BL6-B Series Elevator Controller

User Guide

Doc No. IEC-30.01-160725

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FOREWORD

Thank you for using BL6-B series elevator controller. B

Chapter 1: SAFETY INFORMATION

1.1. LABEL DESCRIPTION

The following conventions are used to indicate precautions in this user guide. Failure to notice the precautions provided in this user guide can result in serious or even fatal injury to damage to the products or to related equipment and systems.



Indicates precautions that if not heeded could possibly result in loss of life or serious injury.



Indicates precautions that if not heeded could result in relatively serious or minor injury to the operator and damage to the product. Also, it should be noted that even for 

precautions, in certain situations could result in serious accident.



Indicate important information that should be memorized.

1.2. SAFETY PRECAUTIONS

u Confirmation upon Delivery



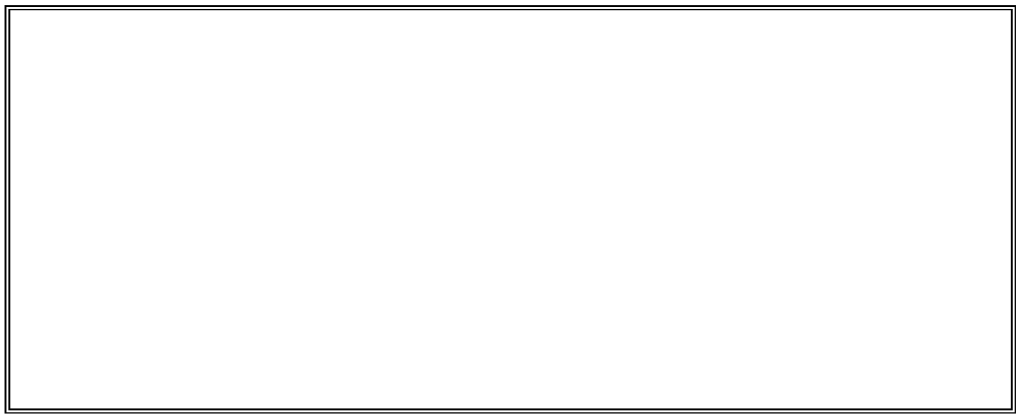
² Never install an integrated controller that is damaged or missing components.
Doing so can result in injury.

u Installation



² Always hold the case when carrying the integrated controller
Otherwise the integrated controller may drop and damage.
² Please install the device to a metal surface or other non-flammable objects
Otherwise there is a fire-hazard potential.
² Please mount the device o
Otherwise the integrated controller may drop and damage.
² Please insa C
Overheat can result in fires or other accidents.
² Do not install the d
nearby.
Otherwise there is risk of fire or explosion.
² Do not lea
Otherwise it may damage the device and has fire-hazard potential.

² Check to be sure that the front cover is attached before turning ON the power supply. Otherwise, an electric shock may occur. ² Do not get close to machine and related objects when choosing the error auto reset function, as the drive will automatically restart after warning reset. Otherwise, an injury may occur. ² Provide a separate fast stop switch; the Digital Operator STOP Key is valid only when its function is set. Otherwise, an Injury may occur. ² Reset alarms only after confirming that the RUN signal is OFF. Otherwise, an Injury may occur. ² Do not perform fault operation and signal checking while the drive is running. Otherwise an injury may occur and the drive may get damaged.



2.3. Specifications

Specifications of BL6-B series elevator integrated controller in chart 2.1.

Chart 2.1 Specifications

MODEL BL6-B 40 -	4002	4003	4005	4007	4011	4015	4018	4022
	4030	4037	4045	4055	4075			
MAX MOTOR POWER(KW)	2.2	3.7	5.5	7.5	11	15	18.5	22
	30	37	45	55	75			
RATED OUTPUT CAPACITY(KVA)	4	5.9	9	12	18	22	27	32
	43	53	63	78	106			
RATED OUTPUT CURRENT(A)	5.5	9	14	18	27	34	41	48
	65	80	96	128	165			
MAX OUTPUT VOLTAGE(V)	3-PHASE,							

Chart2.1 Specifications (Cont#d)

FEATUR	CONTROL MODE	SPACE VECTOR PWM(SVPWM) CLOSED LOOP VECTOR CONTROL
	CARRIER FREQUENCY	8KHZ (6~15KHZ ADJUSTABLE)
	SPEED CONTROL RANGE	1:1000
	SPEED CONTROL ACCURACY	0.05%(25C 10C)
	SPEED RESPONSE	30HZ
	TORQUE LIMIT	YES (SET BY PARAMETER)
	TORQUE ACCURACY	5%

CHART2.1 SPECIFICATIONS (CONT#D)

MAIN PROTECTION FUNCTION	OVER SPEED PROTECTION	PROTECT AT SPEED EXCEED THE MAXIMUM ALLOWABLE SETTING
	SPEED DEVIATION PROTECTION	PROTECT AT SPEED DEVIATION EXCEEDS ALLOWABLE VALUE
	PG FAULT PROTECTION	PROTECT AT PG DISCONNECTION/ PHASE ERROR
	AUTO-TUNING PROTECTION	PROTECT AT AUTO-TUNNING FAULT.
	OPEN-PHASE PROTECTION	PROTECT AT INPUT/OUTPUT PHASE LOST
	DOOR INTERLOCK FAULT	PROTECT AT DOOR INTERLOCK CIRCUIT OPEN WHEN RUNNING
	SAFETY CIRCUIT FAULT	PROTECT AT SAFETY CIRCUIT OPEN WHEN RUNNING
	BRAKE CIRCUIT FAULT	NO BRAKE OPEN FEEDBACK SIGNAL AFTER OUTPUT BRAKE OPEN COMMAND
	LEVELING ZONE FAULT	PROTECT AT LEVELING ZONE SIGNAL FAULT
	OUTPUT CONTACTOR FAULT	PROTECT AT OUTPUT CONTACTOR FAULT
	RUNNING TIME PROTECTION	PROTECT AT SIGNAL RUNNING TIME EXCEEDS LIMIT
	FLOOR COUNTING FAULT	PROTECT AT FLOOR COUNTER FAULT
	COMMUNICATION INTERFERENCE FAULT	PROTECT AT COMMUNICATION INTERFERENCE FAULT
	HOISTWAY PARAMETER LEARNING FAULT	HOISTWAY PARAMETER LEARNING FAULT PROTECTION
	PROTECTION DEGREE	C: CLOSED IP20; O: OPEN IP00
	COOLIN SEN	

Note: 5.5kw BL6 has two dimensions: Dimension of model BL6-BO4005-S and BL6-BO4005-SC is same as above chart. Dimension of model BL6-BO4005 and BL6-BO4005-C is same as 7.5-15kw BL6. Please distinguish while installation and using.

2.4.2 Shield Type

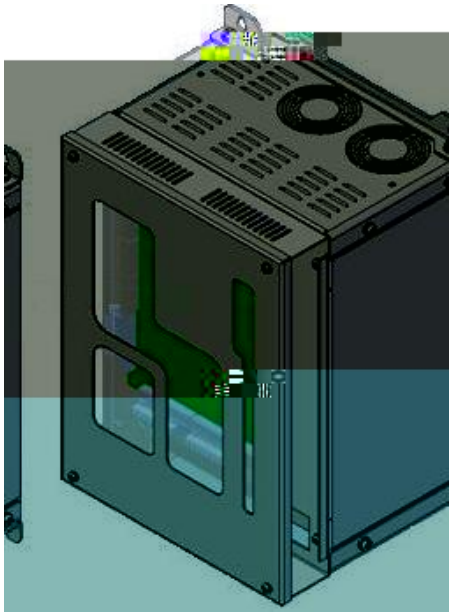


FIGURE 2.5 SHIELD TYPE EXTERIOR DIMENSION

FIGURE 2.6 SHIELD TYPE APPEARANCE

amsEeIBOTj0.06048 Tc (.) 4005c (e) TjT1 Tc (h)-c (t).0556 Tc ( ) WTj0..1853Tc (t) Tc (t) Tj12 Tc (t) Tj-0.19664 Tc (a) Tj0..1853Tc (t) Tc (t) Tj28 Tc (e) Tj-0.

Chart 2.3 SHIELD type Invert e

2.5. Confirmation upon Delivery

Check belo

Release the screw at the terminal cover (arrow), raise the cover according to arrow direction to remove the cover for wiring.

u Install front cover

Complete wiring, and tighten the front cover in reverse order of removing terminal cover.

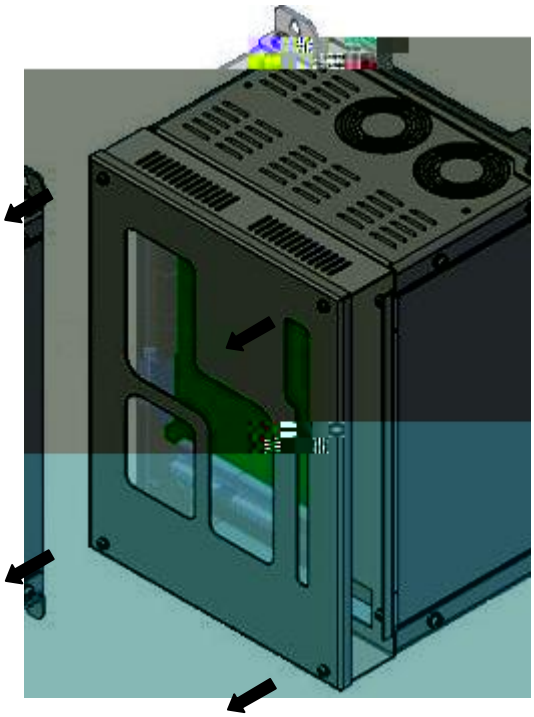


Figure 2.7 Remove terminal cover on shield type

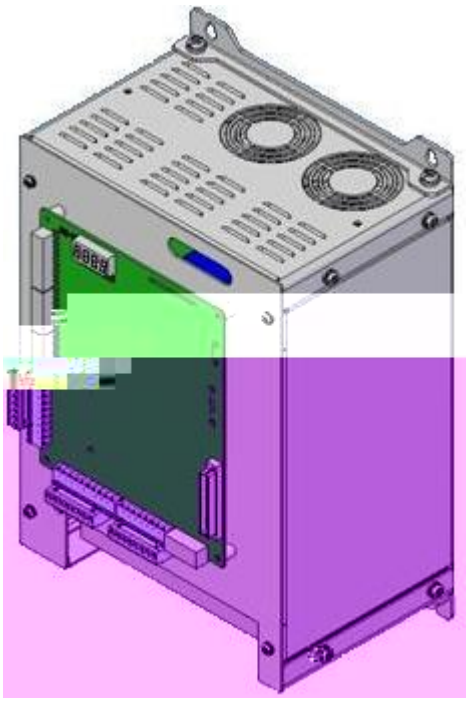


Figure 2.8 Without Shield type elevator controller

2.6.5 Installation Orientation and Space

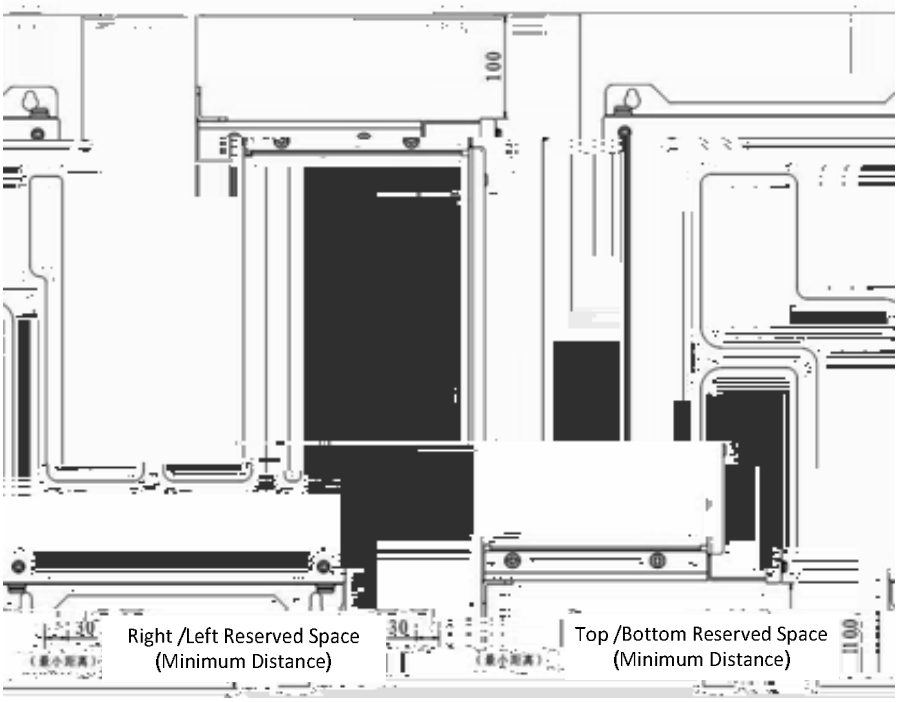


Figure 2.9 Driver Installation Orientations and Space

500 6 □4002-B□

2.8. Product Function

Cart 2.7 Basic Function List (Cont#d)

No.	Name	Purpose	Description	Note
9	Full-load drive by pass	Run to nearest registered floor	At full load, car only respond to car call, not to landing call.	Elevator back to normal state when overload is cleared.
10	Attendant control by pass	VIP Run	At attendant run, press pass over button, elevator only responds to car call.	
11	Operation mode display	tt		

Cart 2.7 Basic Function List (Cont#d)

No.	Name	

Chart 2.8 Special Function List

Chart 2.8 Special Function List (Cont#d)

No.	Name	Purpose	Description	Note
2	Double press Cancellation	Cancel car call	Press car call button again could cancel such call. (Button answer light off)	Such function is also achievable when elevator is not running.
3	Anti-mischief	Cancel car call at terminal	1. When elevator reaches terminal switch, clear all car call. 2. For elevator with weighing device, only last 3 car calls are registered at light load.	
4	Landing call button stuck diagnose	Repair indication	ler no re a If one landing call button is pressed for more than 20s, it is considered stuck (cannot reset), such call is not registered,	

Chart 2.8 Speci

Chart 2.8 Special Function List (Cont#d)

		After power cut, elevator powered by emergency leveling device and level to nearby landing zone to free the passene.89344 Tc ( ) Tj-0.0912 Tc (z) Tj-0.j-0.04896 Tc (ss)
19	Emergency Auto Leveling (ARD mode)	After power cut, elevator powered by emergency leveling device, level to nearby landing zone.

Chart 2.8 Special Function List (Cont#d)

No.	Name	Purpose	Description	Note
22	Re-leveling Function	To achieve re-leveling	Elevator stops at one floor, when passengers move in/out, steel rope will have elastic deformation, and car may move out of landing zone. This function enables elevator move in low speed back to leveling zone with door open. Condition of re-leveling: 1. Elevator stops and leave landing zone; 2. Two leveling sensors enable; 3. Elevator speed slower than set value; 4. Controller low speed output enable; 5. Safety electric board output enable;	In special function select parameter F4-06-19 to enable re-leveling function; For opening in advance/re-leveling function principle/wiring diagram please see Appendix 2- opening in advance/re-leveling function description.

Chart 2.9 Main safety protection Function

No.	Name	Elevator Description
1	Safety Circuit	Safety circuit open, entire system stops immediately.
2	Door interlock	Elevator can only run with all door interlock closed, otherwise entire system stops immediately.
3	Operation Contactor	System check operation contactor constantly, if found any abnormality, system stop immediately.
4	Brake checking protection	The detection switch of brake arm makes a real-time inspection of opening/closing of the brake. If the brake fails to open as per requirements, the system will prevent the elevator from start.
5	Terminal speed-change&correct floor display	If the elevator detects a terminal switch during running, it will be forced to decelerate and meanwhile automatically correct the floor display.
6	Position-limit protection	If the elevator detects a limit switch, the entire system stops immediately.
7	Limit protection	If the elevator runs to trigger a limit switch, he entire system stops immediately.
8	Instantaneous over-current protection	If detects over 200% rated output current system stops immediately.
9	Fuse blowing protection	When fuse blow, the entire system stops immediately.
10	Overload protection	If detects over 150%/180% rated current, system will stop after 60s/10S.
11	Over-voltage protection	Main DC bus voltage higher than 780V, system(400V) will stop or main DC bus voltage higher than 410V, system(200V) will stop
12	Under-voltage protection	Main DC bus voltage lower than 380V, system(400V) stop or main DC bus voltage lower than 190V, system(200V) will stop
13	Radiator overheated protection	Thermal resistor protection
14	IGBT interior protection	IGBT over current overheated short circuit under-voltage protection

Chart 2.9 Main safety protection Function (Cont#d)

No.	Name	Elevator Description
15	Electric motor protection	Electric thermal protection
16	Impact restrain loop failure protection	Through contactor joint to feedback protection
17	Over speed protection	Protect when the speed is faster than allowed
18	Over deviation protection	Protect when speed deviation is larger than allowed.
19	PG fault protection	Protect when PG braking or phase stagger.
20	Self-study protection	Protect when self-study of motor parameter unusual.
21	Phase lack protection	Protect when lack of in/output phase
22	Door drive signal	Protect when door signal unusual.
23	Running time protection	Protect when once run time is longer than limited time.
24	Counter of floor protection	Protect when floor counter is wrong.
25	Trouble of communication immunity	Protect when communicate interrupt.
26	Hoistway learning error	Protect when have trouble in hoistway learning

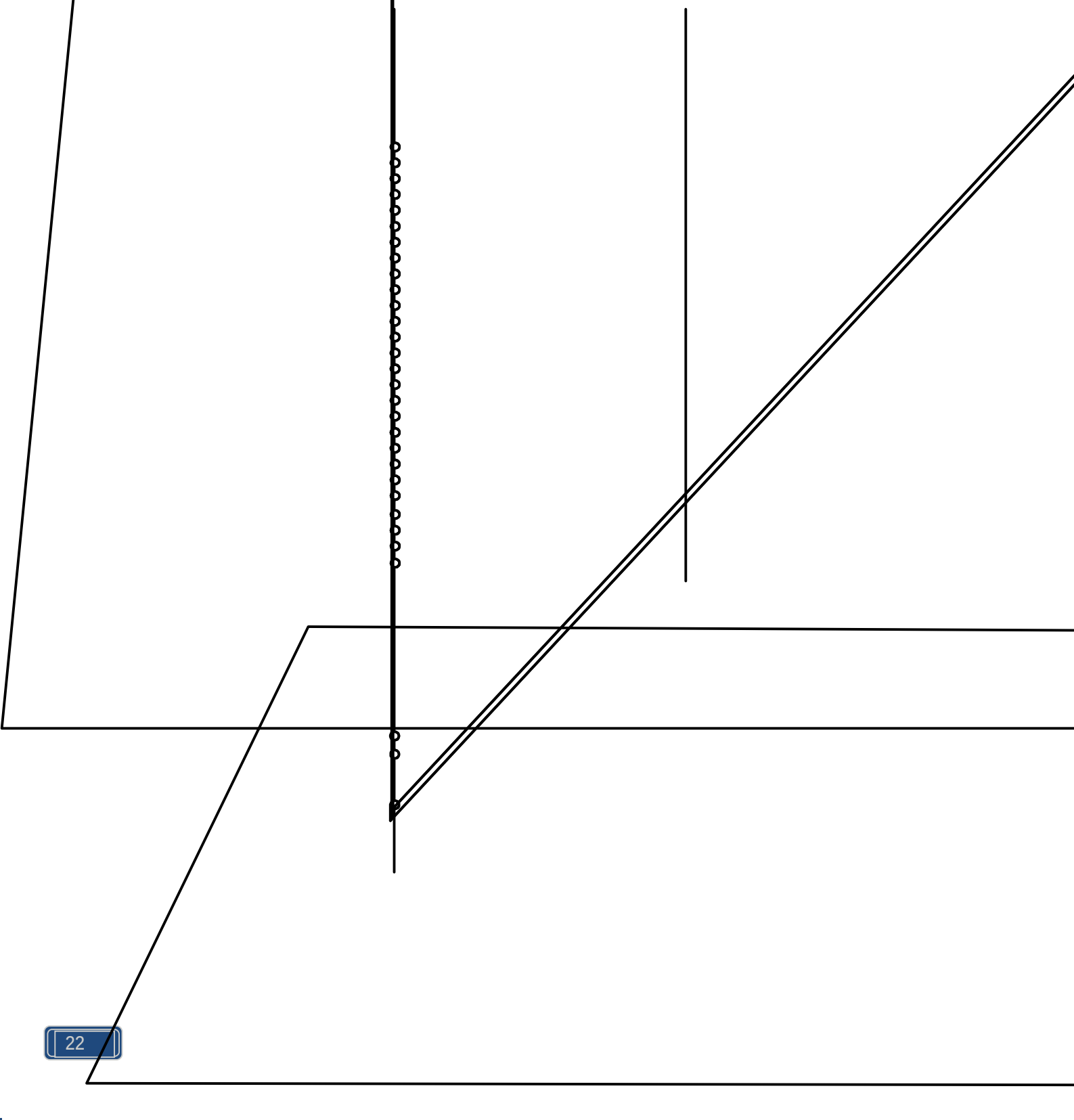
Chart 2.10 Optional Function List

No.	Name	Elevator Description
1	Remote Monitoring	Monitor elevator running status in monitor current through wire/wireless network;
2	Arrival Gong	Clock announce;
3	Voice Synthesizer	Voice announce;
4	Weighing device	Weighing device for elevator;

Chapter 3: Wiring

This chapter describs the terminals and wiring specifications for main circuit, control circuit and PG card of the integrated controller.

