STEP®

AS380 Integrated Drive

Instruction Manual

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Shanghai STEP Electric Corporation

AS 380 series elevator integrated drive controller

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Forward

AS380 series elevator integrated drive controller is the new generation of state-of-the-art elevator-specific control and drive device. With full consideration of the safety & reliability of elevator； inherent characteristic of elevator operation and specific feature of potential energy load for elevator, AS380 series elevator integrated drive controller adopted advanced technology of frequency control of motor speed and intelligent elevator control as well as the integration of control & drive of elevator to make the further improvement of the product performance, easy-to-use property and cost efficiency.

Abstract

The manual give an overall instruction about the installation, operation, parameter setting, daily maintenance and trouble-shooting of AS380 series elevator integrated drive controller. The manual can be used as the reference material in design of elevator system with AS380 series elevator integrated drive controller, or also as the user manual for system installation, setting and maintenance.

Please read the manual thoroughly to ensure the correct installation and operation of the elevator integrated drive controller,

Reader

Users of elevator

Design engineers of elevator control

Engineering maintenance staffs

Customer technical support staffs

The manual is subject to update and amendment; please visit our company website for the update.

Our company website www.stepelectric.com

Main features

a) Prefect integration of control and drive of elevator. The whole device features compact structure and small size, fewer connections, which is characterized as high reliability and easy-to-use property and cost-efficiency.
b) Double 32-bit embedded microprocessor jointly finish the elevator operation and motor drive control
c) Redundant safety design , double safety protection for control processor and drive processor to achieve the maximum safety guarantee for elevator travel
d) The design requirements of anti-interference capacity go beyond the highest standard in the industrial design requirement.
e) All CAN bus communication make the whole system connected easily, data transmitted strongly, and more reliable.
f) The adoption of the advanced direct landing technology make elevator running more efficiently
g) The advanced multifunctional elevator operation mode can fully meet various needs of customers'
h) Advanced group control feature. Not only compatible with the traditional group control mode of up to 8 units, but also support the new group control of destination floor distribution.
i) The adoption of advanced vector control technology can make the motor speed adjusted well for the realization of the best elevator comfort.
j) Adapt to both synchronous motor and asynchronous motor.
k) Newly-developed none-load sensor-activated compensation technology provides excellent starting comfort to elevator even if no counterweight is installed.
l) To adopt incremental ABZ encoder to realize the synchronized control of motors. To adopt the none-load sensor-activated compensation technology to achieve the excellent start-up comfort.
m) New PWM dead band compensation technology can effectively reduce the motor noise and loss of machine.
n) Dynamic PWM carrier modulation technology can effectively reduce the motor noise.
o) Auto-tuning phase of synchronous motor without encoder
p) Asynchronous motor is not required for motor parameter acquisition process once the motor parameter is set correctly. The convenient static motor parameter acquisition process is available If is impossible to acquire the exact motor parameter on site. So there is no need to hoist the car and etc in this way.
q) The hardware is the 6^{th} generation of module with the junction temperature resistance up to 175℃. Low loss for switch and connection to ensure the long use life.

Safety-related sign

The following safety-related sign are used in the manual, be sure to observe the instructions with these signs

: Operation wrongly will cause death or serious injury to person

: Operation wrongly will cause injury to person and damage to equipment.

Important: the important content that need users' attention and observation

Table of contents

Chapter one: General knowledge of the integrated drive controller

This chapter introduces the general information of AS380 series integrated drive controller, including the voltage grade and adaptive motor capacity of the integrated device, and items checkup in the cases. Besides, the chapter describes in detail the notice items during the process of integrated device installation, wiring, operation, maintenance and disposal. Please read carefully this chapter for the safe operation of the integrated device and prolonging of the service life.

1.1 scope of application

The voltage grade of AS380 series elevator integrated drive controller is 200V, 400V. AS380 series elevator integrated drive controller is both asynchronous motor and synchronous motor compatible. The mating motor capacity is 1.1kW～75kW right now. the max floor single elevator support is 64 floor. The max quantity of elevator group control is up to 8 units. For the configuration beyond the above scope, please contact the engineer center of our company.

1.2 items in the cases


◎ Do not install frequency converter damaged or components incomplete。 Otherwise high risk of fire, personal injury。

Please confirm the following item after opening the cases

Any damage caused by transportation, the conformity of items and parameter on the machine nameplate to those in the purchase requirements,

Please contact the manufacturer or supplier for the solution once any inconformity or items omission.

1.3 model description

AS380 series elevator integrated drive controller model number illustration fig 1.1

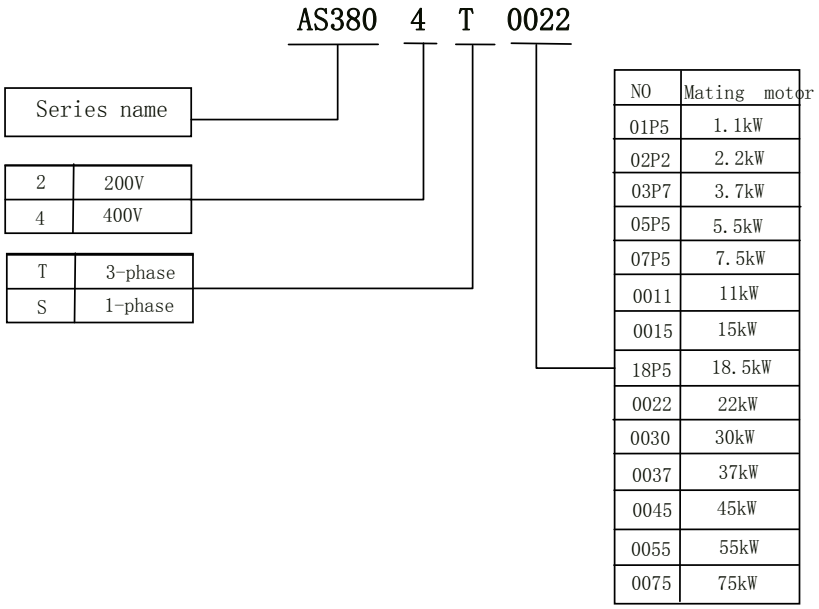


Fig 1.1 Model illustration of elevator integrated drive controller

1.4 integrated drive controller nameplate

Please see fig 1.2 of integrated drive controller

The model, specification, and lot no are all listed on the nameplate of integrated drive controller.

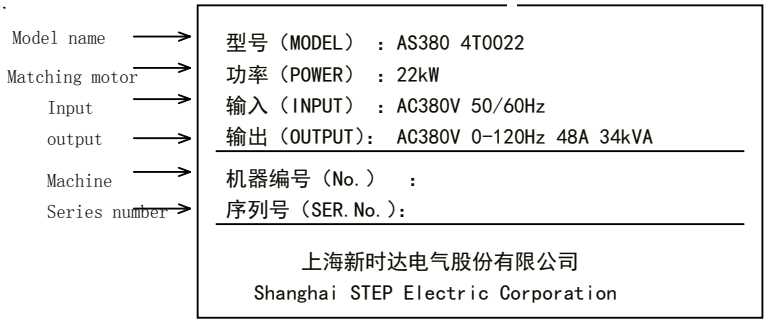


Fig 1.2 Nameplate description of elevator integrated drive controller

1.5 Notice Items for safety

Danger

◎ **Always install on metal structures or other noninflammable objects;**
Or it may cause fire risk.

◎ **Never install in explosive environments**
Or it may cause explosion risk

◎ **Never place combustibles near the product**
Or it may cause fire risk.

Caution

◎ **Always support the body bottom during handling**
Or the possible falling of the main body of elevator integrated drive controller may cause risk of injury and/or property damage.

◎ **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 the 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.


Danger

◎ **Make sure it is disconnected from the mains prior to wiring**
Or it may cause risk of electric shock.
◎ **The wiring can only be performed by trained and qualified electricians**
Or it may cause risk of electric shock.
◎ **Always keep the iAStar-S8 elevated integrated drive controller properly grounded at its grounding terminal E**
Or it may cause risk of electric shock.
◎ **Avoid confusing main circuit input terminals and output terminals of elevator integrated drive controller**
Or it may cause risk of property damage and/or explosion.
◎ **Never make terminal ⊕1/⊕2 and ⊖ be shorted.**
or it may case risk of fire and explosion
◎ **Make sure the cover is placed in position prior to switching on**
Or it may cause risk of electric shock and/or explosion.
◎ **Don't use soggy hands operating elevator integrated drive controller**
Or it may cause risk of electric shock
◎ **At completion of wiring the emergency stop safety circuit, carefully check and make sure all the wirings are correct**
Or it may case risk of hazard.


Danger

◎ **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**
Or it may cause risk of electric shock and explosion


Danger

◎ **Avoid faulty operation when elevator integrated drive controller is running**
Or it may cause risk of high-voltage electric shock.
◎ **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**
Or it may cause risk of high-voltage electric shock.

◎ **Only trained, qualified and authorized person may be allowed to work on elevator integrated drive controller**
Or it may cause risk of electric shock or property damage.
◎ **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**
Or it may cause risk of electric shock and explosion.

1.6 operation notice

Please notice the following points when using AS380 series integrated drive controller.

1.6.1 Brake resistor selection

Elevator feature potential energy load, four quadrants movements' characteristic, and the occurrence of power-generation by braking. Therefore, users should consider adding brake component to the integrated drive controller. Otherwise, tripping may be caused with overvoltage fault. AS380 series integrated drive controller is equipped with brake unit, so only external brake resistor is required. The specification table 1.1 for external brake resistor of integrated drive controller

Table 1.1 AS380 series elevator integrated drive controller brake resistor configuration table

Model No **AS380-**	Matching Motor（kW）	Min value（Ω）	Max value（Ω）	Recommended value（Ω）	Recommended total resistor capacity （W）	
					synchronous	asynchronous
200V integrated device						
2S01P1	1.1	26	72	64	1000	1000
2S02P5	2.2	26	58	50	1000	1000
2S03P7	3.7	26	39	30	1600	1200
400V integrated device						
4T02P2	2.2	56	210	100	1000	1000
4T03P7	3.7	56	144	80	1600	1200
4T05P5	5.5	56	100	70	2000	1600
4T07P5	7.5	56	72	64	3200	2000
4T0011	11	34	48	40	4000	3200
4T0015	15	34	41	36	5000	4000
4T18P5	18.5	17	31	24	6400	5000
4T0022	22	17	27	20	8000	6400

4T0030	30	11	20	15	10000	8000
4T0037	37	8	16	12	12000	10000
4T0045	45	5	10	9	18000	15000
4T0055	55	5	8	8	22000	18000
4T0075	75	5	6	6	30000	25000

1.6.2 Absorber at the output side prohibited

Since the output of integrated drive controller is impulse wave, installation of power factor-improving capacitor or piezoresistor for lightning protection at output side will cause the fault tripping or component damage of integrated drive controller.

The above issue must be taken full consideration in designing. If conducting used elevator renovation, the capacitor or piezoresistor previously connected to the circuit output side must be removed.

The Fig 1.3 is the illustration of no capacitor connecting to the output side of integrated drive controller

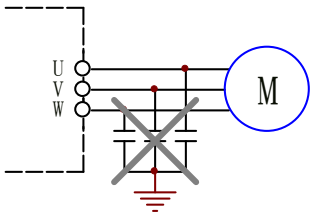


Fig 1.3 the illustration of no capacitor connecting to the output side of integrated drive controller

1.6.3 The application voltage of integrated device.

AS380 series integrated drive controller is only applicable to working within the scope of its rated voltage. If the power voltage and its rated voltage are not in conformity, voltage regulator is required for voltage transformation.

1.6.4 Two-phase input not allowed

It is no appropriate to change the three-phase input into two-phase input. Otherwise, faults will occur.

1.6.5 Altitude and derated application

The thin air at the areas of altitude above 1000 meter will cause the poor heat-dissipation of integrated drive controller. This time it is necessary to do the derated application of integrated drive controller. the relation curve between the rated current output and altitude when the

integrated drive controller is in derated application is as below:

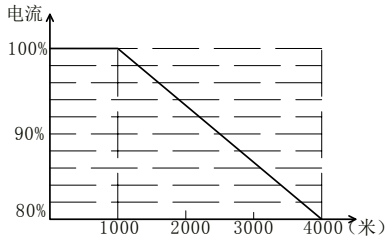


Fig 1.4 the diagram about the relation between the rated output current and altitude

1.6.6 Synchronous sealing star delay

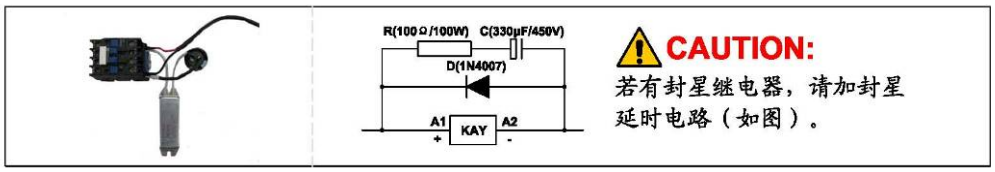


Fig 1.5 sealing star delay circuit tag

1.6.7 Low Voltage directive complies

That our products comply with EN61800-5-1 ： 2007standards, which comply with the Low Voltage Directive (Low Voltage Directive 2006/95/EC).

If the inverter as a component integration in the entire electrical system, make sure theentire system meets the requirements of EC Directives.

Note:

① machine make sure the ground, and make sure the ground terminal is a separateground.

② inverter prohibited for use in of Δ ground and IT power systems.

③ If you are loading the cabinet, make sure that the cabinet ground.

④ use CE certified circuit breaker, electromagnetic contactor, and other accessories.Leakage circuit breakers, please use the B-type leakage circuit breakers.

⑤ inverter in the overvoltage catalog III, Pollution Degree II, under the conditions ofuse. The level of protection of the inverter protection class Ⅰ

1.7 waste disposal

Discarded integrated drive controller should be treated as the industrial waste

1.7.1 Disposal of capacitors

Burning electrolytic capacitor of main circuit and PCB may cause explosion, therefore, electrolytic capacitor not allowed.

1.7.2 Disposal of plastic components

Several plastic components are in the integrated drive controller. Burning plastic components may cause toxic gas, therefore, plastic components burning not allowed.\

Chapter two: Model and Specification

This chapter introduces the model, specification, and installation dimension of AS380 series integrated drive controller.

2.1 Model of integrated drive controller

Table 2.1 is the model list of AS380 series integrated drive controller.

Table 2.1 AS380 series integrated drive controller model list

model **AS380-**	Rated capacity （kVA）	Rated output current（A）	Matching Motor （kW）
2S01P1	2.3	6.0	1.1
2S02P2	4.6	12	2.2
2S03P7	6.9	18	3.7
4T02P2	4.7	6.2	2.2
4T03P7	6.9	9	3.7
4T05P5	8.5	13	5.5
4T07P5	14	18	7.5
4T0011	18	27	11
4T0015	24	34	15
4T18P5	29	41	18.5
4T0022	34	48	22
4T0030	50	65	30
4T0037	61	80	37
4T0045	74	97	45
4T0055	98	128	55
4T0075	130	165	75

2.2 The technical specification of integrated drive controller

Table 2.2 is the technical specification of AS380 series integrated drive controller.

Table 2.2 AS380 series elevator integrated drive controller technical specification

		2S01P5	2S02P2	2S03P7	4T02P2	4T03P7	4T05P5	4T07P5	4T011	4T015	4T0018	4T022	4T0030	4T037	4T045	4T0055	4T075
Max matching motor capacity（kW）		1.1	2.2	3.7	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75
Rated output	Rated capacity（kVA）	2.3	4.6	6.9	4.7	6.9	8.5	14	18	24	29	34	50	61	74	98	130
	Rated current（A）	6.0	12	18	6.2	9	13	18	27	34	41	48	65	80	97	128	165
	Max output voltage （V）	200V：single-phase 220～240（matching input voltage） 400V：three-phase 380/400/415/440/460V（matching input voltage）															
Input power	Phase number voltage frequency	200V：single-phase 220～240V、50/60Hz 400V：three-phase 380/400/415/440/460V、50/60Hz															
	Voltage range allowed	-15%～+10%															
	Frequency range allowed	-5%～+5%															
	Endurance capacity of instantaneous voltage drop	200V：keep running at AC150V or above； Activate under-voltage protection after 15ms from the moment when it drops from rated input condition to somewhere lower than AC150V. 400V：keep running at AC300V or above；Activate under-voltage protection after 15ms from the moment when it drops from rated input condition to somewhere lower than AC300V.															
basic characteristics	Max accessible floor	2～64 floors for single elevator															
	Elevator running speed	≤4.00m/s															
	Units under Group control	≤8 台															
	Communication mode	CAN bus serial communication															
	Operation function	see section 3.1 for product function list															
chara	Control mode	PG card vector control															
	Startup torque	150% 0Hz（PG card vector control）															

	Speed control scope	1:1000（PG card vector control）
	Speed control precision	±0.02%（PG card vector control 25±10℃）
	Torque limit	yes（set with parameter）
	Torque precision	±5%
	Frequency control scope	0～120Hz
	Frequency precision (temperature fluctuation）	±0.1%
	Frequency setting resolution	±0.06Hz/120Hz
	Output frequency resolution （calculation of resolution）	0.01Hz
	No-load startup compensation	When the elevator load 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	Zero speed 150% , < 3Hz is 160%, > 3Hz is 200%

	Brake torque	150% (external braking resistor),integrated braking unit
	Acceleration Deceleration time	0.01～600s
	Carrier frequency	2～11kHz
	Battery operation	In case of blackout, the battery instantaneously supplies power to elevator for leveling at low speed

Card interface	PG card output	5V、12V，300mA
	PG card type	Open collector output, push-pull output, SIN/COS、Endat absolute value type

	PG card signal frequency dividing output	OA，OB orthogonal，frequency dividing coefficient 1～128
Control input/output signal	Opt-coupler input Control power supply	Isolated 24V DC
	Relay output control power supply	Isolated 24V DC
	Low-voltage opt-coupler isolated input	20 channel。Switching capacity。Opt-coupler control signal is isolated 24V DC input signal。
	High-voltage opt-coupler isolated input	3 channel。Switching capacity。
	Relay output 1	4 channel。Normal open contact ，single-pole and single-throw，contact capacity：resistive load，3A 250VAC or 3A 30VDC
	Relay output 2	3 channel。Normal open contact，single-pole and single-throw, contact capacity：resistive load，6A 250VAC
	CAN communicati on port	3 channel （duplex or group control，communication between car and outside，community monitoring ）
	Analog quantity input port	1channel 。 single pole or differential input，input voltage scope-10V～+10V，precision 0.1%
Protection option	Motor overload protection	Able to use parameter setting for the protection curve of motor
	Overload of frequency converter	< 3Hz is 160%,5 seconds， > 3Hz is 185%，10 seconds
	Short-circuit protection	Provide protection to elevator integrated drive controller when overcurrent occurs to any tow phases at output side.

	Input open phase protection	In case that open phase inputted during operation, cut off output to protect the drive controller
	Output open phase protection	In case that open phase outputted during operation, cut off output to protect the drive controller.
	Overvoltage threshold	Bus-bar voltage 410V(200V series) 、810V(400V series)
	Under-voltage threshold	Bus-bar voltage 180V(200V series) 、380V(400V series)
	Instantaneous blackout compensation	15ms above protection
	Heat sink overheat	Protection through the thermistor
	antistall	Antisall protection launched when running speed deviation more than 30% of the rated speed
	Impulse encoder failure	PG disconnection
	Brake protection	Protection launched when automatically detecting the abnormal condition of brake
	Module protection	Protection against over-current , short-circuit, overheating
	Current sensor protection	Self-inspection when power connection
	Speed reversal protection	Inspection through encoder
	I^2t protection	Inspection through three-phase current

	Protection against input overvoltage	400V level＞ 725V，200V level ＞360V,stop and inspect
	Output grounding protection	Any phase grounding short-circuited during operation, cut off input and protect the frequency converter.
	Protection against output imbalance	Found three phase current output imbalance. Cut off output and protect frequency converter.
	Short-circuit protection for brake resistor	Inspection when braking
	Encoder interference	Evaluate the degree of interference of encoder and alarm
	Over-speed protection	Protection launched when exceeding rated speed by 100％
	Low-speed protection	Protection launched when the elevator running speed is far lower than the rated speed du to some reasons including failures.
	Running time governor protection	Protection launched when floor passing time exceed the required time
	Leveling switch fault protection	Protection launched when leveling switch is at fault
	EEPROM fault	Self-inspection when power connection
display	LCD in Chinese and English	Menus at each level
environment	Surrounding temperature	-10～+45℃
	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）
	altitude	Below 1000m
structure	Protection grade	IP20
	Cooling mode	Force air-cooling
Installation mode		In-cabinet installation

2.3 The installation dimensions and mass of the integrated drive controller

See fig 2.1 and table 2.3 for the installation dimensions and mss of the integrated drive controller

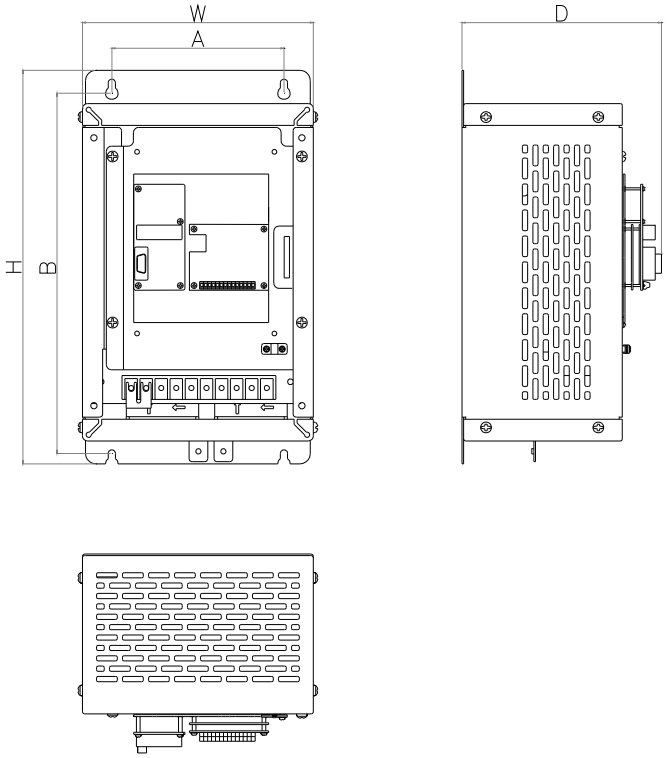


Fig 2.1 the installation dimension of elevator integrated drive controller

Table 2.3 mass and specification table of elevator integrated drive controller

Model **AS380-**	A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	Mounting hole diameter Φ(mm)	installation			Fastening torque (Nm)	Mass (kg)
							bolt	nut	washer		
2S01P1	100	253	265	151	166	5.0	4M4	4M4	4Φ4	2	4.5
2S02P2											
2S03P7											

4T02P2										
4T03P7										
4T05P5										
4T07P5	165.5	357	379	222	192	7.0	4M6	4M6	4Φ6	3	8.2
4T0011											
4T0015	165.5	392	414	232	192						10.3
4T18P5											
4T0022											
4T0030	200	512	530	330	290	9.0	4M8	4M8	4Φ8	6	30
4T0037										9	
4T0045	200	587	610	330	310	10.0					42
4T0055							4M10	4M10	4Φ10	14	
4T0075	260	707	730	430	330	10.0					50

2.4 Installation instructions

Danger

◎ **Always install on metal structures or other noninflammable 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;

2.4.1 Product installation location

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℃。

2.4.2 Product installation positioning 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 2.2

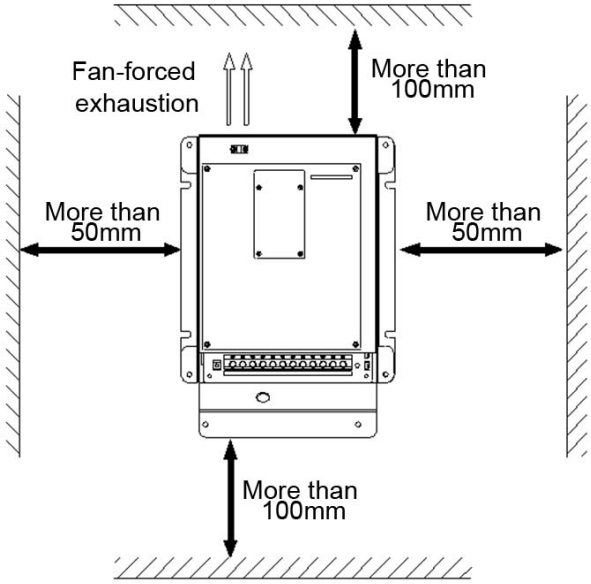


Figure 2.2 Requirements on Installation Clearance

Chapter Three: product function

3.1 Function list

This chapter introduces the function list of AS380 series integrated drive controller and its detailed description.

No	Name	remark	No	Name	remark
Standard			**50**	Parallel connection running	
1	Fully Selective Control		**51**	leveling fine-tuning	
2	Inspection Travel		**52**	door nudging with buzzer	
3	Self-rescue Travel		**53**	door-opening and standby function at base station	
4	Testing Travel		**54**	floor blocking within time slot function	
5	Clock Control		**55**	external call board search function	
6	Automatic Control for Door-opening Time		**56**	CAN communication interference evaluations	
7	Open the Door from This Landing Call		**57**	evaluation about encoder interference	
8	Pre-close the door by Door-closing Button		**58**	car adjustment	
9	Open the Door by Door-opening Button		**Optional**		
10	Door selection		**1**	pre door-opening	Install SM-11-A board
11	Leveling in Changing Destination Landing		**2**	door-opening and releveling	Install SM-11-A board
12	Cancel a Wrong Registration		**3**	Fireman Service Operation	
13	Clear Registrations at Changing Direction		**4**	The Second Car Panel	
14	Direct Landing		**5**	Car Panel by the Rear Door	
15	By-passing Landing Calls on Full-load		**6**	Car Panel for the Handicapped	
16	Power-off for Car Lighting and Fan at Stand-by		**7**	group control	Install SM-GC board
17	Auto homing		**8**	community monitoring	
18	Re-close door		**9**	earthquake response function	
19	Historical Error Log		**10**	arrival gong on car	
20	Self-tuning of Shaft Information		**11**	arrival lamp on landing	
21	Service Landing Setting at Will		**12**	Arrival gong on landing	

22	Indicating Symbols Setting for Landing Display		**13**	Separate Control of Car Doors	
23	Attendant Service		**14**	VIP Priority Service	
24	Independent Travel		**15**	Emergency Levelling at Power-off	
25	Display		**16**	switch for controlling service floor change-over	
26	emergency return running for fire disaster		**17**	Voice Landing Forecasting	
27	Automatic Correction in Landing Position Signals		**18**	Load compensation	
28	Elevator Lock-out		**19**	door-opening holding button	
29	Protection against Door-opening outside Door Zones		**20**	service stop output function	
30	Light Gate Protection for Doors		**21**	IC card floor service control in car	
31	Over-load Protection		**22**	IC card car call service control at hall	
32	Anti-nuisance at Light-load		**23**	Shandong firefighting function	
33	Reversing Protection				
34	Running time governor				
35	fault protection for deceleration switch				
36	protection against terminal over travel				
37	Contact Detecting in Safety Relays and Contactors				
38	Protection against safety circuit fault				
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-type brake switch contact detection protection				
46	failure diagnosis of hoist way				

	self-study				
47	motor thermal protection				
48	Door lock fault protection				
49	Door lock disconnection protection				

3.2 elevator operation function description and setting method

3.2.1 Standard function description

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 only if 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.

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. Besides, some clock control- related functions all use the clock time as the standard one

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.

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

you may set parameter to select different door machine, 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 longer than the setting time without activating the door open limit switch, the door will close and the elevator will travel to the next floor 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.

The registered signal will be canceled. This function can be activated by the parameter setting.

13．Clear Registrations at Changing Direction

when the elevator car arrives at the last landing and is about to reverse the direction, all the registrations behind its present travel will be cancelled at once.

14．Direct landing

the control system decelerates the elevator according to distance principle. No creeping when leveling.

15 full load by pass

When a full-loaded elevator car travels in automatic mode without attendant, the elevator will NOT answer any calls from its 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 in automatic mode stands by out of service over 3 minutes (default value of 3 minutes 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.

17. Auto Homing

When the elevator travels in automatic mode without attendant service while setting Auto Homing in effect, the elevators 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.

18．Re-close door

In order to prevent door-closing failure from the contingent failure of the door machine system and possible door block by something, this function is therefore provided to re-close the door.

19．Fault history Log

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

20 hoist way landing data self-study

the hoist way self-study system should be activated before the elevator goes into service. The system will study various kinds of data within the hoist way and save those running data permanently.

21 Service Landing arbitrarily Setting

Using the handheld operator to set at will which floors the elevator serves and which floors the elevator does NOT serve.

22 Indicating Symbols Setting for Landing Display

Using the handheld operator to set at will the varied display symbols or marks for each floors, for instance, “B” for underground 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 absent and the door can only be closed when attendant keep pressing the door-closing button. Meanwhile the function can also allow attendant to choose direction and by-passing.

24 Independent Travel

Independent Travel is an exclusive travel, during which the elevator overlooks all landing calls and the automatic door-closing is absent. 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, displaying such information as the floor position, running direction, elevator status and etc

26 emergency elevator returning against fire

When encountering fire, passenger set the fire returning switch in position. Elevator immediately cancels all the instruction and call and travel to firefighting station for door-opening and stand-by.

27 Automatic Correction in Landing Position Signals

the traveling elevator system compare its own position signals at each terminal switch and the leveling switch of each landing against those obtained by self-study and making automatic data corrections accordingly.

28 Elevator Lock-in

setting the lock-in switches of elevator in automatic mode or with attendant, and clear up all the registration call. The elevator only respond to the in-car instruction until no new instructions registered. Then the elevator returns to the base station, turns off in-car lighting and fan after opening the door automatically, lighten the door-opening button indicator, and automatically close the door when 10 seconds time delay expired. Finally, the elevator stops running, and will be back to operation when the lock-in switch reset.

29 Protection against Door-opening outside Door Zones

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

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 doors, the light gate protection or safety contact plate will be activated to reopen the doors. The light gate protection is not in effect when elevator is in fire-fighting mode.

31 Over-load Protection

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

32 Anti-nuisance at Light-load

when the elevator is in light-load mode, the in-car registrations have reached or exceeded the setting value. The system will clear all the registrations.

33 Reversing Protection

when the system has detected an inconsistency between the elevator registered direction and travel direction for a while, an emergency stop will be activated with alarm buzzing on.

34 Operation Time Limiter

If the elevator in operation has traveled incessantly for a longer time than the value preset by the time limiter (max.45s) without leveling, all elevator operation will be stopped.

35 Deceleration switch failure protection

When encountering the deceleration switch failure, elevator land in emergency to avoid possible top or bottom floor collision

36． Protection against terminal overtravels

both the uppermost and the lowest ends of the hoistway are mounted with limit switches and speed retardation switch to prevent any elevator over-travels

37 Contact Detection protection of 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 be stopped.

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 elevator at fault.

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 cutoff 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 speed higher than control limit.

41 Underspeed Protection:

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

42 Leveling Switch Fault Protection:

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

43. CAN Communication Fault Protection:
It prevents possible danger in case of CAN communication failure and elevator keep running.

44. Safety contact pad Protection:
When the door is about to close and door safety contact pad is activated, the elevator will automatically open the door or keep the door opening for the prevention of possible clamping passengers.

45. Band-type Brake Switch Contact Detection Protection:
the system check the reliability of band-type brake through its switch. Protection will be launched once the band-type brake is found not reliable.

46. Elevator hoist way self-study failure diagnosis:
Because the hoist way data is the basis for the control system running in quick car mode. Elevator can not run properly without the correct hoist way data. Therefore, the hoist way self-study failure diagnosis is set for hoist way self-study failure.

47. Motor Thermal Protection:
the protection aims to prevent the possible danger caused by motor overheating.

48. Door Switch Fault Protection:
The protection shall be activated to stop elevator once system detect abnormal condition of door lock.

49. Door Lock disconnection Protection:
Elevator will stop once lock disconnection is found in operation.

50 Parallel connection running

the coordination of landing calls between two elevators is realized through CAN serial communication bus-based data transfer between the two elevators. The running efficiency of the elevators is improved.

51 leveling fin-tuning

Use the software to adjust the leveling switch position of each floor within a tiny range. So the complicated procedure of adjusting leveling plug-in board can be avoided.

52 door nudging

Activate the door nudging function. If the elevator keep door opening and no door-closing signal are sent due to light curtain or other reason, the elevator will be closed and acoustic warning will alarmed.

53 base station doo-opening standby function

use parameter setting to choose the elevator door-opening and standby when it is in base station.

54 floor blocking within time slot fun

Conduct the specific blocking service to designated floor at specific time. The specific block service means that user can choose to block outside call registration independently, blocking

instruction registration independently, blocking instruction and outside instruction registration. Meanwhile, user can also choose not to block.

55 External board search function

Use operator to check whether the external board at each floor work properly or not.

56 evaluations on CAN communication interference

Use the operator to check the communication quality of CAN

57 Evaluation on encoder interference

Use operator to check the interference of encoder signal.

58 car adjustment

Revolutionary elevator adjustment method is provided. Working staffs can adjust the elevator directly inside the car, monitor the elevator running condition so as to make the adjustment of elevator leveling, comfort and other function more user-friendly.

3.2.2 Optional function description

1. door pre-opening
The option enable leveling elevator to open door immediately upon arrival at the pre door-opening zone. In this way the elevator operation is more efficient
2. door-opening and releveling
Due to the stretch of wire ropes in case of high-rise buildings, the parking car 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.
3． Fireman Service
The fireman switch is set on in case of fire, the elevator will immediately clear out all instruction & call and return to firefighting base station. Then system switches to fireman service mode.
4 The auxiliary car operating Panel
The auxiliary car operating panel is available for installation when the main car operating panel is installed. Passengers can use it to register instruction and operate the doors.
5 operating panel for the rear door
Rear door operating panel is recommended when elevator has both front and rear door. Passenger can use the rear door operating panel to register instruction and operate the doors.
6 operating panel for the disable
Operating panel for the disabled is available for the disabled to operate the elevators.
7 group control operation
Use group control controller to coordinate landing calls of elevators in the bank. In this way the running efficiency of elevator can be improved. And function such as peak service and distribution waiting state are provided. The group control system can control up to 8 units
8 communities (building) monitoring
Control system link to the PCs in monitoring room through CAN communication line. Working

staff can monitor the elevator position, running direction and fault condition and etc.

9 earthquake response function

Activate the earthquake function. if earthquake occur, the earthquake inspection device activated. A contact signal from the device will be transferred to the control system. The control system will instruct the running elevator to park at nearest floor and open the doors for passenger evacuation as well as stop the elevator then.

10 car arrival gong

The Up/Down arrival gong installed at the top, bottom of the car will ring as the elevator decelerate and level, alarming the passenger in car and hall that the elevator is leveling and about to arrive.

11 arrival lamp at landing

Activate the function. The up/down arrival lamp installed at the hall of each floor will inform passengers the upcoming arrival of the elevator.

12 arrival gong at landing

Activate the function. The up/down arrival gong at hall of each floor will inform passengers the upcoming arrival of the elevator.

13 independent control of front and rear door

Passenger can make independent control of the front and rear door according to their own needs.

14 VIP priority service

A special service for the VIP passengers, the function enables the VIP passenger to arrival the destination floor at fastest speed.

15 Emergency leveling when blackout

The building blackout causes the running elevator fail to reach the door zone and entrapment occurs as the consequence. Under the above circumstance does the blackout emergency leveling device activated. The elevator will be pushed at the low speed to the nearest door zone for passenger evacuation.

16 service floor change-over by the switch control

Use the in-car switch to change the elevator service floor.

17 broadcasting function for upcoming floor

When install the floor broadcasting function to the system, the floor broadcaster will report the upcoming floor during the leveling process and report the subsequent running direction of the elevator at each time of door-closing.

18 weighing compensation

The load compensation value is given based on the car load data inspected by the weighing device. In this way the elevator startup comfort will be improved.

19 door-opening holding buttons

Use the door holding button to enable the door-closing delay

20 out of service display

A display method to inform passenger that elevator is out of service.

21 IC card floor service control in car

Once this function is installed, a card reader is installed in the operating panel. Passenger must use the card to register the instruction for authorized floors

22 IC card elevator call service control at hall

Once this function is installed, a card reader is installed at the call panel of each floor. Passenger

must use the card to register the call signal for the corresponding floor.

23 Shangdong firefighting function，can be set by F35: 1）1）After open the in place at the fire base station in fire return state， output fire instructions.2） In fireman state and elevator at base station . output fire instructions， when elevator leave the fire base station, not output fire instructions。

Chapter four: 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

◎ **Before wiring, please make sure that power supply is completely disconnected.**
Or it may cause risk of electric shock.

◎ **Wiring must be performed by professional electrical personnel.**
Or it may cause risk of electric shock.

◎ **Earth terminal E shall be grounded reliably.**
Or it may cause risk of electric shock.

◎ **Please never touch the terminal with hands; never have the drive controller output line contact the enclosure.**
Or it may cause risk of electric shock.

◎ **Please never connect the power supply to output terminals U, V and W.**
Or it may cause damage.

◎ **Please never short the terminal ⏚1/⏚2 with ⏚.**
Or it may cause risk of explosion.

Caution

◎ **Please check the voltage of AC main circuit power supply is consistent with the rated voltage of integrated driver controller.**

Or it may cause risk of fire and physical injury.

◎ **Please correctly connect the braking resistor as per the wiring diagram.**

Or it may cause risk of fire.

◎ **Main circuit terminal must be firmly connected with the conductor or wire crimping terminal.**

Or it may cause risk of damage.

4.1 The connection between integrated drive controller and peripheral equipments

4.1.1 For typical terminal wiring diagram of elevator integrated drive controller.

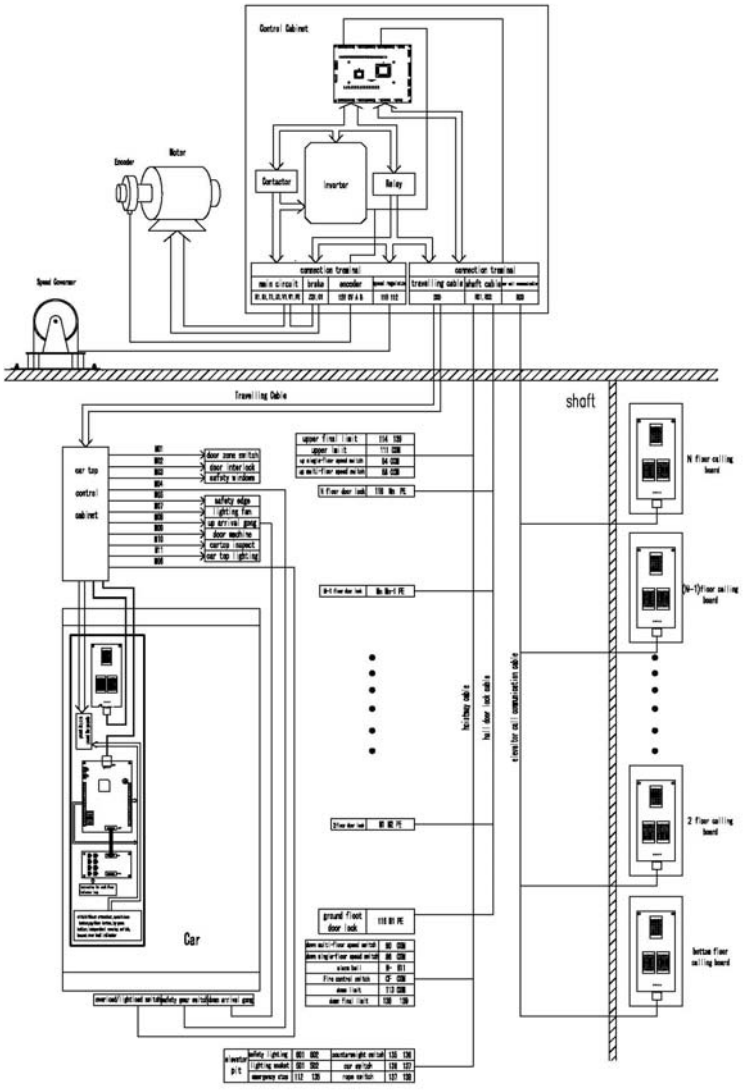


Fig 4.1 example of typical configuration of elevator integrated Drive controller.

4.2 Notice items for peripheral equipments connection

4.2.1 Power supply

The voltage of power supply must be in consistency with the rated voltage of elevator integrated controller. No need to consider the connection sequence of three-phase power supply.

4.2.2 Breaker

The breaker must be used between the power supply and input terminal of elevator integrated drive controller. the capacity of breaker should be 1.5～2 times of the rated current of AS 380 series elevator integrated drive controller. The time behavior of overheating protection of elevator integrated drive controller should be taken into full consideration for that of the breaker.

4.2.3 AC reactor at the input side

AC reactor at the input side can be used as option to improve the power factor of input power supply and reduce ultra-harmonics current.

4.2.4 Interference filter at the input side

Specialized interference filter at the input side can be used as option to restrain power supply from high frequency noise interference of elevator integrated drive controller.

4.2.5 Main circuit output contactor

This contactor is used for controlling the current flow of tractor. The contractor engages every time before the elevator start up and release when the elevator stops. It is must-have safety device installed between the drive device and tractor motor.

4.2.6 Interference filters at the output side.

Specialized interference filter at the input side can be used to restrain the power supply from high frequency noise interference of elevator integrated drive controller.

4.2.7 AC reactor at output side

The AC reactor at the output side is used as option to restrain the radio-frequency interference of elevator integrated drive controller.
When the wiring length between elevator integrated drive controller and motor is too long （>20m）, the AC reactor at output side can prevent the overflow of elevator integrated controller caused by wire distributed capacitance.

4.2.8 DC reactor

DC reactor can be used as option for the improvement of power factor.

4.3 The technical requirements for wire arrangement of peripheral equipments of the elevator integrated drive controller.

4.3.1 The cable requirement of hoist way and accompanying cable arrangement

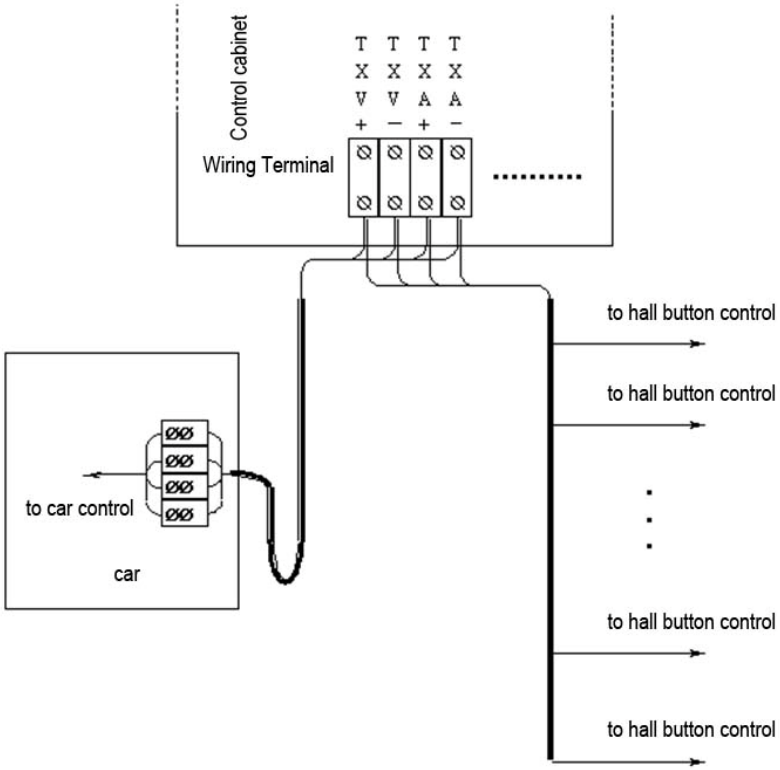


Fig 4.2 hoist way and accompanying cable arrangement

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 these four cables and other cables, especially such as 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 0.75mm^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 twisted pair: characteristic impedance 120Ω; allowable range: 108~132Ω.

Stranded Pitch: ≤30mm

Wire size: ≥0.75mm2

◇ Communication line and power line must be wired respectively

◇ Grounding of Elevator Shaft Cable and Trailing Cable

During wiring of shaft cable and trailing cable, please note to appropriately divide the strong current line (includes door machine power supply, safety circuit, door lock circuit and illumination circuit, etc.) and weak current line (includes communication cable, DC 0V, DC 24V, leveling dry reed , terminal forced slowdown switch and terminal limit switch, etc.). The communication line must be twisted pair with strand pitch between 20 and 30 mm. it is strongly recommended to use shielded twisted pair with grounding protection.

Note: if strong current lines and weak current lines are arranged in parallel, mostly common in trailing cables, the strong current lines shall be arranged on one side and the weak current line on the other side. In addition, the strong current lines and weak current lines must be separated with grounding line.

Note: The wiring rules mentioned 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:

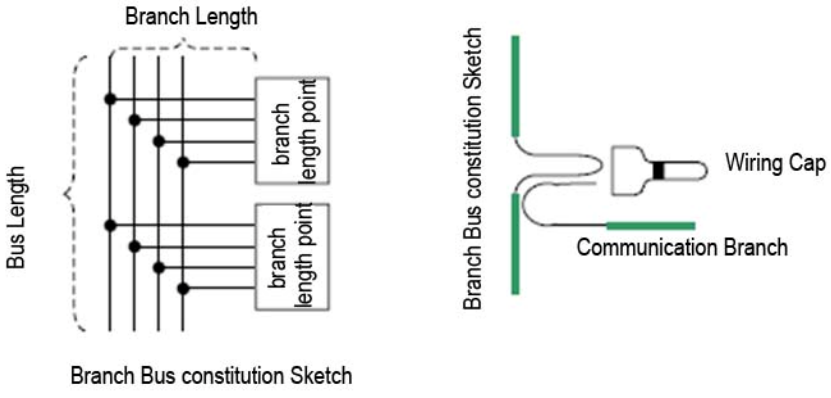


Figure 4.3 Wiring between Branch and Bus

◇ 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. Other strong current signal cables (voltage higher than 24V) shall be arranged at the other trailing cable.

Peels off the insulation sleeve of bus at 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: bus length ≤500m;

Branch Length: ≤3m;

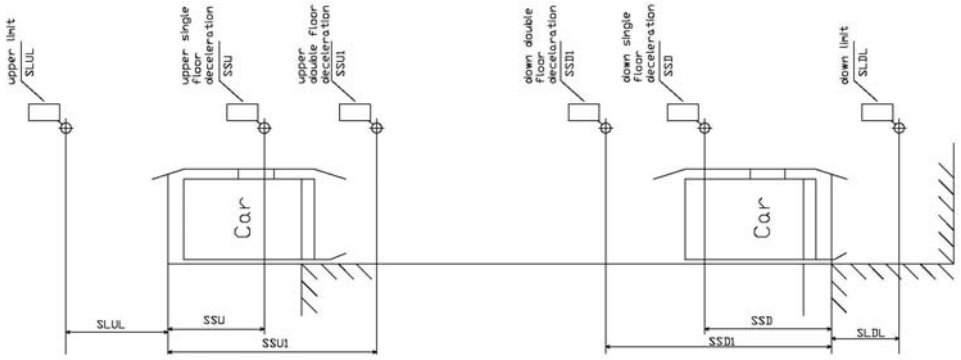
Terminal resistance: 120Ω terminal –matching resistance should be arranged at both ends of the bus. (Note: without terminal-matching resistance, the anti-interference capacity of communication may be impaired)

4.3.3Hoist way switch position

In elevator integrated drive controller system, hoist-way switch need to be arranged according to the following two situations:

1. where the elevator speed is not more than 1.75m/s, it is required to install the two up and down limit switch as well as two single-floor speed switch.
2. Where the elevator speed is more than 1.75m/s, not only the limit switches mentioned above should be installed, but also up and down double floor forced slow car switch.
3. The detailed locations of hoist way switches see Figure 4.4 and table 4.1

Note: the switch locations vary based on the setting of deceleration slope. As a rule, the distance for deceleration switch should always be set a little lower than the normal deceleration distance.



distance / switch	elevator speed	1.0m/s	1.5m/s	1.6m/s	1.75m/s	2.0m/s	2.5m/s
limit	SLUL,SLDL	0.15	0.15	0.15	0.15	0.18	0.18
single floor forced slow down	SSU,SSD	1.2-2.0	2.2-2.6	2.4-2.6	2.2-2.6	2.2-2.6	2.2-2.6
double floor forced slow down	SSU1,SSD1					3.4-4.0	4.9-5.6

Figure 4.4 Detailed Locations of Shaft Switches

Table 4.1 installation clearance of deceleration switch in hoist way

Installation clearance of deceleration switch in hoist way									
Rated	1.0m/s	1.5m/s	1.6m/s	1.75m/s	2.0m/s	2.5/ms	3.0m/s	3.5m/s	4.0m/s

speed									
Single-floor deceleration	1.2~2.0 m	2.2~2.6 m	2.4~2.6 m	2.2~2.6 m	2.2~2.6 m	2.2~2.6 m	2.2~2.6 m	2.2~2.6 m	2.2~2.6 m
Double-floor deceleration	No	No	No	No	3.4~4.0 m	4.9~5.6 m	4.9~5.6 m	4.9~5.6 m	4.9~5.6 m
Three-floor deceleration	No	No	No	No	No	No	6.8~7.5 m	8.8~9.5	7.0~8.1 m
Four-floor deceleration	No	No	No	No	No	No	No	No	11.2~12 m

4.3.4 Upper and Lower Leveling Inductor

In elevator integrated drive control system, two pairs of up and down leveling inductor and several magnet vanes are required by the elevator leveling control to install on 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.

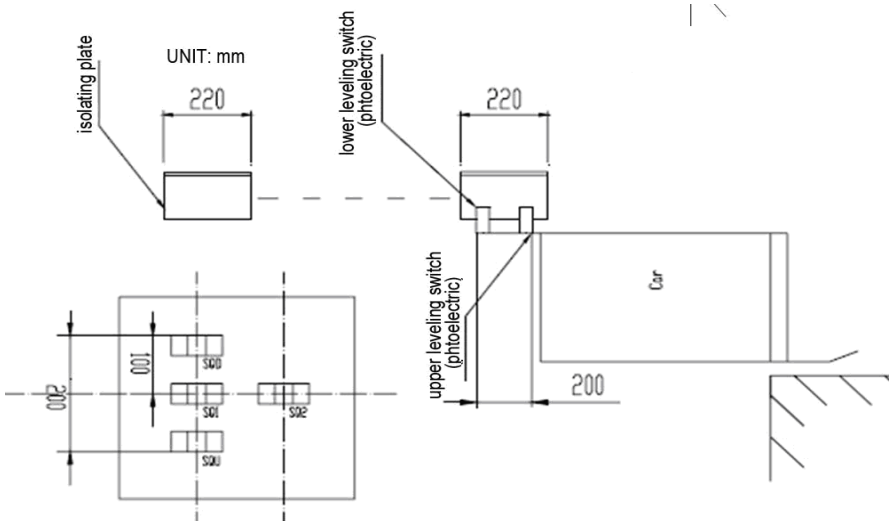


Table 4.1 requirement for inductor and magnetic vane

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 type is recommended for higher response precision	Permanent-magnet inductor	Iron plate thickness ≥1.5mm
Qty.	2	2	as per the number of floors if no other special required.
Height, Length, Depth	The clearance between 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, users are recommended not to make it less than this value. The inserted depth of photoelectric and magnetic switch 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!

4.4 main circuit terminal wiring

4.4.1 The arrangement of main circuit terminal

4.4.2 The main circuit terminal labeling and function description

Please take reference to table 4.1 for main circuit terminal function description

Table 4.1 main circuit terminal function description

Terminal mark	Terminal function description
⊕1	DC reactor can be connected. Shorting before delivery
⊕2	
⊕2	external brake resistor connected
B	
⊖	DC bus negative output terminal

R/L1	Main circuit AC power input, three-phase input power supply connected.
S/L2	
T/L3	
U/T1	Integrated drive controller output, three phase synchronous/asynchronous motor connected.
V/T2	
W/T3	

4.4.3 Main circuit wire specification

The conductor is 600V copper-core plastic insulation conductor for power supply. See Table 4.2 for conductor specification and fastening torque.

Table 4.2 conductor specification and fastening torque

Model **AS380-**	Connectable wire specification（mm^2）	Recommended wire specification（mm^2）	Fastening torque（N.m）
2S01P1	2～6	2.5	1.5
2S02P2	2～6	4	1.5
2S03P7	2～6	4	1.5
4T02P2	2～6	4	1.5
4T03P7	2～6	4	1.5
4T05P5	2～6	4	1.5
4T07P5	4～8	6	2.5
4T0011	4～8	6	2.5
4T0015	4～8	6	2.5
4T18P5	8～16	16	4.0
4T0022	8～16	16	4.0
4T0030	14～25	25	9
4T0037	35～100	35	9
4T0045	35～100	50	9.0
4T0055	60～100	60	18.0
4T0075	80～125	80	18.0

Important

Wire specification is decided in accordance with the conditions of surrounding temperature 50℃ and wire temperature allowable 75℃

The main circuit of integrated drive control adopted the open terminals; round crimping terminal should be used for the open terminals. Please check the table 4.3 for the round crimping terminal.

Table 4.3 round crimping terminal

Wire cross-section（mm^2）	Terminal screw specification	Round crimping terminal specification
0.5	M3.5	1.25/3.5
	M4	1.25/4
0.75	M3.5	1.25/3.5
	M4	1.25/4
1.25	M3.5	1.25/3.5
	M4	1.25/4
2	M3.5	2/3.5
	M4	2/4
	M5	2/5
	M6	2/6
	M8	2/8
3.5/5.5	M4	5.5/4
	M5	5.5/5
	M6	5.5/6
	M8	5.5/8
8	M5	8/5
	M6	8/6
	M8	8/8
14	M6	14/6
	M8	14/8
22	M6	22/6
	M8	22/8

30/38	M8	38/8
50/60	M8	60/8
	M10	60/10
80	M10	80/10
100		100/10

Important

To confirm the wire cross-section, please take full consideration the voltage drop of the wire. The general principle for selection is that the voltage should be maintained within the 2% of rated voltage. When the voltage drops too big, the wire cross-section should be increased accordingly. The formula for voltage drop calculation is as follow:

Inter-wire voltage drop(v) = $\sqrt{3}$ * wire resistor（Ω）* current（A）

4.4.4 The main circuit composition

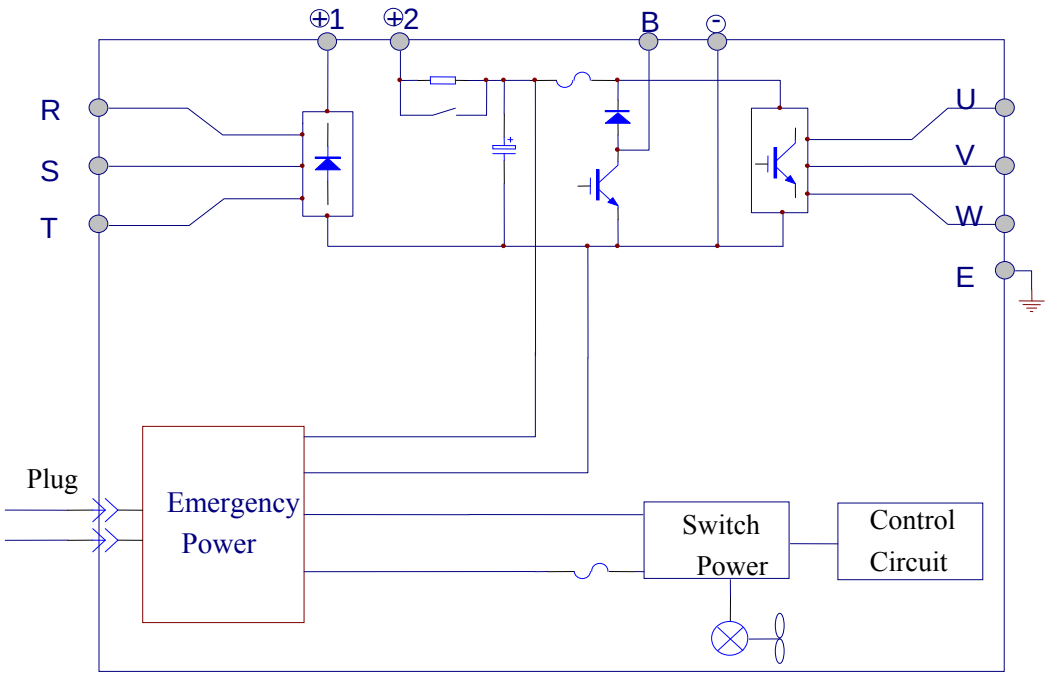


Fig 4.4 Main circuit composition

4.4.5 The detailed description of main circuit terminal wiring

4.4.5.1 grounding terminal （E）/（PE）

a) three-phase AC power supply is recommended to adopt the specialized grounding pole with good grounding performance. The grounding resistance should be below 10Ω

b) Grounding line should not be shared with welding machine and other power equipment.

c) The specification of selected grounding line should meet the requirements of electric

equipment technical standards. Moreover, the grounding line should be as short as possible. If the distance between the grounding line and the earth point is too far, the electricity leakage of integrated drive controller may cause the instability of the electric potential of grounding terminal.

d) Grounding line should adopt the multi-strand copper core line with diameter of 3.5mm^2. It is recommended to use specialized yellow-green grounding line.

e) When several elevator integrated drive controller is grounded. It is recommended not to arrange the wires into loop. The detailed grounding method for several elevator integrated drive controllers is as the fig 4.5

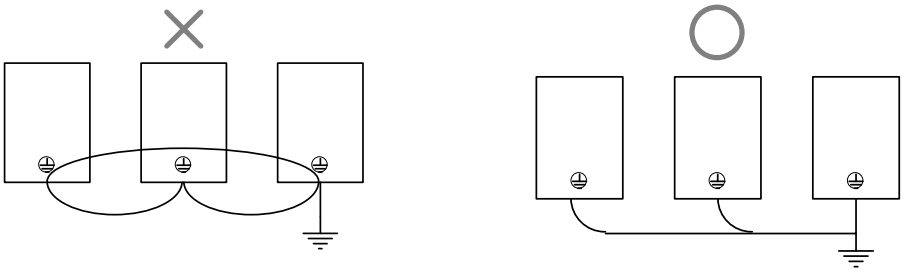


Fig 4.5 multi-elevator integrated drive controllers wiring

4. 4. 5. 2 +48V DC connecting terminal

a) When encountering the blackout, battery will be activated to supply **+48V** DC low voltage Power through R.S terminal to elevator integrated drive controller , and elevator will run at low speed to get leveling at nearest floor.

b) UPS and battery wiring diagram 4.6

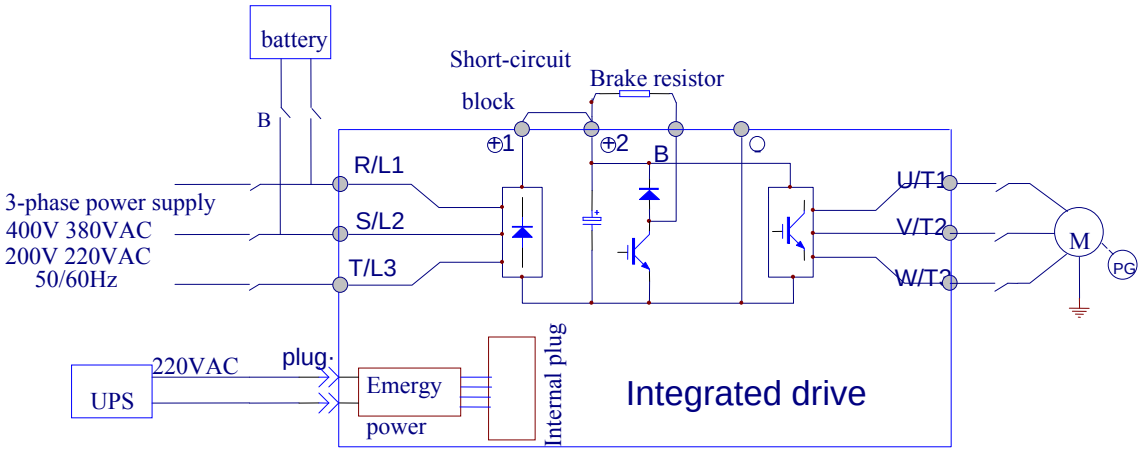


Fig 4.6 schematic diagram of emergency power supply and battery wiring

4. 4. 5. 3 main circuit power input terminal （R/L1，S/L2，T/L3）

a) three-phase AC power supply is connected to the main circuit terminal R/L1，S/L2，T/L3 through breaker. The phase sequence of input power supply has nothing to do with the sequence of R/L1，S/L2，T/L3 terminal, any of which is available for connection.

b) In order to reduce the possible conduction and radiation interference caused by elevator integrated drive controller upon input power supply, noise filters should be installed on the side of power supply. the noise filter can lower the magnetic noise penetration from

power line into the elevator integrated drive controller as well as vice verse.

