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ME320LN^{new} Series Elevator AC Drive

User Guide

Industrial Automation | Intelligent Elevator | New Energy Vehicle | Industrial Robot | Rail Transit

Data code 19010493B02

Preface

Introduction

Thank you for purchasing the ME320LN^{new} series elevator AC drive.

The drive is a high-performance, vector control product specifically designed for elevators, independently developed and manufactured by Suzhou Monarch Control Technology Co., Ltd. Drawing on years of experience in the elevator application industry, it incorporates advanced algorithms such as motor vector control and smooth curve calculation. Additionally, the product features a user-friendly operating panel, simplifying complex keypad operations. The standard RJ45 port allows the operating panel to be connected at any desired location, making elevator commissioning convenient and straightforward.

This guide provides essential information and instructions for using the product, including basic specifications, optional accessories, mechanical installation, electrical wiring, commissioning and operation, parameter description, and troubleshooting guidance.

Revision History

Date	Version	Change description
September 2025	B02	**Updated:** • Recommended specifications of the grounding cable. • Minor corrections. **Added:** Figure of position of the EMC grounding screw.
February 2024	B01	**Added:** • 55 kW/75 kW/110 kW models, dimensions and related selection data. • Installation instructions for the 18.5 kW and above models in *"4.3.4 PG Card Description and Wiring" on page 59*. **Updated:** • Drive overload data in *"2.4 Technical Specifications" on page 27*. • Wall mounting figure of models 15 kW and below in plastic structure in *"3.3 Installation Instructions" on page 36*. • PG card model and description in *"2.6 List of Options" on page 31*, *"4.3.3 I/O Expansion Board Terminals and Wiring" on page 56*, and *"4.3.4 PG Card Description and Wiring" on page 59*.
December 2022	B00	• Added 90 kW model description. • Updated AC input reactor models. • Updated software parameters.

Date	Version	Change description
September 2020	A02	Minor corrections.
October 2018	A01	Replaced the logo.
March 2015	A00	First release.

Access to the Guide

The guide is subject to change due to product upgrade, specification modification as well as efforts to the accuracy and convenience of the guide.

This guide is not in the scope of delivery. If necessary, you can download the PDF file in the following ways:

- Visit *www.inovance.com*, click Download under Support and enter a keyword to search.
- Scan the QR code below to install the application My Inovance, where you can search for and download the guide.

Warranty Disclaimer

Inovance provides warranty service within the warranty period (as specified in your order) for any fault or damage that is not caused by improper operation of the user. You will be charged for any repair work after the warranty period expires.

Within the warranty period, maintenance fee will be charged for the following damage:

- your failure to operate the product in accordance with the user guide
- events beyond our reasonable control, such as fire, flood and abnormal voltage
- function misuse
- out-of-range application

- other events of force majeure, including but not limited to lightning, earthquake and other extreme weather events

The maintenance fee is charged according to the latest Price List of Inovance. If otherwise agreed upon, the agreed terms and conditions shall prevail.

For details, see Product Warranty Card.

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Safety Instructions

Safety Disclaimer

- This chapter provides essential safety instructions for proper use of the equipment. Before operating the equipment, read through the guide and comprehend all the safety instructions. Failure to observe the safety instructions may result in death, personal injuries, or equipment damage.
- "DANGER", "WARNING", and "CAUTION" items in the user guide do not indicate all safety precautions that need to be followed; instead, they just supplement the safety precautions.
- Use this equipment according to the designated environment requirements. Damage caused by improper usage is not covered by warranty.
- 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 death or severe personal injuries.



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



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

Safety Instructions

- Product illustrations in the user guide are sometimes shown without covers or protective guards. Remember to install the covers or protective guards as specified first, and then perform operations in accordance with the instructions.
- Product illustrations in this guide are for reference only. Actual products may vary.
- Personnel must take mechanical precautions to protect personal safety. Wear necessary protective safety gear, such as anti-smashing shoes, clothing, glasses, gloves, and sleeves.

Unpacking
 • Do not proceed with installation if you find damage, rust, or indications of use on the product or accessories. • Do not proceed with installation if you find water seepage, component missing or damage upon unpacking. • Do not install the equipment if you find the packing list does not conform to the equipment you received.
 • Check whether the packing is intact and whether there is damage, water seepage, dampness, and deformation before unpacking. • Unpack by following the correct sequence. Do not hit with force. • Check whether there is damage, rust, or injuries on the surface of the equipment or equipment accessories. • Check the materials and ensure all items are included.

Storage and Transportation



- Large-scale or heavy equipment must be handled by qualified professionals using specialized hoisting equipment. Failure to comply may result in personal injury or equipment damage.
- Before hoisting the equipment, ensure that components such as the front cover and terminal blocks are secured firmly with screws. Loosely-connected components may fall off and result in personal injuries or equipment damage.
- Do not stand or stay below the equipment when it is being hoisted.
- When hoisting the equipment with a steel rope, ensure the equipment is hoisted at a constant speed without suffering from vibration or shock. Do not turn the equipment over or let the equipment stay hanging in the air. Failure to comply may result in personal injuries or equipment damage.



- Handle the equipment with care during transportation and mind your step to prevent personal injuries or equipment damage.
- When carrying this equipment with bare hands, hold the equipment casing firmly with care to prevent parts falling. Failure to comply may result in personal injuries.
- Store and transport this product in strict accordance with the storage and transportation requirements. Failure to comply may result in damage to the product.
- Store and transport the product in environments free from water splashes, rain exposure, direct sunlight, strong electric and magnetic fields, and excessive vibration.
- Store the product for no more than 3 months. For longer storage periods, implement stricter protective measures and conduct necessary inspections.
- Before transportation, ensure the product is packed securely. For long-distance shipping, use airtight packaging.
- Always transport the product separately from any items or substances that could potentially damage or negatively affect its performance.

Installation



- Installation must be performed by only experienced personnel who have been trained with necessary electrical information. Operations by others are prohibited.



- Read through the guide and safety precautions before installation.
- Do not install the equipment in places with strong electric or magnetic fields.
- Before installation, check that the mechanical strength of the installation site can bear the weight of the equipment. Failure to comply can result in mechanical hazards.
- Do not wear loose clothes or accessories during installation. Failure to comply may result in electric shock.
- When installing the equipment in a closed environment (such as a cabinet or casing), use a cooling device (such as a fan or air conditioner) to cool the environment down to the required temperature. Failure to comply may result in equipment over-temperature or a fire.
- Do not modify this product.
- Do not rotate the equipment components or loosen fixed bolts (especially those marked in red) on equipment components.
- When this equipment is installed in a cabinet or final equipment, protection measures such as a fireproof enclosure, electrical enclosure, or mechanical enclosure must be provided. The IP rating must meet IEC standards and local laws and regulations.
- Before installing equipment with strong electromagnetic interference, such as a transformer, install an electromagnetic shielding device for the product to prevent malfunctions.
- Install the product on an incombustible object such as metal and do not touch or attach the product to combustibles. Failure to comply can result in fire accident.



- Cover the top of the equipment with a piece of cloth or paper during installation. This is to prevent unwanted objects such as metal chippings, oil, and water from falling into the equipment and causing faults. After installation, remove the cloth or paper to prevent over-temperature caused by poor ventilation due to blocked ventilation holes.
- Resonance may occur when the equipment operating at a constant speed switches to variable speed operations. In this case, install the vibration-proof rubber under the motor frame or use the vibration suppression function to reduce resonance.

Wiring



- Equipment installation, wiring, maintenance, inspection, or component replacement must be performed only by professionals.
- Before wiring, cut off all the power supplies. Wait as specified on the product warning sign before further operations because residual voltage exists after power-off. Measure the DC voltage of the main circuit and make sure that it is below the safety voltage. Failure to comply will result in an electric shock.
- Never perform wiring, remove the product cover, or contact the PCB at power-on. Failure to comply will result in an electric shock.
- Make sure that the equipment is reliably grounded. Failure to comply will result in an electric shock.



- Never connect the power cable to output terminals of the equipment. Failure to comply may cause equipment damage or even a fire.
- When connecting a drive with the motor, make sure that the phase sequences of the drive and motor terminals are consistent to prevent reverse motor rotation.
- The cables used for wiring must have the appropriate size and shielding type. The cable shield needs to be grounded reliably at both ends.
- Fasten screw terminals with the specified tightening torque. Insufficient or excessive torque may cause overheating, damage, and even a fire.
- After wiring, make sure that no screws are fallen and cables are exposed in the equipment. Failure to comply may result in an electric shock or equipment damage.



- During wiring,follow the proper electrostatic discharge (ESD) procedures, and wear an antistatic wrist strap. Failure to comply will result in damage to internal equipment circuits.
- In wiring the control circuit, use shielded twisted pair cable and connect the shield to the PE terminal. Otherwise, the equipment may not function properly.

Power-on



- Before powering on, check that the equipment is installed properly with secure wiring and the motor can be restarted.
- Check that the power supply meets equipment requirements before powering on to prevent equipment damage or fire.
- When the equipment is powered on, do not open the cabinet door or protective cover, touch any wiring terminal, or disassemble any component of the equipment. Failure to comply can result in electric shock.



- Perform a trial run after wiring and parameter setting to ensure the equipment operates safely. Failure to comply may result in personal injuries or equipment damage.
- Before power-on, check that the rated voltage of the equipment is consistent with that of the power supply. Failure to comply may result in a fire. If the power supply voltage is used incorrectly, it will result in a fire.
- Before power-on, check that no one is near the equipment, motor, or other mechanical parts. Failure to comply may result in personal injuries or even death.

Operation



- The equipment must be operated only by professionals. Failure to comply can result in death or personal injuries.
- During operation, do not touch any connecting terminals or disassemble any component of the equipment. Failure to comply can result in electric shock.



- Do not touch the equipment enclosure, fan, or resistor with bare hands. Failure to comply may result in burns.
- During operation, prevent metal or other objects from falling into the equipment. Failure to comply may result in fire or equipment damage.

Maintenance



- Equipment installation, wiring, maintenance, inspection, or component replacement must be performed only by professionals.
- Do not maintain the equipment with power ON. Failure to comply can result in electric shock.
- Before maintenance, disconnect all the power supplies of the equipment and wait for at least the time designated on the equipment warning label.
- When a permanent magnet motor is used, do not touch the motor terminals immediately after power-off because the motor terminals can generate induced voltage during rotation even after the equipment is powered off. Failure to comply can result in electric shock.



- Perform routine and regular inspection and maintenance on the equipment in accordance with maintenance requirements and keep a record.

Repair



- Equipment installation, wiring, maintenance, inspection, or component replacement must be performed only by professionals.
- Do not perform maintenance on the equipment with power on. Failure to comply can result in electric shock.
- Before inspection and repair, cut off all equipment power supplies and wait as specified on the product warning sign.



- Require for repair services according to the product warranty agreement.
- When the fuse is blown or the circuit breaker or earth leakage circuit breaker (ELCB) trips, wait as specified on the product warning sign before power-on or further operations. Failure to comply may result in personal injuries, equipment damage or even death.
- When the equipment is faulty or damaged, require professionals to perform troubleshooting and repair by following repair instructions and keep a repair record.
- Replace quick-wear parts of the equipment according to the replacement guide.
- Do not operate damaged equipment. Failure to comply may result in worse damage.
- After the equipment is replaced, perform wiring inspection and parameter settings again.

Disposal
WARNING • Dispose of retired equipment in accordance with local regulations and standards. Failure to comply may result in death, personal injuries, or property damage. • Recycle retired equipment in accordance with industry waste disposal standards to avoid environmental pollution.

Safety Signs

To ensure safe operations, comply with safety signs on the device, and do not damage or remove the safety labels. The following table describes the safety signs.

Safety Signs	Description
 WARNING	• Danger of electric shock • Do not open the front cover within 10 minutes after the power is cut off. • Before using the product, read the user guide and safety instructions carefully.

Others

- Requirements for the residual current device (RCD)
  The equipment generates high leakage current during running, which flows through the protective grounding conductor. Thus install a type-B RCD at primary side of the power supply. When selecting the RCD, you must consider the transient and steady-state leakage current to ground that may be generated at startup and during the running of the controller. Select a specialized RCD which can suppress high harmonics or a general-purpose RCD with a relatively large residual current.
- High leakage current warning
  The product generates high leakage current during running. Ground reliably before connecting it to the input power supply. Grounding must comply with local regulations and related IEC standards.
- 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 session, to prevent the elevator AC drive from being damaged due to the poor insulation of motor windings. The motor must be disconnected from the AC drive during the insulation test. A 500 V megger is recommended for the test. Ensure that the measured insulation resistance is 5 MΩ or above.
- Motor overtemperature protection

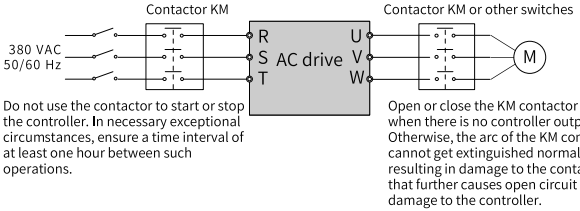
If the rated capacity of the motor selected does not match that of the AC drive ME320LN^{new}, especially when the rated power of the drive is greater than that of the motor, adjust the motor protection parameters of the drive or install a thermal relay for the motor circuit for protection.

- Running at frequencies higher than the mains frequency
  Do not operate above the mains frequency. If the customer intends to operate above 50 Hz, please carefully consider the strength and service life of all mechanical components in the elevator system.

- Motor heat and noise
  The output of the AC drive is pulse width modulation (PWM) wave with harmonics. Therefore, the motor temperature, noise, and vibration are slightly greater than those when the AC drive runs at the mains frequency.

- Voltage-sensitive device or capacitor on the output side of the controller
  The ME320LN^{new} outputs PWM waves, and therefore, do not install the capacitor for improving power factor or lightning protection voltage-sensitive resistor on the output side. Otherwise, the AC drive may suffer transient overcurrent or even be damaged.

- Contactor on the input and output sides of the ME320LN^{new}
  When a contactor is installed between the input side of the AC drive and the power supply, do not start or stop the drive thorough this contactor. When a contactor is installed between the output side of the AC drive and the motor, do not turn off the contactor when the AC drive is active. Otherwise, modules inside may be damaged.



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

- Change from three-phase input to two-phase input
  The ME320LN^{new} series three-phase AC drive must not be used with a two-phase power supply. Otherwise, the AC drive may be damaged or experience faults.

- Surge suppressor
  The AC drive has a built-in voltage dependent resistor (VDR) for suppressing the surge voltage generated when the inductive loads around the drive are switched on or off. If

the inductive loads generate very high surge voltage, use a surge suppressor for the inductive load or use a surge suppressor together with a diode.

Note

Do not connect the surge suppressor on the output side of the AC drive.

- Altitude-based derating
  In places where the altitude is above 1000 m and the cooling effect reduces due to thin air, it is necessary to derate the AC drive during use. Contact Inovance for technical details on derating.
- Special usage
  If your needs are not covered by the wiring drawings recommended in the manual, such as common DC bus, contact Inovance for technical support.
- Disposal
  The electrolytic capacitors on the main circuits and PCBs may explode when they are burnt. In addition, poisonous gas will be generated from the plastic parts during incineration. Dispose of the AC drive as industrial waste.
- Applicable motor
  - The standard applicable motor for the ME320LN^{new} series elevator AC drive is four-pole squirrel-cage asynchronous induction motor and permanent magnet synchronous motor. When selecting the motor, ensure that the rated motor current falls within the allowable AC drive operating range.
  - For use of a constant frequency motor with the cooling fan and rotor shaft connected coaxially, as the cooling effect of the fan deteriorates when the motor slows down, install an extra exhaust fan or replace with an variable frequency motor in case of motor overtemperature.
  - The standard parameters of the applicable asynchronous motor have been configured into the AC drive. However, you may need to perform motor parameter auto-tuning or modify the default values as needed. Otherwise, the operation effect and protection performance may be affected. For permanent magnet synchronous motors, dynamic parameter auto-tuning must be performed.
  - The AC drive may alarm or even be damaged when short circuit occurs in cables or motor. Therefore, perform an insulation short circuit test when the motor and cables are newly installed or during routine maintenance. During the test, make sure that the AC drive is disconnected from the tested parts.
- Precautions on selecting the ELCB
  Tripping may be caused if an improper ELCB is selected when the AC drive drives the motor. This is because the output wave of the drive has high harmonics and the motor cable and the cable connecting the drive and the motor produce leakage current,

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

If an ELCB is equipped, and it trips during startup, remove the EMC grounding screw, as shown in *"Figure -1 Position of the EMC grounding screw" on page 17*.

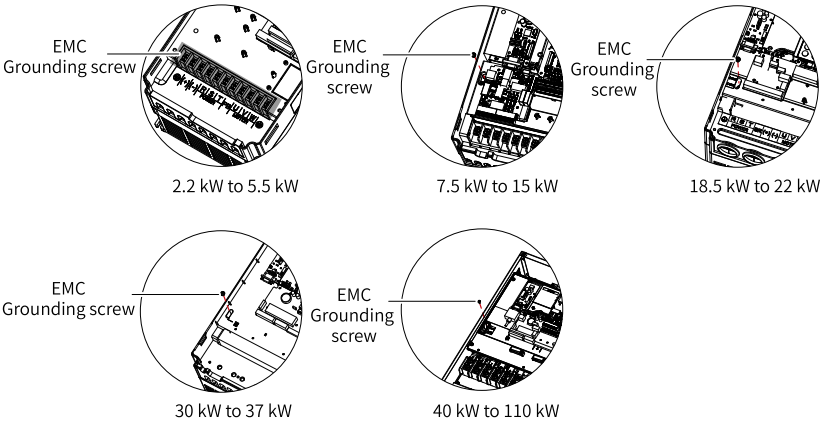


Figure -1 Position of the EMC grounding screw

Protection Features

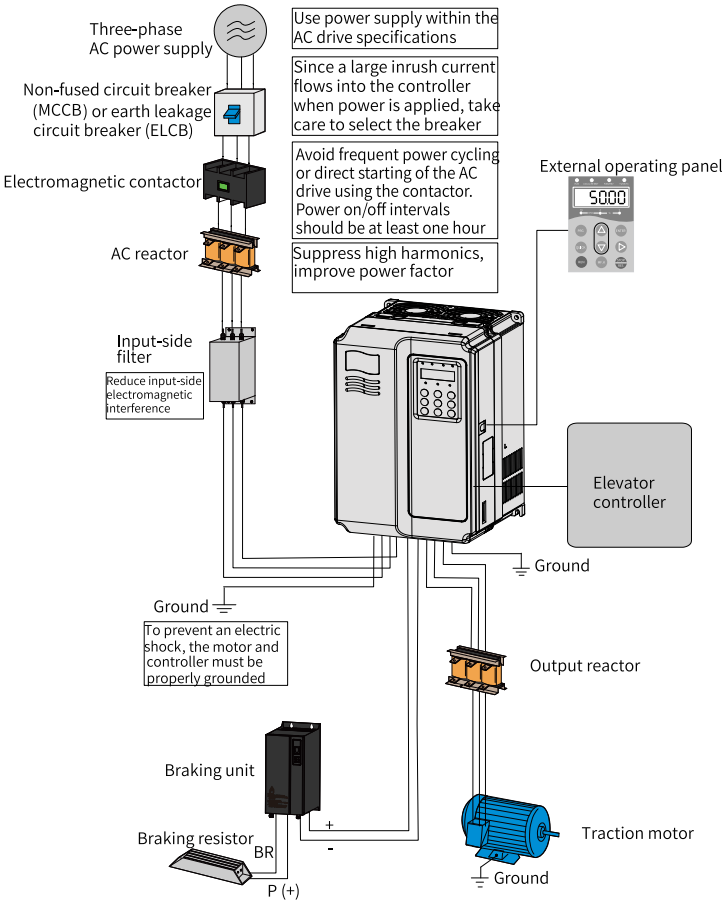
Adopting different protective features for different levels of faults, ME320LN^{new} provides the elevator running system with full abnormality protection.

The following abnormalities are covered:

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

1 Introduction

Connection to Peripheral Devices



Note

- Do not install the capacitor or surge protection device (SPD) on the output side of the AC drive. Otherwise, the AC drive may be faulty, or the capacitor and SPD may be damaged.
- Harmonics are present in the inputs/outputs (main circuit) of the AC drive, which may interfere with the communication device connected to the AC drive. Therefore, install an anti-interference filter to minimize the disturbance.

Main Features

- It drives both the asynchronous motor and permanent magnetic synchronous motor (PMSM), and provides multiple encoder interfaces;
- It supports motor auto-tuning (static auto-tuning and complete auto-tuning);
- It supports multi-speed and analog setting;
- It ensures good elevator riding comfort with flexible startup curves, multi-segment S-curve setting, and four stages of acceleration/deceleration time;
- It allows emergency evacuation at power failure with 48 V power supply by using its battery driving feature;
- It provides various smoothing features for elevator control and operation, including enable detection, brake contactor control, output contactor control, forced slow-down determination, overspeed protection, speed deviation detection, advance door opening, contact stuck detection, motor overheat detection, and startup pre-torque compensation;
- It features a user-friendly operating panel, simplifying complex keypad operations. The standard RJ45 port allows the operating panel to be connected at any desired location, making elevator commissioning convenient and straightforward. The parameter backup unit is simple to use and facilitates batch commissioning.
- It provides built-in DC reactor and braking unit, which improves the output power factor and reduces costs of peripheral devices;
- It has separate air ducts, lightning protection design and thus a reliable product quality is assured by state-of-the-art manufacturing facilities and processes;
- It is built with a thorough protection against lightning, substantially enhancing reliability of the system. It possesses a strong anti-interference capability compliant with EMC standard.

2 Product Information

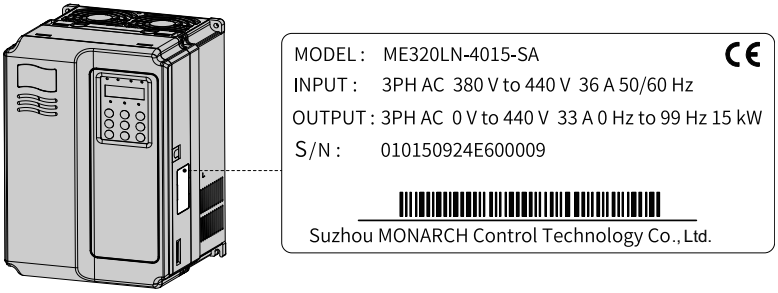
2.1 Model Number and Nameplate

Model Number

ME320 L N - 40 15 - SA
① ② ③ ④ ⑤ ⑥

① **Product series** ME320: AC drive series	⑤ **Power rating** 02: 2.2 kW 03: 3.7 kW ... 30: 30 kW 45: 45 kW 55: 55 kW 75: 75 kW 90: 90 kW (220 V models) 110: 110 kW
② **AC drive type** L: For elevator use	
③ **AC drive structure** N: New structure	
④ **Voltage class** 20: Single/Three-phase 220 V 40: Three-phase 380 V	⑥ **Applicable motor type** SA: Both asynchronous and synchronous motors

Nameplate



2.2 Component Description

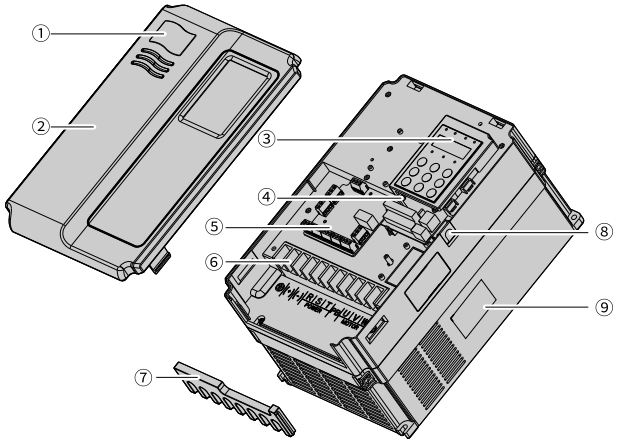


Figure 2-1 Components of the ME320LN^{new} AC drive in plastic structure (2.2 kW to 15 kW)

No.	Component	No.	Component	No.	Component
①	Label	④	MCB	⑦	Cable entry plate
②	Outer casing	⑤	I/O board	⑧	External operating panel interface
③	Operating panel	⑥	Power terminal	⑨	AC drive nameplate

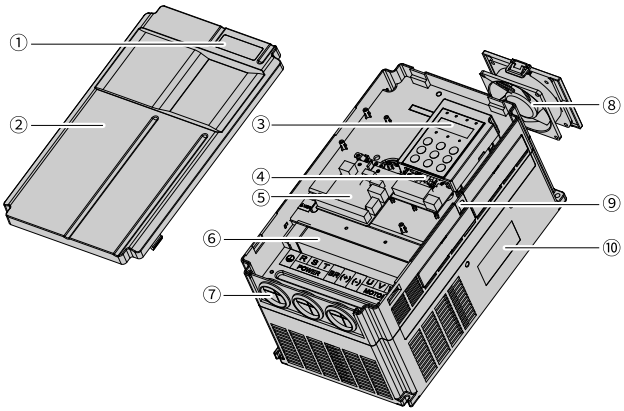


Figure 2-2 Components of the ME320LN^{new} AC drive in plastic structure (18.5 kW to 22 kW)

No.	Component	No.	Component	No.	Component
①	Label	⑤	I/O board	⑨	External operating panel interface
②	Outer casing	⑥	Power terminal	⑩	AC drive nameplate
③	Operating panel	⑦	Cable grommet	-	-
④	MCB	⑧	Fan	-	-

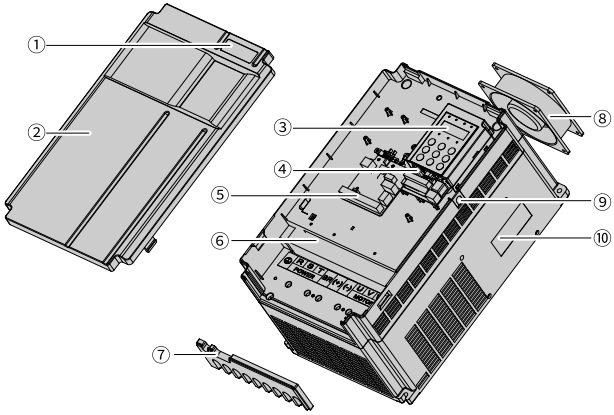


Figure 2-3 Components of the ME320LN^{new} AC drive in plastic structure (30 kW to 37 kW)

No.	Component	No.	Component	No.	Component
①	Label	⑤	I/O board	⑨	External operating panel interface
②	Outer casing	⑥	Power terminal	⑩	AC drive nameplate
③	Operating panel	⑦	Cable entry plate	-	-
④	MCB	⑧	Fan	-	-

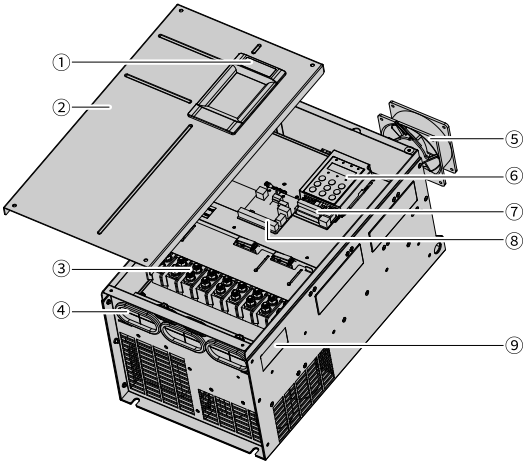


Figure 2-4 Components of the ME320LN^{new} AC drive in sheet metal structure (45 kW to 110 kW)

No.	Component	No.	Component	No.	Component
①	Label	④	Cable grommet	⑦	Control board
②	Outer casing	⑤	Fan	⑧	I/O board
③	Power terminal	⑥	Operating panel	⑨	AC drive nameplate

2.3 Installation Dimensions

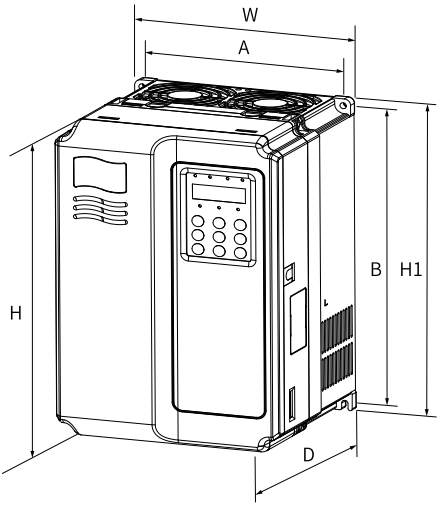


Figure 2-5 Outline and mounting dimensions of the ME320LN^{new} AC drive in plastic structure (2.2 kW to 15 kW)

Table 2–1 Mounting dimensions of the ME320LN^{new} AC drive (2.2 kW to 15 kW)

Drive model	Mounting hole (mm)		Outline dimensions (mm)				Hole diam. (mm)	Weight (kg)
	A	B	H	H1	W	D		
ME320LN-4002-SA	113	172	186	-	125	164	Φ5.0	1.1
ME320LN-4003-SA	148	236	248	-	160	183	Φ5.0	2.5
ME320LN-4005-SA								
ME320LN-4007-SA	190	305	322	-	208	192	Φ6	6.5
ME320LN-4011-SA								
ME320LN-4015-SA								

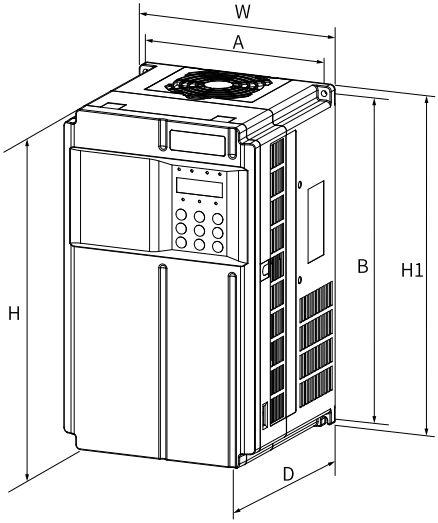


Figure 2-6 Outline and mounting dimensions of the ME320LN^{new} AC drive in plastic structure (18.5 kW to 37 kW)

Table 2–2 Mounting dimensions of the ME320LN^{new} AC drive (18.5 kW to 37 kW)

Drive model	Mounting hole (mm)		Outline dimensions (mm)				Hole diam. (mm)	Weight (kg)
	A	B	H	H1	W	D		
ME320LN-4018-SA	195	335	350	-	210	192	Φ6	7.6
ME320LN-4022-SA								
ME320LN-4030-SA	230	380	400	-	250	220	Φ7	17.5
ME320LN-4037-SA								

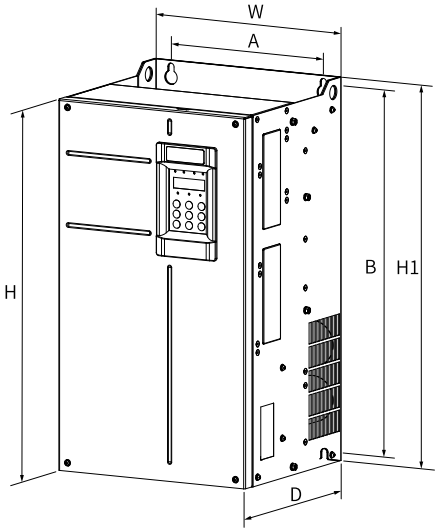


Figure 2-7 Outline and mounting dimensions of the ME320LN^{new} AC drive in sheet metal structure (45 kW to 110 kW)

Table 2–3 Mounting dimensions of the ME320LN^{new} AC drive (45 kW to 110 kW)

Drive model	Mounting hole (mm)		Outline dimensions (mm)				Hole diam. (mm)	Weight (kg)
	A	B	H	H1	W	D		
ME320LN-4045-SA	245	523	525	542	300	275	Φ10	35
ME320LN-4055-SA								
ME320LN-4075-SA	270	560	554	580	338	315	Φ10	51.5
220-ME320LN-4090-SA								
ME320LN-4110-SA								

2.4 Technical Specifications

Table 2–4 Technical specifications of the ME320LN^{new} series AC drive

Item	Specifications			
Basics	Carrier frequency	2 kHz to 16 kHz (automatically adjusted according to the load characteristics)		
	Input frequency resolution	Digital setting: 0.01 Hz Analog setting: Maximum frequency x 0.1%		
	Output frequency accuracy	Digital setting: Maximum frequency x ±0.01% Analog setting: Maximum frequency x ±0.01%		
	Control Mode	Sensorless vector control (SVC), feedback vector control (FVC), and voltage/frequency (V/f) control		
	Starting torque	0.5 Hz/180% (SVC); 0 Hz/200% (FVC)		
	Speed range	1:100 (SVC)	1:1000 (FVC)	1:50 (V/f)
	Speed stability accuracy	±0.5% (SVC)	±0.05% (FVC)	-
	Overload capacity	60s for 150% rated current; 2s for 200% rated current, and 10s for slip detection overload time		
	Motor auto-tuning	With-load auto-tuning, no-load auto-tuning		
	Acceleration/ Deceleration curve	Linear or S-curve acceleration/deceleration; four groups of acceleration/deceleration time and four groups of S-curve settings; multiple combinations available		
	Inspection control	Can be assigned through any multi-speed input		
	Multi-speed operation	Supports up to 8-speed operation		
	Automatic voltage regulation (AVR)	Automatically maintains constant output voltage when the grid voltage varies		
Display and operation	LED display	Can show frequency reference, output frequency, output voltage, output current, and other parameters		
	Parameter backup	Allows quick parameter copy using the LED operating panel		
	Protection functions	40 protection features including short circuit detection at power-on, input/output phase loss protection, overcurrent protection, overvoltage protection, undervoltage protection, and so on		
	Key locking and function selection	The function can be used to lock the keys partially or completely and limit the availability of some keys to prevent accidental operation		

Item	Specifications	
Customized functions	Security check of peripheral devices after power-on	Safety inspection of peripheral devices, such as grounding and short circuit, after power-on
	Emergency Operation at Power Failure	Easy and convenient emergency evacuation solutions
	Overspeed protection	Built-in elevator overspeed protection features; multiple protective actions optional
	Speed deviation judgment	Built-in speed deviation judgment feature to detect potential risks in time
	Forced speed change feature	Forced speed change feature to prevent elevator top-hitting and bottom-clashing
	Direct travel ride	No-creeping running with the direct travel ride command
	Motor temperature detection	Monitor motor temperature, preventing motor overheat
	Startup compensation	Three starting torque compensation modes: analog, digital and no-load-cell
	QUICK key	User-defined shortcut menu
	Timing control	Easy to implement time-based control functions
I/O characteristics	Operation command channel	Operating panel setting, control terminal setting
	Frequency sources	4 frequency sources available including digital setting, multi-speed setting, analog voltage 1, and analog voltage 2
	Input terminal	• 10 digital input terminals, one of which can be used for high-speed pulse input; compatible with active PNP or NPN input types • 2 analog input terminals: one for voltage input only, the other configurable for voltage or current input
	Output terminal	• 3 digital output terminals • 2 relay output terminals • 1 analog output terminal, selectable as 0 mA/4 mA to 20 mA or 0 V/2 V to 10 V, capable of output of physical quantities such as frequency reference, output frequency, and so on

Item	Specifications	
Environment	Altitude	Up to 1000 m and derate the current by 1% for every additional 100 m. The maximum operating altitude is 3000 m
	Ambient temperature	-20℃ to +70℃ Derate above 40℃: derate the rated current by 1.5% for each 1℃ higher; lifetime decreases above 55℃: for every 10℃ increase in temperature, lifetime is halved
	Relative humidity	Less than 95% RH (non-condensing)
	Vibration	Below 5.9 m/s^2 (0.6 g)
	Storage temperature	-40℃ to +85℃, air temperature change less than 1℃/min

2.5 Electrical Specifications

Table 2–5 Main technical data of ME320LN^{new}

ME320LN^{new} model	Input voltage	Power capacity (kVA)	Input current (A)	Output current (A)	Applicable motor (kW)
ME320LN-4002-SA	Three-phase 380 V Range: –15% to +20%	4.0	6.5	5.1	2.2
ME320LN-4003-SA		8.0	10.5	9.0	3.7
ME320LN-4005-SA		11.5	14.8	13.0	5.5
ME320LN-4007-SA		15.0	20.5	18.0	7.5
ME320LN-4011-SA		22.0	29.0	27.0	11.0
ME320LN-4015-SA		29.7	36.0	33.0	15.0
ME320LN-4018-SA		37.6	41.0	39.0	18.5
ME320LN-4022-SA		45.0	49.5	48.0	22.0
ME320LN-4030-SA		53.0	62.0	60.0	30.0
ME320LN-4037-SA		40.8	77.0	75.0	37.0
ME320LN-4045-SA		52.0	93.0	91.0	45.0
ME320LN-4055-SA		62.5	113.0	112.0	55.0
ME320LN-4075-SA		83.0	157.0	150.0	75.0
ME320LN-4110-SA		120.0	214.0	210.0	110.0
220-ME320LN-4090-SA	Three-phase 220 V	97.5	180.0	176.0	90.0

2.6 List of Options

Table 2–6 Options of the ME320LN^{new} AC drive

Name	Model	Function	Note
External braking unit	MDBUN	The external braking unit is used for 37 kW and above models.	For details, see *"2.7 Selection of Braking Components" on page 33*

Name	Model	Function	Note
PG card	MCTC-PG-A4	Increment encoder interface card and frequency-division output card	Provides 15 V power supply and use with AB type incremental encoder (asynchronous motor) with functions of frequency division, adaptive and non-adaptive filtering, fixed interlock and automatic interlock
	MCTC-PG-A5	Increment encoder interface card and frequency-division output card	Use with AB type incremental encoder (asynchronous motor) with functions of frequency division, adaptive and non-adaptive filtering, fixed interlock and automatic interlock
	MCTC-PG-C2	Sin/Cos ERN1387 encoder interface card and frequency-division output card	Provides 5 V power supply, frequency division 1
	MCTC-PG-C3	Sin/Cos ERN1387 encoder interface card and frequency-division output card	Provides 5 V power supply, frequency-division differential output
	MCTC-PG-C5	Sin/Cos ERN1387 encoder interface card and frequency-division output card	Provides 5 V power supply, frequency division 1 (C2-J2 interface)/frequency-division differential output (J2 interface)
	MCTC-PG-G10	AB&ABZ encoder interface card and frequency-division output card	Provides 5 V/12 V/15 V/24 V power supply, frequency-division differential output/open collector output, frequency dividers of 1, 2, 4, 8, 16, 32, 64, and 128 supported
	MCTC-PG-G20	ERN1387 encoder and Weton sin/cos encoder interface card and frequency-division output card	Provides 5 V/12 V/15 V/24 V power supply, frequency-division differential output/open collector output, frequency dividers of 1, 2, 4, 8, 16, 32, 64, and 128 supported
	MD32PG5	Absolute encoder interface card and frequency-division output card	Frequency-division by 1 (24V、COM、OUT-A、OUT-B)
	MD32PG6	Absolute encoder interface card and frequency-division output card	Frequency-division by 1 (24V、COM、OUT-A、OUT-B)

Name	Model	Function	Note
External LED operating panel	MDKE	External LED display and operating panel	Uses RJ45 interface, suitable for long-distance applications
	MDKE6	External LED display and operating panel with parameter backup function	
Extension cable	MDCAB	Standard 8-core network cable	Standard length: 3 m

Note

If any option is needed, specify it in your order.

2.7 Selection of Braking Components

For models of 75 kW and below, this AC drive has a built-in braking unit and you only need to connect an external braking resistor. The models above 75 kW require the external braking unit and braking resistor.