3.1. Elevator Integrated Controller Therminal Wiring Diagram



3.2.4 Specifications for main circuit wiring

Chart 3.2 Wire size and clamping torque for main circuit wiring

Controller Model	Terminal Symbol	Screws	Clamping Torque N‰m	Wire size (min)mm^2	Wire size (Rec)mm^2	Wire type

3.2.5 Main circuit wiring

3.2.5.1 Wiring main circuit input

When wiring the main circuit, please pay attention to the following maters.

1. Molded-case Circuit Breaker (MCCB)Installing

Connect the power input terminals(R,S,T)and power supply via a molded-case circuit breaker(MCCB) suitable for the controller. The capacity of MCCB should be about 1.8 to 2 times of the controller s rated current. For MCCB s timing characteristics, be sure to consider the controller s overload protection (60s at 150% of the rated output current, 10s at 180% of the rated output current).

2. Residual Current Circuit-breaker Instal

2. Do not share the GND with other devices such as welding machines or power tools.
3. GND wire should be as short as possible and should be as thick as possible.
4. Connect to earth at one point.

3.2.5.4 CONNECT BRAKE RESISTOR

1. There is an internal brake unit in the controller, but must equip an external resistor to absorb the feedback energy during brake. Refer to chart 2.6for the configurations of the brake resistance.
2. Connect brake resistor to terminal B1, B2.
3. It is recommended to apply heatproof wire with appropriate specification and minimum length to connect brake resistor.
4. The installation of the braking resistor should consid-0.0288 Tc (i) Tj-0.04896 Tj0.045196 Ta88 Tc (iTj0.09312 Tc (c) Tj-0c

3.3. Wiring Control Circuit Terminals

3.3.1 Control Circuit Terminal Arrangement

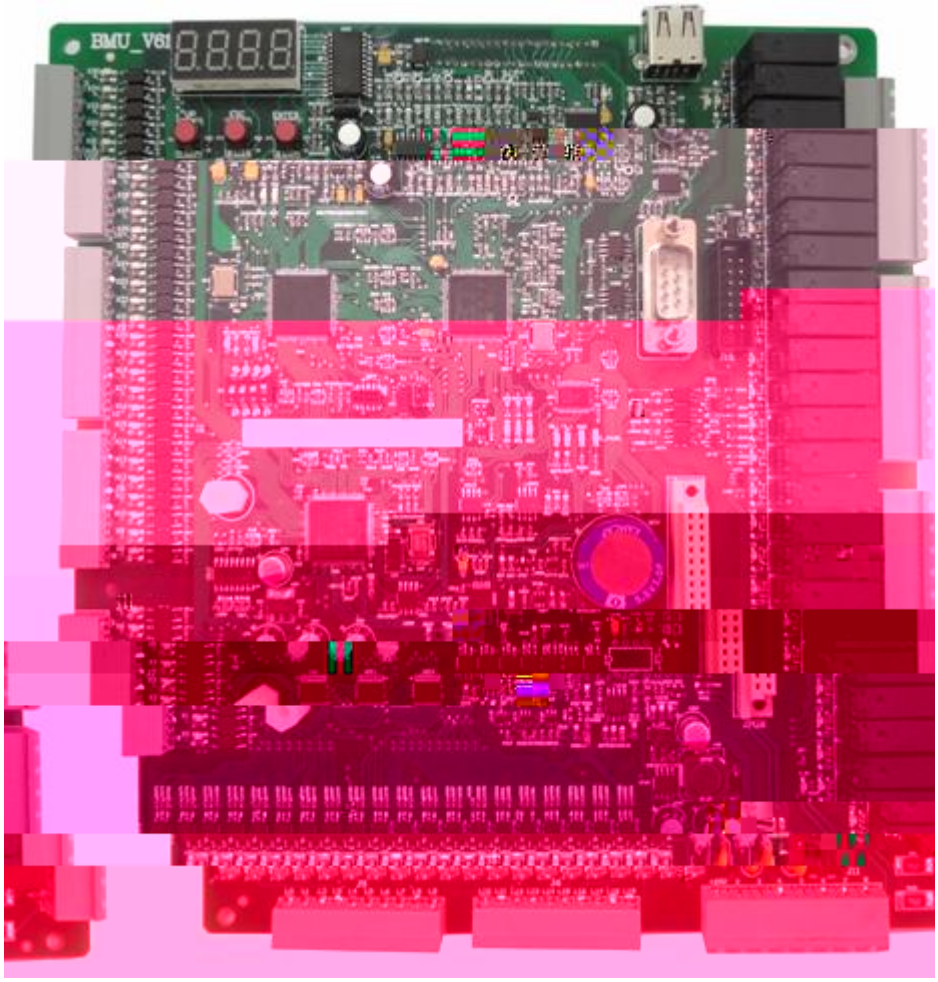


FIGURE 3.4 TERMINAL ARRANGEMENTS FOR CONTROL CIRCUIT

Control circuit includes integr

3.3.2 Terminal Connection for Control Circuit (Figure 3.1)

3.3.3 Control Circuit Port definition and Function

Chart 3.3 Control Circuit Port definition and function list

Interface Tech Spec

Chart 3.3 Control Circuit Port definition and function list (Cont#d)

No.	Symbol			Usage	Ir ech Spec Interface Type	

Chart 3.3 Control Circuit Port definition and function list (Cont#d)

Port No.	Terminal Symbol	Location	Definition	Usage	Interface Tech Spec			
					Interface	Rated	On/off	Max
	+24V1	J11-1	Input common terminal					
	24V_GND	J11-2,J11-3	Input power ground	Power	Power	DC24V10A		
	+24V	J11-4	Input power					
	AG0 IN	J11-5	Analog input	Input	Analog	-10V~+10V		

Note: 1. Definition of DIP switches: Normally, please set all 4 DIP switches to OFF status.

In addition to the terminals above, there are some debugging interfaces on the main control board.

Chart 3.4 Debugging interfaces definition and function list

3.3.4 Wire size for Control Circuit Terminals

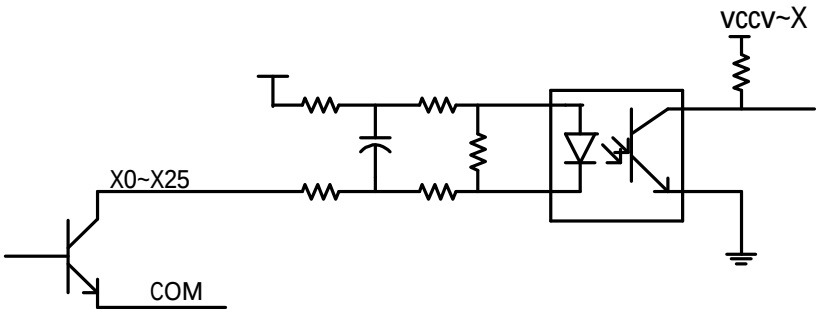
600V plastic insulated wire should be used. Choose appropriate wire model based on terminal function and Refer to Chart 3.5.

Chart 3.5 Wire size for Control circuit terminals

3.3.5 Control Circuit I/O interface and wiring

3.3.5.1 Digital value Input Interface

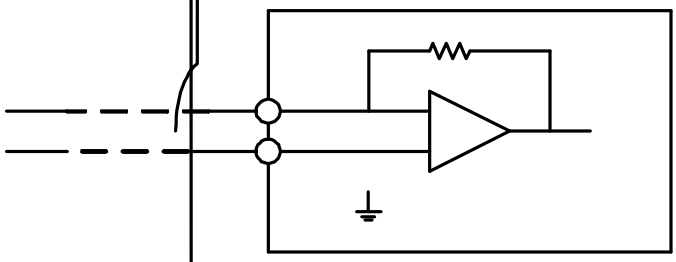
The common terminal of board for digital value input interface is +24V so it should be contactor input or common emitter input (0V common terminal) as shown in Figure 3.5 and Figure 3.6.


VCCV~X
X0~X25
COM

electromagnetic interference caused during elevator running. The function and connection of the CAN communication interface is shown in the Figure 3.7.

3.3.5.3 ANALOG INPUT INTERFACE

The voltage range of analog input interface is -10~+10V for selecting the load information provided by weighing device. As analog signal is easy to get interference, the wire of analog input terminal should be TWISTED-PAIR SHIELD CABLE. Its input and connection is shown in Figure 3.8. AG0_INGND_IN FIGURE 3.8 ANALOG INPUT & CONNECTION 3.3.52 AC 100V INPU



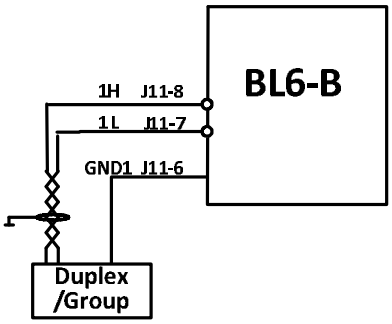


FIGURE 3.10 DUPLEX/GROUP CONTROL CONNECTIONS

3.4. PG Card Installation & Wiring

3.4.1 PG_V6 Interface Card

3.4.1.1 PG_V6 Interface card diagram

PG_V6 interface card is sync/async machine universal pulse encoder speed feedback and frequency dividing output card.
PG_V6 is in supporting use of 5V line driver output type encoder. Encoder for async machine: A/B, and encoder for sync machine: A/B/Z/U/V/W. Refer to Figure 3.11 below for detail.



Installation procedures: first match the connector of the PG_V6 card (welding parts) towards the JPGR connector of the main control board. Match the other two installation hole toward the corresponded two nylon tube (pre-installed). Then keep the PG_V6 card horizontal and fix the nylon screws to location holes by screwdriver.

Removing procedures: first cut off the controller power supply, ensure that the charge indicator LED in the controller is out. Then remove the digital operator and front cover, remove the terminal connection of PG_V6 card. Removed wire should be treated carefully, not contact with other charged objects. Then remove the nylon screws by screw driver, then remove the PG card.

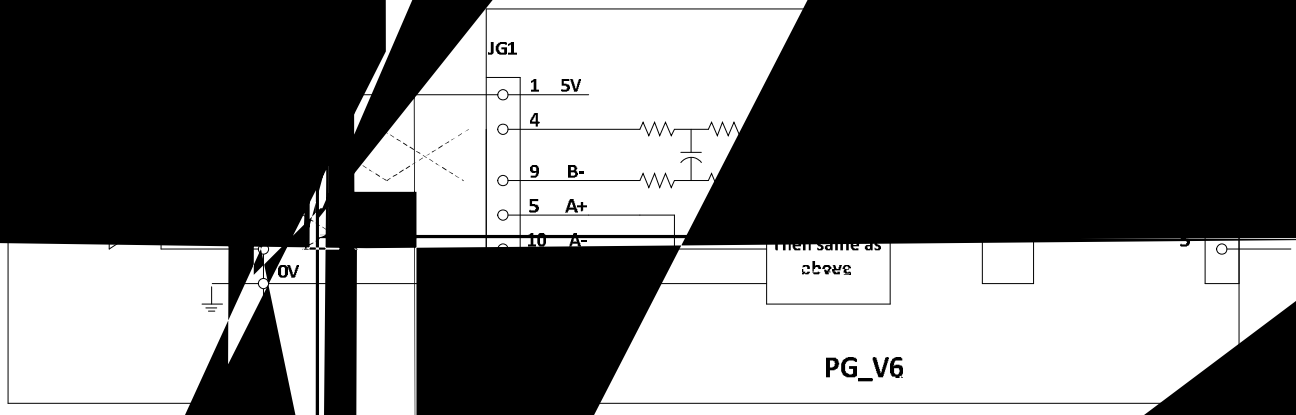
Pay attention to following points for installing and removing.

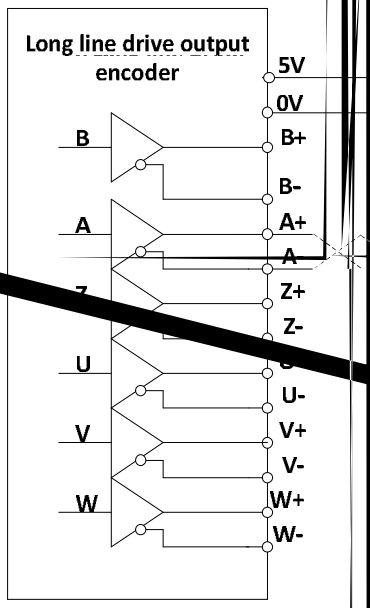
1. Don t touch the chip with bare hand directly to avoid the static charge damage the chip.
2. Choose suitable tool, such as screwdriver, needle point pliers and else.
3. Never damage the components of the card.
4. Never damage the components of the main control board.
5. While recovering the connection, please connect as per wire number and the requirements; make sure that the connections are correct.

3.4.1.3 PG_V6 Terminal Definition & Function List

Chart 3.6 PG_V6 Card Terminal Definition & Function

[redacted]




Long line drive output encoder
5V
0V
B
B+
B-
A
A+
A-
Z+
Z-
U
U-
V
V+
V-
W
W+
W-

3.4.2.3 PG_V6X Terminal Definition & Function List

Chart 3.7 PG_V6X Card Terminals Definition & Function

Terminal Name	Terminal Mark	Location	Definition	Usage	Interface Technical Specification			
					Interface Type	Rated Capacity	On/Off Time	Max Speed
	0V	JEN-1	Power supply Ground	Power supply Ground	Power supply Ground	--		
	IA	JEN-2	OC/Push-pull type input A	synchronization frequency division	Differential output	+10mA/12V-15V		500KHz
	IB	JEN-3	OC/Push-pull type input B	synchronization frequency division	Differential output	+10mA/12V-15V		500KHz
	+12V	JEN-4	OC/push-pull power supply	12V Power supply	Power supply output	+150mA/12V 5%		
	+12V	JEN-5	OC/push-pull power supply	12V Power supply	Power supply output	+150mA/12V 5%		
	A+	JEN-6	Frequency signal OC output A	synchronization frequency division	OC/push-pull output	50mA		500KHz
	B+	JEN-7	Frequency signal OC output B	synchronization frequency division	OC/push-pull output	50mA		500KHz
	0V	JEN-8	Power supply Ground	Power supply Ground	Power supply Ground	--		
	PE	JEN-9	Shield Ground	Shield Ground		--		

The parameters above are for PG_V6X interface card work in the environment temperature of 0 C-70 C, if the temperature exceeds the range, PG interface card may not work normally or even damage.

3.4.2.4 PG_V6Xcard connection with 12V push-pull /OC drive output encoder (for Asynchronous Machine)

The connection of PG_V6X card and 12V push-pull/OC output encoder (for asynchronous machine) is shown in Figure 3.15.

Connect the 12V/B/A/0V of encoder to the +12V/IB/IA/0V of the terminal JEN (the related pin of 4/3/2/1 of JEN).

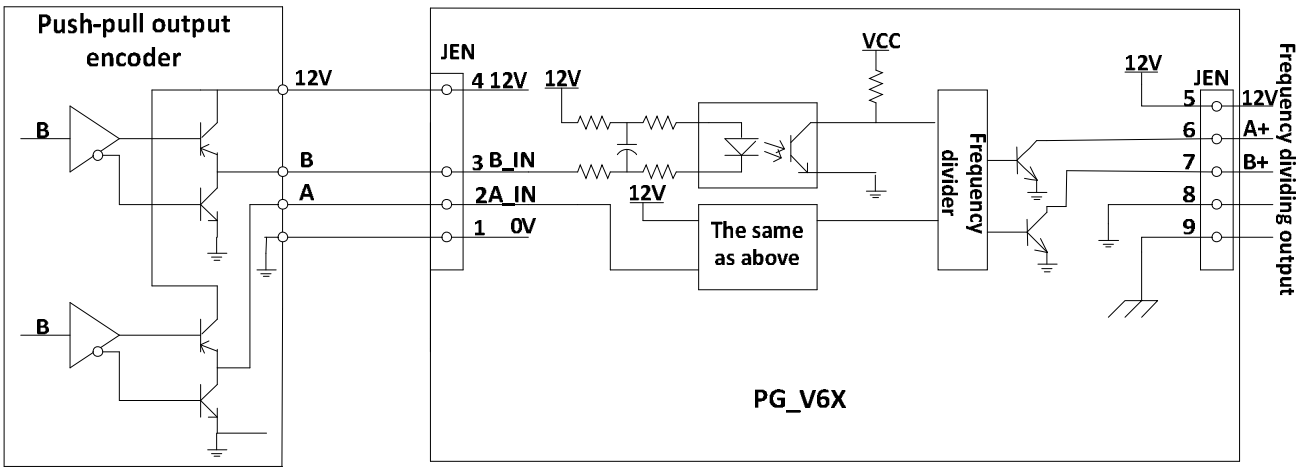


FIGURE 3.15 PG_V6X CONNECT WITH 12V PUSH-PULL/OC DRIVE OUTPUT ENCODER

3.4.2.5 Precautions for using PG_V6 card

For the push-pull/OC output encoder interface of the PG_V6X card, the input pulse signal frequency is required to be no more than 500 KHz, the parameter of the input and output signal current and voltage cannot exceed the range given in the chart 3.7 above.

If the parameter of the input and output signal current and voltage exceed the given range, the PG interface card may not work normally, even PG card and encoder get damaged.

Manufacturer suggests that if the external circuit working condition is not well, please do not power other circuits except the encoder by using the PG_V6X interface card +5V power supply to avoid PG card being interfered or damaged.

Please note that user will take responsibility for the consequence caused by the reasons above.

3.4.3 SPG_V6 Interface Card

3.4.3.1 SPG_V6 interface eard

3.4.3.2 SPG_V6 Interface Card Terminal Definition and Function List

Chart 3.8 SPG_V6 Terminal Definition & Function (D-input/output refers to Differential input/output)

Terminal Name	Terminal Mark	Location	Definition	Usage	Interface Technical Specification			
					Interface Type	Rated Capacity	On/Off Time	Max Speed
JENDAT	+12V	JEN -1	OC / push-push Power Supply	12V power supply	Power output	+150mA/12V 5%		
	A+	JEN -2	Frequency signal OC output A+	Sync-frequency division	OC/ push-pull output	50mA		500KHZ
	B+	JEN -3	Frequency signal OC output B+	Sync-frequency division	OC/ push-pull output	50mA		500KHZ
	0V	JEN -4	Power supply ground	Power ground	Power ground	--		
	PE	JEN -5	Shield groundhield ground	Shield ground	NDD-output	-5 --		

(TjETQ q 248 0 TD ( ) Tj35.52 0 TD ( ) TjETm.72 15.6 re f247.44 542.2 100 q 248fr (e) Tj-0.0288 Tc (ld) Tj0.72 15qu (e) Tj-0.0288 Tc (ld) Tj0.72 15n (e) Tj93.0288 Tc

3.4.3.3 SPG_V6 Interface Card Circuit

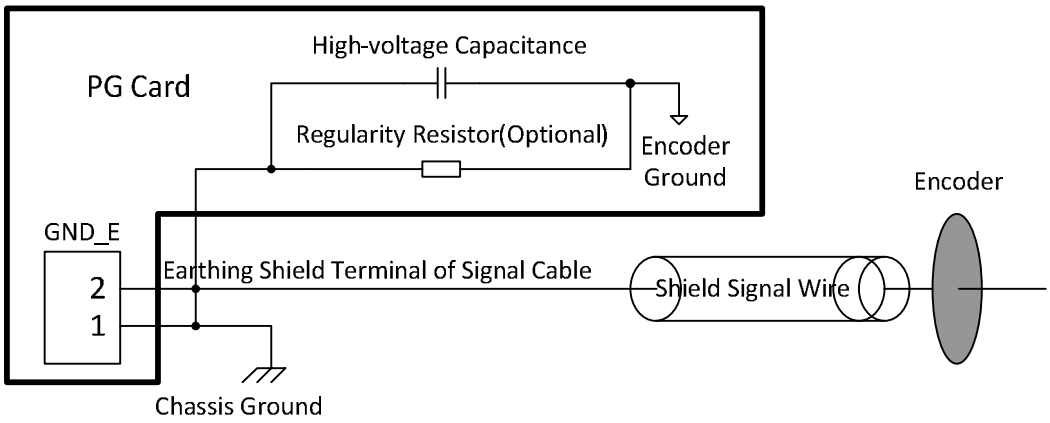


FIGURE 3.17 SPG_V6 CARD

The resistor for ground terminal GND_E is not essential component. There might be different requirement between different versions.

3.4.3.4 Precautions for using SPG_V6

1. Sine/cosine PG card can provide power output of 5V 2.5%/500mA for encoder. If the current required exceeds the PG card rated value, it may damage the PG card or encoder.

2. The cut-off frequency of the analog input signal is requested to be lower than 40KHz. This is decided by filter circuit. If the input signal bandwidth exceeds this range, PG card cannot guarantee to analyze the signal correctly and the driver may not work properly.

