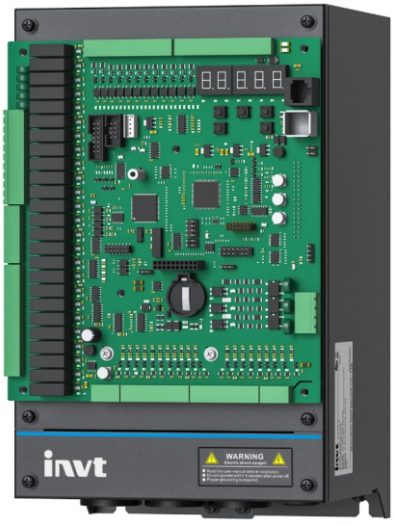
EC90B Elevator Integrated Machine

User Manual



SHENZHEN INVT ELECTRIC CO., LTD.

Preface

Overview

Thank you for choosing the EC90B elevator integrated machine.

EC90B elevator integrated machines are a new generation of intelligent elevator control systems designed based on the concept of integrating drive, control, and network communication technologies. They adopt advanced variable-frequency vector control, intelligent elevator control, and network communication technologies, and organically integrate the drive, control, and management of elevators, improving and optimizing various aspects including safety and reliability, operation simplicity, economy, and personalized design.

This manual introduces the configuration instructions, product specifications, installation and wiring, debugging, and function parameter description of the EC90B elevator integrated machine. To ensure safe and proper use of the product and to maximize its performance, please carefully read the guide before installation.

When you read this manual, please note the following items:

- To illustrate the detailed parts of the product, the icons in this manual are sometimes shown with the cover or safety covering removed. When using the product, ensure that the housing or covering is installed as specified and operate the product according to the requirements of the manual.
- The application wiring diagrams in this manual are for illustration purposes only and may differ from the product you ordered.
- If you need to order a user manual due to damage or loss, consult the local INVT dealer or office.

We provide a comprehensive after-sales and maintenance services. Do not dismantle the machine housing without permission, any alteration or damage to the machine will invalidate the warranty rights and we will not be liable for any consequences arising therefrom.

If you have any questions during the use of the product, consult the local INVT dealer or office.

Readers

- Elevator control designers

- Elevator engineering maintenance personnels
- User technical support professionals

Export inspection

If the product is ultimately used for military affairs or weapon manufacture, comply with the export control regulations in the Foreign Trade Law of the People's Republic of China and complete related formalities.

Change history

The manual is subject to change irregularly without prior notice due to product version upgrades or other reasons.

No.	Change description	Version	Release date
1	First release.	V1.0	March 2026

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1 Safety precautions

1.1 What this chapter contains

Read this manual carefully and follow all safety precautions before moving, installing, operating and servicing the product. Otherwise, equipment damage or physical injury or death may be caused.

We shall not be liable or responsible for any equipment damage or physical injury or death caused due to your or your customers' failure to follow the safety precautions.

1.2 Safety level definition

To ensure personal safety and avoid property damage, you must pay attention to the safety symbols and warnings in the manual.

Symbol	Name	Description
	Danger	Severe personal injury or even death can result if related requirements are not followed.
	Warning	Personal injury or equipment damage can result if related requirements are not followed.
	Electrostatic discharge	The PCBA may be damaged if related requirements are not followed.
	Hot sides	You may get burnt if related requirements are not followed.
Note	Note	Slight personal injury or equipment damage can result if related requirements are not followed.

1.3 Personnel requirements

Trained and qualified professionals: People operating the equipment must have received professional electrical and safety training and obtained the certificates, and must be familiar with all steps and requirements of equipment installing, commissioning, running and maintaining and capable to prevent any emergencies.

1.4 Safety guidelines

General principles	
	• Only trained and qualified professionals are allowed to carry out related operations.

General principles	
	• Do not perform wiring, inspection or component replacement when power supply is applied. Before performing these operations, ensure all the input power supplies have been disconnected, and wait for at least 10 minutes.
	• Do not modify the machine unless authorized; otherwise fire, electric shock or other injury may result. • Prevent the screws, cables and other conductive parts from falling into the machine.
	• The heat sink may become hot when the machine is running. Do not touch. Otherwise, you may get burnt.
	• The electrical parts and components inside the machine are electrostatic sensitive. Take measurements to prevent electrostatic discharge when performing related operations.

Delivery	
	• Select appropriate tools for drive delivery to avoid damage to the machine, and take protective measures like wearing safety shoes and working uniforms to avoid physical injury or death. • Protect the machine against physical shock or vibration. • Do not carry the machine only by its front cover as the cover may fall off.

Installation	
	• Do not install the machine on inflammables. In addition, prevent the machine from contacting or adhering to inflammables. • Do not install the damaged or incomplete machine. • Do not contact the machine with damp objects or body parts. Otherwise, electric shock may result. • The input power cables are only allowed to be permanently fastened, and the equipment must be grounded reliably.
	• Install the product in an environment that meets requirements (see section 3.5 Installation environment for details). • Connect the optional braking parts according to the wiring diagram. • When installing the controller and braking resistor in the same cabinet, set a cooling fan or other cooling device to maintain the intake air temperature below 45°C. Otherwise, fire or other accidents may occur due to overheating.

Commissioning	
	• When the one-click start/stop command is valid, the machine may start automatically. Do not get close to the machine and motor.

Commissioning	
	• Do not switch on or switch off the input power supplies of the machine frequently. • If the machine has been stored without use for a long time, perform capacitor reforming (described in sections 11.1 Periodical inspection and 11.3 Capacitor), inspection and pilot run for the machine before the reuse.

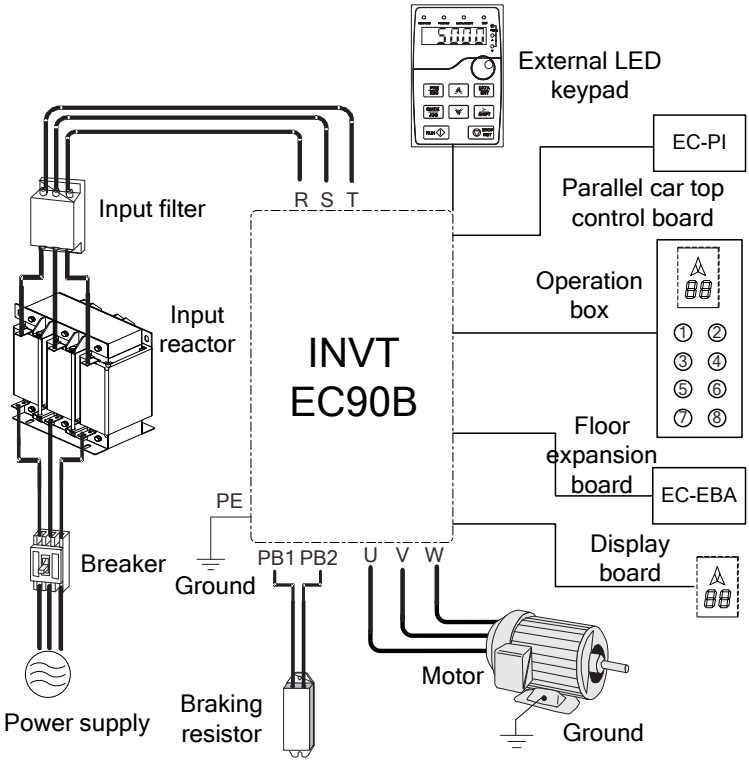
Run	
	• Close the machine front cover before running; otherwise, electric shock may occur. • High voltage presents inside the machine during running. Do not carry out any operation on the machine during running except for keypad setup.

Maintenance	
	• Do not perform machine maintenance or component replacement when the power is on. Otherwise, electric shock may result. • Keep the machine and its parts and components away from combustible materials and ensure they have no combustible materials adhered.
	• During maintenance and component replacement, take proper anti-static measures on the machine and its internal parts.
	• Do not carry out any insulation and voltage withstand test to the machine directly, and do not test the control circuit of the machine by megameter.
Note	• Use proper torque to tighten screws.

Disposal	
	• The components inside the machine contain heavy metals. Dispose of a scrap machine as industrial waste.

2 Configuration instruction

2.1 Hardware configuration table



No.	Product name	Product model	Purpose	Configured quantity	Installation position	Remarks
1	EC90B elevator integrated machine	See section 3.1 Model description	Elevator drive control integrated machine	One for each elevator	Elevator control cabinet	Standard configuration. Select the model according to the motor power and rated current

No.	Product name	Product model	Purpose	Configured quantity	Installation position	Remarks
2	Operation panel	GD300L-LED	Used for the commissioning of elevator controllers	-	Main control board RJ45 interface	Optional
3	Parallel car-top control board	EC-PI	Used to collect elevator car signals in semi-serial mode and control the opening and closing of the door.	One for each elevator	Top of the car	Optional
4	Floor expansion board	EC-EBA	Used for floor expansion	One for each elevator	Elevator control cabinet	Optional, supporting a maximum of 15 floors
5	Elevator door controller	EC30-0R2-S2	Used for door operator control	One for each door motor	Top of the car	Optional

2.2 Standard software functions

No.	Category	Function	Function description	Remarks
1	System functions	Synchronous and asynchronous motor integrated control	EC90B series elevator integrated controller can drive AC asynchronous motor and permanent magnet synchronous motor.	Standard configuration
2		Collective control	When running automatically or with an attendant, the elevator automatically responds to the signals of the Up and Down calling buttons while responding to the in-car commands. Passengers on any floor can call the elevator by registering the Up or	Standard configuration

No.	Category	Function	Function description	Remarks
			Down calling signals.	
3		Built-in pre-weighing compensation	When the synchronous motor adopts two separate adjustment modes, namely speed loop and position loop, no external weighing compensation device is required.	Standard configuration
4		Master autotuning	The synchronous and asynchronous motors adopt static autotuning.	Standard configuration
6		Parallel running	The system is equipped with parallel connection ports, and parallel running can be implemented by connecting a corresponding CAN communication cable. Only one from parallel mode and semi-serial mode can be selected.	Function selection
7		Real-time clock management	The system is equipped with a real-time clock chip, which ensures that the clock can work properly without power supply for a long time.	Standard configuration
8		Keypad	You can set parameters, upload/download parameters, query faults, and monitor status through the LED keypad.	Optional
9	Protection functions	Overload protection	In non-maintenance state, when the car is overloaded, the elevator keeps the door open and the buzzer prompts. Note: The overload switch action is triggered before the door is locked, and the closing elevator door is immediately reversed. After the door is locked, the overload protection is automatically cancelled.	Standard configuration
10		Overspeed protection	This ensures that the running speed of the car is within the safety control range, and thus ensures the safety of passengers and goods.	Standard configuration
11		Protection against phase loss	When detecting an input or output phase loss, the system immediately stops the running of the elevator to protect it.	Standard configuration
12		To-ground short circuit	When powered on, the system can detect the output U, V, and W phases to determine	Standard configuration

No.	Category	Function	Function description	Remarks
		detection	whether a short circuit to ground occurs.	
13		Overheat protection for inverter module	When detecting that the inverter module is overheated, the system immediately stops the running of the elevator to protect it.	Standard configuration
14		Overheat protection for motor	When the input signal point of thermal protection performs an action, the elevator performs leveling at the nearest landing, keeps the door open, and stops running. After the input signal point is reset and the time set through the parameter of thermal protection time elapses, the elevator restores the proper running state.	Standard configuration
15		Door opening protection in non-door zone	The system prevents the elevator from automatically opening the car door when the elevator is in the non-door zone state.	Standard configuration
16		Door-zone switch adhesion protection	When the system detects the door-zone switch adhesion, fast running is disallowed.	Standard configuration
17		Door light curtain protection	When the door is closing and blocked by somebody or something, the light curtain point performs an action and the door is opened.	Standard configuration
18		Floor position Intelligent correction	When accidentally landing on a wrong floor, the elevator automatically runs to the bottom floor for correction.	Standard configuration
19		Encoder feedback detection protection	The system determines the current height and speed of the car through the high-speed counter. If no encoder feedback is obtained during the running, the system automatically stops the elevator to eliminate ceiling-hitting or ground-touching faults that result from the failure to obtain encoder faults.	Standard configuration
20		Reverse running protection	The system identifies elevator car running directions through the high-speed counter. It determines the actual running direction of the car during the running. If the running	Standard configuration

No.	Category	Function	Function description	Remarks
			direction is not consistent with the command, the system automatically stops the car.	
21		Entire-trip running time protection	In the non-inspection state, if the elevator runs continuously for the set entire-trip running time, the system stops the running of the car.	Standard configuration
22		Brake over travel switch feedback detection	The system detects the brake travel switch when the brake is opened or closed. If an exception occurs, the system automatically performs protection.	Standard configuration
23		Running contactor contact detection	The system detects, when the elevator is running and when it stops running, whether the closing and release of the running output contactor is normal. If an exception occurs, the system automatically performs protection.	Standard configuration
24		Brake contactor contact detection	The system detects, when the brake contactor is running and when it stops running, whether the closing and release of the brake contactor is normal. If an exception occurs, the system automatically performs protection.	Standard configuration
25		Door lock contact detection	The system detects, when the elevator gets ready for running or is running, whether the door lock loop is disconnected. If it is disconnected, the system automatically performs protection.	Optional
26		Safety circuit contact detection	The system detects, when supplied with working power, whether the safety loop is disconnected. If it is disconnected, the system automatically performs protection.	Optional
27		Door unlocking protection in running	When detecting the door of the elevator is unlocked during running, the system automatically stops the elevator to protect it, and transmits a door closing signal. The drive immediately locks the IGBT.	Standard configuration
28	Run mode	Maintenance running	This is the operational function used during elevator inspection or commissioning.	Standard configuration

No.	Category	Function	Function description	Remarks
29		Terminal landing inspection speed limit	When the elevator car runs up (down) to the low-speed up (down) forced DEC switch position, the speed switches to low speed of 50 mm/s.	Standard configuration
30		Attendant operation	You can choose the attendant operation by turning on the attendant switch in the control box. In the attendant operation mode, you need to close the door manually. When a hall call is registered, the buzzer in the car sounds and the in-car command indicator corresponding to the hall call blinks to notify the attendant of the call. In addition, the function for the attendant to determine the direction is provided.	Standard configuration
31		Change direction by attendant	In the attendant, bypassing, or independent operation mode, the running direction of the elevator car can be changed by pressing the Up or Down button on the current floor, or by triggering the DS switch in the control box.	Standard configuration
32		Attendant+bypassing	In the attendant operation mode, after the bypassing switch is turned on, hall calls are not responded.	Standard configuration
33		Full-load bypassing	In the non-attendant automatic operation mode, when the car is fully loaded on a floor, the elevator does not respond to hall calls on other floors. In this case, hall calls can still be registered but the door is opened only for the hall calls on this floor. After the full-load signal is reset or there are no in-car commands, the registered hall calls automatically enter the calling state. After the bypassing switch is turned on, hall calls cannot be registered, you need to hold down the Close to close the door, and the attendant can determine the direction.	Standard configuration
34		Light-load anti-nuisance	When the light-load switch is turned on, the system cancels, after running once, all in-car commands if the number of the in-car	Function selection

No.	Category	Function	Function description	Remarks
			commands exceeds the set value.	
35		Independent operation	When the independent operation switch in the car is turned on, the system entered the special-service operation mode. In this case, the elevator does not accept the registration of hall calls, and automatically opens the door when arriving at the specified station. The Close button needs to be held down to close the door, and the function for the attendant to determine the direction is provided.	Function selection
36		Self-leveling operation	If the elevator is in the non-inspection state and does not stop in the leveling zone, it automatically runs to the leveling zone at the speed of returning to the leveling position, and opens the door.	Standard configuration
37		UPS operation function	The system supports two UPS operation modes. The running direction is determined based on the parameters. When the car stops in a non-door zone due to power outage, the UPS operation function is enabled, and the elevator is driven to stop in the leveling zone and open the door.	Function selection
38		Idle return to main landing	In the non-attendant operation mode, the delay for auto main landing return is valid. If no command is received, the elevator automatically returns to the main landing after the set auto return delay elapses. You can set, through the parameter F23.18=32, the elevator to open or close the door and wait for passengers at the main landing.	Function selection
39		Car locking service	In the automatic operation mode, when the car locking switch is turned on (the multi-function input point is defined as 14), all hall call registration is canceled. The elevator still runs properly, it returns to the car locking main landing after implementing all the registered in-car	Standard configuration

No.	Category	Function	Function description	Remarks
			commands, and then stops running, turns on the open button indicator, and turns off the light and fan in the car. When the car locking switch is reset, the elevator starts to run properly again.	
40		Fire evacuation operation	In the automatic operation mode, the elevator immediately cancels all in-car commands and hall calls after receiving a fire alarm signal, runs to the fire protection main landing in the fastest way, and then transmits a fire control linkage signal and keeps the door open. If running reversely, the elevator performs leveling at the nearest landing, stops, keeps the door closed, directly runs to the main landing, and then keeps the door open.	Standard configuration
41		Firefighter service	After receiving a fire alarm signal, the elevator returns to the fire protection main landing. In this case, you can enter the firefighter operation mode in the following two ways: Turn on the firefighter switch in the control box or on the hall to enter the firefighter operation mode. Automatically enter the firefighter operation mode after the set firefighter waiting time elapses. You can select a firefighter operation mode through F23.03, and close the door through the close button for firefighters.	Function selection
42		Earthquake function	When the defined earthquake input point performs an action, the elevator performs leveling at the nearest landing, opens the door, and stops running.	Function selection
43		Test operation	The test operation mode is used for the commissioning or fatigue tests of new elevators. You can set the random run count through the parameter F17.25.	Function selection
44		Car arrival	When the elevator performs leveling and	Function

No.	Category	Function	Function description	Remarks
		chime	enters the door zone, the arrival chime on the car top sounds to notify the passengers both in the car or at the hall that the car is about to arrive.	selection
45		Energy-saving mode	After the door is closed, if the there is no in-car command or hall call command, the in-car light and fan automatically power off after the set idle power conservation delay (F22.02) elapses. If the light curtain performs an action or there is a command response, the in-car light and fan automatically power on again.	Function selection
46	Door operator operation	Door open/close operation during inspection	In the inspection operation mode, if the door lock loop is disconnected, the system sends the Close command when you press the Up/Down button. The elevator can run up/down after the door lock loop is connected. If the elevator stops in the door zone, the system sends the Open command to open the door when you press the Up and Down buttons at the same time.	Standard configuration
47		Repeated door open/close	If the door is not fully closed after closing for 20 seconds, the elevator opens the door. After this process is repeated for 5 times, the door is kept in the closed state. When the door is fully closed but the door lock is disconnected, the door is opened after 10 seconds. After this process is repeated for 5 times, the door is kept in the open state.	Standard configuration
48		Door open time in auto control	In the non-attendant operation mode, the elevator automatically opens the door when arriving a landing. You can set the door open limit delay through the parameter F22.22, which indicates the delay of full door opening.	Function selection
49		Door open delay button	When the door open delay (DOD) button is pressed, the door open limit is reached for the set delay F22.19, and the door can be closed ahead of the delay when you press	Function selection

No.	Category	Function	Function description	Remarks
			the Close button.	
50		Open door by hall call	When stopping on a floor, the car door automatically opens when the hall call button on the floor is pressed. **Note:** If the button is adhered, the floor is registered only once, and then the registration of the floor is invalid until the button is properly reset.	Standard configuration
51		Open door through in-car command	When stopping in the leveling position of a floor, the elevator automatically opens the door when the in-car command button corresponding to the floor is pressed.	Function selection
52		Close door earlier through the Close button	In the automatic operation mode, when the door is open, you can press the Close button to immediately start the Close action to close the door earlier.	Standard configuration
53		Function for keeping door closed	Set the function for keeping the door closed after the door is fully closed according to the type of the door operator.	Function selection
54		Set service landings	Through the door layout parameter group, you can set floors on which the elevator is to stop, whether the elevator opens or closes the door on a floor, and floors on which the elevator is not to stop.	Function selection
55		Front & rear door service	You can set front and rear door service floors through parameters.	Function selection
56		Secondary control box operation	When there is a main control box, secondary control box are optional. A secondary control box is equipped with the same command buttons and the Open and Close buttons. The operating functions of these buttons and the buttons on the main control box are selected according to F23.09.	Function selection
57		Hand sliding door control	The system can realize Indian hand sliding door control by setting parameter F23.01=9.	Function selection
58	Others	LED display	EC90B elevator integrated machine is equipped with standard 5-digit LED display,	Standard configuration

No.	Category	Function	Function description	Remarks
			displaying fault codes and related monitoring information.	
59		Set characters to be displayed	You can set, through parameters, characters (English characters or special symbols supported by the system) to be displayed on each floor.	Function selection
60		Fault historical records	The system can record information about 30 latest faults, including the time a fault occurs, the fault code, and the elevator information when the fault occurs.	Standard configuration
61		Auto reverse floor deregistration	You can deregister the previously registered signals of reverse floors when the elevator arrives at the terminal landing or the running direction changes.	Function selection
62		Leveling adjustment	You can adjust the leveling precision in a unified way by setting the parameter F12.19. In addition, you can fine-tune the leveling on each floor through parameters of F27 and F28 groups.	Standard configuration
63		Ramp elimination of current	In scenarios where permanent-magnet synchronous motors are used, after the elevator decelerates to stop, the holding current of the motor is eliminated in ramp mode to prevent unusual noise in this process. The time for removing the current can be prolonged by setting the parameter F22.09.	Standard configuration
64		Brake forcing	If the brake and brake forcing relays output at the same, the brake forcing relay is closed after the set delay.	Function selection
65		Independent sealed-star control	By configuring multifunction definitions for star-sealing output and feedback, the system ouputs the star-sealing signal first during running, and outputs the running signal after receiving the star-sealing feedback. During stop, if the running contactor is turned off, the star-sealing is deactivated with a delay.	Function selection

2.3 Optional software functions

No.	Function	Function description	Remarks
1	Real-time monitoring through Ethernet	The main control board of EC90B is equipped with an external Ethernet card, which enables the real-time monitoring on the running data of the elevator (sampling at a maximum speed of 0.5 ms).	Function configuration

3 Product introduction

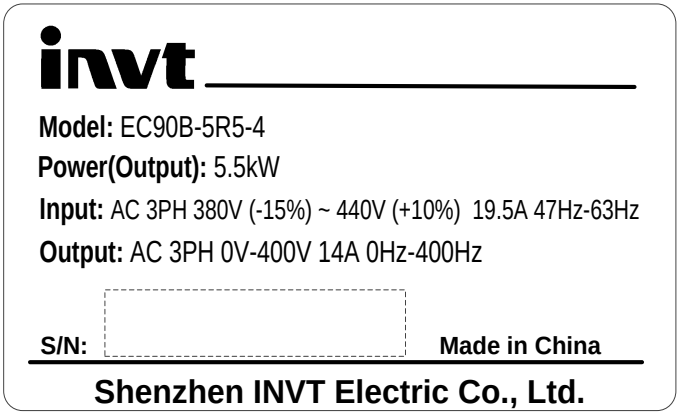
This chapter describes the model, specifications, and performance of the EC90B elevator integrated machines, and the items that need to be confirmed during product arrival and installation.

3.1 Model description

EC90B - 5R5 - 4
① ② ③

Symbol	Description	Specific indication
①	Product series abbreviation	EC: Dedicated to elevators 90: 90 series parallel elevator integrated machine products B: Version B
②	Rated power	5R5: 5.5kW. For details, see section 3.3 Power configuration.
③	Voltage class	4: AC 3PH 380V–440V

3.2 Product nameplate



3.3 Power configuration

Model	Output current	Brake resistor parameter	Recommended brake resistor model	Rated power	Braking unit
EC90B-004-4	9.5A	75–90Ω/1200W	RXG20-1500W80Ω×1	4kW	Built-in
EC90B-5R5-4	14.0A	55–80Ω/1500W	RXG20-1500W80Ω×1	5.5kW	

Note: If you need products of other power levels or voltage classes, which are non-standard products, contact us for customization.

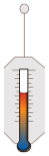
3.4 Technical specifications

Item	Name	Specifications
Input/output characteristics	Input voltage range	AC 3PH 380V (-15%) – 440V (+10%)
	Input frequency range	47Hz–63Hz
	Output voltage range	0–Rated input voltage
	Output frequency range	0–99Hz
Basic characteristics of elevators	Max. number of floors	15 floors
	Max. running speed	1m/s
	Communication mode	One group of CANbus communication port
Characteristics of peripheral ports	Low-voltage digital input port	25 low-voltage digital inputs; DC 24V/4.5–8mA Input high level is valid. Max. frequency: 1kHz; internal impedance: 3.3kΩ
	Analog input port	1 input (AI1) 0–10V or 0–20mA can be selected, resolution: ⩽20mV
	Digital input/output port	20 button inputs/outputs: L1–L20
	High-voltage detection input port	3 110V inputs: DC1–DC3, common point DC-. Unless otherwise specified, 60–120VAC is valid
	Relay output port	25 digital outputs: Y0–Y24, DC30V/5A, AC250V/5A, in which Y0 can be used as emergency operation output, and Y2 can be used as brake output.

Item	Name	Specifications
	CAN communication port	1 communication port
	Encoder port	Sin/Cos, incremental and Endat encoder ports can be extended.
Technical performance characteristics	Control mode	V/F (commissioning mode), SVC (AM), FVC
	Overload capacity	150% of rated current: 60s, 180% of rated current: 10s
	Starting torque	FVC: 0Hz/150%
	Speed control accuracy	FVC: ±0.1% maximum speed
	Carrier frequency	2.0kHz–10.0kHz
Function characteristics	Run mode	Fast running, maintenance, fire control, earthquake, returning to the leveling zone, UPS
	Stop mode	Multi-speed creeping parking
	Starting torque compensation	Adopt two independent adjustment methods: speed loop and position loop (with PG) Achieve smooth start with non-weighing devices
	Motor autotuning mode	The synchronous and asynchronous motors adopt static autotuning.
	Automatic voltage regulation	The output voltage can be kept constant although the grid voltage changes.
	Low voltage speed reduction	Installation mode, when the system detects low input voltage level, it automatically and intelligently reduces the running speed.
Operation and monitoring	Integrated machine keypad	It consists of a 5-digit digital tube, 8 indicators and 5 keys, and can be used for operations including parameter query and parameter setting.
	Handheld keypad	It can be used for operations including parameter query, parameter setting, and parameter uploading and downloading.

