EC30 Series
Elevator Door Controller
User Manual

Preface

Overview

Thank you for choosing EC30 series elevator door controller.

EC30 series elevator door controller is a variable-frequency elevator door controller special for elevator door system, which integrates the logic control of door opening and closing with the motor drive control, and the external system can realize the control of the whole door system by giving the door opening and closing commands through CAN communication or IO terminals. The controller can drive permanent magnet synchronous motors and asynchronous motors in distance control mode. The product is widely used to meet the control and drive needs of most elevator door controller systems.

This manual mainly instructs you how to install, wire, set parameters for, diagnose faults for, and maintain the elevator door controller, and also lists related precautions. Before installing the product, read through this manual carefully to ensure the proper installation and running with the excellent performance and powerful functions into full play.

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 drive housing without permission, any alteration or damage to the drive 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 personnel

- User technical support personnel

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	July 2024

Contents

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 definition

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

Warning symbols	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.
Note	Note	Actions taken to ensure proper running.

1.3 Safety guidelines

⚠	• Only trained and qualified professionals are allowed to carry out installation and maintenance operations. • Do not perform wiring, inspection or component replacement when power supply is applied. Before wiring or inspection, ensure all the input power supplies have been disconnected, and wait for at least 10 minutes. • Use insulation protective tools during maintenance, otherwise electric shock accidents or personal injury may be caused. • Connect the grounding wire reliably, and the wiring shall be performed by professionals to avoid electric shock or fire accidents. • Do not install the motor and drive near combustible materials, otherwise fire may be caused. • Do not modify the product unless authorized, otherwise electric shock, fault, burnout, or fire may be caused.
⚠	• Do not knock the product housing during installation to avoid the damage to the precision parts or declined accuracy. • Check all external wiring carefully before first power-on to avoid major accidents caused by wiring errors.

	• Empty the motor load as much as possible for the first power-on, and be ready to switch off the power according to the running condition. • Do not start or stop the system by connecting or disconnecting the power supply. You shall use the enabling operation to start or stop the system. • The product contains electrolytic capacitors, integrated circuits, epoxy boards, and other components. When the product is scrapped, deal with it as industrial waste, otherwise personal injury or environment pollution may be caused.

🖉**Note: 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.

2 Product overview

2.1 What this chapter contains

This chapter describes the models, specifications, performance, and installation dimensions of the EC30 series elevator door controller.

2.2 Drive nameplate
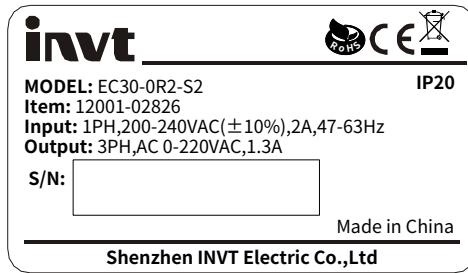
Note: The preceding shows a standard product nameplate example. The nameplate has markings such as "CE", "TUV", and "IP20" depending on the actual certification result.

2.3 Model description

Field identifier	Description
①	EC30: EC30 series elevator door controller
②	3-digit rated output power code: The decimal point is indicated by "R", and "0R2" indicates 0.2kW.
③	Voltage class: S2 indicates AC220V.

2.4 Technical specifications

Item		Condition
Performance control	Control mode	0: VF control mode; 1: Sensorless vector control (SVC); 2: Sensor vector control (VC)

Item		Condition
	Speed control accuracy	Under the encoder mode: ±0.05%
	Starting torque	For AMs: 0.25Hz/150% (SVC) For SMs: 2.5Hz/150% (SVC) 0Hz/200% (VC)
	Frequency resolution	0.01Hz
	Current resolution	0.01A
	Overload capacity	150% of the rated current for 60s 180% of the rated current for 10s
Main functions		When the AC permanent magnet synchronous motor is used, the motor with-load angle autotuning is supported. When the asynchronous motor is used, without-load and with-load tuning motor parameters are supported.
		Support the open-loop jogging.
		Support the fault self-diagnosis function.
		The door fully open/close detection supports the torque detection and limit switch detection.
		Support fast judgment of obstruction identification.
		Drive overload protection: 150% of rated current: 60s, 180% of rated current: 10s
		Support protection functions, such as protection against overvoltage, undervoltage, overcurrent, output phase loss, and inter-phase short circuit.
		Support the automatic demonstration function.
IP rating		IP20
Transport means		When standard packing boxes are used, cars, trains, airplanes, ships and similar means can be used for transport.
Transportation vibration		15m/s^2(1.5g) when the sine vibration range is 9–200Hz

2.5 Outline dimensions of the drive

Figure 2-1 Product outline dimensions (unit: mm)
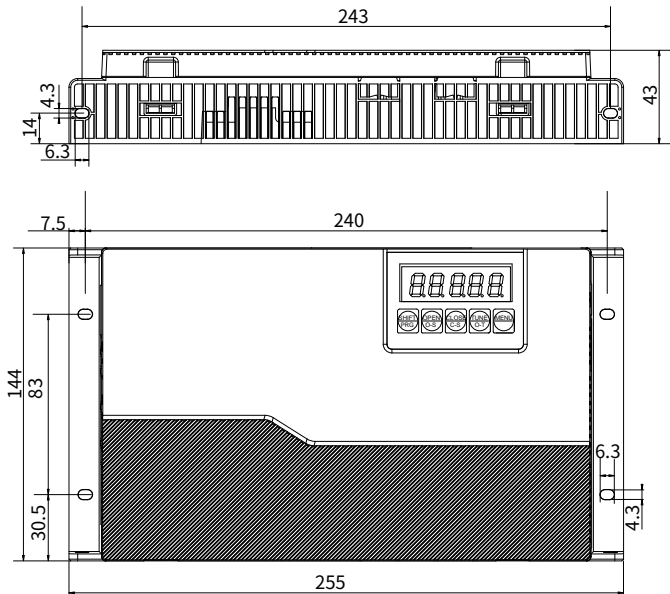
2.6 Technical parameters of the motor

Rated voltage	50V	Rated torque	2.7N.m	Insulation class	F
Rated current	1.1A	Rated speed	180r/min	Motor pole pairs	16
Rated power	50W	IP rating	IP54	Temperature rise	≤105k
Rated frequency	24Hz	Duty cycle	S3-40%	Operating noise	≤52dB

2.7 Technical parameters of the motor encoder

Item	Technical requirements
Output signal	A, B, Z
Supply voltage	DC 12–24V±5%

2.8 Outline dimensions of the motor (Model: DM30-1.1A-01)

Lead-out wire
length 1000mm

E07508 terminal
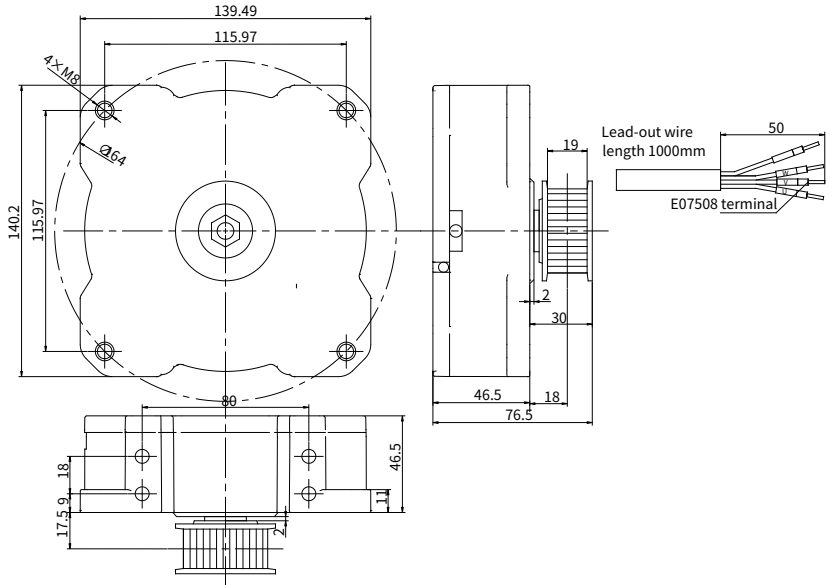
3 Installation guidelines

3.1 What this chapter contains

This chapter describes the installation requirements of the EC30 series elevator door controller as well as the location, specifications and wiring requirements of the various input and output ports.

3.2 Mechanical installation

3.2.1 Unpacking inspection

After receiving the product, perform the following steps to ensure the product use safety.

■ **Check the package**

Before unpacking, check whether the product package is intact–whether the package is damaged, dampened, soaked, or deformed. After unpacking, check whether the interior surface of the packing box is abnormal, for example, in wet condition.

■ **Check the machine and parts**

After unpacking, check whether the equipment enclosure is damaged or cracked, whether the parts (including the controller and manual) inside the packing box are complete, and whether the nameplate and label on the product body are consistent with the model ordered.

3.2.2 Preparing

Only trained and qualified professionals are allowed to carry out the operations mentioned in this chapter. Read the following installation preparation carefully before installation to ensure smooth installation and avoid personal injury or equipment damage.

Warning	
⚠	● Carry out operations according to instructions presented in section 1.3 Safety guidelines. Ensure the controller power has been disconnected before installation. If the controller has been powered on, disconnect the controller power and wait for at least the time specified on the controller, or use a multimeter to check and ensure the controller DC bus voltage is below 36V. ● The controller installation must be designed and done according to applicable local laws and regulations. We do not assume any liability whatsoever for any equipment installation which breaches local laws or regulations.

3.2.3 Installation environment and site

■   **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 1000 meters • 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)

■   **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. 🖉**Note:** Do not install the controller onto combustible objects.

Site		Requirement
		With low salt content.

3.2.4 Drive installation

3.2.4.1 Installation space
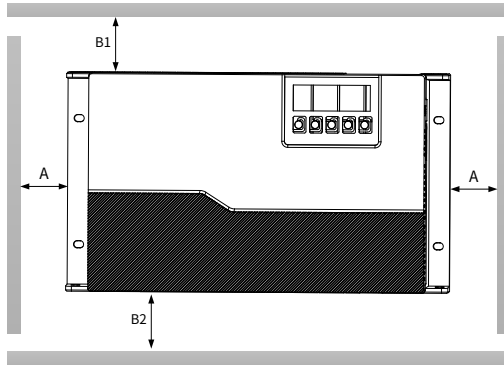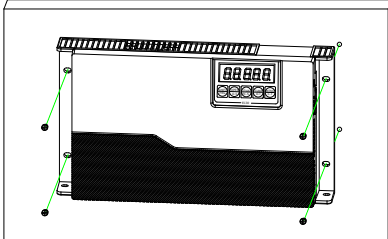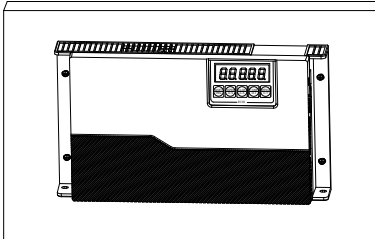
Table 3-1 Installation space dimension requirements
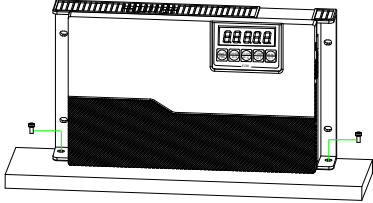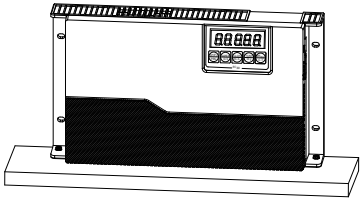
Installation method	Dimension requirements		
Wall mounting	A≥50mm	B1≥100mm	B2≥50mm
Floor mounting	A≥50mm	B1≥100mm	B2=0

3.2.4.2 Installation method

The procedures of wall mounting are as follows:

Step 1 Mark the installation hole positions. Mount the screws onto the designated positions. For details about the installation hole positions, see section 2.5 Outline dimensions of the drive.	Step 2 Fix the drive on the wall or mounting plate, and tighten the screws on the wall or mounting plate.

The procedures of floor mounting are as follows:

Step 1 Mark the installation hole positions. Mount the screws onto the designated positions. For details about the installation hole positions, see section 2.5 Outline dimensions of the drive.	Step 2 Fix the drive on the ground or mounting plate, and tighten the screws on the ground or mounting plate.

