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Monarch



User Guide

NICE1000^{new} Series

Integrated Elevator Controller

User Guide

B02
Data code 19010227

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Preface

Thank you for purchasing the NICE1000^{new} integrated elevator controller.

The NICE1000^{new} is a new-generation integrated elevator controller independently developed and manufactured by Suzhou Inovance Technology Co., Ltd., by optimizing the NICE1000 controller based on a large number of applications and combining new industrial features.

The NICE1000^{new} has the following advantages:

1. It supports high-performance vector control and open-loop low speed running. It can drive both AC asynchronous motor and permanent magnetic synchronous motor (PMSM), and implement switchover between the two types of motors easily by modifying only one parameter.
2. It supports open-loop low-speed running, direct parallel control of two elevators, and CANbus and Modbus communication protocols for remote monitoring.
3. It supports a maximum of 16 floors and is widely applied to elevators used in the villa and freight elevators.

This User Guide describes the correct use of the NICE1000^{new}, including product features, safety information and precautions, installation, parameter setting, commissioning, and maintenance & inspection. Read and understand the manual before using the product, and keep it carefully for reference to future maintenance.

The personnel who involve in system installation, commissioning, and maintenance must receive necessary safety and use training, understand this manual thoroughly, and have related experience before performing operations.

Notes
• The drawings in the manual are sometimes shown without covers or protective guards. Remember to install the covers or protective guards as specified first, and then perform operations in accordance with the instructions. • The drawings in the manual are shown for description only and may not match the product you purchased. • The instructions are subject to change, without notice, due to product upgrade, specification modification as well as efforts to increase the accuracy and convenience of the manual. • Contact our agents or customer service center if you need a new user manual or have problems during the use. • Email: UM@inovance.com

■ Product Checking

Upon unpacking, check:

- Whether the nameplate model and controller ratings are consistent with your order. The box contains the controller, certificate of conformity, user manual and warranty card.
- Whether the controller is damaged during transportation. If you find any omission or damage, contact your supplier or Inovance immediately.

■ First-time Use

For users who use this product for the first time, read the manual carefully. If you have any problem concerning the functions or performance, contact the technical support personnel of Inovance to ensure correct use.

■ Approvals

Certification marks on the product nameplate indicate compliance with the corresponding certificates and standards.

Certification	Mark	Directives		Standard
CE	CE	EMC directives	2014/30/EU	EN 12015 EN 12016
		LVD directives	2014/35/EU	EN 61800-5-1
		RoHS directives	2011/65/EU	EN 50581
TUV	TUV	-		EN 61800-5-1
UL	c UL us LISTED	-		UL61800-5-1 C22.2 No.14-13

Note

- The above EMC directives are complied with only when the EMC electric installation requirements are strictly observed.
- Machines and devices used in combination with this drive must also be CE certified and marked. The integrator who integrates the drive with the CE mark into other devices has the responsibility of ensuring compliance with CE standards and verifying that conditions meet European standards.
- The installer of the drive is responsible for complying with all relevant regulations for wiring, circuit fuse protection, earthing, accident prevention and electromagnetic (EMC regulations). In particular fault discrimination for preventing fire risk and solid earthing practices must be adhered to for electrical safety (also for good EMC practice).
- For more information on certification, consult our distributor or sales representative.

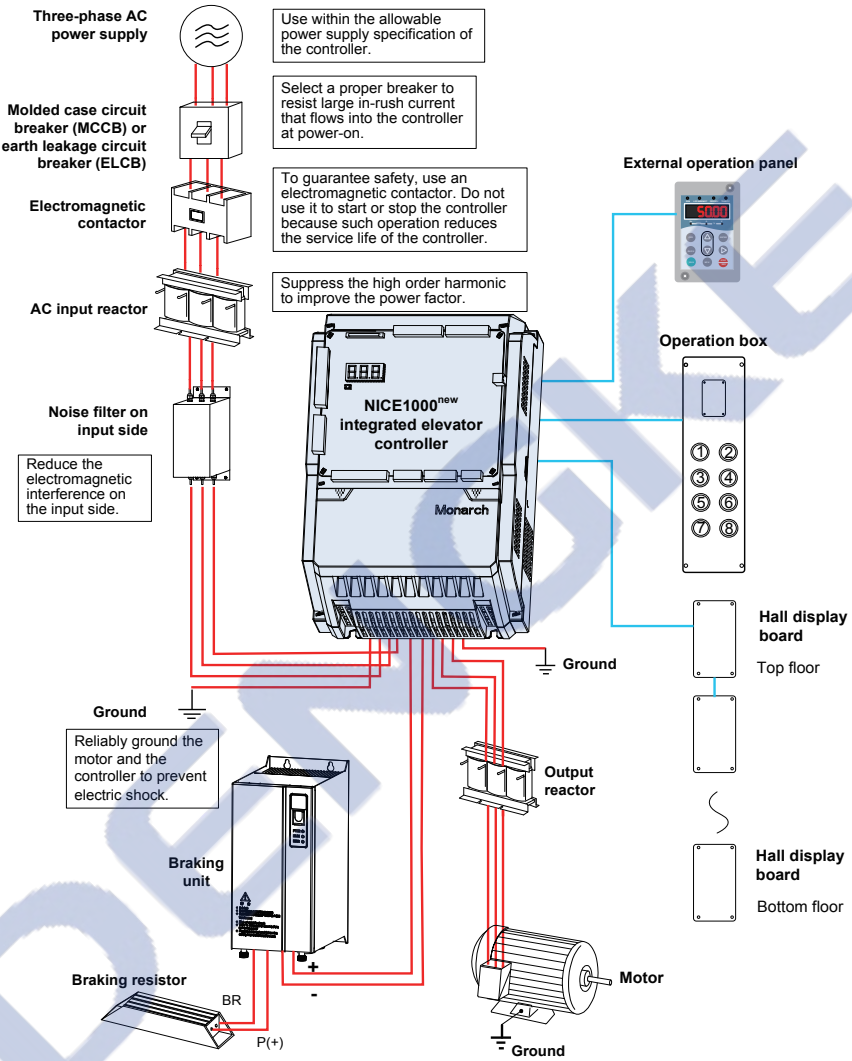
Introduction

1. Comparison with the NICE1000

The following table lists the comparison between the NICE1000^{new} and the NICE1000.

Item	NICE1000	NICE1000^{new}
Maximum number of floors	Standard: 6 (can be extended to 8)	Standard: 8 (can be extended to 16)
Maximum elevator speed	1 m/s	1.75 m/s
I/O terminals	• Digital input: 24 • Button input and indicator output: standard 20 (can be extended to 26) • Relay output: standard 21 (can be extended to 24) • Higher-voltage input: 3	• Digital input: 24 • Button input and indicator output: standard 26 (can be extended to 50) • Relay output: standard 21 (can be extended to 27) • Higher-voltage input: 3
CANbus	None	1 x CANbus
Modbus	None	1 x Modbus
Motor driving type	Separate control for synchronous and asynchronous motors	Integrated control for synchronous and asynchronous motors
No-load-cell startup	Supporting SIN/COS encoder only	Supporting: • Push-pull encoder • Open-collector incremental encoder • UVW encoder • SIN/COS encoder • Endat encoder
Control mode	• Sensorless vector control (SVC) • Closed-loop vector control (CLVC)	• Sensorless vector control (SVC) • Closed-loop vector control (CLVC) • V/F control
Commissioning via Android cell phone (not providing English version currently)	Not support	Support
PG card for asynchronous motor	Not requiring PG card	Requiring MCTC-PG-A2
Extension card	MCTC-KZ-B	MCTC-KZ-D
Use of optional part	The PG card and the extension card use the same interface on the MCB, and they cannot be used at the same time.	The PG card and the extension card can be used at the same time.

2. Connection to peripheral devices



- For model selection of the peripheral electrical devices, refer to section 3.4.
- The NICE1000new in the preceding figure is the standard model. For information about other structures, refer to section 2.5.

3. Basic function list

Function	Description	Remarks
Common Running Functions		
Integrated control for synchronous and asynchronous motors	It can drive both AC asynchronous motor and permanent magnetic synchronous motor (PMSM).	Switchover between the two types of motors easily by modifying F1-25
Full collective selective	In automatic running or attendant state, this function enables the elevator to respond both car calls and hall calls. Passengers at any service floor can call the elevator by pressing the up call button and down call button.	Collective selection set in FE-00
Door open time setting	The system automatically determines different door open time for door open for call, command, protection, or delay according to the set door open holding time.	Set in group Fb
Door open holding	In automatic running state, passengers can press the door open button in the car to delay door open to facilitate goods to be moved in or out.	Set in group Fb
Door machine service floor setting	You can set the required service floors of the door machines.	Set in Fb-02 and Fb-04
Door pre-close by the door close button	During door open holding in automatic running state, passengers can press the door close button to close the door in advance, which improves the efficiency.	-
Floor number display setting	The system supports display of floor numbers in combinations of numbers and letters, which meets the requirements of special conditions.	Set in group FE
Light curtain signal judgment	If the door is blocked by stuff during door close, the light curtain acts and the elevator opens the door. This function is invalid in fire emergency state.	-
Independent control of the front door and back door	When there are two doors for a car, this function implements independent and automatic control on the two doors according to your requirements.	Refer to section 5.2.3 in Chapter 5
Repeat door close	If the door lock is not applied after the elevator performs door close for a certain time, the elevator automatically opens the door and then closes the door repeatedly.	Fb-08 (Door close protection time)
Auto-leveling	The systems implements automatic accurate leveling based on the floor pulse counting and up/down leveling feedback signals.	-
Response at acceleration	The system allows the elevator to automatically respond to calls from the service floors during acceleration.	-
Idle elevator returning to base floor	In automatic running state, the elevator automatically returns to the set parking floor and waits for passengers if there is no car call or hall call within the set time.	F9-00 (Idle time before returning to base floor)

Landing at another floor	If the door open time exceeds the door open protection time but the door open limit signal is still inactive, the elevator closes the door and then automatically runs to the next landing floor. The system reports fault Err55.	-
Forced door close	When the door fails to close within the set time due to the action of the light curtain or safety edge, the elevator enters the forced door close state, closes the door slowly, and gives a prompt tone.	-
Service floor setting	You can enable or disable the system service for certain floors flexibly based on actual requirements.	Set in F6-05
Independent running	The elevator does not respond to any call, and the door needs to be closed manually. In the case of group control, the elevator runs independently out of the group control system.	Enabled when Bit9 of FE-13 is 1 and independent running input of the MCB is active
Attendant running	In attendant state, the running of the elevator is controlled by the attendant.	-
Low-speed self-rescue	When the elevator is in non-inspection state and stops at non-leveling area, the elevator automatically runs to the leveling area at low speed if the safety requirements are met, and then opens the door.	-
Door control function	You can set whether the system keeps outputting commands after door open limit and door close limit based on the type of the door machine.	-
Car arrival gong	After the elevator arrives at the destination floor, the CTB gives a prompt tone.	-
Automatic startup torque compensation	The system automatically implements startup torque compensation based on the current car load, achieving smooth startup and improving the riding comfort.	Set in F8-01
Direct travel ride	The system automatically calculates and generates the running curves based on the distance, enabling the elevator to directly stop at the leveling position without creeping.	-
Automatic generation of optimum curve	The system automatically calculates the optimum speed curve compliant with the human-machine function principle based on the distance, without being limited by the number of curves or short floor.	-
Service suspension output	When the elevator cannot respond to hall calls, the corresponding terminal outputs the service suspension signal.	-
Running times recording	In automatic running state, the system automatically records the running times of the elevator.	Recorded in F9-05 and F9-06
Running time recording	The system automatically records the accumulative power-on time, working hours, and working days of the elevator.	Recorded in F9-03

Automatic door open upon door lock abnormality	If the system detects that the door lock circuit is abnormal during door open/close, the elevator automatically opens and closes the door again, and reports a fault after the set door open/close times is reached.	Fb-09 (Door open/close protection times)
Full-load direct running	When the car is full-loaded in automatic running state, the elevator does not respond to hall calls from the passing floors. These halls calls, however, can still be registered, and will be executed at next time of running (in the case of single elevator) or by another elevator (in the case of parallel control).	-
Overload protection	When the car load exceeds the rated elevator load, the elevator alarms and stops running.	-
Fault data recording	The system automatically records detailed information of faults, which helps improve the efficiency of maintenance and repair.	Set in group FC
Inspection-related Functions		
Shaft auto-tuning	Shaft auto-tuning is required before first-time automatic running. During shaft auto-tuning, the elevator runs from the bottom floor to the top floor at the inspection speed and automatically records all position signals in the shaft.	Refer to section 5.1.2
User-defined parameter display	You can view the parameters that are modified and different from the default setting.	Set in FP-02
Inspection running	After entering the inspection state, the system cancels automatic running and related operations. You can press the up or down call button to make the elevator jog at the inspection speed.	-
Motor auto-tuning	With simple parameter setting, the system can obtain the motor parameters no matter whether the motor is with-load or without load.	Refer to section 5.1.1
Floor position intelligent correction	Every time the elevator runs to the terminal floor, the system automatically checks and corrects the car position information based on slow-down switch 1, and eliminates over travel top terminal or bottom terminal with use of the slow-down switches.	-
Dual-speed for inspection	Considering inaccurate running control at high inspection speed but long running time at low inspection speed, the system provides the dual-speed curve for inspection, which greatly improves the efficiency at inspection.	-
Test running	The test running includes the fatigue test of a new elevator, car call floor test, hall call test, and tests such as hall call response forbidden, door open/close forbidden, terminal floor limit switch shielded, and overload signal shielded.	Set in F6-10

Fire Emergency and Security Functions		
Returning to base floor at fire emergency	After receiving a fire emergency signal, the elevator does not respond to any call but directly runs to the fire emergency floor and waits.	F6-03 (Fire emergency floor)
Firefighter running	After the elevator enters the firefighter running mode, door open/close is implemented by the jog operation (optional) by using the door open and close buttons rather than automatically. In addition, the elevator responds to only car calls and only one call can be registered once.	F6-68 (Fire emergency function selection)
Elevator lock	In automatic running state, when the elevator lock switch acts or the set elevator time is reached, the elevator cancels all registered calls, returns to the elevator lock floor, stops running, and turns off the lamp and fan in the car.	F6-04 (Elevator lock floor)
Troubleshooting based on fault level	Faults are classified into different levels based on the severity. Different levels of faults are rectified using different methods.	Refer to Chapter 8
Runaway prevention	The system detects the running state of the elevator in real time. If the elevator speed exceeds the limit, the system immediately stops running of the elevator.	-
Automatic identification of power failure	The system automatically identifies power failure and outputs the relay signal for emergency evacuation automatic switchover to implement emergency evacuation at power failure.	Y0 especially used for emergency evacuation switchover
Automatic running mode switchover at power failure	For the synchronous motor, when the power supply is interrupted, the system can perform automatic switchover between shorting stator braking mode and controller drive mode, implementing quick and stable self-rescue. Shorting stator braking mode: Upon power failure, UPS is used, the motor stator is shorted, and the brake is automatically released, making the car move slowly under the effect of the weighing difference between the car and the counterweight.	F6-69 (Emergency evacuation function selection)
Running direction identification at power failure	When the power supply is interrupted, the system can automatically identify the current car load and determine the running direction.	F6-69 (Emergency evacuation function selection)
Base floor verification	After detecting a position abnormality, the system runs the elevator to each floor until reaching the terminal floor for verification, guaranteeing system security.	-
Passenger unloading first upon fault	The system automatically determines the fault level. If the safety running conditions are met, the elevator first runs to the leveling position to unload passengers.	-
Interference degree judgment	The system judges the degree of communication interference.	Viewed in FA-24

Earthquake protection	When the earthquake detection device acts and inputs a signal to the system, the elevator lands at the nearest floor and stops running. After the earthquake signal becomes inactive and the fault is reset manually, the elevator restores to normal running.	-
Independent working power supply	The NICE1000new system supports not only three-phase 380 VAC but also single-phase 220 VAC to meet different applications of the power supply system (such as 220 V UPS)	-
Automatic voltage identification	The system detects the bus voltage and automatically adjusts the running speed of the elevator to adapt to the situation of insufficient power from power supply (such as emergency UPS).	-
Parallel Control and Other Functions		
Parallel control	The system supports parallel control of two elevators.	Refer to 5.2.2
Dispersed waiting	In parallel control, the elevators can wait at different floors.	Set in Fd-05
Parallel control exit	If the parallel control exit switch of a certain elevator in a parallel control system is valid or the time for exiting the parallel control is reached, the elevator exits parallel control and runs independently. This does not affect normal running of the parallel control system.	-
Parallel control automatic exit	If an elevator in the parallel control system cannot respond to calls in time due to faults, the elevator automatically exits the parallel control system and runs independently. This does not affect normal running of the parallel control system.	-
Anti-nuisance function	The system automatically judges the number of passengers in the car and compares it with the number of registered car calls. If there are excessive car calls, the system determines that it is nuisance and cancels all car calls. In this case, passengers need to register correct car calls again.	F8-13 (Anti-nuisance function)
Prompt of non-door zone stop	The system gives a prompt when the elevator stops at a non-door zone area due to faults.	-
Interface for intelligent residential management	The system provides an interface for intelligent residential management to perform remote monitoring on the state of elevators in the residential district.	Residential monitoring board MCTC-MIB required
Parameter copy	You can upload and download parameters by using the operation panel MDKE6.	MDKE6 operation panel required
Energy-Saving Functions		
Car energy-saving	If there is no running command within the set time, the system automatically cuts off the power supply to the lamp and fan in the car.	F9-01 (Time for fan and lamp to be turned off)
Energy-saving of idle door machine	After the car lamp is turned off, the system does not output the door close command, which reduces power consumption of the door machine.	Set in FE-14

4. Optional function list

Function	Description	Remarks
Door pre-open	In automatic running state, when the elevator speed is smaller than 0.2 m/s at normal stop and the door zone signal is active, the system shorts the door lock by means of the shorting door lock circuit contactor and outputs the door open signal, implementing door pre-open. This improves the elevator use efficiency.	Door pre-open module MCTC-SCB required
Micro-leveling	After landing at a floor, the elevator may move upward or downward due to the load change and the car door is not aligned with the ground, which is inconvenient for in and out of passengers and goods. In this case, the system allows the elevator to run to the leveling position in the door open state at the leveling speed.	Door pre-open module MCTC-SCB required
Power failure emergency evacuation	For the elevator configured with UPS, the system uses the UPS to implement low-speed self-rescue in the case of power failure.	UPS required
Onsite commissioning	The system can control and monitor running of elevators by using the NEMS software.	NEMS software required
Commissioning by cell phone	The Android cell phone can be connected to the controller through the external Bluetooth module, and you can commission and monitor the elevator, and upload and download parameters by using the cell phone. The software does not supporting English version currently.	Special Bluetooth module (MCTC-BTM-A) and cell phone host EDSAP required
Residential monitoring	The control system can be connected to the terminal in the monitoring room. By using the NEMS software, you can view the floor position, running direction, and fault state of the elevator.	NEMS, accessories, and residential monitoring board MCTC-MIB required

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1 Safety Information and Precautions

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Chapter 1 Safety Information and Precautions

In this manual, the notices are graded based on the degree of danger:

- ⚠ **DANGER** indicates that failure to comply with the notice will result in severe personal injury or even death.
- ⚠ **WARNING** indicates that failure to comply with the notice will result in potential risk of severe personal injury or even death.
- ⚠ **CAUTION** indicates that failure to comply with the notice will result in minor or moderate personal injury or equipment damage.

In addition, **NOTE** appearing in other chapters indicates that an unintended result or situation may occur if the notice is not complied with.

The notices in this manual you have to observe are aimed at guaranteeing your personal safety, as well as to prevent damage to the controller or the parts connected to it. Read this chapter carefully so that you have a thorough understanding and perform all operations by following the notices in this chapter. Inovance will assume no liability or responsibility for any injury or loss caused by improper operation.

1.1 Safety Precautions

Use Stage	Safety Grade	Precautions
Before installation	⚠ WARNING	• This controller has hazardous high voltage and the controlled motor is a dangerous rotating device. Failure to comply with the notices may result in personal injury or damage to the property. • Transportation, installation, operation and maintenance of the controller can be performed only by qualified personnel after they get familiar with the safety information in this manual. This is the prerequisite of safe and stable running of the equipment. • Do not open the front cover or touch the power terminals on the main circuit within 10 minutes after the controller is powered off. The capacitor on the DC circuit still has residual high voltage even after power-off. Failure to comply will result in electric shock.

Use Stage	Safety Grade	Precautions
During installation	⚠DANGER	• Do not install the equipment if you find water seepage, component missing or damage upon unpacking. • Do not install the equipment if the packing list does not conform to the product you received. • Install the equipment on incombustible objects such as metal, and keep it away from combustible materials. Failure to comply may result in a fire.
	⚠WARNING	• Do not loosen the fixed screws of the components, especially the screws with red mark. • Do not install the controller on vibrating parts. Failure to comply may result in damage to the equipment or unexpected accidents.
	⚠CAUTION	• Handle the equipment with care during transportation to prevent damage to the equipment. • Do not drop wire end or screw into the controller. Failure to comply will result in damage to the controller. • Do not use the equipment with damaged or missing components. Failure to comply will result in personal injury. • Do not touch the components with your hands. Failure to comply will result in static electricity damage. • Install the controller in places free of vibration and direct sunlight.
At wiring	⚠DANGER	• Wiring must be performed only by qualified personnel under instructions described in this manual. Failure to comply may result in unexpected accidents. • A circuit breaker must be used to isolate the power supply and the controller. Failure to comply may result in a fire. • Ensure that the power supply is cut off before wiring. Failure to comply may result in electric shock. • Tie the controller to ground properly according to the standard. Failure to comply may result in electric shock.
	⚠WARNING	• Never connect the power cables to the output terminals (U, V, W) of the controller. Pay attention to the marks of the wiring terminals and ensure correct wiring. Failure to comply will result in damage to the controller. • Never connect the braking resistor between the DC bus terminals (+) and (-). Failure to comply may result in a fire.
	⚠CAUTION	• Ensure that the cabling satisfies the EMC requirements and local codes. Use wire sizes recommended in the manual. Failure to comply may result in accidents. • Use the shielded cable for the encoder, and ensure that the shield is reliably grounded at one end. • Use a twisted cable with twisted distance of 20−30 mm as the communication cable, and ensure that the shield is reliably grounded.

Use Stage	Safety Grade	Precautions
During running	⚠ DANGER	• All peripheral devices must be connected properly according to the circuit wiring instructions provided in this manual. Failure to comply will result in accidents • Cover the controller properly before power-on to prevent electric shock. • Do not open the controller's cover after power-on. Failure to comply may result in electric shock. • Do not touch the controller and peripheral circuits with wet hand. Failure to comply may result in electric shock. • Do not touch any I/O terminal of the controller. Failure to comply may result in electric shock. • The controller performs safety detection on external strong power circuits automatically at the beginning of power-on. Do not touch the U, V, W terminals of the controller or the motor terminals at the moment. Failure to comply may result in electric shock. • Do not touch the fan or the discharging resistor to check the temperature. Failure to comply will result in personal burnt. • Signal detection must be performed only by qualified personnel during operation. Failure to comply will result in personal injury or damage to the controller.
	⚠ WARNING	• Do not touch the rotating part of the motor during the motor auto-tuning or running. Failure to comply will result in accidents. • Check that the following requirements are met: • The voltage class of the power supply is consistent with the rated voltage class of the controller. • The input terminals (R, S, T) and output terminals (U, V, W) are properly connected. • No short-circuit exists in the peripheral circuit. • The wiring is secured. Failure to comply will result in damage to the controller.
	⚠ CAUTION	• For synchronous motor, ensure that motor auto-tuning is performed successfully. Perform trial running before resuming the steel rope so as to make the motor run properly. • Avoid objects falling into the controller when it is running. Failure to comply will result in damage to the controller. • Do not perform the voltage resistance test on any part of the controller because such test has been done in the factory. Failure to comply may result in accidents. • Do not change the default settings of the controller. Failure to comply will result in damage to the controller. • Do not start/stop the controller by turning on or off the contactor. Failure to comply will result in damage to the controller.

Use Stage	Safety Grade	Precautions
During maintenance	⚠DANGER	• Do not repair or maintain the controller at power-on. Failure to comply will result in electric shock. • Repair or maintain the controller when its voltage is lower than 36 VAC, about 10 minutes after the controller is powered off. Otherwise, the residual voltage in the capacitor may result in personal injury. • Do not allow unqualified personnel to repair or maintain the controller. Failure to comply will result in personal injury or damage to the controller.
	⚠WARNING	• Repair or maintenance of the controller can be performed only by the warranty center or qualified personnel authorized by Inovance. Failure to comply will result in personal injury or damage to the controller. • Power supply must be cut off before repair or maintenance of the controller.
	⚠CAUTION	• Set the parameters again after the controller is replaced. All the pluggable components must be plugged or removed only after power-off. • Strictly obey the laws and regulations and repair and maintain the elevator equipment periodically. Only timely troubleshooting can ensure the safety of passengers.
Disposal	⚠CAUTION	The packaging materials, screws and terminal blocks can be re-used and it is suggested that you keep them well for future use.
	⚠WARNING	The electrolytic capacitors on the main circuits and PCB may explode when they are burnt. Poisonous gas is generated when the plastic parts are burnt. Treat them as ordinary industrial waste.

1.2 General Precautions

1. Requirement on the residual current device (RCD)

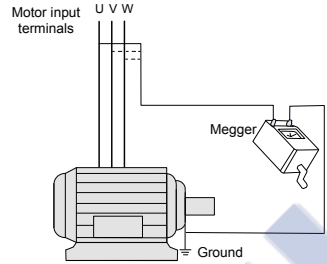
The controller generates high leakage current during running, which flows through the protective earthing conductor. Thus install a type- B RCD at primary side of the power supply. When selecting the RCD, you should consider the transient and steady-state leakage current to ground that may be generated at startup and during running of the controller. You can select a specialized RCD with the function of suppressing high harmonics or a general-purpose RCD with relatively large residual current.

2. High leakage current warning

The controller generates high leakage current during running, which flows through the protective earthing conductor. Earth connection must be done before connection of power supply. Earthing shall comply with local regulations and related IEC standards.

3. Motor insulation test

Perform the insulation test when the motor is used for the first time, or when it is reused after being stored for a long time, or in a regular check-up, in order to prevent the poor insulation of motor windings from damaging the controller. The motor must be disconnected from the controller during the insulation test. A 500-V mega-Ohm meter is recommended for the test. Ensure that the insulation resistance is not less than 5 MΩ.



4. Thermal protection of motor

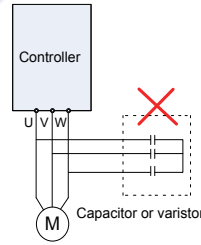
If the rated capacity of the motor selected does not match that of the controller, especially when the rated power of the controller is greater than that of the motor, adjust the motor protection parameters on the operation panel of the controller or install a thermal relay for the motor circuit for protection.

5. Motor heat and noise

The output of the controller is pulse width modulation (PWM) wave with certain harmonic wave, and therefore, the motor temperature rise, noise, and vibration are slightly greater than those at running with the mains frequency.

6. Voltage-sensitive device or capacitor on the output side of the controller

The controller outputs PWM waves, and therefore, do not install the capacitor for improving power factor or lightning protection voltage-sensitive resistor on the output side of the controller. Otherwise, the controller may suffer transient overcurrent or even be damaged.



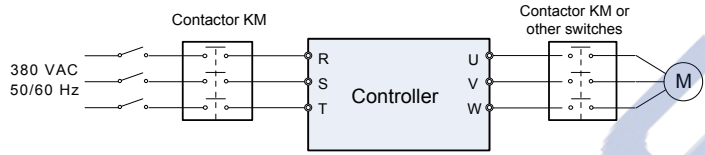
7. Contactor on the input and output sides of the controller

When a contactor is installed between the input side of the controller and the power supply, the controller must not be started or stopped by turning on or off the contactor.

If the controller has to be operated by the contactor, ensure that the time interval between switching is at least one hour because frequent charge and discharge will shorten the

service life of the capacitor inside the controller.

When a contactor is installed between the output side of the controller and the motor, do not turn off the contactor when the controller is active. Otherwise, modules inside the controller may be damaged.



8. Use outside the rated voltage

The controller must not be used outside the allowable voltage range specified in this manual. Otherwise, components inside the controller may be damaged. If required, use a corresponding voltage step-up or step-down device.

9. Surge suppressor

The controller has a built-in voltage dependent resistor (VDR) for suppressing the surge voltage generated when the inductive loads (electromagnetic contactor, electromagnetic relay, solenoid valve, electromagnetic coil and electromagnetic brake) around the controller are switched on or off. If the inductive loads generate very high surge voltage, use a surge suppressor for the inductive load or use a surge suppressor together with a diode.

Note

Do not connect the surge suppressor on the output side of the controller.

10. Altitude and de-rating

In places where the altitude is above 1000 m and the cooling effect reduces due to thin air, it is necessary to de-rate the controller. Contact Inovance for technical support.

11. Disposal

The electrolytic capacitors on the main circuits and PCB may explode when they are burnt. Poisonous gas is generated when the plastic parts are burnt. Treat them as ordinary industrial waste.

12. Adaptable motor

The controller is adaptable to squirrel-cage asynchronous motor or AC PMSM. Select a proper controller according to motor nameplate.

The default parameters configured inside the controller are squirrel-cage asynchronous motor parameters. It is still necessary to perform motor auto-tuning or modify the default values based on actual conditions. Otherwise, the running effect and protection performance will be affected. For PMSM, motor auto-tuning must be performed.

13. Precautions on selecting residual-current circuit breaker (RCCB)

Tripping may be caused if an improper RCCB is selected when the controller drives the motor. This is because the output wave of the controller has high harmonics and the motor

cable and the cable connecting the controller and the motor produce leakage current, which is much larger than the current when the motor runs at the mains frequency.

Thus, it is necessary to determine the proper RCCB sensitivity based on the general leakage current of the cables and the motor. The leakage current is dependent on the motor capacity, cable length, insulation class and wiring method. Generally, the leakage current on the output side of the controller is three times of the current when the motor runs at the mains frequency.

1.3 Protective Functions

Adopting different protective functions for different levels of faults, the NICE1000^{new} provides the elevator running system with full abnormality protection. For detailed solutions to the faults, see chapter 8.

Faults of the controller are classified as follows:

1. Speed abnormal

   The controller monitors the encoder feedback speed and output torque. Once the feedback speed exceeds the limit or the deviation between the torque limit and the speed feedback is too large, the controller performs protection immediately, reports an alarm and prohibits running.

2. Drive control abnormal

   The related faults include drive overcurrent, overvoltage/undervoltage, power input/output phase loss, overload, and storage abnormality. If such a fault occurs, the controller performs protection immediately, stops output, applies the brake and prohibits running.

3. Encoder abnormal

   The related faults include encoder phase loss, direction reversing, wire-breaking, and pulse interference. If such a fault occurs, the controller performs protection immediately to avoid unexpected accidents. If pulse interference is large, the controller reports an alarm immediately. If pulse interference is small, the controller performs position correction every time it receives a leveling signal and clears the accumulative error.

4. Leveling sensor abnormal

   The related faults include sensor failure or sensor stuck. The controller judges whether a fault occurs based on the leveling signal change. If the leveling signal does not change within the set time, the system reports an alarm.

5. Floor data abnormal

   The system stores the floor information through the shaft auto-tuning. If the floor data is abnormal, the system prompts the fault information at the first-time running. During actual running, the controller continuously compares position information input by DIs with the stored floor data. If the deviation is large, the system reports an alarm.

2

Product Information

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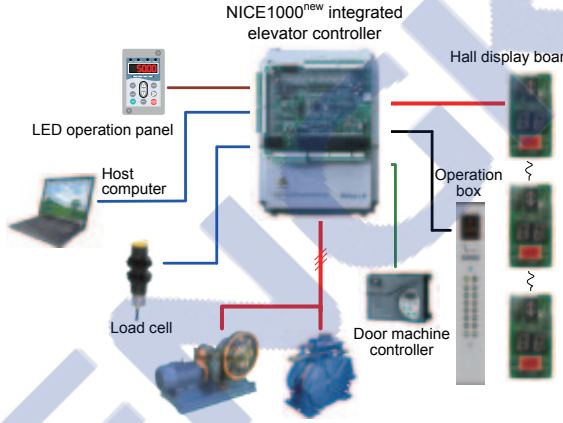
Chapter 2 Product Information

2.1 System Configuration of the NICE1000^{new}

The NICE1000^{new} series integrated elevator control system combines the functions of both elevator controller and high-performance vector control AC drive. As a high-performance vector drive and control elevator system, it meets the standard applications of the elevator. Users can also configure the optional door pre-open module and remote monitoring system to meet requirements for more intelligent applications.

The following figure shows the system components.

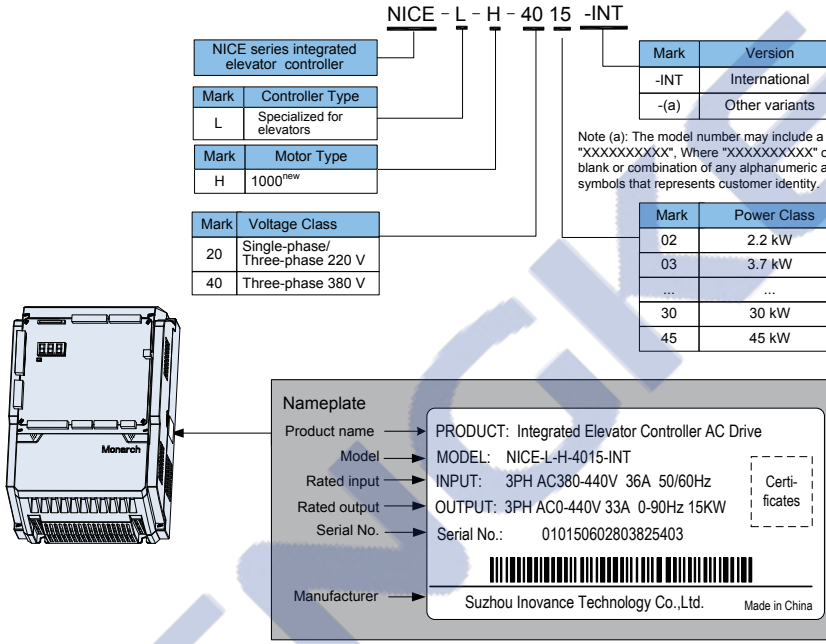
Figure 2-1 System components of the NICE1000^{new}



2.2 Designation Rules and Model Description

2.2.1 Designation Rules and Nameplate

Figure 2-2 Designation rules and nameplate of the NICE1000^{new}



2.3 Models and Specifications

Table 2-1 NICE1000^{new} models and specifications

Controller Model	Power Capacity (kVA)	Input Current (A)	Output Current (A)	Motor Power (kW)
Single-phase 220 V, range: -15% to 20%				
NICE-L-H-2002	2.0	9.2	5.2	1.1
NICE-L-H-2003	2.9	13.3	7.5	1.5
220-NICE-L-H-4007	3.9	17.9	10.3	2.2
220-NICE-L-H-4011	5.9	25.3	15.5	3.7
220-NICE-L-H-4015	7.3	31.3	19	4.0
220-NICE-L-H-4018	8.6	34.6	22.5	5.5
220-NICE-L-H-4022	10.6	42.6	27.7	11
220-NICE-L-H-4030	13.1	52.6	34.6	15

Controller Model	Power Capacity (kVA)	Input Current (A)	Output Current (A)	Motor Power (kW)
Three-phase 220 V, range: -15% to 20%				
NICE-L-H-2002	4.0	11.0	9.6	2.2
NICE-L-H-2003	5.9	17.0	14.0	3.7
220-NICE-L-H-4007	7.0	20.5	18.0	4.0
220-NICE-L-H-4011	10.0	29.0	27.0	5.5
220-NICE-L-H-4015	12.6	36.0	33.0	7.5
220-NICE-L-H-4018	15.0	41.0	39.0	11.0
220-NICE-L-H-4022	18.3	49.0	48.0	15.0
220-NICE-L-H-4030	23.0	62.0	60.0	18.5
Three-phase 380 V, range: -15% to 20%				
NICE-L-H-4002	4.0	6.5	5.1	2.2
NICE-L-H-4003	5.9	10.5	9.0	3.7
NICE-L-H-4005	8.9	14.8	13.0	5.5
NICE-L-H-4007	11.0	20.5	18.0	7.5
NICE-L-H-4011	17.0	29.0	27.0	11.0
NICE-L-H-4015	21.0	36.0	33.0	15.0
NICE-L-H-4018	24.0	41.0	39.0	18.5
NICE-L-H-4022	30.0	49.5	48.0	22.0
NICE-L-H-4030	40.0	62.0	60.0	30.0
NICE-L-H-4037	57.0	77.0	75.0	37.0
NICE-L-H-4045	69.0	93.0	91.0	45.0
NICE-L-H-4055	85.0	113.0	112.0	55.0

Note

1. In terms of single-phase and three-phase 220 VAC, NICE-L-C-2002 and NICE-L-C-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 attentions to the power rating of the adaptable motor during the use.
3. Select the proper controller output current based on the rated motor current. Ensure that the controller output current is equal to or greater than the rated motor current.
4. If you require higher voltage or power rating, contact Inovance.

