INOVANCE

User Guide

MD500 Series AC Drive

(500–630 kW)

User Guide

A02

Data code 19010970

Preface

Thank you for purchasing the MD500 Series AC Drive developed by Inovance.

As a general-purpose and high-performance current vector AC drive, it is mainly used for controlling and adjusting the speed and torque of three-phase AC asynchronous motors. Using high-performance vector control technology, the MD500 series AC drive features high torque output at a low speed, excellent dynamic characteristics, and superior overload capability. It provides user-programmable features and commissioning software monitoring, and communication bus functions and supports multiple encoder types, delivering rich and powerful combined functions and stable performance. It can be used to drive automatic manufacturing equipment in the fields of heating, ceramic, chemical, natural gas, fan, and water pump.

This user guide mainly introduces the 500 kW to 630 kW models in the MD500 series (hereinafter referred to as T13 models.)

Figure A Standard cabinet

Figure B With auxiliary distribution cabinet

■ First use

Read this user guide carefully if you use the product for the first time. For any doubt on its function or performance, contact our technicians for help.

■ Standards compliance

The following table lists the certificates and standards that the product may comply with. For details about the acquired certificates, see the certification marks on the product nameplate.

Name	Directive Name		Standard
CE certification	EMC Directive	2014/30/EU	EN 61800-3
	LVD Directive	2014/35/EU	EN 61800-5-1
	RoHS Directive	2011/65/EU	EN 50581

■ Acquisition

This user guide is shipped with the product. For any additional order, contact your sales representative.

This user guide briefly introduces product information, installation and wiring, troubleshooting, and routine maintenance. For more details, see 19010355 MD500 Series AC Drive Advanced User Guide.

To obtain the user guide, access Inovance's website (http://www.inovance.com), click Download, search for the user guide by its name, and then download the PDF file.

Revision History

Date	Version	Revision Description
May 2019	A00	First issue.
July 2020	A01	Deleted the service hotline.
November 2020	A02	Made minor corrections.

Safety Instructions

Safety Precautions

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

Safety Levels and Definitions

 DANGER	indicates that failure to comply with the notice will result in severe personal injuries or even death.
 WARNING	indicates that failure to comply with the notice may result in severe personal injuries or even death.
 CAUTION	indicates that failure to comply with the notice may result in minor personal injuries or damage to the equipment.

Safety Instructions

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

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

Storage and Transportation

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

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

Installation

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

DANGER

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

Wiring

DANGER

- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed by only professionals.
- Never perform wiring at power-on. Failure to comply will result in an electric shock.
- Before wiring, cut off all equipment power supplies. Wait at least 15 minutes before further operations because residual voltage exists after power-off.
- Make sure that the equipment is well grounded. Failure to comply will result in an electric shock.
- During wiring, follow the proper electrostatic discharge (ESD) procedures, and wear an antistatic wrist strap. Failure to comply will result in damage to internal equipment circuits.

WARNING

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

Power-on
 DANGER ◆ Before power-on, make sure that the equipment is installed properly with reliable wiring and the motor can be restarted. ◆ Before power-on, make sure that the power supply meets equipment requirements to prevent equipment damage or even a fire. ◆ At power-on, unexpected operations may be triggered on the equipment. Therefore, stay away from the equipment. ◆ After power-on, do not open the cabinet door and protective cover of the equipment. Failure to comply will result in an electric shock. ◆ Do not touch any wiring terminals at power-on. Failure to comply will result in an electric shock. ◆ Do not remove any part of the equipment at power-on. Failure to comply will result in an electric shock.
Operation
 DANGER ◆ Do not touch any wiring terminals during operation. Failure to comply will result in an electric shock. ◆ Do not remove any part of the equipment during operation. Failure to comply will result in an electric shock. ◆ Do not touch the equipment shell, fan, or resistor for temperature detection. Failure to comply will result in heat injuries. ◆ Signal detection must be performed by only professionals during operation. Failure to comply will result in personal injuries or equipment damage.
 WARNING ◆ Prevent metal or other objects from falling into the device during operation. Failure to comply may result in equipment damage. ◆ Do not start or stop the equipment using the contactor. Failure to comply may result in equipment damage.
Maintenance
 DANGER ◆ Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed by only professionals. ◆ Do not maintain the equipment at power-on. Failure to comply will result in an electric shock. ◆ Before maintenance, cut off all equipment power supplies and wait at least 15 minutes.

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

Repair

- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed by only professionals.
- Do not repair the equipment at power-on. Failure to comply will result in an electric shock.
- Before inspection and repair, cut off all equipment power supplies and wait at least 15 minutes.

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

Disposal

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

Safety Signs

■ Description of safety signs in the user guide

Read the user guide before installation and operation.

Reliably ground the system and equipment.

Danger!

High temperature!

Prevent personal injuries caused by machines.

High voltage!

Wait xx minutes before further operations.

■ Description of safety signs on the equipment

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

Safety Sign	Description
	◆ Read the user guide before installation and operation. Failure to comply will result in an electric shock. ◆ Do not remove the cover at power-on or within 15 minutes after power-off. ◆ Before maintenance, inspection, and wiring, cut off input and output power, and wait at least 15 minutes until the power indicator is off.

Contents

1 Product Information

1.1 Nameplate and Product Code

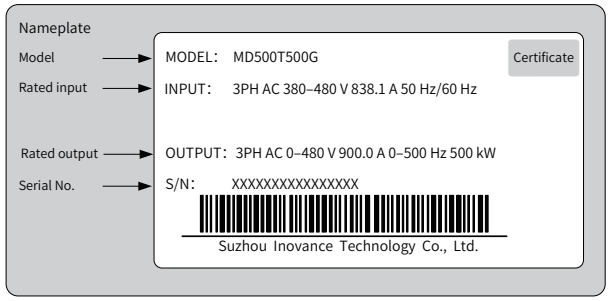


Figure 1-1 Nameplate

NOTE

- The product nameplate is attached on the inside of the front door of the cabinet and can be seen only when the front door is opened.

MD500 T 500 G - A

Mark	Product Name
MD500	AC drive series

Mark	Voltage Class
T	Three phase 380–480 V

Mark	Power Class (kW)
500	500
...	...
630	630

Mark	Cabinet Type
Null	Standard cabinet
A	With auxiliary distribution cabinet

Mark	Applicable Motor
G	General type

Figure 1-2 Model description

NOTE

- Output reactors are equipped for standard cabinets and cabinet unis with auxiliary distribution cabinets by default.
- Options for cabinet units with auxiliary distribution cabinets are fuses, EMC filters, and input reactors. For details about their selection, see *"2.3 Selection of Fuses, EMC Filters, and Input Reactors"*.

1.2 Components

MD500 T13 models include two structure types: the standard cabinet and the cabinet unit with a distribution cabinet. The following figures show their internal electrical components.

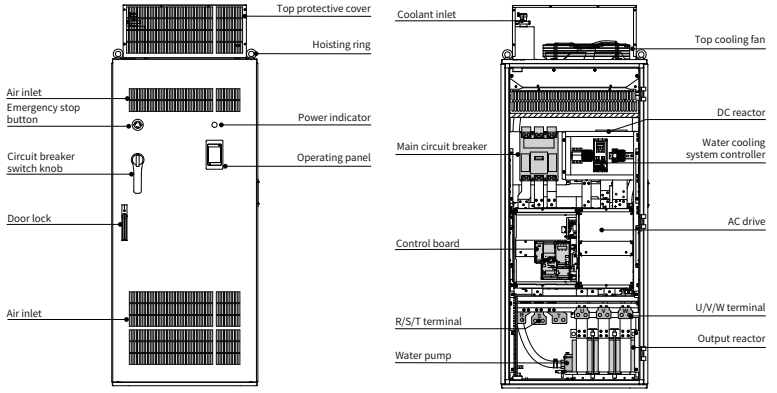


Figure 1-3 Components of MD500T500G to MD500T630G (standard cabinet)

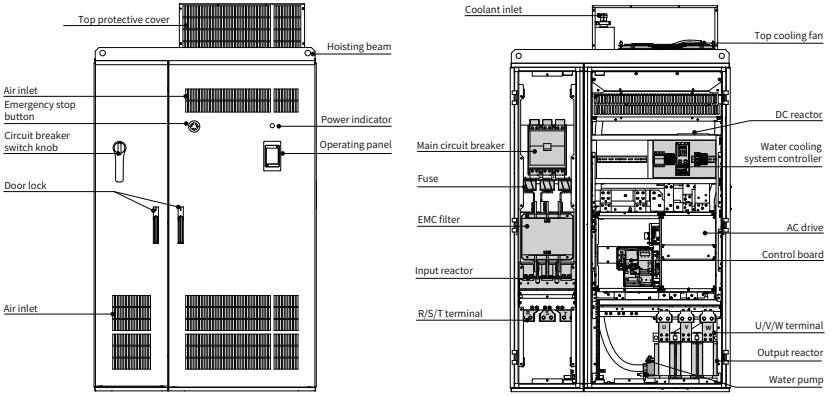


Figure 1-4 Components of MD500T500G-A to MD500T630G-A (with auxiliary distribution cabinet)

1.3 Technial Specifications

Table 1-1 Models and technical data

Item			Specification		
			MD500T500G(-A)	MD500T560G(-A)	MD500T630G(-A)
Outputs	Applicable motor	(kW)	500	560	630
		(HP)	680	760	860
	Rated output current(A)		900	1020	1120
	Output voltage		0 to input voltage		
	Maximum output frequency		500 Hz (editable through a parameter)		
	Carrier frequency		0.8 to 8.0 kHz (automatically adjusted according to the load characteristics)		
	Overload capacity		150% for 60s with rated current		
Inputs	Rated input current (A)		838.1	952.9	1043.5
	Rated voltage/frequency		AC: Three-phase 380 to 480 V, 50/60 Hz		
	Allowed voltage fluctuation		-15% to 10%; actual allowed range: 323 to 528 VAC		
	Allowed frequency fluctuation		±5%		
	Power capacity (kVA)		952	1071	1244
Thermal design	Thermal power consumption (kW)		9.94	10.4	11.5
	Air flow (CFM)		2200	2200	2200

NOTE

◆ The rated power is measured at 440 VAC input voltage.

Table 1-2 Technical specifications of MD500 series AC drives

Item		Description	
Standard functions	Input frequency resolution	Digital setting: 0.01 Hz Analog setting: Maximum frequency x 0.025%	
	Control mode	Sensorless vector control (SVC) Feedback vector control (FVC) Voltage/Frequency (V/F) control	
	Startup torque	0.25 Hz/150% (SVC) 0 Hz/180% (FVC)	
	Speed range	1:200 (SVC)	1:1000 (FVC)
	Speed stability accuracy	±0.5% (SVC)	±0.02% (FVC)
	Torque control accuracy	±3% (FVC); ±5% for 5 Hz above (SVC)	
	Torque boost	Automatic boost; Customized boost 0.1 % to 30.0 %	
	V/F curve	Straight-line V/F curve Multi-point V/F curve Complete V/F separation Half V/F separation	
	Ramp mode	Straight-line ramp S-curve ramp Four separate acceleration/deceleration time settings in the range of 0.0s to 6500.0s.	
	DC injection braking	DC injection braking frequency: 0 Hz to the maximum frequency DC injection braking active time: 0.0s to 36.0s. Current level of DC injection braking: 0.0% to 100.0%.	
	Jog running	Frequency range of jog running: 0.00 to 50.00 Hz Acceleration/Deceleration time of jog running:0.0s to 6500.0s	
	Simple PLC and multi-speed running	The system implements up to 16 speeds by using the simple PLC function or control terminals.	
	Built-in PID	The system implements the proportional–integral–derivative (PID) function in the closed-loop control.	
	Automatic voltage regulation (AVR)	The system maintains a constant output voltage automatically when the grid voltage changes through the permissible range.	
	Overvoltage and overcurrent stall control	The system limits the output current and voltage automatically during operation to prevent frequent or excessive trips.	
	Overcurrent fast prevention	The function helps to avoid frequent overcurrent faults.	
	Torque limit and control	The system limits the torque automatically to prevent frequent overcurrent tripping during operation. Torque control is applied in vector control.	

Item		Description
Individualized functions	Power dip ride-through	The load feedback energy compensates for any voltage reduction, allowing the AC drive to continue to operate for a short time during power dips.
	Overcurrent fast prevention	The function helps to avoid frequent overcurrent faults.
	Virtual I/O	Five groups of virtual digital inputs/outputs (DI/DO) support simple logic control.
	Timing control	Time range: 0.0 to 6500.0 minutes
	Dual-motor switchover	The AC drive can control up to two motors using two groups of motor parameters.
	Multiple field buses	The AC drive supports five field buses: Modbus, PROFIBUS-DP, CANlink, CANopen, and PROFINET.
	Motor overheat protection	The optional input/output (I/O) extension card allows AI3 to receive a signal from the motor temperature sensor input (PT100, PT1000) to implement motor overheat protection.
	Multiple encoder types	The AC drive supports a range of different encoder types, including the differential encoder, open-collector encoder, UVW encoder, and resolver.
	User programmable function	The optional programming card supports secondary development in a programming environment compatible with the Inovance programmable logic controller (PLC).
	Advanced commissioning software	Software in the AC drive allows users to configure some operating parameters, and provides a virtual oscilloscope display that shows system status.

Item		Description
Running	Running command	Allows different methods of switching between running commands: Operating panel; terminal I/O control; and serial communication
	Main frequency reference setting channel	Supports up to 10 frequency reference setting channels and allows different methods of switching between frequency reference setting channels: ◆ Digital setting ◆ Analog voltage reference ◆ Analog current reference ◆ Pulse reference ◆ Communication reference
	Auxiliary frequency reference setting channel	Supports up to 10 auxiliary frequency sources, and allows fine tuning of the auxiliary frequency and main & auxiliary calculation.
	Input terminals	Standard: ◆ Five digital input (DI) terminals, one of which supports up to 100 kHz high-speed pulse inputs ◆ Two analog input (AI) terminals, one of which supports only 0 to 10 V input, and the other supports 0 to 10 V and 0 to 20 mA current input Expanded capacity: ◆ Five digital input (DI) terminals ◆ One AI terminal that supports –10 to +10 V voltage input and PT100/PT1000 motor temperature sensor inputs
	Output terminals	Standard: ◆ Single high-speed pulse output terminal (open-collector) for a square-wave signal output in the frequency range of 0 to 100 kHz ◆ Single relay output terminal ◆ Single analog output (AO) terminal that supports either a current output in the range 0 to 20 mA or a voltage output in the range 0 to 10 V Expanded capacity: ◆ Single digital output (DO) terminal ◆ Single relay output terminal ◆ Single analog output (AO) terminal that supports either a current output in the range 0 to 20 mA or a voltage output in the range 0 to 10 V
Display and operating panel	LED display	Shows parameters.
	LCD display	It is optional and shows parameters in Chinese or English.
	Parameter copy	The LCD operating panel can be used to copy parameters quickly.
	Key locking and function selection	Keys on the control panel can be locked partially or electronically to prevent accidental operation.

Item		Description
Protections	Phase loss protection	Input phase loss protection Output phase loss protection
	Instantaneous overcurrent protection	The AC drive stops when 250% of the rated output current is exceeded.
	Overvoltage protection	The AC drive stops when the DC voltage of the main circuit is above 820 V.
	Undervoltage protection	The AC drive stops when the DC voltage of the main circuit is below 350 V.
	Overheat protection	Protection is triggered when the inverter bridge gets overheated.
	Overload protection	The AC drive stops after running at 150% of rated current for 60 seconds.
	Overcurrent protection	The AC drive stops when 2.5 times of rated current of the AC drive is exceeded.
	Braking protection	Braking unit overload protection Braking resistor short-circuit protection
	Short-circuit protection	Output phase-to-phase short-circuit protection Output phase-to-ground short-circuit protection
Environment	Installation location	Install the AC drive where it is indoors and protected from direct sunlight, dust, corrosive or combustible gases, oil smoke, vapor, ingress from water or any other liquid, and salt.
	Altitude	Below 1000 m If the altitude exceeds 1000 m, de-rating by 1% for per 100 m increase Maximum altitude: 3000 m
	Ambient temperature:	-10°C to +40°C If the ambient temperature exceeds 40°C, de-rating by 1.5% per 1°C increase Maximum temperature: 50°C
	Humidity	Less than 95% RH non-condensing
	Vibration	Less than 5.9 m/s^2 (0.6 g)
	Storage temperature	-20°C to +60°C

1.4 Overall Dimensions

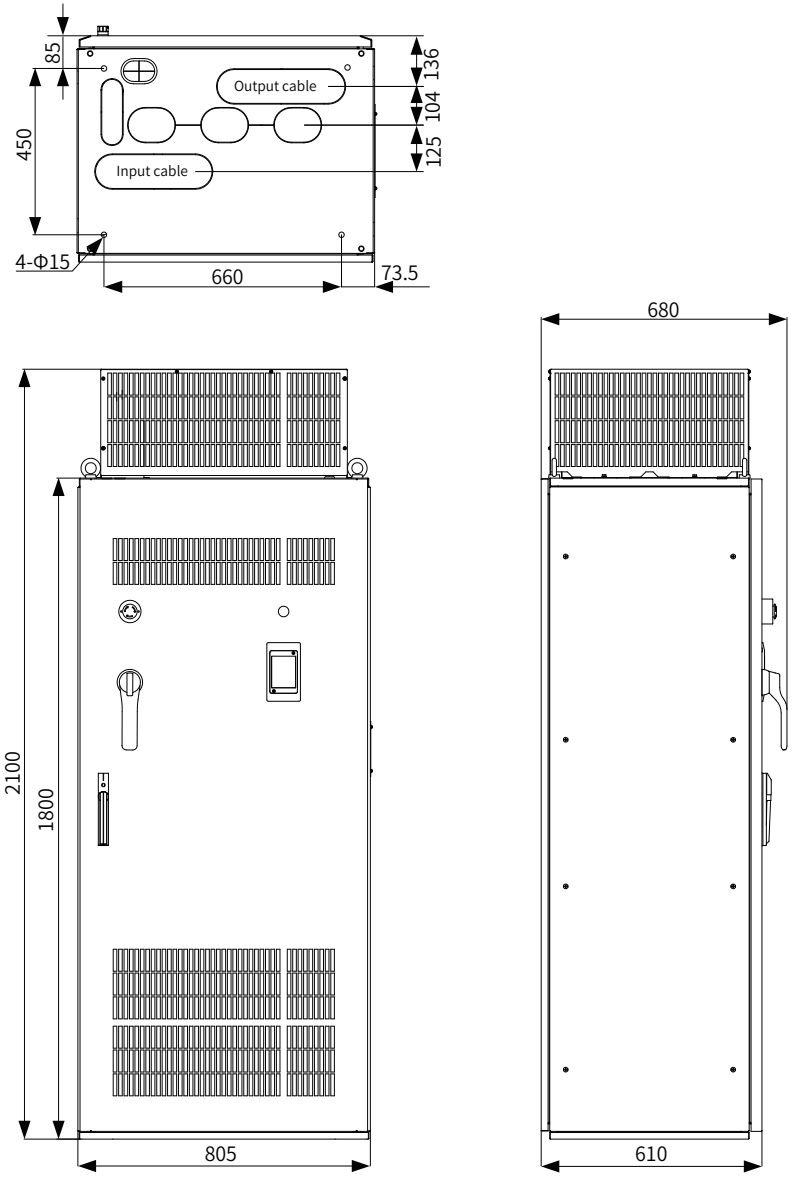


Figure 1-5 Mounting dimensions of MD500T500G to MD500T630G (standard cabinets) (unit: mm)

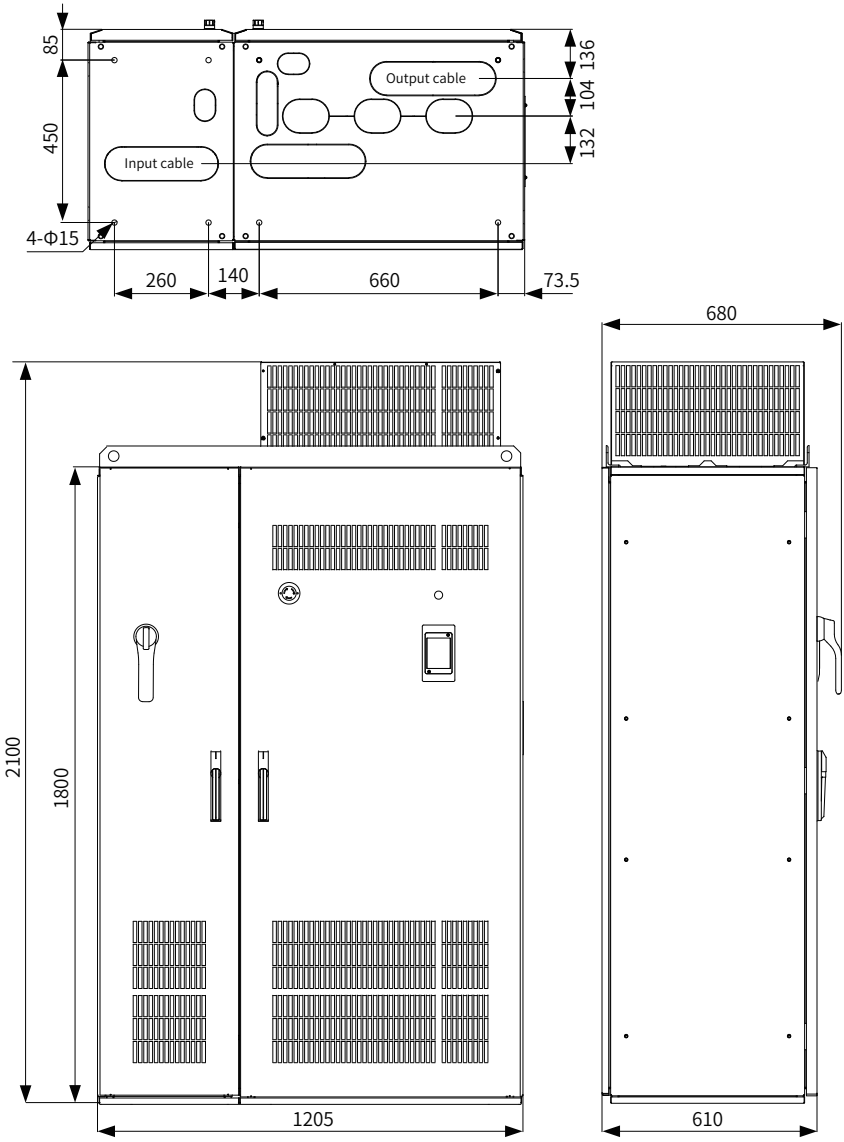


Figure 1-6 Mounting dimensions of MD500T500G-A to MD500T630G-A (with auxiliary distribution cabinet) (unit: mm)

2 System Connection

2.1 System Composition

Table 2-1 Description of peripheral electrical devices in the MD500 series AC drive system

Device	Mounting Location	Function Description
Breaker	Between the power supply and AC drive input side	MCCB: Cuts off power supply when overcurrent occurs on downstream devices.
		Leakage breaker: Provides protection against potential leakage current during drive running to prevent electric shock and even a fire.
EMC filter	AC drive input side	Reduces external conduction and radiation interference of the AC drive. Decreases conduction interference flowing from power supply to the AC drive and improve the anti-interference capacity of the AC drive.
AC reactor	AC drive input side	Improves the power factor of the power input side. Eliminates higher harmonics of the input side effectively and prevents other devices from being damaged due to distortion of voltage waveform. Eliminates input current unbalance caused by inter-phase unbalance.
Braking unit	Between the positive and negative buses	Dissipates regenerative energy during motor deceleration.
Output reactor	Between the AC drive output side and the motor, close to the AC drive	The output side of the AC drive generally has much higher harmonics. When the motor is far from the AC drive, there is much distributed capacitance in the circuit and certain harmonics may cause resonance in the circuit, which will: (a) Degrade motor insulation performance and damage the motor in the long run. (b) Generate large leakage current and cause frequent AC drive protection trips. If the distance between the AC drive and the motor is greater than 100 m, install an AC output reactor. Note: Output reactors are equipped for MD500 T13 models by default.
Output magnetic ring	AC drive output side, close to the AC drive	Reduces bearing current.
Motor	AC drive output side	Select an appropriate motor.
External operating panel		The external LED operating panel MD32NKE1 and external LCD operating panel MDKE9 are supported.

NOTE

- Do not install a capacitor or surge suppressor on the output side of AC drive. Otherwise, the AC drive, capacitor, or surge suppressor may be damaged.
- Inputs/Outputs (main circuit) of the AC drive contain harmonics, which may interfere with the communication device connected to the AC drive. Therefore, install an anti-interference filter to minimize interference.

2.2 Options

Peripherals and options include braking units and function extension cards, as listed in the following table. For use of each option, see its user manual. If you need to purchase the following options, specify the required option in the order.

