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Group Control Board SM-GC

Instruction Manual

编　号：**PrAB-GC**

版本号：**V10**

编　制：_____

批　准：_____

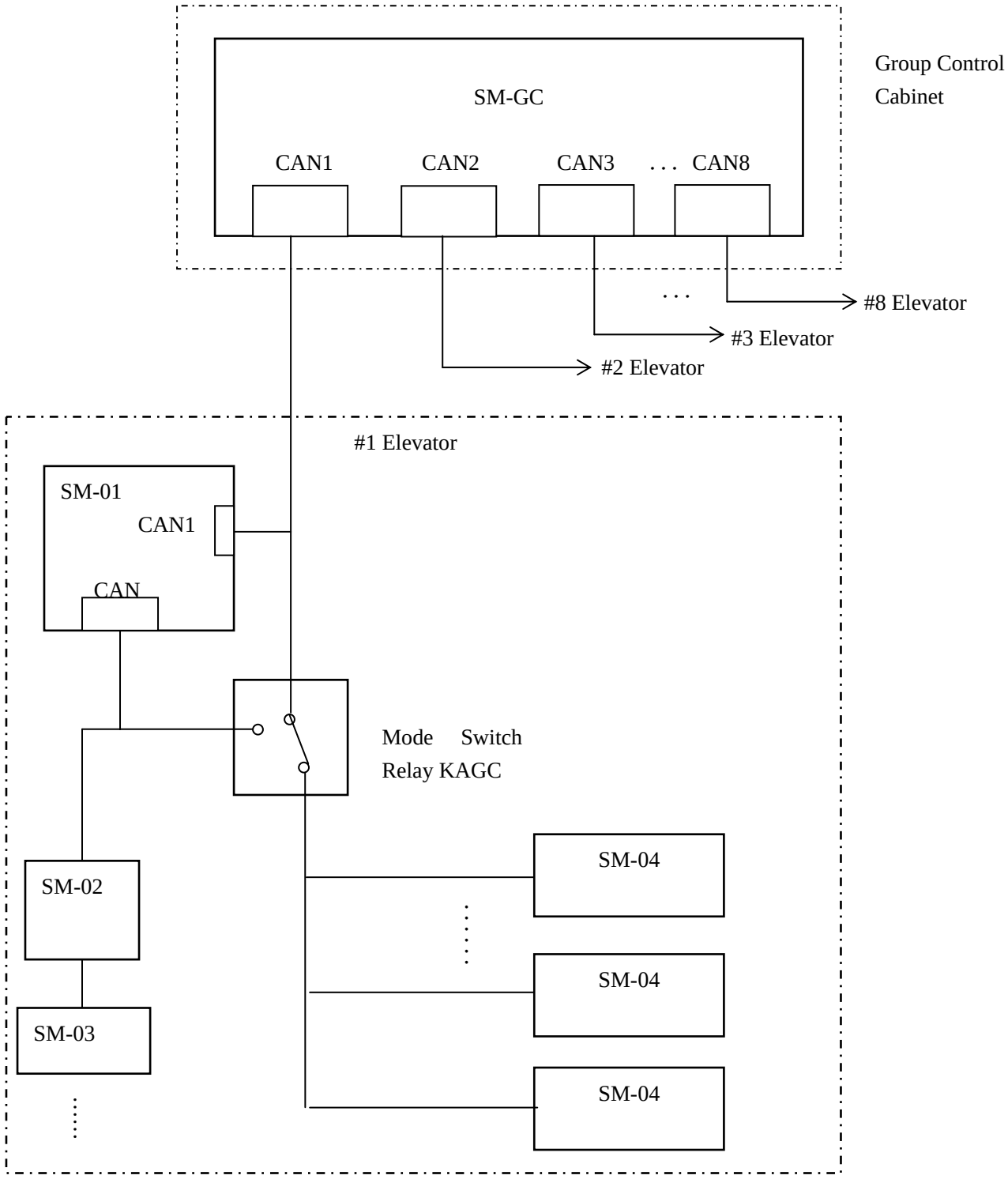
Shanghai STEP Electric Co., Ltd.

2004 年 11 月 18 日

Smart Comll Group Control System Instruction

1、System Structure

Each group control system need a group control cabinet, whose core part is group control board SM-GC. SM-GC communicate with each elevator control board SM-01 in group control system through CAN BUS, and arrange the car call to these SM-01s to make the all system run efficient. System structure is shown as blow:



2、Basic Feature

1、 Smart ComII group control system use centralized-control technology, which means system arrange and dispatch hall call by a special control board. To minimize the waiting time, group control system analyses very situation including floor height, car call and hall call situation, overpass situation and reverse direction situation to dispatch hall call to the elevator which can response fast. Group control system can increase the efficiency of the elevator.

2、 Smart ComII group control system can control 4 elevators at the same time, the max floor number of each elevator is 48. **Note: when there are 3 or 4 elevators in the group control system, it is necessary to add a extension board.**

3、 Group control board use CAN BUS to communicate with elevator control board, which assure the credibility and the speed of data transfer.