Table 2–7 ME320LN^{new} AC drive braking components

Drive model	Applicable motor (kW)	Max. resistance (Ω)	Min. resistance (Ω)	Power (W)	Braking unit
ME320LN-4002-SA	2.2	290	230	600	Built-in as standard
ME320LN-4003-SA	3.7	170	135	1100	
ME320LN-4005-SA	5.5	115	90	1600	
ME320LN-4007-SA	7.5	85	65	2500	
ME320LN-4011-SA	11	55	43	3500	
ME320LN-4015-SA	15	43	35	4500	
ME320LN-4018-SA	18.5	34.0	25	5500	
ME320LN-4022-SA	22	24	22	6500	
ME320LN-4030-SA	30	20	16	9000	
ME320LN-4037-SA	37	16.0	13	11000	
ME320LN-4045-SA	45	14.0	11	13500	
ME320LN-4055-SA	55	12.0	10	16500	
ME320LN-4075-SA	75	8.0	13 x 2	12000 x 2	
220-ME320LN-4090-SA	90	7.0	13 x 2	13500 x 2	MDBUN-60-T x 2
ME320LN-4110-SA	110	12 x 2	9 x 2	18000 x 2	MDBUN-90-T x 2

3 Mechanical Installation

3.1 Installation Environment Requirements

Table 3–1 Installation environment requirements

Item	Requirement
Ambient temperature	The ambient temperature greatly affects the service life of the drive. The operating ambient temperature of the drive cannot exceed the allowable temperature range (-10°C to +50°C).
Vibration and shock	Avoid excessive vibration (Vibration ≤ 0.6 g). Keep the drive away from devices such as a punch press.
Heat dissipation and ventilation	When installing the AC drive, secure it vertically to a flame-retardant surface using screws, and ensure sufficient surrounding space for heat dissipation.
Installation site	Free from direct sunlight, moisture and water drips. Free from corrosive, inflammable, or explosive gases. Free from greasy dirt, dust, and metal dust.

3.2 Mounting Clearance Requirements

The clearance that needs to be reserved varies with the power rating of the ME320LN^{new} series AC drive, as shown in *"Figure 3-1 Mounting clearances" on page 36*.

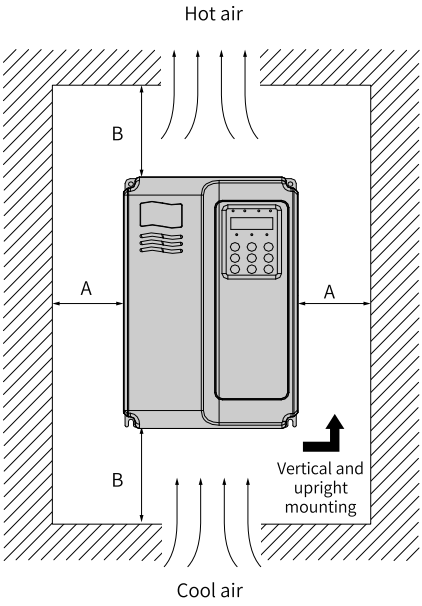


Figure 3-1 Mounting clearances

Power rating	Dimensions	
15 kW and below	A ≥ 10 mm	B ≥ 100 mm
18.5 kW to 37 kW	A ≥ 50 mm	B ≥ 200 mm
45 kW to 110 kW	A ≥ 50 mm	B ≥ 300 mm

3.3 Installation Instructions

The ME320LN^{new} series AC drives, which are divided into plastic structure and sheet metal structure based on different power ratings, support backplate mounting and through-hole mounting to fit different application conditions.

Backplate Mounting of Models 15 kW and Below in Plastic Structure

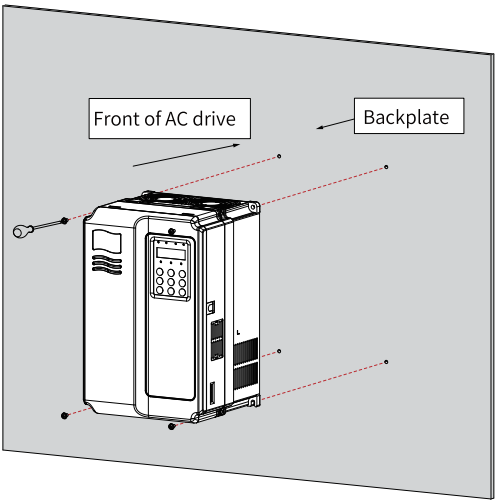


Figure 3-2 Backplate mounting of models 15 kW and below in plastic structure

Embedded Mounting of Models 15 kW and Below in Plastic Structure

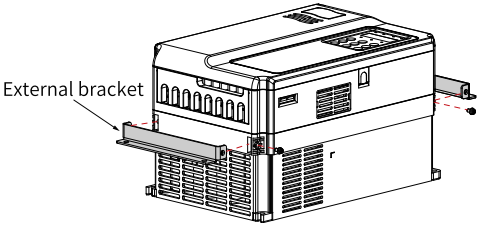


Figure 3-3 Bracket installation of models 15 kW and below in plastic structure

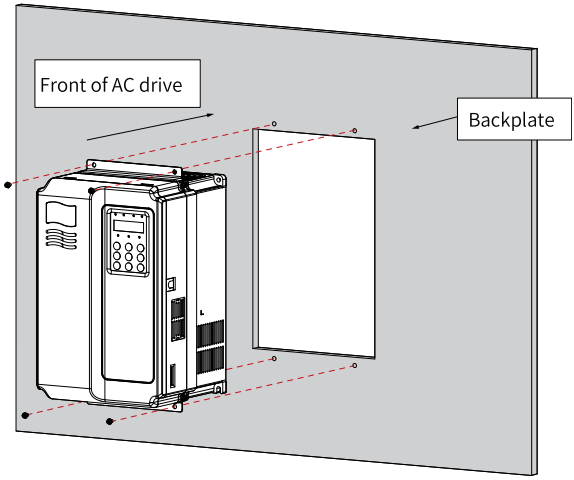


Figure 3-4 Embedded mounting of models 15 kW and below in plastic structure

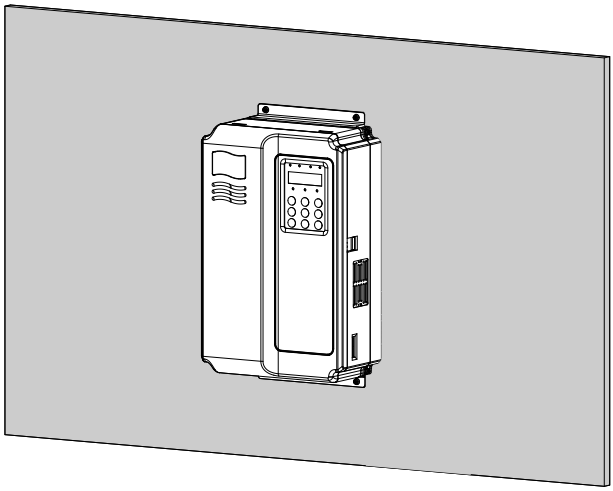


Figure 3-5 Illustration of embedded mounting of models 15 kW and below in plastic structure

Backplate Mounting of Models from 18.5 kW to 37 kW in Plastic Structure

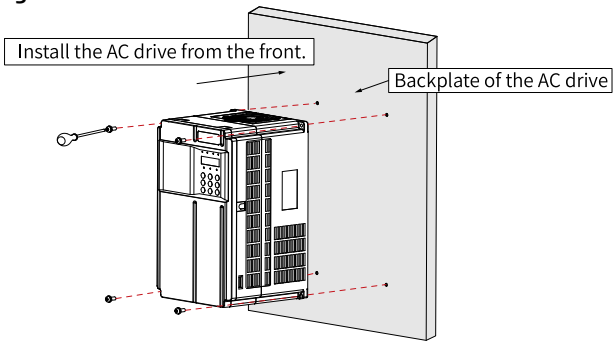


Figure 3-6 Backplate mounting of models from 18.5 kW to 37 kW in plastic structure

Embedded Mounting of Models from 18.5 kW to 37 kW in Plastic Structure

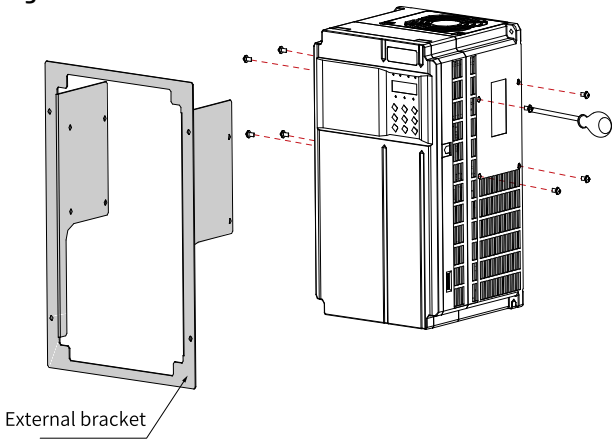


Figure 3-7 Bracket installation of models from 18.5 kW to 37 kW in plastic structure

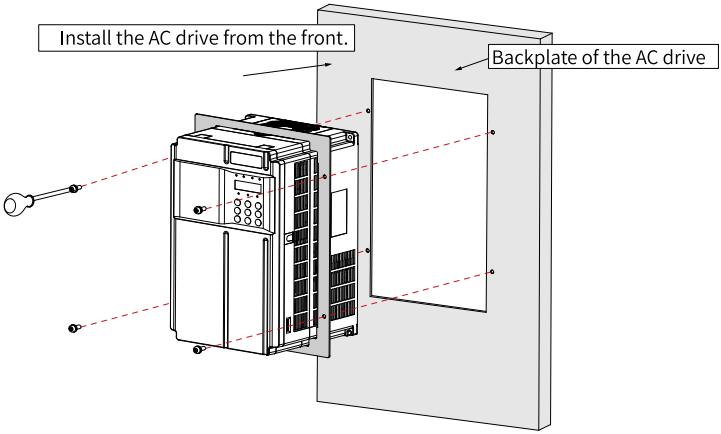


Figure 3-8 Embedded mounting of models from 18.5 kW to 37 kW in plastic structure

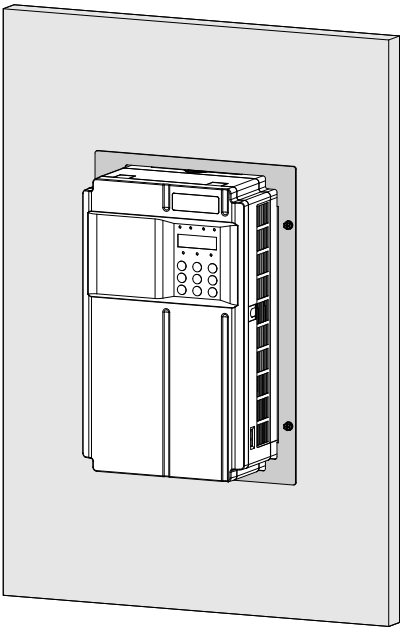


Figure 3-9 Illustration of embedded mounting of models from 18.5 kW to 37 kW in plastic structure

Backplate Mounting of Drive Models in Sheet Metal Structure

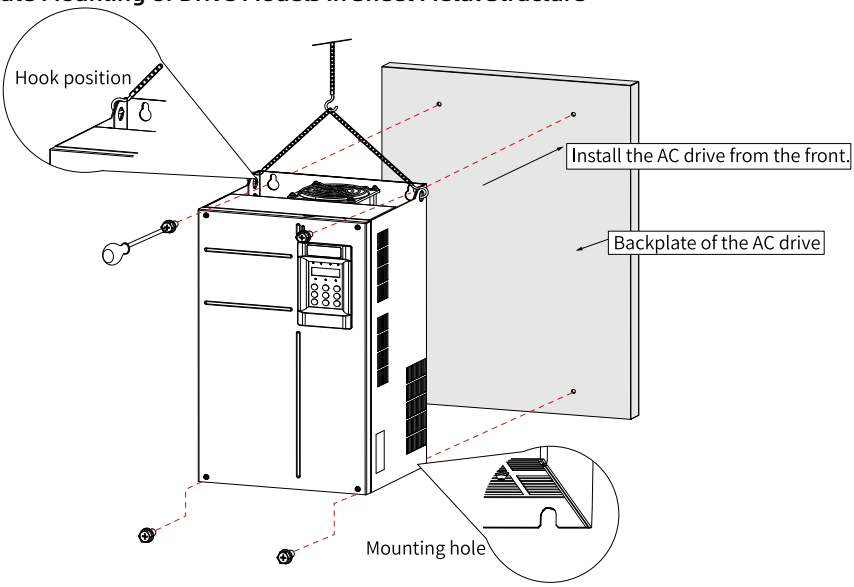


Figure 3-10 Backplate mounting of drive models in sheet metal structure

Embedded Mounting of Drive Models in Sheet Metal Structure

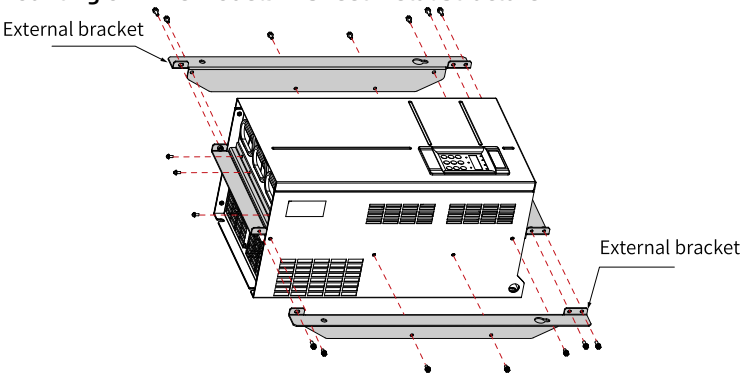


Figure 3-11 Bracket installation of drive models in sheet metal structure

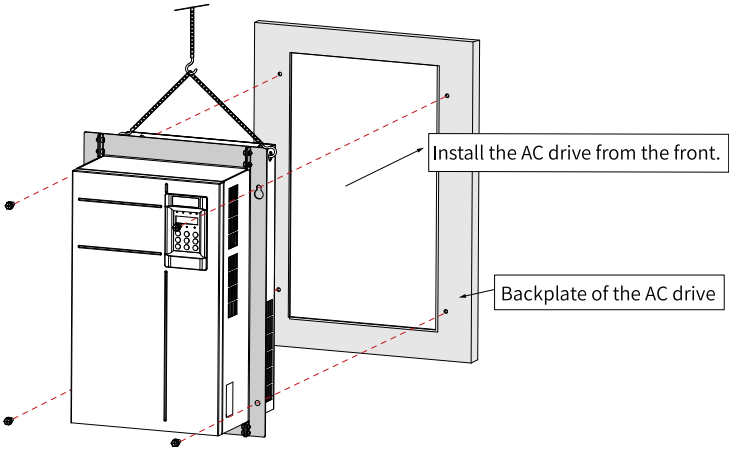


Figure 3-12 Embedded mounting of drive models in sheet metal structure

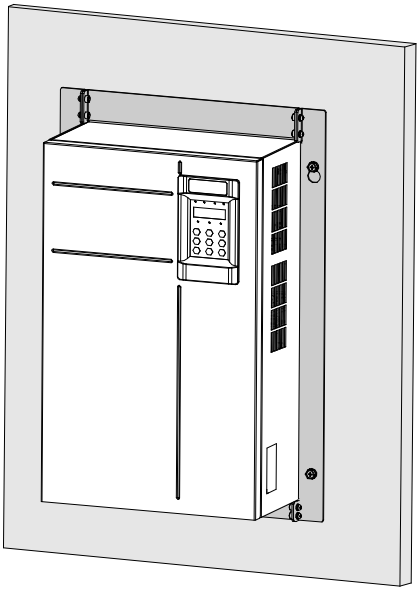


Figure 3-13 Illustration of embedded mounting of drive models in sheet metal structure

Mechanical Installation Precautions

Pay attention to the following points when installing the AC drive.

- Ensure that the installation space adheres to the specifications provided in *"Figure 3-1 Mounting clearances" on page 36*. This guarantees that there is sufficient space

around the drive for adequate heat dissipation. Also, consider the heat dissipation requirements of other components within the enclosure.

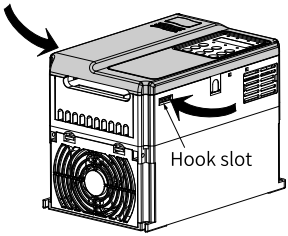
- Install the drive vertically upward to facilitate heat dissipation. Avoid installing the drive upside down.
- If multiple drives are installed in one cabinet, arrange them side by side. In cases where they need to be stacked vertically, install the air guide plate.
- The backplate used for mounting should be made from flame-retardant material.
- In scenarios with heavy metal powder, install the heatsink outside the cabinet, and ensure that the room inside the fully-sealed cabinet is as large as possible to allow for effective heat dissipation.

3.4 Cover Removal and Installation

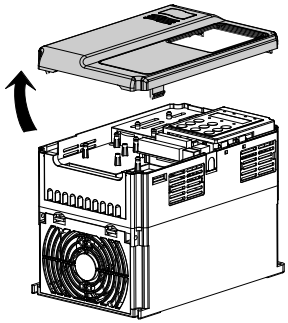
You need to remove the cover of the AC drive for wiring of the main circuit and control circuit.

To remove the cover of the drive in plastic structure, use a tool to press inward on the latch hooks of the lower cover to release and disengage them.

1. Press the hook slots symmetrically on both sides towards the inside to disengage the hooks from the slots.

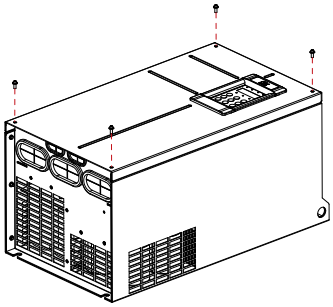


2. Press along the edges of the cover and lift upward.

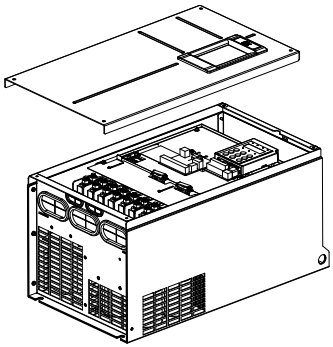


For metal sheet structure, remove the lower cover by using a tool to loosen the screws on the cover.

1. Remove the four screws.



2. Lift the lower edge of the cover and slide it downward to detach.



CAUTION

Be careful when removing the cover. Falling off of the cover may cause equipment damage or personal injury.

4 Electrical Installation

4.1 Peripheral Electrical Component Selection

Table 4–1 Selection of peripheral electrical components of the ME320LN^{new} AC drive

Drive model	Air switch (MCCB) (A)	Contactor (A)	Main circuit cable on input side (mm^2)	Main circuit cable on output side (mm^2)	Control circuit cable (mm^2)	Grounding cable **(mm^2)**
ME320LN-4002-SA	10	9	0.75	0.75	0.75	0.75
ME320LN-4003-SA	16	12	2.5	2.5	0.75	2.5
ME320LN-4005-SA	25	18	2.5	2.5	0.75	2.5
ME320LN-4007-SA	32	25	2.5	2.5	0.75	2.5
ME320LN-4011-SA	40	32	4	4	0.75	4
ME320LN-4015-SA	50	38	6	6	0.75	6
ME320LN-4018-SA	63	40	10	10	0.75	10
ME320LN-4022-SA	80	50	10	10	0.75	10
ME320LN-4030-SA	100	65	16	16	0.75	16
ME320LN-4037-SA	100	80	25	25	0.75	16
ME320LN-4045-SA	160	95	35	35	0.75	16
ME320LN-4055-SA	160	115	50	50	0.75	25
ME320LN-4075-SA	225	170	70 or 2 x 25	70 or 2 x 25	0.75	35 or 25
220-ME320LN-4090-SA	250	205	95 or 2 x 35	95 or 2 x 35	0.75	50 or 35
ME320LN-4110-SA	315	245	120 or 2 x 50	120 or 2 x 50	0.75	70 or 50

4.2 Peripheral Electrical Component Description

Table 4–2 Peripheral electrical components of the ME320LN^{new} AC drive

Name	Mounting position	Function
Air switch	Power input side	Cuts off the power supply of the AC drive and provide short-circuit protection. It must be used.
Contactor	Between the air switch and the AC drive input side	Applies/Cuts off the power supply of the AC drive. Do not start and stop the AC drive frequently by switching the contactor on and off nor use it to directly start the AC drive.
AC input reactor	AC drive input side	• Improves the power factor of the input side. • Eliminates the higher harmonics on the input side to provide effective protection on the rectifier bridge; • Eliminates input current unbalance caused by of inter-phase unbalance of the power supply. This device is installed when the DC input reactor cannot meet the requirements.

Name	Mounting position	Function
DC reactor	Standard configuration for ME320LN^{new} models from 7.5 kW to 45 kW	• Improves the power factor of the input side. • Eliminates impact on the AC drive made by harmonics on the input side, to provide effective protection on the rectifier bridge. • Reduces the input current unbalance due to unbalance between the power phases, although its effectiveness is less than that of an AC input reactor. DC input reactor features small size and does not cause voltage dip, and is therefore recommended. At Inovance, the DC input reactor is the standard configuration.
AC output Reactor	Between output side of the drive side and the motor (close to the drive)	Harmonics are present in the output side of the AC drive. If the motor is routed far away from the servo drive, the following two issues will occur due to large distributed capacitance in the motor circuit and certain harmonics in the servo drive that may generate resonance in the circuit: • Degrades the motor insulation performance and damages the motor in the long run. • Generates large leakage current and causes frequent AC drive protection trips. When the distance between the AC drive and the motor exceeds 100 m, installing an AC output reactor is recommended.

4.3 Electrical Wiring

Note

- Ensure that the power switch is in the OFF state before wiring operations. Failure to comply may result in electric shock.
- Wiring can be performed only by qualified personnel. Failure to comply may result in equipment damage or personal injury.
- The drive must be grounded reliably. Failure to comply may result in electric shock or fire.
- Never connect the braking resistor to the DC bus terminals (+), (-). Otherwise, it may result in severe accidents.

CAUTION

- Ensure that the input power supply complies with the supplied power source. Otherwise, the AC drive may be damaged!
- Ensure the connected motor is compatible with the rated motor specifications. Otherwise, motor damage or AC drive protection may occur!
- Never connect the power cables to the output terminals (U, V, W) of the AC drive, as this will damage the drive!

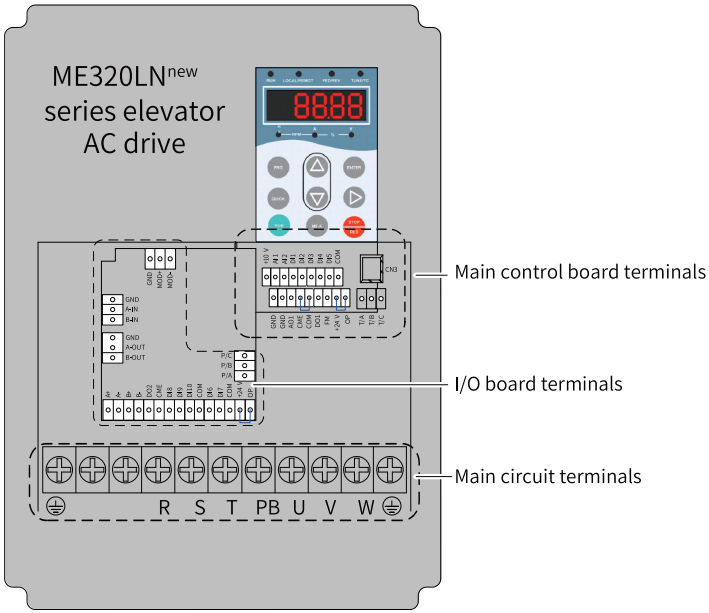


Figure 4-1 Layout of the ME320LN^{new} AC drive terminals

4.3.1 Main Circuit Terminals and Wiring

Main Circuit Terminals

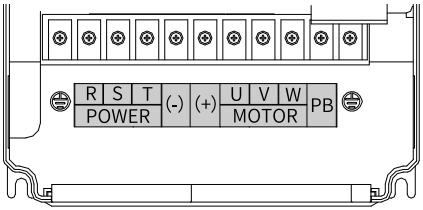


Figure 4-2 Terminal layout of the main circuit (2.2 kW to 5.5 kW and below)

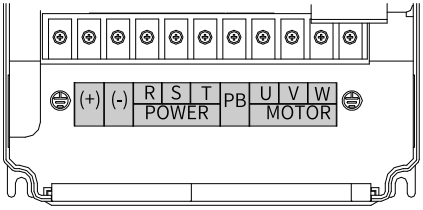


Figure 4-3 Terminal layout of the main circuit (7.5 kW to 15 kW and below)

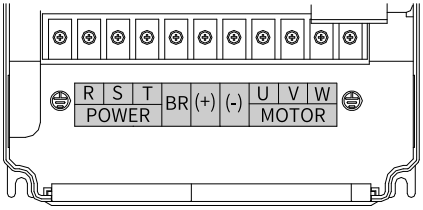


Figure 4-4 Terminal layout of the main circuit (18.5 kW to 90 kW)

Table 4–3 Main circuit terminal function description

Symbol	Name	Description
R, S, T	Three-phase power input terminals	Three-phase 380 VAC power input terminals
(+), (-)	Positive and negative terminals of the DC bus	Common DC bus input points, used for models 37 kW and above
(+), PB	Terminals for connecting braking resistor	Connected to the braking resistor for drives of 37 kW and below.
U, V, W	AC drive output terminals	Connect to a three-phase motor
⏚	Grounding terminal	Grounding terminal

Wiring Methods of the Main Circuit

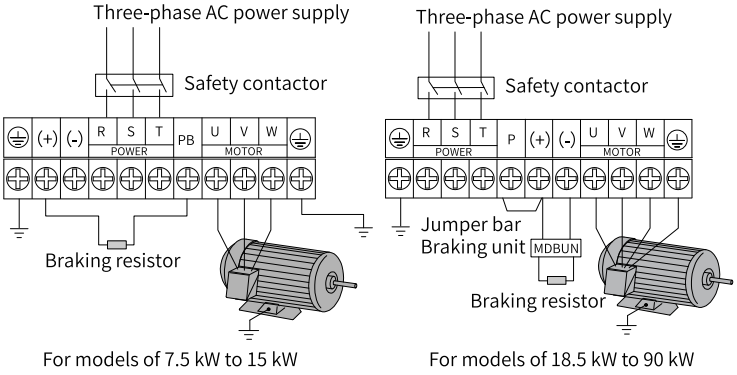


Figure 4-5 Main circuit wiring

Cautions for Cabling

- DC bus (+), (-) terminals

CAUTION

Terminals (+) and (-) of DC bus have residual voltage after power-off. Before touching the terminals, wait until the CHARGE indicator becomes OFF and ensure that the voltage measured with a multimeter is smaller than 36 V.

To dissipate regenerative energy during braking, the ME320LN^{new} AC drive with a power rating of above 75 kW be connected to an external braking unit through the DC bus (+) and (-) terminals. The braking resistor must then be connected to terminals P and PB on the braking unit. Ensure correct polarity of (+) and (-); reversing the polarity may damage the AC drive or even cause fire. The wiring length between the braking unit and the DC bus terminals (+), (-) must not exceed 5 m. The wiring length between the braking unit and braking resistor must not exceed 10 m. Use twisted pair cables or closely-paired cables for parallel connection.

Do not connect the braking resistor directly to the DC bus terminals, as this may damage the AC drive or cause fire.

- Terminals (+) and PB for braking resistor
  The ME320LN^{new} AC drive with power ratings of 75kW and below has a built-in braking unit. To dissipate regenerative braking energy, a braking resistor must be connected to the (+) and PB terminals.
  - For the selection of the braking resistor, see *"Table 2-7 " on page 34*.

- The wiring length to the brake resistor should be less than 5 m.
- The temperature of the braking resistor increases due to energy release. Protection and heat dissipation measures are required.

- Drive output terminals U, V, W
  - The terminals are used to connect the three-phase motor. When the motor rotating direction is reverse to the required direction, exchange any two of the UVW cables.
  - Do not connect a capacitor or surge absorber to the output side of the AC drive. Otherwise, it may cause frequent AC drive faults or even damage the AC drive.
  - The output must not be short-circuited or grounded.
  - Put the UVW cables through the grounded metal pipes and separate these cables from the signal cables or lay them vertical to the signal cables.
  - If the motor cable is too long, electrical resonance will be generated due to the impact of distributed capacitance. This will damage the motor insulation or generate higher leakage current, causing the AC drive to trip in overcurrent protection. Cable length should generally not exceed 100 m. For lengths exceeding this, it is recommended to install an AC output reactor.
- Grounding terminal
  The AC drive grounding terminal must be properly grounded. The grounding cable should be thick and short. It is recommended to use a dedicated yellow-green stranded copper wire of 4mm² or larger, with a grounding resistance of no more than 5 Ω. A dedicated grounding electrode must be used. The grounding electrode and neutral wire don't share a terminal.

4.3.2 MCB Terminals and Wiring

Terminal Function

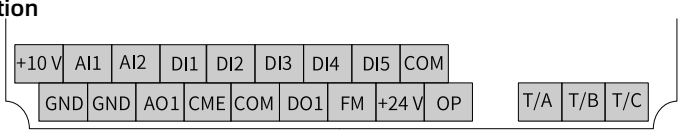


Figure 4-6 Layout of MCB terminals

Table 4–4 Function description of control terminals

Type	Symbol	Name	Function
Power supply	+10V-GND	External +10V power supply	Used to provide +10 V power supply to an external unit with the maximum output current of 10 mA. It is generally used to power up an external potentiometer with resistance ranging from 1 kΩ to 5 kΩ.
	+24V-COM	External +24 V power supply	The terminal is used to provide +24 V power supply to external devices. Generally, it is used to power the DIs and external sensor. The maximum output current is 200 mA.
	OP	Input terminal for external power supply	It is connected to +24V by default. When using external signals to drive DI1 to DI5, OP must be disconnected from the +24V terminal and then connected to an external power source.
Analog input (AI)	AI1-GND	Analog input terminal 1	Input voltage range: 0 VDC to 10 VDC Input impedance: 100 kΩ
	AI2-GND	Analog input terminal 2	• Input range: 0 VDC to 10 VDC/4 mA to 20 mA (determined by jumper J3 on the control board) • Input impedance: 100 kΩ for voltage input or 500 Ω for current input
Digital input terminal	DI1-COM	Digital input 1	• Photocoupler isolation; compatible with dual-polarity input • Input impedance: 3.3 kW • Voltage range for level input: 9 V to 30 V
	DI2-COM	Digital input 2	
	DI3-COM	Digital input 3	
	DI4-COM	Digital input 4	
	DI5-COM	Digital input 5 (High-speed pulse)	Besides features of DI1 to DI4, it can also be used for high-speed pulse input.
Analog output (AO)	AO1-GND	Analog output 1	Voltage or current output, determined by jumper J4 on the control board Output voltage range: 0 V to 10 V Output current range: 0 mA to 2 mA
Digital output (DO)	DO1-CME	Digital output 1	• Optocoupler isolation; bi-polar open collector output • Output voltage range: 0 V to 24 V • Output current range: 0 mA to 50 mA Note that CME and COM are internally insulated, but are shorted externally by a jumper. In this case, DO1 is driven by +24 V by default. Remove the jumper link if you need to apply external power to DO1.
	FM-COM	High-speed pulse output	

Type	Symbol	Name	Function
Relay output	T/A-T/B	NC terminal	Driving capacity of the contact: AC: 250 V, 3 A, and Cosϕ = 0.4 DC: 30 V, 1 A
	T/A-T/C	NO terminal	
Auxiliary interfaces	J1	Function expansion card interface	28-core terminal, industry-specific card interface
	CN3	External operating panel interface	External operating panel and parameter backup unit interface

MCB Terminal Wiring

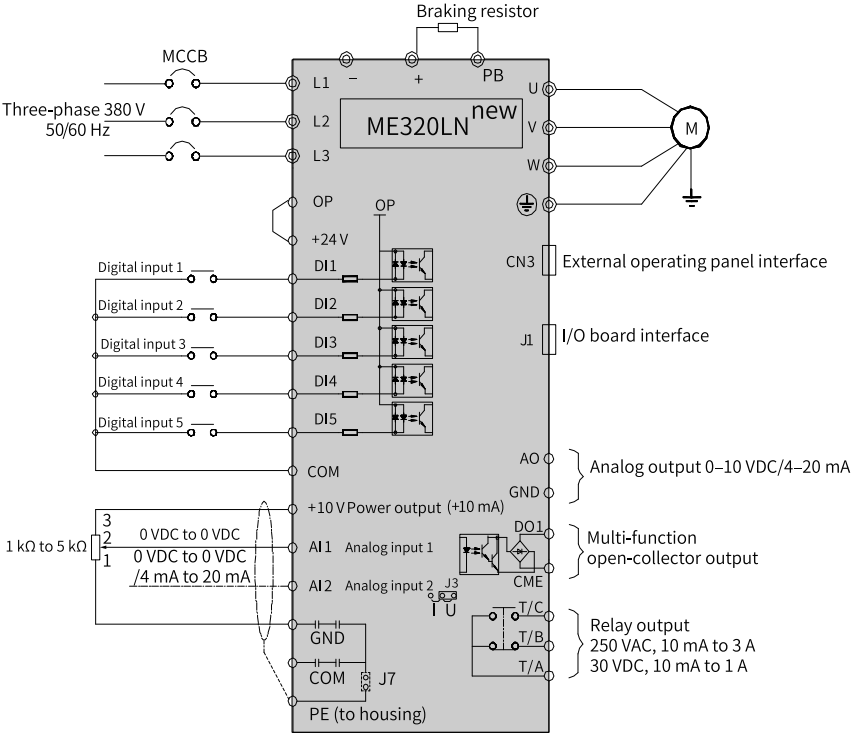


Figure 4-7 MCB terminal wiring

Note

All ME320LN^{new} series AC drives have identical MCB terminal wiring configurations. The symbol ◎ indicates main circuit terminals, and ○ indicates MCB terminals.

Notes on wiring of signal input terminals:

- AI terminals:

Weak analog voltage signals are susceptible to external interference. Therefore, a shielded cable is required, and the wiring distance must be as short as possible (not longer than 20 m), as shown in *"Figure 4-8 " on page 53* . In scenarios where analog signals experience severe external interference, install a filter capacitor or a ferrite core on the analog signal source side, as shown in *"Figure 4-9 " on page 53* .

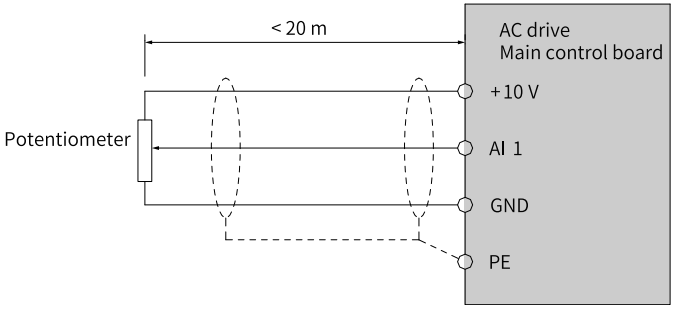


Figure 4-8 Wiring of AI terminals

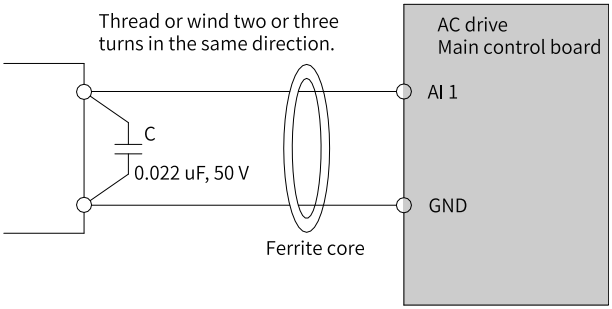


Figure 4-9 AI wiring when analog signals are severely interfered

- DI terminal
  Usually, a shielded cable is required, which should be as short as possible, not longer than 20 m. If an active driving mode is adopted, necessary filtering measures should be taken for the crosstalk of power sources. The contactor control is recommended.

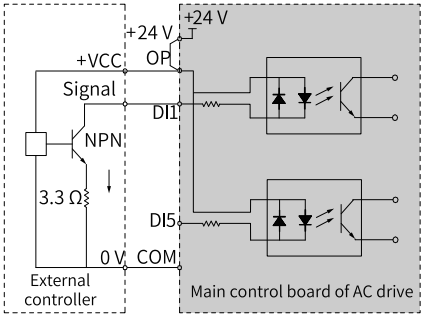


Figure 4-10 Sink wiring mode

This is the most commonly used wiring mode. If an external power supply is used, the jumper bar between +24V and OP must be removed. The positive electrode of the external 24 V power supply must be connected to the OP terminal, and the 0 V of the external power supply connected to the corresponding DI terminal through the AC drive contact.

Note

In the mode, the DIs of different AC drives cannot be connected in parallel. Otherwise, the DI may malfunction. If DIs of different AC drives must be connected in parallel, connect the anode of a diode to the DI in series and the diode needs to satisfy the following requirement: IF > 10 mA and UF < 1 V, as shown in *"Figure 4-11 " on page 54* .

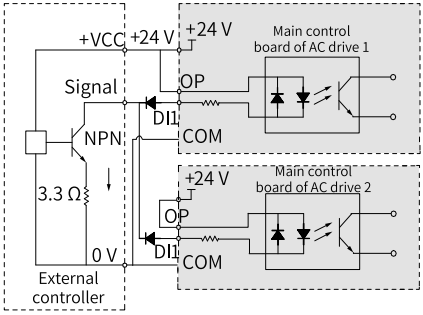


Figure 4-11 Parallel connection of DIs of multiple drives in the sink mode

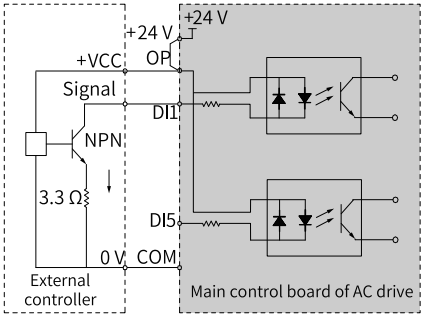


Figure 4-12 Source wiring mode

In such wiring mode, remove jumper between +24V and OP. Connect +24V to the common terminal of the external AC drive and meanwhile connect OP to COM. To use an external power supply, remove the jumper bar between the +24V and the OP terminals, connect the OP terminal of the drive to the 0V terminal of the external power supply, and connect the 24 V positive electrode of the external power supply to the corresponding DI through the external AC drive contact.

Wiring description of control signal output terminals:

- DO terminals
  When the DO needs to drive a relay, connect a snubber diode on both sides of the relay coil. Otherwise, the 24 VDC power supply may be damaged. Ensure that the driving capacity does not exceed 50 mA.

Note

- Do not reverse the polarity of the snubber diode during installation, as shown in the following figure. *"Figure 4-13 " on page 56* shows the details. Otherwise, the 24 VDC power supply will be damaged immediately when the DO terminal generates output.
- The digital output ground CME and digital input ground COM are internally insulated, but are shorted externally by jumper as the factory settings. In this case, DO1 is driven by +24V by default. To drive DO1 by external power supply, remove the jumper between CME and COM.