3.3 Electrical installation

3.3.1 Precautions

⚡	• Before wiring, ensure that the input power supply has been cut off. • Electric engineering professionals are allowed to perform the wiring. • The protection grounding terminal PE must be properly grounded. • Check whether the operation is normal after the safety circuit wiring is complete. • Do not touch the conductor of the output terminals directly with your hands or allow the output cables to come into contact with the housing. Do not cause the output cable short circuit. • Do not touch the circuit parts of the circuit board with your hands.
⚠	• Check whether the voltage of the AC main circuit power supply is the same as the rated voltage of the servo drive nameplate. • Do not carry out any voltage withstand test to the drive, so as to avoid the damage to the semiconductor components. • Use the specified torque to tighten terminal screws. • Only trained and qualified professionals are allowed to carry out the design, installation, commissioning and running of the equipment. Comply with all provisions of the "Warning" during the operating process, otherwise serious personal injury or property damage may be caused. • The input power cables are only allowed to be permanently fastened, and the equipment must be grounded reliably. • Even if the elevator door controller is not in operation, the following terminals may still carry dangerous voltages: Power terminals L and N are connected to the motor terminals U, V and W. • After the power switch has been disconnected, it is necessary to wait for ten
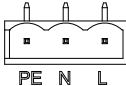
	minutes until the elevator door controller is discharged completely before conducting installation operations.
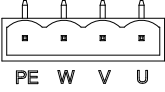
3.3.2 Wiring port description
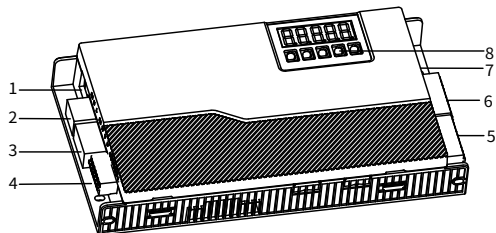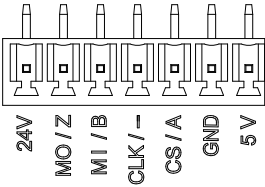
No.	Code	Port label	Port model	Function description
1	SW1	Power switch	Rocker switch	Power input
2	CN3	L, N and PE	F7DEP-7.62-03P	Power AC220V input
3	CN5	U, V, W and PE	F7DEP-7.62-04P	Motor
4	CN7	+5V, GND, CS, CLK, DIN, DOUT and +24V	F7D-3.81-07P	Encoder interface
5	CN1	COM, DI1, ...DI8	F7D-3.81-10P	Control input terminals
6	CN2	TA12, TB1, TC1, TB2, TC2, TA34, TB3, TC3, TB4 and TC4	F7D-3.81-10P	Control output terminal
7	CN8	USB	USB	External hand-held keypad interface
8	-	Display keys	-	Display key operations/functions and parameters.

3.3.3 Drive circuit ports
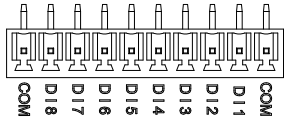
Type	Code	Port label	Name	Description
Drive main circuit input (F7DEP-7.62-03P)	CN3-1	L	AC220V power input	AC 1PH 220V input
	CN3-2	N	AC220V power input	
	CN3-3	PE	Grounding terminal	
Drive main circuit output (F7DEP-7.62-04P)	CN5-1	U	Connect to U phase of the motor	Connect to 3PH motor
	CN5-2	V	Connect to V phase of	
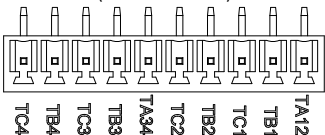
Type	Code	Port label	Name	Description
PE W V U			the motor	
	CN5-3	W	Connect to W phase of the motor	
	CN5-4	PE	Grounding terminal	

3.3.4 Motor encoder input ports

Type	Code	Port label	Name
Motor encoder input (F7D-3.81-07P) 24V MO/Z MI/B CLK/– CS/A GND 5V	CN7-1	+5V	5V power input
	CN7-2	GND	Power ground
	CN7-3	CS/A	Communication encoder CS signal/PA
	CN7-4	CLK/-	Communication encoder clock signal
	CN7-5	MI/B	Communication encoder data input/B
	CN7-6	MO/Z	Communication encoder data output/Z
	CN7-7	+24V	24V power input

3.3.5 Control circuit terminal description

Type	Code	Port label	Name	Remarks
Control signal input (F7D-3.81-10P) COM DI8 DI7 DI6 DI5 DI4 DI3 DI2 DI1 COM	CN1-1	COM	Common terminal	-
	CN1-2	DI1	Door opening input signal	Multi-function input points
	CN1-3	DI2	Door closing input signal	
	CN1-4	DI3	Light curtain signal	
	CN1-5	DI4	Forced door closing signal	
	CN1-6	DI5	Door opening limit signal	
	CN1-7	DI6	Door closing limit signal	
	CN1-8	DI7	Door opening DEC signal	
	CN1-9	DI8	Door closing DEC	

Type	Code	Port label	Name	Remarks
			signal	
	CN1-10	COM	Common terminal	
Door state output terminals (F7D-3.81-10P)	CN2-1	TA12	Common terminal of relay 1 and 2	Equipped with relay outputs as standard configuration TA-TB: NC TA-TC: NO Contact capacity: 5A/AC250V, 5A/DC30V (multi-function output points)
	CN2-2	TB1	1: Door fully open signal NC output	
	CN2-3	TC1	1: Door fully open signal NO output	
	CN2-4	TB2	2: Door fully closed signal NC output	
	CN2-5	TC2	2: Door fully closed signal NO output	
	CN2-6	TA34	Common terminal of relay 3 and 4	
	CN2-7	TB3	Excessive torque NC output	
	CN2-8	TC3	Excessive torque NO output	
	CN2-9	TB4	Fault NC output	
	CN2-10	TC4	Fault NO output	
Commissioning interface	CN8	-	USB interface	Used for bluetooth

3.3.6 Application wiring diagram

EC30 supports the distance control mode and asynchronous motor VF speed switch control mode, and typical wiring diagrams are shown in the following figures.

Figure 3-1 Application wiring for ABZ encoder distance control mode
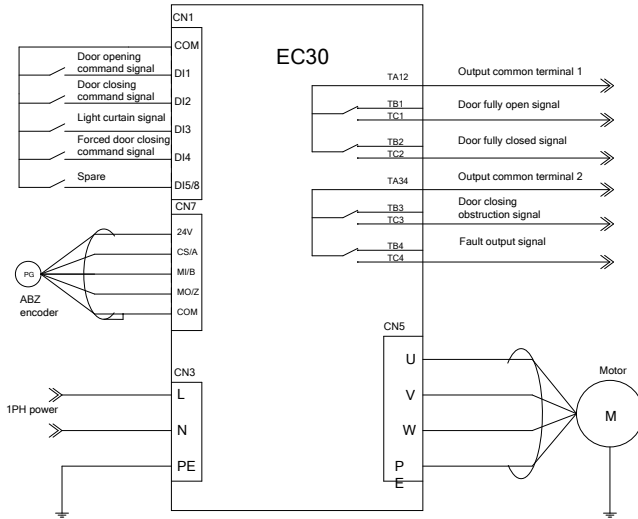
Figure 3-2 Application wiring for speed switch control mode without encoder
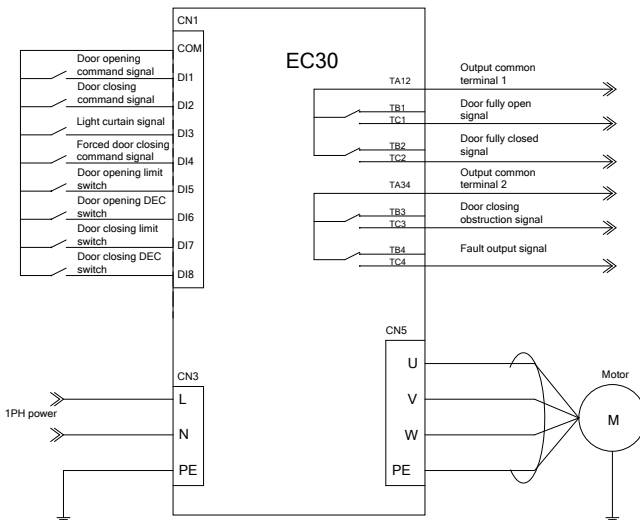
4 Key operation

4.1 What this chapter contains

This chapter describes the keypad, key definitions and operation settings of the EC30 series elevator door controller.

4.2 Keypad
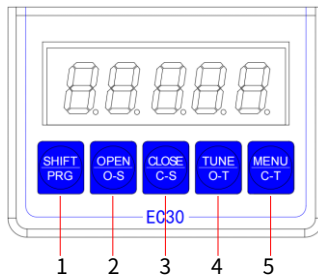
4.3 Key definition

No.	Keys		Description
1	SHIFT PRG	SHIFT/PRG	Press it to exit or return to the previous menu.
2	OPEN O-S	OPEN/O-S	Increase the menu name or parameter value/move upward, door opening.
3	CLOSE C-S	CLOSE/C-S	Decrease the menu name or parameter value/move downward, door closing.
4	TUNE O-T	TUNE/O-T	Press it to select digits to change the parameters (motor autotuning/door width autotuning).
5	MENU C-T	MENU/C-T	Press it to enter the next menu or confirm the current operation.

4.4 Basic settings on the operation panel

The keypad function of the elevator door controller mainly includes two parts, monitoring menu and full menu. Upon power-on, it enters the monitoring menu by default, and the monitoring menu is equipped with basic parameter monitoring and debugging functions.

The full menu adopts the three-level menu structure, covering all the parameters, and it is convenient to query and modify the parameters.

1. Switching process of monitoring menu and full menu

The monitoring menu is displayed upon power-on, and press and hold [MENU C-T] key for more than 1s to enter the full menu. Press [SHIFT PRG] key on the first level menu or wait for 60s without operation to exit to the monitoring menu.

2. Monitoring menu description

In the running/stopped state, if there is no fault in the controller, parameters displayed in running/stopped state can be set through using FA.00/FA.01 and [SHIFT PRG] key.

Query parameters displayed in running/stopped state

Set frequency
Running frequency
Bus voltage
Output voltage
Output current
Output torque
Input state
Output state
Door width position
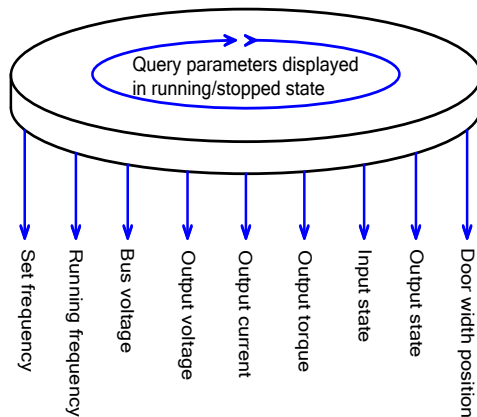
3. Monitoring interface description of the monitoring menu

Interface	System state	Description
O XX.XX	Run	O flashes at intervals: it indicates that the system accepts the external door opening command.
	Door fully open	O is displayed statically: it indicates that the system accepts the external door opening command and the door is fully opened.
C XX.XX	Run	C flashes at intervals: it indicates that the system accepts the external door closing command.
	Door fully closed	C is displayed statically: it indicates that the system accepts the external door closing command and the door is fully closed.
O.XX.XX	Run	O indicates that the system accepts the external door opening and closing commands simultaneously.
P XX.XX	Pause	It indicates that the system enters the pause mode, and

Interface	System state	Description
		press and hold [SHIFT PRG] key to exit.

4. Panel commissioning function

In panel mode (F0.02=0), You can conduct commissioning through the following keys.

Condition	Keys	Name	Remarks
On the monitoring interface of stopping normally	[OPEN O-S] + [SHIFT PRG]	Motor FWD rotation	When F0.02 is 0 or 1, press the key for a short time on the monitoring interface in the stopped state, the motor is controlled by the elevator door controller to run at the speed of F3.03.
	[CLOSE C-S] + [SHIFT PRG]	Motor REV rotation	When F0.02 is 0 or 1, press the key for a short time on the monitoring interface in the stopped state, the motor is controlled by the elevator door controller to run at the speed of F4.03.
	Press and hold [TUNE O-T] + [SHIFT PRG]	Autotuning with one click	Press and hold the key for 3s on the monitoring interface in the stopped state to carry out autotuning with one click. Perform tuning before autotuning with one click, and TUNE1 is displayed. Carry out door width autotuning, and TUNE2 is displayed.
Any state	Press and hold [SHIFT PRG]	Stop/Fault reset	Press and hold the key for more than 1s during running to stop running. When a fault occurs, press and hold the key to reset the fault (some faults cannot be reset).
	Press [SHIFT PRG] for a short time	Exit the menu	Press the key for a short time to return to previous menu, and the monitoring menu is the top-level menu.
	Press and hold [MENU C-T]	Enter the full menu	Press and hold the key for more than 1s on the monitoring interface to enter the full menu.

4.5 Operation instruction of quick commissioning menu

The quick commissioning menu is equipped with basic parameter setting functions.