4、 Group control system has back up protection function. If group control system has any problem, it will cutoff the power supply. The elevators in the group control system can run normally as single mode. When the group control system recover to normal, all the elevators in system will transfer to group control mode automatically.

5、 Group control system can cutoff the fault elevator. If the system find the elevator which has received the hall call does not response, the system will cutoff this fault elevator and re-dispatch the hall call to assure the users won't wait a long time.

6、 If elevator control board runs normally, the hall call is send to group control board from elevator control board. The group control system then send call register signal to call controller through elevator control board to light the call button. If elevator control board is power off, the group control system will communicate with call controller directly to assure call controller still have effect in the system.

7、 There are LEDs on the group control board, users can monitor whether the communication is normal through these LEDs. Input ports also have LEDs to indicate the ON/OFF situation.

3、Main Functions

1、 Homing function: In group control system, if there is no elevator at home base and the elevator which can back to home immediately has no hall call and car call register, then the elevator will homing at once and standby with door closed, which can improve the home base carrying capacity.

2、 Dispersion standby function: When all elevators in the system have standby for one minute, group control system start the dispersion standby function: **a.** if there is no elevator at home base and the floor below home base, system will send an elevator which can reach home base most easily to home base and standby with door closed. **b.** If there are more than two elevators running normally and there is no elevator above central floor, the system will send an elevator to the up standby floor with door closed.

3、 Up peak service: When this function is chosen, system will start up peak service if the up running elevator from home base has more than three call register at up peak time(set by time relay or manual switch). At this time all elevators in the system will back to home base as soon as finish response the hall call and car call. System will recover to normal, when the up peak time passed.

4、 Down peak service: When this function is chosen, system will start down peak service if the down running elevator to the home base has full car situation at down peak time (set by time relay or manual switch). At this time all elevators in the system will back to highest floor as soon as finish response the hall call and car call. System will recover to normal, if the down peak time passed or there is no full car situation for two minutes.

5、 None service floor control function: SMART COMII group control system has preinstall two service floor schemes for user. User can use switch to select(or use time relay to select). When switch set to ON, system will run as the scheme which is set by users. Users can appoint which elevator to response hall call at which floors, also can appoint elevator to response up call or down call.

6、 Group split function: When this function is chosen, the group split switch is enabled. When the switch set to ON, group control system split into two independent group control system which is set by users. When the switch is set to OFF, system is set to normal group control.

7、 Emergency power running mode：When there is a sudden power cut and need to use back up power, it is necessary for user to choose this function. Considering

the back up power capacity, system will let the elevator back to home base one by one and standby with door open. User should set for each elevator whether it can run in emergency power situation. When all elevators have back to home base, group control system will run in two modes. The first is manual mode. After all elevators have back to home base, user use switch to choose the elevator which can go on running in the elevators which are authorized to run in emergency power situation before. The second is auto mode. When all switch is OFF, system will transfer to auto mode. In auto mode, system will choose one elevator in the elevators which are authorized to run in emergency power situation before to run normally. The elevator which has smaller elevator number has the higher priority. And another thing user should pay attention is that there is a power pre-transfer input on the group control board. It has two main functions. One function is to prevent elevators to stop suddenly when power transfer from backup mode to normal mode, which means close pre-transfer switch a short time before power transfer to normal mode and open the switch when power finish transfer and all the elevators stop. The other function is to test emergency power running mode, as the former function pre-transfer switch will be closed a short time before power transfer to normal mode. So when pre-transfer switch is set to ON, all the elevators in group control system can not register car call or hall call(the call which has been registered will be cancelled), if the elevator is running, it will park at the nearest floor and stop with door opened. Elevator will turn back to normal when pre-transfer switch set to OFF.

4、Input signal of hall call and control of hall call button light

In normal situation, elevator control cabinet is power on, mode switch relay(KAGC)is closed. SM-04 send the hall call signal to SM-01 through CAN0 port, and SM-01 send the hall call signal to SM-GC through CAN1 port. SM-GC send the button control signal back to SM-01 through CAN1 port, then SM-01 send the signal to SM-04 to control the button light. If some elevator is power off, the normal close relay(KAGC) will open, and SM-GC can communicate directly with SM-04. In another word, SM-GC can receive the hall call signal from SM-04 and send button control signal to SM-04 directly.

5、principle of hall call arrangement

In group control system, SM-GC process the hall call’s register and cancel. SM-GC

will calculate the score for each elevator to response the hall call button and give hall call to the elevator which has highest score.

To minimize the user waiting time, group control system set the principle as blow:

1、 Distance punish

According to the distance between the hall call floor and the elevator, there is a punish score. Normally, one score for one floor, if the floor is higher than normal the score could be two or three.

2、 Reverse direction punish

According to forward direction priority, set a reverse direction punish score, the principle is show as follow:

a、 Down call above elevator or up call below elevator, will get three to eight punish score.

b、 If elevator is running upward and there is no car call or up hall call above, then give the down hall call below the elevator three punish score. As the same, if elevator is running downward and there is no car call or down hall call below, then give the up hall call above the elevator three punish score.