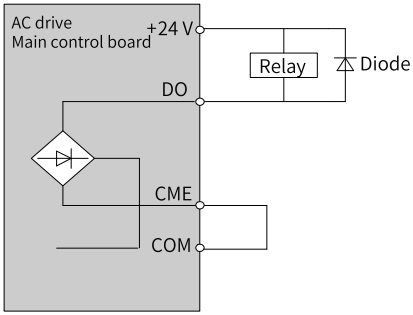


Figure 4-13 Wiring of DO terminals

4.3.3 I/O Expansion Board Terminals and Wiring

I/O Expansion Board Terminals

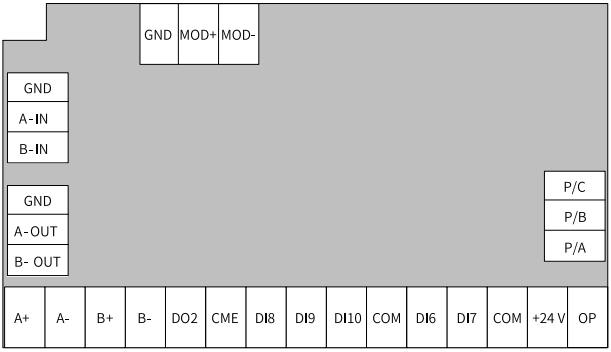


Figure 4-14 Layout of I/O expansion board terminals

Table 4–5 Function description of I/O expansion board terminals

Type	Symbol	Name	Function
Power supply	+24V-COM	External +24 V power supply	The terminal is used to provide +24 V power supply to external devices. Generally, it is used to power the DIs/DOs and external sensor. Max. output current: 200 mA
	OP	External power supply input terminal	It is connected to +24V by default. When DI6 to DI10 are driven by external signals, OP must be disconnected from +24 V and connected to the external power supply.
Digital input	DI6-COM	Digital input 6	• Photocoupler isolation; compatible with dual-polarity input • Input impedance: 3.3 kΩ • Voltage range for level input: 9 V to 30 V
	DI7- COM	Digital input 7	
	DI8- COM	Digital input 8	
	DI9- COM	Digital input 9	
	DI10-COM	Digital input 10	
Digital output	DO2-CME	Digital output 2	Optocoupler isolation; dual-polarity open collector output Output voltage range: 0 V to 24 V Output current range: 0 mA to 50mA Note: Digital output ground CME and digital input ground COM are internally isolated; users must externally short CME and COM during use. When DO2 is to be driven by an external power source, the external shorting between CME and COM must be disconnected.
Relay output	P/A-P/B	NC terminal	Driving capacity of the contact: 250 VAC, 3 A, cosϕ = 0.4 30 VDC, 1 A
	P/A-P/C	NO terminal	
PG card input	A-IN -GND	PG card frequency-division signal A input	• Internally pulled up, can be directly connected to the frequency-division output terminal of the PG card • When using the direct travel ride function, the frequency-division output signal from the PG card must be connected to this terminal
	B-IN -GND	PG card frequency-division signal B input	

Type	Symbol	Name	Function
PG card output	A-OUT -GND	PG card frequency-division signal A output	• Open collector output • When using the direct travel ride function, after the PG card frequency-division output signal is connected to A-IN and B-IN, it is then output from this terminal and provided to the system MCB for use.
	B-OUT -GND	PG card frequency-division signal B output	
	A+ - A-	PG card frequency-division signal A output	• Differential output • When using the direct travel ride function, after the PG card frequency-division output signal is connected to A-IN and B-IN, it is then output from this terminal and provided to the system MCB for use.
	B+ - B-	PG card frequency-division signal B output	
Communication	MOD+	Communication terminal	RS485 communication terminal
	MOD-		

Wiring of I/O expansion board terminals

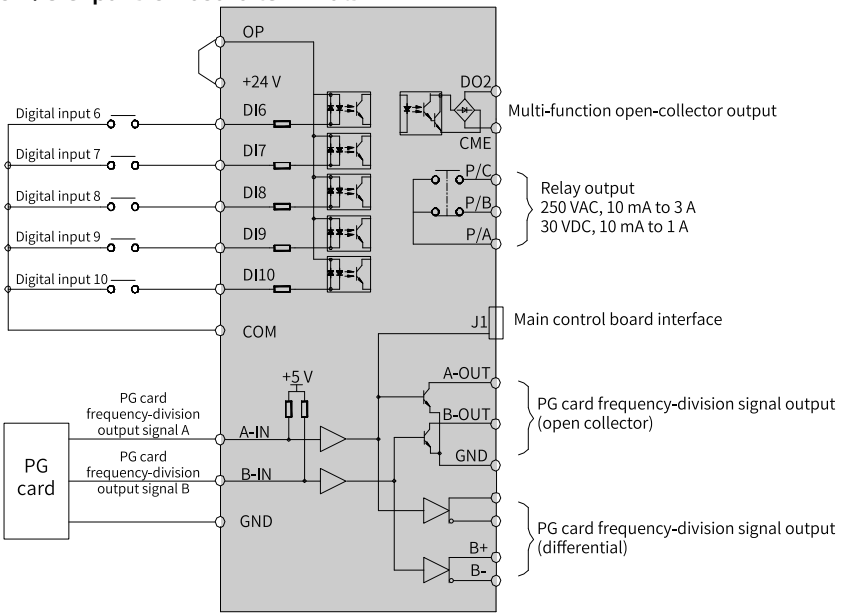


Figure 4-15 Wiring of I/O expansion board terminals

Only when the direct travel ride function is used, the frequency-division output signal from the PG card needs to be connected to the A-IN and B-IN terminals of the I/O

expansion board. At this time, the system control board can choose, as needed, to receive the PG card signal from either the A-OUT, B-OUT terminals (open collector output) or the A+A-, B+B- terminals (differential signal).

4.3.4 PG Card Description and Wiring

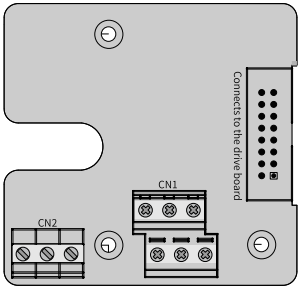
The ME320LN^{new} elevator AC drive is compatible with various encoder interface boards (PG cards). Their models and codes are shown in the following table:

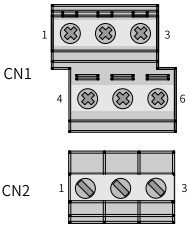
Table 4–6 Applicable PG card models

Code	Model	Applicable encoder type	Applicable drive model
01270054	MCTC-PG-A4	Incremental AB encoder	2.2 kW to 15 kW
01270566	MCTC-PG-A5	Incremental AB encoder	18.5 kW to 110 kW
01013085	MCTC-PG-C2	Sin/Cos encoder	2.2 kW to 15 kW
01038030	MCTC-PG-C3	Sin/Cos encoder	2.2 kW to 15 kW
01270681	MCTC-PG-C5	Sin/Cos encoder	18.5 kW to 110 kW
01275623	MCTC-PG-G10	AB&ABZ encoder	2.2 kW to 15 kW
01275622	MCTC-PG-G20	Absolute encoder Sin/Cos encoder	2.2 kW to 15 kW
01013124	MD32PG5	Absolute encoder	2.2 kW to 15 kW
01270683	MD32PG6	Absolute encoder	18.5 kW to 110 kW

The detailed PG card description is as follows:

MCTC-PG-A4

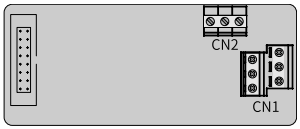


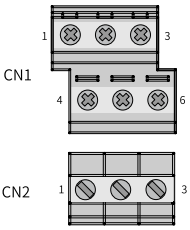


- Use with AB type incremental encoder (asynchronous motor) with functions of frequency division, adaptive and non-adaptive filtering, fixed interlock and automatic interlock
- Interface: Wiring terminal
- Encoder power supply: 15 V/300 mA
- Maximum frequency response: 60 kHz
- Encoder signals: A+/- and B+/-

MCTC-PG-A4 pin assignment of CN1						MCTC-PG-A4 pin assignment of CN2		
1	2	3	4	5	6	1	2	3
PGA	PGB	NC	COM	+15PG	PE	OUT-A	OUT-B	COM

MCTC-PG-A5

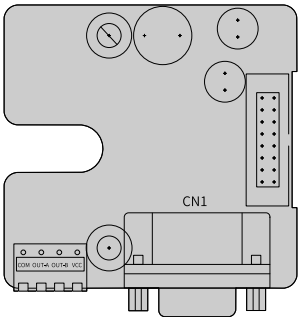


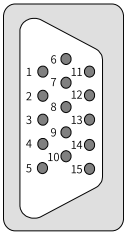


- Use with AB type incremental encoder (asynchronous motor) with functions of frequency division, adaptive and non-adaptive filtering, fixed interlock and automatic interlock
- Interface: Wiring terminal
- Encoder power supply: 15 V/300 mA
- Maximum frequency response: 60 kHz
- Encoder signals: A+/- and B+/-

MCTC-PG-A5 pin assignment of CN1						MCTC-PG-A5 pin assignment of CN2		
1	2	3	4	5	6	1	2	3
PGA	PGB	NC	COM	+15PG	PE	OUT-A	OUT-B	COM

MCTC-PG-C2

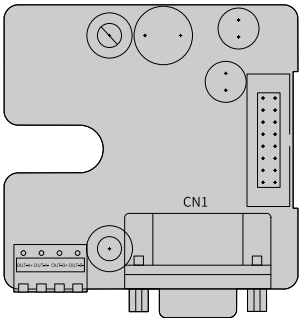


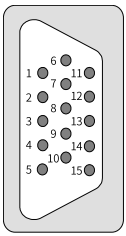


- Use with sin/cos encoder 1387, frequency division 1
- Interface: DB15
- Encoder power supply: 5 V/200 mA
- Maximum frequency response: 50 kHz
- Encoder input signals: A+/-, B+/-, C+/-, D+/-, and Z+/-
- Frequency-division signals (to MCB): VCC, A, B and COM

MCTC-PG-C2 pin assignment of CN1														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B-	NC	Z+	Z-	A+	A-	GND	B+	VCC	C+	C-	D+	D-	NC	NC

MCTC-PG-C3



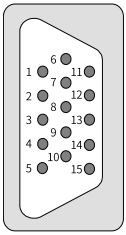


- Use with sin/cos encoder 1387, frequency-division differential output
- Interface: DB15
- Encoder power supply: 5 V/200 mA
- Maximum frequency response: 50 kHz
- Encoder input signals: A+/-, B+/-, C+/-, D+/-, and Z+/-
- Frequency-division signals (to MCB): A+, A-, B+ and B-

MCTC-PG-C3 pin assignment of CN1														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B-	NC	Z+	Z-	A+	A-	GND	B+	VCC	C+	C-	D+	D-	NC	NC

MCTC-PG-C5

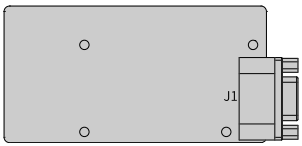


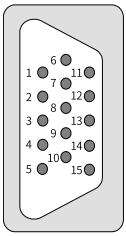


- Use with sin/cos encoder 1387, frequency division 1 (C2-J2 interface)/frequency-division differential output (J2 interface)
- Interface: DB15
- Encoder power supply: 5 V/200 mA
- Maximum frequency response: 50 kHz
- Encoder input signals: A+/-, B+/-, C+/-, D+/-, and Z+/-
- Frequency-division signals (to MCB through C2-J2 interface): VCC, A, B, and GND
- Frequency-division signals (to MCB through J2 interface): A+, A-, B+, and B-

MCTC-PG-C5 pin assignment of CN1														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B-	NC	Z+	Z-	A+	A-	GND	B+	VCC	C+	C-	D+	D-	NC	NC

MCTC-PG-G10





- Use with the AB&ABZ encoder
- Interface: DB15
- Encoder power supply: 5 V/200 mA, 12 V/100 mA, 15 V/100 mA, and 24 V/100 mA
- Maximum frequency response: 100 kHz
- Encoder signals: A+/-, B+/-, and Z+/-
- Frequency division signals: Differential output (A+, A-, B+, B-); OC output (A_OC, b_OC, GND)
- Frequency dividers of 1, 2, 4, 8, 16, 32, 64, and 128 supported

MCTC-PG-G10 pin assignment of J1														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B-	NC	Z+	Z-	A+	A-	GND	B+	VOUT+	C+	NC	NC	NC	24VOUT	NC

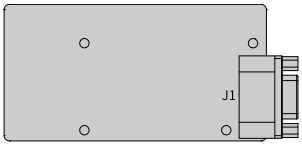
DIP Switch Definition

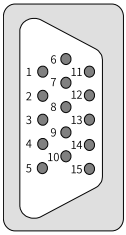
After changing the DIP switch settings on the MCTC-PG-G10, power must be cycled (turned off and on) for the changes to take effect.

Table 4–7 MCTC-PG-G10 frequency divider selection

SW1	SW2	SW3	SW4	Frequency divider
-	ON	ON	ON	1
-	OFF	ON	ON	2
-	ON	OFF	ON	4
-	OFF	OFF	ON	8
-	ON	ON	OFF	16
-	OFF	ON	OFF	32
-	ON	OFF	OFF	64
-	OFF	OFF	OFF	128

MCTC-PG-G20





- Use with ERN1387 and Weton sin/cos encoder
- Interface: DB15
- Encoder power supply: 5 V/200 mA, 12 V/100 mA, 15 V/100 mA, and 24 V/100 mA
- Maximum frequency response: 50 kHz
- Encoder input signals: A+/-, B+/-, C+/-, D+/-, and Z+/-
- Frequency division signals: Differential output (A+, A-, B+, B-); OC output (A_OC, b_OC, GND)
- Frequency dividers of 1, 2, 4, 8, 16, 32, 64, and 128 supported

MCTC-PG-G20 pin assignment of J1														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B-	NC	Z+	Z-	A+	A-	GND	B+	VOUT+	C+	C-	D+	D-	24VOUT	NC

DIP Switch Definition

After changing the DIP switch settings on the MCTC-PG-G20, power must be cycled (turned off and on) for the changes to take effect.

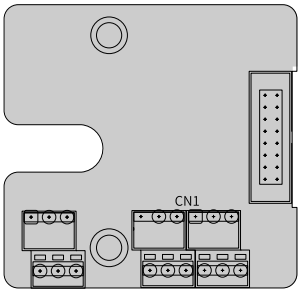
Table 4–8 MCTC-PG-G20: Encoder type

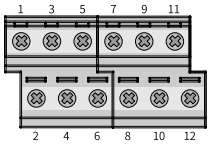
Absolute encoder			Sin/Cos encoder		
DIP switch	Bit	Position	DIP switch	Bit	Position
S1	SW1	ON	S1	SW1	OFF
	SW2	-		SW2	-
	SW3	-		SW3	-
	SW4	-		SW4	-
S2	SW1	ON	S2	SW1	OFF
	SW2	ON		SW2	OFF

Table 4–9 MCTC-PG-G20 frequency divider selection

SW1	SW2	SW3	SW4	Frequency divider
-	ON	ON	ON	1
-	OFF	ON	ON	2
-	ON	OFF	ON	4
-	OFF	OFF	ON	8
-	ON	ON	OFF	16
-	OFF	ON	OFF	32
-	ON	OFF	OFF	64
-	OFF	OFF	OFF	128

MD32PG5

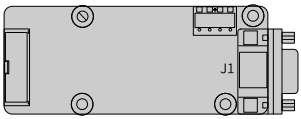


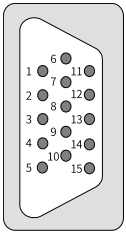


- Use with absolute encoder, frequency-division by 1 (24V、COM、OUT-A、OUT-B)
- Interface: Wiring terminal
- Encoder power supply: 5 V/200 mA
- Maximum frequency response: 50 kHz
- Encoder input signals: A+/-, B+/-, C+/-, and D+/-

MD32PG5 pin assignment of CN1												-
1	2	3	4	5	6	7	8	9	10	11	12	-
D+	D-	C+	C-	M5V	GND	U5V	GND	A+	A-	B+	B-	-

MD32PG56





- Use with absolute encoder, frequency-division by 1 (24V、COM、OUT-A、OUT-B)
- Interface: DB15
- Maximum frequency response: 50 kHz

MD32PG6 pin assignment of J1														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B-	NC	NC	NC	A+	A-	GND	B+	M5V	C+	C-	D+	D-	NC	U5V

Wiring Requirements

For different power ranges of the ME320LN^{new} series, the PG card installation position varies slightly. Identify the correct PG card position during installation by referencing *"Figure 4-16 ME320LN^{new} series PG card installation positions across different power ranges " on page 65*:

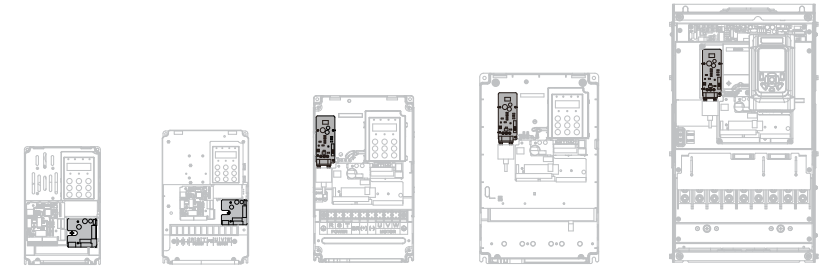


Figure 4-16 ME320LN^{new} series PG card installation positions across different power ranges

For models of 18.5 kW and above, due to structural constraints, note the following when selecting and installing the PG card:

- Models of 18.5 kW and above are compatible with the MCTC-PG-C5, MCTC-PG-A5, and MD32PG6 PG cards. Place orders according to the correct PG card codes listed in *"Table 4-6 Applicable PG card models" on page 59*.
- When ordering the PG card, separately order a 16-pin encoder connection cable (this cable may be assembled onto the unit later).
- During installation, route the PG card connection cable from the left side of the keypad, and install the PG card at the upper left side of the unit.

5 Cable Routing

5.1 Shielded Cable Requirements

The shielded cable must be used to satisfy the EMC requirements of CE marking. Shielded cables are classified into three-conductor cable and four-conductor cable. If conductivity of the cable shield is not sufficient, add an independent PE cable, or use a four-conductor cable, of which one phase conductor is PE cable. *"Figure 5-1 " on page 66* shows the details.

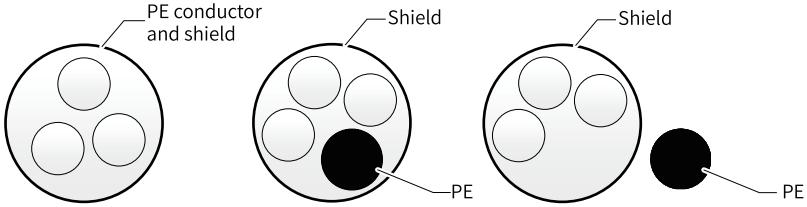


Figure 5-1 Cross section of shielded cables

The motor cable and PE shielded conducting wire (twisted shielded) should be as short as possible to reduce electromagnetic radiation and external stray current and capacitive current of the cable.

To suppress the radio frequency interference effectively, the cable shield uses copper braid as the material. The braiding density should be greater than 90% to enhance the shielding efficiency and conductivity. *"Figure 5-2 " on page 66* shows the details.

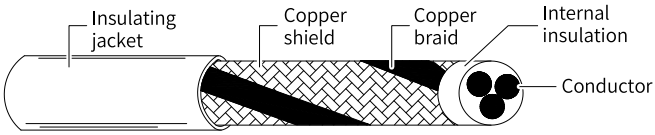


Figure 5-2 Braiding density of the shield

It is recommended that all control cables be shielded. The grounding area of the shielded cable should be as large as possible. A suggested method is to fix the shield on the metal plate using the metal cable clamp so as to achieve good contact, as shown in *"Figure 5-3 " on page 67* .

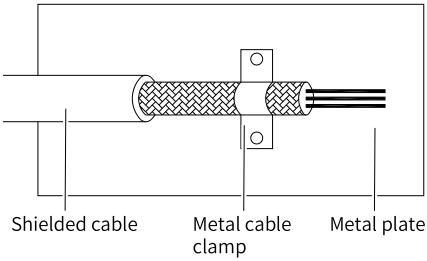


Figure 5-3 Attaching the shield with the metal clamp

"Figure 5-4 " on page 67 shows the grounding method of the shielded cable.

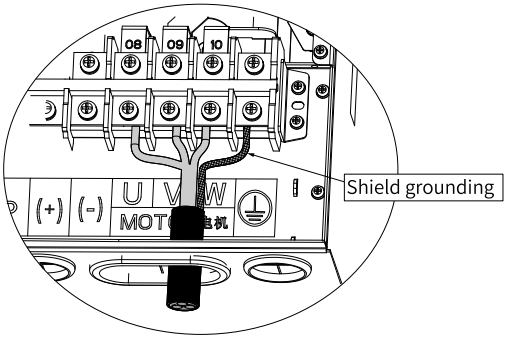


Figure 5-4 Grounding of the shielded cable

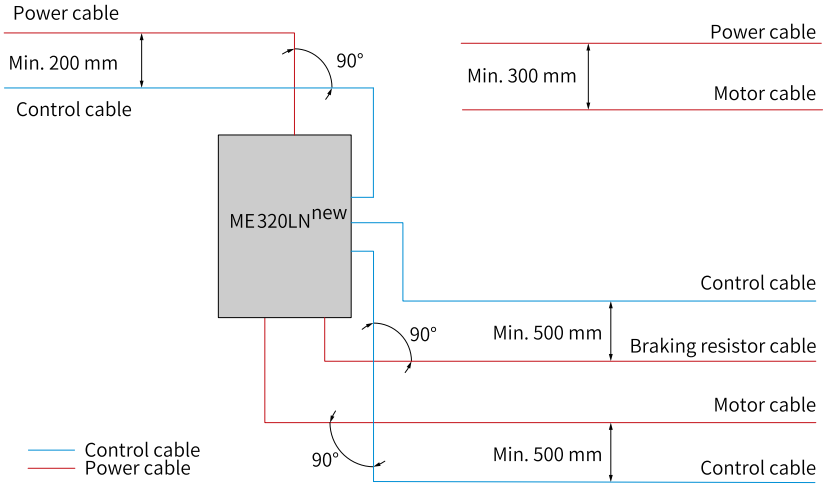
Installation Precautions of the Shielded Cable

- All the shielded cables should use shielded pair cables. Four-conductor cables may also be used for input cables.
- The motor cable and PE shielded conductor (twisted shielded) must be as short as possible to reduce electromagnetic radiation, external stray current, and capacitive current of the cable. For the motor cable longer than 100 m, install an output filter or reactor.
- It is recommended that all control cables be shielded.
- The output power cable of the AC drive should use shielded cable, and the shield must be reliably grounded. For lead cables in exposure to interference, twisted pair shielded control cable should be used and the shield must be reliably grounded.

5.2 Cabling Requirements

- The motor cables must be far away from other cables. Recommended distance is greater than 0.5 m. Motor cables of several drives can be laid in parallel.

- To avoid electromagnetic interference caused by rapid change of the output voltage of the drive, the motor cables and other cables must not be laid side by side for a long distance. It is recommended that motor cables, power input cables and control cables be laid in different cable ducts. The cable duct must be in good connection and well grounded.
- If the control cable must run across the power cable, make sure they are arranged at an angle of close to 90°. Other cables must not run across the drive.
- The power input and output cables of the drive and weak-current signal cables (such as control cable) should be laid vertically (if possible) rather than in parallel.
- The cable ducts must be in good connection between each other and well grounded. Aluminum ducts can be used to improve equipotentiality.
- The filter, drive and motor should be connected to the system (machinery or appliance) properly, with spraying protection at the installation part and conductive metal in full contact.
- The motor must be connected with the system parts as specified. Apply coatings properly and ensure good conductivity.



6 Commissioning and Operation

6.1 Overview

This chapter provides a detailed explanation of the keypad operation and parameter setting for the ME320LN^{new} series AC drive operating panel.

6.1.1 Operating Mode

The command source is the channel of running commands and speed references. Select one from the two command sources.

- Operating panel control: The running commands are given by pressing keys RUN and STOP on the operating panel.
- Terminal control: Running commands and speed references are given by multi-function input terminals.

6.1.2 Control Mode

The ME320LN^{new} AC drive offers three control modes:

- Sensorless vector control (SVC)
- Feedback vector control (FVC)
- V/f control

6.1.3 Operation Mode

Motor auto-tuning mode: The AC drive supports two motor auto-tuning modes: with-load and no-load. For details, see the description of the parameter F1-11.

- Common mode: It refers to the running in operation panel control or analog setting.
- Multi-speed mode: The speed references are given by state combinations of multi-speed terminals.

The AC drive can run in only one mode in a period.

6.1.4 Operation State

The AC drive has four states: stop, programming, running, and fault and alarm states.

- Stop state: After a power cycle or upon completion of run commands, the AC drive stops and remains in a standby state until it receives the next run command. The RUN indicator is off, and the LED display content flashes as a whole; the parameters can be viewed in turn by pressing the >> key.
- Programming state: The AC drive is in the programming state when you view and set parameters on the operating panel.
- Running state: The AC drive is in running state (elevator running). The RUN indicator is on. The LED display content does not flash.

- Fault and alarm state: The AC drive becomes faulty and displays the fault code.

6.2 Operating Panel

The LED operating panel is delivered with the ME320LN^{new} series AC drive as standard. You can modify the parameters, monitor the working status and start or stop the AC drive using the operating panel.

Its appearance and function display are shown in *"Figure 6-1 " on page 70*.

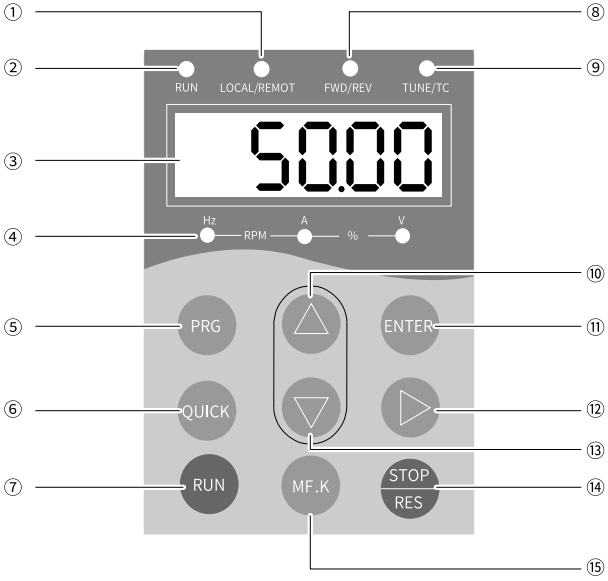


Figure 6-1 Operating panel

Table 6–1 Operating panel layout

No.	Part name	No.	Part name
①	Command source indicator	⑨	Auto-tuning/torque control/fault indicator
②	Running status indicator	⑩	Up key
③	Data display area	⑪	Confirm key
④	Unit indicators	⑫	Shift key
⑤	Programming key	⑬	Down key
⑥	Menu key	⑭	Stop/Reset key
⑦	RUN key	⑮	Multi-function key
⑧	Running direction indicator	-	-

Table 6–2 Keys

Key	Name	Function
PRG	Programming key	Return to the previous menu of level I.
ENTER	Confirm key	Enter the next screen, and confirm the mode, parameters and set values.
△	Up key	Increase the parameter number and setting value.
▽	Down key	Decrease the parameter number and setting value.
▷	Shift key	Shift to the left option for parameter display, parameter number and settings.
RUN	RUN key	In the operating panel control mode, press this key to start the drive.
STOP / RES	Stop/Reset	Stop the running state. Perform a reset operation when it is in the fault state.
MF.K	Multi-function key	Switch functions according to the setting of F7-01.
QUICK	Menu key	Used to switch menu modes according to the setting of FP-03 (One menu mode applies by default).

In the following table,  indicates ON, ● OFF, And  flashing.

Table 6–3 Description of panel indicators

Status		Description
RUN Running status indicator	● RUN	OFF: Stop
	 RUN	ON: Running
LOCAL/REMOT Command source indicator	● LOCAL/REMOT	OFF: Up running
	 LOCAL/REMOT	ON: Down running

Status		Description
FWD/REV Running direction indicator	FWD/REV	OFF: Forward running
	FWD/REV	ON: Reverse running
TUNE/TC Auto-tuning indicator	TUNE/TC	OFF: Not auto-tuning state
	TUNE/TC	ON: Auto-tuning state
Hz - RPM - A - % - V		Unit of frequency: Hz
Hz - RPM - A - % - V		Unit of current: A
Hz - RPM - A - % - V		Unit of voltage: V
Hz - RPM - A - % - V		Unit of motor speed: RPM
Hz - RPM - A - % - V		Percentage: %

The 5-digit LED on the operating panel can display the frequency reference, output frequency, various monitoring data, and fault codes.

Table 6–4 LED display and actual data

LED display	Actual data	LED display	Actual data	LED display	Actual data	LED display	Actual data
0	0	6	6	C	C	N	N
1	1	7	7	c	c	P	P
2	2	8	8	d	D	r	R

LED display	Actual data	LED display	Actual data	LED display	Actual data	LED display	Actual data
3	3	9	9	E	E	r	T
4	4	A	A	F	F	U	U
5	5, S	b	B	L	L	u	u

6.3 Parameter Viewing and Operation

6.3.1 Three-level Menu Operation

Parameters are arranged in three levels to facilitate parameter query and modification.

The three-level menu consists of function parameter groups (Level I menu) → parameters (Level II menu) → parameter setting values (Level III menu). *"Figure 6-2 " on page 73* shows the operation procedure.

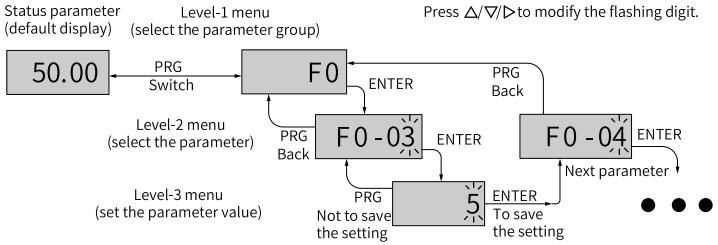


Figure 6-2 Operation procedure of the three-level menu

Notes:

- You can return to Level II menu from Level III menu by pressing PRG or ENTER. The differences between the two are:
  - By pressing ENTER, you will return to Level II menu after saving the set parameter, and move to the next parameter automatically.
  - After you press PRG, the system directly returns to the Level II menu without saving the set parameter and retains on the current parameter.

  Example: Change the value of F0-04 from 50.00 Hz to 15.00 Hz (flashing digit in bold). *"Figure 6-3 " on page 74* shows the details.

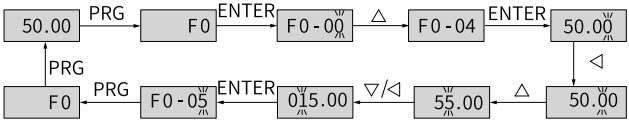


Figure 6-3 Parameter editing

- In the Level III menu, if no digit of the parameter blinks, the parameter cannot be changed. The possible reasons include:
  - This parameter is non-modifiable, such as parameters for actual measured values, operation record data, and so on.
  - This parameter cannot be modified in the running state and can only be changed at stop.

6.3.2 Status Display Parameter Operation

Switching display of status parameters through the shift key:

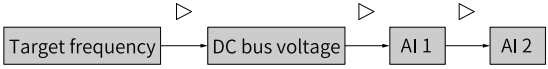


Figure 6-4 Shift between status parameters

In the stop or running state, various parameters can be displayed by the LED segments. You can select the parameters to be displayed by setting F8-01 (parameter display in running state) and F8-02 (parameter display in stop state) parameters, and switch the sequence using to display status parameters in turn in running or stop state.

- In the stop state, a total of 8 parameters can be displayed circularly by pressing the shift key. These are: target linear speed, target frequency, DC bus voltage, AI1, AI2, car load (%), and so on. Users can select which parameters to display by setting bits in parameter F8-02 (converted to binary). Pressing the shift key cycles through the selected parameters in order.
- In the running state, 13 running status parameters—including load speed, running frequency, target frequency, DC bus voltage, output voltage, output current, AI1, AI2, car load (%), startup compensation current (%), running torque current (%)—can be selected for display through bit settings in parameter F8-01 (converted to binary). The shift key cycles through the selected parameters in order.

Param.	Name	Range	Min. unit	Default	Property
F8-01	Parameter display in running state	1 to 32767 bit0: Load speed bit1: Running frequency bit2: Target frequency bit3: DC bus voltage bit4: Output voltage bit5: Output current bit6: AI1 bit7: AI2 bit8: Car load (%) bit9: Startup compensation current (%) bit10: Running torque current (%) bit11: Input state bit12: Output state	1	32767	☆
F8-02	Parameter display in the stop state	1 to 255 bit0: Target load speed bit1: Target frequency bit2: DC bus voltage bit3: AI1 bit4: AI2 bit5: Car load (%) bit6: Input state bit7: Output state	1	255	☆

6.3.3 Fault Information Reading

When a fault occurs on the AC drive, the operation panel displays the fault code. Based on the fault code, you can analyze the fault causes to rectify the fault quickly. The ME320LN^{new} elevator AC drive can store the most recent 11 fault codes, and records the frequency, current, DC bus voltage, digital input terminal status, and digital output terminal status for the latest 3 faults. It is shown in the following figure.

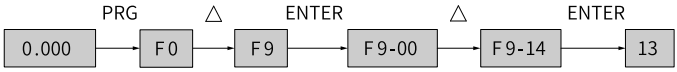


Figure 6-5 Viewing fault information

6.3.4 DI/DO Terminal State Monitoring

The DI/DO terminal state needs to be monitored during running. For details, see the descriptions of the parameter F8-00.

6.4 Password Setting

The AC drive provides the user password protection function to secure the parameter setting.

"Figure 6-6 " on page 76 illustrates how to set the password to 12345.

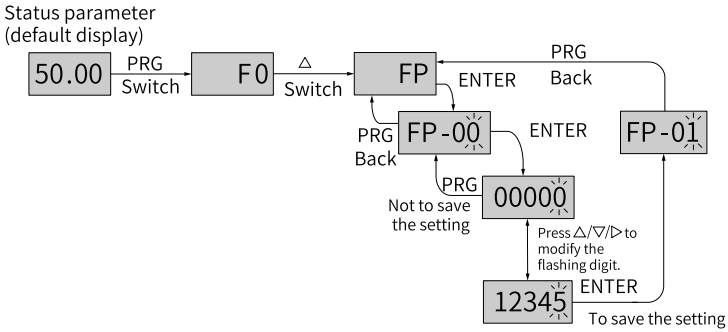


Figure 6-6 Password setting

After a user password is set (parameter FP-00 is not 0), when the user attempts to enter the parameter editing state by pressing PRG, the system will first enter the user password verification state, displaying "−−−". The operator must enter the correct user password to proceed; otherwise, access will be denied. To view factory parameters, you also need to enter the factory password. Do not try to modify factory parameters because incorrect setting will easily cause abnormality or damage to the AC drive.

During password setting, you can change the password and the last input is considered as the set password.

To disable the password protection function, enter the menu with the correct password and then set FP-00 to 0.

7 Function Parameter Table

7.1 Function Parameter Description

The ME320LN^{new} series AC drive organizes the function parameters into groups labeled F0 to F9, FA to FD, FU, FJ, FF, and FP, totaling 18 parameter groups. Each group contains related parameters. The parameters are structured using a three-level menu system. In other sections of this manual, the notation "FX-XX" refers to the parameter numbered "XX" in group "X". For example, "F9-08" denotes the eighth parameter in function group F9.

The parameters adopt the three-level menu.

- The parameter group is Level I menu.
- The parameter is Level II menu
- The parameter setting is Level III menu.

Table 7–1 Meaning of each column in the parameter table

Param.	Name	Range	Min. unit	Default	Property
Parameter number	Full name of the parameter	Effective setting range of the parameter	Measurement unit of the parameter	Factory setting of the parameter	Operation property of parameters (whether to allow modification and modification conditions)

“☆”: The parameter can be modified when the AC drive is in the stop or running state.

“☆”: The parameter cannot be modified when the AC drive is in the stop or running state.

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

Note

The system automatically checks the modification property of all parameters to prevent faulty operation.

The Default column lists the values after the parameters are restored to factory setting. The values will not be updated if they are detected values or recorded values.

The AC drive provides the password protection function to secure the parameter setting. *"6.4 Password Setting" on page 76* shows the details.

7.2 Function Parameter Groups

After pressing PRG and then △ / ▽, you can view the parameter groups. The following table lists parameter group details.

