Monarch

User Guide
NICE3000B Series
Integrated Elevator Control Cabinet

User Guide

INOVANCE

A01
Data code 19010775

Preface

Thank you for purchasing the NICE3000B Integrated Elevator Control Cabinet.

It is an elevator control cabinet system independently designed and manufactured by Inovance Technology. Inovance provides a series of elevator solutions and a variety of integrated solutions conforming to the latest national standards to cater for your different needs. The NICE3000B is of new structure, with aesthetic appearance and proper arrangement. All the materials selected are cleaner and more environmental friendly. In addition, the new-generation NICE3000^{new} integrated controller is adopted, which can be used for driving an AC asynchronous motor or a permanent magnet synchronous motor only after modifying one parameter. The NICE3000B features high safety, high reliability, energy saving, reduced number of traveling cables, and fixed UIs for convenient operation and maintenance.

This guide describes the correct use of the NICE3000B, including product categories and features, safety information and precautions, installation, electrical design, and maintenance. Read and understand the guide before using the product, and keep it carefully for reference to future maintenance.

For more information about running and commissioning, visit Inovance's website www.inovance.com to download the NICE3000^{new} Integrated Elevator Controller User Guide (reference No.: 19010473).

Precautions
◆ The drawings in the guide 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 guide.
◆ The drawings in the guide are for reference only and may differ from the actual product.
◆ The guide will be updated in time after product upgrade or specification changes, and for applicability and accuracy.
◆ If your guide is damaged or missing, contact Inovance's agent in your region or Inovance's Customer Service Center for a new one.
◆ In case of any question in use, contact Inovance's Customer Service Center.

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Introduction

1 Connection of Peripheral Devices

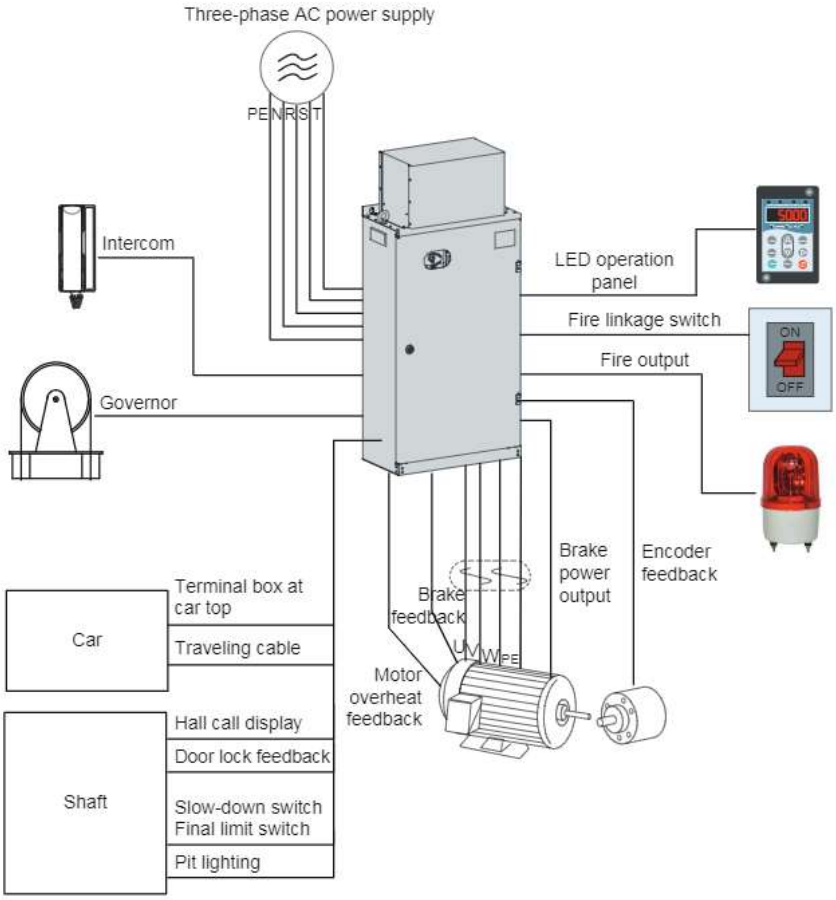


Figure 1 Connections between NICE3000B and peripheral devices

NOTE

- The figure shows the connection between NICE3000B and peripheral devices.
- Contact Inovance's sales staff for peripheral devices if required.

2 Basic Functions

Function	Description
Common Running Functions	
Door circuit fault detection	This function is enabled to check the door lock actions when the car door or landing door is opened; in case of a fault detected, the elevator stops running.
Full concentrated selection	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.
Door open time setting	The system automatically determines different door open time for door open against call, command, protection, or delay according to the set door open holding time.
Door open holding	In automatic running state, passengers can press the door open holding button in the car to delay door open to facilitate goods to be moved in or out.
Door operator service floor setting	You can set the required service floors of the door operators.
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.
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, automatic control on the two doors depends on your requirements.
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 again.
Voice announcement	The elevator automatically announces information such as the running direction and next arriving floor during running.
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.
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.
Cancellation of wrong calls	Passengers can press the button consecutively twice to cancel wrong calls.

Function	Description
Service floor setting	You can enable or disable the system service for certain floors flexibly based on actual requirements.
Service floor selection	You can set the time-based floor service and service floor, or select the service floor through the service floor switch.
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.
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.
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.
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.
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.
Running time recording	The system automatically records the accumulative working hours and working days of the elevator.
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.
Disability service	When the elevator is waiting at the leveling position, if there is a call at this floor from the disability operation box, the door open holding time is prolonged. It is the same for the back door.
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 hall 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/group control).
Overload protection	When the car load exceeds the rated elevator load, the elevator gives an alarm and stops running.
Fault data recording	The system automatically records detailed information of faults, which helps improve the efficiency of maintenance and repair.
Inspection-related Functions	
Bypass running function	The commissioning personnel can operate the bypass plugs on the interface board to allow the elevator to enter the inspection state, or conduct inspection of the landing door lock or car door lock.

Function	Description
Simple maintenance keypad	The 3-button keypad on the MCB provides the functions such as commissioning the running floors and door open/close.
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.
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.
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.
Firefighter operation	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.
Security floor	After the security floor function is enabled, the security floor is used at 10:00 p.m. to 6:00 a.m., and the elevator runs to the security floor first every time, stops and opens the door, and then runs to the destination floor.
Elevator lock	In automatic running state, when the elevator lock switch acts or the set elevator lock time is reached, the elevator returns to the elevator lock floor after canceling all calls, stops running, and turns off the lamp and fan in the car.
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.
Running mode at power failure Automatic switchover	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.

Function	Description
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.
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.
Energy-saving Functions	
Car energy-saving	If no running call is received after the set time, the system automatically switches off the lamp, fan, and so on in the car.
Arrival gong disabled at night	Within the set time period, the arrival gong is disabled.
Energy saving of idle door operator	After switching off the lamp in the car, the elevator system stops outputting door close command to reduce power consumption of the door operator.

3 Optional Functions

Function	Function Description	Remarks
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 passengers and goods in and out. In this case, the system allows the elevator to run to the leveling position in the door open state at the re-leveling speed.	Configure MCTC-MIB.
Power failure emergency evacuation	For the elevator configured with emergency power supply, the system uses the emergency power supply to implement low-speed self-rescue in the case of power failure.	Configure MCTC-ARD-C.
Door pre-open function	In automatic running state, when the elevator speed is smaller than 0.2 m/s and the door zone signal is active, the system shorts the door lock by means of the shorting door lock circuit relay and outputs the door open signal, implementing door pre-open. This improves the elevator use efficiency.	Configure MCTC-MIB.
IC card	Passengers need to use the IC card to go to floors that require authorization.	Configure IC cards.
Parallel running	The system supports parallel control of two elevators to meet your different requirements.	-
Anti-nuisance function	The system automatically judges the number of passengers inside the car and car call registers. If there are excessive car calls, the system determines that it is in nuisance state, and cancels all car calls. Then, car calls need to be registered again correctly.	-

Safety Instructions

Safety Precautions

1) Before installing, using, and maintaining this equipment, read the safety information and precautions thoroughly, and comply with them during operations.
2) To ensure the safety of humans and equipment, follow the signs on the equipment and all the safety instructions in this user guide.
3) "CAUTION", "WARNING", and "DANGER" items in the guide do not indicate all safety precautions that need to be followed; instead, they just supplement the safety precautions.
4) Use this equipment according to the designated environment requirements. Damage caused by improper usage is not covered by warranty.
5) Inovance shall take no responsibility for any personal injuries or property damage caused by improper usage.

Safety Levels and Definitions

Indicates that failure to comply with the notice will result in severe personal injuries or even death.

Indicates that failure to comply with the notice may result in severe personal injuries or even death.

Indicates that failure to comply with the notice may result in minor or moderate personal injuries or equipment damage.

Safety Instructions

Unpacking

◆ Check whether the packing is intact and whether there is damage, water seepage, damp, and deformation.
◆ Unpack the package by following the package sequence. Do not hit the package with force.
◆ Check whether there are damage, rust, or injuries on the surface of the equipment or equipment accessories.
◆ Check whether the number of packing materials is consistent with the packing list.

WARNING

- Do not install the equipment if you find damage, rust, or indications of use on the equipment or accessories.
- Do not install the equipment if you find water seepage, component missing or damage upon unpacking.
- Do not install the equipment if you find the packing list does not conform to the equipment you received.

Storage and Transportation

CAUTION

- Store and transport this equipment based on the storage and transportation requirements for humidity and temperature.
- Avoid transporting the equipment in environments such as water splashing, rain, direct sunlight, strong electric field, strong magnetic field, and strong vibration.
- Avoid storing this equipment for more than three months. Long-term storage requires stricter protection and necessary inspections.
- Pack the equipment strictly before transportation. Use a sealed box for long-distance transportation.
- Never transport this equipment with other equipment or materials that may harm or have negative impacts on this equipment.

WARNING

- Use professional loading and unloading equipment to carry large-scale or heavy equipment.
- When carrying this equipment with bare hands, hold the equipment casing firmly with care to prevent parts falling. Failure to comply may result in personal injuries.
- Handle the equipment with care during transportation and mind your step to prevent personal injuries or equipment damage.
- Never stand or stay below the equipment when the equipment is lifted by hoisting equipment.

Installation

WARNING

- Thoroughly read the safety instructions and user guide before installation.
- Do not modify this equipment.
- Do not rotate the equipment components or loosen fixed bolts (especially those marked in red) on equipment components.
- Do not install this equipment in places with strong electric or magnetic fields.
- When this equipment is installed in a cabinet or final equipment, protection measures such as a fireproof enclosure, electrical enclosure, or mechanical enclosure must be provided. The IP rating must meet IEC standards and local laws and regulations.

DANGER

- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed by only professionals.
- Installation, wiring, maintenance, inspection, or parts replacement must be performed by only experienced personnel who have been trained with necessary electrical information.
- Installation personnel must be familiar with equipment installation requirements and relevant technical materials.
- Before installing equipment with strong electromagnetic interference, such as a transformer, install an electromagnetic shielding device for this equipment to prevent malfunctions.

Wiring

DANGER

- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed by only professionals.
- Never perform wiring at power-on. Failure to comply will result in an electric shock.
- Before wiring, cut off all equipment power supplies. Wait at least 10 minutes before further operations because residual voltage exists after power-off.
- Make sure that the equipment is well grounded. Failure to comply will result in an electric shock.
- During wiring, follow the proper electrostatic discharge (ESD) procedures, and wear an antistatic wrist strap. Failure to comply will result in damage to internal equipment circuits.

WARNING

- Never connect the power cable to output terminals of the equipment. Failure to comply may cause equipment damage or even a fire.
- When connecting a drive with the motor, make sure that the phase sequences of the drive and motor terminals are consistent to prevent reverse motor rotation.
- Wiring cables must meet diameter and shielding requirements. The shielding layer of the shielded cable must be reliably grounded at one end.
- After wiring, make sure that no screws are fallen and cables are exposed in the equipment.

Power-on
DANGER ◆ Before power-on, make sure that the equipment is installed properly with reliable wiring and the motor can be restarted. ◆ Before power-on, make sure that the power supply meets equipment requirements to prevent equipment damage or even a fire. ◆ At power-on, unexpected operations may be triggered on the equipment. Therefore, stay away from the equipment. ◆ After power-on, do not open the cabinet door and protective cover of the equipment. Failure to comply will result in an electric shock. ◆ Do not touch any wiring terminals at power-on. Failure to comply will result in an electric shock. ◆ Do not remove any part of the equipment at power-on. Failure to comply will result in an electric shock.
Operation
DANGER ◆ Do not touch any wiring terminals during operation. Failure to comply will result in an electric shock. ◆ Do not remove any part of the equipment during operation. Failure to comply will result in an electric shock. ◆ Do not touch the equipment shell, fan, or resistor for temperature detection. Failure to comply will result in heat injuries. ◆ Signal detection must be performed by only professionals during operation. Failure to comply will result in personal injuries or equipment damage.
WARNING ◆ Prevent metal or other objects from falling into the device during operation. Failure to comply may result in equipment damage. ◆ Do not start or stop the equipment using the contactor. Failure to comply may result in equipment damage.
Maintenance
DANGER ◆ Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed by only professionals. ◆ Do not maintain the equipment at power-on. Failure to comply will result in an electric shock. ◆ Before maintenance, cut off all equipment power supplies and wait at least 10 minutes.

WARNING

- Perform daily and periodic inspection and maintenance for the equipment according to maintenance requirements and keep a maintenance record.

Repair

DANGER

- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed by only professionals.
- Do not repair the equipment at power-on. Failure to comply will result in an electric shock.
- Before inspection and repair, cut off all equipment power supplies and wait at least 10 minutes.

WARNING

- Require for repair services according to the product warranty agreement.
- When the equipment is faulty or damaged, require professionals to perform troubleshooting and repair by following repair instructions and keep a repair record.
- Replace quick-wear parts of the equipment according to the replacement guide.
- Do not operate damaged equipment. Failure to comply may result in worse damage.
- After the equipment is replaced, perform wiring inspection and parameter settings again.

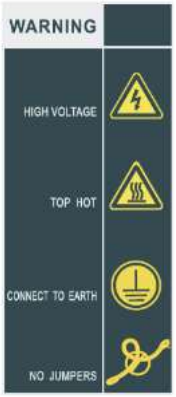
Disposal

WARNING

- Dispose of retired equipment by following local regulations or standards. Failure to comply may result in property damage, personal injuries, or even death.
- Recycle retired equipment by following industry waste disposal standards to avoid environmental pollution.

Safety Signs

For safe equipment operation and maintenance, comply with safety signs on the equipment, and do not damage or remove the safety labels. The following table describes the safety signs.

Safety Signs	Instructions
	◆ HIGH VOLTAGE! ◆ TOP HOT! ◆ DO NOT TOUCH!
	◆ HIGH VOLTAGE! ◆ TOP HOT! ◆ CONNECT TO EARTH! ◆ NO JUMPERS!

1 Product Information

1.1 Model and Nameplate

NICE3000 B - 4 015 - A 1

NICE3000 series

Mark	Controller Type
B	Machine-room
W	Machine-roomless

Mark	Voltage Class
4	Three-phase 380 V

Mark	SN
1	SN1
2	SN2

Mark	Motor Type
A	Asynchronous
B	Synchronous

Mark	Voltage Class
02	2.2 kW
03	3.7 kW
-	-
30	30 kW
37	37 kW

Figure 1-1 Description of model and nameplate

Table 1-1 Designation rules

Cabinet Type	Model	Power Rating	Installation Method
Machine-room control cabinet	NICE3000B-4002 to NICE3000B-4015	2.2 kW, 3.7 kW, 5.5 kW, 7.5 kW, 11 kW, 15 kW	Wall-mounted
	NICE3000B-4018 NICE3000B-4022	18.5 kW, 22 kW	Floor-mounted
	NICE3000B-4030 NICE3000B-4037	30 kW, 37 kW	
Machine-roomless control cabinet	NICE3000W-4005 to NICE3000W-4022	5.5 kW, 7.5 kW, 11 kW, 15 kW, 18.5 kW, 22 kW	Floor-mounted

NOTE

- The table only lists standard products. Contact Inovance's sales staff for customized products if required.
- The serial numbers are only for machine-roomless control cabinets such as ICE3000W-4015-B1 and NICE3000W-4015-B2.

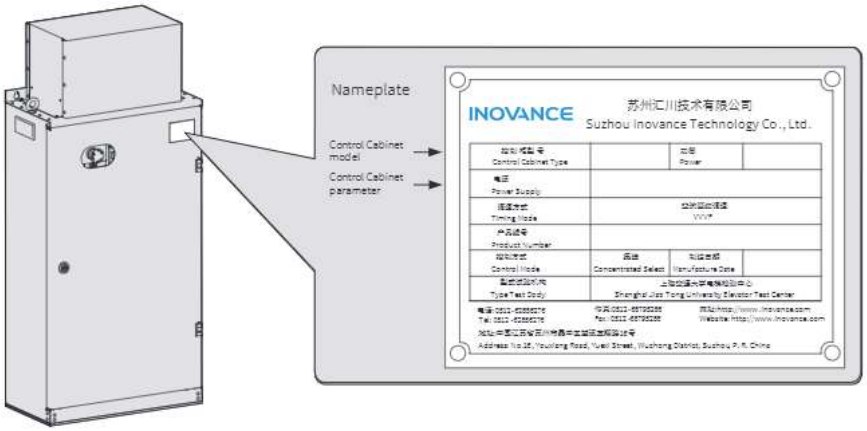


Figure 1-2 Description of nameplate

1.2 Description of Components

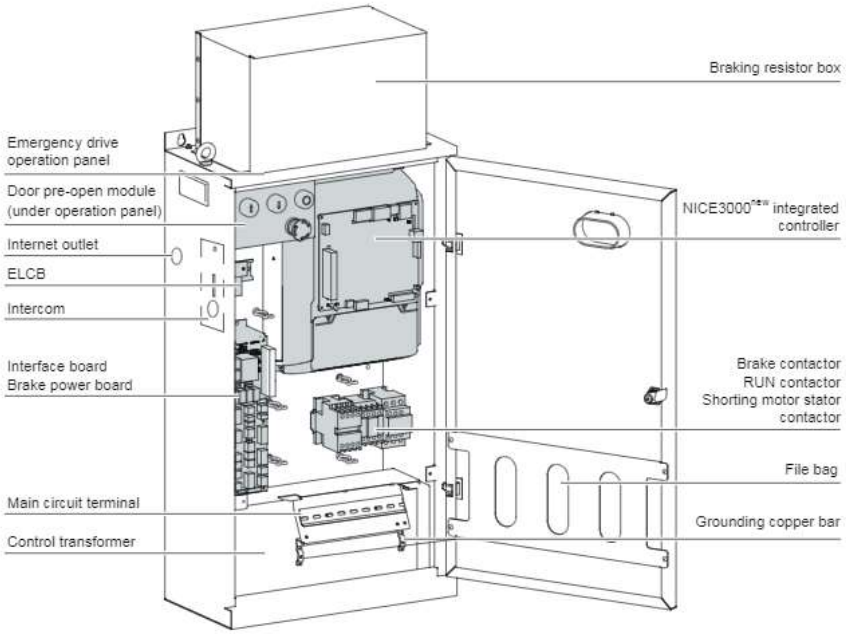


Figure 1-3 Description of components - machine-room control cabinet (NICE3000B-4002 to NICE3000B-4037)

