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MD500-PLUS Series General-Purpose AC Drive

Commissioning Guide

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

Data code 19011579 A05

Preface

About this guide

The MD500-PLUS series AC drive is a general-purpose high-performance current vector control AC drive. It is designed to control and regulate the speed and torque of three-phase AC asynchronous motors and permanent magnet synchronous motors. The AC drive can be used to drive textile machines, paper machines, wire drawing machines, machine tools, packaging machines, food machines, fans, water pumps, and other automated production equipment.

This guide describes the commissioning and trial run of the AC drive, covering commissioning tools, processes, and specific operations.

More documents

Document Name	Document No.	Description
MD500-PLUS Series General-Purpose AC Drive Quick Installation and Commissioning Guide (delivered with the product)	19011581	This guide introduces the installation, wiring, commissioning, troubleshooting, parameters, fault codes, and others.
MD500-PLUS Series General-Purpose AC Drive Hardware Guide	19011578	This guide describes the system composition, technical specifications, components, dimensions, options (installation accessories, cables, and peripheral electrical components), expansion cards, as well as product-related daily maintenance and maintenance instructions, certifications, standards, and others.
MD500-PLUS Series General-Purpose AC Drive Installation Guide	19011582	This guide introduces the installation dimensions, space design, specific installation steps, wiring requirements, routing requirements, option installation requirements, and troubleshooting of common EMC-related problems.
MD500-PLUS Series General-Purpose AC Drive Commissioning Guide	19011579	This guide introduces the commissioning tool, process, procedure, troubleshooting, fault codes, and parameters of the AC drive.
MD500-PLUS Series General-Purpose AC Drive Software Guide	19011580	This guide introduces function application, communication, fault codes, and parameters of the AC drive.

Revision History

Date	Version	Description
November 2021	A05	Updated parameters.
September 2021	A04	Updated the version in the front cover and back cover.
May 2021	A03	Corrected errors.
March 2021	A02	Corrected errors.
November 2020	A01	Corrected errors.
July 2020	A00	First release.

How to obtain

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Table of Contents

Fundamental Safety Instructions

Safety Precautions

1. This chapter presents essential safety instructions for a proper use of the equipment. Before operating the equipment, read through the guide and comprehend all the safety instructions. Failure to comply with the safety instructions may result in death, severe personal injuries, or equipment damage.
2. "CAUTION", "WARNING", and "DANGER" items in the guide only indicate some of the precautions that need to be followed; they just supplement the safety precautions.
3. Use this equipment according to the designated environment requirements. Damage caused by improper use is not covered by warranty.
4. Inovance shall take no responsibility for any personal injuries or property damage caused by improper use.

Safety Levels and Definitions

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

General Safety Instructions

- Drawings in the guide are sometimes shown without covers or protective guards. Remember to install the covers or protective guards as specified first, and then perform operations in accordance with the instructions.
- The drawings in the guide are shown for illustration only and may be different from the product you purchased.

Unpacking

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

- Check whether the packing is intact and whether there is damage, water seepage, dampness, and deformation before unpacking.
- Unpack the package by following the unpacking sequence. Do not strike the package violently.
- Check whether there is damage, rust, or injuries on the surface of the equipment and equipment accessories before unpacking.
- Check whether the package contents are consistent with the packing list before unpacking.

Storage and Transportation

- Large-scale or heavy equipment must be transported by qualified professionals using specialized hoisting equipment. Failure to comply may result in personal injuries or equipment damage.
- Before hoisting the equipment, ensure the equipment components such as the front cover and terminal blocks are secured firmly with screws. Loosely-connected components may fall off and result in personal injuries or equipment damage.
- Never stand or stay below the equipment when the equipment is being hoisted by the hoisting equipment.
- When hoisting the equipment with a steel rope, ensure the equipment is hoisted at a constant speed without suffering from vibration or shock. Do not turn the equipment over or let the equipment stay hanging in the air. Failure to comply may result in personal injuries or equipment damage.

- Handle the equipment with care during transportation and mind your steps to prevent personal injuries or equipment damage.
- When carrying the equipment with bare hands, hold the equipment casing firmly with care to prevent parts from falling. Failure to comply may result in personal injuries.
- Store and transport the equipment based on the storage and transportation requirements. Failure to comply will result in equipment damage.
- Avoid storing or transporting the equipment in environments with water splash, rain, direct sunlight, strong electric field, strong magnetic field, and strong vibration.
- Avoid storing the 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 the equipment with other equipment or materials that may harm or have negative impacts on this equipment.

Installation

- The equipment must be operated only by professionals with electrical knowledge.

- Read through the guide and safety instructions before installation.
- Do not install this equipment in places with strong electric or magnetic fields.
- Before installation, check that the mechanical strength of the installation site can bear the weight of the equipment. Failure to comply will result in mechanical hazards.
- Do not wear loose clothes or accessories during installation. Failure to comply may result in an electric shock.
- When installing the equipment in a closed environment (such as a cabinet or casing), use a cooling device (such as a fan or air conditioner) to cool the environment down to the required temperature. Failure to comply may result in equipment over-temperature or a fire.
- Do not retrofit the equipment.
- Do not fiddle with the bolts used to fix equipment components or the bolts marked in red.
- When the equipment is installed in a cabinet or final assembly, a fireproof enclosure providing both electrical and mechanical protections must be provided. The IP rating must meet IEC standards and local laws and regulations.
- Before installing devices with strong electromagnetic interference, such as a transformer, install a shielding device for the equipment to prevent malfunction.
- Install the equipment onto an incombustible object such as a metal. Keep the equipment away from combustible objects. Failure to comply will result in a fire.

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

Wiring

- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed only by professionals.
- Before wiring, cut off all the power supplies of the equipment, and wait for at least the time designated on the equipment warning label before further operations because residual voltage still exists after power-off. After waiting for the designated time, measure the DC voltage in the main circuit to ensure the DC voltage is within the safe voltage range. Failure to comply will result in an electric shock.
- Do not perform wiring, remove the equipment cover, or touch the circuit board with power ON. Failure to comply will result in an electric shock.
- Check that the equipment is grounded properly. Failure to comply will result in an electric shock.

- Do not connect the input power supply to the output end of the equipment. Failure to comply will result in equipment damage or even a fire.
- When connecting a drive to the motor, check that the phase sequences of the drive and motor terminals are consistent to prevent reverse motor rotation.
- Cables used for wiring must meet cross sectional area and shielding requirements. The shield of the cable must be reliably grounded at one end.
- Fix the terminal screws with the tightening torque specified in the user guide. Improper tightening torque may overheat or damage the connecting part, resulting in a fire.
- After wiring is done, check that all cables are connected properly and no screws, washers or exposed cables are left inside the equipment. Failure to comply may result in an electric shock or equipment damage.