Group	Name	Group	Name
F0	Basic parameters	F9	Protection function parameters
F1	Motor parameters	FA	PG parameter
F2	Vector control parameters	FB	Communication parameters
F3	Startup/Stop control parameters	FC	Advanced specialized function parameters
F4	Input function parameters	FD	Special function parameters
F5	Output function parameters	FU	Monitoring parameters
F6	Speed parameters	FJ	Reserved Parameters
F7	Curve parameters	FF	Factory parameters
F8	Keypad and display parameters	FP	User parameters

7.3 Parameter List

Param.	Name	Range	Min. unit	Default	Property
Group F0: Basic Parameters					
F0-00	Control mode	0: Sensorless vector control (SVC) 1: Feedback vector control (FVC) 2: V/f control	1	1	★
F0-01	Command source	0: Operating panel control 1: Terminal control	1	1	★
F0-02	Speed source	0: Digital setting 1: Multi-speed 2: AI1 3: AI2 4: Reserved 5: Special multi-speed	1	1	★
F0-03	Digital setting frequency	0.00 to max. frequency	0.01 Hz	00.00 Hz	☆
F0-04	Running direction	0: Same direction 1: Opposite direction	1	0	★
F0-05	Max. frequency	0.00 Hz to 90.00 Hz	0.01 Hz	50.00 Hz	★
F0-06	Carrier frequency	0.5 kHz to 16.0 kHz	0.1 kHz	Model dependent	☆
F0-07	Carrier frequency adjustment mode	0: Fixed PWM 1: Random PWM	1	0	☆
Group F1: Motor Parameters					

Param.	Name	Range	Min. unit	Default	Property
F1-00	Encoder type	0: SIN/COS 1: UVW 2: ABZ	1	1	★
F1-01	Rated power	0.4 kW to 110.0 kW	0.1 kW	Model dependent	★
F1-02	Rated voltage	100 V to 500 V	1 V	Model dependent	★
F1-03	Rated current	0.00 A to 655.00 A	0.01 A	Model dependent	★
F1-04	Rated frequency	0 Hz to Maximum frequency	0.01 Hz	50.00 Hz	★
F1-05	Rated speed	0 rpm to 30000 rpm	1rpm	1460rpm	★
F1-06	Reserved	0 to 65535	1	0	★
F1-07	Encoder angle at power-off (synchronous motor)	0.0 to 359.9	0.1	0	★
F1-08	Reserved	0 to 65535	1	0	★
F1-09	Current filter coefficient (synchronous motor)	0.0 to 3.0	0.1	0	★
F1-10	Encoder signal check	0 to 65535	1	0	★
F1-11	Motor auto-tuning selection	0: No operation 1: With-load auto-tuning 2: No-load auto-tuning	1	0	★
F1-12	Reserved	0 to 65535	1	0	★
F1-13	Reserved	0 to 65535	1	0	★
F1-14	Stator resistance	0.001 Ω to 65.000 Ω	0.001 Ω	Model dependent	☆
F1-15	Rotor resistance (asynchronous motor)	0.001 Ω to 65.000 Ω	0.001 Ω	Model dependent	☆
F1-16	Leakage inductance (asynchronous motor)	0.01 mH to 650.00 mH	0.01 mH	Model dependent	☆
F1-17	Mutual inductance (asynchronous motor)	0.1 mH to 6500.0mH	0.1 mH	Model dependent	☆
F1-18	No-load current (asynchronous motor)	0.01 A to 650.00 A	0.01 A	Model dependent	☆
F1-19	D-axis inductance (synchronous motor)	0.01 mH to 650.00 mH	0.01 mH	0.01 mH	★
F1-20	Q-axis inductance (synchronous motor)	0.01 mH to 650.00 mH	0.01 mH	0.01 mH	★
F1-21	Synchronous motor back EMF	0 V to 65535 V	1 V	0 V	★

Param.	Name	Range	Min. unit	Default	Property
F1-25	Motor type selection	0: Asynchronous motor 1: Synchronous motor	1	1	★
Group F2: Vector Control Parameters					
F2-00	Speed loop proportional gain 1	0 to 100	1	35	☆
F2-01	Speed loop integral time 1	0.01s to 10.00s	0.01s	0.60s	☆
F2-02	Switching frequency 1	0.00 Hz to F2-05	0.01 Hz	2.00 Hz	☆
F2-03	Speed loop proportional gain 2	0 to 100	1	30	☆
F2-04	Speed loop integral time 2	0.01s to 10.00s	0.01s	0.8	☆
F2-05	Switching frequency 2	F2-02 to max. frequency	0.01 Hz	5.00 Hz	☆
F2-06	Current loop proportional gain	10 to 500	1	60	☆
F2-07	Current loop integral gain	10 to 500	1	30	☆
F2-08	Torque upper limit	0.0% to 200.0%	0.10%	150.00%	☆
F2-09	Torque acceleration time	1 ms to 500 ms	1 ms	1 ms	★
F2-10	Torque deceleration time	1 ms to 500 ms	1 ms	350 ms	★
F2-11	Speed filter coefficient	1 to 20	1	10	★
F2-12	Angle-free auto-tuning function	0 to 65535 bit1: 0: Angle-free auto-tuning function disabled 1: Angle-free auto-tuning function enabled bit2: 0: Semi-automatic 1: Automatic	1	0	★
Group F3: Start/Stop Control Parameters					
F3-00	Startup frequency	0.00 Hz to 10.00 Hz	0.01 Hz	0.00 Hz	☆
F3-01	Torque output delay	0.00s to 10.00s	0.01s	0.20s	★
F3-02	Brake release delay	0.20s to 10.00s	0.01s	0.20s	★
F3-03	Zero-speed delay	0.00s to 10.00s	0.01s	0.30s	★
F3-04	Starting time	0.00s to 10.00s	0.01s	0.00s	★
F3-05	Startup frequency active time	0.00s to 10.00s	0.01s	0.00s	★
F3-06	Brake close delay	0.00s to 10.00s	0.01s	0.20s	★
F3-07	Stop zero-speed delay	0.00s to 10.00s	0.01s	0.30s	★

Param.	Name	Range	Min. unit	Default	Property
F3-08	RUN contactor open delay	0.00s to 10.00s	0.01s	0.00s	★
F3-09	Startup pre-torque setting selection	0: No pre-torque 1: DI setting 2: AI1 setting 3: AI2 setting 4: Apply pre-torque initial offset 5: No-load-cell compensation	1	0	★
F3-10	Pre-torque offset	0.0% to 100.0%	0.10%	48.00%	☆
F3-11	Pre-torque gain	0.00 to 1.50	0.01	0.6	★
F3-12	Pre-torque initial offset	-100.0% to 100.0%	0.10%	10.00%	☆
F3-13	DI load cell signal 1	0.0% to 100.0%	0.10%	10.00%	★
F3-14	DI load cell signal 2	0.0% to 100.0%	0.10%	30.00%	★
F3-15	DI load cell signal 3	0.0% to 100.0%	0.10%	70.00%	★
F3-16	DI load cell signal 4	0.0% to 100.0%	0.10%	90.00%	★
F3-17	AI load cell filter time	0.00s to 1.00s	0.01s	0.10s	☆
F3-18	Analog load cell no-load input	0.00 V to 10.00 V	0.01 V	0.00 V	☆
F3-19	Analog load cell full-load input	0.00 V to 10.00 V	0.01 V	10.00 V	☆
F3-20	Analog load cell auto-tuning	0 to 100	1	0	☆
F3-21	Analog load cell auto-tuning selection	0: No operation 1: Enabled	1	0	☆
F3-22	Pre-torque direction reversing	0: Direction unchanged 1: Direction reversed	1	0	☆
F3-24	Slip test	0: Disabled 1: Enabled	1	0	★
Group F4: Input Function Parameters					
F4-00	DI filter time	0.001s to 0.200s	0.001	0.020s	☆

Param.	Name	Range	Min. unit	Default	Property
F4-01	DI1 function selection	0: No function 1: Forward running (FWD, up) 2: Reverse running (REV, down) 3: Multi-speed terminal 1 4: Multi-speed terminal 2 5: Multi-speed terminal 3 6: Fault reset 7: Enable control 8: Inspection signal 9: Emergency input 10: RUN contactor feedback 11: Brake feedback 12: Load cell terminal 1 13: Load cell terminal 2 14: Load cell terminal 3 15: Load cell terminal 4 16: External fault 17: Motor overtemperature 18: Up speed judgment 19: Down speed judgment 20: Multi-speed logic selection 1 21: Multi-speed logic selection 2 22: Direct travel ride command The terminal input range is 0 to 122. The hundreds (position) of 1 indicates that the signal is of NC type, and the lower two bits indicate the selected function (invalid if the number is larger than 22). For example, "106" indicates that the DI is set with fault reset function and the function is NC type.	1	3	★
F4-02	DI2 function selection		1	4	★
F4-03	DI3 function selection		1	5	★
F4-04	DI4 function selection		1	6	★
F4-05	DI5 function selection		1	7	★
F4-06	DI6 function selection		1	1	★
F4-07	DI7 function selection		1	2	★
F4-08	DI8 function selection		1	0	★
F4-09	DI9 function selection		1	0	★
F4-10	DI10 function selection		1	0	★
F4-11	Reserved	0 to 65535	1	0	★
F4-12	Reserved	0 to 65535	1	0	★
F4-13	Multi-speed combination filter time	0.000s to 0.200s	0.001	0.020s	☆
Group F5: Output Function Parameters					
F5-00	FM output selection	0: No output 1: In operation 2: Zero-speed running 3: Zero-speed signal (also output in stop) 4: Fault signal 5: RUN contactor output control 6: Brake output control 7: Advance door opening 8: Bus undervoltage	1	15	★
F5-01	DO1 output selection		1	3	★
F5-02	DO2 output selection		1	0	★
F5-03	Control board relay output selection		1	4	★
F5-04	Expansion board relay output selection		1	0	★

Param.	Name	Range	Min. unit	Default	Property
F5-05	Reserved	9: FDT 1 output 10: FDT 2 output 11: Frequency reached 12: Overspeed output 14: Running time reached 15: Ready to run 16: Contact stuck output control 17: Re-leveling output 18: Light-load running output Note: FDT: Frequency detection function. This function detects the AC drive own output frequency, compares it with the preset value, and controls the corresponding output terminals based on the comparison result.	1	0	★
F5-06	Zero-speed output hysteresis time	0.000s to 2.000s	1	0.000s	★
F5-07	AO function selection	0: Running frequency 1: Frequency reference 2: Output current 3: Output torque 4: Output voltage 5: AI1 6: AI2	1	0	★
F5-08	AO zero offset	-100.0% to 100.0%	0.10%	0.00%	☆
F5-09	AO gain	-10.00 to 10.00	0.01	1	☆
Group F6: Speed Parameters					
F6-00	Multi-speed 0	0 to Maximum frequency	0.01 Hz	0.00 Hz	★
F6-01	Multi-speed 1	0 to Maximum frequency	0.01 Hz	0.00 Hz	★
F6-02	Multi-speed 2	0 to Maximum frequency	0.01 Hz	0.00 Hz	★
F6-03	Multi-speed 3	0 to Maximum frequency	0.01 Hz	0.00 Hz	★
F6-04	Multi-speed 4	0 to Maximum frequency	0.01 Hz	0.00 Hz	★
F6-05	Multi-speed 5	0 to Maximum frequency	0.01 Hz	0.00 Hz	★
F6-06	Multi-speed 6	0 to Maximum frequency	0.01 Hz	0.00 Hz	★
F6-07	Multi-speed 7	0 to Maximum frequency	0.01 Hz	0.00 Hz	★
F6-08	Multi-speed 0 acceleration/ deceleration curve selection	1 to 4	1	1	★
F6-09	Multi-speed 1 acceleration/ deceleration curve selection	1 to 4	1	1	★
F6-10	Multi-speed 2 acceleration/ deceleration curve selection	1 to 4	1	1	★

Param.	Name	Range	Min. unit	Default	Property
F6-11	Multi-speed 3 acceleration/ deceleration curve selection	1 to 4	1	1	★
F6-12	Multi-speed 4 acceleration/ deceleration curve selection	1 to 4	1	1	★
F6-13	Multi-speed 5 acceleration/ deceleration curve selection	1 to 4	1	1	★
F6-14	Multi-speed 6 acceleration/ deceleration curve selection	1 to 4	1	1	★
F6-15	Multi-speed 7 acceleration/ deceleration curve selection	1 to 4	1	1	★
F6-16	Inspection speed selection	0 to 7	1	0	★
F6-17	Emergency evacuation power supply at power failure	0: Motor not running 1: UPS-powered operation 2: 48 V battery power supply	1	0	★
F6-18	Analog minimum input	0.00 V to 10.00 V	0.01 V	0.00 V	☆
F6-19	Corresponding percentage of minimum analog input	0.0% to 100.0%	0.10%	0.00%	☆
F6-20	Maximum analog input	0.00 V to 10.00 V	0.01 V	10.00 V	☆
F6-21	Corresponding percentage of maximum analog input	0.0% to 100.0%	0.10%	100.00%	☆
F6-22	AI filter time	0.00s to 1.00s	0.01s	0.10s	☆

Param.	Name	Range	Min. unit	Default	Property
F6-23	AC drive function selection 1	0 to 65535 bit0: 0: Immediate stop at brake close 1: Current cancellation before stop at brake close bit1: 0: No-load-cell compensation disabled during auto-tuning 1: No-load-cell compensation always enabled bit2: 0: Anti-jitter enabled at stop 1: Anti-jitter disabled at stop bit4: 0: The maximum frequency is 90 Hz 1: The maximum frequency equals to the rated frequency bit5: 0: Analog provided according to maximum frequency 1: Analog provided according to rated frequency bit6: Reserved bit7: 0: After stop, if the external command has not been cleared, restart is not allowed. 1: After stop, even if the external command has not been cleared, restart is allowed when a frequency reference is provided.	1	560	☆
F6-23	AC drive function selection 1	bit8: 0: Disable S-curve optimization 1: Enable S-curve optimization (linked to parameter F6-30) bit9: 0: The "Running" output signal is synchronized with brake release 1: The "Running" output signal is synchronized with internal operation status	1	560	☆
F6-24	Motor overtemperature voltage threshold	0.00 V to 11.00 V	0.01 V	0.0 V	☆

Param.	Name	Range	Min. unit	Default	Property
F6-25	AC drive function selection 2	0 to 65535 bit0: 0: SPI communication fault detection 1: No detection bit1: 0: FA-03 and FA-05 cannot be modified when not in panel control mode; after modification, F0-01 cannot be changed 1: Parameters can be modified bit2: 0: Err16, Err17 and Err33 reset not possible 1: Err16, Err17 and Err33 reset possible bit3: 0: No-load-cell startup disabled during emergency operation 1: No-load-cell startup enabled during emergency operation bit4: 0: Only FVC possible under synchronous motor terminal control 1: No restriction bit5: 0: Excessive speed deviation detection only after feedback frequency exceeds 1/4 of rated frequency 1: Excessive speed deviation detection after startup bit6: 0: Emergency evacuation cannot be initiated if a run command is present 1: Emergency rescue can be initiated even if a run command is present bit7: 0: Light-load direction is not automatically judged in emergency evacuation 1: Light-load direction is automatically judged in emergency evacuation	1	0	☆
F6-27	Zero-speed signal output delay	0 ms to 9999 ms	1	0	☆
F6-28	Upper limit of emergency evacuation speed	0.00 Hz to Maximum frequency	0.01 Hz	8.00 Hz	★
F6-29	Analog input filter	0 V to 0.10 V	0.01 V	0 V	★
F6-30	Adjustment threshold for special acceleration rate	0 to F0-05	0.01 Hz	2.00 Hz	★

Param.	Name	Range	Min. unit	Default	Property
Group F7: Curve Parameters					
F7-00	Acceleration time 1	1.0s to 100.0s	0.1s	4.0s	☆
F7-01	Deceleration time 1	1.0s to 100.0s	0.1s	4.0s	☆
F7-02	Time proportion of S-curve 1 start phase	10.0% to 40.0%	0.10%	40.00%	★
F7-03	Time proportion of S-curve 1 end segment	10.0% to 40.0%	0.10%	40.00%	★
F7-04	Acceleration time 2	1.0s to 100.0s	0.1s	4.0s	☆
F7-05	Deceleration time 2	1.0s to 100.0s	0.1s	4.0s	☆
F7-06	Time proportion of S-curve 2 start phase	10.0% to 40.0%	0.10%	40.00%	★
F7-07	Time proportion of S-curve 2 end segment	10.0% to 40.0%	0.10%	40.00%	★
F7-08	Acceleration time 3	1.0s to 100.0s	0.1s	4.0s	☆
F7-09	Deceleration time 3	1.0s to 100.0s	0.1s	20.0s	☆
F7-10	Time proportion of S-curve 3 start phase	10.0% to 50.0%	0.10%	40.00%	★
F7-11	Time proportion of S-curve 3 end segment	10.0% to 50.0%	0.10%	40.00%	★
F7-12	Acceleration time 4	0.5s to 100.0s	0.1s	1.0s	☆
F7-13	Deceleration time 4	0.5s to 100.0s	0.1s	1.0s	☆
F7-14	Time proportion of S-curve 4 start segment	10.0% to 50.0%	0.10%	40.00%	★
F7-15	Time proportion of S-curve 4 end segment	10.0% to 50.0%	0.10%	40.00%	★
F7-16	Slip test acceleration time	0.5s to 10.0s	0.1s	1.0s	★
F7-17	Distance setting of direct travel ride	0.0 mm to 6553.5 mm	0.1 mm	0.0 mm	★
F7-18	Actual distance of direct travel ride	0.0 mm to 6553.5 mm	0.1 mm	0.0 mm	●
Group F8: Keypad and Display Parameters					
F8-00	Input/Output terminal state	-	-	-	●

Param.	Name	Range	Min. unit	Default	Property
F8-01	LED display parameters during running	1 to 32767 bit0: Load speed bit1: Running frequency bit2: Target frequency bit3: DC bus voltage bit4: Output voltage bit5: Output current bit6: AI1 bit7: AI2 bit8: Car load (%) bit9: Startup compensation current (%) bit10: Running torque current (%) bit11: Input state bit12: Output state	1	32767	☆
F8-02	LED display parameters at stop	1 to 255 bit0: Target load speed bit1: Target frequency bit2: DC bus voltage bit3: AI1 bit4: AI2 bit5: Car load (%) bit6: Input state bit7: Output state	1	255	☆
F8-03	Rated elevator speed	0.001 m/s to 8.000 m/s	0.001 m/s	1.600 m/s	☆
F8-04	Heatsink temperature	0℃ to 100℃	1℃	-	●
F8-05	MCB software version	0.00 to 99.99	0.01	-	●
F8-06	Drive board software version	0 to 65535	1	-	●
F8-07	Running time setting	0 h to 65500 h 0: Disabled	1 h	0 h	☆
F8-08	Accumulative running hours	0 h to 65500 h	1 h	0 h	●
F8-09	Accumulative running seconds within one hour	0s to 3600s	1s	0s	●
F8-10	High bits of running times	0 to 9999 **Note:** 1 indicates the actual running times is 10,000.	1	0	●
F8-11	Low bits of running times	0 to 9999	1	0	●
F8-12	Protection against short circuit to ground upon power-on	0: Disabled 1: Enabled	1	0	☆

Param.	Name	Range	Min. unit	Default	Property
F8-13	Temporary version of MCB software	0.00 to 99.99	0.01	-	●
F8-14	Customer version of MCB software	0.00 to 99.99	0.01	-	●
F8-17	Year	2000 to 2100	1	2014	☆
F8-18	Month and day	0101 to 1231	1	101	☆
F8-19	Hour. Minute	00.00 to 23.59	0.01	0	☆
Group F9: Fault and Protection Parameters					
F9-09	Number of automatic resets upon fault	0 to 3	1	0	☆
F9-11	Auto reset attempt period	0.1 to 100.0	0.1s	1.0s	☆
F9-12	Input phase loss protection	0: Inhibited 1: Allowed	1	1	☆
F9-13	Output phase loss protection	1 to 3 bit0: 0: Output phase loss not detected during running 1: Output phase loss detected during running bit1: 0: Output phase loss not detected at startup 1: Output phase loss detected at startup	1	1	☆
F9-14	1st fault code	0 to 60	1	0	●
F9-15	1st fault subcode	0 to 999	1	0	●
F9-16	Month and day upon 1st fault	0 to 1231	1	0	●
F9-17	Hour and minute upon 1st fault	00.00 to 23.59	0.01	0	●
F9-18	2nd fault code	0 to 60	1	0	●
F9-19	2nd fault subcode	0 to 999	1	0	●
F9-20	Month and day upon 2nd fault	0 to 1231	1	0	●
F9-21	Hour and minute upon 2nd fault	00.00 to 23.59	0.01	0	●
F9-22	3rd fault code	0 to 60	1	0	●
F9-23	3rd fault subcode	0 to 999	1	0	●
F9-24	Month and day upon 3rd fault	0 to 1231	1	0	●
F9-25	Hour and minute upon 3rd fault	00.00 to 23.59	0.01	0	●
F9-26	4th fault code	0 to 60	1	0	●
F9-27	4th fault subcode	0 to 999	1	0	●

Param.	Name	Range	Min. unit	Default	Property
F9-28	Month and day upon 4th fault	0 to 1231	1	0	●
F9-29	Hour and minute upon 4th fault	00.00 to 23.59	0.01	0	●
F9-30	5th fault code	0 to 60	1	0	●
F9-31	5th fault subcode	0 to 999	1	0	●
F9-32	Month and day upon 5th fault	0 to 1231	1	0	●
F9-33	Hour and minute upon 5th fault	00.00 to 23.59	0.01	0	●
F9-34	6th fault code	0 to 60	1	0	●
F9-35	6th fault subcode	0 to 999	1	0	●
F9-36	Month and day upon 6th fault	0 to 1231	1	0	●
F9-37	Hour and minute upon 6th fault	00.00 to 23.59	0.01	0	●
F9-38	7th fault code	0 to 60	1	0	●
F9-39	7th fault subcode	0 to 999	1	0	●
F9-40	Month and day upon 7th fault	0 to 1231	1	0	●
F9-41	Hour and minute upon 7th fault	00.00 to 23.59	0.01	0	●
F9-42	8th fault code	0 to 60	1	0	●
F9-43	8th fault subcode	0 to 999	1	0	●
F9-44	Month and day upon 8th fault	0 to 1231	1	0	●
F9-45	Hour and minute upon 8th fault	00.00 to 23.59	0.01	0	●
F9-46	9th fault code	0 to 60	1	0	●
F9-47	9th fault subcode	0 to 999	1	0	●
F9-48	Month and day upon 9th fault	0 to 1231	1	0	●
F9-49	Hour and minute upon 9th fault	00.00 to 23.59	0.01	0	●
F9-50	10th fault code	0 to 60	1	0	●
F9-51	10th fault subcode	0 to 999	1	0	●
F9-52	Month and day upon 10th fault	0 to 1231	1	0	●
F9-53	Hour and minute upon 10th fault	00.00 to 23.59	0.01	0	●
F9-54	Latest fault code	0 to 60	1	0	●
F9-55	Latest fault subcode	0 to 999	1	0	●
F9-56	Month and day upon latest fault	0 to 1231	1	0	●
F9-57	Hour and minute upon latest fault	00.00 to 23.59	0.01	0	●

Param.	Name	Range	Min. unit	Default	Property
F9-58	Logic information upon latest fault	0 to 65535	1	0	●
F9-59	Frequency reference upon latest fault	0.00 Hz to 99.00 Hz	0.01 Hz	0.00 Hz	●
F9-60	Feedback frequency at latest fault	0.00 Hz to 99.00 Hz	0.01 Hz	0.00 Hz	●
F9-61	Bus voltage upon latest fault	0.0 V to 6500.0 V	0.1 V	0.0 V	●
F9-62	Output voltage upon latest fault	0 V to 65000 V	1 V	0 V	●
F9-63	Output current upon latest fault	0.00 A to 650.00 A	0.01 A	0.00 A	●
F9-64	Torque current upon latest fault	0.00 A to 650.00 A	0.01 A	0.00 A	●
F9-65	Output power upon latest fault	0.00 kW to 99.99 kW	0.01 kW	0.00 kW	●
F9-66	Input function state 1 upon latest fault	0 to 65535	1	0	●
F9-67	Input function state 2 upon latest fault	0 to 65535	1	0	●
F9-68	Output function state 1 upon latest fault	0 to 65535	1	0	●
F9-69	Output function state 2 upon latest fault	0 to 65535	1	0	●
Group FA: PG Parameters					
FA-00	PG pulses	100 to 9999	1	1024	★
FA-01	PG disconnection detection time	0.0s to 10.0s (Detection is invalid when this parameter is set to 0)	0.1s	1.0s	★
FA-03	PG magnetic pole angle	0.0 to 359.9	0.1	0	★
FA-04	PG current magnetic pole angle	0.0 to 359.9	0.1	0	●
FA-05	Encoder wiring method	0 to 15	1	0	★
FA-06	PG frequency-division coefficient ratio	1 to 256	1	1	★
Group FB: Communication Parameters (Reserved)					
Group FC: Advanced Specialized Function Parameters					
FC-00	Action at command abnormal	0: Deceleration 1: Block output immediately	1	1	★
FC-01	Deceleration time at abnormality	0.1s to 300.0s	0.1s	3.0s	★
FC-02	Up speed threshold	0.00 to Maximum frequency	0.01 Hz	45.00 Hz	★

Param.	Name	Range	Min. unit	Default	Property
FC-03	Down speed threshold	0.00 to Maximum frequency	0.01 Hz	45.00 Hz	★
FC-04	Advance door opening judgment	0.00 to Maximum frequency	0.01 Hz	5.00 Hz	★
FC-05	Frequency detection threshold 1	0.00 to Maximum frequency	0.01 Hz	50.00 Hz	☆
FC-06	Frequency detection threshold 2	0.00 to Maximum frequency	0.01 Hz	50.00 Hz	☆
FC-07	Frequency detection hysteresis	0.0% to 100.0% (Frequency detection threshold)	0.10%	5.00%	☆
FC-08	Measured width when frequency reached	0.0% to 100.0% (Maximum frequency)	0.10%	0.00%	☆
FC-09	Overspeed detection threshold	80% to 120%	1%	115%	☆
FC-10	Overspeed detection delay	0.0s to 5.0s	0.1s	1.0s	☆
FC-11	Action selection at overspeed	0: Decelerate to stop at abnormality 1: Alarm and block output immediately 2: Continue to run	1	1	☆
FC-12	Speed deviation detection threshold	0% to 50%	1%	30%	☆
FC-13	Speed deviation detection delay	0.0s to 5.0s	0.1s	1.0s	☆
FC-14	Action selection at speed deviation too large	0: Decelerate to stop at abnormality 1: Alarm and block output immediately 2: Continue to run	1	1	☆
Group FD: Special Function Parameters					
FD-00	Torque boost	0.0: (Automatic) 0.1% to 30.0%	0.10%	1.00%	★
FD-01	Frequency of torque boost	0.00 to Maximum frequency	0.01 Hz	50.00 Hz	★
FD-02	V/F slip compensation gain	0.0% to 200.0%	0.10%	100.00%	★
FD-03	Oscillation suppression gain	0 to 100	1	20	★
FD-04	AC drive function selection 3	0 to 65535 bit0: 0: Using fixed values for asynchronous motor current loop 1: Using parameter setting for asynchronous motor current loop	1	0	★
FD-05	Position lock current coefficient	1.0% to 50.0%	0.10%	15.00%	★

Param.	Name	Range	Min. unit	Default	Property
FD-06	Position lock speed loop KP	0.05 to 1.00	0.01	0.5	★
FD-07	Position lock speed loop TI	0.05 to 2.00	0.01	0.6	★
Group FU: Monitoring Parameters					
FU-00	Pre-torque current	-200.0% to 200.0%	0.10%	0	●
FU-01	Logic information	0 to 65535	1	0	●
FU-02	Frequency reference	0.00 Hz to 99.00 Hz	0.01 Hz	0.00 Hz	●
FU-03	Feedback frequency	0.00 Hz to 99.00 Hz	0.01 Hz	0.00 Hz	●
FU-04	Bus voltage	0.0 V to 6500.0 V	0.1 V	0.0 V	●
FU-05	Output voltage	0 V to 65000 V	1 V	0 V	●
FU-06	Output current	0.00 A to 650.00 A	0.01 A	0.00 A	●
FU-07	Output torque	0.0% to 200.0%	0.10%	0.00%	●
FU-08	Torque current	0.00 A to 650.00 A	0.01 A	0.00 A	●
FU-09	Output power	-99.99 kW to 99.99 kW	0.01 kW	0.00 kW	●
FU-10	Car load	0.0% to 100.0%	0.10%	0.00%	●
FU-11	Car speed	0.000 m/s to 65.000 m/s	0.001 m/s	0.000 m/s	●
FU-12	Communication interference	0 to 65535	1	0	●
FU-13	Input function state 1	0 to 65535	1	0	●
FU-14	Input function state 2	0 to 65535	1	0	●
FU-15	Output function state 1	0 to 65535	1	0	●
FU-16	Output function state 2	0 to 65535	1	0	●
FU-17	AI1 voltage	0.00 V to 20.00 V	0.01 V	0.00 V	●
FU-18	AI2 voltage	0.00 V to 20.00 V	0.01 V	0.00 V	●
FU-19	AO1 voltage	0.00 V to 20.00 V	0.01 V	0.00 V	●
FU-20	Startup rollback pulses	0 to 65535	1	0	●
FU-21	PG card pulses per second	0 to 65535	1	0	●
Group FP: User parameters					
FP-00	User password	0 to 65535 (0 indicates no password)	1	0	☆
FP-01	Parameter update	0: No operation 1: Restore factory settings 2: Clear fault records	1	0	★
FP-02	User setting check	0: Disabled 1: Enabled	1	0	★

8 Parameter Description

8.1 Group F0: Basic Parameters

Param.	Name	Range	Min. unit	Default	Property
F0-00	Control mode	0: Sensorless vector control (SVC) 1: Feedback vector control (FVC) 2: V/f control	1	1	★

- 0: Sensorless vector control (SVC).
  Primarily used for test operation during commissioning or for fault diagnosis during maintenance. Note: This control mode is applicable only to asynchronous motors. Synchronous motors require closed-loop control and are not supported in this mode.
- 1: Feedback vector control (FVC).
  Suitable for high-precision speed control in elevator applications. During normal elevator operation, the ME320LN^{new} should operate in this mode.
- 2: V/f control.
  Applicable to special elevator applications. This mode does not require a rotary encoder; however, control performance is inferior to vector control.

Note that if the vector control mode is used, motor auto-tuning must be performed. Accurate motor parameters are required to fully utilize the advantages of vector control. Better performance can be achieved by adjusting the speed regulator parameters (Group F2).

Param.	Name	Range	Min. unit	Default	Property
F0-01	Command source	0: Operating panel control 1: Terminal control	1	1	★

Used to select the input channel of the AC drive control commands.

Control commands include start, stop and others.

- 0: Keypad control ("LOCAL/REMOT" light on); RUN commands are controlled through RUN and STOP RES on the keypad panel. Change the running direction by modifying F0-04.
- 1: Terminal Control** ("LOCAL/REMOTE" light off); RUN commands are controlled through forward running (FWD) and reverse running (REV) set by multi-functional input terminals.

Param.	Name	Range	Min. unit	Default	Property
F0-02	Speed source	0: Digital setting 1: Multi-speed 2: AI1 3: AI2 4: Reserved 5: Special multi-speed	1	1	★

It sets the input channel of speed references. There are four available channels:

- 0: Digital setting - The ME320LN^{new} uses the internal digital frequency setting. The initial value is the value of parameter F0-03 "Digital setting frequency".
- 1: Multi-speed - Selecting this option sets the AC drive to multi-step speed operation mode. The relationship between signals and frequencies need to be determined by group F4 and F6 parameters.
- 2: AI1 and 3: AI2 - Frequency is determined by analog input terminals. Two AI terminals are available in the standard configuration. AI1 (0 V to 10 V voltage input) and AI2 (0-10 V voltage input or 4 mA to 20 mA current input, determined by jumper J3 on the MCB).
- 4: Reserved
- 5: Special multi-speed - A special multi-step speed reference method used for specific applications. In general situations this is not used.

Param.	Name	Range	Min. unit	Default	Property
F0-03	Digital setting frequency	0.00 to max. frequency	0.01 Hz	00.00 Hz	☆

The target operating frequency for the ME320LN^{new} when using digital speed setting.

Param.	Name	Range	Min. unit	Default	Property
F0-04	Running direction	0: Same direction 1: Opposite direction	1	0	★

Changing this parameter allows changing the motor rotation direction without altering the motor wiring.

Note: The motor continues to operate in the original direction after parameter initialization. Users are advised to use this function with caution.

Param.	Name	Range	Min. unit	Default	Property
F0-05	Max. frequency	0.00 Hz to 90.00 Hz	0.01 Hz	50.00 Hz	★

Sets the maximum frequency of the AC drive. When there is a special requirement to operate above the mains frequency, carefully consider the mechanical load of the elevator system.

Param.	Name	Range	Min. unit	Default	Property
F0-06	Carrier frequency	0.5 kHz to 16.0 kHz	0.1 kHz	Model dependent	☆

The carrier frequency is closely related to the motor noise during running. When the carrier frequency is generally set above 10 kHz, quiet running is achieved. It is recommended to set the carrier frequency to the lowest within the allowable noise range.

- When the carrier frequency is low, the high harmonic components of output current will increase with greater motor loss and temperature rise.
- When the carrier frequency is high, power loss and temperature rise of the motor decline. However, the AC drive has an increase in power loss, temperature rise and interference.

Adjusting the carrier frequency will exert influences on the following:

Performance	Influence
Carrier frequency	Low/High
Motor noise	Large/Small
Output current waveform	Bad/Good
Motor temperature rise	High/Low
AC drive temperature rise	Low/High
Leakage current	Small/Large
External radiation interference	Small/Large

Param.	Name	Range	Min. unit	Default	Property
F0-07	Carrier frequency adjustment mode	0: Fixed PWM 1: Random PWM	1	0	☆

- 0: Fixed PWM carrier frequency adjustment method.
- 1: Random PWM carrier frequency adjustment method.

Random PWM results in a wider motor noise frequency spectrum, while fixed PWM produces motor noise at a constant frequency.

8.2 Group F1: Motor Parameters

Param.	Name	Range	Min. unit	Default	Property
F1-00	Encoder type	0: Sin/Cos 1: UVW 2: ABZ	1	1	★

- 0: Sin/Cos encoder
- 1: UVW encoder
- 2: ABZ encoder
- 3: Absolute encoder

Set F1-00 to a proper value according to the type of encoder used together with the motor. Set the PG parameters in Group FA correctly.

Param.	Name	Range	Min. unit	Default	Property
F1-01	Rated power	0.4 kW to 110.0 kW	0.1 kW	Model dependent	★
F1-02	Rated voltage	100 V to 500 V	1 V	Model dependent	★
F1-03	Rated current	0.00 A to 655.00 A for AC drive models with power up to and including 75 kW 0.00 A to 655.00 A for AC drive models with power 90 kW and above	0.01 A	Model dependent	★
F1-04	Rated frequency	0 Hz to Maximum frequency	0.01 Hz	50.00 Hz	★
F1-05	Rated speed	0 rpm to 30000 rpm	1rpm	1460rpm	★

Set these parameters according to the motor nameplate.

Motor parameters must be set accurately to ensure optimal control performance. The system provides the auto-tuning function for parameters. To perform auto-tuning, set rated motor parameters accurately.

To ensure control performance, configure the motor according to the system standards for applicable motors. If the motor frequency differs greatly from that of the standard applicable motor, the control performance may degrade.

Param.	Name	Range	Min. unit	Default	Property
F1-07	Encoder angle at power-off (synchronous motor)	0.0 to 359.9	0.1	0	★

Sets the motor's magnetic pole angle at power failure. Its value is recorded at power failure, used for comparison at next power-on.

Param.	Name	Range	Min. unit	Default	Property
F1-09	Current filter coefficient (synchronous motor)	0.0 to 3.0	0.1	0	★

Sets the current filter time, which suppresses the periodic vertical jitter. Increase the value in ascending order of step 0.5 to achieve the optimum effect.

Param.	Name	Range	Min. unit	Default	Property
F1-10	Encoder signal check	0 to 65535	1	0	★

Sets encoder signal check. This parameter is set by the manufacturer, and you need not modify it generally.

Param.	Name	Range	Min. unit	Default	Property
F1-11	Motor auto-tuning selection	0: No operation 1: With-load auto-tuning 2: No-load auto-tuning	1	0	★

- Sets the auto-tuning mode. The values are as follows:
  0: No operation; 1: With-load auto-tuning: static auto-tuning for asynchronous motor and rotary auto-tuning for synchronous motor; 2: No-load auto-tuning.
- Auto-tuning precautions:
  - Make sure that all installations and wirings comply with the technical specifications for electrical safety.
  - With-load auto-tuning must be performed with correct motor wiring (motor U, V, W terminals must correspond one-to-one to the controller U, V, W outputs). If the motor wiring is incorrect, the motor may vibrate or fail to run after brake release. In this case, interchange any two phases of the U, V, W motor leads.

- When the system is in a fault alarm state, it will not start auto-tuning ("TUNE" not displayed). Reset the current fault before starting the auto-tuning process.
- For synchronous motors, another auto-tuning is required if the motor wiring sequence is changed or the encoder is replaced.
- For synchronous motors, perform multiple auto-tuning cycles (three or more times). Compare the PG initial angle (FA-03) obtained from each auto-tuning; successful auto-tuning is confirmed when the error between results is within 5°.
- After the auto-tuning is complete, perform trial run at a low speed to check whether the output current is normal and actual motor running direction is consistent with the command direction. If not, change by setting F0-04.
- With-load auto-tuning can pose risks (in many control cabinets, operation at inspection speed is emergency electrical operation, which bypasses the shaft safety circuit–extreme caution is required). Ensure that no personnel are present in the shaft during auto-tuning.

Perform motor parameter auto-tuning according to *"Figure 8-1 " on page 99* .

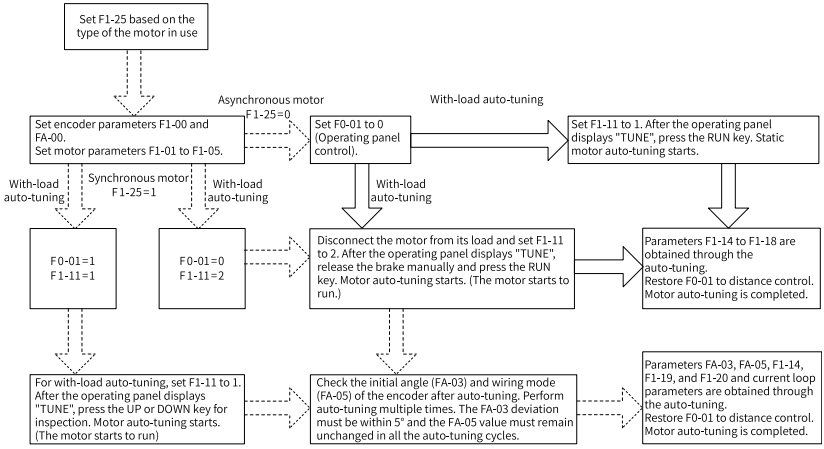


Figure 8-1 Motor auto-tuning flowchart

Description of synchronous motor auto-tuning:

- As the synchronous motor system driven by ME320LN^{new} requires encoder feedback signal, set encoder parameters correctly before auto-tuning.
- During the auto-tuning process for the synchronous motor system, rotational movement is required. The optimal method is no-load dynamic auto-tuning. If conditions do not permit, with-load dynamic auto-tuning can be used as an alternative.
- The stator resistance, d-axis inductance, q-axis inductance, current loop (including position lock) PI parameters, encoder zero position angle are identified during

synchronous motor with-load auto-tuning. Encoder wiring is also identified during no-load auto-tuning.

- During asynchronous motor static auto-tuning, the system identifies stator resistance, rotor resistance, leakage inductance, and automatically calculates mutual inductance and no-load current. A dynamic auto-tuning process can identify mutual inductance, no-load current, and current loop parameters.

- RUN and brake contactor output control
  Due to differences in safety levels across various operating states, the control system handles RUN and brake contactor outputs differently depending on the state. In some cases, manual activation of the contactor is required. The handling of each state is summarized in the following table:

Table 8–1 List of output states

Control mode / Output state	No-load auto-tuning	With-load auto-tuning		Operating panel control F0-01 = 0	Terminal control F0-01 = 1
		Synchronous motor	Asynchronous motor		
RUN contactor	Output	Output	Output	No output	Output
Brake contactor	No output	Output	No output	No output	Output

Param.	Name	Range	Min. unit	Default	Property
F1-14	Stator resistance	0.001 Ω to 65.000 Ω	0.001 Ω	Model dependent	☆
F1-15	Rotor resistance (asynchronous motor)	0.001 Ω to 65.000 Ω	0.001 Ω	Model dependent	☆
F1-16	Leakage inductance (asynchronous motor)	0.01 mH to 650.00 mH	0.01 mH	Model dependent	☆
F1-17	Mutual inductance (asynchronous motor)	0.1 mH to 6500.0 mH	0.1 mH	Model dependent	☆
F1-18	No-load current (asynchronous motor)	0.01 A to 650.00 A	0.01 A	Model dependent	☆

Param.	Name	Range	Min. unit	Default	Property
F1-19	D-axis inductance (synchronous motor)	0.01 mH to 650.00 mH	0.01 mH	0.01 mH	★
F1-20	Q-axis inductance (synchronous motor)	0.01 mH to 650.00 mH	0.01 mH	0.01 mH	★
F1-21	Synchronous motor back EMF	0 V to 65535 V	1 V	0 V	★
F1-25	Motor type selection	0: Asynchronous motor 1: Synchronous motor	1	1	★

To ensure control performance, choose the motor according to the system standards for optimal configuration. If the motor power differs greatly from that of the standard applicable motor, the control performance may degrade.

After the motor auto-tuning is complete, the values of parameters F1-14 to F1-21 are automatically updated.

For asynchronous motors, if field conditions do not allow motor auto-tuning, the known parameters from a similar motor (same brand and model) can be used as reference for manual input.

Note

For asynchronous motors, each time the rated motor power (F1-01) is modified, the system will automatically restore the default standard motor parameters for F1-14 to F1-18.

