BL6-U Parallel Integrated Controller

User Manual

Ver Number：V1.4

Content_Toc528669950

FOREWORD

Thank you for using BL6-U Parallel elevator controller. BL6 series elevator integrated controller is the next generation elevator control system developed by Shenyang Bluelight Automatic Technology CO. LTD. It combines elevator intellectual logic control and high-performance VVVF drive control. With user friendly interface and advanced technology integrated together, the system not only has outstanding performance, but also shows strong reliability in practice.

- The system combines intellectual logic control and high-performance VVVF drive control.
- Adopts advanced vector control technology, demodulates motor with high precision, takes full advantage of motor capacity, improves elevator performance and comfort feel.
- Adopts advanced space vector PWM calculation method, compare with traditional sine/cosine PWM method, it improves elevator operation efficiency and saves more energy.
- Adopts full function of BL2000/3000 system, maximize the performance of elevator in different application.
- When using Bluelight Synchronous machine, controller could pre-define the machine type with the most optimized model, save machine parameter input and auto-tuning process, improves the commissioning efficiency and maximize the machine performance.
- Fuzzy logic control with non-load-compensation start-up. Excellent comfort feels without lift weighing device.
- Rotating or stopping auto-tuning to get motor parameters and initial angle.
- Suitable for both gearless PM Synchronous traction machine and asynchronous induction machine.
- Brake units are built in for the whole BL3-B series to reduce external component cost.
- Internal encoder and frequency dividing interface to match different PG signal.
- Advanced double 32-bit CPU and FPGA for complete elevator control, with high reliability on elevator safety.
- Redundancy design and full software-hardware protection to achieve elevator safety and reliability.
- Passed professional EMC test, suitable for complicated job site.
- Monitor the cutting current from controller to main motor every time elevator stops.
- Generate optimized speed curve based on target floor to enable lift stop directly with high efficiency.
- CAN BUS serial communication technology for duplex control with high speed and reliability. Simplify system wiring/extension.
- Adopts wireless/LAN remote control interface, convenient for long distance commissioning, maintenance and elevator monitoring.
- Equips upper monitoring and software, convenient for parameter setting, commissioning and debugging.
- Data recorder to save integrated controller operation data, help for onsite maintenance /trouble shooting.
- Parameter upload, download and copy to help onsite maintenance.
- Support ARD function with only UPS unit.
- Match GB7588-2003 (equivalent to EN-81) safety standard.

This user guide has introduced on how to use BL6-U Parallel elevator controller. Please read it carefully and understand safety items before use (installation, running maintenance). This user guide is for elevator designer, installation and maintenance technician. The installation, commissioning and maintenance must be performed by train technician.

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

◆ **Confirmation upon Delivery**

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

◆ **Installation**

✧ **Always hold the case when carrying the integrated controller**
Otherwise the integrated controller may drop and damage.

✧ **Please install the device to a metal surface or other non-flammable objects**
Otherwise there is a fire-hazard potential.

✧ **Please mount the device to an object that is strong enough.**
Otherwise the integrated controller may drop and damage.

✧ **Please install the device in a dry place where water or rain could not get into.**
Otherwise the integrated controller could get damaged.

✧ **For the same cabinet to install the integrated controller and brake resistor, install cooling fan or other cooling device and make sure the air temperature entering is below 45°C**
Overheat can result in fires or other accidents.

✧ **Do not install the device in the environment containing flammable, explosive gas or nearby.**
Otherwise there is risk of fire or explosion.

✧ **Do not leave any metallic objects inside the integrated controller**
Otherwise it may damage the device and has fire-hazard potential.

◆ Wiring

WARNING
✧ **Always turn OFF the input power supply before wiring terminals.** Otherwise, an electric shock or fire can occur. ✧ **Wiring must be performed by an authorized person qualified in electrical work.** Otherwise, an electric shock or fire can occur. ✧ **Be sure to ground the ground terminal. (200 V Class: Ground to 100 Ω or less, 400 V Class: Ground to 10 Ω or less)** Otherwise, an electric shock or fire can occur. ✧ **Always check the operation of any Emergency stop circuits after they are wired.** Otherwise, there is the possibility of injury. (Wiring is the responsibility of the user.) ✧ **Never touch the output terminals directly with your hands or allow the output lines to come into contact with the Inverter case. Never short the output circuits.** Otherwise, an electric shock or ground short can occur.

CAUTION
✧ **Check to be sure that the voltage of the main AC power supply satisfies the rated voltage of the Inverter.** Injury or fire can occur if the voltage is not correct. ✧ **Do not perform voltage withstand tests on the Inverter.** Otherwise, semiconductor elements and other devices can be damaged. ✧ **Connect braking resistors, Braking Resistor Units, and Braking Units as shown in the I/O wiring examples.** Otherwise, a fire can occur, and the Inverter, braking resistors, Braking Resistor Units, and Braking Units can be damaged. ✧ **Tighten all terminal screws to the specified tightening torque.** Otherwise, a fire may occur. ✧ **Do not connect AC power to output terminals U, V, and W.** The interior parts of the Inverter will be damaged if voltage is applied to the output terminals. ✧ **Do not connect phase-advancing capacitors or LC/RC noise filters to the output circuits.** The Inverter can be damaged or interior parts burnt if these devices are connected. ✧ **When a magnetic contactor is connected to the output circuits, do not switch it ON and OFF while the Inverter is running.** Surge current will cause the over current protection circuit inside the Inverter to operate. ✧ **Do not make terminal DC+/ P1 and DC- short link.** Otherwise, a fire or explosion may occur.

◆ Trial Operation

WARNING

✧ **Check to be sure that the front cover is attached before turning ON the power supply.**
Otherwise, an electric shock may occur.

✧ **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.

✧ **Provide a separate fast stop switch; the Digital Operator STOP Key is valid only when its function is set.**
Otherwise, an Injury may occur.

✧ **Reset alarms only after confirming that the RUN signal is OFF.**
Otherwise, an Injury may occur.

✧ **Do not perform fault operation and signal checking while the drive is running.**
Otherwise an injury may occur, and the drive may get damaged.

CAUTION

✧ **Do not touch the radiation fins (heat sink), braking resistor, or Braking Resistor Unit. These can become very hot.**
Otherwise, a burn injury may occur.

✧ **Do not touch the braking resistor.**
Doing so can result in electric shock.

✧ **Be careful when changing Inverter settings. The Inverter is factory set to suitable settings.**
Otherwise, the equipment may be damaged.

◆ Maintenance and Inspection

WARNING

✧ **Do not touch the Inverter terminals. Some of the terminals carry high voltages and are extremely dangerous.**
Doing so can result in electric shock.

✧ **Always have the protective cover in place when power is being supplied to the Inverter.**
When attaching the cover, always turn OFF power to the Inverter through the MCCB.
Doing so can result in electric shock.

✧ **After turning OFF the main circuit power supply, wait for the time indicated on the front cover, and make sure the CHARGE indicator light has gone out, and then perform maintenance and inspection.**
The capacitor will remain charged and is dangerous.

✧ **Maintenance, inspection, and replacement of parts must be performed only by authorized personnel. Remove all metal objects, such as watches and rings, before starting work. Always use grounded tools.**
Failure to heed these warning can result in electric shock.

✧ **Do not change the wiring, or remove connectors or terminal, during power on period.**
Otherwise, an electric shock may occur.

CAUTION
✧ A CMOS IC is used in the control board. Handle the control board and CMOS IC carefully. The CMOS IC can be destroyed by static electricity if touched directly.

◆ **Other**

WARNING
✧ Do not attempt to modify or alter the Inverter. Doing so can result in electrical shock or injury.

1.3. Warning Labels on the Controller

Read and follow all warning labels on the controller before installation.

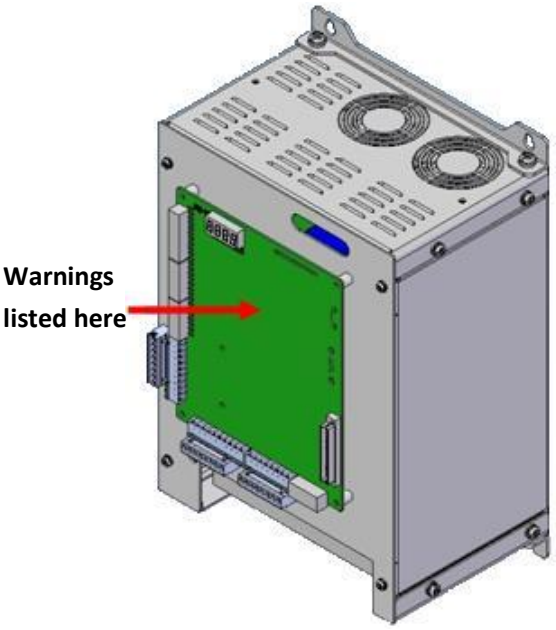


FIGURE 1.1 WITHOUT SHIELD

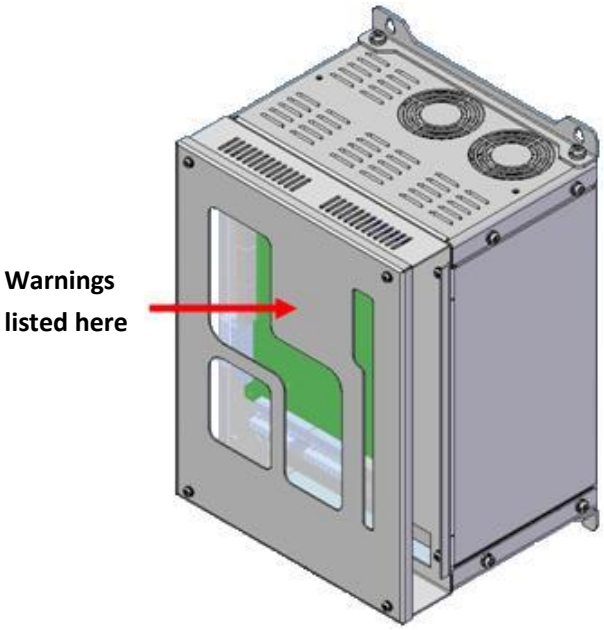


FIGURE 1.2 WITH SHIELD

Text on Warning Labels


WARNING


Risk of electric shock

- Read manual before installing.
- Wait 5 minutes for capacitor discharge after disconnecting power supply.

FIGURE 1.3 WARNING LABEL CONTENT

Chapter 2: Introduction and Installation

This chapter introduces models, specifications, product appearance, size, and product function of the BL6-U Parallel elevator integrated controller, and describes the checks required upon receiving or installing an Inverter.

2.1. Model Description

The model of the elevator integrated controller on the nameplate indicates the specification, voltage level, and maximum motor capacity of the controller in alphanumeric codes. Refer to Figure 2.1 for example (22kw, 400V rank).

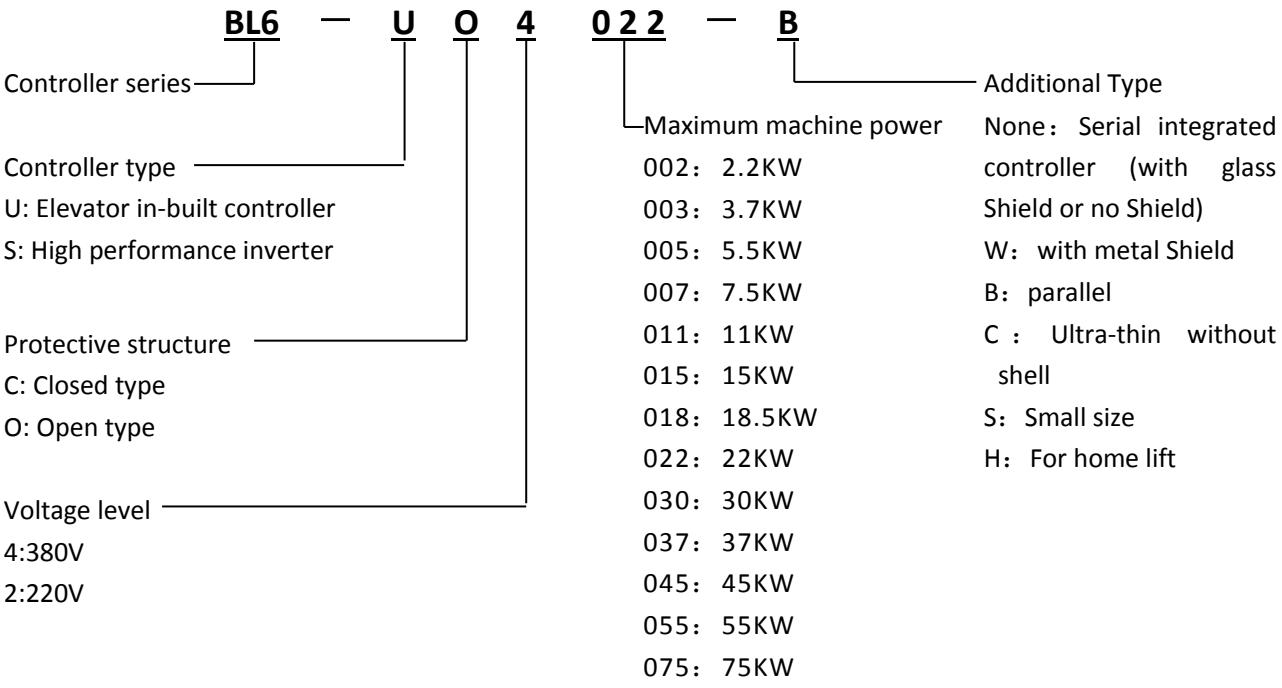


FIGURE 2.1 MODEL DESCRIPTION DIAGRAM

2.2. Nameplate Information

Nameplate information is shown in Figure 2.2 below.

Nameplate attached to the right side of BL6-U Parallel elevator controller describes the model, power, input, output, serial number, and other information about the controller.

Example: A standard nameplate for BL6-U Parallel elevator controller: 3-phase, 400 VAC, 22KW.

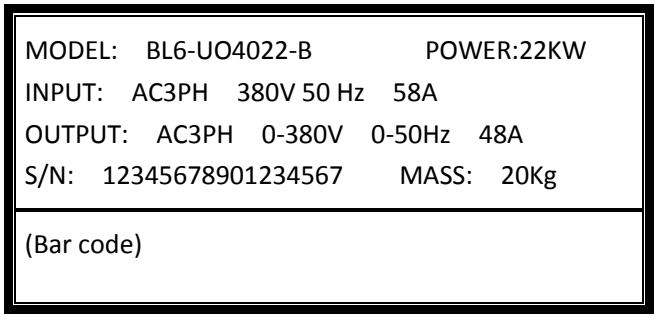


FIGURE 2.2 NAME PLATE INFORMATION

2.3. Specifications

Specifications of BL6-U Parallel elevator integrated controller in chart 2.1.

CHART 2.1 SPECIFICATIONS

MODEL BL6—U□40□□-B		4005	4007	4011	4015	4018	4022	4030	4037	4045
		4055	4075							
MAX MOTOR CAPACITY(KW)		5.5	7.5	11	15	18.5	22	30	37	45
		55	75							
RATED OUTPUT	RATED OUTPUT CAPACITY(KVA)	9	12	18	22	27	32	43	53	63
		78	106							
	RATED OUTPUT CURRENT(A)	14	18	27	34	41	48	65	80	96
		128	165							
	MAX OUTPUT VOLTAGE(V)	Three-phase, AC380(corresponding to the input voltage)								
	RATED FREQUENCY(Hz)	50								
	MAX OUTPUT FREQUENCY(Hz)	120								
POWER INPUT	RATED VOLTAGE(V)	Three-phase, AC380								
	RATED FREQUENCY(Hz)	50								
	RATED INPUT CURRENT(A)	17	22	32	41	49	58	78	96	115
		147	190							
	ALLOWABLE VOLTAGE FLUCTUATION	±15%								
	ALLOWABLE FREQ FLUCTUATION	±5%								

MODEL BL6—U□20□□-B		2003	2005	2007	2011	2015	2018	2022
MAX MOTOR CAPACITY(KW)		3.7	5.5	7.5	11	15	18.5	22
RATED OUTPUT	7	10	14	20	27	33	40	
	17	25	33	49	66	80	96	
	MAX OUTPUT VOLTAGE(V)	Three-phase, AC220(corresponding to the input voltage)						
	RATED FREQUENCY(Hz)	50						
	MAX OUTPUT FREQUENCY(Hz)	120						
POWER INPUT	RATED VOLTAGE(V)	Three-phase, AC220V						
	RATED FREQUENCY(Hz)	50						
	RATED INPUT CURRENT(A)	21	27	40	52	68	92	110
	ALLOWABLE VOLTAGE FLUCTUATION	+10%, -15%						
	ALLOWABLE FREQ FLUCTUATION	±5%						
BASIC FEATURES	ELEVATOR CONTROL MODE	Simplex Collective, Duplex Collective, 3~8 units Group Control						
	ELEVATOR SPEED RANGE	0.5~4m/s						
	APPLICABLE HIGHEST FLOORS	15 levels						
	APPLICABLE ELEVATOR TYPE	Passenger, Hospital, Panoramic, Goods, Villa Elevator						
	APPLICABLE MOTOR	Gear Traction Machine, Gearless Traction Machine						
	COMMUNICATION MODE	CAN bus serial communication						
	LEVELING ACCURACY	≤3mm						
DRIVE CONTROL FEATURES	CONTROL MODE	Space vector PWM (SVPWM) closed loop vector control						
	CARRIER FREQUENCY	8KHz (6~12KHz adjustable)						
	SPEED CONTROL RANGE	1:1000						
	SPEED CONTROL ACCURACY	±0.05% (25℃±10℃)						
	SPEED RESPONSE	30Hz						
	TORQUE LIMIT	Yes (Set by parameters)						
DRIVE CONTROL FEATURES	TORQUE ACCURACY	±5%						
	FREQUENCY CONTROL RANGE	0~120Hz						
	FREQUENCY ACCURACY	Digital Ref: ±0.01% (-10℃~+40℃)						
	FREQUENCY REF RESOLUTION	Digital Ref: 0.01Hz						
	OUTPUT FREQ RESOLUTION	0.01Hz						
	OVERLOAD CAPACITY	150% rated current 60s; 180% rated current 10s						
	STARTING TORQUE	180% rated current 0Hz						
	DECELERATION TIME	0.001~600s						

CHART 2.1 SPECIFICATIONS (Cont'd)

DRIVE CONTROL FEATURES	MAIN CONTROL FUNCTIONS	START WITHOUT LOAD COMPENSATION, BATTERY OPERATION, AUTO TUNING, LOAD COMPENSATION, COOLING FAN CONTROL, BASE BLOCK, TORQUE LIMIT, CAN COMMUNICATION REF, ACCELERATION/DECELERATION TIME, S CURVE ACCELERATION/DECELERATION, **MONITOR OF MAIN MACHINE FOR WHICH ELECTRIC CURRENT CAN BE EFFECTIVELY INTERDICT OR NOT WHEN THE CAR STOPS;** INTERNAL BRAKE, PG FREQ DIVIDING OUTPUT, AUTOMATIC FAULT RETRY, AUTOMATIC FAULT RESET, PARAMETER COPY
CONTROL/INPUT/ OUTPUT INTERFACE	OC INPUT CONTROL POWER	ISOLATED EXTERNAL DC24V
	RELAY OUTPUT CONTROL POWER	ISOLATED INTERNAL DC24V
	LOW OPTO-ISOLATED INPUTS	46-CHANNEL SWITCHES: RATED LOAD 7MA/DC24V, UPPER FREQ 100HZ
	HIGH OPTO-ISOLATED INPUTS	2-CHANNEL SWITCHES: RATED LOAD 8MA/AC110V, UPPER FREQ 100HZ
	PROGRAMMABLE RELAY OUTPUT	24-CHANNEL SWITCHES:1NO, CONTACT CAPACITY 5A/30VDC,5A/250VAC
	CAN COMMUNICATION INTERFACE	1 CHANNEL:(DUPLEX/GROUP CONTROL, REMOTE WIRELESS MONITORING)
	RS232 COMMUNICATION INTERFACE	2 CHANNELS: DIGITAL OPERATOR/PC MONITORING/PROGRAMMABLE INTERFACE; SECURITY DOG COMMUNICATION
DISPLAY	DIGITAL OPERATOR	LCD DISPLAY IN CHINESE/ENGLISH
	MONITORING SOFTWARE INTERFACE	MENU/PARAMETER/STATE/VARIABLE TIMING/DIGITAL OSCILLOSCOPE ETC.
MAIN PROTECTION FUNCTIONS	INSTANTANEOUS OVERCURRENT PROTECTION	STOP AT OVER 200% RATED OUTPUT CURRENT
	FUSE PROTECTION	STOP AT FUSED
	OVERLOAD PROTECTION	STOP AT 150% RATED CURRENT 60S/180% RATED CURRENT 10S
	OVERVOLTAGE PROTECTION	STOPS AT DC BUS VOLTAGE OVER 720V (400V DRIVE) OR 410V (200V DRIVE)
	UNDERVOLTAGE PROTECTION	STOPS AT DC BUS VOLTAGE UNDER 380V (400V DRIVE) OR 190V (200V DRIVE)
	HEATSINK OVERHEAT PROTECTION	PROTECT BY THERMISTORS
	IGBT INTERNAL PROTECTION	IGBT OVERCURRENT/OVERHEAT/SHORT CIRCUIT/UNDERVOLTAGE PROTECTION
	MOTOR PROTECTION	PROTECT BY ELECTRONIC THERMAL DEVICES
	IMPACT RESTRAINING CIRCUIT	PROTECT BY CONTACTOR FEEDBACK
	OVERSPEED 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 TUNING 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 FAULT	NO BRAKE OPEN FEEDBACK SIGNAL AFTER OUTPUT BRAKE OPEN COMMAND
	LEVELING ZONE SIGNAL FAULT	PROTECT AT LEVELING ZONE SIGNAL FAULT
MAIN PROTECTION FUNCTIONS	OUTPUT CONTACTOR FAULT	PROTECT AT OUTPUT CONTACTOR FAULT
	RUNNING TIME PROTECTION	PROTECT AT SINGLE RUNNING TIME EXCEEDS LIMIT
	FLOOR COUNTER FAULT	PROTECT AT FLOOR COUNTER FAULT
	COMMUNICATION INTERFERENCE FAULT	PROTECT AT COMMUNICATION INTERFERENCE FAULT
	HOISTWAY PARAMETER LEARNING FAULT	HOISTWAY PARAMETER LEARNING FAULT PROTECTION
STRUCTURE	PROTECTION DEGREE	C: CLOSED IP20; O: OPEN IP00
	COOLING	FORCED AIR COOLING
	INSTALLATION	CABINET EMBEDDED INSTALLATION/HANGING INSTALLATION
	AMBIENT TEMPERATURE	-10˚C~+40˚C
USING AMBIENT	HUMIDITY	5~95%RH, NO CONDENSATION
	STORAGE TEMPERATURE	-20˚C~+60˚C
	APPLICATION SITUATION	INDOOR (NO CORROSIVE GAS, FLAMMABLE GAS, DUST AND DIRECT SUNLIGHT)
	ALTITUDE	BELOW 1000M
	VIBRATION	10~20HZ, <9.8M/S²;20~50HZ, <2M/S²

2.4. Appearance and Exterior Dimension

BL6-U Parallel elevator controller has Without shield type and shield type. Different from BL3-U series elevator controller, BL6-U can be installed only by hanging method. Refer to Figure 2.3-2.6 and chart 2.2-2.3 for appearance and exterior dimension of BL6-U Parallel elevator controller.

2.4.1 Without shield type

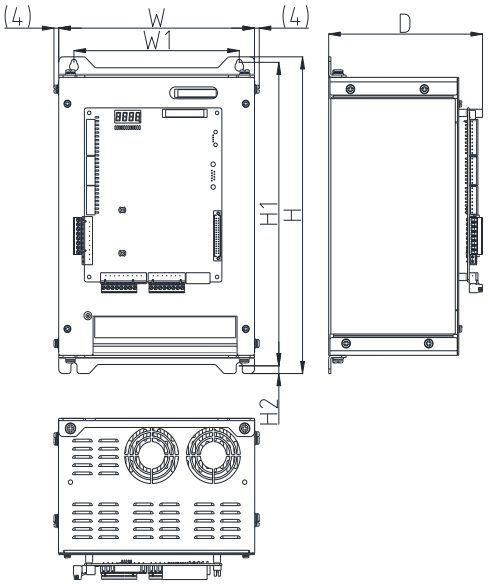


FIGURE 2.3 WITHOUT SHIELD TYPE EXTERIOR DIMENSION

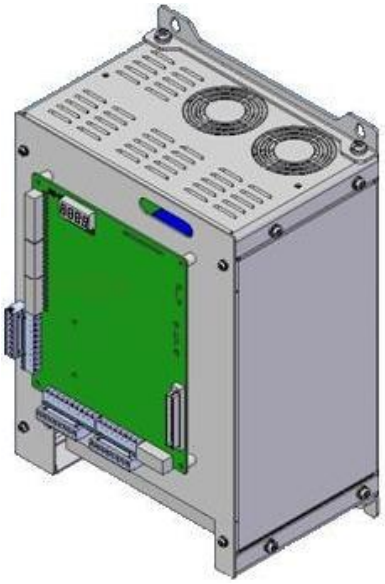


FIGURE 2.4 WITHOUT SHIELD TYPE APPEARANCE

Chart 2.2 Without Shield type exterior dimension

Voltage level	Max Motor Power (KW)	Controller Model	Figure	Exterior Dimension						Weight kg
				W	H	D	W1	H1	H2	
400V 3-phase	5.5	BL6-UO4005-S	Figure 2.3	200	290	173	170	275	8	5.6
		BL6-UO4005		225	348	193	190	333	8.5	6.5
	7.5	BL6-UO4007								7
	11	BL6-UO4011								8
	15	BL6-UO4015								8.5
	18.5	BL6-UO4018		280	418	203	230	403		13
	22	BL6-UO4022								13
	30	BL6-UO4030		320	480	228	270	460	10	19
	37	BL6-UO4037		441	650	324	310	626	10.5	46
	45	BL6-UO4045								
200V 3-phase	3.7	BL6-UO2003	Figure 2.3	225	348	193	190	333	8.5	7
	5.5	BL6-UO2005								8
	7.5	BL6-UO2007								8.5
	11	BL6-UO2011		320	480	228	270	460	10	13
	15	BL6-UO2015								19
	18.5	BL6-UO2018		441	645	324	310	626	10.5	45
	22	BL6-UO2022								

Note: 5.5kw BL6 has two dimensions: Dimension of model BL6-UO4005-S and BL6-UO4005-SC is same as above chart. Dimension of model BL6-UO4005 and BL6-UO4005-C is same as 7.5-15kw BL6. Please distinguish while installation and using.

2.4.2 Shield Type

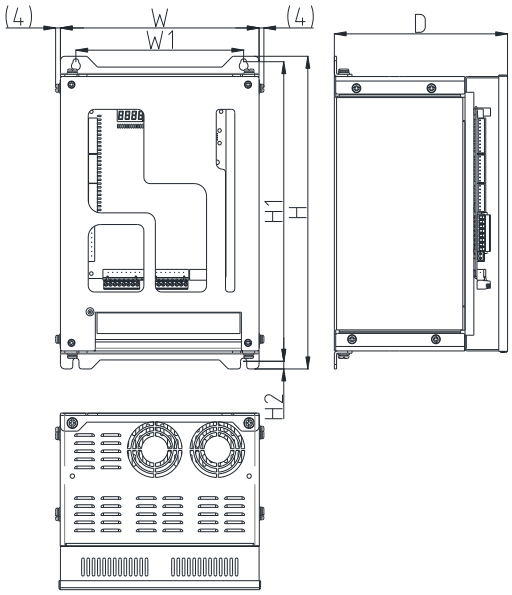


FIGURE 2.5 SHIELD TYPE EXTERIOR DIMENSION

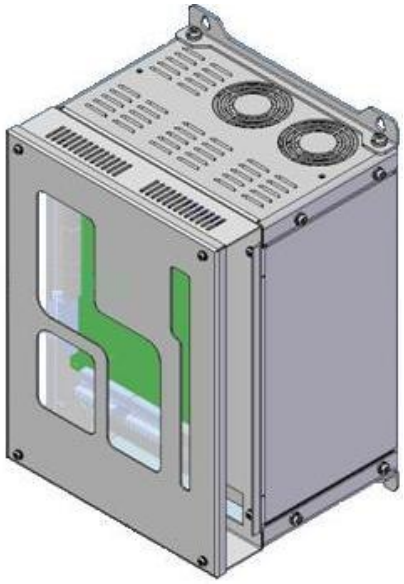


FIGURE 2.6 SHIELD TYPE APPEARANCE

Chart 2.3 SHIELD type Inverter Exterior Dimension

Voltage level	Max Motor Power (KW)	Controller Model	Figure	Exterior Dimension						Weight kg
				W	H	D	W1	H1	H2	
400V 3-phase	3.7	BL6-UO4003-W	Figure 2.5	200	290	180	170	275	8	6
	5.5	BL6-UO4005-SW								
		BL6-UO4005-W		225	348	200	190	333	8.5	7.5
	7.5	BL6-UO4007-W								
	11	BL6-UO4011-W								9
	15	BL6-UO4015-W								9
	18.5	BL6-UO4018-W		280	418	210	230	403		14
	22	BL6-UO4022-W								
200V 3-phase	3.7	BL6-UO2003		225	348	200	190	333	8.5	8
	5.5	BL6-UO2005								9
	7.5	BL6-UO2007								
	11	BL6-UO2011		320	480	235	270	460	10	20
	15	BL6-UO2015								

Note: 5.5kw controller has two type of dimensions： Dimension of model BL6-UO4005-SW is as above chart. And Dimension of model BL6-UO4005-W is same as dimension of 7.5-15kw controller. Please distinguish them when installation.

2.5. Confirmation upon Delivery

Check below items when receiving the products.

Chart 2.4 Things to check upon delivery

NOTES	METHOD
Check if product model is correct.	Check the model on the nameplate.
Check if product is broken.	Check exterior for any damage caused by shipment.
Check if mounting structure is loose.	Check mounting structure. Tighten the loose components with a screw driver, if required.
Check if main control board is loose.	Remove the front cover and check mounting structure. Tighten the loose component switch a screw driver, if required.

With any abnormalities above, please contact the company or regional office.

2.6. Installation

2.6.1 Installation Site

Install BL6-U Parallel elevator controller in an area that meets the requirements listed in chart 2.5

Chart 2.5 Installation Environment Requirements

Type	Ambient Temperature	Ambient Humidity
Open	-10°C~+45°C	5~95%RH (No condensation)
Close	-10°C~+40°C	5~95%RH (No condensation)

Installation of controller should note the following:

1. Install the controller in a clean location which is free from oil mist and dust, or in a fully closed control cabinet which is completely shielded from floating dust.
2. Install the controller in a place which metal powder, oil, water, and other foreign bodies cannot enter.
3. Do not install the controller in or nearby wood and other combustibles.
4. Install the controller in a place without radioactive substances.
5. Install the controller in a place without harmful gas and liquid.
6. Install the controller in a place without vibration.
7. Install the controller in a place without chlorides.
8. Install the controller in a place without direct sunlight.

2.6.2 Temperature Requirement

To enhance the reliability, the controller should be installed in an environment temperature is not easy to rise. When installed in a cabinet, cooling fans or air conditioner are required to keep air temperature in the cabinet below 45°C.

2.6.3 Protect the controller from Foreign Object

Place a cover over the controller during installation to shield it from metal powder produced by drilling. Be sure to remove the cover from the controller after the completion of installation. Otherwise, ventilation will be reduced, causing the controller to overheat.

2.6.4 Removing and attaching the Terminal Cover

Refer to Figure 2.7-2.8. Note the Without Shield type BL6-U integrated controller terminal cover need not remove or attach.

◆ **Remove terminal Cover**

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

◆ **Install front cover**

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

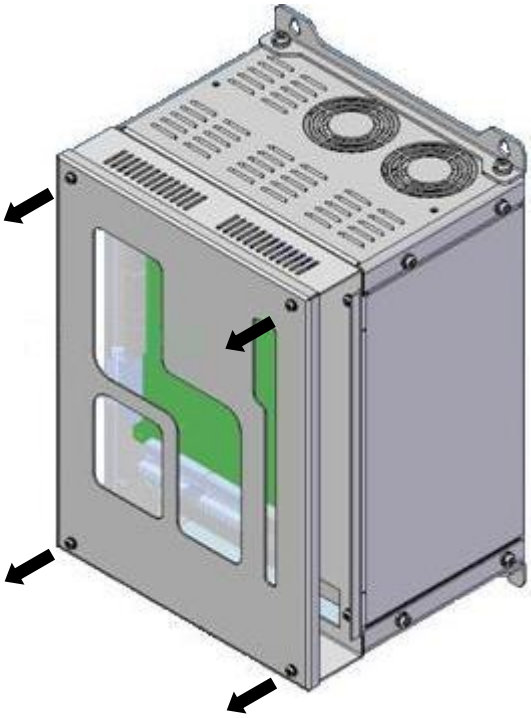


Figure 2.7 Remove terminal cover on shield type

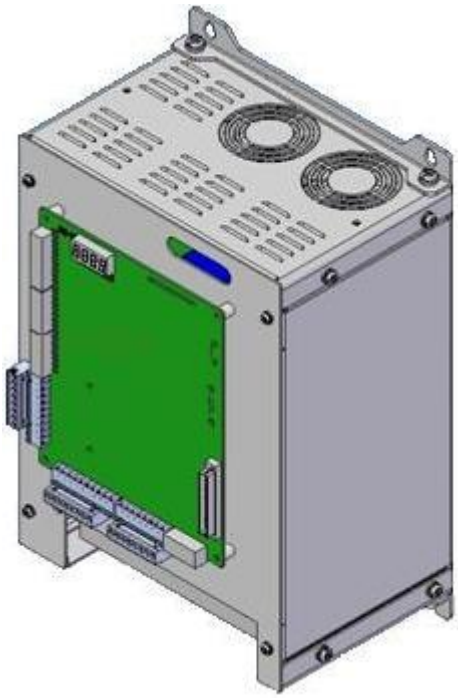


Figure 2.8 Without Shield type elevator controller

2.6.5 Installation Orientation and Space

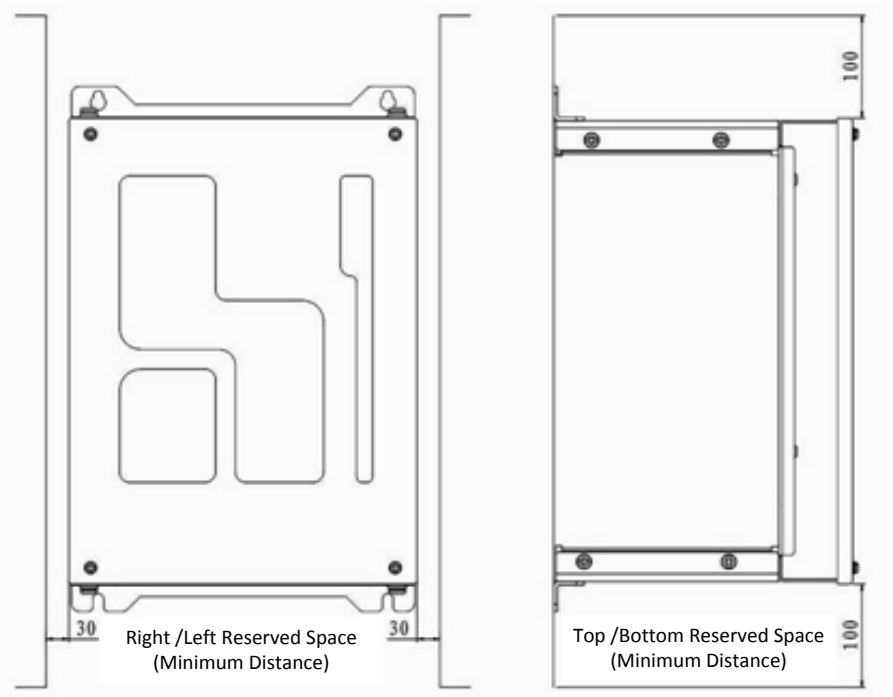


Figure 2.9 Driver Installation Orientations and Space

Install the controller vertically to avoid reducing the cooling effect. When installing the controller, please make sure that installation space is greater than that shown in Figure 2.9, in order to ensure that the BL6-U Parallel elevator integrated controller normal working and cooling.

2.7. Braking Resistance Configuration

Elevator is a typically potential energy load type device. When the elevator is in brake mode, the electricity feedback of motor will make the DC bus voltage increase. Some additional brake component should be applied to release the energy. Otherwise, over-voltage protection will be activated. BL6-U Parallel elevator controller has internal brake unit, customers just need to equip appropriate braking resistor. The numerical value of resistance and power depend on the motor capacity.

Refer to chart 2.6 for braking resistance configuration specific.

Chart 2.6 Braking Resistor value list

Model	Motor Power (kW)	Braking Resistor value (Ω)			Braking Resistor Total Power value (W)	
		Min	MAX	Typ.	Synchronous	Induction
400V (Voltage Range：85%≤380V 3-phase ≤120%)						
BL6-U□4005-□□	5.5	56	90	75	1600	1200
BL6-U□4007-□□	7.5	46	70	65	2200	1600
BL6-U□4011-□□	11	28	45	40	3500	2500
BL6-U□4015-□□	15	28	35	30	4500	3500
BL6-U□4018-□□	18.5	17	29	25	5500	4500
BL6-U□4022-□□	22	17	24	20	6500	5000
BL6-U□4030-□□	30	11	20	16	9000	7000
BL6-U□4037-□□	37	9	16	12	11000	9000
BL6-U□4045-□□	45	9	14	10	13500	10000
BL6-U□4055-□□	55	5	8	7	20000	18000
BL6-U□4075-□□	75	5	6	5	28000	25000
200V (Voltage Range：85%≤ 220V 3-phase ≤120%)						
BL6-U□2003-□□	3.7	28	37	30	1100	800
BL6-U□2005-□□	5.5	20	27	24	1600	1200
BL6-U□2007-□□	7.5	15	21	20	2200	1600
BL6-U□2011-□□	11	10	14	12	3500	2500
BL6-U□2015-□□	15	8	11	10	4500	3500
BL6-U□2018-□□	18.5	7	9	8	5500	4500
BL6-U□2022-□□	22	5	8	8	6500	5000

2.8. Product Function

Functions list shown in chart 2.7-2.10.

Chart 2.7 Basic Function List

No.	Name	Purpose	Description	Note
1	Automatic Run		1.Door auto open at stop; 2.Door auto close in delay time; 3.Door close at close button pushed; 4.Car call register, auto cancel wrong call; 5.Landing call stop car in same direction 6. Car service opposite direction landing call at top/bottom floor	1. Turn all inspection switch to normal state; 2. Turn Auto/Attendant switch to Auto state; 3. The other two Auto/Inspection switch at Auto state;
2	Attendant Run		1. Door auto open at stop; 2. Door close at close button pushed; 3. Car call auto register/ cancel wrong call; 4. Landing call stop car in same direction;	1. Turn all inspection switch to normal state; 2. Turn Auto/Attendant switch to Attendant state; 3. The other two Auto/Inspection switch at Auto state;
3	Inspection Run	Used at System Commissioning; Maintenance	When push up/down button in inspection mode, car runs up/down at inspection speed. Car stop once button released.	Auto/Inspection switch at car top, car and control cabinet, priority from high to low.
4	Auto door open at power on	Auto door open	If car at leveling zone at power on, door open automatically.	
5	Auto door close in delay time	Door keep opening	After door complete opened, it keeps open and will auto close after delay time.	1. Delay time is set through open door holding time parameter (T) 2.T-2s with only landing call 3. T+2s with both landing call and car call.
6	Door OP at current floor landing call	Door open for landing call	If landing call on the same floor at door closing or door closed but car not running, door will open automatically.	Delay time is set by open door holding time.
7	Safety Plate/ light curtain	Close door safely	If safety plate touched/light curtain covered, door will open and close again.	Door safety plate/light curtain reset, door automatically close again.
8	Overload door keep open	Wait for load reduction	Door open at overload, with overload light on, buzzer sounds, CZ display on COP. Car not running.	Elevator back to normal state when overload is cleared.