On the parameter monitoring interface, press [SHIFT PRG] key + [MENU C-T] key simultaneously to

enter the parameter setting interface, which can be used to set the door opening speed gear, door closing speed gear, door opening torque and door closing torque. The operation flow is shown in the following figure.
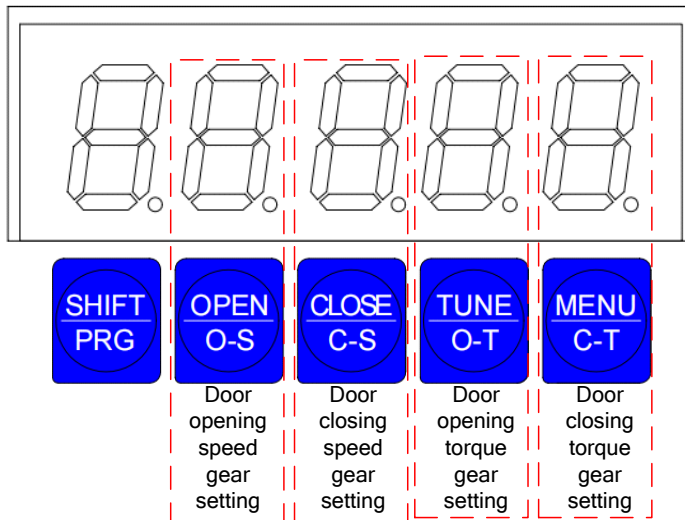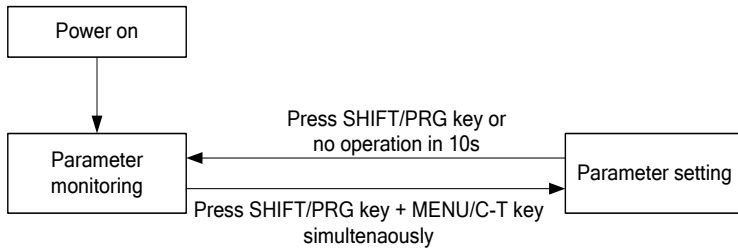
The key descriptions are as follows:

Keys	Name	Remarks
SHIFT PRG + MENU C-T	Enter the quick commissioning menu	Press the key for a short time on the monitoring interface to enter the quick commissioning menu.
OPEN O-S	O–S indicates the door opening speed gear setting.	Door opening speed gear can be set to gear 1–4. The larger the gear, the faster the max. speed of door opening (F3.03), and the shorter the door opening ACC time (F3.04) and the door opening DEC time (F3.06). The system door opening

Keys	Name	Remarks
		speed gear is 0 by default.
CLOSE C-S	C–S indicates the door closing speed gear setting.	Door closing speed gear can be set to gear 1–4. The larger the gear, the faster the max. speed of door closing (F4.03), and the shorter the door closing ACC time (F4.04) and the door closing DEC time (F4.06). The system door closing speed gear is 0 by default.
TUNE O-T	O–T indicates the door opening torque gear setting.	Door opening torque gear can be set to gear 1–4. The larger the gear, the greater the door fully open torque switching point setting (F3.07), door opening obstruction torque (F3.09) and door fully open holding torque (F3.08). The system door opening torque gear is 0 by default.
MENU C-T	C–T indicates the door closing torque gear setting.	Door closing torque gear can be set to gear 1–4. The larger the gear, the greater the door fully closed torque switching point setting (F4.11), door closing holding torque (F4.12) and door closing obstruction torque F4.13). The system door closing torque gear is 0 by default.

For example, press OPEN O-S key to set F3.03 (Door opening high-speed setting), and every time the key is pressed, the corresponding value of the digital tube is increased by 1.

4.6 Operation instruction of full menu

The full menu adopts the three-level menu setting method, which can easily and quickly query and set parameters.

A three-level menu consists of parameter group numbers (level-1 menus), the function codes (level-2 menus), and the function parameters (level-3 menus). The operation flow is shown in the following figure.

Figure 4-1 Key operation flow
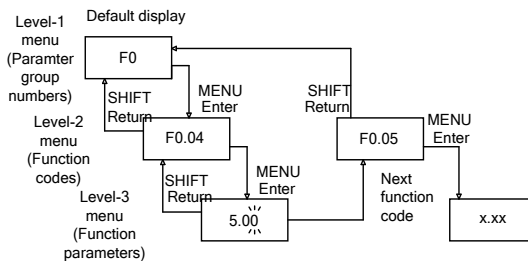
When there is a blinking bit, press the OPEN/CLOSE/TUNE button to modify it!

When performing operations on the level-3 menu, you can press [SHIFT PRG] key or [MENU C-T] key to return to the level-2 menu. If you press [MENU C-T] key, the set value of the parameter is saved first, and then the level-2 menu is returned, displaying the next function code. If you press [SHIFT PRG] key, the level-2 menu is returned directly, without saving the set value of the parameter.

4.7 Application examples of the elevator door controller

4.7.1 Motor tuning

The following describes the AC permanent magnet synchronous motor with-load tuning. Before the first operation of the AC permanent magnet synchronous motor (PMSM), magnetic pole position identification must be carried out. Otherwise it cannot be used properly. If the motor wiring has been changed, the encoder has been replaced, or the encoder wiring has been changed, the position angle of the encoder must be identified again. Therefore, it is necessary to ensure that the motor wiring is exactly the same when the magnetic pole position is identified and when the motor is operating normally.

The tuning operation can only be started in the normal stopped state. The motor will rotate and run during tuning, so make sure it is safe and the encoder signal is normal before tuning.

The tuning procedures are as follows:

Step 1   Press and hold [MENU C-T] key for more than 1s on the monitoring interface to enter the full menu.

Step 2   Set F1.00 to 1, that is, the synchronous motor is selected.

Step 3   Set motor values according to the motor nameplate.

Step 4   After F1.16 is set to 1, TUNE1 blinks on the rear board of the keys, it indicates that motor tuning is started.

Step 5   When TUNE1 disappears, motor tuning is complete.

4.7.2 Door width autotuning

In distance control mode, it is necessary to conduct autotuning of the door system before running. During the door opening and closing process of distance control, the number of pulses is recorded in real time, and the control and judgment of the door fully open and close is conducted according to the number of door width pulses. In distance control mode,

it is necessary to ensure that the motor tuning is completed and the motor wiring is normal before starting the door width autotuning. During the door width autotuning process, the direction of door movement will automatically change, so take into account personal safety before operation, otherwise personal injury may occur. It is necessary to confirm that there are no obstacles during the movement of the door before conducting the door width measurement. If there are obstacles during the movement, it will be judged as arrived and the door width measurement cannot be carried out correctly.

The operation procedures are as follows:

Step 1   Push the door panel manually to the closed position.

Step 2   If it is on the monitoring interface, press and hold key for more than 1s to enter the full menu.

Step 3   Set F0.02 to 1, namely distance mode.

Step 4   Set F6.00 to 1, TUNE2 blinks on the rear board of the keys, indicating that door system autotuning is started.

Step 5   When TUNE2 disappears, it indicates that the door system autotuning is complete.

5 Function parameter list

5.1 What this chapter contains

This chapter lists all the function codes and corresponding description of each function code.

The function parameters of EC30 have been divided into 14 groups from F0 to FP by function. Each function group contains 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.

5.2 Function parameter list

1. The content of the function code table is as follows:

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 elevator door controller automatically checks and constrains the modification of parameters, which helps prevent incorrect modifications.

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

3. "Default" indicates the factory setting of the function parameter. If the value of the parameter is detected or recorded, the value cannot be restored to the factory setting.

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

5.2.1 Group F0—Basic function parameters

Function code	Name	Description	Default	Modify
F0.00	Control mode	0–3 0: Reserved 1: Closed-loop vector control 2: VF control 3: Reserved	1	◎
F0.01	Door opening/closing method	0–2 0: Speed control (travel switch based) 1: Distance control (encoder based) 2: Distance control + Switch control	1	◎
F0.02	Command source selection	0–4 0: Control panel 1: Elevator door controller terminal or communication control 2: Manual commissioning on elevator door controller 3: Automatic demonstration of elevator door controller 4: Reserved	1	◎
F0.03	Elevator door mode selection	0: Reserved 1: Elevator door mode	1	◎
F0.04	Panel based running frequency	0.00Hz–F1.04	5.00Hz	○
F0.05	Input point quick setting (terminal polarity)	0–2	1	◎
F0.06	Slow travel speed setting	0.00Hz–F1.04	4.00Hz	○
F0.07	Carrier frequency adjustment	2.0–16.0kHz	8.0kHz	○
F0.08	Panel based ACC time	0.1–999.9s	2.0s	○
F0.09	Panel based running DEC time	0.1–999.9s	2.0s	○
F0.10	Panel based running torque upper limit	0.0–250.0%	120.0%	○
F0.11	Motor FWD rotation direction	0–1 0: Door opening	0	◎

Function code	Name	Description	Default	Modify
		1: Door closing		
F0.12	Max. output frequency	F0.13–599.00Hz	50.00Hz	◎
F0.13	Upper limit of running frequency	F0.14–F0.12Hz	50.00Hz	◎
F0.14	Lower limit of running frequency	0.00Hz–F0.13	0.00Hz	◎

5.2.2 Group F1—Motor function parameters

Function code	Name	Description	Default	Modify
F1.00	Motor type selection	0–1 0: Asynchronous motor (AM) 1: Synchronous motor (SM)	1	◎
F1.01	Motor rated power	0.0–75.0kW Note: If the motor power is less than 100W, set this parameter to 0.1.	0.1kW	◎
F1.02	Motor rated voltage	0–310V	50V	◎
F1.03	Motor rated current	0.01–99.00A	1.10A	◎
F1.04	Motor rated frequency	1.00–99.00Hz	24.00Hz	◎
F1.05	Motor rated speed	1–9999r/min	180r/min	◎
F1.06	Motor stator phase resistance	0.001–65.535Ω	20.109Ω	○
F1.07	Rotor phase resistance of AM	0.001–65.535Ω	9.280Ω	○
F1.08	Leakage inductance of AM	0.01–655.35mH	3.85mH	○
F1.09	Mutual inductance of AM	0.01–655.35mH	29.60mH	○
F1.10	No-load current of AM	0.00–655.35A	1.20A	○
F1.11	D-axis inductance of SM	0.01–655.35mH	35.8mH	○
F1.12	Q-axis inductance of SM	0.01–655.35mH	54.29mH	○
F1.13	SM counter-emf	0–220V	30V	○
F1.14	SM encoder zero position	0.00–359.99°	0.00°	◎

Function code	Name	Description	Default	Modify
F1.15	SM real-time angle	0.00–359.99°	0.00°	●
F1.16	Autotuning selection	0–2 0: No operation 1: With-load tuning 2: Without-load tuning	0	◎
F1.17	Magnetic saturation coefficient 1 of iron core of AM 1	0.0–100.0%	80.0%	○
F1.18	Magnetic saturation coefficient 2 of iron core of AM 1	0.0–100.0%	68.0%	○
F1.19	Magnetic saturation coefficient 3 of iron core of AM 1	0.0–100.0%	57.0%	○
F1.20	Magnetic saturation coefficient 4 of iron core of AM 1	0.0–100.0%	40.0%	○

5.2.3 Group F2—Performance control parameters

Function code	Name	Description	Default	Modify
F2.00	Speed-loop proportional gain 1	0.0–200.0	5.0	○
F2.01	Speed-loop integral time 1	0.001–10.000s	0.200s	○
F2.02	Switching frequency 1	0.00Hz–F2.05	5.00Hz	○
F2.03	Speed-loop proportional gain 2	0.0–200.0	5.0	○
F2.04	Speed-loop integral time 2	0.001–10.000s	0.200s	○
F2.05	Switching frequency 2	F2.02–F1.04	10.00Hz	○
F2.06	Current-loop proportional coefficient P	0–10000	500	○
F2.07	Current-loop integral coefficient I	0–10000	500	○
F2.08	Vector control slip compensation coefficient (for power	50–200%	100%	○

Function code	Name	Description	Default	Modify
	generation)			
F2.09	Inertia compensation	0–9999	1	◎
F2.10	Torque boost	0.0–30.0%	8.0%	○
F2.11	Overexcitation gain	0–200	64	○
F2.12	SM initial position inferring method	0: No detection 1: High-frequency superposition 2: Pulse superposition	2	◎
F2.13	Speed feedback filtering method	0x00–0x99 Ones place: Low-speed filter times (corresponding to 2^ Ones place*125μs) Tens place: High-speed filter times (corresponding to 2^ Tens place*125μs)	0x00	○
F2.14	Encoder pulse count setting	1–9999pls	1024pls	◎
F2.15	Encoder pulse direction selection	0–1 0: Forward 1: Reverse	0	◎
F2.16	Self-closing coefficient	0–9999	0	○
F2.17	Self-closing initial value	0–9999	0	○
F2.30	Speed-loop differential gain	0.00–10.00s	0.00s	○
F2.31	SM max. flux weakening current	0.0–200.0%	100.0%	◎
F2.32	Encoder type selection	0–3 0: ABZ 1–3: Reserved	0	◎
F2.33	Door opening ACC compensation	0.001–60.000	0.160	○
F2.34	Door closing obstruction ACC compensation	0.0–99.0	0.127	○
F2.35	Door closing ACC compensation	0–9999	0	○
F2.36	With-pulley reduction ratio	0.0–99.9 (Motor shaft pulley: driven pulley)	0.0	◎
F2.59	Overload pre-alarm detection level	F2.61–200%	150%	○

Function code	Name	Description	Default	Modify
F2.60	Overload pre-alarm detection time	0.1–3600.0s	1.0s	◯
F2.61	Underload pre-alarm detection threshold	0%–F2.59	50%	◯
F2.62	Underload pre-alarm detection time	0.1–3600.0s	1.0s	◯
F2.63	Electromotive torque upper limit set through keypad	0.0–300.0%	180.0%	◯
F2.64	Braking torque upper limit set through keypad	0.0–300.0%	180.0%	◯

