

**STEP<sup>®</sup>**

**iAStar-S8**  
**Elevator Integrated Drive Controller**  
**Instruction Manual**

Product Version: V3.1

**2011.10**

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iAStar-S8 Elevator Integrated Drive Controller  
Instruction Manual  
Release Status: Standard  
Revision: V3.1

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## Foreword

iAStar-S8 elevator integrated drive controller is enhanced state-of-art elevator control and drive unit as developed and manufactured by Shanghai Sigriner STEP Electric Corporation which, by taking full consideration of the rule of Safety and Reliability First, inherent characteristics of elevator operation and the specific characteristics of potential energy load of elevator, by introducing advanced variable frequency speed control technology and intelligent elevator control technology and additionally by perfectly integrating the control and drive of elevator, makes the product has further-optimized service performances, easy-to-use property and cost efficiency. iAStar-S8 elevator integrated drive controller has such main characteristics as:

- ◆ Perfect integration of control and drive, compact design, smaller overall size, decreased wiring amount, enhanced reliability and easy-to-use property and cost efficiency.
- ◆ Double 32-bit computer system, which allows elevator's operating functions and motor's drive control through an advanced 32-bit MCU together with a high-performance 32-bit DSP.
- ◆ Redundant safety design. Both controlling computer and driving computer are provided with safety protections to allow considerably-increased assurance coefficient.
- ◆ Strong anti-interference property: conduction interference and coupling interference resistance at 4000V.
- ◆ All CAN serial communication, which makes the complete system has simple wiring, strong data transmission capacity and good reliability.
- ◆ Advanced vector control technology, perfect motor speed control performance and considerable riding comfort.
- ◆ Adapts to both synchronous motor and asynchronous motor. When asynchronous motor is used, no self-setting is required; when synchronous motor is used, the self-setting is very simple.
- ◆ Firstly-developed no-load sensor based starting compensation technology provides to elevator excellent starting comfort even if no load device is installed.
- ◆ As per a Distance rule, it automatically creates optimal retardation-speed curve which allows direct parking and facilitates to improve operating efficiency of elevator.
- ◆ New PWM dead-time compensation method allowing effectively reducing noise and wearing of motor.
- ◆ A monitoring device is provided to check current flow status at each stopping, so the main circuit with single contactor may be in compliance with the requirement of Chinese national standard GB 7588 provided that this elevator integrated drive controller is used.
- ◆ 48V bus line makes low-voltage and low-speed running function available and facilitates battery to supply automatic low-speed rescue running in case of emergency power failure.
- ◆ Conforms to safety regulations of EN81-1998 and GB7588-2003.

## Abstract

This manual describes the installation, operation, parameter setting, maintenance and fault handling of iAStar-S8 elevator integrated drive controller in detail and in full. It may be used not only for information in design of elevator control system, but also for reference in installation, commissioning and maintenance of complete system.

Be sure to read and understand this manual thoroughly before operating in order to ensure correct installation and operation of this elevator integrated drive controller.

## Readers

Users of elevator  
Control and design staff of elevator  
Engineering service persons  
Technical support persons to the user

## Safety-related Signs

The following safety-related signs are used in the manual. Be sure to observe the instructions with these signs.



“Danger” indicates an imminently hazardous situation which, if not avoided, will cause death or serious injury.



“Caution” indicates a potential hazardous situation, which, if no suitable precautions are taken, may result in minor injury and/or property damage.



## Important

This symbol indicates important contents which instructions should be observed.

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## 1 Notice of Use


### 1.1 Scope of Application

iAStar-S8 elevator integrated drive controller is rated at voltage 200V and 400V and is adaptable to both synchronous motor and asynchronous motor with capacity from 2.2kW to 37kW. Single elevator supports up to 64 floors and group control supports up to 8 elevators.


### 1.2 Safety Precautions


	Danger
<ul style="list-style-type: none"> <li>⊙ <b>Always install on metal structures or other noninflammable objects;</b> Or it may cause fire risk.</li> <li>⊙ <b>Never install in explosive environments</b> Or it may cause explosion risk</li> <li>⊙ <b>Never place combustibles near the product</b> Or it may cause fire risk.</li> </ul>	

	Caution
<ul style="list-style-type: none"> <li>⊙ <b>Always support the body bottom during handling</b> Or the possible falling of the main body of elevator integrated drive controller may cause risk of injury and/or property damage.</li> <li>⊙ <b>The platform on which the product will be installed shall have sufficient load bearing capacity</b> Or the contingent falling of the main body of elevator integrated drive controller may cause risk of injury and/or property damage.</li> <li>⊙ <b>Don't install it in the vicinity of sewage pipe or the points with splatters</b> Or it may cause the risk of property damage.</li> <li>⊙ <b>Prevent screws, washers and metal rods falling into the inside of elevator integrated drive controller</b> Or it may cause the risk of fire or property damage.</li> </ul>	

	Danger
<ul style="list-style-type: none"> <li>⊙ <b>Make sure it is disconnected from the mains prior to wiring</b> Or it may cause risk of electric shock.</li> <li>⊙ <b>The wiring can only be performed by trained and qualified electricians</b> Or it may cause risk of electric shock.</li> <li>⊙ <b>Always keep the iAStar-S8 elevated integrated drive controller properly</b></li> </ul>	

<p><b>grounded at its grounding terminal E</b> Or it may cause risk of electric shock.</p>	
⊙	<p><b>Avoid confusing main circuit input terminals and output terminals of elevator integrated drive controller</b> Or it may cause risk of property damage and/or explosion.</p>
⊙	<p><b>Never make terminal 1/2 and 3 be shorted.</b> or it may cause risk of fire and explosion</p>
⊙	<p><b>Make sure the cover is placed in position prior to switching on</b> Or it may cause risk of electric shock and/or explosion.</p>
⊙	<p><b>Don't use soggy hands operating elevator integrated drive controller</b> Or it may cause risk of electric shock</p>
⊙	<p><b>At completion of wiring the emergency stop safety circuit, carefully check and make sure all the wirings are correct</b> Or it may cause risk of hazard.</p>

	Danger
<ul style="list-style-type: none"> <li>⊙ <b>When switching on a elevator integrated drive controller which has been stored for more than 2 years, a voltage regulator is needed to supply it by increasing the voltage gradually</b> Or it may cause risk of electric shock and explosion</li> </ul>	

	Danger
<ul style="list-style-type: none"> <li>⊙ <b>Avoid faulty operation when elevator integrated drive controller is running</b> Or it may cause risk of high-voltage electric shock.</li> <li>⊙ <b>After it is switched off, the inside of elevator integrated drive controller may remain dangerous high voltage for a certain period, don't open the cover or touch connection terminals</b> Or it may cause risk of high-voltage electric shock.</li> <li>⊙ <b>Only trained, qualified and authorized person may be allowed to work on elevator integrated drive controller</b> Or it may cause risk of electric shock or property damage.</li> <li>⊙ <b>Always remove watches, rings or other metal articles prior to working and always wear suitable clothes and use appropriate tools when working on elevator integrated drive controller</b> Or it may cause risk of electric shock and explosion.</li> </ul>	



## 2 Introduction of elevator integrated drive controller

This chapter describes the model, specification, dimension and mass of iAStar-S8 elevator integrated drive controller, provides the schematic figure of product appearance, describes the terminals of both main circuit and control circuit, and additionally, gives detailed instruction to the available functions of this product.

### 2.1 Model Description

See Figure 2-1 and Table 2-1 respectively for model definition and model list of iAStar-S8 elevator integrated drive controller.

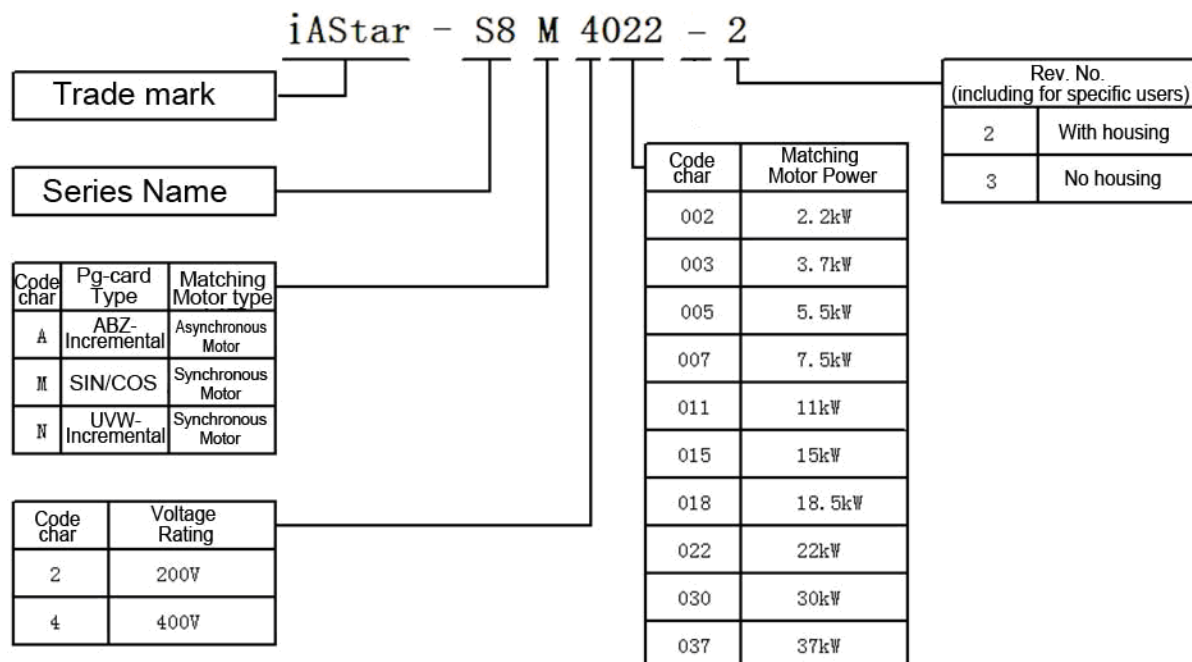


Figure 2.1 Model Definition of Elevator Integrated Drive Controller

Table 2.1 Model List of iAStar-S8 Elevator Integrated Drive Controller

Models of iAStar-S8-	Capacity Rating (kVA)	Output Current Rating (A)	Matching motor (kW)
2002A2/3	4.6	12	2.2
2003A2/3	6.9	18	3.3
4002A2/3	4.7	6.2	2.2
4003A2/3	6.9	9	3.3
4005A2/3	8.5	13	5.5
4007A2/3	14	18	7.5
4011A2/3	18	27	11
4015A2/3	24	34	15
4018A2/3	29	41	18.5
4022A2/3	34	48	22
4030A2/3	50	65	30
4037A2/3	61	80	37
4045A2/3	74	97	45
4055A2/3	98	128	55
4075A2/3	130	165	75

## 2.2 Nameplate Description

See schematic Figure 2-2 for example nameplate, which shows model number, specification and lot number of a iAStar-S8 series elevator integrated drive controller.

Model Name	→	型号 (MODEL) : iAStar-S8A4022-2
Matching Motor Power	→	功率 (POWER) : 22kW
Input ratings	→	输入 (INPUT) : AC380V 50/60Hz 44A
Output ratings	→	输出 (OUTPUT) : AC380V 0-50Hz 48A 34kVA
Machine Number	→	机器编号 (No. ) :
Machine Number	→	序列号 (SER. No. ) :
上海辛格林纳新时达电机有限公司 Shanghai Sigriner STEP Electric Co., Ltd		

Figure 2.2 Nameplate Description of Elevator Integrated Drive Controller

## 2.3 Technical Specifications

See Table 2.2 for technical specifications of iAStar-S8 elevator integrated drive controller.

Table 2.2 Technical Specification of iAStar-S8 Elevator Integrated Drive Controller

		200 2	200 3	400 2	400 3	400 5	400 7	401 1	401 5	401 8	402 2	403 0	403 7	404 5	405 5	407 5
Max. Matching motor Capacity, kW		2.2	3.7	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75
Output Ratings	Capacity Rating, kVA	4.6	6.9	4.7	6.9	8.5	14	18	24	29	34	50	61	74	98	130
	Current Rating, A	12	18	6.2	9	13	18	27	34	41	48	65	80	07	128	165
	Max Output Voltage, V	200V: 3-phase, 220V ~240V (corresponds to input voltage) 400V: 3-phase, 380V ~460V (corresponds to input voltage)														
Input Power	Phase number, voltage, frequency	200V: 1-phase/3-phase, 220V~240V, 50/60Hz 400V: 3-phase, 380V~460V, 50/60Hz														
	Allowable voltage fluctuations	-15%~+10%														
	Allowable Frequency Deviation	-5%~+5%														
	3-phase unbalance	≤2%														
	Acceptable instantaneous voltage drop	200V: keep running at AC150V or above; activate under-voltage protection after 15ms from the moment when it drops from rated voltage to below AC150V. 400V: keep running at AC300V or above; activate under-voltage protection after 15 ms from the moment when it drops from rated voltage to below AC300V.														
Basic Characteristics	Maximum accessible Floors	2 to 64 floors for single elevator														
	Elevator Traveling Speed	≤4.00m/s														
	Group controlling Capacity	≤8 elevators														
	Communication mode	CAN bus serial communication														
	Operating functions	See chapter 2.8, List of Product Functions														

Drive Characteristics	Control Mode	PG card based vector control
	Starting torque	150% 0Hz (PG card based vector control)
	Speed control range	1:1000 (PG card based vector control)
	Speed control accuracy	$\pm 0.05\%$ (PG card based vector control $25\pm 10^{\circ}\text{C}$ )
	Torque Limited	yes (set by parameters)
	Moment accuracy	$\pm 5\%$
	Frequency control range	0~100Hz
	Frequency Accuracy (Temperature fluctuation)	$\pm 0.1\%$
	Frequency setting resolution	$\pm 0.03\text{Hz}/60\text{Hz}$
	Output frequency resolution	0.001Hz
	No-load starting compensation	When the load of elevator is unknown, suitable torque will, as per the ready-to-travel direction of elevator, be applied on motor so as to ensure smooth start of elevator, minimize the slipping and improve comfort at starting moment.
	Overload capacity	1 minute (150% output current rating) or 10 seconds (200% output current rating)
	Brake torque	150% (external braking resistor), integrated braking unit
	Acceleration/Deceleration time	0.01~3600s
	Carrier frequency	5~15kHz
	Battery-supplied Operating	In case of power failure, the batter instantaneously supplies elevator leveling at a low speed.
PG interface signal	PG card Output	5V, 5.3V, 12V, 300mA
	PG card Types	Asynchronous PG card (Open Collector output, push-pull output); Synchronous PG card (supports SIN/COS encoder, UVW encoder)
	PG card divided frequency signal output	A, B quadrature transistor open collector output, frequency division factor 1-128
Control input/output signal	Optoelectronic input control supply	Isolated 24V DC
	Relay output control supply	Isolated 24V DC
	Low-voltage optoelectronic isolated input	32-channel switching capacity. Optoelectronic control signal is isolated 24V DC input signal.
	high-voltage optoelectronic isolated input	4-channel switching capacity. Optoelectronic control signal is isolated 24V DC input signal.
	Programmable control relay output-1	10-channel; Constant open contact; SPST; contact capacity: resistive load, 5A 250VAC or 5A 30VDC
	Programmable control relay output-2	2-channel; constant close contact, SPDT; contact capacity: resistive load, 5A 250VAC or 5A 30VDC
	Programmable control relay output-3	4-channel; constant close contact; DPDT; contact capacity: resistive load, 16A 250VAC
	CAN communication interface	3-channel, (duplex or group control, communication between car and outside, stand-by)

	RS232 communication interface	1-channel (may be used for operator; main board port No.:JP12)
	Modem communication interface	1-channel (may be used for remote monitoring; main board port No.: JP10)
Protection Function	Motor overload protection	1 minutes (150% output current rating); 10 seconds (200% output current rating)
	Overload	1 minutes (150% output current rating of elevator integrated drive controller); 10 seconds (200% output current rating of elevator integrated drive controller)
	Overcurrent	1 minutes (150% output current rating of motor or elevator integrated drive controller); 10 seconds (200% output current rating of motor or elevator integrated drive controller)
	Short circuit protection	Provide protection to elevator integrated drive controller when overcurrent occurs to any two phases at output side.
	Fuse protection	Fuse blows out and stops operation so as to protect elevator integrated drive controller.
	Output open phase protection	In case of open phase of output during operating, it cuts off output to protect elevator integrated drive controller.
	Overvoltage threshold	Bus voltage410 (200V series) 810V(400V series)
	Undervoltage threshold	Bus voltage190 (200V series) 380V(400V series)
	Instantaneous power failure compensation	Protection for more than 15ms
	Overheat of heat sink	Protected by thermistor
	Stall prevention	Activate protection when traveling speed deviates from the rated speed by more than 20%.
	Failure of pulse encoder	Breakage or wrong phase sequence of PG
	IPM internal protection	Overheat, overcurrent, short circuit, undervoltage of control supply of IPM.
	Braking unit protection	Automatically detects abnormal conditions of braking unit and activate protection.
	Over-torque protection	Similar to overcurrent protection.
	Overspeed protection	Activate protection when overspeed by 100% of rated speed.
	Underspeed protection	Activate protection in case that real traveling speed of elevator is far lower than the rated speed due to some reasons including failures.
	Jump time limiter protection	Activate protection in case of the jump time exceeds as-set time,
	Leveling switch fault protection	Protection activated in case of faulty leveling switch.
	EEPROM failure	Switching-on self-test.
Display	LCD in Chinese and English	Menus at each level
Environment	Ambient temperature	-10~+40℃
	Humidity	Below 95% RH (no condensation)
	Storage temperature	-20~+60℃(temperature allowable during short-term transport)
	Application place	Indoor (no corrosive gas, dust and the like)

Config uration	Altitude	Below 1000m
	Protection class	IP20
	Cooling mode	Forced air cooling
Installation mode		In-cabinet installation

## 2.4 Dimensions and Mass

iAStar-S8 elevator integrated drive controller is divided by appearance into two types, one has a casing, but another has no casing. Their installation dimensions and masses are respectively described as follows:

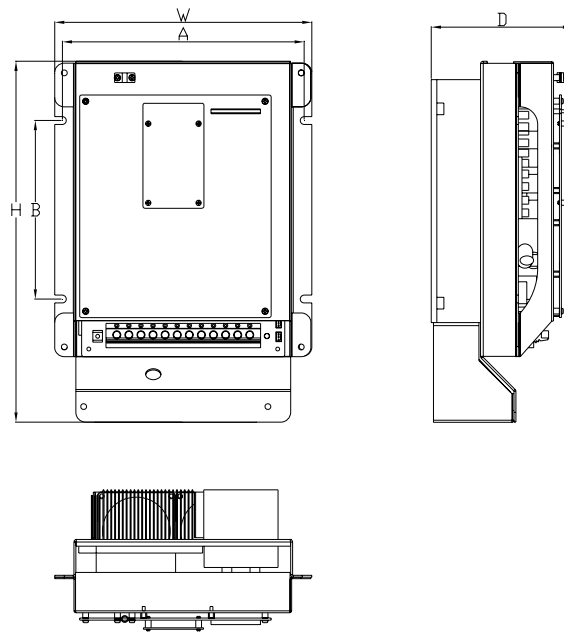


Figure 2.3 Installation Dimension of Elevator Integrated Drive Controller (no casing)

Table 2.3 Specification of Elevator Integrated Drive Controller (no casing)

Model iAStar-S8-	Matching motor, kW	A mm	B mm	H mm	W mm	D mm	Mounting Hole diameter $\Phi$ , mm	Mounting Bolt	Mass, kg
4005A3	5.5	250	183.7	371.5	265	140	7.0	4M6	10
4007A3	7.5								
4011A3	11								
4015A3	15								
4018A3	18.5	269.5	237.7	416	285.5	170	7.0	4M6	11
4022A3	22								

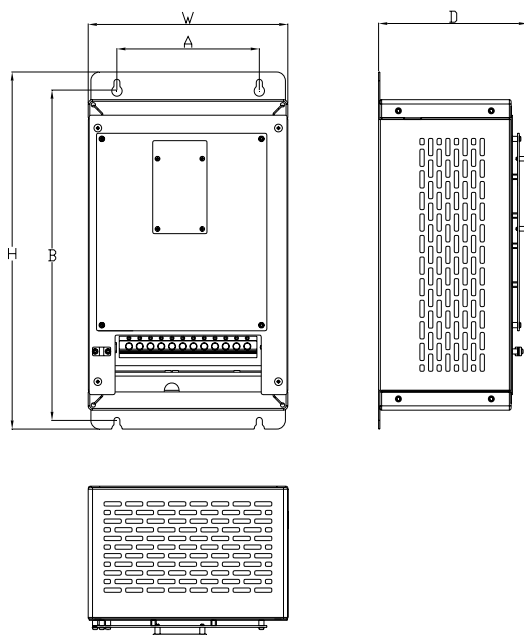


Figure 2.4 Installation Dimension of Elevator Integrated Drive Controller (with casing)

Table 2.4 Specification of Elevator Integrated Drive Controller(with casing)

Model iAStar-S8-	Matching motor, kW	A mm	B mm	H mm	W mm	D mm	Mounting Hole diameter Φ, mm	Mounting Bolt	Mass, kg		
2002A2	2.2	165.5	392	414	232	182	7.0	4M6	13		
2003A2	3.7										
4002A2	2.2										
4003A2	3.7										
4005A2	5.5										
4007A2	7.5										
4011A2	11										
4015A2	15										
4018A2	18.5	165.5	438	463	254	182					15
4022A2	22										
4030A2	30										
4037A2	37	200	512	530	330	290	9.0	4M8	30		
4045A2	45	200	587	610	330	310	10.0	4M8	42		
4055A2	55	200	587	610	330	310	10.0	4M8	42		
4075A2	75	200	707	730	430	330	10.0	4M8	50		

Note: the code character "A", taking model name "iAStar-S8-4005-3" for example, following the "S8" - may be "A", "M" or "N" in a specific model. Please see Figure 2.1 for the meanings of code character "A", "M" and "N".

## 2.5 Product Appearance





Figure 2.5 Appearance of Elevator Integrated Drive Controller (2.2kW, with casing)

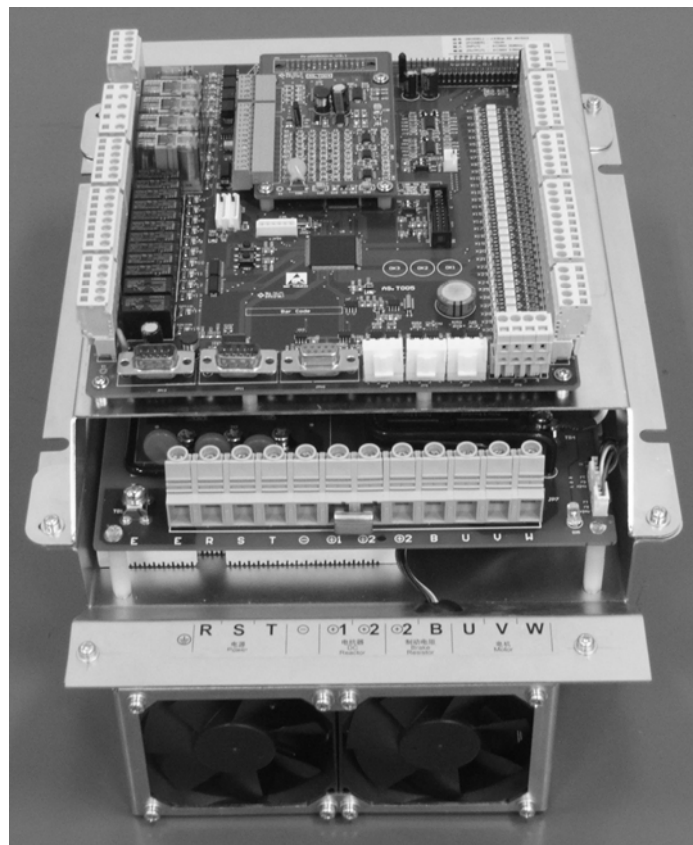


Figure 2.6 Appearance of Elevator Integrated Drive Controller (2.2kW, no casing)

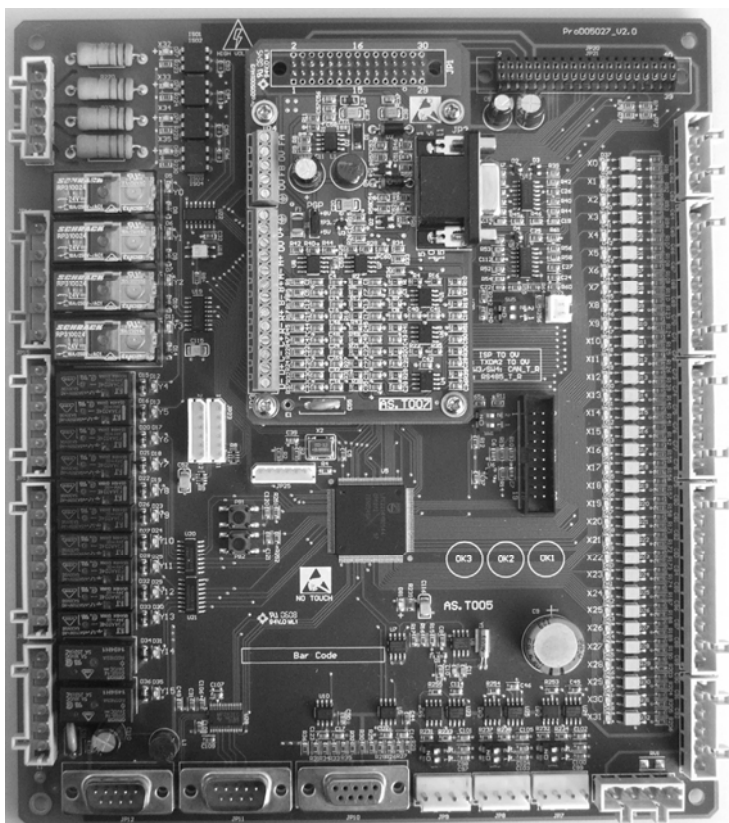


Figure 2.7 Mainboard Appearance of Elevator Integrated Drive Controller (PG-card, SINCOS-A board, Synchronous motor)

## 2.6 Installation Instructions



**Danger**

- ◎ **Always install on metal structures or other nonflammable objects;**  
Or it may cause fire risk.
- ◎ **Never place combustibles near the product**  
Or it may cause fire risk.
- ◎ **Never install in explosive environments**  
Or it may cause explosion risk
- ◎ **The cabinet in which the product will be installed shall meet the requirements of EN50178.**



**Caution**

- ◎ **The platform on which the product will be installed shall have sufficient load bearing capacity**  
Or the contingent falling of the main body of elevator integrated drive controller may case risk of injury and/or property damage
- ◎ **Don't install it in the vicinity of sewage pipe or**

**the points with splatters**

Or it may cause risk of property damage.

- ◎ **Prevent screws, washers and metal rods falling into the inside of elevator integrated drive controller**

Or it may cause the risk of fire or property damage.

- ◎ **Never start a elevator integrated drive controller which is damaged or components are not completed mounted**

Or it may cause risk of property damage.

- ◎ **Don't install under direct sunlight**

Or it may cause risk of overheat or resulting accidents;

### 2.6.1 Product Installation Place

The place where the elevator integrated drive controller will be installed shall meet such conditions as:

- a) Clean, without oil mist, dust or suspended matters which may fly into the fully enclosed cabinet;
- b) No possibility of metal powder, oil or water entering into the inside of elevator integrated drive controller;
- c) No timers and other combustibles are stored;
- d) No radioactive substances are placed;
- e) No hazardous gases or liquids are stored;
- f) Vibration is as low as possible;
- g) Not a salty atmosphere;
- h) Not under direct sunlight;
- i) Temperature rise is as low as possible;

when install the product in a enclosed cabinet, suitable cooling fans or air conditioners should be provided to keep the ambient temperature under 40℃。

### 2.6.2 Installation Orientation and Clearance Requirements

To avoid impair the cooling effect of elevator integrated drive controller, this product shall be installed at a well-ventilated place. In general, it is vertically installed with suitable clearances as shown by Figure 3.1.

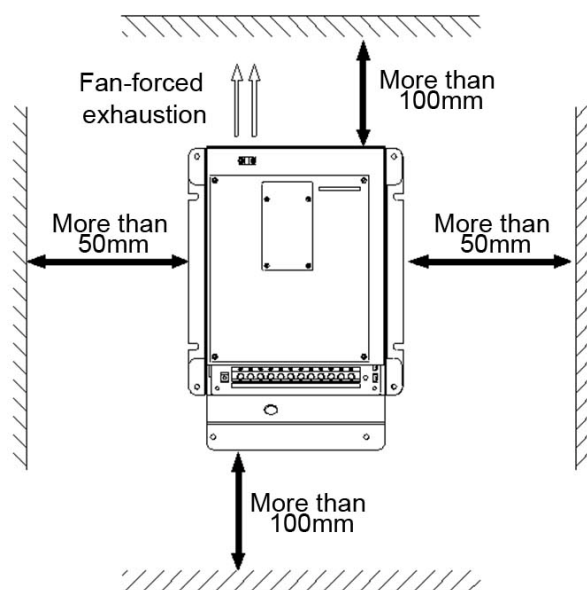


Figure 2.8 Requirements on Installation Clearance

## 2.7 Schedule of Product Functions

No.	Descriptions	Remarks	No.	Descriptions	Remarks
Standard			Optional		
1	Fully Selective Control		1	Pre-Door-opening	with board SM-11-A
2	Inspection Travel		2	Relevelling with Door Open	with board SM-11-A
3	Self-rescue Travel		3	Fire Emergency Return	
4	Testing Travel		4	Fireman Service Operation	
5	Clock Control		5	The Second Car Panel	
6	Automatic Control for Door-opening Time		6	Car Panel by the Rear Door	
7	Open the Door from This Landing Call		7	Car Panel for the Handicapped	
8	Pre-close the door by Door-closing Button		8	Duplex Control	
9	Open the Door by Door-opening Button		9	Group Control	
10	Door selection		10	Up Peak Service in Group	
11	Leveling in Changing Destination Landing		11	Down Peak Service in Group	
12	Cancel a Wrong Registration		12	Zoned Stand-by Service	
13	Clear Registrations at Changing Direction		13	Zone (Building) Monitoring	
14	Direct Landing		14	Earthquake Response function	
15	By-passing Landing Calls on Full-load		15	Arrival Gong on Car	
16	Power-off for Car Lighting and Fan at Stand-by		16	Arrival Lamp on Landing	
17	Auto homing		17	Arrival Gong on Landing	
18	Re-close door		18	Leveling fine tuning	
19	Historical Error Log		19	NS – SW Service in Group	
20	Self-tuning of Shaft Information		20	Separate Control of Car Doors	
21	Service Landing Setting at Will		21	Nudging door	
22	Indicating Symbols Setting for Landing Display		22	VIP Priority Service	
23	Attendant Service		23	Emergency Levelling at Power-off	
24	Independent Travel		24	NS – SW Service in Single	
25	Dot-matrix Landing Indicators		25	Voice Landing Forecasting	
26	Rolling Indication of the Travel Direction		26	Load compensation	
27	Automatic Correction in Landing Position Signals		27	Hold Open Button	
28	Elevator Lock-out		28	Output and display suspended service	

29	Protection against Door-opening outside Door Zones		29	Password Lock-out Function	
30	Light Gate Protection for Doors		30	Homing waiting for opening the door	
31	Over-load Protection		31	Duplex Control by the Car Rear Door Function	
32	Anti-nuisance at Light-load		32	Floors Lock-out at the setting time function	
33	Reversing Protection		33	Load compensation function	
34	Rope-slippage Protection		34	Checkup Hall Calling function	
35	Terminal switch failure				
36	Protection against Overtrip				
37	Contact Detecting in Safety Relays and Contactors				
38	Main circuit fault protection				
39	Master CPU Protection by WDT				
40	Overspeed protection				
41	Underspeed protection				
42	Leveling switch fault protection				
43	CAN communication fault protection				
44	Safety shoe protection				
45	Band brake switch contact detection protection				
46	Elevator shaft self-tuning diagnosis				
47	Motor thermal protection				
48	Door switch fault protection				
49	Door lock breakage protection				

Table 2.5 Product Functions

## 2.8 A Brief on Functions

### ◆ Description of Standard Functions:

#### 1. Fully Selective Control

When in automatic or attendant control, the elevator stops in response to the in-car registrations while automatically follows landing calls up and down, i.e., a passenger can register his or her call at any landing.

#### 2. Inspection Travel

It is a function for field mechanics or engineers to carry out maintenance, inspection or testing tasks. When operational conditions are satisfied, an authorized person can inch the car by pressing and releasing the red button, he can move the car at inspection speed by continuously pushing down the button and stop it by releasing the button.

#### 3. Self-rescue Travel

When the elevator stays out of the leveling zone (NOT in inspection state), it will automatically move to the leveling zone slowly to evacuate the passengers if only the safety requirements for the start are met.

#### 4. Testing Travel

It is a function designed for measuring the performance of a new elevator. By setting a given

parameter in testing travel on the Master Control board, a field engineer will put the elevator into automatic operation. Both the total number of trips and the interval time between trips of the testing travel can be determined by parameter setting.

During commissioning, you should at first set F34, the parameter defining the automatic running times of elevator and secondly set F33, the parameter defining the interval (in second) from the last stop to the next start of automatic running. As these two parameters are set, the elevator will, if under all automatic state; keep running repeatedly, until the times as set by F34 has been reached. If necessary, you may break automatic running by set F34 to "0".

#### 5. Clock Control

With the built-in clock system by real time, the exact time at which a breakdown takes place can be recorded in the Error Log. The clock control can also be used to initiate the required functions precisely by time

The setting of clock is completed by LCD operator. When you wish to enable the time-sharing control function, please contact directly our technical department.

#### 6. Automatic Control for Door-opening Time

When the elevator travels in automatic state without attendant, the door closes automatically by a delay after the car arrives at a landing with the door open. The default delay is 3.0 s for a landing without any call and 3.0 s for a landing with a call. The delay time can be changed by setting the relevant parameters.

You may set open door hold time (in second, only with instruction signal) when leveling by F15; or set the open door hold time (with call signal also) when leveling by F14.

#### 7. Open the Door from This Landing

When the call button of this landing is pressed down, the car door opens automatically. If someone keeps pushing on the button, the door remains open.

#### 8. Pre-close the Door by Door-closing Button

When the door is open in automatic state, the door can be closed immediately before the delay elapses by pushing on the door-closing button.

#### 9. Open the door by Door-opening Button

When the car stays within the door zone, a passenger in the car can open a closed door or make a closing door reverse by pushing on the door-opening button.

#### 10. Door Selection

By F130 you may set to select different door operator, which includes such types as opening-torque hold, closing-torque hold and opening/closing-torque holding.

#### 11. Leveling on Changing Destination Landing

If the door has been opening for 15 seconds without activating the door open limit switch, the door will close and the elevator will travel to the next destination after the door is closed.

#### 12. Cancel a Wrong Registration

If a passenger realizes that he or she has pushed down a wrong button in the car panel, he or she can cancel the wrong registration by pushing the same button twice incessantly.

#### 13. Clear Registrations at Changing Direction

When the elevator car arrives at the last landing to be changing direction, all the registrations behind its present travel will be cancelled at once.

#### 14. Direct Landing

On analogue given curve the control system slows down the elevator by distance without any crawling at leveling.

#### 15. By-passing Landing Calls on Full-load

When a full-loaded elevator car travels in normal mode without attendant, the elevator will NOT answer any calls from its by-passing landings, stopping at the landings by in-car registrations only.

#### 16. Power-off for Car Lighting and Fan at Stand-by

If a elevator stands by out of service over 5 minutes (default value subject to change by parameter), receiving neither in-car nor landing calls, the car lighting and fan will automatically stays off power until a call for the elevator to answer appears.

This is a standard function, so what only to be adjusted is the Delay Time of from sending switching-off instruction to automatically switching off the supply to illumination and fans. You may set the parameter Delay Time (in minute) by F152.

#### 17. Auto Homing

When the elevator travels in automatic state without attendant service while setting Auto Homing in effect, the elevator car which receives neither in-car nor landing calls will automatically return to the main landing within a given period of time determined by parameter setting.

For an elevator not under group control, two parameters are settable for this function: you may set F20 to "0" to disable function or set to nonzero digitals to enable function. As it is enabled, F20 means such a time: when a elevator has executed all instructions, the elevator will automatically return to home floor after calling delay time as set by F20; in addition, the home floor is set by F22.

For an elevator under group control, the function shall be enabled by group control board parameters, where the home floor location shall also be set.

When the home floor function is enabled, whether elevator is under group control or not, it is required to, by F49, set the elevator as returned to home floor into "closed waiting" or "open waiting": "0" for closed waiting or "1" for open waiting.

#### 18. Re-close door

In order to avoid stop of elevator in case of chance failures or seizure of articles between doors causing doors unable to be closed, this function is therefore provided to re-close the door.

#### 19. Historical Fault Log

The Historical Fault Log keeps the latest 20 fault records concerning the occurring time, floors and fault codes.

#### 20. Self-tuning of Shaft Information

The Self-tuning should be initiated before the elevator goes into service for the control system to learn the pertaining hoistway data such as distance between floors, positions of decelerating and protective switches and so on and keep the learned data permanently in memory.

#### 21. Service Landing Setting at Will

Using the handset one can determine at will which floors the elevator serves and which floors the elevator does NOT serve.

Only the floors set as service floors are able to register instructions or calling signals. In normal conditions, a elevator will not travel to the non-service floors. The setting of service/non-service floors are completed by F29~F33 (in which, F29 for setting 1F to 16F, F30 for setting 17F to 32F, F33 for setting 33F to 48F). You are needed to select YES or NO for each floor on a LCD operator. For example, if you want to set the 17F, you should find it in F30 and make selection said above. It should be noted that when group control are used, the service/non-service floor setting is also available on the group control board. Furthermore, when in fire fighting-purpose running, any non-service floors previously set will be disabled (all are to be reset as service floors).

During this operation, you may set DISPLAY CODE by F65 to F112 on LCD operator (F655 for 1F, F66 for 2F,...F112 for 48F). For the relations between display code and actual display character see Table 6.35, DISPLAY CODE schedule under chapter 6.3.9.

#### 22. Indicating Symbols Setting for Landing Display

Using the handset one can determine at will the varied display symbols or marks for the floors, for instance, "B" for basement ONE.

#### 23. Attendant Service

Using the switch in the car operation panel, one can put the elevator into attendant service, under which the automatic door closing is blocked out and the door can only be closed by the attendant

who keeps pressing on the door-closing button. The attendant can also decide on the travel direction and/or the by-passing ride. The other functions are the same as those by normal travel.

#### 24. Independent Travel

Independent Travel is an exclusive travel, during which the elevator overlooks all landing calls and the automatic door-opening and -closing is blocked out. Other features are similar to Attendant Service.

#### 25. Dot-matrix Landing Indicators

Dot-matrix Landing Indicators are used both in the car and on the landing, featuring abundant and elegant indicating symbols and vivid display.

#### 26. Rolling Indication of the Travel

Rolling direction display is applied to both car and landing indicators, which starts when the car is moving.

#### 27. Automatic Correction in Landing Position Signals

During the travel the system checks up its own position signals at each terminal switch and by the leveling switch of each landing against those it has obtained by self-tuning, making automatic corrections in the data.

#### 28. Elevator Lock-out

During the normal service the system clears out all registrations when the lock-out switch is turned off, but the elevator will continue its service dispatching passengers in the car until all the in-car registrations are cleared out. Then the car returns to the main landing, opens the door automatically, switches off lighting and fan, igniting the door-opening button for a 10-second delay before the door is automatically closed for termination of service. The normal service can be initiated again by resetting the lock-out switch.

#### 29. Protection against Door-opening outside Door Zones

The door cannot open outside the door zone, which is preset by the system for safety.

#### 30. Light Gate Protection for Doors

Every elevator is equipped with a light gate door protection, whenever any object appears or stays between the closing door panels, they will reverse open with the light gate in effect.

#### 31. Over-load Protection

With the over-load switch functioning, the door remains open with alarm buzzing on.

#### 32. Anti- nuisance at Light-load

If the system is equipped with a light-load switch which has not yet functioned while the in-car registrations have exceeded value in number (subject to modify by parameter), the system will clear all the registrations.

#### 33. Reversing Protection

When the system has detected an inconsistency between the registered direction and travel direction for 3 seconds on end, an emergency stop will be activated with alarm buzzing on.

#### 34. Rope-slippage Protection (Operation Time Limiter)

If the elevator in operation (except for in inspection mode) has traveled incessantly for a longer time than the value preset by the time limiter (max.45s) without leveling and door operations, a rope slip is supposed to be detected by the system, by which all car movements are at stop until being put into inspection travel or by resetting the power supply.

#### 35. Terminal Switch Failure Prevention:

Prevents elevator continuing to run in case of terminal switch failure and resulting in accidents;

#### 36. Protection against Overtrip

Both the uppermost and the lowest ends of the hoistway are mounted with limit switches for speed retardation of the cab so that any overtrips by it can be prevented.



**37. Contact Detecting in Safety Relay and Contactor**

The system checks up the contact reliability of the safety relays and contactors. If any inconformity between the contact movement and the working status of the coil is detected, all car movements will stay at stop until reset of the power supply.

**38. Main Circuit Fault protection:**

Emergency stop occurs once system receives the signals indicating failure of main circuit. This function is also able to prevent running of a defective elevator.

**39. Master CPU Protection by WDT**

The master control PCB is integrated with WDT protection. When any CPU or program problems are detected, the WDT Circuit will make a forced OFF at the output terminals of the Master Control and reset the CPU.

**40. Overspeed Protection:**

This protection function is provided to avoid safety problems due to elevator running at a higher speed exceeding control limit.

**41. Underspeed Protection:**

This protection function is provided to avoid safety problems due to elevator running at a lower speed exceeding control limit.

**42. Leveling Switch Fault Protection:**

A protection functions to be activated in case of abnormal situations due to failure of leveling switch.

**43. CAN Communication Fault Protection:**

It prevents risks due to elevator running still in case of CAN communication failure.

**44. Safety Shoe Fault Protection:**

When the door is under unclosed state, the activation of safety shoe may make the elevator door opened automatically or keep it in open state so as to avoid seizing any passengers.

**45. Band Brake Switch Contact Detection Protection:**

The protection shall be activated in case that brake is found in system detection unable to act reliably.

**46. Elevator shaft self-tuning diagnosis:**

Elevator shaft data is the basis for control system instructing full-speed running. No correct elevator shaft data available, No elevator can operate normally. The elevator shaft self-tuning shall always be diagnosed "failed" until all the elevator shaft self-tuning procedures are completed successfully.

**47. Motor Thermal Protection:**

It aims to avoid overheat of motor and the resulting risks.

**48. Door Switch Fault Protection:**

The protection shall be activated to stop elevator and avoid shearing accident in case that the state of switch on door system are found abnormal.

**49. Door Lock Breakage Protection:**

This function is provided in order to avoid shearing and/or falling accidents in case that door opening during running. Any breakage of door lock during running must result in emergency stop of elevator.

**◆ Description of Optional Functions:****1. Pre-Door-opening**

This option enables the leveling car to open the door before it comes to a stop in order to raise the operational efficiency of the elevator, by which the door begins to open as soon as the car enters into the door zone (usually  $\pm 75$  mm from the leveling position) at a speed slower than 0.3m/s.

To enable the function, you are required to set F129 to "1" or "3" ("1": enables PRE-OPENING only, "3" enables the function of PRE-OPENING AND RE-LEVELING). In addition, corresponding magnetic switch should be additionally installed at two detection zones.

## 2. Relevelling with Door Open

Due to the stretch of wire ropes in case of high-rise buildings, the car at stop may move up and down while passengers leave and board the car, which may lead to mal-levelling. Once this situation is detected by the system, the control will make the car relevel at a slow speed with the door open.

To enable the function, you are required to set F129 to "2" or "3" ("2" enables PRE-OPENING AND RE-LEVELING only, "3" enables PRE-OPENING and PRE-OPENING AND RE-LEVELING). In addition, corresponding magnetic switch should be additionally installed at two detection zones.

To enable this function, you are required to, by F18, set the home floor (or refuge floor) for elevator returning in case of fire situation.

## 3. Fire Emergency Return

In the event of fire the fire return switch is put on by man, upon which the elevator will clear out all the registrations and calls, returning to the fire home as soon as possible with its door open.

## 4. Fireman Service

As the fireman switch is set on in case of fire, the car will stay ready for fireman service with the door open at the fire home, by which the automatic door operations are blocked and the door can only be opened or closed by pressing and releasing the buttons at short intervals. During fireman service the elevator only answers to the in-car registrations and clear up all of them when it comes to a stop. The normal travel can only be restored only when both the fire return and fireman switches are reset while the car is at the fire home with its door fully open.

## 5. The Second Car Panel

The second car panel is usually mounted on the left-front wall in the car with the same buttons and switches as those in the master panel. The second car panel functions the same as the master panel does in automatic state without attendant service, but it does NOT work during attendant and independent travels.

## 6. Car Panel by the Rear Door

In case of two doors opposite to one another in the cab, a second car panel by the rear or opposite door can be made available, which has the same buttons and switches as those in the other panel with almost the same functions. The difference lies in that on a landing where both doors can open, the door-opening button on the rear panel opens the rear door only while that on the front door opens the front door only. Likewise the car registrations on the rear panel open the rear door only while those on the front panel open the front door only, but the registrations made on both panels will open both doors.

## 7. Car Panel for the Handicapped

The car panel for the handicapped people can be located either below the master panel in the car or at a lower position on the left wall of the car. The panel has both floor number push- buttons and door-opening and -closing buttons, on which are inscribed with Braille in addition to normal floor numbers and marks. At a stop registered by the handicapped, the door will hold open for a longer time (usually by 30 seconds). The rear door will do the same if a registration is made for it in the panel for the handicapped.

## 8. Duplex Control

Duplex control is made available by CAN BUS— a serial communication bus that transfers the data in coordination of the joint call-handling capacity of the two elevators with a view to increasing the efficiency of both. The key to duplex control lies in the optimized distribution of the landing calls between the two elevators. The system works on the distance-based principle, i.e., wherever a call is registered, the control assigns it to the elevator that is nearer to the registered floor so as to reduce the waiting time to the minimum. The automatic return to main landing is intergrated in that after answering all calls and registrations, the elevator which stays nearer to the main landing returns to it. In this case the function of auto-return to main landing becomes optional, which can be realized by the handset.

When running in loop duplex mode, it is required to set F23 to "3". In addition, you are required to set, by F181, the communication address of each elevator. Furthermore, when the lowest floors of

the duplexed elevators are not at the same level, you are also required to set the floor offset by F10.

#### 9. Group Control

It's an option for centralized control of a number of elevators as many as max. eight in a group. The group control governs above the master control of every elevator in the group, responsible for registering and clearing out all the registrations and calls of the group. Monitoring the floor positions and other traveling conditions of the elevator in the bank, the system works out by real time the most rational and cost-effective solutions to every call by one of the elevators based on super-fuzzy algorithm and assigns that elevator to the mission, hence greatly raising the efficiency of the elevators, reducing both power consumption and waiting time by passengers.

When enabling group control function, the parameter F23 of each grouped elevator shall be set to "2". In addition, when the lowest floors of the grouped elevators are not at a same level, the floor offset should also be set by F10 as per the same method as that described in 8.2.

#### 10. Up Peak Service in Group

It is an option only available with the in-group control by time relay settings or by manual switches. When more than three up-going calls are registered on the main landing, the Up Peak Service traffic mode is actuated, whereby all the elevators will immediately return to the main landing with doors open as soon as they finish the Up Peak Service missions. The Up Peak Service traffic mode gives way to normal service when the up-traffic time is over, which is determined either by time relay settings or by manual switches.

#### 11. Down Peak Service in Group

It is an option only available with the in-group control by time relay settings or by manual switches. When the situation in which the elevators descend to the main landing fully loaded appears, the Down Peak Service traffic mode is actuated, whereby all the elevators will immediately return to the top landing with doors open as soon as they finish the Down Peak Service missions. The Down Peak Service traffic mode is switched to normal service when the down-traffic time is over, which is determined either by time relay settings or by manual switches.

#### 12. Zoned Waiting Service

It is also an option only available with the in-group control. When every elevator in the bank has stayed waiting for one minute, the group control starts the zoned waiting service, i.e., a)if no elevator is located on the main landing and the landings below it, the system will assign a elevator with easier access to the main landing, waiting there with the door closed; b)if two of the elevators in the bank are in normal service while no elevator is located on any one of the upper floors above the intermediate one, the system will assign a elevator with easier access to the predetermined upper landing, waiting there with the door closed.

#### 13. Zone (Building) Monitoring

By means of a RS485 communication cable the control system is connected with the PC located in the monitor room of the building (residential zone). With the monitoring software installed in the computer, the travel information such as floor location, travel direction and errors of the elevators can be shown in the computer screen.

#### 14. Earthquake Response Function

If earthquake response function is selected, the seismic detection device will activate instantaneously in case of earthquake and send a contact signal to control system, which will then instruct the running elevator to park at the nearest floor, open the door for escaping and at last stop the elevator.

The function doesn't need any other parameter setting but needs switches and the related wirings for earthquake detection.

#### 15. Arrival Gong on Car

An arrival gong mounted on the top or at the bottom of the car will sound off during the deceleration and leveling period for stop so that the passengers both in the car and on the landing will know that the elevator is coming soon.

#### 16. Arrival Lamp on Landing

With this option the direction-forecasting lamps are mounted on every landing, whereby the relevant direction lamp will flash up when the arriving car reaches the 1.2-meter distance from the floor level so that the waiting passengers on the landing will know that the elevator is arriving and in which direction it is heading for. The lamp will remain flashing until the door is closed.

#### 17. Arrival Gong on Landing

Arrival gongs with both up and down direction indications are mounted on every landing and the relevant one will sound off for the riding direction when a car is leveling in the door zone for stop so that the waiting passengers will know that this elevator is arriving.

#### 18. Leveling Fine Tuning

In order to avoid such complex procedures as adjusting the location of leveling inductor, certain software shall be used to adjust, in a minor range, the location of leveling switch at each floor.

#### 19. NS – SW Service in Group

The option provides users with two predetermined programs of selected service floors under two particular conditions for the elevators by manually setting on one of the two service floor selection switches in the sub-case of the car panel, one switch for a program respectively. When both switches are off, the elevators return to normal service. The predetermined programs refer to which floors' registrations the elevators will answer, which floors' up-call and which floors' down-calls the elevators will answer respectively.

#### 20. Separate Control of Car Doors

This option makes sense in two aspects: 1)When a car panel by the rear door is available, it facilitates the separate control of the doors in the car as specified in 6.Car Panel by the Rear Door. 2)When a push button panel is available on the rear landing, whose registration only enables the door of the rear entrance to open whereas an registration made on the push button panel on one of the front landings only enables the door of the front entrance to open. If registrations have been made on both sides, then both doors will open on the same landing.

When this function is required, not only appropriate hardware should be added, but also the parameter from F50 to F52 must be set correctly (parameter for front hall door of each floor: F50 for 1F~16F; F51 for 17F~32F; F52 for 33F~48F). In addition, the parameters from F53 to F55 must be set correct (parameter for back hall door of each floor: F53 for 1F~16F, F54 for 17F~32F; F55 for 33F~48F). A door can only be opened when the corresponding parameters are set as "OPEN ENABLED".

Additionally, when back call board is provided, the parameter F123 must be set as follows: "1" (means only front and back call boards are provided) or "3" (means not only the front and back call boards but also disabled call board are provided.)

#### 21. Nudging Door

With the option is switched on, if the door has been held open for ONE minute(subject to modify by parameter) without door-closing signal due to the effect of the safety beam or other mechanisms the door will start forced closing with an acoustic signal.

#### 22. VIP Priority Service

With VIP Priority Service a VIP landing is preset, where a VIP switch is integrated in the landing call button panel. A VIP service is activated by resetting the switch once, whereby all the landing and in-car registrations are cancelled immediately while the car comes directly to the VIP landing with its door open. Both the automatic door closing and landing calls are now blocked out while the control enables the VIP rider to select the destination floor in the car and close the door by pushing on the door-closing button constantly. The elevator will return to normal service as soon as the last VIP leaves the car.

#### 23. Emergency Levelling at Power-off

When the car happens to be out of the door zone in the event of a power failure, an entrapment of passengers takes place. In the wake of a power failure the emergency leveling unit will start, driving the elevator car to the nearest landing with the door open to release the passengers.

#### 24. NS – SW Service in Single

This option is made available for a single elevator or elevators in duplex control by manually setting the service floor selection switch in the sub-case of the car panel. A program on the selected service floors under a particular condition should be made based on the requirements of the user, whereby the elevator will override the landing calls and in-car registrations for those floors. When the service floor selection switch is set on, the elevator will NOT serve the selected floors by the program; when the switch is set off, the elevator will serve every floor in normal service.

When this function is required, not only service-non-service change-over switch shall be mounted in and connected to control box, but also the parameters F137~F139 must be set appropriately. When the change-over switch is at "ON" position, the parameters F137~F139 defines whether a floor will be serviced or not: F137 for 1F to 16F; F138 for 17F to 32F; F139 for 33F to 48F.