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	Adjust/ Maintenance	Elevator Running mode, direction, floor, door mode, load and fault information display on integrated controller LCD.	
12	Auto control light	Energy Saving	Car box light turned off if elevator is not used for 15 minutes. Turned on after receiving any call.	
13	Fire-Service Mode		System enters **fire-service mode** when fire switch is closed: 1. Clear up all landing/car call; 2. Auto return to fire floor 3. Door keep opens 4. Output fire linkage signal after return to fire floor. 5. If elevator runs in opposite direction, stop at nearest floor, do not open door, run directly to fire floor, door keep opens.	Two fire-service modes for option: **Fire mode 1:** Elevator stop running after returning to fire floor. **Fire mode 0:** a) Landing call disabled; b) Door keep opens at fire floor; c) To run elevator, fireman should first choose the target floor, press and hold the **close door** button till door close, elevator run; if **close door** button is released before door closed, door open again. d) Arriving target floor, press and hold **open door** button till door opens, otherwise door close again. e) Can only set one floor every running.
14	Auto stop at elevator fault	Free passengers	When car stop outside landing zone at elevator fault, it will auto crawl to leveling zone in middle floor direction and open door.	Only if safety circuit and inverter are both working normal.

Cart 2.7 Basic Function List (Cont'd)

No.	Name	Purpose	Description	Note
15	Parking	Stop Running	Elevator enters parking mode at electric lock closed. 1.Elevator does not respond to landing call, service all car call and return to parking floor (adjustable); 2. If no car call, elevator directly return to parking floor; 3. After return to parking floor: a. HOP and COP display parking sign "ZT"; b. Do not respond to car/landing call; c. After 10s, door close, car box light and HOP/COP display turn off. d. Press any COP/Open, close door button, car box light turns on; e. Press Open/Close door button, car door close again and cut car box light after 10s.	1. If elevator at inspection mode when close electric lock, car cannot auto return to parking floor. Other functions remain. 2. Integrated controller in working state when elevator at parking mode. Once open electric lock, elevator will run normally.
16	Duplex Control	Two elevator optimized control	1. At landing call, both elevator answers based on their running state and location, and only one elevator respond to increase the running frequency. 2. When both elevators at waiting state, one return to waiting floor (normally G floor), the other one stays at current location.	To achieve duplex, connect two integrated controllers with the cable provided and set duplex parameter accordingly.
17	Group Control	Multi-Elevator	Control up to 8 elevators together	

Chart 2.8 Special Function List

No.	Name	Purpose	Description	Note
1	Hoistway Learning	Measure, store hoistway data.	In inspection mode, from bottom terminal switch to top terminal switch, measure and store the landing zone and hoistway switch position.	Hoistway learning may be terminated in unusual condition and system will give error code accordingly. Please follow **Chart 8.2** for detail error codes. ▲**Note：** When hoistway learning stops, only when "**Success**" is displayed on the operator means hoistway learning success.

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	If one landing call button is pressed for more than 20s, it is considered stuck (cannot reset), such call is not registered, button answer light flashes.	Exit such state when button is reset.
5	Repeat close door		At close door command, if door interlock circuit not connected in set time, door open and close again.	If repeat 5 times and door interlock circuit still not close, elevator stops for service, display error code accordingly.
6	Machine room floor selection	Maintenance	Use hand operator to input car call	
7	Machine room floor open/close door	Maintenance	Use hand operator to input open/close door command	
8	Non-Stop Floor		User can set any floor not to stop	
9	Homing floor set	Wait at homing floor	In auto mode, with no landing/car call for certain time, car goes to homing floor.	Can only set one homing floor.
10	Display character set	Change display of certain floor	Display character on any floor can be set through hand operator. (Character or Figure)	
11	Attendant Direction Set	VIP Mode	Choose elevator direction through up/down button before running	Only available in Attendant mode.

Chart 2.8 Special Function List (Cont'd)

No.	Name	Purpose	Description	Note
12	Auto Start/Stop Elevator Service	Automatic start/stop elevator service	User may set elevator on/off time by practical requirement.	1. Time is set by 24hrs 2. Cancel this function by setting both on/off time to 00. 3. This function is only available with electric lock open, otherwise elevator in parking mode. 4. To enable elevator service in off time: a. Close electric lock, wait for 1s, reopen electric lock to enter **force on** mode, elevator could use normally. b. Close electric lock after use, wait for 1s, reopen electric lock to exit **force on** mode, elevator in off time.
13	Special Running	Special Passenger Service	Landing call is invalid, elevator controlled by attendant. Door control mode is attendant mode.	Only available with special buttons.
14	Door open time delay set	Delay the door open time	Press this button before car door fully closed, door open time will be delayed setting time.	1. Must have door open delay button 2. Only available in Auto Mode 3. Normally used in bed elevator system
15	Rear door control	Elevator with two doors	Control rear door operation on each floor	Follow section 6.8 for rear door mode setting.
16	Trouble Shooting	Automatic find and record fault data.	1. When fault happens, system diagnoses fault condition and display error code on LCD. 2. System record the last 30 fault data (fault time/class/floor) in error report menu for further reference.	For trouble shooting error code please follow **Chart 8.1** Trouble shooting for Elevator
17	Interference evaluation	Inspect site interference condition	Evaluate the site shielding condition, including control cabinet/hoistway connection to ground, help to increase resistance to interference.	This function is only available after elevator commissioning and testing.
18	Encoder Evaluation	Inspect encoder output signal	Analyze the evaluate encoder output signal, help service team on-site maintenance to eliminate elevator shock and leveling issue.	Provide direct evidence on encoder quality and interference condition.

Chart 2.8 Special Function List (Cont'd)

19	Emergency Auto Leveling (ARD mode)	After power cut, elevator powered by emergency leveling device, level to nearby landing zone.	After power cut, elevator powered by emergency leveling device and level to nearby landing zone to free the passenger. Such function must meet certain requirements: 1. After power cut, elevator powered by emergency leveling device. (integrated controller I/O board terminal X18 enable); 2. Elevator NOT in inspection mode; 3. Elevator NOT at landing zone; 4. Elevator can run normally; 5. Safety/Door inter-lock circuit close; Elevator emergency leveling procedures when not at landing zone: 1. Determine run direction based on load condition (need weighing device); 2. After leveling to nearby floor, door keep open, and emergency leveling device cuts off power. 3. After power recovery, if system record a history of emergency leveling action, elevator return to bottom floor to re-calibrate hoistway data. **When at landing zone**, emergency leveling device supply power, elevator door open (integrated controller I/O board terminal X18 must enable).	Because the power of emergency automatic leveling running is supplied by elevator emergency automatic leveling controller device, drawings of controller system is different from standard drawing. When you need this function, please ask technique department for drawings accordingly.
20	Input port evaluation	Inspect input signal interference	System evaluates and displays the input signal quality, help service team to increase the hoistway cable resistance to interference and eliminate elevator COP/HOP display fault information and leveling issue.	Provide direct evidence on input signal interference.
21	Door open in advance	When run at low speed, door open beforehand to improve running efficiency.	Elevator reduce speed when approaching target landing zone, if elevator meets the condition below, door open in advance: 1. Elevator run normally, reaching target landing zone; 2. Two leveling sensors enable; 3. Car speed lower than the set protection speed; 4. Controller low speed output enable; 5. Safety board output enable;	In special function select parameter F4-06-20=ON to enable opening in advance; For opening in advance/re-leveling function principle/wiring diagram please see **Appendix 2-opening in advance/re-leveling function description.**

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 to 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, the 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 break 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 describes the terminals and wiring specifications for main circuit, control circuit and PG card of the integrated controller.

3.1. Elevator Integrated Controller Terminal Wiring Diagram

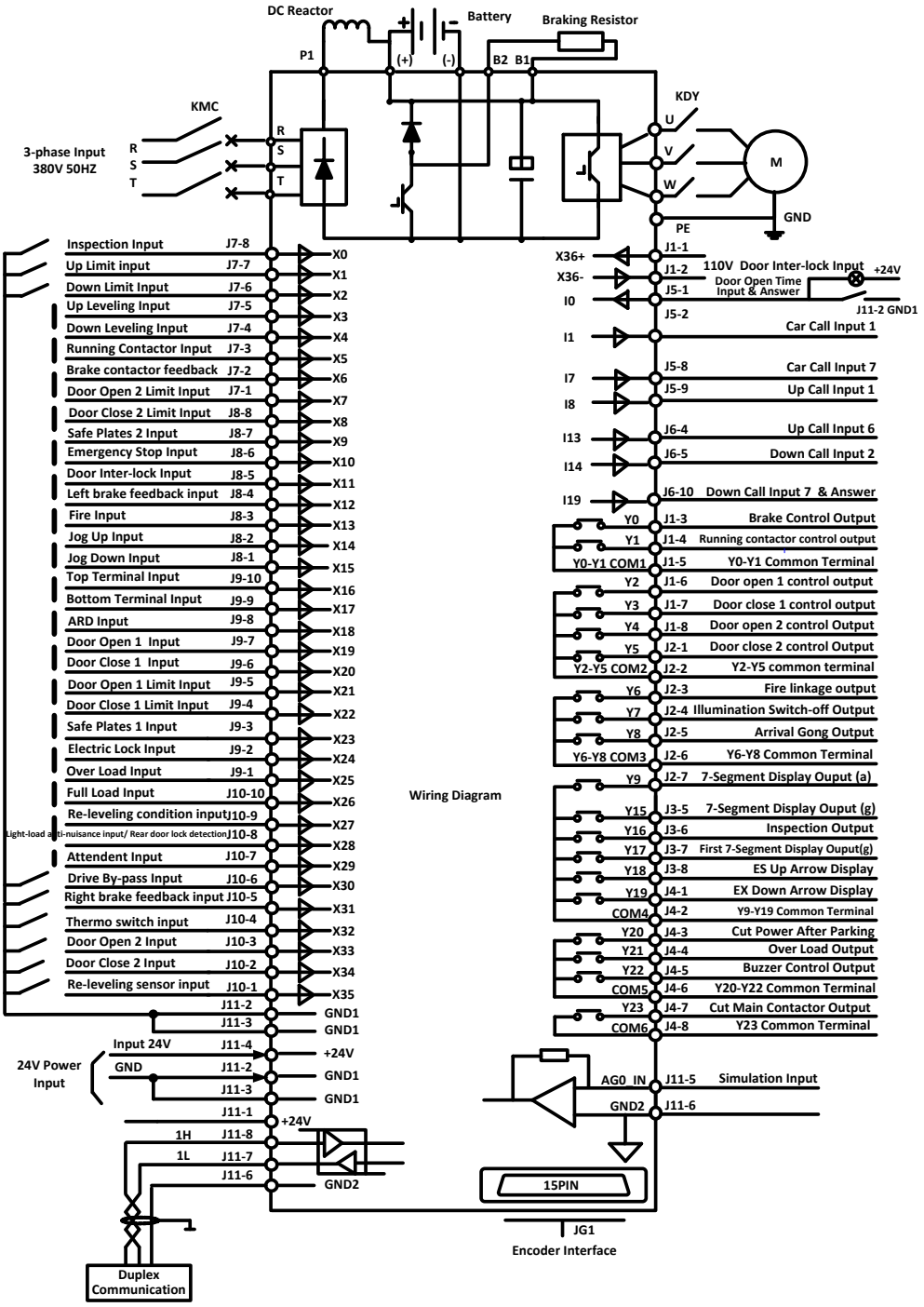


Figure 3.1 Terminal wiring Diagram for Elevator integrated controller

3.2. Wiring Main circuit Terminals

3.2.1 Main circuit structure

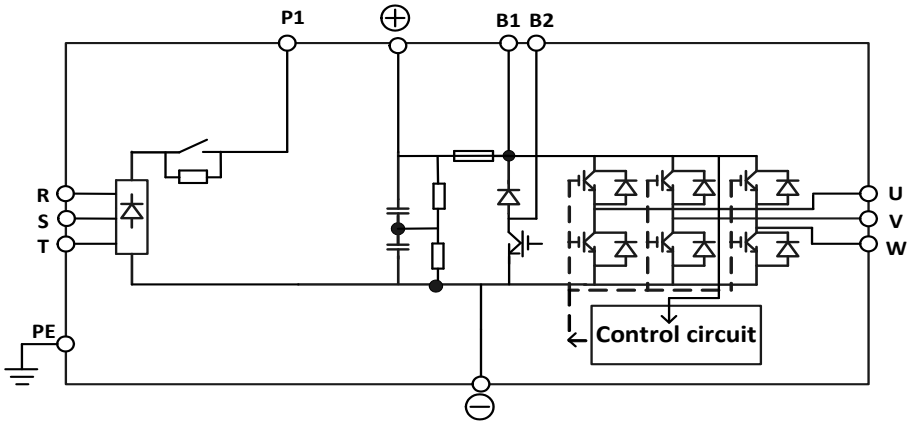


Figure 3.2 Main circuit Structure

3.2.2 Terminal arrangements for Main circuit

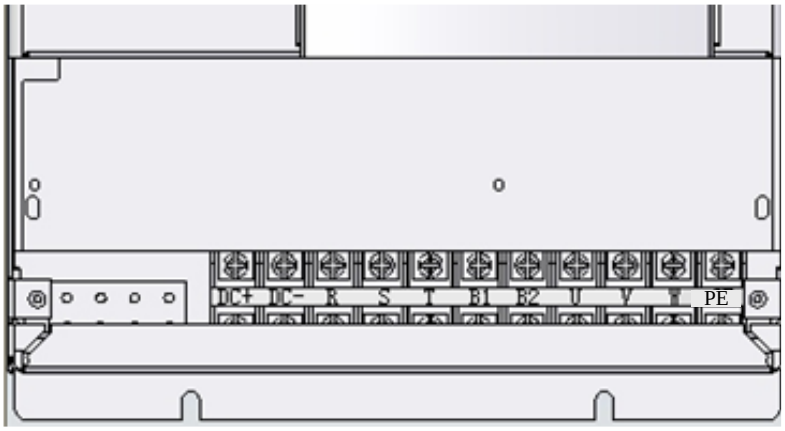


Figure 3.3 Terminal arrangements for main circuit

3.2.3 Main circuit terminal summary and function instruction

Chart3.1 Main circuit terminal definition & function

Terminal Symbol	Function Instruction
R, S, T	Main circuit power input (380V/50Hz，3℄)
DC+	DC BUS output +
DC-	DC BUS output -
B1, B2	External Braking resistor terminal connection
U, V, W	Controller output terminal connect with motor
PE	Terminal connect to ground

Note: DC+, DC- connect with battery device when system has ARD function.

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)mm²	Wire size (Rec)mm²	Wire type
BL6-U□4003-□□	DC+, DC-, R, S,T,B1,B2,U,V,W	M4	1.2~1.5	4	4	
	PE			2.5～4	2.5	
BL6-U□4005-□□	DC+,DC-,R,S,T,B1,B2,U,V,W	M6	4~5	6~10	6	
	PE					
BL6-U□4007-□□/ BL6-U□2003-□□	DC+,DC-,R,S,T,B1,B2,U,V,W	M6	4~5	6~10	6	
	PE					
BL6-U□4011-□□/ BL6-U□2005-□□	DC+,DC-,R,S,T,B1,B2,U,V,W	M6	4~5	6~10	6	
	PE					
BL6-U□4015-□□/ BL6-U□2007-□□	DC+,DC-,R,S,T,B1,B2,U,V,W	M6	4~5	6~10	6	
	PE					
BL6-U□4018-□□	DC+,DC-,R,S,T,B1,B2,U,V,W	M6	4~5	8~10	10	
	PE					
BL6-U□4022-□□	DC+,DC-,R,S,T,B1,B2,U,V,W	M6	4~5	10~16	10	
	PE					
BL6-U□4030-□□/ BL6-U□2011-□□/ BL6-U□2015-□□	DC+,DC-,R,S,T,B1,B2,U,V,W	M6	4~5	10~16	16	
	PE					
BL6-U□4037-□□/ BL6-U□2018-□□	DC+,DC-,R,S,T,B1,B2,U,V,W	M8	9~10	35~50	35	
	PE					
BL6-U□4045-□□/ BL6-U□2022-□□	DC+,DC-,R,S,T,B1,B2,U,V,W	M8	9~10	35~50	35	
	PE					
BL6-U□4055-□□	DC+,DC-,R,S,T,B1,B2,U,V,W	M8	9~10	35~50	35	
	PE					
BL6-U□4075-□□	DC+,DC-,R,S,T,B1,B2,U,V,W	M8	9~10	35~50	35	
	PE					

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 matters.

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 Installing

As the Controller outputs switch frequently, high-frequency leakage current is generated. A residual current circuit breaker should be applied to the controller input side to eliminate high-frequency leakage current which is

harmful to human body. Choosing a special-purpose residual current circuit breaker, its current sensitivity should be up to 30mA or more per controller. When using a general-purpose residual current circuit breaker, its current sensitivity should be upto200mA or more per controller and with an operating time of 0.1s or more.

3. Magnetic Contactor Installing

Power input terminals (R, S, T) can be connected or disconnect to the power supply through a magnetic contactor (KMC). Magnetic contactor capacity depends on the rated current of the controller. Ensure that the capacity of magnetic contactor is greater than the rated current of the controller.

4. Terminals Wiring

If there are no phase sequence requirements, the input power supply can be connected with any one terminal (R, S, T) the phase sequence of input power supply does not necessary correspond to the terminal sequence.

5. Installing Surge Absorber

Ensure using a surge absorber for each inductive load (including magnetic contactor, electromagnetic relays and magnetic brakes, and so on) near the controller. Inductive loads.

3.2.5.2 Wiring the output side of main circuit

1. Connect the controller to Motor

Please connect the motor(input) wires to the output terminals U, V, W. Check that the motor rotates anticlockwise with the forward run command while running, otherwise, exchange the output terminal V and W.

2. Never connect a power supply to output terminals

Never connect a power supply to output terminals U, V, W. If voltage is applied to the output terminals, the controller internal circuit will be damaged.

3. Never short or GND output terminals

Do not allow the output terminals ground or short; Do not allow the output line short circuit or contact controller Shield; Do not touch the controller with bare hands. Otherwise, there will be a risk of electric shock or short circuit.

4. Never use capacity, surge absorber, power factor regulator and noise filter.

Never connect capacity, surge absorber, power factor regulator and noise filter to output circuit. The high-frequency components of the controller output may result in overheating or damage to these parts or may result in damage to the controller

5. Use of magnetic contactor

Don’t connect a magnetic contactor between the controller and the motor and turn it ON or OFF during operation. Otherwise, a large inrush current will be created and the overcurrent protection in the controller will operate. Before shutting off the contactor, please stop the controller output first, after a while delay, then shut off.

3.2.5.3 WIRING EARTH TERMINALS

1. Ensure that earth protection terminal PE connects to ground (Grounding resistance less than 10Ω).

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 consider the need of cooling. If necessary, Fans and protection cover can be applied to ensure ventilation and away from burn, electric shock and fire.
5. Do not touch terminals B1 and B2 with bare hands.

3.3. Wiring Control Circuit Terminals

3.3.1 Control Circuit Terminal Arrangement

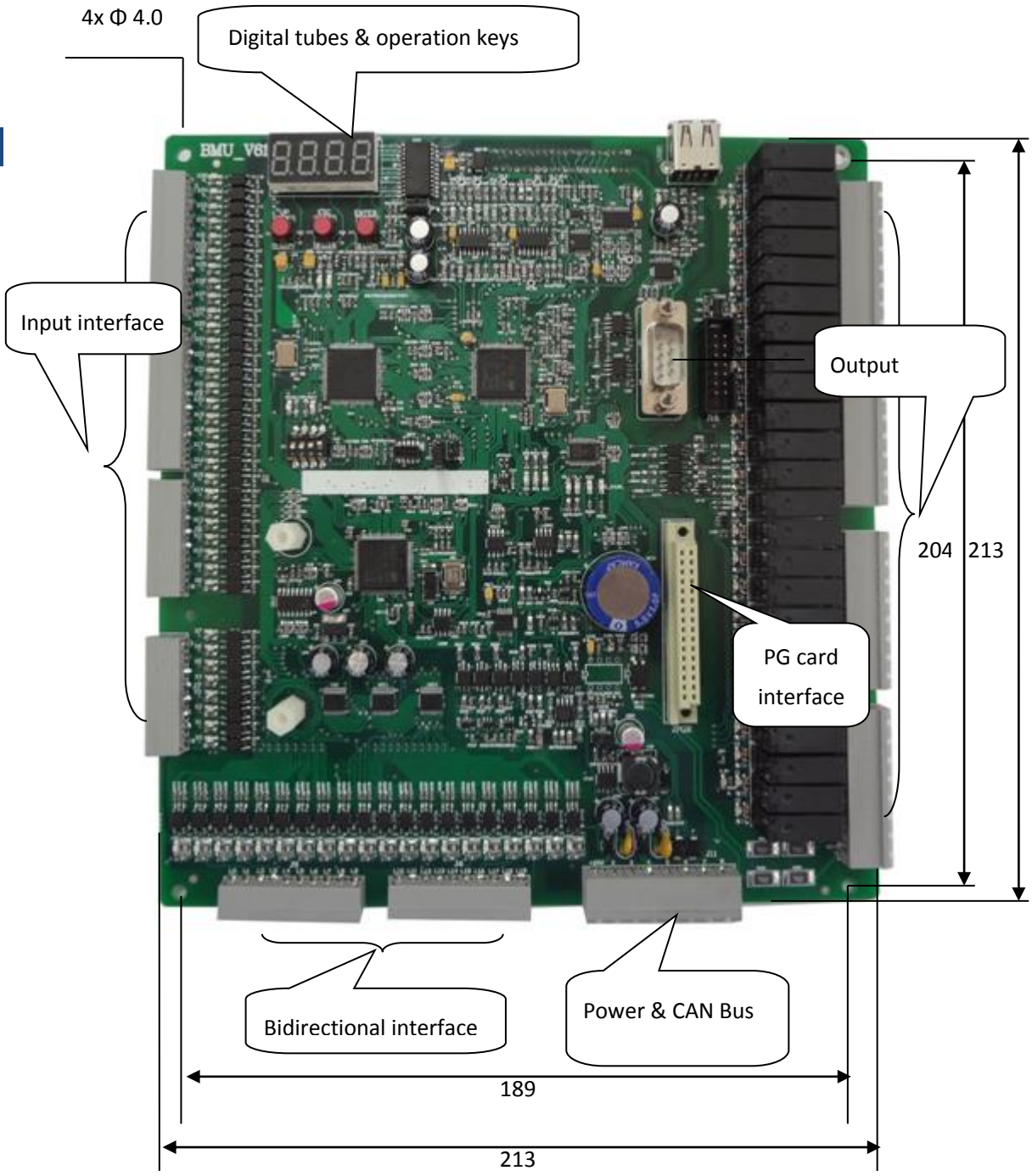


FIGURE 3.4 TERMINAL ARRANGEMENTS FOR CONTROL CIRCUIT

Control circuit includes integrated control board, PG card, digital operator and so on. PG card and digital operator will be introduced separately in **Chapter 4**. As elevator floor varies, the input, output of the controller and CAN communication interface is separate with the other parts of the controller, so the I/0 interface of the controller should be connected with DC 24V power supply. Besides, DC 24V can also be used with HOP and COP. So, the power supply should be equipped with suitable capacity according with the floor.

3.3.2 Terminal Connection for Control Circuit

3.3.3 Control Circuit Port definition and Function

Chart 3.3 Control Circuit Port definition and function list

Port No.	Terminal Symbol	Location	Definition	Usage	Interface Tech Spec			
					Interface Type	Rated Capacity	On/off Time	Max Speed
J1	X36+	J1-1	Door inter-lock input + (110V-220VAC)	Input	OC	AC110V 8mA	10mS	100Hz
	X36-	J1-2	Door inter-lock input – (110V-220VAC)					
	Y0	J1-3	KBC brake output	Output	Relay	DC10A30V AC10A250V	5/10mS	20cpm
	Y1	J1-4	KDY auxiliary contact output					
	COM1	J1-5	Y0-Y1 common terminal					
	Y2	J1-6	KKM Door open 1 control output					
	Y3	J1-7	KGM Door close 1 control output					
	Y4	J1-8	KKM2 door open 2 control output					
J2	Y5	J2-1	KGM2 door close 2 control output	Output	Relay	DC10A30V AC10A250V	5/10mS	20cpm
	CM2	J2-2	Y2-Y5 common terminal					
	Y6	J2-3	KXFL fire linkage output					
	Y7	J2-4	Illumination switch-off output					
	Y8	J2-5	KDZZ arrival gong output					
	CM3	J2-6	Y6-Y8 common terminal					
	Y9	J2-7	Ea low 7 segment code a display					
	Y10	J2-8	Eb low 7 segment code b display					
J3	Y11	J3-1	Ec low 7 segment code c display	Output	Relay	DC10A30V AC10A 250V	5/10mS	20cpm
	Y12	J3-2	Ed low 7 segment code d display					
	Y13	J3-3	Ee low 7 segment code e display					
	Y14	J3-4	Ef low 7 segment code f display					
	Y15	J3-5	Eg low 7 segment code g display					
	Y16	J3-6	EHbc high 7 segment code bc display (Inspection output when floor display is not in 7-seg-code mode. when floor display is in 7-seg-code mode, and the high bit is not used, Inspection output can be set by function code FU-05)					
	Y17	J3-7	EHg high 7 segment code g display					
	Y18	J3-8	ES up arrow display					
J4	Y19	J4-1	EX down arrow display	Output	Relay	DC 10A30V AC 10A250V	5/10mS	20cpm
	CM4	J4-2	Y9~Y19 common terminal					
	Y20	J4-3	Cut-off power after parking (disabled output after parking)					
	Y21	J4-4	ECZ overload output					
	Y22	J4-5	FMQ buzzer control output					
	CM5	J4-6	Y20~Y22 common terminal					
	Y23	J4-7	Cut main contactor output					
	CM6	J4-8	Y23 common terminal					
J5	I0	J5-1	SKYC door open delay input					
	I1	J5-2	Full Collective/Simplex Collective Car call input 1/ Car call input 1	Input Output	Input: Optical-couple Output: OC	Input: DC 24V 7mA Output: 300mA	Input: 10mS	Input: 100Hz
	I2	J5-3	Full Collective/Simplex Collective Car call input 2/ Car call input 2					
	I3	J5-4	Full Collective/Simplex Collective Car call input 3/ Car call input 3					
	I4	J5-5	Full Collective/Simplex Collective Car call input 4/ Car call input 4					
	I5	J5-6	Full Collective/Simplex Collective Car call input 5/ Car call input 5					
	I6	J5-7	Full Collective/Simplex Collective Car call input 6/ Car call input 6					
	I7	J5-8	Full Collective/Simplex Collective Car call input 7/ Car call input 7					

CHART 3.3 Control Circuit Port definition and Function (Cont'd)

Port No.	Terminal Symbol	Location	Definition	Usage	Interface Tech Spec			
					Interface Type	Rated Capacity	On/off Time	Max Speed
J5	I8	J5-9	Full Collective/Simplex Collective Call up input 1/ Car call input 8	Input Output	Input: Optical-couple Output: OC	Input: DC 24V 7mA Output: 300mA	Input: 10mS	Input: 100Hz
	I9	J5-10	Full Collective/Simplex Collective Call up input 2/ Car call input 9					
J6	I10	J6-1	Full Collective/Simplex Collective Call up input 3/ Call input 1	Input Output	Input: Optical-couple Output: OC	Input: DC 24V 7mA Output: 300mA	Input: 10mS	Input: 100Hz
	I11	J6-2	Full Collective/Simplex Collective Call up input 4/ Call input 2					
	I12	J6-3	Full Collective/Simplex Collective Call up input 5/ Call input 3					
	I13	J6-4	Full Collective/Simplex Collective Call up input 6/ Call input 4					
	I14	J6-5	Full Collective/Simplex Collective Call down input 2/ Call input 5					
	I15	J6-6	Full Collective/Simplex Collective Call down input 3/ Call input 6					
	I16	J6-7	Full Collective/Simplex Collective Call down input 4/ Call input 7					
	I17	J6-8	Full Collective/Simplex Collective Call down input 5/ Call input 8					
	I18	J6-9	Full Collective/Simplex Collective Call down input 6/ Call input 9					
	I19	J6-10	Full Collective/Simplex Collective Call down input 7/ Call input 10					
J7	X0	J7-8	SJX Inspection/auto input					
	X1	J7-7	SSXW up limit input					
	X2	J7-6	SXXW down limit input					
	X3	J1-5	SSMQ up leveling input					
	X4	J1-4	SXMQ down leveling input					
	X5	J1-3	SKDY auxiliary contactor input					
	X6	J1-2	KBC brake contactor feedback					
	X7	J1-1	Door open limit 2 input					
J8	X8	J8-8	Door close limit 2 input					
	X9	J8-7	Safe plates 2 input					
	X10	J8-6	SJT Emergency stop input					
	X11	J8-5	SMB door inter-lock input					
	X12	J8-4	Left brake feedback input					
	X13	J8-3	SXF fire input					
	X14	J8-2	SMS jog up input (Attendant up)					
	X15	J8-1	SMX jog down input (Attendant down)					
J9	X16	J9-10	SSDZ top terminal input	Input	OC	DC24V 7mA	10mS	100Hz
	X17	J9-9	SXDZ bottom terminal input					
	X18	J9-8	ARD input					
	X19	J9-7	SKM door open signal input 1					
	X20	J9-6	SGM door close signal input 1					
	X21	J9-5	SKMW1 door open limit input 1					
	X22	J9-4	SGMW1 door close limit input 1					
	X23	J9-3	STAB1 safe plate 1 input					
	X24	J9-2	SDS electronic lock signal input					
	X25	J9-1	SCZ over-load input					

CHART 3.3 Control Circuit Port definition and Function (Cont'd)

Port No.	Terminal Symbol	Location	Definition	Usage	Interface Tech Spec			
					Interface Type	Rated Capacity	On/off Time	Max Speed
J10	X26	J10-10	SMZ full-load input	Input	OC	DC 24V 7mA	10mS	100Hz
	X27	J10-9	Spare/ Re-leveling condition input					
	X28	J10-8	Light-load anti-nuisance input/ Rear door lock detection					
	X29	J10-7	SZH Attendant input					
	X30	J10-6	SZS Bypass drive input					
	X31	J10-5	Right brake feedback input					
	X32	J10-4	Thermal switch input					
	X33	J10-3	SKM2 door open input 2					
	X34	J10-2	SGM2 door close Input 2					
	X35	J10-1	Standby/ Re-leveling sensor input					
J11	+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		
	GND1	J11-6	Input ground	Analog input ground				
	1H	J11-7	Duplex/Group control communications +	Communication Interface	CAN	80mA		25Khz
	1L	J11-8	Duplex/Group control communications -					

Note: 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

No.	Terminal Symbol	Function	Interface Type	Note
1	USB1	Digital operator interface	RS-232	Communication with OP-VX
2	JP1	Security dog interface	RS-232	Communication with SL security dog
3	JPGR	PG card interface		Link to PG_V6, PG_V6x, SPG_V6
4	JTTR0	Bottom Shield drive interface		Link to drive board in bottom Shield

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

Terminal Function	Acceptable Wire size (mm^2)	Recommended wire size (mm^2)	Clamping Torque N.m	Special Requirement
Input/Output	0. 5~1	0.75	0.5~0.6	
PG Car I/O	0.15~0. 5	0.3	0.5~0.6	Twisted pair shield
CAN COMM	0.75~1.5	0.75（≤10 floors） 1.5（>10 floors）	0.5~0.6	Twisted pair shield

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.

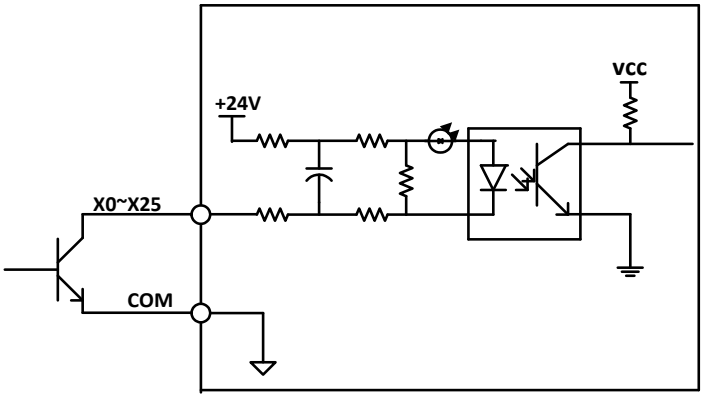


FIGURE 3.5 COMMON EMITTER INPUT

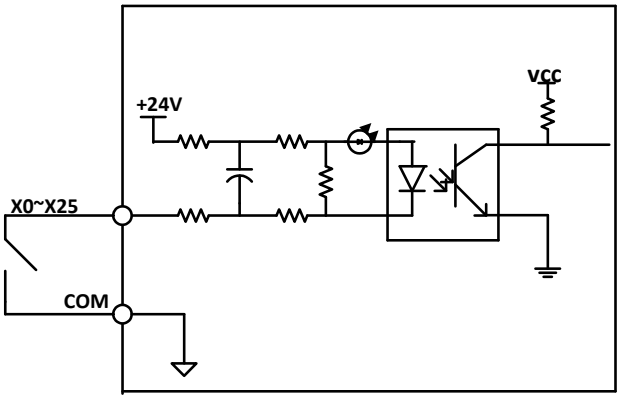


FIGURE 3.6 CONTACTOR SWITCH INPUT

3.3.5.2 CAN COMM INTERFACE

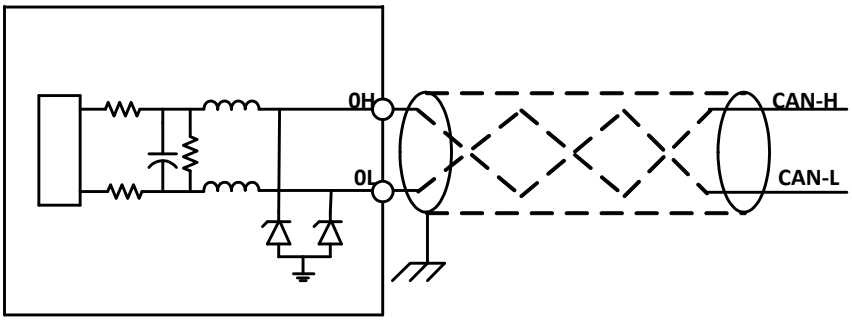


FIGURE 3.7 CAN COMM INTERFACE AND CONNECTION

The controller, COP and HOP are connected through CAN bus. The reliability of CAN BUS communication is directly related to cable wiring. It is specifically required that shaft cable and traveling cable should be **twisted-pair shield cable.** The twisted-pair can stop the differential mode interference of the long wire while shield can isolate the 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 are shown in Figure 3.8.

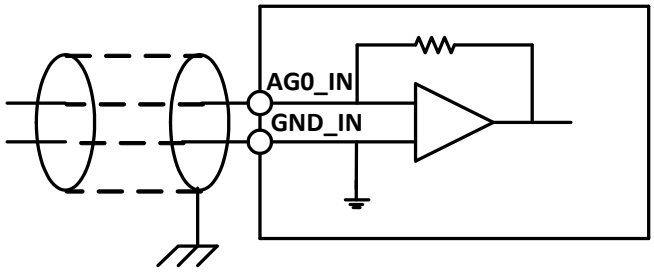


Figure 3.8 Analog Input & Connection

3.3.5.4 AC 100V Input Interface

AC 110V input interface is for testing of Emergency stop/Door Drive. Its interface/connection is shown in Figure 3.9.

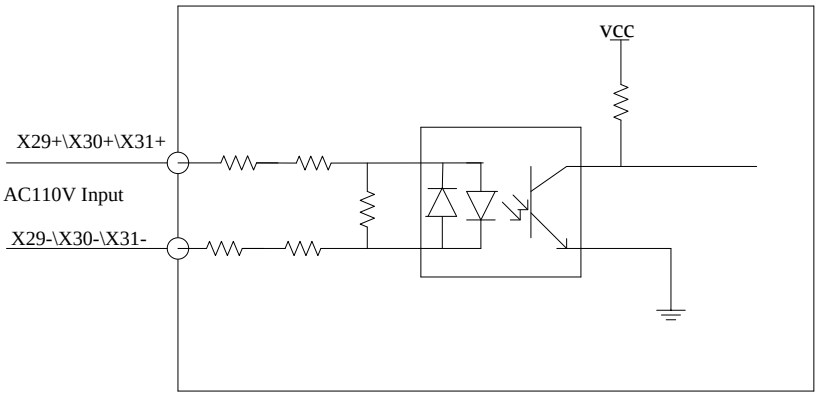


Figure 3.9 AC110V Input Interface & Connections

3.3.5.5 Power Supply Input Interface

Power supply interface and connections are shown in Figure.3.10.

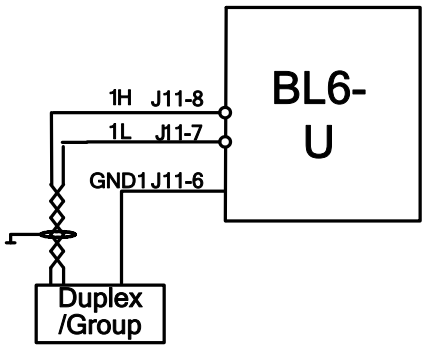


Figure 3.10 Duplex/Group control Connections

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.

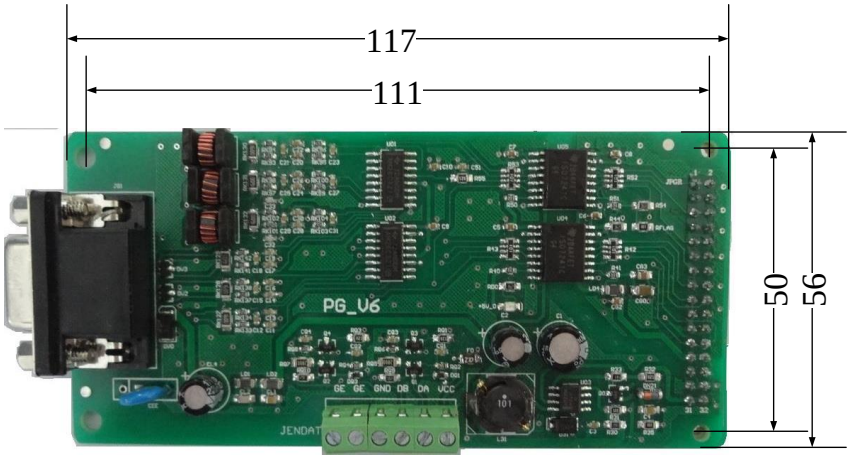


FIGURE 3.11 PG_V6 CARD

3.4.1.2 PG_V6 Installation and Remove

When installing PG_V6 card, first cut off the controller power supply, ensure that charge indicator LED in the controller is out. Then remove the digital operator and the front cover and install the PG_V6 card.