8.3 Group F2: Vector Control Parameters

Param.	Name	Range	Min. unit	Default	Property
F2-00	Speed loop proportional gain 1	0 to 100	1	35	☆
F2-01	Speed loop integral time 1	0.01s to 10.00s	0.01s	0.60s	☆
F2-02	Switching frequency 1	0.00 Hz to F2-05	0.01 Hz	2.00 Hz	☆

Param.	Name	Range	Min. unit	Default	Property
F2-03	Speed loop proportional gain 2	0 to 100	1	30	☆
F2-04	Speed loop integral time 2	0.01s to 10.00s	0.01s	0.8	☆
F2-05	Switching frequency 2	F2-02 to max. frequency	0.01 Hz	5.00 Hz	☆

F2-00 to F2-05 are used to adjust the speed loop performance in vector control.

F2-00 and F2-01 are PI regulation parameters when the running frequency is smaller than the value of F2-02. F2-03 and F2-04 are PI regulation parameters when the running frequency is larger than the value of F2-05. For the running frequency between switchover frequency 1 and switchover frequency 2, the PI regulation parameter value is the weighted mean of parameters F2-00, F2-01, F2-03, and F2-04. *"Figure 8-2 " on page 102* shows the details.

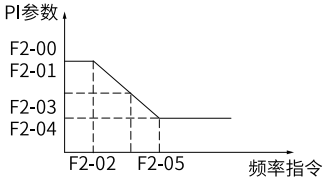


Figure 8-2 Relationship between running frequencies and PI parameters

You can adjust the dynamic response characteristics of the speed loop in vector control by setting the proportional gain and integral time of the speed regulator. To achieve a faster system response, increase the proportional gain and reduce the integral time. Be aware that a too large proportional gain or too small integral time may lead to system oscillation.

Recommended adjustment method:

The default settings meet the requirements of most applications. If the default settings cannot meet the requirements (especially when the motor power is very small), the default speed loop proportional gain may be a little large, leading to the motor oscillation at startup. In this case, decrease the speed loop proportional gain first to ensure that the motor does not oscillate, and then reduce the integral time to ensure that the system has a quick response but small overshoot.

If both switchover frequency 1 and switchover frequency 2 are 0, only F2-03 and F2-04 are valid.

CAUTION

Improper PI parameter settings may cause excessive speed overshoot, and in some cases, lead to overvoltage faults during the overshoot recovery phase.

Param.	Name	Range	Min. unit	Default	Property
F2-06	Current loop proportional gain	10 to 500	1	60	☆
F2-07	Current loop integral gain	10 to 500	1	30	☆

F2-06 and F2-07 are current loop adjusting parameters used on the VC algorithm. Generally, you do not need to adjust these parameters. The default parameter settings can achieve the desired control performance. Adjust them by referring to the speed loop PI adjustment method, if required.

Param.	Name	Range	Min. unit	Default	Property
F2-08	Torque upper limit	0.0% to 200.0%	0.10%	150.00%	☆

ME320LN^{new}output torque current limit. During elevator startup, the upper limit of the pre-torque compensation is also determined by this parameter. When set to 100%, it corresponds to the rated integrated controller current. The motor torque output is given by: F2-08 x (Rated AC drive current/Rated motor current).

Param.	Name	Range	Min. unit	Default	Property
F2-09	Torque acceleration time	1 ms to 500 ms	1 ms	1 ms	★
F2-10	Torque deceleration time	1 ms to 500 ms	1 ms	350 ms	★

Sets the acceleration and deceleration time of the torque current.

During stopping, due to differences in motor characteristics, a "clunking" noise may occur when the current is removed. In such cases, the noise can be eliminated by appropriately increasing the torque deceleration time.

Param.	Name	Range	Min. unit	Default	Property
F2-11	Speed filter coefficient	1 to 20	1	10	★

Eliminates fluctuations in speed feedback; generally no adjustment required.

Param.	Name	Range	Min. unit	Default	Property
F2-12	Angle-free auto-tuning function	0 to 65535 bit1: 0: Angle-free auto-tuning function disabled 1: Angle-free auto-tuning function enabled bit2: 0: Semi-automatic 1: Automatic	1	0	★

Sets the angle-free auto-tuning function.

Angle-free auto-tuning function selection			
bit	Function	Definition	Default
bit1	Angle-free auto-tuning enable	0: Angle-free auto-tuning function disabled 1: Angle-free auto-tuning function enabled	0
bit2	Angle-free auto-tuning mode	0: Semi-automatic 1: Automatic	0

Note

Semi-automatic mode means the angle-free auto-tuning function is enabled only when the inspection signal is active; automatic mode means the angle-free auto-tuning function is enabled regardless of whether the inspection signal is active or not.

8.4 Group F3: V/f Function Parameters

Param.	Name	Range	Min. unit	Default	Property
F3-00	Startup frequency	0.00 Hz to 10.00 Hz	0.01 Hz	0.00 Hz	☆

To improve the motor starting torque at elevator startup, an appropriate startup frequency should be set. Additionally, setting a startup frequency active time allows the motor to establish sufficient magnetic flux during initial motor startup. This function is effective only when the ME320LN^{new} series AC drive operates in multi-speed control mode. It is invalid in other modes such as digital setting or analog input setting.

Param.	Name	Range	Min. unit	Default	Property
F3-01	Torque output delay	0.00s to 10.00s	0.01s	0.20s	★
F3-02	Brake release delay	0.20s to 10.00s	0.01s	0.20s	★
F3-03	Zero-speed delay	0.00s to 10.00s	0.01s	0.30s	★
F3-04	Starting time	0.00s to 10.00s	0.01s	0.00s	★
F3-05	Startup frequency active time	0.00s to 10.00s	0.01s	0.00s	★
F3-06	Brake close delay	0.00s to 10.00s	0.01s	0.20s	★
F3-07	Stop zero-speed delay	0.00s to 10.00s	0.01s	0.30s	★
F3-08	RUN contactor open delay	0.00s to 10.00s	0.01s	0.00s	★

These parameters are used to improve the riding comfort at elevator startup and stop. The definition of each parameter is shown in *"Figure 8-3 " on page 105* (taking the multi-speed operation as an example):

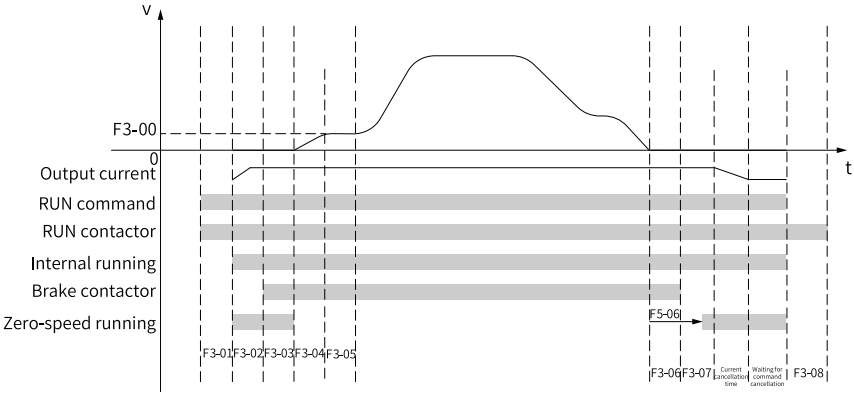


Figure 8-3 Operation timing diagram

- "Current cancellation time" is dependent on the actual current and torque acceleration/deceleration time (F2-10).
- "Wait for command cancellation" can be set to be always waiting or a maximum of 5s waiting time according to the setting of F6-23.
- When the RUN contactor output is not used, the time segments specified in F3-01 and F3-08 are skipped.
- When the brake output control and running output function are not used, the time segments specified in F3-02 and F3-07 are skipped.

Param.	Name	Range	Min. unit	Default	Property
F3-09	Startup pre-torque setting selection	0: No pre-torque 1: DI setting 2: AI1 setting 3: AI2 setting 4: Apply pre-torque initial offset 5: No-load-cell compensation	1	0	★

The ME320LN^{new} series AC drive has five pre-torque setting options. Among them, the DI, AI1, and AI2 settings can be used only with the load cell. When the pre-torque compensation function is enabled, the system can output a torque that matches the elevator load in advance, ensuring smooth and comfortable operation at the instant the brake is released. The output pre-torque is subject to the torque upper limit (F2-08). If the calculated pre-torque exceeds F2-08, the system will output the torque set in F2-08.

In applications where the elevator does not have a load cell, set F3-09 to 4, then adjust the pre-torque offset parameter (F3-12). This allows the ME320LN^{new} series AC drive to perform sufficient pre-excitation before brake release, thereby improving startup comfort. However, this parameter should not be set too high; it is generally recommended to keep it within the range of -15% to +15%.

If no-load-cell compensation is used, set F3-09 to 5. Then, adjust parameters from FD-05 to FD-07 based on site conditions. The gradual adjustment should start from these base values: FD-05 = 15.0%, FD-07 = 0.50, and FD-08 = 0.60.

Param.	Name	Range	Min. unit	Default	Property
F3-10	Pre-torque offset	0.0% to 100.0%	0.10%	48.00%	☆
F3-11	Pre-torque gain	0.00 to 1.50	0.01	0.6	★

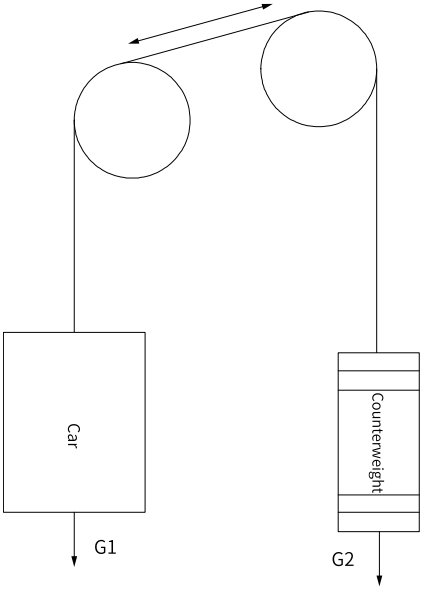


Figure 8-4 Relationship between the car load and the counterweight

Pre-torque offset is actually the balancing factor of the elevator, indicating the percentage of the counterweight to the rated load. Assume that the no-load weight is G1, counterweight is G2, and rated elevator load is G3: F3-10 = (G2-G1)/G3

Assume the load weight in the car is G4, then the motor pre-torque output is calculated as: Motor pre-torque output = Pre-torque gain x {G4-[G3×(F3-10)]}

The pre-torque output direction is only related to the load in the car instead of the running direction. If the load in the car is larger than "[G3×(F3-10)]", the pre-torque output direction is upward. If the load in the car is smaller than "[G3×(F3-10)]", the pre-torque output direction is downward.

Param.	Name	Range	Min. unit	Default	Property
F3-12	Pre-torque initial offset	-100.0% to 100.0%	0.10%	10.00%	☆

When F3-09 is set to 4 (Fixed pre-torque), the ME320LN^{new} series AC drive outputs a corresponding pre-torque current based on the value of F3-12 before the brake is released. This process enables pre-excitation of the motor, thereby improving starting comfort. However, this parameter should not be set too high; it is generally recommended to keep it within the range of -15% to +15%.

Param.	Name	Range	Min. unit	Default	Property
F3-13	DI load cell signal 1	0.0% to 100.0%	0.10%	10.00%	★
F3-14	DI load cell signal 2	0.0% to 100.0%	0.10%	30.00%	★
F3-15	DI load cell signal 3	0.0% to 100.0%	0.10%	70.00%	★
F3-16	DI load cell signal 4	0.0% to 100.0%	0.10%	90.00%	★

When F3-09 is set to 1, the ME320LN^{new} series AC drive detects the car load based on four DI load cell signals, and accordingly controls the magnitude of the pre-torque current output.

Parameters F3-13 to F3-16 correspond to the settings for the digital load cell input signals, matching one-to-one with load cell terminals 1 to 4, and are used in conjunction with them. The value set for each of these four parameters represents the percentage of rated load in the car when the corresponding input signal becomes active.

For example, when the car load reaches 10% in an elevator and the load cell terminal 1 signal is active, set F3-13 to 10%. When the car load reaches 30% and the load cell terminal 2 signal is active, set F3-14 to 30%.

Param.	Name	Range	Min. unit	Default	Property
F3-17	AI load cell filter time	0.00s to 1.00s	0.01s	0.10s	☆
F3-18	Analog load cell no-load input	0.00 V to 10.00 V	0.01 V	0.00 V	☆
F3-19	Analog load cell full-load input	0.00 V to 10.00 V	0.01 V	10.00 V	☆

When F3-09 is set to 2 or 3, the ME320LN^{new} series AC drive detects the car load based on AI1 or AI2 analog signals, and accordingly controls the magnitude of the pre-torque current output.

F3-17 is the filter time of the analog signal. Increasing this parameter can improve the anti-interference capability of the load cell signal.

When the analog load cell input is used, the corresponding input voltages at car no-load and full-load must be set to ensure correct pre-torque compensation.

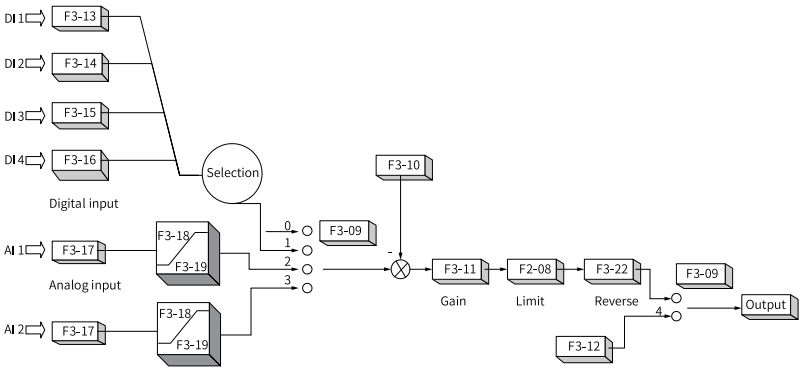


Figure 8-5 Pre-torque principle block diagram

Param.	Name	Range	Min. unit	Default	Property
F3-20	Analog load cell auto-tuning	0 to 100	1	0	☆
F3-21	Analog load cell auto-tuning selection	0: No operation 1: Enabled	1	0	☆

When analog load cell input is selected, you can perform load cell auto-tuning. By changing the load in the car, the corresponding no-load and full-load data will be recorded in F3-18 and F3-19. The detailed procedure is as follows.

1. Ensure that F3-21 is set to 1 and F3-09 is set to 2 or 3 to enable load cell auto tuning.
2. Stop the elevator at any floor, with the car in the no-load state. Set F3-20 to 0 and press ENTER.
3. Put N% load in the car. Then set F3-20 to N and press ENTER to confirm. For example, if you put 100 kg load in the elevator with rated load of 1000 kg, set F3-20 to 10. Load cell auto-tuning is completed.

"Figure 8-6 " on page 110 shows the detailed procedure.

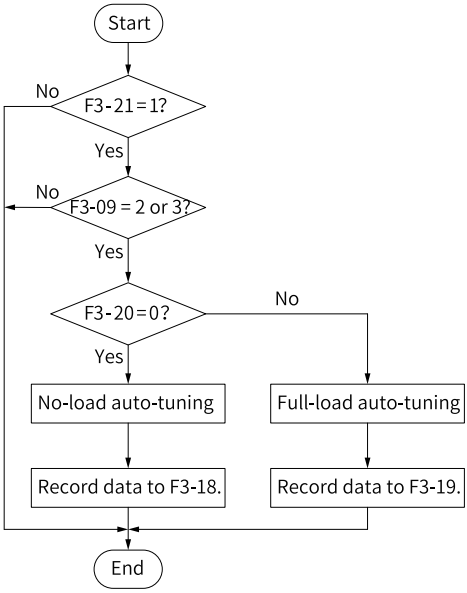


Figure 8-6 Analog load-cell auto-tuning flowchart

Note

- Set F3-21 to 1 during auto-tuning and restore it to 0 after the auto-tuning is completed.
- No-load auto-tuning must be performed before full-load auto-tuning. Otherwise, the obtained data is incorrect.

Param.	Name	Range	Min. unit	Default	Property
F3-22	Pre-torque direction reversing	0: Direction unchanged 1: Direction reversed	1	0	☆

This parameter can be used to directly reverse the direction without changing the pre-torque value.

Param.	Name	Range	Min. unit	Default	Property
F3-24	Slip test	0: Disabled 1: Enabled	1	0	★

To perform a slip test, the inspection input signal must be configured, and the slip test can only be executed when the inspection signal is active.

Operating procedure:

1. In the stop state, set F3-24 to 1.
2. Activate the inspection input signal.
3. Press the inspection button.

During the slip test, the AC drive will accelerate according to the acceleration time set in F7-16. If the slip effect is not obvious during the slip test, F7-16 can be appropriately reduced.

After the slip test is complete, change F3-24 to 0 to exit the slip test mode.

8.5 Group F4: Input Function Parameters

Param.	Name	Range	Min. unit	Default	Property
F4-00	DI filter time	0.001s to 0.200s	0.001	0.020s	☆

This parameter specifies the sensitivity of DI terminals. If DI terminals are liable to interference, which may cause malfunction, set this parameter to a larger value to enhance the anti-interference capability. However, this will lower the sensitivity of DI terminals.

Param.	Name	Range	Min. unit	Default	Property
F4-01	DI1 function selection	0: No function 1: Forward running (FWD, up) 2: Reverse running (REV, down) 3: Multi-speed terminal 1 4: Multi-speed terminal 2 5: Multi-speed terminal 3 6: Fault reset 7: Enable control 8: Inspection signal 9: Emergency input 10: RUN contactor feedback 11: Brake feedback 12: Load cell terminal 1 13: Load cell terminal 2 14: Load cell terminal 3 15: Load cell terminal 4 16: External fault 17: Motor overtemperature 18: Up speed judgment 19: Down speed judgment 20: Multi-speed logic selection 1 21: Multi-speed logic selection 2 22: Direct travel ride command The terminal input range is 0 to 122. The hundreds (position) of 1 indicates that the signal is of NC type, and the lower two bits indicate the selected function (invalid if the number is larger than 22). For example, "106" indicates that the DI is set with fault reset function and the function is NC type.	1	3	★
F4-02	DI2 function selection		1	4	★
F4-03	DI3 function selection		1	5	★
F4-04	DI4 function selection		1	6	★
F4-05	DI5 function selection		1	7	★
F4-06	DI6 function selection		1	1	★
F4-07	DI7 function selection		1	2	★
F4-08	DI8 function selection		1	0	★
F4-09	DI9 function selection		1	0	★
F4-10	DI10 function selection		1	0	★

Parameters F4-01 to F4-10 set corresponding functions for multi-function DI terminals.

<table>
<tr><th>Setting</th><th>Function</th><th>Description</th></tr>
<tr><td>0</td><td>No function</td><td>Even if there is signal input to the terminal, the AC drive has no response. You can set the reserved terminals as no function to prevent operation errors.</td></tr>
<tr><td>1</td><td>Forward running (FWD)</td><td rowspan="2">The forward and reverse running of the AC drive is controlled through external terminals, thus enabling the up and down operation of the elevator. Note: After each running cycle, disconnect the command terminal once. Otherwise, the elevator is unable to run the next time.
<table><tr><th>FWD</th><th>REV</th><th>Definition</th></tr><tr><td>OFF</td><td>OFF</td><td>Invalid</td></tr><tr><td>ON</td><td>OFF</td><td>Forward running</td></tr><tr><td>OFF</td><td>ON</td><td>Reverse running</td></tr><tr><td>ON</td><td>ON</td><td>Invalid</td></tr></table></td></tr>
<tr><td>2</td><td>Reverse running</td></tr>
<tr><td>3</td><td>Multi-speed terminal 1 (K1)</td><td rowspan="3">The 8 speeds can be set through the flexible combinations of three multi-speed terminals. For details, see the following table:
<table><tr><th>K3</th><th>K2</th><th>K1</th><th>Frequency reference</th><th>Param.</th></tr><tr><td>OFF</td><td>OFF</td><td>OFF</td><td>Multi-speed 0</td><td>F6-00</td></tr><tr><td>OFF</td><td>OFF</td><td>ON</td><td>Multi-speed 1</td><td>F6-01</td></tr><tr><td>OFF</td><td>ON</td><td>OFF</td><td>Multi-speed 2</td><td>F6-02</td></tr><tr><td>OFF</td><td>ON</td><td>ON</td><td>Multi-speed 3</td><td>F6-03</td></tr><tr><td>ON</td><td>OFF</td><td>OFF</td><td>Multi-speed 4</td><td>F6-04</td></tr><tr><td>ON</td><td>OFF</td><td>ON</td><td>Multi-speed 5</td><td>F6-05</td></tr><tr><td>ON</td><td>ON</td><td>OFF</td><td>Multi-speed 6</td><td>F6-06</td></tr><tr><td>ON</td><td>ON</td><td>ON</td><td>Multi-speed 7</td><td>F6-07</td></tr></table></td></tr>
<tr><td>4</td><td>Multi-speed terminal 2 (K2)</td></tr>
<tr><td>5</td><td>Multi-speed terminal 3 (K3)</td></tr>
<tr><td>6</td><td>Fault reset input</td><td>Resets the external fault. This is the same as the RESET key on the keypad. It enables automatic fault reset for the elevator system.</td></tr>
<tr><td>7</td><td>Enable control input</td><td>The RUN enable terminal is set. The AC drive stops immediately and outputs the brake close command when the RUN enable signal is missing during running.</td></tr>
<tr><td>8</td><td>Inspection signal</td><td>When the inspection signal is active, the ME320LN^{new} selects multi-speed operation based on the non-zero parameter set in F6-16. During the stop process, if the inspection input signal is removed first, the ME320LN^{new} AC drive decelerates to zero according to the deceleration time associated with the multi-speed defined in F6-16, and continues until the forward or reverse running command is canceled. If the forward or reverse running command is directly removed during inspection operation, the AC drive immediately stops output.</td></tr>
</table>

Setting	Function	Description
9	Emergency input	This input indicates that the elevator will enter emergency operation mode, powered by an external 48 V battery or a 220 V UPS supply.
10	RUN contactor feedback input	If a contactor feedback terminal or brake feedback terminal is configured, after the AC drive stops (outputs the open contactor signal), it begins to monitor the status of the contactor feedback and brake feedback signals. If either signal remains active for 2.5s, the ME320LN^{new} will output a stuck signal. • When the RUN contactor feedback signal is selected, the ME320LN^{new} AC drive detects this signal during the startup process. • When the brake feedback signal is selected, the drive continuously monitors this signal during operation.
11	Brake feedback input	
12	Load cell terminal 1 input	Correspond to a digital load cell signal. The related setting parameters are configured in F3-13 to F3-16.
13	Load cell terminal 2 input	
14	Load cell terminal 3 input	
15	Load cell terminal 4 input	
16	External fault input	When the signal is active, the AC drive sounds alarm and stops running.
17	Motor overheat input	When the DI terminal is set to 17 or 117 (Motor overheat NO/NC input), the motor overheat protection is determined when the corresponding digital terminal signal is active. When the signal returns to inactive (normal state), the motor overheat fault is automatically resets.
18	Up speed judgment input	Together with parameters FC-02 and FC-03, these signals enable the forced slow-down function. During up operation, if the speed detection switch (the forced slow-down switch) is activated, the ME320LN^{new} AC drive compares the current running frequency with FC-02. If the current frequency is greater than FC-02, the AC drive immediately begins decelerating to stop according to the deceleration time set in FC-01. This ensures safe and reliable elevator operation. The same is true for the down operation. For details, see the description in group FC.
19	Down speed judgment input	

Setting	Function	Description
20	Multi-speed logic selection 1	Used when the multi-speed reference mode is set for special applications (F0-02 = 5). Do not use it in general situations.
21	Multi-speed logic selection 2	
22	Direct travel ride command	When the signal is activated, the direct travel ride function is enabled. During deceleration to stop, the ME320LN^{new} AC drive starts direct travel ride after this signal is active. For details, see the chapter "Direct Travel Ride Commissioning".

Note

The DI input range is 0 to 122. The hundreds indicates the normally open (NO)/normally closed (NC) type (1: NC, 0: NO), and the lowest two digits indicate the selected function (invalid if the number is larger than 22). For example, "106" indicates that the DI is set with fault reset function and the function is NC type.

Param.	Name	Range	Min. unit	Default	Property
F4-13	Multi-speed combination filter time	0.000s to 0.200s	0.001	0.020s	☆

The multi-speed references are given by the external controller. If incorrect speed references exist due to relay delay or discreteness of controller terminals, the elevator running curve may be abnormal. Parameter F4-13 is used to filter the references from the multi-speed terminals to avoid incorrect referencesduring multi-speed switchover. *"Figure 8-7 " on page 115* shows the details.

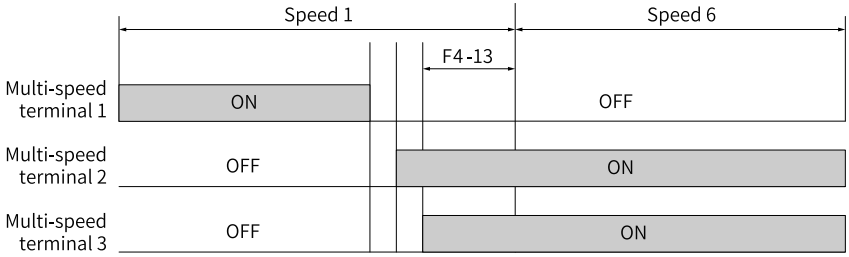


Figure 8-7 Diagram for multi-speed signal switchover

8.6 Group F5: Output Function Parameters

Param.	Name	Range	Min. unit	Default	Property
F5-00	FM output selection	0: No output 1: In operation 2: Zero-speed running 3: Zero-speed signal (also output in stop) 4: Fault signal 5: RUN contactor output control 6: Brake output control 7: Advance door opening 8: Bus undervoltage	1	15	★
F5-01	DO1 function		1	3	★
F5-02	DO2 output selection		1	0	★
F5-03	Control board relay output selection		1	4	★
F5-04	Expansion board relay output selection		1	0	★

For details, see the following table.

Setting	Function	Description
0	No function	The output terminal has no function.
1	Running	When the AC drive is running, it output the "ON" signal. Note: F6-23 bit 9 controls the switching of output selection.
2	Zero-speed running	The signal is active when the drive is in zero-speed running state
3	Zero-speed signal	When the AC drive output frequency is 0 or in the stop state, the signal is active.
4	Fault signal	When the AC drive has a fault, the fault signal is active.
5	RUN contactor output control	The terminal with this function controls the actions of the running contactor.
6	Brake output control	The terminal with this function controls the actions of the brake contactor.
7	Advance door opening signal	When the AC drive decelerates, this signal is active if the output frequency is lower than the setting of FC-04.
8	Bus undervoltage	When the bus voltage is below 280 V, the AC drive outputs the bus undervoltage signal to facilitate the battery-powered operation.
9	FDT 1 output	See the description of parameters in group FC.
10	FDT 2 output	
11	Frequency reached	
12	Overspeed output	When running at a frequency higher than the set frequency (FC-09) for a period longer than FC-10, the AC drive has overspeed output.

Setting	Function	Description
14	Running time reached	If the accumulative operating time of the drive exceeds the time set in F8-07, the AC drive outputs the "ON" signal.
15	Ready for running	When the AC drive is ready for operation, it outputs the "ON" signal.
16	Contact stuck output control	When the contactor contact is detected to be stuck, the AC drive outputs the "ON" signal.
17	Re-leveling output	When the AC drive is ready for operation and the running frequency is below FC-05, it outputs the "ON" signal.
18	Light-load running output	The AC drive outputs the "ON" signal when the elevator car is operating under light-load conditions.

Param.	Name	Range	Min. unit	Default	Property
F5-06	Zero-speed output hysteresis time	0.000s to 2.000s	1	0.000s	★

When the output function is set to 2 (Zero-speed running), the hysteresis time of the corresponding output signal is determined by parameter F5-06. For details, see *"Figure 8-3 " on page 105* .

Param.	Name	Range	Min. unit	Default	Property
F5-07	AO function selection	0: Running frequency 1: Frequency reference 2: Output current 3: Output torque 4: Output voltage 5: AI1 6: AI2	1	0	★

F5-07 sets the function of AO1 on the MCB of the ME320LN^{new} AC drive.

The standard output (zero offset 0, gain 1) of AO1 is 0 mA to 20 mA (or 0 V to 10 V). The range that can be set for AO1 are listed in the following table.

Setting	Function	Range
0	Running frequency	0 to Maximum output frequency
1	Frequency reference	0 to Maximum output frequency
2	Output current	0 A to 2 times the rated AC drive current
3	Output torque	0 to 2 times the rated motor current
4	Output voltage	0 to 1.2 times the rated AC drive voltage

Setting	Function	Range
5	AI1	0 V to 10 V
6	AI2	0 V to 10 V/0 mA to 20 mA

Param.	Name	Range	Min. unit	Default	Property
F5-08	AO zero offset	-100.0% to 100.0%	0.10%	0.00%	☆
F5-09	AO gain	-10.00 to 10.00	0.01	1	☆

If "b" represents the zero offset, "k" the gain, "Y" the actual output, and "X" the standard output, then Y = kX + b.

AO zero offset coefficient 100% corresponds to 10 V (20 mA).

The standard output refers to the output value of 0 V to 10 V (20 mA) corresponding to the analog output value of 0 to the maximum.

These parameters are used to correct the offset of the analog output zero drift and the output amplitude. They can also be used to define the required AO curve.

Example: If the analog output is the operating frequency, and it is expected that the output is 8 V (16 mA) when the frequency is 0 and 3 V (6 mA) at the maximum frequency, the gain shall be set to -0.50, and the zero offset shall be set to 80%.

Note

When the direct travel ride function is used, the AO output function is automatically disabled.

8.7 Group F6: Speed Parameters

When multi-speed control is selected for ME320LN^{new} AC drive, set parameters F6-00 to F6-15 for curve running characteristics.

Param.	Name	Range	Min. unit	Default	Property
F6-00	Multi-speed 0	0 to Maximum frequency	0.01 Hz	0.00 Hz	★
F6-01	Multi-speed 1	0 to Maximum frequency	0.01 Hz	0.00 Hz	★
F6-02	Multi-speed 2	0 to Maximum frequency	0.01 Hz	0.00 Hz	★
F6-03	Multi-speed 3	0 to Maximum frequency	0.01 Hz	0.00 Hz	★
F6-04	Multi-speed 4	0 to Maximum frequency	0.01 Hz	0.00 Hz	★
F6-05	Multi-speed 5	0 to Maximum frequency	0.01 Hz	0.00 Hz	★

Param.	Name	Range	Min. unit	Default	Property
F6-06	Multi-speed 6	0 to Maximum frequency	0.01 Hz	0.00 Hz	★
F6-07	Multi-speed 7	0 to Maximum frequency	0.01 Hz	0.00 Hz	★

The eight speeds are set by state combinations of three DI terminals (multi-speed terminals 1 to 3). Set F0-02 to 1, and set the three DI terminals respectively with functions 3, 4, and 5, represented by K1, K2, and K3.

The relation between the DIs and their corresponding speeds is shown below.

K3	K2	K1	Frequency reference	Param.
OFF	OFF	OFF	Multi-speed 0	F6-00
OFF	OFF	ON	Multi-speed 1	F6-01
OFF	ON	OFF	Multi-speed 2	F6-02
OFF	ON	ON	Multi-speed 3	F6-03
ON	OFF	OFF	Multi-speed 4	F6-04
ON	OFF	ON	Multi-speed 5	F6-05
ON	ON	OFF	Multi-speed 6	F6-06
ON	ON	ON	Multi-speed 7	F6-07

The ME320LN^{new} AC drive determines the running frequency reference according to input combinations of multi-speed terminals. For example, if it is multi-speed 2, the AC drive adopts the value set in F6-02 as the target frequency for its running. During operation of the elevator, the controller determines different multi-speed combinations according to actual application situations and inputs these into the AC drive to achieve running speed control of the elevator.

Param.	Name	Range	Min. unit	Default	Property
F6-08	Multi-speed 0 acceleration/ deceleration curve selection	1 to 4	1	1	★
F6-09	Multi-speed 1 acceleration/ deceleration curve selection	1 to 4	1	1	★
F6-10	Multi-speed 2 acceleration/ deceleration curve selection	1 to 4	1	1	★

Param.	Name	Range	Min. unit	Default	Property
F6-11	Multi-speed 3 acceleration/ deceleration curve selection	1 to 4	1	1	★
F6-12	Multi-speed 4 acceleration/ deceleration curve selection	1 to 4	1	1	★
F6-13	Multi-speed 5 acceleration/ deceleration curve selection	1 to 4	1	1	★
F6-14	Multi-speed 6 acceleration/ deceleration curve selection	1 to 4	1	1	★
F6-15	Multi-speed 7 acceleration/ deceleration curve selection	1 to 4	1	1	★

The ME320LN^{new} AC drive provides four groups of acceleration/deceleration time. For details, see the description in group F7. Parameters F6-08 to F6-15 select the acceleration/deceleration time (1 to 4). This allows different curves to have different acceleration and deceleration time when the elevator is running in different states.

Note: In case of acceleration, the system adopts the acceleration time of the target speed and the corresponding S-curve setting. In case of deceleration, the system adopts the deceleration time of the starting speed and the corresponding S-curve setting.

For example: assume that F6-01 = 0.00 Hz, F6-03 = 8.00 Hz, F6-05 = 48.00 Hz; F6-09 = 2; F6-11 = 3; F6-13 = 4.

- When the AC drive accelerates from F6-01 to F6-05, the acceleration time is 4 (F7-12) set in F6-13.
- When the AC drive decelerates from F6-05 to F6-03, the deceleration time is 4 (F7-13) set in F6-13.
- When the AC drive continues to decelerate from F6-03 to F6-01, the deceleration time is 3 (F7-09) set in F6-11.

This is one running cycle of the elevator under multi-speed control. During this process, the acceleration/deceleration time is generally set to 3s to 4s. But when the elevator decelerates to stop from the creeping speed, the deceleration time can be set differently. For example, you can increase F7-05 properly to ensure smooth landing. *"Figure 8-8 " on page 121* shows the details.

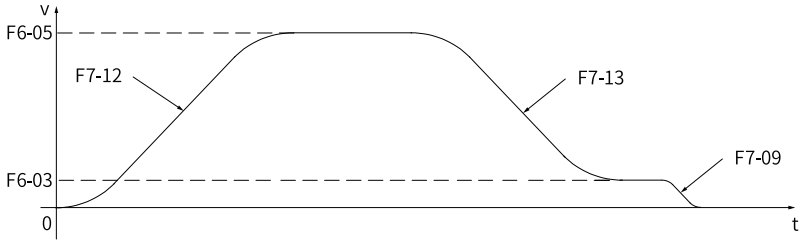


Figure 8-8 Acceleration/Deceleration time

Different acceleration/deceleration running curves are obtained based on the 8 speed references and 4 acceleration/deceleration groups.

Param.	Name	Range	Min. unit	Default	Property
F6-16	Inspection speed selection	0 to 7	1	0	★

Sets the multi-speed options during inspection. For details, see "Inspection Operation".

Param.	Name	Range	Min. unit	Default	Property
F6-17	Emergency evacuation power supply at power failure	0: Motor not running 1: UPS-powered operation 2: 48 V battery power supply	1	0	★

For details, see "Emergency Operation at Power Failure".

Param.	Name	Range	Min. unit	Default	Property
F6-18	Analog minimum input	0.00 V to 10.00 V	0.01 V	0.00 V	☆
F6-19	Corresponding percentage of minimum analog input	0.0% to 100.0%	0.10%	0.00%	☆
F6-20	Maximum analog input	0.00 V to 10.00 V	0.01 V	10.00 V	☆

Param.	Name	Range	Min. unit	Default	Property
F6-21	Corresponding percentage of maximum analog input	0.0% to 100.0%	0.10%	100.00%	☆
F6-22	AI filter time	0.00s to 1.00s	0.01s	0.10s	☆

Define the ME320LN^{new} AC drive speed settings in analog control mode, and the relationship between AI voltage and the setpoint represented by analog input. When the AI voltage goes beyond the preset range, the system uses the maximum or minimum value.

When the analog input is current input, 1 mA current corresponds to 0.5 V voltage.

If the function selected in F0-02 is set to AI1 or AI2, then the corresponding speed channel is processed through parameters F6-18 to F6-22, resulting in a speed reference expressed as a percentage of the maximum frequency or rated frequency. This percentage value becomes the current speed reference for the drive.

Param.	Name	Range	Min. unit	Default	Property
F6-23	AC drive function selection 1	0 to 65535	1	560	☆

This parameter configures various AC drive functions. Each bit has a specific function, as shown in the following table:

F6-23 AC drive function selection 1			
bit	Function	Definition	Default
bit0	Current cancellation at stop	0: Immediate stop at brake close 1: Current cancellation before stop at brake close	0
bit1	No-load-cell compensation function	0: No-load-cell compensation disabled during auto-tuning 1: No-load-cell compensation always enabled	0
bit2	Waiting selection at stop	0: Anti-jitter enabled at stop 1: Anti-jitter disabled at stop	0
bit4	Maximum frequency upper limit selection	0: The maximum frequency is 90 Hz 1: The maximum frequency equals to the rated frequency	1

F6-23 AC drive function selection 1			
bit	Function	Definition	Default
bit5	Analog frequency reference	0: Analog provided according to maximum frequency 1: Analog provided according to rated frequency	1
bit6	Reserved	-	0
bit7	Restart selection after stop	0: After stop, if the external command has not been cleared, restart is not allowed. 1: After stop, even if the external command has not been cleared, restart is allowed when a frequency reference is provided.	0
bit8	S-curve optimization selection	0: Disable S-curve optimization 1: Enable S-curve optimization (linked to parameter F6-30)	0
bit9	"Running" signal output selection	0: The "Running" output signal is synchronized with brake release 1: The "Running" output signal is synchronized with internal operation status	1

Param.	Name	Range	Min. unit	Default	Property
F6-24	Motor overtemperature voltage threshold	0.00 V to 11.00 V	0.01 V	0.0 V	☆

Motor overtemperature is judged by the AI2 terminal. After setting F6-24 to a non-zero value:

Motor overtemperature will no longer be judged based on the input terminal functions in group F4. When the voltage input on AI2 remains higher than the voltage set in F6-24 (filter time 0.5s), the AC drive reports Err39 and performs motor overtemperature protection. When the voltage on AI2 is always lower than the value set in F6-24 (filter time 2s), the motor overtemperature fault is reset automatically.

The thermistor R2 resistance is 1.33 kΩ; it is recommended that R1 resistance be 2.0 kΩ and F6-24 be set to 3.9 V. The wiring is shown in *"Figure 8-9 " on page 124* .

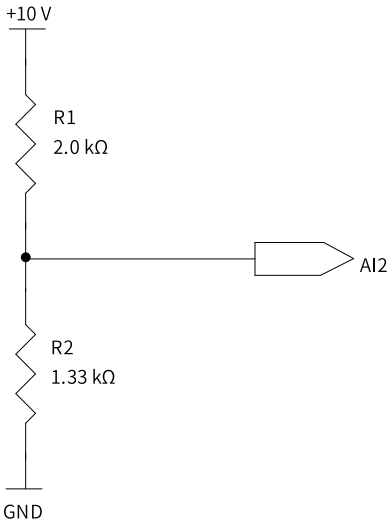


Figure 8-9 Thermistor wiring

Terminals +10V, GND, and AI2 in *"Figure 8-9 " on page 124* are respectively connected to terminals +10V, GND, and AI2 on the MCB of the AC drive.