- During wiring, follow the proper electrostatic discharge (ESD) procedure, and wear an antistatic wrist strap. Failure to comply will damage the equipment or the internal circuits of the equipment.
- Use shielded twisted pairs for the control circuit. Connect the shield to the grounding terminal of the equipment for grounding purpose. Failure to comply will result in equipment malfunction.

Power-on

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

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

Operation

- The equipment must be operated only by professionals. Failure to comply will result in death or personal injuries.
- Do not touch any connecting terminals or disassemble any unit or component of the equipment during operation. Failure to comply will result in an electric shock.

- Do not touch the equipment casing, fan, or resistor with bare hands to feel the temperature. Failure to comply may result in personal injuries.
- Prevent metal or other objects from falling into the equipment during operation. Failure to comply may result in a fire or equipment damage.

Maintenance

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

- Perform routine and periodic inspection and maintenance on the equipment according to maintenance requirements and keep a maintenance record.

Repair

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

- When the fuse is blown or the circuit breaker or earth leakage current breaker (ELCB) trips, wait for at least the time designated on the equipment warning label before power-on or further operations. Failure to comply may result in death, personal injuries or equipment damage.
- When the equipment is faulty or damaged, the troubleshooting and repair work must be performed by professionals that follow the repair instructions, with repair records kept properly.
- Replace quick-wear parts of the equipment according to the replacement instructions.
- Do not use damaged equipment. Failure to comply may result in death, personal injuries, or severe equipment damage.
- After the equipment is replaced, check the wiring and set parameters again.

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

Safety Labels

For safe equipment operation and maintenance, comply with the safety labels on the equipment. Do not damage or remove the safety labels. See the following table for descriptions of the safety labels.

Safety Signs		Description
T1 to T12 models		• Read through the safety instructions before operating the equipment. Failure to comply may result in equipment damage, personal injuries, or even death. • Do not touch terminals or remove the cover while the power is on or within 10 minutes after the power is turned off. Failure to comply may result in an electric shock.
T13 models		• Read through the safety instructions before operating the equipment. Failure to comply may result in equipment damage, personal injuries, or even death. • Do not touch terminals or remove the cover while the power is on or within 15 minutes after the power is turned off. Failure to comply may result in an electric shock.

1 Commissioning Tools

1.1 LED Operating Panel

1.1.1 LED Operating Panel

Dimensions

The following figure shows the appearance and installation dimensions of the LED operating panel.

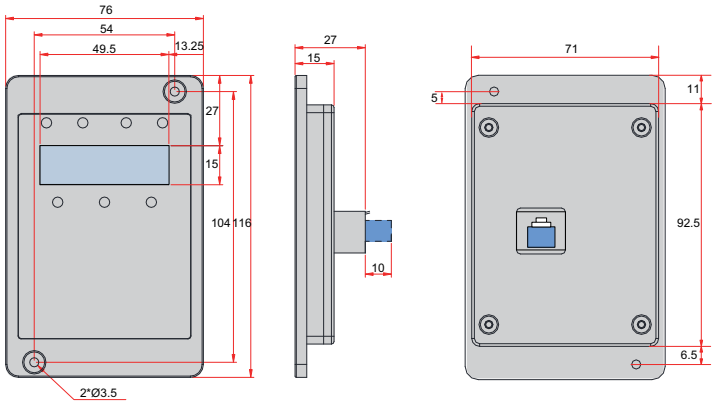


Figure 1-1 Appearance and installation dimensions of the LED operating panel (unit: mm)

Components

You can use the LED operating panel that displays the status of the AC drive to set parameters and view fault information. The following figure shows the components of the operating panel.

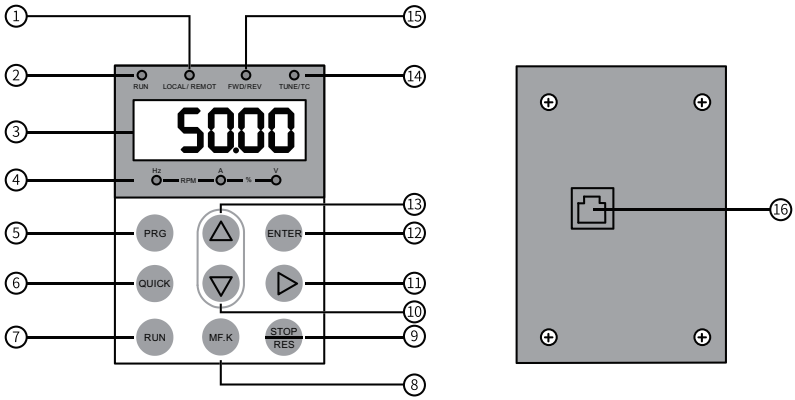


Figure 1-2 Components of the operating panel

Table 1–1 Components of the operating panel

No.	Component Name	No.	Component Name
1	Command source indicator	9	STOP/RES key
2	RUN indicator	10	Decrement key
3	Data display area	11	Shift key
4	Parameter unit indicator	12	Confirm key
5	Programming key	13	Increment key
6	Menu key	14	Auto-tuning/Torque control/ Fault indicator
7	RUN key	15	Running direction indicator
8	Multi-function key	16	RJ45 port (for connecting an external operating panel)

Keys

Table 1–2 Keys of the operating panel

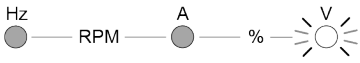
Key	Name	Function
PRG	Programming key	Used to return to the previous screen or go to a level I menu.
ENTER	ENTER key	Used to access the next screen or confirm a mode, a parameter, or a reference value.

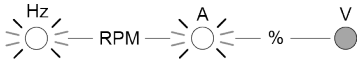
Key	Name	Function
	UPkey	Used to increase the parameter number/ reference value.
	DOWN key	Used to decrease the parameter number/ reference value.
	SHIFT key	Used to shift the display of parameters cyclically leftward and select the digit to be modified during parameter number/value setting.
	RUN key	Used to start the AC drive in operating panel control mode.
	STOP/RES key	Used to stop present operation or reset the AC drive upon a fault.
	Multi-function key	Used to switch between functions as defined by the value of F7-01.
	Menu key	Used to switch over between menu modes as defined by the value of FP-03.

Status indicators

In the following table,  indicates that the indicator is on,  indicates that the indicator is off, and  indicates the indicator blinks.

