INOVANCE

User Guide

CA300 Series AC Drive

For Central Air Conditioner

User Guide

A04

Data code 19010614

Preface

Thank you for purchasing the CA300 series central air conditioner AC drives developed and manufactured by Inovance Technology.

CA300 is a high-performance current vector AC drive that is specially designed for heating, ventilation and air conditioning (HVAC), and used to control and adjust the speed and torque of a three-phase AC asynchronous or synchronous motor in flexible control of rotary-screw compressors. CA300 implements high-performance vector control and automatically adjusts the voltage-frequency ratio output by the AC drive based on the motor load ratio, which improves motor and system efficiency, reduces energy consumption, noise, and vibration of the motor, and optimizes the cooling capability of the compressors of chillers and other HAVC systems at constant temperature and pressure.

■ Features

1) Smaller size with greater power density

Compared with MD380 of the same power model, CA300 is 40% smaller in size on average.

2) Wide operating range

The rated input voltage is three-phase 380 V AC to 480 V AC and the wide operating range is 323 V to 528 V.

3) Long lifetime

With improved bus capacitor configuration, CA300 has a design life of 10 years.

4) Fan-driven circuit protection

The fan-driven circuit is effectively protected in the event of unexpected short circuit resulting from stalled or damaged fan.

5) Enhanced system protection

CA300 offers effective protection against output short-circuit to ground and pre-charge relay (contactor) faults.

6) High condensation pressure protection

CA300 enables the Safe Torque Off (STO) function and hardware-based blockage of pulse-width modulation (PWM) output to avoid abnormal stop upon a system failure.

7) Electromagnetic compatibility (EMC) and certification

CA300 qualifies for Conformance European (CE) Certification and Underwriters Laboratories (UL) Certification.

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

Certification	Directives		Standard
CE	EMC directives	2014/30/EU	EN 61800-3
	LVD directives	2014/35/EU	EN 61800-5-1
	RoHS directives	2011/65/EU	EN 50581

NOTE

- The above EMC directives are complied with only when the EMC electric installation requirements are strictly observed.
- Machines and devices used in combination with this drive must also be CE certified and marked. The integrator who integrates the drive with the CE mark into other devices has the responsibility of ensuring compliance with CE standards and verifying that conditions meet European standards.
- For more information on certification, consult our distributor or sales representative.

Revision History

Date	Version	Change Description
August 2017	A00	First issue.
July 2018	A01	◆ Added *"1.6 DC Reactor Selection".* ◆ Added the weight of the AC drive and cabinet.
July 2020	A02	◆ Updated the link only. No content change involved.
November 2020	A03	◆ Made minor corrections
June 2021	A04	◆ Deleted Group AF Parameters ◆ Added Group A3 Motor Overload Curve Parameters

Contents

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

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

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

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

Safety Instructions

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

- 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 10 minutes before further operations because residual voltage exists after power-off.
- Make sure that the equipment is well grounded. Failure to comply will result in an electric shock.
- During wiring, follow the proper electrostatic discharge (ESD) procedures, and wear an antistatic wrist strap. Failure to comply will result in damage to internal equipment circuits.


WARNING

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

Power-on

- 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

- 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.

- 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
 ◆ Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed by only professionals. ◆ Do not maintain the equipment at power-on. Failure to comply will result in an electric shock. ◆ Before maintenance, cut off all equipment power supplies and wait at least 10 minutes.
 ◆ 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 10 minutes.
 ◆ Require for repair services according to the product warranty agreement. ◆ When the equipment is faulty or damaged, require professionals to perform troubleshooting and repair by following repair instructions and keep a repair record. ◆ Replace quick-wear parts of the equipment according to the replacement guide. ◆ Do not operate damaged equipment. Failure to comply may result in worse damage. ◆ After the equipment is replaced, perform wiring inspection and parameter settings again.
Disposal
 ◆ Dispose of retired equipment by following local regulations or standards. Failure to comply may result in property damage, personal injuries, or even death. ◆ Recycle retired equipment by following industry waste disposal standards to avoid environmental pollution.

Safety Signs

■ 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

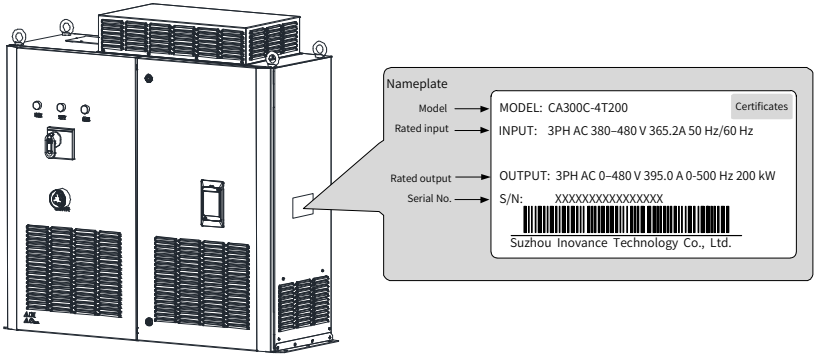
For safe equipment operation and maintenance, comply with safety signs on the equipment, and do not damage or remove the safety labels. The following table describes the safety signs.

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 10 minutes after power-off. ◆ Before maintenance, inspection, and wiring, cut off input and output power, and wait at least 10 minutes until the power indicator is off.

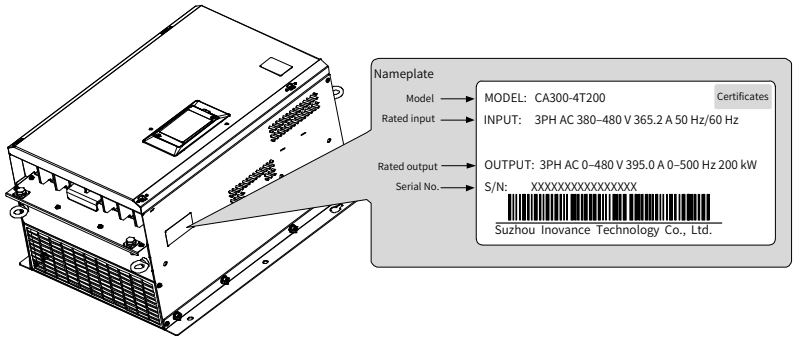
1 Product Information

1.1 Nameplate and model description

■ AC drive cabinet nameplate



■ AC drive nameplate



CA300 C – 4T 200

Mark	Product Series
CA300	Central Air Conditioner

Mark	Product Type
Default	AC Drive
C	Cabinet

Mark	Voltage Class
4T	Three-phase 380 to 480 V

Mark	Applicable Motor (kW)
75	75
...	...
355	355

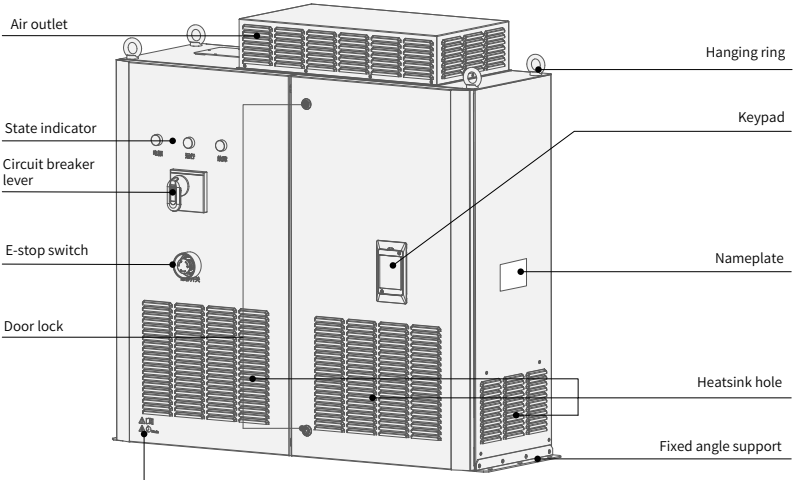
Figure 1-1 Nameplate and model description

NOTE

◆ To use the CA300 AC drive, equip it with Inovance's DC reactor. For details about DC reactor, see *"1.6 DC Reactor Selection"*.

1.2 Description of Parts

■ Components of the AC drive cabinet (355 kW model used as an example)



Warning Label		Description
		Caution! Read the user guide of the AC drive carefully before installation or operation.
	10min	Danger! Do not remove the front cover while the power is on or within 10 minutes after the power is turned off.

Components in the AC drive cabinet are as follows.

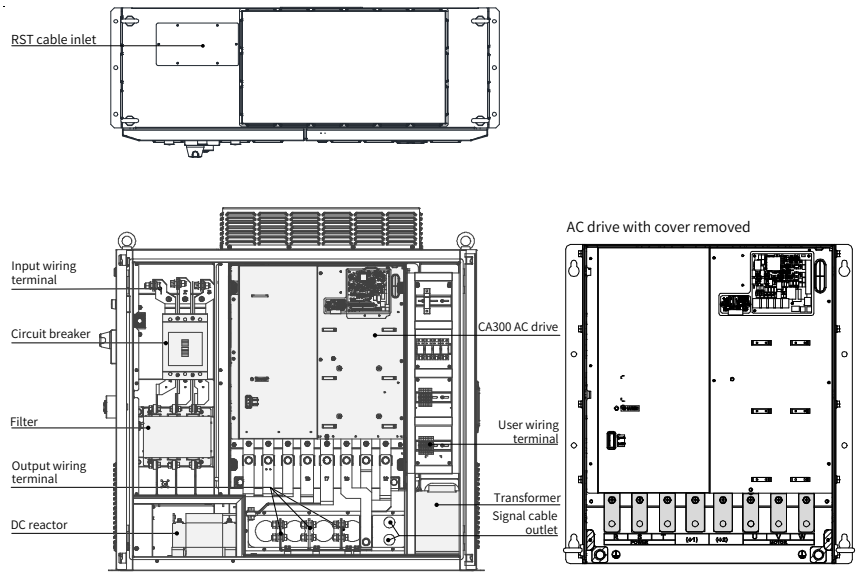


Figure 1-2 AC drive cabinet components (200–355 kW)

■ AC drive components

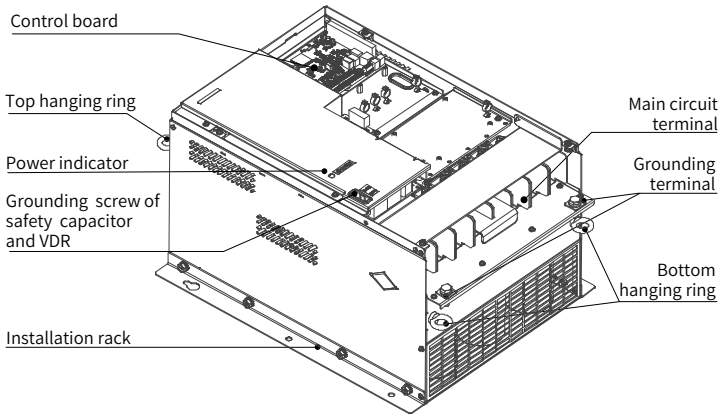


Figure 1-3 AC drive components (75–160 kW)

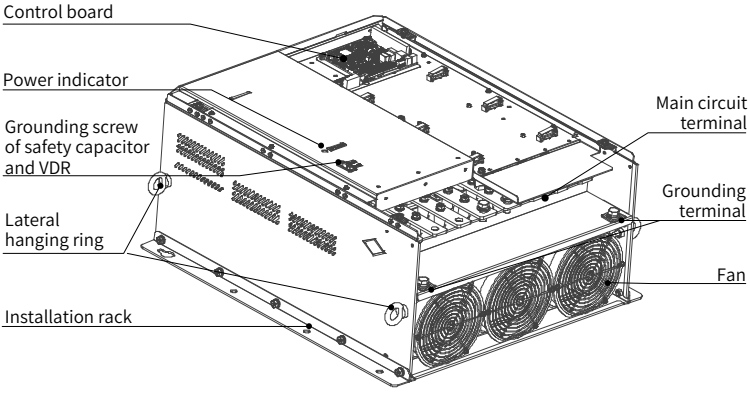


Figure 1-4 AC drive components (200–355 kW)

1.3 Technical Specifications

NOTE

◆ To use the CA300 AC drive, equip it with Inovance's DC reactor. For details about DC reactor, see "1.6 DC Reactor Selection".

Table 1-1 Product models and electrical parameters

Model	Power Capacity (kVA)	Input Current (A)	Output Current (A)	Motor (kW)
Three-phase power supply: 380 V to 480 V (-15% to 10%) 50 Hz/60 Hz				
AC Drive Cabinet				
CA300C-4T75	131	136	150	75
CA300C-4T90	153	162	177	90
CA300C-4T110	181	194	212	110
CA300C-4T132	219	238	260	132
CA300C-4T160	270	291	315	160
CA300C-4T200	328	365	395	200
CA300C-4T220	375	394	426	220
CA300C-4T250	417	443	480	250
CA300C-4T280	464	485	525	280
CA300C-4T315	511	555	600	315
CA300C-4T355	571	609	658	355
AC Drive				
CA300-4T75	131	136	150	75
CA300-4T90	153	162	177	90
CA300-4T110	181	194	212	110
CA300-4T132	219	238	260	132
CA300-4T160	270	291	315	160
CA300-4T200	328	365	395	200
CA300-4T220	375	394	426	220
CA300-4T250	417	443	480	250
CA300-4T280	464	485	525	280
CA300-4T315	511	555	600	315
CA300-4T355	571	609	658	355

Table 1-2 Technical specifications

Item		Description
Standard functions	Output frequency	0 Hz to 500 Hz
	Carrier frequency	2 kHz to 8 kHz, automatically adjusted with load
	Input frequency resolution	◆ Digital setting: 0.01 Hz ◆ Analog setting: Maximum frequency x 0.025%
	Control mode	◆ SVC ◆ V/F
	Overload capability	110% of rated current for 60s
	Torque boost	◆ Auto boost ◆ Customized boost 0.1 % to 30.0 %
	V/F curve	◆ Straight-line V/F curve ◆ Multi-point V/F curve ◆ Square 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
	Jog running	Frequency range of jog running: 0.00 Hz to 50.00 Hz Acceleration/Deceleration time of jog running: 0.0s to 6500.0s
	Multiple preset speeds	The system implements up to eight speeds by using 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 system minimizes overcurrent faults to ensure normal drive operation.
	Power dip ride-through	Load feedback energy compensates for any voltage reduction, allowing the drive to continue to operate for a short time during power dips. The RUN indicator on the operating panel blinks after power dip ride-through is enabled.
	Overcurrent fast prevention	This function helps to avoid frequent overcurrent faults.
	Timing control	Time range: 0.0 minutes to 6500.0 minutes
	Communication bus	Modbus is supported.

Item		Description
Keypad and display	LED display	Shows parameters.
	Key locking and function selection	All or some keys can be locked to prevent accidental operation. The range of some key functions can be limited to a permitted range to prevent incorrect settings.
	Protection	Motor short-circuit detection upon power-on, input/output phase loss protection, overcurrent protection, overvoltage protection, undervoltage protection, overheat protection, and overload protection
Running	Command source	Allows different methods of switching between command sources: ◆ Operating panel (keypad & display) ◆ Terminal I/O control ◆ Serial communication
	Main frequency reference	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	Supports up to 10 auxiliary frequency sources, and allows fine tuning of the auxiliary frequency and main & auxiliary calculation.
	Input terminals	◆ Seven DI terminals with 100 Hz maximum input frequency ◆ Three AI terminals that support 0 V to 10 V/0 mA to 20 mA input and PT100 input
	Output terminals	◆ Four DO terminals ◆ Three relay output terminals, one of which has NO and NC contacts and the other two have NO terminals ◆ Three AO terminals that support 0 mA to 20 mA current output or 0 V to 10 V voltage output
	Communication terminal	One RS485 communication terminal

Item		Description
Environment	Installation location	◆ Install the AC drive inside the cabinet where it is protected from direct sunlight, dust, corrosive or combustible gases, oil smoke, vapor, ingress from water or any other liquid, and salt. ◆ Install the cabinet in a basement or outdoors. Protection from direct sunlight is not mandatory.
	Altitude	◆ 1500 m to 3000 m ◆ The AC drive runs properly when the altitude is below 1500 m. If the altitude exceeds 1500 m, de-rate the AC drive by 1% with increase of every 100 m.
	Ambient temperature	-20°C to +55°C If the ambient temperature exceeds 40°C , de-rate the AC drive by 1% with increase of every 1°C .
	Humidity	Less than 95% RH non-condensing
	Vibration	2 g for boards, conformance to transport standards
	Storage temperature	-25°C to +70°C
	IP rating	AC drive cabinet: IP20 AC drive: IP00
Power grid	Applicable power grid	TN or TT

1.4 Product Appearance and Dimensions

■ AC drive cabinet dimensions

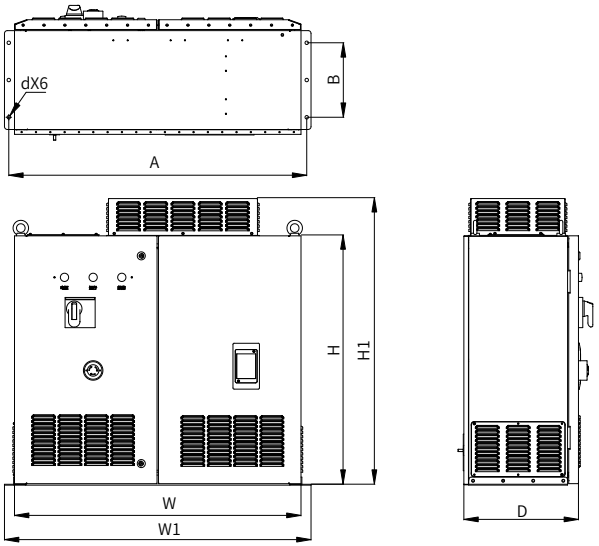


Figure 1-5 Appearance and dimensions of the CA300C AC drive cabinet (75–160 kW)

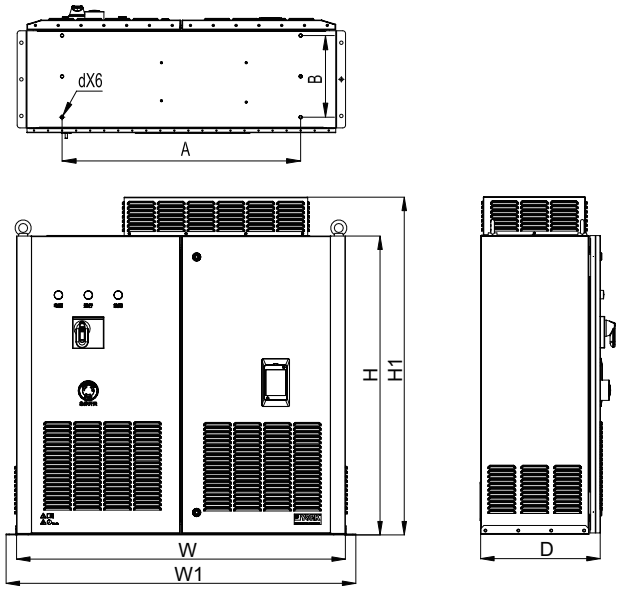


Figure 1-6 Appearance and dimensions of the CA300C AC drive cabinet (200–355 kW)