3.5 Installation environment and site

3.5.1 Environment requirements

Environment	Requirement	
Temperature		-10°C–+40°C Do not use the controller when the ambient temperature exceeds 40°C. When the ambient temperature exceeds 40°C, derate 1% for every increase of 1°C, and the max temperature cannot exceed 50°C. The temperature does not change rapidly. When the VFD is installed in a closed space, such as control cabinet, use a cooling fan or air conditioner for temperature adjustment if necessary. When the temperature is too low, if you want to use the VFD that has been idled for a long time, install an external heating device before the use to eliminate the freeze inside the VFD. Otherwise, the VFD may be damaged.
Relative humidity (RH)		The relative humidity (RH) of the air is less than 90%, and there is no condensation. The max. RH cannot exceed 60% in the environment where there are corrosive gases.
Altitude		Lower than 2000m When the altitude exceeds 1000m, derate by 1% for every increase of 100m. When the altitude exceeds 3000m, consult our local dealer or office for details.
Vibration		Max. vibration ACC: 5.8m/s^2 (0.6g)

3.5.2 Site requirement

Site	Requirement	
Indoor		Without electromagnetic radiation sources and direct sunlight. **Note:** The controller must be installed in a clean and well-ventilated environment based on the housing IP rating.
		Without foreign objects such as oil mist, metal powder, conductive dust, and water.
		Without radioactive, corrosive, hazard, and combustible and explosive substances.

Site	Requirement	
		Note: Do not install the controller onto combustible objects.
		With low salt content

3.6 Confirmation during product arrival

No.	Item	Confirmation method
1	Whether the delivered product is consistent with the purchased one	Check the "Model" column on the nameplate on the side of the product.
2	Whether the product is damaged	Check whether there is any damage caused by transportation by checking the exterior of the product.
3	Whether the tightening parts such as screws are loose	Check the tightening points. Use screwdrivers to check and tighten the parts if necessary.
4	Open the front cover and check whether the control board is loose	Check the tightening points. Use screwdrivers to check and tighten the parts if necessary.

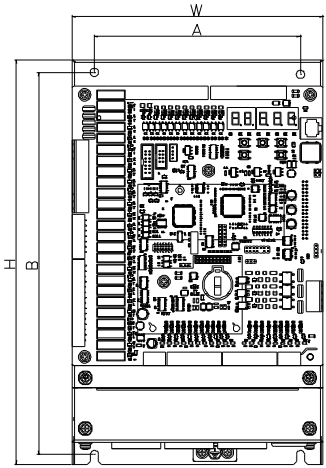
Note: Contact us if any of the defects described in the preceding table are found.

4 Installation and wiring

This chapter describes terminal wiring of the product, including main circuit terminal wiring, control circuit wiring, and PG card wiring.

⚠	• The instructions in this manual must be strictly followed, and the operations must be performed by professional electrical engineers. • Separate the product and power supply with a breaker. • Before wiring, ensure that the input power supply has been completely cut off. • The grounding terminals must be reliable and meet the specification requirements. • Do not touch the terminals of the product directly with your hand. • Do not connect the power supply to the phase U, V, or W. • Do not connect the brake resistor directly to the (+) and (–) terminals of the DC bus.
⚠	• Ensure that the voltage class of the input power supply is consistent with that of the product. • All terminals connected to the product must be reliably tightened. • Prevent anything from dropping into the product during the installation and wiring of the product.

4.1 Outline and installation dimensions



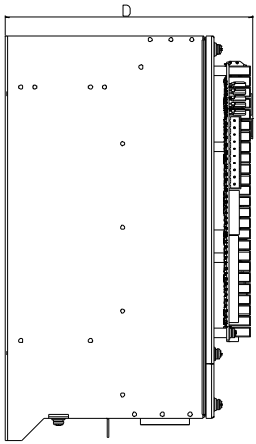


Figure 4—1 Product outline and installation dimensions (unit: mm)

Model	W	H	D	A	B	C hole diameter	Mounting stud
EC90B-004-4	180	290	180	148	274	∅6	M5
EC90B-5R5-4							

Note: To ensure effective heat dissipation, it is recommended that the product be installed 50 mm or more apart from other objects on both the left and right sides, and 100 mm or more apart from other objects on the top and bottom.

4.1.1 Port instruction

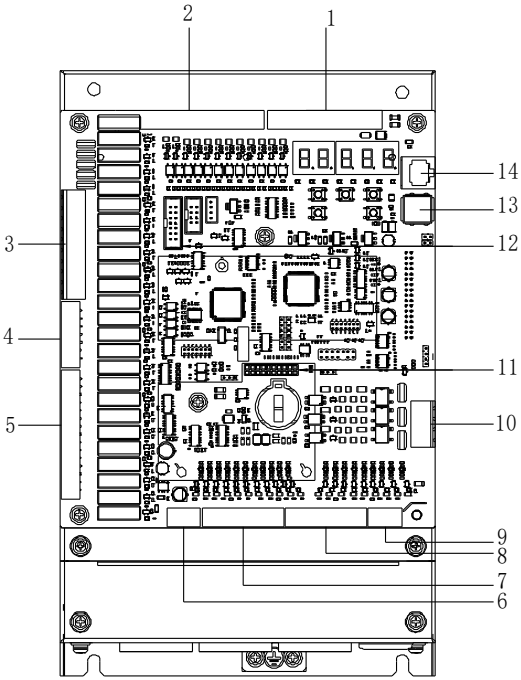


Table 4—2 Port description

No.	Code	Name	Remarks
1–2	CN2/CN10	Elevator peripheral signal interface	Digital input signals X1–X25 and common input terminal
3–5	CN7/CN8/CN9	Relay output interface	Digital output signals Y0–Y24 and output common terminal
6	CN4	Power and CAN	DC 24V input port, CAN communication

No.	Code	Name	Remarks
		communication port	
7–8	CN5/CN6	Composite input and output ports	20 input and output ports
9	CN23	RS485 port, analog value	RS485 internal port (does not support hall calls), analog input
10	CN3	High voltage detection port	Safety circuit, door lock circuit monitoring
11	CN22	PG card interface	Connects to an external encoder PG card
12	CN12	Floor expansion board port	Connects to an external floor expansion board
13	CN11	USB port	Internal port
14	CN13	Ethernet card interface	Connects to an external keypad

4.1.2 Control circuit port description

Table 4－3 Control circuit port description

Plug-in No.	Pin No.	Port definition	Default	LED indicator code	Remarks
CN2	X1	Door zone signal	3	X1	NO input by default
	X2	Running contactor feedback signal	113	X2	NC input by default
	X3	Brake contactor feedback signal	105	X3	NC input by default
	X4	Normal/maintenance signal	109	X4	NC input by default
	X5	Up signal in inspection	10	X5	NO input by default
	X6	Down signal in inspection	11	X6	NO input by default
	X7	Fire control signal	12	X7	NO input by default
	X8	Car locking signal	81	X8	NO input by default
	X9	Up limit signal	115	X9	NC input by default
	X10	Down limit signal	116	X10	NC input by default
	X11	Up forced DEC signal	117	X11	NC input by default
	X12	Down forced DEC signal	118	X12	NC input by default
	X13	Fast running DEC signal	55	X13	NO input by default
CN10	X14	Front door fully open signal	22	X14	NO input by default
	X15	Front door light curtain signal	26	X15	NO input by default
	X16	Attendant signal	28	X16	NO input by default
	X17	Attendant reversing signal	0	X17	NO input by default
	X18	Front door fully close signal	24	X18	NO input by default
	X19	Emergency rescue feedback	0	X19	NO input by default
	X20	Door opening button input	133	X20	NC input by default
	X21	Door closing button input	0	X21	NO input by default
	X22	Delay button input	32	X22	NO input by default
	X23	Full load signal	0	X23	NO input by default
	X24	Overload signal	19	X24	NO input by default
	X25	Overheat protection for motor	0	X25	NO input by default
	24V IN	Input high level is valid, and 24V is used as the common terminal of digital input.			
	24V IN	Input high level is valid, and 24V is used as the common terminal of digital input.			
CN4	24V	External DC24V power input	External DC24V power input terminal		

Plug-in No.	Pin No.	Port definition	Default	LED indicator code	Remarks
	COM				
	CANH	CAN bus differential signal	Only one from parallel and semi-serial communication terminals can be selected		
	CANL				
CN3	DC1	Safety circuit high voltage input detection	-	LED43	Three 110V inputs: Unless otherwise specified, 60–120VAC is valid
	DC2	Front car door lock high voltage monitoring	-	LED44	
	DC3	Rear car door lock high voltage monitoring	-	LED45	
	DC—	High voltage detection input common terminal	-	-	
CN7	Y0	UPS/ARD power switch (recommended)	32	Y0	Relay NO point output 5A, 250VAC
	M0	Y0 common terminal	-	-	
	Y1	Running contactor output	1	Y1	
	M1	Y1 common terminal	-	-	
	Y2	Brake contactor output (recommended)	2	Y2	
	M2	Y2 common terminal	-	-	
	Y3	Car fan output	4	Y3	
	M3	Y3 common terminal	-	-	
	Y4	Car lighting output	0	Y4	
	M4	Y4 common terminal	-	-	
CN8	Y5	Front door open output	6	Y5	Relay NO point output 5A, 250VAC
	Y6	Front door close output	7	Y6	
	M5	Y5—Y6 common terminal	-	-	
	Y7	ARD up signal output	8	Y7	
	Y8	ARD down signal output	9	Y8	
	M6	Y7—Y8 common terminal	-	-	
	Y9	Low bit 7-segment code "a" display output /Binary/BCD code display bit0 output	10	Y9	
	Y10	Low bit 7-segment code "b" display output /Binary/BCD code display bit1	11	Y10	

Plug-in No.	Pin No.	Port definition	Default	LED indicator code	Remarks
		output			
CN9	Y11	Low bit 7-segment code "c" display output /Binary/BCD code display bit2 output	12	Y11	Relay NO point output 5A, 250VAC
	Y12	Low bit 7-segment code "d" display output /Binary/BCD code display bit3 output	13	Y12	
	Y13	Low bit 7-segment code "e" display output /Binary/BCD code display bit4 output	14	Y13	
	Y14	Low bit 7-segment code "f" display output /Binary/BCD code display bit5 output	15	Y14	
	Y15	Low bit 7-segment code "g" display output /Binary/BCD code display bit6 output	16	Y15	
	M7	Y9—Y15 common terminal	-	-	
	Y16	Up arrow display output	17	Y16	
	Y17	Down arrow display output	18	Y17	
	Y18	"-" display output	19	Y18	
	Y19	Output of returning to the fire control main landing	20	Y19	
	Y20	Hand sliding door voice output	55	Y20	
	Y21	Overload signal output	22	Y21	
	Y22	Maintenance signal output	25	Y22	
	Y23	Full load signal output	0	Y23	
	Y24	Arrival chime signal output	0	Y24	
	M8	Y16-Y24 common terminal	-	-	
CN23	AI1	Analog input port positive pole	-	-	Input impedance: 10Ω;

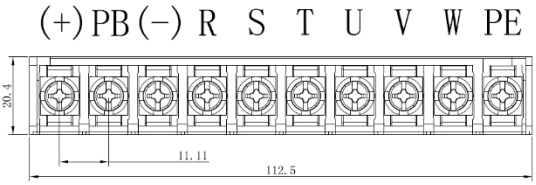
Plug-in No.	Pin No.	Port definition	Default	LED indicator code	Remarks
	GND	Analog input port negative pole	-	-	Voltage range: 0–10V
	485+	RS-485 differential signal	-	-	Internal port
	485-		-	-	Internal port
CN5	L1	1st floor command and light output		L1	Button input and button light output, the output provides 24V to power the button LED indicators. L1-L20 functions can be customized through parameter settings.
	L2	2nd floor command and light output		L2	
	L3	3rd floor command and light output		L3	
	L4	4th floor command and light output		L4	
	L5	5th floor command and light output		L5	
	L6	6th floor command and light output		L6	
	L7	7th floor command and light output		L7	
	L8	1st floor up call command and light output		L8	
	L9	2nd floor up call command and light output		L9	
	L10	2nd floor down call command and light output		L10	
CN6	L11	3rd floor up call command and light output		L11	Button input and button light output, the output provides 24V to power the button LED indicators. L1 — L20 functions can be customized through parameter settings.
	L12	3rd floor down call command and light output		L12	
	L13	4th floor up call command and light output		L13	
	L14	4th floor down call command and light output		L14	
	L15	5th floor up call command and light output		L15	
	L16	5th floor down call command and light output		L16	
	L17	6th floor up call command and light output		L17	
	L18	6th floor down call command and light output		L18	
	L19	7th floor down call command and light output		L19	
	L20	Standby		L20	

Plug-in No.	Pin No.	Port definition	Default	LED indicator code	Remarks
CN22	Encoder PG card connection port				In closed loop mode
CN12	Floor expansion board port				Connects to an external floor expansion board
CN13	Ethernet card interface				Connects to an external keypad

4.2 Main circuit terminal wiring

4.2.1 Main circuit terminal arrangement

Figure 4－1 Main circuit terminals (unit: mm)



4.2.2 Main circuit terminal function description

Terminal	Function description
R, S, T	3PH power input terminals
(+), (-)	DC bus anode and cathode
(+), PB	Brake resistor wiring terminals
U, V, W	3PH AC output terminals
PE,	Grounding terminals

4.2.3 Main circuit lead specifications

System model	Main circuit input side lead (mm^2)	Main circuit output side lead (mm^2)	Grounding cable (mm^2)
EC90B-004-4	4	4	4
EC90B-5R5-4			

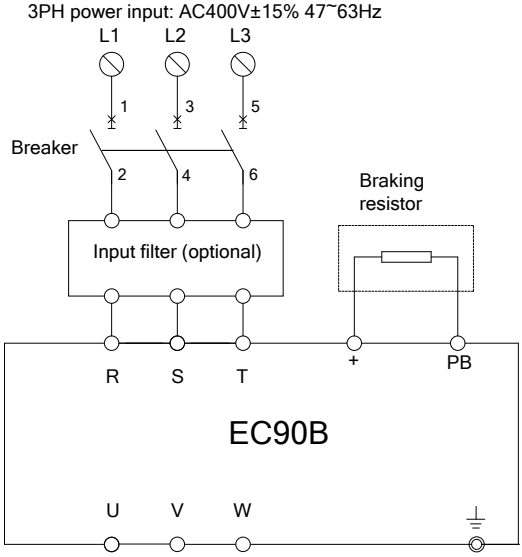
4.2.4 Wiring precautions

Note	• The diagrams provided in this manual are just examples, which may be different from the product you purchase. • Strictly follow the terminal labels during the wiring. Shorten the cables if possible to avoid leakage current that may cause circuit instability. • A standard three-phase five-wire power supply is used, so the grounding terminals must be well grounded. It is recommended that multiple copper cores with a sectional area of larger than 4 mm^2 be used for grounding, and the grounding resistance must be less than 10 Ω. The ground wire must be used exclusively and cannot be shared with other devices. • The circuits on the input and output sides cannot be short circuited or grounded. • The output terminals U, V, and W of the product need to go through the grounded metal tube and be arranged separately from the control circuit signal wires to avoid interference.

4.2.5 Connection of the main circuit integrated machine brake circuit

EC90B elevator integrated machines are equipped with built-in brake units. To release the energy fed back during braking, you need to connect a brake resistor between the (+) and PB terminals. When releasing energy, the brake resistor may get hot. Pay attention to the safety protection and ventilation of the brake resistor when installing it.

Figure 4—2 Brake resistor and brake unit connection diagram

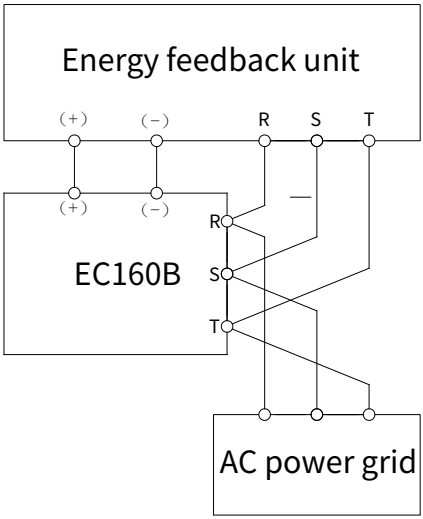


Note: The brake resistor cannot be connected directly between the (+) and (-) terminals. Otherwise, the machine may get damaged or fire may be caused.

4.2.6 RBU series energy feedback unit connection

RBU series energy feedback units can feed the power generated by the motor that is operating in the regenerative braking state back to the grid. The following figure shows the wiring.

Figure 4—3 Energy feedback unit connection diagram



4.2.7 Ground wire connection (PE)

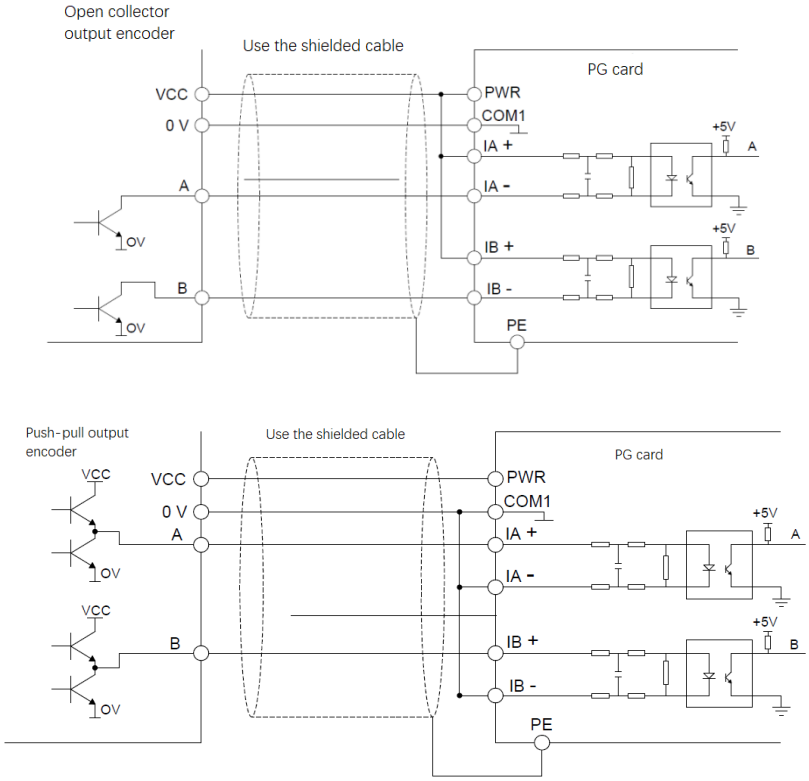
To ensure safety and prevent electric shocks and fire accidents, the grounding terminal PE of the product must be well grounded, and the grounding resistance must be less than 10 Ω. The grounding must be performed in single-point mode, so that the ground wire does not form a loop.

4.3 Encoder wiring

4.3.1 Encoder wiring of asynchronous motors

When an asynchronous motor is used, use a push-pull or open collector output encoder with a power supply of which the power range includes DC 5–30V. The corresponding port is CN22 which connects to external PG cards (EC-PG101-05, EC-PG101-12 and EC-PG101-24), as shown in the following figure.

Figure 4—4 Encoder wiring diagram of asynchronous motors



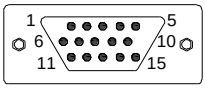
4.3.2 Encoder wiring of synchronous motors

When a synchronous motor is used, use an encoder with a power supply of DC 5V. The encoder interface locates at the control board port CN22 (PG card EC-PG102-05). Encoders include the following two types:

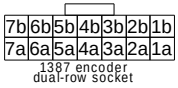
- SIN/COS rotary encoder, such as Heidenhain ERN1387. It is recommended that you use this type of encoders.
- Endat encoder, such as Heidenhain ECN1313 encoder

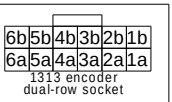
The following figure shows the encoder wiring of a synchronous motor.

Figure4—5 SIN/COS encoder (involving Endat) wiring diagram of synchronous motors



DB15 male connector connects to EC160B





PIN	SIN/COS	UVW	ENDAT	Support EC160B		(PG card is required)	
1	B-	B-	A+	5a	B-	2a	A+(COS+)
2	Empty	Empty	A-			5b	A-(COS-)
3	R+	Z+	B+	4b	R+(Z+)	4a	B+(SIN+)
4	R-	Z-	B-	4a	R-(Z-)	3b	B-(SIN-)
5	A+	A+	Data+	6b	A+	6b	Data+
6	A-	A-	Data-	2a	A-	1a	Data-
7	0V	0V	Empty	3a+5b	0V		
8	B+	B+	Empty	3b	B+		
9	5V	5V	Empty	7a+1b	5V		
10	C-	U-	Empty	1a	C-(SIN-)		
11	C+	U+	Clk+	7b	C+(SIN+)	2b	Clk+
12	D+	V+	Clk-	2b	D+(COS+)	5a	Clk-
13	D-	V-	5V	6a	D-(COS-)	6a+1b	5V
14	Empty	W+	0V			3a+4b	0V
15	Empty	W-	Empty				

Note:

- Use shielded twisted pairs. The shielding layer can be grounded only on one side.
- Keep away from the power cables during wiring, shorten the cables if possible, and ensure that the cables go through the grounded metal tube.

4.4 System installation and wiring

4.4.1 Electrical installation in the hoistway

Install one door zone switch and two speed-changing switches on the top of the car, and the door zone switch and speed-changing switch signals are connected to the input points of the control cabinet main board.

Configure a leveling plate with a length of 200 to 300 mm for each car on each floor. When the car is leveling, the plate is located at the middle position of the leveling switch.

Configure forced DEC switches for elevators with different speeds. Usually for elevators whose running speed is lower than 1.75 m/s, configure SDS1 and SUS1; for those whose running speed ranges from 2.0 m/s to 3.0 m/s, you need to configure two more switches

SDS2 and SUS2 (to avoid high-speed shock, bistable magnetic switches are recommended). The installation position marked in Figure 4-11 refers to the distance between the car and terminal landing leveling zone during valid switch operation.

Install an extreme switch SUFL on the top floor and an extreme switch SDFL on the bottom floor.

Note: When using the soft limit function, there is no need to install up/down limit switches.

4.4.2 Switch installation positions in hoistways

The following table describes the installation distances of the switches. For the switch installation method, refer to Figure 4－6 Switch installation positions in the hoistway. During commissioning, adjust the positions according to the instructions of the keypad.

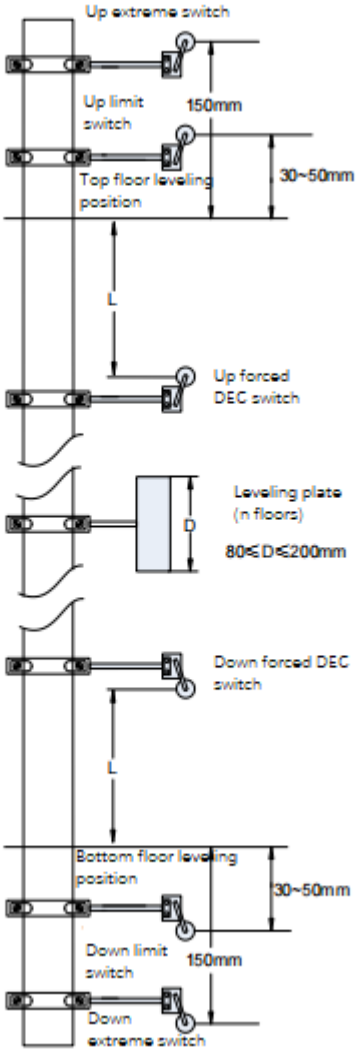
Rated elevator speed	⩽0.4m/s	⩽1.0m/s	⩽1.5m/s	⩽1.75m/s	⩽2.0m/s	⩽2.5m/s	⩽3.0m/s
Low-speed forced DEC distance (level 1)	0.3–0.5m	0.8–1.2m	1.6–1.8m	2.0–2.2m	0.8–1.8m	0.8–1.8m	0.8–1.8m
Medium-speed forced DEC distance (level 2)	-	-	-	-	2.8–3.0m	4.3–4.5m	6.0–6.2m

SDS1: Low-speed down forced DEC switch	SUS1: Low-speed up forced DEC switch
SDS2: Medium-speed down forced DEC switch	SUS2: Medium-speed up forced DEC switch
SDFL: Down extreme switch	SUFL: Up extreme switch

⚠	• When using magnetic switches in the door zone, check whether the insertion depth of the leveling plate reaches the standard line of switch operation. • You can set a leveling switch to NO or NC by modifying the logic settings of the corresponding controller input terminal. • Do not drop any conductive materials, such as metal, into the controller. Otherwise, fire or damage to the controller may be caused.
Note	• The position of the low-speed forced DEC switch needs to enable it to perform actions only when the elevator stops on the terminal landing. In addition, according to the national standard, the actions of the switch must continue after the elevator compresses the buffer. • The preceding table lists the recommended installation positions of forced

	DEC switches for elevators with common speed, which can prevent an elevator, after a landing error occurs, from hitting the ultimate position through emergency deceleration when it runs at the maximum speed to the DEC switch position. The specific installation positions are subject to commissioning and are closely related to the height of the terminal landing floor, the curve of start acceleration stage, and the effective length of the saltando. ● For example, when the saltando for an elevator of 1.75 m/s is not long enough, L1 is changed to 1.2m and L2 to 2.2m (if you choose to install a pair of DEC switches at the position of 1.6m in this state, the software will directly disconnect the safety circuit when the elevator runs at a high speed toward a wrong landing). ● For example, for an elevator of 1.0 m/s, if the bottom floor is 0.7m high, and other floors are 3m high, you need to configure two DEC switches on the bottom floor, where L1=0.3m, and L2=0.8m, and configure one DEC switch on the top floor with L1=0.8m. ● When an elevator accelerates at the rated acceleration to the first DEC switch operation at the speed of V, then the distance L from this switch to the terminal landing leveling line is 0.61×V2+0.2×V.

Figure 4—6 Switch installation positions in the hoistway



4.5 Installation method of speed-changing signal switch

The speed-changing signal switch consists of speed-changing sensor switches and speed-changing plugboards, which is directly connected to the input terminal of the controller. Its function is to make the car stop at each floor efficiently and accurately.

The speed-changing sensor switch is generally installed on the car. By default, EC90B uses one speed-changing detection signal, supports two types of switches (monostable and bistable), and can also support two speed-changing detection signals (the up and down detection signals are not the same). The speed-changing plugboards are installed on the guide rail in the hoistway, with two speed-changing plugboards (or magnets) installed on each floor. Make sure that the length of the plugboard on each floor and the verticality of the installation are consistent.