2.4 Technical Specifications

Table 2-2 Technical specifications of the NICE1000[new]

Item		Specification
Basic specifications	Maximum frequency	99 Hz
	Carrier frequency	2–16 kHz, adjusted automatically based on the load features
Basic specifications	Motor control mode	Sensorless vector control (SVC) Closed-loop vector control (CLVC) Voltage/Frequency (V/F) control
	Startup torque	0.5 Hz: 180% (SVC) 0 Hz: 200% (CLVC)
	Speed adjustment range	1:100 (SVC) 1:1000 (CLVC) 1:50 (V/F)
	Speed stability accuracy	±0.5% (SVC) ±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 travel ride mode in which the leveling position can be adjusted flexibly
	Acceleration/ Deceleration curve	N curves generated automatically
	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	Load cell startup pre-torque compensation No-load-cell startup pre-torque self-adaption
	Test function	Easy to implement multiple elevators commissioning functions.
	Fault protection	Solutions to different levels of elevator faults
	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

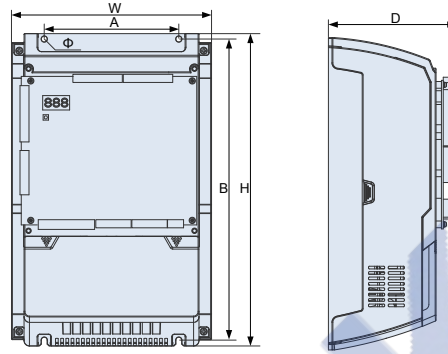
Item		Specification
I/O feature	Digital input (DI)	24 x DI Input specification: 24 V, 5 mA
		3 higher-voltage detection input terminals of safety circuit and door lock circuit Input specification: 95−125 V
	Floor input/output	50 floor button inputs/outputs; functions set flexibly
	Analog input (AI)	AI (voltage range: –10 V to +10 V)
	Communication port	1 CANbus communication ports 1 Modbus communication port
	Output terminal block	27 relay outputs The terminals can be allocated with different functions.
	Encoder interface	Supporting different encoders by using an optional PG card
Operation and display	Keypad	Used for shaft auto-tuning
	LED operation panel	5-digit LED display, querying/modifying most parameters and monitoring the system state
	NEMS software	Connecting the control system and the host computer, convenient for querying/motoring the system state.
Environment	Altitude	Below 1000 m (de-rated 1% for each 100 m higher)
	Ambient temperature	–10°C to 50°C (de-rated if the ambient temperature is above 40°C)
	Humidity	Maximum relative humidity 95%, non-condensing
	Vibration	Maximum vibration: 5.9 m/s^2 (0.6 g)
	Storage temperature	-20°C to 60°C
	IP level	IP20
	Pollution degree	PD2
	Power distribution system	TN, TT

2.5 Physical Appearance and Mounting Dimensions

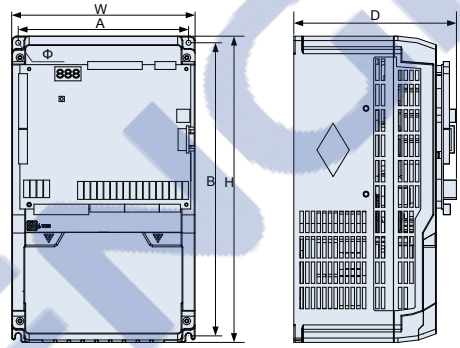
The following figures show the physical appearance and mounting dimensions of the three different structures of the NICE1000^{new}.

Figure 2-3 Physical appearance and mounting dimensions of the NICE1000^{new}

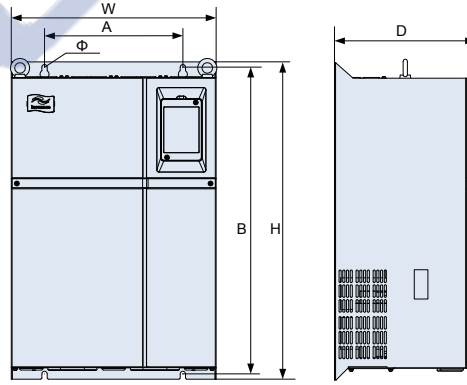
1. L structure, 2.2–15 kW



2. L structure, 18–37 kW



3. L structure, 45–55 kW



The following table lists the mounting dimensions of different models.

Table 2-3 Mounting dimensions of the NICE1000new

Controller Model	A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	Hole Diameter (mm)	Gross Weight (kg)
Single-phase/Three-phase 220 V, range: -15% to 20%							
NICE-L-H-2002	150	334.5	347	223	143	6.5	5.5
NICE-L-H-2003							
220-NICE-L-H-4007	150	334.5	347	223	173.5	6.5	7
220-NICE-L-H-4011							
220-NICE-L-H-4015							
220-NICE-L-H-4018	195	335	350	210	192	6	9.1
220-NICE-L-H-4022							
220-NICE-L-H-4030	230	380	400	250	220	7	17
Three-phase 380 V, range: -15% to 20%							
NICE-L-H-4002	150	334.5	347	223	143	6.5	5.5
NICE-L-H-4003							
NICE-L-H-4005							
NICE-L -H-4007	150	334.5	347	223	173.5	6.5	7
NICE-L -H-4011							
NICE-L -H-4015							
NICE-L-H-4018	195	335	350	210	192	6	9.1
NICE-L-H-4022							
NICE-L-H-4030	230	380	400	250	220	7	17
NICE-L-H-4037							
NICE-L-H-4045	260	580	600	385	265	10	32
NICE-L-H-4055							

2.6 Optional Parts

If any optional part in the following table is required, specify it in your order.

Table 2-4 Optional parts of the NICE1000new

Name	Model	Function	Remark
External braking unit	MDBUN	It is provided for the NICE1000new of 37 kW and above.	For details, see section 2.7 "Selection of Braking Components".
Energy feedback unit	MCTC-AFE	It is used for energy saving. This unit feeds back the electricity generated during braking to the grid.	-

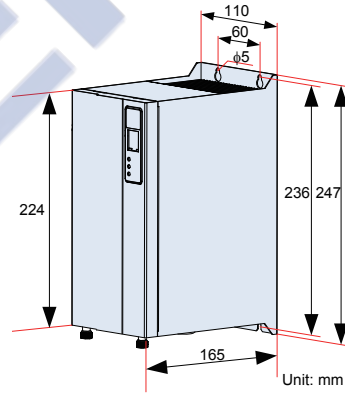
Name	Model	Function	Remark
PG card	MCTC-PG-A2	It is used to adapt to the push-pull and open-collector incremental encoders.	-
	MCTC-PG-D	It is used to adapt to the UVW differential encoder and applied to synchronous motor. It requires 5 V power supply.	-
	MCTC-PG-E	It is used to adapt to the SIN/COS encoder.	-
	MCTC-PG-F1	It is used to adapt to the absolute encoder (Heidenhain ECN413/1313)	
External LED operation panel	MDKE	It is the external LED display and operation panel.	It provides the RJ45 interface for connecting to the controller.
External LED operation panel	MDKE6	It is the external LED display and operation panel.	It can be used for copying parameters.
Extension cable	MDCAB	It is a standard 8-core network cable and can be connected to MDKE.	The cable length is 3 m in the standard configuration.

2.7 Selection of Braking Components

The NICE1000^{new} models of 30 kW and below have a built-in braking unit, and you only need to connect an external braking resistor between PB and + terminals. For models above 30 kW, you need to install a braking unit and a braking resistor externally.

The following figure shows the appearance and dimensions of the braking unit.

Figure 2-4 Appearance and dimensions of braking unit



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

Table 2-5 Braking resistor selection for the NICE1000^{new} models

Controller Model	Power of Adaptable Motor (kW)	Max. Resistance (Ω)	Min. Resistance (Ω)	Power of Braking Resistor (W)	Braking Unit
Single-phase 220 V, range: -15% to 20%					
NICE-L-H-2002	1.1	145.0	125.0	300	Built-in
NICE-L-H-2003	1.5	105.0	90.0	450	
220-NICE-L-H-4007	2.2	72.0	63.0	600	
220-NICE-L-H-4011	3.7	43.0	37.0	1100	
220-NICE-L-H-4015	4.0	40.0	35.0	1200	
220-NICE-L-H-4018	5.5	29.0	25.0	1600	
220-NICE-L-H-4022	11.0	18.0	16.0	3500	Built-in
220-NICE-L-H-4030	15.0	13.0	13.0	4500	
Three-phase 220 V, range: -15% to 20%					
NICE-L-H-2002	2.2	72.0	65.0	600	Built-in
NICE-L-H-2003	3.7	54.0	50.0	1100	
220-NICE-L-H-4007	4.0	40.0	35.0	1200	
220-NICE-L-H-4011	5.5	29.0	25.0	1600	
220-NICE-L-H-4015	7.5	26.0	22.0	2500	
220-NICE-L-H-4018	11.0	14.5	13.0	3500	
220-NICE-L-H-4022	15.0	13.0	12.5	4500	
220-NICE-L-H-4030	18.5	12.5	12.0	5500	
Three-phase 380 V, range: -15% to 20%					
NICE-L-H-4002	2.2	290	230	600	Built-in
NICE-L-H-4003	3.7	170	135	1100	
NICE-L-H-4005	5.5	115	90	1600	
NICE-L-H-4007	7.5	85	65	2500	
NICE-L-H-4011	11	55	43	3500	
NICE-L-H-4015	15	43	35	4500	
NICE-L-H-4018	18.5	34.0	25	5500	
NICE-L-H-4022	22	24	22	6500	
NICE-L-H-4030	30	20	16	9000	
NICE-L-H-4037	37	16.0	13	11000	MDBUN-60-T
NICE-L-H-4045	45	14.0	11	13500	MDBUN-60-T
NICE-L-H-4055	55	12.0	10	16500	MDBUN-90-T

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 minimum resistance.

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3

Mechanical and Electrical Installation

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Chapter 3 Mechanical and Electrical Installation

3.1 Installation Requirements

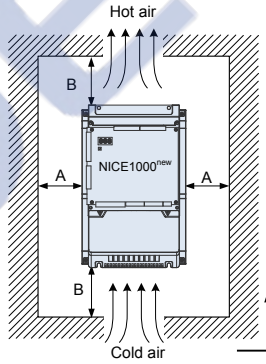
3.1.1 Installation Environment Requirements

Item	Requirements
Ambient temperature	-10°C to 50°C
Heat dissipation	Install the controller on the surface of an incombustible object, and ensure that there is sufficient space around for heat dissipation. Install the controller vertically on the support using screws.
Mounting location	Free from direct sunlight, high humidity and condensation
	Free from corrosive, explosive and combustible gas
	Free from oil dirt, dust and metal powder
Vibration	Less than 0.6 g
Protective enclosure	The controllers of plastic housing are whole-unit built-in products operated through remote control and need to be installed in the final system. The final system must have the required fireproof cover, electrical protective cover and mechanical protective cover, and satisfy the regional laws & regulations and related IEC requirements.

3.1.2 Installation Clearance Requirements

The clearance that needs to be reserved varies with the power class of the NICE1000^{new}, as shown in the following figure.

Figure 3-1 Clearance around the NICE1000^{new} for installation



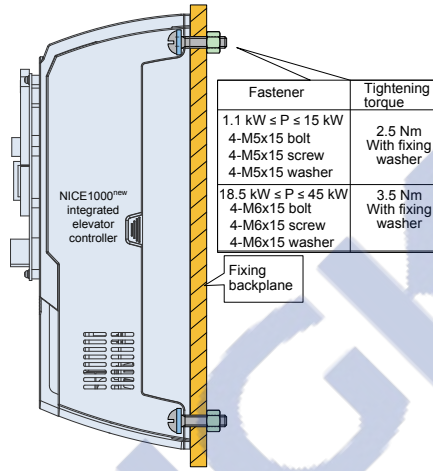
Installation clearance requirements on the NICE1000^{new} of different power classes

Power Class	Clearance Requirements	
1.1-18.5 kW	A ≥ 10 mm	B ≥ 100 mm
22-45 kW	A ≥ 50 mm	B ≥ 100 mm

3.2 Mechanical Installation

The NICE1000^{new} is installed vertically upward on the support with screws fixed into the four mounting holes, as shown in the following figure.

Figure 3-2 Diagram of mounting holes



The controller is generally installed in the control cabinet of the elevator equipment room. Pay attention to the following points when designing the control cabinet:

1. The temperature inside the cabinet must not rise to 10°C higher than the temperature outside the cabinet.
2. A closed control cabinet must be configured with a fan (or other air cooling device such as air conditioner) to ensure air circulation.
3. The air from the fan must not blow directly to the drive unit because this easily causes dust adhesion and further a fault on the drive unit.
4. A vent must be available at bottom of the control cabinet to form bottom-up air flow, which prevents heat island effect on the surface of components or partial thermal conductivity effect.
5. If the fan does not meet the cooling requirements, install an air conditioner in the cabinet or in the equipment room. Note that the temperature inside the cabinet must not be too low; otherwise, condensation may occur, causing short-circuit of components.
6. For special environment where the temperature is high but cannot be reduced effectively, de-rate the controller during use.

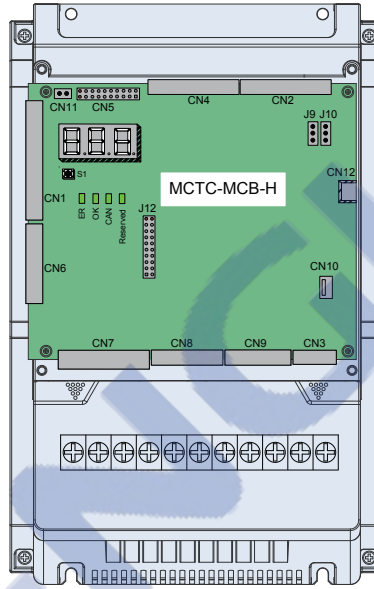
3.3 Electrical Installation

3.3.1 Terminal Arrangement and Wiring Description

■ **Terminal Arrangement**

The following figure shows terminal arrangement of the NICE1000^{new}.

Figure 3-3 Terminal arrangement of the NICE1000^{new}



■ **Description of Main Circuit Terminals**

The following figure shows main circuit terminal arrangement.

Figure 3-4 Main circuit terminal arrangement

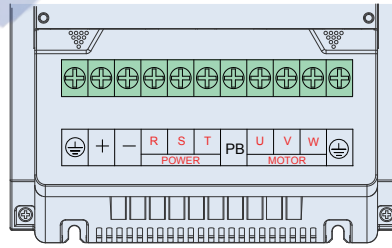
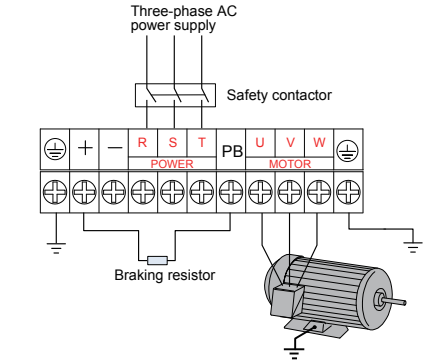
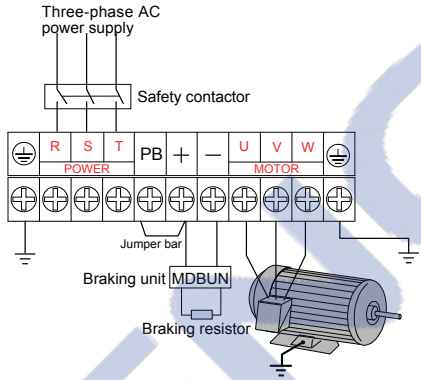


Figure 3-5 Wiring of the main circuit



(For models of below 37 kW)



(For models of 37 kW and above)

Table 3-1 Description of main circuit terminals

Terminal	Name	Description
R, S, T	Three-phase power input terminals	Provide three-phase power supply.
(+), (-)	Positive and negative terminals of DC bus	Connect the external braking unit and energy feedback unit for models of 37 kW and above.
(+), PB (P)	Terminals for connecting braking resistor	(+), PB: Connect the braking resistor for models of below 37 kW. (+), (P): Connect the DC reactor for models of 37 kW and above. At delivery, the (+) and P terminals are shorted with the jumper bar. If you need not connect the DC reactor, do not remove the jumper bar.
U, V, W	Controller output terminals	Connect the three-phase motor.
⏚	Grounding terminal	Must be grounded.

■ Description of Control Circuit Terminals

The following figure shows control circuit terminal arrangement.

Figure 3-6 Control circuit terminal arrangement

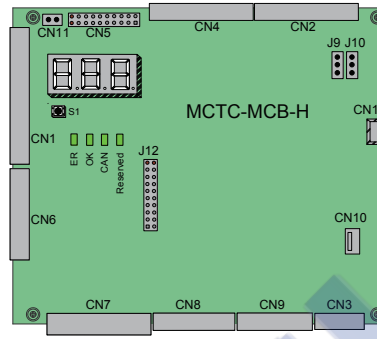
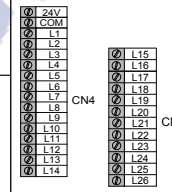
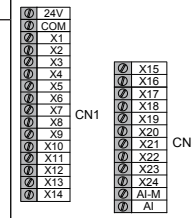
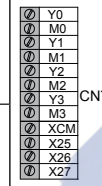
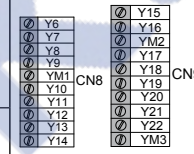
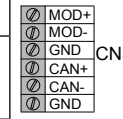
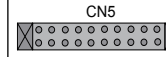


Table 3-2 Description of control circuit terminals

Mark	Code	Terminal Name	Function Description	Terminal Arrangement
CN2 CN4	24V/COM	External 24 VDC power supply	24 VDC power supply for the entire board	
	L1 to L26	Button function selection	Button input and button indicator output, 24 V power for button illumination	
CN1 CN6	24V/COM	External 24 VDC power supply	24 VDC power supply for the entire board	
	X1 to X24	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	
	AI-M/AI	AI	Used for the analog load cell device	

Mark	Code	Terminal Name	Function Description	Terminal Arrangement
CN7	X25 to X27/ XCM	Higher-voltage detection terminal	Input voltage range: 110 VAC±15% 110 VDC±20% for safety circuit and door lock circuit, function set in F5-25 to F5-27	
	Y0/M0 to Y3/M3	Relay output	Normally-open (NO), maximum current and voltage rating: 5 A, 250 VAC Function set in F7-00 to F7-03	
CN8 CN9	Y6 to Y22	Relay output	NO, maximum current and voltage rating: 5 A, 250 VAC or 5 A, 30 DC Function set in F7-06 to F7-22	
	YM1 to YM3	COM for relay output	YM1 is COM for Y6 to Y9; YM2 is COM for Y10 to Y16; YM3 is COM for Y17 to Y22.	
CN3	MOD+/-	Reserved	-	
	CAN+/-	CANbus differential signal	CANbus communication interface, used for parallel control	
	GND	Ground	Must be grounded	
CN5	Interface for extension board MCTC-KZ-D			
CN10	USB interface	Communication	• Used to connect the external Bluetooth module for commissioning via Android cell phone (not supporting English version currently) • Used to burn the MCB program • Used for residential monitoring	
CN11	Control board ground. If it is shorted, the control board ground is connected to the controller ground.			
CN12	RJ45 interface	Interface for operation panel	Used to connect the operation panel	

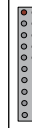
Mark	Code	Terminal Name	Function Description	Terminal Arrangement
J12	Interface for connecting the PG card			 J12
J9/ J10	Factory reserved. Do not short them randomly. Otherwise, the controller may not work properly.			J9 J10

Table 3-3 Description of indicators on the MCB

Mark	Terminal Name	Function Description
ER	Fault indicator	When a fault occurs on the controller, this indicator is ON (red).
OK	Normal running indicator	When the controller is in normal running state, this indicator is ON (green).
CAN	Parallel control communication indicator	This indicator is steady ON (green) when communication for parallel control is enabled, and blinks when the running in parallel mode is normal.
L1 to L26	Button input indicator	This indicator is ON (green) when the button input is active.
X1 to X27	Input signal indicator	This indicator is ON (green) when the external input is active.
Y0 to Y22	Output signal indicator	This indicator is ON (green) when the system output is active.

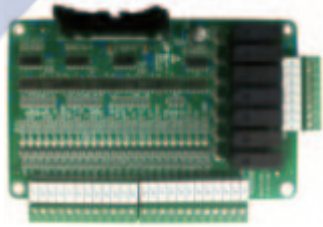
3.3.2 Description of the MCTC-KZ-D Extension Card

The extension card is mainly used for extension of floor button inputs and relay outputs.

1. Installation method and dimensions

The following figure shows installation of the MCTC-KZ-D. The CN2 interface of the MCTC-KZ-D is connected to the CN5 interface on the MCB of the NICE1000^{new} by using a connection cable.

Figure 3-7 Appearance and installation of the MCTC-KZ-D



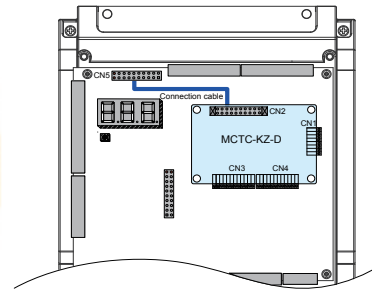
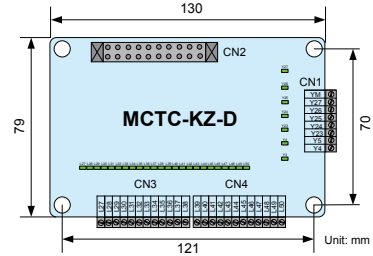
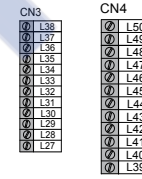
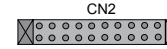


Figure 3-8 Mounting dimensions of the MCTC-KZ-D



2. Function description of terminals

Table 3-4 Function description of terminals

Mark	Code	Terminal Name	Function Description	Terminal Arrangement
CN3	L27 to L38	Button function selection	Button input and button indicator output, 24 V power for button illumination	
CN4	L39 to L50	Button function selection	Button input and button indicator output, 24 V power for button illumination	
CN1	YM/Y4/Y5/ Y23 to Y27	Relay output	Normally-open (NO), maximum current and voltage rating: 5 A, 250 VAC Function set in F7-03 to F7-27	
CN2	Interface for connection to the MCB			

3. Indicators

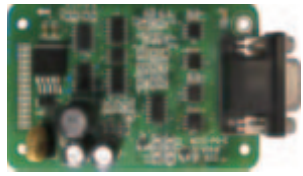
Table 3-5 Description of indicators on the MCTC-KZ-D

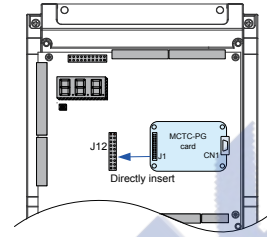
Mark	Terminal Name	Function Description
L27 to L50	Extension button signal collection/feedback indicator	When the extension floor button input signal is active and the response signal is output, this indicator is ON (green).
Y4, Y5, Y23 to Y27	Extension relay output signal indicator	When the extension relay output of the system is active, this indicator is ON (green).

3.3.3 Selection and Use of the MCTC-PG Card

The NICE1000[new] can implement CLVC only with use of the MCTC-PG card. The following figures show the appearance of the MCTC-PG card and its installation on the controller. Directly insert the J1 terminal of the MCTC-PG card into the J12 terminal of the controller.

Figure 3-9 Appearance of the MCTC-PG card and its installation on the controller

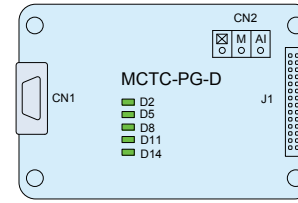
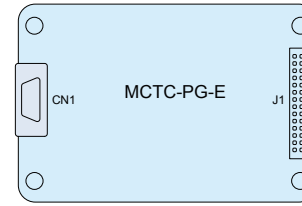


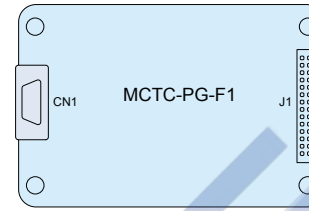


1. Model selection

Four PG card models are available, MCTC-PG-A2, MCTC-PG-D, MCTC-PG-E and MCTC-PG-F1 for different encoder types, as described in the following table.

Table 3-6 Selection of the MCTC-PG card models

Encoder Type	Adaptable PG Card	Appearance
Push-pull encoder Open-collector incremental encoder	MCTC-PG-A2	
UVW encoder	MCTC-PG-D	
SIN/COS encoder	MCTC-PG-E	

Encoder Type	Adaptable PG Card	Appearance
Absolute encoder (ECN413/1313)	MCTC-PG-F1	

2. Terminal wiring and description

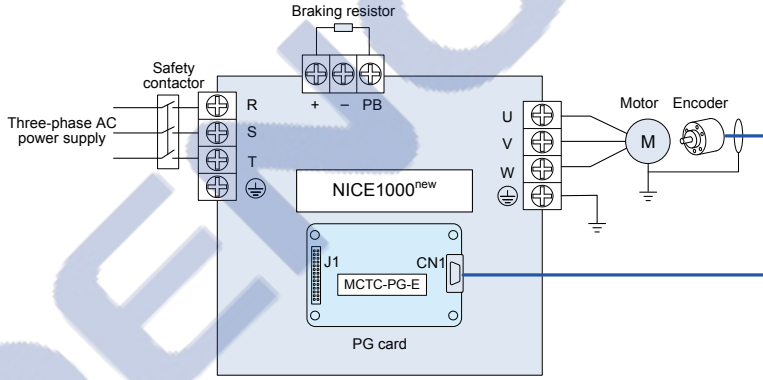
The MCTC-PG card is connected to the controller and the encoder as follows:

The J1 terminal and CN1 terminal of the MCTC-PG card are respectively connected to the J12 terminal of the MCB on the controller and the encoder of the motor.

Different MCTC-PG card models are connected to the MCB in the same way. The connection method to the encoder depends on the CN1 terminal of the model.

The following figure shows the wiring between MCTC-PG-E and the controller.

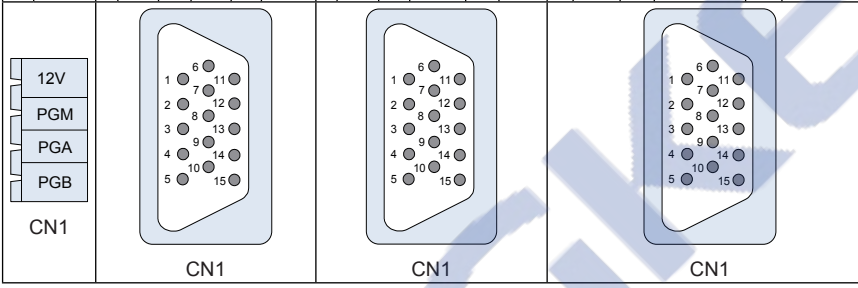
Figure 3-10 Wring between MCTC-PG-E and the controller



The following table defines the CN1 terminals of different MCTC-PG card models.

Table 3-7 Definitions of the CN1 terminals of different MCTC-PG card models

MCTC-PG-A2		MCTC-PG-D						MCTC-PG-E						MCTC-PG-F1					
1	12V	1	A+	6	N/A	11	W+	1	B-	6	A-	11	C-	1	B-	6	A-	11	CLOCK-
2	PGM	2	A-	7	U+	12	W-	2	N/A	7	COM	12	D+	2	N/A	7	GND	12	DATA+
3	PGA	3	B+	8	U-	13	VCC	3	Z+	8	B+	13	D-	3	N/A	8	B+	13	DATA-
4	PGB	4	B-	9	V+	14	COM	4	Z-	9	VCC	14	N/A	4	N/A	9	5V (Up)	14	N/A
		5	N/A	10	V-	15	N/A	5	A+	10	C+	15	N/A	5	A+	10	CLOCK+	15	5V (Sensor)



3. Precautions on connecting the MCTC-PG card

- The cable connecting the MCTC-PG card and the encoder must be separated from the cables of the control circuit and the power circuit. Parallel cabling in close distance is forbidden.
- The cable from the MCTC-PG card to the encoder must be a shielded cable. The shield must be connected to the PE on the controller side. To minimize interference, single-end grounding is suggested.
- The cable from the MCTC-PG card to the encoder must run through the duct separately and the metal shell is reliably grounded.

3.3.4 Selection of Adaptable Motor

The main counters of the electrical relationship between the controller and the motor are voltage and current.

1. In general elevator applications, the input mains voltage is 380 V, and the motor voltage can only be equal to or smaller than 380 V. Thus, when selecting the NICE1000^{new}, you can take only the current of the motor into consideration.
2. When the NICE1000^{new} is designed, large safety allowance is reserved for the main power module. The controller can run properly within the nominal output current. During stable running, the maximum output torque is 150% of the rated torque and can reach up to 200% of the rated torque for a short time.

Therefore, for the motor with the rated voltage of 380 V, you can select the controller of the same power class. As long as the rated current of the motor is smaller than the output current of the controller, the controller of the same power class can also be used.

Generally, select an adaptable motor based on the output current of the controller and

ensure that the rated current of the motor is equal to or smaller than the output current of the controller. For technical specifications of the controller, see section 2.3.

3.3.5 Selection and Use of the Hall Display Board

Inovance does not provide the display board, and customers need to prepare the appropriate board yourselves. The NICE1000^{new} supports four different types of display boards. For details, see the descriptions of FE-12 in chapter 7.

3.4 Selection of Peripheral Electrical Devices

3.4.1 Description of Peripheral Electrical Devices

1. Do not install the capacitor or surge suppressor on the output side of the controller. Otherwise, it may cause faults to the controller or damage to the capacitor and surge suppressor.
2. Inputs/Outputs (main circuit) of the controller contain harmonics, which may interfere with the communication device connected to the controller. Therefore, install an anti-interference filter to minimize the interference.
3. Select the peripheral devices based on actual applications as well as by referring to section 3.4.2.

The following table describes the peripheral electrical devices.

Table 3-8 Description of peripheral electrical devices

Part	Mounting Location	Function Description
MCCB	Forefront of controller power input side	Cut off the power supply of the controller and provide short-circuit protection.
Safety contactor	Between MCCB and the controller input side	Apply/Cut off the power supply of the controller. The close/open of the contactor is controlled by the external safety circuit.
AC input reactor	Controller input side	Improve the power factor of the input side. Eliminate the higher harmonics on the input side to provide effective protection on the rectifier bridge. Eliminate the input current unbalance due to unbalance between the power phases.
AC output reactor	Between the controller output side and the motor, close to the controller	If the distance between the controller and the motor is greater than 100 m, install an AC output reactor.

3.4.2 Selection of Peripheral Electrical Devices

Proper cable specification and cabling greatly improves anti-interference capability and safety of the system, facilitating installation and commissioning and enhancing system running stability.

The following table describes the specifications of peripheral electrical devices for selection.

Table 3-9 Specification of peripheral electrical devices for selection

Controller Model	MCCB (A)	Contactor (A)	Cable of Main Circuit (mm²)	Cable of Control Circuit (mm²)	Grounding Cable (mm²)
Single-phase 220 V, range: -15% to 20%, 50/60 Hz					
NICE-L-H-2002	16	12	1	0.75	1
NICE-L-H-2003	20	18	2.5	0.75	2.5
220-NICE-L-H-4007	25	18	4	0.75	4
220-NICE-L-H-4011	40	25	6	0.75	6
220-NICE-L-H-4015	50	32	6	0.75	6
220-NICE-L-H-4018	50	38	6	0.75	6
220-NICE-L-H-4022	63	50	10	0.75	10
220-NICE-L-H-4030	80	65	16	0.75	16
Three-phase 220 V, range: -15% to 20%, 50/60 Hz					
NICE-L-H-2002	16	12	1.5	0.75	1.5
NICE-L-H-2003	25	18	2.5	0.75	2.5
220-NICE-L-H-4007	32	25	4	0.75	4
220-NICE-L-H-4011	40	32	6	0.75	6
220-NICE-L-H-4015	50	38	6	0.75	6
220-NICE-L-H-4018	63	40	10	0.75	10
220-NICE-L-H-4022	80	50	10	0.75	10
220-NICE-L-H-4030	100	65	16	0.75	16
Three-phase 380 V, range: -15% to 20%, 50/60 Hz					
NICE-L-H-4002	10	9	0.75	0.75	0.75
NICE-L-H-4003	16	12	1.5	0.75	1.5
NICE-L-H-4005	25	18	2.5	0.75	2.5
NICE-L-H-4007	32	25	4	0.75	4
NICE-L-H-4011	40	32	6	0.75	6
NICE-L-H-4015	50	38	6	0.75	6
NICE-L-H-4018	63	40	10	0.75	10
NICE-L-H-4022	80	50	10	0.75	10
NICE-L-H-4030	100	65	16	0.75	16
NICE-L-H-4037	100	80	25	0.75	16
NICE-L-H-4045	160	95	35	0.75	16
NICE-L-H-4055	160	115	50	0.75	25

3.5 Electrical Wiring Diagram of the NICE1000^{new} Control System

Figure 3-11 Electrical wiring diagram of the NICE1000^{new} control system

See the last page of this chapter.

3.6 Installation of Shaft Position Signals

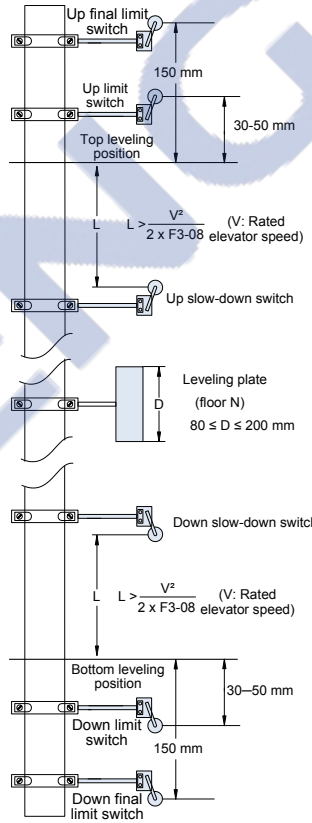
In elevator control, to implement landing accurately and running safely, the car position needs to be identified based on shaft position signals.

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

These shaft position signals are directly transmitted by the shaft cables to the MCB of the controller. For the electrical wiring method, refer to Figure 3-11.

The following figure shows the arrangement of shaft position signals in the shaft.

Figure 3-12 Arrangement of shaft position signals



3.6.1 Installation of Leveling Signals

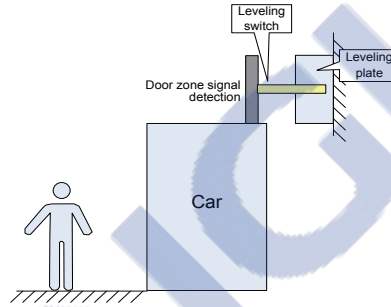
Leveling signals comprise the leveling switch and leveling plate and are directly connected to the input terminal of the controller. It is used to enable the car to land at each floor accurately.

The leveling switches are generally installed on the top of the car. The NICE1000new system supports a maximum of three leveling switches; by default, a leveling switch is used.

The leveling plate is installed on the guide rail in the shaft. A leveling plate needs to be installed at each floor. Ensure that leveling plates at all floors are mounted with the same depth and verticality.

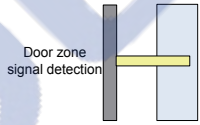
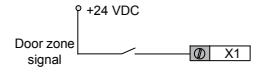
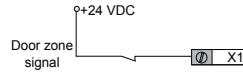
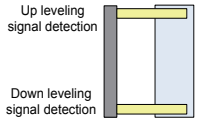
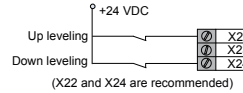
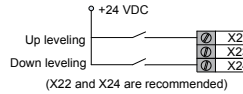
The following figure shows the installation of leveling signals

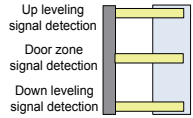
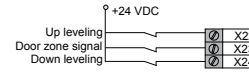
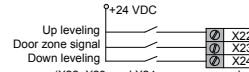
Figure 3-13 Installation of leveling signals



The following table describes the installation requirements of leveling switches

Table 3-10 Installation requirements of leveling switches

Number of Leveling Switches	Installation Method	Connecting to Input Terminals of Controller	Setting of Function Code
1			F5-01 = 03 (NO)
			F5-01 = 103 (normally closed, NC)
2			F5-22 = 101 (NC) F5-24 = 102 (NC)
			F5-22 = 01 (NO) F5-24 = 02 (NO)

Number of Leveling Switches	Installation Method	Connecting to Input Terminals of Controller	Setting of Function Code
3		 (X22, X23, and X24 are recommended)	F5-22 = 101 (NC) F5-23 = 103 (NC) F5-24 = 102 (NC)
		 (X22, X23, and X24 are recommended)	F5-22 = 01 (NO) F5-23 = 03 (NO) F5-24 = 02 (NO)

3.6.2 Installation of Slow-Down Switches

The slow-down switch is one of the key protective components of the NICE1000^{new}, protecting the elevator from over travel top terminal or over travel bottom terminal at maximum speed when the elevator position becomes abnormal.

The NICE1000^{new} system supports one pair of slow-down switches.

The slow-down distance L indicates the distance from the slow-down switch to the leveling plate at the terminal floor. The calculating formula is as follows:

$$L > \frac{V^2}{2 \times F3\text{-}08}$$

In the formula, "L" indicates the slow-down distance, "V" indicates the F0-04 (Rated elevator speed), and "F3-08" indicates the special deceleration rate.

The default value of F3-08 (Special deceleration rate) is 0.5 m/s^2. The slow-down distances calculated based on different rated elevator speeds are listed in the following table:

Table 3-11 Slow-down distances based on different rated elevator speeds

Rated Elevator Speed (m/s)	0.25	0.4	0.5	0.63	0.75	1.0	1.5	1.6	1.75
Distance of Slow-down Switch (m)	0.3–0.4	0.5–0.6	0.6–0.8	0.8–1.0	0.9–1.2	1.2–1.5	1.8–2.5		

Note

- The slow-down switch supports the terminal floor reset function. It must be installed between the leveling plates of the terminal floor and the secondary terminal floor.
- If the distance between these two floors is small and the installation distance of the slow-down switch is outside the installation range of these two floors, enable the super short function by setting Bit14 or Bit15 of F6-07.

3.6.3 Installation of Limit Switches

The up limit switch and down limit switch protect the elevator from over travel top/bottom terminal when the elevator does not stop at the leveling position of the terminal floor.

- The up limit switch needs to be installed 30−50 mm away from the top leveling position. The limit switch acts when the car continues to run upward 30−50 mm from the top leveling position.
- The down limit switch needs to be installed 30−50 mm away from the bottom leveling position. The limit switch acts when the car continues to run downward 30−50 mm from the bottom leveling position.