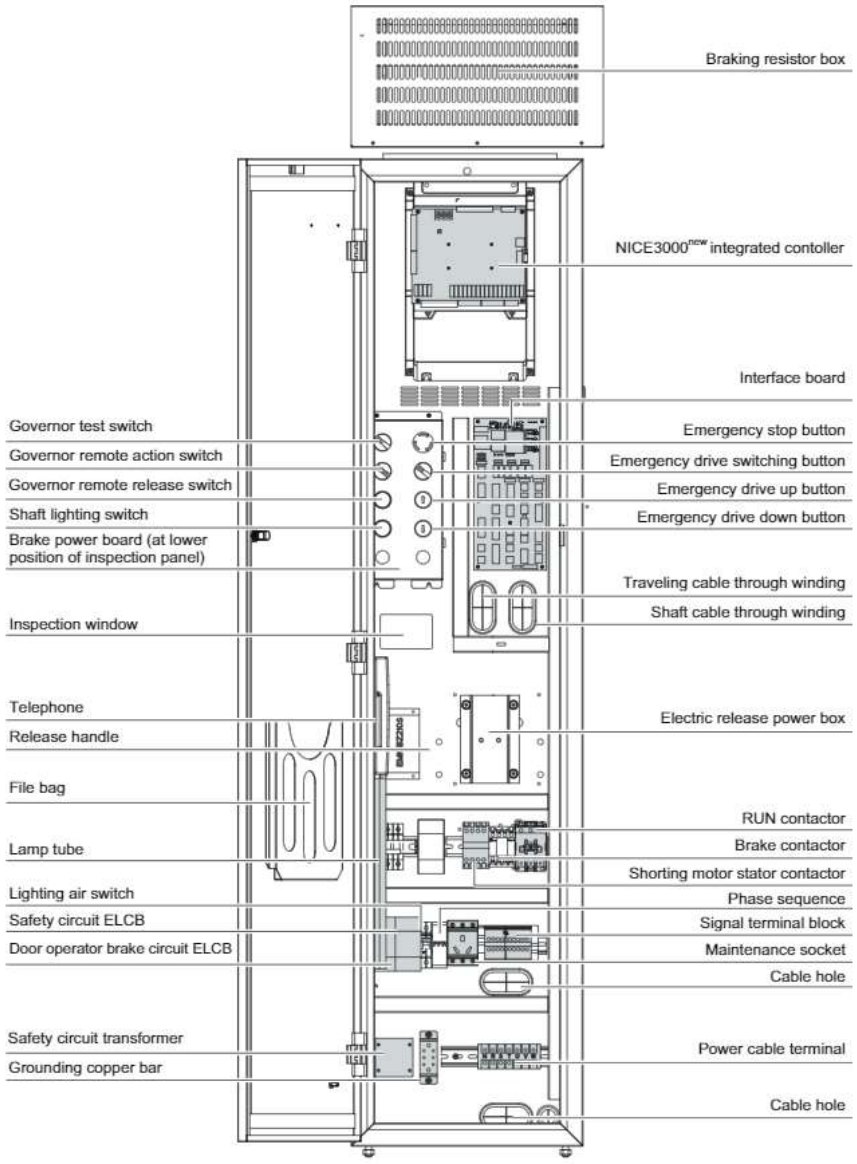


Figure 1-4 Description of components - machine-roomless control cabinet (NICE3000W-4005-B1 to NICE3000W-4022-B1)

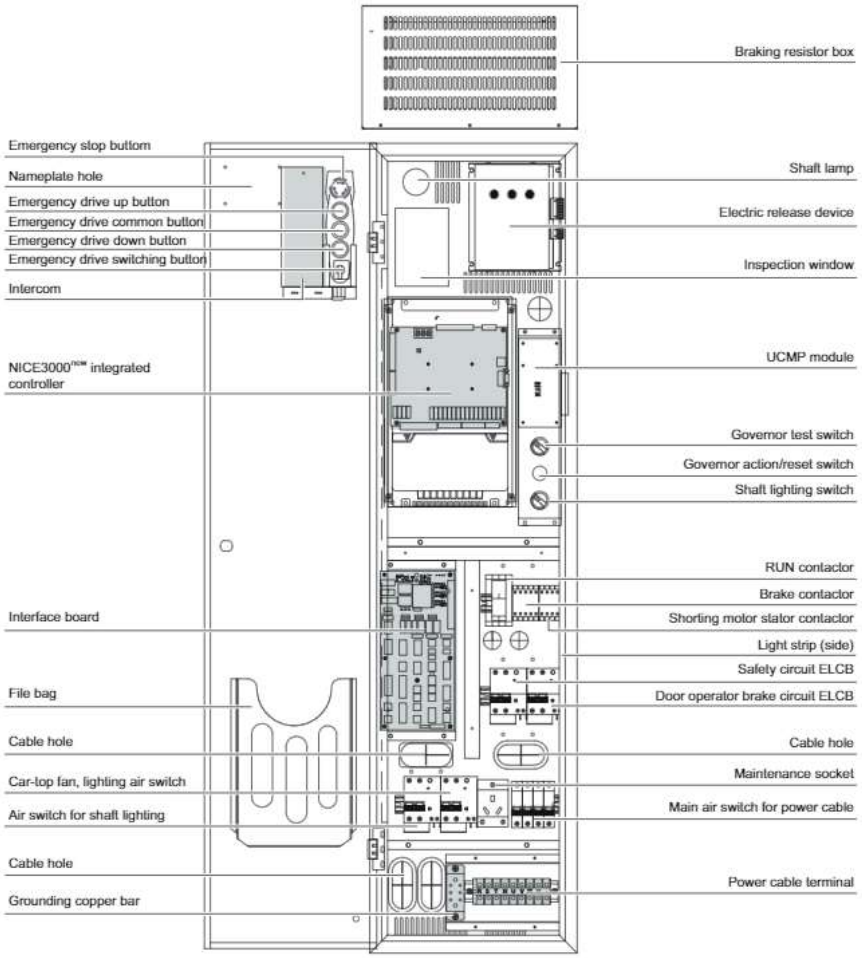


Figure 1-5 Description of components - machine-roomless control cabinet (NICE3000W-4005-B2 to NICE3000W-4022-B2)

Table 1-2 Function description of components

Component	Function
NICE3000new integrated controller	The key component that integrates the control system and drive system
Emergency drive switching button	For switchover between emergency drive state and normal running state
Emergency drive up button	For emergency drive up running

Component	Function
Emergency drive down button	For emergency drive down running
Emergency stop button	For emergency stop
Governor test switch	Machine-roomless governor test
Governor action reset switch	Machine-roomless governor test or post-action reset
Shaft lighting switch	Machine-roomless shaft lighting switch
Safety circuit ELCB	For leakage and over-current protection of safety circuit
Door operator brake ELCB	For leakage and over-current protection of door operator brake
Car lighting ELCB	For leakage and over-current protection of car lighting circuit
Shaft lighting switch	For control of shaft lighting switch
Main air switch	For control of the circuits (other than lighting circuit) in the elevator control system
3-hole socket	For power socket used by maintenance or field inspection personnel
Grounding terminal block	For grounding wire junction
Steel wire rope lamp	For judgment of car location and elevator running direction
Control cabinet lamp	For lighting for operation of the control cabinet
Microswitch	Control cabinet lighting
Door pre-open board	Added for the door pre-open or re-leveling function (MCTC-SCB-A1 for single door driven by synchronous motor; MCTC-SCB-D for through-type door driven by synchronous motor, or door driven by asynchronous motor)
Cable outlet	For cable routing
Interface board	For connection of shaft cables, machine room cables, and traveling cables
Intercom	For installation of an intercom
Brake power board	For motor brake voltage and 24 V system power supply
Terminal for main circuit	Input terminal for system power supply and output terminal for motor power supply
Control transformer	For supply voltage of safety circuit
Braking resistor box	Consumes too much energy during braking
Brake contactor	For on-off control of brake circuit
RUN contactor	For on-off control of output voltage circuit
Shorting motor stator contactor	For control of elevator car movements with the resistance produced after shorted to the stator winding of the synchronous motor (added for synchronous motor)
File bag	For keeping files and drawings

1.3 Product Dimensions

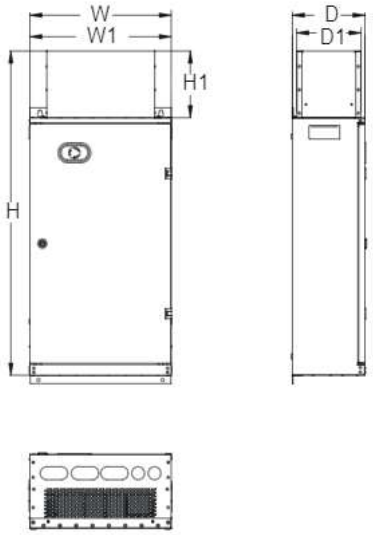


Figure 1-6 Overall dimensions - machine-room control cabinet (NICE3000B-4002 to NICE3000B-4015)

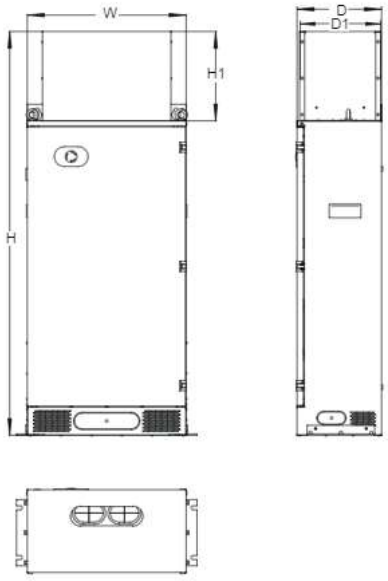


Figure 1-7 Overall dimensions - machine-room control cabinet (NICE3000B-4018 to NICE3000B-4037)

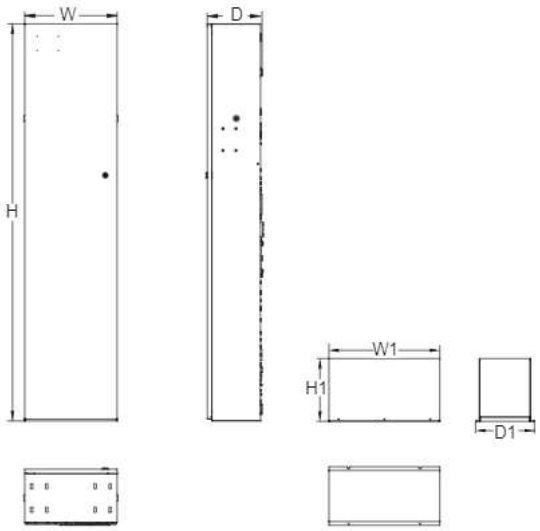


Figure 1-8 Overall dimensions - machine-roomless control cabinet (NICE3000W-4005 to NICE3000W-4022)

Table 1-3 Dimensions of cabinet body and height of resistor box

Model	Dimensions of Cabinet Body, W x D x H (mm)	Dimensions of Resistor Box, W1 x D1 x H1 (mm)
NICE3000B-4002 to NICE3000B-4015	430 × 220 × 970	330 × 195 × 200
NICE3000B-4018	470 × 250 × 1220	380 × 240 × 270
NICE3000B-4022		
NICE3000B-4030	510 × 275 × 1330	420 × 265 × 280
NICE3000B-4037		
NICE3000W-4005-B1 to NICE3000W-4022-B1	400 × 243 × 1720	435 × 230 × 247
NICE3000W-4005-B2	350 × 240 × 1350	440 × 260 × 100
NICE3000W-4007-B2		
NICE3000W-4011-B2 to NICE3000W-4018-B2		440 × 260 × 150
NICE3000W-4022-B2		440 × 260 × 195

NOTE

- The volume and dimensions of the control cabinets are only given for the standard models.
- The resistor boxes of all machine-room control cabinets should be installed at cabinet top.

1.4 Technical Specifications

Table 1-4 Main technical specifications

Item		Specifications	
Basic specifications	Max. frequency	99 Hz	
	Carrier frequency	2 kHz to 16 kHz; automatically adjust carrier frequency based on the load features	
	Motor control mode	FVC	
	Startup torque	0.5 Hz/180% (SVC); 0 Hz/200% (FVC)	
	Speed range	1:100 (SVC)	1:1000 (FVC) 1:50 (V/F)
	Speed stabilizing precision	±0.5% (SVC)	±0.05% (FVC)
	Torque control precision	±5% (FVC)	
	Overload capacity	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	Flexible adjustment of direct travel ride to the leveling position	
	Acceleration/ deceleration curve	Automatic generation of N curves	
	Elevator slow-down	New and reliable slow-down function, and automatic identification of speed reducer position	
	Shaft auto-tuning	32-bit data to ensure accurate recording of shaft position	
	Leveling adjustment	Flexible and operable leveling adjustment function	
	Startup torque compensation	Proper startup pre-torque is selected with the load cell, or self-adaptive pre-torque function is enabled without the load cell.	
	Real-time clock	Accurate real-time clock for various functions such as time-based service, peak service, and automatic password	
	Test function	Various elevator commissioning functions enabled in a convenient manner	
	Fault protection	Multi-class improved elevator troubleshooting function based on different levels	
	Intelligent management	For remote monitoring, user management, group control scheduling, and other functions	
	Safety self-inspection in power-on state	For safety inspection, such as grounding and short circuit inspection, of peripheral devices in power-on state	
	State monitoring	Judgment of elevator running state based on feedback signals	

Item		Specifications
I/O	Power cable terminal	Three-phase input terminal of the control cabinet: R, S, T, (N); Power input terminal of the motor: U, V, W
	Control terminal block	Mains supply input terminal, motor brake winding terminal, fire linkage and fire output terminal (shaft lighting terminal and governor terminal)
	PG card interface	For encoder cable
Operation and commissioning	Operation panel of the control cabinet (machine-room)	With emergency stop switch, emergency drive switch, and emergency drive up/down running button
	Operation panel of the control cabinet (machine-roomless)	Shaft lighting switch, governor action reset button, and electric brake releasing button
	Keypad	3-digit LED display, implementing certain commissioning functions
	Operation panel	5-digit LED display, querying/modifying most parameters and monitoring the system state
	Mobile APP	Viewing and modification of all parameters, uploading and downloading of parameters, monitoring of system state parameters, including running curve

Item		Specifications
Protection features	Phase loss protection	The AC drive in the control cabinet provides the phase loss detection function. In case of incorrect input phase sequence, the control system will report phase loss, stopping the running of the elevator and preventing accidents.
	Leakage protection	ELCBs are arranged in the control cabinet to protect the circuits with a voltage above AC 50 V, the safety circuits of the elevator, and the power supply circuits of the door operator when the leakage current is too large. Leakage protection devices are arranged in the distribution box to protect the sockets at the car top, in the shaft, and in the pit.
	Grounding protection	Grounding copper bars are arranged in the control cabinet. You can connect the peripheral ground wires to the copper bars so that the device has the same EMF as the ground to prevent electric shock.
	Temperature protection	The transformer temperature may rise due to long-time running or other reasons. The system disables protection when the temperature is higher than 105°C and continues to run when the temperature is lowered to below 75°C according to the protection settings.
	Short circuit protection	The drive controller is protected when any two-phase short circuit on the output side causes overcurrent.
	Speed abnormality protection	When the encoder feedback speed exceeds a limit or the deviation between the torque limit and the speed test feedback is excessive, the system will immediately perform protection, give an alarm immediately and prohibit rerunning, achieving quick protection against abnormal elevator speed.
	Rotary encoder abnormality protection	Rotary encoder abnormalities include rotary encoder phase loss, reverse direction, cable breaking, pulse interference, etc. In these cases, the system will perform protection immediately to prevent accidents.
	Leveling switch abnormality protection	Leveling switch abnormalities include leveling switch failure and sticking. The system judges both abnormalities according to the feedback change process of leveling signals. If there is no change in leveling signals, the system will give an alarm.
	Floor data abnormality protection	The system stores floor information through shaft auto-tuning. In case of data abnormality, it gives fault information in the first running after power-on. During running, the system constantly verifies the data based on the signal input position and givens an alarm if the difference is too large.

Item		Specifications
Environment	Altitude	Below 1,000 m (de-rated by 1% for each 100 m above 1,000 m)
	Ambient temperature	-10°C to +45°C (De-rated if the ambient temperature is above 40°C)
	Humidity	Less than 95% RH, non-condensing
	Vibration	< 5.9 m/s2 (0.6 g)
	Storage temperature	-20°C to +55°C
	Pollution degree	PD2
	IP level	IP20
	Power distribution system	TN/TT

1.5 Description of Main Components and Parts

1.5.1 NICE3000^{new} Integrated Controller

The NICE3000^{new} series integrated elevator controller combines the functions of both elevator controller and high-performance vector AC drive. You should select the proper controller according to the required motor and brake parameters (brake current and general power).

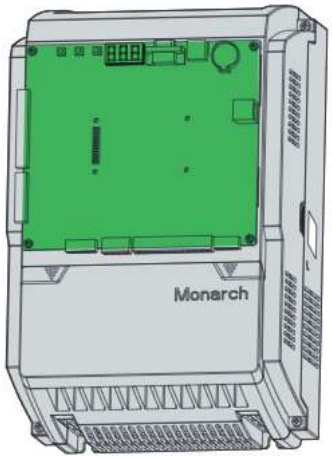


Figure 1-9 NICE3000^{new} integrated controller

As a core part of the NICE3000B, NICE3000^{new} should be selected based on a variety of factors such as motor power, input/output current, and power capacity. The parameters are listed in the following table:

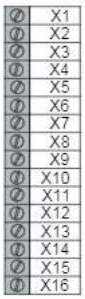
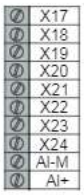
Table 1-5 Parameters of the integrated controller for the NICE3000B

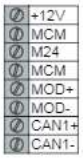
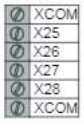
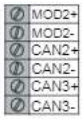
Power Capacity (kVA)	Input Current (A)	Output Current (A)	Applicable Motor (kW)	Model of Control Cabinet
4.0	6.5	5.1	2.2	NICE3000B/W-4002
5.9	10.5	9.0	3.7	NICE3000B/W-4003
8.9	14.8	13.0	5.5	NICE3000B/W-4005
11.0	20.5	18.0	7.5	NICE3000B/W-4007
17.0	29.0	27.0	11.0	NICE3000B/W-4011
21.0	36.0	33.0	15.0	NICE3000B/W-4015
24.0	41.0	39.0	18.5	NICE3000B/W-4018
30.0	49.5	48.0	22.0	NICE3000B/W-4022
40.0	62.0	60.0	30.0	NICE3000B/W-4030
57.0	77.0	75.0	37.0	NICE3000B/W-4037

The NICE3000^{new} integrated controller is also suitable for the machine-roomless NICE3000W control cabinet.

For more information about the NICE3000^{new} integrated controller, visit Inovance's website www.inovance.com to download the NICE3000^{new} Integrated Elevator Controller User Guide (reference No.: 19010473).