Param.	Name	Range	Min. unit	Default	Property
F6-25	AC drive function selection 2	0 to 65535	1	0	☆

This parameter configures various AC drive functions. Each bit has a specific function, as shown in the following table:

F6-25 AC drive function selection 2			
bit	Function	Definition	Default
bit0	SPI communication fault detection	0: SPI communication fault detection 1: No detection	0
bit1	FA-03 and FA-05 modification property	0: FA-03 and FA-05 cannot be modified when not in panel control mode; after modification, F0-01 cannot be changed 1: Parameters can be modified	0
bit2	Fault reset	0: Err16, Err17 and Err33 reset not possible 1: Err16, Err17 and Err33 reset possible	0

F6-25 AC drive function selection 2			
bit	Function	Definition	De fault
bit3	No-load-cell compensation function	0: No-load-cell startup disabled during emergency operation 1: No-load-cell startup enabled during emergency operation	0
bit4	Control mode restriction	0: Only FVC possible under synchronous motor terminal control 1: No restriction	0
bit5	Detection of excessive speed deviation	0: Excessive speed deviation detection only after feedback frequency exceeds 1/4 of rated frequency 1: Excessive speed deviation detection after startup	0
bit6	Run command response during emergency operation	0: Emergency evacuation cannot be initiated if a run command is present 1: Emergency rescue can be initiated even if a run command is present	0
bit7	Light-load direction judgment in emergency evacuation	0: Light-load direction is not automatically judged in emergency evacuation 1: Light-load direction is automatically judged in emergency evacuation	0

Par am.	Name	Range	Min. unit	Default	Proper ty
F6-27	Zero-speed signal output delay	0 ms to 9999 ms	1	0	☆

When the output frequency changes from non-zero to zero, the timing starts. After the time reaches the value of this parameter, the AC drive outputs zero-speed signal.

Par am.	Name	Range	Min. unit	Default	Proper ty
F6-28	Upper limit of emergency evacuation speed	0.00 Hz to Maximum frequency	0.01 Hz	8.00 Hz	★

Limits the emergency evacuation speed. When the emergency evacuation speed is higher than this value, Err32 is reported and the drive stops running.

Param.	Name	Range	Min. unit	Default	Property
F6-29	Analog input filter	0 V to 0.10 V	0.01 V	0 V	★

To prevent the drive from incorrectly detecting the frequency reference when the elevator controller provides no analog signal due to circuit issues.

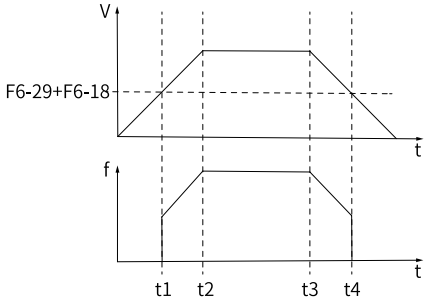


Figure 8-10 Timing diagram

Param.	Name	Range	Min. unit	Default	Property
F6-30	Adjustment threshold for special acceleration rate	0 to F0-05	0.01 Hz	2.00 Hz	★

F6-23 bit8 needs to be set to 1 to enable the function.

S-curve optimization means that during acceleration or deceleration, if the elevator controller changes the target frequency, the AC drive optimizes the speed profile to make it smoother.

If the difference between the current frequency and the new target frequency is less than F6-30, the AC drive will optimize the speed curve. Otherwise, no speed curve optimization is performed.

8.8 Group F7: Auxiliary Function Parameters

The ME320LN^{new} AC drive supports four groups of acceleration/deceleration time with four groups of S-curves set according to user needs.

Param.	Name	Range	Min. unit	Default	Property
F7-00	Acceleration time 1	1.0s to 100.0s	0.1s	4.0s	☆
F7-01	Deceleration time 1	1.0s to 100.0s	0.1s	4.0s	☆
F7-02	Time proportion of S-curve 1 start phase	10.0% to 40.0%	0.10%	40.00%	★
F7-03	Time proportion of S-curve 1 end segment	10.0% to 40.0%	0.10%	40.00%	★
F7-04	Acceleration time 2	1.0s to 100.0s	0.1s	4.0s	☆
F7-05	Deceleration time 2	1.0s to 100.0s	0.1s	4.0s	☆
F7-06	Time proportion of S-curve 2 start phase	10.0% to 40.0%	0.10%	40.00%	★
F7-07	Time proportion of S-curve 2 end segment	10.0% to 40.0%	0.10%	40.00%	★
F7-08	Acceleration time 3	1.0s to 100.0s	0.1s	4.0s	☆
F7-09	Deceleration time 3	1.0s to 100.0s	0.1s	20.0s	☆
F7-10	Time proportion of S-curve 3 start phase	10.0% to 50.0%	0.10%	40.00%	★
F7-11	Time proportion of S-curve 3 end segment	10.0% to 50.0%	0.10%	40.00%	★
F7-12	Acceleration time 4	0.5s to 100.0s	0.1s	1.0s	☆
F7-13	Deceleration time 4	0.5s to 100.0s	0.1s	1.0s	☆

Par am.	Name	Range	Min. unit	Default	Proper ty
F7-14	Time proportion of S-curve 4 start segment	10.0% to 50.0%	0.10%	40.00%	★
F7-15	Time proportion of S-curve 4 end segment	10.0% to 50.0%	0.10%	40.00%	★

You can select the acceleration/deceleration time of each multi-speed section and the S-curve characteristics during AC operation through parameters of F6-08 to F6-15.

- Acceleration time specifies the time t1 required by the AC drive to accelerate from 0 Hz to the maximum frequency (F0-05).
- Deceleration time specifies the time t2 required by the AC drive to decelerate from the maximum frequency (F0-05) to 0 Hz.

"Figure 8-11 " on page 128 shows the details.

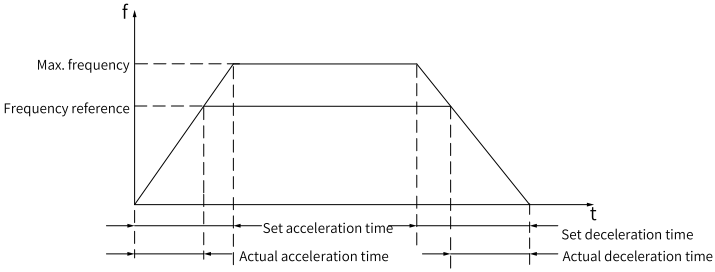


Figure 8-11 Acceleration/Deceleration time

- If the frequency reference is maximum frequency, actual acceleration/deceleration time is the set acceleration/deceleration time reference.
- If the frequency reference is smaller than maximum frequency, actual acceleration/deceleration time is calculated by the equation: Actual acceleration/deceleration time = Reference x (Frequency reference/Maximum frequency).

The ME320LN^{new} AC drive has four groups of S-curves, each with symmetrical acceleration and deceleration phases. Take the S-curve 1 in *"Figure 8-12 " on page 129* as an example. T1 is the time defined in F7-02, within which the ramp of the output frequency change increases gradually. T2 is the time defined in F7-03, within which the slope of the output frequency change gradually decreases to 0. Within the time between T1 and T2, the slope of the output frequency change remains unchanged.

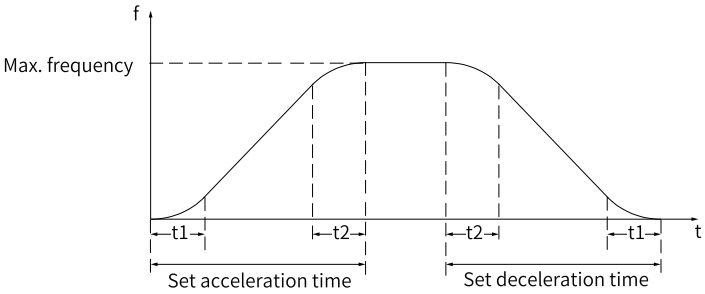


Figure 8-12 S-curve acceleration/deceleration

As is shown, multi-speed control allows different speed options on the S-curve for reasonable speed control and improved riding comfort.

Param.	Name	Range	Min. unit	Default	Property
F7-16	Slip test acceleration time	0.5s to 10.0s	0.1s	1.0s	★

Sets the acceleration in slip test mode. See Figure 6-10 for specific usage. If the slip effect is not obvious during the slip test, this parameter can be appropriately reduced.

Param.	Name	Range	Min. unit	Default	Property
F7-17	Distance setting of direct travel ride	0.0 mm to 6553.5 mm	0.1 mm	0.0 mm	★

Sets the running distance of direct travel ride. For details, see the chapter "Direct Travel Ride Commissioning".

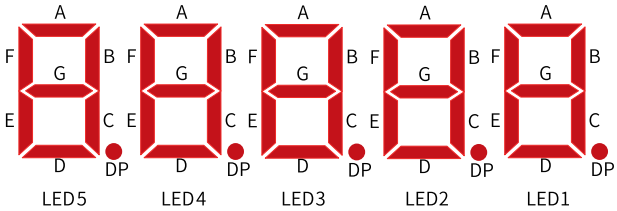
Param.	Name	Range	Min. unit	Default	Property
F7-18	Actual distance of direct travel ride	0.0 mm to 6553.5 mm	0.1 mm	0.0 mm	●

Monitors the actual travel distance during direct travel ride operation to assist with commissioning. For details, see the chapter "Direct Travel Ride Commissioning".

8.9 Group F8: Auxiliary Management Parameters

Param.	Name	Range	Min. unit	Default	Property
F8-00	Input/Output terminal state	-	-	-	●

Displays the system input and output states. The LEDs are numbered 5 to 1 from left to right. The segments are defined in the following figure:

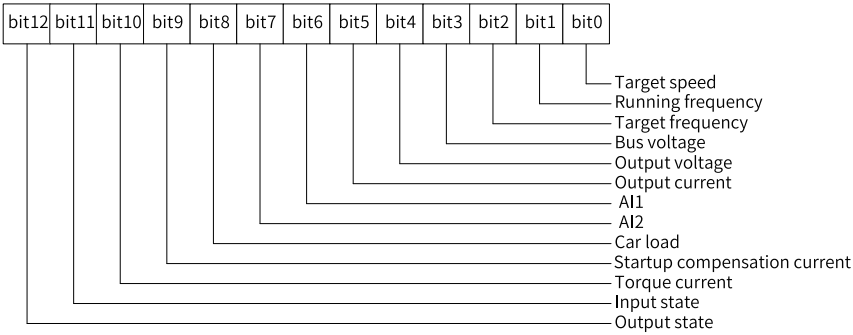


Among the LEDs, LEDs 3, 4, and 5 indicate the I/O terminal states of the AC drive and are displayed in digital segments. LEDs 1 and 2 are reserved.

Each LED segment is defined in the following table:

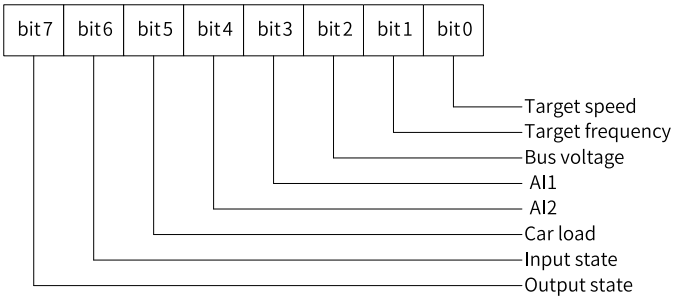
LED	Segment	Indication when the segment is on
3	A	DI1 input active (the input terminal is connected to the common terminal)
	B	DI2 input active
	C	DI3 input active
	D	DI4 input active
	E	DI5 input active
	F	DI6 input active
	G	DI7 input active
	DP	DI8 input active
4	A	DI9 input active
	B	DI10 input active
	C to G, DP	Reserved
5	A	FM output active
	B	DO1 output active
	C	DO2 output active
	D	Relay1 output active
	E	Relay2 output active
	F, G, DP	Reserved

Param.	Name	Range	Min. unit	Default	Property
F8-01	LED display parameters during running	1 to 32767	1	32767	☆



If the above parameters need to be displayed, set the corresponding bit to 1. Convert the binary value to decimal, and then set the parameter F8-01 to the converted decimal value.

Param.	Name	Range	Min. unit	Default	Property
F8-02	LED display parameters at stop	1 to 255 bit0: Target load speed bit1: Target frequency bit2: DC bus voltage bit3: AI1 bit4: AI2 bit5: Car load (%) bit6: Input state bit7: Output state	1	255	☆



If the above parameters need to be displayed, set the corresponding bit to 1. Convert the binary value to decimal, and then set the parameter F8-02 to the converted decimal value.

Param.	Name	Range	Min. unit	Default	Property
F8-03	Rated elevator speed	0.001 m/s to 8.000 m/s	0.001 m/s	1.600 m/s	☆

Sets the car speed when the motor runs at the rated frequency.

Param.	Name	Range	Min. unit	Default	Property
F8-04	Heatsink temperature	0℃ to 100℃	1℃	-	●

Displays the temperature of the heatsink in contact with the IGBTs of the inverter module. The IGBT overtemperature protection threshold may vary depending on the model. The ME320LN^{new} series AC drive has an internal automatic processing program.

Param.	Name	Range	Min. unit	Default	Property
F8-05	MCB software version	0.00 to 99.99	0.01	-	●

Indicates the MCB software version.

Param.	Name	Range	Min. unit	Default	Property
F8-06	Drive board software version	0 to 65535	1	-	●

Indicates the drive board software version.

Param.	Name	Range	Min. unit	Default	Property
F8-07	Running time setting	0 h to 65500 h 0: Disabled	1 h	0 h	☆

Presets the AC drive operating time.

When the accumulative running time (F8-08) reaches the preset value (F8-07), the multi-function digital output (DO) sends a "running time reached" signal, and the AC drive stops operation.

If F8-07 is set to 0, this function is disabled.

Param.	Name	Range	Min. unit	Default	Property
F8-08	Accumulative running time	0 h to 65500 h	1 h	0 h	●
F8-09	Accumulative running seconds within one hour	0s to 3600s	1s	0s	●

When the AC drive is running, parameter F8-09 increments by 1 every second. When it reaches 3600, it resets to zero, and at the same time, parameter F8-08 increments by 1.

Param.	Name	Range	Min. unit	Default	Property
F8-10	High bits of running times	0 to 9999 **Note:** 1 indicates the actual running times is 10,000.	1	0	●
F8-11	Low bits of running times	0 to 9999	1	0	●

In the elevator running mode (not controlled by the operating panel), the ME320LN^{new} series AC drive running count increases by 1 for each run cycle. When the low bits of the running times exceeds 9999, it carries over to the high bits. Therefore, 1 in F8-10 indicates the actual running times of 10,000.

Param.	Name	Range	Min. unit	Default	Property
F8-12	Protection against short circuit to ground upon power-on	0: Disabled 1: Enabled	1	0	☆

Determines whether the AC drive checks for motor short circuit to ground upon power-on. If this function is enabled, the AC drive has a short-duration output at the moment of power-on.

Param.	Name	Range	Min. unit	Default	Property
F8-13	Temporary version of MCB software	0.00 to 99.99	0.01	-	●

When non-zero, it indicates the software version of the control board used for testing or implementing customized functions.

Param.	Name	Range	Min. unit	Default	Property
F8-14	Customer version of MCB software	0.00 to 99.99	0.01	-	●

When non-zero, it indicates the software version of the control board dedicated for customer use.

Param.	Name	Range	Min. unit	Default	Property
F8-17	Year	2000 to 2100	1	2014	☆
F8-18	Month and day	0101 to 1231	1	101	☆
F8-19	Hour. Minute	00.00 to 23.59	0.01	0	☆

Set the AC drive time.

8.10 Group F9: Protection Function Parameters

Param.	Name	Range	Min. unit	Default	Property
F9-09	Number of automatic resets upon fault	0 to 3	1	0	☆

When the AC drive is set to automatic fault reset, this parameter sets the maximum number of times a fault can be automatically reset within one hour. If this limit is exceeded, the AC drive will enter fault standby mode and wait for manual intervention.

Param.	Name	Range	Min. unit	Default	Property
F9-11	Auto reset attempt period	0.1 to 100.0	0.1s	1.0s	☆

Sets the duration from the time when the drive reports a fault to the time when automatic fault reset is performed.

Param.	Name	Range	Min. unit	Default	Property
F9-12	Input phase loss protection	0: Inhibited 1: Allowed	1	1	☆

Determines whether to perform power input phase loss protection.

Param.	Name	Range	Min. unit	Default	Property
F9-13	Output phase loss protection	1 to 3 bit0: 0: Output phase loss not detected during running 1: Output phase loss detected during running bit1: 0: Output phase loss not detected at startup 1: Output phase loss detected at startup	1	1	☆

Determines whether to perform power output phase loss protection.

Output phase loss protection			
bit	Function	Definition	Default
bit0	Output phase loss detection during operation	0: Disabled; 1: Enabled	1
bit1	Output phase loss detection at startup	0: Disabled; 1: Enabled	1

Param.	Name	Range	Min. unit	Default	Property
F9-14	1st fault code	0 to 60	1	0	●
F9-15	1st fault subcode	0 to 999	1	0	●
F9-16	Month and day upon 1st fault	0 to 1231	1	0	●
F9-17	Hour and minute upon 1st fault	00.00 to 23.59	0.01	0	●
...					
F9-50	10th fault code	0 to 60	1	0	●
F9-51	10th fault subcode	0 to 999	1	0	●
F9-52	Month and day upon 10th fault	0 to 1231	1	0	●
F9-53	Hour and minute upon 10th fault	00.00 to 23.59	0.01	0	●
F9-54	Latest fault code	0 to 60	1	0	●

Param.	Name	Range	Min. unit	Default	Property
F9-55	Latest fault subcode	0 to 999	1	0	●
F9-56	Month and day upon latest fault	0 to 1231	1	0	●
F9-57	Hour and minute upon latest fault	00.00 to 23.59	0.01	0	●
F9-58	Logic information upon latest fault	0 to 65535	1	0	●
F9-59	Frequency reference upon latest fault	0.00 Hz to 99.00 Hz	0.01 Hz	0.00 Hz	●
F9-60	Feedback frequency at latest fault	0.00 Hz to 99.00 Hz	0.01 Hz	0.00 Hz	●
F9-61	Bus voltage upon latest fault	0.0 V to 6500.0 V	0.1 V	0.0 V	●
F9-62	Output voltage upon latest fault	0 V to 65000 V	1 V	0 V	●
F9-63	Output current upon latest fault	0.00 A to 650.00 A	0.01 A	0.00 A	●
F9-64	Torque current upon latest fault	0.00 A to 650.00 A	0.01 A	0.00 A	●
F9-65	Output power upon latest fault	0.00 kW to 99.99 kW	0.01 kW	0.00 kW	●
F9-66	Input function state 1 upon latest fault	0 to 65535	1	0	●
F9-67	Input function state 2 upon latest fault	0 to 65535	1	0	●
F9-68	Output function state 1 upon latest fault	0 to 65535	1	0	●
F9-69	Output function state 2 upon latest fault	0 to 65535	1	0	●

This group of function parameters records the most recent 11 fault types and subcodes, along with the date and time of each fault occurrence. It also stores operational data from the most recent fault event, including logic state, output frequency, output current, DC bus voltage, and input/output state.

For detailed description of fault types, see the "Troubleshooting" section.

8.11 Group FA: PG Parameters

The ME320LN^{new}series AC drive supports vector control for both asynchronous motors and permanent magnet synchronous motors. Depending on the encoder used, install the corresponding rotary encoder interface board (PG card). Correctly set the following parameters according to the specific model of the encoder and PG card.

Param.	Name	Range	Min. unit	Default	Property
FA-00	PG pulses	100 to 9999	1	1024	★

In general elevator applications, the rotary encoder of the motor is an essential configuration. FA-00 is the number of pulses per revolution of the rotary encoder. During use, you must set this parameter correctly. Otherwise, overcurrent or other faults may occur during operation.

Param.	Name	Range	Min. unit	Default	Property
FA-01	PG disconnection detection time	0.0s to 10.0s (Detection is invalid when this parameter is set to 0)	0.1s	1.0s	★

If the elevator loses the encoder pulse signal during operation, correct motor control will no longer be possible. The ME320LN^{new} series AC drive continuously monitors the rotary encoder pulse signal. When an abnormal pulse signal is detected for a duration exceeding the time set in parameter FA-01, the drive immediately triggers an alarm output (encoder fault) and stops operation. If FA-01 is set to 0, this alarm function is disabled.

Param.	Name	Range	Min. unit	Default	Property
FA-03	PG magnetic pole angle	0.0 to 359.9	0.1	0	★

The ME320LN^{new} series AC drive requires the encoder initial angle to determine the rotor position when controlling permanent magnet synchronous motors. To ensure high-precision control in both rotation directions, the drive stores the encoder initial angle in parameter FA-03. The value of this parameter is automatically identified during motor

auto-tuning based on the encoder angular position. However, if the user has prior knowledge of the system, it can be manually set.

Only when this parameter is correctly configured can the drive properly control synchronous motors. This parameter is not required for asynchronous motor control.

By default, parameters FA-03 and FA-05 (magnetic pole angle and wiring method) can only be modified when F0-01 = 0. Any changes made require a power cycle before F0-01 can be set back to 1.

Param.	Name	Range	Min. unit	Default	Property
FA-04	PG current magnetic pole angle	0.0 to 359.9	0.1	0	●

During control of a permanent magnet synchronous motor, the encoder continuously feeds back the rotor position to the AC drive, which is reflected in parameter FA-04. This parameter is critical for achieving high-precision control of permanent magnet synchronous motors.

FA-04 is retentive at power failure and is only related to synchronous motor control, not to asynchronous motor control.

Param.	Name	Range	Min. unit	Default	Property
FA-05	Encoder wiring method	0 to 15	1	0	★

FA-05 is effective only in synchronous motor applications and indicates the motor wiring configuration combination.

Param.	Name	Range	Min. unit	Default	Property
FA-06	PG frequency-division coefficient ratio	1 to 256	1	1	★

When using the direct travel ride function, the AC drive main board needs to receive encoder pulse signals from the PG card frequency-division output port. Therefore, the value of this parameter must be set to match the frequency division ratio of the PG card.

For details on the PG card frequency division ratio, see section "PG Card Wiring and Description" in *"4.3.4 PG Card Description and Wiring" on page 59*.

8.12 Group FB: Communication Parameters (Reserved)

8.13 Group FC: Advanced Specialized Function Parameters

Param.	Name	Range	Min. unit	Default	Property
FC-00	Action at command abnormal	0: Deceleration 1: Block output immediately	1	1	★

"Command abnormal" means that the running command becomes invalid suddenly during operation of the elevator. The AC drive determines according to parameter setting in FC-00 if it decelerates to stop according to the normal control logic, ensuring smooth deceleration and elevator speed change ("decelerate to stop"); or it applies the brake and stops output of the RUN contactor immediately ("block output immediately").

FWD	REV	Definition
OFF	OFF	Invalid
ON	OFF	Forward running
OFF	ON	Reverse running
ON	ON	Invalid

Param.	Name	Range	Min. unit	Default	Property
FC-01	Deceleration time at abnormality	0.1s to 300.0s	0.1s	3.0s	★

Sets the time required for the AC drive to decelerate from maximum frequency to 0 Hz when the deceleration abnormality occurs.

Param.	Name	Range	Min. unit	Default	Property
FC-02	Up speed threshold	0.00 to max. frequency	0.01 Hz	45.00 Hz	★
FC-03	Down speed threshold	0.00 to max. frequency	0.01 Hz	45.00 Hz	★

The AC drive implements slow-down based on these two parameters. Note that the AC drive instructs up direction running of the elevator after receiving the forward running command and down direction running of the elevator after receiving the reverse running command. When the up/down speed judgment signal (slow-down switch signal) is active, the AC drive detects whether the running frequency exceeds FC-02/FC-03. If yes,

the AC drive decelerates to stop according to the time set in FC-01. The up speed judgment signal is invalid in the down direction, and vice versa.

The following figure shows the slow-down principle.

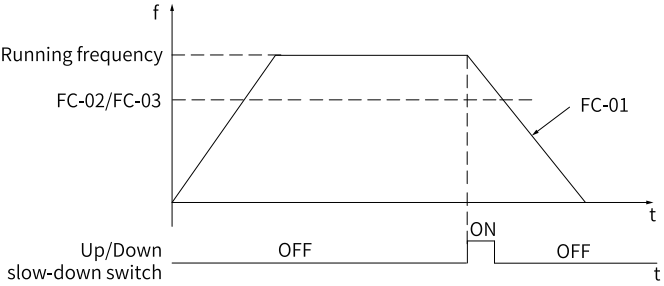


Figure 8-13 Slow-down running principle

Param.	Name	Range	Min. unit	Default	Property
FC-04	Advance door opening judgment	0.00 to max. frequency	0.01 Hz	5.00 Hz	★

When the elevator is in normal deceleration, the ME320LN^{new} AC drive outputs the advance door opening signal if the output frequency is smaller than the value in FC-04.

Param.	Name	Range	Min. unit	Default	Property
FC-05	Frequency detection threshold 1	0.00 to max. frequency	0.01 Hz	50.00 Hz	☆
FC-06	Frequency detection threshold 2	0.00 to max. frequency	0.01 Hz	50.00 Hz	☆
FC-07	Frequency detection hysteresis	0.0% to 100.0% (Frequency detection threshold)	0.10%	5.00%	☆

As shown in *"Figure 8-14 " on page 141* , parameters FC-05 to FC-07 are for the FDT output signal. FDT1 and FDT2 have two different settings. FDT hysteresis = FDT frequency x FC-07

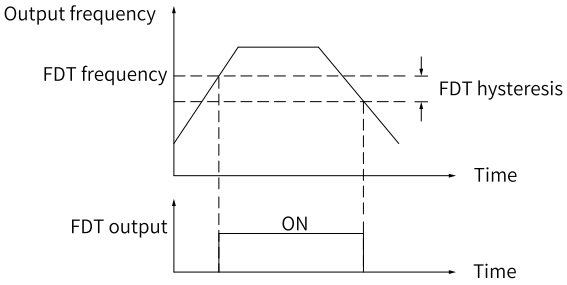


Figure 8-14 FDT signal output principle

Param.	Name	Range	Min. unit	Default	Property
FC-08	Measured width when frequency reached	0.0% to 100.0% (Maximum frequency)	0.10%	0.00%	☆

This function sets the detection width of whether the output frequency reaches the frequency reference. Detection frequency amplitude = Maximum frequency x FC-08. The following figure shows details.

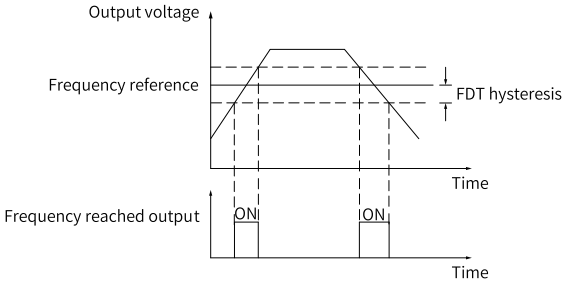


Figure 8-15 Frequency reached signal output principle

Param.	Name	Range	Min. unit	Default	Property
FC-09	Overspeed detection threshold	80% to 120%	1%	115%	☆
FC-10	Overspeed detection delay	0.0s to 5.0s	0.1s	1.0s	☆

The ME320LN^{new} series AC drive has an overspeed detection function, which determines whether the current running frequency exceeds the overspeed threshold based on the

FC-09 setting. If the accumulated time above the threshold exceeds the value set in FC-10, the system recognizes it as an overspeed condition.

The overspeed detection threshold is expressed as a percentage of the maximum frequency; for example, 100% corresponds to the maximum frequency.

Upon detecting overspeed, the AC drive takes corresponding actions according to the FC-11 setting. If the action is set to "Decelerate to stop at abnormality," the AC drive decelerates to a stop based on the deceleration time set in FC-01.

Param.	Name	Range	Min. unit	Default	Property
FC-11	Action selection at overspeed	0: Decelerate to stop at abnormality 1: Alarm and block output immediately 2: Continue to run	1	1	☆

"Decelerate to stop at abnormality" the AC drive decelerates to a stop based on the deceleration time set in FC-01.

Param.	Name	Range	Min. unit	Default	Property
FC-12	Speed deviation detection threshold	0% to 50%	1%	30%	☆
FC-13	Speed deviation detection delay	0.0s to 5.0s	0.1s	1.0s	☆

The ME320LN^{new} series AC drive has a speed deviation detection function, which determines whether the current running frequency has excessive deviation with the frequency reference based on the FC-12 setting. If the accumulated time of the deviation exceeds the value set in FC-13, the system recognizes it as an excessive deviation condition.

The speed deviation threshold is expressed as a percentage of the maximum frequency.

If the speed deviation exceeds this threshold, the ME320LN^{new} will take corresponding action according to the FC-14 function settings.

Param.	Name	Range	Min. unit	Default	Property
FC-14	Action selection at speed deviation too large	0: Decelerate to stop at abnormality 1: Alarm and block output immediately 2: Continue to run	1	1	☆

"Decelerate to stop at abnormality" the AC drive decelerates to a stop based on the deceleration time set in FC-01.

8.14 Group FD: Special Function Parameters

Param.	Name	Range	Min. unit	Default	Property
FD-00	Torque boost	0.0: (Automatic) 0.1% to 30.0%	0.10%	1.00%	★
FD-01	Frequency of torque boost	0.00 to max. frequency	0.01 Hz	50.00 Hz	★

In V/f control mode, FD-00 compensates for insufficient torque production by boosting output voltage of the AC drive.

If the torque boost is set to too large, the motor may overheat, and the AC drive may suffer overcurrent. Generally, FD-00 does not exceed 10%.

Adjust this parameter to prevent overcurrent at startup. Increase this parameter when a heavy load is applied. Decrease this parameter when a light load is applied.

If it is set to 0, fixed torque boost is enabled.

Parameter FD-01 sets the cutoff frequency under which torque boost is valid. If the frequency reference exceeds the value set in FD-01, torque boost becomes invalid.

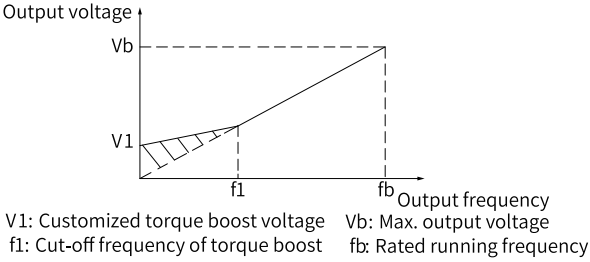


Figure 8-16 Customized torque boost

Param.	Name	Range	Min. unit	Default	Property
FD-02	V/f slip compensation gain	0.0% to 200.0%	0.10%	100.00%	★
FD-03	Oscillation suppression gain	0 to 100	1	20	★

FD-02 slip compensation gain is valid for V/f control. Setting this parameter compensates for slip caused by load under V/f control, reducing the variation in motor speed due to load changes. Typically, 100% corresponds to the rated slip when the motor is operating at rated load. Guidelines for adjusting slip compensation gain: When the load is at rated capacity and the slip compensation gain is set to 100%, the motor speed driven by the AC drive will be close to the set speed. If the load is lighter than rated, the value can be set below 100%; if the load exceeds rated capacity, the value may be slightly set above 100%.

Set FD-03 to 0 if the motor has no oscillation. Only when obvious motor oscillation prevents normal operation should this gain be increased appropriately. A higher gain provides stronger suppression of oscillation. Parameter setting principle: Under the condition that oscillation is effectively suppressed, set the gain as low as possible.

Param.	Name	Range	Min. unit	Default	Property
FD-04	AC drive function selection 3	0 to 65535 bit0: 0: Using fixed values for asynchronous motor current loop 1: Using parameter setting for asynchronous motor current loop	1	0	★

This parameter configures various AC drive functions. Each bit has a specific function, as shown in the following table:

FD-04 AC drive function selection 3			
bit	Function	Definition	Default
bit0	Asynchronous motor current loop parameter	0: Using fixed values for asynchronous motor current loop 1: Using parameter setting (F2-06 and F2-07) for asynchronous motor current loop	0

Param.	Name	Range	Min. unit	Default	Property
FD-05	Position lock current coefficient	1.0% to 50.0%	0.10%	15.00%	★
FD-06	Position lock speed loop KP	0.05 to 1.00	0.01	0.5	★
FD-07	Position lock speed loop TI	0.05 to 2.00	0.01	0.6	★

This group of parameters adjusts elevator startup when no load cell is available. For details, see the chapter "No-load-cell Startup Commissioning".

8.15 Group FU: Monitoring Parameters

Param.	Name	Range	Min. unit	Default	Property
FU-00	Pre-torque current	-200.0% to 200.0%	0.10%	0	●

Displays the percentage of pre-torque current out of the rated current (with positive/ negative sign display, motor driving or regenerative state).

Param.	Name	Range	Min. unit	Default	Property
FU-01	Logic information	0 to 65535	1	0	●

Displays the elevator state.

The five-digit LEDs are numbered 1 to 5 from right to left. LEDs 1 and 2 indicate running state of the AC drive. LED 3 indicates the current speed reference in multi-speed settings; LED 4 indicates the direction command; LED 5 indicates whether it is allowed to run. See the illustration below.

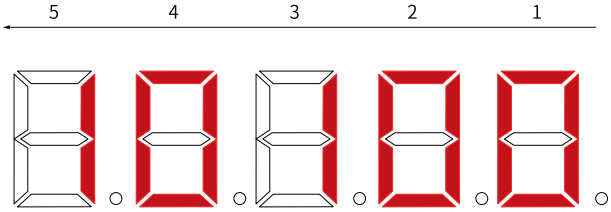


Figure 8-17 Logic information example

5		4		3		2	1
Running through terminal control		Direction command		Multi-speed setting		Running state	
0	Disabled	0	No command	0	Multi-speed 0	0	Standby state
1	Enabled	1	Up direction	1	Multi-speed 1	1	RUN contactor control
-		2	Down direction	2	Multi-speed 2	2	Brake release control
-	-	-	-	3	Multi-speed 3	3	Start zero-speed running
-	-	-	-	4	Multi-speed 4	4	Normal curve running

5		4		3		2	1
Running through terminal control		Direction command		Multi-speed setting		Running state	
-	-	-	-	5	Multi-speed 5	5	Emergency running
-	-	-	-	6	Multi-speed 6	6	Startup frequency processing
-	-	-	-	7	Multi-speed 7	7	RUN contactor release
-	-	-	-	-	-	8	Direct travel ride control
-	-	-	-	-	-	9	Decelerate to stop
-	-	-	-	-	-	10	Stop zero-speed holding
-	-	-	-	-	-	11	Brake close control
-	-	-	-	-	-	12	Stop
-	-	-	-	-	-	13	Slip test running
-	-	-	-	-	-	14	Decelerate to stop at abnormality

Param.	Name	Range	Min. unit	Default	Property
FU-02	Frequency reference	0.00 Hz to 99.00 Hz	0.01 Hz	0.00 Hz	●
FU-03	Feedback frequency	0.00 Hz to 99.00 Hz	0.01 Hz	0.00 Hz	●
FU-04	Bus voltage	0.0 V to 6500.0 V	0.1 V	0.0 V	●
FU-05	Output voltage	0 V to 65000 V	1 V	0 V	●
FU-06	Output current	0.00 A to 650.00 A	0.01 A	0.00 A	●
FU-07	Output torque	0.0% to 200.0%	0.10%	0.00%	●
FU-08	Torque current	0.00 A to 650.00 A	0.01 A	0.00 A	●
FU-09	Output power	-99.99 kW to 99.99 kW	0.01 kW	0.00 kW	●

The parameters are used to display the current performance state of the system (the output power supports positive/negative sign display).

Param.	Name	Range	Min. unit	Default	Property
FU-10	Car load	0.0% to 100.0%	0.10%	0.00%	●

When using the load cell pre-torque function, the paramter is used to display the load of the elevator car obtained from the load cell.

Param.	Name	Range	Min. unit	Default	Property
FU-11	Car speed	0.000 m/s to 65.000 m/s	0.001 m/s	0.000 m/s	●

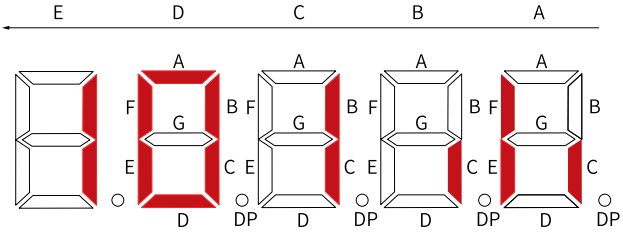
Displays the running speed of the car. The value of F8-03 must be set correctly to ensure the accuracy of this parameter.

Param.	Name	Range	Min. unit	Default	Property
FU-12	Communication interference	0 to 65535	1	0	●

The communication quality between the control board and the drive board is displayed. 0 to 9 indicates the communication quality, where a larger value indicates stronger interference and lower communication quality.

Param.	Name	Range	Min. unit	Default	Property
FU-13	Input function state 1	0 to 65535	1	0	●
FU-14	Input function state 2	0 to 65535	1	0	●
FU-15	Output function state 1	0 to 65535	1	0	●
FU-16	Output function state 2	0 to 65535	1	0	●

Figure 8-18 Input status



As shown in *"Figure 8-18 " on page 147*, the five LEDs are numbered from right to left as A, B, C, D, and E. For the input/output states of terminals FU-13 to FU-14, the values displayed on digits E and D represent the function code of the input/output terminal (for example, 10 indicates the RUN contactor feedback). Digit C being 1 indicates the signal is

active, and 0 indicates it is inactive. The segments of digits A and B represent the state of individual functions, with the 16 segments collectively displaying the states of 16 different functions. As shown in the figure, CDE indicates that the RUN contactor feedback signal is active. Meanwhile, from AB, it can also be seen that not only is the function with code 10 active, but functions with codes 2, 4, and 5 are also active.

FU-13: Input function state 1			
Function code	Function definition	Function code	Function definition
0	Reserved	8	Inspection signal
1	Forward run	9	Emergency input
2	Reverse running	10	RUN contactor feedback
3	Multi-speed terminal 1	11	Brake feedback
4	Multi-speed terminal 2	12	Load cell terminal 1
5	Multi-speed terminal 3	13	Load cell terminal 2
6	Fault reset command	14	Load cell terminal 3
7	Enable control signal	15	Load cell terminal 4
FU-14: Input function state 2			
Function code	Function definition	Function code	Function definition
16	External fault signal	24	Reserved
17	Motor overtemperature signal	25	Reserved
18	Up speed judgment	26	Reserved
19	Down speed judgment	27	Reserved
20	Multi-speed logic selection 1	28	Reserved
21	Multi-speed logic selection 2	29	Reserved
22	Direct travel ride command	30	Reserved
23	Reserved	31	Reserved
FU-15: Output function state 1			
Function code	Function definition	Function code	Function definition
0	Reserved	8	Bus undervoltage
1	Running	9	FDT1 output
2	Zero-speed running	10	FDT2 output
3	Zero-speed signal	11	Frequency reached
4	Fault signal	12	Overspeed output
5	RUN contactor output control	13	Overload prewarning
6	Brake output control	14	Running time reached
7	Advance door opening signal	15	Ready for running
FU-16: Output function state 2			
Function code	Function definition	Function code	Function definition

FU-13: Input function state 1			
Function code	Function definition	Function code	Function definition
16	Contact stuck output	24	Reserved
17	Re-leveling output	25	Reserved
18	Light-load running output	26	Reserved
19	Reserved	27	Reserved
20	Reserved	28	Reserved
21	Reserved	29	Reserved
22	Reserved	30	Reserved
23	Reserved	31	Reserved

Param.	Name	Range	Min. unit	Default	Property
FU-17	AI1 voltage	0.00 V to 20.00 V	0.01 V	0.00 V	●

Displays the voltage of analog input terminal AI1.