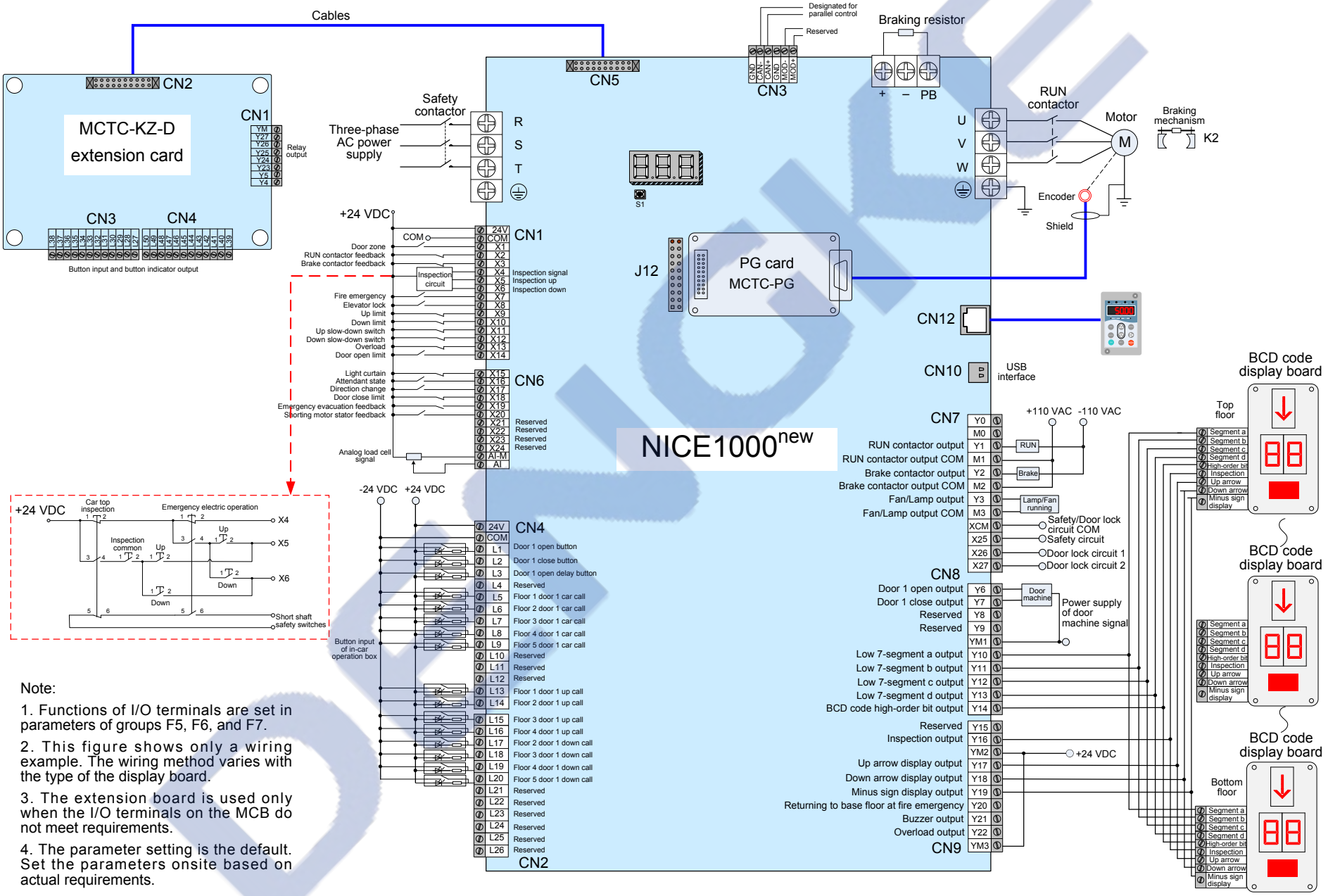
3.6.4 Installation of Final Limit Switches

The final limit switch is to protect the elevator from over travel top/bottom terminal when the elevator does not stop completely upon passing the up/down limit switch.

- The up final limit switch is mounted above the up limit switch. It is usually 150 mm away from the top leveling position.
- The down final limit switch is mounted below the down limit switch. It is usually 150 mm away from the bottom leveling position.

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Figure 3-11 Electrical wiring diagram of the NICE1000^{new} control system



Note:

1. Functions of I/O terminals are set in parameters of groups F5, F6, and F7.
2. This figure shows only a wiring example. The wiring method varies with the type of the display board.
3. The extension board is used only when the I/O terminals on the MCB do not meet requirements.
4. The parameter setting is the default. Set the parameters onsite based on actual requirements.

4

Use of the Commissioning Tools

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Chapter 4 Use of the Commissioning Tools

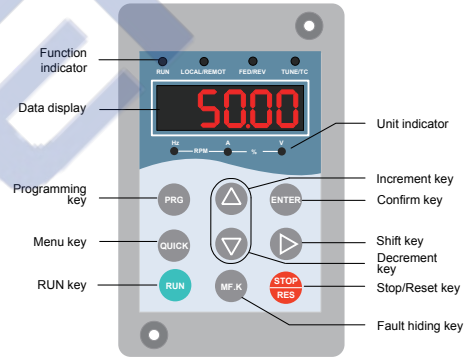
The NICE1000^{new} supports three commissioning tools, S1 button on the MCB, LED operation panel, and host computer monitoring software NEMS.

Tool	Function Description	Remark
S1 button	The keypad provides the S1 button to carry out shaft auto-tuning.	Standard
LED operation panel	It is used to view and modify parameters related to elevator drive and control.	Optional
NEMS monitoring software	It is used to monitor the current elevator state, view and modify all parameters, and upload and download parameters on the PC.	Optional. Download the software at www.szmctc.com.
Andriod cell phone commissioning software (EDSAP)	A Bluetooth module is used to connect the MCB and the Android cell phone installed with the commissioning software, through which you can commission the elevator, and upload and download parameters.	The software does not provide the English version currently.

4.1 Use of the LED Operation Panel

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

Figure 4-1 Diagram of the LED operation panel



4.1.1 Description of Indicators

- RUN

  ON indicates that the controller is in the running state, and OFF indicates that the controller is in the stop state.

- LOCAL/REMOT

  Reserved.

- FWD/REV

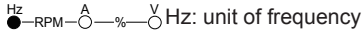
  ON indicates down direction of the elevator, and OFF indicates up direction of the elevator.

- TUNE/TC

  ON indicates the auto-tuning state.

- Unit Indicators

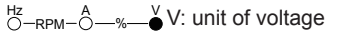
  ● means that the indicator is ON, and ○ means that the indicator is OFF.

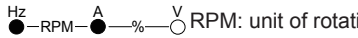
  Hz: unit of frequency

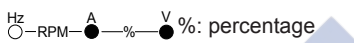
  A: unit of current

  V: unit of voltage

  RPM: unit of rotational speed

  %: percentage

4.1.2 Description of Keys on the Operation Panel

Table 4-2 Description of keys on the operation panel

Key	Name	Function
PRG	Programming	Enter or exit Level-I menu.
ENTER	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	Run	Start the controller in the operation panel control mode.
STOP RES	Stop/Reset	Stop the controller when it is in the running state and perform the reset operation when it is in the fault state.

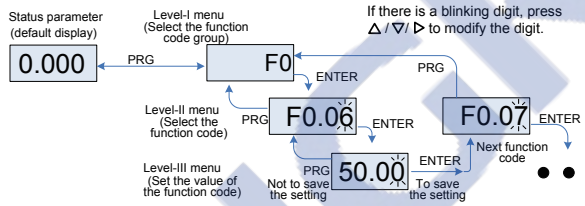
Key	Name	Function
QUICK	Quick	Enter or exit Level-I quick menu.
MF.K	Fault hiding	Press this key to display or hide the fault information in the fault state, which facilitates parameter viewing.

4.1.3 Operation Procedure

The LED operation panel adopts three-level menu.

The three-level menu consists of function code group (Level I), function code (Level II), and function code setting value (level III), as shown in the following figure.

Figure 4-2 Operation procedure on the operation panel

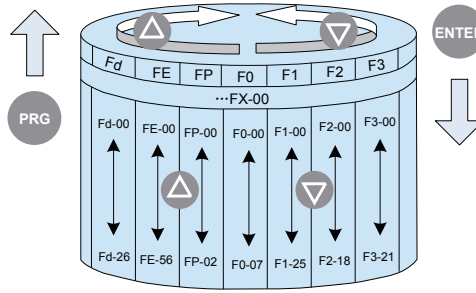


You can return to Level II menu from Level III menu by pressing PRG or ENTER. The difference between the two is as follows:

- After you press ENTER, the system saves the parameter setting first, and then goes back to Level II menu and shifts to the next function code.
- After you press PRG, the system does not save the parameter setting, but directly returns to Level II menu and remains at the current function code.

The following figure shows the shift between the three levels of menus.

Figure 4-3 Shift between the three levels of menus



In Level III menu, if the parameter has no blinking digit, it means that the parameter cannot be modified. This may be because:

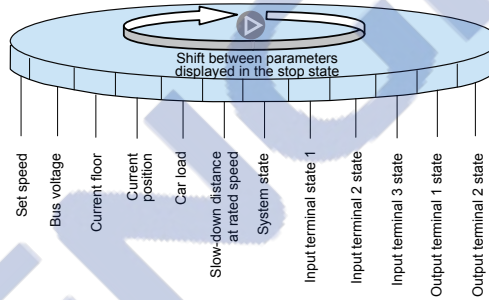
- Such a parameter is only readable, such as actually detected parameters and running record parameters.
- Such a parameter cannot be modified in the running state and can only be changed at stop.

4.1.4 Viewing Status Parameters

In the stop or running state, the operation panel can display multiple status parameters. Whether parameters are displayed is determined by the equivalent binary bits converted from the values of FA-01 and FA-02.

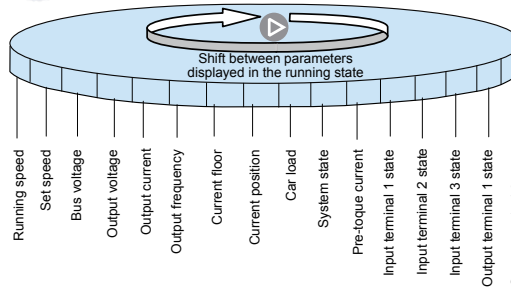
In the stop state, a total of 12 parameters can be displayed circularly by pressing . You can select the parameters to be displayed by setting FA-02 (each of the binary bits converted from the value of FA-02 indicates a parameter).

Figure 4-4 Shift between parameters displayed in the stop state



In the running state, a total of 16 parameters can be displayed circularly by pressing . You can select the parameters to be displayed by setting FA-01 (each of the binary bits converted from the value of FA-02 indicates a parameter).

Figure 4-5 Shift between parameters displayed in the running state



For details, see the description of corresponding parameters in Chapter 7.

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5

System Commissioning and Application Example

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Chapter 5 System Commissioning and Application Example

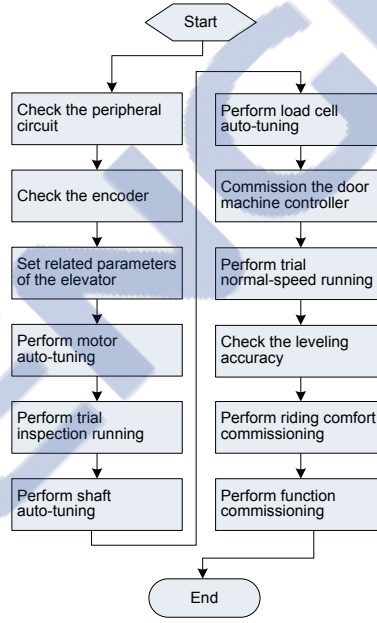
5.1 System Commissioning

⚠ CAUTION

- Ensure that there is no person in the shaft or car before performing commissioning on the elevator.
- Ensure that the peripheral circuit and mechanical installation are ready before performing commissioning.

The following figure shows the commissioning procedure of the system.

Figure 5-1 Commissioning procedure of the system



5.1.1 Check Before Commissioning

The elevator needs to be commissioned after being installed; the correct commissioning guarantees safe and normal running of the elevator. Before performing electric commissioning, check whether the electrical part and mechanical part are ready for commissioning to ensure safety.

At least two persons need to be onsite during commissioning so that the power supply can be cut off immediately when an abnormality occurs.

1. Check the field mechanical and electric wiring.

Before power-on, check the peripheral wiring to ensure component and personal safety.

The items to be checked include:

1) Whether the component models are matched
2) Whether the safety circuit is conducted and reliable
3) Whether the door lock circuit is conducted and reliable
4) Whether the shaft is unobstructed, and the car has no passenger and meets the conditions for safe running
5) Whether the cabinet and traction motor are well grounded
6) Whether the peripheral circuit is correctly wired according to the drawings of the vendor
7) Whether all switches act reliably
8) Whether there is short-circuit to ground by checking the inter-phase resistance of the main circuit
9) Whether the elevator is set to the inspection state
10) Whether the mechanical installation is complete (otherwise, it will result in equipment damage and personal injury)

2. Check the encoder.

The pulse signal from the encoder is critical to accurate control of the system. Before commissioning, check the following items carefully:

1) The encoder is installed reliably with correct wiring. For details on the encoder wiring, see section 3.3.3.
2) The signal cable and strong-current circuit of the encoder are laid in different ducts to prevent interference.
3) The encoder cable is preferably directly connected to the control cabinet. If the cable is not long enough and an extension cable is required, the extension cable must be a shielding cable and preferably welded to the original encoder cable by using the soldering iron.
4) The shielding cable of the encoder cable is grounded on the end connected to the controller (only one end is grounded to prevent interference).

3. Check the power supply before power-on.

1) The inter-phase voltage of the user power supply is within (380 V±15%), and the unbalance degree does not exceed 3%.
2) The power input voltage between terminals 24V and COM on the MCB is within (24 VDC±15%).
3) The total lead-in wire gauge and total switch capacity meet the requirements.

Note

If the input voltage exceeds the allowable value, serious damage will be caused. Distinguish the negative and positive of the DC power supply. Do not run the system when there is input power phase loss.

4. Check the grounding.

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

- R, S, T and PE
- U, V, W and PE
- 24V and PE on the MCB
- Motor U, V, W and PE
- +, – bus terminals and PE
- Safety circuit, door lock circuit, and inspection circuit terminals and PE

5. Check the grounding terminals of all elevator electrical components and the power supply of the control cabinet.

5.1.2 Setting and Auto-tuning of Motor Parameters

The NICE1000^{new} supports two major control modes, sensorless vector control (SVC) and closed-loop vector control (CLVC). SVC is applicable to inspection speed running for commissioning and fault judgment running during maintenance of the asynchronous motor. CLVC is applicable to normal elevator running. In CLVC mode, good driving performance and running efficiency can be achieved in the prerequisite of correct motor parameters.

■ **Motor Parameters to Be Set**

The motor parameters that need to be set are listed in the following table.

Table 5-1 Motor parameters to be set

Function Code	Parameter Name	Description
F1-25	Motor type	0: Asynchronous motor 1: Synchronous motor
F1-00	Encoder type	0: SIN/COS encoder, absolute encoder 1: UVW encoder 2: AB incremental encoder (for asynchronous motor)
F1-12	Encoder pulses per revolution	0–10000
F1-01 to F1-05	Rated motor power Rated motor voltage Rated motor current Rated motor frequency Rated motor rotational speed	These parameters are model dependent, and you need to manually input them according to the nameplate.
F0-00	Control mode	0: Sensorless vector control (SVC) 1: Closed-loop vector control (CLVC) 2: Voltage/Frequency (V/F) control

Function Code	Parameter Name	Description
F0-01	Command source selection	0: Operation panel control 1: Distance control
F1-11	Auto-tuning mode	0: No operation 1: With-load auto-tuning 2: No-load auto-tuning 3: Shaft auto-tuning 1 4: Shaft auto-tuning 2

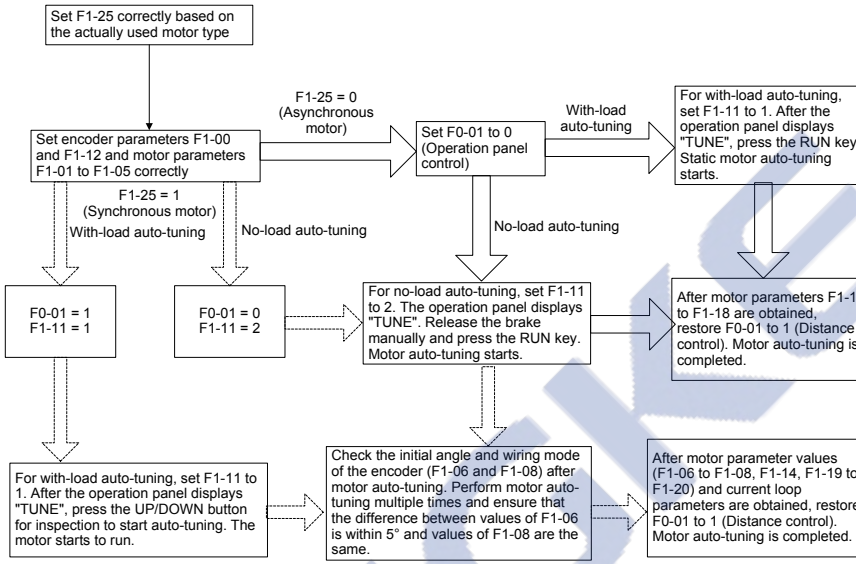
■ Precautions for Motor Auto-tuning

Follow the following precautions:

- Ensure that all wiring and installation meet the safety specifications.
- Reset the current fault and then start auto-tuning, because the system cannot enter the auto-tuning state ("TUNE" is not displayed) when there is a fault.
- Perform motor auto-tuning again if the phase sequence or encoder of the synchronous motor is changed.
- After the auto-tuning is completed, perform trial inspection running. Check whether the current is normal, whether the actual running direction is the same as the set direction. If the running direction is different from the set direction, change the value of F2-10.
- With-load auto-tuning is dangerous (inspection-speed running of many control cabinets is emergency electric running and the shaft safety circuit is shorted). Ensure that there is no person in the shaft in this auto-tuning mode.

The following figure shows the motor auto-tuning process.

Figure 5-2 Motor auto-tuning process



More descriptions of motor auto-tuning are as follows:

1) When the NICE1000^{new} drives the synchronous motor, an encoder is required to provide feedback signals. You must set the encoder parameters correctly before performing motor auto-tuning.

2) For synchronous motor auto-tuning:

a. In the no-load auto-tuning and with-load auto-tuning, the motor needs to rotate. The best auto-tuning mode is no-load auto-tuning; if this mode is impossible, then try with-load auto-tuning.

b. Perform three or more times of auto-tuning, compare the obtained values of F1-06 (Encoder initial angle). The value deviation of F1-06 shall be within ±5°, which indicates that the auto-tuning is successful.

c. With-load auto-tuning learns stator resistance, shaft-D and shaft-Q inductance, current loop (including zero servo) PI parameters, and encoder initial angle. No-load auto-tuning additionally learns the encoder wiring mode.

d. After wiring phase sequence of the motor is changed or the encoder is replaced, perform motor auto-tuning again.

3) For asynchronous motor:

With-load auto-tuning learns stator resistance, rotor resistance, and leakage inductance, and automatically calculates the mutual inductance and motor magnetizing current. No-load auto-tuning learns the mutual inductance, motor magnetizing current, and current loop parameters.

4) The motor wiring must be correct (UVW cables of the motor are connected respectively to UVW terminals of the controller). If the motor wiring is incorrect in the with-load auto-tuning mode, the motor may jitter or may fail to run and report Err20 (subcode 3). To solve the problem, replace any two of motor UVW cables.

■ **Output State 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 RUN contactor or the brake contactor manually.

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

Table 5-2 Output state of the RUN and brake contactors

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

5.1.3 Trial Running at Normal Speed

After ensuring that running at inspection speed is normal, perform shaft auto-tuning, and then you can perform trial running at normal speed (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 slow-down switches are installed properly and act correctly.
2. When the elevator is at the bottom floor, the down slow-down 1 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 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 hold down S1 on the keypad of the MCB (release S1 after the motor starts up), and start shaft auto-tuning.

Note

For shaft auto-tuning when there are only two floors, the elevator needs to run to below the bottom leveling position, that is, the leveling sensor is disconnected from the leveling plate. There is no such requirement when there are multiple floors.

5.1.4 Door Machine Controller Commissioning

The NICE1000^{new} can control the elevator door properly in the prerequisite that:

1. Wiring between the MCB and the door machine controller is correct.

2. After being commissioned, the door machine controller can open/close the elevator door properly and feeds back door open/close limit signal correctly in the terminal control mode.

3. The door open/close command output relays on the MCB are set correctly. The NO/NC states of the door open/close limit signal input contacts are set correctly.

Descriptions of monitoring the elevator door based on the MCB are as follows:

1) F5-28 is used to monitor whether the door open/close signals received by the system are correct. Segment G/DP of LED3 and segment A/B of LED4 are respectively used to monitor door 1/2 open limit and door 1/2 close limit.

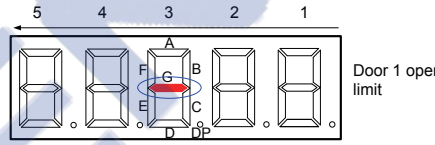
2) Door open limit monitoring:

In the following figure, if segment G is ON, it indicates that the system has received the door 1 open limit signal, and door 1 should be in open state.

If segment G is OFF when the door is open and ON when the door is closed, it indicates that the NO/NC states of door 1 open limit signal are set incorrectly. In this case, you need to correct the setting.

If segment G stays ON or OFF regardless of whether the door is open or closed, it indicates that MCB does not receive the door open limit signal feedback. In this case, check the door machine controller and the wiring.

Figure 5-3 Door 1 open limit monitoring (F5-28)



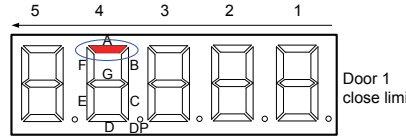
3) Door close limit monitoring:

In the following figure, if segment A is ON, it indicates that the system has received the door 1 close limit signal, and door 1 should be in close state.

If segment G is OFF when the door is closed and ON when the door is open, it indicates that the NO/NC states of door 1 close limit signal are set incorrectly. In this case, you need to correct the setting.

If segment A stays ON or OFF regardless of whether the door is open or closed, it indicates that MCB does not receive the door open limit signal feedback. In this case, check the door machine controller and the wiring.

Figure 5-4 Door 1 close limit monitoring (F5-28)



4) In the door open/close process, neither of segments G and A is ON.

5.1.5 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 discomfort. 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 (synchronous motor)	0–3	0	It can reduce the lower-frequency vertical jitter during running.
F1-18	Magnetizing current	0.01–300.00	0.00 A	Increasing the value can improve the loading capacity of the asynchronous motor.
F2-00	Speed loop proportional gain KP1	0–100	40	F2-00 and F2-01 are the PI regulation parameters when the running frequency is lower than F2-02 (Switchover frequency 1). F2-03 and F2-04 are the PI regulation parameters when the running frequency is higher than F2-02 (Switchover frequency 2). The regulation parameters between F2-02 and F2-04 are the weighted average value of F2-00 & F2-01 and F2-03 & F2-04.
F2-01	Speed loop integral time TI1	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 KP2	0–100	35	
F2-04	Speed loop integral time TI2	0.01–10.00s	0.80s	
F2-05	Switchover frequency 2	F2-02 to F0-05	5.00 Hz	

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

The recommended regulating method is as follows:

If the default setting cannot satisfy the requirements, make slight regulation. Decrease the proportional gain first to ensure that the system does not oscillate. Then decrease the integral time to ensure fast responsiveness and small overshoot.

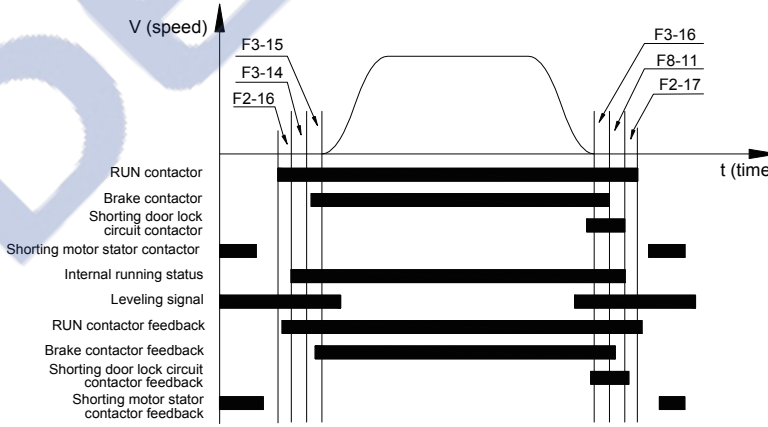
If both F2-02 (Switchover frequency 1) and F2-05 (Switchover frequency 2) are set to 0, only F2-03 and F2-04 are valid.

Function Code	Parameter Name	Setting Range	Default	Description
F2-06	Current loop proportional 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	

The optimum values of these two parameters are obtained during motor auto-tuning, and you need not modify them. Appropriate setting of the parameters can restrain jitter during running and have obvious effect on the riding comfort.

Function Code	Parameter Name	Setting Range	Default	Description
F2-18	Startup acceleration time	0.000–1.500s	0.000s	It can reduce the terrace feeling at startup caused by the breakout friction of the guide rail.
F3-00	Startup speed	0.000–0.030 m/s	0.000 m/s	
F3-01	Startup holding time	0.000–0.500s	0.000s	
F3-14	Zero-speed control time at startup	0.000–1.000s	0.200s	It specifies the zero speed holding time before brake output.
F3-15	Brake release delay	0.000–2.000s	0.200s 0.600s	It specifies the brake release time.
F3-16	Zero-speed control time at end	0.000–1.000s	0.300s	It specifies the zero speed holding time after the brake is applied.
F8-11	Brake apply delay	0.200–1.500s	0.200s	It specifies the brake apply time.

Figure 5-5 Running time sequence



F3-14 (Zero-speed control time at startup) specifies the time from output of the RUN contactor to output of the brake contactor, during which the controller performs excitation on the motor and outputs zero-speed current with large startup torque.

F3-15 (Brake release delay) specifies the time from the moment when the system sends the brake release command to the moment when the brake is completely released, during which the system retains the zero-speed torque current output.

F3-16 (Zero-speed control time at end) specifies the zero-speed output time when the running curve ends.

F8-11 (Brake apply delay) specifies the time from the moment when the system sends the brake apply command to the moment when the brake is completely applied, during which the system retains the zero-speed torque current output.

The release time of the brakes varies according to the types and the response time of the brakes is greatly influenced by the ambient temperature. A 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 the values of F3-15 and F8-11 to check whether the brake release time influences the riding comfort.

Function Code	Parameter Name	Setting Range	Default	Remarks
F8-01	Pre-torque selection	0: Pre-torque invalid 1: Load cell pre-torque compensation 2: Automatic pre-torque compensation	0	Set this parameter based on actual requirement.
F2-11	Zero servo current coefficient	0.20%–50.0%	15.0%	These are zero-servo regulating parameters when F8-01 is set to 2 (Automatic pre-torque compensation).
F2-12	Zero servo speed loop KP	0.00–2.00	0.50	
F2-13	Zero servo speed loop KI	0.00–2.00	0.60	

When F8-01 is set to 2 (Automatic pre-torque compensation), the system automatically adjusts the compensated torque at startup.

a. Gradually increase F2-11 (Zero servo current coefficient) until that the rollback is cancelled at brake release and the motor does not vibrate.

b. Decrease the value of F2-11 (Zero servo current coefficient) if the motor jitters when F2-13 (Zero servo speed loop TI) is less than 1.00.

c. Motor vibration and acoustic noise indicate excessive value of F2-12 (Zero servo speed loop KP). Decrease the default value of F2-12.

d. If the motor noise is large at no-load-cell startup, decrease the value of F2-12 or F2-13.

Function Code	Parameter Name	Setting Range	Default	Remarks
F8-02	Pre-torque offset	0.0%–100.0%	50.0%	These are pre-torque regulating parameters.
F8-03	Drive gain	0.00–2.00	0.60	
F8-04	Brake gain	0.00–2.00	0.60	

When F8-01 is set to 1 (Load cell pre-torque compensation), the system with a load cell pre-outputs the torque matched the load to ensure the riding comfort of the elevator.

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

F8-02 (Pre-torque offset) is actually the elevator balance coefficient, namely, the percentage of the car load to the rated load when the car and counterweight are balanced.

F8-03 (Drive gain) or F8-04 (Brake gain) scales the elevator's present 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 pro-torque compensation is higher. The controller identifies the braking or driving state according to the load cell 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. The method of adjusting the startup is as follows:

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

■ Mechanical Construction

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

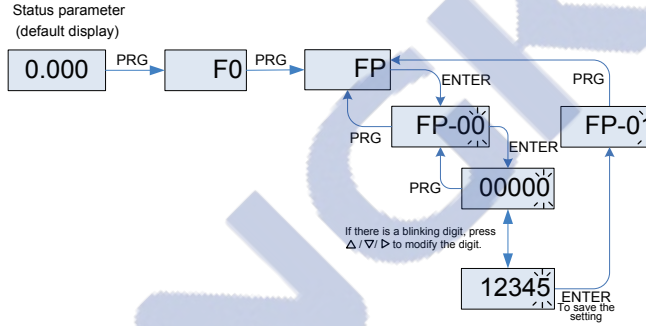
1. Installation of the guide rail mainly involves the verticality and surface flatness of the guide rail, smoothness of the guide rail connection and parallelism between two guide rails (including guide rails on the counterweight side).
2. Tightness of the guide shoes (including the one on the counterweight 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. Large 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 during running may be influenced if the brake arm is installed too tightly or released incompletely.
5. If the car weight is unbalanced, it will cause uneven stress of the guide shoes that connect the car and the guide rail. As a result, the guide shoes 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 that the oscillation is caused by resonance, reduce the resonance by increasing or decreasing the car weight or counterweight and adding resonance absorbers at connections of the components (for example, place rubber blanket under the motor).

5.1.6 Password Setting

The NICE1000^{new} provides the parameter password protection function. Here gives an example of changing the password into 12345 (⁘ indicates the blinking digit), as shown in the following figure.

Figure 5-6 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.
- For factory parameters (group FF), you also need to enter the factory password.
- Do not try to modify the factory parameters. If these parameters are set improperly, the system may be unstable or abnormal.
- In the password protection unlocked state, 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.
- Remember the password you set. Otherwise, the system cannot be unlocked.

5.2 System Application

5.2.1 Emergency Evacuation at Power Failure

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

The emergency evacuation function is implemented in the following two modes:

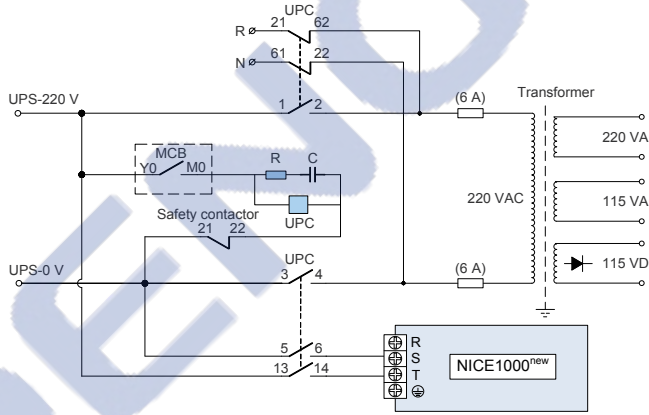
- Uninterrupted power supply (UPS)
- Emergency automatic rescue device (ARD) power supply
- Shorting PMSM stator

The three modes are described in detailed in the following part.

■ **Emergency 220 V UPS**

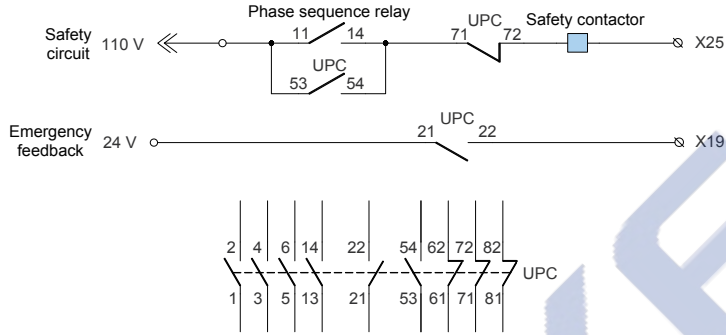
In this scheme, the 220 V UPS provides power supply to the main unit and the drive control circuit. The following figure shows the emergency 220 V UPS circuit.

Figure 5-7 Emergency 220 V UPS circuit



The following figure shows various contacts of the contactors.

Figure 5-8 Various contacts of the contactors



The UPS power is recommended in the following table.

Table 5-3 Recommended UPS power for each power class

UPS Power	Controller Power
1 kVA (700–800 W)	P ≤ 5.5 kW
2 kVA (1400–1600 W)	5.5 kW < P ≤ 11 kW
3 kVA (2100–2400 W)	15 kW ≤ P ≤ 22 kW

The following table lists the setting of the related parameters.

Table 5-4 Parameter setting under the 220 V UPS scheme

Function Code	Parameter Name	Setting
F6-72	Emergency evacuation switching speed	0.010–0.630 m/s
F6-73	Evacuation parking floor	0 to F6-01
F8-09	Emergency evacuation operation speed at power failure	0.000 to F3-11
F3-18	Emergency evacuation acceleration rate	0.100–1.300 m/s^2
F8-10	Emergency evacuation operation mode at power failure	0: Invalid 1: UPS 2: 48 V battery power supply
F5-19 (X19)	X19 function selection	33 (UPS valid signal)
F7-00 (Y0)	Y0 function selection	32 (Emergency evacuation at power failure)

■ Emergency ARD Power Supply

The ARD is a emergency evacuation device with the self recognition and control functions. It is connected between the mains supply and the elevator control cabinet. When the mains supply is normal, it supplies power to the elevator. When the mains supply is interrupted, the ARD supplies power to the main circuit and control circuit.

The following figure shows the schematic diagram.

Figure 5-9 Three-phase emergency ARD power supply

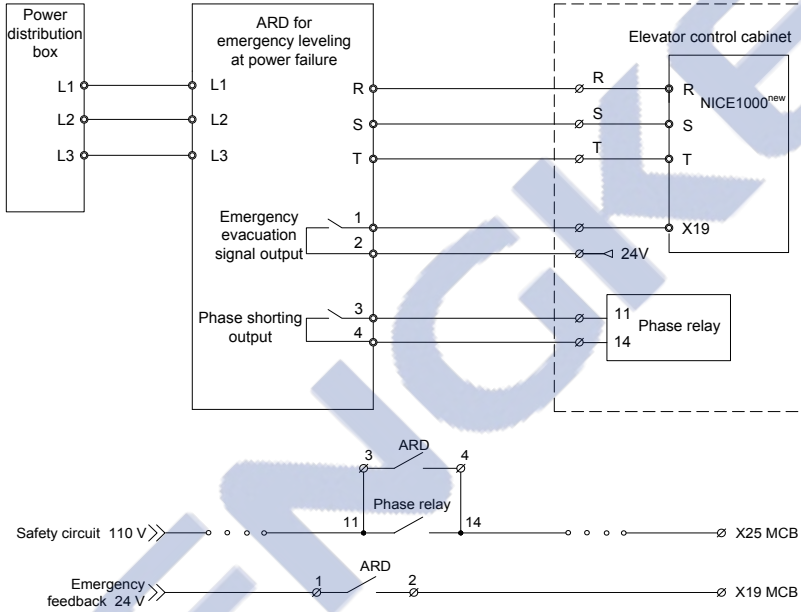
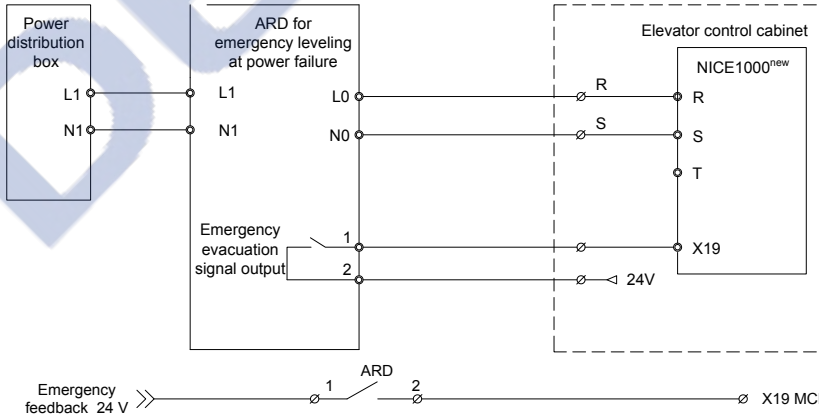


Figure 5-10 Single-phase emergency ARD power supply



The related configuration and description is as follows:

Select the ARD with the nominal output power equal to or larger than the rated motor power.

The 380V ARD outputs the single-phase emergency voltage between the R and T phases to the control cabinet. Note that for ARDs of other brands, the phases that output the emergency voltage may be different.

Table 5-5 Parameter setting under the ARD scheme

Function Code	Parameter Name	Setting Range
F6-72	Emergency evacuation switching speed	0.010–0.630 m/s
F6-73	Evacuation parking floor	0 to F6-01
F8-09	Emergency evacuation operation speed at power failure	0.000 to F3-11
F3-18	Emergency evacuation acceleration rate	0.100–1.300 m/s^2
F8-10	Emergency evacuation operation mode at power failure	0: Invalid 1: UPS 2: 48 V battery power supply
F5-19 (X19)	X19 function selection	33 (UPS valid signal)

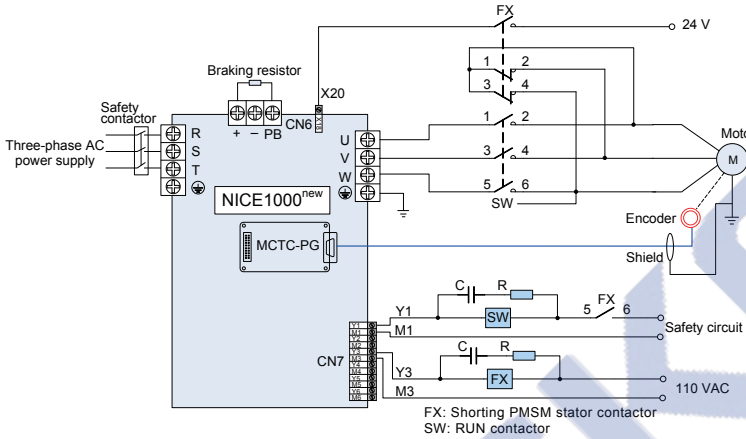
■ **Shorting PMSM Stator**

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 phases to achieve the effect. It is feasible in theory but may cause overcurrent actually. Due to poor quality of the contactor and 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 overcurrent fault and may damage the controller or motor.

Inovance's shorting PMSM stator scheme requires installation of an independent contactor for shorting PMSM stator. The shorting PMSM stator function is implemented via the NC contact of the relay. 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 5-11 Wiring of the independent shorting PMSM stator contactor



The parameter setting in such wiring mode is described in the following table.