#### 25. Voice Landing Forecasting

With this option the system landing announcer makes a voice announcement of the approaching floor during every leveling time and of the traveling direction of the elevator before every door closing, etc.

#### 26. Load Compensation:

On the basis of the car load data from car load device, the system shall demand the elevator integrated drive controller to give a specific load compensation so as to improve the starting comfort.

#### 27. Hold Open Button:

By pressing down the Hold Open Button, the delayed door closing function shall be activated.

#### 28. Output and display suspended service:

A display method notifying passengers the service of certain elevators is suspended. This function don't need any setting, but certain calling board & display control board able to display such characters as "service suspended" shall be provided.

#### 29.Password Lock-out Function

Using password lock-out elevator special-purpose set sets the lock-out elevator time and lock-out the elevator password, as soon as is divided three ranks. When the corresponding time uses up, the elevator enters the self-locking condition, which the status can be available to use special-purpose set unlocking, or through special operation inside the car unlocking 29.

#### 30.Homing Open door at Stand-by

Elevator when in homing opens the door at Stand-by , the elevator possibly returns to the home automatically, also possibly is outside called with the instruction to the home.

#### 31.Duplex Control by the Car Rear Door Function

In parallel operation's elevator, the back door may also carry on mixes, parallel operation's elevator main board basis fuzzy algorithm calculates responds the elevator which Hall Calling at the back door , then the assignment elevator responded in the past.

#### 32.Floors Lock-out at the setting time function

Carries on the specific blockade elevator service in the specific time to the specific floor .The time may be one day in random period of time, may also be from the evening to tomorrow early morning.The floor may be 1-64 random floors. What the specific blockade elevator service refers to that Hall Calling the registration may be blocked alone , the calling registration may be also blocked alone, the calling and Hall Calling the registration may be also blocked, may also be not blocked.

#### 33.Load compensation function

For car mass balancing: Because the elevator starts time is sensitive to the car weight, which affects the comfort, the weighing compensation may revise that because of the car load-carrying capacity change the elevator stops or starts which can influence the comfort for elevator

For floor height linear compensation: Because the elevator does not install compensates the chain or the elevator compensation chain is unable to compensate the elevator height of lift to create to the heavy side and the car side influence, causes the elevator not to be dissimilar in each floor's start comfort, may eliminate this influence to floor height linear compensation.

#### 34.Checkup Hall Calling function

Increased Hall Calling the display panel on the overhaul condition inquiry whether to have the function: With handset to inquire, in Hall Calling the display when the board displaying \* number expresses to be possible for the normal communication.

The demonstration actual floor the biggest position is most highest for the elevator anchors the level

When F123 = 0 Supports front door 1-48

When F123 = 1 Supports front door 1-48, back door 49-96 (actual 1-48)



When F123 = 2 Supports front door 1-48, disabled person 49-96 (actual 1-48)

When F123 = 3 Supports front door 1-32

In Hall Calling board at the front door , \* number displays in the elevator menu to up summon , Hall Calling board at the back door shouts the board \* number displays in the elevator menu to down summon, In Hall Calling board at the disabled person \* number displays in the elevator menu to call.

### 3 Wiring of Elevator Integrated Drive Controller

This chapter defines the wiring of elevator integrated drive controller terminals, including the wiring of main circuit terminals, control circuit terminals and PG card terminals.

 Danger	<ul style="list-style-type: none"> <li>◎ <b>Before wiring, please make sure that power supply is completely disconnected.</b> Or it may cause risk of electric shock.</li> <li>◎ <b>Wiring must be performed by professional electrical personnel.</b> Or it may cause risk of electric shock.</li> <li>◎ <b>Earth terminal E shall be grounded reliably.</b> Or it may cause risk of electric shock.</li> <li>◎ <b>Please never touch the terminal with hands; never have the drive controller output line contact the enclosure.</b> Or it may cause risk of electric shock.</li> <li>◎ <b>Please never connect the power supply to output terminals U, V and W.</b> Or it may cause damage.</li> <li>◎ <b>Please never short the terminal <math>\oplus 1/\oplus 2</math> with <math>\ominus</math>.</b> Or it may cause risk of explosion.</li> </ul>
 Caution	<ul style="list-style-type: none"> <li>◎ <b>Please check the voltage of AC main circuit power supply is consistent with the rated voltage of integrated driver controller.</b> Or it may cause risk of fire and physical injury.</li> <li>◎ <b>Please correctly connect the braking resistor as per the wiring diagram.</b> Or it may cause risk of fire.</li> <li>◎ <b>Main circuit terminal must be firmly connected with the conductor or wire crimping terminal.</b> Or it may cause risk of damage.</li> </ul>

See Fig. 3.1 for typical terminal wiring diagram of elevator integrated drive controller.

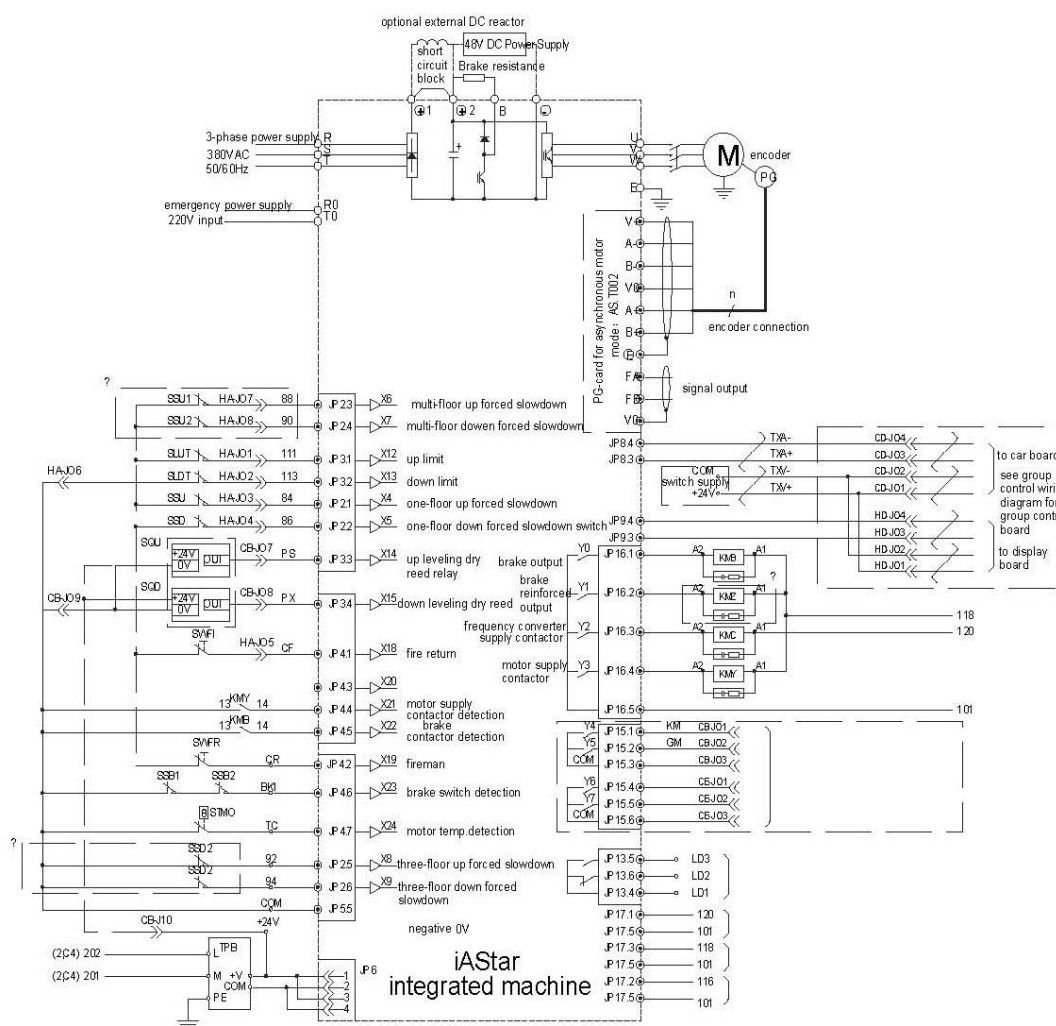


Figure 3.1 Wiring of elevator integrated drive controller terminals

Fig. 3.1 Terminal Wiring Schematic of Elevator Integrated Drive Controller



- a) Wire size should conform to IEC specifications.
- b) After wiring, make sure to check for correct wiring and reliable connection. Following items should be checked that:
  1. If the wiring is correct;
  2. If wire scraps and screws are left inside the drive controller;

3. If the screws become loose;
4. If naked wire of terminal unit contacts other terminal.
- c) iAStar-S8 elevator integrated drive controller contains braking component, but requiring external connection with braking resistor. Make sure to set the resistor between B and  $\oplus 2$  terminal and never have it connected with other terminal, otherwise the braking resistor and the drive controller will be damaged.



- d) Mount the optional “DC reactor” between terminals ⊕1 and ⊕2 and meanwhile remove short-circuit block between them.
- e) If battery operated function is required, connect the emergency power 220V between R0 and T0, and 48V DC power between terminals ⊕2 and ⊖. No connection will be allowed if battery operated function is not required;
- f) It is preferred to connect the earth point PE of iAStar-S8 elevator integrated drive controller with dedicated earth electrode, with earth resistant below 10Ω.
- g) Earth cable should be as short as possible.
- h) If the wiring is to be altered after energizing, the power supply should be firstly cut off. Since the charging capacitor of main circuit of elevator integrated drive controller needs some

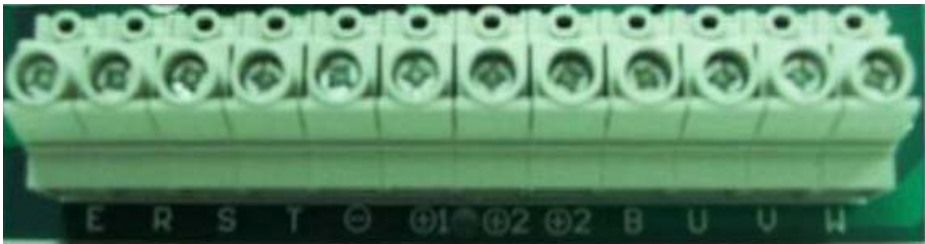
time to discharge, to avoid the hazard. DC voltage at ends of the capacitor can be measured only after the charging inductor turns off and next operation can be done after confirming the voltage is below safety voltage DC 24V.

- i) In the diagram “○” is the terminal of main circuit, “⊙” is the terminal of control circuit.

3.2 Wiring of Main Circuit Terminals

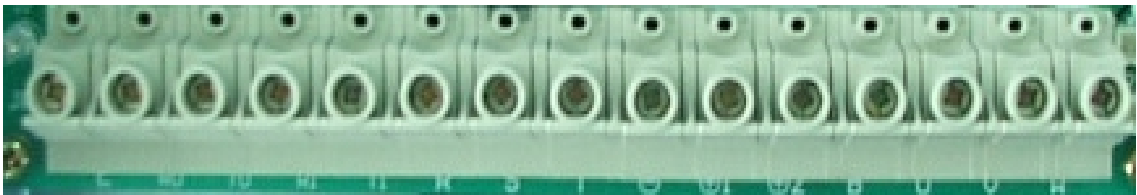
3.2.1 Layout of Main Circuit Terminals

Layout of main circuit terminals of 2.2kW/3.7kW/5.5kW/7.5kW/11kW/15kW elevator integrated drive controller is as shown in Fig. 3.2. See Fig. 3.3 for layout of those of 18.5kW/22kW drive controller and Fig. 3.4 for layout of those of 30kW/37kW drive controller.



E	R	S	T	⊖	⊕1	⊕2	⊕2	B	U	V	W
---	---	---	---	---	----	----	----	---	---	---	---

Fig. 3.2 Layout of 2.2kW/3.7kW/5.5kW/7.5kW/11kW/15kW Main Circuit Terminals



E	R0	T0	R1	T1	R	S	T	⊖	⊕1	⊕2	B	U	V	W
---	----	----	----	----	---	---	---	---	----	----	---	---	---	---

Fig. 3.3 Layout of 18.5kW/22kW Main Circuit Terminals



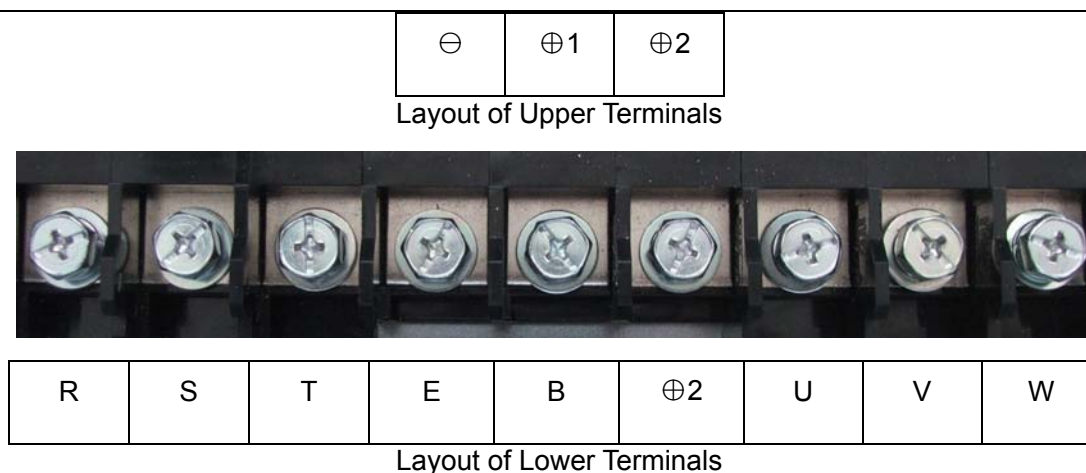


Fig. 3.4 Layout of 30kW/37kW Main Circuit Terminals

### 3.2.2 Labeling of Main Circuit Terminals and Functional Description

See Table 3.1 for functional description of main circuit terminals.

Table 3.1 Functional Description of Main Circuit Terminals

Terminal label	Terminal functional description
E	Earth terminal(PE)
R0,T0	Emergency power 220V input
R, S, T	Main circuit AC power input, connecting 3-phase input power
$\ominus$	Negative output terminal of DC bus
$\oplus 1$	Positive output terminal 1 of DC bus
$\oplus 2$	Positive output terminal 2 of DC bus
$\oplus 1, \oplus 2$	To be connected with DC reactor
$\oplus 2, B$	External braking resistor connection
$\oplus 2, \ominus$	Battery operation, to be connected with 48V DC power
U, V, W	Elevator integrated drive controller output, connecting 3-phase synchronous/asynchronous motor

### 3.2.3 Conductor Specification in Main Circuit Connection

The conductor is 600V plastic insulation conductor for power supply. See Table 3.2 for conductor specification and fastening torque.

Table 3.2 Conductor Specification and Fastening Torque

Model	Spec. of connectible wire mm <sup>2</sup>	Spec. of recommended wire mm <sup>2</sup>	Fastening torque(N.m)
iAStar-S8A/M4005A2	4~8	6	2.5
iAStar-S8A/M4005A3			
iAStar-S8A/M4007A2	4~8	6	2.5
iAStar-S8A/M4007A3			
iAStar-S8A/M4011A2	4~8	6	2.5

iAStar-S8A/M4011A3			
iAStar-S8A/M4015A2	4~8	6	2.5
iAStar-S8A/M4015A3			
iAStar-S8A/M4018A2	8~14	10	4.0
iAStar-S8A/M4018A3			
iAStar-S8A/M4022A2	8~14	10	4.0
iAStar-S8A/M4022A3			
iAStar-S8A/M4030A2	14~22	16	9
iAStar-S8A/M4030A3			
iAStar-S8A/M4037A2	22~40	25	9
iAStar-S8A/M4037A3			
iAStar-S8A/M4045	35~100	50	9.0
iAStar-S8A/M4055	60~100	60	18.0
iAStar-S8A/M4073	80~125	80	18.0

### 3.2.3 Structure of Main Circuit

The structure of main circuit is as shown in Fig. 3.5.

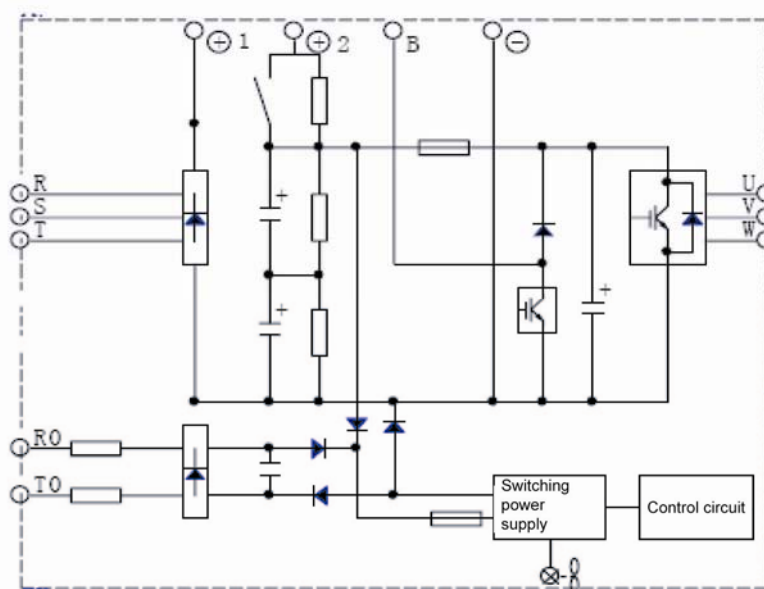


Fig. 3.5 Main Circuit Composition

### 3.2.4 Detailed Wiring Description of Main Circuit Terminals

#### 3.2.4.1 Earth Terminal (E), i.e. (PE)

- Preferably, earth terminal could be dedicated earth electrode and must be properly grounded, with earth resistance below 10Ω;
- Never use an earth wire together with a welder or other power equipment;
- Please use the earth wire with the specification required in electrical equipment technical standard and it should be as short as possible. If the

wire is too far from the grounding point, leakage current of the drive controller will destabilize the potential of earth terminal;

- Earth wire should be multistrand cooper conductor of at least 3.5mm<sup>2</sup>; it is recommended to use the dedicated yellow-green wire;
- In the case of grounding several drive controllers, it is recommended not to form a loop.

#### 3.2.4.2 Emergency Power 220V Input Terminals (R0, T0)

- a) In the case of power failure, AC 220V of UPS will supply the power to control circuit to ensure low-speed operation of the elevator;
- b) During normal operation of the elevator, AC 220V of UPS as always connects with terminals R0 and T0 of the drive controller. See Fig. 3.6 for the connection of emergency power supply.

#### 3.2.4.3 +48V DC Power Connecting Terminals ( $\oplus 2$ , $\ominus$ )

- a) In the case of power failure, the battery will supply low DC voltage to main circuit for low-speed operation to ensure the elevator stops at near floor;
- b) In the case of power failure, see Fig. 3.6 for UPS and battery connection.

#### 3.2.4.4 Main Circuit Power Input Terminals(R, S, T)

- a) 3-phase AC power is connected with main circuit terminals R, S and T via the circuit breaker. Phase sequence of input power is not related to the sequence of terminals R, S and T, any terminal could be connected.
- b) To reduce the conduction and radiation interference of the drive controller over input power, the noise filter may be provided at the power side. This filter can reduce the noise ingress into the drive controller from power cable and also reduce the noise outflow from the drive controller to power cable.

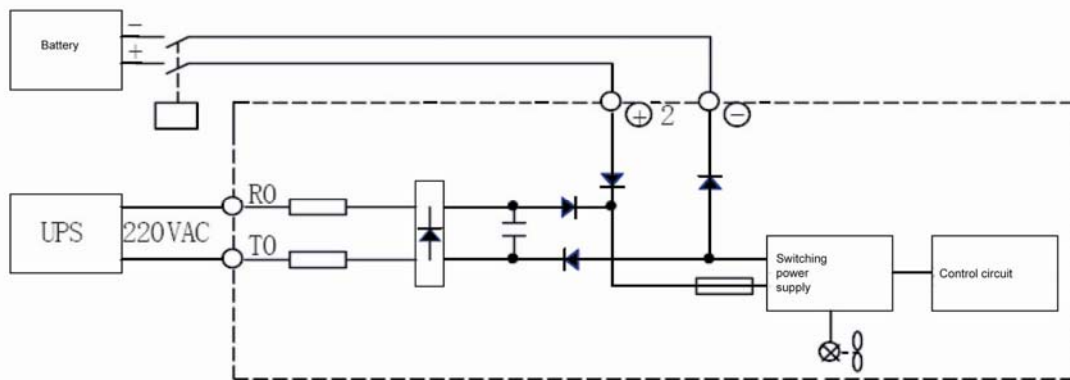


Fig. 3.6 Emergency Power and Battery Wiring Diagram in Case of Power Failure



Caution

**Special Note: Please use the specific noise filter for the elevator integrated drive controller.**

See Fig. 3.7 for correct setting of power-side noise filter.

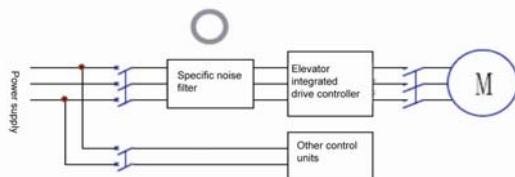


Fig. 3.7 Correct Setting of Power-side Noise Filter

See Fig. 3.8 and 3.9 for correct setting examples of power-side noise filter.

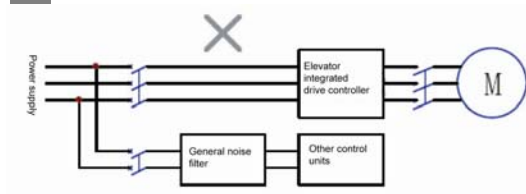


Fig. 3.8 Incorrect Setting Example 1 of Power-side Noise Filter

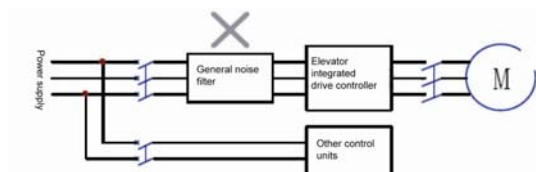


Fig. 3.9 Incorrect Setting Example 2 of Power-side Noise Filter

In Fig. 3.8, setting a noise filter at reception-side does not necessarily achieve the expected results and should be avoided.

#### 3.2.4.5 External DC Reactor Terminals ( $\oplus 1$ , $\oplus 2$ )

- To improve the power coefficient of the elevator integrated drive controller, DC reactor may be connected. Before delivery, a short-circuit block is mounted between terminals  $\oplus 1$  and  $\oplus 2$ . To connect DC reactor, please remove short-circuit block before connection;
- If the DC reactor is not used, do not remove short-circuit block, otherwise abnormal operation will occur;

See Fig. 3.10 for connection of short-circuit block.

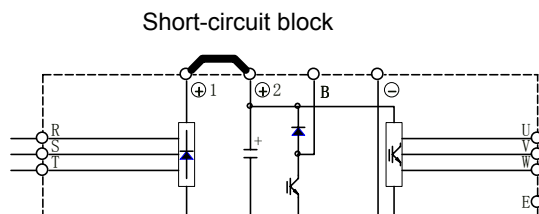


Fig. 3.10 Short-circuit Block Connection Diagram

See Fig. 3.11 for connection of external DC reactor.

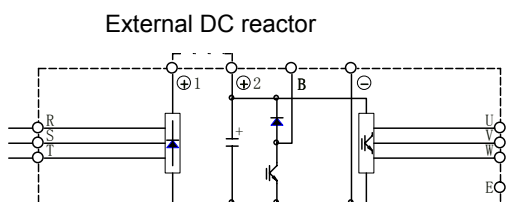


Fig. 3.11 Connection Diagram of External DC Reactor

#### 3.2.4.6 External Braking Resistor Terminals ( $\oplus 2$ , B)

- All iAStar-S8 elevator integrated drive controllers are provided with built-in braking units. To release the energy feed back in motor braking, the braking resistor must be connected. See the Braking Resistor Configuration Table in Section 10.1.1 for specifications of braking resistors.
- The braking resistor is mounted between terminals  $\oplus 2$  and B;

- c) To keep the resistor work normally, be sure to thoroughly consider the condition of its heat dispersion and ensure sound ventilation;
- d) The connection of braking resistor shall be less than 5m.

See Fig. 3.12 for connection of external braking resistor.

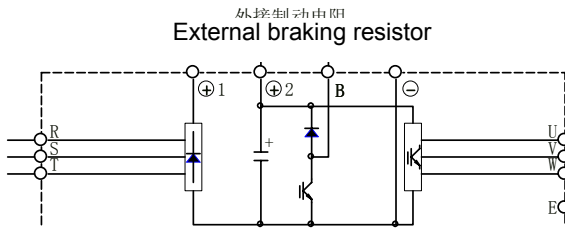
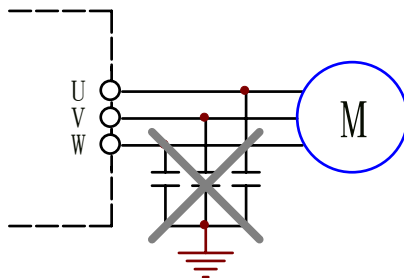


Fig. 3.12 Connection of External Braking Resistor

#### 3.2.4.7 Output Terminals (U, V, W) of Elevator Integrated Drive Controller

- a) Output terminals U, V and W of iAStar-S8 elevator integrated drive controller connect with motor terminals U, V and W. If the direction of motor rotation is wrong, please exchange any two connections of output terminal or motor terminal.
- b) Never connect the power supply with output terminals U, V and W of the drive controller.
- c) Never ground or short the output terminals.
- ◆ Never connect the capacitor and/or surge filter at output side. Since the elevator integrated drive controller outputs higher harmonic wave, capacitor and/or surge filter connection at output side may result in overheat and damage. See Fig. 3.13 for schematic of never connecting the capacitor at output side of the elevator integrated drive controller.



F

fig. 3.13 Schematic of Never Connecting the Capacitor at Output Side

### 3.2.5 Anti-interference Measures

#### 3.2.5.1 Connecting Specific Noise Filter at Output Side

To depress the noise produced at output side, a specific noise filter may be connected at the output side of iAStar-S8 elevator integrated drive controller. See Fig. 3.14 for connection of output-side noise filter.

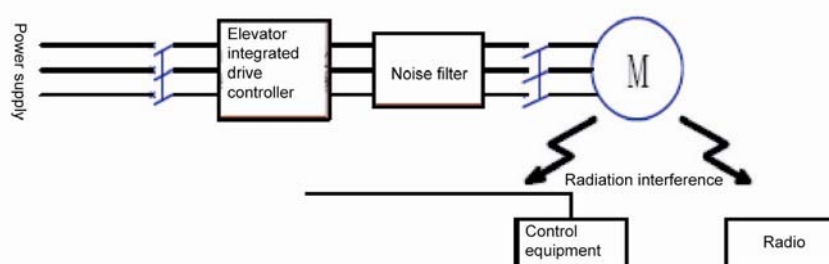


Fig. 3.14 Connection of Output-side Noise Filter

### 3.2.5.2 Layout of Main Circuit Wiring

To depress the radiation interference produced at output side and increase the interference immunity, the wiring of main circuit and control circuit should be separated. Main circuit wiring inserts through metal earth tube, at least 10cm away from signal cable. See Fig. 3.15 for main circuit wiring layout schematic.

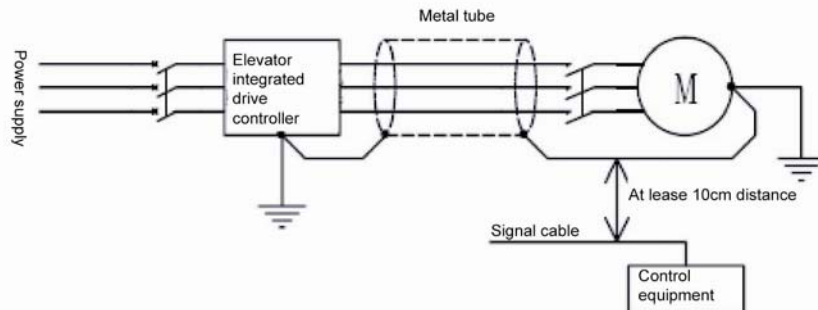


Fig. 3.15 Main Circuit Wiring Layout Schematic

### 3.2.5.3 Preferred Anti-interference Measures

The preferred anti-interference action is to set the noise filter at input and output sides, and have the drive controller unit shielded in an iron box. See Fig. 3.16 for details.

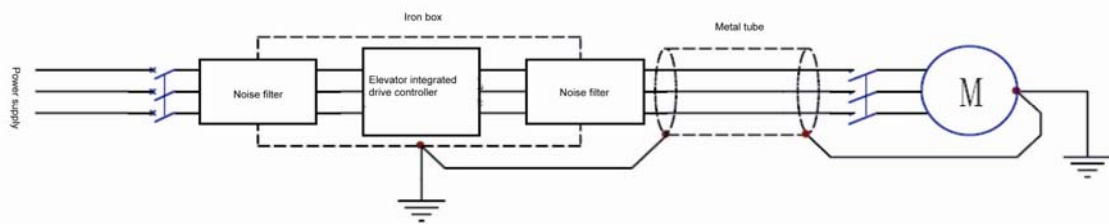


Fig. 3.16 Preferred Anti-interference Measures

### 3.2.5.4 Relationship between Wiring Length and Carrier Frequency

If the wiring between the elevator integrated drive controller and the motor room is too long, higher harmonic leakage current will be increased due to the influence of wire distributed capacitors, which might enable over-current protection for the drive controller output and produce adverse impact on surrounding equipment and the motor. Hence, preferably, the wiring between the elevator integrated drive controller and the motor room shall not be more than 100m in length.

If the length is over 100M, please adjust the carrier frequency E01 by referring to the Table 3.3 below and select the appropriate output-side filter and reactor.

Table 3.3

Wiring distance between the elevator integrated drive controller and the motor room	Below 50m	Below 100m	Above 100m
Carrier frequency	Below 15kHz	Below 10kHz	Below 5kHz



### **3.3      Wiring of Control Circuit Terminals**

#### **3.3.1    Layout of Control Circuit Terminals**

Layout of control circuit terminals is as shown in Fig. 3.17.

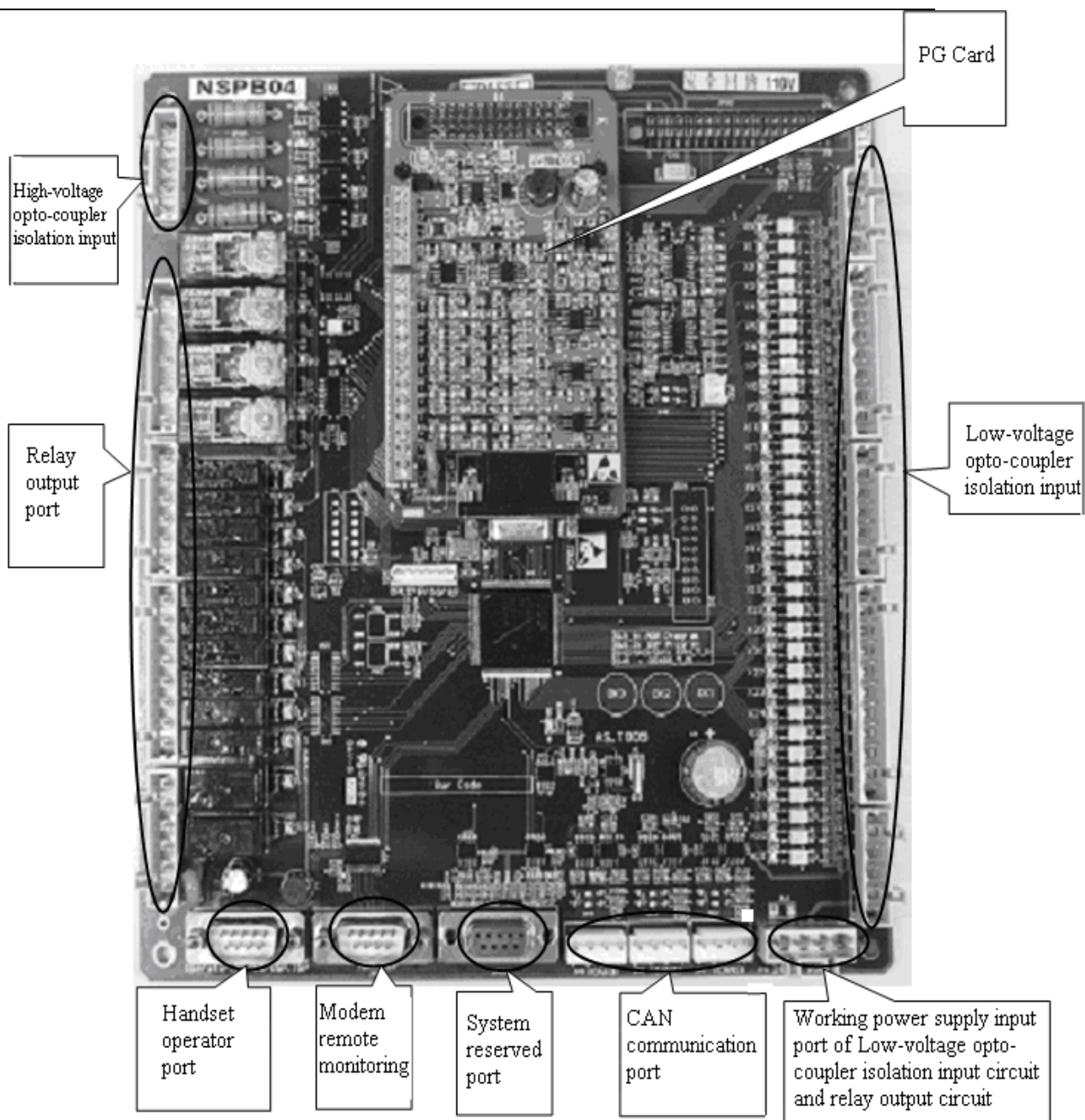


Fig. 3.17 Control Circuit Terminals

Note: PG card in the diagram is based on that for synchronous motor (SINCOS-B board of AS.T014). In addition, there is UVW board of AS.T010. In the case of controlling asynchronous motor, use ABZ board of the asynchronous PG card; see Section 3.4 for more.

### 3.3.2 Functional Description of Control Circuit Terminals

See Table 3.4 for functional description of control circuit terminals.

Table 3.4 Functional Description of Control Circuit Terminals

No.	Terminal	Name	Definitions	Usage	Notes
JP1	JP1.1	X0	Inspection signal 1, off for inspection, X0 and X1 on for normal	Input/default	

	JP1.2	X1	Inspection signal 2, off for inspection, X0 and X1 on for normal	Input/default	
	JP1.3	X2	Up signals for inch-up by inspection and up direction switch by attendant	Input/default	
	JP1.4	X3	Down signals for inch-down by inspection and down direction switch by attendant	Input/default	
<b>JP2</b>	JP2.1	X4	Up first terminal deceleration switch	Input/constant close	
	JP2.2	X5	Down first terminal deceleration switch	Input/constant close	
	JP2.3	X6	Up doubledeceleration switch	Input/constant close	
	JP2.4	X7	Down second terminal deceleration switch	Input/constant close	
	JP2.5	X8	Up third terminal deceleration switch	Input/constant open	
	JP2.6	X9	Down third terminal deceleration switch	Input/constant open	
	JP2.7	X10	Up fourth terminal deceleration switch	Input/constant open	
	JP2.8	X11	Down fourth terminal deceleration switch	Input/constant open	
<b>JP3</b>	JP3.1	X12	Up limit switch	Input/constant close	
	JP3.2	X13	Down limit switch	Input/constant close	
	JP3.3	X14	Up leveling switch	Input/constant open	
	JP3.4	X15	Down leveling switch	Input/constant open	
	JP3.5	X16	Front door zone switch signal input	Input/constant close	
	JP3.6	X17	relays for re-leveling with door open or pre-opening detection	Input/constant open	
<b>JP4</b>	JP4.1	X18	Fire return switch	Input/constant open	
	JP4.2	X19	Fireman switch	Input/constant open	
	JP4.3	X20	Motor power supply contactor 1 detection	Input/constant open	
	JP4.4	X21	Motor power supply contactor 2 detection	Input/constant open	
	JP4.5	X22	Brake contactor detection	Input/constant open	
	JP4.6	X23	Left brake switch detection	Input/constant open	
	JP4.7	X24	Right brake switch detection	Input/constant open	
	JP4.8	X25	Motor temperature testing signal	Input/constant open	
	JP4.9	X26	Earthquake testing signal input	Input/constant open	
	JP4.10	X27	Stand-by	Input/constant open	
<b>JP5</b>	JP5.1	X28	Stand-by(F156=0 for Safe loop relay detection)	Input/constant open	

	JP5.2	X29	Stand-by(F156=0 for Door lock relay detection)	Input/constant open	
	JP5.3	X30	Stand-by	Input/constant open	
	JP5.4	X31	Stand-by	Input/constant open	
	JP5.5	COM	X0-X31 common terminal for input		
<b>JP6</b>	JP6.1	GND	0VDC power supply input terminal(for opto-coupler isolation input circuit)		
	JP6.2	24V	24VDC power supply input terminal(for opto-coupler isolation input circuit)		
	JP6.3	COM	0VDC power supply input(for relay output circuit)		
	JP6.4	VCOM	24VDC power supply input(for relay output circuit)		
<b>JP7</b>	JP7.1	+24V	Stand-by 24VDC output, output current limit 0.5A		Twisted Pairs must be used for communication
	JP7.2	0V	Stand-by 0VDC output		
	JP7.3	CAN1H	Serial communication signal terminal for call and registration(TXA1+)		
	JP7.4	CAN1L	Serial communication signal terminal for call and registration (TXA1-)		
<b>JP8</b>	JP8.1	+24V	Stand-by 24VDC output, output current limit 0.5A		
	JP8.2	0V	Stand-by 0VDC output		
	JP8.3	CAN2H	Serial communication signal terminal for duplex or group control (TXA2+)		
	JP8.4	CAN2L	Serial communication signal terminal for duplex or group control (TXA2-)		
<b>JP9</b>	JP9.1	+24V	Stand-by 24VDC output, output current limit 0.5A		
	JP9.2	0V	Stand-by 0V DC output		
	JP9.3	CAN3H	Stand-by		
	JP9.4	CAN3L	Stand-by		
<b>JP10</b>	JP10	—	Stand-by		
<b>JP11</b>	JP11	—	MODEM remote monitoring port; ARM serial burn recording port		
<b>JP12</b>	JP12	—	RS232 port(for connection with handset operator); DSP serial burn recording port		
<b>JP13</b>	JP13.1	Y14B	Pre-door-opening output	Output/ constant open	
	JP13.2	Y14A	Pre-door-opening output	Output/ constant close	

	JP13.3	COM6	Common terminal Y14 of pre-door-opening output relay	—	
	JP13.4	Y15B	Fire return indication	Output/ constant open	
	JP13.5	Y15A	Fire return indication	Output/ constant close	
	JP13.6	COM7	Common terminal Y15 of fire return output relay	—	
<b>JP14</b>	JP14.1	Y8	Stand-by	Output	
	JP14.2	Y9	Stand-by	Output	
	JP14.3	Y10	Stand-by	Output	
	JP14.4	Y11	Stand-by	Output	
	JP14.5	COM4	Common terminal Y8-Y11 of output relay	—	
	JP14.6	Y12	Stand-by	Output	
	JP14.7	Y13	Stand-by	Output	
	JP14.8	COM5	Common terminal of output relay Y12-Y13	—	
<b>JP15</b>	JP15.1	Y4	relay output of front door opening	Output	
	JP15.2	Y5	relay output of front door closing	Output	
	JP15.3	COM2	Common terminal Y4-Y5 of output relay	—	
	JP15.4	Y6	relay output of rear door opening	Output	
	JP15.5	Y7	relay output of rear door closing	Output	
	JP15.6	COM3	Common terminal Y6-Y7 of output relay	—	
<b>JP16</b>	JP16.1	Y0	Brake contactor output	Output	
	JP16.2	Y1	Brake excitation contactor output	Output	
	JP16.3	Y2	Motor power supply contactor 1 output	Output	
	JP16.4	Y3	Motor power supply contactor 2 output	Output	
	JP16.5	COM1	Common terminal Y0-Y3 of output relay	—	
<b>JP17</b>	JP17.1	X32	Safe loop check positive voltage, line-in 110V /220V	Input	
	JP17.2	X33	Door lock check positive voltage, input voltage 110V/220V	Input	
	JP17.3	X34	Landing door lock check positive, input voltage 110V/220V	Input	
	JP17.4	X35	Stand-by	Input	
	JP17.5	COM	X32-X35 input signal common terminal 0V	—	
<b>JP25</b>	—	—	CPLD program JTAG burn recording port	—	

### 3.3.3 Description of Dip Switch Settings

<b>SW1</b>	SW1-1	ON	ARM program burn recording	OFF at maker's factory. Notes: when burn recording
------------	-------	----	----------------------------	---

	SW1-2	OFF	ARM normal working	the program, firstly burn CPLD, secondly set SW1 to ON to burn recording DSP program and then burn recording ARM program(note different burn recording ports)
		ON	DSP program burn recording	
		OFF	DSP normal working	

SW2,SW3,SW4	ON	Valid CAN terminal resistor	SW2 is set to OFF at maker's factory. SW3/SW4 is set to ON at maker's factory
	OFF	Invalid CAN terminal resistor	

SW5	ON	Valid RS485 terminal resistor	ON at maker's factory (try to keep ON during the use)
	OFF	Invalid RS485 terminal resistor	

### 3.3.4 Wire Specification in Control Circuit Connection

The wire is 600V plastic insulation wire for power supply. Se Table 3.5 for wire specification and fastening torque.

Table 3.5 Wire Specification and Fastening Torque

Model of the elevator integrated drive controller	Spec. of connectible wire mm <sup>2</sup>	Spec. of recommended wire mm <sup>2</sup>	Fastening torque(N.m)
iAStar-S8 full range	0.75~1	0.75	1.5

### 3.3.5 Cautions on Wiring of Control Circuit Terminals

The wiring of control terminals should be away from that of main circuit as far as possible, otherwise false action may be resulted in due to the interference.

## 3.4 Wiring of PG Card Terminals

PG card has several kinds, particularly PG cards for asynchronous motor and for synchronous motor. The model of asynchronous motor PG card is AS.T002 (suitable for ABZ incremental encoder), the model of synchronous motor PG card is AS.T014 (suitable for SINCOS encoder) or AS.T010 (suitable for UVW encoder).

### 3.4.1 Asynchronous Motor PG Card

#### 3.4.1.1 Layout of Asynchronous Motor PG Card Terminals

See Fig. 3.18 for layout of asynchronous motor PG card terminals.

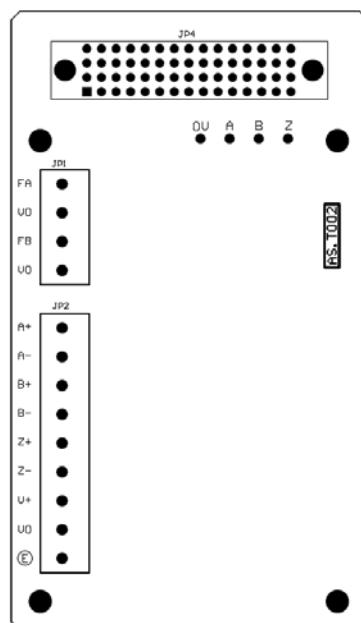


Fig. 3.18 Layout of Asynchronous Motor PG Card Terminals

### 3.4.1.3 Labels of Asynchronous Motor PG Card Terminals

See Fig. 3.19 for labels of asynchronous motor PG card terminals.

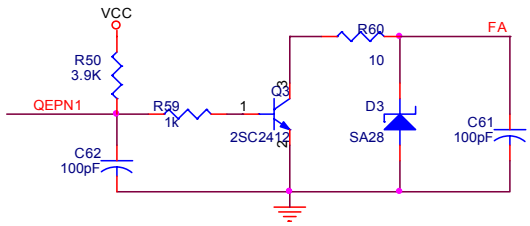
FA	V0	FB	V0	A+	A-	B+	B-	Z+	Z-	V+	V0	(E)
----	----	----	----	----	----	----	----	----	----	----	----	-----

Fig. 3.19 Labels of Asynchronous Motor PG Card Terminals

### 3.4.1.3 Functional Description of Asynchronous Motor PG Card Terminals

See Table 3.6 for functional description of asynchronous motor PG card terminals.

Table 3.6 Functional Description of Asynchronous Motor PG Card Terminals

Designation	Terminal label	Terminal functional description	Specification
Frequency division signal output	FA,FB	Frequency division signal output	Open collector output, max. output frequency 50kHz 
	V0	24V GND	
Encoder input	A+,A-	Encoder A phase signal	Open collector/push-pull, max. input frequency 50kHz
	B+,B-	Encoder B phase signal	
	Z+,Z-	Encoder Z phase signal	

	V+	Positive terminal of encoder power	Voltage 12VDC, max. output current 500mA
	V0	Negative terminal of encoder power	
	(E)	Shield earth	Earth terminal of shielded wire

#### 3.4.1.4 Wiring of Asynchronous Motor PG Card Terminals and Encoder Output Signal

Asynchronous motor PG card can receive two types of output signals: collector open-circuit signal and push-pull signal.

##### 3.4.1.4.1 Wiring with Collector Open-circuit Signal of the Encoder

See Fig. 3.10 for the wiring with collector open-circuit signal of the encoder.

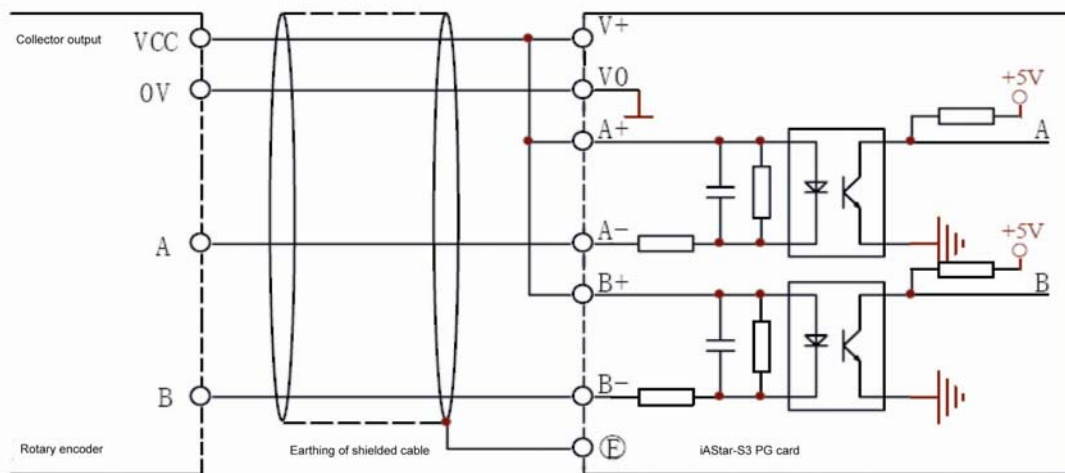


Fig. 3.20 Wiring with Collector Open-circuit Signal of the Encoder

##### 3.4.1.4.2 Wiring with Encoder Push-pull Signal

See Fig. 3.21 for the wiring with encoder push-pull signal.

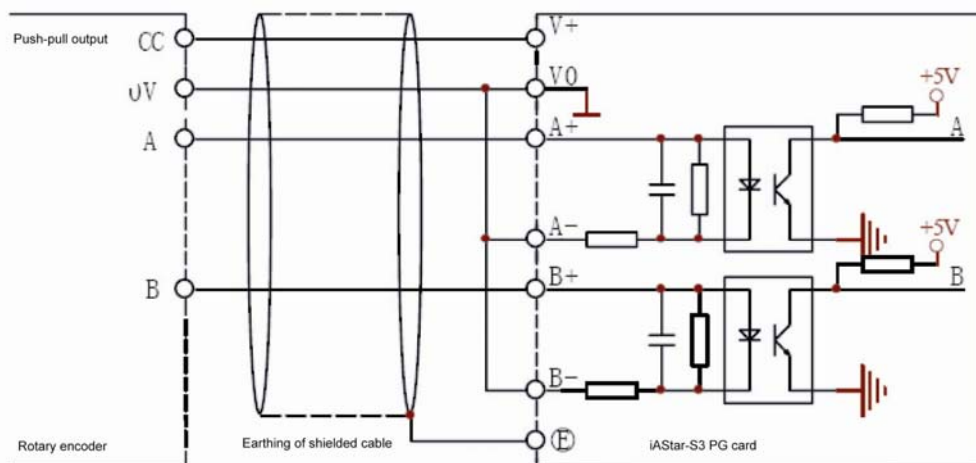
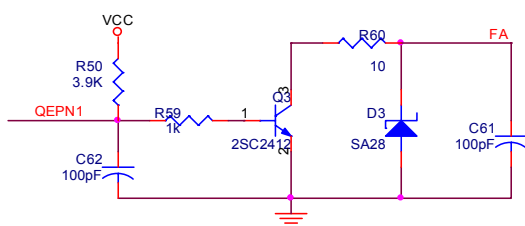
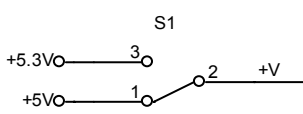


Fig. 3.21 Wiring with Encoder Push-pull Signal





Frequency division signal output	FA	Frequency division signal open collector output A	Open collector output, max. output frequency 50kHz 
	FB	Frequency division signal open collector output B	
	GND	0V	
Encoder signal input	A+,A-	Encoder A signal	Encoder differential signal input terminal (Differential Input Signal, Max 50kHz)
	B+,B-	Encoder B signal	
	Z+,Z-	Encoder Z signal	
	U+,U-	Encoder U signal	
	V+,V-	Encoder V signal	
	W+,W-	Encoder W signal	
	⊕	Shield earth	Shield earth
Encoder power	+V	+5V or +5.3V	S1 jumper selection  Max. 200mA output
	0V	+5V or +5.3V GND	

Note: If the connection of the encoder with PG card is longer, to overcome voltage drop of the line, power supply +5.3V may be used to enhance signal.

UVW board of synchronous motor PG card can receive UVW encoder differential signal. See Fig. 3.23 for the wiring with the encoder.

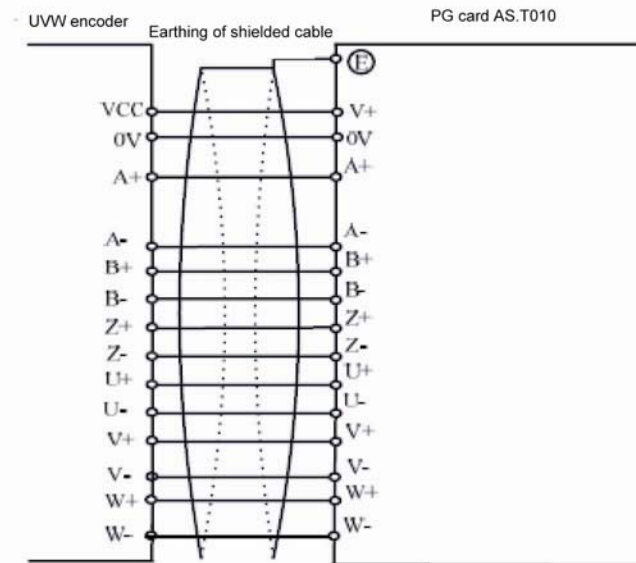


Fig. 3.23 The Wiring of Encoder

### 3.4.2.2 SINCOS Board of Synchronous Motor PG Card

See Fig. 3.24 for layout of SINCOS board terminals of synchronous motor PG card.

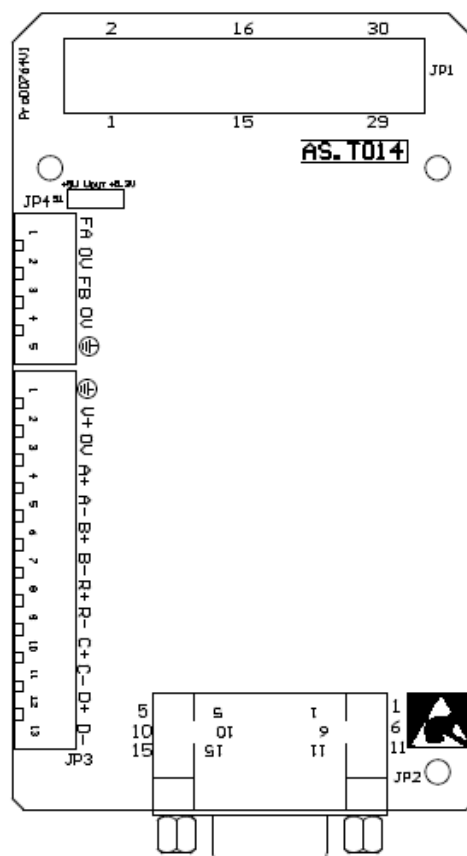


Fig. 3.24 Layout of SINCOS Board Terminals of Synchronous Motor PG Card

See Table 3.10 and 3.11 for labels of SINCOS board terminals of synchronous motor PG card, and Table 3.12 for functional description.