Table 2-2 Options of MD500 series AC drives

Name	Model	Description	Remarks
External braking unit	MDBU	-	Multiple braking units can be connected in parallel.
I/O extension card 1	MD38IO1	Provides five extra DI terminals, one analog voltage input, one relay output, one digital output, and one analog output with AI3 for isolated analog input and Modbus/CANlink supported. It can be connected to PT100 and PT1000.	-
I/O extension card 2	MD38IO2	Provides three extra DI terminals.	Available for all models
I/O extension card 3	MD38IO3	Provides three extra DI terminals, one RS-485 communication signal isolated input, and one normally open (NO) relay output.	Available for all models
RS-485 communication card	MD38TX1	Isolated Modbus communication adapter card	Available for all models
CANlink communication card	MD38CAN1	CANlink communication adapter card	Available for all models
CANopen communication card	MD38CAN2	CANopen communication adapter card	Available for all models
Profbus-DP communication card	MD38DP2	Profbus-DP communication card	-
User programmable card	MD38PC1	User programmable extension card Compatible with Inovance's H1U series PLCs	-

Name	Model	Description	Remarks
Differential encoder interface card	MD38PG1	Differential encoder resolver interface card, 5 V power supply	Available for all models
Resolver interface card	MD38PG4	For use with a resolver that has an excitation frequency of 10 kHz. The card has a DB9 interface.	Available for all models
Open collector encoder interface card	MD38PG5	Open collector encoder interface card, 1:1 frequency dividing, 15 V power supply	Available for all models
Open collector encoder interface card	MD38PG5D	Open collector encoder interface card, optional multiplying frequency division output, 15 V power supply	Available for all models
Differential encoder interface card	MD38PG6	Differential encoder resolver interface card, 5 V power supply	Available for all models
Differential encoder interface card	MD38PG6D	Differential encoder resolver interface card, optional multiplying frequency division output, 5 V power supply	Available for all models
MD38PGMD new multi-function encoder card	MD38PGMD	Compatible of differential input, open-collector input, and push-pull input Supports differential output and open-collector output Compatible with A/B phase input interfaces of often-used encoders and host controllers	Available for all models
External LED operating panel	MD32NKE1	Connected to the external LED display and operating panel through RJ45	Available for MD series
External LCD operating panel	MDKE9	External LCD display and operating panel	Supports parameter copy and download.
Installation seat of the MDKE9 operating panel	CP600-BASE1	-	-
Extension cable	MDCAB	Standard: 8 cores Can be connected to MD32NKE1.	Standard length: 3 m

2.3 Selection of Fuses, C2 EMC Filters, and Input Reactors

Table 2-3 Selection of fuses, C2 EMC filters, and input reactors

MD500 Model	Fuse Specification (Rated Current)	EMC Filter Model	Input Reactor Model
MD500T500G(-A)	1400 A	1600EBK1-60-HV	GH-MVT504ZG-L2
MD500T560G(-A)	1600 A	1600EBK1-60-HV	GH-MVT634ZG-L3
MD500T630G(-A)	1800 A	1600EBK1-60-HV	GH-MVT634ZG-L3

2.4 Selection of External Braking Units

2.4.1 Selection of Resistance of the Braking Resistor

The AC drive transfers regenerative energy generated during braking of the motor to the external braking resistor. The resistance of the braking resistor can be obtained using the formula U x U/R = Pb:

- U refers to the braking voltage at stable system braking. (Its value varies with the system. The default braking voltage of MD500 series is 760 V. You can set F9-08 to change the value.)
- Pb refers to the braking power.

2.4.2 Selection of Power of the Braking Resistor

In theory, the power of the braking resistor is the same as braking power. However, the de-rating K must be taken into consideration.

According to the following formulas,

$K \times Pr = Pb \times D = U \times U/R \times D$

the formula for calculating the braking resistor power can be obtained:

$Pr = (U \times U \times D)/(R \times K)$

- K is about 50%.
- Pr refers to the power of the braking resistor.
- D refers to the braking frequency (percentage of the regenerative process to the whole deceleration).

K is the de-rating coefficient of braking resistor. A low K value ensures that the braking resistor does not get overheated. The K value can be increased appropriately on the condition of good dissipation and should not exceed 50%. Failure to comply may result in a fire due to overheating of the braking resistor.

2.4.3 Selection of Braking Units

Table 2-4 Selection of braking units

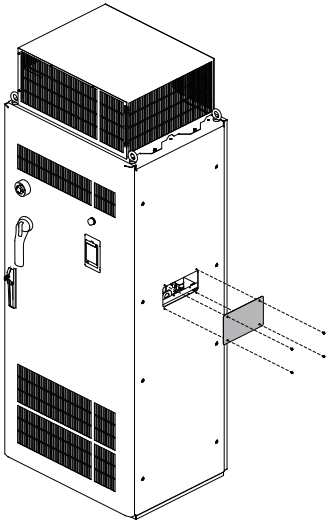
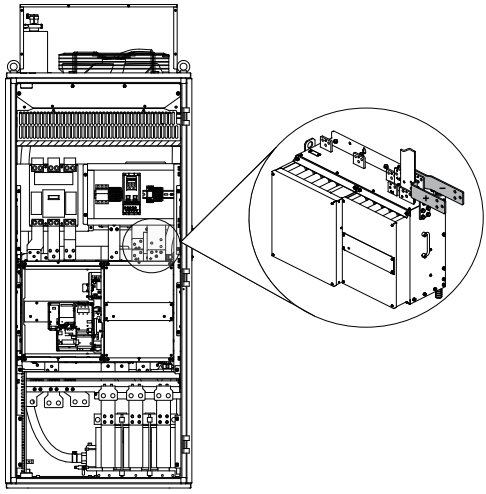
MD500 Model	Applicable Motor (kW)	Braking Unit		125% Braking Torque (10% ED, Max. 10s)		Remarks	Min. Resistance of Braking Resistor (Ω)
		Model	QTY	Specification	QTY		
MD500T500G(-A)	500	MDBU-200-B	4	21000 W 4.1 Ω	4	Input voltage ⩽ 440 VAC	2.5×4
	500	MDBU-200-C	4	21000 W 5.3 Ω	4	Input voltage >440 VAC	3.0×4

MD500 Model	Applicable Motor (kW)	Braking Unit		125% Braking Torque (10% ED, Max. 10s)		Remarks	Min. Resistance of Braking Resistor (Ω)
		Model	QTY	Specification	QTY		
MD500T560G(-A)	560	MDBU-200-B	4	24000 W 3.6 Ω	4	Input voltage ⩽ 440 VAC	2.5×4
	560	MDBU-200-C	4	24000 W 4.6 Ω	4	Input voltage >440 VAC	3.0×4
MD500T630G(-A)	630	MDBU-200-B	4	27000 W 3.2 Ω	4	Input voltage ⩽ 440 VAC	2.5×4
	630	MDBU-200-C	4	27000 W 4.1 Ω	4	Input voltage >440 VAC	3.0×4

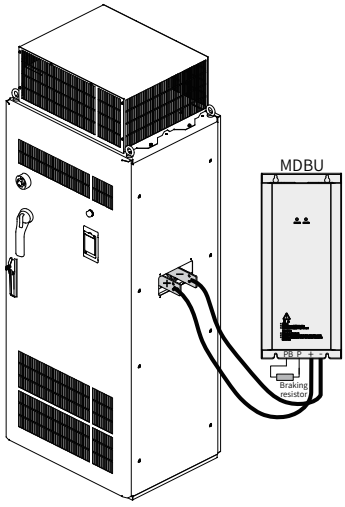
NOTE

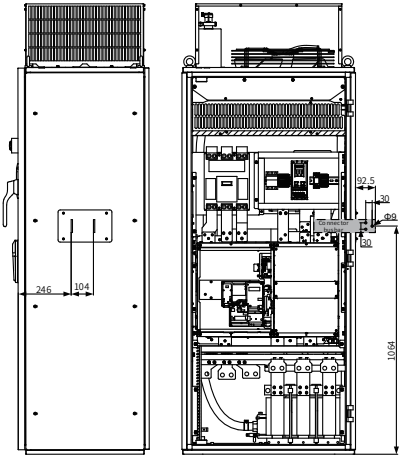
- The minimum resistance supports operating condition with braking usage (ED) of 10% and the longest time for single braking of 10s.
- The default initial braking voltage is 670 V for MDBU-200-B when the input voltage is less than or equal to 440 VAC, and 760 V for MDBU-200-C when the input voltage is above 440 VAC. You can adjust the initial braking voltage based on the input voltage. If the default initial braking voltage (set by F9-08) increases, the resistance of the corresponding braking resistor must be increased.
- The preceding table is for a reference with 125% braking torque only. You can select the resistance and power of braking resistor based on actual needs. The resistance cannot be lower than the reference value and the power can be higher than the reference value. Selection of the braking resistor model is determined by generation power of the motor and is also related to the system inertia, deceleration time, and potential energy load. For systems with high inertia, and/or short deceleration time, and/or frequent braking, select a braking resistor with higher power and lower resistance value.

2.4.4 Installing the External Braking Unit

Step 1: Remove the side cover of the AC drive cabinet.	Step 2: Open the cabinet door, and install the connector busbar of the external braking unit.
	

Step 3: Connect the external braking unit. (Determine the number of braking units to be connected as required. Multiple braking units can be connected in parallel. In the following figure, only one external braking unit is used as an example.)





Unit: mm

2.5 External Operating Panels

2.5.1 External LED Operating Panel MD32NKE1

MD32NKE1 is an external operating panel applicable to the AC drive. It adopts the LED display and has the same operation mode as the operating panel on the AC drive. For details, see *"5 Panel Operation"*. It is optional and easy for commissioning.

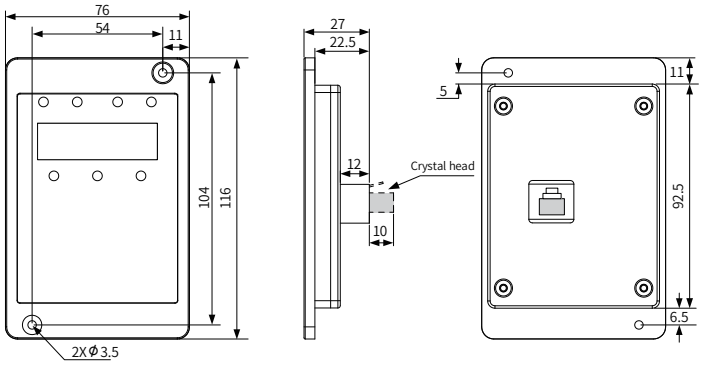


Figure 2-1 Mounting dimensions of MD32NKE1 (unit: mm)

2.5.2 External LCD Operating Panel MDKE9

MDKE9 is an optional external LCD keypad. It supports copy, download, and modification of all parameters and is easy to use in both Chinese and English. The following figure shows its appearance and keys. (For details, see "4 Panel Operations" in 19010355 MD500 Series AC Drive Advanced User Guide.)

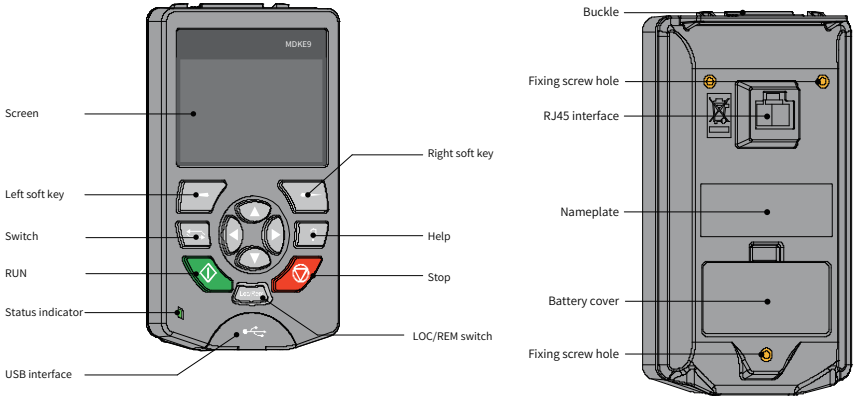


Figure 2-2 Appearance of the MDKE9 external operating panel

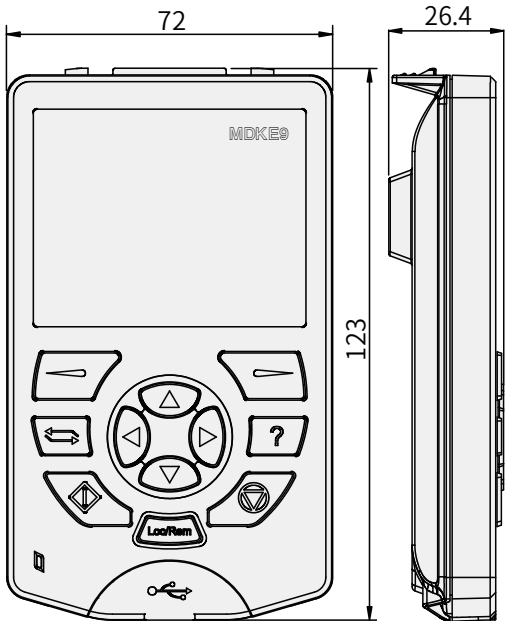


Figure 2-3 Mounting dimensions of the MDKE9 external operating panel (unit: mm)

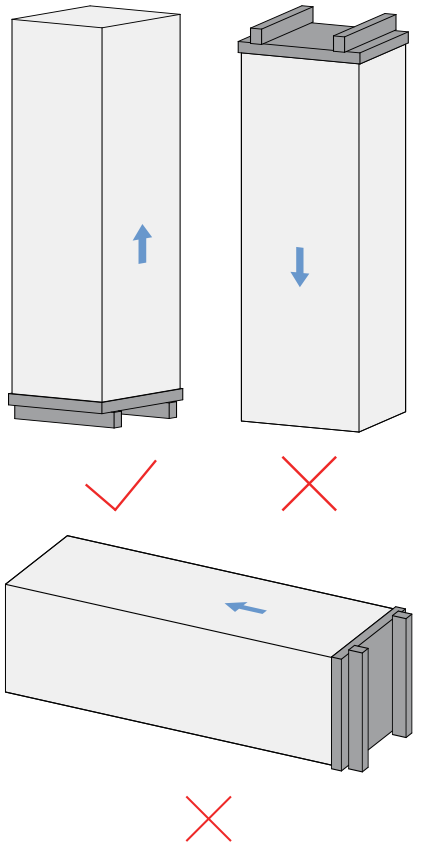
3 Mechanical Installation

3.1 Mechanical Installation Precautions

3.1.1 Transportation

1 Precautions during transportation

- The cabinet units are heavy and have a high center of gravity. Do not place the cabinet units on the slope more than 5 degrees.
- Ensure that the ground at the installation location is flat and strong enough to bear the weight of the cabinet units.
- Suitable hoisting gear operated by trained personnel is also required due to the weight of the cabinet units.
- The cabinet units must always be transported in the upright position indicated. The cabinet units cannot be transported upside down or in a horizontal position.



- Due to the weight and length of the cabinet units, they must be transported only with the hoisting beam (or hoisting rings) on top of the cabinet units and the wooden pallet under the cabinet units.
- The cabinet units must be carried on a wooden pallet when transported with fork-lift trucks. The cabinet units cannot be disassembled while still on wooden pallets and awaiting transport.
- When a hoist is used to move the dual-cabinet units, the hoisting beam must be installed on the cabinet units.

2 Acceptance

Check that you have received all the items specified on the delivery note. Notify the shipping company immediately of any missing components or damage. If you have any problem, contact Inovance or the local agent for technical support.

If the cabinet units are damaged during transportation, the electrical safety of the cabinet can no longer be ensured. Do not connect the cabinet units until a thorough high-voltage test has been carried out.

3 Storage

The cabinet units must be stored in clean, dry rooms, with temperatures between -10°C and +50°C and temperature variations smaller than 1°C per minute. If the cabinet unit is stored for a prolonged period once it has been unpacked, cover it or take other appropriate measures to ensure that it does not become dirty and that it is protected against environmental influences.

3.1.2 Mechanical Installation Checklist

Check the boxes accordingly in the right-hand column if the activity applies to the cabinet unit in your scope of delivery. In the same way, check the boxes once you have finished the installation procedure to confirm that the activities are completed.

Table 3-5 Mechanical installation checklist

Item	Activity	Applicable?	Completed
1	The upright label is attached.	☐	☐
2	The packing box is free of loss, damage, and dampness.	☐	☐
3	The load-bearing capacity and properties of the ground must fulfill the requirements for installation of the MD500 T13 models. For details, see *"3.2.1 Preparations"*.	☐	☐

Item	Activity	Applicable?	Completed
4	The minimum ceiling height required (for unhindered air discharge) must be observed. The cooling air supply and exhaust must not be obstructed and must have sufficient space. Sufficient space must be reserved after cabinet doors are open as safety passageway. For details, see *"3.2.1 Preparations"*.	☐	☐
5	The cabinet unit housing is intact without distortion, peeling, or crack, and there is no water stain.	☐	☐
6	The accessories (user guide, optional parts) inside the cabinet units are complete.	☐	☐
7	Before the cabinet units are finally installed, the wooden pallets supplied with the transport unit must be removed properly. For details, see *"3.2.5 Removing the Pallet"*.	☐	☐
8	The cabinet must be firmly attached to the fixing points provided.	☐	☐
9	All shock protection measures (guards) in and on the cabinet units must be installed before commissioning.	☐	☐

3.2 Installation

3.2.1 Preparations

1 Installation Environment

1) Ambient temperature: The AC drive's service life is greatly influenced by the ambient temperature. Do not run the AC drive under a temperature exceeding the allowed temperature range (-10°C to +50°C).

2) Install the AC drive on the surface of a flame retardant object, and ensure that sufficient space is left around the enclosure to allow for efficient heat dissipation. The AC drive generates great heat during working. Use screws to install the AC drive on the mounting support vertically.

3) Install the AC drive without strong vibration. Ensure that the mounting location is not affected by levels of vibration that exceeds 1 G. Keep the AC drive away from punch machines.

4) Ensure that the mounting location is away from direct sunlight, damp or water drops.

5) Ensure that the mounting location is protected against corrosive, combustible or explosive gases and vapors.

6) Ensure that the mounting location is free from oil and dust.

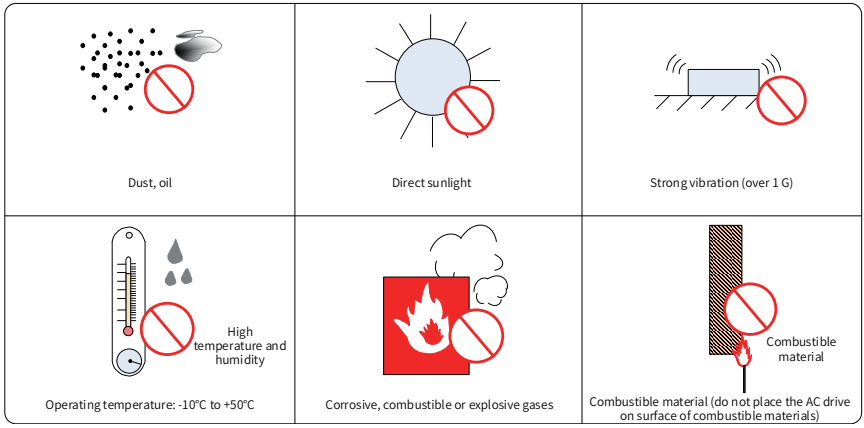
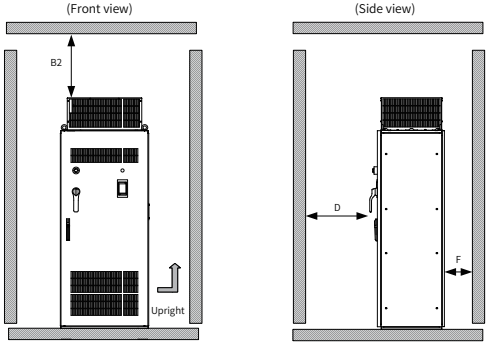


Figure 3-4 Installation environment requirements

7) The AC drive must be installed in a fireproof cabinet with doors that provide effective electrical and mechanical protection. The installation must conform to local and regional laws and regulations, and to relevant IEC requirements.

2 Installation Clearance and Orientation

The following figure shows the installation clearance of MD500 T13 models.



Clearance requirements

Power Rating	Clearance Requirements (unit: mm)		
500–630 kW	B2 ⩾ 250	D ⩾ 800	F ⩾ 100

Figure 3-5 Installation clearance of MD500T500G to MD500T630G

3 Requirements for Ground Flatness

- The installation foundation is flat and strong enough to bear the weight of the cabinet units.
- The door lock is used properly when the cabinet doors are opened and closed.
- When cabinet units are connected side by side, there is no gap between the cabinet units and the ground. If the gap is unavoidable (① in the following figure), use a pad (② in the following figure) to keep the cabinet horizontal, and use proper fillings (for example, fireproofing mud) to fill the space.

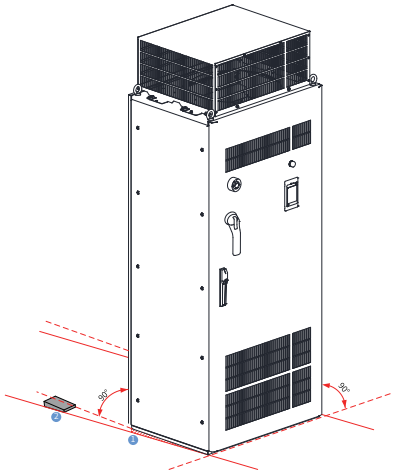


Figure 3-6 Requirements for the installation ground

4 Installation of the Expansion Screw

If the cabinet units are installed on the concrete ground, install the expansion screws in the ground corresponding to the fixing holes of the cabinet units.

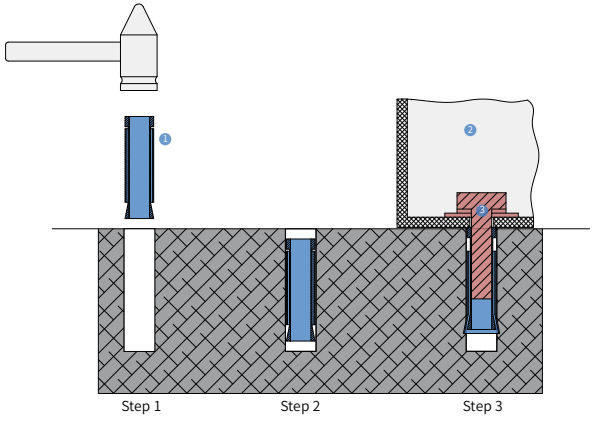


Figure 3-7 Procedure for installing the expansion screw

No.	Description
1	Expansion screw
2	Cabinet unit
3	M12 bolt

1) The dimensions in *"1.4 Overall Dimensions"* show the drilling hole for the expansion screw. The drilling hole must meet the following requirements:

- Diameter of the drilling hole < Maximum outer diameter of the expansion screw
- Depth of the drilling hole > Length of the expansion screw
- Perpendicular to the ground

2) The expansion screw consists of two movable parts: bolt spring shell and stem. Knock the expansion screw into the hole (below the surface) by using a hammer, as shown in Step 2.

3) After placing the cabinet unit in the required position, fasten it with M12 bolts, and the expansion screw stem will be pulled up, making the spring shell deform to fasten the cabinet unit, as shown in Step 3.

5 Requirements for the Foundation

- Lay high-voltage cables and low-voltage cables in different racks. If they cannot be separated due to restricted conditions, lay low voltage cables in fully enclosed metal pipes.
- The cable trench must use non-flammable materials and be smooth. Damp-proof, dust-proof and rat-proof measures are required.
- During foundation design, take the following factors into consideration:
  Inspection space in front of the cabinet units
  Cabling of power cables, motor cables, and system control cables
- Design the cable trench or cable channel below the cabinet unit. The power cables and signal cables must be separated to ensure normal running of the cabinet unit. The following figure shows the wiring requirements.

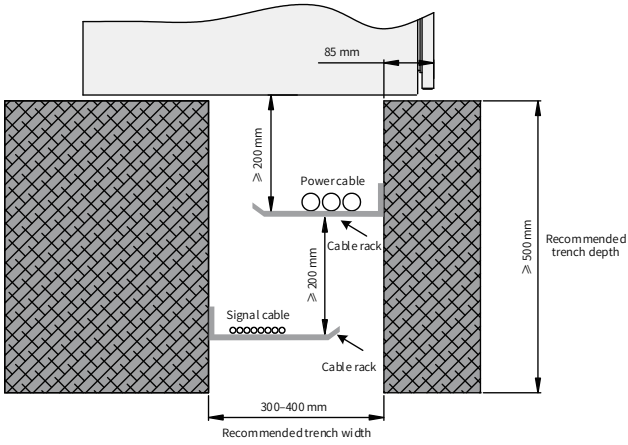


Figure 3-8 Foundation layout

3.2.2 Transporting Before Unpacking

1) Transport the packed product by using the pallet under it.
2) The cabinet units can be transported with a fork-lift truck and hoist. The transportation equipment must have the load capacity larger than the weight of one set of cabinet units.
3) Adjust the distance between fork-lift feet (larger than one half of the cabinet unit length).
4) The lifting rope of the hoist must pass through the pallet under the cabinet units, with the relief height not larger than 0.3 m.
5) The pallet jack must not move for a long distance or on the slope road.
6) When being moved, the cabinet units must be held by persons on the left and right sides.

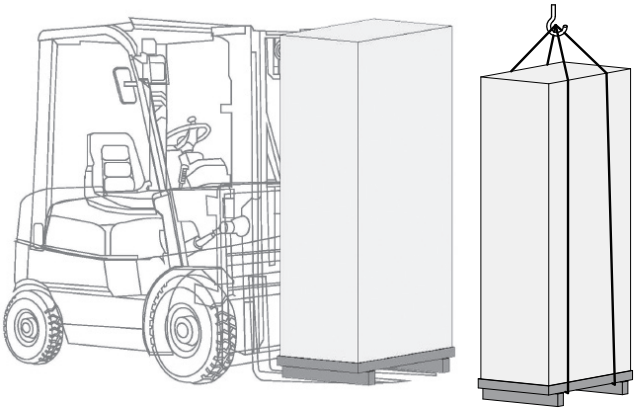


Figure 3-9 Transporting cabinet units before unpacking

3.2.3 Tools Requirements

- Spanner or socket spanner 13#
- Spanner or socket spanner 16#
- Spanner or socket spanner 18#
- Cross screwdriver and straight screwdriver (2.5–6 mm)
- Torque spanner with torque above 60 N · m
- Crowbar

3.2.4 Unpacking

1) During unpacking, put the crowbar into the crate as short as possible to prevent damaging the equipment. Pry off the crate with care and protect yourself from being injured by nails.