Table 5-6 Parameter setting under the shorting PMSM stator scheme

Function Code	Parameter Name	Value	Description
F5-20	X20 function selection	7	Allocate X20 with the input "Shorting PMSM stator feedback".
F7-03	Y3 function selection	05	Allocate Y3 with "Shorting PMSM stator contactor".
FE-14	Elevator function selection 2	-	Bit10 = 0: NC output contactor Bit10 = 1: NO output contactor

More details on the emergency evacuation setting are provided in F6-69, as listed in the following table.

Table 5-7 Parameter description of F6-69

Bit	Function Description	Binary Setting							Remarks
Bit0	Direction determine mode	0	Automatically calculating the direction	0	Load direction determining (based on load cell data or half-load signal)	1	Direction of nearest landing floor		If the torque direction is automatically calculated, the no-load-cell function must be enabled, that is, F8-01 is set to 2.
Bit1		0		1		0			
Bit2	Stop position	1	Stop at the base floor						-
		0	Stop at nearest landing floor						-

Bit	Function Description	Binary Setting		Remarks
Bit4	Startup compensation	1	Startup torque compensation valid in emergency evacuation running	When it is set that the torque direction is automatically calculated, enable automatic startup torque compensation.
Bit8	Emergency evacuation running time protection	1	If the elevator does not arrive at the required floor after 50s emergency evacuation running time, Err33 is reported.	This function is invalid when the function of switching over shorting stator braking mode to controller drive is used.
Bit10	Emergency buzzer output	1	The buzzer output is active during UPS emergency evacuation running.	-
Bit12	Shorting stator braking mode switched over to controller drive	1	Enable the function of switching over the shorting stator braking mode to controller drive.	-
Bit13	Mode of shorting stator braking mode switched over to controller drive	1	Speed setting	If the speed is still lower than the value set in F6-72 after the elevator is in shorting stator braking mode for 10s, the controller starts to drive the elevator.
		0	Time setting	If the time of the shorting stator braking mode exceeds the time set in F6-75, the controller starts to drive the elevator.
Bit14	Emergency evacuation exit mode	1	Exit at door close limit	-
		0	Exit at door open limit	-
Bit15	Function selection of shorting stator braking mode	1	Enable this function.	When this function is enabled, the setting of related function codes becomes effective.

5.2.2 Parallel Control of Two Elevators

The NICE1000^{new} supports parallel control of two elevators, which is implemented by using the CANbus communication port for information exchange and processing between the two elevators, improving elevator use efficiency.

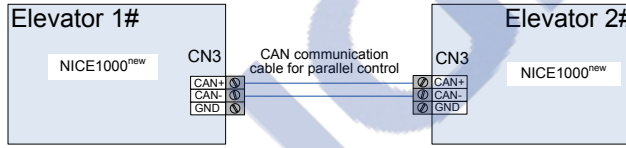
■ **Parameter Setting**

Function Code	Parameter Name	Setting Range	Setting in Parallel Control
Fd-03	Number of elevators in parallel control mode	1–2	2
Fd-04	Elevator No.	1–2	Master elevator: 1 Slave elevator: 2

■ **Wiring for Parallel Control Communication**

Connect the CN3 terminals of the controllers for the two elevators, as shown in the following figure.

Figure 5-12 Wiring for parallel control communication



■ **Function Description**

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

If the floor structures of two elevators are different, the physical floor numbers should start with the floor with the lowest 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 plate should be installed there. You can make the elevator not stop at the floor by setting service floors.

When two elevators are in parallel mode, the hall call and car call wiring and setting should be performed according to physical floors. Parallel running can be implemented only when the hall call and car call setting for one elevator is the same as that for the other elevator in terms of the same floor.

Note

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

Assume that there are two elevators in parallel mode. 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 according to the following table.

Table 5-8 Parameter and address setting of two elevators

		Elevator 1		Elevator 2	
Number of elevators in parallel mode (Fd-03)		2		2	
Elevator No. (Fd-04)		1		2	
Actual floor	Physical floor	Hall call input	Hall call display	Hall call input	Hall call display
B1	1	Terminal L floor 1	FE-01 = 1101	-	-
1	2	Terminal L floor 2	FE-02 = 1901	Terminal L floor 2	FE-02 = 1901
2	3	Terminal L floor 3	FE-03 = 1902	Non-stop floor but leveling plate required	FE-03 = 1902
3	4	Terminal L floor 4	FE-04 = 1903	Terminal L floor 4	FE-04 = 1903
4	5	-	-	Terminal L floor 5	FE-05 = 1904
Bottom floor (F6-01)		1		2	
Top floor (F6-00)		4		5	
Service floor (F6-05)		65535		65531 (not stop at physical floor 3)	

5.2.3 Opposite Door Control

The NICE1000^{new} supports four opposite door control modes: mode 1, mode 2, mode 3, and mode 4, as described in the following table.

Table 5-9 Opposite door control modes and parameter setting

Opposite Door Control Mode	Mode Description	Function Description	Supported Floors
Mode 1: Fb-01 = 0	Simultaneous control	The front door and back door acts simultaneously upon arrival for hall calls and car calls.	≤ 8 (standard) ≤ 16 (after extension)
Mode 2: Fb-01 = 1	Hall call independent, car call simultaneous	The corresponding door opens upon arrival for hall calls from this door. The front door and back door act simultaneously upon arrival for car calls.	≤ 4 (standard) ≤ 8 (after extension)

Opposite Door Control Mode	Mode Description	Function Description	Supported Floors
Mode 3: Fb-01 = 2	Hall call independent, car call manual control	Two methods are available to enable mode 3. Method 1: F6-64 Bit4 (Opening only one door of opposite doors under manual control = 1, DI with function 46 "Single/ Double door selection" inactive in this case. A. The front door opens upon arrival for hall calls from the front door, and the back door opens upon arrival for hall calls from the back door. B. By default, the front door opens upon arrival for car calls. If the DI with function 31 "Door 2 selection signal" is active , the back door opens upon arrival for car calls. Method 2: using DI with function 46 "Single/Double door selection" (F6-64 Bit4 = 0) A. DI inactive (sing door control): same as method 1 B. DI active (double door control): same as mode 2	≤ 4 (standard) ≤ 8 (after extension)
Mode 4: Fb-01 = 3	Hall call independent, car call independent	The corresponding door opens upon arrival for halls call and car calls from this door.	≤ 4 (standard) ≤ 8 (after extension)

Note

- In the fire emergency and elevator lock state, the opposite door is under simultaneous control rather than independent control.
- In any mode, if the door machine controller does not work at a certain floor , the door does not open after arrival of the elevator.
- In any mode, if the door machine controllers of both the front and back doors work but "Back door forbidden input" is active, the back door does not open.
- In any mode, when any door close button input in the car is active, both the front door and back door close.
- "Single/Double door selection input" is valid only in mode 3, and the elevator is in double door service state. Otherwise, the elevator is in single door service state.

6

Function Code Table

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Chapter 6 Function Code Table

6.1 Function Code Description

1. There are a total of 17 function code groups, each of which includes several function codes. The function codes adopt the three-level menu. The function code group number is Level-I menu; the function code number is Level-II menu; the function code setting is Level-III menu.
2. The meaning of each column in the function code table is as follows:

Function Code	Indicates the function code number.
Parameter Name	Indicates the parameter name of the function code.
Setting Range	Indicates the setting range of the parameter.
Default	Indicates the default setting of the parameter at factory.
Unit	Indicates the measurement unit of the parameter.
Property	Indicates whether the parameter can be modified (including the modification conditions)

The modification property of the parameters includes three types, described as follows:

" ☆ ": The parameter can be modified when the controller is in either stop or running state.

" ★ ": The parameter cannot be modified when the controller is in the running state.

" ● ": The parameter is the actually measured value and cannot be modified.

The system automatically restricts the modification property of all parameters to prevent mal-function.

6.2 Function Code Groups

On the operation panel, press PRG and then △ or ▽, and you can view the function code groups. The function code groups are classified as follows:

F0	Basic parameters	F9	Time parameters
F1	Motor parameters	FA	Keypad setting parameters
F2	Vector control parameters	Fb	Door function parameters
F3	Running control parameters	FC	Protection function parameters
F4	Floor parameters	Fd	Communication parameters
F5	Input terminal parameters	FE	Elevator function parameters

F6	Basic elevator parameters	FF	Factory parameters
F7	Output terminal parameters	FP	User parameters
F8	Enhanced function parameters	Fr	Leveling adjustment parameters

6.3 Function Code Table

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Group F0: Basic Parameters					
F0-00	Control mode	0: Sensorless vector control (SVC) 1: Closed-loop vector control (CLVC) 2: Voltage/Frequency (V/F) control	1	-	★
F0-01	Command source selection	0: Operation panel control 1: Distance control	1	-	★
F0-02	Running speed under operation panel control	0.050 to F0-04	0.050	m/s	☆
F0-03	Maximum running speed	0.250 to F0-04	0.480	m/s	★
F0-04	Rated elevator speed	0.200–1.750	0.500	m/s	★
F0-05	Maximum frequency	F1-04 to 99.00	50.00	Hz	★
F0-06	Carrier frequency	0.5–16.0	6.0	kHz	★
Group F1: Motor Parameters					
F1-00	Encoder type	0: SIN/COS encoder, absolute encoder 1: UVW encoder 2: AB incremental encoder (for asynchronous motor)	0	-	★
F1-01	Rated motor power	0.7–75.0	Model dependent	kW	★
F1-02	Rated motor voltage	0–440	Model dependent	V	★
F1-03	Rated motor current	0.00–655.00	Model dependent	A	★
F1-04	Rated motor frequency	0.00–99.00	Model dependent	Hz	★
F1-05	Rated motor rotational speed	0–3000	Model dependent	RPM	★
F1-06	Encoder initial angle (synchronous motor)	0.0–359.9	0	Degree (°)	★

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F1-07	Encoder angle at power-off (synchronous motor)	0.0–359.9	0	Degree (°)	★
F1-08	Synchronous motor wiring mode	0–15	0	-	★
F1-09	Current filter time (synchronous motor)	0–3	0	-	★
F1-10	Encoder verification selection	0–65535	0	-	★
F1-11	Auto-tuning mode	0: No operation 1: With-load auto-tuning 2: No-load auto-tuning 3: Shaft auto-tuning 1 4: Shaft auto-tuning 2	0	-	★
F1-12	Encoder pulses per revolution	0–10000	1024	PPR	★
F1-13	Encoder wire-breaking detection time	0–10.0 (Detection disabled when value smaller than 0.5s)	1.0	s	★
F1-14	Stator resistance (asynchronous motor)	0.000–30.000	Model dependent	Ω	★
F1-15	Rotor resistance (asynchronous motor)	0.000–30.000	Model dependent	Ω	★
F1-16	Leakage inductance (asynchronous motor)	0.00–300.00	Model dependent	mH	★
F1-17	Mutual inductance (asynchronous motor)	0.1–3000.0	Model dependent	mH	★
F1-18	Magnetizing current (asynchronous motor)	0.01–300.00	Model dependent	A	★
F1-19	Shaft Q inductance (torque)	0.00–650.00	3.00	mH	★
F1-20	Shaft D inductance (excitation)	0.00–650.00	3.00	mH	★
F1-21	Back EMF	0–65535	0	-	★
F1-25	Motor type	0: Asynchronous motor 1: Synchronous motor	1	-	★

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Group F2: Vector Control Parameters					
F2-00	Speed loop proportional gain KP1	0–100	40	-	★
F2-01	Speed loop integral time TI1	0.01–10.00	0.60	s	★
F2-02	Switchover frequency 1	0.00 to F2-05	2.00	Hz	★
F2-03	Speed loop proportional gain KP2	0–100	35	-	★
F2-04	Speed loop integral time TI2	0.01–10.00	0.80	s	★
F2-05	Switchover frequency 2	F2-02 to F0-05	5.00	Hz	★
F2-06	Current loop KP1 (torque)	10–500	60	%	★
F2-07	Current loop KI1 (torque)	10–500	30	%	★
F2-08	Torque upper limit	0.0–200.0	150.0	%	★
F2-10	Elevator running direction	0: Direction unchanged 1: Direction reversed	0	-	★
F2-11	Zero servo current coefficient	0.20–50.0	15	%	★
F2-12	Zero servo speed loop KP	0.00–2.00	0.5	-	★
F2-13	Zero servo speed loop KI	0.00–2.00	0.6	-	★
F2-16	Torque acceleration time	1–500	1	ms	★
F2-17	Torque deceleration time	1–500	350	ms	★
F2-18	Startup acceleration time	0.000–1.500	0.000	s	★
Group F3: Running Control Parameter					
F3-00	Startup speed	0.000–0.030	0.000	m/s	★
F3-01	Startup holding time	0.000–0.500	0.000	s	★
F3-02	Acceleration rate	0.200–0.800	0.300	m/s^2	★
F3-03	Acceleration start jerk time	0.300–4.000	2.500	s	★
F3-04	Acceleration end jerk time	0.300–4.000	2.500	s	★

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F3-05	Deceleration rate	0.200–0.800	0.300	m/s^2	★
F3-06	Deceleration end jerk time	0.300–4.000	2.500	s	★
F3-07	Deceleration start jerk time	0.300–4.000	2.500	s	★
F3-08	Special deceleration rate	0.200–2.000	0.500	m/s^2	★
F3-09	Pre-deceleration distance	0–90.0	0.0	mm	★
F3-10	Re-leveling speed	0.000–0.080	0.040	m/s	★
F3-11	Inspection speed	0.100–0.500	0.250	m/s	★
F3-12	Position of up slow-down	0.000–300.00	0.00	m	★
F3-13	Position of down slow-down	0.000–300.00	0.00	m	★
F3-14	Zero-speed control time at startup	0.000–1.000	0.200	s	★
F3-15	Brake release delay	0.000–2.000	0.600	s	★
F3-16	Zero-speed control time at end	0.000–1.000	0.300	s	★
F3-17	Low-speed re-leveling speed	0.080 to F3-11	0.100	m/s	★
F3-18	Acceleration rate at emergency evacuation	0.100–1.300	0.300	m/s^2	★
Group F4: Floor Parameters					
F4-00	Leveling adjustment	0–60	30	mm	★
F4-01	Current floor	F6-01 to F6-00	1	-	★
F4-02	High byte of current floor position	0–65535	1	Pulses	●
F4-03	Low byte of current floor position	0–65535	34464	Pulses	●
F4-04	Length 1 of leveling plate	0–65535	0	Pulses	★
F4-05	Length 2 of leveling plate	0–65535	0	Pulses	★
F4-06	High byte of floor height 1	0–65535	0	Pulses	★
F4-07	Low byte of floor height 1	0–65535	0	Pulses	★
F4-08	High byte of floor height 2	0–65535	0	Pulses	★

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F4-09	Low byte of floor height 2	0–65535	0	Pulses	★
F4-10	High byte of floor height 3	0–65535	0	Pulses	★
F4-11	Low byte of floor height 3	0–65535	0	Pulses	★
F4-12	High byte of floor height 4	0–65535	0	Pulses	★
F4-13	Low byte of floor height 4	0–65535	0	Pulses	★
F4-14	High byte of floor height 5	0–65535	0	Pulses	★
F4-15	Low byte of floor height 5	0–65535	0	Pulses	★
F4-16	High byte of floor height 6	0–65535	0	Pulses	★
F4-17	Low byte of floor height 6	0–65535	0	Pulses	★
F4-18	High byte of floor height 7	0–65535	0	Pulses	★
F4-19	Low byte of floor height 7	0–65535	0	Pulses	★
F4-20	High byte of floor height 8	0–65535	0	Pulses	★
F4-21	Low byte of floor height 8	0–65535	0	Pulses	★
F4-22	High byte of floor height 9	0–65535	0	Pulses	★
F4-23	Low byte of floor height 9	0–65535	0	Pulses	★
F4-24	High byte of floor height 10	0–65535	0	Pulses	★
F4-25	Low byte of floor height 10	0–65535	0	Pulses	★
F4-26	High byte of floor height 11	0–65535	0	Pulses	★
F4-27	Low byte of floor height 11	0–65535	0	Pulses	★
F4-28	High byte of floor height 12	0–65535	0	Pulses	★
F4-29	Low byte of floor height 12	0–65535	0	Pulses	★

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F4-30	High byte of floor height 13	0–65535	0	Pulses	★
F4-31	Low byte of floor height 13	0–65535	0	Pulses	★
F4-32	High byte of floor height 14	0–65535	0	Pulses	★
F4-33	Low byte of floor height 14	0–65535	0	Pulses	★
F4-34	High byte of floor height 15	0–65535	0	Pulses	★
F4-35	Low byte of floor height 15	0–65535	0	Pulses	★
Group F5: Input Terminal Parameters					
F5-00	Attendant/Automatic switchover time	3–200	3	s	★
F5-01	X1 function selection	1–99: NO input, 101–199: NC input 00: Invalid 01: Leveling 1 signal 02: Leveling 2 signal 03: Door zone signal 04: RUN contactor feedback signal 05: Brake travel switch feedback signal 1 06: Brake travel switch feedback signal 1 07: Shorting PMSM stator contactor feedback signal 08: Shorting door lock circuit contactor feedback 09: Inspection signal 10: Inspection up signal 11: Inspection down signal 12: First fire emergency signal (To be continued)	03	-	★
F5-02	X2 function selection		104	-	★
F5-03	X3 function selection		105	-	★
F5-04	X4 function selection		109	-	★
F5-05	X5 function selection		10	-	★
F5-06	X6 function selection		11	-	★

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F5-07	X7 function selection	13: Reserved 14: Elevator lock signal 15: Up limit signal 16: Down limit signal 17: Up slow-down signal 18: Down slow-down signal 19: Overload signal 20: Full-load signal 21: Emergency stop (safety feedback) signal 22: Door 1 open limit signal 23: Door 2 open limit signal 24: Door 1 close limit signal 25: Door 2 close limit signal 26: Door machine 1 light curtain signal 27: Door machine 2 light curtain signal 28: Attendant signal 29: Direct travel ride signal 30: Direction change signal 31: Independent running signal 31: Door 2 selection signal 33: UPS valid signal 34: Door open button 35: Door close button 36: Safety circuit 37: Door lock circuit 1 38: Door lock circuit 2 39: Half-load signal 40: Motor overheat signal 41: Door machine 1 safety edge signal 42: Door machine 2 safety edge signal 43: Earthquake signal 44: Back door forbidden signal (To be continued)	12	-	★
F5-08	X8 function selection		14	-	★
F5-09	X9 function selection		115	-	★
F5-10	X10 function selection		116	-	★
F5-11	X11 function selection		117	-	★
F5-12	X12 function selection		118	-	★
F5-13	X13 function selection		119	-	★
F5-14	X14 function selection		22	-	★
F5-15	X15 function selection		126	-	★
F5-16	X16 function selection		28	-	★
F5-17	X17 function selection		30	-	★
F5-18	X18 function selection		124	-	★
F5-19	X19 function selection		00	-	★
F5-20	X20 function selection		00	-	★

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F5-21	X21 function selection	45: Light-load signal 46: Single/Double door selection	00	-	★
F5-22	X22 function selection	47: Fire emergency floor switchover signal 48: Virtual floor input	00	-	★
F5-23	X23 function selection	49: Firefighter switch signal 50: Brake travel switch feedback signal 1	00	-	★
F5-24	X24 function selection	51–99: Reserved (End)	00	-	★
F5-25	X25 higher-voltage input function selection	00–99	01	-	★
F5-26	X26 higher-voltage input function selection		02	-	★
F5-27	X27 higher-voltage input function selection		03	-	★
F5-28	Terminal state display 1	-	-	-	●
F5-29	Terminal state display 2	-	-	-	●
F5-30	Floor I/O terminal state display 1	-	-	-	●
F5-31	Floor I/O button state display 2	-	-	-	●
Group F6: Basic Elevator Parameters					
F6-00	Top floor of the elevator	F6-01 to 16	5	-	★
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 1	F6-01 to F6-00	1	-	★
F6-04	Elevator lock floor	F6-01 to F6-00	1	-	★
F6-05	Service floors	0–65535 0: Not respond 1: Respond	65535	-	★
F6-06	Elevator function control 1	0–65535	0	-	★
F6-07	Elevator function control 2	0–65535	0	-	★
F6-08	Arrow blinking interval	0–5.0	1	-	★

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-09	Random test times	0–60000	0	-	★
F6-10	Test function selection	Bit0: Hall call forbidden Bit1: Door open forbidden Bit2: Overload forbidden Bit3: Limit forbidden	0	-	★
F6-11	L1 function selection	00: Invalid 200–399	201	-	★
F6-12	L2 function selection		202	-	★
F6-13	L3 function selection		203	-	★
F6-14	L4 function selection		00	-	★
F6-15	L5 function selection		211	-	★
F6-16	L6 function selection		212	-	★
F6-17	L7 function selection		213	-	★
F6-18	L8 function selection		214	-	★
F6-19	L9 function selection		215	-	★
F6-20	L10 function selection		00	-	★
F6-21	L11 function selection		00	-	★
F6-22	L12 function selection		00	-	★
F6-23	L13 function selection		231	-	★
F6-24	L14 function selection		232	-	★
F6-25	L15 function selection		233	-	★
F6-26	L16 function selection		234	-	★
F6-27	L17 function selection		252	-	★
F6-28	L18 function selection		253	-	★
F6-29	L19 function selection		254	-	★
F6-30	L20 function selection		255	-	★
F6-31	L21 function selection		00	-	★
F6-32	L22 function selection		00	-	★
F6-33	L23 function selection		00	-	★
F6-34	L24 function selection		00	-	★
F6-35	L25 function selection		00	-	★
F6-36	L26 function selection		00	-	★
F6-37	L27 function selection		00	-	★
F6-38	L28 function selection		00	-	★
F6-39	L29 function selection		00	-	★
F6-40	L30 function selection		00	-	★
F6-41	L31 function selection		00	-	★

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-42	L32 function selection	00: Invalid 200–399	00	-	★
F6-43	L33 function selection		00	-	★
F6-44	L34 function selection		00	-	★
F6-45	L35 function selection		00	-	★
F6-46	L36 function selection		00	-	★
F6-47	L37 function selection		00	-	★
F6-48	L38 function selection		00	-	★
F6-49	L39 function selection		00	-	★
F6-50	L40 function selection		00	-	★
F6-51	L41 function selection		00	-	★
F6-52	L42 function selection		00	-	★
F6-53	L43 function selection		00	-	★
F6-54	L44 function selection		00	-	★
F6-55	L45 function selection		00	-	★
F6-56	L46 function selection		00	-	★
F6-57	L47 function selection		00	-	★
F6-58	L48 function selection		00	-	★
F6-59	L49 function selection		00	-	★
F6-60	L50 function selection		00	-	★
F6-61	Leveling sensor delay	10–50	14	ms	★
F6-62	Time interval of random running	0–1000	3	s	☆
F6-63	Reserved	-	-	-	-
F6-64	Program control selection 1	0–65535	0	-	★
F6-65	Program control selection 2	0–65535	0	-	★
F6-66	Program control selection 3	0–65535	0	-	★
F6-67	Attendant function selection	0–65535	128	-	★
F6-68	Fire emergency function selection	0–65535	16456	-	★
F6-69	Emergency evacuation function selection	0–65535	0	-	★
F6-71	Reserved	-	-	-	-

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-72	Emergency evacuation switching speed	0.010–0.630	0.010	m/s	★
F6-73	Evacuation parking floor	0 to F6-00	0	-	★
F6-74	Blinking advance time	0.0–15.0	1	s	☆
F6-75	Waiting time for switchover from shorting stator braking mode to controller drive	0.0–45.0	20.0	s	☆
Group F7: Output Terminal Parameters					
F7-00	Y0 function selection	Y0 designated for function 32 "emergency evacuation at power failure"	00	-	★
F7-01	Y1 function selection	Range: 00–05 or 32 00: Invalid 01: RUN contactor output	01	-	★
F7-02	Y2 function selection	02: Brake contactor control 03: Higher-voltage startup of brake	02	-	★
F7-03	Y3 function selection	04: Lamp/Fan running 05: Shorting PMSM stator contactor	04	-	★
F7-04	Y4 function selection	06–99 00: Invalid	00	-	★
F7-05	Y5 function selection	06: Door 1 open output 07: Door 1 close output	00	-	★
F7-06	Y6 function selection	08: Door 2 open output 09: Door 2 close output 10: Low 7-segment a display output	06	-	★
F7-07	Y7 function selection	11: Low 7-segment b display output 12: Low 7-segment c display output	07	-	★
F7-08	Y8 function selection	13: Low 7-segment d display output (To be continued)	08	-	★

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F7-09	Y9 function selection	14: Low 7-segment e display output 15: Low 7-segment f display output 16: Low 7-segment g display output 17: Up arrow display output 18: Down arrow output 19: Minus sign display output 20: Returning to base floor at fire emergency 21: Buzzer output 22: Overload output 23: Arrival gong output 24: Full-load output 25: Inspection output 26: Fan/Lamp output 2 27: Shorting door lock circuit contactor output 28: BCD/Gray code/7-segment high-bit output 29: Controller normal running output 30: Electric lock output 31: Reserved 32: Emergency evacuation at power failure 33: Forced door close 1 34: Forced door close 2 35: Faulty state 36: Up signal 37: Medical sterilization output 38: Non-door zone stop output 39: Non-service state output 40: Reserved 41: High 7-segment a display output 42: High 7-segment b display output (To be continued)	09	-	★
F7-10	Y10 function selection		10	-	★
F7-11	Y11 function selection		11	-	★
F7-12	Y12 function selection		12	-	★
F7-13	Y13 function selection		13	-	★
F7-14	Y14 function selection		00	-	★
F7-15	Y15 function selection		00	-	★
F7-16	Y16 function selection		25	-	★
F7-17	Y17 function selection		17	-	★
F7-18	Y18 function selection		18	-	★
F7-19	Y19 function selection		19	-	★
F7-20	Y20 function selection		20	-	★
F7-21	Y21 function selection		21	-	★
F7-22	Y22 function selection		22	-	★
F7-23	Y23 function selection		00	-	★

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F7-24	Y24 function selection	43: High 7-segment c display output 44: High 7-segment d display output 45: High 7-segment e display output 46: High 7-segment f display output 47: High 7-segment g display output 48–99: Reserved (End)	00	-	★
F7-25	Y25 function selection		00	-	★
F7-26	Y26 function selection		00	-	★
F7-27	Y27 function selection		00	-	★
Group F8: Enhanced Function Parameters					
F8-00	Load for 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	%	★
F8-03	Drive gain	0.00–2.00	0.60	-	★
F8-04	Brake gain	0.00–2.00	0.60	-	★
F8-05	Current car load	0–255	0	-	●
F8-06	Car no-load load	0–255	0	-	★
F8-07	Car full-load load	0–255	100	-	★
F8-08	Load cell input selection	0: MCB digital sampling 1: MCB analog sampling	0	-	☆
F8-09	Emergency evacuation operation speed at power failure	0.000 to F3-11	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	Brake apply delay	0.200–1.500	0.200	s	★
F8-12	Fire emergency floor 2	0 to F6-00	0	-	★

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F8-13	Anti-nuisance function	Bit0: Disabled Bit1: Judged by light curtain Bit 2: Judged by light-load signal	0	-	☆
Group F9: Time Parameters					
F9-00	Idle time before returning to base floor	1–240 0: Invalid	10	min	☆
F9-01	Time for fan and lamp to be turned off	1–240 0: Fan and lamp always ON	2	min	☆
F9-02	Motor running time limit	0–45 Invalid if smaller than 3s	45	s	★
F9-03	Accumulative running time	0–65535	0	h	●
F9-04	Reserved	-	-	-	
F9-05	High byte of running times	0–9999 1 indicating actual running times 10000	0	-	●
F9-06	Low byte or running times	0–9999	0	-	●
Group FA: Keypad Setting Parameters					
FA-00	Reserved	-	-	-	
FA-01	Display in running state	1–65535	65535	-	☆
FA-02	Display in stop state	1–65535	65535	-	☆
FA-03	Current encoder angle	0.0–359.9	0.0	Degree (°)	●
FA-04	Reserved	-	-	-	-
FA-05	Control board software (ZK)	0–65535	0	-	●
FA-06	Drive board software (DSP)	0–65535	0	-	●
FA-06	Heatsink temperature	0–100	0	°C	●
FA-08	Controller model	-	1000	-	●
FA-09	Reserved	-	-	-	-
FA-10	Reserved	-	-	-	-
FA-11	Pre-torque current	0.0–200.0	0	%	●
FA-12	Logic information	0–65535	0	-	●
FA-13	Curve information	0–65535	0	-	●
FA-14	Set speed	0.000–4.000	0	m/s	●

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FA-15	Feedback speed	0.000–4.000	0	m/s	●
FA-16	Bus voltage	0–999.9	0	V	●
FA-17	Present position	0.00–300.0	0	m	●
FA-18	Output current	0.0–999.9	0	A	●
FA-19	Output frequency	0.00–99.99	0	Hz	●
FA-20	Torque current	0.0–999.9	0	A	●
FA-21	Output voltage	0–999.9	0	V	●
FA-22	Output torque	0–200.0	0	%	●
FA-23	Output power	0.00–99.99	0	kW	●
FA-24	Communication interference	0–65535	0	-	●
FA-25	Encoder interference	0–65535	0	-	
FA-26	Input state 1	0–65535	0	-	●
FA-27	Input state 2	0–65535	0	-	●
FA-28	Input state 3	0–65535	0	-	●
FA-29	Input state 4	0–65535	0	-	●
FA-30	Input state 5	0–65535	0	-	●
FA-31	Output state 1	0–65535	0	-	●
FA-32	Output state 2	0–65535	0	-	●
FA-33	Output state 3	0–65535	0	-	●
FA-34	Floor I/O state 1	0–65535	0	-	●
FA-35	Floor I/O state 2	0–65535	0	-	●
FA-36	Floor I/O state 3	0–65535	0	-	●
FA-37	Floor I/O state 4	0–65535	0	-	●
FA-38	Floor I/O state 5	0–65535	0	-	●
FA-39	Floor I/O state 6	0–65535	0	-	●
FA-40	Floor I/O state 7	0–65535	0	-	●
FA-41	System state	0–65535	0	-	★
Group Fb: Door Function Parameters					
Fb-00	Number of door machine(s)	1–2	1	-	★
Fb-01	Opposite door control mode	0–3	0	-	●

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fb-02	Service floors of door machine 1	0–65535 0: Forbid door open 1: Allow door open	65535	-	☆
Fb-03	Holding time of manual door open	1–60	10	s	☆
Fb-04	Service floors of door machine 2	0–65535 0: Forbid door open 1: Allow door open Valid only when there are two door machines	65535	-	☆
Fb-05	Delay at stop after re-leveling	0.00–2.00	0	s	★
Fb-06	Door open protection time	5–99	10	s	☆
Fb-07	Program control selection	0–65535 Bit0–Bit4: Reserved Bit5: Synchronous motor current detection Bit6–Bit12: Reserved Bit13: Higher voltage/Lower voltage 1.5s detection	0	-	☆
Fb-08	Door close protection time	5–99	15	s	☆
Fb-09	Door open/close protection times	0–20 0: Invalid	0	-	☆
Fb-10	Door state of standby elevator	0: Closing the door as normal at base floor 1: Waiting with door open at base floor 2: Waiting with door open at each floor	0	-	☆
Fb-11	Door open holding time for hall call	1–1000	5	s	☆
Fb-12	Door open holding time for car call	1–1000	3	s	☆
Fb-13	Door open holding time upon open delay valid	10–1000	30	s	☆
Fb-14	Door open holding time at base floor	1–1000	10	s	☆
Fb-15	Arrival gong output delay	0–1000	0	ms	☆

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fb-16	Door lock waiting time at manual door	0–50	0	s	☆
Fb-17	Holding time for forced door close	5–180	120	s	☆
Group FC: Protection Function Parameters					
FC-00	Program control for protection function	0–65535 Bit0: Short-circuit to ground detection at power-on Bit1: Canceling current detection at inspection startup Bit2: Decelerating to stop at valid light curtain Bit3: Password ineffective if no operation within 30 minutes Bit4–Bit9: Reserved	0	-	★
FC-01	Program control 2 for protection function	0–65535 Bit0: Overload protection Bit1: Canceling protection at output phase loss Bit2: Canceling over-modulation Bit3: Reserved Bit4: Light curtain judgment at door close limit Bit5: Canceling SPI communication judgment Bit7:Reserved Bit8:Reserved Bit9: Canceling Err55 alarm Bit10–Bit13: Reserved Bit14: Canceling protection at input phase loss	1	-	★
FC-02	Overload protection coefficient	0.50–10.00	1.00	-	★
FC-03	Overload pre-warning coefficient	50–100	80	%	★

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FC-04	Designated fault	0–9999 High two digits indicate the floor number and low two digits indicate the fault code. For example, if Err30 occurs at floor 1, "0130" is displayed. 0: No fault 1: Reserved 2: Err02 (Over-current during acceleration) 3: Err03 (Over-current during deceleration) 4: Err04 (Over-current at constant speed) 5: Err05 (Over-voltage during acceleration) 6: Err06 (Over-voltage during deceleration) 7: Err07 (Overvoltage at constant speed) 8: Reserved 9: Err09 (Undervoltage) 10: Err10 (Controller overload) 11: Err11 (Motor overload) 12: Err12 (Power supply phase loss) 13: Err13 (Power output phase loss) 14: Err14 (Module overheat) 15: Err15 (Output abnormal) 16: Err16 (Current control fault) 17: Err17 (Reference signal of the encoder incorrect) 18: Err18 (Current detection fault) 19: Err19 (Motor auto-tuning fault) (To be continued)	0	-	●

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FC-04	Designated fault	20: Err20 (Speed feedback incorrect) 21: Reserved 22: Err22 (Leveling signal abnormal) 23: Reserved 24: Err24 (RTC clock fault) 25: Err25 (Storage data abnormal) 26: Err26 (Earthquake signal) 27, 28: Reserved 29: Err29 (Shorting PMSM stator feedback abnormal) 30: Err30 (Elevator position abnormal) 33: Err33 (Elevator speed abnormal) 34: Err34 (Logic fault) 35: Err35 (Shaft auto-tuning data abnormal) 36: Err36 (RUN contactor feedback abnormal) 37: Err37 (Brake contactor feedback abnormal) 38: Err38 (Encoder signal abnormal) 39: Err39 (Motor overheat) 40: Err40 (Elevator running reached) 41: Err41 (Safety circuit disconnected) 42: Err42 (Door lock disconnected during running) 43: Err43 (Up limit signal abnormal) 44: Err44 (Down limit signal abnormal) 45: Err45 (Slow-down switch position abnormal) (To be continued)	0	-	●

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FC-04	Designated fault	46: Err46 (Re-leveling abnormal) 47: Err47 (Shorting door lock circuit contactor abnormal) 48: Err48 (Door open fault) 49: Err49 (Door close fault) 50: Consecutive loss of leveling signal 53: Err53 (Door lock fault) 54: Err54 (Overcurrent at inspection startup) 55: Err55 (Stop at another landing floor) 57: Err57 (SPI communication abnormal) 58: Err58 (Shaft position switches abnormal) 62: Err62 (Analog input cable broken) (End)	0	-	●
FC-05	Designated fault code (display)	0–9999	0	-	●
FC-06	Designated fault subcode	0–65535	0	-	●
FC-07	Logic information of designated fault	0–65535	0	-	●
FC-08	Curve information of designated fault	0–65535	0	-	●
FC-09	Set speed upon designated fault	0.000–1.750	0	m/s	●
FC-10	Feedback speed upon designated fault	0.000–1.750	0	m/s	●
FC-11	Bus voltage upon designated fault	0.0–999.9	0	V	●
FC-12	Current position upon designated fault	0.0–300.0	0	m	●
FC-13	Output current upon designated fault	0.0–999.9	0	A	●
FC-14	Output frequency upon designated fault	0.00–99.99	0	Hz	●
FC-15	Torque current upon designated fault	0.0–999.9	0	A	●

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FC-16	1st fault code	0–9999	0	-	●
FC-17	1st fault subcode	0–65535	0	-	●
FC-18	2nd fault code	0–9999	0	-	●
FC-19	2nd fault subcode	0–65535	0	-	●
FC-20	3rd fault code	0–9999	0	-	●
FC-21	3rd fault subcode	0–65535	0	-	●
FC-22	4th fault code	0–9999	0	-	●
FC-23	4th fault subcode	0–65535	0	-	●
FC-24	5th fault code	0–9999	0	-	●
FC-25	5th fault subcode	0–65535	0	-	●
FC-26	6th fault code	0–9999	0	-	●
FC-27	6th fault subcode	0–65535	0	-	●
FC-28	7th fault code	0–9999	0	-	●
FC-29	7th fault subcode	0–65535	0	-	●
FC-30	8th fault code	0–9999	0	-	●
FC-31	8th fault subcode	0–65535	0	-	●
FC-32	9th fault code	0–9999	0	-	●
FC-33	9th fault subcode	0–65535	0	-	●
FC-34	10th fault code	0–9999	0	-	●
FC-35	10th fault subcode	0–65535	0	-	●
FC-36	Latest fault code	0–9999	0	-	●
FC-37	Latest fault subcode	0–65535	0	-	●
FC-38	Logic information of latest fault	0–65535	0	-	●
FC-39	Curve information of latest fault	0–65535	0	-	●
FC-40	Set speed upon latest fault	0.000–1.750	0	m/s	●
FC-41	Feedback speed upon latest fault	0.000–1.750	0	m/s	●
FC-42	Bus voltage upon latest fault	0.0–999.9	0	V	●
FC-43	Current position upon latest fault	0.0–300.0	0	m	●
FC-44	Output current upon latest fault	0–999.9	0	A	●
FC-45	Output frequency upon latest fault	0.00–99.99	0	Hz	●

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FC-46	Torque current upon latest fault	0.0–999.9	0	A	●
Group Fd: Communication Parameters					
Fd-00	Local address	0–127 0: Broadcast address	1	-	★
Fd-01	Communication response delay	0–20	10	ms	★
Fd-02	Communication timeout	0.0–60.0 0: Invalid	0.0	s	★
Fd-03	Number of elevators in parallel control mode	1–2	1	-	★
Fd-04	Elevator No.	1–2	1	-	★
Fd-05	Parallel control function selection	Bit0: Dispersed waiting	1	-	★
Group FE: Elevator Function Parameters					
FE-00	Collective selective mode	0: Full collective selective 1: Down collective selective 2: Up collective selective	0	-	☆
FE-01	Floor 1 display	0000–1999 The two high digits indicate the display code of the ten's digit, and the two low digits indicate the display code of the unit's digit. 00: Display "0" 01: Display "1" 02: Display "2" 03: Display "3" 04: Display "4" 05: Display "5" 06: Display "6" 07: Display "7" 08: Display "8" 09: Display "9" 10: Display "A" 11: Reserved 12: Reserved (To be continued)	1901	-	☆
FE-02	Floor 2 display		1902	-	☆
FE-03	Floor 3 display		1903	-	☆
FE-04	Floor 4 display		1904	-	☆
FE-05	Floor 5 display		1905	-	☆
FE-06	Floor 6 display		1906	-	☆

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FE-07	Floor 7 display	13: Display "H" 14: Display "L" 15: Reserved 16: Display "P" 17: Reserved 18: Display "-" 19: No display 23: Display "C" 24: Display "d" 25: Display "E" 26: Display "F" 28: Display "J" 31: Display "o" 35: Display "U" Larger than 35: No display (End)	1907	-	☆
FE-08	Floor 8 display		1908	-	☆
FE-09	Floor 9 display		1909	-	☆
FE-10	Floor 10 display		0100	-	☆
FE-11	Floor 11 display		0101	-	☆
FE-12	Hall call output selection	0: 7-segment code 1: BCD code 2: Gray code 3: Binary code 4: One-to-one output	1	-	☆

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FE-13	Elevator function selection 1	0–65535 If the bit is set to 1, the function expressed is enabled. Bit0: Reserved Bit1: Reserved Bit2: Re-leveling function Bit3: Door pre-open function Bit4: Reserved Bit5: Forced door close Bit6: Door open valid at non-door zone in the inspection state Bit7: Door open and close once after inspection turned to normal Bit8: Reserved Bit9: Independent running Bit10: Reserved Bit11: Door re-open after car call of the present floor Bit12–Bit15: Reserved	0	-	☆
FE-14	Elevator function selection 2	0–65535 If the bit is set to 1, the function expressed is enabled. Bit0: Reserved Bit1: Door open holding at open limit Bit2: Door close command not output upon door close limit Bit3: Manual door Bit4: Auto reset for RUN and brake contactor stuck Bit5: Slow-down switch stuck detection Bit6–Bit9: Reserved Bit10: NO/NC output selection of shorting PMSM stator contactor Bit11: Reserved Bit12: Fan/Lamp output Bit13–Bit15: Reserved	0	-	☆

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FE-15	Floor 12 display	Same as FE-01 to FE-11	0102	-	☆
FE-16	Floor 13 display		0103	-	☆
FE-17	Floor 14 display		0104	-	☆
FE-18	Floor 15 display		0105	-	☆
FE-19	Floor 16 display		0106	-	☆
Fr: Leveling Adjustment Parameters					
Fr-00	Leveling adjustment function	0: Disabled 1: Enabled	0	mm	★
Fr-01	Leveling adjustment record 1	00000–60060	30030	mm	★
Fr-02	Leveling adjustment record 2	00000–60060	30030	mm	★
Fr-03	Leveling adjustment record 3	00000–60060	30030	mm	★
Fr-04	Leveling adjustment record 4	00000–60060	30030	mm	★
Fr-05	Leveling adjustment record 5	00000–60060	30030	mm	★
Fr-06	Leveling adjustment record 6	00000–60060	30030	mm	★
Fr-07	Leveling adjustment record 7	00000–60060	30030	mm	★
Fr-08	Leveling adjustment record 8	00000–60060	30030	mm	★
Group FP: User Parameters					
FP-00	User password	0–65535 00000: no password	0	-	☆
FP-01	Parameter update	0: No operation 1: Restore default settings 2: Clear fault records	0	-	★
FP-02	User-defined parameter display	0: Invalid 1: Valid	0	-	★

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7

Description of Function Codes

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Chapter 7 Description of Function Codes

The modification property of the parameters includes three types, described as follows:

" ☆ ": The parameter can be modified when the controller is in either stop or running state.