Table 3.10 Labels of SINCOS Board JP4 and JP3 Terminals of Synchronous Motor PG Card

FA	0V	FB	0V			V+	0V	A+	A-	B+	B-	R+	R-	C+	C-	D+	D-
----	----	----	----	--	--	----	----	----	----	----	----	----	----	----	----	----	----

Table 3.11 Labels of SINCOS Board JP2 Terminals of Synchronous Motor PG Card (DB15 socket)

Pin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Label	B-	—	R+	R-	A+	A-	0V	B+	+V	C-	C+	D+	D-	—	—

Table 3.12 Functional Description of SINCOS Board Terminals of Synchronous Motor PG Card

Designation	Terminal label	Terminal functional description	Specification
Open collector signal output	FA	Open collector signal output	Open collector output, max. output frequency 50kHz 
	FB	Open collector signal output	
	0V	GND	
		Shield earth	
Encoder input	A+,A-	Encoder SIN signal	Differential Input Signal (Max 50kHz)
	B+,B-	Encoder COS signal	
	R+,R-	Encoder Z signal	
	C+,C-	Encoder SIN signal	
	D+,D-	Encoder COS signal	
		Shield earth	Wiring terminal of shielded cable
Encoder power	+V	+5V or +5.3V	S1 jumper selected voltage output: 
	0V	+5V or +5.3V GND	Max. 200mA output

Note: If the connection of the encoder with PG card is longer, to overcome voltage drop of the line, power supply +5.3V may be used to enhance signal.

SINCOS board of synchronous motor PG card can receive the encoder SIN/COS differential signal. See Fig. 3.25 for the wiring with the encoder.

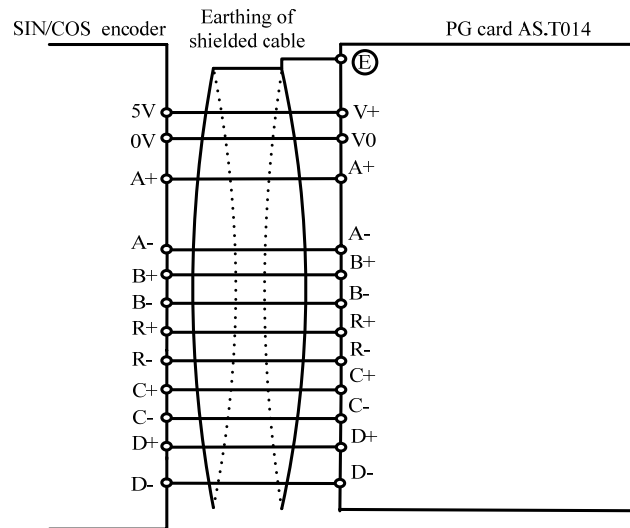


Fig. 3.25 The Wiring with Encoder SIN/COS Differential Output Signal

### 3.4.3 Cautions on Wiring of PG Card Terminals

Encoder signal cable should be separately arranged from main circuit and other power wires; duplex wiring at close intervals is never allowed. Encoder wiring should use the shielded cable whose shielding layer connects with earth terminal  $\textcircled{E}$ .

## **4 Connection of peripherals**

### **4.1 Example of Typical Configuration of Elevator Integrated Drive Controller**

错误！未找到引用源。

Figure 4.1 Example of Typical Configuration of Elevator Integrated Drive Controller

### **4.2 Precautions in Connection of Peripherals**

#### **4.2.1 Power Supply**

Supply voltage must be in consistence with the voltage rating of elevator integrated drive controller.

You are not required to consider phase sequence when connecting three-phase main.

#### **4.2.2 Circuit Breaker**

Circuit breaker must be provided between main and input terminals of elevator integrated drive controller.

The capacity of circuit breaker must be 1.5 to 2 times of the current rating of iAStar-S8 elevator integrated drive controller.

The time response of circuit breaker shall be determined in such a manner that the time response of thermal protection of elevator integrated drive controller is fully taken into account.

#### **4.2.3 Input-side AC Reactor**

The optional input-side AC reactor may be used to improve the power factor and eliminate the higher harmonic current at the input side.

#### **4.2.4 Input-side Interference Filter**

The optional dedicated input-side interference filter may be used to restrain the high frequency noise interference of elevator integrated drive controller to the main.

#### **4.2.5 Main Circuit Output Contactor**

This contactor is used to control the current flow of tractor. It picks up at each start of elevator and releases at each stop of elevator. It is a essential safety protection component always installed between drive and hoisting motor.

#### **4.2.6 Output-side Interference Filter**

The optional dedicated output-side interference filter may be used to restrain the noise interference and lead leakage current of elevator integrated drive controller.

#### **4.2.7 Output-side AC Reactor**

The optional output-side AC reactor may be used to restrain radio frequency interference from elevator integrated drive controller.

When the connection cable between elevator integrated drive controller and motor is too long (more than 20m), the output-side AC reactor may effectively prevent overcurrent of elevator integrated drive controller caused by distributed capacitance.

#### **4.2.8 DC Reactor**

The optional DC reactor may be used to improve power factor.

### **4.3 Technical Requirements On Wiring of Elevator Integrated Drive Controller Peripherals**

### 4.3.1 The requirements on cables by elevator shaft and trailing cable wiring

See figure 4-2 for the requirements on cables by elevator shaft and trailing cable wiring:

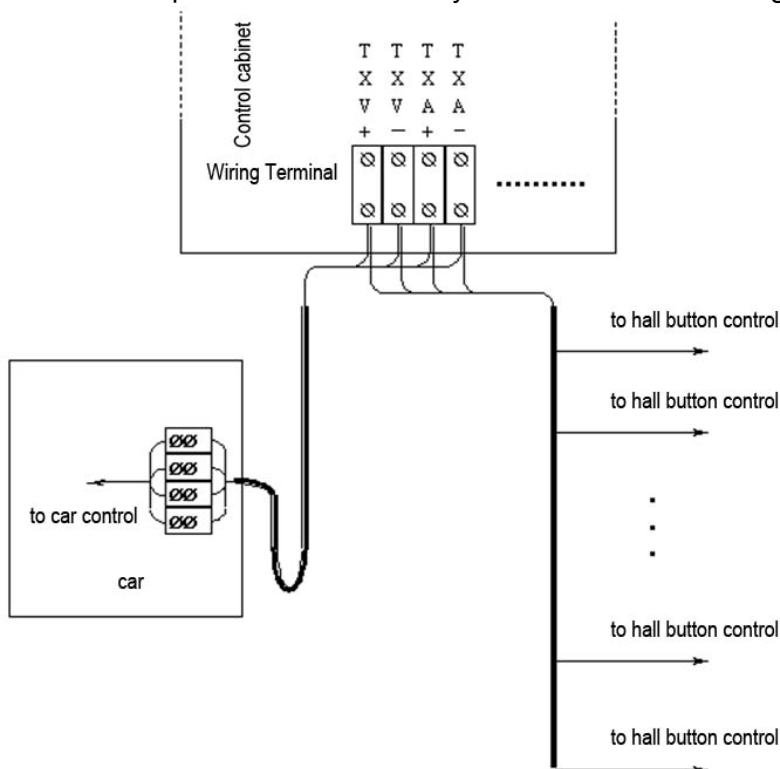


Figure 4.2 Elevator Shaft and Trailing Cable Wiring Sketch

Both elevator shaft and trailing cable each has four communication cables (TXV+, TXV-, TXA+, TXA-).

- ◇ Cares should be taken to avoid shorting between these four cables (TXV+, TXV-, TXA+, TXA-) and other cables. Prior to switching on, universal meter must be used to check there is no any loop between there four cables and other cables, especially such 24V, 36V, 110V, 220V, 380V and other supply cables.
- ◇ Cable TXV+ and TXV- supplies to branch points 24V voltage (branch points include car top control, car control, car display as well as each call board control). The wire size shall not be less than  $0.75\text{mm}^2$ .
- ◇ Cable TXA+ and TXA- is the communication bus between main control and each branch point.
- ◇ Where UTP (unshielded twisted pair) is used, it is recommended to select the yellow one for TXA+ and the green one for TXA-.
- ◇ Specification of UTP: characteristic impedance  $12\Omega$ ; allowable range:  $108\sim 132\Omega$ .  
Stranded Pitch:  $\leq 30\text{mm}$   
Wire size:  $\geq 0.75\text{mm}^2$
- ◇ Where communication cable and power line is in duplex by more than 5m long, they must be spaced more than 30cm in order to avoid crosstalk interference. If it is impracticable due to space limitation, UTP shall be used and make one end of its shielding wire grounded.
- ◇ Grounding of Elevator Shaft Cable and Trailing Cable

During wiring of shaft cable and trailing cable, please note to appropriately divide the heavy current line (includes door operator supply, safety circuit, door lock circuit and illumination

circuit, etc.) and weak current line (includes communication cable, DC 0V, DC 24V, leveling dry reed switch, terminal forced slowdown switch and terminal limit switch, etc.).

Note: if heavy current lines and light current lines are arranged in duplex, mostly occurred on trailing cables, the heavy current lines shall be arranged by a side, and the light current line by another. In addition, they must be spaced with grounding line.

Note: The wiring rules said above must be shown on design drawings, where the specific purpose of each wire size must also be defined.

Note: whether it is shielded or not, twisted pair must be used.

#### 4.3.2 Method of Wiring Between Call board and TXV+, TXV-, TXA+, TXA-

##### ◇ Branch Bus

Branches and bus shall be soundly wired in order to avoid excess voltage drop.

It is recommended to use the wiring methods shown by the following Figure 4.3:

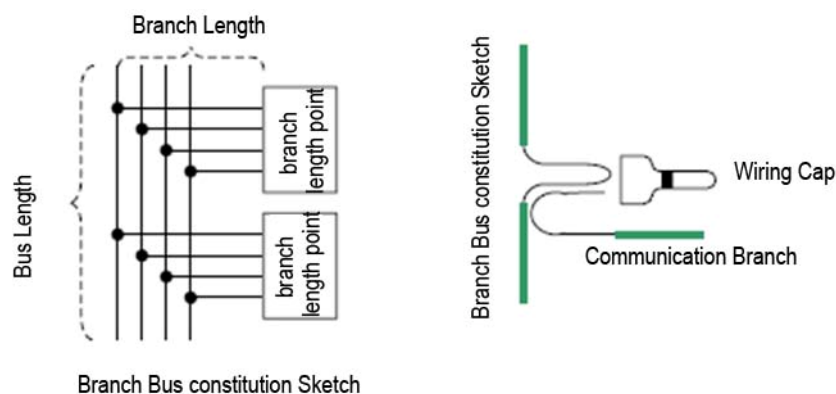


Figure 4.3 Wiring Between Branch and Bus

##### ◇ The Relation between TXV+, TXV-, TXA+, TXA- and Trailing Cable

TXV+, TXV-, TXA+, TXA- and other weak current signal cables (voltage not more than 24V) are allowed to share a same trailing cable. Heavy current signal cables (voltage higher than 24V) shall be arranged at other trailing cable.

Peels off the insulation sleeve of bus in the very vicinity of terminal point, connects the section unpeeled but not cut off at one end of the terminal and leave another end connected to branches.

Bus Specification: buss length  $\leq 500\text{m}$ ;

Branch Length:  $\leq 30\text{m}$ ;

Terminal resistance:  $120\Omega$  terminal –matching resistance should be arranged at both ends of the bus. (note: without terminal-matching resistance, the anti-interference capacity of communication may be impaired)

#### 4.3.3 Arrangement of Shaft Switch

In elevator integrated drive controller system, shaft switches need to be arranged correspondingly in two cases:

1. where the elevator speed is not more than 1.75m/s, such switches as SLUL, SLUT, SSU, SSD, SLDT and SLDL shall be arranged symmetrically;
2. where the elevator speed is more than 1.75m/s, not only the switch above said should be arranged, but also SSUI and SSDI should also be arranged symmetrically.
3. for the detailed locations of shaft switches see Figure 4.4.



Note: the switch locations vary from the setting of deceleration. As a rule, the deceleration switch should always be set at a distance a little lower than the normal deceleration distance.

Or the elevator can not run normally at terminal landings if the installation distance of switch far different from the actually necessary deceleration distance.

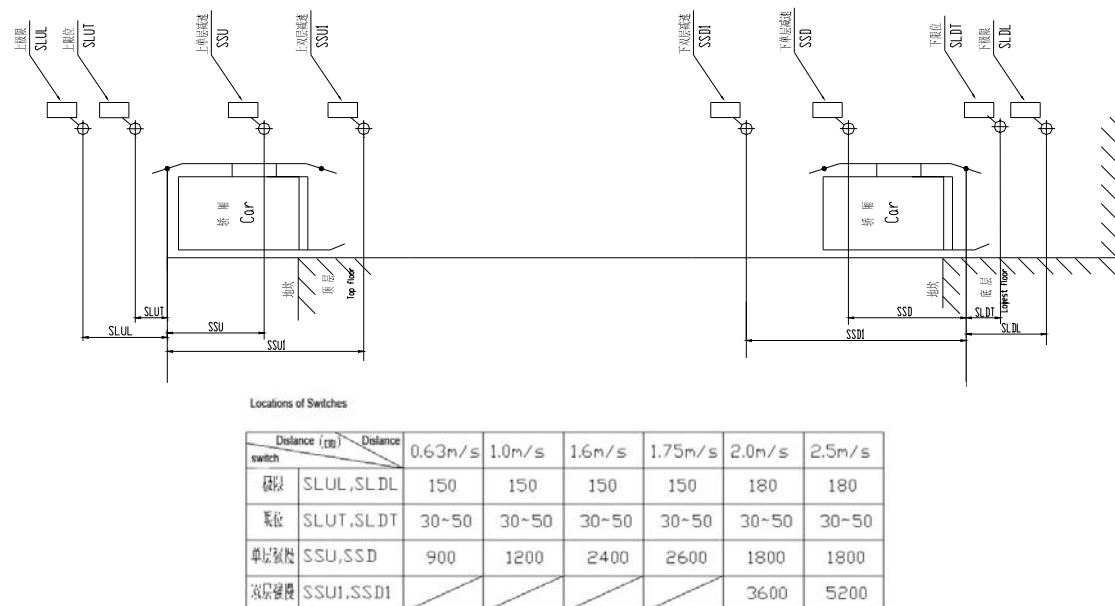
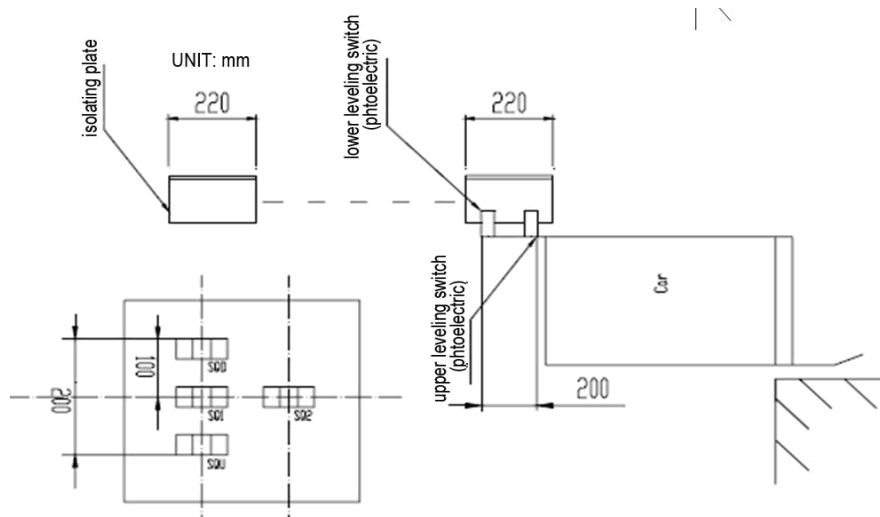


Figure 4.4 Detailed Locations of Shaft Switches

#### 4.3.4 Upper and Lower Leveling Inductor

In SmartCom control system, an upper lower leveling inductor and a lower leveling inductor, totally two inductor and additionally several magnet vanes are required in site. Furthermore, where PRE-OPENING or PRE-OPENING AND RE-LEVELING function is set, additional two door range inductors must be installed. See Table 4.1 for detailed requirements of inductor and magnetic vane.



Category	Leveling Inductor	Door Range Inductor for PRE-OPENING of door	Magnetic Vane
Type, Material	Either Permanent magnet inductor or photoelectric switch works. The latter	Permanent-magnet inductor	Iron plate thickness $\geq 1.5\text{mm}$

	type is recommended in order to improve response accuracy.		
Qty.	2	2	as per the number of floors; no other special required.
Height, Length, Depth	The height difference of top and bottom surface of upper and lower inductor is about 200.	Two door range inductors must be arranged at a same level and able to act at the same time.	Magnetic vane is 220 long, you are recommended not to make it less than this value. The inserted depth is more than 2/3.
Installation Location	Car top	Car top	Elevator shaft
Precautions	Grounded	Grounded	

Table 4.1 Detailed Requirements of Inductor and Magnetic Vane

Important! When inductors are made of non-insulated materials, they must be grounded appropriately!

## 5 Special Hand-held Liquid Crystal Operator

### 5.1 General

Handset is designed specially for the commissioning and maintenance. It consists of a LCD display and a film button. And the main functions are described below:

- Main monitor interface:

The following elevator status can be monitored via LCD display:

- a) Auto, inspection, attendant, fire, etc;
- b) Running times of elevator;
- c) Parking floor of elevator;
- d) Running direction of elevator;

- Monitor status

- a) Speed Curve: Running speed and speed curve
- b) Error Record: Running history and error number, floor and time
- c) Shaft Data: Shaft data of elevator
- d) Output & Input: Output and input status
- e) LED Monitor: After login Elevator Integrated main board can see Parking floor ,speed,rev,bus voltage,output current,output torque,magnetic pole direction,encoder direction one,encoder direction two,provide torque,heat sink temperature one,heat sink temperature two and so on information.
- f) Version: Operator and main board program name.

- Running status

The following elevator status can be monitored via LCD display:

- a) Parking floor of elevator;
- b) Running speed of elevator;
- c) Rev speed of elevator;
- d) Bus voltage;
- e) Output current;
- f) Output torque;
- g) Magnetic pole direction;
- h) Encoder direction one;
- i) Encoder direction two;
- j) Provide torque;
- k) Heat sink temperature one;
- l) Heat sink temperature two

- Parameter Setting

According to Function menu, you can view and set elevator parameters:

- a) Para. F: View and set all F parameters of elevator;
- b) Common Para.: View and set the usually used parameters;
- c) Elevator Specification: Sorting menu through which you can view and set parameters related to elevator specifications;

- d) S Curve: Parameters about running curve
- e) Motor Specification: can set sorting parameters related to STEP Integrated Elevator Machine;
- f) PID Adjust: Can set sorting parameters related to STEP Integrated Elevator Machine;
- g) Flr. Disp.: Can set floor display code;
- h) Test Run:
- i) Door Motor: Door zone, door open or close delay parameters;
- j) Level Tuning: include Up level and down level values and errors;
- k) Level Fine Tuning: Can set the level fine tuning value for every floor;
- l) Input Type: View and set constant open and constant close of input points for main board and car control board, each input point is operated in position;
- m) Service Floor.: View and set parking floor, NS-SW functional floor;
- n) Door Open Allowed: Set Door Open Allowed status of front and rear doors;
- o) Parameter Uploading: Upload parameters in operator to main board;
- p) Parameter Downloading: Download main board parameters to operator.

Attention:

In the course of upload and download, users must input correct check code in order to avoid misoperation and unnecessary losses.

- Call Function.

Monitoring and registering calls and instructions of elevator. In this status, users can monitor or register calls or instructions of every floor via the operator.

- Shaft Tuning

Shaft-tuning is operated via handset during elevator, to make elevator to do shaft tuning and record the position value of every floor.

- Motor Tuning

This Function only used in the STEP Integrated Elevator Machine;

- Reset

With the handset, all parameters of elevator can be reset, including error codes and running times. Before reset, users must input correct check code, so as to avoid misoperation and unnecessary losses.

- Time Setup

Set main board time by this menu.

- Change Password.

Change main board password by this menu. The current password can change itself and lower grade password.

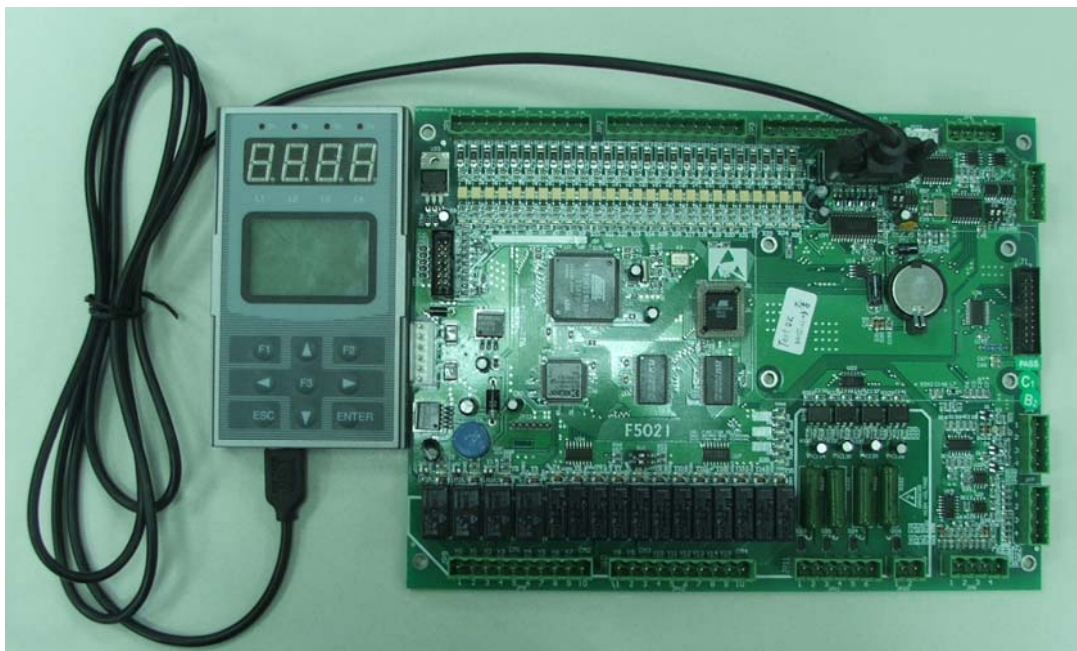
- Relogin

Transfer to the login window by this menu, and users should login main board again.

## 5.2 Connection

The connection of hand held operator and main board is the standard one of RS232, and USB plug is used on operator side, (note: there are two ports under operator with RS232 and CAN communication, and please refer to picture 3.1 for details), D type 9-pin plug is used on main board side with the connection wire of SM-08/USB.

The following schematic drawing is taken the connection of main board F5021 and hand held operator as an example, and for the other types of main board , please refer to the relevant handbook of main board for connection.



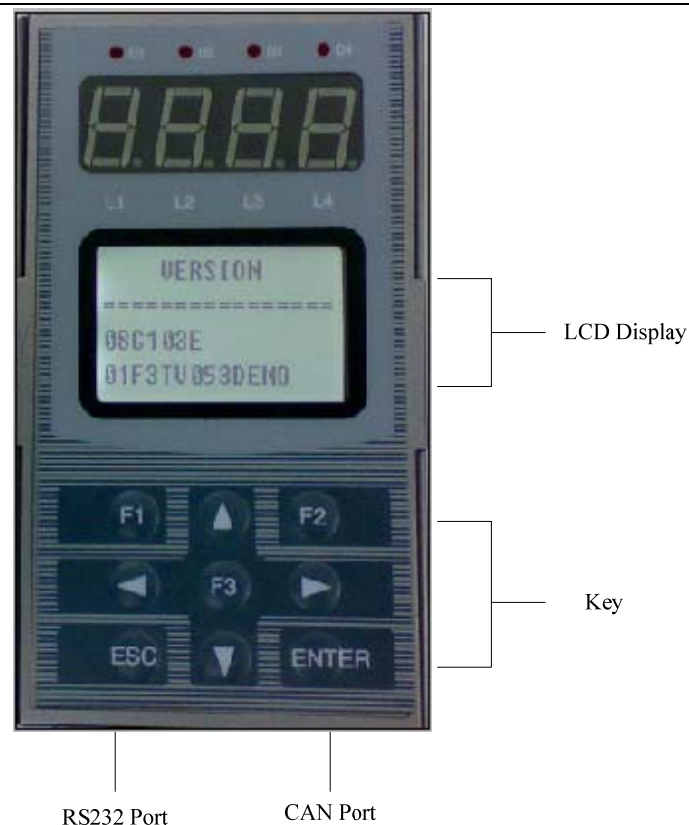
*Picture 5.1 connection drawing of main board F5021 and handset*

#### **Note**

- 1. Below the operator there are two ports: RS232 and CAN communication ports. Make sure that the operator is connected to RS232 port, or the operator communication connection will fail (CAN communication port for backup).**
- 2. This operator's connection (plug in and out) supports hot plug when the main controller is energized.**
- 3. Avoid shock, falling or use of operator in bad environment.**

### **5.3 Instruction of Handset**

Please refer to the following picture of operator figure, and the detailed instruction of keys in table 3.1.



Picture 5.2 Name of operator parts and function

Key		Function
Access key	F1	1. Return to elevator status window when it is not in status window 2. Enter failure inquiry window from elevator status window
	F2	1. Return to elevator status window from failure inquiry window 2. Enter input & output inquiry window from call window. 3. Enter call window when it isn't failure inquiry window or call elevator window.
	F3	Enter speed curve window
Direction key	▲	1. Move up by one item in function selection 2. Increase 1 of the present data in data input 3. Move up by 16 items 4. Set ON or OFF status when position setting.
	▼	1. Move down by one item in function selection 2. Decrease 1 of the present data in data input 3. Move down by 16 items for selecting position parameter 4. Set ON or OFF status
	◀	1. Move up by 10 items in function selection 2. Move cursor left for data input 3. Move left by 1 item for position setting
	▶	1. Move down by 10 items for function selection 2. Move right for data input 3. Move right by one item for position setting



Function key		1.Return to previous menu 2.Cancel data input
		1.Enter function selection 2. Enter edit status when viewing data 2.Save data input

Table 5.1 operation key function

## 5.4 Introduction to display windows

### 5.4.1 Classification of windows

Refer to the following table for the main windows displayed on operator







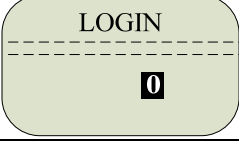
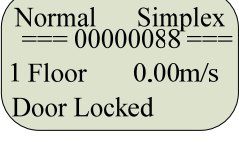
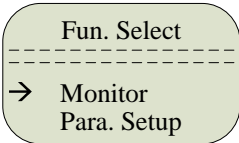
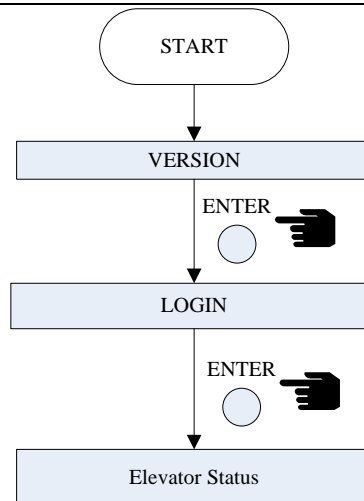
WINDOW	FUNCTION
<p>Start window</p> 	<p>This is the first window when power is on with the right connection. The operator software version is in the third line and the main board software version is in the fourth line.</p> <p>Press , ,  and  to adjust the resolution of LCD in this window with the digital display in the first line.</p> <p>Press  to enter Login window.</p>
<p>Login window</p> 	<p>Enter elevator status window after the input of correct password in this window.</p> <p><b>Note: some main board software allow users to view data without password input but cannot modify parameters.</b></p>
<p>Elevator status display</p> 	<p>Press F1 to return to this window if not in error record window after login. It includes the following contents in this window:</p> <ul style="list-style-type: none"> <li>Auto, inspection, attendant, fire, etc.</li> <li>Single or group status</li> <li>Floor position of elevator</li> <li>Running direction of elevator</li> <li>Running speed of elevator</li> <li>Running status of elevator</li> </ul> <p><b>Note: the operation instructed below take this window as the first window if there is no special notice.</b></p>
<p>Function selection</p> 	<p>This window contains the following functions: monitor, parameters setup, call, shaft teaching, reset, time set, password change, re-login, etc, and there are sub-window in some functions.</p>
Detailed function	Press Enter key to enter the sub-window of the detailed functions, and they can be viewed and modified, please refer to the next content for details.

Table 5.2 classification and main content of window


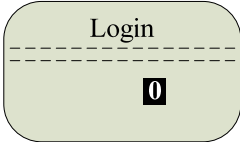

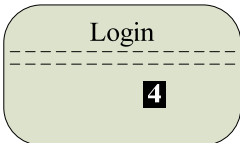

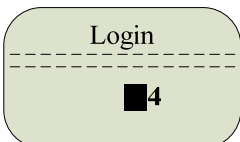

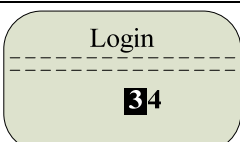

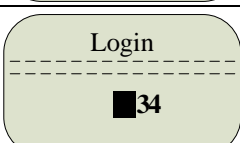

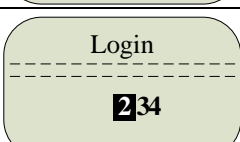

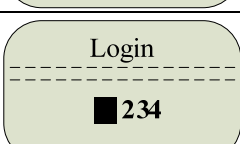
### 5.4.2 Operations from power on to elevator status window

Please refer to the following steps to view the elevator status after the correct connection:



Picture 5.3 operations from power on to elevator status window

Take the operation of login as an example: (initial password is 1234; you'd better change the initial password)

Step	Key	Display on operator	Remark
	Power on	To see picture 3.1	<b>The program version is difference with different program</b>
1			Enter login window
2	 Press 4 times		
3			
4	 Press 3 times		
5			
6	 Press 2 times		
7			




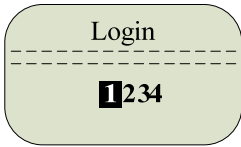

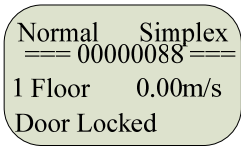
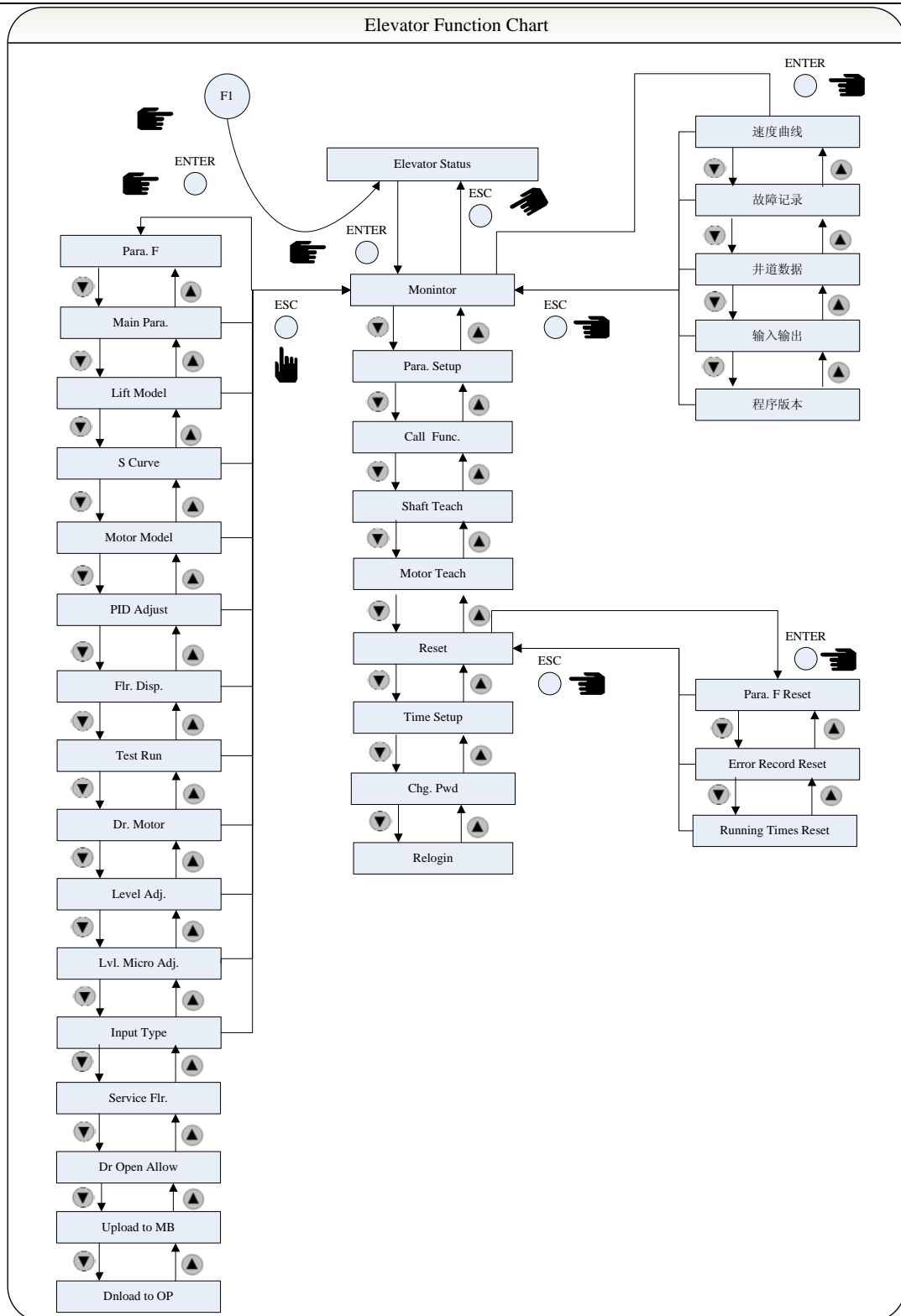
8			Password input is finished
9			Log in, and enter elevator status

Table 5.3 method of password login

#### 5.4.3 Function Change Relation

Press F1 key to return elevator status window if is not in error record window. Users can select function following the below picture:



Picture 5.4 changing between function

Press Enter key after users select one function to enter the relevant detailed function window.

#### 5.4.4 How to view the monitor window

Take view failure history 1 as an example:

Step	Key	Display	Remark
-			Elevator status window
1			Enter function selection window
2			Enter secondary window
4			Press  and  to select upper or lower item
3			View failure history
4			and  are used for page down and page up.
5			View failure information <b>Note: some main board software don't support view failure information.</b>

Table 5.4 how to view failure history

**Note:** Time format in failure information is shown in yy/mm/dd/hh/mm.

#### 5.4.5 How to set parameter

Take the setting of F11=12 as an example:

Step	Key	Display	Remark
-			Elevator status window
1			Enter function selection window













2		<div>Fun. Select</div> <hr/> <div>→ Para. Setup Call Func.</div>	
3		<div>Para. Setup</div> <hr/> <div>→ Para. F Main Para.</div>	Enter secondary window
4		<div>Para. F</div> <hr/> <div>F0 = 0.550m/s2 ACC</div>	View the value of parameter F
5		<div>Para. F</div> <hr/> <div>F1 = 0.550m/s2 DEC</div>	
6		<div>Para. F</div> <hr/> <div>F11 = 3 No. Of Floor</div>	
7		<div>Para. F</div> <hr/> <div>F11 = <b>3</b> No Of Floor</div>	Now the modification of value is enabled.
8		<div>Para. F</div> <hr/> <div>F11 = <b>2</b> No Of Floor</div>	
9		<div>Para. F</div> <hr/> <div>F11 = <b>1</b>2 No Of Floor</div>	
10		<div>Para. F</div> <hr/> <div>F11 = <b>1</b>2 No Of Floor</div>	
11		<div>Para. F</div> <hr/> <div>F11 = 12 No Of Floor</div>	The modification of parameter F11 is successful, if it is not successful, please check instruction of main board if it supports this kind of operator.

Table 5.5 How to Modify Parameter F

Please refer to the above steps to modify the other parameters F, but please attention that some parameters like I/O type, service floor, door blocking contain only two status with ON

and OFF, and press  and  key can move by 16.

Now take setting of X17 from NO to NC as an example:

Step	Key	Display	Remark
------	-----	---------	--------











-		<div>Normal      Simplex</div> <div>===== 00000088 =====</div> <div>1 Floor    0.00m/s</div> <div>Door Locked</div>	Elevator status window
1		<div>Fun. Select</div> <div>-----</div> <div>→ Monitor</div> <div>Para. Setup</div>	Enter function selection window
2		<div>Fun. Select</div> <div>-----</div> <div>→ Para. Setup</div> <div>Call Func.</div>	
3		<div>Para. Setup</div> <div>-----</div> <div>→ Para. F</div> <div>Main Para.</div>	Enter secondary window
4	 Press 11 times	<div>Para. Setup</div> <div>-----</div> <div>→ Input Type</div> <div>Service Flr.</div>	
5		<div>Para. Setup</div> <div>-----</div> <div>I 0 =        481</div> <div>Input Type X0-15</div>	
6		<div>Para. Setup</div> <div>-----</div> <div>I 1 =        4</div> <div>Input Type X16-32</div>	
7		<div>Input Type X16-32</div> <div>-----*</div> <div>I 1 =        4</div> <div>X22 Brake = NO</div>	Now the modification is enabled.
8	 press 5 times	<div>Input Type X16-32</div> <div>-----*</div> <div>I 1 =        4</div> <div>X17 Brake = NO</div>	
9		<div>Input Type X16-32</div> <div>-----*</div> <div>I 1 =        6</div> <div>X17 Brake = NC</div>	
10		<div>Input Type X16-32</div> <div>-----**</div> <div>I 1 =        6</div> <div>X17 Brake = NC</div>	

Table 5.6 how to set I/O type

When set Input Type, NC specifies normal close, and NO specifies normal open;

When set Service Flr., ON specifies allowed to stop, OFF specifies not allowed to stop;

When set Dr. Open Allow, ON specifies allowed to open, OFF specifies not allowed to open.

#### 5.4.6 Call function

In this function window the registered hall call and car instruction can be observed; what's more, they can be registered by operator directly, it is very helpful for debug elevator on jobsite.

Hall call and car instruction can be registered only in Normal mode. Now take registering up hall call of floor 3 as an example:

Step	Key	Display	Remark
-			Elevator status window
1			Enter function selection window
2	 Press 2 times		
3			
4			
5	 press 2 times		
6			

Table 5.7 how to register hall cal

/

#### 5.4.7 Other function

There are functions of shaft teaching, auto running, reset, time setup, change password, re-login in the first menu, these function is easy to be operated by press .

Now take resetting parameter F as an example:

Step	Key	Display	Remark
-			Elevator status window
1			Enter function selection window
2	 Press 5 times		
3			
4			Users must enter check code 5678 to prevent misoperation, like entering password.
5			Enter check code 5678
6			Press ENTER for reset, if it successes, "Reset successful" will be shown; if "Reset unsuccessful", please check whether this operation is needed in the inspection condition.

Table 5.8 Operation of reset parameter F

The time setting is a little different from F parameter setting, now take time set of year 2006, month 10, date 10, hour 15, minute 20 for example:

Step	Key	Display	Remark
-			Elevator status window
1			Enter function selection window
2	 Press 6 times		








3		Time Setup ----- 06Y 10M 01D 09:20:30	
4		Time Setup ----- 06Y 10M 01D 09:20:30	
5	 press 2 times	Time Setup ----- 06Y 10M 01D 09:20:30	
6	 Press 9 times	Time Setup ----- 06Y 10M 10D 09:20:30	
7		Time Setup ----- 06Y 10M 10D 09:20:30	
8	 Press 6 times	Time Setup ----- 06Y 10M 10D 15:20:30	
9		Time Setup ----- 06Y 10M 10D 15:20:30	

Table 5.9 Operation of time set

Operation of password modification is very similar with the operation of parameter F modification. The re-login window is like the login window, so we won't introduce again.



## 6 Instruction of Supporting Products

In the following Table 6.1, [iAStar-S8] elevator integrated drive controller and other supporting materials are tabulated for users making choices in accordance with the specific configuration of their elevators:

Name		Description	Remarks
Car Control Board SM-02(SM-02-C/D)	Board	Collect and process car information and other related information	disposition one Compulsive part,see note
Car Control Board SM-02(SM.02/G)	Board	Collect car input and call button information and other related information	disposition two Compulsive part,see note
Car Control Board SM-02(SM.02/G)	Board	Collect the top of the car information and other related information	disposition two Compulsive part,see note
Car call board SM-03		Mounted in car operation box for collecting the call and door button information	Compulsive part
Call & display control SM-04	SM-04-VRF	optional part1	For call and display Compulsive part
	SM-04-VSC	optional part2	
	SM-04-HRC	optional part3	
	SM-04-HSC	optional part4	
	SM-04-VHL	optional part5	
	SM-04-UL	optional part6	
	SM-04-VL/A	optional part7	
	SM-04-VL/B	optional part8	
Back up power running Extension board		SM-04-VHL,for back up power running function	optional part
Car and the top of the car Extension Board SM.09IO/B		IO Extension for the Rear door and function expanding	disposition one optional part,see note
Call board		For installation of call board/display panel	optional part
Operation box		For installation of instruction board and in-car display panel	optional part
Brake resistor		Mounted in control box for adjusting heat dissipation of hoisting motor drive. The brake resistor varies from the power of controller.	compulsive part
Asynchronous PG-card AS.T002	PG-card	For asynchronous motor	Compulsive for asynchronous motor
Synchronous PG-card: AS.T007 (match SIN/COS encoder) AS.T010 (match UVW encoder)		For synchronous motor	Compulsive for synchronous motor
Asynchronous Motor control Box		For asynchronous motor. Includes iAStar-S8 controller and complete integrated parts.	Optional
Synchronous Motor control box		For synchronous motor. Includes iAStar-S8 controller and complete integrated parts.	Optional
Group control board SM-GC		For group control of 3-8 elevators	Compulsive for standard group control
Handset and connection cable		For elevator commissioning	compulsive part for commissioning

Table 6.1

Notes: The Car system disposition has two ways to be possible to elect:

Disposes one: Non-Top-Car control system disposition Car control board SM-02 (sees disposition one must elect);

Disposes two: The Car and The Top Car separate control system disposition The Car and The Top Car control board (sees disposition two must elect), the back door or the extended function needs to increase the extension board SM.09IO/B (to see disposition two may elect).

## 6.1 Description of Car Control Board (disposition one)

### 6.1.1 External and Mounting Dimensions of Car Control Board

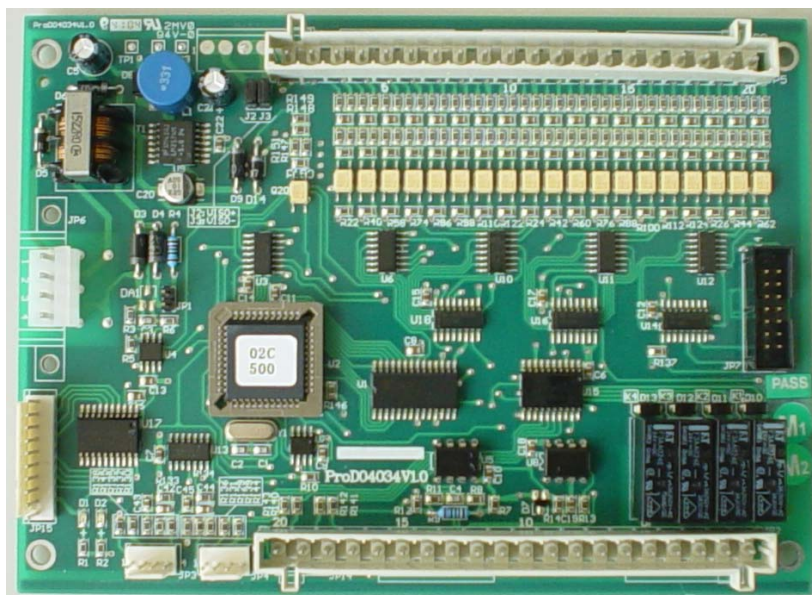


Fig. 6.1 Outside View of Car control board

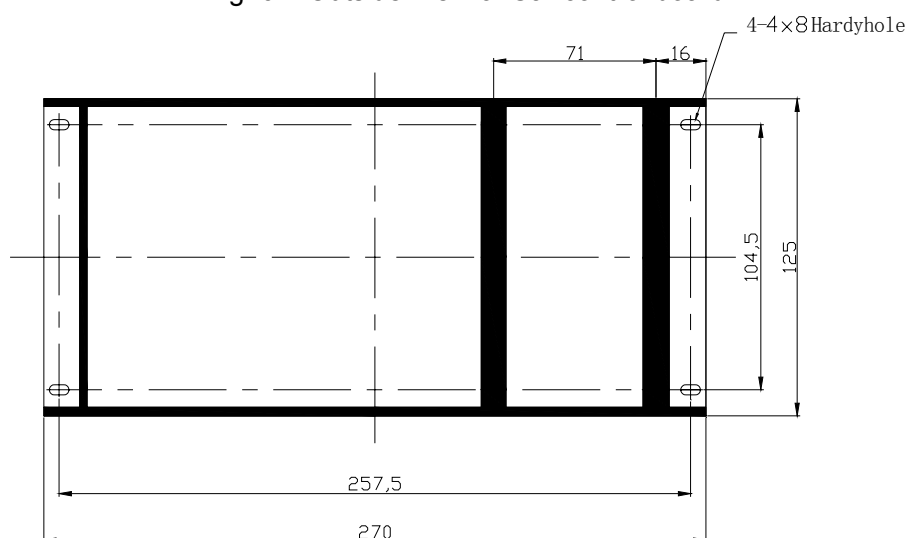


Fig.6.2 Mounting Dimensions of Car Control Board

### 6.1.2 Definitions of Plug-ins and Ports on Car Control Board

Car Control Board			
Socket	Type	Type	Type
JP2/JP5	WAGO 20P	WAGO 20P	14-pin double-lined vertical
JP3/JP4	CH2510-4	CH2510-4	CH2510-10
<b>JP6</b>	CH3.96-4		

List 6.2 Terminal Specifications on Car Control Board

No.	Terminal	Name	Definitions	Usage	Notes
<b>JP2</b>	JP2.1	TY0	relay output of arrival gong upward	Output	
	JP2.2		common terminal TY0		

	JP2.3	TY1	relay output of arrival gong downward	Output	
	JP2.4		common terminal TY1		
	JP2.5	TY2	relay output of car lighting relay	Output	
	JP2.6		common terminal TY2		
	JP2.7	TY3	relay output of Nudging door-closing signal	Output	
	JP2.8		Common terminal TY3		
	JP2.9	TY4	Transistor output of Overload lamp-, output capacity 24V、20mA	Output	
	JP2.10	TY4	Overload lamp +	Output	
	JP2.11	TY5	Transistor output of buzzer-, output capacity 24V、20mA	Output	
	JP2.12	TY5	buzzer output +	Output	
	JP2.13		load analogy signal +	Input	
	JP2.14		load analogy signal -	Input	
	JP2.15	RS485A+	RS485 communication port +		
	JP2.16	RS485B-	RS485communication port -		
	JP2.17		stand-by		
	JP2.18		stand-by		
	JP2.19		Isolation power supply input +		
	JP2.20		Isolation power supply input -		
JP3	JP3.1		door-open indicator power supply -	Output	Note 2
	JP3.2		door-open indicator power supply +	Output	
	JP3.3	TX19	one terminal of door-open button	Input	
	JP3.4	TX19	the other terminal of door-open button	Input	
JP4	JP4.1		door-close indicator power supply -	Output	
	JP4.2		door-close indicator power supply +	Output	
	JP4.3	TX20	one terminal of door-close button	Input	
	JP4.4	TX20	the other terminal of door-close button	Input	
JP5	JP5.1	COM	common terminal TX0-TX18, 0V		
	JP5.2	TX0	door-open limit switch (front)	Input	
	JP5.3	TX1	door-close limit switch (front)	Input	
	JP5.4	TX2	safety edge switch(front)	Input	
	JP5.5	TX3	over-load switch		
	JP5.6	TX4	full-load switch	Input	
	JP5.7	TX5	switch for NS-CB setting	Input	
	JP5.8	TX6	Attendant direction turn	Input	
	JP5.9	TX7	light-load switch		
	JP5.10	TX8	Attendant	Input	
	JP5.11	TX9	VIP	Input	

	JP5.12	TX10	Attendant by-pass switch		
	JP5.13	TX11	door-open limit switch (rear)	Input	
	JP5.14	TX12	door-close limit switch (rear)	Input	
	JP5.15	TX13	safety edge switch for rear door	Input	
	JP5.16	TX14	Light gate for front door		
	JP5.17	TX15	Light gate for rear door	Input	
	JP5.18	TX16	NS-SW setting switch	Input	
	JP5.19	TX17	Password setting switches for floor access	Input	
	JP5.20	TX18	Hold-button (HOLD)	Input	
JP6	JP6.1	TXV+	power supply +24V in serial communication with car and call control etc.		CAN BUS
	JP6.2	TXV-	power supply 0V in serial communication with car and call control etc.		
	JP6.3	TXA+	positive signals in serial communication with car and call control etc.		
	JP6.4	TXA-	Negative signals in serial communication with car and call control etc.		
JP15	JP15.1		duplex voice port D0, LSB		Note 1
	JP15.2		duplex voice port D1		
	JP15.3		duplex voice port D2		
	JP15.4		duplex voice port D3		
	JP15.5		duplex voice port D4		
	JP15.6		duplex voice port D5		
	JP15.7		duplex voice port D6		
	JP15.8		duplex voice port D7,MSB		
	JP15.9		common terminal 0V		
	JP15.10		common terminal +24V		
JP1	Jumper for CAN serial communication port. DO NOT use it if the terminal resistor in car display is already bridged.				
JP7	for connecting car registration control PCB SM-03-D				
J2/J3	If the input power is supplied by JP6.1 and JP6.2, bridge J2 and J3. But if it is supplied by JP2.19 and JP2.20, DO NOT make any bridge!				

List 6.3 Terminal Definition of Car Control Board

**Notes:**

1. SM-02-D outputs eight-bit binary coding pulse signals, triggering voice landing forecast during deceleration of car for stop, one second for every pulse output. The eight-bit output is in the mode of transistors with open loop in the collector and shared anode, output voltage DC24V, current capacity 50mA. The 8-bit binary coding provides as many as 256 output status in accordance with STEP WORD BANK for display. If the user sets B1 in display for the 1<sup>st</sup> floor with its corresponding code 60 which is turned into binary code for output on JP15. The voice landing forecast B1 is made available by decoding the binary code. At present 0-247 are processed by the definition of the word

bank for display ( see the List of Display Codes in 6.3.8 ) whereas the codes of 248-255 are defined as following:

- (248) 11111000: The signal is sent out when the elevator is at the main landing with the door closed for calls of going up.
- (249) 11111001: The signal comes out when the elevator is in fire alarm service.
- (250) 11111010: The signal appears when the door-closing position limit switch turns from OFF to ON status during the door-opening.
- (251) 11111011: The signal appears when the door-opening position limit switch turns from OFF to ON status during the door-closing.
- (252) 11111100: Over-load alarm.
- (253) 11111101: Voice landing forecast for going up when the door is fully open.
- (254) 11111110: Voice landing forecast for going down when the door is fully open.
- (255) 11111111: Undefined.

## 2. Wiring and Connection

- The car controller with power supply and CAN BUS is lined in from JP6, of which JP6.01 and JP6.02 are for TXV+ and TXV-, JP6.03 and JP6.04 for TXA+ and TXA- respectively. TXV+, TXV- are power input DC24V; TXA+ and TXA- are communication lines which must be 4-wire Twisted Pairs.
- The car controller with input signals which are transferred to master control via CAN BUS as the car controller collects most of the switch-generated data signals from inside the car and both on top and bottom of the car such as the inputs of door-opening and -closing, in-position signals for door-opening and -closing, safety edge, attendant, by-passing, full-load and over-load etc.
- The output signals generated by relays and transistors from car controller are transferred under the control signals from the master control via CAN BUS, of which the output signals by relays take control of the relays of arrival gongs and car-lighting etc. for landing forecasting and energy-saving in lighting, whereas the output signals from transistors are responsible for the control of the over-load lighting, alarm buzzer and door-open/close indicators etc.
- The connection between car controller and registration extension control is made ready in the car by means of plug-ins.
- The door-open/close button indicators is shown as follows, i.e., Pin 1 and Pin 2 to the positive and negative of power supply respectively, whereas Pin 3 and Pin 4 to the terminals of the button.

