INOVANCE

Hardware Guide

SLIM LINE Series Control Cabinet

Hardware Guide

Data code 19011452 A00

Preface

Thank you for purchasing the SLIM LINE series control system.

By 2019, over two million elevator controllers/control cabinets produced by INOVANCE, an elevator brand owned by Inovance, have been put into use around the world. Based on such extensive practices and the application experience in different regions, we developed the SLIM LINE control system to meet the new requirements of global market.

This guide introduces the types and features, safety information, as well as mechanical and electrical installation of the control system.

Read this guide carefully before using the product, and keep it properly for future maintenance reference.

Notes
◆ For illustration purpose, the drawings in this guide are sometimes shown without covers or protective guards. Remember to install the covers or protective guards as specified before using the product, and perform operations following the instructions.
◆ The drawings in this guide are for illustration only. Actual products may vary.
◆ The instructions are subject to change, without notice, due to product upgrade, specification modification as well as efforts to increase the accuracy and convenience of the guide.
◆ If the guide is damaged or lost, order a replacement from your agent or the customer service center of Inovance.
◆ Contact the customer service center of Inovance if you have any problems during use.

Contents

Revision History

Date	Version	Change Description
November 2020	A00	First release.

Safety Instructions

Safety Precautions

1) Before using the product, read the safety instructions thoroughly and comply with them during operations.

2) To ensure the safety of humans and equipment, follow the signs on the product and all the safety instructions in this guide.

3) "CAUTION", "WARNING", and "DANGER" items in this guide do not indicate all safety precautions that need to be followed; instead, they just supplement the safety precautions.

4) Use this product according to the designated environmental 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 personal injuries or damage to the equipment.

Safety Instructions

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 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
 ◆ 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.

Other Instructions

1) Requirements for the main air switch

Install a circuit breaker on the front-end of the input power supply side (L, N) of the control cabinet to prevent such faults as short circuit and overload on the back-end load. For a three-phase 380 V or single-phase 220 VAC system, the rated current of the circuit breaker cannot be lower than 32 A. A circuit breaker with rated current above the rated input current of the control cabinet is recommended.

2) Requirements for the residual current device (RCD)

Install an RCD with rated tripping current not higher than 30 mA in the car top lighting and shaft lighting circuits for protection.

3) High leakage current warning

The equipment generates high leakage current during running. Ground the equipment reliably before connecting it to the input power supply. Grounding must comply with local regulations and related IEC standards.

4) Motor insulation test

Perform the insulation test when the motor is used for the first time, after long-time storage, or in a regular inspection, to prevent the control cabinet from being damaged due to the poor insulation of motor windings. The motor must be disconnected from the control cabinet during the insulation test. A 500 V megger is recommended for the test. Ensure that the measured insulation resistance is 5 MΩ or above.

5) Motor thermal protection

Set the motor overload protection parameters properly or install a thermal relay for the motor for protection.

6) Disposal

The electrolytic capacitors inside the control cabinet and on the PCBs may explode when they are burnt. Poisonous gas is generated when the plastic parts are burnt. Treat them as industrial waste.

7) Inspection of peripheral cables

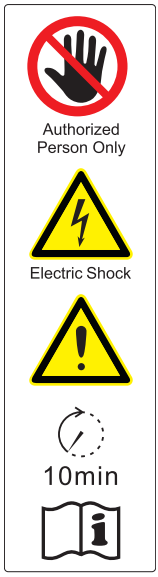
Ensure the cross-sectional area and voltage resistance of power cables and control power cables meet the requirements. Connect the input and output cables separately to avoid danger caused by cable mixing and insulation damage.

Run the signal cables and power cables separately. Use shielded twisted pairs (STPs) as analog signal cables, and ensure that the shielded cables are reliably grounded at one end.

Safety Signs

For safe equipment operations and maintenance, comply with the safety signs on the equipment, and do not damage or remove the safety labels.

The following table describes the safety signs.

Safety Sign	Description
	◆ Only professionals are allowed to open the cabinet door. ◆ High voltage! ◆ Before maintenance, cut off all power supplies and wait 10 minutes. ◆ Before using the product, read the user guide and safety instructions carefully.

1 Unpacking and Transportation

1.1 Inspection upon Unpacking

Upon unpacking, check the following items:

Item	Description
Whether the product model is consistent with your order.	Check whether the product model on the nameplate is consistent with that on your order.
Whether the product is damaged.	Check whether the product enclosure is damaged during transportation.

1.2 Transportation

1.2.1 Transportation Before Unpacking

- The control cabinet can be transported manually due to its small size and light weight.
- The control cabinet must be placed on a flat and firm ground that can bear the weight of the equipment.
- The control cabinet must be transported in the upright manner marked on the packaging box. Never turn it upside down or place it on its side.

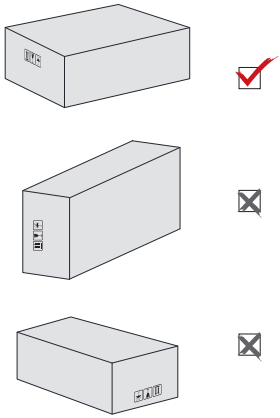


Figure 1-1 Placement mode of the control cabinet

1.2.2 Transportation After Unpacking

The control cabinet can be transported manually because it is small and light.

2 Product Information

2.1 Features

This product is a general-purpose control system designed for home elevators, small residential elevators, and newly installed elevators in old buildings. It features:

Excellent riding experience

Adopting the high-end drive and control technology integrating the vector drive and noiseless control, the control cabinet allows the direct travel ride of elevators. This guarantees a safe, comfortable, and efficient riding.

Powerful functions

Under the guidance of modular design principle, the control cabinet integrates the automatic rescue device (ARD), manual brake release, re-leveling function, unintended car movement protection (UCMP), and selection of multiple brake voltages, allowing the customization of control solutions as required.

Easy human–machine interaction (HMI)

The on-board signal monitoring system, LCD operating panel, smartphone commissioning APP, and easy operations simplify the communication between humans and machines.

Wide applications

- Separable and narrow cabinet structure allows multiple installation modes, adaptive to various buildings
- Meets the elevator standards of different regions, including Europe and China
- Wide voltage range, meeting the needs of global markets

2.2 Model Number

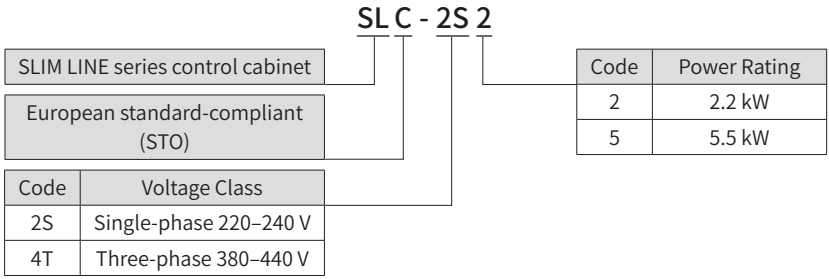


Figure 2-1 Model number

Table 2-1 Description of model number

Model Number	Type of Control Cabinet	Voltage Class	Power Rating	Motor Type	Mounting Mode
SLC-2S2	Machine room-less (MRL)	Single-phase 220 VAC	2.2 kW	Synchronous/ Asynchronous motor	Backplate/Through-hole/Door frame mounting
SLC-4T5	MRL	Three-phase 380 VAC	5.5 kW	Synchronous/ Asynchronous motor	Backplate/Through-hole/Door frame mounting

NOTE

◆ This part only describes the model number of standard products. If you have any customized requirements, contact the sales personnel of Inovance.

2.3 Nameplate

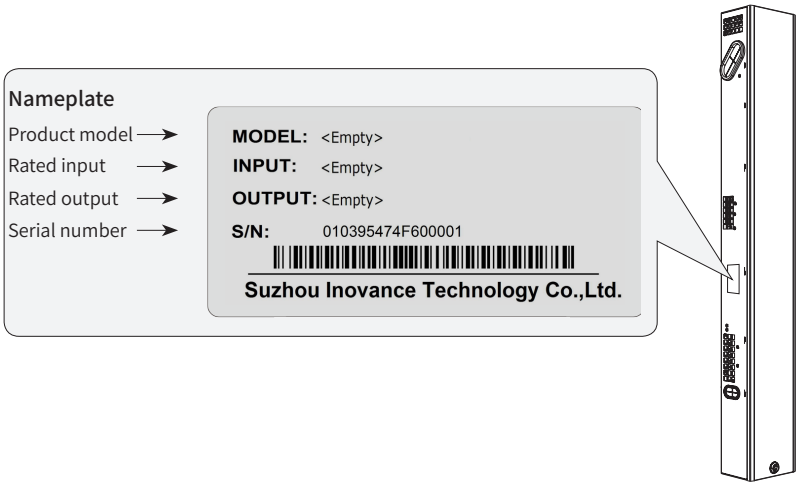
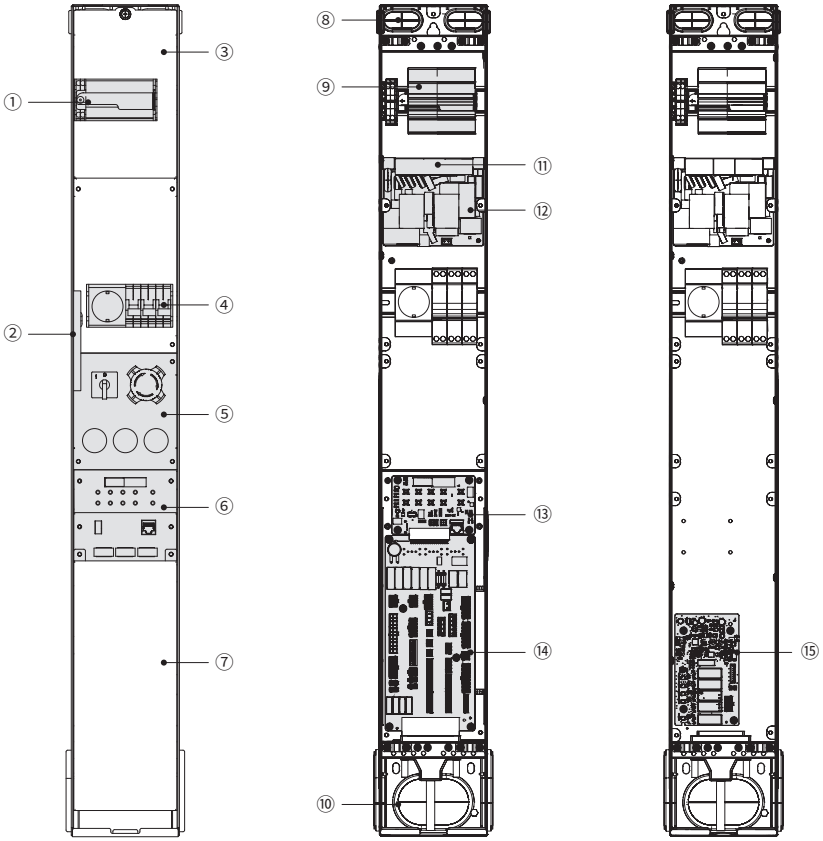


Figure 2-2 Nameplate

2.4 Cabinet Components

The SLIM LINE consists of a monitoring cabinet and a drive cabinet. The following section introduces the components of each cabinet.



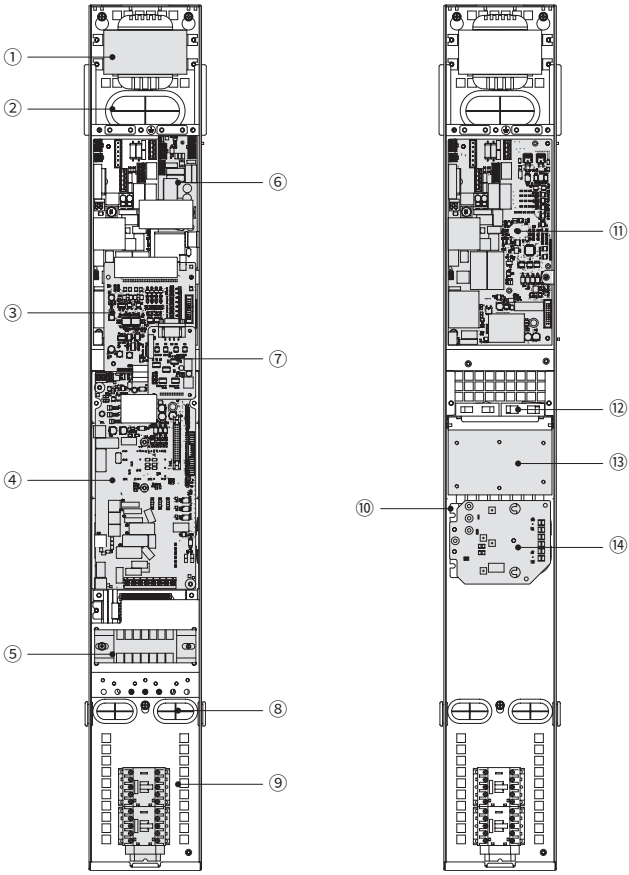
Layout of the 1st layer　　Layout of the 2nd layer　　Layout of the 3rd layer

Figure 2-3 Components of the monitoring cabinet

Table 2-2 Description of components of the monitoring cabinet

No.	Component	No.	Component	No.	Component
①	Air switch lock	⑥	Button board	⑪	Terminal
②	Lighting	⑦	Interface cover	⑫	Lightning protection board

No.	Component	No.	Component	No.	Component
③	Cover for main power cables	⑧	Cable inlet/outlet hole	⑬	Monitoring board
④	Socket and residual current device (RCD)	⑨	Main air switch	⑭	Interface board
⑤	Operating board	⑩	Cable inlet/outlet hole	⑮	Advance door opening (ADO) board (UCMP board)



Layout of the top layer　　Layout of the bottom layer

Figure 2-4 Components of the drive cabinet

Table 2-3 Description of components of the drive cabinet

No.	Component	No.	Component	No.	Component
①	Transformer	⑥	Power supply board B	⑪	Power supply board A
②	Cable inlet/outlet hole	⑦	PG card	⑫	Fan
③	Main control board (MCB)	⑧	Power cable inlet/ outlet hole	⑬	Heatsink
④	Driver board	⑨	Contactors	⑭	Capacitor board
⑤	Power cable terminal block*	⑩	DC reactor		

NOTE

◆ Power cable terminal block*: The terminals from left to right are R1, S1, T1, (+), PB, U, V, and W respectively.

2.5 Rated Data

Table 2-4 Technical data

Model of Control Cabinet	Power Capacity (kVA)	Input Current (A)	Output Current (A)	Applicable Motor (kW)
220 VAC control cabinet: single-phase 220–240 V, 50/60 Hz				
SLC-2S2	3.9	23.0	13.0	2.2
380 VAC control cabinet: three-phase 380–440 V, 50/60 Hz				
SLC-4T5	8.9	14.8	13.0	5.5

NOTE

◆ **Motor model selection:** When selecting a motor, you need to consider both the rated output current and the rated power. Make sure that the rated current/power of the motor is smaller than or equal to the rated output current/power of the SLM LINE control cabinet.

2.6 Technical Specifications

Table 2-5 Technical specifications

Item		Specification
Input power supply	Phase number, voltage, and frequency	220 VAC control cabinet: single-phase 220–240 V, 50/60 Hz 380 VAC control cabinet: three-phase 380–440 V, 50/60 Hz
	Allowable voltage fluctuation	-15% to +10%
	Allowable frequency change	-5% to +5%

Item		Specification
Basic characteristics	Maximum number of floors	40
	Elevator running speed	≤ 1.75 m/s
	Emergency evacuation	Emergency evacuation using ARD or electric brake release
Structure	IP rating	IP20
	Cooling mode	Forced air cooling
	Mounting mode	Backplate mounting, through-hole mounting, or door frame mounting
Drive characteristics	Control mode	Vector control with a PG card
	Startup torque	Up to 200%, depending on the load
	Speed control range	1:1000 (vector control with a PG card)
	Speed control accuracy	±0.05% (vector control with a PG card, 25 ± 10°C)
	Torque limit	Up to 200% in the slip experiment; Up to 180% in normal running
	Torque accuracy	±5%
	Frequency control range	0–99 Hz
	Frequency accuracy	±0.1%
	Frequency setting resolution	0.01 Hz/99 Hz
	Output frequency resolution (calculated resolution)	0.01 Hz
	Torque compensation at no-load startup	If the elevator load is unknown, the system applies an appropriate torque to the motor according to the direction that the elevator will run. This is to achieve a smooth startup by minimizing jerk at the moment of startup, improving the riding comfort at startup.
	Braking torque	150% (external braking resistor), built-in braking unit
	Acceleration/Deceleration time	0.1s to 8s
	Carrier frequency	4–16 kHz
Input/ Output (I/O) characteristics	Low-voltage photocoupler isolation input	-
	Relay output	-
	USB interface	Used for mobile phone commissioning
	CAN communication interface	-
	Modbus communication	-
	Analog input (AI)	-

Item		Specification
Brake power supply	Voltages for high-voltage startup and low-voltage operating	Dual brakes are supported. High-voltage startup: 220 V (2 A); Low-voltage operating: 110 V (1.2 A) High-voltage startup: 110 V (3.5A); Low-voltage operating: 60 V (1.8 A)
	Single-arm braking force test	Supports both dynamic and static single-arm braking force tests
Protection functions	Output overload protection	60s for 150% of the rated current 2s (normal running) or 10s (slip experiment) for 200% of the rated current
	Protection against output phase-to-phase short circuit	Before and during motor running, the system performs protection when output short circuit occurs between any two phases.
	Protection against output short circuit to ground	Before and during motor running, the system performs protection when output short circuit to ground occurs in any phase.
	Braking resistor short circuit protection	Protects the braking IGBT during braking.
	Braking transistor short circuit protection	Prevents the braking resistor from overheating caused by long-time working.
	Input phase loss protection	Before and during motor running, the system performs protection when any input phase is lost.
	Bus overvoltage protection	Triggers protection when the bus voltage is above the set threshold value.
	Bus undervoltage protection	Triggers protection when the bus voltage is below the set threshold value.
	IGBT over-temperature protection	Triggers protection when the temperature of IGBT housing exceeds the set value.
	Protection against incorrect input power supply connection	Triggers protection for the single-phase load when a 220 V control cabinet is connected to a 380 V input power supply.
	Lighting RCD protection	Supported
	Door operator RCD protection	Supported
	Brake RCD protection	Supported
	Protection against short circuit between the safety circuit and the grounding (PE) terminal	Supported
	Brake power supply output short circuit protection	Supported

Item		Specification
Shaft lighting	Voltage and current	220 V, 1 A
Car lighting	Voltage and current	220 V, 1 A
Door operator power supply	Voltage and current	220 V, 2 A
24 V system power supply	Voltage and current	24 V, 4 A (reinforced insulation with the primary side)
Safety circuit power supply	Voltage and current	24–30 V, 1 A (reinforced insulation with the primary side)
Overspeed governor coil	Voltage	220 VAC
Emergency evacuation by ARD	Emergency evacuation speed	≤ 0.3 m/s
	Emergency evacuation direction	Light-load direction
	Maximum emergency evacuation time	360s if a standard battery pack is used (Increasing the battery capacity can prolong the emergency evacuation time.)
Emergency evacuation by automatically shorting the motor stator (for PMSM)	Overspeed protection	Supported
	Speed display	Supported
	Door zone display	Supported
	Display of car running direction	Supported
Emergency evacuation by manually shorting the motor stator (for PMSM)	Overspeed protection	Supported
	Speed display	Supported
	Display of car running direction	Supported
	Door zone display	Supported
Display	Keypad	-
	Operating panel	-
	Host controller software	-

Item		Specification
Environment	Ambient temperature	-10°C to +50°C (de-rated if the ambient temperature is above 40°C)
	Humidity	Below 95% RH, without condensation
	Vibration	Below 5.9 m/s^2 (0.6 g)
	Storage temperature	-20°C to +60°C
	Operating location	Indoor, free of corrosive gases and dust
	Pollution degree	PD2
	IP rating	IP20
	Power distribution system	TN/TT
	Altitude	1000 m or below (de-rated by 1% for each 100 m higher if the altitude is above 1000 m; max. altitude: 3000 m)

2.7 Introduction to Major Components

2.7.1 Lightning Protection Board (MCTC-OPB-N1/N2)

MCTC-OPB-N1 and MCTC-OPB-N2 are lightning protection boards in the control cabinet used to satisfy EMC-related standards.