Model	Mounting Hole (mm)		Dimensions (mm)					Mounting Diameter d (mm)	Weight (kg)
	A	B	W	W1	H	H1	D		
CA300C-4T75	1040	260	1000	1070	870	1000	400	Φ12	165
CA300C-4T90									165
CA300C-4T110									175
CA300C-4T132									175
CA300C-4T160									189
CA300C-4T200	850	290	1100	1170	1000	1130	400	M10	242
CA300C-4T220									242
CA300C-4T250									253
CA300C-4T280									253
CA300C-4T315									265
CA300C-4T355									265

■ AC drive dimensions

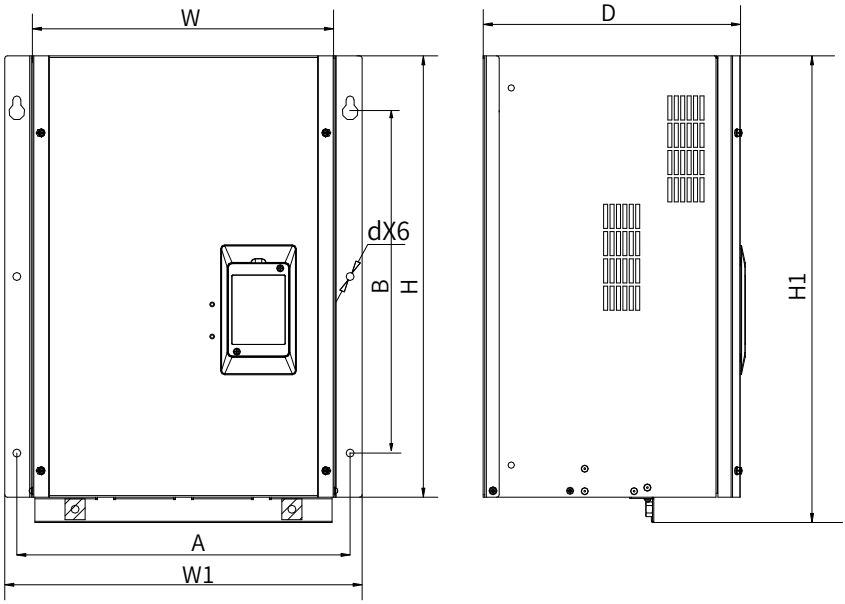


Figure 1-7 Appearance and dimensions of the CA300C AC drive (75–160 kW)

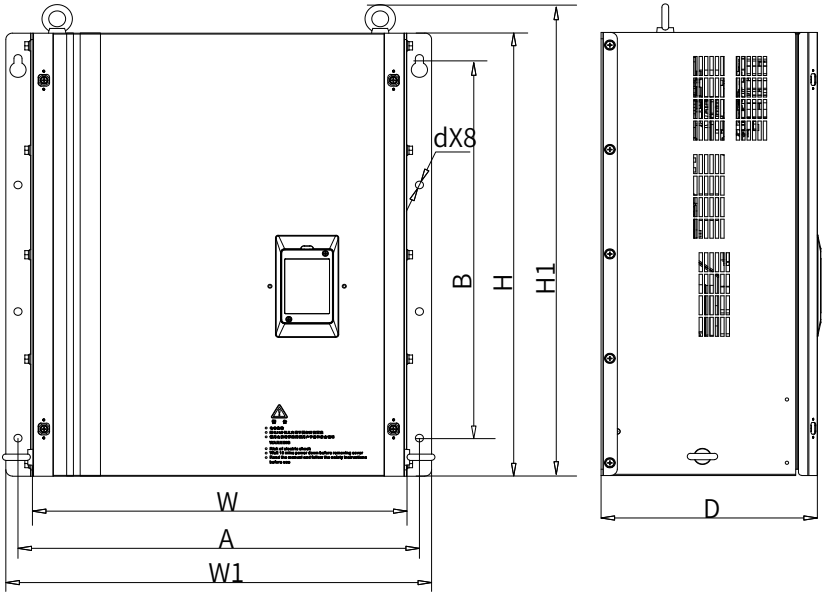


Figure 1-8 Appearance and dimensions of the CA300C AC drive (200–355 kW)

Model	Mounting Hole (mm)		Dimensions (mm)					Mounting Diameter d (mm)	Weight (kg)
	A	B	W	W1	H	H1	D		
CA300-4T75	415	440	375	445	550	580	320	Φ10	42
CA300-4T90									42
CA300-4T110									46
CA300-4T132									46
CA300-4T160									50
CA300-4T200	594	600	550	630	700	745	320	Φ12	89
CA300-4T220									89
CA300-4T250									95
CA300-4T280									95
CA300-4T315									102
CA300-4T355									102

1.5 Cable and Fuse Selection

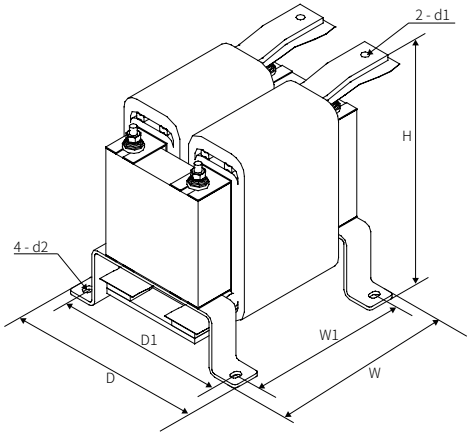
AC Drive Model	Recommended Input IEC Cable (mm^2)	Recommended IEC Ground Cable (mm^2)	Recommended Output IEC Cable (mm^2)	AC Drive Terminal Width (mm)	Screw	Recommended Fuse Bussmann Compliant with UL Certification	
						Rated Current (A)	Model
CA300-4T75	3 x 70	35	3 x 70	38	M10	200	FWH-250B
CA300-4T90	3 x 70	35	3 x 70	38	M10	250	FWH-250A
CA300-4T110	3 x 95	70	3 x 95	38	M10	300	FWH-300A
CA300-4T132	3 x 150	70	3 x 150	38	M10	350	FWH-350A
CA300-4T160	3 x 150	150	3 x 185	38	M10	450	FWH-450A
CA300-4T200	2 x (3 x 120)	120	2 x (3 x 120)	34	M12	600	FWH-600A
CA300-4T220	2 x (3 x 120)	120	2 x (3 x 120)	34	M12	600	FWH-600A
CA300-4T250	2 x (3 x 120)	120	2 x (3 x 120)	34	M12	700	FWH-700A
CA300-4T280	2 x (3 x 120)	120	2 x (3 x 150)	34	M12	800	FWH-800A
CA300-4T315	2 x (3 x 150)	150	2 x (3 x 150)	34	M12	1000	FWH-1000A
CA300-4T355	2 x (3 x 185)	185	2 x (3 x 185)	34	M12	1000	FWH-1000A

1.6 DC Reactor Selection

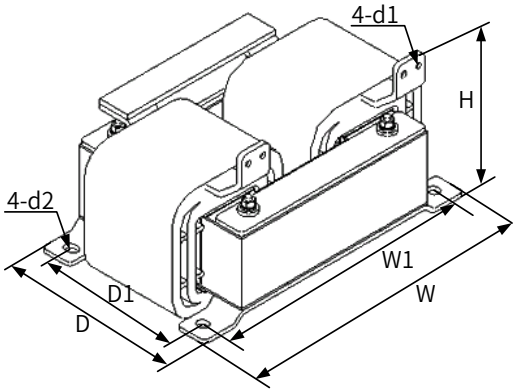
A DC reactor must be equipped on the input side of the AC drive to eliminate impact on the AC drive caused by high harmonics on the input side and reduce external conduction and radiation interference of the AC drive.

Table 1-3 DC reactor selection

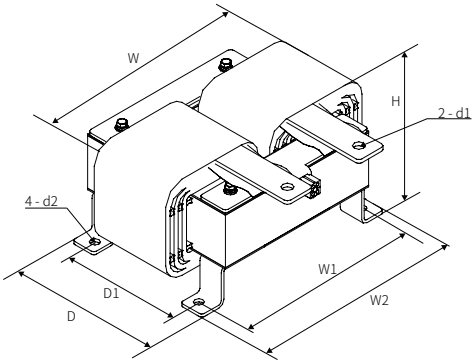
Model	DC Input Reactor Model (Inovance)
CA300-4T75	CA300-4T75-L1
CA300-4T90	CA300-4T90-L1
CA300-4T110	CA300-4T110-L1
CA300-4T132	CA300-4T132-L1
CA300-4T160	CA300-4T160-L1
CA300-4T200	CA300-4T200-L1
CA300-4T220	CA300-4T220-L1
CA300-4T250	CA300-4T250-L1
CA300-4T280	CA300-4T280-L1
CA300-4T315	CA300-4T315-L1
CA300-4T355	CA300-4T355-L1



Model	Dimensions (mm)			Mounting Hole (mm)		Mounting Diameter (mm)		Weight (kg)
	H	W	D	W1	D1	d1	d2	
CA300-4T75-L1	188	172	180	150	160	Φ7	Φ7	14
CA300-4T90-L1	188	172	180	150	160	Φ7	Φ7	14
CA300-4T110-L1	188	172	180	150	160	Φ7	Φ7	14
CA300-4T132-L1	188	172	180	150	160	Φ7	Φ7	14



Model	Dimensions (mm)			Mounting Hole (mm)		Mounting Diameter (mm)		Weight (kg)
	H	W	D	W1	D1	d1	d2	
CA300-4T160-L1	155	280	180	250	141	M6	Φ10	22



Model	Dimensions (mm)				Mounting Hole (mm)		Mounting Diameter (mm)		Weight (kg)
	H	W	W2	D	W1	D1	d1	d2	
CA300-4T200-L1	155	315	280	200	250	160	Φ14	Φ12	25
CA300-4T220-L1	155	315	280	200	250	160	Φ14	Φ12	25
CA300-4T250-L1	158	320	280	204	250	160	Φ14	Φ12	25
CA300-4T280-L1	158	320	280	204	250	160	Φ14	Φ12	25
CA300-4T315-L1	158	320	280	204	250	160	Φ14	Φ12	25
CA300-4T355-L1	158	320	280	204	250	160	Φ14	Φ12	25

2 Installation and Wiring

2.1 Installation

The following figure shows bottom installation of the CA300C AC drive cabinet. The 220 kW to 355 kW model is used as an example (unit: mm).

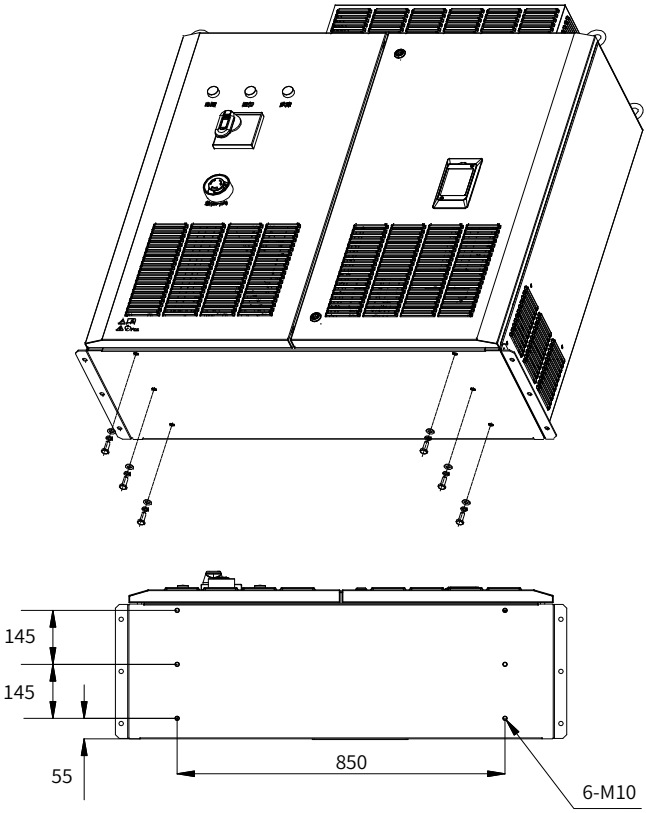


Figure 2-1 Bottom installation of the AC drive cabinet

2.2 Wiring

2.2.1 Standard Wiring

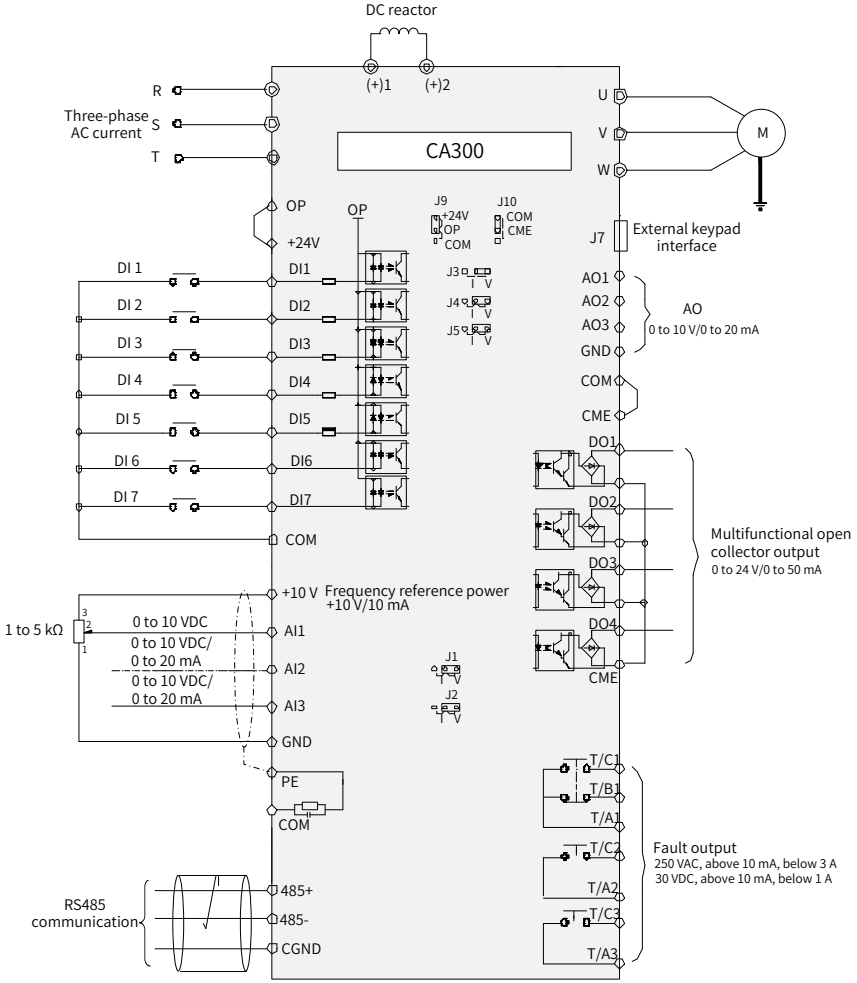


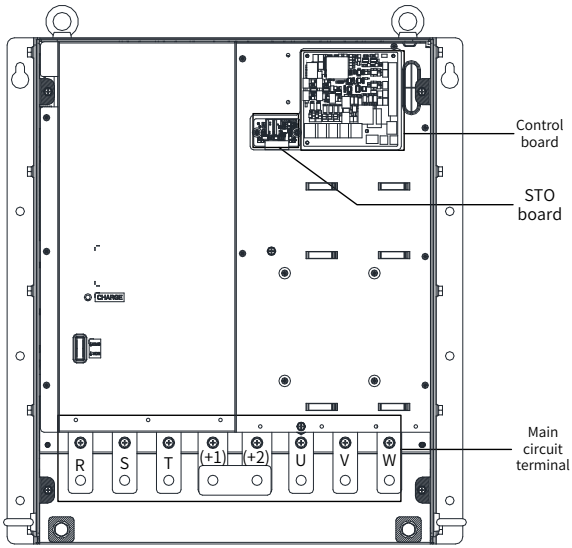
Figure 2-2 Standard electrical wiring

Caution

- To avoid accidental operation resulting from noise interference, separate the signal cable and power cable by more than 10 cm, and configure the input and output of the main circuit separately.
- Do not drop any cable cuttings into the AC drive during the wiring process. Failure to comply may result in errors, faults, and accidental operation.
- Keep the AC drive clean. Prevent cuttings and dust from entering the AC drive when drilling mounting holes on the control cabinet and other devices.

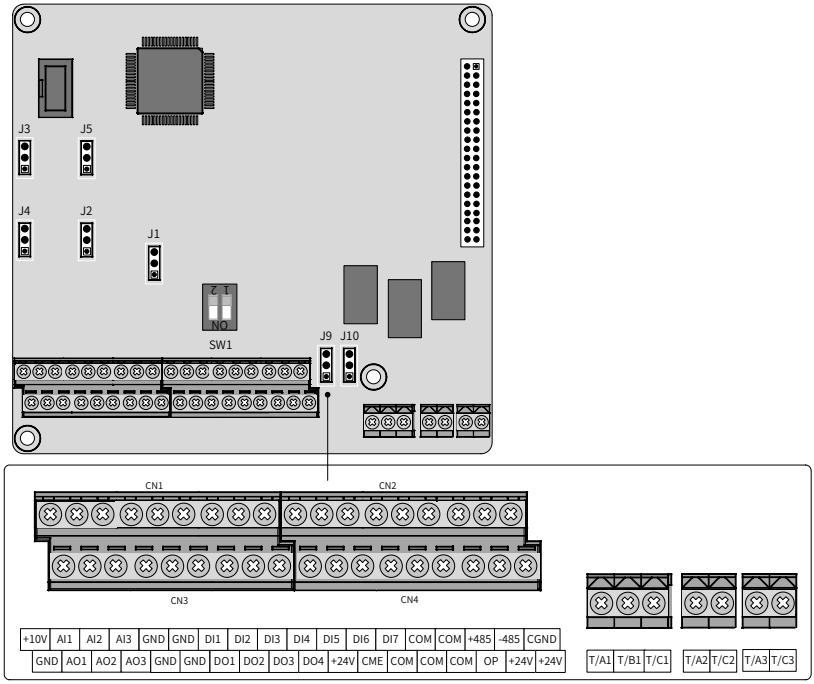
2.2.2 Main Circuit Terminals

■ AC drive terminal arrangement



Type	Mark	Name	Function
Main circuit	R, S, and T	Three-phase power input	Connected to the mains supply
	U, V, and W	AC drive output	Connected to the motor
	(+1) and (+2)	AC reactor connection	Connected to the DC reactor
	⏚	Grounding terminal	Grounding

2.2.3 Control Circuit Terminals



Note: CN1 to CN4 are interconnected pluggable terminals.

