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## Overview

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## Chapter 1 Overview

To facilitate the users who use the NICE3000 control system for the first time to understand how to commission the control system as quickly as possible, this manual briefly describes the specifications, wiring, common parameter setting, and common commissioning of the NICE3000.

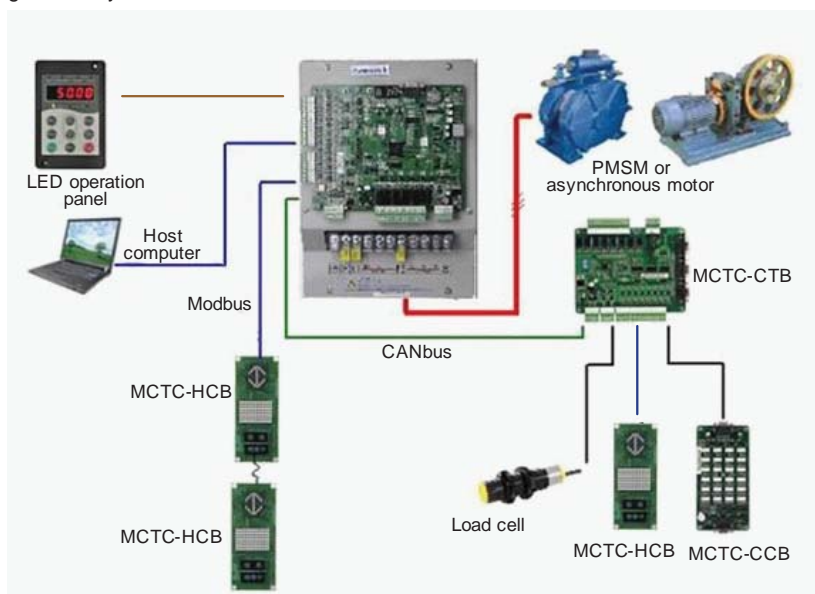
The application range of the NICE3000 is as follows:

Maximum Number of Floors	Maximum Elevator Speed	Parallel/Group Mode	Inputs	Outputs
40	4 m/s	2 to 8 elevators	24	6

The NICE3000 series elevator integrated control system mainly includes the elevator integrated controller, car top board (MCTC-CTB), hall call board (MCTC-HCB), car call board (MCTC-CCB), and optional door pre-open module, and remote monitoring system.

The following figure shows the system architecture.

Figure 1-1 System architecture of the NICE3000





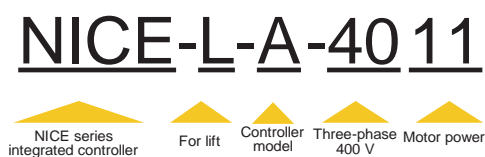
## Product Information

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## Chapter 2 Product Information

### 2.1 Designation Rules

Figure 2-1 Designation rules of the NICE3000



Controller Model	A	B		
Adaptable Motor	Asynchronous Motor	PMSM		
Encoder	Incremental encoder (push-pull output, open-collector output)	Incremental encoder with commutation signals UVW	Incremental SIN/COS encoder with sinusoidal commutation signals	Absolute SIN/COS encoder with EnDat serial communications protocol (Heidenhain ECN1313/413)
PG card	Main control board (MCB) integrating the PG card, requiring no external one	MCTC-PG-B MCTC-PG-D	MCTC-PG-C MCTC-PG-E	MD32PG5

### 2.2 Mounting Dimensions

The NICE3000 controller has three sizes: SIZE-C, SIZE-D, and SIZE-E, as shown in the following figure. SIZE-F is a customized model with different appearances but the same installation mode.

The following figure and table show the appearance and physical dimensions of the NICE3000 controller.

Figure 2-2 Appearance and mounting dimensions of the NICE3000 controller

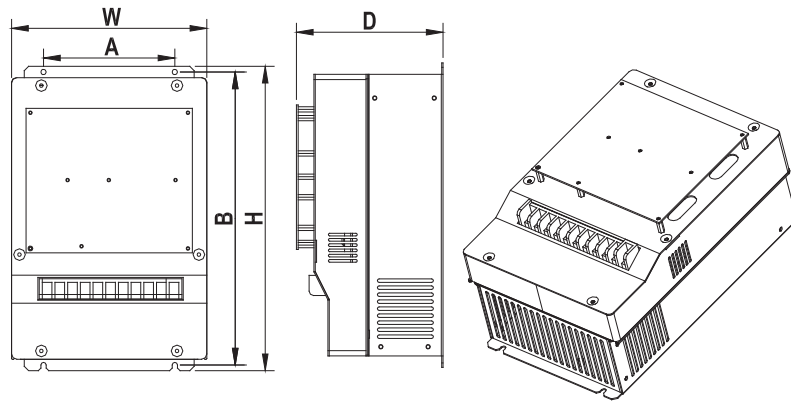


Table 2-1 Sizes of the NICE3000 controller

Size	Model	A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	Hole Diameter (mm)	Gross Weight (kg)	Structure
SIZE-C	$P \leq 5.5$ kW	140	344	355	220	150	6.5	10	L
SIZE-D	$5.5$ kW < $P \leq 15$ kW	150	334.5	347.5	223	167.5	6.5	12	L
	$5.5$ kW < $P \leq 15$ kW	190	305	322	208	212	6	6.5	L1
SIZE-E	$15$ kW < $P \leq 30$ kW	235	541.5	554.5	289.6	223	6.5	14.5	L
SIZE-F	$30$ kW < $P \leq 45$ kW	250	598	620	380	262	10	34	L

**Note**

1. The NICE3000 controller of other power ratings, such as above 45 kW is rarely applied in the elevator, and therefore, specifications are not provided here. For future detail on the options and availability, please contact Monarch.
2. SIZE-D has two types, sheet-metal (structure L) and plastic (structure L1), varying slightly in the size.

## 2.3 Electrical Specifications

Table 2-2 NICE3000 models and electrical specifications

System Model	Power Capacity (kVA)	Input Current (A)	Output Current (A)	Motor Power (kW)
AC supply voltage: single-phase 220 V, range: -15% to 20%				
NICE-L-A/B-2002	2.3	13.2	5.2	1.1
NICE-L-A/B-2003	3.4	17	7.5	1.5
220-NICE-L/L1-A/B-4007	9.8	29	10.3	2.2
220-NICE-L/L1-A/B-4011	12.1	36	15.5	3.7
220-NICE-L/L1-A/B-4015	13.9	41	19	4.0
220-NICE-L-A/B-4018	17.3	40	22.5	5.5
220-NICE-L-A/B-4022	23.1	49	27.7	11
220-NICE-L-A/B-4030	33	61	34.6	15
AC supply voltage: three-phase 220 V, range: -15% to 20%				
NICE-L-A/B-2002	4.0	11.0	9.6	2.2
NICE-L-A/B-2003	5.9	17.0	14.0	3.7
220-NICE-L/L1-A/B-4007	17.0	29.0	18.0	4.0
220-NICE-L/L1-A/B-4011	21.0	36.0	27.0	5.5
220-NICE-L/L1-A/B-4015	24.0	41.0	33.0	7.5
220-NICE-L-A/B-4018	30.0	40.0	39.0	11.0
220-NICE-L-A/B-4022	40.0	49.0	48.0	15.0
220-NICE-L-A/B-4030	57.0	61.0	60.0	18.5
AC supply voltage: three-phase 380 V, range: -15% to 20%				
NICE-L-A/B-4002	4.0	6.5	5.1	2.2
NICE-L-A/B-4003	5.9	10.5	9.0	3.7
NICE-L-A/B-4005	8.9	14.8	13.0	5.5
NICE-L/L1-A/B-4007	11.0	20.5	18.0	7.5
NICE-L/L1-A/B-4011	17.0	29.0	27.0	11.0
NICE-L/L1-A/B-4015	21.0	36.0	33.0	15.0
NICE-L-A/B-4018	24.0	41.0	39.0	18.5
NICE-L-A/B-4022	30.0	49.5	48.0	22.0
NICE-L-A/B-4030	40.0	62.0	60.0	30.0
NICE-L-A/B-4037	57.0	77.0	75.0	37.0
NICE-L-A/B-4045	69.0	93.0	91.0	45.0

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**Note**


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1. In terms of single-phase and three-phase 220 VAC, NICE-L-A/B-2002 and NICE-L-A/B-2003 are specially designed for 220 VAC. The other models that are marked by prefixing "220-" are modified from the three-phase 380 VAC models.
  2. Same models are available for single-phase 220 VAC and three-phase 220 VAC. Pay attention to the power rating of the adaptable motor during the use.
  3. Select the proper controller output current based on the motor rated current. Ensure that the controller output current is equal to or greater than the motor rated current.
- 
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Table 2-3 Technical specifications of the NICE3000

	Item	Specification	
Basic specifications	Maximum frequency	99 Hz	
	Carrier frequency	0.5–16 kHz, adjusted automatically based on the load features	
	Motor control mode	sensorless flux vector control (SFVC), closed-loop vector control (CLVC)	
	Startup torque	0.5 Hz: 180% (SFVC) 0 Hz: 200% (CLVC)	
	Speed stability accuracy	±0.5% (SFVC)	±0.05% (CLVC)
	Torque control accuracy	±5% (CLVC)	
	Overload	60s for 150% of the rated current, 1s for 200% of the rated current	
	Motor auto-tuning	With-load auto-tuning; no-load auto-tuning	
	Distance control	Direct flooring mode in which the leveling position can be adjusted flexibly	
	Acceleration/Deceleration curve	N curves generated automatically	
	Re-leveling	Leveling re-adjustment after the car load changes	
	Slow-down	New reliable slow-down function, automatically identifying the position of the slow-down shelf	
	Shaft auto-tuning	32-bit data, recording the position in the shaft accurately	
	Leveling adjustment	Flexible and easy leveling adjustment function	
	Startup torque compensation	Humanized load cell auto-tuning	
Real-time clock	Real-time clock for time-based floor service, peak service and automatic password		

Item		Specification
Basic specifications	Fault protection	Providing 57 protections such as: <ul style="list-style-type: none"> <li>• Power-on short circuit detection</li> <li>• Protection at power phase loss and output phase loss</li> <li>• Over-current protection</li> <li>• Door machine fault protection</li> <li>• Encoder protection</li> <li>• Protection on multiple levels of elevator faults</li> </ul>
	Intelligent management	Remote monitoring, user management, and group control adjustment
	Security check of peripheral devices after power-on	Security check of peripheral devices, such as grounding and short circuit, after power-on
	Status monitor	Monitoring the state of feedback signals to ensure that the elevator works properly
I/O feature	Digital input (DI)	24 x DI Input specification: 24 V, 5 mA
	Analog input (AI)	AI (voltage range: -10 V to +10 V)
	Communication port	CTB communication (CANbus) Hall call communication (Modbus)
	Output terminal block	6 x Relay output The terminals can be allocated with different functions.
	Encoder interface	Incremental encoder (push-pull output and open collector output) by standard Different encoders via PG card
Operation and display	Operation panel	5-digit LED display, displaying parameters such as running speed and bus voltage
	Keypad	3-digit LED display, implementing some commissioning functions
	Status monitor	Monitoring the state of the elevator, including CTB and HCB
Environment	Altitude	Below 1000 m
	Ambient temperature	-10° C to +40° C (derated if the ambient temperature is between 40° C and 50° C)
	Humidity	Maximum relative humidity 95%, non-condensing
	Vibration	Maximum vibration: 5.9 m/s <sup>2</sup> (0.6 g)
	Storage temperature	-20° C to +60° C

## 2.4 Braking Resistor

The models of 30 kW or below have a built-in braking unit, and you only need to connect an external braking resistor (PB and + terminals). For models above 30 kW, you need to install a braking unit and a braking resistor externally.

Select the braking resistor based on the configuration listed in the following table.

Table 2-4 Braking resistor selection for the three-phase 380 V controller

System Model	Average Power of the Braking Resistor (W)	Maximum Resistance ( $\Omega$ )	Minimum Resistance ( $\Omega$ )	Braking Unit
NICE-L-A/B-4002	650	230	150	Built-in by standard
NICE-L-A/B-4003	1100	135	100	
NICE-L-A/B-4005	1600	90	80	
NICE-L-A/B-4007	2500	65	50	
NICE-L-A/B-4011	3500	45	35	
NICE-L-A/B-4015	4500	30	25	
NICE-L-A/B-4018	5500	25	20	
NICE-L-A/B-4022	6500	20	15	
NICE-L-A/B-4030	9000	15	15	
NICE-L-A/B-4037	11000	13	12	MDBUN-45-T
NICE-L-A/B-4045	13500	11	11	MDBUN-60-T

Table 2-5 Braking resistor selection for the 220 V controller

System Model	Average Power of the Braking Resistor (W)	Maximum Resistance ( $\Omega$ )	Minimum Resistance ( $\Omega$ )	Braking Unit
NICE-L-A/B-2002	650	70	55	Built-in by standard
NICE-L-A/B-2003	1100	40	30	
220-NICE-L-A/B-4007	2500	20	18	
220-NICE-L-A/B-4011	3500	14	10	
220-NICE-L-A/B-4015	4500	10	8	
220-NICE-L-A/B-4018	5500	8	7	
220-NICE-L-A/B-4022	6500	7	6	
220-NICE-L-A/B-4030	9000	7	6	

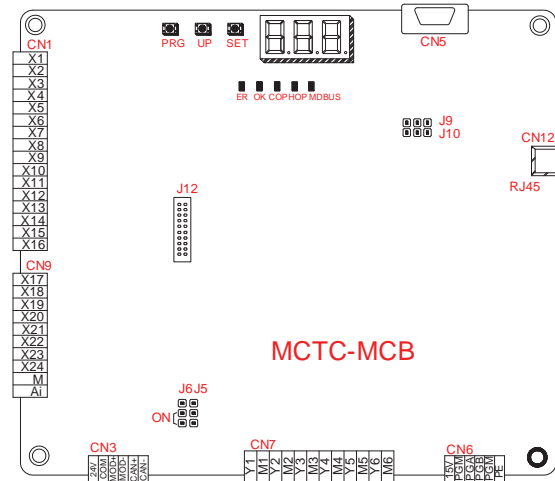
### Note

1. The preceding configuration takes the synchronous motor as an example. The asynchronous motor has poor energy transfer efficiency, and you can reduce the power of the braking resistor or increase the resistance of the braking resistor.
2. It is recommended that you select the braking resistor closest to the maximum resistance.

### 2.5 Terminal Descriptions

The following figure shows the structure of the MCB for the NICE3000.

Figure 2-3 Structure of the MCB



The NICE3000 provides a keypad with three keys and three 7-segment LEDs for display, and five LED status indicators. The NICE3000 also supports the external LED operation panel.

Table 2-6 Terminal description and specifications

Mark	Code	Terminal Name	Function Description
CN1	X1 to X16	DI	Input voltage range: 10–30 VDC Input impedance: 4.7 kΩ Optocoupler isolation Input current limit: 5 mA Functions set in F5-01 to F5-24.
CN9	X17 to X24	DI	
CN9	Ai/M	AI	Used for the analog load cell device
CN3	24V/COM	External 24 VDC power supply	24 VDC power supply for the entire board
	MOD+/-	RS485 differential signal	Standard isolated RS485 communication interface, used for hall call and display
	CAN+/-	CANbus differential signal	CANbus communication interface, communication with the CTB

Mark	Code	Terminal Name	Function Description
CN7	Y1/M1 to Y6/M6	Relay output	Normally-open (NO), maximum current and voltage rating: 5A, 250 VAC. The functions are set in F5-26 to F5-31.
CN6	15V/PGM/PGA/PGB/PE	Encoder interface for asynchronous motor	Connecting the incremental encoder (push-pull output or open collector output)
CN5	DB9 interface	RS232 communication interface	Used as the interface for commission software, cell monitoring, RS232/RS485 parallel control, and software download for the MCB and drive board
CN12	RJ45 interface	Operation panel interface	Used to connect the digital operation panel
J5	Used to connect the terminal resistor for the CANbus communication control board; the pins marked with "ON" connected to the terminal resistor		
J6	Used to connect the terminal resistor for the Modbus communication control board; the pins marked with "ON" connected to the terminal resistor		
J9/J10	Software writing jumper block (used by the manufacturer). Do not short the pins randomly; otherwise, the controller cannot be used properly		
J12	Interface for connecting the PG card.		

Table 2-7 Description of indicators on the MCB

Mark	Terminal Name	Function Description
ER	Fault indicator	When a fault occurs, the system reports an alarm and this indicator is on (red).
OK	OK indicator	When there is no fault, this indicator is on (green).
COP	CTB communication indicator	When communication between the MCB and the CTB is normal, this indicator is on (green).
HOP	HCB communication indicator	When communication between the MCB and the HCB is normal, this indicator is on (green).
MDBUS	Parallel/Group mode indicator	This indicator is steady on (green) when the communication for parallel mode or group mode is normal, and blinks when the running in parallel mode or group mode is normal.
X1 to X24	Input signal indicator	ON when the 24 VDC input is active.
Y1 to Y6	Output signal indicator	ON when the relay output is active.





## Component Description

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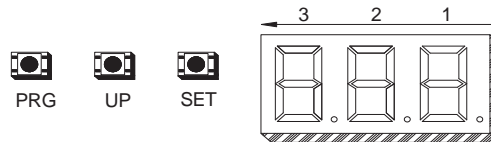
## Chapter 3 Component Description

### 3.1 Keypad Description

The keypad consists of three 7-segment LEDs and three buttons. You can query information about the controller and enter simple commands on the keypad.

The following figure shows the appearance of the keypad.

Figure 3-1 Appearance of the keypad



As shown in the preceding figure, the three buttons are PRG, UP, and SET. The functions of the three buttons are as follows:

- PRG: Press this button in any state to display the current function group number. You can press the UP button to change the function group number.

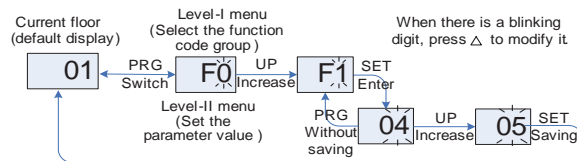
- UP: Press this button to increase the function group number.

Currently, the MCB defines a total of nine function code groups, namely, F0 to F8. You can press the UP button to display them in turn. In addition, in special function code group menu, you can input simple references by using the UP button.