Caution

Special note: please use the specialized noise filter of elevator integrated drive controller.

The right setting of noise filter at the side of power supply is as fig 4.7

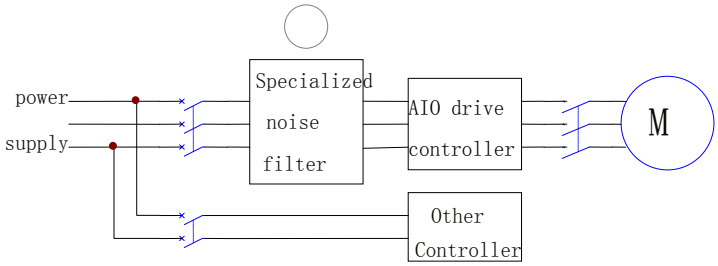


Fig 4.7 the right setting of noise filter at the side of power supply

The wrong setting of noise filter at the side of power supply is as fig 4.8 and fig 4.9

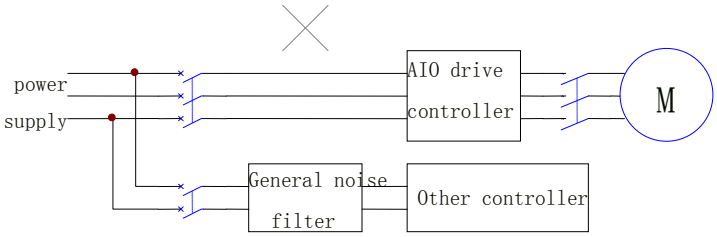


Fig 4.8 the wrong setting of noise filter at the side of power supply

The noise filter at power supply side as fig 4.8 may not be able to realize the expected effect and should be avoided to arrange in this way.

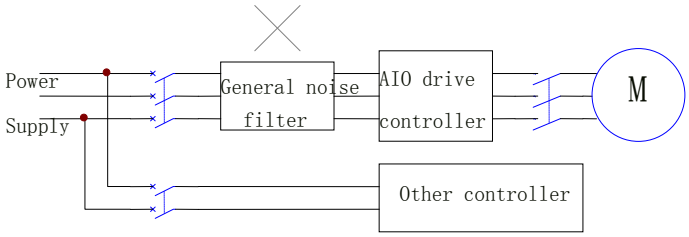


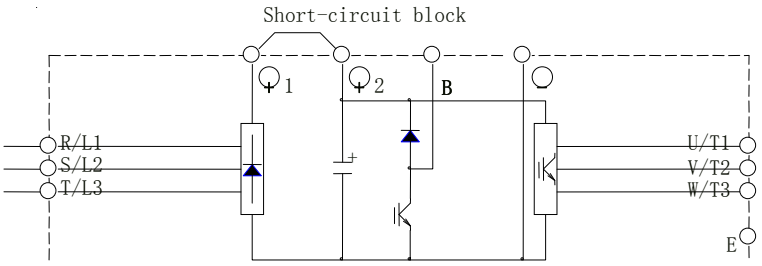
Fig 4.9 the wrong setting of noise filter at the side of power supply

The noise filter at the input side as fig 4.9 may not be able to realize the expected effect and should be avoided to arrange in this way.

4.4.5.4 external-connected DC reactor terminal （⊕1，⊕2）

a) external-connected DC reactor terminal can be launched in order to improve the power factor of elevator integrated drive controller. shorting block is installed between the （⊕1，⊕2）before delivery. If need to connect DC reactor, the shorting block should be removed and then connect the DC reactor.

b) Do not remove the shorting block if no DC reactor is required. Otherwise the elevator integrated drive controller does not work. The wiring of shorting block is as the fig 4.10



External connected DC reactor wiring see fig 4.11

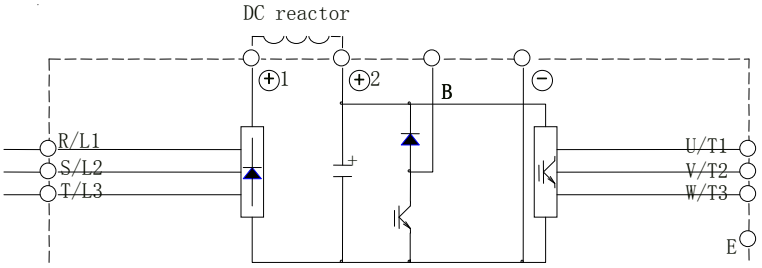


Fig 4.11 external connected DC reactor wiring

4.4.5.5 external-connected braking resistor terminal （⊕2，B）

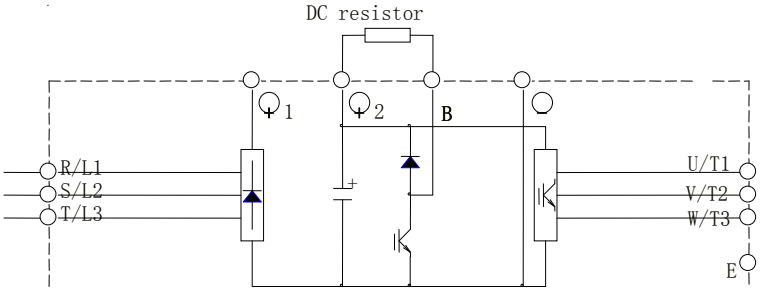
a) There are braking unit in all type of AS380 elevator integrated drive controller. in order to release the feedback energy of braking motor, braking resistor must be connected externally, the specification of braking resistor see the table 1.6.1 braking resistor configuration of chapter 1.

b) the braking resistor must be installed between （⊕2，B） terminal.

c) in order to make the braking resistor work well, the heat dissipation of brake resistor must be taken full consideration. Good ventilation is must.

d) The wire length of braking resistor should not be more than 5 meter.

The wiring of external connected braking resistor is as fig 4.12



4.4.5.6 elevator integrated drive controller output terminal （U/T1，V/T2，W/T3）

a) the output terminal of elevator integrated drive controller U/T1、V/T2、W/T3 and motor terminal U、V、W are connected. If the rotating direction of motor is not right, please exchange the wires of any two phase of the elevator integrated drive controller output terminal or motor terminal.

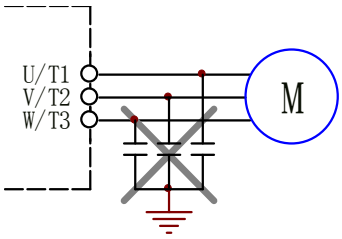
b) connection between power supply output and elevator integrated drive controller output terminal U/T1、V/T2、W/T3 is prohibited.

c) The grounding or shorting of output terminal is prohibited.

d) Do not connect the capacitor and/or surge filter to the output side of elevator integrated drive controller. Since there is ultra-harmonics at the output of elevator integrated drive controller, connection of capacitor and /or surge filter at the output side will make the integrated drive

controller overheat or damage.

No connection of capacitor at the output side of integrated drive controller see fig 4.13



The schematic diagram of no connection of capacitor at the output side of integrated drive controller

4.5 anti-interference measures.

4.5.1 The specialized noise filter connected at the output side.

In order to suppress the noise created at the output side of integrated drive controller, specialized noise filter can be connected at the output side of integrated drive controller. please see fig 4.14 for the wiring of noise filter at the output side of integrated drive controller.

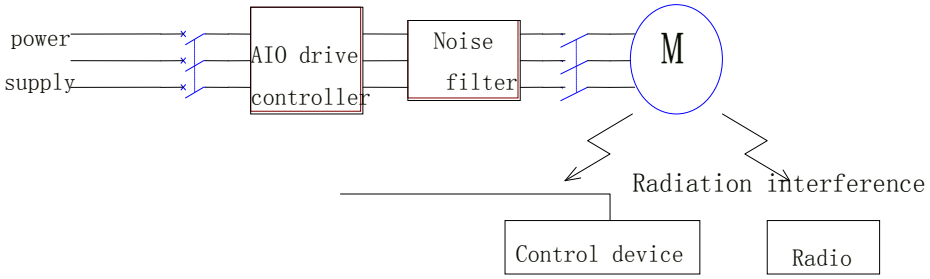


Fig .4.14 the wiring at the output side of integrated drive controller

4.5.2 Main circuit wiring arrangement

In order to suppress the radiated interference created at the output side of integrated drive controller and improve the anti-interference performance, the wire of main circuit and that of control circuit should be separated. The wire of main circuit should go through the grounding metal tube and should be 10cm away from the signal wire. The wiring arrangement of main circuit is as below fig 4.15

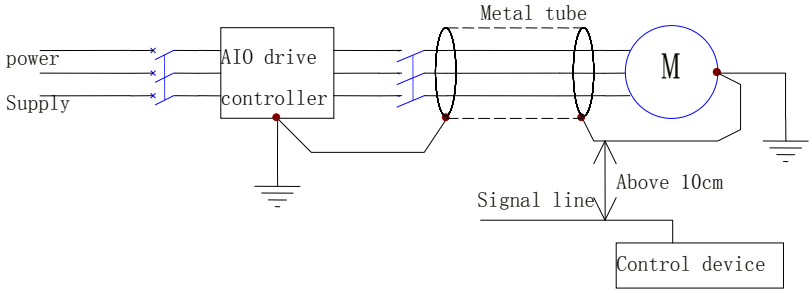


Fig 4.15 the wiring arrangement schematic diagram of main circuit

4.5.3 the better anti-interference measure

The better anti-interference measure is realized through the installation of noise filters on both side of I/O of elevator drive controller. And the elevator integrated drive controller is shielded by putting itself into the box.

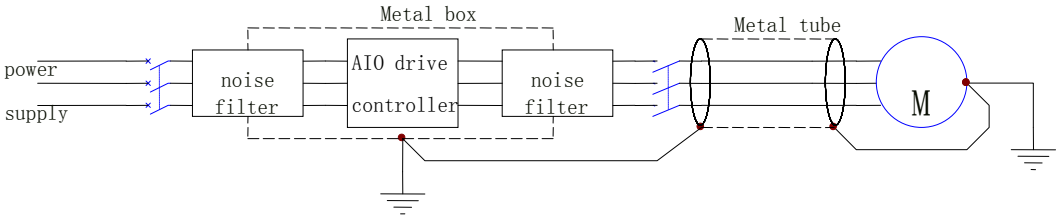


Fig 4.16 better anti-interference measure

4.5.4 Relation 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 P02.14 by referring to the Table below and select the appropriate output-side filter and reactor.

Wiring distance between the elevator integrated drive controller and the motor room	Below 50m	Below 100m	Above 100m
Carrier frequency	Below 11kHz	Below 8kHz	Below 5kHz

4.6 Wiring of Control Circuit Terminals

4.6.1 Layout of Control Circuit Terminals

Layout of control circuit terminals is as shown in Fig.4.17.

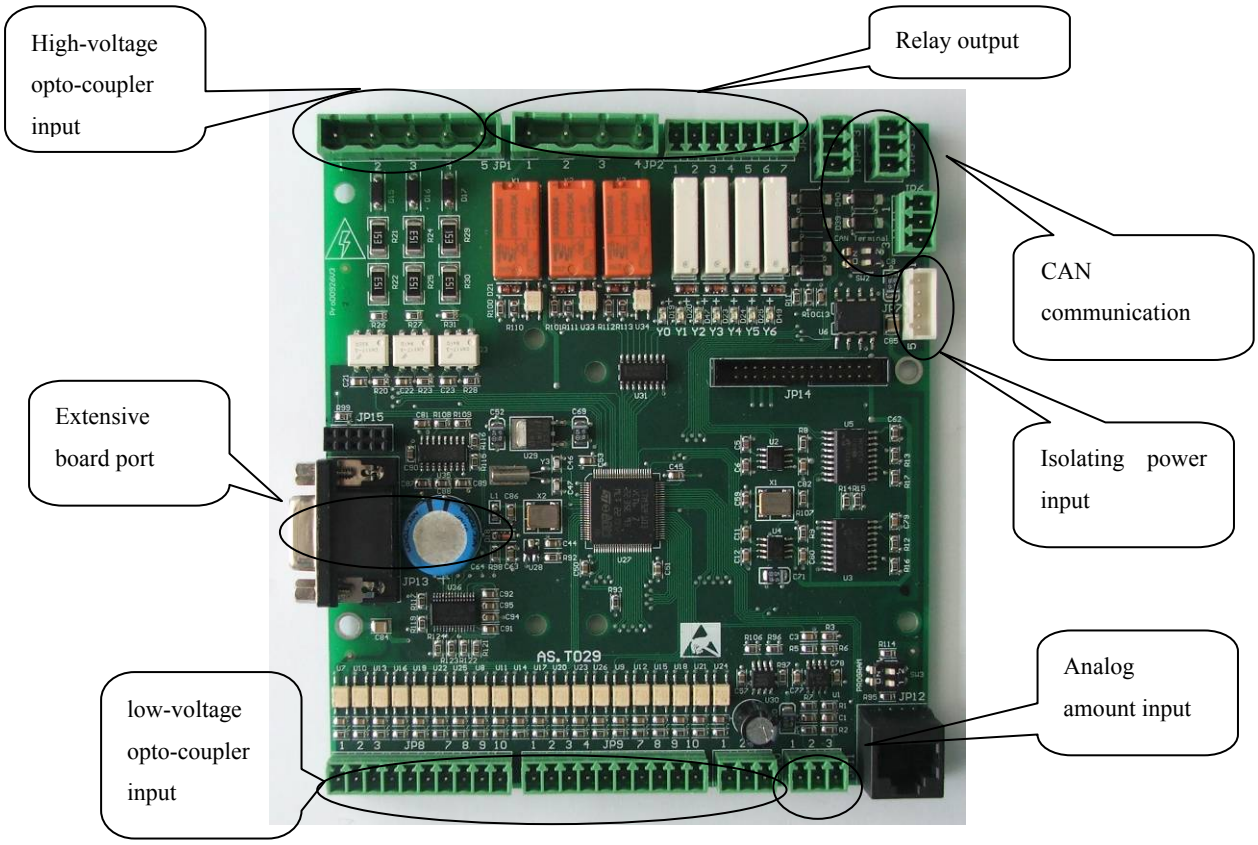


Fig .4.17 Control Circuit Terminals

4.6.2 Functional Description of Control Circuit Terminals

See Table 4.4 for functional description of control circuit terminals.

Table 4.4 Functional Description of Control Circuit Terminals

No	location	name	Definition	type	remark
JP1	JP1.1	XCOM	X20-X22 input signal common port 0V		
	JP1.2	X20	safety circuit inspection positive voltage port，110V/220V input	Input	
	JP1.3	X21	door lock circuit inspection positive voltage port，110V/220V input	Input	

	JP1.4	X22	Hall door lock circuit inspection positive voltage port，110V/220V input	Input	
	JP1.5	XCOM	X20-X22 input signal common port 0V, internally connected to JP1.1		
JP2	JP2.1	Y0	Band brake contactor output	Output	
	JP2.2	Y1	Band brake strong contactor output	Output	
	JP2.3	Y2	Main contactor output	Output	
	JP2.4	COM1	Output relay Y0-Y3 common port		
JP3	JP3.1	Y3	Door pre-opening relay	Output	
	JP3.2	Y4	blackout emergency stop leveling completion signal output	Output	
	JP3.3	COM2	output relay Y3-Y4 common port		
	JP3.4	Y5	firefighting signal output	Output	
	JP3.5	COM3	output relay Y5 common port		
	JP3.6	Y6	reserved ,standby	Output	
	JP3.7	COM4	output relay Y6 common port		
JP4	JP4.1	0V	0V DC		
	JP4.2	CAN0H	instruction serial communication signal port（TXA0+）		
	JP4.3	CAN0L	instruction serial communication signal port（TXA0-）		
JP5	JP5.1	0V	0V DC		
	JP5.2	CAN1H	parallel connection serial communication signal port（TXA1+）		
	JP5.3	CAN1L	parallel connection serial communication signal port（TXA1-）		
JP6	JP6.1	0V	quarantine OV DC		
	JP6.2	CAN2H	Community monitoring （TXA2+）		
	JP6.3	CAN2L	Community monitoring（TXA2-）		
JP7	JP7.1	G5VIO	Isolating power 0V		
	JP7.2	+5VIO	Isolating power +5V		
	JP7.3		Empty slot，TBD		
	JP7.4	G24VIO	opt coupler input shield power 0V		
	JP7.5	+24VIO	opt coupler input shield power +24V		

JP8	JP8.1	X0	Inspection signal 1，disconnection as inspection，X0 and X1 all connected as automatic	Input	Normal close
	JP8.2	X1	inspection signal 2, disconnection as inspection, X0 and X1 all connected as automatic	Input	Normal close
	JP8.3	X2	move up signal ,inspection, inch moving up, attendant, move up and change direction	Input	
	JP8.4	X3	move down, inspection, inching move down, attendant, move down and change direction	Input	
	JP8.5	X4	upward No 1 terminal deceleration switch	Input	Normal close
	JP8.6	X5	Downward No 1 terminal deceleration switch	Input	Normal close
	JP8.7	X6	upper leveling switch	Input	
	JP8.8	X7	under leveling switch	Input	
	JP8.9	X8	motor power supply contactor inspection	Input	Normal close
	JP8.10	X9	band brake contactor inspection	Input	Normal close
JP9	JP9.1	X10	left band brake switch Inspection	Input	
	JP9.2	X11	right band brake switch inspection	Input	
	JP9.3	X12	motor temperature inspection signal	Input	
	JP9.4	X13	door pre-opening relay inspection	Input	
	JP9.5	X14	door zone signal inspection	Input	
	JP9.6	X15	firefight return/ firemen switch (parameter selection)	Input	
	JP9.7	X16	blackout emergency leveling input/earthquake/ building backup power supply(parameter selection)	Input	

	JP9.8	X17	door interlock circuit relay inspection	Input	Normal close
	JP9.9	X18	upward No 2 terminal deceleration switch	Input	
	JP9.10	X19	downward No 2 terminal deceleration	Input	
JP10	JP10.1	+24VIO	input isolating power supply +24v, internally connect to JP7.5		
	JP10.2	VSIO	Externally connect to JP 10.1, Effective low level input, at this time JP10.3 as input common port. Externally connect to JP10.3, effective high level input, at this time JP10.1 as input common port.		
	JP10.3	G24VIO	input shield power OV, internally connect with JP7.4		
JP11	JP11.1	0V	analog quantity input 0V		
	JP11.2	AIN-	differential analog quantity input－		
	JP11.3	AIN+	differential analog quantity input＋		

Note：The connection on the load cell is as follows：the sensor simulation quantity output is connected to JP11.3. the sensor 0V connect to JP11.2 and JP11.1 and JP11.2 should be shorted.

4.6.3 Dip switch setting method

SW2	ON	Monitoring CAN terminal resistor effective condition	SW2 default setting is OFF；
	OFF	Monitoring CAN terminal resistor invalid condition	
SW3	ON	program recording condition	Default setting is OFF （keep OFF condition when in use）
	OFF	normal working condition	

4.6.4 Wire specification of control circuit

The control circuit should adopt the 600V pressure-proof plastic insulated copper core wire. The wire specification and fastening torque see table 4.5

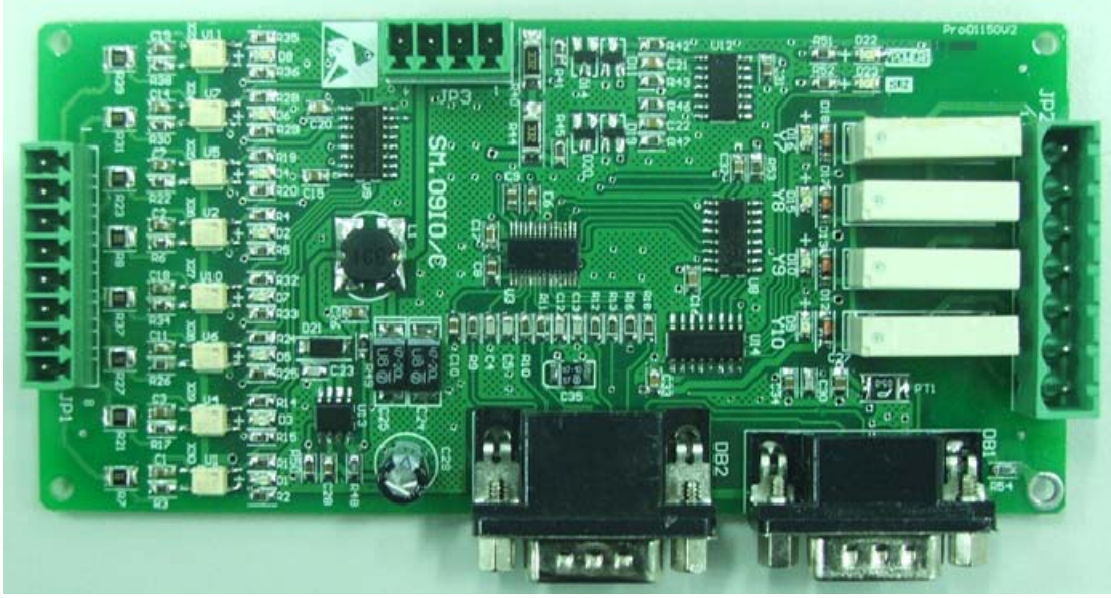
Table 4.5 wire specification and fastening torque

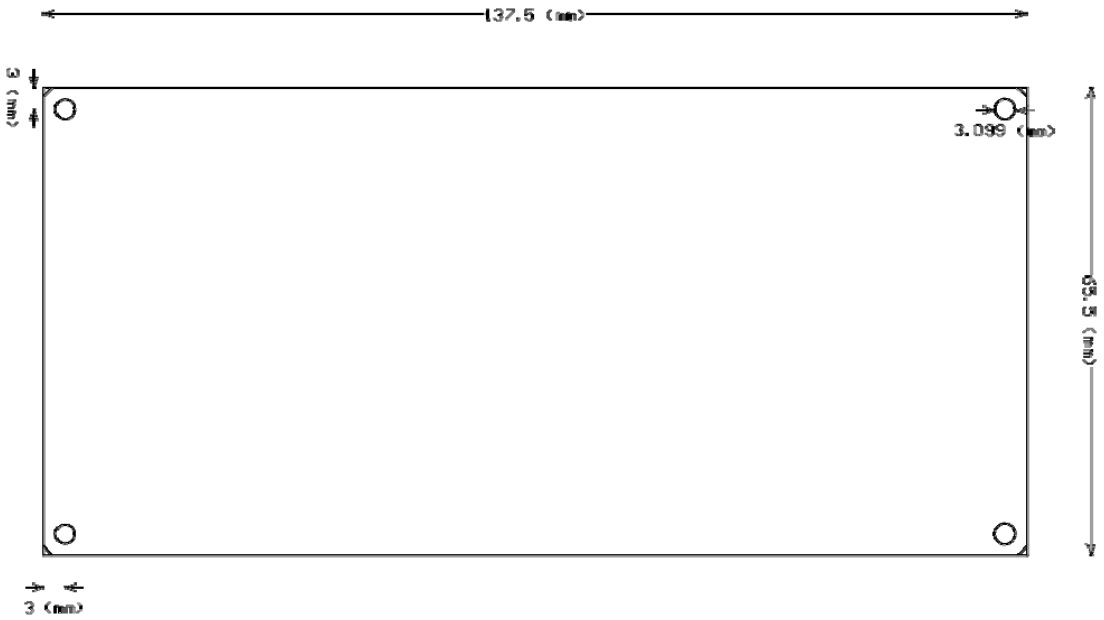
model	Spec of connectible wire mm^2	Spec of recommended wire mm^2	Fastening torque （N.m）
AS380 all series	0.75～1	0.75	1.5

The wire specification is subject to the surrounding temperature 50℃ and allowable wire temperature 75℃.

4.6.3 main extension board SM09I0/C introduction

4.6.3.1 main extension board SM09I0/C outside view and installation dimension





4.6.3.2 main extension board SM09IO/C plug-in and port definition and Configurable content introduction

Table 4.5 IO main extension board SM09IO/C plug in specification

JP1	OQ/180D-3.81-8P，green
JP2	OQ-C/180D-5.08-7P，green
JP3	OQ/180D-3.81-4P，green

Table 4.6 IO main extension board SM09IO/C Configurable content

JP1 input：

0	Emergency Levelling	1	earthquake
2	Back-up power	3	Overload
4	Full load	5	Light-load
6	Fireman	7	Elevator Lock-out
8	Self-tuning of Shaft Information	9	sealing star Detect
10	Back-up	11	Fire return
12	upward No 3 terminal deceleration	13	downward No 3 terminal deceleration
14	upward No 4 terminal deceleration	15	downward No 4 terminal deceleration
16	up limit	17	down limit

JP2 output：

0	pre door-opening slowdown output（V<0.3m/s）	1	Fan output
2	Up	3	Down
4	Door lock	5	Door-zone
6	Front door open	7	Front door close

8	Rear door open	9	Rear door close
10	Not stop at door-zone	11	Fault
12	Run	13	Emergency Level state output

Note:

1、 Input and output functional description can be set by the program ， same function cannot be set at two ports

2、 COM is the COM on the main board

4.6.5 Notice items for control circuit terminal wiring

The wire of control terminal should be arranged far away from the main circuit wire. Otherwise, false operation may occur as the result of the interference.

4.7 the wires of PG card terminal

PG card has 4 types to adapt to different kinds of encoder. See the below table

PG card type	Motor type	model	Input signal	remarks
ABZ incremental 12V	Asynchronous/synchronous	AS.T025	Collector open circuit signal、push-pull signal	Encoder voltage 12V
SIN/COS type	synchronous	AS.T024	SIN/COS differential signal	
ABZ incremental 5V	Asynchronous/synchronous	AS.T041	Collector open circuit signal, push-pull signal, differential signal	Encoder voltage 5V
Endat absolute value	synchronous	AS.L06/L	Endat output signal	

4.7.1 ABZ incremental 12v PG card

ABZ incremental 12v PG card (model AS.T025) can receive the output signal of tow types of encoder with the installation of encoders of collector open circuit signal and push-pull signal

4.7.1.1 ABZ incremental 12v PG card terminal layout

Please see fig 4.18 for the ABZ incremental 12v PG card （model AS.T025）terminal layout

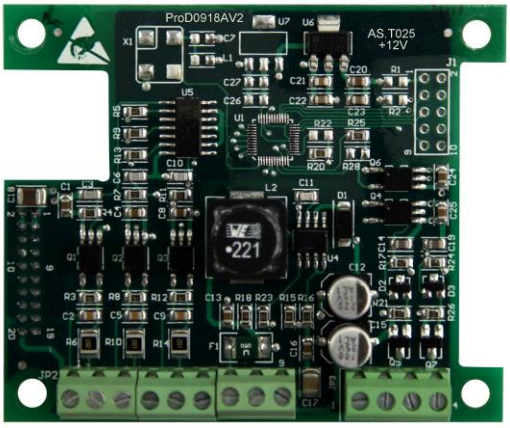


Fig 4.18 ABZ incremental 12v PG card terminal layout

4.7.1.2 ABZ incremental 12v PG card terminal labeling

ABZ incremental 12v PG card terminal labeling as following

JP3 frequency-dividing output terminal

FA	V0	FB	V0

JP2 output terminal

A+	A-	B+	B-	Z+	Z-	V+	V-	PE

4.7.1.3 ABZ incremental 12 v PG card terminal function description

ABZ incremental 12 V PG card terminal functions description see table 4.6

Table 4.6 ABZ incremental 12v PG card terminal function description

name	Pin No	Terminal label	Terminal function description	specification
Frequency-dividing signal output	JP3.1	FA	Frequency-dividing signal output A phase	Triode collective open output（max output frequency 100kHz）;
	JP3.2	0V	24V GND	
	JP3.3	FB	Frequency-dividing signal output B phase	
	JP3.4	0V	24V GND	
Encoder input	JP2.1	A+	Encoder A phase signal +	Open collector/push-pull，max input frequency 100kHz
	JP2.2	A-	Encoder A phase signal -	

	JP2.3	B+	Encoder B phase signal +	
	JP2.4	B-	Encoder B phase signal -	
	JP2.5	Z+	Encoder Z phase signal +	
	JP2.6	Z-	Encoder Z phase signal -	
	JP2.7	V＋	Encoder power positive pole	Voltage 12VDC，max output current 500mA
	JP2.8	V-	Encoder power negative pole	
	JP2.9	PE	Shield grounding	shield line grounding terminal

4.7.1.4 ABZ incremental 12 V PG card input terminal and wiring for encoder output signal

ABZ incremental 12V PG card can receive the output signal of tow types of encoder: collector open circuit signal and push-pull signal

Fig 4.19 the wiring of encoder collective open circuit signal

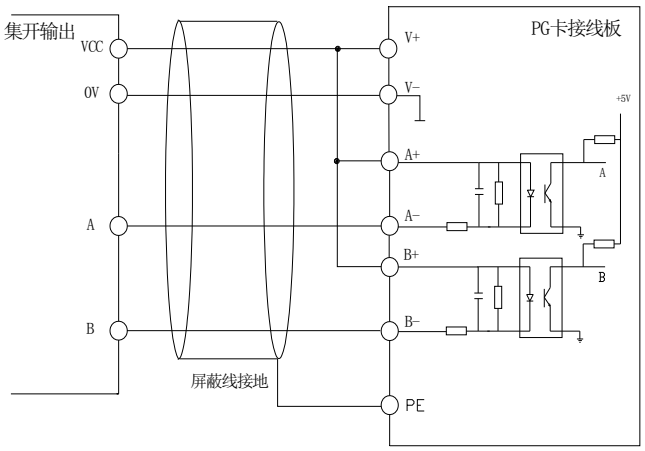
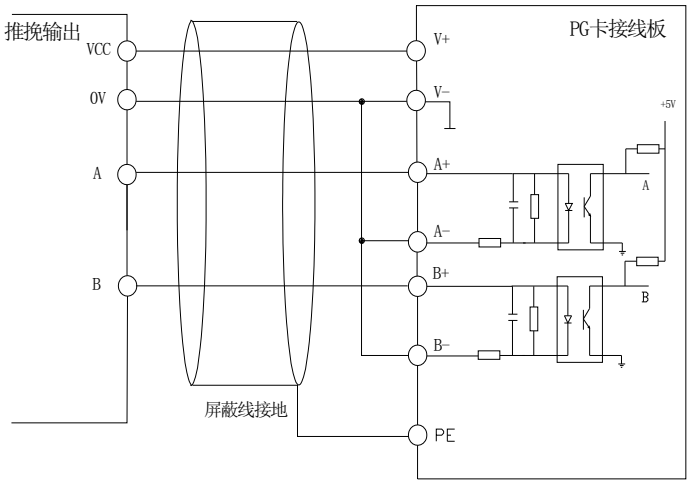


Fig 4.20 the wiring of encoder push-pull signal

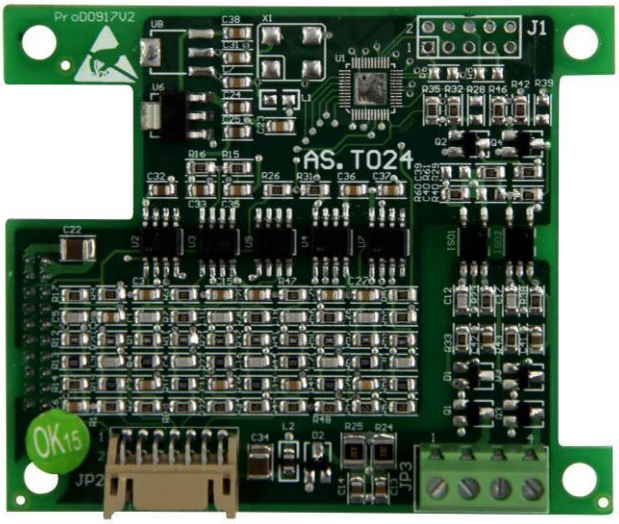


4.7.2 SIN/COS PG card

Sin/Cos PG card (model AS.T024) can receive the sin/cos differential output signal of encoder and be available for the installation of encoder of sin/cos differential output signal

4.7.2.1 sin/cos PG card terminal layout

Sin/cos PG card terminal layout see fig 4.21



4.7.2.2 SIN/COS PG card terminal label

SIN/COS PG card (AS.T024) terminal label is shown as following:

JP3 terminal label

FA	V0	FB	V0

JP2 terminal label （14 pin socket）

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

4.7.2.3 SIN/COS PG card terminal function description

SIN/COS PG card (AS.T024) terminal description see table 4.7

name	Terminal label	Terminal function description	specification
Collector open output	FA	Frequency-dividing signal output A phase	Triode collective open output （max output frequency 100kHz）;
	0V	24V GND	
	FB	Frequency-dividing signal output B phase	
	0V	24V GND	
Encoder	A+,A-	Encoder A phase signal	Differential signal max input frequency 100kHz;
	B+,B-	Encoder B phase signal	
	R+,R-	Encoder Z signal	
	C+,C-	Encoder SIN signal	
	D+,D-	Encoder COS signal	
	V+	+5V	
	0V	+5V GND	

4.7.2.4 sin/cos PG card input teriminla and encoder output signal wiring

Sin/cos PG card can receive the sin/cos differential signal of encoder

Fig 4.22 the wiring of encoder

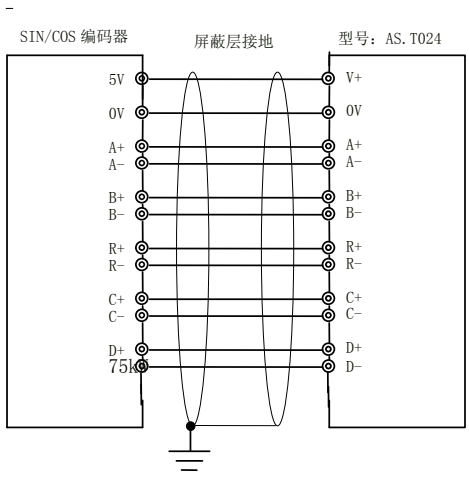
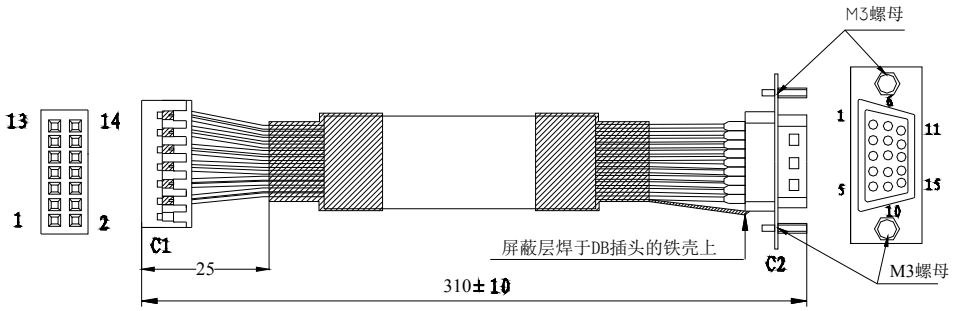


Fig 4.2.2 the wiring of sin/cos differential output signal of encoder

4.7.2.5 the encoder signal tieline of sin/cos PG card

For the convenience of on-site wiring, the encoder signal tieline is provided for Sin/Cos PG card. The tieline will turn encoder signal into D-type 15 pin plug through connection. The detailed definition is as follows:



C1 塑壳2*7	C2 DB15母头	信号	对应颜色
PIN3	PIN 4	R-	红
PIN4	PIN 3	R+	红/白
PIN5	PIN 1	cos-	橙
PIN6	PIN 8	cos+	橙/黑
PIN7	PIN 6	sin-	黄
PIN8	PIN 5	sin+	黄/黑
PIN9	PIN 13	D-	绿
PIN 10	PIN 12	D+	绿/黑
PIN 11	PIN 10	C-	蓝
PIN 12	PIN 11	C+	蓝/黑
PIN 13	PIN 7	GND	黑
PIN 14	PIN 9	v+	黑/白

Fig 4.23 Sin/Cos PG tieline definition

4.7.3 ABZ incremental 5V PG card

ABZ incremental 5V PG card (model AS.T041) can receive three kind of encoder output signal, which mean encoder of open collector signal or push-pull signal or differential signal can be installed.

4.7.3.1 ABZ incremental 5V PG card terminal layout

ABZ incremental 5V PG card (model AS.T041) terminal layout see fig 4.23

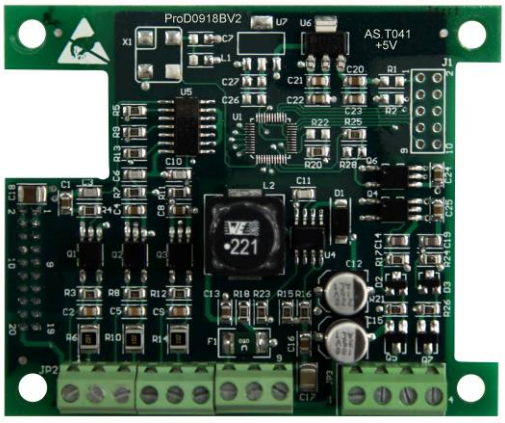


Fig 4.23 ABZ incremental 5V PG card terminal layout

4.7.3.2 ABZ incremental 5V PG card terminal label

ABZ incremental 5V PG card terminal label as follow:

JP3 frequency-dividing output terminal

	V0	FB	V0

JP2 input terminal

A+	A-	B+	B-	Z+	Z-	V+	V-	PE

4.7.3.3 ABZ incremental 5V PG card terminal function description

ABZ incremental 5V PG card terminal function description see table 4.8

Table 4.8 ABZ incremental 5V PG card terminal function description

name	Pin No	Terminal label	Terminal function description	specification
Frequency-dividing signal output	JP3.1	FA	Frequency-dividing signal output A phase	Triode collective open output（max output frequency 100kHz）;
	JP3.2	0V	24V GND	
	JP3.3	FB	Frequency-dividing signal output B phase	
	JP3.4	0V	24V GND	
Encoder input	JP2.1	A+	Encoder A phase signal +	Open collector/push-pull，max input frequency 100kHz
	JP2.2	A-	Encoder A phase signal -	
	JP2.3	B+	Encoder B phase signal +	
	JP2.4	B-	Encoder B phase signal -	
	JP2.5	Z+	Encoder Z phase signal +	
	JP2.6	Z-	Encoder Z phase signal -	

	JP2.7	V＋	Encoder power positive pole	Voltage 5VDC，max output current 500mA
	JP2.8	V-	Encoder power negative pole	
	JP2.9	PE	Shield grounding	shield line grounding terminal

4.7.4 Endat absolute value PG card

Endat absolute value PG card (model AS.l06/l) can receive endat output signal of encoder, which mean it can install the encoder with endat output signal. For example the HEADS model: 1313 or 413 encoder

4.7.4.1 Endat absolute value PG card terminal layout

Endat absolute value PG card (model AS.L06/L) terminal layout see fig 4.24

Fig .4.24 Endat absolute value PG card terminal layout

4.7.4.2 Endat absolute value PG card terminal label

Endat absolute value PG card terminal label as follow:

JP3 terminal label

FA	V0	FB	V0	12

JP2 terminal label (14 pin plug)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
NC	NC	NC	NC	B-	B+	A-	A+	D-	D+	C-	C+	0V	V+

4.7.4.3 Endat absolute value PG card terminal function description

Endat absolute value PG card terminal function description see table 4.9

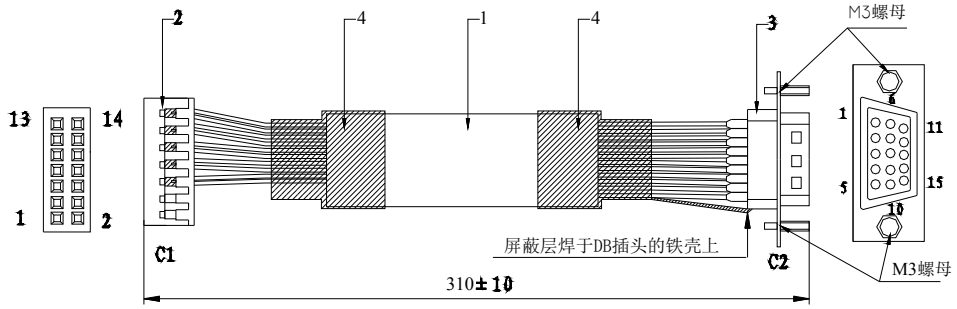
Table 4.9 Endat absolute value PG card terminal function description

name	Terminal label	Terminal function description	specification

Collector open signal output	FA	Frequency-dividing signal output A phase	triode collective open output (max output frequency 100khz) max output current 50mA,
	0V	GND	
	FB	Frequency-dividing signal output B phase	
	0V	GND	
	+12V	12V power output	
Encoder input	A+,A-	Encoder A phase signal	differential signal, max input frequency 100kHz
	B+,B-	Encoder B phase signal	
	C+,C-	Encoder clock signal	
	D+,D-	Encoder data signal	
	V+	+5V	
	0V	+5V 的 GND	

4.7.4.4 Endat absolute value PG card encoder signal tieline

For the convenience of on-site wiring, encoder signal tieline is provided for Endat absolute value PG card. The tieline can turn encoder signal into D-type 15 pin plug through connection. The detailed definition is as follow:



C1 塑壳2*7	C2 DB15母头	信号	对应颜色
PIN 5	PIN 4	cos-	红
PIN 6	PIN 3	cos+	红/白
PIN 7	PIN 2	sin-	黄
PIN 8	PIN 1	sin+	黄/黑
PIN 14	PIN 13	v+	橙
PIN 13	PIN 14	GND	橙/黑
PIN 9	PIN 6	dat-	蓝
PIN 10	PIN 5	dat+	蓝/黑
PIN 11	PIN 12	clk-	绿
PIN 12	PIN 11	clk+	绿/黑

Fig 4.25 Endat absolute value tieline definition

4.7.5 Notice item for PG card terminal wiring

Important

Encoder signal line should be arranged separately with main circuit and other power line. Do not arrange the lines in close parallel. The encoder wiring is shield line. Shield layer of shield line should be connected to terminal grounding PE

Chapter Five ： Operator

AS 380 integrated drive controller is equipped with operator of LED indicator and 7-segment code display. The programmable LED indicator in it can display the I/O condition and other basic information of elevator. The 7-segment code can display the integrated unit parameter and fault code. Besides, AS380 integrated drive controller can also support LCD handheld operator for the elevator advanced adjustment.

5.1 The 7-segment display operator

The appearance and definition of 7-segment display operator is as the below photo 5.1. The detailed function explanation about the operation key is in table 5.2

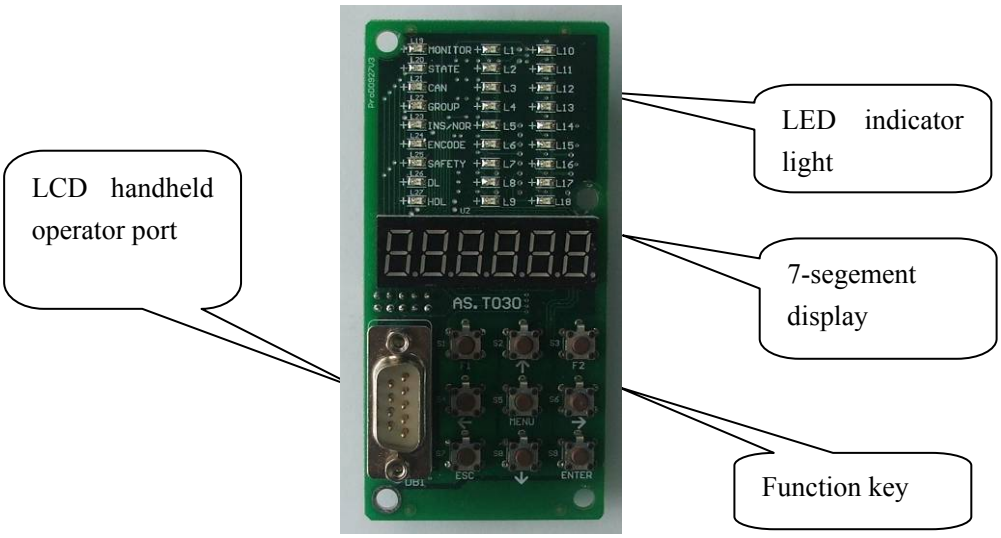


Fig 5.1 7-segement operator

5.1.1 LED indicator light

7-segement display operator has 27 LED indicator light at the upper section, in which 9 indicator lights L19-L27 at the left side have fixed definition (the corresponding meaning see table 5.1, the 18 indicator lights L1-L18 in the middle are definable. See table 5.5

Table 5.1 L19-L27 definition explanation

Code Name	display	definition	remark
L19	MONITOR	Community monitor communication	Flash—in communication
L20	STATE	CPU in work	Rapid flash-normal/mid-speed-self-studying/low-speed-elevator fault/no flash-manufacturer contact
L21	CAN	car/hoist way communication	flash-in communication

L22	GROUP	Parallel connected/group control communication	flash-in communication
L23	INS/NOR	inspection/auto mode	Light on mean auto/light off mean inspection
L24	ENCODE	rotating encoder	Light on –speed feed back
L25	SAFETY	Safety circuit	Light on-safety circuit turn on
L26	DL	Master door lock	Light on- master door lock circuit turn on
L27	HDL	Hall door lock	light on- hall door lock circuit turn on

5.1.2 Function key

9 button at the under part of operator, the key function see table 5.1

Table 5.1 button function description

button	Button name	function
	Up button	1.move up by one item when browsing menu 2. the current number increase by 1 when input data
	Down button	1. move down by one item when browsing menu 2. the current number decrease by 1 when input data
	Left button	1.move left one menu when select function 2. move left cursor when input data
	Right button	1.move right one menu when select function 2.move right cursor when input data
	Esc button	1.cancel input when input data
	Enter button	1.change parameter when browsing parameter 2. save when input data
	MENU button	1.enter the LED indicator light function select interface 2.enter the open/close door control interface
	F1 button	Press the button at open/close control interface to open the door
	F2 button	Press the button at open/close control interface to close the door

5.1.3 Operator handling

5.1.3.1 Menu structure

Main menu structure is as the below fig 5.2. the operation interface adopt the one level menu structure due to the structure confinement of 7-segment and button. Press left and right button to switch between various menu, press menu key to switch between LED function selection and open/close door control.

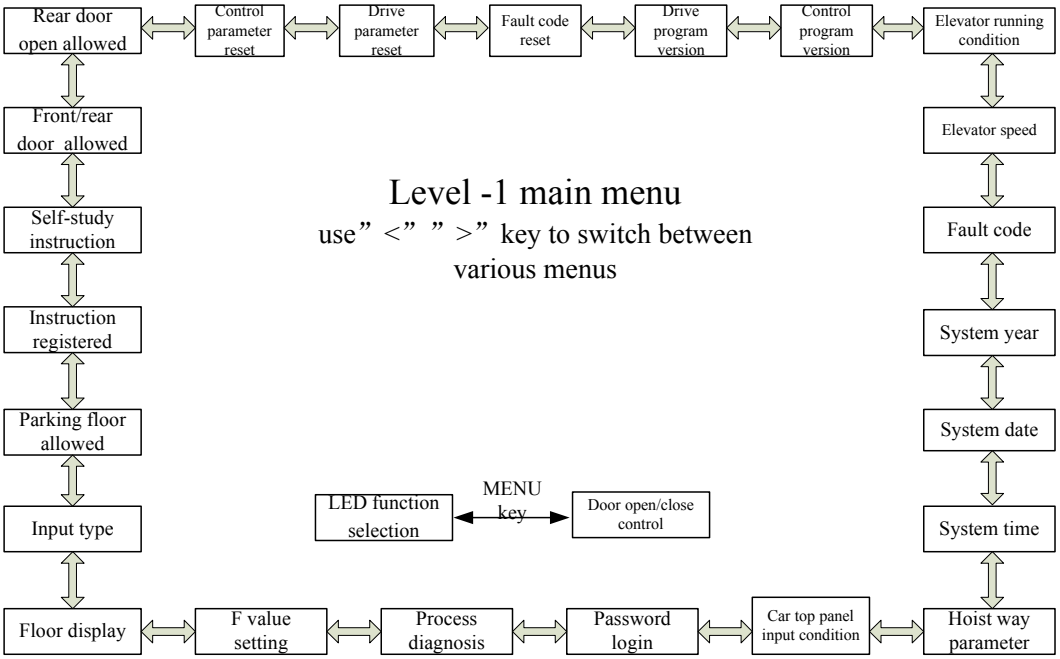
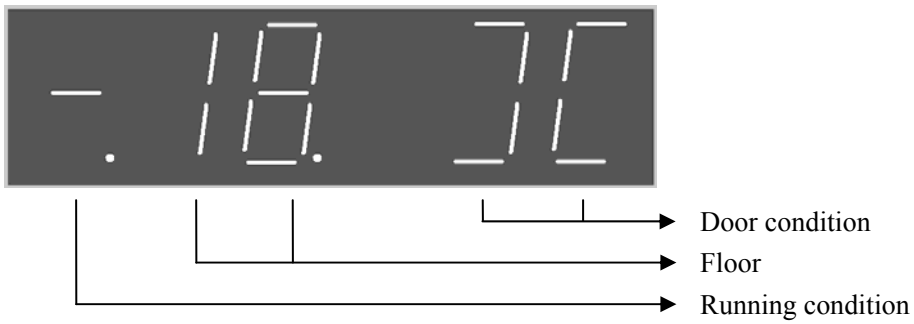


Fig 5.2 menu structure

5.1.3.2 Operation introduction for menus that use left or right button to switch

Press left or right button to switch between menus under the level-1 main menu interface. The first interface displayed when power turn on is the elevator running condition interface. The detailed introduction about the menu is as follow:

1 elevator running condition (the menu display when power on)



This menu will display the basic condition of elevator, including running condition, floor located, and door condition.

At the item: the running condition

 mean elevator moving up  mean elevator moving down

 mean elevator stop

The floor located is expressed with two digit of decimal system

At the item: door condition

 Mean door opening  mean door opening in place

 mean door closing  mean door closing in place

1 elevator speed

This menu display the current running speed of elevator, the unit is M/S. as above fig, the current speed displayed is 1.75m/s

3 fault code

The integrated unit can save up to 20 fault code. The latest fault code serial no is 00. use up or down key to browse the these fault code. Press enter key to display the fault date, press left or right key to check the time and floor that fault occurred. Press esc to quit.

4 System years

The above picture show: the year 2010, “Y“ is the abbreviation of year, when need to modify, press enter button, the figure in the lowest order start to flash, use left or right button to select the figure required for modification. The selected figure start to flash. Then use up or down button to modify the figure ,press the enter button to confirm the modification.

5 System date

The above picture show: 8 month 12 day. “d” is the abbreviation of day. When need ot modify, press the enter button. The figure in the lowest order start to flash, use the left or right button to select the figure required for modification. The selected figure starts to flash. Then use up or down button to modify the figure, press the enter button to confirm the modification.

6 System time

The above figure show: 15 hour 36 minutes, T is abbreviation of time. Please note, the “T” displayed in the integrated unit is always shown as that in the above figure, due to the confinement of 7-segment code. When need to modify, press enter key the figure in the lowest order start to flash. Use left or right key to select the figure required for modification. The selected figure starts to flash. Then use the up or down button to modify the figure. Press the enter button to confirm the modification.

7 Hoist way parameter

The parameter shows the data of floor hoist way, the length of leveling plate, distance of leveling switch, deceleration switch position. The detailed operation is as follow: Use up or down button to select the needed parameter. For example, P02, the screen displays the above P.02. Then the there will display the 03.000, the value of P02 parameter, on screen after waiting for one second. Then Both P.02 and 03.000 will display alternatively. Each displays for one second. The parameter shows that there are 3 meter high between the first floor and second floor. The definition of each parameter is as follow:

Table 5.3 hoist way parameter definition

Serial number	definition
P01-P64	1-64floor hoist way data
P65	Leveling plate length
P66	Leveling switch center distance
P67	1 floor up deceleration switch distance
P68	2 floor up deceleration switch distance
P69	3 floor up deceleration switch distance
P70	4 floor up deceleration switch distance
P71	1 floor down deceleration switch distance
P72	2 floor down deceleration switch distance
P73	3 floor down deceleration switch distance
P74	4 floor down deceleration switch distance

8 car top panel input condition

GX serial No

GX input condition

The above figure show the GX0 has no input, press up or down to select GX serial no the serial no start from 0 to 15. After finished the selection of corresponding serial no GX, the figure in the highest order show the input to this input terminal is valid or not. (O represents no valid input. 1 represent valid input)

HX serial No

HX input condition

The above figure show: HX0 has no input. Press up or down to select HX serial No. serial no start from 0-15. after finishing the selection of corresponding serial no HX， the figure in the highest order show the input to this input terminal is valid or not (o represent no valid input , 1 represent

valid input)

9 Password login

Press enter button to enter the menu as the below fig

Password input，the password show in the figure is 149

In the login menu, you will see “login”, press the enter button, the figure in the lowest order of LED display start to flash, use up or down button to select the needed figure. Use left or right to select the needed figure. The selected figure start to flash, which mean it has entered into the figure input stat. use up or down button again to select the figure needed to input. After finishing the password input, press the enter button to finish the login. If the password inputted is correct, the word “login” will display on the screen after pressing the enter button. If the password is wrong, the password input stat will remain after pressing the enter button, use esc button to quit.

Please note, only elevator condition and parameter can be browsed if not login. Only in login stat can be authorized to modify the parameter.

10 process diagnosis

Stat code

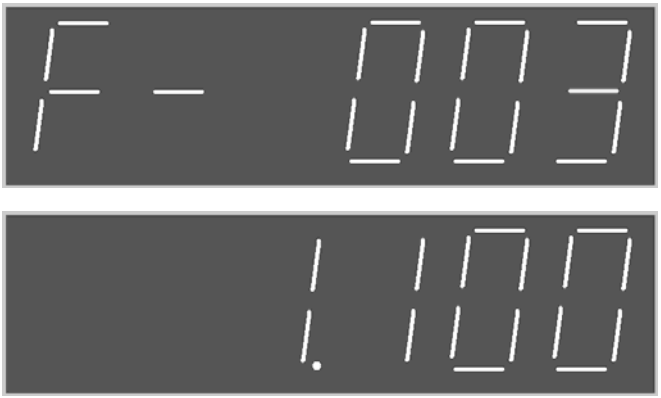
This menu shows the current status of elevator. Use one two digit status code to show, the definition of status code is as follow:

Table 5.4 status coder definition

Serial no	description
0	Safety circuit disconnect
1	Elevator fault
2	Motor overheat
3	Elevator overload
4	Safety edge
5	Door open button action(door open button or same-direction hall call button action)

6	Door lock short circuit/door open limit action
7	Elevator door opening
8	Elevator door closing
9	Door closing limit action
10	Upward limit
11	Downward limit
12	Door lock closed, meeting the running condition
13	KMY contact inspecting
14	KMB contact inspecting
15	In zero speed servo
16	Elevator by pass
17	Elevator running
18	Elevator door lock disconnect
19	Hoist way study not finished
20	Frequency converter enabling stat check

11 F parameter setting



Because F parameter has many values, the serial No of parameter is displayed in three digits. Moreover the parameter itself need multi-digit to display. The special treatment is adopted in design by using alternative display of F parameter. The detailed operation is as follow: use up or down button to select the needed parameter. For example F3, the screen will display the F-003 as above, then the value 1.100 of F3 parameter will be displayed on the screen one second later as the picture above. Then F-003 and 1.100 will display alternatively, each will last 1 seconds. Press enter button, the figure in the lowest order of LED display start to flash, use up or down button to select the figure. Use left or right to select the figure needed to input. The selected figure start to flash, which mean the figure input stat already is on. Then use up and down button to select the figure needed to input. Press the enter button to finish the parameter modification. The selected figure stops flashing.

Login authorization is required for the F parameter modification. Once modify parameter and press the enter button in non login stat, login menu will pop up.

12 floor display

The parameter set the floor display code of each floor, the detailed operation is as follow: use up or down button to select the floor needed to browse, for example, first floor, the screen will display FLr-01 as above picture, the figure will last for 1 second, then the screen will display the display code 1 of the floor, as the above picture. You will see 1, then FLr-01 and 1 alternatively display, each of which last 1 second. Press the enter button, the figure in the lowest order of LED display start to flash. Use the up and down button to select the figure, use the left and right button to select the figure needed to input. The selected figure start to flash, which mean the figure input stat is on, use up or down button again to select the figure need to input. Press the enter button to finish the parameter modification. The selected figure stops flashing.

Login authorization is required for the floor display parameter modification. Once modify parameter and press the enter button in non login stat, login menu will pop up

13 input type

Input type parameter

X input point

Input type parameter

GX input point

Input type parameter

HX input point

Use the up or down button to select the X or GX or HX input point needed to modify. Press the enter button the value start to flash, use the up or down button to set the value. press the enter button to confirm, in which 1 represent normal close input, o represent normal open input. Please note, the X and G and H of integrated unit are all shown as those in the above picture, due to the confinement of the 7-segement code, Moreover, please pay attention to make clear distinguish between X and H, since these two words have very similar display.

Login authorization is required for the input type modification. Once modify parameter and press the enter button in non login stat, login menu will pop up

14 parking floor allowed

Use up and down button to select the floor need to modify. Please note, the floor mentioned here is the actual floor (or the control floor) press the enter button. The selected value start to flash, press the up and down button to set the value. press the enter button to confirm, in which 1 mean parking allowed, 0 mean parking prohibited.

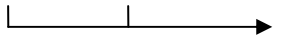
Login authorization is required for the parking floor allowed modification, Once modify parameter and press the enter button in non login stat, login menu will pop up.

15 instruction registration

Use up and down button to select the floor needed to register the instruction, press the enter button, to register the instruction.

16 self-study instruction

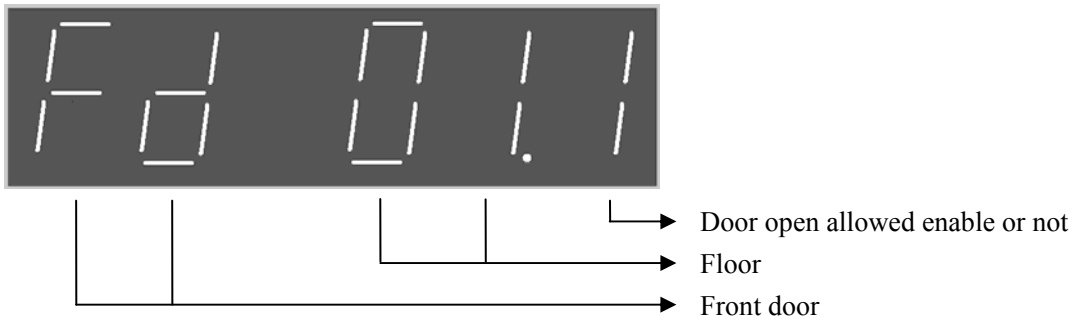
The above picture will display once enter the menu.