Table 1–3 Indicators on the operating panel

Indicator Status		Description
RUN RUN indicator		Off: stop
		On: running
LOCAL/REMOT Command source indicator		Off: operating panel control
		On: terminal control
		Blinking: communication control
FWD/REV Running direction indicator		Off: forward running
		On: reverse running
TUNE/TC Auto-tuning/Torque control/Fault indicator		Off: normal running
		On: torque control active
		Blinking slowly: auto-tuning (once per second)
		Blinking quickly: faulty (four times per second)
		Frequency unit: Hz
		Current unit: A
		Voltage unit: V

Indicator Status	Description
	Speed unit: RPM
	Percentage (%)

Data display

The five-digit LED data display indicates the frequency reference, output frequency, monitoring information, and fault code.

Table 1–4 Description of LED display

LED Display	Actual Data	LED Display	Actual Data	LED Display	Actual Data	LED Display	Actual Data
	0		6		C		N
	1		7		c		P
	2		8		D		R
	3		9		E		T
	4		A		F		u
	5, S		B		L		U

1.1.2 Related Parameters

Table 1–5 Parameters related to the operating panel

Parameter	Name	Default	Value Range	Description
F7-01	MF.K key function	0	0: MF.K key disabled 1: Switchover between operating panel control and remote control (terminal or communication) 2: Switchover between forward and reverse running 3: Forward jog 4: Reverse jog	The MF.K key is a multi-functional key. This parameter is used to set the function of the MF.K key. 0: MF.K key disabled The MF.K key does not work. 1: Switchover between operating panel control and remote control (terminal or communication) When F0-02 is set to 0 (operating panel), pressing the MF.K key produces no effect. When F0-02 is set to 1 (terminal), pressing the MF.K key can switch between terminal control and operating panel control. When F0-02 is set to 2 (communication), pressing the MF.K key can switch between communication control and operating panel control. 2: Switchover between forward and reverse run You can change the direction of the frequency reference by using the MF.K key. This function is valid only when the operating panel is set as the command source. 3: Forward jog Forward jog (FJOG) can be enabled by using the MF.K key. This function is valid only when the operating panel is set as the command source. 4: Reverse jog Reverse jog (RJOG) can be enabled by using the MF.K key. This function is valid only when the operating panel is set as the command source.
F7-02	STOP/RES key function	0	0: STOP/RES key enabled only in operating panel control mode 1: STOP/RES key enabled in any mode	The STOP/RES key on the operating panel is used for stop/reset. This parameter is used to set the function of the key. 0: STOP/RES key enabled only in operating panel control mode The function of the key is available only in operating panel control mode. 1: STOP/RES key enabled in any mode The function of the key is available in any mode.

Parameter	Name	Default	Value Range	Description
F7-03	LED display of parameters during running 1	0x1F	Bit 00: Running frequency (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 (%) Bit07: 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	In the running state, pressing the  key on the LED operating panel displays the 16 state values of the AC drive in real time. The options of each bit are 1 (display) and 0 (hide). The hexadecimal number converted from the binary number is the value of F7-03.
F7-04	LED display of parameters during running 2	0	Bit 00: PID feedback Bit 01: PLC stage Bit 02: Pulse input reference (kHz) Bit 03: Running frequency 2 (Hz) 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 (hour) Bit 10: Current running time (min) Bit 11: Pulse input reference (Hz) Bit 12: Communication setting value Bit 13: Encoder feedback speed (Hz) Bit 14: Roll diameter (mm) Bit 15: Taper tension (N)	In the running state, pressing the  key on the LED operating panel displays the 16 state values of the AC drive in real time. The options of each bit are 1 (display) and 0 (hide). The hexadecimal number converted from the binary number is the value of F7-04.

Parameter	Name	Default	Value Range	Description
F7-05	LED display of parameters at stop	0x33	Bit 00: Frequency reference (Hz) Bit 01: Bus voltage (V) Bit 02: DI state Bit03: 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 display Bit 11: PID reference Bit 12: Pulse input reference (kHz) Bit 13: Roll diameter (mm) Bit 14: Tension (N)	To display these parameters at stop, set the corresponding bits to 1 and set F7-05 to a hexadecimal number obtained by converting this binary number. In the stop state, pressing the  key on the LED operating panel displays the 13 state values of the AC drive. The options of each bit are 1 (display) and 0 (hide). The hexadecimal number converted from the binary number is the value of F7-05.
FP-01	Parameter initialization	1	0: No operation 1: Restore default parameter mode 1 2: Clear records 4: Back up current parameters 501: Restore user backup parameters 503: Restore default parameter mode 2	This parameter is used to set the corresponding action upon parameter initialization of the AC drive. 0: No operation The AC drive does not perform any operation. 1: Restore default parameter mode 1 Parameters of the AC drive are restored to default settings except motor parameters, frequency reference resolution (F0-22), fault records, accumulative running time (F7-09), accumulative power-on time (F7-13), accumulative power consumption (F7-14), and heatsink temperature of IGBT (F7-07). 2: Clear records The fault records, accumulative running time (F7-09), accumulative power-on time (F7-13), and accumulative power consumption (F7-14) are cleared. 4: Back up current user parameters All parameter settings specific to the current user are backed up. 501: Restore user backup parameters The parameter settings that are backed up by setting FP-01 to 4 are restored. 503: Restore default parameter mode 2 All AC drive parameters are restored to default settings except FP-00, FP-01, and the parameters in group FF.

Parameter	Name	Default	Value Range	Description
FP-02	Parameter group display	111	Ones (position): Group U display 0: Hide 1: Display Tens (position): Group A display 0: Hide 1: Display Hundreds (position): Group B display 0: Hide 1: Display Thousands (position): Group C display 0: Hide 1: Display	This parameter is used to determine whether to display the parameters of groups U, A, B, and C on the operating panel.
FP-03	Display of user parameters	11	Ones: Display of user-defined parameter group 0: Hide 1: Display Tens (position): Display of user-modified parameter group 0: Hide 1: Display	This parameter is used to determine whether to display the user-customized parameter group and the user-modified parameter group on the operating panel.

1.1.3 Setting Parameters

The operating panel has a three-level menu structure for parameter setting. After entering a menu at a level, press  ,  , and  for setting a display bit that is flashing. The following describes the structure:

- Level I menu: parameter group
- Level II menu: parameter
- Level III menu: parameter value

The following example shows how to modify F3-02 from 10.00 Hz to 15.00 Hz.