■ **MCTC-OPB-N1 (used for 220 VAC control cabinet)**

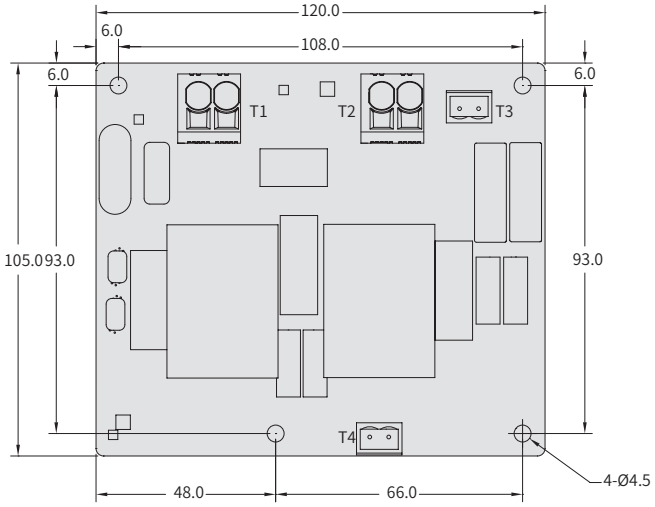


Figure 2-5 Outline and dimensions of the MCTC-OPB-N1 (unit: mm)

Table 2-6 Description of MCTC-OPB-N1 terminals

Terminal	Pin	Function Description
T1 N L	N	220 VAC input terminal
	L	220 VAC input terminal
T2 N1 L1	N1	220 VAC input terminal connected to the driver board
	L1	220 VAC input terminal connected to the driver board
T3 L1 N1	L1	Grid voltage detection terminal connected to the power supply board
	N1	Grid voltage detection terminal connected to the power supply board
T4 L1 N1	L1	Control power supply terminal
	N1	Control power supply terminal

■ **MCTC-OPB-N2 (used for 380 VAC control cabinet)**

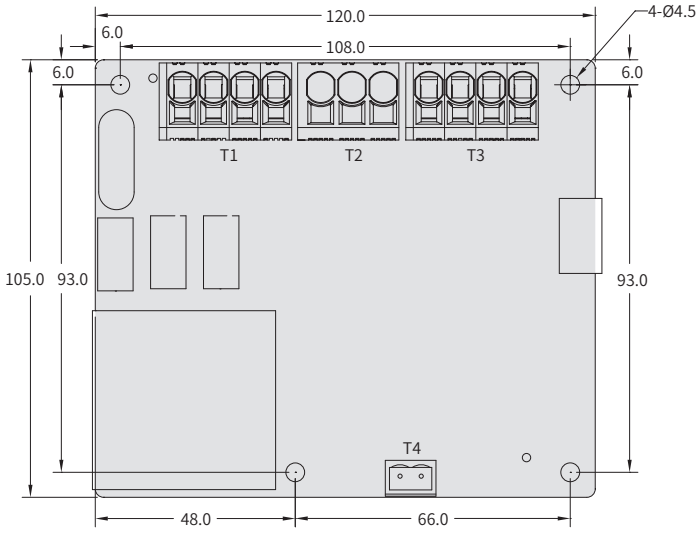


Figure 2-6 Outline and dimensions of the MCTC-OPB-N2 (unit: mm)

Table 2-7 Description of MCTC-OPB-N2 terminals

Terminal	Pin	Function Description
T1 N T S R	N	380 VAC input terminal
	T	380 VAC input terminal
	S	380 VAC input terminal
	R	380 VAC input terminal
T2 T1 S1 R1	T1	380 VAC input terminal connected to the driver board
	S1	380 VAC input terminal connected to the driver board
	R1	380 VAC input terminal connected to the driver board
T3 N2 T1 S1 R1	N2	Grid voltage detection terminal connected to the power supply board
	T1	Grid voltage detection terminal connected to the power supply board
	S1	Grid voltage detection terminal connected to the power supply board
	R1	Grid voltage detection terminal connected to the power supply board
T4 R11 N1	R11	Control power supply terminal
	N1	Control power supply terminal

2.7.2 Power Supply Board A (MCTC-PCB-N1)

Power supply board A provides the operating power supply for the control cabinet.

① When the system works normally, power supply board A provides a 60 V power supply for buses (inputs to all auxiliary system power supplies, 24 V system power supply, as well as safety circuit power supply) and powers up the standby power supply and brake.

② When the system enters the emergency evacuation state, the standby power supply powers up the door operators, brake, and AC drive buses.

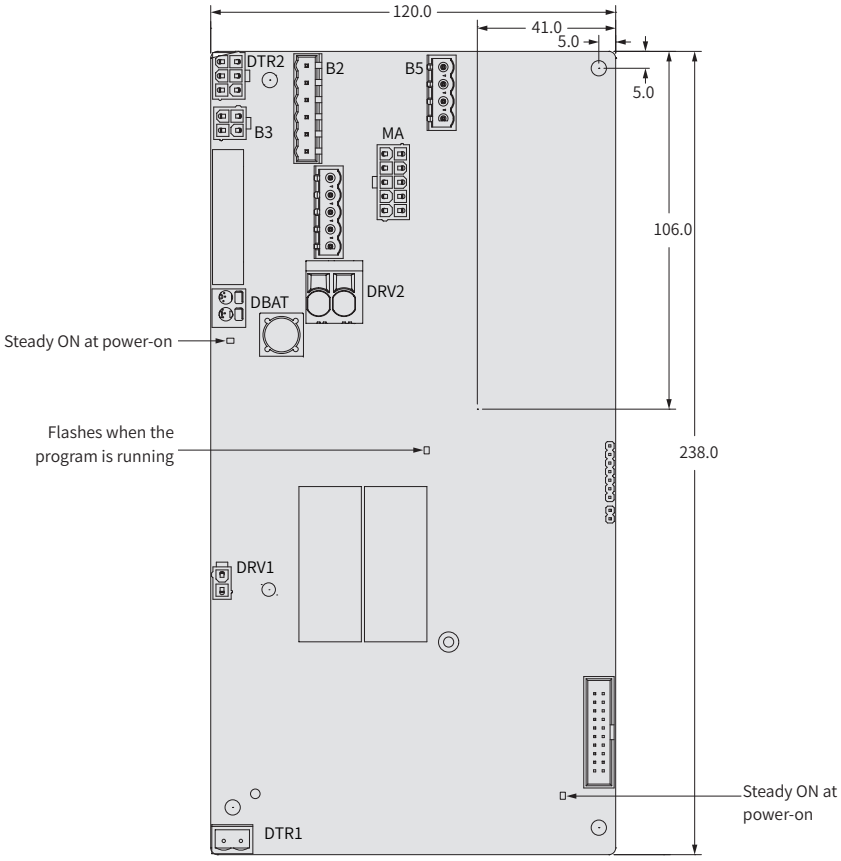


Figure 2-7 Outline and dimensions of the MCTC-PCB-N1 (unit: mm)

For the description of terminals on the power supply board, see *"Table 6-2 Description of terminals on the power supply board" on Page 58*.

2.7.3 Power Supply Board B (MCTC-PCB-N2)

Power supply board B provides the system power supply for the control cabinet, including a 24 V system power supply and a 24 V safety circuit power supply. It integrates the relays controlling the brake contactors, and STO board.

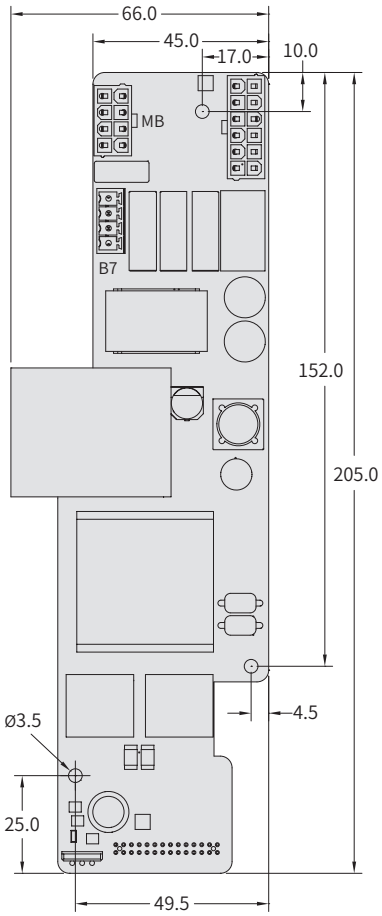


Figure 2-8 Outline and dimensions of the MCTC-PCB-N2 (unit: mm)

For the description of terminals on the power supply board, see *"Table 6-2 Description of terminals on the power supply board" on Page 58*.

2.7.4 Drive Module (MCTC-MPA-N1/N2)

The drive module, the drive part of the control cabinet, consists of such components as the driver board, capacitor board, and fan. It functions as the core of an elevator drive control system.

NOTE

- MCTC-MPA-N1: drive module of 380 VAC system
- MCTC-MPA-N2: drive module of 220 VAC system
- The MCTC-MPA-N1 and MCTC-MPA-N2 have the same dimensions, but they are different in appearance. The MCTC-MPA-N2 does not provide the components marked with dashed boxes in the following table.

Appearance differences:
The MCTC-MPA-N2 does not provide the components marked with dashed boxes.

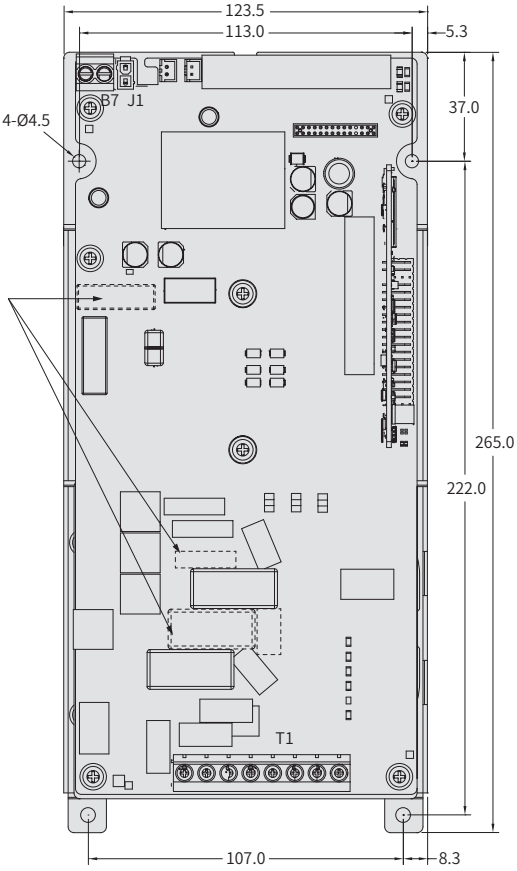


Figure 2-9 Outline and dimensions of the MCTC-MPA-N1/N2 (unit: mm)

Table 2-7 Description of MCTC-MPA-N1/N2 terminals

Terminal	Pin	Function Description
T1 P BR R S T U V W	P	Bus +
	BR	Braking resistor
	R	Three-phase input voltage
	S	Three-phase input voltage
	T	Three-phase input voltage
	U	Three-phase output voltage
	V	Three-phase output voltage
	W	Three-phase output voltage
J1 2 1	PSB_DC+	Auxiliary power supply bus (+) of the driver board
	PSB_DC-	Auxiliary power supply bus (-) of the driver board
B7 P N	P	Drive bus +
	N	Drive bus -

2.7.5 Main Control Board (MCTC-MCB-N1)

The MCB is the control part of the control cabinet. It is mainly used for:

① elevator logic control

② communication between different modules of the elevator control system

③ detection signal collection and output control of the elevator control system

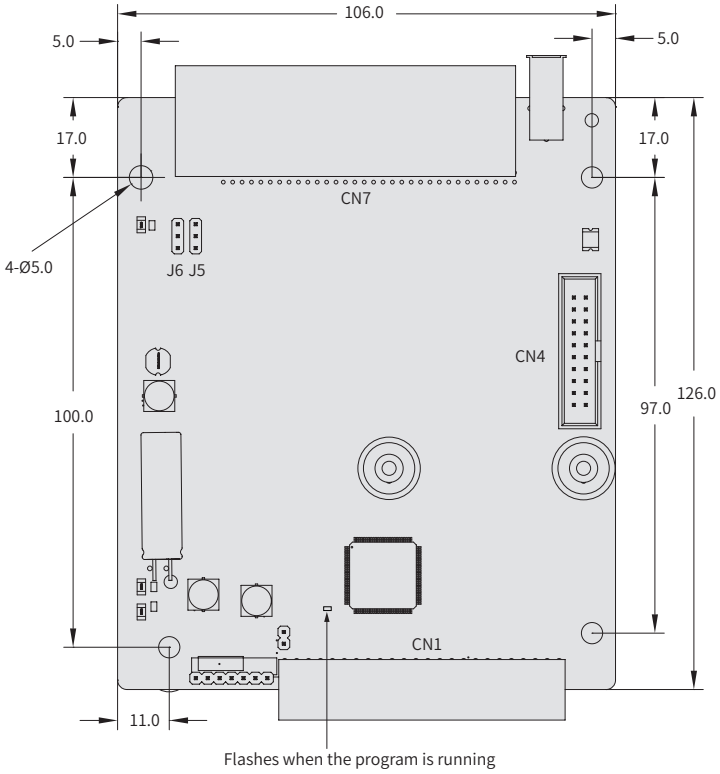


Figure 2-10 Outline and dimensions of the MCTC-MCB-N1 (unit: mm)

Table 2-8 Description of MCTC-MCB-N1 terminals

Terminal	Pin	Function Description
J6 (Jumper selection terminal of CAN termination resistor) GND CAN+	GND	Power ground
	CAN+	CAN bus +
	-	-
J5 (Jumper selection terminal of CAN termination resistor) 5V CAN-	5V	5 V power supply
	CAN-	CAN bus -
	-	-

2.7.6 Monitoring Board (MCTC-MB-N1)

The monitoring board is mainly used for:

① displaying the elevator's running state, fault codes, and parameters.

② switching the I/O state display of elevator detection signals.

③ setting the parameters, viewing the state switchover of elevator detection signals, and operating the function keys.

④ detecting the system input signals.

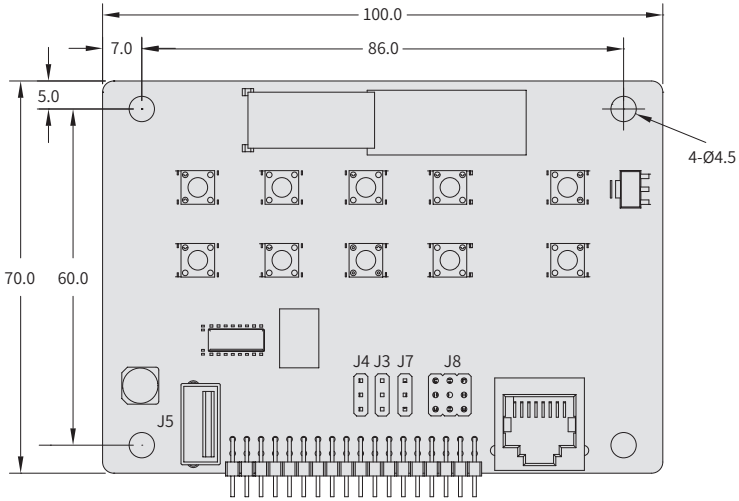


Figure 2-11 Outline and dimensions of the MCTC-MB-N1 (unit: mm)

■ **Description of programming jumpers on the monitoring board**

The programming terminals on the monitoring board enables the programming of PCBs with the running program.

① Program the J5 USB port by connecting the USB terminal to a computer.

② Short pin 1/2 of terminal J7 when programming the Boot program. Short pin 2/3 of terminal J7 when programming the user program.

③ Use the J8 terminal to select the board to be programmed, including the monitoring board (MB), MCB (MCB), ARD board (ARD), and DSP board (DSP).

Short pins COM and MB when programming the monitoring board.

Short pins COM and MCB when programming the MCB.

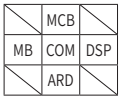
Short pins COM and ARD when programming the ARD board.

NOTE

◆ Before programming the ARD board, set F0-24 to 1. After the programming is complete, set it to 0.

Short pins COM and DSP when programming the DSP board.

Table 2-9 Description of MCTC-MB-N1 terminals

Terminal	Pin	Function Description
J8 (Programming jumper selection terminal) 	MB	Monitoring board programming jumper
	ARD	ARD board programming jumper
	COM	Common terminal of programming jumpers
	MCB	MCB programming jumper
	DSP	DSP board programming jumper
J7 (Boot programming jumper selection terminal) 	BOOT	Boot program programming jumper
	5V	5V power supply
	-	-
J4 (Jumper selection terminal of CAN termination resistor) 	GND	Power ground
	CAN+	CAN bus +
	-	-
J3 (Jumper selection terminal of CAN termination resistor) 	5V	5 V power supply
	CAN-	CAN bus -
	-	-

2.7.7 Interface Board (MCTC-KCB-N1)

The control cabinet provides fixed interfaces for users to facilitate the wiring. The interface board is mainly used for:

① ARD activation, lighting switch operations, and cancellation of emergency evacuation using the ARD.

② the connection of system detection signals, as well as the connection and assignment of power supplies

③ the parallel connection of safety circuit signals in the elevator system

④ door lock shorting and UCMP test

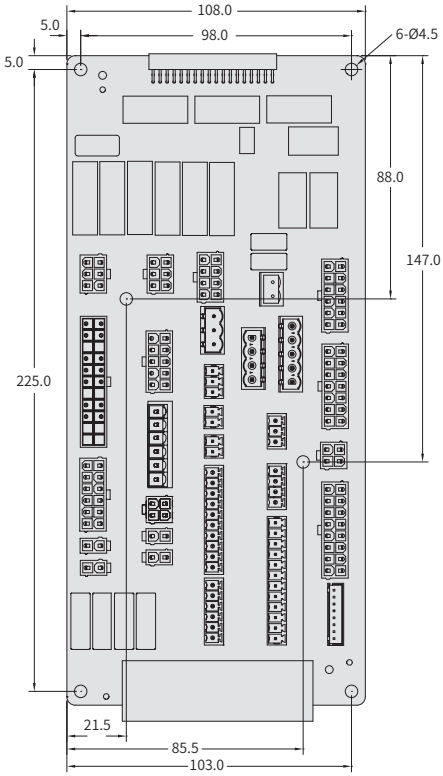


Figure 2-12 Outline and dimensions of the MCTC-KCB-N1 (unit: mm)

For the description of terminals on the interface board, see *"Table 6-3 Description of control signal terminals on the interface board" on Page 60*.