- SET: In the function code group menu, press this button to enter the menu of the function code group.

In special function code group menu, after you input a simple reference and press this button to save the setting, the keypad enters the F0 menu by default.

The following figure shows the setting of increasing the called floor to 5.



The function code groups displayed on the keypad are described as follows:

1. F0: display of floor and running direction

The F0 menu is displayed on the keypad by default upon power-on. The first 7-segment LED indicates the running direction, while the last two 7-segment LEDs indicate the current floor of the elevator.

When the elevator stops, the first 7-segment LED has no display. When the elevator runs, the 1st 7-segment LED indicates the running direction.

When a system fault occurs, the 7-segment LEDs automatically display the fault code and blink. If the fault is reset, the F0 menu is displayed.

2. F1: command input of the running floor

After you enter the F1 menu, the 7-segment LEDs display the bottom floor (F6-01). You can press the UP key to set the destination floor within the range of lowest to top and then press the SET key to save the setting. The elevator runs to the destination floor, and the 7-segment LEDs automatically switch over to the F0 menu at the same time.

3. F2: fault reset

After you enter the F2 menu, the 7-segment LEDs display 0. When you press the UP button to select 1 and press the SET button, the system fault is reset. After the system fault is reset, the 7-segment LEDs automatically switch over to the F0 menu.

4. F3: time display

After you enter the F3 menu, the 7-segment LEDs display the current system time circularly.

5. F4: contract number display

After you enter the F4 menu, the 7-segment LEDs display the user's contract number.

6. F5: running times display

After you enter the F5 menu, the 7-segment LEDs display the elevator running times circularly.

7. F6: reserved

User setting is prohibited.

8. F7: shaft auto-tuning command input

After you enter the F7 menu, the 7-segment LEDs display 0. You can select 0 or 1 here, where 1 indicates the shaft auto-tuning command available. After you select 1 and press the SET button, shaft auto-tuning is implemented if the conditions are met. Meanwhile, the 7-segment LEDs switch over to the F0 menu. After shaft auto-tuning is complete, F7 is back to 0 automatically. If shaft auto-tuning conditions are not met, fault code "E35" is displayed.

9. F8: test function

After you enter the F8 menu, the 7-segment LEDs display 00. The setting range of F8 is 1–4, described as follows:

- 1: Hall call forbidden
- 2: Door open forbidden
- 3: Overload forbidden
- 4: Limit switches disabled

After the setting is complete, press SET. Then the 7-segment LEDs display E88 and blink, prompting that the elevator is being tested. When you press PRG to exit, F8 is back to 0 automatically.

### 3.2 Use of the LED Operation Panel

The LED operation panel is connected to the RJ45 interface of the NICE3000 controller by means of an 8-core flat cable. You can modify the function parameters, monitor the working status, and run or stop the NICE3000 controller by using the LED operation panel. The following figure shows the appearance of the LED operation panel.

Figure 3-2 Appearance of the LED operation panel



#### ■ Function Indicators

- RUN: This indicator is on when the NICE3000 is running.
- LOCAL/REMOT: Reserved.
- FWD/REV: It is the elevator direction indicator. ON indicates down direction, and OFF indicates up direction.
- TUNE/TC: It is the auto-tuning indicator. This indicator is on when the elevator is in auto-tuning state.

### ■ Unit Indicators

○ indicates OFF, and ● indicates ON.

●—RPM—○—%—○ Hz: unit of frequency

○—RPM—●—%—○ A: unit of current










○—RPM—○—%—● V: unit of voltage

●—RPM—●—%—○ RPM: unit of rotational speed

○—RPM—●—%—● %: percentage

### ■ Keys on the Operation Panel

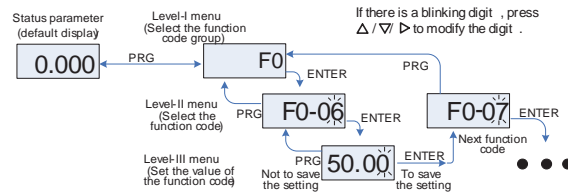
Table 3-1 Keys on the operation panel

Key	Name	Function
	Programming	Enter or exit Level I menu.
	Confirm	Enter the menu interfaces level by level, and confirm the parameter setting.
	Increment	Increase data or function code.
	Decrement	Decrease data or function code.
	Shift	Select the displayed parameters in turn in the stop or running state, and select the digit to be modified when modifying parameters.
	RUN	In operation panel control mode, press this key to run the NICE3000.
	Stop/Reset	In operation panel control mode, press this key to stop the running or reset the controller in fault state.
	Quick	Enter or exit Level I shortcut menu.
	Fault display	Press this key to display or hide fault information in fault state.

■ Operations on the Three-Level Menu

The following figure shows the operation procedure on the three-level menu.

Figure 3-3 Operation procedure on the three-level menu



3.3 CTB

The car top board (MCTC-CTB) is the elevator car control board of the NICE3000 controller. It consists of eight DI terminals, one AI terminal, and nine relay output terminals. The CTB can communicate with the CCB and HCB. The following figure shows the structure and size of the CTB.

Figure 3-4 Structure and size of the CTB

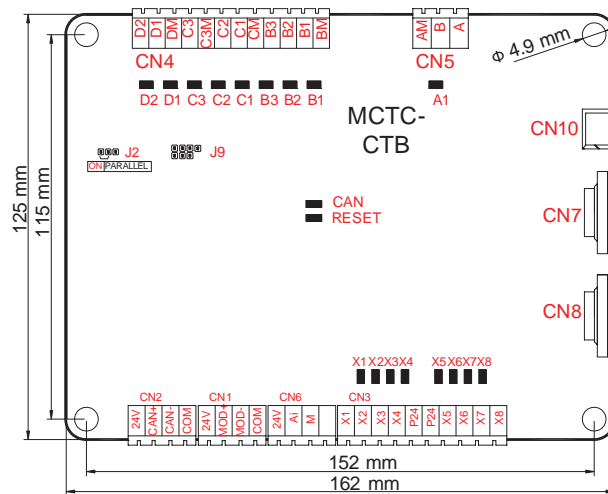


Table 3-2 Description of CTB terminals

Type	Terminal	Name	Description
CN2 (communication with the MCB)	+24V/COM	External 24 V power supply	24 VDC power supply to the entire board
	CAN+/CAN-	CAN communication	Connecting the MCB

Type	Terminal	Name	Description
CN1 (communication with the HCB)	+24V/COM	24 V power supply	24 VDC power supply to the HCB
	MOD+/MOD-	Modbus communication	Communication with the HCB
CN6 (AI)	Ai-M	Load cell signal input	0–10 VDC
CN3 (DI)	P24	24 V power supply	DI common terminal
	X1	Light curtain 1	1. Photocoupler isolation, unipolarity input 2. Input impedance: 3.3 k $\Omega$ 3. Positive logic
	X2	Light curtain 2	
	X3	Door open limit 1	
	X4	Door open limit 2	
	X5	Door close limit 1	
	X6	Door close limit 2	
	X7	Full-load signal (100%)	
X8	Overload signal (110%)		
CN4 (relay output)	B1-BM	Door open signal 1	30 VDC, 1 A
	B2-BM	Door close signal 1	
	B3-BM	Forced door close 1	
	C1-CM	Door open signal 2	
	C2-CM	Door close signal 2	
	C3-C3M	Forced door close 2	
	D1-DM	Up arrival signal	
	D2-DM	Down arrival signal	
CN5	A-AM	Car fan and lamp control	250 VAC, 3 A; 30 VDC, 1 A
CN7/8	DB9 pin port	CCB communication	Connecting the CCB
CN10	RJ45	RJ45	Reserved
J9	Software writing interface	Software writing interface	Used by the manufacturer
J2	ON/ PARALLEL	Address jumper	Setting the CTB addresses: short PARALLEL for a single elevator; short PARALLEL for the master elevator and ON for the slave elevator in parallel mode
CAN	Indicator	Communication indicator	This indicator blinks when the CTB communicates with the MCB.

Type	Terminal	Name	Description
RESET	Indicator	Fault indicator	This indicator blinks and the CAN indicator is steady on when a fault occurs during communication between the CTB and the MCB.
X1–X8	Indicator	Input indicator	This indicator is on (green) when the external input is active.
A–D	Indicator	Output indicator	This indicator is on (green) when the system output is active.

### 3.4 Display Board (MCTC-HCB)

As an important interface between users and the control system, the MCTC-HCB receives hall calls and displays the current floor and running direction for the hall. This board can also be used as car display board.

Monarch provides many types of display boards. The following describes only a few common types. If you need other types, please contact Monarch.

The common types to be described are listed in the following table.

Table 3-3 Common types of HCB-H

Name	Feature	Size (mm)
HCB-H	Dot-matrix display board (red)	144 x 70 x 18
HCB-R1	Ultrathin dot-matrix display board (red)	144 x 70 x 10
HCB-D2	Ultrathin segment LED display board (blue background white display)	144 x 70 x 10
HCB-U1	4.3-inch segment LED display board (blue background white display)	143.5 x 79.2 x 9.4

#### 3.4.1 HCB-H (Dot-Matrix Display Board)

The following figures show the appearance and size of HCB-H.

Figure 3-5 Appearance of HCB-H

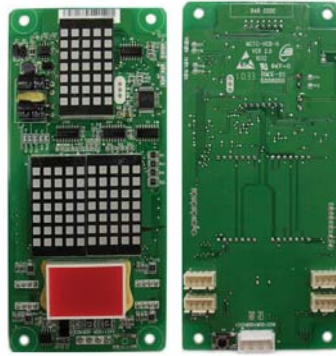
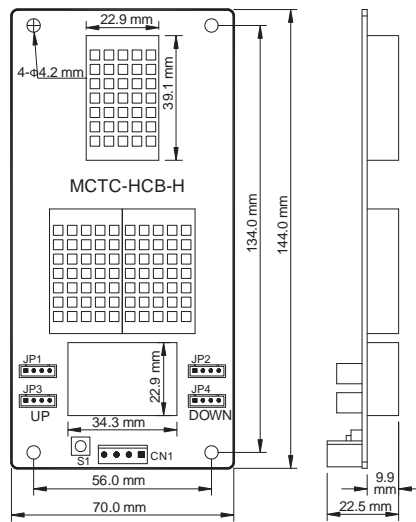


Figure 3-6 Size of HCB-H



The following table describes the input and output terminals.

Table 3-4 Input and output terminals of HCB-H

Terminal Name	Function
JP1	Interface for the elevator locking switch and up arrival indicator Pins 2 and 3 are for switch input. Pin 1 and 4 are power supply for the up arrival indicator.
JP2	Interface for the fire-emergency switch and down arrival indicator Pins 2 and 3 are for switch input. Pin 1 and 4 are power supply for the down arrival indicator.
JP3	Interface for the up call button and indicator Pins 2 and 3 are for up call input. Pins 1 and 4 are power supply for the up call indicator.
JP4	Interface for the down call button and indicator Pins 2 and 3 are for down call input. Pins 1 and 4 are power supply for the down call indicator.
Note: Pins 1 and 2 are positive of power supply. The pin with white dot or that is rectangular is pin 1.	
S1	Button for setting the floor address. Hold down the button to adjust the floor address. After you stop pressing, the address number blinks three times, and therefore, the setting is successful.
CN1	Modbus communication and power supply terminal Pins 2 and 3 are for Modbus communication. Pins 1 and 4 are for DC power supply.

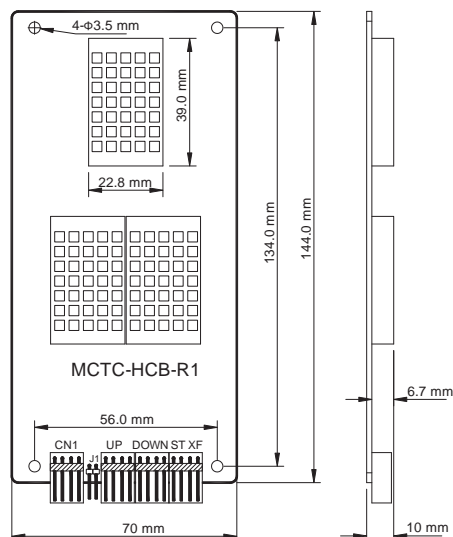
### 3.4.2 HCB-R1 (Ultrathin Dot-Matrix Display Board)

The following figures show the appearance and size of HCB-R1.

Figure 3-7 Appearance of HCB-R1



Figure 3-8 Size of HCB-R1



The following table describes the input and output terminals.

Table 3-5 Input and output terminals of HCB-R1

Terminal Name	Function
UP	Interface for the up call button and indicator Pins 2 and 3 are for up call input. Pins 1 and 4 are power supply for the up call indicator.
DOWN	Interface for the down call button and indicator Pins 2 and 3 are for down call input. Pins 1 and 4 are power supply for the down call indicator.
Note: Pins 1 and 2 are positive of power supply. The pin with white dot mark or that is rectangular is pin 1.	
XF/ST	Interface for the fire-emergency and elevator locking switch Pins 1 and 2 are for fire-emergency input. Pins 3 and 4 are for elevator locking input.
J1	Terminal for setting the floor address. Short J1, and press the UP button or DOWN button to set the floor address. After the jumper cap is removed, the address is automatically stored.
CN1	Modbus communication and power supply terminal Pins 2 and 3 are for Modbus communication. Pins 1 and 4 are for DC power supply.

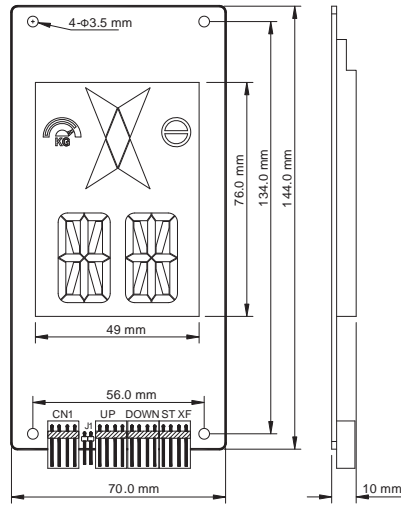
3.4.3 HCB-D2 (Ultrathin Segment LED Display Board)

The following figures show the appearance and size of HCB-D2.

Figure 3-9 Appearance of HCB-D2



Figure 3-10 Size of HCB-D2



The following table describes the input and output terminals.

Table 3-6 Input and output terminals of HCB-D2

Terminal Name	Function
JP2	Interface for the up call button and indicator Pins 2 and 3 are for up call input. Pins 1 and 4 are power supply for the up call indicator.
JP3	Interface for the down call button and indicator Pins 2 and 3 are for down call input. Pins 1 and 4 are power supply for the down call indicator.
Note: Pins 1 and 2 are positive of power supply. The pin with white dot mark or that is rectangular is pin 1.	
JP1	Interface for the fire-emergency and elevator locking switch Pins 1 and 2 are for fire-emergency input, and pins 3 and 4 are for elevator locking input.
J1	Terminal for setting the floor address. Short J1, and press the UP button or DOWN button to set the floor address. After the jumper cap is removed, the address is automatically stored.
CN1	Modbus communication and power supply terminal Pins 2 and 3 are for Modbus communication. Pins 1 and 4 are for DC power supply.

#### 3.4.4 HCB-U1 (4.3-inch Segment LED Display Board)

The following figures show the appearance and size of HCB-U1.

Figure 3-11 Appearance of HCB-U1

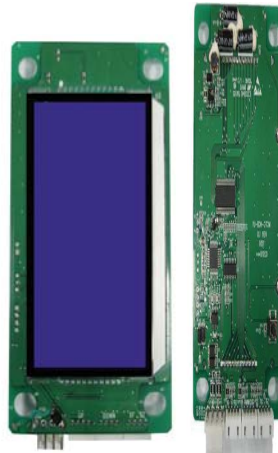
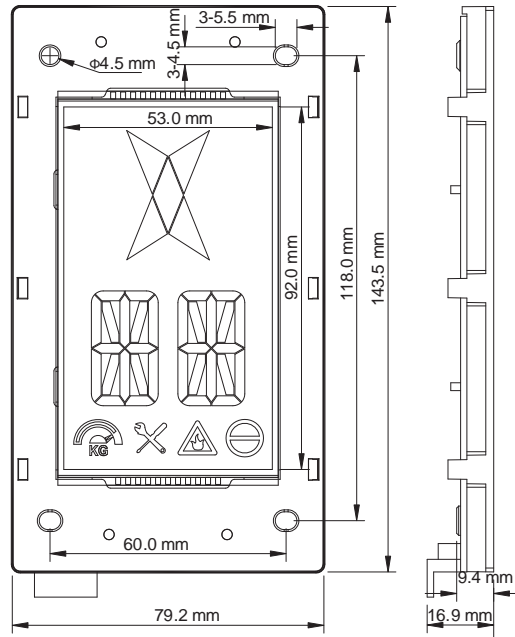


Figure 3-12 Size of HCB-U1



The following table describes the input and output terminals.

Table 3-7 Input and output terminals of HCB-U1

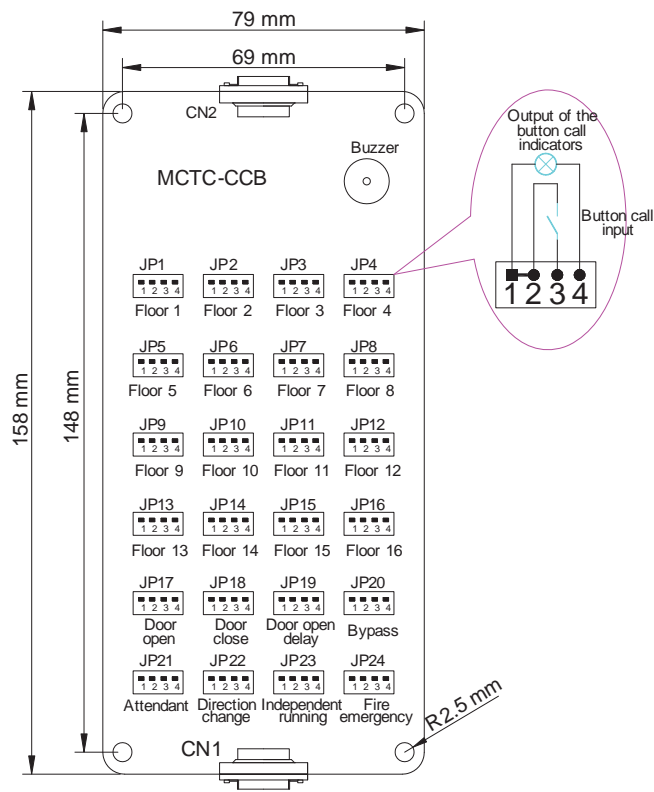
Terminal Name	Function
J1	Interface for the up call button and indicator Pins 2 and 3 are for up call input. Pins 1 and 4 are power supply for the up call indicator.
JP3	Interface for the down call button and indicator Pins 2 and 3 are for down call input. Pins 1 and 4 are power supply for the down call indicator.
Note: Pins 1 and 2 are positive of power supply. The pin with white dot mark or that is rectangular is pin 1.	
J3	Interface for the fire-emergency and elevator locking switch Pins 1 and 2 are for fire-emergency input, and pins 3 and 4 are for elevator locking input.
S1	Button for setting the floor address. Hold down the button to adjust the floor address. After you stop pressing, the address number blinks three times, and therefore the setting is successful.
CN1	Modbus communication and power supply terminal Pins 2 and 3 are for Modbus communication. Pins 1 and 4 are for DC power supply.