Table 1-6 Description of MCB control circuit terminal

No.	Code	Terminal Name	Function Description	Terminal Arrangement
CN1	X1 to X16	DI	Input voltage range: 10–30 VDC Input impedance: 4.7 kΩ optocoupler isolation Input current limit: 5 mA DI terminal Functions set in F5-01 to F5-24	
CN9	X17 to X24	DI		
	AI-M/AI+	AI	Used for the analog load cell device	

No.	Code	Terminal Name	Function Description	Terminal Arrangement
CN3	+12V/ MCM	External 12 VDC input	12 V emergency power supply	 CN3
	M24V/ MCM	External 24 VDC input	24 VDC power supply for the entire board	
	MOD+/-	RS485 differential signal	Standard isolated RS485 communication interface, used for hall call and display	
	CAN1+/-	CANbus differential signal	CANbus communication interface, communication with the car top board (CTB); machine-roomless monitoring board and DI/DO expansion board interface	
CN2	X25 to X28/ XCOM	Strong-current detection terminal	Input voltage 110 VAC ± 15%, 110 VDC ± 20% safety circuit and door lock circuit, function set in F5-37 to F5-40	 CN2
CN7	Y1/M1 to Y6/M6	Relay output	NO contact output: 5 A/250 VAC Function set in F5-26 to F5-31	 CN7
CN8	USB interface	RS232 communication interface	Cell phone bluetooth commissioning interface	 USB
CN4	MOD2+/-	RS485 differential signal	MOD2 communication interface, used for residential monitoring and Internet of Things	 CN4
	CAN2+/-	CAN2 differential signal	CAN2 communication interface, used for parallel/group control	
	CAN3+/-	Reserved		
CN5	DB9 interface	RS232 communication interface	Interface for: Site commissioning software Residential monitoring RS232/RS485 parallel/group control Software downloading of the MCB and DSP board	 CN5

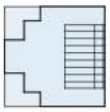
No.	Code	Terminal Name	Function Description	Terminal Arrangement
CN12	RJ45 interface	Operation panel interface	Used to connect the operation panel	 CN12
J12	Interface for connecting the PG card			 J12
J1	Factory reserved, optional grounding terminal for AI. The pins marked with "COM" are not connected to the ground by default.			 COM J1
J5	Factory reserved, termination resistor connection terminal for the MOD2 communication control board. The pins marked with "ON" are connected to the termination resistor by default.			 ON J5 J6
J6				
J13	Factory reserved, termination resistor connection terminal for the CAN2 communication control board. The pins marked with "ON" are connected to the termination resistor by default.			 ON J14 J13
J14				
J7	Factory reserved, internal 24 V PE terminal, shorted by default			 J8J7
J8	Factory reserved, external 24 V PE terminal, shorted by default			
J9/ J10	Factory reserved. Do not short them randomly. Otherwise, the controller may not work properly.			

Table 1-7 Description of indicators on the MCB

No.	Terminal Name	Function Description
MOD2	Modbus2 communication indicator	When communication with Internet of Things and MIB/ remote monitoring board is normal, this indicator is on (green).
COP	CAN1 communication indicator	When communication between the MCB and the CTB is normal, this indicator is on (green).
HOP	Modbus1 communication indicator	When communication between the MCB and the HCB is normal, this indicator is on (green).
CAN2	Group control communication indicator	This indicator is steady on (green) when communication for parallel/group control is normal, and blinks when the running in parallel/group control mode is normal.

No.	Terminal Name	Function Description
232	Serial communication indicator	This indicator is on (green) when communication with the host computer or MIB/remote monitoring board is normal.
X1 to X24	Low voltage input signal indicator	This indicator is on when the external input is active.
X5 to X28	High voltage input signal indicator	This indicator is on when the external input is active.
Y1 to Y6	Output signal indicator	This indicator is on when the system output is active.

1.5.2 Braking Components

The NICE3000^{new} series integrated elevator controller below 37 kW (including 37 kW) has a built-in braking unit, so only a braking resistor is housed in the resistor box and installed in the control cabinet.

The braking resistor should be configured based on the following table:

Table 1-8 Braking resistor and braking unit selection of the NICE3000^{new} series integrated controller

Controller Model	Power of Applicable Motor (kW)	Max. Resistance of Braking Resistor (Ω)	Min. Resistance of Braking Resistor (Ω)	Power (W)	Braking Unit
Three-phase 380 V, range: 380 – 440 V					
NICE-L-C-4002	2.2	290	230	600	Built-in
NICE-L-C-4003	3.7	170	135	1100	
NICE-L-C-4005	5.5	115	90	1600	
NICE-L-C-4007	7.5	85	65	2500	
NICE-L-C-4011	11	55	43	3500	
NICE-L-C-4015	15	43	35	4500	
NICE-L-C-4018	18.5	34.0	25	5500	
NICE-L-C-4018F					
NICE-L-C-4022	22	24	22	6500	
NICE-L-C-4022F					
NICE-L-C-4030	30	20	16	9000	
NICE-L-C-4030F					
NICE-L-C-4037	37	16.0	13	11000	MDBUN-60-T
NICE-L-C-4037F					

NOTE

◆ Contact Inovance or supplier for replacement of a resistor.

1.5.3 Transformer

The standard control transformer (TRF) for the NICE3000B outputs AC 110 V power over safety circuits. Its parameters are listed in the following table:

Table 1-9 Parameters of control transformer

Model	Capacity	Input Voltage	Output Voltage	Remarks
TRF	55 VA	AC 220 V	AC 110 V	Standard configurations for volume 1 and volume 2
TRF	110 VA	AC 220 V	AC 110 V	Standard configurations for volume 3

NOTE

- TRF control transformer has overheat protection feature. It acts when the temperature reaches 105°C and restores when the temperature is lowered to 70°C .

1.5.4 Brake Power Board

The brake in the NICE3000B is fed from the brake power board.

The brake power board has a standard voltage of DC 110 V, and the brake voltage is adjustable. Appearance of brake power board is shown in the following figure:

Figure 1-10 Appearance of brake power board

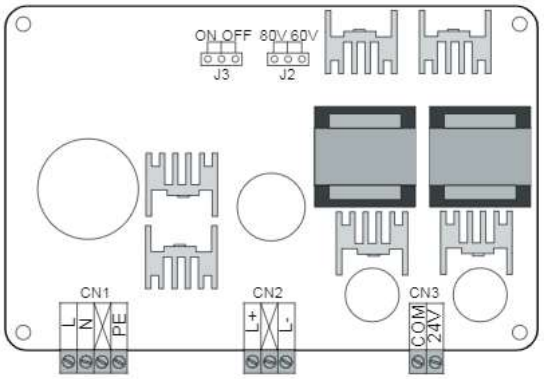


Figure 1-11 Distribution of terminals for brake power board

Table 1-10 Description of terminals for brake power board

Terminal Name	Terminal Distribution	Function	Max. Current (for 3s)	Holding Current
CN1 terminal	PE N/A N L	Input power supply AC 220 V	-	-
CN2 terminal	L- N/A L+	Output brake power supply DC 110 V	6 A	3 A
CN3 terminal	24V COM	Output power supply of control circuit DC 24 V	5 A	-
J2 Jumper switch	ON OFF	In ON state, the brake power supply is constant (DC 110 V); in OFF state (or with no jumper), the brake power supply has a dropped voltage.	-	-
J3 Jumper switch	80V 60V	When J2 is in OFF state and J3 voltage is 80 V, the brake power supply becomes constant after dropped to 80 V DC; when J2 is in OFF state and J3 voltage is 60 V, the brake power supply becomes constant after dropped to 60 V DC.	-	-

NOTE

- PE is a grounding terminal.
- After outputting a brake voltage of DC 110 V for 3s (with a latency of ±5%s), the CN2 terminal automatically drops and maintains the voltage between 60 V and 70 V or between 80 V and 90 V.
- The CN3 terminal can maintain the overload current (7 A) for 2s.

1.5.5 Interface Board

The NICE3000B provides fixed interfaces and reduced number of cables to facilitate wiring. You can directly select Inovance's supporting peripheral cables or independently make peripheral cables based on Inovance's diagrams.

Appearance of the interface board is shown in the following figure:

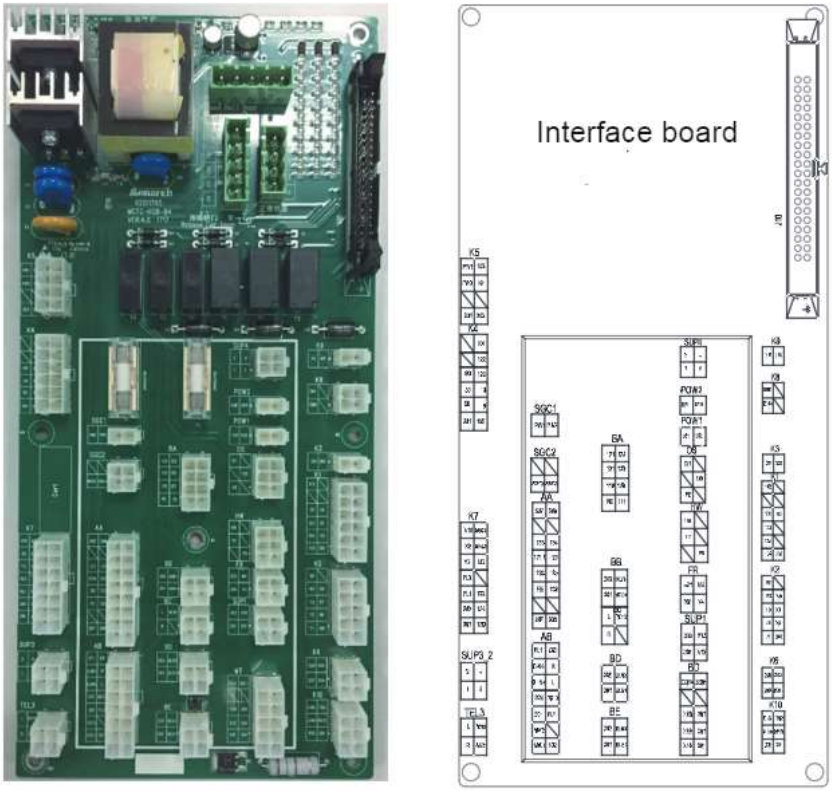


Figure 1-12 Interface board appearance and terminal distribution

NOTE

◆ For details about the interfaces, see Section 3.2.4.

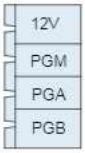
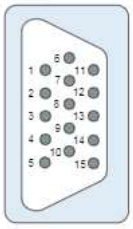
1.5.6 PG Card

A PG card is configured on the controller for the NICE3000B, which is required for FVC. Different PG cards should be selected for different types of external motors. MCTC-PG-E card is for a synchronous motor while MCTC-PG-A2 card is for an asynchronous motor.

Table 1-11 Selection of the MCTC-PG card models

Motor Type	Encoder Type	Applicable PG Card	Appearance
Asynchronous Motor	It is used to adapt to the push-pull and open-collector incremental encoders.	MCTC-PG-A2	
Synchronous Motor	SIN/COS encoder	MCTC-PG-E	

Table 1-12 Definitions of the CN1 terminals of different PG cards

MCTC-PG-A2		MCTC-PG-E					
1	12 V	1	B-	6	A-	11	C-
2	PGM	2	N/A	7	COM	12	D+
3	PGA	3	Z+	8	B+	13	D-
4	PGB	4	Z-	9	VCC	14	N/A
-	-	5	A+	10	C+	15	N/A
 CN1		 CN1					

1.5.7 Description of Terminal Blocks

The NICE3000B uses screw terminals for the main circuit to ensure reliable wiring, and the terminals are provided with a transparent cover to prevent electric shock.

Figure 1-13 Appearance of main circuit terminal

NOTE

◆ For details about the terminals for main circuit and control signals, see Section 3.2.2 and Section 3.2.3.

1.6 List of Optional Parts

You can contact Inovance's sales staff for delivery of the following optional parts together with the control cabinet.

Table 1-13 List of optional parts

Optional Parts	Model	Function	Remarks
External operation panels and cables	MDKE	LED operation panels, with strong functions and easy to operate	RJ45 interface
Plugs and pins	Plugs and pins for interface board	Plugs and pins for on-site fabrication of cables	Please contact Inovance's sales staff.

2 Mechanical Installation

2.1 Installation

2.1.1 Installation Environment Requirements

Item	Requirement
Altitude	Below 1,000 m; de-rated by 1% for each 100 m higher if the altitude is above 1,000 m; maximum 3,000 m
Ambient temperature	-10°C to +45°C ; air temperature change of less than 0.5°C /min; rated current de-rated by 1.5% for each 1°C higher if the ambient temperature is above 40°C ; maximum temperature 45°C
Humidity	Less than 95% RH, non-condensing
Vibration	Less than 5.9 m/s^2 (0.6 g)
Headroom	Not less than 2.5 m in control cabinet work area in machine room
Work area before control cabinet	For inspection and maintenance purpose, a horizontal clearance of 0.5 m × 0.7 m should be kept before the control cabinet.
Ventilation	Proper ventilation should be ensured for the machine room to protect the control cabinet and its cables against dust, harmful gases, and moisture as far as possible.

2.1.2 Mounting Clearance Requirements

For cabinet body dimensions and base installation drawings, see the relevant drawings as a part of engineering and technical data. All cabinets should be installed according to the drawings and enough clearance shall be provided to ensure air flow and maximum door movement, and for maintenance. An access (such as aisle clearance) to the installation base should be provided and the space for transportation of auxiliary devices shall be kept.

1 Machine-room control cabinet

Generally, the distance between the cabinet back and the wall should ensure proper placement of the cabinet. The cabinet room should have headroom not less than 2,500 mm. The cabinet front should be at least 700 mm to the wall while the cabinet side should be at least 600 mm to the wall. All cabinets must be fixed on the hard surface by using expansion bolts.

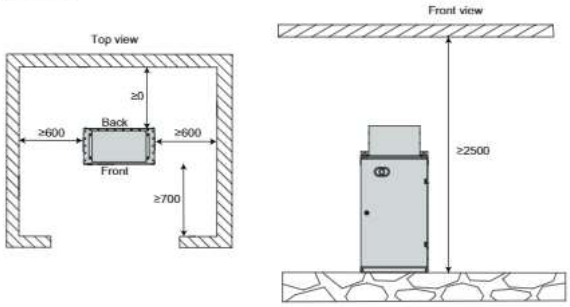


Figure 2-1 Installation clearance for machine-r

NOTE

◆ The installation clearance requirements are applicable to both wall-mounted and floor-mounted control cabinets.

2 Machine-roomless control cabinet

Generally, the cabinet back is connected to the shaft; the cabinet room should have a headroom not less than 2,000 mm and greater than the cabinet height. The cabinet front should be at least 700 mm to the wall. The distance between the cabinet side and the wall should ensure proper placement of the cabinet.

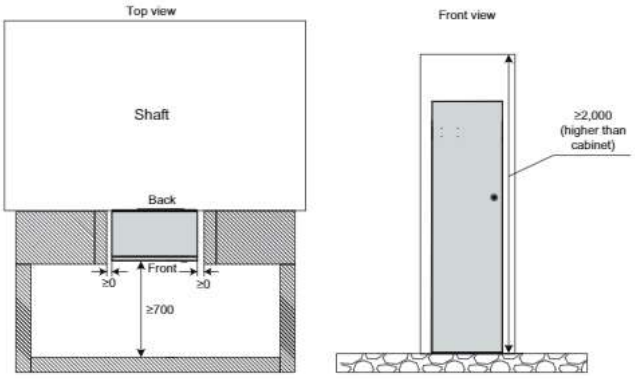


Figure 2-2 Installation clearance for machine-roomless control cabinet (in mm)

2.2 Handling

2.2.1 Packaged Cabinet Body

The packaged cabinet body can be handled with a forklift or a crane.

1 Forklift

Handle the cabinet body as shown in the following figure if a forklift is used. Pay attention to the distance between two legs of the forklift to prevent inclination.

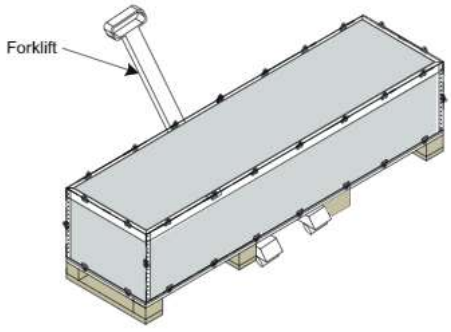


Figure 2-3 Handle packaged cabinet body with a forklift

2 Crane

When handle the cabinet body with a crane, hold the cabinet body to prevent horizontal movement.

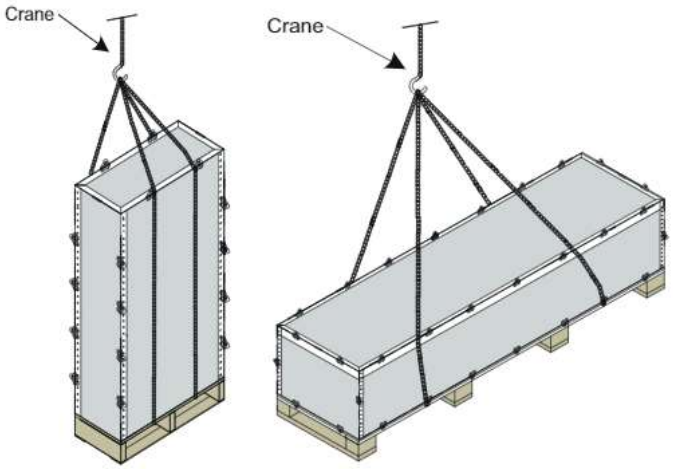


Figure 2-4 Handle packaged cabinet body with a crane

2.2.2 Unpackaged Cabinet Body

After removing the packaging, two persons should handle the cabinet body simultaneously through the square holes arranged on both sides to prevent collision.

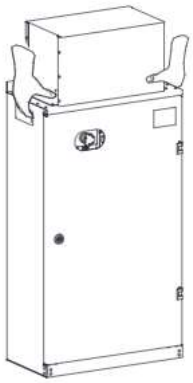


Figure 2-5 Handle the unpackaged cabinet body

2.3 Mounting Procedure

2.3.1 Machine-room Control Cabinet

Two mounting modes are available based on the volume of machine-room control cabinets. The control cabinets of 15 kW or below 15 kW are mainly wall-mounted while those of above 15 kW are mainly floor-mounted by follow the following procedure:

1 Wall-mounted control cabinet

The positions and dimensions of four mounting holes on the upper and lower back of the cabinet are shown in the following figure:

NICE3000B-4002 to NICE3000B-4015

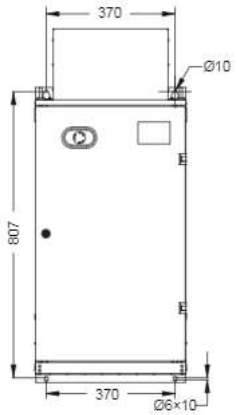


Figure 2-6 Positions and dimensions of the mounting holes on the back (in mm)

The control cabinet should be mounted on the wall with four M8 expansion bolts, as shown in the following figure:

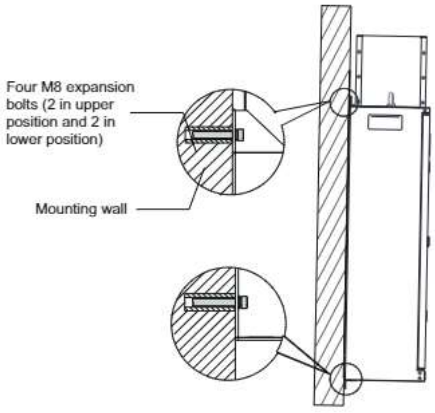


Figure 2-7 Fix wall-mounted control cabinet

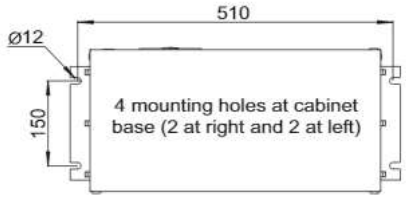
NOTE

- The control cabinet must be mounted on the wall close to the traction machine.