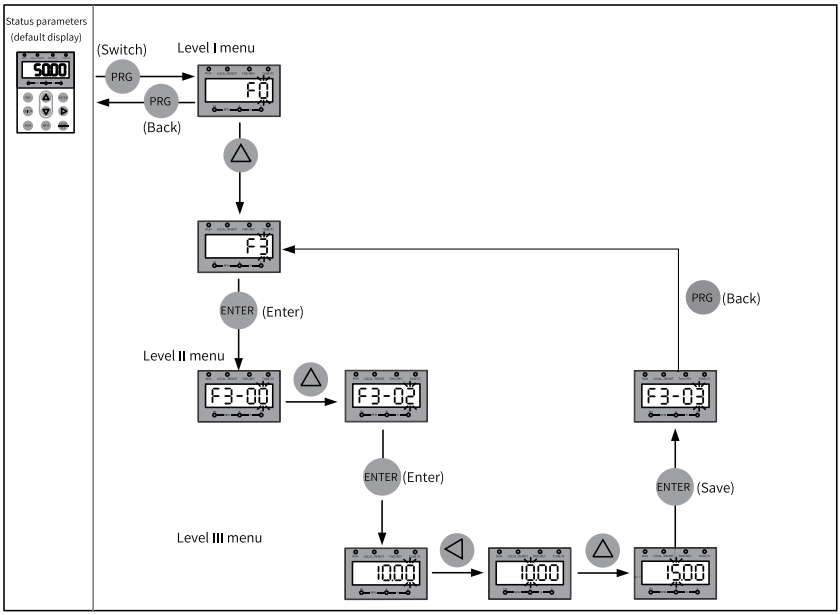


Figure 1-3 Modifying a parameter

Press PRG or ENTER to return to a level II menu when operating a level III menu. These two keys are different in that:

1. Pressing ENTER returns to the level II menu after saving the current parameter setting, where the next parameter is automatically displayed.
2. Pressing PRG returns to the level II menu corresponding to the current parameter without saving the current parameter setting.

When you are operating a level III menu, you cannot modify a parameter that does not include any flashing bit. This is because of two possible reasons:

1. The parameter is an unmodifiable parameter such as product type, actual detection, and running record parameters.
2. The parameter cannot be modified when the AC drive is running. You can modify such parameters when the AC drive is stopped.

1.1.4 Viewing Parameters

Set FP-02 to 11 and FP-03 to 11 to view all parameters through the operating panel. The following figure shows how this is done.

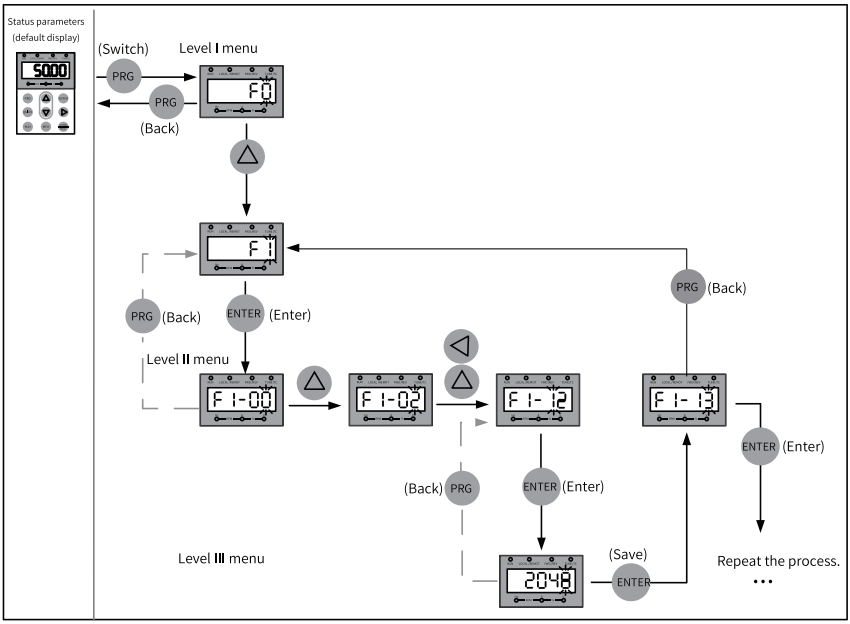


Figure 1-4 Viewing parameters

1.1.5 Viewing Status Parameters

In the running state, press ▷ to view status parameters. The status parameters displayed by default include running frequency, frequency reference, bus voltage, output voltage, and output current. For more status parameters, see related description of F7-03 and F7-04 in "Related Parameters".

In the stop state, press ▷ to view status parameters. The status parameters displayed by default include frequency reference, bus voltage, AI1 voltage, and AI2 voltage. For more status parameters, see related description of F7-05 in "Related Parameters".

1.1.6 Viewing Faults

When the AC drive is faulty, the fault indicator blinks, and the operating panel displays a fault code, as shown in the following figure.

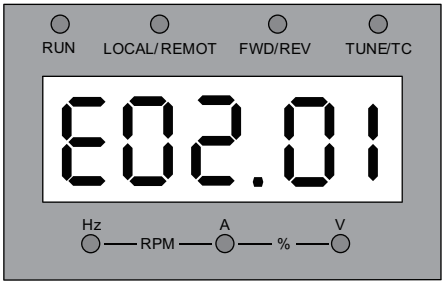


Figure 1-5 Fault code

When the fault indicator blinks, the AC drive will immediately stop output, and the contact of the fault relay will be closed. Perform troubleshooting according to the common solutions specified in *"3.2 List of Fault Codes" on page 91* or contact Inovance for technical support. Locate the fault and rectify the fault cause based on the fault code displayed on the operating panel.

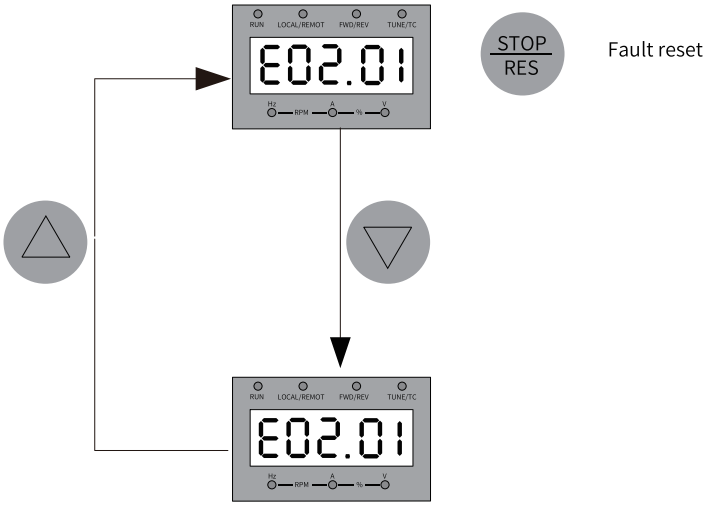


Figure 1-6 Viewing and resetting upon multiple faults

1.1.7 Operating the MF.K Key

The MF.K key is a multi-function key on the operating panel. Its function can be set using F7-01. In the stop or running state, press the key for control mode switchover, switchover between forward and reverse run, and forward/reverse jog.