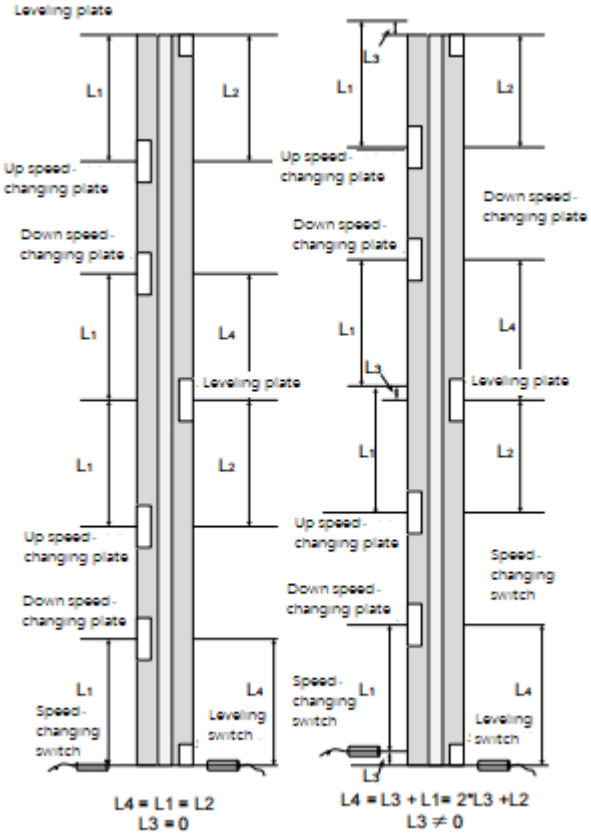
For the EC90B open-loop integrated controller (without encoder), the speed-changing switch is an important signal for the elevator to stop at the specified floor efficiently and accurately. Proper installation of the speed-changing switch signal can enhance running efficiency and prevent issues such as missed floor stops. The EC90B parallel integrated control system features two speed-changing switches on each floor, namely the up speed-changing switch and the down speed-changing switch. The distance between the speed-changing DEC switch and the current leveling plugboard is the speed-changing DEC distance (L1). It is calculated as follows:

$$L1>1/2\times(V1-V2)\times F12\text{-}12 \text{ (deceleration time)}$$

L1 is the speed-changing DEC distance, V1 is the rated elevator speed (F12-05), V2 is the crawling elevator speed, and the fixed value of F12-03 is 0.1m/s. The fixed value of the low-speed crawling speed is 0.1m/s. Based on different rated speeds, the speed-changing DEC distance is calculated as shown in the following table:

Rated elevator speed / Speed-changing distance	**0.3m/s**	**0.4m/s**	**0.5m/s**	**0.63m/s**	**0.75m/s**	**1.0m/s**
Speed-changing DEC distance	0.3–0.4m	0.5–0.6m	0.6–0.8m	0.8–1.0m	0.9–1.2m	1.2–1.5m

Figure 4—7 Installation position diagram of speed-changing switches



4.5.1 Peripheral equipment connection precautions

Equipment	Precautions
Power supply	The power supply voltage must be consistent with the rated voltage of the product. The voltage fluctuation range is less than 7%.
Breaker	You must configure a breaker between the power supply and the input terminal of the product. The capacity of the breaker needs to be 1.5 to 2 times the product rated input current.
AC reactor on the input side	You can configure an optional AC reactor on the input side to improve the power factor of the power supply on the input side and reduce high-order

Equipment	Precautions
	harmonic current.
Interference filter on the input side	You can configure optional special interference filters on the input side to suppress the high-frequency noise interference of the product power cable on the power supply.
Main circuit output contactor	The main circuit output conactor is used to control the current flow of the traction machine. The contacts of the contactor are closed every time when the elevator starts and released when the elevator stops. It is configured between the drive unit and traction motor. It is recommended that you use two contactors. For details, see the electrical schematic diagram we provide.
Interference filter on the output side	You can configure optional special interference filters on the output side to suppress the interference noise and lead leakage current generated on the output side of the product.
AC reactor on the output side	You can configure optional AC reactors on the output side to suppress the radio frequency (RF) interference of the product.

4.5.2 CAN communication wiring

In parallel mode, the hoistway and trailing cables don't contain any wires for communication, and CANL and CANH are only used for parallel connection.

In semi-serial mode, trailing cables contain two wires for communication, and the wires used for in-car command communication are CANL and CANH.

Short circuit cannot be formed between the two cables and other cables. Before power-on, use the multimeter to check whether there is a loop between the four cables and other cables, especially the power cables such as 24V, 36V, 110V, 220V, and 380V.

The switch-mode power supply (SMPS) provides 24V power for all branch points (including the car top controllers, car controllers and car displays in cars, and all call box controllers). The wire diameter is required to be no less than 0.75mm2. When the floor is high (over the 25th floor) or in other scenarios where a large voltage drop is caused in the circuit, you must take measures to reduce the voltage drop to ensure that the voltage of the power provided farthest away from the control cabinet is no lower than 20V.

Twisted pair specifications: Characteristic impedance of 120Ω, allowable range of 108–132Ω

Stranded pitch: ⩽ 30mm

Wire diameter: ⩾0.75 mm^2

If the parallel routing of the communication cable and power cable exceeds 5m, the

distance between the communication cable and power cable must be greater than 30cm, preventing power crosstalk. If the requirement cannot be met due to the routing space, use shielded twisted pairs, with one end connected to the ground.

When grounding the cables in the hoistway and the trailing cables, separate the strong power cables (including the door operator power supply, safety circuit, door lock circuit, lighting circuit, etc.) from weak power cables (including the communication cables, DC 0V, DC 24V, leveling sensor, terminal landing forced DEC switch, terminal landing limit switch, and so on). You must use twisted pairs of which the stranding pitch is less than 30 mm to function as communication cables. Use shielded twisted pairs if possible, and ground the shielding layer.

	• Do not insert or remove the CAN communication plugs (24V, COM, CANH, CANL) when power is applied. Otherwise, permanent damage to the components may be caused. • The improper setting of CAN communication terminal resistors may cause improper communication. • Under normal circumstances, the resistance between CANH and CANL is about 60Ω.
Note	• It is common that the strong and weak power cables are laid in parallel for trailing cables. When adopting the parallel layout mode, you must lay the strong power cables on one side, and the weak ones on the other side, and separate them by ground wires. • CAN communication cables must be twisted pairs with a stranding pitch of less than 30 mm. • CAN communication cables must be routed away from high-voltage cables. A communication power cable, a communication cable, and a high-voltage circuit cannot use the same group of windings. • CAN communication cables cannot be connected to other circuits or ground cables. • CAN communication cables are isolated from the 24V power supply of the product, and they cannot be connected to other loads. • Hall call panels and in-car call panels are open drain collector outputs that are applicable to LED-type loads but not bulb-type loads. If the integrated machine is used for transformation of old elevators and the original button lights are of the bulb type, you must replace the buttons. • For details, see the electric diagram.

4.6 Installation guidelines compliant with EMC regulations

4.6.1 About EMC

EMC is short for electro magnetic compatibility, which refers to the ability of a device or system to function properly in its electromagnetic environment and not constitute an unbearable electromagnetic disturbance to anything in that environment. EMC includes two aspects: electromagnetic interference and electromagnetic immunity.

Electromagnetic interference can be divided into two categories.

- Conducted interference propagates along any conductor. Therefore, any conductor, such as wire, transmission line, inductor, and capacitor, is a transmission channel for conducted interference.
- Radiated interference is in the form of electromagnetic waves that propagate with energy that is inversely proportional to the square of the distance.

Electromagnetic interference must have three elements at the same time: interference source, transmission channel, and sensitive receiver, each of which is indispensable. The solution of EMC problem mainly focuses the three elements. For users, the solution of EMC problem is mainly in transmission channels because the equipment as interference source or receiver cannot be changed.

Different electric and electronic devices have different EMC capacities because of adopting different EMC standards or classes.

4.6.2 EMC characteristics of drives

Like other electrical or electronic devices, a drive is both the EMI source and receiver in a power distribution system. According to working principle of drives, they will inevitably generate some EMI noise. To ensure the proper operation of drives in electromagnetic environments, anti-EMI capabilities must be designed. When a drive works, its EMC characteristics are mainly reflected in the following aspects:

- The input current is generally non-sinusoidal. The current contains rich high-order harmonics. These harmonics may cause EMI to other devices, decrease the power factor of the grid, and increase the line loss.
- The output voltage is high-frequency PWM wave, which may cause the motor temperature to rise; reduce the service life of the motor; increase the leakage current and thereby cause maloperation of the line leakage protection device; and cause strong EMI to other devices, affecting the reliability of other devices in the same system.

- As an electromagnetic receiver, excessively strong interference may cause maloperation of the drive and even damage to the VFD, affecting the normal operation of the VFD.
- In system wiring, interference caused by a drive and its interference immunity are correlated. Reducing the interference caused by the drive also improves the immunity of the drive.

4.6.3 EMC installation guidelines

Taking the EMC characteristics of drives into account, to ensure the reliable operation of the electrical devices in the same system, this section describes the EMC installation method in details in terms of noise suppression, on-site wiring, grounding, leakage current, and usage of power filters to provide guidance for on-site installation. EMC can be well implemented only when you properly deal with these five aspects.

4.6.3.1 Noise control

All the connections to the drive control terminals must use shielded cables. The shield layer of cable must be grounded near the drive entrance. The ground mode is 360-degree loop connection formed by cable clips. Do not twist a shield layer in the braid shape before grounding it. Otherwise, the shield effect may be significantly reduced and even lost.

Use a shielded cable or use an independent routing groove to function as the connection cable between the drive and motor. Connect one end of the motor cable shield layer or the routing groove metal housing to the drive ground in the principle of proximity, and connect the other end to the motor housing. If a noise filter is installed at the same time, electromagnetic noise can be greatly suppressed.

4.6.3.2 Onsite wiring

Power wiring: In different control systems, the power supply incoming cable is independently supplied from the power transformer, usually using a 5-core cable, of which 3 are live wires, 1 is the neutral wire, and 1 is the ground wire. The neutral wire and earth wire cannot be the same wire.

Device categorization: Generally, there are different electrical devices in one control cabinet, such as drive, filter, and detection instrument, which have different ability of emitting and withstanding electromagnetic noise. Therefore, it needs to categorize these devices into strong noise device and noise sensitive device. The same kind of devices needs to be placed in the same area, and the distance between devices in different categories needs to be more than 20cm.

Wiring inside the control cabinet: Generally, there is a signal line (weak power) and power

line (strong power) in the control cabinet. For drives, power cables are divided into incoming power cables and outgoing power cables. A signal cable is susceptible to interference of a power cable and may cause maloperation of the devices. During routing, lay signal cables and power cables in different areas. Do not lay them in parallel with a short distance (less than 20cm) or cross them. Do not bundle them together. If the signal cables have to cross the power cables, they need to be arranged in 90 degree angle. The incoming and outgoing power cables cannot be crossed or bundled together, especially in scenarios where noise filters are configured. Otherwise, the electromagnetic noise may be coupled through the distributed capacitance of the incoming and outgoing cables, thus make the noise filter ineffective.

4.6.3.3 Grounding

The drive must be safely and reliably grounded during operation. Grounding has the priority in all EMC methods because it does not only ensure the safety of equipment and persons, but also it is the simplest, most effective and lowest-cost solution for EMC problems.

Three categories of grounding: special pole grounding, common pole grounding and series-wound grounding. Different control system needs to use special pole grounding, different devices in the same control system needs to use common pole grounding, and different devices connected by the same power cables needs to use series grounding.

4.6.3.4 Leakage current

Leakage current includes line-to-line leakage current and ground leakage current. The magnitude of the leakage current depends on the magnitude of the distributed capacitance and the carrier frequency of the drive configured during system wiring. Ground leakage current refers to the leakage current flowing through the common ground, which not only flows into the drive system but also into the other devices through the ground, and thus cause maloperation of the leakage breaker, relay or other devices. Cable-to-cable leakage current refers to the leakage current flowing through the distributed capacitance between the input and output cables of the drive. The magnitude of the leakage current is related to the carrier frequency of the drive, the length of the motor cable, and the cross-sectional area of the cable. A higher drive carrier frequency requires a longer motor cable, while a larger cable cross-sectional area results a larger leakage current.

Countermeasures: Reduce the carrier frequency can effectively reduce the leakage current. If the motor cable is long (50m or more), configure an AC reactor or sinusoidal filter on the output side of the drive. If the motor cable is longer, configure reactors at certain distance intervals.

4.6.3.5 Noise filter

Noise filters work well in electromagnetic decoupling, and it is recommended you install noise filters even when the operating conditions are met.

There are two types of noise filters:

- Noise filter installed on the input of the drive to isolate the drive from other devices.
- Noise filter or isolation transformer installed on the input side of another device to isolate the device from the drive.

4.6.4 Drive specifications

When the drive and EMI filters are installed following the installation and wiring guide provided in this manual, the following specifications shall be met:
EN61000-6-4: Product electromagnetic interference detection for industrial environments and EN61800-3: Electromagnetic radiation standards (for environments of type 2). The configured EMC filters can meet the EN61000-6-3 electromagnetic radiation standards (for residential environments) and EN61000-6-4 electromagnetic radiation standards (for industrial environments).

5 Commissioning tool instructions

5.1 Overview

EC90B elevator integrated machine can be debugged using the onboard keypad or LED operation panel.

Tool type	Function introduction	Remarks
Main board keypad	Full parameter query and parameter modification for elevator drive and control	Standard configuration on the main board
LED operation panel	Full parameter query and parameter modification for elevator drive and control	Optional part

5.2 Main board keypad description

Figure 5－1 Digital tube

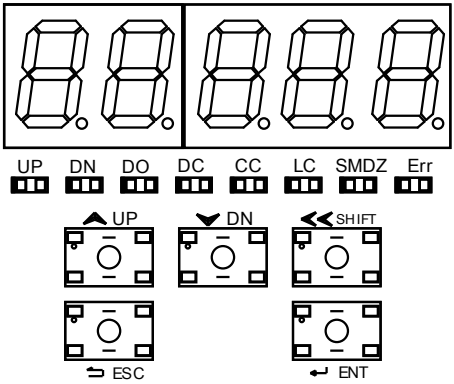


Table 5－1 Key description

No.	Keys	Meaning	Description
1	UP	Increase progressively	Press it to increase data or move upward.
2	DN	Decrease progressively	Press it to decrease data or move downward.
3	SHIFT	Shift left	Press it to select display parameters rightward in the interface for the product in stopped or running state or to select digits to change during parameter setting.
4	ESC	Cancel	Press it to enter or exit level-1 menus.

No.	Keys	Meaning	Description
5	ENT	Enter	Press it to enter the next-level menu page and confirm the setting parameters.

Table 5－2Indicator state description

No.	Indicator	Meaning	Description
1	UP	Elevator upward running indication	It turns on when the elevator runs up.
2	DN	Elevator downward running indication	It turns on when the elevator runs down.
3	DO	Elevator door opening	It is on when the elevator opens the door.
4	DC	Elevator door closing	It is on when the elevator closes the door.
5	CC	Car communication indication	It is on when the communication between EC90B and the car is disconnected.
6	LC	Car locking indication	It is on when the elevator exits the car locking state.
7	SMDZ	Door zone indication	It is on when the elevator enters the door zone.
8	Err	Elevator fault indication	It is on when a fault occurs to the elevator.

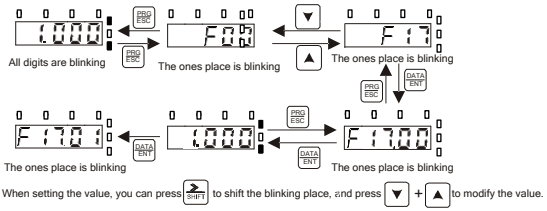
5.2.1 Digital tube display

- When there is no fault at power-on, the floor where the current elevator is located is displayed by default.
- When the elevator is going up or down, the first digital tube indicates the up or down direction.
- When there is a fault in the system, the fault code is directly displayed in the format of E*** (flashing).
- When setting parameters, after the main board key is pressed, the digital tube display content stops flashing for 2 seconds.
- In any case, press the ESC key to exit the menu.

5.2.2 Operation procedure

The system displays the floor where the current elevator is located → Press the ESC key → The main board displays F00, and the menu can be increased or decreased by pressing the ↑ and ↓ keys.

Figure 5－2 EC90B menu diagram



5.2.3 Up and down flip of the level-1 menus

- Main board digital tube display: F00 → Trigger action of UP↑ key → Main board digital tube display: F01 → Trigger action UP↑ key → Main board digital tube display: F02 → Trigger action of UP↑ key → Main board digital tube display: F03... → Trigger action of UP↑ key → Main board digital tube display: F28 → Trigger action of UP↑ key → Main board digital tube display: F29 (Menu can be cyclically scrolled)
- Main board digital tube display: F29 → Trigger action of DN↓ key → Main board digital tube display: F28 → Trigger action of DN↓ key → Main board digital tube display: F27 → Trigger action of DN↓ key → Main board digital tube display: F24... → Trigger action of DN↓ key → Main board digital tube display: F01 → Trigger action of DN↓ key → Main board digital tube display: F00 (Menu can be cyclically scrolled)

5.2.4 Up and down flip of the level-2 menus

- Main board digital tube display: F00 → Trigger action of ENT key → Main board digital tube display: F00.00 → Trigger action of UP↑ key → Main board digital tube display: F00.01 → Trigger action of UP↑ key → F00.02... → Trigger action of UP↑ key → F00.09 → Trigger action of UP↑ key → F00.00 (Small menu can be cyclically scrolled)

  1. Press UP↑ key ⩾2s, the menu is scrolled quickly

2. Press "SHIFT key" to perform the shifting operation

5.2.5 Change of level-3 menu function code

(Take the parameter F00.08 as an example)

- Main board digital tube display: F00.08 → Trigger action of ENT key → Main board digital tube display: 0 → Trigger action of UP↑ key → Main board digital tube display: 1 → Trigger action of UP↑ key → 2 ... → Trigger action of UP↑ key → 65535

1. Press UP↑ key ⩾2s, parameter are scrolled quickly
2. Press DN↓ key ⩾2s, parameter are scrolled quickly
3. Press "SHIFT key" to perform the shifting operation

5.3 Simple description of the operation panel

5.3.1 Keypad function description

Table 5－3Indicator description

Indicator	Name	Description
RUN/TUNE	Status indicator	On: The machine is running. Off: The machine is stopped.
LOCAL/REMOT	-	Local/remote communication connection
FWD/REV	Elevator upward/downward	On: The elevator runs down. Off: The elevator runs up.

Indicator	Name	Description
	running indicator	
TRIP	Fault indicator	On: The machine is in fault state. Off: The machine is in normal state.

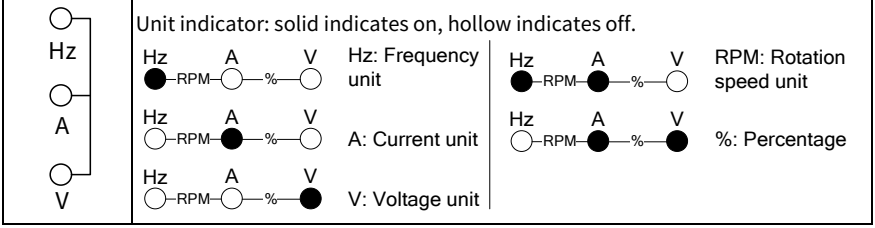


Table 5—4 Key description

Keys	Name	Function
PRG ESC	Programming key	Press it to enter or exit level-1 menus.
DATA ENT	Confirmation key	Press it to enter the next-level menu and confirm the setting parameters.
▲	UP key	Increase progressively
▼	Down key	Press it to decrease data or move downward.
SHIFT	Right-shifting key	Press it to select display parameters rightward in the interface for the machine in stopped or running state. Press it to select digits to change during parameter modification.
RUN	Run key	Press it to start the panel operation when the panel is in the running mode.
STOP RST	Stop/Reset key	Press it to stop the panel operation when the panel is in operation.
QUICK JOG	Multifunction shortcut key	P1 elevator call interface, the upper limit is the total floor. P2 fault record query.

Table 5—5 Press the SHIFT key to switch monitoring content during operation

Current floor	Monitoring content
Running speed	"Hz" + "V" are on
Set speed	"Hz" + "V" flashes
Bus voltage	"V" is on
Output voltage	"V" is on
Output current	"A" is on
Set frequency	"Hz" is on
Running frequency	"Hz" is on
Rotational speed	"Hz" + "A" + "V" are on
Main board input state	Main board input X1–16, consistent with stopping state monitoring
Main board output state	Main board output Y1–Y7, consistent with stopping state monitoring
Manufacturer ID	Elevator hoistway signal and running state

6 Function parameter description

The function parameters of EC90B have been divided into 30 groups from F00 to F29 by function. Each function group contain several function codes. A three-level menu style is applied to present the function groups, function codes, and function parameters. The function group numbers correspond to the level-1 menus, the function codes correspond to the level-2 menus, and the function parameters correspond to the level-3 menus.

1. The function code table contains:

   Column 1 "Function code": Code of the function group and parameter.

   Column 2 "Name": Full name of the function parameter.

   Column 3 "Description": Setting range and description of the function parameter.

   Column 4 "Default": Initial value set in factory.

   Column 5 "Modify": Whether the function parameter can be modified, and conditions for the modification.

   "○" indicates that the value of the parameter can be modified when the drive is in stopped or running state.

   "◎" indicates that the value of the parameter cannot be modified when the drive is in running state.

   "●" indicates that the value of the parameter is detected and recorded, and cannot be modified.

   Note: The drive automatically checks and constrains the modification of parameters, which helps prevent incorrect modifications.

2. The parameters adopt the decimal system (DEC) and hexadecimal system (0–F). If the hexadecimal system is adopted, all bits are mutually independent on data during parameter editing.

3. "Default" indicates that when the default parameter restoring operation is performed, the function code parameters are refreshed and reset to their factory values. However, the actual detected parameter values or recorded values will not be refreshed.

4. To protect parameters better, the drive provides the password protection function.

After entering the operator main menu, press the ENT key to enter the parameter setting menu.

Group number	Name	Group number	Name
F00	Basic functions	F15	Reserved
F01	Start/stop control	F16	Serial communication and CAN communication
F02	Motor parameter group	F17	State viewing
F03	Vector control	F18	Encoder parameters
F04	V/F control parameters	F19	Floor setting parameters
F05	X input terminal parameters of the main control board	F20	Floor display setting parameters
F06	L terminal button input and output parameters of the main control board	F21	Door stopping parameters
F07	Y terminal output parameters of the main control board	F22	Time setting parameters
F08	S terminal input and output parameters of the expansion board	F23	Elevator function setting parameters
F09	T terminal output parameters of the expansion board	F24	Detection function setting parameters
F10	HMI parameters	F25	Reserved
F11	Enhanced function parameters	F26	Reserved
F12	Speed curve setting parameters	F27	Upward leveling fine-tuning parameters
F13	Non-weighing compensation parameters	F28	Downward leveling fine-tuning parameters
F14	Protection parameters	F29	Factory functions

F00 Basic function parameters

Function code	Name	Description	Default	Unit	Modify
F00.00	Speed control mode	0–3 0: SVC 0 , that is, open-loop vector, only applicable to the commissioning mode of asynchronous motor. 1: SVC 1 , that is, open-loop vector, only applicable to the	0	-	◎

Function code	Name	Description	Default	Unit	Modify
		commissioning mode of asynchronous motor. 2: V/F control 3: FVC, namely, closed-loop vector control, which requires the installation of encoder			
F00.01	Rated speed of the lift	0.100–4.000	1.000	m/s	◎
CAUTION	Please enter this parameter according to the elevator nameplate as the reference value of the actual running speed of the elevator.				
F00.02	Reserved	0–65535	1.000	-	◎
F00.03	Running direction	0–2 0: Run at the default direction. 1: Run at the opposite direction. 2: Disable reverse running.	0	-	◎
F00.04	Carrier frequency	0: Fixed carrier frequency. The VFD runs at the carrier frequency set in F00.05. 1: Automatic regulation	0	-	◎
F00.05	Carrier frequency setting	2.0–10.0	8.0	kHz	◎
F00.06	Motor parameter autotuning	Ones place: Motor basic parameter autotuning 0: No operation 1: Dynamic autotuning 2: Complete parameter static autotuning 3: Partial parameter static autotuning 4: Deadzone compensation autotuning Tens place: Initial pole angle autotuning 0: No operation 1: Rotary autotuning 2: Static autotuning 3: Rotary autotuning 2	0	-	◎
F00.07	Reserved	0–65535	0	-	◎

Function code	Name	Description	Default	Unit	Modify
F00.08	Function parameter restoration	0–65535 0: No operation 1: Restore default values (DSP) 2: Clear fault records (DSP) 2222: Restore to default values (MCU) 3333: Clear fault records (MCU)	0	-	◎
F00.09	Channel of running commands	0–8 0: Keypad 1: Terminal	1	-	◎
F00.10	Speed command channel selection	0–9 0: Keypad digital 6: Multi-step speed running 8: Modbus/Modbus TCP communication (Reserved)	6	-	◎
F00.14	Max. output frequency	Max(P00.22, 10.00)–200.00	50.00	Hz	◎
F00.18	User password	0–65535	0	-	◎
F00.22	Upper limit of running frequency	P00.23–P00.14	50.00	Hz	◎
F00.23	Lower limit of running frequency	0.00–P00.22	0.00	Hz	◎

F01 Start/stop control parameters

Function code	Name	Description	Default	Unit	Modify
F01.00	Start mode	0: Direct start (Start from F01.01) 1: Start after DC braking (setting parameters F01.04, F01.05)	1	-	◎
F01.01	Starting frequency of direct start	0.00–50.00(Hz)	0.00	Hz	◎
F01.02	ACC time of start	0.000–0.100(s)	0.010	s	◎
F01.03	Hold time of starting frequency	0.0–50.0(s)	0.0	s	◎
F01.04	Braking current before start	0.0–100.0(%)	30.0	%	◎

Function code	Name	Description	Default	Unit	Modify
F01.05	Braking time before start	0.00–50.00(s)	0.10	s	◎
F01.06	ACC/DEC mode	1: S curve. The output frequency increases or decreases according to the S curve.	1	-	◎
F01.07	Stop mode	0: Decelerate to stop	0	-	○
F01.08	Starting frequency of DC braking for stop	0.00–600.00(Hz)	0.00	Hz	○
F01.09	Demagnetization time	0.00–30.00(s)	0.00	s	○
F01.10	DC braking current for stop	0.0–100.0(%)	50.0	%	○
F01.11	DC braking time for stop	0.00–50.00(s)	0.15	s	○
F01.12	Stop inflection frequency	0.00–10.00(Hz)	1.00	Hz	○
F01.13	Startup delay	0.00–60.00(s)	0.00	s	○
F01.14	Reserved	0–65535	0	-	○
F01.15	Reserved	0–65535	0	-	○

F02 Motor control parameters

Function code	Name	Description	Default	Unit	Modify
CAUTION	Except for the rated power, rated current and rated voltage of the motor, the parameters of group F02 are not restored to factory values.				
F02.00	Motor type	0: Asynchronous motor (AM) 1: Synchronous motor (SM)	0	-	◎
CAUTION	After changing the motor type, the corresponding encoder parameters need to be changed. When the synchronous motor is changed to an asynchronous motor, F02.06–F02.10 are automatically set to the corresponding values based on the rated power of the motor.				
F02.01	Motor rated power	0.1–3000.0(kW)	Model depended	(kW)	◎
F02.02	Motor rated	0.01Hz–400.00(Hz)	Model	Hz	◎

Function code	Name	Description	Default	Unit	Modify
	frequency		depended		
F02.03	Motor rated speed	0.01Hz–400.00(Hz)	Model depended	(rpm)	◎
F02.04	(of the motor rated voltage)	0–1200(V)	Model depended	V	◎
F02.05	(of the motor rated current)	0.8–6000.0(A)	Model depended	A	◎
CAUTION	During the motor autotuning, the above motor nameplate parameters need to be accurately entered. When the rated power of the asynchronous motor is changed, the characteristic parameters from F02.06 to F02.10 of the motor are automatically set to the corresponding values based on the rated power of the motor.				
F02.06	Stator resistance of AM	0.001–65.535(Ω)	Model depended	Ω	○
F02.07	Rotor resistance of AM	0.001–65.535(Ω)	Model depended	Ω	○
F02.08	Leakage inductance of AM	0.1–6553.5(mH)	Model depended	mH	○
F02.09	Mutual inductance of AM	0.1–6553.5(mH)	Model depended	mH	○
F02.10	No-load current of AM	0.1–6553.5(A)	Model depended	A	○
F02.11	Direct-axis inductance of SM	0.01–655.35(mH)	Model depended	mH	○
F02.12	Quadrature-axis inductance of SM	0.01–655.35(mH)	Model depended	mH	○
F02.13	SM counter-emf	0–10000	320	V	○
F02.14	Pulley diameter	100–2000(mm)	500	mm	◎
F02.15	DEC ratio	0.01–10.00	1.00	-	◎
F02.16	Speed ratio	0–65535	1000	-	◎
F02.17	Reserved	0–65535	0	-	◎
CAUTION	After the motor autotuning is completed normally, the above parameters will be automatically updated. These parameters are the benchmark parameters for high-performance vector control, directly affecting the control performance.				
WARNING	Please do not change the above parameters at will. Incorrect parameters may cause damage to the motor.				