Press the enter button when need to do the hoist way study, the figure in the lowest order start to flash, press the up button , figure 0 change to 1. Press the enter button again to confirm, as the above fig. the elevator start to do the hoist way self-study. If the value is set to 2, asynchronous motor parameter self-study will start.

Login authorization is required for the self-study instruction modification, Once modify parameter and press the enter button in non login stat, login menu will pop up.

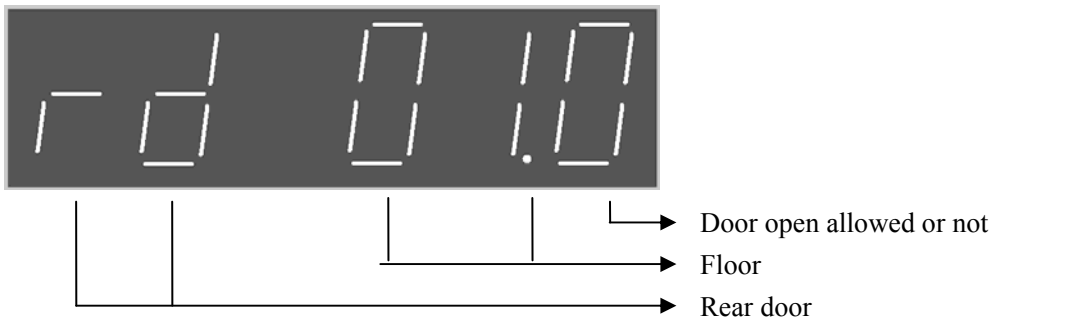
17 the front door opening allowed



The above picture mean: shield 1 floor front door open allowed. Fd is the abbreviation of Front door. Press the up and down button to browse the front door open allowed parameter of corresponding floor. Press the enter button to make modification. The figure in the lowest order starts to flash, use up or down button to modify the figure into 0 or 1. Press the enter button to confirm the modification (0 is to shield front door open allowed function, 1 is to allow front door open function)

Login authorization is required for the front door open allowed modification, Once modify parameter and press the enter button in non login stat, login menu will pop up.

18 rear door open allowed



The above picture mean: shield 1 floor rear door open allowed. Rd is the abbreviation of rear door. Press the up and down button to browse the rear door open allowed parameter of corresponding floor. Press the enter button to make modification. The figure in the lowest order starts to flash, use up or down button to modify the figure into 0 or 1. Press the enter button to confirm the modification (0 is to shield rear door open allowed function, 1 is to allow rear door open function)

Login authorization is required for the rear door open allowed modification, Once modify parameter and press the enter button in non login stat, login menu will pop up.

19 control parameter reset

The menu realizes the reset of control parameter F0-F199. Please note the control parameter reset is only valid when the login level is equal or more than the level-2. There is no use to press enter button if the login level is not qualified. Once the login qualification is met, press the enter button to enter into the menu for the authentication code input (the authentication code setting is against the misoperation. The authentication code always is 5678) if the authentication code is right, press the enter button and control parameter reset.

20 drive parameter reset

The menu realizes the reset of control parameter F200-F255. Please note the control parameter reset is only valid when the login level is equal or more than the level-2. There is no use to press enter button if the login level is not qualified. Once the login qualification is met, press the enter button to enter into the menu for the authentication code input (the authentication code setting is against the misoperation. The authentication code always is 5678) if the authentication code is right, press the enter button and control parameter reset.

21 fault coder reset

The menu realizes the fault code reset. Please note the fault code reset is only valid when the login level is equal or more than the level-2. There is no use to press enter button if the login level is not qualified. Once the login qualification is met, press the enter button to enter into the menu for the authentication code input (the authentication code setting is against the misoperation. The authentication code always is 5678) if the authentication code is right, press the enter button and control parameter reset.

22 drive program version

The menu shows the program version of drive part of integrated unit. The screen will display the program version 30.03 after 1 second waiting. Then the word ver1 and 30.03 will alternatively display, each of which will last for 1 second

23 control program version

The menu shows the program version of control part of integrated unit. The screen will display the program version E02 of the control part one second later, as per the above picture. Then the words VER 2and E02 will alternatively display, each of which will last for 1 second.

5.1.3.3 Use Menu to switch among various menus

Under any circumstance press the menu button to switch between LED function selection and door open/close control. Press ESC to return to the elevator status interface. The following is the detailed description of those menus

1. LED function selection

Use up and down button to select the definition code of 18 LED indicator light L1-L8. press enter button to confirm. The LED indicator light will change as per the code definition. The definition code of L1-L8 is as following table 5.5

Table .5.5 L1-L8 display content selection

Nixie tube display	luminous diode code	Display content	remark
LED 00	L1	door lock relay output signal	Maintenance running startup condition, all 8
	L2	main contactor contact input signal(no contact adhesion and light on)	

	L3	band brake contactor contact input signal (contactor no adhesion , light on)	light on means that peripheral signal ok for inspection running
	L4	band brake switch (input point normal and light on)	
	L5	motor overheat(input point normal and light on)	
	L6	up limit switch (compound) status signal	
	L7	down limit switch (compound) status signal	
	L8	inspection upward/downward signal(light on as signal exist	
	L10	main contactor drive signal	The internal status as inspection running. all six light on one by one when inspection run normally.
	L11	enable signal	
	L12	signal for moving up /down	
	L13	running signal feed from drive part	
	L14	band brake contactor drive signal	
	L15	speed curve given or not	
LED 01	L1	down limit switch status- light off, no move down	Hoist way switch and leveling switch status. Light on means the connection of external input point
	L2	down level-1 forced deceleration switch on-off	
	L3	down level-2 forced deceleration switch on-off	
	L4	down level-3 forced deceleration switch on-off	
	L5	down level-4 forced deceleration switch on-off	
	L6	up level-1 forced deceleration switch on-off	
	L7	up level-2 forced deceleration switch on-off	
	L8	up level-3 forced deceleration switch on-off	
	L9	up level-4 forced deceleration switch on-off	
	L10	up limit switch status- light off, do not move up	
	L11	up leveling switch on-off	
	L12	down leveling switch on-off	
LED 02	L1	door lock relay (X17/parameter setting-if no normal light)	Quick car running startup condition. All these 11 light on means the peripheral signal ok, the startup condition for quick car running is met
	L2	）main contactor contact input signal (contactor no adhesion and light on)	
	L3	band brake contactor contact input signal(contact no adhesion and light on)	
	L4	band brake switch	
	L5	motor overheating	
	L6	up limit switch (compound) status signal	

	L7	down limit switch (compound) status signal	
	L8	door close limit switch signal (front and rear door)	
	L9	light on when no internal startup fault exist	
	L10	front valid signal registration existed or not	
	L11	auto hi-speed status signal	
	L12	main contactor drive signal	The internal status of quick car running. All six light on one by one when the quick car run normally.
	L13	enable signal	
	L14	up direction/down direction signal	
	L15	running signal feed from drive part	
	L16	band brake contactor drive signal	
	L17	speed curve given or not	
LED 03	L1	front door open limit on-off	Door open/close signal. Light on mean external input point is connected.
	L2	front door close limit on-off	
	L3	rear door open limit on-off	
	L4	rear door close limit on-off	
	L5	front door safety edge switch on-off	
	L6	rear door safety edge switch on-off	
	L7	front door light curtain switch on-off	
	L8	rear door light curtain switch on-off	
	L9	overload switch on-off	
	L10	door open button signal	
	L11	door close button signal	
	L12	present floor door open signal	
	L13	light on when in attendant status or independent status	
	L14	light on when in firemen operation status	
	L15	front door open output	
	L16	front door close output	
	L17	rear door open output	
	L18	rear door close output	
LED 04	L1	main contactor contact input on-off	Contact inspection signal, light on mean external signal connected.
	L2	band brake contactor contact input on-off	
	L3	No 1 band brake inspection switch contact input on-off	
	L4	No 2 band brake inspection switch contact input on-off	
	L5	safety circuit high-voltage point input on-off	
	L6	safety circuit relay contact input on-off	
	L7	door lock circuit high-voltage point input on-off	
	L8	door lock relay contact point input on-off	
	L10	main contactor drive output	
	L11	band brake contactor drive output	
LED 05	L1	down limit switch status	Main input signal logic status
	L2	down level-1 forced deceleration switch status	
	L3	down level-2 forced deceleration switch status	
	L4	down level-3 forced deceleration switch status	

	L5	down level-4 forced deceleration switch status	
	L6	up level-1 forced deceleration switch status	
	L7	up level-2 forced deceleration switch status	
	L8	up level-3 forced deceleration switch status	
	L9	up level-4 forced deceleration switch status	
	L10	up limit switch status	
	L11	up leveling switch status	
	L12	down leveling switch status	
	L13	firefight return/ firemen operation switch	
	L14	motor overheat signal	
LED 06	L1 ～ L18	Corresponding input point：X0 ～ X17 status	Main board input point on-off, light on means the external input point is connected
LED 07	L1	Door lock relay (X17 value setting- light on if no switch-on/off very often)	The hoist way self-study startup condition. All these 9 light on means peripheral signal is normal, the hoist way self-study is on
	L2	main contactor contact input signal (contactor no adhesion, light on)	
	L3	band brake contactor contact input signal (contactor no adhesion, light on)	
	L4	band brake switch	
	L5	motor overheat	
	L6	up limit switch(compound) status signal	
	L7	down limit switch(compound) status signal	
	L8	door close limit switch signal (front and rear door)	
	L9	light on if startup internally is good.	
	L10	self-study command 1	The internal status of hoist way self-study, all six light on one by one when the self-study run.
	L11	next level forced slowdown status	
	L12	down leveling switch status	
	L13	up leveling switch status	
	L14	self-study command 2	
	L15	self-study startup	

2 Door open/close control

When Bit 3 of parameter F165 (door open./close control) is set to 1, the door open/close function of LED operator is activated. Press the F1 at this interface to make system output the door open signal. Press F2 to make the system output door close signal.

5.1.4 graphic symbol of number and letter on LED screen

Due to the confinement of LED structure, the number and letter displayed somehow difficult to understand, therefore the parallel table about the symbol and related definition is given as below

display	meaning	display	meaning	display	meaning	display	meaning
	1		2		3		4
	5		6		7		8
	9		0		A		B
	C		D		E		F
	G		H		I		J
	K		L		M		N
	O		P		Q		R
	S		T		U		V
	W		X		Y		Z

5.2 LCD handheld operator

5.2.1 LCD handheld operator introduction

LCD handheld operator is a specialized tool for system adjustment and maintenance. it consists of a LCD display and film buttons. 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) Drive status: check the elevator given speed, feedback speed, bus voltage, output current, output torque, pre-torque. and etc.

b) Car call function: elevator cal and instruction monitoring and registration, use handheld operator to monitor the status of elevator call and instruction registration of each floor. And also use the device to register the instruction or call signal of any floor.

c) speed curve: elevator running speed and speed curve.

d) output/input: elevator input, output status and each port definition

e) Fault recording: elevator running record and fault code as well as the floor and time that fault code occur.

f) Hoist way data: elevator hoist way data.

g) Self-diagnosis: check the interference evaluation of CAN communication bus and encoder. and the fault status of hall call panel of each floor.

h) Program version: the program version information of operator and main board.

● parameter classification

Function selection menu, use handheld operator to check and set elevator parameter.

a) Basic parameter: check and set the common F parameter for elevator adjustment in the menu.

b) Comfort adjustment: check and set the S curve parameter and PID adjusting parameter related to elevator running comfort.

c) Elevator specification: this menu is the classification menu related to elevator specification. Check and set the related parameter of elevator specification.

d) Motor specification: check and set the sorting parameter related the motor.

e) Leveling adjustment: check and set adjustment amount and deviation of upper /down leveling

f) Leveling fin-tuning: check and set the leveling fine-tuning value of each floor.

g) Input type: check and set the normal open/close of input point of main board and car top panel. Each input point should be operated bit by bit.

h) Floor display: able to set floor display code.

i) Test running

j) Door control: check and set door open function and door open/close delay parameter

k) Door open allowed: set the status of door open allowed of front and rear door.

l) Service landing: check and set the parking landing and NW-SW function floor.

m) IC card setting: set the parameter of elevator number and service floor when IC card function activated.

n) Time slot service floor: set the time slot allowable for each floor service.

o) Parameter summary: check and set all F parameter in the menu.

p) Control parameter service: able to reset the elevator control parameter from F0-F199. In order to avoid unnecessary loss caused by mishandling, correct authentication code should be input before conducting reset.

q) Drive parameter reset: able to rest the elevator drive parameter from F200-F255. in order to avoid unnecessary loss caused by mishandling, correct authentication code should be input before conducting reset.

r) Parameter copy: able to download the parameter set in the main broad and save in the operator. And also able to upload the data from operator to elevator main board.

Please note: when conducting uploading or downloading, in order to avoid the unnecessary loss caused by mishandling, correct authentication code should be input before conducting upload or download.

● adjustment operation

a) Asynchronous motor study: asynchronous motor need self-study to conduct the motor parameter study operation.

b) hoist way self-study: let control system to conduct an study about the elevator reference position at each floor and put those data into record.

c) Terminal landing car call: able to give the car call command about the up/down terminal landing of elevator.

d) Test running: set the elevator auto running frequency and time interval

e) Door operation: set function of the elevator door open allowed.

f) Weighing adjustment: weighing device self-study and monitoring weighing status

● reset command

The handheld operator can reset all the parameter of elevator, including fault code and elevator running frequency. In order to avoid unnecessary loss caused by mishandling, correct authentication code is require to be input before conducting reset.

● value-added function:

Use handheld device to set the main board time , floor offset, main landing configuration, firefighting mode and etc.

● re-login

Use handheld operator to input login password to re-login main board

● password modification

Able to modify the operator's main board login password, use the present level password to change the lower level password and the present level password.

5.2.2 Handheld operator connection method

Handheld operator and the integrated unit is connected with standard RS232. the connection port at the upper part of operator is USB plug, the part of the integrated device connected to 7-segment code operator is D-type 9-hole plug. The connection line is SM-08E/USB

The following schematic diagram show how the integrated device connected to handheld operator

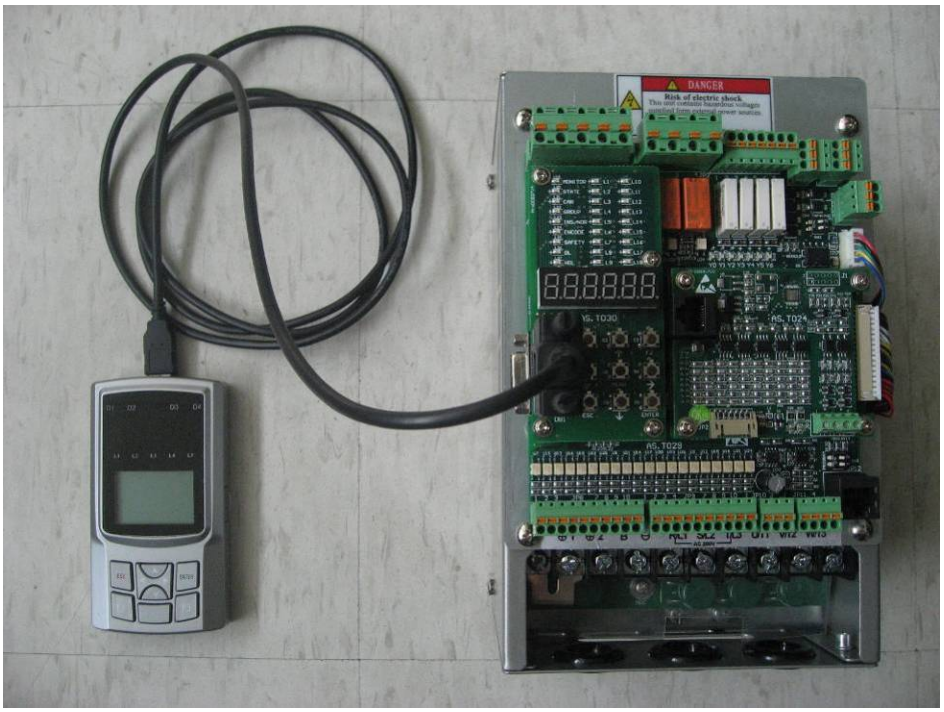


Fig. 5.3 the integrated device and handheld operator

Please note:

1) The connection of operator (including plug-in and pull out) can be done in hot plug mode when the integrated device power on.
2) Do not knock or drop the operator and not to use it in bad environment.

5.2.3 Handheld operator function

The outer appearance of handheld operator is as blew fig 5.4. the detailed introduction about the operation key function is listed in table 5.5

Fig 5.4 handheld operator outer appearance

Key		Function
Shortcut key	F1	1. Return to elevator status interface when it is not in status interface 2. Enter fault inquiry interface from elevator status interface
	F2	1. Return to elevator status interface from fault inquiry interface 2. Enter when elevator status interface display 3. Enter the car call interface when I/O status check interface display
	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 bit 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 bit parameter 4.Set ON or OFF status when bit setting
	◀	1.Move up by 10 items in function selection 2.Move cursor left for data input 3.Move left by 1 item for bit setting
	▶	1.Move down by 10 items for function selection 2.Move right for data input 3.Move right by one item for bit setting
Function key	ESC	1.Return to previous menu 2.Cancel data input
	Enter	1.Enter function selection 2. Enter edit status when viewing data 2.Save data input

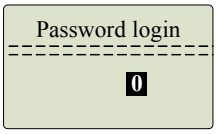
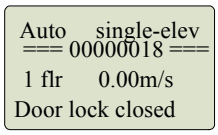
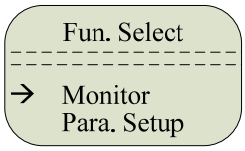
5.2.4 Introduction to display interface of LCD hand-held operator

5.2.4.1 display interface classification

The below table show several mina display interface of handheld operator.

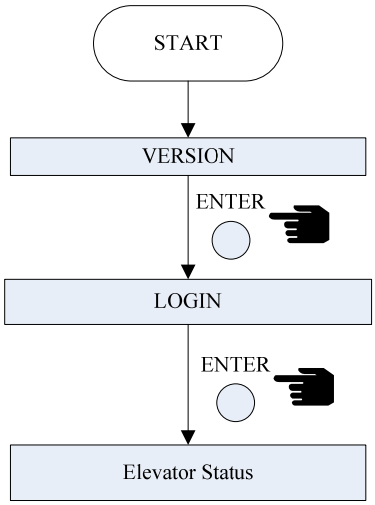
Table 5.6 the type and main content of display interface

Interface name	Main content
Mode selection interface Mode selection ========== Press enter to auto in Press esc to enter manually	The first status when power on and all well connected. Operator mode select, for the integrated device ,please press enter button to enter automatically
Version interface version ========== 30.03 NSPE02	Press enter button to enter the interface when power on and all well connected. The program version is shown. The third line is the elevator drive program version.

	The forth line is the elevator control program version
Login interface 	In this interface, input the password and login and user can check the elevator running status. **Note: if the password input is incorrect, only main monitor interface, monitor status interface and re-login interface can be seen ,**
Elevator status display 	Press F1 to return to this window if not in error record window after login. It includes the following contents in this window: Auto, inspection, attendant, fire, etc. Single or group status Floor position of elevator Running direction of elevator Running speed of elevator Running status of elevator **Note: the operation instructed below take this window as the first window if there is no special notice.**
Function selection 	This window contains the following functions: monitor, parameters classification, adjustment, reset, value-added fucntion, password change, re-login, etc, and there is sub-window in some functions. The detailed description of each menu see chapter one.
Detailed function	Press Enter key to enter the detailed functions when in function selection status, and they can be viewed and modified, please refer to the next content for details

5.2.4.2 Operations from power on to elevator status window

Please refer to the following steps to view the elevator status after the correct connection between handheld operator and main board:



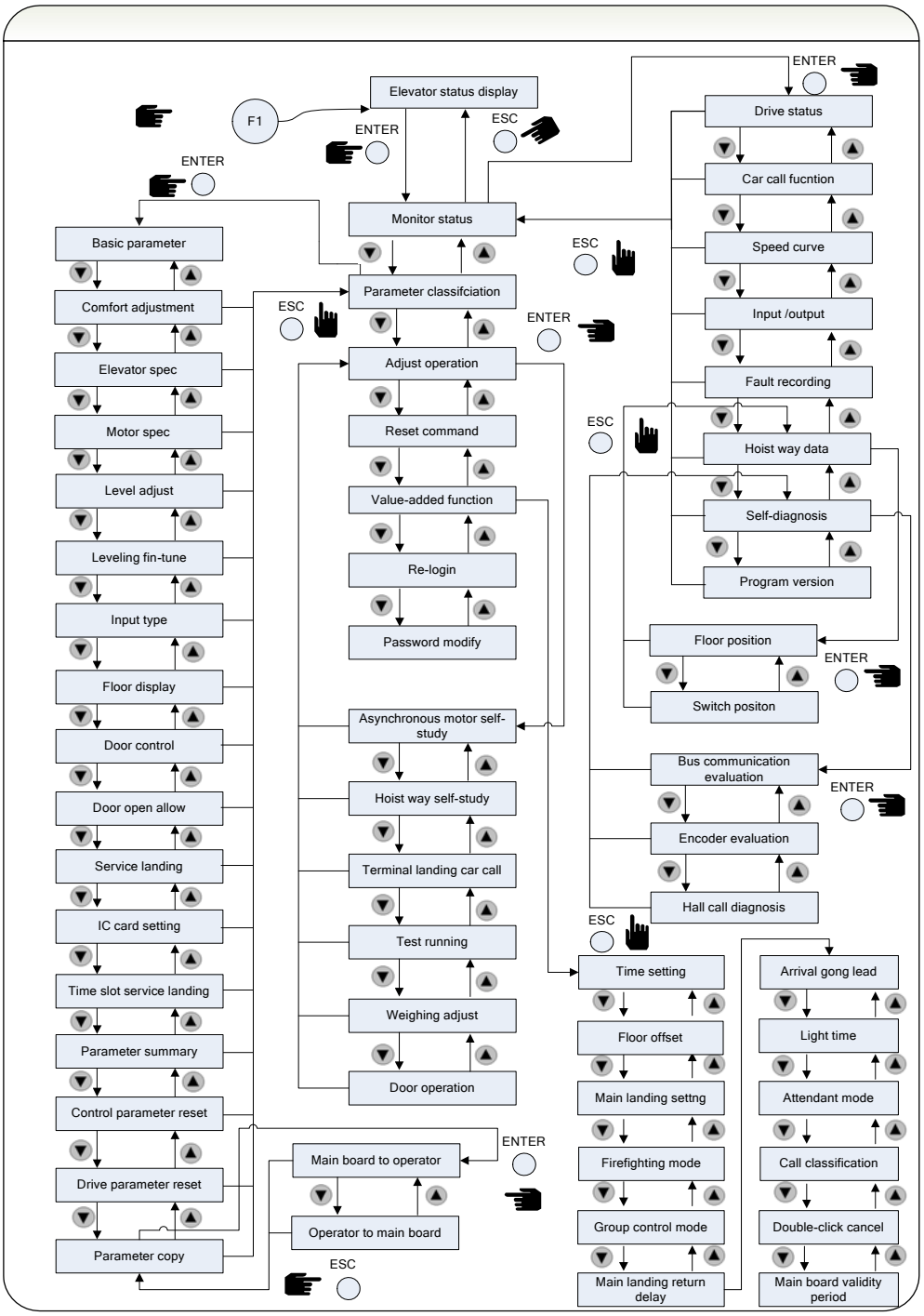
Picture 5.5 operations from power on to elevator status window

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 5.5	
1	Enter	Login 0	Enter login window
2	Press 4 times	Login 4	
3		Login ■4	
4	Press 3 times	Login 34	
5		Login ■34	
6	Press 2 times	Login 234	
7		Login ■234	
8		Login 1234	Password input is finished
9	Enter	Normal Simplex === 00000088 === 1 Floor 0.00m/s Door Locked	Log in, and enter elevator status

5.2.4.3 Function status switch

Press F1 key to return elevator status window if is not in error record window. Users can select function following the fig 5.6



Function status switch

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

5.2.4.4 Method to check monitor status

Take fault check recording 1 as an example:

Serial No	Key	Operator status	Remark
0	------	auto Simplex === 00000018 === 1 Floor 0.00m/s Door Locked	Elevator status window
1	Enter	Fun. Select → Monitor Running status	Enter function selection window
2	Enter	Monitor → drive condition car call fucntion	Enter secondary window
4	▼	Monitor → Fault Record Shaft Data	Press ▲ and ▼ to select upper or lower item
3	Enter	No. 0 Err. Code 35 Floor 4 Date 1007251330	View fault record
4	▲	No. 1 Err. Code 11 Floor 7 Date 1007261530	▲ And ▼ are used for page down and page up.
5	Enter	Err. Info Down Sw. error 1 10-07-26 15：30	View fault information

Table 5.4 how to view failure *history*

Note: Time format in fault information is shown in yy/mm/dd/hh/mm, in which each one take 2 bit.

For other function in monitoring status, take the above table for operation, Use ▲ and ▼ for page down and page up.

5.2.4.5 Parameter setting

Take the setting of F11=12 as an example:

Serial no	Key	Operator status	Remark
0	-----	auto Simplex === 00000018 === 1 Floor 0.00m/s Door Locked	Elevator status window

1	Enter	Fun. Select → Monitor Para. Setup	Enter function selection window
2	▼ Press once	Fun. Select → Para. Setup adjust operation	Press key to realize the function selection
3	Enter	Para. Setup → Basic para comfort Para.	Enter secondary window
4	Enter Press 13 times	Para. setup → para summary Control para reset	
5	Enter	Para summary F0 = 0.550m/s2 acc slop rate	Check the parameter F value
6	▼	Para summary F1 = 0.550m/s2 Dceel slope rate	Check the next parameter ▲ check the previous one
6	▶	Para summary F1 1= 3 Preset total floor	Check the next 10 parameter ◀ check the previous 10 parameter
7	Enter	Para summary F1 1= 3 Preset total floor	Press enter button into edit status for parameter check status. Data can be modified
8	▼	Para. summary F11 = 2 Preset total floor	The fig decrease by 1 The fig increase by 1
9	◀	Para. summary F11 = 2 Preset total floor	Move left to the highest bit of parameter Move right to the lowest bit of parameter
10	▲	Para summary F11 = 12 Preset total floor	The fig decrease by 1.
11	Enter	Para summay F11 = 12 preset total floor	*F11 MODIFY SUCESSFULLY, IF PARA MODIFCATION FAIL , (THE ORIGINAL ON E WILL DISPLAY)*

Please refer to the above steps for parameter F to modify the other parameters, but please note that some parameters like input type, service floor, door open allowed contain only two status with ON and OFF, and press ▲ and ▼ key can move by 16 each time

Now take setting of X9 from NO to NC as an example:

Table 5.10 device input type method

Step	Key	Display	Remark
-	---------	Auto Simplex === 00000018 === 1 Floor 0.00m/s Door Locked	Elevator status window
1	Enter	Fun. Select → Monitor Para. Setup	Enter function selection window
2	▼ Press once	Fun. Select → Para. Setup adjust opeation	Press key to realize function selection
3	Enter	Para. Setup → basic Para. comfort adjust	Enter secondary window
4	▼ Press 6 times	Para. Setup → Input Type Flr display	Press key to realize function selection
5	Enter	Input type F25= 51 Input Type X0-15	Enter parameter setting interface
6	Enter	Input type F25 = 51 Band brake(X9) NO	Enter parameter setting
7	▶ Press 9 times	Input Type F25 = 51 Band brake inspection(x9) =	
8	▼	Input Type F25=563 Band BK insepection(X9)NC	Set parameter selection
9	Enter	Input Type F25=563 Input type X0-15	Parameter modification confirmed

Table 5.6 how to set I/O type

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

5.2.4.6 Car Call function

In this function window the registered hall call and car instruction can be observed; what's more, they can be registered with operator directly, it is very helpful for elevator debugging 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:

Table 5.11 the operation method of car call function

Serial no	Key	Operator status	Remark
0	------	auto Simplex === 00000018 === 1 Floor 0.00m/s Door Locked	Elevator status window
1	Enter	Fun. Select → Monitor Para. Setup	Enter function selection window
2	Enter	Monitor status → drive conditon. Car call fucntion	Enter into monitor status
3	▼ Press once	Monitor status → elevator call Speed curve	
4	Enter	1 Call 1Flr. Call UP DOWN	
5	▼	1 Call 1Flr. Call UP DOWN	
6	▶ Press twice	1 Call 3Flr. Call UP DOWN	
7	Enter	↑ 1 Call 3Flr. Call UP DOWN	

5.2.4.7 Other function

There are functions of hoist way self-study, motor study, reset, time setup, change password, re-login in the first menu, these function is easy to be operated by press Enter .

Now take resetting parameter F as an example:

Table 5.12.F parameter reset operation

Serial no	Key	Display status	Remark
0	——	Auto Simplex === 00000018 === 1 Floor 0.00m/s Door Locked	Elevator status window
1	Enter	Fun. Select → Monitor Para. Setup	Enter function selection window
2	▼ Press 3 times	Fun. Select → reset command value added	
3	Enter	Reset command → F para reset fault code reset	
4	Enter	Reset Para. F Pls Input: 5678 0	Users must enter check code 5678 to prevent mishandling, operation like entering password.
5	Enter	Reset Para. F Pls. Input: 5678 5678	Enter check code 5678
6	Enter	Reset Para. F Reset Para. F Successful!	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.

The time setting is a little different from parameter F setting, now take time set of year 2006, month 10, date10, hour 15, minute 20 for example:

Step	Key	Operator status	Remark
0	----------	Auto Simplex === 00000018 === 1 Floor 0.00m/s Door Locked	Elevator status window
1	Enter	Fun. Select → Monitor Para. Setup	Enter function selection window
2	▼ Press 4 times	Fun. Select → value-added relogin	

3	Enter	Value-added func → time setting Floor offset	
4	Enter	Time Setup 09 Y10 M 01 D 09:20:30	
5	Enter	Time Setup 09Y 10M 01D 09:20:30	
6	Press 2 times	Time Setup 09Y 10M 01D 09:20:30	
7	Press 9 times	Time Setup 09Y 10M 10D 09:20:30	
8		Time Setup 09Y 10M 10D 09:20:30	
9	Press 6 times	Time Setup 09Y 10M 10D 15:20:30	
10	Enter	Time setup 09Y10M10D 15:20:30	

Operation of password modification is very similar with the operation of parameter F modification. enter the operation menu and modify time& password as per the parameter F modification method.

The re-login window is like the login window, so we won't introduce again.

Chapter 6 introduction to the supporting products

In the following Table 6.1, AS 380 series elevator integrated drive controller's supporting materials are tabulated for users making choices in accordance with the specific configuration of their elevators:

Name		Description		Remarks
Car top Control Board SM-02/H		Collect and process car top information and other related information		required part,
Car top Extension Board SM.09IO/B		Control rear door open/close signal and collect information related to rear door		required part for rear door
Car Control Board SM.02/G		Collect and process car information and other related information		required part
Car extension board SM.09IO/B		Collect and process door open holding button, NS-SW switch information		optional part
Instruction control panel SM-03		Command panel, installed in car operation panel, collect information related car call and etc		Required part
Call & display control SM-04	SM-04-VRF	optional part1	For call and display	required 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/A3	optional part7		
	SM-04-VL/B3	optional part8		
	SM-04-VSD	Optional part 9		
	SM-04-VRJ	Optional part 10		
Calling board		For installation of call/ display panel		optional part
Operation box		For installation of instruction panel and car display board		optional part
Brake resistor		Installed in the control cabinet, for the heat dissipation of elevator tractor. The controller of various frequency should be equipped with the corresponding brake resistors		optional part
ABZ incremental 12V PG card AS.T025		For asynchronous motor or synchronous motor with incremental encoder		Required par as per the encoder type
SIN/COS PG card AS.T024		For synchronous motor		
ABZ incremental 5V PG card AS.T041		For asynchronous motor or synchronous motor with incremental encoder		
Endat PG card AS.L06/L		For synchronous motor		
Elevator control cabinet		For elevator control, including AS380 control cabinet and the all accessories in the cabinet		Optional

Group control board SM-GC	For elevator group control from 3 to 8 unit	Standard group control required
Handheld operator and connecting wires	For elevator adjustment	Adjustment required accessories

6.1 Car top control board SM.02/H introduction

6.1.1 Car top control panel SM.02/H outside view and installation dimension

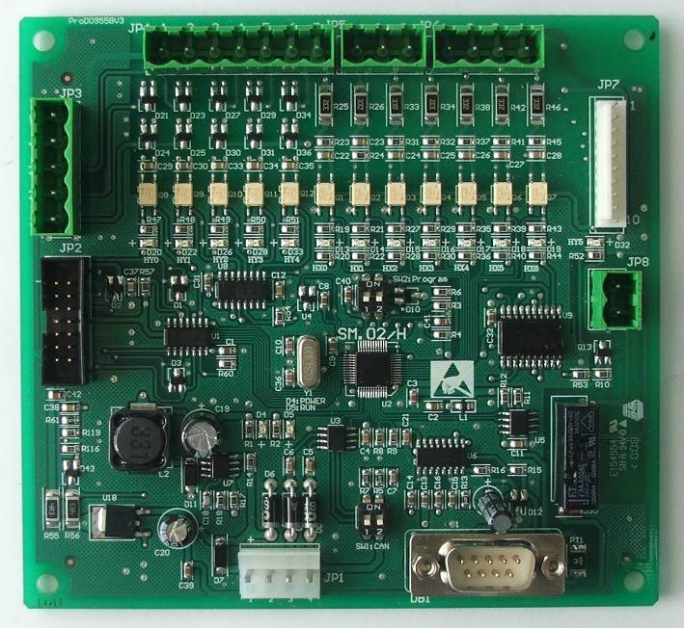


Fig 6.1 car top control panel outside view

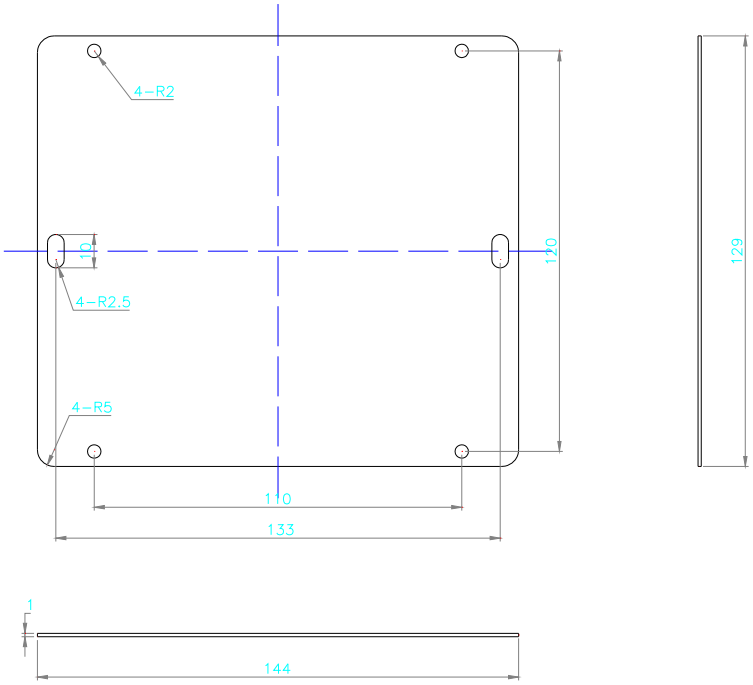


Fig 6.2 car top control baseboard installation dimension

6.1.2 Car top control panel SM 02/H

Table 6.1 car top control panel SM.02/H plug-in specification

Car top control panel SM-2/H plug-in specification			
JP1	CH3.96-4A	**JP5**	5.08-3P-V-green
JP2	IDC-14P	**JP6**	5.08-4P-V-green
JP3	5.08-5P-V-绿	**JP7**	CH2510-10A
● JP4	5.08-7P-V-绿	**JP8**	5.08-2P-V-green

Table 6.2 Car top control panel SM.02/H input and output port definition

Port definition			
Socket No	Port No	Definition	Remark
JP1	1	24V red	
	2	GND yellow	
	3	CANH green	
	4	CANL blue	
JP2	Connecting car top extension board		
JP3	1	Out put JP3.2-JP3.3 common port	
	2	Output HY0，down arrival gong	
	3	Output HY1， upper arrival gong	
	4	Output 0V	
	5	Output 24V	
JP4	1	Input JP4.2-JP4.3 common port	
	2	Input HX0，front door close in place	Default NC
	3	Input HX1，front door open in place	Default NC
	4	Output JP4.5-JP4.7common port	
	5	Output HY2，front door forced close output	
	6	Output HY3， front door close signal output	
	7	Output HY4， front door open signal output	
JP5	1	Input JP5.2-JP5.3 common port，0V	
	2	Input HX2，front door safety edge	Default NC
	3	Input HX3，front door light curtain	Default NO
JP6	1	Input JP6.2-JP6.4 common port，0V	
	2	Input HX4，light load	Default NO
	3	Input HX5，full load	Default NO
	4	Input HX6，overload	Default NC
JP7	1	Parallel voice port D0, LSB	
	2	Parallel voice port D1	
	3	Parallel voice port D2	
	4	Parallel voice port D3	
	5	Parallel voice port D4	

	6	Parallel voice port D5	
	7	Parallel voice port D6	
	8	Parallel voice port D7, MSB	
	9	Common port 0V	
	10	Common port ＋24V	
JP8	1	JP8.2 common port	
	2	Output HY5，light fan relay	
DB1		Program burning record port	
SW1	SW1.1	simultaneously turn on and CAN terminal resistor is connected, simultaneously turn off and terminal resistor disconnected	
	SW1.2		
SW2	SW2.1	simultaneously turn on and enter into the program recording status, simultaneously turn off and return to normal running status	
	SW2.2		

Note:

1) The JP 7 port of SM-02/H 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 255 output status in accordance with STEP WORD BANK for display, namely, supposing t that user set B1 for the first floor display, the corresponding display code is 60. The JP7 output signal is to transform the decimal bit of 60 into binary bit before outputting. The words" we now arrive at B1 floor" are broadcasted by decoding that binary signal. At present 0-247 are processed by the definition of the word bank for display（see the List of Display Codes in 6.5.10） whereas the codes of 248-255 are defined as following:

(248) 11111000: The elevator door close and the signal sent when the elevator is at main landing and is about to move upward

(249) 11111001: the signal sent when elevator is in fire alarming status.

(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： Overload alarming

(253) 11111101： Door opening in place and then forecast next moving direction as upward

(254) 11111110：Door opening in place and then forecast next moving direction as downward

(255) 11111111：To be defined.

2． Wiring and Connection

✧ Car top controller and connection between power supply and communication bus

The car controller with power supply and CAN BUS is lined in from JP1, of which JP1.01 and JP1.02 are for TXV+ and TXV-，JP1.03 and JP1.04 for TXA+ and TXA- respectively. TXV+, TXV- are power input DC24V; TXA+ and TXA- are communication lines which must be 4-wire Twisted Pairs.

✧ Car top controller input signal connection

Car top controller is mainly responsible for collecting part of switch-generated data signal from car top and bottom, and transmit these signal status into main controller through CAN bus. The switch signal is such as door-open/close input, door-open/close in place, safety edge, overload, full load and etc.

✧ connection of output signal of car top controller

Car controller control the relay output with the signals transmitted by CAN bus from main controller. Its relay output control the arrival gong relay, lighting relay and etc for function such as arrival forecast, energy-saving lighting control

6.2 car top extension board SM09I0/B introduction

6.2.1 Car top extension board SM09IO/B outside view and installation dimension

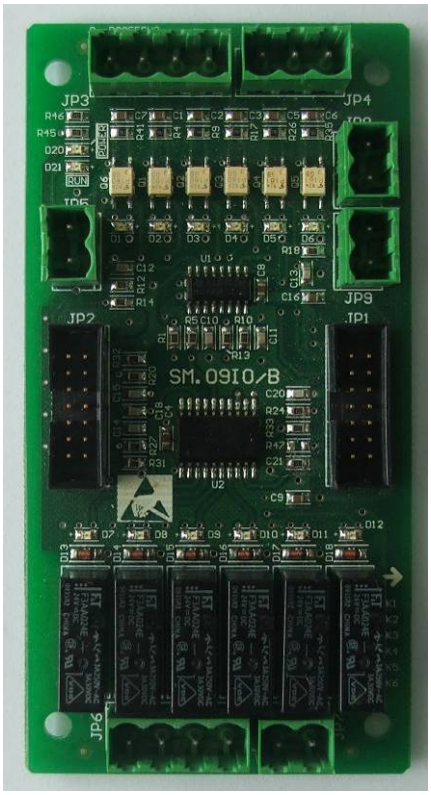


Fig 6.3 car top extension board outside view

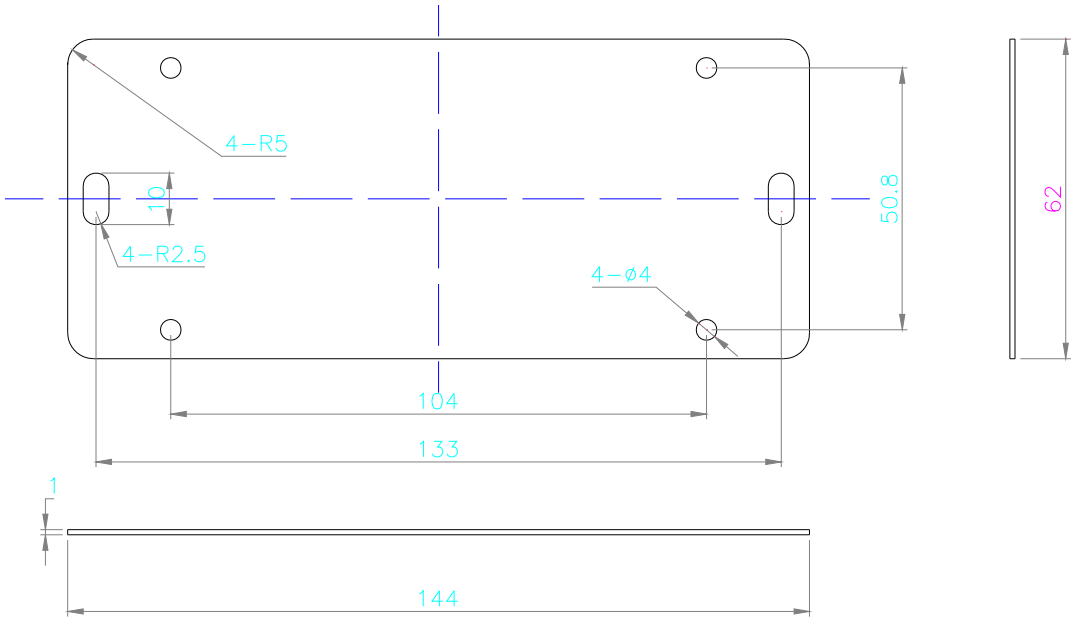


Fig 6.4 car top extension board installation dimension

6.2.2 car top extension board SM09IO/B plug-in and port definition introduction

Table 6.3 car top extension board SM09IO/B plug in specification

Car top extension board			
Socket No	**model**	**Socket No**	**Model**
JP1/JP2	IDC-14P	JP4	5.08-3P-V-green
JP3/JP6	5.08-4P-V-green	**JP5/JP7/JP8/JP9**	5.08-2P-V-green

Table 6.4 SM09IO/B input /output port definition when using as car top extension board

Socket no	Terminal no	Definition	remark
JP1	Connecting car top board SM.02/H		
JP2	Connecting car top extension board		
JP6	1	Output HY6，rear door open signal output	
	2	Output HY7，rear door close signal output	
	3	Output HY8，rear door nudging output	
	4	Output JP6.1-JP6.3 common port	
JP7	1	Output HY9，door open signal output	
	2	Output JP7.1 common port	
JP8	1	Output HY10，door close signal output	
	2	Output JP8.1 common port	
JP9	1	Output HY11，door nudging output	
	2	Output JP9.1 common port	
JP3	1	Input HX7，rear door open in place	Default NC
	2	Input HX8 rear door close in place	Default NC

	3	Input HX9， rear door light curtain	Default NO
	4	Input power，need to connect switch power supply+24V	
JP4	1	Input HX10，rear door safety edge	Default NO
	2	Input HX11，backup	
	3	JP4.1-JP4.2 Input common port,0V	
JP5	1	Input HX12，backup	
	2	JP5.1 Input common port,0V	

6.3 Car controller panel SM.02/G introduction

6.3.1 Car controller panel SM02/G outside view and installation dimension

Fig 6.5 car controller outside view

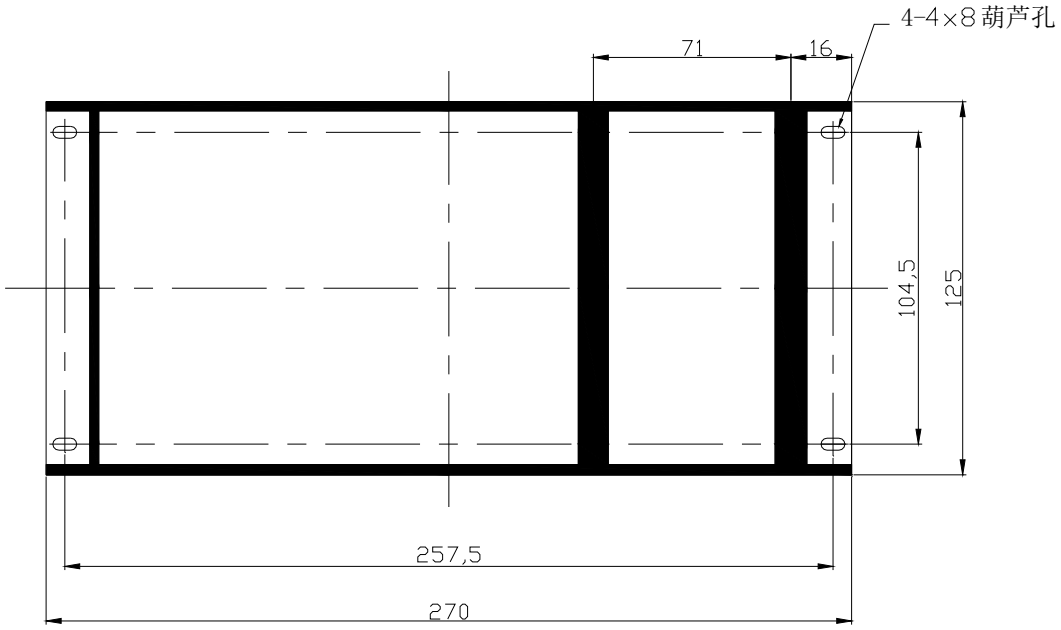


Fig 6.5 car control panel installation dimension

6.3.2 Car control board SM.02/G plug-in and port definition introduction

Table 6.5 car control board SM02/G plug-in specification

Car control board			
Socket No	**model**	**Socket No**	**model**
JP1	CH3.96-4A	**JP5**	5.08-6P
JP2/JP3	IDC-14P	**JP6/JP7**	CH2510-4A
JP4	B4B-XH-A		

Table 6.6 car control board SM.02/G port definition

Port Definition			
Socket No	Port No	Definition	remark
JP1	1	24V red	
	2	GND yellow	
	3	CANH green	
	4	CANL blue	
JP2	connecting instruction board		
JP3	connecting car extension board		
JP4	car adjusting port		
JP5	1	Input GX0， attendant change direction	Default NO
	2	Input GX1， attendant	Default NO
	3	Input GX2, Independent	Default NO
	4	Input GX3, attendant by-pass	Default NO
	5	Input GX4, firemen	Default NO

	6				Input JP5.1-JP5.5 signal common source	Default NO
JP6	1				Negative pole of power supply for door-opening indicator light	
	2				positive pole of power supply for door-opening indicator light	
	3				door-opening button (GX5)	
	4				door-opening button	
JP7	1				Negative pole of power supply for door-closing indicator light	
	2				positive pole of power supply for door-closing indicator light	
	3				door-closing button (GX6)	
	4				door closing button	
DB1					program record burning slot	
SW1	SW1.1				Simultaneously turn on, CAN terminal resistor connected. Simultaneously turn off, terminal resistor disconnected.	
	SW1.2					
SW2	SW2.1				Simultaneously turn on, program record burning status; simultaneously turn off, normal running status.	
	SW2.2					
SW3	SW3.1	SW3.2	SW3.3	SW3.4	operation cabinet type	
	ON	OFF	OFF	OFF	main operation cabinet	
	OFF	ON	OFF	OFF	rear operation cabinet	
	OFF	OFF	ON	OFF	the disabled operation cabinet	
	OFF	OFF	OFF	ON	auxiliary operation cabinet	

Table 6.7 SM09IO/B I/O Port definition when used as car extension board

Socket No	Terminal No	Definition	remark
JP1	Connecting car board SM.02/G		
JP2	connecting the second car extension board		
JP6	1	Output GY0 ， door-opening holding indicator light output	
	2	Output GY1，standby	
	3	Output GY2，standby	
	4	Output JP6.1-JP6.3 common port	
JP7	1	Output GY3， standby	
	2	Output JP7.1 common port	
JP8	1	Output GY4， standby	
	2	Output JP8.1 common port	

JP9	1	Output GY5， standby	
	2	Output JP9.1 common port	
JP3	1	Input GX7， standby	
	2	Input GX8， standby	
	3	Input GX9， standby	
	4	Input power supply need to connect the power supply of switch +24V	
JP4	1	Input GX10， door opening holding button input	Default NO
	2	Input GX11， NS-SW	Default NO
	3	JP4.1-JP4.2 Input common port,0V	
JP5	1	Input GX12， standby	
	2	Input power supply， need to connect switch power supply+24V	

Note:

✧ car control board is linked to the power supply and communication bus

The power supply and communication of car control board is lined in with JP1, in which JP1.01 and JP1.02 is TXV+ and TXV-. JP1.03 and JP1.04 is TXA+ and TXA -，

The input power supply of TXV+，TXV- is DC24V. TXA+ and TXA- is communication line. The communication line must be 4-wire twisted pairs.

✧ car control board input signal connection

Car control board mainly collect car switch-generated data signal, and transmit these signal status to main controller through CAN bus. These switch-generated data signal such as door open/close input, attendant, by-pass, etc.

✧ car control board output signal connection

Car control board control the transistor output through the signal transmitted from CAN bus. The transistor output control the output of door-opening/closing button lamp.

✧ the connection between car control board and instruction controller

The connection line between instruction extension control board and car control board is preinstalled in the car. And the pin plug into the JP2 groove

✧ door opening/closing button and indicator lamp connection instruction.

1 and 2 pin connecting respectively to “-“and “+” terminal of power supply of door indictor lamp. 3 and 4 pin connecting to the button terminal of door opening and closing

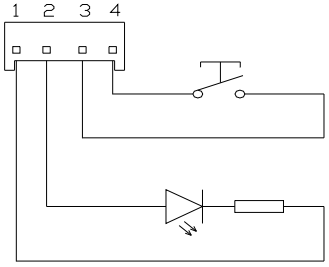


Fig 6.7 door opening/closing button and instruction lamp connection diagram

6.4 instruction control board SM-03

6.4.1 Instruction control board SM-03 outside view and installation dimension

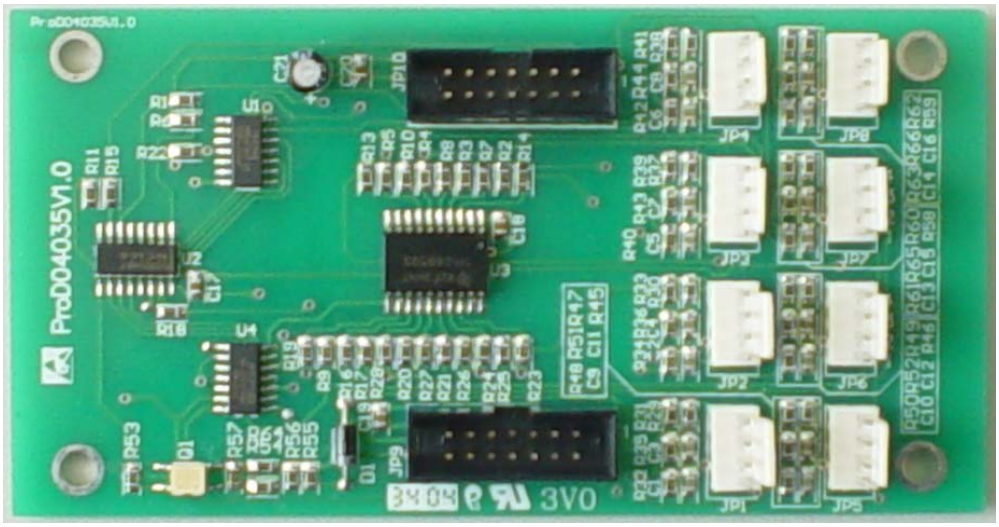


Fig 6.8 instruction control board outside view

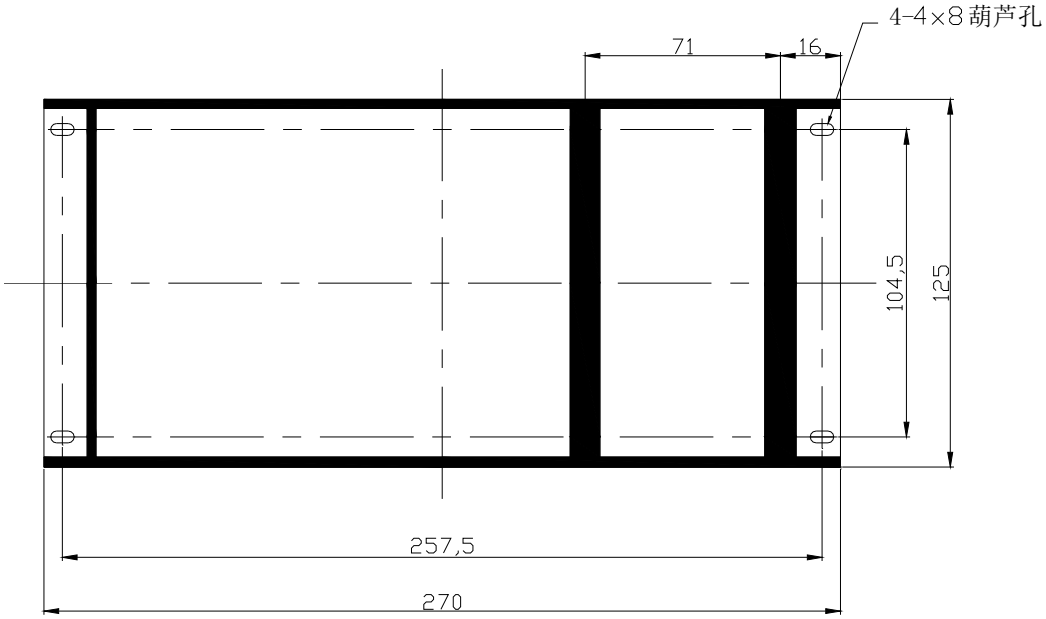


Fig 6.9 instruction controller board installation dimension

6.4.2 Instruction controller board SM-03 plug-in and port definition introduction

Table 6.7 instruction control board plug-in specification

Instruction controller board	
Socket No	**Model**
JP1/JP2/JP3/JP4/JP5/JP6/JP7/JP8	CH2510-4
JP9/JP10	14 pin parallel dot-matrix socket

Table 6.8 instruction control board port definition

Serial No	the definition of 1# instruction controller pin	the definition of 2# instruction controller pin	…	the definition of 8# instruction controller pin
JP1	Connect 1st floor instruction button	Connect 9th floor instruction button	…	Connect 57th floor instruction button
JP2	Connect 2nd floor instruction button	Connect 10th floor instruction button	…	Connect 58th floor instruction button
JP3	Connect 3rd floor instruction button	Connect 11th floor instruction button	…	Connect 59th floor instruction button
JP4	Connect 4th floor instruction button	Connect 12th floor instruction button	…	Connect 60th floor instruction button
JP5	Connect 5th floor instruction button	Connect 13th floor instruction button	…	Connect 61st floor instruction button
JP6	Connect 6th floor instruction button	Connect 14th floor instruction button	…	Connect 62nd floor instruction button
JP7	Connect 7th floor instruction button	Connect 15th floor instruction button	…	Connect 63rd floor instruction button
JP8	Connect 8th floor instruction button	Connect 16th floor instruction button	…	Connect 64th floor instruction button

Note: instruction button and indicator lamp connection.

Pin 1 and 2 connect respectively to the "-" and "+"terminal of power supply of indicator. And pin 3 and 4 connect to the instruction button terminal.