2 Floor-mounted control cabinet

The positions and dimensions of four mounting holes on the left and right sides of the base are shown in the following figure:

NICE3000B-4018 to NICE3000B-4022



NICE3000B-4030 to NICE3000B-4037

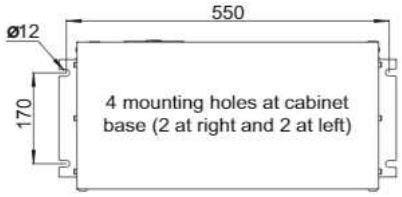


Figure 2-8 Positions and dimensions of the mounting holes at the base (in mm)

The control cabinet should be mounted on the floor with four M8 expansion bolts, as shown in the following figure:

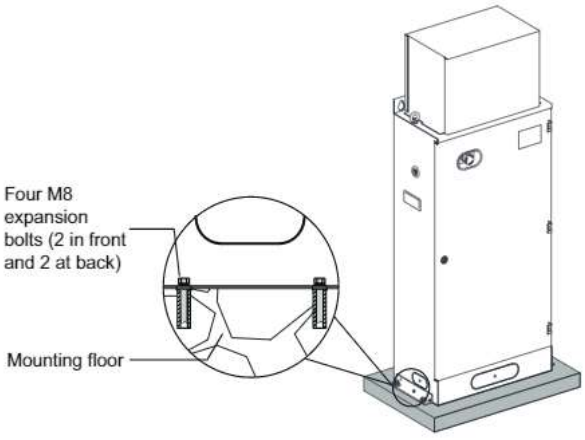


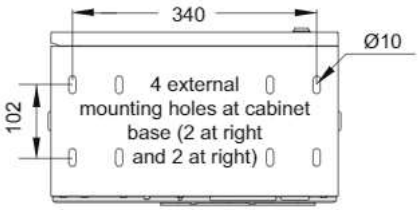
Figure 2-9 Fix floor-mounted control cabinet

2.3.2 Machine-roomless Control Cabinet

The machine-roomless control cabinet is directly floor-mounted.

Eight holes are arranged at the base. The positions of four external mounting holes are shown in the following figure:

NICE3000W-40XX-B1



NICE3000W-40XX-B2

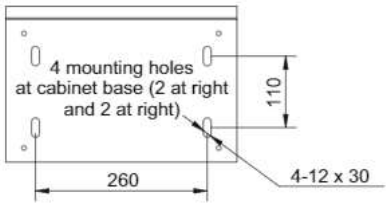


Figure 2-10 Positions and dimensions of the mounting holes at the base (in mm)

The control cabinet should be directly mounted on the floor with four M8 expansion bolts evenly distributed at the four corners as appropriate, as shown in the following figure:

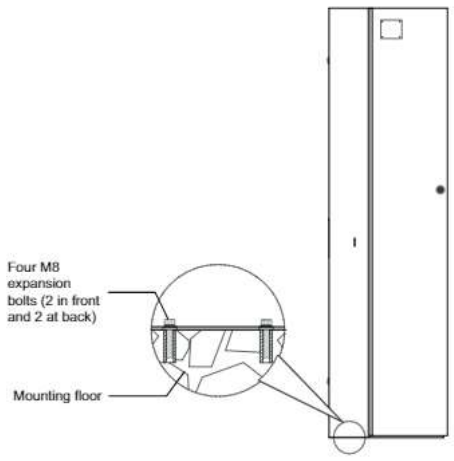


Figure 2-11 Fix machine-roomless control cabinet

2.3.3 Machine-roomless Braking Resistor Box

The braking resistor boxes of all machine-room control cabinets should be mounted at the cabinet top while those of machine-roomless control cabinets must be separated from the cabinet body due to height restrictions.

The positions and dimensions of four mounting holes on the left and right sides of the base are shown in the following figure:

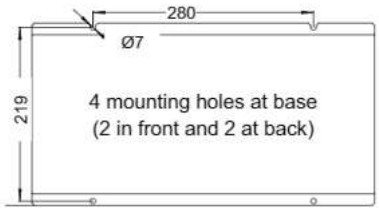


Figure 2-12 Positions and dimensions of the mounting holes at the base (in mm)

The braking resistor box should be vertically mounted on the wall with four M8 expansion bolts, as shown in the following figure:

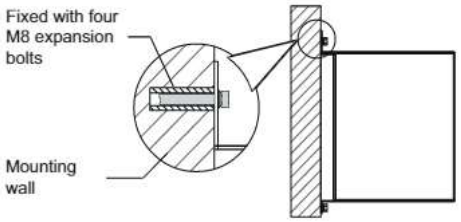


Figure 2-13 Fix braking resistor box

NOTE

- The braking resistor box of an machine-roomless control cabinet should be mounted in a position in the shaft and close to the control cabinet;
- The braking resistor box of an machine-roomless control cabinet is attached with a 4 m cable.
- After installation, the resistor cable should be respectively connected to the "PB" and "+" terminals on the controller according to the field conditions. In case of any question, please contact Inovance's technicians.

3 Electrical Installation

Different electrical installation methods should be adopted for different types of control cabinets. You should select the proper control cabinet according to the field conditions. Generally, the machine-room control cabinet must have an external distribution box and each elevator should have a separate main switch that can cut off all power supply circuits of the elevator.

Precautions for Electrical Installation
Caution ◆ Complete peripheral cables must be ready. ◆ Power cables and incoming control power cables must meet the requirements on diameter and withstand voltage. ◆ Input and output cables must be separately arranged to prevent any risks that may result from mixing and damaged insulation. ◆ Signal cables and power cables must be separately arranged, and analog signal cables must be shielded twisted pair cables with one end reliably grounded. ◆ Before insulation resistance measurement or power frequency test of the transformer, the cables between the MCB and the interface board must be disconnected to prevent damage to the unit. ◆ No jumper should be left in the control cabinet to prevent any risks.

3.1 External Interfaces of NICE3000B

This section mainly describes the main external interfaces of the control cabinet for arrangement of peripheral cables with reference to the control cabinet diagram, and preparations for wiring.

The external interfaces include the terminals for main circuits, signal cables, interface boards, grounding copper bars, and PG cards.

3.1.1 Positions of External Interfaces

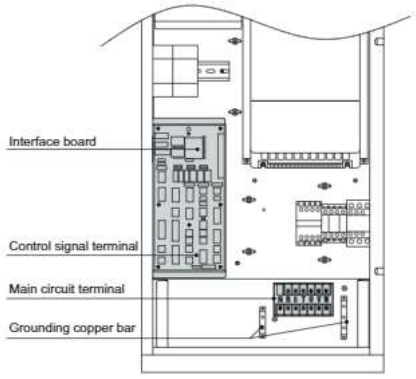
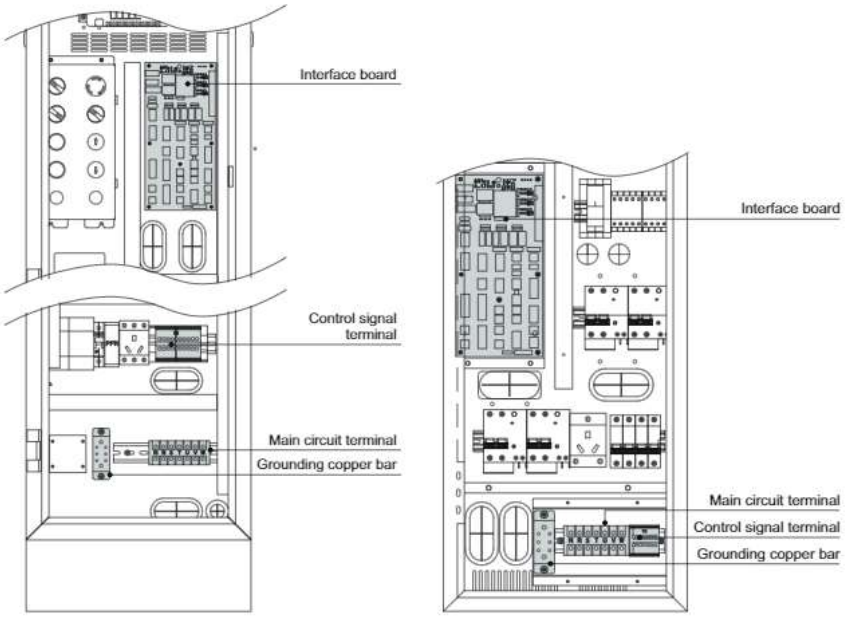


Figure 3-1 Positions of external interfaces on machine-room control cabinet (NICE3000B-40XX)



NICE3000B-40XX-B1 NICE3000B-40XX-B2

Figure 3-2 Positions of external interfaces on machine-roomless control cabinet

3.1.2 Main Circuit Terminal

Screw terminals are selected for the main circuit to ensure reliable wiring, and they are provided with a transparent cover to prevent electric shock. The interfaces for main circuit cables are the same on machine-room control cabinets and machine-roomless control cabinets. The following part describes the wiring of main circuit terminal.

Main circuit terminal arrangement:

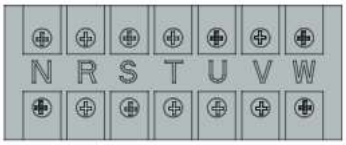


Figure 3-3 Main circuit terminal arrangement

N, R, S, and T are the power input terminals; U, V, and W are the output terminals.

Table 3-1 Description of main circuit terminal

Terminal ID	Function
(N), R, S, T	Three-phase power input terminals; N indicates neutral wire.
U, V, W	Output terminals, connected to the motor

Main circuit wiring diagram:

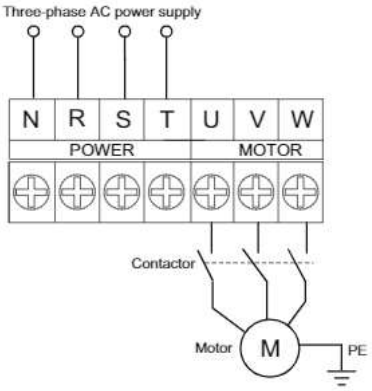


Figure 3-4 Main circuit wiring diagram

NOTE

- Pay attention to the phase sequence and input/output cables of the main circuit to ensure normal state of the control cabinet.
- The N wire for the system power supply must be led to the control cabinet to ensure normal state.

3.1.3 Control Signal Terminal

All signal terminals of the machine-room control cabinet are set on the interface board, so no additional signal is involved in the control cabinet.

■ Machine-room control cabinet

All signal terminals of the machine-room control cabinet are set on the interface board, so no additional signal is involved in the control cabinet.

■ Machine-roomless control cabinet

Weidmuller 2.5 mm2 straight-through spring clamp terminals are selected for the signal cables of the machine-roomless control cabinet, which are led to the corresponding external interfaces.

Totally seven signal terminals numbered from 1 to 7 are provided in the machine-roomless control cabinet, corresponding to governor terminal signal and shaft lighting signal. The following figure shows the terminals:

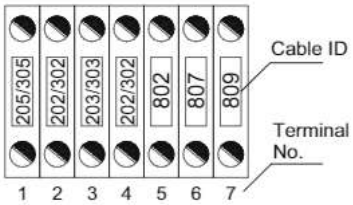


Figure 3-5 Signal terminals of machine-roomless control cabinet

The signal terminals of the machine-roomless control cabinet are different from those of the machine-room control cabinet in both quantity and functions. Governor winding terminal and shaft lighting terminal are added but no mains input terminal is provided.

Table 3-2 Description of terminals

Terminal ID	Cable ID	Function	Remarks
1 to 4	205, 202, 203, 202	AC 220 V voltage from the control cabinet is led to the governor remote action winding through the terminals 203 and 202, and to the governor remote release winding through the terminals 205 and 202.	Additional
	305, 302, 303, 302	DC 220 V voltage from the control cabinet is led to the governor remote action winding through the terminals 303 and 302, and to the governor remote release winding through the terminals 305 and 302.	Additional
5 to 7	802, 807, 809	Shaft lighting: Shaft lighting switch is also set in the machine-roomless control cabinet due to special requirements.	Standard configuration

3.1.4 Interface Board Terminal

All NICE3000Bs use the same type of interface boards and user terminals are set on the Molex welding blocks to reduce cables and facilitate operations.

Distribution of interface board terminals:

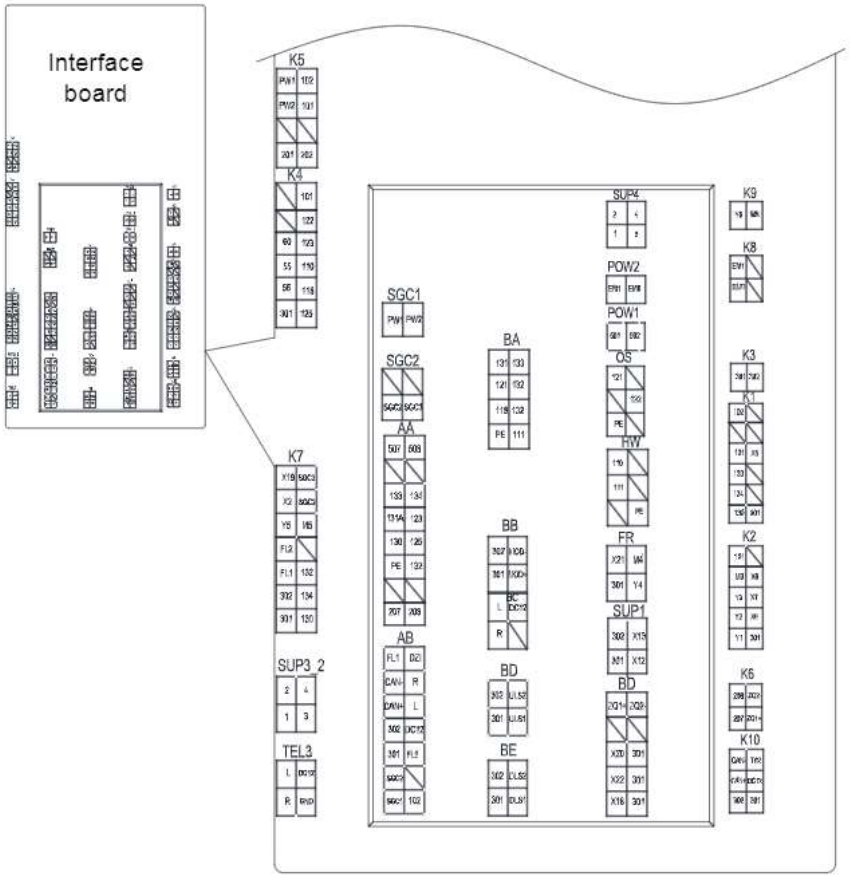
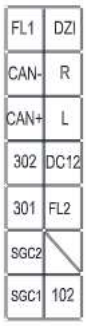
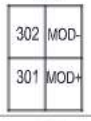
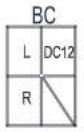
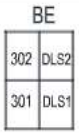
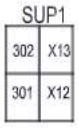
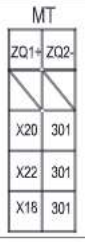
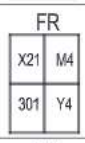
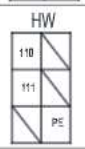
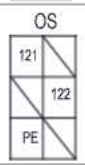


Figure 3-6 Distribution of interface board terminals

Table 3-3 Definitions of external interfaces for interface board terminals

Part ID	Signal ID	Function Description	
AA (traveling cable)	AA 	508 507 208 PE 207	Car lighting: 220 V - L Car lighting: 220 V - N Door operator power supply: 220 V - N Grounding Door operator power supply: 220 V - L
		130 131A 132 123 125 133 134	End point signal for safety circuit: 110 V End point signal for front car door lock: 110 V End point signal for front hall door lock: 110 V Car-top safety signal: 110 V Emergency drive signal: 110 V Safety signal for car door lock: 110 V Car-top safety signal: 110 V
AB (traveling cable)	AB 	SGC1 SGC2 301 302 CAN+ CAN- FL1 FL2 DZI DC12 B01 L R 102	Auxiliary car door lock 1 Auxiliary car door lock 2 24 V power supply + 24 V power supply - CAN+ CAN- Up leveling signal: X1 Down leveling signal: X3 Door zone signal: X2 Intercom signal: 12 V+ Intercom signal: 12 V- Intercom signal: - Intercom signal: + Safety circuit: neutral wire
BA (shaft safety cable)	BA 	111 121 118 131 132 133 PE	Safety circuit start point in shaft and pit Safety circuit end point in shaft and pit Emergency drive shorting point in pit Start point of landing door lock circuit End point of front landing door lock circuit End point of back landing door lock circuit Grounding wire of safety circuit
BB (intercom in pit)	BB 	301 302 MOD+ MOD -	24 V power supply + 12 V/24 V common terminal MOD+ MOD-
BC (hall call communication)	BC 	R L DC12	Intercom signal: + Intercom signal: - Intercom power supply: +

Part ID	Signal ID		Function Description
BD (up slow-down switch)		301 302 ULS2 ULS1	24 V power supply + 24 V power supply - Signal input of up switch 1: X14 Signal input of up switch 2: X16
BE (down slow-down switch)		301 302 DLS2 DLS1	24 V power supply + 24 V power supply - Signal input of down switch 1: X15 Signal input of down switch 2: X17
SUP1 (standby signal input point)		301 302 X12 X13	24 V power supply + 24 V power supply - X12 signal input point X13 signal input point
SGC1 (power supply of auxiliary brake)		PW1 PW2	Power output 1 of auxiliary brake Power output 2 of auxiliary brake
SGC2 (control signal of auxiliary brake)		SGC2 SGC3	Control signal output 1 of auxiliary brake Control signal output 2 of auxiliary brake
MT (brake signal of traction machine)		ZQ1+ ZQ2-	Output brake power supply + Output brake power supply -
		301 X18 X22 X20	24 V power supply + Detection input of brake travel switch 1 Detection input of brake travel switch 2 Detection input of traction machine overheat protection
FR (fire signal)		301 X21	24 V power supply + Fire signal input
		Y4 M4	Fire output Fire output common terminal
HW (turning handwheel)		110 111 PE	Start point of turning handwheel switch End point of turning handwheel switch Grounding wire of safety circuit
OS (governor switch)		121 122 PE	Start point of governor switch End point of governor switch Grounding

Part ID	Signal ID	Function Description	
POW1 (mains supply input)	POW1 501 502	502 501	Mains supply input: N Mains supply input: L
POW2 (standby input)	POW2 EM1 EM0	EM1 EM0	Standby power supply: L Standby power supply: N
SUP4 (standby input)	SUP4 2 4 1 3		Standby weak-current input, supporting standby function input

Table 3-4 Definitions of internal interfaces for interface board terminals

Parts ID	Signal ID	Function Description	
K1 (main board feedback signal in the cabinet)	K1 102 131 X5 133 134 130 301	301 X5 130 134 133 131 102	24 V power supply + X5 signal input Safety circuit detection signal Door lock circuit detection signal Back door lock stuck detection signal Front door lock stuck detection signal Detection signal common terminal: N
K2 (contactor output and feedback)	K2 101 M3 X8 Y3 X7 Y2 X6 Y1 301	Y1 Y2 Y3 M3 101 301 X6 X7 X8	RUN contactor output control Brake contactor output control Shorting motor stator contactor output control Shorting motor stator output common terminal Safety circuit start point 24 V power supply + RUN contactor feedback Brake contactor feedback Shorting motor stator contactor feedback
K3 (24 V input in the cabinet)	K3 301 302	302 301	24 V power supply - 24 V power supply +
K4 (emergency drive)	K4 101 122 60 123 55 110 56 118 301 125	56 55 60 301 125 118 110 101 122 123	Emergency drive down input: X11 Emergency drive up input: X10 Emergency drive signal input: X9 24 V power supply + Emergency drive shorting point at car top Emergency drive shorting point in pit End point of control cabinet emergency stop signal Start point of control cabinet emergency stop signal Start point of emergency drive OFF safety signal End point of emergency drive OFF safety signal

Parts ID	Signal ID	Function Description	
K5 (power signal input)	K5 PW1 102 PW2 101 201 202	201 202	Power input of door operator brake: L Power input of door operator brake: N
		101 102	Safety circuit power supply: L Safety circuit power supply: N
		PW1 PW2	Power input 1 of auxiliary brake Power input 2 of auxiliary brake
K6 (power input/ output of brake power box)	K6 208 ZQ2- 207 ZQ1+	ZQ1+ ZQ2-	Output brake power supply + Output brake power supply -
		207 208	Power supply of brake power box: L Power supply of brake power box: N
K7 (door pre-open)	K7 X19 SGC3 X2 SGC2 Y5 M5 FL2 FL1 132 302 134 301 130	301 302 FL1 FL2 Y5 DZI X19 130 132 134 M5 SGC2 SGC3	24 V power supply + 24 V power supply - Up leveling signal input: X1 Down leveling signal input: X3 Shorting door lock output signal Door zone signal input: X2 Shorting door lock feedback signal Safety circuit end point End point of front door lock circuit End point of back door lock circuit Shorting door lock output common terminal Auxiliary door lock signal 1 Auxiliary door lock signal 2
K8 (standby power supply)	K8 EM1 EM0	220 V 0 V	Standby power input interface 1 Standby power input interface 2
K9 (Y6 functional parts)	K9 Y6 M6	Y6 M6	Y6 output Y6 output common terminal
K10 (standby parts in the cabinet)	K10 CAN- T02 CAN+ DC12 302 301	301 302 CAN+ CAN-	24 V power supply + 24 V power supply - CAN+ CAN-
		DC12 T02	DC 12 V power supply + System standby power input
SUP3_2 (standby function input)	SUP3_2 2 4 1 3	4P	(standby weak-current function input)

Parts ID	Signal ID	Function Description	
TEL3 (intercom in machine room)	TEL3 L DC12 R GND	R L	Intercom signal: + Intercom signal: -
		DC12 GND	Intercom power supply: + Intercom power supply: -

Table 3-5 Description of indicators on the interface board

No.	Terminal Name	Function Description
OV	Indicator for overvoltage protection circuit	Indicate whether 220 V input is led to 380 V, and output circuit is short-circuit (the red indicator is normally on in case of a fault).
111, 121, 123	Indicator for overvoltage protection circuit	Indicate whether the safety circuit between the nodes 111, 121 and 123 is subject to a fault (the green indicator is normally on in normal state).