3、 Car call or hall call punish

It will take an elevator some time to response the car call or hall call. If there is any car call or hall call registered between the elevator and the new hall call, each call which is registered will get three punish score.

4、 Overpass punish

To increase efficiency of the elevator and prevent overpass situation, there is an overpass punish when calculate the score. Normally, when there are more than two elevators running in the same direction, the elevators which are not in the first position will get eight punish score to the forward hall call.

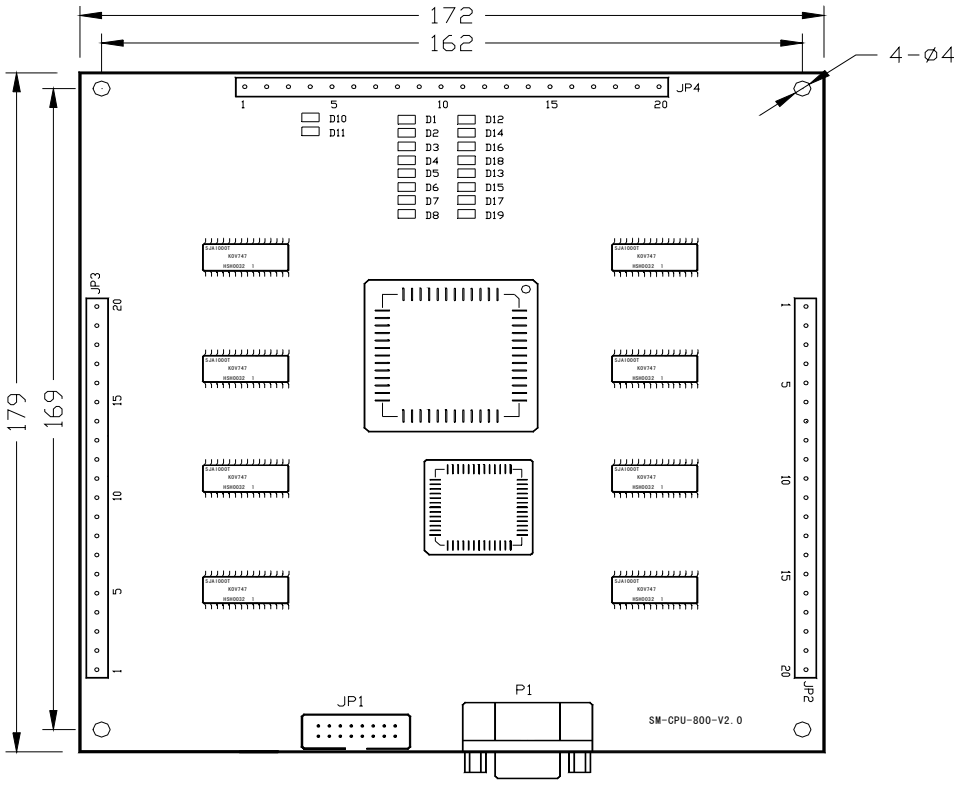
6. Treatment in special situation

When some elevator in the group control system can not run normally, system will cut off the elevator from group control and send the call signal to the rest elevators.

IF there is some error occurred in SM-GC, SM-01 will transfer to single mode automatically after it confirm the situation.

7. The Declaration of Group Controller(SM-GC)

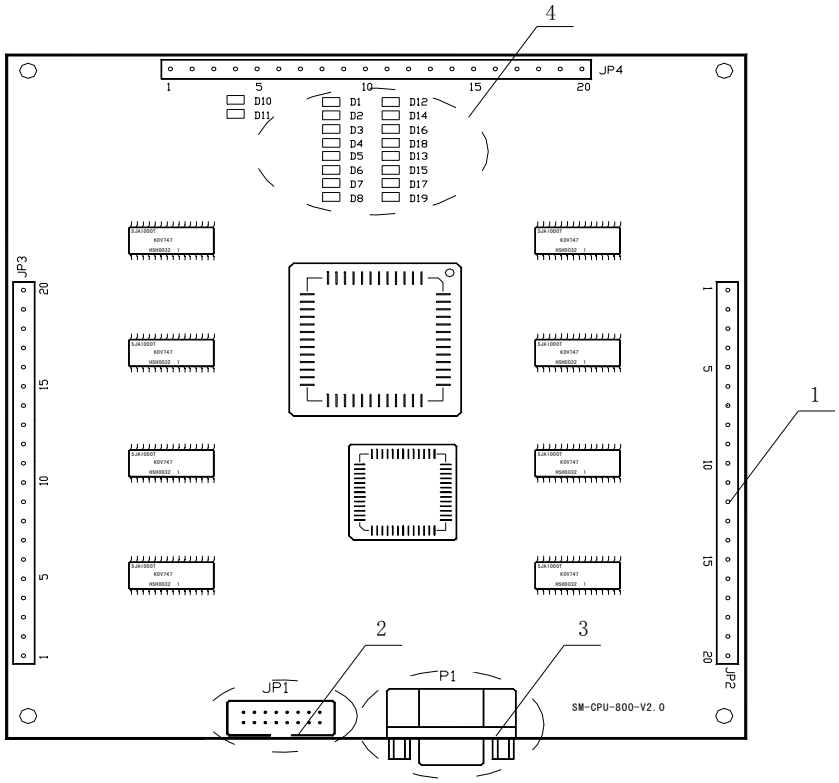
7. 1 The Configuration of Group Controller