3. If use the frequency output function that PG card provided, make sure that the current in frequency dividing interface is within rated level to avoid any unwanted circuit protection mechanism. Also, the maximum frequency dividing output rate is 250KB/S; beyond such limit of the speed rate may cause frequency dividing signal not output properly.

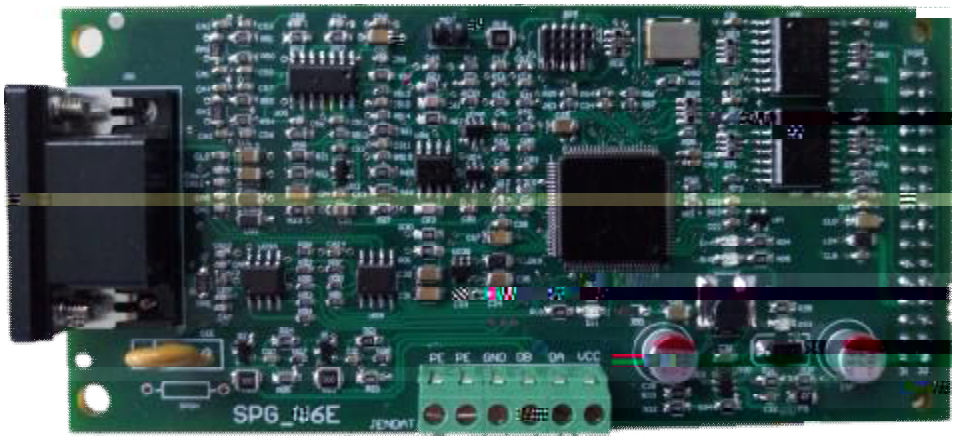
4. The two ground terminal of GND_E is connected inside. At site, one terminal is required to connect to the system GND wires, and the GND resistance should be minimized with independent ground connection point. The other terminal is connected to the shielding layer of the signal cable for the sine/cosine encoder. For the shielding layer of the signal cable, it is suggested that two terminals are grounded at both sides or at the end terminal of GND_E side. As the output signal of the sine/cosine encoder sigsitput sblgdeosinspuco e T-0.04512 Tc (osi) -0.04896

3.4.4 SPG_V6E Interface Card

3.4.4.1 SPG_V6 interface card diagram

SPG_V6E interface card is sync/async machine universal sine cosine encoder speed feedback andfrequency dividing output card.SPG_V6 is in supporting use of 5V line driver output type sine cosineencoder.Encoder for async machine:A/B, and encoder for sync machine:A/B/R/C/D. (Suitble for ECN1313)

Refer to Figure 3.18 below for detail.



50 56

111

117

FIGURE 3.16 SPG_V6E CARD

3.4.4.2 SPG_V6E Interface Card Terminal Definition and Function List

Chart 3.9 SPG_V6E Terminal Definition & Function (D-input/output refers to Differential input/output)

Terminal Name	Terminal Mark	Location	Definition	Usage	Interface Technical Specification			
					Interface Type	Rated Capacity	On/Off Time	Max Speed
	+12V	JEN -1	OC / push-push Power Supply	12V power supply	Power output	+150mA/12V 5%		
	A+	JEN -2	Frequency signal OC output A	Sync-frequency division	OC/ push-pull output	50mA		500KHZ

Chart 3.9 SPG_V6E Terminal Definition & Function (D-input/output refers to Differential input/output)(Cont#d)

3.4.4.3 SPG_V6E Interface Card Circuit

SPG_V6E interface card circuit is same with 3.4.3.3.

3.4.4.4 Precautions for using SPG_V6E

Precaution for SPG_V6E is same with 3.4.3.4.

3.5. Precautions with Wiring

1. Before connection, please pay attention to the precautions mentioned in chapter 1.2, especially the warning and caution part.

2. Before connection make sure that the power supply is off, and the charge indicator LED is out.

3. Please ask professional engineers with training and authorization for the wiring.

4. The wire size and clamping torque should follow the regulation of Chart 3.2 and chart 3.4

5. To increase wiring convenience and reliability it is better to use round crimp type terminal (for main circuit) and club-shaped terminal (for control circuit).

6. Wire the control circuit/main circuit/power supply separately.

7. CAN communication cable encoder cable encoder frequencyre e n cncneTj-0.03744 Tc (m) Tj0lo02112 Tc (e) Tjgc (c) Tj-

8. Please ground the cable shield wire correctly, and maximize the contact area.

9. Make sure the signal cable for PG/encoder is less than 30m in length, and as short as possible.

10. Make sure the cable between controller and machine is less than100m, and as short as possible.

11. Make sure the brake resistor is connected between B1 and B2.

12. Make sure the connection of ground terminal PE is secure, do not share the ground cable with other devices such as welding machines or power tools. Minimize length and dimensnsner 100m100F-0.024 A624 T0 Tc ( ) Tj0.09312 Tc (c) 5 (r) Tj--

4.1.2 Operator Keys

Chart 4.2 Operator Keys names and functions

Keys	Name	Function Description
	[RUN] Key	Run the controller in keypad control mode; button is disabled in program control mode. Enable/disable is set through parameters.
	[STOP] Key	Stop the controller in keypad control mode; button is disabled in program control mode. Enable/disable is set through parameters.
	[MENU] Key	Return to main menu on any screen.
	[SHIFT] key	Enable the 2nd function of other keys.
	[RESET] Key	Enter the digit setting option for certain parameters.
	[UP] Key	Scroll up menu options or edit figures in certain setting page.
	[DOWN] Key	Scroll down menu options or edit figures in certain setting page.
	[LEFT] Key	For parameter setting, choose the left digit for editing.
	[RIGHT] Key	For parameter setting, choose the right digit for editing.
	[ENTER] Key	Enter the next level sub-menu on main screen; Input set value on parameter setting; Give command; Check fault/warning information.
	[ESC] Key	Return the previous level menu.

4.1.3 LCD Display

Controller enters the main interface after power on. The main interface is shown in Figure 4.2.

The main interface displays the main information of the elevator in present status, including floor number, elevator speed, running direction, door lock status, running model, fault code and else. On the main interface, the above information is live updated.

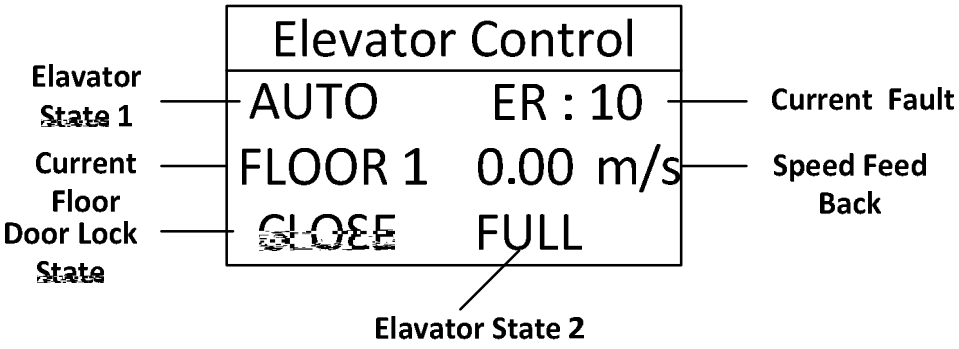


FIGURE 4.2 MAIN INTERFACE ON DIGITAL OPERATOR

The instructions for the information shown in the Digital operator LCD display interface are as following:

1. The status of the elevator display1

INSP	ARD	MANU	AUTO
FIRE	STOP	USER	

2. Present floor display:

Display the floor number that the elevator is at.

3. Door lock status:

CLOSE/OPEN: Door inter-lock circuit closed/opened.

4. The status of the elevator display 2:

FULL:	Full load
OVER:	Overload
GROUP:	Group control
TWINS:	Duplex control

5. Present error:

ERR XX Display the present Error code.

4.1.4 Function of Operator

The function of digital operator is as follows:

1. LCD display with English and Chinese

2. Setting log in level and corresponded password.
3. Adjusting the settings of quick menu
4. Monitor the status of the elevator and the controller.
5. Parameter check, setting and save.
6. Hoistway learning
7. Motor parameter learning
8. Weighing data learning
9. System clock setting
10. Error history log record and check.
11. Parameter copy, upload and download.
12. Restore to factory setting.

4.1.5 Installation and Connection of Digital Operation

The connection for the digital operator of the opening controller is as follows: remove the front cover of the controller, connect one side of the special communication cable to digital operator, and connect the other side to the J232_T connection on the main board. Make sure the connection is securely; install the front cover of the controller.



1. The installation, dismantle, insert and remove of the digital operator can be carried out when the controller is power-on. That is to say, hot plug is accepted by the digital controller.

2. Please install, dismantle, insert and remove the digital operator carefully to avoid unwanted damage of the digital operator.

3. Please save the removed digital operator and communication cable well, DO NOT press, damage the operator or put it in extreme environment.

4. Please DO NOT use the self-made (> 3m) communication cable.

4.2. Structure and Switch process of the Operator Interface

The structure and interface switch process of the digital operator, as shown in Figure 4.3.

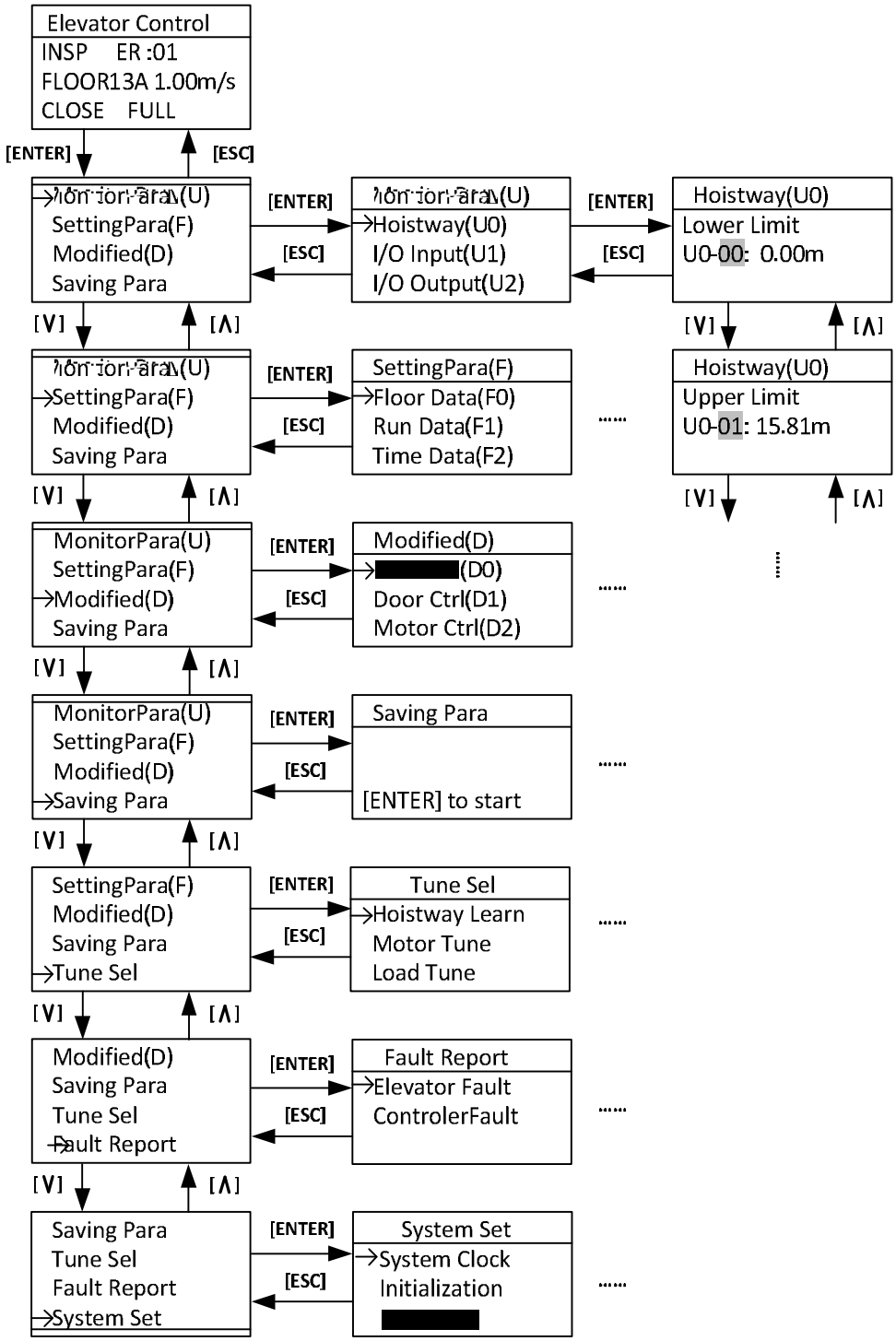


FIGURE 4.3 STRUCTURE FLOWCHART OF OPERATOR MENU

4.3. Parameter Setting

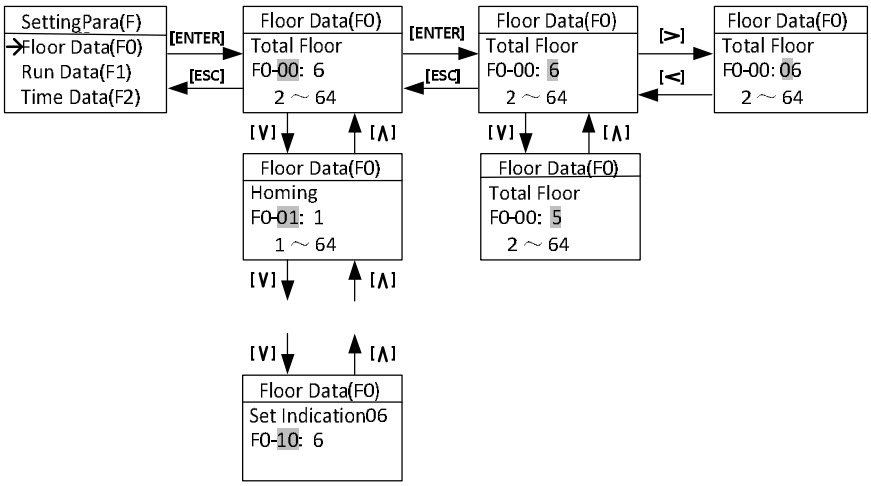
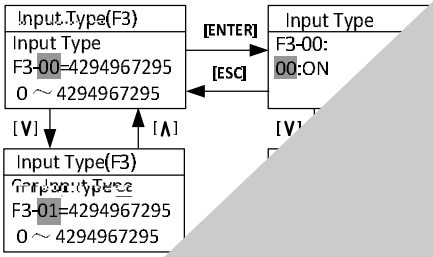


FIGURE 4.4 PARAMETER SETTING

In the interface of parameter menu: Press [ENTER] key to enter the interface. (First, it should input the correct user password in the environment setting menu, otherwise, pressing the [ENTER] key will enter the interface of user password setting. So please pay attention to distinguish the factory password and user password. If you want to input the factory password, please press the [ESC] key, returning to previous menu, then press the [DOWN] key to change the prompt to input the factory password , after that press the [ENTER] key, entering to the interface of the inputting factory password). Press the [UP] or [DOWN] key to check all the parameters. Please press the [ENTER] key to enter the interface of parameter menu. the pppp ea e c


Input Type(F3)
Input Type
F3-00=4294967295
0 ~ 4294967295
[ENTER]
[ESC]
Input Type
F3-00:
00:ON
[V]
[Λ]
Input Type(F3)
F3-01=4294967295
0 ~ 4294967295

Door open and close flowchart is shown in Figure 4.7. Io



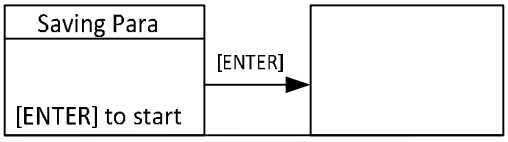
Duplex control communication

OK Duplex control system communication good

ET/ER Duplex control system communication abnormal (When choose this option)

4.5. Save Parameter

In the interface of saving parameter, press the [ENTER] to save all the parameters in the F menu. During saving process, LCD will display Waiting ; after saving, it will display Success or Failure . The flowchart of saving parameter is shown in the Figure 4.11.



4.7. Motor Auto-tuning

Motor Auto-tuning includes two parts: Motor angle tuning and motor parameter tuning. In the interface of Motor Tune: Press [UP] or [DOWN] key to move the arrow to select related tuning information; Press [ENTER] key to enter the pointed tuning interface.

In the interface of Motor Angle Tuning and Motor Parameter Tuning, press [ENTER] to start turning. During tuning, the operator display waiting ; after tuning, it will display success . During tuning, if there is error, the tuning process will be terminated, and LCD will display Tune End , and the status is error , with error code followed.

IMPORTANT Before auto-tuning process, make sure to set the parameters in the F5 & F8 menu first.

Make sure motor has no load, first carry out motor parameter tuning, then carry out the motor angle tuning. Press [ESC] key to return to the previous menu. The flowchart of the motor learning is shown in Figure 4.13.

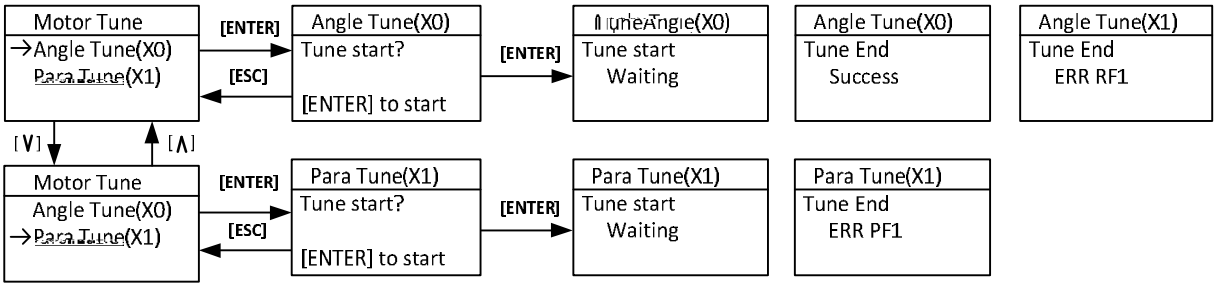


FIGURE 4.13 MOTOR AUTO-TUNING PROCESS

4.8. Motor Load Tuning

Motor Load Tuning also includes two parts: Light loaded tuning and Full-loaded tuning.

In the interface of load tuning: Press [UP] or [DOWN] move the arrow to select related tuning information; press [ENTER] key to enter the pointed tuning interface.

In light-loaded tuning or full-loaded tuning interface: Press [ENTER] to start tuning process, the operator display the present status. Press [ESC] key to return to the Previous Menu.

The load tuning process is shown in Figure 4.14.

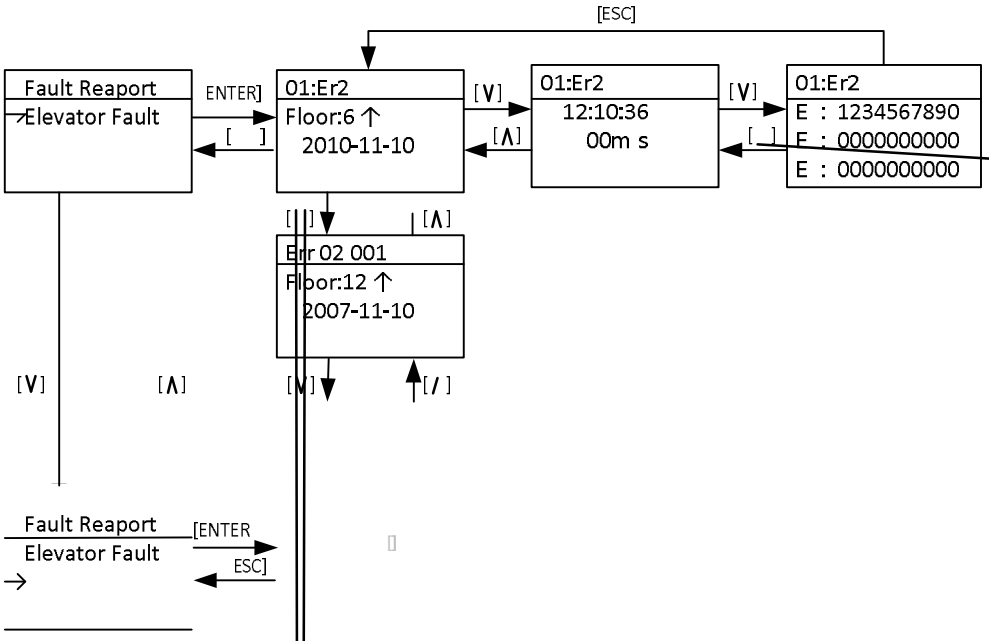


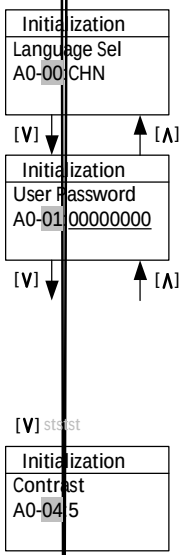
FIGURE 4.16 FAULT RECORD

Press [ESC] key to return to the Previous Menu.