Mark	Name	Function
+10V-GND	+10 V power supply	◆ Provides the +10 V power supply with 10 mA maximum output current. ◆ Supplies power to an external potentiometer with resistance ranging from 1 kΩ to 5 kΩ.
+24V-COM	+24 V power supply	◆ 24 V±10% ◆ No-load ghost voltage ⩽ 30 V ◆ Maximum output current: 200 mA ◆ Internally isolated from OP and GND
OP	Input terminal for external power supply	◆ Internally isolated from COM and 24 V, and short-circuited to 24 V by pins 1 and 2 of jumper J9 by default. ◆ When DI1 to DI7 need to be driven by external signals, OP must be disconnected from the +24 V power terminal and connected to an external power supply.
AI1-GND	AI terminal 1	◆ Input voltage: 0 VDC to 10 VDC ◆ Input impedance: 22.1 kΩ ◆ PT100 input supported

Mark	Name	Function
AI2-GND	AI terminal 2	◆ Input: 0 VDC to 10 VDC or 0 mA to 20 mA, depending on jumper J1 of the control board Note: Voltage is input when pins 1 and 2 of jumper J1 are short-circuited (default setting); current is input when pins 2 and 3 are short-circuited. ◆ Input impedance: 22.1 kΩ (voltage input) or 500 Ω (current input) ◆ PT100 input supported
AI3-GND	AI terminal 3	◆ Input: 0 VDC to 10 VDC or 0 mA to 20 mA, depending on jumper J2 of the control board Note: Voltage is input when pins 1 and 2 of jumper J2 are short-circuited (default setting); current is input when pins 2 and 3 are short-circuited. ◆ Input impedance: 22.1 kΩ (voltage input) or 500 Ω (current input) ◆ PT100 input supported
DI1-OP	DI terminal 1	◆ Optically-coupled isolation compatible with dual-polarity inputs; maximum input frequency: 100 Hz ◆ Input impedance: 1.39 kΩ ◆ Voltage upon level input: 9 V to 24 V
DI2-OP	DI terminal 2	
DI3-OP	DI terminal 3	
DI4-OP	DI terminal 4	
DI5-OP	DI terminal 5	
DI6-OP	DI terminal 6	
DI7-OP	DI terminal 7	
AO1-GND	AO terminal 1	◆ Output voltage: 0 V to 10 V ◆ Output current: 0 mA to 20 mA ◆ Whether to output voltage or current is determined by jumpers J3, J4, and J5 of the control board. Note: Voltage is output when pins 1 and 2 of jumpers J3, J4, and J5 are short-circuited (default setting); current is output when pins 2 and 3 are short-circuited.
AO2-GND	AO terminal 2	
AO3-GND	AO terminal 3	
DO1-CME	DO terminal 1	◆ Optically-coupled isolation compatible with dual-polarity open collector outputs ◆ Output voltage: 0 V to 24 V ◆ Output current: 0 mA to 50 mA Note: The DO ground CME is isolated from the DI ground COM. By default, CME and COM are short-circuited by pins 1 and 2 of jumper J10. (DO1 to DO4 are driven by the +24 V power supply.) When DO1 to DO4 are driven by an external power supply, the external short circuit between CME and COM must be disconnected by pins 2 and 3 of jumper J10.
DO2-CME	DO terminal 2	
DO3-CME	DO terminal 3	
DO4-CME	DO terminal 4	
485+	RS485 communication positive signal	◆ Modbus supported ◆ Input isolated
485-	RS485 communication negative signal	
CGND	RS485 communication signal ground	

Mark	Name	Function
T/A1-T/B1	Normally closed (NC) terminal	Contact driving capacity: 250 VAC/3 A (COSϕ = 0.4); 30 VDC/1 A
T/A1-T/C1	Normally open (NO) terminal	
T/A2-T/C2	NO terminal	
T/A3-T/C3	NO terminal	

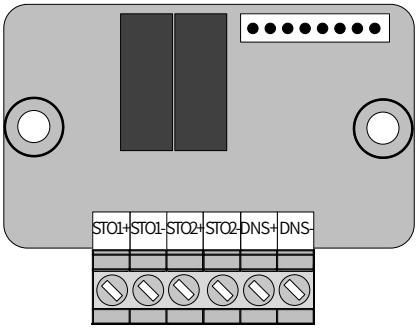
■ DI switch

Mark	Position	Terminal Resistor
SW1	Switch to 1 and 2. 	No terminal resistor is used (default setting).
	Switch to ON. 	Connected to a terminal resistor (pin 1 indicated by a white dot).

Caution

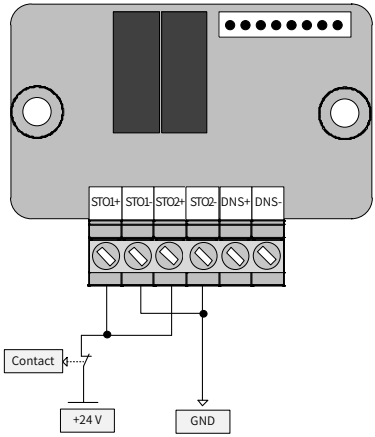
- During RS485 communication, the end AC drive must be connected to a terminal resistor (switch to 1 and 2 on SW1).
- To avoid communication signal interference, use non-parallel twisted pair shielded cables. If the bus is long, connect CGND of each node to the shielding layer of the non-parallel twisted pair shielded cable.

■ Layout of STO board terminals



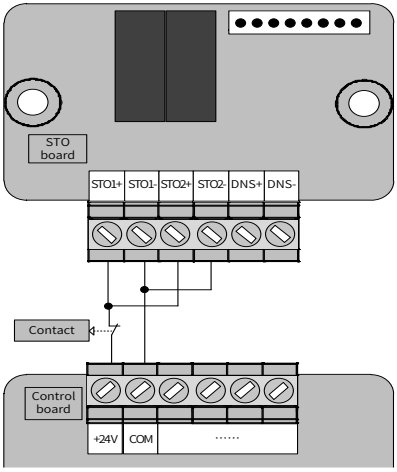
Port Signal	Function	Remarks
STO1+	Positive input of the first security signal	Vin1: Voltage difference between STO1+ and STO1-
STO1-	Negative input of the first security signal	
STO1+	Positive input of the second security signal	Vin2: Voltage difference between STO2+ and STO2-
STO2-	Negative input of the second security signal	
DNS+	Positive output of external detection signal	DNS: Voltage difference between DNS+ and DNS-; OC door output
DNS-	Negative output of external detection signal	

■ External 24 V power supply for the STO board



STO1+ and STO2+ are connected by NC contacts to the positive pole of the 24 V power supply. STO1- and STO2- are directly connected to the negative pole. When contacts are closed, the AC drive runs properly with 24 V input. When contacts are open, the AC drive executes an emergency stop.

■ Internal power supply for the STO board



STO1+ and STO2+ are connected by NC contacts to the positive pole of the 24 V power supply for the control board. STO1- and STO2- are directly connected to COM of the control board. When contacts are closed, the AC drive runs properly with 24 V input. When contacts are open, the AC drive executes an emergency stop.

3 Panel Operation

3.1 Introduction

Using the operating panel, you can set and modify function codes, monitor working status, and perform running control (start/stop) of the AC drive. You can also equip an external panel using the option LED operating panel (MD32NKE1).

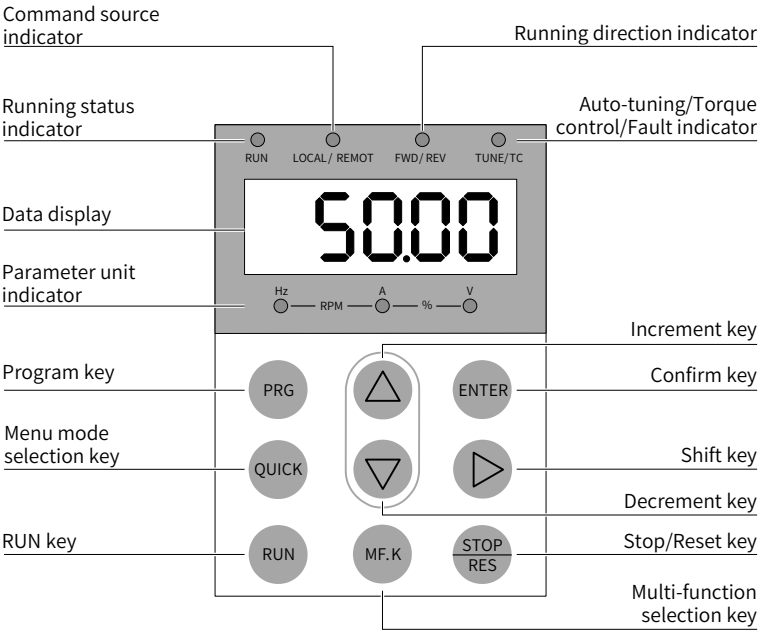


Figure 3-1 Details of the operating panel

3.2 Keys on LED Operating Panel

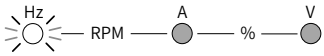
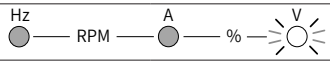
Table 3-1 Function of keys on the LED operating panel

Key	Key Name	Function
PRG	Programming	Used to enter or exit the level-1 menu.
ENTER	Confirm	Used to enter the menu interfaces level by level, and confirm the parameter setting.
△	Increment	Used to increase the displayed data or parameter number.
▽	Decrement	Used to decrease the displayed data or parameter number.
▷	Shift	Used to select the displayed parameters in turn in the stop or running state and select the digit to be modified during parameter modification.
RUN	RUN	Used to start the AC drive in the operating panel control mode.
STOP/RES	Stop/Reset	Used to stop the AC drive when it is in the running status or reset the AC drive when it is in the faulty status.
MF.K	Multifunction	Used to switch over between functions.
PRG	Menu mode selection	Used to switch over between menu modes as defined by the setting of FP-03 (Selection of individualized parameter display). By default, one menu mode is set.

3.3 Function Indicators

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

Table 3-2 Indicators on the operating panel

Indicator Status		Description
RUN Running status indicator	 RUN	Off: STOP status
	 RUN	On: RUNNING status
LOCAL/REMOT Command source indicator	 LOCAL/ REMOT	Off: under operating panel control
	 LOCAL/ REMOT	On: under terminal control
	 LOCAL/ REMOT	Flashing: under serial communication control
FWD/REV Running direction indicator	 FWD/ REV	Off: forward motor rotation
	 FWD/ REV	On: reverse motor rotation
TUNE/TC Auto-tuning/ Torque control/Fault indicator	 TUNE/ TC	Off: normal running
	 TUNE/ TC	On: torque control mode
	 TUNE/TC	Flashing slowly: auto-tuning status (once per second)
	 TUNE/TC	Flashing quickly: fault status (four times per second)
		Frequency unit: Hz
		Current unit: A
		Voltage unit: V
		Speed unit: RPM
		Percentage (%)

4 Basic Operations and Trial Run

4.1 Quick Commissioning

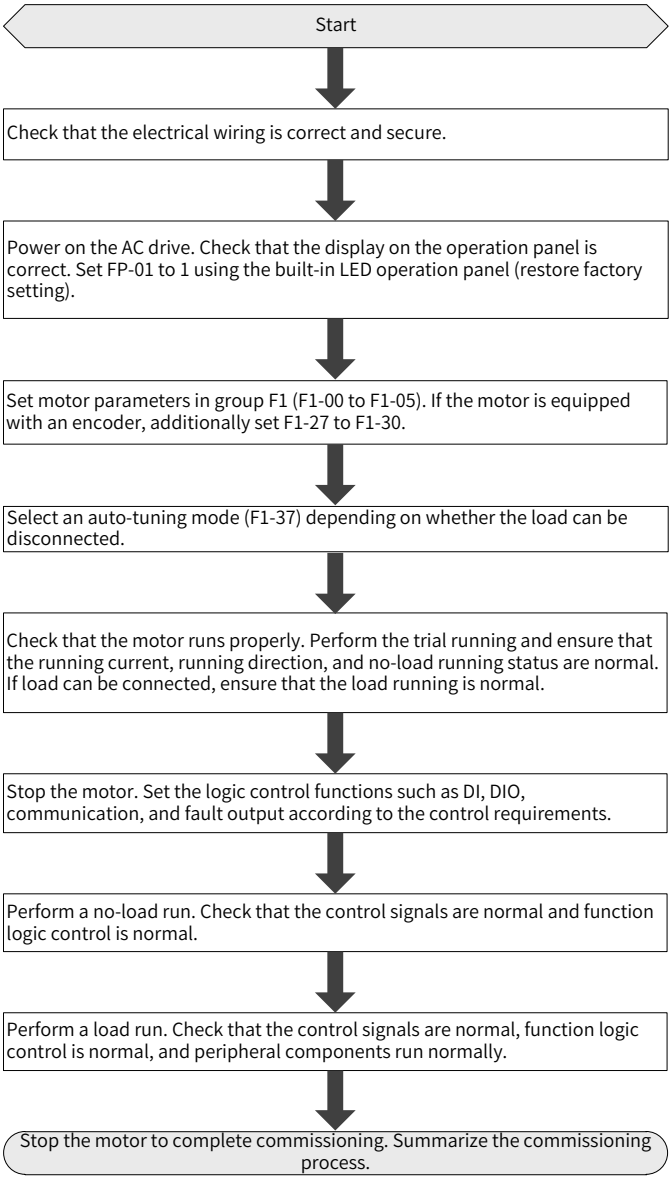


Figure 4-1 Quick commissioning steps

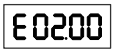
4.2 Checklist Before Power-on

Check the following items before powering on the drive.

Item	Description
Voltage	The voltage is 380 VAC to 480 VAC and 50/60 Hz.
	The input terminals R, S, and T are correctly connected.
	The AC drive and motor are grounded 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 control circuit terminals of the AC drive	Control circuit terminals of the AC drive are firmly connected to other control devices.
Status of AC drive control terminals	All control circuit terminals of the AC drive are OFF (the AC drive is not running).
Load	The motor is idle and disconnected from the mechanical system.

4.3 Display After Power-on

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

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

4.4 Parameter Initialization

You can restore the AC drive to factory parameters. After initialization, FP-01 (Parameter initialization) is automatically zeroed.

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 (Parameter initialization) is set to 1 (Restore factory parameters except motor parameters, encoder parameters, and max. frequency), most of the parameters are restored to the factory default settings. However, motor parameters,

F0-22 (Frequency reference resolution), F7-09 (Accumulative running time), F7-13 (Accumulative power-on time), F7-14 (Accumulative power consumption), and F7-07 (Max. temperature of AC drive IGBT) are not restored.

2: Clear records

Fault 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 and values of all the current function parameters are backed up for restoration after errors caused by parameter adjustment.

501: Restore user backup parameters

Restore parameters backed up by setting FP-01 (Parameter initialization) to 4 (Back up current user parameters).

4.5 Motor Control

Function Code	Description	Scenario
F0-01: Motor 1 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 = 2: V/F control	It is applicable to scenarios without requirements on load or using one AC drive to drive multiple motors, for example, fans and bumps.

4.6 Auto-tuning

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

Auto-tuning Method	Scenario	**Result**
Dynamic auto-tuning with no-load (F1-37 = 2)	It is applied to scenarios where the motor can be disconnected from load.	Best
Dynamic auto-tuning with load (F1-37 = 2)	It is applied to scenarios where the motor cannot be disconnected from the application system and with-load running is allowed. 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.	Good

Auto-tuning Method	Scenario	**Result**
Static auto-tuning 1 (F1-37 = 1)	It is applied to scenarios where the motor cannot be disconnected from the load and dynamic auto-tuning is not allowed.	Average
Static auto-tuning 2 (F1-37 = 3)	It is applied to scenarios where the motor cannot be disconnected from the load and dynamic auto-tuning is not allowed. This mode is recommended for static auto-tuning. The auto-tuning time is longer compared to static auto-tuning 1.	Better
Manual parameter input	It is applied to scenarios where the motor cannot be disconnected from the application system. Copy parameters of motors of the same model which have been auto-tuned to F1-00 (Motor type selection) to F1-10 (Asynchronous motor no-load current).	Better

Auto-tuning methods are described below.

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

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

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

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

Step 4: If an asynchronous motor is used, set F1-37 (Auto-tuning selection) to 2 (Asynchronous motor no-load autotuning) 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, the auto-tuning is complete.

After auto-tuning, the following motor parameters are automatically obtained.

Motor	Parameter
Motor 1	F1-06: Asynchronous/Synchronous motor stator resistance F1-07: Asynchronous motor rotor resistance F1-08: Asynchronous motor leakage inductive reactance F1-09: Asynchronous motor mutual inductive reactance F1-10: Asynchronous motor no-load current

If the motor cannot be disconnected from load, set F1-37 (Auto-tuning selection) to 3 and press RUN on the operating panel to start auto-tuning of motor parameters.

5 Troubleshooting

5.1 Troubleshooting During Trial Run

■ Open-loop vector control mode (F0-01 = 0: default value)

The AC drive controls the motor speed and torque without an encoder for speed feedback. In this control mode, motor auto-tuning is required to obtain the motor-related parameters.

Problem	Solutions
Overload or overcurrent detected during motor start	1) Set motor parameters F1-01 (Motor type selection) to F1-05 (Rated motor speed)according to the motor nameplate. 2) Select a proper motor auto-tuning mode by setting F1-37 (Auto-tuning selection) to 3 (Asynchronous motor static autotuning 2) and perform motor auto-tuning. If possible, select dynamic auto-tuning (F1-37 = 02). 3) Reduce the setting of F2-10 (Digital setting of torque limit in speed control, in the range from 120% to 150%).
Low speed accuracy	If the speed error is large when the motor runs with load, increase the setting of F2-06 (VC slip compensation adjustment) by 10% gradually.
Obvious speed fluctuation	1) If motor speed fluctuation is large, increase the setting of F2-07 (Speed feedback filter time constant) or A9-05 (Asynchronous motor SVC speed filter) by 0.001s gradually. 2) Increase the speed loop percentage.
Loud motor noise	Increase the setting of F0-15 (Carrier frequency) by 1.0 kHz gradually. Note that an increase in carrier frequency will result in an increase in the leakage current of the motor.
Insufficient motor torque or output	Check whether the torque upper limit is small. If yes, 1) Increase the setting of F2-10 [Digital setting of torque limit in speed control (electric)] in the speed control mode. 2) Increase A0-03 (Torque digital setting) in the torque control mode.

■ V/F control mode (F0-01 = 2)

It is applicable to applications without an encoder for speed feedback. You only need to set motor parameters according to the motor nameplate. Auto-tuning can be skipped.

Setting of the rated motor current has impact on motor overload protection.

Problem	Solutions
Motor oscillation during running	Increase the setting of F3-11 (V/F oscillation suppression gain) by 10 gradually. The permissible maximum setting here is 100.
Overcurrent during start	Decrease the setting of F3-01 (Torque boost) by 0.5% gradually. Increase the setting of F0-17 (Acceleration time 1).