Table 1–6 MF.K key parameters

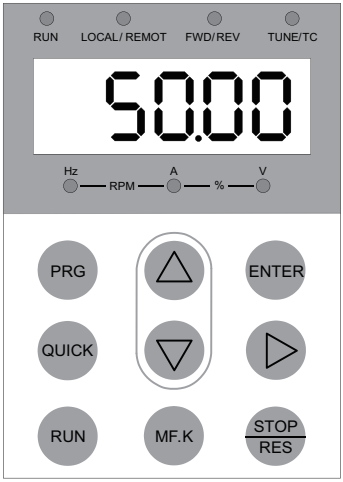
Para. No.	Name	Default	Value Range	Description
F7-01	MF.K key function selection	0	0: MF.K key disabled 1: Switchover between operating panel control and remote control (terminal I/O control or communication control) 2: Switchover between forward and reverse run 3: Forward jog 4: Reverse jog	This parameter is used for setting the function of the MF.K key on the operating panel. 0: MF.K key disabled The key has no function. 1: Switchover between operating panel control and remote control (terminal I/O control or communication control) When F0-02 is set to 0 (operating panel control), pressing the MF-K key produces no effect. When F0-02 is set to 1 (terminal), pressing the MF.K key can switch between terminal I/O control and operating panel control. When F0-02 is set to 2 (communication), pressing the MF.K key can switch between communication control and operating panel control. 2: Switchover between forward and reverse run Pressing the MF.K key can switch between frequency reference directions. This function is available only when the operating panel is selected as the command source. 3: Forward jog Pressing the MF.K key enables forward jog (FJOG). This function is available only when the operating panel is selected as the command source. 4: Reverse jog Pressing the MF.K key enables reverse jog (RJOG). This function is available only when the operating panel is selected as the command source.

1.1.8 Driving the Motor Using the Operating Panel

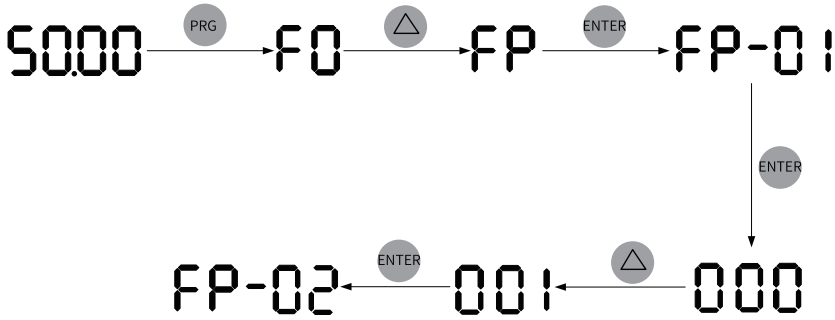
Press MF.K on the operating panel to control forward/reverse jog of the motor and press RUN / STOP RES to start/stop the motor.

Procedure

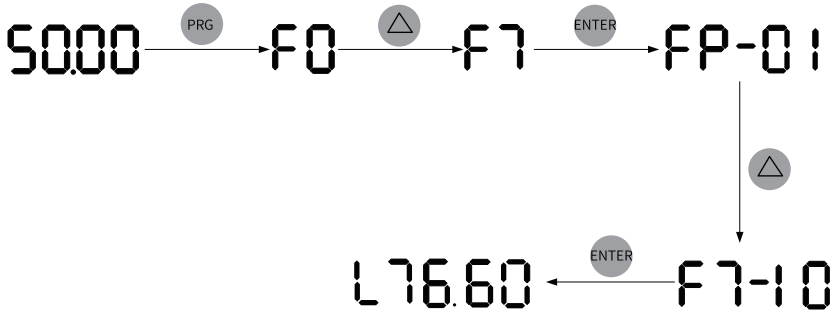
1. Perform inspection before power-on.
   Inspect installation and wiring as instructed in the *MD500-PLUS Series General-Purpose AC Drive Installation Guide*. For details, see the parts related to inspection before power-on in that guide.
2. Press the power switch to power on the AC drive.
3. Check the display on the operating panel. If the operating panel displays 50.00, the power-on is successful.



4. Set FP-01 to 001 to restore all parameters to default settings. The following figure shows an example.



5. Check the value of F7-10, which indicates the software version.



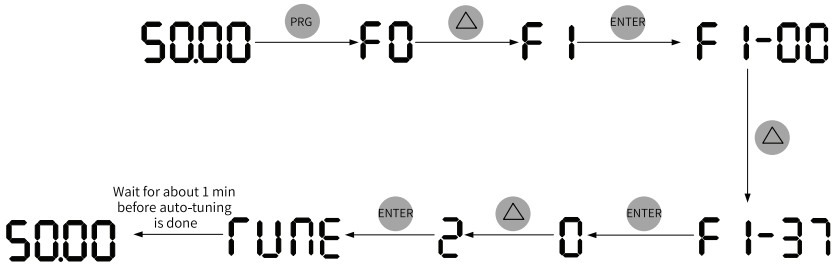
6. Set motor parameters in group F1 according to the motor nameplate.

Table 1–7 Motor parameters

Para. No.	Name	Default	Value Range	Description	Set point
F1-00	Motor type selection	0	0: Common asynchronous motor 1: Variable frequency asynchronous motor 2: Synchronous motor	A variable frequency motor adjusts its frequency and speed according to the load. It is suitable for applications with low voltage or light load. For low-voltage applications, its frequency can be reduced for reliable startup. For light-load applications, its frequency, speed, and current can be reduced to save electrical energy. Common asynchronous motors are suitable for applications with normal voltage but often full load. Designed on constant frequency and constant voltage, they are impossible to meet all frequency control requirements.	0
F1-01	Rated motor power	Model dependent	0.1–1000.0 kW	This is the shaft end output power of the motor during operation under rated working conditions. The selected value should allow cost-efficiency while being sufficient to support the required mechanical load. Factors such as motor heating, allowable overload capacity, and starting capacity should be considered.	22.0
F1-02	Rated motor voltage	Model dependent	1–2000 V	This is the voltage of the motor during normal operation, which typically refers to the line voltage.	0380