Material: FR4 Epoxy

Board thickness: 2.0mm

7. 2 Introduction of Ports



The specific ports introduction is as follows:

No.	Name	Use	Note
1	JP2、JP3、JP4	Wiring Port	
2	JP1	Program Port	
3	P1	RS232 Monitor Port	
4	Di	Indicator Light	

7. 3 Electrical Character

♦ Switched Input

Total Input			8（insert and pull port）
Input Type			Photoelectric coupling
Input Voltage	Rating		24VDC
	Signal “1”		12~24VDC
	Signal “0”		0~5VDC
Input Current	Signal “0”		0~2mA
	Signal “1”		4~7mA
Insulated Port			1
Delay	Standard		10ms
Input Frequency	Standard		1KHz
Length of electric cable	Standard	Mask	400 M
		Unmask	200 M

♦ Communication Port

Connection Port Type	WAGO
Signal Type	Differential Voltage
Communication Mode	CAN
The Maximal Delay of Communication	10ms

7. 4 Input and Output Port Definition

7. 4. 1 The Definition of Plug JP2

Plug	Port	Name
JP2-1		Void
JP2-2	TXA4-	Communication signal negative port of elevator No.4 in the group control system
JP2-3	TXA4+	Communication signal positive port of elevator No.4 in the group control system
JP2-4	TXV4-	Power supply negative port of elevator No.4 in the group control system
JP2-5	TXV4+	Power supply positive port of elevator No.4 in the group control system
JP2-6		Void
JP2-7	TXA3-	Communication signal negative port of elevator No.3 in the group control system
JP2-8	TXA3+	Communication signal positive port of elevator No.3 in the group control system
JP2-9	TXV3-	Power supply negative port of elevator No.3 in the group control system
JP2-10	TXV3+	Power supply positive port of elevator No.3 in the group control system
JP2-11		void
JP2-12	TXA2-	Communication signal negative port of elevator No.2 in the group control system
JP2-13	TXA2+	Communication signal positive port of elevator No.2 in the group control system
JP2-14	TXV2-	Power supply negative port of

		elevator No.2 in the group control system
JP2-15	TXV2+	Power supply positive port of elevator No.2 in the group control system
JP2-16		Void
JP2-17	TXA1-	Communication signal negative port of elevator No.1 in the group control system
JP2-18	TXA1+	Communication signal positive port of elevator No.1 in the group control system
JP2-19	TXV1-	Power supply negative port of elevator No.1 in the group control system
JP2-20	TXV1+	Power supply positive port of elevator No.1 in the group control system

7. 4. 2 The Definition of Plug JP3

Plug	Port	Name
JP3-1		Void
JP3-2	TXA4-	Communication signal negative port of elevator No.8 in the group control system
JP3-3	TXA4+	Communication signal positive port of elevator No.8 in the group control system
JP3-4	TXV4-	Power supply negative port of elevator No.8 in the group control system
JP3-5	TXV4+	Power supply positive port of elevator No.8 in the group control system
JP3-6		Void
JP3-7	TXA3-	Communication signal negative port of elevator No.7 in the group control

		system
JP3-8	TXA3+	Communication signal positive port of elevator No.7 in the group control system
JP3-9	TXV3-	Power supply negative port of elevator No.7 in the group control system
JP3-10	TXV3+	Power supply positive port of elevator No.7 in the group control system
JP3-11		Void
JP3-12	TXA2-	Communication signal negative port of elevator No.6 in the group control system
JP3-13	TXA2+	Communication signal positive port of elevator No.6 in the group control system
JP3-14	TXV2-	Power supply supply negative port of elevator No.6 in the group control system
JP3-15	TXV2+	Power supply positive port of elevator No.6 in the group control system
JP3-16		Void
JP3-17	TXA1-	Communication signal negative port of elevator No.5 in the group control system
JP3-18	TXA1+	Communication signal positive port of elevator No.5 in the group control system
JP3-19	TXV1-	Power supply negative port of elevator No.5 in the group control system
JP3-20	TXV1+	Power supply positive port of elevator No.5 in the group control system

7.4.3 Power definition of control board (supplied by switch power)

Plug	Name	Definition
JP4-1	0V	power supply negative port for +5V
JP4-2	+5V	power supply positive port for +5V
JP4-3	0V	power supply negative port for +24V
JP4-4	+24V	power supply positive port for +5V

