Lift / Elevator TCP/IP Control Module with 6A DC12V PSU

LCM16-IP

User Manual

Please read these instructions carefully before operating the unit and keep for further reference.

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Index

Chapter 1 System Overview

1.1 Overview

With the rapid development of high technology, intelligent management has entered people's lives. The modern city is surrounded by high-rise buildings, and the elevator has become an indispensable tool for people to go up and down. The intelligent elevator system is a high-tech product that integrates information management, computer control and smart card technology with IC/ID card as medium. It is possible to control the entrance and exit of the floor, and selectively release or prohibit the personnel who want to enter and exit the floor. It has a variety of functions such as authorization, recording, query, statistics, anti-theft, alarm, etc., and has a very high security capability.

The intelligent elevator management system has provided a scientific, efficient and safe means for the implementation of modern management, and has been widely adopted. It has its own specialties in terms of security, convenience, manageability, applicability, etc. The application fields of intelligent elevator management systems are also becoming wider and wider. It has a wide range of applications in factories, government agencies, intelligent buildings, smart communities, office buildings, hotels, etc., which greatly improves the efficiency of managers and the security level within the management area.

1.2 Intelligent Elevator

- **Convenient**

By authorized card to swipe on the card reader, you can reach the designated floor and it is very easy to use.

- **Adjust permissions at any time**

The intelligent floor management system can adjust its permissions anytime, including opening objects, locations, time, etc., to achieve real-time control.

- **Flexible configuration**

Modular design, choose the corresponding function modules as needed.

- **High security**

The cards in the intelligent system each have an independent key, which cannot be copied. When the card is lost, after reported, the lost card can no longer be used. if the card is found again, the loss can be released and the card can be used again. Each time you use the card to open the door, you can automatically record it, which is convenient for inquiring personnel data about in and out.

- **Multi-purpose**

Except the intelligent elevator management function, the KEYKING smart card can also be used in parking, attendance, consumption and many other aspects, it reduces much investment and costs.

- **Powerful**

Customized for elevator users, integrated with multiple functional modules, fully meet

customer needs.

- **Permission**

When the card is issued, the permission of the card is authorized. After the user enters in the elevator and swipes the card on the card reader, the access control system determines whether the card is valid and has the permission to reach the floor, and automatically select the corresponding floor, and the elevator will go up to the designated floor.

- **Designated floor**

The card user is authorized to reach the designated floor. After the user enters in the elevator and swipes the card on the card reader, the access control system determines whether the card is valid, and the elevator can go to the designated floor without pressing the elevator floor button. Otherwise, button is invalid and the elevator is restricted.

- **Temporary visitor function**

Temporary cards can be issued for visitors. You can set the effective time, the floor, the elevator, and the in-out times .When the temporary visitor leaves, you can cancel the card and cancel the permission of this temporary card.

- **Mutual access function**

The households swipe the card normally, the system is opened to the self-occupied floor (by default). If the household needs to visit other friends in the same building, press the “Re-visit” button after entering the elevator. At this time, the system enters the “mutual access mode” working state,

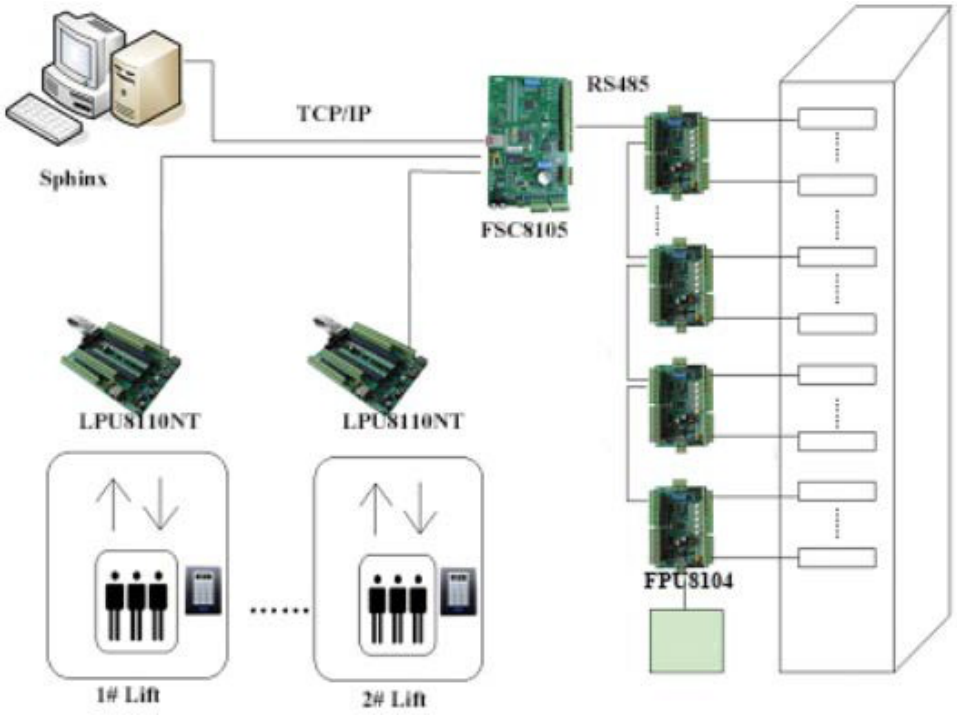
- **Intercom**

When the visitor calls the household, after the household confirmed, the intercom system opens the door, the elevator will be called. On the first floor, a set of floor signals is provided to the main control board. The buttons on the floor are valid. After the vistor enter the elevator, the corresponding floor button can be pressed to drive the elevator to the destination floor.

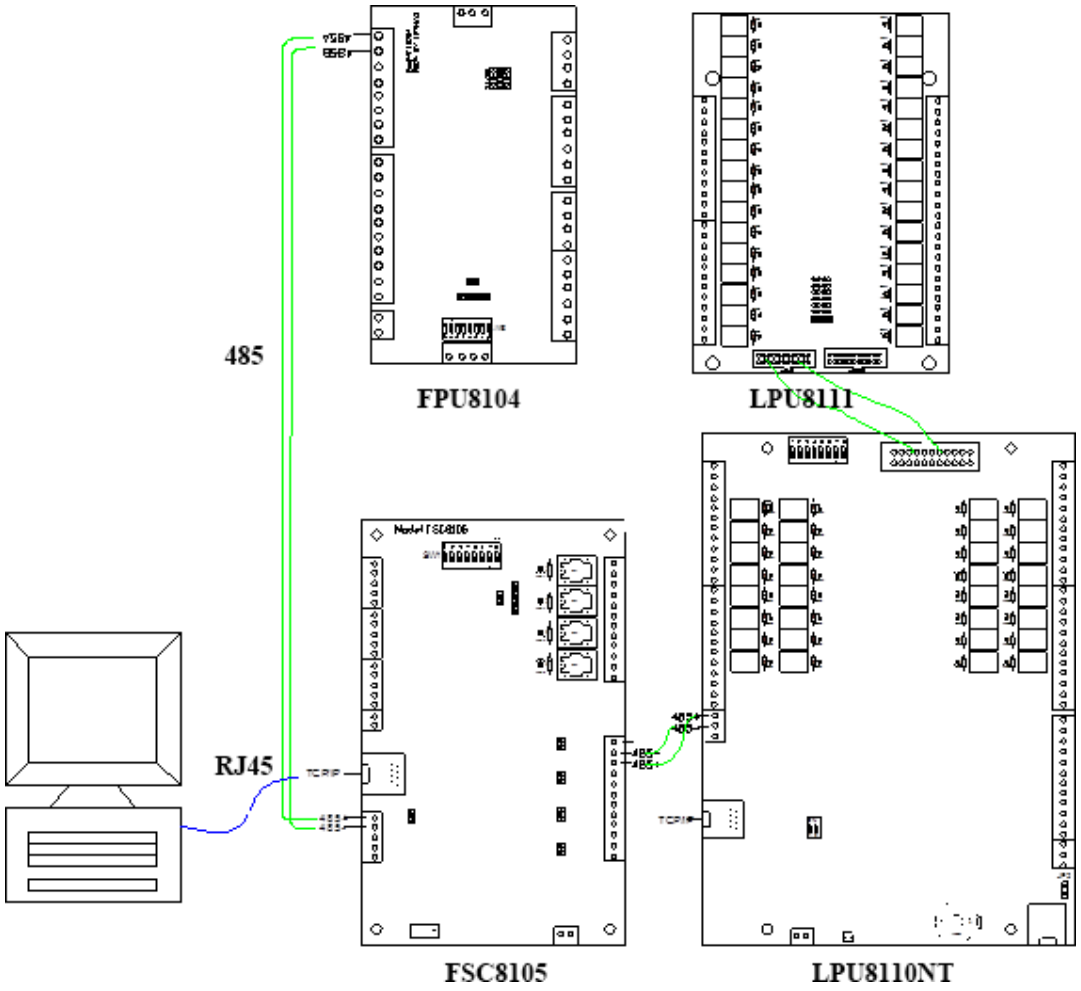
1.3 System components

- Sphinx
- Elevator Controller
- Elevator Expand Controller Board
- FLP8104
- FSC8105
- Reader
- Other accessories, such as printers.