Problem	Solutions
Large current during running	1) Set F1-02 (Rated motor voltage) and F1-04 (Rated motor frequency) properly. 2) Decrease the setting of F3-01 (Torque boost) by 0.5% gradually, or set it to 0.0%.
Loud motor noise	Increase the setting of F0-15 (Carrier frequency) by 1.0 kHz gradually. Note that the increase of carrier frequency will result in an increase in the leakage current of the motor.
Overvoltage detected when heavy load is suddenly removed or during deceleration	1) Ensure that F3-23 (V/F voltage limit selection) is set to 1 (enabled). Increase the setting of F3-24 (Frequency gain for V/F voltage limit)/F3-25 (Voltage gain for V/F voltage limit) by 10 gradually. The permissible maximum setting here is 100. The default value of F3-24/F3-25 is 30. 2) Decrease the setting of F3-22 (V/F voltage limit) by 10 V gradually. The permissible minimum setting here is 700 V. The default value of F3-22 is 770 V.
Overcurrent detected when heavy load is suddenly added or during acceleration	1) Increase the setting of F3-20 (V/F current limit gain) by 10 gradually. The permissible maximum setting here is 100. The default value of F3-20 is 20. 2) Decrease the setting of F3-18 (V/F current limit level) by 10% gradually. The permissible minimum setting here is 50%. The default value of F3-18 is 150%.

5.2 Fault Display and Reset

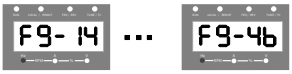
Faults are handled prior to alarms.

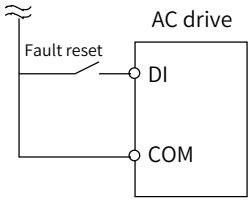
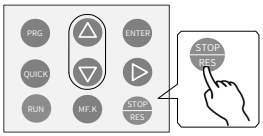
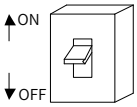
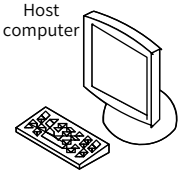
1) Example of fault code displayed: "E02.00"

2) Example of alarm code displayed: "A16.13"

When a fault occurs during running, the AC drive stops output immediately, the fault indicator 

flashes, and contact of the faulty relay acts. The following table lists faults and solutions for reference. Perform troubleshooting according to the descriptions and do not repair or modify the AC drive randomly. If the fault cannot be rectified, contact the agent or Inovance.

Stage	Solution	Remarks
After the fault occurs	Check the operating panel for detailed information of recent three faults, such as fault type and frequency, current, bus voltage, DI/DO state, accumulative power-on time and accumulative running time, IGBT temperature, and fault subcode at occurrence of the faults.	View this information using F9-14 (1st fault type) to F9-46 (Fault subcode upon 1st fault). 

Stage	Solution	Remarks
Before the fault is reset	Locate the fault cause and rectify the fault. Then follow the steps below to reset the fault.	Troubleshoot the fault according to "5.3 Faults and Diagnostics".
Fault resetting method	1) Fault resetting through a DI terminal Allocate a DI terminal with function 9 "Fault reset (RESET)" by setting any of F4-00 (DI1 function selection) to F4-04 (DI5 function selection) to 9 (Fault reset).	
	2) Fault resetting using the operating panel Press the STOP key on the operating panel.	
	3) Automatic resetting Disconnect the power supply. Wait until the fault code disappears, and connect the power supply again.	
	4) Fault resetting through communication Confirm that F0-02 (Command source selection) is set to 2 (Serial comms.) and write "7" (fault reset) to communication address 2000H using a host controller.	

5.3 Faults and Diagnostics

Fault Code	Fault Name	Cause	Possible Solution
E01.01	Hardware fault	The AC drive is abnormal in current sampling.	Check whether the main circuit is powered on. Check whether the hall sensor or current sampling circuit is damaged. If yes, contact the agent or Inovance.
E01.02		The contactor is faulty.	Check the contactor.
E01.03		The braking resistor is short-circuited.	Check that the braking resistor is normal and its model matches the AC drive model.

Fault Code	Fault Name	Cause	Possible Solution
E02.00	Overcurrent during acceleration	A ground fault or short circuit exists in the output circuit of the AC drive.	Check whether short circuit occurs on the motor, motor cable, or contactor.
		The control mode is SVC but motor auto-tuning is not performed.	Set motor parameters according to the motor nameplate and perform motor auto-tuning.
		Acceleration time is too short.	Increase acceleration time.
		The overcurrent stall prevention parameters are set improperly.	Ensure that current limit is enabled (F3-19 = 1). The setting of F3-18 (V/F current limit level) is too large. Adjust it between 110% and 140%. The setting of F3-20 (V/F current limit gain) is too small. Adjust it between 5 and 20.
		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 flying start 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, locate the interference source. If external interference does not exist, the drive board or hall device may be faulty.
E03.00	Overcurrent during deceleration	A ground fault or short circuit exists in the output circuit of the AC drive.	Check whether short circuit occurs on the motor, motor cable, or contactor.
		The control mode is SVC but motor auto-tuning is not performed.	Set motor parameters according to the motor nameplate and perform motor auto-tuning.
		Deceleration time is too short.	Increase deceleration time.
		The overcurrent stall prevention parameters are set improperly.	Ensure that current limit is enabled (F3-19 = 1). The setting of F3-18 (V/F current limit level) is too large. Adjust it between 110% and 140%. The setting of F3-20 (V/F current limit gain) is too small. Adjust it between 5 and 20.
		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, locate the interference source. If external interference does not exist, the drive board or hall device may be faulty.

Fault Code	Fault Name	Cause	Possible Solution
E04.00	Overcurrent at constant speed	A ground fault or short circuit exists in the output circuit of the AC drive.	Check whether short circuit occurs on the motor, motor cable, or contactor.
		The control mode is SVC 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 (V/F current limit level) is too large. Adjust it between 110% and 140%. The setting of F3-20 (V/F current limit gain) is too small. Adjust it between 5 and 20.
		The AC drive power class is small.	If output current exceeds rated motor current or rated output current of the AC drive during stable running, replace a 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, locate the interference source. If external interference does not exist, the drive board or hall device may be faulty.
E05.00	Overvoltage during acceleration	Input voltage is too high.	Adjust input voltage to normal range.
		An external force drives the motor during acceleration.	Remove the external force or install a braking resistor. The setting of F3-26 (Frequency rise threshold during voltage limit) is too small. Adjust it between 5 Hz and 15 Hz.
		The overvoltage stall prevention parameters are set improperly.	Ensure that the voltage limit function is enabled (F3-23 = 1). The setting of F3-22 (V/F voltage limit) is too large. Adjust it between 700 V and 770 V. The setting of F3-24 (Frequency gain for V/F 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.
		Acceleration time is too short.	Increase acceleration time.

Fault Code	Fault Name	Cause	Possible Solution
E06.00	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 (V/F voltage limit) is too large. Adjust it between 700 V and 770 V. The setting of F3-24 (Frequency gain for V/F voltage limit) is too small. Adjust it between 30 and 50.
		An external force drives motor during deceleration.	Remove the external force or install a braking resistor. The setting of F3-26 (Frequency rise threshold during voltage limit) is too small. Adjust it between 5 Hz and 15 Hz.
		Deceleration time is too short.	Increase deceleration time.
		The braking unit and braking resistor are not installed.	Install the braking unit and braking resistor.
E07.00	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 ofF3-22 (V/F voltage limit) is too large. Adjust it between 700 V and 770 V. The setting of F3-24 (Frequency gain for V/F voltage limit) is too small. Adjust it between 30 and 50.
		An external force drives the motor during running.	Remove the external force or install a braking resistor. The setting of F3-26 (Frequency rise threshold during voltage limit) is too small. Adjust it between 5 Hz and 15 Hz.
E08.00	Pre-charge resistor overload	Input voltage is not within the permissible range, causing frequent ON/OFF of contactor.	Adjust the voltage to normal range to ensure that bus voltage fluctuation does not cause frequent contactor ON/OFF.
E09.00	Undervoltage	Instantaneous power failure occurs.	Enable the power dip ride through function by setting F9-59 (Power dip ride-through function selection) to a non-zero value.
		The AC drive's input voltage is not within the permissible range.	Adjust the voltage to normal range.
		The bus voltage is abnormal.	Contact the agent or Inovance.
		The rectifier bridge, the inverter drive board, or the inverter control board is abnormal.	Contact the agent or Inovance.

Fault Code	Fault Name	Cause	Possible Solution
E10.00	AC drive overload	The load is too heavy or locked-rotor occurs on the motor.	Reduce load or check motor and mechanical conditions.
		The AC drive power class is small.	Replace a drive of larger power class.
		The control mode is SVC but motor auto-tuning is not performed.	Set motor parameters according to the motor nameplate and perform motor auto-tuning.
		The V/F control mode is used.	Reduce the setting of F3-01 (Torque boost) by 1.0% gradually, or set it to 0 (auto torque boost).
E10.01	Pulse-by-pulse current limit fault	The load is too heavy or locked-rotor occurs on the motor.	Reduce load or check motor and mechanical conditions. Replace a drive of larger power class.
		The AC drive power class is small.	
E11.00	Motor overload	F9-01 (Motor overload protection gain) is set improperly.	Set F9-01 properly.
		The load is too heavy or locked-rotor occurs on the motor.	Reduce load or check motor and mechanical conditions.
E12.01	Input voltage fault	R phase is lost.	Check whether input phase loss occurs. Check whether the input cable is broken. Check that DI terminals are properly connected. Check the hardware voltage detection circuit.
E12.02		S phase is lost.	
E12.03		T phase is lost.	
E12.04		Overvoltage occurs on input phase.	Adjust the voltage to normal range.
E12.05		Voltage imbalance occurs on input phase.	Check whether input phase loss occurs. Check the hardware voltage detection circuit.
E13.00	Output phase loss	The motor is faulty.	Check whether open circuit occurs on the motor.
		The cable connecting the AC drive and the motor is abnormal.	Rectify 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	Cause	Possible Solution
E14.00	IGBT overheat	The ambient temperature is too high.	Lower the ambient temperature.
		The ventilation is clogged.	Clean the ventilation.
		The cooling fan is damaged.	Replace the fan.
		The thermally sensitive resistor of The IGBT is damaged.	Contact the agent or Inovance.
		The IGBT is damaged.	
E15.01	External fault	An external fault signal is input through an NO DI.	Confirm that the mechanical condition allows restart (F8-18, Startup protection selection) and reset the operation.
E15.02		An external fault signal is input through an NC DI.	Confirm that the mechanical condition allows restart (F8-18, Startup protection selection) and reset the operation.
E16.01	Communication fault	Modbus communication timeout	Check whether the RS485 cable is correctly connected. Check whether the settings of Fd-04 (Modbus communication timeout) and PLC communication cycle are proper.

Fault Code	Fault Name	Cause	Possible Solution
E19.02	Motor auto-tuning fault	Auto-tuning of pole position angle of the synchronous motor is faulty.	The motor may be disconnected, or output phase loss may occur.
E19.04			
E19.05		Auto-tuning of initial pole position angle of the synchronous motor is faulty.	Increase the setting of F2-29 (Initial position angle test current for synchronous motor).
E19.06		Stator resistance auto-tuning is faulty.	Check whether the motor is connected. Ensure that F1-03 (Rated motor current) is set according to the motor nameplate.
E19.07			
E19.08			
E19.09		Auto-tuning of instantaneous leakage inductance of the asynchronous motor is faulty.	Check whether the motor is connected or output phase loss occurs. Ensure that the motor is connected.
E19.10			
E19.11		Inertia auto-tuning is faulty.	Ensure that F1-03 (Rated motor current) is set according to the motor nameplate. Increase the setting of F2-43 (Inertia auto-tuning and dynamic speed reference).
E19.12		Auto-tuning times out.	Check whether the motor is connected or output phase loss occurs. Ensure that the motor is disconnected from load.
E19.13			
E19.14			
E19.15			
E19.16			
E19.17			
E19.19			
E19.20		Auto-tuning of zero position angle of the no-load synchronous motor times out.	Check the Z feedback signal.
E19.22			
E19.23		Auto-tuning of pole position of the synchronous motor is faulty.	Ensure that F1-03 (Rated motor current) is set according to the motor nameplate. Decrease the setting of F2-29 (Initial position angle test current for synchronous motor).
E19.24		Auto-tuning of instantaneous leakage inductance of asynchronous motor is incorrect.	Check whether the AC drive power class is small, and replace an AC drive of proper power class based on motor power.

Fault Code	Fault Name	Cause	Possible Solution
E21.01 E21.02 E21.03 E21.04	EEPROM read and write fault	EEPROM read and write is abnormal.	For parameters written to EEPROM, check RAM addresses and address mapping. For details, see the address expression rules in *"Appendix A Definition of Communication Data Address and Modbus Communication Protocol"*. If the EEPROM chip is damaged, require the agent or Inovance to replace the main control board.
E22.00	Abnormal motor auto-tuning result	Stator resistance is not within the permissible range.	Check whether rated motor voltage and current are incorrectly set, and set F1-02 (Rated motor voltage) and F1-03 (Rated motor current) according to the motor nameplate. Check that auto-tuning is performed after the motor stops.
E22.01		Asynchronous motor rotor resistance is not within the permissible range.	
E22.02		No-load current and mutual inductive reactance of the asynchronous motor are not within the permissible range. If such an alarm is generated, the AC drive calculates no-load current and mutual inductive reactance based on known parameters. The calculated values may be different from optimal values.	Set motor parameters in group F1 according to the motor nameplate. Before auto-tuning, ensure that the motor has no load.
E22.03		Synchronous motor back EMF is not within the permissible range after auto-tuning.	Ensure that F1-02 (Rated motor voltage) is set according to the motor nameplate. Before auto-tuning, ensure that the motor has no load.
E22.04		Inertia auto-tuning is faulty.	Ensure that F1-03 (Rated motor current) is set according to the motor nameplate.
E23.00	Short circuit to ground	The motor is short circuited to the ground.	Replace the faulty cable or motor.
E24.00	Motor phase-to-phase short circuit	Phase-to-phase short circuit occurs on the motor.	Check whether two-phase short circuit occurs in three-phase (U, V, W) output.
E26.00	Accumulative running time reached	Accumulative running time reaches the setting value.	Clear the record through parameter initialization.
E29.00	Accumulative power-on time reached	Accumulative power-on time reaches the setting value.	Clear the record through parameter initialization.

Fault Code	Fault Name	Cause	Possible Solution
E30.00	Load loss	The output current of the AC drive is smaller than F9-64 (Load lost detection level).	Check whether the load is disconnected or the setting of F9-64 and F9-65 (Load lost detection time) satisfies actual running conditions.
E31.00	PID feedback lost during running	PID feedback is smaller than the setting value of FA-26 (Detection level of PID feedback loss).	Check PID feedback or set FA-26 properly.
E42.00	Excessive speed deviation	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 improperly.	Set F9-69 and F9-70 properly based on actual conditions.
E43.00	Motor over-speed	Encoder parameters are set improperly.	Set encoder parameters properly.
		Motor auto-tuning is not performed.	Perform motor auto-tuning.
		F9-67 (Over-speed detection level) and F9-68 (Over-speed detection time) are set improperly.	Set F9-67 and F9-68 properly based on actual conditions.
E45.00	Motor overheat	Cable connection of the temperature sensor is loose.	Check cable connection of the temperature sensor.
		The motor temperature is too high.	Increase carrier frequency or take other measures to cool the motor.
		The setting of F9-57 (Motor overheat protection threshold) is too small.	Increase the setting of F9-57 (90°C to 100°C for common motors).
E46.01	Synchronous control parameter setting fault	More than two slave types are set.	Check whether the slave option is selected for A8-10, A8-50, and A8-70.
E47.00	STO fault	The STO card is faulty.	Check STO wiring.

5.4 Symptoms and Diagnostics

No.	Fault Description	Cause	Possible Solution
1	There is no display at power-on.	The mains voltage is not input or is too low.	Check the power supply.
		The switching power supply on the drive board of the AC drive is faulty.	Check bus voltage.
		The control board or operating panel is faulty.	Contact the agent or Inovance.
		The rectifier module is damaged.	
2	"HC" is displayed at power-on.	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 sensor is damaged.	
		The mains voltage is too low.	
3	"E23.00" is displayed at power-on.	The motor or motor output cable is short circuited to ground.	Use a megger to measure the insulation resistance of the motor and motor cable.
		The AC drive is damaged.	Contact the agent or Inovance.
4	The display is normal at power-on. But after running, "HC" is displayed and the AC drive stops immediately.	The cooling fan is damaged or locked-rotor occurs.	Replace the fan.
		Short circuit exists in wiring of control terminals.	Eliminate short circuit faults in control circuit wiring.
5	E14.00 (IGBT overheat) is detected frequently.	The setting of carrier frequency is too high.	Reduce F0-15 (Carrier frequency).
		The cooling fan is damaged, or ventilation is clogged.	Replace the fan or clean the ventilation.
		Components inside the AC drive are damaged (thermistor or others).	Contact the agent or Inovance.

No.	Fault Description	Cause	Possible Solution
6	The motor does not rotate after the AC drive runs.	The motor or motor cable is faulty.	Check that wiring between the AC drive and motor is normal.
		Motor parameters are set improperly on the AC drive.	Restore the factory parameters and reset the following parameters properly: ◆ Motor ratings, such as rated motor frequency and rated motor speed ◆ F0-01 (Motor 1 control mode) and F0-02 (Command source selection) ◆ F3-01 (Torque boost) in V/F control under heavy-load start.
		The drive board is faulty.	Contact the agent or Inovance.
7	DI terminals are disabled.	Related parameters are set improperly.	Check and set parameters in group F4 again.
		External signals are incorrect.	Re-connect external signal cables.
		The jumper across OP and +24 V is loose.	Re-confirm the jumper bar across OP and +24 V.
		The control board is faulty.	Contact the agent or Inovance.
8	The AC drive detects overcurrent and overvoltage frequently.	Motor parameters are set improperly.	Set motor parameters or perform motor auto-tuning again.
		Acceleration/Deceleration time is set improperly.	Set proper acceleration/deceleration time.
		Load fluctuates.	Contact the agent or Inovance.
9	The braking torque is insufficient when the motor is decelerating or decelerates to stop.	Voltage limit is enabled.	If a braking resistance is configured, set F3-23 (V/F voltage limit selection) to 0 (Disabled) to disable voltage limit.

Appendix A Definition of the Communication Data Address and Modbus Communication Protocol

A.1 Definition of the Communication Data Address

The CA300 AC drive supports the Modbus-RTU communication protocol. The host controller can implement control such as monitoring and parameter viewing and modification on the AC drive using this protocol.

The AC drive's communication data is classified into parameter data and non-parameter data. The non-parameter data includes running commands, running status, running parameters, and alarm information.