7. 4. 4 Plug definition of switched input

Plug	Name	Definition
JP4-5		void
JP4-6		void
JP4-7	+24V	input port insulated circuit power supply positive
JP4-8	+24V	input port insulated circuit power supply positive
JP4-9	+24V	input port insulated circuit power supply positive
JP4-10	0V	input port insulated circuit power supply negative
JP4-11	0V	input port insulated circuit power supply negative
JP4-12	COM	Common port of input port form No.1 to No.8
JP4-13	Input No.8	Switch for manual selecting the Elevator No.2 to run continuously
JP4-14	Input No.7	Switch for manual selecting the Elevator No.1 to run continuously
JP4-15	Input No.6	check-in rush hour service switch
JP4-16	Input No.5	Power supply converse preparation switch
JP4-17	Input No.4	Service floor converse switch
JP4-18	Input No.3	Check-off rush hour service switch

JP4-19	Input No.2	Group partition switch
JP4-20	Input No.1	Abnormal power supply detect

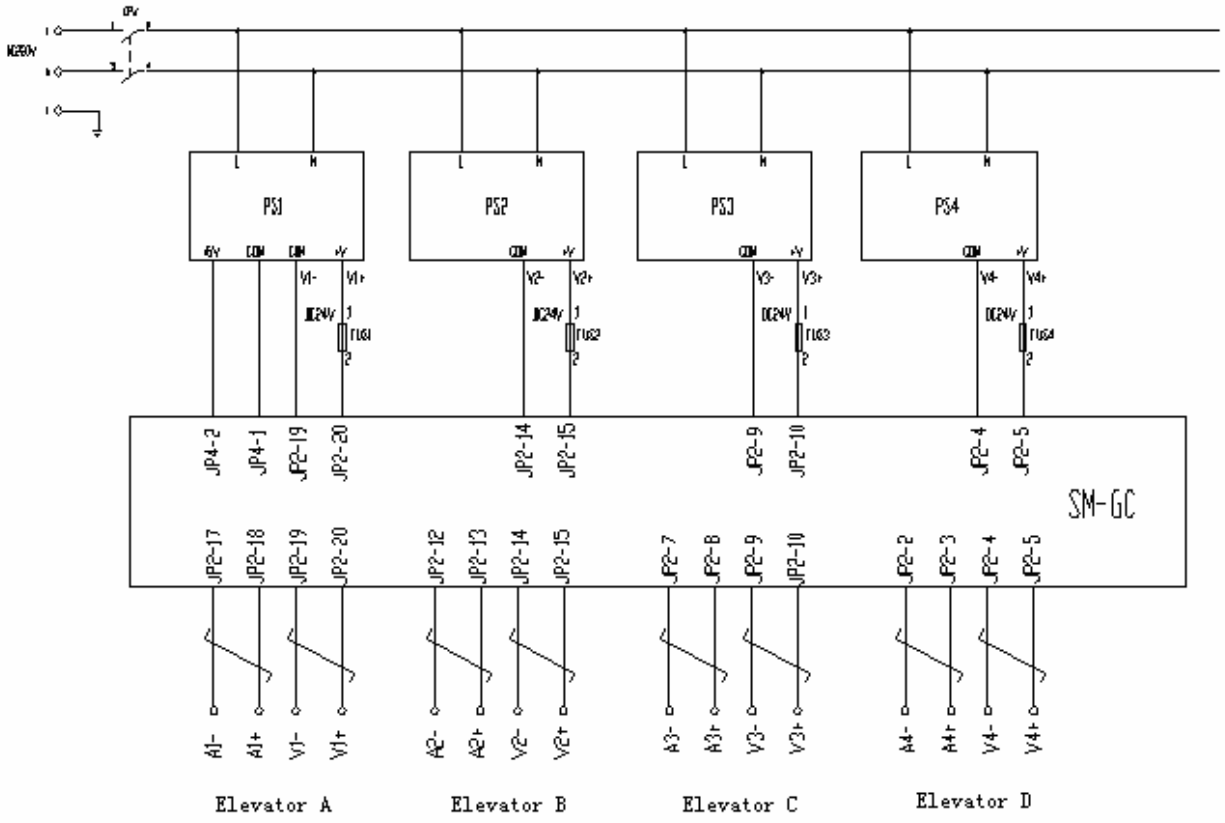
7. 4. 5 Other ports definition

P1: RS232, Monitor Port。

SM-GC（P1）	Laptop（RS232）	Note
2	3	RXD
3	2	TXD
5	5	SGND

8、 Joining Method of Group Control System

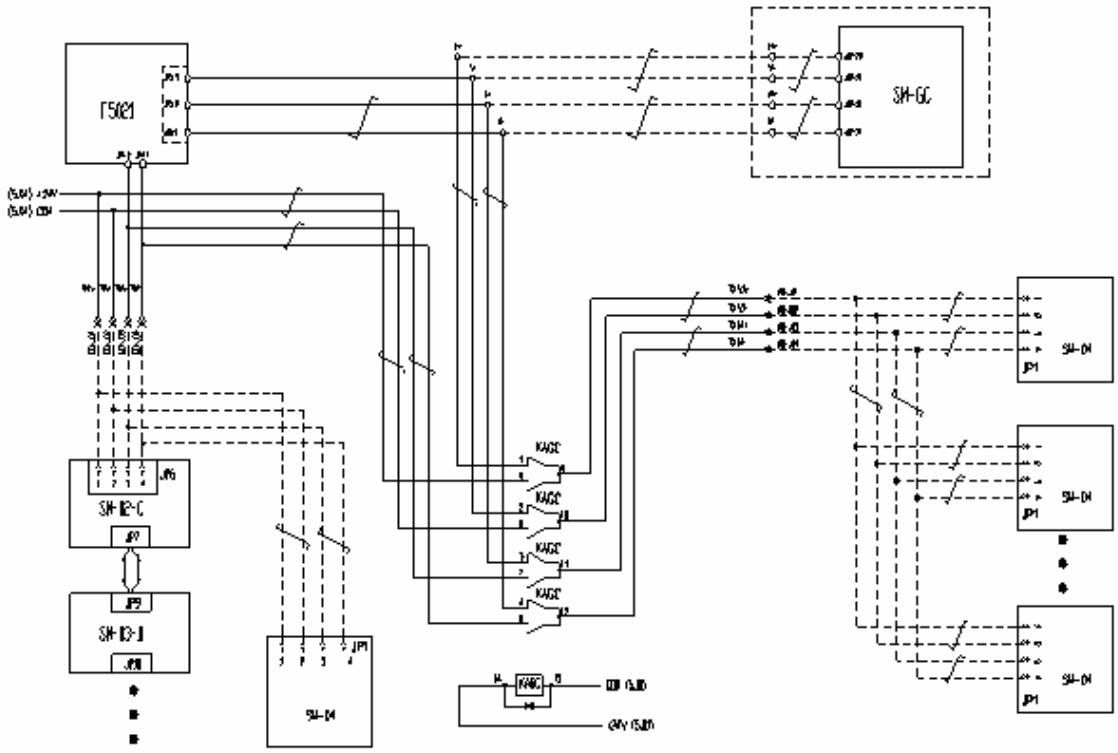
8. 1 Joining sketch map of group control cabinet



This figure shows the joining method for four elevators' group control

PS1、PS2、PS3、PS4 are switch power supply,PS1 has +5V (3A) and +24V (1.8A) output, PS2、PS3 and PS4 have only +24V(1.8A) output。FU1、FU2、FU3、FU4 are over-current protection devices, SM-GC is group control board。