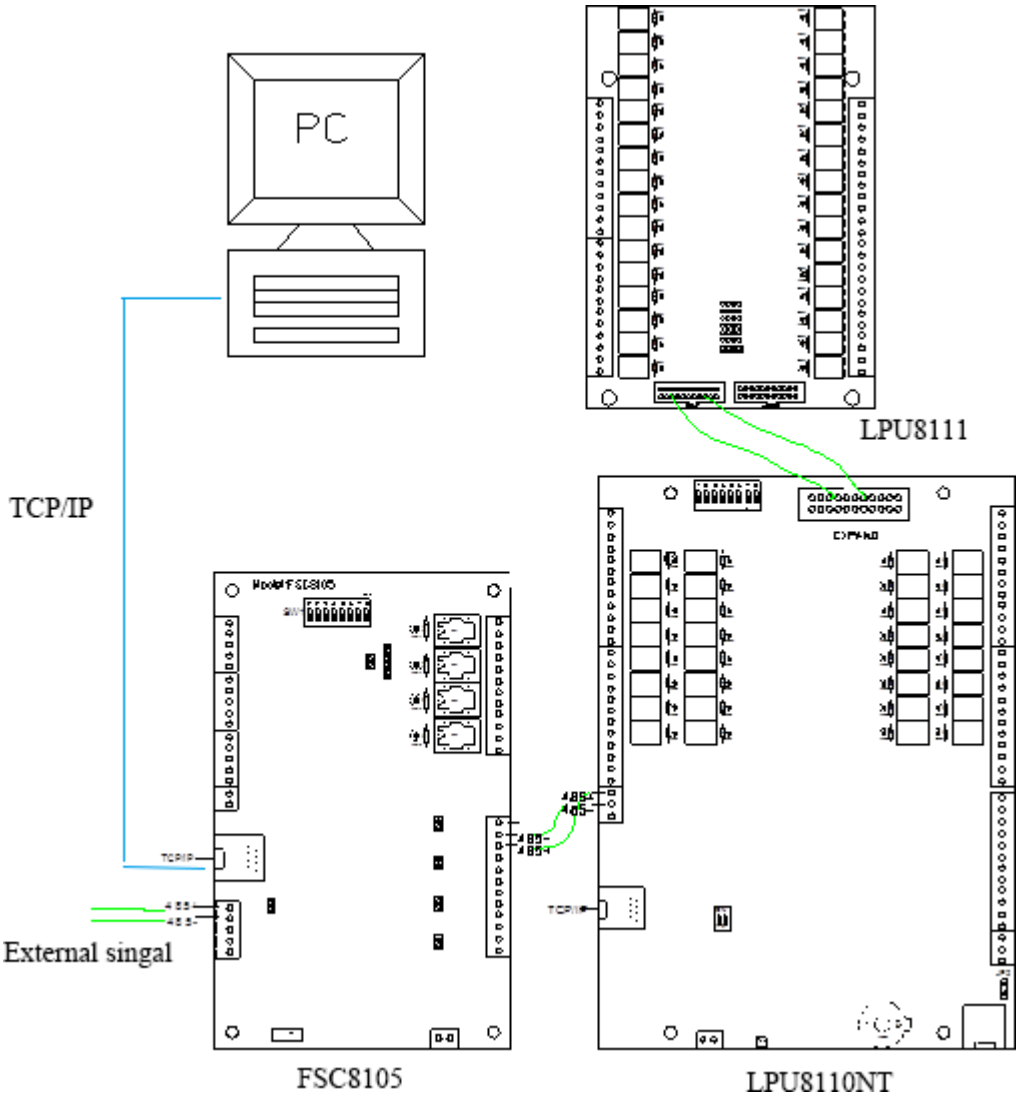
1.4 Diagram


TCP/IP
RS485
Sphinx
FSC8105
LPUS110NT
LPUS110NT
FPUS104
1# Lift
2# Lift

- System wiring



- Wiring diagram when the floor signal is an external signal (such as used for the shidean protocol)



1.5 Application

Elevator control, floor management; VIP cabinet management, cabinet control.

Chapter 2 LCM16-IP Elevator Controller

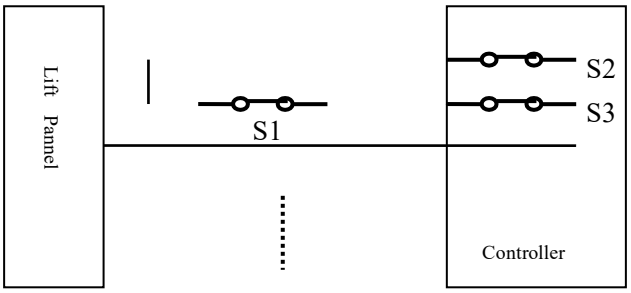
2.1 Overview

The LCM16-IP is the main component of the elevator control system, which can independently control the 16-floors elevator. Each LCM16-IP elevator controller can support seven elevator control expand boards to control 128-floors elevator.

The LCM16-IP main control board works in two working modes: normal mode and mutual access mode, adding a "mutual access" button to each of the elevator cab; the resident swipes the card, and the system opens the self-occupied floor (the default home), This is the "normal mode"; if the household needs to visit other friends in the same building, press the "mutual access" button after entering the elevator. At this time, the system enters the "mutual access" mode.

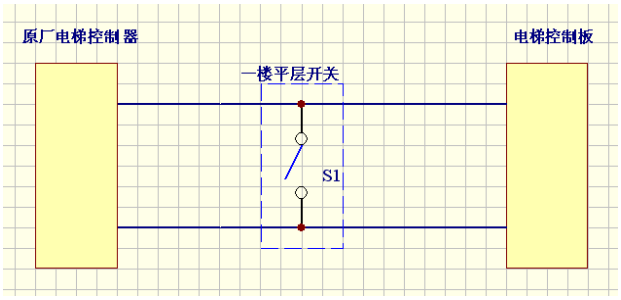
1.Normal mode

As shown in the following figure: the Control of floor buttons (only one floor for example):



In the above picture, S3 is the floor button on the original elevator control panel, S1and S2 are added analog buttons (relay contacts), series S1 is the NC contact of the relay we use, and S2 uses the NO contact.

Due to the needs of the system, the floor collection board also needs to collect the Working status of each elevator. The acquisition method is shown in the following figure.



Since the original control mode or circuit of the elevator has not been changed, even if our

system is powered down or other conditions occur, the elevator can work normally without being affected by the above contact. Of course, we have taken multiple security measures at the same time (such as using a highly reliable switching power supply, adding a clutter suppressor to the input and output ports, using hardware watchdog technology, using highly reliable TCP/IP communication, all communication The data is based on CRC check technology, etc.) to ensure that the system will not drop and crash.