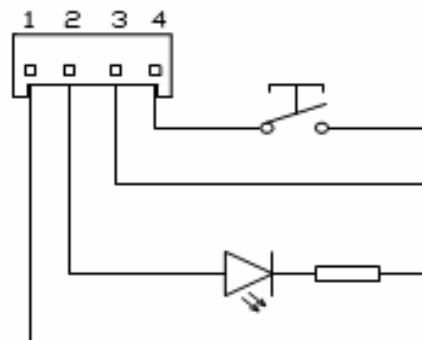


Fig. 6.3 Connection of Door Open/Close Buttons & Indicators

## 6.2 Description of Car Control Board (disposition one)

### 6.2.1 External and Mounting Dimensions of Car Control Board

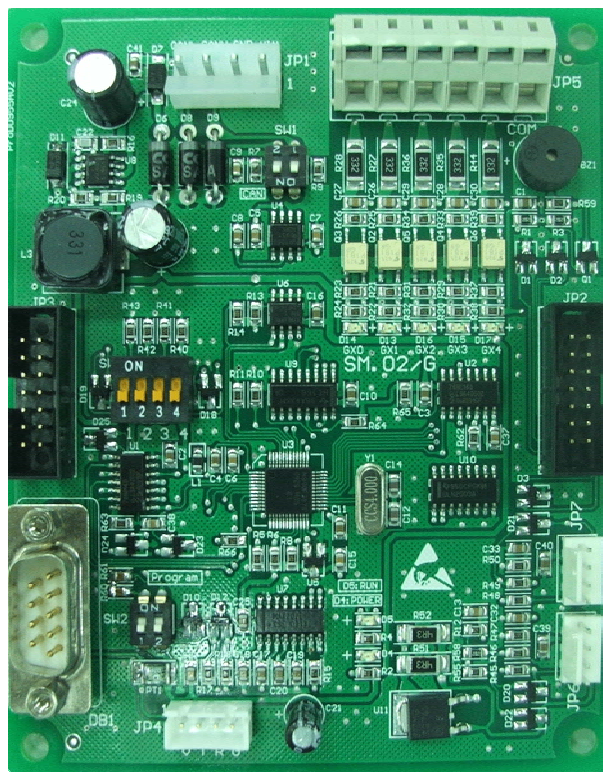


Fig. 6.4 Outside View of Car control board

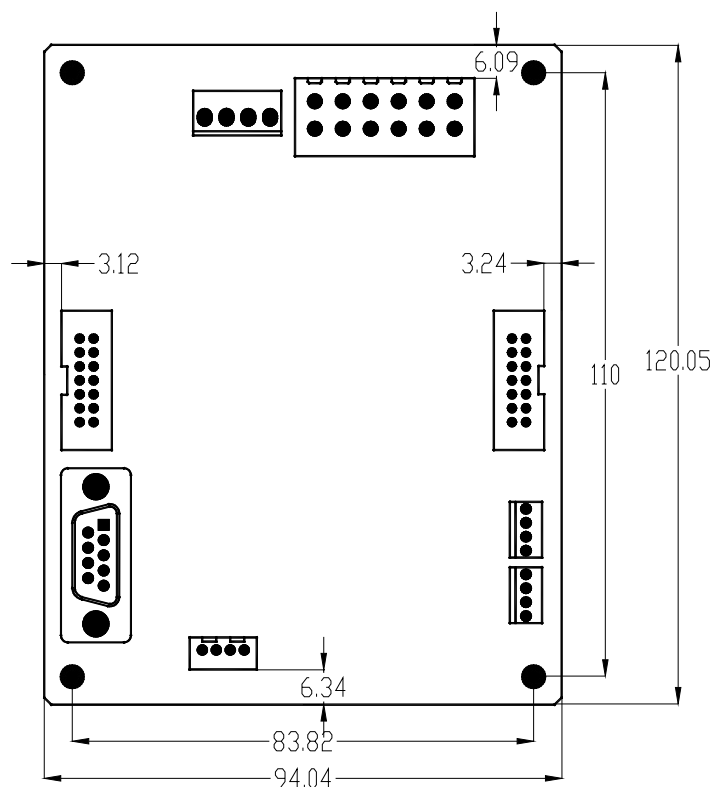


Fig.6.5 Mounting Dimensions of Car Control Board

### 6.2.2 Definitions of Plug-ins and Ports on Car Control Board

Car Control Board			
Socket	Type	Type	Type
JP1	CH3.96-4A	JP5	AK 3000/06-508-ash
JP2/JP3	IDC-14P	JP6、JP7	CH2510-4A
JP4	B4B-XH-A		

List 6.3 Terminal Specifications on Car Control Board

No.	Terminal	Name	Definitions	Usage	Notes
JP1	JP1.1		GND	Output	
	JP1.2		CANH		
	JP1.3		CANL	Output	
	JP1.4		GND		
JP2	Connection call board(the port don't support hot plug)				
JP3	Connection extension board				
JP4	JP4.1		V, +5V	Output	
	JP4.2		T	Sendout	
	JP4.3		R	Send in	
	JP4.4		G, 0V	Output	
JP5	JP5.1	TX22	(corresponding board GX0)attendant direction turning direction	input	Constant open
	JP5.2	TX8	(corresponding board GX1) attendant	input	Constant open
	JP5.3	TX9	(corresponding board GX2) independence	input	Constant open
	JP5.4	TX10	(corresponding board GX3) By-pass with attendant	input	Constant open
	JP5.5	TX21	(corresponding board GX4) fireman	Input	Constant open
	JP5.6		Common terminal signal JP5.1-JP5.5 of input ,0v		
JP6	JP6.1		door-open indicator power supply -		
	JP6.2		door-open indicator power supply +		
	JP6.3	TX19	one terminal of door-open button		
	JP6.4	TX19	the other terminal of door-open button		
JP7	JP7.1		door-open indicator power supply -		
	JP7.2		door-open indicator power supply +		
	JP7.3	TX20	one terminal of door-open button		



	JP7.4		TX20		the other terminal of door-open button		
DB1	Program burn recording port						
SW1	SW1.1				if Dip switch is ON or OFF at the same time , CAN terminal resistor means to connect or disconnect		
	SW1.2						
SW2	SW2.1				if Dip switch is ON or OFF at the same time , Program burn or elevator is running naturally		
	SW2.2						
SW3	Sw 3.1	Sw 3.2	Sw 3.3	Sw 3.4	Control Car type		
	ON	OF	OF	OF	Main Control Car		
	OF	ON	OF	OF	Rear Control Car		
	OF	OF	ON	OF	Handicapped Control Car		
	OF	OF	OF	ON	Assistant Control Car		
JP1	Jumper for CAN serial communication port. DO NOT use it if the terminal resistor in car display is already bridged.						
JP7	for connecting car registration control PCB SM-03-D						
J2/J3	If the input power is supplied by JP6.1 and JP6.2, bridge J2 and J3. But if it is supplied by JP2.19 and JP2.20, DO NOT make any bridge!						

List 6.4 Terminal Definition of Car Control Board

### 6.3 Description of Car Control Board (disposition two)

#### 6.3.1 External and Mounting Dimensions of Car Control Board

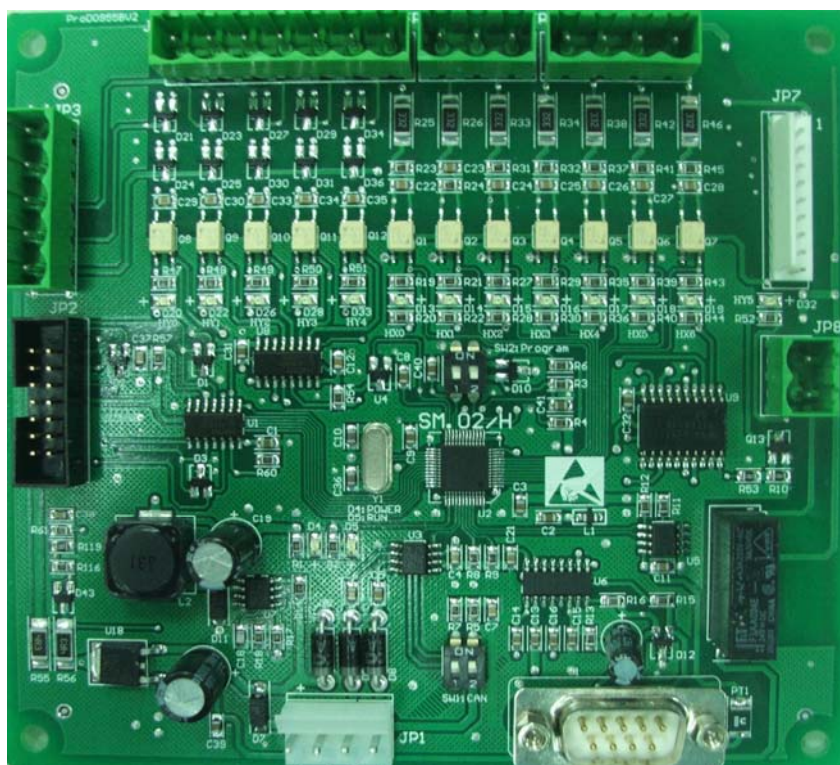


Fig. 6.6 Outside View of Car control board

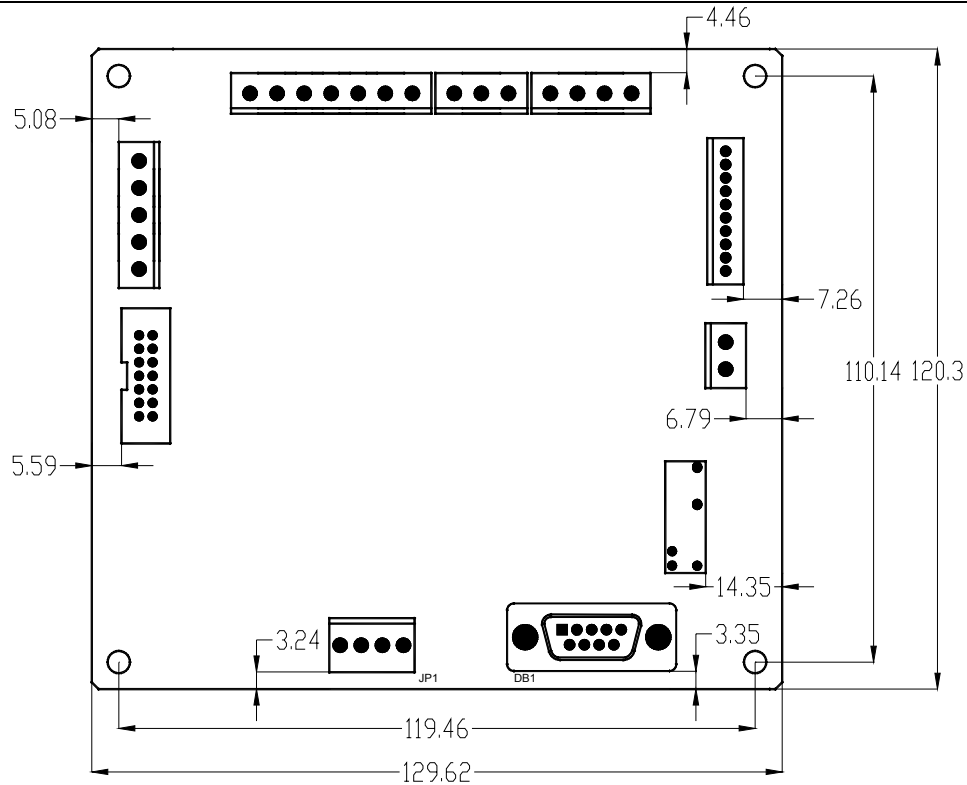


Fig.6.7 Mounting Dimensions of Car Control Board

### 6.3.2 Definitions of Plug-ins and Ports on Car Control Board

Car Control Board			
Socket	Type	Type	Type
JP2/JP5	WAGO 20P	WAGO 20P	14-pin double-lined vertical
JP3/JP4	CH2510-4	CH2510-4	CH2510-10
JP6	CH3.96-4		

List 6.5 Terminal Specifications on Car Control Board

No.	Terminal	Name	Definitions	Usage	Notes
JP2	JP2.1	TY0	relay output of arrival gong upward	Output	
	JP2.2		common terminal TY0		
	JP2.3	TY1	relay output of arrival gong downward	Output	
	JP2.4		common terminal TY1		
	JP2.5	TY2	relay output of car lighting relay	Output	
	JP2.6		common terminal TY2		
	JP2.7	TY3	relay output of Nudging door-closing signal	Output	
	JP2.8		Common terminal TY3		
	JP2.9	TY4	Transistor output of Overload lamp-, output capacity 24V、20mA	Output	
	JP2.10	TY4	Overload lamp +	Output	
	JP2.11	TY5	Transistor output of buzzer-, output capacity 24V、20mA	Output	
	JP2.12	TY5	buzzer output +	Output	

	JP2.13		load analogy signal +	Input	
	JP2.14		load analogy signal -	Input	
	JP2.15	RS485A+	RS485 communication port +		
	JP2.16	RS485B-	RS485communication port -		
	JP2.17		stand-by		
	JP2.18		stand-by		
	JP2.19		Isolation power supply input +		
	JP2.20		Isolation power supply input -		
JP3	JP3.1		door-open indicator power supply -	Output	Note 2
	JP3.2		door-open indicator power supply +	Output	
	JP3.3	TX19	one terminal of door-open button	Input	
	JP3.4	TX19	the other terminal of door-open button	Input	
JP4	JP4.1		door-close indicator power supply -	Output	
	JP4.2		door-close indicator power supply +	Output	
	JP4.3	TX20	one terminal of door-close button	Input	
	JP4.4	TX20	the other terminal of door-close button	Input	
JP5	JP5.1	COM	common terminal TX0-TX18, 0V		
	JP5.2	TX0	door-open limit switch (front)	Input	
	JP5.3	TX1	door-close limit switch (front)	Input	
	JP5.4	TX2	safety edge switch(front)	Input	
	JP5.5	TX3	over-load switch		
	JP5.6	TX4	full-load switch	Input	
	JP5.7	TX5	switch for NS-CB setting	Input	
	JP5.8	TX6	Attendant direction turn	Input	
	JP5.9	TX7	light-load switch		
	JP5.10	TX8	Attendant	Input	
	JP5.11	TX9	VIP	Input	
	JP5.12	TX10	Attendant by-pass switch		
	JP5.13	TX11	door-open limit switch (rear)	Input	
	JP5.14	TX12	door-close limit switch (rear)	Input	
	JP5.15	TX13	safety edge switch for rear door	Input	
	JP5.16	TX14	Light gate for front door		
	JP5.17	TX15	Light gate for rear door	Input	
	JP5.18	TX16	NS-SW setting switch	Input	
	JP5.19	TX17	Password setting switches for floor access	Input	
	JP5.20	TX18	Hold-button (HOLD)	Input	
JP6	JP6.1	TXV+	power supply +24V in serial communication with car and call control etc.		CAN BUS
	JP6.2	TXV-	power supply 0V in serial communication with car and call control etc.		

	JP6.3	TXA+	positive signals in serial communication with car and call control etc.		
	JP6.4	TXA-	Negative signals in serial communication with car and call control etc.		
JP15	JP15.1		duplex voice port D0, LSB		Note 1
	JP15.2		duplex voice port D1		
	JP15.3		duplex voice port D2		
	JP15.4		duplex voice port D3		
	JP15.5		duplex voice port D4		
	JP15.6		duplex voice port D5		
	JP15.7		duplex voice port D6		
	JP15.8		duplex voice port D7,MSB		
	JP15.9		common terminal 0V		
	JP15.10		common terminal +24V		
JP1	Jumper for CAN serial communication port. DO NOT use it if the terminal resistor in car display is already bridged.				
JP7	for connecting car registration control PCB SM-03-D				
J2/J3	If the input power is supplied by JP6.1 and JP6.2, bridge J2 and J3. But if it is supplied by JP2.19 and JP2.20, DO NOT make any bridge!				

List 6.6 Terminal Definition of Car Control Board

## Notes:

SM-02-H outputs eight-bit binary coding pulse signals, triggering voice landing forecast during deceleration of car for stop, one point five second for every pulse output. The eight-bit output is in the mode of transistors with open loop in the collector and shared anode, output voltage DC24V, current capacity 50mA. The 8-bit binary coding provides as many as 256 output status in accordance with STEP WORD BANK for display. At present 0-247 are processed by the definition of the word bank for display (see the List of Display Codes in 6.3.8) whereas the codes of 248-255 are defined as following:

(250) 11111010: The signal appears when the door-closing position limit switch turns from OFF to ON status during the door-opening.

(251) 11111011: The signal appears when the door-opening position limit switch turns from OFF to ON status during the door-closing.

(252) 11111100: Over-load alarm.

(253) 11111101: Voice landing forecast for going up when the door is fully open.

(254) 11111110: Voice landing forecast for going down when the door is fully open.

248,249,255 Stand-by

## 6.4 Car Call Board

### 6.4.1 External and Mounting Dimensions of Car Call Board

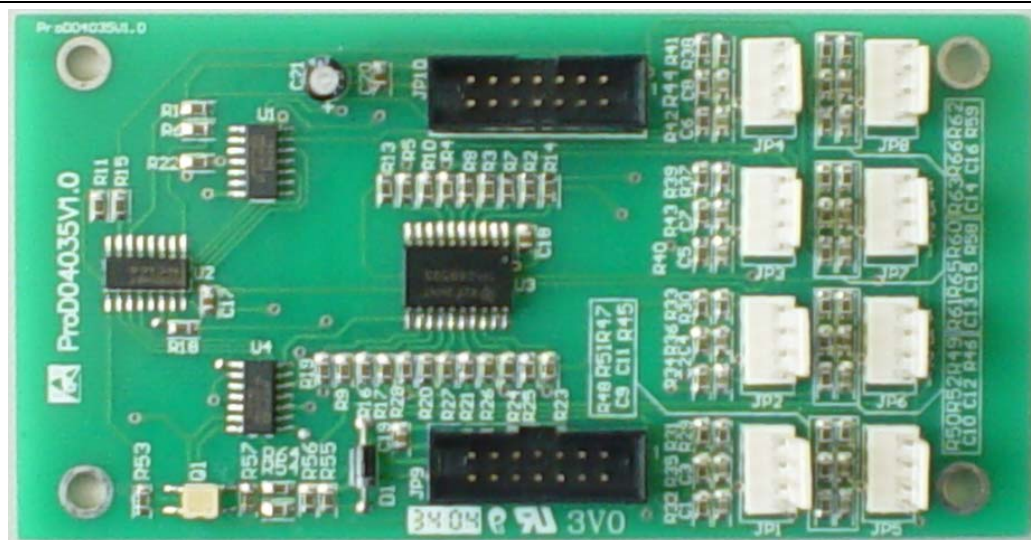


Fig. 6.4 Outside View of Car Call Board

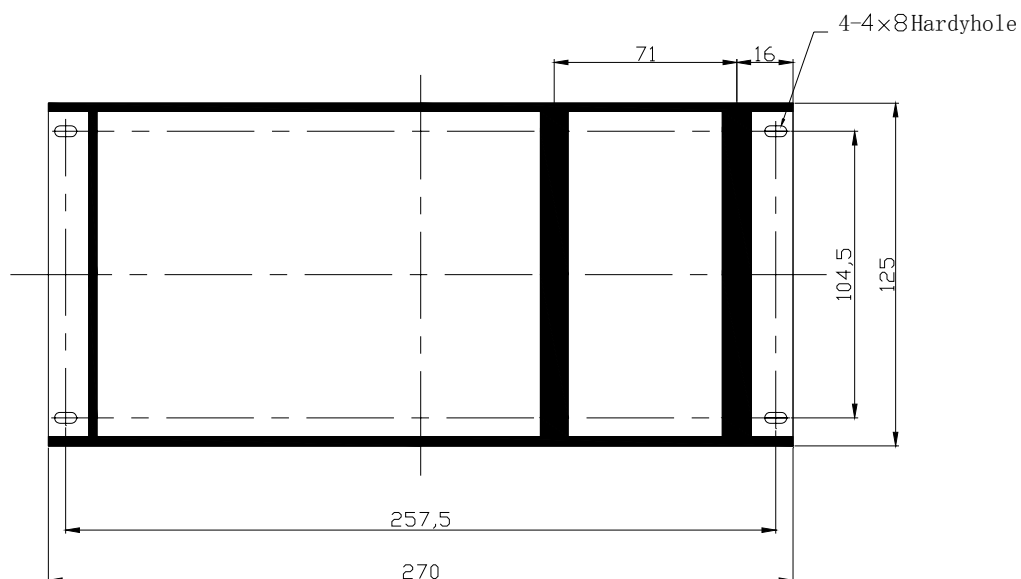


Fig. 6.5 Mounting Dimensions of Car Call Board

### 6.2.2 The Plug-ins and Ports on Car Call Board

Car Call Board	
Socket	Type
JP1/JP2/JP3/JP4/JP5/JP6/JP7/JP8	CH2510-4
JP9/JP10	14-pin double-lined vertical

List6.4 Terminal Specification on Car Call Board

No.	Terminal Definition of Car Call Board 1#	Terminal Definition of Car Call Board 2#	...	Terminal Definition of Car Call Board 8#
JP1	to button of 1 <sup>st</sup> Fl.	to button of 9 <sup>th</sup> Fl.	...	to button of 57 <sup>th</sup> Fl

<b>JP2</b>	to button of 2 <sup>nd</sup> Fl.	to button of 10 <sup>th</sup> Fl.	...	to button of 58 <sup>h</sup> Fl
<b>JP3</b>	to button of 3 <sup>rd</sup> Fl.	to button of 11 <sup>th</sup> Fl.	...	to button of 59 <sup>th</sup> Fl
<b>JP4</b>	to button of 4 <sup>th</sup> Fl.	to button of 12 <sup>th</sup> Fl.	...	to button of 60 <sup>th</sup> Fl
<b>JP5</b>	to button of 5 <sup>th</sup> Fl.	to button of 13 <sup>th</sup> Fl.	...	to button of 61 <sup>th</sup> Fl
<b>JP6</b>	to button of 6 <sup>th</sup> Fl.	to button of 14 <sup>th</sup> Fl.	...	to button of 62 <sup>th</sup> Fl
<b>JP7</b>	to button of 7 <sup>th</sup> Fl.	to button of 15 <sup>th</sup> Fl.	...	to button of 63 <sup>st</sup> Fl
<b>JP8</b>	to button of 8 <sup>th</sup> Fl.	to button of 16 <sup>th</sup> Fl.	...	to button of 64 <sup>nd</sup> Fl

List 6.5 Terminal Definition of Car Call Board

**Notes:**

Wiring of the door-open/close button indicators is shown as follows, i.e., Pin 1 and Pin 2 to the positive and negative of power supply respectively, whereas Pin 3 and Pin 4 to the terminals of the button.

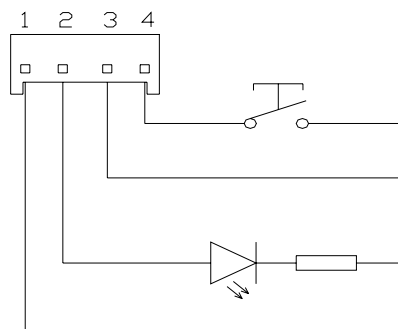


Fig. 6.6 Connection of Door Open/Close Buttons &amp; Indicators

**6.6 Call & Display Control Board****6.6.1 Call & Display Control Board SM-04-VRF**

☆ Outside View & Mounting Dimensions of SM-04-VRF

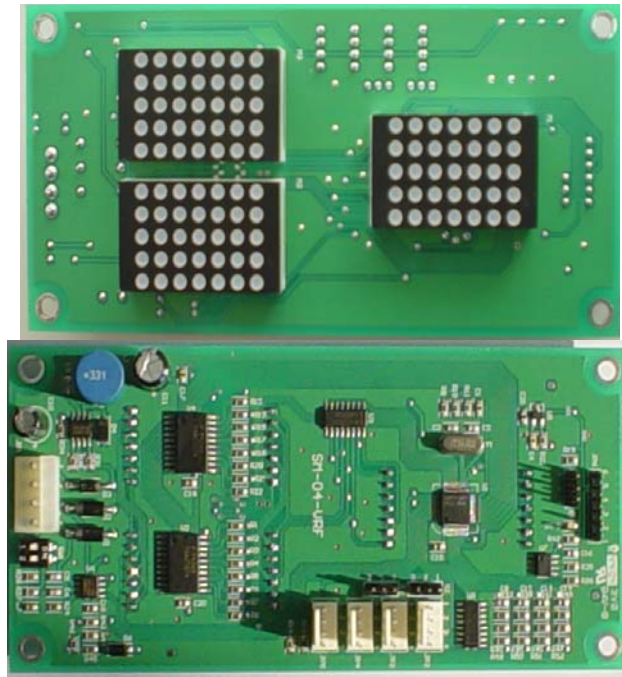


Fig. 6.13 Outside View of SM-04-VRF

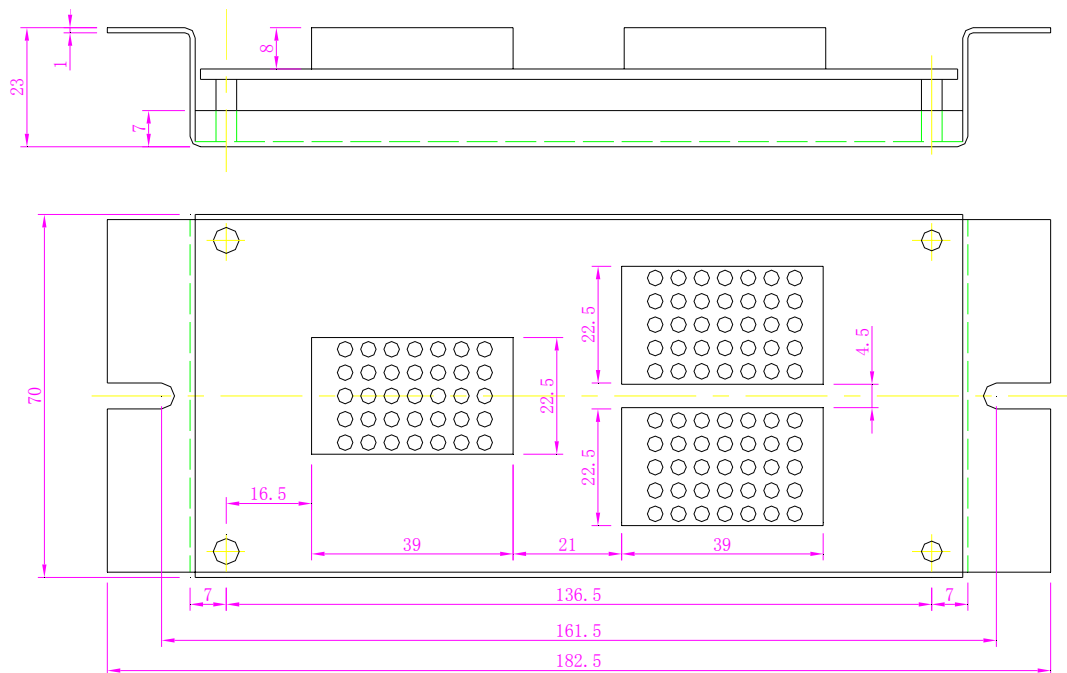


Fig.6.14 Mounting Dimensions of SM-04-VRF

☆ Terminal Definition and Plug-in Specification on SM-04-VRF

Serial	Descriptions	Remarks
JP1	Serial port, of which Pin 1 for TXV+, Pin 2 for TXV-, Pin 3 for TXA+ and Pin 4 for TXA- respectively.	CH3.96-4
JP2	Up-call terminals, of which Pin 1- and Pin 2+ for button indicator, Pin 3 and Pin 4 for button input.	CH2510-4



<b>JP3</b>	Down-call terminals, of which Pin 1- and Pin 2+ for button indicator, Pin 3 and Pin 4 for button input.	CH2510-4
<b>JP4</b>	Stop indicator(Landing)/Over load indicator(In-Car) and lockout terminals, of which Pin 1- and Pin 2+ for stop/over load indicator; Pin 3 and Pin 4 for the input of default open contact of the lockout switch.	CH2510-4
<b>JP5</b>	Output terminals for full-load indicator(Landing)/fire indicator(In-Car), of which Pin 1- and Pin 2+ for full-load/fire indicator; Pin 3 and Pin 4 for stand-by.	CH2510-4
<b>JP6</b>	RS232 port for program burn recording.	
<b>S1</b>	Set the address codes of the display Board with the jumper on, after that the jumper MUST BE REMOVED.	
<b>SW1</b>	Resistor jumper for serial communication terminals for connecting the 120Ω built-in resistor when jumpers are put on together.	

List 6.11 Terminal Definition and Specification of SM-04-VRF

### 6.6.2 Call & Display Control Board SM-04-VSC

☆ Outside View & Mounting Dimensions of SM-04-VSC

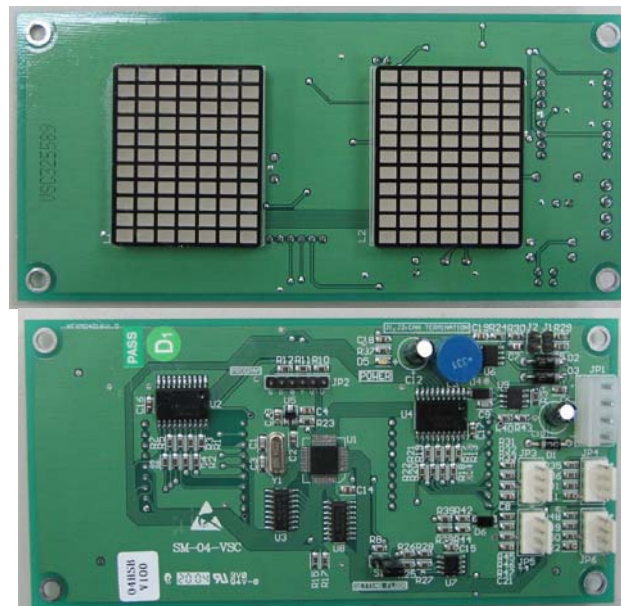


Fig. 6.15 Outside View of SM-04-VSC



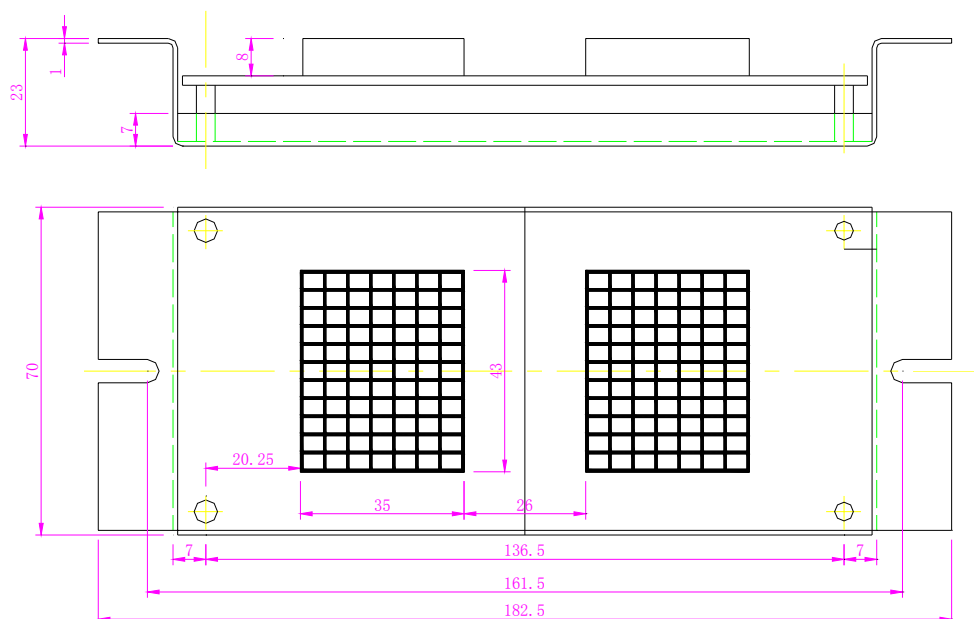


Fig.6.16 Mounting Dimensions of SM-04-VSC

☆ Terminal Definition and Plug-in Specification on SM-04-VSC

Serial	Descriptions	Remarks
<b>JP1</b>	Serial port, of which Pin 1 for TXV+, Pin 2 for TXV-, Pin 3 for TXA+ and Pin 4 for TXA- respectively.	CH3.96-4
<b>JP2</b>	RS232 port for program burn recording.	CH2510-4
<b>JP3</b>	Up-call terminals, of which Pin 1- and Pin 2+ for button indicator, Pin 3 and Pin 4 for button input.	CH2510-4
<b>JP4</b>	Down-call terminals, of which Pin 1- and Pin 2+ for button indicator, Pin 3 and Pin 4 for button input.	CH2510-4
<b>JP5</b>	Stop indicator (Landing)/Over load indicator(In-Car) and lockout terminals, of which Pin 1- and Pin 2+ for stop/over load indicator; Pin 3 and Pin 4 for the input of default open contact of the lockout switch.	CH2510-4
<b>JP6</b>	Output terminals for full-load indicator (Landing)/fire indicator(In-Car), of which Pin 1- and Pin 2+ for full-load/fire indicator; Pin 3 and Pin 4 for stand-by.	
<b>S1</b>	Set the address codes of the display Board with the jumper on, after that the jumper MUST BE REMOVED.	
<b>J1/J2</b>	Resistor jumper for serial communication terminals for connecting the 120Ω built-in resistor when jumpers are put on together.	

List 6.12 Terminal Definition and Specification of SM-04-VSC

### 6.6.3 Call & Display Control Board SM-04-HRC

☆ Outside View &amp; Mounting Dimensions of SM-04-HRC

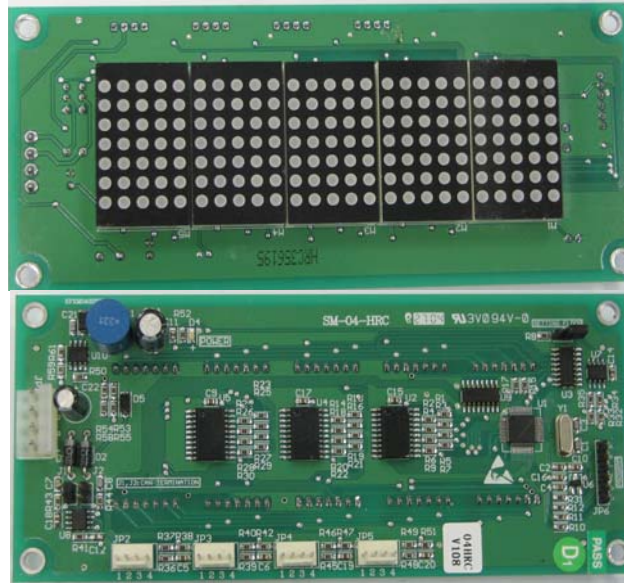


Fig.6.17 Outside View of SM-04-HRC

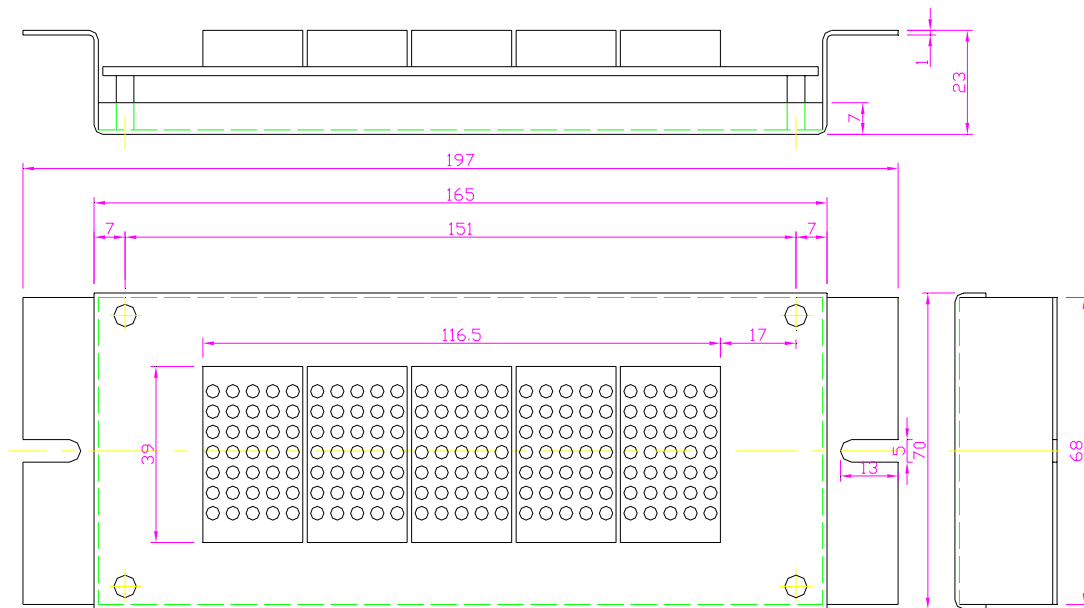


Fig. 6.18 Mounting Dimensions of SM-04-HRC

☆ Terminal Definition and Plug-in Specification on SM-04-HRC

Serial	Descriptions	Remarks
<b>JP1</b>	Serial port, of which Pin 1 for TXV+, Pin 2 for TXV-, Pin 3 for TXA+ and Pin 4 for TXA- respectively.	CH3.96-4
<b>JP2</b>	Up-call terminals , of which Pin 1- and Pin 2+ for button indicator, Pin 3 and Pin 4 for button input.	CH2510-4
<b>JP3</b>	Down-call terminals , of which Pin 1- and Pin 2+ for button indicator, Pin 3 and Pin 4 for button input.	CH2510-4

<b>JP4</b>	Stop indicator(Landing)/Over load indicator(In-Car) and lockout terminals, of which Pin 1- and Pin 2+ for stop/over load indicator; Pin 3 and Pin 4 for the input of default open contact of the lockout switch.	CH2510-4
<b>JP5</b>	Output terminals for full-load indicator(Landing)/fire indicator(In-Car), of which Pin 1- and Pin 2+ for full-load/fire indicator; Pin 3 and Pin 4 for stand-by.	CH2510-4
<b>JP6</b>	RS232 port for program burn recording.	2.54*6-pin single-lined
<b>S1</b>	Set the address codes of the display Board with the jumper on, after that the jumper MUST BE REMOVED.	
<b>J1/J2</b>	Resistor jumper for serial communication terminals for connecting the 120Ω built-in resistor when jumpers are put on together.	

List6.13 Terminal Definition and Specification of SM-04-HRC

#### 6.6.4 Call & Display Control Board SM-04-HSC

☆ Outside View & Mounting Dimensions of SM-04-HSC

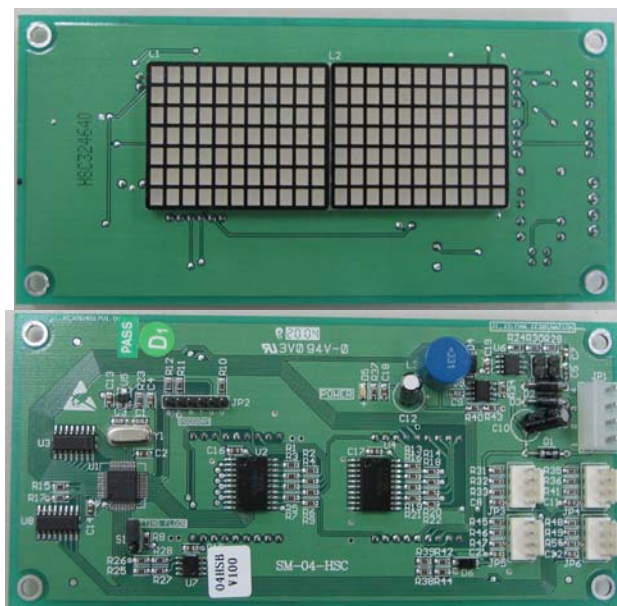


Fig. 6.19 Outside View of SM-04-HSC

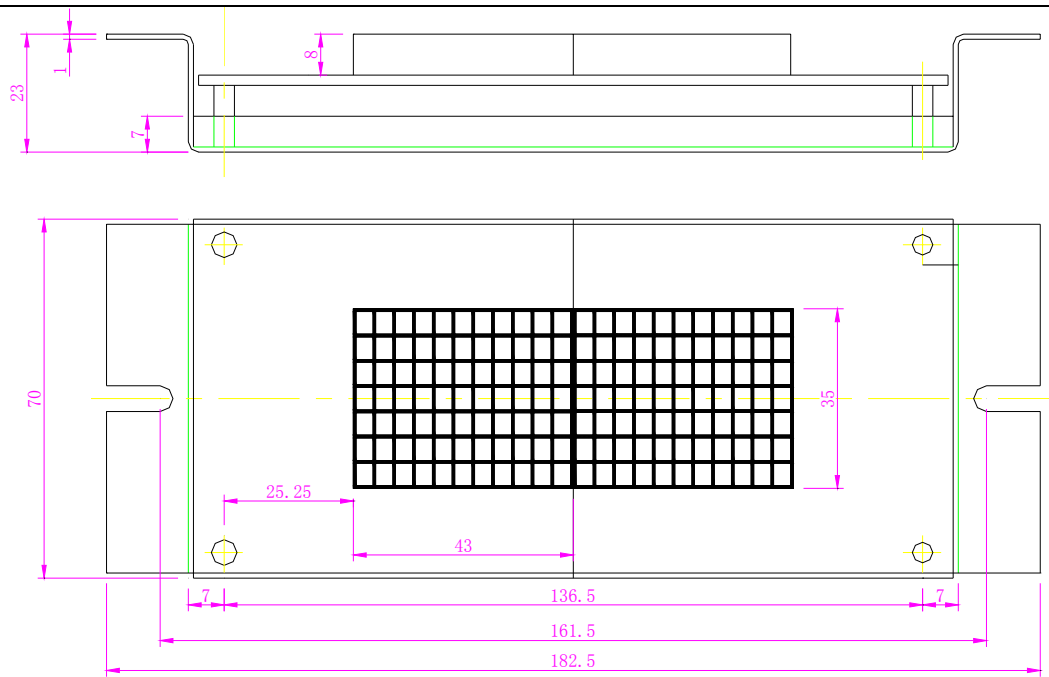


Fig. 6.20 Mounting Dimensions of SM-04-HSC

☆ Terminal Definition and Plug-in Specification on SM-04-HSC

Serial	Descriptions	Remarks
<b>JP1</b>	Serial port, of which Pin 1 for TXV+, Pin 2 for TXV-, Pin 3 for TXA+ and Pin 4 for TXA- respectively.	CH3.96-4
<b>JP2</b>	RS232 port for program burn recording.	
<b>JP3</b>	Up-call terminals, of which Pin 1- and Pin 2+ for button indicator, Pin 3 and Pin 4 for button input.	CH2510-4
<b>JP4</b>	Down-call terminals, of which Pin 1- and Pin 2+ for button indicator, Pin 3 and Pin 4 for button input.	CH2510-4
<b>JP5</b>	Stop indicator(Landing)/Over load indicator(In-Car) and lockout terminals, of which Pin 1- and Pin 2+ for stop/over load indicator; Pin 3 and Pin 4 for the input of default open contact of the lockout switch.	CH2510-4
<b>JP6</b>	Output terminals for full-load indicator(Landing)/fire indicator(In-Car), of which Pin 1- and Pin 2+ for full-load/fire indicator; Pin 3 and Pin 4 for stand-by.	CH2510-4
<b>S1</b>	Set the address codes of the display Board with the jumper on, after that the jumper MUST BE REMOVED.	
<b>J1/J2</b>	Resistor jumper for serial communication terminals for connecting the 120Ω built-in resistor when jumpers are put on together.	

List 6.14 Terminal Definition and Specification of SM-04-HSC

### 6.6.5 Call & Display Control Board SM-04-VHL

☆ Outside View &amp; Mounting Dimensions of SM-04-VHL



<b>JP4</b>	Down-call terminals, of which Pin 3+ and Pin 4- for button indicator, Pin 1 and Pin 2 for button input.		CH2510-4
<b>JP6</b>	Up-call terminals, of which Pin 3+ and Pin 4- for button indicator, Pin 1 and Pin 2 for button input.		CH2510-4
<b>JP8</b>	Pin 1 and Pin 2 JP8 for the input of default open contact of the lockout switch, Pin 3 and Pin 4 for stand-by.		CH2510-5
<b>JP2</b>	JP2.1	output terminal for landing arrival gong up	CH2510-4
	JP2.2	common terminal for landing arrival gongs up and down	
	JP2.3	output terminal for landing arrival gong down	
	JP2.4	output terminal for landing arrival gong up	
	JP2.5	common terminal for landing arrival gongs up and down	
	JP2.6	output terminal for landing arrival gong down	
<b>JP7</b>	Resistor jumper for serial communication terminals for connecting the 120Ω built-in resistor when jumpers are put on together.		
<b>S1</b>	Set the address codes of the display Board with the jumper on, after that the jumper MUST BE REMOVED.		
<b>S2</b>	Inserting the jumper on the landing call display Board of the elevator locked out shows the lockout input on this Board in effect. Only ONE of the display Boards of the elevator shall be jumped to S2.		

List 6.15 Terminal Definition and Specification of SM-04-VHL

**6.6.6 Call & LCD Control Board SM-04-UL**

☆ Outside View &amp; Mounting Dimensions of SM-04-UL



Fig. 6.23 Outside View of SM-04-UL

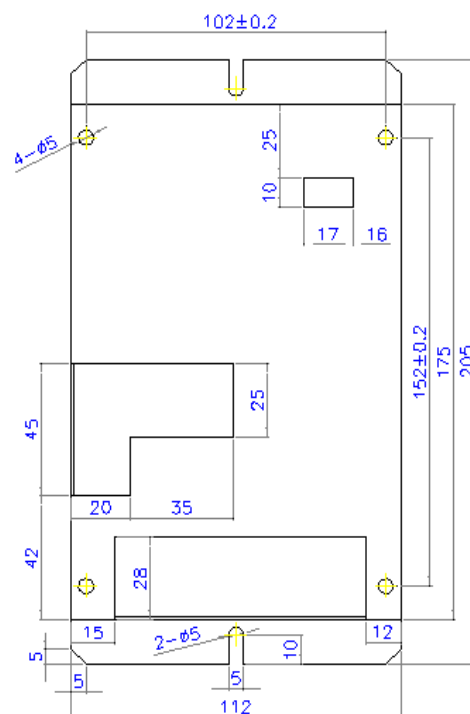


Fig. 6.24 Mounting Dimensions of SM-04-UL

☆ Terminal Definition and Plug-in Specification on SM-04-UL

Serial	Descriptions	Remarks
--------	--------------	---------

<b>JP8</b>	Serial port, of which Pin 1 for TXV+, Pin 2 for TXV-, Pin 3 for TXA+ and Pin 4 for TXA- respectively.	CH3.96-4
<b>JP11</b>	Down-call terminals, of which Pin 3+ and Pin 4- for button indicator, Pin 1 and Pin 2 for button input.	CH2510-4
<b>JP12</b>	Up-call terminals, of which Pin 3+ and Pin 4- for button indicator, Pin 1 and Pin 2 for button input.	CH2510-4
<b>JP10</b>	Pin 3 and Pin 4 for the input of default open contact of the lockout switch, Pin 1 and Pin 2 for stand-by.	CH2510-5
<b>SW1</b>	Resistor jumper for serial communication terminals for connecting the 120Ω built-in resistor when jumpers are put on together. Both ON for connection of CAN terminal resistor, both OFF for disconnection of it.	
<b>SW2</b>	SW2.1 ON for setting number of passengers allowed boarding in car by pressing on up and down buttons, OFF for normal. SW2.2 ON for display in English, OFF for display in Chinese.	
<b>SW5</b>	SW5.1 ON for setting address codes by pressing on up and down buttons, OFF for normal. SW5.2 ON for selecting time options by pressing on up button, for changing in time by pressing on down button, OFF for normal. Both SW2.1 and SW5.1 ON before power-on for adjusting display contrast by pressing on up and buttons.	

List 6.16 Terminal Definition and Specification of SM-04-UL

## ☆ A Guide to Settings

Address Codes	SW5.1 ON, press on up and down call buttons.		Range of Codes	0 to 48
Time Setting	SW5.2 ON, press on up call button to select time options, press on down call button to make changes in time.			
Passengers Allowed Entry in Car	SW2.1 ON, press on up and down call buttons to set the number of passengers allowed boarding in car.			
Display Contrast Adjustment	in hardware	Adjust the value of resistance in R53 by turning a screwdriver while watching the change in contrast. It allows for a wide range in adjustment.		
	in software	Set both SW2.1 and SW5.1 ON before switch on power and adjust the display contrast by pressing on up and down call buttons, only good for fine adjustment.		
Language Setting	SW2.2 ON for display in English, OFF for display in Chinese.			