8. 2 The joining method for group-control cabinet and elevator communication system



9、Setting of group control

9. 1 Setting of group control

1. Connection

After the mono-elevator’s commissioning, do the group control system’s commissioning. Joining the group-control cabinet, connect Lift No.1 which has been appointed in the agreement to the output port of JP2.17～JP2.20 of group controller, connect Lift No.2 to the output port of JP2.13～JP2.16 and etc. If the total floors, stop floors or serial number of lifts in the group-control system are changed which are discordant with the agreement in the site, please inform us. Perhaps unpredictable wrong will happen, and the group control will fail.

2. Setting of wire jumpers

Please connect ‘J1’ in the control board with wire jumper before group controlling.

3. Measure of resistant

After setting the wire jumpers, please measure the value of the terminal resistant. The value of JP5.4 and JP5.5 in the control board is about 60ohm, if the value is not

within bound, please check if the wire jumper is in position, mask cable is good and plug in the control board is reliable.

4. Setting of Manual

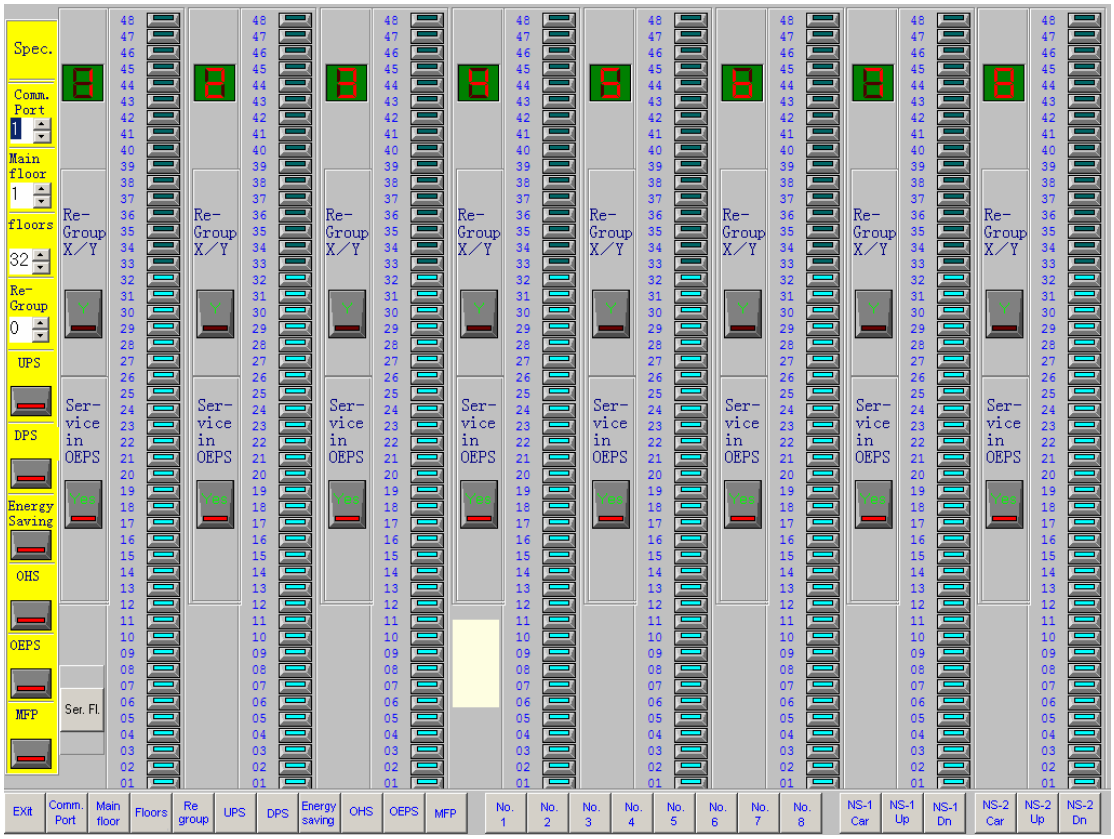
Before debugging the group-control system, please make sure that all mono lifts are in normal state and then set Parameter “Group Mode” of all the lifts to 2.