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

Port No.	Terminal Symbol	Location	Definition	Usage	Interface Tech Spec			
					Interface Type	Rated Capacity	On/off Time	Max Speed
JENDATA(short for JEN)	+12V	JEN-1	OC/Push-pull type power	12V power	Power output	+150Ma/12V±5%		
	A+	JEN-2	Freq dividing signal OC output A	Sync freq dividing	OC/Push pull output	±50Ma		500KHz
	B+	JEN-3	Freq dividing signal OC output B	Sync freq dividing	OC/Push pull output	±50Ma		500KHz
	0V	JEN-4	Power ground	Power ground	Power ground	—		
	GE	JEN-5	Shield ground	Shield ground		—		
	GE	JEN-6	Shield ground	Shield ground		—		
JG1	+5V	JG1-1	+5V	5V Power	Power output	+400Ma/5V±5%		
	U+	JG1-2	U+	differential signal U+	differential input	±20Ma/3.1-5V		500KHz
	Z+	JG1-3	Z+	differential signal Z+	differential input	±20Ma/3.1-5V		500KHz
	B+	JG1-4	B+	differential signal B+	differential input	±20Ma/3.1-5V		500KHz
	A+	JG1-5	A+	differential signal A+	differential input	±20Ma/3.1-5V		500KHz
	GND	JG1-6	GND	5V ground	Power ground	—		
	U-	JG1-7	U-	differential signal U-	differential input	±20Ma/3.1-5V		500KHz
	Z-	JG1-8	Z--	differential signal Z-	differential input	±20Ma/3.1-5V		500KHz
	B-	JG1-9	B-	differential signal B-	differential input	±20Ma/3.1-5V		500KHz
	A-	JG1-10	A-	differential signal A-	differential input	±20Ma/3.1-5V		500KHz
	GND	JG1-11	GND	5V ground	Power ground	—		
	V+	JG1-12	V+	differential signal V+	differential input	±20Ma/3.1-5V		500KHz
	V-	JG1-13	V-	differential signal V-	differential input	±20Ma/3.1-5V		500KHz
	W+	JG1-14	W+	differential signal W+	differential input	±20Ma/3.1-5V		500KHz
	W-	JG1-15	W-	differential signal W-	differential input	±20Ma/3.1-5V		500KHz

The parameters above are for PG_V6 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.

3.4.1.4 PG_V6 Connection for 5V long line drive output encoder (for Asynchronous Machine)

Connection of PG_V6 card and 5Vlong line driver output encoder (for asynchronous machine) is shown in Figure 3.12.

IMPORTANT

Connect the 5V/B+/A+/B-/A-/0V on the encoder to the PG card D-type connector JG1 (standard 3-line 15-pin D-type connector hole socket) terminal+5V/B+/A+/B-/A-/GND, that is the D-type connector pin socket terminal corresponding 1/4/5/9/10/6 of JG1. Ensure that the wiring correct, then plug and lock well.

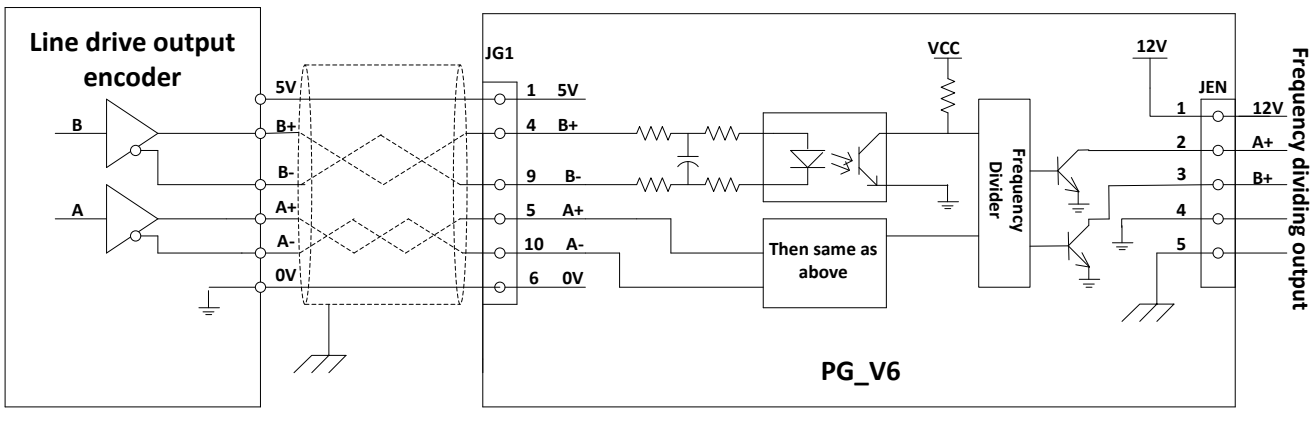


FIGURE 3.12 PG_V6 CARD CONNECTION TO 5V LONG LINE DRIVE OUTPUT ENCODER (FOR ASYNCHRONOUS MACHINE)

3.4.1.5 PG_V6 card connection with 5V long cable drive output encoder (for Synchronous Machine)

The connection of PG_V6 card and 5V long line drive output encoder (for synchronous machine) is shown in Figure 3.13.

IMPORTANT

Connect the 5V/0V/A+/A-/B+/B-/Z+/Z-/U+/U-/V+/V-/W+/W- of encoder to the +5V/GND/A+/A-/B+/B-/Z+/Z-/U+/U-/V+/V-/W+/W- of the D-type connection on terminal JG1(the related pin of 1/6/5/10/4/9/3/8/2/7/12/13/14/15of JG1 for D-type connection part). Ensure that the wiring connection is correct, then plug and lock well.

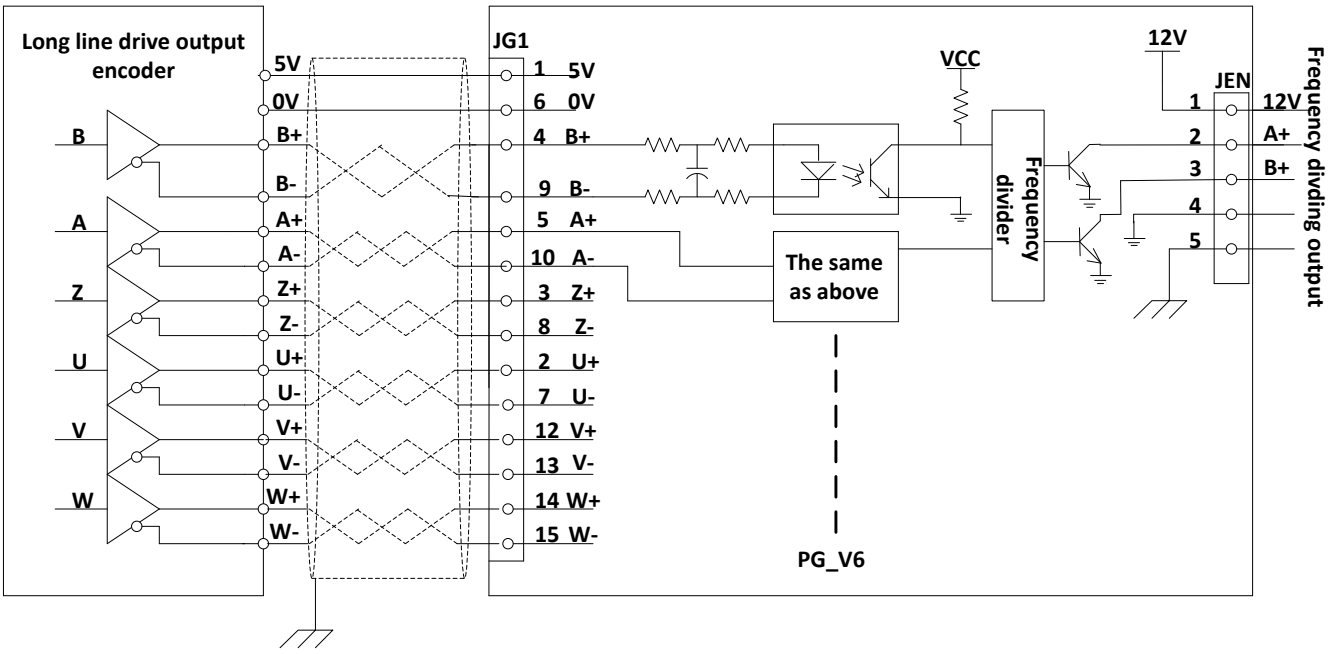


Figure 3.13 PG_V6 connection with 5V long line drive output encoder (for synchronous machine)

3.4.1.6 Precautions for using PG_V6 card

For the 15-pin differential output encoder interface of the PG_V6 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 3.6 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_V6 interface card +5V power supply to avoid PG card being interfered or damaged.

3.4.2 PG_V6X Interface Card

3.4.2.1 PG_V6X Interface card diagram

PG_V6X interface card is async machine universal pulse encoder speed feedback and frequency dividing output card. PG_V6X is in supporting use of 12V OC output type, and push-pull output pulse encoder. Encoder for async machine: A/B. Diagram is shown in Figure 3.14 below.

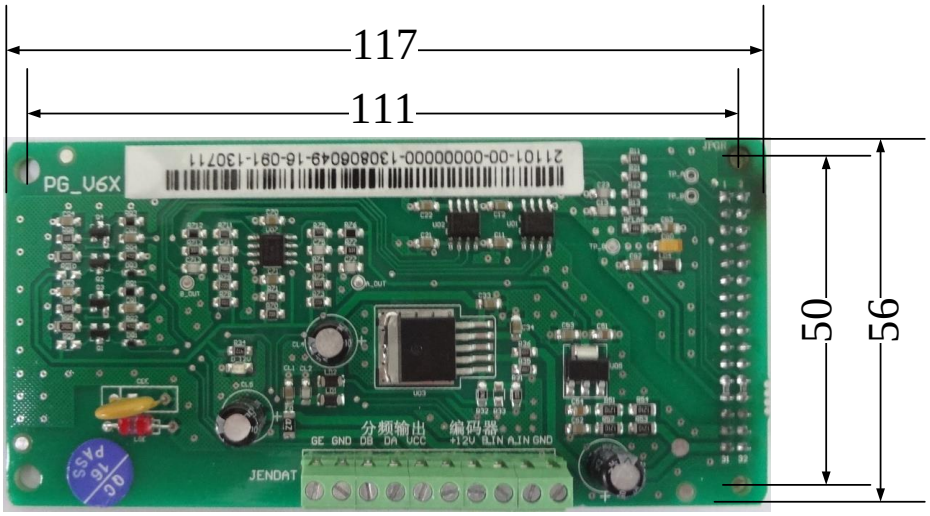


FIGURE 3.14 PG_V6X CARD

3.4.2.2 PG_V6X Interface Card Installation and Remove

When installing PG_V6X card, first cut off the controller power supply, ensure that charge indicator LED in the controller is out (Remove the front cover first for shield type controller). Then remove the digital operator and the front cover and install the PG_V6X card.

Installation procedures: first match the connector of the PG_V6X 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_V6X 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.

3.4.2.3 PG_V6X Terminal Definition & Function List

Chart 3.7 PG_V6X Card Terminals Definition & Function

Port No.	Terminal Symbol	Location	Definition	Usage	Interface Tech Spec			
					Interface Type	Rated Capacity	On/off Time	Max Speed
JENDATA (short for JEN)	0V	JEN-1	Power ground	Power ground	Power ground	—		
	IA	JEN-2	OC/Push-pull type A phase input	Input signal A	OC/Push pull input	-10Ma/12V-15V		500KHz
	IB	JEN-3	OC/Push-pull type B phase input	Input signal B	OC/Push pull input	-10Ma/12V-15V		500KHz
	+12V	JEN-4	OC/Push-pull type power	12V Power supply	Power output	+150Ma/12V±5%		
		JEN-5						
	+12V	JEN-6	OC/Push-pull type power	12V Power supply	Power output	+150Ma/12V±5%		
	A+	JEN-7	Freq dividing signal OC output A	Sync freq dividing	OC/Push pull output	±50Ma		500KHz
	B+	JEN-8	Freq dividing signal OC output B	Sync freq dividing	OC/Push pull output	±50Ma		500KHz
	0V	JEN-9	Power ground	Power ground	Power ground	—		
	GE	JEN-10	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).

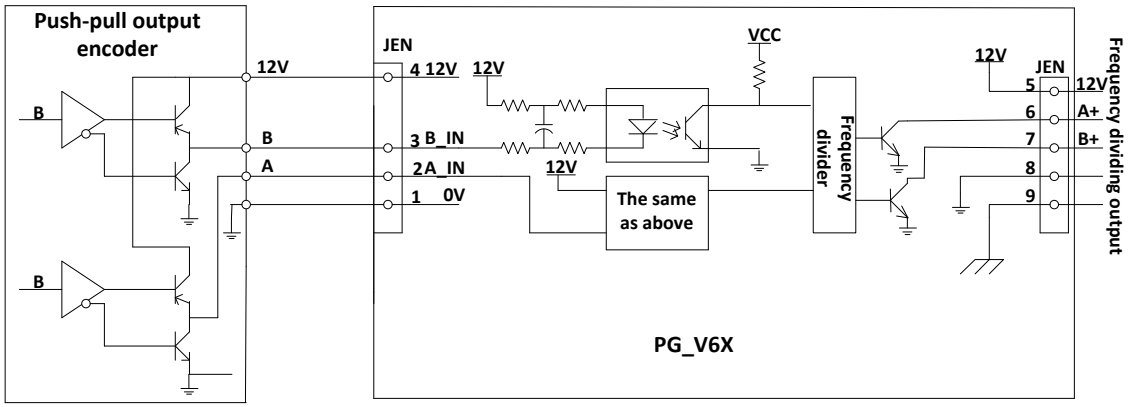


FIGURE 3.15 PG_V6X CONNECT WITH 12V PUSH-PULL/OC DRIVE OUTPUT ENCODER

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 card diagram

SPG_V6 interface card is sync/async machine universal sine cosine encoder speed feedback and frequency dividing output card.SPG_V6 is in supporting use of 5V line driver output type sine cosine encoder. Encoder for async machine: A/B, and encoder for sync machine: A/B/R/C/D.
Refer to Figure 3.16 below for detail.

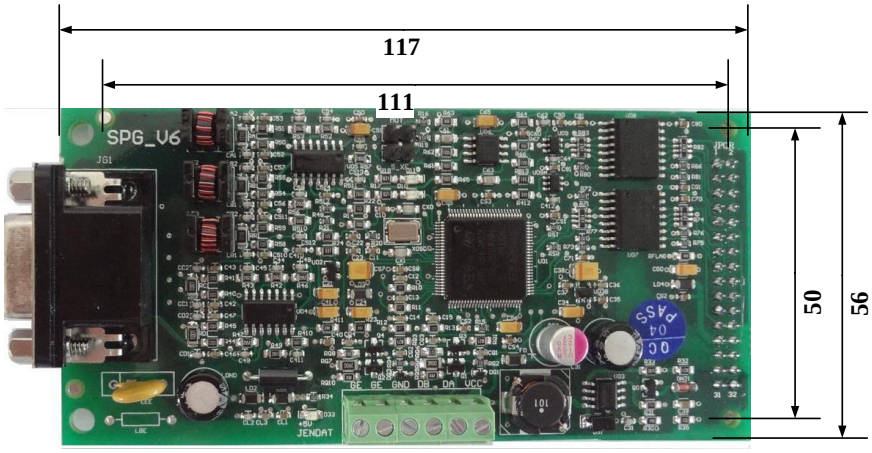


FIGURE 3.16 SPG_V6 CARD

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)

Port No.	Terminal Symbol	Location	Definition	Usage	Interface Tech Spec			
					Interface Type	Rated Capacity	On/off Time	Max Speed
JENDAT（short for JEN）	+12V	JEN-1	OC/Push-pull type power	12V Power supply	Power output	+150mA/12V±5%		
	A+	JEN-2	Freq dividing signal OC output A	Sync freq dividing	OC/Push pull output	±50mA		500KHz
	B+	JEN-3	Freq dividing signal OC output B	Sync freq dividing	OC/Push pull output	±50mA		500KHz
	0V	JEN-4	Power ground	Power ground	Power ground	—		
	GE	JEN-5	Shield ground	Shield ground		—		
	GE	JEN-6	Shield ground	Shield ground		—		
JG1	B-	JG1-1	B-	differential signal B-	differential input			40KHz
	*	JG1-2	—	—	—			
	R+	JG1-3	R+	differential signal R+	differential input			40KHz
	R-	JG1-4	R-	differential signal R-	differential input			40KHz
	A+	JG1-5	A+	differential signal A+	differential input			40KHz
	A-	JG1-6	A-	differential signal A-	differential input			40KHz
	0V	JG1-7	GND	5V ground	Power ground			
	B+	JG1-8	B+	differential signal B+	differential input			40KHz
	5V	JG1-9	+5V	5V Power supply	Power output	500mA/5V±2.5% Voltage ripple lower than 50mV		
	C-	JG1-10	C-	differential signal C-	differential input			40KHz
	C+	JG1-11	C+	differential signal C+	differential input			40KHz
	D+	JG1-12	D+	differential signal D+	differential input			40KHz
	D-	JG1-13	D-	differential signal D-	differential input			40KHz
	*	JG1-14	—	—	—			
	*	JG1-15	—	—	—			

3.4.3.3 SPG_V6 Interface Card Circuit

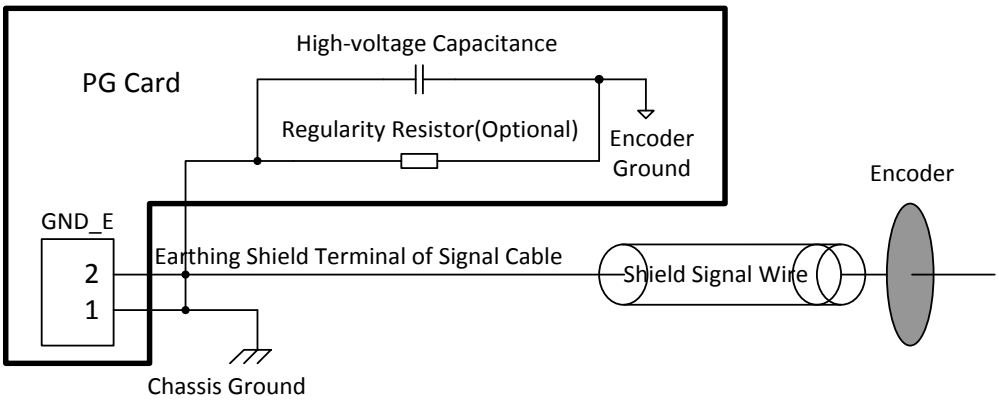


FIGURE 3.17 SPG_V6 CARD

IMPORTANT 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 to 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 is small analog signal which is easier to get interference, it is better to use the recommended signal cable with complete shield layer, lower transfer impedance and wire twin twisted. Inappropriate ground connection or use unsuitable signal transfer cable may result in system not working properly.

5. Jumper S_XF is kept for future adjustments, please keep it disconnected.

3.4.4 SPG_V6E Interface Card

3.4.4.1 SPG_V6E interface card diagram

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

Refer to Figure 3.18 below for detail.

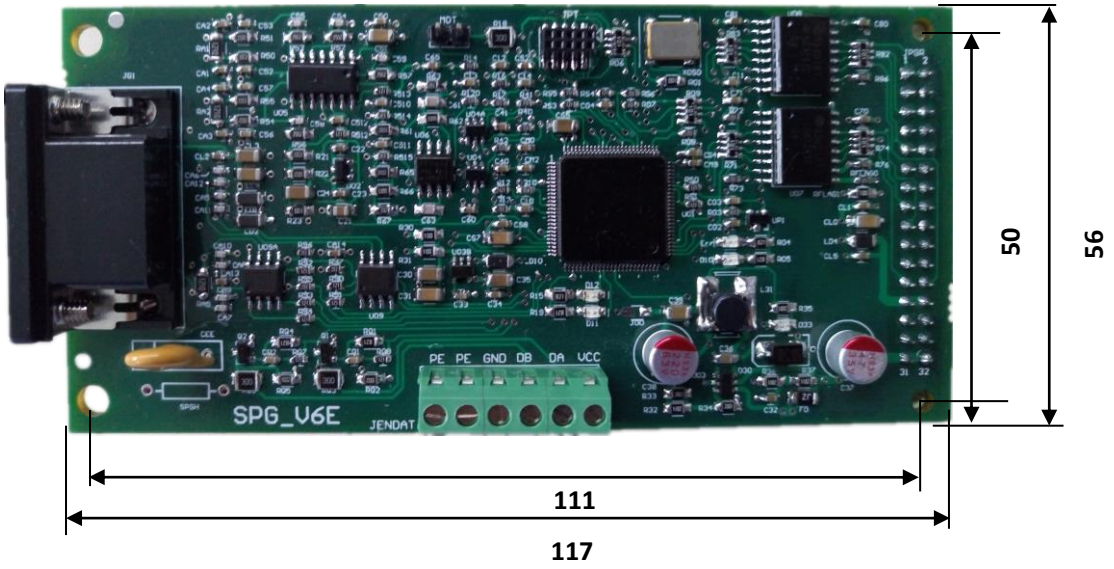


FIGURE 3.18 SPG_V6E CARD

3.4.4.2 SPG_V6E Interface Card Terminal Definition and Function List

Chart 3.8 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
JENDAT (For frequency dividing signal)	+12V	JEN -1	OC / push-pull 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 ground	Shield ground	D-output	--		
	PE	JEN -6	Shield ground	Shield ground	PGND	--		
JG1	B-	JG1-1	B-	Differential signal B-	Differential input			40KHz
	*	JG1-2	--	--	--			
	*	JG1-3	*	JG1-2	--	--	--	
	*	JG1-4	*	JG1-2	--	--	--	

Chart 3.8 SPG_V6E Terminal Definition & Function (D-input/output refers to Differential input/output) (Cont'd)

Terminal Name	Terminal Mark	Location	Definition	Usage	Interface Technical Specification			
					Interface Type	Rated Capacity	On/Off Time	Max Speed
JG1	A+	JG1-5	A+	Differential signal A+	D-input			40KHz
	A-	JG1-6	A-	Differential signal A-	D-input			40KHz
	0V	JG1-7	GND	5V Ground	PGND			
	B+	JG1-8	B+	Differential signal B+	D-input			40KHz
	5V	JG1-9	+5V	5Vpower	Power output	+500mA/5V±2.5% Voltage ripple<50mV		
	C-	JG1-10	Clock-	Differential signal C-	D-input			40KHz
	C+	JG1-11	Clock+	Differential signal C+	D-input			40KHz
	D+	JG1-12	Data+	Differential signal D+	D-input/output			40KHz
	D-	JG1-13	Data-	Differential signal D-	D-input/output			40KHz
	*	JG1-14	--	--	--			
	*	JG1-15	--	--	--			

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 frequency output cable and analog input cable should use TWISTED-PAIR SHIELD CABLE.

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 dimension of ground cable and ground at one point.

13. After wiring, make sure check the following:

1) Correctness and reliability of connection.

2) Whether there is leftover, such as wire, screw and metal filing

3) Whether the connection of the screw, the terminals and the connection parts are loose.

4) Whether the bare conductor of terminals is connected with other terminals.

Chapter 4: Digital Operator

BL6-U Parallel elevator integrated controller is equipped with LCD digital operator OP-V6. It is a tool for commissioning and maintenance of control system. It provides a nice and easy human-machine interface with both Chinese and English on display.

4.1. Key, display and function of Digital Operator

The digital operator OP-V6 has the main LCD screen with resolution of 128×64 LCD, 5 LED and 11 function buttons. Refer to Figure 4.1 below for detail.

FIGURE 4.1 DIGITAL OPERATOR

4.1.1 Operator LED Display

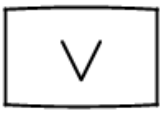
5 LEDs on the top of the operator display controller current state simply and directly. The definition and display function of each LED, as shown in chart 4.1.

Chart 4.1 LED definition & display function

Name	Function
DRV	When the controller is in operation, the LED light.
FWD	When the controller is in forward running operation, the LED light.
REV	When the controller is in reversal running operation, the LED light.
COM	When the controller communication is normal, the LED light.
ERR	When the controller is in fault, the LED light.

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.

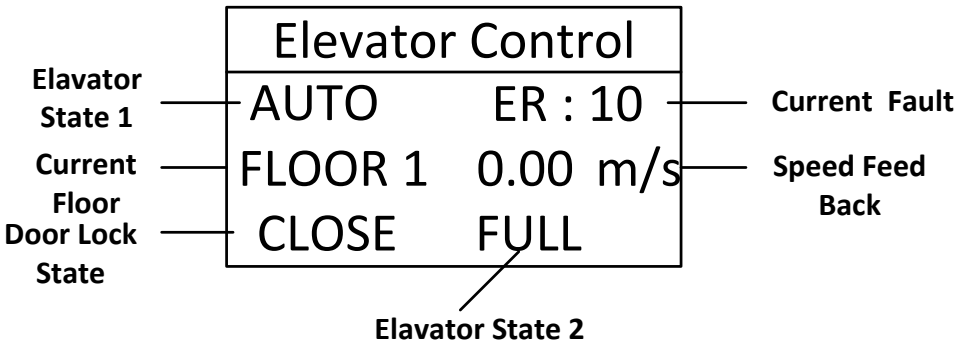


FIGURE 4.2 MAIN INTERFACE ON DIGITAL OPERATOR

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 displays 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 Operator

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 secure; 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.

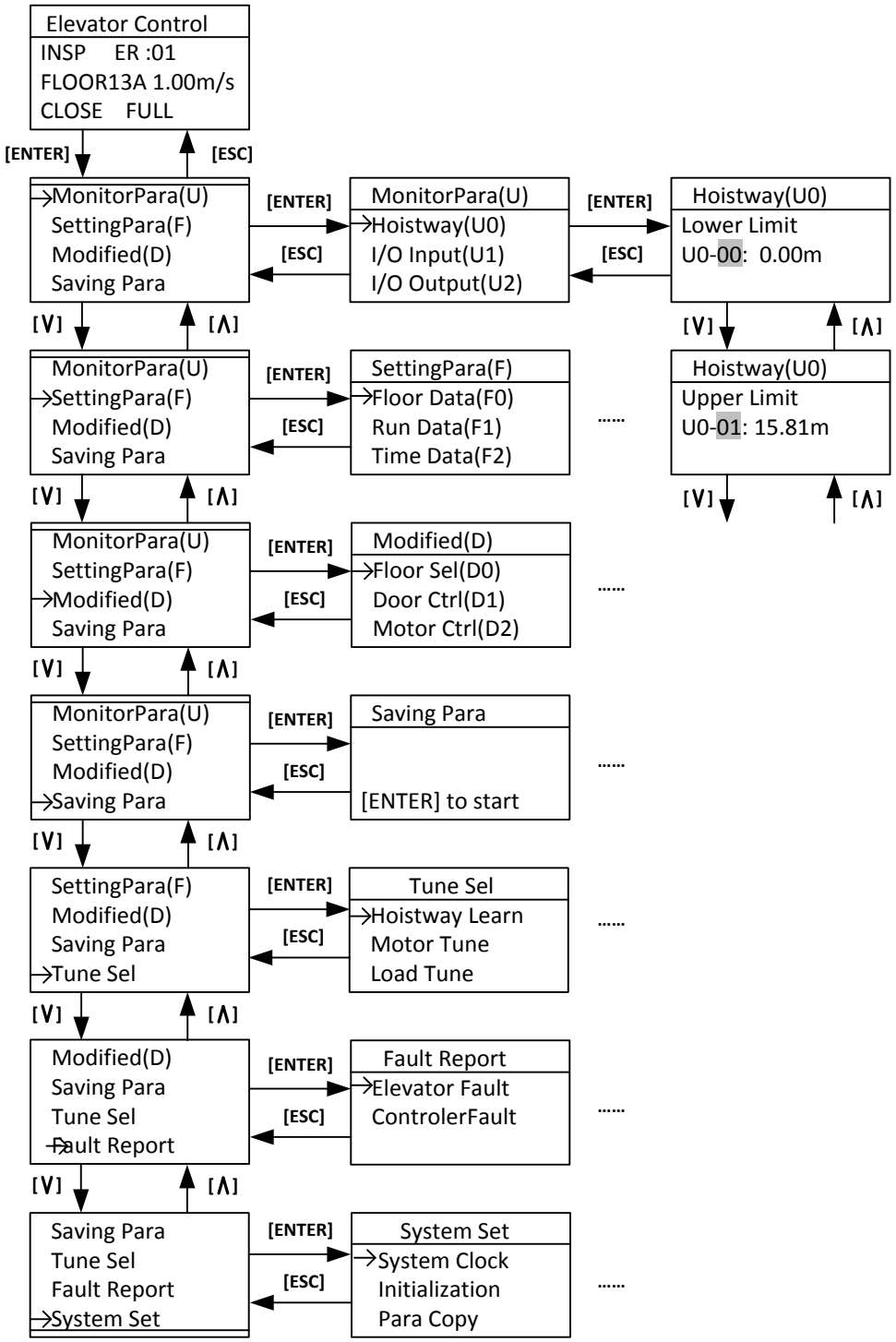


FIGURE 4.3 STRUCTURE FLOWCHART OF OPERATOR MENU

4.3. Parameter Setting

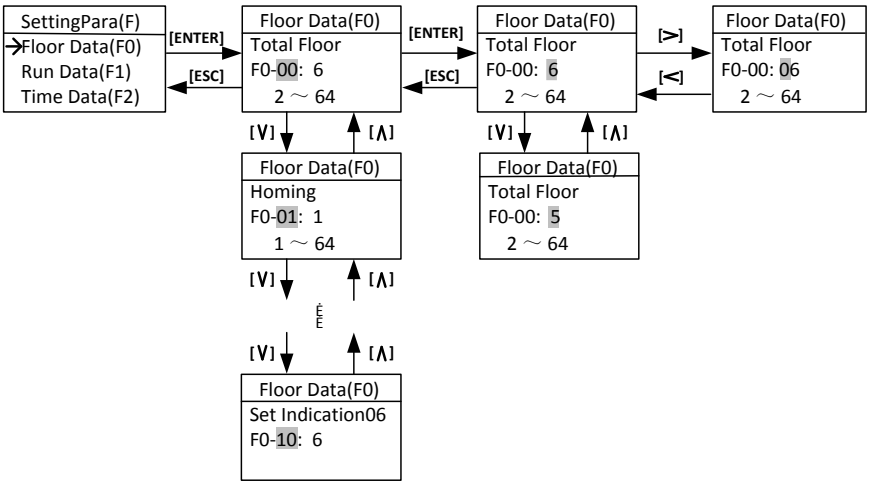


FIGURE 4.4 PARAMETER SETTING

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. Please press [LEFT] or [RIGHT] key to move the arrow to left or right. Press the [UP] or [DOWN] to increase or decrease the value that the arrow point at. After setting the value, please press the [ENTER] key to save the parameter.

Some parameter values are combination values of the status. Their setting cannot follow the above flowchart directly and should follow the ToolTip in the parameter changing interface. Press [RES] key to enter the bit parameter setting interface to set the status value as per the bit. After entering the bit parameter setting interface, press [UP] or [DOWN] key to check the status of the present bit. When the status of the present bit needs to be changed, press [ENTER] key to enter the status change interface. In the status change interface, press [UP] or [DOWN] key to check the status of the present bit, press the [ENTER] key to save the status of the present bit, press [ESC] key to return the Previous Menu

The process of bit parameter setting is shown in Figure 4.5.

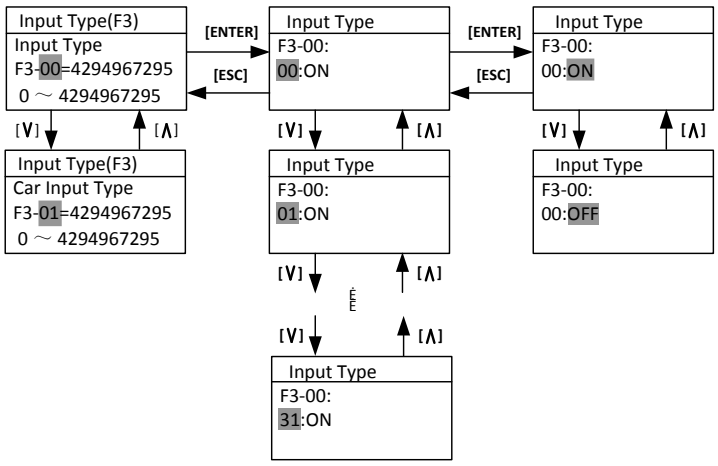


FIGURE 4.5 SETTING BIT PARAMETERS

4.4. Commissioning Parameters

In commissioning interface: Move the arrow by pressing [UP] key or [DOWN] key to carry out the operation, press [ENTER] to enter the selected interface.

In floor selection interface: Press [UP] key or [DOWN] key to check the car call status in present floor. If need to set car calls on current floor, press [ENTER] key in the interface to save the car call information. In the interface, the information follows “F:” is the present floor the elevator car at.

Floor selection flowchart is shown in Figure 4.6.

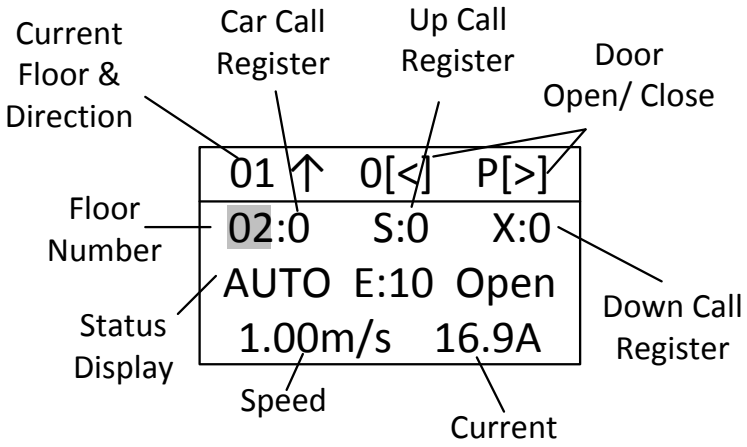


FIGURE 4.6 FLOOR SELECTION

In the interface of door control: Press [LEFT] key in the interface to carry out the command “opening front door”. Press [RIGHT] key to carry out the command “close front door”. Press [UP] key to carry out the command “open rear door”. Press [DOWN] key to carry out the command “close rear door”, Press [RES] key to cancel all the commands.

Door open and close flowchart is shown in Figure 4.7.

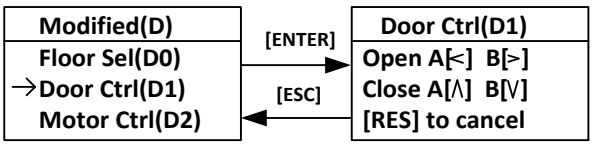


FIGURE 4.7 DOOR CONTROL INTERFACE

In Motor Control interface: Press [UP]/ [DOWN] key to select the running mode is continuous running or JOG. In continuous running mode, press [RUN] key to start motor first, press [UP]/ [DOWN] key to increase/decrease the motor given speed. The motor given speed can be negative (negative speed means motor reverse run), press [ENTER] key to save the given speed. Press [STOP] key to stop the motor. In the mode of JOG, press [UP]/ [DOWN] key to increase/decrease the JOG operation frequency, after press the [ENTER] to save the setting, and then press the [RUN] key to start and press the [STOP] to stop the operation.

The process of operator to control the motor running is shown below in the Figure 4.8.

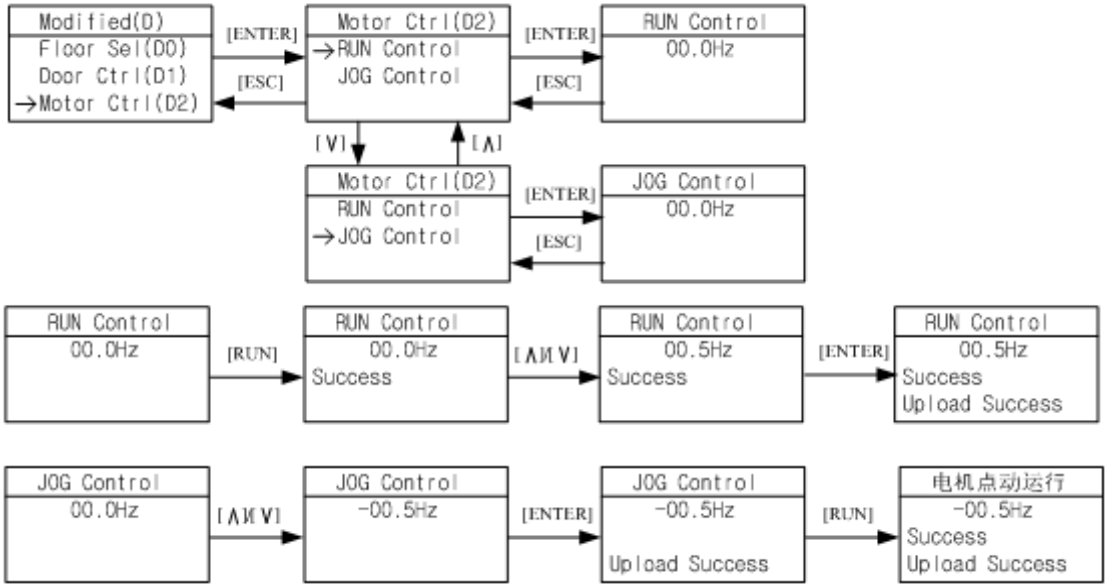


FIGURE 4.8 FLOWCHART FOR OPERATOR TO CONTROL MOTOR RUNNING

In interface of call testing: Press [UP]/ [DOWN] key to check the connections for all floors. Normally, it displays running success, otherwise it shows fails. Press [ESC] key to return to the Previous Menu.

The flowchart for call testing is shown in Figure 4.9.

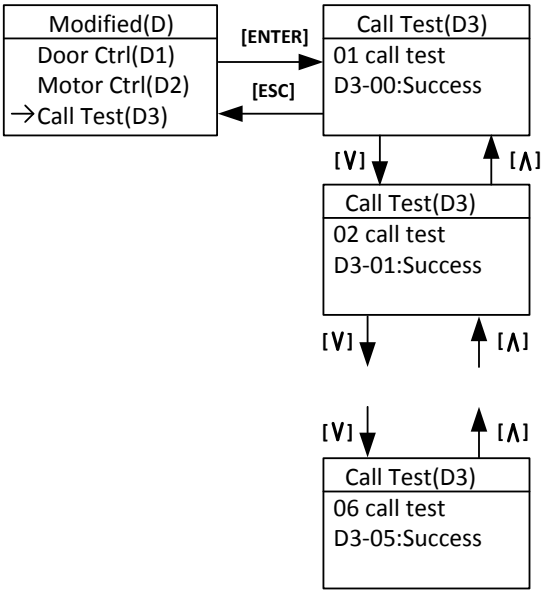


FIGURE 4.9 ELEVATOR CALL TESTING INTERFACE

The interface of communication testing is shown in the Figure 4.10.

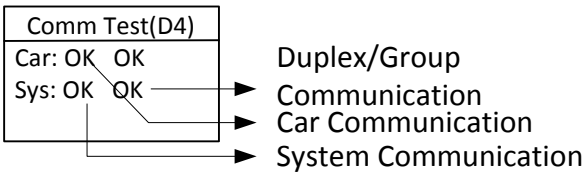


FIGURE 4.10 COMMUNICATION TESTING INTERFACE

The display of the Car Control Communication is as follows:

OK Communication normal

ER Controller receiving data error (please check communication connection & car control board), when there appears a numerical value, it refers to the times of error on car control board communication.

System communication display

OK communication good

ET the controller sending data error (please check landing call communication connection), when there appears a figure, it refers to the times of error on system communication.

Group control communication

OK Group control system communication normal

ER Group control system communication abnormal (When choose this option)

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.

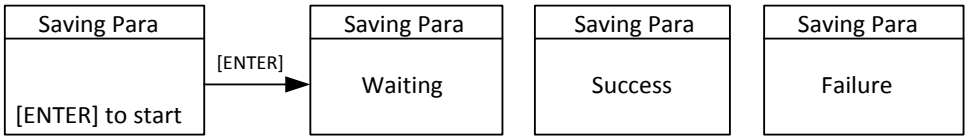


FIGURE 4.11 SAVING PARAMETER

4.6. Hoistway Learning

In hoistway learning interface: when status display “To Down limit”, the hoistway learning cannot start directly. The elevator should manual run to the down limit position first, and “To Down limit” status disappear, the screen will display “[ENTER] to start”, press the [ENTER] key to start hoistway learning. During the learning process, the interface will display the current learning floor and display the status of “Waiting”, when the hoistway learning is completed, the status will display “Success”, when there are errors during the hoistway learning, the status will display “ERR” and display error code. Press [ESC] key to return the Previous Menu.

The flowchart of the hoistway learning is shown in the Figure 4.12.