### 3.5 CCB

The car call board (MCTC-CCB) is another interface between users and the control system. Each CCB comprises 24 inputs and 22 outputs, including 16 floor buttons and 8 functional signals. The CCB mainly collects button calls and outputs signals of the button call indicators. The need for 31-floor use can be implemented through cascaded connection. CN2 is an input connector and CN1 is a cascaded output connector.

The following figure shows the structure of the CCB.

Figure 3-13 Structure of the CCB



The following table describes the input and output terminals.

Table 3-8 Input and output terminals of the CCB

No.	Interface	Pins 2 and 3	Pins 1 and 4	Remarks
1	JP1	Floor 1 button input	Floor 1 display output	For CCB2, the input signal of JPn corresponds to floor (16+n) button input.
2	JP2	Floor 2 button input	Floor 2 display output	
3	JP3	Floor 3 button input	Floor 3 display output	
4	JP4	Floor 4 button input	Floor 4 display output	
5	JP5	Floor 5 button input	Floor 5 display output	
6	JP6	Floor 6 button input	Floor 6 display output	
7	JP7	Floor 7 button input	Floor 7 display output	
8	JP8	Floor 8 button input	Floor 8 display output	
9	JP9	Floor 9 button input	Floor 9 display output	
10	JP10	Floor 10 button input	Floor 10 display output	
11	JP11	Floor 11 button input	Floor 11 display output	
12	JP12	Floor 12 button input	Floor 12 display output	
13	JP13	Floor 13 button input	Floor 13 display output	
14	JP14	Floor 14 button input	Floor 14 display output	
15	JP15	Floor 15 button input	Floor 15 display output	
16	JP16	Floor 16 button input	Floor 16 display output	
17	JP17	Door open button input	Door open display output	Invalid for CCB 2.
18	JP18	Door close button input	Door close display output	
19	JP19	Door open delay button input	Door open delay display output	
20	JP20	Bypass input	Bypass display output	
21	JP21	Attendant input	Reserved	
22	JP22	Direction change input	Reserved	
23	JP23	Independent running input	Reserved	
24	JP24	Firefighter input	Reserved	
Note: Pins 1 and 2 are positive of power supply. The pin with white dot mark or that is rectangular is pin 1.				



## Use of the NICE3000

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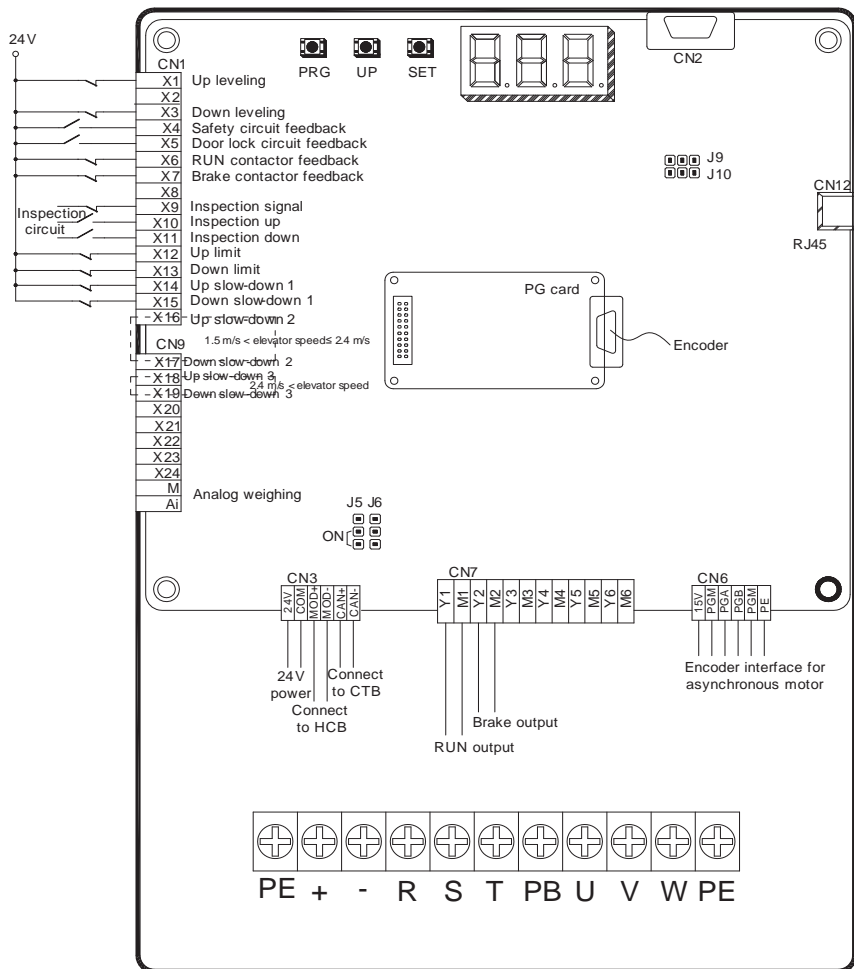
## Chapter 4 Use of the NICE3000

### 4.1 Wiring Diagrams Under Default Parameter Settings

#### 4.1.1 Electric Wiring of the NICE3000

The following figure shows the electric wiring diagram of the NICE3000.

Figure 4-1 Electric wiring diagram of the NICE3000



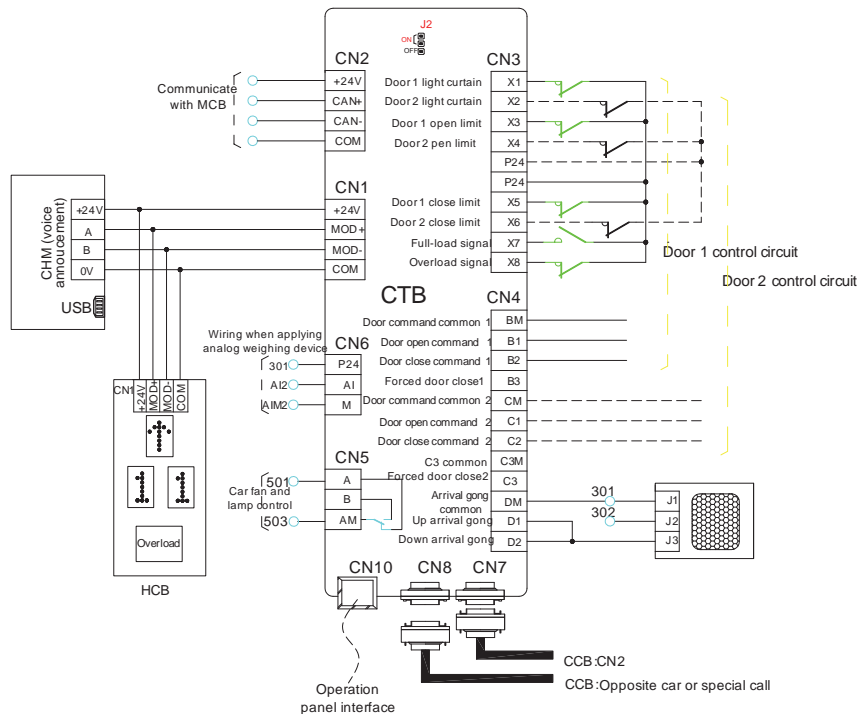
**Note**

The above wiring diagram shows the default I/O function setting of group F5. The braking resistor is connected to PB and +.

4.1.2 Recommended CTB Wiring and Parameter Setting

The following wiring diagram shows the default function setting of the CTB. You can change the input polarity (NO/NC) of the CTB terminals in F5-25.

Figure 4-2 Recommended CTB wiring



4.2 Description of Shaft Signals

In elevator control, the car position needs to be identified based on shaft position signals, implementing stop at floors accurately and guaranteeing safe running.

These shaft position signals include the up final limit switch, down final limit switch, up limit switch, down limit switch, up slow-down switch, low slow-down switch and leveling switches.

#### 4.2.1 Limit Switch and Final Limit Switch

Stop the car at the top (or bottom) leveling position, and mount the limit switch 100 mm away from the top (or bottom) leveling position. That is, the limit switch shall act when the car continues to run upward (or downward) 100 mm from the top (or bottom) leveling position.

The final limit switch is mounted above the up limit switch or below the down limit switch. It is usually 100 to 150 mm away from the top (or bottom) leveling position.

#### 4.2.2 Slow-Down Switch

Slow-down switch is one of the key protective components of the NICE3000, protecting the elevator from over travel top terminal or over travel bottom terminal at maximum speed when the elevator position becomes abnormal.

The default deceleration rate ("Special deceleration rate" in F3-08) of the NICE3000 system is  $0.9 \text{ m/s}^2$ . In the condition that the rated speed and the special deceleration rate are certain, the slow-down distance can be obtained via the following formula:

Slow-down distance = Rated speed x Rated speed / (2 x special deceleration rate)

Then you can get the mounting positions of the slow-down switches that correspond to various elevator speeds.

The recommended positions of slow-down switches are listed in the following table.

Table 4-1 Recommended positions of slow-down switches

Rated Elevator Speed	$V \leq 1.5 \text{ m/s}$	$1.5 \text{ m/s} < V \leq 2.4 \text{ m/s}$	$2.4 \text{ m/s} < V \leq 3.7 \text{ m/s}$
Slow-down switch 1	1.3 m-L/2	1.3 m	1.3 m
Slow-down switch 2		3.2 m	3.2 m
Slow-down switch 3			8.0 m

#### Note

- "L" in the table indicates the landing height. The default special deceleration rate is  $0.9 \text{ m/s}^2$ , and the acceleration rate and deceleration rate are  $0.6 \text{ m/s}^2$ .
- The positions of slow-down switches are calculated on the basis of default value (special deceleration rate  $0.9 \text{ m/s}^2$ , and acceleration rate and deceleration rate are  $0.6 \text{ m/s}^2$ ). Decreasing the acceleration rate and deceleration rate or increasing the special deceleration rate does not affect the safety, but increasing the acceleration rate and deceleration rate or decreasing the special deceleration rate may bring safety hazard. If any value needs to be changed, calculate proper slow-down distance for mounting the slow-down switches.

#### 4.2.3 Leveling Switch

The NICE3000 system allows the use of 1 to 3 leveling switches. If only one leveling sensor is used, the corresponding function code which is used for input of leveling signal is allocated with function 03 (NO input of door zone signal).

There is no special requirement on the length of the flag. It is recommended to use a flag of 80–200 mm long. Ensure that flags at all landings have the same length and are mounted vertically.

You need to add two re-leveling switches if applying the door pre-open function. In this case, you need to increase the length of the flag properly. For details on the door pre-open module, contact Monarch or local agent for more information.

### 4.3 Typical Commissioning

#### 4.3.1 Check Before Commissioning

■ Check Before Power-On

1. Check for the following wiring:

- a. The wiring between the power cables RST of the elevator and the three-phase power cables RST of the control cabinet is normal.
- b. The wiring between the brake coils of the motor of the control cabinet is normal.
- c. The wiring between UVW of the control cabinet and power cables of the motor is normal.
- d. The power and signal wiring between the motor encoder and the control cabinet is normal.
- e. The safety circuits are closed.
- f. The door lock circuits are closed.
- g. The wiring of the car top and CTB is normal.
- h. The inspection circuit is normal.
- i. The power and signal wiring of the door machine is normal.
- j. The CAN communication wiring between the MCB and the CTB is normal.
- k. The Modbus communication wiring between the HCB and the MCB is normal.
- l. The wiring between the CCB and CTB is normal.

2. Check for the communication cables.

- a. Check the impedance between the communication cables CAN+, CAN-, MOD+, and MOD- and other control or power cables. It is better that the impedance is close to infinity.
- b. Check the impedance between the communication cables CAN+, CAN-, MOD+, and MOD- and the grounding cable. It is better that the impedance is close to infinity.
- c. Measure the resistance of the terminal resistor between CAN+ and CAN-, and between MOD+ and MOD-. The correct value is close to 60  $\Omega$ .

3. Check for the motor's winding resistance and insulation to the ground.

4. Check for the cable grounding and measure the resistance.

- 1) Check that the resistance between the following points and the ground is close to infinity.

- a. R, S, T, U, V, W
- b. Input and output terminals of the controller and power supply for switches
- c. Brake power coils and wiring terminals of the braking resistor
- d. Nodes of various control signals
- e. Encoder signal (note the grounding mode of the shielding layer and encoder body)
- f. Various nodes of safety circuit

If any resistance is small, check the wiring immediately and find the fault. Otherwise, transformer or power protection may result.

2) Check that the resistance between the following points and the ground is close to 0 (less than  $4 \Omega$ ).

- a. Grounding cable of the power supply
- b. Grounding cable of the motor
- c. Shielding lay of the encoder
- d. Grounding terminal of the controller
- e. Grounding point of the control transformer
- f. Grounding point of the switching power supply
- g. Grounding point of the brake
- h. Grounding point of various safety switches

The grounding and ground cable directly affect stability and reliability of the elevator running. Ensure that the grounding points are tied to the ground reliably and the grounding cable is reliable.

5. Check for the capacity of the power supply and switches, and the diameter of the power cable.

6. Check that the power voltage complies with the regulation, including amplitude and interphase deviation.

7. Confirm the following items:

- a. All switches and fuses in the cabinet are in the off state.
- b. The normal/emergency electric dial of the control cabinet is in the emergency electric state.
- c. The inspection switch of the car top or the car is in the normal state.
- d. The shaft allows movement of the car.

8. After all the precedent check is complete and the power-on requirements are satisfied, power on the controller.

■ Check After Power-On

1. Turn on the power switch and check the phase failure relay (PFR). If the PFR is abnormal, turn off the power switch and then exchange any two power input phases.

2. Check the input and output voltage of the control transformer in the cabinet.

Power	380 VAC input	110 VAC output	220 VAC output	110 VDC output
Measured voltage	$380 \pm 15\%$	$110 \pm 5\%$	$220 \pm 5\%$	$110 \pm 5\%$ (DC)

3. If there is any problem, find the cause and solve the problem immediately.  
 4. If it is normal, turn on the MCCB in the cabinet and check the corresponding voltage and circuit.  
 5. Check for the state of relays in the cabinet.

Relay	State
Phase sequence relay	Normal working status
Safety circuit relay	Closed
Safety contactor	Closed
Door lock contactor	Closed

6. After ensuring that the circuits are normal, set the related parameters based on the requirements and regulations on the use of the elevator to prepare for inspection-speed commissioning.

#### 4.3.2 Commissioning at Inspection Speed

To implement accurate control on the motor, motor auto-tuning must be performed before the use of the NICE3000. Ensure that the installation and wiring satisfy the safety requirements and technical specifications before the auto-tuning.

##### ■ No-load Auto-tuning

1. Asynchronous motor

**Note**

For the asynchronous motor, after F1-11 is set to 2 (No-load auto-tuning), the motor will run. You must take off the steel rope and release the brake manually.

To perform no-load auto-tuning for asynchronous motor, do as follows:

- 1) Set F0-01 (Command source selection) to 0 (Operation panel control) and press



on the operation panel to reset the current faults.

- 2) Enter the motor nameplate parameters correctly.

- F1-01 (Rated motor power)
- F1-02 (Rated motor voltage)
- F1-03 (Rated motor current)
- F1-04 (Rated motor frequency)
- F1-05 (Rated motor rotational speed)

Then, set F1-12 (Encoder lines per revolution) based on the encoder nameplate.

- 3) Remove the load from the motor completely. Set F1-11 to 2 (No-load auto-tuning). "TUNE" is displayed on the operation panel. Release the brake manually and press



on the operation panel. The motor enters the excitation state first, and starts

to rotate after about 2s. The motor accelerates to the full speed and then decelerates to stop. Then the RUN contactor opens. After the motor stops rotating, apply the brake manually. Then, the motor auto-tuning is complete. During the auto-tuning, the controller automatically measures the motor parameters:

- F1-06 (Stator resistance)
  - F1-07 (Rotor resistance)
  - F1-08 (Leakage inductance)
  - F1-09 (Mutual inductance)
  - F1-10 (Motor magnetizing current)
- 4) Run the motor in operation panel control and set F0-02 (Speed reference in operation panel control) to a proper value. For the consideration of safety, the system does not output power cables for the running contactor and brake contactor. You have to press down the running contactor and release the brake manually.

If the motor jitters or E20 is reported in operation panel control, exchange any two output power cables or exchange phases A and B of the encoder, and then perform the motor auto-tuning again.

## 2. PMSM

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**Note**

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For PMSM, after F1-11 is set to 2 (No-load auto-tuning), the motor will run. You must take off the steel rope and release the brake manually.

To perform no-load auto-tuning for PMSM, do as follows:

- 1) Check the motor power cables and encoder wiring.  
Ensure that the UVW power cables of the motor are properly connected to the UVW terminals of the controller, and the encoder's AB, UVW or CDZ signal wires are properly connected to the AB, UVW or CDZ terminals of the PG card.
- 2) After the system is powered on, set F0-01 (Command source selection) to 0 (Operation panel control) and press  on the operation panel to reset the current faults.
- 3) Set the encoder parameters properly.  
F1-00 (Encoder type selection)

- 0: SIN/COS encoder
- 1: UVW encoder

F1-12 (Encoder lines per revolution)

If applying the Heidenhain ECN 1313 or 413 encoder with the MD32PG5 card, set F1-00 to 0.