3.1.5 Grounding Copper Bar

The grounding copper bar in the NICE3000B is designed to provide an unified connection position of ground wires. This allows the housing to have the same EMF as the grid ground wire to ensure personal safety. To prevent indirect electric shock, the exposed conductive part is also grounded.

Insert the bolt into the wire nose and fasten the bolt by using a Phillips screwdriver to fix the ground wire to the copper bar.

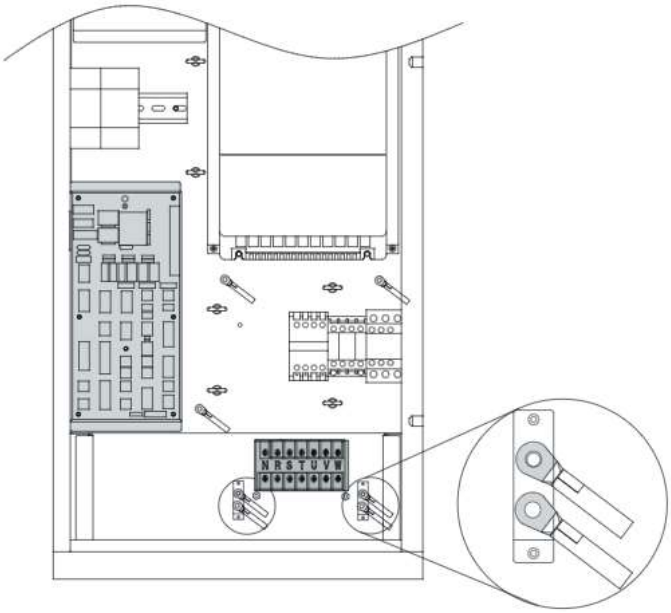


Figure 3-7 Installation of grounding copper bar

NOTE

- You should select proper grounding wires according to the guide. For selection of wire diameter, see Table 4-4;
- The grounding wires must be properly marked;
- The control cabinet must be deenergized before connecting the grounding wire.
- After connection, confirm that all bolts on the copper bar are fastened to prevent leakage.

3.1.6 Wiring of PG Card

A speed closed-loop vector system is formed by connecting the J1 terminal and CN1 terminal of the MCTC-PG card to the J12 terminal of the MCB on the NICE3000^{new} and the encoder of the motor traction machine respectively. Different MCTC-PG card models are connected to the MCB in different ways. The connection method to the encoder depends on the terminal of the model. The following figure shows the electrical connection between the MCTC-PG-E card and the NICE3000^{new} series integrated controller.

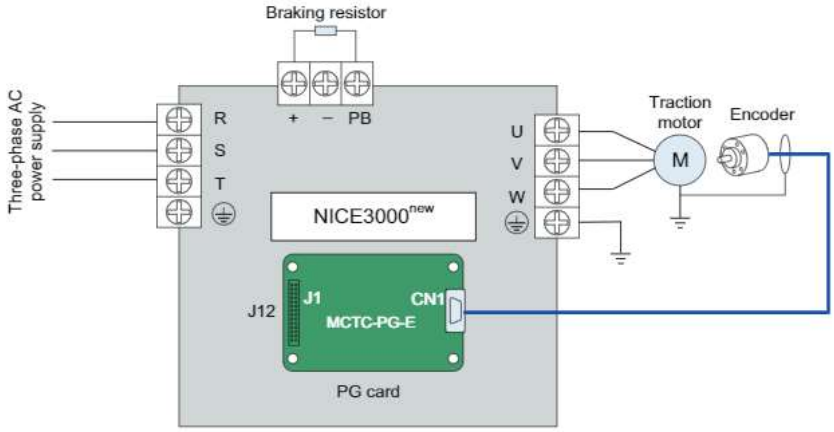


Figure 3-8 Electrical connection between the MCTC-PG-E card and the NICE3000^{new} series integrated controller

NOTE

- Inovance's elevator control cabinet is designed with special inlets and outlets for encoder cables to prevent interference from electromagnetic signals. Please follow the guide in operation.
- CN1 is a screw terminal for MCTC-PG-A2 and you need a flathead screwdriver for installation;
- CN1 is a DB15 female socket for MCTC-PG-E and you need encoder cables with a DC15 male plug.

3.2 Wiring Mode of External Interfaces

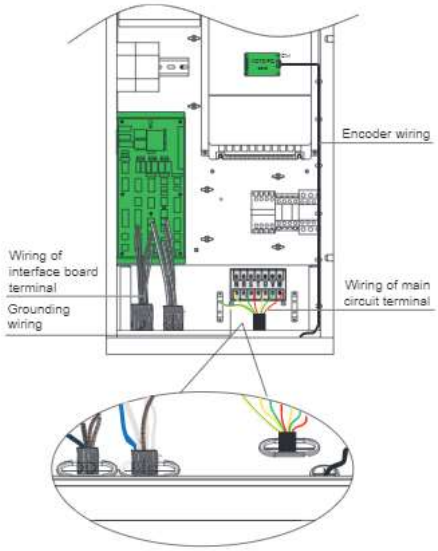


Figure 3-9 Wiring of external interfaces of machine-room control cabinet

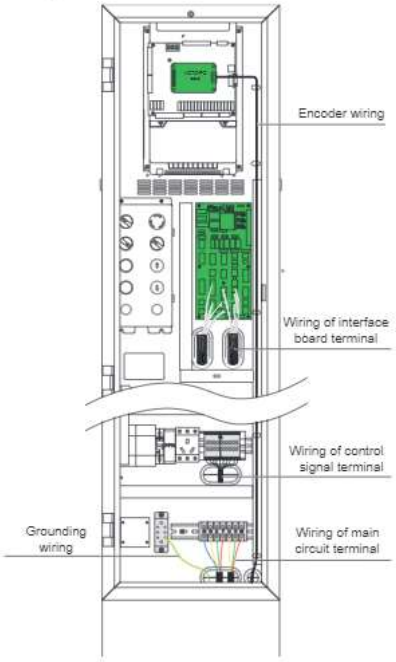


Figure 3-10 Wiring of external interfaces of machine-roomless control cabinet

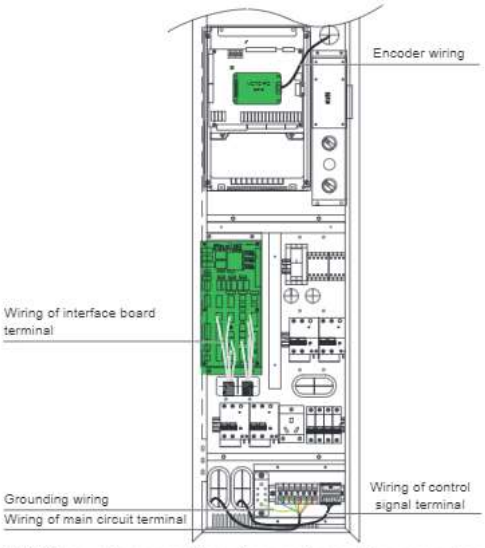


Figure 3-11 Wiring of external interfaces of machine-roomless control cabinet

The power cable, control power and encoder cable must be separately routed to reduce EMC interference between them.

3.3 Recommended Peripheral Cables

For better use of the control cabinet, the following table is given for selection of peripheral cables.

Table 3-6 Recommended peripheral cables

Control Cabinet Power Rating (kw)	Recommended Circuit Breaker (A)	Recommended Contactor (A)	Recommended Diameter of Power Cable (in mm^2)	Recommended Diameter of Control Cable (in mm^2)	Recommended Diameter of Grounding Wire (in mm^2)
2.2	10	9	0.75	0.75	0.75
3.7	16	12	1.5	0.75	1.5
5.5	25	18	2.5	0.75	2.5
7.5	32	25	4	0.75	4
11	40	32	6	0.75	6
15	50	38	6	0.75	6
18.5	63	40	10	0.75	10
22	80	50	10	0.75	10
30	100	65	16	0.75	16
37	100	80	25	0.75	16

3.4 Description of Main Electrical Circuits

This section mainly describes some main electrical circuit diagrams of the NICE3000B. You can make reference to this section before use to ensure normal state of the entire circuit.

3.4.1 Main Circuit of the Elevator

The AC 110\220 V circuit of the elevator is protected against leakage to meet the leakage protection requirements stated in 7588.1. For details, see Appendixes: Figure A-1 Main circuit diagram.

NOTE

- The main circuit follows three-phase five-wire system and a four-way air switch is provided in the distribution box. The three-phase power supply and neutral wire should be disconnected at the same time. Note that the power supply from three-phase five-wire system is required for normal state of the elevator system.
- Car lighting ELCB, shaft lighting ELCB, and lighting double-control switch are provided in the distribution box, to protect the circuits above 50 V of the car and shaft lighting sockets.
- ELCBs for safety circuit and door operator power circuit are provided in the control cabinet. The leakage current will not exceed 30 A.

3.4.2 Safety Circuit and Door Lock Circuit

For safety circuit diagram of the elevator system, see Appendixes: Figure A-2 Safety circuit diagram.

MCB is the main board on the controller. The controller is designed with four HV detection points (X25, X26, X27, and X28) for safety detection, door lock stuck detection, door lock detection, and door lock detection respectively. Three HV detection points are added in the interface board, indicating the state of the safety circuits of the control cabinet, shaft, and machine room. The safety circuits are fed by the transformer in the cabinet, with standard voltage of AC 110 V. The safety circuit is disconnected when:

The emergency stop switch in the cabinet acts; the electrical switch of safety components in the elevator system is turned off.

After the elevator is started, it can run normally only when the input at four HV points is normal (both safety circuit and door lock circuit are in normal state).

3.4.3 Inspection Circuit and Emergency Drive Circuit

1 Description of emergency drive parameters

Parameter	Description	Parameter Setting
F5-04	X4 function selection	118: Door lock bypass NC input
F5-09	X9 function selection	116: Emergency drive NC input
F5-10	X10 function selection	09: Emergency drive up NO input
F5-11	X11 function selection	10: Emergency drive down NO input

2 Diagram

The inspection circuit diagram of the elevator system is shown in the following figure:

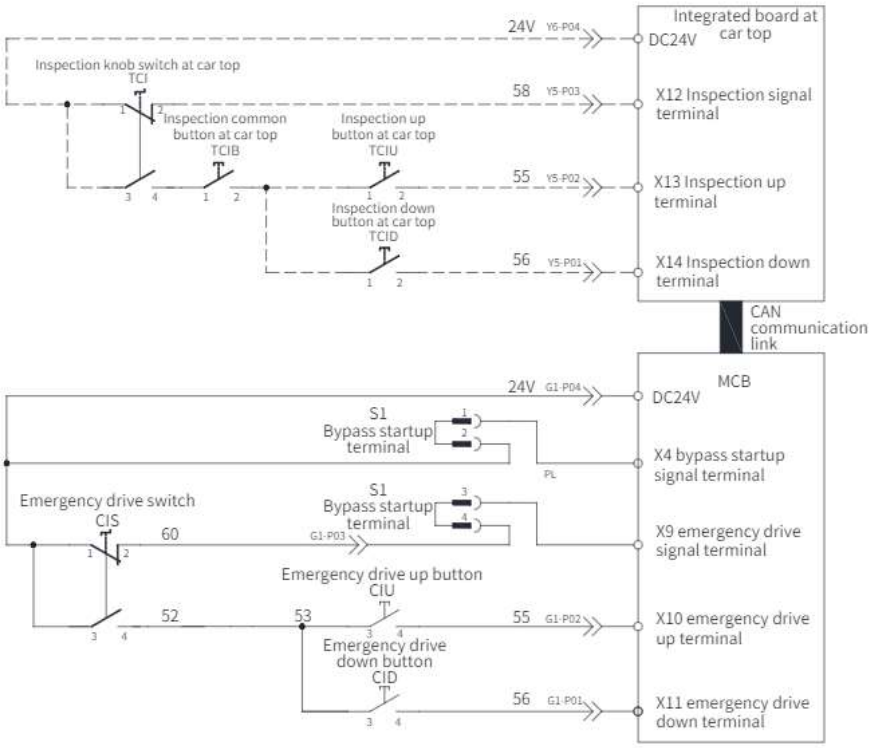


Figure 3-12 Inspection and emergence drive circuit diagram

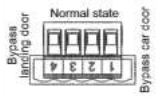
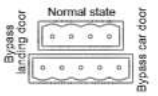
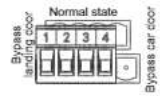
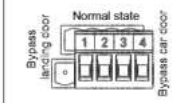
You can operate the emergency drive knob switch in the control cabinet to allow the elevator to enter the emergency drive state, or operate the inspection knob switch at the car top to allow the elevator to enter inspection state. After you operate the inspection knob switch, CTB X12 inspection signal is active and the inspection knob switch disconnects the safety circuit. Only when you operate the inspection common button and direction button simultaneously, the car can be moved after the safety circuit is connected and the inspection running starts. Similarly, after the emergency drive knob switch acts, the car can be moved only by operating the emergency drive up/down button. The inspection knob switch has a higher control level than the emergency drive knob switch as the former disconnects the safety circuit.

3.4.4 Bypass Circuit

To meet the door lock bypass function, plugs are specially added in the interface board circuit. For details, see Appendixes: Figure A-3 Bypass circuit diagram.

Operation procedure of bypass function

1 State description of bypass device

Terminal Definition	S1 ON	S1 OFF		
	S2 ON	S2 OFF	S2 left side OFF	S2 right side OFF
Input signal state	X4/X9 On	X4/X9 OFF		
State	Normal/ Automatic	Emergency drive	Bypass circuit of landing door lock	Bypass circuit of landing door lock
Illustration				

State: normal, emergency drive, bypass landing door contactor, bypass car door contactor

NOTE

◆ If the terminal is connected, it is ON; otherwise, it is OFF.

2 Operation description of bypass device

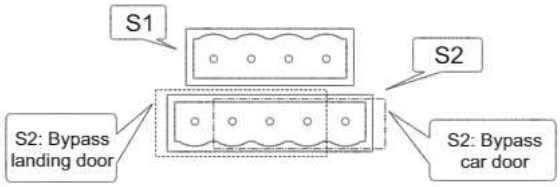


Figure 3-13 Bypass function operation diagram

1) Remove the bypass plug from S1, and then the elevator enters the emergency drive and bypass state. Insert the bypass plug into S2 (see the state description of bypass device), and then the landing door lock circuit or car door lock circuit is shorted. At this moment, emergency drive or inspection running can be performed only when the door is closed in position, and audible and visual alarm acts during implementation.
2) At the end, insert the bypass plug back to S1. The elevator restores to normal state.

3.4.5 Brake Circuit

The brake circuit diagram of the elevator system is shown in the following figure:

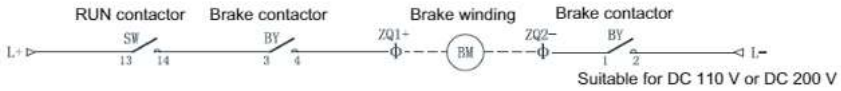


Figure 3-14 Brake circuit diagram

As shown in the figure, L+ and L- indicate the DC voltage from the brake power board, which are led to K6 on the interface board through the RUN contactor and brake contactor, and finally to the brake winding.

NOTE

- The power output interface of the traction machine brake is set on the interface board (MT).
- The brake circuit can only be standard DC circuit; if used in AC scenario, the interface board has to be modified.
- DC brake follow-current circuit and device are arranged on the interface board; if unnecessary or used in other AC scenarios, the circuit has to be removed.

3.4.6 ARD Circuit

The NICE3000B has an ARD (MCTC-ARD-C) circuit for more simple structure and operation. For details, see Appendixes: Figure A-4 ARD circuit diagram.

NOTE

- MNK control must be used with an emergency device that has 220 V output to ensure normal state of the system.

3.4.7 Leveling Signal System Circuit

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 at car top. The NICE3000^{new} system supports the installation of 4 leveling switches. 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.

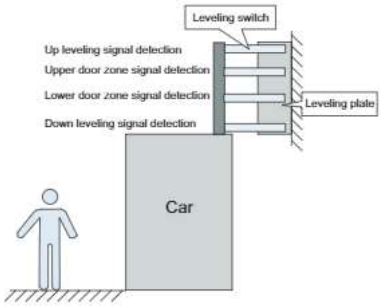
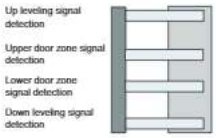
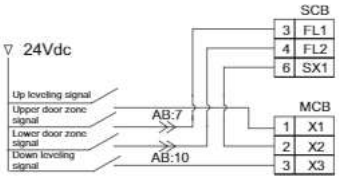
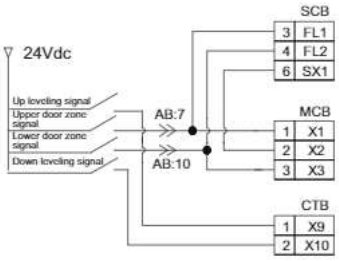


Figure 3-15 Installation of leveling switches

Table 3-7 Installation description of leveling switches

Installation Method	Connecting to Input Terminals of Interface Board and Controller	Parameter Setting	State Monitoring
		F5-01=1 F5-02=3 F5-03=2 F6-52 Bit6 = 0 (Closed)	FA-26 Bit1: Up leveling state monitoring FA-26 Bit2: Down leveling state monitoring FA-26 Bit3: Door zone signal monitoring
		F5-01=1 F5-02=3 F5-03=2 F6-52 Bit6 = 1 (Open) F5-25 Bit9 = 1 (NO) F5-25 Bit10 = 1 (NO)	FA-33 Bit10: Up leveling state monitoring FA-33 Bit11: Down leveling state monitoring FA-26 Bit3: Door zone signal monitoring FA-26 Bit1: Upper door zone signal monitoring FA-26 Bit2: Lower door zone signal monitoring

NOTE

- The system has door pre-open function and all leveling switches send/receive NO signals;
- After being transmitted to the machine room control system, the upper/lower door zone signals must enter the door pre-open system. Then, the door zone signals generated in the system are further sent to the main control system.
- If three or more leveling switch signals are involved, the upper/lower leveling signals must be sent to the CTB.