2.7.8 ADO Board (MCTC-SCB- A3/D)

The ADO board is one of the supporting products of the control system. It is used to implement the following functions:

① Re-leveling: When stopping at a landing, the elevator may move upward or downward due to the elastic deformation of steel ropes or other factors. It is inconvenient for passengers and goods to get in and out. With the ADO board, the system allows the elevator with door open to automatically run to the leveling position at the re-leveling speed, eliminating the safety risks caused by the deviation between the car door sill and the landing door sill.

② ADO: In the automatic running state, when the elevator speed decreases to the allowable range during stop and the door zone signal is active, the ADO board shorts the door lock by using the safety relay to open the elevator doors in advance, improving the running efficiency.

③ Door lock shorting detection: During door open after arrival, the control system together with the ADO board identifies whether the door lock is shorted by shorting the door lock and performing segmented door lock detection. This eliminates the safety risks caused by the door lock contact fault or by manual door lock shorting.

④ UCMP test and stopping component triggering: When the car stops in the door zone with door open, if an abnormal car movement occurs, the ADO board outputs a control signal to trigger the stopping components (such as the auxiliary brake) to stop the car after the corresponding door zone switch becomes inactive. This guarantees the safety of passengers in the car.

■ MCTC-SCB-A3

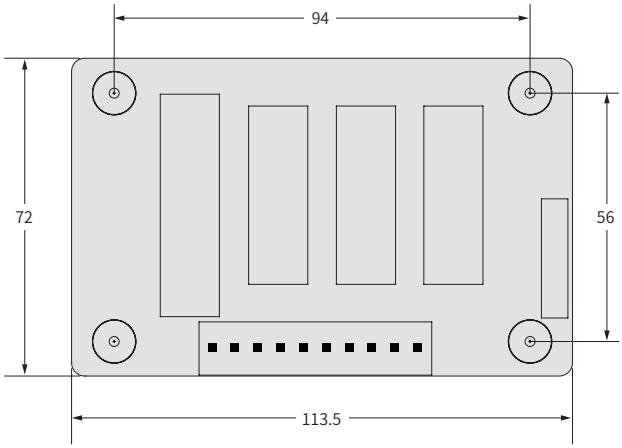


Figure 2-13 Outline and dimensions of the MCTC-SCB-A3 (unit: mm)

Table 2-10 Description of MCTC-SCB-A3 terminals

Terminal	Pin	Function Description
24V COM FL1 FL2 SY SX1 SX2 SO1 SO2	FL1	Up door zone signal input
	FL2	Down door zone signal input
	SY	Shorting door lock circuit relay output
	SX1	Door zone output
	SX2	Shorting door lock circuit relay output feedback
	SO1	Door lock circuit
	SO2	

■ MCTC-SCB-D

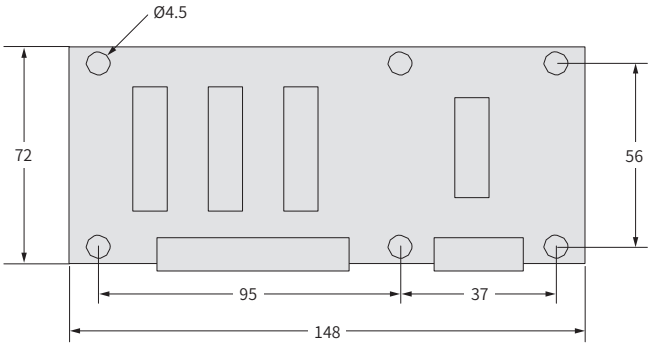


Figure 2-14 Outline and dimensions of the MCTC-SCB-D (unit: mm)

Table 2-11 Description of MCTC-SCB-D terminals

Terminal	Pin	Function Description
24V COM DZU FL1 FL2 DZD SY SX1 SX2 SEL S05 S06 S07	24V	DC24V +
	COM	DC24V -
	DZU	Up leveling signal input
	FL1	Up door zone signal
	FL2	Down door zone signal
	DZD	Down leveling signal input
	SY	Shorting door lock circuit signal input from MCB
	SX1	Door zone signal output
	SX2	Shorting door lock circuit feedback signal
	SEL	power supply of shorting door lock circuit feedback signal or door zone signal
	S05	Auxiliary brake control terminal
	S06	Auxiliary brake control terminal
	S07	Overspeed judging switch connection auxiliary terminal for overspeed governor
S01 S02 S03 S04	S01	Landing door lock shorting output
	S02	
	S03	Car door lock shorting output
	S04	

3 System Overview

3.1 System Configuration

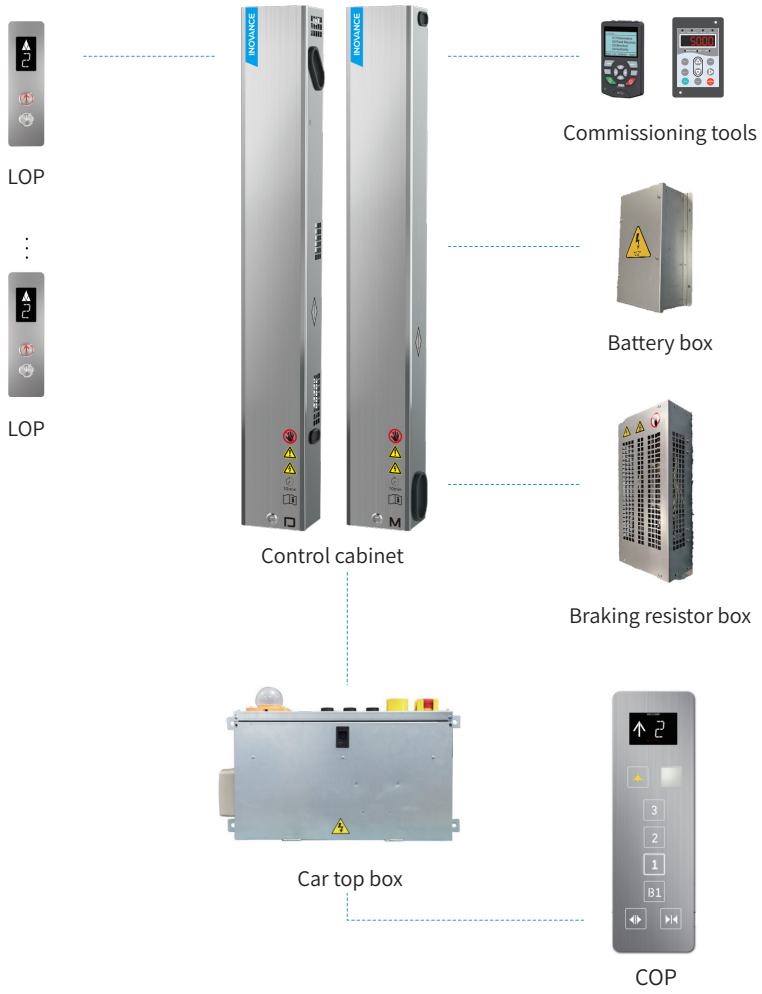


Figure 3-1 Configuration of the elevator control system

The main control part of the system consists of the control cabinet, car top box, pit box, car operating panel (COP), braking resistor box, and battery box.

① The control cabinet is the main control unit which controls all the components connected to it, including the car top box, landing operating panel (LOP), encoder, leveling switches, load weighing device, commissioning tools, and remote monitoring system.

② The car top box is a car top control unit that communicates with the control cabinet through CAN communication. It controls all the electrical components on the car top, such as the door operator controller, inspection device, light curtains, sound and light alarm device, and load weighing device.

③ The COP integrates the controls of all the electrical components inside the car, including floor buttons, door open/close button, lighting/fan control button, car display board, IC card device, and voice announcer. It communicates with the car top box through Modbus.

④ The braking resistor consumes the thermal energy generated when the elevator runs in the braking mode.

⑤ The battery box provides backup power for the ARD and electric brake release device.

3.2 System Structure

The following figure shows the structure of the elevator control system with SLC.

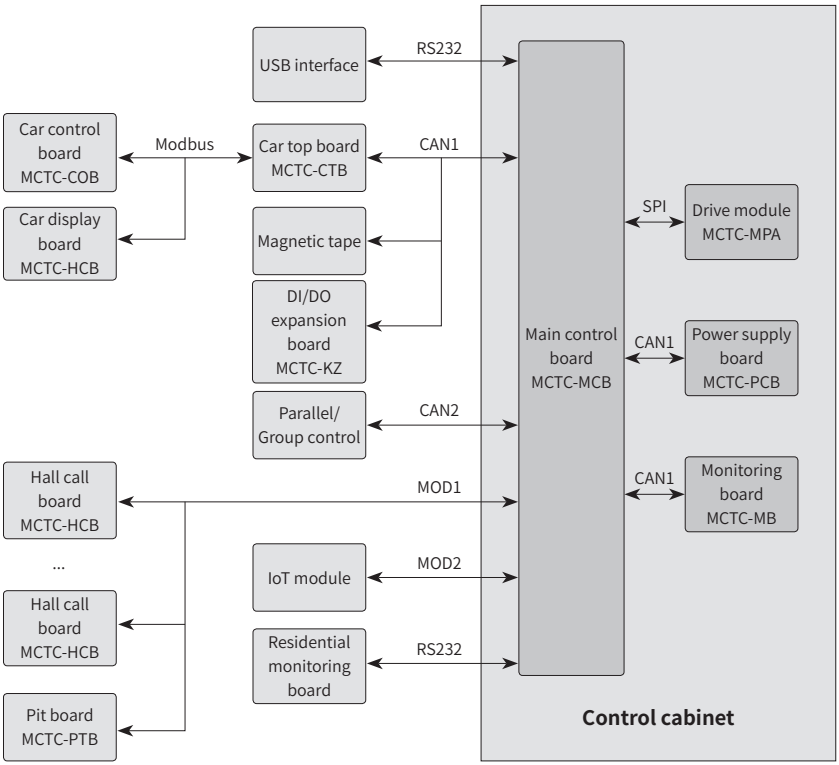


Figure 3-2 Structure of the elevator control system with SLC

4 Preparations for Installation

4.1 Installation Environment

Table 4-1 Requirements for the installation environment

Item	Requirement
Altitude	1000 m or below (de-rated by 1% for each 100 m higher if the altitude is above 1000 m) Maximum altitude: 3000 m
Ambient temperature	-10°C to +50°C, with the rated current de-rated by 1.5% for each 1°C higher if the ambient temperature is above 40°C Temperature variation: < 0.5°C/min
Humidity	Below 95% RH, without condensation
Vibration	Below 5.9 m/s^2 (0.6 g)
Working area in front of the control cabinet	For inspection and repair, reserve a 0.7 m clearance in front of the control cabinet.
Ventilation	The installation area of the control cabinet must be properly ventilated to protect the control cabinet and cables from dust, harmful gases, and moisture.

4.2 Mounting Clearances

Drive cabinet Monitoring cabinet

Figure 4-1 Control cabinet

- For the dimensions and baseplate installation of the control cabinet, see related drawings in the delivered technical documents.
- Install all cabinets according to the drawings. Allow sufficient clearances around the cabinets for proper ventilation, maximum door swing, and maintenance.
- Provide a passageway for entering the installation foundation and reserve sufficient space for the auxiliary equipment to transport the AC drive.

The control cabinet can be mounted in any of the three modes: backplate mounting (side by side or one above the other), through-hole mounting (side by side or one above the other), and door frame mounting. See the following sections for the specific mounting requirements.

NOTE

- To mount the monitoring cabinet and drive cabinet separately, follow the preceding rules and use a customized 5 m cable to connect the two cabinets.

4.2.1 Backplate Mounting (Side by Side or One Above the Other)

■ Side by side

In this mode, reserve enough clearances around air vents on the cabinet backs and around cabling routeways. The clearance on the drive cabinet side must exceed 150 mm so that the monitoring cabinet and drive cabinet can be exchanged.

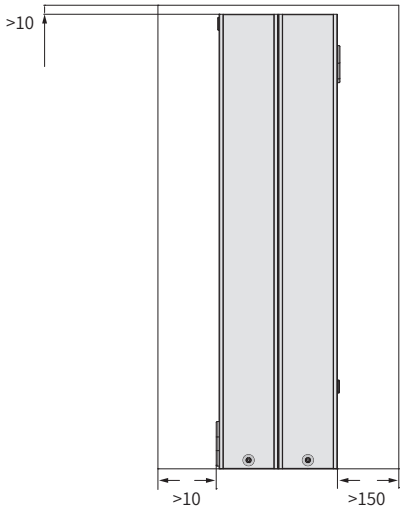


Figure 4-2 Backplate mounting of two cabinets side by side (unit: mm)

■ One above the other

To mount the two cabinets one above the other, the height available must be above 2100 mm. The clearances on the left and right sides of the control cabinet must exceed 150 mm.

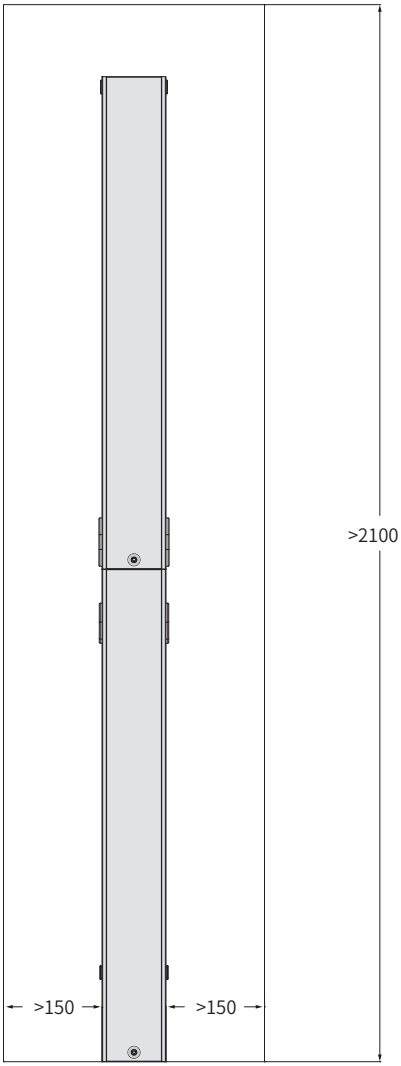


Figure 4-3 Backplate mounting of two cabinets, with one above the other (unit: mm)

4.2.2 Through-hole Mounting (Side by Side or One Above the Other)

■ Side by side

In this mode, the cabinet backs face the shaft, with a clearance larger than 300 mm behind the cabinets. The cabinet door plates must protrude from the wall by more than 15 mm. However, if a clearance larger than 10 mm can be reserved above the cabinet tops, the cabinet door plates only need to protrude from the wall by more than 13 mm.

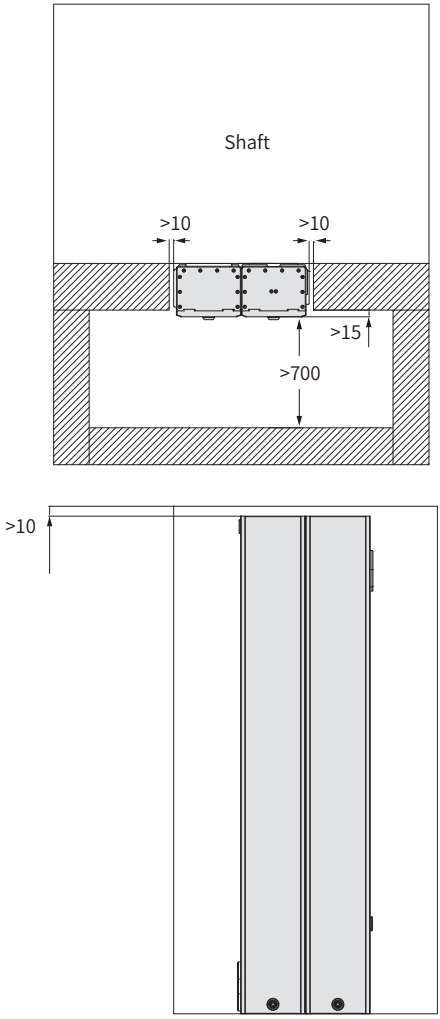


Figure 4-4 Through-hole mounting of two cabinets side by side (unit: mm)

■ One above the other

In this mode, the cabinet backs face the shaft, with a clearance larger than 300 mm behind the cabinets. The cabinet door plates must protrude from the wall by more than 15 mm. However, if a clearance larger than 10 mm can be reserved above the cabinet tops, the cabinet door plates only need to protrude from the wall by more than 13 mm.

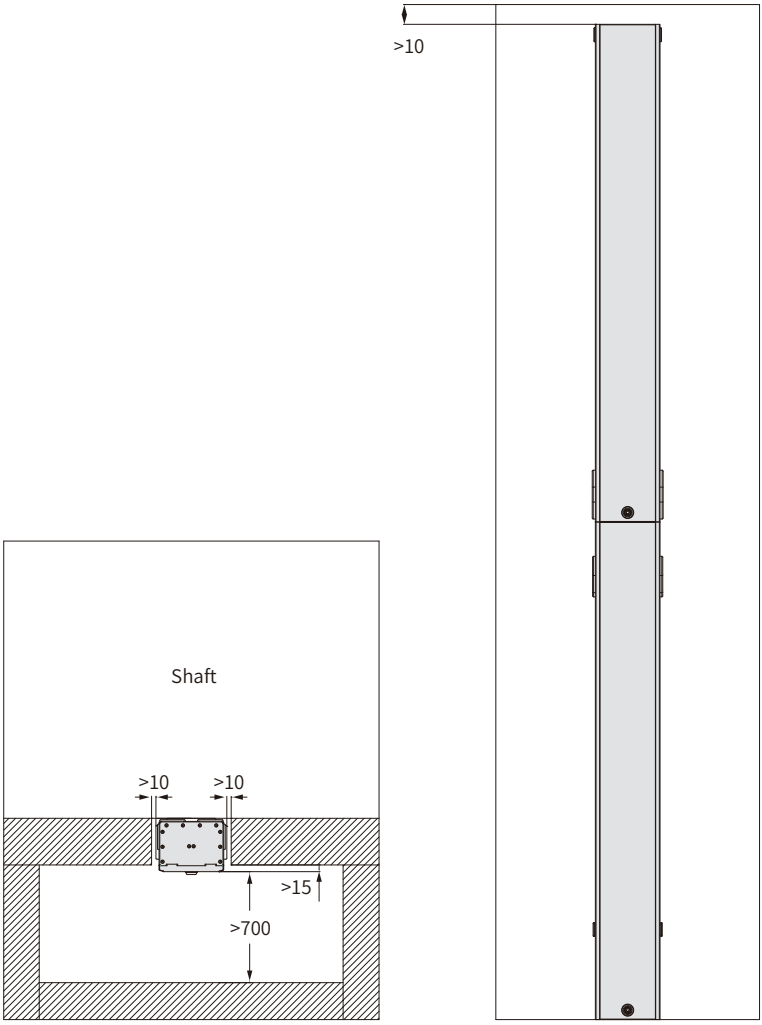


Figure 4-5 Through-hole mounting of two cabinets, with one above the other (unit: mm)

4.2.3 Door Frame Mounting

Install the control cabinet in the landing door frame if the door frame is higher than 2000 mm.