5.2.4 Group F3—Door opening basic parameters

Function code	Name	Description	Default	Modify
F3.00	Door opening low-speed start setting	0.00Hz–F3.03	1.5Hz	◯
F3.01	Door opening start ACC time	0.1–999.9s	0.2s	◯
F3.02	Speed-control door opening low-speed running time	0.1–999.9s	0.5s	◯
F3.03	Door opening high-speed setting	0.00Hz–F1.04	18.00Hz	◯
F3.04	Door opening ACC time	0.1–999.9s	0.5s	◯
F3.05	Door opening end low-speed setting	0.00Hz–F3.03	1.5Hz	◯
F3.06	Door opening DEC time	0.1–999.9s	2.0s	◯
F3.07	Door fully open torque switching point setting	0.0–150.0%	80.0%	◯
F3.08	Door fully open holding torque	0.0–180.0%	60.0%	◯
F3.09	Door opening	0.0–150.0%	150.0%	◯

Function code	Name	Description	Default	Modify
	obstruction torque			
F3.10	Door opening start torque	0.0–150.0%	90.0%	○
F3.11	Door opening obstruction detection time	0–9999ms	0ms	○
F3.12	Door fully open low-speed setting	0.00Hz–F3.03	0.8Hz	○
F3.13	Door re-opening low-speed setting	0.00Hz–F3.03	4.00Hz	○
F3.14	Door opening coupler high-speed setting	0.00Hz–F3.03	4.00Hz	○
F3.15	Door coupler release high-speed time	0.0–5.0s	0.6s	○
F3.16	Door fully open low-speed detection time	0.0–3.0s	3.0s	○

5.2.5 Group F4—Door closing basic parameters

Function code	Name	Description	Default	Modify
F4.00	Door closing start low-speed setting	0.00Hz–F4.03	2.00Hz	○
F4.01	Door closing start ACC time	0.1–999.9s	0.2s	○
F4.02	Speed control door closing low-speed running time	0.1–999.9s	0.1s	○
F4.03	Door closing high-speed setting	0.00Hz–F1.04	18.00Hz	○
F4.04	Door closing ACC time	0.1–999.9s	0.7s	○
F4.05	Door closing end low-speed setting	0.00Hz–F4.03	1.00Hz	○
F4.06	Door closing DEC time	0.1–999.9s	1.2s	○
F4.07	Door fully closed low-speed setting	0.00Hz–F4.03	0.80Hz	○

Function code	Name	Description	Default	Modify
F4.08	Door fully closed low-speed running time	1–9999ms	300ms	○
F4.09	Door closing coupler speed setting	0.00Hz–F4.03	2.00Hz	○
F4.10	Door closing coupler running time	1–9999ms	600ms	○
F4.11	Door fully closed torque switching point setting	0.0–150.0%	70.0%	○
F4.12	Door fully closed holding torque	0.0%–F4.11	50.0%	○
F4.13	Door closing obstruction torque	0.0–150.0%	75.0%	◎
F4.14	Door closing obstruction handling mode	0–2 0: Output only the obstruction signal at door closing obstruction 1: Stop immediately at door closing obstruction 2: Re-open the door at door closing obstruction	1	◎
F4.15	Door closing obstruction determination time	0–9999ms	300ms	○
F4.16	Fire-control door closing high-speed setting	5.00Hz–F1.04	24.00Hz	○
F4.17	Door closing obstruction high-speed setting	F4.18–F1.04Hz	12.00Hz	○
F4.18	Door closing obstruction low-speed setting	0.00Hz–F1.04	1.20Hz	○
F4.19	High-speed obstruction torque setting	0.0–150.0%	100.0%	○

Function code	Name	Description	Default	Modify
F4.20	Low-speed obstruction torque setting	0.0–150.0%	100.0%	○
F4.21	Door closing limit point forward displacement	0.0–10.0%	4.0%	○
F4.22	Pulse reservation amount during power-off door closing	0–5000	500	○
F4.23	DEC start voltage setting at power-off	150.0–310.0	200.0	◎
F4.24	Door closing start torque	0.0–150.0%	80.0%	○

5.2.6 Group F5—Door opening/closing enhanced parameters

Function code	Name	Description	Default	Modify
F5.00	Abnormal DEC time	0.1–5.0s	0.4s	○
F5.01	Door opening time limit	0.0–999.9s	30.0s	○
F5.02	Door closing time limit	0.0–999.9s	30.0s	○
F5.03	Low speed running time limit	0.0–999.9s	30.0s	○
F5.04	External door opening delay time	0.0–999.9s	99.9s	○
F5.05	External door closing delay time	0.0–999.9s	99.9s	○
F5.06	Door opening curve selection	0–1 0: Linear ACC/DEC 1: S-curve ACC/DEC	1	○
F5.07	Starting segment time of door opening ACC S curve	10.0–50.0% ACC/DEC time: Starting segment + Rising segment≤90%	30.0%	○
F5.08	Rising segment time of door opening ACC S curve	10.0–80.0% ACC/DEC time: Starting segment + Rising segment≤90%	40.0%	○

Function code	Name	Description	Default	Modify
F5.09	Starting segment time of door opening DEC S curve	10.0–50.0% ACC/DEC time: Starting segment + Rising segment≤90%	30.0%	○
F5.10	Falling segment time of door opening DEC S curve	10.0–80.0% ACC/DEC time: Starting segment + Rising segment≤90%	40.0%	○
F5.11	Door closing curve selection	0–1 0: Linear ACC/DEC 1: S-curve ACC/DEC	1	○
F5.12	Starting segment time of door closing ACC S curve	10.0–50.0%	30.0%	○
F5.13	Rising segment time of door closing ACC S curve	10.0–80.0%	40.0%	○
F5.14	Starting segment time of door closing DEC S curve	10.0–50.0%	30.0%	○
F5.15	Falling segment time of door closing DEC S curve	10.0–80.0%	40.0%	○
F5.16	Speed deviation setting	0–80%	50%	○
F5.17	Speed deviation excessive determination time	0–5000ms	400ms	○
F5.18	Door closing steady speed delay	0–9999ms	200ms	○
F5.19	Fault braking current	0.1–150.0%	100.0%	○
F5.20	Withdrawal current rate	1–1000ms	2ms	○
F5.21	Direction change DEC time	0.1–5.0s	2.0s	○
F5.22	Function selection switch	0–9999	0	◎
F5.23	Function selection switch	0–9999	128	○

Function code	Name	Description	Default	Modify
F5.24	Function selection switch	0–9999	78	○
F5.26	Oscilloscope monitoring address 1	0x0000–0xFFFF	0x0000	○
F5.27	Oscilloscope monitoring address 2	0x0000–0xFFFF	0x0000	○

5.2.7 Group F6—Distance control parameters

Function code	Name	Description	Default	Modify
F6.00	Door width autotuning function selection	0–1 0: Invalid 1: Door width measurement, effective in manual commissioning mode	0	○
F6.01	Door width autotuning speed	0.00–20.00Hz	3.00Hz	○
F6.02	Door width	0.0–6000.0mm	950.0mm	◎
F6.04	Distance-control door opening start low-speed running distance	0.0–30.0%	10.0%	○
F6.05	Distance-control door opening DEC point setting	60.0–90.0%	70.0%	○
F6.06	Distance-control door opening limit point setting	80.0–99.0%	96.0%	○
F6.07	Distance-control door closing start low-speed running distance	0.0–30.0%	10.0%	○
F6.08	Distance-control door closing DEC point setting	60.0–90.0%	70.0%	○
F6.09	Distance-control door closing limit point setting	80.0–99.9%	96.0%	○

Function code	Name	Description	Default	Modify
F6.10	Output torque display	0.0–180.0%	0.0%	○
F6.11	Door opening limit switch position	0.0–6000.0mm	0.0mm	◎
F6.13	Door closing limit switch position	0.0–6000.0mm	0.0mm	◎
F6.14	Door width autotuning and initial running torque setting	0.0–150.0%	80.0%	◎
F6.15	Door opening DEC point	0.0–6000.0mm	0.0mm	◎
F6.17	Door closing DEC point	0.0–6000.0mm	0.0mm	◎
F6.19	Distance deviation setting for door fully open output	0.0–6000.0mm	8.0mm	○
F6.20	Distance deviation setting for door fully closed output	0.0–6000.0mm	5.0mm	○
F6.21	Door position feedback pulse setting	0.0–99.9%	33.0%	○
F6.22	Door opening reserve setting	0.0–6000.0mm	8.0mm	○
F6.23	Door coupler pulse length	0.0–6000.0mm	38.0mm	○
F6.25	Door closing coupler distance	0.0–6000.0mm	38.0mm	○
F6.26	Door closing reserve setting	0.0–6000.0mm	10.0mm	○
F6.27	Door travel distance	100–9999mm	475mm	○
F6.28	Door coupler length setting	0mm–F6.27	38mm	○
F6.29	SM transmission ratio	0.0–100.0	0.0	○

5.2.8 Group F7—Demonstration function parameters

Function code	Name	Description	Default	Modify
F7.00	Door fully open holding time for demonstration	1.0–99.9s	2.0s	○
F7.01	Door fully closed holding time for demonstration	1.0–99.9s	2.0s	○
F7.02	Door opening/closing run count for demonstration	0–9999	0	●
F7.03	Door opening/closing specified run count for demonstration	0–9999	0	◎

5.2.9 Group F8—Auxiliary parameters

Function code	Name	Description	Default	Modify
F8.00	Drive software version number	0.00–655.35	0.00	●
F8.01	Module temperature	-56.0–126.0℃	0.0℃	●
F8.02	Auto fault reset count	0–100	6	◎
F8.03	Braking utilization rate	0–100%	0%	●
F8.04	Accumulated working time (hours)	0–65535h	0h	●
F8.05	Accumulated working time (minutes)	0–3599min	0min	●
F8.06	Accumulated running time (hours)	0–65535h	0h	●
F8.07	Accumulated running time (minutes)	0–3599min	0min	●
F8.08	Accumulated working time setting	0–65535h	0h	◎
F8.09	Accumulated running time setting	0–65535h	0h	◎
F8.10	Auxiliary function switch 1	0x0000–0xFFFF Bit 0: Trigger-based door opening	0x0000	◎

Function code	Name	Description	Default	Modify
		command Bit 1–Bit 3: Reserved Bit 4: Starting door closing takes priority. Bit 5–Bit 6: Reserved Bit 7: Enable auto run at power-on in demonstration mode. Bit 8–Bit 9: Reserved Bit 10: Enable door opening/closing priority. Bit 11–Bit 15: Reserved		
F8.11	Fault function selection	0–9999	0	◎
F8.12	Parameter update switch	0–1 0: Record parameters. 1: Do not record parameters.	1	○
F8.13	Drive function selection	0–9999	0	◎
F8.14	Overload coefficient	0.00–10.00	2.00	◎
F8.15	Auxiliary function switch 2	0x0000–0xFFFF Bit 0: Reserved Bit 1: Enable pulse-to-distance conversion. Bit 2: Enable frequency-to-speed conversion. Bit 3: Enable high-accuracy pulse-to-distance conversion. Bit 4–Bit 15: Reserved	0x0000	◎
F8.16	Drive software temporary version	0.00–655.35	0.00	●
F8.17	Function software version	0.00–655.35	0.00	●
F8.18	Function software temporary version	0.00–655.35	0.00	●
F8.19	Auto fault reset interval	0.1–3600.0s	2.0s	○

Function code	Name	Description	Default	Modify
F8.20	Pre O&M function switch	0–65535	0	◎
F8.21	Door closing obstruction force limit	0–999N	150	◎
F8.22	Kinetic energy limit	0.0-99.9J	10.0	◎
F8.23	Forced door closing kinetic energy limit	0.0-99.9J	4.0	◎
F8.24	Reserved	0–65535	0	○
F8.27	Maladjustment detection time	0.0–10.0s	0.5s	○
F8.28	Current limit selection	0x00–0x11 Ones place: Current limit action selection 0: Invalid 1: Always valid Tens: Hardware current limit overload alarm selection 0: Valid 1: Invalid	0x01	◎
F8.29	Automatic current limit threshold	50.0–200.0%	160.0%	◎
F8.30	Frequency drop rate during current limit	0.00–50.00Hz/s	10.00Hz/s	◎
F8.31	Overload protection selection of motor 1	0–2 0: No protection 1: Common motor (with low-speed compensation) 2: Frequency-variable motor (without low-speed compensation)	2	◎
F8.32	Overload protection coefficient of motor 1	20.0–150.0%	100.0%	○
F8.33	Enabling auto carrier frequency reduction	0–1 0: Disable 1: Enable	0	○
F8.34	Min. carrier frequency	1.0–15.0kHz	4.0kHz	○
F8.35	Temperature point of auto carrier frequency	40.0–85.0℃	70.0℃	○

Function code	Name	Description	Default	Modify
	reduction			
F8.36	Carrier frequency reduction interval	0–30s	10s	○
F8.37	Protection against phase loss	0x000–0x011 Ones place: 0: Disable software input phase loss protection. 1: Enable software input phase loss protection. Tens place: 0: Disable output phase loss protection. 1: Enable output phase loss protection. Hundreds place: Reserved	0x010	○
F8.38	Frequency drop at transient power-off	0–1 0: Disable 1: Enable	0	○
F8.39	Enabling elevator door controller overload integral	0–1 0: Disable 1: Enable	0	◎
F8.40	Hardware current limit and overcurrent sampling window	18–32	Model depended	◎
F8.41	Zero vector current limiting frequency division coefficient	1–21	Model depended	◎
F8.42	CBC current limiting frequency division coefficient	1–21	Model depended	◎
F8.43	Hardware overcurrent frequency division coefficient	1–21	Model depended	◎
F8.65	Pull-in current 1	-100.0–100.0% (of the motor rated current)	30.0%	○
F8.66	Pull-in current 2	-100.0–100.0% (of the motor rated current)	10.0%	○