3.5 Overall System Wiring Diagram

See Appendixes: Page 85, "Figure A-5 Overall system wiring diagram"

4 System Commissioning

This chapter describes the basic commissioning guide of the NICE3000^{new}. By following the instruction, you can perform complete commissioning on the elevator system and implement all basic normal running functions of the elevator.

4.1 Test Run and Commissioning Procedure

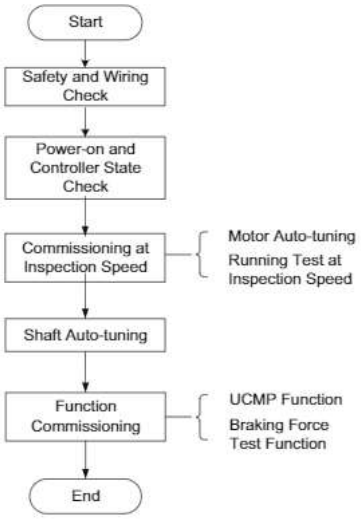


Figure 4-1 Overall commissioning flowchart

4.2 Safety and Circuit Check

Safety check flowchart:

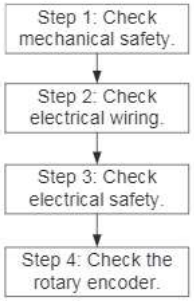


Figure 4-2 Flowchart of safety and circuit check before power-on

NOTE

◆ The input and output terminals of the NICE3000^{new} have default setting at delivery. You can change the setting based on your requirements. The examples in this guide are all based on the default setting of the terminals.

Step 1: Check mechanical safety.

Check that the shaft is unobstructed, there is no person in the shaft, inside or on top of the car, and the conditions for elevator safe running are met.

Step 2: Check electrical wiring.

☐ √	No.	Inspection Points
☐	1	The power supply R, S, T cables are wired correctly and securely.
☐	2	The U, V, W cables between the controller and the motor are wired correctly and securely.
☐	3	The controller (cabinet) and motor are grounded correctly.
☐	4	The safety circuit is conducted, and the emergency stop buttons and switches in the cabinet and in the machine room can act reliably.
☐	5	The door lock circuit is conducted. The door lock circuit is disconnected when the car door or any landing door opens.

Safety Information
⚠ Danger To guarantee safe running of elevator ◆ Short the safety circuit with caution. If the elevator starts running when the safety circuit is shorted, it will cause serious personal injury or even death. ◆ Before starting commissioning, ensure that there is no person in the shaft; otherwise, it will cause personal injury or even death. ◆ NEVER perform commissioning at normal speed when the safety circuit is shorted. ◆ NEVER short the door lock circuit during elevator startup and running. Failure to comply will result in serious personal injury or even death.

Step 3: Check electrical safety.

☐ √	No.	Inspection Points
☐	1	The line voltage of the user power supply is within 380–440 V, and the phase unbalance degree does not exceed 3%.
☐	2	The total lead-in wire gauge and total switch capacity meet the requirements.
☐	3	There is no inter-phase or to-ground short circuit in the R, S, T power supply.
☐	4	There is no inter-phase or to-ground short circuit in the U, V, W phases of the controller. There is no to-ground short circuit in the U, V, W phases of the motor.
☐	5	There is no to-ground short circuit on the output side of the transformer.
☐	6	There is no inter-phase or to-ground short circuit in the 220 V power supply.
☐	7	The 24 V power supply has no short circuit between positive and negative or to-ground short circuit.
☐	8	The CANbus/Modbus communication cable has no short circuit with the 24 V power supply or short circuit to ground.

Step 4: Check the rotary encoder.

☐ √	No.	Inspection Points
☐	1	The encoder is installed reliably with correct wiring.
☐	2	The encoder signal cables and strong-current circuit are laid in different troughs to prevent interference.
☐	3	The encoder cables are 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 shielded cable and preferably soldered to the original encoder cables.
☐	4	The shield of the encoder cables is grounded on the end connected to the controller (only one end is grounded to prevent interference).

4.3 Power-on and Controller State Check

4.3.1 Check Power-on State

☐ √	No.	Check Contents
☐	1	Apply the power. Check that the line voltage of the R, S, T phases of the controller is within 380-440 V, with the phase unbalance degree ⩽ 3%. If it is abnormal, cut off the power, and check the power supply and the wiring of R, S, T cables on the controller.
☐	2	Check that the power input voltage of the 24 V terminal (CN3) on the MCB is 24 VDC±15%. If it is abnormal, cut off the power; check the switch-mode power supply and check whether the 24 VDC circuit is wired correctly.

4.3.2 State Check at Normal Power-on

☐ √	No.	Check Contents
☐	1	Check that the keypad has display after power-on. If there is no display on the keypad, check whether the power supply of the controller is normal.
☐	2	If the input signal indicators shown in the preceding figure become ON, it indicates that the 24 VDC power supply is normal, and the X input terminals work properly. If none of the indicators is ON, it indicates that the 24 VDC power supply is abnormal, and you need to eliminate the problem.

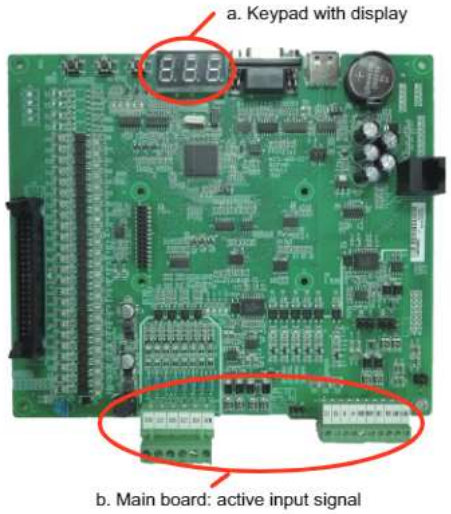


Figure 4-3 MCB display after normal power-on

4.3.3 Potential Controller States and Handling Methods Before Commissioning

Check the controller state and handle related faults accordingly as follows:

During commissioning especially at first-time power-on, certain faults may occur because the conditions for automatic elevator running are not met and certain peripheral signals are not connected. Such faults include E41, E42, E35, E51, E52, and E58.

Handling of faults E41, E42, E35, E51, E52, and E58 before commissioning at inspection speed:

Table 4-1 Fault handling before commissioning at inspection speed

Fault	Fault Name	Fault Description	Handling Method
E41	Safety circuit fault	◆ At this fault, the elevator cannot run or be commissioned. ◆ By default, the safety circuit input signal is connected to terminals X4 and X25.	Observe whether the signal indicator of input terminals X4 and X25 is ON. If this indicator is OFF, the safety circuit is disconnected. In this case, you need to repair the safety circuit. Then, you can perform commissioning at inspection speed.

Fault	Fault Name	Fault Description	Handling Method
E42	Door lock circuit fault	◆ At this fault, the elevator cannot run or be commissioned. ◆ By default, the door lock circuit signal is connected to terminals X5, X26, and X27.	Observe whether the signal indicator of terminals X5, X26, and X27 is ON. If this indicator is OFF, the door lock circuit is disconnected. In this case, you need to repair the door lock circuit. Then, you can perform commissioning at inspection speed. ◆ NEVER short the door lock circuit for commissioning.
E35	Shaft auto-tuning data abnormal	◆ This fault is reported at each power-on because shaft auto-tuning is not performed. It does not affect commissioning at inspection speed.	Press MF.K on the operation panel to hide the fault display. Then, you can perform commissioning at inspection speed.
E51	CAN communication fault	◆ This fault does not affect commissioning at inspection speed, and it affects only commissioning at normal speed. ◆ The COP indicator is OFF at this fault.	
E52	HCB communication abnormal	◆ This fault does not affect motor auto-tuning and commissioning at inspection speed. ◆ The HOP indicator is OFF at this fault.	
E58	Shaft position switches abnormal	◆ The elevator cannot run. You need to rectify the fault first and then perform commissioning at inspection speed. ◆ The fault cause may be: The feedback inputs of both up and down slow-down switches 1 are active; feedback inputs of both up and down limit switches are active simultaneously.	◆ Terminals X14 and X15 are connected to the slow-down switches 1 (NC input). Observe whether the signal indicators of both X14 and X15 are OFF. Check whether the slow-down switches 1 are connected to X14 and X15 and act properly. ◆ Terminals X12 and X13 are connected to the up and down limit switches (NC input). Observe whether the signal indicators of both X12 and X13 are OFF. Check whether the limit switches are connected to X12 and X13 and act properly.

4.4 Commissioning at Inspection Speed

Safety Information
Caution ◆ Ensure that all installation and wiring comply with the electrical safety specifications before commissioning at inspection speed. ◆ During auto-tuning involving the car, pay attention to the running direction of the motor and prevent the elevator from getting too close to the terminal floor. You are advised to run the car to the floor far away (for example, more than 2 floors away) from the terminal floor, and then perform commissioning. ◆ For certain cabinets, "emergency drive" is used instead of "inspection RUN". Note that "emergency drive" shorts certain safety circuit in the shaft, and you need to pay more attentions to the safety when the car runs close to the terminal floor.
Danger To guarantee safe running of elevator ◆ The motor may rotate during auto-tuning. Keep a safety distance from the motor to prevent personal injury. ◆ During with-load motor auto-tuning, ensure that there is no person in the shaft to prevent personal injury or death.

Commissioning at inspection speed includes motor auto-tuning and running test at inspection speed.

4.4.1 Motor Auto-tuning

1 Parameters related to motor auto-tuning

Parameter	Parameter Description	Description
F1-25	Motor type	0: Asynchronous motor 1: Synchronous motor
F1-00	Encoder type	0: SIN/COS encoder 1: UVW encoder 2: ABZ incremental encoder 3: ECN413/1313 absolute encoder
F1-12	Encoder pulses per revolution	0 to 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.
F0-01	Command source selection	0: Operation panel control 1: Distance control

Parameter	Parameter Description	Description
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 5: Synchronous motor static auto-tuning

2 Motor auto-tuning flowcharts

1) Synchronous motor with-load auto-tuning (motor connected with car)

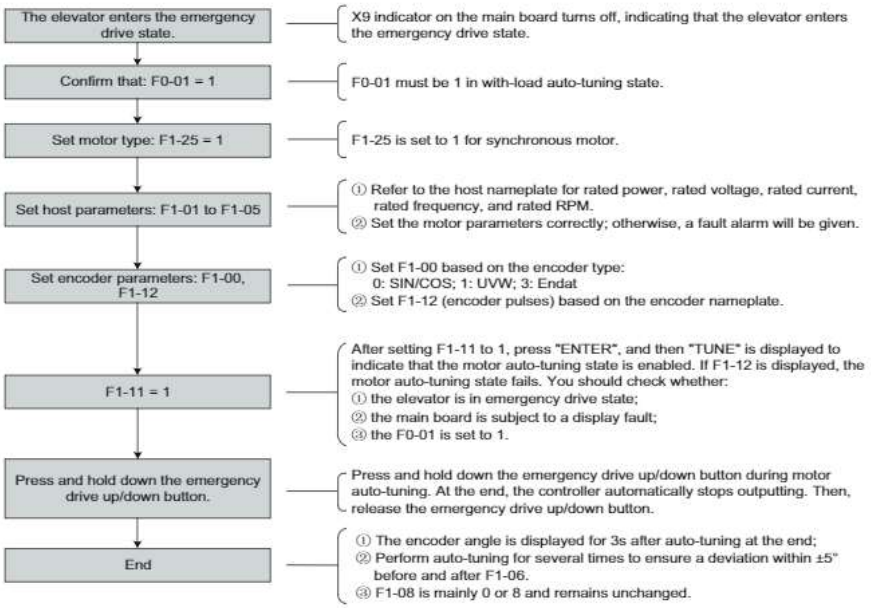


Figure 4-4 Synchronous motor with-load auto-tuning

2) Synchronous motor static auto-tuning (motor connected with car, brake not released and motor not rotate)

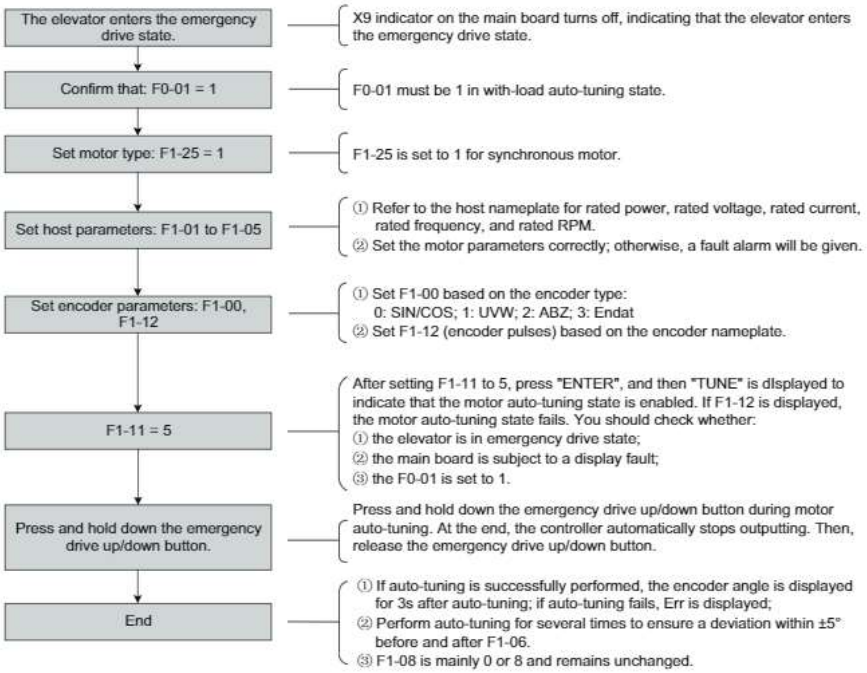


Figure 4-5 Synchronous motor static auto-tuning

3) Synchronous motor no-load auto-tuning (motor disconnected from car)

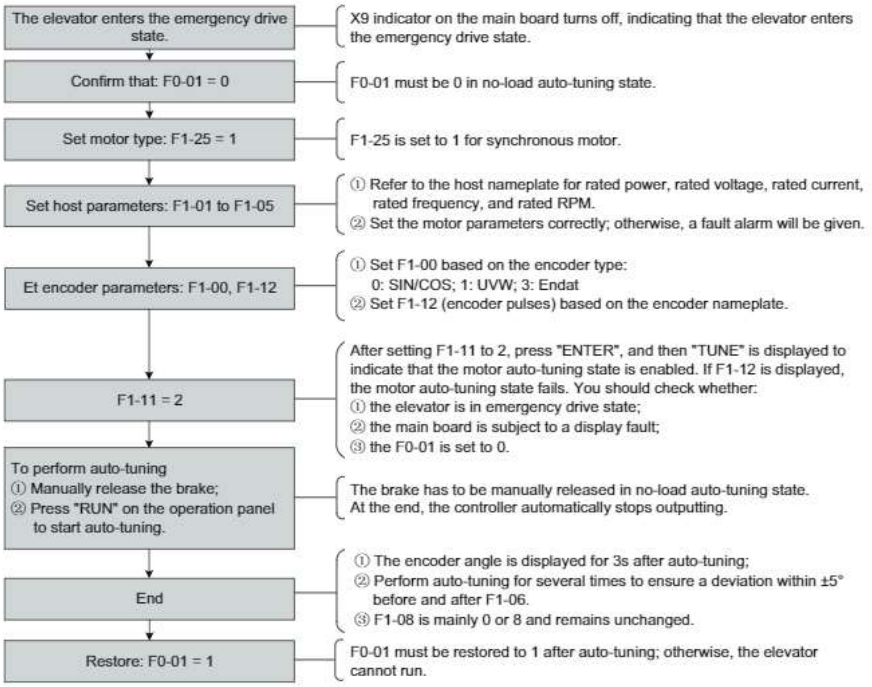


Figure 4-6 Synchronous motor no-load auto-tuning

Pay attention to the following precautions during synchronous motor auto-tuning:

- Synchronous motor auto-tuning learns motor initial pole angle, encoder initial angle, motor wiring mode, and shaft-D and shaft-Q inductance.
- Perform three or more times of auto-tuning; compare the obtained values of F1-06 (encoder initial angle), and the value deviation of F1-06 shall be within ±5°.
- Each time the encoder, encoder cable connection or motor wiring sequence as well as rated motor current, frequency and speed is changed, perform motor auto-tuning again.
- You can modify F1-06 manually. The modification takes effect immediately. Therefore, when you replace the MCB, you can directly run the controller by manually setting F1-06 to the original value rather than performing motor auto-tuning.

4) Asynchronous motor with-load auto-tuning (motor connected with car)

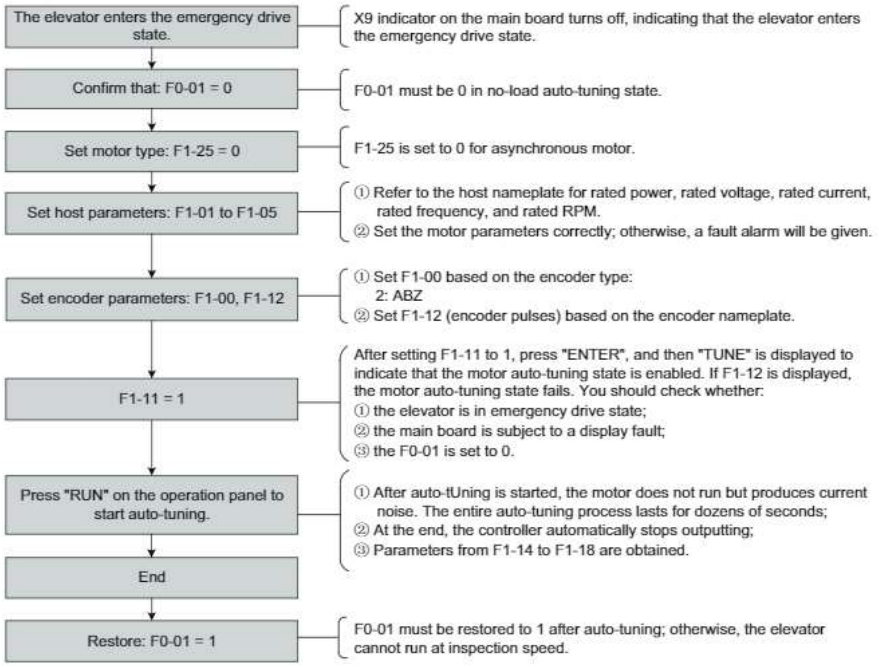


Figure 4-7 Asynchronous motor with-load auto-tuning

5) Asynchronous motor no-load auto-tuning (motor disconnected from car)

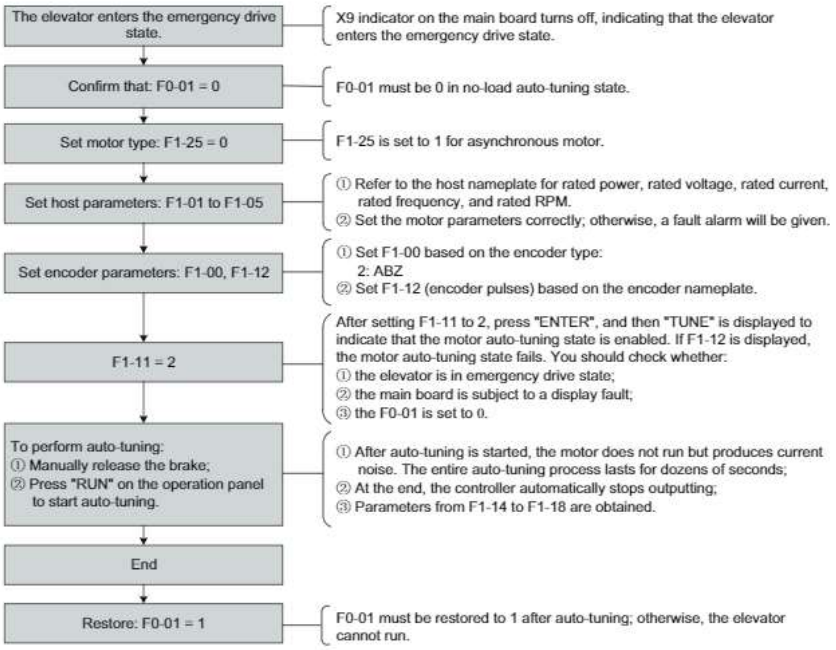


Figure 4-8 Asynchronous motor no-load auto-tuning

Pay attention to the following precautions during asynchronous motor auto-tuning:

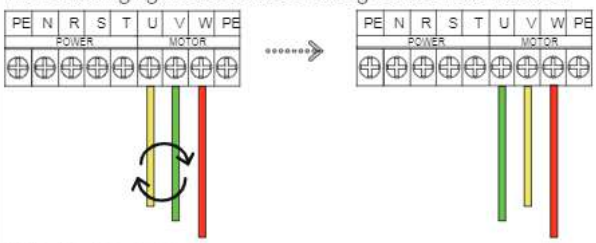
The sequence of encoder phases A and B must be correct. If the sequence is incorrect, fault Err38 is reported. To solve the problem, exchange phases A and B of the encoder.