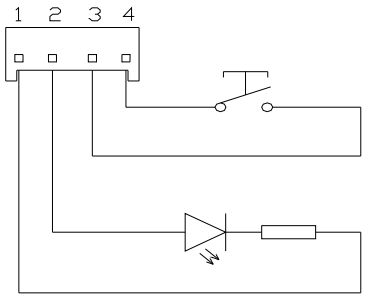


Fig 6.10 instruction button and indicator lamp wiring diagram

6.5 call & display control board

6.5.1 call &display control board SM-04-VRFS

SM-04-VRF outside view and installation dimension

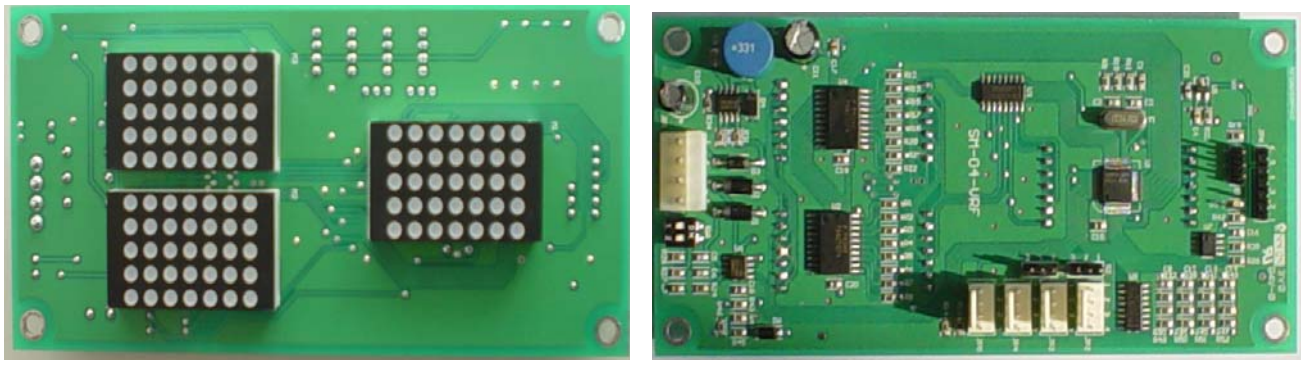


Fig 6.11 SM-04-VRF outside view

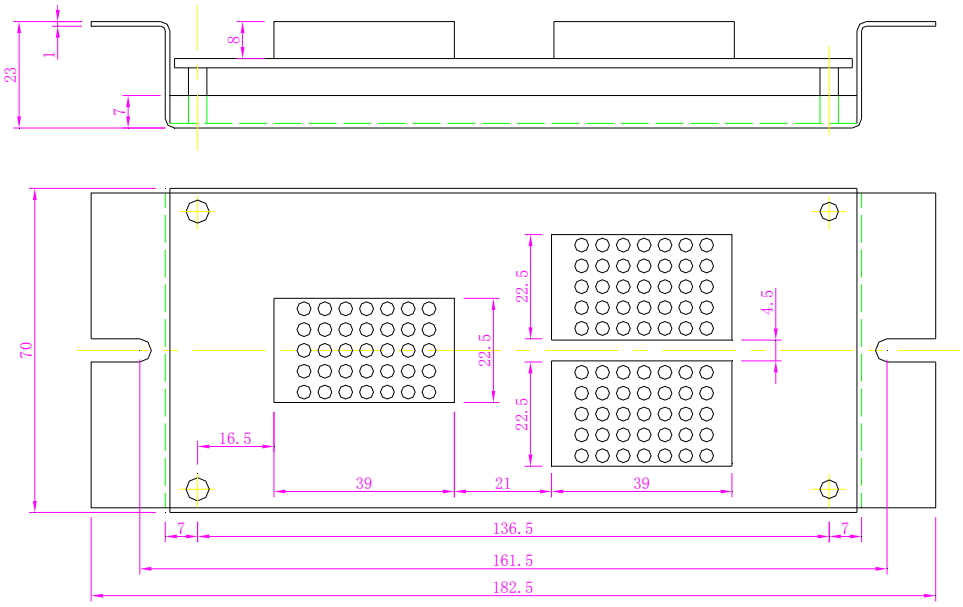


Fig 6.12 SM-04-VRF installation dimension

☆SM-04-VRF plug-in specification and port definition

Table 6.9 SM-04-VRF plug-in specification and port definition

Serial No	description	remark
JP1	Serial communication port，in which pin 1 as TXV+, pin 2 as TXV-，pin 3 as TXA+, pin 4 as TXA-	CH3.96-4
JP2	upward call button port (pin 1,2 as button lamp indicator, 1 as "-", 2 as "+", pin 3 and 4 as button input	CH2510-4
JP3	downward call button port (pin 1,2 as button lamp indicator, 1 as "-", 2 as "+", pin 3 and 4 as button input	CH2510-4
JP4	stop indicator(hall)/overload output (car) and elevator lock input port (pin 1,2 as button lamp indicator, 1 as "-", 2 as "+", pin 3 and 4 as normal open contact input of elevator lock switch)	CH2510-4
JP5	Full-load indicator(hall)/firefighting output (car) (pin 1,2 as button lamp indicator, 1 as "-", 2 as "+", pin 3 and 4 as standby input)	CH2510-4
JP6	program burning slot/RS232 communication port	

S1	Plug in jumper to set the address code of the display board and remove the jumper after the setting complete	
S2	Bridge S2.1 and S2.2 and use JP2 as the button of three wire system, bridge S2.2 and S2.3 (or do not bridge) as the button of four wire system	
S3	Bridge S3.1 and S3.2 and use JP3 as button of three-wire system, bridge S3.2 AND s3.3 (or do not bridge) as button of four wire system	
SW1	Resistor jumper of serial communication terminal and shortening mean the connection to the built-in 120 ohm resistor	

6.5.2 Call& display control board SM-04-HSC

Outside View & Mounting Dimensions of SM-04-HSC

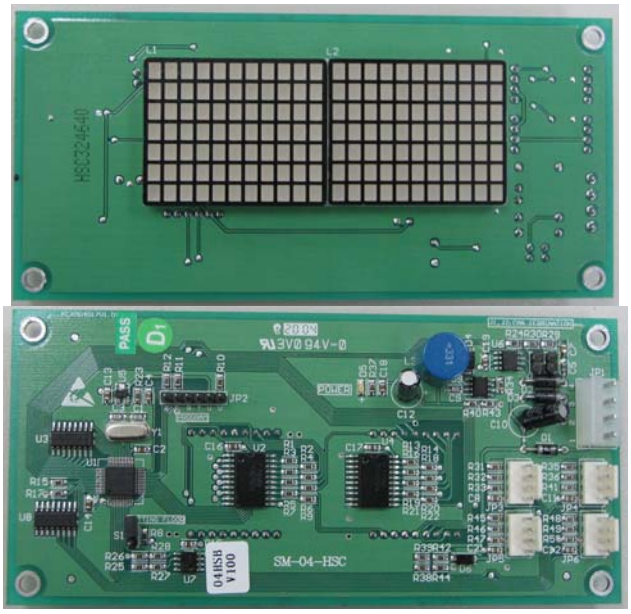


Fig. 6.17 Outside View of SM-04-HSC

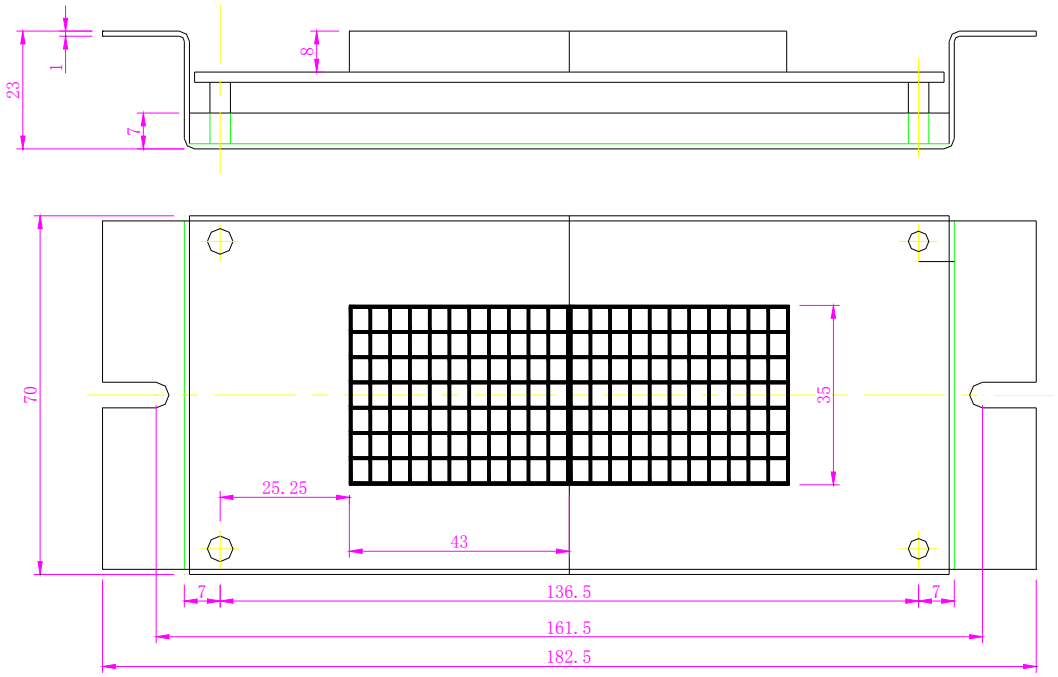


Fig. 6.18 Mounting Dimensions of SM-04-HSC

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

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	RS232 port / program burn recording slot.	
JP3	Up-call terminals, of which Pin 1- and Pin 2+ for button indicator, Pin 3 and Pin 4 for button input.	CH2510-4
JP4	Down-call terminals, of which Pin 1- and Pin 2+ for button indicator, Pin 3 and Pin 4 for button input.	CH2510-4
JP5	Stop indicator (Landing)/Over load output(In-Car) and lockout input terminals, of which Pin 1- and Pin 2+; Pin 3 and Pin 4 for the normal open contact input of the lockout switch.	CH2510-4
JP6	full-load indicator (Landing)/fire indicator (In-Car), of which Pin 1- and Pin 2+ for light indicator; Pin 3 and Pin 4 for stand-by.	CH2510-4
S1	Set the address codes of the display Board with the jumper on, after that the jumper MUST BE REMOVED.	
J1/J2	Resistor jumper for serial communication terminals for connecting the 120Ω built-in resistor when jumpers are put on together.	

List 6.12 Terminal Definitions and Specification of SM-04-HSC

6.5.3 Call & Display Control Board SM-04-VHL

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

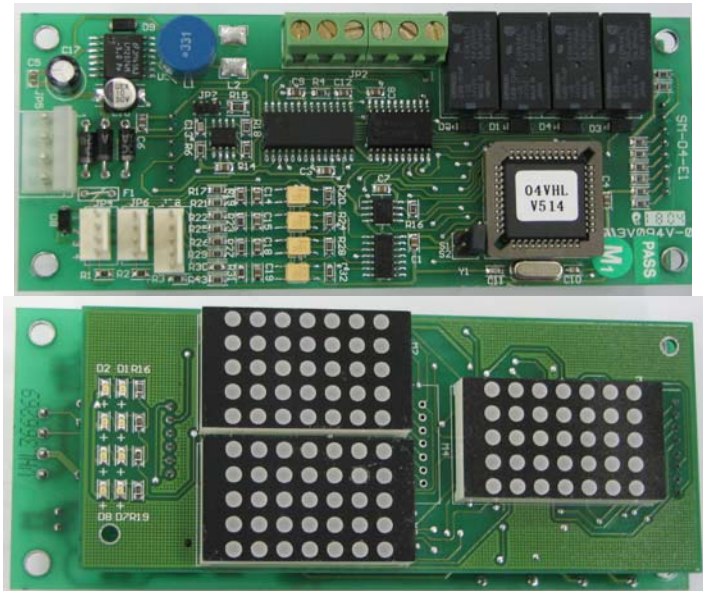
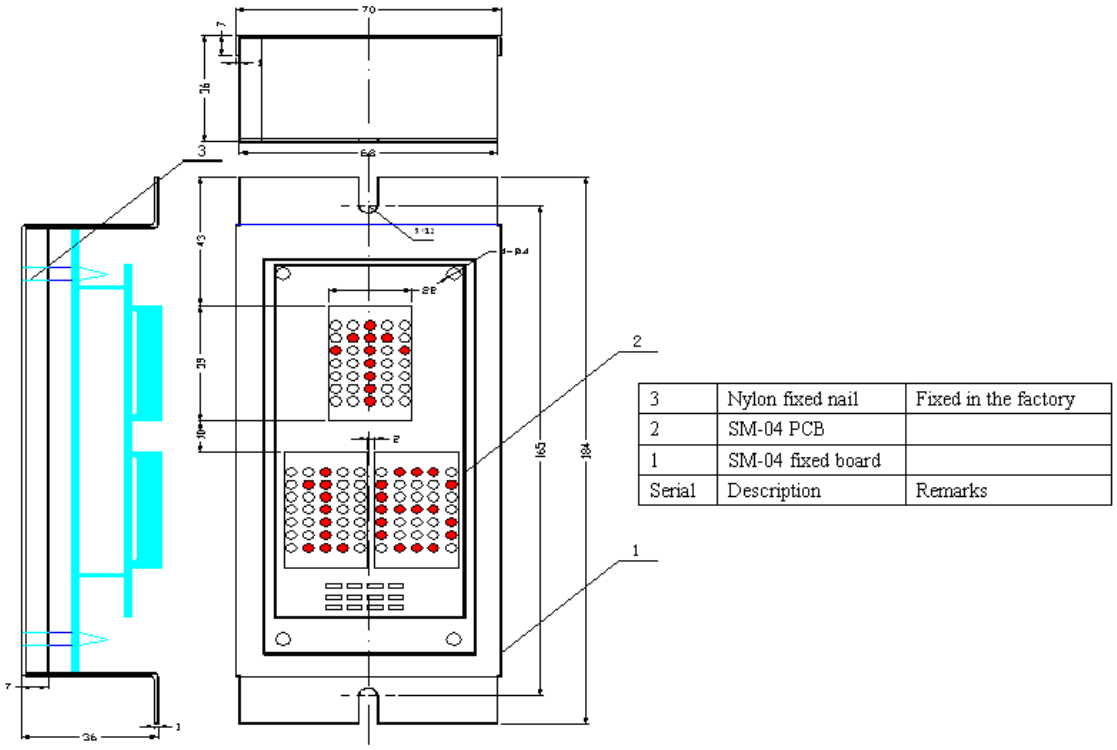


Fig. 6.19 outside View of SM-04-VHL



3	Nylon fixed nail	Fixed in the factory
2	SM-04 PCB	
1	SM-04 fixed board	
Serial	Description	Remarks

Fig. 6.20 Mounting Dimensions of SM-04-VHL

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

Serial	Descriptions		Remarks
JP5	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
JP4	Down-call terminals, of which Pin 3+ and Pin 4- for button indicator, Pin 1 and Pin 2 for button input.		CH2510-4
JP6	Up-call terminals, of which Pin 3+ and Pin 4- for button indicator, Pin 1 and Pin 2 for button input.		CH2510-4
JP8	Pin 1 and Pin 2 JP8 for the input of normal open contact of the lockout switch, Pin 3 and Pin 4 for stand-by.		CH2510-5
JP2	JP2.1	output terminal for landing arrival gong up	CH2510-4
	JP2.2	common port for landing arrival gongs up and down	
	JP2.3	output terminal for landing arrival gong down	
	JP2.4	output terminal for landing arrival lamp up	
	JP2.5	common port output for landing arrival lamp up and down	
	JP2.6	output terminal for landing arrival lamp down	
JP7	Resistor jumper for serial communication terminals for connecting the 120Ω built-in resistor when jumpers are put on together.		
S1	Set the address codes of the display Board with the jumper on, after that the jumper MUST BE REMOVED.		
S2	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 6.13 Terminal Definitions and Specification of SM-04-VHL

6.5.4 Call & LCD Control Board SM-04-UL

☆ 6.21 Outside View & Mounting Dimensions of SM-04-UL

Dimension specification：Outside Dimension: 160 x 109 cm,

LCD display dimension: 110 x 86 cm

Working temperature：-10 degree---60 degree

Working humidity：<95%

55 outside view and installation size

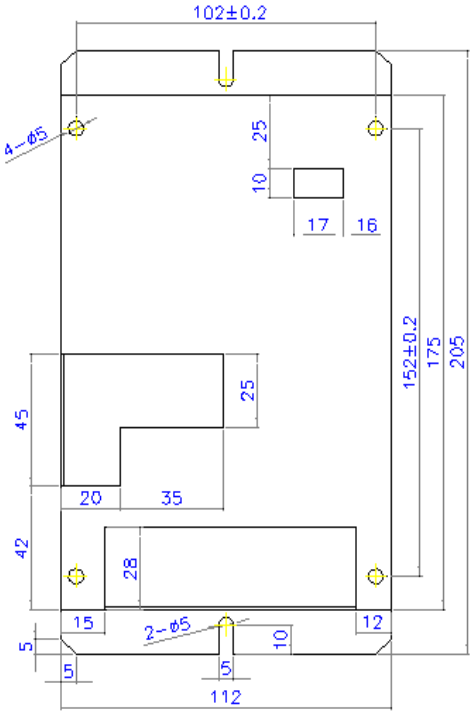


Fig. 6.22 outside View of SM-04-UL

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

Serial	Descriptions	Remarks
JP8	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
JP11	Down-call terminals, of which Pin 1 -and Pin 2 + for button indicator, Pin 3 and Pin 4 for button input.	CH2510-4
JP12	Up-call terminals, of which Pin 1- and Pin 2+ for button indicator, Pin 3 and Pin 4 for button input.	CH2510-4
JP10	Pin 3 and Pin 4 for the input of normal open contact of the lockout switch, Pin 1 and Pin 2 for stand-by.	CH2510-5
SW1	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.	
SW2	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.	
SW5	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 down buttons.	

List 6.14 Terminal Definitions and Specification of SM-04-UL

Table 6-15 function description

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 for 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.			

6.5.5 Car Call & LCD Control Board SM-04-VL

☆ Outside View & Mounting Dimensions of Landing call display Board SM-04-VL16/A

Fig. 6.23 outside View of SM-04-VL16/A

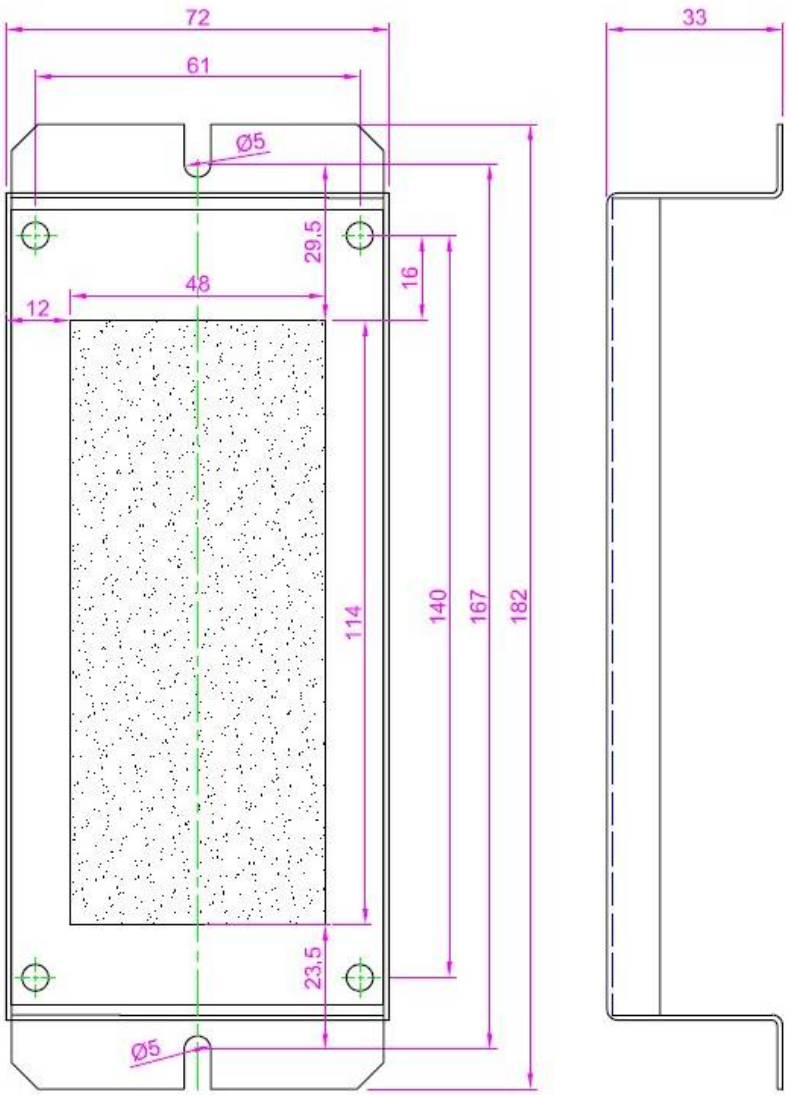


Fig.6.24 Mounting Dimensions of SM-04-VL16/A

Table 6.16 A SM-04-VL16/A plug-in specification and port definition

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
JP3	Down-call terminals, of which Pin 1- and Pin 2+ for button indicator, Pin 3 and Pin 4 for button input.	CH2510-4
JP4	Pin 3 and Pin 4 of JP5 connected to the normal open contact of elevator –lock switch	CH2510-4
JP5	Pin 3 and Pin 4 of JP6 is the port for passenger button	CH2510-4
SW2	The dip switch of serial communication terminal resistor , right turn mean the connection of built-in 120Ω resistor	
SW1.2	SW1.2 ON for display in English, OFF for display in Chinese and English together.	
SW1.3	SW1.3 ON for 64 floor mode, otherwise, for 48 floor mode.	

SW1.4	SW1.4 ON for setting address codes of the display board, and SW1.4 OFF after setting finished.	

6.5.6 In-car SM-04-VL/B3 outside view and installation dimension

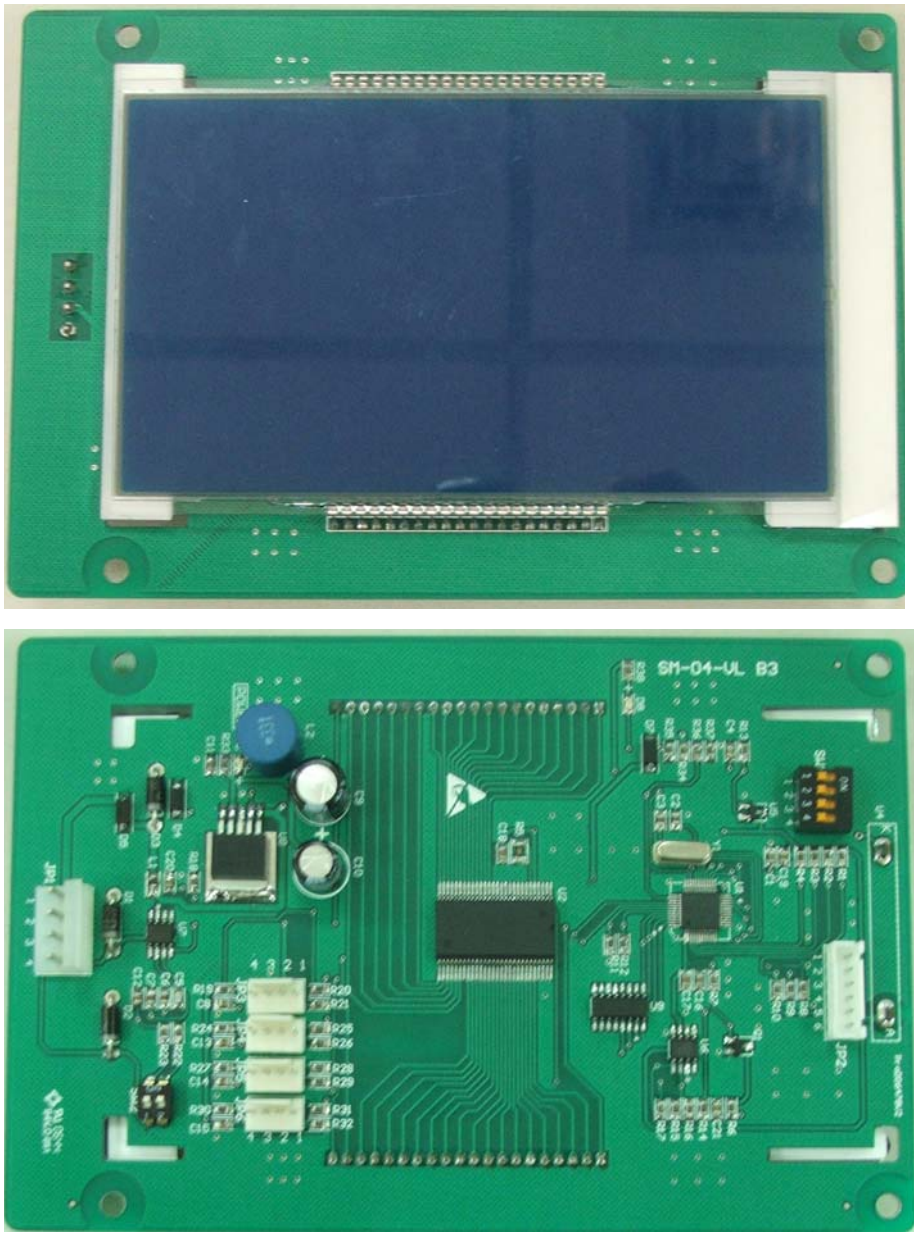


Fig 6.25 SM-04-VL/B3 outside view

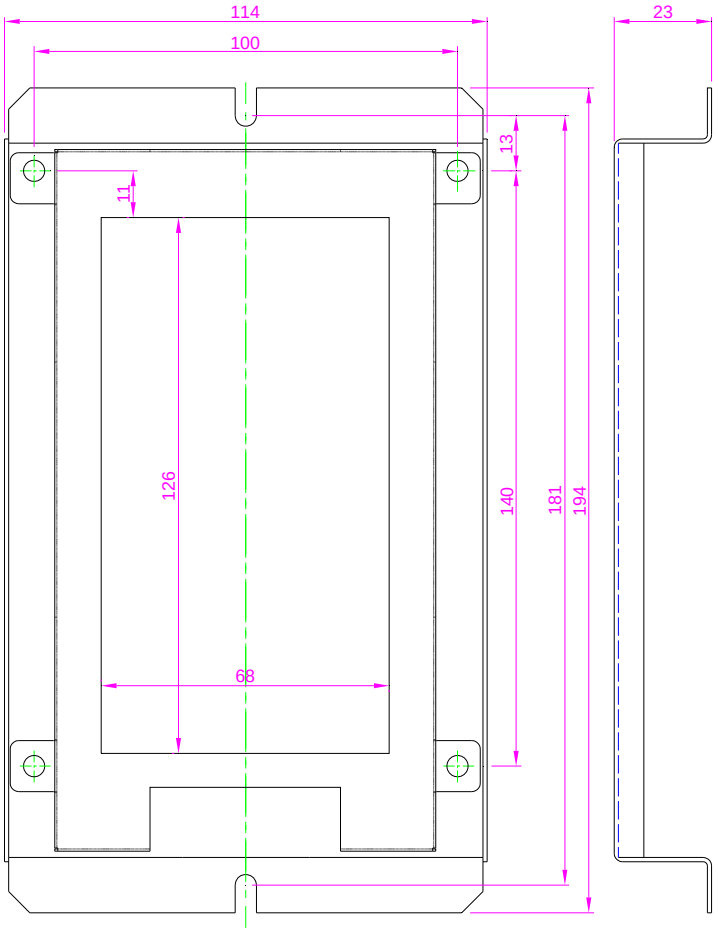


Fig 6.26 SM-04-VL/B3 installation dimension

Table 6.16B SM-04-VL/B3 plug-in specification and port definition

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
JP3	Up-call terminals, of which Pin 1- and Pin 2+ for button indicator, Pin 3 and Pin 4 for button input.	CH2510-4
JP4	Down-call terminals, of which Pin 1- and Pin 2+ for button indicator, Pin 3 and Pin 4 for button input.	CH2510-4
JP5	Pin 3 and Pin 4 of JP5 connected to the normal open contact of elevator –lock switch	CH2510-4
JP6	Pin 3 and Pin 4 of JP6 is the port for passenger button	CH2510-4
SW2	The dip switch of serial communication terminal resistor , right turn mean the connection of built-in 120Ω resistor	
SW1.2	SW1.2 ON for display in English, OFF for display in Chinese and English together.	
SW1.3	SW1.3 OFF in standard mode	
SW1.4	SW1.4 ON for setting address codes of the display board, and SW1.4 OFF after setting finished.	

6.5.7 Call& LED display control panel SM-04-VSD

The outside view and installation dimension of SM-04-VSD

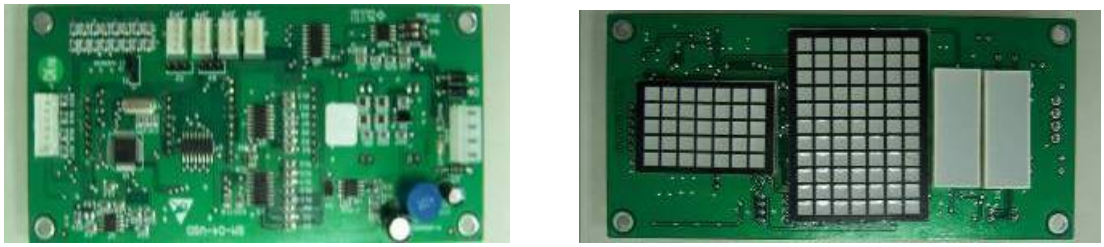


Fig 6.27 SM-04-VSD outside view

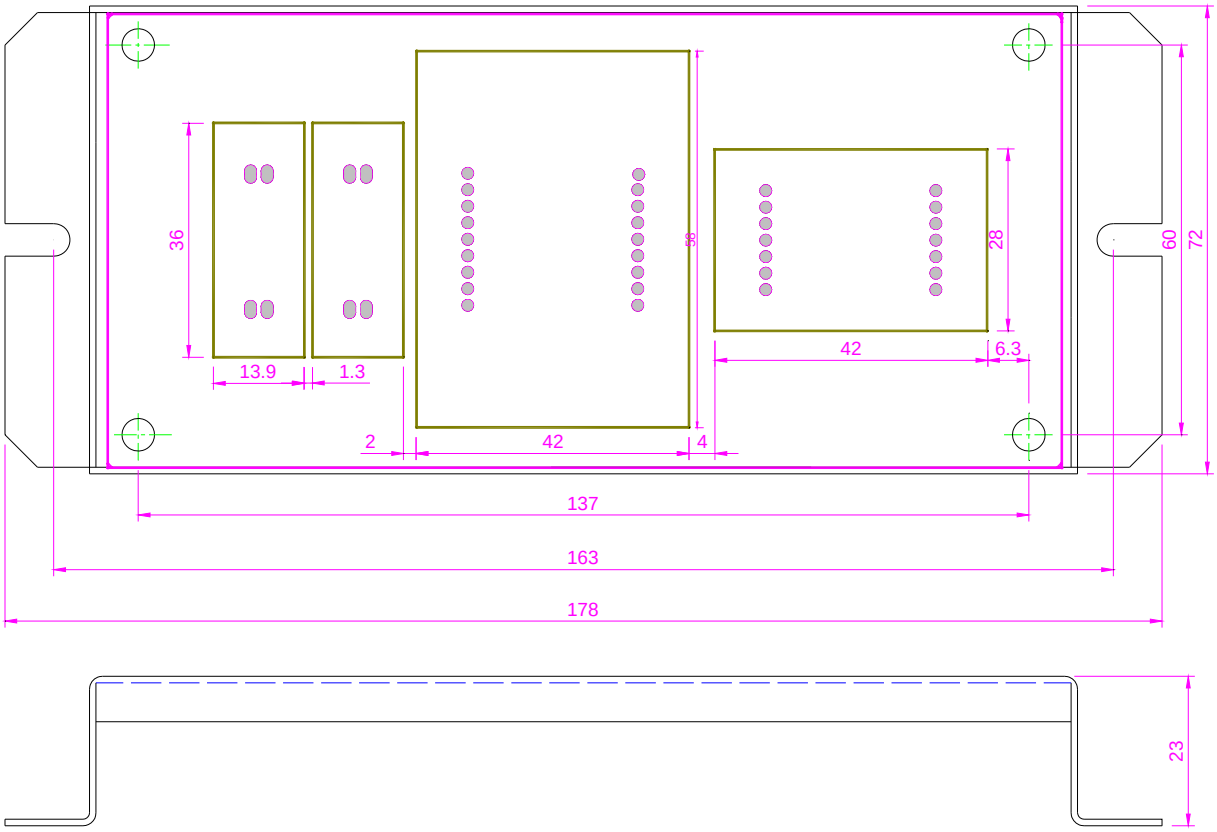


Fig 6.28 SM-04-VSD installation dimension

☆ SM-04-VSD plug-in specification and port definition

Table 6.17 SM-04-VSD plug-in specification and port definition

Serial	Descriptions	Remarks
JP1	Program burning record slot/ RS232 communication port	
JP2	Serial communication port, in which pin 1 is TXV+, pin 2 is TXV-, pin 3 is TXA+, pin 4 is TXA-	CH3.96-4
JP3	Up-call terminals, of which Pin 1- and Pin 2+ for button indicator, Pin 3 and Pin 4 for button input.	CH2510-4

JP4	Down-call terminals, of which Pin 1- and Pin 2+ for button indicator, Pin 3 and Pin 4 for button input.	CH2510-4
JP5	Pin 1 and Pin 2 is the elevator-lock indicator output, Pin 3 and 4 are Normal open contact input of elevator-lock	CH2510-4
JP6	standby	CH2510-4
S1	Set the address codes of the display Board with the jumper on, after that the jumper MUST BE REMOVED.	
S2	Bridge S2.1 and S2.2 to use JP2 as the button of three-wire system, otherwise , used as button for four wire system.	
S3	Bridge S3.1 and S3.2 to use JP3 as the button of three-wire system, otherwise, used as button for four wire system	
SW1	Resistor jumper of serial communication terminal, meanwhile shorting means the connection of built-in 120Ω resistor.	

6.5.8 Call & LED display SM-04-VRJ

SM-04-VRJ outside view and installation dimension

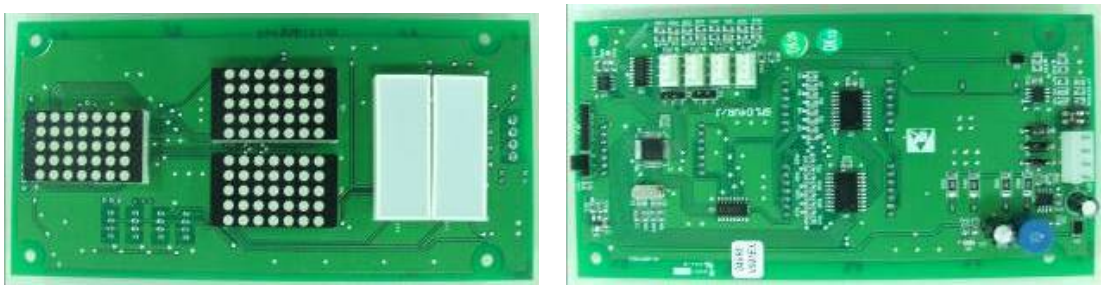


Fig 6.29 SM-04-VRJ outside view

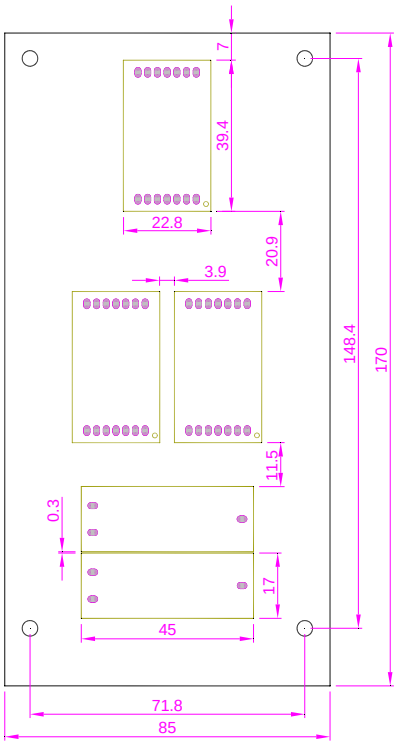


Fig 6.30 SM-04-VRJ installation dimension

☆SM-04-VRJ plug-in specification and port definition

Table 6.18 SM-04-VRJ plug-in specification and port definition

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	Down-call terminals, of which Pin 1 -and Pin 2 + for button indicator, Pin 3 and Pin 4 for button input.	CH2510-4
JP3	Up-call terminals, of which Pin 1- and Pin 2+ for button indicator, Pin 3 and Pin 4 for button input.	CH2510-4
JP4	Pin 3 and Pin 4 for the input of normal open contact of the lockout switch, Pin 1 and Pin 2 for stand-by.	CH2510-4
JP5	standby	CH2510-4
JP6	Program burning record slot/ RS232 communication port	
S1	Set the address codes of the display Board with the jumper on, after that the jumper MUST BE REMOVED.	
S2	Bridge S2.1 and S2.2 to use JP2 as the button of three-wire system, otherwise, used as button for four wire system.	
S3	Bridge S3.1 and S3.2 to use JP3 as the button of three-wire system, otherwise, used as button for four wire system	
SW1	Resistor jumper of serial communication terminal, meanwhile shorting means the connection of built-in 120Ω resistor.	

6.5.9 Miscellaneous (A List of Display Codes)

A list of performance displays

Displays in Car				No Voice Forecast
Inspection	☑ Normal	☐ No	☐Special symbol/otherwise	
Re-leveling at power off	☑ Normal	☐ No	☐Special symbol/otherwise	
Independent	☑ Normal	☐ No	☐Special symbol/otherwise	
Fireman	☑ Normal	☐ No	☐Special symbol/otherwise	
Safety circuit off	☑ Normal	☐ No	☐Special symbol/otherwise	
Lockout	☑ Normal	☐ No	☐Special symbol/otherwise	
Breakdown	☑ Normal	☐ No	☐Special symbol/otherwise	

Overload	☐ Normal	☐ No	☑Special symbol/otherwise	”oL”on display
By-pass with attendant	☑ Normal	☐ No	☐Special symbol/otherwise	
Full-load	☑ Normal	☐ No	☐Special symbol/otherwise	
Displays in the Landing				No Voice Forecast
Inspection	☐ Normal	☑ No	☐Special symbol/otherwise	
Re-leveling at power off	☐ Normal	☑ No	☐Special symbol/otherwise	
Independent	☐ Normal	☑ No	☐Special symbol/otherwise	
Fireman	☐ Normal	☑ No	☐ Special symbol/otherwise	
Safety circuit off	☐ Normal	☑ No	☐ Special symbol/otherwise	
Lockout	☐ Normal	☑ No	☐ Special symbol/otherwise	
Breakdown	☐ Normal	☑ No	☐ Special symbol/otherwise	
Overload	☑ Normal	☐ No	☐ Special symbol/otherwise	
By-pass with attendant	☐ Normal	☐ No	☑ Special symbol/otherwise	1[F]，2/3 Normal
Full-load	☐ Normal	☐ No	☑ 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	12	13A	17	17	5A	G1	G2	G3	F	出口	C1	C2	C3	C4	C

	B		A	B											
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							

◆ 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. 6.32, 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. 6.31.

i.e., Pin 1 and Pin 2 for push-button indicator lamp, whereas Pin 3 and Pin 4 for the push button.

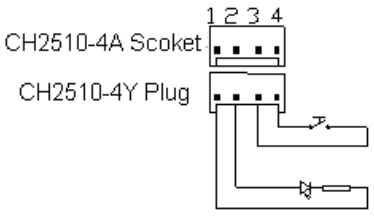


Fig. 6.31 Connection of the Push Button Lines

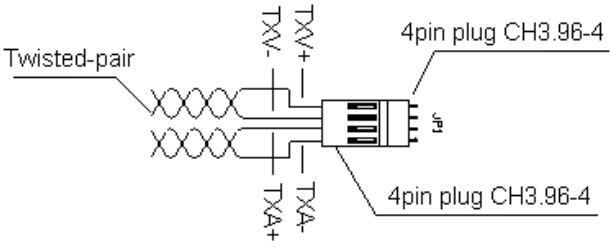


Fig. 6.32 Connection of Communication

6.6 SM-GC board introduction

6.6.1 System structure

Each group control system in standard group control mode needs a group control cabinet, whose core part is computer board SM-GC. SM-GC communicates with each elevator integrated drive controller in the control cabinet through CAN BUS, and arranges each elevator in the group control to make the efficient group control running. System structure is shown as blow:

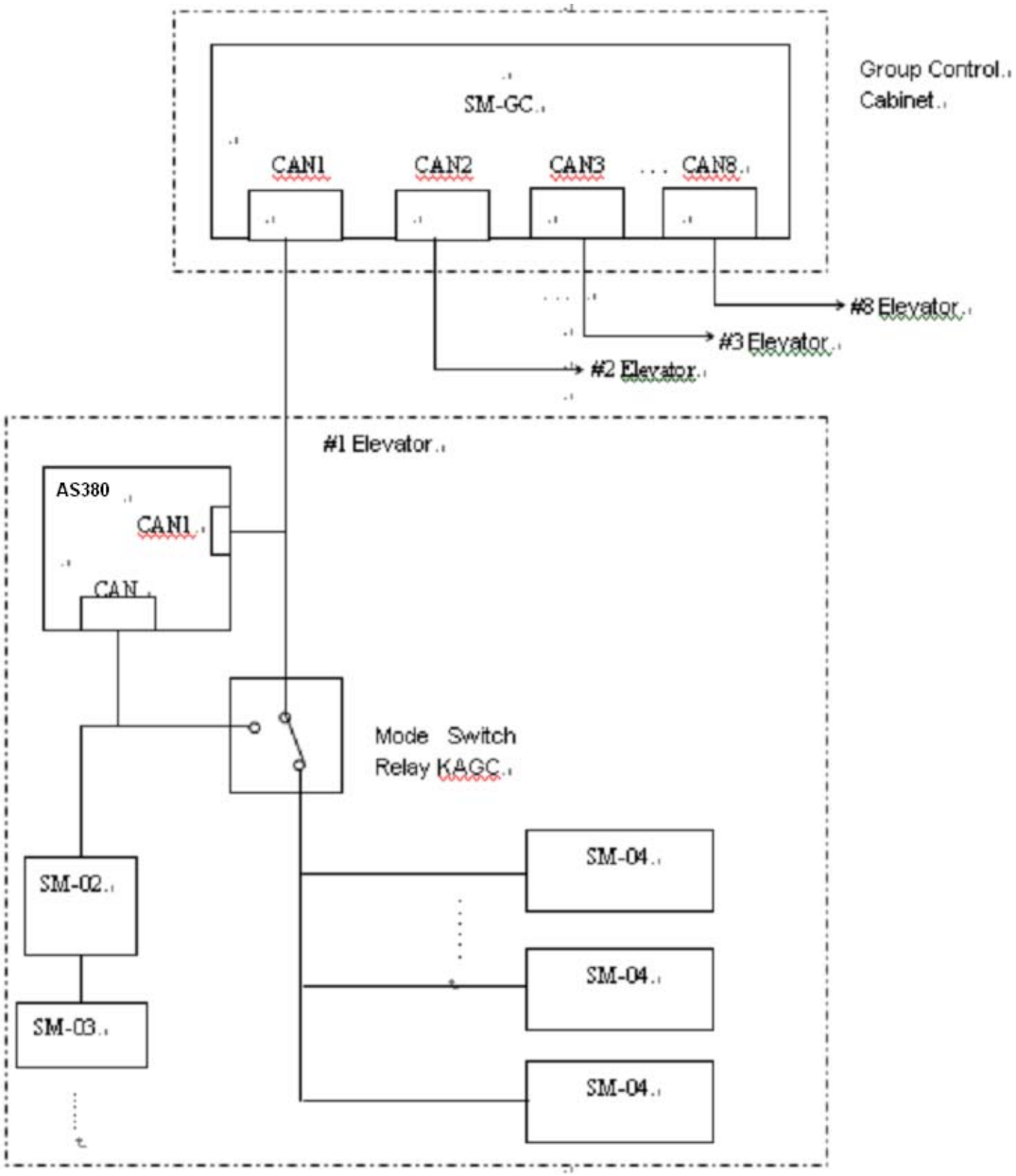


Fig 6.28 System structure.

6.6.2Basic Feature

1 Smart ComII group control system use centralized-control technology, which means system arrange and dispatch hall call with a group control board. With the adoption of minimum waiting time principle in call signal dispatching, group control system analyses various

situations including floor height, car call and hall call situation, elevator transcending situation and reverse direction situation to dispatch hall call to the elevator which can respond most quickly. Group control system can increase the efficiency of the elevator.

2 Smart ComII group control system can control up to 8 elevators at the same time; the max floor number of each elevator is 48.

3 Group control board use CAN BUS serial communication method to communicate with elevator control board, which assure the credible and hi-speed 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 in 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 respond （such as door-closing）, the system will cutoff this fault elevator and re-dispatch the hall call to assure the users not to 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 registration 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 the communication status between group control board and elevator control board through these LEDs. Input terminals in the group control board also have the corresponding LEDs to indicate the ON/OFF situation.

6.6.3Main Functions

1 Homing function: automatically homing function activation is required with related parameter setting. 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. In this way can improve the home base carrying capacity. Homing function has two mode: in standard mode, only one elevator will return to home base automatically without time delay, in the mode of designating the number of elevator automatically homing, the number of elevator automatically homing is set up to four unit. Meanwhile, the homing time delay can also be set. In this mode, it is required to use the second setting software to set the homing elevator quantity and time delay, apart from using standard setting software for homing function activation.

2 Dispersion standby function: dispersion standby function activation is required with related parameter setting, it also has two modes. When all elevators in the system maintain standby status for one minute, group control system activate 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 in the group control system and there is no elevator above central floor, the system will send an elevator which can reach home base most easily to the up standby floor with door closed. In the mode of designating the floor for elevator to standby, if all elevator maintain standby status for a certain period of time (the time set by parameter) and the floor designated for elevator to standby (max set to four) has no elevator , the group control system will dispatch the easiest-reach elevator to the floor designated for elevator to standby with door closed. In this mode, it is required to use the second setting software to set the floors designated for standby and time delay for dispersion standby, apart from using standard setting software for dispersion standby function activation.

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 the completion of response to the hall call and car call. System will recover to normal, when the up peak time passed (set by time relay or manual switch).

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 and standby with door closed as soon as the completion of response to the hall calls and car calls. 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 two switches to select (or use two time relay to select). When one of switch set to ON, system will run with the scheme which is set by users. If both switches are off, elevator will run in normal service floor mode. Each schemes need preset. Users can appoint which elevator to response hall call at which floors and they can also appoint elevator to response up call or down call at designated floor.

6 Standard group split function: When the group split mode parameter is set to 0 and the group split switch is set to ON, group control system split into two independent group control system in accordance with the preset value.(which elevators belong to group X, which elevators belong to group Y) When the switch is set to OFF, system is set to normal group control.

7 Partial incomplete split function: To cope with the inconsistency of bottom floors of elevators in the group control system, the group dividing mode parameter can be set to 1, and group should be divided in accordance with the reachable floor (Group Y for the elevator that can reach the lowest floor, Group X for elevator that can not reach the lowest floor). Turn on the group dividing switch and the group control system enters into the down-call incomplete split running mode. At this time, the passengers at the above floor, who want to get to the lowest floor, can register the down-call signal to elevator that can reach the lowest floor. The system with activation of incomplete split function will only dispatch the elevator that can reach the lowest floor to respond. If the down-call from the elevator that can not reach the lowest floor is registered, system will not activate the incomplete split function and dispatch the easiest reachable elevator to respond. For the up-call signal, group control system will not make any split. Meanwhile, to cope with the inconsistency of top floors of elevators in the group control system, the group dividing mode parameter can be set to 2, and group should be divided in accordance with the reachable floor (group Y for the elevator that can reach the top floor, Group X for elevator that can not reach the top floor). Turn on the group dividing switch and group control system enters into the up-call incomplete split running mode. At this time, the passengers at the below floor, who want to get to the top floor, can register the up-call signal to elevator that can reach the top floor. The system with activation of incomplete split function will only dispatch the elevator that can reach the top floor to respond. If the up-call from the elevator that can not reach the top floor is registered, system will not activate the incomplete split function and dispatch the easiest reachable elevator to respond. For the down-call signal, group control system will not make any split. The advantage of adoption of such function is to meet the needs of passengers that want to go to the certain floor while still maintain the running efficiency of group control system.

8 Signal elevator running under special circumstance, if the certain elevator in the group control system encounter difficult in communication with group control system. The elevator will automatically switch to signal elevator running mode.

9 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's limited capacity, system will let the elevator back to home base one by one and standby with door open. After all the elevator returned to the home base, group control system will assign

which elevators to continue operating and which elevators to standby with door closed in accordance with preset parameters. Therefore, backup power overload will never happen.

6.6.4 Call button signal input and call button lamp control

In normal situation, elevator control cabinet is power on, mode switch relay is closed, elevator integrated drive controller is linked with SM-GC through communication line. SM-04 send the button signal to the elevator integrated drive controller, and the elevator integrated drive controller send the button signal to SM-GC through another CAN port (CAN 1) for button signal processing. SM-GC send the processed button lighting signal to the elevator integrated drive controller and the elevator integrated drive controller will send the lighting signal through CAN port to SM-04. SM-04 finally control the button light on/off based on the received signal. If the control cabinet of certain elevator is power off, the normal close contact of switch relay inside the control cabinet will connect the CAN communication line of SM-GC and SM-04.SM-GC can directly communicate with SM-04 of that elevator. It can directly receive the button contact signal sent by that SM-04 and send lighting signal directly to SM-04.

6.6.5 Overall adjustment principle

In group control system, SM-GC process the hall call's registration and cancellation. 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 following principles

1、 Distance punish

According to the distance between the call button 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 principle of same direction priority，set a reverse direction punish score while calculating 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 according to the specific circumstance.

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. In this way, 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、 Instruction or call punish

It will take an elevator some time to respond the registered instruction or call signal. If there is any instruction or call registered between the elevator and the new hall call, each instruction or same-direction call which is registered will get three punish score.

4、 Overpass punish

To increase efficiency of the elevator and prevent overpass among elevators, 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 points should be added for its entire buttons punish

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 in correspond with each elevator. By comparing the scores, the qualification of that button will be distributed to the elevator with the lowest score.

6.6.6 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 system and send the call signal to the rest of the elevators. Even if there is only one unit left in the group control system, the system itself will always maintain the consistency and reasonableness of elevator dispatch.

IF there is some error occurred in SM-GC, the other elevator integrated drive controller blew will confirm the situation and automatically transfer to single mode to ensure elevators within the group can bring in full play of operation efficiency under the emergency.

6.6.7 detailed description of group controller

6.6.7.1 the appearance of group controller and installation dimension

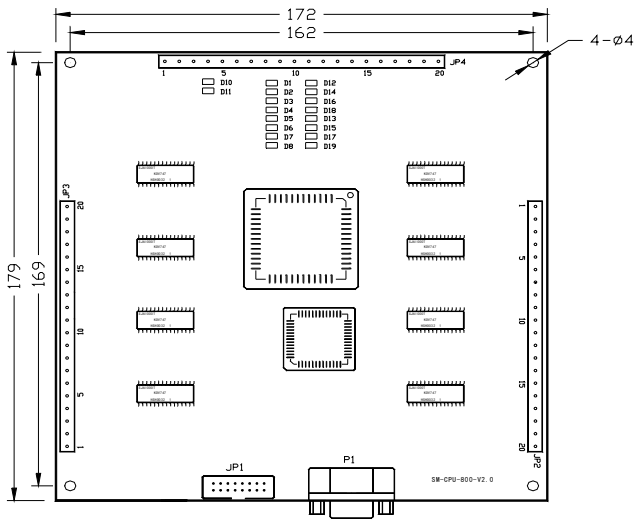


Fig 6.29 Outside view and installation dimension

6.6.7.2 The parts introduction

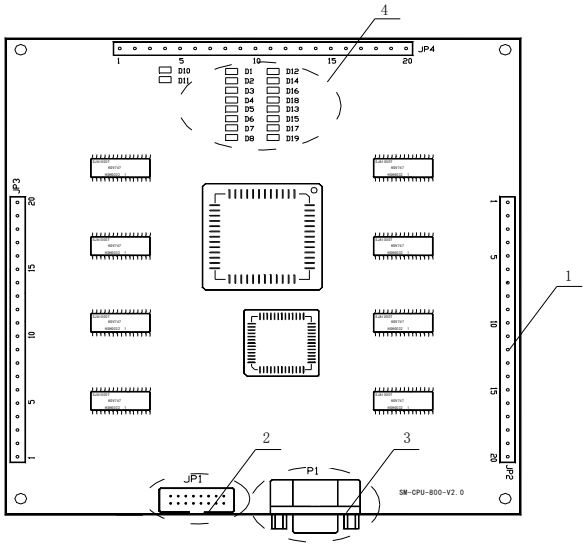


Fig 6.30 Parts Name

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

6.6.7.3 Electrical Specification

♦ Switching value 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 Group (common terminal)			1
Delay	Standard		10ms
Input Frequency range	Standard		1KHz
Length of electric cable	Standard	Shielded	400 M
		Non-shielded	200 M

♦ Communication Port

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

6.6.7.4 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）

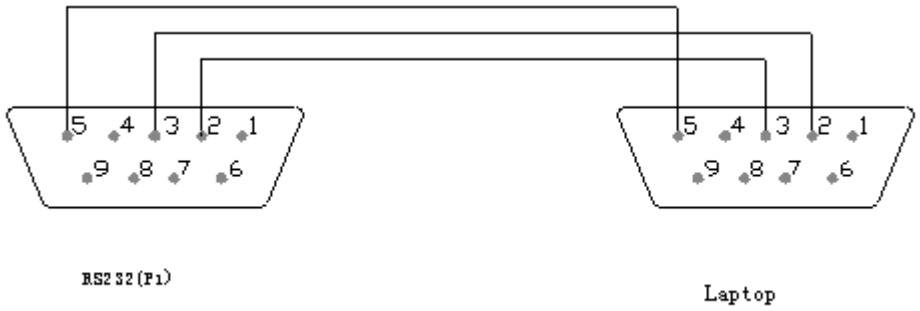
Pin	Name	Definition
JP4-1	0V	negative terminal OV for +5V power supply
JP4-2	+5V	+5Vpower supply
JP4-3	0V	negative terminal OV for +24V power supply
JP4-4	+24V	+24V power supply input

Definition of switching value input terminal (JP4 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	Standby
JP4-14	Input terminal 7	Standby
JP4-15	Input terminal 6	check-in peak hour service switch
JP4-16	Input terminal 5	No 2 switch of service floor switching scheme
JP4-17	Input terminal 4	No 1 switch of service floor switching scheme
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

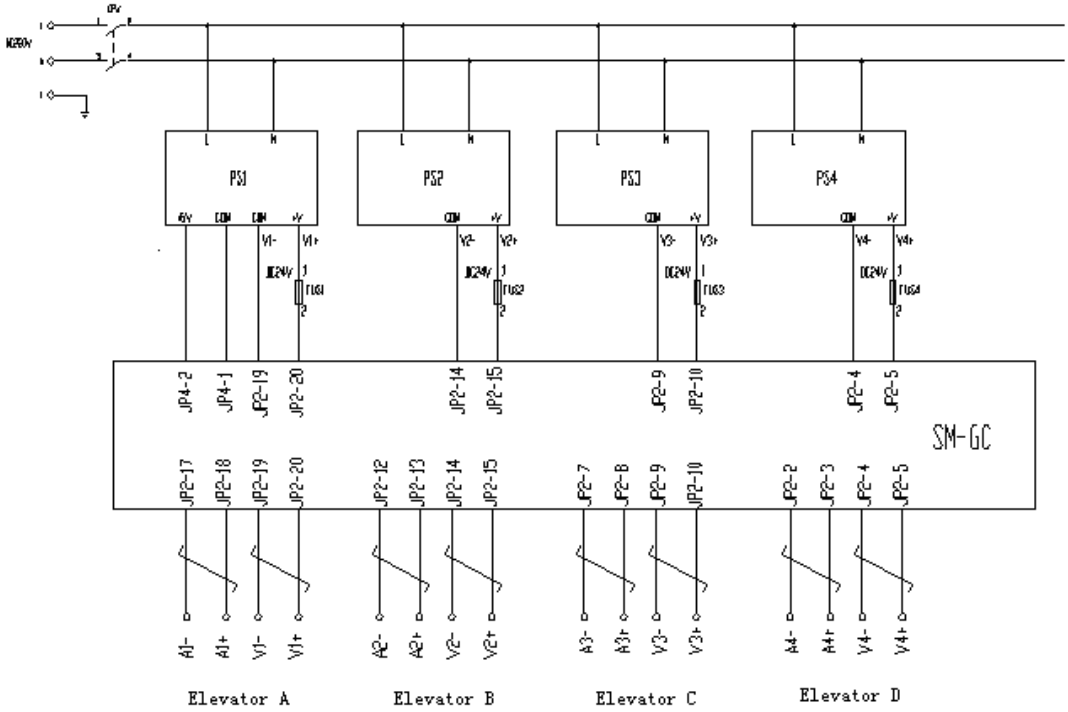
6.6.7.5 Description of other ports

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

6.6.8 Connection Diagram of Group Control System



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、PS8 and PS4 have only +24V(1.8A) output. FU1、FU2、FU3、FU4 are over-current protection devices，SM-GC is group control board.

6.6.9 Setting of group control running

6.6.9.1 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 listed in the agreement to the output port of JP2.13～JP2.16 and so on. 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 mistake 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 so as to bridge terminal resistor of two serial communication wire TXA+ , TXA-.

3．Measurement of resistance

After setting the wire jumpers, please use an universal meter to measure the value of the terminal resistance for the future commissioning.

The resistance value of JP5.4 and JP5.5 in the main control board is about 60ohm, if the value is not within this limit, please check the wire jumper is in position or not, the shielded cable is good and plug in the control board is reliable.

4．Manu Setting

Before debugging the group-control system, please make sure that each and every elevator is in normal state, then link to the group control system and start the system commissioning by setting Parameter “Group Mode” of all the elevators to 2 firstly.

6.7.10 Instruction for the group-control parameter setting programming

1． Basic instruction

This program is used for setting the parameter in the group-control CPU board. Connecting computer and group-control CPU board with standard RS232 communication wire set the parameter in computer. The DC5V power supply must be connected to the group control CPU board when in operation. Please take reference to the connection diagram of group control board for the wiring.

2． Installation of program

This program can run directly from CD without installation, or copy to the any folder in an pc for running. In the CD Rom we supplied for client, there are two files GROUPSET.EXE and MSCOMM32.OCX. GROUPSET.EXE is a setting file and MSCOMM32.OCX is a control file. If in your computer there is not file MSCOMM32.OCX, file GROUPSET.EXE is not able to run correctly.

Please do following steps to setup MSCOMM32.OCX:

Copy file Mscomm32.ocx form CD Rom to directory SYSTEM of Windows in your computer, open Run Dialog, click browsing button, select file Regsvr32.exe in the directory SYSTEM of Windows, click Open button, input MScomm32.ocx after Regsvr32.exe and click OK button, then run register program. After running the program a dialogue box displays, click 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 file GROUPSET.EXE, the main interface of the program is displayed. click Set Button to enter the parameter-setting interface.

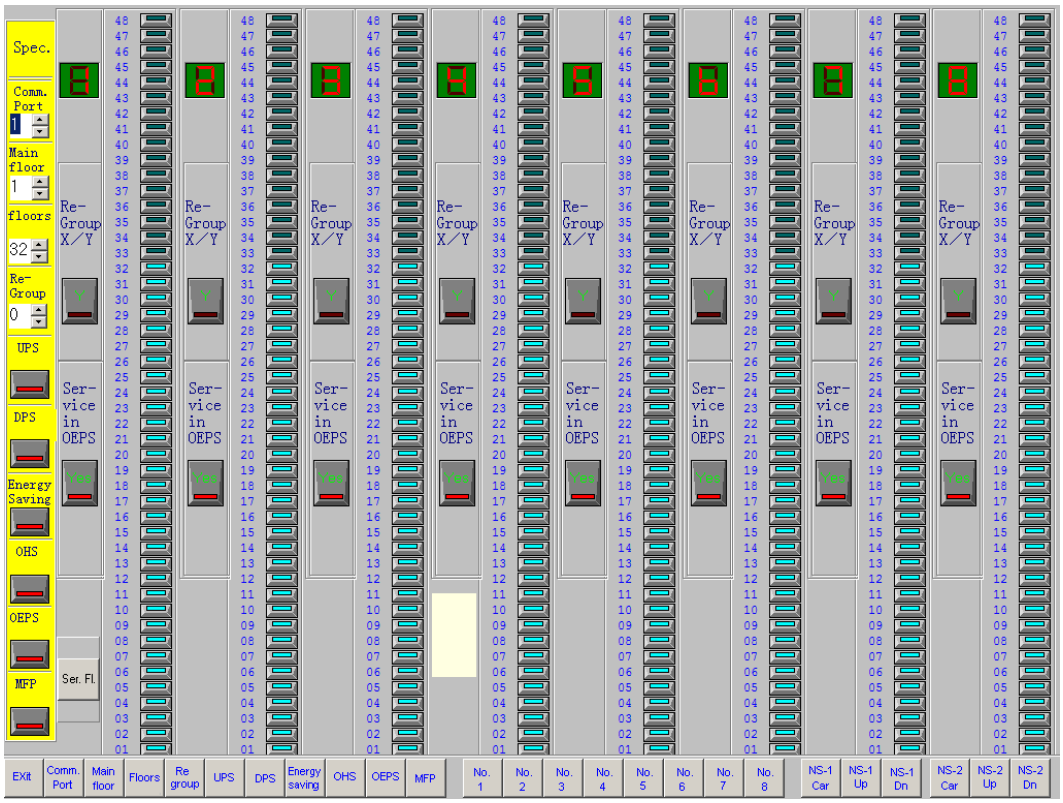


Fig 6.31 the group parameter setting interface

4. Group control parameter and setting method.

(1) Comm. port: This is the parameter that establishes the RS232 ports of PC machine. The data(such as'1'or'2') in the communication port frame of the upper left side of the interface means that designated serial port is the COM1 or COM2. If there is necessary to change setting, click'Δ 'or'▽ ' to change the data into the desired value, then click [Comm. port] button underneath of interface to set the data.

(2) Location of main floor of group control: The group-controlled main floor position means the position of the elevator main floor in the floor sequence of all group-controlled elevators from the lowest floor heading upward. For example: There is an elevator in the group has the two floors underground, but the whole home floor position of group is the 1st floor. Then from underground 2 floors heading upward, the 1st floor is the 3rd floor. So, the home floor position data of the group is 3. While setting, click'Δ 'or'▽ 'to adjust the data in the [Main floor] frame on the upper left side of the interface to the desired 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 lowest floor to the highest floor. Usually this data should be set for each project. While setting, first click'Δ 'or'▽ ' to adjust the data in the [Floors] frame to right value 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 setting: 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 floors of each elevators is service floors. If the service floor of each elevator is deferent, it needs 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 status. 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 transmit the data to group control board. 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, setting completion.