4.11. Environment Initialization

In environment initialization interface, the display language, the parameter visit grade, input password and the shortcut menu of the operator can be set.

The flowchart for environment initialization is shown in the Figure 4.17.

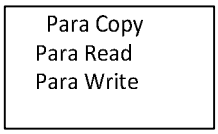


4.12. Parameter Copy

The function parameter copy is to simplify the parameter setting and commissioning process, especially for multiple elevators with same configurations. After finishing the parameter setting and commissioning of one elevator, this function can copy all the parameters (Saved in the digital operator memory), take the digital operator and connect to other elevators, copy all the parameters to the controller, check parameters, and the elevator can run normally.

In the interface of parameter copy: Press [UP] or [DOWN] key to move the arrow to carry on the necessary operation, press the [ENTER] key to start operation.

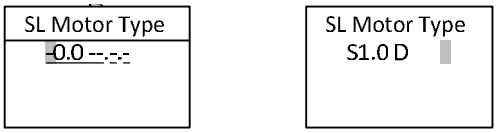
The flowchart of parameter copy is shown in Figure 4.21.



4.14. Blue-Light Traction machine Parameter Input

When using Blue-Light Integrated Controller, if the traction machine is also made by Blue-Light, you only need to input the machine model number and encoder information on the machine name plate to finish the parameter setting of the machine.

The interface of the Blue-Light machine input is showing in Figure 4.24(a). The input content has three parts, separated by . . The first part is the model number(separated in 4 digits), the middle part is encoder resolution information, the last part is the PG model. The detail information is showing in Figure 4.24(b). n



(a) (b)

Chapter 5: Parameters

5.1. Parameters Function Classifications

According different function, parameters are divided into groups as shown in chart 5.1.

Chart 5.1 Parameter Functions List

5.2. Parameters Hierarchical Structure

The hierarchy structure of parameters as shown in Figur

5.3. Monitoring Parameters

5.3.1 Hoistway Location (U0)

Hoistway location parameters refer to the hoistway switches (top/bottom terminal/limit switches)position data on each floor recorded in the controller after hoistway learning process, and the unit is m (meter). If need to calculate the distance between two floors, simply minus the calibration data on these two floors.

After hoistway learning, please check the floor calibration, if the calibration value is higher than expected, it is possible that elevator s rated speed setup is higher than the actual value or elevator encoder pulse setup is smaller than the actual pulse. If the calibration value is too low, it is possible that elevator rated speed setup is lower than the actual value or its encoder pulse setup is larger than the actual pulse.

Hoistway location parameter s number, description and content are shown in chart 5.2

Chart 5.2 U0 Monitoring Parameter List

Para No.	Display	Content	Range	Unit	Ref Page
U0-00	Lower Limit	The location of bottom limit in hoistway. Data will be recorded after finishing hoistway learning	--	m	--
U0-01	Upper Limit	The location of top limit in hoistway. Data will be recorded after finishing hoistway learning	--	m	--
U0-02	Lower Slowdown 1	Location of bottom terminal switch 1in hoistway. Data will be recorded after finishing hoistway learning	--	m	--
U0-03	Lower Slowdown 2	Location of bottom terminal switch 2in hoistway. Data will be recorded after finishing hoistway learning	--	m	--
U0-04	Upper Slowdown 1	Location of top terminal switch 1in hoistway. Data will be recorded after finishing hoistway learning	--	m	--
U0-05	Upper Slowdown 2	Location of top terminal switch 2in hoistway. Data will be recorded after finishing hoistway learning	--	m	-- a54Tc (m f61.0 Tc

5.3.2 Monitoring Parameter for I/O Status, Cabin Signal & Interference Appraisal (U1-U5)

Chart 5.3 U1~U5 Monitoring Parameter List

Para No.	Dia

0 0 27168 Tc

5.3.3

N states the parameter cannot be changed in the process of running. Y states the parameter can be changed in the process of running. It has same meaning in the following Chart.

5.4.2 Parameters for Running Setup (F1)

Chart 5.7 Running Setup Parameters List

Para No.	Display	Content	Range	Factory Setting	Unit	Live	Ref Page

Chart 5.7 Running Setup Parameters List (Cont#d)

Para No.	Display	Content	Range	Factory Setting	Unit	Live Change	Ref P 732.48 T517.68

Chart 5.7 Running Setup Parameters List (Cont#d)

Para No.	Display	Content	Range	Factory Setting	Unit	Live Change	Ref Page
F1-21	Drive Mode	Selection of driving mode ,when setting 1 , attendant/VIP mode close door manually; when setting 3 , elevator automatically do test run ,other value is invalid.	0~9	0	--	N	--
F1-22	Two Door Mode	Setup rear door mode, based on customer requirements, set from mode 0 to 5 .	0~5	0	--	N	86/87
F1-23	Fire Mode	Three Fire modes: 1.Mode 0 : Elevator run fire-mode after returning to fire floor; 2.Mode 1 : Elevator stop running after returning to fire floor; 3. Mode 2 : After elevator return to fire floor, depend on fire switch to run/stop in fire mode.	0~2	0	--	N	85
F1-24	Parallel No.	Set YES in duplex enable. Set elevator number 0-1 in duplex; 0-7 in group control.	0~7	0	--	N	89
F1-25	Twins Control	Elevator duplex control: 1: On 0:OFF	0/1	0	--	Y	89
F1-26	Group Control	Elevator group control: 1:ON 0:OFF	0/1	0	--	Y	90
F1-27	Far Monitor	Remote Monitoring System: 1 On 0 Off	0/1	0	--	Y	--
F1-28	Auto Parking	Auto parking: 1:ON 0:OFF	0/1	0	--	Y	84
F1-29	Load Enable	Load Weighing: 1:ON 0: OFF	0/1	0	--	Y	89
F1-30	Open Delay Able	Door open/close delay: 1:ON 0:OFF	0/1	0	--	Y	83
F1-31	Brake Feedback	Test brake feedback signal: 1: open 2: close	0/1	0	--	Y	79
F1-32	Rerun Password	Password to release elevator stop.	0~9999	0	--	N	--

5.4.3 Time Setup Parameters (F2)

Chart 5.8 Time Setup Parameters List

Para No.	Display	Content	Range	Factory Setting	Unit	Live Change	Ref Page
F2-00	Brake ON Time	Brake open first then run elevator speed curve. This is to improve the elevator start comfort and match control system with different machine brake on time.	0.00~9.99	0.50	s	Y	79
F2-01	Brake OFF Time	Brake close first then disable elevator run. This is to improve elevator stop comfort and avoid slip at elevator stop.	0.00~9.99	0.50	s	Y	79
F2-02	Insp Brake Time	The time delay in inspection mode before brake close.	0.00~9.99	0.05	s	Y	79
F2-04	Zero Time	The time delay when system detects elevator stop. Adjust this parameter to close brake after elevator reach 0 speed completely, increase elevator stop comfort.	0~9.99	0.30	s	Y	80
F2-05	Open Door Time	In Auto mode, elevator automatically open door when stopping at one floor, door will automatically close after set time.	0~999	3	s	Y	82
F2-06	Open Delay Time	Enable door open delay function, press open delay button, door open time will be delayed.	0~999	30	s	Y	82
F2-07	Homing Time	The waiting time before elevator return to homing floor without landing/car call, Set value to 0 to disable this function.	0~999	60	s	Y	84
F2-08	Door Run Time	1. Door open/close command run time; 2. Door open/close relay run time for door drive without open/close limit switch. 3. For door drive with open/close limit switch, this run time should be 1s longer than the door actual open/close time.	0~999	5	s	Y	83
F2-09	Beep Delay Time	After elevator change speed to target floor, landing signal is delayed by set time, arrival gong/voice synthesizers are also delayed by set time.	0.00~9.99	0.15	s	Y	--
F2-10	Enable Delay	Drive enable signal given/drop is delayed by set time after drive direction signal is given/drop. During this time, drive output current is decreased to reduce current noise.	0.00~9.99	0	s	Y	79

Chapter 5: Parameter set (cont'd)

Para No.	Display	Content	Range	Factory Setting	Unit	Live Change	Ref Page
F2-11	Lamp Off Time	In Auto mode, if have no car/landing call during set time, system will cut car light power from COP.	0~999	15	min	Y	--
F2-12	Over Time	To prevent wire rope slipping or elevator car stuck, time from elevator running to stop is limited to set value. If elevator is running longer than set value, system stops immediately and enter protection mode. Need to re-start the system in order to exit from such mode.	0~999	45	s	Y	--
F2-13	SmoothStart Time	The time to keep elevator start smooth.	0.00~ 9.99	0	s	Y	79
F2-14 F2-15	Start Time	System will automatically start the elevator (Electric lock: ON) at set time.	00:00 23:59	00:00	Hour: minute	Y	84
F2-16 F2-17	Stop Time	System will automatically stop the elevator (Electric lock: OFF) at set time. This function is disabled if same start/stop time.	00:00 23:59	00:00	Hour: minute	Y	84
F2-18 F2-19	Start Time1	System will run bypass the set floor start from this time.	00:00 23:59	00:00	Hour: minute	Y	
F2-20 F2-21	Stop Time1	System will run bypass the set floor start until this time.	00:00 23:59	00:00	Hour: minute	Y	

IMPORTANT

The elevator automatic switch: F2-14,F2-15 F2-16,F2-17 were set separately as per hours and minutes. Please follow the operator indication for this setting.

5.4.4 Input type setup Parameters (F3)

Chart 5.9 Input Type Setup Parameters List

Para No.	Display	Content	Range	Factory Setting	Live Change

5.4.5 Service Setup Parameters (F4)

Chart 5.10 Service Setup Parameters List

Para No.	Display	Content	Range	Factory Setting	Live Change	Ref Page
F4-00	Set Stop Floor1	Set elevator stop/bypass at floor corresponds to each bit. (1-32 floors)	0 ~ 4294967295	4294967295	Y	89
F4-01	Set Stop Floor2	Set elevator stop/bypass at floor corresponds to each bit. (33-64floors)	0 ~ 4294967295	4294967295	Y	89
F4-02	TIM Stop Floor1	Set elevator stop/bypass at floor corresponds to each bit at the set time. (1-32floors)	0 ~ 4294967295	0	Y	89
F4-03	TIM Stop Floor2	Set elevator stop/bypass at floor corresponds to each bit at the set time. (33-64 floor)	0~ 4294967295	0	Y	89
F4-04	Door Select A1	Set elevator front door enable /disable at floor corresponds to each bit (ON/OFF: Front door enable /disable at this floor)	0~ 4294967295	4294967295 (1~32)	Y	87
F4-05	Door Select B1	Set elevator rear door enable /disable at floor corresponds to each bit (ON/OFF: Rear door enable /disable at this floor)	0~ 4294967295	4294967295 (1~32)	Y	87
F4-06	Function Select	Set elevator functions enable /disable at floor corresponds to each bit. (ON: Enable, OFF: Disable)	0~ 4294967295	4	Y	91/ 92
F4-07	Function Select 2	Set elevator functions enable /disable at floor corresponds to each bit. (ON: Enable, OFF: Disable)	0 ~ 4294967295	0	Y	92/ 94

Note: See more detail of F4-06 and F4-07, please refer to Chart 6.4.

5.4.6 Motor Setup Parameters (F5-F6)

15.6 16.72 1.92 4.04 513.12 0.72 r

5.4.7 Multiple PI Setup Parameters (F7)

Chart 5.12 Multiple PI Setup Parameters List

Para No.	Display	Content	Range	Factory Setting	Unit	Live Change	Ref Page
F7-00	PIMulEnable	Multiple PI parameters 1: Enable; 0: Disable	0/1	0	--	N	96 97

5.4.8 Encoder Setup Parameters (F8)

Chart 5.13 Encoder Setup Parameters List

5.4.9 Control Setup Parameters (F9)

chart 5.14 Control Setup Parameters List

Para No.	Display	Content	Range	Fac

Chart 5.15 No-load Compensation Setup Parameters List (Cont#d)

5.4.11 Special Parameters (FC)

Special parameters (FC) are mapping a part of factory parameters (FX) in customer level; users can access this part information by user level password. In these parameters, FC-00~FC-06 can only be viewed but not edl60 Tc2-0.0288 Tc -0.024 Tc u

5.4.12 Environment Setup Parameters (A)

Chart 5.17 Environment Setup Parameters List

Para No.	Display	Content	Range	Factory Setting	Unit	Live Change	Ref Page
A0-00	Language Sel	Language selection	--	ENGLISH	--	Y	--
A0-01	User Password	Input/Setting user level password	000000~ 999999	000000	--	Y	--
A0-02	Factory Password	Input/setting factory level password	000000~ 999999	000000	--	Y	--
A0-04	Contrast	Setting the LCD contrast level	0~10	5	--	N	--

p

Chapter 6: Parameters Setup

6.1. Elevator Running Speed Setup

6.1.1 Elevator Rated Speed, Motor Rated Speed, Encoder pulses Setup

1. Elevator rated speed (F1-00) can be calculated through motor RPM, traction ratio, reduction ratio and traction sheave diameter.

   Elevator rated speed is used for calculating the ratio between motor rated speed and elevator speed, modifying this parameter cannot change the actual running speed of elevator; if need to change elevator running speed, please modify parameter F6-02 (Speed Zoom)

2. Motor rated speed (F1-01) is the speed of traction machine (RPM) under elevator rated speed.

3. Encoder Pulse (F1-02) is the pulse number of encoder for hoistway counting at elevator running.

4 .Motor rated speed and elevator rated speed much follow the condition below:

Motor RPMxtraction sheave diameterx3.14xspeed reduction ratio

If bottom/top terminal (X8/X7) is valid, elevator slow down to 1/2 inspection speed to prevent exceeding the limit.

When up/down jogging is cancelled, speed given will be instantly 0 without deceleration curves.

6.1.3 Rescue Speed

In both case the elevator will run in rescue speed (F1-05):

1. Due to fault or other reasons, elevator stops outside leveling zone, after elevator restores, it runs in rescue speed to the nearest floor and open door to release passengers;

2. When there is a hoistway counting error (ER14, Er18), elevator will run at rescue speed to the bottom floor for recalibration; After elevator reaches the bottom terminal, elevator will run at 1/2 of rescue speed to the bottom leveling position.

6.1.4 Least Speed

Least speed curve (F1-06) limits the lowest speed generated in the system. System will choose the elevator speed based on running distance, but the lowest speed is limited here. For certain site with very small floor distance, reduce this value could achieve normal running on this floor. Otherwise elevator can not park at small distance floor, it will stops at the next floor.

6.2. Normal Running Speed Curve

Elevator can generate several optimal running curves based on rated speed setting to suit for different speed/distance running. But note lowest running speed curve is limited by F1-06.

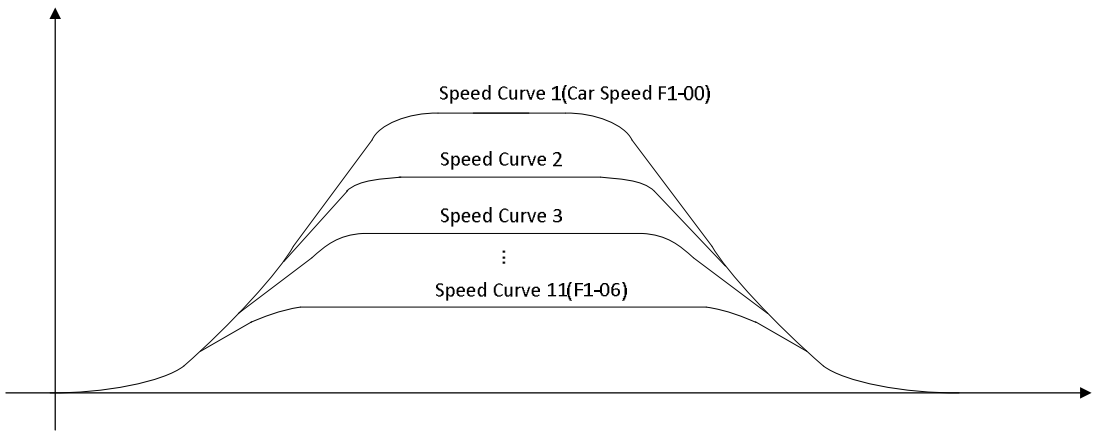


FIGURE 6.1 ELEVATOR RUNNING SPEED CURVE

Acceleration, deceleration for normal running curve and Acce/Decefor S curve are set by the following parameters:

1. F1-10 (Acceleration B1)
2. F1-11 (Deceleration B2)
3. F1-12 (S curve P1)
4. F1-13 (S curve P2)

5. F1-14 (S curve P3)
6. F1-15 (S curve P4)

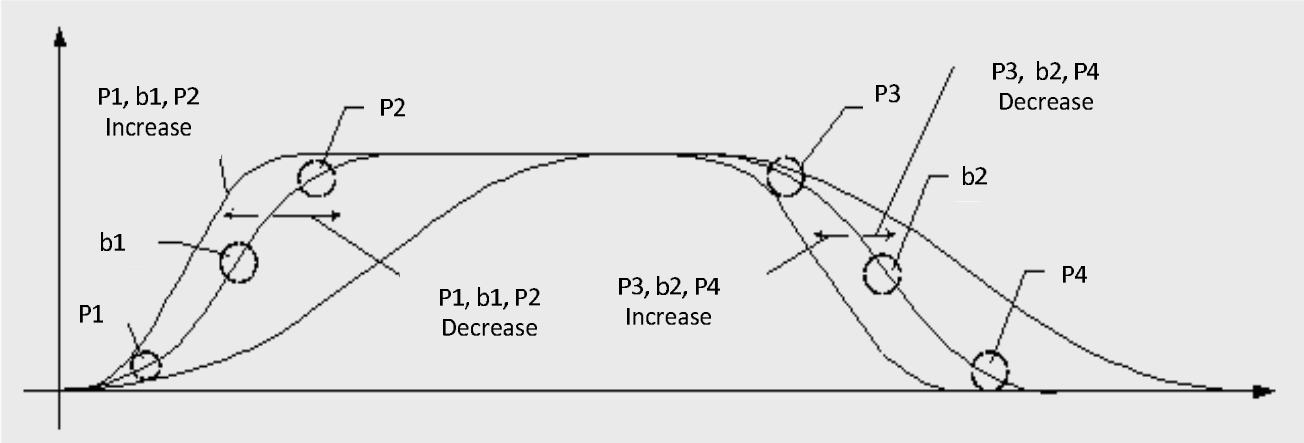


FIGURE 6.2 PARAMETERS ADJUSTMENTS FOR SPEED CURVE

- Elevator running comfort level can be set through the above 6 parameters. (Comfort level is also related to the drive control parameters.)The relationship between b1, b2, P1, P2, P3, P4 and running curve are shown in Figure 6.2.
- Increase parameters value, the corresponded curve will be steeper. While decreasing value will smooth the corresponded curve. Adjusting the above six parameters properly can reach good comfort level at elevator running, and meet the related standard.

6.3. Elevator Running Timing Diagram

6.3.1 Timing Diagram for Normal Running

The timing diagram for normal running is shown below in Figure 6.3.

If smooth start running speed (F1-04) is set to 0 , smooth start running function will be disabled; smooth start time (F2-13) will be disabled too.