1 Parameter Data

The parameter data provides important parameters of the AC drive. The parameter data is described as below:

Parameter Data	Group F (read-write)	F0, F1, F2, F3, F4, F5, F6, F7, F8, F9, FA, FB, FC, Fd, FE, FF
	Group A (read-write)	A0, A1, A2, A3, A4, A5, A6, A7, A8, A9, AA, AB, AC, AD, AE, AF

Communication addresses of parameter data are defined as follows:

1) When parameter data is read through communication

For groups F0 to FF and A0 to AF, the high 16 bits of the communication address indicate the group number and the low 16 bits indicate the parameter number in the group.

Example:

The communication address of F0-16 is F010H, where F0H indicates group F0 and 10H is the hexadecimal data format of serial number 16 in the group.

The communication address of AC-08 is AC08H, where ACH indicates group AC and 08H is the hexadecimal data format of serial number 8 in the group.

2) When parameter data is written through communication

For groups F0 to FF, whether the high 16 bits in the communication address are 00 to 0F or F0 to FF is determined by whether the high 16 bits are written to EEPROM. The low 16 bits indicate the parameter number in the group.

F0-16 is used as an example:

If F0-16 is not written to EEPROM, its communication address is 0010H.

If F0-16 is to be written to EEPROM, its communication address is F010H.

For groups A0 to AF, whether the high 16 bits in the communication address are 40 to 4F or A0 to AF is determined by whether the high 16 bits are written to EEPROM. The low 16

bits indicate the parameter number in the group.

AC-08 is used as an example:

If AC-08 is not written to EEPROM, its communication address is 4C08H.

If AC-08 is written to EEPROM, the communication address is AC08H.

2 Non-Parameter Data

Non-parameter Data	Status data (read-only)	Group U (monitoring parameters), AC drive fault information, and AC drive running status
	Control parameters (write-only)	Control commands, communication setting values, DO control, AO1 control, and parameter initialization

1) Status data

Status data includes group U (monitoring parameters), AC drive fault description, and AC drive running status.

Group U (monitoring parameters):

The high 16 bits in communication addresses of U0 to UF is 70 to 7F and the low 16 bits indicate the parameter number in the group. For example, the communication address of U0-11 is 700BH.

AC drive fault description:

When fault description is read through communication, the communication address is fixed to 8000H. You can obtain the current fault code of the AC drive by reading the address.

AC drive running status:

When the drive running status is read through communication, the communication address is fixed to 3000H. You can obtain current running status information of the AC drive by reading the address. The running status is defined in the following table.

Communication Address of AC Drive's Running Status	Status Definition	
3000H	1: Forward run 2: Reverse run 3: Stop	4: Auto-tuning 5: Fault

2) Control parameters

The control parameters include control commands, communication setting values, DO control, AO1 control and parameter initialization.

■ Control commands

When F0-02 (Command source selection) is set to 2 (Serial comms.), you can implement

control such as start/stop of the AC drive using communication addresses on the host controller. The control commands are defined in the following table.

Communication Address of Control Commands	Command Definition	
2000H	1: Forward run 2: Reverse run 5: Coast to stop	6: Decelerate to stop 7: Fault reset

■ Communication setting value

Communication setting values include data set through communication, such as frequency reference, torque limit, V/F separation voltage, PID reference, and PID feedback. The communication address is 1000H. The data range is -10000 to 10000 and corresponding value range is -100.00% to 100.00%.

■ DO control

When a DO terminal is set for function 20 (Communication setting), you can implement control on DO terminals of the AC drive using the communication address 2001H on the host controller. The reserved bit is set to 0. Control on DO terminals of the AC drive is defined in the following table.

Communication Address of DO Control	Command Definition	
2001H	Bit 0: DIO1 output control Bit 1: DIO2 output control Bit 2: Relay1 output control Bit 3: Reserved Bit 4: Reserved	Bit 5: Reserved Bit 6: Reserved Bit 7: Reserved Bit 8: Reserved Bit 9: Reserved

■ AO1 control

When AO1 is set to function 12 (Communication setting), you can implement control on AO using communication addresses on the host controller. The definition is provided in the following table.

Output Control Communication Address		Command Definition
AO1	2002H	0 to 7FFF indicates 0% to 100%.

■ Parameter initialization

This function is required for performing parameter initialization on the AC drive by using the host controller.

If FP-00 (User password) is set to a non-zero value, pass password verification first. After password verification is successful, the host controller performs parameter initialization within 30 seconds.

The communication address for password verification through communication is 1F00H. Directly write the correct user password to this address to perform password verification.

The communication address of parameter initialization through communication is 1F01H, which is defined in the following table.

Communication Address of Parameter Initialization	Command Definition
1F01H	1: Restore default settings
	2: Clear records
	4: Restore user backup parameters
	501: Back up current user parameters

A.2 Modbus Communication Protocol

The AC drive provides the RS485 communication interface and supports the Modbus-RTU communication protocol, which enables the user to implement centralized control using a PC or PLC, such as setting running commands, modifying and reading parameters, and reading running status and fault information of the AC drive.

This protocol defines the content and format of transmitted messages during serial communication, including the master polling (or broadcasting) format and master coding method (parameters for actions, transmission data, and error check). The slave uses the same structure in response, including action confirmation, data returning, and error check. If an error occurs when the slave receives a message, or the slave cannot complete the action required by the master, the slave returns a fault message as a response to the master.

1) Application

The AC drive is connected to a "single-master multi-slave" PC/PLC control network as a communication slave with the RS485 bus.

2) Bus structure

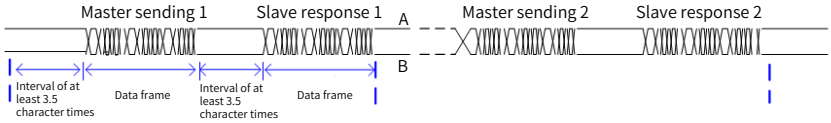
■ Topological structure

The system consists of a single master and multiple slaves. In the network, each communication device has a unique slave address. A device functions as the communication master (a PC, PLC, or HMI) and initiates communication to perform parameter read or write operations on slaves. The other devices (slaves) respond to query or communication operations from the master. Only one device is allowed to transmit data at a time and other device receives data only.

The address range of the slaves is 1 to 247, and 0 is the broadcast address. A slave address must be unique in the network.

■ Transmission mode

The asynchronous serial and half-duplex transmission mode is used. During asynchronous serial communication, data is sent frame by frame in the form of packet. In the Modbus-RTU protocol, an interval of at least 3.5 character times marks the end of the previous message. A new message starts to be sent after this interval.



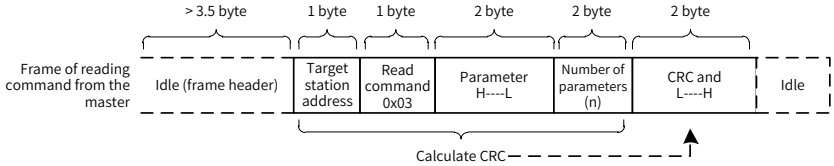
The communication protocol used by the AC drive is the Modbus-RTU slave communication protocol, which allows the AC drive to respond to "query/command" from the master or execute the action according to "query/command" from the master.

The master, which is a PC, an industrial device, or a PLC, can communicate with a single slave or send broadcast messages to all slaves. When the master communicates with a single slave, the slave must return a message (response) to "query/command" from the master. For a broadcast message sent by the master, the slaves need not return a response.

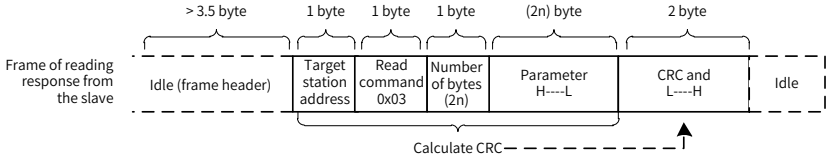
A.3 Data Format

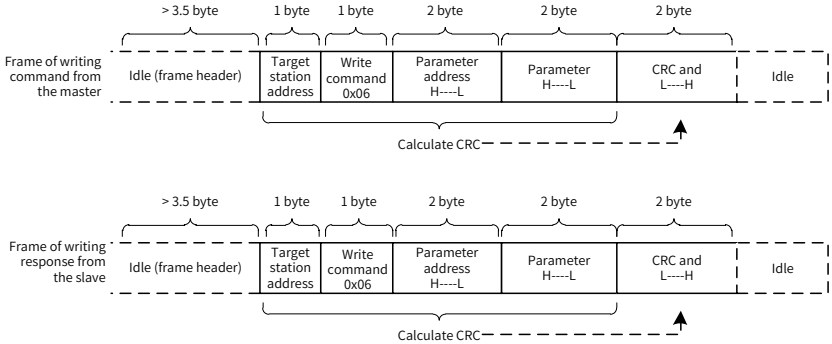
The AC drive supports reading and writing of word-type parameters only. The reading command and writing command are 0x03 and 0x06, respectively. Reading and writing of bytes or bits is not supported.

The Modbus-RTU protocol communication data format of the AC drive is as follows:

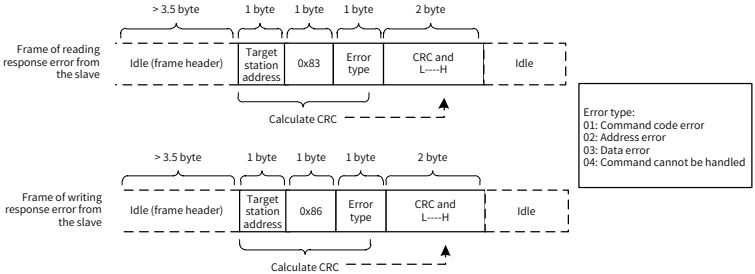


In theory, the host controller can read several consecutive parameters (n can reach up to 12), but the last parameter it reads cannot jump to the next parameter group. Otherwise, an error occurs on the response.





If the slave detects a communication frame error or a reading/writing failure is caused by other reasons, an error frame will be returned:



The frame format is described in the following table.

Frame Header (START)	Greater than the 3.5 character times
Slave Address (ADR)	Communication address: 1 to 247 0: Broadcast address
Command Code (CMD)	03: Read slave parameters 06: Write slave parameters
Parameter Address (H)	It is the internal parameter address of the AC drive, expressed in hexadecimal format. The parameters include functional parameters and non-functional parameters (such as running status and running command). For details, see the definition of addresses. During transmission, low-order bytes follow the high-order bytes.
Parameter Address (L)	
Number of Parameters (H)	It is the number of parameters read by this frame. If it is 1, one parameter is read. During transmission, low-order bytes follow the high-order bytes. In the present protocol, only one parameter is re-written once, and this field is unavailable.
Number of Parameters (L)	

Data (H)	It is the response data or data to be written. During transmission, low-order bytes follow the high-order bytes.
Data (L)	
CRC CHK Low Bytes	It is the detection value (CRC16 verification value). During transmission, high-order bytes follow the low-order bytes. For the calculation method, see CRC below.
CRC CHK High Bytes	
END	It is 3.5 character transmission times.

■ CRC

CRC (Cyclical Redundancy Check) uses the RTU frame format. A Modbus message includes an error detection domain based on the CRC method. The CRC field checks the content of the entire message. The CRC field is two bytes, containing a 16-bit binary value. The CRC field is calculated by the transmitting device, and then added to the message. The receiving device recalculates CRC of received messages that is compared with the value in the received CRC domain. If both CRC values are unequal, a transmission error occurs.

The CRC is first stored to 0xFFFF. Then a procedure is invoked to process the successive 8-bit byte in the message and the value in the register. Only the eight bits in each character are used for the CRC. The start bit, stop bit, and the parity bit do not apply to the CRC.

During generation of the CRC, each eight-bit character is in exclusive-OR (XOR) with the content in the register. Then the result is shifted in the direction of the least significant bit (LSB), with a zero filled into the most significant bit (MSB) position. The LSB is extracted and examined. If the LSB is 1, the register then performs XOR with a preset value. If the LSB is 0, no XOR is performed. This process is repeated until eight shifts have been performed. After the last (eighth) shift, the next eight-bit byte is in XOR with the register's current value, and the process repeats for eight more shifts as described above. The final value of the register, after all the bytes of the message have been applied, is the CRC value.

When CRC is added in a message, high order bytes follow low order bytes. The CRC simple function is as follows:

```
unsigned int crc_chk_value (unsigned char *data_value,unsigned char length)
{
                    unsigned int crc_value=0xFFFF;
                    int i;
                    while (length--)
                    {
                            crc_value^=*data_value++;
                            for (i=0;i<8;i++)
                            {
                                    if (crc_value&0x0001)
                                    {
                                            crc_value= (crc_value>>1) ^0xa001;
```

```
                                        }
                                        else
                                        {
                                                crc_value=crc_value>>1;
                                        }
                                }
                        }
                        return (crc_value);
}
```

■ Definition of communication parameter addresses

Function parameters can be read and written (except unchangeable parameters that are only for factory use or monitoring).

A.4 Parameter Address Expression Rules

The parameter group No. and parameter identifying No. are used to express the parameter address.

High-order bytes: F0 to FF (groups F), A0 to AF (groups A), 70 to 7F (groups U)

Low-order bytes: 00 to FF

For example, the communication address of F3-12 is expressed as 0xF30C.

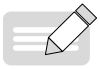
Note:

Group FF: They are factory parameters. The parameters cannot be read or changed.

Groups U: These parameters can only be read.

Some parameters cannot be modified when the AC drive is running. Some parameters cannot be modified regardless of status of the AC drive. In addition, pay attention to the setting range, unit, and description of parameters when modifying them.

Parameter Group	Visited Address	Parameter Address in RAM
F0 to FE	0xF000 to 0xFEFF	0x0000 to 0x0EFF
A0 to AC	0xA000 to 0xACFF	0x4000 to 0x4CFF
B0 to BF	0xB000 to 0xBFFF	0x5000 to 0x5FFF
C0 to CF	0xC000 to 0xCFFF	0x6000 to 0x7FFF
U0	0x7000 to 0x70FF	



NOTE

Frequent storage to the EEPROM reduces its service life. Therefore, in communication mode, users can change values of certain parameters in RAM rather than storing the setting.

For groups F parameters, users only need to change high order F of the parameter address to 0.

For groups A parameters, users only need to change high order A of the parameter address to 4.

The parameter addresses are expressed as follows:

High-order bytes: 00 to 0F (groups F), 40 to 4F (groups A)

Low-order bytes: 00 to FF

For example, if parameter F3-12 is not stored into EEPROM, the address is expressed as 030C; if parameter A0-05 is not stored into EEPROM, the address is expressed as 4005. This address supports only RAM writing and does not support RAM reading, and it is an invalid address when being read.

■ Stop/Run parameters

Para. Address	Description	Para. Address	Description
1000H	Communication setting value (decimal): -10000 to 10000	1010H	PID reference
1001H	Running frequency	1011H	PID feedback
1002H	Bus voltage	1012H	PLC process
1003H	Output voltage	1013H	Pulse input frequency, unit: 0.01 kHz
1004H	Output current	1014H	Feedback speed, unit: 0.1 Hz
1005H	Output power	1015H	Remaining running time
1006H	Output torque	1016H	AI1 voltage before correction
1007H	Running speed	1017H	AI2 voltage before correction
1008H	DI input indication	1019H	Linear speed
1009H	DO output indication	101AH	Current power-on time
100AH	AI1 voltage	101BH	Current running time
100BH	AI2 voltage	101CH	Pulse input frequency, unit: 1 Hz
100DH	Counting value input	101DH	Communication reference
100EH	Length value input	101EH	Actual feedback speed
100FH	Load speed	101FH	Main frequency reference X display
–	–	1020H	Auxiliary frequency reference Y display

NOTE

- The communication setting value indicates percentage: 10000 corresponds to 100.00%, and -10000 corresponds to -100.00%.
- With regard to frequency, communication reference is a percentage of F0-10 (Max. frequency). With regard to torque, communication reference is a percentage of F2-10 [Digital setting of torque limit in speed control (electric)].

Control command input to the AC drive (write-only):

Command Word Address	Command Word Function
2000H	0000: Stop in mode set by F6-10
	0001: Forward run
	0002: Reverse run
	0003: Forward jog
	0004: Reverse jog
	0005: Coast to stop
	0006: Decelerate to stop
	0007: Fault reset

AC drive state reading (read-only):

State Word Address	State Word Function
3000H	0001: Forward run
	0002: Reverse run
	0003: Stop
	0004: Auto-tuning
	0005: Fault

Parameter lock password check:

If the actual password is returned, the password check is passed. If no password exists (password value = 0), 0000H is returned.

Password Address	Password Content
1F00H	*****

DO terminal control (write-only):

Command Address	Command Content
2001H	Bit 0: DO1 control Bit 1: DO2 control Bit 2: Relay1 output control Bit 3: Reserved Bit 4: Reserved Bit 5: Reserved Bit 6: Reserved Bit 7: Reserved Bit 8: Reserved Bit 9: Reserved

AO1 control (write-only):

Command Address	Command Content
2002H	0 to 7FFF indicates 0% to 100%.

AC drive fault description:

AC Drive Fault Address	AC Drive Fault Information (Hexadecimal)	
8000H	0000: No fault 0001: Hardware fault 0002: Overcurrent during acceleration 0003: Overcurrent during deceleration 0004: Overcurrent at constant speed 0005: Overvoltage during acceleration 0006: Overvoltage during deceleration 0007: Overvoltage at constant speed 0009: Undervoltage 000A: AC drive overload 000B: Motor overload 000C: Input phase loss 000D: Output phase loss 000E: IGBT overheat 000F: External fault 0010: Communication fault 0013: Motor auto-tuning fault	0014: Reserved 0015: Parameter read and write fault 0016: Abnormal motor auto-tuning result 0017: Motor short circuited to ground 0018: Phase-to-phase short circuit 0019: Rectifier fault 001A: Accumulative running time reached 001B: User-defined fault 1 001C: User-defined fault 2 001D: Accumulative power-on time reached 001E: Load lost 001F: PID feedback lost during running 002A: Large speed deviation 002B: Motor over-speed 002D: Motor overheat 0050: Fan fault

Appendix B Description of Parameters

B.1 Parameter Table

The symbols in the parameter table are described as follows:

☆ : 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.