5. Setting interface pattern

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 blue means that floor is service floor, having no color means non- service floor. Data at the left side means the floor number in the group (bottom floor is 1) .

The choice button used for setting teams in the group control. The red color of middle line of button means that elevator is divided into X team when team grouping is valid , light color means Y team.

The choice button used for setting whether that elevator runs or not when urgent power supply is on. Red color of middle line within button means that elevator keep on running when the urgent power supply is valid, light color means movement stops.

The service floor switch scheme prompt dialog box. This group system has two service floors switch scheme in total. The diagram example mean current interface is setting instruction service floor of scheme 1.

The group service specification order press button

[Exit]- Exit parameter setting program

[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 on-duty peak.

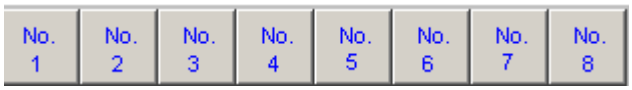
[DPS]– set off-duty peak

[Energy saving] – set the energy saving movement

[OHS]– set separate wait

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

[MFP]- set home floor return



The elevator service floor set button. Used for setting elevator's service options.

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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:

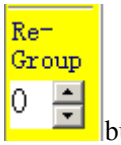
First, choose service option. The procedure starts with an undecided service option. Option prompt box is a blank.

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.

（1）Communication port: Choose the RS232 communication port, 1= COM1:, 2= COM2:, then click [Comm. port] button.

(2) Group home floor position: Click [Main floor] button after choosing the group home floor position.

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

（4）The group partitions specification setting: If group of partition functions function is on, set each elevator into team status 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).when selection finished, click [Re group] set button in the bottom of interface.

(5) On-duty peak specification setting: After clicking 

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

(6) Off-duty peak specification setting: After clicking 

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

(7)Energy saving running specification setting: After clicking 

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

（8）Separate wait specification setting: After clicking 

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

（9）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.

（10）Return the home floor specification setting: After clicking 

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

（11）The non- service floor control specification setting: Unless there is special request, don't need generally to set this specification. This system has total two service floor control projects to provide a choice, controlled differently by two switches. When a switch ON, the elevator run with project 1 service floor specification. When another switch ON, the elevator run with project 2 service floor specifications. Two switches can't switch ON simultaneously. 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 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 setting method is same with (4) the group service floor specification setting.

(12) When group partition each elevator partition set: Usually this specification doesn't need setting, but if a group of partition functions exist, it has to carry out 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.

(13) Whether continued to run specification setting or not when urgent power supply is on: Usually this specification doesn't need to be set, but if have urgent power supply run function, have to carry on this setting. 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.

Chapter 7 Parameter Table of Integrated Drive Controller

7.1 F Parameter List

Table 7.1 F Parameter List

No.	Name	Factory Setup	Scope	Unit	Remarks
F00	Accelerating slope	0.550	0.200～1.500	m/s^2	
F01	Decelerating slope	0.550	0.200～1.500	m/s^2	
F02	S curve T0 (initial S angle time T0)	1.300	0.300～3.000	s	
F03	S curve T1 (S angle T1 at end of acceleration)	1.100	0.300～3.000	s	
F04	S curve T2 (S angle time T2 at the beginning of deceleration)	1.100	0.300～3.000	s	
F05	S curve T3 (S angle time T3 at the end of deceleration)	1.300	0.300～3.000	s	
F06	Nominal speed	1.750	0.100～10.000	m/s	
F09	Parking floor	1	1～64	×	
F10	Offset floor	0	0～64	×	
F11	Floor number	18	2～64	×	
F12	Inspection speed	0.250	0～0.630	m/s	
F13	Creeping speed	0.060	0.010～0.150	m/s	
F14	Closing delay 1 (repsonse to hall call)	3.0	0～30.0	s	
F15	Closing delay 2 (repsonse to car call)	3.0	0～30.0	s	
F16	brake delay	0.2	0～2.0	s	
F17	Automatic enable signal release time	0.6	0.2～3.0	s	
F18	Fire floor	1	1～64	×	
F20	Base station return delay time	0	0～65535	s	0 represents not open; other numbers represents open and delayed time.
F21	Leveling switch motion delay distance (full-speed)	6	0～40	mm	

F22	Single and Duplex return to base station	1	1～64	×	
F23	Group control mode	0	0～3	×	
F25	Input type 1 (normal open or close setup for X0～X15 input point)	819	0～65535	×	
F26	Input type 2 (normal open or close setup for X16～X25 input point)	2	0～65535	×	
F27	Elevator car board input type (normal open or close setup for GX0 ～ GX15 input point)	0	0～65535	×	
F28	Car roof input type (normal open or close setup for HX0 ～ HX15 input point)	327	0～65535	×	
F29	Service floor 1 (Set up if 1～16 floors are secure)	65535	0～65535	×	
F30	Service floor 2 (Set up if 17～32 floors are secure)	65535	0～65535	×	
F31	Service floor 3 (Set up if 33～48 floors are secure)	65535	0～65535	×	
F190	Service floor 4 (Set up if 49～64 floors are secure)	65535	0～65535	×	
F33	Auomatic operation interval for test run	5	0～60	s	
F34	Automatic operation times for test run.	0	0～65535		

F35	Firefighting switch input definition and firefighting mode selection	0	0～65535	×	Bit0: 0: ordinary firefighting, 1: Schindler fire mode Bit1: 0: fireman switch without lift car board; 1: fireman switch with lift car board Bit2: 0: ordinary firefighting signal display; 1: Shandong firefighting signal display Bit3: 0: Motherboard X15 input for firefighting return; 1: Motherboard X15 input for fireman switch
F36	Band-type Brake switch detection mode	0	0～2	×	
F40	Weight data bias	48	0～100	%	
F41	Weighter study and parameter setup command.	0	0 / 1 / 2 / 10 / 20 / 30 / 40 / 50 / 60	×	
F43	Buzzing/flashing function selection for attendant status call	3	0～65535	×	.
F44	Serial communication address (255 for non-monitor)	255	0～255	×	
F49	Emergency leveling orientation mode	0	0～2		
F50	Front door opening permission 1 (opening setup value for 1 ～ 16 floors)	65535	0～65535	×	
F51	Front door opening permission 2 (opening setup value for 17 ～ 32 floors)	65535	0～65535	×	

F52	Front door opening permission 3 (opening setup value for 33～48 floors)	65535	0～65535	×	
F191	Front door opening permission 4 (opening setup value for 49～64 floors)	65535	0～65535	×	
F53	Rear door opening permission 1 (opening setup value for 1～16 floors)	0	0～65535	×	
F54	Rear door opening permission 2 (opening setup value for 17～32 floors)	0	0～65535	×	
F55	Rear door opening permission 3 (opening setup value for 33～48 floors)	0	0～65535	×	
F192	Rear door opening permission 4 (opening setup value for 49～64 floors)	0	0～65535	×	
F56	Up leveling adjustment (50 to refernece value)	50	0～240	mm	
F57	Down leveling adjustment (50 to refernece value)	50	0～240	mm	
F59	Zero speed brake delay	0	0～10.00	0.01s	
F61	Arrival distance by arrival gong	1200	0～4000	mm	
F62	Anti-slipping limit time	32	20～45	s	
F65	Base electrode lock mode	0	0～1	×	0: No base lock, 1: output contactor off, immediate lock
F66	With or whithout upper and lower limt	0	0-1		0:no 1:yes
F67	With or whithout entension board	0	0-1		0:no 1:yes
F70	Light load uplink gain	100	0-300	%	
F71	Light load lowlink gain	100	0-300	%	
F72	Heavy load uplink gain	100	0-300	%	
F73	Heavy load lowlink gain	100	0-300	%	

F74	Light load height gain	512	0-1024		
F75	Heavy load height gain	512	0-1024		
F115	Overtime opening door	15	3～30	s	
F116	Overtime closing door	15	3～30	s	
F117	Opening time for forced closing	60	0～1800	s	
F118	Opening time for the disabled	10	0～1800	s	
F120	Car call number when anti-nuisance function activates.	0	0～30	×	
F121	Activate forced closing function (0 represents not activate)	0	0～1	×	
F122	Signal delay release time in Inspection.	0.3	0～10.0	s	
F123	Call categories	0	0～3	x	
F124	Define the function of mainboard X16 input point	0	0～2	×	
F128	Control of front and rear doors	0	0 / 1	×	0: separate control of front and back doors; 1: joint control of front and back doors
F129	Activate the functions of re-leveling and/or pre-opening	0	0～3	×	
F130	Maintain the opening/closing torque	0	0～7	×	Bit0: 1: door maintaining open Bit1: 1: door maintaining closed Bit2: 1: door maintaining closed during operation
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		
F137	Service floor 1 (Floor 1~16) when NS-SW function is set.	65535	0～65535	×	
F138	Service floor 2 (Floor 17~32) when NS-SW function is set.	65535	0～65535	×	
F139	Service floor 3 (Floor 33~48) when NS-SW function is set.	65535	0～65535	×	
F199	Service floor 4 (Floor 49~64) when NS-SW function is set.	65535	0～65535	×	
F141	Time of delay release of the main contactor (after enabled)	0.50	0.50～10.00	s	
F145	Bus voltage gain	100	80～120	%	
F146	Position error distance	180	180～1000	mm	
F147	Protection of contact detection	0	0～1		
F152	Lighting delay (fans turned off automatically, delay lighting)	180	0～65535	S	0: do not turn off the lights
F153	high-voltage input detection with or without hall door lock	1	0 / 1	×	0: No 1: Yes
F156	With or without lock relay contact detection	1	0 / 1	×	0: No 1: Yes
F160	Whether the manual removal of error instruction activated	1	0 / 1	×	0: No 1: Yes
F161	The function of floor blocking for a time slot	0	0～65535	×	Bit0: 1: block instruction Bit1: 1: block upward call Bit2: 1: block downward call

F163	Choose whether the back-up power continues running after returning to the base in case of single elevator or parallel connection	0	0 / 1	×	0: stop running 1: may continue running
F164	Type of weighing device	99	0～99	×	See the manual for more detailed explanation
F165	Special control of door operation	0	0～65535	×	Bit0: 1: door closed during Ispection Bit1: 1: door closed during debug running Bit2: 1: door opened at the base station for the elevator Bit3: 1: whether to open the door by LED operator
F168	Elevator No. with IC card service	0	0～65535	×	
F169	Selection of upward and downward callus by IC card	0	0～65535	×	
F170	IC card function in the car corresponding to IC card swiping need on Floor 1～16	0	0～65535	×	
F171	IC card function in the car corresponding to IC card swiping need on Floor 17～32	0	0～65535	×	
F172	IC card function in the car corresponding to IC card swiping need on Floor 33～48	0	0～65535	×	
F175	Creeping speed at startup	0.006	0～0.100	m/s	
F180	Speed gain	100.0	0～110.0	%	
F181	Elevator No. at mutual parallel connection mode	0	0～1	×	

F182	Slow down switch series	0	0～10	×	0: determine automatically by speed
F183	Learn trip speed	0.800	0～1.000	m/s	
F186	Creeping time at startup	0.50	0～10.00	s	
F187	Monitor items	0	0～255	×	
F193	No-load compensation on the bottom floor	50.0	0～100.0	%	
F194	Full-load compensation on the bottom floor	50.0	0～100.0	%	
F195	No-load compensation on the top floor	50.0	0～100.0	%	
F196	Second base station at Duplex	0	0～64	×	
F200	inverter software version	Factory setup		×	Read-only
F201	Inverter drive mode	3	0/1/2/3	×	Set inverter basic mode: 0:Vector control without speed sensor 2:Torque control with speed sensor 3:Vector control with speed sensor
F202	Motor type	0	0 / 1	×	0: Asynchronous 1: Synchronous
F203	Motor rated power	By Inverter parameter	0．40～160．00	KW	
F204	Motor nominal current	By Inverter parameter	0．0～300．0	A	
F205	Motor nominal frequency	50.00	0.00～120.00	Hz	
F206	Motor nominal rotation speed	1460	0～3000	rpm	
F207	Motor nominal voltage	By Inverter parameter	0.～460	V	
F208	Number of poles of motor	4	2～128	×	
F209	Motor nominal slip frequency	1.40	0～10.00	Hz	

F210	Encoder type	0	0 / 1 / 2	×	0: incremental Encoder 1: SIN/ COS Encoder 2: Endat Encoder
F211	Encoder pulse number	1024	500～16000	PPr	
F212	Zero speed PID adjustor incremental P0	130.00	0.00～655.35	×	
F213	Zero speed PID adjustor integral I0	80.00	0.00～655.35	×	
F214	Zero speed PID adjustor differential D0	0.50	0.00 ～ 655.35	×	
F215	Low speed PID adjustor incremental P1	70.00	0.00 ～ 655.35	×	
F216	Low speed PID adjustor integral I1	30.00	0.00 ～ 655.35	×	
F217	Low speed PID adjustor differential D1	0.50	0.00 ～ 655.35	×	
F218	Medium speed PID adjustor incremental P2	120.00	0.00 ～ 655.35	×	
F219	Medium speed PID adjustor integral I2	25.00	0.00 ～ 655.35	×	
F220	Medium speed PID adjustor differential D2	0.20	0.00 ～ 655.35	×	
F221	High speed PID adjustor incremental P3	140.00	0.00 ～ 655.35	×	
F222	High speed PID adjustor integral I3	5.00	0.00 ～ 655.35	×	
F223	High speed PID adjustor differential D3	0.10	0.00 ～ 655.35	×	
F224	Low speed point switch frequency F0	1.0	0.0～100.0	%	
F225	High speed point switch frequency F0	50.0	0.0～100.0	%	
F226	Zero servo time	0.5	0.0～30.0	s	
F227	Band-type Brake release time	0.25	0.00～30.00	s	
F228	Current slowdown time	0.00	0.00～10.00	s	
F229	Torque compensation direction	0	0/1	×	0：positive direction 1：negative direction
F230	Torque compensation gain	100.0	0.0～200.0	%	
F231	Torque compensation bias	0.0	0.0～100.0	%	

F232	Filtering time for feedback signal of encoder	0	1～30	ms	
F233	Feedback direction of encoder	1	0 / 1	×	1：positive sequence 0：negative sequence
F234	Motor phase sequence	1	0 / 1	×	1：positive direction 0：negative direction
F235	Motor no-load current coefficient	32.00	0.00～60.00	%	Unnecessary to set up nomally
F236	PWM carrier frequency	6.000	1.100～11.000	kHz	Do not adjust this parameter under normal circumstances
F237	PWM carrier width	0	0.000～1.000	kHz	Do not adjust this parameter under normal circumstances
F238	Regulator mode	1	0/1/2/3	×	Do not adjust this parameter under normal circumstances
F239	Output torque limit	175	0～200	%	Do not adjust this parameter under normal circumstances
F240	Input voltage of inverter	380	0～460	V	
F241	Nominal power of inverter			KW	This is a read-only query data
F242	Phase angle of encoder	0.0	0.0～360.0	Degree	
F243	Zero position correction of encoder	0	0/2	×	Set 2 for zero point correction
F244	Spare	10002			

No.	**Name**	**Factory Setup**	**Scope**	**Unit**	**Remarks**
F245	Selection of F246~F255 parameter function	0	0～65535	×	Modify this parameter, then F246～F255 will have different meanings
When F245=0, F246~F255 have the following meanings					
F246	Overheating protection time for radiator	50	000～65535	0.01s	Default protection in case of radiator overheating for more than 0.5 second
F247	Overspeed protection coefficient	12000	0～65535	0.01%	The default overspeed protection threshold is 120%
F248	Overspeed protection time	100	0～65535	0.01s	Default protection in case of the speed surpasses F247 value for 1 second

F249	Confirmation times for inputting open phase	60	0～65535	Time	Default protection in case of inputting open phase for more than 60 times in a given moment
F250	Confirmation times for short circuit of braking resistor	10	0～65535	Time	Default protection in case of short circuit of braking resistor for more than 10 times in a given moment
F251	Confirmation times for SinCos Encoder disconnection	2	0～65535	Time	Default protection in case of SinCos Encoder disconnection confirmed for more than twice
F252	Confirmation times for outputting open phase	2000	0～65535	0.001s	Default protection in case of outputting open phase confirmed for more than 2 second
F253	Confirmation of voltage for charging relay failure	65	0～65535	Volt	Protection after the three-phase in-operation input voltage reduces to 65/1.414 = 46V, 144 failure reported, the charging relay may be damaged or the grid voltage is suddenly decreased.
F254	Confirmation threshold of Encoder phase CD failure	300	0～65535		No 28 failure reported in case that the D-value of the absolute position and computing position of encoder exceed the setting value.
F255	Protection threshold of ABZ encoder disconnection	20	0～100		Protection in case of speed feedback deviation of synchronous motor confirmed for more than the setting value
When F245=1, F246~F255 have the following meanings					
F246	Protection times of IGBT	2	0~65535	Times	Times of Instantaneous over current of IGBT
F247	Protection option of I2t	0	0/1/2		0:two ways of I2t protection,1:only the first way of I2t protection,2: only the second way of I2t protection
F248	Spare				
F249	Spare				
F250	Spare				
F251	Spare				
F252	Spare				
F253	Spare				
F254	Spare				
F255	Spare				

When F245=2, F246~F255 have the following meanings					
F246	Spare				Internal test parameters, do not modify
F247	PWM modulation mode	2	0～2	×	0: 5 segment; 1: 7 segment; 2: < 40% rpm 7 segments, > 40% 5 segments At low speed, the AIO has too much interference toward outside. For example, when CAN has a poor communication signal, the change to 0 (5 segments) will have significant effect, and it will reduce the heat of the drive, but may cause too much noise for inverter at low speed.
F248	Spare				Internal test parameters, do not modify
F249	Spare				Internal test parameters, do not modify
F250	Three-phase current balance coefficient			×	Read-only, the calibration factor of three-phase current balance coefficient will automatically change. The synchronous motor may trigger the self study command of the asynchronous motor to output contactor, and carry out the calibration of the three-phase current balance coefficient. Such function will reduce the motor vibration and improve comfort.
F251	Spare				
F252	Positive /negtive rotation enabled	0	0~60000	0.1s	0:allow Positive /negtive rotation 1:only allow positive rotation
F253	Position /negtive rotation dead-time	20	0~200	%	The zero-speed time of positive/negative rotation change
F254	Accelerating overcurrent threshold of inverter	180	0～200	%	Inverter stop accelerating and maintain the current speed if overcurrent occur during the acceleration process, then continue to accelerate once the current drop.

F255	decelerating overvoltage threshold of inverter	750	0～800	V	Inverter stop decelerating and maintain the current speed if bus voltage is more than the setting value during the deceleration process, then continue to decelerate once the voltage drop.
When F245=3, F246~F255 have the following meanings					
F246	Current loop P	140	35～280	×	Current loop Kp (no need to modify)
F247	Current loop I	100	25～200	×	Current loop Ki(no need to modify)
F248	Current loop D	0	0～200	×	Current loop Kd(no need to modify)
F249	spare			×	
F250	spare			×	
F251	spare			×	
F252	spare			×	
F253	Spare				
F254	Torque direction	0	0/1		0:positive 1:negtive
F255	Spare				
When F245=4, F246~F255 have the following meanings					
F246	Software version			x	Read-only
F247	ID No 0			X	Read-only
F248	ID No 1			X	Read-only
F249	ID No 2			x	Read-only
F250	ID No 3			x	Read-only
F251	ID No 4			X	Read-only
F252	ID No 5			X	Read-only
F253	Inverter rated current			0.1A	Read-only
F254	Rated current of inverter current sensor			A	Read-only
F255	Motor power coefficient	200	50~400	%	Set the max power output, generally do not need to change
When F245=5, F246~F255 have the following meanings					
F246	Stator resistor			0.001 ohm	Stator resistor of asynchronous motor
F247	Rotor resistor			0.001 ohm	Rotor resistor of asynchronous motor
F248	Stator inductor			0.0001 H	Stator inductor of asynchronous motor
F249	Rotor inductor			0.0001 H	Rotor inductor of asynchronous motor

F250	Mutual inductor			0.0001 H	Mutual inductor of asynchronous motor
F251	Motor low-speed overcurrent threshold	1500	0～65535	0.1%	Motor stop and motor low-speed onvercurrent reported in case that the motor speed is lower than 20% of nominal speed, and the value and time duration of current surpass those of F252.
F252	Low-speed overcurrent time	600	0～65535	0.1s	Duration of motor low-speed overcurrent
F253	Motor high-speed overcurrent threshold	1200	0～65535	0.1%	Motor stop and motor high-speed overcurrent reported in case that the motor speed is higher than 20% of nominal speed, and the value and time duration of current surpass those of F2524
F254	High-speed overcurrent time	3000	0～65535	0.1s	Time duration of motor high-speed overcurrent
F255	Frequency dividing coefficient of encoder (PG card required)	0	0～7		0: (no frequency dividing), 1:(2 frequency dividing), 2: (4 frequency dividing),3:(8 frequency dividing), 4: (16 frequency dividing),5 (32 frequency dividing),6:(64 frequency dividing), 7: (128 frequency dividing) Note: (PG card required)
When F245=6, F246~F255 have the following meanings					
F246	Synchronous motor study angle or not when power on	1	0/1		Determine whether synchronous motor conduct angle self-study or not when power on , 0 for no study, 1 for study
F247	Current gain when self-study	150	0～400	%	Current gain when synchronous motor conduct angle self-study
F248	Command option	2	0/1/2		Running command option
F249	Zero servo process current loop gain	100	48~65535	%	Zero servo process current loop gain
F250	Spare				
F251	Spare				
F252	Anti-slipping parameter	6616	0~65535		6616：open anti-slipping function
F253	Spare				

F254	Spare				
F255	Spare				

7.2 Definition of function parameter

F0 —— Accelerated speed**.** The acceleration slope rate is the slope rate of linear accelerating section between T0-T1,

F1 —— Decelerated speed. The deceleration slope rate is the slope rate of linear Decelerating section between T2-T3

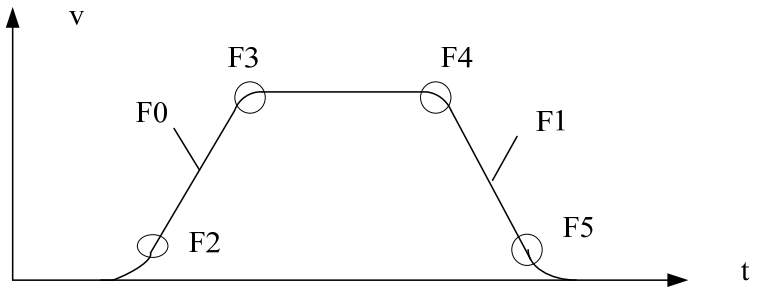
F2 —— S curve T0 is acceleration time for starting round angle of S curve. Default parameter value is 1.3S

F3 —— S curve T1 is acceleration time for accelerating round angle of S curve. Default parameter value is 1.1S

F4 —— S curve T2 is acceleration time for decelerating round angle of S curve. Default parameter value is 1.1S

F5 —— S curve T3 is acceleration time for leveling round angle of S curve. Default parameter value is 1.3S

The below diagram illustrate the specific positions of the above six parameters in the S curve of elevator operation.



F6 —— rated speed of elevator. S

F9 —— base floor lock. The floor that elevator should return when entering the elevator lock Mode. It is a floor sequencing data. The lowest floor is 1。 Please note that the floor Sequencing should be done in accordance with the overall condition of the entire elevator group when the group is in group control mode or parallel connection. For example, suppose that there are three elevator: A,B,C, of which the floors of elevator A are -2、-1、1～8；the floors of elevator B are -1、1～8；the floors of elevator C is 1～8。All three elevators should return floor one after entering into lock mode. It is no question to set F9 of elevator A as 3. But elevator B and elevator C are required to start the floor sequencing from floor -2 too. So the F9 of elevator B and C are also required to be set as 3.

F10—— offset floor. It refers to the D-Value between the lowest floor of the elevator and those of all the elevators within the group control or in the parallel connection. The value of single elevator always is zero. However it is required to set the parameter when the bottom floors of each elevator within the group control or in parallel connection are not same

F11—— Total floor number. The total floor number is that of real leveling plates of elevator.

The following is the example explaining the setting method of parameter F10 and F11

Suppose that there are two elevators in parallel connection in a building. Elevator A serves 15 floors above ground only while Elevator B serves 15 floors above ground and 2 floors underground.

For Elevator A, the total floor number is 15; offset floor is 2; the address of lowest floor call and registration begin with 3.

For Elevator B, the total floor number is 17; offset floor is 0, the address of lowest floor call and registration begin with 1.

Note: if the by-pass floors of elevators within the group control or in parallel connection are different, it is required to artificially make the service floors by installing the leveling plate to the by-pass floors of those elevators. In this way do guarantee the same floor sequencing among the elevators within the group control or in parallel connection.

Example as the following table

Table 7.2 example for F10 and F11 parameter setting

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	4	4	5	4
3	3	3	4	3	3	4	3
2	2	2	3	2	by-pass	3	2
1	G	1	2	70	1	2	70
-1	-1				-1	1	50

As show in the above table, Elevator B must install a leveling plate at the by-pass position of second floor to keep its floor number as same as Elevator A.

For elevator A, the total floor number is 4; floor offset is 1; the address of first floor call and registration begin with 2. Display setting: first floor=70; second floor=2;

Third floor=3; forth floor=4.

Parking floor: G (stand for the specific floor address) –yes (Parking allowed) 2-Yes; 3-Yes; 4-Yes.

For elevator B, the total floor number is 5; floor offset is 0; the address of floor -1 call and registration begin with 1. The address of first floor is 2.

Display setting : floor －1 =50； floor 1=70；floor 2=2；floor 3=3； floor 4=4。

Parking floor: -1- Yes；G-Yes；2-No (parking not allowed, the call and registration of floor address 3 of elevator B is invalid)

3-Yes；4-Yes。

F12—— inspection speed. The inspection speed range from 0 to 0.63m/s

F13——releveling speed. It refer to the speed that elevator with the non-inspection status reach the leveling zone in the process of automatically leveling searching, as well as the running speed of releveling. The scope range from 0.01 to 0.15 m/s .the speed of automatic leveling searching is inspection speed.

F14—— door-closing delay 1.

When the elevator responds to landing call, the door will keep opening within the setting time duration. The door will close when the timing end. The function valid only without attendant

F15—— door-closing delay 2.

When the elevator parks only with the registration call, the door will keep opening within the setting time duration. The door will close when the timing end. The function valid only without attendant

F16—— brake delay. The time delay from running signal dispatching to band-type brake contactor release, when startup.

F17—— Running signal release delay when in automatic status. The time delay from band-type brake contactor release to running signal signoff, when in automatic status.

F18—— Firefighting base station. The elevator will automatically return to default floor set by the parameter when the firefighting switch is on.

F20—— Auto homing time delay. Auto homing function deactivated when F20=0.

Auto homing function activated when F20≠0.The parameter is the auto homing time delay. When the elevator respond the last call or registration and no new call or registration come after within the time delay set by F20,elevator automatically return to the base station set by the parameter F22. the parameter is invalid in the group control mode because that auto base station return setting and base station position are controlled by group control system.

F21—— Leveling switch motion delay distance. The purpose of setting this parameter is to compensate the distance deviation caused by leveling switch motion delay distance when doing position correction. Since this distance deviation has something to do with speed, the parameter may be adjusted a little bit higher when the elevator run at high speed. Under current circumstance, the rated speed of the elevator shall be under 2.5m/s. Default value is generally used since the above-mentioned deviation distance is relatively minor.

F22—— single or duplex return to base station. The function valid only when F20 set to non-zero

F23—— Group control mode**.** Set each elevator to 3 when in single or duplex. Meanwhile, it is required to use F181 to set the principle elevator and auxiliary elevators when in parallel connection. All elevators within the group control are set 2.

F25—— mainboard input selection 1. Constant open/close setting for switch input point X0-X15 of mainboard. It is 16 bit data. The bottom bit for X0, The ceiling bit for X15. When any point within that range is set as constant open, the corresponding bit should be set as zero. When any point within that range is set as constant close, the corresponding bit should be set as one. The parameter in operator is set point by point（one bit after another）during the actual operation. Therefore there is no need to calculate the value.

F26—— mainboard input selection 2. Constant open/close setting for switch input point X16-X32 of mainboard. It is 16 bit data. The bottom bit for X16, the ceiling bit for X31. When

any point within that range is set as constant open, the corresponding bit should be set as zero. When any point within that range is set as constant close, the corresponding bit should be set as one. The parameter in operator is set point by point（one bit after another）during the actual operation. Therefore there is no need to calculate the value.

F27—— Car wall-mounted control board input selection. Constant open/close setting for switch input point GX0-GX15 of car board. It is 16 bit data. The bottom bit for GX0, The ceiling bit for GX15. When any point within that range is set as constant open, the corresponding bit should be set as zero. When any point within that range is set as constant close, the corresponding bit should be set as one. The parameter in operator is set point by point（one bit after another）during the actual operation. Therefore there is no need to calculate the value.

F28—— Car ceiling-mounted control board selection. Constant open/close setting for switch input point HX0-HX15 of car ceiling. It is 16 bit data. The bottom bit for HX0, The ceiling bit for HX15. When any point within that range is set as constant open, the corresponding bit should be set as zero. When any point within that range is set as constant close, the corresponding bit should be set as one. The parameter in operator is set point by point（one bit after another）during the actual operation. Therefore there is no need to calculate the value.

Note: supplementary explanation for input type setup.

HX6—— The overload switch must be constant close switch. If the constant open switch is used, it will not work if the overload switch broken down or the overload circuit disconnected. The failure to detect an overload situation would most likely to put the elevator in service in danger.

So are the limit switches and terminal deceleration switches and etc. constant close contact recommended. Otherwise potential safety hazard may occur to the elevator.

HX4—— NO-Load switch(input at this point means that the car is no-load. The action point of the switch is the load of less than 100 KG

If this switch is not in use, the HX4 must be set as constant open.

Otherwise, the system will permanently identify the car as no-load. The following consequence will occur. When the system in the elevator detect more than 5 call registrations (according to the parameter setting of F120), the system mistakenly identify the car as no-load. The system in the elevator indentifies so many call registrations as the result of children making trouble. The system will activate anti-nuisance function and cancel all the existing call registration in order to reduce waste.

HX7—— door-opening limit switch for rear door, HX8 door-closing limit switch for Rear door and HX10 safety edge for rear door

If there is no rear door for the elevator, HX7 set as constant open, HX8 as constant close, HX10 as constant open. The setting of the elevator with rear door should be in conformity with the actual condition.

F29—— Service floor 1, F29 value set whether the actual floor sequence from 1 to 16 is allowed to park or not. It is 16 bit data. The bottom bit for the lowest floor, The ceiling bit for 16^{th} floor. When any point within that range is set as one, the corresponding floor should be set as service floor for parking. Vice versa, when any point within that range

is set as zero, the corresponding floor should be set as non-service floor with no parking allowed. The non-service floor with no parking allowed can not register call. The parameter in operator is set floor by floor（one bit after another）during the actual operation. Therefore there is no need to calculate the value.

F30—— service floor 2, F30 value set whether the actual floor sequence from 17th to 32nd is allowed to park or not. It is 16 bit data. The bottom bit for the 17th floor, the ceiling bit for 32nd floors. When any point within that range is set as one, the corresponding floor should be set as service floor for parking. Vice versa, when any point within that range is set as zero, the corresponding floor should be set as non-service floor with no parking allowed. The non-service floor with no parking allowed can not register call. The parameter in operator is set floor by floor（one bit after another）during the actual operation. Therefore there is no need to calculate the value.

F31—— service floor 3, F31 value set whether the actual floor sequence from 33rd to 48th is allowed to park or not. It is 16 bit data. The bottom bit for the 33rd floor, the ceiling bit for 48th floors. When any point within that range is set as one, the corresponding floor should be set as service floor for parking. Vice versa, when any point within that range is set as zero, the corresponding floor should be set as non-service floor with no parking allowed. The non-service floor with no parking allowed can not register call. The parameter in operator is set floor by floor（one bit after another）during the actual operation. Therefore there is no need to calculate the value.

F190——service floor 4, F190 value set whether the actual floor sequence from 49th to 64th is allowed to park or not. It is 16 bit data. The bottom bit for the 49th floor, the ceiling bit for 64th floors. When any point within that range is set as one, the corresponding floor should be set as service floor for parking. Vice versa, when any point within that range is set as zero, the corresponding floor should be set as non-service floor with no parking allowed. The non-service floor with no parking allowed can not register call. The parameter in operator is set floor by floor（one bit after another）during the actual operation. Therefore there is no need to calculate the value.

★ the setting of service-floor (floor blocking) can also be controlled on group control panel within group control. The floor sequence should be arranged in accordance with the floor sequence of the whole elevator group if the group is in group control or parallel connection.

F33—— the time interval between the running testing startup and auto running. The default value is 5 seconds

F34—— the auto running times after running testing startup. The default value is 0, which means the deactivation of running testing function in elevator.

Note: The two values of F33 and F34 is set for the elevator running test. Once the F33 and F34 are set, tester can use handheld operator or control wheel to register call and the elevator will run automatically among the registered floor until the defined times set by F34

F35—— definition of firefighting switch input point and firefighting mode selection.

Among which:

Bit 0 set as 1: Schindler firefighting mode.

Bit 0 set as 0: common firefighting mode.

Bit 1 set as 1: activate firefighting switch input of car board.

Bit 1 set as 0: invalid firefighting switch input point of car board.
Bit 2 set as 1: firefighting indicator lighting mode in ShangDong Mode
Bit 2 set as 0: firefighting indicator lighting mode in common mode.
Bit 3 set as 0: main board input point X15 as fire return switch input point.
Bit 3 set as 1: main board input point X15 as firefighter operation switch Input point.

When users set the parameter F35 on the handheld operator, it will guide the users to set the parameter bit by bit instead of calculating and setting all in one time.

F36—— Band-type brake switch inspection mode. 0: no band-type brake switch inspection; 1: inspection mode outside Hong Kong region. 2: inspection at Hong Kong region.

F40—— Weighing data offset. Observe the weighing percentage value with an operator when the elevator is balance-loaded. Then set the F40 with the above value.

If such value is not set, the incorrect null position of weighing instrument will affect the startup comfort when elevator is balance-loaded.

F41—— the self-study and parameter setting. These parameters need the handheld operator to set. Only DTZZIII-DC-SC weighing instrument is valid.

F41	Description
1	No-load self-study command and the return data after the successful no-load self-study.
2	Full-load self-study command and the return data after the successful full-load self-study.
10	Activity range of weighing device sensor 0～10mm. The parameter setting of weighing device and return data after successful self-study.
20	Activity range of weighing device sensor 0～20mm. The parameter setting of weighing device and return data after successful self-study.
30	Activity range of weighing device sensor 0～30mm. The parameter setting of weighing device and return data after successful self-study.
40	Activity range of weighing device sensor 10mm～0. The parameter setting of weighing device and return data after successful self-study.
50	Activity range of weighing device sensor 20mm～0. The parameter setting of weighing device and return data after successful self-study.
60	Activity range of weighing device sensor 30mm～0. The parameter setting of weighing device and return data after successful self-study.

After inputting the corresponding self-study command, F41 will display 5 if it starts self-study, and the inputted self-study command will display after studying successfully. Otherwise, zero will display if it fail.

For self-study mode 1 and 2, it can resume only when the F41 display 6.

When conducting self-study, set the activity range of weighing instrument sensor before

starting the mode 1 and mode 2 self studies.

F43—— landing call buzzing/flashing and door-closing standby option when in attendant status. This parameter is only valid in attendant status.

Among which:

Bit0 set as 1, buzzing inside car when pressing call button

Bit0 set as 0, no buzzing inside car when pressing call button.

Bit1 set as 1, the corresponding inductor button inside car flash to the floor with call registration.

Bit1 set as 0, no flashing inductor button in car

Bit2 set as 1, door-closing and standby allowed in attendant status.

Bit2 set as 0, door-closing and standby not allowed in attendant status

Bit3 set as 1, schindler attendant mode

Bit3 set as 0, common attendant mode

When users set the parameter F43 on the handheld operator, it will guide the users to set the parameter bit by bit (function by function) instead of calculating and setting all in one time.

F44——local address of serial communication, the value of elevator running or single elevator monitoring is set to 255. If the port 485 community monitoring or port 232 remote monitoring is applied to banks, every elevator in the bank can be set one of natural number smaller than 255 for the main board identification by remote PC. Therefore every elevator in the bank can have independent setting.

F49—— Emergency leveling orientation mode,

0: judge return leveling orientation through pretorque. If the pretorque is less than 0, return leveling turns upward.

1: judge return leveling orientation through pretorque. If the pretorque is less than 0, return leveling turns downward.

2: use weighing compensation value to judge the return leveling orientation.

F50—— front door opening allowed. 1. Setting whether the floor 1-16 (floor sequence) allowed opening or not. The lowest position corresponds to the front door of the lowest floor. The highest position corresponds to the front door of 16th floor counting from the lowest floor.

F51—— front door opening allowed. 2. Setting whether the floor 17-32 (floor sequence) allowed opening or not. The lowest position corresponds to the front door of the 17th floor. The highest position corresponds to the front door of 32nd floor

F52—— front door opening allowed. 3. Setting whether the floor 33-48 (floor sequence) allowed opening or not. The lowest position corresponds to the front door of the 33rd floor. The highest position corresponds to the front door of 48th floor

F191——front door opening allowed. 4. Setting whether the floor 49-64 (floor sequence) allowed opening or not. The lowest position corresponds to the front door of the 49th floor. The highest position corresponds to the front door of 64th floor

F53—— rear door opening allowed. 1. Setting whether the floor 1-16 (floor sequence) allowed opening or not. The lowest position corresponds to the rear door of the lowest floor. The highest position corresponds to the rear door of 16th floor counting from the lowest floor.

F54—— rear door opening allowed. 2. Setting whether the floor 17-32 (floor sequence) allowed opening or not. The lowest position corresponds to the rear door of the 17th floor. The highest position corresponds to the rear door of 32nd floor

F55—— rear door opening allowed. 3. Setting whether the floor 33-48 (floor sequence) allowed opening or not. The lowest position corresponds to the rear door of the 33rd floor. The highest position corresponds to the rear door of 48th floor

F192——rear door opening allowed. 4. Setting whether the floor 49-64 (floor sequence) allowed opening or not. The lowest position corresponds to the rear door of the 49th floor. The highest position corresponds to the rear door of 64th floor

Note: For the above 8 parameters, any of which is set as zero, the front or rear door of the corresponding floor will not open. If any of the above 8 parameters is set as 1, the front or rear door of corresponding floor will open. For those in group control or parallel connection, the floor sequence should be in conformity with that of the whole group. When conducting the above 8 parameter setting, the parameter should be set layer by layer (bit by bit) on the operator. Therefore, there is no need to calculate the overall value.

F56—— Upper leveling precision adjustment

F57—— Down leveling precision adjustment

Upper leveling precision adjustment F56 and down leveling precision adjustment F57 is only aimed at the condition that the precision deviations of every floor leveling are same.

The specific adjustment method as following: lower F56 for over-leveling when moving upward. Increase F56 for under-leveling when moving upward, while lower F57 for over-leveling when moving downward, increase F57 for under-leveling when moving downward. The setting scope of F56 and F57 ranges from 0 to 100. The default value is 50, which mean no leveling adjustment.

Note: both parameters F56 and F57 are the compensation adjustment for leveling precision. Common leveling precision deviation within 15mm can be adjusted with F56 and F57. If the deviation value is too large, it is recommended to adjust the items such as the leveling switch installation position, drive parameter, hoistway data-study. If the leveling precision deviation of each floor is not in conformity with each other, the installation position of leveling plate of the corresponding floor should be adjusted.

F59—— zero-speed band-type brake delay, switch on band-type brake after F59 time upon the zero speed reached.

F61—— distance between car and destination leveling position when arrival indicator and arrival gong activated. The data can be used to adjust the time points given by arrival indicator and arrival gong. The default is 1200, which mean the two signals will be given by car at about 1.2m away from the destination floor leveling position.

F62—— time limit for anti-slippage operation, the default is 32. If the elevator fails to receive any leveling signal within 32 seconds, it will stop service, reporting fault NO 25.(the value is defined by GB7588-2003 as between 20～45 seconds)

F65—— base electrode lock mode, 0: No base electrode lock mode. 1: immediately turn off the integrated system output once it detect cutoff of output contactor

F67——Without or with extension board

F70——Light load uplink gain .Ranges from 0% to 300%. The default value is 100%.
F71——Light load lowlink gain.Ranges from 0% to 300%. The default value is 100%.
F72——Heavy load uplink gain. Ranges from 0% to 300%. The default value is 100%.
F73——Heavy load lowlink gain. Ranges from 0% to 300%. The default value is 100%.
F74——Light load height gain. Ranges from 0 to 1024. The default value is 512.
F75——Heavy load height gain. Ranges from 0 to 1024. The default value is 512.
Note 1:

The parameter F70～F75 is only valid when the F164 set as 0,3,4. Namely: the above three parameter is only used when the weighing device DTZZ-III-DC-SC or switch of light-load or full-load is used in elevator for startup preload compensation,

On detailed adjusting method of above three parameters, please take reference to the section 8, 10 of chapter 8 (the detailed introduction about adjusting method of the elevator startup pre-load compensation function)

F115—— time limit for door-opening timeout. If the door-opening limit switch fail to work after the ending of time set by F115 for door opening. The elevator will stop the door-opening and turn to close the door. The default value is 15s. range from 3s～30s

F116——time limit for door-closing timeout. If the door-closing limit switch fail to work after the ending of time set by F116 for door closing. The elevator will stop the door-closing and turn to open the door. The default value is 15s. range from 3s～30s

F117——forced door closing or opening time duration. Force the door to close or open button (hold button) the door-opening will maintain for the setting time after pressing the button

F118—— the disable door-opening time duration, the door-opening time duration for the disable.

F120——Anti-nuisance function and instructions for threshold of judging anti-nuisance.

0: no anti-nuisance function. **1:** activation of anti-nuisance function in line with the action of light curtain: if the elevator park for three floors consecutively without the activation of light curtain, then the mischief can be identified. All registered instruction signal will be cleared away.

2-64: activate the anti-nuisance function based on non-empty-load switch and registered instructions. If the non-empty-load is not activated (the load in car is little, close to empty-load) but registered instructions are more than the value set by F120, mischief can be identified by the system. The entire registered instruction signal will be cleared away.

F121——activate the function of door nudging with buzzer.

0: no activation of the function, **1:** activation of the function. When the function of door nudging with buzzer activated under the circumstance of no presence of attendant, the elevator door will be closed forcibly once the door keep opening as the result of repetitive F117 time setting from door-opening button, ROHB function, light curtain action and etc.

At the same time, the system will close the door forcibly while ignoring the signals from door-opening button, ROHB function, and light curtain.

F122——Running signal release delay during inspection, the delay time from the disconnection of band-type contactor output to the turnoff of frequency converter output.

F123——call controller mode setting, this parameter is used to set the call mode of the call controller and to define the address of call controller.

0: for the standard 04 program board, only call fro front door. The address 1～48 correspond to the floor 1～48 front door call.

For the customized 04 program board for 64 floors, front door call, rear door call, and the disabled call all can be provided. The address of 1～64 correspond to the front door call of the floors 1～64. The address of 65～128 correspond to that of rear door call, 129～192 correspond to the disabled call.

1: only for standard 04 program board, front door call and rear door call are provided. The address of 1～48 correspond to the front door call of the floor 1～48.

2: only for standard 04 program board, front door call and the disabled call are provided. The address of 1～48 corresponded to the front door call of the floor 1～48, 49～96 corresponded to the disabled door call of floor 1～48

3: only for standard 04 program board, the highest floor is 32nd. Front door call, rear door call, the disabled call are provided. The address of 1～32 corresponded to the front door call of the floor 1～32. 33～64 corresponded to the rear door call of the floor 1～32, 65～96 corresponded to the disabled call of the floor 1～32.

F124——the function definition of X16 input point of main board

0: Input point of emergency leveling function under the circumstance of blackout.

1: action input point of earthquake device

2: input point for emergency power supply condition of the building emergency power supply operation function.

F128—— control mode for front/ rear door. 0: the separate control of front door and rear door. 1: integrated control of front door and rear door.

F129—— activate the pre-opening of door and re-leveling of door opening.

The range set from 0 to 3. 0: all deactivated. 1: only activate the pre-opening of door. 2: only activate the function of re-leveling of door-opening. 3 activated both two functions mentioned above.

F130—— holding door-opening/closing torque. 0: no torque holding. 1: door-opening torque holding, 2: door-closing torque holding, 3: door-opening/closing torque. 4: only the door-closing torque holding during operation.

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—non service floor setting of switch control. F137 set the value from the

bottom floor to the 16th floor. The bottom bit corresponds to the bottom floor. The highest bit corresponds to 16th floor. F138 set the value from 17th floor to 32nd floor. The lowest bit corresponded to 17th floor. The highest floor corresponded to 32nd floor. F139 set the value from floor 33rd to floor 48th. The lowest bit corresponded to 33rd floor. The highest floor corresponded to 48th floor. F199 set the value from 49th floor to 64th floor. The lowest floor corresponded to floor 49th. The highest floor corresponded to 64th floor. When the bit is set as 1, the corresponding floor will be non-service floor during the switch validity. The instructions and call signal from the floor can not be registered. The parameters are under the control of a switch.

The parameters will be invalid when the switch deactivated. If setting the parameters in group control or parallel connection, the floor sequence must be in conformity with that of the whole group.

★ detailed setting method. Please take reference to the setting method of F50-F52，F191.

F141—— delay release time of main contactor. The time delay range from the elimination of running signal to main contactor release while the elevator stopped. The default is 0.5s.

F145—— busbar voltage gain. If it is found during the inspection that there is error between the busbar voltage in display and that in actual inspection, set the parameter F145 to make the above two data consistent. The default is 100%, which mean no adjustment.

F146—— position deviation distance. Do inspection on the deviation of leveling position when stop the elevator. The parameter represents the allowed deviation distance.

F147—— contact inspection protection mode. 0: self-protection against fault after detecting the contacts adhesion failure. Power cutoff or inspection reset is required. 1: stop the elevator when detecting contact adhesion and keep running after the troubleshooting.

F152—— the delay time of auto shutdown of in-car lighting and fan. The system will automatically shut down the in-car lighting and fan when idle time of elevator in automatic mode reach the value set by the parameter. The default value is 3 minutes.

F153—— high-voltage input detection with or without hall door lock

1: high-voltage input detection with hall door lock.

0: high-voltage input detection without hall door lock.

The default value is 1.

F156—— detection on existence of door lock relay. 1: yes, 0: no

F160—— activation/deactivation of manually clearing away error instruction .

1: activation, 2: deactivation. When such function is activated, the wrong instruction signal can be cleared away by pressing the button twice once the wrong instruction signal is registered.

F161—— activation/deactivation of time slot floor blockade

1: activation, 0: deactivation.

F163—— the elevator continue to run or stop after homing while the signal or parallel backup power supply is running. 0: the elevator stops after homing while backup power supply is running.1: the elevator continues to run after homing while the backup power supply is running.

F164—— load-weighing instrument type, the acquisition method of weighing signal and compensation signal. The following table gives a list of corresponding load-weighing instrument type, the acquisition method of different weighing signal and compensation signal with difference F164 parameter.

F164 setting value	**Load-weighing instrument modle**	**Signal acquisition method of light-load, heavy-load, full-load , over-load**	**Acquisition method of compensation signal**
0	DTZZ-III-DC-SC	Switch signal input to car ceiling board	Input load-weighing instrument signal through CAN, Then calculate the final compensation value based on the weighing instrument signal, F193,F194,F195
1	DTZZ-II	Input the load-weighing instrument signal through CAN, then calculate based on the weighing instrument signal.	Input the load-weighing instrument signal through CAN
2	DTZZ-II	Switch signal input to car ceiling board	Input the load-weighing instrument signal through CAN
3	DTZZ-III-DC-SC	Input the load-weighing instrument signal through CAN, then calculate based on the weighing instrument signal	Input load-weighing instrument signal through CAN, Then calculate the final compensation value based on the weighing instrument signal, F193,F194,F195
4	none	Switch signal input to car ceiling board	Calculated the weighing compensation value of light-load and heavy-load based on the light-load or heavy-load switch signal as well as F193, F194, F195. meanwhile, F40 set as 50%
5		Switch signal input to car ceiling board	Input weighing instrument signal through analog quantity.
6		Input the weighing instrument signal through analog quantity. And calculate based on the weighing instrument signal	Input weighing instrument signal through analog quantity.
99		Switch signal input to car ceiling board	None.

Note 1:

When F164 is 0～3 , the load-weighing device is model DTZZ-III-DC-SC or DTZZ-II specialized for STEP corporation. The weighing signal is transmitted to

main board through CAN. When F164 is 4, the elevator is without electronic weighing device but mechanic weighing switch. When F164 is 5 and 6, the elevator weighing device is other type device. The weighing signal is transmitted into analog quantity input port through analog quantity of DC 0～10V.

Note 2:

When F164 is 0,2,4,,5, the over-load, full-load, light-load switch signal is acquired through inputted switching value signal. When F164 is 1,3,6, the over-load, full-load, light-load switch signal is calculated based on inputted weighing signals.

Note 3:

When F164 is 0 and 3, the pre-load compensation value at startup is calculated based on the data of weighing signal plus that of linear correction results of F193,F194,F195 .When F164 is 4, make sure the car loading condition based on light-load or heavy load switch signal before doing else. Then, calculate the pre-load weighing compensation value of light-load and heavy-load based on the parameters F193,F194,F195. When F164 is 1,2,5 and 6, use the weighing data obtained from weighing device as the pre-loading weighing compensation value.

F165—— special control parameters for door operation. Bit 0: door operation allowed or not in inspection. Bit1: door-opening allowed or not during the period of adjustment and setting. Bit2: elevator standby with/without door-opening. Bit 3: door operation with or without onboard LED operator.

F168—— elevator serial number with IC card service.

F169—— hall up/down IC card-based call. 0: down call, 1: up call.

F170—— when the in-car IC card instruction registration is on, the corresponding floor 1～16 require IC card-swiping selection. The corresponding bit 1 represents the need for IC card-swiping registration. 0 represent no need for IC car-swiping.

F171—— when the in-car IC car instruction registration is on, the corresponding floor 17～32 require IC card-swiping selection.

F172—— when the in-car IC car instruction registration is on, the corresponding floor 33～48 require IC card-swiping selection.

F175—— creeping speed at startup. For the comfort adjustment at startup
When starting resistance of tractor is too much, the tractor will be adjusted appropriately to the startup creeping speed. When creep speed at startup is set as 0. it is in no use. This value should be used together with that of startup creeping duration F186.

F180—— speed gain. Gain for the speed given peak. The range is from 0.0% to 110.0%
The default value is 1000. (Reading as 100.0%)

F181—— mutual parallel mode (F23=3) of elevator number setting. The range is 0～1, the main elevator setting is 0. The auxiliary elevator is 1.

F182—— the installation series of deceleration switch at hoistway.(Equal to the half deceleration switch number) Setting 0 represent the deceleration switch series based on rated speed (see table 4.1)

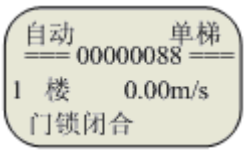
F183—— setting the running speed during the hositway self-study.

F186—— creeping duration at startup, for adjusting the startup comfort. It can be used together

with startup creeping speed F175.

F187—— Monitoring items

The display position of running times in the main interface of operator can be set by F187 to show various kinds of monitoring items. Take the 00000088 in the following figure as example.



F187 set as 0: to display the running times of elevator

F187 set as 1: to display the interference evaluation. The meaning of the counting is to record the interference situation of last time running.

The number can be updated only when the elevator stop. If there is no-interference, the number should be 0. When the counting reaches 1000 great interference from encoder should be identified. There is need to test the interference situation of encoder.

F187 set as 2: to display the fault counter of CAN1(the CAN communication between hoistway and car). The meaning of this counter: if the CAN communication is ok, the value should be 0.If the counting reach 96, big problem for communication should be identified. It is necessary to check the communication line.

F187 set as 3: to display the fault counter of CAN2 (the CAN communication in group control or parallel connection). The meaning of this counter: if the CAN communication is ok, the value should be 0.If the counting reach 96, big problem for communication should be identified. It is necessary to check the communication line.

F187 set as 4: to display the running speed of motor. The unit is rpm

F187 set as 5: to display the voltage of busbar. The unit is V

F187 set as 6: to display the output current, the unit is 0．01A

F187 set as 7: to display the output torque, the unit is ‰ (rated load)

F187 set as 11: to display the pre-torque, the unit is ‰ (rated load)

F187 set as 14: to display the weighing value.

F193—— No-load compensation value on the bottom floor when elevator start up with the function of pre-load compensation. The value ranges from 0 to 1000.

1000 is 100.0%, which mean the given compensation is 100% rated torque.

F194—— full-load compensation value on the bottom floor when elevator start up with the function of pre-load compensation. The value ranges from 0 to 1000.1000 is 100.0%, which mean the given compensation is 100% rated torque.

F195—— No-load compensation value on the top floor when elevator start up with the function of pre-load compensation. The value ranges from 0 to 1000.

1000 is 100.0%, which mean the given compensation is 100% rated torque.

Note 1:

The parameter F193～F195 is only valid when the F164 set as 0,3,4. Namely: the above three parameter is only used when the weighing device DTZZ-III-DC-SC or switch of light-load or full-load is used in elevator for startup preload compensation,

Note 2:

F193 is the bottom floor non-load compensation adjusting parameter when the elevator pre-load compensation function started up. Namely: when the elevator is non-loaded at the bottom floor, the required compensation load set by F193 will make the elevator startup in best condition.

F194 is the bottom-floor full-load compensation adjustable parameter,

F195 is the top-floor non-load compensation adjustable parameter.

On detailed adjusting method of above three parameters, please take reference to the section 8, 10 of chapter 8 (the detailed introduction about adjusting method of the elevator startup pre-load compensation function)

F196—— 2nd homing base station when in parallel connection

F200—— frequency converter version number. It is the default read-only data.

F201—— frequency converter control mode.

If need to motify, first set F244=2345, then set F201. After powering-down and powering-up again, F201 is 3 automaticly.

0: none- speed sensor V/f control mode.

1: none-speed sensor vector control mode. 2: speed sensor torque control mode. 3: speed sensor vector control mode. The default is 3. The speed sensor vector control mode is usually adopted in formal use. Therefore the default parameter is 3. However, the parameter can be set as 0 for time being to run the frequency converter in open loop V/F control mode at some adjusting &setting situation so that the car can be moved before the encoder installed.

Please note: before preparing hoist way self-study, it is necessary to install the encoder, complete the wiring, and reset the F201 to 3.

F202—— motor type selection. 0: asynchronous, 1: synchronous

F203—— motor rated power, the unit is KW, set in accordance with nameplate

F204—— motor rated current, the unit is A , set in accordance with nameplate

F205—— motor rated frequency, the unit is Hz, set in accordance with nameplate

F206—— motor rated revolution, the unit is rpm. Set in accordance with nameplate

F207—— motor rated voltage, the unit is V. Set in accordance with nameplate.

F208—— motor poles number, set in accordance with nameplate. If no poles number is shown on the nameplate, please take reference to the following formula.

The NO. of poles=（120×f）÷n. In the formula: n—rated revolution; f –rated frequency.

For the calculated result, the even-integral number is adopted as poles number.

F209——motor rated slip frequency. The unit is Hz. Only be effective for asynchronous motor. Set in accordance with nameplate. If the rated slip frequency is not shown on the nameplate, please take reference to the following formula for F209 setting value.

Rated frequency—F (F205), Rated revolution—N (F206), motor poles No. (F208)

Slip frequency= f－（（n×p）÷120）。

For example: the rated frequency-50Hz, the rated revolution-1430rpm, the motor pole No-4

F209 setting value= 50－（（1430×4）÷120）＝2.33Hz

F210——encoder type. 0: increment encoder, 1: sin/cos encoder. 2: Endat encoder

F211——encoder pulse No. Per circle . The unit is Ppr

F212——Zero speed PID adjustor incremental P0

F213——Zero speed PID adjustor integral I0

F214——Zero speed PID adjustor differential D0

F215——low speed PID adjustor incremental P1

F216——low speed PID adjustor integral I1

F217——low speed PID adjustor differential D1

F218——medium speed PID adjustor incremental P2

F219——medium speed PID adjustor integral I2

F220——medium speed PID adjustor differential D2

F221——high speed PID adjustor incremental P3

F222——high speed PID adjustor integral I3

F223——high speed PID adjustor differential D3

F224——low speed point switch frequency F0.Setting the phased low speed point switch frequency value of the PID adjustor, it is set in accordance with percentage of rated frequency. If the rated frequency is 50Hz, the required switch frequency F0 is 10Hz. Since 10 Hz is 20% of 50Hz, the value should be set as 20.

F225——high speed point switch frequency F1. Setting the phased high speed point switch frequency value of the PID adjustor, it is set in accordance with percentage of rated frequency. If the rated frequency is 50Hz, the required switch frequency F1 is 40Hz. Since 40Hz is 80% of 50Hz, the value should be set as 80.

F212～F225 : The role of proportional constant P of PID adjustor: the increase in P value will improve the system response speed. But too big the P value will cause the overstrike and oscillation. The effect of P value upon the feedback is as the following Fig 7.1. The integral constant I value affect the response time. The bigger value I is, the faster speed is.

Once users find the system overstrike is too big or dynamic response too slow, properly increase the value I. But once the value I is too big, system oscillation may occur. The effect of value I upon the feedback is as the following Fig 7.2. Differential constant D affects the sensitiveness of system response. The increase in D value makes the system response quick.

But once the value D is too big, system oscillation may occur.

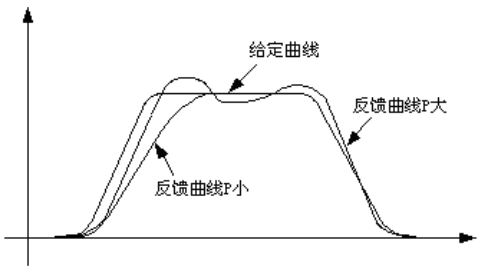


Fig 7.1 effect of proportional Constant upon feedback

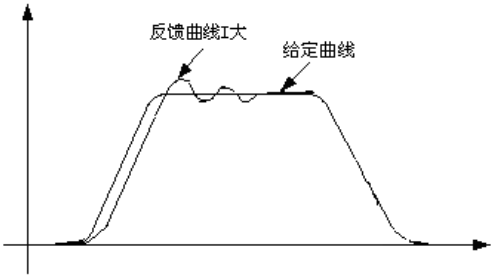


Fig 7.2 effect of integral constant I upon feedback

During the PID constant adjustment, usually the proportional constant P should be adjusted firstly. Increase the value P as big as possible under the precondition of guaranteeing system stability. Then adjust the integral constant I to make the system both response quickly and overstrike not much. The differential constant D can be adjusted properly under the precondition

of adjustment of P and I still not enough for the improvement of system sensitiveness. The effect scope of PID adjustor of various speed is shown as following fig 7.3

F226—— zero servo action time adjustment parameter. The zero servos is that the Frequency converter output a phase of zero speed torque holding during the Period from the end of excitation to given speed. The parameter determine Action time of three zero servos PID parameter of F212、F213 and F214 The action time of zero servos is as following figure 7.4

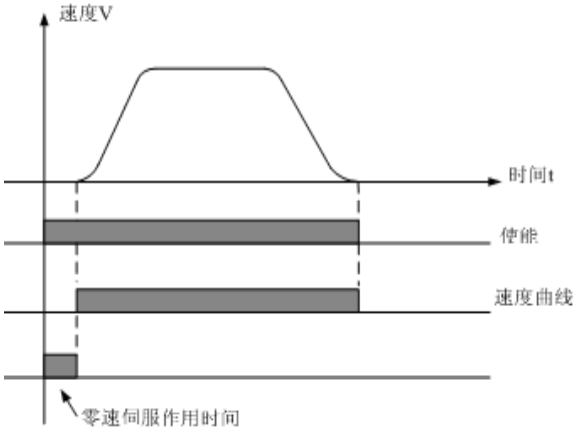
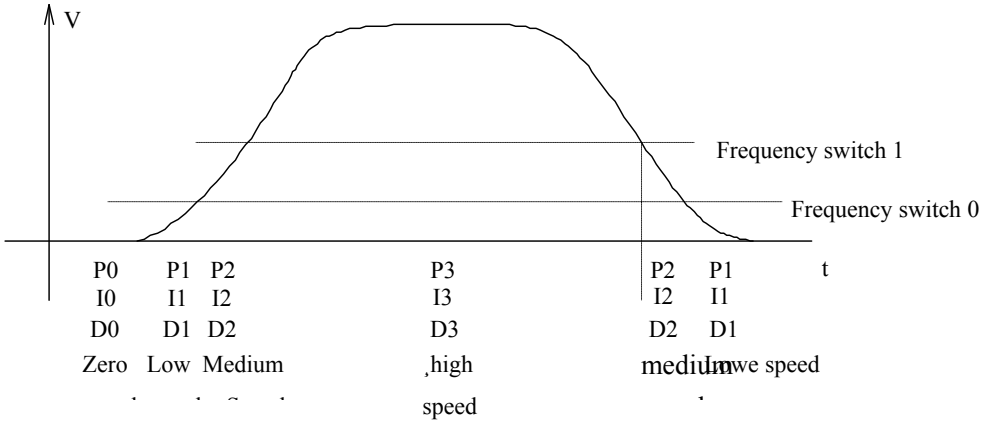


Fig 7.4 the action time of zero servos



F227—— band-type brake action time, it is the adjustable parameter for band-type brake mechanic release time. The parameter is set in accordance with the actual band-type brake mechanic release time.