F03 Vector control parameters

Function code	Name	Description	Default	Unit	Modify
F03.00	ASR low-speed proportional gain	0–200.0	20.0	-	○
F03.01	ASR low-speed integral time	0.000–10.000	0.600	s	○
F03.02	Low-point frequency for switching	0.00–F03.05(Hz)	5.00	Hz	○
F03.03	ASR high-speed proportional gain	0.0–200.0	20.0	-	○
F03.04	ASR high-speed integral time	0.000–10.000(s)	0.600	s	○
F03.05	High-point frequency for switching	F03.02–F00.04(Hz)	10.00	Hz	○
F03.06	Speed-loop output filter	0–8 (corresponding to 0–2^8/10ms)	0	-	○
CAUTION	The above are the speed loop adjustment parameters in vector control mode. When the low-point frequency for switching (P03.02) is not reached, the speed-loop PI parameters are: P03.00 and P03.01. When the high-point frequency for switching (P03.05) is not reached, the speed-loop PI parameters are: P03.03 and P03.04. PI parameters are obtained according to the linear change of two groups of parameters.				
F03.07	Electromotive slip compensation coefficient of vector control	50–200 (%)	100	%	○
F03.08	Braking slip compensation coefficient of vector control	50–200 (%)	100	%	○
F03.09	Current loop Kp bandwidth	0–2000	200	-	○
F03.10	Current loop Ki bandwidth	0–2000	200	-	○
CAUTION	The above two parameters are current loop PI adjustment parameters. It impacts the dynamic response speed and control accuracy of the system. Depending on				

Function code	Name	Description	Default	Unit	Modify
	different occasions, appropriate adjustment may be required. Improper settings may cause system operation oscillation.				
F03.11	Torque upper limit setting	0.0–200.0 (%)	180.0	%	○
CAUTION	The value 100% corresponds to the rated current of the product. You may need to increase the value when performing load tests.				
F03.12	Emergency running torque upper limit	0.0–200.0 (%)	150.0	%	○
CAUTION	The value 100% corresponds to the rated current of the product. You may need to increase the value when performing load tests.				
F03.13	Weighing input selection	0–1	0	-	◎
F03.14	Weighing compensation input channel	0–2	0	-	◎
F03.15	Pre-torque offset	0.0–100.0	45.0	%	◎
F03.16	Drive-side offset gain	0.000–9.000	2.000	-	◎
F03.17	Brake-side offset gain	0.000–9.000	2.000	-	◎
F03.18	Car weighing analog input filter	0.00–0.50(s)	0.10	s	◎
F03.19	Machine room weighing analog input filter	0.00–0.50(s)	0.10	s	○
F03.20	ASR low-speed gain for stopping	0–100	0	-	○
F03.21	ASR low-speed integral time for stopping	0.00–10.00(s)	0.00	s	○
F03.22	High-speed current-loop proportional coefficient P	0–65535	0	-	○
F03.23	High-speed current-loop integral coefficient I	0–65535	0	-	○
F03.24	Reserved	0–65535	0	-	○
F03.25	Reserved	0–65535	0	-	○

F04 V/F control parameters

Function code	Name	Description	Default	Unit	Modify
F04.00	Torque boost of motor	0.0 (automatic adjustment), 0.1–10.0	0.0	%	○
F04.01	Torque boost cut-off of motor	0.0–50.0 (%)	20.0	%	○
F04.02	Motor V/F slip compensation gain	0.0–200.0 (%)	100.0	%	○
F04.03	Low-frequency oscillation control factor of motor	0–100	10	-	○
F04.04	High-frequency oscillation control factor of motor	0–100	10	-	○
F04.05	Oscillation control threshold of motor	0.00–600.00(Hz)	30.00	Hz	○
F04.06	Energy-saving run	0: Disable 1: Automatic energy-saving run (Reserved)	0	-	◎
F04.07	Reserved	0–3000	50	-	◎
F04.08	Reserved	0–3000	30	-	◎

F05 X terminal input parameters of the main control board

Function code	Name	Description	Default	Unit	Modify	Remarks
F05.00	Reserved	-	-	-	-	-
F05.01	X1 function	Note: If "hundreds" is set to 0, the signal point is set to NO. If "hundreds" is set to 1, the signal point is set to NC. 0/100: No function; 1/101: Reserved; 2/102: Reserved; 3/103: Door zone signal 4/104: Reserved;	3	-	◎	-
F05.02	X2 function		113	-	◎	-
F05.03	X3 function		105	-	◎	-
F05.04	X4 function		109	-	◎	-

Function code	Name	Description	Default	Unit	Modify	Remarks
F05.05	X5 function	5/105: Brake contactor feedback signal; 6/106: Brake travel switch feedback signal 1; 7/107: Reserved; 8/108: Reserved; 9/109: Normal/maintenance signal; 10/110: Maintenance up signal; 11/111: Maintenance down signal 12/112: Fire control signal; 13/113: Running contactor feedback signal; 14/114: Car locking signal; 15/115: Up limit signal; 16/116: Up limit signal; 17/117: Up forced DEC signal; 18/ 118: Down forced DEC signal; 19/119: Overload signal; 20/120: Full load signal; 21/121: Reserved; 22/122: Front door fully open signal; 23/123: Reserved; 22/124: Front door fully close signal; 25/125: Reserved; 26/126: Front door light curtain signal; 27/127: Reserved; 28/128: Attendant signal; 29/129: Bypassing signal; 30/130: Attendant reversing signal; 31/131: Reserved;	10	-	◎	-
F05.06	X6 function		11	-	◎	-
F05.07	X7 function		12	-	◎	-
F05.08	X8 function		81	-	◎	-
F05.09	X9 function		115	-	◎	-
F05.10	X10 function		116	-	◎	-
F05.11	X11 function		117	-	◎	-
F05.12	X12 function		118	-	◎	-
F05.13	X13 function		55	-	◎	-
F05.14	X14 function		22	-	◎	-
F05.15	X15 function		26	-	◎	-
F05.16	X16 function		28	-	◎	-
F05.17	X17 function		0	-	◎	-
F05.18	X18 function		24	-	◎	-
F05.19	X19 function		0	-	◎	-

Function code	Name	Description	Default	Unit	Modify	Remarks
F05.20	X20 function	32/132: UPS feedback point; 33/133: Emergency rescue feedback; 34: Door opening button input; 35: Door closing button input; 36/136: Reserved; 37/137: Reserved; 38/138: Reserved; 39/139: Reserved; 40/140: Motor thermal protection; 41/141: Reserved; 42/142: Reserved; 43/143: Earthquake; 44/144: Reserved; 45/145: Light load signal; 46/146: Star-sealing feedback; 47/147: Reserved; 48/148: Reserved; 49/149: Firefighter input; 50/150: Brake travel switch feedback signal 2; 51/151: Reserved; 52/152: Reserved; 53/153: Up speed-changing signal input; 54/154: Down speed-changing signal input; 55/155: Single speed-changing signal input; 56–79: Reserved; 60/160: Independent running signal; 80/180: Manual door electric lock feedback; 81/181: Car STOP signal;	133	-	◎	-
F05.21	X21 function		0	-	◎	-
F05.22	X22 function		32	-	◎	-
F05.23	X23 function		0	-	◎	-
F05.24	X24 function		19	-	◎	-
F05.25	X25 function		0	-	◎	-

F06 L terminal button input and output parameters of the main control board

Function code	Name	Description	Default	Unit	Modify
F06.00	Reserved	-	0	-	◎
F06.01	L1 multifunction input and output	0–900 7XX: Corresponds to the front door function; 8XX: Corresponds to the rear door function; 701: Door opening button and light output; 702: Door closing button and light output; 703: Delay button and light output; 711: 1st floor command and light output; 712: 2nd floor command and light output; 713: 3rd floor command and light output; 714: 4th floor command and light output; 715: 5th floor command and light output; 716: 6th floor command and light output; 717: 7th floor command and light output; 718: 8th floor command and light output; 719: 9th floor command and light output; 720: 10th floor command and light output; 721: 11th floor command and light output;	701	-	◎
F06.02	L2 multifunction input and output		702	-	◎
F06.03	L3 multifunction input and output		711	-	◎
F06.04	L4 multifunction input and output		712	-	◎
F06.05	L5 multifunction input and output		713	-	◎
F06.06	L6 multifunction input and output		714	-	◎
F06.07	L7 multifunction input and output		715	-	◎
F06.08	L8 multifunction input and output		716	-	◎
F06.09	L9 multifunction input and output		717	-	◎
F06.10	L10 multifunction input and output		0	-	◎
F06.11	L11 multifunction input and output		731	-	◎
F06.12	L12 multifunction input and output		752	-	◎

Function code	Name	Description	Default	Unit	Modify
F06.13	L13 multifunction input and output	722: 12th floor command and light output; 723: 13th floor command and light output; 724: 14th floor command and light output; 725: 15th floor command and light output; 726: 16th floor command and light output; 731: 1st floor up call command and light output; 732: 2nd floor up call command and light output; 733: 3rd floor up call command and light output; 734: 4th floor up call command and light output; 735: 5th floor up call command and light output; 736: 6th floor up call command and light output; 737: 7th floor up call command and light output; 738: 8th floor up call command and light output; 739: 9th floor up call command and light output; 740: 10th floor up call command and light output; 741: 11th floor up call command and light output; 742: 12th floor up call command and light output; 743: 13th floor up call command and light output; 744: 14th floor up call command and light output; 745: 15th floor up call	753	-	◎
F06.14	L14 multifunction input and output		754	-	◎
F06.15	L15 multifunction input and output		755	-	◎
F06.16	L16 multifunction input and output		756	-	◎
F06.17	L17 multifunction input and output		757	-	◎
F06.18	L18 multifunction input and output		758	-	◎
F06.19	L19 multifunction input and output		0	-	◎
F06.20	L20 multifunction input and output		0	-	◎

Function code	Name	Description	Default	Unit	Modify
		command and light output; 752: 2nd floor down call command and light output; 753: 3rd floor down call command and light output; 754: 4th floor down call command and light output; 755: 5th floor down call command and light output; 756: 6th floor down call command and light output; 757: 7th floor down call command and light output; 758: 8th floor down call command and light output; 759: 9th floor down call command and light output; 760: 10th floor down call command and light output; 761: 11th floor down call command and light output; 762: 12th floor down call command and light output; 763: 13th floor down call command and light output; 764: 14th floor down call command and light output; 765: 15th floor down call command and light output; 766: 16th floor down call command and light output; 767: Front door fully open signal; 768: Front door fully close signal; 769: Front door light curtain signal;			
F06.21	EC-PI board input point logical inversion	0–900	0	-	◎

Function code	Name	Description	Default	Unit	Modify
	setting 1 (Note)				
F06.22	EC-PI board input point logical inversion setting 2 (Note)	0–900	0	-	◎
F06.23	EC-PI board input point logical inversion setting 3 (Note)	0–900	0	-	◎
F06.24	Reserved	0–900	0	-	◎
F06.25	Reserved	0–900	0	-	◎

Note: EC-PI board input point logic inversion definitions (1 indicates signal inversion) are shown in the following table.

Binary	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
Decimal	128	64	32	16	8	4	2	1
F06.21	Attendant signal	Bypassing signal	Overload signal	Front door fully open signal	Front door fully close signal	Door opening button and light output (front door)	Door closing button and light output (front door)	Front door light curtain signal
F06.22	Light load signal	Full load signal	Rear door light curtain signal	Attendant reversing signal	Independent running signal	Rear door fully open signal	Rear door fully close signal	Firefighter input
F06.23	Reserved	Rear door close button	Rear door open button	Reserved	Reserved	Reserved	Reserved	In-carSTOP signal

F07 Y terminal output parameters of the main control board

Function code	Name	Description	Default	Unit	Modify
F07.00	Y0 terminal UPS/ARD power switch	**UPS/ARD power switch can only use Y0** 0–5 (Y0 can be selected as 32)	32	-	◎

Function code	Name	Description	Default	Unit	Modify
	(recommended to be fixed to 32)	Y0-Y4 multifunction definition: 00: No function 01: Run contactor output; 02: Brake contactor output 1; 03: Brake contactor output 2; 04: Car lighting control output; 05: Star-sealing output; Y0 terminal multifunction definition; 32: UPS/ARD power switch;			
F07.01	Y1 terminal multifunction definition		1	-	◎
F07.02	Y2 terminal brake contactor output 1 (recommended to be fixed to 2)		2	-	◎
F07.03	Y3 terminal multifunction definition		4	-	◎
F07.04	Y4 terminal multifunction definition		0	-	◎
F07.05	Y5 terminal multifunction definition	6–200 (or 0) Y5-Y24 multifunction definition: 06: Front door open output; 07: Front door close output; 08: Rear door open output; 09: Rear door close output; 10: Low bit 7-segment code "a" display output; 11: Low bit 7-segment code "b" display output; 12: Low bit 7-segment code "c" display output; 13: Low bit 7-segment code "d" display output; 14: Low bit 7-segment code "e" display output; 15: Low bit 7-segment code "f" display output; 16: Low bit 7-segment code "g" display output; 17: Up arrow display output;	6	-	◎
F07.06	Y6 terminal multifunction definition		7	-	◎
F07.07	Y7 terminal multifunction definition		0	-	◎
F07.08	Y8 terminal multifunction definition		0	-	◎
F07.09	Y9 terminal multifunction definition		10	-	◎
F07.10	Y10 terminal multifunction definition		11	-	◎
F07.11	Y11 terminal multifunction definition		12	-	◎

Function code	Name	Description	Default	Unit	Modify
F07.12	Y12 terminal multifunction definition	18: Down arrow display output; 19: "-" display output; 20: Output of returning to the fire control main landing; 21: Buzzer output; 22: Overload signal output; 23: Arrival chime signal output; 24: Full load signal output; 25: Maintenance signal output; 26: Car fan control output; 27: Reserved; 28: Reserved; 29: No fault output; 30: Hall door electric lock output 31: Reserved; 32: Reserved; 33: Reserved; 34: Reserved; 35: Reserved; 36: Up running; 37: Reserved; 38: Reserved; 39: Reserved; 40: Reserved; 41: High bit 7-segment code "a" display output; 42: High bit 7-segment code "b" display output; 43: High bit 7-segment code "c" display output; 44: High bit 7-segment code "d" display output; 45: High bit 7-segment code "e" display output; 46: High bit 7-segment code "f" display output;	13	-	◎
F07.13	Y13 terminal multifunction definition		14	-	◎
F07.14	Y14 terminal multifunction definition		15	-	◎
F07.15	Y15 terminal multifunction definition		16	-	◎
F07.16	Y16 terminal multifunction definition		17	-	◎
F07.17	Y17 terminal multifunction definition		18	-	◎
F07.18	Y18 terminal multifunction definition		19	-	◎
F07.19	Y19 terminal multifunction definition		20	-	◎
F07.20	Y20 terminal multifunction definition		55	-	◎
F07.21	Y21 terminal multifunction definition		22	-	◎
F07.22	Y22 terminal multifunction definition		25	-	◎
F07.23	Y23 terminal multifunction definition		0	-	◎

Function code	Name	Description	Default	Unit	Modify
F07.24	Y24 terminal multifunction definition	47: High bit 7-segment code "g" display output; 48: ARD up signal output; 49: ARD down signal output; 50: Reserved; 51: Reserved; 52: Reserved; 53: Reserved; 54: Reserved; 55: Hand sliding door lock disconnected 50: Attendant 70: Car locking output; 71: Bypass alarm output 72: Maintenance up; 73: Maintenance down;	0	-	◎
F07.25	Reserved	0–200	0	-	◎
F07.26	Reserved	0–200	0	-	◎
F07.27	Reserved	0–200	0	-	◎
F07.28	Reserved	0–200	0	-	◎
F07.29	Reserved	0–200	0	-	◎

F08 S terminal button input and output parameters of the main control board

Function code	Name	Description	Default	Unit	Modify
F08.00	Reserved	0–900	0	-	◎
F08.01	S1 function	0–900 7XX: Corresponds to the front door function; 8XX: Corresponds to the rear door function; 701: Door opening button input; 702: Door closing button input; 703: Delay button input; 711: 1st floor command and light output;	718	-	◎
F08.02	S2 function		719	-	◎
F08.03	S3 function		720	-	◎
F08.04	S4 function		721	-	◎

Function code	Name	Description	Default	Unit	Modify
F08.05	S5 function	712: 2nd floor command and light output; 713: 3rd floor command and light output; 714: 4th floor command and light output; 715: 5th floor command and light output; 716: 6th floor command and light output; 717: 7th floor command and light output; 718: 8th floor command and light output; 719: 9th floor command and light output; 720: 10th floor command and light output; 721: 11th floor command and light output; 722: 12th floor command and light output; 723: 13th floor command and light output; 724: 14th floor command and light output; 725: 15th floor command and light output; 726: 16th floor command and light output; 731: 1st floor up call command and light output; 732: 2nd floor up call command and light output; 733: 3rd floor up call command and light output; 734: 4th floor up call command and light output;	722	-	◎
F08.06	S6 function		723	-	◎
F08.07	S7 function		724	-	◎
F08.08	S8 function		725	-	◎
F08.09	S9 function		737	-	◎
F08.10	S10 function		738		◎
F08.11	S11 function		739		◎
F08.12	S12 function		740		◎
F08.13	S13 function		741	-	◎
F08.14	S14 function		742	-	◎
F08.15	S15 function		743	-	◎
F08.16	S16 function		744	-	◎
F08.17	S17 function		758	-	◎
F08.18	S18 function		759	-	◎
F08.19	S19 function		760	-	◎

Function code	Name	Description	Default	Unit	Modify
F08.20	S20 function	735: 5th floor up call command and light output; 736: 6th floor up call command and light output; 737: 7th floor up call command and light output; 738: 8th floor up call command and light output; 739: 9th floor up call command and light output; 740: 10th floor up call command and light output; 741: 11th floor up call command and light output; 742: 12th floor up call command and light output; 743: 13th floor up call command and light output; 744: 14th floor up call command and light output; 745: 15th floor up call command and light output; 752: 2nd floor down call command and light output; 753: 3rd floor down call command and light output; 754: 4th floor down call command and light output; 755: 5th floor down call command and light output; 756: 6th floor down call command and light output; 757: 7th floor down call command and light output; 758: 8th floor down call command and light output; 759: 9th floor down call command and light output; 760: 10th floor down call	761	-	◎
F08.21	S21 function		762	-	◎
F08.22	S22 function		763	-	◎
F08.23	S23 function		764	-	◎
F08.24	S24 function		765		◎

Function code	Name	Description	Default	Unit	Modify
		command and light output; 761: 11th floor down call command and light output; 762: 12th floor down call command and light output; 763: 13th floor down call command and light output; 764: 14th floor down call command and light output; 765: 15th floor down call command and light output; 766: 16th floor down call command and light output; 767: Front door fully open signal; 768: Front door fully close signal; 769: Front door light curtain signal; 801: Door opening button and light output; 802: Door closing button and light output; 867: Rear door fully open signal; 868: Rear door fully close signal; 869: Rear door light curtain signal; 401: In-car STOP signal (fixed to NO)			
F08.25	Reserved	0–900	0	-	◎
F08.26	Reserved	0–900	0	-	◎

F09 T terminal output parameters of the expansion board

Function code	Name	Description	Default	Unit	Modify
F09.00	Reserved	-	0	-	◎

Function code	Name	Description	Default	Unit	Modify
F09.01	T1 function	0–200 01: Front door open output; 02: Front door close output; 03: Rear door open output; 04: Rear door close output; 05: ARD up signal output; 06: ARD down signal output; 07: Low bit 7-segment code "a" display output; 08: Low bit 7-segment code "b" display output; 09: Low bit 7-segment code "c" display output; 10: Low bit 7-segment code "d" display output; 11: Low bit 7-segment code "e" display output; 12: Low bit 7-segment code "f" display output; 13: Low bit 7-segment code "g" display output; 14: Up arrow display output; 15: Down arrow display output; 16: "-" display output; 17: Output of returning to the fire control main landing; 18: Buzzer output; 19: Overload signal output; 20: Maintenance signal output; 21: Full load signal output; 22: Arrival chime signal output; 23: No fault output; 24: Car locking output; 25: Bypass alarm output 26: Maintenance up;	41	-	◎
F09.02	T2 function		42	-	◎
F09.03	T3 function		43	-	◎
F09.04	T4 function		44	-	◎
F09.05	T5 function		45	-	◎
F09.06	T6 function		46	-	◎
F09.07	T7 function		47	-	◎

Function code	Name	Description	Default	Unit	Modify
		27: Maintenance down; 28: High bit 7-segment code "a" display output; 29: High bit 7-segment code "b" display output; 30: High bit 7-segment code "c" display output; 31: High bit 7-segment code "d" display output; 32: High bit 7-segment code "e" display output; 33: High bit 7-segment code "f" display output; 34: High bit 7-segment code "g" display output;			
F09.08	Reserved	0–200	0	-	◎
F09.09	Reserved	0–200	0	-	◎

F10 HMI parameters

Function code	Name	Description	Default	Unit	Modify
F10.00	Reserved	-	-	-	●
F10.01	X1–X16 input state	0–0xffff; 1 indicates that there is a signal.	0	-	●
F10.02	X17–X25 input state	0–0x01ff ; 1 indicates that there is a signal.	0	-	●
F10.03	S1–S16 input state	0–0xffff; 1 indicates that there is a signal.	0.0	-	●
F10.04	S17-S24 input state	0–0x00ff ; 1 indicates that there is a signal.	0.0	-	●
F10.05	L1–L16 input state	0–0xffff; 1 indicates that there is a signal.	0.0	-	●
F10.06	L17-L20 input state	0–0x000f ; 1 indicates that there is a signal.	0.0	-	●
F10.07	High-voltage input state	0–0x0007 ; 1 indicates that there is a signal.	0.0	-	●

Function code	Name	Description	Default	Unit	Modify
F10.08	Y0–Y15 output state	0–0xffff; 1 indicates that there is a signal.	0.0	-	●
F10.09	Y16–Y24 output state	0–0x001f ; 1 indicates that there is a signal.	0.0	-	●
F10.10	T1–T7 output state	0–0x007f ; 1 indicates that there is a signal.	0.0	-	●
F10.11	L1–L16 output state	0–0xffff; 1 indicates that there is a signal.	0.0	-	●
F10.12	L17–L20 output state	0–0x000f ; 1 indicates that there is a signal.	0.0	-	●
F10.13	Setting of year	-	2010	Year	○
F10.14	Setting of month and date	-	0101	MM.DD	○
F10.15	Setting of hour and minute	-	1200	hh.mm	○
F10.16	Rectifier bridge temperature	-20.0–120.0(℃)	0.0	℃	●
F10.17	Inverter module temperature	-20.0–120.0(℃)	0.0	℃	●
F10.18	Elevator DSP software version	0–655.35	0.0	-	●
F10.19	Elevator MCU software version	0–655.35	0.0	-	●
F10.20	Elevator MCU software small version	0–655.35	0.0	-	●
F10.24	Low bit of running count limit	0–65535	0	-	●
F10.25	High bit of running count limit	0–65535	0	-	●
F10.26	Time running limit	0–65535	0	-	●
F10.28	Manufacturer ID	0–65535	0	-	●
F10.38	Accumulated running time/hours	0–65535h	0	h	●
F10.39	Accumulated running time/minutes	0–60min	0	min	●
F10.42	Multi-step speed S1–S8 output terminal state	0–0xffff ; 1 indicates that there is a signal.	0	-	●

Function code	Name	Description	Default	Unit	Modify
F10.44	S1–S16 input state	0–0xffff ; 1 indicates that there is a signal.	0	-	●
F10.45	S17－S24 input state	0–0x00ff ; 1 indicates that there is a signal.	0	-	●
F10.51	PI board input state 0	0–0xffff ; 1 indicates that there is a signal. Bit0: Attendant Bit1: Bypassing Bit2: Overload Bit3: Front door fully open Bit4: Front door fully close Bit5: Door opening button and light output Bit6: Door closing button and light output Bit7: Front door light curtain Bit8: Light load Bit9: Full load Bit10: Rear door light curtain Bit11: Change direction by attendant Bit12: Independent operation Bit13: Rear door fully open Bit14: Rear door fully close bit15: Firefighter closes the door	0	-	●
F10.52	PI board input state 1	0–0xffff ; 1 indicates that there is a signal. bit0: In-car STOP bit5: Rear door opening button bit6: Rear door closing button	0	-	●
F10.53	Elevator DSP software small version	0–65535	0	-	●
F10.54	Parameter copy	0: No operation 1: Upload parameters to	0	-	●

Function code	Name	Description	Default	Unit	Modify
		keypad 2: Download all parameters (including motor parameters)			

F11 Enhanced function parameters

Function code	Name	Description	Default	Unit	Modify
F11.00	Brake fault action selection	0: Report a fault and stop 1: Stop without reporting a fault	0	-	◎
F11.01	Contactor fault action selection	0: Report a fault and stop 1: Stop without reporting a fault	0	-	◎
F11.02	Braking threshold voltage	200.0–2000.0(V)	700.0	V	○
F11.03	Auto fault reset count	0–10 (IGBT fault and overcurrent fault are not allowed to reset automatically)	5	-	○
F11.04	Fault relay action during auto fault reset	0x00–0x11 LED ones: 0: Act at undervoltage 1: Do not act at undervoltage LED tens: 0: Act during the automatic reset period 1: Do not act during the automatic reset period	0x00	-	○
F11.05	Braking frequency during shutdown	0.01–5.00(Hz)	0.40	Hz	○
F11.06	PWM method	0x0000–0x1221 Ones: PWM mode selection 0: Switch from SVPWM to DPWM overmodulation 1: SPWM overmodulation	0x1121	-	◎