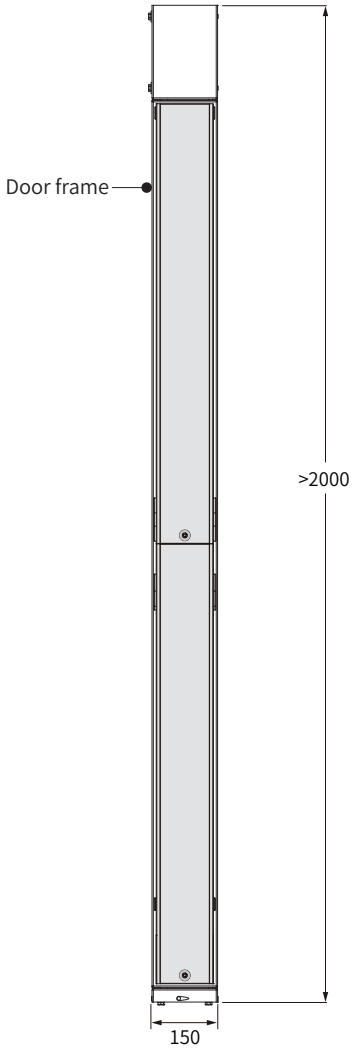


Figure 4-6 Door frame mounting (unit: mm)

5 Mechanical Installation

5.1 Mounting Dimensions

The mounting holes of the monitoring cabinet and drive cabinet are both at the bottom. Install the cabinets after removing cabinet doors. The positions and dimensions of mounting holes (Ø8mm) are shown in the following figure.

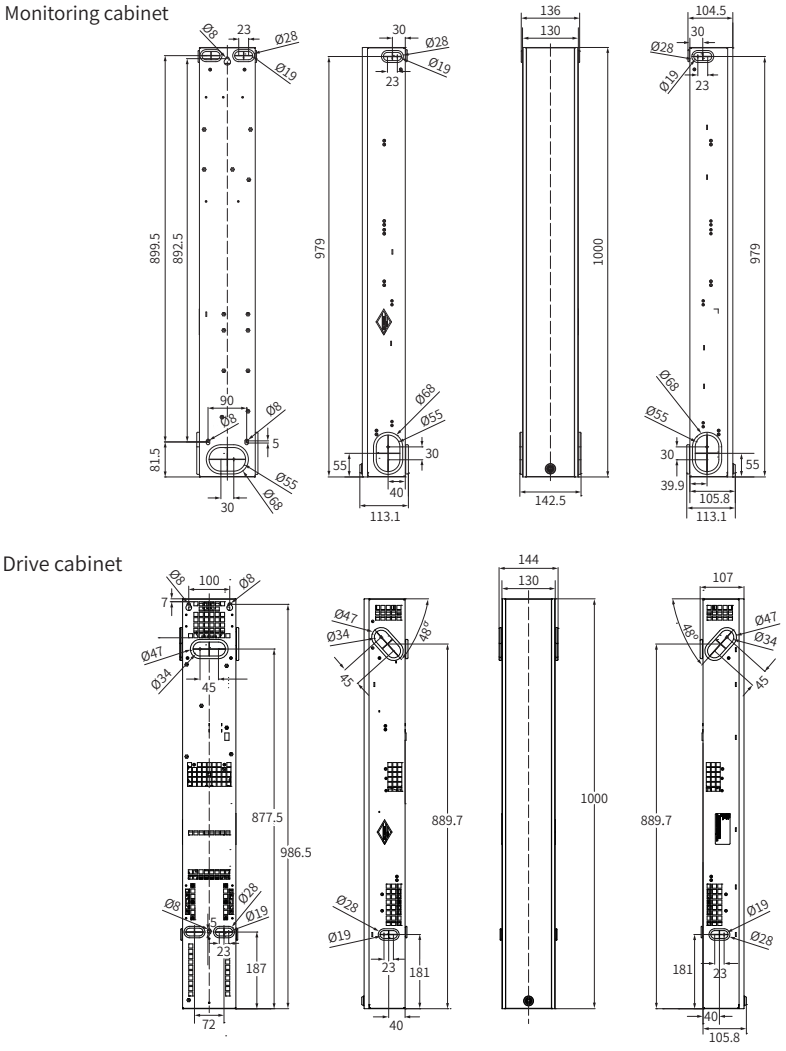


Figure 5-1 Mounting dimensions of the control cabinet (unit: mm)

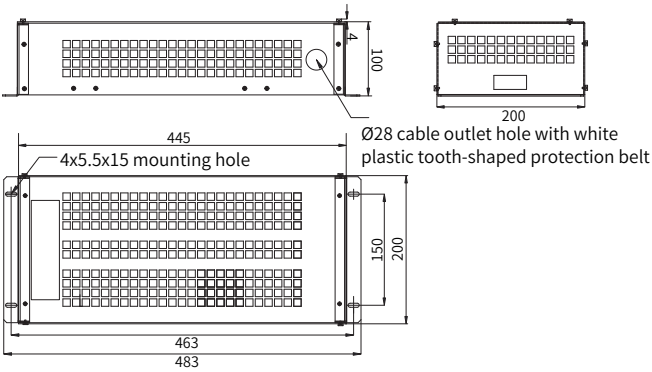


Figure 5-2 Mounting dimensions of the braking resistor box (unit: mm)

NOTE

◆ The length of the resistor cables provided is 3 m by default.

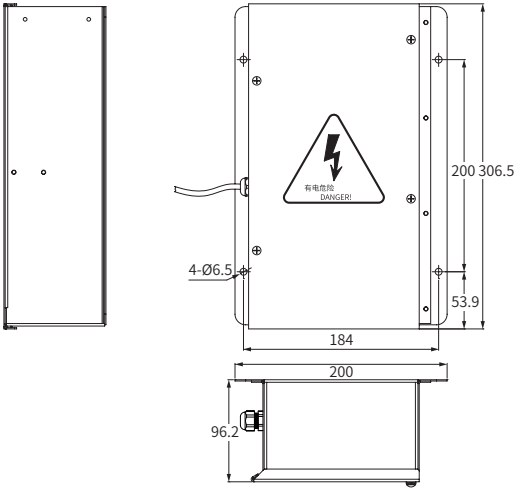


Figure 5-3 Mounting dimensions of the battery box (unit: mm)

NOTE

◆ A 3 m cable is provided by default.

5.2 Installation Modes

5.2.1 Installing the Control Cabinet

Three mounting methods are available for the control cabinet: through-hole mounting, backplate mounting, and door frame mounting. This guide only introduces the backplate mounting in detail.

As shown in the following figure, use three M6 expansion bolts to secure the drive cabinet and monitoring cabinet on the wall respectively.

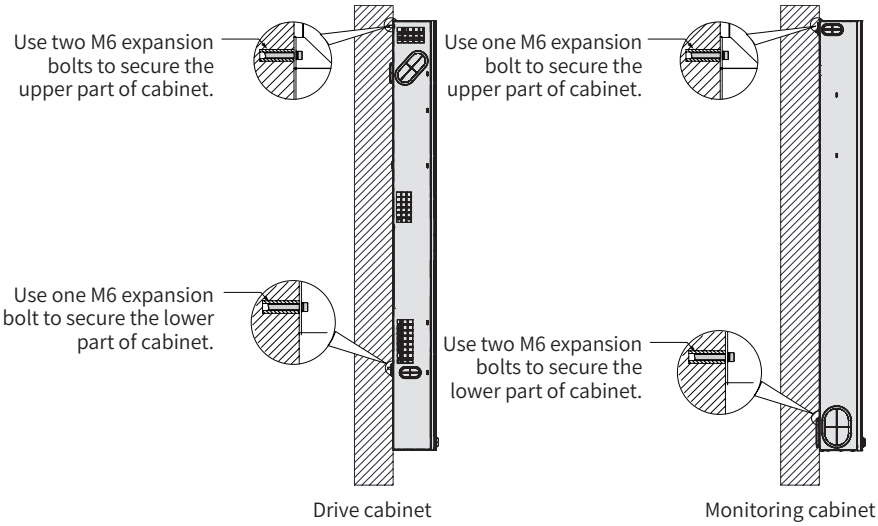


Figure 5-4 Backplate mounting of the control cabinet

NOTE

- In this mode, all the expansion bolts must be fastened. Otherwise, the cabinet may fall off and be damaged due to an unbalanced force on the fixed part during long-time running.

5.2.2 Installing the Braking Resistor Box

Due to the height limit, the braking resistor box must be installed separately from the control cabinet.

There are four mounting holes at the bottom of the braking resistor box, with two on each side. Their locations and dimensions are shown in the following figure.

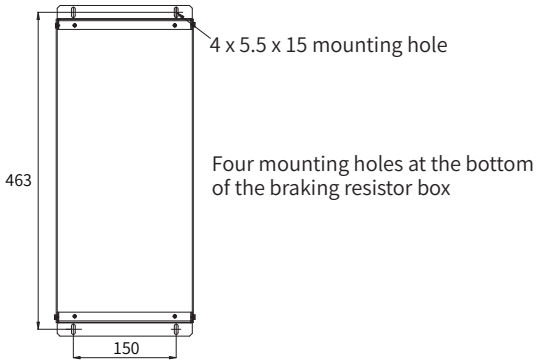


Figure 5-5 Locations and dimensions of the mounting holes at the bottom of the braking resistor box (unit: mm)

Use four M4 expansion bolts to secure the braking resistor box vertically on the wall.

The following figure shows the installation of the braking resistor box.

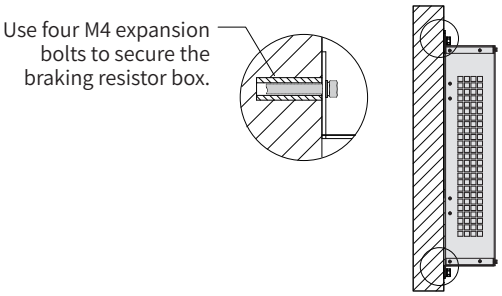


Figure 5-6 Installation of the braking resistor box

NOTE

- Flame-retardant resistor cables (length: 3 m) are provided for the braking resistor box.
- After the installation is complete, connect the resistor cables to terminals P and BR on the controller. You can determine the wiring mode yourself based on the working condition. Contact the technicians of Inovance if you have any problem.

5.2.3 Installing the Battery Box

Backplate mounting is adopted for the battery box (MCTC-PDB-N1). Use four M6 expansion bolts to secure the battery box vertically on the wall.

The following figure shows the locations of the mounting holes.

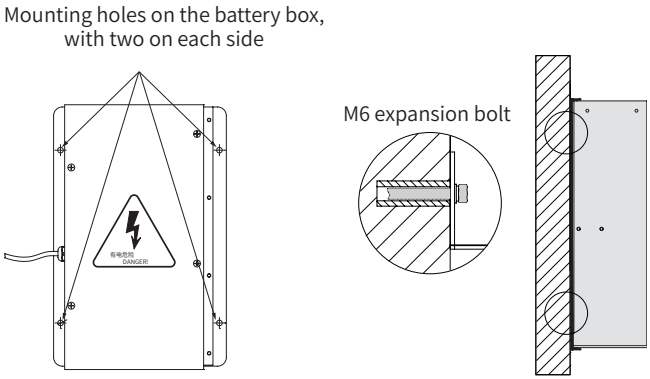
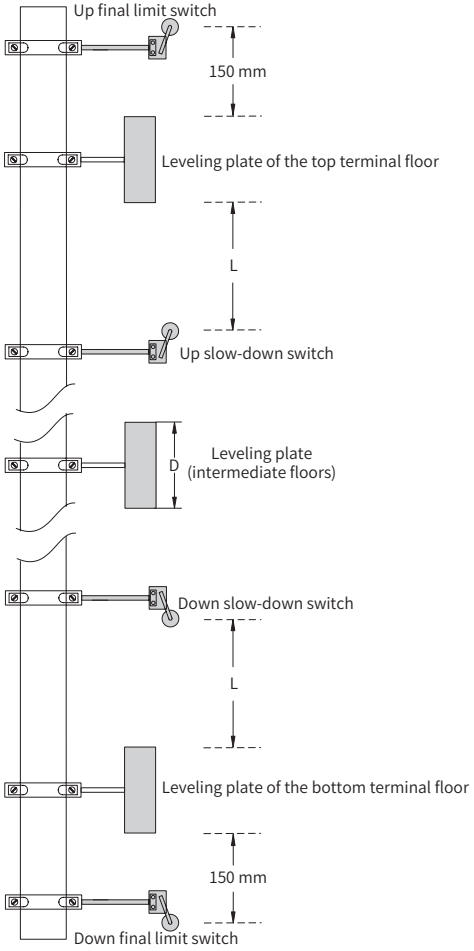


Figure 5-7 Installation of the battery box

5.2.4 Installing Shaft Position Switches

To implement accurate landing and safe running, shaft position switches are required to identify the car position. The shaft position switches include the leveling switches, up and down slow-down switches, and up and down final limit switches. The switch signals are directly transmitted to the control cabinet through shaft cables. The following figure shows the layout of these switches in the shaft.



$L > \frac{V^2}{2 \times F3\text{-}08}$ (V: rated speed) $80 \le D \le 300$ mm

Figure 5-8 Layout of shaft position switches

NOTE

◆ The control cabinet adopts the software limit. Therefore, the up limit switch and down limit switch are not required.

The system can properly configure the software limit according to the type of current leveling signal, as shown in the following table.

Type of Leveling Signal	Limit Judging Logic
Two leveling switches are used.	If the down slow-down switch remains active, the down limit is triggered immediately when the down leveling switch detaches from the leveling plate of the first floor. Otherwise, the up limit is triggered.
Four switches are used: ① Up and down leveling switches ② Up and down door zone switches	In this mode, the up leveling signal and down leveling signal are transmitted from the car top board (CTB) to the MCB through CAN communication, and the up door zone signal and down door zone signal are transmitted to the MCB in the form of electrical signals. **① CAN communication of the CTB is normal.** If the down slow-down switch remains active, the down limit is triggered immediately when the down leveling switch detaches from the leveling plate of the first floor. Otherwise, the up limit is triggered. **② CAN communication of the CTB is disconnected.** If the down slow-down switch remains active, the down limit is triggered immediately when the down door zone switch detaches from the leveling plate of the first floor. Otherwise, the up limit is triggered.

5.2.5 Installing Leveling Switches

Leveling signals, including the leveling switches and leveling plates, are connected to the input terminals of the controller. They enable the car to land at each floor accurately. The leveling switches are generally installed on the top of the car. The leveling plates are installed on the guide rails, with one plate at each floor. Make sure that the length and verticality of all the leveling plates are the same.

Requirements for leveling switches:

① Two leveling switches are used.

Two leveling switches are used by default. There are no certain requirements for the signal feature (NO/NC) of the switches, but NO switches are recommended.

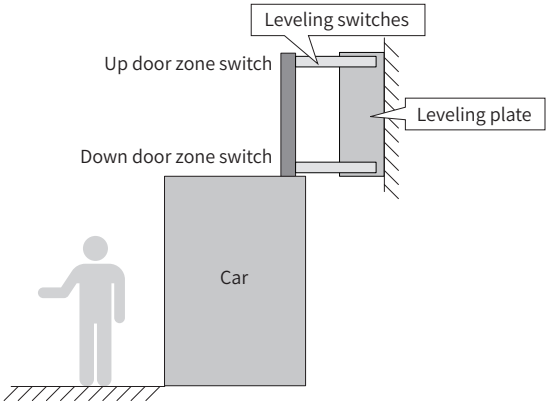
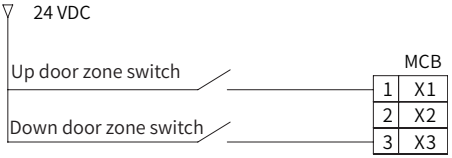


Figure 5-9 Installation positions of two leveling switches

Connections Between Leveling Switches and Input Terminals of the Controller	Parameter Setting
	F5-01 = 1 F5-02 = 0 F5-03 = 2

② **Four switches (two leveling switches and two door zone switches) are used.**

Install four switches (two leveling switches and two door zone switches) when the ADO, re-leveling, and UCMP functions are used. The up and down door zone switches must be NO.

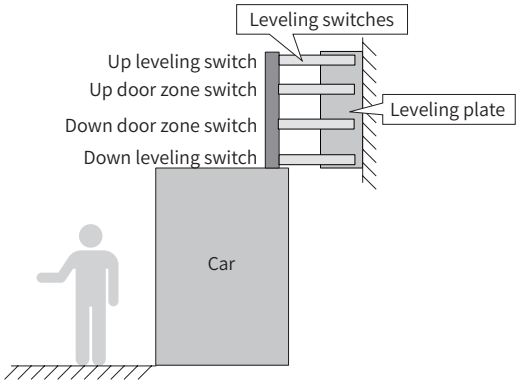
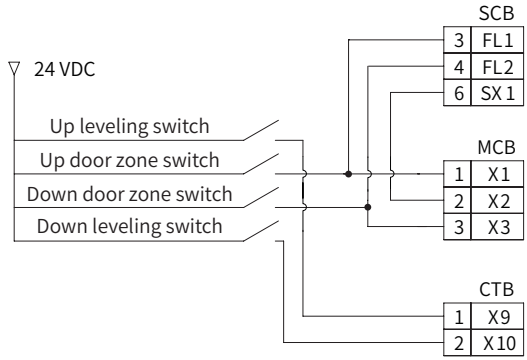


Figure 5-10 Installation positions of two leveling switches and two door zone switches

Connections Between Leveling Switches and Input Terminals of the Controller	Parameter Setting
	F5-01 = 1 F5-02 = 3 F5-03 = 2 Bit6 of F6-52 = 1 (re-leveling signal communication enabled) Bit9 of F5-25 = 1 (NO) Bit10 of F5-25 = 1 (NO)

5.2.6 Installing Slow-down Switches

The slow-down switch is one of the key means to guarantee the elevator's safety. When the elevator runs at the maximum speed, it prevents top-hitting or bottom-clashing if the elevator position becomes abnormal. The slow-down distance L indicates the distance between the up/down slow-down switch and the leveling plate of the top/bottom terminal floor. It is calculated as follows:

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

L: Slow-down distance; V: Rated elevator speed (F0-04); F3-08: Special deceleration rate

The default value of F3-08 (Special deceleration rate) is 0.9 m/s^2. The following table lists the slow-down distances corresponding to different rated elevator speeds.

Rated Elevator Speed (m/s)	≤ 0.75	1	1.5	1.6	1.75
Slow-Down Distance (m)	0.4	0.7	1.5	1.7	2.0


NOTE

- Compared with the recommended values, the actual installation distance of slow-down switches are allowed to have an error of ±0.2 m.
- The slow-down switches must be installed at the terminal floors. Ensure that there is no leveling plate between the up/down slow-down switch and the leveling plate of the top/bottom terminal floor.
- The slow-down distances listed in the preceding table are calculated at the default special deceleration rate (0.9 m/s^2).
- Decreasing the acceleration/deceleration rate and increasing the special deceleration rate does not affect the elevator's safety. However, decreasing the special deceleration rate may cause safety hazards. If a modification is required, calculate the slow-down distance again according to the preceding formula.