The system handles the output commands to the RUN contactor or brake contactor differently in different motor auto-tuning modes, as described in the following table.

Table 4-2 Output state of RUN and brake contactors and motor state

Work Mode / Tuning Mode / Control Object	No-load Auto-tuning		With-load Auto-tuning		
	Synchronous Motor	Asynchronous Motor	Synchronous Motor	Synchronous Motor Static Auto-tuning	Asynchronous Motor
RUN contactor	Working	Working	Working	Working	Working
Brake contactor	Not working	Not working	Working	Not working	Not working
Motor	Rotate	Rotate	Rotate	Not rotate	Not rotate

3 Possible faults and handling

Auto-tuning Fault	Fault Symptom	Handling Method
Auto-tuning fails.	Err19	☐ Check whether the encoder cable is broken; use a new PG card and perform auto-tuning again. ☐ Check the three-phase wiring and output contactor.
	Err20	☐ Check whether the encoder cables and strong current circuit are in separate troughs. ☐ Check whether the brake is released completely. If not, check whether power supply of the brake and power circuit is normal. ☐ Check whether the encoder cables are broken. ☐ Check whether there is interference on the encoder cables by observing whether the encoder cables are too close to the motor power cables. ☐ Check whether the encoder is in good condition and installed securely. ☐ The low-power motor (such as P ≤ 5.5 kW) may jitter after auto-tuning starts. Decrease the value of F2-00 to within 10–40.
The motor wiring sequence is incorrect.	Err20 /Err33	☐ Exchange the motor cables. Then, perform auto-tuning again. The following figure shows the exchange of the motor cables:  Note: Fault symptoms 1) During no-load auto-tuning, if the motor wiring sequence is incorrect, Err20 (E0-00) with fault subcode 3 (E0-01) will be reported. 2) During with-load auto-tuning, if the motor wiring sequence is incorrect, the synchronous motor will jitter abnormally during auto-tuning, Err33 is reported, and auto-tuning stops. For the asynchronous motor, there is no prompt during auto-tuning, but Err33 is reported during running at inspection speed.

NOTE

- When the above two problems occur, the wiring sequence from the motor to the controller needs to be changed.
- To change the wiring sequence: swap any two wires on adjacent phases, for only once.

4.4.2 Test Run at Inspection Speed

1 Parameters for running test at inspection speed

Parameter	Parameter Description	Description	Default
F2-10	Elevator running direction	0: Direction unchanged 1: Direction reversed	0
F3-25	Emergency drive speed	0.100–0.600 m/s	0.250 m/s

2 Running Test Flow at Inspection Speed

1. Check that the motor rotates in correct direction.

- Run the elevator at inspection speed after auto-tuning to 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.

2. Check that the motor runs under normal current.

- When the elevator runs at inspection speed, the motor has a current much lower than its rated current in no-load state; the actual current generally does not exceed the rated current in with-load constant speed running state. If, after several times of motor auto-turning, the values of encoder angle differ a little but the current in with-load constant speed running state still exceeds the rated current, you should check whether:
  - ☐ the brake is fully released;
  - ☐ the balance coefficient of the elevator is normal;
  - ☐ the car or centering guide shoe is too tight;

3. Check that the inspection knob switch at car top is enabled.

- Check that the inspection knob switch at car top is enabled and the emergency dive knob switch is disabled. That is to say, the inspection knob switch has a higher control level than the emergency drive knob switch.

4. Check that the shaft is unblocked.

- Check that the shaft is free from mechanical or construction obstacles to prevent damage to the car.

5. Check that the slow-down switches and limit switches for the terminal floor are enabled.

- Check that the slow-down switches and limit switches are enabled before the elevator runs to the terminal floor. It is recommended that the running duration and distance not to be too long so as to prevent mechanical damage possibly caused by over travel.

4.5 Shaft Auto-tuning

1 Preparations for shaft auto-tuning

1. Check that the shaft switches act normally.

- The shaft switches mainly include final limit switches, limit switches, slow-down switches, and leveling switches.

2. Check that the leveling switches act in proper sequence.

- Generally, one leveling switch can satisfy the need. If more leveling switches are installed, you should check that they act in proper sequence when passing through the floor leveling plate. The following example is based on three leveling switches.

  ① If the elevator runs up at inspection speed, the switches should act in the following sequence: up leveling switch → door zone switch → down leveling switch
  ② If the elevator runs down at inspection speed, the switches should act in the following sequence: down leveling switch → door zone switch → up leveling switch

3. Check that the CAN communication is normal.

- Check that no E51 fault alarm is given for the CAN communication between MCB and CTB. If CAN1 signal indicator flashes, it indicates that the CAN communication is normal; otherwise, you need to rectify the fault according to the E51 fault analysis and solution described in the Chapter "Fault Information and Troubleshooting".

2 Parameters

Parameter	Parameter Description	Description	Default	Remarks
F0-04	Rated elevator speed	0.250–4.000 m/s	1.600 m/s	-
F6-00	Top floor of the elevator	F6-01 to 40	9	Actual number of floors (number of installed leveling plates)
F6-01	Bottom floor of the elevator	1 to F6-00	1	-
F3-26	Shaft auto-tuning speed	0.250 to 0.630	0.250	-

NOTE

◆ After F0-04 is changed, shaft auto-tuning must be performed again. Otherwise, an abnormality will occur during elevator running.

Check that the conditions for shaft auto-tuning have been met.

- The elevator is in emergency drive state;
- The elevator needs to run to below the bottom leveling position, that is, at least one leveling switch is below the leveling plate;(This condition applies to only the two-floor case.)
- The down slow-down switch 1 signal input to the MCB is active; (This condition applies to only the two-floor case.)
- The NICE3000B is not in the fault state. If there is a fault, press STOP RES to reset the fault.

3 Perform and complete shaft auto-tuning

When the preceding conditions are met, start shaft auto-tuning by using any of the following methods:

- Set F1-11 to 3 on the operation panel. Switch emergency drive to normal.
- Set F7 to 1 on the keypad of the MCB. Switch emergency drive to normal.

After shaft auto-tuning starts, the elevator runs at the speed set in F3-26. The elevator automatically runs to the leveling plate of the bottom floor and then up to the leveling plate of the top floor and stops after reaching the leveling plate of the top floor. Then, the keypad on the MCB displays the present floor number (top floor), indicating that shaft auto-tuning is successful.

If fault Err35 is reported during the process, it indicates that shaft auto-tuning fails. You need to rectify the fault according to the solution described in the Chapter "Fault Information and Troubleshooting", and perform shaft auto-tuning again.

4 Perform running test at normal speed

After shaft auto-tuning is completed successfully, running at normal speed may not be successful because the door controller and full-load/overload function are not commissioned. You can set parameters to enable the system to forbid door open and allow overload, and then perform running test at normal speed.

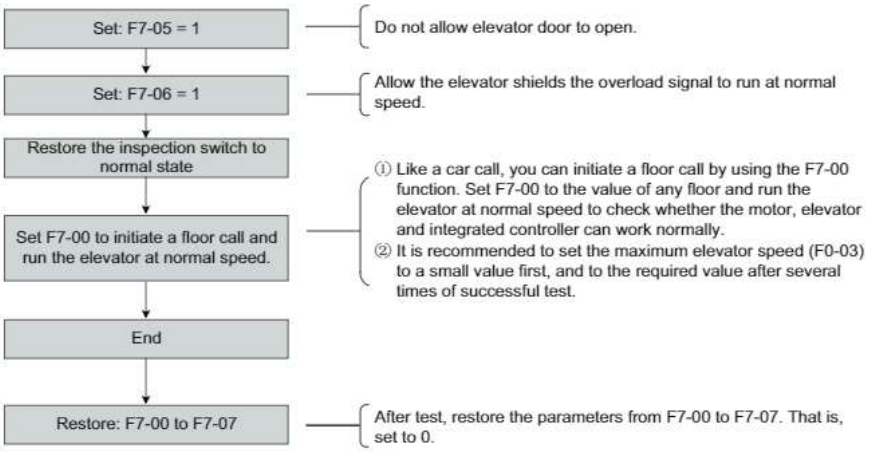


Figure 4-9 Running test at normal speed

NOTE

- The controller restores F7-00 to F7-02 and F7-05 to F7-07 to 0 after power-on again. If you need to continue the test, set these parameters again.

4.6 Function Commissioning

4.6.1 UCMP Function

1 Function description (Default setting of the system. Certain actions can be modified by setting the parameters)

The elevator car landing at a certain floor may move unexpectedly, with landing door unlocked and car door open, if the motor or any component of the drive control system fails. A device is required to prevent or stop the movement, guaranteeing safety.

Table 4-3 Selection of test components

Item	Synchronous Motor	Asynchronous Motor
	Without an Auxiliary Brake	With an Auxiliary Brake
Model	MCTC-SCB-A[1]、or MCTC-SCB-A1[3]	MCTC-SCB-C or MCTC-SCB-D[2]

[1] CE certificated, for domestic and foreign application, others for domestic application only.

[2] Only MCTC-SCB-D can be used for the through-type door and asynchronous motor on site.

[3] One MCTC-SCB-D or two MCTC-SCB-A1 can be used for through-type door driven by synchronous motor.

Requirements for switch installation

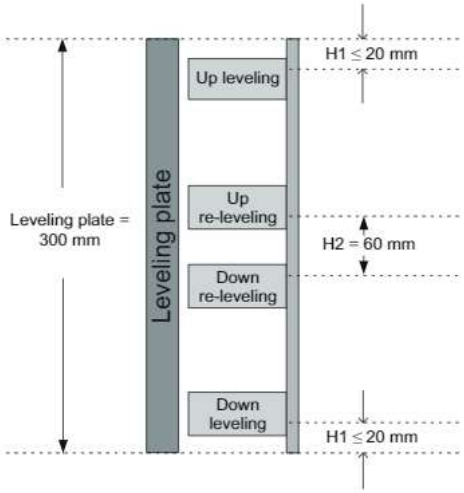


Figure 4-10 Recommended installation solution for Monarch UCMP switch

Requirements for switch installation:

- H1 ≤ 20 mm; H2 = 60 mm
- Leveling plate length ≤ 300 mm. A 300 mm leveling plate is recommended.
- Two door zone switches must be used. The leveling plate length is determined by the actual door open zone (door vane length) of the elevator.
- No door zone switches must be used.

2 Parameters

Parameter	Description	Setting Range
F-8	Test function	7: Entering the UCMP test with the keypad
F3-24	Program function selection	0: Reserved 1: Slip experiment function enabled 2: UCMP manual test

Parameter	Description	Parameter Setting
F5-01	X1 function selection	01: Up leveling signal NO
F5-03	X3 function selection	02: Down leveling signal NO
F5-02	X2 function selection	03: Door zone signal NO
F5-08	X8 function selection	22: Shorting door lock circuit contactor feedback NO
F5-30	Y5 function selection	03: Shorting door lock circuit contactor control

3 Test method

In emergency drive state, in the case of door lock closed, and in the door zone.

Set F-8 to 7 (or F3-24 to 2 using the keypad, and the system displays E88 and enters the UCMP test function. At this moment, the door lock circuit is open.

Manually press and hold down the emergency drive up or down button, and the shorting motor stator contactor performs outputting and the door lock is shorted. At this moment, the elevator is in emergency drive state.

After the elevator is divorced from the door zone (the door zone signal is invalid), the hardware UCMP module will cancel door lock shorting. At this moment, the elevator reports E65 (UCMP fault) and stops running.

NOTE

- It is invalid to set F-8 to 7 and F3-24 to 2 in non-inspection state or door zone or in the case of door lock inoperative.
- After F-8 is set to 7 or F3-24 is set to 2, clearing is automatically performed after one running and after power failure.
- In UCMP test mode, the startup acceleration curve is linearly accelerated to the inspection speed according to F3-08.
- Automatic resetting cannot be performed in case of E65 or after power-off and on.
- E65 can be manually reset only in inspection state.

4.6.2 Braking Force Test Function

1 Function description (Default setting of the system. Certain actions can be modified by setting the parameters)

To prevent failure of the brake contactor of the motor that guarantees safe running, periodically test whether the braking force of the brake contactor meets the requirements and detect the braking force of the control system.

2 Parameters

Parameter	Description	Setting Range	Default	Remarks
F2-32	Torque output duration	1 to 10s	5	When it is set to 0, the system uses the default value 5s.
F2-33	Torque limit	1 to 150% of the rated motor torque	110	When it is set to 0, the system uses the default value 80% of rated motor torque.
F2-34	Threshold of pulses for judging braking force abnormal	1 to 100 encoder feedback pulses	0	When it is set to 0, the system uses the default value 30.
F2-35	Threshold of slip distance excessive	1° to 20° motor rotating mechanical angle	0	When it is set to 0, the system uses the default value 5° for the synchronous motor and 10° for the asynchronous motor.
F-8	Test function	8: Manual test on braking force	0	The braking force test is enabled with the keypad.
F7-09	Braking force test result	0 to 2	0	/
F7-10	Braking force test countdown	0 to 1440	1440	Countdown time is automatically restored to 1440 at the end of the test.

3 Manual test

① The system is in emergency drive state, and the emergency driveswitch is enabled;

② The elevator stops in door zone and keeps door closed.

③ Triggering with the keypad: F-8 is set to 8;

④ When the system enters the test state, the MCB displays E88;

⑤ The shorting motor stator contactor and RUN contactor have output, and the brake contactor has no output;

⑥ The system starts testing according to the output torque related to the braking force.

⑦ E88 disappears on the MCB. F7-09 is displayed at the end of the test. In the case of F7-09 = 2, E66 (braking force unqualified) is reported immediately, the elevator stops running, and the fault cannot be reset.

4 Automatic test

After braking force test condition 1 is satisfied, the system automatically enters the test state. The steps are the same as steps ④ , ⑤ , ⑥ and ⑦ of the manual test.

Fault E66 cannot be reset upon power failure and can be automatically reset only when a braking force test is redone and passes.

Countdown function: After 12 hours is exceeded, the system starts to judge whether condition 1 is satisfied. If testing has been performed, the countdown function code is reset to 24 hours. If no test has been performed, the system proceeds to condition 2 (forced test).

During the automatic test, no fault is prompted for hall calls and the keypad prompts the E88 test state. Hall calls can be registered, but cannot obtain a response. The system restores to normal and responds to registered hall calls at the end of the test. Car calls are canceled. The door cannot be opened or closed.

Test conditions:

Condition 1: Normal test on braking force: Under the condition of no car and hall calls, testing is performed after the elevator energy saving time or 3 minutes.

Condition 2: Forced test on braking force: The system makes a judgment ahead of 10 minutes. When time set in F7-10 is smaller than or equal to 10 minutes, the elevator buzzes for 30s. Buzzing can be closed by setting F8-19 Bit13. At the moment, registered hall calls are reserved, car calls are canceled, and the door can be opened or closed. The system starts testing after the door is closed.

5 Inspection and Maintenance

5.1 Routine Inspection

As an key part of the elevator system, the NICE3000B must be inspected and maintained according to the national laws and regulations and the industry standards.

5.1.1 Routine Inspection Items

☐ √	No.	Routine Inspection Items
☐	1	The motor does not produce abnormal sound during running.
☐	2	The motor does not produce strong vibration during running.
☐	3	The NICE3000B's installation environment has/has not been changed.
☐	4	The NICE3000B does not overheat.
☐	5	All electrical components in the NICE3000B are in normal state.
☐	6	The NICE3000B is free from condensation.
☐	7	All screws in the NICE3000B are fastened.
☐	8	All contactors in the NICE3000B do not produce abnormal sound when the elevator is running.

5.1.2 Routine Cleaning Items

☐ √	No.	Routine Cleaning Items
☐	1	The NICE3000B must be cleaned on a regular basis.
☐	2	The NICE3000B has a protection level of IP20. Waterproof and dustproof measures must be taken during cleaning.
☐	3	Dust on the NICE3000B must be cleared away and prevented from entering the cabinet.

5.2 Periodic Maintenance

Periodic maintenance should be performed for the places difficult to be inspected during routine maintenance and running.

5.2.1 Periodic Inspection Items

☐ √	No.	Routine Inspection Items
☐	1	All screws are fastened.
☐	2	All terminals are free from scratches and other marks.
☐	3	All electrical components are in normal state.
☐	4	All cables in the NICE3000B are not exposed.

5.2.2 Replacement of Wear Parts

Wear parts in the NICE3000B mainly include transformer fuses, fuse wires, and air switches. Additional fuses are reserved for standby.

The lifetime of air switches and contactors is generally 2 to 3 years. You can regularly replace the wear parts based on their lifetime and actual running conditions.