Function code	Name	Description	Default	Unit	Modify
		throughout the entire process Tens: PWM low-speed carrier frequency limit 0: Low-speed carrier frequency limit mode 1 1: Low-speed carrier frequency limit mode 2 2: No limit on low-speed carrier frequency Hundreds: Deadzone compensation selection 0: Compensation method 1 1: Compensation method 2 (only for vector control) 2: Compensation method 3 (only for vector control) Thousands place: SVPWM mode selection 0: SVPWM using three-order harmonic injection method 1: Traditional SPWM			
F11.07	Overmodulation selection	0: Disable 1: Enable	1	-	◎
F11.08	FDT1 electrical level detection value	0.00–600.00(Hz)	0.00	Hz	○
F11.09	FDT1 lagging detection value	0.0–100.0 (%)	5.0	%	○
F11.10	Detection amplitude value for frequency being reached	0.00–600.00(Hz)	0.00	Hz	○
F11.11	Running mode of cooling fan	0: Normal mode 1: Permanent running after power-on 2: Module temperature control mode (In running state: It is enabled when the module temperature is	0	-	○

Function code	Name	Description	Default	Unit	Modify
		greater than 50°C, and disabled when the temperature is less than 45°C. In stopped state: It is enabled when the module temperature is greater than 70°C, and disabled when the temperature is less than 60° C.)			
F11.12	Enable light load direction search	0: Disable 1: Enable auto running 2: Enable to only provide running direction	1	-	◎
F11.13	Light-load direction detection Storage time	0.000–5.000(s)	2.000	s	◎
F11.14	Short floor control enable	0: Disable 1: Enable	0	-	◎
F11.15	Short floor speed setting	0.0–90.0 (%)	00.0	%	◎
F11.16	Reserved	-	0	-	○
F11.17	Reserved	-	0	-	○
F11.19	Temperature point of auto carrier frequency reduction	40.0–85.0(℃)	70.0	℃	○
F11.20	Carrier frequency reduction interval	0–30(min)	10	min	○
F11.21	AM open-loop start brake release frequency	0.00–5.00(Hz)	0.00	Hz	○

F12 Speed curve setting parameters

Function code	Name	Description	Default	Unit	Modify
F12.00	Speed at maintenance	0–0.630(m/s)	0.200	m/s	◎
F12.01	UPS running	0–0.300(m/s)	0.080	m/s	◎

Function code	Name	Description	Default	Unit	Modify
	speed/leveling returning speed				
F12.02	Keypad speed	0–1.000(m/s)	1.000	m/s	◎
F12.03	Crawling speed	0–0.100(m/s)	0.050	m/s	◎
F12.04	Creeping leveling speed	0–0.200(m/s)	0.030	m/s	◎
F12.05	Maximum elevator speed	0–1.000(m/s)	0.800	m/s	◎
F12.06	Second speed segment	0–F00.02	0.080	-	◎
F12.07	S-curve ACC start segment duration	0.1–360.0(s)	2.0	s	◎
F12.08	S-curve ACC end segment duration	0.1–360.0(s)	2.0	s	◎
F12.09	ACC time	0.1–360.0(s)	2.0	s	◎
F12.10	S-curve DEC start segment duration	0.1–360.0(s)	2.0	s	◎
F12.11	S-curve DEC end segment duration	0.1–360.0(s)	2.0	s	◎
F12.12	DEC time	0.1–360.0(s)	2.0	s	◎
F12.13	S-curve start segment duration during stop	0.1–360.0(s)	2.0	s	◎
F12.14	S-curve end segment duration during stop	0.1–360.0(s)	2.0	s	◎
F12.15	ACC/DEC time at maintenance	0.1–360.0(s)	4.0	s	◎
F12.16	Forced DEC time	0.1–360.0(s)	2.0	s	◎
F12.17	Emergency ACC/DEC time	0.1–360.0(s)	10.0	s	◎
F12.18	Door zone range	40–400	200	mm	◎
F12.19	Leveling accuracy time	0–1000ms	500	ms	◎
F12.20	DEC time for creeping to stop	0.1–360.0	2.0	s	○
F12.21	Speed threshold for light-load detection in open-loop control	0.50–20.00(Hz)	2.00	Hz	○
F12.26	UPS upward stopping leveling accuracy compensation	0–2000 (ms)	1500	ms	◎
F12.27	UPS downward stopping leveling accuracy	0–2000 (ms)	1500	ms	◎

Function code	Name	Description	Default	Unit	Modify
	compensation				
F12.29	Emergency running speed	0.001–1.000(m/s)	0.100	m/s	◎

F13 Non-weighing compensation parameters

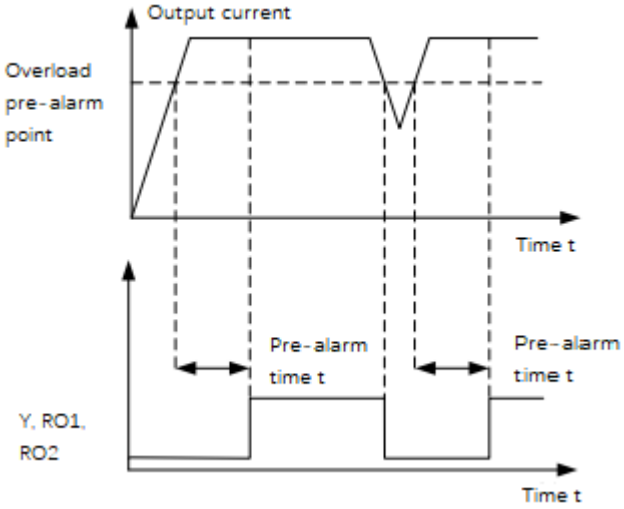
Function code	Name	Description	Default	Unit	Modify
F13.00	Non-weighing compensation enable	0: Disable 1: Enable	0	-	◎
F13.01	Load compensation time	0.000–5.000(s)	0.400	s	◎
F13.02	Load compensation reduction time	0.000–5.000(s)	0.100	s	◎
F13.03	Load compensation ASR gain	0–100.0	25.0	-	◎
F13.04	Load compensation ASR integral time	0.001–10.000(s)	0.160	s	◎
F13.05	Load compensation current coefficient KP	-1000–2000	500	-	○
F13.06	Load compensation current coefficient KI	-1000–2000	0	-	○
F13.07	Position loop APR gain	0–100.0	0.0	-	○
F13.08	Position loop APR differential time	0.001–10.000(s)	0.001	s	○
F13.09	Current loop filter coefficient	0x0000–0xFFFF Bit0–2: Current command filter times (compensation completion stage) Bit3–5: Current command filter times (compensation stage) Bit6: Speed measurement switching (0: Subdivision; 1: Observer) Bit7-8: Current sampling filter times Bit14: Enable temperature carrier frequency reduction (0:	0	-	○

Function code	Name	Description	Default	Unit	Modify
		Enable 1: Disable) Bit2–15: Reserved			
F13.10	Reserved	0–65535	0	-	◎
F13.11	Reserved	0–65535	0	-	◎

F14 Protection parameters

Function code	Name	Description	Default	Unit	Modify
F14.00	Protection against phase loss	0x000–0x111 LED ones: 0: Disable protection against input phase loss 1: Enable protection against input phase loss LED tens: 0: Disable protection against output phase loss 1: Enable output phase loss protection LED hundreds: 0: Disable hardware input phase loss protection 1: Hardware input phase loss protection enabled	0x011	-	○
F14.01	Frequency drop at transient power-off	0: Disable 1: Enable	0	-	○
F14.02	Frequency decrease ratio at sudden power down	0.00Hz/s–600.0(Hz/s)	10.00	Hz/s	○
F14.03	Overvoltage stalling protection	0: Disable 1: Enable	0	-	○
F14.04	Overvoltage stalling protection voltage	120–150% (standard bus voltage) (380V)	136%	%	○
F14.05	Current limit action selection	0x00–0x11 Ones: Current limit action selection 0: Invalid 1: Always valid	0	-	◎

Function code	Name	Description	Default	Unit	Modify
		Tens place: Hardware current limit overload alarm 0: Valid			
F14.06	Automatic current limit threshold	50.0–200.0 (%)	160.0	%	◎
F14.07	Frequency decrease ratio in current limiting	0.00–50.00(Hz/s)	10.00	Hz/s	◎
F14.08	VFD/motor OL pre-alarm selection	0x000–0x131 Ones: 0: Motor OL/UL pre-alarm, relative to the motor rated current. 1: VFD OL/UL pre-alarm, relative to the VFD rated current Tens: 0: The VFD continues to work for an OL/UL alarm 1: The VFD continues to work for a UL alarm but stops running for an OL fault 2: The VFD continues to work for an OL alarm but stops running for a UL fault 3. The VFD stops running for an OL/UL alarm Hundreds: 0: Always detect 1: Detect during constant speed running.	0x000	-	○
F14.09	Overload pre-alarm detection threshold	100%–200% (Relative value determined by the ones of P11.08)	Type G: 150%	%	○
F14.10	Overload pre-alarm detection time	0.1–3600.0(s)	1.0	s	○

Function code	Name	Description	Default	Unit	Modify
	If the VFD or motor output current is larger than the overload pre-alarm detection threshold (F14.09), and the duration exceeds the overload pre-alarm detection time (F14.10), overload pre-alarm signal will be output. 				
F14.11	Motor overload selection	0: No protection 1: Common motor 2: Variable-frequency motor	2	-	◎
F14.12	Overload protection coefficient of motor	20.0%–150.0	100.0	%	○
F14.13	Speed deviation detection value	0.0–50.0	10.0	%	○
F14.14	Speed deviation detection time	0.0–10.0	2.0	s	○
F14.15	Emergency running undervoltage point	0.0–1000.0	30.0	V	○
F14.16	No "enable" signal action selection during operation	0–1	0	-	◎
F14.17	"Enable" signal delay detection time	0–10.0	3.0	s	○

F15 Reserved

F16 Serial communication and CAN communication

Function code	Name	Description	Default	Unit	Modify
F16.00	Local communication address	1–247	1	-	○
F16.01	Communication baud rate	0: 1200bps 1: 2400bps 2: 4800BPS 3: 9600bps 4: 19200bps 5: 38400bps 6: 57600bps 7: 115200BPS	4	-	○
CAUTION	The baud rate set on the upper computer must be consistent with that set on the product. A greater baud rate indicates faster communication.				
F16.02	Data bit check	0: No check (N, 8, 1) for RTU 1: Even check (E, 8, 1) for RTU 2: Odd check (O, 8, 1) for RTU 3: No check (N, 8, 2) for RTU 4: Even check (E, 8, 2) for RTU 5: Odd check (O, 8, 2) for RTU	1	-	○
F16.03	Communication response delay	0–200ms	5	ms	○
CAUTION	Used to indicate the communication response delay, that is, the interval from when the product completes receiving data to when it sends response data to the upper computer. If the response delay is shorter than the rectifier processing time, the rectifier sends response data to the host controller after processing data. If the delay is longer than the rectifier processing time, the rectifier does not send response data to the host controller until the delay is reached although data has been processed.				
F16.04	Communication timeout time	0.0 (invalid), 0–60.0(s)	0.0	s	○
CAUTION	When the function code is set to 0.0, the communication timeout time is invalid. When the function code is set a non-zero value, the rectifier reports the "485				

Function code	Name	Description	Default	Unit	Modify
	communication fault" (E_485) if the communication interval exceeds the value. In general, the function code is set to 0.0. When continuous communication is required, you can set the function code to monitor communication status.				
F16.05	Transmission error processing	0: Report an alarm and coast to stop 1: Keep running without reporting an alarm 2: Stop in enabled stop mode without reporting an alarm (applicable only to communication mode) 3: Stop in enabled stop mode without reporting an alarm (applicable to any mode)	0	-	○
F16.06	Communication processing action	0x00–0x11 LED ones: 0: Respond to write operations. The VFD responds to both read and write commands from the upper computer. 1: Not respond to write operations. The VFD does not respond to the write commands, but responds only to the read commands from the upper computer. This setting can improve the communication efficiency. LED tens: 0: Disable 1: Enable	0x00	-	○
F16.07	Reserved	-	0	-	○
F16.08	Reserved	-	0	-	○

F17 State viewing parameters

Function code	Name	Description	Default	Unit	Modify
F17.00	Set frequency	0.00–600.00(Hz)	0.00	Hz	●
F17.01	Output frequency	0.00–600.00(Hz)	0.00	Hz	●
F17.02	Ramp reference frequency	0.00–600.00(Hz)	0.00	Hz	●
F17.03	Output voltage	0–1200(V)	0	V	●
F17.04	Output current	0.0–5000.0(A)	0.0	A	●
F17.05	Motor rotation speed	0.0–5000.0(A)	0	(rpm)	●
F17.06	Torque current	-3000.0–3000.0(A)	0.0	A	●
F17.07	Exciting current	-3000.0–3000.0(A)	0.0	A	●
F17.08	Motor power	-300.0–300.0 (%)	0.0	%	●
F17.09	Motor output torque	-250.0–250.0 (%)	0.0	%	●
F17.10	Estimated motor frequency	0.00–600.00(Hz)	0.00	Hz	●
F17.11	DC bus voltage	0.0–2000.0(V)	0.0	V	●
F17.12	AI1 input voltage	0.00–10.00(V)	0.00	V	●
F17.13	ASR controller output	-300.0–300.0 (%)	0.0	%	●
F17.14	Actual frequency of encoder	-3276.8–3276.7(Hz)	0.0	Hz	●
F17.15	Encoder pulse count	0–65535	0	-	●
F17.16	Encoder Z pulse count value	0–65535	0	-	●
F17.17	Magnetic pole position angle	0–359.99	0.00	-	●
F17.18	Initial magnetic pole position angle	0–359.99	0.00	-	●
F17.19	Encoder C-phase AD value	0–4095	0	-	●
F17.20	Encoder D-phase AD value	0–4095	0	-	●
F17.21	Function code in function parameter upload/download error	0.00–29.00	0	-	●

Function code	Name	Description	Default	Unit	Modify
F17.22	Reserved	0–65535	0	-	●
F17.23	Reserved	0–64	0	-	●
F17.24	Reserved	0–65	0	-	●
F17.25	Random running times	0–5000	0	-	●
F17.42	Running limit setting	0	0	-	○
F17.43	UPS running procedures	0–65535	0	-	●
F17.44	Energy-saving running state	0–65535	0	-	●
F17.45	Light-load direction detection result	0–0xffff Bit0: Light-load direction detection completed Bit1: Down as the light-load direction detection result Bit2: Up as the light-load direction detection result	0	-	●
F17.46	Monitor the operation steps of the elevator (ID)	0–65535	0	-	●
F17.47	Drive running procedures	0–65535	0	-	●

F18 Encoder parameters

Function code	Name	Description	Default	Unit	Modify
F18.00	Encoder type selection	0–6 0: Incremental encoder 1: Resolver encoder 2: Sin/Cos encoder 3: EnDat absolute encoder 4: SSI absolute encoder 5: ABZUVW encoder 6: Sin/Cos encoder with CD signals	0	-	◎

Function code	Name	Description	Default	Unit	Modify
CAUTION	When using closed-loop mode, you need to select the encoder PG card.				
F18.01	Encoder pulse count	0–60000	1024	-	◎
F18.02	Encoder direction	Ones: AB direction 0: Forward 1: Reverse Tens: Reserved Hundreds: CD (UVW) magnetic pole signal direction 0: Forward 1: Reverse	0x00	-	◎
CAUTION	When the synchronous motor performs autotuning and the speed deviation fault is reported, this parameter will be automatically adjusted. When the asynchronous motor performs maintenance running for the first time, there is a violent vibration accompanied by a speed deviation or overcurrent fault, you should try to change this parameter.				
F18.03	Detection time of encoder offline fault	0.0–10.0(s)	1.0	s	○
F18.04	Detection time of encoder reversal fault	0.0–100.0(s)	0.8	s	○
CAUTION	These parameters indicate the time for detecting encoder faults. Setting them to 0 indicates that fault protection is disabled. When the encoder disconnection fault is reported, check whether the brake is fully released first. When the encoder reverse fault is reported, check whether the elevator slips first.				
F18.05	Filter times of encoder detection	0x000–0x999 (convert hexadecimal numbers to decimal numbers)	0x033	-	○
F18.06	Speed ratio between motor and encoder mounting shaft	0.001–65.535	1.000	-	○
F18.07	SM control parameter	Setting range: 0x0000–0xFFFF Bit0: Enable Z pulse calibration Bit1: Enable encoder angle calibration Bit2: Enable SVC speed measurement Bit3: Resolver speed	2003	-	○

Function code	Name	Description	Default	Unit	Modify
		measurement mode selection Bit4: Z pulse capturing mode Bit5: Do not detect the encoder initial angle in V/F control Bit6: Enable the CD signal calibration Bit7: Disable Sin/Cos subdivision speed measurement Bit8: Do not detect encoder faults during autotuning Bit9: Enable Z pulse detection optimization Bit10: Disable the Z pulse calibration optimization Bit12: Clear the Z pulse arrival signal after stop			
F18.08	Enable Z pulse offline detection	0x00–0x11 Ones: Z pulse 0: Do not detect 1: Enable Tens: UVW pulse (for synchronous motors) 0: Do not detect 1: Enable	0x10	-	○
F18.09	Initial angle of Z pulse	0.00–359.99	0	°	○
F18.10	Pole initial angle	0.00–359.99	0	°	○
F18.11	Reserved	Reserved	0	-	◎
F18.12	Speed measurement optimization enable	0: Disable 1: Enable	1	-	○
F18.13	CD signal gain	0.80–1.20	0.00	-	◎
F18.14	C signal offset	0–4095	2048	-	◎
F18.15	D signal offset	0–4095	2048	-	◎
CAUTION	Synchronous motor autotuning can automatically obtain these three parameters. Generally, you do not need to modify it.				

F19 Floor setting parameters

Function code	Name	Description	Default	Unit	Modify
F19.00	Collective control mode	0–4 0: Full collective 1: Reserved 2: XPM (in the attendant running state, the door is closed after you hold down the Close key and is opened when you release the key; generally selected for goods elevators) 3: Up running 4: Down running	0	-	◎
P19.01	Total floor setting	2–15	7	-	◎
P19.02	Basement floor setting	0–07	1	-	◎
P19.03	Fire control landing floor	1–07	1	-	◎
P19.04	Car parking floor	1–07	1	-	◎
P19.05	Main landing floor	1–07	1	-	◎
CAUTION	F19.01 indicates the total number of floors, which must be consistent with the number of installed door zones. F19.02 indicates the basement floor that involves in the parallel application scenarios. Set the elevator that can arrive on the basement floor as the main elevator. F19.03 indicates the destination floor where an elevator is forced to land during fire control (the thousands and hundreds places stand for the second fire floor). F19.04 indicates the destination floor where an elevator parks after being locked. F19.05 indicates the main landing floor where an elevator returns when there is no calling request and the main landing return delay elapses.				
P19.06	Security floor setting	1–07	1	-	◎
P19.07	Security floor start time	0–2359	0	-	◎
P19.08	Security floor end time	0–2359	0	-	◎
CAUTION	After the security floor function is enabled, the elevator automatically stops,				

Function code	Name	Description	Default	Unit	Modify
	opens the door, and closes the door when passing through the security floor within the specified period.				
P19.09	Elevator group number	0–10	0	-	◎
P19.10	Upper offset floor	0–64	0	-	◎
P19.11	Lower offset floor	0–64	0	-	◎
P19.12	Parallel main landing	0–64	0	-	◎
CAUTION	F19.09 indicates the elevator group number. Set it to 0 if the elevator is to run as a stand-alone one; set it to 1 if the elevator is to run as the parallel main elevator; and set it to 2 if the elevator is to run as the parallel secondary elevator. F19.11 and F19.12 need to be set only in parallel connection scenarios.				
P19.13	Same-floor door open mode for parallel hall calls	0–2 0: Both the main and secondary elevators open doors. 1: The main elevator opens the door. 2: The secondary elevators open the doors.	0	-	◎

F20 Floor setting parameters

Function code	Name	Description	Default	Unit	Modify
F20.00	Information displayed on floor 1	0–9090 0: Displays "0" 1: Displays "1" 2: Displays "2" 3: Displays "3" 4: Displays "4" 5: Displays "5" 6: Displays "6" 7: Displays "7" 8: Displays "8" 9: Displays "9"	1912	-	◎
F20.01	Information displayed on floor 2		1901	-	◎
F20.02	Information displayed on floor 3		1902	-	◎
F20.03	Information displayed on floor 4		1903	-	◎

Function code	Name	Description	Default	Unit	Modify
F20.04	Information displayed on floor 5	10: Displays "A" 11: Displays "B" 12: Displays "G"	1904	-	◎
F20.05	Information displayed on floor 6	13: Displays "H" 14: Displays "L" 15: Displays "M"	1905	-	◎
F20.06	Information displayed on floor 7	16: Displays "P" 17: Displays "R" 18: Displays "-"	1906	-	◎
F20.07	Information displayed on floor 8	19: No display 20: Displays "12" 21: Displays "13"	1907	-	◎
F20.08	Information displayed on floor 9	22: Displays "23" 23: Displays "C" 24: Displays "D"	1908	-	◎
F20.09	Information displayed on floor 10	25: Displays "E" 26: Displays "F" 27: Displays "I"	1909	-	◎
F20.10	Information displayed on floor 11	28: Displays "J" 29: Displays "K" 30: Displays "N"	0100	-	◎
F20.11	Information displayed on floor 12	31: Displays "O" 32: Displays "Q" 33: Displays "S"	0101	-	◎
F20.12	Information displayed on floor 13	34: Displays "T" 35: Displays "U" 36: Displays "V"	0102	-	◎
F20.13	Information displayed on floor 14	37: Displays "W" 38: Displays "X" 39: Displays "Y"	0103	-	◎
F20.14	Information displayed on floor 15	40: Displays "Z" 41: Displays "15" 42: Displays "17" 43: Displays "19"	0104	-	◎
F20.15	Reserved	-	0105	-	◎
F20.16	Reserved	-	0106	-	◎

F21 Door stopping parameters

Function code	Name	Description	Default	Unit	Modify
F21.00	Front door stopping floors 1–8	0–255	255	-	◎
F21.01	Front door stopping floors 9–16	0–255	255	-	◎
F21.02	Rear door stopping floors 1–8	0–255	0	-	◎
F21.03	Rear door stopping floors 9–16	0–255	0	-	◎
F21.04	Front and rear door stopping floors 1–8	0–255	0	-	◎
F21.05	Front and rear door stopping floors 9–16	0–255	0	-	◎

Set the front door stopping floors in binary mode. Set the corresponding bit of a floor where the front door is to be opened to 1 and that of a floor where the front door is not to be opened to 0. For example, if the elevator is to stop only on floors 1, 3, 6, and 8, set F21.00=(1+4+32+128)=165. The following table describes the calculation method.

[F21.00 stopping floors 1–8]	Value of NO	Value of NC		[F21.00 stopping floors 1–8]	Value of NO	Value of NC
Floor 1	0	1		Floor 5	0	16
Floor 2	0	2		Floor 6	0	32
Floor 3	0	4		Floor 7	0	64
Floor 4	0	8		Floor 8	0	128

The setting methods for door opening and closing are as follows:

Choose the menu for setting door opening and closing by floor to set door opening and closing of each of the floors 1 to 15 separately. For floors where the elevator is to pass without stop, set this parameter to 0; for those where the elevator is to open only the front door, set it to 1; for those where the elevator is to open only the rear door, set it to 2; for those where both the doors are to be opened based on hall call signals or car calling signals of control boxes, set it to 3; for those where the elevator is to open both the front and rear doors, set it to 7.

F22 Time setting parameters

Function code	Name	Description	Default	Unit	Modify
F22.00	Door fully open delay	0–500.0 This parameter is used to set the interval time of electric lock output in the state of hand sliding door.	3.0	s	◎
F22.01	Main landing return delay	0–500.0 This parameter is used to set the period from the time when the elevator enters the idle state to that when the elevator starts to automatically return to the main landing.	120.0	s	◎
F22.02	Idle energy conservation delay	0–500.0 This parameter is used to set the period from the time when the elevator enters the idle state to that when the elevator enters the energy conservation state.	60.0	s	◎
F22.03	Brake open delay	0–5.000 This parameter is used to set the period from the time when the running direction is set to that when the brake signal is output.	0.100	s	◎
F22.04	Brake close delay	0–5.000 This parameter is used to set the period from the time when the speed is eliminated to that when the brake is canceled.	0.100	s	◎
F22.05	Brake feedback detection time	0.0–5.0	2.0	s	◎
F22.06	Contactor feedback detection time	0.00–5.00	0.20	s	◎
F22.07	Auto fault reset interval	0.1–3600.0	3.0	s	○

Function code	Name	Description	Default	Unit	Modify
F22.08	VFD stop delay	0.00–5.00	0.10	s	◎
F22.09	Current withdrawal time after stop	0.00–5.00	0.00	s	◎
F22.10	Short floor running time	0.00–20.00	0.00	s	◎
F22.11	Contactor switch-off delay	0.00–10.00	0.50	s	◎
F22.12	Shake prevention delay during start	0–5.000	1.000	s	◎
CAUTION	This parameter is used to set the period from the time when the door lock is connected after receiving a calling command to that when the running contactor signal is output. If the door lock jitters when the door open signal is output or close limit is reached, adjust this parameter as required.				
F22.13	Maintenance stop delay	0–5.000	0.300	s	◎
CAUTION	This parameter is used to set the period from the time when the brake is canceled in the maintenance state to that when the direction is canceled. If the brake over travel switch is not connected, increase the value of this parameter as required. If the value of this parameter is less than 0.300, the brake and speed are canceled together. Otherwise, the elevator decelerates and stops according to the door zone range.				
F22.14	Firefighter operation delay	0–5.000 This parameter is used to set the period from the time when the elevator is forced to land to that when it enters the firefighter state.	0.000	s	◎
F22.15	Arrival chime delay	0–5.000 This parameter is used to set the period from the time when the arrival chime signal is output after the elevator arrives at a landing to that when the arrival chime signal is canceled.	1.500	s	◎
F22.16	Thermal protection reset delay	0–5000 This parameter is used to set the	600	s	◎

Function code	Name	Description	Default	Unit	Modify
		period from the time when the thermal protection switch is reset to that when the elevator starts to run again.			
F22.17	Speed setting delay	0–5.000 This parameter is used to set the period from the time when the brake signal is output and feedback is received to that when the speed is set.	0.600	s	◎
F22.18	Brake voltage switching delay	0–5.000 This parameter is used to set the period from the time when the brake signal is output to that when the brake is switched.	0.000	s	◎
F22.19	Door open delay hold time	0–1200.0 This parameter is used to set the period from the time when the open delay button is pressed to that when the system automatically closes the door (the door can be closed ahead of time if the Close button is pressed within this period).	30.0	s	◎
F22.20	Entire-trip running protection time	0–999.9 This parameter is used to restrict the operation time of the motor. When the time is reached, the elevator stops immediately.	90.0	s	◎
F22.21	Single-floor running protection time	0–100.0 In scenarios with ultra-high floors, the value of this parameter cannot be too small.	45.0	s	◎
F22.22	Door open delay at fast-running arrival	0–6553.5 This parameter is used to set the period from the time when the "close brake" signal is output after the elevator stops to that	0	s	◎

Function code	Name	Description	Default	Unit	Modify
		when the door open signal is output. The unit is 100 ms. Generally, you do not need to set this parameter.			
F22.23	Maintenance speed segment delay time	0–10 The value range of this parameter is 3s to 10s. After it is set, the elevator runs at 50 mm/s for the set period after it accelerates to 50 mm/s, and then continues to accelerate to the maintenance speed.	0	s	◎
F22.24	Door close protection time of door operator	0–10 When this parameter is set to a non-zero value and the set period elapses after the door close signal is output, no more door close signal is output even when the door lock is not connected.	0	s	◎
F22.25	Open door signal hold time	0–16 0: Invalid 1–15: After the door open signal is held for the set period, wait for the door fully open delay (F22.00). When the door open signal is output, the door close request is invalid. 16: Hold the door open output. The door close request is valid after the door fully open is reached.	0	s	◎
F22.26	UPS energy-saving time	0–65535	0	s	◎
F22.27	UPS door closing delay	0–65535	0	s	◎
CAUTION	When F22.26 and F22.27 are 0, domestic UPS mode is enabled. When F22.26 and F22.27 are not 0, Indian UPS mode is enabled.				