5.2.7 Software Limit Function

The software limit is used by default, which requires no limit switch. The system judges whether the car arrives at the limit position through the slow-down switch signals and leveling switch signals at terminal floors. The principle is described as follows:

When the car runs down to the bottom terminal floor, the down slow-down switch signal is active. The system considers that the car has arrived at the down limit position when the down door zone signal or down leveling signal becomes inactive. At this time, the car can run only in the up direction.

When the car runs up to the top terminal floor, the up slow-down switch signal is active. The system considers that the car has arrived at the up limit position when the up door zone signal or up leveling signal becomes inactive. At this time, the car can run only in the down direction.

5.2.8 Installing Final Limit Switches

The up and down final limit switches are electrical forced stop switches used to avoid top-hitting or bottom-clashing when the elevator does not stop completely upon arriving at the up/down limit position.

The up final limit switch is installed above the leveling switch at the top terminal floor. It is usually 150 mm away from the top leveling position.

The down final limit switch is installed below the leveling switch at the bottom terminal floor. It is usually 150 mm away from the bottom leveling position.

6 Electrical Installation

For safety and operational needs, each elevator must be equipped with a main switch that can cut off all the power supply circuits and a switch that can separately cut off the elevator lighting power supply.

CAUTION	
	◆ Before wiring, cut off all the power supplies. ◆ All the peripheral cables must be prepared. ◆ Ensure that the cross sectional area and voltage withstanding capacity of power cables and control power cables meet the requirements. ◆ Route the input cables and output cables separately to avoid cable mixing and danger caused by insulation damage. ◆ Route the signal cables and power cables separately. Use shielded twisted pairs (STPs) as analog signal cables, and ensure that shielded cables are reliably grounded at one end. ◆ Do not leave shorting cables or iron scraps in the control cabinet. Failure to comply may cause danger.

6.1 Interfaces to External Devices

The control cabinet consists of a monitoring cabinet and a drive cabinet. Therefore, the external wiring includes the wiring between the monitoring cabinet and the drive cabinet as well as between the control cabinet and peripheral devices.


NOTE

◆ As for the cables required, you can either choose the products offered by Inovance or prepare proper cables by yourself according to the wiring diagrams provided by Inovance.

6.1.1 Wiring Between the Monitoring Cabinet and the Drive Cabinet

A total of five cables are required to connect the monitoring cabinet and the drive cabinet. The length of cables varies with the installation method. The following table lists the recommended values.

Table 6-1 Length of cables connecting the monitoring cabinet and the drive cabinet

Separate Installation			
Model	Cable	Model of cables	Length of cables
SLC-2S2	① Main power cable	MCTC-WCL-2002-P1	5 m
	② Main control cable		
	③ Grid detection cable		
	④ 220 V control power cable		
	⑤ 24 V control power cable		
SLC-4T5	① Main power cable	MCTC-WCL-4005-P1	
	② Main control cable		
	③ Grid detection cable		
	④ 220 V control power cable		
	⑤ 24 V control power cable		

Integrated Installation			
Model	Cable	Model of cables	Length of cables
SLC-2S2	① Main power cable	MCTC-WCL-2002-P3	2.5 m
	② Main control cable		2 m
	③ Grid detection cable		
	④ 220 V control power cable		
	⑤ 24 V control power cable		
SLC-4T5	① Main power cable	MCTC-WCL-4005-P3	2.5 m
	② Main control cable		2 m
	③ Grid detection cable		
	④ 220 V control power cable		
	⑤ 24 V control power cable		

■ **Cables connecting the monitoring cabinet and the drive cabinet**

① **Main power cable**: T2 (lighting protection board) —— TA (barrier terminal)

② **Main control cable**: CN3 (DB62 female on the interface board) —— CN3 (DB62 female on the MCB)

③ **Grid detection cable**: T3 (lighting protection board) —— B2 (power supply board A)

④ **220 V control power cable**: MA (interface board) ——— MA (power supply board A)

⑤ **24 V control power cable**: MB (interface board) ——— MB (power supply board B)

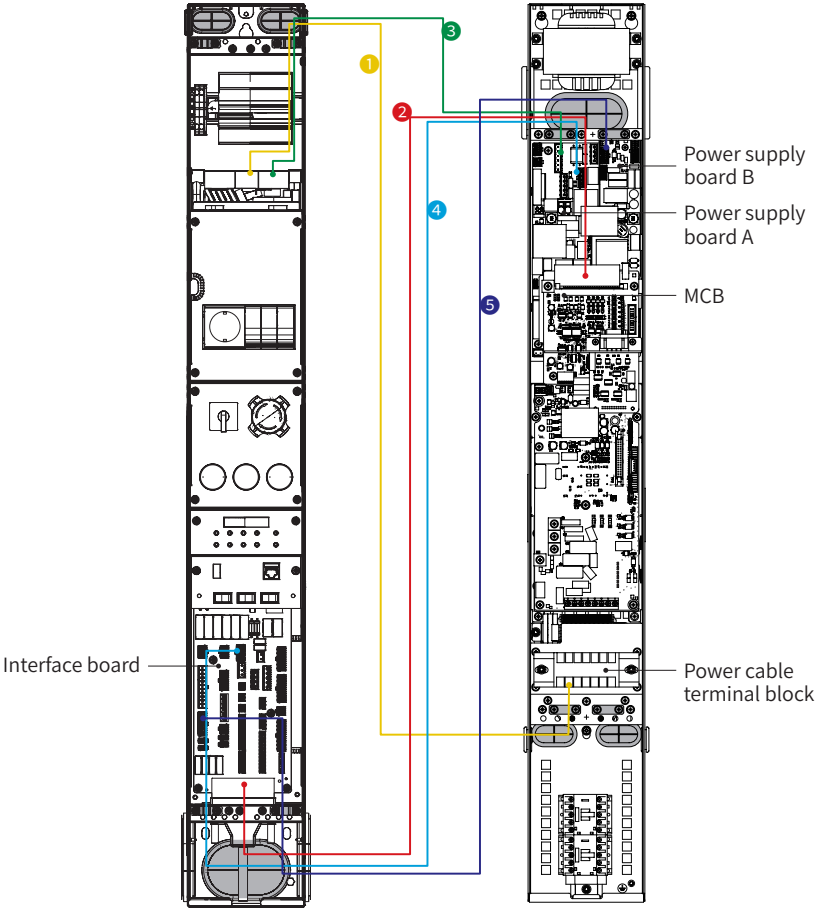


Figure 6-1 Cables connecting the monitoring cabinet and the drive cabinet

■ Cable shield clips

Both the monitoring cabinet and drive cabinet have two groups of cable shield clips to fix the cabling position. The cabling type of each cable shield clip is shown in the following figure.

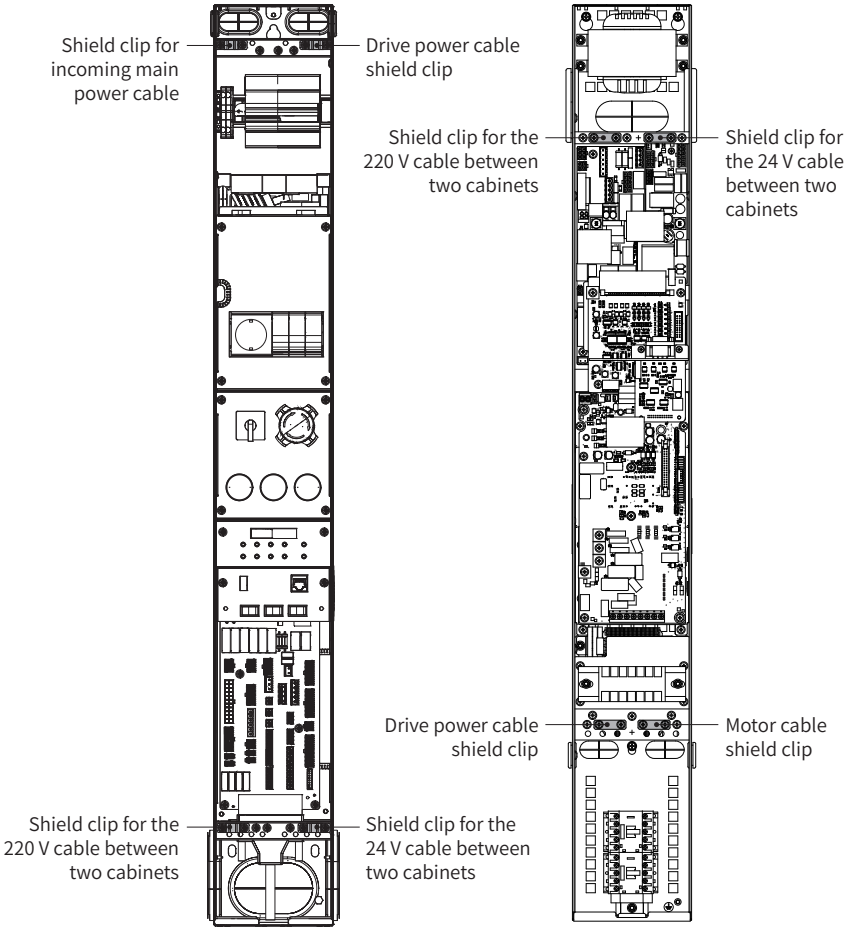


Figure 6-2 Cable shield clips

■ Main circuit wiring

WARNING
◆ If there is a four-quadrant AC drive or active front end (AFE) on the power grid side, add a filter on the front end of the input power supply of the control cabinet.

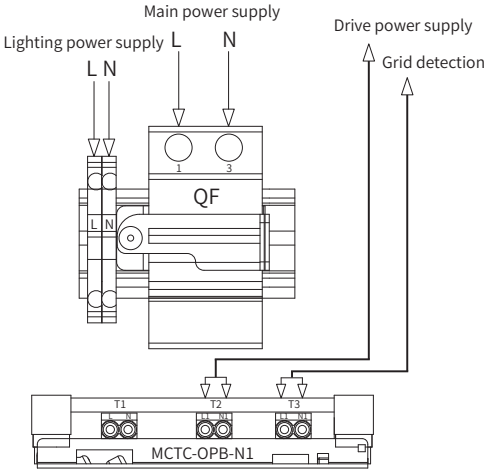


Figure 6-3 Main circuit wiring (220 V)

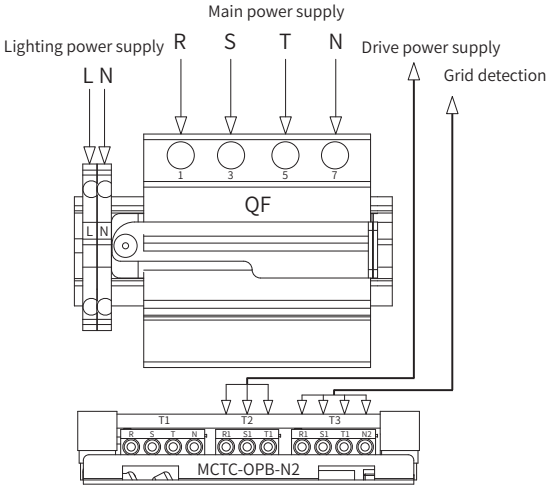


Figure 6-4 Main circuit wiring (380 V)

■ MA/MB wiring

Inter-cabinet high voltage: MA (interface board) ——● MA (power supply board A)

Inter-cabinet low voltage: MB (interface board) ●—— MB (power supply board B)

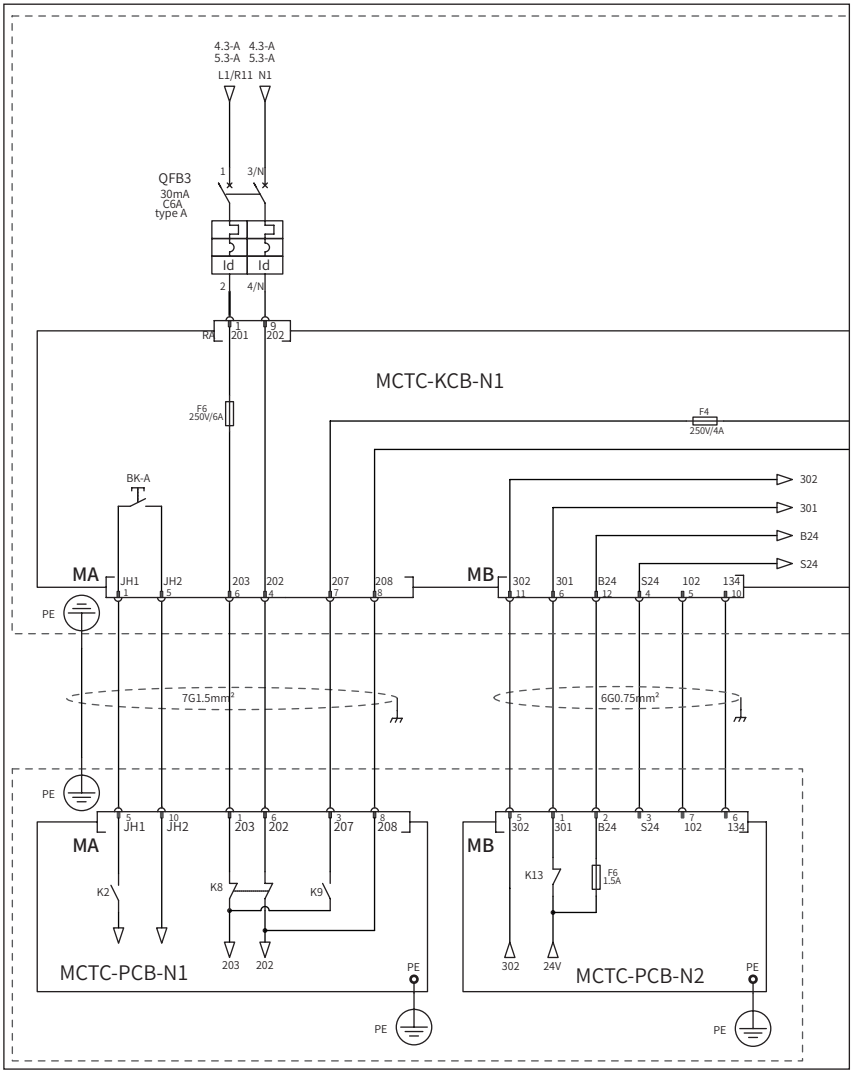


Figure 6-5 MA/MB wiring

6.1.2 Wiring Between the Control Cabinet and Peripheral Devices

6.1.2.1 Interfaces on the Power Supply Board to Peripheral Devices

The power supply board has the following interfaces to peripheral devices: B2, B5, MA, MB, and B7.

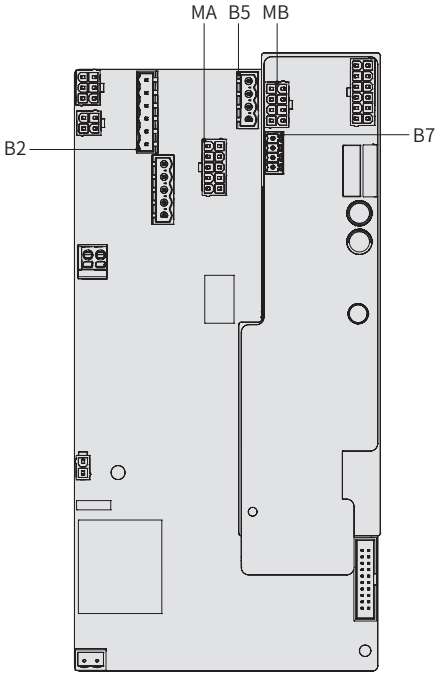


Figure 6-6 Terminals on the power supply board（MCTC-PCB-N1/N2）

Table 6-2 Description of terminals on the power supply board

Terminal No.	Pin No.	Function Description of Each Pin	
MA (Inter-cabinet high-voltage terminal)		202	Power supply of the power supply board
		203	
		208	Door operator power supply
		207	
		JH2	Activation
		JH1	

Terminal No.	Pin No.	Function Description of Each Pin	
B5 (Brake power supply terminal)	BK2- BK2+ BK1- BK1+	BK2-	Brake 2 power supply
		BK2+	
		BK1-	Brake 1 power supply
		BK1+	
B2 (Grid detection terminal)	R S T N	R	-
		S	-
		T	-
		N	-
MB (Inter-cabinet low-voltage terminal)	S24 102 B24 134 301 302	S24	Safety circuit power supply
		102	
		B24	24 V uninterruptible power supply (UPS)
		134	Door lock circuit end
		301	24 V system power supply
		302	
B7 (Brake feedback terminal)	301 X12 301 X13	301	-
		X12	Brake 1 travel feedback
		301	-
		X13	Brake 2 travel feedback

NOTE

◆ Connect the power supply of the left and right brakes of the traction machine separately.

6.1.2.2 Interfaces on the Interface Board to Peripheral Devices

The interface board has the following interfaces to peripheral devices: AA, AB, BA, BB, BC, BD, SA, SB, SC, SD, SE, and SF.