**6.6.7 Car Call & LCD Control Board SM-04-VL**

## ☆ Outside View &amp; Mounting Dimensions of Landing call display Board SM-04-VL/A



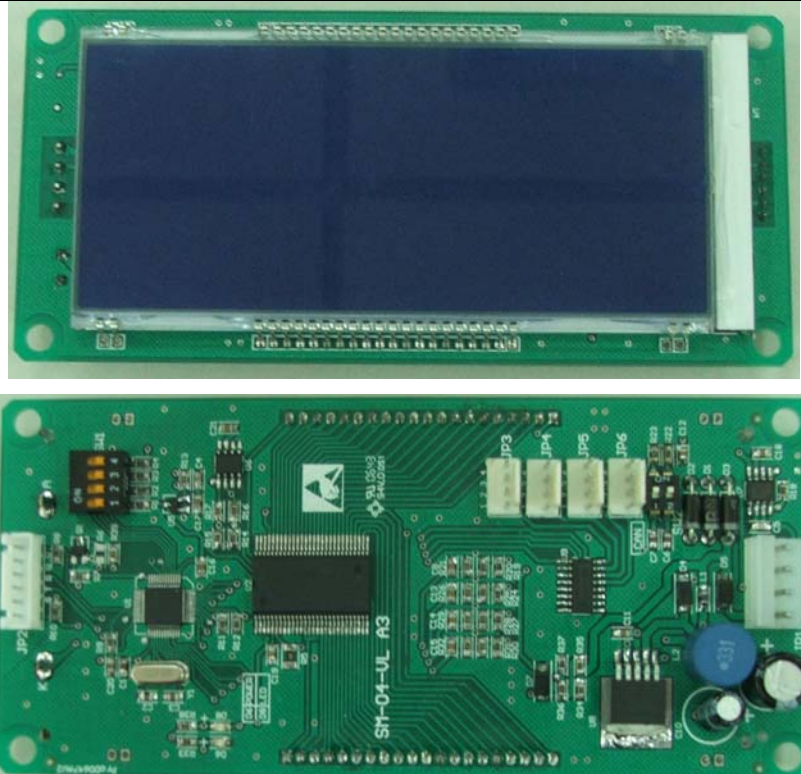


Fig. 6.25 Outside View of SM-04-VL/A

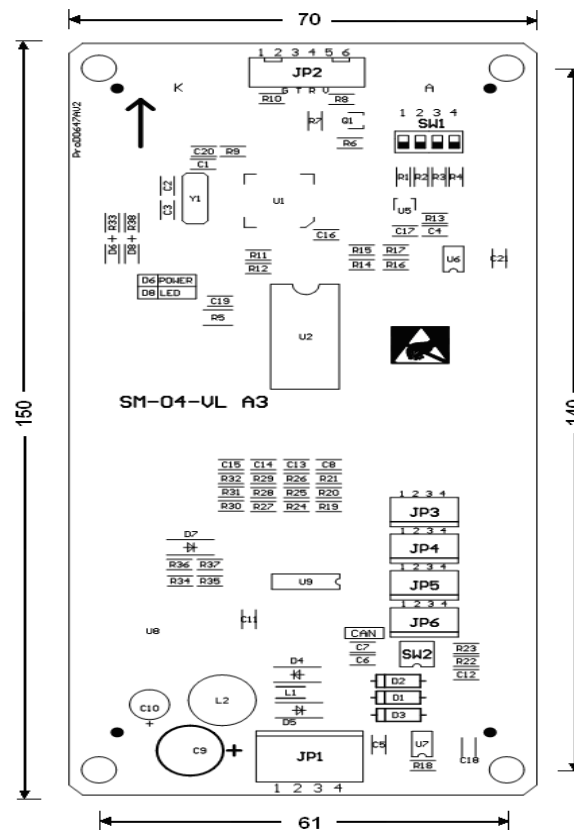


Fig.6.26 Mounting Dimensions of SM-04-VL/A

☆ Outside View & Mounting Dimensions of Display Board in Car SM-04-VL/B



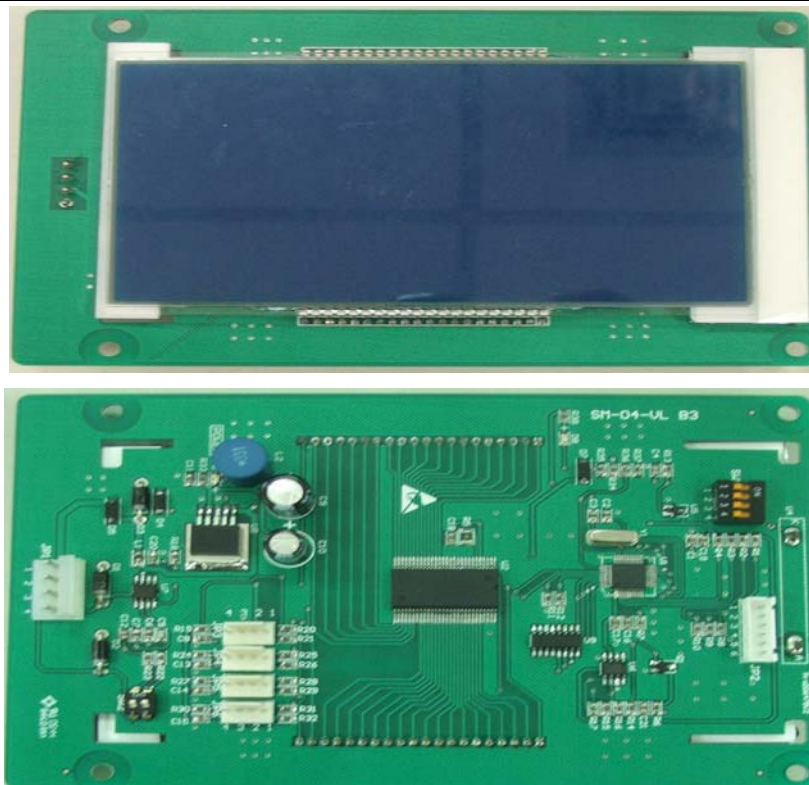


Fig.6.27 Outside View of SM-04-VL/B

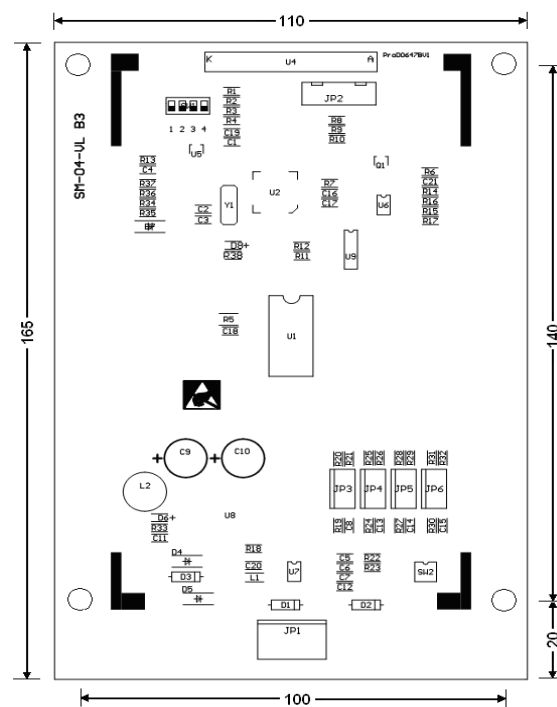


Fig. 6.28 Mounting Dimensions of SM-04-VL/B

☆Terminal Definition and Plug-in Specification on SM-04-VL

Serial	Descriptions	Remarks
--------	--------------	---------

<b>JP1</b>	Serial port, of which Pin 1 for TXV+, Pin 2 for TXV-, Pin 3 for TXA+ and Pin 4 for TXA- respectively.	CH3.96-4
<b>JP3</b>	Up-call terminals, of which Pin 3+ and Pin 4- for button indicator, Pin 1 and Pin 2 for button input.	CH2510-4
<b>JP4</b>	Down-call terminals, of which Pin 3+ and Pin 4- for button indicator, Pin 1 and Pin 2 for button input.	CH2510-4
<b>JP5</b>	Pin 3 and Pin 4 for the input of default open contact of the lockout switch, Pin 1 and Pin 2 for stand-by.	CH2510-4
<b>JP6</b>	Pin 3 and Pin 4 for the input of the visitor switch, Pin 1 and Pin 2 for stand-by.	
<b>SW2</b>	Resistor jumper for serial communication terminals for connecting the 120Ω built-in resistor when jumpers are put on together. Both ON for connection of CAN terminal resistor, both OFF for disconnection of it.	
<b>SW1.2</b>	SW1.2 ON for display in English, OFF for display in Chinese and English together.	
<b>SW1.3</b>	SW1.3 OFF under the standard mode	
<b>SW1.4</b>	SW5.1 ON for setting address codes by pressing on up and down buttons, OFF for normal	

### 6.6.8 Miscellaneous (A List of Display Codes)

☆A List of Performance Displays

Displays in Car				No Voice Forecast
Inspection	错误! 未找到引用源。 Normal	错误! 未找到引用源。 No	错误! 未找到引用源。Special symbol/otherwise	
Re-leveling at power off	错误! 未找到引用源。 Normal	错误! 未找到引用源。 No	错误! 未找到引用源。Special symbol/otherwise	
Independent	错误! 未找到引用源。 Normal	错误! 未找到引用源。 No	错误! 未找到引用源。Special symbol/otherwise	
Fireman	错误! 未找到引用源。 Normal	错误! 未找到引用源。 No	错误! 未找到引用源。Special symbol/otherwise	
Safety circuit off	错误! 未找到引用源。 Normal	错误! 未找到引用源。 No	错误! 未找到引用源。Special symbol/otherwise	
Lockout	错误! 未找到引用源。 Normal	错误! 未找到引用源。 No	错误! 未找到引用源。Special symbol/otherwise	

Breakdown	错误! 未找到引用源。 Normal	错误! 未找到引用源。 No	错误! 未找到引用源。 Special symbol/otherwise	
Overload	错误! 未找到引用源。 Normal	错误! 未找到引用源。 No	错误! 未找到引用源。 Special symbol/otherwise	“oL” on display
By-pass with attendant	错误! 未找到引用源。 Normal	错误! 未找到引用源。 No	错误! 未找到引用源。 Special symbol/otherwise	
Full-load	错误! 未找到引用源。 Normal	错误! 未找到引用源。 No	错误! 未找到引用源。 Special symbol/otherwise	

Displays in the Landing				No Forecast	Voice
Inspection	错误! 未找到引用源。 Normal	错误! 未找到引用源。 No	错误! 未找到引用源。 Special symbol/otherwise		
Re-leveling at power off	错误! 未找到引用源。 Normal	错误! 未找到引用源。 No	错误! 未找到引用源。 Special symbol/otherwise		
Independent	错误! 未找到引用源。 Normal	错误! 未找到引用源。 No	错误! 未找到引用源。 Special symbol/otherwise		
Fireman	错误! 未找到引用源。 Normal	错误! 未找到引用源。 No	错误! 未找到引用源。 Special symbol/otherwise		
Safety circuit off	错误! 未找到引用源。 Normal	错误! 未找到引用源。 No	错误! 未找到引用源。 Special symbol/otherwise		
Lockout	错误! 未找到引用源。 Normal	错误! 未找到引用源。 No	错误! 未找到引用源。 Special symbol/otherwise		
Breakdown	错误! 未找到引用源。 Normal	错误! 未找到引用源。 No	错误! 未找到引用源。 Special symbol/otherwise		
Overload	错误! 未找到引用源。 Normal	错误! 未找到引用源。 No	错误! 未找到引用源。 Special symbol/otherwise		
By-pass with attendant	错误! 未找到引用源。 Normal	错误! 未找到引用源。 No	错误! 未找到引用源。 Special symbol/otherwise	1[F], 2/3 Normal	
Full-load	错误! 未找到引用源。 Normal	错误! 未找到引用源。 No	错误! 未找到引用源。 Special symbol/otherwise	1[F], 2/3 Normal	

☆ A List of Display Codes (by Standard STEP Word Bank)

Display code list

Code	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Display	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Code	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Display	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Code	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
Display	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
Code	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
Display	45	46	47	48		-1	-2	-3	-4	-5	-6	-7	-8	-9	
Code	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74
Display	B1	B2	B3	B4	B5	B6	B7	B8	B9	B	G	M	M1	M2	M3
Code	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89
Display	P	P1	P2	P3	R	R1	R2	R3	L	H	H1	H2	H3	3A	12A
Code	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104
Display	12B	13A	17A	17B	5A	G1	G2	G3	F	出口	C1	C2	C3	C4	C
Code	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119
Display	D1	D2	D3	D4	D	1F	2F	3F	4F	5F	1C	2C	3C	4C	
Code	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134
Display	1B	2B	3B	4B	1A	2A	4A	CF	LB	E	A	UB	LG	UG	6A
Code	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149
Display	6B	7A	7B	5B	6C				SB	15A	13B	K	U	S	EG
Code	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164
Display	KG	KE1	KE2	KE3	KE4	KE5	KE6	KE7	KE8	KE9	GF	MZ	SR	19A	Z
Code	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179
Display	HP	AB	PH	AA	L1	L2	L3	PB	-10	AG	BE	RF	1L	5L	1M
Code	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194
Display	3M	4M	B1A	B2A	B3A	B4A	PM	14A	14B	AS	15B	16A	16B	22A	22B
Code	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209
Display	E1	E2	S1	S2	S3	E3	E4	49	50	51	52	53	54	55	56
Code	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224
Display	57	58	59	60	61	62	63	64	P4	P5	LD	JC	S4	S5	SS
Code	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
Display	LL	5C	9F	LF	UF	FF	33A	S6	S8	LP	UP	MR	PC	P6	P7
Code	240	241	242	243	244	245	246	247							
Display	P8	P9	P10	P3A	P7A	P8A	P9A	AF							

错误! 未找到引用源。The definitions and display symbols of the terminals may vary with the edition. The above listing is the one based on the standard edition.

#### ☆ Wiring and Connection

1. The connection of the display Board for power supply and communication is shown in Fig. 2-13(B), the power supply and communication is made available via a 4-pin plug, of which Pin 1 for TXV+, Pin 2 for TXV-, both with DC24V power supply; Pin3 for TXA+ and Pin 4 for TXA- are communication lines. The lines for communication must be **Twisted Pairs**.
2. The connection between the display Board and the landing push button is shown in Fig. 2-13(A),  
i.e., Pin 1 and Pin 2 for push-button indicator, whereas Pin 3 and Pin 4 for the push button.

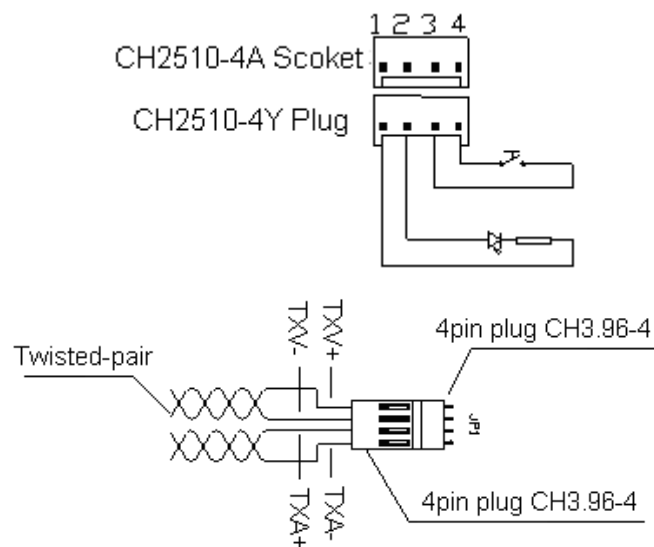


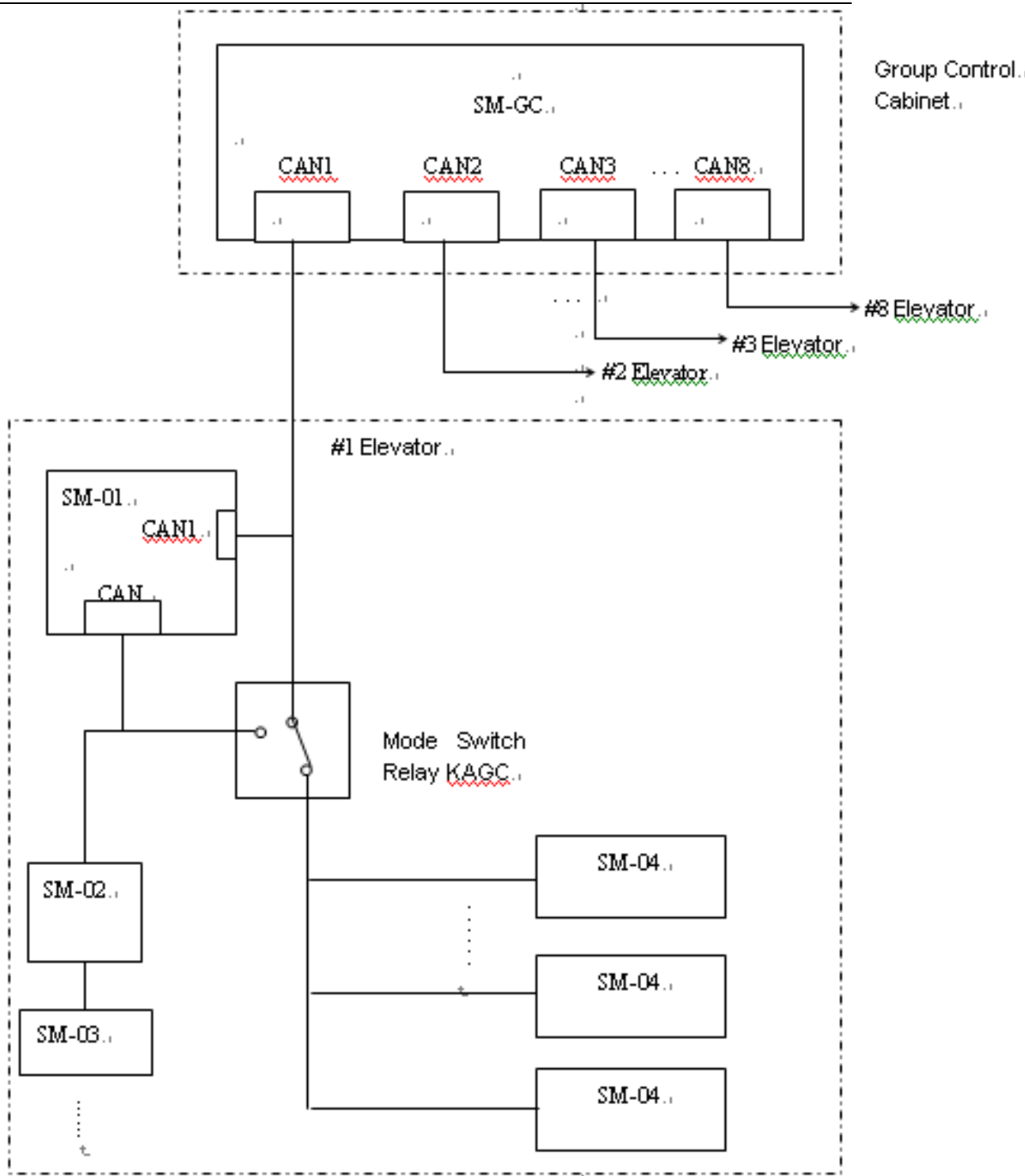
Fig. 6.29(A) Connection of the Push Button Lines

Fig. 6.29(B) Connection of Communication Lines

## 6.7 Group Control Board SM-GC Instruction

### 6.7.1 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:



### 6.7.2 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 terminals also have LEDs to indicate the ON/OFF situation.

### 6.7.3 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.

#### 6.7.4 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.

#### 6.7.5 Principle of overall dispatch

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.

#### 5. Energy saving punish

If the elevator has the energy saving running function, when a certain elevator is in energy saving running sleep status, 80 scores should be plus for its entire buttons additionally.

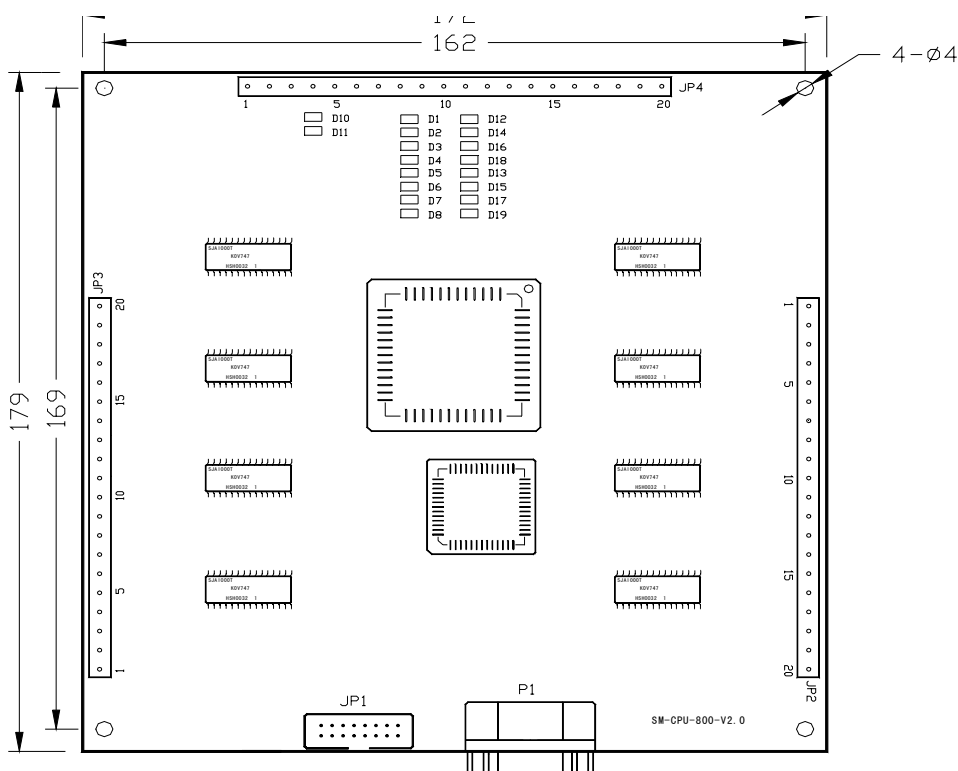
A total punished score should be accumulated for every call button of every elevator according to the principle above. There will be a punished score for every call button of every elevator. By comparing the scores, the qualification of that button will be distributed to the elevator with the lowest score.

### 6.7.6 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 confirms the situation.

### 6.7.7 Detailed Description of Group Controller(SM-GC)

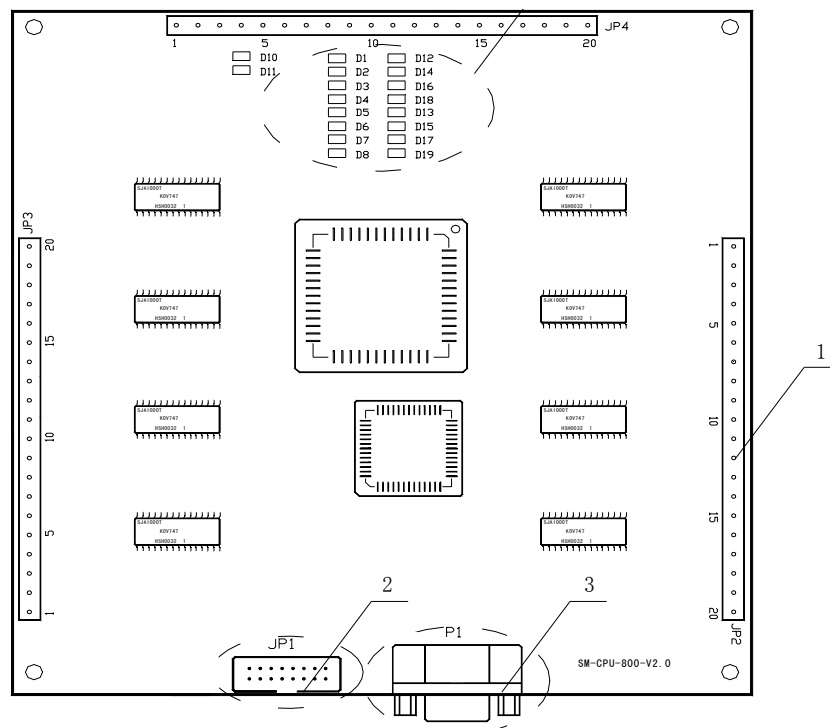


#### 6.7.7.1 Profile and mounting size of Group Controller

Material: FR4 Epoxy

Board thickness: 2.0mm

### 6.7.7.2 Introduction of Parts



The specific parts introduction is as follows:

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

### 6.7.7.3 Electrical Specification

#### ◆ Digital Input

Total Input		8 (pluggable terminal)
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 terminal)	Group (common)	1
Delay	Standard	10ms
Input Frequency	Standard	1KHz
Length of electric cable	Standard	Shielded 400 M
		Non-shielded 200 M

## ◆ Communication Port

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

**6.7.7.4 Input and Output Interface Definition**

The Definition of PortJP2

Pin	Port	Name
JP2-1		Void
JP2-2	TXA4-	Communication signal negative terminal of elevator No.4 in the group control system
JP2-3	TXA4+	Communication signal positive terminal of elevator No.4 in the group control system
JP2-4	TXV4-	Power supply negative terminal of elevator No.4 in the group control system
JP2-5	TXV4+	Power supply positive terminal of elevator No.4 in the group control system
JP2-6		Void
JP2-7	TXA3-	Communication signal negative terminal of elevator No.3 in the group control system
JP2-8	TXA3+	Communication signal positive terminal of elevator No.3 in the group control system
JP2-9	TXV3-	Power supply negative terminal of elevator No.3 in the group control system
JP2-10	TXV3+	Power supply positive terminal of elevator No.3 in the group control system
JP2-11		void
JP2-12	TXA2-	Communication signal negative terminal of elevator No.2 in the group control system
JP2-13	TXA2+	Communication signal positive terminal of elevator No.2 in the group control system
JP2-14	TXV2-	Power supply negative terminal of elevator No.2 in the group control system
JP2-15	TXV2+	Power supply positive terminal of elevator No.2 in the group control system
JP2-16		Void
JP2-17	TXA1-	Communication signal negative terminal of elevator No.1 in the group control system
JP2-18	TXA1+	Communication signal positive terminal of elevator No.1 in the group control system
JP2-19	TXV1-	Power supply negative terminal of elevator No.1 in the group control system
JP2-20	TXV1+	Power supply positive terminal of elevator No.1 in the group control system

Definition of Port JP3

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

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

Definition of power port of mainboard (supplied by switch power)

Pin	Name	Definition
JP4-1	0V	negative terminal 0V for +5V power supply
JP4-2	+5V	+5V power supply
JP4-3	0V	negative terminal 0V for +24V power supply
JP4-4	+24V	+24V power supply input

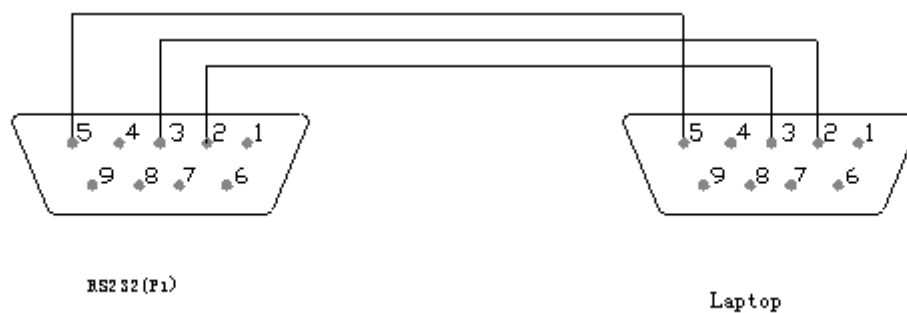
Definition of digital input terminal

Pin	Name	Definition
JP4-5		void
JP4-6		void
JP4-7	+24V	input terminal insulated circuit power supply positive
JP4-8	+24V	input terminal insulated circuit power supply positive
JP4-9	+24V	input terminal insulated circuit power supply positive
JP4-10	0V	input terminal insulated circuit power supply negative
JP4-11	0V	input terminal insulated circuit power supply negative
JP4-12	COM	Common port of input terminal form No.1 to No.8
JP4-13	Input terminal.8	Switch for manual selecting the Elevator No.2 to run continuously
JP4-14	Input terminal 7	Switch for manual selecting the Elevator No.1 to run continuously

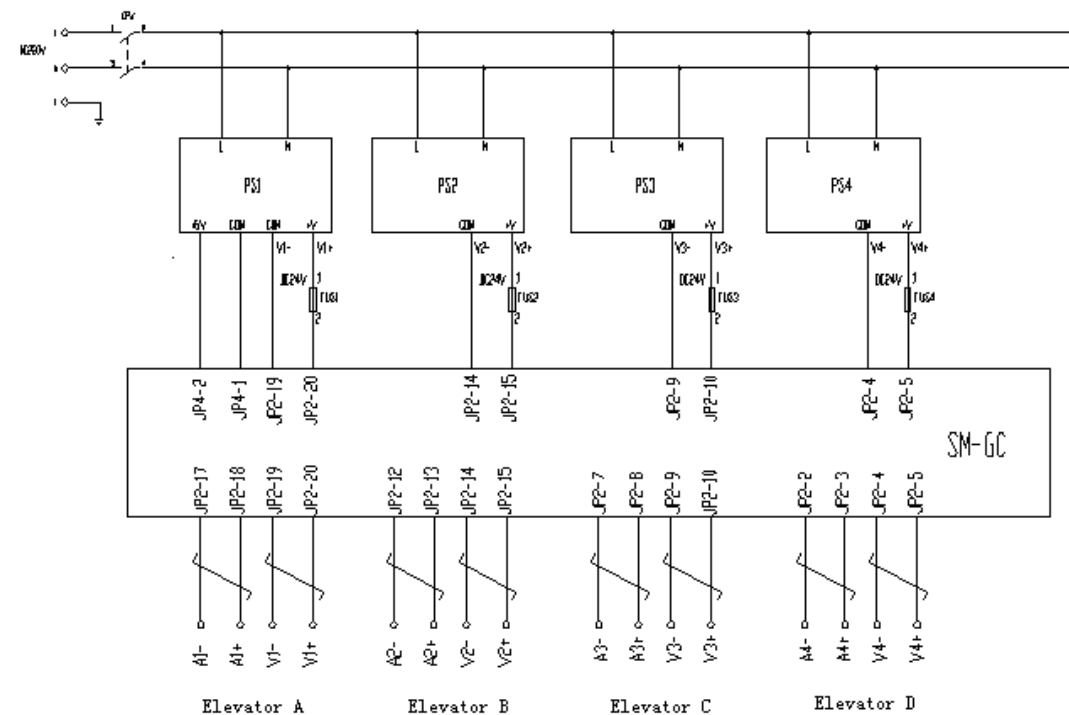
JP4-15	Input terminal 6	check-in peak hour service switch
JP4-16	Input terminal 5	Power supply converse preparation switch
JP4-17	Input terminal 4	Service floor converse switch
JP4-18	Input terminal 3	Check-off peak hour service switch
JP4-19	Input terminal 2	Group partition switch
JP4-20	Input terminal 1	Abnormal power supply detection

#### 6.7.7.5 Description of other ports

P1: RS232, Monitor Port., for connection with the notebook PC..



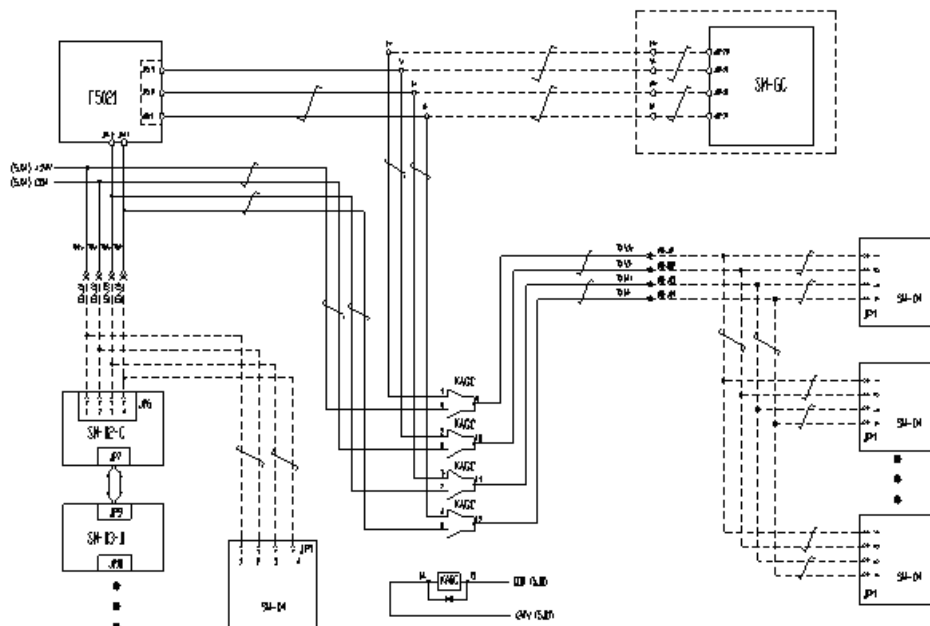
SM-GC (P1)	Laptop (RS232)	Note
2	3	RXD
3	2	TXD
5	5	SGND



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.

The connection diagram for group-control cabinet and elevator system



## 6.7.9 Setting of group control running

### 6.4.9.1 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 Elevator No.1 which has been appointed in the agreement to the output port of JP2.17~JP2.20 of group controller, connect Elevator No.2 to the output port of JP2.13~JP2.16 and etc. If the total floors, stop floors or serial number of elevators 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. Measurement of resistance

After setting the wire jumpers, please measure the value of the terminal resistance.

The resistance value of JP5.4 and JP5.5 in the control board is about 60ohm, if the value is not within this limit, please check the wire jumper is in position, the shielded 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 elevators are in normal state and then set Parameter "Group Mode" of all the elevators 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.

## 6.7.10 Instruction for the group-control parameter setting programming software

### 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.

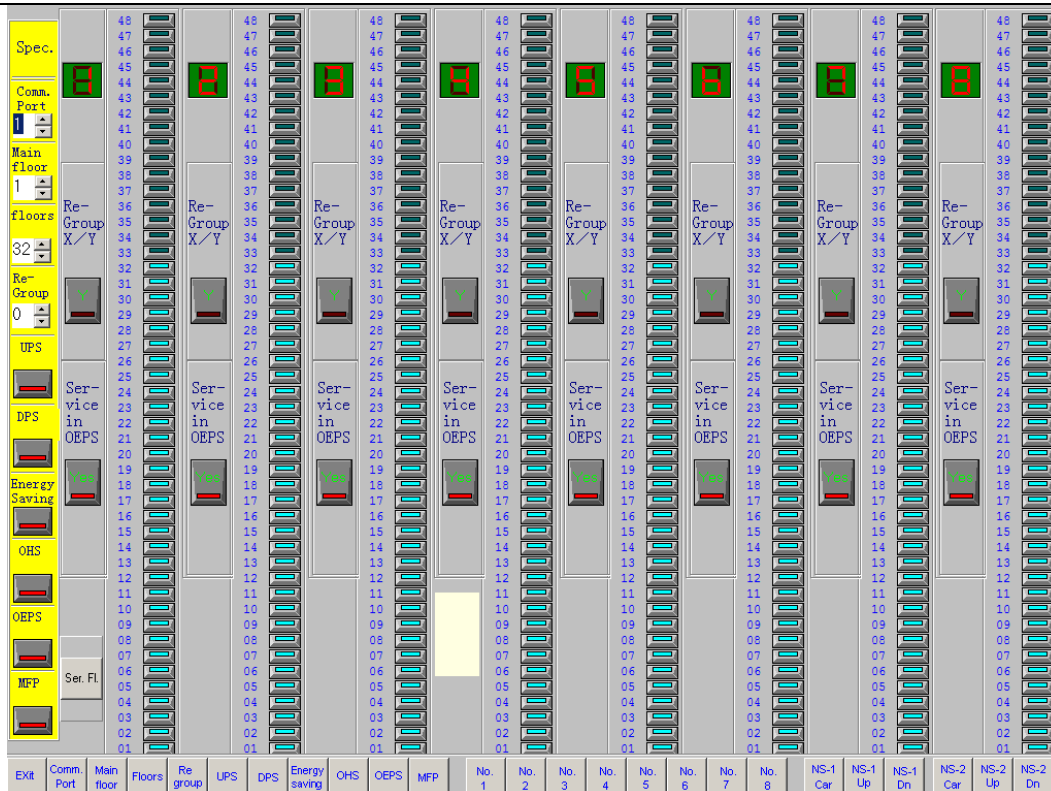
Please do following steps to setup MSCOMM32.OCX:

Copy file Mscomm32.ocx from 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 '▽' to 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 home floor position means the elevator home 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 home floor position of group is the 1st floor. Then from underground 2 floors heading up, the 1st floor is the 3rd floor. So, the home 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 home 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 setting process

[Comm. Port] – Set communication port.

[Group control home floor] – set group control home floor.

[Group control landing] – set group control landing.

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

[UPS] – set go to work peak.

[DPS]– set go off work peak.

[Energy saving] – set the economy energy movement

[OHS]– set separate wait.

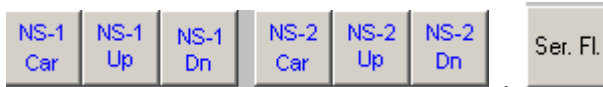
[OEPS] – set elevator's movement when urgent power supply. First need to set each elevator run or not when urgent power supply.

[MFP]- set home floor return.



The elevator service floor set button.

Used for setting elevator's service options.



The group control option button. Used for choosing the group project, read the option setting in the group and show. The yellow prompt box displays the option selected:

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



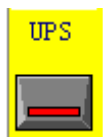
Choose a communication port.



Choose group control home floor position.



Choose the group control floor number



The group control energy saving running button.

#### 6. The parameter setting method:

First, choose service option. The procedure starts with an undecided service option. Option prompt box 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= COM1:, 2= COM2:, then click [Comm. port] button.

Group home floor position: Click [Main floor] button after choosing the group home 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 peak specification setting: After clicking  button to make this function valid or not, click [UPS] button underneath of interface.



Go off work peak specification setting: After clicking  button to make this function valid or not, click [DPS] button underneath of interface .




Energy saving running specification setting: After clicking  button to make this function valid or not, click [Energy saving] button underneath of interface.

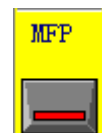


Separate wait specification setting: After clicking  button to make this function valid or not, click [OHS] button underneath of interface.

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 home 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 are OFF, the elevator carries 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 setting that button, click [OEPS] button underneath the interface.

## 7 Elevator Commissioning Guide

This chapter provides the guide for operation of elevator. By the operation procedures described in this chapter, the design, installation, wiring, parameter setting and commissioning of elevator may be completed quickly.



### Important Notice:

- ✓ Any users of our products are required to carefully read and understand this manual and the related equipment manuals to system prior to starting system commissioning or putting it into operation in order to avoid accident losses.
- ✓ Be sure to read and understand the instructions for **System Parameter Setting** in this manual prior to starting system commissioning or putting it into operation in order to avoid accident losses.
- ✓ Site commissioning can not be started until all mechanical equipment, especially shaft equipments and devices are completed reliably (how the machine room equipment is required depends on the preparation of machine room).
- ✓ Any equipment and devices required to be installed and commissioned before system commissioning shall be surely completed in a reliable manner.
- ✓ Before commissioners starting its works, all the works must be confirmed by the related installation persons and commissioning director of mechanical system and other system or by the other persons designated to taking the related responsibilities.
- ✓ Prior to system commissioning, the commissioner shall carefully check all the equipment and other devices related to the commissioning of electric system are all completely installed and commissioned appropriately.
- ✓ Prior to system commissioning, the commissioner must carefully check there is not any existences of unsafe factors to human body and property (including potential and possible unsafe factors).
- ✓ The commissioner must be of trained and qualified to execute commissioning of elevator control system.
- ✓ In case that this manual can not satisfy your requirements, please contact us timely to get supporting in time.
- ✓ Commissioner shall, before starting its work, check all the site conditions are ready to carry out system commissioning.



Danger

© **Energized, don't remove the shell**

Or it may cause risk of electric shock.

◎ **Do not reset alarm signals until operating signals are surely cut off**

Or it may cause risk of injury.



Caution

◎ **Heat sink and brake resistor is at elevated temperature, do not touch it**

Or it may cause risk of burn.

**Prior to put them into operation, make sure all motors and machines are to be used in their scope of application.**

Or it may cause risk of injury.

## 7.1 Inspection prior to Switching on

After completing electric installation of control system, the electric parts must be inspected:

1. check all connections are properly completed against instruction manual and electric diagrams.
2. check heavy current and weak current part is separated properly. Check the resistance between circuits of different voltages and the resistances to earth is " $\infty$ ".
3. Check the supply lines to control boxes and the wiring of motors are made properly to avoid burning out of elevator integrated drive controller when switching on
4. check the control box casing, motor casing, car earth connection and hall door earth connection is reliably grounded to ensure personal safety.

▲ Note: single-point-grounding method must be adopted for control box casing and the motor casing.

## 7.2 Power up and inspection

### 7.2.1 Inspection before power up

1. Short-circuit inspection of the control cabinet to ground before power up:

- (1) Input power line three-phase to ground
- (2) Motor line three-phase to ground
- (3) Terminal 220V to ground
- (4) Communication line to ground
- (5) Encoder line to ground

Please eliminate the short-circuit if it occurs for any of the above items.

2. Grounding inspection: (please make sure that the following items need to be grounded reliably)

- (1) Control cabinet is grounded.
- (2) Motor is grounded.

- (3) Car is grounded.
- (4) Door operator is grounded.
- (5) Wireway is grounded.
- (6) Control cabinet of the encoder shielding layer is grounded.
- (7) Motor of encoder shielding layer is grounded.

Note: One terminal of shielding layer of the asynchronous motor encoder is grounded, both terminals of shielding layer of the synchronous motor encoder need to be grounded.

3. Wiring inspection of communication line、encoder line and power line: (Please affirm whether it can meet the following request in the scene, please correct if not.)

- (1) Hoistway communication lines are twisted in pair with the distance of intertwist <35cm.
- (2) Cabin communication lines are twisted in pair with the distance of intertwist <35cm.
- (3) Parallel group control communication lines are twisted in pair with the distance of intertwist <35cm (only for parallel or group control lifts)
- (4) Encoder lines and power lines are in the different wiring ducts.
- (5) Communication lines and power lines are in the different wiring ducts.
- (6) Parallel group control communication lines and power lines are in the different wiring ducts. (only for parallel or group control lifts)

## 7.2.2 Inspections after Switching on Power

7.2.2.1 Switch on the main switch, if the green light on the phase-relay KAP lights up, the phase order is correct; if NOT, switch off the power supply and exchange connections of any two of the three phases and switch on power again.

7.2.2.2 Check the voltage levels on the terminals of the isolation transformer TCO in the cabinet to ensure they are within their normal voltage ranges respectively. When the above checks prove correct, do the following:

- (1) Switch on fuses FUn (n=1, 2, 3.....);
- (2) Switch on the power supply control so that the switch power unit TPB (Voltages on the terminals of TPB is shown in List 7-1 below) is powered on and the master control board starts working.

Part	L~ N	24V~ COM
Voltage	220±7%VAC	24.0±0.3VDC

Table 7.1 Voltages on the Terminals of TPB

- (3) Switch on the Emergency Switch in the control cabinet with its corresponding LED lighting up, and inspect the following:
  - ◆ Check if the door interlock circuit works properly;
  - ◆ Check if the door zone signals, the up limit and down limit switch signals work properly;
  - ◆ The working status in the handset programmer should have "INSPECTION" in display.
 If anything wrong or abnormal is herein found out, further checks and corrections should be done.

## 7.3 Setting of Basic System Parameter and Motor Setting

### 7.3.1 Setting of Basis system Parameter

With handheld special-purpose LCD operator, the following basic system parameters may be set properly (see Chapter 5 for Operation Method of Handheld Operator):

Table 7.2 Basic System Parameters

Parameter No.	Description	Default Value	Range	Unit	Remarks
F06	Rated speed	1750	200-6000	mm/s	
F07	Rated rotate speed of motor	1450	50-10000	rpm	
F08	Encoder pulses per revolution	1024	100-10000	PPR	
F09	Locking/home landing	1	1-48		
F10	Floor offset	0	0-20		
F11	Pre-set number of floors	18	2-48		
F12	Inspection speed	250	0-500	mm/s	0.25m/s
F23	Group control mode	3	0-4		Depend on whether group control or not. For setting details, see Chapter 8.
F25	Input type 1 (set input point X0-X15 as constant close or constant open)	12531	0-65535		
F26	Input type 2 (set input point X16-X31 as constant close or constant open)	1	0-65535		
F27	Input type 3 (set input TX0-TX15 as constant close or constant open)	4255	0-65535		
F28	Input type 4 (set input TX16-TX31 as constant close or constant open)	0	0-65535		
F32	Specification options of elevator integrated drive controller	5	0~7		Setting as per Chapter 8.2
F182	Series of deceleration switch	2	0-65535		
F183	Self-tuning speed of shaft	800	0-65535	mm/s	0.800m/s
F218	Motor type	0	0,1	×	0: asynchronous 1: synchronous
F219	Motor poles	4	2~32	×	Set as per nameplate
F220	Rated motor voltage	380	0~400	V	200V Series: 220; 400V Series: 380;
F221	Rated motor speed	Factory-default			Set as per nameplate (see F07 also)
F222	Rated motor current	Factory-default	0~80.00	A	Set as per nameplate
F223	Max output torque	150	0~300	%	Max 200% 10s
F224	Motor slip frequency	1.40	0~10	×	(synchronous rotate speed — rated rotate speed)÷synchronous rotate speed ×rated frequency; no setting is required for synchronous motor)

F225	Carrier frequency	8.0	4~15	kHz	Carrier frequency for PWM output)
F226	Encoder type	0	0~10	×	0: For incremental type, difference type, SINCOS, 2048 PPR is required for synchronous motor 1: CCW type UVW Encoder 2: CW type UVW encoder
F227	Encoder pulses per revolution	Factory-default			Set as per nameplate (see F08 also)
F228	Magnetic pole phase	0	0~360	Degree	Initial phase angle in synchronization to be set.

**Note:**

All parameters shown above must be properly set prior to commissioning; the setting of motor may be made in reference to nameplate; for different site conditions, please see Chapter 8 for specific setting and definition of each parameter.

**7.3.2 Motor Setting**

No self Self-tuning procedure but only self-setting of phase as follows is needed by asynchronous motor:

1. When [iAStar-S8] series elevator integrated drive controller is provided with synchronous traction machine, synchronous PG card will be necessary (5V, 5.3V, with frequency division output, article code AS.T007 or AS.T010.);
2. Make sure the phase sequence of output power lines at the motor side of elevator integrated drive controller is correct and both motor and elevator integrated drive controller are reliably grounded with resistance less than 10ohms.
3. The standard configuration uses Sin/Cos difference encoder or UVW encoder. Please make sure the encoder is wired properly and the shielding layer is reliably grounded.
4. Self setting of motor phase:
  - a. Elevator is in the state of "Inspection". Self-setting of motor phase requires balance between car and counterweight, which means even if the brake is open, the elevator will not slip.
  - b. Make sure the parameters are set correctly:  
Confirm the parameters by operator:
    - 1) Rated motor voltage F220, 200V series: 220; 400V series: 380;
    - 2) Current loop proportional gain F216 = 1.00; Motor Type F218 = 1(synchronous motor); Motor reversion F232 =0;
    - 3) Motor Poles F219, rated motor rotate speed F221, rated motor current F222, encoder type F226, encoder pulses F227 are set as per site requirements;
  - c. Activate Motor Self-tuning menu, press ENTER to confirm, then press INSPECT UP or INSPECT DOWN button to activate motor self-setting. If no failure indicator lamps light up at completion of self-setting, it means the setting is completed successfully. Now you should turn off the power before exiting from the setting state.



d. If failure indicator lamp lights up at completion of self-setting and the operator displays a error code “65”, you may invert V and W phase sequence and it is not required to restart self-setting.

5. Observe the speed feedback of elevator integrated drive controller when elevator is in inspection state. If obvious jump is found, check if the shielding layer of encoder has been grounded reliably.

6. If the motor runs abnormally or only a in a same direction, check the phase sequence of motor.

7. When the up and down inspection running is normal, the no-load full-speed running may be started. Observe if the output current of elevator integrated drive controller is correct.

## **7.4 Low-speed trial running and preparation before high-speed running**

### **7.4.1 Inspection running of machine room**

1. The following items should be checked before inspection of machine room

- (1) the inspection switch of the control cabinet is turned to “Inspection” position and the car top inpection button is at “normal” position.
- (2) the safe loop and the door-lock loop operate normally. Never make door locks shorted;
- (3) encoders are installed and wired properly;
- (4) check that the transducers are normal after powered up, that its parameters are set properly. and that the working state of the lift is “ Inspection”;
- (5) correctly connect brake lines of traction machine to the terminals in the control cabinet;
- (6) wiring of up/down limit switches and up/down forced slow-down switces is normal;
- (7) Wiring of preferential loop of the car top inspection is in normal;

#### **2. Inspection running of machine room**

Push the slow-up/down button on control cabinet when inspection running conditions are satisfied, and then the elevator should moves up or down at the set speed.

- (1) Check up or down motion. Observe the operation direction of elevator. If the direction is opposite, change any two-phase of the asynchronous motor and A/B phase of the encoder; for the synchronous motor, invert the signal from the main board to the transducer so that it can operate in normal or reversal direction.
- (2) Inspect up or down motion. If the motor feed-back speed by the transducer is unstable or obviously different from the given speed, please change A/B phase of the encoder and start inspection with power up again.
- (3) Inspect up or down motion. Observe whether speed displayed on main board is +or-. If the display is opposite, please change A/B phase of speed feedback port on the main board.
- (4) Please affirm that X10(down leveling) actuates first compared to X9(up leveling) through the leveling when inspecting up leveling of the lift. Please correct it if the order is opposite; otherwise, the hoistway self-tuning can not be completed successfully.

### **7.4.2 Inspection Ride on Top of Car**

If the inspection ride is worked out properly from the machine room, try it again on top of the car.

### 7.4.3 Inspection of CAN communication cable and address setting of 04 board

#### 1. Inspection of communication terminal resistor:

(1) Check the terminal resistor between CAN 1 communication ports TXA+ and TXA- is 60 ohm( in car and hall each 120 ohm)

(2) Affirm CAN2 communication ports TXA1+ and TXA1- in are parallel or the group control terminal resistor is 60 ohm (only for parallel or group control elevators, CAN2 communication terminal resistor must be in).

#### 2. Address Setting of the SM-04 board

Please set the address of SM-04 board from 1 to the topmost in turn. Please set the address of SM-04 board in car as 0(setting method see Section 6.3 for detailed).

### 7.4.4 Adjustment of opening/closing door

1. Make the elevator in inspection state and in leveling position;
2. Provide gate operator supply;
3. Move the gate by hand. Monitor whether signal of opening door to the set position (TX0) and closing door to the set position (TX1) on the main-board is normal;
4. Affirm safety shoe and overload signal is not working;
5. Put the gate at the middle position;
6. Push the close door button. Affirm output of the door close relay is normal and the door can be closed properly until the signal of closing door to the set position activates;
7. Push the open door button. Affirm output of the door open relay is normal and the door can be opened properly until the signal of opening door to the set position activates.

## 7.5 Shaft self-tuning

Hoistway self-tuning is that the elevator works at a self-tuning speed and records the positions of each floor and switches in the hoistway. The positions of floor are the basis for normal run brake and floor display, so elevator shaft self-tuning is necessary before high-speed running.

### 7.5.1 Self-tuning method

Procedures of self-tuning are as follows:

1. Affirm the elevator meets the safe operation conditions.
2. Installation and wiring of each switch in the shaft is correct. Traveling cables and outside cables are properly wired;
3. Set the elevator in inspection position;
4. Enter the self-tuning menu via a hand-held programmer and operate as per the menu;
5. Make the elevator in automatic state. Elevator will run down to the bottom at the self-tuning speed, and then run above to start self-tuning. Hand-held manipulator will show "success of self-tuning" after the successful completion of self-tuning;

6. If the control system has abnormal phenomena during the self-tuning process, self-tuning will stop. At the same time, the corresponding fault signal will be sent and the hand-held manipulator will show "failure of self-tuning".

**Especially note:** For 2 floor/2 landing self-tuning, We must make the elevator in limit position manually and make sure the up leveling switch is prolapsed before setting the elevator in inspection position;

**Note:** It is forbidden to run at a high-speed before elevator shaft self-tuning.

#### 7.5.2 Interpreting the meaning of hoistway data (monitoring state): unit mm

No.	Meaning unit mm
1-64	1-64 floors hoistway data
65	Length of leveling insert plate
66	Leveling inductor distance
67	Distance of up slow down switch on floor 1
68	Distance of up slow down switch on floor 2
69	Distance of up slow down switch on floor 3
70	Distance of up slow down switch on floor 4
71	Distance of down slow down switch on floor 1
72	Distance of down slow down switch on floor 2
73	Distance of down slow down switch on floor 3
74	Distance of down slow down switch on floor 4

### 7.6 High-speed running

#### 1. High-speed trial running

Affirm the elevator meets the safe operation conditions when low-speed running is satisfactory. Then start high-speed trial running after the elevator shaft self-tuning as follows:

1. Set the elevator to the normal position.

2. With the floor selection interface by activating the MONITOR menu of handheld programmer, you can select floors for elevator's trial running: one floor run, double-floor run, multi-floor run and the full floor run.

3. Affirm the elevator can normally close the door, start-up, accelerate, operate, stop the car, slow down, stop eliminate the signal and open the door.

#### 2. Safety testing

##### 1) Safe loop

Test requirement: the safe loop relay releases when any safety switch activates;

##### 2) Door lock loop

Test requirement: the door lock relay releases when any hall door lock disconnects and when the car door lock disconnects;

3) Safe loop relay conglutination protection (not necessary if there is no safe loop relay) .

Test requirement: Push the emergency stop button on the control cabinet to make the safe loop relay release. Press the safe loop relay by hand. The main-board should be protected and can not be reset automatically;

4) Door lock relay conglutination protection (not necessary if there is no door lock relay)

Test requirement: Press the door lock relay by hand when the door is open. The main-board should be protected and can not be reset automatically;

5) Band brake contactor conglutination protection

Test requirement: Press the band brake contactor by hand when it stops. The main-board should be protected and can not be reset automatically;

6) Output contactor conglutination protection

Test requirement: Press the band brake contactor by hand when stop. The main-board should be protected and can not be reset automatically;

7) Slip protection function

Test requirement: Inspection travel of the elevator in the middle floor. Removal two leveling sensor lines from console cabinet terminal (Suppose that the leveling signal is normal-open). Turn to normal state. The elevator runs to the leveling slowly. The main-board should be protected in 45 and can not be reset automatically;

8) Error floor protection

Test requirement: Run the elevator to the middle floor. Remove feedback terminal on the main-board. Inspect one or two leveling in down motion. Turn to normal state. Plug the feedback terminal in. Register instructions at the bottom. The elevator runs down at high-speed. When meeting the forced slow-down switch at the bottom, it can slow down normally to the leveling.

Run the elevator to the middle floor. Remove feedback terminal on the main-board. Inspect one or two leveling in up motion. Turn to normal state. Plug the feedback terminal in. Register instructions at the top. The elevator runs up at high-speed. When meeting the forced slow-down switch at the top, it can slow down normally to the leveling;

9) Overload function

Test requirement: Elevator overloaded switching action. Elevator should not close the door. The car buzzer should ring and overload lamp should turn on.

10) 110% load test

Test requirement: Put 110% load in the car. Reverse TX3 (overload signal) of the main-board, so that overloading does not work. The elevator can start and brake normally during high-speed running up and down for 40 times;

**3. Function test of the lift**

1) Automatic operation

Test requirement: Register a number of directives in the car, and then the elevator can

normally and automatically close the door, start, stop, eliminate signal and open the door;

Registered a number of up and down directives, and then elevator can stop the car, slow down, eliminate signal and open the door normally..

## 2) Attendant operation

Test requirement: Make the car switch in attendant position and register several directives. Press the door close button continuously. The elevator can close the door, start, stop, eliminate signal and open the door. Register a number of up and down directives, and then elevator can normally stop the car, slow down, eliminate signal and open the door.

## 3) Independent running.

Test requirement: Make the switch in independent position in the car. The elevator should have no display and the call button is not working. Register directives in the car and press the door close button continuously. The elevator can close the door, start, stop, eliminate signal and open the door.

## 4) Fire return

Test requirement: Keep the elevator stop on a non-landing floor and make the fire rundown switch in position "ON". It should be immediately closed and return to landing with high-speed to open the door and keep the door open, all the calls and orders in the car should be invalid;

The elevator runs up at a high-speed and the fire rundown switch in position "ON". The elevator should stop at the nearest station and return to the landing at high-speed to open the door and keep the door open, all the calls and orders in the car should be invalid;

The elevator runs down at a high-speed and make the fire rundown switch in position "ON". The elevator should return to the landing directly to open the door and keep the door open, all the calls and orders in the car should be invalid;

## 5) Fire running (Only for the fire ladder)

Test requirement: Make the firemen switch of operation panel in position "ON" after the elevator fire back to the landing. Register a number of directives and press the close button continuously. The elevator can close the door, start, stop, eliminate all in-car registrations and does not open the door. The elevator should be opened when pressing the door open button continuously. Keep the opening state after the door opens.

## 6) Parallel group control (only for the parallel or group control elevator)

Test requirement: Register a number of signal outside. Control system will deploy the elevators which use the shortest time to response to the signal outside. When a elevator stop the car, the signal outside on the same floor should be eliminated at the same time. An elevator should wait on the landing when it is free.

## 7) Elevator lock function

Test requirement: Assume that the elevator stops on a non-landing floor and makes the lock key of landing in a "lock" position. The elevator should close the door immediately, and should not response to the signal outside. Return to the landing at a high-speed. Delay to close the door after stopping and opening the door, turn off the light with no instructions, outside call and display outside;

Assume that the elevator is in operation and makes the lock key of landing in a "lock" position. The elevator should response to all the instructions one by one, and should not response to the signal outside. Return to landing with high-speed. Delay to close the door after stop and open the door, turn off the light with no all instruction, outside call and display outside;

Assume that the elevator stopped at landing floor and made the lock key of landing in a "lock" position. The elevator should close the door and turn off the light with no all instruction, outside call and display outside;

## **7.7 Adjustment of Elevator Comfort**

### **7.7.1 Factors Concerning the Comfort**

#### **1. Electric factors:**

##### **① Setting of running curve-related parameters:**

Acceleration, deceleration, S curve turning time, start break delay and stop brake delay, etc.