4) Enter the motor nameplate parameters correctly.

- F1-01 (Rated motor power)
- F1-02 (Rated motor voltage)
- F1-03 (Rated motor current)
- F1-04 (Rated motor frequency)
- F1-05 (Rated motor rotational speed)

If applying the Heidenhain ERN 1387 SIN/COS encoder, set F1-10 (Selection of encoder's signal check) to 1.

5) Remove the load from the motor completely. Set F1-11 to 2 (No-load auto-tuning). "TUNE" is displayed on the operation panel. Release the brake manually and press



RUN

on the operation panel. The motor then starts to run and the controller

automatically calculates F1-06 (Encoder initial angle) and F1-08 (Wiring mode). After three or more times of auto-tuning, compare the obtained values. The value deviation of F1-06 shall be within  $\pm 5^\circ$ . The values of F1-08 shall be the same.

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**Note**

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If the obtained value of F1-08 is an odd number, it indicates that the output phase sequence is incorrect. In this case, you can run the motor but cannot complete with-load auto-tuning. If with-load auto-tuning is required, exchange any two UVW phases of power output to ensure correct phase sequence. Therefore, the value of F1-08 is an even number.

6) Run the motor in operation panel control and set F0-02 (Speed reference in operation panel control) to a proper value. For the consideration of safety, the system does not output commands for the RUN contactor and brake contactor. You have to press down the running contactor and release the brake manually. The motor current is usually less than 1 Amp in no load condition.

■ With-load Auto-tuning

1. Asynchronous motor

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**Note**

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For the asynchronous motor, after F1-11 is set to 1 (With-load auto-tuning), the motor keeps still. You need not take off the steel rope. You can hear the motor current noise in the process of auto-tuning.

To perform with-load auto-tuning for asynchronous motor, do as follows:

- 1) Set F0-01 (Command source selection) to 0 (Operation panel control) and press




on the operation panel to reset the current faults.

- 2) Enter the motor nameplate parameters correctly.

- F1-01 (Rated motor power)
- F1-02 (Rated motor voltage)
- F1-03 (Rated motor current)
- F1-04 (Rated motor frequency)
- F1-05 (Rated motor rotational speed)

Set F1-12 (Encoder lines per revolution) based on the encoder nameplate.

- 3) Set F1-11 to 1 (With-load auto-tuning) if the load cannot be removed from the motor

completely. Then "TUNE" is displayed on the operation panel. Press  on the operation panel. The controller starts motor auto-tuning, measures the stator resistance, rotor resistance and leakage inductance successively and automatically calculates the motor's mutual inductance and no-load current. After the auto-tuning is complete, the running contactor opens.

- 4) Run the motor at the inspection speed and check:

- Whether the running current is normal
- Whether the actual running direction of the elevator is consistent with the given direction
- Whether the pulse direction is correct

Ensure that F4-03 (Low byte of current floor position) increases when you press the UP key and decreases when you press the DOWN key.

The elevator running direction and pulse direction can be modified by F2-10 (Elevator running direction).

## 2. PMSM

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**Note**

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- Ensure that the UVW power cables of the motor are connected to the UVW terminals of the controller properly.
  - Ensure that the AB, CDZ signal wires of the ERN1387 SIN/COS encoder are connected to the AB, CDZ terminals of the PG card properly. The AB, UVW signal cables of the UVW encoder are connected to the AB, UVW terminals of the PG card properly.
  - Make sure that F8-01 (Pre-torque selection) is set to 0 (Pre-torque invalid). Otherwise, the elevator runaway may result during the auto-tuning.
  - If the auto-tuning still fails (the motor does not run or suddenly runs in one direction and then stops) when the UVW power cables of the motor are correctly wired, exchange any two output power cables of the controller and perform the motor auto-tuning again.
  - Ensure that there is nobody in the shaft because the auto-tuning process is dangerous.
- 
-

To perform with-load auto-tuning for PMSM, do as follows:

- 1) Check the motor power cables and encoder wiring.

Ensure that the motor's UVW power cables are connected to the controller's UVW terminals properly, and the encoder's AB, UVW or CDZ signal cables are connected to the AB, UVW or CDZ terminals of the PG card properly.

- 2) Power on the system and set the inspection switch to the inspection position. Ensure that F0-01 (Command source selection) to 1 (Distance control).
- 3) Set the encoder parameters properly.

F1-00 (Encoder type selection)

- 0: SIN/COS encoder
- 1: UVW encoder

F1-12 (Encoder lines per revolution)

- 4) Enter the motor nameplate parameters correctly.

- F1-01 (Rated motor power)
- F1-02 (Rated motor voltage)
- F1-03 (Rated motor current)
- F1-04 (Rated motor frequency)
- F1-05 (Rated motor rotational speed)

Make sure that F8-01 (Pre-torque selection) is set to 0 (Pre-torque invalid). If applying the ERN1387 SIN/COS encoder, set F1-10 (Selection of encoder's signal check) to 1.

If applying the ECN 1313 or 413 encoder with the MD32PG5 card, set F1-00 to 0.

- 5) Reset the current faults and set F1-11 to 1 (With-load auto-tuning). Press the inspection UP or DOWN button. The electromagnetic noise comes first. Then the motor runs one turn in the given direction until the encoder original signal is detected.

When the TUNE indicator becomes off, the motor auto-tuning is complete. After three or more times of auto-tuning, compare the obtained values. The value deviation of F1-06 shall be within  $\pm 5^\circ$ . The values of F1-08 shall be the same.

- 6) If applying the ERN1387 SIN/COS encoder, set F1-10 (Selection of encoder's signal check) to 2. Run the motor at the inspection speed and check:

- Whether the running current is normal
- Whether the actual running direction of the elevator is consistent with the given direction
- Whether the pulse direction is correct

Ensure that F4-03 (Low byte of current floor position) increases when you press the UP key and decreases when you press the DOWN key.

The elevator running direction and pulse direction can be modified by F2-10 (Elevator running direction).

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**Note**


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After the motor auto-tuning is complete, the system prohibits inspection running for 8s and saves parameters during the time.

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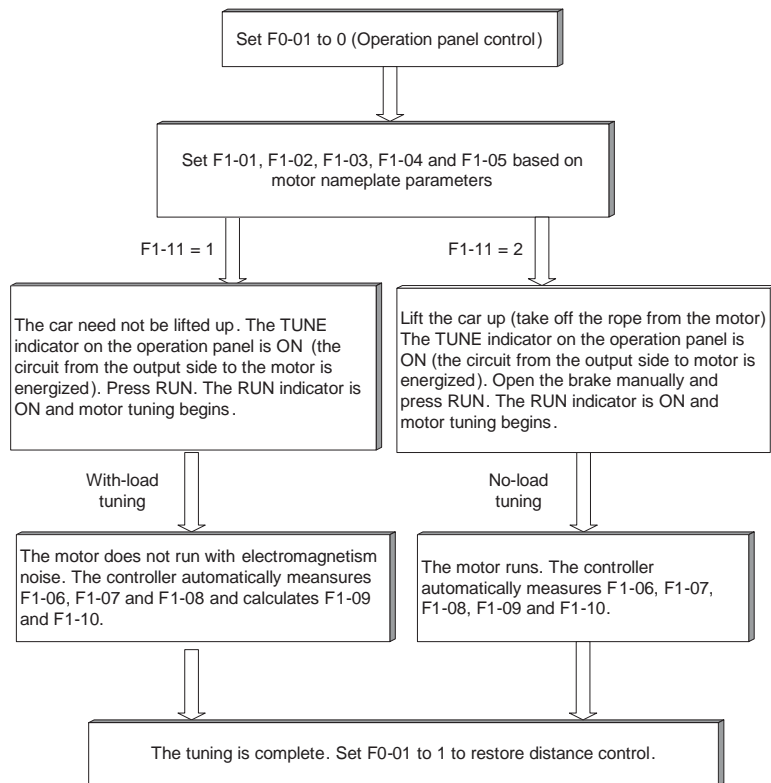


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#### 4.3.3 Summary of Commissioning at Inspection Speed

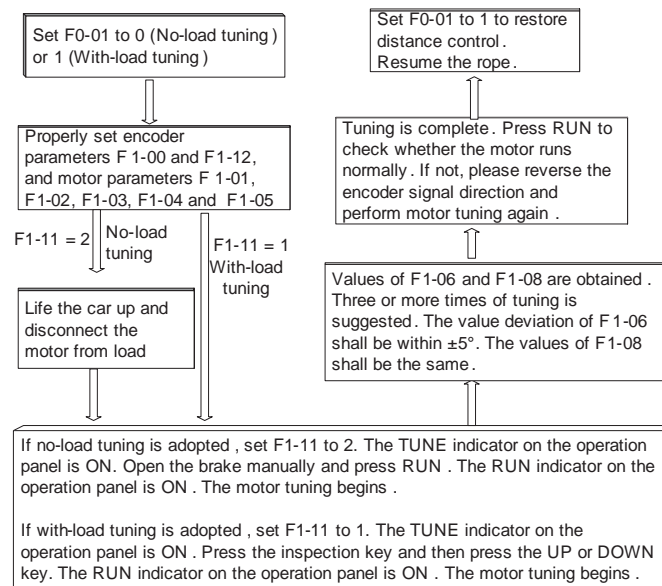
##### ■ Asynchronous Motor Auto-tuning Process

Figure 4-3 Auto-tuning process of the asynchronous motor



■ PMSM Auto-tuning Process

Figure 4-4 Auto-tuning process of the PMSM



■ Output Status of RUN and Brake Contactors

For the sake of safety in different control modes, the system handles the output commands to the RUN contactor or brake contactor differently. In some situations, it is necessary to release the running contactor or the brake contactor manually.

The following table lists the output status of the running and brake contactors.


Table 4-2 Output status of the running and brake contactors

Control Mode / Output State	Motor Auto-tuning (F1-11 = 1, 2)			Controller Running (Not Auto-tuning)	
	No-load Auto-tuning	With-load Auto-tuning		Operation Panel Control (F0-01 = 0)	Distance Control (F0-01 = 1)
		PMSM	Asynchronous Motor		
RUN contactor	Output	Output	Output	Not output	Output
Brake contactor	Not output	Output	Not output	Not output	Output

#### 4.3.4 Commissioning at Normal Speed

After ensuring that running at inspection speed is normal, you can start commissioning at normal speed. Shaft auto-tuning is required before the commissioning at normal speed. Ensure that the elevator satisfies the safety running requirements.

To perform shaft auto-tuning, the following conditions must be satisfied:

1. The signals of the encoder and leveling sensors (NC, NO) are correct and the position switches are installed properly.
2. The elevator is at the bottom floor and the down slow-down switch acts.
3. The elevator is in the inspection state. The control mode is distance control and CLVC (F0-00 = 1, F0-01 = 1).
4. The top floor number (F6-00) and bottom floor number (F6-01) are set correctly.
5. The NICE3000 system is not in the fault alarm state. If there is a fault at the moment, press  to reset the fault.

Then set F1-11 to 3 on the operation panel or set F7 to 1 on the keypad of the MCB, and start shaft auto-tuning.

#### 4.3.5 Riding Comfort

The riding comfort is an important factor of the elevator's overall performance. Improper installation of mechanical parts and improper parameter settings will cause bad comfort. Enhancing the riding comfort mainly involves adjustment of the controller output and the elevator's mechanical construction.

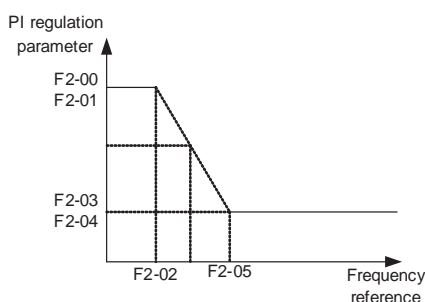
##### ■ Controller Output

The parameters that may influence the riding comfort are described in this part.

Function Code	Parameter Name	Setting Range	Default	Description
F1-09	Current filter time (PMSM)	0.00–40.00	0.00	It can reduce the lower-frequency vertical jitter during running.
F2-00	Speed loop proportional gain 1	0–100	40	F2-00 and F2-01 are the PI regulation parameters when running frequency is lower than F2-02 (Switchover frequency 1). F2-03 and F2-04 are the PI regulation parameters when running frequency is higher than F2-05 (Switchover frequency 2). The regulation parameters between F2-02 and F2-05 are the weighted average value of F2-00 & F2-01 and F2-03 & F2-04.
F2-01	Speed loop integral time 1	0.01–10.00s	0.60s	
F2-02	Switchover frequency 1	0.00 to F2-05	2.00 Hz	
F2-03	Speed loop proportional gain 2	0–100	35	
F2-04	Speed loop integral time 2	0.01–10.00s	0.80s	
F2-05	Switchover frequency 2	F2-02 to F0-06	5.00 Hz	

For a faster system response, increase the proportional gain and reduce the integral gain. Be aware that a fast system response causes system oscillation.

Figure 4-5 Relationship between switchover frequencies



The recommended regulating method is as follows:

If the factory parameters cannot satisfy the requirements, make slight regulation. Increase the proportion gain first to the biggest value under which the system does not oscillate. Then decrease the integral time to ensure fast responsiveness and small overshoot.

If both F2-02 (Switchover frequency 1) and F2-05 (Switchover frequency 2) are set to 0 simultaneously, only F2-03 and F2-04 are valid.

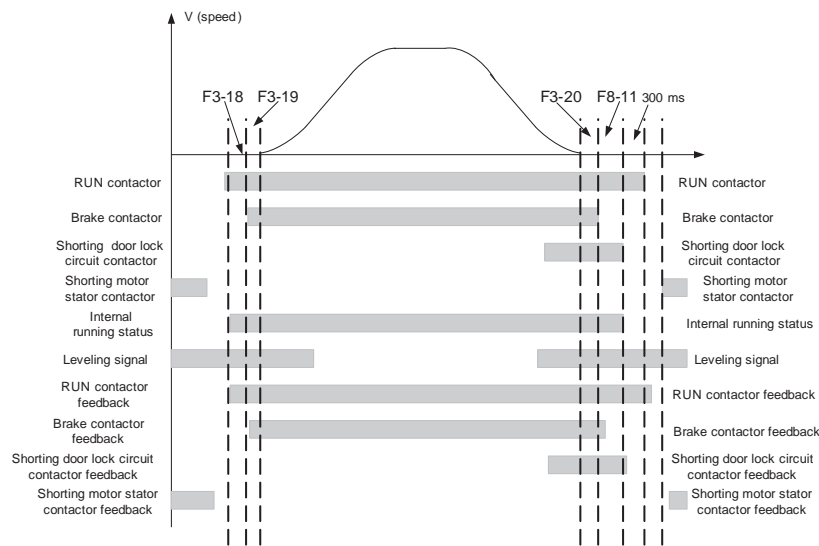
Function Code	Parameter Name	Setting Range	Default	Description
F2-06	Current loop proportion gain	10–500	60	F2-06 and F2-07 are the current loop adjustment parameters in the vector control algorithm.
F2-07	Current loop integral gain	10–500	30	

Regulating the two parameters for PMSM has obvious effect on the riding comfort. Appropriate regulation can restrain jitter during running. Generally, increase their default value to 180 and 60 respectively for the PMSM.

Function Code	Parameter Name	Setting Range	Default	Description
F3-00	Startup speed	0.000–0.030 m/s	0.010 m/s	It can reduce improve the terrace feeling at startup caused by the breakout friction of guide rail.
F3-01	Startup speed holding time	0.000–0.500s	0.150s	
F3-18	Zero-speed control time at startup	0.000–1.000s	0.200s	It specifies the zero speed holding time before brake output.

Function Code	Parameter Name	Setting Range	Default	Description
F3-19	Brake release delay	0.000–1.000s	0.200s 0.600s	It specifies the time required from when the system outputs the open signal to when the brake is completely released. The value is automatically changed to 0.0600s by the system when F8-02 is 2.
F3-20	Brake apply delay	0.000–1.000s	0.300s	It specifies the time from when the system outputs the close signal to when the brake is completely applied.
F8-11	Zero-speed control time at end	0.200–1.500s	0.200s	It specifies the zero speed holding time after the brake is applied.

Figure 4-6 Running time sequence



The open time of the brakes varies according to the types and the response time of the brakes is greatly influenced by the ambient temperature. Too high brake coil temperature slows the brake responsiveness. Thus, when the riding comfort at startup or stop cannot be improved by adjusting zero servo or load cell compensation parameters, appropriately increase F3-19 and F3-20 to check whether the brake release time influences the riding comfort.

Function Code	Parameter Name	Setting Range	Default
F8-01	Pre-torque selection	0: Pre-torque invalid 1: Load cell pre-torque compensation 2: Automatic pre-torque compensation	0
F8-02	Pre-torque offset Zero servo current coefficient	0.0%–100.0% 0.20%–50.0%	50.0% 15.0%
F8-03	Drive gain Zero servo speed loop KP	0.00–2.00 0.00–1.00	0.60 0.50
F8-04	Brake gain Zero servo speed loop TI	0.00–2.00 0.00–2.00	0.60 0.60

#### 1: Load cell pre-torque compensation

The controller with the load cell sensor pre-outputs the torque matched the load so as to ensure the riding comfort of the elevator.

- Motor driving status: full-load up, no-load down
- Motor braking status: full-load down, no-load up

"Pre-torque offset" is actually the elevator balance coefficient, namely, the percentage of car load to rated load when the car cage and counterweight are balanced.

The drive gain or brake gain scales the elevator's current pre-torque coefficient when the motor runs at the drive or brake side. If the gain set is higher, then the calculated value of startup pre-torque compensation is higher. The controller identifies the braking or driving state according to the load cell sensor signal and automatically calculates the required torque compensation value.

When an analog device is used to measure the load, these parameters are used to adjust the elevator startup. To adjust the startup, do as follows:

- In the driving state, increasing the value of F8-03 could reduce the rollback during the elevator startup, but a too high value could cause car lurch at start.
- In braking state, increasing the value of F8-04 could reduce the jerk in command direction during the elevator startup, but a too high value could cause car lurch at start.

#### 2: Automatic pre-torque compensation

This function is enabled only when the ERN1387 or ECN1313 encoder is applied. The system automatically adjusts the compensated torque at startup.