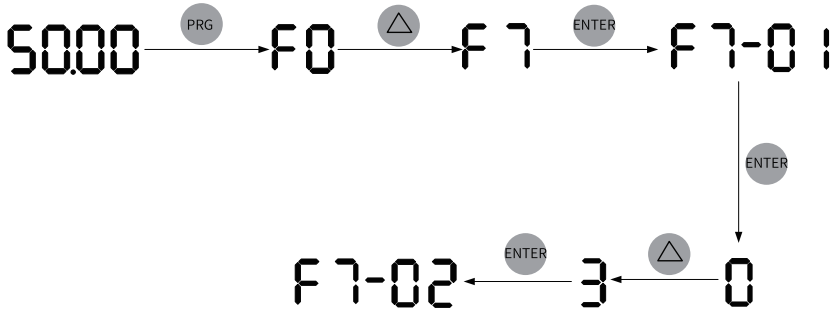
Para. No.	Name	Default	Value Range	Description	Set point
F1-03	Rated motor current	Model dependent	0.1–6553.5 A	This is the current of the motor during normal operation, which typically refers to the line current.	45.0
F1-04	Rated motor frequency	Model dependent	0.01–600.00 Hz	This is the frequency of the power supply connected to the stator winding when the motor is running in rated conditions.	50.00
F1-05	Rated motor speed	Model dependent	1–65535 RPM	This is the speed of the rotor in RPM when the motor is running in rated conditions.	1460

7. Set F1-37 to 2 and press ENTER. The keypad displays  . Press and hold the RUN key for more than 3s to start motor auto-tuning. In this case, the RUN indicator is steady on, the TUNE/TC indicator blinks, and the motor is energized. About 1 minute later, the operating panel displays 50.00, indicating that the auto-tuning is done.

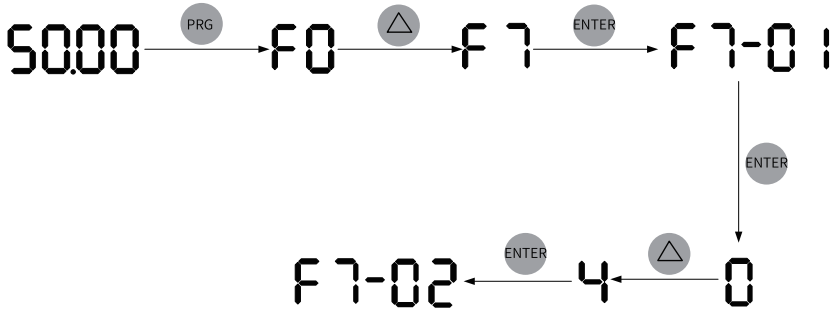


8. Set F7-01 to 3. Press 

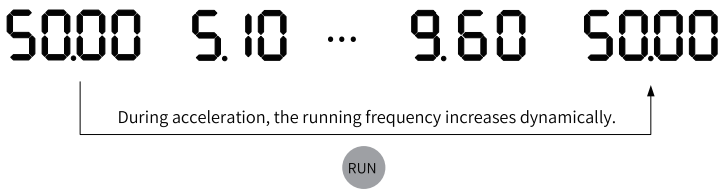
to start forward jogging.



9. Set F7-01 to 4. Press MF.K for reverse jog of the motor.



10. Press RUN to start the motor. The motor starts accelerating and the operating penal displays the current running frequency, as shown in the following figure. After the acceleration is done, the displayed frequency is 50.00. Press this key to switch the displayed status parameter.



11. Press STOP/RES to make the motor decelerate to stop.

2 Commissioning and Trial Run

2.1 Commissioning Procedure

2.1.1 Basic Commissioning Process

For different modes, see related sections.

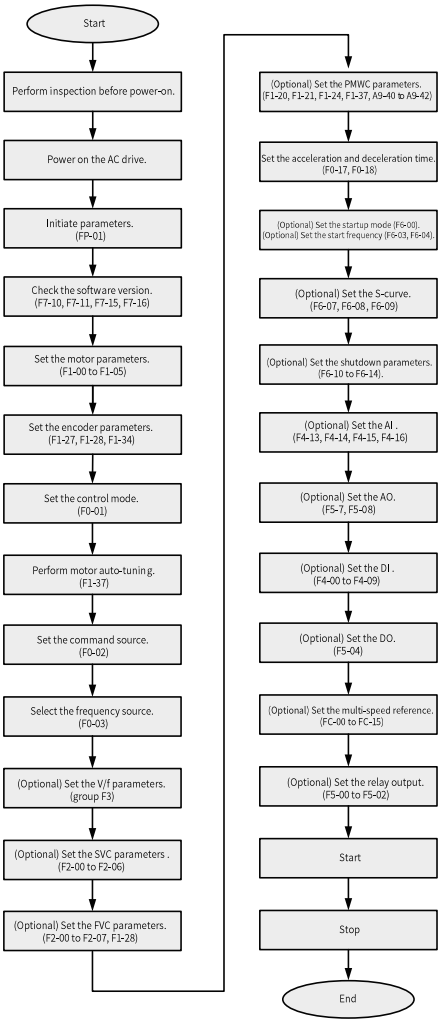


Figure 2-1 Basic commissioning flowchart

Table 2–1 Basic commissioning process

No.	Step	Related Parameter
1	Perform inspection before power-on.	None
2	Power on the AC drive.	None
3	Initiate parameters.	FP-01
4	Check the software versions	F7-10, F7-11, F7–15, and F7–16
5	Set the motor parameters.	F1-00 to F1-05 You also need to set the motor type.
6	Set the encoder parameters.	F1–27, F1–28, and F1–34
7	Set the control mode.	F0-01
8	Perform motor auto-tuning.	F1-37
10	Select the command source.	F0-02
11	Select the frequency source.	F0-03
12	(Optional) Set the V/f parameters.	Parameters in group F3
13	(Optional) Set the SVC parameters.	F2-00 to F2-06
14	(Optional) Set the FVC parameters.	F2-00 to F2-07, and F1-28
15	(Optional) Set the PMVVC parameters.	F0-01, F1-00, F1-20, F1-21, F1-24, F1-37, and A9-40 to A9-42
16	Set the acceleration and deceleration time.	F0-17 and F0-18
17	(Optional) Set the startup mode.	F6-00
18	(Optional) Set the startup frequency.	F6-03 and F6-04
19	(Optional) Set the S-curve.	F6-07, F6-08, and F6-09
20	Set the shutdown parameters.	F6-10 to F6-14
21	(Optional) Set the AI.	F4-13, F4-14, F4-15, and F4-16
22	(Optional) Set the AO.	F5-07 and F5-08
23	(Optional) Set the DI.	F4-00 to F4-09
24	(Optional) Set the DO.	F5-04
25	(Optional) Set the multi-speed reference.	FC-00 to FC-15
26	(Optional) Set the replay output.	F5-00, F5-01, and F5-02
27	Start the AC drive.	None
28	Stop the AC drive.	None