Function code	Name	Description	Default	Unit	Modify
	F22.27 starts timing from door fully open and outputs door closing signal. If the door fully close signal is detected within the time period set in F22.26 , the output starts after the door is fully closed and the time period set in F22.26 is reached, otherwise the timing output starts directly from the door fully open (light curtain action, door not fully close will result in the failure to detect the door fully close signal). Under normal circumstances, the energy-saving delay should be greater than the door closing delay.				
F22.28	Hall call door opening time	0–6553.5	3.0	s	◎
F22.29	Door opening and closing obstruction detection time	0–65535	20	s	◎
F22.30	Fast running protection time	0–5000	250	s	◎
F22.31	Direction cancellation delay	0–5.000	0.600	s	◎
F22.36	Brake forcing delay cancellation time	0–655.35	0	s	◎

F23 Elevator function setting parameters

Function code	Name	Description	Default	Unit	Modify
F23.00	Reserved	-	-	-	◎
F23.01	Hand sliding door enabling	0–100 0: Invalid 1: Whether the door open/close limit is reached is not detected at arrival. The elevator continues to run only after the door lock is disconnected once. 3: Dumbwaiter (Car call boards are not detected, and the elevator runs in fast running mode after the door	0	-	◎

Function code	Name	Description	Default	Unit	Modify
		lock is disconnected.) 5: Fast deceleration and leveling is performed due to the light curtain operation of the hand sliding door. 9: The hand sliding door mode is locked through electric locks for landing doors.			
CAUTION	In this case, if energy conservation needs to be enabled, set the door fully closed signal to NC. After setting this parameter to 9, define the multi-function output 30 on the main board as the landing door electric lock output that starts when the elevator arrives or the door is opened due to a hall call and stops after the delay set in F22.00 elapses.				
F23.02	Door close output delay	0–600.0s 0: No more door close signal is output after the door is fully closed. 1–600: Time for holding the door close signal after the door lock is connected and the door is fully closed.	2.0	s	◎
F23.03	Fire control mode	0–3 0: Fire control mode for China 1: Fire control mode for India (the door can be closed through in-car commands; the initially registered in-car commands are responded, and the edge is invalid) 2: Fire control mode for Britain 3: Fire control mode dedicated to fire control elevators of the 2012 version	1	-	◎
F23.04	Dual door close output condition	0–1 0: Door close signals are output for both the two doors	0	-	◎

Function code	Name	Description	Default	Unit	Modify
		when the door lock is not connected. 1: The corresponding close command is ended after the door is fully closed.			
CAUTION	This parameter is valid when it is set by the main elevator. When F23.04 is set to 0, F23.02 needs to be set to a non-zero value. When F23.04 is set to 1, you can also set the door close output delay in F23.02.				
F23.05	Reserved	-	0	-	◎
F23.06	Running timeout fault reset mode	0–1 0: Manual reset 1: Automatically returning to the leveling zone	0	-	◎
F23.07	Reserved	-	0	-	◎
F23.08	In-car command count for nuisance prevention	0–5 0: Nuisance prevention disabled 1–5: In the light load condition, when the number of registered internal commands exceeds the set value, the registered internal commands are eliminated after the car stops at the station. When the elevator runs to different floors and the number of times the light curtain signal does not operate continuously reaches the set value, the registered internal commands are eliminated.	0	-	◎
F23.09	Dual-door operator control mode	0–1 0: Two sets of command boards. Front and rear doors are controlled independently. 1: One set of command board.	1	-	◎

Function code	Name	Description	Default	Unit	Modify
		The calling of the front and rear doors are controlled independently and the floor internal commands open two doors simultaneously.			
CAUTION	When two control boxes are used, you need to set the door opening and closing logic for the rear door.				
F23.10	Fire control landing output mode	0–1 0: Output after fire control landing 1: Output only on the fire control main landing after fire control landing	0	-	◎
F23.11	In-car command processing mode	0–65535 0: Disable door opening by using current floor in-car command 0: Enable door opening by using current floor in-car command (applicable to IC cards and foreign occasions without door opening buttons) 4: The front-door and rear-door commands have equivalent effect. (The front-door control box internal command can register rear-door floors and the rear-door control box internal command can register front-door floors.)	1	-	◎
F23.12	Reserved	-	0	-	◎
F23.13	Reserved	-	0	-	◎
F23.14	Reserved	-	0	-	◎
F23.15	Reserved	-	0	-	◎
F23.16	Test mode selection	0–65535 0: No operation	0	-	◎

Function code	Name	Description	Default	Unit	Modify
		1: When a drive failure occurs, communication reset is allowed. 4: The door can be closed by pressing the Close button after the light curtain action keeps four times the door fully open delay. 8: The door is not opened at arrival in fast running mode, and hall calls are screened (generally applied in commissioning or test mode). 16: The double-click calling deregistration function is disabled (it is recommended that you set this parameter in scenarios where IC cards are used). 32: Door open signal output is disabled when a brake action or reset timeout fault occur.			
CAUTION	This is a multi-function setting parameter. Multiple functions can be implemented simultaneously by adding corresponding weight values. For example, if you need to allow the communication reset at drive fault and keep the door closed at arrival in fast running, set the parameter to 1+8=9.				
F23.17	CAN communication-related setting	0–65535 1: Open protocol 2: Main control board weighing sensor overload voltage > full load voltage > light load voltage ((also applicable to the weighing sensor in the machine room) 4: The command is deregistered when the elevator stops in the door zone in fast running mode. If	5	-	◎

Function code	Name	Description	Default	Unit	Modify
		this parameter is not set, the command is deregistered at the deceleration point. 16: When the open protocol is adopted, RS485 communication is used for hall calls. 32: Door operators of the communication type are used. 128: 3G monitoring is enabled. 256: The hall call fire control terminal is used as the landing door lock detection point. 2048: Communication inspection Note: This is a multi-function setting parameter. Multiple functions can be implemented simultaneously by adding corresponding weight values. For example, if you need to use internal protocol for hall calls when the open protocol is adopted, and to set commands to be deregistered when the elevator stops in door zones, set the parameter to 1+4+16=21.			
CAUTION	After the protocol is changed to the open protocol, the car control board or main control board needs to be powered on again after being adjusted, and the in-car multi-function output and car weighing compensation function are disabled. This parameter is not involved in factory setting restoration.				
F23.18	Elevator running-related setting	0–65535 1: Use CAN communication for hall calls 2: Cyclic scanning of parallel hall calls 4: Calculation of	1	-	◎

Function code	Name	Description	Default	Unit	Modify
		speed-involved parallel scheduling 8: Enable the communication IC card 16: Enable the function of responding to in-car remote calls without deregistration of reverse floor calls (after being saved, the setting takes effect after restart) 32: Enable the function of standing by with the door opened on the main landing 64: Enable energy conservation during standing by with the door opened on the main landing (in this case, energy conservation is automatically disabled when the light curtain performs actions) 128: Enable the function of standing by with the door opened on each floor 512: Enable the villa elevator mode 1024: Enable 24-hour emergency operation			
CAUTION	This is a multi-function setting parameter. Multiple functions can be implemented simultaneously by adding corresponding weight values. For example, if you need to use the communication-type IC cards, keep the door open on the main landing, and enable energy conservation, set the parameter to 8+32+64=104.				
F23.19	Reserved	-	0	-	◎
F23.20	PI board fault display	0–65535 0: Normal display 1: Alternate display of F and floor	0	-	◎
F23.21	Reserved	-	0	-	◎

Function code	Name	Description	Default	Unit	Modify
F23.22	UPS application plan	0–65535 0: 220V power supply (The switching of the drive power supply is controlled by Y6. The logic of the KPWR input point needs to be set to NC. UPS output feedback and bus voltage are detected, and Y0 is disconnected in the delay after the door is opened in the leveling zone.) 1: 380V power supply (The switching of the drive power supply is controlled by UPS itself. UPS bus voltage does not need to be detected. Y0 is output in the delay after the door is opened in the leveling zone. The logic of the KPWR input point is optional.)	0	-	◎
F23.23	Special function setting	0–65535 0: Original definition 1: Display the Arrow sign for state of returning to the leveling zone 2: Independent running, displaying a blank screen for the hall call line 3: Elevator direct entry 8: Enable in-car leveling adjustment 64: Enable autotuning during power-on maintenance 128: Fire control mode for India, in which only the front door is opened 1024: Enable double door zone counting to prevent floor	1	-	◎

Function code	Name	Description	Default	Unit	Modify
		split			
F23.24	Reserved	-	0	-	◎
F23.25	Reserved	-	0	-	◎
F23.26	TSS start hour and minute 1	0–23.59	00.00	-	◎
F23.27	TSS end hour and minute 1	0–23.59	00.00	-	◎
F23.28	TSS time 1 Stop on floors 1 to 16	0–65535	0	-	◎
F23.29	Enable DC3 DSP operation	0–1 0: Disable 1: Enable	0	-	◎
F23.30	Reserved	-	0	-	◎
F23.31	Reserved	-	0	-	◎
F23.32	TSS start time 2	0–2359	0	-	◎
F23.33	TSS end time 2	0–2359	0	-	◎
F23.34	TSS time 2 Stop on floors 1 to 16	0–65535	0	-	◎
F23.35	Reserved	-	0	-	◎
F23.36	Reserved	-	0	-	◎
F23.37	Reserved	-	0	-	◎
F23.38	TSS start time 3	0–2359	0	-	◎
F23.39	TSS end time 3	0–2359	0	-	◎
F23.40	TSS time 3 Stop on floors 1 to 16	-	0	-	◎
CAUTION	The 24-hour time system is used for the time parameters. If the start time and end time are different, the time-sharing service (TSS) function is enabled. Based on the system clock, the elevator stops only on the set floors within the corresponding time segment.				
F23.51	Random number	0–99999	0	-	●
F23.52	Password low bit	0–9999	0	-	◎
F23.53	Password high bit	0–9999	0	-	◎
F23.75	Analog light load setting voltage	0–10.0	0	-	◎
F23.76	Analog full load setting voltage	0–10.0	0	-	◎
F23.77	Analog overload setting	0–10.0	0	-	◎

Function code	Name	Description	Default	Unit	Modify
	voltage				
CAUTION	When F13.00 is set to a non-zero value, the load state can be obtained by setting F23.75, F0.76, and F23.77 without weighing autotuning, but you need to understand the rough voltage of the sensor in different load states.				
F23.78	Special function setting	0–65535 1: Flash internal display arrival floor (Flash starts during deceleration and stops after elevator stop) 2: Buzzer will alarm for door open/close 1024: Overseas bypassing function (hall call registration is prohibited, and only in-car calls are responded) 2048: The elevator doesn't open the door when returning to the main landing 4096: Long press and hold it to cancel the calls 8192: Multi-floor elevator locking 16384: Hall call fault enable. When a hall call is registered, "ER+fault code" is prompted. 32768: The buzzer sounds once when a in-car command is registered.	32769	-	◎
F23.82	Arrival chime muting time	0–2323 Ones and tens: indicate the end time for muting the arrival chime. The unit is hour. Hundreds and thousands: indicate the start time for muting the arrival chime. The unit is hour.	0	h	◎
F23.90	Fast-running start speed	0–50	0	-	◎

Function code	Name	Description	Default	Unit	Modify
F23.91	Hold time of start speed	0–3000	0	-	◎
CAUTION	These two parameters indicate the set speed and its hold time when the elevator starts to run in the fast running mode, and are used to optimize the startup of the asynchronous motor. Generally, the start speed is set to about 10 mm/s, and the hold time is set to about 1000 ms.				

F24 Detection function setting parameters

Function code	Name	Description	Default	Unit	Modify
F24.06	Door fully close detection in fast running	0–65535 0: Disabled 768: Door fully close detection in fast running	0	-	◎
CAUTION	Door fully close detection is not performed in the maintenance state. Door fully close detection is required in the bypass state, and door fully open detection is not performed.				
F24.07	Reserved	-	0	-	◎
F24.08	Reserved	-	0	-	◎
F24.09	Reserved	-	0	-	◎
F24.10	Reserved	-	0	-	◎
F24.11	Reserved	-	0	-	◎
F24.12	DEC signal	0–3 0: One deceleration signal, monostable 3: Two deceleration signals, monostable	0	-	◎
F24.13	Multifunction definition	0–0xFFFF Bit0: Equipped with EC-PI board Bit1: No door open/close limit Bit2: No running contactor feedback Bit3: No brake contactor feedback	0	-	◎

Function code	Name	Description	Default	Unit	Modify
		Bit4: No hand sliding door electric lock feedback Bit5: Equipped with CAN communication hall call board			
F24.21	High voltage point detection time	0–9999 One and tens: High voltage valid detection time Hundreds and thousands: High voltage invalid detection time	9001	ms	◎
F24.31	82# fault judgment times	1–5	5	-	◎
F24.32	Special function	0: Undefined 1: Enable public protocol comparison	1	-	◎
F24.56	Hand door electric lock output protection time	0–6553.5	45.0	s	◎
F24.57	No call cancellation at hand door fault	0–65535	0	-	◎
F24.58	Forced call cancellation time at hand door fault	0–6553.5 The command will be forced to be canceled after the set time of hand sliding door fault.	00.0	s	◎
F24.59	Hall call output display selection	0–5 00: 7-segment code display output 01: BCD code display output 02: Gray code display output 03: Binary display output 04: One-to-one display output 05: CAN communication display output 10: L/C display under the hand sliding door	0	-	◎
F24.60	Overseas voice alarm for India	0–65535	0	-	◎

Function code	Name	Description	Default	Unit	Modify
F24.74	Time for the door to keep the open and registered command not canceled during elevator running	0–65535	0	s	◎
F24.75	Electric lock connection time	0–65535	0	s	◎
F24.76	Electric lock disconnection time	0–65535	0	s	◎
F24.77	Number of electric lock tests	0–65535	0		◎
F24.78	Voice prompt time	0–65535	0	s	◎
F24.79	After responding to the last in-car command, there is a delay to perform the electric lock detection.	0–65535	0	s	◎
F24.96	24V off test mode	0–65535	0	-	◎
F24.97	Time for simulating the door fully open signal	0–65535	3	s	◎

F25 Reserved

F26 Reserved

F27 Upward leveling fine-tuning parameters

Function code	Name	Description	Default	Unit	Modify
F27.00	Reserved	-	-	-	-
F27.01	Reserved	-	-	-	-
F27.02	Upward leveling fine-tuning time of 2nd floor	In SVC mode: 0–1000 (ms)	500	ms	◎
F27.03	Upward leveling	In SVC mode: 0–1000 (ms)	500	ms	◎

Function code	Name	Description	Default	Unit	Modify
	fine-tuning time of 3rd floor				
F27.04–F27.014	Upward leveling fine-tuning time of 4th–14th floors	In SVC mode: 0–1000 (ms)	500	ms	◎
F27.15	Upward leveling fine-tuning time of 15th floor	In SVC mode: 0–1000 (ms)	500	ms	◎

The above parameters are used for fine-tuning the leveling of each floor. The setting method is the same as F12.19. F27 are upward leveling fine-tuning parameters, and F28 are downward leveling fine-tuning parameters. When F27/F28 has no value, the corresponding floor uses F12.19 parameters.

Note: Parameters are mapped to specific floors in a one-to-one relationship. For example, F27.02 corresponds to upward leveling fine-tuning time of 2nd floor, and F28.01 corresponds to downward leveling fine-tuning time of 1st floor.

F28 Downward leveling fine-tuning parameters

Function code	Name	Description	Default	Unit	Modify
F28.00	Reserved	-	0	-	-
F28.01	Downward leveling fine-tuning time of 1st floor	In SVC mode: 0–1000 (ms)	500	ms	◎
F28.02	Downward leveling fine-tuning time of 2nd floor	In SVC mode: 0–1000 (ms)	500	ms	◎
F28.03–F28.013	Downward leveling fine-tuning time of 3rd–13th floors	In SVC mode: 0–1000 (ms)	500	ms	◎
F28.14	Downward leveling fine-tuning time of 14th floor	In SVC mode: 0–1000 (ms)	500	ms	◎

F29 Manufacture parameters

7 Slow running commissioning

7.1 Inspection before running

7.1.1 Mechanical assembly, inspection, and confirmation

No.	Inspection	Checked by
1	Bracket, rail, traction machine, counterweight, car, rope, control cabinet, and speed governor are installed according to the standards.	☐
2	Ensure that all components of the safety circuit, such as the four emergency stop buttons configured respectively in the machine room, car, car top, and pit, phase sequence, governor switch, up/down extreme switches, hydraulic buffer switch, rope broken switch, safety gear switch, and safety window switch, are well installed and work properly.	☐
3	Ensure that all the landing doors and car doors are properly installed and work properly.	☐
4	Remove all scaffolds and other obstacles in the hoistway that may block the running of the elevator.	☐

7.1.2 Electrical assembly, inspection, and confirmation

Check the wiring	● Check three-phase wires between the general power supply box and the control cabinet of the elevator. ● Check the connection between the brake coil of the motor and the control cabinet. ● Check the connection between U1, V1 and W1 of the control cabinet and the three-phase wires of the motor. ● Check the connection between the motor encoder and the control cabinet. ● Check whether the safety circuit is normal. ● Check whether the door lock circuit is normal. ● Ensure that the car top wiring is correct. ● Ensure that the connection and disconnection logic of the maintenance circuit is correct. ● Ensure that the door operator power supply wiring and signal connection are correct. ● Ensure that the CAN communication circuit of the car is wired properly. ● Ensure that the communication circuit of the hoistway is wired properly.

Check the connection of the hoistway and car communication cables.	● Ensure that the terminal resistance jumper on the display board in the car is connected. ● Ensure that the terminal resistor on the display board in the hoistway module on the lowest floor is connected. ● Connect the hoistway communication module of which the resistance is about 60Ω. ● Connect the car communication module of which the resistance is about 60Ω.
Check the resistance between the three phases of the motor	● Check whether the resistance between the three phases of the motor is balanced.
Grounding check	The following checking requires that the resistance between every measured terminal or component and the PE should be almost infinitely great. ● Between the product 3PH input power terminals R, S, T and the PE ● Between the brake coil and the PE ● Between the safety circuit and the PE ● Between the door lock circuit and the PE ● Between the control power and the PE ● Between the communication circuit and the PE ● Between the motor 3PH U, V, W terminals and the PE ● Between the rotary encoder circuit and the PE ● Between the product unit signal terminal, power terminal, and the PE ● Between each maintenance circuit terminal and the PE **Note:** In the preceding checking, if the resistance is small, identify and remove the fault. After the fault is removed, you can continue the commissioning.
	The following checking requires that the resistance between every measured terminal or component and the PE should be as small as possible (0–3Ω). ● Between the mains power grounding point and the PE ● Between the motor grounding point and the PE ● Between the the shield layer of the rotary encoder cables and the PE ● Between the cabinet-connected end of the external metal hose of the rotary encoder and the PE ● Between the product grounding point and the PE ● Between the switch power grounding point and the PE ● Between the brake grounding point and the PE ● Between the control cabinet wall, door and the PE ● Between the coil slot end and the PE

	● Between the speed governor and the PE ● Between the car and the PE ● Between the landing door electrical lock and PE ● Between the ground points of the safety switches in the hoistway pit and the PE **Note:** Before commissioning, ensure the earth wires of the onsite power are grounded properly, compliant with the national standards.

7.1.3 Encoder assembly, inspection, and confirmation

No.	Inspection	Checked by
1	Ensure that the encoder is firmly fixed, and the coupling that connects the encoder shaft and the extension shaft of the motor is also well fixed.	☐
2	It is recommended that you directly lead the cable from the encoder into the control cabinet to connect them.	☐
3	If the connection wire of the encoder is not long enough, you need to lengthen the wire. The added part needs to be a shielded wire and it is recommended that you weld the wires using soldering iron, and the wires must be separated from each other and wrapped with metallized paper for shielding.	☐
4	Complete the wiring correctly according to the wiring drawings and the line colors defined on the encoder.	☐
5	Connect the shielded cable of the encoder to the grounding terminal in the control cabinet.	☐
6	The cables of the encoder must be arranged in a metal hose, and the metal hose must be laid from the encoder to the control cabinet. If it is not long enough, add another one, and the ends of the two hoses must be reliably connected to form one hose. The end connected to the control cabinet must be grounded.	☐

Note: If the shielded cable of the encoder is already grounded, you do not need to connect it, but ensure that it does not come into contact with any electrical terminals or grounding casings.

7.1.4 Inspection, and confirmation before power is applied

No.	Inspection	Checked by
1	Ensure that all switches and fuses are in the opened state.	☐
2	Ensure that the check/normal switches of the control cabinet are at the maintenance position, and the emergency switch is pressed down.	☐
3	Ensure that the inspection switches on top of the car and in the car are turned to the correct positions.	☐
4	Ensure that there is nobody in the hoistway, car, on the top of the car, and in the pit, and the conditions for the safe running of the elevator are met.	☐
5	Ensure that the construction outside the hoistway does not affect the safe running of the elevator.	☐
6	Check the voltage of the three-phase, five-wire main incoming line provided on the site. The three-phase voltage needs to be 380±7%V AC and the phase-to-phase deviation cannot be more than 15V AC. The single-phase voltage between each phase and the N wire is 220±7%V AC. If the N wire is connected to PE, then the voltage between them cannot be more than 30V AC.	☐
7	Ensure that the general incoming cable specifications and general switch capacity meet the drawing requirements.	☐

Note: After performing the preceding inspection and ensuring that nothing goes wrong, you can apply power and perform commissioning.

7.1.5 Inspection and confirmation after power is applied

No.	Inspection	Checked by
1	Turn on the general power switch, and check the phase sequence relay. If the green indicator is on, it indicates the phase is normal; otherwise, turn off the general power switch and swap the wires of any two phases.	☐
2	Ensure that the voltage between 24V and COM is 24.3V±0.3V.	☐
3	After typing the password on the keypad, enter the parameter menu, check parameter settings, and modify parameters based on onsite commissioning requirements.	☐

7.2 Motor autotuning

	The synchronous motor needs to perform autotuning before the first time of slow running. Otherwise, damage to the integrated machine and motor and physical injury or death may be caused.

The synchronous motor must perform autotuning before running. Otherwise, incorrect parameter settings may cause damage to the integrated controller and motor.

Function code	Description	Description
F00.00	Speed control mode	0-3 [0]
F00.09	Channel of running commands	0-1 [0]
F02.00	Motor type selection	=0: AM 1: SM
F02.01	Motor rated power	Set according to the nameplate
F02.02	Motor rated frequency	Set according to the nameplate
F02.03	Motor rated speed	Set according to the nameplate
F02.04	(of the motor rated voltage)	Set according to the nameplate
F02.05	(of the motor rated current)	Set according to the nameplate
F18.00	Encoder type selection	0–6 0: Incremental encoder 1: Resolver encoder 2: Sin/Cos encoder 3: EnDat absolute encoder 4: SSI absolute encoder 5: ABZUVW encoder 6: Sin/Cos encoder with CD signals
F18.01	Encoder resolution	1–10000
F00.06	Motor parameter autotuning	Ones place: Motor basic parameter autotuning 0: No operation 1: Dynamic autotuning 2: Complete parameter static autotuning 3: Partial parameter static autotuning 4: Deadzone compensation autotuning Tens place: Initial pole angle autotuning 0: No operation

Function code	Description	Description
		1: Rotary autotuning 2: Static autotuning 3: Rotary autotuning 2

Operation procedures: Set the corresponding parameters, the elevator is in the machine room maintenance state, and the safety door lock is turned on.

Choose the system autotuning menu and choose motor static autotuning.

Procedures of motor autotuning	1. Check whether the motor UVW wiring, motor grounding cable, brake connection cable and encoder connection cable are reliably connected. 2. Connect the safety and door lock circuits, and check whether the motor and encoder parameter settings are correct in the maintenance state. 3. First set F00.09=0 keypad mode, then enter the menu--F00.06 Motor autotuning interface, and enter the motor autotuning process. 4. When [RUN] is selected, the running contactor is automatically switched on (avoid terminal landing autotuning). Start motor autotuning, the keypad displays 1...2...3. Perform the static autotuning of the motor characteristic parameters, and the keypad displays "SUCCE", indicating that the motor autotuning is successful. 5. If "SUCCE" is not displayed, return to the menu-fault record to find out the cause of the fault. 6. The static autotuning method of the synchronous motor is the same as that of the asynchronous motor. After autotuning, read the pole initial angle (F18.10), repeat the above steps for three times, and ensure that the deviation of F18.10 is within ±20° after three successful autotuning.
Precautions for the autotuning process	1. In the motor autotuning process, if any exceptions occur (for example, the drive board whistles, or there is obvious hot smoke or smell), press the emergency-stop button or turn off the main power supply switch to stop the motor autotuning in a timely manner. 2. In the motor autotuning process, if a failure message is displayed, adjust the encoder direction. 3. The motor performs autotuning at the inspection speed. The inspection speed cannot be too low. Generally, the default value can be used.