Function code	Name	Description	Default	Modify
F8.67	Pull-in current switching frequency	0.0–200.0% (of the motor rated frequency)	20.0%	○
F8.68	Torque boost of motor 1	0.0–10.0%	0.0%	○
F8.69	Torque boost cut-off of motor 1	0.0–50.0%	0.0%	○
F8.70	V/F slip compensation gain of motor 1	0.0–200.0%	0.0%	○
F8.71	Low-frequency oscillation control factor of motor 1	0–100	10	○
F8.72	High-frequency oscillation control factor of motor 1	0–100	10	○
F8.73	Oscillation control threshold of motor 1	0.00Hz–F0.03	30.00Hz	○

5.2.10 Group F9—Input and output function parameters

Function code	Name	Description	Default	Modify
F9.00	Terminal filter time	0–100ms	20ms	○
F9.01	Digital input terminal DI1	0–117 0: No function	1	○
F9.02	Digital input terminal DI2	1: Door opening command 2: Door closing command	2	○
F9.03	Digital input terminal DI3	3: External reset input 4: Disable terminal input at door	10	○
F9.04	Digital input terminal DI4	opening 5: Disable terminal input at torque	6	○
F9.05	Digital input terminal DI5	holding 6: Enable input at slow-speed door	0	○
F9.06	Digital input terminal DI6	closing 7: Fire control input	0	○
F9.07	Digital input terminal DI7	8: Maintenance signal 9: Reserved	0	○
F9.08	Digital input terminal DI8	10: Light curtain signal N.O. input 11: Touch plate signal N.O. input	0	○

Function code	Name	Description	Default	Modify
		12: Door opening limit signal N.O. input		
		13: Door closing limit signal N.O. input		
		14: Door opening DEC point N.O. input		
		15: Door closing DEC point N.O. input		
		16: Door lock signal N.O. input		
		17: Motor overheating N.O. input		
		18−109: Reserved		
		110: Light curtain signal N.C. input		
		111: Touch panel signal N.C. input		
		112: Door opening limit signal N.C. input		
		113: Door closing limit signal N.C. input		
		114: Door opening DEC point N.C. input		
		115: Door closing DEC point N.C. input		
		116: Door lock signal N.C. input		
		117: Motor overheating N.C. input		
F9.09	Programmable relay output TA1/TB1/TC1	0−17 0: No function	3	○
F9.10	Programmable relay output TA2/TB2/TC2	1: Door fully open signal output 0 2: Door fully closed signal output 0	4	○
F9.11	Programmable relay output TA3/TB3/TC3	3: Door fully open signal output 1 4: Door fully closed signal output 1	11	○
F9.12	Programmable relay output TA4/TB4/TC4	5: Fault relay signal output 1 6: Reserved 7: Door fully open signal output 2 (only when both door fully open signal output 1 and door lock signal are effective) 8: Door fully closed signal output 2 (only when both door fully closed signal output 1 and door lock signal are effective)	5	○

Function code	Name	Description	Default	Modify
		9: Door lock signal output		
		10: Door re-opening signal output		
		11: Door closing obstruction output		
		12: Door position feedback output		
		13: Elevator door controller readiness output		
		14: Door fully open signal output 3 (only when both door fully open signal output 0 and position limit switch are effective)		
		15: Door fully closed signal output 3		
		16: Door fully open signal output 4 (only when both door fully open signal output 0 and position limit switch are effective)		
		17: Door fully closed signal output 4		

5.2.11 Group FA—Display function parameters

Function code	Name	Description	Default	Modify
FA.00	Selection of parameters displayed in running state on digital panel	0x0000−0x1FFF Bit 0: Set frequency Hz Bit 1: Running frequency Hz Bit 2: DC bus voltage V Bit 3: Output voltage V Bit 4: Output current A Bit 5: Output torque % Bit 6: Digital input terminal state Bit 7: Digital output terminal state Bit 8: Door width pulse percentage	0x013F	○
FA.01	Selection of parameters displayed in stopped state on digital panel	0x00−0x3F Bit 0: Door opening set frequency Hz Bit 1: Door closing set frequency Hz Bit 2: DC bus voltage V Bit 3: Digital input terminal state Bit 4: Digital output terminal state Bit 5: Door width pulse percentage	0x27	○

Function code	Name	Description	Default	Modify
FA.02	1st fault type	0–56	0	●
FA.03	1st fault prompt	0: No fault	0	●
FA.04	2nd fault type	1: Reserved	0	●
FA.05	2nd fault prompt	2: Overcurrent during ACC	0	●
FA.06	3rd fault type	3: Overcurrent during DEC	0	●
FA.07	3rd fault prompt	4: Overcurrent during constant speed running	0	●
FA.08	4th fault type		0	●
FA.09	4th fault prompt	5: Overvoltage during ACC	0	●
FA.10	5th fault type	6: Overvoltage during DEC	0	●
FA.11	5th fault prompt	7: Overvoltage during constant speed running 8: Reserved 9: Undervoltage protection 10: Elevator door controller overloaded 11: Motor overload 12: Reserved 13: Output side phase loss 14: Module overheating 15: Reserved 16: EEPROM fault 17: Reserved 18: Current detection fault 19: Motor tuning fault 20: Rotary encoder fault 21: Initial position detection fault 22–24: Reserved 25: Overspeed fault (Reserved) 26: Incorrect parameter setting 27: Door width autotuning fault 28: Door opening timeout 29: Door closing timeout (Reserved) 30: Slow-speed door opening/closing timeout 31: Door opening obstruction protection 32: Speed deviation protection 33: Door opening limit loss	0	●

Function code	Name	Description	Default	Modify
		34–37: Reserved 38: Mal-adjustment fault 39: Underload fault 40: Double CPU communication fault 41–48: Reserved 49: RS485 communication fault 50–55: Reserved 56: Z pulse loss fault		
FA.12	Bus voltage at latest fault	0.0–999.0V	0.0V	●
FA.13	Output current at latest fault	0.00–9.90A	0.00A	●
FA.14	Running frequency at latest fault	0.00–99.00Hz	0.00Hz	●
FA.15	Output torque at latest fault	-300.0–300.0%	0.0%	●
FA.16	Input terminal state at latest fault	0x00–0xFF Bit 0: DI1 Bit 1: DI2 Bit 2: DI3 Bit 3: DI4 Bit 4: DI5 Bit 5: DI6 Bit 6: DI7 Bit 7: DI8	0x00	●
FA.17	Output terminal state at latest fault	0x0–0xF Bit 0: T1 relay output state Bit 1: T2 relay output state Bit 2: T3 relay output state Bit 3: T4 relay output state	0x0	●
FA.18	Terminal state query	0x000–0xFFF Bit 0: DI1 Bit 1: DI2 Bit 2: DI3 Bit 3: DI4 Bit 4: DI5 Bit 5: DI6	0x000	●

Function code	Name	Description	Default	Modify
		Bit 6: DI7 Bit 7: DI8 Bit 8: T1 relay output state Bit 9: T2 relay output state Bit 10: T3 relay output state Bit 11: T4 relay output state		
FA.19	Function input state query 1	0x0000–0xFFFF Bit 0: Door opening command Bit 1: Door closing command Bit 2: External reset Bit 3: Disable door opening Bit 4: Disable torque holding Bit 5: Slow-speed door closing Bit 6: Fire control Bit 7: Maintenance Bit 8: Light curtain Bit 9: Touch panel Bit 10: Door opening limit Bit 11: Door closing limit Bit 12: Door opening DEC Bit 13: Door closing DEC Bit 14: Door lock Bit 15: Motor overheating	0x0000	●
FA.20	Function output state query 1	0x0000–0xFFFF Bit 0: Door fully open signal output 0 Bit 1: Door fully closed signal output 0 Bit 2: Door fully open signal output 1 Bit 3: Door fully closed signal output 1 Bit 4: Door fully open signal output 2 Bit 5: Door fully closed signal output 2 Bit 6: Door fully open signal output 3 (Reserved) Bit 7: Door fully closed signal output 3 Bit 8: Door fully open signal output 4 (Reserved) Bit 9: Door fully closed signal output 4 Bit 10: Fault signal output Bit 11: Door lock signal output	0x0000	●

Function code	Name	Description	Default	Modify
		Bit 12: Door re-opening signal output		
		Bit 13: Door closing obstruction output		
		Bit 14: Door position feedback output		
		Bit 15: Elevator door controller readiness output		
FA.21	Display control switch	0–9999	0	●
FA.22	Display 1	0–9999	0	●
FA.23	Display 2	0–9999	0	●
FA.24	Analog voltage display	0.00–10.00V	0.00V	●
FA.25	Actual door position low bit	0–9999	0	●
FA.26	Actual door position high bit	0–9999	0	●
FA.27	Run state check	0–9999	0	●
FA.28	Door direction determination	0–1	0	●
FA.29	Door position percentage	0.0–100.0%	0.0%	●
FA.30	Set frequency	0.00–99.99Hz	0.00Hz	●
FA.31	Feedback frequency	0.00–99.99Hz	0.00Hz	●
FA.32	Bus voltage	0.0–999.9V	0.0V	●
FA.33	Output voltage	0–9999V	0V	●
FA.34	Output current	0.00–99.99A	0.00A	●
FA.35	Output torque	-300.0–300.0%	0.0%	●
FA.36	Ramp reference frequency	0.00–99.99Hz	0.00Hz	●
FA.37	Motor rotation speed	0–65535rpm	0rpm	●
FA.38	Torque current	-300.00–300.00A	0.00A	●
FA.39	Exciting current	-300.00–300.00A	0.00A	●
FA.40	Motor power	-300.0–300.0%	0.0%	●
FA.41	Estimated motor frequency	0.00–600.00Hz	0.00Hz	●
FA.42	Door fully open adaptation torque	0.0–99.9	0.0	●
FA.43	Door fully closed adaptation torque	0.0–99.9	0.0	●

Function code	Name	Description	Default	Modify
FA.44	Max. reset pulse deviation	0–9999	0	●
FA.48	Kinetic energy limit max. frequency	0.00–655.35Hz	0.00Hz	●
FA.49	Kinetic energy limit forced door closing max. frequency	0.00–655.35Hz	0.00Hz	●
FA.50	Ramp reference frequency at fault	0.00–99.99Hz	0.00Hz	●
FA.51	Output voltage at fault	0–9999V	0V	●
FA.52	Module temperature at fault	-56.0–126.0°C	0.0°C	●
FA.53	Factory bar code 1	0x0000–0xFFFF	0xFFFF	●
FA.54	Factory bar code 2	0x0000–0xFFFF	0xFFFF	●
FA.55	Factory bar code 3	0x0000–0xFFFF	0xFFFF	●
FA.56	Factory bar code 4	0x0000–0xFFFF	0xFFFF	●
FA.57	Factory bar code 5	0x0000–0xFFFF	0xFFFF	●
FA.58	Factory bar code 6	0x0000–0xFFFF	0xFFFF	●

5.2.12 Group FB—Communication function parameters

Function code	Name	Description	Default	Modify
FB.00	Serial port baud rate	0–4 0: 9600 bps 1: 19200 bps 2: 38400 bps 3: 57600 bps 4: 115200 bps	4	○
FB.01	Front/rear door setting on elevator door controller	1–2 1: Front door 2: Rear door	1	○
FB.02	Local address	0–247	1	○
FB.03	Response time	0–20ms	10ms	○
FB.04	Communication timeout time	0.0–100.0s	0.0s	○

Function code	Name	Description	Default	Modify
FB.05	Communication function selection	0–1 0: Host controller, in-system programming 1: Performance monitoring on the backend	0	○
FB.06	Communication function setting	0x0000–0xFFFF Bit 0: Reserved Bit 1: CAN controlled door opening/closing Bit 7: Enable the standard Modbus protocol	0x0000	○
FB.07	CAN communication quality	0–9	0	●
FB.08	RS485 communication quality	0–9	0	●
FB.09	CAN communication baud rate	0–4 0: 33kbps 1: 40kbps 2: 50kbps 3: 100kbps 4: 110kbps	1	◎

5.2.13 Group FC—Password parameters

Function code	Name	Description	Default	Modify
FC.00	User password	0–65535	*****	○
FC.01	Parameter update	0–4 0: None 1: Restore factory settings 2: Clear faults 3: SM parameter pre-settings 4: AM parameter pre-settings	0	◎
FC.02	User setting check	0–1	0	○
FC.03	Year	0–65535	0	○
FC.04	Month	0–12	0	○
FC.05	Date	0–31	0	○
FC.06	Hour	0–23	0	○