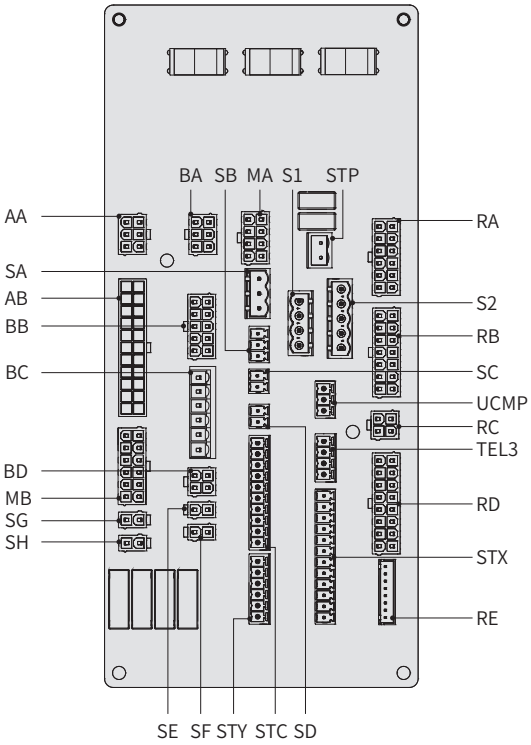
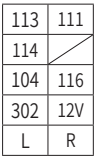


Figure 6-7 Terminals on the interface board（MCTC-KCB-N1）

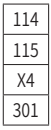
Table 6-3 Description of control signal terminals on the interface board

Terminal No.	Pin No.	Function Description of Each Pin	
AA (Traveling cable high-voltage terminal)		502	220 V car lighting power supply - N
		207A	220 V door operator power supply - L
		507	220 V car lighting power supply - L
		PE	Grounding
		208	220 V door operator power supply - N

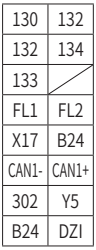
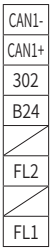
<table>
<tr><th>Terminal No.</th><th>Pin No.</th><th colspan="2">Function Description of Each Pin</th></tr>
<tr><td rowspan="20">AB
(Terminal used for traveling cable communication and connecting the safety circuit and door lock circuits)</td><td rowspan="20"><table>
<tr><td>116</td><td>114</td></tr>
<tr><td>117</td><td>130</td></tr>
<tr><td>122</td><td>131A</td></tr>
<tr><td>133</td><td>134</td></tr>
<tr><td></td><td></td></tr>
<tr><td>R</td><td>L</td></tr>
<tr><td>301</td><td>302</td></tr>
<tr><td>12V</td><td>CAN1+</td></tr>
<tr><td>B24</td><td>CAN1-</td></tr>
<tr><td>FL1</td><td>FL2</td></tr>
<tr><td>X14</td><td>X15</td></tr>
</table></td><td>X14</td><td>Up slow-down</td></tr>
<tr><td>FL1</td><td>Up door zone signal</td></tr>
<tr><td>B24</td><td>Car top UPS</td></tr>
<tr><td>12V</td><td>Intercom power supply</td></tr>
<tr><td>301</td><td>24 V power supply (+)</td></tr>
<tr><td>R</td><td>Intercom signal</td></tr>
<tr><td>133</td><td>Rear car door lock</td></tr>
<tr><td>122</td><td>Switchover from emergency electrical operation (EEO) to car top inspection</td></tr>
<tr><td>117</td><td>Car top reserved switch (start point)</td></tr>
<tr><td>116</td><td>Car top inspection (door lock bypass)</td></tr>
<tr><td>X15</td><td>Down slow-down</td></tr>
<tr><td>FL2</td><td>Down door zone signal</td></tr>
<tr><td>CAN1-</td><td>CTB communication</td></tr>
<tr><td>CAN1+</td><td>CTB communication</td></tr>
<tr><td>302</td><td>24 V power supply (-)</td></tr>
<tr><td>L</td><td>Intercom signal</td></tr>
<tr><td>134</td><td>Rear car door lock</td></tr>
<tr><td>131A</td><td>-</td></tr>
<tr><td>130</td><td>Safety circuit end detection</td></tr>
<tr><td>114</td><td>Car top inspection (door lock bypass)</td></tr>
<tr><td rowspan="4">BA
(Shaft lighting terminal)</td><td rowspan="4"><table>
<tr><td>PE</td><td>802</td></tr>
<tr><td></td><td></td></tr>
<tr><td>804</td><td>803</td></tr>
</table></td><td>802</td><td>Shaft lighting common</td></tr>
<tr><td>803</td><td>Shaft lighting power supply</td></tr>
<tr><td>PE</td><td>Grounding</td></tr>
<tr><td>804</td><td>Shaft lighting power supply</td></tr>
</table>

Terminal No.	Pin No.	Function Description of Each Pin	
BB (Pit safety and intercom terminal)		111	EEO circuit
		116	Overspeed governor activation
		12V	Intercom power supply
		R	Intercom signal
		113	Pit inspection (door lock bypass)
		114	-
		104	Tension pulley switch
		302	Communication power supply
		L	Intercom signal
BC (Landing door lock terminal)		131A	Manual door terminal (reserved)
		131B	Manual door terminal (reserved)
		131	Front landing door lock
		132	Rear landing door lock
		132	Front landing door lock
		133	Rear landing door lock
BD (Hall call terminal)		301	Communication power supply
		302	Communication power supply
		MDO1+	Hall call communication signal
		MOD1-	Hall call communication signal
MA (Control circuit terminal)		JH1	Activation
		202	Power supply of the power supply board
		JH2	Activation
		203	Power supply of the power supply board
		207	Door operator power supply
		208	Door operator power supply

Terminal No.	Pin No.	Function Description of Each Pin	
MB (Control power supply circuit terminal)	301 B24 102 302 S24 134	S24	Safety circuit power supply
		102	Safety circuit ground
		301	-
		134	Door lock circuit end
		302	24 V system power supply
		B24	24 V UPS
SA (Overspeed governor terminal)	202 OS03 OS04	OS04	Overspeed governor test
		OS03	Overspeed governor reset
		202	Overspeed governor coil common
SB (Motor emergency stop terminal)	 103 104	103	Motor emergency stop
		104	-
SC [Up final limit terminal (safety circuit)]	113 114	113	Up final limit (safety circuit)
		114	Up final limit (safety circuit)
SD [Overspeed governor switch terminal (safety circuit)]	116 117	116	Overspeed governor switch (safety circuit)
		117	Overspeed governor switch (safety circuit)
SE (Up slow-down terminal)	301 X14	X14	Up slow-down switch
		301	Up slow-down switch power supply
SF (Down slow-down terminal)	301 X15	X15	Down slow-down switch
		301	Down slow-down switch power supply
SG (Motor over-temperature detection terminal)	X16 301	X16	Motor over-temperature detection
		301	Motor over-temperature detection
SH (Braking resistor over-temperature detection terminal)	X12M 301	X12M	Braking resistor over-temperature detection
		301	Braking resistor over-temperature detection

Terminal No.	Pin No.	Function Description of Each Pin	
STC (Expansion communication terminal)		301	24 V power supply (+)
		302	24 V power supply (-)
		CAN1-	MCB backup CAN1 communication
		CAN1+	MCB backup CAN1 communication
		CAN2+	MCB backup CAN2 communication
		CAN2-	MCB backup CAN2 communication
		B24	24 V power supply (+)
		302	24 V power supply (-)
		MOD2-	MCB backup MOD2 communication
		MOD2+	MCB backup MOD2 communication
STY (Fire linkage output/ Back DO terminal)		Y5M	Monitoring board backup DO
		M5M	Monitoring board backup DO
		Y6	Fire linkage output
		M6	Fire linkage output
		Y7	Alarm filter
		M7	Alarm filter
STP (Backup power supply of the control cabinet)		507	220 V backup power supply - L
		502	220 V backup power supply - N
S1 (Bypass terminal 1)		114	-
		115	-
		X4	-
		301	-
S2 (Bypass terminal 2)		134	Car door shorted
		133	-
		131B	Landing door shorted
		130	Car door shorted

Terminal No.	Pin No.	Function Description of Each Pin	
STX (Earthquake and landing door detections/Fire linkage/Backup DI terminal)	301 X18 301 X19 301 X20 301 X23 301 302 AI	301	-
		X18	MCB backup DI
		301	-
		X19	MCB backup DI
		301	-
		X20	MCB backup DI
		301	-
		X23	MCB backup DI
		301	-
		302	-
		AI	Analog load cell
RA (Control cabinet power supply and lighting terminal)	501 201 502 801 202 802 B24 X21	201	System power supply
		801	Shaft lighting power supply
		802	Shaft lighting power supply
		X21	Main air switch feedback
		501	Car lighting power supply
		502	Car lighting power supply
		202	System power supply
		B24	Main air switch feedback
RB (EEO interface)	103 101 115 111 116 122 X9 B24 X10 X11	101	Control cabinet stop
		111	Switchover to EEO mode
		122	Switchover to car top inspection
		B24	EEO
		X11	EEO down
		103	Control cabinet stop
		115	EEO (safety circuit disconnected)
		116	EEO (safety circuit disconnected)
		X9	EEO
		X10	EEO up
RC (Backup low-voltage terminal	B24 302	B24	-
		302	-

<table>
<tr><th>Terminal No.</th><th>Pin No.</th><th colspan="2">Function Description of Each Pin</th></tr>
<tr><td rowspan="14">RD
(ADO terminal)</td><td rowspan="14"> 
</td><td>132</td><td>Landing door lock signal</td></tr>
<tr><td>134</td><td>Car door lock signal</td></tr>
<tr><td>FL2</td><td>Down door zone</td></tr>
<tr><td>B24</td><td>-</td></tr>
<tr><td>CAN1+</td><td>-</td></tr>
<tr><td>Y5</td><td>Shorting door lock circuit relay output</td></tr>
<tr><td>DZI</td><td>Door zone signal</td></tr>
<tr><td>130</td><td>Car door lock signal</td></tr>
<tr><td>132</td><td>Landing door lock signal</td></tr>
<tr><td>133</td><td>Landing door lock signal</td></tr>
<tr><td>FL1</td><td>Up door zone</td></tr>
<tr><td>X17</td><td>Shorting door lock circuit relay output feedback</td></tr>
<tr><td>CAN1-</td><td>-</td></tr>
<tr><td>302</td><td>Power supply</td></tr>
<tr><td rowspan="9">RE
(Reserved ADO terminal)</td><td rowspan="9"> 
</td><td>B24</td><td>Power supply</td></tr>
<tr><td>CAN1-</td><td>Communication</td></tr>
<tr><td>CAN1+</td><td>Communication</td></tr>
<tr><td>302</td><td>Power supply</td></tr>
<tr><td>B24</td><td>Power supply</td></tr>
<tr><td>FL2</td><td>Down door zone</td></tr>
<tr><td>FL1</td><td>Up door zone</td></tr>
<tr><td rowspan="2">UCMP
(UCMP terminal)</td><td rowspan="2"> 
</td><td>131</td><td>-</td></tr>
<tr><td>131B</td><td>-</td></tr>
<tr><td rowspan="4">TEL3
(Control cabinet intercom terminal)</td><td rowspan="4"> 
</td><td>12V</td><td>Intercom power supply</td></tr>
<tr><td>302</td><td>-</td></tr>
<tr><td>R</td><td>Intercom signal</td></tr>
<tr><td>L</td><td>-</td></tr>
</table>

6.2 I/O Terminals

Table 6-4 Description of I/O terminals

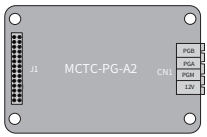
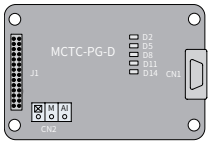
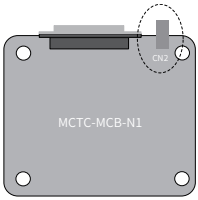
Terminal	Function Description
X1	Up door zone signal
X2	Door zone signal
X3	Down door zone signal
X4	Bypass signal
X5	Brake contactor BY1 feedback
X6	STO feedback
X7	Internal use
X8	Brake contactor BY2 feedback
X9	EEO signal input
X10	EEO up signal input
X11	EEO down signal input
X12	Left brake feedback switch detection
X13	Right brake feedback switch detection
X14	Up slow-down signal
X15	Down slow-down signal
X16	Motor over-temperature protection signal
X17	Shorting door lock circuit relay output feedback signal
X18	Fire linkage signal
X19	Backup
X20	Backup
X21	Main air switch detection
X22	ARD function disabling signal
X23	Backup
X24	Detection of short circuit between the safety circuit and the grounding (PE) terminal
X25	Safety circuit feedback
X26	Door lock 1 shorting detection
X27	Door lock feedback signal
X28	Door lock 2 shorting detection
Y1/M1	STO control & brake contactor BY2 control
Y2/M2	Left brake control
Y3/M3	Right brake control

Terminal	Function Description
Y4/M4	Brake contactor BY1 control
Y5/M5	Shorting door lock circuit relay
Y6/M6	Backup
Y7/M7	Backup
Y8/M8	Backup

6.3 PG Card

The control cabinet supports different types of encoders. Select a proper PG card manufactured by Inovance based on the encoder type to implement the feedback vector control (FVC). The PG card corresponding to each encoder type is as follows.

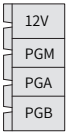
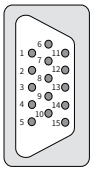
Table 6-5 Model selection of the MCTC-PG card

Encoder Type	Applicable PG Card	Appearance
Incremental push-pull/ open-collector output encoder	MCTC-PG-A2	
UVW encoder	MCTC-PG-D	
Sin/Cos encoder	MCTC-PG-E	
Absolute encoder (Endat type, ECN413/1313)	MCTC-PG-F1	
Weton intelligent communication encoder (EA53C9.25)	Built-in PG card, connected to the encoder through terminal CN2	

NOTE

◆ Weton intelligent communication encoder can store motor and encoder parameters, enabling parameter downloading to the control cabinet. This allows you to skip motor auto-tuning during field commissioning.

Table 6-6 Pin assignment of the CN1 terminal on different PG cards

Pin No.	MCTC-PG-A2			Pin Assignment
1	12V			
2	PGM			
3	PGA			
4	PGB			
Pin No.	MCTC-PG-D	MCTC-PG-E	MCTC-PG-F1	Pin Assignment
1	A+	B-	B-	
2	A-	-	-	
3	B+	Z+	-	
4	B-	Z-	-	
5	-	A+	A+	
6	-	A-	A-	
7	U+	COM	GND	Note: The CN1 terminal interface on the PG card is a DB15 female. Therefore, the encoder cable must be equipped with a DB15 male.
8	U-	B+	B+	
9	V+	VCC	5V (UP)	
10	V-	C+	CLK+	
11	W+	C-	CLK-	
12	W-	D+	DATA+	
13	VCC	D-	DATA-	
14	COM	-	-	
15	-	-	5V (Sensor)	

A speed FVC system is formed by connecting the J1 and CN1 terminals on the PG card to the driver board and the encoder respectively. The following figure shows the wiring between the MCTC-PG-E card and the control cabinet.

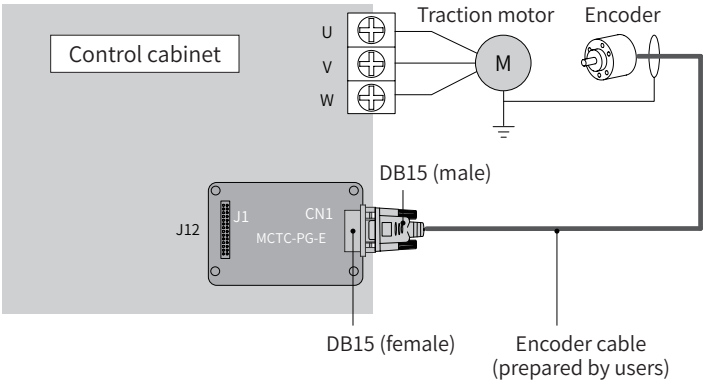


Figure 6-8 Wiring between the MCTC-PG-E card and the control cabinet

NOTE

◆ Prepare the encoder cable yourself.

7 Options

7.1 List of Options

Different options are required to implement different functions. The following table lists the options compatible with the control cabinet. If you have any needs, specify it in your order.

Table 7-1 List of options

Option	Model	Function	Configuration
Car top box	MCTC-CTW-N1	① Complies with European standard EN81-20/50, specific to regions with European standard requirement. ② Installed on the car top, controls such components as the door operator controller, light curtains, weighing device etc. ③ Consisting of components such as : inspection device, light, socket, emergency light, alarm bell, except emergency battery and intercom.	Provided only for European standard markets
	MCTC-CTW-N1-BT	① Installed on the car top, controls such components as the door operator controller, light curtains, weighing device etc. ② Consisting of components such as : inspection device, light, socket, emergency light, alarm bell, emergency battery and intercom.	Provided for all the oversea except European standard markets
Pit box	MCTC-PTW-N1	① European standard-compliant (EN81-20/50), specific to regions with European standard requiremen. ② Installed in the pit, consisting of components such as : inspection device, light, socket.	Provided only for European standard markets
	MCTC-PTW-N1-T	Installed in the pit, consisting of components such as : inspection device, light, socket, intercom.	Provided for all the oversea except European standard markets

Option	Model	Function	Configuration
Car control board	MCTC-COB-B1	Installed in the COP, the car control board can be connected to the car display board, IC card device, lighting/fan switch, car intercom system, emergency light, 16 floor inputs, door open/close button, and some control switches such as the independent running switch and attendant switch.	Standard
Display board	MCTC-HCB series	A standard dot-matrix hall call display board installed in the LOP	Optional
Group control board	MCTC-GCB-A	Used for the group control of multiple elevators	Optional
Expansion board	MCTC-KZ-G1	Used to expand DIs/DOs in the control cabinet and on the car top. It is connected to the control system through CAN communication. Multiple expansion boards can be used at the same time.	Optional

7.2 Car Top Boxes

7.2.1 MCTC-CTW-N series car top box

1 MCTC-CTW-N1 (Specialized for European Standard Markets):

The MCTC-CTW-N1 is a car top box complying with European standard EN81-20/50. It can be applied to European standard markets or markets without standard requirements.

Control functions: The MCTC-CTW-N1 is connected to the control cabinet and COP through CAN and Modbus communications respectively. It integrates the connections to light curtains, safety edges, overload/full-load device, up/down leveling signal, and door operator over-temperature signal, as well as the controls of door open/close (dual entrance car supported), car lighting/fan, car top inspection device, and sound and light alarm device.

Components: Car top light, emergency light, general-purpose socket, emergency stop device, inspection control device, alarm, and intermediate relay for manual door (optional)

Control boards: MCTC-CTB-N1 (car top control board) and MCTC-CIB-N1 (car top interface board)

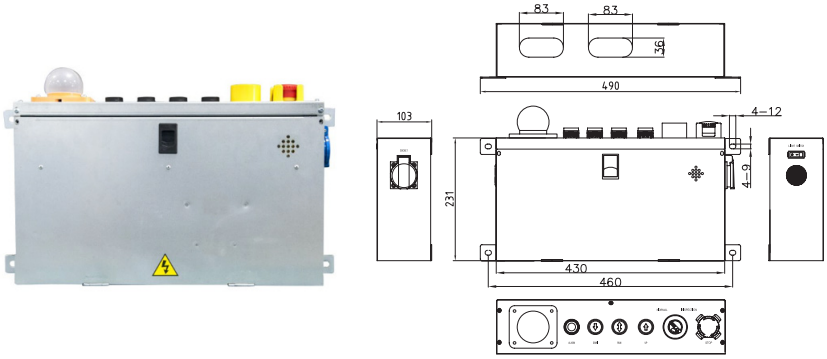


Figure 7-1 Appearance and dimensions of the MCTC-CTW-N1 (unit: mm)

2 MCTC-CTW-N1-BT:

The MCTC-CTW-N1-BT car top box can be applied to markets except European standard.