- Gradually increase F8-02 (Zero servo current coefficient) until that the rollback or jerk in command direction is cancelled at brake release and the motor does not vibrate.
- Increase the value of F8-02 (Zero servo current coefficient) if the motor jitters when F8-04 (Zero servo speed loop TI) is less than 1.00.
- Motor vibration and acoustic noise indicate excessive value of F8-03 (Zero servo speed loop KP). Use the default value of F8-03.

#### ■ Mechanical Construction

The mechanical construction affecting the riding comfort involves the guide rail, guide shoe, steel rope, installation of the brake, balance of the car and the resonance caused by the car, guide rail and motor. For asynchronous motor, abrasion or improper installation of the gearbox may arouse bad riding comfort.

1. Installation of the guide rail mainly involves the verticality of the rail, rail surface flatness, smoothness of the guide rail connection and parallelism between two guide rails (including rails at the counterweight side).
2. The tightness of the guide shoes (including the one at the counterweight side) also influences the riding comfort. The guide shoes must not be too loose or tight.
3. The drive from the motor to the car totally depends on the steel rope. Too big flexibility of the steel rope with irregular resistance during the car running may cause curly oscillation of the car. In addition, unbalanced stress of multiple steel ropes may cause the car to jitter during running.
4. The riding comfort may be influenced during running if the brake arm is installed too tightly or the brake is released incompletely.
5. If the car weight is unbalanced, it will cause uneven stress of the guide shoe that connects the car and the guide rail. As a result, the guide shoe will rub with the guide rail during running, affecting the riding comfort.
6. For asynchronous motor, abrasion or improper installation of the gearbox may also affect the riding comfort.
7. Resonance is an inherent character of a physical system, related to the material and quality of system components. If you are sure the oscillation is caused by resonance, reduce the resonance by increasing/decreasing the car weight or counterweight and add resonance absorbers at connections of the components. For example, place rubber blanket under the motor.

#### 4.3.6 Door Machine Commissioning

As shown in the second figure in section 4.1, correlation of the door machine controller and the elevator controller is that the CTB outputs door open/close command and the door machine controller feeds back the door open/close limit signal.

After commissioning and installation of the door machine are complete, check whether the wiring is correct and the door open/close limit signals are consistent with the default setting. To perform the door machine commissioning, do as follows:

1. In the terminal control mode of the door machine controller, manually short the door open relay output terminal BM/B1 and the door close relay output terminal BM/B2 on the CTB and observe whether the door machine can open and close correspondingly. If the door machine cannot act properly, check whether BM/B1 and BM/B2 are wrongly connected to the input terminals of the door machine controller and whether commissioning of the door machine controller is complete.

- After ensuring that control of door open/close is normal, check whether the door open/close signal feedback from the door machine is normal.

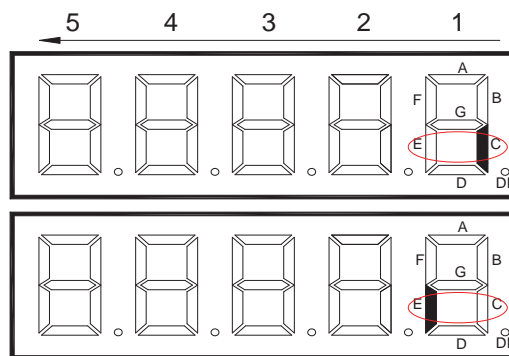
As shown in the following figure which is part of display of parameter F5-35 on the operation panel, segments E and C of the upmost right 7-segment LED are the monitoring points of door open limit and door close limit.

- Segment C ON, segment E OFF: The system receives the door open limit signal and the door is in the open state.
- Segment E ON, segment C OFF: The system receives the door close limit signal and the door is in the close state.

The two segments should be off in the door open/close process.

Control the door in the open or close state manually and query parameter F5-35. If the following screen is displayed, it indicates that the door machine controller feeds back the correct door open and close signals.

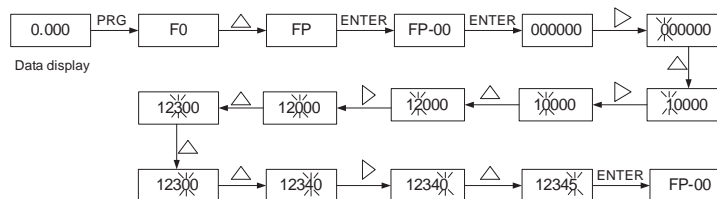
Figure 4-7 Monitoring the door open and close limit signals



#### 4.3.7 Password Setting

The NICE3000 controller provides the parameter password protection function. Here gives an example of changing the password into 12345, as shown in the following figure.

Figure 4-8 Example of changing the password



After you set the user password (set FP-00 to a non-zero value), the system requires user password authentication (the system displays "-----") when you press PRG. In this case, you can modify the function code parameters only after entering the password correctly.

In the password protection unlocked status, you can change the password at any time. The last input number will be the user password.

If you want to disable the password protection function, enter the correct password and then set FP-00 to 0. If FP-00 is a non-zero value at power-on, the parameters are protected by the password.



## Function Code Table

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## Chapter 5 Function Code Table

Function Code	Parameter Name	Setting Range	Default
Group F0: Basic parameters			
F0-00	Control mode	0: Sensorless flux vector control (SFVC) 1: Closed-loop vector control (CLVC)	1
F0-01	Command source selection	0: Operation panel control 1: Distance control	1
F0-02	Speed reference in operation panel control	0.050 m/s to F0-04	0.050 m/s
F0-03	Maximum elevator running speed	0.250 m/s to F0-04	1.600 m/s
F0-04	Rated elevator speed	0.250–4.000 m/s	1.600 m/s
F0-05	Rated elevator load	300–9999 kg	1000 kg
F0-06	Maximum frequency	20.00–99.00 Hz	50.00 Hz
F0-07	Carrier frequency	0.5–16.0 kHz	6 kHz
Group F1: Motor parameters			
F1-00	Encoder type selection	0: SIN/COS incremental encoder 1: UVW incremental encoder	1
F1-01	Rated motor power	1.1–75.0 kW	Model dependent
F1-02	Rated motor voltage	0–440 V	380 V
F1-03	Rated motor current	0.00–655.00 A	Model dependent
F1-04	Rated motor frequency	0.00–99.00 Hz	50.00 Hz
F1-05	Rated motor rotational speed	0–3000 RPM	1460 RPM
F1-06	Stator resistance (asynchronous motor)	0.000–30.000 $\Omega$	Model dependent
	Encoder initial angle (PMSM)	0–359.9°	
F1-07	Rotor resistance	0.000–30.000 $\Omega$	Model dependent
	Encoder angle at power-off (PMSM)	0–359.9°	
F1-08	Leakage inductance (asynchronous motor)	0.00–300.00 mH	Model dependent
	Wiring mode (PMSM)	0–15	
F1-09	Mutual inductance	0.1–3000.0 mH	Model dependent
	Current filter time (PMSM)	0.00–40.00	
F1-10	Motor magnetizing current	0.01–300.00 A	Model dependent
	Selection of encoder's signal check (PMSM)	0–255	

Function Code	Parameter Name	Setting Range	Default
F1-11	Auto-tuning mode selection	0: No operation 1: With-load auto-tuning 2: No-load auto-tuning 3: Shaft auto-tuning	0
F1-12	Encoder lines per revolution	0–10000	1024
F1-13	Encoder fault detection time	0.0–10.0s	1.0s
Group F2: Vector control parameters			
F2-00	Speed loop proportional gain 1	0–100	40
F2-01	Speed loop integral time 1	0.01–10.00s	0.60s
F2-02	Switchover frequency 1	0.00 to F2-05	2.00 Hz
F2-03	Speed loop proportional gain 2	0–100	35
F2-04	Speed loop integral time 2	0.01–10.00s	0.80s
F2-05	Switchover frequency 2	F2-02 to F0-06	5.00 Hz
F2-06	Current loop proportional gain	10–500	60
F2-07	Current loop integral gain	10–500	30
F2-08	Torque limit	0.0–200.0%	150.0%
F2-10	Elevator running direction	0: Running direction and position pulse direction unchanged 1: Running direction reversed, position pulse direction reversed 2: Running direction unchanged, position pulse direction reversed 3: Running direction reversed, position pulse direction unchanged	0
Group F3: Running control parameters			
F3-00	Startup speed	0.000–0.030 m/s	0.010 m/s
F3-01	Startup speed holding time	0.000–0.500s	0.150s
F3-02	Acceleration rate	0.200–2.000 m/s <sup>2</sup>	0.600 m/s <sup>2</sup>
F3-03	Acceleration start jerk time	0.300–4.000s	2.500s
F3-04	Acceleration end jerk time	0.300–4.000s	2.500s
F3-05	Deceleration rate	0.200–2.000 m/s <sup>2</sup>	0.600 m/s <sup>2</sup>
F3-06	Deceleration start jerk time	0.300–4.000s	2.500s
F3-07	Deceleration end jerk time	0.300–4.000s	2.500s
F3-08	Special deceleration rate	0.500–2.000 m/s <sup>2</sup>	0.900 m/s <sup>2</sup>
F3-09	Pre-deceleration distance	0–90.0 mm	0.0 mm
F3-10	Re-leveling speed	0.000–0.080 m/s	0.040 m/s
F3-11	Inspection speed	0.100–0.630 m/s	0.250 m/s
F3-12	Position of up slow-down 1	0.00–300.00 m	0.00 m

Function Code	Parameter Name	Setting Range	Default
F3-13	Position of down slow-down 1	0.00–300.00 m	0.00 m
F3-14	Position of up slow-down 2	0.00–300.00 m	0.00 m
F3-15	Position of down slow-down 2	0.00–300.00 m	0.00 m
F3-16	Position of up slow-down 3	0.00–300.00 m	0.00 m
F3-17	Position of down slow-down 3	0.00–300.00 m	0.00 m
F3-18	Zero-speed control time at startup	0.000–1.000s	0.200s
F3-19	Brake release delay	0.000–1.000s	0.200s 0.600s
F3-20	Brake apply delay	0.000–1.000s	0.300s
Group F4: Floor parameters			
F4-00	Leveling adjustment	0–60 mm	30 mm
F4-01	Current floor	F6-01 to F6-00	1
F4-02	High byte of current floor position	0–65535	1
F4-03	Low byte of current floor position	0–65535	34464
F4-04	Length 1 of leveling flag	0–65535	0
F4-05	Length 2 of leveling flag	0–65535	0
F4-06	High byte of floor 1 height	0–65535	0
F4-07	Low byte of floor 1 height	0–65535	0
F4-08	High byte of floor 2 height	0–65535	0
F4-09	Low byte of floor 2 height	0–65535	0
F4-10	High byte of floor 3 height	0–65535	0
F4-11	Low byte of floor 3 height	0–65535	0
	⋮		
F4-62	High byte of floor 29 height	0–65535	0
F4-63	Low byte of floor 29 height	0–65535	0
F4-64	High byte of floor 30 height	0–65535	0
F4-65	Low byte of floor 30 height	0–65535	0
Group F5: Terminal function parameters			
F5-00	Attendant/Normal switchover time	3–200s	3

Function Code	Parameter Name	Setting Range	Default
F5-01	X1 function selection	NO input: 01–31	33
F5-02	X2 function selection	00: No function	35
F5-03	X3 function selection	01: Up leveling signal	34
F5-04	X4 function selection	02: Down leveling signal	04
F5-05	X5 function selection	03: Door zone signal	05
F5-06	X6 function selection	04: Safety circuit feedback signal	38
F5-07	X7 function selection	05: Door lock circuit feedback signal	39
F5-08	X8 function selection	06: Running feedback signal	22
F5-09	X9 function selection	07: Brake feedback signal	40
F5-10	X10 function selection	08: Inspection signal	09
F5-11	X11 function selection	09: Inspection up signal	10
F5-12	X12 function selection	10: Inspection down signal 11: Fire emergency signal 12: Up limit signal 13: Down limit signal 14: Over-load signal 15: Full-load signal 16: Up slow-down 1 signal 17: Down slow-down 1 signal 18: Up slow-down 2 signal 19: Down slow-down 2 signal 20: Up slow-down 3 signal 21: Down slow-down 3 signal 22: Shorting door lock circuit contactor feedback 23: Firefighter switch signal 24: Door machine 1 light curtain signal 25: Door machine 2 light curtain signal 26: Brake travel switch feedback signal 27: UPS valid signal 28: Elevator locked signal 29: Safety circuit 2 feedback signal 30: Shorting PMSM stator feedback signal 31: Door lock circuit 2 feedback signal (To be continued)	44

Function Code	Parameter Name	Setting Range	Default
F5-13	X13 function selection	NC input: 33–63	45
F5-14	X14 function selection	33: Up leveling signal	48
F5-15	X15 function selection	34: Down leveling signal	49
F5-16	X16 function selection	35: Door zone signal	50
F5-17	X17 function selection	36: Safety circuit feedback signal	51
F5-18	X18 function selection	37: Door lock circuit feedback signal	00
F5-19	X19 function selection	38: Running feedback signal	00
F5-20	X20 function selection	39: Brake feedback signal	00
F5-21	X21 function selection	40: Inspection signal	00
F5-22	X22 function selection	41: Inspection up signal	00
F5-23	X23 function selection	42: Inspection down signal	00
F5-24	X24 function selection	43: Fire emergency signal	00
		44: Up limit signal	00
		4513: Down limit signal	00
		46: Over-load signal	00
		47: Full-load signal	00
		48: Up slow-down 1 signal	00
		49: Down slow-down 1 signal	00
		50: Up slow-down 2 signal	00
		51: Down slow-down 2 signal	00
		52: Up slow-down 3 signal	00
		53: Down slow-down 3 signal	00
		54: Shorting door lock circuit contactor feedback	00
		55: Firefighter switch signal	00
		56: Door machine 1 light curtain signal	00
		57: Door machine 2 light curtain signal	00
		58: Brake travel switch feedback	00
		59: UPS valid signal NC input	00
		60: Elevator locked signal	00
		61: Safety circuit 2 feedback	00
		62: Shorting PMSM stator contactor feedback	00
		63: Door lock circuit 2 feedback	00

Function Code	Parameter Name	Setting Range	Default																																				
F5-25	CTB input type selection	0–255	64																																				
<p>The NO/NC setting of terminals X1 to X8 on the CTB is listed in the following table.</p> <table border="1"> <thead> <tr> <th>Terminal</th> <th>Bit</th> <th>Parameter Name</th> <th>Default</th> </tr> </thead> <tbody> <tr> <td>X1</td> <td>Bit0</td> <td>Door 1 light curtain</td> <td>0</td> </tr> <tr> <td>X2</td> <td>Bit1</td> <td>Door 2 light curtain</td> <td>0</td> </tr> <tr> <td>X3</td> <td>Bit2</td> <td>Door 1 open limit</td> <td>0</td> </tr> <tr> <td>X4</td> <td>Bit3</td> <td>Door 2 open limit</td> <td>0</td> </tr> <tr> <td>X5</td> <td>Bit4</td> <td>Door 1 close limit</td> <td>0</td> </tr> <tr> <td>X6</td> <td>Bit5</td> <td>Door 2 close limit</td> <td>0</td> </tr> <tr> <td>X7</td> <td>Bit6</td> <td>Full-load signal</td> <td>1</td> </tr> <tr> <td>X8</td> <td>Bit7</td> <td>Over-load signal</td> <td>0</td> </tr> </tbody> </table> <p>0: NC 1: NO</p>				Terminal	Bit	Parameter Name	Default	X1	Bit0	Door 1 light curtain	0	X2	Bit1	Door 2 light curtain	0	X3	Bit2	Door 1 open limit	0	X4	Bit3	Door 2 open limit	0	X5	Bit4	Door 1 close limit	0	X6	Bit5	Door 2 close limit	0	X7	Bit6	Full-load signal	1	X8	Bit7	Over-load signal	0
Terminal	Bit	Parameter Name	Default																																				
X1	Bit0	Door 1 light curtain	0																																				
X2	Bit1	Door 2 light curtain	0																																				
X3	Bit2	Door 1 open limit	0																																				
X4	Bit3	Door 2 open limit	0																																				
X5	Bit4	Door 1 close limit	0																																				
X6	Bit5	Door 2 close limit	0																																				
X7	Bit6	Full-load signal	1																																				
X8	Bit7	Over-load signal	0																																				
F5-26	Y1 function selection	Output function: 0: No function 1: RUN contactor control 2: Brake contactor control 3: Shorting door lock circuit contactor 4: Fire emergency floor arrival signal feedback 5: Door 1 open 6: Door 1 close 7: Door 2 open 8: Door 2 close 9: Brake and RUN contactors healthy 10: Fault state 11: Running monitor 12: Shorting PMSM stator 13: Emergency evacuation operation 14: System healthy 15: Emergency buzzer control 16: High-voltage startup of brake 17: Elevator running in up direction 18: Fan and lamp	1																																				
F5-27	Y2 function selection		2																																				
F5-28	Y3 function selection		3																																				
F5-29	Y4 function selection		4																																				
F5-30	Y5 function selection		0																																				
F5-31	Y6 function selection		0																																				

Function Code	Parameter Name	Setting Range	Default
F5-32	Communication status display		
<p style="text-align: center;">Figure 5-1 Communication status display</p> <p>The upmost left 7-segment LED is expressed by 0–9, and used for CAN communication monitoring.</p> <ul style="list-style-type: none"> <li>• 0: communication normal</li> <li>• 9: communication interrupted completely</li> </ul> <p>The eight segments A/B/C/D/E/F/G/DP of the four 7-segment LEDs from right to left successively indicate each HCB Modbus communication monitoring of each HCB.</p> <ul style="list-style-type: none"> <li>• ON: The Modbus communication of the HCB for the floor is normal.</li> <li>• OFF: The Modbus communication of the HCB for the floor is interrupted.</li> </ul>			
F5-33	Program control selection	<ul style="list-style-type: none"> <li>• Bit0 to Bit3: Reserved</li> <li>• Bit4: Arrival gong disabled at night (22:00 p.m. to 7:00 a. m.)</li> <li>• Bit5: Input function 25/27 used as motor overheat or earthquake detection input</li> <li>• Bit6: Door lock disconnected added once to the prerequisites from inspection to normal running</li> <li>• Bit7: Fault code not displayed on the keypad</li> <li>• Bit8: Door open command cancelled immediately at door open limit</li> <li>• Bit9: Car stop due to zero-speed torque holding when the travel switch of the brake is abnormal</li> <li>• Bit10 to Bit15: Reserved</li> </ul>	0
F5-34	Terminal state display		
F5-35	Terminal state display		
<p>F5-34/F5-35 indicates the state of the I/O terminals. The serial numbers of the five 7-segment LEDs are 5, 4, 3, 2 and 1 from left to right, shown as below:</p>			