2) When removing the inner packing materials such as plastic film, do not use a sharp tool to avoid scratching the equipment.

3) Place the packed product on the empty and flat ground of the workshop, and prepare the tools such as the crowbar. Use the crowbar to pry off the crate along the gap from the plate edge. Then remove the cover plate, side plates, and ends plates.

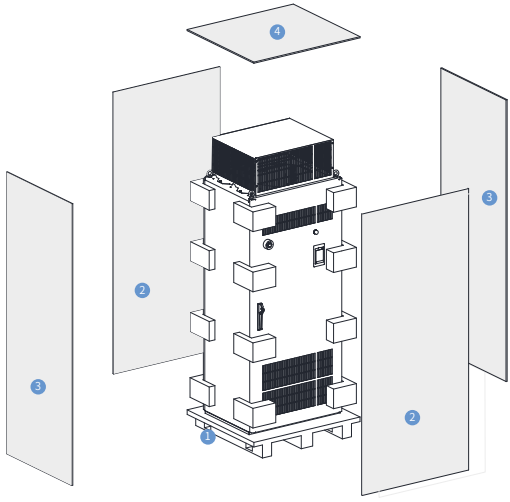


Figure 3-10 Unpacking

Mark	Description
1	Pallet
2	End plate
3	Side plate
4	Cover plate

NOTE

◆ The packaging material must be discarded in accordance with the applicable country-specific guidelines and rules.

3.2.5 Removing the Pallet

Before installing cabinet units, loosen the screws for fastening the transportation pallet and cabinet units in the four corners of the cabinet units, and remove the pallet.

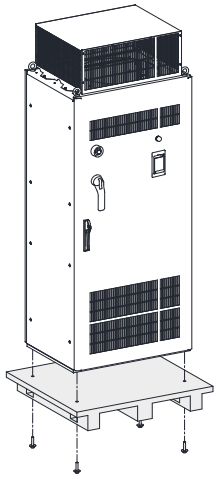
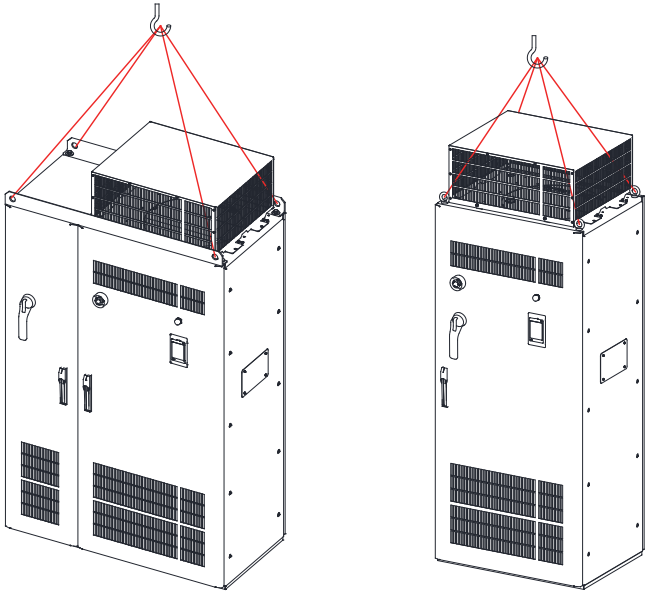


Figure 3-11 Lifting the cabinet unit off the pallet

3.2.6 Transporting After Unpacking

1) During installation, use the hoist or a similar device to assist operations.
2) Transport the cabinet units with a hoist with the load capacity larger than the weight of one set of cabinet units.
3) Use the auxiliary hoisting angle iron or hoisting ring to help hoisting and moving, with the relief height not larger than 0.3 m.
4) Ensure that the cabinet unit doors are locked before transporting.
5) When being moved, the cabinet units must be held by persons on the left and right sides.



With auxiliary distribution cabinet　　Standard cabinet

Figure 3-12 Transporting cabinet units after unpacking

4 Electrical Installation

4.1 Electrical Installation Checklist

- The cabinet units are operated with high voltages. All connection work must be carried out when the cabinet unit is de-energized.
- Only trained technicians are allowed to operate the cabinet unit.
- Take caution when operating the cabinet unit disconnected from power supply, as there may still be external supply voltage. The main circuit and control circuit terminals may be live even when the motor is not running.
- Wait 15 minutes after the input and output power is cut off and do not operate until the power indicator is off.
- The user is responsible for ensuring that the motor, cabinet units, and other components are installed and connected in accordance with the recognized technical rules in the country of installation and with other applicable regional regulations. Special attention must be paid to cable dimensions, fuses, grounding, disconnection, isolation, and overcurrent protection.
- If an item of protective gear trips in a branch circuit, a leakage current may have been disconnected. To reduce the risk of a fire or an electric shock, the current-carrying parts and other components in the cabinet must be inspected and damaged parts must be replaced. When an item of protective gear trips, the cause of the trip must be identified and rectified.

4.2 EMC-Compliant Cable Routing

4.2.1 EMC Requirement Description

1) Routing signal cables and motor cables separately

When analog signals are used to control the AC drive in remote control, the signal cables and strong-current circuit cables (power input, inverter output, and braking resistor connecting cable) of the controlled AC drive must be routed separately with a distance larger than 50 cm, to reduce interference on the analog generated by the AC drive and other devices. This requirement must be met even inside the control cabinet.

2) Requirements on the analog control signal cable

Use the twisted pair shielded cables as the analog control signal cables.
When stripping the sheathing back of the cable, the stripped part must be as short as possible (5–7 mm), and wrap the stripped shield with the insulating tape to prevent the shielded cable from contacting other cables, eliminating interference.

3) Requirements on the motor cable

- Use the shielded cables as the motor cables.

- The distance between the AC drive and the motor must be as short as possible.
- The motor cables must be separated from other cables.
- To avoid electromagnetic interference caused by rapid change of the AC drive output voltage, the motor cables and other cables cannot be laid side by side for a long distance.

4) Requirements on the power cables

Use the shielded cables as the motor cables, or protect all cables between the AC drive and the motor with ducts.

5) Requirements on the control cables and power cables

If the control cable must run across the power cable, make sure they are arranged at an angle of close to 90° .

4.2.2 Routing Suggestions

Separate cables for transmitting different signals. Reserve a distance between interfering cables and sensitive cables. If the routing space is large, the recommended distance is 30 cm. If these two types of cables must cross, arrange them at an angle of 90° to prevent interference.

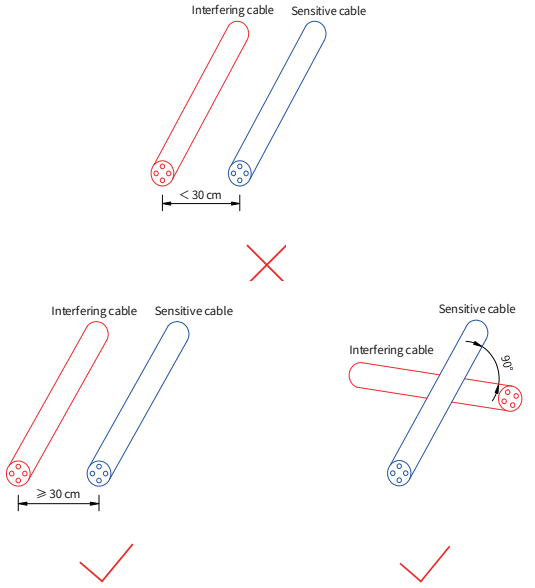


Figure 4-1 Routing of the interfering cable and sensitive cable

It is recommended that different types of signals be separated from the equipotential signal.

When routing cables of same signal type, lay the equipotential signal cables at the outer layer, and consider the equipotential signal arrangement in the middle. The following figure shows an example.

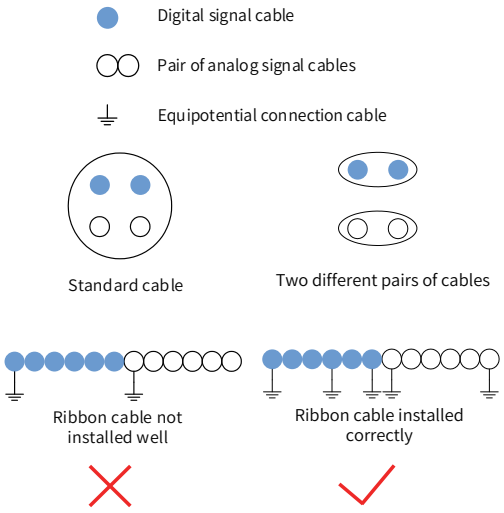


Figure 4-2 Routing of different types of signal cables

For the multi-conductor cable, it is recommended that a cable transmit the same type of signals. If a cable is used to transmit different types of signals, use the cable with conductor shielded, as shown in the following figure.

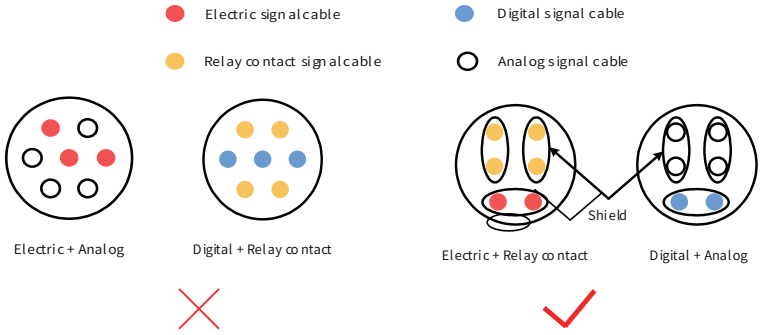


Figure 4-3 Routing of multi-core cables

When certain conductors in a multi-conductor cable are not used, connect all the unused (or reserved) conductors to the equipotential connection point.

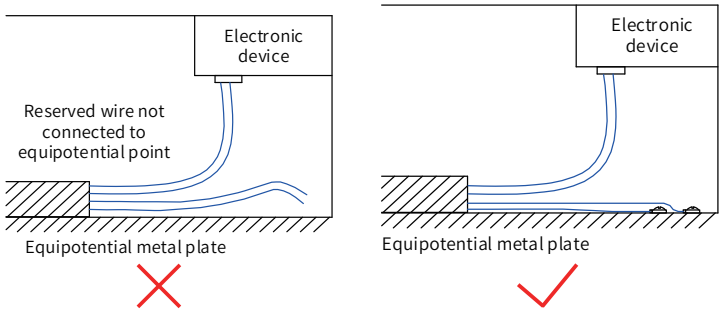


Figure 4-4 Handling of the remaining conductor in a multi-conductor cable

For the low-level sensor signals and relay signals with a common cable, lay the two cables close to each other, preventing too large loop area.

Make sure to use the twisted pair for the analog signal.

Lay the digital signal cables close to each other.

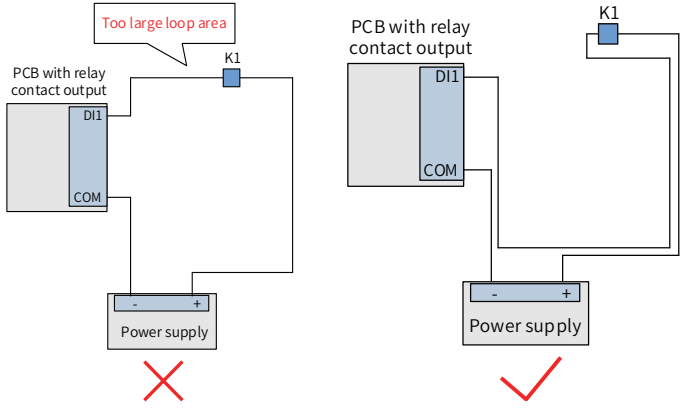


Figure 4-5 Routing for preventing too large loop area

Lay multiple types of cables along the metal block with equipotential connection and separate them to improve internal EMC. If cables in the same metal (zinc-iron or stainless steel) duct are separated with a metal plate, the effect will be better.

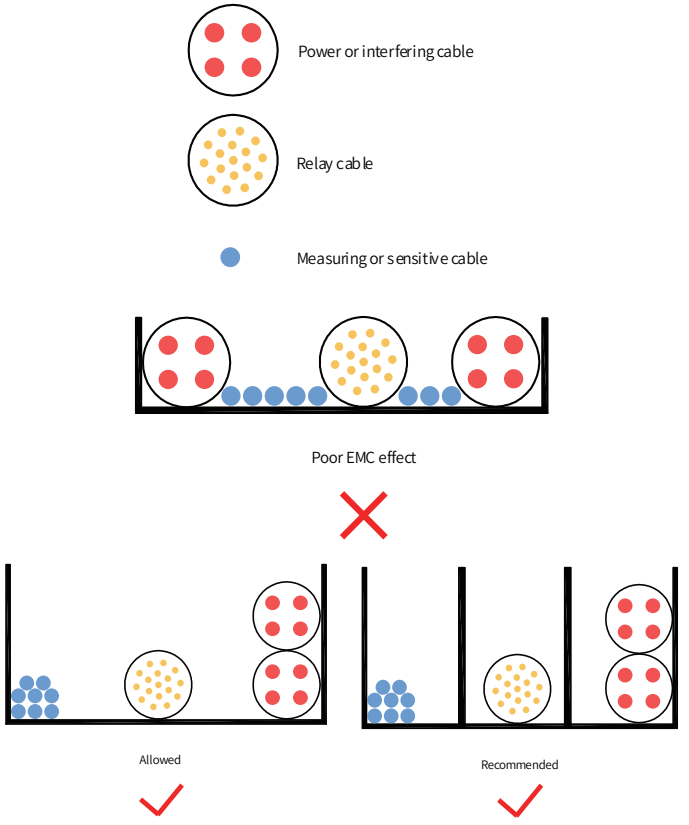


Figure 4-6 Routing of multiple types of cables

The unshielded part of the shielded cable must be as short as possible, and the shield braid is connected to the nearest PE end. If the stripped part is long, the cable is prone to interference, especially for encoder signals.

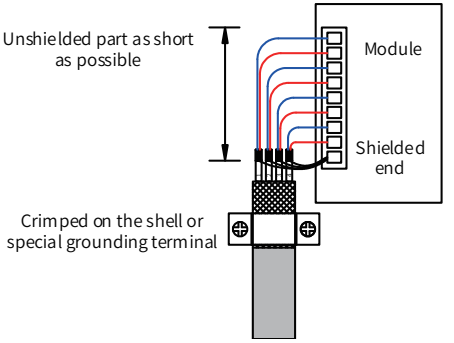


Figure 4-7 Shielded cable requirements

4.3 Standard Wiring Diagram

The following figure shows the standard wiring of MD500 T13 models. For details about the internal electrical wiring diagram, see "Appendix B Electrical Wiring in the Cabinet".

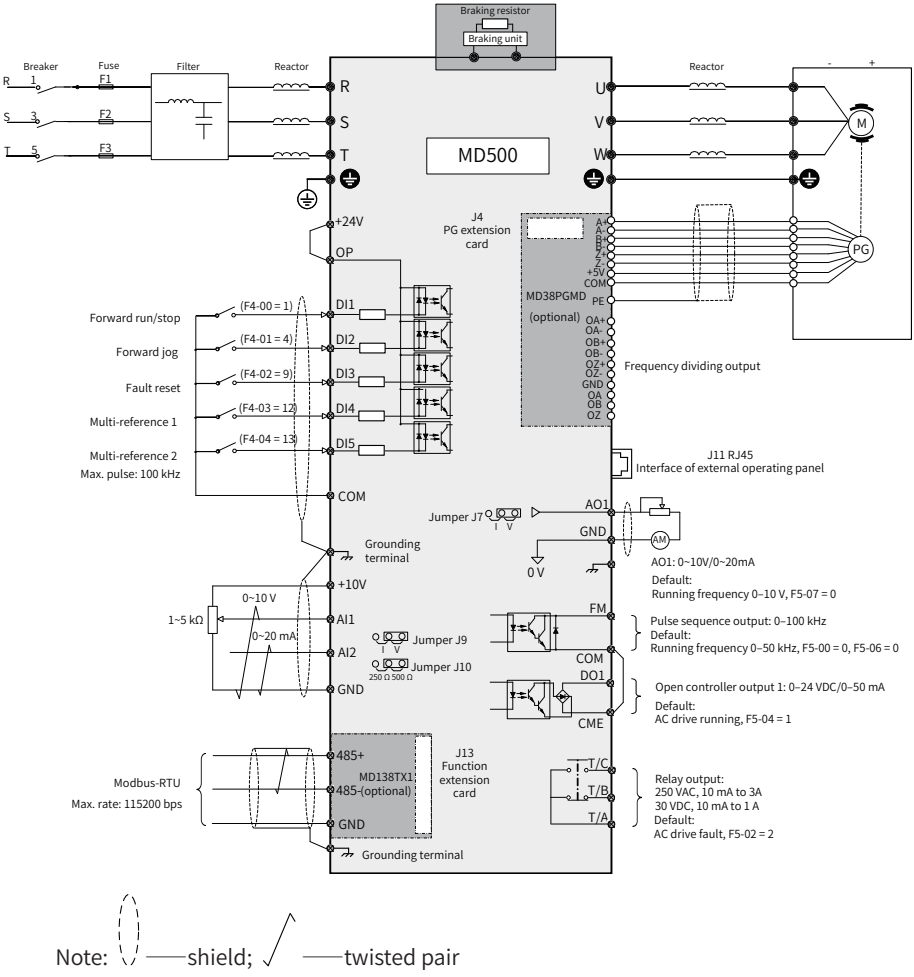


Figure 4-8 Standard wiring

4.4 Wiring of Main Circuit Terminals

Table 4-6 Description of main circuit terminals

Terminal	Name	Description
R, S, T	Three-phase power supply input terminal	Connected to three-phase power supply

Terminal	Name	Description
(+), (-)	Braking resistor connection terminal	Connected to the external braking unit
U, V, W	AC drive output terminal	Connected to a three-phase motor
⏚	Grounding terminal (PE)	Grounding connection

■ Wiring of the grounding terminal (PE)

Step 1: Fix the grounding cable on the fixing screw rod, as shown in Figure 4-9.

Step 2: Fit the M16 nut, spring washer, and flat washer. Then, tighten the nut with the torque recommended in Table 4-7.

■ Wiring of the main power terminals (R/S/T, U/V/W)

Step 1: Fit two cables (①) on the screws on the screw fixing board, as shown in Figure 4-9.

Step 2: Fit the grounding busbar on the screw fixing board from the back, fit another two cables (②), and then put the flat washers and spring washers.

Step 3: Tighten the nuts with the torque recommended in Table 4-7.

■ Wiring of the control terminal

Lay the control circuit cables by following the trench direction in the cabinet, as shown in Figure 4-10.

NOTE

◆ To prevent mice and insects from entering the cabinet, seal inlets and outlets with sealing material (such as fireproofing mud) after wiring the main power terminals and grounding terminal.

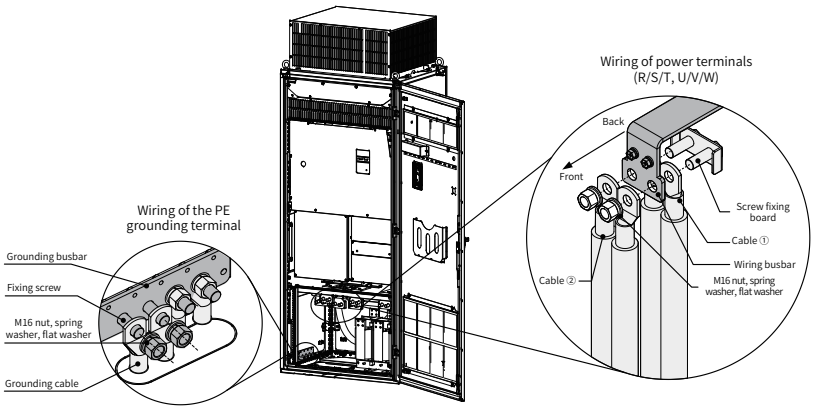


Figure 4-9 Wiring of main circuit terminals and PE grounding terminals of MD500T500G to MD500T630G (example)

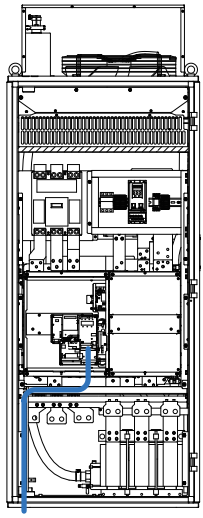


Figure 4-10 Control circuit cable layout of MD500T500G to MD500T630G (example)

Table 4-7 Cable selection

MD500 Model	Input Current (A)	Input/Output Side		Grounding Cable		Screw	Tightening Torque (N · m)
		Recommended Cable Specification (mm^2)[1]	Recommended Lug Model	Recommended Cable Specification (mm^2)[1]	Recommended Lug Model		
MD500T500G(-A)	838.1	4 x (3 x 120)	GTNR120-16	2 x 120	GTNR120-16	M16	180
MD500T560G(-A)	952.9	4 x (3 x 120)	GTNR120-16	2 x 120	GTNR120-16	M16	180
MD500T630G(-A)	1043.5	4 x (3 x 150)	GTNR150-16	2 x 150	GTNR150-16	M16	180

NOTE

[1] Suitable for the Chinese standard. "3 x 120" indicates one three-conductor cable, and "2 x (3 x 120)" indicates two three-conductor cables.

Table 4-8 and Figure 4-11 show the maximum dimensions of the wiring terminal.

Table 4-8 Maximum dimensions of the wiring terminal

Screw/Bolt	Cross-sectional Area (mm^2)	D2 (mm)	B (mm)	I (mm)	C1 (mm)	C2 (mm)
M16	240	17	39	92	19	16

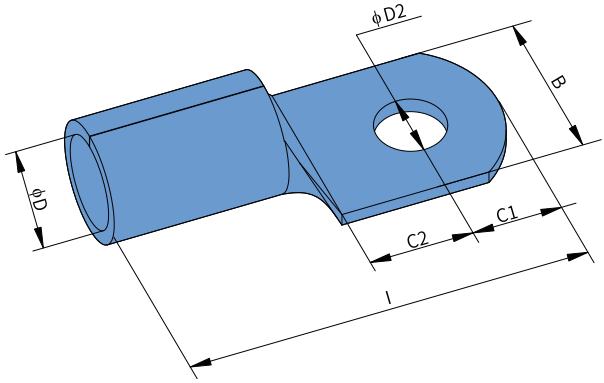


Figure 4-11 Appearance of the wiring terminal

4.5 Description of Control Circuit Terminals

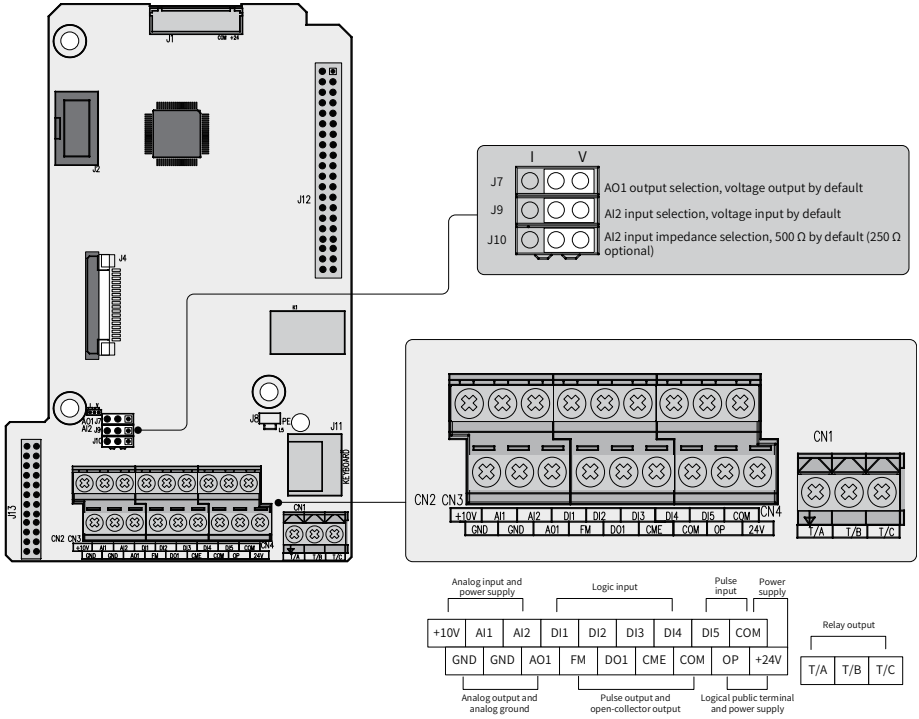


Figure 4-12 Control circuit terminal arrangement

Table 4-9 Functions of control circuit terminals

Category	Terminal Mark	Terminal Name	Description
Power supply	+10V-GND	+10 V power supply	Provides +10 V power supply to an external unit. Max. output current: 10 mA Generally used to supply an external potentiometer of 1 to 5 kΩ
	+24V-COM	+24 V power supply	Provides +24 V power supply to an external unit. Generally used for power supply for DI/DO terminals and external sensors. Max. output current: 200 mA [1]
	OP	Input terminal for external power supply	Connected to +24 V by default. When DI1 to DI5 need to be driven by external signals, OP must be disconnected from + 24 V and connected to an external power supply.
Analog inputs	AI1-GND	Analog input 1	Input voltage range: 0 to 10 VDC Input impedance: 22 kΩ
	AI2-GND	Analog input 2	Either a voltage or current input, determined by jumper J9[3] on the control board Input voltage range: 0 to 10 VDC Input current range: 0 to 20 mA Input impedance: 22 kΩ (voltage input), 500 Ω or 250 Ω (current input) decided by J10 [2]
Digital inputs	DI1- OP	Digital input 1	Optically-coupled isolation compatible with dual-polarity inputs Input impedance: 1.39 kΩ Voltage range for active level inputs: 9 to 30 V
	DI2- OP	Digital input 2	
	DI3- OP	Digital input 3	
	DI4- OP	Digital input 4	
	DI5- OP	High-speed pulse input	In addition to having the same features as DI1 to DI4, DI5 can also be used for high-speed pulse inputs. Max. input frequency: 100 kHz Input impedance: 1.03 kΩ
Analog outputs	AO1-GND	Analog output 1	Either a voltage or current output, determined by jumper J7[3] on the control board Output voltage range: 0 to 10 V Output current range: 0 to 20 mA
Digital outputs	DO1-CME	Digital output 1	Note that DO1 is internally used. Therefore, do not connect it.
	FM- COM	High-speed pulse output	Controlled by F5-00 (FM terminal output selection). When used as high-speed pulse output, the maximum output frequency is 100 kHz. When used as an open-collector output, the specification is the same as for DO1.