Function code	Name	Description	Default	Modify
FC.07	Minute	0–59	0	○

5.2.14 Group FP—Quick commissioning parameters

Function code	Name	Description	Default	Modify
FP.00	Gear 1 door opening high-speed setting	0.00Hz–F1.04	33.00Hz	○
FP.01	Gear 1 door opening ACC time	0.1–999.9s	1.8s	○
FP.02	Gear 1 door opening DEC time	0.1–999.9s	1.8s	○
FP.03	Gear 1 door closing high-speed setting	0.00Hz–F1.04	33.00Hz	○
FP.04	Gear 1 door closing ACC time	0.1–999.9s	1.8s	○
FP.05	Gear 1 door closing DEC time	0.1–999.9s	1.8s	○
FP.06	Gear 1 door fully open torque switching point setting	0.0%–150.0%	50.0%	○
FP.07	Gear 1 door fully open holding torque	0.0%–180.0%	50.0%	○
FP.08	Gear 1 door opening obstruction torque	0.0%–150.0%	75.0%	○
FP.09	Gear 1 door fully close torque switching point setting	0.0–150.0%	25.0%	○
FP.10	Gear 1 door fully close holding torque	0.0%–F4.11	25.0%	○
FP.11	Gear 1 door closing obstruction torque	0.0–150.0%	60.0%	○
FP.12	Gear 2 door opening high-speed setting	0.00Hz–F1.04	40.00Hz	○
FP.13	Gear 2 door opening ACC time	0.1–999.9s	1.5s	○
FP.14	Gear 2 door opening	0.1–999.9s	1.5s	○

Function code	Name	Description	Default	Modify
	DEC time			
FP.15	Gear 2 door closing high-speed setting	0.00Hz–F1.04	40.00Hz	○
FP.16	Gear 2 door closing ACC time	0.1–999.9s	1.5s	○
FP.17	Gear 2 door closing DEC time	0.1–999.9s	1.5s	○
FP.18	Gear 2 door fully open torque switching point setting	0.0%–150.0%	70.0%	○
FP.19	Gear 2 door fully open holding torque	0.0%–180.0%	70.0%	○
FP.20	Gear 2 door opening obstruction torque	0.0%–150.0%	100.0%	○
FP.21	Gear 2 door fully close torque switching point setting	0.0–150.0%	30.0%	○
FP.22	Gear 2 door fully close holding torque	0.0%–F4.11	30.0%	○
FP.23	Gear 2 door closing obstruction torque	0.0–150.0%	80.0%	○
FP.24	Gear 3 door opening high-speed setting	0.00Hz–F1.04	46.00Hz	○
FP.25	Gear 3 door opening ACC time	0.1–999.9s	1.2s	○
FP.26	Gear 3 door opening DEC time	0.1–999.9s	1.2s	○
FP.27	Gear 3 door closing high-speed setting	0.00Hz–F1.04	46.00Hz	○
FP.28	Gear 3 door closing ACC time	0.1–999.9s	1.2s	○
FP.29	Gear 3 door closing DEC time	0.1–999.9s	1.2s	○
FP.30	Gear 3 door fully open torque switching point setting	0.0%–150.0%	90.0%	○
FP.31	Gear 3 door fully open	0.0%–180.0%	90.0%	○

Function code	Name	Description	Default	Modify
	holding torque			
FP.32	Gear 3 door opening obstruction torque	0.0%–150.0%	120.0%	○
FP.33	Gear 3 door fully close torque switching point setting	0.0–150.0%	40.0%	○
FP.34	Gear 3 door fully close holding torque	0.0%–F4.11	40.0%	○
FP.35	Gear 3 door closing obstruction torque	0.0–150.0%	100.0%	○
FP.36	Gear 4 door opening high-speed setting	0.00–F1.04Hz	50.00Hz	○
FP.37	Gear 4 door opening ACC time	0.1–999.9s	1.0s	○
FP.38	Gear 4 door opening DEC time	0.1–999.9s	1.0s	○
FP.39	Gear 4 door closing high-speed setting	0.00Hz–F1.04	50.00Hz	○
FP.40	Gear 4 door closing ACC time	0.1–999.9s	1.0s	○
FP.41	Gear 4 door closing DEC time	0.1–999.9s	1.0s	○
FP.42	Gear 4 door fully open torque switching point setting	0.0%–150.0%	120.0%	○
FP.43	Gear 4 door fully open holding torque	0.0%–180.0%	120.0%	○
FP.44	Gear 4 door opening obstruction torque	0.0%–150.0%	150.0%	○
FP.45	Gear 4 door fully close torque switching point setting	0.0–150.0%	50.0%	○
FP.46	Gear 4 door fully close holding torque	0.0%–F4.11	50.0%	○
FP.47	Gear 4 door closing obstruction torque	0.0–150.0%	120.0%	○

6 Commissioning

6.1 What this chapter contains

This chapter provides a detailed introduction to the application of EC30 series elevator door controller in an elevator door control system, the basic steps involved in commissioning, and the methods for setting function parameters.

6.2 Precautions

⚡	• Ensure that terminals have been properly connected before applying power. Do not remove the covers when the device is powered on. • Ensure that the running signals are cut off before performing fault reset. • Do not perform signal check or maloperation during the operating.
⚠	• Do not touch the heat sink since the temperature of the heat sink may become very high. • Do not switch on or switch off the input power supplies frequently. • The product has been configured with proper factory settings before delivery. Do not modify the settings randomly. • If the drive has been stored for a long time without being used, perform checking and carry out pilot run for the drive before using it again.

✎Note:

- Due to the fact that the elevator door controller output voltage is in the form of PWM wave, containing certain harmonics, the temperature rise, noise, and vibration of the motor will be slightly higher compared to operating at the power frequency.

- The elevator door controller outputs PWM waves. If components such as capacitors for power factor improvement or varistors for surge protection are installed on the output side, it may cause instantaneous overcurrent in the controller, potentially leading to damage. Do not use varistors or capacitors on the output sides.

- If the external voltage is not within the permissible operating voltage range specified in the manual, using the elevator door controller may easily cause damage to the controller's components. If necessary, use the appropriate step-up or step-down devices for voltage conversion.

6.3 Elevator door controller commissioning

6.3.1 Commissioning procedure

To facilitate the elevator door controller commissioning, this section lists the usual sequence for setting parameters in the controller. Basic elevator door controller commissioning can be completed once the peripheral circuits and mechanical installation

are in place. Commissioning flowchart is as follows.

```
                        ┌──────────────┐
                        │    Start     │
                        └──────────────┘
                               │
                   ┌───────────────────────┐
                   │        Check          │
                   │   peripheral wiring   │
                   └───────────────────────┘
                               │
                   ┌───────────────────────┐
                   │  Check encoder wiring │
                   └───────────────────────┘
                               │
                   ┌───────────────────────┐
                   │  Set controller related│
                   │ parameters (pay attention to│
                   │   motor parameters).  │
                   └───────────────────────┘
                               │
                   ┌───────────────────────┐
                   │    Perform jog run    │
                   │(Ensure the Open/Close button│
                   │ consistent with the actual.)│
                   └───────────────────────┘
                               │
                   ┌───────────────────────┐
                   │Perform door width autotuning.│
                   └───────────────────────┘
                               │
                   ┌───────────────────────┐
                   │Perform trail run of entire-travel│
                   │  door opening/closing │
                   └───────────────────────┘
                               │
                   ┌───────────────────────┐
                   │Adjust the door opening/closing│
                   │ speed change point position│
                   └───────────────────────┘
                               │
                   ┌───────────────────────┐
                   │Adjust smooth speed change│
                   │ for door opening/closing│
                   └───────────────────────┘
                               │
                        ┌──────────────┐
                        │     End      │
                        └──────────────┘
```

6.3.2 Wiring check

Before powering on the elevator door controller, conduct a thorough inspection of the peripheral wiring to ensure component and personnel safety.

- Follow the manufacturer's drawings for correct wiring.

- Ensure mechanical components are installed properly to prevent equipment damage or personal injury.

- Check the inter-phase resistance of the main circuit and verify the absence of ground short-circuit conditions.

6.3.3 Encoder check

The pulse signals feedback from the encoder are crucial for precise control implemented by the elevator door controller, and thorough inspection is essential before commissioning.

- Ensure the encoder connector is securely installed in the EC30 encoder interface.

- Arrange encoder signal lines separately from power circuits to prevent interference.

- For encoder connection, direct wiring from the encoder to the elevator door controller is preferred. If extension of wires is necessary due to insufficient cable length, use shielded cables, and soldering is recommended for connecting the extension to the encoder's original wires.

- Ensure the encoder's shield layer is reliably grounded at one end of the controller.

6.3.4 Grounding check

Check if the resistance between the following terminals and the grounding terminal PE is infinite. If it is too small, please check immediately:

- Resistance between L, N, and PE.

- Resistance between U, V, W, and PE.

- Resistance between encoder power, CS/A, MI/B, MO/Z, CLK/-, GND, and PE.

6.3.5 AC permanent magnet synchronous motor application

Before the first operation of the AC permanent magnet synchronous motor (PMSM), magnetic pole position identification must be carried out. Otherwise it cannot be used properly. If the motor wiring has been changed, the encoder has been replaced, or the encoder wiring has been changed, the position angle of the encoder must be identified again. Therefore, it is necessary to ensure that the motor wiring is exactly the same when the magnetic pole position is identified and when the motor is operating normally. The motor will rotate and run during tuning, so make sure it is safe before tuning. The tuning flowchart is as follows.

```
                          ( Power on )
                               │
                               ▼
        ┌──────────────────────────────────────────────────┐
        │ Set F0.02 to Control panel, and set motor         │
        │ parameters and encoder parameters according to    │
        │ the motor nameplate.                              │
        └──────────────────────────────────────────────────┘
                               │
                               ▼
              ◇ Manually push the door to check if the door      No    ┌──────────────────┐
              ◇ Direction of opening and closing is consistent ──────►│ Modify the       │
              ◇ with the direction displayed on the digital          │ encoder direction │
              ◇ panel.                                                └──────────────────┘
                               │
                              Yes
                               ▼
        ┌──────────────────────────────────────────────────┐
        │ Perform one-click autotuning.                     │
        │ (Press SHIFT and TUNE simultaneously)             │
        └──────────────────────────────────────────────────┘
                               │
                               ▼
        ┌──────────────────────────────────────────────────┐
        │ After pressing SHIFT and TUNE simultaneously, the │
        │ digital panel shows "TUNE1", indicating that the  │
        │ motor parameter autotuning is in progress. When   │
        │ the motor parameter autotuning is completed,      │
        │ "TUNE2" is displayed, indicating that the door    │
        │ width autotuning is in progress. When the door    │
        │ width autotuning is completed, "TUNE2" disappears │
        │ and the one-click autotuning ends.                │
        └──────────────────────────────────────────────────┘
                               │
                               ▼
        ┌──────────────────────────────────────────────────┐
        │ Press SHIFT+OPEN or SHIFT+CLOSE to start the      │
        │ trial run.                                        │
        └──────────────────────────────────────────────────┘
                               │
                               ▼
              ◇ Check whether the motor runs normally and
              ◇ whether the output current is normal during      No
              ◇ operation.
                               │
                              Yes
                               ▼
        ┌──────────────────────────────────────────────────┐
        │ Set F0.02=1, and connect the terminal to the      │
        │ elevator system.                                  │
        └──────────────────────────────────────────────────┘
                               │
                               ▼
                           ( End )
```

Before tuning, the following operation must be completed: Set the following parameters correctly, including F1.00 (Motor type selection), F1.01 (Motor rated power), F1.02 (Motor rated voltage), F1.03 (Motor rated current), F1.04 (Motor rated frequency), F1.05 (Motor rated speed), F2.14 (Encoder pulse count setting), F6.27 (Door travel distance) and F6.28 (Door coupler length setting). Manually push the door to close the door, and check if the digital panel displays "Cxxx". Manually push the door to open the door, and check if the digital panel displays "Oxxx". If not, modify F2.15 (Encoder pulse direction selection).

6.3.6 Asynchronous motor application

The asynchronous motor must be re-tuned if the motor wiring has been changed, the encoder has been replaced, or the encoder wiring has been changed. The motor will rotate and run during tuning, so make sure it is safe before tuning. The tuning flowchart is as follows.

```
                      ( Power on )
                           │
   ┌───────────────────────▼───────────────────────┐
   │  Set F0.02 to Control panel, and set motor     │
   │  parameters and encoder parameters according   │
   │  to the motor nameplate.                        │
   └───────────────────────┬───────────────────────┘
                           │◄────────────────────────┐
                      ◇────▼────◇                     │
              Manually push the door to check    No   ┌──────────────┐
              if the door Direction of opening ───────│  Modify the  │
              and closing is consistent with         │  encoder     │
              the direction displayed on the         │  direction   │
              digital panel.                          └──────────────┘
                      ◇────┬────◇
                        Yes │
   ┌───────────────────────▼───────────────────────┐
   │  Perform one-click autotuning.                  │◄──────┐
   │  (Press SHIFT and TUNE simultaneously)          │       │
   └───────────────────────┬───────────────────────┘       │
   ┌───────────────────────▼───────────────────────┐       │
   │ After pressing SHIFT and TUNE simultaneously,   │       │
   │ the digital panel shows "TUNE1", indicating     │       │
   │ that the motor parameter autotuning is in       │       │
   │ progress. When the motor parameter autotuning   │       │
   │ is completed, "TUNE2" is displayed, indicating  │       │
   │ that the door width autotuning is in progress.  │       │
   │ When the door width autotuning is completed,    │       │
   │ "TUNE2" disappears and the one-click autotuning │       │
   │ ends.                                            │       │
   └───────────────────────┬───────────────────────┘       │
   ┌───────────────────────▼───────────────────────┐       │
   │  Press SHIFT+OPEN or SHIFT+CLOSE to start       │       │
   │  the trial run.                                  │       │
   └───────────────────────┬───────────────────────┘       │
                      ◇────▼────◇                            │
              Check whether the motor runs normally    No   │
              and whether the output current is ─────────────┘
              normal during operation.
                      ◇────┬────◇
                        Yes │
   ┌───────────────────────▼───────────────────────┐
   │  Set F0.02=1, and connect the terminal to       │
   │  the elevator system.                            │
   └───────────────────────┬───────────────────────┘
                           │
                      (   End   )
```

Before tuning, the following operation must be completed:

Set the following parameters correctly, including F1.00 (Motor type selection), F1.01 (Motor rated power), F1.02 (Motor rated voltage), F1.03 (Motor rated current), F1.04 (Motor rated frequency), F1.05 (Motor rated speed), F2.14 (Encoder pulse count setting), F6.27 (Door travel distance) and F6.28 (Door coupler length setting).