Function Code	Parameter Name		Setting Range		Default	
	F5-34			F5-35		
	SN	Segment	Indication	SN	Segment	Indication
1	1			1	A	Light curtain 1
		B	Up leveling signal		B	Light curtain 2
		C	Down leveling signal		C	Door 1 open limit
		D	Door zone signal		D	Door 2 open limit
		E	Safety circuit feedback 1		E	Door 1 close limit
		F	Door lock circuit feedback 1		F	Door 2 close limit
		G	Running contactor feedback		G	Full-load signal
		DP	Brake contactor feedback 1		DP	Over-load signal
2	2	A	Inspection signal	2	A	Door open button
		B	Inspection up signal		B	Door close button
		C	Inspection down signal		C	Door open delay button
		D	Fire emergency signal		D	Bypass signal
		E	Up limit signal		E	Attendant signal
		F	Down limit signal		F	Direction change signal
		G	Over-load signal		G	Independent running signal
DP	Full-load signal	DP	Firefighter operation signal			
3	3	A	Up slow-down 1 signal	3	A	Door open output 1
		B	Down slow-down 1 signal		B	Door close output 1
		C	Up slow-down 2 signal		C	Door lock signal
		D	Down slow-down 2 signal		D	Door open output 1
		E	Up slow-down 3 signal		E	Door close output 2
		F	Down slow-down 3 signal		F	Door lock signal
		G	Shorting door lock circuit contactor feedback		G	Up arrival gong
		DP	Motor overheat signal		DP	Down arrival gong

Function Code	Parameter Name	Setting Range	Default
4	A	Door machine 1 light curtain	A
	B	Door machine 2 light curtain	B
	C	Brake feedback 2	C
	D	UPS input	D
	E	Elevator locked input	E
	F	Safety circuit feedback 2	F
	G	Shorting PMSM stator contactor feedback	G
	DP	Door lock circuit feedback 2	DP
5	A	Reserved	A
	B	RUN contactor output	B
	C	Brake contactor output	C
	D	Shorting door lock circuit contactor control	D
	E	Fire emergency floor arrival signal	E
	F		F
F5-36	Load cell input selection	0: MCB digital input 1: CTB digital input 2: CTB analog input 3: MCB analog input	2
<b>Group F6: Basic elevator parameters</b>			
F6-00	Top floor of the elevator	F6-01 to 31	9
F6-01	Bottom floor of the elevator	1 to F6-00	1
F6-02	Parking floor	F6-01 to F6-00	1
F6-03	Fire emergency floor	F6-01 to F6-00	1
F6-04	Elevator-locked floor	F6-01 to F6-00	1
F6-05	Service floors 1	0–65535 (floors 1–16)	65535
F6-06	Service floors 2	0–65535 (floors 17–31)	65535
F6-07	Number of elevators in group mode	1–8	1
F6-08	Elevator SN	1–8	1

Function Code	Parameter Name	Setting Range	Default
F6-09	Parallel selection	<ul style="list-style-type: none"> <li>• Bit0: Dispersed waiting</li> <li>• Bit1: Reserved</li> <li>• Bit2: Parallel implemented at monitoring port</li> <li>• Bit4: Door not open at power-on if elevator-locked signal is enabled</li> <li>• Bit6: Clear floor number and display direction in advance</li> <li>• Bit7: New anti-nuisance function</li> <li>Bit14: Safety 2, door lock 2 time interval detection</li> </ul>	0
F6-10	Leveling sensor filter time	10–50 ms	14 ms
F6-11	Elevator function selection	<ul style="list-style-type: none"> <li>• Bit1: Returning to base floor for large position deviation function</li> <li>• Bit2: Cancelling auto sequential arrange of floor addresses to be displayed</li> <li>• Bit3: Stopping shorting motor stator output at door open after auto slide</li> <li>• Bit4: Current slope mode at stop for 300 ms</li> <li>• Bit5: Current detection valid at startup for PMSM</li> <li>• Bit7: Door open valid at non-door zone in the inspection state</li> <li>• Bit8: Door open and close once after inspection turned to normal</li> <li>• Bit10: Buzzer not tweet upon re-leveling</li> <li>• Bit11: Super short floor function</li> <li>• Bit13: E53 fault auto reset</li> </ul>	0
F6-12	VIP floor	F6-01 to F6-00	0
F6-13	Security floor	F6-01–F6-00	1
F6-14	Down-collective 1 start time	00.00–23.59 (hour.minute)	00.00
F6-15	Down-collective 1 end time	00.00–23.59 (hour.minute)	00.00
F6-16	Down-collective 2 start time	00.00–23.59 (hour.minute)	00.00
F6-17	Down-collective 2 end time	00.00–23.59 (hour.minute)	00.00
F6-18	Time-based floor service 1 start time	00.00–23.59 (hour.minute)	00.00
F6-19	Time-based floor service 1 end time	00.00–23.59 (hour.minute)	00.00
F6-20	Floor 1 of time-based floor service 1	0–65535 (floors 1–16)	65535
F6-21	Floor 2 of time-based floor service 1	0–65535 (floors 17–31)	65535

Function Code	Parameter Name	Setting Range	Default
F6-22	Time-based floor service 2 start time	00.00–23.59 (hour.minute)	00.00
F6-23	Time-based floor service 2 end time	00.00–23.59 (hour.minute)	00.00
F6-24	Floor 1 of time-based floor service 2	0–65535 (floors 1–16)	65535
F6-25	Floor 2 of time-based floor service 2	0–65535 (floors 17–31)	65535
F6-26	Peak 1 start time	00.00–23.59 (hour.minute)	00.00
F6-27	Peak 1 end time	00.00–23.59 (hour.minute)	00.00
F6-28	Peak 1 floor	F6-01–F6-00	1
F6-29	Peak 2 start time	00.00–23.59 (hour.minute)	00.00
F6-30	Peak 2 end time	00.00–23.59 (hour.minute)	00.00
F6-31	Peak 2 floor	F6-01–F6-00	1
Group F7: Test function parameters			
F7-00	Test floor 1	0–top floor of the elevator (F6-00)	0
F7-01	Test floor 2	0–top floor of the elevator (F6-00)	0
F7-02	Test floor 3	0–top floor of the elevator (F6-00)	0
F7-03	Random test times	0–60000	0
F7-04	Hall call enabled	0: Hall call allowed 1: Hall call prohibited	0
F7-05	Door open enabled	0: Door open allowed 1: Door open prohibited	0
F7-06	Over-load function selection	0: Over-load running prohibited 1: Over-load running allowed	0
F7-07	Limit switch	0: Limit switch enabled 1: Limit switch disabled	0
Group F8: Enhanced function parameters			
F8-00	Load cell auto-tuning	0–100%	0%
F8-01	Pre-torque selection	0: Pre-torque invalid 1: Load cell pre-torque compensation 2: Automatic pre-torque compensation	0
F8-02	Pre-torque offset	0.0–100.0%	50.0%
	Zero servo current coefficient	0.20%–50.0%	15.0%
F8-03	Drive gain	0.00–2.00	0.60
	Zero servo speed loop KP	0.00–1.00	0.50
F8-04	Brake gain	0.00–2.00	0.60
	Zero servo speed loop TI	0.00–2.00	0.60

Function Code	Parameter Name	Setting Range	Default
F8-05	Current car load	0–1023	0
F8-06	Car no-load load	0–1023	0
F8-07	Car full-load load	0–1023	100
F8-08	Anti-nuisance function	0: Disabled 1: Enabled (load cell sensor required)	0
F8-09	Emergency evacuation operation speed at power failure	0.000–0.100 m/s	0.050 m/s
F8-10	Emergency evacuation operation mode at power failure	0: Motor not running 1: UPS 2: 48 V battery power supply	0
F8-11	Zero-speed control time at end	0.200–1.500s	0.200
Group F9: Time parameters			
F9-00	Time for idle elevator to return to base floor	0–240 minutes	10 minutes
F9-01	Time for fan and lamp to be turned off	0–240 minutes	2 minutes
F9-02	Maximum floor running time interval	0–45s (invalid under 3s)	45s
F9-03	Clock: year	2000–2100	Current time
F9-04	Clock: month	1–12	Current time
F9-05	Clock: day	1–31	Current time
F9-06	Clock: hour	0–23	Current time
F9-07	Clock: minute	0–59	Current time
F9-09	Accumulative running time	0–65535 hours	0
F9-11	High byte of running times	0–9999	0
F9-12	Low byte of running times	0–9999	0
Group FA: Keypad setting parameters			
FA-00	Keypad display selection	0: Reversed display, physical floor 1: Positive display, physical floor 2: Reversed display, hall call data 3: Positive display, hall call data	0
FA-01	Run display 1	1–65535	65535
FA-02	Stop display	1–65535	65535
FA-03	Current encoder angle	0.0–360.0°	0.0°
FA-04	Software 1 (FK)	0–65535	0
FA-05	Software 2 (ZK)	0–65535	0
FA-06	Software 3 (DSP)	0–65535	0
FA-07	Heatsink temperature	0–100° C	0° C

Function Code	Parameter Name	Setting Range	Default
Group FB: Door function parameters			
FB-00	Number of door machine (s)	1–2	1
FB-01	CTB software	0–99	0
FB-02	Service floor 1 of door machine 1	0–65535 (floors 1–16)	65535
FB-03	Service floor 2 of door machine 1	0–65535 (floors 17–31)	65535
FB-04	Service floor 1 of door machine 2	0–65535 (floors 1–16), valid only when there are two door machines	65535
FB-05	Service floor 2 of door machine 2	0–65535 (floors 17–31), valid only when there are two door machines	65535
FB-06	Open door time protection	5–99s	10s
FB-07	Arrival gong output delay	0–1000	0
FB-08	Close door time protection	5–99s	15s
FB-09	Times of door open and close	0–20	0
FB-10	Door state of idle elevator	<ul style="list-style-type: none"> <li>• 0: close the door successfully</li> <li>• 1: waiting with door open at base floor</li> <li>• 2: waiting with door open at each floor</li> </ul>	0
FB-11	Door open holding time for hall call	1–30s	5s
FB-12	Door open holding time for car call	1–30s	3s
FB-13	Door open holding time at base floor	1–30s	10s
FB-14	Door open holding time	10–1000s	30s
Group FC: Protection function parameters			
FC-00	Protection function selection	<ul style="list-style-type: none"> <li>• Bit0: Detection of short circuit to ground at power-on</li> <li>• Bit1: Detection of inspection startup current</li> </ul>	1
FC-01	Protection function selection	<ul style="list-style-type: none"> <li>• Bit0: Over-load protection selection</li> <li>• Bit1: Output phase loss selection</li> <li>• Bit2: Over-modulation function selection</li> <li>• Bit3: Reserved</li> <li>• Bit4: Light curtain judgment at door close limit</li> <li>• Bit5: Cancelling DSP communication check</li> <li>• Bit6: Reserved</li> <li>• Bit7: Stop at leveling position function</li> </ul>	1

Function Code	Parameter Name	Setting Range	Default
FC-02	Over-load protection coefficient	0.50–10.00	1.00
FC-03	Over-load alarm coefficient	50–100%	80%
FC-04	Opposite door selection	1–10	0
FC-06	1st fault	The first two digits indicate the floor and the last two digits indicate the fault code. For example, if E30 (elevator position abnormal) occurs at floor 1, the fault information is 0130.	0
FC-07	1st fault time (month/day)	0–1231	0
FC-08	2nd fault	0–3199	0
FC-09	2nd fault time (month/day)	0–1231	0
FC-10	3rd fault	0–3199	0
FC-11	3rd fault time (month/day)	0–1231	0
FC-12	4th fault	0–3199	0
FC-13	4th fault time (month/day)	0–1231	0
FC-14	5th fault	0–3199	0
FC-15	5th fault time (month/day)	0–1231	0
FC-16	6th fault	0–3199	0
FC-17	6th fault time (month/day)	0–1231	0
FC-18	7th fault	0–3199	0
FC-19	7th fault time (month/day)	0–1231	0
FC-20	8th fault	0–3199	0
FC-21	8th fault time (month/day)	0–1231	0
FC-22	9th fault	0–3199	0
FC-23	9th fault time (month/day)	0–1231	0
FC-24	10th fault	0–3199	0
FC-25	10th fault time (month/day)	0–1231	0
FC-26	Latest fault	0–3199	1
FC-27	Speed at latest fault	0.000–4.000 m/s	0.000
FC-28	Current at latest fault	0.0–999.9 A	0.0
FC-29	DC bus voltage at latest fault	0–999 V	0
FC-30	Latest fault time (month/day)	0–1231	0

Function Code	Parameter Name	Setting Range	Default
FC-31	Latest fault time (hour/minute)	00.00–23.59	00.00
Group FD: Communication parameters			
FD-00	Baud rate setting	0–5: 9600 bps 6: 19200 bps 7: 38400 bps	5
FD-01	Data format	0: No check-out, data format <8,N,2> 1: Even check-out, data format <8,E,1> 2: Odd check-out, data format <8,O,1>	0
FD-02	Local address	0–127 0: Broadcasting address	1
FD-03	Communication response delay	0–20 ms	10 ms
FD-04	Communication timeout delay	0.0–60.0s, 0.0s: invalid	0.0s
FD-05	Stop delay upon re-leveling	0.00–2.00s	0.00s
Group FE: Elevator function parameters			
FE-00	Collective selective mode	0: Full selective 1: Down selective 2: Up selective	0
FE-01	Floor 1 corresponding display	0000–1999 The first two digits indicate the display code of ten's place, and the last two digits indicate the display code of unit's place. 00: display 0 01: display 1 02: display 2 03: display 3 04: display 4 05: display 5 (Continued)	1901
FE-02	Floor 2 corresponding display		1902
FE-03	Floor 3 corresponding display		1903
FE-04	Floor 4 corresponding display		1904
FE-05	Floor 5 corresponding display		1905
FE-06	Floor 6 corresponding display		1906
FE-07	Floor 7 corresponding display		1907

Function Code	Parameter Name	Setting Range	Default
FE-08	Floor 8 corresponding display	06: display 6	1908
FE-09	Floor 9 corresponding display	07: display 7	1909
FE-10	Floor 10 corresponding display	08: display 8	0100
FE-11	Floor 11 corresponding display	09: display 9	0101
FE-12	Floor 12 corresponding display	10: display A	0102
FE-13	Floor 13 corresponding display	11: display B	0103
FE-14	Floor 14 corresponding display	12: display G	0104
FE-15	Floor 15 corresponding display	13: display H	0105
FE-16	Floor 16 corresponding display	14: display L	0106
FE-17	Floor 17 corresponding display	15: display M	0107
FE-18	Floor 18 corresponding display	16: display P	0108
FE-19	Floor 19 corresponding display	17: display R	0109
FE-20	Floor 20 corresponding display	18: display -	0200
FE-21	Floor 21 corresponding display	19: no display	0201
FE-22	Floor 22 corresponding display	20: display 12	0202
FE-23	Floor 23 corresponding display	21: display 13	0203
FE-24	Floor 24 corresponding display	22: display 23	0204
FE-25	Floor 25 corresponding display	23: display C	0205
FE-26	Floor 26 corresponding display	24: display D	0206
FE-27	Floor 27 corresponding display	25: display E	0207
FE-28	Floor 28 corresponding display	26: display F	0208
FE-29	Floor 29 corresponding display	27: display I	0209
FE-30	Floor 30 corresponding display	28: display J	0300
FE-31	Floor 31 corresponding display	29: display K	0301
		30: display N	
		31: display O	
		32: display Q	
		33: display S	
		34: display T	
		35: display U	
		36: display V	
		37: display W	
		38: display X	
		39: display Y	
		40: display Z	

Function Code	Parameter Name	Setting Range	Default
FE-32	Factory function selection 1	<ul style="list-style-type: none"> <li>• Bit0: Attendant function</li> <li>• Bit1: Returning to base floor at fire emergency</li> <li>• Bit2: Re-leveling function</li> <li>• Bit3: Pre-open function</li> <li>• Bit4: Removal of stuck hall calls</li> <li>• Bit5: Night security floor function</li> <li>• Bit6: Down collective selective peak service</li> <li>• Bit7: Parallel (group mode) peak service</li> <li>• Bit8: Floor selection of time-based floor service</li> <li>• Bit9: Independent running</li> <li>• Bit10: Inspection automatic door-close</li> <li>• Bit11: Mal-deletion of car calls</li> <li>• Bit12: Mal-deletion of hall calls</li> <li>• Bit13: Emergency evacuation function</li> <li>• Bit14: Emergency evacuation over-speed protection</li> <li>• Bit15: Shorting door lock circuit detection function valid</li> </ul>	35843

Function Code	Parameter Name	Setting Range	Default
FE-33	Factory function selection 2	<ul style="list-style-type: none"> <li>• Bit1: Door open holding at door open limit</li> <li>• Bit2: Not output door close signal at door close limit</li> <li>• Bit3: Detecting door close limit in inspection mode</li> <li>• Bit4: Auto reset for running and brake contactor stuck</li> <li>• Bit5: Detecting slow-down switch stuck</li> <li>• Bit6: Shorting PMSM stator function enabled</li> <li>• Bit7: Forced door close function</li> <li>• Bit8: NC output of shorting motor stator contactor</li> <li>• Bit9: Immediately stop upon re-leveling</li> <li>• Bit10: Adopting 10-bit AD sampling (load cell)</li> <li>• Bit11: Disabling door-close command after car lamp is turned off</li> <li>• Bit12: Stop upon re-leveling only for service floors</li> <li>• Bit13: High-speed elevator protection function selection</li> <li>• Bit14: New door open delay function (door open delay signal triggered 3s after the hall call button or door open button is pressed)</li> <li>• Bit15: Opposite door independent control for freight elevator</li> </ul>	32
FP-00	User password	0–65535 0: no password	0
FP-01	Parameter update	0–2	0
FP-02	User setting check	0: Disabled 1: Enabled	0





## System Application

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## Chapter 6 System Application

### 6.1 Parallel Mode and Group Mode

#### 6.1.1 Parameter Setting

The NICE3000 has the parallel control function. Two NICE3000 controllers can exchange the elevator information by means of CAN or RS485 communication, coordinating response of the two elevators to hall calls and improving the elevator efficiency.