2.1.2 Commissioning Process in V/f Control Mode

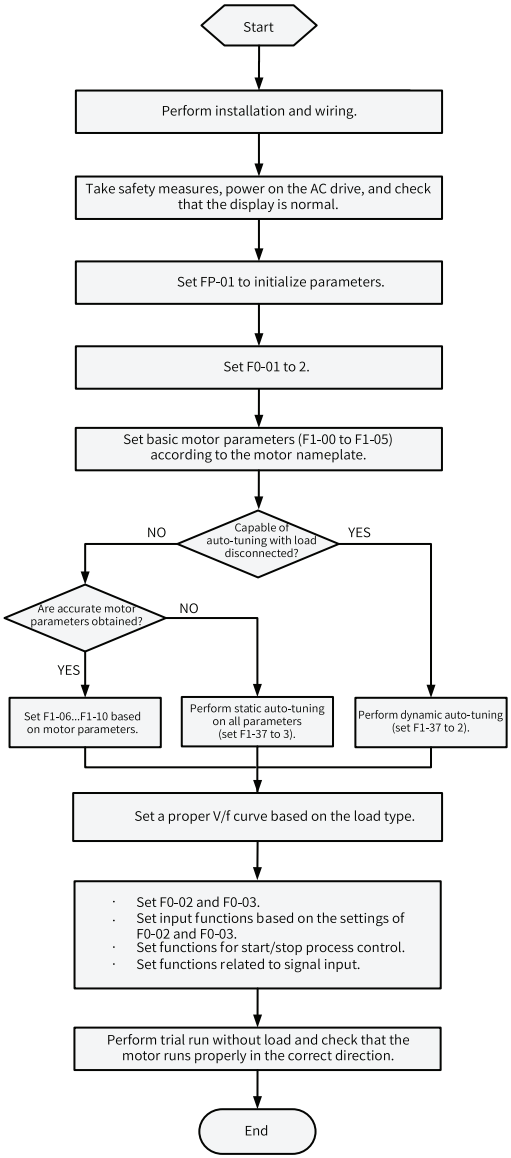


Figure 2-2 AC drive commissioning flowchart (in V/f control mode)

2.1.3 Commissioning Process in SVC/FVC Mode

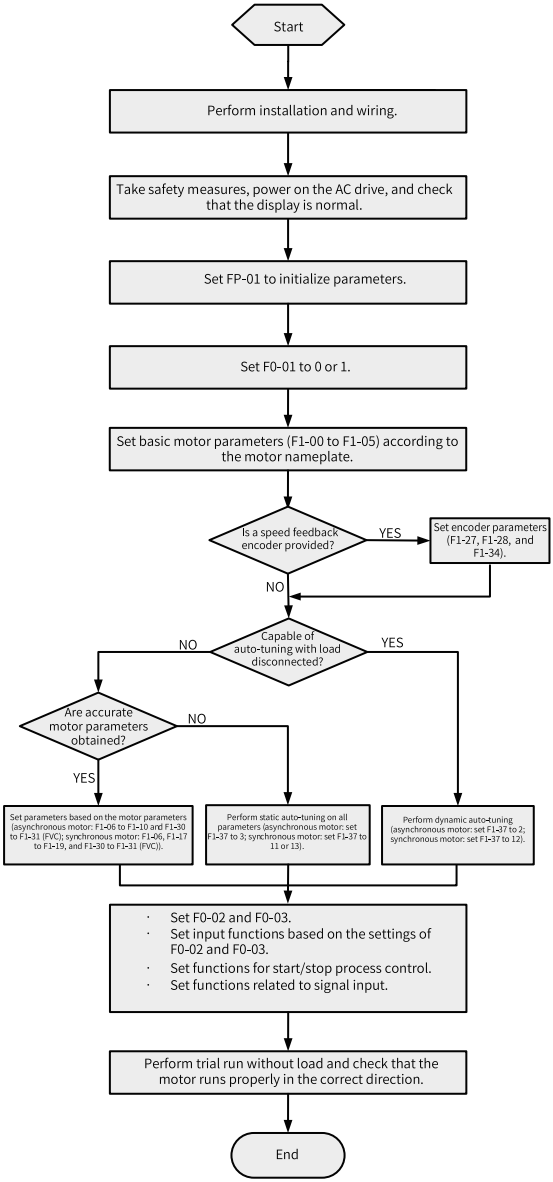


Figure 2-3 AC drive commissioning flowchart (in SVC/FVC mode)

2.1.4 Commissioning Process in PMVVC Mode

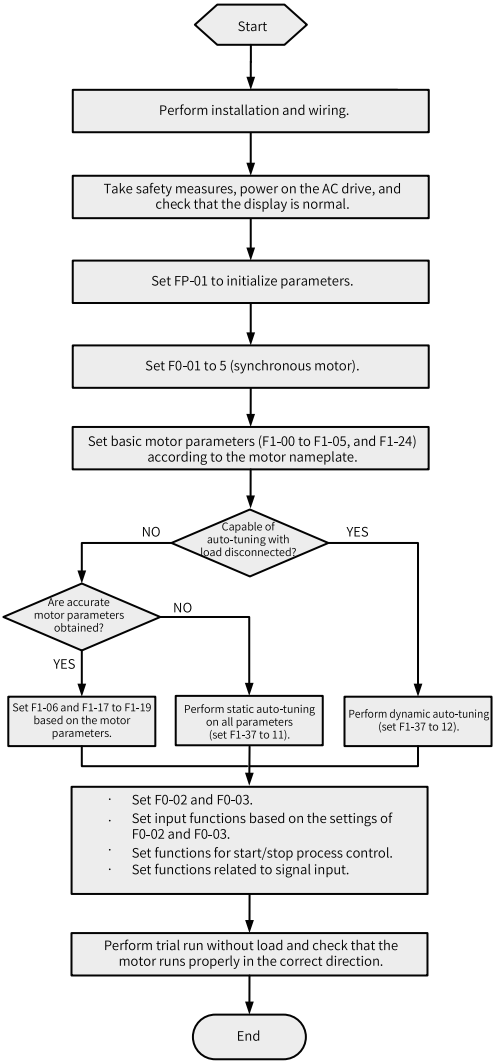


Figure 2-4 AC drive commissioning flowchart (in PMVVC mode)

2.2 Commissioning Procedure

2.2.1 Checklist Before Power-on

Ensure compliance of the items in the following table before power-on.