F228—— time parameter of current slowdown . The parameter F228 set the current slowdown time period from frequency converter receiving stop-output command to actual zero output current. The default value is 0. Only under the some special circumstance, the rapid current release of frequency converter will cause big noise to motor as the elevator stop. Therefore, appropriately increase the value should be necessary. But the value should increase no bigger than the delay time of main contactor release. Otherwise, the contactor live release will cause contacts pull arc and affect the service life of contactor as the result. The frequency converter will not output any current since the loop disconnect after contactor release.

F229——compensation torque direction adjustment parameter. The parameter work when there is

startup pre-load compensation function. The default value is 0. But if the system torque compensation direction is wrong as the result of other reasons, simply set the F229 value from 0 to 1 to solve the problem.

F230—— compensation torque gain. The frequency convertor calculate the actual torque compensation value on the basis of the compensation value given by the control system and also increased/decreased by the F230 parameter gain, when there is startup pre-load compensation function.(when F230 bigger than 100 is referred to as increase. When F230 smaller than 100 is referred to as decrease.) . Set the parameter in accordance with the following principle. If the compensation is not enough, the value increase is required. When the compensation is too much, the value decrease is required. The insufficient compensation refer to the phenomenon of full-load downward impact（slippage when upward, acceleration when downward ） and the light-load upward impact (slippage when downward, acceleration when upward). The overcompensation refer to the phenomenon of full-load upward impact (slippage when downward, acceleration when upward) and light-load downward impact (slippage when upward, acceleration when downward)

F231—— compensation torque offset. The parameter work when there is startup pre-load compensation function. The parameter is set in the following way.
When car and counterweight reach complete balance, the inspection speed is set as 0. Meanwhile, the car should remain still while handling the elevator inspection operation. If the car is active, the parameter should be set until the car reach complete still while doing the inspection operation.

F232—— encoder feedback signal filtering time parameter. The default value is 0. Only when on-site interference is very serious, properly expansion the filtering duration will increase the anti-interference capacity of the system.

F233—— encoder feedback direction. 0: negative sequence. 1: positive sequence. The default value is 1. Under the normal circumstance, there is no need to change the value. But if the feedback direction is directly opposite to the actual direction due to the wrong encoder wiring, set the parameter F233 to adjust it.

F234—— motor phase sequence, the default value is 1. but if it is found that the rotating direction of motor is directly opposite to the required rotating direction, set the parameter F234 from 1 to 0 to reverse the direction of motor.

F235—— motor none-load current parameter, set the proportion value of tractor non-load current in term of rated current . The default value is 32%. Under the normal circumstance, there is no need to change the value.

F236—— PWM carrier frequency. The higher the carrier frequency is, the smaller the noise of the motor is, the more the lost will be. Under the normal circumstance, there is no need to change the setting, just use the default value (6KHz). Since the increase in the carrier frequency will aggravate the waste of frequency converter, so if there is on-site need to reduce the motor noise by increasing the carrier frequency and the increased carrier frequency exceed the default value, the frequency converter need to be derated by 5% for every 1KHz increase.

F237—— PWM carrier frequency width. Under the normal circumstance, users only need to operate with the default value. To change automatically the carrier frequency within

the width range so as to reduce the motor noise in some situation. For example, the setting value of F236 is 6KHz, the setting value of F237 is 0.4KHz. the actual carrier frequency of frequency converter change automatically within the scope of 5.8～6.2KHz

F238—— adjustor mode. Generally the default value is 1. The standard adjustor mode

F239—— output torque limit. It set the limit value of output torque. It is percentage data of rated torque. the default value is 175（175%）

F240—— rated voltage of frequency converter. Setting the output voltage of frequency converter

F241—— rated power of frequency converter. It is default value. for the reference only, Modification not allowed.

F242—— phase angle of encoder. It is the encoder phase angle data automatically acquired by the system. For the reference only

F243—— zero position correction of encoder. 0: regular mode. 2: encoder zero position correction. When the operation inspections are ok, synchronize the elevator to do the encoder zero-position correction to realize the better control precision. The specific method as follow: at first, set the inspection speed to 4 rpm. Then set the F243 to 2. Press up-down button to run the elevator at low speed for 30 seconds. And then the integrated control will stop. The F243 turn to 0 and the encoder zero-position correction completed.

F245—— F246~F255 parameter function selection. Change the parameter will make the definition of F246~F255 different. The range is 0～6. The default value is 0.

When F245=0

F246—— Overheating protection time for radiator. The integrated unit starts protection when the radiator overheating time duration exceed the setting time.

F247—— Over-speed protection coefficient. The integrated unit launches the protection when the following two conditions are met: 1) the motor rotating speed monitored by the integrated unit exceed the protection coefficient set by the parameter.2）the motor over-speed time duration exceed the over-speed protection time set by the parameter.

F248—— Over-speed protection time. Setting the protection time duration for the motor over-speed

F249—— the confirming number of times of open phase input. At certain instant the open phase input exceeds the number of times set by the parameter. Then the protection is launched.

F250—— the confirming number of times of brake resistor short-circuit. At certain instant the numbers of times of brake resistor short-circuit exceed that set by the parameter. The protection is launched.

F251—— the confirming numbers of time of Sin/Cos encoder disconnection. At certain instant the confirming numbers of time of Sin/Cos encoder disconnection exceed that set by the parameter. The protection is launched.

F252—— confirming time of output open phase. The output open phase exceeds the time duration set by the parameter. Then the protection launched.

F253—— Confirmation of voltage for charging relay failure. Protection after the three-phase in-operation input voltage fall below the value set by the parameter and fault No 144

reported. The charging relay may be damaged or the grid voltage is suddenly decreased.

The Fault No 114 reported due to insufficient capacity of temporary power supply adopted at the beginning of on-sit adjustment and setting. Meanwhile, it is impossible to improve the capacity of power supply at the working place. Under such circumstance, users can confirm that the charging relay of frequency converter is ok if they can hear the sound of relay close and open inside of frequency converter when the frequency convert is power-on or power-off. Then users can realize this kind of the elevator running with the temporary power by changing the parameter of the frequency converter. The detailed method is as follow:

Change the parameter F253 from default value 45 to 90. In this way the elevator can run with low-capacity power supply. When the on-site installation is completed, change the parameter value back to the default value of 45 when the normal power supply is recovered.

F254—— encoder CD phase fault confirmation threshold. The default value is 300. When the difference value between the encoder absolute position and calculation position exceed the setting value, the No.28 fault reported.

When selecting not to do self-study with power on (F245=6, F246=0). The integrated unite will automatically activate the encoder C/D phase inspection. If it is found that C/D phase position is not correct, the setting threshold of F254 exceed, the integrated unit will report No 98 default.

Please note the if value F245 (F245=6) change from 1 to 0 on the site, the No 98 fault will reported, because C/D phase position is not inspected when F245=1(F245=6),and disconnection or wrong connection does not matter. The fault inspection is only for sincos encoder and Endata encoder.

F255—— **ABZ** encoder disconnection protection threshold. The default value is 20%. When the synchronous motor adopted the ABZ encoder, the encoder disconnection is identified once the feedback speed deviation exceeds the protection threshold. The No 12 fault is reported with the frequency converter.

When F245=1

F246---- Times og Instantaneous overcurrent of IGBT

F247---- 0:two ways of I2t protection,1:only the first way of I2t protection,2: only the second way of I2t protection

When F245=2

F247—— PWM adjustment mode. 0: 5 stages, 1: 7 stages, 2: <40%rpm 7stages, >40% 5 stages. The integrated units at low-speed cause too much interference to outside. For example, change to 0 (5 stages) for the improvement of CAN communication signal and for heating reduction of frequency converter. But in this way will possible cause the loud noise of frequency converter at low speed.

F250—— three phase current balance coefficient. This parameter is read-only parameter; it will change automatically after doing the three-phase electricity balance coefficient calibration. If it is synchronous motor, activation of synchronous motor self-study command will close the output contactor and conduct the three-phase current calibration. This function will reduce the motor vibration and improve the comfort.

the detailed method of three-phase current sensor calibration is as following: first of all, find the asynchronous motor self-study mode in the adjustment menu of the portable operator, press the confirmation key and the integrated unit will output the KMY closing command to make the contactor closed. Then the operator will display "studying" for 30 seconds while conducting three-phase current sensor self-calibration. The operator will display "study complete" when study successfully. At this time set the F245 to 2, and obverse the F250 to be the value between 800 and 1200 (1000 not allowed). The default value of F250 is 1000. The value can not be 1000 after self-study. Otherwise, redo the self-study until the correct value is obtained.

F252—— 0:allow Positive /negtive rotation 1:only allow positive rotation

F253—— The zero-speed time of positive/negative rotation change

F254—— accelerated over-current threshold of frequency converter. Acceleration will stop if current exceed the setting value during the process of the acceleration. And current speed is maintained. Acceleration will resume after the current drop.

F255—— decelerated over-voltage threshold of frequency converter. Deceleration will stop if busbar voltage exceeds the setting value during the process of the deceleration. The current speed is maintained. Deceleration will resume after the voltage drop.

When F245=3

F246—— the integral P of current loop PID adjuster, no adjustment needed.

F247—— the integral I of current loop PID adjuster, no adjustment needed.

F248—— the integral D of current loop PID adjuster, no adjustment needed.

F254—— Torque direction 0:positive 1:negative

When F245=4

F246—— Software version code. Read-only parameter

F247—— ID NO 0. Read-only parameter

F248—— ID NO 1. Read-only parameter

F249—— ID NO 2. Read-only parameter

F250—— ID NO 3. Read-only parameter

F251—— ID NO 4. Read-only parameter

F252—— ID NO 5. Read-only parameter

F253—— rated current of the integrated unit, read-only parameter.

F254—— rated current of the integrated unit current sensor, Read-only parameter.

F255—— Motor power coefficient Set the max power output, generally do not need to change

When F245=5

F246—— Stator resistor. The stator resistor of asynchronous motor

F247—— rotor resistance. Rotor resistance of asynchronous motor

F248—— Stator inductor. The stator inductor of asynchronous motor

F249—— rotor inductor. The rotor inductor of asynchronous motor

F250—— Mutual inductor. The mutual inductor of asynchronous motor

F251—— Motor low-speed over current threshold. When the motor speed is lower than the 20% rated speed, motor stop and motor low-speed over current reported when the current exceed the setting value and the over current time duration exceed that set by the F252.

F252—— Low-speed over current time. The duration of motor low-speed over current

F253—— Motor high-speed over current threshold. When the motor speed is higher than the 20% rated speed, motor stop and motor high-speed over current reported when the current exceed the setting value and the over current time duration exceed that set by the F254.

F254—— high-speed over current time. The time duration of motor high-speed over current

F255—— Frequency dividing coefficient of encoder. This parameter selects the frequency dividing output coefficient of PG card, the default value is 0. It requires the PG card with frequency dividing output function.

0: (no frequency dividing), 1:(2 frequency dividing), 2: (4 frequency dividing),3:(8 frequency dividing),4: (16 frequency dividing),5 (32 frequency dividing),6:(64 frequency dividing), 7: (128 frequency dividing)

When F245=6

F246—— self study selection or not when power on . The default is 1: self-study every time when power on. If it changes to 0, never conduct another self-study when power on once the self-study has been done. (Only for sincos encoder and Endata encoder) .user can manually change the phase angel F242 data. If F242 value is 0, the integrated unit will conduct self-study automatically. Please note: once F246 (F245=6) set as 0 and main unit or rotary encoder has been replaced, F242 should be set as 0 to do a self-study. Otherwise, the wrong phase angel will cause the vibration of motor.

F247—— current gain when conducting self-study. The default value is 150, which mean the default phase self-study is done with 1.5 times rated current

When using special main unit (such as BOMA motor) on site, phase self-study is required for several times. After the self-study is completed, there is the need to run main unit once. The phase angle position obtained can be seen at F242. Change F242 to 0, the main unit can do the self-study even without power disconnection.

Comparing the F242 values obtained from self-study each time, increase the F247 (when F245=6) to redo the self-study until the deviation of self-study every time is less than 10 if the variation range is more than ＋10～－10.

F247 (when F245=6) value should not be too high, otherwise the main unit running at the first time after the self-study will cause noise. So it is ok to set the value below 300.

For BOMA main unit on site, the value should be set as 250 to do the self-study. Its phase angle deviation is within 8.

F248—— command option. It is used to choose the running command.

F249—— Zero servo process current loop gain. Current loop gain in the zero servo process

F252—— set 6616,open anti-slipping function.

Cattier frequency(F236=4.000kHz)

Cancel 1 fault(F245=2,F246=64), The original is 0

Cancel 21 fault(F245=1,F246=40000), The original is 2

Cancel 27 fault(F245=1,F247=1), The original is 0

Every time it run， F252 minus 1，F252 greater than 6616 or less than or equal to 6606，then F252 is 0 automaticly 自； after power off and power on，F252 is 0Chapter 8 Elevator adjustment and setting instructions

This chapter provides the guide for operation of elevator. Following the operation procedures described in this chapter to complete the design, installation, wiring, parameter setting and commissioning of elevator quickly.

Important Notice:

✓ Any users of our products are required to carefully read and understand this manual and the related equipment manuals of the system prior to starting system commissioning or putting it into operation in order to avoid accidentals 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 installed reliably (The equipment required in the machine room 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

◎ **don't remove the shell when power is on**

Or it may cause risk of electric shock.

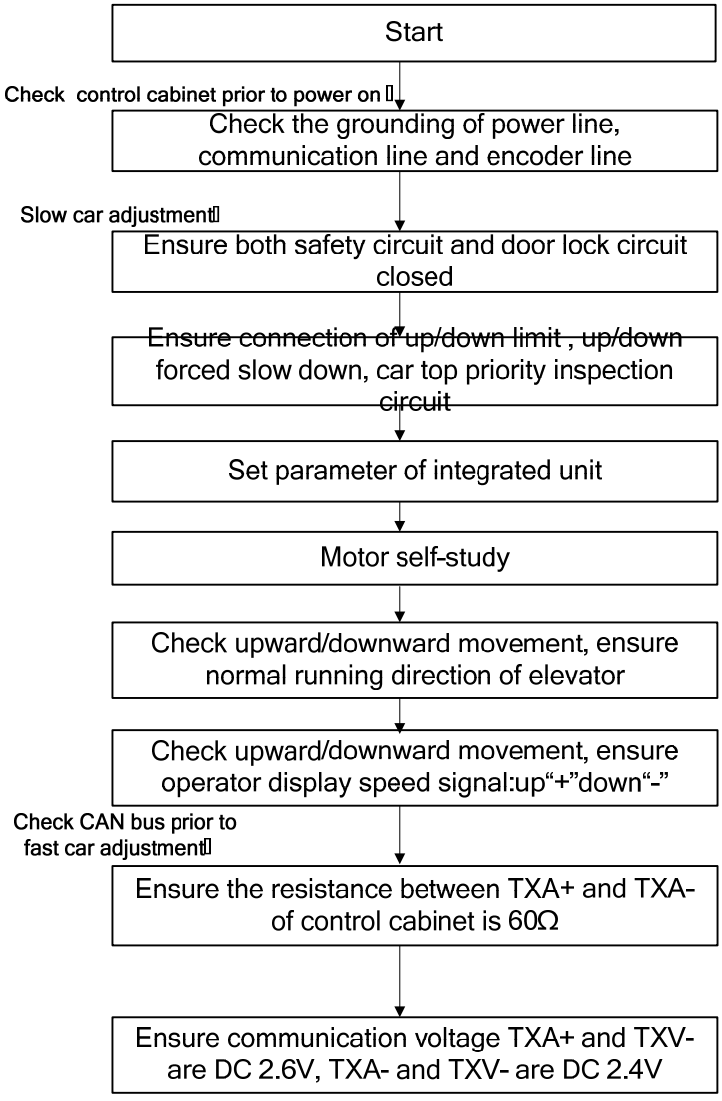
◎ **Do not reset alarm signals until operating signals are surely cut off**

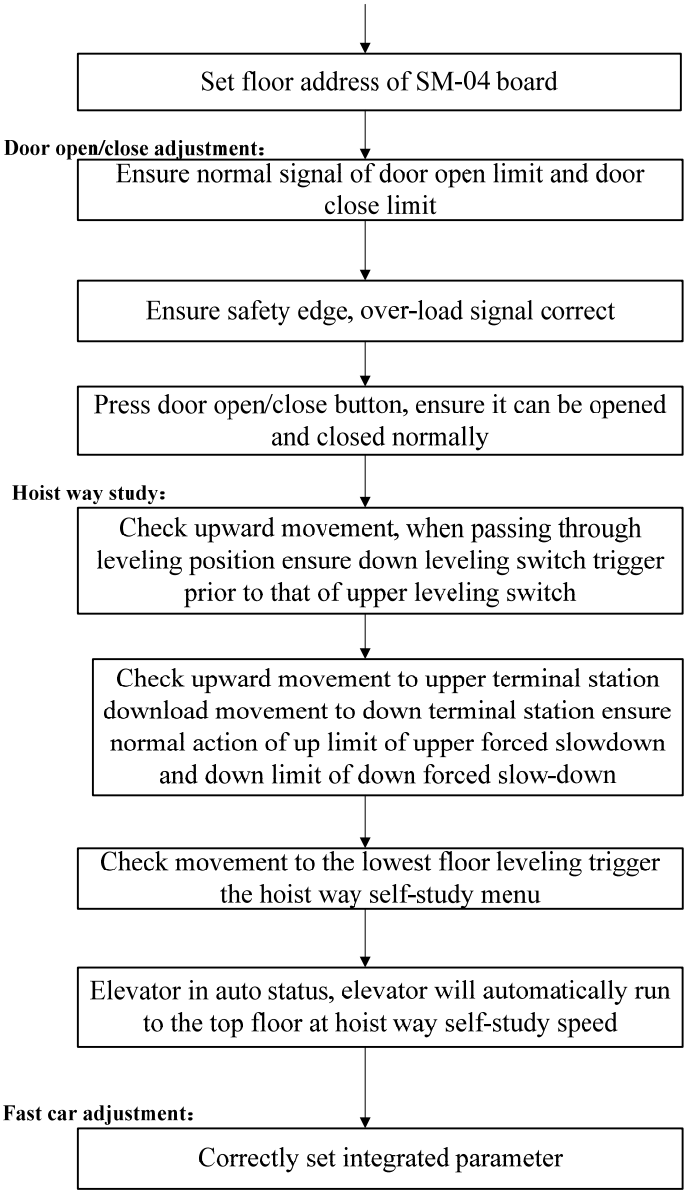
Or it may cause risk of injury.

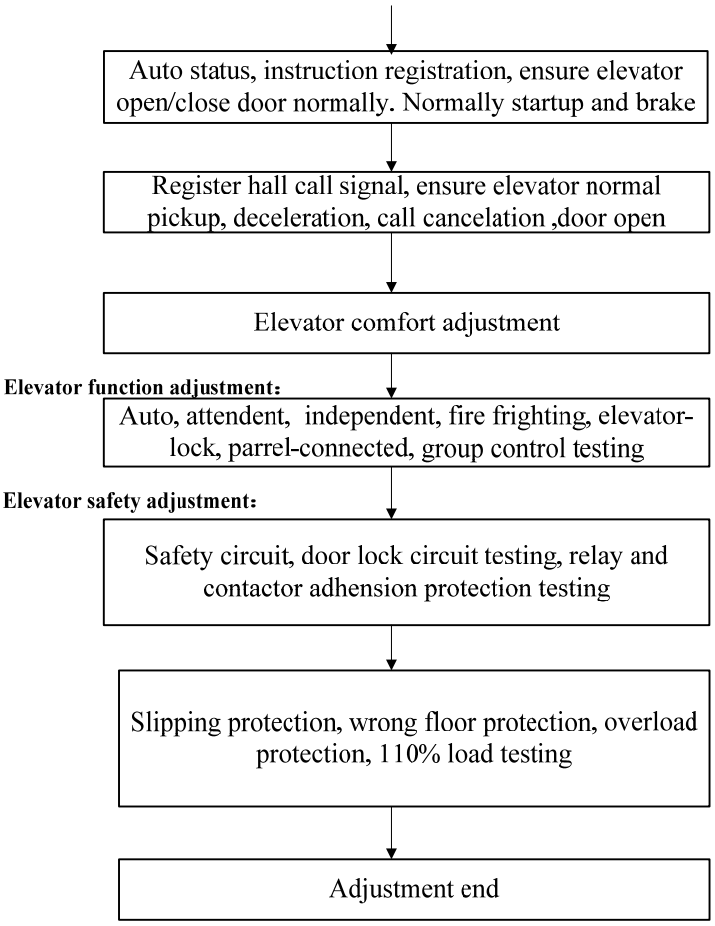
Caution
◎ **There is high temperature in heat sink and brake resistor ,do not touch it** Or it may cause risk of burning. **Prior to put them into operation, make sure all motors and machines are to be used in their scope of application.** Or it may cause risk of injury.

8.1 simplified adjustment and setting diagrams

A new elevator equipped with AS380 series elevator integrated drive controller Manufactured by shanghai step electric co,ltd. The adjustment procedure of the Electric control and drive is as follow:




Set floor address of SM-04 board
Door open/close adjustment:
Ensure normal signal of door open limit and door close limit
Ensure safety edge, over-load signal correct
Press door open/close button, ensure it can be opened and closed normally
Hoist way study:
Check upward movement, when passing through leveling position ensure down leveling switch trigger prior to that of upper leveling switch
Check upward movement to upper terminal station download movement to down terminal station ensure normal action of up limit of upper forced slowdown and down limit of down forced slow-down
Check movement to the lowest floor leveling trigger the hoist way self-study menu
Elevator in auto status, elevator will automatically run to the top floor at hoist way self-study speed
Fast car adjustment:
Correctly set integrated parameter



8.2 Check before Power on

After installation of electrical control systems, electrical parts must be checked:

1. Check the connection of all parts, according to the user manual and electrical schematic diagram.
2. Check whether the strong current part and the weak current part are connected. Check the resistance between various voltage circuits with ohm grade of a multimeter, and the grounding resistance should be ∞.
3. Please carefully check whether the power incoming line of the control cabinet and motor connections are correct, to avoid burning the elevator integrated drive controller after power on.
4. Check whether the control cabinet case, motor case, car grounding wire, hall door grounding wire are reliably and securely connected, to ensure personal safety.

▲ Note: The cabinet case and the motor case should be one point grounding.

8.3 Power on and Check

8.3.1 Confirmation before Power on

1. Check the control cabinet for earthing short circuit before power on:
   (1) input power line three-phase ground
   (2) Motor line three-phase ground
   (3) Terminal 220V ground

(4) Communication line ground

(5) Encoder line ground

Please exclude all items above if short circuited.

2. Grounding check: (Make sure the following items are reliably grounded)

(1) Control cabinet ground

(2) Motor ground

(3) Lift car ground

(4) Door motor ground

(5) wire casing ground

(6) Encoder shield control cabinet ground

(7) Encoder shield motor terminal ground

Note: single terminal grounded for asynchronous motor encoder shield, both terminals grounded for synchronous motor Encoder shield.

3. Check communication lines, encoder cable and power line wiring: (Please confirm whether the site meets the following requirements, if not, please correct):

(1) Well communication line is twisted pair line and the twist distance <35cm

(2) Lift car communication line is twisted pair and the twist distance <35cm

(3) Group control communication line of parallel connection is a twisted pair line and the twist distance<35cm (only parallel connection or group control elevator)

(4) Encoder lines and power lines go separate trunking

(5) Communication lines and power lines go separate trunking

(6) Group control communication lines of parallel connection and power lines go separate trucking (only parallel connection or group control elevator)

8.3.2 Checks after Power on

1. Close the main power switch. If the green light on the phase sequence relay KAP is on, the phase position is correct. If the green light is not on, shut off the main power supply; swap any two-phase positions and then power on again.

2. Check all terminal voltage of the isolation transformer TCO in the control cabinet, and see whether they are within the nominal range.

3. In the premise of carrying out the above steps correctly, proceed with the following steps:

(1) Close the fuse **FUn** (n = 1, 2, 3 ... ...);

(2) Close the door open/close power control switch; open/close TPB is powered on, and the motherboard is electrified to run.

Each terminal voltage of switching power supply is as follows:

Table 8.1 Terminal voltage of switching power supply

Terminal	L～ N	24V～ COM
voltage	220±7%VAC	24.0±0.3VDC

(3) Reset the emergency stop switch of the control cabinet, connect safety loop, and the LED lights corresponding to the motherboard input point are on.

(4) Check the following circuit:

- Check whether the door lock loop is normal;
- Check whether the leveling switch signal is normal;
- The elevator status on the handheld programmer should show "**Inspection**";

If abnormal, please check and correct accordingly.

8.4 Configuration of System Basic Parameters and Self Study of Motor Parameters

8.4.1 Configuration of System Basic Parameters

First set the system basic parameters in Table 7.2 correctly through a dedicated handheld LCD Manipulator (see Chapter 5 for the use of hand-held Manipulator), and then make commissioning as described in the following sections. For each new system, before setting parameters, it's recommended to make a parameter reset through a dedicated LCD Manipulator.

Parameter reset as follows:

(1) The elevator is in stop state;

(2) Find "parameter reset" command interface in handheld Manipulator;

(3) Align the cursor with "parameter reset" command and press Enter key, the system will complete parameter reset immediately.

After parameter reset, all the parameters are changed into factory default values. Configure the basic parameters on the basis of parameter reset, and the other parameters are set to be the factory default values, to ensure normal and reliable operation of the system.

Table 8.2 System Basic Parameters

No.	Name	Default Value	Scope	Unit	Remarks
F06	Elevator rated speed	1.750	0.100～10.000	m/s	
F09	Lockout floor	1	1～64	×	
F10	Offset floor	0	0～64	×	
F11	Total floor number preset	18	2～64	×	
F12	Inspection speed	0.250	0～0.630	m/s	
F23	Group control mode	0	0～3	×	
F25	Input Type 1 (normal open or normal closed configuration for X0 ~ X15 input point)	819	0～65535	×	
F26	Input Type 2 (normal open or normal closed configuration for X16 ~ X25 input point)	2	0～65535	×	
F27	Lift car board input type (normal open or normal closed configuration for GX0 ~ GX15 input point)	0	0～65535	×	
F28	Car top board input type (normal open or normal closed configuration for HX0 ~ HX15 input point)	327	0～65535	×	

F182	Deceleration switch series	0	0～10	×	
F183	Learn trip speed	0.800	0～1.000	m/s	
F202	Motor type	0	0 / 1	×	0: asychronous 1: synchronous
F203	Motor rated power	According to inverter parameter	0．40～160．00	KW	
F204	Motor rated current	According to inverter parameter	0．0～300．0	A	
F205	Motor rated frequency	50.00	0.00～120.00	Hz	
F206	Motor rated rotary speed	1460	0～3000	rpm	
F207	Motor rated voltage	According to inverter parameter	0.～460	V	
F208	Motor pole number	4	2～128	×	
F209	Motor rated slip frequency	1.40	0～10.00	Hz	
F210	Encoder type	0	0 / 1 / 2	×	0:incremental Encoder 1:SIN／COS Encoder 2: Endat Encoder
F211	Encoder pulse number	1024	500～16000	PPr	

Note:

Before debugging, the basic parameters above must be correctly set; the basic parameters of the motor can be input based on nameplate; according to the actual situation of the site, please refer to Chapter VII for the parameter setting method and detailed definition.

8.4.2 Motor Parameter Self Study

No motor parameters self study for the synchronous motor. Because **AS380** series elevator integrated drive controller adopts the most advanced and unique drive technology which can automatically obtain Encoder phase angle data, therefore, there is no need for motor auto-tuning of Encoder phase angle.

Note that: every time AS380 series elevator integrated drive controller is used to control synchronous motors, it will automatically capture Encoder information at its first running after powered on, which takes 2 seconds or so. Therefore, the given running signal at this

time is slightly later than usual. Please do consider this detail in the design for this control system, to avoid unnecessary failure.

For the induction motor, if the on-site motor parameters are confirmed to be very accurate, in particular if the F209 (motor rated slip frequency) parameters are ensured to be accurate, the following self study of motor internal characteristic parameters will not be necessary. However, if the on-site motor parameters are not accurate enough, or with the purpose of ensuring excellent operating characteristics of the system, self study can be carried out on site regarding the motor internal operating parameters. Specific methods are as follows:

(1) The connections between AS380 series elevator integrated drive controller and motor, between AIO and encoder have been correctly completed;

(2) Correctly power on for AIO;

(3) Confirm that the safety loop and lock loop are in a normal connected state;

(4) The Auto / Inspection (or emergency power operation) switch is in position of Inspection (or emergency power operation):

(5) Select "induction motor self study" command by Seven-Segment Code Display Manipulator or LCD handheld Manipulator, and then press the Enter key;

(6) AIO starts static self study: the main contactor between AIO and the motor will automatically pull; AIO obtains internal characteristics parameters of the motor by applying test current on the motor. But the brake contactor will not pull; neither will the motor rotate;

(7) The motor parameters complete their self study after 30 seconds, and the main contactor releases automatically.

If the self study does not work, mainly check the following items:

(1) Whether the safety loop and the lock loop are connected. If not, the main contactor will not pull, so it is impossible to complete the self study;

(2) Whether the Encoder wiring is correct, whether A, B phase is reversed;

(3) Whether the motor parameters are set correctly.

8.5 Test Run of Slow Car

8.5.1 Inspection Operation of Engine Room and Preparations for Express Car

1. Points to be confirmed by the engine room before slow car run

（**1**）Inspection (or emergency power operation) switch of the control cabinet to "**Inspection**"(or emergency power operation) position, and car top Inspection switch to "**normal** " position;

（**2**）Safety loop and lock loop work properly. **Remember not to have lock shorted**;

（**3**）Encoder properly installed and wired correctly;

（**4**）After powered on, the elevator integrated drive controller displays normally and checks whether its parameters are set correctly, and manual programming shows that the elevator is in a status of "Inspection";

（5）Connect the tractor brake line onto the terminal in the control cabinet correctly;

（6）The upper and lower slow down switches are correctly wired;

（7）Inspection priority circuit on the car top is correctly wired;

2. Operation of engine room slow car

After the engine room slow car meets the operating conditions, press the upward (downward) button on the control cabinet, and the elevator should go upward (downward) at a preset Inspection speed.

（1）Observe whether the elevator follows the right direction, when it goes up or down. If in the wrong direction, first check whether the up and down buttons are correctly wired: JP8.3 of AIO motherboard should be connected to upward button signal, JP8.4 should be connected to the downward signal button. If correctly wired, change the F234 motor phase sequence parameters (from 0 to 1or from 1 to 0).

（2）When the slow car goes upward or downward, if the motor displayed by AIO feedbacks an unstable speed or gives a value with significant deviation, check the wiring between Encoder and the motherboard: (1) whether the cable is properly used. If the Encoder is a differential signal, use shielded twisted-pair cable; if not differential signal, use general shielded cable. (2) Whether the alignment is reasonable. The Encoder cable and power lines should not go trunking together, and must be strictly separated from each other (3) Check whether the shielding lines and net are reliably grounded.

（3）Check whether the upper and lower leveling switches are correctly wired: when the elevator goes up slowly, X7 (lower leveling switch) motion should be confirmed before passing through the leveling floor, and X6 (upper leveling switch) motions after. In case of the opposite order, the well cannot complete self study successfully. In that case, the wiring of the two switches to the motherboard must be interchanged.

Note: Under many circumstances, slow running is not an Inspection operation, but an emergency power operation. At this point, in the safety loop, the safety gear switch, limiter switch, upward over speed protection switch, upper and lower terminal limit switch and buffer reset switch are all shorted in the slow run mode, to which particular attention should be paid. It is recommended that the engine room emergency operation should not last too long in time and distance, and do not have the lift car run to the end position.

8.5.2 Car Top Inspection Operation

After engine room slow car functions normally, you can run the car top Inspection operations. The Inspection speed may be adjusted appropriately lower in the first overhaul. After the operator enters into the car top:

(1) First set immediately the car top Auto / Inspection switch to Inspection position, and confirm that the upward and downward buttons in the control cabinet of the engine room do not work at this moment.

(2) Press the upward and downward buttons by car top, and confirm that the button direction is the same with the lift car running direction.

(3) The operator should operate on the car top the elevator for a test run of back and forth, carefully observe the surrounding of the lift car and confirm that there is no obstruction for the lift car in the entire well.

(4) By Inspection operation on the car top, confirm that the motion and movement position of the deceleration switch at the end of the well terminal are correct.

(5) By Inspection operation on the car top, confirm that the well leveling switch and leveling spiles are installed correctly; at all leveling positions, each leveling switch motions at the right point.

8.5.3 Check of CAN Communication Lines and Setting of 04 Board Address

1. Check of communication terminal resistance:

(1) Confirm that the terminal resistance between the CAN 1 communication port TXA + and TXA- is 60 ohms (inside the car and outside the hall there is a respective jumper terminal resistance of 120 ohms).

(2) Confirm that the terminal resistance of CAN2 communication port TXA1 +, TXA1-parallel connection or group control is 60 ohms (for parallel connection or group control elevator, the terminal resistance at motherboard CAN2 port should be inter-connected.)

2. Setting of SM-04 board address

Please start from the lowest order, set the SM-04 board address from 1 until the top end. Set the SM-04 address inside the car to 0. Note that: if it is parallel connection or group control, the address sequence is based on the order of the entire elevator group. For example: three elevators A, B, C for group control, Elevator A serves floor -2, -1,1,2 ~ 8; B serves -1,1,3 ~ 8; C serves 1,2,4 ~ 7. Then set the SM-04 board of each elevator to the address as shown below.

Floor	Elevator A Board SM-04 Set Address	Elevator B Board SM-04 Set Address	Elevator C Board SM-04 Set Address
-2	1	×	×
-1	2	2	×
1	3	3	3
2	4	×	4
3	5	5	×
4	6	6	6
5	7	7	7
6	8	8	8
7	9	9	9
8	10	10	×

The "×" in the table above indicates that there is no SM-04 board on the floor. In specific settings, first set the address switch on the SM-04 board (SW5.1 or SW1.4) to ON position, or set the address to the jumper pin (S1) or short with a short circuit cap (whether it is switch or jumper pin and what the switch code should be is determined by different types of SM-04 board. Refer to Section 6.3 Definition of Display Penal Port). Then, power on the SM-04 board, it is in the address setting state, the normal display of the elevator location now shows the address of SM-04 board. Press the up and down buttons to adjust the address data upward and downward, until the address displayed shows that the SM-04 board should set on this floor. Finally, reset the address setting switch or the jumper pin to make SM-04 board back to normal operation.

8.5.4 Door Opening/Closing Adjustment

1. Set the elevator to Inspection status and leave the lift car at the leveling position;
2. Send in door machine power;
3. Move the car door manually, monitor on the handheld Manipulator whether the door closing in place (HX0) signal and the door opening in place (HX1) signal work correctly;
4. Confirm the safety edge signal and the overload signal are not in action;
5. Confirm F165 parameter set to 0 (door operation allowed during the elevator Inspection);
6. Have the car door in complete open state;
7. Press close button to confirm that the elevator door may close correctly until close in place;
8. Then, press the button to open the door, make sure the elevator door may open correctly until open in position.

8.6 hoist way Self Study

Running hoist way self study means the elevator runs at self study speed and records the position of each floor and that of each switch in the well, as the floor location is the basis for the normal brake and operation of the elevator and for the floor display. Therefore, before the express car operates, it is mandatory to run well self study first.

8.6.1 Hoist way Self Study Method

1. Confirm the elevator complies with safe operating conditions.
2. Confirm that all switches within the well are correctly installed and wired, and the connection of accompanying cables and outside cables is correct;
3. Have the elevator into Inspection (or emergency electric operating) state;
4. Enter into self study menu by hand-held programmer, follow the menu instructions, and find well self study interface. Then move the cursor to well self study command and press Enter key;
5. Set the elevator into the automatic state, and the elevator runs down to the bottom level at s Learn trip speed (set by F183) and then automatically goes up at self study speed, and begin well self study. Well study is complete until the elevator arrives at the top leveling position and stops automatically. The handheld Manipulator shows "self study completed" after the success of the self study;
6. In the self study process, if the control system is abnormal, self study will stop and give the corresponding fault number, and the handheld Manipulator shows "self study unsuccessful".
Main reasons for unsuccessful well self study include:

（1）The total story number set (F11) is inconsistent with the number of leveling spiles installed in the well;
（2）The number of slow down switches installed is inconsistent with the data set by parameter F182;
（3）The upper and lower leveling switch wiring reversed;
（4）The leveling switch and leveling spiles are installed in the position not accurate enough to make leveling switch motion effectively and correctly when the leveling spile of each floor inserts;

（5）The set norm. Open / norm. closed input of leveling switch is inconsistent with the actual one;

（6）Wrong motion or wrong installation position of slow down switch (when the lift car is at the ground floor leveling position, the slow down switch on the lower single level must motion, before the lift car goes upward to the leveling position of the second bottom floor, the slow down switch on the lower single level must have been reset; when the lift car is at the top floor leveling position, the slow down switch on the upper single level must motion, before the lift car goes downward to the leveling position of the second top floor, the slow down switch on the upper single level must have been reset).

（7）The set norm. open / norm. closed input of slow down switch is inconsistent with the actual one;

（8）Encoder signal is interfered or Encoder has wiring error;

（9）Leveling switch signal interfered;

（10）Leveling switch failure or Encoder failure.

Note: in 2 levels / 2 stops self study, run the elevator to the lower limit after it enters Inspection state. Proceed with normal self study after the upper leveling switch pulls away.

Note: Express car operation is only possible after well self study.

8.7 Express Car Operation

1．Test Run of Express Car

After slow car runs correctly, first make sure the elevator complies with safe operating conditions. After well self study, proceed with express car test run. Specific steps are as follows:

1) Set the elevator in normal state.

2) Monitor the selected floor by hand-held programmer to select the floor where the elevator runs. Test run is possible for single floor, double floor, multi floors and full trip.

3) Check whether the elevator can correctly close the door, start, accelerate, run, cut, decelerate, stop, cancel and open.

4) In case of abnormal operation, follow the fault code (see Chapter IX) and operate accordingly.

2．Safety Test

1) Safety loop

Testing requirements: When the elevator stops, any of the safety switches motions. After safety loop is disconnected, the elevator can not start; when the elevator is under inspection operation, any of the safety switches motions. After safety loop is disconnected, the elevator takes an emergency stop.

2) Door lock loop

Testing requirements: When the elevator stops, after any of the hall door locks is disconnected, the elevator can not start; when the elevator is under Inspection operation, after any of the hall door locks is disconnected, the elevator takes an emergency stop.

3) Safety loop relay adhesion protection (This function may not be tested if no safety loop relay)

Testing requirements: Press the emergency stop of control cabinet to disconnect the safety loop, and then force the safety loop relay not to release by any means. The system should be protected and not reset automatically;

4) Door lock loop relay adhesion protection (This function may not be tested if no door lock loop

relay)

Testing requirements: Under door-open circumstances, force the door lock loop relay not to release by any means. The system should be protected and not reset automatically;

5) Brake contactor adhesion protection

Testing requirements: Under stop circumstances, force the brake contactor not to release by any means. The system should be protected and not reset automatically;

6) Output contactor normal adhesion protection

Testing requirements: Under stop circumstances, force the brake contactor not to release by any means. The system should be protected and not reset automatically;

7) Skid protection function

Testing requirements: Move the elevator Inspection to the middle floor, remove the leveling sensor lines from the control cabinet wiring terminal (assuming leveling floor signal is normal. open), switch to normal, the elevator goes leveling at low speed, the system protected within 45 seconds and will not reset automatically;

8) Split-level protection

Testing requirements: (1) Move the elevator Inspected to the leveling position of middle floor, and switch to Inspection or emergency power operation. If the slow down switch is normal closed contact, disconnect the JP8.5 wiring at the upper single deceleration switch input on the motherboard; but if it is norm. Open contact, short JP8.5 and JP10.3 (input COM terminal). And thus create an intentional split-level fault, and then the system will display the top floor data. Then, change the JP8.5 wiring at the upper single deceleration switch input back to normal, and switch the elevator to normal state, register the bottom instructions, elevator express car goes down, make sure the elevator can decelerate and level normally to the bottom floor and does not sink to the bottom; (2) Move the elevator Inspected to the middle floor, and switch to Inspection or emergency power operation. If the slow down switch is normal closed contact, disconnect the JP8.6 wiring at the lower single deceleration switch input on the motherboard; but if it is norm. open contact, short JP8.6 and JP10.3 (input COM terminal). And thus create an intentional split-level fault, and then the system will display the bottom floor data. Then, change the JP8.6 wiring at the lower single deceleration switch input back to normal, and switch the elevator to normal state, register the top instructions, elevator express car goes up, make sure the elevator can decelerate and level normally to the top floor and does not rush to the top.

9) Overload function

Testing requirements; elevator overload switching, check the elevator should not be closed, the buzzer sounds inside the car, and the overload indicator light on.

1 Elevator function testing

(1) automatic running

Testing requirement: register several instructions in the car and confirm: elevator can normally close the door automatically, start, run at high speed, and automatically decelerate at the nearest registered landing, stop and cancel registration (the instruction canceled is in consistent with the landing the elevator stop) and open door.

Register several upper or down hall call signals, confirm: elevator can automatically close the door, start, accelerate, run, cut, decelerate, stop, cancel and open.

(2) attendant running

Testing requirement: turn the in-car switch to attendant status, and register several instructions. Keep pressing door-closing button to close the elevator door (if user release the door open/close button before door closing, the elevator will immediately turn from door-closing motion into door-opening motion until the door completely open). Automatically start after door close, run at high speed, and auto decelerate at nearest registered landing, stop , correctly cancel instruction and auto open door. Register several upper and down hall call signals ,keep pressing door-closing button until elevator close door (if use release the door open/close button before door closing, the elevator will immediately turn from door-closing motion into door-opening motion until the door completely open), auto start after door closed, run at high speed, and normally cut, decelerate, cancel and open.

(3) independent running

testing requirement: turn the in-car switch to individual status, make sure no floor showed on hall display board（or display floor No with words like " out of service" the call button does not work, register instruction in car, and keep pressing door closing button until elevator door closed,(if user release the door button before door closed, the elevator will immediately turn from door-closing motion into door-opening motion until door complete open). Auto start after door closed, run at high speed, and auto decelerate at nearest floor with instruction registered, and stop, cancel and auto open the door.

(4) Return at fire

Testing requirement: when elevator park at the certain floor other than firefighting return base station （appointed by F18）, turn the switch of base station return at fire into On position, all registered instructions and call signals will be completely canceled without any more registration allowed. The elevator will close door immediately, and return to firefighting base station in express car mode and the elevator open door and be out of service after auto door opening. When elevator run in the opposite direction of firefighting base station in express car mode, turn the base station firefighting return switch into On position. All registered instructions and call signals will be completely canceled without any more registration allowed. The elevator will park at nearest station without door open, and return to base station in express car mode and the elevator open door and be out of service after auto door opening. When elevator run in the direction of firefighting base station in express car mode, turn the base station firefighting return switch into On position. All registered instructions and call signals will be completely canceled without any more registration allowed. The elevator will bypass to the base station with stop, and elevator open door and be out of service after auto door opening until firefighting return switch reset and elevator return to normal running status.

(5) firemen operation (only firefighting ladder)

Testing requirement: turn the elevator firemen operation switch into on position, elevator will immediately enter into emergency return for firefighting base station (appointed by F18) status. The whole process and motion is complete same as that of the above fire return. After elevator return to the firefighting base station, stop and open the door, elevator enter into firemen operation status. At this time, there is no auto door opening or closing motion automatically. When doing door closing operation in door complete opening status, keep pressing door-closing button or instruction button, and elevator will

turn form door closing motion to door opening motion until door completely open. If closing door by keep pressing instruction button, the corresponding instruction signals will be registered after door closed. Press the instruction button for other floor in door closing status, the instruction signal will also be registered. After instruction signal registered, the elevator will immediately start automatically, run at high speed, and slow down at the registered floor and stop. Car stop enable all registered instruction signals to be removed. When car stop with door closed, keep pressing door-opening button to maintain door open until the door open in place. Once release the door-opening button in the process of door opening, the elevator will immediately change from door opening motion into door closing motion until the door is completely closed. The call button will always out of function in the fireman operation mode. Only when the elevator park at the firefighting base station, elevator doors open in place and firefighter switch reset, the elevator can return to normal running status.

(6) group control in duplex (only for elevator in duplex or group control)

Testing requirement: register several hall call signals and confirm the control system will allocate most recent or convenient elevator to respond registered call signals. When one elevator responded a call, the same call signals of all elevators in the same floor will be canceled at the same time. It is not allowed to have two or more than two elevator to respond the same call signal, to ensure the down call signals of top floor registered effectively, and enable the nearest or most convenient elevator to respond. When each elevator in the group has inconsistent service floor, do the following test for the floors that only some of elevators can park: move the elevator from it original floor to the floor a little bit far, and move the elevators that can not park at the floor to park at the near floor. When register call signal for the floor, ensure a nearest elevator in those for that floor to respond immediately. If base station return function and standby elevator disperse function is available, make sure that the parking floor location is conform to the result of required return base station and elevator standby disperse

(7) elevator lock function

Testing requirement: suppose that elevator stop at the floor outside of elevator lock base station or is running, turn the elevator lock key at base station to the position of elevator lock. The elevator can erase all registered call signal and will not register any new call signal. And landing display of the floor extinguishes or shows the words “out of service”. The elevator will continue to respond instruction (before arrive base station, continue to accept new instruction registration signal). After finish response of instruction signal, automatically return to base station, stop car and open door, cut off in-car lighting and fan power after door complete its opening, delay 10seconds and then close the door. The elevator then is out of service.

8.8 Adjust Elevator Comfort

8.8.1 Factors Relating to Elevator Comfort in Operation

(1) Electrical factors:

① Operating curve parameters setting: acceleration, deceleration, S curve bend time, start

brake delay, stop brake delay, etc.;

② Vector control PID parameters: proportional, integral and differential constants, etc.

(2) Mechanical factors: rail verticality, surface roughness, connection, guide shoe tension, uniformity of steel wire rope tension, etc.

The coordination in the mechanical system is the most fundamental factor to determine the comfort of the elevator operation; electrical parameters can only cooperate with the mechanical system, and further improve the comfort. The electrical factor is adjusted by the serial motherboard parameter and inverter parameter.

If there are problems in mechanical systems affecting the comfort, the serial motherboard parameter and inverter parameter can only improve comfort, but cannot change the mechanical defects fundamentally. The commissioning and related technical personnel should pay sufficient attention to this.

8.8.2 Adjust Elevator Comfort

(I) Adjust Mechanical Factors

1) Slideway:

- ✧ Slideway surface roughness
- ✧ Slideway installation verticality
- ✧ Connections between slideways

The slideway verticality and the parallelism between two slideways should be controlled within the limits prescribed by the national standard (GB). If the error is too large, it will affect the elevator comfort in high-speed operation, there will be jitter or oscillation, or the lift car shakes from left to right in some positions.

The improper connections of slideway will add step feelings to the elevator operation in some fixed positions.

2) Tension of Guide Shoe

In case the guide shoe is too tight, there will be step feeling, and it will generate brake feeling at stop; when guide shoe is too loose, the lift car will give shaking feeling.

If the guide shoe is sliding, then a small space should be maintained between the guide shoe and the slideway. Without the space or even guide shoe rubs the slideway surface, there will be oscillation or step feeling when the elevator starts and stops.

When commissioning, shake the lift car with your feet from left to right on the car top. It will be enough if the lift car has an obvious small displacement from left to right.

3) Uniformity of Steel Wire Rope Tension

If the steel wire rope tension is uneven, some ropes will be tight but some loose to cause jitter or oscillation in the elevator operation, and thus will affect the start, high-speed operation and stop.

In commissioning, the elevator can be stopped on the middle floor. Pull every steel wire rope manually with the same force on the car top. If the pull distance is roughly the same, the steel wire ropes are under the uniform tension; if not, ask the installer to adjust the tension of steel wire ropes.

In addition, steel wire ropes are tied in the circle before installation, so with response torsional stress. Installed directly, the elevator operation will prone to vibration. Therefore, before installation, fully release such torsional stress.

4) Lift Car Installation Fastening and Sealing

When the elevator is running at high speed, the entire lift car will be under a great force. If the lift car bracket or the lift car wall is not well fastened, it will generate dislocation in high speed operation and have the lift car vibrate. The buzzer acoustic resonance of the lift car is generally related to the fastening degree of the installation, the sealing of the lift car and the well.

5) Anti-Mechanical Resonance Device

- ✧ Pad rubber gasket under tractor shelf girder;
- ✧ Use wood chuck or other similar devices at the pigtail of the lift car steel wire rope to eliminate vibration.
- ✧ At present, for decorative effects, some lift cars use new lightweight materials, which reduces the weight of the lift car and produces "mechanical resonance ", especially in high speed elevator. When such phenomenon occurs, add appropriate load on the lift car to change its natural frequency and eliminate mechanical resonance.

6) Tractor

Sometimes improper assembly of tractor leads to poor mesh between turbine worm and gear; or long use wares the turbine worm and gear, causes axial movement in acceleration or deceleration and results in the step feeling in acceleration or deceleration.

7) Lift car balance

Sometimes, the design or installation or other reasons lead to uneven weight of the lift car to slide to one side. In the elevator operation, the guide shoe tightly rubs the slideway surface, which generates jitter or vibration. At this point, add a block on the lighter side of the lift car and test.

8) Other

Such as the parallelism of traction wheel and guide wheel, adjustment of run-time brake clearance, etc.

(II) Adjust Electrical Factors

Electrical aspects that affect comfort mainly include: the performance of the speed curve, electromagnetic interference of analog signal speed reference signal (if using analog signal speed reference method), Encoder feedback signal quality and inverter drive performance. Our later discussion is established on that all other factors that may affect comfort have been adjusted. How can we adjust the parameters relating to this integrated drive controller, to improve the drive performance of the system and to improve the elevator comfort.

1) Adjust starting comfort

Integrated drive controller uses original non-load sensor start-compensation technology, so even if there is no pre-load device for start compensation, it can also be adjusted by parameters to achieve good starting comfort.

(a) Conventional method for adjusting starting comfort

Under normal circumstances, adjust the inverter's zero servo PID parameters and the excitation time and other parameters, to improve the starting comfort. Refer to the Table below for relevant adjustment parameters.

Function Code	Name	Content	Scope	Unit	Factory Setup	Remarks
F212	Zero servo gain P0	Gain value of PID regulator that takes effect on zero servo	0.00～655.35	×	130.00	
F213	Zero servo integral I0	Integral value of PID regulator that takes effect on zero servo			80.00	
F214	Zero servo differential D0	Differential value of PID regulator that takes effect on zero servo			0.50	
F226	Zero servo time	Start accelerated movement after the inverter gives operating signal and this time maintains torque.	0.0～30.0	s	0.5	

Note 1: The speed at the starting point to be adjusted around PID regulator

F226 is a zero servo time parameter, used to adjust and control the delay time given by the system speed curve; this time is also the action time of PID regulator P0, I0, and D0 at zero servo (or zero speed). See the following for the detailed timing sequence diagram.

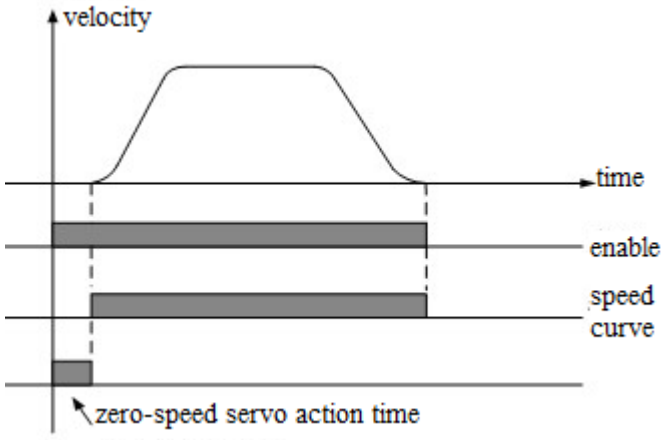


Figure 8.1 Zero Servo Timing Sequence Diagram

When zero servo ends, AIO inverter gives the controller a signal with speed instruction, and the elevator begins to accelerate.

F212, F213 and F214 are proportional (P0), integral constant (I0) and the differential constant (D0) of the zero servo regulator. In adjustment, fist set P0 to a very small value, and have the elevator go downward non-loaded; at this moment, the elevator shows pull-back at start. Increase the P0 value gradually, until the elevator stops showing pull-back at start. However, if P0 is too large, the elevator may oscillate up and down at start. So in case of obvious oscillation at start, decrease the P0 value. I0 is the integral constant of zero-speed PID regulator at

stop. The greater I0 is, the shorter the response time is. If the I0 value is too small, P0 will not have enough time to motion; if I0 is too large, high frequency oscillation may be easily produced. D0 helps the system with the response speed. The larger D0 is, the faster response is; but too large D0 can cause oscillation.

(b) Adjust timing sequence to improve starting comfort

The starting timing sequence is the coordination between the main contactor pull, the release of inverter upward or downward command (or enable signal), brake open and the speed signal, when the elevator starts. In general, at the elevator starter, the main contactor pulls first, then inverter enable signal releases, and then the brake open and the speed reference command give out. The order between the speed reference and the brake has a great impact on the starting comfort of the elevator. The ideal coordination point is: at the mechanical movement (really open) of the brake, the speed reference is given. However, due to the brake contactor delay and the mechanical brake delay, it is not easy to give accurate data for the two motions to achieve the desired effect. The following principles may be observed for adjusting timing sequence: in no-load operation, if the downward start shows an obvious pull back, postpone the opening time of the brake (or set the reference speed earlier; if the downward start shows a weak pull back, but an obvious push for the upward start, set the brake o timing diagram at start and stop.

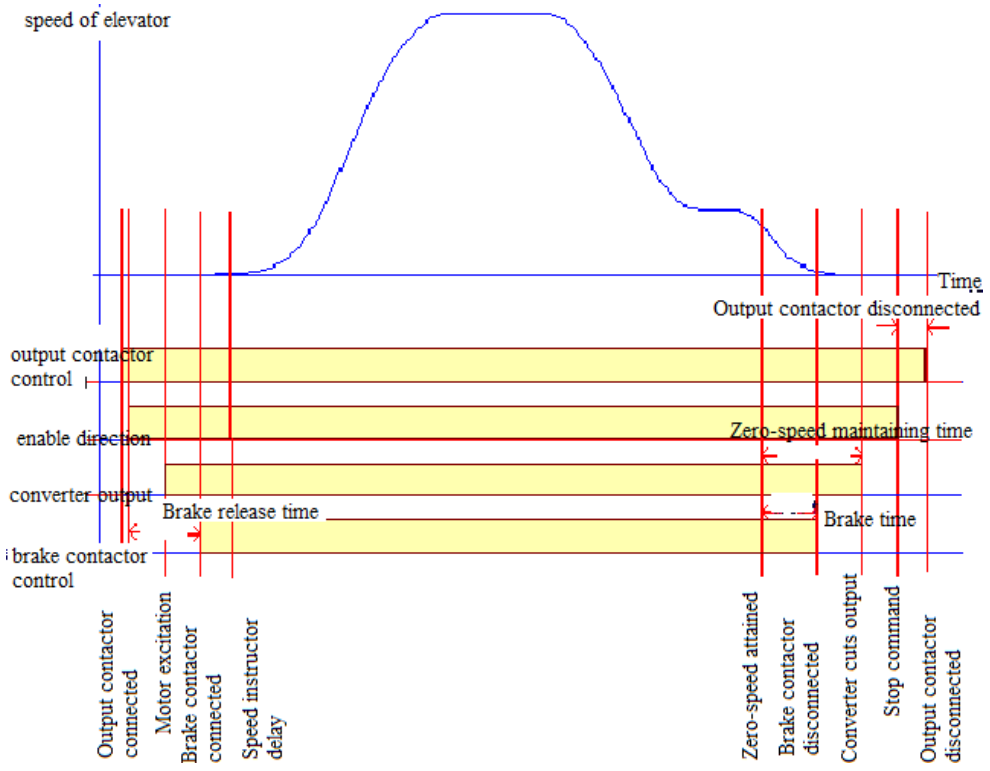


Diagram 8.2 Adjustable Timing Sequence Diagram

2) Comfort adjustment during operation

By adjusting the PID regulator parameters at each speed segment in the elevator running process, the comfort can be improved. The adjusting parameters are as follows.