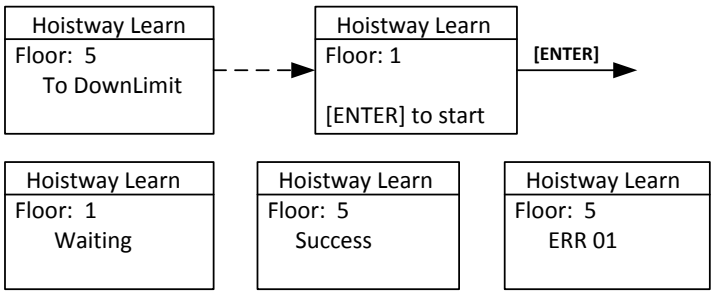


FIGURE 4.12 HOISTWAY LEARNING

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.

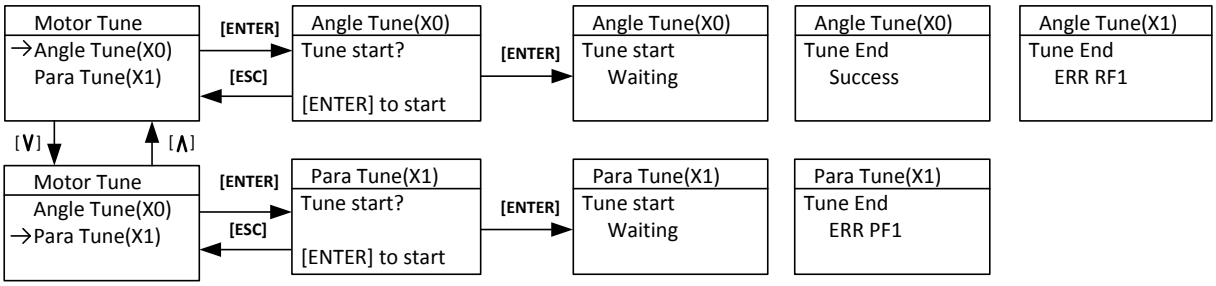


FIGURE 4.13 MOTOR AUTO-TUNING PROCESS

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 displays the present status. Press [ESC] key to return to the Previous Menu.

The load tuning process is shown in Figure 4.14.

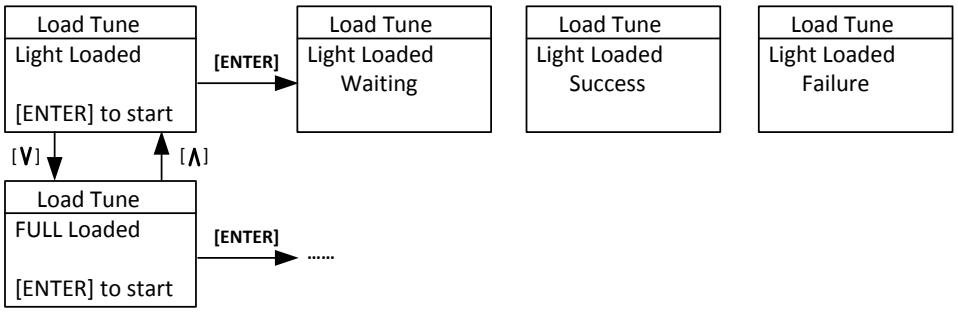


FIGURE 4.14 MOTOR LOAD TUNING PROCESS

4.9. Time Setting

In the interface of time setting, the last two digits of “Year”, “month”, “day”, “hour”, “Minute” and “second” are editable, press [LEFT] or [RIGHT] to move the arrow to the right place. Press [UP] or [DOWN] key to change the pointed value. After setting: Press the [ENTER] key to save. Press [ESC] key to return the Previous Menu.

The flowchart of time setting is shown in the Figure 4.15.

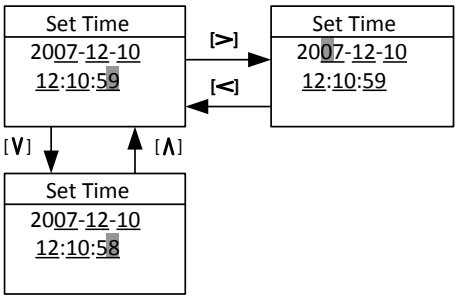


FIGURE 4.15 TIME SETTING

4.10. Fault Record Check

In the interface of Fault Record: Press [UP] or [DOWN] key to check the elevator and controller fault record. Press [ENTER] to enter the selected fault record, press [UP] or [DOWN] key to check the latest 30 fault history record.

Each elevator fault record includes error code, time, elevator status at fault (Floor number, running direction, running speed, I/O state), and related information. This helps to find the root cause of the elevator fault and guide the elevator maintenance.

Each controller fault record includes error code, time, elevator status at fault and other important data (Running speed, line/BUS voltage and current). This helps to find the root cause of the controller fault and guide the elevator maintenance.

The flowchart of the fault record check is shown in the Figure 4.16.

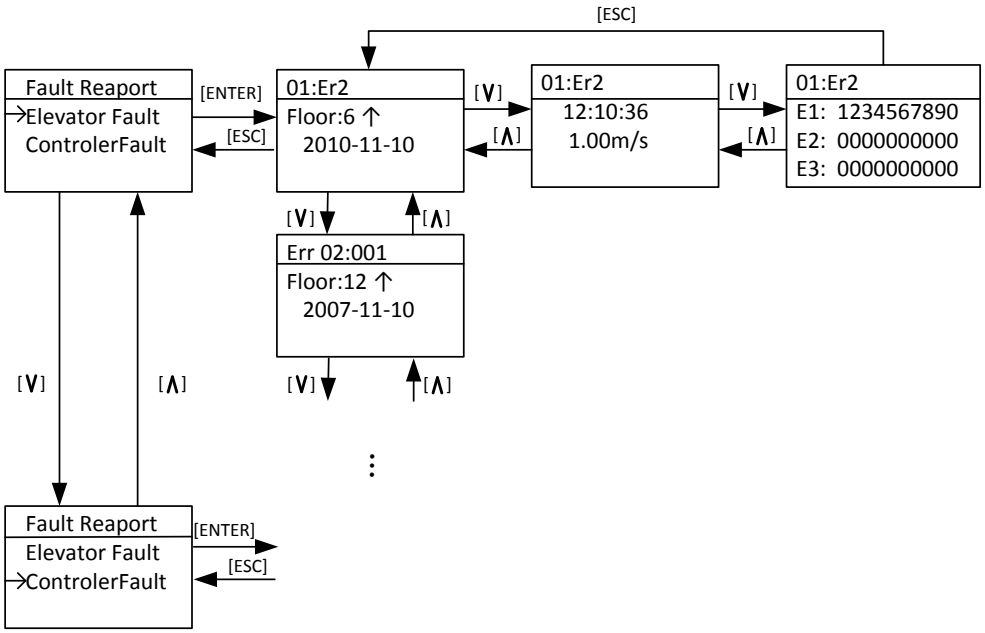


FIGURE 4.16 FAULT RECORD

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.

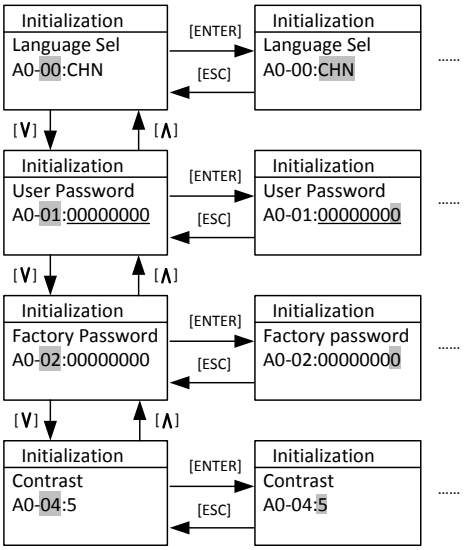


FIGURE 4.17 ENVIRONMENT INITIALIZATION

Language Selection

The flowchart for the language selection is shown in the Figure 4.18.

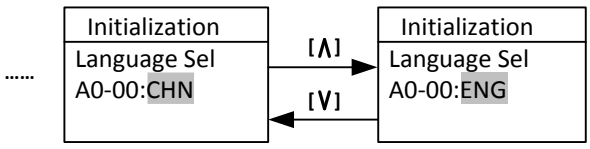


FIGURE 4.18 LANGUAGE SELECTION

Press [UP] or [DOWN] to select language, and press [ENTER] key to save the selection.

User password input and setting

In the interface of password, press the [LEFT] or [RIGHT] key to move the arrow to the pointed position, press [UP] or [DOWN] key to increase or decrease the pointed value, press the [ENTER] key to input the password. When password input is incorrect, “invalid password” will be displayed, and the password cannot be changed at this time. When the password input is correct, “Password OK” will be displayed, next press [ENTER] first then press [RES] key to enter the password setting interface and reset the password. Resetting password is similar to input password. Finally press the [ENTER] key to save the new password.

The flowchart of the password input and change is shown in the Figure 4.19.

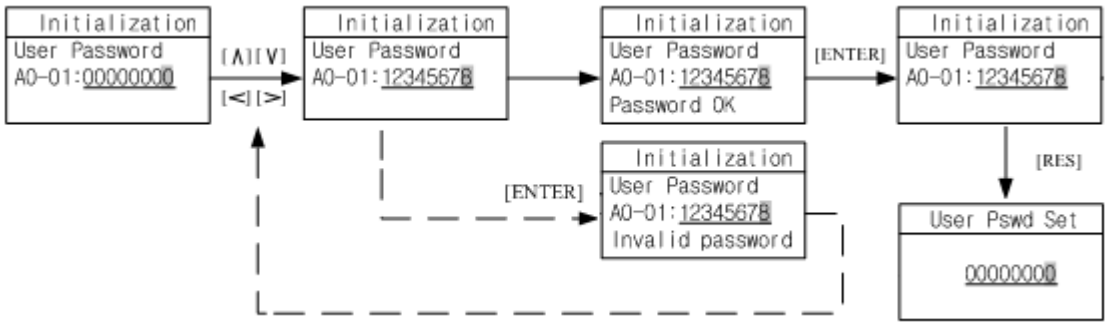


FIGURE 4.19 USER LEVEL PASSWORD INPUT/CHANGE

Factory level password Input and Setting

The process of the factory level password input and setting refers to the user level password input and setting.

Contrast setting

Set the LCD display gray scale. Press [RES] key to change the display grayscale.

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.

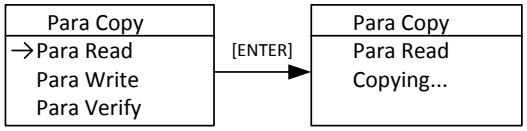


FIGURE 4.21 PARAMETER COPY

After copy operation, LCD display is shown below in Figure 4.22.

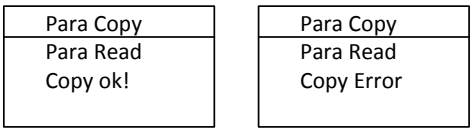


FIGURE 4.22 PARAMETER COPY FINISH

Press [ESC] key to return to the previous menu.

4.13. Restore to Factory Setting

If necessary, the controller can be restored to the factory (default) setting. Press the [ENTER] key to restore the factory setting, the interface will display the status and the result.

The flowchart of restore the factory setting is shown in the Figure 4.23.

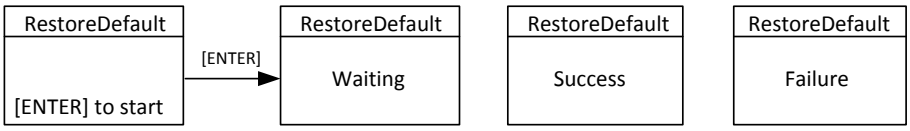


FIGURE 4.23 RESTORE TO FACTORY SETTING

Press [ESC] key to return the previous menu.

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).

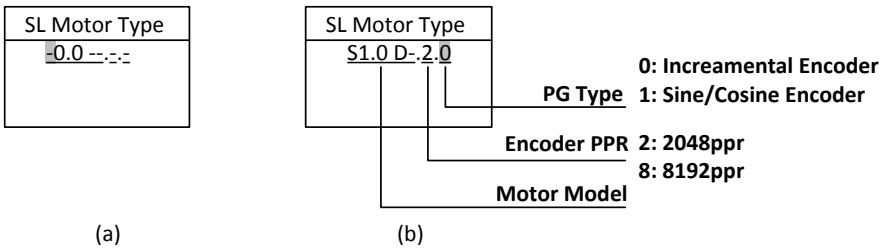


FIGURE 4.24 BLUE-LIGHT MACHINE INPUT

Use [UP] or [DOWN] key to set the content of the pointed area, then press the [ENTER] key to confirm. The cursor is then moved to next bit. If the pointed area is not set, the cursor will not move even you press the [ENTER] key (Except the 4th number of the machine model, e.g. S1.0D- as the last number is empty, you can press the [ENTER] key directly to set the next bit).

The flow chart of the Blue-Light machine input is shown below in Figure 4.25 (S0.75D as an example).

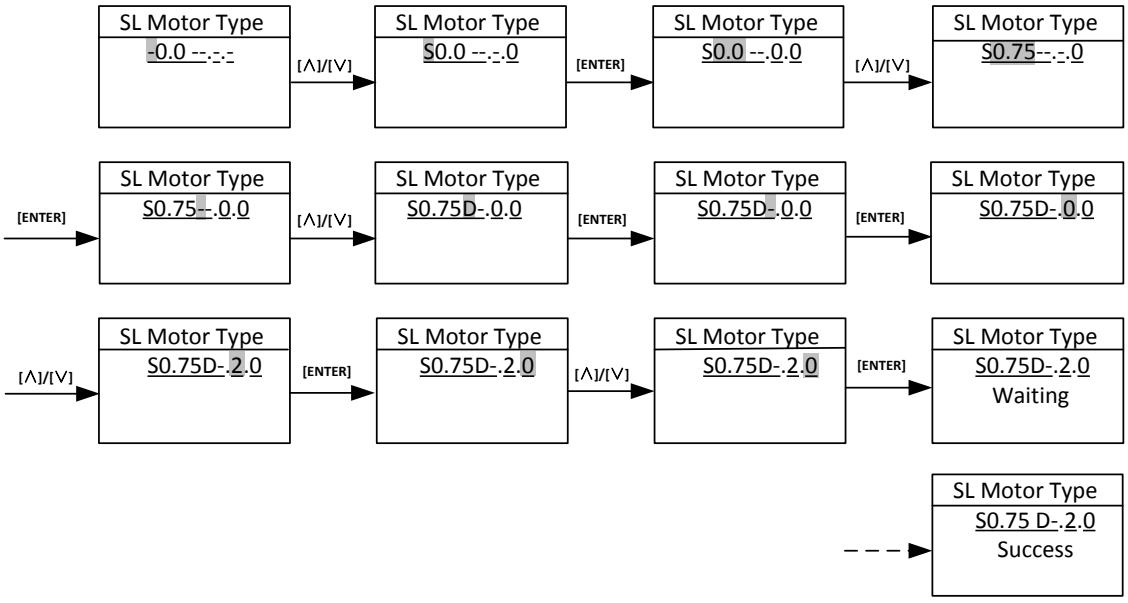


FIGURE 4.25 BLUE-LIGHT MACHINE INPUT FLOW CHART

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

Function Symbol	Function Name
U	Monitoring Parameters
F	Setup Parameters
A	Environment Initialization
D	Commissioning Parameters

5.2. Parameters Hierarchical Structure

The hierarchy structure of parameters as shown in Figure 5.1.

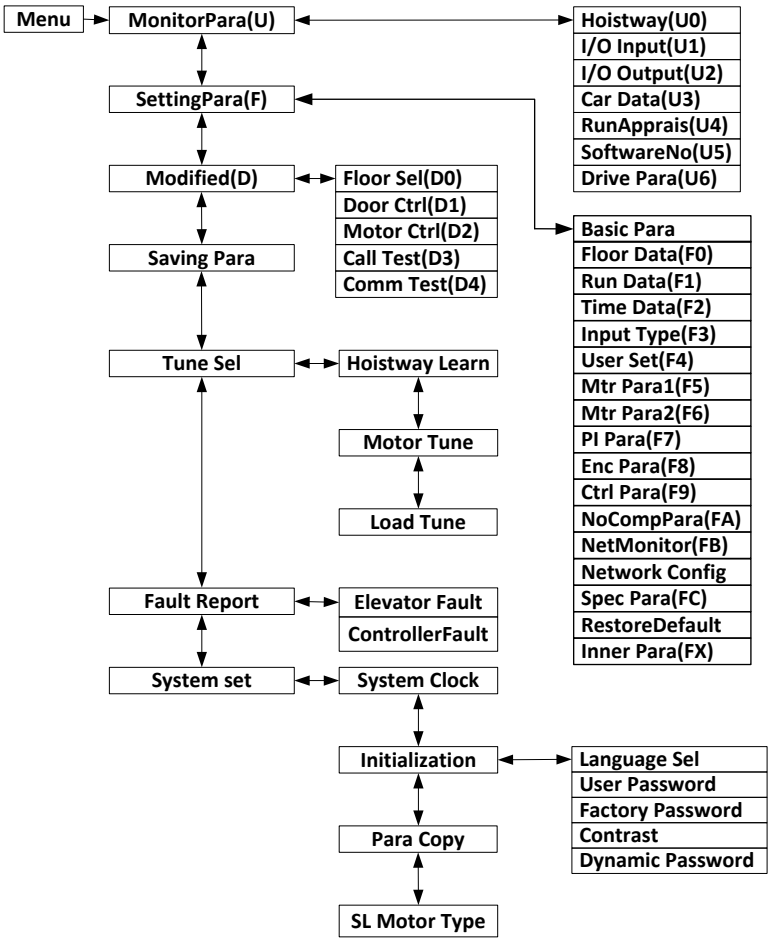


FIGURE 5.1 CONTROLLER PARAMETERS HIERARCHICAL STRUCTURE

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	--
U0-06 … U0-69	Floor Data 1…64	The location of floor 1-64 switches in hoistway. Data will be recorded after finishing hoistway learning	--	m	--

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.	Display	Content	Range	Unit	Ref Page
U1-00	Input Data	Controller input data show in decimal type. It will be turned into binary type to show the logical status of the input port.	--	--	29
U1-01	Input Bin	Input port data show in binary type. Each data corresponds to logical status of one input port.	--	--	
U1-02	Input App	Each line corresponds to one input port, “On/Off” states the current port status, the following “n” value states the signal appraisal to input level. Value from “10” to “0” refers to interference condition from good (less interference) to bad (large interference)	--	--	
U2-00	Output Data	Display the output port Y0-Y15 current status. The valid output port has the corresponded indication. Port without output (invalid) will be hidden.	--	--	30
U3-00	Car Input Data	Display car input signal status. The valid input port has the corresponded indication. Port without input (invalid) will be hidden.	--	--	63
U4-00	Run Times	Show the elevator accumulated running times. Adopts 10 digital decimal figures as indication	--	Times	--
U4-01	Run Hours	Show the elevator accumulated running hour. Adopts 10 digital decimal figures as indication.	--	Hour	--
U4-04	SendApp1	Signal send appraisal for Duplex and group control. Large number means communication send more mistakes.	--	--	--
U4-05	ReceiveApp2	Signal receive appraisal for Duplex and group control. Large number means communication receive more mistakes.	--	--	--
U4-06	Interfere Appraise	Appraise the value of interference strength at site. The big value refers to strong interference, ”0” states no interference and good GND condition.	--	--	--
U4-07	Encoder Appraise	The interference degree of encoder signal. When elevator runs steady, large value states the encoder signal weak with heavy interference.	--	--	--

Chart 5.3 U1~U5 Monitoring Parameters List (Cont'd)

Para No.	Display	Content	Range	Unit	Ref Page
U4-09	Lock Timer	The current elevator stop timer	--	--	--
U5-00	CtrlSoftWare NO	Show the elevator control software information. Provide the current software version for factory maintenance and software upgrading.	--	--	--
U5-01	DriveCodeVer	Show the drive control software information. Provide the current software version for factory maintenance and software upgrading.	--	--	--
U5-02	CpldEdition	Show base drive control software information. Provide the current software version for factory maintenance and software upgrading.	--	--	--

IMPORTANT

For the meaning of input status U1-01 AND output status U2-00, please refer to the control terminal definition chart 3.3. (**Page29**)

Cabin signal symbol definition and content is shown in chart 5.4. (**Page 63**).

Chart 5.4 U3-00 Cabin Signal Content & Definition

Cabin signal	Symbol signal	Cabin terminal No.	Content
C00	IGM1	J3-4	door close 1 input
C01	IKM1	J2-4	door open 1 input
C02	IGM2	J5-4	door close 2 input
C03	IKM2	J4-4	door open 2 input
C04	GMV2	J10-6	door close limit 2 input
C05	KMV2	J10-5	door open limit 2 input
C06	GMV1	J9-3	door close limit 1 input
C07	KMV1	J9-2	door open limit 1 input
C08	SZY	J10-1	Special Use Input
C09	IGMYS	J6-4	door open delay input
C10	SZH	J9-10	Attendant input
C11	--	--	Empty (for Backup use)
C12	SZS	J10-2	Bypass drive input
C13	MZ	J9-6	Full-load input
C14	QZ	J9-8	Light-load input
C15	CZ	J9-5	Over-load input
C16	KZ (50%)	J9-9	50% Full-load (No-load) input
C17	KAB2	J9-7	Door safety plate 2
C18	KAB1	J9-4	Door safety plate 1

5.3.3 Drive Monitoring Parameters (U6)

Chart 5.5 U6 Drive Monitoring Parameters List

Para No.	Display	Content	Range	Unit	Ref Page
U6-00	Power	Rated power class	--	kW	--
U6-01	Ref Speed	Reference Speed	--	RPM	--
U6-02	Feedback Speed	Feedback Speed	--	RPM	--
U6-03	Load	The current load in % of full load	--	%	--
U6-04	DC Voltage	DC BUS voltage	--	V	--
U6-05	Output Current	Output Current	--	A	--
U6-06	Temperature	Drive internal temperature	--	˚C	--
U6-07	Output Torque	Output Torque	--	N·M	--

5.4. Parameters setup Function Instruction

5.4.1 Building Setup Parameters (F0)

Chart 5.6 Building Setup Parameters List

Para No.	Display	Content	Range	Factory Setting	Unit	Live Change	Ref Page
F0-00	Total Floor	Total floor number (same as door zone plate number)	2~64	6	--	N	--
F0-01	Homing Floor	Without landing/car call elevator will return this floor.	1~Total floor	1	--	N	84
F0-02	Fire Floor	At fire-linkage circuit close, elevator enter fire mode and return to this floor automatically.	1~Total floor	1	--	N	85
F0-03	Parking Floor	When close electric lock in the process of running, elevator return to this floor and stop.	1~Total floor	1	--	N	84
F0-04	VIP Floor	VIP floor setup correspond to floor display type: 1-SevenSegment, 2-BCD code, 3-Graycode, 4-point-to-point, 5-binary	1~Total floor	1	--	N	--
F0-05 … F0-68	Set Indication 1~64	Set indication 1-64, customized character/figure display available	---	1 … 64	--	N	91

“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 Change	Ref Page
F1-00	Car Speed	Elevator speed at motor rated speed. Calculate through motor rated rev, traction ratio, deceleration ratio and traction sheave diameter.	0~4.0	1.6	m/s	N	76
F1-01	Motor Speed	Motor speed at elevator rated speed (Calculated)	1~ 9999	306	RPM	N	76
F1-03	Insp Speed	Car running speed at inspection cannot exceed 0.6m/s based on relevant standards and regulations	0~0.6	0.3	m/s	Y	76
F1-04	Start Speed	For large resistance at motor start, the starting speed can have smooth increase. The start smooth speed is invalid if set to “0”.	0~0.2	0.03	m/s	Y	--
F1-05	Leveling Speed	When elevator park outside door zone due to fault, if satisfy running condition, the elevator can level to door zone with this speed.	0.01 ~ 0.6	0.3	m/s	Y	77
F1-06	Least Speed	Steady speed on the lowest speed curve.	0~1.0	0.5	m/s	N	77
F1-07	Open Door Speed	Car speed when elevator open door in advance is allowed.	0~0.3	0.15	m/s	N	Appendix 2
F1-08	Relevelst Speed	The speed limit for re-leveling. If speed exceeds such value in re-leveling process, the re-leveling will stop with #03 protections.	0~0.3	0.3	m/s	N	Appendix 2
F1-09	Relevelrun Speed	Elevator running speed at re-leveling.	0~0.10	0.05	m/s	N	Appendix 2

IMPORTANT

When elevator rated speed/Single floor running speed is lower than 0.5m/sec, please properly decrease the acceleration B1, deceleration B2; otherwise it will affect the system calculation of current speed. When user modifies the two-speed value out of limit, system will reset to the data before modification.

Chart 5.7 Running Setup Parameters List (Cont'd)

Para No.	Display	Content	Range	Factory Setting	Unit	Live Change	Ref Page
F1-10	Acceleration B1	B1 refers to the acceleration speed curve changing rate, smaller value means elevator start with smooth and gentle increase of speed.	0.1~1.0	0.5	m/s^2	N	77
F1-11	Deceleration B2	B2 refers to the deceleration speed curve changing rate, smaller value means elevator brake with smooth and gentle decrease of speed.	0.1~1.0	0.5	m/s^2	N	77
F1-12	S Curve P1	P1: Acceleration speed increase rate at beginning of elevator start; smaller value means beginning of elevator start with slow and steady movement.	0.1~1.0	0.5	m/s^3	N	77
F1-13	S Curve P2	P2: Acceleration speed decrease rate at end of elevator start; smaller value means end of elevator start with slow and steady movement.	0.1~1.0	0.5	m/s^3	N	77
F1-14	S Curve P3	P3: Deceleration speed increase rate at beginning of elevator brake; smaller value means beginning of elevator brake with slow and steady movement.	0.1~1.0	0.5	m/s^3	N	77
F1-15	S Curve P4	P4: Deceleration speed decrease rate at end of elevator brake; smaller value means end of elevator brake with slow and steady movement.	0.1~1.0	0.45	m/s^3	N	77
F1-16	Zero Speed	Motor speed less than set value, system considers elevator speed as zero and output brake signal.	0~10	1	RPM	Y	81
F1-17	Leveling Adj	Adjust differences of up/down leveling	0~100	50	mm	N	91
F1-18	Load Adj	Normally used in synchronous machine system, compensate elevator load based on steel rope weight difference on each floor.	0~20	0	--	Y	90

IMPORTANT

Acceleration B1, deceleration B2, S curve P1, P2, P3, P4 work together to determine the final speed curve and its trend. These parameters have internal relation with each other and are not allowing to change at will. When the modified value is out of limit, the value will recover to the previous data.

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	0.21	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	5	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	60	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

Chart 5.8 Time setup Parameters List (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	0.5	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 starts 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 starts 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	Ref Page
F3-00	Input Type	Setting the input type on main control panel. Each bit corresponds to one terminal. Set default level of mainboard input port. **ON:** Close enable, **OFF**: Open enable.	0 ~ 4294967295	3726441599	N	87/88
F3-01	Car Input Type	Setting the input type of cabin. Each bit corresponds to one terminal. **ON**: Close enable, **OFF**: Open enable.	0 ~ 4294967295	4294967295	N	88
F3-02	Input select 1	X12 Input Function Selection	0~32	12	N	
F3-03	Input select 2	X18 Input Function Selection	0~32	18	N	
F3-04	Input select 3	X27 Input Function Selection	0~32	27	N	
F3-05	Input select 4	X35 Input Function Selection	0~32	35	N	
F3-06	Input select 5	Spare	0~32	25	N	
F3-07	output select 1	Spare	0~32	0	N	
F3-08	output select 2	Spare	0~32	11	N	
F3-09	output select 3	Spare	0~32	12	N	

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	0	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)

Chart5.11 Motor Setup Parameters List

Para No.	Display	Content	Range	Factory Setting	Unit	Live Change	Ref Page
F5-00	Motor Type	Set motor type (0: sync- outer rotor, 1: async machine, 2: sync-inner rotor)	0~2	0	--	N	94
F5-01	Poles	Motor poles (Nameplate)	1~99	20	--	N	94
F5-02	Sync Freq	Motor synchronous frequency (Nameplate)	0.001~ 99.999	16	Hz	N	94
F5-03	Rated Power	Motor rated power (Nameplate)	1~50	6.7	kW	N	94
F5-04	Rated Speed	Motor rated speed (Nameplate)	1~1999	96	RPM	N	94
F5-05	V IN	Motor counter-EMF (Nameplate)	1~380	280	V	N	94
F5-06	L_phase	Motor phase inductance set. (Auto-tuning/ manual input)	Auto-tuning/ Nameplate		mH	N	95
F5-07	R_phase	Motor phase resistance set. (Auto-tuning/ manual input)	Auto-tuning/ Nameplate		Ω	N	95
F5-08	Rated FLA	Motor rated current. (Nameplate)	0~99.999		A	N	95
F5-09	NO-Load Current	For asynchronous machine, no-load excitation current.	0.1~50	0	A	N	95
F5-10	Rated Slip	For asynchronous machine rated slip. (Nameplate)	0.1~10	1.5	HZ	N	95
F6-00	Carrier Freq	Set controller carrier frequency.	6~15	8	kHz	N	--
F6-02	SpeedZoom	Speed Zoom (Reduce elevator actual running speed)	0~100	100	%	Y	95
F6-03	DirSel	Select motor running direction (0/1: Motor rotates anti-clockwise, car move down/up).	0/1	0	--	--	95
F6-04	Kp	Speed loop proportional gain. (Valid for complete curve if not used in multiple PI.)	0~65535	1000	--	--	96
F6-05	KI	Speed loop integral gain. (Valid for the complete curve if not used in multiple PI.)	0~65535	600	--	--	96

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
F7-01	PI1 Range	PI available range 1 (Start-middle speed running PI switch frequency)	0~ Rated freq	0	Hz	Y	96 97
F7-02	PI2 Range	PI available range 2 (middle -high speed running PI switch frequency)	0~ Rated freq	0	Hz	Y	96 97
F7-04	PI3 Range	PI available range 4	0~ Rated freq	0.5	Hz	Y	96 97
F7-05	Kp1	PI available range 1 proportional gain	0~2000	700	--	Y	96 97
F7-06	Kx1	PI available range 1 integral gain	0~2000	260	--	Y	96 97
F7-07	Kp2	PI available range 2 proportional gain	0~2000	0	--	Y	96 97
F7-08	Kx2	PI available range 2 integral gain	0~2000	0	--	Y	96 97
F7-11	Kp3	PI available range 4 proportional gain	0~2000	700	--	Y	96 97
F7-12	Kx3	PI available range 4 integral gain	0~2000	260	--	Y	96 97

5.4.8 Encoder Setup Parameters (F8)

Chart 5.13 Encoder Setup Parameters List

Para No.	Display	Content	Range	Factory Setting	Unit	Live Change	Ref Page
F8-00	Encoder PPR	The encoder pulse count per-revolution.	100~8192	2048	--	N	98/99
F8-02	PGType	PG card type (0: Incremental encoder, 1: Sine/Cosine encoder）	0/1	1	--	N	98/99

5.4.9 Control Setup Parameters (F9)

chart 5.14 Control Setup Parameters List

Para No.	Display	Content	Range	Factory Setting	Unit	Live Change	Ref Page
F9-00	Max Torq Comp	Maximum torque compensation (torque required to compensate at no load, 100% correspond to machine rated torque.)	0 ~ 100%	0	%	N	89
F9-01	SPDSourceSel	Speed given source selection: 0: Simulation; 1: Multi-segment 2: Internal; 3: Operator	0~3	2		N	--
F9-03	Spderr Set	Speed Deviation Set (100% correspond to machine rated speed.)	0~100	5	%	Y	--
F9-11	Load Comp Enable	Load Compensation: 1 enable; 0 Unable	0/1	0	--	N	97/98
F9-13	Load Source Sel	Weighing source (0: SJT weighing,1: -10-10V weighing,2:0-10V weighing)	0/1/2	0	--	N	97/98
F9-19	UP Comp Bias	Up direction (clockwise) Compensation Bias	-100~100	0	--	Y	--
F9-20	DOWN Comp Bias	Down direction (anti-clockwise) Compensation Bias	-100~100	0	--	Y	--
F9-21	FULL Comp Pro	Full load compensation proportion	0~200	100	--	Y	--

5.4.10 No-load Compensation Setup Parameters (FA)

Chart 5.15 No-load Compensation Setup Parameters List

Para No.	Display	Content	Range	Factory Setting	Unit	Live Change	Ref Page
FA-00	StratKP	Start-up proportional gain with no compensation.	0~50000	30	--	N	99
FA-01	StratKI	Start-up integral gain with no compensation	0~50000	750	--	N	99
FA-08	PLKP1	No compensation effect proportional gain 1	1~6500	3600	--	N	99
FA-09	PLTime	No compensation effect time	1~1000	900	ms	N	99
FA-11	PLKP2	No compensation effect proportional gain 2	0~50000	800	--	N	99
FA-12	PLKPMOD	No compensation effect proportional factor	0~50000	125	--	N	99

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 editable, while other parameters can be changed. Special parameters (FC) number, description and content are shown below in Chart 5.16.

Chart 5.16 Special Parameters List

Para No.	Display	Content	Range	Factory Setting	Unit	Live Change	Ref Page
FC-00	Zpulse_Init	Result of motor angle tuning, same as FX-00.	0~3277	--	--	N	--
FC -07	KpIreg	Current ring proportional (FX-07), **MODIFY WITH CAUTION!**	0~ 65535	10000	--	N	--
FC -08	KxIreg	Current ring integral (FX-08), **MODIFY WITH CAUTION!**	0~ 65535	5000	--	N	--
FC-13	AutoTuneModeSel	Sine/Cosine PG card auto- tuning selection (FX-20): 0: Rotation; 1: Stationary;	0/1	0	--	N	--
FC-14	N Temp Alarm Ena	Negative temperature alarm (FX-21) 1: Alarm enable at -15C; 0: Alarm disable at -15C.	0/1	1	--	N	--
FC-15	InitTuneEnable	When using Sine/Cosine PG card, whether need CD signal for position at power up 0: Yes.1: No (Can only set to 0 for SPG-V33 and above) Set to 0 can avoid electric noise at first power up.	0/1	0		N	FX-24
FC-16	CD DirSel	FC 15 is available if set to 1. Set to 0 if AB & CD signal in same phase, otherwise set to 1. (Auto selected at motor angle tuning.)	0/1	0		N	FX-25

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	--

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 encoders for hoistway counting at elevator running.

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

$$\text{Elavator rated speed} = \frac{\text{Motor RPM} \times \text{traction sheave diameter} \times 3.14 \times \text{speed reduction ratio}}{60 \times 1000 \times \text{traction ratio}}$$

For example: Motor rated speed is1370 rev/min., traction sheave diameter 590mm, speed reduction ratio: 2/53, traction ratio 1/1, then:

$$\textbf{Elevator rated speed} = \frac{1370 \times 590 \times 3.14 \times 2}{60 \times 1000 \times 1 \times 53} = 1.\frac{6m}{s}$$

After setting elevator rated speed, motor rated speed, encoder pulse number, system record the relationships between traction ratio, speed reduction ratio, traction sheave diameter and relationships between shaft counting pulse and running distance. If the setting is incorrect, the following problems may happen:

1) The elevator running speed on digital operator or software is different with the elevator actual running speed.

For example, if encoder pulse or motor rated speed is set to a smaller value, speed indicated on the display will be higher than actual speed, after hoistway learning, floor height learned by the system will be larger than actual height.

2) As the floor height learned by the system is higher, the elevator deceleration curve will be steeper than the setting. This could result elevator cannot level sometimes (running out of leveling zone with sudden brake).

6.1.2 Inspection Run Speed

In inspection mode, elevator runs in slow inspection speed(F1-03), based on international standard, such speed should be no more than 0.6m/s. After elevator reaches top or bottom terminal, the running speed will be reduced to half of the inspection speed.

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 cannot park at small distance floor, it will stop 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.

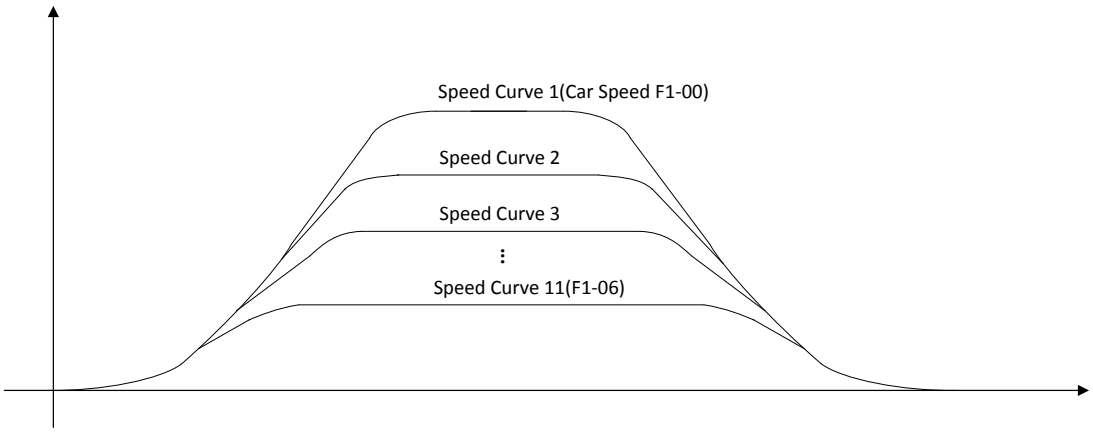


FIGURE 6.1 ELEVATOR RUNNING SPEED CURVE

Acceleration, deceleration for normal running curve and Acce/Dece for 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)

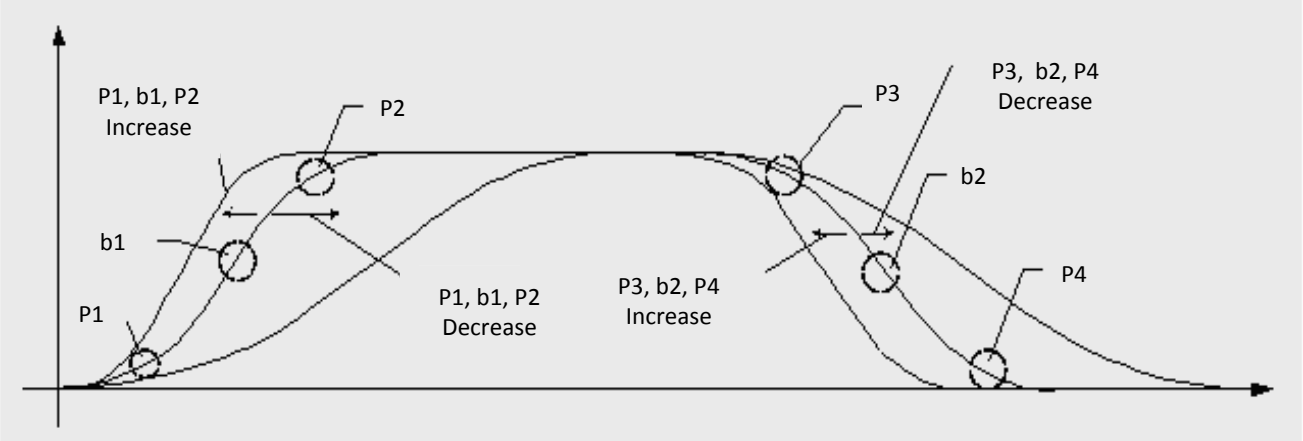


FIGURE 6.2 PARAMETERS ADJUSTMENTS FOR SPEED CURVE

✧ 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.