##### **② The setting of PI parameters related to vector control: proportional gain, integral time, etc.**

#### **2. Mechanical factors: verticality of guide rail, flatness of rail surface, perfectiveness of joints, tension of guide shoe and uniformity of steel wire rope tension, etc.**

The coordination status of the mechanical system is the essential factor which definitively affects the elevator comfort; while the electric factor is only helpful to further improve elevator comfort through perfect coordinating with mechanical system. The electric factor is to be set and adjusted by serial board parameters and elevator integrated drive controller parameters.

The commissioning personnel and related technicians should pay sufficient attention if the elevator comfort is affected due to defective mechanical system, any adjustment and setting of serial board parameters and elevator integrated drive controller parameters can definitely resolve it but improve comfort only.

### **7.7.2 Adjustment of Elevator Comfort**

#### **(I) Adjustment of mechanical factors**

##### **1) Guide rail:**

- ✧ Flatness of rail surface;
- ✧ Erection verticality of guide rail;
- ✧ Treatment of rail joint;

The rail verticality and rail duplexism shall be controlled within the range allowed by Chinese national standard. Too much of tolerance will affect comfort when elevator runs at a higher speed, which is evidenced by obvious vibration, joggling or left-right swinging of car at some positions;

Poor rail joint cause elevator stepping at certain fixed positions.

##### **2) Tension of guide shoe**

Too tight guide shoe is liable to cause elevator stepping when starting or braking when stopping; too loose guide shoe is liable to cause elevator swinging.

Where slipper guide shoes are used, suitable clearance should be provided between guide shoes and guide rail. If no clearance is reserved, the guide shoe will cause wearing of rail surfaces and further cause elevator stepping or vibrating at start/stopping phase.

Stand on car roof and try best to rock the car in right-left direction during commissioning. The fitness is allowable when only a little right-left displacement can be sensed.

### **3) Tension of Wire Rope**

Non-uniform tension of wire ropes may cause elevator joggling or vibration due to some ropes are over-tensioned but other ropes are under-tensioned and as a result, affect the start, stop and high-speed running of elevator.

During commissioning, stop the elevator at middle floor, stand on car roof and pull wire ropes one by one in horizontal direction. Uniform tension is indicated by approximately identical shift distances caused by pulling forces. On the contrary situation, the installer must adjust the their tensions.

In addition, the wire rope just uncoiled has restored torsion stress, which is liable to cause vibration if directly installed. So, appropriate measures should be taken before installation to release any restored torsion stress.

### **4) Soundness and Tightness of Car as installed**

When elevator runs at a higher speed, the whole car has to bear considerable forces. If any parts of car frame or car wall are not sufficiently tightened, relative slippage may cause vibration. Most resonant whistles might be caused due to insufficient soundness and tightness of car and some factors of shaft.

### **5) Whether mechanical resonance preventers are available**

- ✧ Before mounting on tractor on steel beam, a rubber pad is arranged between them.
- ✧ Use suitable wood chuck or equivalent devices at wire rope ends to facilitate eliminating vibration.
- ✧ Nowadays, some new type light-weight materials are used in car interior for decorating purpose., however, this light-weight car is liable to cause “mechanical resonance”, especially in case of high-speed high-rise elevators. This mechanical resonance may be eliminated by add appropriate loads on the car to change its natural frequency.

### **6) Tractor**

Improper installation of tractor or long-term wearing of worm gear may cause axial movement of worm gear during acceleration or deceleration of elevator and cause elevator “stepping”.

### **7) Car Balance**

Sometimes because of design or installation, the unbalanced car mass causes it slightly tilting to a side. During car traveling, the guide shoe may closely abrade the rail surface and result in joggling or vibration. Now, a balance weight may be added to the lighter side followed for test running.

### **8) Others**

The duplexism between guiding pulley and overhang traction sheave; the brake clearance adjustment during running;

## **(II) Adjustment of Electric Factors**

### **1) Elevator Operation Curve**

In order to meet the requirements of elevator comfort and efficiency, the following S-curve should be observed. The system may, by adjust the acceleration /deceleration slope and time constants at four transition points, ensure the elevator comfort and efficiency.

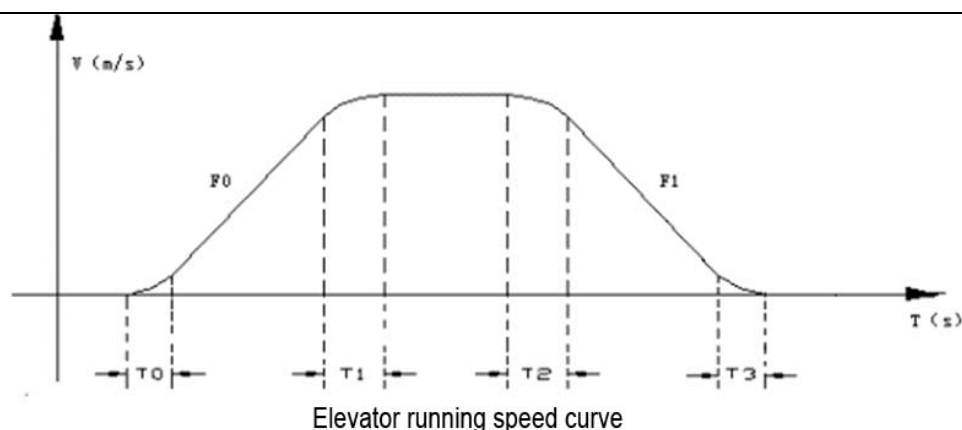


Figure 7.1 Elevator Operation Curve

When internal instruction is send for starting elevator, the output contactor KMY picks up; thereafter, on the one hand it drives band brake contactor after delay time F16, on the other hand, it gives speed curve instructions after delay time F5; the entire operation process is described as follows: start transition (elapses time T0)→liner acceleration (uniform acceleration F1)→acceleration transition (elapses time T1)→uniform speed running→deceleration transition(elapses time T2)→liner deceleration (uniform deceleration F2)→leveling transition (elapses time T3)→stop. During leveling process, it firstly sends internal instruction STOP and then opens the brake contactor; after delay time F17, it stops instruction signals (for inverter running) and shields the speed instruction at last release output contactor KMY after delay time 0.5s.

Key parameters are described as follows:

Parameter No.	Parameter Name	Recommended value or range	Setting Range
F0	Acceleration slope a1	50 (40~65)	Smaller the value, smoother the acceleration. Too small value decreases efficiency; too high value results in abrupt acceleration: ① too abrupt acceleration makes passengers uncomfortable; ② too abrupt acceleration is liable cause current problems. The elevator speed is generally induced by value setting as follows: 1m/s(40); 1.5~1.8m/s (50); 2.0m/s (60). Higher value setting is not appreciated especially for hotel and some residence buildings in which a lot of oldsters and/or children lives.
F1	Deceleration slope a2	50 (40~65)	Smaller the value, smoother the deceleration. Too small value decreases efficiency; too high value results in abrupt deceleration: ① too abrupt deceleration makes passengers uncomfortable; ② too abrupt acceleration is liable cause voltage problems. The elevator speed is generally induced by value setting as follows: 1m/s(40); 1.5~1.8m/s (50); 2.0m/s (60). Higher value setting is not appreciated especially in hotel and some residence buildings in which a lot of oldsters and/or children live in.
F2	S-curve T0	130 (130~160)	T0: transmission time from starting to acceleration stage; higher value setting results in smoother starting. In this stage, elevator runs at a very low speed, too long transmission time is liable to cause motor



			incapable to drive the elevator and subsequently induce PGO error or overcurrent failure, especially in the case of full-loaded car.
F3	S-curve T1	110 (100~120)	T1: transmission time from the end point of acceleration to the top speed; T2: Transmission time from the top speed to the start point of deceleration.  T1 and T2 do not obviously affect the elevator comfort, they are unnecessary to be adjusted under most conditions. Too higher T2 may cause over-travel.
F4	S-curve T2	110 (100~120)	
F5	S-curve T3	130 (130~160)	T3: the transmission time from the end point of deceleration to the stop of elevator. In this stage, elevator runs at a low speed, too long transmission time is liable to cause motor incapable to drive the elevator and subsequently induce PGO error or overcurrent failure, especially in the case of full-loaded car.

Table 7.3 Key Parameters

**Attention:**

Properly down set the F0 and F1 may improve elevator comfort, but at the same time decrease elevator efficiency. Properly up set F2~F5, totally four transmission times may also improve comfort, but also decrease elevator efficiency.

**2) Start-Brake Sequence Setting**

Start-brake sequence is shown by the following figure 7.2.

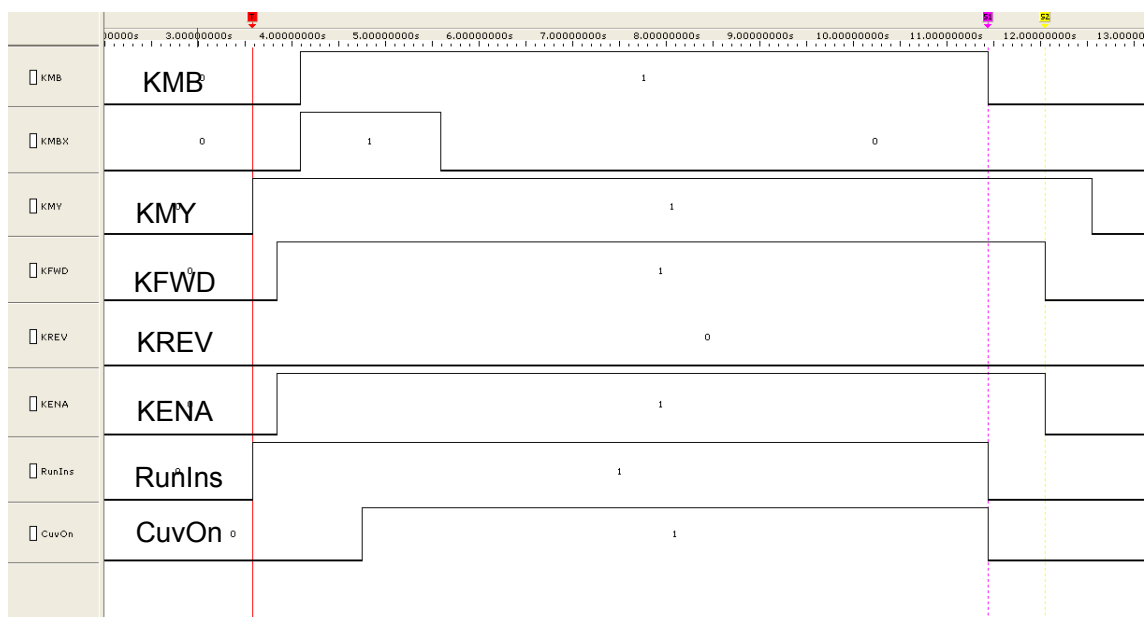


Figure 7.2 Start-brake Sequence

**KMB** Brake output

After KENA output instruction, it is started after delay time F16(D8); KMB output stops when RunIns stops.

**KMY** Main circuit output contactor

KMY output starts when RunIns activates; KMY output stops 0.5s after KENA stops.

**KFWD** Up output of elevator integrated drive controller

In up stage, it starts or stops at the same time with KENA;

KREV Down output of elevator integrated drive controller

In down stage, it starts or stops at the same time with KENA;

KENA Enabling output of elevator integrated drive controller

KENA output start 0.5s after KMY output starts; KENA stops after a delay time as set by F17 (D9) when KMB output stops.

RunIns Internal running instruction

CuvOn Speed instruction output

It starts after a delay time as set by F58(D10) when KMB output starts (actually when output is detected by band brake switch). CuvOn stops when RunIns stops.



#### Important Note:

**Start:** 1 in case the start is abrupt but without back movement, properly down set F16 or up set F58 if other settings are in normal state.

2. In case the start is abrupt with back movement, properly up set F16 or down set F58 if other settings are in normal state.

**Stop:** 1. in case the stop is abrupt, properly up set F17;

2. In case slippage occurs during stopping, properly up set F17 or down set F122;

3. In case during stopping the delay time before release of contactor is too long and the motor is heard of abnormal sound, properly down set F122.

### 3) Drive PID Regulating

Function parameters F206 to F213 are provided to set the speed regulator PID and are determinative to the elevator operating performance. Function parameter F214 and F215 is for setting the switch-over frequency between high-speed and low speed.

See following Figure 7.3 for configuration of Drive Speed PID (where,  $K_p$  is proportional constant;  $K_i$  is integral constant) :

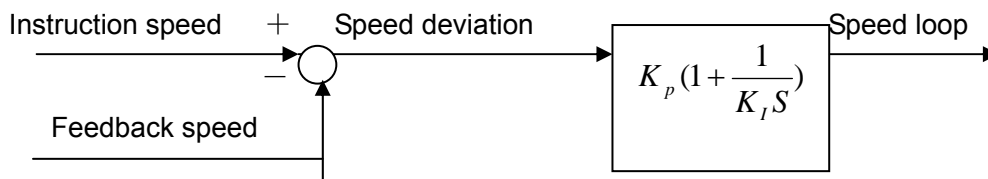


Figure 7.3 Speed Regulator PID

#### ◆ Adjustment of Starting Comfort

This elevator integrated drive controller uses sensor based no-load starting compensation technology which may ensure starting comfort of elevator even if no load device is installed. In most cases, input the analog load measuring signals is not necessary, it is only needed to set F204 and F205, respectively the proportion parameter and integral parameter. When elevator is ready for operation, set F205, set the zero servo time parameter F217, delay time F58 (0.5s as default) for setting control system speed curve and the parameter C14 (0.8s as default). Up set F204 to make traction sheave immovable when brake is opened. If the higher value setting of 204 causes motor swinging, it is necessary to suitably down set F204 and up set F205 to ensure traction sheave movable when brake is opened. See the following Figure 7.4 for sequence.

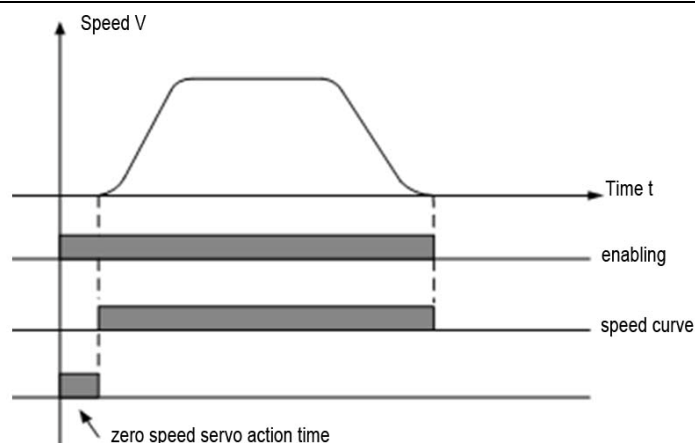


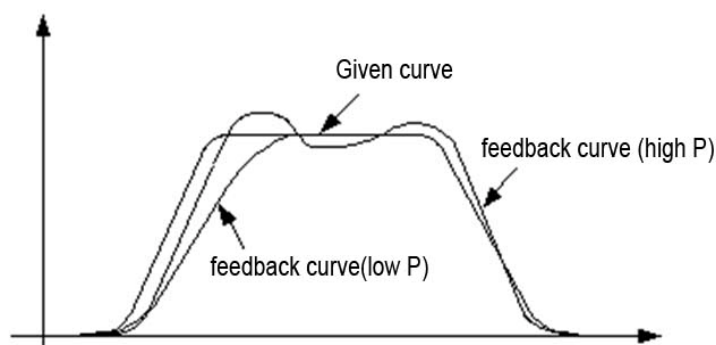
Figure 7.4 Adjustment of Starting Comfort

#### ◆ Adjustment of Stopping Comfort

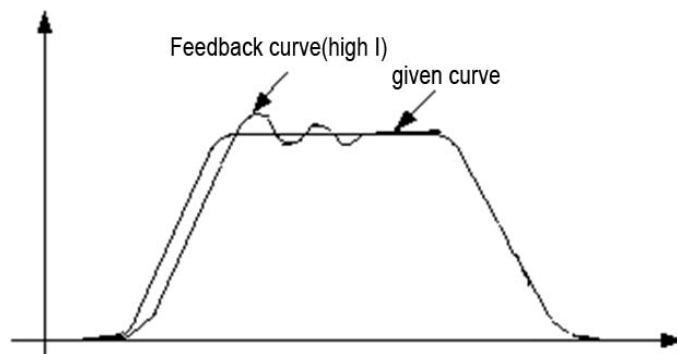
In case there is pulsation in stopping stage, the frequency switch-over point 1 may be risen and additionally, F207 (low-speed proportion parameter) and F208 (low-speed integral parameter) may be properly adjusted.

#### ◆ PID Setting Description

a) Increasing proportion constant  $P$  may speed up the dynamic response of system. However, too higher  $P$  value setting may cause system oscillation. See Figure 7.5 for the effect of  $P$  on feedback tracking:

Figure 7.5 The effect of  $P$  on Feedback Tracking

b) Increasing the integral parameter  $I$  may speed up dynamic response of system. If considerable vibration may be felt in low-speed starting or stopping, the  $I$  may be properly up set. However, too higher  $I$  value setting may cause system oscillation. See figure as follows:

Figure 7.6 The effect of  $I$  on Feedback Tracking

- c) Usually, the proportion constant P is set at first. The P value may be up set as far as possible provided that no occurrence of system oscillation. Then the integral constant I will be so set that the system response is rapid but the overshooting is acceptable.
- d) See Figure 7.7 for elevator operation curve sectional PI control.

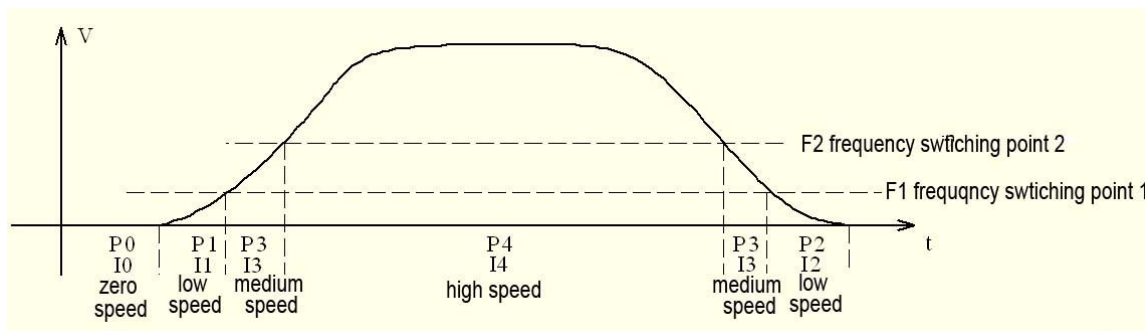


Figure 7.7 Elevator Operation Curve Sectional PI Control

## 7.8 Floor Leveling Adjustment

☆ The floor leveling adjustment may start as the adjustment of riding comfort is near finish.

### 7.8.1 Basic Requirements for Levelling

7.8.1.1 First of all both the door-zone inductors and the plates must be precisely positioned with its bisecting point in line with the bisected distance between the two door-zone inductors in order to avoid neither higher nor lower level of the car than the right and desirable leveling position.

7.8.1.2 When using magnetic switches, sufficient inserting length shall be guaranteed in installation in order to allow for the time needed by the inducting switches to act properly against the higher-up and/or lower-down phenomenon.

7.8.1.3 To guarantee good leveling, the system calls for a short creeping of the lift before stop.

7.8.1.4 In practice, the adjustment should begin with an intermediate landing until the leveling looks perfect on that floor. The adjustment on other floors may continue based on the data obtained from the first-done landing.

7.8.1.5 By means of the adjustment in the curve formation, ratio and integral increment, it should be achieved that the landing position of the lift on the intermediate floor remains the same no matter whether the lift is going up or down, with a tolerance of  $\pm 2 \sim 3$ mm from trip to trip.

### 7.8.2 Adjustment in Leveling with Multi-staged Speed Reference

#### 7.8.2.1 No Creeping or Longer Creeping

After the deceleration begins the system requires entry of creeping of the lift as a basic condition for leveling. The curve must be too flat so that there is no creeping whereas the curve must be too steep if the creeping lasts too long. Modify the curve until CREEPING APPEARS but NOT too long.

#### 7.8.2.2 Lower-up and Higher-down or Vice Versa

When this phenomenon occurs, the creeping speed must be too high so that it should be adjusted.

#### 7.8.2.3 Both Lower-up and -down or Higher-up and -down

If this happens at stop, the door-zone plates must be in a deviated position which should be adjusted to the right position.

#### 7.8.2.4 Switches of the Terminal landings

If the terminal switches are improperly installed, the leveling accuracy on the terminal landings will be affected. Take the top landing for example:

- The terminal switches on top landings are positioned at a greater distance than they are required for switching speeds.

- The lift travels to the terminal landing at rated speed and slows down without leveling.
- Set the lift into INSPECTION service immediately.
- Measure the difference between the sills, which is the distance which should be moved upwards in adjustment. Likewise the adjustment in downward direction should be done in the same way.

### 7.8.3 Adjustment in Leveling with Analogical Speed Reference

#### 7.8.3.1 Confirm the Coincidence of the Stop Position for Every Travel

By means of the adjustment in the curve formation, ratio and integral increment as addressed in Chapter III, it should be pledged that the landing position of the lift on the intermediate floor remains the same no matter whether the lift is going up or down, with a tolerance of  $\pm 2 \sim 3$  mm from trip to trip.

#### 7.8.3.2 Adjustment of the plates in the door-zone

- Have the lift stop at one landing after another, measure and note down the difference  $\Delta S$  between the sills (“+” for the higher car sill and “-” for vice versa).
- Adjust the plate positions floor by floor, move the plate downward by  $\Delta S$  if  $\Delta S > 0$ , and upward by  $\Delta S$  if  $\Delta S < 0$ .
- A self-learning must be done again after the plate adjustment is completed.
- Check the leveling again. If NOT satisfied with the result, repeat STEP (1) through (3).

#### 7.8.3.3 Adjustment of Parameters in the Menu

If the coincidence of the landing position shows a feature of repetition, but the leveling position varies between trips up and down on the same landing, e.g., up-higher and down-lower or up-lower and down higher. Go to the parameter menu and make adjustment by F56 and F57. The default value is 50 mm, reduce it with up-higher and down-lower but increase it with up-lower and down higher, the adjusting range should be 50% of the difference value. E.g., if the difference value in the case of up-higher and down-lower is 20 mm, decrease the parameter by 10 mm.

### ☆ Requirements for Installation of Leveling Switches

With the car sill and landing sill absolutely in line horizontally, the upper edge of the leveling plate should stay higher than the lower leveling switch and the lower edge stay lower than the upper leveling switch by roughly 10 mm respectively, which make it easy to adjust the riding comfort and the leveling accuracy. The standard length of the leveling plate is 220 mm, and each of them should have the same length with a tolerance NOT exceeding 3 mm (see the Fig. below).

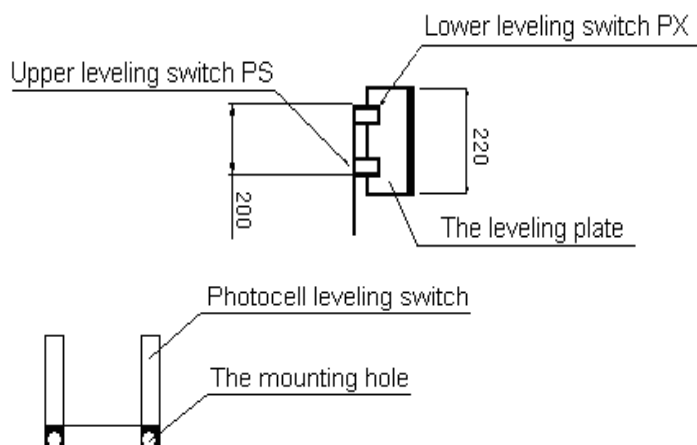


Figure 7.8 Leveling Switch Installation Specification

#### (1) When using magnetic leveling switches

- ① Ensure enough inserting length of the plate into the leveling switches so that the switches can act effectively and reliably.
- ② The leveling plate must be mounted in strict vertical alignment to avoid the situation that

only of the switches work properly while the other is left out of the effective working range, which spoils the normal operation of the lift.

**(2) When using photocell leveling switches (STEP Serial Port accepts effective low-volt signals.)**

It is recommended to have the switches treated in the way below for better performance.

- ① Remove the paint on the shade around the mounting hole in order to make a perfect earth connection of the photocell's metal coat via screws, brackets and top of the car. If an earth wire is fixed beneath the fixation nut on the photocell casing with paint removed, greater reliability in use can be expected.
- ② It is recommended the connection to the car top terminal box via a shielded cable with an earth to it.
- ③ Using constant-open photo switches may greatly reduce the extent of being interfered.
- ④ In case one of the photo switches flashes in operation causing problems in travel or leveling, it could be attributed to interference. Attach a capacitor of  $0.1\mu\text{F}63\text{V}$  between COM and PS (or PX) as shown in the Fig. below.

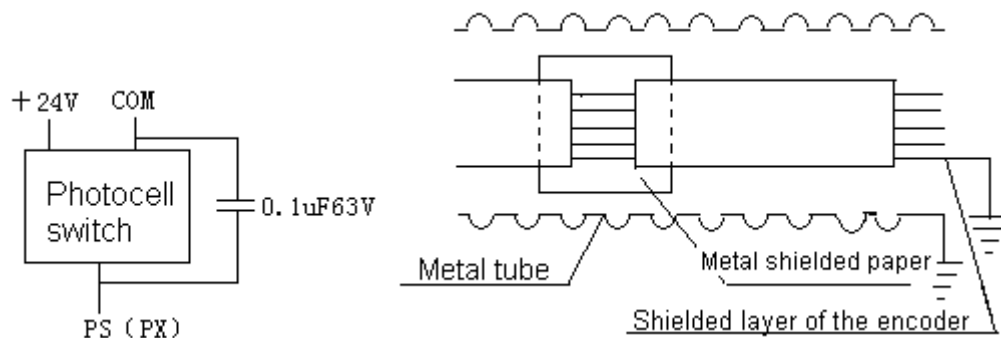


Figure 7.9 Capacitor Wiring Diagram

**Attention:** Photocell leveling switches are easily disturbed, it is not an advisable way to repeatedly replace and that will greatly increase the cost. But if the 4 notes above are adopted, the extent of being interfered will be greatly reduced.

☆ **Attention Should be Paid to Installation of the Switches**

- ① The leveling plates is supposed to insert into the switches by a depth of  $2/3$  while the plates on every floor should be in vertical alignment with one another in order to maintain the same insertion depth in the switches on every floor.
- ② With the insertion well done, both ends of the plate should stretch out of the switch by a length of 10 mm to 30 mm (see the Fig. below).

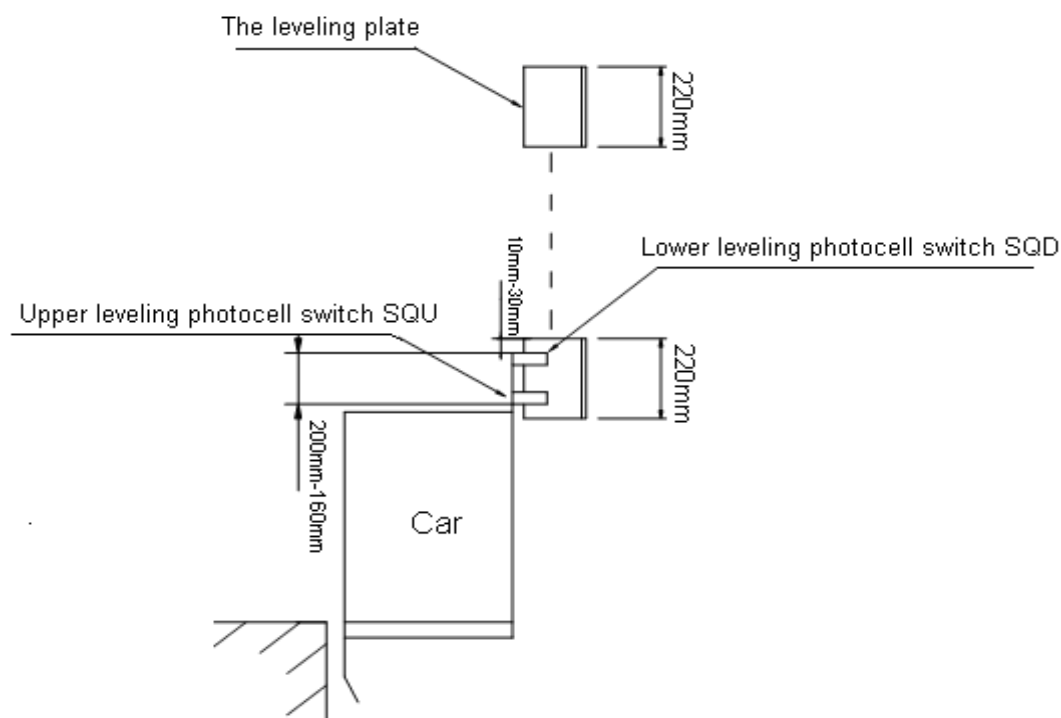


Figure 7.10 Leveling plates Installation Specification

- ③ The leveling plates of every floor should be in alignment with the inductor by the central line for better leveling performance after recording the floors.
- ④ Let the lift go up and down to every floor at normal speed, noting down the difference between the sills. When going up, the higher car sill is regarded as overleveling whereas the lower car sill as underleveling; when going down, the lower car sill is regarded as overleveling whereas the higher car sill as underleveling.
- ⑤ In case of the encoder is interfered or it is of poor quality, the leveling performance may also be affected. When wiring the system, the encoder cables or lines should be laid in a separate trunk from that one in which the power supply lines are laid.

#### ☆ Attention Should be Paid to Leveling Adjustment

- The distance between the centers of the leveling inductors is recommended as follows:  
Without releveing with the door open: the distance in between should be 60 mm smaller than the length of the plate, with 30 mm stretching out on both ends respectively.  
With releveing with the door open: the distance in between should be 40 mm smaller than the length of the plate, with 20 mm stretching out on both ends respectively.
- Setting of F21(delay for leveling inductor), 6 mm for 1.75 m/s and below, 10 mm for 2.0 ~ 3.0m/s;  
 Setting of F56 and F57, F56 = 50, F57 = 50, Fine adjustment for each floor 20.
- Adjust PI in the inverter to eliminate over-frequency.
- Write down the leveling data of every floor, "+" for the higher car sill and "-"for the lower. Single-floor up from F2 to FN, note down the leveling difference as Up(2),Up(3), ... Up(N), Single-floor down from F ( N-1 ) to F1, note down the leveling difference as Dn(N-1),...Dn(2),Dn(1),  
 Calculate the respective leveling difference of the floors,

$$X(2) = (Up(2) + Dn(2)) / 2;$$

$$X(3) = (Up(3) + Dn(3)) / 2;$$

$$X(4) = (Up(4) + Dn(4)) / 2;$$

...  
 ...

$$X(N-1) = (Up(N-1) + Dn(N-1)) / 2;$$

$X(2) \sim X(N-1)$  If the difference is greater than 10 mm, the positioning of the plate have to be adjusted,  $X(n)$  positive implies the plate's positioned too high, and vice versa. If the difference is smaller than 10 mm, use fine leveling adjustment.

□ With the plates re-positioned, let the lift do the self-learning, and write down the leveling data again.

Single-floor up from F 2 to F N note down the leveling difference as  $Up(2), Up(3), \dots Up(N)$ ,

Single-floor down from F ( N-1 ) to F 1, note down the leveling difference as  $Dn(N-1), \dots Dn(2), Dn(1)$ ,

1) Calculate the respective leveling difference of the floors,

$$X(2) = (Up(2) + Dn(2)) / 2;$$

$$X(3) = (Up(3) + Dn(3)) / 2;$$

$$X(4) = (Up(4) + Dn(4)) / 2;$$

...

$$X(N-1) = (Up(N-1) + Dn(N-1)) / 2;$$

2) Calculate the current difference value on average  $XUp$ ,  $XDn$  excluding those to the terminal landings

Difference value on average going up,  $XUp = (Up(2) + Up(3) + \dots + Up(N-1)) / (N-2)$ ;

Difference value on average going down,  $XDn = (Dn(2) + Dn(3) + \dots + Dn(N-1)) / (N-2)$ ;

Intermediate position,  $pX = (XUp - XDn) / 2$ ;

Note that  $XUp$ ,  $XDn$  and  $pX$  are all calculations with "+/-" marks.

3) Adjust F56, F57:

$$F56 = 50 - pX;$$

$$F57 = 50 - pX;$$

4) Make fine leveling adjustment and note down the data in fine adjustment for  $F_n$  as

$L(n)$ :

$$L(2) = 20 - X(2)$$

$$L(3) = 20 - X(3)$$

...

$$L(n) = 20 - X(n)$$

...

$$L(N-1) = 20 - X(N-1)$$

Finally calculate the value in fine adjustment for the terminal landings.



### ☆Reasons for Poor leveling adjustment:

The following issues are summed up. Please check in turn:

1. If the following parameters are set improperly, the leveling can not be adjusted well.

Inspect F21 ( adjustment of the leveling sensor will be delayed). Factory default setting: 6 mm. The elevator can be set to 6mm using the photoelectric leveling sensor below the speed of 1.75m/s.

High-speed elevators (3.0m/s or above) can be set to 10mm using the photoelectric leveling sensor.

High-speed elevators (5.0m/s or above) can be set to 16mm using the photoelectric leveling sensor.

F56 leveling adjustment of up motion. Factory default setting: 50 mm.

F57 leveling adjustment of up motion. Factory default setting: 50 mm.

Leveling fine tuning: The Leveling fine tuning on every floor is set to factory default setting 20 mm.

#### 2. Encoder interference

1) The encoder shielding line accepts a disturbance of power line because it is not grounded or the signal line and power line are not separated. This problem is more serious at the synchronous motor scene. The signal of the Sincos encoder or rotary transformer is small analog signal, and is more vulnerable to interference. It is shown as the random and erratic non-leveling.

2) Inspection method: Record the elevator shaft data after self-tuning (from down station to up station), then restart self-tuning and record shaft data accordingly. Compare these data collected during the self-tuning. The position error of corresponding floors is no more than 3 mm. (Generally they are the same or the difference is + - 1mm) It is considered as the encoder interference or traction sheave slippage when the error is more than 3 mm.

#### 3) Solutions:

a) Make sure the electrical grounding line has been connected from the motor to the control cabinet.

b) Make sure the shielding line of PG card from the encoder to the transducer has been grounded at the transducer end. Check whether there is a connection between the cable terminations; if so, make sure that both ends of the shielding line are grounded.

**Warning:** Special attention should be given to the middle joins of Sincos encoder line of the synchronous motor!!

c) Make sure the encoder line from PG card to encoder line of the main-board has been grounded

d) Make sure the encoder line is far away from the power line and break resistor line (the encoder line should be covered with flexible conduit if they are in the same wireway )

e) Make sure it is connected from PG card 0V to the main-board 0V. (Particularly when A +, A-, B +, B- output is used at multi-segment speeds)

f) Inspect whether the encoder coupling shaft slips.

### 3. Slippage of the traction sheave's steel wire rope

1) Phenomenon: The leveling is not correct when the elevator runs with no-load or full-load, or when the up and down leveling is inconsistent. It is accurate when it runs at half-load.

2) Inspection method: On any floor (Assumption it is the third floor), mark signal line with chalk between the traction sheave and the rope. Return to the third floor after running single round-trip (from the third floor to the fourth floor, from the fourth floor to the third floor). Check error distance between signal line of traction sheave and rope (requested less than 5 mm); this error is the single slippage distance error. Run 2 times when there is slippage error in the no-load and full-load situation. Slippage error which is greater than 5 mm must be resolved.

### 3) Solutions:

a) Before and after the car decoration it may vary around 200 Kg. Is Car decoration completed now? Is the current balance coefficient right? If we can not confirm console cabinet load to half load, Ping-error?

b) High-speed elevators can not solve the slippage problem, the following two approaches are:

1. Install the encoder at the side of the governor to offer the position feedback of the main-board.

2. Absorb the slippage error by creeping. Set F24 = 2 (Analog with creep) or F24 = 0 (Multi-speed operation)

### 4. Speed regulator overshooting

DC speed regulator or synchronous motor with no gear may overshoot because of having no reducer, especially Mentor II DC governor. It uses the encoder to feedback and the characteristic is soft. Recommend the use of gun generators. Do not band brake at zero rate before parking, and then another rate, have non-zero-speed band brake for the Performance.

1) Inspection method: Check the elevator band brake situation when it is parked. If it is found that speed of elevators slow down to zero, escalators do not have a band brake, and then begin to have speed, and then hold the band brake with speed, which shows that the elevator has overshoot.

2) Solution: Adjust PI parameters of the governor speed loop PI to eliminate the overshoot data.

5. Ensure adequate insertion depth when using the magnetic reed sensor. Check whether the leveling insert plate on each floor is inserted into the red line of sensor, and flashboard on each floor is installed tilt.

6. When the length of leveling insert plate is inconsistent, flashboard on the second floor is the length of the benchmark. The length of flashboard on other floors requirements to be the same with the second floor, otherwise may cause problems of flashboard.

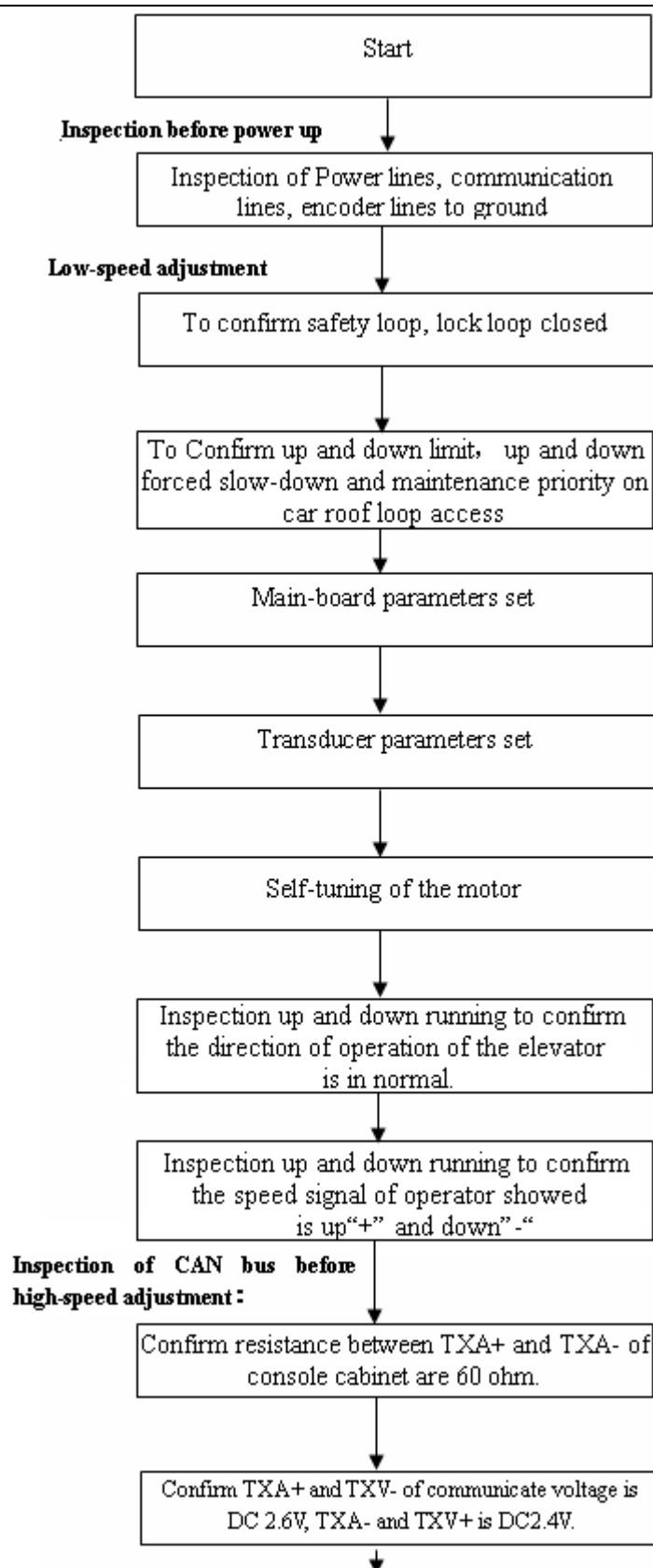
7. Does not do self-tuning again after adjusting the flashboard

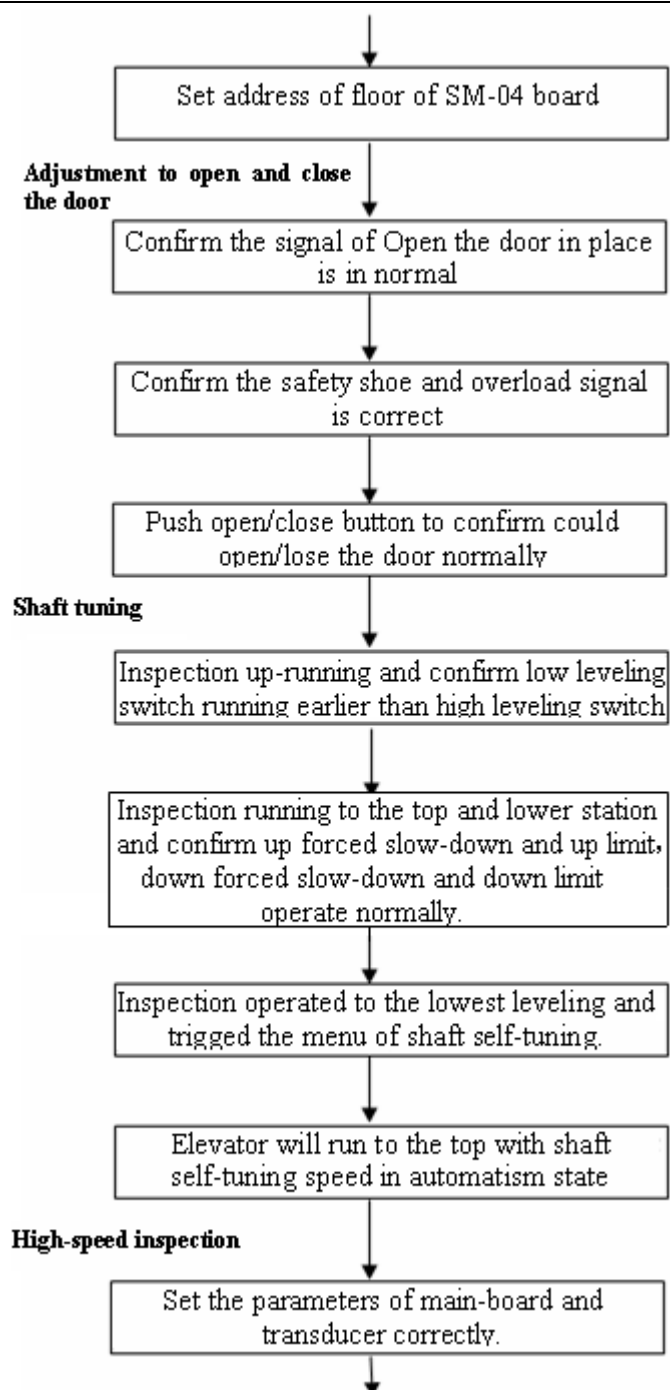
## **7.9 Setting of Other Functions**

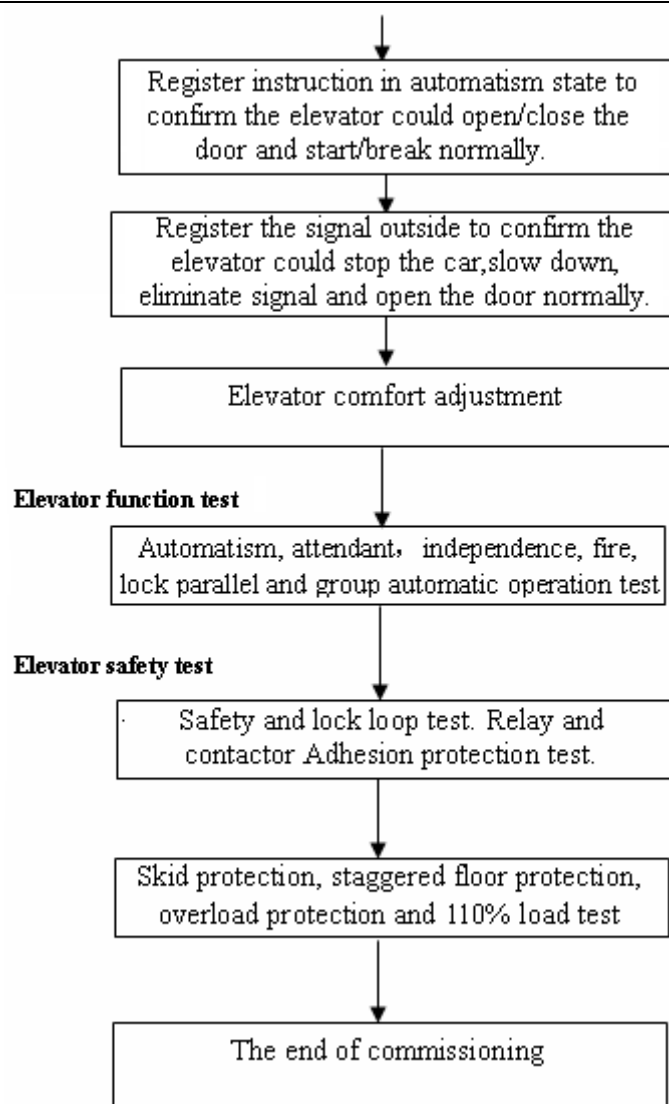
If necessary, you may enable or set other functions by setting the parameter F (see Section 2.8 for detailed function definition and setting method for elevator operation)

## **7.10 Simple commissioning diagram**

Commissioning Process







## 8 Function Parameter

### 8.1 Schedule of Function Parameter

Table 8.1 Definition of F Parameters

Paranumber	Parameter Description	Default	Range	Unit	Reference
F00	Adjust starting acceleration	550	200-1500	mm/s <sup>2</sup>	0.55m/ s <sup>2</sup>
F01	Adjust braking deceleration	550	200-1500	mm/s <sup>2</sup>	0.55m/ s <sup>2</sup>
F02	S Jerk T0 (S curve jerk start at start T0)	1300	300-3000	ms	1.300s
F03	S Jerk T1 (S curve jerk at end of acceleration T1)	1100	300-2000	ms	1.100s
F04	S Jerk T2 (S curve jerk at start of deceleration T2)	1100	300-2000	ms	1.100s
F05	S Jerk T3 (S curve jerk at end of deceleration T3)	1300	30-3000	ms	1.300s
F06	Rated speed	1750	200-6000	mm/s	1.75m/s
F07	Rated rotations of motor	1450	50-10000	rpm	1450rpm
F08	Encoder Pulses	1024	100-10000	ppr	1024ppr
F09	Locked home landing	1	1-64		
F10	Floor offset	0	0-20		
F11	No. of Floor	18	2-64		
F12	Inspection Speed	250	0-500	mm/s	0.25m/s
F13	Relevelling Speed	60	10-150	mm/s	0.06m/s
F14	Door-closing delay for calls	30	0-300	0.1s	3.0s
F15	Door-closing delay for registrations	30	0-300	0.1s	3.0s
F16	Brake delay	2	0-20	0.1s	0.2s
F17	Operation removal delay	6	2-30	0.1s	0.6s
F18	Fire home	1	0-64		
F19	Second fire home(Not used yet)	1	0-64		
F20	Homing Delay	0	0-60	s	
F21	Level adjust distance (Tolerance in distance for single-floor and multi-floor leveling)	6	0-40	mm	6mm
F22	1 <sup>st</sup> main landing by duplex control	1	0-64		
F23	Group mode	3	0-4		
F24	Drive mode of elevator integrated drive controller	1	0-2		

F25	Input Type 1 (X0-X15 Input N/O,N/C setup)	12531	0-65535		
F26	Input Type 2(X16-X31 Input N/O,N/C setup)	1	0-65535		
F27	Input Type 3 ( TX0-TX15 Input N/O,N/C setup)	4255	0-65535		
F28	Input Type 4 ( TX16-TX31 Input N/O,N/C setup)	0	0-65535		
F29	Service floor setting 1 (whether stop on Fl. 1-16)	65535	0-65535		
F30	Service floor setting 2 (whether stop on Fl. 17-32)	65535	0-65535		
F31	Service floor setting 3 (whether stop on Fl. 33-48)	65535	0-65535		
F190	Service floor setting 4 (whether stop on Fl. 49-64)	65535	0-65535		
F32	Specification option of elevator integrated drive controller	5	0-60		See definition in 8.2
F33	Interval between trips in automatic running test	5	0-60	s	5s
F34	Number of trips in automatic running test	0	0-65535		
F35	Fireman mode	0	0-3		
F36	Brake switch detection mode	0	0-65535		
F37-F40	Stand-by				
F41	DTZ-III-DC-SC weighting equipment empty or full load study Refers to F164 = 0,3.	0	0-65535		
F42	Stand-by				
F43	Buzzer & flashing at landing call by attendant service	3	0-255		
F44	The serial communication the self-address (does not monitor is 255)	255	0-255		
F45-F49	Stand-by				
F50	Front door-opening allowed 1 for Fl.1-16	65535	0-65535		
F51	Front door-opening allowed 2 for Fl.17-32	65535	0-65535		
F52	Front door-opening allowed 3 for Fl.33-48	65535	0-65535		



F191	Front door-opening allowed 4 for Fl.49-64	65535	0-65535		
F53	Rear door-opening allowed 1 for Fl.1-16	0	0-65535		
F54	Rear door-opening allowed 2 for Fl.17-32	0	0-65535		
F55	Rear door-opening allowed 3 for Fl.33-48	0	0-65535		
F192	Rear door-opening allowed 4 for Fl.49-64	0	0-65535		
F56	Leveling adjustment up ( 50 for baseline )	50	0-65535	mm	50mm
F57	Leveling adjustment down ( 50 for baseline )	50	0-65535	mm	50mm
F58	Speed curve delay at start	5	0-250	0.1s	0.5s
F59	Zero-speed band brake delay	0	0-65535	0.01s	0s
F60	KMC testing mode ( the 2 <sup>nd</sup> contactor of the main circuit )	3	0-3		when one contactor is used in the main circuit, F60 should be set as 0
F61	Distance for triggering arrival gong	1200	0-65535	mm	1.200m
F62	Time limit for anti-slippage operation	32	20-45	s	32s
F63-F64	Standby				
F65-F112	Indication of floors		0-65535		
F113-F114	Stand-by				
F115	Open timeout	15	3-30	s	
F116	Close timeout	15	3-30	s	
F117	Holding time before forced door closing	60	0-65535	s	
F118	Holding time for the handicapped	30	0-65535	s	
F119	Stand-by				
F120	Number of registrations for anti-nuisance	0	0-65535		
F121	Forced door-closing enable	0	0-1		
F122	Release direction delay during inspection service	3	0-65535	0.1s	0.3s
F123	Landing call classification	0	0-65535		
F124-F127	Stand-by				
F128	Separate door control	0	0-65535		
F129	Relevelling with door open and/or pre-door-opening Enable.	0	0-65535		

F130	Holding door-opening/closing torque	0	0-65535		
F131	Time section floor blockade floor set	0	0-65535		
F132	Time section floor blockade beginning time set	0	0-65535		
F133	Time section floor blockade closure time set	0	0-65535		
F134-F136	Stand-by				
F137	Service floor setting 1 (whether stop on Fl. 1-16) by NS-SW	65535	0-65535		
F138	Service floor setting 2 (whether stop on Fl. 17-32) by NS-SW	65535	0-65535		
F139	Service floor setting 3 (whether stop on Fl. 33-48) by NS-SW	65535	0-65535		
F199	Service floor setting 4 (whether stop on Fl. 49-64) by NS-SW	65535	0-65535		
F140	Stand-by				
F141	KMY release delay	100	100-65535	5ms	0.5s
F142-F144	Stand-by				
F145	Bus voltage gain	100	100-120	100	
F146	leveling encoder position value and floor data error	180	180-65535	180	
F147	Choice contact device adhesion failure protection way	0	0-65535	0	
F152	Delay for car-lighting ( automatically switching off car-lighting and fan )	5	0-65535	60s	300s
F153	Whether hall door lock high pressure checkup point (0: Does not have; 1: Has)	1	0-65535		
F154-F155	Stand-by				
F156	Door lock and safe loop relay check enable	0	0-65535		
F157-F159	Stand-by				
F160	Clearing error registrations manually enable	1	0-1		
F161	Time-sharing door blocking function enable	0	0-65535		
F162	Stand-by				

F163	The reserve power source returns to the home whether to continue to move	0	0-65535		
F164	Load-weighing signal	0	0-65535		
F165	Door open selection in testing traveling	0	0-65535		
F166-F167	Stand-by				
F168	Elevator numbering for IC card service	0	0-65535		
F169	Setting landings for up/down calls by IC card	0	0-65535		
F170	With IC control in car, 1-16 Fl. for selection of identification by IC card	0	0-65535		
F171	With IC control in car, 17-32 Fl. for selection of identification by IC card	0	0-65535		
F172	With IC control in car, 33-48 Fl. for selection of identification by IC card	0	0-65535		
F173-F174	Stand-by				
F175	Creeping speed at start	6	0-100	mm/s	0.006m/s
.....					
F180	Velocity increment	1000	0-65535	‰	100.0‰
F181	Elevator numbering in duplex control	0	0-65535		
F182	Steps of speed reduction switches	1	0-65535		
F183	Speed at self-tuning	800	0-65535	mm/s	0.800m/s
.....					
F186	Creeping speed at start	50	0-65535	10ms	0.50s
F187	Leveling induction calibration running.	0	0-65535		
.....					
F193	Empty-load compensation at lowest landing	0	0-65535	‰	0.0‰
F194	Full-load compensation at lowest landing	0	0-65535	‰	0.0‰
F195	Empty-load compensation at top landing	0	0-65535	‰	0.0‰
F196	2 <sup>nd</sup> main landing by duplex control	0	0-64		
.....					
F200	DSP software revision number	Factory-default			Read only
F201	——	0	——	——	Standby

F202	Synchronization static from learning	1			
F203	rotary regulate for HEIDENHAIN 1387 encoder	0	0~65535		
F204	Zero speed proportion ASR P0	100.00	0~655.35		130.00
F205	Zero speed integral ASR I0	0.00	0~655.35		80.00
F206	Low speed proportion ASR P1	70.00	0~655.35		60.00/140.00
F207	Lower speed integral ASR I1	10.00	0~655.35		35.00/45.00
F208	Low speed proportion ASR P2	70.00	0~655.35		60.00/90.00/100.00
F209	Low speed Integral ASR I2	10.00	0~655.35		35.00
F210	Medium speed proportion ASR P3	120.00	0~655.35		100.00
F211	Medium speed Integral ASR I3	10.00	0~655.35		20.00/25.00
F212	High speed proportion ASR P4	140.00	0~655.35		160.00/180.00
F213	High speed Integral ASR I4	5.00	0~655.35		5.00
F214	Low speed switchover frequency 1	0.50	0~15.00	Hz	0.50
F215	High speed switchover frequency 2	25.00	15.00~50.00	Hz	25.00
F216	Current loop proportional gain	5.00	0~200.00		65.00
F217	Zero speed servo time	0.800	0~5.000	s	0.800
F218	Motor Type	0	0, 1		0-asynchronous 1-synchronous
F219	Motor Poles	4	2~32		
F220	Rated motor voltage	380	0~400	V	200V Series: 220; 400V Series: 380;
F221	Rated motor rotate speed	1450	—	—	Set as per site requirements
F222	Rated motor current	Factory-default	0~80.00	A	Set as per motor nameplate
F223	Max. output torque	150	0~300	%	200% 10s
F224	Motor slip frequency	1.40	0~10		Setting of asynchronous motor (synchronous speed-speed rating)*synchronous speed*frequency rating; no setting is necessary for synchronous motor
F225	Carrier frequency	8.0	4~15	kHz	
F226	Encoder type	0	0~10		0: increment, difference, SinCos. 2048 PPR is required for Synchronous motor; 1: CCW UVW Encoder 2: CW encoder

F227	Encoder pulses	1024	—	—	Set as per site requirements
F228	Magnetic pole phase	0	0~360	degree	
F229	Regulator mode	0	0~5		Synchronous: 0(2m/s), 1(1m/s~1.75m/s); Asynchronous: 1 for enhanced control; 2 or 3 for improve noise prevention
F230	Pre-load type	0			0: no load device; 1-CAN is given (standby) 2-load analogue
F231	Max. elevator speed	1.75m/s	—	—	Read only
F232	Motor reversion	0	0/1	—	Change the revolution direction of tractor to set operation direction of elevator and tractor.
F233	Encoder mode	0	1-65535		4 <sup>th</sup> digit: 0 for standard mode, 1 for correction mode; 3 <sup>rd</sup> digit: 0-9 is the time for current decrease, Unit: 300ms; Other digits :Standby
F234- F237	—	0	—	—	Standby
F238	Weigh gain of choice	336	65535		
F239	Stand-by				
F240	Concussion babe factor 2	0	100-500		Uses in the normal operation being only suitable for 1387 encoders
F241	Weighing pattern, heavy load upward gain	0	0-200		
F242	Weighing pattern, heavy load downward gain	0	0-200		
F243	Zero speed starting method	0 or 3	0-65535		being only suitable for 1387 encoders
F244	Zero speed pi delay	0	0-65535	ms	being only suitable for 1387 encoders
F245	Weighing pattern, underloading upward gain	0	0-200		
F246	Current gain 2	100	40-260		5.5KW or below: 100-260 7.5KW-15KW: default 18.5KW or above: 40-100
F247	load analogue zero point	512	0-1024		
F248	load analogue gain	100	0-1000	%	
F249	Power code				Same as F32
F250- F255	—	0	—	—	Standby

## 8.2 Definitions of Function Parameter

**F0** —The accelerating slope rate is the slope rate of linear accelerating section between T0 and T1, i.e., accelerated speed.