" ★ ": The parameter cannot be modified when the controller is in the running state.

"●": The parameter is the actually measured value and cannot be modified.

The system automatically restricts the modification property of all parameters to prevent mal-function.

Group F0: Basic Parameters

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F0-00	Control mode	• 0: Sensorless vector control (SVC) • 1: Closed-loop vector control (CLVC) • 2: Voltage/Frequency (V/F) control	1	-	★

It is used to set the control mode of the system.

- 0: Sensorless vector control (SVC)

  It is applicable to low-speed running during no-load commissioning of the asynchronous motor, fault judgment at inspection, and synchronous motor running on special conditions.

- 1: Closed-loop vector control (CLVC)

  It is applicable to normal running in distance control.

- 2: Voltage/Frequency (V/F) control

  It is applicable to equipment detection where the ratio between the voltage and the frequency is fixed, control is simple, and the low-frequency output torque feature is poor.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F0-01	Command source selection	0: Operation panel control 1: Distance control	1	-	★

It is used to set the source of running commands and running speed references.

- 0: Operation panel control

  The controller is operated by pressing RUN and STOP RES on the operation panel, and the running speed is set by F0-02 (Running speed under operation panel control). This method is applicable only to the test or motor no-load auto-tuning.

- 1: Distance control

  This method is used in the NICE series integrated elevator controller. During inspection, the elevator runs at the speed set in F3-11 (Inspection speed). During normal running, the controller automatically calculates the speed and running curve for the elevator based on the distance between the current floor and the target floor within the rated elevator speed, implementing direct travel ride.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F0-02	Running speed under operation panel control	0.050 to F0-04	0.050	m/s	☆

It is used to set the running speed in the operation panel control mode.

Note that this function is enabled only when F0-01 is set to 0 (Operation panel control). You can change the running speed of the elevator by modifying this parameter during running

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F0-03	Maximum running speed	0.200 to F0-04	0.480	m/s	★

It is used to set the actual maximum running speed of the elevator. The value must be smaller than the rated elevator speed.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F0-04	Rated elevator speed	0.200–1.750	0.500	m/s	★

It is used to set the norminal rated speed of the elevator. The value of this parameter is dependent on the elevator mechanism and traction motor.

Note

F0-03 is the actual running speed within the elevator speed range set in F0-04. For example, for a certain elevator, if F0-04 is 1.750 m/s and the actually required maximum running speed is 1.600 m/s, set F0-03 to 1.600 m/s.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F0-05	Maximum frequency	F1-04 to 99.00	50.00	Hz	★

It is used to set the maximum output frequency of the system. This value must be larger than the rated motor frequency.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F0-06	Carrier frequency	0.5–16.0	6.0	kHz	★

It is used to set the carrier frequency of the controller.

The carrier frequency is closely related to the motor noise during running. When it is generally set above 6 kHz, mute running is achieved. It is recommended to set the carrier frequency to the lowest within the allowable noise, which reduces the controller loss and radio frequency interference.

- If the carrier frequency is low, output current has high harmonics, and the power loss and

temperature rise of the motor increase.

- If the carrier frequency is high, power loss and temperature rise of the motor declines. However, the system has an increase in power loss, temperature rise and interference.

Adjusting the carrier frequency will exert influences on the aspects listed in the following table.

Table 7-1 Influences of carrier frequency adjustment

Carrier frequency	Low	High
Motor noise	Large	Small
Output current waveform	Bad	Good
Motor temperature rise	High	Low
Controller temperature rise	Low	High
Leakage current	Small	Large
External radiation interference	Small	Large

Note

On certain environment conditions (the heatsink temperature is too high), the system will reduce the carrier frequency to provide overheat protection for the controller, preventing the controller from being damaged due to overheat. If the temperature cannot reduce in this case, the controller reports the overheat fault.

Group F1: Motor Parameter

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F1-00	Encoder type	0: SIN/COS encoder, absolute encoder 1: UVW encoder 2: AB incremental encoder (for asynchronous motor)	0	-	★

It is used to set the encoder type matching the motor.

When F1-25 is set to 1 (Synchronous motor), this parameter is automatically changed to 0. If the actually used is UVW encoder, manually set this parameter to 1 before auto-tuning. Otherwise, the system fails to run.

When F1-25 is set to 0 (Asynchronous motor), this parameter is automatically changed to 2. You need not modify it manually.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F1-01	Rated motor power	0.7–75.0	Model dependent	kW	★
F1-02	Rated motor voltage	0–440	Model dependent	V	★

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F1-03	Rated motor current	0.00–655.00	Model dependent	A	★
F1-04	Rated motor frequency	0.00–99.00	Model dependent	Hz	★
F1-05	Rated motor rotational speed	0–3000	Model dependent	RPM	★

Set these parameters according to the motor nameplate.

Ensure that these motor parameters are set correctly. Incorrect setting affects the motor auto-tuning and the vector control effect.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F1-06	Encoder initial angle (synchronous motor)	0.0–359.9	0	Degree (°)	★
F1-07	Encoder angle at power-off (synchronous motor)	0.0–359.9	0	Degree (°)	★
F1-08	Synchronous motor wiring mode	0–15	0	-	★

These parameters are obtained by means of motor auto-tuning.

F1-06 specifies the encoder angle at zero point. After multiple times of auto-tuning, compare the obtained values, and the value deviation of F1-06 shall be within ±5°.

F1-07 specifies the angle of the magnetic pole when the motor is powered off. The value is recorded at power-off and is used for comparison at next power-on.

F1-08 specifies the motor wiring mode, that is, whether the output phase sequence of the drive board is consistent with the UVW phase sequence of the motor. If the value obtained by means of no-load auto-tuning is an even number, the phase sequence is correct. If the value is an odd number, the sequence is incorrect; in this case, exchange any two of UWW phases of the motor.

Note

With-load auto-tuning of the synchronous motor can be performed only when the UVW phase sequence of the motor is consistent with the output phase sequence of the controller.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F1-09	Current filter time (synchronous motor)	0–3	0	-	★

It is used to set the current filter time, which suppress the periodic vertical jitter. Increase the value in ascending order of 0.5 to achieve the optimum effect.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F1-10	Encoder verification selection	0–65535	0	-	★

It is used to set encoder signal verification. This parameter is set by the manufacturer, and you need not modify it generally.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F1-11	Auto-tuning mode	0: No operation 1: With-load auto-tuning 2: No-load auto-tuning 3: Shaft auto-tuning 1 4: Shaft auto-tuning 2	0	-	★

It is used to select the auto-tuning mode.

1: With-load auto-tuning

It is static auto-tuning for the asynchronous motor (the motor does not rotate) and rotary auto-tuning for the synchronous motor (the brake is released and the motor rotates).

2: No-load auto-tuning

The motor must be completely disconnected from the load; otherwise, the auto-tuning effect will be affected. When "TUNE" is displayed on the operation panel, you need to manually release the brake before starting auto-tuning.

3: Shaft auto-tuning 1 4: Shaft auto-tuning 2

These two modes are similar, except that shaft auto-tuning 1 reserves the leveling adjustment records in group Fr, and shaft auto-tuning 2 clears these records.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F1-12	Encoder pulses per revolution	0–10000	1024	PPR	★

It is used to set the pulses per revolution of the encoder (according to the encoder nameplate).

This parameter is critical to CLVC. Set the encoder nominal value in this parameter. Otherwise, the elevator may not run properly. When the feedback pulses received by the system is data after frequency division by other equipment, set the frequency-division value rather than the encoder nominal value in this parameter. For example, if the pulses per revolution of the encoder is 8192 and is sent to the system after 1/4 frequency division, set this parameter to 2048 (8192/4 = 2048).

F0-04 (Rated elevator speed), F1-05 (Rated motor rotational speed), and F1-12 (Encoder pulses per revolution) determine whether the elevator can run properly. If any of these parameters is changed, shaft auto-tuning must be performed again.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F1-13	Encoder wire-breaking detection time	0–10.0	1.0	s	★

This parameter is used to set the time that a wire-break fault lasts before being detected.

After the elevator starts running at non-zero speed, if there is no encoder signal input within the time set in this parameter, the system prompts the encoder fault and stops running.

When the value is smaller than 0.5s, this function is disabled.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F1-14	Stator resistance (asynchronous motor)	0.000–30.000	Model dependent	Ω	★
F1-15	Rotor resistance (asynchronous motor)	0.000–30.000	Model dependent	Ω	★
F1-16	Leakage inductance (asynchronous motor)	0.00–300.00	Model dependent	mH	★
F1-17	Mutual inductance (asynchronous motor)	0.1–3000.0	Model dependent	mH	★
F1-18	Magnetizing current (asynchronous motor)	0.01–300.00	Model dependent	A	★

These parameters are obtained by means of motor auto-tuning. After the motor auto-tuning is completed successfully, the values of these parameters are updated automatically.

If motor auto-tuning cannot be performed onsite, manually enter the values by referring to data of the motor with the same nameplate parameters.

Each time F1-01 (Rated motor power) of the asynchronous motor is modified, these parameters automatically resume to the default values for the standard motor.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F1-19	Shaft Q inductance (torque)	0.00–650.00	3.00	mH	★
F1-20	Shaft D inductance (excitation)	0.00–650.00	3.00	mH	★
F1-21	Back EMF	0–65535	0	-	★

These parameters are obtained by means of motor auto-tuning.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F1-25	Motor type	0: Asynchronous motor 1: Synchronous motor	1	-	★

It is used to set the motor type. This parameter must be set correctly before motor auto-tuning; otherwise, the motor auto-tuning cannot be performed.

Group F2: Vector Control Parameters

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F2-00	Speed loop proportional gain KP1	0–100	40	-	★
F2-01	Speed loop integral time TI1	0.01–10.00	0.60	s	★
F2-02	Switchover frequency 1	0.00 to F2-05	2.00	Hz	★

F2-00 and F2-01 are PI regulation parameters when the running frequency is smaller than the value of F2-02 (Switchover frequency 1).

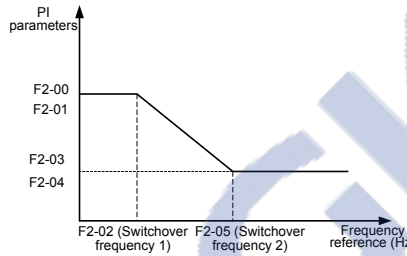
Function Code	Parameter Name	Setting Range	Default	Unit	Property
F2-03	Speed loop proportional gain KP2	0–100	35	-	★

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F2-04	Speed loop integral time TI2	0.01–10.00	0.80	s	★
F2-05	Switchover frequency 2	F2-02 to F0-05	5.00	Hz	★

F2-03 and F2-04 are PI regulation parameters when the running frequency is larger than the value of F2-05 (Switchover frequency 2).

If the running frequency is between F2-02 and F2-05, the speed loop PI parameters are obtained from the weighted average value of the two groups of PI parameters (F2-00, F2-01 and F2-03, F2-04), as shown in Figure 7-1.

Figure 7-1 Relationship between running frequencies and PI parameters



The speed dynamic response characteristics in vector control can be adjusted by setting the proportional gain and integral time of the speed regulator.

To achieve a faster system response, increase the proportional gain and reduce the integral time. Be aware that this may lead to system oscillation.

The recommended adjustment method is as follows:

If the default setting cannot meet the requirements, make proper adjustment. Decrease the proportional gain first to ensure that the system does not oscillate, and then reduce the integral time to ensure that the system has quick response and small overshoot.

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

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F2-06	Current loop KP1 (torque)	10–500	60	%	★
F2-07	Current loop KI1 (torque)	10–500	30	%	★

These two parameters are regulation parameters for the torque axis current loop.

These parameters are used as the torque axis current regulator in vector control. The best values of the parameters matching the motor characteristics are obtained by means of motor auto-tuning. You need not modify them generally.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F2-08	Torque upper limit	0.0–200.0	150.0	%	★

It is used to set the torque upper limit of the motor. The value 100% corresponds to the rated output torque of the adaptable motor.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F2-10	Elevator running direction	0–1	0	-	★

It is used to set the elevator running direction.

The values are as follows:

- 0: Direction unchanged
- 1: Direction reversed

You can modify this parameter to reverse the running direction (without changing the wiring of the motor).

When you perform inspection running for the first time after motor auto-tuning is successful, check whether the actual motor running direction is consistent with the inspection command direction. If not, change the motor running direction by setting F2-10 to consistent with the inspection command direction.

Pay attention to the setting of this parameter when restoring the default setting.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F2-11	Zero servo current coefficient	0.20–50.0	15.0	%	★
F2-12	Zero servo speed loop KP	0.00–2.00	0.5	-	★
F2-13	Zero servo speed loop KI	0.00–2.00	0.6	-	★

These parameters are used to adjust automatic pre-torque compensation in the case of no-load-cell. The no-load-cell startup function is enabled when F8-01 is set to 2.

Decrease the values of these parameters in the case of car lurch at startup, and increase the values in the case of rollback at startup. For details, see the description of section 5.1.5.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F2-16	Torque acceleration time	1–500	1	ms	★
F2-17	Torque deceleration time	1–500	350	ms	★

These two parameters are used to set the acceleration time and deceleration time of the torque current.

Due to different characteristics, the motor may have an abnormal sound when the current is withdrawn at stop. In this case, you can increase the torque deceleration time properly to eliminate the abnormal sound.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F2-18	Startup acceleration time	0.000–1.500	0.000	s	★

It is used to set the acceleration time of the startup speed. It is used with F3-00. For details, see Figure 7-2.

Group F3: Running Control Parameters

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F3-00	Startup speed	0.000–0.030	0.000	m/s	★
F3-01	Startup holding time	0.000–0.500	0.000	s	★

These two parameters are used to set the startup speed and startup speed holding time. For details, see Figure 7-2.

The parameters may reduce the terrace feeling at startup due to static friction between the guide rail and the guide shoes.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F3-02	Acceleration rate	0.200–0.800	0.300	m/s^2	★
F3-03	Acceleration start jerk time	0.300–4.000	2.500	s	★
F3-04	Acceleration end jerk time	0.300–4.000	2.500	s	★

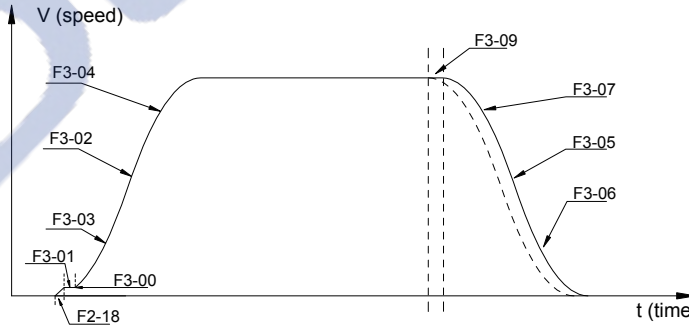
These parameters are used to set the running curve during acceleration of the elevator.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F3-05	Deceleration rate	0.200–0.800	0.300	m/s^2	★
F3-06	Deceleration end jerk time	0.300–4.000	2.500	s	★
F3-07	Deceleration start jerk time	0.300–4.000	2.500	s	★

These parameters are used to set the running curve during deceleration of the elevator.

- F3-02 (F3-05) is the acceleration rate (deceleration rate) in the straight-line acceleration process (deceleration process) of the S curve.
- F3-03 (F3-07) is the time for the rate to increase from 0 to the value set in F3-02 (F3-05) in the end jerk segment of the S curve. The larger the value is, the smoother the jerk is.
- F3-04 (F3-06) is the time for the rate to decrease from the value set in F3-02 (F3-05) to 0 in the start jerk segment of the S curve. The larger the value is, the smoother the jerk is.

Figure 7-2 Setting the running curve



Function Code	Parameter Name	Setting Range	Default	Unit	Property
F3-08	Special deceleration rate	0.200–2.000	0.500	m/s^2	★

It is used to set the deceleration rate in elevator slow-down, inspection, and shaft auto-tuning.

This parameter is not used during normal running. It is used only when the elevator position is abnormal or the slow-down signal is abnormal, preventing over travel top terminal or over travel bottom terminal.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F3-09	Pre-deceleration distance	0–90.0	0.0	mm	★

It is used to set the pre-deceleration distance of the elevator in distance control, as shown in Figure 7-2. This function is to eliminate the effect of encoder signal loss or leveling signal delay.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F3-10	Re-leveling speed	0.000–0.080	0.040	m/s	★

is used to set the elevator speed during re-leveling.

This parameter is valid only when the pre-open module (MCTC-SCB-A) is added to implement the re-leveling function (set in FE-13).

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F3-11	Inspection speed	0.100–0.500	0.250	m/s	★

It is used to set the elevator speed during inspection and shaft auto-tuning.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F3-12	Position of up slow-down	0.000–300.00	0.00	m	★
F3-13	Position of down slow-down	0.000–300.00	0.00	m	★

These parameters specify the positions of the slow-down switches relative to the bottom leveling position, and the positions are automatically recorded during shaft auto-tuning. For the installation positions of the slow-down switches, see Table 3-11.

The NICE1000^{new} integrated elevator controller supports only one pair of slow-down switches, which are installed near the terminal floor.

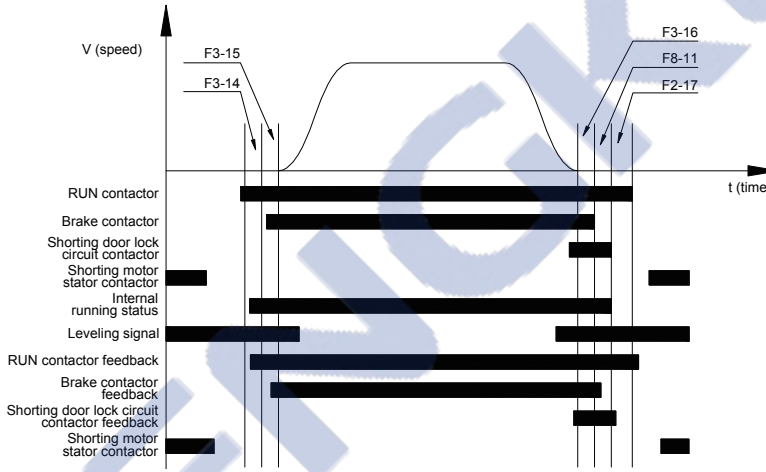
The system automatically detects the speed when the elevator reaches a slow-down switch. If the detected speed or position is abnormal, the system enables the elevator to slow down at the special deceleration rate set in F3-08, preventing over travel top terminal or over travel bottom terminal.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F3-14	Zero-speed control time at startup	0.000–1.000	0.200	s	★
F3-15	Brake release delay	0.000–2.000	0.600	s	★
F3-16	Zero-speed control time at end	0.000–1.000	0.300	s	★

These parameters are used to set the time related to the zero-speed holding current output and braking action delay.

- F3-14 (Zero-speed control time at startup) specifies the time from output of the RUN contactor to output of the brake contactor, during which the controller performs excitation on the motor and outputs zero-speed current with large startup torque.
- F3-15 (Brake release delay) specifies the time from the moment when the system sends the brake release command to the moment when the brake is completely released, during which the system retains the zero-speed torque current output.
- F3-16 (Zero-speed control time at end) specifies the zero-speed output time when the running curve ends.
- F8-11 (Brake apply delay) specifies the time from the moment when the system sends the brake apply command to the moment when the brake is completely applied, during which the system retains the zero-speed torque current output.

Figure 7-3 Running time sequence



Function Code	Parameter Name	Setting Range	Default	Unit	Property
F3-17	Low-speed re-leveling speed	0.080 to F3-11	0.100	m/s	★

It is used to set the elevator speed of returning to the leveling position at normal non-leveling stop.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F3-18	Acceleration rate at emergency evacuation	0.100–1.300	0.300	m/s^2	★

It is used to set the acceleration rate at emergency evacuation.

Group F4: Floor Parameters

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F4-00	Leveling adjustment	0–60	30	mm	★

It is used to adjust the leveling accuracy at elevator stop. If over-leveling occurs at all floors during elevator stop, decrease the value of this parameter properly. If under-leveling occurs at all floors during elevator stop, increase the value of this parameter properly.

This parameter takes effect to leveling of all floors. Therefore, if leveling at a single floor is inaccurate, adjust the position of the leveling plate.

The NICE1000^{new} has the advanced distance control algorithm and adopts many methods to ensure reliability of direct travel ride. Generally you need not modify this parameter.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F4-01	Current floor	F6-01 to F6-00	1	-	★

This parameter indicates the current floor of the elevator car.

The system automatically changes the value of this parameter during running, and corrects it at leveling position (door open limit) after the up slow-down and down slow-down switches act. At non-bottom floor and top-floor leveling, you can also manually modify this parameter, but the value must be consistent with the actual current floor.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F4-02	High byte of current floor position	0–65535	1	Pulses	●
F4-03	Low byte of current floor position	0–65535	34464	Pulses	●

These two parameters indicate the absolute pulses of the current position of the elevator car relative to the bottom leveling position.

The position data of the NICE1000^{new} in the shaft is recorded in pulses. Each position is expressed by a 32-bit binary number, where the high 16 bits indicate the high byte of the floor position, and the low 16 bits indicate the low byte of the floor position.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F4-04	Length 1 of leveling plate	0–65535	0	Pulses	★
F4-05	Length 2 of leveling plate	0–65535	0	Pulses	★

These two parameters respectively indicate the pulses corresponding to the length of the magnetic value and the length between two leveling sensors. They are automatically recorded during shaft auto-tuning.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F4-06	High byte of floor height 1	0–65535	0	Pulses	★
F4-07	Low byte of floor height 1	0–65535	0	Pulses	★
…(Floor height 2 to floor height 14)					
F4-34	High byte of floor height 15	0–65535	0	Pulses	★
F4-35	Low byte of floor height 15	0–65535	0	Pulses	★

These parameters indicate the pulses corresponding to the floor height i (between the leveling plates of floor n and floor i+1). Each floor height is expressed by a 32-bit binary number, where the high 16 bits indicate the high byte of the floor height, and the low 16 bits indicate the low byte of the floor height. On normal conditions, the floor height i of each floor is almost the same.

Group F5: Input Terminal Parameters

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F5-00	Attendant/Automatic switchover time	3–200	3	s	★

If there is a hall call at current floor in attendant state, the system automatically switches over to the automatic (normal) state after the time set in this parameter. After this running is completed, the system automatically restores to the attendant state (Bit2 of F6-67 must be set to 1). When the value of this parameter is smaller than 5, this function is disabled, and the system is in the normal attendant state.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F5-01	X1 function selection	0–127	33	-	★
F5-02	X2 function selection		104	-	★
F5-03	X3 function selection		105	-	★
…			…		
F5-23	X23 function selection		00	-	★
F5-24	X24 function selection		00	-	★

These parameters are used to set the functions of input terminals X1 to X24.

Terminals X1 to X24 are digital inputs, and are allocated with corresponding functions based on the input signals. The same function must not be allocated to multiple terminals. After the 24 V voltage is input, the corresponding input terminal indicator becomes ON. The functions are described as follows:

00: Invalid

Even if there is signal input to the terminal, the system has no response. You can allocate this function to terminals that are not used to prevent mis-function.

01: Leveling 1 signal 02: Leveling 2 signal

03: Door zone signal

The NICE1000^{new} system determines the elevator leveling position based on the leveling sensor signal. The system supports three types of leveling configuration: a. single door zone sensor; b. up and down leveling sensors; c. door zone sensor + up and down leveling sensor.

If the leveling signal is abnormal (stuck or unavailable), the system reports fault Err22.

04: RUN contactor feedback signal 05: Brake contactor feedback signal 1
06: Brake travel switch feedback signal 1 50: Brake travel switch feedback signal 2

The system detects the feedback from the RUN and brake contactors 2s after outputting the contactor RUN signal, to determine whether the related contactor is closed properly.

07: Shorting PMSM stator contactor feedback signal

When the elevator enters emergency running state upon power failure, the brake is released and the related terminal outputs the signal if the motor is PMSM and is in automatic emergency running state. The car automatically moves to the nearest leveling position

under the effect of the weighing difference between the car and the counterweight.

This function can also be used at normal elevator stop to improve safety.

08: Shorting door lock circuit contactor feedback

It is used to short or release the door lock circuit if the function of door pre-open upon arrival or re-leveling at door open is enabled for the elevator configured with the pre-open module.

09: Inspection signal 10: Inspection up signal 11: Inspection down signal

When the Automatic/Inspection switch is set to the Inspection position, the elevator enters the inspection state; in this case, the system cancels all automatic running including the automatic door operations. When the inspection up signal or inspection down signal is valid, the elevator runs at the inspection speed.

12: First fire emergency signal

When the first fire emergency switch is turned on, the elevator enters the fire emergency state, and immediately cancels the registered hall calls and car calls. The elevator stops at the nearest floor without opening the door, and then directly runs to the fire emergency floor and automatically opens the door after arrival.

13: Reserved 14: Elevator lock signal

When the elevator lock signal is active, the system enters the elevator lock state.

15: Up limit signal 16: Down limit signal

The up limit signal and down limit signal are used as the stop switches at the terminal floor to prevent over travel top terminal or over travel bottom terminal when the elevator runs over the leveling position of the terminal floor but does not stop.

17: Up slow-down signal 18: Down slow-down signal

These signals are set to NO input, corresponding to the slow-down switches. The system automatically records the positions of the switches in group F3 during shaft auto-tuning.

19: Overload signal

When the elevator load exceeds 110% of the rated load during normal use, the elevator enters the overload state. Then the overload buzzer beeps, the overload indicator in the car becomes ON, and the elevator door keeps open.

The overload signal becomes invalid when the door lock is applied. If the running with 110% of the rated load is required during inspection, you can set Bit2 of F6-10 to 1 to allow overload running (note that this function has potential safety risks and use it with caution).

20: Full-load signal

When the elevator load is 80% to 110% of the rated load, the hall display board displays the full-load state, and the elevator does not respond to hall calls.

21: Emergency stop (safety feedback) signal

The safety circuit is important to guarantee safe running of the elevator.

22: Door 1 open limit signal 23: Door 2 open limit signal

The terminal with this function is used to receive the corresponding door open limit signal.

24: Door 1 close limit signal 25: Door 2 close limit signal

The terminal with this function is used to receive the corresponding door close limit signal.

26: Door machine 1 light curtain signal 27: Door machine 2 light curtain signal

The terminal with this function is used to receive the corresponding light curtain signal.

28: Attendant signal

The elevator enters the attendant operation state after this signal is active.

29: Direct travel ride signal

The elevator does not respond to hall calls when this signal is active in attendant state.

30: Direction change signal

The elevator changes the running direction when this signal is active in attendant state.

31: Independent running signal

The elevator exits the parallel control mode when this signal is active.

31: Door 2 selection signal

If the door open/close is controlled by the switch or button in the car in opposite door control mode, the terminal is used to receive this signal. When this signal is active, door 2 is used. When this signal is inactive, door 1 is used.

33: UPS valid signal

The terminal is used to receive the emergency evacuation signal at power failure.

34: Door open button

The terminal is used to receive the door open input signal.

35: Door close button

The terminal is used to receive the door close input signal.

36: Safety circuit

The safety circuit is important to guarantee safe running of the elevator.

37: Door lock circuit 1

It is used to ensure that the hall door and car door have been closed when the elevator starts to run.

38: Door lock circuit 2

It has the same function as "Door lock circuit 2", so that you can separate the hall door signal and car door signal.

The system considers that the door lock is effective only when both signals 37 and 38 are active.

39: Half-load signal

When the car load exceeds half of the limit, this signal becomes active. It is used to judge the emergency running direction at power failure.

40: Motor overheat signal

If this signal remains active for more than 2s, the controller stops output and reports fault Err39 to prompt motor overheat.

41: Door machine 1 safety edge signal 42: Door machine 2 safety edge signal

They are used to detect the safety edge signal state of door machine 1 and door machine 2 (if existing).

43: Earthquake signal

If this signal remains active for more than 2s, the elevator enters the earthquake stop state, stops at the nearest landing floor and opens the door. Then the elevator starts running again after the earthquake signal becomes inactive.

44: Back door forbidden signal

If double door machines are applied, this signal is used to prohibit the use of door machine 2.

45: Light-load signal

It is used for nuisance judgment in the anti-nuisance function. If Bit2 in F8-13 is set to 1, the system performs nuisance judgment by using the light-load switch. The load below 30% of the rated load is regarded as light load.

46: Single/Double door selection

This function is valid only in opposite door control mode 3. When this signal is active, the elevator is double door service state; otherwise, the elevator is in single door service state.

47: Fire emergency floor switchover signal

The NICE1000^{new} supports two fire emergency floors. By default, the elevator stops at fire emergency floor 1 in fire emergency state. If this signal is active, the elevator stops at fire emergency floor 2 in fire emergency state.

48: Virtual floor input

This signal is required when the floor distance is too large.

If the floor distance is too large, the time protection may be enabled and the system reports Err30 after a long-time running. To solve the problem, you need to set the virtual floor input at a proper intermediate position of the floor. Then, the elevator clears the counted time after arriving at this virtual floor, so that the system will not report Err30.

49: Firefighter switch signal

It is the firefighter switch signal and is used to enable the firefighter running. After the elevator returns to the fire emergency floor, the elevator enters the firefighter running state if the firefighter signal is active.

51–99: Reserved

101–199: These signals respectively correspond to 01 to 99 in sequence. 01 to 99 are NO inputs, while 101 to 199 are NC inputs.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F5-25	X25 higher-voltage input function selection	01–16	01	-	★
F5-26	X26 higher-voltage input function selection	01–16	02	-	★
F5-27	X27 higher-voltage input function selection	01–16	03	-	★

00: Invalid

Even if there is signal input to the terminal, the system has no response. You can allocate this function to terminals that are not used to prevent mis-function.

01: Safety circuit signal

This terminal is used to detect the higher-voltage signal feedback of the safety circuit.

02: Door lock circuit 1 signal

This terminal is used to detect the higher-voltage signal feedback of the door lock circuit, including the hall door circuit and car door lock circuit.

03: Door lock circuit 2 signal

This terminal is used to detect the higher-voltage signal feedback of the door lock circuit, including the hall door circuit and car door lock circuit.

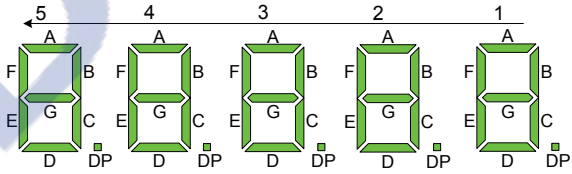
04–16: Reserved

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F5-28	Terminal state display 1	-	-	-	●
F5-29	Terminal state display 2	-	-	-	●

After you enter the F5-28 menu, the operation panel displays the state of all I/O terminals of the system.

The LEDs are arranged as 5, 4, 3, 2, 1 from left to right.

Figure 7-4 I/O terminal state (F5-28)



The following table describes the meaning of the LED segments indicating the I/O terminal state in F5-28.

Table 7-2 Meaning of the LED segments for F5-28

No.	Segment	Meaning of Segment ON
1	A	Reserved
	B	Leveling 1 signal active
	C	Leveling 2 signal active
	D	Door zone signal active
	E	RUN contactor output feedback
	F	Brake contactor feedback 1 signal active
	G	Brake contactor feedback 2 signal active
	DP	Shorting PMSM stator contactor feedback signal active
2	A	Shorting door lock circuit contactor feedback signal active
	B	Inspection signal active
	C	Inspection up signal active
	D	Inspection down signal active
	E	First fire emergency signal active
	F	Reserved
	G	Elevator lock signal active
	DP	Up limit signal active
3	A	Down limit signal active
	B	Up slow-down signal active
	C	Down slow-down signal active
	D	Overload signal active
	E	Full-load signal active
	F	Emergency stop (safety feedback) signal active
	G	Door 1 open limit signal active
	DP	Door 2 open limit signal active
4	A	Door 1 close limit signal active
	B	Door 2 close limit signal active
	C	Door machine 1 light curtain signal active
	D	Door machine 2 light curtain signal active
	E	Attendant signal active
	F	Direct travel ride signal active
	G	Direction change signal active
	DP	Independent running signal active

No.	Segment	Meaning of Segment ON
5	A	Door 2 selection signal active
	B	UPS input signal active
	C	Door open button active
	D	Door close button active
	E	Door lock circuit 1 signal active
	F	Door lock circuit 2 signal active
	G	Half-load signal active
	DP	Reserved

The following table describes the meaning of the LED segments indicating the I/O terminal state in F5-29.

Table 7-3 Meaning of the LED segments for F5-29

No.	Segment	Meaning of Segment ON
1	A	Invalid
	B	Safety circuit signal active
	C	Door lock circuit 1 signal active
	D	Door lock circuit 2 signal active
	E	Reserved
	F	Reserved
	G	Reserved
	DP	Reserved
2	A	Y0 output active
	B	RUN contactor output active
	C	Brake contactor output active
	D	Higher-voltage startup of brake active
	E	Fan/Lamp output active
	F	Shorting PMSM stator contactor output active
	G	Door 1 open output active
	DP	Door 1 close output active
3	A	Door 2 open output active
	B	Door 2 close output active
	C	Low 7-segment a display output active
	D	Low 7-segment b display output active
	E	Low 7-segment c display output active
	F	Low 7-segment d display output active
	G	Low 7-segment e display output active
	DP	Low 7-segment f display output active

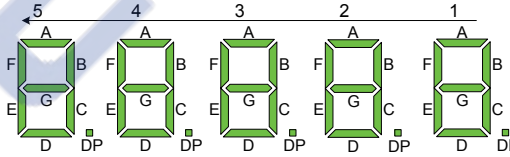
No.	Segment	Meaning of Segment ON
4	A	Low 7-segment g display output active
	B	Up arrow display output active
	C	Down arrow output active
	D	Minus sign display output active
	E	Returning to base floor at fire emergency output active
	F	Buzzer output active
	G	Overload output active
	DP	Arrival gong output active
5	A	Full-load output active
	B	Inspection output active
	C	Fan/Lamp output 2 active
	D	Shorting door lock circuit contactor output active
	E	BCD/Gray code/7-segment high-bit output active
	F	Controller normal running output active
	G	Reserved
	DP	Reserved

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F5-30	Floor I/O terminal state display 1	-	-	-	●
F5-31	Floor I/O button state display 2	-	-	-	●

After you enter the F5-30 menu, the operation panel displays the state of all floor I/O terminals of the system.

The LEDs are arranged as 5, 4, 3, 2, 1 from left to right.

Figure 7-5 Floor I/O terminal state (F5-30)



The following table describes the meaning of the LED segments indicating the floor I/O terminal state in F5-30.