Param.	Name	Range	Min. unit	Default	Property
FU-18	AI2 voltage	0.00 V to 20.00 V	0.01 V	0.00 V	●

Displays the voltage of analog input terminal AI2.

Param.	Name	Range	Min. unit	Default	Property
FU-19	AO1 voltage	0.00 V to 20.00 V	0.01 V	0.00 V	●

Displays the voltage of analog output terminal AO1.

Param.	Name	Range	Min. unit	Default	Property
FU-20	Startup rollback pulses	0 to 65535	1	0	●

Used to observe the rollback at startup when the no-load-cell startup function is enabled (F3-09 = 5). For details, see the chapter "No-load-cell Startup Commissioning".

Param.	Name	Range	Min. unit	Default	Property
FU-21	PG card pulses per second	0 to 65535	1	0	●

When using the direct travel ride function, the frequency-division output signal from the PG card must be connected to the corresponding terminal on the I/O expansion board, which then transmits the signal to the MCB of the AC drive. During operation, this parameter can be used to check whether the pulse signal from the PG card is normal.

8.16 Group FF: Factory Parameters (Reserved)

8.17 Group FP: User Parameters

Param.	Name	Range	Min. unit	Default	Property
FP-00	User password	0 to 65535 0: No password	1	0	☆

To enable password protection, set this parameter to any number except 0.

00000: Clear the password set before and invalidate the password protection function.

ME320LN^{new}disables viewing of parameters when the user password is set and effective.

Keep your password safe. If you forget your password, contact the manufacturer.

Param.	Name	Range	Min. unit	Default	Property
FP-01	Parameter update	0: No operation 1: Restore factory settings 2: Clear fault records	1	0	★

Param.	Name	Range	Min. unit	Default	Property
FP-02	User setting check	0: Disabled 1: Enabled	1	0	★

After setting FP-02 to 1, only parameters different from factory values are displayed on the operating panel LEDs. This helps users to check the settings and identify problems. When it is set to 0, all parameters are displayed.

9 Application and and Commissioning

9.1 Multi-speed Control

Multi-speed control is a commonly used method in elevator control applications, characterized by strong anti-interference capability, good adaptability, and ease of implementation. However, in traditional multi-speed control, all speed combinations share the same acceleration and deceleration curves, causing mutual interference. This often makes it difficult for users to achieve optimal effect during commissioning. The ME320LN^{new} series AC drive is specially designed to address the characteristics of multi-speed control: each multi-speed combination can be flexibly assigned to a different acceleration/deceleration curve. This simplifies the commissioning process for users.

9.1.1 Wiring

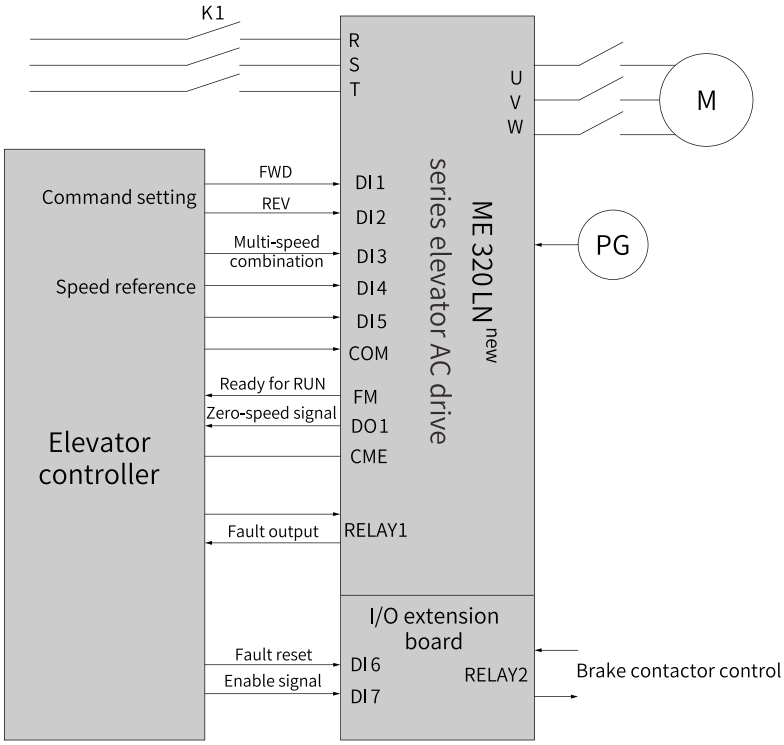


Figure 9-1 Multi-speed Control Wiring

Note

- *"Figure 9-1 " on page 151* Except for RELAY2, all other input/output terminals are pre-configured at the factory. Reconfiguration is only necessary if specific changes are required.
- It is recommended to use RELAY2 output as a brake control signal, connected in series into the system's brake control circuit.

9.1.2 Parameter Setting

This section provides parameter adjustments in three steps—motor auto-tuning, inspection operation, and normal-speed operation—arranged in the typical sequence for elevator commissioning, covering the most common application scenarios.

Motor Auto-tuning

- Process of asynchronous motor auto-tuning (static and dynamic)

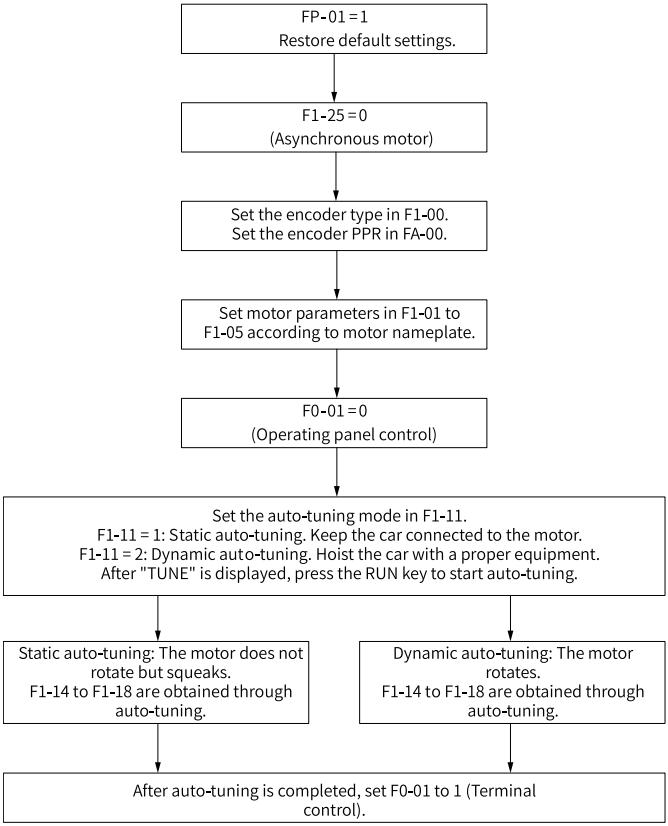


Figure 9-2 Asynchronous motor auto-tuning process

Note

If the control mode is set to open-loop vector or V/f control, there is no need to configure the encoder type or number of encoder pulses. For elevator operation control, closed-loop vector control is recommended.

- Synchronous motor no-load auto-tuning

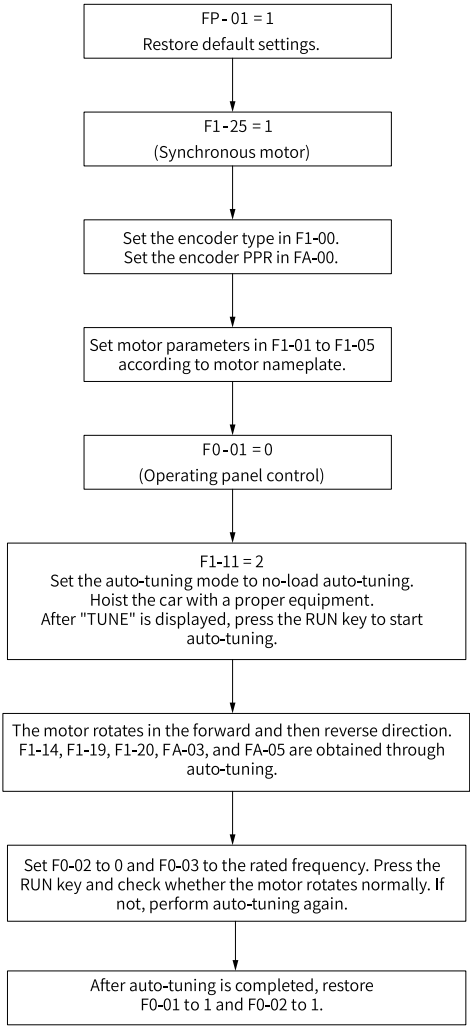


Figure 9-3 Synchronous motor no-load auto-tuning process

Note

It is recommended to perform the auto-tuning process several times. Only after achieving a result with FA-03 error within 5 degrees and FA-05 remaining stable should test operation begin.

- Synchronous motor with-load auto-tuning

To facilitate field use of synchronous motors, the ME320LN^{new} series AC drive features a with-load encoder angle identification method. Using this method, users can complete encoder angle identification without detaching the steel rope. The following figure shows the details:

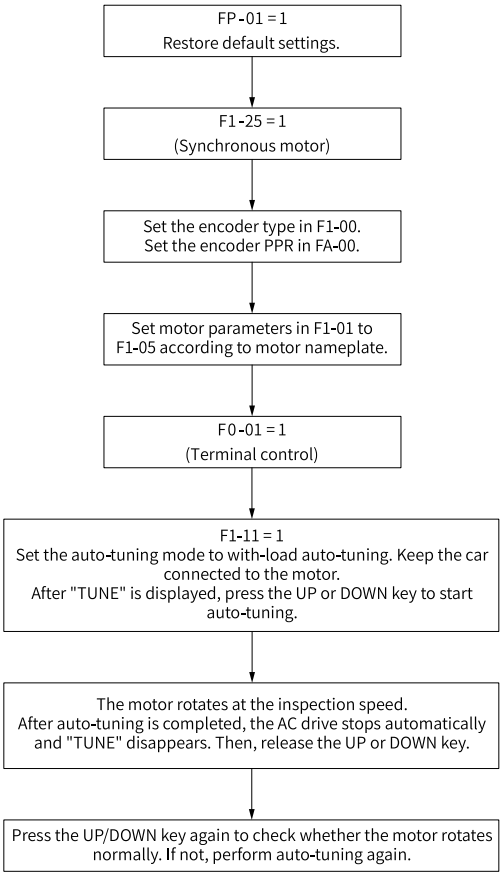


Figure 9-4 Synchronous motor with-load auto-tuning process

Note

- After auto-tuning is completed, the AC drive will require a storage period of 2s, during which it will not respond to any input commands.
- Important: The AC drive with-load encoder angle identification function must be operated by qualified personnel, and it must be ensured that no one is in the shaft to prevent accidents.
- At the start of auto-tuning, disable the no-load pre-torque compensation function (set F6-23 bit1 = 0) to avoid abnormalities.
- If auto-tuning cannot be completed normally, interchange any two of the AC drive output power lines (U, V, W) and then perform auto-tuning again.

Inspection Operation

After successful auto-tuning, the system enters the inspection operation phase. Before inspection operation, the following parameters must be set:

1. Inspection speed selection (F6-16).
2. Inspection multi-step frequency setting (F6-00 to F6-07).
3. Inspection multi-step acceleration/deceleration curve selection (F6-08 to F6-15).
4. Inspection multi-step acceleration/deceleration time setting (F7-00 to F7-15).

Additional notes:

- F6-16 defines which multi-speed mode is used for inspection running. For example, if multi-speed 2 is selected, set F6-16 to 2.
- Then set the running frequency for the selected inspection speed (multi-speed 2, F6-02). The AC drive will output this frequency during inspection operation.
- Select the acceleration/deceleration curve for the inspection speed (F6-10 for multi-speed 2; S-curve 1 by default).
- To adjust the acceleration/deceleration time for the selected curve (S-curve 1 by default), modify the corresponding parameters in F7-00 to F7-03.

Note

If the terminal functions of the AC drive used in the system differ from the default functions, check and properly set the corresponding parameters in groups F4 and F5 before performing inspection operation.

Normal-speed Operation

Once the elevator enters commissioning at normal speed, the AC drive must be tuned to match ride comfort requirements. The following parameter adjustments are required:

1. Confirm that the encoder wiring and AC drive output phases (U, V, W) connected to the motor have not been swapped after motor auto-tuning.
2. Set the target running frequencies for each multi-speed option in the speed profile.
3. Set the appropriate acceleration/deceleration curves for each multi-speed option.
4. Set the acceleration/deceleration time of each curve, as well as the start and end segments of the curve based on the comfort.
5. Adjust the parameters in groups F2 and F3 based on the comfort level during operation and start/stop.

Application Example

Assume the following speed configuration:

- Inspection: multi-speed 2, target running frequency 10 Hz, acceleration/deceleration S-curve 4.
- Creep: multi-speed 3, target running frequency 3 Hz, acceleration/deceleration S-curve 3.
- Normal speed: multi-speed 7, target running frequency 48 Hz, acceleration/deceleration S-curve 1.

Then set the multi-speed parameters according to the following table.

Speed option	Param.	Name	Setting	Note
Inspection	F6-16	Inspection speed selection	2	-
	F6-02	Multi-speed 2	10	-
	F6-10	S-curve selection for multi-speed 2	4	To modify S-curve 4, set parameters F7-12 to F7-15 as needed.
Creep	F6-03	Multi-speed 3	3	-
	F6-11	S-curve selection for multi-speed 3	3	To modify S-curve 3, set parameters F7-08 to F7-11 as needed.
Maximum speed	F6-07	Multi-speed 7	48	-
	F6-15	S-curve selection for multi-speed 7	1	To modify S-curve 1, set parameters F7-00 to F7-03 as needed.

Note

The application example provided lists only speed-related parameters and does not include other parameters that may need adjustment for multi-speed commissioning.

9.2 Analog Control Mode

Another commonly used method for the ME320LN^{new} series AC drive in elevator applications is the analog speed reference mode. In this control mode, the AC drive receives speed commands through analog input, while run commands are provided through input terminals. Below is a brief introduction to its control and usage.

9.2.1 Wiring

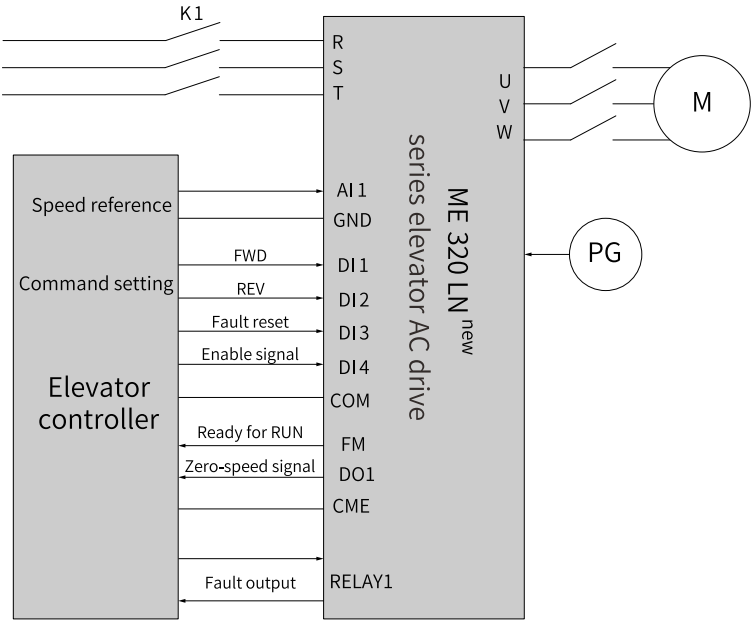


Figure 9-5 Analog control wiring

9.2.2 Parameter Setting

The motor auto-tuning method for analog speed control applications is the same as that for multi-speed control. Refer to the motor auto-tuning section for multi-speed control to complete motor auto-tuning.

In the analog control system, the AC drive acts as an executor, completely following the controller commands, as shown in the preceding figure. The analog input signal is assumed to be a 0 V to +10 V input. The following table shows the parameters to be adjusted.

Description	Param.	Name	Setting
Analog function parameter	F0-02	Speed source	2
	F6-19	Corresponding percentage of minimum analog input	0
	F6-21	Corresponding percentage of maximum analog input	100
	F6-18	Analog minimum input	0
	F6-20	Maximum analog input	10
	F8-22	AI filter time	0.1
Motor encoder disk parameter	Groups F1 and FA	Obtained through motor auto-tuning. Refer to the motor auto-tuning section for synchronous and asynchronous motors in multi-speed control.	
Vector control speed loop parameter	Group F2	Adjust according to the actual running characteristics	
Input terminal definition parameter (Group F4)	F4-03	DI3 function selection	7
	F4-04	DI4 function selection	6

9.3 Inspection Operation

The ME320LN^{new} series AC drive has a built-in inspection operation mode under multi-speed control, which applies corresponding processing according to the characteristics of elevator inspection operation. The following part describes the control process and running curve.

There are two ways to enable the AC drive to enter the inspection mode:

- The input terminal inspection signal of the AC drive is active. After this signal is active, if the inspection speed (F6-16) is set to a non-zero value, the AC drive will forcibly operate according to the multi-speed setting selected by F6-16.
- Set the inspection speed (F6-16) to a non-zero value, and the given multi-speed value equals F6-16. For example, if F6-16 is set to 1, and the multi-speed from DI input is also 1, the AC drive will enter inspection mode even if no inspection signal is input at the terminals.

For functions that must be used in inspection mode, such as slip test function or semi-automatic angle-free auto-tuning function, the AC drive must be placed into inspection mode before system operation starts; otherwise, these functions will not take effect.

9.3.1 Wiring

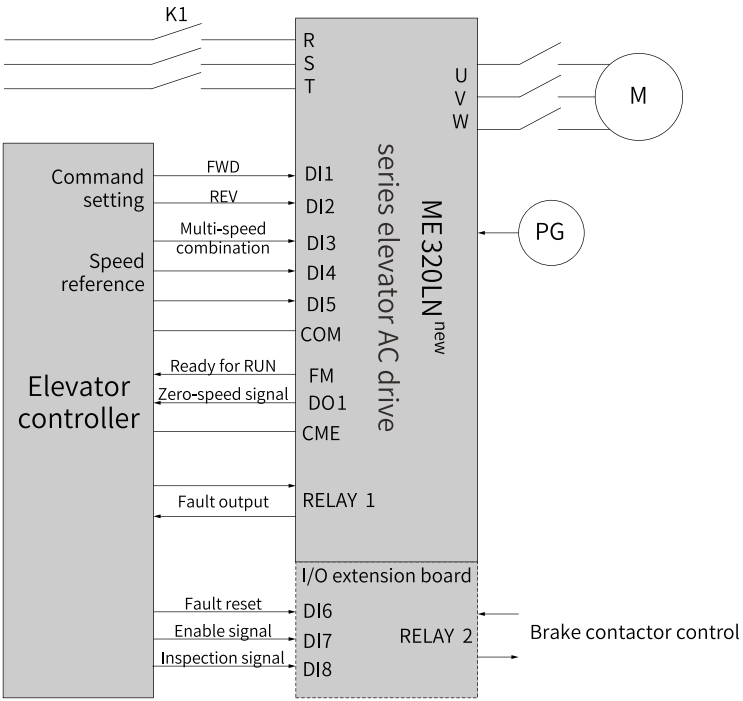


Figure 9-6 Wiring for inspection operation (assume DI8 is for inspection signal input)

9.3.2 Parameter Setting and Running Curve

The main difference between the operation timing in inspection mode and normal mode lies in the stop process. For example, when F6-16 = 2: In this case, if the elevator receives a forward (or reverse) running command along with an inspection input terminal signal, the ME320LN^{new} drive will operate at the target frequency of multi-speed 2. The acceleration time is determined according to the corresponding time curve of multi-speed 2. If the inspection input signal is removed first during the stop process, the system will decelerate to zero according to the deceleration time set for multi-speed 2 until the forward or reverse running command is canceled. (As shown in *"Figure 9-7 " on page 161* , the deceleration time can be set very short–for example, 1s–ensuring rapid stopping.)

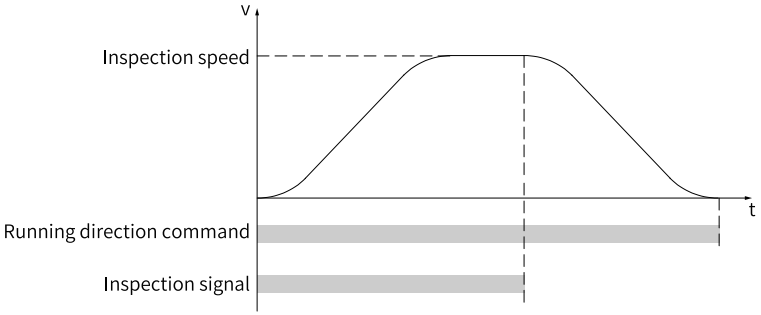


Figure 9-7 Stop process timing in inspection operation

If, during inspection operation, the forward or reverse running command is directly removed, the AC drive will immediately stop output. *"Figure 9-8 " on page 161* shows the details.

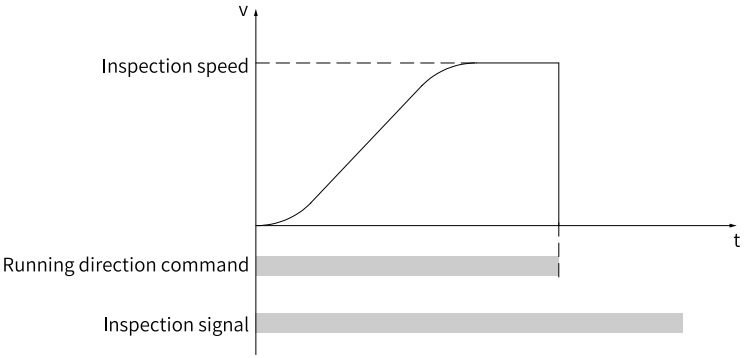


Figure 9-8 Stop process timing in inspection operation with running direction command removed

Assuming multi-speed 2 is used for inspection operation, with an inspection running frequency of 10 Hz and S-curve 4 selected, the corresponding inspection operation speed parameters should be set as shown in the following table:

Par am.	Name	Setting	Default	Note
F6-05	Multi-speed 2	10.00 Hz	0.00 Hz	Rated motor speed is 50.00 Hz
F6-13	Multi-speed 2 acceleration/ deceleration time selection	4	1	-
F6-16	Inspection speed selection	2	0	The inspection speed is set to multi-speed 2

Param.	Name	Setting	Default	Note
F7-12	Acceleration time 4	2.0s	20.0s	-
F7-13	Deceleration time 4	1.0s	20.0s	The parameter value should be set sufficiently small to ensure that the speed is reduced to a minimal level before the brake engages.

9.4 Emergency Operation at Power Failure

During elevator operation, a sudden loss of the system power supply may trap passengers inside the car.

The ME320LN^{new} series AC drive supports two emergency operation methods: UPS-powered operation and 48 V battery-powered operation.

48 V battery-powered operation: The AC drive main circuit is powered by a 48 V battery, while the elevator's other components are powered by a UPS (or inverter power supply) with an output voltage greater than 220 V. In this configuration, the motor operates using energy from the battery, allowing the control power capacity to be relatively small.

UPS-powered operation: Both the main circuit and the elevator control system are powered by a UPS during a power failure, enabling emergency operation.

The following sections describe the two methods separately.

9.4.1 Emergency Operation at Power Failure

System Wiring

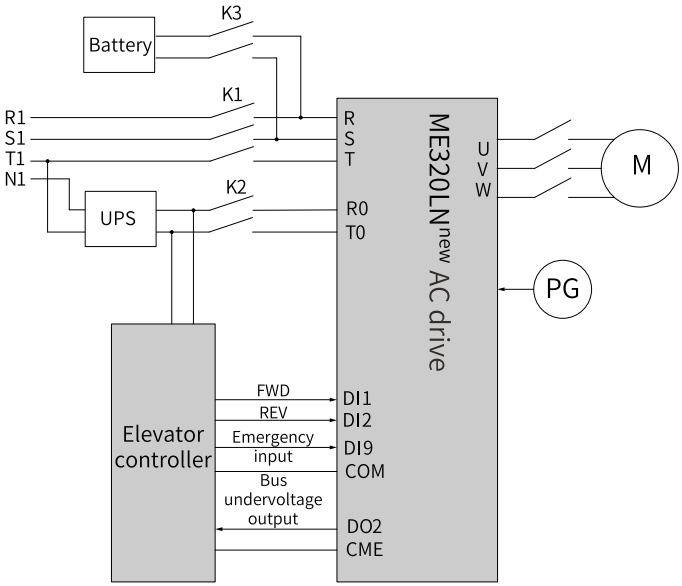


Figure 9-9 Battery-powered emergency operation

Note

To use this method, you need to modify the drive and add a UPS power interface (terminals R0 and T0).

Operation Timing

When the AC drive operates under multi-speed control and is wired as shown in the preceding figure, DO2 is used as the DC bus undervoltage output signal. Multi-speed 2 is designated as the emergency operation speed profile. Therefore, under multi-speed control, the following parameters must be set as shown in the following table:

Param.	Name	Setting	Default	Note
F4-09	DI9 input	9	0	Emergency input
F5-01	DO2 output selection	8	0	Bus undervoltage
F6-02	Multi-speed 2	2.00 Hz	0.00 Hz	Rated motor speed is 50.00 Hz
F6-10	S-curve selection for multi-speed 2	3	1	-

Param.	Name	Setting	Default	Note
F6-17	Emergency evacuation power supply at power failure	2	0	Select 48 V battery for power supply
F7-08	Acceleration time 3	30.0s	4.0s	Increase acceleration time to avoid excessive inrush current

Taking up running as an example, the operation timing is shown in *"Figure 9-10 " on page 164* :

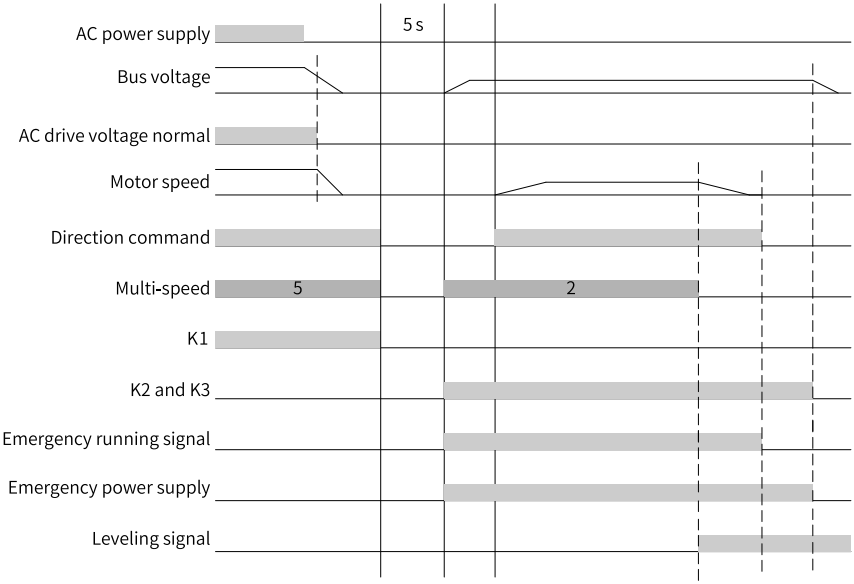


Figure 9-10 Operation Timing During Emergency

The emergency operation signal is provided by the elevator controller and connected to the AC drive through the DI terminal. The AC drive uses this signal to determine whether the current operation is in emergency mode. Contactors K1, K2, and K3 are controlled by the elevator controller.

Precautions

- Set the battery-powered running speed and acceleration/deceleration time appropriately according to actual elevator conditions. The acceleration/deceleration time is recommended to be greater than 10s. The battery-powered running speed should be set according to the following formula: Battery running frequency < (48 V-5 V) x Rated motor frequency/(1.414 x Rated voltage)
- A 48 VDC voltage is supplied to the main circuit through the battery. Control power is supplied through an auxiliary power source such as a UPS.

- The stable output current of the battery is recommended to be larger than the no-load current of the traction motor.
- The ME320LN^{new} series AC drive uses its digital input (DI) terminals to detect whether the operation is in emergency mode. The AC drive running speed is determined by multi-speed settings. The acceleration/deceleration time corresponding to the multi-speed setting is the battery-powered operation acceleration/deceleration time. Unlike normal operation, acceleration and deceleration follow a linear profile during emergency operation.
- The AC drive does not perform DC bus voltage detection during battery-powered operation. Therefore, it is essential to ensure that the 48 VDC voltage has been applied to the main circuit before releasing the brake.
- The ME320LN^{new} series AC drive performs speed monitoring during battery-powered operation. If the speed exceeds the value set in F6-28 (emergency evacuation speed limit at power failure), the AC drive will trigger a fault protection (Err32).
- To prevent excessive load during emergency operation, the external controller should select a travel direction that balances or brakes the load. The ME320LN^{new} series AC drive provides a "Light-load operation output" function. During normal operation, this signal is turned on or off based on the load. The external controller can use this signal to determine the appropriate direction for emergency operation.
- During emergency operation at power failure, pay close attention to the operation timing between the main power contactor and the UPS contactor connected to the AC drive. Never close both contactors simultaneously, as this may damage the UPS or battery.

9.4.2 UPS-powered Emergency Operation

System Wiring

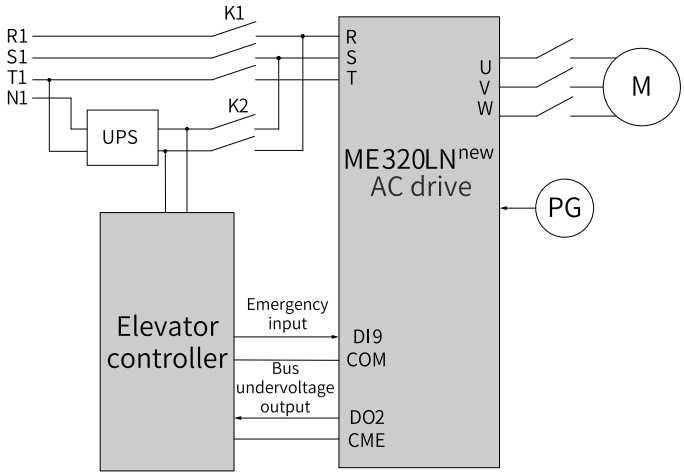


Figure 9-11 UPS-powered emergency operation

Operation Timing

When the AC drive operates under a multi-speed combination mode and uses the UPS emergency evacuation method, the following connections shall be added according to *"Figure 9-11 " on page 166* :

- "Emergency input" and "Bus undervoltage output" wiring.
- UPS power supply wiring to the AC drive during power failure.

Taking the multi-speed 2 as the emergency operation speed profile as an example, the parameters listed in the following table need to be set:

Param.	Name	Setting	Default	Note
F4-09	DI9 input	9	0	Emergency input
F5-01	DO2 output selection	8	0	Bus undervoltage
F6-02	Multi-speed 2	2.00 Hz	0.00 Hz	Rated motor speed is 50.00 Hz
F6-10	S-curve selection for multi-speed 2	3	1	-
F6-17	Emergency evacuation power supply at power failure	1	0	UPS-powered operation
F7-08	Acceleration time 3	30.0s	4.0s	Increase acceleration time to avoid excessive inrush current

The operation timing during UPS evacuation operation is the same as that during 48 V evacuation operation.

Similarly, the UPS emergency operation signal is provided by the elevator controller and connected to the AC drive through the DI terminal. The AC drive uses this signal to determine whether the current operation is in emergency mode. Contactors K1 and K2 are controlled by the elevator controller.

9.5 Analog Load Cell Commissioning

For the ME320LN^{new} series AC drive, it is assumed that FWD corresponds to elevator up operation and REV corresponds to elevator down operation. The following analog load cell commissioning procedure is based on this configuration.

9.5.1 Parameter Setting

1. Assume AI1 is used as the pre-torque input channel. Set the parameters as follows: F3-09 = 2; F3-10 = elevator balancing factor.
2. With the car unloaded, use the operating panel to switch and view the AI1 sampling value (FU-17), and input this value into F3-18. Similarly, with the car fully loaded, input the AI1 sampling value (FU-17) into F3-19. These two parameters can also be determined through load cell auto-tuning.
3. Adjust F3-11 to select appropriate compensation, typically set to around 0.6.

9.5.2 Commissioning for Identifying Right Balancing Factor

In some sites, after correct no-load compensation, the effect deteriorates as the load in the car increases. The cause is inaccurate balancing factor of the elevator.

When the balancing factor is unknown, the no-load and full-load two-point compensation method can be adopted to determine the balancing factor (F3-10) and gain (F3-11), so that the system compensation effect is consistent.

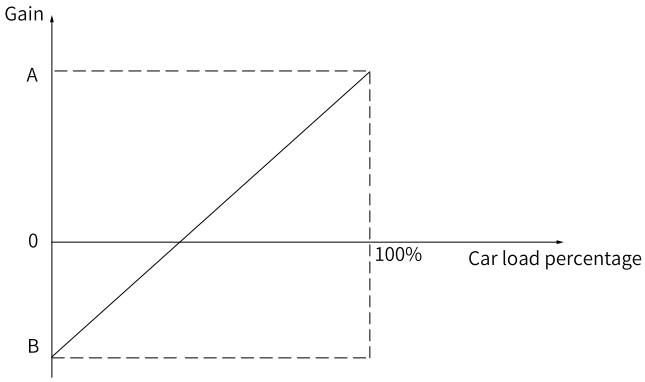


Figure 9-12 Compensation curve

As shown in *"Figure 9-12 " on page 168* , first set F3-10 to 50%. Perform no-load auto-tuning with the car unloaded. Then run the elevator up and down, adjust F3-11, and observe whether the motor has any slip at the instant the brake releases. When the motor torque compensation results in no slip during both up and down movement, and without over-compensation, record F3-11 = B. Then load the car to full capacity, perform full-load auto-tuning, and run the elevator up and down again. Adjust F3-11. Similarly, if compensation is just right, F3-11 = A.

It can be seen from *"Figure 9-12 " on page 168* that the diagonal line is the correct compensation curve for the elevator. The point where this line crosses the horizontal axis is the balancing compensation point of the elevator, corresponding to the elevator balancing factor. Based on the preceding test, geometric calculation yields: F3-10 = 100 x B/(A + B); F3-11 = (A + B)/2.

For example, B = 0.7 obtained during no-load test, A = 0.4 during full-load test; therefore the corresponding balancing factor is set as F3-10 = 36.4%, F3-11 = 0.55.

9.5.3 Commissioning for Rectifying Wrong Running Direction

If, on-site, forward running has already been set to correspond to down operation and reverse running to up operation, the above method will worsen the compensation. The reason is that the compensation direction is reversed. In this case, first record the sampling values for the car no-load and full-load conditions of F3-18 and F3-19, and the balancing factor F3-10.

For example: F3-18 = X; F3-19 = Y; F3-10 = Z. Then, set the following values to resolve the issue: F3-19 = X; F3-18 = Y; F3-10 = 100 - Z.

9.6 No-load-cell Commissioning

9.6.1 Parameter Setting

Param.	Description	Setting
F1-00	Encoder type	0
F3-09	Load cell mode	5
F3-04	Brake release delay (zero-speed holding time)	> 0.5s

9.6.2 Commissioning Instructions

- Gradually increase the position lock current coefficient (FD-05), until the rollback is as small as possible and the motor is not oscillating after the brake is released.
- During commissioning, you can observe the rollback condition of position lock from the parameter FU-20 and adjust the value to minimum.
- If the position lock speed loop TI (FD-07) is less than 1.00 and the motor is visibly oscillating, increase the position lock current coefficient (FD-05).
- Do not adjust the position lock speed loop KP (FD-06) too much, maintain the set value as much as possible. Otherwise the motor is likely to oscillate.

9.7 Direct Travel Ride Commissioning

The ME320LN^{new} AC drive provides the direct travel ride function designed to eliminate the need for a creep phase when the elevator reaches its destination, thereby enhancing the efficiency of elevator operations. Conditions for enabling this function:

- It requires the elevator controller to send a direct travel ride signal to the AC drive.
- The direct travel ride signal should be issued when the car reaches a fixed distance from the leveling position and should be maintained until the AC drive stops the elevator.

9.7.1 Wiring

Taking an elevator system using a sin/cos encoder and an I/O expansion card with open collector output as an example, the recommended wiring diagram for the direct travel ride application is shown in *"Figure 9-13 " on page 170* :

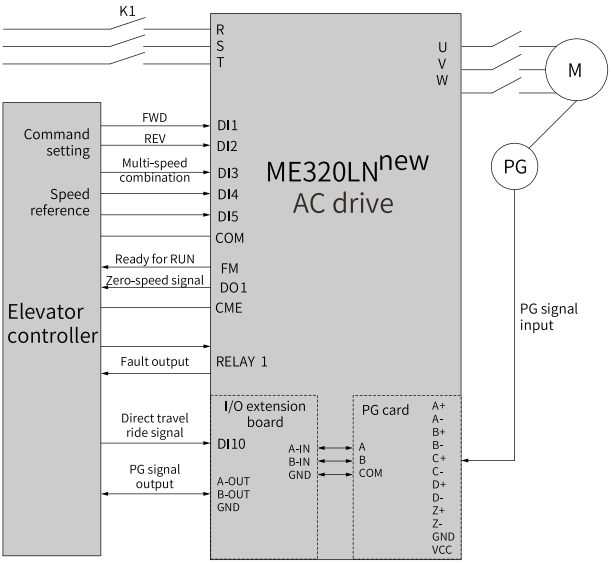


Figure 9-13 Direct travel ride wiring

Note

- The frequency-division output of the PG card must be connected to the PG pulse input terminal on the AC drive I/O expansion board. This terminal only accepts PG cards with open collector output. Refer to the "Mechanical and Electrical Installation" chapter for details on PG card selection and ensure the correct PG card model is used.
- The frequency-division PG signal required by the elevator controller should be taken from the PG pulse output terminal on the AC drive I/O expansion board. There are two sets of PG pulse output terminals on the AC drive I/O expansion board: open collector output and differential output types. Select the appropriate output type based on the input requirements of your elevator controller.

9.7.2 Parameter Setting

In addition to setting motor parameters and encoder parameters correctly, the following parameters must be set correctly (take *"Figure 9-13 " on page 170* as an example):

Param.	Name	Setting	Default	Note
F4-10	DI10 input function selection	22	0	Direct travel ride command signal (NO)
F7-17	Distance setting for direct travel ride	100.0 mm	0.0 mm	The distance between the car and the leveling position when the direct travel ride command is issued (set according to actual conditions)
F8-03	Rated elevator speed	1.600 m/s	1.600 m/s	Rated elevator speed
FA-06	PG frequency-division coefficient ratio	1	1	Set according to the frequency division ratio of the PG card used

9.7.3 Stop Timing Diagram

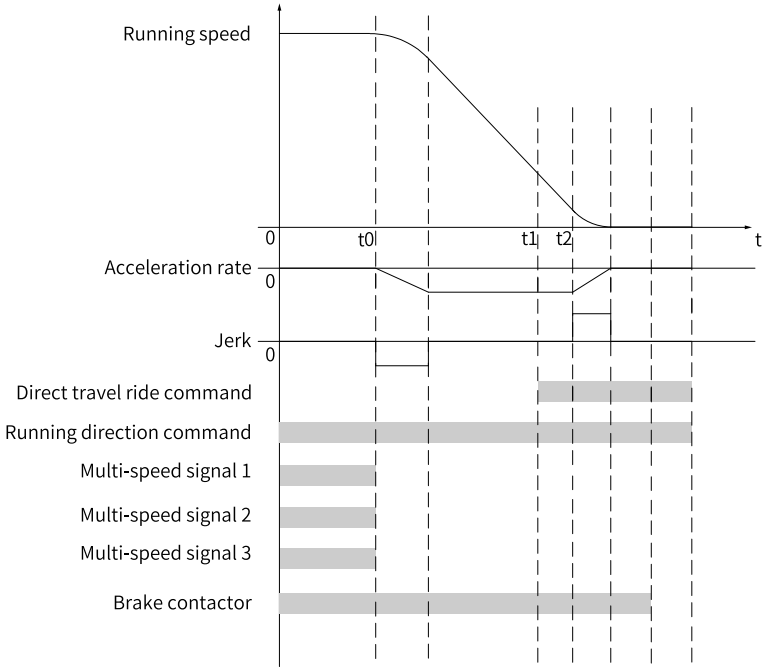


Figure 9-14 Direct travel ride timing

Note

- When reaching the speed change point, the elevator controller removes all multi-speed signals, setting the target speed to 0.
- When the car reaches the preset distance from leveling position, the elevator controller issues a direct travel ride command.
- After the drive decelerates to zero speed, it releases the brake.
- Once the brake is fully released, the direction command and the direct travel ride command are canceled. (The direct travel ride command may temporarily remain active, but must be canceled before the next deceleration.)