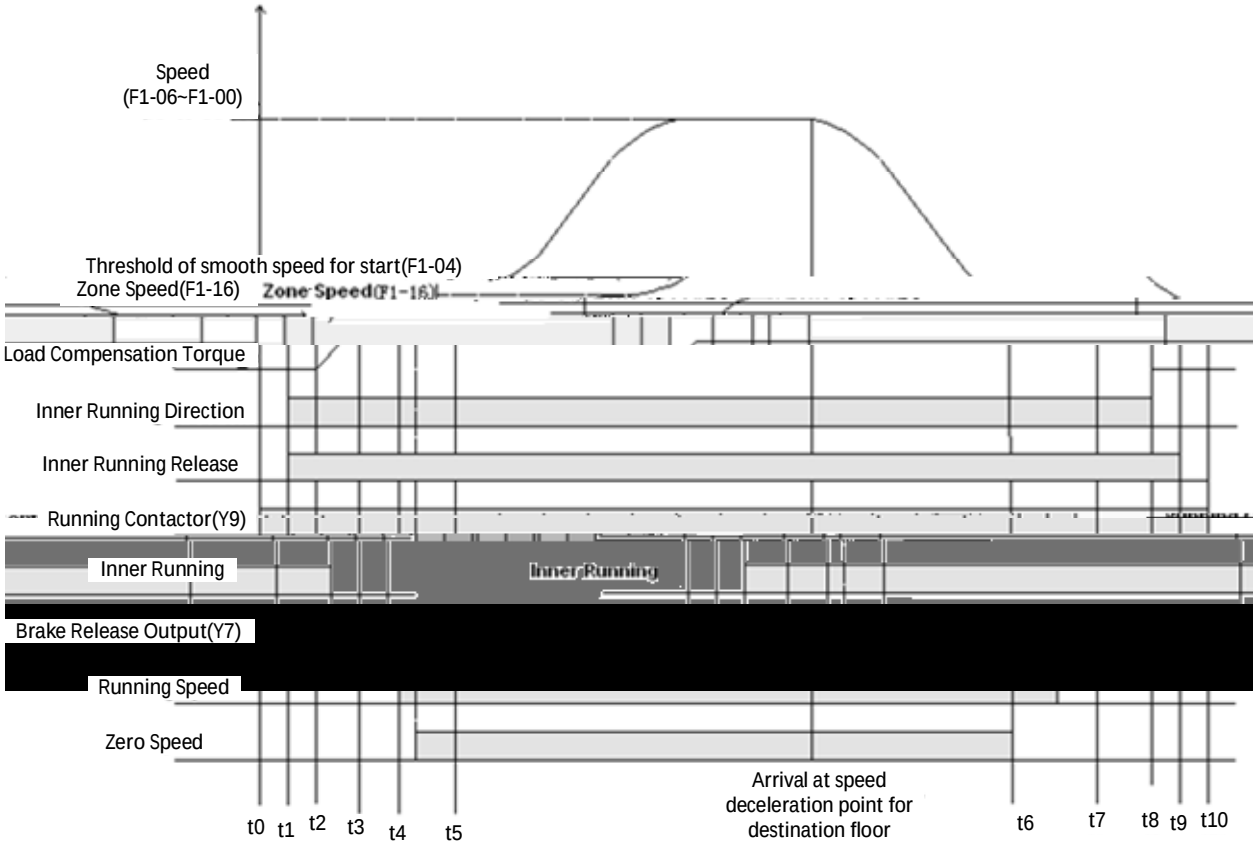


FIGURE 6.3 ELEVATOR TIMING DIAGRAM FOR NORMAL RUNNING

Detail explanation of timing diagram for elevator normal running is explained below in Chart 6.1

CHART 6.1 TIMING DEFINITION FOR ELEVATOR NORMAL RUNNING

Time	Definition and Setup Instruction
t0~t1	Control system will first output running contactor (Y9) command; check for feedback time, if valid then system will give running direction and enable driving control based on the given direction.
t1~t2	Driving module output torque.
t2~t3	Waiting time for internal running signal (F2-03): In this period, driving module complete motor excitation or finish load compensation torque output.
t3~t4	Brake advance release time (F2-00): System output brake release command (Y7), brake release and brake arm feedback valid (e.g.F1-31=1), waiting for brake advance release time (F2-00), and then running speed is given. Two functions for brake advance release time (F2-00): 1. Brake has enough time to release completely; this can avoid elevator startup with brake. 2. After brake release, traction sheave may rotate due to the load, with enough time traction sheave can be steady at zero speed then start in order to achieve comfort feeling at start. Based on the brake condition, set 0.8-1.5s for synchronous machine, and 0.3-0.5s for asynchronous machine. Bacc(s) Tj0.0624 Tc (2 re f105) 250.32 40.08 0.2 re

Chart 6.1 Timing definitin

Definitions and instructions for timing diagram above are shown below in Chart 6.2.

6.3.4 Timing Diagram for Recalibration Running

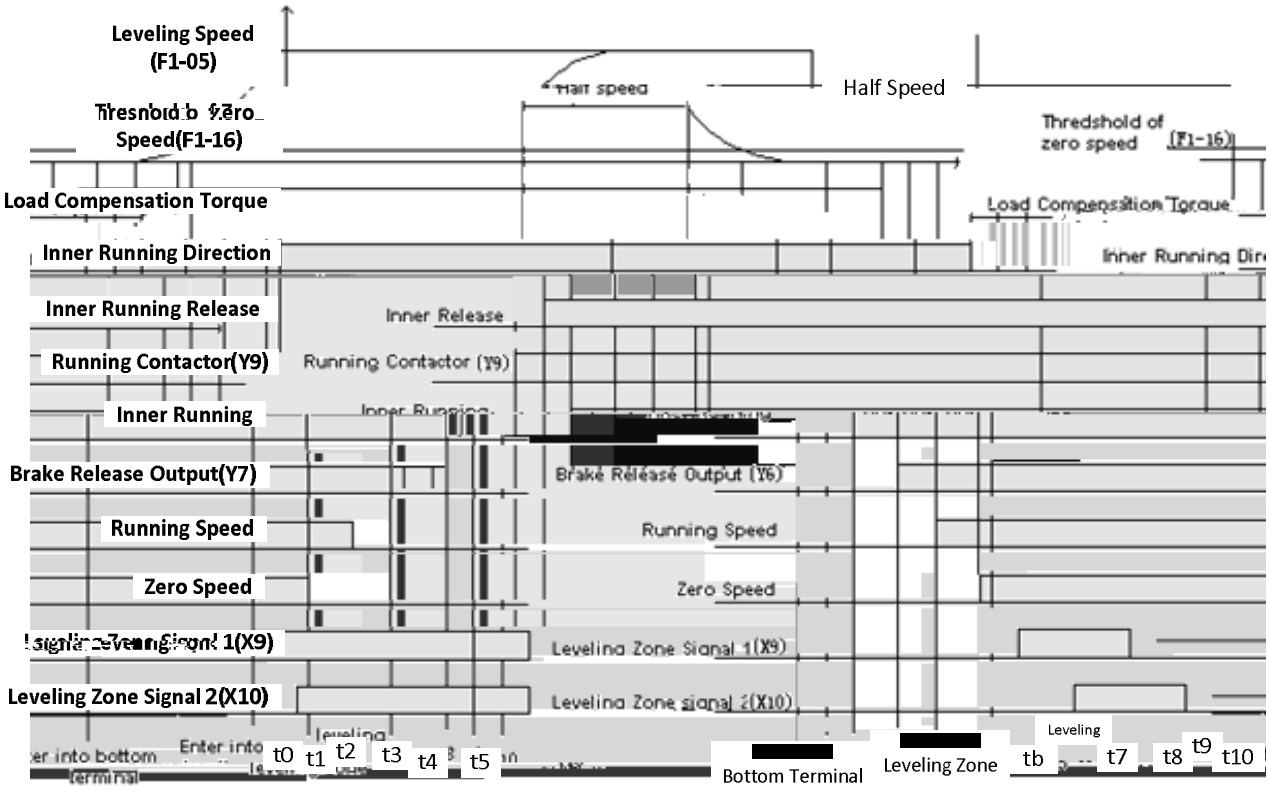
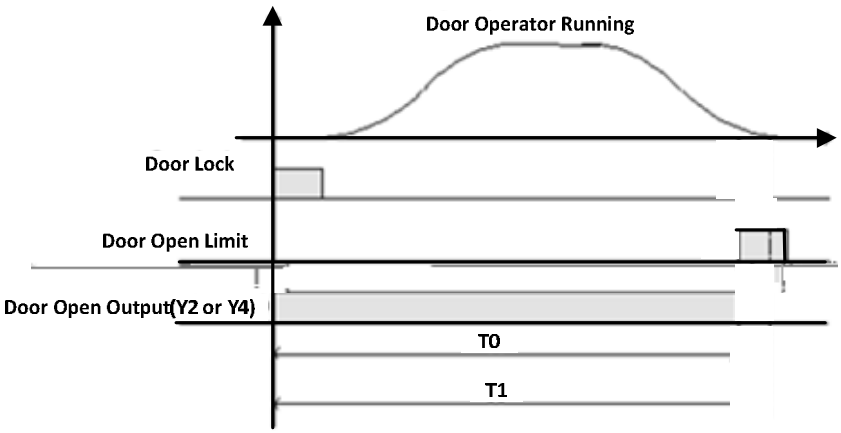


FIGURE 6.6 TIMING DIAGRAMS FOR RECALIBRATION RUNNING (SAME DEFINITION & SETTING WITH NORMAL RUNNING)

6.4. Door Control

6.4.1 Door Open/Close Control

For door control, door open and close time is the related parameter; door limit is the related signal. Timing diagram for door open and close can be seen below in Figure 6.7 and Figure 6.8.



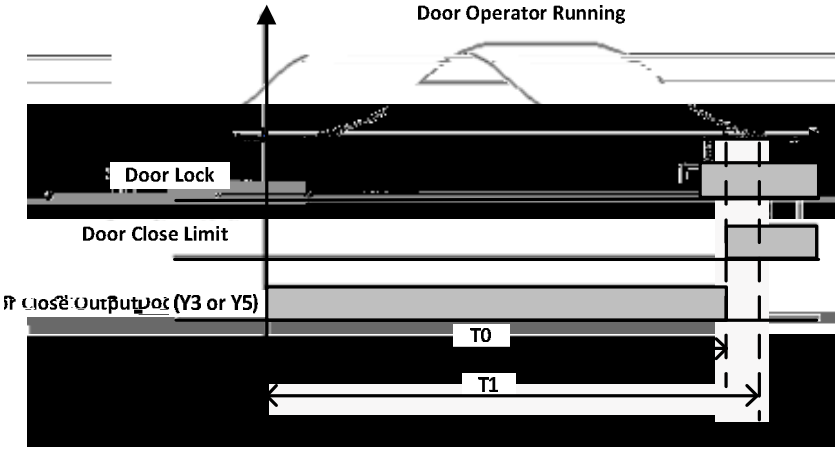


FIGURE 6.8 TIMING DIAGRAM FOR DOOR CLOSE

T0: The actual door-drive running time for door to open or close completely;

T1: Door open or close time (F2-08).

T1 should be 1s more than T0 to ensure the door normal open/close action, otherwise:

1. After system output door close signal, but door dose not close completely after T1 door close time (F2-08), elevator will open the door again, and door cannot be closed.
2. After system output door open signal, but door does not open completely after T1door open time (F2-08), elevator stops the door open action, and door cannot reach the self-lock position.

Door close limit should be fixed in the position where it is only valid after door is completely closed, otherwise:

1. Door cannot close in inspection modei--89344 Tc ( ) Tj0 -15.6 TD -0.07392 Tc (2) Tj-0.02112 Tc (.) Tj0.25344 Tc ( ) Tj0 Tc (D) Tj

5. When elevator enables disabled function, if there are disabled landing/car calls on current floor, waiting time will be door open delay time (F2-06).

6.4.3 Door Control in Attendant and Special use mode

In attendant/special use mode, door must be closed manually. If door driving mode (F1-21) is set to 1, door close will be jog mode, if set to 0, door will close completely after pushing door close button, no need to push the button continuously.

6.4.4 Door Control in Inspection, Fire mode

In inspection mode, door eo

6.8. Rear Door Control Setup

6.8.1 Different Mode Selection

On the same floor, both front/rear doors can be opened; there are different modes (0-n) available based on customer requirements.

Parameters setup for rear door mode is F1-22.

n=0: single door mode.
n=1: Rear door mode 1, only one door acts at every floor.
n=2: Rear door mode 2, two doors can open on some floors, but they cannot open at the same time, if one door needs to be opened, the other door must be closed first.(Two sets of COPs are needed for both front and rear door.)
n=3: Rear door mode 3, two doors can open at some floors, after landing on these floors, two doors open at the same time.(Only one set of COP is needed, HOP calling address is same for both doors.)
n=4: Rear door mode 4, two doors can open at some floors, after landing on these floors, two doors open at the same time.(Two sets of COPs are needed for both front and rear door.)
n=5: Rear door mode 5, two doors can act at some floors, when elevator runs to such floors, door will open as per requirement, for example: front/rear door will open on front/back car call and landing call. Both doors will open on both sides car/ carwcacnc a id ca
bac r

) (Cont#d)

Definition	Parameters	Default Input Level	Output Switch Default State	Indicator Default State
SMS jog up input(Attendant up)	F3-00-14	ON	OPEN	OFF
SMX jog down input(Attendant down)	F3-00-15	ON	OPEN	OFF
SSDZ top terminal input	F3-00-16	OFF	CLOSE	OFF
SXDZ bottom terminal input	F3-00-17	OFF	CLOSE	OFF
ARD input	F3-00-18	ON	OPEN	OFF
SKM door open signal input 1	F3-00-19	ON	OPEN	OFF
SGM door close signal input 1	F3-00-20	ON	OPEN	OFF
SKMW1 door open limit input 1	F3-00-21	OFF	CLOSE	OFF
SGMW1 door close limit input 1	F3-00-22	OFF	CLOSE	OFF

Based on this function (refer to the function selection Chart), non-stop on certain floor in set time function is available too. Between the non-stop beginning time (F2-14/15) and ending time (F2-16/17), if elevator cannot land on some floors, please set the non-stop floors by setting F4-02 and F4-03 OFF .

6.11. Weighing Device Setup

When using SJT-300 weighing device, load detection is available through communication with main control board on CAN BUS. See below for setup procedures:

1. Enable weighing device F1-29=1, F9-11=1;
2. Perform light load and full load self-learning procedures;
3. According to the compensation condition

6.13. Group Control Setup

Main control board and group control board are connected through CAN1 port. (See group control board manual), corresponded parameters need to be set to achieve group control.

Setup procedures:

1. Enable group control, F1-26=1;
2. Set elevator number in F1-24, the number should be 0-7 for elevator A-H.
3. All elevators must have same fireman floor. (Otherwise call registers will be mixed up)
4. Call address should be set the same as single elevator.

After setup please save the parameters, reset the power and updating the communication address.

6.14. Leveling Adjustment Setup

After elevator landing, if elevator speed curve has no problem (i.e. there is no sudden stop and overrun leveling zone at elevator landing) and elevator runs outside leveling zone (it stops higher than leveling zone in up-running, lower than leveling zone in down-running), need to decrease leveling adjustment parameter F1-17 (default 50); if elevator cannot reach leveling position(it stops lower in up running, higher in down running), increase leveling adjustment parameter F1-17, general range for adjustment is 40-60, if the adjustment is big, please adjust driving parameter PI, or speed curve shape (F1-10~F1-15).

6.15. Floor Indication Setup

In parameter F0-05~F0-69, we can set third bit display, first two bit can be figure, characters or - , third bit can only be the following capital characters: ABCDEFGHIJKLMNO. If only need two bits, set the first two bits only and third big is empty.(Third bit indication should be supported by the HOP board, otherwise it cannot display normally.)

6.16. Special Function Selection

To meet certain special requirements from customers, this control system has included some customized functions (F4-06 & F4-07).

Chart 6.4 Special Function List

Number	Instruction
F4-06-00	After elevator stops, based on current floor, if there is no landing/car call ahead of the current floor in previous running direction, system will cancel all the car calls.
F4-06-01	Only for internal test.

Chart 6.4 Special Function List (COnt#d)

Number	Instruction
F4-07-00	ON: When ARD function is active, system will open brake for 1s (when sliding speed >0.1m/s, brake will close again), it will then find the heavy load direction based on the sliding direction, use battery to land the cabin on heavy load direction and reduce leveling energy cost.
F4-07-01	ON: Enable elevator data recorder. Together with PC debugging software, after-sales/ service team can provide fault diagnosis
F4-07-02	ON: Re-levelling enable; OFF Re-levelling disable.
F4-07-03	ON: Door open in advance enable; OFF: Door open in advance disable.
F4-07-04	ON: Open door standby at all floors.
F4-07-05	Spare(gxz38)z38)
F4-07-06	

○ P

I

When motor speed is smaller than the set frequency in F7-03 (deceleration), system will adopts F7-11, F7-12 of group 3 PI to adjust the speed. This group of PI parameters is used for adjustment in deceleration to stop period. If F7-03 is 0, system will adopt the last group of PI parameters before deceleration.

For different groups of PI effective range please see Figure 6.13 below.

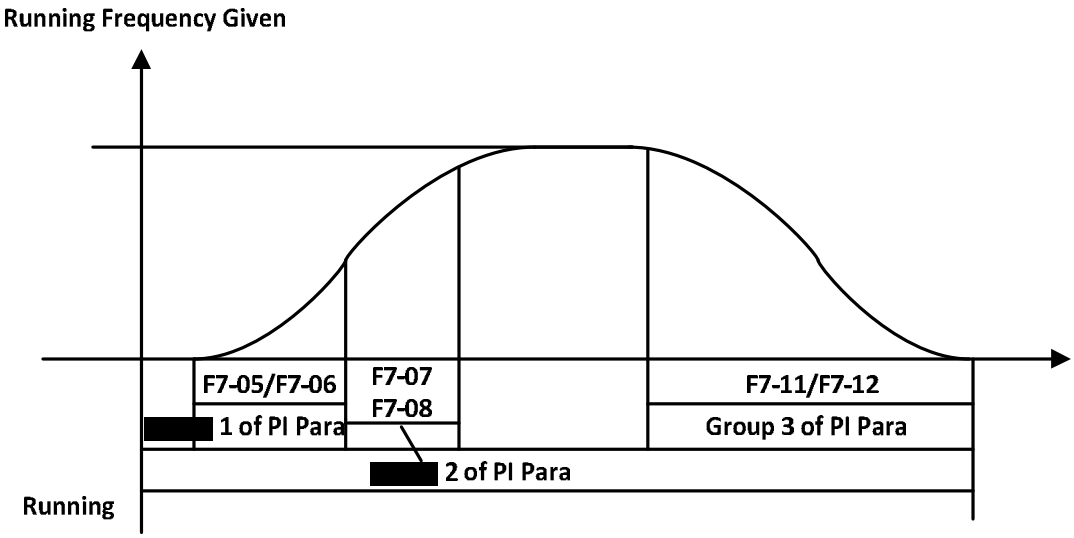


FIGURE 6.13 EFFECTIVE RANGES FOR DIFFERENT GROUPS OF PI

6.20. Load-Compensation Torque Output Setup

Parameters related to load compensation torque output control:

1. The parameters related when using of weighing device from Blue-light:
   1) F1-29: Weighing device enable (1: enable, 0: disable)
   2) U6-03: weighing value, the current load situation
   3) F1-18: weighing adjustment, adjust the compensation according to floor number, it is suitable for elevator without compensation chain.
2. Load simulative input, input range+10V~-10V or 0V~+10V, this input cannot be changed.
3. Load compensation source selection F9-13,
   0: Internal serial signal, it can only be used with Blue-light weighing device;
   1: External simulative input +10V~-10V;
   2: External simulative input 0V~+10V.
4. Maximum torque compensation F9-00; if set to 60%, the maximum output torque compensation at full load will be 60% of the rated torque.
5. Torque control output enable F9-11; if set to 1 , system will output torque based on the source of F9-13 and multiply by F9-00; if set to 0 , load compensation is disabled.

Output control diagram of load compensation torque can be seen below in Figure 6.14.

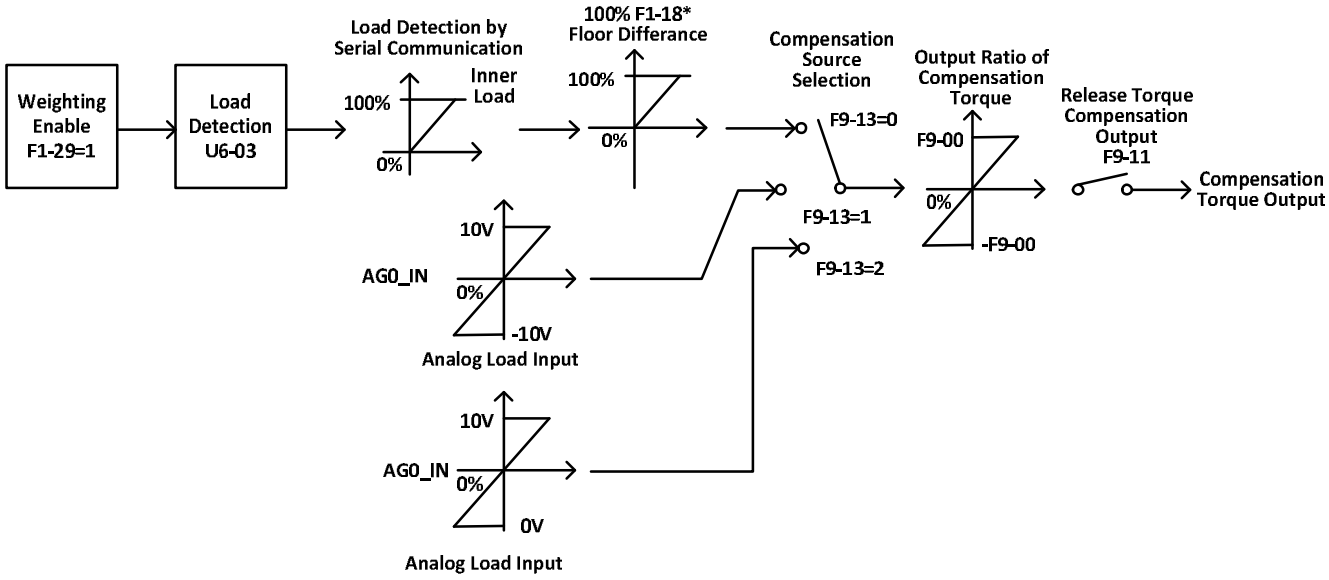


FIGURE 6.14 LOAD COMPENSATION TORQUE OUTPUT CONTROL

6. In synchronous machine control, as there is no compensation chain for low building, Blue -light weighing device can only measure the load in cabin and cannot detect the rope weight variation on different floor. In this case load compensation adjustment (F1-18) need to be used.