5. The mark of the success of group control

After doing abovementioned steps, restart the power, if the group control is successful, one black point is displayed in the LCD, else please check if the above steps are operated correctly。

10. Instruction for the group-control parameter setting program

1. Basic instruction
   This program is used for setting the parameter in the group-control board. Connecting computer and group-control board with standard RS232 communication wire, set the parameter in computer. The DC5V in group-control board must be connected.
2. Installation of program
   This program can run directly without installation. In the CD Rom we supplied for client, there are two files GROUPSET.EXE and MSCOMM32.OCX. GROUPSET.EXE is a setting file and MSCOMM32.OCX is a control file. If in your computer there is not file MSCOMM32.OCX, file GROUPSET.EXE is not able to run correctly.
   Please do following steps to setup MSCOMM32.OCX:
   Copy file Mscomm32.ocx form CD Rom to directory SYSTEM of Windows in your computer, open Run Dialog, touch browsing button, select file Regsvr32.exe in the directory SYSTEM of Windows, touch Open button, input MScomm32.ocx after Regsvr32.exe and touch OK button, then run register program. After running the program a dialogue box displays, touch OK button and restart the monitor program.
   This program demands the display resolution of your computer to 1024*768
3. Running the setting program
   Double click the log of file GROUPSET.EXE, the main interface of the program is displayed. Touch Set Button to enter the parameter-setting interface.



The group parameter and setting method introduce

(1) Comm. port: This is the parameter that establishes the PC machine RS232 ports. The data(such as'1'or'2') in the communication port frame of the upper left of the interface means that specify currently of the port is the COM1 or COM2. If there is necessary change constitution, click'△'or'▽' make the data become the value of hope in the frame, then click [Comm. port] button underneath of interface to set the data.

(2) Main floor: The group base floor position means the elevator base floor is order of sequence of the first floor heading up top floor in all whole elevators . For example: There is a elevator in the group have the underground two layers, but the whole base floor position of group is the 1st floor. Then from underground 2 floors heading up , the 1st floor is the 3rd floor. So, the base floor position data of the group is 3. While setting, click'△'or'▽'to adjust the data in the [Main floor] frame the left side of the interface to the group base floor position data, click [Main floor] button underneath of interface , then data setting complete.

(3) The group floor number: The group floor number is all service floors of elevators in the group. The data count from the first floor to the tallest floor. Usually this

data each project should set. While setting, first click'△ 'or'▽ ' to adjust the data in the [Floors] frame to right valve of the left side of the interface, then click [Floors] button underneath of interface to complete the data setting .

(4) The group service floor specification set: If all service floors of elevators in the group are consistent, this specification doesn't need to set specially, it adopt a default value, each the set elevators each floors is service floors. If the service floor of each elevator is deferent, it need to set this data. For example: Four elevators groups, 1# elevator's and 2# elevator's service floors is -2,-1 and 1-10, but 3# elevator's and 4# elevator's service floors is 1-10, then #3 elevator's and 4# elevator's -2,-1 floor should be set to non- service floor(corresponding the floor is 1 and 2 in the setting interface). Setting method as follows: First click the [ser. floor] button in the left bottom of the interface(not in the edge) , the system enters the service floor specification setting appearance. Then, to set each floor of each elevator is service floor or not. Click each small button will change color of horizontal line within it (the blue mean that floor is service floor, having no color means non- service floor). Finally, click [No.1], [No.2] button one by one in the bottom of interface to make the data send to group board through a correspondence. With the above example, first click 3# elevator's and 4# elevator's 01 floors(-2 floor) and 2nd floors(-1 floor) button to no color, then click [No.3] button to wait communication over, then click [No.4]button, after waiting the communication over, constitution completion.

5. Setting interface pattern elucidation:


The elevator number means the elevator serial number in the group. The diagram example means No.2 elevator.

The choice button used for set service, instruction service, Up Call service and Down Call service. The numeral of the left side means floor number. Button's middle line is blue means that floor is service floor, having no color is non- service floor.