9.7.4 Commissioning Method

After setting the parameters and connecting all signals according to the above instructions, register a call and run a test operation. After the elevator stops at the floor, check the value of F7-18.

- If F7-18 is 0, it indicates that the AC drive does not use the direct travel ride function at stop. There are two reasons:
  - The AC drive does not receive the direct travel ride command. To solve the problem, check wiring of the direct travel ride command signal, and function selection of the corresponding DI terminal of the AC drive. When the direct travel ride command is active, the corresponding LED segment in FU-14 is ON.
  - The AC drive deceleration time segment is too long. That is, the time from t2 to zero-speed in *"Figure 9-13 " on page 170* is too long. In this case, even if the AC drive receives the direct travel ride command, it cannot execute the command because it has enter the deceleration stage and the stop distance cannot be adjusted. To solve the problem, reduce the end time segment of AC drive deceleration. For example, if speed 4 is used for the normal speed running, and F6-12 (Running curve of speed 4) is set to 1, then decrease the value of F7-02 (Time proportion of running curve 1 start segment).
- If F7-18 is not 0, the AC drive uses the direct travel ride mode. Adjust F7-17 based on the actual leveling conditions: Increase F7-17 at under-leveling and decrease F7-17 at over-leveling.
  When F7-17 is increased or decreased to a certain value, F7-18 will not change along with F7-17. It indicates that F7-17 reaches the upper limit or lower limit. This is because that the deceleration distance can be adjusted only within a certain range when the direct travel ride command is received.
  - If F7-17 reaches the upper limit, increase the deceleration time.
    For example, if speed 4 is used for the normal speed running, and F6-12 (Running curve of speed 4) is set to 1, then increase the value of F7-01 (Deceleration time 1).

This increases the deceleration distance. The speed switchover point also needs to be adjusted accordingly.

- If F7-17 reaches the lower limit, reduce the end time segment of AC drive deceleration. For example, if speed 4 is used for the normal speed running, and F6-12 (Running curve of speed 4) is set to 1, then decrease the value of F7-02 (Time proportion of running curve 1 start segment). Note that a very small value of F7-02 may affect the riding comfort.

- The deviation between the leveling error at light-load running and that at heavy-load running is very large. For example, the leveling error at heavy-load running is within 2 mm, but that at light-load running is larger than 5 mm. To solve the problem, decrease the speed loop integral time set in F2-01 and F2-04 to improve the speed loop control accuracy and reduce the deviation.

9.8 Calculation of the Speed Change Point

As stated above, when a direct travel ride command appears, the adjustable range of the deceleration distance of the curve is limited. Therefore, the speed change point where the system begins deceleration must be accurate–that is, the time point t0 in *"Figure 9-13" on page 170* must not be too early or too late.

Below is the formula for calculating the distance traveled from moment t0 to AC drive stop:

$$L=V\times Tdec\times(\frac{2+Kf-Ks}{4})+\frac{V}{12}\times\frac{Ks^2-Kf^2}{2-Ks-Kf}$$

$$Tdec=\frac{V\times Tdec}{Vmax}$$

Where: V is the car speed before speed change (m/s), Vmax is the car speed (m/s) corresponding to the maximum AC drive output frequency (F0-05), Tdec is the set deceleration time (s), Ks is the ratio of the start segment of the set curve (%), Kf is the ratio of the end segment of the set curve (%).

Example: High-speed operation uses multi-speed 4, multi-speed 4 frequency (F6-04) is rated frequency, maximum frequency is also set the same as rated frequency, multi-speed 4 acceleration/deceleration time selection (F6-12) is 1, deceleration time 1 (F7-01) is 4s, S-curve 1 start segment ratio is 20.0%, S-curve 1 end segment ratio is 20.0%, elevator rated speed (F8-03) is 1 m/s.

According to the above parameters, Vmax = 1 m/s, V = 1 m/s, Tdec = 4 s, Ks = 0.2, Kf = 0.2. Substituting into the formula gives L = 2 m. Therefore, the elevator controller should initiate speed change 2 m before the leveling position.

10 Troubleshooting

10.1 List of Fault Codes

The ME320LN^{new} AC drive supports 50 faults and protection functions. If a fault occurs, the protection function is activated, the AC drive stops output, the contact of the fault relay works, and the operating panel displays the fault code. Before seeking for help, find the possible causes and rectify the fault according to the instructions in this chapter. If the fault persists, contact your agent or Inovance.

Note

Faults Err33, Err16, and Err17 can be reset only after turning power off and on again.

Fault code	Name	Subcode	Cause	Solution	Note
Err02/ Err03/ Err04	Output overcurrent	1	The main circuit output is grounded or short-circuited or the motor insulation performance degrades.	• Check whether the motor and grounding cables are connected correctly. • Check whether the shorting motor stator contactor causes a short circuit at the controller output side. • Check whether motor cables have a damaged jacket. • The drive board is abnormal.	-
			Motor auto-tuning is not performed or motor parameter setting errors occur.	• Check whether motor parameters comply with the nameplate. Perform motor auto-tuning again. • The current loop PI parameters are set improperly. Reduce F2-06.	-
			The encoder signal is incorrect.	• Check whether the encoder PPR is set correctly in FA-00. • Check whether the encoder signal is interfered with, whether the encoder cable runs through the duct independently or is too long, and whether the shield is grounded at one end. • Check whether the encoder is installed reliably, whether it is connected to the motor shaft securely, and whether the encoder is stable during high-speed running. • Check whether the encoder is connected correctly and securely. Check whether the encoder wirings are correct. For the asynchronous motor, perform SVC and compare the current to judge whether the encoder works properly.	-

Fault code	Name	Subcode	Cause	Solution	Note
Err02/ Err03/ Err04	Output overcurrent	1	The phase sequence of the motor is incorrect.	Interchange the motor UVW phase sequence or manually set FF-10 to adjust the sequence.	-
			The acceleration time is too short	Reduce the acceleration rate F3-02.	-
			The braking resistor is short-circuited.	Check whether the braking resistor and braking unit are connected correctly. Make sure that there is no short circuit.	-
			Power hardware fault	In V/f control mode without releasing the brake, it indicates hardware fault with overcurrent reported at power-on.	-
		2	Same as subcode 1	Same as subcode 1	-
		11			
		12			
		15	Overcurrent occurs in the detection of inter-phase short circuit.	Check whether there is three-phase short circuit.	-
Err05/ Err06/ Err07	Bus overvoltage	1	Bus voltage is too high.	• During operation under generator power, the braking resistance is too large. • The correction coefficient of FF-08 bus voltage is too large. • During operation under generator power, the bus voltage hardware mismatches with software, especially for the 380 V and 220 V. • Check the input power supply. • Deceleration time is too short	-
Err09	Input undervoltage	1	FF-08 set too small	Change FF-08 bus voltage correction coefficient to 100.0%.	
			An instantaneous input power failure	Check the input power line.	-
			Too low input voltage	Check the power supply system.	
			AC drive power mismatch with the motor	Replace with an AC drive of higher power.	
			The drive control board malfunctions.	Replace the drive hardware.	

Fault code	Name	Subcode	Cause	Solution	Note
Err10	Drive overload	1	The mechanical resistance is too large.	• Check whether the brake is released and whether the brake power supply is normal. • Check whether the guide shoes are too tight.	Overload curve: Take 180% of rated AC drive current as the upper overload limit to calculate the time of overload capacity. If it is not 180%, adjust the overload time proportionally.
			The balancing factor is improper.	Check the balancing factor.	
			The encoder feedback signal is abnormal.	• Check whether the feedback signal and parameter setting (FA-00) are correct. • For synchronous motors, check whether the starting angle of the encoder is correct.	
			Motor auto-tuning is not performed properly.	Check whether the motor parameters are correct, and perform motor auto-tuning again. If this fault is reported during the slip experiment, perform the slip experiment by enabling the slip function set in F3-24.	
			The phase sequence of the motor is incorrect	Adjust the UVW phase sequence.	
			The AC drive model is of too low power class.	If the current has exceeded the rated current of the AC drive during stable-speed running of the elevator with an empty car, replace with an AC drive of higher power.	
Err11	Motor overload	1	-	See Err10-001.	-
Err12	Input phase loss	1	• The R, S and T power input is unbalanced or the input phase loss occurs. • Some of the input terminals are loosely connected.	• Set FJ-18 bit1 to 1 to increase the judgment threshold. • The R, S and T power lines have phase loss. • There is severe three-phase unbalance. • The drive board is abnormal.	-
Err13	Output phase loss	2	The output wiring of the main circuit is loose.	Check whether motor cables are connected securely.	-
		Maximum three-phase output current	The motor is damaged.	Check whether the motor is internally abnormal.	-

Fault code	Name	Subcode	Cause	Solution	Note
Err14	Module overtemperature	Carrier frequency	The temperature curve FF-02 is set incorrectly.	• The temperature curve FF-02 is set incorrectly. • Fan fault	-
			Air filter blocked	Clean the air filter. Check whether the installation clearances of the controller satisfy the requirements.	-
			Ambient temperature too high	Lower the ambient temperature	-
			The MCB is incompatible with the drive board.	Replace a compatible MCB or drive board.	-
			The AC drive model is of too low power class.	Replace with an AC drive of higher power.	-
Err15	Braking unit fault	1	The braking resistor is short-circuited.	Check whether the braking resistor and braking unit are connected correctly. Make sure that there is no short circuit.	-
		2	The braking transistor has short circuit.	• The input power supply is of poor quality. • The braking transistor has short circuit. • The voltage ripple sampled is large.	Detect the bus voltage fluctuation at stop to see whether the braking transistor is faulty.
Err16	Current control fault	1	The excitation current control is abnormal.	• Motor parameters are set incorrectly. • Output phase loss occurs. • The RUN contactor is not closed. • The brake circuit is abnormal. • The input voltage is low.	-
		2	Torque current control fault		-
		3	The torque reaches the upper limit and the speed is very low.		-
Err17	Encoder interference during motor auto-tuning	2	Abnormal Z signal position during auto-tuning	• Encoder interference. • Check the CD signal zero drift correction.	-
		3	The UVW encoder auto-tuning reference signal is abnormal.	• Encoder interference. • The encoder cable is disconnected.	-
Err18	Current detection fault	1	Hardware fault or interference exists.	Replace the drive hardware.	-
		2			
		3	The drive board is damage.	Replace the drive board.	-

Fault code	Name	Subcode	Cause	Solution	Note
Err19	Motor auto-tuning fault	1	Stator resistance auto-tuning fault	• The RUN contactor is not closed. • Output phase loss occurs. • Check whether the rated motor current is set correctly in F1-03. • The drive board is abnormal.	-
		5	The output circuit is open during magnetic pole position auto-tuning.	Check whether open circuit occurs in the UVW output.	-
			The motor power is way below that of the AC drive (for example, 40%).	Replace with an AC drive of lower power.	-
		6	See subcode 5.	See subcode 5.	-
		8	Motor type F1-25 mismatches with encoder type F1-00.	• Check the motor type setting. • Check the encoder type setting.	-
		9	The encoder CD signal is unstable.	• Check the motor rotation direction. • Encoder interference.	-
		10	Parameter setting error	The encoder phase sequence is set incorrectly.	-
		12	F2-12 bit0 and bit1 are enabled, and the encoder zero position angle is not obtained.	Perform angle-free auto-tuning and ensure that the motor makes three rotations before power-off and power-on again.	-
		13	Synchronous motor rotor magnetic pole position auto-tuning failure	Check whether the group F1 parameters are set correctly.	-
		14	The encoder type is set incorrectly.	In static auto-tuning, F1-00 needs to be set to 0 or 3.	-
		15	Encoder CD signal error	Check that the encoder is of sin/cos type, and that F1-00 settings are correct.	-
		19		Encoder Replacement	-

Fault code	Name	Subcode	Cause	Solution	Note
Err20	Speed feedback incorrect	1	No AB pulse change in no-load auto-tuning	• The motor may not rotate in auto-tuning. • The brake is not released or the current is low. • AB phase interference exists. • AB phases are not connected correctly.	-
		3	Encoder AB phase sequence incorrect	• The phase sequence is reversed. • The motor may not rotate in auto-tuning. The brake is not released or the current is low. • AB phase interference exists. • Set encoder PPR correctly. • Modify FF-10.	-
		4	Z signal loss during auto-tuning	• Z phase signal is not connected. • Encoder interference. • The encoder is not connected. • The motor may not rotate.	-

Fault code	Name	Subcode	Cause	Solution	Note
Err20	Speed feedback incorrect	5	Disconnection of CD signals in stop state	• Check that the encoder is of sin/cos type that supports CD signals. • Check for correct CD signal wiring. • For the 1313 series encoder with CD signals from PG card simulation, check for correct signals. • The magnetic ring encoder has no CD signals available and F0-00 needs to be set to 5.	-
		7	UVW encoder wiring disconnection	• Check the encoder type setting. • Check the PG card. • Check the wiring.	-
		9	Runaway protection	• Parameters FD-05, F2-06 and F2-07 are not correct. Generally, FD-05 is F2-06 divided by 10. • Check for correct phase sequence and speed measurement parameter settings. • Set encoder PPR correctly. • Check for correct rated motor speed setting. • Encoder interference. • Check for correct brake release.	-
		10	The output torque reaches the upper limit but the motor does not rotate.	• The upper torque limit is set too low. • The load is too heavy. • Check whether the brake is fully released. • Check the AC drive selection. • The bus voltage is low or motor back EMF high.	-
		11	Excessive sin/cos encoder AB/CD zero drift	• Check the PG card, system and motor grounding. • For the 1313 series encoder, check for correct CD signals from simulation. • Replace the PG card and test.	-
		12	The output torque reaches the upper limit but the motor does not rotate.	• Check whether the brake is fully released. • Obtain the magnetic pole angle through auto-tuning and check consistency. • Check the encoder wiring.	-

Fault code	Name	Subcode	Cause	Solution	Note
Err20	Speed feedback incorrect	13	AB signal disconnection during running.	• Check whether the brake acts unexpectedly. • Check whether the encoder feedback signal is updated.	-
		14	Z signal loss during running	• Check the encoder grounding interference. • For the 1313 series encoder, confirm whether the Z signal exists.	-
		19	Encoder AB signal disconnection during running	Check the encoder wiring.	-
		20	Speed measurement error during with-load auto-tuning	• Check whether encoder feedback pulses are updated. • Check whether the motor rotates.	-
		21	CD signals abnormal during with-load auto-tuning	• Check the CD wiring. • Set encoder PPR correctly. • For the 1313 series encoder, check for correct CD signals from simulation.	-
		55	Encoder CD signals or Z signal error	• Serious Z phase interference exists. • For the 1313 series encoder, check the relationship between CD and Z signals.	-
Err21	Parameter setting error	2	The set maximum frequency smaller than the rated motor frequency	Check whether F0-06 exceeds F1-04.	-
		3	The encoder type is set incorrectly.	The sin/cos encoder, absolute encoder, or ABZ encoder is incorrectly set as the UVW encoder. Check whether the encoder type set in F1-00 is the same as the actual encoder.	-
		4			-
		5	Maintenance fault	Contact the elevator manufacturer.	-
		6	Maintenance fault	Contact the elevator manufacturer.	
			MCB elevator lock terminal active		-
		7	The MCB and the drive board software are incompatible, but FF-07 is set.	Set FF-07 correctly.	-
		8			-

Fault code	Name	Subcode	Cause	Solution	Note
Err23	Short circuit fault	1	• UVW output short circuit to ground • AC drive output short circuit to ground	• Check whether short circuit to ground exists in the UVW output. • Check whether the AC drive output is grounded.	-
		2		• Check whether short circuit to ground exists in the UVW output. • Check whether short circuit to ground exists in the three-phase output of the AC drive, or whether the three phases have the same output.	-
		3			
		4			
		5	UVW output short circuit to ground	Check whether short circuit to ground exists in the UVW output.	-
		6			
Err24	Initial magnetic pole position detection fault	-	-	-	-
Err25	Data storage abnormal	101	The data storage in the MCB is abnormal.	Contact the agent or manufacturer.	-
		102			-
Err32	Emergency running overspeed	101	The speed during battery running exceeds the set value (F6-28).	• Check whether the battery voltage is normal. • Check whether the circuit become loose. • Check whether F6-28 is set too low.	
Err33	Overspeed	101	The AC drive running speed exceeds the threshold level for overspeed detection, and the accumulated time exceeds the overspeed judgment time.	• Check whether the motor power is properly matched. • Check whether the elevator is overloaded. • Check whether the rotary encoder signal is correct. • Check the settings of parameters FC-09 and FC-10.	-
Err34	Excessive speed deviation	101	The deviation between the feedback frequency and the frequency reference exceeds the set range, and this situation lasts for a period longer than the set time.	• Check whether the motor power is properly matched. • Check whether the elevator is overloaded. • Check whether the rotary encoder signal is correct. • Check the settings of parameters FC-12 and FC-13.	-

Fault code	Name	Subcode	Cause	Solution	Note
Err36	RUN contactor feedback abnormal	101	The feedback of the RUN contactor is active but the contactor has no output.	• Check whether the feedback contact of the RUN contactor acts properly. • Check whether the NO/NC settings of the feedback contact are correct.	-
		102	The feedback of the RUN contactor is inactive but the contactor has output		
Err37	Brake contactor feedback abnormal	101	The feedback of the RUN contactor is active but the contactor has no output.	• Check whether the brake contactor functions properly. • Check whether the signal feature (NO/NC) of feedback contacts of the brake contactor is set correctly. • Check the brake contactor feedback circuit.	-
		102	The feedback of the RUN contactor is inactive but the contactor has output		
Err38	Contact stuck	101	Feedback signal of the RUN contactor remains valid for more than 2.5s.	• Check the wiring. • Check the brake and RUN contactors.	-
		102	Feedback signal of the brake contactor remains valid for more than 2.5s.		
Err39	Motor overtemperature	101	The motor overheat relay input remains active for a certain time.	• Check whether the signal feature (NO/NC) of motor parameters are set correctly. • Check whether the thermal protection relay socket is normal. • Check whether the motor is used normally and whether it is damaged. • Improve the cooling conditions of the motor.	-
		102	The AI2 analog input voltage is greater than F6-24 and lasts for a certain period.		-
Err40	Pulse-by-pulse current limit fault	1	-	-	-
Err55	DSP communication protection	101	Abnormal connection between drive board and control board	Check the connection between the drive board and the control board	-
		102			
Err74	STO fault	1	Hardware STO error	Check the STO card and replace if necessary.	-
		2	The safety circuit is disconnected	Check the safety circuit.	-
Err79	Encryption fault	1	NICE3000^{new} controller encrypted drive board authentication fails.	The drive board incompatible with MCB	-

10.2 Common Faults and Solutions

The following symptoms may occur during use of the drive. When these symptoms occur, perform simple analysis according to the following table.

- There is no display upon power-on.
  - Check with a multimeter whether the AC drive power supply is consistent with the rated AC drive voltage. If not, eliminate the power supply problems.
  - Check whether the three-phase rectifier bridge is normal. If it is damaged, contact us or our agent for technical support.
  - Check whether the CHARGE indicator is on. If this indicator is off, the fault may occur on the rectifier bridge or snubber. If this indicator is on, the fault may be caused by the switch-mode power supply. Contact us or our agent for technical support.
- The power circuit breaker trips after power-on.
  - Check whether the power supply is grounded or short circuited. If yes, eliminate the fault.
  - Check whether the rectifier bridge is damaged. If yes, contact us or our agent for technical support.
- The motor does not rotate after the AC drive runs.
  - Check whether there is balanced three-phase output from the UVW cables. If yes, the cause is motor cabling problem, motor damage, or locked-rotor due to mechanical reasons. Eliminate the fault.
  - If there is output but the three-phase output is unbalanced, the cause is damage of the AC drive board or output module. Contact us or our agent for technical support.
  - If there is no output voltage, the cause may be damage of the AC drive board or output module. Contact us or our agent for technical support.
- The AC drive display is normal after power-on, but the power circuit breaker trips during running.
  - Check whether inter-phase short-circuit occurs in the output module. If yes, contact us or our agent for technical support.
  - Check whether motor lead wire is short circuited or grounded. If yes, eliminate the fault.
  - If trip occurs only sometimes and the distance between the motor and the AC drive is far, install an AC output reactor.

11 Maintenance

11.1 Daily Maintenance Items

The influence of the ambient temperature, humidity, dust, and vibration will age the components inside the AC drive, which may cause potential faults or reduce the service life of the AC drive. Therefore, it is necessary to carry out routine and regular maintenance.

Note

There is still voltage on the filter capacitor after power-off. Wait until the CHARGE indicator goes off and test with a multimeter that the residual voltage is lower than 36 V and then perform repair or maintenance.

11.1.1 Daily Inspection Items

The operator is responsible for performing checks including but not limited to those listed in the following table in accordance with the recognized technical rules in the country of installation and with applicable regional guidelines. Tick after each check of the item.

No.	Item	Tick
1	Ensure that no abnormal noise exists when the motor is running.	☐
2	Ensure that the motor does not vibrate excessively.	☐
3	Ensure that the installation environment of the AC drive does not change.	☐
4	Ensure that the cooling fan works properly.	☐
5	Ensure that the AC drive does not overheat.	☐

11.1.2 Daily Cleaning Items

The operator is responsible for performing checks including but not limited to those listed in the following table in accordance with the recognized technical rules in the country of installation and with applicable regional guidelines. Tick after cleaning each item.

No.	Item	Tick
1	Keep the AC drive clean all the time.	☐
2	Remove the dust on the surface of the AC drive to prevent the dust, especially the metal dust, from entering the AC drive.	☐
3	Clear the oil stain on the cooling fan of the AC drive.	☐

11.2 Periodic Inspection Items

Periodic maintenance primarily targets areas that are difficult to inspect during daily upkeep and regular operation.

The operator is responsible for performing checks including but not limited to those listed in the following table in accordance with the recognized technical rules in the country of installation and with applicable regional guidelines. Tick after each check of the item.

No.	Item	Tick
1	Check and clean the air filter periodically.	☐
2	Ensure that screw do not become loose.	☐
3	Ensure that the AC drive is not corroded.	☐
4	Check that terminals have no signs of abrasion, strain, or mechanical damage.	☐
5	Perform insulation test on the main circuit.	☐



Before measuring the insulating resistance with megameter (500 VDC megameter recommended), disconnect the main circuit from the AC drive. Do not use the insulating resistance meter to test the insulation of the control circuit. The high voltage test need not be performed again because it has been completed before delivery.

11.3 Part Replacement

The quick-wear parts of the AC drive include the cooling fan and electrolytic capacitor. The service life of such devices is closely related to the operating environment and maintenance conditions. The following table describes the general service life.

Part name	Service life (year)	Possible damage cause	Judging criteria
Fan	2 to 3	Bearing worn out, blade aging	Check whether there is crack on the blade. Check whether there is abnormal vibration noise at startup.
Electrolytic capacitor	4 to 5	Input power supply unstable, high ambient temperature, frequent load fluctuations and electrolyte aging	Check whether there is liquid leakage. Check whether the safety valve has projected. Measure the static capacitance. Measure the insulating resistance.

11.4 Storage

For storage of the AC drive, pay attention to the following aspects:

- Pack the unit with the original packing box provided by Inovance as possible as you can.
- Long-term storage degrades the electrolytic capacitor. Thus, the unit must be energized once every 2 years, each time lasting at least 5 hours. The input voltage must be increased slowly to the rated value with the regulator.

12 Certification, Directive and Standard

12.1 Certification, Directive and Standard

The product complies with the following certification, directives and standards. See the product nameplate for the certification it has obtained.

Certification	Mark	Directive		Standard
CE	CE	EMC directive	2014/30/EU	EN 12015:2020
				EN 12015:2014
				EN 12016:2013
		LVD directive	2014/35/EU	EN 61800-5-1
		RoHS directive	2011/65/EU	EN 50581

12.2 CE Certification



Figure 12-1 CE marking

Important Notes on EU Standards Compliance:

- The CE marking certifies that a product has met EU health, safety and environment requirements, which ensure consumer safety. Manufacturers in the European Union (EU) and abroad must meet CE marking requirements where applicable in order to market their products in Europe.
- It is required for products manufactured anywhere in the world that are then marketed in the EU .
- This product is labeled with CE mark, compliant with Low Voltage Directive (LVD), Electromagnetic Compatibility (EMC) Directive and Environmental Protection (RoHS) Directive.
- Machines and devices integrated with this drive must also comply with CE requirements for distribution in Europe.
- It is the responsibility of the end user of the product to ensure the machines the product to be used for comply with the CE standard and to affix the CE marking.

12.2.1EMC Standard

EMC is defined by the International Electrotechnical Commission (IEC) as the ability of an equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment. In

other words, EMC includes two aspects: The electromagnetic interference generated by a device or system must be restricted within a certain limit (EMI: Electromagnetic Interference); the device or system must have sufficient immunity to the electromagnetic interference in the environment (EMS: Electromagnetic Susceptibility).

12.2.2EMC Directive Compliance

This product complies with EMC Directive 2014/30/EU and can be used for First Environment and Second Environment defined in EN 12015:2020 and EN 12016:2013. For better EMC performance, install input EMC filter and use output shielded cable or other options. Ensure the filter is well grounded and that the cable has large-area 360° shielding.

Note

The integrator of the system installed with the product is responsible for compliance of the system with the European EMC Directive and standards EN 12015:2020 and EN 12016:2013 according to the system application environment.

12.2.3LVD Low Voltage Directive Compliance

This product has been tested according to EN 61800-5-1, and it complies with the Low Voltage Directive. To ensure machines or devices that the product is installed in as a whole comply with the Low Voltage Directive, be sure to meet these requirements as described below.

Installation Site

Install the product in a place with overvoltage category III and pollution degree 1 or 2 as specified by IEC 60664-1.

Installation Environment

For installation environment requirements, see *"3.1 Installation Environment Requirements" on page 35*.

Protection Requirements

The product is intended for cabinet assembly for systems operating in the end-user environment. The end-user system shall provide enclosures for fireproof and electrical and mechanical protection in line with local laws and regulations and relevant IEC standards.

For IP20 products, install them in structures where foreign objects cannot enter from the top or front sides.

Wiring Description of Main Circuit Terminals

For details, see *"4.3.1 Main Circuit Terminals and Wiring" on page 48*.

Protective Devices Requirements

To comply with EN 61800- 5-1, install fuses/circuit breakers on the input side to prevent accidents caused by short circuit in the internal circuit.

12.2.4 Installation and Selection of EMC Peripheral Devices

12.2.4.1 EMC Input Filter Selection

An EMC filter installed between the AC drive and the power supply can not only restrict the interference of electromagnetic noise in the surrounding environment on the AC drive, but also prevent the interference from the AC drive on the surrounding equipment. The ME320LN^{new} AC drive satisfies the requirements of category C2 when an EMC filter is installed on the power input side. The installation precautions are as follows:

- Strictly comply with the ratings when using the EMC filter. The EMC filter is category I electric apparatus, and therefore, the metal enclosure ground of the filter should be in good contact with the metal ground of the installation cabinet on a large area, and requires good conductive continuity. Otherwise, electric shock or poor EMC effect may occur.
- Install the EMC filter as close as possible to the power input side of the drive.
- The following table lists the recommended manufacturers and models of EMC filters for the drive. Select a proper one based on actual requirements.

Table 12–1 EMC filter model and appearance

Filter model		Appearance
JIANLI	EBK series	
SCHAFFNER	FN3258 series	

Table 12–2 Recommended manufacturers and models for EMC input filter

Drive model	Power capacity (kVA)	Rated input current (A)	AC input filter model (JIANLI)	AC input filter model
ME320LN-4002-SA	4	6.5	DL-10EBK5	FN 3258-7-44
ME320LN-4003-SA	5.9	10.5	DL-16EBK5	FN 3258-16-33
ME320LN-4005-SA	8.9	14.8	DL-16EBK5	FN 3258-16-33
ME320LN-4007-SA	11	20.5	DL-25EBK5	FN 3258-30-33
ME320LN-4011-SA	17	29	DL-35EBK5	FN 3258-30-33
ME320LN-4015-SA	21	36	DL-50EBK5	FN 3258-42-33
ME320LN-4018-SA	24	41	DL-50EBK5	FN 3258-42-33
ME320LN-4022-SA	30	49.5	DL-50EBK5	FN 3258-55-34
ME320LN-4030-SA	40	62	DL-65EBK5	FN 3258-75-34
ME320LN-4037-SA	57	77	DL-80EBK5	FN 3258-100-35
ME320LN-4045-SA	69	93	DL-100EBK5	FN 3258-100-35
ME320LN-4090-SA	134	180	DL-200EBK5	FN 3258-180-40

12.2.4.2 AC Input Reactor Selection

The AC input reactor is an option used to suppress the harmonics in the input current. In applications where harmonics need to be suppressed, install an external AC input

reactor. The recommended AC input reactor manufacturer and model are listed in the following table.

Table 12-3 Recommended manufacturer and models of the AC input reactor

Drive model	Power capacity (kVA)	Rated input current (A)	AC Input Reactor Model (Inovance)
ME320LN-4002-SA	4	6.5	MD-ACL-7-3.5-4T-4%
ME320LN-4003-SA	5.9	10.5	MD-ACL-10-2.8-4T-4%
ME320LN-4005-SA	8.9	14.8	MD-ACL-15-1.9-4T-4%
ME320LN-4007-SA	11	20.5	MD-ACL-20-1.4-4T-4%
ME320LN-4011-SA	17	29	MD-ACL-30-0.93-4T-4%
ME320LN-4015-SA	21	36	MD-ACL-40-0.7-4T-4%
ME320LN-4018-SA	24	41	MD-ACL-50-0.56-4T-4%
ME320LN-4022-SA	30	49.5	MD-ACL-50-0.56-4T-4%
ME320LN-4030-SA	40	62	MD-ACL-60-0.24-4T-2%
ME320LN-4037-SA	57	77	MD-ACL-90-0.16-4T-2%
ME320LN-4045F-SA	69	93	MD-ACL-120-0.12-4T-2%
ME320LN-4090F-SA	134	180	MD-ACL-250-0.056-4T-2%

12.2.4.3 选择磁环和磁扣

磁环主要用于驱动器的输出侧，在安装时请尽量靠近驱动器放置。输出侧安装磁环主要用来减少驱动器对外干扰，同时降低轴承电流。

对于部分应用现场中存在的漏电流问题及其他信号线干扰问题，可选用磁环或磁扣进行抑制。

- 非晶磁环：抑制驱动器干扰的效果好，常用于电源线和UVW线上。
- 铁氧体磁扣：常用于抑制各种信号线和通信线上的干扰噪声。

Table 12–4 磁环与磁扣

磁环与磁扣		外观
磁环	RH28.5X28.5 X13.8	
	RH28X28X18	
	D5A T36*30*15	
磁扣	DYR-130-B	

磁环选型

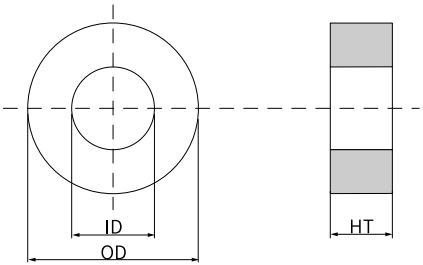


Figure 12-2 磁环尺寸示意图

Table 12–5 输出动力线磁环规格说明

变频器编码	额定电流	功率	磁环厂家型号	编码	尺寸（OD×ID×HT）（mm）
0103DD87	9A	3.7kW	RH28.5X28.5X13.8	11050378	28.5×13.8×28.5
0103DD86	13A	5.5kW	RH28X28X18	11050377	28.0×18.0×28.0
0103DD85	17A	7.5kW			
0103DD89	25A	11kW			
0103DD83	32A	15kW			
0103DD82	37A	18.5kW	D5A T36*30*15	11050379	36.0×25.0×30.0

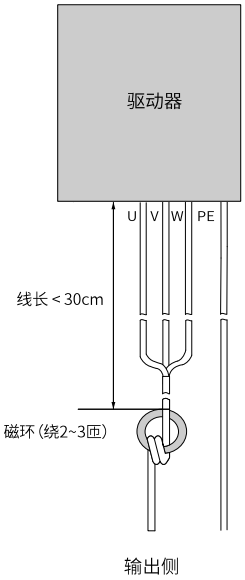


Figure 12-3 磁环安装方法

磁扣选型

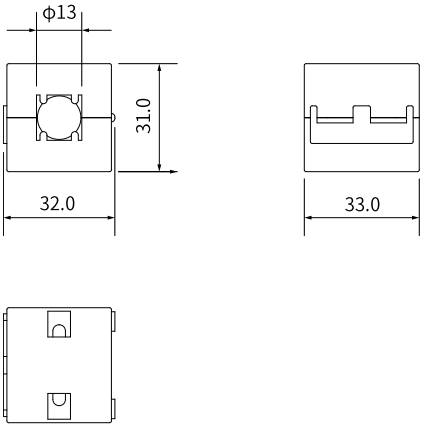


Figure 12-4 磁扣尺寸示意图

Table 12–6 铁氧体磁扣规格说明

磁扣厂家型号	外形尺寸（长×外径×内径）（mm）
7427122S	32.8×28×13

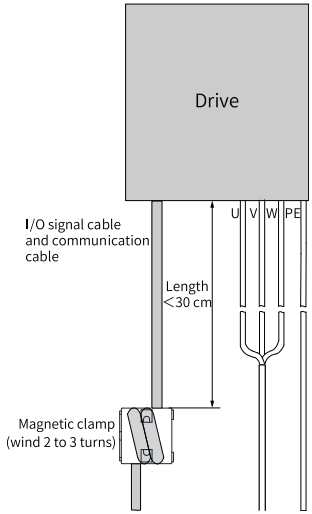


Figure 12-5 磁扣安装方法

12.2.4.4 Simple Filter Selection

Model selection

The simple EMC filter effectively attenuates radio frequency noise from the power line and running controller. For the equipment using a residual current device (RCD), the simple EMC filter fixed at the input side of the controller can also help control the possible RCD malfunction.



Figure 12-6 Simple filter

Dimensions

Ground the simple filter reliably and ensure that the cable connecting the filter and the AC drive is shorter than 30 cm. Its grounding terminal must be connected to the PE terminal of the drive, and the grounding cable must be as short as possible (below 30 cm).

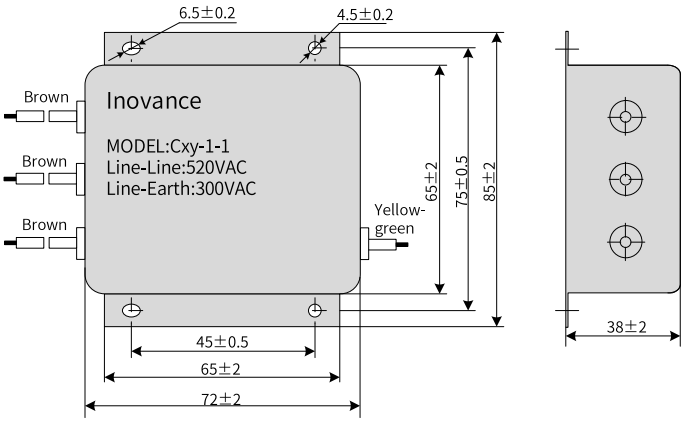
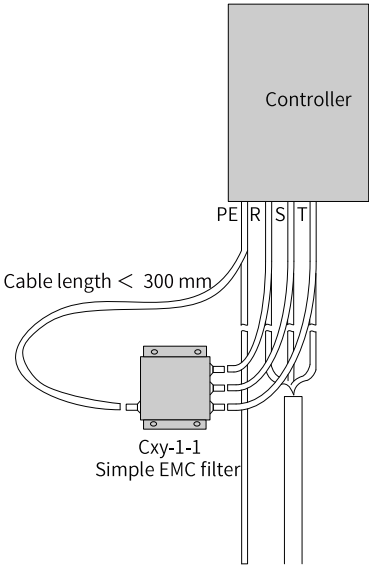


Figure 12-7 Outline dimensions of the simple filter (Unit: mm)

Installation Description



Appendix A: Solutions to Common EMC Issues

If a circuit breaker with leakage current protection is to be used, follow these guidelines for selection:

- During operation, the control cabinet/integrated controller generates some high-frequency leakage current. To avoid false trips of the residual current device (RCD), select an RCD with a tripping current of no less than 100 mA for each cabinet or controller.
- Use recommended RCD brands like CHINT and SCHNEIDER.

If a circuit breaker with leakage current protection is used and a malfunction occurs, use the following methods to solve the fault.



For all rectification measures involving grounding, measure the grounding impedance with a multimeter after connecting the grounding cable to ensure that the measurement value is below 1 Ω.

Symptom	Causes	Solutions
Instantaneous trip at power-on	Poor RCD interference resistance	1. Ensure that the equipment is reliably grounded, and use a multimeter to measure the grounding resistance to be less than 1 Ω. 2. Power off and on 2 to 3 times and check whether it still trips. 3. Use RCDs from recommended brands. 4. Consider replacing with an RCD with a higher tripping current. 5. Move unbalanced loads upstream of the RCD. 6. Disconnect the EMC screw or external EMC filter grounding terminal to reduce input capacitance to ground. For the location of the EMC screw, see *"Figure - 1 Position of the EMC grounding screw" on page 17*.
	RCD not powered simultaneously	
	Small tripping current of the RCD	
	Unbalanced loads connected downstream of the RCD	
	Large capacitance to ground upstream of the drive	
RCD trip during operation	The anti-interference performance of the RCD is poor.	1. Ensure that the equipment is reliably grounded, and use a multimeter to measure the grounding resistance to be less than 1 Ω. 2. Power off and on 2 to 3 times and check whether it still trips. 3. Reduce the length of motor cables. 4. Lower the carrier frequency appropriately while ensuring performance requirements are met. 5. Use RCDs from recommended brands. 6. Consider replacing with an RCD with a higher rated tripping current. 7. Consider replacing with an RCD with a higher rated tripping current. 8. Install the magnetic ring near the RCD on the LN/RST and UVW lines. For details, see *"12.2.4.3 选择磁环和磁扣" on page 193*. 9. Install the simple EMC filter at the input side. For details, see *"12.2.4.4 Simple Filter Selection" on page 197*.
	Small tripping current of the RCD	
	Unbalanced loads connected downstream of the RCD	
	Excessive distributed capacitance to ground in motor cables, motors, and so on	

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