2. Visitor mode:

2.2 Features

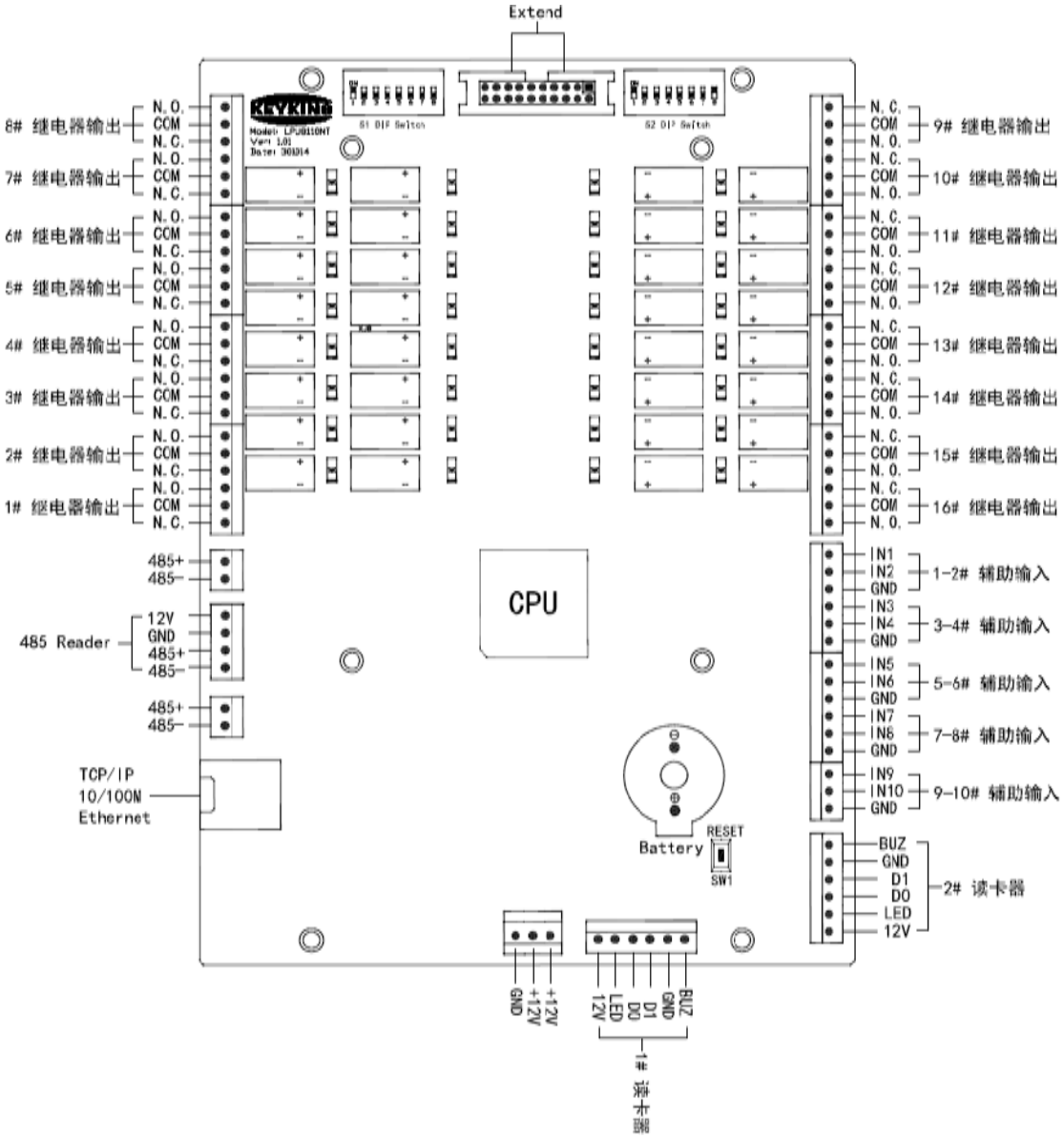
- using RS485 communication, the longest distance can reach 1200m
- Modular design, flexible configuration, easy to upgrade
- Separate design by controller and card reader, high security
- The main control board and card reader adopt RS485 and Wiegand communication modes, and the choice is flexible.
- Wiegand mode is compatible with multiple Wiegand readers on the market
- With backup battery, data will not be lost when power is off, battery is available for 5 years
- Normal mode, mutual access mode. The controller has several working states such as sleep, safety, NO, and NC.
- Programmable linkage control and programmable card reader protocol settings
- Direct control of the status of each output relay
- Relay action time and card interval can be set
- With fire Alarm signal input interface, when the fire switch signal is activated, the elevator system does not work, and the elevator returns to the original state (the fire signal provided by the elevator company should be a passive dry contact signal)
- The system supports offline operation (smart) and flexible networking.
- Main functions: visitor function, mutual access function, call function

2.3 Specification

- CPU: 32-bit microprocessor
- Control floor: 16 floors (expandable to 128 floors)
- Communication method: RS485, TCP/IP.
- Communication rate: TCP/IP communication, rate 100M. RS485: 9600/4800, 1, 1, N
- Inspection method: CRC-16
- Storage event: 100,000
- Support card: 30,000 sheets
- Working voltage: 12VDC, 3A

- PCB Dimension: 20 (L) × 14.5 (W) cm
- Working temperature: -20 ° C to 70 ° C
- Relative humidity: 5% to 95%

2.4 Wiring



2.5 socket define

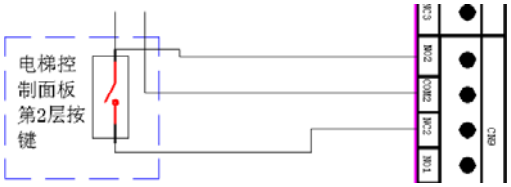
- **PIN definition：**

Socket	Description	Remark

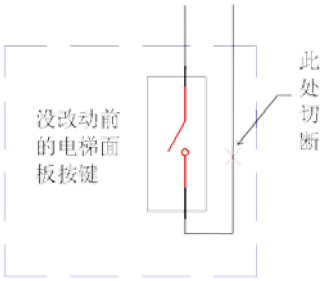
Ethernet	Ethernet	10/100M adaptive
RS485	To RS485 device	customized
RS485 Reader	RS485 Reader	only receive Keyking protocol RS485 card reader
RS485	To PC , Main Communication	Connect to computer or RS485 converter
NC/COM/NO	Output	Connect to floor button
IN 1--10	Input 1# to 10# ,	IN1#---Maintenance switch; IN2#---Fire Alarm; IN3#---Cancel fire Alarm; IN10#---Visit mode
Wiegand	Wiegand reader	
Power , +12V/GND	12VDC , Power	

- **Relay output termination method**

With 16 relay passive outputs (control elevator button with normally closed end), NC1, COM1, NO1 (normally closed, common, normally open)... NC16, COM1, NO16 are relay output ports, elevator control panel LPU8110 and elevator panel buttons Connection method (as an example, only the second layer of the button connection on the panel is listed, and the other floors are connected in the same way).



The elevator panel buttons before changed:



- **Communication input interface**

2 kinds of communication input interfaces, one is 100M TCP/IP, which can directly access the controller through the Internet; the other is RS485, the longest communication distance under the twisted pair shielded wire can reach 1200 meters.

1. TCP/IP

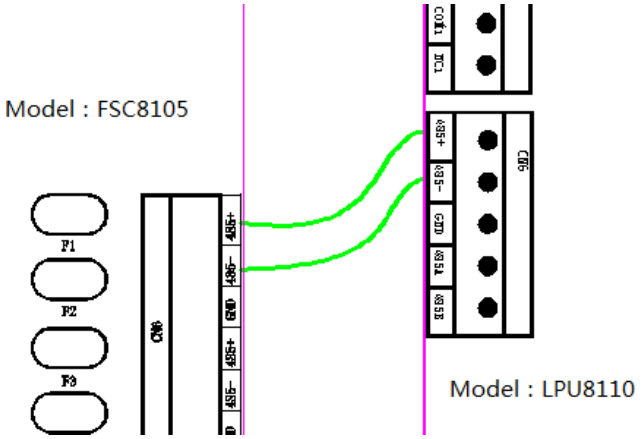
When using the TCP/IP connection method, you can directly connect the controller to a PC or network switch, such as a straight line or crossover cable.

When connecting by TCP/IP, pay attention to configuring the SW2 DIP switch. DP1 and DP2 are defined as follows:

Switch	State	Function Description
DIP 1	OFF	Write protect
	ON	Configurable, writable
DIP 2	OFF	Normal
	ON	Force the IP of converter to default IP 10.1.1.10

2. RS485

When using RS485 communication, it can be used with FSC8105 group controller at the same time. FS8105 communication output terminal 485+, 485- is connected with LPU8110 communication input terminal 485+, 485- respectively. The specific wiring diagram is as follows:



- **Programmable input interface**

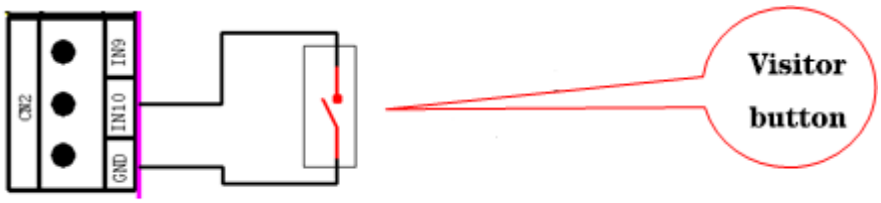
IN No.	Description	Remark
IN 1	Maintenance Switch	When short circuited, the elevator returns to the "out of control" state, and you can press the button without swiping the card.
IN 2	Fire Alarm ,	Once input, the elevator returns to the "out of control" state, you can press the button without swiping the card.
IN 3	Disable Fire Alarm	Once input, the elevator returns to the "normal control" state, you need to swipe the card to press
IN 4--9	Reserved, customer-defined	customer-defined in Sphinx

IN 10	Visitor mode	Short circuit, swipe, select "mutual access

		floor"

With 10 channels of arbitrarily programmable input points, the system defaults to 4 groups for fixed functions as follows:

1. A set of maintenance switch inputs (IN1): All floors can pass when the maintenance switch has a signal, until the maintenance switch signal disappears and the controller returns to normal operation.
2. A set of fire switch trigger input (IN2): When the fire switch is triggered, all floors can pass until the fire switch is triggered or the controller is reset to resume normal operation.
3. A group cancels the fire switch trigger input (IN3): When the fire switch is canceled, the controller returns to normal operation.
4. A group of visitor mode selector switch (IN10): Press the button connected to the LPU8110 board IN10 and then swipe the card to the guest mode. After swiping the card, press all authorized floors. If you do not press this button to swipe, it is in normal mode (ie, home mode). The system actively opens the only self-occupied floor (the self-occupied floor number is set in the PC software)



2.6 DIP Switch

- **Switch S1（Unit ID）**

The DIP switch S1 has a total of 8 bits. The first 1 to 7 bits are the address of the DIP switch, and the DIP8 is the initialization switch. Power off or pressing the reset button will cause the parameter to initialize.