6 Appendixes

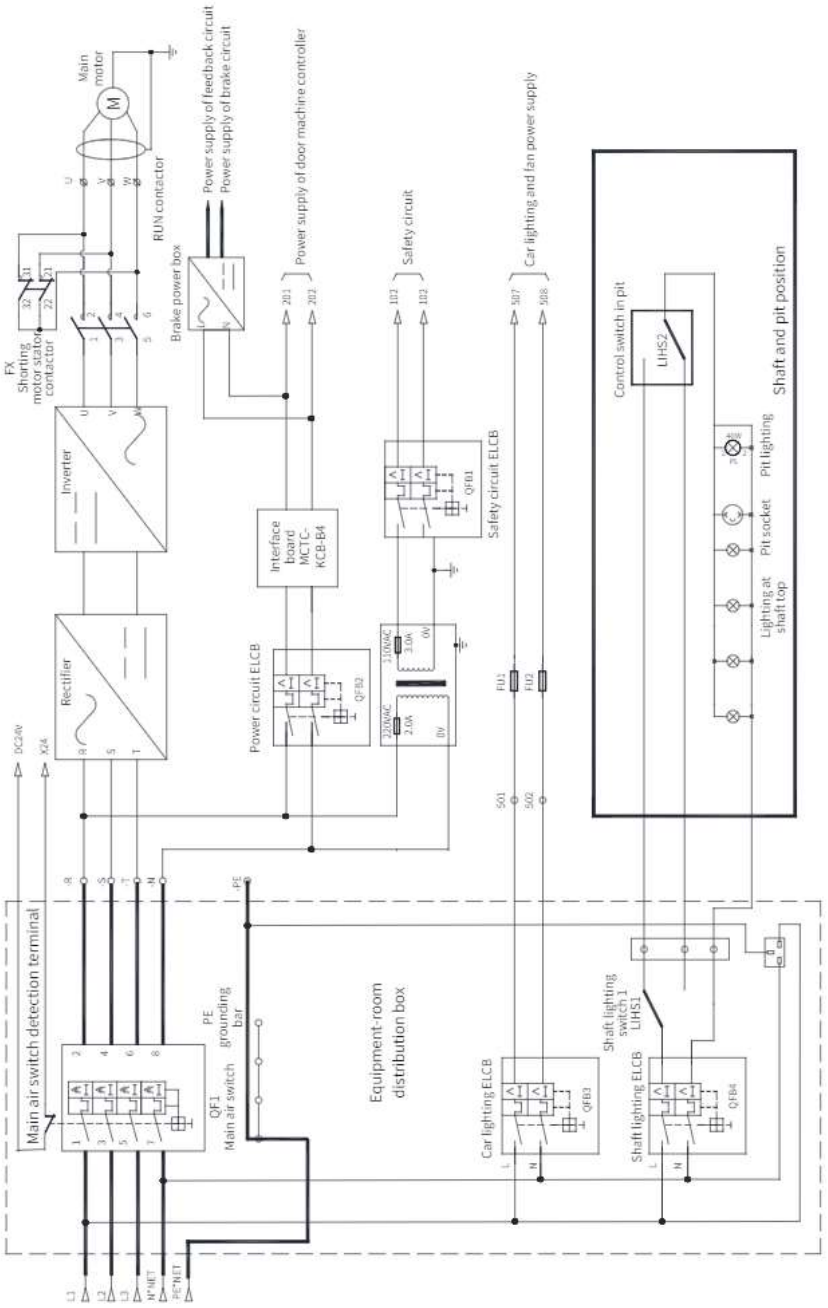


Figure 6-1 Main circuit diagram

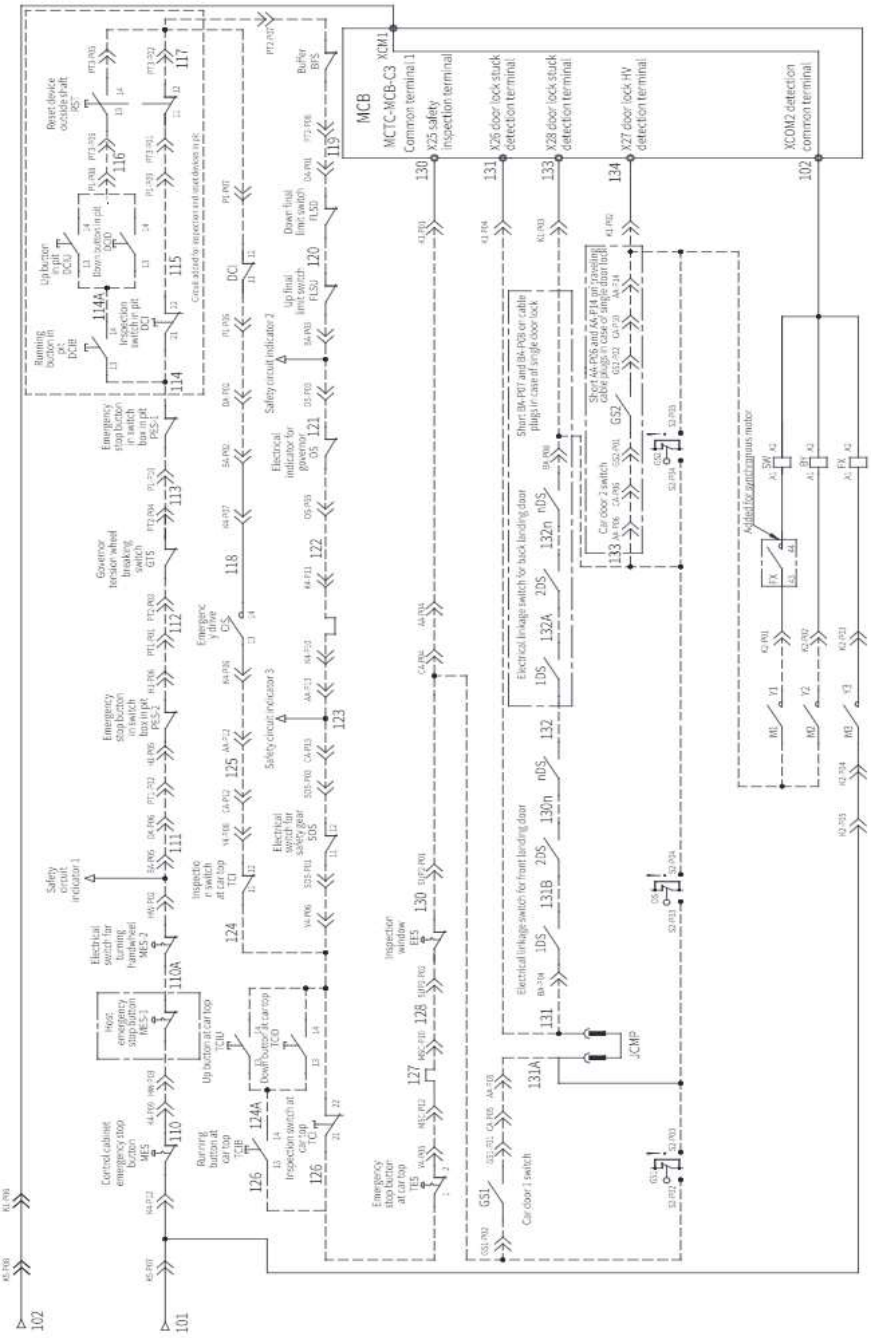


Figure 6-2 Safety circuit diagram

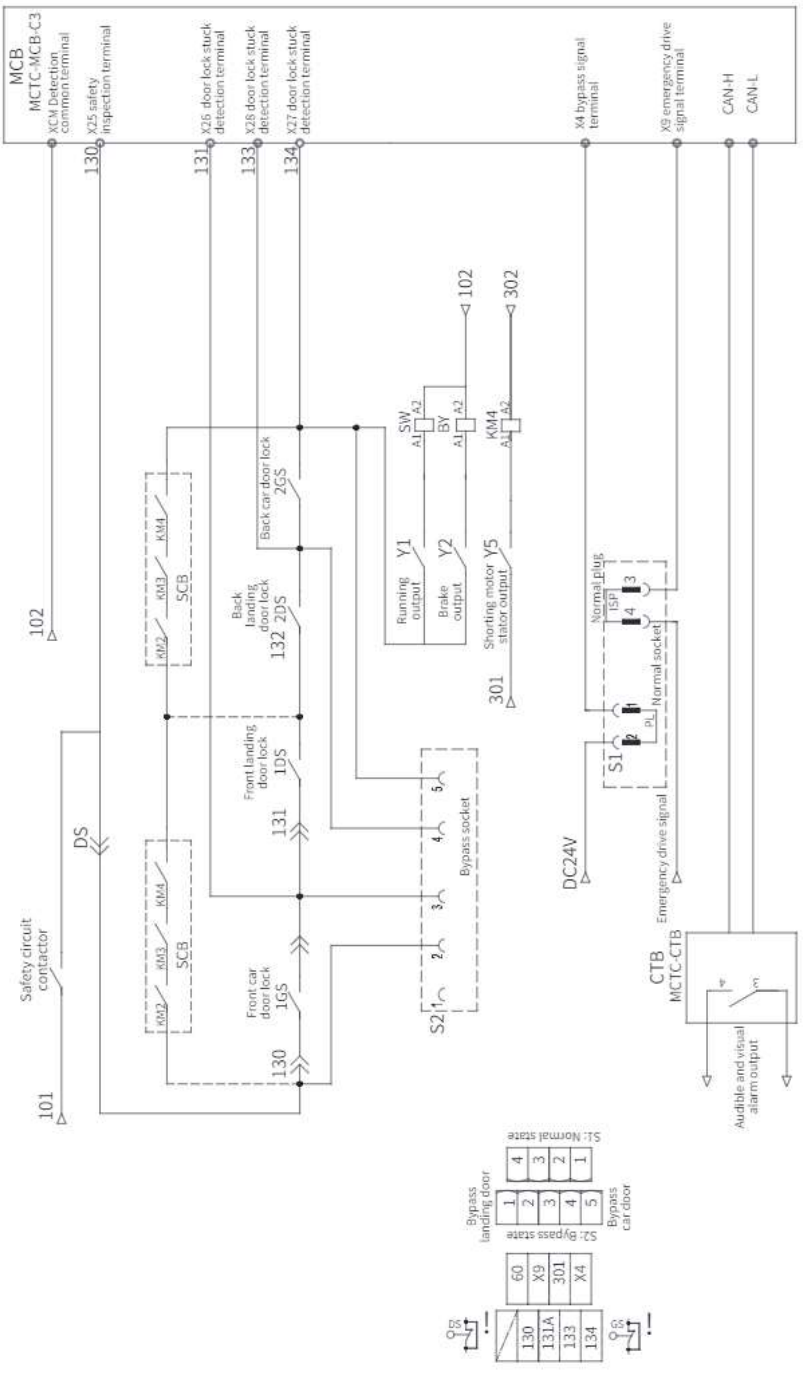


Figure 6-3 Bypass circuit diagram

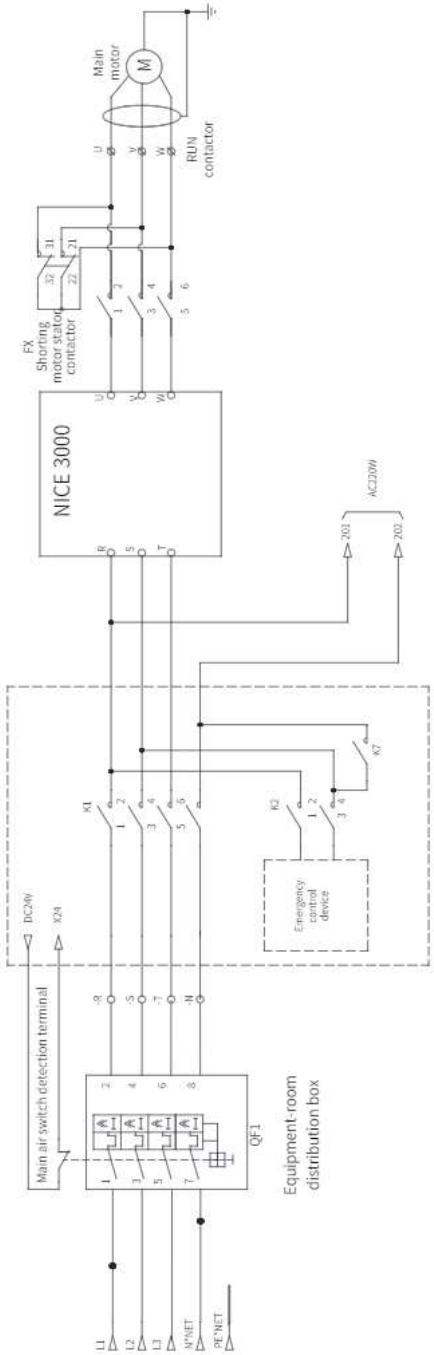


Figure 6-4 ARD circuit diagram

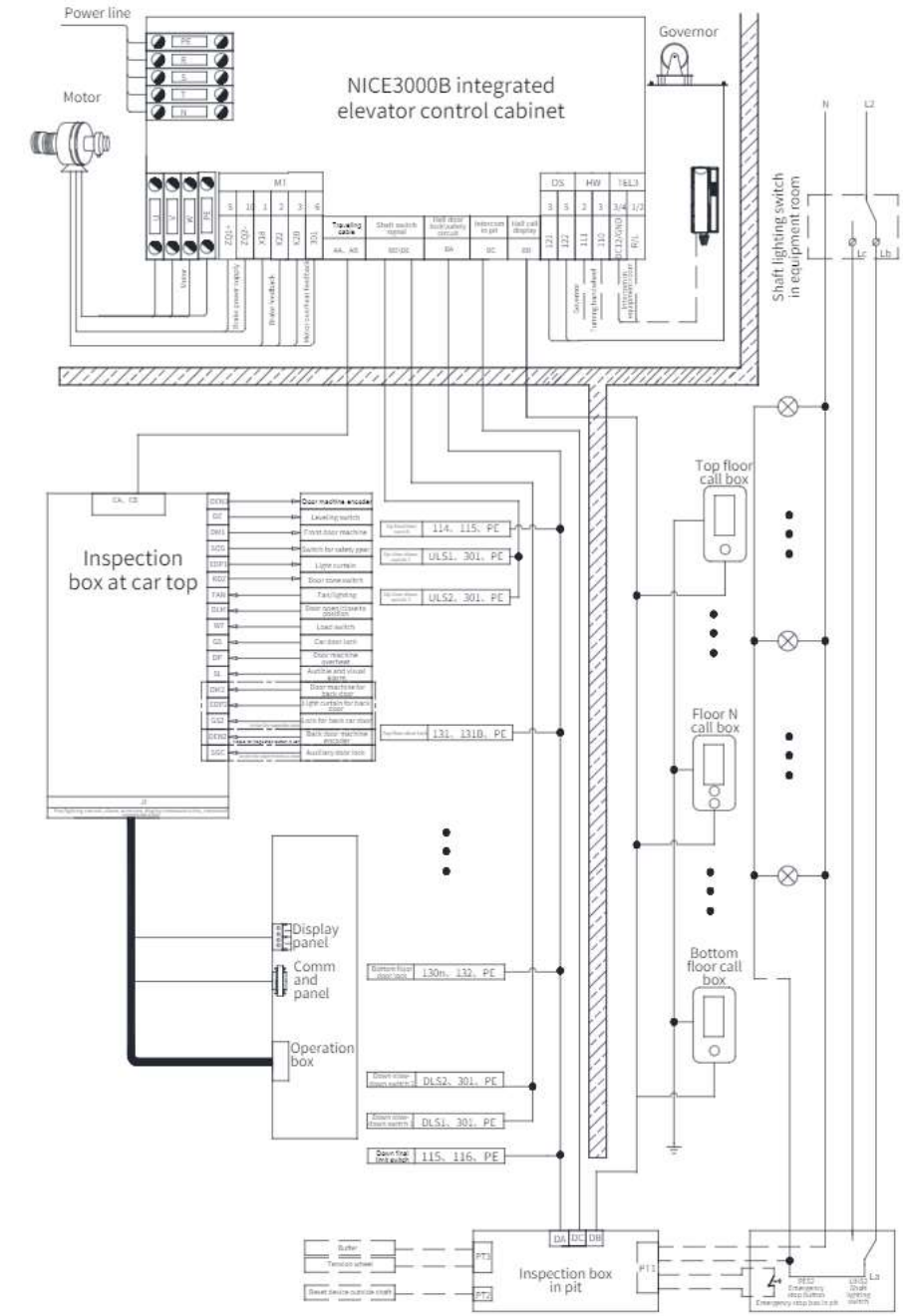


Figure 6-5 Overall system wiring diagram

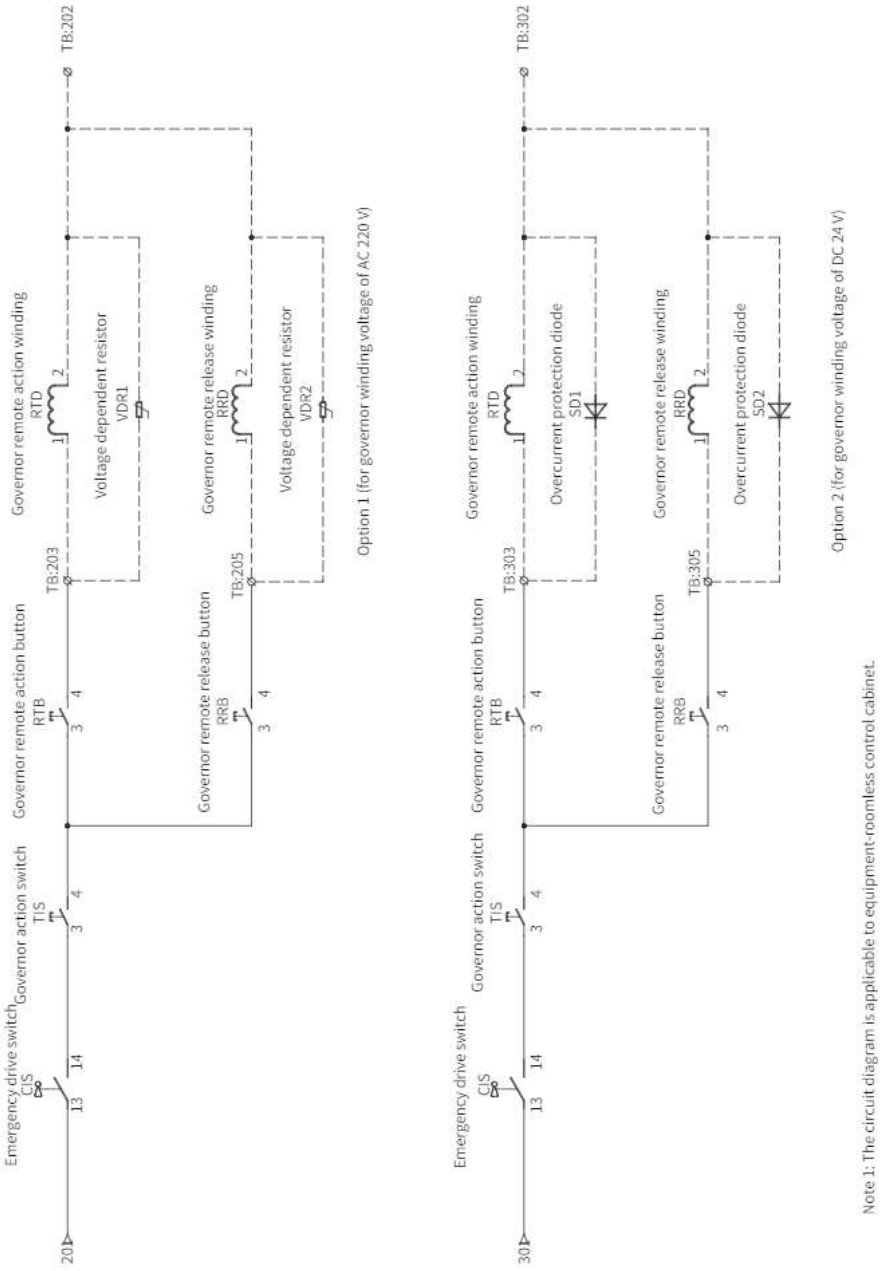


Figure 6-6 Equipment-roomless governor action and release wiring diagrams

7 Version History

Date	Version	Revision
May 2018	A00	First issue.
November 2018	A01	Updated logo.

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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