**F1** —The decelerating slope rate is the slope rate of linear decelerating section between T0 and T1, i.e., decelerated speed.

**F2** —S curve T0 is the acceleration time for starting rounding angle of S curve, the value 130 is recommended.

**F3** —S curve T1 is the acceleration time for the accelerating rounding angle of S curve, the value 110 is recommended.

**F4** —S curve T2 is the acceleration time for decelerating rounding angle of S curve, the value 110 is recommended.

**F5** —T3 is the acceleration time for leveling rounding angle of S curve,, the value 130 is recommended.

★ THE ABOVE SIX PARAMETERS ARE VALID WITH ANALOGICAL SPEED REFERENCES ONLY!

**F6** —Rated speed of the elevator

**F7** —Rated rotate speed of the motor

**F8** —Pulses of encoder

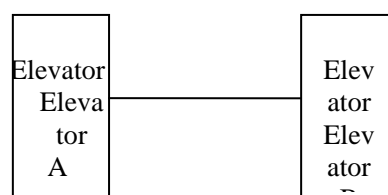
THE ABOVE THREE PARAMETERS ARE VERY IMPORTANT! They must be set in accordance with the normal specifications of the equipment, otherwise the elevator would run in failure or maloperation, for instance, the failure in speed measurement could result in generating incorrect speed reference. Whenever any ONE of these THREE parameters varies, the shaft self-tuning must be done to ensure the perfect performance of the elevator system.

When the feedback pulses into the control system comes from other components which works on the frequency shunt of the signals it receives from the encoder, the value should be set as that after the frequency shunt instead of the original value from the encoder, e.g. the encoder generates 1024 pulses per rotation and the component takes in is a shunt of it that is one fourth of 1024, hence the correct value should be  $1024/4 = 256$ .

**F9** —Locked home floor

**F10** —Floor offset, refers to the number of floors served by one or some of the elevator under group control or in duplex.

**F11** —No. of floors. The total floor number is to be set according to the actual number of leveling plates.



The following is an example to set the parameters F10 and F11:

There are two elevators in duplex in a building, Elevator A serves the 15 floors above ground only while Elevator B serves the 15 floors above ground and 2 floors underground.

For Elevator A, the total floor number is 15, "floor offset" is 2 so that the address of landing calls and in-car registration begins with Address 3;

for Elevator B, the total floor number is 17, "floor offset" is 0.

**IMPORTANT: If the TWO or MORE elevators in duplex or under group control have different by-pass floors, the by-pass floors must have leveling plates installed as is shown below:**

Actual Floors	Actual Indication	Floors By Elevator A	Fl. address of Elevator A	Set Indications for Elevator A	Floors by Elevator B	Fl. address of Elevator B	Set Indications for Elevator B
4	4	4	5	F69=4	4	5	F69=4
3	B1	3	4	F68=60	3	4	F68=60
2	G	2	3	F67=70	by-pass	3	F67=70
1	1	1	2	F66=1	1	2	F66=1
-1	-1				-1	1	F65=50

List 3-2 an example to set parameters F10 & F11

As is specified in the list above, Elevator B must have a leveling plate installed on Floor 2 in the same way as Elevator A does.

For **Elevator A**: total floor number is 4, "floor offset" is 1, the landing call and registration address begins with 2. Indication settings: F66(for Address 2 and so on)=1; F67=70; F68=60; F69=4. Landing floors: 1(for the floor by address 1)-Yes(for landing allowed); g-Yes; b1-Yes; 4-Yes.

For **Elevator B**: total floor number is 5, "floor offset" is 0, the landing call and registration address begins with 1 for (Fl.-1) and 2 for (Fl.1). Indication settings: F65=50; F66=1; F67=70; F68=60; F69=4. Landing floors:-1- Yes; 1-Yes; g-No (for landing NOT allowed, calls and registrations on the floor by address 3 invalid with Elevator B); b1-Yes; 4-Yes.

**F12**—Inspection speed. Inspection speed between 0 and 0.5m/s.

**F13**—Releveling speed. Releveling speed refers to the speed at which the elevator returns to leveling from outside the leveling zone, between 0 and 0.15 m/s.

**F14**—Door-closing delay 1: When the elevator is answering a landing call, the door will hold open in the time delay and closes when it elapses, valid ONLY without attendant.

**F15**—Door-closing delay 2: When the elevator is answering a registration in car call, the door will hold open in the time delay and closes when it elapses, valid ONLY without attendant.

**F16**—Brake delay. Brake-open delay refers to the time between giving out the signal for the speed regulator to start operation and opening of the brake contactor.

**F17**—Operation removal delay. Operation removal delay is the time from closing of the brake to clearing out of the signal for operation of the speed regulator.

**F18**—Fire home. The main landing for fire return service is the predetermined landing, to which the elevator returns after the fire switch is set on.

**F20**—Homing Delay. Delay for returning to the main landing. When F20 > 0, the elevator will return to the main landing preset by F22 after the delay set by F20 after it has served the last landing call or registration in car. The elevator will NOT do it if F20=0.

**F21**—Level distance tolerance. Leveling tolerance between one-floor running and multi-floor running (unit: mm). To be exact, this parameter should be regarded as the compensation for leveling delay. Due to the varied sensibility of photo switches and magnetic switches, the length of the leveling plates of a particular elevator varies accordingly.

**F22**—The first main landing for duplex control (see F20, F196).

**F23**—Group control mode. Set 1 for duplex slave elevator; 2 for group control; 3 for ring duplex mode (see F181) .

**F24**—— Drive mode of elevator integrated drive controller. The parameter does not need setting

**F25**—— Input type I, for constant open/closed setting at the digital input point X0-X15, it is a 16-bit figure, the lowest bit for X0 while the highest for X15. Anywhere in the section is set as constant open, the corresponding bit should be set **0**; whereas **1** for constant closed. This parameter can be done under the menu of Input Type in the handset.

**F26**——Input type II, for constant open/closed setting at the input section X16-X25, it is a 16-bit figure, the lowest bit for X16 while the highest for X25. Anywhere in the section is set as constant open, the corresponding bit should be set **0**; whereas **1** for constant close. This parameter can be done under the menu of Input Type in the handset.

**F27**——Input type III, for constant open/closed setting at the input section TX0-TX15, it is a 16-bit figure, the lowest bit for TX0 while the highest for TX15. Anywhere in the section is set as constant open, the corresponding bit should be set **0**; whereas **1** for constant close. This parameter can be done under the menu of Input Type in the handset.

**F28**——Input type IV, for constant open/closed setting at the input section TX16-TX19, it is a 16-bit figure, but only 4 of the 16 bit in use, the lowest bit for TX16 while the 4<sup>th</sup> in use for TX19. Anywhere in the section is set as constant open, the corresponding bit should be set **0**; whereas **1** for constant close. This parameter can be done under the menu of Input Type in the handset.

### **IMPORTANT for Setting of Input Type**

**TX3**—— The overload switch must be the ONE of the normally -CLOSED switches! If a constant open switch is used, it would fail to work properly in case it breaks down itself or the overload protection breaks off. The failure to detect an overload situation would most likely to set the elevator in service in danger!

Likewise, it is recommended that limit switches, terminal deceleration switches and so on should be the ones of constant close type in order to avoid any hazards.

**TX7**—— If the light load switch is NOT in use, it should be set constant close. Failure to do so would lead to deletion of all the in-car registrations whenever there are more than FIVE (to be set by F120) of them, taken for anti-nuisance situation by the system.

**TX11**—— The door-opening limit switch TX11, door-closing limit switch TX12 and the safety edge TX13 of the back door.

TX11 and TX13 should be set normally -closed and TX12 should be set normally -open if without a rear door. They should be set based on the field situation if with a rear door.

**F29**—— Service floor 1, the figure here is one of the 16 floors (1-16), which is allocated to a floor by a 16-bit binary for **1**. The parameter can be set under the menu of Door Blocking by the handset.

**F30**—— Service floor 2, the figure here is one of the 16 floors (17-32), which is allocated to a floor by a 16-bit binary for **1**. The parameter can be set under the menu of Door Blocking by the handset.

**F31**—— Service floor 3, the figure here is one of the 16 floors (33-48), which is allocated to a floor by a 16-bit binary for **1**. The parameter can be set under the menu of Door Blocking by the handset.

**F190**——**Service floor 4, the figure here is one of the 16 floors (49-64), which is allocated to a floor by a 16-bit binary for 1. The parameter can be set under the menu of Door Blocking by the handset. (##中文版没有, 估计是删除)**

★ With group control, the floors in service (or blocking the other floors) are preset on the group control board, the sequence of the floors is based on the floor arrangement of the building as a whole. **For example**, A elevator serves eight of the 16 floors (1-16) without basement and two of the floors (2, 5) are NOT to be served, hence the elevator is allowed to stop at all floors except F1.2 and F1.5.



16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1

$$2^{15} + 2^{14} + 2^{13} + 2^{12} + 2^{11} + 2^{10} + 2^9 + 2^8 + 2^7 + 2^6 + 2^5 + 2^3 + 2^2 + 2^0$$

Parameter F29 =  $2^{15} + 2^{14} + 2^{13} + 2^{12} + 2^{11} + 2^{10} + 2^9 + 2^8 + 2^7 + 2^6 + 2^5 + 2^3 + 2^2 + 2^0 = (2^{16} - 1) - 2^4 - 2^1 = 65517$ , here F29 comes out automatically as 65517. The setting of other floors in service follows the same way.

**F32**—— Specification option parameters of elevator integrated drive controller,

200V: 2.2KW set as 0; 3.7KW set as 1;

400V: 2.2KW set as 10; 3.7KW set as 11; 5.5KW set as 0; 7.5KW set as 1; 11KW set as 2; 15KW set as 3; 18.5KW set as 4; 22KW set as 5; 30KW set as 6; 37KW set as 7; 45KW set as 8; 55KW set as 9;

Parameters must be set based on the nameplate of elevator integrated drive controller before use.

**F33**—— Auto run interval. Default value is 5 s. The elevator is set via the liquid crystal operation interface as Auto Run status. The system will register an instruction automatically every 5 seconds to drive the elevator run automatically.

**F34**—— Number of trips in automatic running test. Default value is 0. Denote do not enable testing function.

**Notes:** Both **F33** and **F34** are parameters designed for testing purposes. Only when both parameters are set, and then being set as Auto Run via the liquid crystal operation interface, the elevator can automatically run as required. If F34 is set as 0, the elevator will not run automatically even it is in Auto Run status.

**F35**—— Fire mode. Fireman service is a parameter for acceptance to determine the mode of fireman service, 0 for China Standard, 1 for Schindler Suzhou Standard with (the only difference lying in door-closing permitted in fire-fighting).

**F36**—— Brake switch detection delay. After the control system sends out a brake control signal, a constant close contact in the switch is ready for the master control board to detect the preset time for testing delay before the brake opens by means of the signal. **0** for NO brake switch; **1** for being set elsewhere; **2** for being set in Hong Kong.

**F41**—— DTZ-III-DC-SC weighing equipment spatial full load study Refers to F164 = 0,3.

Weighing the equipment effective survey distance to altogether have 6 grades, in studying only needs to study a grade then, weighing the equipment effective range

Weighing the equipment effective survey study: F41 = 10, indicated that the weighing enters the study, scope 0mm-10mm, studying successfully returns 10, not successfully returns 0.

Weighing the equipment effective survey to study: F41 = 20, indicated that the weighing enters the study, scope 0mm-10mm, studying successfully returns 20, not successfully returns 0.

Weighing the equipment effective survey to study: F41 = 30, indicated that the weighing enters the study, scope 0mm-10mm, studying successfully returns 30, not successfully returns 0.

Weighing the equipment effective survey to study: F41 = 40, indicated that the weighing enters the study, scope 0mm-10mm, studying successfully returns 40, not successfully returns 0.

Weighing the equipment effective survey to study: F41 = 50, indicated that the weighing enters the study, scope 0mm-10mm, studying successfully returns 50, not successfully returns 0.

Weighing the equipment effective survey study: F41 = 60, indicated that the weighing enters the study, scope 0mm-10mm, studying successfully returns 60, not successfully returns 0.

Empty load self-study process: when elevator is empty load, weighting the equipment contains empty-load effective survey to study, setting F41 = 1, studying successfully returns 1, not successfully returns 0.

Full load self-study process: when elevator is full load, weighting the equipment contains full-load effective survey to study, setting F41 = 2, studying successfully returns 1, not successfully returns 0.

**F43**—— Landing call buzzing and flashing by attendant. **0** for neither buzzing nor flashing; **1** for buzzing without flashing; **2** for flashing without buzzing; **3** for both buzzing and flashing (standard attendant service mode); **4** for waiting with door open, which can be combined randomly, e.g., **7** indicates buzzing and flashing and waiting with door open together.

**F44**—— Local address for serial communication. 255 for elevator in operation or single elevator monitoring. If the elevators are under residential zone monitoring by Port 485 or remote monitoring by Port 232, any one of the elevators in the bank should have a natural numeral smaller than 255 set for its master board so that the distant PC can identify its master control PCB. That's why this parameter varies from one elevator to another in the group.

**F45、F46、F47**—— Don't need to change

**F157、F158**—— Don't need to change

**F50**—— Front door-opening allowed 1. For Fl.1-16 (absolute value of floors) for opening the front door.

**F51**—— Front door-opening allowed 2. For Fl.17-32 (absolute value of floors) for opening the front door.

**F52**—— Front door-opening allowed 3. For Fl.33-48 (absolute value of floors) for opening the front door.

**F191**—— Front door-opening allowed 4. For Fl.49-64 (absolute value of floors) for opening the front door.

**F53**—— Rear door-opening allowed 1. For Fl.1-16 (absolute value of floors) for opening the rear door.

**F54**—— Rear door-opening allowed 2. For Fl.17-32 (absolute value of floors) for opening the rear door.

**F55**—— Rear door-opening allowed 3. For Fl.33-48 (absolute value of floors) for opening the rear door.

**F192**—— Rear door-opening allowed 4. For Fl.49-64 (absolute value of floors) for opening the rear door.

★ For setting of 8 parameters above, with group control or duplex, the floor sequence setting is based on the floor arrangement of the building as a whole.

**F56**—— Up leveling accuracy adjustment

**F57**—— Down leveling accuracy adjustment

These two parameters are invalid with digital mode. With analogy control, use F56 and F57 in adjusting leveling deviation only when the deviation remains the same value and in the same direction. F56 for lowering over-leveling by reducing the value whereas F57 for raising under-leveling by increasing the value. The range of parameter is 0-100 and 50 by ex-works, indicating no offset.

★ Note: Both parameters F56 and F57 feature a compensation adjustment in floor leveling for a range as small as 15 mm. If the deviation exceeds 15mm, it is recommended that the position of leveling switches, plates should be adjusted at first, then use the parameters for fine adjustment. Otherwise the traveling comfort would be affected.

**F58**—— Speed curve delay at start, the time delay from opening the brake to giving out the speed curve, is set at 5 by default for 0.5 s.

**F59**——Zero-speed band brake delay, the time delay from the zero speed to closing the brake.

**F60**—— KMC testing mode (the 2<sup>nd</sup> contactor of the main circuit), **0** for KMC pre-positioned, always on without testing; **1** for KMC pre-positioned, always on without testing; **2** for KMC pre-positioned, off after every trip with testing against sticking together; **3** for KMC positioned in the rear, off after every trip with testing against sticking together; when one contactor is used in the main circuit, F60 should be set as 0.

**F61**—— Distance for triggering arrival gong is 1200 by default, the value stands for 1.2 m from the leveling position.

**F62**—— Time limit for anti-slippage operation is 32s by default setting. If the elevator fails to receive any leveling signal within 32 seconds, it will stop service, reporting Error 25. (The value is defined as between 20 and 45 seconds by GB7588-2003 ).

**F65~ F112**—— Indication of floors, the figures or symbols in display for Floor 1~48.

The option enables man to set floor indication by **B**, **H** and **M** etc. For instance, with a elevator serving FIVE floors, man wants to have the floor indication B1, -1, 1, H and 3, then the setting should be F65=60, F66=50, F67=1, F68=84, F69=3 respectively.

★ With group control or duplex, the indication arrangement should follow the preset floor sequence, see the example under F11.

**F69=3** When parallel or group control elevator, basing ilevator 's group floor order set display code (see F11 total level station several to arrange in order instance explanation)

**F115**—— open door overtime :After opening the door the output, how many seconds later that that has not opened the door arriving to recognize to open door overtime. The leaving the plant default is 15S, scope 3s-30s.

**F116**—— close door overtime:After closing the door the output, how many seconds later that that has not opened the door arriving to recognize to close door overtime. The leaving the plant default is 15S, scope 3s-30s.

**F117**——Forced door or open hold time. The door will remain open by the preset time value once the HOLD button is pressed.

**F118**—— Holding time for the handicapped, the time during which the door holds open when any handicapped passenger makes a registration.

**F120**—— Number of registrations an- nuisance, **0** for no anti-nuisance; **1** for triggering by the light gate without light gate activated for three incessant floors; **2~64** is the range for setting the number of registrations to start anti-nuisance option.

**F121**—— Forced door-closing enabled, 0 for OFF; 1 for ON.

**F122**—— Release direction delay during inspection service. Delay at change in direction during inspection service is the preset time from switching off the brake contactor output to clearing the traveling direction.

**F123**—— Call classification. 0 for only have front door based on 48 floor. To 64 floor there have front, rear, handicapped cop. 1 for have front door and rear door landing calls. 2 for have front door and handicapped door landing calls. 3 for have front door, rear and handicapped door landing calls.

**F128**—— Separate door control. 0 for Separately control. 1 for control together.

**F129**—— Relevelling with door open and/or pre-open door Enable. Range from 0-3. 0 for nothing. 1 for only enable pre-open door. 2 for only Relevelling with door open. 3 for both on.

**F130**—— Holding door-opening/closing torque. 0 for no holding torque. 1 for Holding door-opening torque. 2 for holding door-closing torque. 3 for holding door-opening and door-closing torque. 4 for holding door-opening torque when traveling.

**F131~F133**——F131-F133 Time section floor blockade floor set related parameter. F131 is the floor setting, F132 is the beginning time setting, F133 is the closure time setting. Related parameter F161 is the turn-on time section floor function parameter.

The following is establishes the demonstration:

When F131 = 1, establishes F132 = 1000, F133 is 1200, then 1 building's blocking time is 10:00-12:00

When F131 = 1, establishes F132 = 2300, F133 is 800, then 1 building blocking time for evening 23:00 to second day of early morning 8:00

Adjusts F131 value and corresponding F132 and F133 may establish 64 floor time section blocking time, does not block the floor does not establish F132 and F133 then

F132 and the F133 time establishment's range of validity is 0-2359 expressing 0:00:23:59.

**F137~F139 ,F199**—— Service floor setting by switch control. 1 for serviced floor. 0 for non-serviced floor. When the non-service floor control switch is ON, the floor set as non-service can not answer car calls and landing calls; or non-service floor control switch is OFF, elevator return to normal. The non-service floor data is invalid now. if it is under group control or in duplex, when setting parameters, the floor sequence is arranged according to the floor sequence of the whole group. Setting details see F50 – F52.

**F141** ——KMY release delay . Default for 0.5 s.

**F146**——Even levelingtime encoder position value and floor data error. Unit: mm, tacitly approves 180mm.

**F147**——Uses in choosing the contact device adhesion failure protection way .When F147 = 0, breaks down contact device adhesion, the elevator failure protection, when the contact device adhesion breakdown restores, the elevator breakdown does not reposition. is still the malfunction, must overhaul or the power failure replacement. When F147 is not 0, breaks down the contact device adhesion breakdown, the elevator failure protection, when the contact device adhesion breakdown restores, elevator breakdown replacement.

**F152**—— Delay for car-lighting before automatically switching off car-lighting and fan, default value is 5 minutes.

**F153**—— Whether hall door lock high pressure examination .1: Has the hall door lock high pressure examination, 0: Non-hall door lock high pressure examination. Tacitly approves 1 F156

**F156**—— Door lock and safe loop relay check enable. 0 for YES, 1 for NO.

**F160**—— Clearing error registrations manually enable. 0 for OFF; 1 for ON.

**F161**——Time-sharing door blocking function enable. 0 for OFF; 1 for ON.

**F163**——The reserve power source returns to the home whether to continue to move.0: After the reserve power source after returning to the home does not continue to move, 1: After the reserve power source after returning to the base, continues the normal operation.

**F164**——Weighed apparatus type.When weighing device type choice F164 = 0,3,4 need to establish F193~F195.

0: DTZZ-III-DC-SC weighing installment: over, full, light loading signal input the Car, the compensation signal weighing the installment feedback by the motherboard basis the elevator weight computation.

1: DTZZ-II weighing installment: over, full, light loading obtained by the mainboard according to the weighing installment feedback signal computation. The weighing compensation signal gives through the weighing installment;

2: DTZZ-II weighing installment: over, full, light loading signal input the Car board, the weighing compensation signal gives through the weighing installment;

3: DTZZ-III-DC-SC weighing installment: over, full, light loading signal obtained by the mainboard according to the weighing installment feedback signal computation. The

compensation signal weighing the installment feedback by the mainboard basis the elevator weight computation;

4: over, full, loading signal input the Car board, Compensation signal: When elevator light loading the mainboard (F193) and the Car height of lift linearity gives according to the first floor underloading compensation value; When elevator full load the mainboard (F194) and the Car height of lift linearity gives according to the first floor full load compensation value.

**F165**—— Door open prohibited during commissioning. 0 for open door in testing; 1 for forbidden door operation in inspection; 2 for don't open the door during commissioning.

**F168**—— Elevator numbering for IC card service

**F169**—— Setting landings for up/down calls by IC card. 0: down call; 1: up call.

**F170**—— With IC control in car, 1-16 Fl. for selection of identification by IC card. 0 for requiring card identification register instruction, 1 for not requiring card identification.

**F171**—— With IC control in car, 17-32 Fl. for selection of identification by IC card.

**F172**—— With IC control in car, 33-48 Fl. for selection of identification by IC card.

**F175**—— Creeping speed at start, the creeping speed of elevator at the low-speed section.

**F180**—— Velocity gain. The gain for speed-given peak, range from 0.0% - 110.0%, default value is 1000, denote 100.0%.

**F181**—— Elevator numbering in duplex control. Range from 0-7. Lower number has high priority. (F32=3)

**F182**—— Steps of speed reduction switches (Half the number of the decelerated switches)

**F183**—— Speed at self-tuning. It must be set before shaft self-tuning.

**F186**—— Creeping time at start, the creeping time of elevator at the low-speed section..

**F187**—— monitor item

The set main contact surface demonstrated that the movement number of times the position according to the F187 hypothesis the value, may demonstrate the different monitoring project, following chart "00000088":

Normal	Simplex
==== 00000088'====	
1 Floor	0.00m/s
Door Locked	

0: the movement number of times;

1: Encoder interference assessment;

This counting significance: When stops, records the previous movement the disturbed condition, namely this digit when parking only will renew, if will not have disturbance, this digit should be 0. At this time counts surpasses 1000, thought that the encoder has the very big disturbance, must examine the encoder disturbed condition.

2: CAN1 Order Counter

This counting significance: If the CAN communication is normal, should be still 0, at this time counts surpasses 96, thought that the communication has the very major problem, must inspect the communication.

### 3: CAN2 Order Counter Parallel can communication

This counting significance: If the CAN communication is normal, should be 0, at this time counts surpasses 96, thought that the parallel CAN communication has the very major problem, must inspect the communication

4:Running speed of elevator;

5:Bus voltage;

6:Output current;

7:Output torque;

8:Magnetic pole direction;

9:Encoder direction one;

10:Encoder direction two;

11:Provide torque;

12:Heat sink temperature one;

13:Heat sink temperature two

14:weight value

**F193**—— Empty-load compensation at lowest landing

**F194**—— Full-load compensation at lowest landing

**F195**—— Empty-load compensation at top landing

**F196**—— 2<sup>nd</sup> main landing by duplex control (used for ring duplex).

**F198~F199**——stand-by

**F200**——DSP software revision number; read only.

**F201**——stand-by

**F202**——Synchronization static from learning function,after set 1,Elevator Integrated enter static self-study status,

**F203**——The zero-load current, uses in asynchronous. When F218=0 has an effect, when F218=1 does not have an effect,according to overhaul status to run to finish self-study(in this status must let the wrench not open,,electric contactor pick-up)after self-study the elevator namely can run normally.

**F204**——zero speed proportion ASR P0, the proportion parameter for starting compensation;

When F230=0 and F205>0, F217 functions in certain duration;

Setting range: 0~655.35; factory default: 100.00

**F205**——zero integral ASR I0, the integral parameter for starting compensation;

May be set during slow speed running: setting range: 0~655.35, factory default :0.00

★Note: as sensor-based no-load starting compensation technology is used, it is not necessary to input analogue load signals. This means excellent starting comfort can be assured even if no load device is installed.

★Note: for synchronous motor, it is recommended to set F205 to 80.00 and only adjust F204 if necessary.

★Note: for asynchronous motor, both F204 and F205 are necessary to be adjusted to the degree that elevator do not slip when band brakes are opened and the motor do not swing any more.

**F206**——low-speed proportion ASR P1: setting range 0~655.35, factory-default 70.00

**F207**——low-speed integral ASR I1: setting range 0~655.35, factory-default 10.00

**F208**——low-speed proportion ASR P2: setting range 0~655.35, factory-default 70.00

**F209**——low-speed integral ASR I2: setting range 0~655.35, factory-default 10.00

**F210**——medium-speed proportion ASR P3: setting range 0~655.35, factory-default 120.00

**F211**——medium-speed integral ASR I3: setting range 0~655.35, factory-default 10.00

**F212**——high-speed proportion ASR P4: setting range 0~655.35, factory-default 140.00

**F213**——high-speed integral ASR I4: setting range 0~655.35, factory-default 5.00

**F214**——low-speed switchover frequency 1: setting range 0~655.35 Hz, factory-default 0.50

**F215**——high-speed switchover frequency 2: setting range 0~655.35 Hz, factory-default 25.00

★Note: function codes F206~F213 above-shown are parameters for setting speed regulator PID. The operating performance of elevator may be adjusted by setting F206~F213. The default setting of system parameter is set to ensure certain comfort. Specific setting may be made on the basis of site conditions by adjusting the PI value for corresponding frequency range.

★Note: Function code F214 means the low speed-medium speed switching frequency; F215 means the medium speed-high-speed switching frequency. The frequency switching corresponds to the elevator speed, their relations are:

Elevator speed rated	=	actual speed
50.00		frequency switching

**F216**——current loop proportion gain: setting range 0~655.35, factory default:65.00;

For asynchronous motor, the system default 65.00 works well, no adjustment is necessary; for synchronous motor, set it to “1”.

**F217**——zero speed servo time: 0~5.000s, factory default: 0.800

**F218**——motor type: 0-asynchronous motor; 1-synchronous motor. This option is provided to set the control object of elevator integrated drive controller.

This parameter must be set as per motor conditions prior to commissioning.

**F219**——Motor Poles: for setting the number of motor poles. Setting range :2~32, factory default: 4

**F220**——motor voltage rating: set as per motor nameplate. Setting range: 0~400V, factory default: 380.200V series: 220; 400V series: 380.

This parameter must be set as per input voltage of inverter prior to commissioning.

**F221**——motor speed rating: set as per motor nameplate

This parameter must be set as per motor conditions prior to commissioning.

**F222**——motor current rating: set as per motor nameplate. Setting range: 0~80.00A.

This parameter must be set as per motor conditions prior to commissioning.

**F223**——Maximum output torque: upper limit of output torque. Setting range: 0~300, factory default: 150

This parameter must be set as per motor conditions prior to commissioning.

**F224**——motor slip frequency:  $(\text{synchronous speed} - \text{speed rating}) \div \text{synchronous speed} \times \text{frequency rating}$ ;

Setting is necessary asynchronous motor. Setting range: 0~10; factory default: 1.40.

When up and down speed is different for driving synchronous motor, step up the value (ranged from 0 to 4.0).

**F225**——carrier frequency: carrier frequency for output of PWM. Setting range 4~15 kHz, factory default: 8.0 kHz

This parameter is unnecessary to be adjusted except in special cases.

**F226**——encoder type: 0: increment, difference, Sin/Cos. 2048 PPR is required for synchronous motor. 1:CCW type UVW encoder; 2: CW type UVW encoder. Setting range 0~10, factory default:0;

This parameter must be set as per encoder conditions prior to commissioning.

**F227**——Number of Encoder Pulses per revolution. Set as per encoder specification.

This parameter must be set as per encoder conditions prior to commissioning.

**F228**——Magnetic pole phase. For synchronous motor, the initial phase angle will be displayed after setting. Setting range: 0~360 degree.

**F229**——regulator mode. Dedicated for elevator integrated drive controller. Usual setting mode: 0/1/2. There is no need of setting under most conditions.

Synchronous: 0 (2m/s); 1 (1m/s~1.75m/s);

Asynchronous:1, for enhancing control

★Note: it may be set to “2” or “3” to improve noise prevention.

**F230**——Pre-load type: 0-no load device; 1-CAN given (standby); 2-load analogue. Setting range: 0/1/2, factory default: 0.

**F231**——Elevator top speed: read only

**F232**——Motor reversion. Reverse the revolution direction of traction motor to set elevator and traction machine movement direction. 0: identical; 1: opposite;

**F233**——Encoder mode. 4<sup>th</sup> digit: 0 for standard mode, 1 for correctiona mode; 3<sup>rd</sup> digit: 0-9 is the time for current decrease, Unit: 300ms; 1<sup>th</sup> digit: 1- speed demarcations halve processing, uses in the scene encoder disturbance too big situation :the others Standby

**F238**——When F238=336, F241, F242, F245, F248 has an effect; When F238≠336, F248 has an effect

**F240**——Concussion babe factor,Uses in the normal operation being only suitable for 1387 encoders which can decrease duly the cocussion in thr running

**F241**——The weighing simulation quantity heavy load upward gain, weighing under the pattern, when upward movement, weighing the signal for heavy load time gain.

**F242**——The weighing simulation quantity heavy load downward gain, weighing under the pattern, when downward movement, weighing the signal for heavy load time gain.

**F243**——Zero fast initialization mode is only suitable for 1387 encoders, F243=3 may solve on certain electrical machinery and has under the weighing signal use situation, the start has the different sound; In weighing the signal input time must be 0.

**F244**—— Zero fast PI time delay is only suitable for 1387 encoders, unit ms, according to wrench time adjustment. When F243=3 only then has an effect  
, in weighing the signal input time must be 0

**F245**—— The weighing simulation quantity underloading upward gain, weighing under the pattern, when upward movement, weighing the signal for light loading time gain.



**F246**——Current gain 2; Decreasing the parameter to improve noise when motor is decelerated or run in low speed , especially for the motor whose power is more than 18.5KW. For the motor whose power is below 5.5KW, it could advance torque control accuracy and load capability. The value is default for the motor whose power ranged from 7.5KW to 15KW. If it is necessary to adjust the value, please contact us timely to get supporting in time. Make sure the current is within rated motor current when adjust the value. The range of the parameter as following:

5. 5kw or below (100~260) Tractive wheel slippage test: increasing the value if it doesn't slip when encoder position and main motor parameters is correct and motor slip frequency is set as 4.

7. 5—15kw (100~160) Tractive wheel slippage test: increasing the value if it doesn't slip when encoder position and main motor parameters is correct and motor slip frequency is set as 4.

18. 5kw or above (40~100) When the lift run normally for one direction but the main motor has exceptional noise for another, especially in decelerating, the value could be decreased slightly.

**F247**——load analogue zero point; 0 for -10V, 1024 for +10V, 512 for 0V;


Read the value of load analogue in balance load, and then convert to the parameter. **F248**——load analogue gain;

Increasing the value may increase the torque of pre-load compensation.

**F249**——power code. Refer to F32.

## 9 Faults and Solutions

This chapter describes the fault codes, situations, causes and solutions, and additionally, provides analysis of faults occurred in operating and commissioning for information.

 <b>Danger</b>
<p>◎ <b>Start operation 10minutes after it is disconnected to main in order to ensure at that time charge indicator lamp goes out or DC bus voltage is under 24V.</b></p> <p>Or it may cause risk of electric shock.</p> <p>◎ <b>In no case may the elevator integrated drive controller be remodeled without authorization.</b></p> <p>Or it may cause risk of electric shock and/or injury.</p> <p>◎ <b>Only professional electricians may be allowed for maintenance. Never leave foreign wire ends or metal substances inside.</b></p> <p>Or it may cause fire risk.</p>


 <b>Caution</b>
<p><b>When power is on, do not change wiring and remove terminals</b></p> <p>Or it may cause risk of electric shock.</p>

Table 9.1 Fault Code and Analysis

Code	Faults	Possible Causes and Analysis
02	Door disengaged during running (emergency stop)	Safety circuit works but door is unavailable.
03	breakage of up limit switch	In automatic running mode, both the up and down limit switches activate simultaneously but the elevator is not at the top floor. The up limit switch breaks during up running of elevator
04	Breakage of down limit switch	In automatic running mode, both the up and down limit switches activate simultaneously but the elevator is not at the bottom floor The down limit switch breaks during down running of elevator
05	Door lock does not open	The door can not open to set position 15s after output of OPEN DOOR signal (except there is no door lock signal) and it alarms 3 times. Hall door lock is shorted when elevator is at door range with hall door lock signal and opening limit signal (for 1.5s) but without car door lock signal (only valid with high-voltage input of separate door)
06	Door lock dose not close	The door can not close to set position 15s after output of CLOSE DOOR signal (except there is door lock signal) and it alarms 8 times. If closing limit switch is not in consistence with door lock for continuous 4 seconds, it is considered as closing overtime (except there is door lock signal) and it alarms 8 times.
08	CANBUS Communication Error	Interfered communication Terminal resistance is not shorted.

		Interrupted communication The system can not communicate with car control board SM-02 for 4 continuous 4 seconds, it alarms.
10	Dislocation of Up deceleration switch 1 (SSU1)	Inspect after self-tuning or powering on: one-floor up deceleration switch (SSU1) activates at a higher position than 3/5 floor height of the top floor.
		Inspect after self-tuning or powering on: one-floor up deceleration switch (SSU1) activates at a lower position than the minimum acceleration distance.
		Inspect during running: one floor up deceleration switch (SSU) activates at a position which is 100mm lower than its position during shaft self tuning.
		Inspect during running: one floor up deceleration switch (SSU1) activates at a position which is 150mm higher than its position during shaft self tuning.
		Inspect after stop: one floor up deceleration switch (SSU1) activates at a position which is 100mm lower than its positions during shaft self tuning.
		Inspect after stop: one floor up deceleration switch (SSU1) activates at a position which is 150mm higher than its position during shaft self tuning , it did not activate.
		When in automatic control , up deceleration switch and down deceleration switch are activate at the same time but the lift is not at the top floor
11	Dislocation of Down deceleration switch 1 (SSD1)	Inspect after self-tuning or powering on: one-floor down deceleration switch (SSD1) activates at a lower position than 3/5 floor height of the bottom floor.
		Inspect after self-tuning or powering on: one-floor down deceleration switch (SSD1) activates at a higher position than the minimum acceleration distance.
		Inspect during running: one floor down deceleration switch (SSD1) activates at a position which is 100mm higher than its position during shaft self tuning.
		Inspect during running: one floor down deceleration switch (SSD1) activates at a position which is 150mm lower than its position during shaft self tuning.
		Inspect after stop: one floor down deceleration switch (SSD1) activates at a position which is 100mm higher than its positions during shaft self tuning.
		Inspect after stop: one floor down deceleration switch (SSD1) activates at a position which is 150mm lower than its position during shaft self tuning, it did not activate.
		When in automatic control , up deceleration switch and down deceleration switch are activate at the same time but the lift is not at the bottom floor.
12	Dislocation of Up deceleration switch 2 (SSU2)	Inspect after self tuning or powering on: two-floor up deceleration switch (SSU2) activates at a higher position than 3/5 floor height of the floor where this switch is installed.
		Inspect during running: SSU2 activates at a position which is 150mm lower than its position during shaft self tuning.
		Inspection during running: SSU2 activates at a position which is 250mm higher than its position during shaft self tuning.
		Inspect after stop: SSU2 activates at a position which is 150mm lower than its position during shaft self tuning.
		Inspect after stop: SSU2 activates at a position which is 200mm

		higher than its position during shaft self tuning, it did not activate Only first deceleration switch is installed but it is set to have both first and second deceleration switch (see F182)
13	Dislocation of down deceleration switch 2 (SSD2)	Inspect after self tuning or powering on: two-floor down deceleration switch (SSD2) activates at a lower position than 3/5 floor height of the floor where this switch is installed.
		Inspect during running: SSD2 activates at a position which is 150mm higher than its position during shaft self tuning.
		Inspect during running: SSD2 activates at a position which is 250mm lower than its position during shaft self tuning.
		Inspect after stop: SSD2 activates at a position which is 150mm higher than its position during shaft self tuning.
		Inspect after stop: SSD2 activates at a position which is 200mm lower than its position during shaft self tuning, it did not activate
		Only first deceleration switch is installed but it is set to have both first and second deceleration switch (see F182)
14	Dislocation of up deceleration switch 3 (SSU3)	Inspect after self tuning or powering on: three-floor up deceleration switch (SSU3) activates at a higher position than 3/5 floor height of the floor where this switch is installed.
		Inspect during running: SSU3 activates at a position which is 250mm lower than its position during shaft self tuning.
		Inspect during running: SSU3 activates at a position which is 300mm higher than its position during shaft self tuning.
		Inspect after stop: SSU3 activates at a position which is 250mm lower than its position during shaft self tuning.
		Inspect after stop: SSU3 activates at a position which is 250mm higher than its position during shaft self tuning, it did not activate
		Only first and second deceleration switch are installed but it is set to have three deceleration switches (see F182)
15	Dislocation of down deceleration switch 3 (SSD3)	Inspect after self tuning or powering on: three-floor down deceleration switch (SSD3) activates at a lower position than 3/5 floor height of the floor where this switch is installed.
		Inspect during running: SSD3 activates at a position which is 250mm higher than its position during shaft self tuning.
		Inspect during running: SSD3 activates at a position which is 300mm lower than its position during shaft self tuning.
		Inspect after stop: SSD3 activates at a position which is 250mm higher than its position during shaft self tuning.
		Inspect after stop: SSD3 activates at a position which is 250mm lower than its position during shaft self tuning, it did not activate
		Only first and second deceleration switch are installed but it is set to have three deceleration switches (see F182)
16	Dislocation of up deceleration switch 4 (SSU4)	Inspect after self tuning or powering on: four-floor up deceleration switch (SSU4) activates at a higher position than 3/5 floor height of the floor where this switch is installed.
		Inspect during running: SSU4 activates at a position which is 150mm lower than its position during shaft self tuning.
		Inspect during running: SSU4 activates at a position which is 250mm higher than its position during shaft self tuning.
		Inspect after stop: SSU4 activates at a position which is 150mm lower than its position during shaft self tuning.
		Inspect after stop: SSU4 activates at a position which is 200mm higher than its position during shaft self tuning, it did not activate
		Only first, second the third deceleration switch are installed but it is set to have four deceleration switches (see F182)

17	Dislocation of down deceleration switch 4 (SSD4)	Inspect after self tuning or powering on: four-floor down deceleration switch (SSD4) activates at a lower position than 3/5 floor height of the floor where this switch is installed.
		Inspect during running: SSD4 activates at a position which is 150mm higher than its position during shaft self tuning.
		Inspect during running: SSD4 activates at a position which is 250mm lower than its position during shaft self tuning.
		Inspect after stop: SSD4 activates at a position which is 150mm higher than its position during shaft self tuning.
		Inspect after stop: SSD4 activates at a position which is 200mm lower than its position during shaft self tuning, it did not activate
		Only first and second deceleration switch are installed but it is set to have four deceleration switches (see F182)
19	Open and close door limitfailure	In automatic status open to the limit and close to the limit overrun 1.5s at the same time
20	Slip prevention failure	In running (except for inspection running), the leveling switch doesn't activate after the time as set by F62 (slip prevention time)
21	Motor overheat	There are input signals at motor overheat input point.
23	Elevator overspeed	The speed feedback exceeds the allowable speed for 0.1s, the fault coded 23 occurs. When set speed is less than 1m/s, the allowable speed=set speed +0.25m/s When set speed is more than 1m/s, the allowable speed=set speed×1.25 Maximum allowable speed < rated speed ×108%
		When elevator runs to terminal landing by 0.8m/s <sup>2</sup> deceleration, the fed back value continuously exceeds this deceleration for 0.1s, the fault coded 23 occurs.
24	Elevator underspeed	The speed feedback is less than the allowable value for continuous 0.5s, the fault coded 24 occurs. When set speed is less than 0.5m/s, the allowable speed = set speed -0.25m/s. When set speed les more than 0.5m/s, the allowable speed =set speed ×0.5.
27	Up leveling inductor fault	When it stops after high speed running, the up leveling inductor does not activate
		The up leveling inductor activates at a distance exceeding the maximum effective protection distance of exceeding the maximum ineffective protection distance, the fault coded 27 occurs. If the length of leveling insert plate is less than 300mm: the maximum effective action protection distance =300mm×4 If the length of leveling insert plate is more than 300mm: the maximum effective action protection distance =4×leveling insert plate length If the highest floor height is less than 3: the maximum ineffective action protection distance=maximum floor height×1.5 If the highest floor height is more than 3: the maximum ineffective action protection distance =maximum floor height ×2.5.
28	Down leveling inductor fault	The down leveling inductor doesn't activate
		The down leveling inductor activates at a distance exceeding the maximum effective protection distance of exceeding the maximum ineffective protection distance, the fault coded 28 occurs. If the length of leveling insert plate is less than 300mm: the maximum effective action protection distance =300mm×4 If the length of leveling insert plate is more than 300mm: the maximum effective action protection distance =4×leveling insert plate

		length If the highest floor height is less than 3: the maximum ineffective action protection distance=maximum floor height×1.5 If the highest floor height is more than 3: the maximum ineffective action protection distance =maximum floor height ×2.5.
32	Safety circuit opens during operating	Safety circuit opens during operating of elevator
35	Band brake contactor adhesion detection fault	There is no output of Mainboard KMB(brake contactor), but input signal is detected at input point (including rear two detection points) There is output of Mainboard KMB(brake contactor), but no input signal is detected at input point (including rear two detection points)
36	Output contactor adhesion detection fault	There is no output of mainboard KMY relay, but input signal is detected at input detection point (adhesion of KMY contactor) This is output of mainboard KMY relay, but no input signal is detected at input detection point (KMY contactor does not pick up)
37	Door lock contact adhesion detection fault	Opening limit signal activates and door lock detection signal is sent
38	Brake Switch Failure	An output from relay KMB on master control PCB is detected, but brake switch is not open.
39	Safety circuit relay contact fault	Damaged safety relay can not pick up normally. Safety relay is seized. Input signal of safety circuit is inconsistent with that detected at contact. Broken high-voltage input terminal of mainboard safety circuit The signal from high-voltage detection point of safety circuit is inconsistent with the that detected at safety relay (F156=0)
42	In Non overhaul status the elevator stops ,The up limit switch and down deceleration switch act at the same time,or The down limit switch and up deceleration switch act at the same time.	In Non overhaul status the elevator stops ,The up limit switch and down deceleration switch act at the same time,or The down limit switch and up deceleration switch act at the same time.the fault can not be self-protection .the fault status renew which namely means replace
45	Ahead of opening door relay check fault	Ahead of opening door relay output varies from ahead of opening door check input over 0.5s,Y14 has output signal but Y17 not; or T17 has output signal but Y14 not
49	Communication fault	Abnormal communication between clip chips of mainboard
50	parameter initialization fault	1)power cut exists can renew, show that reading the parameter error sign is incorrect 2)If power cut exists can't renew,show that parameter error sign change indeed
54	Hall and Car Door lock high voltage varied fault	Hall and Car Door lock high voltage check position difference time over 1.5s,X33 connect normally,but X34 not;or X34 break but X33 connect normally.
68	In self-study Flatlayer flashboard length and Flatlayer switch distance combination is not suitable for demand fault	1)flatlayer flashboard too long or too short .arithmetic;(flatlayer flashboard length + flatlayer switch distance)/2 < 100mm or > 900mm 2)Flatlayer area too long or too short .arithmetic;(flatlayer flashboard length - flatlayer switch distance)/2 < 10mm or > 100mm 3)
69	In self-study flashboard number varies from elevator total floor number fault	Elevator total floor number = floor number in advance (F11) + actual floor number

71	IPM fault	Causes: instantaneous current, shorted output three phases, abnormal power module supply, excessively elevated the temperature of power module Remedies: contact supplier for service
72	DSP controller fault	Causes: abnormal control board input voltage Remedies: check voltage; replace mainboard
73	Heatsink overheated	Causes: excessively elevated ambient temperature, damaged cooling fan, existence of heating source around. Remedies: make cooling unit available; remove heating source around
74	Brake unit fault	Cause: defective brake cable or damaged brake elements; Remedies: check brake resistor connection
75	Broken fuse at DC side	Causes: broken main circuit supply fuse Remedies: replace
76	Excessive torque output	Causes: overloaded. Small capacity of elevator integrated drive controller, torque output exceeds the rated value by 200% for 10 seconds. Remedies: check loads or replace it with another with higher capacity.
77	Excessive speed deviation	Causes: overloaded; too short of acceleration/deceleration time Remedies: reduce the load; increase acceleration/deceleration time.
78	DC bus overvoltage	Cause: too short deceleration time, excessive motor regenerated energy; too high supply voltage Remedies: increase deceleration time; connect brake resistor; lower voltage in the supply range.
79	DC bus undervoltage	Causes: open phase of input supply; instantaneous power failure; excessive voltage fluctuation of input supply; loose terminals of input supply; pickup current load in a same power supply system. Remedies: inspect input supply, correct the voltage to normal, reset and restart; check input wiring; change power supply system into a conformable one.
80	Open phase of output	Causes: broken output wire from elevator integrated drive controller; loose output terminals; Remedies: check motor wiring; adjust the capacity of elevator integrated drive controller or motor
81	Motor overcurrent	The actual motor current exceeds the rated value by 150% for 1 minutes or by 200% for 10 seconds
82	Encoder feedback fault	Causes: broken wiring of PG; wrong wiring of PG; defective PG card hardware Remedies: check wiring; replace PG card
83	Current exists after stop	Causes: current flow exists due to ineffective shut down
84	Encoder reversion fault	Cause: inverse speed signal is detected during running Remedies: remove interferences to encoder
85	Slip after stop	Cause: loose band brake causes elevator sipping; interfered or loosened encoder Remedies: check band brake; fasten encoder; remove interference.
86	Reversed motor phase sequence	Causes: inversed motor phase sequence occurs in case encoder is properly wired Remedies: adjust motor phase sequence
87	Forward runway protection	Causes: defective or wrong wiring or interfered encoder Remedies: check encoder wiring
88	Backward runway protection	Causes: defective or wrong wiring or interfered encoder Remedies: check encoder wiring
89	UVW encoder phase sequence error	Causes: wrong sequence in wiring of encoder and PG card Remedies: check and adjust wiring again
90	R+, R- breakage	Causes: abnormal encoder wiring

	protection	Remedies: check if encoder is properly wired
91	Transient overcurrent	Causes: output current too big or current check incorrectly Remedies: check electric load or replace control board
93	Input overvoltage	Causes: too high voltage of elevator integrated drive controller input supply Remedies: check elevator integrated drive controller input supply
94	1: UVW encoder wire breakage 2: Endat encoder communication fault	Causes: 1. broken any one phase of UVW encoder 2. Endat encoder communication fault Remedies: 1. check encoder wiring 2. check Endat encoder communication
95	Cooling Fan fault	Causes: blocked fan or broken fan detection wire Remedies: check cooling fan
96	Motor self setting not completed	Causes: self setting is not carried out where UVW encoder is used Remedies: activate motor self setting to make it reset automatically
97	software overcurrent fault	Causes: electric block Remedies: check electric load or wrench
98	Encoder C,D phase connect incorrectly	Causes: C,D phase connect incorrectly
99	Open phase of input power	Causes: Open phase of input power Remedies: check input power or connection wire



## 10 Precautions

### 10.1 Precautions in Application

The flowing precautions must be taken in the application of iAStar-S8 elevator integrated drive controller.