	4. When the motor performs autotuning for the first time after power-on, and the speed deviation fault is reported, the system automatically changes the running direction of the encoder. In this case, motor autotuning needs to be performed once again. During the first time of maintenance and trial run, identify the running direction of the elevator first to avoid hitting the limit. If the inspection running direction is opposite to the actual running direction of the elevator, modify F00.03 to set the running direction of the motor. 5. Enter the drive monitoring interface, and press the Up/Down button. If the fed-back current is normal, it indicates that the motor autotuning is complete. Otherwise, check whether the parameter settings in the F00, F02 and F18 groups are consistent with the motor nameplate and encoder parameters.
CAUTION	◆ Save the parameters after the autotuning is complete. ◆ The static autotuning of an asynchronous motor is the same as that of a synchronous motor. F02.06 to F02.10 are updated after the autotuning is complete. ◆ To ensure the accuracy of the motor static autotuning results, wait patiently for the autotuning to complete, and the keypad will display a message to indicate success or failure. The whole process takes about 4 minutes, and discontinuous electromagnetic noise is emitted discontinuously. ◆ Only panel motor autotuning is supported, and terminal motor autotuning is disallowed.

7.3 Maintenance running

1. Turn on the general power supply and reset the control cabinet emergency stop switch.
2. Safety circuit is smooth: The phase sequence is normal, and the control cabinet emergency stop key is reset.
3. Connect the door lock circuits: the series circuits of the car doors and landing doors are connected.
4. Connect the up and down limit circuits.
5. Connect the up and down forced DEC circuits. Otherwise, the actual running speed of the elevator in slow running mode will be the leveling speed.

6. Maintenance circuit wiring is correct.
7. During maintenance: Press the Up key to start slow upward run.

   Press the Down key to start slow downward run.

   a) The keypad displays the current running speed or frequency of the elevator when the elevator is running.
   b) View the receiving and output states of signals on the keypad.
   c) If the running direction of the elevator is different from the inspection running direction, change the value of the running direction setting parameter in the motor drive control parameter settings.
   d) View the speed displayed on the keypad. The value is positive for up running, and negative for down running. If exceptions occur, change the value of the pulse counting direction in the encoder parameter settings.
   e) Check whether the speed displayed on the keypad is consistent with the set speed. If there is a large deviation, check the grounding of the encoder and the system.
   f) When the elevator slips during startup, increase the values of F03.00 and F03.09 properly.
   g) When the elevator slips during stop, increase the value of F22.08.
8. After the slow run is normal,, you can work on the remaining wiring tasks.

8 Commissioning of fast running

8.1 Inspection before commissioning

8.1.1 Electrical assembly, inspection, and confirmation

No.	Inspection	Checked by
1	The wiring in the machine room is correct, and the light curtain is properly wired.	☐
2	The car top leveling switch is properly wired, and the installation dimensions are correct.	☐
3	All safety switches in the hoistway work properly.	☐
4	The up/down limit switches in the hoistway are installed in the right positions and work properly.	☐
5	The up/down limit switches are installed in the right positions and work properly.	☐
6	The up/down forced DEC switches are installed in the right positions and work properly. Terminal DEC switch: For elevators of less than 1.75m/s, configure SDS1 and SUS1; for elevators of 2.0 to 3.0m/s, adds two switches, namely SDS2 and SUS2. For details, refer to section 4.4.1 Electrical installation in the hoistway.	☐
7	The interphones are properly wired and work properly.	☐
8	The arrival chimes are properly wired.	☐
9	The calling communication boards are reliably and properly wired.	☐
10	Turn off the main power supply switch and check the communication wires. Check whether the terminal resistors in the car and on the hall call panels of the bottom floor are shorted. Ensure that the resistance in the communication lines is about 60Ω.	☐
11	The lights in the car and the fans are properly wired.	☐

8.1.2 Inspection and confirmation before power-on

No.	Inspection	Checked by
1	The power supply is switched off.	☐
2	Ensure all the switches are off.	☐
3	Ensure that the maintenance/auto switches of the control cabinet are at the maintenance position, and the emergency switch is pressed down.	☐
4	Ensure that there is nobody in the hoistway and the car, and the conditions for the safe running of the elevator are met.	☐
5	Ensure that the construction outside the hoistway does not affect the safe running of the elevator.	☐

8.1.3 Inspection and commissioning on the door operator

No.	Inspection	Checked by
1	Switch on the power supply.	☐
2	Restore the emergency-stop switch of the control cabinet.	☐
3	Switch on the power supply of the door operator in the control cabinet, and turn the maintenance/auto switch to the maintenance position.	☐
4	Ensure that the voltage between the power terminals on the variable-frequency door operator board is 220V±7%V AC.	☐
5	Perform commissioning on the door operator according to the instructions of the door operator.	☐
6	Check the door open and close operations.	☐
7	Check the door fully open and closed operations. ● Stop the elevator at the leveling position, turn the maintenance/auto switch to the normal position, and the door is in the closed state. ● The keypad displays the auto state.	☐

8.1.4 Inspection on the light curtain and car display

No.	Inspection	Checked by
1	Perform inspection according to the installation and usage instructions of the light curtain, and enter the input state monitoring column in the automatic running mode.	☐
2	Switch off the power supply of the elevator, connect the car communication cables, and then switch on the power supply.	☐
3	Ensure that the car display works properly and the displayed information varies according to the display of the keypad in the control cabinet.	☐
4	Short connect the terminal resistor of the floor display panel.	☐

8.1.5 Inspection on the wiring of the leveling sensor

No.	Inspection	Checked by
1	Ensure that the leveling sensor is properly wired according to the diagram.	☐
2	Check the signals of the leveling sensor.	☐
3	Check the limit and extreme switch positions: ● When the car runs up to reach the up limit switch, the sill of the car is 50 mm higher than the sill of the top floor landing door. ● The car runs down to reach the down limit switch, the sill of the car is 50 mm lower than the sill of the bottom floor landing door. ● After the up and down extreme switches are connected with a jumper cable, when the car runs up to the up limit safety switch, the sill of the car is 250 mm higher than the sill of the top floor landing door. ● When the car runs down to the down limit safety switch, the sill of the car is 250 mm lower than the sill of the bottom floor landing door. ● After the adjustment is complete, remove the jumper cable to restore the original wiring.	☐

8.1.6 Inspection and adjustment on the terminal forced DEC switches

No.	Inspection	Checked by
1	The terminal forced DEC switches include up and down terminal forced DEC switches.	☐
2	When the car runs up to reach the up terminal forced DEC switch, the sill of the car is X lower than the sill of the top floor landing door. (For details about X, see section 4.4.2 Switch installation positions in hoistways).	☐
3	When the car runs down to reach the down terminal forced DEC switch, the sill of the car is X higher than the sill of the bottom floor landing door. (For details about X, see section 4.4.2 Switch installation positions in hoistways).	☐
4	After the adjustment is complete, restore the original wiring.	☐
5	Check the installation positions and quantity of leveling plates on each floor.	☐

8.2 Inspection on parameters

Check the light curtain signal, monitor the front door light curtain and rear door light curtain movement through the operation panel F10, and manually block the light curtain to observe the front/rear door light curtain input indicator.

Check whether the door operator opens and closes the door normally. The door operator manually opens and closes the door through the operation panel F10 to monitor the front/rear door opening and closing conditions.

8.3 Fast running

⚠	● During first time of fast running, do not run to terminal landings. Otherwise, ceiling-hitting or ground-touching may be caused due to incorrect parameter settings.
⚠	● Ensure that all the protection switches in the safety circuit work properly and reliably. ● Ensure that the car doors and landing door locks are not shorted, and all door locks work properly and reliably. ● Ensure that all levels of forced DEC switches and slow-running limit switches work properly and reliably. ● Ensure that the logic of all the input points of the main board and the main controller of the car is correctly set. ● Runs the car at slow speed to the leveling zone of the terminal landing,

	change the inspection mode to the normal mode after the floor display is corrected. If the elevator automatically opens and closes the door, the in-car call and hall call communication is normal.

You can perform operation in the machine room to run the elevator in the fast running mode and observe on the keypad whether the fed-back speed is correct.

1. Ensure that there is nobody in the car, hoistway, or pit, or on top of the car, and the landing door and car door are closed. Ensure that the safety circuit and door lock circuit are normal.

2. Perform operation in the machine room to run the car in the slow running mode to the middle floor, and then change the running mode to the auto mode. Use the manipulator to register one floor command. Then, the car runs at the single-floor speed change into automatic state. Observe information such as the fed-back speed, leveling signal and traction machine to see whether the start, acceleration, deceleration, leveling, and stop are normal. If any exception occurs, adjust the values of related parameters.

3. After the single-floor running is normal, register two floor commands. Then, the car runs at the two-floor speed. Observe information such as the fed-back speed, leveling signal and traction machine to see whether the start, acceleration, deceleration, leveling, and stop are normal. If any exception occurs, adjust the values of related parameters.

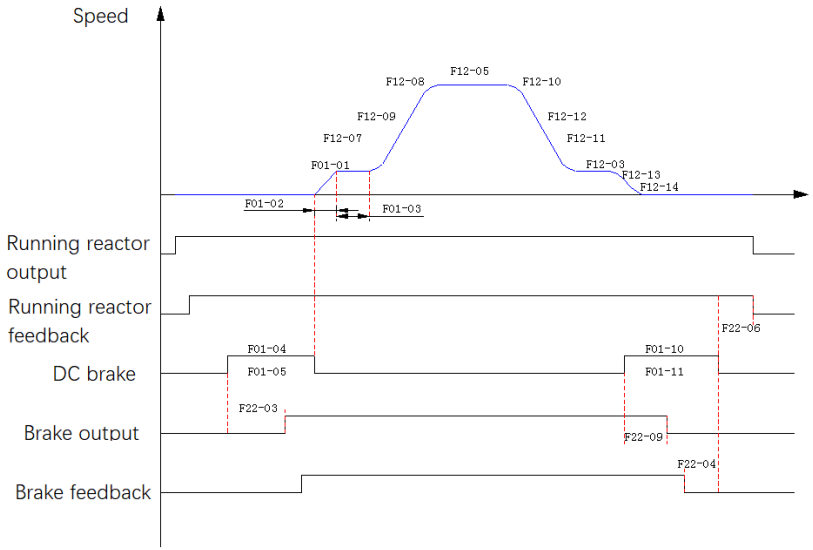
4. After the two-floor running is normal, register multiple floor commands. Then, the car runs at the multi-floor speed. Observe whether the start, acceleration, deceleration, leveling, and stop are normal. If any exception occurs, adjust the values of related parameters.

5. After the multi-floor running is normal, run the car at the multi-floor speed separately to the top floor and bottom floor. Observe whether the car runs properly.

6. If the car can run properly to the top and bottom floors, check whether the working distances of the up and down forced DEC switches meet the standards. If they meet the standards, run the car down and up with incorrect leveling. Observe whether the car hits the ceiling or touches the ground. If any exception occurs, adjust the up and down forced DEC switch distances.

8.4 S curve adjustment diagram

Figure 8－1S curve adjustment diagram



8.5 Leveling adjustment

8.5.1 Leveling adjustment instructions

The leveling plates must be plugged 2/3 deep into the photoelectric switches or magnetic switches, and the leveling plates of all the floors must be plugged vertically with the same depth.

During installation, align the center of the leveling plate with that of the sensor. In this way, leveling can be better performed after a floor is written.

Usually, the car runs up or down to each floor. Record the height difference between the car sills and corresponding landing door sills. When the car runs up, if the car sill is higher, over leveling is performed; and if the car sill is lower, under leveling is performed. When the car runs down, if the car sill is lower, over leveling is performed; and if the car sill is higher, under leveling is performed.

The leveling precision is affected if the rotary encoder is interfered or of poor quality.

Ensure the encoder is connected with shielded cables, and the shielding layer must be grounded at the end of the control cabinet. During wiring, do not lay the cables of the encoder and the power cables in the same cable tray.

8.5.2 Leveling fine-tuning for each floor

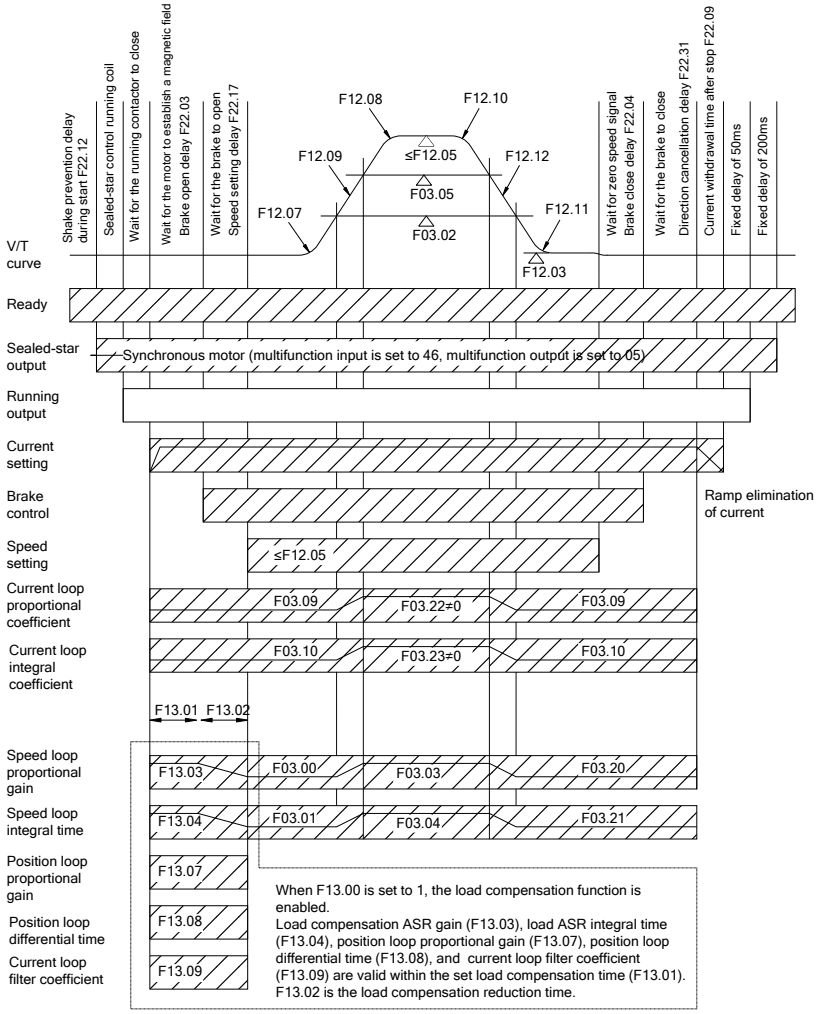
Fine-tune the up/down leveling on each floor by setting parameters of the F27 and F28 groups. When the elevator overshoots the leveling position (stopping after passing the leveling line), measure the overtravel distance. For under-leveling conditions (stopping before reaching the leveling line), adjust parameters F27 (for upward direction) or F28 (for downward direction) following this principle: increase the value for overshoot cases, decrease the value for undershoot cases.

Note:

- Adjust the leveling switch, magnet vanes, or the forced DEC switch.
- You can set the parameters of the F27 and F28 groups in the same way to implement the leveling fine-tuning of each floor.
- The fine-tuning range of in-car leveling is ±50 mm.

8.6 Comfort

8.6.1 Fast running vector control timing diagram



8.6.2 Adjustment of non-weighing compensation start

When F03.13 is set to 1, within the load compensation time (F13.01), F13.03, F13.04, F13.07 and F13.08 are valid.

F13.02 (load compensation reducing time) indicates the transition time it takes to change from the zero-speed ASR to the low-speed ASR.

When oscillation occurs during the start of the motor, increase the value of F13.04 (load compensation ASR integral time).

When the elevator slips at startup, you can decrease the value of F13.04 (load compensation ASR integral time) or increase the value of F13.03 (load compensation ASR proportional gain).

Usually, you do not need to set the APR parameters. Oscillation is easy to be caused on the motor if the value of F13.07 (APR proportional gain) is too large.

8.6.3 Speed loop adjustment

The speed loop PI parameters are closely related to the inertia of the system. By setting the proportional gain and integral time of the speed loop, You can adjust the dynamic response characteristics of the vector control speed loop. Increasing proportional gain or reducing integral time can accelerate dynamic response of speed loop; however, if the proportional gain is too large or integral time is too small, system oscillation and overshoot may occur. If proportional gain is too small, stable oscillation or speed offset may occur.

Gain switching of speed loop:

1. When the running frequency is lower than F03.02 (low-point frequency for switching), the parameters F03.00 (ASR low-speed proportional gain) and F03.01 (ASR low-speed integral time) are used.

2. When the frequency is higher than F03.05 (high-point frequency for switching), the parameters F03.03 (ASR high-speed proportional gain) and F03.04 (ASR high-speed integral time) are used.

3. When the running frequency is between F03.02 and F03.05, the PI parameters are obtained through the linear change of the two groups of parameters.

8.6.4 Current loop adjustment

The adjustment of the current loop PI parameters F03.09 (current loop proportional coefficient) and F03.10 (current loop integral coefficient) may affect the dynamic responding speed and control performance of the system. If the values of the current

loop PI parameters are too large, high-frequency oscillation may be caused to the output current, and the motor may generate noise. If the values are too small, low-speed running jitters may be caused to the motor.

The factory parameters of the current loop basically meet the requirements. If high-frequency current noise occurs, reduce F03.22 and F03.33 appropriately. If low-speed jitter occurs, increase F03.09 and F03.10 appropriately.

Generally, the larger the transient inductance of the motor, the larger value of F03.09 you can set. The higher the stator resistance of the motor, the larger value of F03.10 you can set.

Note: After F03.22 and F03.33 are set to non-zero values, the current loop switching function is enabled. Generally, you do not need to set these parameters. When various speed features are available during load changing of the motor, the current loop switching function can be enabled (disabled when it is set to 0).

After the current loop switching function is enabled, F03.09 and F03.10 are low-speed current loop proportional and integral coefficients, and F03.22 and F03.23 are high-speed current loop proportional and integral coefficients. The switching mode is similar to that of the speed loop switching.

8.6.5 Motor noise adjustment

If the motor generates noise during running, check the carrier frequency F00.05 first, which should be set to 6 kHz. Then, adjust the current loop PI parameters F03.09 and F03.10 appropriately.

When an asynchronous motor is running and the motor noise is caused by output voltage, increase the slip in the direction of the corresponding load to reduce the noise.

8.6.6 Comfort-related parameters

Fast running state	Adjustment reference for related parameters
Slip towards the heavier side during startup	For asynchronous motors, you also need to adjust the starting function F01.01 (starting frequency of direct start), F01.02 (ACC time of start) and F01.03 (starting frequency hold time), and correctly set F01.04 (braking current before start) and F01.05 (braking time before start). In addition, you can increase F03.00 (speed loop proportional gain).
Vibration during	Increase the value of F04.03 (low-frequency oscillation control factor of motor), and reduce the value of F04.05 (oscillation control threshold of

Fast running state	Adjustment reference for related parameters
startup	motor).
ACC/DEC is too fast	Reduce the value of F12.09 (acceleration) and F12.12 (deceleration). Note that the ratio of acceleration to the increased acceleration is less than 2, and the same applies to deceleration and the decreased deceleration.
Vibration during ACC/DEC	Adjust the values of F03.02 (low-point frequency for switching) and F03.05 (high-point frequency for switching). Try reducing the difference between the high-speed loop gain and low-speed loop gain.
Vibration at the end of ACC/DEC	Adjust the values of F12.13 (S-curve start segment duration during stop) and F12.14 (S-curve end segment duration during stop).
Vibration during stop	Reduce the value of F03.00 (speed loop gain); or enable current loop switching and decrease the values of F03.09 (low-speed current loop proportional coefficient) and F03.10 (low-speed current loop integral coefficient), and increase the values of F03.22 (high-speed current loop proportional coefficient) and F03.23 (high-speed current loop integral coefficient).
Slip towards the heavier side during stop	Increase the values of F03.22 (low-speed proportional gain) and F22.07 (direction cancel delay) properly.
Slip towards the running side during stop	Properly increase the low-speed proportional gain (F03.22) (set the low-speed integral time to 0.1s if noise occurs). Try reducing the speed command current loop filter coefficient (which shall not exceed 3).
Vibration during low-speed running	Adjust F03.00 (low-speed proportional gain) and F03.01 (low-speed integral time). Increase the values of F03.09 (current loop proportional coefficient) and F03.10 (current loop integral time).
Vibration during high-speed running	Adjust F03.03 (high-speed proportional gain) and F03.04 (high-speed integral time).
Vibration during the entire process	Properly adjust F03.09 and F03.10, F03.02 and F03.05 (shall not exceed 3), and F03.06.

Note: When the characteristics of the elevator changes with load (for example, runs properly at light load while generates noise and resonance at full load), enable the current loop switching function, set the original parameters F03.09 and F03.10 as the low-speed current loop proportional gain and integral time, and set F03.22 and F03.23 as the high-speed current loop proportional gain and integral time.

9 Supporting device description

9.1 Instructions for floor expansion board EC－EBA

Figure 9－1 EC－EBA dimensions (unit: mm)

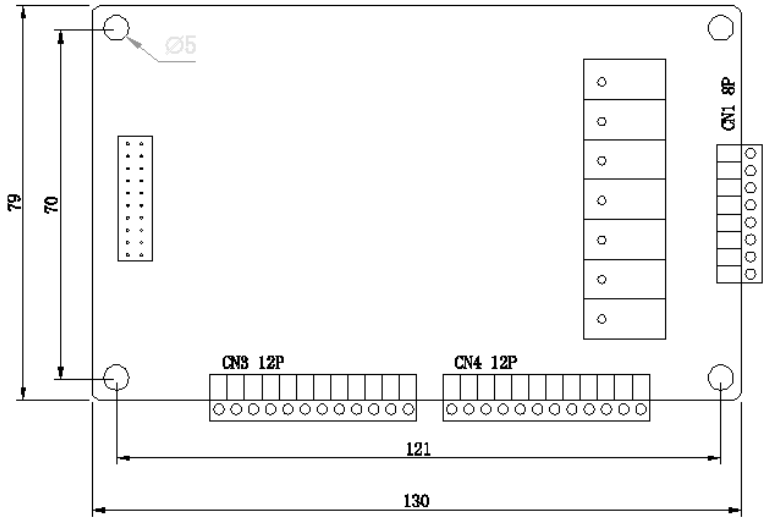


Table 9－1 EC－EBA terminal definition

No.	Plug-in No.	Terminal	Function description
1	CN1	T1–T7/M9	7 relays (7-segment code), re-definable
2	CN3	S1–S12	12 composite inputs and outputs (hall and in-car call signals), not re-definable
3	CN4	S13–S24	12 composite inputs and outputs (hall and in-car call signals), not re-definable
4	CN5	P14 port	EC90B-compatible communication port

Table 9－2 Digital input signal technical specifications

Input form		Open circuit input with optoelectronic isolation
Current signal	"0" level	0–2mA
	"1" level	4.5–8mA

Input form		Open circuit input with optoelectronic isolation
Voltage signal	"0" level	18–24V DC
	"1" level	0–5V DC
Signal digital filter delay		30ms
Signal response frequency		200Hz

Table 9—3 Relay digital output technical specifications

Output form	Relay output
AC	250V AC
DC	110V DC
Inductive load	3A
Resistive load	5A
Electrical durability	3 million times
Mechanical durability	10 million times

10 Typical functions and solutions

10.1 Attendant function

Function description

The elevator responds to hall calls. The elevator does not close the door automatically. You need to press and hold the door closing button manually to close the door. During the door closing process, if you release the door closing button, the elevator will automatically open the door.

In the attendant state, the bypassing function ca be used through the main board (the bypassing function is defined by the main board input point 29, and the reversing function is defined by the main board input point 30). When the bypassing operation in the car is valid, it does not respond to hall calls. After the reversing signal is valid once, the elevator will change the running direction of the next operation and respond to the call in the opposite direction.

In the parallel system, the elevator that enters the attendant mode does not exit the parallel system, and its hall calls are responded by other elevators. System default function, some functions can be modified through parameters.

Related parameters

Parameter	Name	Setting range	Factory value
F05.16	Multifunction input	28/128	28

10.2 Fire control function

Function description

Return to the fire control main landing: The elevator automatically clears the in-car and hall calls. The elevator stops at the nearest landing without opening the door, and then returns to the fire control main landing. After the elevator stops at the main landing, the door keeps open. In the parallel system, the elevator that enters the fire mode automatically exits the parallel system.

Firefighter operation: The elevator does not respond to hall calls, but only to in-car commands, and only one command can be registered. The elevator does not open/close the door automatically, and the door opening/closing action must be performed by (jogging) the door opening/closing button. The light curtain signal input is invalid, and the safety touch panel signal input is valid.

Description

System default function, some functions can be modified through parameters.

- State of returning to the fire control main landing

Main control board fire control input :

Parameter F05.07 : X7 input function setting, 12: Fire control NO signal; 112 : Fire NC signal.

Parameter F07.19 : Y20 output function setting 20 - Return to the fire control main landing.

- Firefighter running state

The main control board enters the firefighter state.

Parameter F05.XX : Input function setting, 49 (NO signal) or 149 (NC signal). When the elevator returns to the fire control main landing, directly enters the firefighter running state.

10.3 Car locking function

Car locking procedures

Step 1 After the elevator responds to all registered in-car call commands, it returns to the car locking main landing.

Step 2 After the elevator stops at the car locking main landing, it opens the door normally, then closes the door and stops the car.

Step 3 After the elevator stops , all hall call displays are turned off, and the in-car lighting and fan are also turned off.

Description

System default function, some functions can be modified through parameters.

Wiring

Car locking input method and setting

Main control board car locking input

Parameter F05.XX : Input function setting: 14: Car locking NO signal; 114 : Car locking NC signal.

Related parameters

Generally, the car locking signal is input through the main control board .

Parameter	Name	Setting range	Factory value
F19.05	Car locking main landing	1–7	1

10.4 Overload/full load function

Function description

Overload: Buzzer alarm. The elevator cannot close the door, and pressing the door closing button has no effect.

Full load: In-car call operates normally. Hall call can be registered but no response is given.

There are two types of elevator overload/full load switches: analog switch and digital switch.

The parameter settings for these two types of switches are explained respectively.

Wiring

Analog overload/full load switch wiring and parameter setting descriptions.

Classification	Wiring description	Parameter setting
Analog signal connected to the main board	The main board 24V is connected to the power cable positive end of the sensor, GND of the CN23 terminal on the main board is connected to the negative end of the sensor , and AI is connected to the signal cable of the sensor.	F03.13=1

When using the analog overload/full load weighing switch, it is necessary to set the overload, full load and light load voltage parameters (F23.75 , F23.76 and F23.77), otherwise the weighing switch will be invalid.

Digital full load/overload switch wiring and parameter setting descriptions:

Classification	Wiring description	Parameter setting
Digital signal connected to main board	The X terminal on the main board can define the overload/full load input point	-

11 Maintenance and hardware fault diagnosis

11.1 Periodical inspection

The maintenance workload is small when the product is installed in an environment that meets requirements. The following table describes the routine maintenance periods recommended by us.