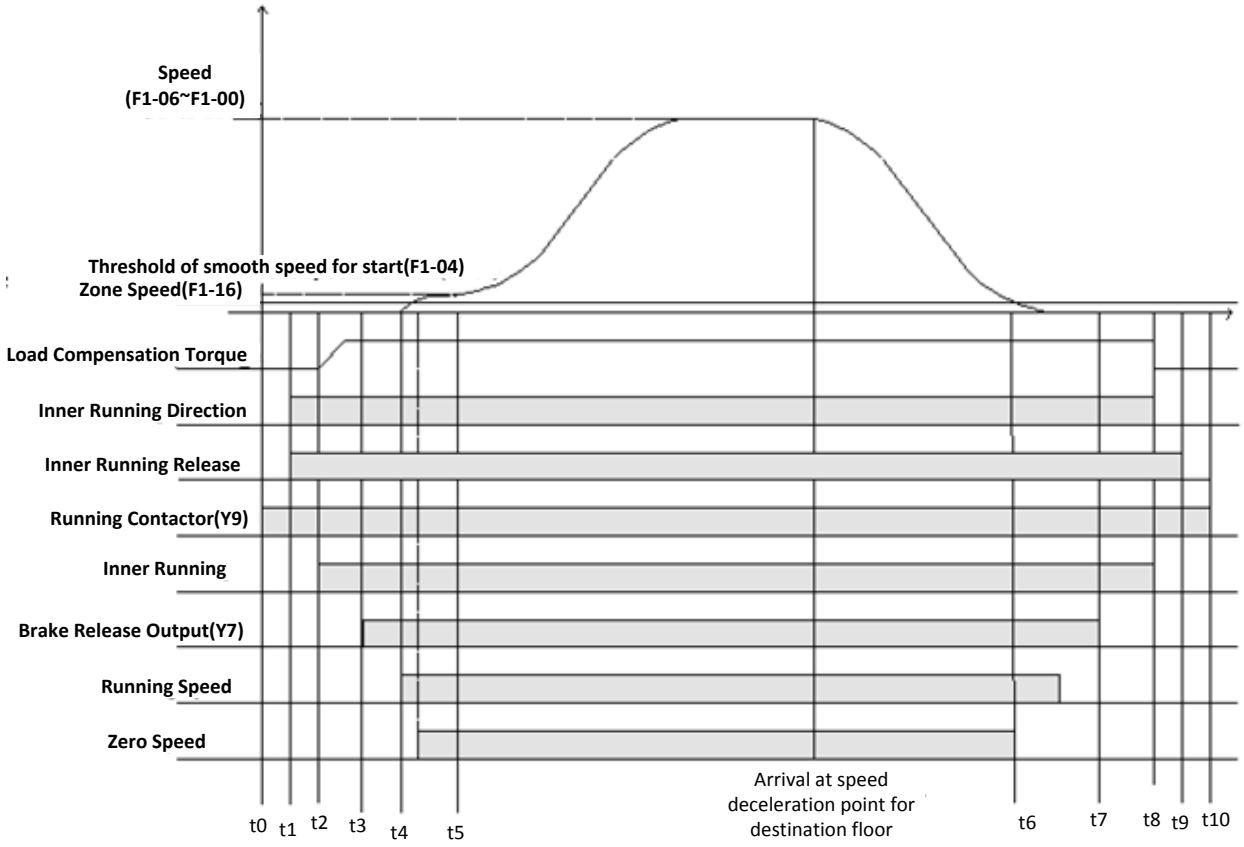


FIGURE 6.3 ELEVATOR TIMING DIAGRAM FOR NORMAL RUNNING

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.
t4~t5	Smooth start time (F2-13): Elevator runs in start smooth speed (F1-04) for a period at start up, this is to overcome part of the elevator static friction. This is normally set as 0.2s-0.4s, setting it too long may reduce the elevator start efficiency.

Chart 6.1 Timing definition for Elevator Normal Running (Cont'd)

Time	Definition and Setup Instruction
t6~t7	Zero speed time (F2-04): When elevator runs to the destination floor and speed is lower than the zero-speed limit (F1-16), after zero speed time (F2-04), brake release output is disabled. If zero speed time is set too short, brake may close before elevator completely stop. Normally this value is set to 0.2s-0.4s.
t7~t8	Braking time (F2-01): After brake close, due to the subsequent flow and demagnetization, brake cannot lock on the traction sheave immediately and torque output is kept in the meantime. After braking time, system drop internal direction command and torque output. This time can prevent the elevator slip due to braking lag. Based on the brake condition, set 0.8-1.5s for synchronous machine, and 0.3-0.5s for asynchronous machine.
t8~t9	After system drop internal direction command, stop output current immediately may generate large current noise. Time delay (F2-10) can be set to decrease output current gradually, finally stop the elevator after dropping the internal direction command.
t9~t10	Time delay for running contactor open is 0.4s to prevent electric arc when contactor opens with current. But braking, emergency stop, door lock protection does not have time delay, they act immediately.

6.3.2 Timing Diagram for Inspection Running

Timing diagram for elevator inspection running can be seen below in Figure 6.4.

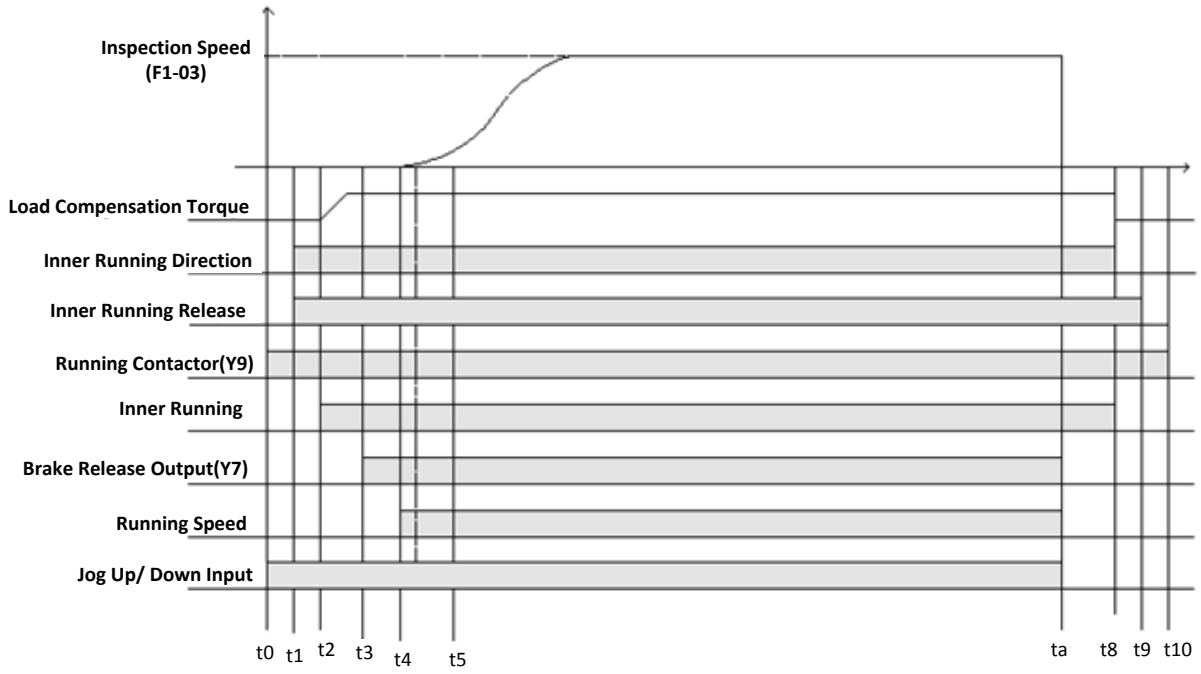


FIGURE 6.4 TIMING DIAGRAM FOR ELEVATOR INSPECTION RUNNING

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

Chart 6.2 Timing Definition for Elevator Inspection Running

Time	Definition and Setup Instruction
t0~t9	Definition for t0~t9 are the same with elevator normal running
ta~t8	Inspection braking time (F2-02): At inspection running stop, system will not wait for elevator zero speed to close brake. When jogging up/down instruction is dropped, brake will close at once (with speed). For some asynchronous traction machines, holding time for torque output too long will result system trigger over-current protection. In this case decreasing the braking time can eliminate such protection. For synchronous machine control, this value should be same under normal running and set as 0.8s-1.5s, for asynchronous machine control, this value should be set as 0.1s-0.3s.

6.3.3 Timing Diagrams for Rescue Running

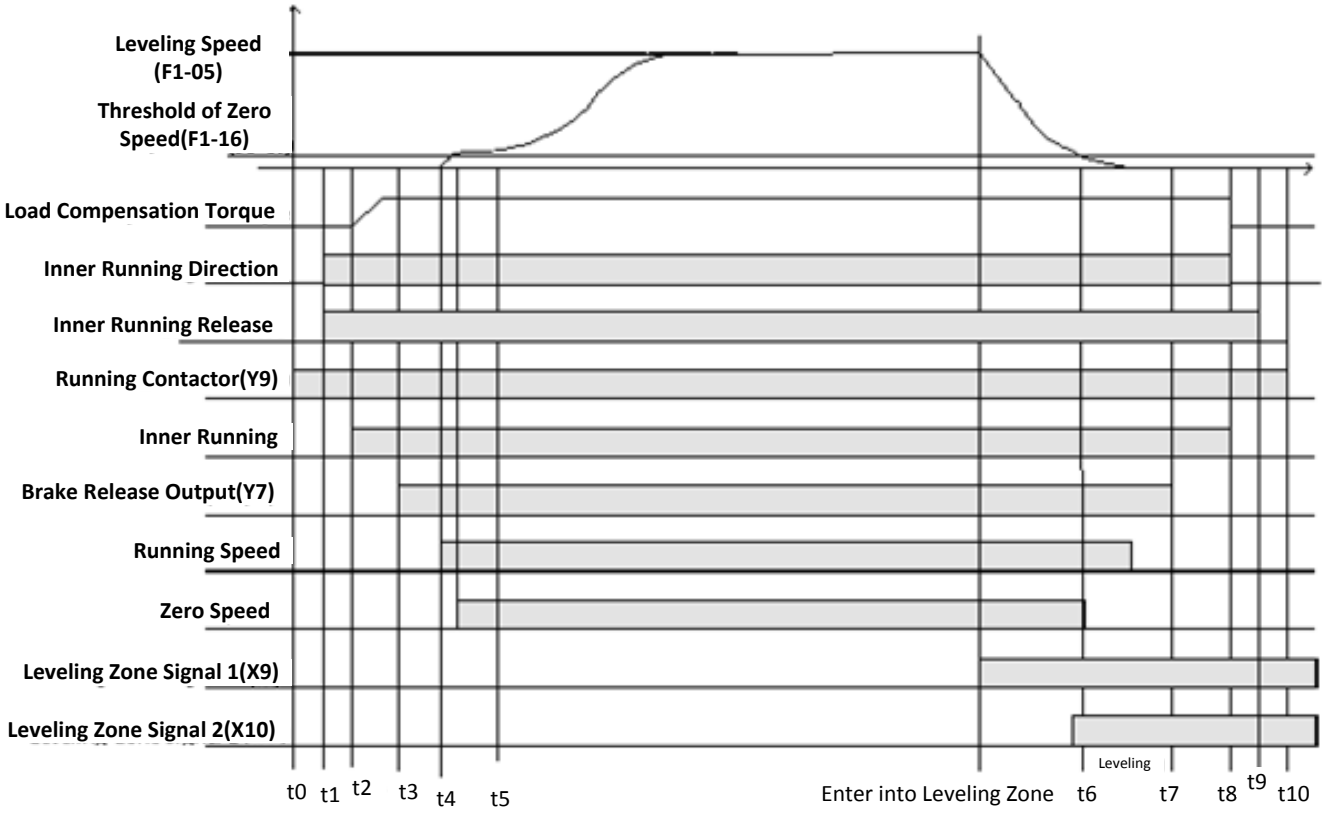


FIGURE 6.5 TIMING DIAGRAMS FOR RESCUE RUNNING (SAME DEFINITION & SETTING WITH NORMAL RUNNING)

6.3.4 Timing Diagram for Recalibration Running

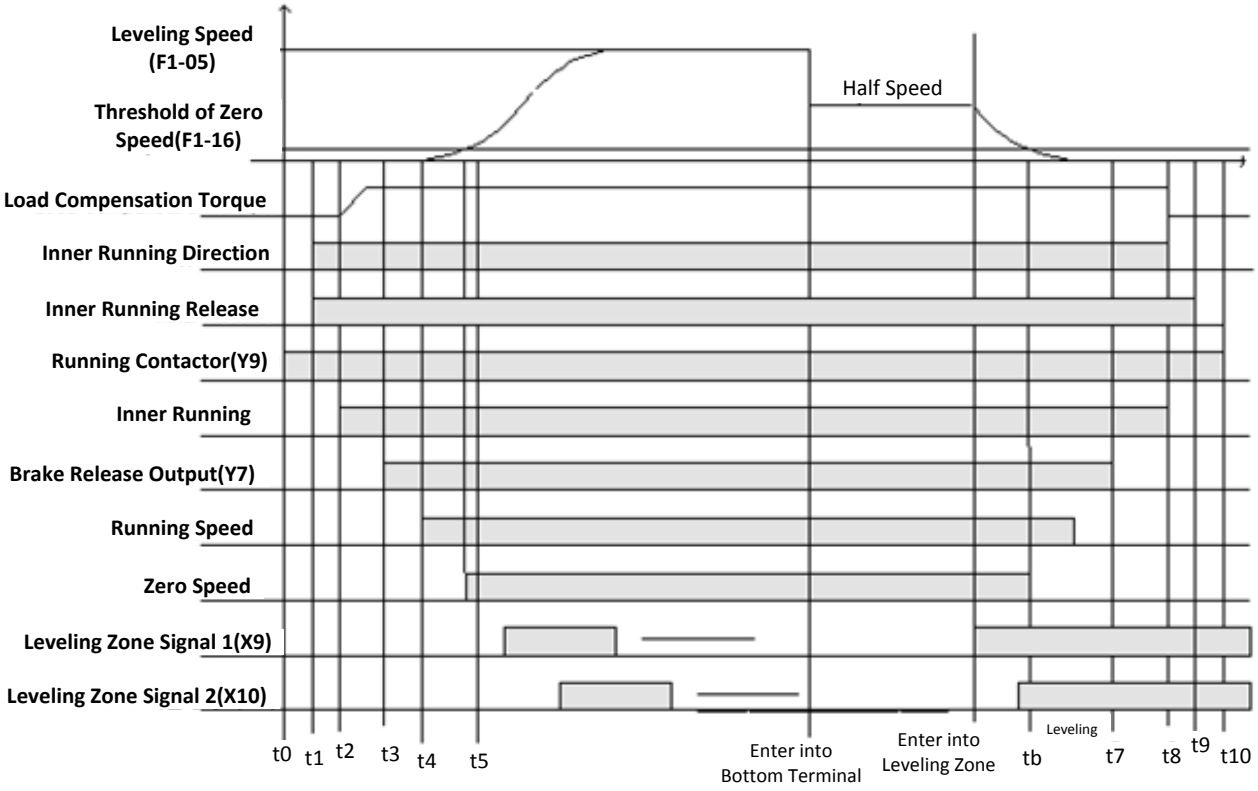


FIGURE 6.6 TIMING DIAGRAMS FOR RECALIBRATION RUNNING (SAME DEFINITION & SETTING WITH NORMAL RUNNING)

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.

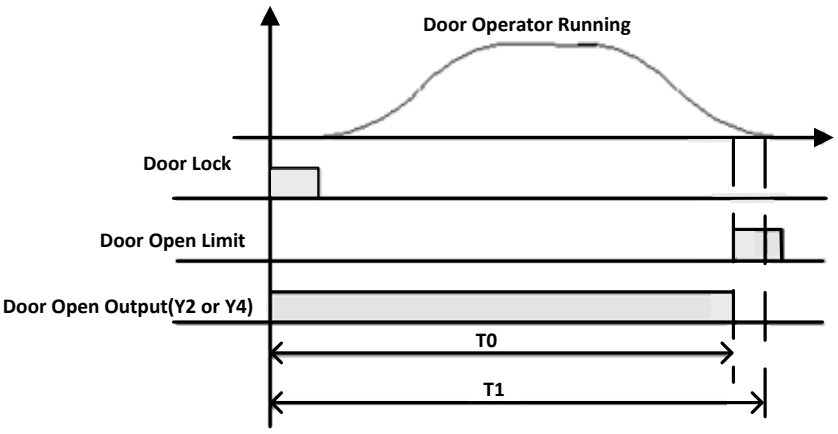


FIGURE 6.7 TIMING DIAGRAM FOR DOOR OPEN

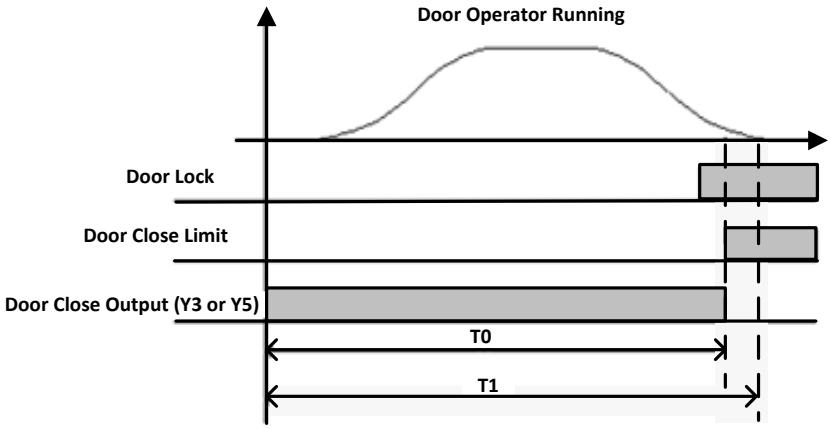


FIGURE 6.8 TIMING DIAGRAM FOR DOOR CLOSE

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 mode.
2. Door close limit valid, system stops output door close signal, door cannot close, system open the door again.
3. Door close limit is valid, system will open door after set time in F2-08. Door can still be closed under the holding force of door drive, but system will show a door close error, and elevator can run normally.

If the door open/close limit switches cannot be valid after installation, elevator will control door open/close based on time set in F2-08. If door open/close limit signals are normal; the control of door open and close will be based on door open/close limit signals.

6.4.2 Door Open Holding Time

Elevator run in auto mode, after landing, door open, and door will hold for following time:

1. After landing, door open, if elevator has no landing/car call, waiting time is door open holding time (F2-05).
2. After landing, door open, if elevator has only landing call, waiting time is door open holding time (F2-05) minus 2s.
3. After landing, door open, if elevator has both landing/car calls, waiting time is twice of door open holding time (F2-05) minus 2s.
4. If door open delay time (F1-30) is valid (Set as 1), and after door open, door open delay button is pushed, waiting time will be door open delay time (F2-06). After the delay time or press door close button to close door in advance and then reopen door again, door open delay function will be cancelled, unless push door open delay button again after door is open.

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 open and close are both jog mode based on international standard.

Door control in fire-mode:

1. In fire mode, if elevator is running, elevator will land to the nearest floor but does not open door, then elevator return to fireman floor.
2. In fire mode, if elevator stops at another floor, door will not open after fully closed, then elevator return to the fireman floor. If door is open, door will close at once, but before the door is completely closed, the door can be opened again by pushing the door open button.
3. If elevator is at the fireman floor, it will open door and hold.
4. In fire mode, except on fireman floor, on all other floor's door can only be controlled in jog mode.

6.5. Homing Function Setup

Elevator in auto mode (no duplex/group control), if there are no landing/car calls in set time, elevator will return to homing floor.

1. Set homing floor (F0-01)
2. Set homing time (F2-07), this function is disabled if set homing time to 0.

6.6. Parking Function Setup

Normal elevator lock input:

1. Electric lock input (X20) invalid, elevator in auto mode, it will return to parking floor (F0-03) after finishing all car calls.
2. Electric lock input (X20) invalid, elevator in attendant/special use mode, as door cannot close automatically, after finishing all car calls, door must be closed manually, elevator will then return to parking floor.
3. Electric lock input (X20) invalid, elevator in inspection mode, it will be locked at once.

Automatic Start/Stop:

1. Electric lock input (X20) valid, set auto parking (F1-28) as 1, automatic start time (F2-14), automatic stop time (F2-15) to correspond value to enable this function.
2. Electric lock input (X20) invalid, elevator will enter parking state; cannot set auto start/stop function.
3. In elevator auto stop time and elevator need to run temporarily, turn the electric lock to invalid and restore to valid, elevator will run. After the running, operate the electric lock in same procedures, elevator will re-enter lock mode, until reach auto-start time, then it starts running again.

6.7. Fireman Operation Function Setup

Controller has three kinds of fireman operation mode; fireman mode (F1-23) can be set as "0, 1, and 2":

0: Normal fireman mode: When fireman input is valid, elevator lands to the nearest floor but doesn't open door, then it returns to the fireman floor(F0-02), it opens door and stops, meanwhile it enters into the fireman mode, elevator can run in fireman standard.

1: Fire emergency stop mode: When fireman input is valid, elevator lands to the nearest floor but doesn't open door, then it returns to the fireman floor (F0-02), it opens door and stops. Meanwhile elevator stops running, until fireman input is eliminated.

2: Fireman control mode: It includes two steps, step 1 is fire emergency return, and step 2 is fireman operation. Only after elevator returns to the fireman floor could step 2 be operated.

1) Fireman input switch has two states (ON/OFF); it is connected to X12 on main control board. Fireman operation switch has three states (ON/START/OFF), ON is connected to fireman input (by-pass input) on COP, START is connected to the door close input in parallel (For fireman to close door, when fireman turns the key to the START position, point ON is still valid, after releasing switch will automatically return to ON.)

   Step 1: Fireman input X12 is valid, if elevator is running, it will cancel all car call and landing call and stop at the nearest floor but doesn't open door and then return to the fireman floor; if elevator is under stop and door open state, elevator will close door at once and return to the fireman floor. After elevator returns to the fireman floor, it opens door and stop running.

   Step 2: Elevator in fire mode, return to fireman floor then stop running; At this time fireman operation running can be activated by fireman operator switch, switch to ON/STAR, elevator will run under fireman operation (Only serve one car call, door open and close follow fireman operation function). After switch to ON/STAR and elevator finished serving fireman operation, if elevator already leave the fireman floor, and switch is turned to OFF, at this time elevator will keep running. Only when elevator returns to the fireman floor again then it will stop running.

2) After elevator enters fire mode, light curtain input will be invalid. Elevator will exit from fire mode only when fireman input switch, fireman operation switch is both in OFF state.

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/landing call. (Two sets of COPs are needed for both front and rear door.)

According to the rear door mode, HOP address setting and COP wiring are different too:

1. HOP address setting

1) When rear door mode on controller is set as**0, 1, 3**, HOP address is same as usual;
2) When rear door mode on controller is set as**2,4,5,** HOP address is set as below:
   a) **1**~**32**is the absolute floor number at front door side:
   1is the bottom floor, **2**is second to bottom floor, maximum number is **32**, total **32** floors.
   b) **33**~**64**is absolute floor number at rear door side**:**
   33 is the bottom floor, **34** is second to bottom floor, maximum number is **64**, total **32** floors.
   c) If there is only one door on some floors, then the HOP address for the other door is empty.

   Example 1: Elevator has one basement floor with both front and rear doors, on this floor HOP address is 1 for front door and 33 for rear door.

   Example 2: Elevator has one basement floor with only front door, and one ground floor with both front and rear doors, on the basement floor HOP address is 1 for front door and empty for rear door. On the ground floor HOP address is 2 for front door and 34 for rear door.

2. C.O.P button wiring:

1) When rear door mode on controller is set as **0, 1: 1~N** floor buttons are connected to the COP terminal as usual.
2) When rear door mode on controller is set as **2, 4, 5:** set total floor no. **N,** then the **1~N** car call ports correspond to **1~N** floor car call buttons at front door, **1** is the bottom floor, **N** is the top floor. **N+1~2N** floor car call ports correspond to the **1~N** floor car call buttons at rear door, **N+1** is the bottom floor, **2N** is the top floor.

For example: Elevator has 6 floors (1~6), no basement, 3rd floor has double entrance; other floors have only front entrance. Then car call buttons **1~6** at front door should be connected to **1~6** car call ports, car call button **3** at rear door should be connected to **N+3=6+3=9** car call port.

IMPORTANT When rear door mode is **1**, **2, 3, 4, 5,** need to install two sets of door open/close buttons, this is to open front and rear door separately in inspection running.

IMPORTANT If rear door mode is 1, and there is one set of door open/close buttons, please set parameter FU18 to "ON". In other mode, if there is only one set of door open and close buttons, in inspection running, only front door can be opened by door open button, rear door cannot be opened by the button.

6.8.2 Rear Door Condition Setup

Front door setting parameter (F4-04) and rear door setting parameter (F4-05) are required to set front or rear door open on certain floors. In single door mode, these two parameters are invalid. In rear door mode, if set F4-04 to "ON" for some floors, front door can open on these floors, if set F4-04 to "OFF", front door cannot open on these floors. This is same for rear door setup. Please set both doors condition based on actual situation to avoid door open mistake.

6.9. Input Type Setup

Input type on main control board (F3-00) can be changed based on actual ON/OFF state. When switch is at valid position/state and switch is closed, then its input type is ON. When switch is at valid position/state and switch is open, then its input type is OFF. Input type setup on main control board can be seen below in Chart 6.3

Chart 6.3 Input Type Setup

Name	Port	Position	Definition	Parameters	Default Input Level	Output Switch Default State	Default State
Main Control Board F3-00	X0	J7-8	SJX Inspection/auto input	F3-00-00	ON	OPEN	OFF
	X1	J7-7	SSXW up limit input	F3-00-01	ON	CLOSE	OFF
	X2	J7-6	SXXW down limit input	F3-00-02	ON	CLOSE	OFF
	X3	J1-5	SSMQ up leveling input	F3-00-03	ON	OPEN	ON
	X4	J1-4	SXMQ down leveling input	F3-00-04	ON	OPEN	ON
	X5	J1-3	SKDY auxiliary contactor input	F3-00-05	ON	OPEN	ON
	X6	J1-2	KBC brake contactor feedback	F3-00-06	ON	OPEN	ON
	X7	J1-1	Door open limit 2 input	F3-00-07	OFF	CLOSE	ON
	X8	J8-8	Door close limit 2 input	F3-00-08	OFF	CLOSE	ON
	X9	J8-7	Safe plates 2 input	F3-00-09	OFF	CLOSE	OFF
	X10	J8-6	SJT Emergency stop input	F3-00-10	ON	OPEN	OFF
	X11	J8-5	SMB door inter-lock input	F3-00-11	ON	OPEN	OFF
	X12	J8-4	Left brake feedback input	F3-00-12	ON	OPEN	OFF
	X13	J8-3	SXF fire input	F3-00-13	ON	OPEN	OFF

Chart 6.3 Input Type Setup (Cont'd)

Name	Port	Position	Definition	Parameters	Default Input Level	Output Switch Default State	Indicator Default State
Main Control BoardF3-00	X14	J8-2	SMS jog up input (Attendant up)	F3-00-14	ON	OPEN	OFF
	X15	J8-1	SMX jog down input (Attendant down)	F3-00-15	ON	OPEN	OFF
	X16	J9-10	SSDZ top terminal input	F3-00-16	OFF	CLOSE	OFF
	X17	J9-9	SXDZ bottom terminal input	F3-00-17	OFF	CLOSE	OFF
	X18	J9-8	ARD input	F3-00-18	ON	OPEN	OFF
	X19	J9-7	SKM door open signal input 1	F3-00-19	ON	OPEN	OFF
	X20	J9-6	SGM door close signal input 1	F3-00-20	ON	OPEN	OFF
	X21	J9-5	SKMW1 door open limit input 1	F3-00-21	OFF	CLOSE	OFF
	X22	J9-4	SGMW1 door close limit input 1	F3-00-22	OFF	CLOSE	OFF
	X23	J9-3	STAB1 safe plate 1 input	F3-00-23	OFF	CLOSE	OFF
	X24	J9-2	SDS electronic lock signal input	F3-00-24	OFF	CLOSE	OFF
	X25	J9-1	SCZ over-load input	F3-00-25	ON	OPEN	OFF
	X26	J10-10	SMZ full-load input	F3-00-26	ON	OPEN	
	X27	J10-9	Spare/ Re-leveling condition input	F3-00-27	ON	OPEN	
	X28	J10-8	Light-load anti-nuisance input/ Rear door lock detection	F3-00-28	ON	OPEN	
	X29	J10-7	SZH Attendant input	F3-00-29	OFF	CLOSE	
	X30	J10-6	SZS Bypass drive input	F3-00-30	ON	OPEN	
	X31	J10-5	Right brake feedback input	F3-00-31	ON	OPEN	
	X32	J10-4	Thermal switch input	F3-01-00	ON	OPEN	
	X33	J10-3	SKM2 door open input 2	F3-01-01	ON	OPEN	
	X34	J10-2	SGM2 door close Input 2	F3-01-02	ON	OPEN	
	X35	J10-1	Standby/ Re-leveling sensor input	F3-01-03	ON	OPEN	
	X36+	J7-3	Door Interlock Input +	F3-01-04	ON	OPEN	OFF
	X36-	J7-1	Door Interlock Input -				

IMPORTANT

If the top/bottom limit circuit is closed in normal state, default input level shows "ON".
If the top/bottom limit circuit is open in normal state, default input level shows "OFF".

6.10. Service Floor Setup

Non-stop floors in the system can be set through F4-00 and F4-01. For the floors that elevator can land, set "ON", for the floors that elevator cannot land, set "OFF". After setting F4-00, F4-01, elevator cannot land to the set floors in any case. 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, adjust the compensation coefficient F9-00.
4. For elevator with no compensation chain, adjust F1-18 based on actual condition on top and bottom floor:

   a) Adjust the simulated load compensation gain in inverter until elevator runs down from top floor with no sliding;

   b) Move the empty elevator to bottom floor, increase load compensation adjustment parameter until elevator runs up from bottom floor with no sliding;

   c) The adjustment range for this parameter should be 0-12.

6.12. Duplex Control Setup

Controller has internal integrated duplex module, two elevators are connected through CAN1 in parallel, corresponded parameters need to be set to achieve duplex control.

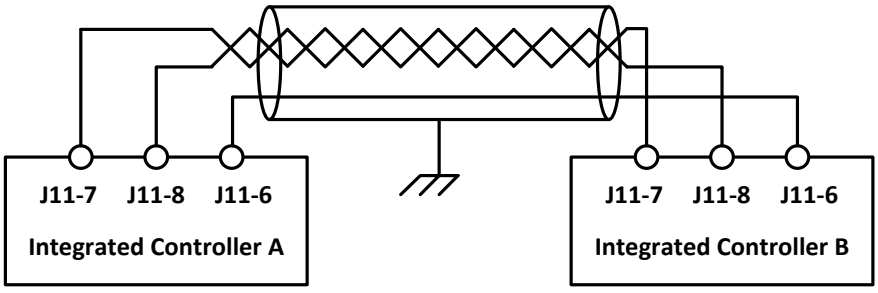


FIGURE 6.9 CONNECTION FOR DUPLEX CONTROL

Setup procedures:

1. Enable duplex control, F1-25=1
2. Set duplex elevator number F1-24, elevator A is set to 0, elevator B is set to 1.
3. Both elevators must have same fireman floor. (Otherwise call registers will be mixed up)
4. Call address should be set the same with single elevator.

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

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 digit display, first two digits can be figure, characters or "-", third digit can only be the following capital characters: ABCDEFGHIJKLMNO. If only need two digits, set the first two digits only and third digit is empty. (The third digit 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	ON: While ER14 occurs, levels the car first to evacuate passengers on the nearest floor in the first place then return to base floor. OFF: Elevator directly returns to base floor.
F4-06-02	ON: In Fire mode when elevator leaves fire floor then disables fire linkage output, when elevator return to fire floor then restore fire linkage output.
F4-06-03	ON: Disable ER29 fault.
F4-06-04	ON: Two elevators in duplex control and not in service, when the same floor has both up/down landing call registered, both elevators serve this call; OFF: Only one elevator serves this call.
F4-06-05	ON: Elevator disable cabin overload signal, this is used in elevator 125% load test; OFF: Overload signal enable.
F4-06-06	ON: Y16 means inspection output, when floor display is in 7-segment code mode (First 7-segment display must be not occupied).
F4-06-07	ON: Direction arrow flashes when the car is running.
F4-06-08	ON: When set floor display to 7-segment code mode, the floor display remains; OFF: When set floor display to 7-segment code mode, the floor display doesn't remain.
F4-06-09	ON: Elevator can cancel registered car call at running. If all call canceled, elevator stops in nearby floor.
F4-06-10	Only for internal test. Remain the default OFF state. ON: New curve is applied compulsively.
F4-06-11	ON: Arrival bell rings as soon as elevator enter landing zone （Time delay is still valid）. Floor number display changes after elevator enter landing zone; OFF: Arrival bell rings after a time delay when elevator arrive terminal floor. Floor number display changes after elevator change speed.
F4-06-12	ON: When elevator stops in inspection mode, brake will close after receiving zero speed signals to reduce impact.
F4-06-13	Spare
F4-06-14	ON: Enable landing/car call remapping; OFF: Disable landing/car call remapping.
F4-06-15	ON: Disable all display relays when elevator is in electric lock mode or emergency mode.
F4-06-16	ON: When door lock is closed, door close limit must be valid too; OFF: Door lock state is not related to door close limit.
F4-06-17	ON: When elevator stops in inspection mode, inverter-direction-given and brake are released together; OFF: When elevator stops in inspection mode, inverter-direction-given drop is 0.5s later than brake close.
F4-06-18	ON: In rear door mode, elevator only installs one set of door open& close buttons; OFF: In rear door mode, elevator installs two sets of door open & close buttons.
F4-06-19	ON: Door close 1 and door close 2 will share the Y3 Output. Y5 is economy resistance; OFF: Y3 is door close 1, and Y5 is door close 2.
F4-06-20	ON: 3-phase 380V 50Hz power supply (with back-up generator); OFF: Battery power supply (disable BUS under voltage fault).
F4-06-21	ON: In inspection mode, door cannot open outside levelling zone; OFF: In inspection mode, door can open at any position.
F4-06-22	ON: Simplex collective; OFF: Full collective. Default: OFF.
F4-06-23	ON: Use SJT-300 serial weighing device through CAN BUS; OFF: NO weighing device.
F4-06-24	ON: After brake arm feedback enable, turn on left (X12) and right (X31) double brake arm feedback; OFF: After brake arm feedback enable, only turn on the right (X31) brake arm feedback.
F4-06-25	ON: When the elevator cannot open door in current floor (OP fault in controller), it will automatically go to the next floor and open door.

Chart 6.4 Special Function List (Cont'd)

Number	Instruction
F4-06-26	ON: Passengers can input more than three car calls in light-load mode; OFF: Passengers cannot input more than three car calls in light-load mode.
F4-06-27	ON: Redirection when zero speed has been detected. OFF: Redirection after brake close at zero speed.
F4-06-28	ON: Use light curtains/safety plates separately, the attendant up/down input terminal（X14/X15） is used as front/rear door safety plates input. In fire mode or if light curtains are effective for 2 minutes continuously, disable light curtains input.
F4-06-29	Spare
F4-06-30	ON: Integrated controller LED has reverse display. This is used for Blue-light G-series cabinet in room-less elevator (where control board is placed reversely) OFF: Integrated controller LED has normal display. (U menu is reversed; F menu is normal)
F4-06-31	Spare
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: open the releveling function; OFF: turn off the releveling function. (control software 1000_5600 and the above version support this function)
F4-07-03	ON: open the door-open-in-advance function; OFF: turn off the door-open-in-advance function. (control software 1000_5600 and the above version support this function)
F4-07-04	ON: open the door open waiting function for any floor. (control software 1000_5600 and the above version support this function)
F4-07-05	ON: enable the new national standard function; OFF: the old national standard scheme is enabled. (control software 1000_5600 and the above version support this function)
F4-07-06	Reserved.
F4-07-07	ON: If car speed inside leveling zone is still faster than rescue speed, then the car will be forced to stop in leveling zone.
F4-07-08	Reserved
F4-07-09	Reserved.
F4-07-10	Reserved.
F4-07-11	Reserved.
F4-07-12	ON: Enable clearing car calls when no light curtain actions within three car-call stops in auto running mode to anti trouble make.
F4-07-13	ON: Enable auto-restricting-door function to prevent door lock loop disconnect caused by no self-locking power.
F4-07-14	OFF: Improve car stop; (Default) ON: Give up the time-dependent decreasing speed curve after speed change in leveling zone.
F4-07-15	Reserved.
F4-07-16	Reserved.
F4-07-17	ON: In UPS running mode, elevator will arrive in leveling zone, open the door, and close the Y23 contactor in 30s, then cut-off the UPS circuit to avoid UPS battery pack deep discharge.
F4-07-18	ON: The car waits at homing floor with door open.
F4-07-19	ON: Enable elevator run to bottom level in UPS running mode. (When applying this function, F4-07-00 and F4-07-25 will be no effect.)

Special Function List (Cont'd)

Number	Instruction
F4-07-20	ON: Enable TIM Stop Floor function. Stop floor time set1 Start time: F2-18 & 19; End time: F2-20 & 21 TIM stop floor time set1 corresponds Set Stop Floor parameter is: F4-00 Set Stop Floor1, F4-01 Set Stop Floor2. Stop floor time set2 Start time: F2-14&15; End time: F2-16 & 17(multiplexing start time/stop time setting). TIM stop floor time set2 corresponds Set Stop Floor parameter is: F4-02 Set Stop Floor1, F4-03 Set Stop Floor2.
F4-07-21	ON: There is only one door zone signal, the elevator will still level while it turns from inspection to auto or from error to normal or runs in ARD mode. It will avoid that the car door vane cannot drive the hall door when it is too short.
F4-07-22	ON: enable hall door and call door short connection detection function; OFF: close this function. (control software 1000_5600 and the above version support this function)
F4-07-23	Reserved.
F4-07-24	ON: Elevator return to homing floor to proofreading level number when power on for the first time.
F4-07-25	Reserved.
F4-07-26	Reserved.
F4-07-27	ON: Enable brake force self-test function. Automatically start at 3: 00AM or manually start by modify F4-07-30. （Default: ON） OFF: Disenable brake force self-test function. (control software 1000_5600 and the above version support this function)
F4-07-28	Reserved.
F4-07-29	ON: Leveling adjustment can be set separately. The default Leveling adjustment of each floor (1~64 floor) in setting parameters is 50mm.
F4-07-30	1. Every time turn to ON from OFF, act brake force self-test once. Keep ON will be ineffective; (1000_56xx) 2. open the door open waiting function for any floor. (1000_55xx)
F4-07-31	Reserved.

6.17. Motor Parameters Speed Setup

First, please set the motor parameters based on actual machine.

F5-00: motor type. 0: synchronous outer rotor machine; 1: asynchronous machine, 2: synchronous inner rotor machine.

Please make sure the machine type is set correctly, as system will perform motor auto-tuning and vector control based on motor type.

Also, please input following motor parameters based on the machine nameplate or user manual to ensure the accuracy of system generated motor digital model and vector control coupling.

1. F5-01: Motor poles
2. F5-02: Motor rated frequency
3. F5-03: Motor rated power
4. F5-04: Motor rated speed (RPM)
5. F5-05: Motor back-EMF (this parameter is only valid for asynchronous machine)

6. F5-06: Motor phase inductance (this parameter can be acquired from motor auto-tuning)
7. F5-07: Motor phase resistance (this parameter can be acquired from motor auto-tuning)
8. F5-08: Motor rated current
9. F5-09: No-load current (this parameter is only valid for asynchronous machine, it can be acquired from motor self-learning)
10. F5-10: Motor rated Slip (this parameter is only valid for asynchronous machine)

Beside above, when some parameters are not accurate, please perform motor parameter auto-tuning.

For the drive versions above 0007, parameter auto-tuning is not necessary.

6.18. Elevator Running Speed Setup

Elevator rated speed (F1-00) and motor rated speed (RPM) (F1-01) are used to calculate the ratio between elevator rated running speed and motor RPM. Also, with encoder pulse number per cycle (F1-03), we can get the relationship between each pulse and traveling distance in hoistway, and this achieves the distance detection of elevator running. Therefore, changing F1-00, F1-01 will only change their ratio, but not elevator actual running speed.

When F1-03 for hoistway counting is from inner pulse source, pulse number in one cycle (F1-03) = pulse number of motor encoder (F8-00) / PG frequency division ratio (F8-01). Rated speed of traction machine (F1-01) = Motor rated speed (F5-04).