#### 10.1.1 Selection of Optional Brake Resistor`

Elevator is potential load in four-quadrant running mode, which may cause occurrence of negative torque. Therefore, elevator integrated drive controller should be provided with optional brake assembly to avoid overcurrent or overvoltage and the resultant tripper. All iAStar-S8 series elevator integrated drive controllers are provided with integrated brake units. You are only required to connect an external brake resistor. Brake resistor varies from the motor type (synchronous or asynchronous). See the following table for external brake resistors matching various power classes:

Series	Power (kW)	Matching Resistor				
		Min. (Ω)	Max. (Ω)	Recomm- ended (Ω)	Total power of the recommended resistors (W)	
					Syn.	Asyn.
400V	2.2	56	210	100	1000	1000
	3.7	56	144	80	1600	1200
	5.5	56	100	70	2000	1600
	7.5	56	72	64	3200	2000
	11	34	48	40	4000	3200
	15	34	41	36	5000	4000
	18.5	17	31	24	6400	5000
	22	17	27	20	8000	6400
	30	11	20	15	10000	8000
	37	8	16	12	12000	10000
	45	5	10	9	18000	15000
	55	5	8	8	22000	18000
	75	5	6	6	3000	25000
200V	2.2	13	58	50	1000	1000
	3.7	13	39	30	1600	1000
	5.5	8	26	20	2000	2000
	7.5	8	21	15	3200	2000

#### 10.1.2 Absorption Devices are not allowed at output side

Care should be taken in design, Elevator integrated drive controller provides pulsed output, so it may cause failure of elevator integrated drive controller failure, tripping or element damage when capacitors or lightning protection piezoresistor for improving power factor of the line is installed. Care must be taken in its design. When retrofit an old elevator, the existing capacitors and piezoresistors at the output side must be removed. See Figure10.1.

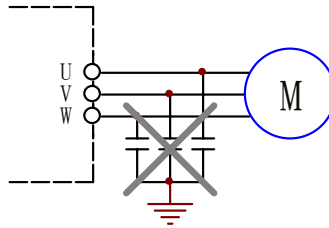


Figure 10.1 No capacitors are allowed at the output side of elevator integrated drive controller

### 10.1.3 Working Voltage

[iAStar-S8] elevator integrated drive controller only applies to 380V rated voltage. Where the supply voltage is inconsistent with the rated voltage, a voltage regulator must be used.

### 10.1.4 Two-phase Input Inappropriate

It is not agreeable to change 3-phase input to 2-phase input to avoid failures

### 10.1.5 Lightning Impact Protection

iAStar-S8 elevator integrated drive controller is provided with built-in lightning impact protection to make it has certain capacity of self protection.

### 10.1.6 Altitude and Derated Application

Where the altitude is above 1000m, the thin air may impair the cooling effect of elevator integrated drive controller; therefore it is necessary to use it by derating. See Figure 10.2 for the relation between derated output current and altitude:

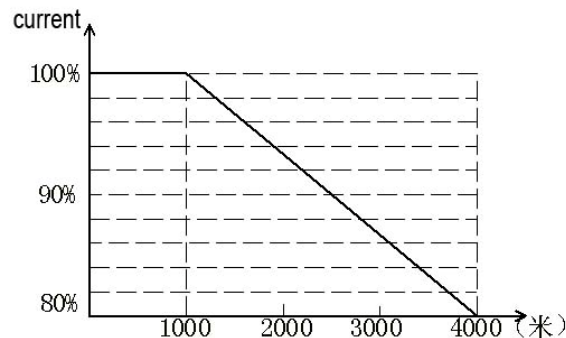


Figure 10.2 Relation between rated output current of elevator integrated drive controller and altitude

### 10.1.7 Correct and Normative Wiring

- (1) For wiring or replacing wires, the line numbers must be carefully recorded to avoid misconnection.
- (2) Calling board should be wired as per the coincidence relation between plug line number and the cabinet side line number. As a rule, it can not be plugged until the communication voltages are measured correct one by one. For calling board communication voltage standard and sequence, see the diagram for SM-04 hall calling board display and the applicable drawings.
- (3) Before use, the car control board 02 and display board 04 in control cabinet must be unplugged. After completion of communication wiring, switch it on and use multimeter to check the voltage sequence of communication plugs (**Remember! Both plugs must be measured.**). It is allowed to plug in only if the check is satisfactory. Never plug in before you do not know whether the wiring is correct or not.

(4) Incorrect wiring method or wrong wiring may cause damage of communication board or affect its service life.

(5) Car control board 02 and display board 04 uses same plug and same plugging sequence. Note to make the notch of plug upward.

(6) Please attach importance to the correct method for installation and operation of communication board.

a. Take care of the insulation between communication board and metal components around in order to avoid contact caused short circuit.

b. Do not directly contact the circuit of communication board to in order to avoid electronic elements against oxidation or electrostatic damage. Prior to installation of calling control panel (04), put hands on other metal structures to release static electricity. During installation of display board 04 or setting calling addresses, it is not allowed to contact circuit board, especially the chips.

c. please note in wiring of communication plugs: ① check the pins and snap springs are in good conditions, ② never make the wires excessively tensioned to avoid pulling off or poor contact; ③ when clamping, make sure the clamping heads are as close to the wire's plastic cover as possible to avoid shorting between wire ends.

(7) It is forbidden to use TXV+, TXV-, 24V-COM, 5V-COM and 12V-0V for other purpose, except for those specified by us (e.g. photoelectric switch).

(8) If shielded twist pair is used for communication line, single end grounding method must be used for grounding. It is forbidden to connect the shielding line to any one of communication wires.

(9) Prior to switching on, make sure, by measuring, the 24V, 5V and COM line of switch supply, the 12V, 0V, A and V line of rotary encoder and the communication line TXV+, TXV-, TXA+ and TXA- each has 10KΩ ground resistance, or the related circuit must be checked carefully.

(10) For all circuit boards (01, 02, 04, etc) of serial system and the elevator integrated drive controller, in no case may they be modified and welded. When wiring over the elevator integrated drive controller, a paper must be used to cover the frequency converter to avoid metal wire ends falling into elevator integrated drive controller and resulting in short circuit.

#### **10.1.8 Requirements on the clearance between two leveling insert plate**

Generally it shall not be more than 6m. Where it exceeds 8m, the leveling insert plate must be additionally provided as a virtual floor.

Setting of calling controller address: in general, the leveling insert plate of bottom floor shall be set a calling address "1". From the bottom floor to top floor, each increment of floor no. causes the calling address of insert plate increase by 1; the address of car display board must be set as "0".

In case some modifications are made to leveling switch and insert plate, shaft self-tuning must be redone to ensure normal operation of elevator.

When a calling controller on a floor is proposed to be used on another floor, proper address must be set as per the floor address value. The calling controller on each floor must be set with a proper floor address.

#### **10.1.9 No installation personnel allowed to modify the system wiring without approval**

If the adjustment of external wiring is necessary during installation or maintenance, you must clearly understand the following issues: what is purpose of modification: what is the effect of modification; what lines are to be modified; how to modify. After modification, do not switch it on until it is checked that the modification on corresponding lines are completed to

its purposes. You had better measure them with multimeter and especially check if the as-wired parts are necessary to be modified in order to avoid wrong connection.

After inspection, it is required to start low-speed running in the machine room, then start high-speed test running for one floor, and then multi-floor. The whole test running shall be completed without any persons in the car or on the car top in order to avoid safety risk.

#### 10.1.10 You may get twice the result with half the effort if installing some components the final position by one time

Take leveling switch, limit switch, final limit switch and forced slow-down switch for example: A. check if they can activate effectively; B. set their activating distance as per technical specifications; c. test run at normal inspection speed, never take them for granted.

The installation distance for up/down forced slow-down switch may be calculated by (the theoretical value must be proved by such tests as “up overrun” and down overrun):

$$S = V^2 / 2a + 20 \quad (\text{cm})$$

The installation distance of up/down forced slow-down switch may be calculated by

Where  $S$  = distance of forced slow-down switch;

$V$  = elevator speed rated

$A$  = deceleration slope

#### 10.1.11 CAN Communication

CAN communication cable must be of type twisted pair, with twisting pitch within 2-3cm; however, shielded twist pair will be more appreciable.

(1) Under normal conditions when no peripherals are connected, the mainboard communication voltage may be directly measured at control cabinet terminals.

(2) When peripherals are connected and both calling board and car display board of the bottom floor each is jumped by a terminal resistance, the communication voltage during normal operation of elevator serial system may be measured out:

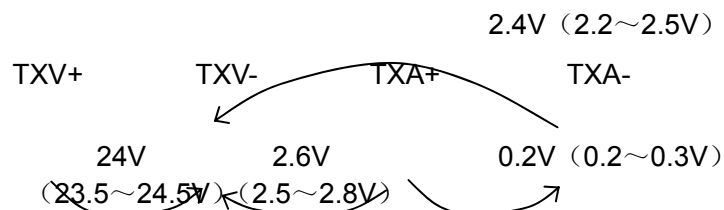


Figure 10.3 The voltage during normal operation of elevator serial system

Note:

The above shown communication voltage values are the normal standard values (not bracketed) or optimal values in the allowable deviation range (bracketed). All voltages are positive values in the forward direction. Please note the direction of arrow.

Excessive deviation of communication voltage indicates normal communication circuit and mostly inspection will be necessary:

- inspect for broken, bad contacted or wrong wired communication line and for grounding short-circuit.
- inspect SM-02-D car control board and SM-04 display board for damage.

#### Damage shooting methods:

① individually connect the car communication line or shaft communication line to the system in order to measure each communication voltage. In case abnormal voltage is found, it indicates the connected communication board is damaged.

② in case communication circuit voltage is found abnormal: if communication voltage recovers to normal when a communication board is disconnected, it indicates this board is damaged. Then proceed further check by method 3:

③ After disconnecting SM-02-D car control board or SM-04 display board from communication circuit, use multimeter (turn to 20K $\Omega$  position) to measure the TXV- to TXA+ resistance and TXV- to TXA- resistance. If both results are "1" (means infinitely great), it indicates the board is in good condition; if any one of the results is not "1" (display a resistance value), it indicates this board is damaged (communication circuit fault).

④ If calling board and display board is disconnected, the mainboard no-load communication voltage shall be such: 3.0V between TXA+ and TXV-; 2.0V between TXA- and TXV-, otherwise the mainboard communication interfaces is damaged.

The communication circuit faults caused by our peripheral communication board (SM-02-D and SM-04) appear as: the elevator can works normally within most of the time, but occasionally it may cause instruction demand or calling board calling failure; occasionally affect the opening/closing of door; possibly cause mainboard halted; sometimes it may reset automatically after several minutes of fault, sometimes it has to be powered off and on again to return to normal.

So, in case of peripheral communication faults, e.g. a board is damaged, please replace timely to ensure normal operation of serial system and serves users better.

#### **10.1.12 Rotary Encoder**

Rotary encoder must be wired with shielded wire. Where extension is necessary, the extension part shall also be wired with shielded wire. The existing part and the extension part must be jointed in such a way their shielding layers are reliably welded together and are connected to the ground terminal of control cabinet; any joints must be covered by 1 shielding metal foil and adhesive tapes. The spare wire ends (for example: Z-phase) must be wrapped with adhesive tape to avoid contact with the shielded wire. No matter the rotary encoder lines are arranged together with power lines or not, they must be threaded into metal hose(s) with the length from encoder to the control cabinet. Where necessary, a joint has to be made by reliably connecting the metal part. In addition, the end to control cabinet shall be grounded, another end must not be grounded. (see fig.3.20/3.21, the same with Synchronous Motor PG Card)

#### **10.1.13 Terminal Resistance**

At the bottom floor, a terminal resistance jumper must be added to each of the hall calling & display board and the car display board.

#### **10.1.14 Absorption Circuit**

Absorption circuit must be additionally arranged to the coil side such inductive loads as relay, contactor, band brake coil, passing chime and so one. For AC circuit, the absorption circuit mainly includes a RC with resistance 100 $\Omega$ /4W and capacitance 0.1 $\mu$ f/630V. For DC circuit, the absorption circuit mainly includes duplexed diodes. Where the current of DC circuit is very heavy, the bridge rectifiers must be used in stead of diode.

#### **10.1.15 Shaft cable and Trailing Cable**

Note that heavy voltage line and weak voltage line must be separated by ground wire. Or if ground wire is not available, at least two wires, each with size 0.75mm<sup>2</sup>, may be used as ground wire. Herein, the heavy voltage means those with voltage higher than 24V (e.g. 36V, 80V, 110V, 220V, 380V). Heavy voltage line means those control circuits with voltage lower than 24V (included).

#### **10.1.16 Ground System**

To avoid several communication signals against interference, grounding is strictly required by the system.

- ◆ The machine room must be provided with grounding conditions as specified in elevator technical specifications. All grounding line to the machine room must be connected to copper strips of control cabinet.
- ◆ Machine room equipment, e.g. the grounding line of five-wire supply system, the motor casing, control cabinet casing and encoder casing, must be reliably grounded at the grounding copper strips of control cabinet.
- ◆ Control cabinet built-in equipment such as elevator integrated drive controller, switch supply and transformer must be reliably grounded at the grounding copper strips of control cabinet.
- ◆ Car top equipment (e.g. door operator) and the complete car top must be reliably grounded at the grounding copper strips of control cabinet.
- ◆ The hall calling board must be uniformly grounded at the copper strips of control cabinet.
- ◆ Grounding of encoder shielding wire:
  - a) If the encoder casing is grounded and one end of shielding wire is connected to the casing, another end (to elevator integrated drive controller) of shielding wire shall not be grounded.
  - b) If the encoder casing is grounded but the shielding wire is not connected to the casing, the end (to elevator integrated drive controller) of shielding wire must be grounded.
- ◆ In order to suppress the inductive interference among circuits, not only the output supply line from elevator integrated drive controller but also the wires of encoder must be threaded in well grounded metal hoses. The supply lines and signal lines must be spaced by more than 30cm.



**Important ! Centralized grounding point (e.g. copper strips of control cabinet) must be provided. Distributed grounding should never be used.**

#### 10.1.17 Car Wiring

Car operation board internal wiring must be made to keep heavy voltage line far away from car control board as practicably as possible due to that the heavy voltage line may cause car control board CPU halted.

#### 10.1.18 Passing Chime

It is recommended to use 24V electronic passing chime. If heavy-voltage coil type passing chime is used, suitable resistance capacitor (RC, for AC circuit) or backward diode (for DC circuit) must be additionally provided for absorption.

#### 10.1.19 Observation of Car Input Signal

Only by Mainboard LCD display, we can observe whether there are car input signals or not. When observing the CAR INPUT screen in auto mode of mainboard, “\*” means a closed input point; “-” means an open input point. If car control board is in good conditions, you may see on car control board the lamp “D1” keeps lighting while “D2” flashes at a high frequency.

#### 10.1.20 Supply to Hall Calling Board

Where elevator runs to 28F or higher, switch supply must be additionally installed at the middle section of shaft to supply all the calling board at the lower floors.

### 10.2 Scraping Precautions

The scrapped iAStar-S8 elevator integrated drive controller shall be treated as industrial refuse,

#### 10.2.1 Disposal of Capacitors


Burning the electrolytic capacitors on main board or other PC boards may cause risk of explosion. So, it is forbidden to burn any capacitor.


#### **10.2.2 Disposal of Plastic Components**

There are several plastic components on elevator integrated drive controller. It is forbidden to burn them due to burned plastics will produce toxic gases.

## 11 Maintenance

This chapter describes general information for maintenance of this product.

 <b>danger</b>
<p>◎ <b>Start operation 10minutes after it is disconnected to main in order to ensure at that time charge indicator lamp goes out or DC bus voltage is under 24V</b></p> <p>Or it may cause risk of electric shock.</p> <p>◎ <b>In no case may the elevator integrated drive controller be remodeled without authorization</b></p> <p>Or it may cause risk of electric shock and injury.</p> <p>◎ <b>Only professional electricians may be allowed for maintenance. Never leave foreign wire ends or metal substances inside.</b></p> <p>Or it may cause fire risk.</p>

 <b>caution</b>
<p>◎ <b>When power is on, don't change the wiring or remove terminals.</b></p> <p>Or it may cause risk of electric shock</p>

### 11.1 Warranty

Our company guarantees the elevator integrated drive controller (main body) in the following cases:

In the warranty period calculated from the delivery date, the manufacture will be liable for failures or damages occurred in normal operating conditions; when warranty period is expired, the service will be reasonably paid.

The services for dealing with the flowing troubles will also be paid even if it is still in warranty period:

- 1) Failures and/or troubles caused due to use it not in accordance with instruction manuals or modify or remodel it without authorization.
- 2) Not used for its intended use.
- 3) Damages during transport or due to falling after purchase.
- 4) Damages due to earthquake, fire, flood, lightning, abnormal voltage or other force majeure.

### 11.2 Product Checkup



In case damages, troubles or other problems are found on product, please contact the agencies or out technical departments and provides the following information:

- 1) Product Type
- 2) Serial number
- 3) Purchase date

The following information must be informed of: damage condition, unclear problems and troubles.

### 11.3 Routine Inspection

Never remove the casing of elevator integrated drive controller when power is on or operating. You are only needed to carry out visual examination from outside. The routine inspection aims to check:

- a) Ambient environment is in compliance with standard specification;
- b) Operating performance is compliance with the standard specification;
- c) No noise, vibration and other abnormal conditions;
- d) The cooling fan of elevator integrated drive controller is running normally;
- e) There is no overheating.

### 11.4 Periodic Inspection

Prior to inspection, stop elevator. After it is disconnected from the main, remove the casing of this product. At this time, the reservoir capacitors of main circuit may still remain charging voltage which may be discharged out after certain dwell time. Please wait until the charging indicator lamp goes out and be additionally proofed by using multimeter, the as measured DC bus voltage is lower than safety voltage (DC 24V). Touch terminals immediately after switching off may cause the risk of electric shock. See table 10.1 for detailed periodic inspection items.

Table 10.1 Periodic Inspection Items

Objects		Inspection Items	Methods	Criteria
Operating environment		1) Ambient temperature, humidity, vibration, dust, corrosive gas, oil mist, water drop. 2) Hazardous materials around	1) Visual inspection, thermometer, hygrometer 2) Visual inspection	1) the ambient temperature must be lower than 40℃. RH must be in compliance with environmental requirements. 2) no existence of hazardous materials around.
LCD display		3) LCD displays clearly with uniform back light. 4) If some characters can not be displayed by LCD	Visual inspection	1) Uniform backlight 2) Display in good condition
Plug-in terminal Bolt		1) check for loose bolts 2) check for loose plugs	1) screw down 2) visual inspection	1) no abnormal conditions 2) installed securely
Main circuit	Conductor	1) Check for broken or faded cover layer 2) Deformation of copper strip	Visual inspection	No abnormal
	Electromagnetic contactor, relay	1) check for vibrating noise during operation 2) if contacts pick up or not	acoustic inspection Visual Inspection	1) No vibration noise 2) Hear the picking-up sound

	reservoir electrolytic capacitor	1) check for liquid leakage, fade, fissure, expansion of casing 2) if safety valve works normally and if expansion occurs to valve body	Visual inspection	No abnormality
	Heat sink	1) Check for dust 2) Check for blocking or foreign materials in air tunnel	Visual inspection	No abnormality
	Cooling fan	1) Check for abnormal noise, 2) Check for abnormal vibration; 3) Check for fade and deformation due to overheat	1) Acoustic/visual inspection. Turn the fan blade after powering off 2) Visual inspection 3) Visual inspection, olfactory inspection	1) Rotate smoothly 2),3)no abnormality
Control circuit	Wiring Plugs	Check for dust and absorbed foreign materials on double-bank plug-in assembly between control board and main circuit	Visual inspection	No abnormality
	Control panel	1) Check for fade and off odor of control circuit board 2) Check for fissure, breakage and deformation of circuit board	1) Visual/olfactory inspection 2) Visual inspection	No abnormality

## Appendix A EMC Installation Guide

From such aspects as noise control, wiring requirement, grounding, peripheral equipment surge absorption, leakage current, EMC Zoning, installation precaution, use of supply filter and disposal of radiated noise, this appendix describes the elevator integrated drive controller EMC design and installation guide for reference by elevator integrated drive controller users.

### A1 Noise Control

As determined by operating principle, the elevator integrated drive controller produces certain noises. The effect of noise on peripheral equipment is relevant to the noise type, transmission path as well as the design, installation, wiring and grounding of drive system.

#### A1.1 Noise Type

Noise types are shown by Attached figure A1.1.

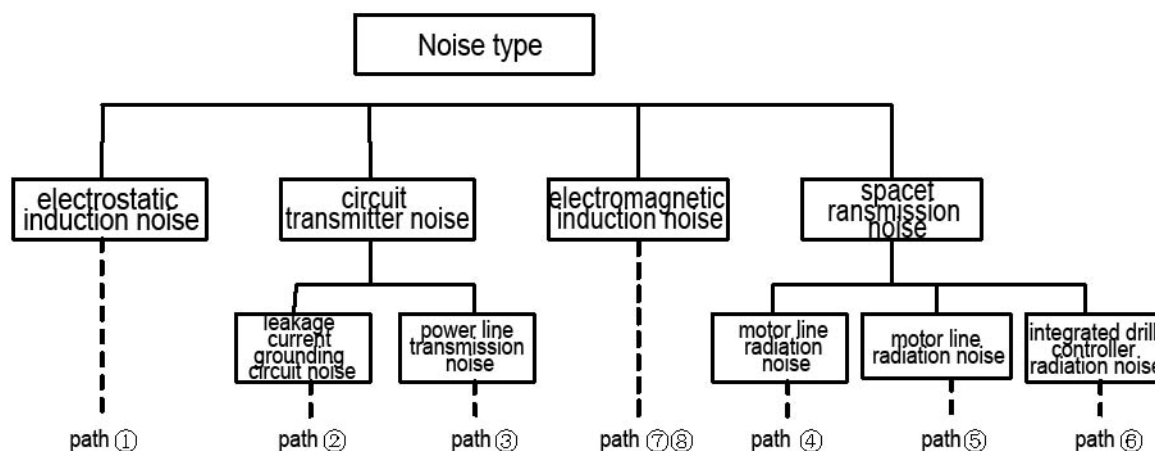
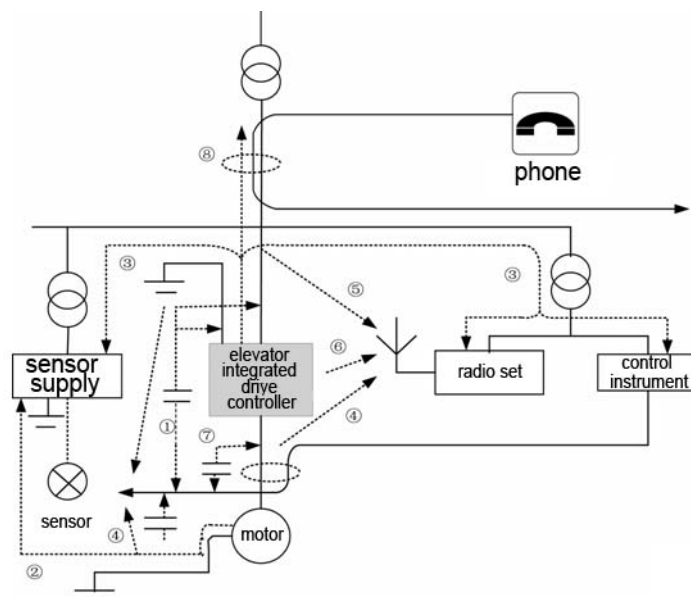


Figure A1.1 Noise Types Diagram

#### A1.2 Transmission Path

See attached figure A1.2 for transmission path of noise.



#### A1.3 Basic Measures for Noise Suppression

See attached Table A1.1 for basic noise suppression measures.

Attached Table A1.1 Basic Noise Suppression Measures.

No.	Causes	Measures
① ⑦ ⑧	Due to electromagnetic induction and electrostatic induction where signal lines are arranged in duplex with power lines or arranged in bundle, noises occurs and transmits in signal line and additionally results in malfunction of peripherals	<ol style="list-style-type: none"> <li>1. avoid arranging signal line and power line in duplex and in bundle.</li> <li>2. keep susceptible peripherals far away from elevator integrated drive controller;</li> <li>3. keep susceptible signal line far away from the input/output cable of elevator integrated drive controller;</li> <li>4. use shielded lines as signal line and power line. It is better to put them in metal hoses (hose-to-hose spacing shall not be less than 20cm )</li> </ol>
②	Where closed loop circuit is formed among peripherals and elevator integrated drive controller, the grounding leakage current of integrated drive controller may cause malfunction of peripherals.	If that time the peripherals are not grounded, the malfunction due to leakage current may be avoided.
③	When peripherals sharing a power supply system with elevator integrated drive controller, the noise of elevator integrated drive controller may transit along the supply line and resultantly cause malfunction of the related peripherals.	Connect a noise filter at the input side of elevator integrated drive controller; or isolate the peripheral from noise by isolating transformer/supply filter.
④ ⑤ ⑥	When such weak voltage equipment as control computers, measuring gauges, radio sets and sensor and their signal lines are installed in a same control cabinet with elevator integrated drive controller and are wired very close to each other, the radiated interference may cause malfunction of peripheral.	<ol style="list-style-type: none"> <li>1. Susceptible peripherals and their signal lines must be arranged far away from elevator integrated drive controller. Furthermore, the signal line shall be of type shielded line which shielding layer is properly grounded. Signal line shall be threaded into metal hose and arranged far away from the input/output cable of elevator integrated drive controller. These two kinds of cable shall be perpendicular to each other.</li> <li>2. radio noise filter and linear noise filter (ferrite common mode choke) as installed at both input side and output side of elevator integrated drive controller will be effective for suppress its noise radiation;</li> <li>3. the cables of elevator integrated drive controller shall be arranged in thicker shielding layer such as ducts with thickness 2mm or be embedded in cement tray. In addition, the cables must be threaded in grounded metal hose. (Four-core cable may be appreciable for motor cable. One end of a core conductor shall be grounded to the elevator integrated drive controller side and another end shall be connected to motor casing.</li> </ol>

## A2 Requirements on Cable Laying

### A2.1 Requirement on Cable Laying

As shown by figure A2.1(a): To prevent mutual coupling of interferences, control signal cable must be laid separately with supply cable and motor cable and be spaced as far as

practicable. as shown by figure A2.1(b): where the control signal cable has to cross over supply cable or motor cable, they must be perpendicular with each.

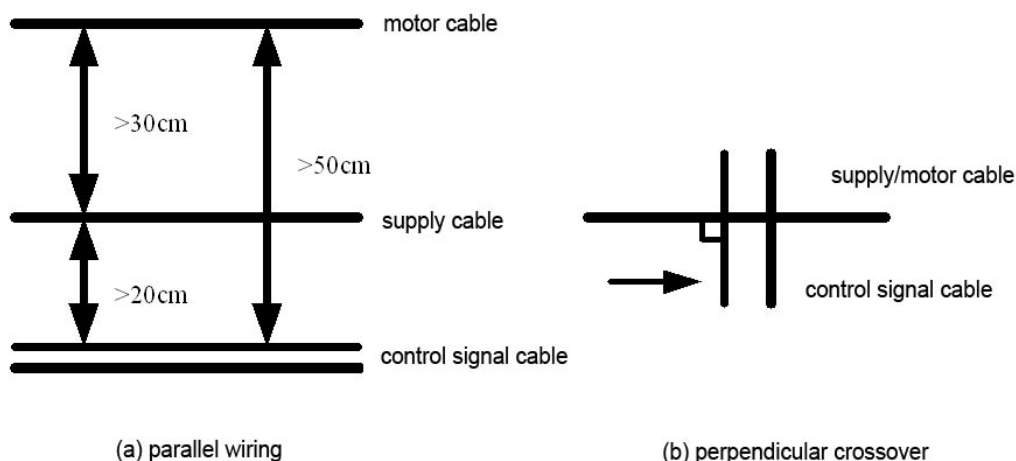


Figure A2.1 Requirements on cable laying

## A2.2 Requirements on Cable Size

Greater cable size causes greater ground capacitance and greater ground leakage current. Therefore, motor cable with excessive cross-sectional area shall be used by derating so as to reduce output current (each increment of cross sectional area makes current decreasing by 5%).

## A2.3 Requirements on Shielded Cable

High frequency low-impedance shielded and armored (such as weaved copper wire mesh or, aluminum wire mesh) cable shall be used.

## A2.4 Requirements on Installation of shielded cable

Control cables are mostly shielded cables which shielding-purpose metal wire mesh must be connected to metal casing by 360° girth jointing method with cable clip at both ends, as shown by figure A2.2. In addition, the figure A2.3 shows an incorrect shield grounding method.

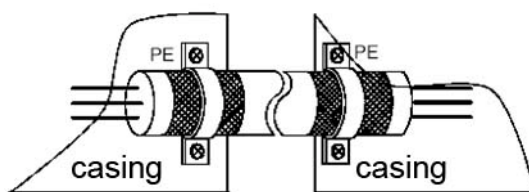


Figure A2.2 Correct Shield Grounding Method

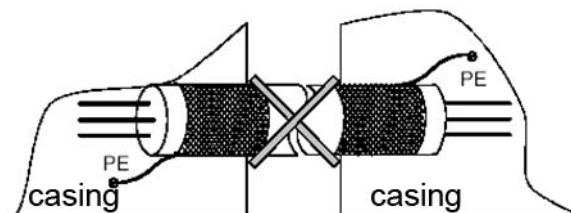


Figure A2.3 Incorrect Shield Grounding Method

## A3 Grounding Requirements

### A3.1 Grounding Method

See figure A3.1 for grounding method of Ground pole

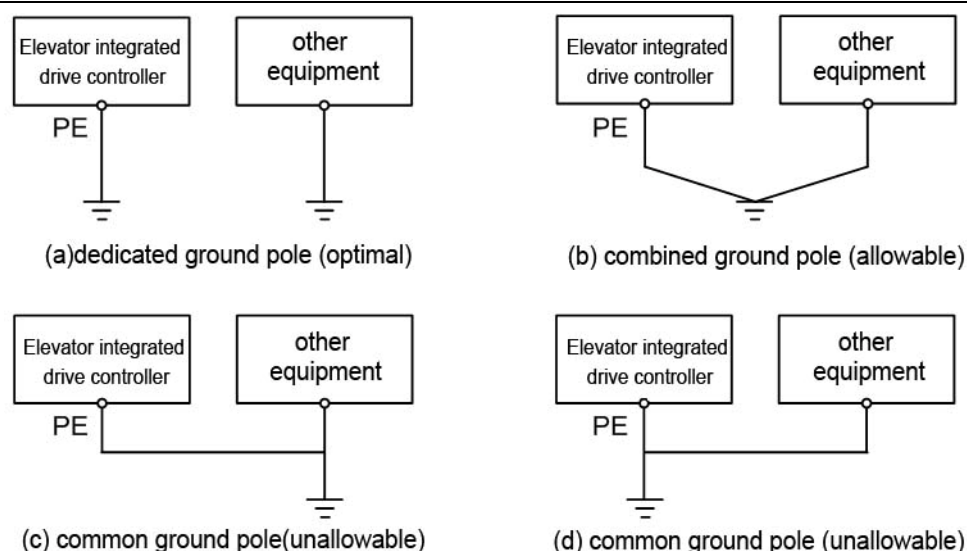


Figure A3.1 Dedicated Ground Pole

Among the above-shown four figures, (a) shows the optimal grounding method. Users are advised to use this method as practicably as possible.

### A3.2 Precautions for Grounding Connection

- (1) Use grounding cable of standard cross section as far as possible in order to minimize the grounding impedance; due to flat cable has smaller high-frequency impedance than round-section cable, therefore, flat cable with identical cross-sectional area will be more preferable.
- (2) The ground cable should be as short as possible and the grounding point should be close to the elevator integrated drive controller as practicably as possible.
- (3) If four-core cable is used for motor line, one of the four core conductors must be grounded in such a way that one end of it is grounded by the side of elevator integrated drive controller and another end is connected to the ground terminal of motor. The optimal grounding effect may be achieved if each of both motor and the elevator integrated drive controller has individual dedicated ground pole.
- (4) Where all ground terminals of system components are combined together, the noise source caused by ground leakage current will affect the other peripherals of elevator integrated drive controller. Therefore, in a same control system, the grounding for elevator integrated drive controller shall be separated from those for weak voltage equipment such as computer, sensor or audio devices.
- (5) To get smaller high-frequency impedance, the anchor bolts of equipment may be used as high-frequency terminal connecting rear panel of cabinet. Note to remove insulation coating around the securing point in installation.
- (6) The grounding cable must be laid far away from the I/O wirings of noise sensitive equipment. In addition, the grounding cable must be as short as possible.

### A4 Install Surge Absorption Device

Even if they are installed outside or elevator integrated drive controller, such heavy noise production devices as relay, contactor and electromagnetic brake must be additionally provided with surge suppressor. As shown in Figure 4.1.

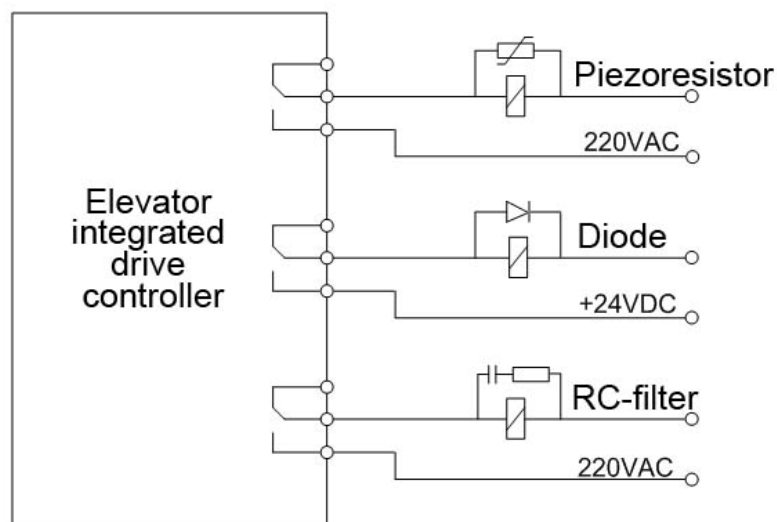


Figure 4.1 Use Requirements of Relay, Contactor and Electromagnetic Brake

### A5 Leakage Current and Countermeasures

Figure A5.1 shows the wiring capacitance, motor capacitance, ground leakage current and line-to-line leakage current by the input/output side of elevator integrated drive controller. The intensity of leakage current depends upon the carrier frequency and capacitance.

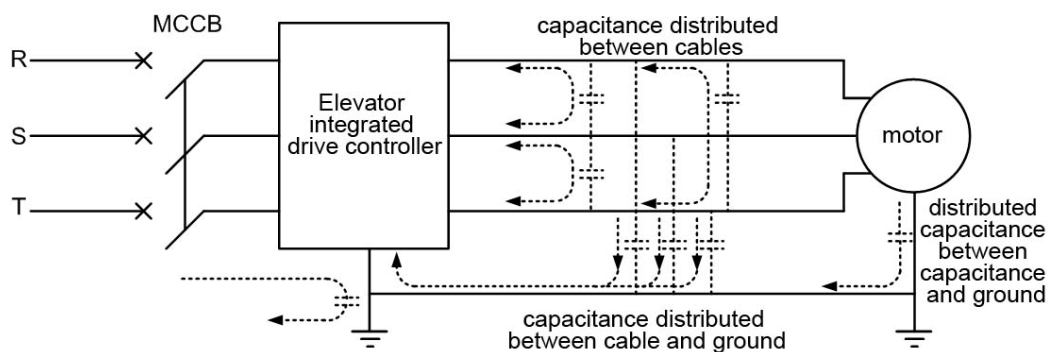


Figure A5.1 Paths of Leakage Current

#### A5.1 Ground Leakage Current

Ground leakage current not only flows by elevator integrated drive controller but also flows by other equipment via the ground wire. As a result, it may cause malfunction of leakage protection circuit breaker, relay or other equipment. The leakage current increases with the increment of carrier frequency of elevator integrated drive controller and the extension of motor cable.

Suppression measures: reduce carrier frequency; shorten motor cable as practicably as possible; use leakage protection circuit breaker specially designed for leakage current due to higher harmonic/surge.

#### A5.2 Line-to-Line Leakage Current

As for leakage current flowing by the distributed capacitance between I/O side cables of elevator integrated drive controller, its higher/sub harmonics may cause malfunction of external thermorelay. Especially when small capacity elevator integrated drive controller under 7.5Kw is used, and at the same time, long wiring (more than 50m) is provided, the increased leakage current is liable to make malfunction of external thermorelay.

Suppression Measures: reduce carrier frequency; install AC output reactor at the output side; monitor the motor temperature directly with the temperature sensor; or use electronic

thermorelay, the motor overload protection integrated to elevator integrated drive controller instead of external thermorelay,

## A6 Suppression of Radiated Emission

Elevator integrated drive controller is usually installed in metal control cabinet, the external instruments and equipments are lightly affected by radiated emission of elevator integrated drive controller. Therefore, the external connecting cables are deemed as the main source of radiated emission. Due to the supply cable, motor cable as well as the control cable and keyboard cable are all necessary to be led outside of the shielding cabinet; the cable outlet must be so treated specially to avoid impairing the shielding effects.

In Figure A6.1: the cables in the shielded cabinet acts as an antenna, which absorbs the radiated noises in cabinet, transmits outside via cables and emits them to the space; in Figure A6.2: ground the cable's shielding layer at the outlet of the shielded cabinet, thus the noise radiation absorbed by the cable will flow to earth directly via the shielding cabinet so as to eliminate its effect on external environment.

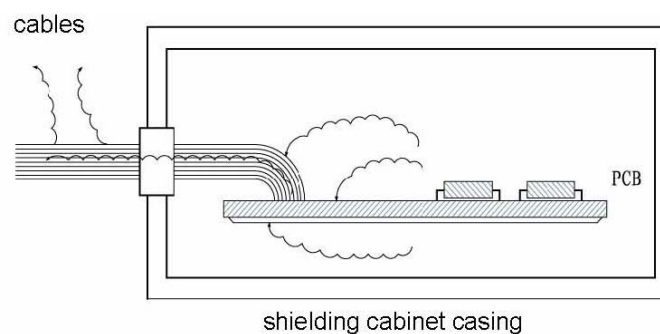


Figure A6.1 Radiation from output cables from shielding cabinet

When using the shielding layer grounding method as shown in figure A6.2, the shielding layer must be grounded as close to the cabinet as possible, otherwise the sectional cable from grounding point to the outlet of cabinet will still act as an antenna coupling. The noise grounding point shall not be more than 15cm from cable outlet of cabinet, and smaller clearance will always be more preferable.

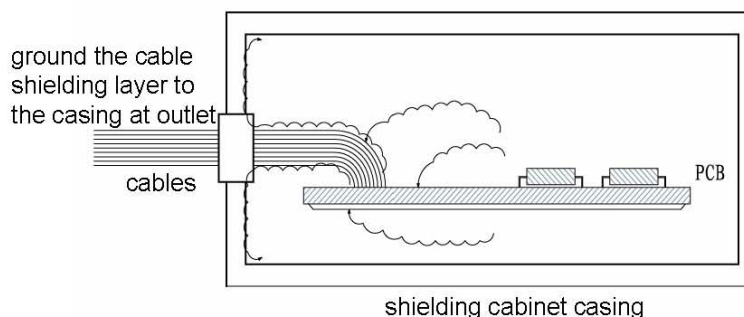


Figure A6.2 Radiation suppression by grounding the cable shielding layer to the casing

## A7 Guide for Use of Power line filter

Power line filter may be used by heavy-noise protection devices and noise susceptible devices.

### A7.1 Functions of Power line filter



(1) The power line filter is two-way low pass filter which only permits flowing of DC current or 50HZ operating frequency AC current but stops flowing of higher frequency electromagnetic interference current. Therefore, it can not only inhibit the equipment's electromagnetic interferences flowing into power line but also inhibit the noises in power line flowing into equipment.

(2) The power line filter may be able to make equipment meeting EMC requirements on conducted emission and transmission sensitivity. In addition, it may also suppress the radiated interference of equipment.

#### **A7.2 Precautions for Installation of Power Line Filter**

(1) In the cabinet, the filter shall be located close to the power line inlet as practicably as possible. Additionally, the filter supply line section left in the control cabinet must be as short as possible.

(2) Where the input line and output line of filter is too closely laid, the high-frequency interference may bypass the filter, couple directly with output line and input line and as a result make the power filter failing to function.

(3) Usually there is a dedicated ground terminal on the casing of filter. However, if this ground terminal is connected by a conductor to the cabinet body, the filters will not functions due to the long conductor with great high-frequency resistance can not plays the role of a bypass. Correct installation method shall be such: closely laid the filter casing on the conductive plane of metal cabinet so as to maximize their contact area. Note to remove the insulation coating during installation in order to ensure good electric contact.

#### **A8 EMC Installation Zoning**

In the drive system constituted by elevator integrated drive controller and motor, the elevator integrated drive controller and peripherals such as control devices and sensors are usually installed in a same control cabinet. The interferences of control cabinet on external environment may be inhibited by taking suitable measures at the main contacts, therefore, the supply line radio noise filter and supply line AC reactor shall be installed. In order to meet the EMC directive, the interiors of control cabinet shall also be arranged in accordance with EMC requirements.

In the drive system constituted by elevator integrated drive controller and motor, the elevator integrated drive controller, brake units and contactors are all heavy noise source which may affect the normal operation of such noise sensitive peripherals as automated assembly, encoder and sensor. On the basis of electric characteristics of peripherals, they will be installed at different EMC zones in order to spatially isolate the noise sources and noise receivers. This is an effective measure for eliminating interferences.

See Figure A8.1 for EMC installation zoning for elevator integrated drive controller.

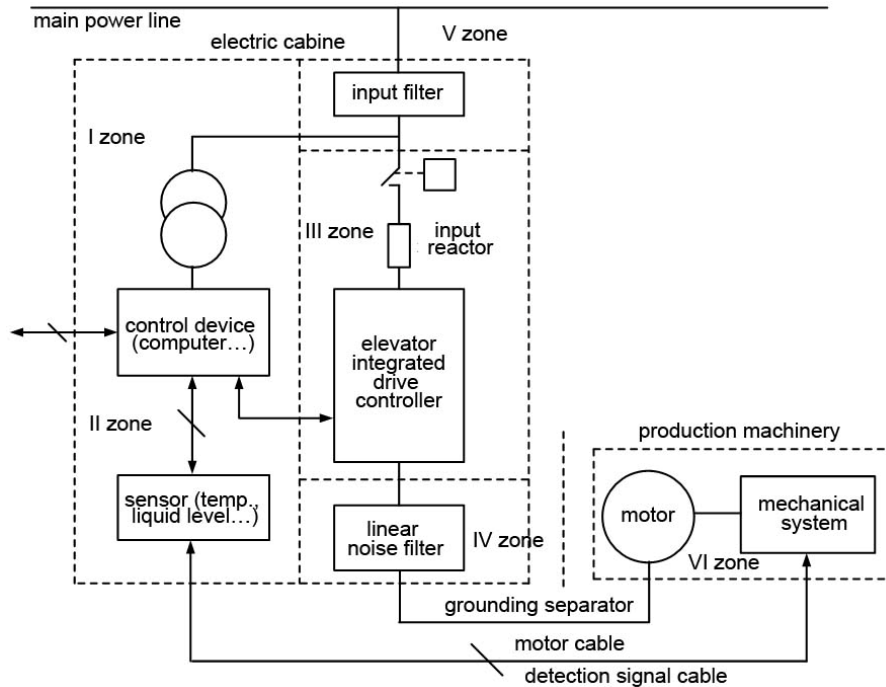


Figure A8.1 EMC Zone for installation of elevator integrated drive controller

Description of above shown EMC zoning for installation:

- I zone: Control supply transformer, control device and sensor
- II zone: Control signal cable interface requiring certain anti-interference capacity
- III zone: Main noise sources including input reactor, elevator integrated drive controller, brake unit, contactor and the like
- IV zone: Output noise filter and its wiring
- V zone: Power supply (includes wiring of radio noise filter)
- VI zone: Motor and its cable

These zones shall be separated by minimum 20cm in order to realize electromagnetic decoupling; for better decoupling effect, ground separator is preferred among the zones. The cables shall be laid and arranged by zone; if necessary, filters shall be installed at interfacing point between zones; all the bus cables led out from cabinet (e.g. RS485) and signal cable must be shielded.

## A9 Precautions for Electric Installation

See Figure A9.1 for electric installation of elevator integrated drive controller.

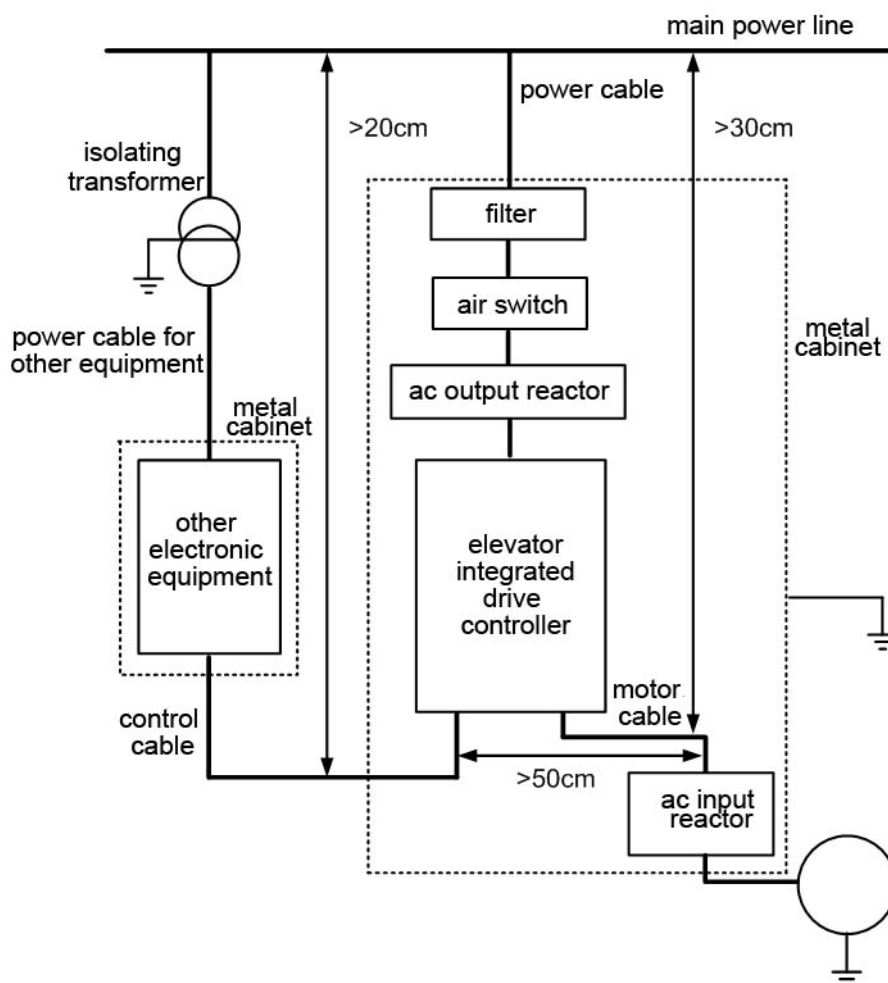


Figure A9.1 Electric Installation of elevator integrated drive controller In order to meet the EMC directive, the following notices must be taken:

- (1) Elevator integrated drive controller shall be installed in a cabinet where the base plates of elevator integrated drive controller and such peripherals as input filter will be secured on the rear panel in order to ensure good electric contact; the elevator integrated drive controller and filters must be arranged as close as possible within 15cm in order to minimize the high-frequency impedance of their grounding line and reduces high-frequency noises.
- (2) Install a wide ground terminal bank at the inlet (5cm or less from outlet) of control cabinet and then secure all the shielding layers of cabinet in/out cables onto the terminal bank by 360° girth jointing method in order to ensure good electric contact.
- (3) Motor cable shall be of type shielded cable and it is more preferable to use shielded cables with such two shielding layers as spiral metal belt and metal mesh. By the elevator integrated drive controller side, the shielding layer of motor cable shall be connected, by 360° girth jointing method and with cable clip, to the rear panel of cabinet at two points: one point shall be close to elevator integrated drive controller as far as possible within 15cm, another point is located on ground terminal bank. 360° girth jointing method shall also be used when the motor cable's shielding layer threads through motor terminal box and grounds at motor metal casing; if it is impractical, firstly strand both shielding layers as braid, then flatten it to width of more than 1/5 braid length in for connecting to motor terminal. The core conductor of motor cable and its PE soft braid lead shall be as short as possible within 5cm.
- (4) Terminal control cable must be of type shielded cable, which shielding layer should be connected to terminal bank at the cable inlet of cabinet by 360° girth jointing method; the shielding layer end connecting elevator integrated drive controller may be secured to the

metal casing of elevator integrated drive controller. If impractical, firstly strand both shielding layers as short and wide braid, and then flatten it to facilitate connecting to the PE terminal of elevator integrated drive controller. The uncovered section of cable core conductor and the PE soft braid lead shall be as short as possible within 15cm.

(5) Keyboard cable shall not be threaded out from the shielding cabinet.

The slot holes on shielding cabinet shall be as small as possible within 15cm in length.

## A10 EMC Conformity

The iAStar-S8 series elevator integrated drive controller conforms to the EMC directive as shown by attached Table A10.1 provided that suitable input/output filters and AC reactors (see "Optional Parts" for the type of optional filters and reactors) and installed and the above-said precautions are carefully taken.

Table A10.1 General EMC Performance of iAStar-S8-series Elevator Integrated Drive Controller

Item	Applicable standard	Criteria Level
Conducted noise emission immunity	EN12015.1998	0.15≤f<0.50MHz, 100db (μv/m) quasipeak 0.50≤f<5.0MHz, 86db (μv/m) quasipeak 5.0≤f<30MHz, 90:70db (μv/m) quasipeak
Radiated noise emission immunity	EN12015.1998	30≤f<230MHz, 40db (μv/m) quasipeak 230≤f<1000MHz, 47db (μv/m) quasipeak
Electrostatic discharge noise immunity	EN12016.2004	Criterion B(contact discharge 4000V, air discharge 8000V)
Radiated electromagnetic field noise immunity	EN12016.2004	Level 3, criterion A(3V/m)
EFTB immunity	EN12016.2004	Level 4, Criterion B(heavy voltage end ±2KV/2.5kHz)
Surge Immunity	EN12016.2004	Criterion B(±1KV)
Conducted noise immunity	EN12016.2004	Criterion A (3V,0.15~80MHz)

## Notice to customers

Dear customers:

RoHS is the English abbreviation of the *Restriction of the use of certain hazardous substances in electrical and electronic equipment*. EU implemented the RoHS on July 1, 2006, it regulates the limited use of six kinds of harmful materials during the electrical and electronic equipment products of recently putting on the market, such as lead, mercury, cadmium, sexavalence chromium, PBB, and PBDE etc..

On Feb 28, 2006, the seven ministries and commissions of Ministry of Information Industry of China, Development and Reform Commission, Department of Commerce, General Administration of Customs, State Administration for Industry and Commerce, State General Administration for Quality Supervision and Inspection and Quarantine, State Environmental Protection Administration jointly issued the *Measures for Administration of the Pollution Control of Electronic Information Products* which is the RoHS of Chinese version and make a compulsory implementation. On Feb 1, 2008, *Measures for Administration of the Environmental Protection of Electronic Wastes Pollution* which was issued by China Environmental Protection Administration began to be implemented which clearly regulated that the user of the electrical and electronic equipment product should offer or relegate the electronic waste to units (including individual business households) who had the corresponding scope of business listed in directory (including temporary directory) to demolish, utilize or dispose them.

The products of our company comply with the requirements of *Measures for Administration of the Pollution Control of Electronic Information Products* and RoHS on the part of electronic parts and components, PCB board, harness material, selecting and purchasing of structural element etc., it strictly controls the six kinds of harmful materials of lead, mercury, cadmium, sexavalence chromium, PBB, and PBDE. Also, during the production, PCB parts and components are welded in lead free product line using the lead free welding process.

The possible poisonous elements contained in the following components:

Components type	Electronic component	Electronic printed circuit board (PCB)	Sheet metal parts	Radiator	Working of plastics	Wire
Possible poisonous elements	Six kinds of harmful materials of lead, mercury, cadmium, sexavalence chromium, PBB, and PBDE					

#### 1 Environmental impact analysis

During the usage, our company products will produce some heat to result in some harmful materials volatilizing very a little, however, it can not seriously affect the environment. While the electronic products are out of use at the end of the lifecycle and are discarded, the heavy metal and chemical poisonous material will seriously pollute the soil and water source.

#### 2 Lifecycle of electronic products and equipments

Any electronic products and equipments have its service life and can be abandoned, even though it can be used, it also will be washed out by upgraded products. The lifecycle of our company electronic products and equipments are generally below 20 years.

#### 3 Abandoned disposal methods of electronic products

When the various electronic products are abandoned, if disposed improperly, they will pollute the environment. Our company requires the customer to establish the recycle system according to the national corresponding provisions, it can not be disposed as general domestic garbage or general industrial solid waste, and it shall be stored and utilized by environmental harmless method or unified recovered and disposed by authorized units strictly according to *Measures for Administration of the Environmental Protection of Electronic Wastes Pollution* issued by China Environmental Protection Administration. For any individual and unit without rights, to demolish, utilize or dispose electronic wastes is forbidden.

Please don't discard the electronic wastes with common domestic garbage. Any proposal about

disposal of electronic wastes, please contact local waste product disposal organization or environmental protection bureau.

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