Control functions: Same as those of MCTC-CTW-N1

Components: Car top light, general-purpose socket socket, emergency stop device, inspection control device, alarm, intercom, battery, and intermediate relay for manual door (optional)

Control boards: MCTC-CTB-N1 (car top control board) and MCTC-CIB-N1 (car top interface board)

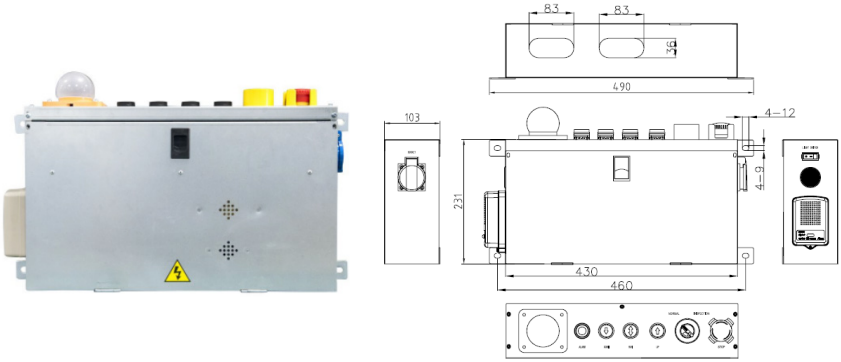


Figure 7-2 Appearance and dimensions of the MCTC-CTW-N1-BT (unit: mm)

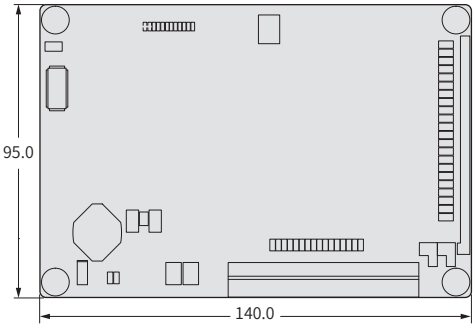


Figure 7-3 Dimensions of the MCTC-CTB-N1 (unit: mm)

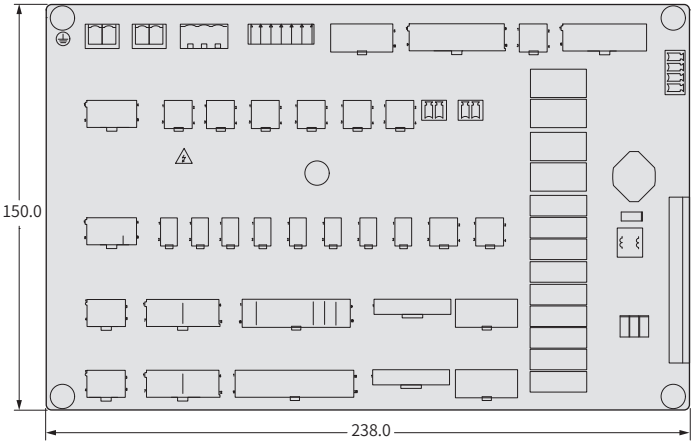


Figure 7-4 Dimensions of the MCTC-CIB-N1 (unit: mm)

Table 7-2 State description of indicators on the MCTC-CTW-N series

Indicator	State	Function
POWER	Steady ON	Indicates that the power supply is normal.
	OFF	Indicates that the power supply is abnormal.
CAN	Flashing	Indicates that the CAN communication is normal.
	OFF	Indicates that the CAN communication is abnormal. The control cabinet reports Err51.
CX1-CX23	Steady ON	Indicates that the 24 VDC input of corresponding X terminal is active.
	OFF	Indicates that the 24 VDC input of corresponding X terminal is inactive.
CY1-CY16	Steady ON	Indicates that the corresponding Y relay output is active.
	OFF	Indicates that the corresponding Y relay output is inactive.

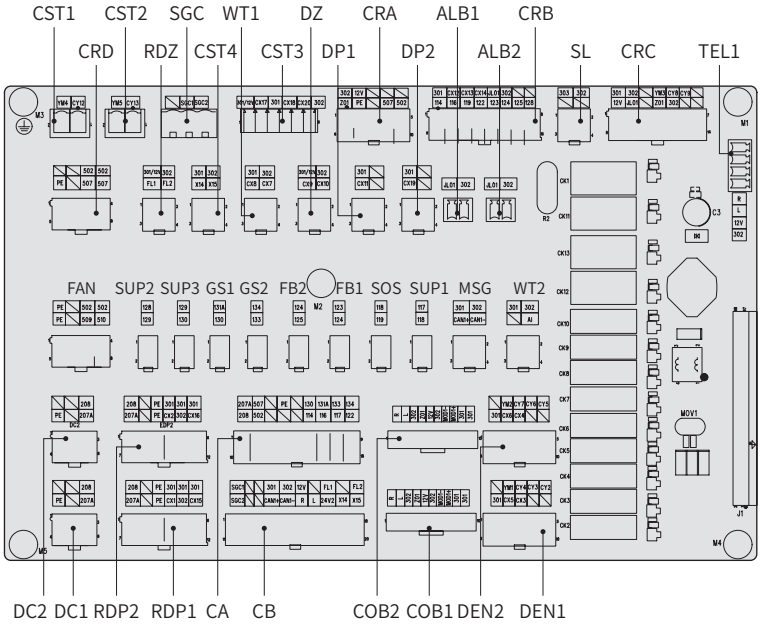


Figure 7-5 Arrangement of MCTC-CIB-N1 terminals

Table 7-3 Pin assignment and function description of MCTC-CIB-N1 terminals

Terminal Mark	Terminal Name	Pin Assignment		Function Description
CST1	Electromagnetic control DO terminal of manual door	YM4	Relay output	◆ Relay output ◆ Contact driving capacity: 28 V, 5 A
		Y12	Relay output	
CST2	Car top backup DO terminal	YM5	Relay output	◆ Relay output ◆ Contact driving capacity: 28 V, 5 A
		Y13	Relay output	
SGC	Terminal connecting the auxiliary car door lock switch	SGC1	Auxiliary car door lock switch	Use this terminal when enabling the UCMP function of asynchronous motor.
		SGC2	Auxiliary car door lock switch	

Terminal Mark	Terminal Name	Pin Assignment		Function Description
CST3	Backup input terminal	301/12V	24 VDC control power supply	CX terminal inputs, 10–30 V active
		CX17	CTB backup input	
		301	24 VDC control power supply	
		CX18	CTB backup input	
		301	24 VDC control power supply	
		CX20	CTB backup input	
		302	0 VDC control power supply	
CRA	Intercom battery terminal	302	0 V power supply for intercom system	-
		12V	12 VDC power supply for intercom system	
		Z01	12 VDC power supply for car emergency lighting	
		PE	Grounding	
		507	220 VAC battery charging power supply - L	
		502	220 VAC battery charging power supply - N	

Terminal Mark	Terminal Name	Pin Assignment		Function Description
CRB	Inspection device terminal	301	24 VDC control power supply	X terminal inputs, 10–30 V active
		CX12	Car top inspection input	
		CX13	Car top inspection up input	
		CX14	Car top inspection down input	
		JL01	Wiring for car top box alarm button	
		302	Wiring for car top box alarm button	
		114	Safety circuit (EEO switch bypass)	
		116	Safety circuit (EEO switch bypass)	
		119	Safety circuit	
		122	Safety circuit	
		123	Safety circuit	
		124	Safety circuit (protection balustrade switch bypass)	
		125	Safety circuit (protection balustrade switch bypass)	
		128	Safety circuit	
SL	Sound and light alarm control terminal	303	Sound and light alarm control (+24 VDC)	◆ Relay control ◆ Relay contact driving capacity: 28 V, 5 A
		302	Sound and light alarm control (0 VDC)	

Terminal Mark	Terminal Name	Pin Assignment		Function Description
CRC	Arrival gong/ Alarm terminal	301	24 VDC power supply for arrival gong	◆ CY8/CY9: relay output ◆ Relay contact driving capacity: 28 V, 5 A
		302	0 VDC power supply for arrival gong	
		YM3	Arrival gong signal common point	
		CY8	Up arrival gong output	
		CY9	Down arrival gong output	
		12V	Car top alarm	
		JL01	Car top alarm	
		Z01	12 VDC power supply for car top emergency lighting	
		302	0 VDC power supply for car top emergency lighting	
CRD	Backup 220 VAC terminal	502	Backup 220 VAC power supply - N	-
		PE	Grounding	
		507	Backup 220 VAC power supply - L	
		507	Backup 220 VAC power supply - L	
RDZ	Leveling switch terminal	301/12V	12/24 VDC power supply	If the mains electricity is normal, the power supply for door zone switches is 24 VDC. If the mains electricity fails, the power supply for leveling switches is 12 VDC (provided by the batteries in the car top box).
		302	0 VDC power supply	
		FL1	Up door zone signal	
		FL2	Down door zone signal	

Terminal Mark	Terminal Name	Pin Assignment		Function Description
CST4	Car top slow-down switch terminal	301	24 VDC power supply	◆ X terminal inputs, 10–30 V active ◆ Used only when the up and down slow-down switches are installed on the car top.
		302	0 VDC power supply	
		X14	Car top up slow-down signal	
		X15	Car top down slow-down signal	
WT1	Load cell terminal	301	24 VDC power supply	X terminal inputs, 10–30 V active
		302	0 VDC power supply	
		CX8	Overload signal	
		CX7	Full-load signal	
DZ	Up/Down leveling signal terminal	301/12V	12/24 VDC power supply	◆ If the mains electricity is normal, the power supply for leveling switches is 24 VDC. If the mains electricity fails, the power supply for leveling switches is 12 VDC (provided by the batteries in the car top box). ◆ The CX9/CX10 input is 10–30 V active. Signals are sent to the MCB through CAN communication.
		302	0 VDC power supply	
		CX9	Up leveling signal	
		CX10	Down leveling signal	
DP1	Door 1 motor over-temperature switch terminal	301	24 VDC power supply	X11 terminal input (digital), 10–30 V active
		CX11	Door 1 motor over-temperature signal	

Terminal Mark	Terminal Name	Pin Assignment		Function Description
DP2	Door 2 motor over-temperature switch terminal	301	24 VDC power supply	X19 terminal input (digital), 10–30 V active
		CX19	Door 2 motor over-temperature signal	
ALB1	COP 1 alarm terminal	JL01	COP 1 alarm button wiring	-
		302	COP 1 alarm button wiring	
ALB2	COP 2 alarm terminal	JL01	COP 2 alarm button wiring	-
		302	COP 2 alarm button wiring	
TEL1	Car top intercom terminal	R	Car top intercom communication	-
		L	Car top intercom communication	
		12V	12 VDC power supply for car top intercom	
		302	0 VDC power supply for car top intercom	
FAN	Fan/Lighting control terminal	PE	Grounding	The power supplies for the lighting and fan are controlled by relays. A thermistor cable is used for power-on pre-charge in the lighting circuit. Therefore, the lighting and fan must be connected correctly. The relay contact driving capacity is 240 V, 3 A.
		502	Car lighting power supply - N	
		502	Fan power supply - N	
		PE	Grounding	
		509	Fan power supply - L	
		510	Car lighting power supply - L	
SUP2	Emergency stop terminal on door 2 side	128	Safety circuit	-
		129	Safety circuit	

Terminal Mark	Terminal Name	Pin Assignment		Function Description
SUP3	Backup safety switch 2 terminal	129	Safety circuit	-
		130	Safety circuit	
GS1	Front car door lock switch terminal	131A	Safety circuit	-
		130	Safety circuit	
GS2	Rear car door lock switch terminal	134	Safety circuit	-
		133	Safety circuit	
FB2	Landing barrier NO switch terminal	124	Safety circuit (protection balustrade switch bypass)	-
		125	Safety circuit (protection balustrade switch bypass)	
FB1	Landing barrier NC switch terminal	123	Safety circuit	-
		124	Safety circuit	
SOS	Safety gear switch terminal	118	Safety circuit	-
		119	Safety circuit	
SUP1	Backup safety switch 1 terminal	117	Safety circuit	-
		118	Safety circuit	
MSG	Backup CAN1 communication terminal	301	24 VDC	-
		302	0 V	
		CAN1+	CAN communication	
		CAN1-	CAN communication	
WT2	Analog load weighing device terminal	301	24 VDC	AI terminal input, 10–30 V active
		302	0 V	
		AI	Analog communication signal	

Terminal Mark	Terminal Name	Pin Assignment		Function Description
DC1/DC2	Door operator 1/2 controller power supply terminal	208	220 VAC door operator power supply - N	1
		PE	Grounding	
		207A	220 VAC door operator power supply - L	
EDP1/ EDP2	Light curtain/ Safety edge connection terminal	208	220 VAC light curtain power supply - N	◆ Two types of power supply are available for light curtains: 24 VDC and 220 VAC. Select the power supply based on actual conditions. ◆ X terminal inputs, 10–30 V active
		PE	Grounding	
		301	Light curtain signal common point	
		301	24 VDC light curtain power supply	
		301	Safety edge 2 signal common point	
		207A	220 VAC light curtain power supply - L	
		PE	Grounding	
		CX1/CX2	Light curtain 1/2 input	
		302	24 VDC light curtain power supply	
		CX15/ CX16	Safety edge 1/2 input	
DEN1/ DEN2	Door operator 1/2 control terminal	YM1/YM2	Door 1/2 open/close output command common point	◆ CX terminal inputs, 10–30 V active; relay output; contact driving capacity: 28 V, 5 A
		CY4/CY7	Door 1/2 forced door close output	
		CY3/CY6	Door 1/2 close output	
		CY2/CY5	Door 1/2 open output	
		301	Door open/close limit common point	
		CX5/CX6	Door 1/2 close limit input	
		CX3/CX4	Door 1/2 open limit input	

Terminal Mark	Terminal Name	Pin Assignment		Function Description
CA	Traveling cable terminal	207A	220 VAC power supply for door operator/light curtains - L	-
		507	220 VAC fan/lighting power supply - L	
		PE	Grounding	
		130	Safety circuit end	
		131A	Door lock circuit end of car door 1	
		133	Door lock circuit end of landing door 1/2	
		134	Door lock circuit end of car door 2	
		208	220 VAC power supply for door operator/light curtains - N	
		502	220 VAC fan/lighting power supply - N	
		114	Safety circuit (EEO switch bypass)	
		116	Safety circuit (EEO switch bypass)	
		117	Safety circuit (main circuit)	
		122	Safety circuit (main circuit)	

Terminal Mark	Terminal Name	Pin Assignment		Function Description
CB	Traveling cable terminal	SGC1	Auxiliary car door lock switch	-
		301	24 VDC control power supply	
		302	0 VDC control power supply	
		12V	12 VDC emergency power supply	
		FL1	Up door zone signal	
		FL2	Down door zone signal	
		SGC2	Auxiliary car door lock switch	
		CAN1+	CAN communication	
		CAN1-	CAN communication	
		R	Intercom system communication signal	
		L	Intercom system communication signal	
		24V2	Backup 24 VDC power supply	
		X14	Car top up slow-down switch signal (optional)	
		X15	Car top down slow-down switch signal (optional)	

Terminal Mark	Terminal Name	Pin Assignment		Function Description
COB1/ COB2	COP 1/2 terminal	R	Intercom system communication signal	-
		L	Intercom system communication signal	
		302	0 VDC control power supply	
		Z01	12 VDC power supply for car emergency lighting	
		12V	0 VDC emergency power supply for intercom system	
		302	0 VDC control power supply	
		MOD-	Modbus communication	
		MOD+	Modbus communication	
		301	24 VDC control power supply	
		301	24 VDC control power supply	

7.3 Pit Box

1 The MCTC-PTW-N1 (Specialized for European Standard Markets)

Functions: Pit inspection, pit lighting, as well as connections to the pit entry detection switch and the hall reset switch.

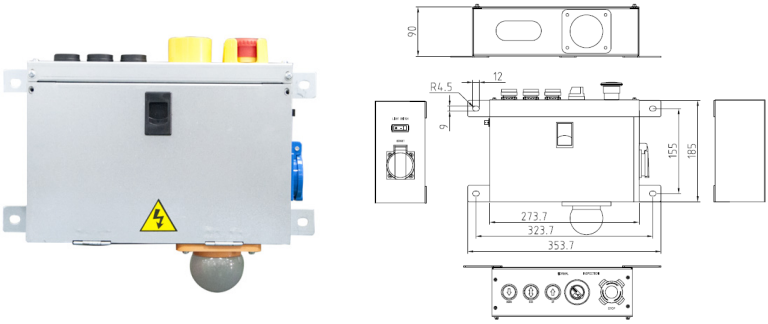


Figure 7-6 Appearance and dimensions of the MCTC-PTW-N1 (unit: mm)

2 The MCTC-PTW-N1-T (for all the markets except European Standard areas)

Functions: Pit inspection, pit lighting, pit intercom, as well as connections to the pit entry detection switch and the hall reset switch.

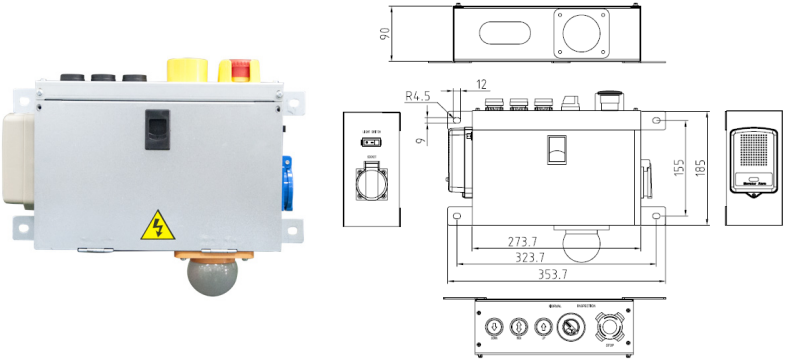


Figure 7-7 Appearance and dimensions of the MCTC-PTW-N1-T (unit: mm)

Table 7-4 State description of indicators on the MCTC-PTB-N sevies PIT box

Indicator	State	Function
RUN	Steady ON	Indicates that the power supply is normal.
	Flashing	Indicates that the firmware is normal.
	OFF	Indicates that the power supply is abnormal.
MOD	Flashing	Indicates that the MOD communication is normal.
	OFF	Indicates that the MOD communication is abnormal. The control cabinet reports subcode 102 of Err52.
PX1-PX6	Steady ON	Indicates that the 24 VDC input of corresponding PX terminal is active.
	OFF	Indicates that the 24 VDC input of corresponding PX terminal is inactive.

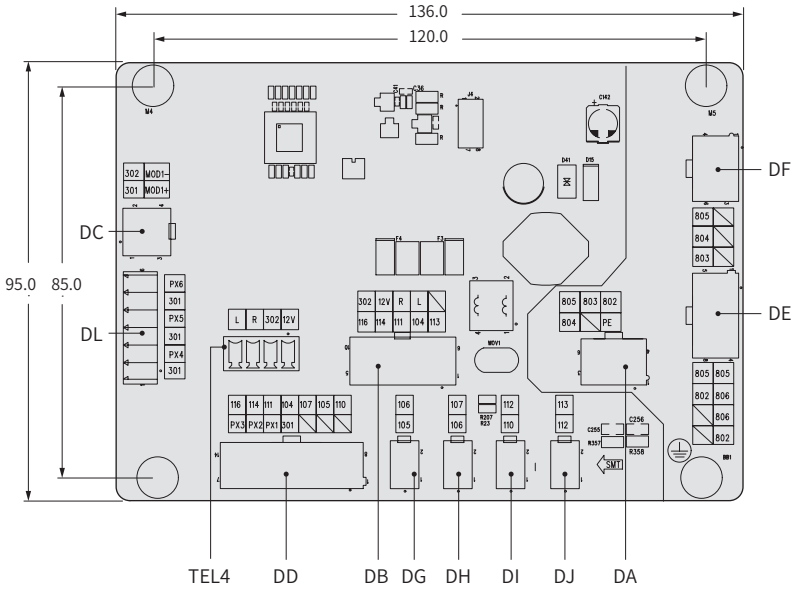


Figure 7-8 Arrangement of MCTC-PTB-N1 terminals

Table 7-5 Pin assignment and function description of MCTC-PTB-N1 terminals

Terminal Mark	Terminal Name	Pin Assignment		Function Description
DC	Communication terminal	301	24 VDC power supply	-
		302	0 VDC power supply	
		MOD+	Modbus communication	
		MOD-	Modbus communication	
DL	Pit entry detection terminal	301	24 VDC power supply	-
		PX4	Landing door 1 triangle lock detection switch	◆ Connected to a NC signal. ◆ When someone enters the pit, the signal is disconnected and the protection against pit entry becomes active.
		301	24 VDC power supply	-
		PX5	Landing door 2 triangle lock detection switch	◆ Connected to a NC signal. ◆ When someone enters the pit, the signal is disconnected and the protection against pit entry becomes active.
		301	24 VDC power supply	-
		PX6	Pit reset switch input	◆ Connected to an NO signal ◆ The reset function becomes active when the switch is turned on.