Category	Terminal Mark	Terminal Name	Description
Relay outputs	T/A-T/B	Normally-closed (NC) terminal	Contact driving capacity: 250 VAC, 3 A, Cos Φ = 0.4 30 VDC, 1 A
	T/A-T/C	Normally-open (NO) terminal	
Auxiliary interfaces	J13	Extension card interface	Interface for the 28-core terminal and optional cards (I/O extension card, PLC card, and various bus cards)
	J4	PG card interface	The open-collector, differential, and resolver are selectable options.
	J11	External operating panel interface	Connected to an external operating panel
Jumpers[3]	J7	AO1 output selection	Either a voltage or a current output, voltage output by default
	J9	AI2 input selection	Either a voltage or a current input, voltage input by default
	J10	AI2 input impedance selection	Either 500 Ω or 250 Ω input, 500 Ω input by default

[1] When the ambient environment is above 23°C , the output current must be de-rated for 1.8 mA per 1°C temperature rise. The maximum output current is 170 mA at 40°C . When OP is connected to 24 V, the current of the DI must also be considered.

[2] Select 500 Ω or 250 Ω input impedance according to the with-load capacity of the signal source. For example, if 500 Ω is selected, the maximum output voltage of the signal source cannot be smaller than 10 V so that AI2 can measure 20 mA current.

[3] For positions of jumpers J7, J9 and J10 on the control board, see Figure 4-11.

5 Panel Operation

5.1 Introduction

The LED operating panel allows you to set and modify parameters, monitor system status, and start or stop the AC drive. For details, see 19010355 MD500 Series AC Drive Advanced User Guide. An external LED (MD32NKE1) or LCD (MDKE9) operating panel is also available as an option. For details, see *"2.5 External Operating Panels".*

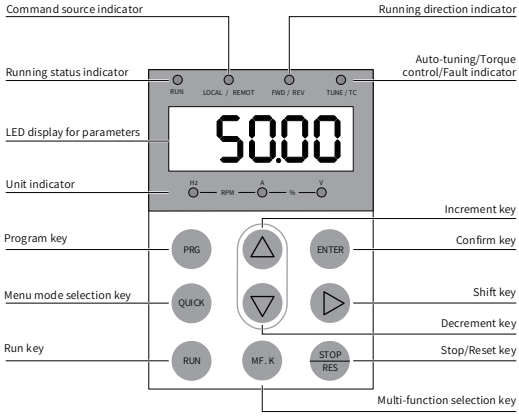


Figure 5-1 Details of the operating panel

5.2 Keys on the LED Operating Panel

Table 5-1 Function of keys on the LED operating panel

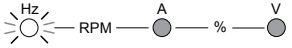
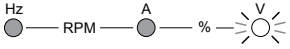
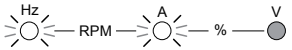
Key	Name	Function
PRG	Programming	Enter or exit Level I menu.
ENTER	Enter	Enter each level of menu interface and confirm the displayed parameter setting.
△	Increment	Increase the displayed value when editing a parameter value.
▽	Decrement	Decrease the displayed value when editing a parameter value.
▷	Shift	Select the displayed parameter in the STOP or RUNNING status. Select the digit to be modified when modifying a parameter value.
RUN	RUN	Start the AC drive when using the operating panel control mode.
STOP RES	Stop/Reset	Stop the AC drive when the AC drive is in the RUNNING status. Perform a reset operation when the AC drive is in the FAULT status.

Key	Name	Function
MF.K	Multifunction	Perform a function switchover as defined by the setting of F7-01 (MF.K key function selection).
QUICK	Menu mode selection	Switch over between menu modes as defined by the setting of FP-03 (Selection of individualized parameter display).

5.3 Indicators on the LED Operating Panel

 indicates that the light turns on,  indicates that the light turns off, and  indicates that the light flashes.

Table 5-2 Indicators on the operating panel

State		Indication
RUN Running status indicators		OFF indicates the STOP status.
		ON indicates the RUNNING status.
LOCAL/REMOT Running command indicators		OFF indicates under operating panel control.
		ON indicates under terminal control.
		FLASHING indicates under serial communication control.
FWD/REV Forward and reverse rotation indicators		OFF indicates forward motor rotation.
		ON indicates reverse motor rotation.
TUNE/TC Auto-tuning, torque control and fault indicators		OFF indicates that the AC drive is normal.
		ON indicates the torque control mode.
		FLASHING SLOWLY (once a second) indicates auto-tuning status.
		FLASHING QUICKLY (four times a second) indicates a fault condition.
		Hz for frequency
		A for current
		V for voltage
		RPM for motor speed
		Percentage

6 Basic Operations and Trial Run

6.1 Quick Commissioning Guide

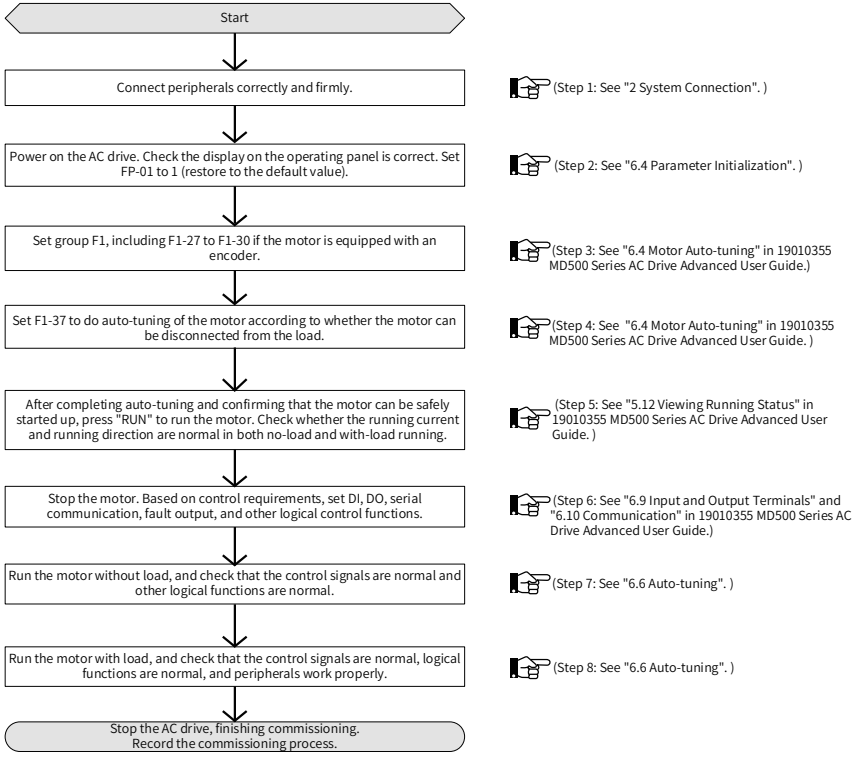


Figure 6-1 Quick commissioning

6.2 Checklist Before Power-on

Be sure to check the following items before powering on the AC drive.

Item	Description
Voltage	The voltage is AC 380 to 480 V and 50/60 Hz.
	The input terminals R, S, and T are correctly connected.
	The AC drive is connected to the motor properly.
Connection of AC drive output terminals and motor terminals	The AC drive output terminals U, V, and W are firmly connected to the motor terminals.
Connection of terminals in the control circuit	Terminals of the control circuit are firmly connected to other control devices.
Status of control terminals	All terminals of the control circuit are OFF (the AC drive is not running).

Item	Description
Load	The motor is idle and not connected to the mechanical system.

6.3 Display After Power-on

The following table lists the display on the operating panel after the AC drive is powered on.

State	Display	Description
Normal		Default value 50.00 Hz is displayed.
Fault		The AC drive stops and displays an error code.

6.4 Parameter Initialization

You can restore the AC drive to factory parameters. After initialization, FP-01 is automatically reset to 0.

FP-01	Parameter initialization		Default	0
	Setting Range	0	No operation	
		1	Restore factory parameters except motor parameters	
		2	Clear records	
		4	Back up current user parameters	
		501	Restore user backup parameters	

1: Restore factory parameters except motor parameters

When FP-01 is set to 1, most of the parameters are restored to the factory default settings. However, motor parameters, F0-22 (Frequency reference resolution), error records, F7-09 (Accumulative running time), F7-13 (Accumulative power-on time), F7-14 (Accumulative power consumption), and F7-07 (Heatsink temperature of AC drive) cannot be restored.

2: Clear records

Error records, F7-09 (Accumulative running time), F7-13 (Accumulative power-on time), and F7-14 (Accumulative power consumption) are cleared.

4: Back up current user parameters

Parameters set by the current user are backed up. Values of all the current function parameters are backed up for restoration after an error caused by parameter adjustment occurs.

501: Restore user backup parameters

Restore parameters backed up by setting FP-01 to 4.

6.5 Motor Control

Parameter	Description	Scenario
F0-01: Motor control mode	F0-01 = 0: SVC	It indicates the SVC mode. It is applicable for common high-performance control scenarios in which one AC drive can drive only one motor, for example, machine tool, centrifuge, drawing machine, and injection molding machine.
	F0-01 = 1: FVC	It indicates the FVC mode. The motor must be equipped with an encoder and the AC drive must be equipped with a PG card in the same type of the encoder. It is applicable to scenarios requiring high precision speed or torque control. One AC drive can drive only one motor, for example, high-speed papermaking machine, cran, and elevator.
	F0-01 = 2: V/F control	It is applicable to scenarios having no requirement on load or using one drive to drive multiple motors, including fans and bumps. It is applicable to scenarios in which one drive is used to drive multiple motors.

6.6 Auto-tuning

You can obtain parameters of a controlled motor through motor auto-tuning. Motor auto-tuning methods include dynamic auto-tuning, static auto-tuning 1, and static auto-tuning 2. You can enter the motor parameters manually.

Auto-tuning Method	Application	Result
Dynamic no-load auto-tuning F1-37 = 2	It is applied to applications where motors can be disconnected from the load.	Best
Dynamic auto-tuning with load F1-37 = 2	It is applied to applications where motors cannot be disconnected from the load. The load friction force is small and the motor is appropriately idle when running at a constant speed. The effect is better with a smaller friction force.	Better
Static auto-tuning 1 F1-37 = 1	It is applied to applications where motors cannot be disconnected from the load and dynamic auto-tuning is not allowed.	Good
Static auto-tuning 2 F1-37 = 3	It is applied to applications where motors cannot be disconnected from the load and dynamic auto-tuning is not allowed. This mode is recommended for static auto-tuning. It lengthens the auto-tuning time compared to static auto-tuning 1.	Better
Manual parameter input	It is applied to applications where motors cannot be disconnected from the load. Copy parameters of motors of the same model which have been auto-tuned to F1-00 (Motor type selection) to F1-10 (No-load current).	Better

Auto-tuning methods are described below.

Motor 1 is used to describe motor auto-tuning methods. If you need to perform auto-tuning on motor 2, set F0-24 (Motor parameter group selection) to 1 (Motor parameter group 2).

Step 1: If the motor can be disconnected from the load, cut off the power, and disconnect the motor from the load to have the motor run without load.

Step 2: Power on the AC drive. Set F0-02 (Running command selection) to 0 (Serial communication) to select the operating panel as the running command.

Step 3: Input motor nameplate parameters (F1-00 to F1-05) correctly. Set the following parameters according to the motor:

Motor	Parameter
Motor 1	F1-00: Motor type selection F1-01: Rated motor power F1-02: Rated motor voltage F1-03: Rated motor current F1-04: Rated motor frequency F1-05: Rated motor speed
Motor 2	A2-00 (Motor type selection) to A2-05 (Rated motor speed) have the same definition.

If there is an encoder, set F1-27 (Encoder pulses per revolution), F1-28 (Encoder type), and F1-30 (A/B phase sequence of ABZ incremental encoder).

Step 4: For an asynchronous motor, set F1-37 (Auto-tuning selection) (A2-37 in case of Motor 2) to 2 (Asynchronous motor dynamic auto-tuning) and press ENTER. "TUNE" is displayed, as shown in the following figure:

Press RUN on the operating panel. The AC drive drives the motor to accelerate/decelerate and run in forward/reverse direction. The RUN indicator becomes ON and auto-tuning lasts for about 2 minutes. After the preceding display disappears and the operating panel returns to normal parameter display state, auto-tuning is completed.

After auto-tuning, the following motor parameters are calculated:

Motor	Parameter
Motor 1	F1-06: Stator resistance F1-07: Rotor resistance F1-08: Leakage inductive reactance F1-09: Mutual inductive reactance F1-10: No-load current
Motor 2	A2-06 to A2-10 have the same definition.

If the motor cannot be disconnected from the load, set F1-37 (A2-37 in case of Motor 2) to 3 (Asynchronous motor complete static auto-tuning) and press RUN on the operating panel. Auto-tuning starts.

7 Troubleshooting and Solutions

7.1 Faults and Diagnostics

Troubleshoot the faults occurred during operating the AC drive as follows.

Fault Code	Fault Name	Possible Cause	Solution
Err02	Overcurrent during acceleration	A grounding fault or short circuit exists in the output circuit.	Check whether short-circuit occurs on the motor, motor cable, or contactor.
		The control mode is SVC or FVC but motor auto-tuning is not performed.	Set motor parameters according to the motor nameplate and perform motor auto-tuning.
		The acceleration time is too short.	Increase the acceleration time.
		The overcurrent stall prevention parameters are set improperly.	Ensure that current limit is enabled (F3-19 = 1). The setting of F3-18 (Current limit level) is too large. Adjust it between 120% and 150%. The setting of F3-20 (Current limit gain) is too small. Adjust it between 20 and 40.
		Customized torque boost or V/F curve is not appropriate.	Adjust the customized torque boost or V/F curve.
		The spinning motor is started.	Enable the catching a spinning motor function or start the motor after it stops.
		The AC drive suffers external interference.	View historical fault records. If the current value is far from the overcurrent level, find the interference source. If an external interference does not exist, the drive board or hall device may be faulty.

Fault Code	Fault Name	Possible Cause	Solution
Err03	Overcurrent during deceleration	A grounding fault or short circuit exists in the output circuit.	Check whether short-circuit occurs on the motor, motor cable, or contactor.
		The control mode is SVC or FVC but motor auto-tuning is not performed.	Set the motor parameters according to the motor nameplate and perform motor auto-tuning.
		The deceleration time is too short.	Increase the deceleration time.
		The overcurrent stall prevention parameters are set improperly.	Ensure that current limit is enabled (F3-19 = 1). The setting of F3-18 (Current limit level) is too large. Adjust it between 120% and 150%. The setting of F3-20 (Current limit gain) is too small. Adjust it between 20 and 40.
		The braking unit and braking resistor are not installed.	Install the braking unit and braking resistor.
		The AC drive suffers external interference.	View historical fault records. If the current value is far from the overcurrent level, find the interference source. If an external interference does not exist, the drive board or hall device may be faulty.
Err04	Overcurrent at constant speed	A grounding fault or short circuit exists in the output circuit.	Check whether short-circuit occurs on the motor, motor cable, or contactor.
		The control mode is SVC or FVC but motor auto-tuning is not performed.	Set motor parameters according to the motor nameplate and perform motor auto-tuning.
		The overcurrent stall prevention parameters are set improperly.	Ensure that current limit is enabled (F3-19 = 1). The setting of F3-18 (Current limit level) is too large. Adjust it between 120% and 150%. The setting of F3-20 (Current limit gain) is too small. Adjust it between 20 and 40.
		The AC drive power class is small.	If the output current exceeds the rated motor current or rated output current of the AC drive during stable running, replace an AC drive of larger power class.
		The AC drive suffers external interference.	View historical fault records. If the current value is far from the overcurrent level, find the interference source. If an external interference does not exist, the drive board or hall device may be faulty.

Fault Code	Fault Name	Possible Cause	Solution
Err05	Overvoltage during acceleration	The input voltage is too high.	Adjust the input voltage to normal range.
		An external force drives the motor during acceleration.	Cancel the external force or install a braking resistor.
		The overvoltage stall prevention parameters are set improperly.	Ensure that the voltage limit function is enabled (F3-23 = 1). The setting of F3-22 (Voltage limit) is too large. Adjust it between 700 V and 770 V. The setting of F3-24 (Frequency gain for voltage limit) is too small. Adjust it between 30 and 50.
		The braking unit and braking resistor are not installed.	Install the braking unit and braking resistor.
		The acceleration time is too short.	Increase the acceleration time.
Err06	Overvoltage during deceleration	The overvoltage stall prevention parameters are set improperly.	Ensure that the voltage limit function is enabled (F3-23 = 1). The setting of F3-22 (Voltage limit) is too large. Adjust it between 700 V and 770 V. The setting of F3-24 (Frequency gain for voltage limit) is too small. Adjust it between 30 and 50.
		An external force drives the motor during deceleration.	Cancel the external force or install a braking resistor.
		The deceleration time is too short.	Increase the deceleration time.
		The braking unit and braking resistor are not installed.	Install the braking unit and braking resistor.
Err07	Overvoltage at constant speed	The overvoltage stall prevention parameters are set improperly.	Ensure that the voltage limit function is enabled (F3-23 = 1). The setting of F3-22 (Voltage limit) is too large. Adjust it between 700 V and 770 V. The setting of F3-24 (Frequency gain for voltage limit) is too small. Adjust it between 30 and 50. The setting of F3-26 (Frequency rise threshold during voltage limit) is too small. Adjust it between 5 Hz and 20 Hz.
		An external force drives the motor during acceleration.	Cancel the external force or install a braking resistor.

Fault Code	Fault Name	Possible Cause	Solution
Err08	Pre-charge power fault	The bus voltage fluctuates around the undervoltage threshold continuously.	Contact the agent or Inovance.
Err09	Undervoltage	An instantaneous power failure occurs.	Enable the power dip ride through function (F9-59 ≠ 0).
		The AC drive's input voltage is not within the permissible range.	Adjust the voltage to the normal range.
		The bus voltage is abnormal.	Contact the agent or Inovance.
		The rectifier bridge, pre-charge resistor, drive board, or control board are abnormal.	Contact the agent or Inovance.
Err10	AC drive overload	The load is too heavy or locked-rotor occurs on the motor.	Reduce the load or check motor and mechanical conditions.
		The AC drive power class is small.	Replace an AC drive of larger power class.
Err11	Motor overload	F9-01 (Motor overload protection gain) is set improperly.	Set F9-01 (Motor overload protection gain) correctly.
		The load is too heavy or locked-rotor occurs on the motor.	Reduce the load or check motor and mechanical conditions.
Err12	Input phase loss	Input phase loss occurs.	Eliminate faults in external circuits.
		The drive board, lightning protection board, main control board, or rectifier bridge is abnormal.	Contact the agent or Inovance.
Err13	Output phase loss	The motor is faulty.	Check and ensure that the motor is without open circuit.
		The cable connecting the AC drive and the motor is abnormal.	Eliminate external faults.
		The AC drive's three-phase outputs are unbalanced when the motor is running.	Check whether the motor three-phase winding is normal.
		The drive board or the IGBT is abnormal.	Contact the agent or Inovance.

Fault Code	Fault Name	Possible Cause	Solution
Err14	IGBT overheat	The ambient temperature is too high.	Lower the ambient temperature.
		The ventilation is clogged.	Clean the ventilation.
		The fan is damaged.	Replace the cooling fan.
		The thermistor of IGBT is damaged.	Replace the thermistor.
		The IGBT is damaged.	Replace the IGBT.
Err15	External fault	An external fault signal is input using the DI.	Eliminate external faults, and confirm that the mechanical condition allows restart (F8-18) and reset the operation.
		An external fault signal is input using virtual I/O.	Confirm that the virtual I/O parameters in group A1 are set correctly and reset the operation.
Err16	Communication fault	The host controller is in abnormal state.	Check the cable of host controller.
		The communication cable is abnormal.	Check the communication cables.
		The serial port communication protocol (F0-28) of the extension communication card is set improperly.	Set F0-28 (Serial port communication protocol) for the extension communication card correctly.
		Communication parameters in group Fd are set improperly.	Set communication parameters in group Fd properly.
		If the fault still exists after all the preceding checkings are done, restore the default settings.	
Err17	Contactor fault	The drive board and power supply are abnormal.	Replace the drive board or power supply board.
		The contactor is abnormal.	Replace the contactor.
		The lightning protection board is abnormal.	Replace the lightning protection board.
Err18	Current detection fault	The hall is abnormal.	Replace the hall element.
		The drive board is abnormal.	Replace the drive board.

Fault Code	Fault Name	Possible Cause	Solution
Err19	Motor auto-tuning fault	Motor parameters are not set according to the nameplate.	Set motor parameters correctly according to the nameplate.
		Motor auto-tuning times out.	Check whether the AC drive and motor are connected correctly.
		The encoder is abnormal.	Check whether F1-27 (Encoder pulses per revolution) is set correctly. Check whether signal lines of the encoder are connected correctly and securely.
Err20	Encoder fault	The encoder is not matched.	Set the encoder type correctly.
		The encoder wiring is incorrect.	Check the PG card power supply and phase sequence.
		The encoder is damaged.	Replace the encoder.
		The PG card is abnormal.	Replace the PG card.
Err21	EEPROM read-write fault	The EEPROM chip is damaged.	Replace the main control board.
Err23	Short circuit to ground	The motor is short-circuited to the ground.	Replace the cable or motor.
Err25	Power supply unit fault	The voltage of the input grid is abnormal.	Check whether the input voltage is too high or low.
		The power supply unit is faulty.	Contact the agent or Inovance.
Err26	Accumulative running time reached	The accumulative running time reached the set value.	Clear the record by parameter initialization.
Err27	User-defined fault 1	The signal of user-defined fault 1 is input through the multi-functional terminal DI.	Perform the reset operation.
		The signal of user-defined fault 1 is input through the virtual I/O.	Perform the reset operation.
Err28	User-defined fault 2	The signal of user-defined fault 2 is input through the multi-functional terminal DI.	Perform the reset operation.
		The signal of user-defined fault 2 is input through the virtual I/O.	Perform the reset operation.

Fault Code	Fault Name	Possible Cause	Solution
Err29	Accumulative power-on time reached	The accumulative power-on time reached the set value.	Clear the record by parameter initialization.
Err30	Load loss	The operation current of the AC drive is smaller than F9-64 (Load loss detection level).	Check whether the load is disconnected or ensure that F9-64 (Load loss detection level) and F9-65 (Load loss detection time) are set based on the actual conditions.
Err31	PID Feedback loss	PID feedback is smaller than FA-26 (Detection level of PID feedback loss).	Check the PID feedback signal or set FA-26 (Detection level of PID feedback loss) correctly.
Err40	Pulse-by-pulse current limit fault	The load is too heavy or locked-rotor occurs on the motor.	Reduce the load or check motor and mechanical conditions.
		The AC drive power class is small.	Replace an AC drive of larger power class.
Err41	Motor switchover fault during running	Motor switchover is performed using a terminal during running of the AC drive.	Perform motor switchover after the AC drive stops.
Err42	Speed error	Encoder parameters are set improperly.	Set encoder parameters properly.
		Motor auto-tuning is not performed.	Perform motor auto-tuning.
		F9-69 (Detection level of speed error) and F9-70 (Detection time of speed error) are set incorrectly.	Set F9-69 (Detection level of speed error) and F9-70 (Detection time of speed error) correctly based on actual condition.
Err43	Motor overspeed	Encoder parameters are set improperly.	Set encoder parameters properly.
		Motor auto-tuning is not performed.	Perform motor auto-tuning.
		F9-67 (Overspeed detection level) and F9-68 (Overspeed detection time) are set incorrectly.	Set F9-67 (Overspeed detection level) and F9-68 (Overspeed detection time) correctly based on the actual situation.
Err45	Motor overheat	Cable connection of the temperature sensor becomes loose.	Check cable connection of the temperature sensor.
		The motor temperature is too high.	Increase the carrier frequency or take other measures to cool the motor.

Fault Code	Fault Name	Possible Cause	Solution
Err61	Braking unit overload	The resistance of braking resistor is too small.	Replace a braking resistor of larger resistance.
Err62	Short-circuit of braking circuit	The braking module is abnormal.	Contact the agent or Inovance.
Err64	Water cooling system fault	The control unit of the water cooling system is faulty.	Reset the operation.
			Replace the control unit
Err65	AC drive overheat	The internal temperature of the AC drive is too high.	Replace the fan in the AC drive.
			Contact the agent or Inovance.
A66	Low liquid level alarm	The liquid level in the water tank is too low.	Add more cooling liquid.