Data of the left side means the floor number in the group(bottom floor is 1) .

The choice button used for setting a group cent set. The red color of middle line of button means that elevator is divide as X set when group set is valid , shallow color means Y set.

The choice button used for setting Whether that elevator run or not when urgent power supply power. Red color of middle line within button means that elevator keep on running when the urgent power supply is valid, shallow color means stop movement.

The service floor change project frame. This group system has two service floors change projects altogether. The diagram example mean current interface is setting instruction service floor of project 1.

The group service specification order press button

[Exit]- Exit parameter constitution procedure

[Comm. Port] - Set communication port.

[Main floor] - set group base floor

[Floors] - set group floor.

[Re group]- set group partitions. Need to set each elevator grouping set before setting group partitions.(The x set or Y set)

[UPS] - set go to work high peak.

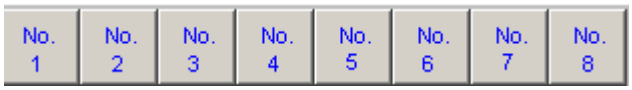
[DPS]- set go off work high peak.

[Energy saving] - set the economy energy movement

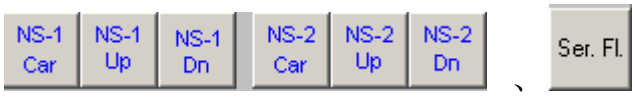
[OHS]- set separate wait.

[OEPS] - set elevator's movement when urgent power supply. First need to set each elevator run or not when urgent power supply.

[MFP]- set returns base floor or not.



The elevator service floor set button. Used for set elevator's service project.



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The group project choice button. Used for choosing the group project, read the project setting in the group and show. The yellow hints frame manifestation the project that in choose:

"The instruction service project 1","Up Call service project 1","Down Call service project 1","the instruction service project 2","Up Call service project 2","Down Call service project 2","the service floor specification setting".

Choose a communication port.

Choose group base floor position.

Choose the group floor number

The group economy energy run choice button.

6. The parameter setting method:

First, choose service project. The procedure starts with an undecided service project. Project's hinting a frame is a blank.

Click the group project choice button, make sure a service project. The procedure will read at first the initial value of that project and show.

Communication port: Choose the RS232 communication port, 1= COM1s:, 2= COM2s:, then click [Comm. port] button.

Group base floor position: Click [Main floor] button after choosing the group base floor position.

The group floor number: Click [floors] button after choosing the group floor number.

The group service and specification setting:

The group partitions specification setting: If group of partition functions function is on, set each elevator separate set first. Click the interface left side 

button to change the color of middle line of button to mean whether valid group of partition functions(have no the color means invalid for that function, red means valid for that function).After choice click [Re group] set button in the bottom of interface.

Go to work high peak specification setting: After clicking 

button to make this function valid or not, click [UPS] button underneath of interface .

Go off work high peak specification setting: After clicking 

button to make this function valid or not, click [DPS] button underneath of interface .

Economize energy run specification setting: After clicking 

button to make this function valid or not, click [Energy saving] button underneath of interface.

Separate wait specification setting: After clicking 

button to make this function valid or not, click [OHS] button underneath of interface .

The urgent power supply running setting: If set the urgent power supply running function, first set each elevator run or not when at urgent power supply .Click 

button,

after making valid or invalid choice of that function, click [OEPS] button underneath of interface.

Return the base floor specification setting: After clicking 

button to make this function valid or not, click [MFP] button underneath of interface .

The non- service floor control specification setting: Unless there is special request, don't need generally to set this specification. This system has two service floor control projects to provide a choice altogether, controlled differently by two switch. When a switch ON, the elevator presses project 1 the service floor specification to run, being another switch ON, the elevator presses project 2 service floor specifications to run. Two switches can't is ON in the meantime. But when two switches all OFF, the elevator carry out the normal service floor movement. In two sets of projects, all can set the instruction service floor, up Call service floor and Down Call service floor respectively. Right in underneath of the interface there is six buttons: [NS-1 Car], [NS-1 Up], [NS-1 Down], [NS-2Car], [NS-2 Up], [NS-2 Down] set respectively project 1's instruction service floor, project 1's Up Call service floor, project 1's Down Call service floor and project 2's instruction service floor, project 2's Up Call service floor, project 2's Down Call service floor. Its constitution method is same with (4) the group service floor specification setting.

When group partition each elevator partition set: Usually this specification doesn't need setting, but if have a group of partition functions, have to carry on this setting. Click button in under [Re. group X/Y] in the frame of elevator in the interface to change middle line's color within button, it will change the elevator's partition, red color means to divide to the X set, having no color means to divide to the Y set. After that button is set, click [Re. group] button underneath the interface.

When urgent power supply whether continued to run specification setting: Usually this specification doesn't need to be set, but if have urgent power supply run function, have to carry on this constitution. Click button underneath [OEPS] of elevator's frame in

the interface, to change the color of middle line of button, the red mean this set elevator continues to run, having no color means stop running. After set that button, click [OEPS] button underneath the interface .