Manually push the door to close the door, and check if the digital panel displays "Cxxx". Manually push the door to open the door, and check if the digital panel displays "Oxxx". If not, modify F2.15 (Encoder pulse direction selection).

6.3.7 Tuning parameters

Function code	Name	Description	Default
F0.00	Control mode	0: Reserved 1: Closed-loop vector control 2: VF control 3: Reserved	1
F0.01	Door opening/closing method	0: Speed control (travel switch based) 1: Distance control (encoder based) 2: Distance control + Switch control	1
F0.02	Command source selection	0: Control panel 1: Elevator door controller terminal or communication control 2: Manual commissioning on elevator door controller 3: Automatic demonstration of elevator door controller 4: Reserved	1
F0.03	Elevator door mode selection	0: Reserved 1: Elevator door mode	1
F1.00	Motor type	0: Asynchronous motor (AM) 1: Synchronous motor (SM)	1
F1.01	Motor rated power	0.0~75.0kW Note: If the motor power is less than 100W, set this parameter to 0.1.	0.1kW
F1.02	Motor rated voltage	0–310	50V
F1.03	Motor rated current	0.01~99.00A	1.10A
F1.04	Motor rated frequency	1.00~99.00Hz	24.00Hz
F1.05	Motor rated speed	1–9999r/min	180r/min

Function code	Name	Description	Default
F1.16	Autotuning selection	0: No operation 1: With-load tuning 2: Without-load tuning	1
F2.14	Encoder pulse count setting	1–9999pls	1024pls
F2.15	Encoder pulse direction selection	0: Forward 1: Reverse	0
F2.32	Encoder type	0: ABZ	0
F6.00	Door width autotuning function selection	1: Door width measurement, effective in manual commissioning mode	1
F6.27	Door travel distance	100–9999mm	475mm
F6.28	Door coupler length setting	0mm–F6.27	38mm

6.3.8 Door width autotuning

Before starting the door width autotuning, make sure that the motor operation direction of the elevator door controller in panel manual control mode is consistent with the actual (open and close door states). During the door width autotuning process, the direction of door movement will automatically change, so take into account personal safety before operation, otherwise personal injury may occur.

🖉**Note:** It is necessary to confirm that there are no obstacles during the movement of the door before conducting the door width measurement. If there are obstacles during the movement, it will be judged as arrived and the door width measurement cannot be carried out correctly.

6.3.9 Trial run

After the door width autotuning is successful, a trial run with a hall door can be carried out. It is recommended to use panel manual control mode for the trial run.

During the trial run, pay attention to the following three issues.

1. During the opening/closing process, whether the car door and the hall door are running smoothly, whether there is any noise from the motor, whether there is any heating phenomenon, and whether the direction of motor operation is consistent with the actual situation (door opening and closing status).

2. Whether there is a high speed door contact during the door closing process. If it exists,

reduce the value of F6.26 (Door closing reserve setting) appropriately. Conversely, if there is a long low-speed running time before the door is closed, increase the value of F6.26 appropriately. If there is a long coupler closing time after closing the door, reduce the value of F4.09 (Door closing coupler speed setting).

3. Whether there is any high-speed opening to the end during the door opening process. If it exists, reduce the value of F6.22 (Door opening reserve setting) appropriately. Conversely, if there is a long low-speed running time before the door is fully opened, increase the value of F6.22 appropriately. If the door cannot be fully opened, increase the value of F3.07 (Door fully open torque switching point setting).

6.3.10 Automatic demonstration

Manual trigger: F0.02=3, F7.03=XX (number of times), trigger by panel SHIFT+CLOSE or SHIFT+OPEN.

Automatic trigger: F0.02=3, F7.03=XX (number of times), bit7=1 for F8.41, enter demonstration mode automatically after power on.

6.4 Typical applications

6.4.1 Door opening/closing curve in distance control mode

Figure 6-1 Door opening curve

Introduction to the door opening process:

1. When the door opening command is valid, the elevator door controller first follows the curve of opening the door and releasing the coupler, accelerating to F3.14 (Door opening coupler high-speed setting) in the time of F3.15 (Door coupler release high-speed time).

2. When the door coupler release is about to end, the elevator door controller slows down

to the set speed of F3.00 (Door opening low-speed start setting) in the time of F3.15 (Door coupler release high-speed time).

3. After entering the door opening low-speed running curve, the elevator door controller first runs at the speed of F3.00 (Door opening low-speed start setting) for the time of F3.02 (Speed-control door opening low-speed running time) to reach the door width percentage, and then starts accelerating.

4. The elevator door controller accelerates to its maximum running speed in the time of F3.04 (Door opening ACC time), with the speed upper limit of F3.03 (Door opening high-speed setting).

5. After the deceleration position is reached, the elevator door controller decelerates to the set speed of F3.05 (Door opening end low-speed setting) in the time of F3.06 (Door opening DEC time), and then runs the distance of F6.22 (Door opening reserve setting).

6. After the door is fully opened, the elevator door controller begins to stall. When the torque reaches the set torque value of F3.07 (Door fully open torque switching point setting), it enters the torque holding stage, and the holding torque is determined by F3.08 (Door fully open holding torque).

7. If the system door opening command is removed after the door is fully opened, torque holding is still required. The door open holding time can be set via F5.04 (External door opening delay time).
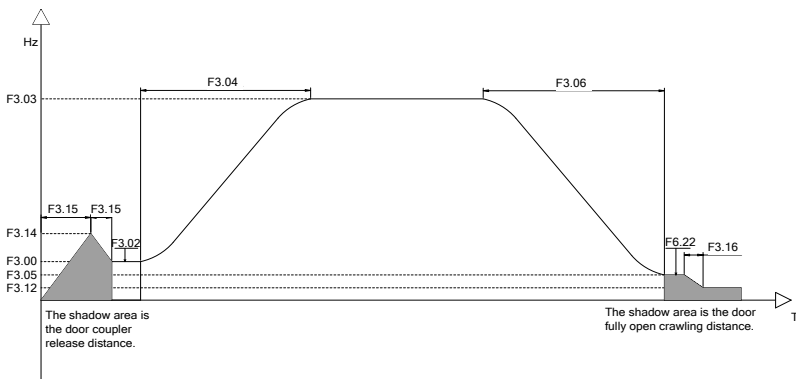
Figure 6-2 Door closing curve
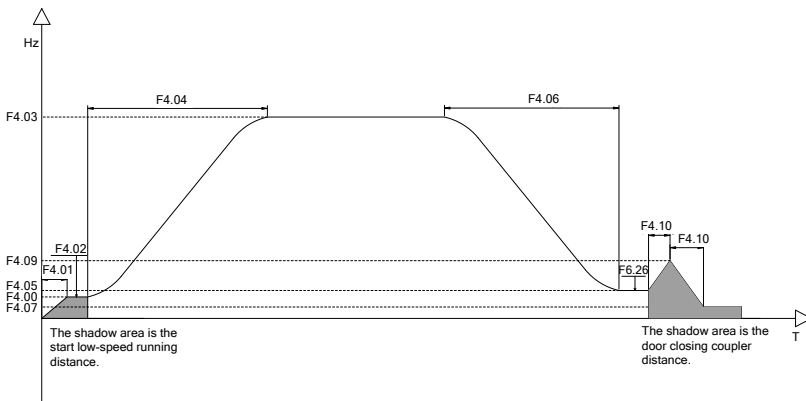
Introduction to the door closing process:

1. When the door closing command is valid, the elevator door controller accelerates to F4.00 (Door closing start low-speed setting) in the time of F4.01 (Door closing start ACC

time), and then runs for the time of F4.02 (Speed control door closing low-speed running time).

2. After the door closing position reaches the door width percentage, the elevator door controller accelerates to its maximum door closing speed in the time of F4.04 (Door closing ACC time), with the speed upper limit of F4.03 (Door closing high-speed setting).

3. After the door closing position reaches the deceleration position, the elevator door controller decelerates to the set speed of F4.05 (Door closing end low-speed setting) in the time of F4.06 (Door closing DEC time).

4. When the closing position enters the door coupler area, the elevator door controller begins to close the coupler at a speed of F4.09 (Door closing coupler speed setting), with a coupler closing time of F4.10 (Door closing coupler running time).

5. When the door coupler retraction is about to end, the elevator door controller decelerates to F4.07 (Door fully closed low-speed setting). After running for F4.08 (Door fully closed low-speed running time), the elevator door controller begins to stall. When the torque reaches the set torque value of F4.11 (Door fully closed torque switching point setting), it enters the torque holding stage, and the holding torque is determined by F4.12 (Door fully closed holding torque).

6. If the door closing command is removed after the door is fully closed, torque holding is still required. The door open holding time can be set via F5.05 (External door closing delay time).

6.4.2 Door opening/closing curve in speed control mode

Figure 6-3 Door opening curve

Introduction to the door opening process:

1. When the door opening command is valid, the elevator door controller first follows the

curve of opening the door and releasing the coupler, accelerating to F3.14 (Door opening coupler high-speed setting) in the time of F3.15 (Door coupler release high-speed time).

2. When the door coupler release is about to end, the elevator door controller slows down to the set speed of F3.00 (Door opening low-speed start setting) in the time of F3.15 (Door coupler release high-speed time).

3. After entering the door opening low-speed running curve, the elevator door controller first runs at the speed of F3.00 (Door opening low-speed start setting) for the time of F3.02 (Speed-control door opening low-speed running time) to reach the door width percentage, and then starts accelerating.

4. The elevator door controller accelerates to its maximum running speed in the time of F3.04 (Door opening ACC time), with the speed upper limit of F3.03 (Door opening high-speed setting).

5. When the door opening DEC point signal is valid, the elevator door controller decelerates to the set speed of F3.05 (Door opening end low-speed setting) in the time of F3.06 (Door opening DEC time).

6. When the door opening limit signal is valid, indicating that the door is fully opened, the elevator door controller begins to stall. When the torque reaches the set torque value of F3.07 (Door fully open torque switching point setting), it enters the torque holding stage, and the holding torque is determined by F3.08 (Door fully open holding torque).

7. If the system door opening command is removed after the door is fully opened, torque holding is still required. The door open holding time can be set via F5.04 (External door opening delay time).

Figure 6-4 Door closing curve
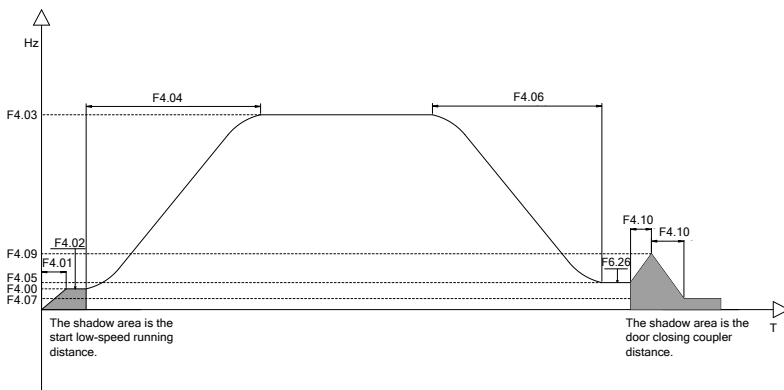
Introduction to the door closing process:

1. When the door closing command is valid, the elevator door controller accelerates to F4.00 (Door closing start low-speed setting) in the time of F4.01 (Door closing start ACC time).

2. After the elevator door controller runs for the time of F4.02 (Speed control door closing low-speed running time), the elevator door controller accelerates to its maximum door closing speed in the time of F4.04 (Door closing ACC time), with the speed upper limit of F4.03 (Door closing high-speed setting).

3. When the door closing DEC point signal is valid, the elevator door controller decelerates to the set speed of F4.05 (Door closing end low-speed setting) in the time of F4.06 (Door closing DEC time).

4. When the door closing limit signal is valid, after the closing position enters the door coupler area, the elevator door controller begins to close the coupler at a speed of F4.09 (Door closing coupler speed setting), with a coupler closing time of F4.10 (Door closing coupler running time).

5. When the door coupler retraction is about to end, the elevator door controller decelerates to F4.07 (Door fully closed low-speed setting). After running for F4.08 (Door fully closed low-speed running time), the elevator door controller begins to stall. When the torque reaches the set torque value of F4.11 (Door fully closed torque switching point setting), it enters the torque holding stage, and the holding torque is determined by F4.12 (Door fully closed holding torque).