Para. No.	Para. Name	Setting Range	Default	Property
Group F0: Standard Parameters				
F0-00	G/P type display	1: G type (constant-torque load model)	Model dependent	●
F0-01	Motor 1 control mode	0: Sensorless vector control (SVC) 1: Reserved 2: Voltage/Frequency (V/F) control (not available for synchronous motor)	0	★
F0-02	Command source selection	0: External Operating panel (keypad & LED display) or commissioning software 1: Terminal I/O control 2: Serial comms.	0	★
F0-03	Main frequency reference setting channel selection	0: Digital setting F0-08 (pressing UP or DOWN can revise F0-08 easily, but the revised value would be cleared after power off) 1: Digital setting F0-08 (pressing UP or DOWN can change F0-08 easily, and the revised value won't be cleared even after power off) 2: AI1 3: AI2 4: AI3 5: Pulse setting (DI5) 6: Multi-reference setting 7: Simple PLC 8: PID 9: Communication setting 10: Reserved	0	★
F0-04	Auxiliary frequency reference setting channel selection	Same as F0-03	0	★

Para. No.	Para. Name	Setting Range	Default	Property
F0-05	Base value of range of auxiliary frequency reference for main and auxiliary superposition	0: Relative to maximum frequency 1: Relative to main frequency reference	0	☆
F0-06	Range of auxiliary frequency reference for main and auxiliary superposition	0% to 150%	100%	☆
F0-07	Final frequency reference setting selection	Ones position: Frequency reference selection 0: Main frequency reference 1: Main and auxiliary calculation (based on tens position) 2: Switchover between main and auxiliary 3: Switchover between main and "main & auxiliary calculation" 4: Switchover between auxiliary and "main & auxiliary calculation" Tens position: Main and auxiliary calculation formula 0: Main + auxiliary 1: Main - auxiliary 2: Max. (main, auxiliary) 3: Min. (main, auxiliary) 4: Main x auxiliary	0	☆
F0-08	Preset frequency	0.00 Hz to max. frequency (F0-10)	50.00 Hz	☆
F0-09	Running direction	0: Run in the same direction 1: Run in opposite direction	0	☆
F0-10	Max. frequency	50.00 to 600.00 Hz	50.00 Hz	★
F0-11	Setting channel of frequency reference upper limit	0: Set by F0-12 1: AI1 2: AI2 3: AI3 4: Reserved 5: Communication setting 6: Multi-reference	0	★
F0-12	Frequency reference upper limit	Frequency lower limit (F0-14) to max. frequency (F0-10)	50.00 Hz	☆
F0-13	Frequency reference upper limit offset	0.00 Hz to max. frequency (F0-10)	0.00 Hz	☆
F0-14	Frequency reference lower limit	0.00 Hz to frequency upper limit (F0-12)	0.00 Hz	☆
F0-15	Carrier frequency	2 to 8.0 kHz	Model dependent	☆
F0-16	Carrier frequency adjusted with temperature	0: Disabled 1: Enabled	1	☆

Para. No.	Para. Name	Setting Range	Default	Property
F0-17	Acceleration time 1	0.00s~650.00s (F0-19=2) 0.0s~6500.0s (F0-19=1) 0s~65000s (F0-19=0)	20.0s	☆
F0-18	Deceleration time 1	0.00s~650.00s (F0-19=2) 0.0s~6500.0s (F0-19=1) 0s~65000s (F0-19=0)	20.0s	☆
F0-19	Acceleration/ Deceleration time unit	0: 1s 1: 0.1s 2: 0.01s		★
F0-21	Frequency offset of auxiliary frequency setting channel for main and auxiliary calculation	0.00 Hz to max. frequency (F0-10)	0.00 Hz	☆
F0-22	Frequency reference resolution	1: 0.1 Hz 2: 0.01 Hz	2	★
F0-23	Retentive of digital setting frequency upon stop	0: Non-retentive 1: Retentive	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	Main frequency coefficient	0.00% to 100.00%	10.00%	☆
F0-28	Auxiliary frequency coefficient	0.00% to 100.00%	10.00%	☆
Group F1: Motor 1 Parameters				
F1-00	Motor type selection	0: Common asynchronous motor 1: Variable frequency asynchronous motor 2: Synchronous motor	0	★
F1-01	Rated motor power	0.1 to 1000.0 kW	Model dependent	★
F1-02	Rated motor voltage	1 to 2000 V	Model dependent	★
F1-03	Rated motor current	0.01 to 655.35 A (AC drive power ⩽ 55 kW) 0.1 to 6553.5 A (AC drive power > 55 kW)	Model dependent	★
F1-04	Rated motor frequency	0.01 Hz to max. frequency (F0-10)	Model dependent	★
F1-05	Rated motor speed	1 to 65535 RPM	Model dependent	★

Para. No.	Para. Name	Setting Range	Default	Property
F1-06	Asynchronous/ Synchronous motor stator resistance	0.001 to 65.535 Ω (AC drive power ⩽ 55 kW) 0.0001 to 6.5535 Ω (AC drive power > 55 kW)	Auto-tuning dependent	★
F1-07	Asynchronous motor rotor resistance	0.001 to 65.535 Ω (AC drive power ⩽ 55 kW) 0.0001 to 6.5535 Ω (AC drive power > 55 kW)	Auto-tuning dependent	★
F1-08	Asynchronous motor leakage inductive reactance	0.01 to 655.35 mH (AC drive power ⩽ 55 kW) 0.001 to 65.535 mH (AC drive power > 55 kW)	Auto-tuning dependent	★
F1-09	Asynchronous motor mutual inductive reactance	0.1 to 6553.5 mH (AC drive power ⩽ 55 kW) 0.01 to 655.35 mH (AC drive power > 55 kW)	Auto-tuning dependent	★
F1-10	Asynchronous motor 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 dependent	★
F1-11	Asynchronous motor core saturation coefficient 1	50.0% to 100.0%	86.0%	☆
F1-12	Asynchronous motor core saturation coefficient 2	100.0% to 150.0%	130.0%	☆
F1-13	Asynchronous motor core saturation coefficient 3	100.0% to 170.0%	140.0%	☆
F1-14	Asynchronous motor core saturation coefficient 4	100.0% to 180.0%	150.0%	☆
F1-17	Synchronous motor D-axis inductor	0.01 to 655.35 mH (AC drive power ⩽ 55 kW) 0.001 to 65.535 mH (AC drive power > 55 kW)	Auto-tuning dependent	★
F1-18	Synchronous motor Q-axis inductor	0.01 to 655.35 mH (AC drive power ⩽ 55 kW) 0.001 to 65.535 mH (AC drive power > 55 kW)	Auto-tuning dependent	★
F1-19	Synchronous motor back EMF	0.1 to 6553.5 V	Auto-tuning dependent	★
F1-23	Frictional moment	0.00% to 100.00%	0.00%	★
F1-26	Auto-tunning direction (inertia auto-tuning and synchronous motor)	0, 1	1	★

Para. No.	Para. Name	Setting Range	Default	Property
F1-37	Auto-tuning selection	0: No auto-tuning 1: Asynchronous motor static auto-tuning 2: Asynchronous motor no-load auto-tuning 3: Asynchronous motor static complete auto-tuning 11: Synchronous motor no-load partial auto-tuning (back EMF is not auto-tuned) 12: Synchronous motor dynamic no-load auto-tuning 13: Synchronous motor static auto-tuning	0	★
Group F2: Vector Control Parameters				
F2-00	Low speed loop Kp	1 to 200	Asynchronous motor: 30 Synchronous motor: 20	☆
F2-01	Low speed loop Ti	0.001s to 10.000s	0.500s	☆
F2-02	Switchover frequency 1	0.00 to F2-05	5.00 Hz	☆
F2-03	High speed loop Kp	1 to 200	20	☆
F2-04	High speed loop Ti	0.001s to 10.000s	1.000s	☆
F2-05	Switchover frequency 2	F2-02 to max. frequency	10.00 Hz	☆
F2-06	VC slip compensation adjustment	50% to 200%	100%	☆
F2-07	Speed feedback filter time constant	0.000s to 0.100s	0.004s	☆
F2-08	VC deceleration over-excitation gain	0 to 200	64	☆
F2-09	Torque limit source in speed control (electric)	0: F2-10 1: AI1 2: AI2 3: AI3 4: Pulse reference (DIO1) 5: Communication setting 6: Min. (AI1, AI2) 7: Max. (AI1, AI2) (100% of options 1 to 7 corresponds to the value of F2-10)	0	☆
F2-10	Digital setting of torque limit in speed control (electric)	0.0% to 200.0%	150.0%	☆

Para. No.	Para. Name	Setting Range	Default	Property
F2-11	Torque limit source in speed control (regenerative)	0: F2-10 1: AI1 2: AI2 3: AI3 4: Pulse reference (DIO1) 5: Communication setting 6: Min. (AI1, AI2) 7: Max. (AI1, AI2) 8: F2-12	0	☆
F2-12	Digital setting of torque limit in speed control (regenerative)	0.0% to 200.0%	150.0%	☆
F2-13	Low speed current loop Kp adjustment	0.1 to 10.0	1.0	☆
F2-14	Low speed current loop Ki adjustment	0.1 to 10.0	1.0	☆
F2-15	High speed current loop Kp adjustment	0.1 to 10.0	1.0	☆
F2-16	High speed current loop Ki adjustment	0.1 to 10.0	1.0	☆
F2-17	Speed loop Kp upon zero speed lock	1 to 100	30	☆
F2-18	Speed loop Ti upon zero speed lock	0.001s to 10.000s	0.500s	☆
F2-20	Speed loop switchover frequency upon zero speed lock	0.00 to F2-02	0.05 Hz	☆
F2-21	Max. output voltage coefficient	100 to 110	100	☆
F2-22	Output voltage filter time constant	0.000s to 0.010s	0.000s	☆
F2-23	Zero speed lock	0: Disabled 1: Enabled	0	★
F2-24	Vector voltage limit Kp	0 to 1000	40	☆
F2-25	Acceleration compensation gain	0 to 200	0	☆
F2-26	Acceleration compensation filter	0 to 500	10	☆
F2-27	Vector voltage limit selection	0: Disabled 1: Enabled	1	☆
F2-28	Cut-off frequency of torque filter reference	50 to 1000 Hz	500 Hz	☆
F2-29	Initial position angle test current for synchronous motor	50% to 180%	80%	☆
F2-30	Speed loop parameter auto-calculation	0: Disabled 1: Enabled	0	★

Para. No.	Para. Name	Setting Range	Default	Property
F2-31	Expected speed loop bandwidth (high speed)	1.0 to 200.0 Hz	10.0 Hz	☆
F2-32	Expected speed loop bandwidth (low speed)	1.0 to 200.0 Hz	10.0 Hz	☆
F2-33	Expected speed loop bandwidth (zero speed)	1.0 to 200.0 Hz	10.0 Hz	☆
F2-34	Expected speed loop damping ratio	0.100 to 65.000	1.000	☆
F2-35	System inertia (equivalent to start time, in the unit of seconds)	0.001s to 50.000s	Model dependent	★
F2-36	Single motor inertia (kg x m^2)	0.001 to 50.000	Model dependent	★
F2-43	Inertia auto-tuning and dynamic speed reference	0% to 100% (Unit: %. The base value is the rated motor frequency.)	30%	★
F2-47	Inertia auto-tuning	0: Disabled 1: Enabled	0	★
F2-48	Speed loop bandwidth reference of inertia auto-tuning	0.1 to 100.0 Hz	10.0 Hz	★
F2-50	Inertia auto-tuning mode	0: Acceleration/Deceleration mode 1: Triangular wave mode	0	★
F2-51	Acceleration/ Deceleration coefficient of inertia auto-tuning	0.1 to 10.0	1.0	★
F2-52	Decoupling control	0, 1	0	★
F2-53	Regenerative power limit selection	0: Disabled 1: Enabled	0	★
F2-54	Regenerative power limit	0.0 to 200.0%	Model dependent	★
		Group F3: V/F Control Parameters		
F3-00	V/F curve selection	0: Linear V/F 1: Multi-point V/F 2: Square V/F 3: 1.2-power V/F 4: 1.4-power V/F 6: 1.6-power V/F 8: 1.8-power V/F 9: Reserved 10: V/F complete separation 11: V/F half separation	0	★
F3-01	Torque boost	0.0%: Auto torque boost 0.1% to 30.0%	Model dependent	☆

Para. No.	Para. Name	Setting Range	Default	Property
F3-02	Cut-off frequency of torque boost	0.00 Hz to max. frequency	50.00 Hz	★
F3-03	Multi-point V/F frequency 1	0.00 Hz to F3-05	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 to F3-07	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 to rated motor frequency (F1-04)	0.00 Hz	★
F3-08	Multi-point V/F voltage 3	0.0% to 100.0%	0.0%	★
F3-09	V/F slip compensation gain	0.0% to 200.0%	0.0%	☆
F3-10	V/F over-excitation gain	0 to 200	64	☆
F3-11	V/F oscillation suppression gain	0 to 100	Model dependent	☆
F3-12	Oscillation suppression gain mode	0: Disabled 3: Enabled	3	★
F3-13	Voltage source for V/F separation	0: Digital setting (F3-14) 1: AI1 2: AI2 3: AI3 4: Reserved 5: Multi-reference	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: This parameter indicates the time required for change 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: This parameter indicates the time required for change from the rated motor voltage to 0 V.	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	V/F current limit level	50 to 200%	120%	★
F3-19	V/F current limit selection	0: Disabled 1: Enabled	1	★
F3-20	V/F current limit gain	0 to 100	5	☆
F3-21	Compensation factor of V/F speed multiplying current limit level	50 to 200	50	★

Para. No.	Para. Name	Setting Range	Default	Property
F3-22	V/F voltage limit	650.0 to 800.0 V	770.0 V	★
F3-23	V/F voltage limit selection	0: Disabled 1: Enabled	1	★
F3-24	Frequency gain for V/F voltage limit	0 to 100	30	☆
F3-25	Voltage gain for V/F voltage limit	0 to 100	30	☆
F3-26	Frequency rise threshold during voltage limit	0 to 50	5	★
F3-27	Slip compensation time constant	0.1 to 10.0	0.5	☆
F3-28	Auto frequency rise	0: Disabled 1: Enabled	0	★
F3-29	Min. electric torque current	10 to 100	50	★
F3-30	Max. regenerative torque current	10 to 100	20	★
F3-31	Auto frequency rise Kp	0 to 100	50	☆
F3-32	Auto frequency rise Ki	0 to 100	50	☆
F3-33	Online torque compensation gain	80 to 150	100	★
Group F4: Input Terminals				

Para. No.	Para. Name	Setting Range	Default	Property
F4-00	DI1 function selection	0: No function 1: Forward RUN (FWD) 2: Reverse RUN (REV) 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, keypad) 20: Command source switchover terminal 21: Acceleration/Deceleration prohibited 22: PID pause 23: PLC status reset 24: Swing pause 25: Counter input (DIO1) 26: Counter reset 27: Length count input (DIO1) 28: Length reset 29: Torque control prohibited 31: Reserved 32: Immediate DC injection braking 33: External fault normally closed (NC) input 34: Frequency modification forbidden 35: PID action direction reverse 36: External STOP terminal 1 37: Command source switchover terminal 2 38: PID integral disabled 39: Switchover between main frequency source X and preset frequency 40: Switchover between auxiliary frequency source Y and preset frequency 41: Reserved 42: Position lock selection 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 switchover 52-60: 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	★
F4-10	DI filter time	0.000s to 1.000s	0.010s	☆

Para. No.	Para. Name	Setting Range	Default	Property
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 to 65.535 Hz/s	1.000 Hz/s	☆
F4-13	AI curve 1 min. input	0.00 V to F4-15	0.00 V	☆
F4-14	Corresponding percentage of AI curve 1 min. input	-100.0% to 100.0%	-100.0%	☆
F4-15	AI curve 1 max. input	F4-13 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 fitter time	0.00s to 10.00s	0.10s	☆
F4-18	AI curve 2 min. input	0.00 V to F4-20	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 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	AI curve 3 min. input	0.00 V to F4-25	0.00 V	☆
F4-24	Corresponding percentage of AI curve 3 min. input	-100.0% to 100.0%	0.0%	☆
F4-25	AI curve 3 max. input	F4-23 to 10.00 V	10.00 V	☆
F4-26	Corresponding percentage of AI curve 3 max. input	-100.0% to 100.0%	100.0%	☆
F4-28	Pulse min. input	0.00 kHz to F4-30	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 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	☆

Para. No.	Para. Name	Setting Range	Default	Property
F4-33	AI curve selection	Ones position: AI1 curve selection 1: Curve 1 (2 points, see F4-13 to F4-16) 2: Curve 2 (2 points, see F4-18 to F4-21) 3: Curve 3 (2 points, see F4-23 to F4-26) 4: Curve 4 (4 points, see A6-00 to A6-07) 5: Curve 5 (4 points, see A6-08 to A6-15) Tens position: AI2 curve selection, same as above Hundreds position: AI3 curve selection, same as above	321	☆
F4-34	Setting selection when AI less than min. input	Ones position: AI1 0: Corresponding percentage of min. input 1: 0.0% Tens position: AI2 Hundreds position: AI3, same as above	0	☆
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	0: High level active 1: Low level active Ones position: DI1 active mode Tens position: DI2 active mode Hundreds position: DI3 active mode Thousands position: DI4 active mode Ten thousands position: DI5 active mode	0	★
F4-39	DI active mode selection 2	0: High level active 1: Low level active Ones position: DI6 active mode Tens position: DI7 active mode Hundreds position: Reserved Thousands position: Reserved Ten thousands position: Reserved	0	★
Group F5: Output Terminals				
F5-00	Reserved		0	☆

Para. No.	Para. Name	Setting Range	Default	Property
F5-01	Relay 3 function selection	0: No output 1: AC drive running 2: Fault output 1 (having output after AC drive stops at occurrence of coast to stop fault and decelerate to stop fault) 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 (RUN related) 19: Undervoltage status output 20: Communication setting 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 (direct output at fault or alarm) 39: Motor overheat warning 40: Current running time reached 41: Fault output 2 (having output after AC drive stops at occurrence of coast to stop fault and decelerate to stop fault; no output at undervoltage) 43: Position lock successful (offset pulses of Position lock less than the value of F6-25)	0	☆
F5-02	Relay 1 function selection		2	☆
F5-03	Relay 2 function selection			
F5-04	DO1 function selection		0	☆
F5-05	DO2 function selection		0	☆

Para. No.	Para. Name	Setting Range	Default	Property
F5-06	Reserved	0: Running frequency 1: Set frequency 2: Output current 3: Output torque (100.0% corresponds to twice rated motor torque) 4: Output power 5: Output voltage (100.0% corresponds to 1.2 times rated AC drive voltage) 6: Pulse reference (100.0% corresponds to 50.0 kHz) 7: AI1 8: AI2 9: AI3 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 to 1000.0 V) 16: Output torque (directional; 100.0% corresponds to twice rated motor torque)	0	☆
F5-07	AO1 function selection		0	☆
F5-08	AO2 function selection		0	☆
F5-09	Reserved	0.01 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	Relay 3 output delay	0.0s to 3600.0s	0.0s	☆
F5-18	Relay 1 output delay	0.0s to 3600.0s	0.0s	☆
F5-20	Relay 2 output delay	0.0s to 3600.0s	0.0s	☆
F5-22	DO active mode selection	0: Positive logic active 1: Negative logic active Ones position: Relay 3 active mode Tens position: Relay 1 active mode Hundreds position: Relay 2 active mode Thousands position: DO1 active mode Ten thousands position: DO2 active mode	0	☆