DIP Switch	Description	Remark
DIP 1--7	Unit ID	$M = N*2^0 + N*2^1 + N*2^2 + N*2^3 + N*2^4 + N*2^5 + N*2^6$, N=0 or 1
DIP 8	reset : OFF--Default ON-- Reset	Clear data, initialization

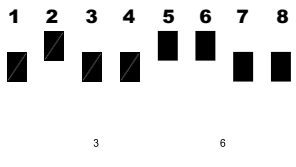


Figure 2-1-5 DIP Switch 1

DIP	1	2	3	4	5	6	7	8

ID									
1	ON							STATUS	RESET
2		ON						ON	COLD
3	ON	ON							
---	--	---	---	---	---	---	---	OFF	HOT
127	ON	ON	ON	ON	ON	ON	ON		

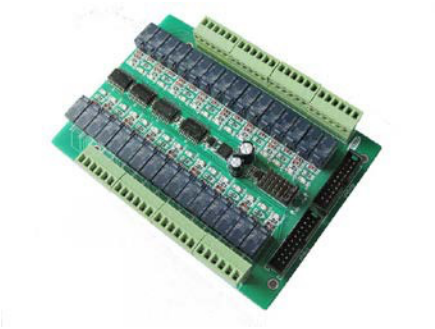
- **Switch S2（Function）**

S2 or Dip Switch 2 is the 2nd dip switch on the controllers, The functions for Dip Switch 2 are below:

Switch	State	Description
DIP 1	OFF	Write protect
	ON	Configurable, writable
DIP 2	OFF	Normal
	ON	Force the IP of converter to default IP 10.1.1.10
DIP 3	OFF	
	ON	
DIP 4	OFF	TCP/IP
	ON	RS485 communication, or offline mode (TCP/IP is not available in this mode)
DIP 5	OFF	6611K Clock synchronization, no RS485 card reader enabled
	ON	enabled RS485 card reader
DIP 6	OFF	
	ON	
DIP 7	OFF	Disable Supervisor four-state detection
	ON	Enable Supervisor four-state detection
DIP 8	OFF	Disable WDT
	ON	Enable WDT

Chapter3 Elevator Expand Controller Board

3.1 Overview



The elevator control expansion board is used with the LCM16-IP elevator controller to expand the number of elevator control floors. Each additional elevator control expansion board can increase the number of elevator control levels of 16 floors.

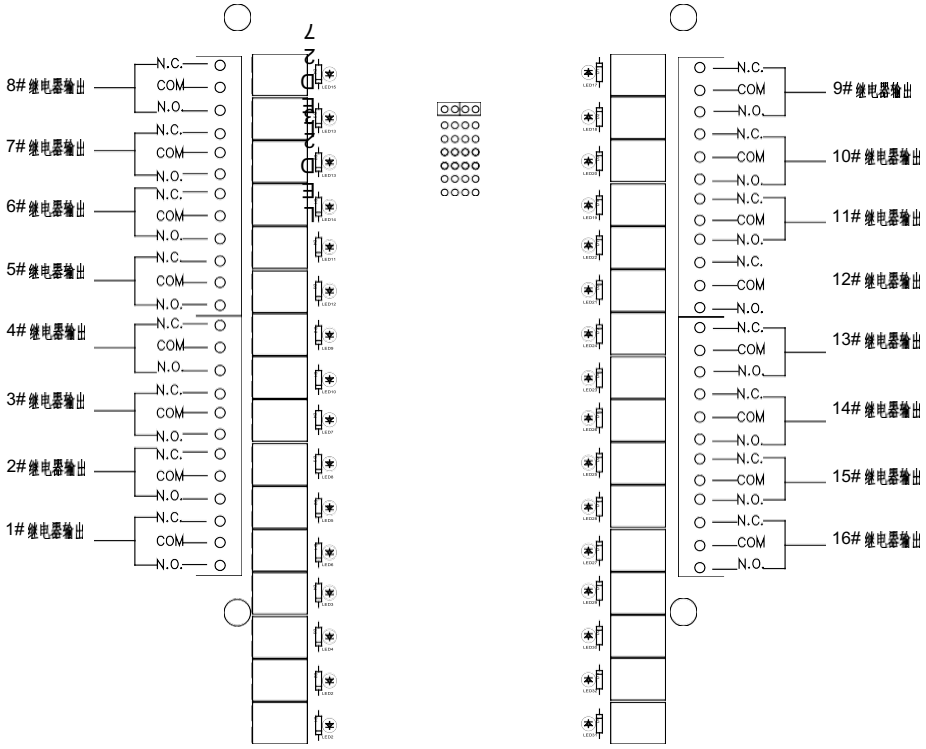
3.2 Features

- ELEVATOR CONTROL EXPAND BOARDS cannot be used independently and can only be used together withLCM16-IP
- Each expansion board can control 16-floors
- Relay output: 32 groups
- Check in through the LCM16-IP
- The relay of the expansion board can be directly controlled by the LCM16-IP
- The status of each point is the same as the relay of the motherboard LCM16-IP

3.3 Specification

- Extended floor: 16 floors
- PCB Dimension: 14 (L) × 10 (W) cm
- Working voltage: 12VDC, 3A
- Working temperature: -20 ° C to 70 ° C
- Relative humidity: 5% to 95%.

3.4 wiring



3.5 socket define

- **Relay output interface**

  32 relay passive outputs。

  NC1，COM1 … NC16，NO16，COM16

- **Expansion board diagnostic interface**

  2Pin expansion board interface

  INPUT is the power/signal input, OUTPUT is the expansion board power/signal output

- **Expansion board extended interface**

Ex1...7 is the extension position selection end of the expansion board (short connection is valid), Ex1 is 17...32 layers, Ex2 is 33...48 layers... and so on, up to 7 ELEVATOR CONTROL EXPAND BOARDS can be extended, each expansion board can Control 16 layers.

CS1...7 is the signal control end of the expansion board (short connection is valid), and must correspond to Ex1 7. After this terminal is shorted, the relay of the expansion board can work.

Chapter 4 FLP8104

4.1 Overview

The FPU8104 floor collector combines the new building intercom technology to develop a smart elevator management system that collects user floor signals and elevator operating status through high-speed optocouplers, enabling visitor functions and control and management of temporary use of temporary elevators.

The system allows the visitor to reach the tenant floor without the use of a card or remember password without the need for a resident permit, and cannot enter other floors. Residents still use the IC card elevator in the form of internal personnel level control: swiping the card or entering a password. When the guest visits, the intercom system is used to call the resident. The resident agrees that the unit door can be opened by the intercom extension, and the elevator floor collector can also send the signal that the guest can go to the floor. When the elevator goes down to the bottom, the guest enters the elevator. After that, according to the authorization of the owner, press the button of the floor where the resident lives, and then register to start the elevator, while other unauthorized floors, the visitor cannot log in.

4.2 Features

- Floor signal collection
- Elevator control status collection
- Each board can be used for 10 floors of elevators. Each additional expansion board can add 10 floors. With the above control panel, it can efficiently manage and control 128-story elevators.
- Connect 16 floor collectors
- 1 set of relay contact output
- 4 sets of extended signal input

4.3 Parameters

- CPU: 8-bit microcontroller CPU
- Power supply: 9-12VDC
- Communication: RS485
- Inspection method: CRC
- Working temperature: -20 ° C to 70 ° C
- Relative humidity: 5% to 95%