Adjustment Procedures:

1) Perform no-load, full-load learning;
2) Run the no-load elevator to top floor;
3) Adjust simulative load compensation gain in inverter until elevator does not slide when runs down from top floor.
4) Run the no-load elevator to bottom floor, increase the load compensation adjustment parameter (F1-18) until elevator does not slide when runs up from bottom floor.

6.21. Encoder Parameters Setup

Set F8-00 based on encoder pulse number. Encoder pulse usages can be seen below in Figure 6.15.

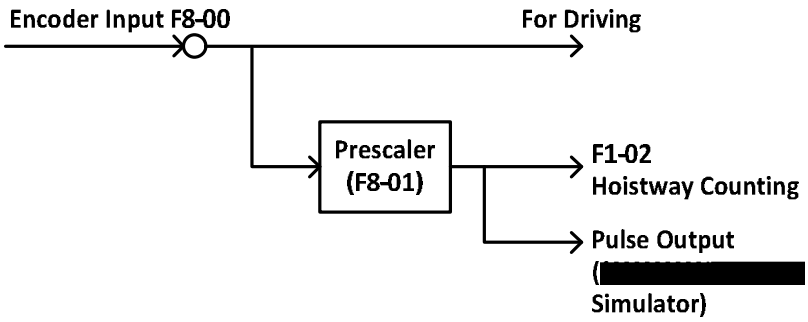
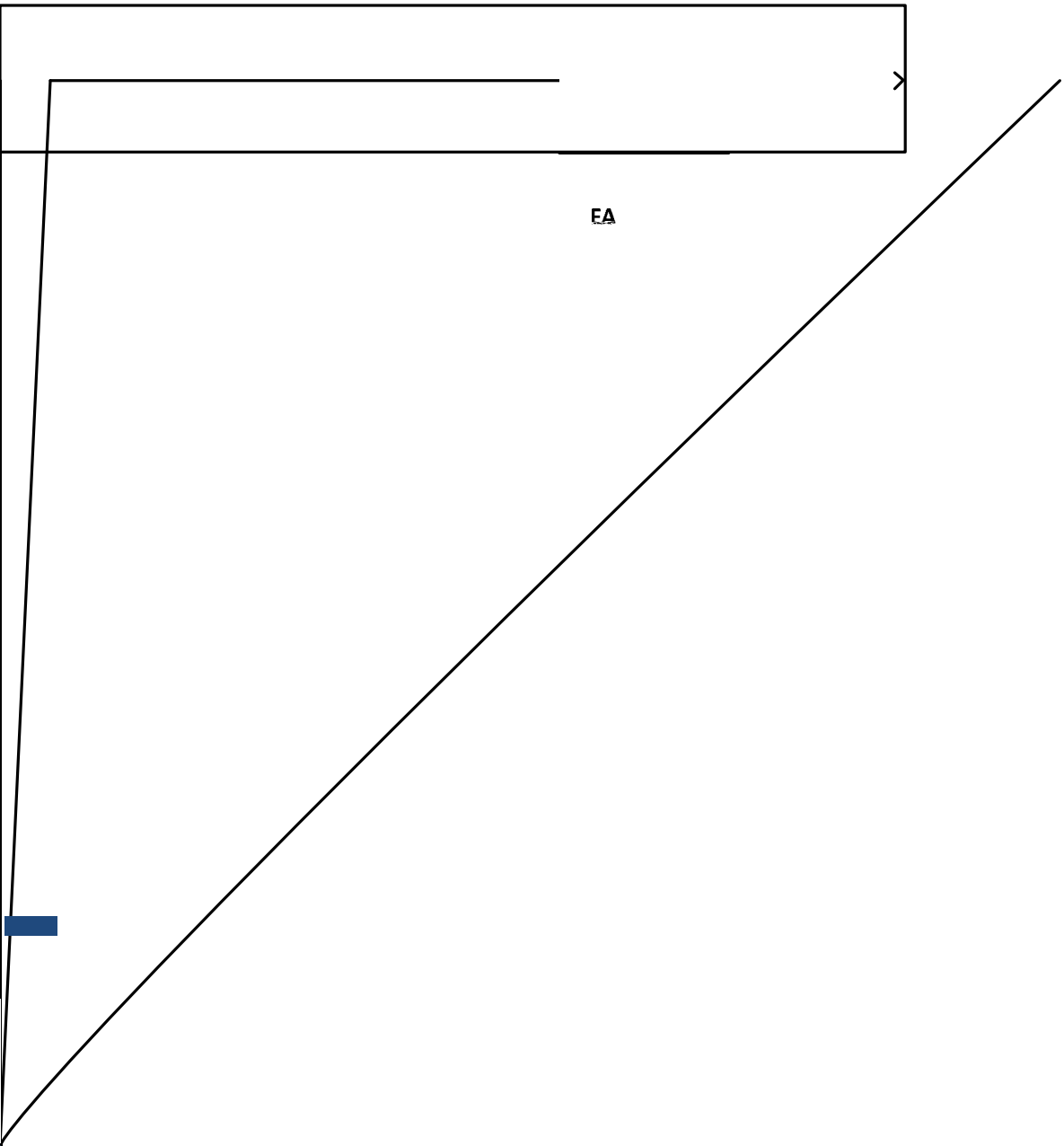


FIGURE 6.15 ENCODER PULSE USAGES

6.22. Start without Load Compensation Setup

When using BL6 series integrated controller with Sine/Cosine PG card, it is possible to achieve comfort start without load compensation by proper setup in FA group parameters. (It means elevator can reach the same effect of load compensation ev 10.56 Tf-32.64 -39.12 Tc ( ) Tj-0.1104 Tc (w) Tj-0.0288 Tc (i) Tj0.0624 Tc (t) Tj-0.024 Tc (h) Tj-0.04512 Tc (o) Tj-0



3) Adjustment method: Main parameters used are FA-08, FA-09 and FA-11.

FA-09

This parameter is the working time kind a nme ethethhc(t) Tj-0.024 Tc (hm4 Tc (h) Tj0 Tcp) Tj-0.0288 Tc (im) Tj0.02112 Tc (e) T-0.024

Chapter 7: Commissioning

7.1. Important Reminder

1. Thanks for purchasing our product, please read this manual and related instruction thoroughly before

7.3.2 Inspection after Power On

1. Close main power switch Q1, if phase relay KXX green LED on, it means the phase sequence is correct, otherwise red LED on, means phase sequence is incorrect, in this case please switch off the main power switch, exchange any two

4) Check door open/close system, do corresponded adjustment if necessary.

7.4. Parameter Setup

It is very important to set Parameters based on actual site condition, as this is the foundation for controller or control system to maximize its performance. For parameter setups please refer to chapter 4-6. When setting parameters, please pay attention to the following points:

1. Set the motor basic parameters from motor nameplate namely motor parameter 1 content (F5 group). For example, motor type, pole numbers, rated frequency, rated power, rated RPM, rated current, Back-EMF (only for synchronous machine), no-load current (only for asynchronous machine), phase inductance, phase resistance and else. Amount which phase inductance, phase resistance and other parameters that are unknown can be acquired from motor -tuning; if system moment of inertia is unknown, leave it as default.
2. Set encoder parameter correctly (F8 group), for example encoder pulse, PG frequency division coefficient.
3. Set elevator running parameters correctly, such as motor rated RPM, encoder pulse (after frequency division.)
4. Set input type correctly, they should match the actual contactors, relays and hoistway contacts and switches.

7.5. Motor Parameters Tuning

Controller has motor parameter tuning function. Base on the input basic motor parameters, system automatically performs control, detecting, calculation, and recognize the unknown motor parameters required. For example, phase inductance, phase resistance, no-load current (only for asynchronous machine) and else.

Unless all the necessary motor parameters are known (F5 group), for example phase inductance (F5-06), phase resistance (F5-07) and all other parameters, please set the parameters directly and there is no need to run the motor parameter tuning. Otherwise motor parameter tuning is necessary.

Note: For BL6-B series elevator integrated controller, parameter tuning is not nesseray.

7.5.1 Motor Rotation Tuning

Motor rotation tuning process is shown below:

PG Type (F8-02) should be set correctly, and AutoTuneModeSel (FC-13/FX-20) should be set to 0.

1. Make motor (traction machine) with no load (do not attach the steel rope);
2. Short circuit running contactor output Y9 (J5-10) and COM3 (J5-6), make running contactor closed;
3. Short circuit brake output Y7(J5-8) and COM3 (J5-6), close braking contactor and release the brake;

With the digital operator, perform the motor tuning command according to Figure 7.2.

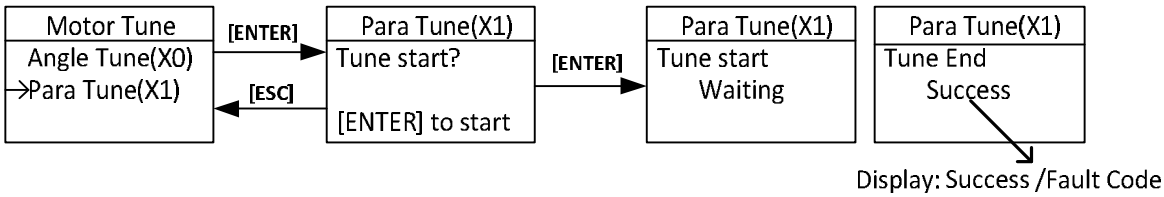


FIGURE 7.2 MOTOR PARAMETER TUNING WORKFLOW

After press the Enter button, motor parameters tuning start. Motor will remain static after a short vibration, system continues to supply current and motor generates current noise. The whole process takes about 5 seconds.

If tuning success, return to parameter setting menu, check motor phase inductance (F5-06), and motor phase resistance (F5-07). They should all be adjusted to the correct value. Generally, one successful tuning is enough. However, if want to acquire more accurate results, one can record the results of this tuning, then repeat the process, and take the average value from tuning results.

If self-learning fails, operator will indicate the error code, please refer to the troubleshooting chart in chapter 8, find out the reason and solve the problems, then start motor parameter tuning again.

7.5.2 Motor Static Tuning

Motor static tuning process is as follows.

1. Close brake.

2. Select tuning method parameter FC-13 (or FX-20) to 1 on digital operator.

3. Short circuit running contactor output Y9 (J5-10) and COM3 (J5-6) to make it close; (If the system has a separate star short circuited contactor, close it as well).

If tuning success, return to parameter setting menu, check motor phase inductance (F5-06), and motor phase resistance (F5-07). They should all be adjusted to the correct value. Generally, one successful tuning is enough. However, if want to acquire more accurate results, one can record the results of this tuning, then repeat the process, and take the average value from tuning results.

If tuning fails, operator will indicate the error code, please refer to the troubleshooting chart in chapter 8, find out the reason and solve the problems, then start motor parameter tuning again.

7.6. Motor Initial Angle Tuning

For synchronous motor, it is necessary to perform motor initial angle tuning. Otherwise the machine cannot run normally, or even sever slip. Therefore, tuning initial angle is very important for synchronous machine. Before proceed to load run, synchronous machine must first perform initial angle tuning successful and no load running successful. For the tuning procedures, please refer to Figure 7.3.

7.6.1 Rotation Tuning Procedures

BL6 series elevator integrated controller no longer distinguish encoder types. This angle tuning mode requires that the motor is no-load and the brakes are open.

The preparations before tuning as follows:

1. Synchronous motor(traction machine) must not have any load (don t hang on steel ropes);
2. Short circuit running contactor output Y 9 (J5-10) and COM3 (J5-6) to make it close;
3. Short circuit brake contactor output Y7 (J5-8) and COM3 (J5-6) to make it close and open brake;

With digital operator, AutoTuneModeSel (FC-13/FX-20) should be set to 0(0: Rotation tuning; 1: Static tuning).With the motor parameters (F5) and encoder parameters (F8) are set correctly, perform the initial angle rotation tuning as follow figure.

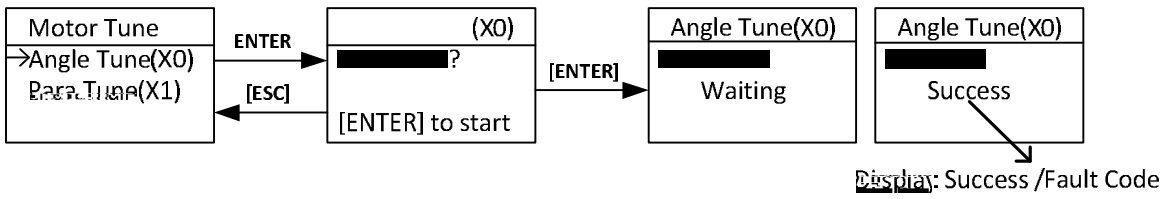


FIGURE 7.3 MOTOR INITIAL ANGLE ROTATION TUNING

After pressing Enter , tuning starts. At first, Motor will immediately rotate to a certain position, then rotate forward at a certain speed (facing to traction sheave, anticlockwise rotation is forward direction), the speed is depended on motor pole number and initial position. Motor will stop after at most 2 turns, and will be rotated again to a certain position to stop for 2 seconds, then tuning stops and the operator display success . The whole tuning procedure lasts around 30s.

After tuning successful, perform a trial run according to chapter 4 4.4 Parameter commissioning in Digital Operator . Make traction machine accelerate forward from zero speed to rated speed, run it in constant speed for a while and observe the running condition; make motor run in opposite direction in same way.

After trial run with digital operator, please remove the short circuit on running contactor output and brake control output . Press jog up button on control cabinet to perform inspection running, observe motor running condition; Then press jog down button on control cabinet to perform inspection running, observe motor running condition.

When jog up (down), if the real running direction of cabin is down (up), please set F6-03 to correct it. 0: anticlockwise rotation is down, 1: anticlockwise rotation is up, set based on actual site condition.

After the above trial running is finished, attd

7.6.2 Static Tuning Procedures

For this tuning method, tuning can be carried out with steel rope attached, but please make sure the following procedures are finished correctly before tuning:

1. Wiring in control cabinet is completely correct, and system under inspection state;
2. Running parameter (F1), motor parameter (F5) and encoder parameter (F8) are set correctly ;
3. All mechanical faults in hoistway have been eliminated; cabin and counterweight locate at center of the hoistway.

SetAutoTuneModeSel FC-13 (FX-20) to 1 on digital operator (0: rotation tuning, 1: static tuning), perform motor initial angle tuning according to the following procedures shown in Figure 7.4.

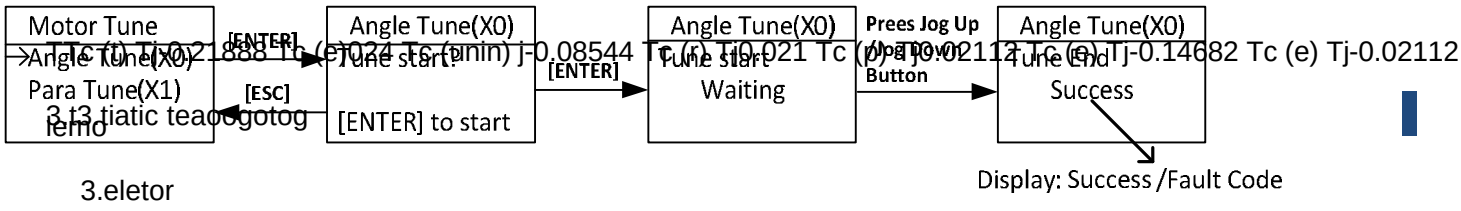


FIGURE 7.4 MOTOR INITIAL ANGLE STATIC TUNING

After pressing Enter , tuning starts. When digital operator indicates Waiting , press jog up or down button ,Running contactor closes, motor will vibrate a little and give a noise, the duration depends on motor rated power and rated current, but no longer than 5s, this is static tuning period.(Make sure jog up or down button is pressed constantly, DO NOT release the button during this period.)Motor will then start and run in inspection speed, jog up or down, until digital operator indicates success, this is test running period. Finally, release the jog up or down button and finish the tuning procedure.

Please note the following items at motor static tuning:

3.

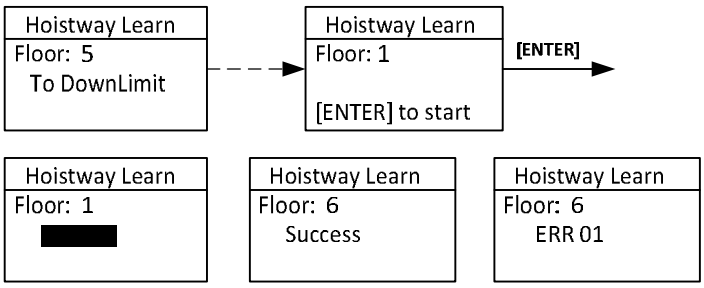


FIGURE 7.5 HOISTWAY PARAMETER SELF-LEARNING PROCEDURES

5. The results of learning can be seen from hoistway position parameter U00-U69 under monitor menu with unit of meter, please check the switches position after hoistway learning.
6. In self-learning process, if control system detects any abnormal phenomenon, self-learning will be terminated and give fault code, please refer to troubleshooting chart in chapter 8, find out the reason and solve it accordingly, then start hoistway parameter self-learning again.

When self-learning process stops, only when LCD indicator shows success on digital operator, self-learning is completed successfully.

7.9. Normal Speed Running

After hoistway parameter self-learning is completed successfully, normal speed running can be carried out. Procedure as follows:

1. Switch elevator to attendant mode (Manual)
2. In floor selection parameter D0 through digital operator, target floor can be set (details refer to chapter 4.4 Commissioning Parameters Setup).Then it is possible to perform single floor traveling, double floor traveling, multi-floor traveling and full trip traveling test. Through D1 parameter interface, input door open and close instruction to control the door.
3. Make sure elevator can start, accelerate, decelerate and leveling normally in normal speed running.
4. If running is abnormal, please check for parameters setting.

7.10. Elevator Comfort Level Adjustment

If comfort level and leveling accuracy of elevator running are not perfect, please follow procedures blow.First, check the mechanical system condition (Such as clearance of guide shoes, lubricating, steel rope, position of the rope hitch plate and else.)which might influence the comfort of elevator running. After checking all the mechanical parts, then do adjustment in controller.

As the controller control the motor running accordj-0.024 Tc (unnin) Tj0.06624 TTj-0.08544 Tc (r57o) Tj-0.085404896 Tc (s) Tj0 Tc

7.10.1 Adjustment for Start/Brake speed curve

Elevator running speed curve is shown below in Figure 7.6.

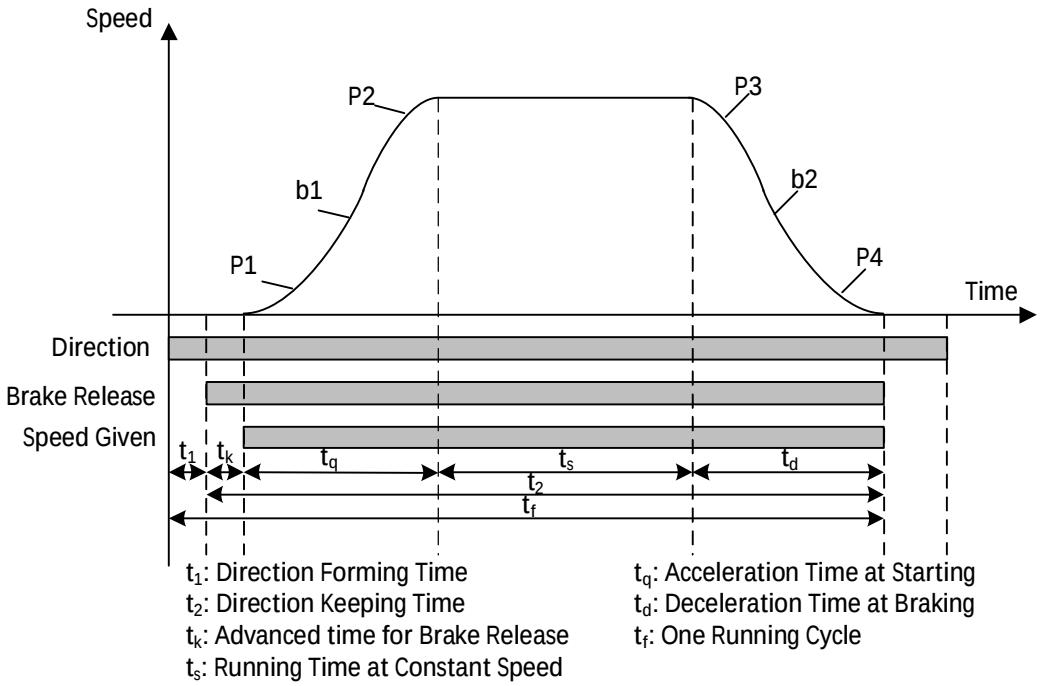


FIGURE 7.6 ELEVATOR RUNNING SPEED CURVE

1. Three parameters adjustment for motor starting S curve:

1) P1: Acceleration increase in starting section, it means the rate of elevator acceleration change. Smaller value means the slower starting section, the smoother running period and the lower the efficiency. On the other hand, faster at acceleration starting section means higher efficiency for elevator running.

2) b1: Acceleration i

e

e

eration

3) P4: Deceleration decrease at end of braking section, it means the rate of deceleration change. Smaller value means slower at end of braking section, smoother running period and the lower efficiency. On the other hand, faster at brake ending section means higher efficiency for elevator running.