If F1-03 for hoistway counting is from outer pulse source (i.e. speed limiter encoder, must adopt special PG card), F1-03 should be set as pulse number in one cycle from outer pulse source, Rated speed of traction machine (F1-01) = Outer pulse source speed (i.e. speed limiter speed).

Speed given instruction can be seen below in Figure 6.10.

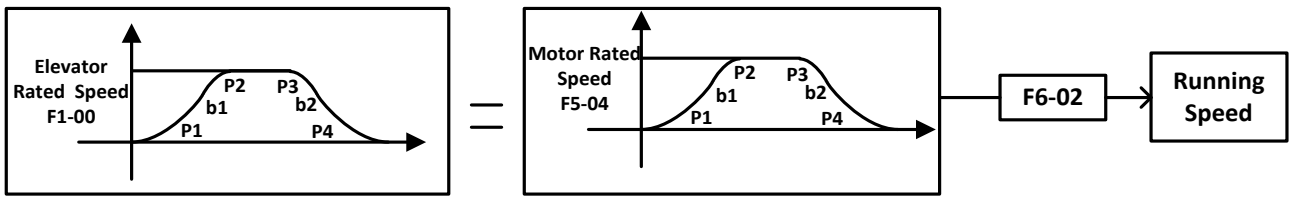


FIGURE 6.10 SPEED GIVEN INSTRUCTION

If need to reduce the elevator actual speed, please change the value of speed ratio (F6-02), when F6-02=100%, elevator runs in rated speed; reduce F6-02 elevator actual speed will decrease in corresponded ratio.

6.19. Speed Control Setup (PI Adjustment)

6.19.1 Speed Control Setup with Single PI Adjustment

For speed control under vector control, there are two ways, F7-00: when multi-section PI enable is set 0, PI does not change with speed given change. Instead, it is a fixed value for the whole elevator speed range, which simplifies setup procedures.

This is the most used method; the flow diagram can be seen below in Figure 6.11.

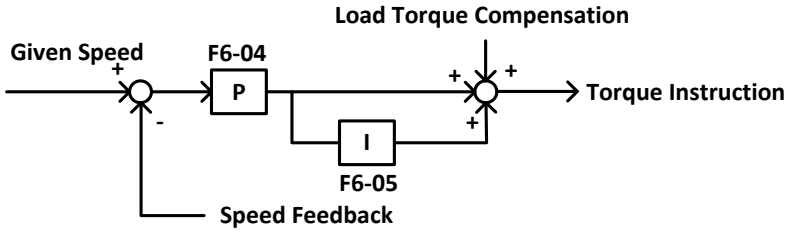


FIGURE 6.11 SPEED ADJUSTMENTS 1

6.19.2 Speed control Setup with Multi-Section PI Adjustment

For speed control under vector control, F7-00: multi-section PI enable is set 1, speed control function can be performed by PI changed in multi-section. In this control mechanism, parameters in F6-04 and F6-05 will not take effect all the time, instead, 4 groups of PI value F7-05~F7-12 are used to perform speed control.

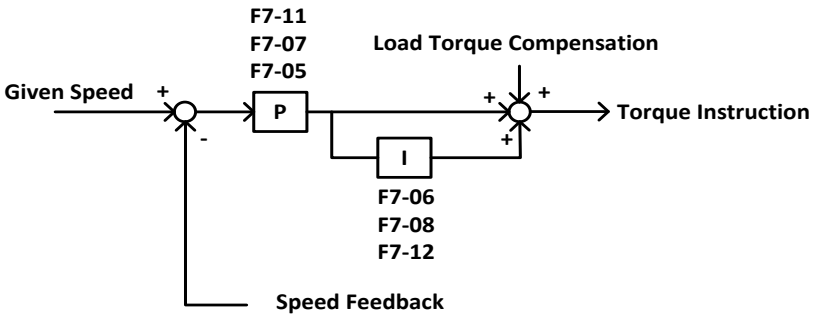


FIGURE 6.12 SPEED ADJUSTMENTS 2

F7-05, F7-06: Group 1 PI; it is generally adopted in low speed period at motor start.
F7-07, F7-08: Group 2 PI; it is generally adopted in middle speed section at acceleration period or steady-speed section at low speed period.
F7-11, F7-12: Group 3 PI; it is generally adopted in deceleration period.
Switching frequency for the above groups of PI parameter are set in F7-01~F7-04: frequency setting of PI effective range.

Group 1 PI effective range:

When motor starts from zero speed or in acceleration period, if the current frequency given is smaller than F7-01, system will adopt F7-05, F7-06 of group 1 PI to adjust the speed. To enable elevator quick stable at zero speed when brake release and follow the speed curve quickly in initial acceleration, F7-05 and F7-06 can be set slight bigger.

Group 2 PI effective range:

After motor starts, when speed (acceleration) is larger than the set frequency in F7-01 and smaller than F7-02, system will adopt F7-07, F7-08 of group 2 PI to adjust the speed. When motor running speed is larger than the set frequency in F7-02, system will adopt F6-04 and F6-05.

Group 3 PI effective range:

When motor speed is smaller than the set frequency in F7-03 (deceleration), system will adopt 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.

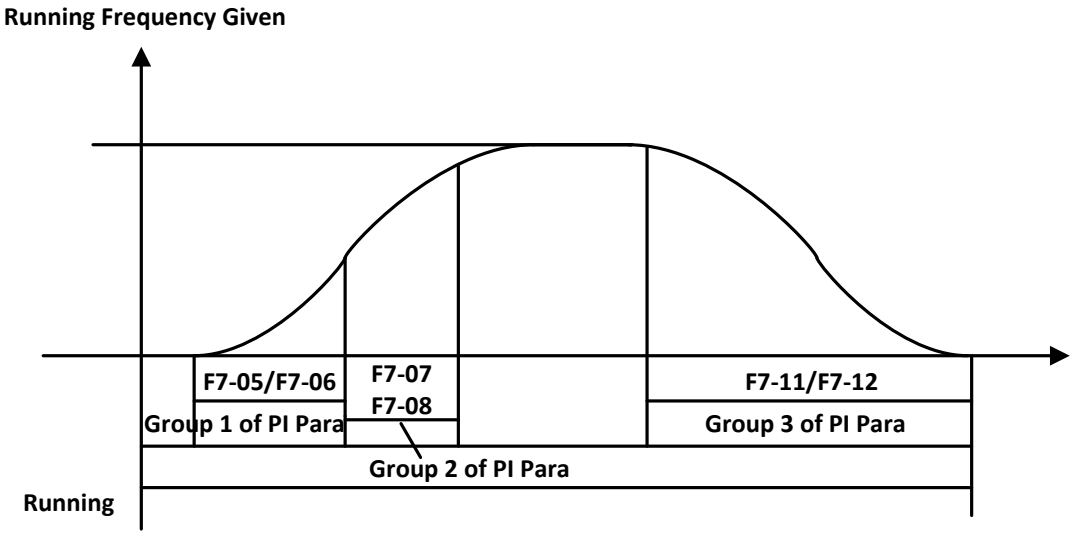


FIGURE 6.13 EFFECTIVE RANGES FOR DIFFERENT GROUPS OF PI

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.

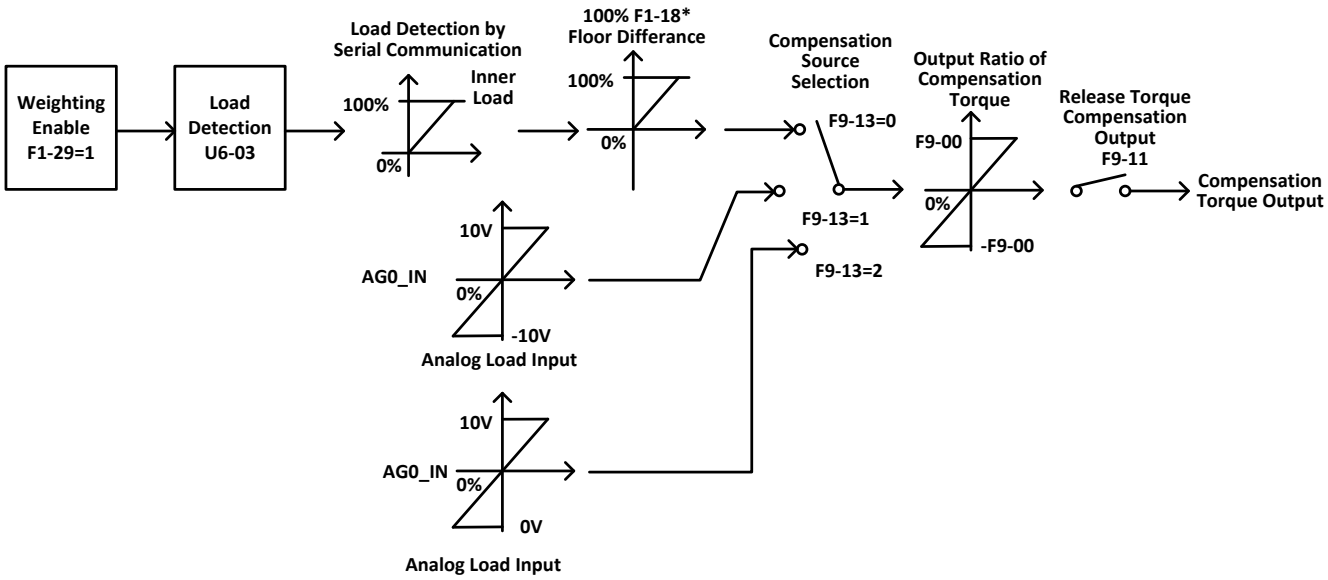


FIGURE 6.14 LOAD COMPENSATION TORQUE OUTPUT CONTROL

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.

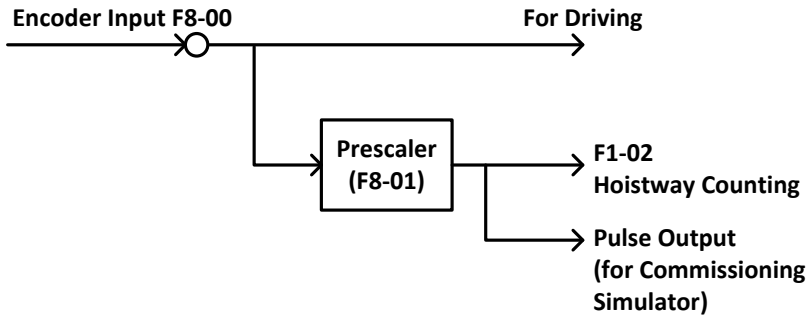


FIGURE 6.15 ENCODER PULSE USAGES

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 even without weighing device.)

1. Note for starting without load compensation:

1) PG card type, F8-02 is set to "1" (Sine/Cosine PG card)

2) Weighing compensation invalid, confirms F9-11 is set to "0" to disable weighing compensation and enable FA group parameters.

3) Drive software version, confirm version is 0005 or above.

2. Adjustment method for elevator starting without load compensation:

1) Principles: As can be seen in Figure 6.16 below, when brake open, based on the position feedback from Sine/Cosine PG card, system can calculate the necessary torque required for motor to remain the steady position under current load, and it gives corresponded torque at once to minimize the traction sheave movement and to achieve comfortable start.

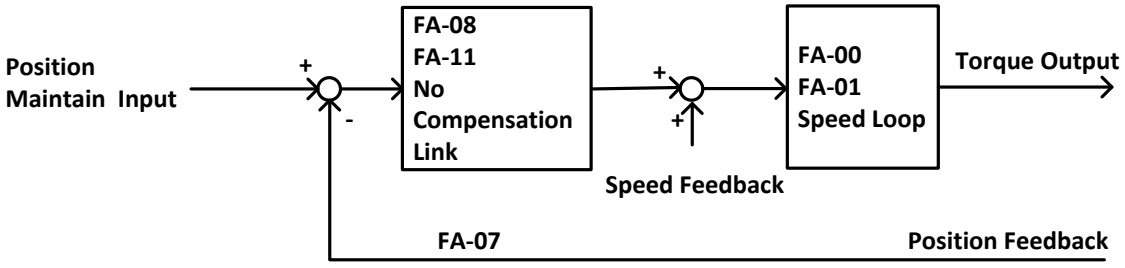


FIGURE 6.16 FLOWCHART FOR ELEVATOR STARTING WITHOUT LOAD COMPENSATION

2) Parameters: Parameters related to function can be seen below in chart 6.5.

Chart 6.5 Elevator start without load compensation parameters list

Para No.	Display	Factory Setting	Fast Brake Recommendation	Slow Brake Recommendation
FA-00	StratKP	30	KEEP	KEEP
FA -01	StratKI	750	KEEP	KEEP
FA -08	PLKP1	3600	4800	3600
FA -09	PLTime	900	700	KEEP
FA -11	PLKP2	800	KEEP	KEEP
FA -12	PLKPMOD	125	KEEP	KEEP
F2-00	BrakeON Time	0.5	0.9	1
F9-00	Max Torq Comp	0	KEEP	KEEP
F9-11	Load Comp Enable	1	0	0

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

FA-09

This parameter is the working time for starting without load compensation after brake opens, it must be set according to the actual brake opening time, if the time is too short, elevator will slip as this action will be over before brake fully opened; Also the value of F2-00 (brake opening time before running) must be 100ms longer than the value of FA-09, so that this action can finish before speed curve start.

FA-08 and FA-11

Two gain parameters for the starting without load compensation action, these two parameters can be adjusted according to the elevator slipping condition and comfort level, if the slipping is too much please increase the value of FA-08; if the traction machine gets vibration, please reduce this value; during the period of torque keeping, if there is slight slipping or small back-and-forth movement on traction sheave, please increase the value of FA-11, if there is vibration, please reduce this value.

1. During commissioning, besides the mentioned 3 parameters, other FA group parameters can be kept with factory setting.

2. For different versions of program, the name of FA group parameters might be different, but their positions remain the same. As a result, only adjust FA-08, FA-09, FA-11 despite the operator version.

3. The setting value of above parameters is just for reference, as the PG card is not same in different job side; please adjust above parameters based on site condition.

4. F9-00 is the pre-set torque when the starting without load compensation function is enabled. Generally, there is no need to change its value, please keep it with factory setting (0)

6.23. Remote monitor

Controller support remote monitor function. Connect controller with assorted WCR remote monitor module, it will use same CAN Bus with COP/HOP communication. Set relative parameters, then remote monitor can be achieved. Parameter setting is as follow,

1. Set Remote monitor enable, F1-27=1;
2. Save parameter.

Chapter 7: Commissioning

7.1. Important Reminder

1. Thanks for purchasing our product, please read this manual and related instruction thoroughly before processing with installation, connection (wiring), operation, maintenance and inspection. To avoid any damage/loss of the products or accident to people, please make sure you have sound knowledge of the device and familiar with all safety information/precautions before processing to operate the control system.
2. Before commissioning and running the product, please read the manual carefully and refer to this manual during commissioning and running.
3. Make sure that all the mechanical devices are installed properly beforehand, especially the devices in hoistway (the devices that should be set in the machine room depends on the situation of the machine room).
4. Make sure that the installation and commissioning for the devices, which should be finished before commissioning of the control system, have been completed.
5. Before commissioning, it is necessary to get signature confirmation from a person responsible for mechanical installation and commissioning.
6. Make sure that all the mechanical devices and other devices which are related to the system commissioning are installed and tested properly.
7. Make sure that there are no unsafe factors which could cause injuries and damages to personnel and devices.
8. Commissioning should be carried out by qualified personnel.
9. Site should meet the conditions for commissioning and running.
10. When doing commissioning for both electric and mechanical parts, technicians for both parts should collaborate.
11. If this manual could not meet your requirement, please contact our company at once to acquire help and to avoid accident and loss.
12. Before system commissioning, make sure all the conditions are sufficiently prepared.

7.2. Inspections before Power On

After electric system is installed, please check the electric system carefully and pay attention to the following items:

1. Compare with the manual and electric diagram, check if the connections are all correct.

2. Check if there is interference between high voltage part and low voltage part. Use a multi-meter to measure the resistor in different circuit, resistor to earth must be infinity big.

3. Please check if wiring from power supply to the control cabinet and traction machine is correct, this is to avoid damaging the controller after powering on.

4. Check wiring between encoder and controller, coaxial degree of encoder and traction machine shaft, wiring between encoder and traction machine.

1) Check if the enclosure of the controller and motor, cabin, landing door are reliably earthed to ensure the safety to personnel.

CAUTION
Controller enclosure and motor enclosure should be earthed to one point.

2) Make sure correct wiring of the terminal block **J1** on control board to avoid any damage to the main control board.

CAUTION
Controller has special digital operator, it should be connected to the socket J232 on main control board by a special cable before commissioning. USB serial communication cable is also available; connect it to the port USB0 on main control board to computer, then do commissioning with special software. (please refer to commissioning software manual)

3) Make elevator stop at the middle floor.

4) Turn electric lock to position “ON”.

7.3. Power on and Inspection

7.3.1 Things need to confirm before Power On

1. Confirm all the air switches in control cabinet are open.

2. Confirm mode switch on the controller is at “inspection”, emergency stop button is pressed.

3. Confirm inspection switches on car top and cabin are both in “normal” positions.

4. Confirm terminal resistor for bottom HOP is connected

5. Check voltage on the main power supply：3 phase voltage is 380±15%VAC, phase-phase voltage difference is smaller than 15VAC, Phase-N voltage is 220±7%VAC.

6. Confirm the wire specification and main switch capacity match the design requirement.

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 phases, and repeat the above inspection.

2. Inspect the terminal voltage on transformer **TC1,** the values should be in the range of **±7%** of the indicated value, if voltage exceeds this range, find out the problem and correct it.

3. if the above inspections are normal, then do the following process:

a. Switch on F4: Voltage between terminal 100-101 should be 110±7%VAC

Voltage between terminal 103-102 should be 110±7%VDC

b. Switch on F5: Voltage between terminal 200-201 should be 220±7%VAC

c. **(Note: Connect digital operator before power on)** After power on, first see if the main menu display is correct on LCD indicator. For example: elevator state, fault state, door lock state, current floor, running speed and else. In this way we can tell if the controller is working properly and whether 24V power supply is normal. Interface on digital operator LCD screen can be seen below in Figure 7.1.

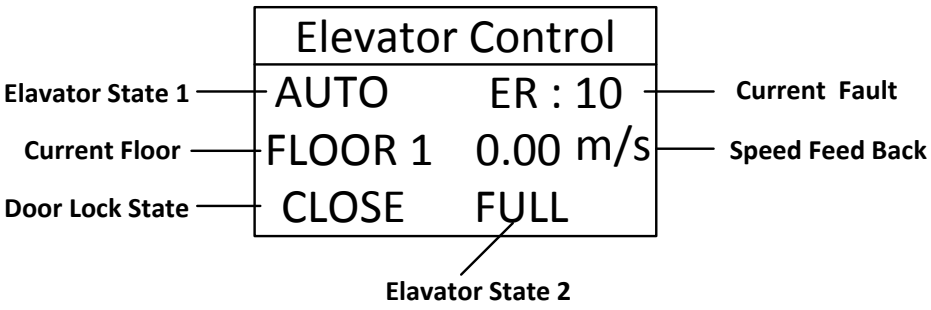


FIGURE 7.1 DIGITAL OPERATOR LCD SCREEN INTERFACE

d. Terminal voltage of switch power supply unit:

Chart 7.1 Terminal Voltage for switch power supply unit

Terminal	L~ N	24V~ G
Voltage	220±7%VAC	24.0±0.3VDC

e. After above inspections, do the following inspections:

1) Check door lock circuit.

2) Check leveling zone signal, top/bottom limit signal.

3) Check electric lock, set the elevator auto-start/off time to “0’, set electric lock switch to “ON”, LCD screen will then display elevator state as “INSP”, if set electric lock switch to “OFF”, LCD screen will show “STOP”.

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-U Parallel elevator integrated controller, parameter tuning is not necessary.

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.

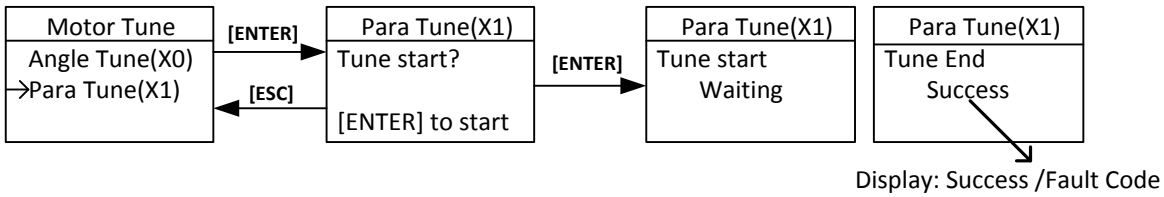


FIGURE 7.2 MOTOR PARAMETER TUNING WORKFLOW

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 proceeding 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.

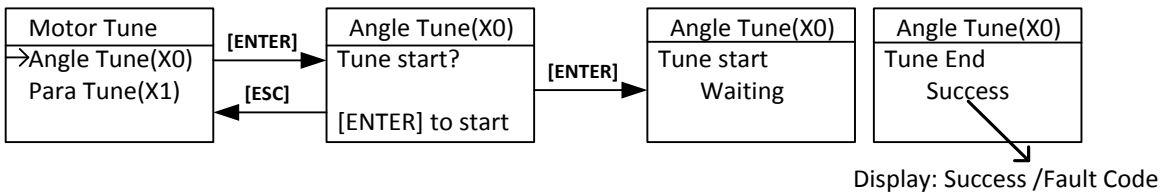


FIGURE 7.3 MOTOR INITIAL ANGLE ROTATION TUNING

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, attach the steel rope and run motor with load.

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.

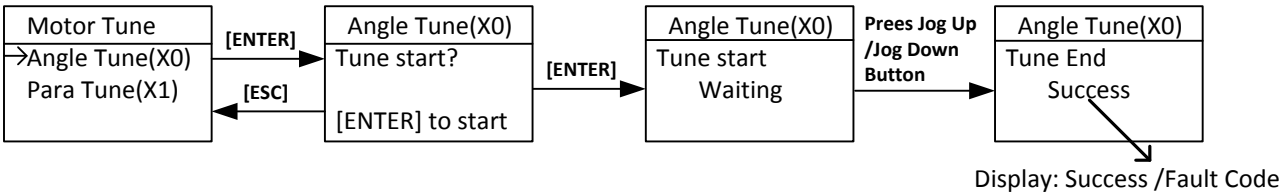


FIGURE 7.4 MOTOR INITIAL ANGLE STATIC TUNING

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. To ensure safety, during tuning process, people is strictly forbidden to stay in car or hoistway;
4. Press up or down jogging button can base on the current cabin position;
3. The whole tuning procedures can be divided into two steps: static tuning and motor trial running, make sure there is no interruption between two steps. If no fault happens, before digital operator indicates success, press the jog up or down button constantly;
4. To achieve optimal control effect, it is recommended to repeat above tuning procedures 5 times, if the deflection of the results is small, take the average value.

If fault occurs in tuning, please refer to chapter 8 troubleshooting chart, locate the fault and solve it accordingly, then repeat tuning procedures.

7.7. Inspection Running

7.7.1 Inspection Running in Machine Room

1. Things to check before inspection running in machine room.

1) Inspection switch in control cabinet is at “Inspection” position, inspection switch on car top and cabin should be in “Normal” position.

2) Safety circuit and door interlock circuit work normal, DO NOT short door interlock circuit.

3) After power on, emergency stop contactor, door interlock contactor, and power contactor in control cabinet are closed, check if the controller works normal and parameter setting is correct, in LCD indicator, elevator state is “**INSP”.**

4) Connect the brake wiring to control cabinet properly.

2. Inspection running in machine room

When the inspection running requirements in machine room are satisfied, press the Jog Up/Down button on the control cabinet, elevator will run up/down in set inspection speed.

Note: For integrated controller with ARD function, the inspection switch is called "Emergency Run Mode Switch"

7.7.2 Inspection Running on Car Top/Cabin

If inspection running in machine room works normal, then inspection running on car top and cabin can be performed. If the up or down direction of the buttons of inspection running on car top and cabin are opposite with the actual running direction, please inspect its buttons’ wiring, do not change the wiring in control cabinet.

7.8. Hoistway Learning

Hoistway parameter self-learning means elevator runs at a self-learning speed and measures every floor height and record the position of every switch in the hoistway. As the floor position is the foundation for elevator normal running, braking and floor display. Therefore, before normal running, hoistway parameter self-learning must be performed. Before hoistway parameter self-learning, inspection running in full trip must be performed too; elevator must be able to run normally from bottom limit to top limit.

Hoistway parameter self-learning procedure is as follows:

1. Make sure elevator meets the conditions for safety running;

2. Make sure all the switches in hoistway are installed and connected correctly, traveling cable and hoistway cable are connected correctly, and finish setting the HOP/display address;

3. Elevator in inspection mode, jog elevator down to the bottom limit (bottom limit is valid);

4. Enter elevator hoistway self-learning menu through digital operator, follow the learning procedures shown below in Figure 7.5.

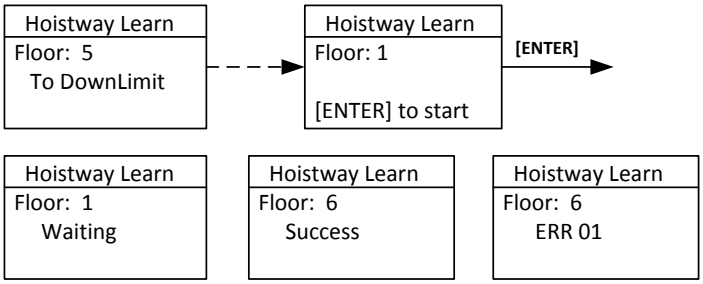


FIGURE 7.5 HOISTWAY PARAMETER SELF-LEARNING PROCEDURES

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.

IMPORTANT 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 below. 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 according to the given starting/braking speed curve, therefore shape of the given speed curve, motor feedback speed to controller and the timing logic of controller signals directly influence the comfort level of elevator running.

7.10.1 Adjustment for Start/Brake speed curve

Elevator running speed curve is shown below in Figure 7.6.

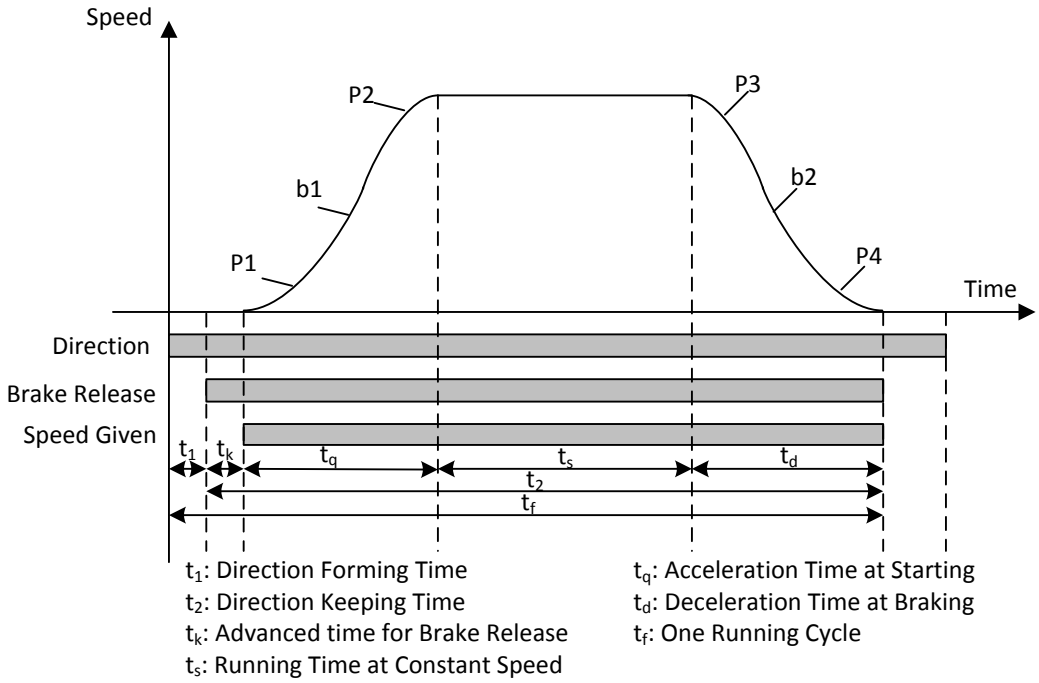


FIGURE 7.6 ELEVATOR RUNNING SPEED CURVE

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

3) P2: Acceleration decrease at end of starting section, it means the rate of elevator acceleration change. Smaller value means slower at end of starting section, the smoother running period and the lower efficiency. On the other hand, faster at acceleration ending section means higher efficiency for elevator running.

2. Three parameters adjustment for motor braking S curve:

1) P3: Deceleration increase at start of braking section, it means the rate of deceleration change, smaller value means slower at start of braking section is, smoother running period and lower efficiency. On the other hand, faster at brake starting section means higher efficiency for elevator running.

2) b2: Deceleration in braking section, it means the rate of elevator speed change. Smaller value means the slower braking section, the smoother running period and the lower efficiency. On the other hand, faster at braking section means higher efficiency for elevator running.

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.

Commissioning at jobsite need to first guarantee the elevator running efficiency, then adjust the above 6 parameters to achieve optimal elevator running curve.

7.10.2 Follow & Adjust Running Curve

To achieve the maximum level of comfort, integrated controller must control the motor and make feedback speed strictly following the change of running curve.

As the controller establishes the mathematic motor module based on the motor parameters input by customers, and controller perform decoupling control by this module on motor starting/braking. Therefore, customer should input the motor parameters correctly. (When motor parameter is not precise or not confirmed, we suggest customer perform motor parameter tuning.)

Proportional gain on the speed circle **F6-04** and integral gain **F6-05 or F7-05~F7-12** for PI section parameters also influence the motor tracking ability to speed curve. Generally, increasing the proportion gain will improve the reaction of the system and promote the tracking speed. However, if proportion gain is set too big, it will cause system vibration with high frequency and large motor noise. Increasing integral gain can improve the system anti-interference/tracking ability and improve the leveling precision but set integral gain too big will make system vibration, speed over adjustment and wave vibration.

Generally, it is recommended to first adjust the proportion gain, increase it right before system vibration threshold. Then adjust the integral gain, enable system with quick reaction and no over adjustment.

If system performance is not perfect at start or stop period (low speed period), try to control in multi-section PI, detail can be seen in 6.19.2 in Chapter 6.

7.10.3 Control Timing Adjustment

The control timing of this system can be seen Section **6.3** in **Chapter 6**, customer can adjust timing parameters and zero speed setting.

1. Timing adjustment: Refer to **section 6.3** Timing diagram under different state **in Chapter 6**.
2. Zero speed setting: This parameter is the threshold of zero speed. Main control board determines braking time by this value. If this value is too big, elevator will stop with speed, if too small it will delay door open after elevator stop.

Generally, for asynchronous motor, it is 5 RPM, for synchronous motor, it is 1 RPM.

7.11. Leveling Precision Adjustment

Leveling precision adjustment should be performed after comfort level adjustment is satisfied.

7.11.1 Basic Conditions for Elevator Leveling

1. Make sure the leveling switches and leveling inductor plates are installed in the right position.
2. Length of leveling inductor plates on every floor must be the same.
3. Leveling inductor plates must be installed vertically.
4. The position of leveling inductor plates should be precise. When elevator Is at the leveling position, the center of the plate and center of two inductors should match together (refer to appendix), otherwise elevator leveling will have deflection, which means in up or down running, elevator stops higher or lower than leveling position.
5. If magnetic inductors are adopted, please make sure the inductor plates inserting to the inductor sufficiently, otherwise it will influence the reaction time of inductor, in that way elevator will overruns the leveling position.
6. To ensure precise leveling, system require elevator to crawl for a certain distance before stop.
7. In practice, first make adjustment for a middle floor, until leveling is precise. Then, adjust the other floors on the base of these parameters.

After adjusting curve selection, ratio and integral gain in the above context, please make sure every time elevator runs up or down, when stop at middle floor, its leveling positions are the same (each deflection of stop position ≤±2~3mm).

7.11.2 Leveling Parameter Adjustment

If elevator still cannot achieve desired leveling condition with adjustment based on instructions in section 7.9.1 in Chapter 7, further adjustments can be done by parameters. After elevator stops in normal running, if running speed curve has no problem (for example, no sudden stop or overrun beyond leveling zone), if elevator overruns the leveling position (it stops higher in up-running, lower in down-running), please decrease leveling adjustment parameter F1-17 (default: 50). If elevator cannot reach the leveling position (It stops lower in up running, higher in down running), increase leveling adjustment parameter F1-17, generally the range of this parameter is 40~60, if the adjustment is too big, please adjust driving parameter PI, or the shape of speed curve (F1-10~F1-15).

7.12. Terminal Switch Position

Top and bottom terminal switch signal is used for elevator force deceleration and floor position calibration, it should be installed in the position where it is triggered when elevator is 2.5m ahead of top (bottom) leveling position (for **1.6m/s lift**). The position should be determined as follows:

1. Switch elevator to inspection mode.
2. Set the inspection speed to 0.3m/s, jog run up(down).
3. Stop elevator when top(bottom) switch is triggered.
4. Distance between car sill and landing door sill should be 2.5±0.1m.

For the positions of terminal switches under other speed elevator, please refer to the appendix I.

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 drive-error code. Determine the possible cause of the fault and solve in corresponding solution.
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	Brake open fault: System does not receive brake open feedback signal after output brake open command: 1. No X6/X31 feedback after Y0output 0.5/2s. 2. X6/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	Inverter pulse not enough at elevator running.	Check the wiring from encoder to controller.
Er9	KDY fault: Contactor KDY output not matching feedback signal: 1. After Y1 output X5 no feedback in 0.4s. 2. X5 is enabled when Y1 has no output.	Check the contactor KDY coil and output/feedback circuit wiring.
Er10	Safety circuit open, input X10 is invalid.	Check all 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 encoder, top limit switch including its position / wiring.
Er13	Elevator pass bottom limit switch (X2 is invalid)	Check encoder, bottom limit switch including its position / 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.
Er17	No drive output after running command.	Check parameters in controller or contact supplier.
Er18	Floor number error: after this error, elevator will return to bottom floor in inspection speed for recalibration.	Check the encoder and its wiring.
Er19	The deceleration distance for target floor is not enough, elevator did not perform hoistway parameter learning after changing terminal switch location.	1. Decrease “Least Speed” in user menu; make elevator running curve steeper; reduce speed adjusting distance; 2. Do hoistway parameter learning again.

Chart 8.1 Elevator System Fault List (Cont'd)

Error Code	Definition	Possible Solution
Er20	When elevator reaches top/bottom floor and get deceleration instruction, but elevator doesn't slow down; elevator did not perform hoistway parameter learning after changing terminal switch location.	1. Increase the proportion parameter of controller; Check the braking resistor specification; 2. Make elevator running curve smoother; 3. Do hoistway parameter self-learning.
Er21	Single running time is over set time	1. Check related parameters in controller; 2. Check the traction rope for slip or car jam; 3. Check value of parameter "Over Time".
Er22	Elevator has inspection signal input (X0 invalid) at elevator normal running.	Check inspection switch and related circuits.
Er23	One of two leveling switch (X3, X4) is invalid at elevator normal running.	Check leveling switches and wirings.
Er25	Heat sensor protection: Braking resistor or motor is over heat (X32 invalid).	Check heat sensor circuit. If this error cannot reset in 90s, Y23 relay on controller will output KMC contactor open signal.
Er26	Door inter-Lock fault: Door inter-Lock contactor working state does not match to its coil (X11, X36 input different)	Check door interlock contactor terminal & coil and their related terminal on controller.
Er27	Emergency stop fault: Emergency stop contactor working state does not match its coil state. (X13, X29 input different)	Check emergency stop contactor terminal & coil and their related terminal on controller.
Er28	Top/bottom terminal (1st or 2nd) adhesions. (X16 or X17 valid when elevator outside their floor)	Terminal invalid in corresponding floor. Check terminal signals.
Er29	Communication interference too much (In system or in duplex communication).	Check system ground condition; Eliminate interference. Check COP/LOP for possible damage that may influence CAN BUS communication.
Er30	Door open fault (car cannot open door)	1. Run elevator in inspection mode, give door open command and check Y2 for output signal; 2. If Y2 has no output, need to check door open, close limit switch and related signal; 3. Be aware whether front door and rear door setting is opposite when two door mode is used.
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 switching power supply 24V sag fault	1. Check External switching power supply 24V connection; 2. Fault prompt given if detect the external voltage is lower than 16V.
Er35	Master clock error	Main board hardware circuit working abnormal. Please contact supplier.
Er36	Internal power supply 5V error	Fault prompt given if detect the 5V voltage is lower than 4.7V.
Er37	Running contactor shakes in brake open action.	Check running contactor action and X5 running contactor feedback.

Chart 8.1 Elevator System Fault List (Cont'd)

Error Code	Definition	Possible Solution
Er39	Brake force test failure, lack of brake force.	Examine the brake. Powering off can make it recover, however it should do a brake force test again to ensure enough brake force.
Er40	Brake is invalid and cause sliding error.	The safety protection function of safety circuit board has acted, the car has creeped and released people after finding brake invalid. Then the car return to top floor and try to brake again, but the brake is still invalid and the car slide. System latch the error unless power off.
Er41	Unexpected slide error, examine brake force.	The safety protection function of safety circuit board has acted, the brake is successfully closed while car's creeping. System records the slide in fault record as a warning of brake force fault but shows no error.
Er42	While emergency running input is valid, the car moves unexpectedly because of the invalidation of brake force.	The car slide, the system report error and save fault record to avoid other unpredictable dangers. Because the voltage of emergency power may be too low while creeping.
Er43	The safety protection function of safety circuit board has acted, the door circuit break because the car runs out door zone. System reports door zone missing error, this error will not recover until reset.	Because it will run out door zone, when door zone misses, and brake force become invalid in same time. It is for reminding maintenance staffs of solving door zone missing error in time, and avoiding the car runs out safety door zone while creeping.
Er44	The car meets unexpected sliding and during releasing passengers, the signal of top limit vibrates.	The sliding protection function of safety circuit board has acted. After the system finds brake invalid, the signal of top limit vibrates during upward creeping. Then the safety protection will be stopped by top limit error. This error will be latched and will not recover until reset.
Er45	The car meets unexpected sliding and during releasing passengers, the signal of bottom limit vibrates.	The sliding protection function of safety circuit board has acted. After the system finds brake invalid, the signal of bottom limit vibrates during downward creeping. Then the safety protection will be stopped by bottom limit error. This error will be latched and will not recover until reset.
Er46	The car meets unexpected sliding and during releasing passengers, the signal of top terminal vibrates.	The sliding protection function of safety circuit board has acted. After the system finds brake invalid, the signal of top terminal vibrates during upward creeping. Then the safety protection will be stopped by top terminal adhesion error. This error will be latched and will not recover until reset.
Er47	The car meets unexpected sliding and during releasing passengers, the signal of bottom terminal vibrates.	The sliding protection function of safety circuit board has acted. After the system finds brake invalid, the signal of bottom terminal vibrates during downward creeping. Then the safety protection will be stopped by bottom terminal adhesion error. This error will be latched and will not recover until reset.
Er48	Wrong parameters setting of unexpected sliding protection.	Enable sliding protection, but not enable door-open-in-advance and releveling function.
Er49	Signals of safety door zone miss.	Enable sliding protection but cannot detect safety door zone signals at door zone.

Chart 8.1 Elevator System Fault List (Cont'd)

Error Code	Definition	Possible Solution
Er50	Unreasonable parameter setting.	Check the following setting: Check if parking floor, homing floor, fire floor is set to non-stop floor; Check if both front and rear door of stop-able floor are set to disable while in two door mode; Check if group control is enabled while parallel control or two door mode is enabled at same time.
Er51	Drive module overheat protection.	While running, the drive power module occurs overheat protection.
Er52	The signals of up and down door zone are reversed.	The signals of up and down door zone are reversed. Exchange wirings of up and down door zone signals.
Er53	Changing speed is too late, which after running through door zone.	Increase the minimum single layer velocity and curve acceleration.
Er62	Haven't used X31 as hall door detection, but X31 is effective. Or have no door contactor but X11 become effective.	1. Check if X31 is effective when F4-06-12 is OFF; 2. Check if X11 is effective when F4-06-13 is ON.
Er97	The minimum speed change distance is less than the door zone segment magnetic plate.	Increase the minimum running speed of single floor.
Er98	Drive program locked.	No unlock after program update. Please return to factory or contact with custom service.
Er99	Logic program locked.	No unlock after program update. Please return to factory or contact with custom service.