Table 7-4 Meaning of the LED segments for F5-30

No.	Segment	Meaning of Segment ON
1	A	Door 1 open button I/O active
	B	Door 1 close button I/O active
	C	Door 1 open delay button I/O active
	D	Floor 1 door 1 car call I/O active
	E	Floor 2 door 1 car call I/O active
	F	Floor 3 door 1 car call I/O active
	G	Floor 4 door 1 car call I/O active
	DP	Floor 5 door 1 car call I/O active
2	A	Floor 6 door 1 car call I/O active
	B	Floor 7 door 1 car call I/O active
	C	Floor 8 door 1 car call I/O active
	D	Floor 9 door 1 car call I/O active
	E	Floor 10 door 1 car call I/O active
	F	Reserved
	G	Reserved
	DP	Reserved
3	A	Floor 1 door 1 up call I/O active
	B	Reserved
	C	Floor 2 door 1 up call I/O active
	D	Floor 2 door 1 down call I/O active
	E	Floor 3 door 1 up call I/O active
	F	Floor 3 door 1 down call I/O active
	G	Floor 4 door 1 up call I/O active
	DP	Floor 4 door 1 down call I/O active
4	A	Floor 5 door 1 up call I/O active
	B	Floor 5 door 1 down call I/O active
	C	Floor 6 door 1 up call I/O active
	D	Floor 6 door 1 down call I/O active
	E	Floor 7 door 1 up call I/O active
	F	Floor 7 door 1 down call I/O active
	G	Floor 8 door 1 up call I/O active
	DP	Floor 8 door 1 down call I/O active

No.	Segment	Meaning of Segment ON
5	A	Floor 9 door 1 up call I/O active
	B	Floor 9 door 1 down call I/O active
	C	Reserved
	D	Floor 10 door 1 down call I/O active
	E	Reserved
	F	Reserved
	G	Reserved
	DP	Reserved

The following table describes the meaning of the LED segments indicating the floor I/O terminal state in F5-31.

Table 7-5 Meaning of the LED segments for F5-31

No.	Segment	Meaning of Segment ON
1	A	Door 2 open button I/O active
	B	Door 2 close button I/O active
	C	Door 2 open delay button I/O active
	D	Floor 1 door 2 car call I/O active
	E	Floor 2 door 2 car call I/O active
	F	Floor 3 door 2 car call I/O active
	G	Floor 4 door 2 car call I/O active
	DP	Floor 5 door 2 car call I/O active
2	A	Floor 6 door 2 car call I/O active
	B	Floor 7 door 2 car call I/O active
	C	Floor 8 door 2 car call I/O active
	D	Floor 9 door 2 car call I/O active
	E	Floor 10 door 2 car call I/O active
	F	Reserved
	G	Reserved
	DP	Reserved
3	A	Floor 1 door 2 up call I/O active
	B	Reserved
	C	Floor 2 door 2 up call I/O active
	D	Floor 2 door 2 down call I/O active
	E	Floor 3 door 2 up call I/O active
	F	Floor 3 door 2 down call I/O active
	G	Floor 4 door 2 up call I/O active
	DP	Floor 4 door 2 down call I/O active

No.	Segment	Meaning of Segment ON
4	A	Floor 5 door 2 up call I/O active
	B	Floor 5 door 2 down call I/O active
	C	Floor 6 door 2 up call I/O active
	D	Floor 6 door 1 down call I/O active
	E	Floor 7 door 1 up call I/O active
	F	Floor 7 door 1 down call I/O active
	G	Floor 8 door 1 up call I/O active
	DP	Floor 8 door 1 down call I/O active
5	A	Floor 9 door 1 up call I/O active
	B	Floor 9 door 1 down call I/O active
	C	Reserved
	D	Floor 10 door 1 down call I/O active
	E	Reserved
	F	Reserved
	G	Reserved
	DP	Reserved

Group F6: Basic Elevator Parameters

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-00	Top floor of the elevator	F6-01 to 16	5	-	★
F6-01	Bottom floor of the elevator	1 to F6-00	1	-	★

These two parameters are used to set the top floor and bottom floor of the elevator, determined by the number of actually installed leveling plates.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-02	Parking floor	F6-01 to F6-00	1	-	★

When the idle time of the elevator exceeds the value set in F9-00, the elevator returns to the parking floor automatically.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-03	Fire emergency floor	F6-01 to F6-00	1	-	★

When entering the state of returning to the fire emergency floor, the elevator returns to this floor.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-04	Elevator lock floor	F6-01 to F6-00	1	-	★

When entering the elevator lock state, the elevator returns to this floor.

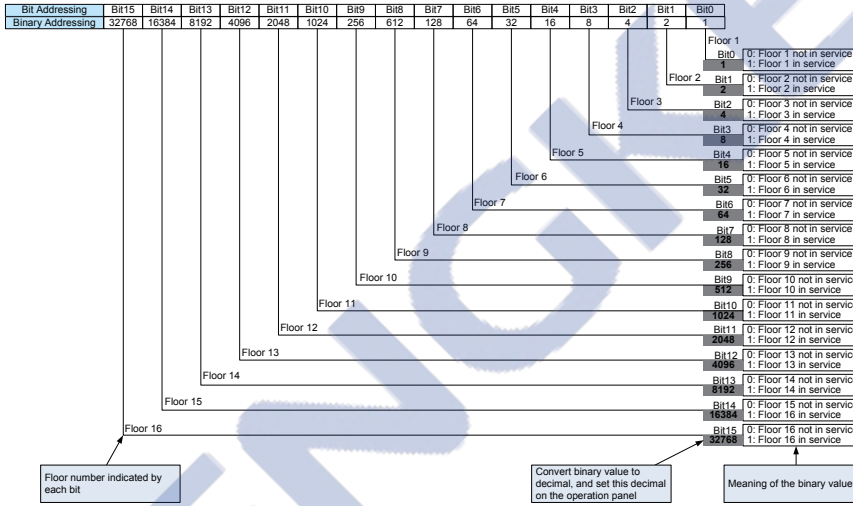
Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-05	Service floors	0–65535	65535	-	★

It is used to set the service floors.

This function code is enabled through bit addressing.

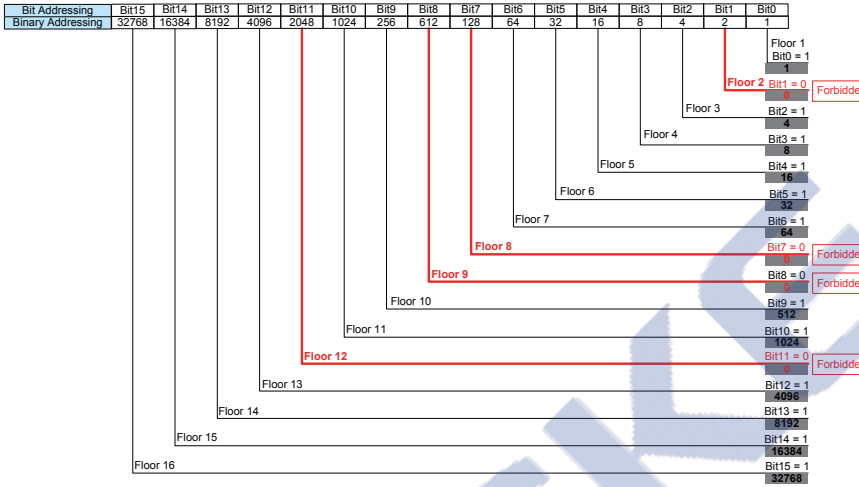
The 16 bits of the function code respectively correspond to 16 floors. If a bit is set to 1, the elevator will respond to calls of this floor; if this bit is set to 0, the elevator will not respond to calls of this floor.

Figure 7-6 Converting binary value of F6-05 to decimal



Example:

If floors 2, 8, 9, and 12 of a 16-floor elevator need to be forbidden, and all other floors are in service, we need to set Bit1, Bit7, Bit8, and Bit11 corresponding to floors 2, 8, 9, and 12 to 0, and set the other bits to 1, as shown in the following figure.



Convert the binary value to decimal:

1 + 4 + 8 + 16 + 32 + 64 + 512 + 1024 + 4096 + 8192 + 16384 + 32768 = 63101

Then, enter "63101" for F6-05 on the operation panel.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-06	Elevator function control 1	0–65535	0	-	★

It is used to select the required elevator functions.

Each bit of the function code defines a function, as described in the following table.

If a bit is set to 1, the function indicated by this bit is enabled; if this bit is set to 0, the function is disabled.

Table 7-7 Functions indicated by bits of F6-06

F6-06 Elevator function control 1			
Bit	Function	Description	Default
Bit1	Returning to base floor if position deviation too large	The elevator stops at nearest landing floor and then returns to the base floor for verification when the car position deviation is too large.	0
Bit2	Reserved	Reserved	-
Bit3	Buzzer not tweet upon re-leveling	The buzzer output relay does not work upon re-leveling.	0
Bit5	Cancelling auto reset of door lock fault	The door lock fault is not reset automatically.	0

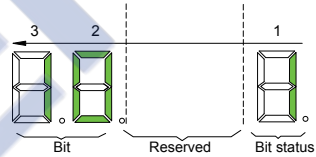
F6-06 Elevator function control 1			
Bit6	Clear floor number and display direction in advance	The displayed floor number is cleared before the elevator reaches the target floor. If the elevator needs to change the direction, the changed direction is displayed in advance.	0
Bit8	Hall call not directional	It is used for the application where there is only one hall call button. The hall call input can be connected to the up button input or down button input for this floor on the MCB.	0
Bit9	Not detecting analog wire breaking	The system does not detect analog wire breaking during normal running.	0
Bit10	Door lock disconnected once when inspection turned to normal	When the inspection state is turned to the normal state, the elevator can enters the normal state only after the door lock is disconnected once.	0

You can view and set F6-06 as follows:

The methods of viewing F6-06 are as follows:

- Method 1 (viewing decimal value): After you enter F6-06, the operation panel displays a decimal number, corresponding to the sum of all the valid binary values. For example, if Bit0, Bit3, and Bit8 are valid and other bits are invalid, the displayed decimal number is 00265. The decimal number can be viewed only and cannot be changed.
- Method 2 (viewing bit): On the decimal number display interface, press  or , and the operation panel displays the value in bits.

Figure 7-6 Viewing F6-06 in bit

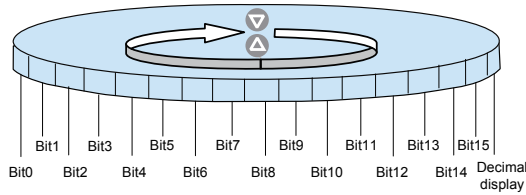


As shown in the preceding figure, the LEDs are numbered 1, 2, and 3 from right to left. LEDs 2 and 3 indicate the current bit, and LED 1 indicate the status of the current bit: 1 (valid) or 0 (invalid). The preceding figure shows that Bit10 is valid, that is, the function "Door lock disconnected once when inspection turned to normal" is enabled.

The method of setting F6-06 is as follows:

You can set a total of 16 bits (Bit0 to Bit15). Press  or  on the operation panel to view the bits (indicated by LEDs 2 and 3) cyclically, and press  to set the status of the current bit (indicated by LED 1).

Figure 7-7 Viewing bits cyclically



Function codes with multiple bits can be viewed and set in the same way as F6-06. These function codes include F6-07, F6-64 to F6-69, FB-07, FC-00 and FC-01, and FE-13 and FE-14.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-07	Elevator function control 2	0–65535	0	-	★

It is used to select the required elevator functions.

Each bit of the function code defines a function, as described in the following table.

If a bit is set to 1, the function indicated by this bit is enabled; if this bit is set to 0, the function is disabled.

For details on how to view and set this function code in bit, refer to F6-06.

Table 7-8 Functions indicated by bits of F6-07

F6-07 Elevator function control 2			
Bit	Function	Description	Default
Bit2	Arrow blinking during running	The display arrow blinks during elevator running. The blinking interval is set in F6-08.	0
Bit3	Elevator lock in the attendant state	The elevator is locked properly in the attendant state.	0
Bit6	Fault code not displayed on keypad	The fault code is not displayed on the keypad of the MCB.	0
Bit9	Stop holding at brake feedback abnormal	When the brake feedback is abnormal, the controller retains the holding torque.	0
Bit10	Cancelling Err30 detection at re-leveling	Err30 is not judged during re-leveling.	0
Bit12	Fault auto reset	The controller automatically resets the faults once every hour.	0
Bit13	Super short floor function	The controller cannot perform shaft-tuning if the floor height is less than 500 mm. After this function is enabled, shaft-tuning can be performed normally.	0
Bit14	Up slow-down not reset for super short floor	If this function is enabled, the up slow-down 1 signal does not reset floor display. The down slow-down 1 signal still resets floor display. This is valid only when the customized super short floor function is enabled.	0

F6-07 Elevator function control 2			
Bit	Function	Description	Default
Bit15	Down slow-down not reset for super short floor	If this function is enabled, the down slow-down 1 signal does not reset floor display. The up slow-down 1 signal still resets floor display. This is valid only when the customized super short floor function is enabled.	0

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-08	Arrow blinking interval	0–5.0	1	-	★

It is used to set the arrow blinking interval when the arrow blinking function is enabled.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-09	Random test times	0–60000	0	-	★

When the test times is set, the elevator selects floors randomly and starts automatic running until the set times is reached.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-10	Test function selection	Bit0: Hall call forbidden Bit1: Door open forbidden Bit2: Overload forbidden Bit3: Limit forbidden	0	-	★

- Bit0: Hall call forbidden

  The elevator does not respond to hall calls if it is set to 1. It is automatically restored to 0 at power failure.

- Bit1: Door open forbidden

  The elevator does not automatically open the door if it is set to 1. It is automatically restored to 0 at power failure.

- Bit2: Overload forbidden

  The overload function does not take effect if it is set to 1. It is automatically restored to 0 at power failure, so that the running at 110% of the rated load is allowed.

- Bit3: Limit forbidden

  Limit protection is disabled when it is set to 1, so that you can inspect the limit switches. It is automatically restored to 0 at power failure. The setting is valid only to the current time.

- Bit4 to Bit15: Reserved

  Note that F6-10 can be set only by professional engineers with caution. The consequence is borne by the person who performs the setting.

  Ensure that F6-10 is set to 0 during normal elevator running.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-11	L1 function selection	201–399	201	-	★

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-12	L2 function selection	201–399	202	-	★
...	...	...	...	...	...
F6-59	L49 function selection	201–399	00	-	★
F6-60	L50 function selection	201–399	00	-	★

These parameters are used to select the input functions of floor buttons.

The setting values are described in the following table.

200–299 (Door 1 control parameters)	00	00: Invalid
	201–203 (Door 1 open/close)	201: Door 1 open button 202: Door 1 close button 203: Door 1 open delay button
	204	Door 2 selection button
	205–210	Reserved
	211–226 (Door 1 car call)	211: Door 1 floor 1 car call 212: Door 1 floor 2 car call 213: Door 1 floor 3 car call 214: Door 1 floor 4 car call 215: Door 1 floor 5 car call 216: Door 1 floor 6 car call 217: Door 1 floor 7 car call 218: Door 1 floor 8 car call 219: Door 1 floor 9 car call 220: Door 1 floor 10 car call 221: Door 1 floor 11 car call 222: Door 1 floor 12 car call 223: Door 1 floor 13 car call 224: Door 1 floor 14 car call 225: Door 1 floor 15 car call 226: Door 1 floor 16 car call
	227–230	Reserved

200–299 (Door 1 control parameters)	231–245 (Door 1 up call)	231: Door 1 floor 1 up call 232: Door 1 floor 2 up call 233: Door 1 floor 3 up call 234: Door 1 floor 4 up call 235: Door 1 floor 5 up call 236: Door 1 floor 6 up call 237: Door 1 floor 7 up call 238: Door 1 floor 8 up call 239: Door 1 floor 9 up call 240: Door 1 floor 10 up call 241: Door 1 floor 11 up call 242: Door 1 floor 12 up call 243: Door 1 floor 13 up call 244: Door 1 floor 14 up call 245: Door 1 floor 15 up call
	246–251	Reserved
	252–266 (Door 1 down call)	252: Door 1 floor 2 down call 253: Door 1 floor 3 down call 254: Door 1 floor 4 down call 255: Door 1 floor 5 down call 256: Door 1 floor 6 down call 257: Door 1 floor 7 down call 258: Door 1 floor 8 down call 259: Door 1 floor 9 down call 260: Door 1 floor 10 down call 261: Door 1 floor 11 down call 262: Door 1 floor 12 down call 263: Door 1 floor 13 down call 264: Door 1 floor 14 down call 265: Door 1 floor 15 down call 266: Door 1 floor 16 down call
	267-299 Reserved	
301–399 (Door 2 control parameters)	301–303 (Door 2 open/close)	These values are defined in the same way as those of door 1.
	304: Door 2 selection button indicator	
	305–310 (Reserved)	
	311–326 (Door 2 car call)	
	327–330 (Reserved)	
	331–345 (Door 2 up call)	
	346–351 (Reserved)	
	352–369 (Door 2 down cal)	
	370–399 (Reserved)	

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-61	Leveling sensor delay	10–50	14	ms	★

It is used to set the delay time from the action time of the leveling sensor to the time when the leveling signal becomes active. You need not modify this parameter.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-62	Time interval of random running	0–1000	3	s	☆

It is used to set the time interval between two times of random running.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-64	Program control selection 1	0–65535	0	-	★
F6-65	Program control selection 2	0–65535	0	-	★
F6-66	Program control selection 3	0–65535	0	-	★

These parameters are used to set program control functions.

Each bit of the function code defines a function, as described in the following table.

If a bit is set to 1, the function indicated by this bit is enabled; if this bit is set to 0, the function is disabled.

For details on how to view and set this function code in bit, refer to F6-06.

Table 7-9 Functions indicated by the bits of F6-64

F6-64 Program control selection 1			
Bit	Function	Description	Default
Bit1	Soft limit function	When the up slow-down and down leveling signals are active and the up leveling signal is inactive, the system considers that the up limit is performed. It is the same for the down limit signal.	0
Bit4	Opening only one door of opposite doors under manual control	This function is enabled only in the opposite door control mode 3 (hall call independent, opposite-door manual control). In this case, only one door opens each time while the other door must stay in the door close limit state.	0
Bit5	Clearing calls immediately at elevator lock	When the elevator lock signal is active, the system immediately clears the registered calls and enables the elevator to stop at nearest landing floor and then return to the elevator lock floor.	0
Bit9	Disabling reverse floor number clear	The system clears all the current car calls by default every time the elevator changes the direction. When this function is enabled, the function of clearing reverse floor numbers is disabled.	0
Bit11	Responding to car calls first	The system responds to hall calls only after executing all car calls.	0

F6-65 Program control selection 2			
Bit	Function	Description	Default
Bit2	Inspection to stop due to slow-down	During inspection running, if the slow-down switch acts, the system decelerates to stop.	0
Bit4	Buzzer tweet during door open delay	The buzzer will tweet when the door open delay time set in Fb-13 is reached.	0
Bit8	Door open at elevator lock	In the elevator lock state, the elevator keeps the door open at the elevator lock floor.	0
Bit9	Display available at elevator lock	In the elevator lock state, hall calls are displayed normally.	0
Bit11	Blinking at arrival	The car display blinks when the elevator arrives at a floor. The blinking advance time is set in F6-74.	0
F6-66 Program control selection 3			
Bit	Function	Description	Default
Bit1	Cancelling door open/close command at delay after door open/ close limit	If this function is enabled, the door open/close command is cancelled at the delay of 1s after door open/close limit.	0
Bit2	Not judging door lock state at door close output	On normal conditions, the system determines that the door is completely closed only when the door close limit signal is active and the door lock is applied. If this function is enabled, the system need not judge the door lock state.	0
Bit3	Door close command output during running	The door close command is output continuously during the elevator running.	0
Bit4	Returning to base floor for verification at first-time power-on	The elevator runs to the bottom floor for verification at power-on for the first time.	0

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-67	Attendant function selection	0–65535	128	-	★

Each bit of the function code defines a function, as described in the following table.

If a bit is set to 1, the function indicated by this bit is enabled; if this bit is set to 0, the function is disabled.

For details on how to view and set this function code in bit, refer to F6-06.

Table 7-10 Attendant-related functions indicated by bits of F6-67

F6-67 Attendant Function Selection			
Bit	Function	Description	Default
Bit0	Calls cancelled after entering attendant state	All car calls and hall calls are cancelled after the system enters the attendant state for the first time.	0
Bit1	Not responding to hall calls	The car blinks inside, prompting there is hall call, but the system does not respond.	0
Bit2	Attendant/Automatic state switchover	If this function is enabled, the setting of F5-00 (Attendant/Normal switchover time) is valid.	0
Bit3	Door close at jogging	The elevator door closes after the attendant presses the door close button manually.	0
Bit4	Automatic door close	It is the same as the normal state. After the door open holding time is reached, the door closes automatically.	0
Bit5	Buzzer tweeting at intervals in attendant state	When the hall call floor and the car call floor are different, the buzzer tweets 2.5s at intervals.	0
Bit6	Continuous buzzer tweeting in attendant state	When the hall call floor and the car call floor are different, the buzzer tweets continuously.	0
Bit7	Car call button blinking to prompt	When the hall call input is active, the car call button for the corresponding floor blinks to give a prompt.	0

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-68	Fire emergency function selection	0–65535	16456	-	★

Each bit of the function code defines a function, as described in the following table.

If a bit is set to 1, the function indicated by this bit is enabled; if this bit is set to 0, the function is disabled.

For details on how to view and set this function code in bit, refer to F6-06.

Table 7-11 Fire emergency functions indicated by bits of F6-68

F6-68 Fire Emergency Function Selection			
Bit	Function	Description	Default
Bit3	Arrival gong output in inspection or fire emergency state	The arrival gong is output in the inspection or fire emergency state.	0
Bit4	Multiple car calls registered in fire emergency state	Multiple car calls can be registered in the fire emergency state. If this function is disabled, only one car call can be registered.	0
Bit5	Retentive at power failure in fire emergency state	In the fire emergency state, the current system and car state will be memorized at power failure and be resumed after the system is powered on again.	0

F6-68 Fire Emergency Function Selection			
Bit	Function	Description	Default
Bit6	Closing door by holding down the door close button	In the fire emergency state, the door close process can be completed only by holding down the door close button until the door close limit is reached. Otherwise, it will be switched over to door open automatically.	0
Bit9	Displaying hall calls in fire emergency state	Hall calls are displayed in the fire emergency state.	0
Bit11	Exiting fire emergency state for firefighter	The system can exit the fire emergency state only after the elevator arrives at the fire emergency floor.	0
Bit12	Not clearing car calls at reverse door open in firefighter running state	In the firefighter running state, the car calls that have been registered are not cleared at reverse door open.	0
Bit13	Reserved	-	0
Bit14	Opening door by holding down the door open button	In the fire emergency state, the door open process can be completed only by holding down the door open button until the door open limit is reached. Otherwise, it will be switched over to door close automatically.	0
Bit15	Automatic door open in fire emergency floor	The door opens automatically after the elevator arrives at the fire emergency floor.	0

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-69	Emergency evacuation function selection	0–65535	0	-	★

Each bit of the function code defines a function, as described in the following table.

If a bit is set to 1, the function indicated by this bit is enabled; if this bit is set to 0, the function is disabled.

For details on how to view and set this function code in bit, refer to F6-06.

Table 7-12 Emergency evacuation functions indicated by bits of F6-69

F6-69 Emergency Evacuation Function Selection								
Bit	Function	Description						Default
Bit0	Direction determine mode	0	Automatically calculating direction	0	Load direction determining (based on load cell data or half-load signal)	1	Direction of nearest landing floor	0
Bit1		0		1		0		0
Bit2	Stopping at evacuation parking floor	During evacuation running, the elevator arrives at the evacuation parking floor set in F6-73 (it must be a non-zero value and is a service floor). Otherwise, the elevator stops at the nearest floor.						0
Bit4	Compensation at startup	The non-load-cell startup is still valid in the process of evacuation running.						0

F6-69 Emergency Evacuation Function Selection				
Bit	Function	Description		Default
Bit8	Emergency running time protection	If the elevator does not arrive at the required floor after 50s emergency evacuation running time, Err33 is reported. In this case, the function of switching over shorting stator braking mode to controller drive based on the time setting cannot be implemented.		0
Bit9	Reserved	-		0
Bit10	Emergency buzzer output	The buzzer tweets at intervals in the emergency evacuation running state.		0
Bit12	Shorting stator braking mode switched over to controller drive	It enables the function of switching over shorting stator braking mode to controller drive.		0
Bit13	Mode of shorting stator braking mode switched over to controller drive	0	Time setting If the time of the shorting stator braking mode exceeds the time set in F6-75, the controller starts to drive the elevator.	0
		1	Speed setting If the speed is still smaller than the value of F6-72 after 10s in the shorting stator braking mode, the controller starts to drive the elevator.	
Bit14	Emergency evacuation exit mode	0	The system exits emergency evacuation when receiving the door open limit signal from the elevator that arrives at the target floor.	0
		1	The system exits emergency evacuation when receiving the door close limit signal from the elevator that arrives at the target floor.	
Bit15	Function selection of shorting stator braking mode	When this function is enabled, the setting of related function codes becomes effective.		0

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-72	Emergency evacuation switching speed	0.010–0.630	0.010	m/s	★

It is used to set the switching speed at shorting stator braking mode switched over to controller drive via speed setting.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-73	Evacuation parking floor	0 to F6-00	0	-	★

It is used to set the evacuation parking floor when Bit2 (Stopping at evacuation parking floor) in F6-69 is enabled.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-74	Blinking advance time	0.0–15.0	1	s	☆

It is used to set the blinking advance time when the elevator arrives the floor required by the car call.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F6-75	Waiting time for switchover from shorting stator braking mode to controller drive	0.0–45.0	20.0	s	☆

It is used to set the interval for switchover from shorting stator braking mode to controller drive mode. If the elevator does not reach the leveling position with the time set in this parameter, the system switches over to the controller drive mode for emergency evacuation.

Group F7: Output Terminal Parameters

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F7-00	Y0 function selection	00–05 or 32	00	-	★

As an independent relay output, Y0 can be allocated with any function among all the relay output functions. When function 32 "emergency evacuation at power failure" is required, only Y0 can be used as the relay for this output. F7-00 must be set to 32 so that the elevator can switch over to the emergency evacuation state after power failure.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F7-01	Y1 function selection	00–05	01	-	★
F7-02	Y2 function selection	00–05	02	-	★
F7-03	Y3 function selection	00–05	04	-	★

The functions that can be allocated for F1-01 to F7-03 are as follows:

- 00: Invalid

  The terminal has no function.

- 01: RUN contactor output

  The terminal with this function controls whether the RUN contactor is opened or closed.

- 02: Brake contactor control

  The terminal with this function controls whether the brake contactor is opened or closed.

- 03: Higher-voltage startup of brake

  The terminal retains the output for continuous 4s to control startup of the brake.

- 04: Lamp/Fan running

  It is used for the lamp/fan running output.

- 05: Shorting PMSM stator contactor

  When the elevator enters emergency running state upon power failure, the brake is released and this signal is output. The car automatically moves to the nearest

leveling position under the effect of the weighing difference between the car and the counterweight. This function can also be used during normal elevator running to enhance the safety.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F7-04	Y4 function selection	06–99	00	-	★
F7-05	Y5 function selection	06–99	00	-	★
F7-06	Y6 function selection	06–99	06	-	★
...	...	...	...	-	★
F7-27	Y27 function selection	06–99	00	-	★

The output functions are as follows:

00: Invalid

06: Door 1 open output 07: Door 1 close output 08: Door 2 open output

09: Door 2 close output 10: Low 7-segment a display output

11: Low 7-segment b display output 12: Low 7-segment c display output

13: Low 7-segment d display output 14: Low 7-segment e display output

15: Low 7-segment f display output 16: Low 7-segment g display output

17: Up arrow display output 18: Down arrow output

19: Minus sign display output 20: Returning to base floor at fire emergency

21: Buzzer output 22: Overload output 23: Arrival gong output

24: Full-load output 25: Inspection output 26: Fan/Lamp output 2

27: Shorting door lock circuit contactor output

28: BCD/Gray code/7-segment high-bit output

29: Controller normal running output 30: Electric lock output

31: Reserved 32: Emergency evacuation at power failure

33: Forced door close 1 34: Forced door close 2

35: Faulty state 36: Up signal

37: Medical sterilization output 38: Non-door zone stop output

39: Non-service state output 40: Reserved

41: High 7-segment a display output 42: High 7-segment b display output

43: High 7-segment c display output 44: High 7-segment d display output

45: High 7-segment e display output 46: High 7-segment f display output

47: High 7-segment g display output 48–99: Reserved

Group F8: Enhanced Function Parameters

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F8-00	Load for load cell auto-tuning	0–100	0	%	★

It is used to set the load for load cell auto-tuning.

To perform load cell auto-tuning, do as follows:

1. Ensure that F8-01 is set to 0 and F8-08 is set to 1 to make the system allow load cell auto tuning.
2. Stop the elevator at any floor, with the car in the no-load state. Set F8-00 to 0 and press ENTER.
3. Put N% load in the car. Then set F8-00 to N and press ENTER.

   For example, if you put 500 kg load in the elevator with rated load of 1000 kg, set F8-00 to 50.

After the load-cell auto-tuning is completed, the corresponding no-load and full-load data will be recorded in F8-06 and F8-07. You can also manually input the data according to the actual situation.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F8-01	Pre-torque selection	0–2	0	-	★

It is used to set the pre-torque compensation mode at startup of the elevator.

The values are as follows:

- 0: Pre-torque invalid

  Load cell auto-tuning is allowed.

- 1: Load cell pre-torque compensation

  With a load cell, the system implements the pre-torque compensation function.

- 2: Automatic pre-torque compensation

  The system automatically adjusts the compensated torque at startup without a load cell.

If F8-01 is set to 1, the system outputs the torque matching the load in advance to ensure the riding comfort at startup. The output torque is limited by F2-08 (Torque upper limit). When the load torque is greater than the set torque upper limit, the output torque of the system is the torque upper limit.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F8-02	Pre-torque offset	0.0–100.0	50.0	%	★

It is used to set the pre-torque offset. It is actually the balance coefficient of the elevator, indicating the percentage of the car load to the rated load when the counterweight and the car weight are balanced.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F8-03	Drive gain	0.00–2.00	0.60	-	★
F8-04	Brake gain	0.00–2.00	0.60	-	★

These two parameters are used to set the pre-torque gain when the elevator runs on the drive side or the brake side.

For details, see section 5.1.5.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F8-05	Current car load	0–255	0	-	●

This parameter is read-only and reflects the load situation in the car. The value is sampled by the NICE1000^{new} by using a load cell. This parameter is used to judge overload or full-load, or calculate the torque current for load cell pre-torque compensation.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F8-06	Car no-load load	0–255	0	-	★
F8-07	Car full-load load	0–255	100	-	★

These two parameters respectively specify the car no-load load and full-load load. They are AD sampling values.

Note

If F8-06 = F8-07, the full-load and overload become invalid.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F8-08	Load cell input selection	0: MCB digital sampling 1: MCB analog sampling	0	-	☆

It is used to set the channel of elevator load cell signals. Set this parameter correctly before using the load cell device.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F8-09	Emergency evacuation operation speed at power failure	0.000 to F3-11	0.050	m/s	★

It is used to set the speed for emergency evacuation operation at power failure.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F8-10	Emergency evacuation operation mode at power failure	0–2	0	-	★

It is used to set the emergency evacuation operation mode at power failure.

- 0: Motor not running
- 1: UPS
- 2: 48 V battery power supply

For details, see section 5.2.1.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F8-11	Brake apply delay	0.200–1.500	0.200	s	★

It is used to set the time from the moment when the system sends the brake apply command to the moment when the brake is completely applied. For details, see Figure 7-3.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F8-12	Fire emergency floor 2	0 to F6-00	0	-	★

It is used to set the second fire emergency floor. The switchover between fire emergency floor 1 and fire emergency floor 2 is implemented by means of input from the MCB. When this signal is input, the elevator enters the fire emergency state and returns to this floor.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F8-13	Anti-nuisance function	Bit0: Disabled Bit1: Judged by light curtain Bit 2: Judged by light-load signal	0	-	☆

It is the criteria for judging whether nuisance exists.

- Bit0: Anti-nuisance function disabled
- Bit1: Nuisance judged by light curtain

  The system determines that nuisance exists when the light curtain does not act after the elevator stops at arrival for three consecutive times.
- Bit2: Nuisance judged by light-load signal

  If the light-load signal is active, the system determines that nuisance exists when the number of car calls is greater than a certain value.

When the system determines that the elevator is in the nuisance state, it cancels all car calls. In this case, call calls need to be registered again.

Group F9: Time Parameters

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F9-00	Idle time before returning to base floor	0–240	10	min	☆

It is used to set the idle time of the elevator before returning to the base floor.

When the idle time of the elevator exceeds the setting of this parameter, the elevator returns to the base floor.

If this parameter is set to 0, it becomes invalid.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F9-01	Time for fan and lamp to be turned off	0–240	2	min	☆

It is used to set the time that fan and lamp stays ON before being turned off automatically.

If there is no running command in the automatic running state, the system turns off the fan and lamp automatically after the time set in this parameter.

If this parameter is set to 0, it becomes invalid.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F9-02	Motor running time limit	0–45	45	s	★

It is used to set the running time limit of the motor.

In normal running state, if the continuous motor running time in the same direction between two adjacent floors exceeds the setting of this parameter but no leveling signal is received, the system will perform protection.

This parameter is mainly used for over-time protection in the case of steel rope slipping on the traction sheave.

If this parameter is set to a value smaller than 3s, it becomes invalid.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
F9-03	Accumulative running time	0–65535	0	h	●
F9-05	High byte of running times	0–9999	0	-	●
F9-06	Low byte or running times	0–9999	0	-	●

These parameters are used to view the actual accumulative running time and running times of the elevator.

Running times of the elevator = F9-11 x 10000 + F9-12.

Group FA: Keypad Setting Parameters

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FA-01	Display in running state	1–65535	65535	-	☆

It is used to set the running parameters displayed on the keypad when the elevator is in the running state.

A total of 16 running parameters can be displayed during running, each respectively corresponding to the 16 binary bits of FA-01. If a bit is set to 1, the parameter indicated by this bit is displayed; if this bit is set to 0, the parameter is not displayed.

You can switch over the displayed parameter by pressing  and set whether to display this parameter according to your own using habit.

The 16 binary bits correspond to the running parameters listed in the following table.

Table 7-13 Running parameters corresponding to 16 bits of FA-01

Bit	Parameter Name	Default	Bit	Parameter Name	Default
Bit0	Running speed	1	Bit8	Car load	1
Bit1	Set speed	1	Bit9	System state	1
Bit2	Bus voltage	1	Bit10	Pre-toque current	1
Bit3	Output voltage	1	Bit11	Input terminal 1 state	1
Bit4	Output current	1	Bit12	Input terminal 2 state	1
Bit5	Output frequency	1	Bit13	Input terminal 3 state	1
Bit6	Current floor	1	Bit14	Output terminal 1 state	1
Bit7	Current position	1	Bit15	Output terminal 2 state	1

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FA-02	Display in stop state	1–65535	65535	-	☆

It is used to set the parameters displayed on the keypad when the elevator is in the stop state.

A total of 16 parameters can be displayed at stop. The use is the same as that of FA-01.

The 16 binary bits correspond to the stop parameters listed in the following table.

Table 7-14 Stop parameters corresponding to 16 bits of FA-02

Bit	Parameter Name	Default	Bit	Parameter Name	Default
Bit0	Set speed	1	Bit8	Input terminal 2 state	1
Bit1	Bus voltage	1	Bit9	Input terminal 3 state	1
Bit2	Current floor	1	Bit10	Output terminal 1 state	1
Bit3	Current position	1	Bit11	Output terminal 2 state	1
Bit4	Car load	1	Bit12	Reserved	0
Bit5	Slow-down distance at rated speed	1	Bit13	Reserved	0
Bit6	System state	1	Bit14	Reserved	0
Bit7	Input terminal state 1	1	Bit15	Reserved	0

The running and stop parameters of the NICE1000^{new} system are the important references for engineers to perform commissioning on site. The parameters are described as follows:

1. Running speed: indicates the actual running speed of the elevator.

   Its maximum value is F0-03 (Maximum running speed), in unit of m/s.

2. Set speed: indicates the set speed of the NICE1000^{new} system during elevator running. It is the running speed calculated by the system theoretically at which the elevator should run, in unit of m/s.

3. Bus voltage: indicates the DC bus voltage of the NICE1000^{new} system, in unit of m/s.

4. Current floor: indicates the information of the physical floor where the elevator is located.

It is the same as the value of F4-01.

5. Current position: indicates the absolute distance from the current elevator car to the leveling plate of the first floor, in unit of m.
6. Car load: indicates the percentage of the car load to the rated load judged by the NICE1000^{new} system based on data from the sensor, in unit of %.
7. Output voltage: indicates the effective value of the equivalent voltage of the PWM wave output by the NICE1000^{new} system, in unit of V.
8. Output current: indicates the effective value of the actual current when the NICE1000^{new} system drives the motor to turn, in unit of A.
9. Output frequency: indicates the actual frequency of the motor during running. It has a fixed corresponding relationship with the running speed. The unit is Hz.
10. Pre-torque current: indicates the percentage of the pre-torque current compensated during startup to the rated current, in unit of %.
11. Input terminal 1 state: indicate the meaning of input terminals by bit. "1" indicates that the signal is active.