4.4 Wiring diagram

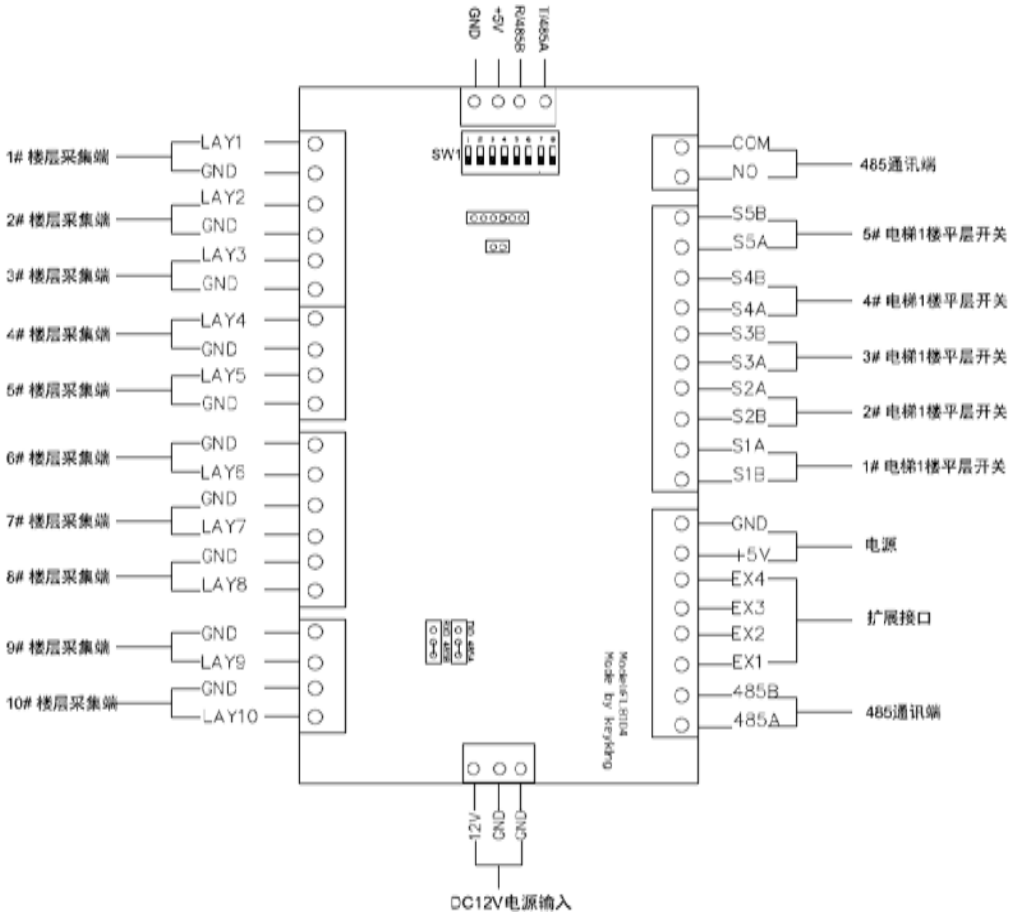
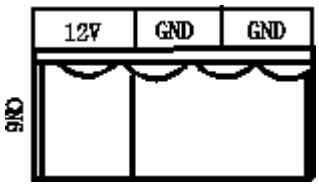


Figure 4-1 FPU8104

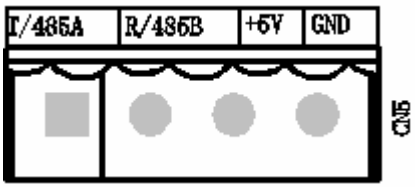
4.5 Sockets

- **power**

FPU8104 uses DC12V power input, and has DC5V power output



DC12V input



DC5V power output

- **DIP setting**

The FPU8104 DIP switch consists of 8 bits, of which the first bit is used for the host and the attached machine, the 2nd to 5th bits are used to set the host and the attached address, and the 6th to 8th bits are reserved.

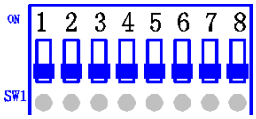


Figure 4-2 FPU8104 DIP

The SW8 of the FSC8105 DIP switch should be selected to OFF (as shown below), and the FPU8104 DIP switch SW1 should turn OFF.

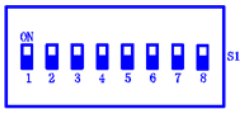


Figure4-3 FSC8105 SW8 OFF

FPU8104 DIP Switch：

DIP	status	Function Description
DIP 1	OFF	host
	ON	Attached
DIP 2-5	OFF	Number of attached machines, OFF is 0
	ON	Number of attached machines, OFF is 1
DIP 6-8	OFF	reserved
	ON	

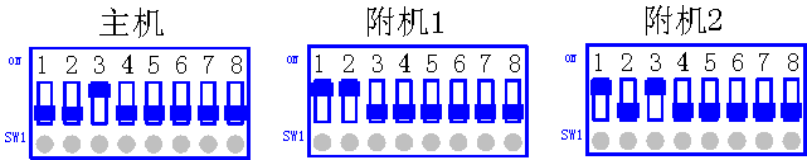
- 1： OFF-host，ON- Attached。
- 2-5：The number of attached machines, up to 15 attached
- 6-8：NC

- **FLP8104 address 1-15 decimal number and binary number**

Decimal	binary	2→5 DIP			
		2	3	4	5
1	1	ON	OFF	OFF	OFF
2	10	OFF	ON	OFF	OFF
3	11	ON	ON	OFF	OFF
4	100	OFF	OFF	ON	OFF
5	101	ON	OFF	ON	OFF
6	110	OFF	ON	ON	OFF
7	111	ON	ON	ON	OFF
8	1000	OFF	OFF	OFF	ON
9	1001	ON	OFF	OFF	ON
10	1010	OFF	ON	OFF	ON
11	1011	ON	ON	OFF	ON
12	1100	OFF	OFF	ON	ON
13	1101	ON	OFF	ON	ON
14	1110	OFF	ON	ON	ON
15	1111	ON	ON	ON	ON

Note: The attached machine address starts from 1 and needs to be the same as the number of

machines that set by the host. For example, if one host has 2 attached machines, the host is set to 2 (converted binary 10), and the attached machine address starts from 1. Setting as the following picture



- **Communication**

The communication between FPU8104 and group controller FSC8105 adopts RS485 communication mode;The communication between host FPU8104 and attached machines also uses RS485. The following figure shows the wiring method of FSC8105 and one main two attached FPU8104 board:

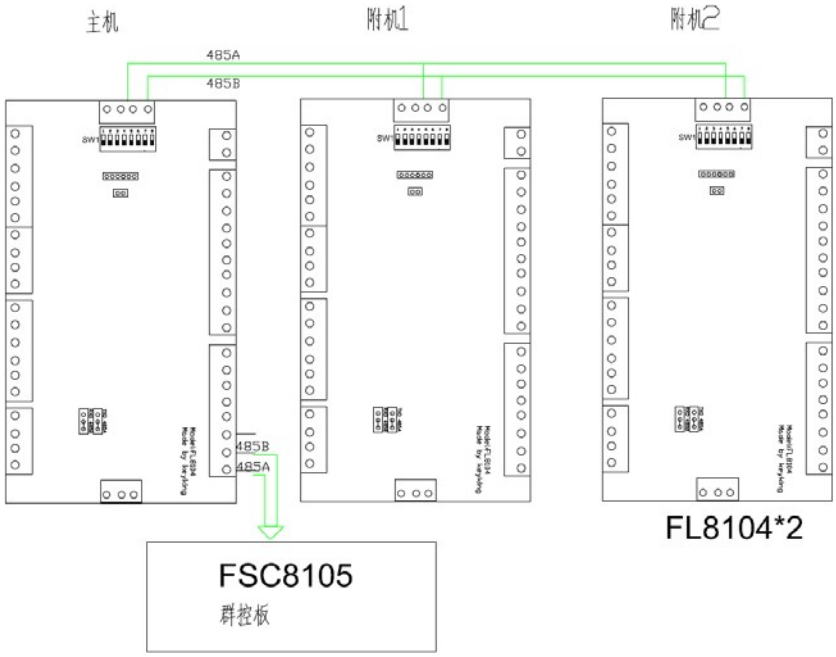
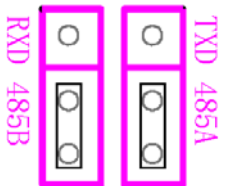


Figure 4-4 wiring

FSC8105 group control board 485+, 485- respectively connected with floor collector host 485+, 485-, FSC8105 host T/485A, T/485B and attached machine T/485A, T/485B corresponding connection, attached machine and attached machine T/485A, T/485B corresponding connection.

- **Jumper settings**

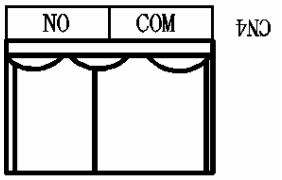
when the host and the attached machine used at the same time, and the communication distance exceeds 100 meters, in order to increase the communication signal, it is recommended to short the 485 jumper, and the following jumper is selected to the 485 state shorting diagram:



Under normal situation, the TX1 and RX1 indicators on the FPU8104 board are flashing rapidly, and there is no alarm sound.

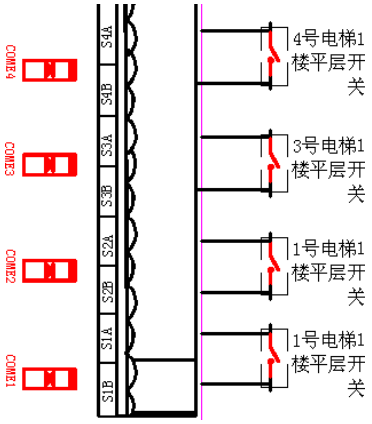
- **Relay input**

In order to facilitate the docking of the building intercom and the intelligent elevator system, a set of relay switch signal input (NO, COM) end is provided for the floor collector to connect the intercom host signal.



- **switch（S1B，S1A）**

The FPU8104 detects the leveling signal of the first floor. If the elevator is on the first floor, the corresponding LED will light up.