8.2. Hoistway Parameter Self-Learning Faults

Chart 8.2 Hoistway Parameter Self-Learning Fault List

Error Code	Definition	Possible Solution
LER=0	System running error	Press "ESC" to exit learning, check fault record shown in Chart 8.1
LER=1	Pulse input phase reverse	Exchange phase A and phase B in encoder.
LER=2	Bottom terminal 1 switch input repeat.	Bottom terminal 1 switch installation error, causing multiple terminal switch input or bottom terminal 1 switch signal shake. Check related switches.
LER=3	Bottom terminal 1 switch signal lost (elevator >2.0m/s)	Bottom terminal 2 switch enable before bottom terminal 1 switch or bottom terminal 1 switch signal lost. Check related switches.
LER=4	Bottom terminal 2 switch signal repeat. (elevator >2.0m/s)	Bottom terminal 2 switch installation error, causing multiple terminal switch input or bottom terminal 2 switch signal shake. Check related switches.
LER=5	Bottom terminal 2 switch signal lost (elevator >2.0m/s)	Top terminal 2 switch enable before bottom terminal 2 switch or bottom terminal 2 switch signal lost.
LER=6	Top terminal 2 switch signal repeat. (elevator >2.0m/s)	Top terminal 2 switch installation error, causing multiple terminal switch input or top terminal 2 switch signal shake. Check related switches.
LER=8	Top terminal 2 switch signal lost (elevator >2.0m/s)	Top terminal 1 switch enable before top terminal 2 switch or top terminal 2 switch signal lost.
LER=9	Bottom terminal 1 switch signal lost	Top terminal 1 switch enable before bottom terminal 1 switch or bottom terminal 1 switch signal lost.
LER=10	Top terminal 1 switch signal repeat	Top terminal 1 switch installation error, causing multiple terminal switch input or top terminal 1 switch signal shake. Check related switches.

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

Error Code	Definition	Possible Solution
LER=11	Top terminal 1 switch signal lost	Top limit switch enables before top terminal 1 switch or top terminal 1 switch signal lost.
LER=12	Total floor setting error	Check total floor number match actual floor number. Check leveling inductor plates on every floor.
LER=14	Two leveling inductors cannot trigger together	Leveling inductor plate on this floor cannot cover both inductors or missing one leveling inductor.
LER=15	Press "ESC" in the middle of hoistway parameter learning process.	Cancel the learning by pressing "ESC".
LER=17	Up/Down leveling switch enable at same time	Wiring of two switches is parallel connection by mistake, or bottom limit switch is installed close to 1st floor leveling position.
LER=18	Hoistway data saving error	▲Please contact supplier at once.
LER=19	Both leveling switch signal enable together when arrive at top limit switch.	Move up top limit switch.
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 positions of up and down door zone sensors, 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
DF1	UV	**DC bus under voltage** (for 400V drive, 380V at UV protection; for 200V drive, 220V at UV protection)	1. Phase lost on input supply; 2. Instantaneous power lost; 3. Excessive input voltage fluc tuation; 4. Loose terminals at input; 5. Surge Resistance didn't release; 6. UPS running, but X18 is in valid.	1. UV error after power ON; Check input power supply; Check input power cable terminals; Check cable between main board and power board; 2. Without load, up running is normal, but down running shows UV error, Check surge resistance; 3. UV error while ARD running, Check X18 connection; 4. UV error after power off. This is normal condition, system record each time of power off by UV error.
DF2	OV	**DC bus over voltage** (for 400V drive, 760V at OV protection; for 200V drive, 410V at UV protection)	1. Too short deceleration time; 2. Brake resistance value mismatch; 3. Supply voltage too high; 4. No connection to braking resistor or abnormal braking resistor or lack of capacity.	1. Increase deceleration time; 2. Connect capacity and connection of brake resistor; 3. Check power supply.

Chart 8.3 Driver Fault List (Cont'd)

Error Code	Display	Definition	Possible Causes	Possible Solution
DF3	OH	**Heat sink overheated** Find temperature of module is higher than a preset value and keep for certain time; Find temperature of module is lower than zero degree and keep for certain time;	1. Excessively ambient temperature; 2. Damaged cooling fan; 3. Existence of heat source around; 4. Ambient temperature is below zero degree; 5. Bad connection between main board and power board.	1. Reduce ambient temperature; 2. Remove heat source around; 3. Check the fan and wiring; 4. Set FX-21 to OFF (disable minus temperature warning); 5. Check cable between main board and power board.
DF4	IF	**IPM fault** Find drive module has serious short circuit error, system trigger a hardware over- current protection. Please get rid of external short circuit before retrying	1. IPM over current/short circuit; 2. IPM over heat; 3. Abnormal IPM control power (UV); 4. Motor wire adhered or short to ground; 5. Abnormal star-sealed contactor action.	1. Check output short circuit; 2. Check motor short circuit; 3. Check star-sealed contactor action; 4. Contact with supplier.
DF5	OC	**Overcurrent** Phase current of controller has exceeded limit and keep for certain time	1. Inverter output short circuit; 2. Machine over-load; 3. Accel/decel time too short; 4. Encoder signals have a bad connection; 5. Wrong motor or encoder parameter setting: (1)Wrong original point (Gearless); (2)Rated slip is too large (Geared); (3)Wrong poles setting; (4)Wrong encode pulse setting; (5)Wrong P & I parameter setting.	1. Check motor short circuit; 2. Check accel/decel time, slow down if needed; 3. Check if inverter's capacity match load; 4. Check encoder connection: (1) Check original point (Gearless); (2) Check rated slip (Geared); (3) Check poles setting; (4) Check encoder pulse setting; (5) Check P & I parameter setting.
DF6	CF	**CPU faults** Controller abnormal	Electro-Magnetic interference.	Too much interference.
DF7	OS	**Elevator over speed** the speed feedback exceeds the speed limit and last longer than set time.	1. Max speed /last time set incorrect; 2. Speed over-tuning; 3. Encoder feedback incorrect; 4. Wrong motor parameters setting.	1. Check speed limit setting; 2. Check the P/I parameter; 3. Check encoder; 4. Check motor parameters.
DF8	OE	**Speed over deviation** the speed deviation exceeds the allowable range(F9-03) and last longer than set time.	1. System overload; 2. Accel/decel time short; 3. Parameter setting wrong; 4. Encoder cannot work properly; 5. Brake wrongly act; 6. Wrong allowable range set.	1. reduce system load; 2. Increase accel/decel time; 3. Check the parameters; 4. Check the encoder; 5. Exchange motor phase sequence or exchange A+/A- and B+/B- wire; 6. Check brake action.

Chart 8.3 Driver Fault List (Cont'd)

Error Code	Display	Definition	Possible Causes	Possible Solution
DF9	PGO	**PG disconnect** Did not receive encoder signal at operation. PG card type setting is different with actual one, system cannot identify it.	1. Encoder wiring is broken, loosen or wrong connection; 2. Encoder damaged; 3. Wrong PG type setting; 4. PG card damaged; 5. Brake not open.	1. check encoder wiring; 2. Check encoder; 3. Check if F8-02 PG type is same with actual PG card; 4. Check connection between PG card and main board; 5. Check if brake can open; 6. If software version is old, please enter Fault report->Controller Fault, and find E2, E3 value: Incremental encoder: (1)E3=35, no speed feedback; (2)E2=16, U/V/W signals error; Sin/Cos encoder: (1)E3=35, no speed feedback; (2)E3=29,31,36, abnormal communication between main board and SPG card; (3)E3=28 or 34, C/D signal error; (4)E3=32 or 33, A/B/C/D signals are highly similar; 7. If software version is new, these errors are DF18, DF19 and DF20.
DF10	FF	**Flash memory fault**	Data fault at saving parameters.	Please contact supplier.
DF11	BF	**Baseblock circuit error** When system find baselock valid and receive running command, but running condition isn't ready.	1. Wiring for baseblock at X14 is incorrect; 2. Setting electric level for baseblock at X14 is incorrect.	1. Check the wiring at X14; 2. Modify the parameters.
DF12	OL	**Motor overload** current output exceed 150% (200%) rated value for 60s (10s). Motor current exceed 150% (200%) rated value for 60s (10s).	1. System load too heavy; 2. System power rating too low; 3. Low capacity controller.	1. Reduce system load; 2. Change a more suitable controller; 3. Change motor or increase F5-08 rated current properly to promote overload capacity.
DF13	MC	**MC contactor bad action** Controller main contactor MC does not close after given close command for set time.	1. Wrong wiring for MC contactor; 2. MC contactor damaged; 3. Wrong FX-23 surge feedback type setting; 4. Drive power on power board is abnormal.	1. Try to reset the power, if this error come again, contact supplier for replacement; 2. Change FX-23 status, then power off and power on again.

Chart 8.3 Driver Fault List (Cont'd)

Error Code	Display	Definition	Possible Causes	Possible Solution
DF14	BR	**Brake unit fault** While system find DC bus voltage reach braking range, but braking tube keep open and last over preset time.	1. defective brake cable or damaged brake elements or IGBT module; 2. External brake resistor dis connected or not connect ed; 3. Bad connection between the main board and the power board.	1. Check brake resistor; 2. Replace the controller; 3. Check the main board a nd the power board co nnector.
DF15	OF	**Output phase lost** System find phase lost or break, running condition is not ready	1. Output cable break or lo ose terminal; 2. Motor stator cable discon nect.	1. Check output cable/term inal; 2. Check motor stator cabl e; 3. Set FD-21. BIT2 to 1 to disable this detection.
DF16	SCF	**Output current remains at elevator stop** After the system executes the stop instruction, the output current is not zero and the preset time is kept.	1. Controller damaged; 2. Cabinet works abnormally.	1. Change the controller; 2. Check cabinet wiring.
DF17	SRF	**Elevator slips after stop** After the system executes the stop command, the encoder's feedback speed is not zero.	1. Brake/encoder loose; 2. Encoder interference.	1. Fasten brake/encoder; 2. Remove interference source.
DF18	UF	Incremental: **Signal U of encoder wire lost** Sin/Cos: **Signal C and D abnormal**	1. Encoder damaged or wiring incorrect; 2. Wrong PG type setting.	1. Check encoder and wirings; 2. Correct PG type setting.
DF19	VF	Incremental: **Signal V of encoder lost** Sin/Cos: **A, B, C, D signals are highly similar**	1. Encoder damaged or wiring incorrect; 2. Wrong PG type setting.	1. Check encoder and wirings; 2. Correct PG type setting.
DF20	WF	Incremental: **Signal W of encoder wire lost** Sin/Cos: **Abnormal communication between SPG card and main board**	1. Encoder damaged or wiring incorrect; 2. Wrong PG type setting; 3. Bad connection between the main board and the PG card.	1. Check encoder and wirings; 2. Correct PG type setting; 3. Check whether the PG card is fastened to the main board.

Chart 8.3 Driver Fault List (Cont'd)

Error Code	Display	Definition	Possible Causes	Possible Solution
DF21	DF	**Parameter setting error** System find rated current/no-load current/ rated slip/ poles/pulse setting error.	Parameter setting error Check rated current/no-load current/ rated slip/ poles/pulse setting.	Check parameter setting.
DF22	SDF	**Internal programmer self-check error** The system detected the types of faults that cannot be classified into routine fault types.	Internal data setting error.	Please contact with supplier.
DF23	150	**Current collection sensor error** When the elevator starts, the system detected that the instantaneous current value of the current sensor is not near the zero point.	1. Bad contact between main board and drive power; 2. Hardware error.	1. Please with contact supplier; 2. Check the main board and driver power board connection.
DF24	151	**Overtime at zero speed** The system has detected that the elevator controller has been given a zero-speed state and exceeds the zero-speed timeout time.	Drive controller keep too long time under zero speed.	Check if inspection speed or rated speed is reasonable.
DF25	152	**Baselock error** System detect baselock signal and cannot reset error	1. Bad contact among chips on mainboard; 2. Bad contact among main board and power board.	1. Check the connection between; Bad contact among chips on mainboard; 2. main board and power cable. Replace main board.
DF26	153	**Sequence of load compensation is abnormal** When the load compensation device starts, the system detects the rotation of the motor.	While drive controller operate load compensation, the sequence is abnormal. Or brake open time is too short.	Check the brake and if Brake ON Time setting is too short.
DF27	154	**Angle tuning fail** Angle tuning with load not completed.	Angle tuning fail with fault.	Solve angle tuning fault first, then do it again. **Attention: Don't run elevator without successful auto tuning, or it will lose control.**

Chart 8.3 Driver Fault List (Cont'd)

Error Code	Display	Definition	Possible Causes	Possible Solution
DF28	155	**Internal communication error** The system has detected the abnormal communication in the main board.	1. Internal communication between controllers is abnormal; 2. Component on mainboard is abnormal; 3. Elevator controller gives wrong commands.	1. Check if there is serious EMI or contact with supplier; 2. Change the main board.
DF29	156	**The running mode of machine is abnormal** speed source selection F9-01 cannot match current logic.	Speed source selection F9-01 do not adapt to current control logic.	When normal running, confirm F9-01=2.
DF30	157	**Power of bottom case identification error** The main board cannot correctly identify the bottom case configuration information.	1. Connection between main board and power drive board is bad; 2. Component on mainboard is abnormal; 3. Component on power drive board is abnormal.	1. Check the connection between main board and drive power; 2. Change main board; 3. Change power board.
DF31	158	**Communication error between drive modules** Detection of communication error between drive modules	Communication of internal drive chip is abnormal.	1. Check if there is serious EMI or contact with supplier; 2. Change main board.
DF32	159	**Encoder Z (or R) signal is abnormal** Motor has run for over 2 rounds but didn't find Z signal.	1. The controller finds disconnection or interference in Z pulse; 2. Component on mainboard is abnormal; 3. Component on PG card is abnormal.	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.	1. Encoder signal anomaly; 2. Brake force may be not enough or already open.	1. Check A & B signals of encoder; 2. Check brake.
DF34	161	**While brake force detecting, feedback movement of encoder is too long.**	1. Encoder feedback signal anomaly; 2. Brake force may be not enough or already open.	Check the brake and encoder.

Chart 8.3 Driver Fault List (Cont'd)

Error Code	Display	Definition	Possible Causes	Possible Solution
DF35	162	**While safety protecting, motor has crept too long** When the system is in the state of security protection, it is detected that the encoder feedback displacement is too large.	1. Encoder feedback signal anomaly; 2. Brake force may be not enough or already open. 3. The setting of control parameter is not reasonable.	Check the brake, encoder and parameter setting related to safety protection
DF36	163	**Lack of phase protection for 3-phase input power** During the operation of the system, the input phase is detected lack, and the shell driving power is abnormal.	1. While running, system find lack of phase. 2. Check if there's IF error in Fault report. If yes, solve error according to IF error. 3. Bad contact between main board and power board.	1. Check 3-phase input power; 2. Check if there's short circuit of output 3-phase; 3. Check cable between main board and power board; 4. While using one phase, set FD-21. BIT0=1 to ignore lack of phase error.
DF37	164	**Three-phase output line short circuit** Short circuit between 3-phase output or short to earth or to N line.	1. There is short circuit among 3-phase output or output to earth or output to N line; 2. Imbalance adapt between motor and inverter capacity.	1. Check 3-phase output and output to earth and output to N line; 2. Check if inverter capacity adapts to motor. **Note: Set FD-21. BIT3=1 can ignore this error, but we don't suggest doing 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.	1. The output current feedback way of 3-phase output is seriously abnormal; 2. One of 3-phase may short to earth or N line.	1. Check if there is broken circuit or short circuit with N(Neutral) of 3-phase output; 2. Feedback channel of current sensor.
DF39	166	**Output voltage is saturated** During the operation of the system, the integrated controller output voltage is detected to be saturated.	1. Low input voltage; 2. Rated motor speed setting is not same with actual speed; 3. For geared motor, rated slip is too low or over load.	1. Check DC bus voltage; 2. Check if rated RPM is same with nameplate or if bus voltage has been dropped down through monitoring running status; 3. Check rated slip for geared motor; 4. Check balance factor.

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** The drive has a failure and cannot do Initial Angle Rotation Tuning.	Controller has met fault.	First solve fault according to error code, then angle tuning again. Refer to **Chart 8.3 Driver Fault List.**
RF226	**Give voltage limit** Already give limit force during angle tuning, but feedback current cannot reach least requirement.	1. Incorrect parameters of motor or encoder; 2. The difference between the actual parameters of the motor and the estimated parameters of the driver is too large; 3. Power matching imbalance between motor and driver (The motor power is far less than the drive).	1. Check parameters of motor and encoder; 2. Decrease F5-08 to complete tuning, then recover F5-08; 3. Check if the power of inverter is adapted to motor, refer 2.
RF227	**Output current over limit** During the tuning process, the driver controller detects that the output current has reached the limit and stops the output, indicating that the current is out of limit.	1. Incorrect parameters of motor or encoder; 2. The difference between the actual parameters of the motor and the estimated parameters of the driver is too large; 3. Power matching imbalance between motor and driver (The motor power is far more than the drive).	1. Check parameters of motor and encoder; 2. Increase F5-08 to complete tuning, then recover F5-08; 3. Check if the power of inverter is adapted to motor, refer 2.
RF228	**ESC input** During the tuning process, ESC input is effective, and self-tuning is cancelled.	The hand operator triggers the ESC button to cancel angle tuning.	Angle tuning interruption, failure to complete, please do angle tuning again.
RF229	**Over time at zero speed** In the process of tuning, when the rotor is positioned, the feedback speed is not zero for a long time, and it cannot locate accurately.	1. Motor carrying partial load; 2. Bad feedback speed of encoder.	1. Ensure brake is off; 2. Remove interference of encoder.

Chart 8.4 Motor Initial Angle Rotation Tuning Fault List (Cont'd)

Error Code	Definition	Possible Causes	Possible Solution
RF230	**Current detection error** During the tuning process, the feedback current value ultra-lower limit and the self-tuning condition is not satisfied.	1. Broken circuit at load side or lack of phase; 2. Imbalance phase of motor side or rated current wrongly set; 3. Inverter cannot adapt to motor. (Motor capacity is highly lower than inverter)	1. Ensure 3-phase connection to motor; 2. Ensure motor parameters setting; 3. Ensure motor should adapt to inverter.
RF231	**CD signals of encoder is abnormal** In the process of tuning, it is found that CD feedback position value is abnormal, and it is impossible to identify the CD line sequence.	1. Parameters of motor or encoder have been wrongly input; 2. Interference in encoder; 3. Error input of motor or encoder; 4. Wrong PG type set.	1. Check CD signals wiring; 2. Remove interference; 3. Verify parameters of motor and encoder; 4. Check PG type set.
RF232	**Motor does not rotate** In the process of tuning, the driver cannot control the normal rotation of the motor.	1. Encoder connection fault, no feedback speed; 2. Motor has load or brake close; 3. The power difference between the motor and the driver is too large and does not match.	1. Check encoder A&B signal connection, elimination of encoder signal interference; 2. Make sure motor has no load & brake open; 3. Check the parameters of the number of the motor and the number of the encoder; 4. Detect of power matching of motor and driver controller, reduce the rated current [F5-08], and resume F5-08 after tuning.
RF233	**Motor rotates in wrong direction** In the process of tuning, the direction of the motor is not consistent with the control direction, and there is a reverse rotation.	Motor phase sequences does not match encoder.	1. Adjust motor phase sequence; 2. Adjust encoder A-, A+ or B-, B+.
RF234	**Encoder R pulse signal error** R pulse signal was not detected for a long time in the process of tuning.	1. No detection of R pulse signal; 2. Interference of encoder signal; 3. Error input of motor or encoder; 4. In the course of tuning, the motor is rotated in distress.	1. Check wiring for R pulse signal; 2. Elimination of encoder signal interference; 3. Verifying the number of motor poles and the number of encoder lines; 4. Open or close the brake in the process of self-learning.

Chart 8.5 Motor Initial Angle Static Tuning Fault List

Error Code	Definition	Possible Causes	Possible Solution
RF100	**Controller fault** The drive has fault and cannot do tuning.	Controller has met fault	First solve fault according to error code, then angle tuning again. Refer to **Chart 8.3 Driver Fault List.**
RF226	**Give voltage limit** Already give limit force during angle tuning, but feedback current cannot reach least requirement.	1. Incorrect parameters of motor or encoder; 2. The difference between the actual parameters of the motor and the estimated parameters of the driver is too large; 3. Power matching imbalance between motor and driver (The motor power is far less than the drive).	1. Check parameters of motor and encoder; 2. Decrease F5-08 to complete tuning, then recover F5-08; 3. Check if the power of inverter is adapted to motor, refer 2.
RF227	**Output current over limit** During the tuning process, the driver controller detects that the output current has reached the limit and stops the output, indicating that the current is out of limit.	1. Incorrect parameters of motor or encoder; 2. The difference between the actual parameters of the motor and the estimated parameters of the driver is too large; 3. Power matching imbalance between motor and driver (The motor power is far more than the drive).	1. Check parameters of motor and encoder; 2. Increase F5-08 to complete tuning, then recover F5-08; 3. Check if the power of inverter is adapted to motor, refer 2.
RF228	**ESC input** During the tuning process, ESC input is effective, and self-tuning is cancelled.	1. Release Up or Down button while tuning; 2. Fault occurs during angle tuning.	1. Angle tuning interruption, failure to complete, please do angle tuning again. Do not forced to run, there is a danger of losing control. 2. Check whether there is elevator logic fault, resulting in stop tuning. Refer to **Chart 8.1 Elevator System Faults List.**
RF229	**Over time at zero speed** Over time at zero speed Before start, feedback speed is not zero for a long time	1. Brake open or brake force is not enough; 2. There's interference in encoder.	1. Ensure brake is off; 2. Remove interference of encoder.

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

Error Code	Definition	Possible Causes	Possible Solution
RF230	**Current detection error** During the tuning process, the feedback current value ultra-lower limit and the self-tuning condition is not satisfied.	1. Broken circuit at load side or lack of phase; 2. Imbalance phase of motor side or rated current wrongly set; 3. Inverter cannot adapt to motor. (Motor capacity is highly lower than inverter)	1. Ensure 3-phase connection to motor; 2. Ensure motor parameters setting; 3. Ensure motor should adapt to inverter.
RF231	**CD signals of encoder is abnormal** In the process of tuning, it is found that CD feedback position value is abnormal, and it is impossible to identify the CD line sequence.	1. Parameters of motor or encoder have been wrongly input; 2. Interference in encoder; 3. Error input of motor or encoder; 4. Wrong PG type set.	1. Check CD signals wiring; 2. Remove interference; 3. Verify parameters of motor and encoder; 4. Check PG type set.
RF237	**Motor moved while static angle calculation** When the motor angle position is inferred static, the motor cannot rotate to obtain the determined current position.	1. Brake open or brake force is not enough; 2. Bad encoder wire or interference in encoder.	1. Ensure brake is closed; 2. Check encoder A, B signals, remove interference
PF238	**Detection current is too small** In the Initial angle static tuning process, the output current value is lower than the lower limit, and the tuning condition is not satisfied.	1. The rated current of the motor may not be in conformity with the actual motor; 2. Motor/Controller connection is incorrect. (Break circuit or phase lost)	1. Check motor/controller connection; 2. Check rated current and rated power of motor.
PF239	**Encoder R pulse signal lost** No encoder R pulse signal detected after motor tuning for 10s	1. Interference in R pulse signal; 2. A & B signals connection error; 3. Inspection elevator speed setting is too low.	1. Check the encoder wiring; 2. Remove the encoder interference; 3. Ensure the normal operation of the motor; 4. Inspection elevator speed setting is too low.
RF252	**While static angle tuning, motor speed is over proof**	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.	1. Check if there is feedback from SIN/COS encoder; 2. 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)

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.
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.

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/Controller connection error.	1. Check input parameters; 2. Check motor/controller connection.
PF237	Motor is not held still at initial tuning period.	Motor brake is not close, or brake is too loose, causing sheave to move during initial tuning period	Make sure motor brake is tightly closed.
PF238	Current too small at initial tuning period.	Motor/Controller connection error.	Check motor/controller connection.

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, etc.), 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 check 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 depend 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)
Other components	-----	Decide after inspection

Note: Conditions below are required in order for components to reach life time mentioned above.

Ambient temperature: Average 30℃ around one year

Load rate: Average below 80%

Running rate: Daily usage time <12 hrs.

9.5. Warranty

Integrated controller warranty period is 18 months after manufacturer (based on product name plate). However, even within the 18-month warranty period, repair cost will be charged in the following cases:

1. Damage caused by miss-operation – not following manual guidance
2. Damage due to use outside rated range
3. Damage due to abnormal application of the drive
4. Damage due to natural environment, such as fire, flood, earthquake etc.

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. It has two parts: first, the device/system must be able to work normally in environment with electromagnetic interference. Then, the electromagnetic interference it generated must be within a certain level, so it will not affect other devices/systems in the environment.

10.2. EMC Characteristics of Integrated Controller

Same as other electronic devices, the integrated controller is affected by electromagnetic interference and at the same time it is also a source of electromagnetic interference. In order to enable the controller work normally in an electromagnetic environment, at the same time not to affect other devices, it is specially designed to deal with EMC characteristics shown below.

1. Input current is non-sine wave, with high frequency, this will cause strong electromagnetic interference.
2. Output voltage is high frequency PWM wave, this will cause strong electromagnetic interference.
3. As electromagnetic receiver, if controller receives too strong interference, it may not work properly.
4. Reduce controller generated electromagnetic interference will increase its own EMC level.

10.3. EMC Installation Guide

As determined by operating principle, the elevator integrated controller produces certain noises during operation. The effect of noise on peripheral equipment is relevant to the noise type, transmission path as well as the design, installation, wiring and grounding of drive system.

10.3.1 Noise Control

Basic strategy for noise control is to cut the transmission channel between noise source and noise receiver. Detail solutions are shown below:

1. Power cable and signal cable should be lay out separately and stay as far as possible, make sure to avoid two kind of cables stay in parallel or tied together. When meet situations in which signal cable must pass power cable, make sure two cables stay in perpendicular crossing and stay as far as possible.

2. All controller signal cable must have net shield, and the shield should be grounded at the controller side, with grounding area as large as possible.

3. For signal cables easy to get interference, such as encoder cable, it should have double twist shield cover, with grounding area as large as possible. One suggestion is to put the cable in metal tube or in an individual metal cable tunnel with reliable grounding condition.

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 cores (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 the power line inlet as practicably as possible. Additionally, the filter supply line section left in the control cabinet must be as short as possible.
2. The power line filter should be grounded with reliable connection, and the grounding area should be as large as possible.
3. The power line filter metal case should be securely attached to the control cabinet plate, with contacting area as large as possible and ensure good electrical connection.
4. Please use power line filter that matches the system, such as inverter use power line RFI filter.

10.4. EMC standard satisfied by Integrated Controller

When install integrated controller and EMI filter, if the installation procedures are following EMC installation guide, then the system could meet the standards below:

EN61000-6-4：EMC test in Industrial Environment 1800-3。

EN61800-3：EMC Standard (2nd Level Environment)

EN61000-6-3：EMC Standard (Residential Environment)

EN61000-6-4：EMC Standard (Industrial Environment)

Chapter 11: Accessories

11.1. Elevator Group Control Board BL2000-QKB-V1

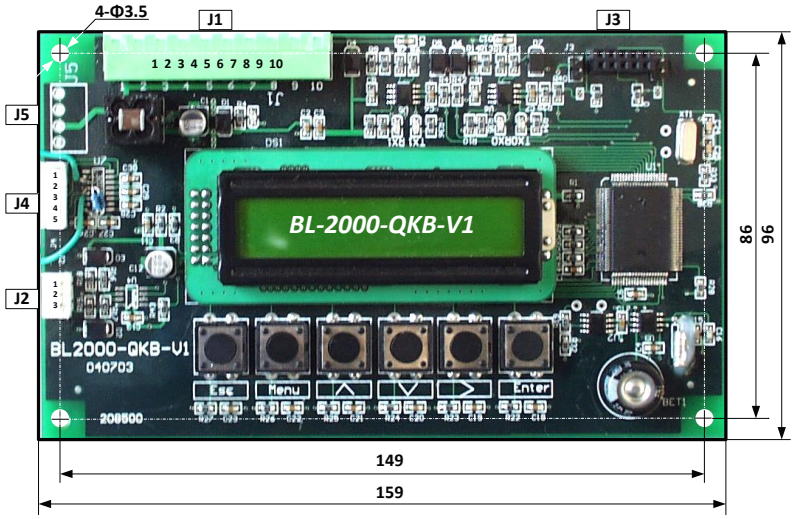


FIGURE 11.1 GROUP CONTROL BOARD BL2000-QKB-V1 SHAPE & DIMENSION

11.1.1 Function

1. Group control system is combined with one group control board "BL2000-QKB-V1" and several integrated controllers in every elevator in the group. Group controller collect hall call, car call and status information of every elevator through CAN BUS, process them, and deliver distribution orders to every elevator. In this way the group control for up 8 elevators & 64 floors is achieved.
2. Four Running Modes
   - Up peak mode: At set time, all elevators answer landing call with up call from base floor has highest priority.
   - Down peak mode: At set time, one elevator answers up call with priority; other elevators answer down call (one elevator on each area) with priority to minimize the down call reaction time.
   - Balance mode: Landing call distribution is optimized according to shortest time response principle.
   - Spare mode: 3 minutes at the balance mode without landing/car call, elevator will wait for the order from the first floor on each area so that response to hall car as soon as possible.

When elevator is at status of fault, attendant, inspection, parking, fire and special use mode, it will be excluded from group control mode. Please follow the relevant chapter in this user guide for individual elevator operation in group control mode.

11.1.2 Application

1. Group Control from 3 to 8 elevators;
2. Elevator speed 0.5-4m/s;
3. Can be used up to 64 floors;
4. Applies to passenger and residential elevator.

11.1.3 Terminal Specification

1. J1 Multiple Wire Socket DK5EHDRC-10P; Rated Voltage: 300V, Rated Current: 15A, Max Voltage: 4KV, Leg: 5mm.

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

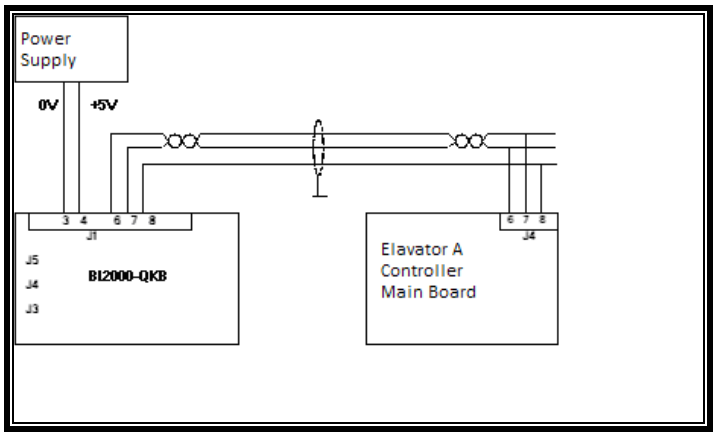


FIGURE 11.2 GROUP CONTROL BOARD BL2000-QKB-V1 INTERFACE CIRCUIT

11.1.5 Terminal Definition & Specification

Chart 11.1 Group Control Board BL2000-QKB-V1 Terminal Definition & Specification List

Name	Terminal	Location	Definition	Usage	Technical Specification		
					Interface Type	Rated Load	Max Speed
J1	GND3	J1-1	0V	Power & Communication			
		J1-2					
	GND3	J1-3	0V				
	5V IN	J1-4	5V Input			200mA	
		J1-5					
	TXA+	J1-6	Group Control Communication				
	TXA-	J1-7					
	GND3	J1-8	0V				
		J1-9	Spare CANComm.TXA+				
		J1-10	Spare CANComm.TXA-				
J2	DA+	J2-1		RS485			
	DA-	J2-2					
	GND	J2-3					
J3	Programming Interface						
J4	TX	J4-1	Communication Send	RS232			
	RX	J4-2	Communication Receive				
	IN	J4-3	Control Input				
	OUT	J4-4	Control Output				
J5	TXA+	J5-1	Group Communication				
	TXA-	J5-2					
	GND3	J5-3	0V				
		J5-4					

11.2. Parallel Extension Board FR2000-EBA-V01

Parallel Extension Board FR2000-EBA-V01 shape and dimension are shown below in Figure 11.3.

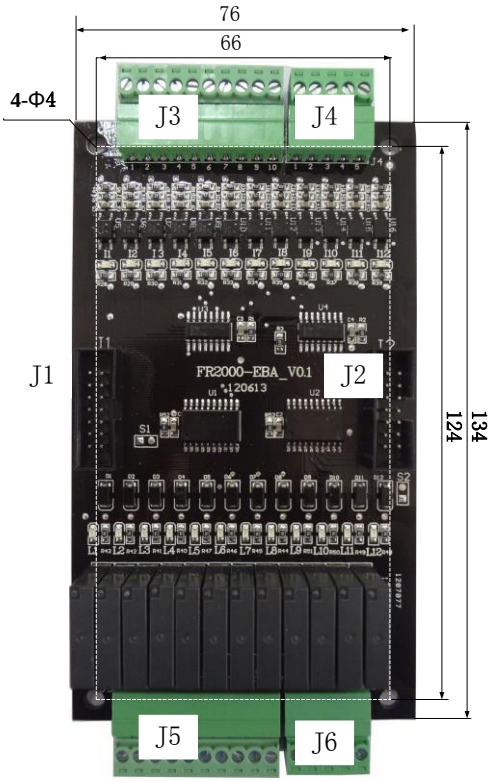


Figure 11.3 FR2000-EBA Dimension

11.2.1 Function

Parallel extension board is used with parallel integrated controller for floor extension. Without extension board, parallel controller can achieve maximum 7 floors (full collective), each extension board can extend 4 floors. At most, you can connect two extension boards and extend maximum floors to 15 floors.

11.2.2 Application

1. Extend maximum car call/landing call for floors 8 to 15;
2. Each extension board can extend 4 car calls and 4 landing calls;

11.2.3 Terminal Specification

1. J1 Double Pin Bar 2.54/14P
2. J2 Double Pin Bar 2.54/14P
3. J3 Straight pin socket, 3.5/10P
4. J4 Straight pin socket, 3.5/5P
5. J5 Straight pin socket, 3.5/10P
6. J6 Straight pin socket, 3.5/5P

11.2.4 Interface Circuit

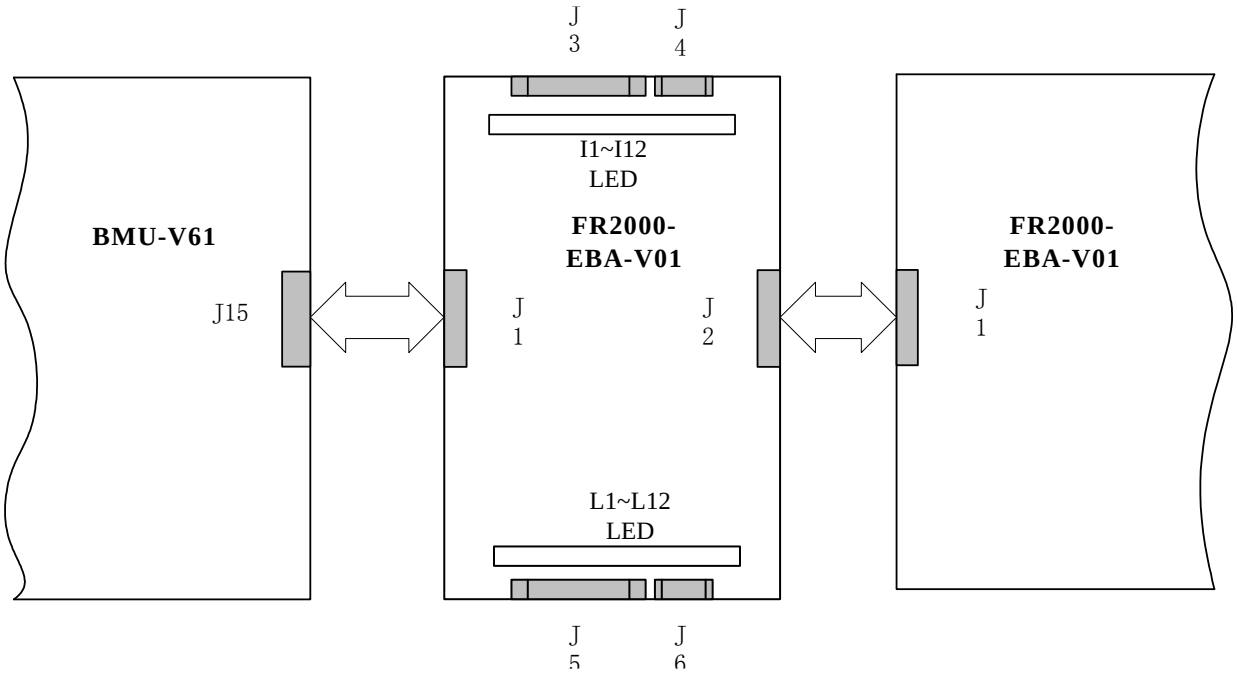


FIGURE 11.4 PARALLEL EXTENSION BOARD FR2000-EBA-V01 INTERFACE CIRCUIT

11.2.5 Terminal Definition & Specification

Chart 11.2 Parallel Extension Board FR2000-EBA-V01 Terminal Definition/Specification List

Name	Terminal	Location	Definition	Usage	Technical Specification		
					Interface Type	Rated Load	Max Speed
J1	24V	J1-1	24V	Power & Communication			
	24V	J1-2	24V				
	None	J1-3					
	None	J1-4					
	GND	J1-5	0V				
	GND	J1-6	0V				
	SOTNEB	J1-7	Output data				
	RCK	J1-8	Output clock				
	SRCK	J1-9	Output Latch				
	SER	J1-10	Input Latch				
	CLK	J1-11	Input clock				
	SH	J1-12	Input data				
	5V	J1-13	5V				
	5V	J1-14	5V				
J2	Same as J1						

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				
J4 (Extension 1)	I11	J4-1	Full Collective/Simplex Collective Down call input 10/ Call input 15				
	I12	J4-2	Full Collective Down call input 11				
		J4-3					
		J4-4					
		J4-5					
J5(Extension 1)	L1	J5-1	Full Collective/Simplex Collective Car call output 8/ Car call output 10				
	L2	J5-2	Full Collective/Simplex Collective Car call output 9/ Car call output 11				
	L3	J5-3	Full Collective/Simplex Collective Car call output 10/ Car call output 12				
	L4	J5-4	Full Collective/Simplex Collective Car call output 11/ Car call output 13				

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	Location	Definition	Usage	Technical Specification		
					Interface Type	Rated Load	Max Speed
J3 (Extension 2)	I1	J3-1	Full Collective Car call input 12	Power & Communication			
	I2	J3-2	Full Collective Car call input 13				
	I3	J3-3	Full Collective Car call input 14				
	I4	J3-4	Full Collective Car call input 15				
	I5	J3-5	Full Collective Up call input 11				
	I6	J3-6	Full Collective Up call input 12				
	I7	J3-7	Full Collective Up call input 13				
	I8	J3-8	Full Collective Up call input 14				
	I9	J3-9	Full Collective Down call input 12				
	I10	J3-10	Full Collective Down call input 13				
J4 (Extension 2)	I11	J4-1	Full Collective Down call input 14				
	I12	J4-2	Full Collective Down call input 15				
		J4-3					
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					

Appendix 1: Hoistway Switches Information (Partly)

F1.1 Leveling Switches & Flag Installation

For elevator leveling control, two leveling switches (up/down leveling switches) and some door zone flags (one in each floor) are required. Two leveling switches are installed on top of car, door zone flag is installed in hoistway, their dimensions and positions are illustrated in Figure F1.1. Leveling switches can be optical or magnetic.