7.2 Common Symptoms and Diagnostics

No.	Fault Symptom	Possible Cause	Solution
1	There is no display upon power-on.	There is no power supply to the AC drive or the power input to the AC drive is too low.	Check the power supply.
		The switching power supply on the drive board of the AC drive is faulty.	Check the bus voltage.
		Wires between the control board and drive board and between the control board and operating panel break.	Re-connect the 8-pin wire and 40-pin wire.
		The pre-charge resistor of the AC drive is damaged.	Contact the agent or Inovance.
		The control board or the operating panel is faulty.	
		The rectifier bridge is damaged.	
2	"HC" is displayed upon power-on.	Cable connection between the drive board and control board is in poor contact.	Re-connect the 8-pin wire and 28-pin wire.
		Related components on the control board are damaged.	Contact the agent or Inovance.
		The motor or motor cable is short-circuited to ground.	
		The hall device is faulty.	
		The mains voltage is too low.	

No.	Fault Symptom	Possible Cause	Solution
3	"Err23" is displayed upon power-on.	The motor or the motor cable is short-circuited to the ground.	Check the insulation status of the motor and the output cable with a megger.
		The AC drive is damaged.	Contact the agent or Inovance.
4	The AC drive display is normal upon power-on, but after running the AC drive displays "HC" and stops immediately.	The cooling fan is damaged or does not rotate.	Replace the damaged fan.
		The cable of the external control terminal is short-circuited.	Eliminate the external short-circuit fault.
5	Err14 (IGBT overheat) is detected frequently.	The setting of carrier frequency is too high.	Reduce F0-15 (Carrier frequency).
		The cooling fan is damaged, or the ventilation is clogged.	Replace the cooling fan and clean the ventilation.
		Components (thermal coupler or others) inside the AC drive are damaged.	Contact the agent or Inovance.
6	The motor does not rotate after the AC drive runs.	Check the motor and the motor cables.	Check that cabling between the AC drive and the motor is normal.
		The motor parameters in group F1 are set improperly.	Restore the factory parameters and reset the following parameters properly: ◆ Encoder parameters ◆ Motor ratings, such as rated motor frequency and rated motor speed ◆ F0-01 (Motor 1 control mode) and F0-02 (Running command selection) ◆ F3-01 (Torque boost) in V/F control under heavy-load start
		Cable connection between the drive board and control board is in poor contact.	Re-connect wirings and ensure secure connection.
		The drive board is faulty.	Contact the agent or Inovance.

No.	Fault Symptom	Possible Cause	Solution
7	DI terminals are disabled.	The related parameters are set incorrectly.	Check and reset the parameters in group F4 again.
		The external signal is incorrect.	Re-connect the external signal cable.
		The jumper across OP and +24 V becomes loose.	Re-confirm the jumper bar across OP and +24 V.
		The control board is faulty.	Contact the agent or Inovance.
8	The motor speed does not rise in FVC control.	The encoder is faulty.	Replace the encoder and re-confirm cable connection.
		The encoder connection is incorrect or in poor contact.	Replace the PG card.
		The PG card is faulty.	Contact the agent or Inovance.
		The drive board is faulty.	
9	The AC drive detects overcurrent and overvoltage frequently.	The motor parameters in group F1 are set improperly.	Set the motor parameters in group F1 or perform motor auto-tuning again.
		The acceleration/deceleration time is improper.	Set proper acceleration/ deceleration time.
		The load fluctuates.	Contact the agent or Inovance.
10	Err17 is detected upon power-on or running.	The pre-charge contactor is not closed.	◆ Check whether the contactor cable is loose. ◆ Check whether the contactor is faulty. ◆ Check whether 24 V power supply of the contactor is faulty. ◆ Contact the agent or Inovance.
11	The brake torque of the motor is insufficient when the motor is in the deceleration or decelerate to stop state.	The encoder disconnection or overvoltage stall protection takes effect.	Check the encoder wiring at FVC (F0-01 = 1). If the braking resistor has been configured, set F3-23 (Voltage limit selection) to 0 (Disabled).

8 Routine Inspection and Maintenance

8.1 Routine Inspection

Check the following items daily to ensure normal running and prevent damage to the AC drive. Copy this checklist and sign the "Checked" column after each inspection.

Inspection Item	Inspection Points	Solutions	Checked
Motor	Inspect whether the abnormal sounds and vibration occur on the motor.	◆ Check whether the mechanical connection is normal. ◆ Check whether output phase loss occurs on the motor. ◆ Check whether retaining screws of the motor are tightened.	
Fan	Inspect whether the cooling fan of the AC drive and motor work abnormally.	◆ Check running of the cooling fan of the AC drive. ◆ Check whether the cooling fan of the motor is normal. ◆ Check whether the ventilation is clogged. ◆ Check whether the ambient temperature is within the permissible range.	
Installation environment	Inspect whether the cabinet and cable duct are abnormal.	◆ Check for input and output cables with insulation damaged. ◆ Check for vibration of hanging bracket. ◆ Check whether ground bars and terminals become loose or get corroded.	
Load	Inspect whether the running current of the AC drive exceeds the rated current of the AC drive and motor for a certain period.	◆ Check whether motor parameters are set properly. ◆ Check whether the motor is overloaded. ◆ Check whether the mechanical vibration is severe (allowed range: < 1 g).	
Input voltage	Inspect whether the power voltage of the main and control circuits is within the allowed range.	◆ Check that the input voltage is within the allowed range. ◆ Check whether heavy load is started.	

8.2 Periodic Inspection

Inspection Item	Inspection Point	Solution	Checked
General	Inspect for wastes, dirt, and dust on the surface of the AC drive.	◆ Check whether the cabinet of the AC drive is powered off. ◆ Use a vacuum cleaner to suck up wastes and dust to prevent direct touching. ◆ Wipe stubborn stains with alcohol and wait until the alcohol evaporates.	
Cables	Inspect power cables and connections for discoloration. Inspect wiring insulation for aging or wear.	◆ Replace cracked cables. ◆ Replace damaged terminals.	
Peripheral devices such as relay and contactor	Check whether the contactor is loose or abnormal noise exists during operation. Check whether short-circuit, water stain, expansion, or cracking occurs on peripheral devices.	◆ Replace abnormal peripheral devices.	
Ventilation	Inspect whether ventilation and heatsink are clogged. Check whether the fan is damaged.	◆ Clean the ventilation. ◆ Replace the fan.	
Control circuit	Inspect for control components in poor contact. Inspect for loose terminal screws. Inspect for control cables with cracked insulation.	◆ Clear away foreign matters on the surface of control cables and terminals. ◆ Replace damaged or corroded control cables.	
Cooling liquid	Inspect whether the cooling liquid becomes yellow or discolored or has foreign matters.	Replace the cooling liquid.	
Dust filter foam	Inspect whether the dust filter foam is dusty.	Clean the dust filter foam.	

8.3 Replacement of Wear Parts

8.3.1 Lifetime of Wear Parts

The lifetime of fans and electrolytic DC bus capacitors is related to the operating environment and maintenance status. The general lifetime is listed as follow.

Component	Service Life [1]
Fan	⩾ 5 years
Electrolytic capacitor	⩾ 5 years

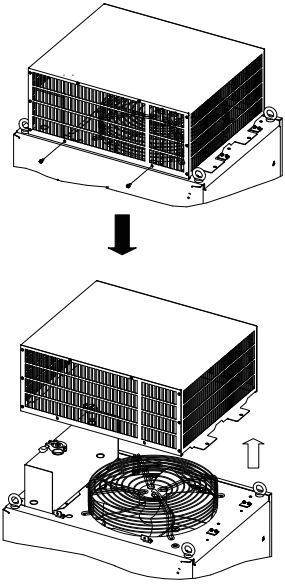
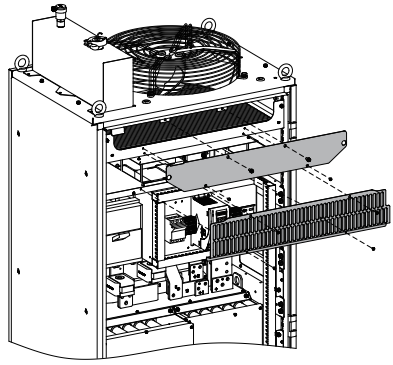
[1] You can determine when to replace these parts according to the actual operating time.

- Ambient temperature: 40°C
- Load rate: 80%
- Operating rate: 24 hours per day

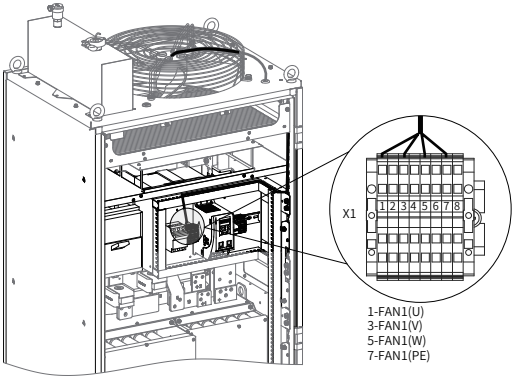
8.3.2 Replacing Cooling Fans

1) Possible damage causes: bearing worn and blade aging

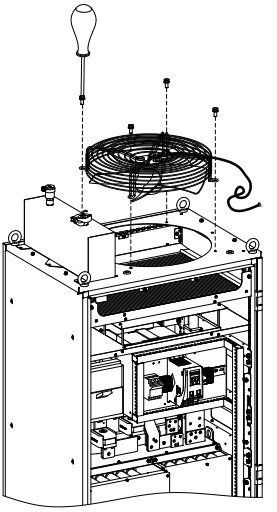
2) Judging criteria: whether there is crack on the blade; whether there is abnormal vibration noise upon startup; whether the blade runs abnormally

Removing the Top Fan	
① Remove the two screws in the front of the top protective cover. Hold the protective cover with both hands and move it forward along the slide rail for about 20 mm. Then, raise the cover vertically to remove it. 	② Remove the baffle in the cabinet, as shown in the figure. 

③ Disconnect the cables connecting the top fan on the X1 terminal block. Then, pull out the cables from the cable trough. Note that only cables connected to terminals 1, 3, 5, and 7 need to be removed.



④ Remove the four screws on the top fan. Then, remove the fan from the cabinet.

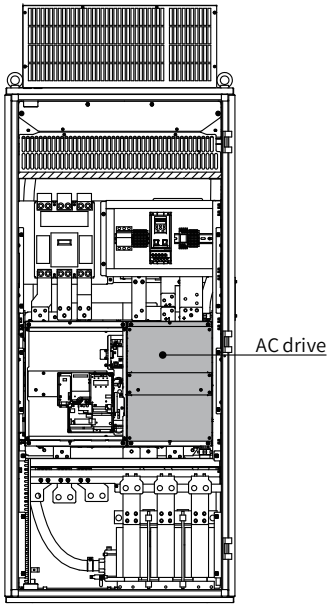


Installing the Top Fan

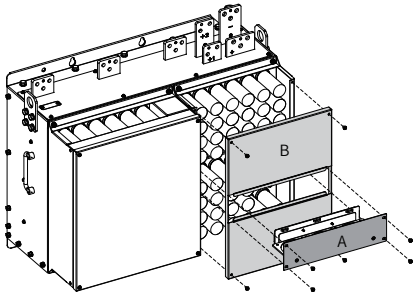
① Install the fan in a reverse procedure to removal.
② Perform fan wiring according to the cable trough diagram.
③ Note that terminals 1, 3, 5, and 7 on the X1 terminal block must be connected.

Removing the AC Drive Fan in the Cabinet

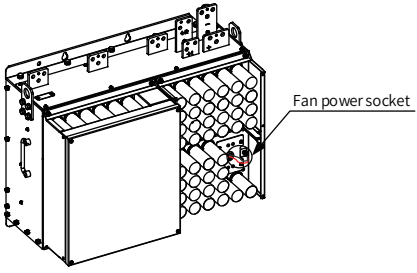
① Open the cabinet door to expose the AC drive, as shown in the following figure.



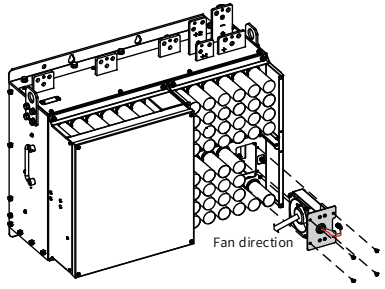
② Remove baffles A and B of the AC drive in sequence, as shown in the figure.



③ Disconnect the fan power cable from the AC drive.



④ Remove the four screws on the fan. Then, remove the fan from the AC drive. Note that the fan direction is from right to left.



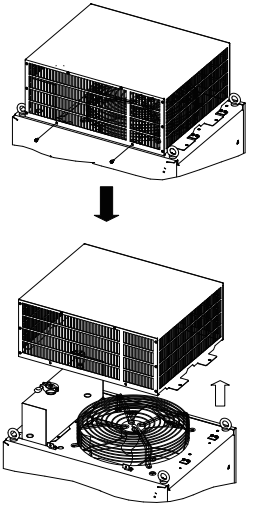
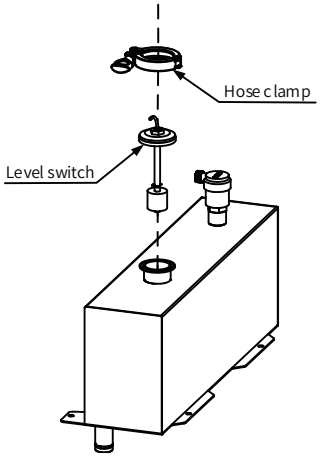
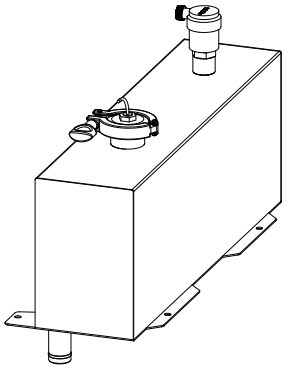
Installing the AC Drive Fan in the Cabinet

Install the fan in a reverse procedure to removal. Pay attention to the direction of the fan. Align the mounting holes of the fan and the AC drive, as shown in step 4 of the removal procedure.
Check that the air flow direction is correct after the fan is replaced.

8.3.3 Adding and Replacing Cooling Liquid

■ Adding cooling liquid

If A66 is displayed on the operating panel of the AC drive, the level of the cooling liquid is lower than the threshold. (The cooling liquid used is 45% ethylene glycol solution with the freezing temperature of -40°C .) In this case, add the cooling liquid according to the following procedure.

<table>
<tr><th colspan="2">Adding Cooling Liquid</th></tr>
<tr><td>① Remove the two screws in the front of the top protective cover. Hold the protective cover with both hands and move it forward along the slide rail for about 20 mm. Then, raise the cover vertically to remove it.
  </td><td>② Remove the hose clamp and level sensor of the water tank in sequence, as shown in the figure.
  </td></tr>
<tr><td>③ Add cooling liquid. Then, install the level sensor and tighten the hose clamp.
  </td><td>④ Install the top protective cover on the AC drive cabinet.</td></tr>
</table>

■ Replacing cooling liquid

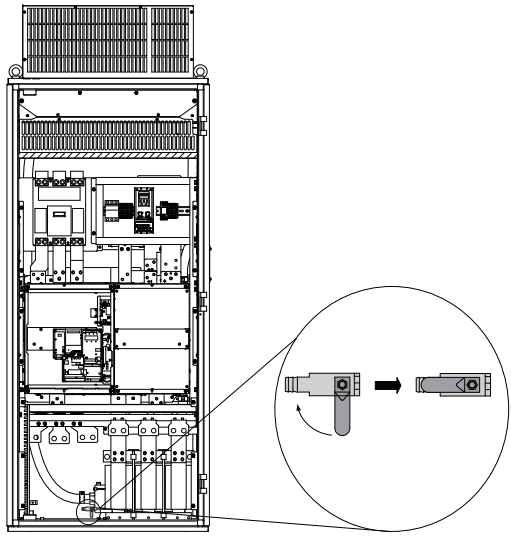
Periodic check (once per year) is recommended. If the cooling liquid becomes yellow, discolors, or has many foreign matters, replace the cooling liquid.

It is recommended that the cooling liquid be replaced once every five years.

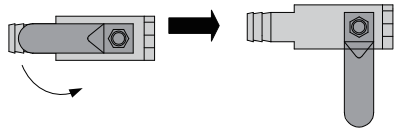
Before adding new cooling liquid, exhaust the original cooling liquid. The specific procedure is described below.

1) Open the bottom protective cover of the AC drive cabinet. Prepare a 16 L container. Then, put one end of the drain pipe of the bottom water pump in the container.

2) Remove the hose clamp of the water tank on the top of the cabinet. Open the valve of the water pump (rotate the valve to the horizontal position) by following the direction shown in the figure to exhaust all cooling liquid (wait about 10 minutes).



3) Close the valve of the water pump by following the direction shown in the figure (rotate the valve to the vertical position).



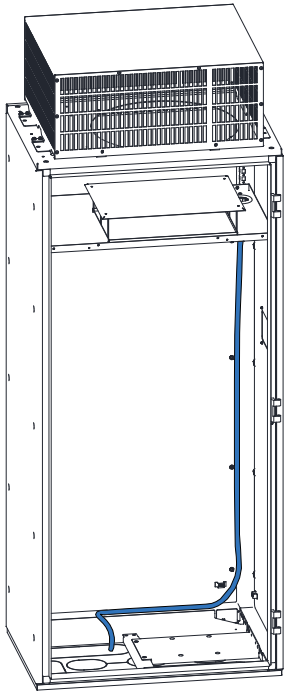
4) Add cooling liquid by following the procedure described in "Adding Cooling Liquid" table. Note that about 13.5 L cooling liquid is required.

8.3.4 Placing the Safety Pipe of the Waterproof Baffle

For the safety of the AC drive, the waterproof baffle is used to prevent component damage caused by drip due to condensation. The procedure for placing the safety pipe of the waterproof baffle is as follows.

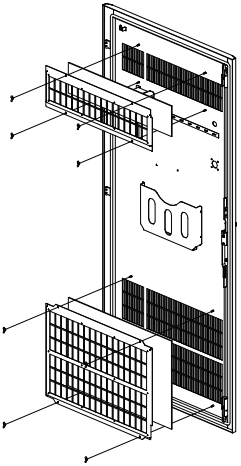
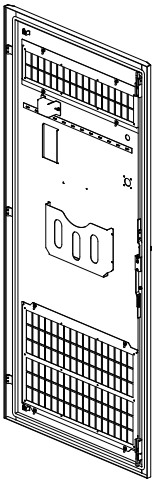
1) Open the bottom protective cover of the AC drive cabinet.

2) Pass the other end of the safety pipe through the bottom protective cover of the AC drive, and then put it in the trench.



8.3.5 Replacing the Dust Filter Foam

When the dust filter foam is dusty and heat dissipation of the cabinet door is affected, clean or replace the dust filter foam by following the procedure below.

<table>
<tr><th colspan="2">Removing the Dust Filter Foam</th></tr>
<tr><td>① Remove the M6 castellated nuts on the dust filter foam. Remove the dust filter foam by holding the frame of the dust filter foam with both hands.
  </td><td>② Clean the dust filter foam using water or neutral detergent. Then, dry the dust filter foam at a clean and well-ventilated place.</td></tr>
<tr><th colspan="2">Installing the Dust Filter Foam</th></tr>
<tr><td>③ Install the dust filter foam in a reverse procedure to removal.
  </td><td>-</td></tr>
</table>

Periodic clean (once every two weeks) is recommended.

8.4 Storage

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

1) Pack the AC drive with the original packing box provided by Inovance.
2) Do not expose the AC drive to moisture, high temperature or outdoor direct sunlight for a long time.
3) The electrolytic capacitor will deteriorate after being stored for a long time. Therefore, the AC drive must be switched on once every 6 months, each time lasting at least 5 hours. Ensure to increase the input voltage gradually to the rated value by using a voltage regulator. Contact professionals for technical support if necessary.

Appendix A Parameter Table

☆ : It is possible to modify the parameter with the AC drive in the Stop and in the Run status.

★ : It is not possible to modify the parameter with the AC drive in the Run status.

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

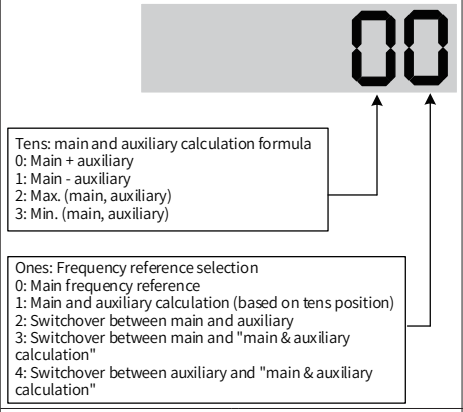
*: The parameter is a factory parameter and can be set only by the manufacturer.

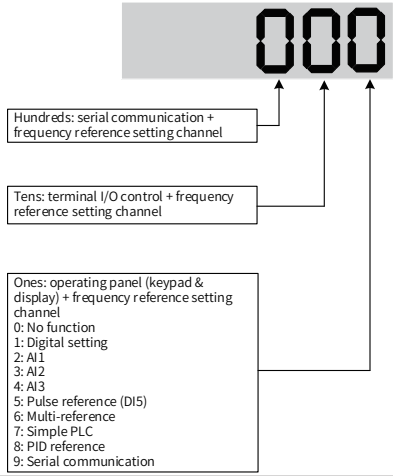
NOTE

◆ The following tables list only the parameters. For details about their explanation and usage, see 19010355 MD500 Series AC Drive Advanced User Guide.

A.1 Standard Parameter Table

No.	Param. Name	Setting Range		Default	Change
Group F0: Standard Parameters					
F0-00	G/P type display	1: G (constant torque load) 2: P (fan and pump)		Model dependent	●
F0-01	Motor 1 control mode	0: SVC 1: FVC 2: V/F		0	★
F0-02	Running command selection	0: Operating panel 1: Terminal	2: Serial communication	0	☆
F0-03	Main frequency reference setting channel selection	0: Digital setting (revised value is cleared after power off) 1: Digital setting (revised value is not cleared after power off) 2: AI1 3: AI2	4: AI3 5: Pulse setting (DI5) 6: Multi-reference 7: Simple PLC 8: PID reference 9: Communication setting	0	★
F0-04	Auxiliary frequency reference setting channel selection	Same as F0-03 (Main frequency reference setting channel selection)		0	★
F0-05	Base value of range of auxiliary frequency reference for Main and auxiliary calculation	0: Relative to maximum frequency 1: Relative to main frequency reference		0	☆
F0-06	Range of auxiliary frequency reference for main and auxiliary calculation	0% to 150%		100%	☆

No.	Param. Name	Setting Range	Default	Change
F0-07	Final Frequency reference setting selection		00	☆
F0-08	Preset frequency	0.00 Hz to F0-10 (Max. frequency)	50.00 Hz	☆
F0-09	Running direction	0: Run in the default direction 1: Run in the direction reverse to the default direction	0	☆
F0-10	Max. frequency	50.00 Hz to 500.00 Hz	50.00 Hz	★
F0-11	Setting channel of frequency upper limit	0: Set by F0-12 (Frequency reference upper limit) 1: AI1 2: AI2 3: AI3 4: Pulse reference 5: Communication reference	0	★
F0-12	Frequency reference upper limit	F0-14 (Frequency reference lower limit) to F0-10 (Max. frequency)	50.00 Hz	☆
F0-13	Frequency reference upper limit offset	0.00 Hz to F0-10 (Max. frequency)	0.00 Hz	☆
F0-14	Frequency reference lower limit	0.00 Hz to F0-12 (Frequency reference upper limit)	0.00 Hz	☆
F0-15	Carrier frequency	0.5 kHz to 16.0 kHz	Model dependent	☆
F0-16	Carrier frequency adjusted with load	0: Disabled 1: Enabled	1	☆
F0-17	Acceleration time 1	0.00s to 650.00s(F0-19 = 2) 0.0s to 6500.0s(F0-19 = 1) 0s to 65000s(F0-19 = 0)	Model dependent	☆
F0-18	Deceleration time 1	0.00s to 650.00s(F0-19 = 2) 0.0s to 6500.0s(F0-19 = 1) 0s to 65000s(F0-19 = 0)	Model dependent	☆
F0-19	Acceleration/ Deceleration time unit	0: 1s 1: 0.1s 2: 0.01s	1	★

No.	Param. Name	Setting Range		Default	Change
F0-21	Frequency offset of auxiliary frequency setting channel for main and auxiliary calculation	0.00 Hz to F0-10 (Max. frequency)		0.00 Hz	☆
F0-22	Frequency reference resolution	2: 0.01 Hz		2	★
F0-23	Retentive of digital setting frequency upon stop	0: Not retentive	1: Retentive	0	☆
F0-24	Motor parameter group selection	0: Motor parameter group 1	1: Motor parameter group 2	0	★
F0-25	Acceleration/ Deceleration time base frequency	0: Maximum frequency (F0-10) 1: Frequency reference 2: 100 Hz		0	★
F0-26	Base frequency for UP/DOWN modification during running	0: Running frequency	1: Frequency reference	0	★
F0-27	Running command + frequency source			0000	☆
F0-28	Serial port communication protocol	0: Modbus protocol 1: PROFIBUS-DP or CANopen protocol		0	★
Group F1: Motor 1 Parameters					
F1-00	Motor type selection	0: Common asynchronous motor	1: Variable frequency asynchronous motor	0	★
F1-01	Rated motor power	0.1 kW to 1000.0 kW		Model dependent	★
F1-02	Rated motor voltage	1 V to 2000 V		Model dependent	★
F1-03	Rated motor current	0.01 A to 655.35 A (AC drive power ⩽ 55 kW) 0.1 A to 6553.5 A (AC drive power > 55 kW)		Model dependent	★