Functional test: After connecting the line according to the above figure, short the LAY1 and GND of FSC8104, then connect the board S1A to 12V+, S1B to 12V-, (ie simulate the elevator to the first floor), at this time the first floor layer of the elevator control board LPU8110 is turned on. At the same time, the host computer has an event display.

- **Lay collection (LAY1-10)**

FPU8104 has 10 sets of floor signal acquisition and output terminals, LAY1, GND, LAY2, GND...LYA10, GND is 10 sets of switch signals, which are connected with the intercom extensions on 1-10 floors.

Chapter 5 FSC8104

5.1 Overview

If there are multiple elevators at the same time, mutual coordination and data exchange will be an inevitable problem. So we have developed a smart elevator management FSC8105 group controller. It is used as a communication coordination between various devices and as a bridge for communication with the host computer; when the upper computer is absent, it automatically plays the role of the upper computer and completes some functions of the upper computer.

The group controller is the dispatching unit of the elevator controller and is responsible for the information transmission and communication of each component. Each group of elevators (each unit) requires a group controller, and each group controller can control up to 4 elevators.

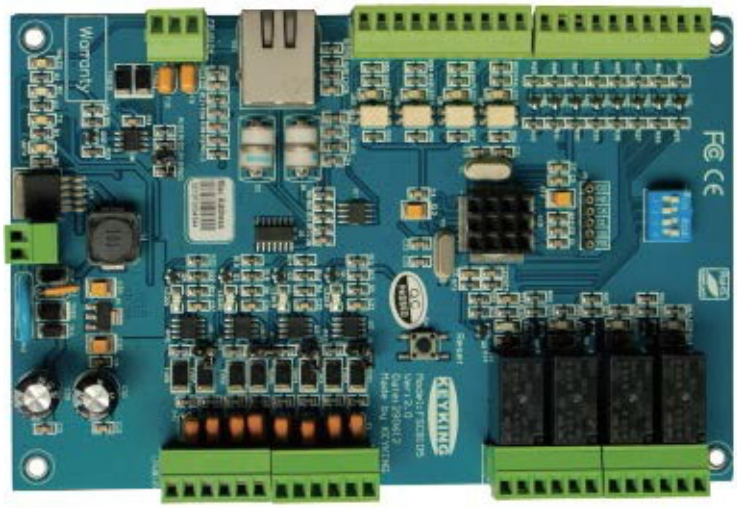


Figure 5-1 FSC8105

5.2 Features

- The group controller is the dispatching unit of the elevator controller, responsible for the information transmission and communication of each component.
- Each group of elevators (each unit) needs a group controller
- Upper communication interface: TCP/IP interface, 100M base
- LPU8110 interface: can connect 4 RS485 buses, each bus can be connected to LPU8110 elevator controller, wiring is more convenient
- FSC8104 interface: on a separate RS485 bus, you can connect 127 FPU8104 floor signal collectors
- Video intercom input interface: support RS232/485 floor information input signal, at this time, the FPU8104 floor signal collector can be omitted.
- Elevator in-position detection terminal, accurately know the location information of each elevator
- Extended input port for convenient function expansion
- 4 sets of C-type auxiliary relays, easy to extend functions

5.3 Parameters

- CPU: ARM® CortexTM-M3 32-bit controller
- Power supply: 12VDC
- Communication method: RS485, TCP/IP
- Rate: 9600bps,
- Transmission distance: 1.2Km (at 100Kbps)
- Working temperature: -20 ° C to 70 ° C
- Relative humidity: 5% to 95%

5.4 Wiring diagram

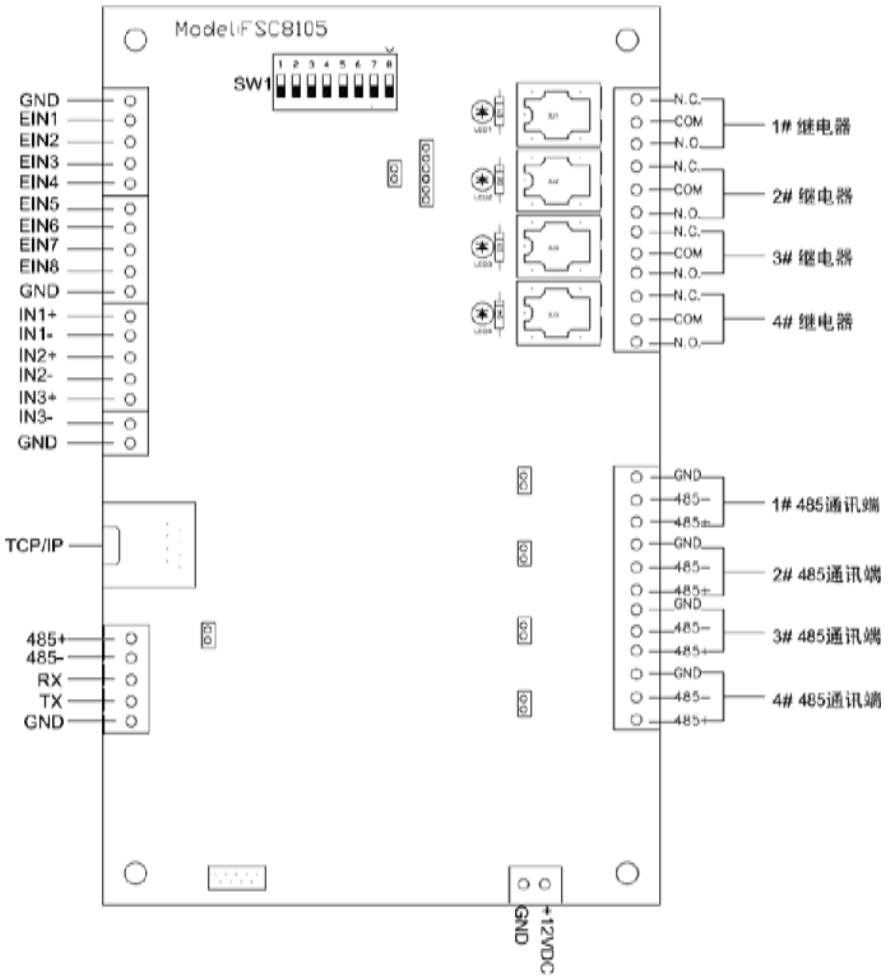


Figure 5-2 FSC8105

5.5 Sockets

- **DIP**

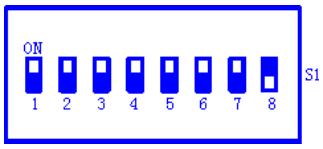
The FSC8105 DIP switch consists of 8 bits：

Switch	Status	Function Description
DIP 1	OFF	Write protect

	ON	Configurable, writable
DIP 2	OFF	Normal
	ON	Force the IP of converter to default IP 10.1.1.10
DIP 3	OFF	External watchdog invalid
	ON	External watchdog is valid, recommended (more stable)
DIP 4	OFF	Normal
	ON	Reset the converter
DIP 5	OFF	Set visitor time / 60 seconds
	ON	Set visitor time / 120 seconds
DIP 6-7		Reserved
DIP8	OFF	FPU8104
	ON	shidean floor protocol

The time setting on sw5 is the total time from the start of the visitor to the elevator. It is 60 seconds when it is OFF, and 120 seconds when it is set to ON. It is based on the distance between the gate and the elevator.

The SW8 of the FSC8105 is set to ON, the rest is set to OFF (as shown in the figure below), At this time, the shidean protocol is used。



- **Switch**

The FPU8105 detects the leveling signal of the first floor. If the elevator is on the first floor, the corresponding LED will light up.