Door zone flag adjustment:

1. Elevator stop at each floor, measure car and hall sills difference △S on each level at elevator park (car sills higher is position, lower is negative)
2. Adjust door zone flag on each floor, if △S>0, flag on this floor should move down △S; move flag up △S if △S<0.
3. Elevator need to redo the hoistway parameter learning after door zone flag adjustment.
4. Check elevator leveling on each floor, read part 1-3 if necessary.

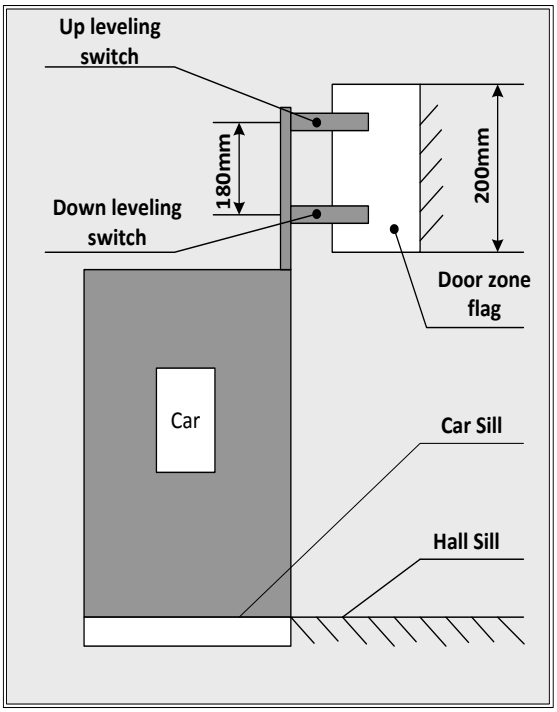


FIGURE F1.1 DOOR ZONE FLAG & LEVELING SWITCH POSITION

F1.2 Up/Down Terminal Switches Installation

1. Terminal switches are recommended to use non-contact type, such as magnetic switch.

2. Up/Down terminal switches are installed in hoistway guide rail; terminal flag is installed on top of car. Their positions are shown blow in Figure F1.2 & F1.3.

3. For elevator speed ≤1.75m/s, only one up and one down terminal switch and one terminal flag is required. For elevator speed ≥2.0m/s, more terminal switches should be installed for safety purpose. Please see below Chart F1.1 for up/down terminal switches position with different elevator speed.

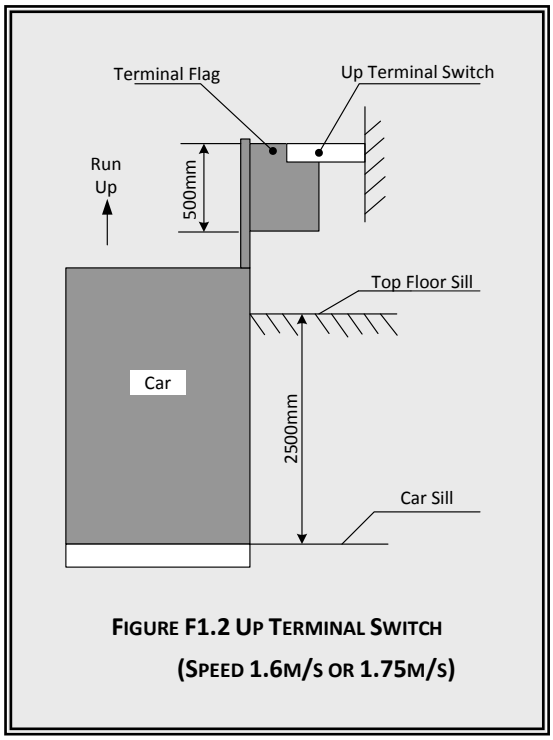


FIGURE F1.2 UP TERMINAL SWITCH
(SPEED 1.6M/S OR 1.75M/S)

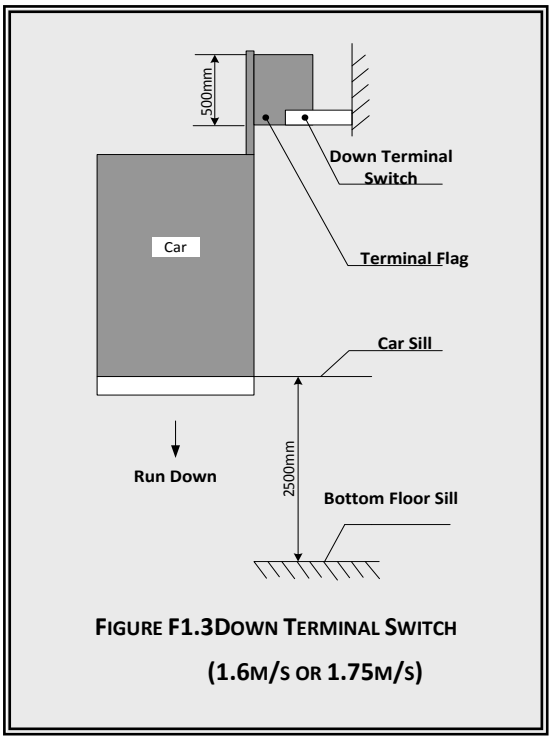


FIGURE F1.3DOWN TERMINAL SWITCH
(1.6M/S OR 1.75M/S)

Chart F1.1 Up/Down Terminal Switches with different elevator speed

Terminal \ Speed	Terminal Switch Location					
	0.5m/s	1.0m/s	1.6m/s 1.75m/s	2.0m/s	2.5m/s	4.0m/s
Up/Down Terminal Switch 1	1m	1.3m	2.5m	2.5m	2.5m	2.5m
Up/Down Terminal Switch 2				4m	6.25m(4m)	8m
Up/Down Terminal Switch 3						

F1.3 Confirm the Terminal Switches Location

Up/down terminal switches signal is used for elevator force change speed and floor position calibration, they should be installed 2.5m from car top/bottom to top/bottom floor leveling position. (For elevator speed at 1.6m/s or 1.75m/s). To confirm such position:

1. Make sure elevator in inspection mode;
2. Set inspection speed to 0.3m/s, run up/down elevator;
3. Stop elevator when touching up/down terminal switches;
4. At this time the car sills and hall sills should have a distance of 2.5±0.1m.

Appendix 2: Re-Leveling & Door Open in Advance

F2.1 Safety Control Board (SJT-ZPC-V2) Drawings

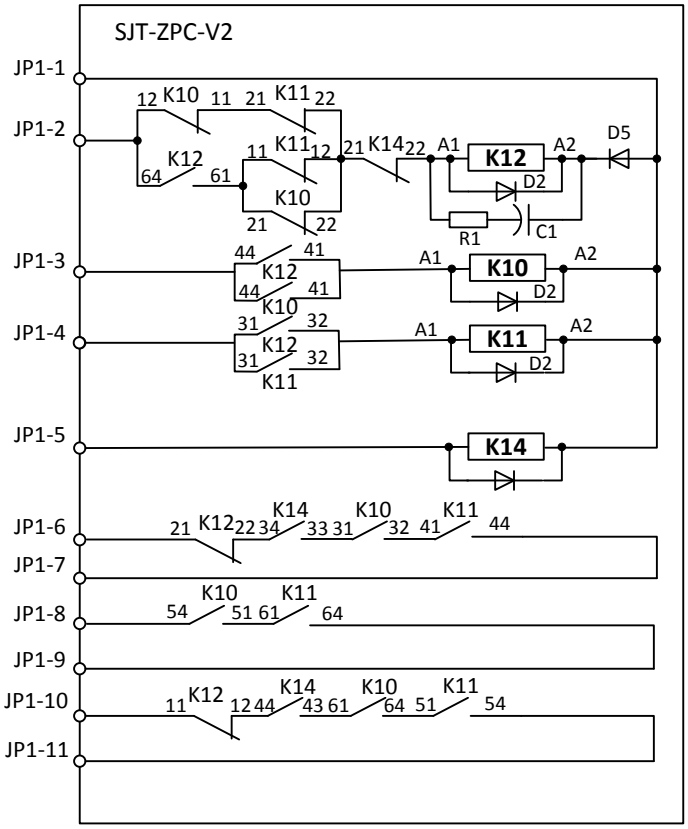


Figure F2.1 Safety Control Board (SJT-ZPC-V2) Drawings

F2.2 Safety Control Board Terminal Definition

Chart F2.1 Safety Control Board Terminal Definition

Name	Location	Definition
JP1	JP1-1	24V+
	JP1-2	0V
	JP1-3	Re-leveling up door zone
	JP1-4	Re-leveling down door zone
	JP1-5	Control system re-leveling conditions satisfied
	JP1-6	Re-leveling conditions satisfied output
	JP1-7	Re-leveling conditions satisfied output Public terminal
	JP1-8	Re-leveling door zone output
	JP1-9	Re-leveling door zone output public terminal
	JP1-10	By-pass door inter-lock +
	JP1-11	By-pass door inter-lock-

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

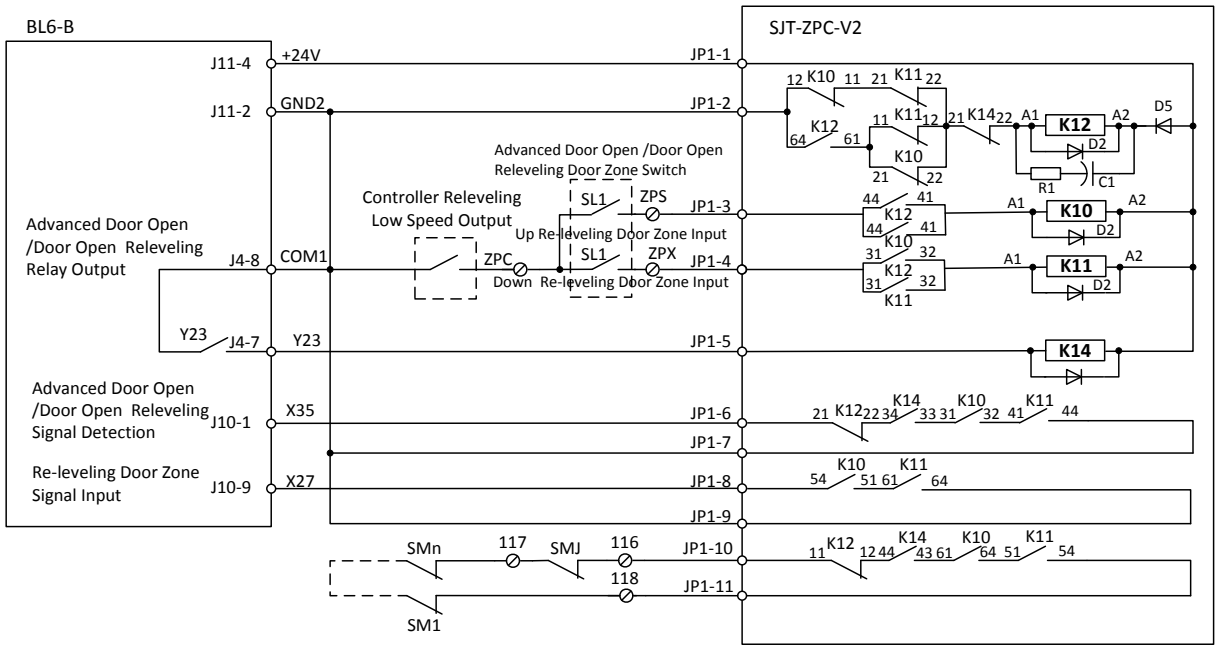


Figure F2.2 Re-Leveling & Door Open in Advance Wiring Diagram

F2.4 Installation for Re-Leveling Door Zone Switches

When using the function of advance door open and re-leveling, besides the up and down leveling switches, two extra re-leveling switches should also be installed. Their installation is shown in Figure F2.3.

mq1：Up leveling switch; mq2: down leveling switch; sl1: up re-leveling switch; sl2: down re-leveling switch; all leveling switches should be installed in sequence. Otherwise the direction of the re-leveling running will be reversed.

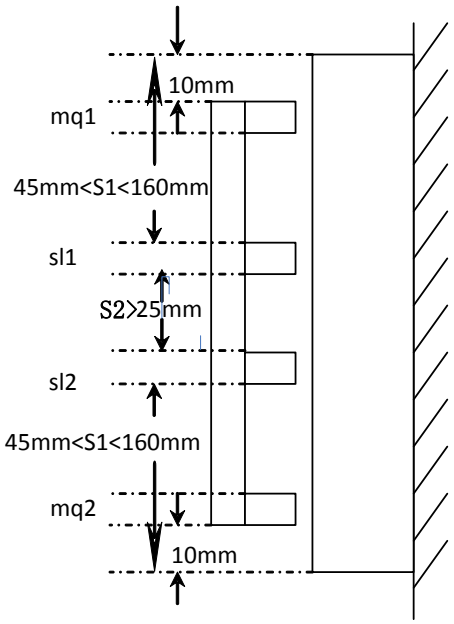


FIGURE F2.3 RE-LEVELLING DOOR ZONE SWITCHES POSITION

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
U0-00	Lower Limit	0	
U0-01	Upper Limit	0	
U0-02	Lower Slowdown 1	0	
U0-03	Lower Slowdown 2	0	
U0-04	Upper Slowdown 1	0	
U0-05	Upper Slowdown 2	0	
U0-06	Floor Data 1	0	
U0-07	Floor Data 2	0	
U0-08~68	Floor Data 3~63	0	
U0-69	Floor Data 64	0	
U1-00	Input Data	--	
U1-01	Input Bin	--	
U1-02	Input App	--	
U2-00	Output Data	--	
U3-00	Car Input Data	--	
U4-00	Run Times	0	
U4-01	Run Hours	0	
U4-04	CAN1SendAPP	--	
U4-05	CAN1ReceiveAPP	--	
U4-06	Interfere Appraise	--	
U4-07	Encoder Appraise	--	
U4-09	Loading Data		
U5-00	Ctrsoftware NO	--	
U5-01	DriveCodeVer	--	
U5-02	CpldEdition	--	
U6-00	Power	--	
U6-01	Ref Speed	--	
U6-02	Feedback Speed	--	
U6-03	Load	--	
U6-04	DC Voltage	--	
U6-05	Output current	--	
U6-06	temperature	--	
U6-07	Output torque	--	
F0-00	Total floor	6	
F0-01	Homing Floor	1	
F0-02	Fire floor	1	
F0-03	Parking floor	1	
F0-04	VIP floor	1	
F0-05	1st floor indicator setting	1	
F0-xx	Xxth floor indicator setting	1~63	

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	Twins Control	0	
F1-26	Group Control	0	
F1-27	Far monitor	0	
F1-28	Auto Parking	0	
F1-29	Load Enable	0	
F1-30	Open Delay Time	0	
F1-31	Brake Feedback	0	
F1-32	Solution Ladder Password	0	
F2-00	Brake ON Time	0.5s	
F2-01	Brake OFF Time	0.5s	
F2-02	Insp Brake Time	0.05s	
F2-04	Zero Time	0.3ms	
F2-05	Open Door time	3s	
F2-06	Open Delay Time	30s	
F2-07	Homing Time	60s	
F2-08	Door Run Time	5s	
F2-09	Beep Delay Time	0.15s	
F2-10	Enable Delay	0s	
F2-11	Lamp Off Time	15min	

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

Parameter	Name	Default Value	Set Value
F2-12	Over Time	45s	
F2-13	SmoothStart Time	0	
F2-14	Start Time/Hour	00	
F2-15	Start Time/Minute	00	
F2-16	Stop Time/Hour	00	
F2-17	Stop Time/Minute	00	
F2-18	Start Time 1/Hour	00	
F2-19	Start Time 1/Minute	00	
F2-20	Stop Time 1/Hour	00	
F2-21	Stop Time 1/Minute	00	
F3-00	Input type	3974102631	
F3-01	Car input type	4294573839	
F3-02	Input select 1	12	
F3-03	Input select 2	18	
F3-04	Input select 3	27	
F3-05	Input select 4	35	
F3-06	Input select 5	0	
F3-07	Output select 1	0	
F3-08	Output select 2	11	
F3-09	Output select 3	12	
F4-00	Set Stop Floor1	4294967295	
F4-01	Set Stop Floor2	4294967295	
F4-02	TIM Stop Floor1	0	
F4-03	TIM Stop Floor2	0	
F4-04	Door Select A1	4294967295(1~32floor)	
F4-05	Door Select B1	4294967295(1~32floor)	
F4-06	Function Select	4	
F4-07	Function Select 2	0	
F5-00	Motor type	0	
F5-01	Poles	20	
F5-02	Rated Freq	16	
F5-03	Motor rated power	6.7	
F5-04	rated speed	96	
F5-05	V IN	280	
F5-06	L_phase	--	
F5-07	R_phase	--	
F5-08	Rated FLA	--	
F5-09	Non-load current	0	
F5-10	slip frequency	1.5HZ	
F6-00	Carrier Freq	8HZ	
F6-02	SpeedZoom	100%	
F6-03	DirSel	0	

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

Parameter	Name	Default Value	Set Value
F6-04	Kp	1000	
F6-05	KI	600	
F7-00	PIMulEnable	0	
F7-01	PI1 Range	5	
F7-02	PI2 Range	0	
F7-04	PI3 Range	0.5	
F7-05	Kp1	1200	
F7-06	Kx1	900	
F7-07	Kp2	1000	
F7-08	Kx2	600	
F7-11	Kp3	600	
F7-12	Kx3	500	
F8-00	Encoder PPR	2048	
F8-02	PG Type	1	
F9-00	Max Torq Comp	0%	
F9-01	SPDSourceSel	2	
F9-03	Spderr Set	5	
F9-11	Load Comp Enable	0	
F9-13	Load Source Sel	0	
F9-19	UP Comp Bias	0	
F9-20	DOWN Comp Bias	0	
F9-21	FULL Comp Pro	100%	
FA-00	StratKP	30	
FA-01	StratKI	750	
FA-04	ZeroKeepKP	180	
FA-05	ZeroKeepKI	550	
FA-08	PLKP	2500	
FA-09	PLTime	900ms	
FA-11	IntegralGain	800	
FA-12	FluxGain	125	
FC-00	Zpulse_Init	0	
FC-07	KpIreg	10000	
FC-08	KxIreg	5000	
FC-13	AutoTuneModeSel	0	
FC-14	N Temp Alarm Ena	1	
FC-15	InitTuneEnable	0	
FC-16	CD DirSel	0	
A0-00	Language Sel	English	
A0-01	User Password	000000	
A0-02	Factory password	000000	
A0-04	Contrast	5	

Appendix 4: Emergency Leveling Function

BL6-U series integrated controller is designed to work with elevator emergency leveling device to offer customers with the most reliable elevator emergency rescue solutions.

F4.1 Emergency Leveling Device Model

Suitable Motor power：

SJT - YU - A: Below 7.5KW
SJT - YU - B： 7.5-15KW
SJT - YU - C： 15-22KW
Series: YU (Note: UPS Control)

F4.2 Emergency Leveling Device Specification

1． Power Supply: AC220V±15%; 50HZ ±10%
2． Power Output: AC220V±10%; 50Hz ±2%
3． Ambient Temperature: 0℃~40℃
4． Relative Humidity: 20~90%NO DEW
5． Leveling Precision: ±15mm
6． Suitable Motor Power: Type A: Below 7.5kW
Type B: 7.5~15KW
Type C: 15 ~22KW
7. Maximum Running Time: ≤2min
8. Cabinet Dimension：SJT-YU-A/B/C：604*247*556 (Only for Reference)
(Note: As UPS shape change from power rating, the emergency leveling device cabinet dimension is also different with power. Please contact supplier for actual cabinet dimension if needed.)

F4.3 Caution

F4-06-22 Set to "ON", emergency power supply should be 380V
Set to "OFF", emergency power supply should be 220V

The effect of F4-06-22 parameter is that when the emergency power supply is 220V, the voltage of DC-bus will drop and cause low voltage fault; when emergency leveling input X18 is enable on integrated controller, the elevator will run in emergency leveling mode. At this time if the parameter is set "OFF", the integrated controller will by-pass such fault and continue the rescue operation.

If emergency power supply is 380V, or UPS output is 380V, please set the parameter to ON. Otherwise when X18 input signal is active, the controller cannot detect the voltage drop on main DC-bus and it cannot start the rescue operation.

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

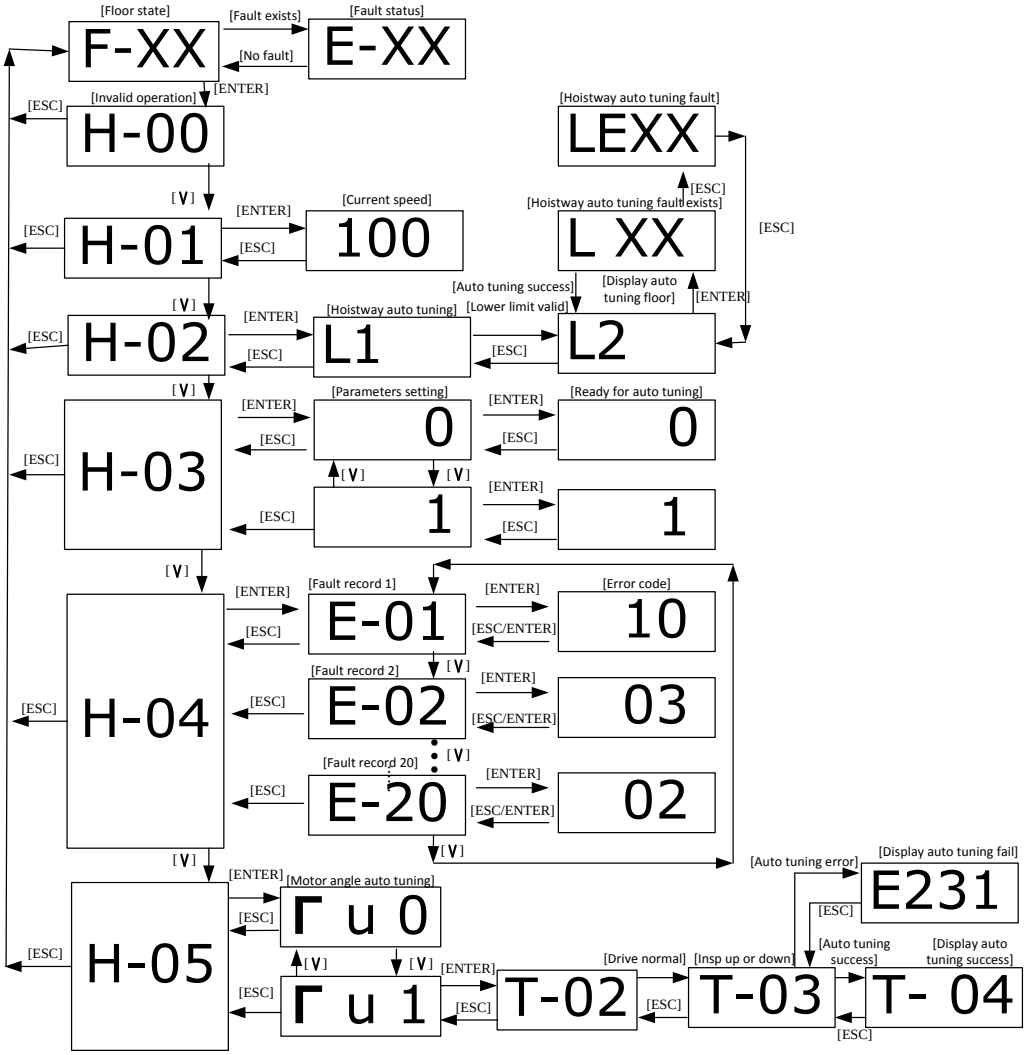


Figure F5.1 Setting flow chart

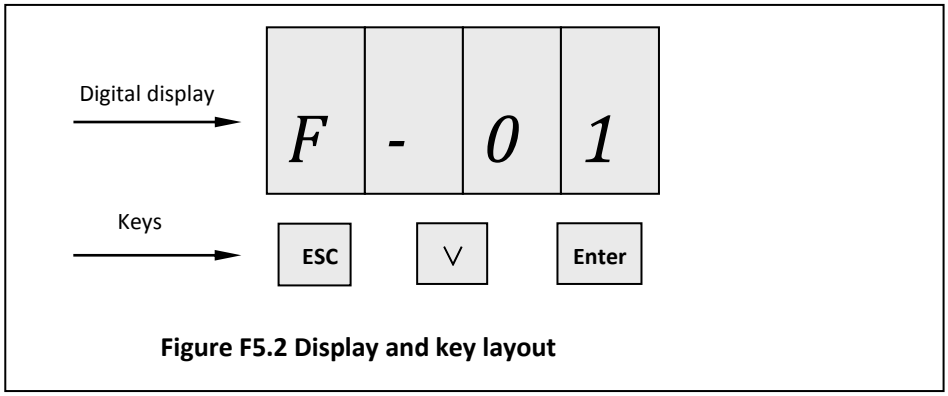


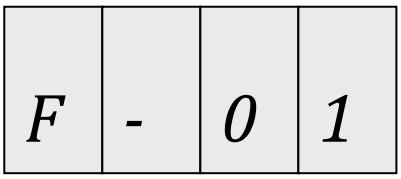
Figure F5.2 Display and key layout

ESC: Cancel/return key;

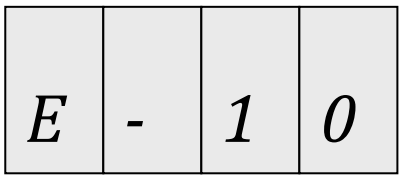
∨: Flip key;

ENTER: OK key;

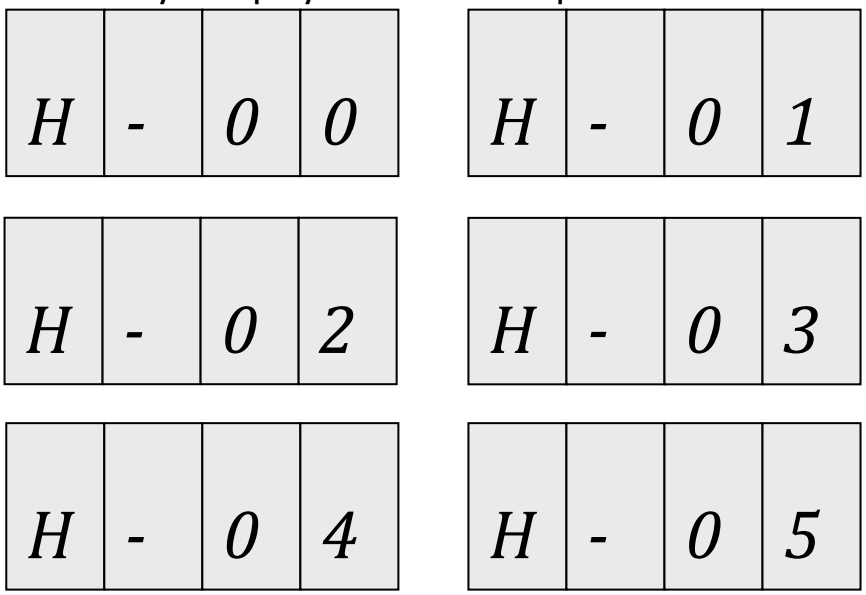
1. **Normally, display current floor F-XX:**



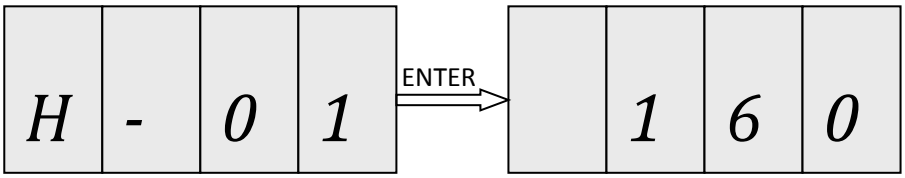
2. **Digital tube flashing display error code when fault occurs.**



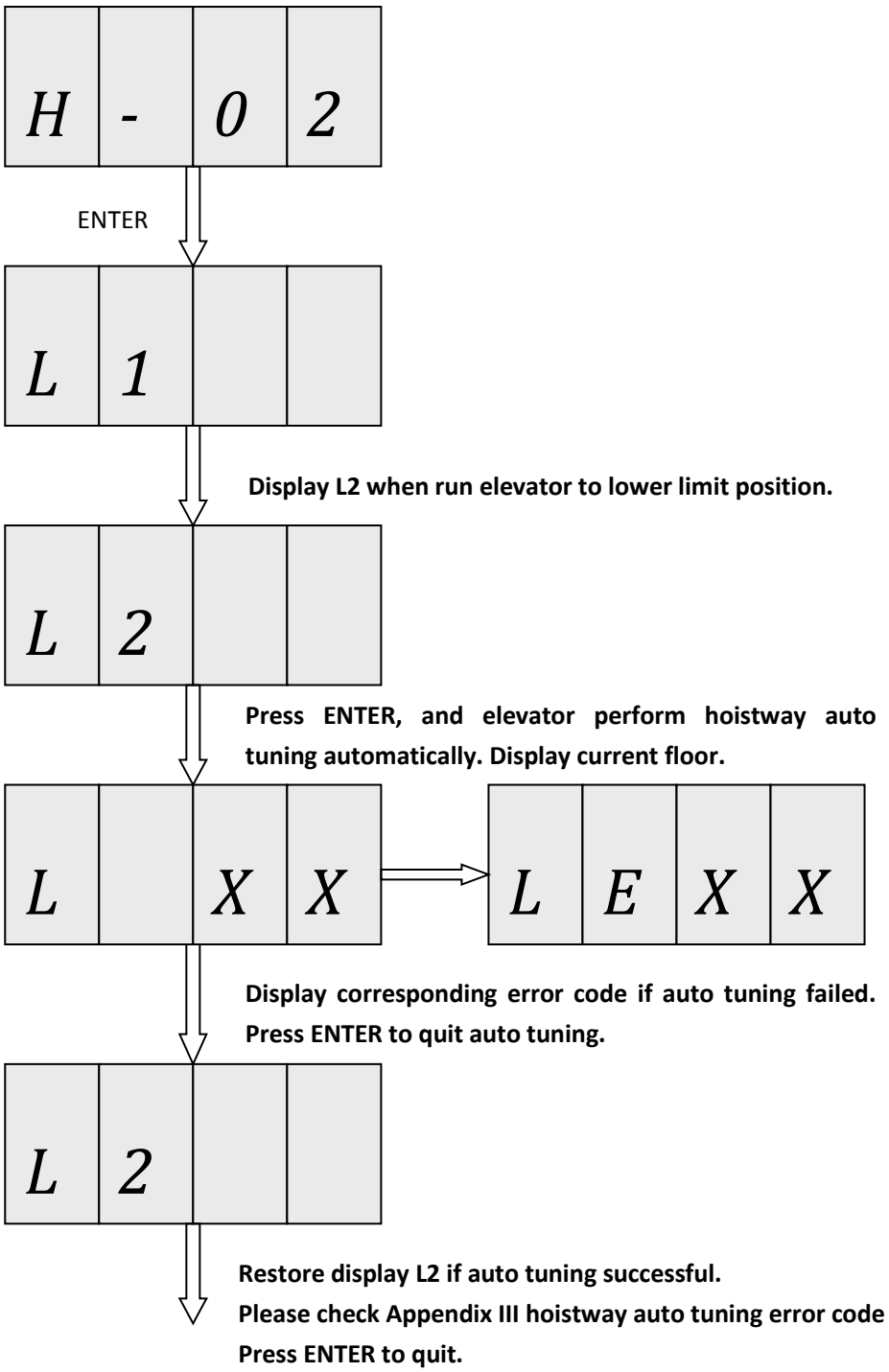
3. **Press ENTER key and Flip key to select H-00~H-07 parameters:**



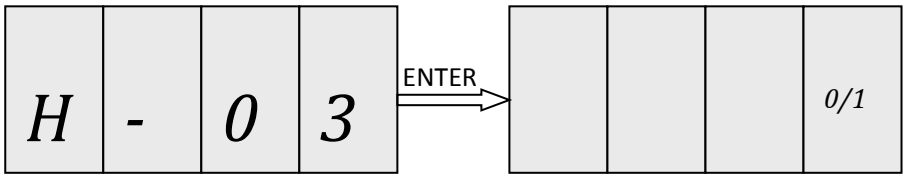
4. **H-00: Invalid parameter;**
5. **H-01: Display current running speed (Unit: cm/s):**



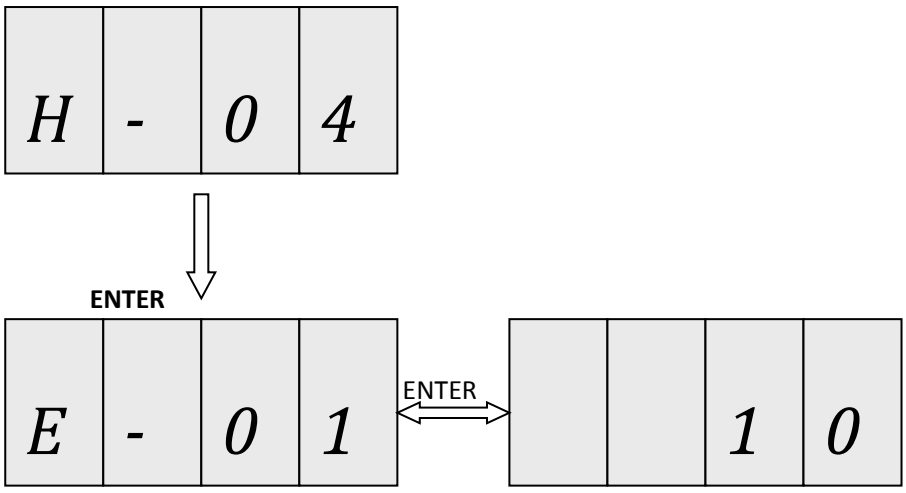
6. **H-02: Hoistway parameter self-learning:**



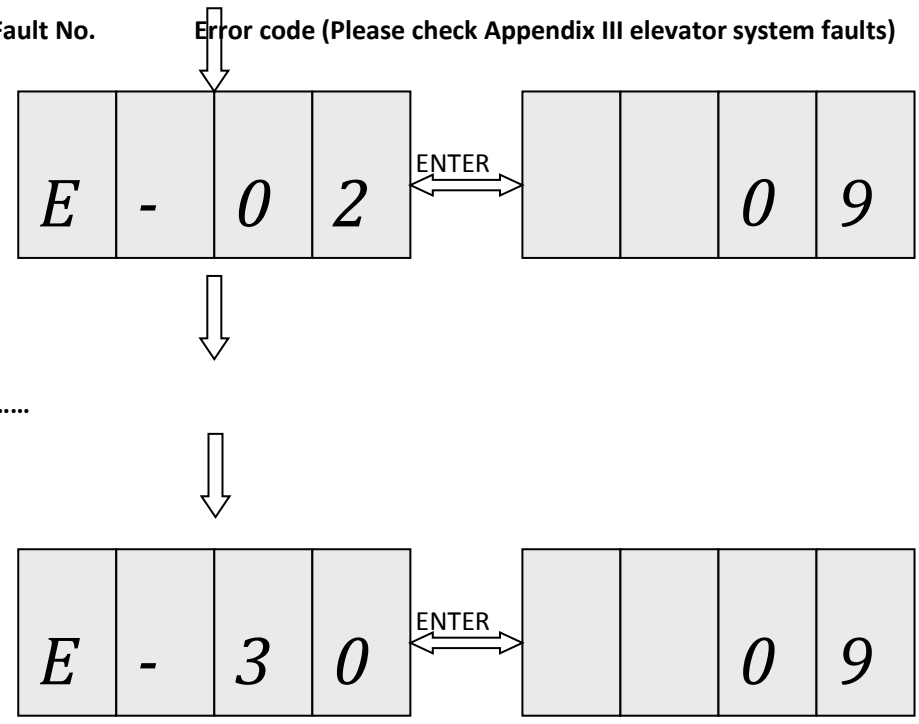
7. **H-03: Parameters setting with hand operator. Set once the parameter when connecting digital operator. (Set this parameter again to support hand operator after main board reset).**



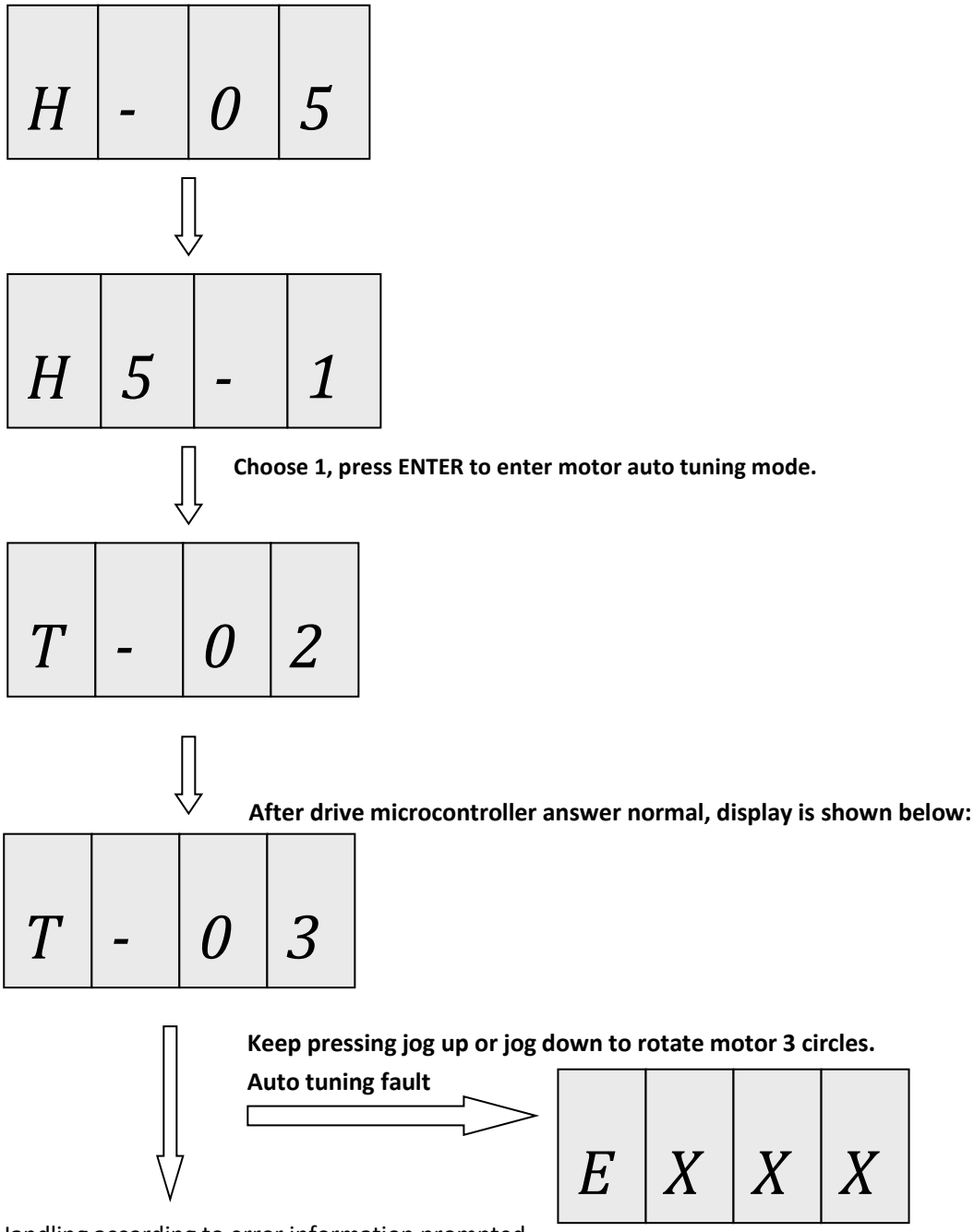
8. **H-04: View 30 fault recodes.**



Fault No. **Error code (Please check Appendix III elevator system faults)**



9. H-05: Motor static angle auto tuning



Auto tuning proceeds gradually.

Press ENTER to quit.