A total of 16 bits are defined as below:

Bit	Meaning	Bit	Meaning
Bit0	Reserved	Bit8	Shorting door lock circuit contactor feedback
Bit1	Up leveling signal	Bit9	Inspection signal
Bit2	Down leveling signal	Bit10	Inspection up signal
Bit3	Door zone signal	Bit11	Inspection down signal
Bit4	RUN contactor feedback	Bit12	Fire emergency signal
Bit5	Brake contactor feedback	Bit13	Reserved
Bit6	Brake travel switch feedback	Bit14	Elevator lock signal
Bit7	Self-lock feedback	Bit15	Up limit signal

12. Input terminal 2 state: indicate the meaning of input terminals by bit. "1" indicates that the signal is active.

A total of 16 bits are defined as below:

Bit	Meaning	Bit	Meaning
Bit0	Down limit signal	Bit8	Door 1 close limit
Bit1	Up slow-down signal	Bit9	Door 2 close limit
Bit2	Down slow-down signal	Bit10	Door machine 1 light curtain
Bit3	Overload signal	Bit11	Door machine 2 light curtain
Bit4	Full-load signal	Bit12	Attendant signal
Bit5	Emergency stop (safety feedback) signal	Bit13	Direct travel ride signal
Bit6	Door 1 open limit	Bit14	Direction change signal
Bit7	Door 2 open limit	Bit15	Independent running

13. Input terminal 3 state: indicates the meaning of output terminals by bit. "1" indicates that the signal is active.

A total of 16 bits are defined as below:

Bit	Meaning	Bit	Meaning
Bit0	Door 2 selection	Bit8	Motor overheat
Bit1	UPS input	Bit9	Door 1 safety edge
Bit2	Door open button	Bit10	Door 2 safety edge
Bit3	Door close button	Bit11	Earthquake signal
Bit4	Safety circuit	Bit12	Back door forbidden
Bit5	Door lock circuit 1	Bit13	Half-load signal
Bit6	Door lock circuit 2	Bit14	Single/Double door selection
Bit7	Half-load signal	Bit15	Fire emergency floor switchover

14. Output terminal 1 state: indicates the meaning of output terminals by bit. "1" indicates that the signal is active.

A total of 16 bits are defined as below:

Bit	Meaning	Bit	Meaning
Bit0	Reserved	Bit8	Door 2 open
Bit1	RUN contactor	Bit9	Door 2 close
Bit2	Brake contactor	Bit10	Low 7-segment a display output
Bit3	Higher-voltage startup of brake	Bit11	Low 7-segment b display output
Bit4	Fan/Lamp output	Bit12	Low 7-segment c display output
Bit5	Shorting PMSM stator contactor output	Bit13	Low 7-segment d display output
Bit6	Door 1 open	Bit14	Low 7-segment e display output
Bit7	Door 1 close	Bit15	Low 7-segment f display output

15. Output terminal 2 state: indicates the meaning of CTB outputs by bit. "1" indicates that the signal is active.

A total of 16 bits are defined as below:

Bit	Meaning	Bit	Meaning
Bit0	Low 7-segment g display output	Bit8	Full-load output
Bit1	Up arrow display output	Bit9	Inspection output
Bit2	Down arrow output	Bit10	Fan/Lamp output 2
Bit3	Minus sign display output	Bit11	Shorting door lock circuit contactor output
Bit4	Returning to base floor at fire emergency output	Bit12	BCD/Gray code/7-segment c ode high-bit output

Bit	Meaning	Bit	Meaning
Bit5	Buzzer output	Bit13	Controller normal running output active
Bit6	Overload output	Bit14	Electric lock output
Bit7	Arrival gong output	Bit15	Reserved

16. System state: indicates the system state by bit. "1" indicates that the signal is active.

A total of 16 bits are defined as below:

Bit	Meaning	Bit	Meaning
Bit0	Light curtain state 1	Bit8	Car state: 1: Door open 2: Door open holding 3: Door close 4: Door close limit 5: Running
Bit1	Light curtain state 2	Bit9	
Bit2	Elevator lock	Bit10	
Bit3	Fire emergency	Bit11	
Bit4	Elevator state: 0: Inspection 1: Shaft auto-tuning 3: Return to base floor at fire emergency 4: Firefighter operation 6: Attendant operation 7: Automatic (normal)	Bit12	Full-load
Bit5		Bit13	Overload
Bit6		Bit14	Reserved
Bit7		Bit15	Reserved

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FA-03	Current encoder angle	0.0–359.9	0.0	Degree (°)	●

It displays the real-time encoder angle. This parameter cannot be modified.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FA-05	Control board software	0–65535	0	-	●
FA-06	Drive board software	0–65535	0	-	●

These two parameters respectively display the program version number of the logic control board and the drive control board.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FA-07	Heatsink temperature	0–100	0	°C	●

It displays the current temperature of the heatsink.

Normally, the heatsink temperature is below 40°C. When the heatsink temperature is too high, the system lowers the carrier frequency automatically to reduce heat dissipation. When the heatsink temperature rises to a certain value, the system reports the module overheat fault and stops running.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FA-08	Controller model	-	1000	-	●

It displays the NICE series model of the controller.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FA-11	Pre-torque current	0.0–200.0	0	%	●

It displays the percentage of pre-torque current to the rated current (positive/negative display, indicating driving or braking).

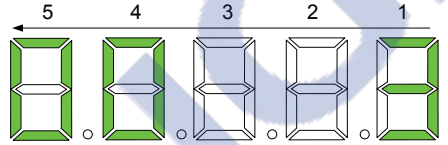
Function Code	Parameter Name	Setting Range	Default	Unit	Property
FA-12	Logic information	0–65535	0	-	●

It displays the elevator status parameters.

The LEDs are arranged as 5, 4, 3, 2, 1 from left to right. LED 1 shows the state of door 1. LEDs 2 and 3 have no display. LEDs 4 and 5 together show the elevator state.

The following figure shows the elevator in inspection and door close state.

Figure 7-7 Elevator state display



The LEDs are defined in the following table.

Table 7-15 LED display of the elevator state

LED 5		LED 4		LED 3	LED 2	LED 1	
Elevator State				No Display	No Display	Door 1 State	
00	Inspection state	8	Elevator lock	-	-	0	Waiting state
01	Shaft auto-tuning	09	Idle elevator parking			1	Door open state
02	Micro-leveling	10	Re-leveling at inspection speed			2	Door open limit
03	Returning to base floor at fire emergency	11	Emergency evacuation operation			3	Door close state
04	Firefighter operation	12	Motor auto-tuning			4	Door close limit
05	Fault state	13	Keypad control			-	-
06	Attendant operation	14	Base floor check			-	-
07	Automatic running	-	-			-	-

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FA-13	Curve information	0–65535	0	-	●

It displays the system running curve information. Similar to the display of FA-12, LEDs 5, 4 and 3 have no display, while LEDs 2 and 1 show the running curve information.

LED 5	LED 4	LED 3	LED 2		LED 1	
No Display	No Display	No Display	Curve Information			
-	-	-	00	Standby state	09	Deceleration start segment
			01	Zero-speed start segment	10	Linear deceleration segment
			02	Zero-speed holding segment	11	Deceleration end segment
			03	Reserved	12	Zero speed at stop
			04	Startup speed stage	13	Current stop phase
			05	Acceleration start segment	14	Reserved
			06	Linear acceleration segment	15	Stop data processing
			07	Acceleration end segment	16-20	Auto-tuning stage
			08	Stable-speed running segment	21	Emergency operation

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FA-14	Set speed	0.000–4.000	0	m/s	●
FA-15	Feedback speed	0.000–4.000	0	m/s	●
FA-16	Bus voltage	0–999.9	0	V	●
FA-17	Present position	0.00–300.0	0	m	●
FA-18	Output current	0.0–999.9	0	A	●
FA-19	Output frequency	0.00–99.99	0	Hz	●
FA-20	Torque current	0.0–999.9	0	A	●
FA-21	Output voltage	0–999.9	0	V	●
FA-22	Output torque	0–200.0	0	%	●
FA-23	Output power	0.00–99.99	0	kW	●

These parameters display the current performance state of the system (the output torque and output power supports positive/negative display).

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FA-24	Communication interference	0–65535	0	-	●

It displays the current communication quality of the system, as described in the following table.

Table 7-16 Communication quality display

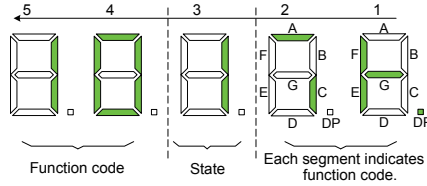
LED 5		LED 4	LED 3		LED 2	LED 1
SPI Communication Quality		No Display	CAN2 Communication Quality		No Display	No Display
0	Good	-	0	Good	-	-
↓	↑		↓	↑		
9	Interrupted		9	Interrupted		

0–9 indicates the communication quality. The greater the number is, the larger interference the communication suffers and the poorer the communication quality is.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FA-26	Input state 1	0–65535	0	-	●
FA-27	Input state 2	0–65535	0	-	●
FA-28	Input state 3	0–65535	0	-	●
FA-29	Input state 4	0–65535	0	-	●
FA-30	Input state 5	0–65535	0	-	●
FA-31	Output state 1	0–65535	0	-	●
FA-32	Output state 2	0–65535	0	-	●
FA-33	Output state 3	0–65535	0	-	●
FA-34	Floor I/O state 1	0–65535	0	-	●
FA-35	Floor I/O state 2	0–65535	0	-	●
FA-36	Floor I/O state 3	0–65535	0	-	●
FA-37	Floor I/O state 4	0–65535	0	-	●
FA-38	Floor I/O state 5	0–65535	0	-	●
FA-39	Floor I/O state 6	0–65535	0	-	●
FA-40	Floor I/O state 7	0–65535	0	-	●

The following figure shows an example of the displayed input states.

Figure 7-9 Example of input state display



As shown in the preceding figure, the LEDs from right to left are numbered 1, 2, 3, 4, and

5. For FA-26 to FA-37, LEDs 5 and 4 show the function No.; LED 3 shows whether the function is valid (1) or invalid (0); the 16 segments of LEDs 1 and 2 show the states of the 16 functions in this parameter.

The preceding figure shows display of FA-16: LEDs 5, 4, and 3 show that function 10 (Inspection down) is 1 (Valid); LEDs 1 and 2 show that besides function 10, functions 4 (RUN contactor feedback), 5 (Brake contactor feedback), 6 (Brake travel switch feedback), 7 (Shorting PMSM stator contactor feedback), and 8 (Shorting door lock circuit contactor feedback) are valid.

FA-26 Input state 1				FA-27 Input state 2			
No.	Function	No.	Function	No.	Function	No.	Function
0	Reserved	8	Shorting door lock circuit contactor feedback	0	Down limit signal	8	Door 1 close limit
1	Up leveling signal	9	Inspection signal	1	Up slow-down signal	9	Door 2 close limit
2	Down leveling signal	10	Inspection up	2	Down slow-down signal	10	Door machine 1 light curtain
3	Door zone signal	11	Inspection down	3	Overload signal	11	Door machine 2 light curtain
4	RUN contactor feedback	12	Fire emergency signal	4	Full-load signal	12	Attendant signal
5	Brake contactor feedback	13	Reserved	5	Emergency stop signal	13	Direct travel ride signal
6	Brake travel switch feedback	14	Elevator lock	6	Door 1 open limit	14	Direction change signal
7	Shorting PMSM stator contactor feedback	15	Up limit signal	7	Door 2 open limit	15	Independent running
FA-28 Input state 3				FA-29 Input state 4			
No.	Function	No.	Function	No.	Function	No.	Function
0	Door 2 selection	8	Motor overheat	0	Virtual floor	8	Reserved
1	UPS input	9	Door 1 safety edge	1	Firefighter switch	9	Reserved
2	Door open button	10	Door 2 safety edge	2	Brake travel switch feedback 2	10	Reserved
3	Door close button	11	Earthquake signal	3	Reserved	11	Reserved
4	Safety circuit	12	Back door forbidden	4	Reserved	12	Reserved
5	Door lock circuit 1	13	Half-load signal	5	Reserved	13	Reserved
6	Door lock circuit 2	14	Single/Double door selection	6	Reserved	14	Reserved
7	Half-load signal	15	Fire emergency floor switchover	7	Reserved	15	Reserved

FA-30 Input state 5				FA-31 Output state 1			
No.	Function	No.	Function	No.	Function	No.	Function
0	Reserved	8	Reserved	0	Reserved	8	Door 2 open
1	Higher-voltage safety circuit	9	Reserved	1	RUN contactor	9	Door 2 close
2	Higher-voltage door lock circuit 1	10	Reserved	2	Brake contactor	10	Low 7-segment a display output
3	Higher-voltage door lock circuit 2	11	Reserved	3	Higher-voltage startup of brake	11	Low 7-segment b display output
4	Reserved	12	Reserved	4	Fan/Lamp output	12	Low 7-segment c display output
5	Reserved	13	Reserved	5	Shorting PMSM stator contactor output	13	Low 7-segment d display output
6	Reserved	14	Reserved	6	Door 1 open	14	Low 7-segment e display output
7	Reserved	15	Reserved	7	Door 1 close	15	Low 7-segment f display output
FA-32 Output state 2				FA-33 Output state 3			
No.	Function	No.	Function	No.	Function	No.	Function
0	Low 7-segment g display output	8	Full-load output	0	Emergency evacuation at power failure	8	Reserved
1	Up arrow display output	9	Inspection output	1	Forced door close 1	9	High 7-segment a display output
2	Down arrow output	10	Fan/Lamp output 2	2	Forced door close 2	10	High 7-segment b display output
3	Minus sign display output	11	Shorting door lock circuit contactor output	3	Faulty state	11	High 7-segment c display output
4	Returning to base floor at fire emergency output	12	BCD/Gray code/7-segment c ode high-bit output	4	Up signal	12	High 7-segment d display output
5	Buzzer output	13	Controller normal running output active	5	Medical sterilization output	13	High 7-segment e display output
6	Overload output	14	Electric lock output	6	Non-door zone stop output	14	High 7-segment f display output
7	Arrival gong output	15	Reserved	7	Non-service state output	15	High 7-segment g display output

The input/output signals of all floors are viewed in FA-34 to FA-40, as described in the following table.

FA-34 Floor I/O state 1				FA-35 Floor I/O state 2 (door 1 car call)			
No.	Function	No.	Function	No.	Function	No.	Function
0	Door 1 open	8	Door 2 open	0	Floor 1 car call	8	Floor 9 car call
1	Door 1 close	9	Door 2 close	1	Floor 2 car call	9	Floor 10 car call
2	Door 1 open delay	10	Door 2 open delay	2	Floor 3 car call	10	Floor 11 car call
3	Door 2 selection	11	Reserved	3	Floor 4 car call	11	Floor 12 car call
4	Reserved	12	Reserved	4	Floor 5 car call	12	Floor 13 car call
5	Reserved	13	Reserved	5	Floor 6 car call	13	Floor 14 car call
6	Reserved	14	Reserved	6	Floor 7 car call	14	Floor 15 car call
7	Reserved	15	Reserved	7	Floor 8 car call	15	Floor 16 car call
FA-36 Floor I/O state 3 (door 1 up call)				FA-37 Floor I/O state 4 (door 1 down call)			
No.	Function	No.	Function	No.	Function	No.	Function
0	Floor 1 up call	8	Floor 9 up call	0	Reserved	8	Floor 9 down call
1	Floor 2 up call	9	Floor 10 up call	1	Floor 2 down call	9	Floor 10 down call
2	Floor 3 up call	10	Floor 11 up call	2	Floor 3 down call	10	Floor 11 down call
3	Floor 4 up call	11	Floor 12 up call	3	Floor 4 down call	11	Floor 12 down call
4	Floor 5 up call	12	Floor 13 up call	4	Floor 5 down call	12	Floor 13 down call
5	Floor 6 up call	13	Floor 14 up call	5	Floor 6 down call	13	Floor 14 down call
6	Floor 7 up call	14	Floor 15 up call	6	Floor 7 down call	14	Floor 15 down call
7	Floor 8 up call	15	Reserved	7	Floor 8 down call	15	Floor 16 down call
FA-38 Floor I/O state 5 (door 2 car call)				FA-39 Floor I/O state 6 (door 2 up call)			
No.	Function	No.	Function	No.	Function	No.	Function
0	Floor 1 car call	8	Floor 9 car call	0	Floor 1 up call	8	Floor 9 up call
1	Floor 2 car call	9	Floor 10 car call	1	Floor 2 up call	9	Floor 10 up call
2	Floor 3 car call	10	Floor 11 car call	2	Floor 3 up call	10	Floor 11 up call
3	Floor 4 car call	11	Floor 12 car call	3	Floor 4 up call	11	Floor 12 up call
4	Floor 5 car call	12	Floor 13 car call	4	Floor 5 up call	12	Floor 13 up call
5	Floor 6 car call	13	Floor 14 car call	5	Floor 6 up call	13	Floor 14 up call
6	Floor 7 car call	14	Floor 15 car call	6	Floor 7 up call	14	Floor 15 up call
7	Floor 8 car call	15	Floor 16 car call	7	Floor 8 up call	15	Reserved

FA-39 Floor I/O state 7 (door 2 down call)				FA-41 System state			
No.	Function	No.	Function	No.	Function	No.	Function
0	Reserved	8	Floor 9 down call	0	Up direction	8	-
1	Floor 2 down call	9	Floor 10 down call	1	Down direction	9	-
2	Floor 3 down call	10	Floor 11 down call	2	System in running state	10	-
3	Floor 4 down call	11	Floor 12 down call	3	System full-load	11	-
4	Floor 5 down call	12	Floor 13 down call	4	System overload	12	-
5	Floor 6 down call	13	Floor 14 down call	5	System half-load	13	-
6	Floor 7 down call	14	Floor 15 down call	6	System light-load	14	-
7	Floor 8 down call	15	Floor 16 down call	7	-	15	-

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FA-41	System state	0–65535	0	-	★

It displays the current system I/O state.

Group Fb: Door Function Parameters

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fb-00	Number of door machine (s)	1–2	1	-	★

It is used to set the number of door machine(s).

Set this parameter based on actual conditions.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fb-01	Opposite door control mode	0–3	0	-	●

It is used to set the opposite door control mode. The values are as follows:

0: Simultaneous control

1: Hall call independent, car call simultaneous

2: Hall call independent, car call manual control

3: Hall call independent, car call independent

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fb-02	Service floors of door machine 1	0–65535	65535	-	☆
Fb-04	Service floors of door machine 2	0–65535	65535	-	☆

These parameters are used to set the service floors of door machine 1 and door machine 2. These parameters are set in the same way as F6-05. For details, refer to F6-05.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fb-03	Holding time of manual door open	1–60	10	s	☆

It is used to set the delay time after door open limit under manual control. This parameter is valid only the manual door function is used.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fb-06	Door open protection time	5–99	10	s	☆

It is used to set the door open protection time.

After outputting the door open command, if the system does not receive the door open limit signal after the time set in this parameter, the system re-opens the door. When the door open/close times reach the value set in Fb-09, the system reports fault Err48.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fb-07	Program control selection	0–65535	0	-	☆

It is used to select the required program control functions.

Each bit of the function code defines a function, as described in the following table.

If a bit is set to 1, the function indicated by this bit is enabled; if this bit is set to 0, the function is disabled.

For details on how to view and set this function code in bit, refer to F6-06.

Table 7-16 Program control functions indicated by bits of Fb-07

Fb-07 Program control selection			
Bit	Function	Description	Default
Bit5	Synchronous motor current detection	The system detects the output current at startup of the synchronous motor, and blocks the output and forbids running if the current is abnormal.	0
Bit13	Higher voltage/ Lower voltage 1.5s detection	When the higher voltage/lower voltage safety and door lock signals are set, the higher voltage and lower voltage signals must be consistent within 1.5s. Otherwise, the system considers that the signals are invalid. You need to power on the system again and then the system restores the detection.	0

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fb-08	Door close protection time	5–99	15	s	☆

It is used to set the door close protection time.

After outputting the door close command, if the system does not receive the door close limit signal after the time set in this parameter, the system re-closes the door. When the door open/close times reach the value set in Fb-09, the system reports fault Err49.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fb-09	Door open/close protection times	0–20	0	-	☆

It is used to set the door re-open/re-close times allowed when door open/close is abnormal.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fb-10	Door state of standby elevator	0–2	0	-	☆

It is used to set the door state when the elevator is in stop and standby state.

The values are as follows:

- 0: Closing the door as normal at base floor
- 1: Waiting with door open at base floor
- 2: Waiting with door open at each floor

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fb-11	Door open holding time for hall call	1–1000	5	s	☆

It is used to set the door open holding time when there is a hall call. The elevator closes the door immediately after receiving a door close command.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fb-12	Door open holding time for car call	1–1000	3	s	☆

It is used to set the door open holding time when there is a car call. The elevator closes the door immediately after receiving a door close command.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fb-13	Door open holding time upon open delay valid	10–1000	30	s	☆

It is used to set the door open holding time when there is door open delay input. The elevator closes the door immediately after receiving a door close command.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fb-14	Door open holding time at base floor	1–1000	10	s	☆

It is used to set the door open holding time after the elevator arrives at the base floor. The elevator closes the door immediately after receiving a door close command.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fb-15	Arrival gong output delay	0–1000	0	ms	☆

It is used to set the delay of arrival gong output.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fb-16	Door lock waiting time at manual door	0–50	0	s	☆

When the manual door function is enabled, the elevator responds to other calls only after the time set in this parameter if the door lock is not disconnected upon arrival.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fb-17	Holding time for forced door close	5–180	120	s	☆

It is used to set the holding time before forced door close is implemented.

If the forced door close function is enabled, the system enters the forced door close state and sends a forced door close signal when there is no door close signal after the time set in this parameter is reached.

Group FC: Protection Function Parameters

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FC-00	Program control for protection function	0–65535	0	-	★

It is used to set program control related to protection functions.

Each bit of the function code defines a function, as described in the following table.

If a bit is set to 1, the function indicated by this bit is enabled; if this bit is set to 0, the function is disabled.

For details on how to view and set this function code in bit, refer to F6-06.

Table 7-17 Program control functions indicated by bits of FC-00

FC-00 Program control for protection function			
Bit	Function	Description	Default
Bit0	Short-circuit to ground detection at power-on	Whether the motor is short-circuited to ground is detected at power-on. If the motor is short-circuited to ground, the controller blocks the output immediately, and reports the fault.	0
Bit1	Canceling current detection at inspection startup	You can cancel the limit on the maximum current at startup for inspection.	0

FC-00 Program control for protection function			
Bit	Function	Description	Default
Bit2	Decelerating to stop at valid light curtain	During normal-speed running, the elevator decelerates to stop immediately after the light curtain acts, and then runs to the registered destination floor after the light curtain restores. This function is mainly used in the case of manual door.	0
Bit3	Password ineffective if no operation within 30 minutes	If you does not perform operation 30 minutes after entering the password, the operation panel exits the function code interface automatically. You need to enter the password again to perform operation.	0

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FC-01	Program control 2 for protection function	0–65535	1	-	★

It is used to set program control related to protection functions. "1" indicates that the function is enabled, and "0" indicates that the function is disabled.

FC-01 Program control 2 for protection function			
Bit	Function	Description	Default
Bit0	Overload protection	It sets whether to implement overload protection.	1
Bit1	Canceling protection at output phase loss	It sets whether to implement protection at output phase loss.	0
Bit2	Canceling over-modulation	It sets whether to implement over-modulation. 0: Over-modulation enabled 1: Over-modulation disabled	0
Bit4	Light curtain judgment at door close limit	At door close limit, the door re-opens if the light curtain is valid.	0
Bit5	Canceling SPI communication judgment	It sets whether to implement wire-breaking detection on SPI communication between the MCB and the drive board.	0
Bit9	Canceling Err55 alarm	The system does not report fault Err55 when the door open limit signal at arrival becomes inactive.	0
Bit14	Canceling protection at input phase loss	It sets whether to implement protection at input phase loss.	0

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FC-02	Overload protection coefficient	0.50–10.00	1.00	-	★

After detecting that the output current exceeds (FC-02 x Rated motor current) and the duration lasts the time specified in the inverse time lag curve, the system outputs fault Err11 indicating motor overload.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FC-03	Overload pre-warning coefficient	50–100	80	%	★

After detecting that the output current exceeds (FC-03 x Rated motor current) and the duration lasts the time specified in the inverse time lag curve, the system outputs a pre-warning signal.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FC-04	Designated fault	0–9999	0	-	●

It is used to designate the fault to be monitored.

The designated fault code is saved in parameters of FC-05 to FC-15, and will not be overwritten.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FC-05	Designated fault code	0–9999	0	-	●
FC-06	Designated fault subcode	0–65535	0	-	●
FC-07	Logic information of designated fault	0–65535	0	-	●
FC-08	Curve information of designated fault	0–65535	0	-	●
FC-09	Set speed upon designated fault	0.000–1.750	0	m/s	●
FC-10	Feedback speed upon designated fault	0.000–1.750	0	m/s	●
FC-11	Bus voltage upon designated fault	0.0–999.9	0	V	●
FC-12	Current position upon designated fault	0.0–300.0	0	m	●
FC-13	Output current upon designated fault	0.0–999.9	0	A	●
FC-14	Output frequency upon designated fault	0.00–99.99	0	Hz	●
FC-15	Torque current upon designated fault	0.0–999.9	0	A	●

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FC-16	1st fault code	0–9999	0	-	●
FC-17	1st fault subcode	0–65535	0	-	●
FC-18	2nd fault code	0–9999	0	-	●
FC-19	2nd fault subcode	0–65535	0	-	●
…					
FC-34	10th fault code	0–9999	0	-	●
FC-35	10th fault subcode	0–65535	0	-	●

These parameters record the latest 10 faults of the elevator.

The fault code is a 4-digit number. The two high digits indicate the floor where the car is

located when the fault occurs, and the two low digits indicate the fault code. For example, the 1st fault code is 0835, indicating that when the 1st fault (fault Err35) occurs, the car is near floor 8.

The fault subcode is used to locate the causes of the fault. The specific fault time is recorded in month, day, hour and minute.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FC-36	Latest fault code	0–9999	0	-	●
FC-37	Latest fault subcode	0–65535	0	-	●
FC-38	Logic information of latest fault	0–65535	0	-	●
FC-39	Curve information of latest fault	0–65535	0	-	●
FC-40	Set speed upon latest fault	0.000–1.750	0	m/s	●
FC-41	Feedback speed upon latest fault	0.000–1.750	0	m/s	●
FC-42	Bus voltage upon latest fault	0.0–999.9	0	V	●
FC-43	Current position upon latest fault	0.0–300.0	0	m	●
FC-44	Output current upon latest fault	0–999.9	0	A	●
FC-45	Output frequency upon latest fault	0.00–99.99	0	Hz	●
FC-46	Torque current upon latest fault	0.0–999.9	0	A	●

Group Fd: Communication Parameters

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fd-00	Local address	0–127 0: Broadcast address	1	-	★
Fd-01	Communication response delay	0–20	10	ms	★
Fd-02	Communication timeout	0.0–60.0 0: Invalid	0.0	s	★

These RS232 serial port communication parameters are used for communication with the monitor software in the host computer.

- Fd-00 specifies the current address of the controller. The setting of these two parameters must be consistent with the setting of the serial port parameters on the host computer.
- Fd-01 specifies the delay for the controller to send data by means of the serial port.
- Fd-02 specifies the communication timeout time of the serial port. Transmission of each frame must be completed within the time set in this parameter; otherwise, a communication fault occurs.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fd-03	Number of elevators in parallel control mode	1–2	1	-	★
Fd-04	Elevator No.	1–2	1	-	★

These two parameters are used to set the quantity and No. of the elevators in parallel control mode.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fd-05	Parallel control function selection	Bit0: Dispersed waiting	1	-	★

When Bit0 = 1, the elevator does not return to the base floor; one elevator waits at the base floor and the other waits at a non-base floor.

Group FE: Elevator Function Parameters

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FE-00	Collective selective mode	0–2	0	-	★

It is used to set the collective selective mode of the system.

The values are as follows:

- 0: Full collective selective

  The elevator responds to both up and down hall calls.

- 1: Down collective selective

  The elevator responds to down hall calls but does not respond to up hall calls.

- 2: Up collective selective

  The elevator responds to hall up calls but does not respond to hall down calls.

Function Code	Parameter Name	Setting Range		Default	Unit	Property
FE-01	Floor 1 display	The two high digits indicate the display code of the ten's digit, and the two low digits indicate the display code of the unit's digit. 00: Display "0" 01: Display "1" 02: Display "2" 03: Display "3" 04: Display "4" 05: Display "5" 06: Display "6" 07: Display "7" 08: Display "8" 09: Display "9" 10: Display "A"	11: Reserved 12: Reserved 13: Display "H" 14: Display "L" 15: Reserved 16: Display "P" 17: Reserved 18: Display "-" 19: No display 23: Display "C" 24: Display "d" 25: Display "E" 26: Display "F" 28: Display "J" 31: Display "o" 35: Display "U"	1901	-	☆
FE-02	Floor 2 display			1902	-	☆
FE-03	Floor 3 display			1903	-	☆
FE-04	Floor 4 display			1904	-	☆
FE-05	Floor 5 display			1905	-	☆
Floor 6 to floor 10 display				…		
FE-11	Floor 11 display			0101	-	☆
FE-15	Floor 12 display			0102	-	☆
FE-16	Floor 13 display			0103	-	☆
FE-17	Floor 14 display			0104	-	☆
FE-18	Floor 15 display			0105	-	☆
FE-19	Floor 16 display			0106	-	☆

These parameters are used to set the display of each floor. The setting range is 0000–9999, where the two high digits indicate the display code of the ten's digit, and the two low digits indicate the display code of the unit's digit.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FE-12	Hall call output selection	0–4	1	-	☆

It is used to set the coding method of the hall display board. By default, the system uses the BCD code.

- 0: 7-segment code
- 1: BCD code
- 2: Gray code
- 3: Binary code
- 4: One-to-one output

7-segment code: For the output setting, see the description in Group F7.

BCB/Gray code: A Y output controls a display bit. In the NICE1000^{new}, the output parameter of each display bit is based on the parameter setting of 7-segment code, as described in the following table.

Bit	Parameter of Output Y	Bit	Parameter of Output Y
Low Bit0	10: Low 7-segment a display output	Low Bit3	13: Low 7-segment d display output
Low Bit1	11: Low 7-segment b display output	High bits	28: High bit output of BCD/ Gray/7-segment code
Low Bit2	12: Low 7-segment c display output	-	-

Binary code: A Y output controls a display bit. In the NICE1000^{new}, the output parameter of each display bit is based on the parameter setting of 7-segment code, as described in the following table.

Bit	Parameter of Output Y	Bit	Parameter of Output Y
Bit0	10: Low 7-segment a display output	Bit3	13: Low 7-segment d display output
Bit1	11: Low 7-segment b display output	Bit4	14: Low 7-segment e display output
Bit2	12: Low 7-segment c display output	-	-

One to one output: A Y output is used for the display of each floor. In the NICE1000^{new}, the output parameter of each floor display is based on the parameter setting of 7-segment code, as described in the following table.

Floor	Parameter of Output Y	Floor	Parameter of Output Y
1	10: Low 7-segment a display output	9	42: High 7-segment b display output
2	11: Low 7-segment b display output	10	43: High 7-segment c display output
3	12: Low 7-segment c display output	11	44: High 7-segment d display output
4	13: Low 7-segment d display output	12	45: High 7-segment e display output
5	14: Low 7-segment e display output	13	46: High 7-segment f display output
6	15: Low 7-segment f display output	14	47: High 7-segment g display output
7	16: Low 7-segment g display output	15	19: Minus sign display output
8	41: High 7-segment a display output	16	28: High bit output of BCD/Gray/ 7-segment code

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FE-13	Elevator function selection 1	0–65535	0	-	☆

Each bit of the function code defines a function, as described in the following table.

If a bit is set to 1, the function indicated by this bit is enabled; if this bit is set to 0, the function is disabled.

For details on how to view and set this function code in bit, refer to F6-06.

Table 7-18 Elevator functions indicated by bits of FE-13

FE-13 Elevator function selection 1			
Bit	Function	Description	Default
Bit2	Re-leveling function	The elevator performs re-leveling at a low speed with door open. An external shorting door lock circuit contactor needs to be used together.	0
Bit3	Door pre-open function	During normal stop, when the elevator speed is smaller than a certain value and the door zone signal is active, the system shorts the door lock by means of the shorting door lock circuit contactor and outputs the door open signal, implementing door pre-open. This improves the elevator use efficiency.	0
Bit5	Forced door close	If the door still does not close within the time set in Fb-17 in automatic state, the system outputs the forced door close signal; at this moment, the light curtain becomes invalid and the buzzer tweets.	0
Bit6	Door open valid at non-door zone in the inspection state	In the inspection state, you can open/close the door by pressing the door open/close button at the non-door zone.	0
Bit7	Door open and close once after inspection turned to normal	The elevator door opens and closes once after the system turns from first-time inspection to normal running.	0
Bit9	Independent running	The independent running function is enabled.	0
Bit11	Door re-open after car call of the present floor	The door re-opens if the car call of the present floor is valid during door close.	1

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FE-14	Elevator function selection 2	0–65535	0	-	☆

It is used to set the elevator functions. "1" indicates that the function is enabled, and "0" indicates that the function is disabled.

It is used to set the elevator functions.

Each bit of the function code defines a function, as described in the following table.

If a bit is set to 1, the function indicated by this bit is enabled; if this bit is set to 0, the function is disabled.

For details on how to view and set this function code in bit, refer to F6-06.

Table 7-19 Elevator functions indicated by bits of FE-14

FE-14 Elevator Function Selection 2			
Bit	Function	Description	Default
Bit1	Door open holding at open limit	The system still outputs the door open command upon door open limit.	0

FE-14 Elevator Function Selection 2			
Bit	Function	Description	Default
Bit2	Door close command not output upon door close limit	The system stops outputting the door close command upon door close limit.	0
Bit3	Manual door	When this function is enabled, the system does not output the door open/close command (electric lock output still active), and does not detect door open/close limit.	0
Bit4	Auto reset for RUN and brake contactor stuck	If the feedback of the RUN and brake contactors is abnormal, faults Err36 and Err37 are reported, and you need to manually reset the system. With this function, the system resets automatically after the fault symptom disappears. A maximum of three auto reset times are supported.	0
Bit5	Slow-down switch stuck detection	The system detects the state of slow-down switches. Once detecting that a slow-down switch is stuck, the system instructs the elevator to slow down immediately and reports a corresponding fault.	1
Bit10	NO/NC output selection of shorting PMSM stator contactor	Bit10 = 0: NC output contactor Bit10 = 1: NO output contactor	0
Bit12	Fan/Lamp output	Bit12 = 0: NC output Bit12 =1: NO output	0

Group Fr: Leveling Adjustment Parameters

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fr-00	Leveling adjustment function	0: Disabled 1: Enabled	0	-	★

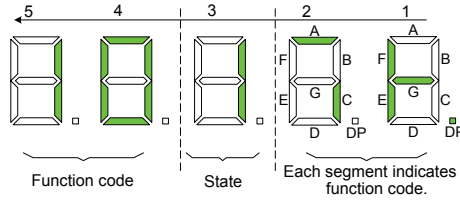
This parameter is used to enable the leveling adjustment function.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
Fr-01	Leveling adjustment record 1	00000–60060	30030	mm	★
Fr-02	Leveling adjustment record 2		30030	mm	★
…			…		
Fr-08	Leveling adjustment record 8		30030	mm	★

These parameters are used to record the leveling adjustment values. Each parameter records the adjustment information of two floors, and therefore, 40 floor adjustment records are supported totally.

The method of viewing the record is shown in the following figure.

Figure 7-10 Viewing the leveling adjustment record



As shown in the preceding figure, the left two LEDs and the right two LEDs respectively show the adjustment bases of floor 1 and floor 2. If the value is larger than 30, it is upward leveling adjustment; if the value is smaller than 30, it is downward leveling adjustment. The default value "30" indicates that there is no leveling adjustment. The maximum adjustment range is ±30 mm.

The leveling adjustment method is as follows:

1. Ensure that shaft auto-tuning is completed successfully, and the elevator runs properly at normal speed.
2. Set Fr-00 to 1 to enable the car leveling adjustment function. Then, the elevator shields hall calls, automatically runs to the top floor, and keeps the door open after arrival. If the elevator is at the top floor, it directly keeps the door open.
3. Go into the car, press the top floor button, and the leveling position is changed 1 mm upward; press the bottom floor button, and the leveling position is changed 1 mm downward. The value is displayed in the car.

   Positive value: up arrow + value, negative value: down arrow + value, adjustment range: ±30 mm
4. After completing adjustment for the current floor, press the top floor button and bottom floor button in the car at the same time to save the adjustment result. The car display restores to the normal state. If the leveling position of the current floor need not be adjusted, press the top floor button and bottom floor button in the car at the same time to exit the leveling adjustment state. Then, car calls can be registered.
5. Press the door close button, and press the button for the next floor. The elevator runs to the next floor and keeps the door open after arrival. Then, you can perform leveling adjustment.
6. After completing adjustment for all floors, set Fr-00 to 0 to disable the leveling adjustment function. Otherwise, the elevator cannot be used.

Group FF: Factory Parameters

Group FP: User Parameters

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FP-00	User password	0–65535	0	-	☆

It is used to set the user password. The value 0 indicates that no password is used.

If it is set to any non-zero number, the password protection function is enabled. After a password has been set and taken effect, you must enter the correct password in order to enter the menu. If the entered password is incorrect, you cannot view or modify parameters.

If FP-00 is set to 00000, the previously set user password is cleared, and the password protection function is disabled.

Remember the password that you set. If the password is set incorrectly or forgotten, contact Inovance to replace the control board.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FP-01	Parameter update	0–2	0	-	★

It is used to set processing on the parameters.

The values are as follows:

- 0: No operation
- 1: Restore default settings
- 2: Clear fault records

If you set this parameter to 1 (Restore default settings), all parameters except group F1 are restored to the default settings. Be cautions with this setting.

Function Code	Parameter Name	Setting Range	Default	Unit	Property
FP-02	User-defined parameter display	0: Invalid 1: Valid	0	-	★

It is used to set whether to display the parameters that are modified.

When it is set to 1, the parameters that are different from the default setting are displayed.

8

Troubleshooting

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Chapter 8 Troubleshooting

8.1 Maintenance

8.1.1 Routine Maintenance

The influence of the ambient temperature, humidity, dust and vibration will cause the aging of the components inside the controller, which may cause potential faults or reduce the service life of the controller. Therefore, it is necessary to carry out routine and periodic maintenance.

Routine maintenance involves checking:

- Whether abnormal noise exists during motor running
- Whether the motor vibrates excessively
- Whether the installation environment of the controller changes
- Whether the cooling fan works properly
- Whether the controller overheats

Routine cleaning involves:

- Keep the controller clean all the time.
- Remove the dust, especially metal powder on the surface of the controller, to prevent the dust from entering the controller.
- Clear the oil stain on the cooling fan of the controller.

8.1.2 Periodic Inspection

Perform periodic inspection on the items that are difficult to check during running. Periodic inspection involves:

- Check and clean the air filter periodically.
- Check whether the screws become loose.
- Check whether the controller is corroded.
- Check whether the wiring terminals have arc signs.
- Carry out the main circuit insulation test.