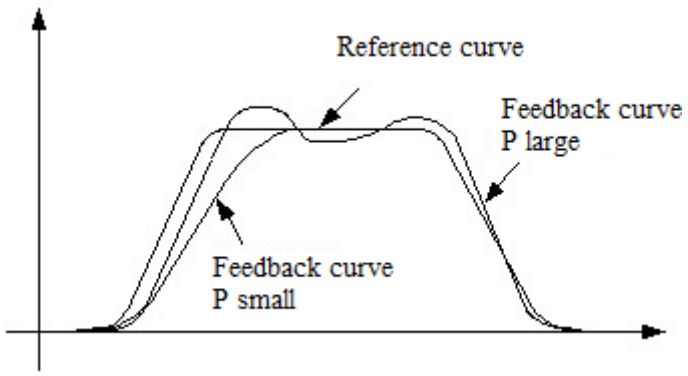
Function Code	Name	Content	Scope	Unit	Factory Setup	Remarks

F215	Gain P1 at low speed	The effective PID regulator gain value when the given speed is lower than the switching frequency F0			70.00	See the following description
F216	Integral I1 at low speed	The effective PID regulator integral value when the given speed is lower than the switching frequency F0			30.00	See the following description
F217	Differential D1 at low speed	The effective PID regulator differential value when the given speed is lower than the switching frequency F0			0.50	See the following description
F218	Proportional P2 at medium speed	The effective PID regulator gain value when the given speed is between switching frequencies F0 and F1			120.00	
F219	Integral I2 at medium speed	The effective PID regulator integral value when the given speed is between switching frequencies F0 and F1			25.00	
F220	Differential D2 at medium speed	The effective PID regulator differential value when the given speed is between switching frequencies F0 and F1			0.20	
F221	Gain P3 at high speed	The effective PID regulator gain value when the given speed is higher than the switching frequency F1			140.00	
F222	Integral I3 at high speed	The effective PID regulator integral value when the given speed is higher than the switching frequency F1			5.00	
F223	Differential D3 at high speed	The effective PID regulator differential value when the given speed is higher than the switching frequency F1			0.10	
F224	Switching frequency F0 at low speed point	Set the switching frequency parameter of PID regulator at low speed point, which is based on a percentage of nominal frequency. If the rated frequency is 50Hz, the required switching frequency F0 is 10Hz. Because 10HZ accounts for 20% of 50Hz, the data should be set to 20	0.～100.0	%	1.0	See the following description. in the medium-speed segment between F0 and F1, PID regulation data is automatically generated by the system based on the low and high-speed PID

F225	Switching frequency F1 at high speed point	Set the switching frequency parameter of PID regulator at high speed point, which is based on a percentage of nominal frequency. If the rated frequency is 50Hz, the required switching frequency F1 is 40Hz. Because 40HZ accounts for 80% of 50Hz, the data should be set to 80	0.0～100.0	%	50.0	See the following description. in the medium-speed segment between F0 and F1, PID regulation data is automatically generated by the system based on the low and high-speed PID

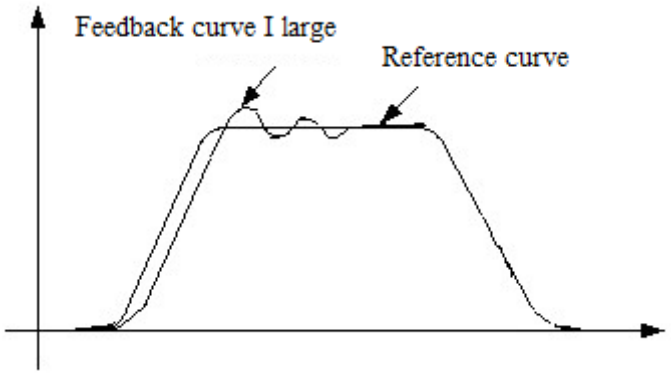
Parameters F215 ~ F217 are P, I and D values (P1, I1, D1) of the PID regulator at the low-speed section, F218 ~ F220 are P, I and D values (P2, I2, D2)of the PID regulator at the medium-speed section, F221 ~ F223 are P, I and D values (P3, I3, D3) of the PID regulator at the high-speed section. They play roles in different sections on the running curve during the entire elevator operation (see Figure 8.3). Parameters F224 and F225 are switching frequency between partitions (see Figure 8.3). Adjust Parameters F215 ~ F217, F218 ~ F220 and F221 ~ F223 and F224 and F225 to improve respectively the comfort of the elevator when running through different sections.

Increase of the proportional constant P can enhance the system's dynamic response. But if P is too large, it may generate overshoot and oscillation of the system. The impact of P on the feedback tracking is as shown below.



Impact of P (Propotional Constant) on the Feedback Tracking

Increase of the integral constant I can enhance the system's dynamic response. Increase I if the overshoot is too large or the dynamic response is too long. But if I is too large, it may generate overshoot and oscillation of the system. The impact of P on the feedback tracking is as shown below.



Impact of I (Integral Constant) on the Feedback Tracking

Similarly, increasing the differential constant D can increase the sensitivity of the system. However, if D is too large, the system will be too sensitive and cause oscillation.

In the adjustment of PID regulator parameters, it is usually to adjust the proportional constant P first. Under the premise of system not oscillated, maximize the P value, and then adjust the integral constant I, so that the system has both fast response and little overshoot. Only when the adjustment results of P and I are not satisfactory, adjust the D value.

The segment of the PID regulator in Elevator operation curve is as shown in Diagram 8.3 below.

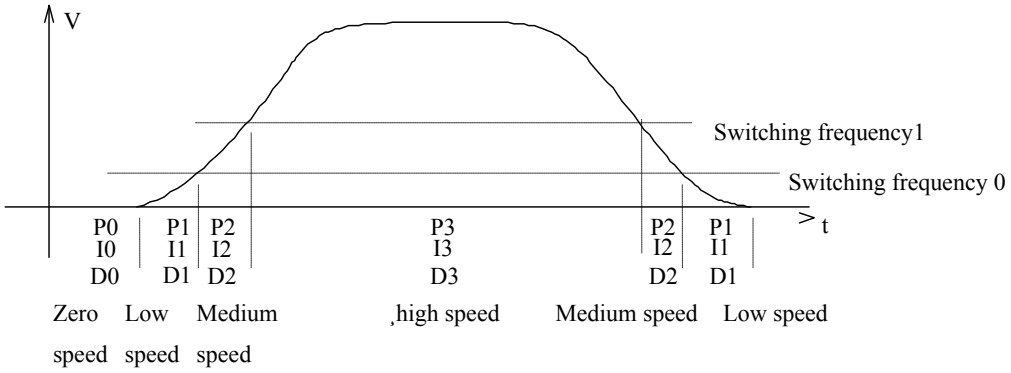


Diagram 8.3 Elevator operation curve segment PI control chart

Seen from the figure above, the PID regulator of this inverter is adjusted in three different speed sections, which facilitate the commissioning work. In case of poor comfort effect in high-speed section, it will be enough to adjust PID parameters in high speed section, which has little impact on the other two sections. Similarly, in case of poor comfort effect in medium and low-speed sections, it will be enough to adjust the corresponding PID parameters. Because different sections require different PID parameters to achieve the best comfort, adjusting PID values by sections can make each speed section gain their best effect.

3) Adjust Elevator Operation Curve

The shape of elevator operation curve will also directly affect the comfort of elevator. In order to satisfy passengers' requirements for comfort and operational efficiency, the elevator should run according to the S-curve as shown in Diagram 8.4. The system can adjust the acceleration / deceleration slopes of the S curve and time constant at the four corners to ensure the comfort and operational efficiency of the elevator. The main parameters that may affect the curve are as follows.

No.	Name	Recommended values and reference range	Parameter range
F0	Acceleration slope a1	0.500 (0.400～0.650)	The smaller this value is, the more stable the acceleration is. But too small will be inefficient. The greater this value is, the more sudden the acceleration is: ① if too sudden, users do feel uncomfortable; ② too sudden can lead to over-current fault. General 0.400 for 1m / s, 0.500 for 1.5 ~ 1.8m / s and 0.600 for 2.0m / s are appropriate. Especially it should not be great for elevators in hotels or the residential elevators with many children and old people.
F1	Deceleration slope a2	0.500 (0.400～0.650)	The smaller this value is, the more stable the acceleration is. But too small will be inefficient. The greater this value is, the more sudden the acceleration is: ① if too sudden, users do feel uncomfortable; ② too sudden can lead to over-current fault. General 0.400 for 1m / s, 0.500 for 1.5 ~ 1.8m / s and 0.600 for 2.0m / s are appropriate. Especially it should not be great for elevators in hotels or the residential elevators with many children and old people.
F2	S Curve T0	1.300 (1.300～1.600)	T0: transition time curve from start-up to acceleration beginning, the greater the value is, the more stable the start-up is. In this time, the elevator runs at very low speed. But too long may lead to failure of motor to drag the elevator and cause "PGO" fault, or over-current fault, especially when lift car is fully or heavily loaded.
F3	S Curve T1	1.100 (1.00～1.200)	T1 is the transition time curve between acceleration end to the highest speed, T2 is the transition time curve between the highest speed deceleration beginning. T1 and T2 have no significant effect on comfort, generally not adjusted. If T2 adjusted too much, may lead to level rush.
F4	S Curve T2	1.100 (1.000～1.200)	
F5	S Curve T3	1.300 (1.300～1.600)	T3is the transition time curve between deceleration end tostop, the greater the value is, the more stable the stop is. In this time, the elevator runs at very low speed. But too long may lead to failure of motor to drag the elevator and cause "PGO" fault, or over-current fault, especially when lift car is fully or heavily loaded.

Note: Properly reducing F0 and F1 will increase the comfort of the elevator, but also decrease the operational efficiency. Properly increasing the time of the four corners F2 ~ F5 can improve the comfort, but also decrease the operational efficiency.

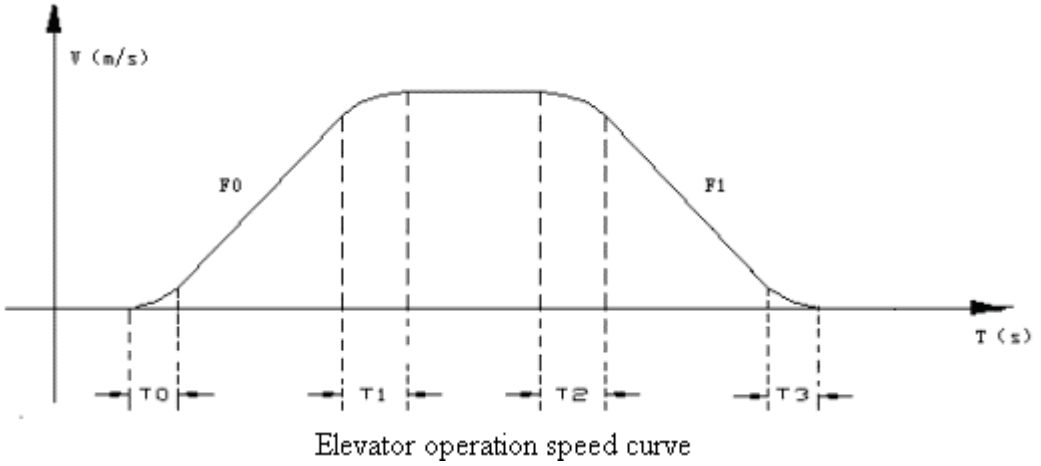


Figure 8.4 Elevator Operation Curve

4) Adjust Comfort at Stop

The following two points affect the elevator comfort most at stop: 1. the PID value in low-speed section. According to the previous section, adjusting the PID value in low-speed section may help the elevator gain the best comfort at stop. 2. Timing for stop. It is mainly the

coordination between the reference speed at stop and the brake action. The ideal state is: when the reference speed is zero, elevator has just held the brake. The adjustment principle is: if the elevator jerks at stop, it means the brake is held too early; the other hand, if the elevator skids at stop, it means the brake is held too late.

8.9 Leveling Adjustment

After comfort adjustment, leveling accuracy can be regulated.

1. Basic conditions to ensure the elevator leveling

（**1**）Ensure the door area sensor and the deck board are installed very accurately, which means:
The deck length at door area of each floor must be accurate and consistent;
The bracket must be solid;
The deck boards should be installed at accurate. When the lift car is at leveling position, the deck center should coincide with the center between sensors of two doors. Otherwise, there will be leveling deviation of this floor, which means it is higher or lower than the upper and lower leveling points.

（**2**）If a magnetic sensor switch is used, the deck board should be inserted deep enough when installed. Otherwise, it will affect the action time of the sensor switch, and lead to higher on top and lower on bottom when leveling on this floor.

（**3**）To ensure leveling, the system also requires elevator to creep for a short distance before stop.

（**4**）In the actual adjustment, adjust one of the middle floors first until leveled up. Then, take this floor as parameter to adjust other floors.

By adjusting the curve selection, proportional, integral gain as in the previous section, ensure that the stop position (that is, the stop position should have an error of ≤ ± **2 ~ 3mm**) should be repeated for the elevator to go both upward and downward to stop in the middle.

2. Adjust leveling accuracy

（**1**）Confirm the repeat of stop position

By adjusting the curve selection, proportional, integral gain as in the previous section, ensure that the stop position (that is, the stop position should have an error of ≤ ± **2 ~ 3mm**) should be repeated for the elevator to go both upward and downward to stop in the middle.

（**2**）Adjust deck board at door area

◆ Have the elevator stop floor by floor, measure and record the deviation Δ S between the lift car sill and the hall door sill (positive when the lift car sill is higher than the hall door sill, otherwise negative.)

◆Adjust the position of deck board at door area floor by floor, if Δ S> 0, then move the deck board downward by Δ S; if Δ S <0, then move the deck board upward by Δ S.

◆ After the adjustment of deck board at door area, carry out well self study again.

◆ Check the leveling again. If the leveling accuracy does not meet the requirements, repeat steps **(1) ～ (3).**

（**3**）Adjust parameter menu

If the stop positions of the elevator are repetitive, but not at the same position for upward or,

downward leveling on each floor, such as up higher down lower, or up lower down high, make leveling adjustment of Parameter F56, F57 in the parameter menu. Its default value is **50mm**. decrease this value for up higher down lower, and increase this value for up lower down higher, by the adjustment amount of **half of the leveling difference**. For example: the total difference for up higher down lower is **20mm** and then decrease this value by **10mm**.

◆ **Installation standard for leveling switch:**

When the lift car sill and the hall door sill keep the absolute level, the upper surface of the leveling spile is about 10mm higher than the lower leveling switch, and the lower surface of the leveling spile is about 10mm lower than the upper leveling switch, which facilitates the adjustment of comfort and leveling accuracy. The standard length of leveling spile is 220mm to ensure that every spile is of the same length (the length error should be less than 3mm). (See Diagram 8.5)

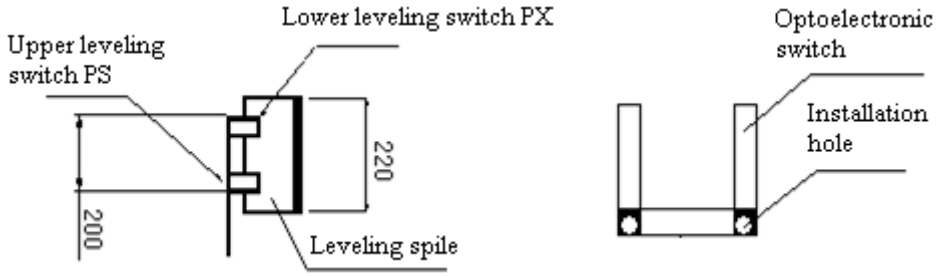


Diagram 8.5 Installation standard for leveling switch

⑴ Select magnetic switch as leveling switch:

①Insert the leveling switch into the leveling spile deep enough to ensure that the action of leveling switch is effective and reliable;

②The verticality of the leveling spile is very demanding to ensure that it will not happen for leveling stop that only one leveling switch acts effectively, but the other has run out of effective motion range, which will affect the normal operation of elevator.

⑵ Select optical switch as leveling switch (**our company generally accepts low-level effective signal for the input interface of the serial system**):

Follow the following points to gain a better effect:

① Scrape the paint in the shadow around the installation hole, to guarantee that the metal shell is well grounded by photoelectric switch bolts, brackets and car top; if press an earthing wire under the mounting bolt after scrape, and connect it to the earthing pile of the connection box on the car top, the effect will be better;

② Photoelectric switch should be connected to the connection box on the car top, and ground the shield layer;

③ Photoelectric switch should use normal open switch, to reduce interference of photoelectric switch itself.

④ The photoelectric switch flashing in operation may cause exception for elevator operation or leveling, then it may be subject to interference, so connect a capacitor of 0.1μF63V between the photoelectric switches COM and PS (or PX). (See Diagram 8.6)

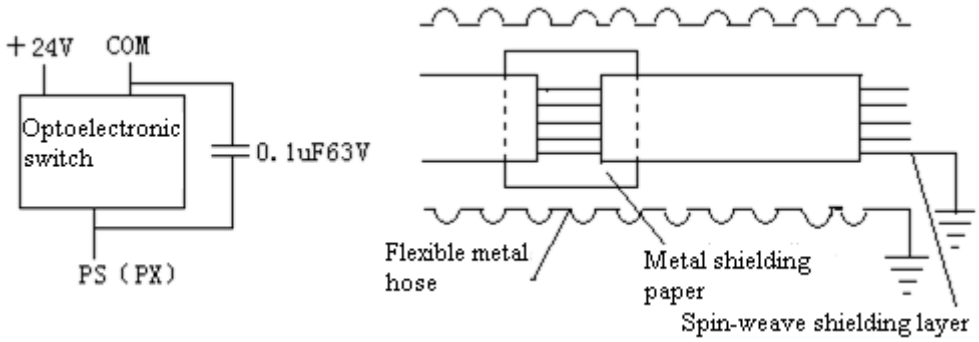


Figure 8.6 Capacitor connection diagram

Note: improper dispose of leveling photoelectric switch may interfere with normal operation, and frequent change is not a fundamental solution, and will greatly increase the cost. Taking the above 4 methods will greatly reduce the interference and even eliminate interference.

◆Notes for leveling switch installation

① The optical switches or magnetic switches should be inserted to 2 / 3 of the leveling spile, and check the leveling spile on each floor should be vertical and the insertion depth should be the same.

② After the optical switches or magnetic switches inserted into the leveling spile, ensure that both ends expose 10mm-30mm, as shown below:

③ During installation, Keep the spile center on each floor is along the same line with the sensor center, which will guarantee the leveling effect.

④ When the elevator goes upward and downward respectively and arrives at every floor normally, record the height difference between the lift car sill and the hall door sill. When the elevator runs up: lift car sill higher means leveling excess, otherwise means leveling lack; when the elevator runs down: lift car sill lower means leveling excess, otherwise means leveling lack. After recording, move the unleveling well spile, and record again after moving.

If the leveling difference is considerable for each floor, adjust the leveling spiles to set them to the same deviation. Take this as reference, and debug parameters to control these leveling deviations within the standard scope.

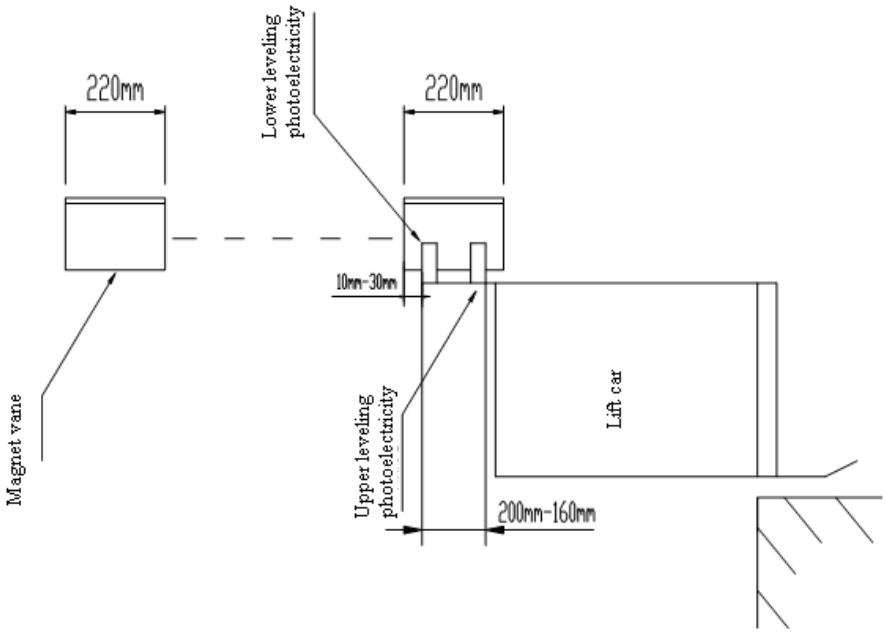


Diagram 8.7

⑤ When the rotary Encoder is interfered or in poor quality, it will also affect the leveling accuracy

Check whether the Encoder uses shielding lines, and the shielding layer should be grounded at one end of the control cabinet. Also note that when wiring, the Encoder lines should not be place in the same trough as the power lines.

◆ **Notes for adjusting leveling in serial control system:**

- Recommended value for the center spacing of the leveling sensor:
  In case of door close and under leveling function: the center spacing of the leveling sensor is suggested to be 60mm shorter than the length of spile that is 30mm exposed on both sides. In case of door open and under leveling function: the center spacing of the leveling sensor is suggested to be 40mm shorter than the length of spile that is 20mm exposed on both sides
- Set F21(leveling sensor delay adjustment) to 6mm below 1.75 m/s, to 10mm below 2.0 - 3.0m/s.
  Set F56 = 50, F57 = 50. Set the leveling fine-tuning of each floor to 20
- Adjust the PI value of the elevator integrated drive controller, eliminate its overshoot.
- Record the leveling data for each floor. Record as a positive number when the lift car is higher than the sill and record as a negative number when lower.

Single level runs upward, from Floor 2 to Floor N, the upward leveling deviation is recoded as Up(2),Up(3), ... Up(N)

Single level runs downward, from Floor N-1 to Floor 1, the upward leveling deviation is recoded as Dn(N-1),...Dn(2),Dn(1)

Calculate the current leveling position error of each floor

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;

If the deviation of X(2)～X(N-1) exceeds 10 mm, please adjust spile , a positive X(n) means the spile of this floor is too high; a negative X(n) means the spile of this floor is too low. If the deviation is less than 10mm, adjust with leveling fine-tuning software.

- After rough adjustment for spile, carry out well self study again, and record leveling data.

Single level runs upward, from Floor 2 to Floor N, the upward leveling deviation is recoded as Up(2),Up(3), ... Up(N)

Single level runs downward, from Floor N-1 to Floor 1, the upward leveling deviation is recoded as Dn(N-1),...Dn(2),Dn(1)

1) Calculate the current leveling position error of each floor

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 average offset XUp, XDn; end station is not included

Upward average offset XUp = (Up(2) + Up(3) + ... + Up(N-1)) / (N-2);
Downward average offset XDn = (Dn(2) + Dn(3) + ... + Dn(N-1)) / (N-2);
Central position pX = (XUp - XDn) / 2;
Note: XUp, XDn, pX are operations with symbols

3) Adjust F56, F57:

F56 = 50 - pX;
F57 = 50 - pX;

4) Adjust leveling fine-tuning, record the leveling fine-tuning data of the Nth floor to Ln

L(2) = 20 - X(2)
L(3) = 20 - X(3)
...
L(n) = 20 - X(n)
...
L(N-1) = 20 - X(N-1)
Calculate the leveling fine-tuning of the end station

◆ **Reasons why leveling cannot be adjusted:**

There may be the following questions, please check in order:

1. The following parameters will lead to improper leveling adjustment if not reasonably configured

Check F21 (leveling sensor delay adjustment), the factory value: 6 mm. Below 1.75m / s, it can be set to 6mm when the elevator uses optical leveling sensor

It can be set to 10 mm when the high-speed elevator (3.0m / s or above) uses optical leveling sensor

It can be set to 16 mm when the high-speed elevator (5.0m / s or above) uses optical leveling sensor

F56 upward leveling adjustment, factory value: 50 mm

F57 downward leveling adjustment, factory value: 50 mm

Leveling fine-tuning: set the leveling fine-tuning of each floor to factory default: 20 mm

2. Encoder interference

1) Encoder shielded wire is not grounded, or the signal lines and power lines are not separated, or interfered by power lines. This problem is very serious on the synchronous motor site. Sincos Encoder or resolver is small analog signal, more vulnerable to interference, which is reflected by random irregular unleveling.

2) Check methods: record the well data (from the bottom to the top) after self study, re-start well self study, compare the two self study data, with a corresponding position error of less than 3mm (usually identical or difference of + - 1mm), error of more than 3 mm can be regarded as Encoder interfere or traction wheel skid.

3) Solutions:

a) Confirm that the motor ground wire has been connected from the motor to the control cabinet

b) Confirm that the shielding line from Encoder to the inverter PG card has been grounded at the inverter end. Check whether this grounding line has intermediate connection terminal. If any, make sure both ends of the shielding lines are grounded. Note: the connection of the synchronous motor Sincos Encoder!!!

c) Confirm that the shielding line from the inverter PG Card to the motherboard Encoder has been grounded

d) Confirm the Encoder lines separated from power lines and braking resistor lines (cover the Encoder lines with flexible conduit if in the same groove)

e) Confirm that the 0V of PG card is connected with the 0V of the motherboard (in particular, in multi-speed A +, A-, B +, B-output)

f) Check whether connecting shaft of Encoder skids

3． Steel wire rope of traction wheel slips

1) Phenomenon: the leveling is not accurate in case of operation with no-load or full load, or the upward leveling is inconsistent with downward leveling, half-load operation leveling is accurate.

2) Check method: at any floor (assumed to be Floor 3), mark an aligning chalk line between the steel wire rope and the traction wheel, run a single level back and forth layer (Floor 3 -> Floor 4, Floor 4 to Floor 3), and back to Floor 3, check the error distance with the chalk mark (required to be less than 5mm). This error distance is the slip error for a single level. The slip error should be done twice respectively in no load and full load. All slip error greater than 5 mm must be resolved.

3) Solution

a) There may be a 200Kg weight difference for the lift car before and after decoration. Has the lift car decoration finished? Is the current balance coefficient correct? If not sure, set the lift car to half loaded, is there still leveling error?

b) If it is impossible to resolve the slipping problem for high-speed elevator, there are two solutions as follows:

1. Install Encoder on one side of the speed governor to feedback the position to the motherboard

2. Use creeping to absorb slip error, set F24 = 2 (analog signal with creeping) or F24 = 0 (multi-speed operation)

4．When using magnetic reed sensor, ensure adequate insertion depth. Check whether the leveling spile of each floor has been inserted into within the red line of the sensor and check whether any spile is installed tilt.

5．The leveling spiles have inconsistent lengths. The spile on the second floor is the baseline length, the spiles of the other floors should be of the same length with that on the second floor, and otherwise it may cause leveling problems.

6．The well self study is not carried out again after spiles adjusted.

8.10 Method for Adjusting Pre-Load Weighing Compensation at Elevator Start

This integrated drive controller adopts advanced non-load sensor start compensation technology, so even without pre-load weighing device, the elevator can still gain comfort at start. See its start features as shown in Diagram 8.8.

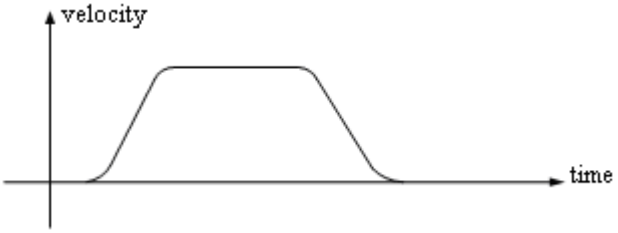


Diagram 8.8 Compensation characteristic diagrams for no load sensor startup

Although, under normal circumstances, **AS380** series integrated drive controller does not need pre-load weighing device. However, on some occasions, in order to obtain overload and full load signal, analog signal weighing device is installed; or some elevator users have particularly high comfort requirements for elevator starter and ask for pre-load weighing device for starting compensation; there exists also another case: in case of using non-gear tractor, no Encoder complies with non-pre-load starting compensation requirements, the elevator will need pre-load devices, and inverter adopts torque compensation technology at start.

When pre-load weighing is used to compensate starting, it is necessary to set and adjust the following parameters.

Function Code	Name	Content	Scope	Unit	Factory Setup	Remarks
F164	Type of weighing device		0～99	×	99	See the following descriptions for details
F193	No-load compensation on the ground floor	Set the load compensation on the ground floor	0～100.0	%	50.0	
F194	Full-load compensation on the ground floor	Set the load compensation on the ground floor	0～100.0	%	50.0	
F195	No-load compensation on the top floor	Set the load compensation on the top floor	0～100.0	%	50.0	
F229	Torque compensation direction	Set torque compensation direction	0/1	×	0	0: forward direction 1: reverse direction

F230	Torque compensation gain	Set torque compensation gain	0.0～200.0	%	100.0	
F231	Torque compensation bias	Set torque compensation bias	0.0～100.0	%	0.0	

Parameter F164 has the meanings as follows:

F164 set value	**Model of weighing device**	**Acquisition method of light, heavy, full and over load signal**	**Acquisition method of compensation signal**
0	DTZZ-III-DC-SC	Input open/close signal to the car top board	Input weighing device signal by CAN, and then calculate the final compensation value by weighing device signal, F193, F194 and F195 parameters
1	DTZZ-II	Input weighing device signal by CAN, and then calculate the result by weighing device signal	Input weighing device signal by CAN
2	DTZZ-II	Input open/close signal to the car top board	Input weighing device signal by CAN
3	DTZZ-III-DC-SC	Input weighing device signal by CAN, and then calculate the result by weighing device signal	Input weighing device signal by CAN, and then calculate the final compensation value by weighing device signal, F193, F194 and F195 parameters
4	None	Input open/close signal to the car top board	Calculate the weighing compensation values at light load and heavy load by light/heavy switch signal, F193, F194 and F195 parameters, and 40 is set to be 50% at this time.
5		Input open/close signal to the car top board	Input weighing device signal by analog signal
6		Input weighing device signal by analog signal, and then calculate the result by weighing device signal	Input weighing device signal by analog signal
99		Input open/close signal to the car top board	None

Different types of weighing devices correspond to three different adjustment methods: the first is use of DTZZ-III-DC-SC weighing device (F164 set to 0 or 3); the second is Use of non-DTZZ-III-DC-SC weighing device (F164 set to 1, 2, 5 or 6); the third is without weighing device, a simple compensation by using light-load and heavy-load switch. The following three sections make a detailed introduction on how to adjust the three parameters F193 ~ F195 or 229 ~ F231 in the three start compensating methods. In the absence of start compensation, the four parameters F164, F193 ~ F195 do not need to be set, and their default value 0 will be ok; the three parameters 229 ~ F231 can also use their default values.

8.10.1 Use of DTZZ-III-DC-SC

Use of DTZZ-III-DC-SC weighing device (F164 set to 0 or 3) to compensate or adjust the start.

When DTZZ-III-DC-SC model weighing device is chosen, its weighing data is sent to the control system in **AS380** series AIO via CAN communications. Based on the values of the three adjustment parameters F193 ~ F195, the control system calculates the final exact compensation data to the inverter in AIO, and the inverter makes torque starting compensation directly based on this data. Therefore, in this case, it is enough to adjust only the three parameters F193 ~ F195.

In adjustment, set DTZZ-III-DC-SC model weighing device via Parameter F41 and carry out self study. The meaning of Parameter F41 is as follows:

F41 Value	Meaning
1	No load self study command, the return data after the no load self study is successful
2	Full load self study command, the return data after the full load self study is successful
10	When the activity of weighing device sensor ranges within 0 ~ 10mm , parameter set command and the return data after successful self study
20	When the activity of weighing device sensor ranges within 0～20mm , parameter set command and the return data after successful self study
30	When the activity of weighing device sensor ranges within 0～30mm , parameter set command and the return data after successful self study
40	When the activity of weighing device sensor ranges within 10mm～0mm , parameter set command and the return data after successful self study
50	When the activity of weighing device sensor ranges within 20mm～0mm , parameter set command and the return data after successful self study
60	When the activity of weighing device sensor ranges within 30mm～0mm , parameter set command and the return data after successful self study

Step 1, based on the actual activity scope of the device, set a correct data in 10～60 by F41; Step 2, have lift car no-loaded, set F41 to 1, the weighing device carries out no-load self study. After the self study completes successfully, F41 displays 1; Step 3, have lift car full-loaded, set F41 to 2, the weighing device carries out full-load self study. After the self study completes successfully, F41 displays 1. After these three steps, the self study of the weighing device ends.

Then, confirm whether the compensation direction is correct: if the increase of F194 may reduce the downward impact oscillation of the lift car at start (slipping back when start upward or rushing when start downward), it means the compensation direction is correct; otherwise, it means the compensation direction is wrong. If wrong, change the value of Parameter F229 (from 0 to 1, or from 1 to 0)

After confirming the compensation direction, you can adjust the three parameters F193～F195. Firstly , run the full-load lift car to the leveling position of the bottom floor, leave the elevator in Inspection status, set the Inspection speed (F12) to 0, adjust the value of F194 (bottom full-load compensation) so that the lift car can maintain motionless when the Inspection starts. During the adjustment, if the lift car moves downward at start, increase F194; if downward, decrease F194, until the lift car does not motion when the Inspection starts. Then leave the lift car no-loaded and stay at the leveling position of the bottom floor. Adjust the value of F193 (bottom

no-load compensation) so that the lift car can maintain motionless when the Inspection starts. During the adjustment, if the lift car moves downward at start, increase F193; if downward, decrease F193, until the lift car does not motion when the Inspection starts. In the end, adjust Parameter F195 (top no-load compensation) so that the non-load lift car can maintain at top leveling position. Then set the inspection speed (F12) to 0, adjust the F195 (top floor non-load compensation) value to make car maintain static at inspection start. During the adjustment, if the lift car moves downward at start, increase F195; if downward, decrease F195, until the lift car does not motion when the Inspection starts. After the adjustment completes, reset F12 Inspection speed parameter back to normal data.

8.10.2 Use of non-DTZZ-III-DC-SC weighing device (F164 set to 1, 2, 5 or 6) to compensate or adjust the start

When non-DTZZ-III-DC-SC model weighing device is chosen, its weighing data is sent to the control system in **AS380** series AIO via CAN communications or analog signal input port. The control system sends this data directly to the inverter in AIO. Based on the adjustment of the three adjustment parameters F229 ~ F231, the inverter calculates the final actual torque compensation value and makes starting compensation. Therefore, in this case, it is necessary to adjust the three parameters F229 ~ F231.

First, adjust the compensation offset parameter F231. Load the lift car to the balance load, run the lift car to the middle position, and then confirm that the lift car is in complete balance with its counterweight (after powered off, with the brake released, the lift car can remain completely motionless). Set the Inspection speed F12 to 0, adjust the parameter F231 so that the elevator can remain completely motionless in Inspection operation.

Then, confirm whether the compensation direction is correct: Leave the lift car stop no-loaded at the leveling position of any floor in the middle, if the decrease of F230 (compensated gain) may reduce the upward impact oscillation of the lift car at start (slipping back when start downward or rushing when start upward), it means the compensation direction is correct; otherwise, it means the compensation direction is wrong. If wrong, change the value of Parameter F229 (from 0 to 1 or from 1 to 0)

After confirming the compensation direction, you can finally adjust compensation gain parameter F230. Run the no-load lift car to the leveling position of the top floor, set the Inspection speed (F12) to 0, adjust the compensation gain parameter F230 (if the lift car moves upward at start, decrease this parameter; if downward, increase this parameter, until the lift car does not motion when the Inspection starts.

8.10.3 Simple compensation by using light-load and heavy-load switch (F164 set to 4)

AS380 integrated elevator dedicated drive controller adopts pre-load starting compensation with weighing device and another simple starting compensation: by using light-load and heavy-load switch. With this starting compensation, Encoder can adopt 8192 pulse A, B, Z phase incremental Encoder, and does not need accurate weighing devices but simply installs two micro-switches on the car bottom. For synchronous gearless tractor elevator, high resolution SIN /

COS Encoder is mandatory for a no weighing starting compensation mode. Compared with A, B, Z phase incremental Encoder, SIN / COS Encoder is more expensive with more wiring and weaker to interference. So, compared with no weighing starting compensation mode, the light-load and heavy-load switch starting compensation is less expensive, with less wiring and stronger to interference. Compared with pre-load starting compensation with analog signal input, it is less expensive, easier to be installed and simpler for commissioning due to the absence of an accurate weighing device. Therefore, we recommend the light-load and heavy-load switch starting compensation mode to the customers who use the dedicated drive controller of **AS380** integrated elevator.

When the light-load and heavy-load switch starting compensation mode is adopted, it is necessary to install a light-load and a heavy-load switch on the car bottom. We recommend that the light-load switch motions when the lift car load is less than 25% of the rated load, while the heavy-load switch motions when the lift car load is greater than 75% of the rated load. The light-load switch can be connected to JP6-02 (HX4) of (SM-02H) on the car top board, while the heavy-load switch can be connected to JP6-03 (HX5) terminal of (SM-02H) on the car top board. In the adjustment, load the lift car with 12% of its rated load, leave it stop at the leveling position on the bottom floor, set the Inspection speed to 0, adjust Parameter F193 (bottom no-load compensation) so that the lift car can maintain motionless when the Inspection starts; then move the lift car with 12% of the rated load to the leveling position on the top floor, set the Inspection speed to 0, adjust Parameter F195 (top no-load compensation). Move the lift car to the leveling position on the bottom floor, load it with 62% of the rated load, set the Inspection speed to 0, adjust Parameter F194, so that the lift car can maintain motionless when the Inspection starts. After the adjustment completes, reset F12 Inspection speed parameter back to normal data.

8.11 The adjustment of other function

If there is necessary, use parameter F setting to activate or commission other function. Please take reference to the chapter 3.1 elevator operation function description and setting method for the setting of required operation function activation and test whether the function work well or not according to the function description.

Chapter 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.

Danger

◎ **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.**

Or it may cause risk of electric shock.

◎ **In no case may the elevator integrated drive controller be remodeled without authorization.**

Or it may cause risk of electric shock and/or injury.

◎ **Only professional electricians may be allowed for maintenance. Never leave foreign wire ends or metal substances inside.**

Or it may cause fire risk.

Caution

When power is on, do not change wiring and remove terminals

Or it may cause risk of electric shock.

9.1 The fault analysis of the integrated device control system

Table 9.1 shows the fault code and analysis of AS380 series elevator integrated drive controller

Table 9.1 Fault Code and Analysis

Code	Description	Fault Cause Analysis
02	Door lock disengagement in operation (emergency stop)	Safety loop in operation without door lock
03	Elevator overtravels when going upwards	In automatic operation, the upper and lower limit switches are in action at the same time and the elevator is not at the highest level
		In upward operation, the upper limit disconnected
		In upward operation, the elevator crosses the top level
04	Elevator overtravels when going downwards	In automatic operation, the upper and lower limit switches are in action at the same time and the elevator is not at the lowest level
		In downward operation, the lower limit disconnected

		In downward operation, the elevator crosses the bottom level
05	Door lock will not open	Door fails to open in position after the door-open signal outputs for consecutive 15 seconds (except the absence of door-lock signal), reports failure for 3 times
		Short circuit for lobby door lock: the elevator is in the hall area. Lobby door lock signal exists without car door lock and with door-open limit signal (for consecutive 1.5 seconds) (only effective for car door separation under
06	Door lock will not close	Door fails to close in position after the door-close signal outputs for consecutive 15 seconds (except the existence of door-lock signal) and
		Inconsistence for 4 seconds between door-close limit and door lock determines time-out for door close (except the existence of door-lock signal). Failure reported after 8 inconsistencies
08	CANBUS communication failure	Communications interference
		Terminal resistance is not under short circuit
		Breakdown in communications
		Failure reported after disconnection with lift car panel SM-02 communication
10	Dislocation of upward deceleration switch 1	Check after self study or with power on: the position of the upward deceleration switch on the single level is 3/5 higher than the story height of the top floor
		Check after self study or with power on: the position of the upward deceleration switch on the single level is shorter than the minimum deceleration distance
		Check the operation: the position of the upward deceleration switch on the single level is 100mm lower than the position of the upward deceleration switch on the single level in the well learning
		Check the operation: the position of the upward deceleration switch on the single level is 150mm higher than the position of the upward deceleration switch on the single level in the well learning
		Check at stop: the position of the upward deceleration switch on the single level is 100mm lower than the position of the upward deceleration switch on the single level in the well learning
		Check at stop: the position of the upward deceleration switch on the single level is 150mm higher than the position of the upward deceleration switch on the single level in the well learning, and the deceleration switch on the single level is not in action
		In automatic operation, the upper and lower limit switches are in action at the same time and the elevator is not at the highest level
11	Dislocation of downward deceleration switch 1	Check after self study or with power on: the position of the downward deceleration switch on the single level is 3/5 higher than the story height of the bottom floor
		Check after self study or with power on: the position of the downward

		deceleration switch on the single level is shorter than the minimum deceleration distance
		Check the operation: the position of the downward deceleration switch on the single level is 100mm higher than the position of the downward deceleration switch on the single level in the well learning
		Check the operation: the position of the downward deceleration switch on the single level is 150mm lower than the position of the downward deceleration switch on the single level in the well learning
		Check at stop: the position of the downward deceleration switch on the single level is 100mm higher than the position of the downward deceleration switch on the single level in the well learning
		Check at stop: the position of the downward deceleration switch on the single level is 150mm lower than the position of the downward deceleration switch on the single level in the well learning, and the deceleration switch on the single level is not in action
		In automatic operation, the upper and lower limit switches are in action at the same time and the elevator is not at the lowest level
12	Dislocation of upward deceleration switch 2	Check after self study or with power on: the position of the upward deceleration switch on the double level is 3/5 higher than the story height of the switch floor
		Check the operation: the position of the upward deceleration switch on the double level is 150mm lower than the position of the upward deceleration switch on the double level in the well learning
		Check the operation: the position of the upward deceleration switch on the double level is 250mm higher than the position of the upward deceleration switch on the double level in the well learning
		Check at stop: the position of the upward deceleration switch on the double level is 150mm lower than the position of the upward deceleration switch on the double level in the well learning
		Check at stop: the position of the upward deceleration switch on the double level is 200mm higher than the position of the upward deceleration switch on the double level in the well learning, and the deceleration switch on the double level is not in action
		Only one-grade deceleration switch installed, but two-grade deceleration switch configured (See F182)
13	Dislocation of downward deceleration switch 2	Check after self study or with power on: the position of the downward deceleration switch on the double level is 3/5 higher than the story height of the switch floor
		Check the operation: the position of the downward deceleration switch on the double level is 150mm higher than the position of the downward deceleration switch on the double level in the well learning
		Check the operation: the position of the downward deceleration switch on the double level is 250mm lower than the position of the downward deceleration

		switch on the double level in the well learning
		Check at stop: the position of the downward deceleration switch on the double level is 150mm higher than the position of the downward deceleration switch on the double level in the well learning
		Check at stop: the position of the downward deceleration switch on the double level is 200mm lower than the position of the downward deceleration switch on the double level in the well learning, and the deceleration switch on the double level is not in action
		Only one-grade deceleration switch installed, but two-grade deceleration switch configured (See F182)
14	Dislocation of upward deceleration switch 3	Check after self study or with power on: the position of the upward deceleration switch on three levels is 3/5 higher than the story height of the switch floor
		Check the operation: the position of the upward deceleration switch on three levels is 250mm lower than the position of the upward deceleration switch on three levels in the well learning
		Check the operation: the position of the upward deceleration switch on three levels is 300mm higher than the position of the upward deceleration switch on three levels in the well learning
		Check at stop: the position of the upward deceleration switch on three levels is 250mm lower than the position of the upward deceleration switch on three levels in the well learning
		Check at stop: the position of the upward deceleration switch on three levels is 250mm higher than the position of the upward deceleration switch on three levels in the well learning, and the deceleration switch on three levels is not in action
		Only one-grade or two-grade deceleration switch installed, but three-grade deceleration switch configured (See F182)
15	Dislocation of downward deceleration switch 3	Check after self study or with power on: the position of the downward deceleration switch on three levels is 3/5 higher than the story height of the switch floor
		Check the operation: the position of the downward deceleration switch on three levels is 250mm higher than the position of the downward deceleration switch on three levels in the well learning
		Check the operation: the position of the downward deceleration switch on three levels is 300mm lower than the position of the downward deceleration switch on three levels in the well learning
		Check at stop: the position of the downward deceleration switch on three levels is 250mm higher than the position of the downward deceleration switch on three levels in the well learning
		Check at stop: the position of the downward deceleration switch on three levels is 250mm lower than the position of the downward deceleration switch on three levels in the well learning, and the deceleration switch on

		three levels is not in action
		Only one-grade or two-grade deceleration switch installed, but three-grade deceleration switch configured (See F182)
16	Dislocation of upward deceleration switch 4	Check after self study or with power on: the position of the upward deceleration switch on four levels is 3/5 higher than the story height of the switch floor
		Check the operation: the position of the upward deceleration switch on the double level is 150mm lower than the position of the upward deceleration switch on the double level in the well learning
		Check the operation: the position of the upward deceleration switch on the double level is 250mm higher than the position of the upward deceleration switch on the double level in the well learning
		Check at stop: the position of the upward deceleration switch on the double level is 150mm lower than the position of the upward deceleration switch on the double level in the well learning
		Check at stop: the position of the upward deceleration switch on the double level is 200mm higher than the position of the upward deceleration switch on the double level in the well learning, and the deceleration switch on the double level is not in action
		Only one-grade, two-grade or three-grade deceleration switch installed, but four-grade deceleration switch configured (See F182)
17	Dislocation of downward deceleration switch 4	Check after self study or with power on: the position of the downward deceleration switch on the double levels is 3/5 lower than the story height of the switch floor
		Check the operation: the position of the downward deceleration switch on the double level is 150mm higher than the position of the downward deceleration switch on the double level in the well learning
		Check the operation: the position of the downward deceleration switch on the double level is 250mm lower than the position of the downward deceleration switch on the double level in the well learning
		Check at stop: the position of the downward deceleration switch on the double level is 150mm higher than the position of the downward deceleration switch on the double level in the well learning
		Check at stop: the position of the downward deceleration switch on the double level is 200mm lower than the position of the downward deceleration switch on the double level in the well learning, and the deceleration switch on the double level is not in action
		Only one-grade, two-grade or three-grade deceleration switch installed, but four-grade deceleration switch configured (See F182)
19	Door open/close limit failure	At automatic mode, door open limit switch and door close limit switch are in action at the same time with time-out for 1.5s
20	Slip protection failure	In operation, the leveling switch is not in action for over the time set in F62 (anti-slip time), except during Inspection

21	Motor overheating	Input signal at motor overheating point
22	Motor reverse failure	Skid for consecutive 0.5 seconds (upward speed feedback<-150mm, downward speed feedback>150mm)
23	Elevator overspeed failure	Failure 23 reported when speed feedback value is greater than allowable speed for 0.1 seconds When the given speed is less than 1m / s, allowable speed= given speed +0.25 m / s When the given speed is greater than 1m / s, allowable speed= given speed *1.25 Maximum allowable speed < rated speed * 108%
		When terminal level runs at a decelerating speed of 0.8m/s^2, Failure 23 reported when speed feedback value is greater than allowable speed for 0.1 seconds
24	Elevator over-low speed	Failure 24 reported when speed feedback value is less than allowable speed for 0.5 seconds When the given speed is less than 0.5m / s, allowable speed= given speed -0.25 m / s When the given speed is greater than 0.5m / s, allowable speed= given speed *0.5
27	Sensor failure for upper leveling floor	After high-speed operation stops, the sensor for upper leveling floor is not in action.
		Failure 27 reported, when the action on the sensor for upper leveling floor is greater than the maximum effective protection distance or greater than the maximum invalid protection distance When the length of the leveling spile is less than 300mm: maximum protection distance for effective action = 300mm*4 When the length of the leveling spile is greater than 300mm: maximum protection distance for effective action = length of the leveling spile*4 When the top floor is less than 3: maximum protection for invalid action = maximum story height*1.5 When the top floor is greater than 3: maximum protection for invalid action = maximum story height*2.5
28	Sensor failure for lower	The sensor for lower leveling floor is not in action

	leveling floor	Failure 28 reported, when the action on the sensor for lower leveling floor is greater than the maximum effective protection distance or greater than the maximum invalid protection distance When the length of the leveling spile is less than 300mm: maximum protection distance for effective action = 300mm*4 When the length of the leveling spile is greater than 300mm: maximum protection distance for effective action = length of the leveling spile*4 When the top floor is less than 3: maximum protection for invalid action = maximum story height*1.5 When the top floor is greater than 3: maximum protection for invalid action = maximum story height*2.5
30	Leveling position error is too large	Test the leveling position error at stop. Failure report when the error detected is greater than the value set by F146.
32	Safety loop disconnected in operation	Safety loop disconnected in operation
35	Brake contactor contact fault	Motherboard has no drive signal on brake contactor, but input signal is detected at input testing point (adhesion failure)
		Motherboard has drive signal on brake contactor, but input signal is not detected at input testing point (non-adhesion failure)
36	Output contactor contact fault	Motherboard has no drive signal on circuit contactor, but input signal is detected at input testing point (adhesion failure)
		Motherboard has drive signal on circuit contactor, but input signal is not detected at input testing point (non-adhesion failure)
37	Door-lock failure	Door- lock close signal input when the door-open limit signal is in action
		When door-lock relay detection is set, the lock input point has inconsistent high and low voltage detection
38	Brake switch malfunction	Motherboard has no drive signal on brake contactor, but open/close action is detected at brake switch input testing point (adhesion failure)
		Motherboard has drive signal on brake contactor, but no open/close action is detected at brake switch input testing point
40	Run signal failure	The control part of the AIO sends out run signal, but does not receive the run signal feedback from the drive part
42	Deceleration switching error	Overtravel in upward movement and the lower level forces slow open/close, or overtravel in downward movement and the upper level forces slow open/close
45	Pre-opening relay detection fault	when the pre-opening relay output is detected inconsistent with the pre-opening for over 0.5s, Y14 has output, but X17 has no input; Y14 has no output but X17has input

49	Communication failure	Exceptional communications in drive part and control part
50	Parameter error	Parameter read error
54	Inconsistent lock failure	When the door opens, the hall door lock has inconsistent pressure detection point with the door lock
60	Base closure failure	In operation, the output contactor contact is detected disconnected, turn off the output of the AIO and report Failure 60
61	Signal start failure	After the brake is opened, no zero servo terminal signal is received returning from the drive part
62	No speed output	After start, the elevator maintains the speed at 0, and the elevator does not move
67	RTC error	Main board hardware error
68	The combination of the length of the self study leveling spile and the distance with the leveling switch does not meet the requirements	1) The leveling spile is too long or too short. Algorithm: (length of the leveling spile + leveling switch space) / 2 less than 100mm or greater than 900mm. 2) The leveling area is too long or too short. Algorithm: (length of the leveling spile - leveling switch space) / 2 less than 10mm or greater than 100mm
69	The inconsistency of the number of self study spiles and the total story number of the elevator with the level bias	The number of spiles installed = Designed total story number(F11) — Offset floor (F10). However, the total number of spiles installed is different from the calculation value.

9.2 fault analysis of Integrated drive system

The fault code and analysis of drive system of AS 380 series elevator integrated drive controller is shown in table 9.2

Table 9.2 drive system fault code table

Code	Fault Description	Possible Cause	Solution
71	Module protection against over-current	DC terminal with excessive voltage	Check power supply and high inertia loads. Rapid stop without dynamic braking
		short circuit at periphery	Check whether the motor and the output wiring are short circuit, whether earthing is short circuit
		Open phase in output	Check the motor and output wiring for loose
		Encoder fault	Check whether the encoder is damaged or the wiring is correct
		Encoder wrong phase	Check motor phase
		Motor wrong phase	Check motor phase
		Phase angle self-study	Do self-study of phase angle again

Code	Fault Description	Possible Cause	Solution
		incorrect	
		Insufficient current when phase self-study	Increase F247 current gain when do self-study
		Bad contact of hardware or damaged	Ask professional technical personnel for Inspection
		Converter internal connectors loose	Ask professional technical personnel for Inspection
72	ADC failure	Current sensor damaged	Replace current sensor
		Problem in current sampling circuit	Replace control board
73	Radiator overheating	Ambient temperature is too high	Reduce the ambient temperature, enhance ventilation
		Duct obstruction	Clean dust, cotton and other debris in the duct
		Fan abnormal	Check the fan power cable for connection, or replace the fan with the same model
		Temperature detection circuit fault	Ask professional technical personnel for Ispection
74	Brake unit failure	Brake unit damaged	Replace the corresponding driver module
		External braking resistor short circuit	Check the braking resistor connection
75	Fuse-off failure	Current is too large to fuse	Check whether the fuse circuit is open, or for loose connections
76	Over output torque	Over-low input power voltage	Check the input power
		Motor stall or severe load mutation	Lower load mutation to prevent motor stall
		Encoder fault	Check whether the encoder is damaged or the wiring is correct
		Open phase for output	Check the motor and output wiring for loose connections
77	Speed deviation	Acceleration time is too short	Extend the acceleration time
		Overloaded	Reduce the load
		Current limit is too low	Increase the limit value in the allowable range
78	(In accelerated running) Bus over-voltage	Abnormal input power voltage	Check the input power
		The motor is quick restarted again in high-speed rotation	Stop and restart the motor

Code	Fault Description	Possible Cause	Solution
	protection		
	(In decelerated running) bus over-voltage protection	Excessive load inertia	Use appropriate braking components
		Deceleration time is too short	Extend the deceleration time
		The braking resistor has an extremely large value or is disconnected	Connect the appropriate braking resistor
	(In constant speed operation) bus over-voltage protection	Exceptional input power	Check the input power
		Excessive load inertia	Use appropriate braking components
		The braking resistor has an extremely large value or is disconnected	Connect the appropriate braking resistor
79	Bus under voltage	Supply voltage falls below the minimum operating voltage	Check the input power
		Instantaneous power failure	Check the input power. When the input voltage is normal, restart after reset
		Significant changes in input power voltage	
		The power wiring terminal is loose	Check the input wiring
		Abnormal internal switching power	Ask professional technical personnel for Ispection
		Large starting current load in the same power system	Changes the power system to meet the specifications
80	Open phase for output	Abnormal, or ignored connection or disconnection in converter output side connection	Follow the rules and check the converter output side connections, eliminate missing and disconnection
		Output terminal is loose	
		Electrical power is too small, 1 / 20 or less of the maximum applicable motor capacity in the converter	Adjust converter capacity or motor capacity
		Unbalanced	Check whether the motor wiring is intact

Code	Fault Description	Possible Cause	Solution
		output three-phase	Power off, check whether the converter output side is consistent with the features of DC side terminal
81	Motor overcurrent at low speed (in acceleration)	Low voltage in power grid	Check the input power
		Abnormal motor parameters	Set correct motor parameters
		Quick start the motor in operation	Restart after the motor stops rotating
	Motor overcurrent at low speed (in deceleration)	Low voltage in power grid	Check the input power
		Excessive load inertia	Use appropriate braking components
		Abnormal motor parameters	Set correct motor parameters
		Deceleration time is too short	Extend the deceleration time
	Motor overcurrent at low speed (in constant speed)	Load mutation in operation	Reduce the mutation frequency and magnitude of the load
		Abnormal motor parameters	Set correct motor parameters
82	Encoder fault	Encoder not connected correctly	Change Encoder wiring
		Encoder has no signal output	Check the Encoder and power supply
		Encoder wiring disconnected	Repair the disconnection
		Abnormal function code setup	Confirm the relevant functional configuration of the converter Encoder
83	Current detected at stop	Current not effectively blocked when the motor stops	Synchronous motor skid
			Ask professional technical personnel for Inspection
84	Velocity reverse in operation	Reverse speed in operation	Check the external load for mutation
		Encoder is inconsistent with the motor phase sequence	Change motor or encoder phase sequence
		Motor reversal at start, and the current reaches the current limit	Current limit is too low, or the motor does not match
85	Velocity detected at stop	Brake loose, the elevator car slides	Check brake
		Encoder interfered or loose	Fasten encoder, eliminate interference
86	Motor phase sequence error	Motor wiring reverse	Anti-line or adjust parameters

Code	Fault Description	Possible Cause	Solution
87	Overspeed in the same direction (within the maximum allowed range)	Galloping in the field-loss status of synchronous motor	Check motor
		Incorrect self study in angle of synchronous motor	Restart self study
		Encoder parameter error or interfered	Check encoder circuit
		Excessive forward load or load mutation	Check the external causes for load mutations
88	Overspeed in the reverse direction (within the maximum allowed range)	Galloping in the field-loss status of synchronous motor	Check motor
		Incorrect self study in angle of synchronous motor	Restart self study
		Encoder parameter error or interfered	Check encoder circuit
		Excessive reverse load or load mutation	Check the external causes for load mutations
89	Wrong phase sequence of UVW encoder	Problem with encoder connection or wrong parameters	Check the connection or change the parameters
90	Encoder communication failure	Encoder fault	Check encoder wiring and try to do encoder self study
91	Abc over-current (three-phase Instantaneous value)	Motor single-phase ground short circuit	Check motor and the output wire circuit
		Encoder fault	Check whether the encoder is damaged or the wiring is correct
		Encoder wrong phase	Check encoder phase
		Motor wrong phase	Check encoder phase
		Phase angle self-study incorrect	Do phase angle self-study again
		Insufficient current when do phase self-study	Increase current gain of F247 as doing self-study
		Error detected on circuit driver board	Replace driver board
92	Brake detection failure	No action of output relay	Check the relay control circuit
		Relay action brake is not activated	Check whether the brake power cable is loose or disconnected
		Feedback component fail to	Regulate feedback component

Code	Fault Description	Possible Cause	Solution
		detect signal	
93	Input over-voltage	Incoming voltage is too high	Check whether incoming line voltage matches converter
		Problems with switching power supply voltage detection circuit	Ask professional technical personnel for Ispection
94	UVW Encoder disconnection	Problems with encoder wiring circuit	Check whether the terminal is loose or the wire is broken or damaged
96	Encoder is not self study	Synchronous motor fails to learn encoder angle	Make encoder self study
97	Output over-current (RMS)	Running under overload for too long. The greater the load, the shorter the time	Stop running for some time. If it occurs again after re-start, check whether the load is within the allowable range
		Motor stall	Check motor or brake
		Motor coil short circuit	Check motor
		Encoder fault	Check encoder damage or not and wiring
		Encoder wrong phase	Check encoder phase
		Motor wrong phase	Check motor phase
		Phase angle self-study incorrect	Do phase angle self-study again
		Insufficient current as doing phase self-study	Increase F247 current gain when doing self-study
		Output short circuit	Check the wiring or the motor
98	Sincos Encoder failure	Encoder damaged or wrong lines	Check the Encoder and the line
99	Missing input phase	Abnormal voltage on input side	Check grid voltage
		Open phase input	
		Loose terminal on input side connection	Check the input terminal wiring

Code	Fault Description	Possible Cause	Solution
100	Overspeed protection (protection against exceeding the maximum speed limit)	Encoder parameter error or interfered	Check Encoder circuit
		Load mutation	Check causes of the external load mutation
		Overspeed protection parameter error	Check parameters
101	High-speed over-current motor	Low voltage power grid	Check the input power
		Running load mutation	Reduce the load mutation frequency and magnitude
		Abnormal motor parameters setup	Set motor parameters correctly
		Encoder parameter error or interfered	Check Encoder circuit
102	Earthing protection	Connection error	Correct wiring errors according to user manual
		Abnormal motor	Test earthing insulation before replacing the motor
		Over-current leakage of converter output side against earthing	Ask professional technical personnel for Ispection
103	Capacitance aging	Converter capacitor aging	Ask professional technical personnel for Ispection
104	External fault	Failure signal on external input	Check the external cause of the malfunction
105	Unbalanced output	Converter output side has connection exception, miss, or disconnection	Follow the operational rules and check the wiring of converter output side, eliminate ignored connection and disconnection
		Unbalanced three-phase motor	Check motor
106	Parameter error	Parameter error	Modify the inverter parameters
107	Current sensor fault	Driver board hardware failure	Ask professional technical personnel for Inspection
108	Braking resistor short circuit	short circuit of external braking resistor	Check the braking resistor connection
109	Current instantaneous value is too large	When Ia, Ib, Ic is not in operation, instantaneous value of three-phase current is too large and reports alarm	Ask professional technical personnel for Inspection
112	IGBT short-circuit	Short circuit in periphery	Check whether the motor and output wiring is short circuit, and whether the earthing is short circuit

Code	Fault Description	Possible Cause	Solution
	protection		
113	Communication failure for AIO	Loose connectors inside inverter	Ask professional technical personnel for Inspection
		Hardware has bad contact or is damaged	Ask professional technical personnel for Inspection
114	Charging relay failure	Charging relay damaged	Ask professional technical personnel for Inspection
		The transient drop of three-phase input power voltage exceeds 30V	Check the cause for input voltage drop

Chapter 10: Maintenance

This chapter describes general information for maintenance of this product.

◎ **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**

Or it may cause risk of electric shock.

◎ **In no case may the elevator integrated drive controller be remodeled without authorization**

Or it may cause risk of electric shock and injury.

◎ **Only professional electricians may be allowed for maintenance. Never leave foreign wire ends or metal substances inside.**

Or it may cause fire risk.

◎ **When power is on, don't change the wiring or remove terminals.**

Or it may cause risk of electric shock

10.1 Warranty

Our company guarantees the elevator integrated drive controller (main body) in the following cases:

In the warranty period calculated form 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.

10.2 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.

10.3 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.