Para. No.	Para. Name	Setting Range	Default	Property
Group F6: Start/Stop Control				
F6-00	Start mode	0: Direct start 1: Flying start 2: Pre-excited start (AC asynchronous motor)	0	☆
F6-01	Mode of flying start	0: From stop frequency 1: From 50 Hz 2: From max. frequency Note: The preceding modes are effective for asynchronous motors in V/F control mode. In SVC, the initial mode of flying start is adaptive.	0	★
F6-02	Speed of flying start	1 to 100	20	☆
F6-03	Start frequency	0.00 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 1 level	0% to 100%	0%	★
F6-06	DC injection braking 1 active time/Pre-excitation active time	0.0s to 100.0s	0.0s	★
F6-07	Acceleration/ Deceleration mode	0: Linear acceleration/deceleration 1: S-curve acceleration/deceleration	0	★
F6-08	Time proportion of S-curve at Accel start	0.0% to (100.0% - F6-09)	30.0%	★
F6-09	Time proportion of S-curve at Accel end	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/ Position lock start frequency	0.00 Hz to max. 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%	0%	☆
F6-14	DC injection braking active time	0.0s to 100.0s	0.0s	☆
F6-15	Braking use ratio	0% to 100%	100%	★
F6-16	Closed-loop current Kp of flying start	0 to 1000	500	☆
F6-17	Closed-loop current Ki of torque tracking	0 to 1000	800	☆
F6-18	Flying start current limit	30 to 200	100	☆
F6-20	Flying start voltage rise time	0.5s to 3.0s	1.0s	☆
F6-21	Demagnetization time	00.00s to 10.00s	1.00s	☆
F6-22	Start torque presetting	000.0% to 200.0%	0.0%	☆

Para. No.	Para. Name	Setting Range	Default	Property
Group F7: Keypad Operation and LED Display				
F7-03	LED display running parameters 1	0000 to FFFF Bit 00: Running frequency 1 (Hz) Bit 01: Frequency reference (Hz) Bit 02: Bus voltage (V) Bit 03: Output voltage (V) Bit 04: Output current (A) Bit 05: Output power (kW) Bit 06: Output torque (%) Bit 07: DI state Bit 08: DO state Bit 09: AI1 voltage (V) Bit 10: AI2 voltage (V) Bit 11: AI3 voltage (V) Bit 12: Count value Bit 13: Length value Bit 14: Load speed display Bit 15: PID reference	1F	☆
F7-04	LED display running parameters 2	0000 to FFFF Bit 00: PID feedback Bit 01: PLC stage Bit 02: Pulse reference (kHz) Bit 03: Running frequency 2 Bit 04: Remaining running time Bit 05: AI1 voltage before correction (V) Bit 06: AI2 voltage before correction (V) Bit 07: AI3 voltage before correction (V) Bit 08: Linear speed Bit 09: Current power-on time (h) Bit 10: Current running time (min) Bit 11: Pulse reference (Hz) Bit 12: Communication setting Bit 13: Encoder feedback speed (Hz) Bit 14: Main frequency display (Hz) Bit 15: Auxiliary frequency display (Hz)	0	☆

Para. No.	Para. Name	Setting Range	Default	Property
F7-05	LED display stop parameters	0000 to FFFF Bit 00: Frequency reference (Hz) Bit 01: Bus voltage (V) Bit 02: DI state Bit 03: DO state Bit 04: AI1 voltage (V) Bit 05: AI2 voltage (V) Bit 06: AI3 voltage (V) Bit 07: Count value Bit 08: Length value Bit 09: PLC stage Bit 10: Load speed Bit 11: PID reference Bit 12: Pulse reference (kHz)	33	☆
F7-06	Load speed display coefficient	0.0001 to 6.5000	1	☆
F7-07	Max. temperature of AC drive IGBT	0.0°C to 100.0°C	-	●
F7-08	Product number	300	-	●
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	0: Zero decimal places 1: One decimal place 2: Two decimal places 3: Three decimal places	1	☆
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 max. 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	☆
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	Model dependent	☆

Para. No.	Para. Name	Setting Range	Default	Property
F8-08	Deceleration time 4	0.0s to 6500.0s	Model dependent	☆
F8-09	Frequency jump 1	0.00 Hz to max. frequency	0.00 Hz	☆
F8-10	Frequency jump 2	0.00 Hz to max. frequency	0.00 Hz	☆
F8-11	Frequency jump band	0.00 Hz to max. 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: Enabled 1: Disabled	1	●
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	☆
F8-16	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 (FDT1)	0.00 Hz to max. frequency	50.00 Hz	☆
F8-20	Frequency detection hysteresis (FDT1)	0.0% to 100.0% (FDT1 level)	5.0%	☆
F8-21	Detection width of target frequency reached	0.0% to 100.0% (max. 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 max. frequency	0.00 Hz	☆
F8-26	Switchover frequency of deceleration time 1 and deceleration time 2	0.00 Hz to max. frequency	0.00 Hz	☆
F8-27	Set highest priority to JOG function	0: Disabled 1: Enabled	0	☆
F8-28	Frequency detection value (FDT2)	0.00 Hz to max. frequency	50.00 Hz	☆
F8-29	Frequency detection hysteresis (FDT2)	0.0% to 100.0% (FDT2 level)	5.0%	☆
F8-30	Detection of frequency 1	0.00 Hz to max. frequency	50.00 Hz	☆
F8-31	Detection width of frequency 1	0.0% to 100.0% (max. frequency)	0.0%	☆
F8-32	Detection of frequency 2	0.00 Hz to max. frequency	50.00 Hz	☆
F8-33	Detection width of frequency 2	0.0% to 100.0% (max. frequency)	0.0%	☆

Para. No.	Para. Name	Setting Range	Default	Property
F8-34	Zero current detection level	0.0% to 300.0% (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 1: AI1 2: AI2 (100% of analog input corresponds to the value of F8-44)	0	★
F8-44	Running time	0.0 to 6500.0 min	0.0 min	★
F8-45	AI1 input voltage lower limit	0.00 V to F8-46	3.10 V	☆
F8-46	AI1 input voltage upper limit	F8-45 to 11.00 V	6.80 V	☆
F8-47	IGBT temperature threshold	0°C to 100°C	75°C	☆
F8-48	Cooling fan working mode	0: Working during drive running 1: Working continuously	0	☆
F8-49	Wakeup frequency	Hibernating frequency (F8-51) to max. frequency (F0-10)	0.00 Hz	☆
F8-50	Wakeup delay time	0.0s to 6500.0s	0.0s	☆
F8-51	Hibernating frequency	0.00 Hz to wakeup frequency (F8-49)	0.00 Hz	☆
F8-52	Hibernating delay time	0.0s to 6500.0s	0.0s	☆
F8-53	Running time threshold this time	0.0 to 6500.0 min	0.0 min	☆
F8-54	STO selection	0: Disabled 1: Enabled	1	☆
F8-55	Deceleration time for emergency stop	0.0s to 6500.0s	0.0	☆
Group F9: Fault and Protection				

Para. No.	Para. Name	Setting Range	Default	Property
F9-00	AC drive overload protection	0, 1	0	☆
F9-01	Motor overload protection gain	0.20 to 10.00	1.00	☆
F9-02	Motor overload pre-warning coefficient	50% to 100%	80%	☆
F9-06	Output phase loss detection before startup	0: Disabled 1: Enabled	0	☆
F9-07	Detection of short-circuit to ground upon power-on	0: No detection 1: Detection before power-on 2: Detection before running 3: Detection before power-on and running	1	★
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	☆

Para. No.	Para. Name	Setting Range	Default	Property
F9-14	1st fault type	0: No fault 1: Hardware fault 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 resistor overload 9: Undervoltage 10: AC drive overload 11: Motor overload 12: Power input voltage fault 13: Power output phase loss 14: IGBT overheat 15: External fault 16: Communication fault 17 and 18: Reserved 19: Motor auto-tuning fault 20: Reserved 21: EEPROM read and write fault 22: Abnormal motor auto-tuning result 23: Motor short circuited to ground 24: Motor phase-to-phase short circuit 25: Rectifier fault 26: Accumulative running time reached 27: User-defined fault 1 28: User-defined fault 2 29: Accumulative power-on time reached 30: Output load lost 31: PID feedback lost during running 42: Too large speed deviation 43: Motor over-speed 45: Motor overheat 46: Synchronous control parameter setting fault 47: STO fault 80: Fan fault		●
F9-15	2nd fault type			●
F9-16	3rd (latest) fault type			●
F9-17	Frequency upon 3rd fault			●
F9-18	Current upon 3rd fault			●
F9-19	Bus voltage upon 3rd fault			●
F9-20	DI state upon 3rd fault			●

Para. No.	Para. Name	Setting Range	Default	Property
F9-21	DO state upon 3rd fault			●
F9-22	AC drive state upon 3rd fault			●
F9-23	Power-on time upon 3rd fault			●
F9-24	Running time upon 3rd fault			●
F9-25	IGBT temperature upon 3rd fault			●
F9-26	Fault subcode upon 3rd fault type			●
F9-27	Frequency upon 2nd fault			●
F9-28	Current upon 2nd fault			●
F9-29	Bus voltage upon 2nd fault			●
F9-30	DI state upon 2nd fault			●
F9-31	DO state upon 2nd fault			●
F9-32	AC drive state upon 2nd fault			●
F9-33	Power-on time upon 2nd fault			●
F9-34	Running time upon 2nd fault			●
F9-35	IGBT temperature upon 2nd fault			●
F9-36	Fault subcode upon 2nd fault			●
F9-37	Frequency upon 1st fault			●
F9-38	Current upon 1st fault			●
F9-39	Bus voltage upon 1st fault			●
F9-40	DI state upon 1st fault			●
F9-41	DO state upon 1st fault			●
F9-42	AC drive state upon 1st fault			●
F9-43	Power-on time upon 1st fault			●
F9-44	Running time upon 1st fault			●
F9-45	IGBT temperature upon 1st fault			●
F9-46	Fault subcode upon 1st fault			●

Para. No.	Para. Name	Setting Range	Default	Property
F9-47	Fault protection action selection 0	Ones position: Reserved Tens position: Overvoltage (E05: overvoltage during acceleration; E06: overvoltage during deceleration; E07: overvoltage at constant speed) Hundreds position: Pre-charge resistor overload (E08) Thousands position: Undervoltage (E09) Ten thousands position: AC drive overload (E10) Note: The only action for these five fault types is coast to stop, which is enabled by default.	00000 0: Coast to stop	★
F9-48	Fault protection action selection 1	Ones position: Motor overload (E11) Tens position: Input phase loss (E12) Hundreds position: Output phase loss (E13) Thousands position: Heatsink overheat (E14) Ten thousands position: External fault (E15) Note: The Decelerate to stop and Alarm options are only effective in V/F at occurrence of output phase loss.	10000 0: Coast to stop 1: Decelerate to stop 2: Reserved 3: Reserved 4: Alarm 5: Disabled	★
F9-49	Fault protection action selection 2	Ones position: Communication timeout (E16) Tens position: Reserved Hundreds position: Reserved Thousands position: Motor auto-tuning fault (E19) Ten thousands position: Reserved	00000 0: Coast to stop 1: Decelerate to stop 2: Reserved 3: Reserved 4: Alarm 5: Disabled	★
F9-50	Fault protection action selection 3	Ones position: Reserved Tens position: Reserved Hundreds position: Motor short circuited to ground (E23) Thousands position: Phase-to-phase short circuit (E24) Ten thousands position: Rectification fault(E25)	25000 0: Coast to stop 1: Decelerate to stop 2: Reserved 3: Reserved 4: Alarm 5: Disabled	★

Para. No.	Para. Name	Setting Range	Default	Property
F9-51	Fault protection action selection 4	Ones position: Accumulative running time reached (E26) Tens position: User-defined fault 1 (E27) Hundreds position: User-defined fault 2 (E28) Thousands position: Accumulative power-on time reached (E29) Ten thousands position: Load lost (E30)	51111 0: Coast to stop 1: Decelerate to stop 2: Reserved 3: Reserved 4: Alarm 5: Disabled	★
F9-52	Fault protection action selection 5	Ones position: PID feedback lost during running (E31) Tens position: Reserved Hundreds position: Reserved Thousands position: Too large speed deviation (E42) Ten thousands position: Motor over-speed (E43)	00101 0: Coast to stop 1: Decelerate to stop 2: Reserved 3: Reserved 4: Alarm 5: Disabled	★
F9-53	Fault protection action selection 6	Ones position: Motor overheat (E45) Tens position: Reserved Hundreds position: Reserved Thousands position: Reserved Ten thousands position: Fan fault (E80)	05500 0: Coast to stop 1: Decelerate to stop 2: Reserved 3: Reserved 4: Alarm 5: Disabled	★
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	1	☆
F9-55	Backup frequency upon fault	0.0% to 100.0% (max. frequency)	100.0%	☆
F9-56	Type of motor temperature sensor	0: No temperature sensor (AI1 channel as AI input) 1: PT100 Ones position: PT100_1 Tens position: PT100_2 Hundreds position: PT100_3	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: Decelerate 2: Decelerate to stop	0	★

Para. No.	Para. Name	Setting Range	Default	Property
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	0.0s to 100.0s	0.5s	☆
F9-62	Threshold of power dip ride-through function enabled	60% to 100% (standard bus voltage)	80%	☆
F9-64	Load lost detection level	0.0% to 100.0%	10.0%	☆
F9-65	Load lost detection time	0.0s to 60.0s	1.0s	☆
F9-67	Over-speed detection level	0.0% to 50.0% (max. frequency) (Over-speed detection disabled at 0.0%)	5.0%	☆
F9-68	Over-speed detection time	0.0s to 60.0s	1.0s	☆
F9-69	Detection level of speed error	0.0% to 50.0% (max. frequency) (Speed error detection disabled at 0.0%)	20.0%	☆
F9-70	Detection time of speed error	0.0s to 60.0s	5.0s	☆
F9-71	Power dip ride-through gain	0 to 100	40	☆
F9-72	Power dip ride-through integral	0 to 100	30	☆
F9-73	Deceleration time of power dip ride-through	0.0s to 300.0s	20.0s	☆
Group FA: PID Function				
FA-00	PID reference setting channel	0: Set by FA-01 1: AI1 2: AI2 3: AI3 4: Reserved 5: Communication setting 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: Reserved 5: Communication setting 6: AI1 + AI2 7: Max. (|AI1|, |AI2|) 8: Min. (|AI1|, |AI2|)	0	☆

Para. No.	Para. Name	Setting Range	Default	Property
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 100.00s	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 max. frequency	2.00 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	0.00s to 650.00s	0.00s	☆
FA-12	PID feedback filter time	0.00s to 60.00s	0.00s	☆
FA-13	PID error gain	0.0% to 100.0%	100.0%	☆
FA-15	Proportional gain Kp2	0.0 to 1000.0	20.0	☆
FA-16	Integral time Ti2	0.01s to 100.00s	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 through DI 2: Auto switchover based on PID error 3: Auto switchover based on running frequency 6: Auto adjustment based on roll diameter 7: Adjustment based on max. roll diameter percentage	0	☆
FA-19	PID error 1 for auto switchover	0.0% to FA-20	20.0%	☆
FA-20	PID error 2 for auto switchover	FA-19 to 100.0%	80.0%	☆
FA-21	PID initial value	0.0% to 100.0%	0.0%	☆
FA-22	PID initial value active time	0.00s to 650.00s	0.00s	☆
FA-23	Forward max. value between two output errors	0.00% to 100.00%	1.00%	☆
FA-24	Reverse max. value between two output errors	0.00% to 100.00%	1.00%	☆
FA-25	PID integral property	Stop integral operation 0: Disabled 1: Enabled	0	☆
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	☆

Para. No.	Para. Name	Setting Range	Default	Property
Group Fb: Wobble Function, Fixed Length, and Count				
Fb-00	Wobble setting mode	0: Relative to the frequency reference 1: Relative to the max. frequency	0	☆
Fb-01	Wobble amplitude	0.0% to 100.0%	0.0%	☆
Fb-02	Wobble step	0.0% to 50.0%	0.0%	☆
Fb-03	Wobble cycle	0.1s to 3000.0s	10.0s	☆
Fb-03	Triangular wave rising time coefficient	0.1% to 100.0%	50.0%	☆
Fb-05	Set length	0 to 65535 m	1000 m	☆
Fb-06	Actual length	0 to 65535 m	0 m	☆
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%	☆
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	0: Not retentive 1: Retentive Ones position: Retentive at power down Tens position: Retentive at stop	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)	☆

Para. No.	Para. Name	Setting Range	Default	Property
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)	☆
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)	☆

Para. No.	Para. Name	Setting Range	Default	Property
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	☆
FC-50	Time unit of simple PLC running	0: s (second) 1: h (hour)	0	☆
FC-51	Reference 0 source	0: Set by FC-00 1: AI1 2: AI2 4: Pulse reference (DIO1) 5: PID 6: Set by preset frequency (F0-08), modified via terminal UP/DOWN	0	☆
Group Fd: Communication				
Fd-00	Modbus baud rate	0: 300 bps 1: 600 bps 2: 1200 bps 3: 2400 bps 4: 4800 bps 5: 9600 bps 6: 19200 bps 7: 38400 bps 8: 57600 bps 9: 115200 bps	5	☆

Para. No.	Para. Name	Setting Range	Default	Property
Fd-01	Modbus data format	0: No check <8,N,2> 1: Even parity check <8,E,1> 2: Odd parity check <8,O,1> 3: <8,N,1>	0	☆
Fd-02	Modbus local address	1 to 247 0: Broadcast address	1	☆
Fd-03	Modbus response delay	0 to 20 ms	2	☆
Fd-04	Modbus communication timeout	0.1s to 60.0s 0.0: Disabled	0	☆
Fd-06	Auto reset of communication fault	0: Disabled 1: Enabled	1	☆
Group FE: User-Defined Parameters				
FE-00	User-defined parameter 0	F0-00 to FP-xx A0-00 to Ax-xx U0-xx to U0-xx	F0-01	☆
FE-01	User-defined parameter 1		F0-02	☆
FE-02	User-defined parameter 2		F0-03	☆
FE-03	User-defined parameter 3		F0-07	☆
FE-04	User-defined parameter 4		F0-08	☆
FE-05	User-defined parameter 5		F0-17	☆
FE-06	User-defined parameter 6		F0-18	☆
FE-07	User-defined parameter 7		F3-00	☆
FE-08	User-defined parameter 8		F3-01	☆
FE-09	User-defined parameter 9		F4-00	☆
FE-10	User-defined parameter 10		F4-01	☆
FE-11	User-defined parameter 11		F4-02	☆
FE-12	User-defined parameter 12		F5-04	☆
FE-13	User-defined parameter 13		F5-07	☆
FE-14	User-defined parameter 14		F6-00	☆
FE-15	User-defined parameter 15		F6-10	☆
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		F0-00	☆
FE-21	User-defined parameter 21		F0-00	☆
FE-22	User-defined parameter 22		F0-00	☆
FE-23	User-defined parameter 23	F0-00 to FP-xx A0-00 to Ax-xx U0-xx to U0-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	☆
FE-30	User-defined parameter 30		F0-00	☆
FE-31	User-defined parameter 31		F0-00	☆
Group FP: Function Parameter Management				
FP-00	User password	0 to 65535	0	☆