Note

Before measuring the insulating resistance with megameter (500 VDC megameter recommended), disconnect the main circuit from the controller. Do not use the insulating resistance meter to test the insulation of the control circuit. The high voltage test need not be performed again because it has been completed before delivery.

8.1.3 Replacement of Vulnerable Components

Vulnerable components of the controller include the cooling fan and filter electrolytic capacitor. Their service life is related to the operating environment and maintenance.

The service life of the two components is listed in the following table.

Table 8-1 Service life of cooling fan and filter electrolytic capacitor

Component	Service Life	Possible Damage Cause	Judging Criteria
Fan	2 to 3 years	• Bearing worn • Blade aging	• Check whether there is crack on the blade. • Check whether there is abnormal vibration noise upon startup.
Electrolytic capacitor	4 to 5 years	• Input power supply in poor quality • High ambient temperature • Frequent load jumping • Electrolytic aging	• Check whether there is liquid leakage. • Check whether the safety valve has projected. • Measure the static capacitance. • Measure the insulating resistance.

The service life is obtained based on the following conditions:

- Ambient temperature: average 30°C per year
- Load rate: below 80%
- Running time: less than 20 hours per day

8.1.4 Storage of the Controller

For storage of the controller, pay attention to the following two aspects:

1. Pack the controller with the original packing box provided by Inovance.
2. Long-term storage degrades the electrolytic capacitor. Thus, the controller must be energized once every 2 years, each time lasting at least 5 hours. The input voltage must be increased slowly to the rated value with the regulator.

8.2 Description of Fault Levels

The NICE1000^{new} has almost 60 pieces of alarm information and protective functions. It monitors various input signals, running conditions and feedback signals. If a fault occurs, the system implements the relevant protective function and displays the fault code.

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

Table 8-2 Fault levels

Category	Action	Remarks
Level 1	1. Display the fault code. 2. Output the fault relay action command.	1A. The elevator running is not affected on any condition.
Level 2	1. Display fault code. 2. Output the fault relay action command. 3. Continue normal running of the elevator.	2A. The paralle/group control I function is disabled.
		2B. The door pre-open/re-leveling function is disabled.
Level 3	1. Display the fault code. 2. Output the fault relay action command. 3. Stop output and apply the brake immediately after stop.	3A. In low-speed running, the elevator stops at special deceleration rate, and cannot restart.
		3B. In low-speed running, the elevator does not stop. In normal-speed running, the elevator stops, and then can start running at low speed after a delay of 3s.
Level 4	1. Display the fault code. 2. Output the fault relay action command. 3. In distance control, the elevator decelerates to stop and cannot run again.	4A. In low-speed running, the elevator stops under special deceleration rate, and cannot restart.
		4B. In low-speed running, the elevator does not stop. In normal-speed running, the elevator stops, and then can start running at low speed after a delay of 3s.
		4C. In low-speed running, the elevator does not stop. In normal-speed running, the elevator stops, and then can start running at low speed after a delay of 3s.
Level 5	1. Display the fault code. 2. Output the fault relay action command. 3. The elevator stops immediately.	5A. In low-speed running, the elevator stops immediately and cannot restart.
		5B. In low-speed running, the elevator does not stop. In normal-speed running, the elevator stops, and then can start running at low speed after a delay of 3s.

Note

- A, B, and C are fault sub-category.
- Low-speed running involves inspection, emergency evacuation, 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 lock, and elevator parking.

8.3 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 8-3 Fault codes and troubleshooting

Fault Code	Name	Possible Causes	Solution	Level
Err02	Overcurrent during acceleration	• The main circuit output is grounded or short circuited. • Motor auto-tuning is performed improperly. • The load is too heavy. • The encoder signal is incorrect. • The UPS running feedback signal is incorrect.	• Check whether the RUN contactor at the controller output side is normal. • Check: - Whether the power cable jacket is damaged - Whether the power cable is possibly short circuited to ground - Whether the power cable is connected reliably • Check the insulation of motor power terminals, and check whether the motor winding is short-circuited or grounded. • Check whether shorting PMSM stator causes controller output short circuit. • Check whether motor parameters comply with the nameplate. • Perform motor auto-tuning again. • Check whether the brake keeps released before the fault occurs and whether the brake is stuck mechanically. • Check whether the balance coefficient is correct. • Check whether the encoder wirings are correct. For asynchronous motor, perform SVC and compare the current to judge whether the encoder works properly.	5A
Err03	Overcurrent during deceleration	• The main circuit output is grounded or short circuited. • Motor auto-tuning is performed improperly. • The load is too heavy. • The deceleration rate is too short. • The encoder signal is incorrect.		5A

(To be continued)

Fault Code	Name	Possible Causes	Solution	Level
Err04	Overcurrent at constant speed	• The main circuit output is grounded or short circuited. • Motor auto-tuning is performed properly. • The load is too heavy. • The encoder is seriously interfered with.	• Check: - Whether encoder pulses per revolution (PPR) 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 - Whether the shield is grounded at one end • Check: - Whether the encoder is installed reliably - Whether the rotating shaft is connected to the motor shaft reliably - Whether the encoder is stable during normal-speed running • Check whether UPS feedback is valid in the non-UPS running state (Err02). • Check whether the acceleration/deceleration rate is too high (Err02, Err03). (End)	5A

Fault Code	Name	Possible Causes	Solution	Level
Err05	Overvoltage during acceleration	• The input voltage is too high. • The regeneration power of the motor is too high. • The braking resistance is too large, or the braking unit fails. • The acceleration rate is too short.	• Adjust the input voltage. Observe whether the bus voltage is normal and whether it rises too quickly during running. • Check for the balance coefficient. • Select a proper braking resistor and check whether the resistance is too large based on the recommended braking resistance table in chapter 3. • Check: - Whether the cable connecting the braking resistor is damaged - Whether the cooper wire touches the ground - Whether the connection is reliable	5A
Err06	Overvoltage during deceleration	• The input voltage is too high. • The braking resistance is too large, or the braking unit fails. • The deceleration rate is too short.		5A
Err07	Overvoltage at constant speed	• The input voltage is too high. • The braking resistance is too large, or the braking unit fails.		5A
Err09	Undervoltage	• Instantaneous power failure occurs on the input power supply. • The input voltage is too low. • The drive control board fails.	• Eliminate external power supply faults and check whether the power fails during running. • Check whether the wiring of all power input cables is secure. • Contact the agent or Inovance.	5A
Err10	Controller overload	• The brake circuit is abnormal. • The load is too heavy. • The encoder feedback signal is abnormal. • The motor parameters are incorrect. • A fault occurs on the motor power cables.	• Check the brake circuit and power input. • Reduce the load. • Check whether the encoder feedback signal and setting are correct, and whether the initial angle of the encoder for the PMSM is correct. • Check the motor parameter setting and perform motor auto-tuning. • Check the power cables of the motor (refer to the solution of Err02).	4A

Fault Code	Name	Possible Causes	Solution	Level
Err11	Motor overload	• FC-02 is set improperly. • The brake circuit is abnormal. • The load is too heavy.	• Adjust the parameter (FC-02 can be set to the default value). • Refer to the solution of Err10.	3A
Err12	Power supply phase loss	• The power input phases are not symmetric. • The drive control board fails.	• Check whether the three phases of power supply are balanced and whether the power voltage is normal. If not, adjust the power input. • Contact the agent or Inovance.	4A
Err13	Power output phase loss	• The output wiring of the main circuit is loose. • The motor is damaged.	• Check the wiring. • Check whether the contactor on the output side is normal. • Eliminate the motor fault.	4A
Err14	Module overheat	• The ambient temperature is too high. • The fan is damaged. • The air filter is blocked.	• Lower the ambient temperature. • Clear the air filter. • Replace the damaged fan. • Check whether the installation clearance of the controller satisfies the requirement.	5A
Err15	Output abnormal	• Braking short-circuit occurs on the output side. • The U, V, W output is abnormal.	• Check wiring of the braking resistor and braking unit is correct, without short-circuit. • Check whether the main contactor works properly. • Contact the agent or Inovance.	5A
Err16	Current control fault	The excitation current deviation is too large. The torque current deviation is too large. The torque limit is exceeded for a very long time.	• Check the circuit of the encoder. • The output MCCB becomes OFF. • The values of the current loop parameters are too small. • Perform motor auto-tuning again if the zero-point position is incorrect. • Reduce the load if it too heavy.	5A

Fault Code	Name	Possible Causes	Solution	Level
Err17	Reference signal of the encoder incorrect	The deviation between the Z signal position and the absolute position is too large. The deviation between the absolute position angle and the accumulative angle is too large.	• Check whether the encoder runs properly. • Check whether the encoder wiring is correct and reliable. • Check whether the PG card wiring is correct. • Check whether the grounding of the control cabinet and the motor is normal.	5A
Err18	Current detection fault	The drive control board fails.	Contact the agent or Inovance.	5A
Err19	Motor auto-tuning fault	The motor cannot rotate properly. The motor auto-tuning times out. The encoder for the PMSM fails.	• Enter the motor parameters correctly. • Check the motor wiring and whether phase loss occurs on the contactor at the output side. • Check the encoder wiring and ensure that the encoder PPR is set properly. • Check whether the brake keeps released during no-load auto-tuning. • Check whether the inspection button is released before the PMSM with-load auto-tuning is finished.	5A

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Fault Code	Name	Possible Causes	Solution	Level
Err20	Speed feedback incorrect	1: AB signals are lost during auto-tuning. 3: The phase sequence of the motor is incorrect. 4: Z signal cannot be detected during auto-tuning. 5: The CD signal cables of the SIN/COS encoder break. 7: The UVW cables of the UVW encoder break. 8: The angle deviation is too large. 9: Overspeed occurs or the speed deviation is too large. 10/11: AB signals or CD signals of the SIN/COS encoder are interfered with. 12: The detected speed is 0 at torque limit. 13: AB signals are lost during running. 14: Z signal is lost during running. 19: The AB analog signal cables break during low-speed running. 55: CD signal error or serious Z signal interference occurs during auto-tuning.	3: Exchange any two phases of the motor UVW cables. 1, 4, 5, 7, 8, 10, 11, 13, 14, 19: Check that all signal cable wiring of the encoder is correct and secure. 9: Check that the setting of F1-00, F1-12, and F1-25 for the synchronous motor is correct. 12: Check that there is no mechanical stuck and that the brake has been released during running. 55: Check that the grounding is reliable and eliminate interference problems.	5A
Err22	Leveling signal abnormal	101: The leveling signal is active during floor switchover. 102: The falling edge of the leveling signal is not detected during elevator startup and floor switchover. 103: The leveling position deviation is too large in elevator auto-running state.	101, 102: • Check whether the leveling and door zone sensors work properly. • Check the installation verticality and depth of the leveling plates. • Check the leveling signal input points of the MCB. 103: Check whether the steel rope slips.	1A
Err25	Storage data abnormal	101, 102: The storage data of the MCB is abnormal.	101, 102: Contact the agent or Inovance.	4A

Fault Code	Name	Possible Causes	Solution	Level
Err26	Earthquake signal	101: The earthquake signal is active and the duration exceeds 2s.	101: Check that the earthquake signal is consistent with the parameter setting (NC, NO) of the MCB.	3B
Err29	Shorting PMSM stator feedback abnormal	101: The shorting PMSM stator feedback is abnormal.	101: • Check that the state (NO, NC) of the feedback contact on the contactor is correct. • Check that the contactor and corresponding feedback contact act correctly. • Check the coil circuit of the shorting PMSM stator contactor.	5A
Err30	Elevator position abnormal	101, 102: In the normal-speed running or re-leveling running mode, the running time is larger than the value of F9-02, but the leveling signal has no change.	101, 102: • 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. • Check whether the distance between two floors is too large, causing too long re-leveling running time. • Check whether signal loss exists in the encoder circuits.	4A
Err33	Elevator speed abnormal	101: The detected running speed during normal-speed running exceeds the limit. 102: The speed exceeds the limit during inspection or shaft auto-tuning. 103: The speed exceeds the limit in shorting stator braking mode. 104: The speed exceeds the limit during emergency running. 105: The emergency running time protection function is enabled (set in Bit8 of F6-69), and the running time exceeds 50s, causing the timeout fault.	101: • Check whether the encoder is used properly. • Check the setting of motor nameplate parameters. Perform motor auto-tuning again. 102: Attempt to decrease the inspection speed or perform motor auto-tuning again. 103: Check whether the shorting PMSM stator function is enabled. 104, 105: • Check whether the emergency power capacity meets the requirements. • Check whether the emergency running speed is set properly.	5A

Fault Code	Name	Possible Causes	Solution	Level
Err34	Logic fault	Logic of the MCB is abnormal.	Contact the agent or Inovance.	5A
Err35	Shaft auto-tuning data abnormal	101: When shaft auto-tuning is started, the elevator is not at the bottom floor or the down slow-down is invalid, 102: The system is not in the inspection state when shaft auto-tuning is performed. 103: It is judged upon power-on that shaft auto-tuning is not performed. 104: In distance control mode, it is judged at running startup that shaft auto-tuning is not performed. 106, 107, 109, 114: The plate pulse length sensed at up/down leveling is abnormal. 108, 110: No leveling signal is received within 45s continuous running. 111, 115: The stored floor height is smaller than 50 cm. 112: The floor when auto-tuning is completed is not the top floor. 113: The pulse check is abnormal.	101: Check that the down slow-down switch is valid, and that F4-01 (Current floor) is set to 1. 102: Check that the inspection switch is in inspection state. 103, 104: Perform shat auto-tuning. 106, 107, 109, 114: • Check that NO/NC setting of the leveling sensor is set correctly • Check whether the leveling plates are inserted properly and whether there is strong power interference if the leveling sensor signal blinks. • Check whether the leveling plate is too long for the asynchronous motor. 108, 110: Check whether the running times out: No leveling signal is received when the running time exceeds F9-02. 111, 115: Enable the super short floor function if the floor distance is less than 50 cm. If the floor distance is normal, check installation of the leveling plate for this floor and check the sensor. 112: Check whether the setting of F6-00 (Top floor of the elevator) is smaller than the actual condition. 113: Check whether the signal of the leveling sensor is normal. Perform shaft auto-tuning again.	4C

Fault Code	Name	Possible Causes	Solution	Level
Err36	RUN contactor feedback abnormal	101: The feedback of the RUN contactor is active, but the contactor has no output. 102: The controller outputs the RUN signal but receives no RUN feedback. 103: The startup current of the asynchronous motor is too small. 104: When both feedback signals of the RUN contactor are enabled, their states are inconsistent.	101, 102, 104: • Check whether the feedback contact of the contactor acts properly. • Check the signal feature (NO, NC) of the feedback contact. 103: • Check whether the output cables UVW of the controller are connected properly. • Check whether the control circuit of the RUN contactor coil is normal.	5A
Err37	Brake contactor feedback abnormal	101: The output of the brake contactor is inconsistent with the feedback. 102: When both feedback signals of the brake contactor are enabled, their states are inconsistent. 103: The output of the brake contactor is inconsistent with the feedback 2. 104: When both feedback 2 signals of the brake contactor are enabled, their states are inconsistent.	101 to 104: • Check whether the brake coil and feedback contact are correct. • Check the signal feature (NO, NC) of the feedback contact. • Check whether the control circuit of the brake contactor coil is normal.	5A
Err38	Encoder signal abnormal	101: Pulse signal change in F4-03 does not change within the time threshold in of F1-13. 102: The running direction and pulse direction are inconsistent.	101, 102: • Check whether the encoder is used correctly. • Exchange phases A and B of the encoder. • Check whether the system and signal cables are grounded reliably. • Check whether cabling between the encoder and the PG card is correct.	5A
Err39	Motor overheat	101: The motor overheat relay input remains valid for a certain time.	101: • Check whether the thermal protection relay is normal. • Check whether the motor is used properly and whether it is damaged. • Improve cooling conditions of the motor.	3A

Fault Code	Name	Possible Causes	Solution	Level
Err40	Elevator running reached	The set elevator running time is reached.	Check the related parameter, or contact the agent or Inovance.	4B
Err41	Safety circuit disconnected	101: The safety circuit signal becomes OFF.	101: • Check the safety circuit switches and their states. • Check whether the external power supply is normal. • Check whether the safety circuit contactor acts properly. • Confirm the signal feature (NO, NC) of the feedback contact of the safety circuit contactor.	5A
Err42	Door lock disconnected during running	101: The door lock circuit feedback is invalid during the elevator running.	101: • Check whether the hall door lock and the car door lock are in good contact. • Check whether the door lock contactor acts properly. • Check the signal feature (NO, NC) of the feedback contact on the door lock contactor. • Check whether the external power supply is normal.	5A
Err43	Up limit signal abnormal	101: The up limit switch acts when the elevator is running in the up direction.	101: • Check the signal feature (NO, NC) of the up limit switch. • Check whether the up limit switch is in good contact. • Check whether the limit switch is installed at a relatively low position and acts even when the elevator arrives at the terminal floor normally.	4C
Err44	Down limit signal abnormal	101: The down limit switch acts when the elevator is running in the down direction.	101: • Check the signal feature (NO, NC) of the down limit switch. • Check whether the down limit switch is in good contact. • Check whether the limit switch is installed at a relatively high position and thus acts even when the elevator arrives at the terminal floor normally.	4C

Fault Code	Name	Possible Causes	Solution	Level
Err45	Slow-down switch position abnormal	101: The down slow-down distance is insufficient during shaft auto-tuning. 102: The up slow-down distance is insufficient during shaft auto-tuning. 103: The slow-down position is abnormal during normal running. 104, 105: The elevator speed exceeds the maximum speed when slow-down is enabled.	101 to 103: • Check whether the up slow-down and the down slow-down are in good contact. • Check the signal feature (NO, NC) of the up slow-down and the down slow-down. 104, 105: Ensure that the obtained slow-down distance satisfies the slow-down requirement at the elevator speed.	4B
Err46	Re-leveling abnormal	101: The leveling signal is inactive during re-leveling. 102: The re-leveling running speed exceeds 0.1 m/s. 103: At startup of normal-speed running, the re-leveling state is valid and there is shorting door lock circuit feedback. 104: During re-leveling, no shorting door lock circuit feedback or door lock signal is received 2s after shorting door lock circuit output.	101: Check whether the leveling signal is normal. 102: Check whether the encoder is used properly. 103, 104: • Check whether the signal of the leveling sensor is normal. • Check the signal feature (NO, NC) of the feedback contact on the shorting door lock circuit contactor, and check the relay and wiring of the SCB-A board.	2B
Err47	Shorting door lock circuit contactor abnormal	101: During re-leveling or pre-open running, the shorting door lock circuit contactor outputs for continuous 2s, but the feedback is invalid and the door lock is disconnected. 102: During re-leveling or pre-open running, the shorting door lock circuit contactor has no output, but the feedback is valid for continuous 2s. 103: During re-leveling or pre-open running, the output time of the shorting door lock circuit contactor is larger than 15s.	101, 102: • Check the signal feature (NO, NC) of the feedback contact on the shorting door lock circuit contactor. • Check whether the shorting door lock circuit contactor acts properly. 103: • Check whether the leveling and re-leveling signals are normal. • Check whether the re-leveling speed is set too low.	2B

Fault Code	Name	Possible Causes	Solution	Level
Err48	Door open fault	101: The consecutive times that the door does not open to the limit reaches the setting in Fb-13.	101: • Check whether the door machine system works properly. • Check whether the CTB is normal. • Check whether the door open limit signal is normal.	5A
Err49	Door close fault	101: The consecutive times that the door does not open to the limit reaches the setting in Fb-13.	101: • Check whether the door machine system works properly. • Check whether the CTB is normal. • Check whether the door lock acts properly.	5A
Err50	Consecutive loss of leveling signal	Leveling signal stuck or loss occurs for three consecutive times (Err22 is reported for three consecutive times).	• Check whether the leveling and door zone sensors work properly. • Check the installation verticality and depth of the leveling plates. • Check the leveling signal input points of the MCB. Check whether the steel rope slips.	5A
Err51	CAN communication abnormal	101: Feedback data of CANbus communication with the CTB remains incorrect.	101: • Check the communication cable connection. • Check the power supply of the CTB. • Check whether the 24 V power supply of the controller is normal. • Check whether strong-power interference on communication exists.	1A

Fault Code	Name	Possible Causes	Solution	Level
Err52	HCB communication abnormal	101: Feedback data of Modbus communication with the HCB remains incorrect.	101: • Check the communication cable connection. • Check whether the 24 V power supply of the controller is normal. • Check whether the HCB addresses are repeated. • Check whether strong-power interference on communication exists.	1A
Err53	Door lock fault	101: The door lock feedback signal remains active for more than 3s during door open. 102: The multiple door lock feedback signal states are inconsistent for more than 2s.	101: • Check whether the door lock circuit is normal. • Check whether the feedback contact of the door lock contactor acts properly. • Check whether the system receives the door open limit signal when the door lock signal is valid. 102: Check whether when the hall door lock signal and the car door lock signal are detected separately, the detected states of the hall door locks and car door lock are inconsistent.	5A
Err54	Overcurrent at inspection startup	The current at startup for inspection exceeds 110% of the rated current.	• Reduce the load • Change Bit1 of FC-00 to 1 to cancel the startup current detection function.	5A
Err55	Stop at another landing floor	101: During automatic running of the elevator, the door open limit is not achieved at the present floor.	101: Check the door open limit signal at the present floor.	1A
Err57	Serial peripheral interface (SPI) communication abnormal	101, 102: The SPI communication is abnormal. No correct data is received with 2s of DSP communication. 103: The MCB does not match the AC drive.	101, 102: Check the wiring between the control board and the drive board. 103: Contact the agent or Inovance.	5A

Fault Code	Name	Possible Causes	Solution	Level
Err58	Shaft position switches abnormal	101: The up slow-down and down slow-down are disconnected simultaneously. 102: The up limit feedback and down limit feedback are disconnected simultaneously.	101, 102: • Check whether the states (NO, NC) of the slow-down switches and limit switches are consistent with the parameter setting of the MCB. • Check whether malfunction of the slow-down switches and limit switches occurs.	4B
Err62	Analog input cable broken	The analog input cable of the CTB or the MCB is broken.	• Check whether F8-08 is set correctly. • Check whether the analog input cable of the CTB or MCB is connected incorrectly or broken.	1A

Note

- Fault Err41 is not recorded in the elevator stop state.
- Fault Err42 is reset automatically when the door lock circuit is shorted or 1s after the fault occurs in the door zone.
- If faults Err51 and Err52 persist, they are recorded once every one hour.
- Except the fault code and level, the number (such as 1, 101) indicates the fault subcode.

9

EMC

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Chapter 9 EMC

9.1 Definition of Terms

1. EMC

   Electromagnetic compatibility (EMC) describes the ability of electronic and electrical devices or systems to work properly in the electromagnetic environment and not to generate electromagnetic interference that influences other local devices or systems.

   In other words, EMC includes two aspects: The electromagnetic interference generated by a device or system must be restricted within a certain limit; the device or system must have sufficient immunity to the electromagnetic interference in the environment.

2. First environment

   Environment that includes domestic premises, it also includes establishments directly connected without intermediate transformers to a low-voltage power supply network which supplies buildings used for domestic purposes

3. Second environment

   Environment that includes all establishments other than those directly connected to a low-voltage power supply network which supplies buildings used for domestic purposes

4. Category C1 Controller

   Power Drive System (PDS) of rated voltage less than 1 000 V, intended for use in the first environment

5. Category C2 Controller

   PDS of rated voltage less than 1 000 V, which is neither a plug in device nor a movable device and, when used in the first environment, is intended to be installed and commissioned only by a professional

6. Category C3 Controller

   PDS of rated voltage less than 1 000 V, intended for use in the second environment and not intended for use in the first environment

7. Category C4 Controller

   PDS of rated voltage equal to or above 1 000 V, or rated current equal to or above 400 A, or intended for use in complex systems in the second environment

9.2 Introduction to EMC Standard

9.2.1 Installation Environment

The system manufacturer using the controller is responsible for compliance of the system with the European EMC directive. Based on the application of the system, the integrator must ensure that the system complies with standard EN 61800-3: 2004 Category C2, C3 or C4.

The system (machinery or appliance) installed with the controller must also have the CE mark. The system integrator is responsible for compliance of the system with the EMC directive and standard EN 61800-3: 2004 Category C2.

⚠WARNING

If applied in the first environment, the controller may generate radio interference. Besides the CE compliance described in this chapter, users must take measures to avoid such interference, if necessary.

9.2.2 Requirements on Satisfying the EMC Directive

1. The controller requires an external EMC filter. The recommended filter models are listed in Table 9-1. The cable connecting the filter and the controller should be as short as possible and be not longer than 30 cm. Furthermore, install the filter and the controller on the same metal plate, and ensure that the grounding terminal of the controller and the grounding point of the filter are in good contact with the metal plate.
2. Select the motor and the control cable according to the description of the cable in section 9.4.
3. Install the controller and arrange the cables according to the cabling and grounding in section 9.4.
4. Install an AC reactor to restrict the current harmonics. For the recommended models, see Table 9-2.

9.3 Selection of Peripheral EMC Devices

9.3.1 Installation of EMC Input Filter on Power Input Side

An EMC filter installed between the controller and the power supply can not only restrict the interference of electromagnetic noise in the surrounding environment on the controller, but also prevents the interference from the controller on the surrounding equipment.

The NICE1000^{new} controller satisfies the requirements of category C2 only with an EMC filter installed on the power input side. The installation precautions are as follows:

- Strictly comply with the ratings when using the EMC filter. The EMC filter is category I electric apparatus, and therefore, the metal housing ground of the filter should be in good contact with the metal ground of the installation cabinet on a large area, and requires good conductive continuity. Otherwise, it will result in electric shock or poor EMC effect.
- The grounds of the EMC filter and the PE conductor of the controller must be tied to the same common ground. Otherwise, the EMC effect will be affected seriously.
- The EMC filter should be installed as closely as possible to the power input side of the controller.

The following table lists the recommended manufacturers and models of EMC filters for the NICE1000^{new} controller. Select a proper one based on actual requirements.

Table 9-1 Recommended manufacturers and models of EMC filter

Controller Model	Power Capacity (kVA)	Rated Input Current (A)	AC Input Filter Model (Changzhou Jianli)	AC Input Filter Model (Schaffner)
Three-phase 380 V, range: -15% to 20%				
NICE-L-H-4002	4.0	6.5	DL-10EBK5	FN 3258-7-44
NICE-L-H-4003	5.9	10.5	DL-16EBK5	FN 3258-16-33
NICE-L-H-4005	8.9	14.8	DL-16EBK5	FN 3258-16-33
NICE-L-H-4007	11.0	20.5	DL-25EBK5	FN 3258-30-33
NICE-L-H-4011	17.0	29.0	DL-35EBK5	FN 3258-30-33
NICE-L-H-4015	21.0	36.0	DL-50EBK5	FN 3258-42-33
NICE-L-H-4018	24.0	41.0	DL-50EBK5	FN 3258-42-33
NICE-L-H-4022	30.0	49.5	DL-50EBK5	FN 3258-55-34
NICE-L-H-4030	40.0	62.0	DL-65EBK5	FN 3258-75-34
NICE-L-H-4037	57.0	77.0	DL-80EBK5	FN 3258-100-35
NICE-L-H-4045	69.0	93.0	DL-100EBK5	FN 3258-100-35
Three-phase 220, range: -15% to 20%				
NICE-L-H-2002	4.0	11.0	DL-16EBK5	FN 3258-7-44
NICE-L-H-2003	5.9	17.0	DL-25EBK5	FN 3258-7-44
220-NICE-L-H-4007	17.0	29.0	DL-35EBK5	FN 3258-7-44
220-NICE-L-H-4011	21.0	36.0	DL-50EBK5	FN 3258-16-33
220-NICE-L-H-4015	24.0	41.0	DL-50EBK5	FN 3258-16-33
220-NICE-L-H-4018	30.0	40.0	DL-50EBK5	FN 3258-30-33
220-NICE-L-H-4022	40.0	49.0	DL-50EBK5	FN 3258-30-33
220-NICE-L-H-4030	57.0	61.0	DL-65EBK5	FN 3258-42-33
Single-phase 220 V, range: -15% to 20%				
NICE-L-H-2002	2.3	13.2	DL-20TH1	FN2090-20-06
NICE-L-H-2003	3.4	17.0	DL-20TH1	FN2090-20-06
220-NICE-L-H-4007	9.8	29.0	DL-30TH1	FN2090-30-08
220-NICE-L-H-4011	12.1	36.0	DL-40K3	Consult the manufacturer.
220-NICE-L-H-4015	13.9	41.0	DL-50T3	
220-NICE-L-H-4018	17.3	40.0	DL-50T3	
220-NICE-L-H-4022	23.1	49.0	DL-50T3	
220-NICE-L-H-4030	33.0	61.0	DL-70TH1	

9.3.2 Installation of AC Input Reactor on Power Input Side

An AC input reactor is installed to eliminate the harmonics of the input current. As an optional device, the reactor can be installed externally to meet strict requirements of an application environment for harmonics. The following table lists the recommended manufacturers and models of input reactors.

Table 9-2 Recommended manufacturers and models of AC input reactors

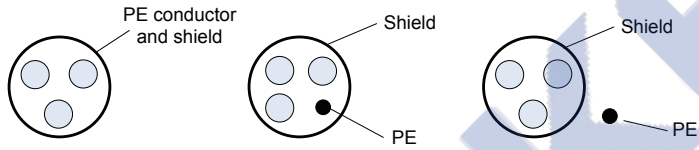
Controller Model	Power Capacity (kVA)	Rated Input Current (A)	AC Input Reactor Model (Inovance)
Three-phase 380 V, range: -15% to 20%			
NICE-L-H-4002	4.0	6.5	MD-ACL-7-4T-222-2%
NICE-L-H-4003	5.9	10.5	MD-ACL-10-4T-372-2%
NICE-L-H-4005	8.9	14.8	MD-ACL-15-4T-552-2%
NICE-L-H-4007	11.0	20.5	MD-ACL-30-4T-113-2%
NICE-L-H-4011	17.0	29.0	MD-ACL-30-4T-113-2%
NICE-L-H-4015	21.0	36.0	MD-ACL-40-4T-153-2%
NICE-L-H-4018	24.0	41.0	MD-ACL-50-4T-183-2%
NICE-L-H-4022	30.0	49.5	MD-ACL-50-4T-183-2%
NICE-L-H-4030	40.0	62.0	MD-ACL-80-4T-303-2%
NICE-L-H-4037	57.0	77.0	MD-ACL-80-4T-303-2%
NICE-L-H-4045	69.0	93.0	MD-ACL-120-4T-453-2%
Three-phase 220 V, range: -15% to 20%			
NICE-L-H-2002	4.0	11.0	MD-ACL-15-4T-222-2%
NICE-L-H-2003	5.9	17.0	MD-ACL-30-4T-222-2%
220-NICE-L-H-4007	17.0	29.0	MD-ACL-30-4T-113-2%
220-NICE-L-H-4011	21.0	36.0	MD-ACL-50-4T-113-2%
220-NICE-L-H-4015	24.0	41.0	MD-ACL-50-4T-153-2%
220-NICE-L-H-4018	30.0	40.0	MD-ACL-50-4T-183-2%
220-NICE-L-H-4022	40.0	49.0	MD-ACL-50-4T-183-2%
220-NICE-L-H-4030	57.0	61.0	MD-ACL-80-4T-303-2%
Single-phase 220 V, range: -15% to 20%			
NICE-L-H-2002	2.3	13.2	Consult the manufacturer.
NICE-L-H-2003	3.4	17.0	
220-NICE-L-H-4007	9.8	29.0	
220-NICE-L-H-4011	12.1	36.0	
220-NICE-L-H-4015	13.9	41.0	
220-NICE-L-H-4018	17.3	40.0	
220-NICE-L-H-4022	23.1	49.0	
220-NICE-L-H-4030	33.0	61.0	

9.4 Shielded Cable

9.4.1 Requirements for the Shielded Cable

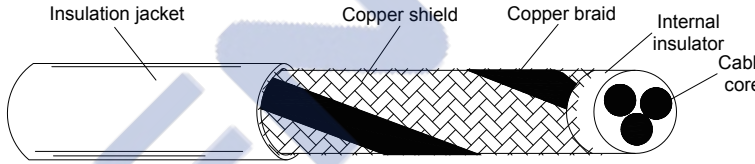
The shielded cable must be used to satisfy the EMC requirements. Shielded cables are classified into three-conductor cable and four-conductor cable. If conductivity of the cable shield is not sufficient, add an independent PE cable, or use a four-conductor cable, of which one phase conductor is PE cable.

The three-conductor cable and four-conductor cable are shown in the following figure.

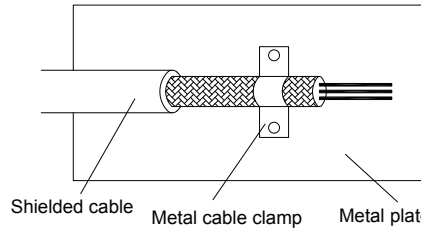


The motor cable and PE shielded conducting wire (twisted shielded) should be as short as possible to reduce electromagnetic radiation and external stray current and capacitive current of the cable.

To suppress emission and conduction of the radio frequency interference effectively, the shield of the shielded cable is cooper braid. The braided density of the cooper braid should be greater than 90% to enhance the shielding efficiency and conductivity, as shown in the following figure.

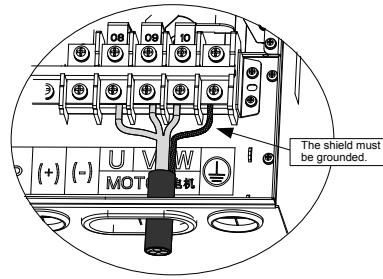


It is recommended that all control cables be shielded. The grounding area of the shielded cable should be as large as possible. A suggested method is to fix the shield on the metal plate using the metal cable clamp so as to achieve good contact, as shown in the following figure.



The following figure shows the grounding method of the shielded cable.

Figure 9-1 Grounding of the shielded cable



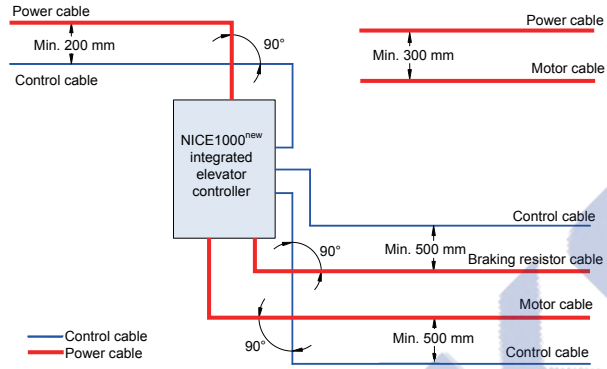
9.4.2 Installation Precautions of the Shielded Cable

- Symmetrical shielded cable is recommended. The four-conductor shielded cable can also be used as an input cable.
- The motor cable and PE shielded conducting wire (twisted shielded) should be as short as possible to reduce electromagnetic radiation and external stray current and capacitive current of the cable. If the motor cable is over 100 meters long, an output filter or reactor is required.
- It is recommended that all control cables be shielded.
- It is recommended that a shielded cable be used as the output power cable of the controller; the cable shield must be well grounded. For devices suffering from interference, shielded twisted pair (STP) cable is recommended as the lead wire and the cable shield must be well grounded.

9.4.3 Cabling Requirement

1. The motor cables must be laid far away from other cables, with recommended distance larger than 0.5 m. The motor cables of several controllers can be laid side by side.
2. It is recommended that the motor cables, power input cables and control cables be laid in different ducts. To avoid electromagnetic interference caused by rapid change of the output voltage of the controller, the motor cables and other cables must not be laid side by side for a long distance.
3. If the control cable must run across the power cable, make sure they are arranged at an angle of close to 90°. Other cables must not run across the controller.
4. The power input and output cables of the controller and weak-current signal cables (such as control cable) should be laid vertically (if possible) rather than in parallel.
5. The cable ducts must be in good connection and well grounded. Aluminium ducts can be used to improve electric potential.
6. The filter and controller should be connected to the cabinet properly, with spraying protection at the installation part and conductive metal in full contact.
7. The motor should be connected to the system (machinery or appliance) properly, with spraying protection at the installation part and conductive metal in full contact.

Figure 9-2 Cabling diagram



9.5 Solutions to Common EMC Interference Problems

The controller generates very strong interference. Although EMC measures are taken, the interference may still exist due to improper cabling or grounding during use. When the controller interferes with other devices, adopt the following solutions.

Interference Type	Solution
Leakage protection switch tripping	• Connect the motor housing to the PE of the controller. • Connect the PE of the controller to the PE of the mains power supply. • Add a safety capacitor to the power input cable. • Add magnetic rings to the input drive cable.
Controller interference during running	• Connect the motor housing to the PE of the controller. • Connect the PE of the controller to the PE of the mains voltage. • Add a safety capacitor to the power input cable and wind the cable with magnetic rings. • Add a safety capacitor to the interfered signal port or wind the signal cable with magnetic rings. • Connect the equipment to the common ground.
Communication interference	• Connect the motor housing to the PE of the controller. • Connect the PE of the controller to the PE of the mains voltage. • Add a safety capacitor to the power input cable and wind the cable with magnetic rings. • Add a matching resistor between the communication cable source and the load side. • Add a common grounding cable besides the communication cable. • Use a shielded cable as the communication cable and connect the cable shield to the common grounding point.

Interference Type	Solution
I/O interference	• Enlarge the capacitance at the low-speed DI. A maximum of 0.11 uF capacitance is suggested. • Enlarge the capacitance at the AI. A maximum of 0.22 uF is suggested.

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Revision History

Date	Version	Change Description
July 2014	V.0	First issue.
Dec 2016	B01	Modified product name, designation rule and nameplate.
Nov 2018	B02	Updated logo.

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INOVANCE Warranty Agreement

1) Inovance provides an 18-month free warranty to the equipment itself from the date of manufacturing for the failure or damage under normal use conditions.
2) Within the warranty period, maintenance will be charged for the damage caused by the following reasons:
   a. Improper use or repair/modification without prior permission
   b. Fire, flood, abnormal voltage, natural disasters and secondary disasters
   c. Hardware damage caused by dropping or transportation after procurement
   d. Operations not following the user instructions
   e. Damage out of the equipment (for example, external device factors)
3) The maintenance fee is charged according to the latest Maintenance Price List of Inovance.
4) If there is any problem during the service, contact Inovance's agent or Inovance directly.
5) Inovance reserves the rights for explanation of this agreement.

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