10.4 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 inspection can only start 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		1) LCD displays clearly with uniform back light. 2) 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.

A1.1Noise Type

Noise types are shown by Attached figure A1.1.

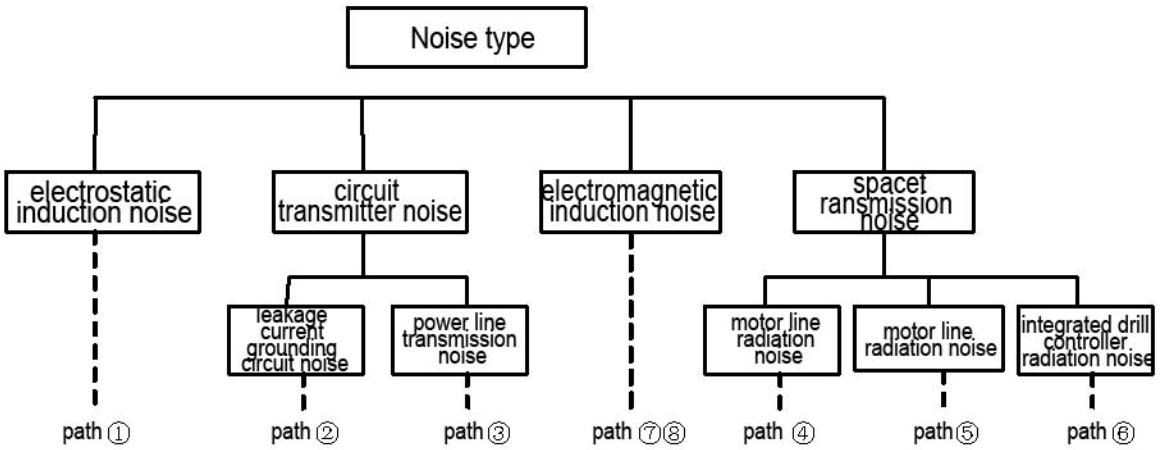
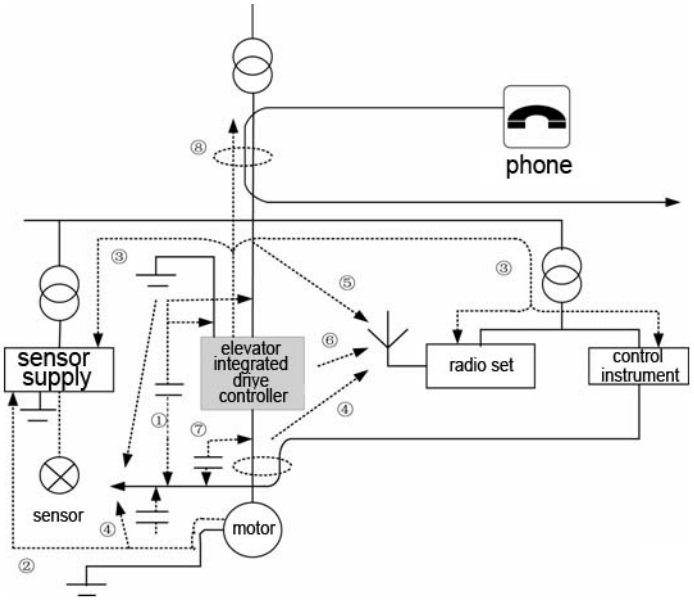


Figure A1.1 Noise Types Diagram

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	1. Avoid arranging signal line and power line in duplex and in bundle. 2. keep susceptible peripherals far away from elevator integrated drive controller; 3. keep susceptible signal line far away from the input/output cable of elevator integrated drive controller; 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)
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.	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. 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; 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.

A2 Requirements on Cable Laying

A2.1Requirement 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.

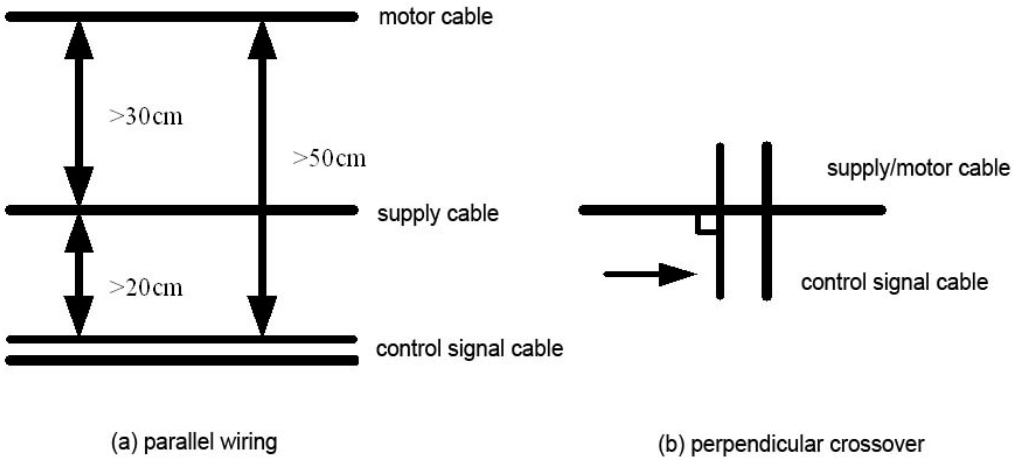


Figure A2.1 Requirements on cable laying

A2.2Requirements 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%).

A2.3Requirements on Shielded Cable

High frequency low-impedance shielded and armored (such as weaved copper wire mesh or, aluminum wire mesh) cable shall be used.

A2.4Requirements 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.

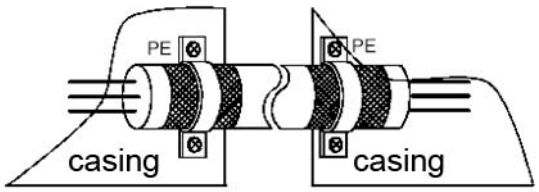


Figure A2.2 Correct Shield Grounding Method

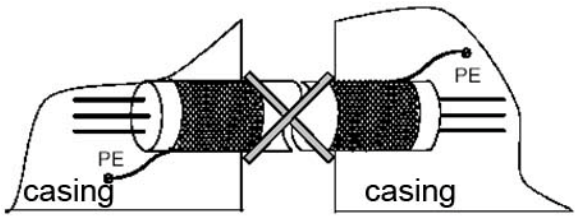


Figure A2.3 Incorrect Shield Grounding Method

A3 Grounding Requirements

A3.1Grounding Method

See figure A3.1 for grounding method of Ground pole

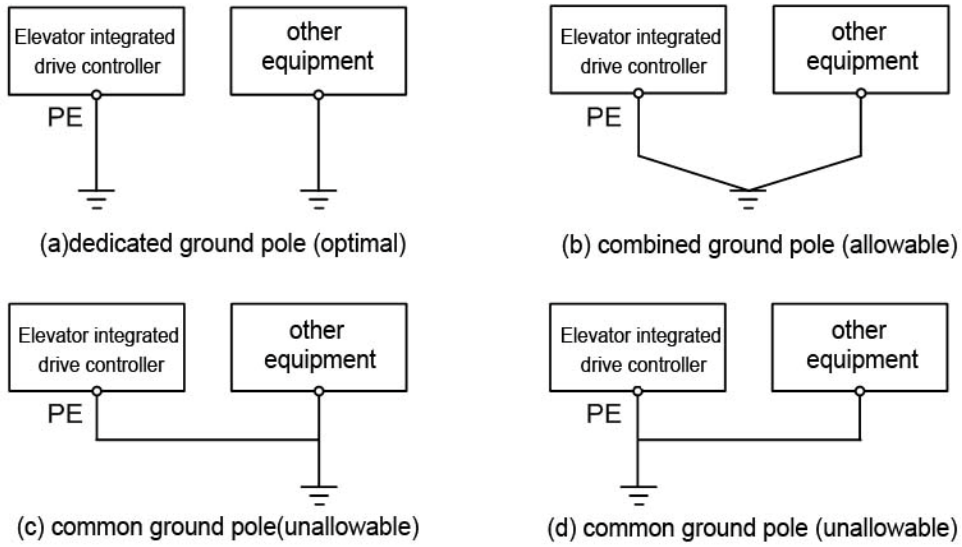


Figure A3.1 Dedicated Ground Pole

Among the above-shown four figures, (a) shows the optimal grounding method. Users are advised to use this method as practicably as possible.

A3.2Precautions 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.

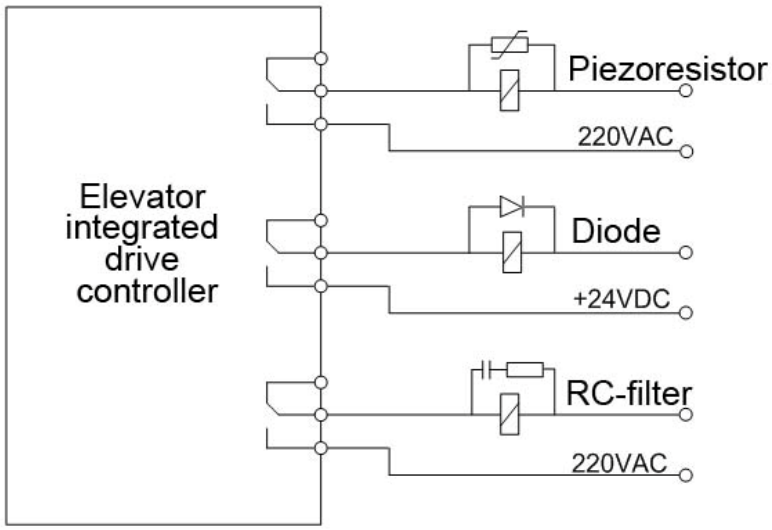


Figure 4.1 Use Requirements of Relay, Contactor and Electromagnetic Brake

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.

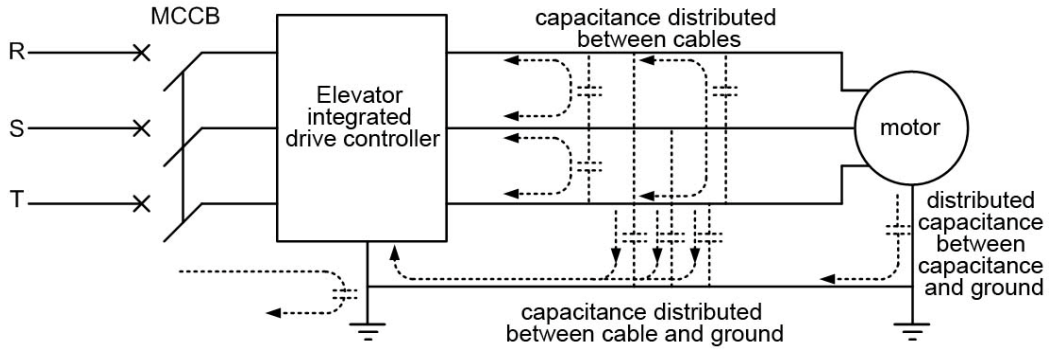


Figure A5.1 Paths of Leakage Current

A5.1Ground 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.

A5.2Line-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.

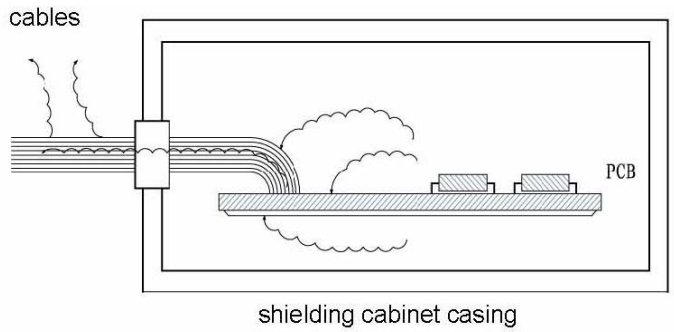


Figure A6.1 Radiation from output cables from shielding cabinet

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.

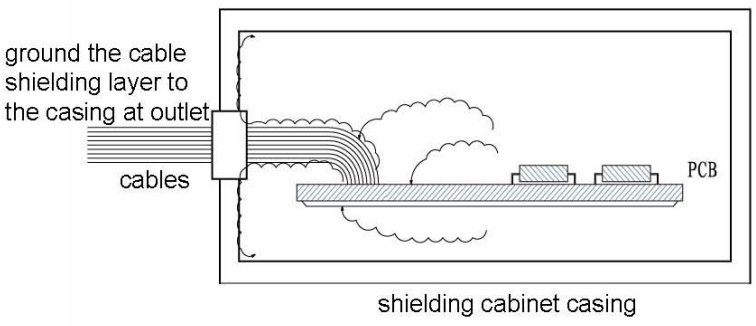


Figure A6.2 Radiation suppression by grounding the cable shielding layer to the casing

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.

A7.2Precautions 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.

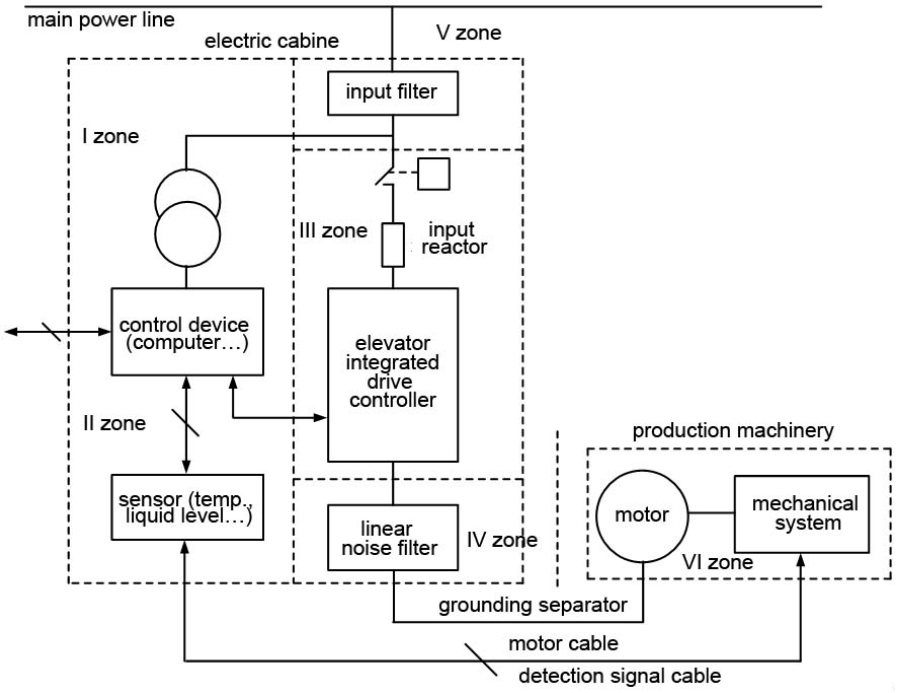


Figure A8.1 EMC Zone for installation of elevator integrated drive controller

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.

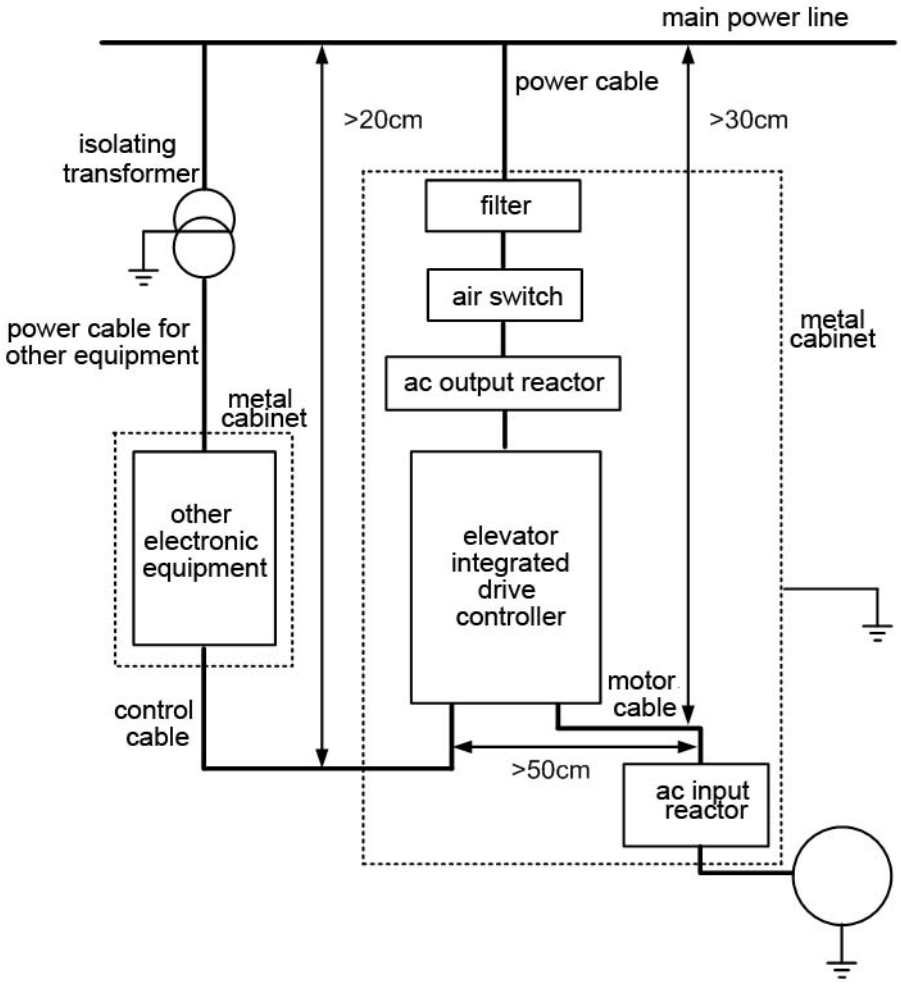


Figure A9.1 Electric Installation of elevator integrated drive controller In order to meet the EMC directive, the following notices must be taken:

(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 than 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 AS380 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)

Appendix B Function Parameter, Fault List Summary

This appendix summarize the function parameter, running situation and fault list, in order to make it convenient for the user to check and use.

B.1 Function Parameter List

No.	Name	Factory Setup	Scope	Unit	Remarks
F00	Accelerating slope	0.550	0.200～1.500	m/s^2	
F01	Decelerating slope	0.550	0.200～1.500	m/s^2	
F02	S curve T0 (initial S angle time T0)	1.300	0.300～3.000	s	
F03	S curve T1 (S angle T1 at end of acceleration)	1.100	0.300～3.000	s	
F04	S curve T2 (S angle time T2 at the beginning of deceleration)	1.100	0.300～3.000	s	
F05	S curve T3 (S angle time T3 at the end of deceleration)	1.300	0.300～3.000	s	
F06	Nominal speed	1.750	0.100～10.000	m/s	
F09	Parking floor	1	1～64	×	
F10	Offset floor	0	0～64	×	
F11	Floor number	18	2～64	×	
F12	Inspection speed	0.250	0～0.630	m/s	
F13	Creeping speed	0.060	0.010～0.150	m/s	
F14	Closing delay 1 (repsonse to hall call)	3.0	0～30.0	s	
F15	Closing delay 2 (repsonse to car call)	3.0	0～30.0	s	
F16	brake delay	0.2	0～2.0	s	
F17	Automatic enable signal release time	0.6	0.2～3.0	s	
F18	Fire floor	1	1～64	×	
F20	Base station return delay time	0	0～65535	s	0 represents not open; other numbers represents open and delayed time.
F21	Leveling switch motion delay distance (full-speed)	6	0～40	mm	

F22	Single and Duplex return to base station	1	1～64	×	
F23	Group control mode	0	0～3	×	
F25	Input type 1 (normal open or close setup for X0～X15 input point)	819	0～65535	×	
F26	Input type 2 (normal open or close setup for X16～X25 input point)	2	0～65535	×	
F27	Elevator car board input type (normal open or close setup for GX0 ～ GX15 input point)	0	0～65535	×	
F28	Car roof input type (normal open or close setup for HX0 ～ HX15 input point)	327	0～65535	×	
F29	Service floor 1 (Set up if 1～16 floors are secure)	65535	0～65535	×	
F30	Service floor 2 (Set up if 17～32 floors are secure)	65535	0～65535	×	
F31	Service floor 3 (Set up if 33～48 floors are secure)	65535	0～65535	×	
F190	Service floor 4 (Set up if 49～64 floors are secure)	65535	0～65535	×	
F33	Auomatic operation interval for test run	5	0～60	s	
F34	Automatic operation times for test run.	0	0～65535		

F35	Firefighting switch input definition and firefighting mode selection	0	0～65535	×	Bit0: 0: ordinary firefighting, 1: Schindler fire mode Bit1: 0: fireman switch without lift car board; 1: fireman switch with lift car board Bit2: 0: ordinary firefighting signal display; 1: Shandong firefighting signal display Bit3: 0: Motherboard X15 input for firefighting return; 1: Motherboard X15 input for fireman switch
F36	Band-type Brake switch detection mode	0	0～2	×	
F40	Weight data bias	48	0～100	%	
F41	Weighter study and parameter setup command.	0	0 / 1 / 2 / 10 / 20 / 30 / 40 / 50 / 60	×	
F43	Buzzing/flashing function selection for attendant status call	3	0～65535	×	.
F44	Serial communication address (255 for non-monitor)	255	0～255	×	
F49	Emergency leveling orientation mode	0	0～2		
F50	Front door opening permission 1 (opening setup value for 1 ～ 16 floors)	65535	0～65535	×	
F51	Front door opening permission 2 (opening setup value for 17 ～ 32 floors)	65535	0～65535	×	

F52	Front door opening permission 3 (opening setup value for 33～48 floors)	65535	0～65535	×	
F191	Front door opening permission 4 (opening setup value for 49～64 floors)	65535	0～65535	×	
F53	Rear door opening permission 1 (opening setup value for 1～16 floors)	0	0～65535	×	
F54	Rear door opening permission 2 (opening setup value for 17～32 floors)	0	0～65535	×	
F55	Rear door opening permission 3 (opening setup value for 33～48 floors)	0	0～65535	×	
F192	Rear door opening permission 4 (opening setup value for 49～64 floors)	0	0～65535	×	
F56	Up leveling adjustment (50 to refernece value)	50	0～240	mm	
F57	Down leveling adjustment (50 to refernece value)	50	0～240	mm	
F59	Zero speed brake delay	0	0～10.00	0.01s	
F61	Arrival distance by arrival gong	1200	0～4000	mm	
F62	Anti-slipping limit time	32	20～45	s	
F65	Base electrode lock mode	0	0～1	×	0: No base lock, 1: output contactor off, immediate lock
F66	With or whithout upper and lower limt	0	0-1		0：no 1：yes
F67	With or whithout entension board	0	0-1		0：no 1：yes
F70	Light load uplink gain	100	0-300		
F71	Light load lowlink gain	100	0-300		
F72	Heavy load uplink gain	100	0-300		
F73	Heavy load lowlink gain	100	0-300		

F74	Light load height gain	512	0-1024		
F75	Heavy load height gain	512	0-1024		
F115	Overtime opening door	15	3～30	s	
F116	Overtime closing door	15	3～30	s	
F117	Opening time for forced closing	60	0～1800	s	
F118	Opening time for the disabled	10	0～1800	s	
F120	Car call number when anti-nuisance function activates.	0	0～30	×	
F121	Activate forced closing function (0 represents not activate)	0	0～1	×	
F122	Signal delay release time in Inspection.	0.3	0～10.0	s	
F123	Call categories	0	0～3	x	
F124	Define the function of mainboard X16 input point	0	0～2	×	
F128	Control of front and rear doors	0	0 / 1	×	0: separate control of front and back doors; 1: joint control of front and back doors
F129	Activate the functions of re-leveling and/or pre-opening	0	0～3	×	
F130	Maintain the opening/closing torque	0	0～7	×	Bit0: 1: door maintaining open Bit1: 1: door maintaining closed Bit2: 1: door maintaining closed during operation
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		
F137	Service floor 1 (Floor 1~16) when NS-SW function is set.	65535	0～65535	×	
F138	Service floor 2 (Floor 17~32) when NS-SW function is set.	65535	0～65535	×	
F139	Service floor 3 (Floor 33~48) when NS-SW function is set.	65535	0～65535	×	
F199	Service floor 4 (Floor 49~64) when NS-SW function is set.	65535	0～65535	×	
F141	Time of delay release of the main contactor (after enabled)	0.50	0.50～10.00	s	
F145	Bus voltage gain	100	80～120	%	
F146	Position error distance	180	180～1000	mm	
F147	Protection of contact detection	0	0～1		
F152	Lighting delay (fans turned off automatically, delay lighting)	180	0～65535	S	0: do not turn off the lights
F153	high-voltage input detection with or without hall door lock	1	0 / 1	×	0: No 1: Yes
F156	With or without lock relay contact detection	1	0 / 1	×	0: No 1: Yes
F160	Whether the manual removal of error instruction activated	1	0 / 1	×	0: No 1: Yes
F161	The function of floor blocking for a time slot	0	0～65535	×	Bit0: 1: block instruction Bit1: 1: block upward call Bit2: 1: block downward call

F163	Choose whether the back-up power continues running after returning to the base in case of single elevator or parallel connection	0	0 / 1	×	0: stop running 1: may continue running
F164	Type of weighing device	99	0～99	×	See the manual for more detailed explanation
F165	Special control of door operation	0	0～65535	×	Bit0: 1: door closed during Ispection Bit1: 1: door closed during debug running Bit2: 1: door opened at the base station for the elevator Bit3: 1: whether to open the door by LED operator
F168	Elevator No. with IC card service	0	0～65535	×	
F169	Selection of upward and downward callus by IC card	0	0～65535	×	
F170	IC card function in the car corresponding to IC card swiping need on Floor 1～16	0	0～65535	×	
F171	IC card function in the car corresponding to IC card swiping need on Floor 17～32	0	0～65535	×	
F172	IC card function in the car corresponding to IC card swiping need on Floor 33～48	0	0～65535	×	
F175	Creeping speed at startup	0.006	0～0.100	m/s	
F180	Speed gain	100.0	0～110.0	%	
F181	Elevator No. at mutual parallel connection mode	0	0～1	×	

F182	Slow down switch series	0	0～10	×	0: determine automatically by speed
F183	Learn trip speed	0.800	0～1.000	m/s	
F186	Creeping time at startup	0.50	0～10.00	s	
F187	Monitor items	0	0～255	×	
F193	No-load compensation on the bottom floor	50.0	0～100.0	%	
F194	Full-load compensation on the bottom floor	50.0	0～100.0	%	
F195	No-load compensation on the top floor	50.0	0～100.0	%	
F196	Second base station at Duplex	0	0～64	×	
F200	inverter software version	Factory setup		×	Read-only
F201	Inverter drive mode	3	0 / 1 / 2 /3	×	Set the Inverter basic modes: 0: V / F control mode 1: Vector control without speed sensor 2: Torque control with speed sensor 3: Vector control with speed sensor
F202	Motor type	0	0 / 1	×	0: Asynchronous 1: Synchronous
F203	Motor rated power	By Inverter parameter	0．40～160．00	KW	
F204	Motor nominal current	By Inverter parameter	0．0～300．0	A	
F205	Motor nominal frequency	50.00	0.00～120.00	Hz	
F206	Motor nominal rotation speed	1460	0～3000	rpm	
F207	Motor nominal voltage	By Inverter parameter	0.～460	V	
F208	Number of poles of motor	4	2～128	×	
F209	Motor nominal slip frequency	1.40	0～10.00	Hz	

F210	Encoder type	0	0 / 1 / 2	×	0: incremental Encoder 1: SIN/ COS Encoder 2: Endat Encoder
F211	Encoder pulse number	1024	500～16000	PPr	
F212	Zero speed PID adjustor incremental P0	130.00	0.00～655.35	×	
F213	Zero speed PID adjustor integral I0	80.00	0.00～655.35	×	
F214	Zero speed PID adjustor differential D0	0.50	0.00～655.35	×	
F215	Low speed PID adjustor incremental P1	70.00	0.00～655.35	×	
F216	Low speed PID adjustor integral I1	30.00	0.00～655.35	×	
F217	Low speed PID adjustor differential D1	0.50	0.00～655.35	×	
F218	Medium speed PID adjustor incremental P2	120.00	0.00～655.35	×	
F219	Medium speed PID adjustor integral I2	25.00	0.00～655.35	×	
F220	Medium speed PID adjustor differential D2	0.20	0.00～655.35	×	
F221	High speed PID adjustor incremental P3	140.00	0.00～655.35	×	
F222	High speed PID adjustor integral I3	5.00	0.00～655.35	×	
F223	High speed PID adjustor differential D3	0.10	0.00～655.35	×	
F224	Low speed point switch frequency F0	1.0	0.0～100.0	%	
F225	High speed point switch frequency F0	50.0	0.0～100.0	%	
F226	Zero servo time	0.5	0.0～30.0	s	
F227	Band-type Brake release time	0.25	0.00～30.00	s	
F228	Current slowdown time	0.00	0.00～10.00	s	
F229	Torque compensation direction	0	0/1	×	0：positive direction 1：negative direction
F230	Torque compensation gain	100.0	0.0～200.0	%	
F231	Torque compensation bias	0.0	0.0～100.0	%	

F232	Filtering time for feedback signal of encoder	0	1～30	ms	
F233	Feedback direction of encoder	1	0 / 1	×	1：positive sequence 0：negative sequence
F234	Motor phase sequence	1	0 / 1	×	1：positive direction 0：negative direction
F235	Motor no-load current coefficient	32.00	0.00～60.00	%	Unnecessary to set up nomally
F236	PWM carrier frequency	6.000	1.100～11.000	kHz	Do not adjust this parameter under normal circumstances
F237	PWM carrier width	0	0.000～1.000	kHz	Do not adjust this parameter under normal circumstances
F238	Regulator mode	1	0/1/2/3	×	Do not adjust this parameter under normal circumstances
F239	Output torque limit	175	0～200	%	Do not adjust this parameter under normal circumstances
F240	Input voltage of inverter	380	0～460	V	
F241	Nominal power of inverter			KW	This is a read-only query data
F242	Phase angle of encoder	0.0	0.0～360.0	Degree	
F243	Zero position correction of encoder	0	0/2	×	Set 2 for zero point correction
F244	Spare				

No.	**Name**	**Factory Setup**	**Scope**	**Unit**	**Remarks**
F245	Selection of F246~F255 parameter function	0	0～65535	×	Modify this parameter, then F246～F255 will have different meanings
When F245=0, F246~F255 have the following meanings					
F246	Overheating protection time for radiator	50	000～65535	0.01s	Default protection in case of radiator overheating for more than 0.5 second
F247	Overspeed protection coefficient	12000	0～65535	0.01%	The default overspeed protection threshold is 120%
F248	Overspeed protection time	100	0～65535	0.01s	Default protection in case of the speed surpasses F247 value for 1 second

F249	Confirmation times for inputting open phase	35	0～65535	Time	Default protection in case of inputting open phase for more than 35 times in a given moment
F250	Confirmation times for short circuit of braking resistor	10	0～65535	Time	Default protection in case of short circuit of braking resistor for more than 10 times in a given moment
F251	Confirmation times for SinCos Encoder disconnection	2	0～65535	Time	Default protection in case of SinCos Encoder disconnection confirmed for more than twice
F252	Confirmation times for outputting open phase	2000	0～65535	0.001s	Default protection in case of outputting open phase confirmed for more than 2 second
F253	Confirmation of voltage for charging relay failure	65	0～65535	Volt	Protection after the three-phase in-operation input voltage reduces to 65/1.414 = 46V, 144 failure reported, the charging relay may be damaged or the grid voltage is suddenly decreased.
F254	Confirmation threshold of Encoder phase CD failure	300	0～65535		No 28 failure reported in case that the D-value of the absolute position and computing position of encoder exceed the setting value.
F255	Protection threshold of ABZ encoder disconnection	20	0～100		Protection in case of speed feedback deviation of synchronous motor confirmed for more than the setting value
When F245=1, F246~F255 have the following meanings					
F246	Protection times of IGBT	2	0~65535	Times	Times of Instantaneous over current of IGBT
F247	Protection option of I2t	0	0/1/2		0:two ways of I2t protection,1:only the first way of I2t protection,2: only the second way of I2t protection
F248	Spare				
F249	Spare				
F250	Spare				
F251	Spare				
F252	Spare				
F253	Spare				
F254	Spare				
F255	Spare				

When F245=2, F246~F255 have the following meanings					
F246	Spare				Internal test parameters, do not modify
F247	PWM modulation mode	2	0～2	×	0: 5 segment; 1: 7 segment; 2: < 40% rpm 7 segments, > 40% 5 segments At low speed, the AIO has too much interference toward outside. For example, when CAN has a poor communication signal, the change to 0 (5 segments) will have significant effect, and it will reduce the heat of the drive, but may cause too much noise for inverter at low speed.
F248	Spare				Internal test parameters, do not modify
F249	Spare				Internal test parameters, do not modify
F250	Three-phase current balance coefficient			×	Read-only, the calibration factor of three-phase current balance coefficient will automatically change. The synchronous motor may trigger the self study command of the asynchronous motor to output contactor, and carry out the calibration of the three-phase current balance coefficient. Such function will reduce the motor vibration and improve comfort.
F251	Spare				
F252	Positive /negtive rotation enabled	0	0~60000	0.1s	0:allow Positive /negtive rotation 1:only allow positive rotation
F253	Position /negtive rotation dead-time	20	0~200	%	The zero-speed time of positive/negative rotation change
F254	Accelerating overcurrent threshold of inverter	180	0～200	%	Inverter stop accelerating and maintain the current speed if overcurrent occur during the acceleration process, then continue to accelerate once the current drop.

F255	decelerating overvoltage threshold of inverter	750	0～800	V	Inverter stop decelerating and maintain the current speed if bus voltage is more than the setting value during the deceleration process, then continue to decelerate once the voltage drop.
When F245=3, F246~F255 have the following meanings					
F246	Current loop P	140	35～280	×	Current loop Kp (no need to modify)
F247	Current loop I	100	25～200	×	Current loop Ki(no need to modify)
F248	Current loop D	0	0～200	×	Current loop Kd(no need to modify)
F249	spare			×	
F250	spare			×	
F251	spare			×	
F252	spare			×	
F253	Spare				
F254	Torque direction	0	0/1		0:positive 1:negtive
F255	Spare				
When F245=4, F246~F255 have the following meanings					
F246	Software version			x	Read-only
F247	ID No 0			X	Read-only
F248	ID No 1			X	Read-only
F249	ID No 2			x	Read-only
F250	ID No 3			x	Read-only
F251	ID No 4			X	Read-only
F252	ID No 5			X	Read-only
F253	Inverter rated current			0.1A	Read-only
F254	Rated current of inverter current sensor			A	Read-only
F255	Motor power coefficient	200	50~400	%	Set the max power output, generally do not need to change
When F245=5, F246~F255 have the following meanings					
F246	Stator resistor			0.001 ohm	Stator resistor of asynchronous motor
F247	Rotor resistor			0.001 ohm	Rotor resistor of asynchronous motor
F248	Stator inductor			0.0001 H	Stator inductor of asynchronous motor
F249	Rotor inductor			0.0001 H	Rotor inductor of asynchronous motor

F250	Mutual inductor			0.0001 H	Mutual inductor of asynchronous motor
F251	Motor low-speed overcurrent threshold	1500	0～65535	0.1%	Motor stop and motor low-speed onvercurrent reported in case that the motor speed is lower than 20% of nominal speed, and the value and time duration of current surpass those of F252.
F252	Low-speed overcurrent time	600	0～65535	0.1s	Duration of motor low-speed overcurrent
F253	Motor high-speed overcurrent threshold	1200	0～65535	0.1%	Motor stop and motor high-speed overcurrent reported in case that the motor speed is higher than 20% of nominal speed, and the value and time duration of current surpass those of F2524
F254	High-speed overcurrent time	3000	0～65535	0.1s	Time duration of motor high-speed overcurrent
F255	Frequency dividing coefficient of encoder (PG card required)	0	0～7		0: (no frequency dividing), 1:(2 frequency dividing), 2: (4 frequency dividing),3:(8 frequency dividing), 4: (16 frequency dividing),5 (32 frequency dividing),6:(64 frequency dividing), 7: (128 frequency dividing) Note: (PG card required)
When F245=6, F246~F255 have the following meanings					
F246	Synchronous motor study angle or not when power on	1	0/1		Determine whether synchronous motor conduct angle self-study or not when power on , 0 for no study, 1 for study
F247	Current gain when self-study	150	0～400	%	Current gain when synchronous motor conduct angle self-study
F248	Command option	2	0/1/2		Running command option
F249	Zero servo process current loop gain	100	48~65535	%	Zero servo process current loop gain
F250	Spare				
F251	Spare				
F252	Spare				
F253	Spare				
F254	Spare				

F255	Spare				

B.2 Fault Code And Analysis

Code	Description	Fault Cause Analysis
02	Door lock disengagement in operation (emergency stop)	Safety loop in operation without door lock
03	Elevator overtravels when going upwards	In automatic operation, the upper and lower limit switches are in action at the same time and the elevator is not at the highest level
		In upward operation, the upper limit disconnected
		In upward operation, the elevator crosses the top level
04	Elevator overtravels when going downwards	In automatic operation, the upper and lower limit switches are in action at the same time and the elevator is not at the lowest level
		In downward operation, the lower limit disconnected
		In downward operation, the elevator crosses the bottom level
05	Door lock will not open	Door fails to open in position after the door-open signal outputs for consecutive 15 seconds (except the absence of door-lock signal), reports failure for 3 times
		Short circuit for lobby door lock: the elevator is in the hall area. Lobby door lock signal exists without car door lock and with door-open limit signal (for consecutive 1.5 seconds) (only effective for car door separation under
06	Door lock will not close	Door fails to close in position after the door-close signal outputs for consecutive 15 seconds (except the existence of door-lock signal) and
		Inconsistence for 4 seconds between door-close limit and door lock determines time-out for door close (except the existence of door-lock signal). Failure reported after 8 inconsistencies
08	CANBUS communication failure	Communications interference
		Terminal resistance is not under short circuit
		Breakdown in communications
		Failure reported after disconnection with lift car panel SM-02 communication
10	Dislocation of upward deceleration switch 1	Check after self study or with power on: the position of the upward deceleration switch on the single level is 3/5 higher than the story height of the top floor
		Check after self study or with power on: the position of the upward deceleration switch on the single level is shorter than the minimum deceleration distance
		Check the operation: the position of the upward deceleration switch on the single level is 100mm lower than the position of the upward deceleration switch on the single level in the well learning
		Check the operation: the position of the upward deceleration switch on the

		single level is 150mm higher than the position of the upward deceleration switch on the single level in the well learning
		Check at stop: the position of the upward deceleration switch on the single level is 100mm lower than the position of the upward deceleration switch on the single level in the well learning
		Check at stop: the position of the upward deceleration switch on the single level is 150mm higher than the position of the upward deceleration switch on the single level in the well learning, and the deceleration switch on the single level is not in action
		In automatic operation, the upper and lower limit switches are in action at the same time and the elevator is not at the highest level
11	Dislocation of downward deceleration switch 1	Check after self study or with power on: the position of the downward deceleration switch on the single level is 3/5 higher than the story height of the bottom floor
		Check after self study or with power on: the position of the downward deceleration switch on the single level is shorter than the minimum deceleration distance
		Check the operation: the position of the downward deceleration switch on the single level is 100mm higher than the position of the downward deceleration switch on the single level in the well learning
		Check the operation: the position of the downward deceleration switch on the single level is 150mm lower than the position of the downward deceleration switch on the single level in the well learning
		Check at stop: the position of the downward deceleration switch on the single level is 100mm higher than the position of the downward deceleration switch on the single level in the well learning
		Check at stop: the position of the downward deceleration switch on the single level is 150mm lower than the position of the downward deceleration switch on the single level in the well learning, and the deceleration switch on the single level is not in action
		In automatic operation, the upper and lower limit switches are in action at the same time and the elevator is not at the lowest level
12	Dislocation of upward deceleration switch 2	Check after self study or with power on: the position of the upward deceleration switch on the double level is 3/5 higher than the story height of the switch floor
		Check the operation: the position of the upward deceleration switch on the double level is 150mm lower than the position of the upward deceleration switch on the double level in the well learning
		Check the operation: the position of the upward deceleration switch on the double level is 250mm higher than the position of the upward deceleration switch on the double level in the well learning
		Check at stop: the position of the upward deceleration switch on the double level is 150mm lower than the position of the upward deceleration switch on

		the double level in the well learning
		Check at stop: the position of the upward deceleration switch on the double level is 200mm higher than the position of the upward deceleration switch on the double level in the well learning, and the deceleration switch on the double level is not in action
		Only one-grade deceleration switch installed, but two-grade deceleration switch configured (See F182)
13	Dislocation of downward deceleration switch 2	Check after self study or with power on: the position of the downward deceleration switch on the double level is 3/5 higher than the story height of the switch floor
		Check the operation: the position of the downward deceleration switch on the double level is 150mm higher than the position of the downward deceleration switch on the double level in the well learning
		Check the operation: the position of the downward deceleration switch on the double level is 250mm lower than the position of the downward deceleration switch on the double level in the well learning
		Check at stop: the position of the downward deceleration switch on the double level is 150mm higher than the position of the downward deceleration switch on the double level in the well learning
		Check at stop: the position of the downward deceleration switch on the double level is 200mm lower than the position of the downward deceleration switch on the double level in the well learning, and the deceleration switch on the double level is not in action
		Only one-grade deceleration switch installed, but two-grade deceleration switch configured (See F182)
14	Dislocation of upward deceleration switch 3	Check after self study or with power on: the position of the upward deceleration switch on three levels is 3/5 higher than the story height of the switch floor
		Check the operation: the position of the upward deceleration switch on three levels is 250mm lower than the position of the upward deceleration switch on three levels in the well learning
		Check the operation: the position of the upward deceleration switch on three levels is 300mm higher than the position of the upward deceleration switch on three levels in the well learning
		Check at stop: the position of the upward deceleration switch on three levels is 250mm lower than the position of the upward deceleration switch on three levels in the well learning
		Check at stop: the position of the upward deceleration switch on three levels is 250mm higher than the position of the upward deceleration switch on three levels in the well learning, and the deceleration switch on three levels is not in action
		Only one-grade or two-grade deceleration switch installed, but three-grade deceleration switch configured (See F182)

15	Dislocation of downward deceleration switch 3	Check after self study or with power on: the position of the downward deceleration switch on three levels is 3/5 higher than the story height of the switch floor
		Check the operation: the position of the downward deceleration switch on three levels is 250mm higher than the position of the downward deceleration switch on three levels in the well learning
		Check the operation: the position of the downward deceleration switch on three levels is 300mm lower than the position of the downward deceleration switch on three levels in the well learning
		Check at stop: the position of the downward deceleration switch on three levels is 250mm higher than the position of the downward deceleration switch on three levels in the well learning
		Check at stop: the position of the downward deceleration switch on three levels is 250mm lower than the position of the downward deceleration switch on three levels in the well learning, and the deceleration switch on three levels is not in action
		Only one-grade or two-grade deceleration switch installed, but three-grade deceleration switch configured (See F182)
16	Dislocation of upward deceleration switch 4	Check after self study or with power on: the position of the upward deceleration switch on four levels is 3/5 higher than the story height of the switch floor
		Check the operation: the position of the upward deceleration switch on the double level is 150mm lower than the position of the upward deceleration switch on the double level in the well learning
		Check the operation: the position of the upward deceleration switch on the double level is 250mm higher than the position of the upward deceleration switch on the double level in the well learning
		Check at stop: the position of the upward deceleration switch on the double level is 150mm lower than the position of the upward deceleration switch on the double level in the well learning
		Check at stop: the position of the upward deceleration switch on the double level is 200mm higher than the position of the upward deceleration switch on the double level in the well learning, and the deceleration switch on the double level is not in action
		Only one-grade, two-grade or three-grade deceleration switch installed, but four-grade deceleration switch configured (See F182)
17	Dislocation of downward deceleration switch 4	Check after self study or with power on: the position of the downward deceleration switch on the double levels is 3/5 lower than the story height of the switch floor
		Check the operation: the position of the downward deceleration switch on the double level is 150mm higher than the position of the downward deceleration switch on the double level in the well learning
		Check the operation: the position of the downward deceleration switch on the

		double level is 250mm lower than the position of the downward deceleration switch on the double level in the well learning
		Check at stop: the position of the downward deceleration switch on the double level is 150mm higher than the position of the downward deceleration switch on the double level in the well learning
		Check at stop: the position of the downward deceleration switch on the double level is 200mm lower than the position of the downward deceleration switch on the double level in the well learning, and the deceleration switch on the double level is not in action
		Only one-grade, two-grade or three-grade deceleration switch installed, but four-grade deceleration switch configured (See F182)
19	Door open/close limit failure	At automatic mode, door open limit switch and door close limit switch are in action at the same time with time-out for 1.5s
20	Slip protection failure	In operation, the leveling switch is not in action for over the time set in F62 (anti-slip time), except during Inspection
21	Motor overheating	Input signal at motor overheating point
22	Motor reverse failure	Skid for consecutive 0.5 seconds (upward speed feedback<-150mm, downward speed feedback>150mm)
23	Elevator overspeed failure	Failure 23 reported when speed feedback value is greater than allowable speed for 0.1 seconds When the given speed is less than 1m / s, allowable speed= given speed +0.25 m / s When the given speed is greater than 1m / s, allowable speed= given speed *1.25 Maximum allowable speed < rated speed * 108%
		When terminal level runs at a decelerating speed of 0.8m/s^2, Failure 23 reported when speed feedback value is greater than allowable speed for 0.1 seconds
24	Elevator over-low speed	Failure 24 reported when speed feedback value is less than allowable speed for 0.5 seconds When the given speed is less than 0.5m / s, allowable speed= given speed -0.25 m / s When the given speed is greater than 0.5m / s, allowable speed= given speed *0.5
27	Sensor failure for upper leveling floor	After high-speed operation stops, the sensor for upper leveling floor is not in action.

		Failure 27 reported, when the action on the sensor for upper leveling floor is greater than the maximum effective protection distance or greater than the maximum invalid protection distance When the length of the leveling spile is less than 300mm: maximum protection distance for effective action = 300mm*4 When the length of the leveling spile is greater than 300mm: maximum protection distance for effective action = length of the leveling spile*4 When the top floor is less than 3: maximum protection for invalid action = maximum story height*1.5 When the top floor is greater than 3: maximum protection for invalid action = maximum story height*2.5
28	Sensor failure for lower leveling floor	The sensor for lower leveling floor is not in action
		Failure 28 reported, when the action on the sensor for lower leveling floor is greater than the maximum effective protection distance or greater than the maximum invalid protection distance When the length of the leveling spile is less than 300mm: maximum protection distance for effective action = 300mm*4 When the length of the leveling spile is greater than 300mm: maximum protection distance for effective action = length of the leveling spile*4 When the top floor is less than 3: maximum protection for invalid action = maximum story height*1.5 When the top floor is greater than 3: maximum protection for invalid action = maximum story height*2.5
30	Leveling position error is too large	Test the leveling position error at stop. Failure report when the error detected is greater than the value set by F146.
32	Safety loop disconnected in operation	Safety loop disconnected in operation
35	Brake contactor contact fault	Motherboard has no drive signal on brake contactor, but input signal is detected at input testing point (adhesion failure)
		Motherboard has drive signal on brake contactor, but input signal is not detected at input testing point (non-adhesion failure)
36	Output contactor contact fault	Motherboard has no drive signal on circuit contactor, but input signal is detected at input testing point (adhesion failure)
		Motherboard has drive signal on circuit contactor, but input signal is not detected at input testing point (non-adhesion failure)
37	Door-lock failure	Door- lock close signal input when the door-open limit signal is in action
		When door-lock relay detection is set, the lock input point has inconsistent high and low voltage detection

38	Brake switch malfunction	Motherboard has no drive signal on brake contactor, but open/close action is detected at brake switch input testing point (adhesion failure)
		Motherboard has drive signal on brake contactor, but no open/close action is detected at brake switch input testing point
40	Run signal failure	The control part of the AIO sends out run signal, but does not receive the run signal feedback from the drive part
42	Deceleration switching error	Overtravel in upward movement and the lower level forces slow open/close, or overtravel in downward movement and the upper level forces slow open/close
45	Pre-opening relay detection fault	when the pre-opening relay output is detected inconsistent with the pre-opening for over 0.5s, Y14 has output, but X17 has no input; Y14 has no output but X17 has input
49	Communication failure	Exceptional communications in drive part and control part
50	Parameter error	Parameter read error
54	Inconsistent lock failure	When the door opens, the hall door lock has inconsistent pressure detection point with the door lock
60	Base closure failure	In operation, the output contactor contact is detected disconnected, turn off the output of the AIO and report Failure 60
61	Signal start failure	After the brake is opened, no zero servo terminal signal is received returning from the drive part
62	No speed output	After start, the elevator maintains the speed at 0, and the elevator does not move
67	RTC error	Main board hardware error
68	The combination of the length of the self study leveling spile and the distance with the leveling switch does not meet the requirements	1) The leveling spile is too long or too short. Algorithm: (length of the leveling spile + leveling switch space) / 2 less than 100mm or greater than 900mm. 2) The leveling area is too long or too short. Algorithm: (length of the leveling spile - leveling switch space) / 2 less than 10mm or greater than 100mm
69	The inconsistency of the number of self study spiles and the total story number of the elevator with the level bias	The number of spiles installed = Designed total story number(F11) — Offset floor (F10). However, the total number of spiles installed is different from the calculation value.

drive system fault code table

Code	Fault Description	Possible Cause	Solution
71	Module protection against over-current	DC terminal with excessive voltage	Check power supply and high inertia loads. Rapid stop without dynamic braking
		short circuit at periphery	Check whether the motor and the output wiring are short

Code	Fault Description	Possible Cause	Solution
			circuit, whether earthing is short circuit
		Open phase in output	Check the motor and output wiring for loose
		Encoder fault	Check whether the encoder is damaged or the wiring is correct
		Encoder wrong phase	Check motor phase
		Motor wrong phase	Check motor phase
		Phase angle self-study incorrect	Do self-study of phase angle again
		Insufficient current when phase self-study	Increase F247 current gain when do self-study
		Bad contact of hardware or damaged	Ask professional technical personnel for Inspection
		Converter internal connectors loose	Ask professional technical personnel for Inspection
72	ADC failure	Current sensor damaged	Replace current sensor
		Problem in current sampling circuit	Replace control board
73	Radiator overheating	Ambient temperature is too high	Reduce the ambient temperature, enhance ventilation
		Duct obstruction	Clean dust, cotton and other debris in the duct
		Fan abnormal	Check the fan power cable for connection, or replace the fan with the same model
		Temperature detection circuit fault	Ask professional technical personnel for Ispection
74	Brake unit failure	Brake unit damaged	Replace the corresponding driver module
		External braking resistor short circuit	Check the braking resistor connection
75	Fuse-off failure	Current is too large to fuse	Check whether the fuse circuit is open, or for loose connections
76	Over output torque	Over-low input power voltage	Check the input power
		Motor stall or severe load mutation	Lower load mutation to prevent motor stall
		Encoder fault	Check whether the encoder is damaged or the wiring is correct

Code	Fault Description	Possible Cause	Solution
		Open phase for output	Check the motor and output wiring for loose connections
77	Speed deviation	Acceleration time is too short	Extend the acceleration time
		Overloaded	Reduce the load
		Current limit is too low	Increase the limit value in the allowable range
78	(In accelerated runni g) Bus over-voltage protection	Abnormal input power voltage	Check the input power
		The motor is quick restarted again in high-speed rotation	Stop and restart the motor
	(In decelerated running) bus over-voltage protection	Excessive load inertia	Use appropriate braking components
		Deceleration time is too short	Extend the deceleration time
		The braking resistor has an extremely large value or is disconnected	Connect the appropriate braking resistor
	(In constant speed operation) bus over-voltage protection	Exceptional input power	Check the input power
		Excessive load inertia	Use appropriate braking components
		The braking resistor has an extremely large value or is disconnected	Connect the appropriate braking resistor
79	Bus under voltage	Supply voltage falls below the minimum operating voltage	Check the input power
		Instantaneous power failure	Check the input power. When the input voltage is normal, restart after reset
		Significant changes in input power voltage	
		The power wiring terminal is loose	Check the input wiring
		Abnormal internal switching power	Ask professional technical personnel for Ispection
		Large starting current load in the same power system	Changes the power system to meet the specifications
80	Open phase for output	Abnormal, or ignored connection or disconnection	Follow the rules and check the converter output side connections, eliminate missing and disconnection

Code	Fault Description	Possible Cause	Solution
		in converter output side connection	
		Output terminal is loose	
		Electrical power is too small, 1 / 20 or less of the maximum applicable motor capacity in the converter	Adjust converter capacity or motor capacity
		Unbalanced output three-phase	Check whether the motor wiring is intact
			Power off, check whether the converter output side is consistent with the features of DC side terminal
81	Motor overcurrent at low speed (in acceleration)	Low voltage in power grid	Check the input power
		Abnormal motor parameters	Set correct motor parameters
		Quick start the motor in operation	Restart after the motor stops rotating
	Motor overcurrent at low speed (in deceleration)	Low voltage in power grid	Check the input power
		Excessive load inertia	Use appropriate braking components
		Abnormal motor parameters	Set correct motor parameters
		Deceleration time is too short	Extend the deceleration time
	Motor overcurrent at low speed (in constant speed)	Load mutation in operation	Reduce the mutation frequency and magnitude of the load
		Abnormal motor parameters	Set correct motor parameters
82	Encoder fault	Encoder not connected correctly	Change Encoder wiring
		Encoder has no signal output	Check the Encoder and power supply
		Encoder wiring disconnected	Repair the disconnection
		Abnormal function code setup	Confirm the relevant functional configuration of the converter Encoder
83	Current detected at stop	Current not effectively blocked when the motor stops	Synchronous motor skid
			Ask professional technical personnel for Inspection
84	Velocity	Reverse speed in operation	Check the external load for mutation

Code	Fault Description	Possible Cause	Solution
	reverse in operation	Encoder is inconsistent with the motor phase sequence	Change motor or encoder phase sequence
		Motor reversal at start, and the current reaches the current limit	Current limit is too low, or the motor does not match
85	Velocity detected at stop	Brake loose, the elevator car slides	Check brake
		Encoder interfered or loose	Fasten encoder, eliminate interference
86	Motor phase sequence error	Motor wiring reverse	Anti-line or adjust parameters
87	Overspeed in the same direction (within the maximum allowed range)	Galloping in the field-loss status of synchronous motor	Check motor
		Incorrect self study in angle of synchronous motor	Restart self study
		Encoder parameter error or interfered	Check encoder circuit
		Excessive forward load or load mutation	Check the external causes for load mutations
88	Overspeed in the reverse direction (within the maximum allowed range)	Galloping in the field-loss status of synchronous motor	Check motor
		Incorrect self study in angle of synchronous motor	Restart self study
		Encoder parameter error or interfered	Check encoder circuit
		Excessive reverse load or load mutation	Check the external causes for load mutations
89	Wrong phase sequence of UVW encoder	Problem with encoder connection or wrong parameters	Check the connection or change the parameters
90	Encoder communication failure	Encoder fault	Check encoder wiring and try to do encoder self study
91	Abc over-current (three-phase Instantaneous value)	Motor single-phase ground short circuit	Check motor and the output wire circuit
		Encoder fault	Check whether the encoder is damaged or the wiring is correct
		Encoder wrong phase	Check encoder phase
		Motor wrong phase	Check encoder phase

Code	Fault Description	Possible Cause	Solution
		Phase angle self-study incorrect	Do phase angle self-study again
		Insufficient current when do phase self-study	Increase current gain of F247 as doing self-study
		Error detected on circuit driver board	Replace driver board
92	Brake detection failure	No action of output relay	Check the relay control circuit
		Relay action brake is not activated	Check whether the brake power cable is loose or disconnected
		Feedback component fail to detect signal	Regulate feedback component
93	Input over-voltage	Incoming voltage is too high	Check whether incoming line voltage matches converter
		Problems with switching power supply voltage detection circuit	Ask professional technical personnel for Ispection
94	UVW Encoder disconnection	Problems with encoder wiring circuit	Check whether the terminal is loose or the wire is broken or damaged
96	Encoder is not self study	Synchronous motor fails to learn encoder angle	Make encoder self study
97	Output over-current (RMS)	Running under overload for too long. The greater the load, the shorter the time	Stop running for some time. If it occurs again after re-start, check whether the load is within the allowable range
		Motor stall	Check motor or brake
		Motor coil short circuit	Check motor
		Encoder fault	Check encoder damage or not and wiring
		Encoder wrong phase	Check encoder phase
		Motor wrong phase	Check motor phase
		Phase angle self-study incorrect	Do phase angle self-study again
		Insufficient current as doing phase self-study	Increase F247 current gain when doing self-study

Code	Fault Description	Possible Cause	Solution
		Output short circuit	Check the wiring or the motor
98	Sincos Encoder failure	Encoder damaged or wrong lines	Check the Encoder and the line
99	Missing input phase	Abnormal voltage on input side	Check grid voltage
		Open phase input	
		Loose terminal on input side connection	Check the input terminal wiring
100	Overspeed protection (protection against exceeding the maximum speed limit)	Encoder parameter error or interfered	Check Encoder circuit
		Load mutation	Check causes of the external load mutation
		Overspeed protection parameter error	Check parameters
101	High-speed over-current motor	Low voltage power grid	Check the input power
		Running load mutation	Reduce the load mutation frequency and magnitude
		Abnormal motor parameters setup	Set motor parameters correctly
		Encoder parameter error or interfered	Check Encoder circuit
102	Earthing protection	Connection error	Correct wiring errors according to user manual
		Abnormal motor	Test earthing insulation before replacing the motor
		Over-current leakage of converter output side against earthing	Ask professional technical personnel for Ispection
103	Capacitance aging	Converter capacitor aging	Ask professional technical personnel for Ispection
104	External fault	Failure signal on external input	Check the external cause of the malfunction
105	Unbalanced output	Converter output side has connection exception, miss, or disconnection	Follow the operational rules and check the wiring of converter output side, eliminate ignored connection and disconnection
		Unbalanced three-phase motor	Check motor

Code	Fault Description	Possible Cause	Solution
106	Parameter error	Parameter error	Modify the inverter parameters
107	Current sensor fault	Driver board hardware failure	Ask professional technical personnel for Inspection
108	Braking resistor short circuit	short circuit of external braking resistor	Check the braking resistor connection
109	Current instantaneous value is too large	When Ia, Ib, Ic is not in operation, instantaneous value of three-phase current is too large and reports alarm	Ask professional technical personnel for Inspection
112	IGBT short-circuit protection	Short circuit in periphery	Check whether the motor and output wiring is short circuit, and whether the earthing is short circuit
113	Communication failure for AIO	Loose connectors inside inverter	Ask professional technical personnel for Inspection
		Hardware has bad contact or is damaged	Ask professional technical personnel for Inspection
114	Charging relay failure	Charging relay damaged	Ask professional technical personnel for Inspection
		The transient drop of three-phase input power voltage exceeds 30V	Check the cause for input voltage drop

Appendix C Inverter complies with the standards

1. European Low Voltage directive

AS320 Series converter products complies with EN61800-5-1:2007 standards, which comply with the Low Voltage Directive（Low Voltage Directive 2006/95/EC）。

The inverter also meet the following standards：

EN61800-5-1 ： 2007:Adjustable speed electrical powerdrive systems –Part 5-1:Safetyrequirements –Electrical, thermal and energy

2. European EMC regulations

When you follow the recommendations in this manual for installation, the AS320 seriesinverter product meets the following EMC standards:

EN12015.1998 Electromagnetic compatibility-Product family standard for lifts, escalators and passenger conveyors-Emission.

EN12016.2004 Electromagnetic compatibility-Product family standard for lifts, escalators and passenger conveyors-Immunity.

EN61800-3:2004： Power drive D of Part 3

3. ISO9001 Quality Management System

Shanghai Sigriner STEP Electric Co., Ltd will manage its quality management system in accordance with the ISO9001 standards.

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.

Shanghai STEP Electric Corporation