Para. No.	Para. Name	Setting Range	Default	Property
FP-01	Parameter initialization	0: No operation 01: Restore factory parameters except motor parameters, encoder parameters, and max. frequency 02: Clear records 04: Back up current user parameters 501: Restore user backup parameters	0	★
FP-02	Parameter display property	0: Not displayed 1: Displayed Ones position: Group U display selection Tens position: Group A display selection	111	☆
FP-03	Selection of individualized parameter display	0: Not displayed 1: Displayed Ones position: Selection of user-defined parameters display Tens position: Selection of user-modified parameters display	11	☆
FP-04	Selection of parameter modification	0: Parameters can be modified 1: Parameters cannot be modified	0	☆
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: Digital setting 1 (A0-03) 1: AI1 2: AI2 3: AI3 4: Reserved 5: Communication setting 6: Min. (AI1, AI2) 7: Max. (AI1, AI2) (100% of options 1 to 7 corresponds to the digital setting of A0-03)	0	★
A0-03	Torque digital setting	-200.0% to 200.0%	100.0%	☆
A0-04	Torque filter time	0 to 5.000s	0.000s	☆
A0-05	Speed limit digital setting	-120.0% to 120.0%	0.00%	☆
A0-07	Acceleration time (torque)	0.0s to 650.00s	1.00s	☆
A0-08	Deceleration time (torque)	0.0s to 650.00s	1.00s	☆

Para. No.	Para. Name	Setting Range	Default	Property
A0-09	Speed limit setting channel selection	0: Set by A0-05 1: Frequency reference	0	☆
A0-10	Speed limit offset	0 to max. frequency (F0-10)	5.00 Hz	☆
A0-11	Active state selection for speed limit offset	0: Bi-directional offset 1: Unidirectional offset	0	★
A0-12	Acceleration time (frequency)	0.0s to 6500.0s	1.0s	☆
A0-13	Deceleration time (frequency)	0.0s to 6500.0s	1.0s	☆
A0-14	Torque mode switchover	0: No switchover 1: Switch to speed at stop 2: Target torque 0 at stop	1	★
Group A1: Virtual DI/DO				
A1-00	VDI1 function selection	See F4-00.	0	★
A1-01	VDI2 function selection	See F4-00.	0	★
A1-02	VDI3 function selection	See F4-00.	0	★
A1-03	VDI4 function selection	See F4-00.	0	★
A1-04	VDI5 function selection	See F4-00.	0	★
A1-05	VDI active state setting mode	0: Set by A1-06 1: DO state 2: DI state Ones position: VDI1 Tens position: VDI2 Hundreds position: VDI3 Thousands position: VDI4 Ten thousands position: VDI5	00000	★
A1-06	Selection of VDI active state	0: Inactive 1: Active Ones position: VDI1 Tens position: VDI2 Hundreds position: VDI3 Thousands position: VDI4 Ten thousands position: VDI5	00000	☆
A1-07	Function selection for AI1 used as DI	See F4-00.	0	★
A1-08	Function selection for AI2 used as DI	See F4-00.	0	★
A1-10	Active state selection for AI used as DI	0: High level active 1: Low level active Ones position: AI1 Tens position: AI2	00	★
Group 3: Motor Overload Curve Parameters				
A3-00	Motor overload threshold 1	105% to A3-02	115%	★
A3-01	Motor overload time 1	A3-03 to 65535.5s	4800.0s	★
A3-02	Motor overload threshold 2	A3-00 to A3-04	125%	★
A3-03	Motor overload time 2	A3-05 to A3-01	2400.0s	★

Para. No.	Para. Name	Setting Range	Default	Property
A3-04	Motor overload threshold 3	A3-02 to A3-06	135%	★
A3-05	Motor overload time 3	A3-07 to A3-03	900.0s	★
A3-06	Motor overload threshold 4	A3-04 to A3-08	145%	★
A3-07	Motor overload time 4	A3-09 to A3-05	360.0s	★
A3-08	Motor overload threshold 5	A3-06 to A3-10	165%	★
A3-09	Motor overload time 5	A3-11 to A3-07	150.0s	★
A3-10	Motor overload threshold 6	A3-08 to A3-12	185%	★
A3-11	Motor overload time 6	A3-13 to A3-09	90.0s	★
A3-12	Motor overload threshold 7	A3-10 to A3-14	205%	★
A3-13	Motor overload time 7	A3-15 to A3-11	50.0s	★
A3-14	Motor overload threshold 8	A3-12 to 245%	225%	★
A3-15	Motor overload time 8	0.0s to A3-13	30.0s	★
Group A4: Screw Machine Parameters				
A4-00	Power calculation method selection	0: AC 1: DC	1	☆
A4-01	DC bus current correction coefficient	0% to 500.0%	100.0%	☆
A4-02	Current delay compensation selection	0: Disabled 1: Enabled	1	☆
A4-03	Over-modulation function selection	0: Disabled 1: Enabled	0	☆
A4-04	Power correction coefficient	50.0% to 200.0%	100.0	☆
A4-05	AC drive power at stop	0.1 to 100.0 kW	1.0	★
A4-06	AC drive load loss	0.0 to 10.0	0.3	★
A4-07	AC drive input voltage correction coefficient	0 to 200.0	100.0	☆
A4-08	Energy saving control selection	0, 1	0	★
A4-09 to A4-19	Reserved			
A4-20	DO3 function selection	Same as F5-04	0	☆
A4-21	DO4 function selection	Same as F5-04	4	☆
A4-22	AO3 function selection	Same as F5-07	0	☆
A4-23	AO3 zero offset coefficient	-100.0% to 100.0%	0.0%	☆
A4-24	AO3 gain	-10.00 to 10.00	1.00	☆
Group A5: Control Optimization				
A5-00	DPWM switchover frequency upper limit	0.00 Hz to max. frequency (F0-10)	12.00 Hz	☆

Para. No.	Para. Name	Setting Range	Default	Property
A5-01	PWM modulation pattern	0: Asynchronous modulation 1: Synchronous modulation	0	☆
A5-02	Dead zone compensation mode selection	0: Not compensated 1: Compensated	1	★
A5-03	Random PWM depth	0: Random PWM inactive 1 to10: Random PWM depth based on carrier frequency	0	☆
A5-04	Overcurrent fast prevention	0: Disabled 1: Enabled	1 0 (asynchronous motor SVC)	☆
A5-05	Sampling delay	1 to 13	5	☆
A5-06	Undervoltage threshold	60 to 140%	100.0%	☆
Group A6: AI Curve Setting				
A6-00	AI curve 4 min. input	-10.00 V to A6-02	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 inflexion 1 input	A6-00 to A6-04	3.00 V	☆
A6-03	Corresponding percentage of AI curve 4 inflexion 1 input	-100.0% to 100.0%	30.0%	☆
A6-04	AI curve 4 inflexion 2 input	A6-02 to A6-06	6.00 V	☆
A6-05	Corresponding percentage of AI curve 4 inflexion 2 input	-100.0% to 100.0%	60.0%	☆
A6-06	AI curve 4 max. input	A6-06 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	-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 inflexion 1 input	A6-08 to A6-12	-3.00 V	☆
A6-11	Corresponding percentage of AI curve 5 inflexion 1 input	-100.0% to 100.0%	-30.0%	☆
A6-12	AI curve 5 inflexion 2 input	A6-10 to A6-14	3.00 V	☆
A6-13	Corresponding percentage of AI curve 5 inflexion 2 input	-100.0% to 100.0%	30.0%	☆
A6-14	AI curve 5 max. input	A6-12 to 10.00 V	10.00 V	☆

Para. No.	Para. Name	Setting Range	Default	Property
A6-15	Corresponding percentage of AI curve 5 max. input	-100.0% to 100.0%	100.0%	☆
A6-16	AI1 gain	-10.00 to 10.00	1.00	☆
A6-17	AI1 zero offset coefficient	-100.0% to 100.0%	0.0%	☆
A6-18	AI2 gain	-10.00 to 10.00	1.00	☆
A6-19	AI2 zero offset coefficient	-100.0% to 100.0%	0.0%	☆
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 A9: Supplementary Parameters of Vector Control				
A9-00	Rotor time constant during asynchronous motor online auto-tuning	0: No auto-tuning 1: Having auto-tuning	0	☆
A9-04	Max. torque limit coefficient of field weakening area in vector control	30 to 150	80	☆
A9-05	Asynchronous motor SVC speed filter	5 to 32 ms	15 ms	☆
A9-06	SVC speed feedback processing for asynchronous motor during speed control	0: No special processing 1: Limit min. synchronous frequency based on load change 2, 3: Output fixed current at low running speed	0	☆
A9-07	SVC magnetic field adjustment bandwidth of asynchronous motor	0 to 8.0 Hz	2.0 Hz	☆
A9-08	Asynchronous motor current setting at low running speed SVC	30 to 170	100	☆

Para. No.	Para. Name	Setting Range	Default	Property
A9-09	Switchover frequency of SVC fixed current output by asynchronous motor	2.0 to 100.0 Hz	3.0 Hz	☆
A9-10	SVC speed fluctuation suppression coefficient of asynchronous motor	0 to 6	3	☆
A9-11	Asynchronous motor SVC acceleration/ deceleration time	0.1s to 3000.0s	20.0s	☆
A9-12	Stator resistance during fast auto-tuning prior to asynchronous motor startup	0: No auto-tuning 1: Having auto-tuning	0	☆
A9-13	Coefficient 1 of fast stator resistance identification by asynchronous motor	-		★
A9-14	Coefficient 2 of fast stator resistance identification by asynchronous motor	-		★
A9-15	Coefficient 3 of fast stator resistance identification by asynchronous motor	-		★
A9-17	Real-time angle of synchronous motor	-		☆
A9-18	Initial position angle test of synchronous motor	0: Always test upon running 1: No test 2: Test upon initial power-on	0	☆
A9-20	Field weakening method selection	0: Auto field weakening 1: Adaptive field weakening for synchronous motor 2: Hybrid field weakening for synchronous motor 3: No field weakening	1	★
A9-21	Synchronous motor field weakening gain	0 to 50	5	☆
A9-22	Output voltage upper limit margin of synchronous motor	0% to 50%	5%	☆
A9-23	Max. output power adjustment gain of synchronous motor	20% to 300%	100%	☆

Para. No.	Para. Name	Setting Range	Default	Property
A9-24	Adjustment gain of synchronous motor excitation current calculation	40% to 200%	100%	☆
A9-25	SVC speed estimation integral gain of synchronous motor	5 to 1000	30	☆
A9-26	SVC speed estimation proportional gain of synchronous motor	5 to 300	20	☆
A9-27	SVC estimated speed filter of synchronous motor	10 to 2000	100	☆
A9-28	SVC min. carrier frequency of synchronous motor	0.8 kHz to F0-15	2.0 kHz	☆
A9-29	Synchronous motor excitation current at low speed	0% to 80%	30%	☆
Group AC: AI/AO Correction				
AC-00	AI1 measured voltage 1	-10.000 to 10.000 V	Factory-corrected	☆
AC-01	AI1 displayed voltage 1	-10.000 to 10.000 V	Factory-corrected	☆
AC-02	AI1 measured voltage 2	-10.000 to 10.000 V	Factory-corrected	☆
AC-03	AI1 displayed voltage 2	-10.000 to 10.000 V	Factory-corrected	☆
AC-04	AI2 measured voltage 1	-10.000 to 10.000 V	Factory-corrected	☆
AC-05	AI2 displayed voltage 1	-10.000 to 10.000 V	Factory-corrected	☆
AC-06	AI2 measured voltage 2	-10.000 to 10.000 V	Factory-corrected	☆
AC-07	AI2 displayed voltage 2	-10.000 to 10.000 V	Factory-corrected	☆
AC-08	AI3 measured voltage 1	-10.000 to 10.000 V	Factory-corrected	☆
AC-09	AI3 displayed voltage 1	-10.000 to 10.000 V	Factory-corrected	☆
AC-10	AI3 measured voltage 2	-10.000 to 10.000 V	Factory-corrected	☆
AC-11	AI3 displayed voltage 2	-10.000 to 10.000 V	Factory-corrected	☆
AC-12	AO1 target voltage 1	-10.000 to 10.000 V	Factory-corrected	☆
AC-13	AO1 measured voltage 1	-10.000 to 10.000 V	Factory-corrected	☆

Para. No.	Para. Name	Setting Range	Default	Property
AC-14	AO1 target voltage 2	-10.000 to 10.000 V	Factory-corrected	☆
AC-15	AO1 measured voltage 2	-10.000 to 10.000 V	Factory-corrected	☆
AC-16	AO2 target voltage 1	-10.000 to 10.000 V	Factory-corrected	☆
AC-17	AO2 measured voltage 1	-10.000 to 10.000 V	Factory-corrected	☆
AC-18	AO2 target voltage 2	-10.000 to 10.000 V	Factory-corrected	☆
AC-19	AO2 measured voltage 2	-10.000 to 10.000 V	Factory-corrected	☆
AC-20	PT100_1 measured voltage 1	-3.300 to 3.300 V	Factory-corrected	☆
AC-21	PT100_1 displayed voltage 1	-3.300 to 3.300 V	Factory-corrected	☆
AC-22	PT100_1 measured voltage 2	-3.300 to 3.300 V	Factory-corrected	☆
AC-23	PT100_1 displayed voltage 2	-3.300 to 3.300 V	Factory-corrected	☆
AC-24	PT100_2 measured voltage 1	-3.300 to 3.300 V	Factory-corrected	☆
AC-25	PT100_2 displayed voltage 1	-3.300 to 3.300 V	Factory-corrected	☆
AC-26	PT100_2 measured voltage 2	-3.300 to 3.300 V	Factory-corrected	☆
AC-27	PT100_2 displayed voltage 2	-3.300 to 3.300 V	Factory-corrected	☆
AC-28	AO1 measured current 1	0.000 to 20.000 mA	Factory-corrected	☆
AC-29	AO1 target current 1	0.000 to 20.000 mA	Factory-corrected	☆
AC-30	AO1 measured current 2	0.000 to 20.000 mA	Factory-corrected	☆
AC-31	AO1 target current 2	0.000 to 20.000 mA	Factory-corrected	☆
AC-32	AO2 measured current 1	0.000 to 20.000 mA	Factory-corrected	☆
AC-33	AO2 target current 1	0.000 to 20.000 mA	Factory-corrected	☆
AC-34	AO2 measured current 2	0.000 to 20.000 mA	Factory-corrected	☆
AC-35	AO2 target current 2	0.000 to 20.000 mA	Factory-corrected	☆
AC-36	AO3 measured current 1	0.000 to 20.000 mA	Factory-corrected	☆
AC-37	AO3 target current 1	0.000 to 20.000 mA	Factory-corrected	☆

Para. No.	Para. Name	Setting Range	Default	Property
AC-38	AO3 measured current 2	0.000 to 20.000 mA	Factory-corrected	☆
AC-39	AO3 target current 2	0.000 to 20.000 mA	Factory-corrected	☆
AC-40	AO3 measured voltage 1	-10.000 to 10.000 V	Factory-corrected	☆
AC-41	AO3 target voltage 1	-10.000 to 10.000 V	Factory-corrected	☆
AC-42	AO3 measured voltage 2	-10.000 to 10.000 V	Factory-corrected	☆
AC-43	AO3 target voltage 2	-10.000 to 10.000 V	Factory-corrected	☆
AC-44	PT100_3 measured voltage 1	-3.300 to 3.300 V	Factory-corrected	☆
AC-45	PT100_3 displayed voltage 1	-3.300 to 3.300 V	Factory-corrected	☆
AC-46	PT100_3 measured voltage 2	-3.300 to 3.300 V	Factory-corrected	☆
AC-47	PT100_3 displayed voltage 2	-3.300 to 3.300 V	Factory-corrected	☆

B.2 Monitoring Parameters

Para. No.	Para. Name	Min. Unit	Communication Address
Group U0: Monitoring Parameters			
U0-00	Running frequency	0.01 Hz	7000H
U0-01	Frequency reference	0.01 Hz	7001H
U0-02	Bus voltage	0.1 V	7002H
U0-03	Output voltage	1 V	7003H
U0-04	Output current	0.1 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	0.01 V	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 display	1	700EH
U0-15	PID reference	0.1%	700FH
U0-16	PID feedback	0.1%	7010H
U0-17	PLC stage	1	7011H
U0-18	Pulse reference	0.01 kHz	7012H
U0-19	Feedback frequency	0.01 Hz	7013H

Para. No.	Para. Name	Min. Unit	Communication Address
U0-20	Remaining running time	0.1 min	7014H
U0-21	AI1 voltage before correction	0.001 V	7015H
U0-22	AI2 voltage before correction	0.001 V	7016H
U0-23	AI3 voltage before correction	0.001 V	7017H
U0-24	Linear speed	1 m/min	7018H
U0-25	Accumulative power-on time	1 min	7019H
U0-26	Accumulative running time	0.1 min	701AH
U0-27	Pulse reference	1 Hz	701BH
U0-28	Communication reference	0.01%	701CH
U0-29	Encoder feedback frequency	0.01 Hz	701DH
U0-30	Main frequency reference	0.01 Hz	701EH
U0-31	Auxiliary frequency reference	0.01 Hz	701FH
U0-33	Synchronous motor rotor position	0.1°	7021H
U0-34	PTC1 motor temperature (U1-07)	1°C	7022H
U0-35	Target torque	0.1%	7023H
U0-37	Power factor angle	0.1°	7025H
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
U0-45	Fault subcode	1	702DH
U0-46	Heatsink temperature	1°C	702EH
U0-47	PTC channel voltage before correction	0.001 V	702FH
U0-48	PTC channel voltage after correction	0.001 V	7030H
U0-49	Number of position lock offset pulses	1	7031H
U0-61	AC drive running status	1	703DH
U0-62	Fault code	1	703EH
Group U1: Screw Machine Monitoring Parameters			
U1-00	Bus voltage	0.1 A	7100H
U1-01	U-phase IGBT temperature	1°C	7101H
U1-02	V-phase IGBT temperature	1°C	7102H
U1-03	RS phase voltage	0.1 V	7103H
U1-04	RT phase voltage	0.1 V	7104H
U1-05	W-phase IGBT temperature	1°C	7105H
U1-07	PTC1 motor temperature	1°C	7107H
U1-08	PTC2 motor temperature	1°C	7108H
U1-09	PTC3 motor temperature	1°C	7109H
U1-10	PTC1 channel voltage before correction	0.001 V	710AH
U1-11	PTC1 channel voltage after correction	0.001 V	710BH
U1-12	PTC2 channel voltage before correction	0.001 V	710CH
U1-13	PTC2 channel voltage after correction	0.001 V	710DH

Para. No.	Para. Name	Min. Unit	Communication Address
U1-14	PTC3 channel voltage before correction	0.001 V	710EH
U1-15	PTC3 channel voltage after correction	0.001 V	710FH

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