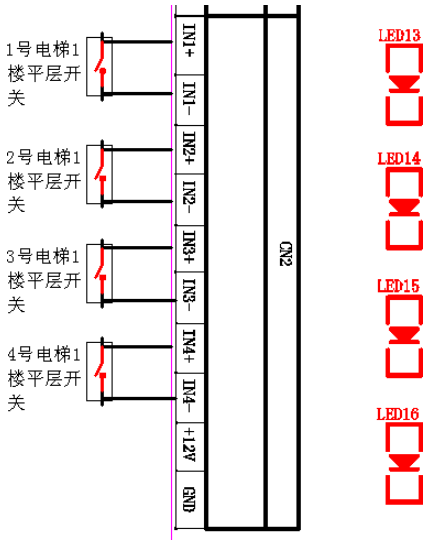


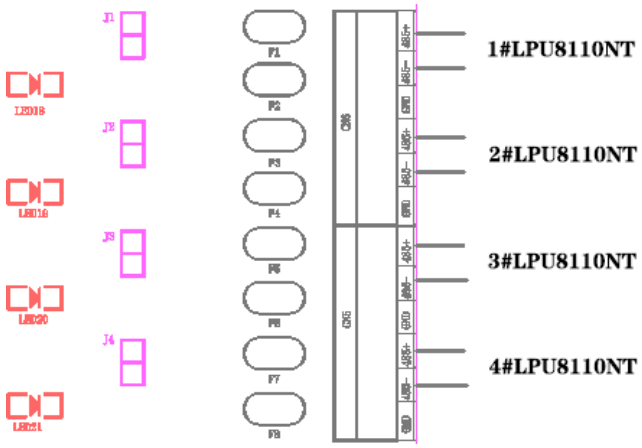
Figure 5-3 first floor signal

- **Communication**

a) 4-channel 485 input

Following picture is wiring diagram between FSC8105 elevator group controller board and

the controller board LPU8110, in which, J1-J4 is corresponding with 485 channel's 120 Ohms resistance jumper, LED18-LED21 is corresponding with 485 channel communication indicator.



b) 1 channel 485 external floor signal input

c) 2 channel RS232 input COM0（RX0，TX0，GND）COM1（DB9）

d) 1 channel ETHERNET output

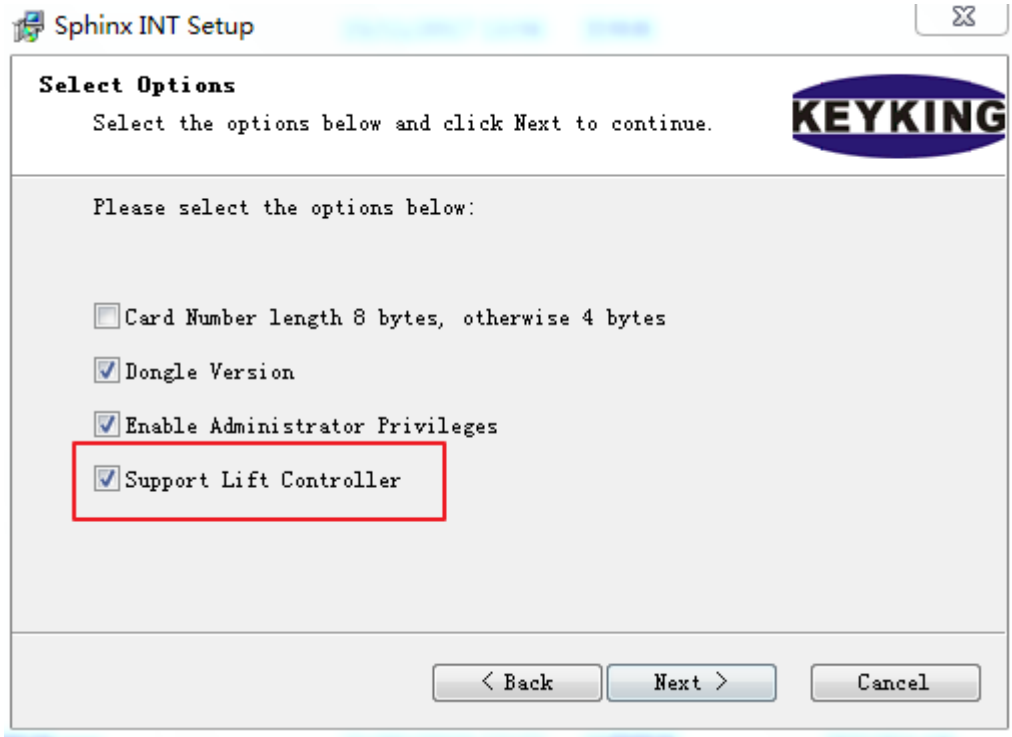
- **Extended interface**

  4- channel relay expansion interface（NC1、COM1、NO1… … NC4、COM4、NO4）

  8-channel EIN expansion interface（EIN1… … EIN8，GND）

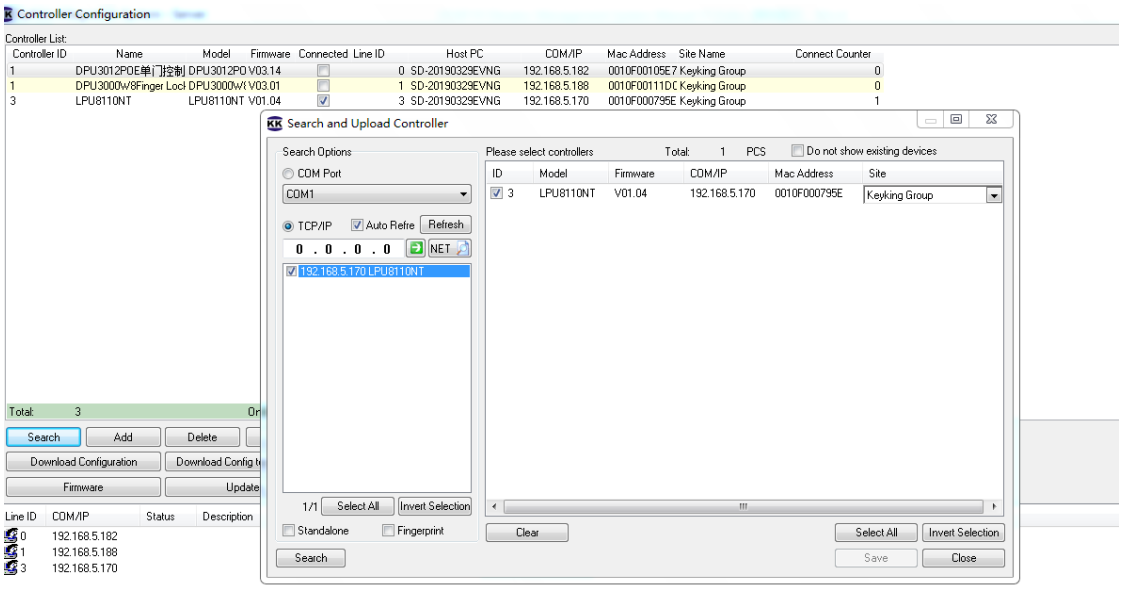
Chapter 6 Operation in sphinx

Make sure the installation of sphinx with Lift controller.