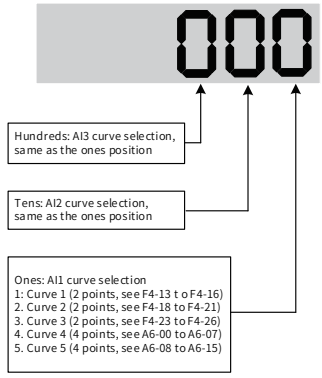
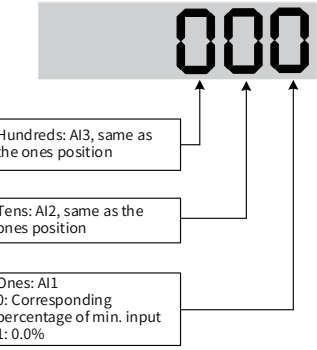
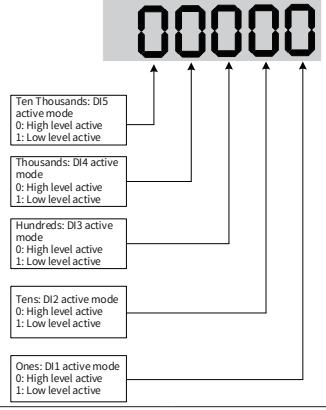
No.	Param. Name	Setting Range		Default	Change
F1-04	Rated motor frequency	0.01 Hz to max. frequency		Model dependent	★
F1-05	Rated motor speed	1 rpm to 65535 rpm		Model dependent	★
F1-06	Stator resistance	0.001 Ω to 65.535 Ω (AC drive power ⩽ 55 kW) 0.0001 Ω to 6.5535 Ω (AC drive power > 55 kW)		Auto-tuning parameter	★
F1-07	Rotor resistance	0.001 Ω to 65.535 Ω (AC drive power ⩽ 55 kW) 0.0001 Ω to 6.5535 Ω (AC drive power > 55 kW)		Auto-tuning parameter	★
F1-08	Leakage inductive reactance	0.01 mH to 655.35 mH (AC drive power ⩽ 55 kW) 0.001 mH to 65.535 mH (AC drive power > 55 kW)		Auto-tuning parameter	★
F1-09	Mutual inductive reactance	0.1 mH to 6553.5 mH (AC drive power ⩽ 55 kW) 0.01 mH to 655.35 mH (AC drive power > 55 kW)		Auto-tuning parameter	★
F1-10	No-load current	0.01 A to F1-03 (AC drive power ⩽ 55 kW) 0.1 A to F1-03 (AC drive power > 55 kW)		Auto-tuning parameter	★
F1-27	Encoder pulses per revolution	1 to 65535		1024	★
F1-28	Encoder type	0: ABZ incremental encoder	2: Resolver	0	★
F1-30	A/B phase sequence of ABZ incremental encoder	0: Forward	1: Reverse	0	★
F1-34	Number of pole pairs of resolver	1 to 65535		1	★
F1-36	Encoder wire-break fault detection time	0.0s: No detection	0.1s to 10.0s	0.0s	★
F1-37	Auto-tuning selection	0: No auto-tuning 1: Asynchronous motor partial static auto-tuning 2: Asynchronous motor dynamic auto-tuning 3: Asynchronous motor complete static auto-tuning		0	★
Group F2: Vector Control Parameters of Motor 1					
F2-00	Speed loop proportional gain 1	1 to 100		30	☆
F2-01	Speed loop integral time 1	0.01s to 10.00s		0.50s	☆
F2-02	Switchover frequency 1	0.00 to F2-05 (Switchover frequency 2)		5.00 Hz	☆
F2-03	Speed loop proportional gain 2	1 to 100		20	☆
F2-04	Speed loop integral time 2	0.01s to 10.00s		1.00s	☆
F2-05	Switchover frequency 2	F2-02 (Switchover frequency 1) to maximum frequency		10.00 Hz	☆

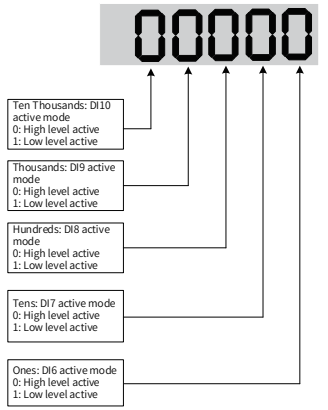
No.	Param. Name	Setting Range		Default	Change
F2-06	Vector control slip compensation gain	50% to 200%		100%	☆
F2-07	Speed feedback filter time in SVC	0.000s to 0.100s		0.015s	☆
F2-09	Torque limit source in speed control	0: F2-10 1: AI1 2: AI2 3: AI3 4: Pulse reference (DI5)	5: Serial comms. 6: Min. (AI1, AI2) 7: Max. (AI1, AI2) The full scale of 1-7 corresponds to F2-10.	0	☆
F2-10	Digital setting of torque limit in speed control	0.0% to 200.0%		150.0%	☆
F2-11	Torque limit source in speed control (regenerative)	0: F2-10 (electrical or regenerative) 1: AI 2: AI2 3: AI3 4: Pulse reference	5: Communication reference 6: Min. (AI1, AI2) 7: Max. (AI1, AI2) 8: F2-12 The full scale of 1-7 corresponds to F2-12.	0	☆
F2-12	Digital setting of torque limit in speed control (regenerative)	0.0% to 200.0%		150.0%	☆
F2-13	Excitation adjustment proportional gain	0 to 60000		2000	☆
F2-14	Excitation adjustment integral gain	0 to 60000		1300	☆
F2-15	Torque adjustment proportional gain	0 to 60000		2000	☆
F2-16	Torque adjustment integral gain	0 to 60000		1300	☆
F2-17	Speed loop integral separation selection	0: Disabled	1: Enabled	0	☆
F2-21	Max. torque coefficient of field weakening area	50 to 200%		100%	☆
F2-22	Regenerative power limit selection	0: Disabled	1: Enabled	0	☆
F2-23	Regenerative power limit	0.0 to 200.0%		Model dependent	☆
Group F3: V/F Control Parameters					
F3-00	V/F curve setting	0, 2-9: Linear V/F 1: Multi-point V/F 10: V/F complete separation	11: V/F half separation Note: When F3-00 is set to 2 to 9, the actual linear V/F is used.	0	★
F3-01	Torque boost	0.0%: Automatic torque boost	0.1% to 30.0%	Model dependent	☆

No.	Param. Name	Setting Range		Default	Change
F3-02	Cut-off frequency of torque boost	0.00 Hz to the maximum frequency		50.00 Hz	★
F3-03	Multi-point V/F frequency 1	0.00 Hz to F3-05 (Multi-point V/F frequency 2)		0.00 Hz	★
F3-04	Multi-point V/F voltage 1	0.0% to 100.0%		0.0%	★
F3-05	Multi-point V/F frequency 2	F3-03 (Multi-point V/F frequency 1) to F3-07 (Multi-point V/F frequency 3)		0.00 Hz	★
F3-06	Multi-point V/F voltage 2	0.0% to 100.0%		0.0%	★
F3-07	Multi-point V/F frequency 3	F3-05 (Multi-point V/F frequency 2) to F1-04 (rated motor frequency)		0.00 Hz	★
F3-08	Multi-point V/F voltage 3	0.0% to 100.0%		0.0%	★
F3-10	V/F over-excitation gain	0 to 200		64	☆
F3-11	V/F oscillation suppression gain	0 to 100		40	☆
F3-13	Voltage source for V/F separation	0: Set by F3-14 1: AI1 2: AI2 3: AI3 4: Pulse reference (DI5) 5: Multi-reference	6: Simple PLC 7: PID reference 8: Serial comms. Note: 100.0% corresponds to the rated motor voltage	0	☆
F3-14	Digital setting of voltage for V/F separation	0 V to rated motor voltage		0 V	☆
F3-15	Voltage rise time of V/F separation	0.0s to 1000.0s Note: It is the time used for the voltage increases from 0 V to the rated motor voltage.		0.0s	☆
F3-16	Voltage decline time of V/F separation	0.0s to 1000.0s Note: It is the time used for the voltage increases from 0 V to the rated motor voltage.		0.0s	☆
F3-17	Stop mode selection for V/F separation	0: Frequency and voltage declining to 0 independently 1: Frequency declining after voltage declines to 0		0	☆
F3-18	Current limit level	50% to 200%		150%	★
F3-19	Current limit selection	0: Disabled	1: Enabled	1 (Enabled)	★
F3-20	Current limit gain	0 to 100		20	☆
F3-21	Compensation factor of speed multiplying current limit	50% to 200%		50%	★
F3-22	Voltage limit	650.0 V to 800.0 V		770.0 V	★
F3-23	Voltage limit selection	0: Disabled	1: Enabled	1 (Enabled)	★
F3-24	Frequency gain for voltage limit	0 to 100		30	☆

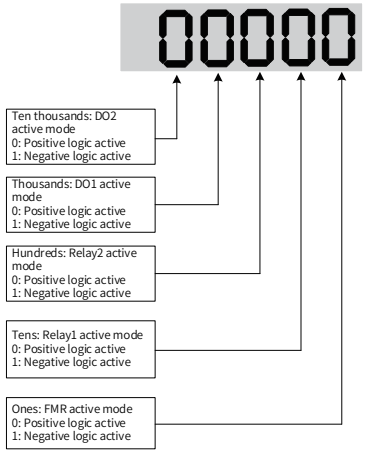
No.	Param. Name	Setting Range		Default	Change
F3-25	Voltage gain for voltage limit	0 to 100		30	☆
F3-26	Frequency rise threshold during voltage limit	0 to 50 Hz		5 Hz	★
Group F4: Input Terminals					
F4-00	DI1 function selection	0: No function 1: Forward RUN (FWD) or running command 2: Reverse RUN (REV) or running direction (Note: F4-11 must be set when F4-00 is set to 1 or 2.) 3: Three-wire control 4: Forward JOG (FJOG) 5: Reverse JOG (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Coast to stop 9: Fault reset (RESET) 10: RUN pause 11: External fault normally open (NO) input 12: Multi-reference terminal 1 13: Multi-reference terminal 2 14: Multi-reference terminal 3 15: Multi-reference terminal 4 16: Terminal 1 for acceleration/deceleration time selection 17: Terminal 2 for acceleration/deceleration time selection 18: Frequency source switchover 19: UP and DOWN setting clear (terminal, operating panel) 20: Running command switchover terminal 1 21: Acceleration/ Deceleration prohibited 22: PID pause 23: PLC status reset 24: Wobble pause 25: Counter input 26: Counter reset 27: Length count input 28: Length reset 29: Torque control prohibited	30: Pulse input (enabled only for DI5) 31: Reserved 32: Immediate DC injection braking 33: External fault normally closed (NC) input 34: Frequency modification enabled 35: PID action direction reverse 36: External STOP terminal 1 37: Running command switchover terminal 2 38: PID integral disabled 39: Switchover between main frequency source and preset frequency 40: Switchover between auxiliary frequency source and preset frequency 41: Motor terminal selection 42: Reserved 43: PID parameter switchover 44: User-defined fault 1 45: User-defined fault 2 46: Speed control/ Torque control switchover 47: Emergency stop 48: External STOP terminal 2 49: Deceleration DC injection braking 50: Clear the current running time 51: Two-wire/Three-wire mode switchover 52: Reverse frequency forbidden 53-59: Reserved	1	★
F4-01	DI2 function selection			4	★
F4-02	DI3 function selection			9	★
F4-03	DI4 function selection			12	★
F4-04	DI5 function selection			13	★
F4-05	DI6 function selection			0	★
F4-06	DI7 function selection			0	★
F4-07	DI8 function selection			0	★
F4-08	DI9 function selection			0	★
F4-09	DI10 function selection			0	★

No.	Param. Name	Setting Range	Default	Change
F4-10	DI filter time	0.000s to 1.000s	0.010s	☆
F4-11	Terminal I/O control mode	0: Two-wire control mode 1 1: Two-wire control mode 2 2: Three-wire control mode 1 3: Three-wire control mode 2	0	★
F4-12	Terminal UP/DOWN rate	0.001 Hz/s to 65.535 Hz/s	1.00 Hz/s	☆
F4-13	AI curve 1 min. input	0.00 V to F4-15 (AI curve 1 max. input)	0.00 V	☆
F4-14	Corresponding percentage of AI curve 1 min. input	-100.0% to +100.0%	0.0%	☆
F4-15	AI curve 1 max. input	F4-13 (AI curve 1 min. input) to 10.00 V	10.00 V	☆
F4-16	Corresponding percentage of AI curve 1 max. input	-100.0% to +100.0%	100.0%	☆
F4-17	AI1 filter time	0.00s to 10.00s	0.10s	☆
F4-18	AI curve 2 min. input	0.00 V to F4-20 (AI curve 2 max. input)	0.00 V	☆
F4-19	Corresponding percentage of AI curve 2 min. input	-100.0% to +100.0%	0.0%	☆
F4-20	AI curve 2 max. input	F4-18 (AI curve 2 min. input) to 10.00 V	10.00 V	☆
F4-21	Corresponding percentage of AI curve 2 max. input	-100.0% to +100.0%	100.0%	☆
F4-22	AI2 filter time	0.00s to 10.00s	0.10s	☆
F4-23	AI3 curve min. input	-10.00 V to F4-25 (AI curve 3 max. input)	-10.00 V	☆
F4-24	Corresponding percentage of AI curve 3 min. input	-100.0% to +100.0%	-100.0%	☆
F4-25	AI curve 3 max. input	F4-23 (AI3 curve min. input) to 10.00 V	10.00 V	☆
F4-26	Corresponding percentage of AI curve 3 max. input	-100.0% to +100.0%	100.0%	☆
F4-27	AI3 filter time	0.00s to 10.00s	0.10s	☆
F4-28	Pulse min. input	0.00 kHz to F4-30 (Pulse max. input)	0.00 kHz	☆
F4-29	Corresponding percentage of pulse min. input	-100.0% to 100.0%	0.0%	☆
F4-30	Pulse max. input	F4-28 (Pulse min. input) to 100.00 kHz	50.00 kHz	☆
F4-31	Corresponding percentage of pulse max. input	-100.0% to 100.0%	100.0%	☆
F4-32	Pulse filter time	0.00s to 10.00s	0.10s	☆

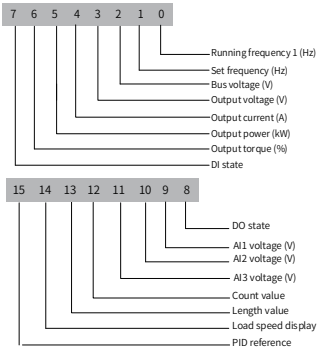
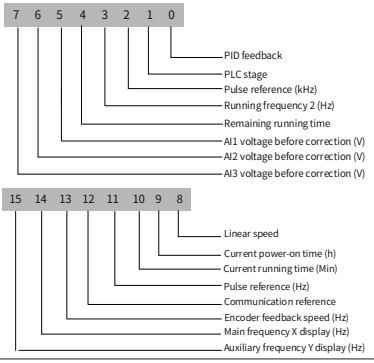
No.	Param. Name	Setting Range	Default	Change
F4-33	AI curve selection		321	☆
F4-34	Setting selection when AI less than min. input		000	☆
F4-35	DI1 delay	0.0s to 3600.0s	0.0s	★
F4-36	DI2 delay	0.0s to 3600.0s	0.0s	★
F4-37	DI3 delay	0.0s to 3600.0s	0.0s	★
F4-38	DI active mode selection 1		00000	★

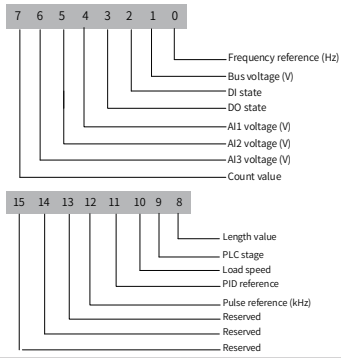
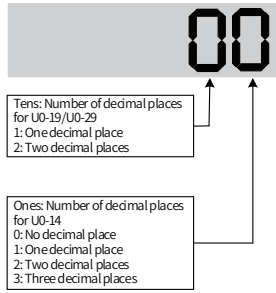
No.	Param. Name	Setting Range		Default	Change
F4-39	DI active mode selection 2			00000	★
Group F5: Output Terminals					
F5-00	FM terminal output mode	0: Pulse output (FMP)	1: Digital output (FMR)	0	☆

No.	Param. Name	Setting Range		Default	Change
F5-01	FMR function selection (open collector output terminal)	0: No output 1: AC drive running 2: Fault output (coast to stop) 3: Frequency-level detection FDT1 output 4: Frequency reached 5: Zero-speed running (no output at stop) 6: Motor overload pre-warning 7: AC drive overload pre-warning 8: Set count value reached 9: Designated count value reached 10: Length reached 11: PLC cycle completed 12: Accumulative running time reached 13: Frequency limited 14: Torque limited 15: Ready for RUN 16: AI1 > AI2 17: Frequency upper limit reached 18: Frequency lower limit reached (no output at stop) 19: Undervoltage status output 20: Communication setting 21: Reserved 22: Reserved	23: Zero-speed running 2 (having output at stop) 24: Accumulative power-on time reached 25: Frequency level detection FDT2 output 26: Frequency 1 reached 27: Frequency 2 reached 28: Current 1 reached 29: Current 2 reached 30: Timing duration reached 31: AI1 input limit exceeded 32: Load lost 33: Reverse running 34: Zero current status 35: IGBT temperature reached 36: Software current limit exceeded 37: Frequency lower limit reached (having output at stop) 38: Alarm output 39: Motor overheat warning 40: Current running time reached 41: Fault output (no output at undervoltage)	0	☆
F5-02	Control board relay function selection (T/A-T/B-T/C)			2	☆
F5-03	Extension card relay (P/A-P/B-P/C) function selection			0	☆
F5-04	DO1 function selection			1	☆
F5-05	Extension card DO2 function selection			4	☆

No.	Param. Name	Setting Range		Default	Change
F5-06	FMP function selection	0: Running frequency 1: Set frequency 2: Output current 3: Output torque (absolute value, proportion to motor torque) 4: Output power 5: Output voltage 6: Pulse input (100.0% corresponds to 100.0 kHz) 7: AI1 8: AI2 9: AI3 (extension card) 10: Length	11: Count value 12: Communication setting 13: Motor rotational speed 14: Output current (100.0% corresponds to 1000.0 A) 15: Output voltage (100.0% corresponds to1000.0 V) 16: Output torque (actual value, proportion to motor torque)	0	☆
F5-07	AO1 function selection			0	☆
F5-08	AO2 function selection			1	☆
F5-09	Max. FMP output frequency	0.01 kHz to 100.00 kHz		50.00 kHz	☆
F5-10	AO1 zero offset coefficient	-100.0% to +100.0%		0.0%	☆
F5-11	AO1 gain	-10.00 to +10.00		1.00	☆
F5-12	AO2 zero offset coefficient	-100.0% to +100.0%		0.0%	☆
F5-13	AO2 gain	-10.00 to +10.00		1.00	☆
F5-17	FMR output delay	0.0s to 3600.0s		0.0s	☆
F5-18	Relay 1 output delay	0.0s to 3600.0s		0.0s	☆
F5-19	Relay 2 output delay	0.0s to 3600.0s		0.0s	☆
F5-20	DO1 output delay	0.0s to 3600.0s		0.0s	☆
F5-21	DO2 output delay	0.0s to 3600.0s		0.0s	☆
F5-22	Active mode selection of DO output terminals			00000	☆

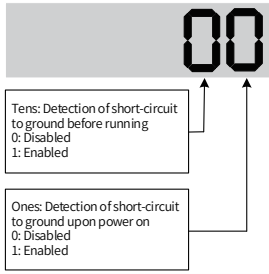
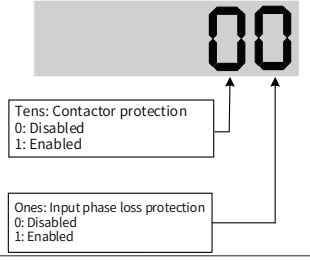
No.	Param. Name	Setting Range	Default	Change
Group F6: Start/Stop Control				
F6-00	Start mode	0: Direct start 1: Catching a spinning motor 2: Pre-excited start (AC asynchronous drive) 3: SVC quick start	0	☆
F6-01	Mode of catching a spinning motor	0: From stop frequency 1: From power frequency 2: From max. frequency	0	★
F6-02	Speed of catching a spinning motor	1 to 100	20	☆
F6-03	Start frequency	0.00 Hz to 10.00 Hz	0.00 Hz	☆
F6-04	Start frequency holding time	0.0s to 100.0s	0.0s	★
F6-05	DC injection braking level/Pre-excitation level	0% to 100%	50%	★
F6-06	DC injection braking active time/Pre-excitation active time	0.0s to 100.0s	0.0s	★
F6-07	Acceleration/ Deceleration mode	0: Linear acceleration/deceleration 1-2: S-curve dynamic acceleration/deceleration	0	★
F6-08	Time proportion of S-curve start segment	0.0% to (100.0% - F6-09)	30.0%	★
F6-09	Time proportion of S-curve end segment	0.0% to (100.0% - F6-08)	30.0%	★
F6-10	Stop mode	0: Decelerate to stop 1: Coast to stop	0	☆
F6-11	DC injection braking start frequency	0.00 Hz to the maximum frequency	0.00 Hz	☆
F6-12	DC injection braking delay time	0.0s to 100.0s	0.0s	☆
F6-13	DC injection braking level	0% to 100%	50%	☆
F6-14	DC injection braking active time	0.0s to 100.0s	0.0s	☆
F6-15	Braking use ratio	0% to 100%	100%	☆
F6-18	Catching a spinning motor current limit	30% to 200%	Model dependent	★
F6-21	Demagnetization time (effective for SVC)	0.00 to 5.00s	Model dependent	☆
F6-23	Overexcitation selection	0: Disabled 1: Enabled during deceleration 2: Enabled in the whole process	0	☆
F6-24	Overexcitation suppression current level	0 to 150%	100%	☆
F6-25	Overexcitation gain	1.00 to 2.50	1.25	☆

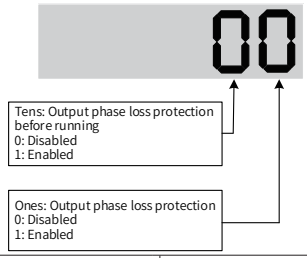
No.	Param. Name	Setting Range	Default	Change
Group F7: Operating Panel and Display				
F7-00	LED default display check	0 to 1	0	☆
F7-01	MF.K key function selection	0: MF.K key disabled 1: Switchover from remote control (terminal or communication) to operating panel control 2: Switchover between forward rotation and reverse rotation 3: Forward jog 4: Reverse jog	0	★
F7-02	STOP/RESET key function	0: STOP/RESET key enabled only in operating panel control 1: STOP/RESET key enabled in any operation mode	1	☆
F7-03	LED display running parameters 1	0000 to FFFF 	1F	☆
F7-04	LED display running parameters 2	0000 to FFFF 	33	☆

No.	Param. Name	Setting Range	Default	Change
F7-05	Display stop parameters	0000 to FFFF 	0	☆
F7-06	Load speed display coefficient	0.0001 to 6.5000	1.0000	☆
F7-07	Heatsink temperature of IGBT	-20°C to 120°C	-	●
F7-08	Product number	-	-	●
F7-09	Accumulative running time	0 to 65535 h	-	●
F7-10	Performance software version	-	-	●
F7-11	Function software version	-	-	●
F7-12	Number of decimal places for load speed display		21	☆
F7-13	Accumulative power-on time	0 to 65535 h	-	●
F7-14	Accumulative power consumption	0 to 65535 kWh	-	●
Group F8: Auxiliary Functions				
F8-00	Jog frequency reference	0.00 Hz to the maximum frequency	2.00 Hz	☆
F8-01	Jog acceleration time	0.0s to 6500.0s	20.0s	☆
F8-02	Jog deceleration time	0.0s to 6500.0s	20.0s	☆
F8-03	Acceleration time 2	0.0s to 6500.0s	Model dependent	☆

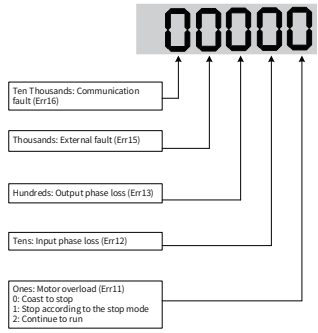
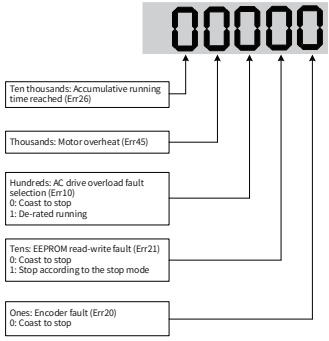
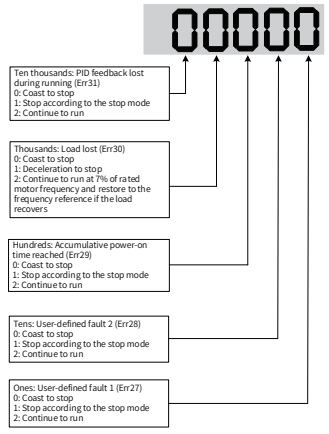
No.	Param. Name	Setting Range		Default	Change
F8-04	Deceleration time 2	0.0s to 6500.0s		Model dependent	☆
F8-05	Acceleration time 3	0.0s to 6500.0s		Model dependent	☆
F8-06	Deceleration time 3	0.0s to 6500.0s		Model dependent	☆
F8-07	Acceleration time 4	0.0s to 6500.0s		0.0s	☆
F8-08	Deceleration time 4	0.0s to 6500.0s		0.0s	☆
F8-09	Frequency jump 1	0.00 Hz to the maximum frequency		0.00 Hz	☆
F8-10	Frequency jump 2	0.00 Hz to the maximum frequency		0.00 Hz	☆
F8-11	Frequency jump band	0.00 Hz to the maximum frequency		0.00 Hz	☆
F8-12	Forward/Reverse run switchover dead-zone time	0.0s to 3000.0s		0.0s	☆
F8-13	Reverse RUN selection	0: Disabled	1: Enabled	0	☆
F8-14	Running mode when frequency reference lower than frequency lower limit	0: Run at frequency reference lower limit	1: Stop 2: Run at zero speed	0	☆
F8-15	Droop rate	0.00% to 100.00%		0.00%	☆
F8-16	Accumulative power-on time threshold	0 to 65000 h		0 H	☆
F8-17	Accumulative running time threshold	0 to 65000 h		0 H	☆
F8-18	Startup protection selection	0: Disabled	1: Enabled	0	☆
F8-19	Frequency detection value 1	0.00 Hz to the maximum frequency		50.00 Hz	☆
F8-20	Frequency detection hysteresis 1	0.0% to 100.0% (FDT1 level)		5.0%	☆
F8-21	Detection width of target frequency reached	0.0% to 100.0% (maximum frequency)		0.0%	☆
F8-22	Jump frequency function	0: Disabled	1: Enabled	0	☆
F8-25	Switchover frequency of acceleration time 1 and acceleration time 2	0.00 Hz to the maximum frequency		0.00 Hz	☆
F8-26	Switchover frequency of deceleration time 1 and deceleration time 2	0.00 Hz to the maximum frequency		0.00 Hz	☆
F8-27	Set highest priority to terminal JOG function	0: Disabled	1: Enabled	0	☆
F8-28	Frequency detection value 2	0.00 Hz to the maximum frequency		50.00 Hz	☆