The related parameters are set in the following table.

Table 6-1 Setting of the related parameters

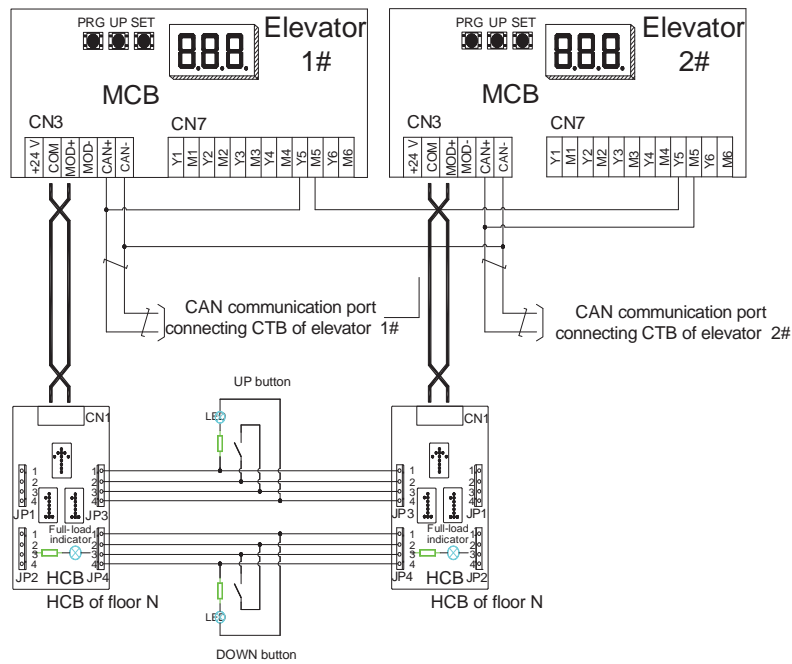
Function Code	Parameter Name	Setting Range	Setting in Parallel
F5-29	Y4 function selection	0–14	14
F6-07	Number of elevators in group mode	1–8	2
F6-08	Elevator SN	1–8	Master elevator: 1
			Slave elevator: 2
F6-09	Parallel selection	Bit2: Parallel implemented at monitoring port	Bit = 1 when CN5 is used for the parallel mode
Note: The CAN communication port is used for the parallel mode by default. It is unnecessary to set F6-09.			

#### 6.1.2 Setting of CTB Addresses

In parallel mode, the CTB address jumper of the master elevator (elevator whose SN is 1) is the same as that used for the control of single elevator. That is, J2 is shorted in the ON position. The CTB address jumper of the slave elevator (elevator whose SN is 2) is shorted in the PARALLEL position. Otherwise, CTB data communication of the elevators becomes abnormal.

For description of CTB terminals, see section 3.3. The following figure shows connection of two elevators in parallel mode by means of CAN communication.

Figure 6-1 Parallel connection by means of CAN communication



### 6.1.3 Parallel Mode Using RS485 Communication (Monitoring Port)

When CAN communication is applied to parallel mode, if the 24 V power voltages of two systems are different or the external interference is severe, the communication effect is affected. To achieve better communication effect in parallel mode, we adopt RS485 at the monitoring port of the MCB for communication of the parallel mode.

In this case, the RS232 communication signal needs to be converted to RS485 communication signal. Thus, two optical-isolated RS232/RS485 converters (model: U485A) are required. In field application, connect the RS232/RS485 converter to CN2 of the MCB, and then correspondingly connect the two signal terminals (D+, D-) of the RS485 side of the converter via a cable. Set F6-09 to Bit2 (Parallel implemented at monitoring port).

The following figure shows the parallel mode implemented at the monitoring port.

Figure 6-2 Parallel connection at the monitoring port



#### 6.1.4 Setting of Physical Floors

Physical floors, relative to the NICE3000 control system, are defined by the installation position of the leveling flag. The floor (such as the ground floor) at which the lowest leveling flag is installed corresponds to physical floor 1. The top physical floor is the accumulative number of the leveling flags. In parallel mode, the physical floor numbers of the same floor for two elevators are consistent.

If two elevators in parallel stop at different floors, physical floors should start with the lowest leveling flag installation position. The physical floors at the overlapped area of the two elevators are the same. Even if one elevator does not stop a floor in the overlapped area, a leveling flag should be installed there. The user can make the elevator not stop at the floor by setting service floors.

When two elevators are in parallel mode, the addresses of the HCBs should be set according to physical floors. Parallel running can be implemented only when the HCB addresses of one floor are set the same for the two elevators.

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**Note**

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In parallel mode, the top floor (F6-00) and bottom floor (F6-01) of the elevators should be set based on corresponding physical floors.

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Assume that there are two elevators in parallel. Elevator 1 stops at floor B1, floor 1, floor 2, and floor 3, while elevator 2 stops at floor 1, floor 3, and floor 4. Now, you need to set related parameters and HCB addresses according to the following table.

Table 6-2 Parameter setting and HCB addresses of two elevators

		Elevator 1		Elevator 2	
Number of elevators in group mode		2		2	
Elevator SN		1		2	
Actual floor	Physical floor	HCB address	HCB display	HCB address	HCB display

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		Elevator 1		Elevator 2	
B1	1	1	FE-01 = 1101		
1	2	2	FE-02 = 1901	2	FE-02 = 1901
2	3	3	FE-03 = 1902	Bypass floor but leveling flag required	FE-03=1902
3	4	4	FE-04 = 1903	4	FE-04=1903
4	5			5	FE-05=1904
Bottom floor (F6-01)		1		2	
Top floor (F6-00)		4		5	
Service floor (F6-05)		65535		65531 (It does not stop at physical floor 3)	

### 6.1.5 Group Mode

The group control board is required if three or more elevators work in group mode. For details, see the Monarch's Use Instruction of Group Control Board.

## 6.2 Emergency Evacuation at Power Failure

Passengers may be trapped in the car if power failure suddenly happens during the use of the elevator. The evacuation function at power failure is designed to solve the problem.

The evacuation function is implemented in the following two modes:

- Uninterrupted power supply (UPS)
- Shorting PMSM stator

Here we first introduce the implementation through the NICE3000's shorting PMSM stator scheme, which can save energy and improve safety.

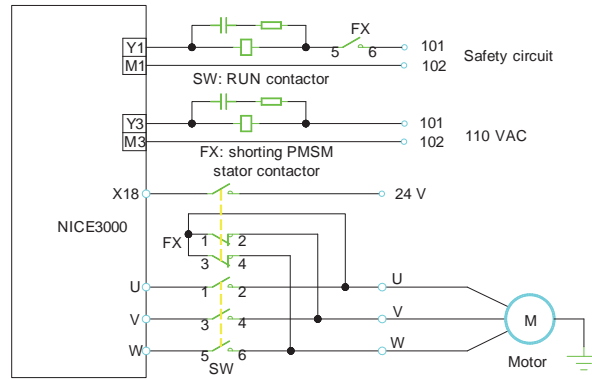
### 6.2.1 Shorting PMSM Stator

Shorting PMSM stator means shorting phases UVW of the PMSM, which produces resistance to restrict movement of the elevator car. In field application, an auxiliary NC contact is usually added to the NO contact of the output contactor to short PMSM UVW to achieve the effect. It is feasible in theory but may cause over-current actually. Due to the poor quality of the contactor and the wiring of adding the auxiliary contact, the residual current of the controller is still high when the outputs UVW are shorted at abnormal stop. This results in an over-current fault and may damage the controller or motor.

Monarch's shorting PMSM stator scheme requires the installation of an independent contactor for shorting PMSM stator. The shorting PMSM stator function is implemented via the relay NC contact. On the coil circuit of the RUN contactor, an NO contact of the shorting PMSM stator contactor is connected in serial to ensure that output short-circuit does not occur when the parameter setting is incorrect.

The following figure shows wiring of the independent shorting PMSM stator contactor.

Figure 6-3 Wiring of the independent shorting PMSM stator contactor



Then set the related parameters as follows:

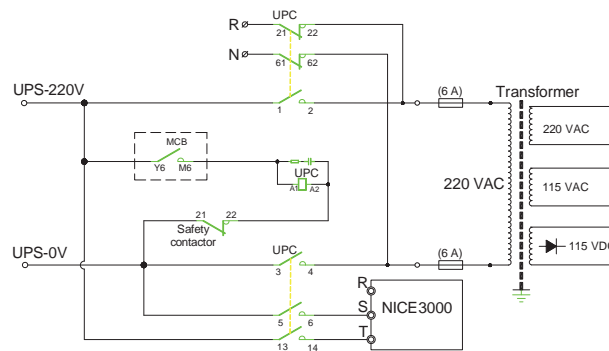
Table 6-3 Parameter setting under the shorting PMSM stator scheme

Function Code	Parameter Name	Setting Value	Description
F5-18	X18 function selection	30	Allocate X18 with "NO input of shorting PMSM stator feedback".
F5-28	Y3 function selection	12	Allocate Y3 with "Shorting PMSM stator contactor feedback".
FE-33	Bit6	1	Enable the shorting PMSM stator function.
	Bit8	1	Set the shorting PMSM stator contactor to NC mode.

### 6.2.2 Emergency 220 V UPS

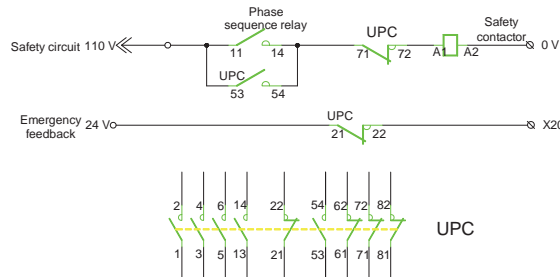
In this scheme, the 220 V UPS provides power supply to the main unit and the drive control circuit. The following figure shows the emergency 220 V UPS circuit.

Figure 6-3 Emergency 220 V UPS circuit



The following figure shows various contacts of the contactors.

Figure 6-4 Various contacts of the contactors



The UPS power is recommended in the following table.

Table 6-4 Recommended UPS power for each power rating

UPS Power	Controller Power
1 kVA (700–800 W)	≤ 5.5 kW
2 kVA (1400–1600 W)	> 5.5 kW and ≤ 11 kW
3 kVA (2100–2400 W)	15 kW

The following table lists the setting of the related parameters.

Table 6-5 Parameter setting under the 220 V UPS scheme

Function Code	Parameter Name	Setting Value	Description
F8-09	Emergency evacuation operation speed at power failure	0.05 m/s	Set the running speed for emergency evacuation operation.
F8-10	Emergency evacuation operation mode at power failure	0: Motor not running 1: UPS 2: 48 V battery power supply	Set the emergency evacuation operation mode.
F5-20 (X20)	X20 function selection	59	Allocate X20 with "NC input of UPS valid signal".
F5-31 (Y6)	Y6 function selection	13	Allocate Y6 with "Emergency evacuation operation".

**Note**

UPS emergency output at power failure can be allocated only to Y6.

### 6.3 Opposite Door Control

Set related parameters according to the following table.

Table 6-6 Parameter setting for opposite door control

Opposite Door Control Mode	Parameter Setting	Function Description
0 (simultaneous control)	FE-33 BIT15 = 0: disable opposite door independent control	The hall call buttons of both door sides are connected in parallel to implement simultaneous control on the opposite door. A maximum of 40 floors are supported.
	FE-33 BIT15 = 1: opposite door independent control FC-04=0: simultaneous control	The hall call DIP switch address of the front door is set based on floor (1-15). The hall call DIP switch address of the back door is set based on floor +16 (17-31). A maximum of 15 floors are supported. The front door and back door are opened and closed simultaneously.
1 (hall call independent, car call simultaneous)	FE-33 BIT15 = 1: opposite-door independent control FC-04 = 1: hall call independent, car call simultaneous	The hall call DIP switch address of the front door is set based on floor (1-15). The hall call DIP switch address of the back door is set based on floor +16 (17-31). A maximum of 15 floors are supported. In this control mode, hall call is independent. Front door opens upon arriving at the floor with front door hall call. Back door opens upon arriving at the floor with back door hall call. Both doors open if the two doors have hall call respectively. When arriving at the floor with car call, the elevator opens both doors.
2 (hall call independent, opposite-door manual control)	FE-33 BIT15 = 1: opposite-door independent control FC-04 = 2: Hall call independent, opposite-door manual control	The hall call DIP switch address of the front door is set based on floor (1-15). The hall call DIP switch address of the back door is set based on floor +16 (17-31). A maximum of 15 floors are supported. JP16 is the door switchover switch. In this control mode, hall call is independent. Front door opens upon arriving at the floor with front door hall call. Back door opens upon arriving at the floor with back door hall cal. Both doors open if the two doors have hall call respectively. The front door and back door are controlled by JP16 for arriving at the floor with car call.

Opposite Door Control Mode	Parameter Setting	Function Description
3 (hall call independent, car call independent)	FE-33 BIT15 = 1: opposite-door independent control FC-04 = 3: hall call independent, car call independent	This control mode applies to double call boards, double operation panels and two CCBs connected in serial. The hall call DIP switch address of the front door is set based on floor (1-15). The hall call DIP switch address of the back door is set based on floor +16 (17-31). The car calls of the front door are controlled by JP1 to JP15 of CCB1, and the car calls of the back door are controlled by JP1 to JP15 of CCB2. JP16 of CCB1 is the back-door open button, and JP17 of CCB1 is the front-door open button. JP18 of CCB1 is the common door close button. A maximum of 15 floors are supported, with independent control on hall calls and car calls. CCB2 is the next-level call board of CCB1.

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**Note**

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In the fire emergency, inspection or re-elevating state, the opposite door is under simultaneous control rather than independent control.

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## Troubleshooting

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## Chapter 7 Troubleshooting

### 7.1 Description of Fault Levels

The NICE3000 has more than 60 pieces of alarm information and protective functions. It monitors various input signals, running conditions and feedback signals. If a fault occurs, the relevant protective function acts and the system displays the fault code.

The controller is a complicated electronic control system and the displayed fault information is graded into 5 levels according to the severity. The faults of different levels are handled according to the following table.

Table 7-1 Fault levels

Category	Action	Remarks
Level 1	Display fault code. Output fault relay action command.	The elevator running is not affected on any condition.
Level 2	Display fault code. Output fault relay action command. Disable the elevator group control (parallel control) mode.	The elevator can run properly.
Level 3	Display fault code. Output fault relay action command. Make the elevator stop at the nearest landing floor, and then forbid running in distance control. Make the elevator stop immediately in other conditions.	The controller immediately stops output and applies the brake after stop.
Level 4	Display fault code. Output fault relay action command. In distance control, the controller stops output and applies the brake immediately after stop. Low-speed running (such as re-leveling and inspection) is allowed.	The elevator can run at low speed with fault code.
Level 5	Display fault code. Output fault relay action command. The controller stops output and applies the brake immediately, and then forbids running.	The controller forbids running.

**Note**

- Low-speed running involves inspection, emergency rescue, shaft auto-tuning, re-leveling, motor auto-tuning, base floor detection, and running in operation panel control.
- Normal-speed running involves automatic running, returning to base floor in fire emergency state, firefighter operation, attendant operation, elevator locked, and elevator parking.

## 7.2 Fault Information and Troubleshooting

If an alarm is reported, the system performs corresponding processing based on the fault level. You can handle the fault according to the possible causes described in the following table.

Table 7-2 Fault codes and troubleshooting

Fault Code	Name	Possible Causes	Solution	Level
E01	Invert unit protection	<ol style="list-style-type: none"> <li>1. The main circuit output is grounded or short circuited.</li> <li>2. The connecting cable of the motor is too long.</li> <li>3. The working temperature is too high.</li> <li>4. The internal connections become loose.</li> </ol>	<ol style="list-style-type: none"> <li>1. Eliminate external faults.</li> <li>2. Install a reactor or an output filter.</li> <li>3. Check the air channel and the cooling fan.</li> <li>4. Contact the agent or Monarch.</li> </ol>	5
E02	Over-current during acceleration	<ol style="list-style-type: none"> <li>1. The main circuit output is grounded or short circuited.</li> <li>2. Motor auto-tuning is performed improperly.</li> <li>3. The load is too heavy.</li> <li>4. The encoder signal is incorrect.</li> <li>5. The UPS running feedback signal is abnormal.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether the RUN contactor at the controller output side is normal.</li> <li>2. Check whether the power cable jacket is damaged, whether the power cable is possibly short circuited to ground and whether the cable is connected reliably.</li> <li>3. Check the insulation of motor power terminals, and check whether the motor winding is short-circuited or grounded.</li> <li>4. Check whether the shorting PMSM stator contactor causes controller output short circuit.</li> <li>5. Check whether motor parameters comply with the nameplate.</li> <li>6. Perform motor auto-tuning again.</li> <li>7. Check whether the brake keeps released before the fault occurs and whether the brake is stuck mechanically. (To be continued)</li> </ol>	5
E03	Over-current during deceleration	<ol style="list-style-type: none"> <li>1. The main circuit output is grounded or short circuited.</li> <li>2. Motor auto-tuning is performed improperly.</li> <li>3. The load is too heavy.</li> <li>4. The deceleration rate is too short.</li> <li>5. The encoder is seriously interfered with.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether the RUN contactor at the controller output side is normal.</li> <li>2. Check whether the power cable jacket is damaged, whether the power cable is possibly short circuited to ground and whether the cable is connected reliably.</li> <li>3. Check the insulation of motor power terminals, and check whether the motor winding is short-circuited or grounded.</li> <li>4. Check whether the shorting PMSM stator contactor causes controller output short circuit.</li> <li>5. Check whether motor parameters comply with the nameplate.</li> <li>6. Perform motor auto-tuning again.</li> <li>7. Check whether the brake keeps released before the fault occurs and whether the brake is stuck mechanically. (To be continued)</li> </ol>	5