Chapter 8: Troubleshooting

This chapter explains in detail the fault display of integrated controller, the reasons behind and possible solution. The fault display on integrated controller may come from elevator system errors, Hoistway learning errors, driver errors, motor parameters setting and Encoder phasing errors.

8.1. Elevator System Faults

Chart 8.1 Elevator System Fault List

Error Code	Definition	Possible Solution
Er2	Door inter-lock faults: Door inter-lock circuit open at elevator running	Check the work condition of door vane and door interlock circuit. Roller should have enough space at both side of the vane.
Er3	Driver faults	Check driver fault code, find the cause of fault, and resolve it.
Er4	Elevator running in opposite direction with command	1. Exchange phase V and W on motor 2. Exchange phase A and B , on encoder terminal block or change in parameter setup.
Er5	System does not receive brake open feedback signal after output brake open command: 1. No X17/X12/X31 feedback after Y0 output 0.5/2s/2s. 2. X17/X15/X31 enable when Y0 has no output.	1. Check the traction machine brake detection switch and wiring; 2. If no feedback switch, should set feedback enable to OFF
Er6	During elevator running, leveling zone input signal X3, X4 is always on.	Check leveling zone signal circuit and induction switch
Er7	Encoder pulse not enough at elevator running.	Check the wiring from encoder to controller.
Er9	Running contactor output not matching feedback signal: 1. After Y1 output,X5 has no feedback in 0.4s. 2. X5 is enabled when Y1 has no output.	Check the Running contactor coil and output/feedback circuit wiring.
Er10	Safety circuit open, X10 input are invalid.	Check safety circuits.
Er11	Leveling switch signal missing: Elevator is running pass the floor, but there is not input at X3 /X4.	Check the leveling switches and its wiring.
Er12	Elevator pass top limit switch (X1 is invalid)	Check the encoder, top limit switch including its position and wiring.
Er13	Elevator pass bottom limit switch (X2 is invalid)	Check the encoder, bottom limit switch including its position and wiring.
Er14	Floor counter error from encoder deviation accumulation: after this error, elevator will return to bottom floor in inspection speed for recalibration.	1. Check encoder wiring and related circuits; 2. Check the leveling switch and related circuits; 3. Possible reason: traction rope slip /door drive shake at start.

Chart 8.1 Elevator System Fault List (Cont'd)

Error Code	Definition	Possible Solution
Er31	Door close fault (car cannot close door)	Normally due to door not installed properly and short circuit door interlock circuit. Check if door close and door interlock circuit are output at same time.
Er32	Floor number counting error.	A sudden power break may affect terminal/limit switches and cause floor number error. Elevator will then return to bottom floor for recalibration.
Er34	External power +24V drop down error	Check the connection of external power +24V. When system find the voltage is lower than 16V, this error occurs.
Er35	System clock error	The circuit hardware on main board works abnormally, please contact with our factory.
Er36	Internal power +5V error	When system find the power of 5V is lower than 4.7V, this error occurs.
Er37	Running contactor vibrate while brake opening	Check the action of running contactor and its feedback X5.
Er39	Brake force detection fail, lack of brake force.	Check the brake, power off then on or disable brake force self-detection. Recoverable.
Er40	Brake invalid and car slide error	Safety protection function act. When system find the brake invalid, it control the car creep around door zone to release passengers and then return to top floor and brake off again, but brake still fail to close. System announces brake invalid error and lock, will not recover until reset.
Er41	Unintended slide error, pay attention to brake force.	Safety protection function act. When system find the brake invalid, it control the car creep around door zone to release passengers and try to brake off. During the creeping, the brake successful turn off. System record this slide error as a warning of brake force but not display error. You can see it in Fault Record.
Er42	While ARD mode, system find brake force invalid.	The car slides, system announces error and record it to prevent power of UPS drop too low during creeping. Unless it may cause unpredictable danger.

Chart 8.1 Elevator System Fault List (Cont'd)

Error Code	Definition	Possible Solution
Er43	Safety protection function act, the car runs out of door zone while re-leveling and caused door circuit been cut off. System announce door zone missing and lock the error until reset.	Remind maintenance man to solve the problem of door zone missing. To prevent door zone missing happens as well as brake force invalid, or creeping will cause the car run out of safety range.
Er44	While safety protection function works, signal of up limit has vibrated.	Safety protection act, then car creep around door zone. While up creeping, the signal from up limit(X1) vibrated. System will record this error and lock the error until reset.
Er45	While safety protection function works, signal of down limit has vibrated.	Safety protection act, then car creep around door zone. While down creeping, the signal from down limit(X2) vibrated. System will record this error and lock the error until reset.
Er46	While safety protection function works, signal of up terminal has vibrated.	Whilf Safety protection act, theg a s vei s . 4 r e T j - 0 . prty w

ionpafetetvrtvaSa77602112 Tc (e)D -0.v44 Tc1.9(t) Ti0 Tc (v) Ti3.13344 Tc ( ) Ti-0.024 Tc (p) Ti-0.08544 Tc (r) Tc (r) Ti0 Tc (a) T018cq1.9(t) Ti

Chart 8.2 Hoistway Parameter Self-Learning Fault List (Cont'd)

Error Code	Definition	Possible Solution
LER=20	Bottom limit switch too high	Lower the bottom limit switch.
LER=21	When elevator reaches top limit switch, bottom terminal 1/2 switch is valid.	Check the switches position and their wirings.
LER=22	When elevator start from bottom limit switch, top terminal 1/2 switch is valid.	Check the switches position and their wirings.
LER=23	No pulse feedback after starting.	Check the wire of PG card.
LER=24	The up and down door zone signals are opposite in hoistway learning.	Check installation position of up and down door zone sensor, exchange their wires.

Note: System has 2 top and 2 bottom terminal switches for elevator speed >2.0m/s.

8.3. Driver Faults

Chart 8.3 Driver Fault List

Error Code	Display	Definition	Possible Causes	Possible Solution

Chart 8.3 Driver Fault List (Cont'd)

Error Code	Display	Definition	Possible Causes	Possible Solution
DF3	OH	Heat sink overheatet		

Chart 8.3 Driver Fault List (Cont'd)

Error Code	Display	Definition	Possible Causes	Possible Solution
DF8	OE	Speed over deviation. The speed deviation exceeds the allowable range(F9-03) and last longer than set time.	1. System overload; 2. AcTj0.09312 Tc (cTj1.28 14246.4 761.52 4.32 0.72 r D -0 (cTj1eTc (2j624 Tc (.02	

Chart 8.3 Driver Fault List (Cont'd)

Error Code	Display	Definition	Possible Causes	Possible Solution

[redacted]

[redacted]

[redacted]

Chart 8.3 Driver Fault List (Cont'd)

Error Code	Display	Definition	Possible Causes	Possible Solution
DF30	157	Power of bottom case identification error	Main board can not identify configuration information of bottom case.	Check the connection between main board and drive power, or change main board and power board.
DF31	158	Communication error between drive modules.	Communication of internal drive chip is abnormal.	Check if there is serious EMI or contact with supplier.
DF32	159	Encoder Z (or R) signal is abnormal Motor has run for over 2 rounds, but didn t find Z signal	The controller has run the machine for over 2 rounds, but not find Z pulse. The controller find vibration in Z pulse.	Check if there is interference or broken wire of Z pulse.
DF33	160	Before start, feedback speed is abnormal.	Before elevator start, system find the feedback speed is over limit. Brake force may be not enough or already open.	Check A & B signals of encoder Chech brake.
DF34	161	While brake force detecting, movement of motor is too long	While operating brake force detection, system find feedback movement is too long	Check the brake and encoder
DF35	162	While safety protecting, motor has crept too long	While operating safety protection, system find feedback movement is too long	Check the encoder and parameter setting related to safety protection
DF36	163	Lack of phase protection for 3-phase input power	While running, system find lack of phase. Check if there s IF error in Fault report. If yes, solve error according to IF error. Bad contact between main board and power board.	Check 3-phase input power Check if there s short circuit of output 3-phase Check cable between main board and power board While using one phase, set FD-21.BIT0=1 to ignore lack of phase error.
DF37	164	Short circuit between 3-phase output or short to earth or to N line.	There is short circuit among 3-phase output or output to earth or output to N line Imbalance adapt between motor and inverter capacity.	Check 3-phase output and output to earth and output to N line. Check if inverter capacity adapt to motor. Set FD-21.BIT3=1 can ignore this error, but we don t suggest to do that. Because it has risk to burn module.
DF38	165	Imbalance of 3-phase output System find the summation of 3-phase current is not zero and last for certain time.	The output current of 3-phase output is seriously imbalance One of 3-phase may short to earth or N line.	Check if there is broken circuit or short circuit with N(Neutral) of 3-phase output

Chart 8.3 Driver Fault List (Cont'd)

Error Code	Display	Definition	Possible Causes	Possible Solution
DF39	166	Output voltage is saturated	While running, system find output voltage is already saturated. Low input voltage. Rated motor speed setting is not same with actual speed; For geared motor, rated slip is too low or over load.	Check DC bus voltage. Check if rated RPM is same with nameplate or if bus voltage has been dropped down through monitoring running status. Check rated slip for geared motor; Check balance factor.

Note: FD-21 is special function control parameter for controller. Each bit of binary stand for a function. So it have to be set by bit.

BIT0: Ignore input phase lost

BIT1: Adjust if subdivision speed is same with normal hardware speed

BIT2: Adjust output phase lost

BIT3: Break circuit and short circuit test

BIT4: Temperature adapt

BIT5: Low voltage adapt

BIT6: 1 round tuning

BIT7: calculate poles automatically

BIT8: extend running mode for geared

BIT9-BIT15: Spared.

The final value of FD-21 depends on calculation of all above bit. The formula is as follow,
FD-21 = BIT0*2^0+BIT1*2^1+BIT2*2^2+ **(** +BIT15*2^15**;**

If only ignore input phase lost, you can set FD-21=BIT0*2^0=1;

If ignore input phase lost and output phase lost, FD-21=BIT0*2^0+BIT2*2^2=1+4=5.

8.4. Motor Initial Angle Tuning Faults

Chart 8.4 Motor Initial Angle Rotation Tuning Fault List

Error Code	Definition	Possible Causes	Possible Solution
RF100	Controller fault	Controller has met fault	First solve fault according to error code, then angle tuning again.
RF226	Already give limit force during angle tuning, but feedback current can not reach least requirement	During angle tuning, the given force has already reach limit, but still can not get an accurate angle value. Bad contact between motor and inveter	Check parameters of motor and encoder Check if the power of inverter is adapted to motor Decrease F5-08 to complete tuning, then recover F5-08.

Chart 8.4 Motor Initial Angle Rotation Tuning Fault List (CONT#D)

Error Code	Definition	Possible Causes	Possible Solution
RF227	Output current over limit	Imbalance between inverter and motor Wrong motor or encoder parameter setting	Check motor parameters Increase F5-08 to complete tuning, then recover F5-08.
RF228	ESC input	Release Up or Down button while tuning ESC input effective during angle tuning	Do angle tuning again
RF229	Over time at zero speed Before start, feedback speed is not zero for a long time	Brake open or brake force is not enough. There s interference in encoder.	Ensure brake is off. Remove interference of encoder

Chart 8.5 Motor Initial Angle Static Tuning Fault List (Cont'd)

Error Code	Definition	Possible Causes	Possible Solution
PF238	Detection current is too small	Motor/Controller connection is incorrect.(Break circuit or phase lost)	Check motor/controller connection. Check rated current and rated power of motor.
PF239	Encoder Z/R pulse signal lost.(For BL6 only)	No encoder Z/R pulse signal detected after motor tuning for 10s. Interference in Z/R pulse signal. A & B signals connection error.	If motor can run, check the encoder wiring; otherwise find out why motor cannot run. Remove the interference.
RF252	While static angle tuning, motor speed is overproof.	During static angle tuning, after initial location, motor need to rotate for 3 rounds. During rotating, system give out speed but receive no feedback and the lasting time of this status has been over limit. Then system announce error.	Check if there is feedback from SIN/COS encoder. Check the phase of power input.

Note: 1. Above description is for SIN/COS encoder;

2. For increment encoder, RF231 correspond to UVW signals, RF234 and RF239 correspond to Z pulse. The solution is same, and other faults are same too.

8.5. Motor Parameters Tuning Faults

Motor parameters tuning error code and their possible causes and solution are shown below in Chart 8.6 and Chart 8.7. (Including rotation and static parameters tuning)

Motor Parameters Rotation Tuning Faults

Chart 8.6 Motor Parameters Rotation Tuning Fault List

Error Code	Definition	Possible Causes	Possible Solution
PF2	Motor parameter input incorrect or no input.	1. Motor parameter input error; 2. Motor/Controller connection error.	1. Check motor parameters; 2. Check motor/controller connection.
PF3	Motor resistor tuning result error.	1. Input motor data is incorrect; 2. Wire not secured on terminal block.	1. Check input parameters; 2. Check the motor wiring and secured them on terminal block.
PF4	Motor leakage inductance tuning result error	1. Input motor data is incorrect; 2. Motor tuning with load.	1. Check the input parameters; 2. Make sure motor has no load.
PF5	Motor does not rotate in auto tuning.	1. Motor parameter input incorrect; 2. Wire loose on terminal block; 3. PG card damaged or wiring incorrect.	1. Check the input parameters; 2. Secure the wire on terminal block; 3. Check PG card and its wiring.

Chart 8.6 Motor Parameters Rotation Tuning Fault List （CONT#D）

Error Code	Definition	Possible Causes	Possible Solution
PF6	Motor cannot reach rated speed or rotate direction error.	1. Input motor data incorrect; 2. Motor input phase incorrect; 3. Encoder /PG card /wiring error.	1. Check the input parameters; 2. Check motor input phase; 3. Check encoder, PG card and wiring
PF7	No-Load Current error	Auto tuning motor with loads	Make sure the motor has no load.

Motor Parameter Static Tuning Faults

Chart 8.7 Motor Parameter Static Tuning Fault List

Error Code	Definition	Possible Causes	Possible Solution
PF2	Initial fault	1. Motor parameters input incorrect; 2. Motor/Controller connection error.	1. Input correct motor parameters; 2. Check motor/controller connection.
PF3	Motor resistor tuning result error.	1. Input motor data is incorrect; 2. Wire not secured on terminal block.	1. Check input parameters; 2. Check the motor wiring and secured them on terminal block.
PF4	Motor leakage inductance tuning result error	1. Input motor data is incorrect; 2. Motor/Contr	

Chapter 9: Maintenance

This chapter describes precautions and notes for drive storage and maintenance.

9.1. Safety Precautions for Drive Maintenance & Storage

Danger

- There are high voltage terminals in integrated controller, please DO NOT TOUCH.

Otherwise there has potential risk of electric shock.

- Make sure to install front protection cover before power on integrated controller and cut power before removing the front protection cover.

Otherwise there has potential risk of electric shock.

- Before open case service/maintenance, make sure the power is cut for 10 minutes, power on LED (CL) is off and DC+/- bus voltage is lower than 24V.

Otherwise there has potential risk of electric shock due to capacitor remain voltage.

- Only authorized and qualified personnel are allowed to inspect/service integrated controller.

Otherwise there has potential risk of electric shock and damage the product.

- Before maintenance, technicians must remove any metal objects (watch, ring, ect), and must wear cloth with qualified isolation level.

Otherwise there has potential risk of electric shock.

- DO NOT remove or change terminal ports at controller power on.

Otherwise there has potential risk of electric shock.

- DO NOT change internal structure of the integrated controller.

Otherwise there has potential risk of electric shock and damage the product.

- After maintenance, please make sure all terminals and contactors are tightly secured.

Otherwise there has potential risk of controller not functioning or even get damaged.

Attention

- CMOS integrated circuits are applied in control board, please be aware.

If touch by hand directly, the control board may get damaged due to static charge.

9.2. Daily Check

In order to increase the life time of controller and make sure the safety operation of elevator, it is necessary to check and inspect controller in a daily basis. As it is not allowed to remove the controller front cover with controller power on, the controller can checked by observing the device external condition, including:

1. Check if fan is working properly, including any abnormal noise.
2. Check if the LED indictor and digital operator of controller is working properly.
3. Check if there are any abnormal noise, vibration or smell.
4. Check thermal condition of controller and motor.
5. Check the ambient environment (Temperature -10~45 , humidity 5 95%RH, no frozen, no oil mist or powder in air)
6. Check if the comfort level of elevator has decreased dramatically.
7. Check if the input power and frequency are within rated range.

9.3. Routine Inspection

In order to increase the life time of controller and make sure the safety operation of elevator, it is necessary to check and inspect controller in a routine basis. At routine check, first switch elevator to inspection mode, stop elevator operation and cut system power. Then please perform inspections procedures based on Chart 9.1, following safety precautions and notes mentioned above.

Chart 9.1 Routine Inspection Check List

Check Item	Definition	Possible Solution for fault
Terminal, connector, screws	Check for loose screws/bolts	Tighten the loose screws/bolts
	Check for loose connector	Reconnect the loose connector
Heat sink & Wind tunnel	Check for dust or any blockage.	Use dry air gun (0.4-0.6MPa) to clean dust, use proper tools to remove other attached objects.
PCBs	Check for dust, oil (conducting).	Use dry air gun (0.4-0.6MPa) to clean dust, use proper tools to remove other attached objects, replace PCB if necessary.
Cooling Fan	1. Abnormal noise & vibration 2. Color/shape change due to heat 3. Loose bolts, screws.	For 1,2: Change fan For 3: Tighten screws.
Power device	Check for dust	Use dry air gun (0.4-0.6MPa) to clean dust or other objects.
Capacitor	Check for color, smell	Change controller or capacitor if necessary.

9.4. Quick Wear parts

Controller is made from many components inside, all these parts have their lifetimes, and they depends on environment and working condition. As a result, in order to increase the life time of controller and make sure the safety operation of elevator, it is necessary to check and inspect some of these parts in a regular basis, replace them if needed. Chart 9.2 below is the components change standard.

Chart 9.2 Component change standard

Item	Life time	Change method
Cooling Fan	2-3 year (20000hrs)	Change new fan
Main circuit capacitor	5 year	Change new capacitor (Decide after inspection)
Main circuit fuse	10 year	Change new fuse
Capacitors on PCB	5 year	Change new PCB (Decide after inspection)

5 0 0 48 Tc 0 Tw 12 Tc (a) Tj 0.0624 Tc (t) 67.8

Chapter 10: Controller installation with EMC Standard

This chapter explains in detail the integrated controller installation with EMC standard for reference.

10.1. EMC Briefing

EMC (short for Electromagnetic Compatibility) refers to the device/system capability to function normally in an environment with electromagnetic interference (EMI) that gives off. It has two parts: first, the device/system can operate normally in the environment with electromagnetic interference (EMI) that gives off.

4. Power cable and motor cable should use power cable with armor cover or shield. Power cable should use individual metal cable tunnel with reliable grounding point at controller side. Motor cable should follow the same grounding principle and its shield should also connect to motor cover at motor side.

5. Power cable should be connected to inverter use RFI filter or output reactor. Motor cable should be connected with output filter (sine/cosine filter) or install output reactor. Another solution is to surround motor cable twice with ferrite magnetic circle.

6. Other devices that are easy to get interference should be put far away from the controller and power cable.

7. Inductive devices around controller such as contactor, relay, brake unit, their coil need to install surge controller (such as RC filter, resistor or freewheeling diode).

10.3.2 Wiring

1. Wiring in Control Cabinet

1) Inside control cabinet, signal cable and power cable should be placed in different area, with minimum distance of 20cm. DO NOT put two kinds of cables in parallel or tied together. If must cross two cable, they must remain strictly perpendicular with each other.

2) The input (power) and output (motor) of power cable cannot cross or tied together, especial when the cable is connected with input/output filter.

3) Inductive devices inside control cabinet (such as contactor, relay, brake unit), their coil need to install surge controller (such as RC filter, resistor or freewheeling diode).

4) Both signal and power cable should have net shield/armor with high frequency low impedance.

5) Cable shield should ground with large area.

2. Wiring at site

1) Power cable must have 5 wires, including U/V/W, one for ground and one for neutral, DO NOT mix use.

2) At site, signal cable and power cable should be placed in different area, with minimum distance of 20cm. DO NOT put two kinds of cables in parallel or tied together. If must cross two cable, they must remain strictly perpendicular with each other.

3) Signal cables must have net shield, the shield should be grounded at controller side with large ground area.

4) Power cable and motor cable should use power cable with armor cover or shield. Power cable should use individual metal cable tunnel with reliable grounding point at controller side. Motor cable should follow the same grounding principle and its shield should also connect to motor cover at motor side.