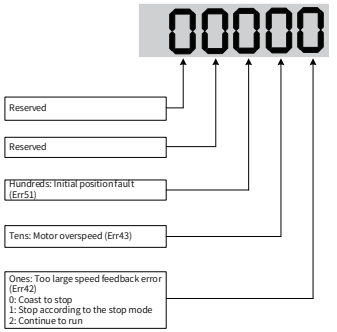
No.	Param. Name	Setting Range		Default	Change
F8-29	Frequency detection hysteresis 2	0.0% to 100.0% (FDT2 level)		5.0%	☆
F8-30	Detection of frequency 1	0.00 Hz to the maximum frequency		50.00 Hz	☆
F8-31	Detection width of frequency 1	0.0% to 100.0% (maximum frequency)		0.0%	☆
F8-32	Detection of frequency 2	0.00 Hz to the maximum frequency		50.00 Hz	☆
F8-33	Detection width of frequency 2	0.0% to 100.0% (maximum frequency)		0.0%	☆
F8-34	Zero current detection level	0.0% to 300.0% 100.0% corresponds to the rated motor current.		5.0%	☆
F8-35	Zero current detection delay	0.01s to 600.00s		0.10s	☆
F8-36	Output overcurrent threshold	0.0% (no detection)	0.1% to 300.0% (rated motor current)	200.0%	☆
F8-37	Output overcurrent detection delay	0.00s to 600.00s		0.00s	☆
F8-38	Detection level of current 1	0.0% to 300.0% (rated motor current)		100.0%	☆
F8-39	Detection width of current 1	0.0% to 300.0% (rated motor current)		0.0%	☆
F8-40	Detection level of current 2	0.0% to 300.0% (rated motor current)		100.0%	☆
F8-41	Detection width of current 2	0.0% to 300.0% (rated motor current)		0.0%	☆
F8-42	Timing function	0: Disabled	1: Enabled	0	★
F8-43	Running time setting channel	0: Set by F8-44 (Running time) 1: AI1 2: AI2	3: AI3 (100% of analog input corresponds to the value of F8-44)	0	★
F8-44	Running time	0.0 min to 6500.0 min		0.0 min	★
F8-45	AI1 input voltage lower limit	0.00 V to F8-46 (AI1 input voltage upper limit)		3.10 V	☆
F8-46	AI1 input voltage upper limit	0.00 V to F8-46 (AI1 input voltage upper limit)		6.80 V	☆
F8-47	IGBT temperature threshold	0°C to 100°C		75°C	☆
F8-48	Cooling fan working mode	0: Working during running	1: Working continuously	0	☆
F8-49	Wakeup frequency	F8-51 (Hibernating frequency) to F0-10 (Max. frequency)		0.00 Hz	☆
F8-50	Wakeup delay time	0.0s to 6500.0s		0.0s	☆
F8-51	Hibernating frequency	0.00 Hz to F8-49 (Wakeup frequency)		0.00 Hz	☆
F8-52	Hibernating delay time	0.0s to 6500.0s		0.0s	☆

No.	Param. Name	Setting Range	Default	Change
F8-53	Running time threshold this time	0.0 to 6500.0min	0.0 min	☆
F8-54	Output power correction coefficient	0.00% to 200.0%	100.0%	☆
Group F9: Fault and Protection				
F9-00	Motor overload protection	0: Disabled 1: Enabled	1	☆
F9-01	Motor overload protection gain	0.20 to 10.00	1.00	☆
F9-02	Motor overload pre-warning coefficient	50% to 100%	80%	☆
F9-03	Overvoltage protection gain	0 to 100	30	☆
F9-04	Overvoltage protection voltage	650 V to 800 V	770 V	☆
F9-07	Detection of short-circuit to ground		01	☆
F9-08	Braking unit applied voltage	650 V to 800 V	760 V	★
F9-09	Auto reset times	0 to 20	0	☆
F9-10	Selection of DO action during auto reset	0: Not act 1: Act	0	☆
F9-11	Delay of auto reset	0.1s to 100.0s	1.0s	☆
F9-12	Input phase loss/ Contactor protection		11	☆

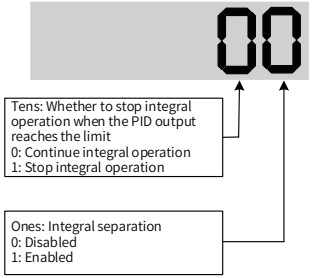
No.	Param. Name	Setting Range		Default	Change
F9-13	Output phase loss protection			01	☆
F9-14	1st fault type	0: No fault 1: Reserved 2: Overcurrent during acceleration 3: Overcurrent during deceleration 4: Overcurrent at constant speed 5: Overvoltage during acceleration 6: Overvoltage during deceleration 7: Overvoltage at constant speed 8: Pre-charge power fault 9: Undervoltage 10: AC drive overload 11: Motor overload 12: Input phase loss 13: Output phase loss 14: IGBT overheat 15: External fault 16: Communication fault 17: Contactor fault 18: Current detection fault 19: Motor auto-tuning fault 20: Encoder/PG card fault	21: Parameter read and write fault 22: AC drive hardware fault 23: Motor short circuited to ground 24: Reserved 25: Reserved 26: Accumulative running time reached 27: User-defined fault 1 28: User-defined fault 2 29: Accumulative power-on time reached 30: Load lost 31: PID feedback lost during running 40: Fast current limit timeout 41: Motor switchover error during running 42: Too large speed deviation 43: Motor over-speed 45: Motor overheat 51: Initial position error 55: Slave error in master-slave control	—	●
F9-15	2nd fault type			—	●
F9-16	3rd (latest) fault type			—	●
F9-17	Frequency upon 3rd (latest) fault	0.00 Hz to 655.35 Hz		0.00 Hz	●
F9-18	Current upon 3rd (latest) fault	0.00 A to 655.35 A		0.00 A	●
F9-19	Bus voltage upon 3rd (latest) fault	0.0 V to 6553.5 V		0.0 V	●
F9-20	DI state upon 3rd (latest) fault	0 to 9999		0	●

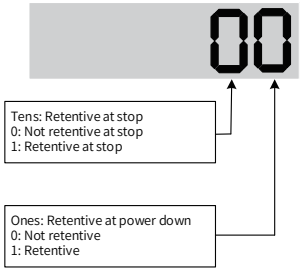
No.	Param. Name	Setting Range	Default	Change
F9-21	DO state upon 3rd (latest) fault	0 to 9999	0	●
F9-22	AC drive state upon 3rd (latest) fault	0 to 65535	0	●
F9-23	Power-on time upon 3rd (latest) fault	0s to 65535s	0s	●
F9-24	Running time upon 3rd (latest) fault	0.0s to 6553.5s	0.0s	●
F9-27	Frequency upon 2nd fault	0.00 Hz to 655.35 Hz	0.00 Hz	●
F9-28	Current upon 2nd fault	0.00 A to 655.35 A	0.00 A	●
F9-29	Bus voltage upon 2nd fault	0.0 V to 6553.5 V	0.0 V	●
F9-30	DI state upon 2nd fault	0 to 9999	0	●
F9-31	DO state upon 2nd fault	0 to 9999	0	●
F9-32	AC drive state upon 2nd fault	0 to 65535	0	●
F9-33	Power-on time upon 2nd fault	0s to 65535s	0s	●
F9-34	Running time upon 2nd fault	0.0s to 6553.5s	0.0s	●
F9-37	Frequency upon 1st fault	0.00 Hz to 655.35 Hz	0.00 Hz	●
F9-38	Current upon 1st fault	0.00 A to 655.35 A	0.00 A	●
F9-39	Bus voltage upon 1st fault	0.0 V to 6553.5 V	0.0 V	●
F9-40	DI state upon 1st fault	0 to 9999	0	●
F9-41	DO state upon 1st fault	0 to 9999	0	●
F9-42	AC drive state upon 1st fault	0 to 65535	0	●
F9-43	Power-on time upon 1st fault	0s to 65535s	0s	●
F9-44	Running time upon 1st fault	0.0s to 6553.5s	0.0s	●

No.	Param. Name	Setting Range	Default	Change
F9-47	Fault protection action selection 1		00000	☆
F9-48	Fault protection action selection 2		00000	☆
F9-49	Fault protection action selection 3		00000	☆

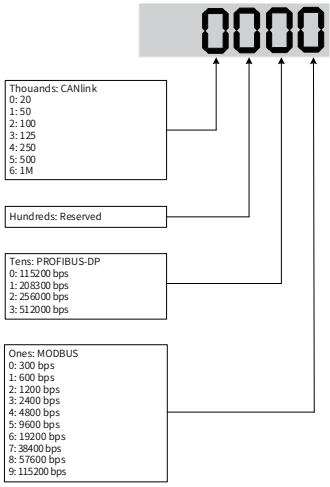
No.	Param. Name	Setting Range		Default	Change
F9-50	Fault protection action selection 4			00000	☆
F9-54	Frequency selection for continuing to run upon fault	0: Current running frequency 1: Frequency reference 2: Frequency upper limit	3: Frequency lower limit 4: Backup frequency upon abnormality	0	☆
F9-55	Backup frequency upon fault	0.0% to 100.0% (100.0% corresponds to F0-10.)		100.0%	☆
F9-56	Type of motor temperature sensor	0: No temperature sensor 1: PT100 2: PT1000		0	☆
F9-57	Motor overheat protection threshold	0°C to 200°C		110°C	☆
F9-58	Motor overheat pre-warning threshold	0°C to 200°C		90°C	☆
F9-59	Power dip ride-through function selection	0: Disabled 1: Bus voltage constant control	2: Decelerate to stop	0	★
F9-60	Threshold of power dip ride-through function disabled	80% to 100%		85%	★
F9-61	Judging time of bus voltage recovering from power dip	0.0 to 100.0s		0.5S	★
F9-62	Threshold of power dip ride-through function enabled	60% to 100%		80%	★
F9-63	Load lost protection	0: Disabled	1: Enabled	0	☆
F9-64	Load lost detection level	0.0 to 100.0%		10.0%	☆
F9-65	Load lost detection time	0.0 to 60.0s		1.0s	☆
F9-67	Overspeed detection level	0.0% to 50.0% (maximum frequency)		20.0%	☆
F9-68	Overspeed detection time	0.0s: Not detected	0.1s to 60.0s	1.0s	☆
F9-69	Detection level of speed error	0.0% to 50.0% (maximum frequency)		20.0%	☆

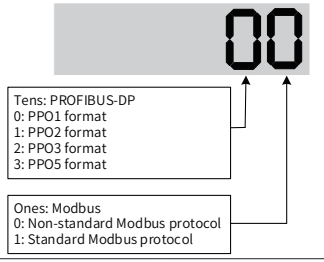
No.	Param. Name	Setting Range		Default	Change
F9-70	Detection time of speed error	0.0s: Not detected	0.1 to 60.0s	5.0s	☆
F9-71	Power dip ride-through gain Kp	0 to 100		40	☆
F9-72	Power dip ride-through integral coefficient Ki	0 to 100		30	☆
F9-73	Deceleration time of power dip ride-through	0 to 300.0s		20.0s	★
Group FA: PID Function					
FA-00	PID reference setting channel	0: Set by FA-01 (PID digital setting) 1: AI1 2: AI2	3: AI3 4: Pulse reference (DI5) 5: Serial comms. 6: Multi-reference	0	☆
FA-01	PID digital setting	0.0% to 100.0%		50.0%	☆
FA-02	PID feedback setting channel	0: AI1 1: AI2 2: AI3 3: AI1-AI2 4: Pulse reference (DI5)	5: Serial comms. 6: AI1 + AI2 7: Max. (|AI1|, |AI2|) 8: Min. (|AI1|, |AI2|)	0	☆
FA-03	PID operation direction	0: Forward	1: Reverse	0	☆
FA-04	PID reference and feedback range	0 to 65535		1000	☆
FA-05	Proportional gain Kp1	0.0 to 1000.0		20.0	☆
FA-06	Integral time Ti1	0.01s to 10.00s		2.00s	☆
FA-07	Differential time Td1	0.000s to 10.000s		0.000s	☆
FA-08	PID output limit in reverse direction	0.00 Hz to the maximum frequency		0.00 Hz	★
FA-09	PID error limit	0.0% to 100.0%		0.0%	☆
FA-10	PID differential limit	0.00% to 100.00%		0.10%	☆
FA-11	PID reference change time	0.00 to 650.00s		0.00s	☆
FA-12	PID feedback filter time	0.00 to 60.00s		0.00s	☆
FA-13	PID output filter time	0.00 to 60.00s		0.00s	☆
FA-14	Reserved	-		-	☆
FA-15	Proportional gain Kp2	0.0 to 1000.0		20.0	☆
FA-16	Integral time Ti2	0.01s to 10.00s		2.00s	☆
FA-17	Differential time Td2	0.000s to 10.000s		0.000s	☆
FA-18	PID parameter switchover condition	0: No switchover 1: Switchover using DI 2: Auto switchover based on PID error	3: Auto switchover based on running frequency	0	☆

No.	Param. Name	Setting Range		Default	Change
FA-19	PID error 1 for auto switchover	0.0% to FA-20 (PID error 2 for auto switchover)		20.0%	☆
FA-20	PID error 2 for auto switchover	FA-19 (PID error 1 for auto switchover) to 100.0%		80.0%	☆
FA-21	PID initial value	0.0% to 100.0%		0.0%	☆
FA-22	PID initial value active time	0.00 to 650.00s		0.00s	☆
FA-23	Reserved	-		-	-
FA-24	Reserved	-		-	-
FA-25	PID integral property			00	☆
FA-26	Detection level of PID feedback loss	0.0%: No detection	0.1% to 100.0%	0.0%	☆
FA-27	Detection time of PID feedback loss	0.0s to 20.0s		0.0s	☆
FA-28	Selection of PID operation at stop	0: Disabled	1: Enabled	0	☆
Group FB: Fixed Length and Count					
FB-05	Set length	0 m to 65535 m		1000m	☆
FB-06	Actual length	0 m to 65535 m		0m	☆
FB-07	Number of pulses per meter	0.1 to 6553.5		100.0	☆
FB-08	Set count value	1 to 65535		1000	☆
FB-09	Designated count value	1 to 65535		1000	☆
Group FC: Multi-Reference and Simple PLC Function					
FC-00	Reference 0	-100.0% to 100.0%		0.0%	☆
FC-01	Reference 1	-100.0% to 100.0%		0.0%	☆
FC-02	Reference 2	-100.0% to 100.0%		0.0%	☆
FC-03	Reference 3	-100.0% to 100.0%		0.0%	☆
FC-04	Reference 4	-100.0% to 100.0%		0.0%	☆
FC-05	Reference 5	-100.0% to 100.0%		0.0%	☆
FC-06	Reference 6	-100.0% to 100.0%		0.0%	☆
FC-07	Reference 7	-100.0% to 100.0%		0.0%	☆
FC-08	Reference 8	-100.0% to 100.0%		0.0%	☆
FC-09	Reference 9	-100.0% to 100.0%		0.0%	☆
FC-10	Reference 10	-100.0% to 100.0%		0.0%	☆
FC-11	Reference 11	-100.0% to 100.0%		0.0%	☆
FC-12	Reference 12	-100.0% to 100.0%		0.0%	☆

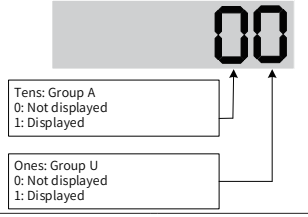
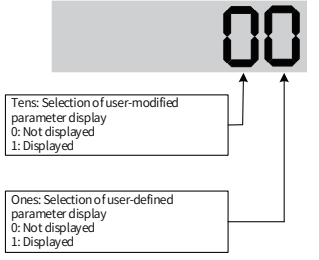
No.	Param. Name	Setting Range	Default	Change
FC-13	Reference 13	-100.0% to 100.0%	0.0%	☆
FC-14	Reference 14	-100.0% to 100.0%	0.0%	☆
FC-15	Reference 15	-100.0% to 100.0%	0.0%	☆
FC-16	Simple PLC running mode	0: Stop after running one cycle 1: Keep final values after running one cycle 2: Repeat after running one cycle	0	☆
FC-17	Simple PLC retentive selection		00	☆
FC-18	Running time of simple PLC reference 0	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-19	Acceleration/ Deceleration time of simple PLC reference 0	0 to 3	0	☆
FC-20	Running time of simple PLC reference 1	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-21	Acceleration/ Deceleration time of simple PLC reference 1	0 to 3	0	☆
FC-22	Running time of simple PLC reference 2	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-23	Acceleration/ Deceleration time of simple PLC reference 2	0 to 3	0	☆
FC-24	Running time of simple PLC reference 3	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-25	Acceleration/ Deceleration time of simple PLC reference 3	0 to 3	0	☆
FC-26	Running time of simple PLC reference 4	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-27	Acceleration/ Deceleration time of simple PLC reference 4	0 to 3	0	☆
FC-28	Running time of simple PLC reference 5	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-29	Acceleration/ Deceleration time of simple PLC reference 5	0 to 3	0	☆
FC-30	Running time of simple PLC reference 6	0.0s (h) to 6553.5s (h)	0.0s (h)	☆

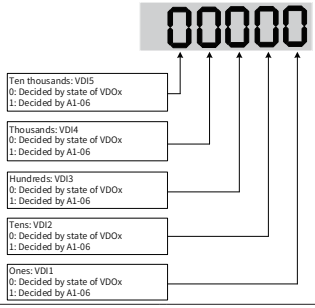
No.	Param. Name	Setting Range	Default	Change
FC-31	Acceleration/ Deceleration time of simple PLC reference 6	0 to 3	0	☆
FC-32	Running time of simple PLC reference 7	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-33	Acceleration/ Deceleration time of simple PLC reference 7	0 to 3	0	☆
FC-34	Running time of simple PLC reference 8	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-35	Acceleration/ Deceleration time of simple PLC reference 8	0 to 3	0	☆
FC-36	Running time of simple PLC reference 9	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-37	Acceleration/ Deceleration time of simple PLC reference 9	0 to 3	0	☆
FC-38	Running time of simple PLC reference 10	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-39	Acceleration/ Deceleration time of simple PLC reference 10	0 to 3	0	☆
FC-40	Running time of simple PLC reference 11	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-41	Acceleration/ Deceleration time of simple PLC reference 11	0 to 3	0	☆
FC-42	Running time of simple PLC reference 12	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-43	Acceleration/ Deceleration time of simple PLC reference 12	0 to 3	0	☆
FC-44	Running time of simple PLC reference 13	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-45	Acceleration/ Deceleration time of simple PLC reference 13	0 to 3	0	☆
FC-46	Running time of simple PLC reference 14	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-47	Acceleration/ Deceleration time of simple PLC reference 14	0 to 3	0	☆
FC-48	Running time of simple PLC reference 15	0.0s (h) to 6553.5s (h)	0.0s (h)	☆
FC-49	Acceleration/ Deceleration time of simple PLC reference 15	0 to 3	0	☆

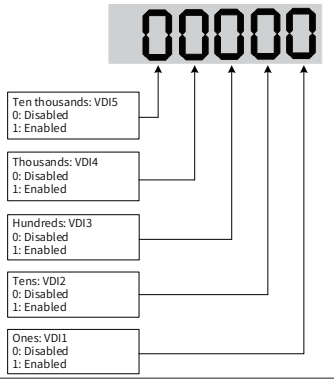
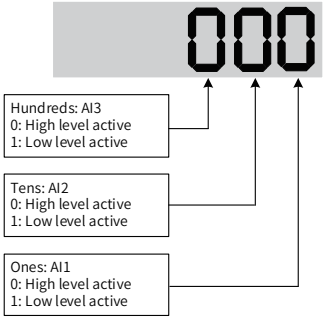
No.	Param. Name	Setting Range		Default	Change
FC-50	Time unit of simple PLC running	0: s	1: h	0	☆
FC-51	Reference 0 source	0: Set by FC-00 (Reference 0) 1: AI1 2: AI2 3: AI3 4: Pulse reference	5: PID 6: Set by preset frequency (F0-08), modified using terminal UP/DOWN	0	☆
Group FD: Communication					
FD-00	Baud rate			5005	☆
FD-01	Modbus data format symbol	0: No check (8,N,2) 1: Even parity check (8,E,1) 2: Odd parity check (8,O,1)	3: No check, data format (8,N,1) (Valid for Modbus)	0	☆
FD-02	Local address	0: Broadcast address; 1 to 247 (Valid for Modbus, PROFIBUS-DP, and CANlink)		1	☆
FD-03	Modbus response delay	0 to 20 ms (Valid for Modbus)		2	☆
FD-04	Serial port communication timeout	0.0: Disabled 0.1 to 60.0s (Valid for Modbus, PROFIBUS-DP, and CANopen)		0.0	☆

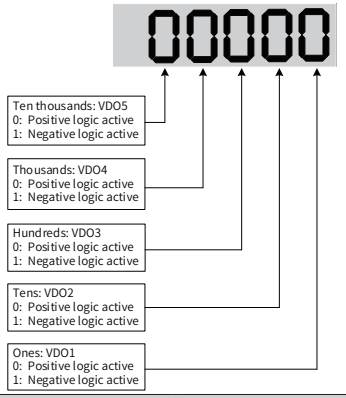
No.	Param. Name	Setting Range	Default	Change
FD-05	Modbus protocol selection and PROFIBUS-DP data frame		30	☆
FD-06	Current resolution read by communication	0: 0.01 A (valid when ⩽ 55 kW) 1: 0.1 A	0	☆
FD-08	Profibus and CANopen communication timeout time	0.0 (Invalid) 0.1 to 60.0s	0	☆

No.	Param. Name	Setting Range	Default	Change
Group FE: User-Defined Parameters				
FE-00	User-defined parameter 0	F0-00 to FP-xx A0-00 to Ax-xx U0-00 to U0-xx U3-00 to U3-xx	U3-17	☆
FE-01	User-defined parameter 1		U3-18	☆
FE-02	User-defined parameter 2		F0.00	☆
FE-03	User-defined parameter 3		F0.00	☆
FE-04	User-defined parameter 4		F0.00	☆
FE-05	User-defined parameter 5		F0.00	☆
FE-06	User-defined parameter 6		F0.00	☆
FE-07	User-defined parameter 7		F0.00	☆
FE-08	User-defined parameter 8		F0.00	☆
FE-09	User-defined parameter 9		F0.00	☆
FE-10	User-defined parameter 10		F0.00	☆
FE-11	User-defined parameter 11		F0.00	☆
FE-12	User-defined parameter 12		F0.00	☆
FE-13	User-defined parameter 13		F0.00	☆
FE-14	User-defined parameter 14		F0.00	☆
FE-15	User-defined parameter 15		F0.00	☆
FE-16	User-defined parameter 16		F0.00	☆
FE-17	User-defined parameter 17		F0.00	☆
FE-18	User-defined parameter 18		F0.00	☆
FE-19	User-defined parameter 19		F0.00	☆
FE-20	User-defined parameter 20		U0-68	☆
FE-21	User-defined parameter 21		U0-69	☆
FE-22	User-defined parameter 22		F0.00	☆

No.	Param. Name	Setting Range	Default	Change
FE-23	User-defined parameter 23	F0-00 to FP-xx A0-00 to Ax-xx U0-00 to U0-xx U3-00 to U3-xx	F0.00	☆
FE-24	User-defined parameter 24		F0.00	☆
FE-25	User-defined parameter 25		F0.00	☆
FE-26	User-defined parameter 26		F0.00	☆
FE-27	User-defined parameter 27		F0.00	☆
FE-28	User-defined parameter 28		F0.00	☆
FE-29	User-defined parameter 29		F0.00	☆
Group FP: Parameter Management				
FP-00	User password	0 to 65535	0	☆
FP-01	Parameter initialization	0: No operation 01: Restore factory parameters except motor parameters 02: Clear records 04: Back up current user parameters 501: Restore user backup parameters	0	★
FP-02	Parameter display property		11	★
FP-03	Selection of individualized parameter display		00	☆
FP-04	Selection of parameter modification	0: Disabled / 1: Enabled	0	☆