Fault Code	Name	Possible Causes	Solution	Level
E04	Over-current at constant speed	<ol style="list-style-type: none"> <li>1. The main circuit output is grounded or short circuited.</li> <li>2. Motor auto-tuning is performed properly.</li> <li>3. The load is too heavy.</li> <li>4. The encoder is seriously interfered with.</li> </ol>	<ol style="list-style-type: none"> <li>8. Check whether the balance coefficient is correct.</li> <li>9. Check whether the encoder wirings are correct. For asynchronous motor, perform SFVC and compare the current to judge whether the encoder works properly.</li> <li>10. Check whether the encoder lines per revolution is set correctly, whether the encoder signal is interfered with, whether the encoder cable runs through the duct independently, whether the cable is too long and whether the shielding layer is grounded at one end.</li> <li>11. Check whether the encoder is installed reliably, whether the rotating shaft is connected to the motor shaft reliably and whether the encoder is stable during normal-speed running.</li> <li>12. Check whether UPS feedback is valid in the non-UPS running state E02).</li> <li>13. Check whether the acceleration/deceleration rate is too high.</li> </ol>	5
E05	Over-voltage during acceleration	<ol style="list-style-type: none"> <li>1. The input voltage is too high.</li> <li>2. The regeneration power of the motor is too high.</li> <li>3. The braking resistance is too large, or the braking unit fails.</li> <li>4. The acceleration rate is too short.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust the input voltage. Observe whether the bus voltage is normal and whether it rises too quickly during running.</li> <li>2. Check for the balance coefficient.</li> <li>3. Select a proper braking resistor and check whether the resistance is too large based on the recommended braking resistance table in chapter 3. (To be continued)</li> </ol>	5

Fault Code	Name	Possible Causes	Solution	Level
E06	Over-voltage during deceleration	<ol style="list-style-type: none"> <li>1. The input voltage is too high.</li> <li>2. The braking resistance is too large, or the braking unit fails.</li> <li>3. The deceleration rate is too short.</li> </ol>	<ol style="list-style-type: none"> <li>4. Check whether the cable connecting the braking resistor is damaged, whether the copper wire touches the ground and whether the connection is reliable.</li> </ol>	5
E07	Over-voltage at constant speed	<ol style="list-style-type: none"> <li>1. The input voltage is too high.</li> <li>2. The braking resistance is too large, or the braking unit fails.</li> </ol>		5
E09	Under-voltage	<ol style="list-style-type: none"> <li>1. Instantaneous power failure occurs on the input power supply.</li> <li>2. The input voltage is too low.</li> <li>3. The drive control board fails.</li> </ol>	<ol style="list-style-type: none"> <li>1. Eliminate external power supply faults and check whether the power fails during running.</li> <li>2. Check whether the wiring of all power input cables is reliable.</li> <li>3. Contact the agent or Monarch.</li> </ol>	5
E10	Controller overload	<ol style="list-style-type: none"> <li>1. The brake circuit is abnormal.</li> <li>2. The load is too heavy.</li> <li>3. The encoder feedback signal is abnormal.</li> <li>4. The motor parameters are incorrect.</li> <li>5. A fault occurs on the motor power cables.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the brake circuit and power input.</li> <li>2. Reduce the load.</li> <li>3. Check whether the encoder feedback signal and setting are correct. Check whether initial angle of the encoder for the PMSM is correct.</li> <li>4. Check the motor parameter setting and perform motor auto-tuning.</li> <li>5. Check the power cables of the motor (refer to the solution of E02).</li> </ol>	4
E11	Motor overload	<ol style="list-style-type: none"> <li>1. FC-02 is set improperly.</li> <li>2. The brake circuit is abnormal.</li> <li>3. The load is too heavy.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust the parameter (FC-02 can be set to the default value).</li> <li>2. Refer to E10.</li> </ol>	3
E12	Power supply phase loss	<ol style="list-style-type: none"> <li>1. The power input is not symmetric.</li> <li>2. The drive control board fails.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether the three phases of power supply are balanced and whether the power voltage is normal. If not, adjust the power input.</li> <li>2. Contact the agent or Monarch.</li> </ol>	4

Fault Code	Name	Possible Causes	Solution	Level
E13	Power output phase loss	<ol style="list-style-type: none"> <li>1. The output wiring of the main circuit is loose.</li> <li>2. The motor is damaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the wiring.</li> <li>2. Check whether the contactor at the output side is normal.</li> <li>3. Eliminate the motor fault.</li> </ol>	4
E14	Module overheat	<ol style="list-style-type: none"> <li>1. The ambient temperature is too high.</li> <li>2. The fan is damaged.</li> <li>3. The air channel is blocked.</li> </ol>	<ol style="list-style-type: none"> <li>1. Lower the ambient temperature.</li> <li>2. Clear the air channel.</li> <li>3. Replace the damaged fan.</li> <li>4. Check whether the installation clearance of the controller satisfies the requirement in chapter 3.</li> </ol>	5
E16	Encoder fault	<ol style="list-style-type: none"> <li>1. The startup position is incorrect.</li> <li>2. The torque deviation is too large.</li> <li>3. The speed deviation is too large.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the encoder circuit.</li> <li>2. Turn off the output MCCB.</li> <li>3. The current loop parameters are too small.</li> <li>4. The zero-point position is incorrect. Perform motor auto-tuning again.</li> <li>5. Reduce the load</li> </ol>	5
E17	Encoder signal check abnormal	The deviation of real-time angle and reference angle of the 1387 encoder is too large.	<ol style="list-style-type: none"> <li>1. Check whether the encoder is normal.</li> <li>2. Check whether the encoder wiring is reliable and normal.</li> <li>3. Check whether the PG card wiring is proper.</li> <li>4. Check whether the main unit and control cabinet are grounded well.</li> </ol>	5
E18	Current detection fault	The drive control board fails.	Contact the agent or Monarch.	
E19	Motor auto-tuning fault	<ol style="list-style-type: none"> <li>1. The motor cannot rotate properly.</li> <li>2. The motor auto-tuning times out.</li> <li>3. The encoder for the PMSM fails.</li> </ol>	<ol style="list-style-type: none"> <li>1. Enter the motor parameters correctly.</li> <li>2. Check the motor wiring and whether phase loss occurs on the contactor at the output side.</li> <li>3. Check the feedback encoder wiring and ensure that PPR of the encoder is set properly.</li> <li>4. Check whether the brake keeps released during no-load auto-tuning.</li> <li>5. Check whether the inspection button is released before the PMSM with-load auto-tuning is finished.</li> </ol>	5

Fault Code	Name	Possible Causes	Solution	Level
E20	Encoder fault	<ol style="list-style-type: none"> <li>1. Check whether the encoder model matches the motor.</li> <li>2. The encoder wiring is incorrect.</li> <li>3. The current keeps large during low-speed running.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether F1-00 is set correctly.</li> <li>2. Check the encoder wiring.</li> <li>3. Check whether the encoder is normal.</li> <li>4. Check whether the encoder is stuck mechanically during running.</li> <li>5. Check whether the brake keeps released during running.</li> </ol>	5
E22	Leveling signal abnormal	Leveling or door zone signal is stuck or breaks.	<ol style="list-style-type: none"> <li>1. Check whether the leveling and door zone sensors work properly.</li> <li>2. Check the installation verticality and depth of the leveling flags.</li> <li>3. Check the input points of the MCB.</li> </ol>	1
E23	Short circuit to ground	The output is short circuited to ground.	Check the power cable or contact Monarch.	5
E25	EEPROM failure	EEPROM of the MCB fails.	Contact the agent or Monarch.	5
E29	Shorting PMSM stator feedback abnormal	The shorting PMSM stator's output is inconsistent with the feedback.	<ol style="list-style-type: none"> <li>1. Check whether the feedback contact (NO, NC) of the contactor is consistent with the parameter setting of the MCB.</li> <li>2. Check whether the state of the MCB output indicator is consistent with the contactor action.</li> <li>3. Check whether corresponding feedback contact acts after the contactor acts, and whether the corresponding feedback input point of the MCB acts correctly.</li> <li>4. Check whether the shorting PMSM stator contactor is consistent with the MCB output feature.</li> <li>5. Check the coil circuit of the shorting PMSM stator contactor.</li> </ol>	5

Fault Code	Name	Possible Causes	Solution	Level
E30	Elevator position abnormal	<ol style="list-style-type: none"> <li>1. The controller does not receive leveling signal within the time set in F9-02.</li> <li>2. The up and down limit switches are met during the re-leveling process.</li> <li>3. The leveling signal is not received when re-leveling times out.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether the leveling sensor mal-acts in non-leveling zone.</li> <li>2. Check whether the leveling signal cables are connected reliably and whether the signal copper wires may touch the ground or be short circuited with other signal cables.</li> <li>3. Check whether the encoder is used properly.</li> </ol>	4
E31	DPRAM abnormal	DPRAM reading and writing are abnormal	Contact the agent or Monarch to replace the control board.	3
E32	CPU abnormal	The CPU is abnormal.	<ol style="list-style-type: none"> <li>1. Check jumpers J9 and J10 and check whether only the right two pins of J9 are shorted.</li> <li>2. Contact the agent or Monarch to replace the control board.</li> </ol>	5
E33	Elevator speed abnormal	<ol style="list-style-type: none"> <li>1. The feedback speed is 1.15 times of the maximum running speed.</li> <li>2. The speed is higher than 0.65 m/s in the inspection state.</li> <li>3. The speed exceeds half of the rated speed during emergency running.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether the encoder is used properly.</li> <li>2. Check the setting of motor nameplate parameters.</li> <li>3. Perform motor auto-tuning again.</li> <li>4. Check inspection switch and signal cables.</li> </ol>	5
E34	Logic fault	Redundancy judgment and logic of the control board are abnormal.	Contact the agent or Monarch to replace the control board.	5

Fault Code	Name	Possible Causes	Solution	Level
E35	Shaft auto-tuning data abnormal	<ol style="list-style-type: none"> <li>1. The elevator is not at the bottom floor when shaft auto-tuning is started.</li> <li>2. No leveling signal is received within 45s while continuous running.</li> <li>3. The distance between two floors is too small.</li> <li>4. The maximum number of landing floors is inconsistent with the setting value.</li> <li>5. The floor pulses change inversely.</li> <li>6. The system is not in the inspection state when shaft auto-tuning is performed.</li> <li>7. Shaft auto-tuning is not performed upon power-on.</li> </ol>	<ol style="list-style-type: none"> <li>1. Upon power-on, E35 is reported when the flag height is detected to be 0 or the RUN contactor is detected to keep open. <ul style="list-style-type: none"> <li>• Check whether the down slow-down switch is valid.</li> <li>• Check whether the current floor (F4-01) is set to 1, and whether F0-00 is set to 1.</li> <li>• Check whether the inspection switch is set to the inspection state.</li> </ul> </li> <li>2. E35 is reported when the first leveling position is reached. <ul style="list-style-type: none"> <li>• Check whether F4-03 increases when the elevator runs up. If not, adjust F2-10.</li> <li>• Check whether the NC/NO setting of the leveling sensor is correct.</li> <li>• If the leveling sensor signal blinks, check whether the flag is installed properly.</li> </ul> </li> <li>3. E35 is reported during running. <ul style="list-style-type: none"> <li>• Check whether the running times out: no leveling signal is received when the running time exceeds F9-02.</li> <li>• Check whether the super short floor function is enabled when the floor distance is less than 50 cm.</li> <li>• Check whether the setting of F6-00 (Top floor of the elevator) is smaller than the actual condition.</li> </ul> </li> <li>4. E35 is reported when the elevator arrives at the top floor. <ul style="list-style-type: none"> <li>• Check whether the obtained top floor of the elevator and bottom floor of the elevator are consistent with the setting of F6-00 and F6-01 when the up slow-down signal is valid and the elevator reaches the door zone.</li> <li>• Check whether the obtained floor interval is less than 50 cm.</li> </ul> </li> </ol>	4

Fault Code	Name	Possible Causes	Solution	Level
E36	RUN contactor feedback abnormal	<ol style="list-style-type: none"> <li>1. The RUN contactor feedback is valid when the elevator starts up.</li> <li>2. The feedback signal is not received 2s after the output of the RUN contactor.</li> <li>3. The running current of the elevator is less than 0.1 A after the output of both the RUN contactor and the brake contactor.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether the feedback contact of the contactor acts properly.</li> <li>2. Check whether the feedback contact (NO, NC) of the contactor is consistent with the MCB parameter setting.</li> <li>3. Check whether the output cables UVW of the controller are connected properly.</li> <li>4. Check whether the power supply of the controller's control circuit is normal.</li> </ol>	5
E37	Brake contactor feedback abnormal	The output of the brake contactor is inconsistent with the feedback.	<ol style="list-style-type: none"> <li>1. Check whether the brake coil and feedback contact are correct.</li> <li>2. Confirm the signal feature (NO, NC) of the feedback contact.</li> <li>3. Check whether the power supply of the brake coil's control circuit is normal.</li> </ol>	5
E38	Encoder signal abnormal	<ol style="list-style-type: none"> <li>1. There is no input of the encoder pulses when the elevator runs automatically.</li> <li>2. The direction of the input encoder signal is incorrect when the elevator runs automatically.</li> <li>3. F0-00 is set to 0 (SFVC) in distance control.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether the encoder is used correctly.</li> <li>2. Exchange phases A and B of the encoder.</li> <li>3. Check the setting of F0-00, and change it to "CLVC".</li> <li>4. Check whether the system and signal cables are grounded reliably.</li> <li>5. Check whether cabling between the encoder and the PG card is normal.</li> </ol>	5
E39	Motor overheat	Motor overheat input is valid.	<ol style="list-style-type: none"> <li>1. Check whether the motor is used properly and whether it is damaged.</li> <li>2. Improve cooling conditions of the motor.</li> </ol>	3
E40	Elevator running time-out	The setting of the elevator running time is exceeded.	The elevator is used for a long time and needs maintenance.	4

Fault Code	Name	Possible Causes	Solution	Level
E41	Safety circuit breaking	The safety circuit signal breaks off.	<ol style="list-style-type: none"> <li>1. Check the status of the safety circuit switches.</li> <li>2. Check whether the external power supply is normal.</li> <li>3. Check whether the safety circuit contactor acts properly.</li> <li>4. Confirm the signal feature (NO, NC) of the feedback contact of the safety circuit contactor.</li> </ol>	5
E42	Door lock breaking off during running	The door lock circuit feedback breaks off during the elevator running.	<ol style="list-style-type: none"> <li>1. Check whether the landing door lock and the car door lock are in good contact.</li> <li>2. Check whether the door lock contactor acts properly.</li> <li>3. Confirm the signal feature (NO, NC) of the feedback contact on the door lock contactor.</li> <li>4. Check whether the external power supply is normal.</li> </ol>	5
E43	Up limit signal breaking off during running	The up limit signal breaks off when the elevator is running up.	<ol style="list-style-type: none"> <li>1. Confirm the feature (NO, NC) of the up limit signal and down limit signal.</li> <li>2. Check whether the up limit and down limit switches act properly.</li> </ol>	4
E44	Down limit signal breaking off during running	The down limit signal breaks off when the elevator is running down.	<ol style="list-style-type: none"> <li>3. The installation positions of limit switches are too close to the leveling flag. The limit switches will be touched at normal leveling.</li> </ol>	4
E45	Slow-down switch position abnormal	<ol style="list-style-type: none"> <li>1. The installation positions of the slow-down switches do not satisfy the slow-down requirements.</li> <li>2. The recorded slow-down switch position is greatly different from the actual position.</li> </ol>	<ol style="list-style-type: none"> <li>1. Ensure that the installation positions satisfy the requirements.</li> <li>2. Check whether the slow-down switches act properly.</li> <li>3. Set the NC/NO state of slow-down signal correctly.</li> </ol>	4

Fault Code	Name	Possible Causes	Solution	Level
E46	Re-leveling abnormal	<ol style="list-style-type: none"> <li>1. The re-leveling running speed exceeds 0.1 m/s.</li> <li>2. The elevator is out of the door zone when re-leveling.</li> <li>3. The feedback of the shorting door lock circuit contactor is abnormal.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the original and secondary wiring of the shorting door lock circuit relay.</li> <li>2. Check whether the shorting door lock circuit contactor feedback function is enabled and whether the feedback signal is normal.</li> <li>3. Check whether the encoder is used properly.</li> </ol>	1
E47	Shorting door lock circuit contactor failure	<ol style="list-style-type: none"> <li>1. The feedback of the shorting door lock circuit fails.</li> <li>2. The elevator runs at over speed or the running times out when the shorting door lock circuit contactor has output.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm the signal feature (NO, NC) of the feedback contact on the shorting door lock circuit contactor.</li> <li>2. Check whether the shorting door lock circuit contactor acts properly.</li> </ol>	1
E48	Door open fault	The consecutive times that the door does not open/close to the limit reaches the setting in FB-09.	<ol style="list-style-type: none"> <li>1. Check whether the door machine system works properly.</li> <li>2. Check whether the CTB is normal.</li> </ol>	5
E49	Door close fault			
E51	CAN communication abnormal	Feedback from the CTB is abnormal.	<ol style="list-style-type: none"> <li>1. Check the communication cable connection.</li> <li>2. Check whether the 24 V power supply of the NICE3000 is normal.</li> </ol>	1
E52	HCB communication abnormal	Feedback from the HCB is abnormal.	<ol style="list-style-type: none"> <li>1. Check the communication cable connection.</li> <li>2. Check whether the 24 V power supply of the NICE3000 is normal.</li> <li>3. Check whether the HCB addresses are repeated.</li> </ol>	1
E53	Shorting door lock circuit fault	<ol style="list-style-type: none"> <li>1. The door lock and door open limit signals are valid simultaneously.</li> <li>2. The landing door lock and the hall door lock are in different states.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether the door lock circuit is normal.</li> <li>2. Check whether the feedback contact of the door lock contactor acts properly.</li> <li>3. Check whether the system receives the door open limit signal when the door lock signal is valid.</li> </ol>	5
E54	Over-current at startup of inspection running	The current exceeds 110% of the rated current at the startup of inspection running.	<ol style="list-style-type: none"> <li>1. Reduce the load.</li> <li>2. Perform the motor auto-tuning again.</li> </ol>	5

Fault Code	Name	Possible Causes	Solution	Level
E55	Stop at another landing floor	The door does not open to the limit at the current floor when the elevator runs automatically.	Check the door open limit signal.	1
E57	DSP communication abnormal	The time during which DSP and MCB have no communication reaches 500 ms.	1. Check the connection between the control board and the drive board. 2. Replace the controller.	5