Check scope		Check item	Method	Expected result
Ambient environment		Check the ambient temperature and humidity, and whether there is vibration, dust, gas, oil spray, and water droplets in the environment.	Visual inspection and instrument measurement	The requirements stated in this manual are met.
		Check whether there are foreign matters, such as tools, or dangerous substances placed nearby.	Visual inspection	No foreign objects or dangerous substances
Voltage		Check the voltage of the main circuit and control circuit.	Use multimeters or other instruments for measurement.	The requirements stated in this manual are met.
Keypad		Check the display of information.	Visual inspection	The characters are displayed properly.
		Check whether characters are not completely displayed.	Visual inspection	The requirements stated in this manual are met.
Main circuit	Common	Check whether bolts are loose or fall off.	Screw them up.	No looseness or falling off
		Check whether the machine and insulators are deformed, cracked, or damaged, or aged and discolored due to overheating.	Visual inspection	No appearance exception occurs.
		Check whether there are stains and dust attached.	Visual inspection	No abnormal stains or dust **Note:** Discoloration of

Check scope		Check item	Method	Expected result
				copper bars does not mean that they cannot work properly
	Conductor and wire	Check whether conductors are deformed or discolored due to overheating.	Visual inspection	No exception occurs.
		Check whether the wire sheaths are cracked or discolored.	Visual inspection	No exception occurs.
	Terminal block	Check whether the terminal block is damaged.	Visual inspection	No exception occurs.
	Filter capacitor	Check whether there is electrolyte leakage, discoloration, cracks, and housing expansion.	Visual inspection	No exception occurs.
		Check whether the the safety valve is open.	Determine the service life based on the maintenance information or measure it through the electrostatic capacity.	No exception occurs.
		Check whether the electrostatic capacity is measured as required.	Measure the capacitance through instruments.	Electrostatic capacity ⩾ (Initial value × 0.85)
	Resistor	Check whether there is displacement or insulator cracks caused due to overheating.	Olfactory and visual inspection	No exception occurs.
		Check whether the resistor is disconnected.	Visual inspection, or measuring with a multimeter after removing one cable end.	Resistance range: ±10% (of the standard resistance).

Check scope		Check item	Method	Expected result
	Transformer, reactor	Check whether there is unusual vibration sounds or smells.	Auditory, olfactory, and visual inspection	No exception occurs.
	Electromagnetic contactor, relay	Check whether there are vibration sounds during operation.	Auditory inspection	No exception occurs.
		Check whether the contacts are in good contact.	Visual inspection	No exception occurs.
	Control PCB and connector	Check whether the screws and connectors are loose.	Screw them up.	No exception occurs.
		Check whether there is unusual smell or discoloration.	Olfactory and visual inspection	No exception occurs.
		Check whether there are cracks, damage, deformation, or rust.	Visual inspection	No exception occurs.
		Check whether there is electrolyte leakage or deformation.	Visual inspection, and determine the service life based on the maintenance information.	No exception occurs.
	Cooling fan	Check whether there are unusual sounds or vibration.	Auditory and visual inspection, and turn the fan blades with your hand.	The rotation is smooth.
		Check whether the bolts loose.	Screw them up.	No exception occurs.
		Check whether there is decoloration caused due to overheat.	Visual inspection, and determine the service life based on the maintenance information.	No exception occurs.
	Ventilation duct	Check whether there are foreign matters blocking or	Visual inspection	No exception occurs.

Check scope		Check item	Method	Expected result
		attached to the cooling fan, air inlets, or air outlets.		

11.2 Cooling fan

The service life of the drive cooling fan is more than 25,000 hours. The actual service life of the cooling fan is related to the use of the drive and the temperature in the ambient environment.

You can view the drive run time through related parameters.

The increase of the bearing noise indicates a fan fault. If the drive is applied in a key position, replace the fan once the fan starts to generate unusual noise.

11.2.1 Cooling fan replacement:

Step 1 Stop the machine and disconnect the AC power.

Step 2 Use a screwdriver to pry the fan mounting plate up from the cabinet and lift the fan mounting plate upward.

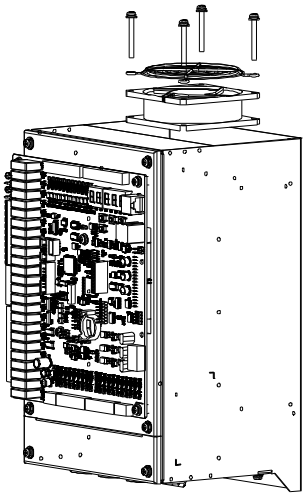
Step 3 Open the cable clamp to loose the fan cable.

Step 4 Remove the fan cable.

Step 5 Remove the fan installation plate.

Step 6 Install the fan to the mounting plate, and then install the mounting plate to the drive in reverse order.

Step 7 Connect to the power supply.



Note: Read chapter 1 Safety precautions carefully and follow the instructions to perform operations. Ignoring these safety precautions may lead to physical injury or death, or device damage.

11.3 Capacitor

11.3.1 Capacitor reforming

If the drive has been left unused for a long time, you need to follow the instructions to reform the DC bus capacitor before using it. The storage time is calculated from the date the product is delivered.

Storage time	Operation principle
Less than 1 year	No charging operation is required.
1 to 2 years	The drive needs to be powered on for 1 hour before the first ON command.
2 to 3 years	Use a voltage controlled power supply to charge the drive: ・Charge the drive at 25% of the rated voltage for 30 minutes, ・and then charge it at 50% of the rated voltage for 30 minutes, ・at 75% for another 30 minutes, ・and finally charge it at 100% of the rated voltage for 30 minutes.
More than 3 years	Use a voltage controlled power supply to charge the drive: ・Charge the drive at 25% of the rated voltage for 2 hours, ・and then charge it at 50% of the rated voltage for 2 hours,

Storage time	Operation principle
	• at 75% for another 2 hours, • and finally charge it at 100% of the rated voltage for 2 hours.

The method for using a voltage controlled power supply to charge the drive is described as follows:

The selection of a voltage controlled power supply depends on the power supply of the drive. For drives with an incoming voltage of 1PH/3PH 230 V AC, you can use a 230 V AC/2 A voltage regulator. Both 1PH and 3PH drives can be charged with a 1PH voltage controlled power supply (connecting L+ to R, and N to S or T). All the DC bus capacitors share one rectifier, and therefore they are all charged.

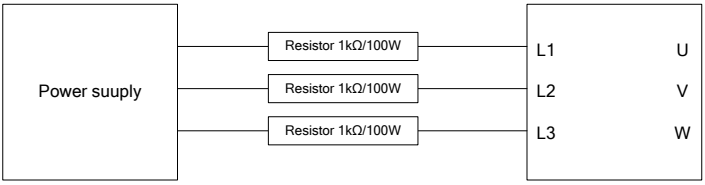
For drives of a high voltage class, ensure that the voltage requirement (for example, 400V) is met during charging. Capacitor changing requires little current, and therefore you can use a small-capacity power supply (2 A is sufficient).

The method for using a resistor (incandescent lamp) to charge the drive is described as follows:

If you directly connect the drive device to a power supply to charge the DC bus capacitor, it needs to be charged for a minimum of 60 minutes. The charging operation must be performed at a normal indoor temperature without load, and you must connect a resistor in series mode in the 3PH circuit of the power supply.

For a 400V drive device, use a resistor of 1 kΩ/100W. If the voltage of the power supply is no higher than 400V, you can also use an incandescent lamp of 100W. If an incandescent lamp is used, it may go off or the light may become very weak.

Figure 11－1 400V driving device charging circuit example



11.3.2 Electrolytic capacitor replacement

⚠	● Read chapter 1 Safety precautions carefully and follow the instructions to perform operations. Ignoring these safety precautions may lead to physical injury or death, or device damage.

The electrolytic capacitor of a drive must be replaced if it has been used for more than 35,000 hours. For details, contact us.

11.4 Power cable

	• Read chapter 1 Safety precautions carefully and follow the instructions to perform operations. Ignoring these safety precautions may lead to physical injury or death, or device damage.

- Stop the VFD, disconnect the power supply, Wait for 10 minutes for the drive DC capacitor to discharge. Use a multimeter (at least 1 MΩ) to check whether the discharge is complete.
- Check the connection of the power cables. Ensure that they are firmly connected.
- Connect to the power supply.

12 Fault code description

12.1 Fault type description

The elevator integrated machine has a variety of warning information and protection functions. The elevator integrated machine monitors various input signal operating conditions and external feedback information in real time. Once an abnormality occurs, the corresponding protection function is activated and the elevator integrated machine displays the fault code.

12.2 Fault indication and reset

When the TRIP indicator is on, the VFD is in abnormal state, with the keypad showing the fault code. For details about fault causes and solutions, see section 12.3 Faults and solutions. If the fault cause cannot be located, contact our local office for technical support.

There are two methods to reset VFD faults:

Method 1 Reset through the maintenance terminal.

Method 2 Cut off the VFD power supply.

When a fault occurred, handle the fault as follows:

Step 1 Check whether the keypad display is improper. If the keypad cannot be displayed, please consult INVT and its office.

Step 2 If keypad works properly, check the Fault codes in P2 group through the short-cut key ($\frac{\text{QUICK}}{\text{JOG}}$) to confirm the corresponding fault record parameters, and determine the real state when current fault occurred through parameters.

Step 3 Check the following table for the exception and solution.

Step 4 Rule out the faults or ask for help from professionals.

Step 5 After confirming the fault is removed, perform fault reset, and start running.

12.3 Faults and solutions

Fault Code	Fault type	Possible cause	Solution
1	Main control board faults	Main control board internal faults.	Replace the main control board.
2	IO board power failure	The external DC24V power supply is damaged or the cable is broken. The cable between the IO board and the master is disconnected.	Check whether the wiring of the switch power supply is loose. Check whether the switch power is damaged.
7	People-trapped fault	The elevator stops running due to other faults.	Check whether the light curtain is valid. Troubleshoot the cause according to the accompanying fault.
9	Motor thermal protection	Motor thermal protection switch acts. The MF input point of integrated machine is mistakenly set to motor thermal protection switch signal.	Check whether the parameter setting is wrong (NO, NC). Check whether the thermal protection relay block is normal. Check whether the motor is used properly and whether the motor is damaged. Improve the heat dissipation conditions of the motor.
30	Safety circuit opened	1. A circuit in the safety circuit is disconnected. 2. If there is a safety relay in the control cabinet, it is possible that the contact of the safety relay is damaged. 3. The high voltage monitoring point of safety circuit on the integrated machine main board is damaged.	Check the switches of the safety circuit and check their states. Check whether the power supply voltage of the safety circuit is normal. Check whether the contactor of the safety circuit operates correctly. Check the signal characteristics of the feedback point of the safety circuit (NO/NC).
31	Door lock released during elevator running	1. The door knife is installed in an improper position. When the elevator is running, the door knife hits the door ball, causing	Check the parameter settings of door fully close detection. Check the wiring and definition of the car door closing detection

Fault Code	Fault type	Possible cause	Solution
		the door released during elevator running. 2. If there is a door lock relay in the control cabinet, the door lock relay is in poor contact. 3. The car door lock or hall door lock is in poor contact.	point. Check the door opening and closing signals.
32	Door lock short-circuit fault	Check that the lock signal and opening signal of the terminal state in the keypad act at the same time. If they act at the same time, check the logic setting of the main control board signals (e.g. open, closed). After the opening signal output for 5s, the lock is not disconnected. The car door lock may be jammed and cannot be opened. Check the door lock circuit to confirm whether there is a short circuit.	Check whether the door lock is short-circuited. Check whether the door fully open switch misacts. Check whether the door operator device is abnormal.
33	Failure to stop in door zone during fast running	Elevator protection caused by other faults during fast running. Guide shoes for the car or counterweight is too tight. Steel rope slips seriously.Set the acceleration and deceleration parameters to a smaller value and perform trial running, or set F12.05 to a smaller value.	Adjust the door zone switch and plate position. Replace the door zone sensor. Check the car door and hall door lock contacts. Check the door lock contactor contacts.
34	The elevator deceleration time is too long	The deceleration time exceeds the limit.	F12.10, F12.11 and F12.12 are set too small. Increase the values or set to default.
35	The single-floor running time exceeds the	Switch in door area is damaged. The brake is not fully open or the guide shoe is too tight.	Replace the door zone sensor. Set F22.20 to a greater value. Check the speed setting

Fault Code	Fault type	Possible cause	Solution
	limit value	There is extra-long floor. Set F22.20 to a greater value.	parameters in the VFD. Check whether the brake is fully opened.
37	Running overtime fault during whole journey	Switch in door area is damaged. The brake is not fully open or the guide shoe is too tight. There is extra-long floor. Set F22.21 to a greater value.	During fast running, if the car fails to reach the target floor within the specified time, check whether the speed is too low or the floor is too high.
40	Door zone signal exception	The signal in door area continuously acts after fast running starts for 5s. Switch in door area is damaged. The brake is not fully open or the guide shoe is too tight, so the elevator does not run properly.	Check the door zone signal. Check the peripheral wiring. Check the parameter setting of returning to the leveling zone.
42	Low-speed forced DEC switches act simultaneously	The low-speed forced DEC switches on both the top and bottom floors perform actions simultaneously.	Check whether the NO and NC properties of the forced DEC switch are consistent with the main board parameter configuration. Check whether the forced DEC switch misacts.
43	Earthquake action	The main board detects the earthquake. The MF input point of integrated machine is mistakenly set to the earthquake signal.	Check whether the earthquake input signal is consistent with the main control board parameter setting (NC, NO). Restore the earthquake detection device to the non-acted state.
47	Action of the down limit switch	In slow running, the down limit switch performs an action.	Check the down limit signal characteristics (NO, NC). Check whether the down limit switch is in normal contact. The limit switch is installed too low, and it will also act during normal operation to the terminal landing.
48	Action of the up limit switch	In slow running, the up limit switch performs an action.	Check the up limit signal characteristics (NO, NC).

Fault Code	Fault type	Possible cause	Solution
			Check whether the up limit switch is in normal contact. The limit switch is installed too low, and it will also act during normal operation to the terminal landing.
50	No feedback after the running contactor closing	The contact of contactor is damaged. The signal of main board/IO board is damaged.	Check the contactor contacts and wiring. Check the multi-function definition and NO and NC settings.
51	Feedback exists after the running contactor releasing		
52	No feedback after the braking contactor closing		Check the contactor contacts and wiring. Check the multi-function definition and NO and NC settings. Check whether the brake is opened.
53	Feedback exists after the braking contactor releasing		
54	No feedback from brake travel switch signal after the braking contactor closing	The brake does not close totally when the elevator stops, and the mechanical closing is too slow. The brake travel switch is not installed properly. Incorrect parameter settings. Dual brake travel detection is enabled.	Check the brake travel switch circuit wiring. Check the brake travel switch.
55	Feedback from brake travel switch signal exists after the braking contactor		Check the brake travel switch. Check the multi-function definition and NO and NC settings. Check whether the brake is opened.

Fault Code	Fault type	Possible cause	Solution
	releasing		
56	UPS output relay closing timeout	No feedback is detected after the UPS power is switched.	Check the multi-function definition and NO and NC settings.
60	Door open fault	After the elevator door is opened for 20 seconds, the door fully open signal is not detected. Under the door opening timeout fault, the door is repeatedly opened and closed for 5 times.	Check whether the door operator can work properly. Check whether the output of the main control board is normal. Check whether the door fully open signal is correct.
61	Door close fault	After the elevator door closing command is output to open the door for 10 seconds, the door fully closed signal is still not detected.	Check whether the door operator can work properly. Check whether the output of the main control board is normal. Check whether the door fully open signal is correct. Check whether the door lock contacts are normal. Check the definition and wiring of the car door closing detection point.
62	Simultaneous actions of the door open and close limit switches	The wiring of door fully open/closed is wrong. The logic setting of the door operator VFD is wrong. Door operator fault.	Check the door fully open/closed switch and wiring. Check the logic parameter setting of the door operator VFD. Troubleshoot according to the door operator fault.
64	Safety touch panel/light curtain action timeout	Safety touch panel/light curtain continuous action timeout.	Clean the dust and obstructions on the light curtain. Replace the light curtain connection cable or light curtain box. Check the logic parameter settings of the main control board.
65	Automatic rescue action	The main board detects an automatic rescue signal action.	Check the logic parameter settings of the main control board.
66	Door lock not	The system detects the door fully	Check the NO and NC settings of

Fault Code	Fault type	Possible cause	Solution
	connected when the door is fully closed	closed operation, but the door lock is not connected.	door fully open and closed signals. Check the wiring of door fully open and closed signals.
70	Simultaneous actions of the up and down limit switches in slow running	In slow running, the up and down limit switches perform actions at the same time.	Check whether the NO and NC properties of the limit switches are consistent with the main board parameter configuration. Check whether the limit switches misact.
72	Low-speed down forced DEC switch action adhesion	The low- and medium-speed forced DEC switches on the lower terminal landing do not reset when the elevator leaves the ground floor for 9s.	Check the down forced DEC SDS1 switch. Check the cable wiring.
73	Low-speed up forced DEC switch action adhesion	The low- and medium-speed forced DEC switches on the upper terminal landing do not reset when the elevator leaves the top floor for 9s.	Check the down forced DEC SUS1 switch. Check the cable wiring.
76	Forced DEC switch misaction	Forced deceleration switch mal-function occurred during elevator running.	Check the up and down forced DEC switches.
77	Up and down limit switch adhesion in slow running	The up/down limit switch is faulty or not reset.	Check the up/down limit switch and wiring.
79	Abnormal elevator position	1. The elevator is in the terminal station, but the corresponding low speed forced deceleration switch does not act. 2. The corresponding low speed forced deceleration switch acts, but the elevator is not in the terminal station. 3. Hoistway information is lost or is inconsistent with the autotuning results.	Check the forced DEC switch SUS1/SDS1. Clean the wire ropes and check the wear conditions of the traction wheel. Comprehensively judge according to other faults.

Fault Code	Fault type	Possible cause	Solution
		4. Wrong floor.	
82	Contactor adhesion faults exceed the set value	No. 50, 51, 52, 53, 54, 55, 57, 59 fault occurred more than 5 times. Fault reset method: turn the switch from normal to maintenance for three times consecutively.	Refer to faults #50, #51, #52, #53, #54, #55 for troubleshooting measures.
83	Drive unit faults exceeding the set value	The drive unit fault exceeds the set value of F11.03.	Check the drive faults.
88	Hand sliding door electric lock output timeout	The first fault can be automatically reset, and the second fault is maintained.	Check whether F24.56 is set too small.
89	Maintenance switch acts in normal fast running	1. Maintenance switch acts in fast running. 2. Poor contact of inspection circuit or switch.	Check the maintenance circuit wiring . Check the traveling cable wiring.
90	Manual sliding door electric lock detection point feedback timeout	Electric lock feedback point adhesion during hand sliding door operation.	Check the electric lock wiring. Check the main board multifunction definitions.
91	Manual sliding door electric lock detection point disconnection timeout	No electric lock feedback is detected during hand sliding door operation.	Check the electric lock wiring. Check the main board multifunction definitions.
93	Speed-changing switch adhesion	When the car stops at door zone during normal operation (in non-maintenance state), if the speed-changing switch acts and a adhesion fault is reported, the door is kept open, operation is prohibited, and the fault is reset automatically.	Check the speed-changing switches.

Fault Code	Fault type	Possible cause	Solution
96	Speed-changing switch disconnection	In the non-maintenance running, if the rising edge of the door zone is detected but the speed-changing switch acts for less than 2 times, the speed-changing switch disconnection fault is reported. The fault is reset after turning the switch from normal to maintenance once, the car is urgently decelerated and creeps to the door zone.	Check the speed-changing switches.
101	Inverter unit U-phase protection	ACC is too fast. IGBT module is damaged. Misoperation caused by interference. Drive wires are poorly connected. To-ground short circuit occurs.	Increase ACC time. Replace the power unit. Check drive wires. Check whether there is strong interference surrounding the peripheral device.
102	Inverter unit V-phase protection		
103	Inverter unit W-phase protection		
104	Overcurrent during ACC	ACC/DEC is too fast. The voltage of the grid is too low. VFD power too small. Load transient or exception occurred. To-ground short circuit or output phase loss occurred. Strong external interference sources existed. Overvoltage stall protection disabled.	Increase ACC/DEC time. Check the input power. Select a VFD with larger power. Check whether the load is short circuited (to-ground short circuit or line-to-line short circuit) or the rotation is not smooth. Check the output wiring. Check whether there is strong interference.
105	Overcurrent during DEC		
106	Overcurrent during constant speed running		
107	Overvoltage during ACC	Abnormal input voltage. Large energy feedback. No braking components.	Check the input power. Check whether load DEC time is too short or the motor starts during rotating.
108	Overvoltage during DEC		

Fault Code	Fault type	Possible cause	Solution
109	Overvoltage during constant speed running		
110	Undervoltage fault	Grid voltage is too low. Overvoltage stall protection disabled.	Check the grid input power. Check the settings of related function codes.
111	Motor overload	The grid voltage is too low. Motor rated current set incorrectly. Motor stall or load jumps violently.	Check the grid voltage. Reset the rated current of the motor. Check the load and adjust the torque boost.
112	System overload	ACC is too fast. The motor in rotating is restarted. The grid voltage is too low. Load too heavy. VFD power too small.	Increase ACC time. Avoid restart after stop. Check the grid voltage. Select a VFD with larger power. Select a proper motor.
113	Input side phase loss	Phase loss or violent fluctuation occurred on input R, S, T.	Check the input power. Check the installation wiring.
114	Phase loss on output side	Phase loss output occurs to U, V, W (or the three phases of the load are seriously asymmetrical).	Check the output wiring. Check the motor and cables.
115	Rectifier module overheating	Air duct blocked or fan damaged. Ambient temperature too high. Long-time overload running.	Ventilate the air duct or replace the fan. Lower the ambient temperature.
116	Inverter module overheating		
117	External fault	External fault input X terminal action	Check external device input.
118	Modbus communication fault	Improper baud rate. Communication line fault. Incorrect communication address. Communication suffers from strong interference.	Set a proper baud rate. Check the communication port wiring. Set the communication address correctly. Replace or change wiring to enhance anti-interference.
119	Current	Poor contact of the connector of	Check the connector and re-plug.

Fault Code	Fault type	Possible cause	Solution
	detection fault	control board. The Hall component is damaged. Exception occurred to amplification circuit.	Replace the controller base. Replace the main control board.
120	Motor autotuning fault	The motor capacity does not match the VFD capacity. Improper motor parameter setting. Autotuned parameter settings deviate sharply from the standard ones. Autotuning timeout.	Change the VFD model. Set the motor type and nameplate parameters correctly. Empty the motor load and re-perform autotuning. Check motor wiring and parameter settings. Ensure that the frequency upper limit is greater than 2/3 of the rated frequency.
121	EEPROM operation error	Error in reading or writing control parameters. EEPROM is damaged.	Replace the main control board.
123	Braking circuit fault	Braking circuit fault or braking pipe damage. External braking resistor with small resistance.	Check the braking unit, and replace with new braking pipe. Increase the braking resistance.
124	Running time reached	The actual running time of the system is longer than the preset running time.	Ask the supplier to adjust the preset running time.
125	Electronic overload fault	The system reports an overload pre-alarm according to the setting.	Check the load and overload pre-alarm threshold.
132	Motor-to ground short circuit software fault 1	The output of the VFD is short circuited to the ground. Current detection circuit fault.	Check whether the motor wiring is normal. Replace the hall component. Replace the main control board.
133	Motor-to ground short circuit hardware fault 2		
134	Speed deviation fault	The load is too heavy or stalled. Output phase loss occurred in SM.	Check the load to ensure it is proper, and increase the detection time. Check whether the control

Fault Code	Fault type	Possible cause	Solution
			parameters are set properly. Check the output cable. Check the motor supply and cables.
135	Mal-adjustment fault	SM control parameters are set incorrectly. Autotuned parameters are not accurate. The VFD is disconnected from the motor.	Check the load and ensure the load is normal. Check whether control parameters are set correctly. Increase the mal-adjustment detection time.
136	Electronic underload fault	The system reports an underload pre-alarm according to the setting.	Check the load and underload alarm thresholds.
137	Encoder disconnection fault	Incorrect encoder wiring, causes the failure to get the encoder signal. Incorrect encoder parameter settings.	Check the wiring. Check encoder parameter settings.
138	Encoder reversal fault	Incorrect encoder signal direction.	Change the encoder direction through F18.02, or check that the wiring sequence of encoder AB signal is correct.
139	Encoder Z pulse disconnection fault	The Z-pulse signal cable is not connected.	Check the Z-pulse signal cable.
192	AI1 disconnection fault	AI1 input too low. AI1 wiring disconnected.	Connect a 5V or 10mA power source to check whether the input is normal. Check the wiring or replace the cables.
680	Brake fault	Brake signal and control signal are inconsistent. Feedback terminal signal is interfered.	Check whether the brake is in good condition. Check feedback terminal signal.
681	Contactor fault	Contactor feedback signal and control signal are inconsistent. Feedback terminal signal is	Check whether the contactor is in good condition. Check feedback terminal signal.

Fault Code	Fault type	Possible cause	Solution
		interfered.	
682	No hardware enabling signal	Enabling signal is missing during operation.	Check the enabling signal timing and connection.
684	AM open-loop output without current	Braking pipe resistance is unmatched. Braking pipe fault.	Check the resistance of braking pipe.
685	No absolute position signal	The sine-cosine or absolute-value encoder position signal is lost. The encoder is interfered.	Check whether the encoder is in good condition. Check whether the VFD and encoder are grounded.
687	Dual-CPU communication fault 1	With dual CPU structure, MCU does not work properly.	Check whether J1 and J11 are short-circuited. Replace the main control board.
690	Sin/Cos encoder CD signal loss fault	Sin/Cos encoder CD signal is disconnected. Encoder is damaged.	Check the CD signal wiring of the Sin/Cos encoder. Replace the Sin/Cos encoder cable. Replace the Sin/Cos encoder.

13 Appendix

13.1 System mapping

Decimal	Binary	Hex
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F
16	10000	0x10
32	100000	0x20
64	1000000	0x40
128	10000000	0x80
65535	1111 1111 1111 1111	0xFFFF

bit15	bit14	bit13	bit12	bit11	bit10	bit9	bit8	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
32768	16384	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1

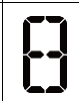
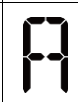
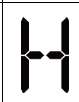
Example: If you need to set bit0, bit2, bit8, and bit15 of a parameter to 1, the value of the parameter is:

$1\times2^{0} + 1\times2^{2} + 1\times2^{8} + 1\times2^{15}$

=1 + 4 + 256 + 32768

=33029

13.2 Mapping of 7-segment and 11-segment display

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

Your Trusted Industry Automation Solution Provider

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