Terminal Mark	Terminal Name	Pin Assignment		Function Description
TEL4	Pit intercom terminal	12V	12 VDC power supply	-
		302	0 VDC power supply	
		R	Intercom communication	
		L	Intercom communication	
DB	Shaft cable terminal	113	Safety circuit	-
		104	Safety circuit	
		111	Safety circuit (EEO switch circuit)	
		114	Safety circuit (EEO switch bypass)	
		116	Safety circuit (EEO switch bypass)	
		L	Intercom communication	
		R	Intercom communication	
		12V	12 VDC power supply	
		302	0 VDC power supply	
DD	Inspection device terminal	301	24 VDC power supply	-
		PX1	Pit inspection input	
		PX2	Pit inspection up input	
		PX3	Pit inspection down input	
		110	Safety circuit	
		105	Safety circuit	
		107	Safety circuit	
		104	Safety circuit	
		111	Safety circuit (EEO switch circuit)	
		114	Safety circuit (EEO switch bypass)	
		116	Safety circuit (EEO switch bypass)	

Terminal Mark	Terminal Name	Pin Assignment		Function Description
DG	Pit stop 2	105	Safety circuit	-
		106	Safety circuit	
DH	Tension pulley switch	106	Safety circuit	-
		107	Safety circuit	
DI	Buffer switch 1	110	Safety circuit	-
		112	Safety circuit	
DJ	Down final limit switch	112	Safety circuit	-
		113	Safety circuit	
DF	Shaft lighting switch	805	Lighting power supply - L	-
		804	Lighting power supply - L	
		803	Lighting power supply - L	
		PE	Grounding	
DA	Shaft lighting cable	804	Lighting power supply - L	-
		802	Lighting power supply - N	
		803	Lighting power supply - L	
		805	Lighting power supply - L	
DE	Pit lighting	805	Lighting power supply - L	-
		806	Lighting power supply - L	
		806	Lighting power supply - L	
		802	Lighting power supply - N	
		805	Lighting power supply - L	
		802	Lighting power supply - N	

7.4 Car Control Board

The car control board (MCTC-COB-B1) has 24 button input interfaces, 20 button output interfaces, one intercom interface, and two RS485 communication interfaces.

The MCTC-COB-B1 is connected to the car top box through Modbus communication. The communication protocol for this board must be consistent with that for HCBs.

NOTE

- If a specialized communication protocol is used for your HCBs, the MCTC-COB-B1 must also use the same protocol. Otherwise, the MCTC-COB-B1 cannot communicate with the CTB.

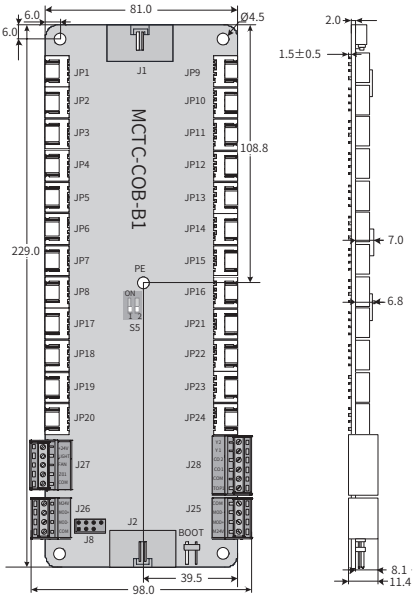


Figure 7-9 Arrangement of MCTC-COB-B1 terminals (unit: mm)

Table 7-6 Pin assignment and wiring description of key terminals on the MCTC-COB-B1

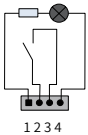
Mark	Pins 2 and 3	Pins 1 and 4	Wiring Description
JP1	Floor 1 button input	Floor 1 display output	When the MCTC-COB-B1 is used as a cascaded board, the JPn input signal corresponds to floor (16 + n) button input. Floor button indicator Floor button 
JP2	Floor 2 button input	Floor 2 display output	
JP3	Floor 3 button input	Floor 3 display output	
JP4	Floor 4 button input	Floor 4 display output	
JP5	Floor 5 button input	Floor 5 display output	
JP6	Floor 6 button input	Floor 6 display output	
JP7	Floor 7 button input	Floor 7 display output	
JP8	Floor 8 button input	Floor 8 display output	
JP9	Floor 9 button input	Floor 9 display output	
JP17	Door open button input	Door open display output	
JP18	Door close button input	Door close display output	
JP19	Door open delay button input	Door open delay display output	
JP20	Direct travel ride input	Reserved	
JP21	Attendant input	Reserved	
JP22	Direction change input	Reserved	
JP23	Independent running input	Reserved	
JP24	Firefighter running input	Reserved	

Table 7-7 Table 7-7 Pin assignment and function description of function selection terminals on the MCTC-COB-B1

Terminal Mark		Terminal Name	Function Description
JP25	M24V/COM	24 VDC power supply	-
JP26	MOD+/MOD-	RS485 communication interface	Connects the external devices of RS485 communication, such as HCBs and IC card.

<table>
<tr><th colspan="2">Terminal Mark</th><th>Terminal Name</th><th>Function Description</th></tr>
<tr><td rowspan="4">JP27</td><td>+24V</td><td>24 VDC power supply</td><td>-</td></tr>
<tr><td>COM</td><td>24 V power ground</td><td>-</td></tr>
<tr><td>LIGHT</td><td>Lighting control input</td><td>Turns off the lighting when there is a 24 V input.</td></tr>
<tr><td>FAN</td><td>Fan control input</td><td>Turns off the fan when there is a 24 V input.</td></tr>
<tr><td rowspan="5">JP28</td><td>Z01</td><td>Car emergency lighting</td><td>Car emergency lighting input, shared COM</td></tr>
<tr><td>DC12</td><td>Intercom power supply (+)</td><td rowspan="4">Connects the car intercom.</td></tr>
<tr><td>GND</td><td>Intercom power supply (-)</td></tr>
<tr><td>CO1</td><td>Intercom output</td></tr>
<tr><td>C02</td><td>Intercom output ground</td></tr>
<tr><td rowspan="2">Y1</td><td>Audio signal</td><td rowspan="2">Connects the external loudspeaker.</td></tr>
<tr><td>Y2</td><td>Audio signal</td></tr>
<tr><td colspan="2">J1/J2</td><td>Cascaded port for MCTC-COB-B1</td><td>Connects the MCTC-COB-B1 board.</td></tr>
<tr><td colspan="2">S1</td><td>Voice announcer PRG</td><td>Menu key of the voice announcer</td></tr>
<tr><td colspan="2">S2</td><td>Voice announcer UP</td><td>Performs incremental operations, for example, increase the voice volume or switch the language in the up direction.</td></tr>
<tr><td colspan="2">S3</td><td>Voice announcer DOWN</td><td>Performs decremental operations, for example, decrease the voice volume or switch the language in the down direction.</td></tr>
<tr><td colspan="2" rowspan="2">S5</td><td rowspan="2">DIP switch for COB address selection</td><td colspan="4">Used to set the COB address.</td></tr>
<tr><td>  </td><td>  </td><td>  </td><td>  </td></tr>
<tr><td>Call at floors 1 to 16</td><td>Call at floors 17 to 32</td><td>Call at floors 1 to 16 of the rear door of through-type door</td><td>Call at floors 17 to 32 of the rear door of through-type door</td></tr>
</table>

The MCTC-CTW-N1 must be used together with the MCTC-COB-B1. The cable connecting the two needs to be ordered separately and has multiple models. The following table shows the details.

Table 7-8 Model selection of the cable connecting the car top box and the car control board

Cable Name	Model	Length
Cable connecting the car top box and the car control board	MCTC-CTW-A1-3m	3 m
	MCTC-CTW-A1-7m	7 m
	MCTC-CTW-A1-0.35m	0.35 m

7.5 Display Board

① When installed in the LOP, the HCB series display board communicates with the control cabinet through an RS485 interface and is used for hall display, elevator call/lock, and fire input.

② When installed in the COP, the HCB series display board communicates with the MCTC-COB-B1 through an RS485 interface and is used for car display.

NOTE

◆ The HCB series display board has a variety of models. This section only introduces the usage of MCTC-HCB-D630 display board designed for general products.

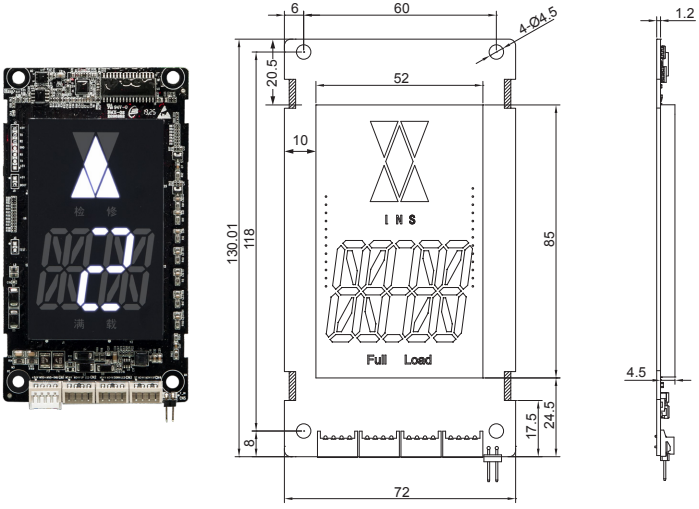


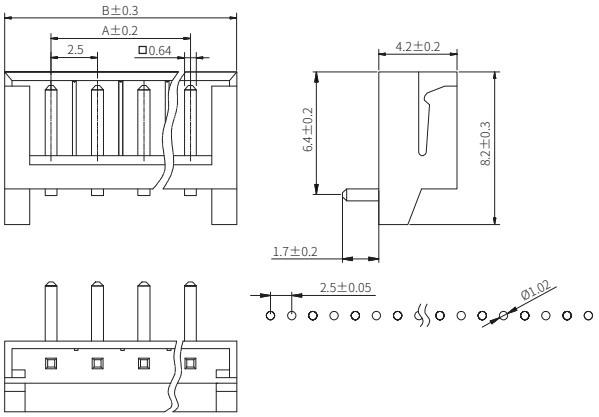
Figure 7-10 Appearance and dimensions of the MCTC-HCB-D630 (unit: mm)

Terminal Mark		CN1		CN2		CN3		CN4		CN5
Function		Interface for Modbus bus and power supply		Up call button terminal		Down call button terminal		Fire emergency and elevator lock inputs		Traditional address jumper
Pins	1	+V24	24 V power supply	MP24	24 V power supply	MP24	24 V power supply	ST	Elevator lock input	ON: Set the floor addresses by shorting two pins and pressing the up and down call buttons simultaneously. OFF: No jumper (default state)
	2	MOD+	Modbus communication cable	MP24	24 V power supply	MP24	24 V power supply	MP24	24 V power supply	
	3	MOD-	Modbus communication cable	U-IN	Up call button input	D-IN	Down call button input	MP24	24 V power supply	
	4	GND	Power ground	LED-UP	Up call button output	LED-DOWN	Down call button output	XF	Fire emergency input	

NOTE

- 24 V power supply: 18V ≤ voltage ≤ 26 V; RS485 communication: 38400 bit/s by default; Load current of button indicators: ≤ 25 mA; no jumper on CN5 by default

Type of terminals CN1 to CN4:



7.6 Group Control Board

The group control board (MCTC-GCB-A) supports the group control of four elevators up to 40 floors. This section only introduces the basic interfaces. Consult Inovance for more details about the usage of the group control board.

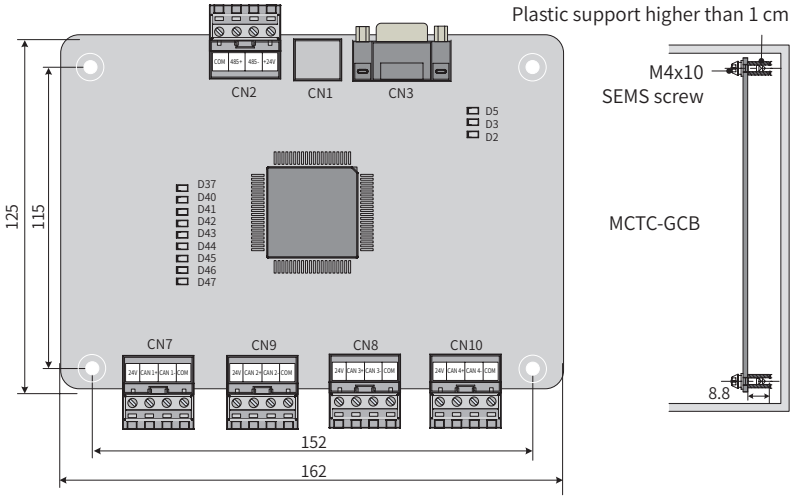
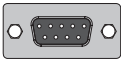


Figure 7-11 Appearance and dimensions of the MCTC-GCB-A (unit: mm)

Table 7-9 Pin assignment and function description of MCTC-GCB-A terminals

Terminal Mark		Terminal Name	Function Description	Pin Assignment
CN1	-	Operating panel terminal	Connects operating panels.	
CN2	+24V/COM	24 VDC voltage output	Connects the external 24 V power supply for the group control board.	
	MOD+/MOD-	Modbus communication terminal	Communication with the LCD device and function expansions.	
CN3	-	Reserved	-	

Terminal Mark		Terminal Name	Function Description	Pin Assignment
CN7	+24V/COM	External 24 VDC power supply	24 VDC power supply for the corresponding CAN communication module	
	CAN1+/CAN1-	CAN bus communication terminal	CAN communication between the group control board and the MCB of elevator 1	
CN9	+24V/COM	External 24 VDC power supply	24 VDC power supply for the corresponding CAN communication module	
	CAN2+/CAN2-	CAN bus communication terminal	CAN communication between the group control board and the MCB of elevator 2	
CN8	+24V/COM	External 24 VDC power supply	24 VDC power supply for the corresponding CAN communication module	
	CAN3+/CAN3-	CAN bus communication terminal	CAN communication between the group control board and the MCB of elevator 3	
CN10	+24V/COM	External 24 VDC power supply	24 VDC power supply for the corresponding CAN communication module	
	CAN4+/CAN4-	CAN bus communication terminal	CAN communication between the group control board and the MCB of elevator 4	

7.7 I/O Expansion Board

The I/O expansion board (MCTC-KZ-G1) is used to expand the DIs/DOs of the control cabinet to external devices. It is connected to the CAN1 bus of the MCB through a CAN interface to implement the expansion of up to 10 DI terminals and 10 DO terminals.

The CAN1 bus supports a maximum of two expansion boards, with one placed in the machine room and the other placed on the car top. You can set the expansion board addresses using the DIP switches. When all the switches are OFF, this expansion board is on the car top. When K1 is set to ON (1) and other positions are set to OFF, this expansion board is in the machine room. The functions of terminals on the expansion

board are set in FD-11 (Expansion board 1: X1 input) to FD-50 (Expansion board 2: Y10 output).

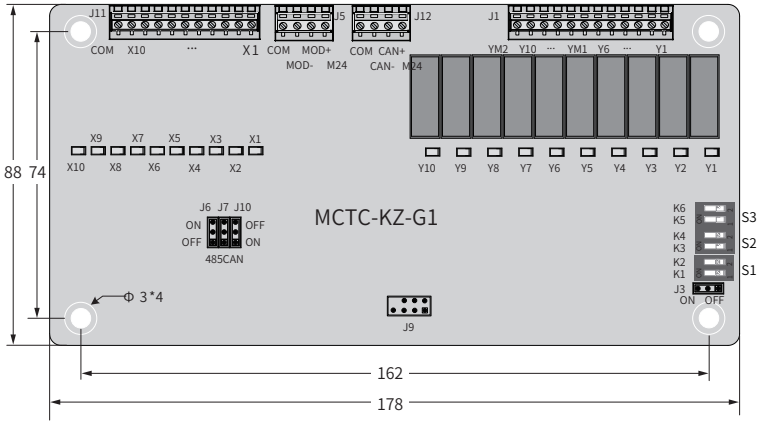
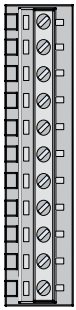
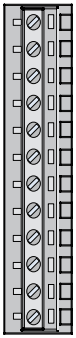
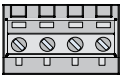
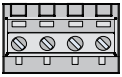
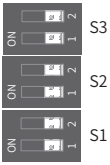
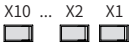
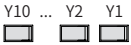


Figure 7-12 Appearance and dimensions of the MCTC-KZ-G1 (unit: mm)

Table 7-10 Description of MCTC-KZ-G1 terminals

Terminal Mark		Terminal Name	Function Description	Pin Assignment
J11	X1	DI signal 1	DI signals Rated voltage: 30 V Rated current: 5 mA	
	X2	DI signal 2		
	X3	DI signal 3		
	X4	DI signal 4		
	X5	DI signal 5		
	X6	DI signal 6		
	X7	DI signal 7		
	X8	DI signal 8		
	X9	DI signal 9		
	X10	DI signal 10		
	M24V	External 24 V power supply input		

Terminal Mark		Terminal Name	Function Description	Pin Assignment
J1	Y1	Relay output Y1	Relay output terminal Contact current capacity: 250 VAC, 5 A	
	Y2	Relay output Y2		
	Y3	Relay output Y3		
	Y4	Relay output Y4		
	Y5	Relay output Y5		
	Y6	Relay output Y6		
	YM1	Reference ground of relay outputs Y1 to Y6		
	Y7	Relay output Y7		
	Y8	Relay output Y8		
	Y9	Relay output Y9		
	Y10	Relay output Y10		
	YM2	Reference ground of relay outputs Y7 to Y10		
J12	+24V/COM	External 24 VDC power supply	Connects the external 24 V power supply.	
	CAN+/CAN-	Reserved CAN communication interface	CAN communication with the MCB	
J5	+24V/COM	24 VDC voltage output	Connects the external 24 V power supply.	
	MOD+/MOD-	RS485 communication interface with the MCB	This interface is reserved when the expansion board is placed on the car top. When the expansion board is installed in the machine room, this interface can expand one hall call of the rear door to realize the through type car control of 40 floors.	

Terminal Mark	Terminal Name	Function Description	Pin Assignment
J6/J7	Modbus termination resistor jumper	When Modbus communication is used, short the ON pin of jumper J6/J7 to connect the termination resistor.	
J10	CAN termination resistor jumper	When CAN communication is used, short the ON pin of jumper J10 to connect the termination resistor.	
J3	Reserved	Factory reserved	
S1/S2/S3	Address DIP switch	These switches are used to set the type of expansion boards. When all the switches are OFF, this expansion board is on the car top. When K1 is set to ON and other positions are set to OFF, this expansion board is in the machine room.	
X1 to X10	DI indicator	When an external DI signal is active, the corresponding indicator lights up (green).	
Y1 to Y10	Relay output indicator	When a system output is active, the corresponding output relay indicator lights up (green).	
J9	Reserved	Factory reserved Do not short this terminal randomly. Otherwise, it possibly does not work properly.	

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