No.	Param. Name	Setting Range		Default	Change
Group A0: Torque Control and Limit					
A0-00	Speed/Torque control selection	0: Speed control	1: Torque control	0	★
A0-01	Torque reference source in torque control	0: Set by A0-03 1: AI1 2: AI2 3: AI3 4: Pulse reference	5: Communication reference 6: Min. (AI1, AI2) 7: Max. (AI1, AI2) The full scale of 1-7 corresponds to A0-03.	0	★
A0-03	Torque digital setting in torque control	-200.0% to 200.0%		150.0%	☆
A0-05	Forward max. frequency in torque control	0.00 Hz to the maximum frequency		50.00 Hz	☆
A0-06	Reverse max. frequency in torque control	0.00 Hz to the maximum frequency		50.00 Hz	☆
A0-07	Acceleration time in torque control	0.00s to 650.00s		0.00s	☆
A0-08	Deceleration time in torque control	0.00s to 650.00s		0.00s	☆
Group A1: Virtual DI/DO					
A1-00	VDI1 function selection	0 to 59		0	★
A1-01	VDI2 function selection	0 to 59		0	★
A1-02	VDI3 function selection	0 to 59		0	★
A1-03	VDI4 function selection	0 to 59		0	★
A1-04	VDI5 function selection	0 to 59		0	★
A1-05	VDI active state setting mode			00000	★

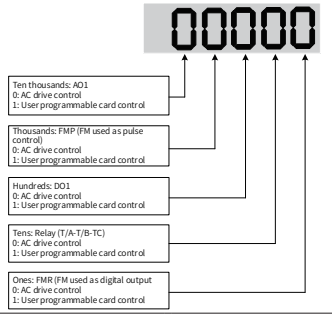
No.	Param. Name	Setting Range		Default	Change
A1-06	Selection of VDI active state			00000	★
A1-07	Function selection for AI1 used as DI	0 to 59		0	★
A1-08	Function selection for AI2 used as DI	0 to 59		0	★
A1-09	Function selection for AI3 used as DI	0 to 59		0	★
A1-10	Active state selection for AI used as DI			000	★
A1-11	VDO1 function selection	0: Short with physical DIx internally	1 to 41: See physical DO selection in group F5	0	☆
A1-12	VDO2 function selection	0: Short with physical DIx internally	1 to 41: See physical DO selection in group F5	0	☆
A1-13	VDO3 function selection	0: Short with physical DIx internally	1 to 41: See physical DO selection in group F5	0	☆
A1-14	VDO4 function selection	0: Short with physical DIx internally	1 to 41: See physical DO selection in group F5	0	☆
A1-15	VDO5 function selection	0: Short with physical DIx internally	1 to 41: See physical DO selection in group F5	0	☆

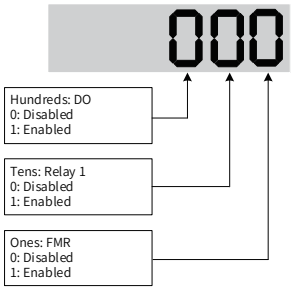
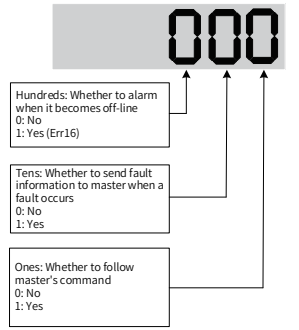
No.	Param. Name	Setting Range	Default	Change
A1-16	VDO1 output delay	0.0s to 3600.0s	0.0s	☆
A1-17	VDO2 output delay	0.0s to 3600.0s	0.0s	☆
A1-18	VDO3 output delay	0.0s to 3600.0s	0.0s	☆
A1-19	VDO4 output delay	0.0s to 3600.0s	0.0s	☆
A1-20	VDO5 output delay	0.0s to 3600.0s	0.0s	☆
A1-21	VDO active mode selection		00000	☆
Group A2: Motor 2 Parameters				
A2-00	Motor type selection	0: Common asynchronous motor 1: Variable frequency asynchronous motor	0	★
A2-01	Rated motor power	0.1 kW to 1000.0 kW	Model dependent	★
A2-02	Rated motor voltage	1 V to 2000 V	Model dependent	★
A2-03	Rated motor current	0.01 A to 655.35 A (AC drive power ⩽ 55 kW) 0.1 A to 6553.5 A (AC drive power > 55 kW)	Model dependent	★
A2-04	Rated motor frequency	0.01 Hz to the maximum frequency	Model dependent	★
A2-05	Rated motor speed	1 rpm to 65535 rpm	Model dependent	★
A2-06	Stator resistance	0.001 Ω to 65.535 Ω (AC drive power ⩽ 55 kW) 0.0001 Ω to 6.5535 Ω (AC drive power > 55 kW)	Model dependent	★
A2-07	Rotor resistance	0.001 Ω to 65.535 Ω (AC drive power ⩽ 55 kW) 0.0001 Ω to 6.5535 Ω (AC drive power > 55 kW)	Model dependent	★
A2-08	Leakage inductive reactance	0.01 mH to 655.35 mH (AC drive power ⩽ 55 kW) 0.001 mH to 65.535 mH (AC drive power > 55 kW)	Model dependent	★
A2-09	Mutual inductive reactance	0.1 mH to 6553.5 mH (AC drive power ⩽ 55 kW) 0.01 mH to 655.35 mH (AC drive power > 55 kW)	Model dependent	★
A2-10	No-load current	0.01 A to A2-03 (AC drive power ⩽ 55 kW) 0.1 A to A2-03 (AC drive power > 55 kW)	Model dependent	★
A2-27	Encoder pulses per revolution	1 to 65535	1024	★

No.	Param. Name	Setting Range		Default	Change
A2-28	Encoder type	0: ABZ incremental encoder	2: Resolver	0	★
A2-29	Speed feedback channel selection	0: Local PG card 1: Extension PG card	2: Pulse input (DI5)	0	★
A2-30	A/B phase sequence of ABZ incremental encoder	0: Forward	1: Reverse	0	★
A2-31	Encoder installation angle	0.0 to 359.9°		0.0°	★
A2-34	Number of pole pairs of resolver	1 to 65535		1	★
A2-36	Encoder wire-break fault detection time	0.0s: No detection	0.1s to 10.0s	0.0	★
A2-37	Auto-tuning selection	0: No auto-tuning 1: Asynchronous motor partial static auto-tuning 2: Asynchronous complete dynamic auto-tuning	3: Asynchronous complete static auto-tuning	0	★
A2-38	Speed loop proportional gain 1	1 to 100		30	☆
A2-39	Speed loop integral time 1	0.01s to 10.00s		0.50s	☆
A2-40	Switchover frequency 1	0.00 to A2-43 (Switchover frequency 2)		5.00 Hz	☆
A2-41	Speed loop proportional gain 2	1 to 100		20	☆
A2-42	Speed loop integral time 2	0.01s to 10.00s		1.00s	☆
A2-43	Switchover frequency 2	A2-40 (Switchover frequency 1) to the maximum frequency		10.00 Hz	☆
A2-44	Vector control slip compensation gain	50% to 200%		100%	☆
A2-45	SVC torque filter constant	0.000s to 0.100s		0.000s	☆
A2-47	Torque limit source in speed control	0: Set by A2-48 (Digital setting of torque limit in speed control) 1: AI1 2: AI2 3: AI3 4: Pulse reference	5: Communication reference 6: Min. (AI1, AI2) 7: Max. (AI1, AI2) The full scale of 1-7 corresponds to A2-48.	0	☆
A2-48	Digital setting of torque limit in speed control	0.0% to 200.0%		150.0%	☆

No.	Param. Name	Setting Range		Default	Change
A2-49	Torque limit source in speed control (regenerative)	0: Set by F2-10 (Digital setting of torque limit in speed control) 1: AI1 2: AI2 3: AI3 4: Pulse setting 5: Communication setting	6: Min. (AI1, AI2) 7: Max. (AI1, AI2) 8: Set by F2-12 [Digital setting of torque limit in speed control (regenerative)] The full scale of 1-7 corresponds to F2-12.	0	☆
A2-50	Digital setting of torque limit in speed control (regenerative)	0.0% to 200.0%		150.0%	☆
A2-51	Excitation adjustment proportional gain	0 to 20000		2000	☆
A2-52	Excitation adjustment integral gain	0 to 20000		1300	☆
A2-53	Torque adjustment proportional gain	0 to 20000		2000	☆
A2-54	Torque adjustment integral gain	0 to 20000		1300	☆
A2-55	Speed loop integral separation selection	Ones: Integral separation 0: Disabled	1: Enabled	0	☆
A2-59	Max. torque coefficient of field weakening area	50% to 200%		100%	☆
A2-60	Regenerative power limit selection	0: Disabled	1: Enabled	0	☆
A2-61	Regenerative power limit	0.0 to 200.0%		Model dependent	☆
A2-62	Motor 2 control mode	0: SVC 1: FVC 2: V/F control		0	★
A2-63	Motor 2 acceleration/ deceleration time selection	0: Same to Motor 1 2: Acceleration/ Deceleration time selection 2	3. Acceleration/ Deceleration time selection 3 4: Acceleration/ Deceleration time selection 4	0	☆
A2-64	Motor 2 torque boost	0.0%: Automatic torque boost	0.1% to 30.0%	Model dependent	☆
A2-66	Motor 2 oscillation suppression gain	0 to 100		40	☆
Group A5: Control Optimization					
A5-00	DPWM switchover frequency upper limit	5.00 Hz to the maximum frequency		8.00 Hz	☆

No.	Param. Name	Setting Range		Default	Change
A5-01	PWM modulation pattern	0: Asynchronous modulation	1: Synchronous modulation	0	☆
A5-02	Dead zone compensation mode selection	0: Disabled	1: Enabled (compensation mode 1)	1	☆
A5-03	Random PWM depth	0: Random PWM invalid 1 to 10: Random PWM		0	☆
A5-04	Overcurrent fast prevention	0: Disabled	1: Enabled	1	☆
A5-05	Voltage over modulation coefficient	100 to 110%		105%	★
A5-06	Undervoltage threshold	210 V to 420 V		350 V	☆
A5-08	Low speed frequency	0.0 to 8.0 kHz		0.0	☆
A5-09	Overvoltage threshold	200.0 V to 2500.0 V		Model dependent	★
A5-11	DC injection braking threshold at low speed	0.00 to 5.00 Hz		0.30 Hz	☆
Group A6: AI Curve Setting					
A6-00	AI curve 4 min. input	-10.00 V to A6-02 (AI curve 4 inflection 1 input)		0.00 V	☆
A6-01	Corresponding percentage of AI curve 4 min. input	-100.0% to +100.0%		0.0%	☆
A6-02	AI curve 4 inflection 1 input	A6-00 (AI curve 4 min. input) to A6-04 (AI curve 4 inflection 2 input)		3.00 V	☆
A6-03	Corresponding percentage of AI curve 4 inflection 1 input	-100.0% to +100.0%		30.0%	☆
A6-04	AI curve 4 inflection 2 input	A6-02 (AI curve 4 inflection 1 input) to A6-06 (AI curve 4 max. input)		6.00 V	☆
A6-05	Corresponding percentage of AI curve 4 inflection 2 input	-100.0% to +100.0%		60.0%	☆
A6-06	AI curve 4 max. input	A6-04 (AI curve 4 inflection 2 input) to +10.00 V		10.00 V	☆
A6-07	Corresponding percentage of AI curve 4 max. input	-100.0% to +100.0%		100.0%	☆
A6-08	AI curve 5 min. input	-10.00 V to A6-10 (AI curve 5 inflection 1 input)		-10.00 V	☆
A6-09	Corresponding percentage of AI curve 5 min. input	-100.0% to +100.0%		-100.0%	☆
A6-10	AI curve 5 inflection 1 input	A6-08 (AI curve 5 min. input) to A6-12 (AI curve 5 inflection 2 input)		-3.00 V	☆
A6-11	Corresponding percentage of AI curve 5 inflection 1 input	-100.0% to +100.0%		-30.0%	☆

No.	Param. Name	Setting Range	Default	Change
A6-12	AI curve 5 inflection 2 input	A6-10 (AI curve 5 inflection 1 input) to A6-14 (AI curve 5 max. input)	3.00 V	☆
A6-13	Corresponding percentage of AI curve 5 inflection 2 input	-100.0% to +100.0%	30.0%	☆
A6-14	AI curve 5 max. input	A6-12 (AI curve 5 inflection 2 input) to +10.00 V	10.00 V	☆
A6-15	Corresponding percentage of AI curve 5 max. input	-100.0% to +100.0%	100.0%	☆
A6-24	Jump point of AI1 input corresponding setting	-100.0% to 100.0%	0.0%	☆
A6-25	Jump amplitude of AI1 input corresponding setting	0.0% to 100.0%	0.5%	☆
A6-26	Jump point of AI2 input corresponding setting	-100.0% to 100.0%	0.0%	☆
A6-27	Jump amplitude of AI2 input corresponding setting	0.0% to 100.0%	0.5%	☆
A6-28	Jump point of AI3 input corresponding setting	-100.0% to 100.0%	0.0%	☆
A6-29	Jump amplitude of AI3 input corresponding setting	0.0% to 100.0%	0.5%	☆
Group A7: User Programmable Card				
A7-00	User programmable function selection	0: Disabled 1: Enabled	0	★
A7-01	Control board output terminal control mode selection		0	★
A7-02	Programmable card AI/AO function selection	0: AI3 (voltage input), AO2 (voltage output) 1: AI3 (voltage input), AO2 (current output) 2: AI3 (current input), AO2 (voltage output) 3: AI3 (current input), AO2 (current output) 4: AI3 (PTC input), AO2 (voltage output) 5: AI3 (PTC input), AO2 (current output) 6: AI3 (PT100 input), AO2 (voltage output) 7: AI3 (PT100 input), AO2 (current output)	0	★

No.	Param. Name	Setting Range		Default	Change
A7-03	FMP output	0.0% to 100.0%		0.0%	☆
A7-04	AO1 output	0.0% to 100.0%		0.0%	☆
A7-05	Selection of PLC program controlling digital output			000	☆
A7-06	Setting frequency reference using the user programmable card	-100.00% to 100.00%		0.0%	☆
A7-07	Setting torque reference using the user programmable card	-200.0% to 200.0%		0.0%	☆
A7-08	Setting running command using the user programmable card	0: No command 1: Forward run 2: Reverse run 3: Forward jog	4: Reverse jog 5: Coast to stop 6: Decelerate to stop 7: Fault reset	0	☆
A7-09	Setting torque reference with the user programmable card	0: No fault	80 to 89: User-defined fault code	0	☆
Group A8: Point-to-point Communication					
A8-00	Point-to-point communication	0: Disabled	1: Enabled	0	☆
A8-01	Master or slave selection	0: Master	1: Slave	0	☆
A8-02	Selection of action of the slave in point-to-point communication			011	★
A8-03	Slave received data	0: Torque reference	1: Frequency reference	0	☆
A8-04	Zero offset of received data (torque)	-100.00% to 100.00%		0.00%	★

No.	Param. Name	Setting Range	Default	Change
A8-05	Gain of received data (torque)	-10.00 to 100.00	1.00	★
A8-06	Point-to-point communication interruption detection time	0.0 to 10.0s	1.0s	☆
A8-07	Master data sending cycle in point-to-point communication	0.001s to 10.000s	0.001s	☆
A8-11	Window width	0.20 Hz to 10.00 Hz	0.50 Hz	☆
Group AC: AI/AO Correction				
AC-00	AI1 measured voltage 1	-10.00 V to 10.000 V	Factory-corrected	☆
AC-01	AI1 displayed voltage 1	-10.00 V to 10.000 V	Factory-corrected	☆
AC-02	AI1 measured voltage 2	-10.00 V to 10.000 V	Factory-corrected	☆
AC-03	AI1 displayed voltage 2	-10.00 V to 10.000 V	Factory-corrected	☆
AC-04	AI2 measured voltage 1	-10.00 V to 10.000 V	Factory-corrected	☆
AC-05	AI2 displayed voltage 1	-10.00 V to 10.000 V	Factory-corrected	☆
AC-06	AI2 measured voltage 2	-10.00 V to 10.000 V	Factory-corrected	☆
AC-07	AI2 displayed voltage 2	-10.00 V to 10.000 V	Factory-corrected	☆
AC-08	AI3 measured voltage 1	-10.00 V to 10.000 V	Factory-corrected	☆
AC-09	AI3 displayed voltage 1	-10.00 V to 10.000 V	Factory-corrected	☆
AC-10	AI3 measured voltage 2	-10.00 V to 10.000 V	Factory-corrected	☆
AC-11	AI3 displayed voltage 2	-10.00 V to 10.000 V	Factory-corrected	☆
AC-12	AO1 target voltage 1	-10.00 V to 10.000 V	Factory-corrected	☆
AC-13	AO1 measured voltage 1	-10.00 V to 10.000 V	Factory-corrected	☆
AC-14	AO1 target voltage 2	-10.00 V to 10.000 V	Factory-corrected	☆
AC-15	AO1 measured voltage 2	-10.00 V to 10.000 V	Factory-corrected	☆
AC-16	AO2 target voltage 1	-10.00 V to 10.000 V	Factory-corrected	☆
AC-17	AO2 measured voltage 1	-10.00 V to 10.000 V	Factory-corrected	☆
AC-18	AO2 target voltage 2	-10.00 V to 10.000 V	Factory-corrected	☆

No.	Param. Name	Setting Range	Default	Change
AC-19	AO2 measured voltage 2	-10.00 V to 10.000 V	Factory-corrected	☆

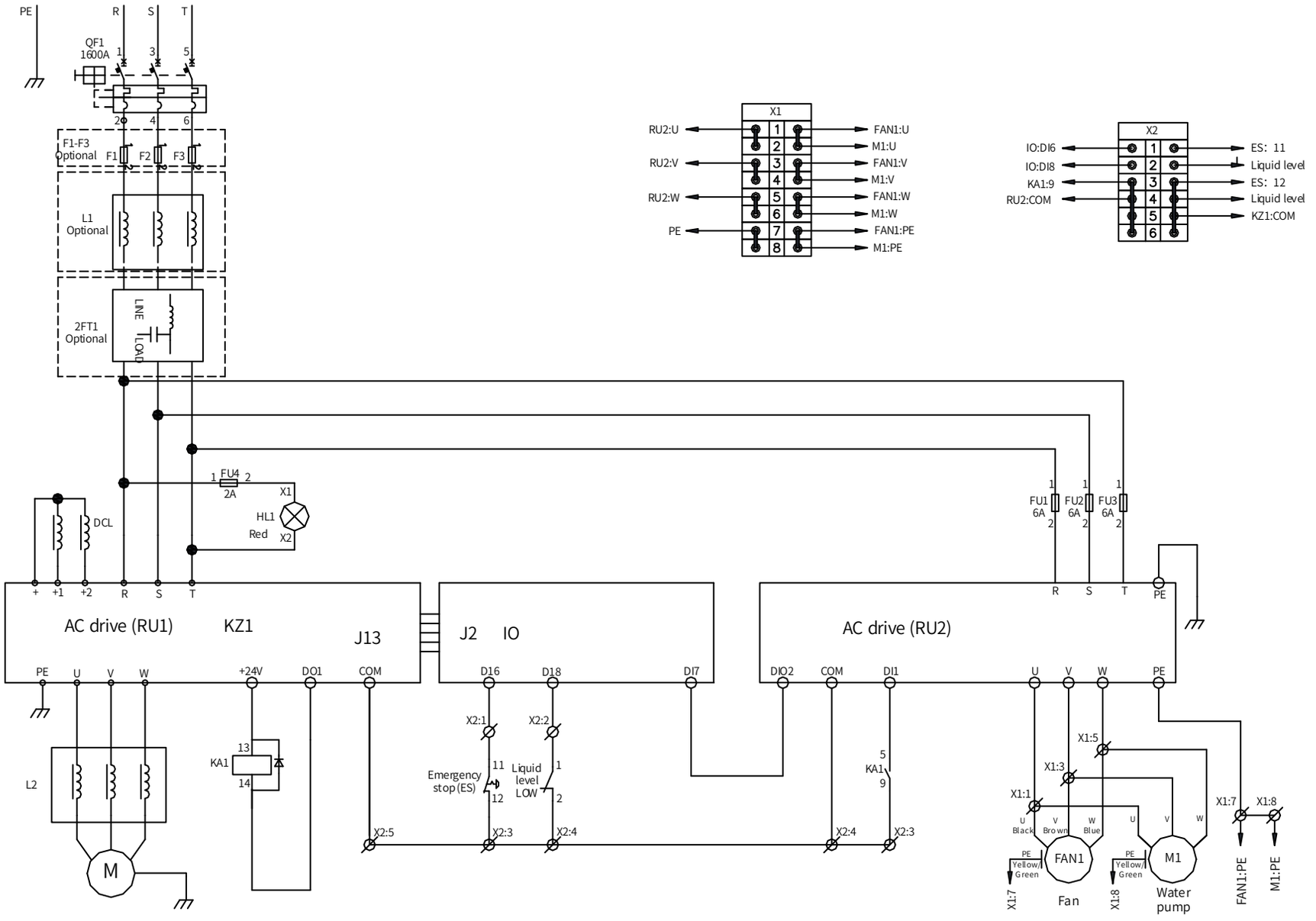
A.2 Monitoring Parameters

No.	Param. Name	Minimum Unit	Communication Address
Group U0: Monitoring Parameters			
U0-00	Running frequency	0.01 Hz	7000H
U0-01	Frequency reference	0.01 Hz	7001 H
U0-02	Bus voltage	0.1 V	7002H
U0-03	Output voltage	1 V	7003H
U0-04	Output current	0.01 A	7004H
U0-05	Output power	0.1 kW	7005H
U0-06	Output torque	0.1%	7006H
U0-07	DI state	1	7007H
U0-08	DO state	1	7008H
U0-09	AI1 voltage	0.01 V	7009H
U0-10	AI2 voltage (V)/current (mA)	0.01 V/0.01 mA	700AH
U0-11	AI3 voltage	0.01 V	700BH
U0-12	Count value	1	700CH
U0-13	Length value	1	700DH
U0-14	Load speed	1 rpm/min	700EH
U0-15	PID reference	1	700FH
U0-16	PID feedback	1	7010H
U0-17	PLC stage	1	7011 H
U0-18	Pulse reference	0.01 kHz	7012H
U0-19	Feedback speed	0.01 Hz	7013H
U0-20	Remaining running time	0.1 min	7014H
U0-21	AI1 voltage before correction	0.001 V	7015H
U0-22	AI2 voltage (V)/ current (mA) before correction	0.001 V/0.01 mA	7016H
U0-23	AI3 voltage before correction	0.001 V	7017H
U0-24	Motor speed	1 rpm/min	7018H
U0-25	Current power-on time	1 min	7019H
U0-26	Current running time	0.1 min	701AH
U0-27	Pulse reference	1 Hz	701BH
U0-28	Communication reference	0.01%	701CH
U0-29	Encoder feedback speed	0.01 Hz	701DH
U0-30	Main frequency reference	0.01 Hz	701EH
U0-31	Auxiliary frequency reference	0.01 Hz	701FH
U0-32	Viewing any register address value	1	7020H
U0-34	Motor temperature	1°C	7022H
U0-35	Target torque	0.1%	7023H
U0-36	Resolver position	1	7024H
U0-37	Power factor angle	0.1°	7025H
U0-38	ABZ position	1	7026H

No.	Param. Name	Minimum Unit	Communication Address
U0-39	Target voltage upon V/F separation	1 V	7027H
U0-40	Output voltage upon V/F separation	1 V	7028H
U0-41	DI state display	1	7029H
U0-42	DO state display	1	702AH
U0-43	DI set for function state display 1 (function 01-40)	1	702BH
U0-44	DI set for function state display 2 (function 41-80)	1	702CH
U0-45	Fault information	1	702DH
U0-58	Phase Z counting	1	703AH
U0-59	Rated frequency	0.01%	703BH
U0-60	Running frequency	0.01%	703CH
U0-61	AC drive state	1	703DH
U0-62	Current fault code	1	703EH
U0-63	Sending torque value of point-to-point communication	0.01%	703FH
U0-64	Number of slaves	1	7040H
U0-65	Torque upper limit	0.1%	7041 H
U0-66	Communication extension card type	100: CANOpen 200: PROFIBUS-DP 300: CANlink	7042H
U0-67	Communication extension card version	Display range	-
U0-68	AC drive state on DP card	Bit0: AC drive running status Bit1: Running direction Bit2: Whether the AC drive has a fault Bit3: Target frequency reached Bit4 to Bit7: Reserved Bit8 to Bit15: Fault code	7043H
U0-69	Speed of transmitting DP/0.01 Hz	0.00 Hz to the maximum frequency	7044H
U0-70	Motor speed of transmitting DP/RMP	0 to rated motor	7045H
U0-71	Communication card current display	Display range	-
U0-72	Communication card faulty state	Display range	-
U0-73	Motor SN	0: Motor 1 1: Motor 2	7046H
U0-74	AC drive output torque	-100% to 100%	7047H

Appendix B Electrical Wiring in the Cabinet

The following figure shows the electrical wiring in the cabinet.



INOVANCE Warranty Agreement

1) Inovance provides an 18-month free warranty to the equipment itself from the date of manufacturing for the failure or damage under normal use conditions.
2) Within the warranty period, maintenance will be charged for the damage caused by the following reasons:
   a. Improper use or repair/modification without prior permission
   b. Fire, flood, abnormal voltage, natural disasters and secondary disasters
   c. Hardware damage caused by dropping or transportation after procurement
   d. Operations not following the user instructions
   e. Damage out of the equipment (for example, external device factors)
3) The maintenance fee is charged according to the latest Maintenance Price List of Inovance.
4) If there is any problem during the service, contact Inovance's agent or Inovance directly.
5) Inovance reserves the rights for explanation of this agreement.

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