10.3.3 Ground Connection

Controller must be connected to the ground at work, grounding helps to solve the EMC issue, at the same time it brings safety to the device and people. Ground correctly is the most important (and most reliable/economic) solution to EMC issue, and it should be considered first. Notes for ground connections are shown below:

1. Control cabinet must have GND public terminal (copper plate).
2. The case of control cabinet must be connected to the ground public terminal. This connection can be made between cabin door and ground public terminal copper plate (width >15mm).
3. All ground connection must remain complete on both sides, cannot connect two grounding wire in the middle.
4. The ground of integrated controller must be connected to the ground public terminal.
5. Power cable, motor cable and brake resistor cable (if necessary) shield/armor must be connected to the ground public terminal.
6. The distance from cable shield to ground public terminal should be <50mm.
7. Ground connection wire should have low impedance (large cross sectional area and short in length).
8. Power cable should have 5 cores (U,V,W, neutral & ground) with shield, motor cable should have 4 core (U, V, W, ground) with shield. For motor cable ground wire, one terminal should be grounded at controller side, another terminal should be grounded at motor side.

10.3.4 Leakage Current

Leakage current happens between wire and to ground, it depends on wire capacitance and controller carrier frequency. Leakage between wire is related to wire capacitance between controller input (power cable) and output (motor cable), controller carrier frequency, motor/power cable cross sectional area and length, while leakage current to ground is located at ground public terminal, it will get into the system and (in some case) affect other electrical devices through ground connection.

Countermeasure for leakage current:

1. Reduce controller carrier frequency;
2. Keep the power and motor cable as short as possible;
3. Power and motor cable cross sectional area should not be too big;
4. For long motor cable (>50m), controller output should have filter or reactor;
5. Should equip inverter use leakage current circuit break.

10.3.5 Power Line Filter

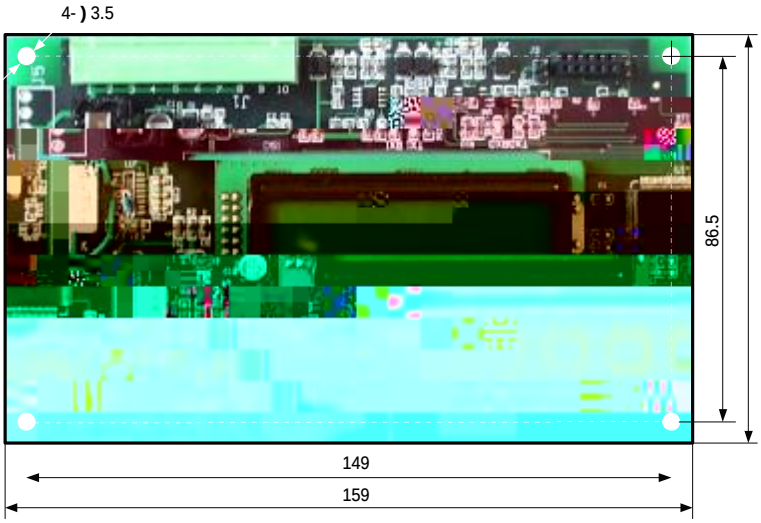
The power line filter is two-way low pass filter which only permits flowing of DC current or 50HZ operating frequency AC current but stops flowing of higher frequency electromagnetic interference current. Therefore, it can not only inhibit the equipment s electromagnetic interferences flowing into power line but also inhibit the noises in power line flowing into equipment.

Precautions for Installation of Power Line Filter:

1. In the cabinet, the filter should be located close to thec

Chapter 11: Accessories

11.1. Elevator Group Control Board BL2000-QKB-V1



2. J2 Connector 2.54/3P
3. J3 Twin housing 2.54/10P
4. J4 Connector 2.54/5P
5. J5 Single shield plug-in 3.96/4P

11.1.4 Interface Circuit

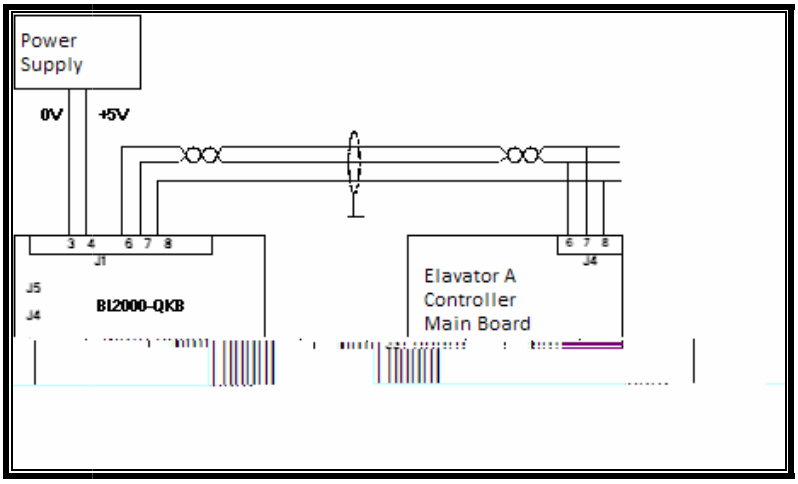


FIGURE 11.23 GROUP CONTROL BOARD BL2000-QKB-V1 INTERFACE CIRCUIT

11.1.5 Terminal Definition & Specification

Chart 11.6 Group Control Board BL2000-QKB-V1 Terminal Definition & Specification List

Name	Terminal	Location			Technical Specification

	TXA-	J5-2					
	GND3	J5-3	0V				
		J5-4					

4

Chart 11.2 Parallel Extension Board FR2000-EBA-V01 Terminal Definition/Specification List(Cont#d)

Name	Terminal	Location	Definition	Usage	Technical Specification		
					Interface Type	Rated Load	Max Speed
J3 (Extension 1)	I1	J3-1	Full Collective/Simplex Collective Car call input 8/ Car call input 10	Power & Communication			
	I2	J3-2	Full Collective/Simplex Collective Car call input 9/ Car call input 11				
	I3	J3-3	Full Collective/Simplex Collective Car call input 10/ Car call input 12				
	I4	J3-4	Full Collective/Simplex Collective Car call input 11/ Car call input 13				
	I5	J3-5	Full Collective/Simplex Collective Up call input 7/ Car call input 14				
	I6	J3-6	Full Collective/Simplex Collective Up call input 8/ Car call input 15				
	I7	J3-7	Full Collective/Simplex Collective Up call input 9/ Call input 11				
	I8	J3-8	Full Collective/Simplex Collective Up call input 10/ Call input 12				
	I9	J3-9	Full Collective/Simplex Collective Down call input 8/ Call input 13				
	I10	J3-10	Full Collective/Simplex Collective Down call input 9/ Call input 14				

Chart 11.2 Parallel Extension Board FR2000-EBA-V01 Terminal Definition/Specification List(Cont#d)

Name	Terminal	Location	Definition	Usage	Technical Specification		
					Interface Type	Rated Load	Max Speed
J5 (Extension 1)	L5	J5-5	Full Collective/Simplex Collective Up call output 7/ Car call output 14				
	L6	J5-6	Full Collective/Simplex Collective Up call output 8/ Car call output 15				
	L7	J5-7	Full Collective/Simplex Collective Up call output 9/ Call output 11				
	L8	J5-8	Full Collective/Simplex Collective Up call output 10/ Call output 12				
	L9	J5-9	Full Collective/Simplex Collective Down call output 8/ Call output 13				
	L10	J5-10	Full Collective/Simplex Collective Down call output 9/ Call output 14				
J6 (Extension 1)	L11	J6-1	Full Collective/Simplex Collective Down call output 10/ Call output 15				
	L12	J6-2	Full Collective Down call output 11				
		J6-3					
		J6-4					
		J6-5					

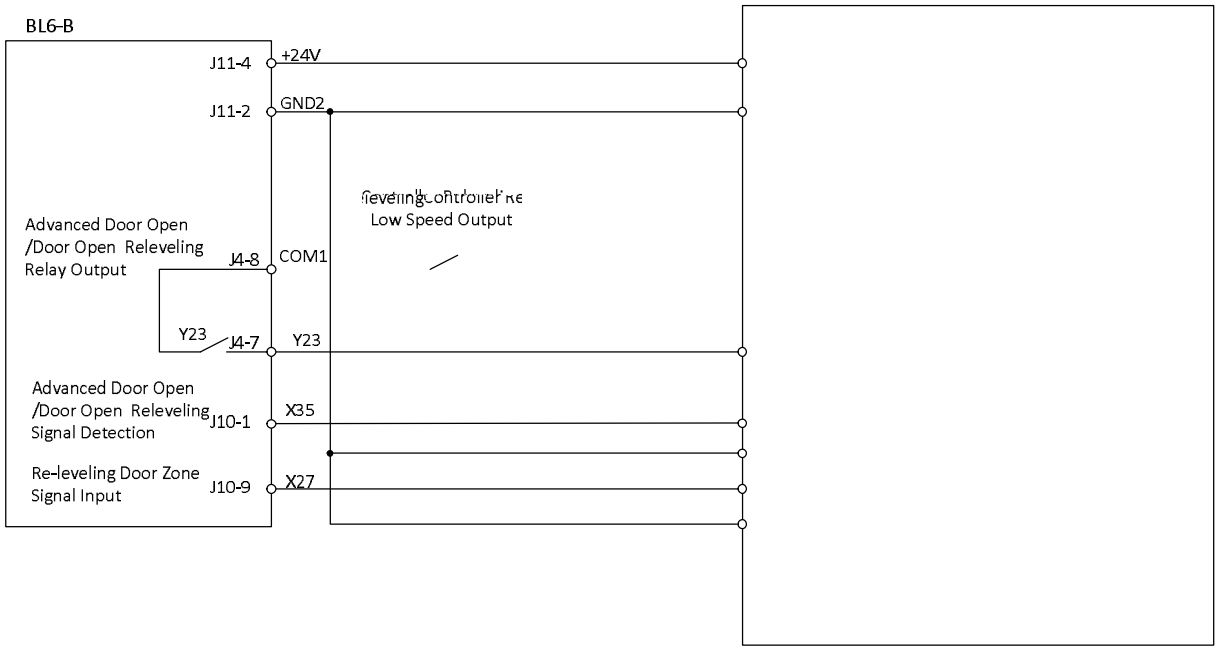
Chart 11.2 Parallel Extension Board FR2000-EBA-V01 Terminal Definition/Specification List(Cont#d)

Name	Terminal				Technical Specification

Chart 11.2 Parallel Extension Board FR2000-EBA-V01 Terminal Definition/Specification List(Cont#d)

Name	Terminal	Location	Definition	Usage	Technical Specification		
					Interface Type	Rated Load	Max Speed
J4(Extension 2)		J4-4					
		J4-5					
J5 (Extension 2)	L1	J5-1	Full Collective Car call output 12				
	L2	J5-2	Full Collective Car call output 13				
	L3	J5-3	Full Collective Car call output 14				
	L4	J5-4	Full Collective Car call output 15				
	L5	J5-5	Full Collective Up call output 11				
	L6	J5-6	Full Collective Up call output 12				
	L7	J5-7	Full Collective Up call output 13				
	L8	J5-8	Full Collective Up call output 14				
	L9	J5-9	Full Collective Down call output 12				
	L10	J5-10	Full Collective Down call output 13				
J6 (Extension 2)	L11	J6-1	Full Collective Down call output 14				
	L12	J6-2	Full Collective Down call output 15				
		J6-3					
		J6-4					
		J6-5					

F2.3 Re-Leveling & Door Open in Advance Wiring Diagram





If SI1 and SI2 are magnetic sensor, their distance must remain at least 5cm, otherwise two sensors will be affected by each other and not able to function.

F2.5 Main Control Board Parameters Setup

F2.5.1 Enable this function in Special function list

Chart F2.2 Door advance open/Re-leveling Function Enable Setup

Function Number	Definition
F4-07-02	ON: Re-levelling enable; OFF Re-levelling disable.
F4-07-03	ON: Door open in advance enable; OFF: Door open in advance disable.

F2.5.2 Running Parameters Setup

There are 3 parameters related to door open in advance/re-leveling function.

1. Advance door open elevator speed (F1-07): After elevator enter door zone in normal running, the elevator speed at advance door opening.
2. Re-leveling speed limit (F1-08): In the process of advance door opening and re-leveling, if elevator speed is higher than this value, elevator will stop.
3. Re-leveling running speed (F1-09): Set the elevator running speed at re-leveling.

Appendix 3: Parameters List

Chart F3.1 Controller Parameters &Factory Setting List

Parameter	Name	Default Value	Set Value 1

Chart F3.1 Controller Parameters &Factory Setting List (Cont'd)

Parameter	Name	Default Value	Set Value
F0-68	64th floor indicator setting	64	
F1-00	Car speed	1.60m/s	
F1-01	Motor speed	1450r	
F1-03	Insp speed	0.3m/s	
F1-04	Start speed	0m/s	
F1-05	Leveling Speed	0.3m/s	
F1-06	Least Speed	0.5m/s	
F1-07	Open Door Speed	0.15m/s	
F1-08	Relevelst Speed	0.30m/s	
F1-09	Relvelrun speed	0.05m/s	
F1-10	Acceleration B1	0.7m/s^2	
F1-11	Deceleration B2	0.7 m/s^2	
F1-12	S Curve P1	0.6 m/s^3	
F1-13	S Curve P2	0.6 m/s^3	
F1-14	S Curve P3	0.6 m/s^3	
F1-15	S Curve P4	0.6 m/s^3	
F1-16	Zero Speed	1RPM	
F1-17	Leveling Adj	50mm	
F1-18	Load Adj	0	
F1-21	Drive mode	0	
F1-22	Two Door Mode	0	
F1-23	Fire Mode	0	
F1-24	Parallel No.	0	
F1-25	Twinj-0.04512l 107.28 0.48 re f42m Tj-0.10176 Tc (N) Tj80 Tc (aC Tc (o) Tj-0.024 Tc (d) Tj0.021		

Chart F3.1 Controller Parameters &Factory Setting List (Cont'd)

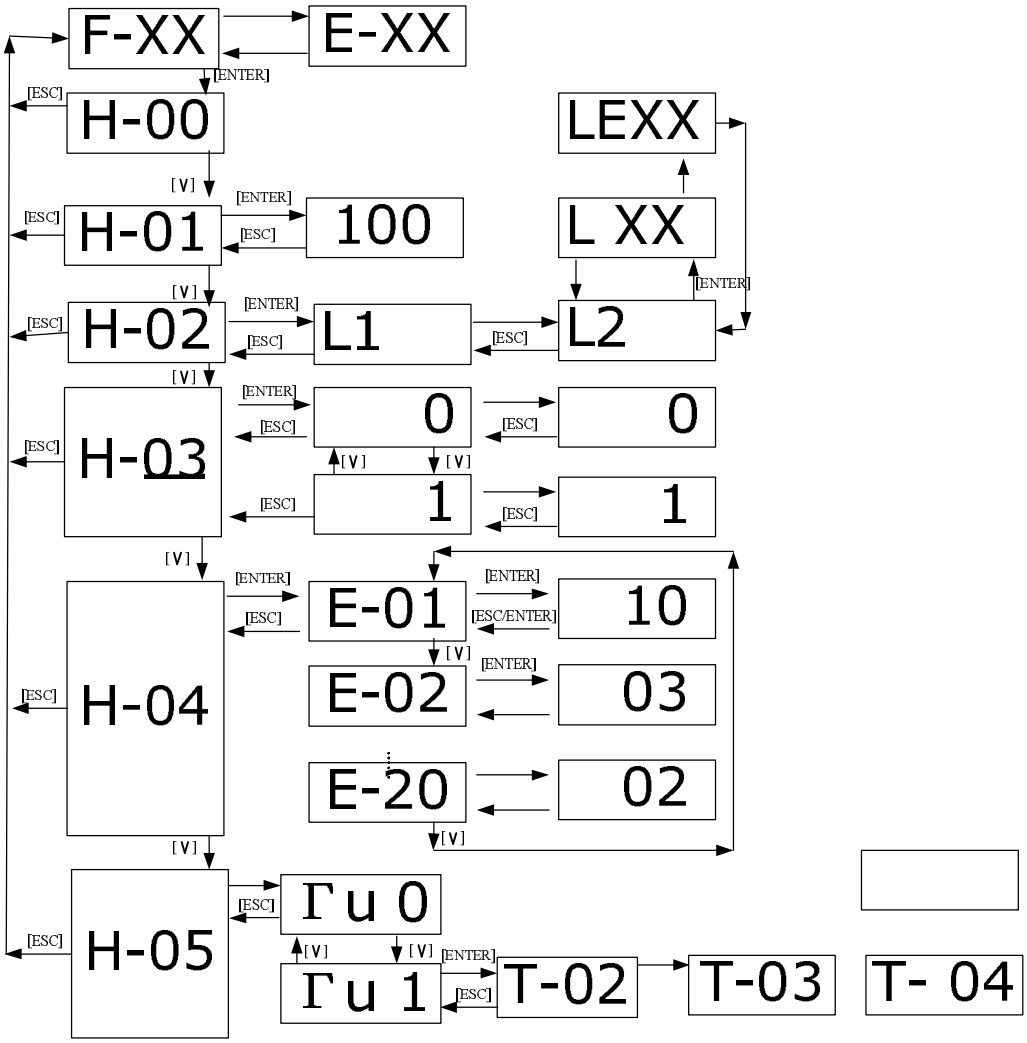
Parameter	Name	Default Value	Set Value
F2-12	Over Time	45s	
F2-13	Smoot		

Chart F3.1 Controller Parameters & Factory Setting List (Cont'd)

Parameter	Name	Default Value	Set Value 1

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Appendix 5: Menu operation processes with Digital tubes & operation keys



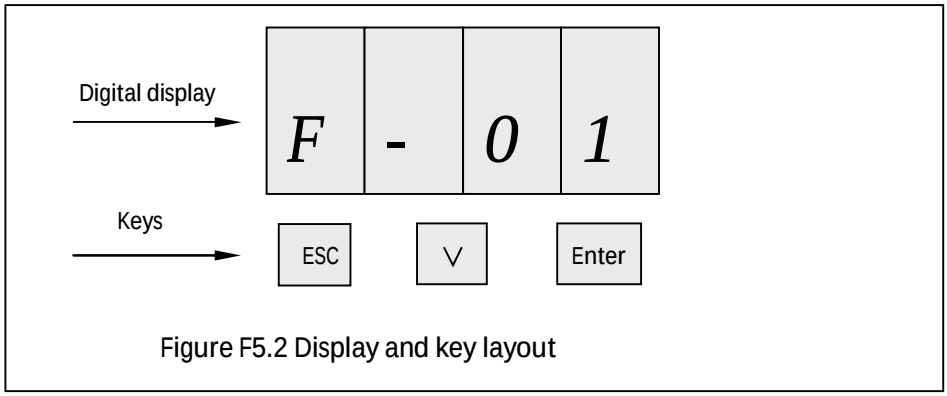


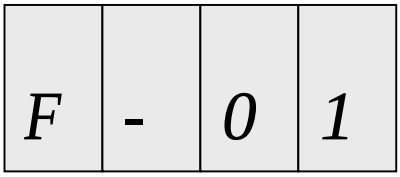
Figure F5.2 Display and key layout

ESC: Cancel/return key;

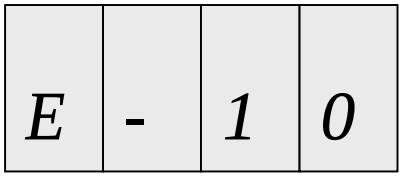
: Flip key;

ENTER: OK key;

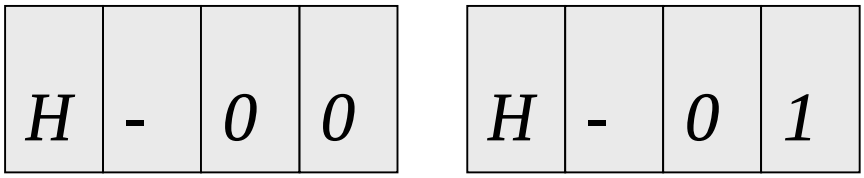
1. Normally, display current floor F-XX:

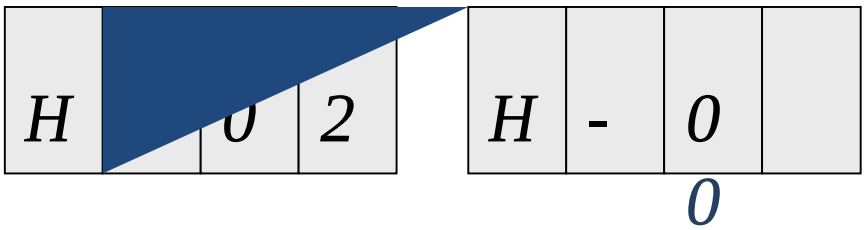


2. Digital tube flashing display error code when fault occurs.

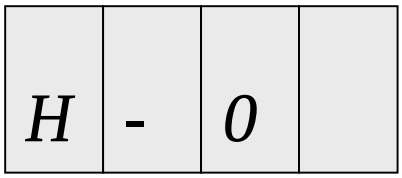


3. Press ENTER key and Flip key to select H-00~H-07 parameters:





4. H-00: Invalid parameter;
5. H-01: Display current running speed(Unit: cm/s):



6. H-02: Hoistway parameter self-learning:

Display L2 when run elevator to lower limit position.

7. H03: Parameters setting with hand operator. Set once the parameter and not need to reset

9. H-05: Motor static angle auto tuning

Choose 1, p MoT18 p 7io eh oo hohhoh

te12ce 12cctoieaue12caisag i

en12cesng o5n12cog nt

12cest