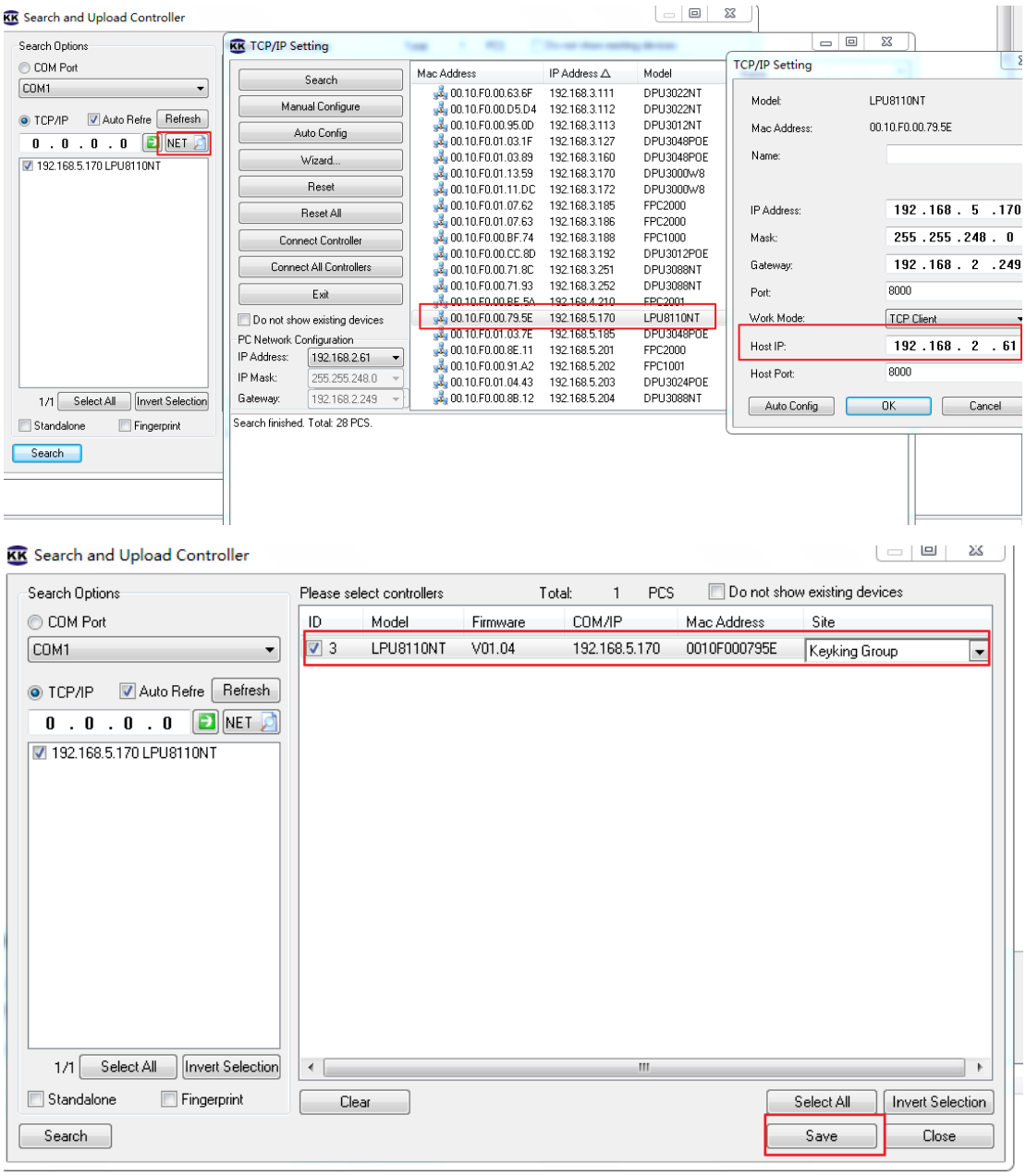


（1） Add device in sphinx,

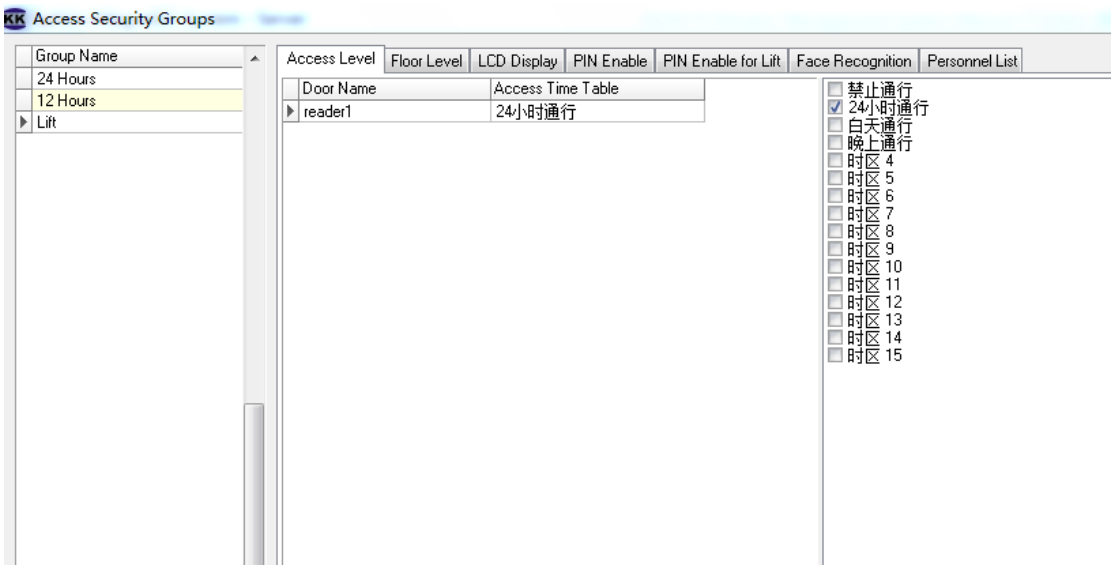
Setup---hardware---controller configuration---search



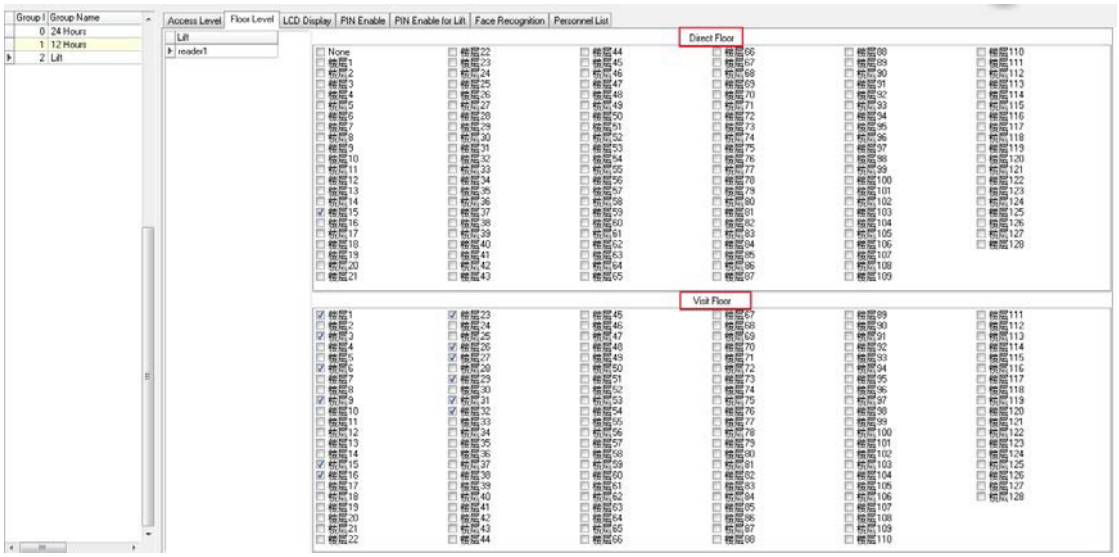
(2) click  to search controller,then configure and save.



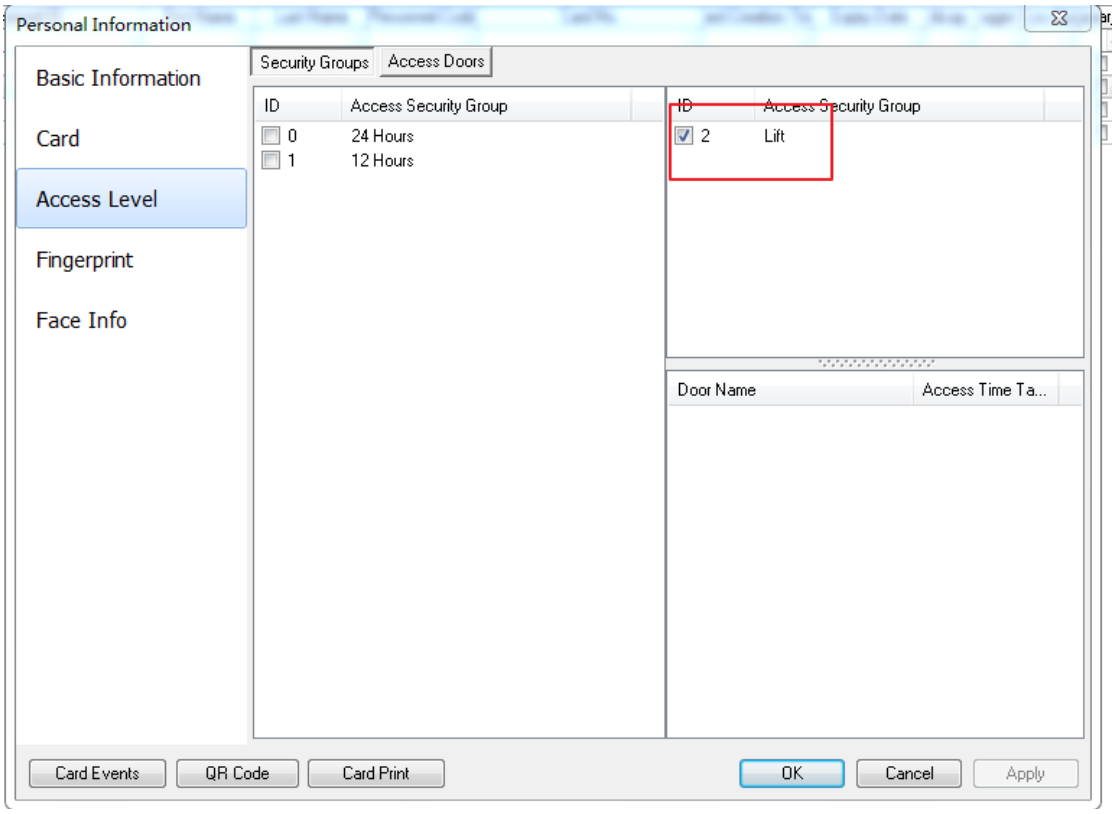
(3) Add permission in **security groups,**



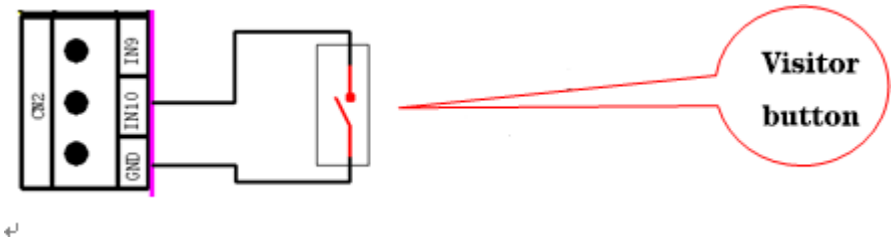
Also can set the floor level .**Direct floor** and **visit floor**



(3) Add permission in **personal list**



(4)If you want to use visitor mode ，please short IN10 and GND



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