6. If the door closing command is removed after the door is fully closed, torque holding is still required. The door open holding time can be set via F5.05 (External door closing delay time).

6.4.3 Description of output door fully open/closed settings (parameters of group F9)

1. Door fully open signal output 0 (set to 1)

   During the door opening process, if the door width percentage under the current pulse count is greater than the set value of F6.06 (Distance-control door opening limit point setting), the door fully open signal 0 is output.

2. Door fully closed signal output 0 (set to 2)

   During the door closing process, if the door width percentage under the current pulse count is greater than the set value of F6.09 (Distance-control door closing limit point setting), the door fully closed signal 0 is output.

3. Door fully open signal output 1 (set to 3)

- Distance control: When the door fully open signal 0 is satisfied and the stall torque reaches the set value of F3.07 (Door fully open torque switching point setting), the door

fully open signal 1 is output.

- Switch control or Distance + switch control: When the input terminal (limit switch) is valid and the stall torque reaches the set value of F3.07 (Door fully open torque switching point setting), the door fully open signal 1 is output.

4. Door fully closed signal output 1 (set to 4)

- Distance mode: When the door fully closed signal 0 is satisfied and the stall torque reaches the set value of F4.11 (Door fully closed torque switching point setting), the door fully closed signal 1 is output.

- Switch control or Distance + switch control: When the input terminal (limit switch) is valid and the stall torque reaches the set value of F4.11 (Door fully closed torque switching point setting), the door fully open signal 1 is output.

5. Door fully open signal output 2 (set to 7)

When the door fully open signal 1 is satisfied and the door lock signal is invalid, the door fully open signal 2 is output.

6. Door fully closed signal output 2 (set to 8)

When the door fully closed signal 1 is satisfied and the door lock signal is valid, the door fully closed signal 2 is output.

7. Door fully open signal output 3 (set to 14), reserved.

8. Door fully closed signal output 3 (set to 15)

If the input terminal in group F9 is set to the door fully closed signal and this terminal signal is valid, and at the same time, the door width percentage under the current pulse count is greater than the set value of F6.06 (Distance-control door opening limit point setting), the door fully closed signal 3 is output.

9. Door fully open signal output 4 (set to 16), reserved.

10. Door fully closed signal output 4 (set to 17)

When the door fully closed signal 1 is satisfied and the input terminal in group F9 is set to the door fully closed signal and this terminal signal is valid, the door fully closed signal 4 is output.

7 Fault diagnosis and solution

7.1 Faults and solutions

The elevator door controller has 5 warning messages. The elevator door controller constantly collects current and voltage signals. If overcurrent, undervoltage, or overvoltage occurs, the elevator door controller will lock the pulse in a short period of time to stop the motor from running. At the same time, the elevator door controller calculates the pulse through the motor shaft end encoder to provide speed protection for the motor. If a fault occurs, the fault code can be viewed through the group FA. The elevator door controller can only operate normally after the fault is reset.

Fault code	Fault type	Fault cause	Handling method
Err02	Overcurrent during acceleration	● ACC/DEC is too fast. ● Grid voltage is too low. ● The elevator door controller power is too small. ● Load transient or exception occurred. ● 3PH output current imbalance. ● There are strong external interference sources (contactor switchover or improper grounding).	● Increase ACC/DEC time. ● Increase grid input voltage. ● Check for motor stalling, short connection, and load device exceptions. ● Check for abnormal elevator door controller 3PH output voltage and motor 3PH resistance imbalance. ● Check for strong interference (whether motor cable far away from contactor and system grounded reliably).
Err03	Overcurrent during deceleration		
Err04	Overcurrent during constant speed running		
Err05	Overvoltage during acceleration	● ACC/DEC time is too short. ● Abnormal input voltage. ● Start during motor rotating. ● Load energy regeneration is too large.	● Increase ACC/DEC time. ● Check the input voltage. ● Wait for the motor to stop steadily, and then start the elevator door controller.
Err06	Overvoltage during deceleration		
Err07	Overvoltage during constant speed running		
Err09	Undervoltage	● The grid voltage is too low. ● Abnormal bus voltage display. ● Abnormal precharge relay	● Increase grid input voltage.

Fault code	Fault type	Fault cause	Handling method
		closing.	
Err10	Elevator door controller overloaded	• Acceleration is too fast. • The motor is restarted during rotating. • The grid voltage is too low • Load is too heavy. • The elevator door controller power is too small.	• Increase acceleration time. • Avoid restart after stop. • Increase grid input voltage. • Select an elevator door controller with larger power.
Err11	Motor overload	• Grid voltage is too low. • Motor rated current is set incorrectly. • Motor stall or load jumps violently	• Increase grid input voltage. • Reset the motor rated current in the motor parameter group. • Check the load and adjust torque boost.
Err13	Phase loss on output side	• Output cables are broken or short connected to the ground. • UVW phase loss (or the three phases of load are seriously asymmetrical). •	• Check for loose or broken output cables. • Check for sharp load fluctuation and motor 3PH resistance imbalance.
Err14	Elevator door controller overheating	• Ambient temperature is too high. • Module thermistor is damaged. • Inverter module is damaged. • 14-101.Motor overheating: Ambient temperature too high or internal short circuit.	• Keep good ventilation to lower ambient temperature. • Select an elevator door controller with larger power.
Err18	Current detection fault	• Abnormal motor cable or motor insulation.	• Remove motor cables to check.
Err19	Motor tuning fault	• Motor capacity does not match with the elevator door controller capacity. This fault may occur if the	• Check motor wiring, motor type, and parameter settings. • Empty the motor load and re-perform autotuning.

Fault code	Fault type	Fault cause	Handling method
		capacity difference exceeds five power classes. ● Incorrect motor parameter setting. ● The parameters gained from autotuning deviate sharply from the standard parameters. ● Autotuning timeout. ● Pulse current setting is too large.	● Check whether the upper limit frequency is larger than 2/3 of the rated frequency. ● ● Decrease the pulse current setting properly.
Err20	Rotary encoder fault	● Encoder is damaged. ● Encoder wiring error.	● Replace the encoder. ● Check the encoder wiring.
Err21	EEP fault	● Error in reading or writing parameters.	● Power off and then power on again.
Err26	Incorrect parameter setting	● 26-101: SM control mode is set to 2. ● 26-103: Incorrect selection of door opening and closing method during door width autotuning.	● 26-101: SM control mode should be set to 1. ● 26-103: Distance control should be selected for door opening and closing method during door width autotuning.
Err27	Door width autotuning fault	● 27-101: Mechanical jamming. ● 27-102: Door width autotuning was not carried out before starting the operation. ● 27-103/104: Limit switch failure (speed mode). ● 27-105/106: Encoder fault ● 27-107: Incorrect autotuning direction.	● 27-101: Troubleshooting mechanical jamming. ● 27-102: Start door width autotuning. ● 27-103/104: Check the limit switch (speed mode). ● 27-105/106: Check the encoder. ● 27-107: Check the encoder direction
Err28-101	Door opening timeout	● F5.01 (Door opening time limit) is not set properly. ● There is a jam on the door, causing the system point 0	● Adjust the value of F5.01 (Door opening time limit). ● Check for the jam.

Fault code	Fault type	Fault cause	Handling method
		reset is improper.	
Err30	Slow-speed door opening/closing timeout	• F5.03 (Low speed running time limit) is not set properly.	• Adjust the value of F5.03 (Low speed running time limit).
Err31	Door opening obstruction protection	• There are debris in the track. • The upper limit of the door opening torque is improper. • The door opening obstruction detection time is improper.	• Check for the debris in the track. • Adjust the upper limit of the door open torque. • Adjust the door opening obstruction detection time.
Err32	Speed deviation protection	• Incorrect encoder settings. • Incorrect motor parameter settings. • The setting of speed deviation protection parameters is improper. • Encoder is disconnected.	• Set the encoder parameters correctly. • Carry out the motor parameter identification. • Set the detection parameters based on the actual situation (the larger the value, the less sensitive it is). • Check the encoder wiring.
Err33	Door opening limit loss	• Limit switch error (speed mode).	• Check the presence of the door fully closed signal. If the signal is not present, the DI input needs to be turned off.
Err38	Mal-adjustment fault	• Load exception. • Incorrect SM parameter settings. • Autotuned motor parameters are inaccurate. • The elevator door controller is not connected to the motor.	• Check for overload or stalling. • Check motor parameter and counter EMF settings. • Re-perform motor parameter autotuning. • Increase the maladjustment detection time.
Err39	Underload fault	-	• Check the load and underload pre-alarm threshold.

Fault code	Fault type	Fault cause	Handling method
Err40	Double CPU communication fault	● The component is broken.	● Contact us.
Err49	RS485 communication fault	● Incorrect RS485 communication parameter setting.	● Adjust the RS485 communication parameter.
Err56	Z pulse loss fault	● Encoder is abnormal.	● Check the encoder.

8 Maintenance and inspection

The internal components of elevator door controller will become ageing due to the influence of environmental temperature, humidity, dust, vibration and other factors, which causes the potential failure or shortens the service life. Therefore, routine inspection and periodic maintenance must be performed for the elevator door controller and motor.

8.1 Precautions

Please note the following items before carrying out maintenance or inspection work.

⚡	- There are high-voltage terminals among the elevator door controller terminals. Do not touch the terminals casually. - The protective cover must be installed before powering on. Before disassembling the protective cover, disconnect the circuit breaker of the input power circuit. - Do not remove the protective cover or touch the terminals for a short period of time after cutting off the main circuit power. Maintenance and inspection can only be carried out after confirming that the bus voltage is completely discharged. - Maintenance, inspection, or replacement of components must be performed by the trained, qualified, and authorized professionals. - Before carrying out maintenance work, please remove metal accessories (such as watches, rings, etc.) from your body, and use clothing and tools that meets insulation requirements during work. - Do not replace wiring and disassemble terminals and connectors while powered on. - Before inspection, cut off all the equipment power supplies; wait for more than 10 minutes or measure the voltage with a multimeter at the bus (+) and (-) is lower than 36V. This avoids the danger caused by the residual voltage of elevator door controller internal capacitor.
⚠	- Integrated circuits are used on the control circuit board, please operate with caution. - If directly touched by hand, the circuit board may be damaged due to static electricity.

8.2 Elevator door controller storage

When storing the purchased elevator door controller, try to pack the product in the original packaging box. Long term storage can lead to the deterioration of electrolytic capacitors, so it is necessary to power on the product once within 2 years for at least 5 hours. The input

voltage must be slowly increased to the rated value using a voltage regulator.

8.3 Check items

The following items need to be checked on a regular basis.

Check items	Content	Method	Expected result
Running environment	Ambient temperature, humidity, dust volume, dust composition, oil, acid mist, and so on	Visual inspection, thermometer, and hygrometer	Requirements in the manual are met.
Power supply voltage	Whether the supply voltage is normal	Voltmeter and multimeter	Requirements in the manual are met.
	Whether power-on logic actions (such as contactor and air switch) are normal		
Drive exterior and internal components	Whether there is abnormal vibration, noise, deformation, or breakage	Screw fastening, visual inspection, multimeter	No exception occurs.
	Whether the parts are aging and running abnormally		
Cable	Whether the cable and its connection position are decolored, aged, or broken in the insulation layer.	Visual inspection	No ageing symptom such as decoloring or breakage
Air duct	Whether the air duct or heat sink is blocked	Visual inspection	No blocking

8.4 Main circuit insulation test

The megohmmeter test is limited to the insulation between the motor windings and the housing. Before the test, all wires between the motor and elevator door controller must be disconnected already. Only the 1000V megohmmeter can be used, with the insulation resistance greater than 50MΩ.

An improper insulation test method may damage the drive. You are not advised to perform the insulation test by yourself.

8.5 Motor insulation inspection

A motor insulation check should be done when the motor is first used, when it is reused after a long period of time, and during periodic inspections to prevent damage to the elevator door controller due to insulation failure of the motor windings. Separate the motor

connection from the elevator door controller when conducting insulation check. It is recommended to use a 500V voltage-type megohmmeter, and ensure that the measured insulation resistance is not less than 5MΩ.

8.6 Replacement of wearing parts

8.6.1 Service life

The wearing parts of the elevator door controller are mainly the electrolytic capacitor for filtering, whose service life is closely related to the running environment and maintenance condition.

Part	Service life	Possible damage cause	Criterion
Electrolytic capacitor	4–5 years	The possible causes include poor input power quality, high ambient temperature, frequent load jumps, and electrolyte aging	There is liquid leakage and the safety valve is protruding; measurement of electrostatic capacitance; measurement of insulation resistance

8.6.2 Replacement of wearing parts

The electrolytic capacitor that reaches the service life or has a damage needs to be replaced in time to avoid affecting the normal use of drive. The following table lists the replacement criteria and method.

Part	Symptom	Criteria	Replacement method
Electrolytic capacitor	There is liquid outflow, the safety valve is loose, or the electrostatic capacitance value changes.	There is breakage in the exterior, the safety valve is loose, or the electrostatic capacitance value changes.	Do not replace the electrolytic capacitor by yourself since drive internal components are related. Please contact the supplier for the replacement.

✎**Note:** Explosion may occur when the electrolytic capacitors in the main circuit and on the printed circuit board are incinerated. Toxic gases are produced when plastic parts are incinerated. Please dispose of them as industrial waste.

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