Table 2–2 Checklist before power-on

Item	Checklist
Main circuit wiring	The power supply voltage is correct (380–480 VAC; 50/60 Hz).
	The power input terminals and the AC drive input terminals (R/S/T) are connected properly.
	The motor input terminals and the AC drive output terminals (U/V/W) are connected properly.
	The AC drive and motor are properly grounded.
	The cross sectional area of the main circuit cable is proper.
	The heat-shrink tube is applied to the copper lug and conductors of the main circuit cable and the tube completely wraps the conducting parts of the cable.
	The motor output cable is shorter than 50 m, or the carrier frequency (F0-15) is reduced otherwise.
Control circuit wiring	The control circuit terminals are reliably connected to other control devices.
	The control circuit signal cables in use are shielded twisted pair cables.
	Optional cards are connected correctly.
	Control circuit cables and main circuit cables are routed through different routes.
	The control circuit terminals of the AC drive are all OFF (the AC drive is not running).
Load	The motor is not connected to any load or mechanical system.
Braking resistor	The braking resistor and braking unit, where applicable, are wired properly with proper resistance value.

2.2.2 Powering on the AC Drive

Switch off the power switch and check the display on the operating panel of the AC drive. If the operating panel displays 50.00, the AC drive is powered on properly.

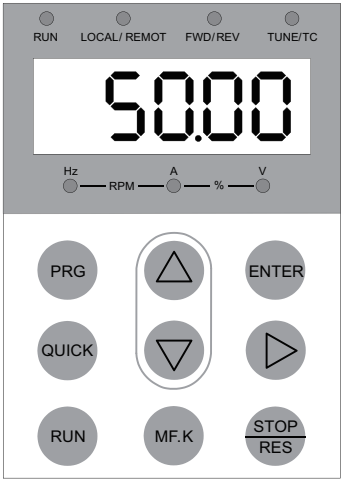


Figure 2-5 Power-on display on the operating panel

2.2.3 Initializing Parameters

Para. No.	Name	Default	Value Range	Description
FP-01	Parameter initialization	0	0: No action 1: Restore default settings (mode 1) 2: Clear records 4: Back up current user parameters 501: Restore user backup parameters 503: Restore default settings (mode 2)	This parameter is used to set the action of the AC drive upon parameter initialization. 0: No action The AC drive takes no action. 1: Restore default settings (mode 1) Parameters of the AC drive are restored to default settings except motor parameters, frequency reference resolution (F0-22), fault records, accumulative running time (F7-09), accumulative power-on time (F7-13), accumulative power consumption (F7-14), and heatsink temperature of IGBT (F7-07). 2: Clear records The fault records, accumulative running time (F7-09), accumulative power-on time (F7-13), and accumulative power consumption (F7-14) are cleared. 4: Back up current user parameters All parameter settings specific to the current user are backed up. 501: Restore user backup parameters The parameter settings that are backed up by setting FP-01 to 4 are restored. 503: Restore default settings (mode 2) All AC drive parameters are restored to factory settings except FP-00, FP-01, and the parameters in group FF.

2.2.4 Checking Software Versions

Para. No.	Name	Value Range	Description
F7-10	Performance software version	-	Indicates the performance software version of the AC drive.
F7-11	Function software version	-	Indicates the function software version of the AC drive.
F7-15	Temporary performance software version	-	Indicates the temporary performance software version.
F7-16	Temporary function software version	-	Indicates the temporary function software version.

2.2.5 Setting the Motor Parameters

Parameter	Name	Value Range	Description
F1-00	Motor type	0: Common asynchronous motor 1: Variable frequency asynchronous motor 2: Synchronous motor	A variable frequency motor can adjust its frequency and speed according to the load. When the voltage is low, the motor can reduce the frequency and start reliably. When the load is light, the motor can reduce the frequency, speed, and current to save electric energy. A common asynchronous motor is suitable for applications with normal voltage but often full load. Designed on constant frequency and constant voltage, asynchronous motors cannot meet all frequency control requirements.
F1-01	Rated motor power	0.1 kW to 1000.0 kW	The rated motor power indicates the shaft end output power of the motor during operation under rated working conditions. Select a motor of a proper power rating based on the requirements of the mechanical load, with due consideration to factors such as motor heating, overload capacity, and starting capacity.
F1-02	Rated motor voltage	1 V to 2000 V	The rated motor voltage indicates the voltage of the motor during normal operation, which typically refers to the line voltage.
F1-03	Rated motor current	0.1 A to 6553.5 A	The rated motor current indicates the current of the motor during normal operation, which usually refers to the line current.
F1-04	Rated motor frequency	0.01 Hz to F0-10	The rated motor frequency indicates the frequency of the power supply connected to the stator winding under the rated operation state of the motor.
F1-05	Rated motor speed	1 RPM to 65535 RPM	The rated motor speed indicates the speed of the rotor in RPM when the motor is running in rated conditions.
F1-06	Asynchronous/ Synchronous motor stator resistance	0.001Ω to 65.535 Ω (power ≤ 55 kW) 0.0001 Ω to 6.5535 Ω (power > 55 kW)	This is the DC resistance of the motor stator winding, which can be obtained through motor auto-tuning.

Parameter	Name	Value Range	Description
F1-07	Asynchronous motor rotor resistance	0.001 (power ≤ 55 kW) 0.0001 (power > 55 kW)	This is the DC resistance of rotor winding of an asynchronous motor, which can be obtained by static or dynamic motor auto-tuning.
F1-08	Asynchronous motor leakage inductance	0.01 mH to 655.35 mH (power ≤ 55 kW) 0.001 mH to 65.535 mH (power > 55 kW)	The asynchronous motor leakage inductance is caused by the leakage flux of the motor winding. When current is introduced to the motor winding, magnetic flux will be generated. Based on the path, the magnetic flux can be divided into main flux and leakage flux. The leakage flux is the leakage inductance. This parameter can be obtained by static auto-tuning or dynamic auto-tuning of the motor.
F1-09	Asynchronous motor mutual inductance	0.1 mH to 6553.5 mH (power ≤ 55 kW) 0.01 mH to 655.35 mH (power > 55 kW)	When the current in one coil of the motor changes, electromotive force is induced in a coil adjacent to it. Such mutually induced electromotive force can be described by this parameter. The mutual inductance of a motor can be divided into two types. One type is the interphase inductance of the stator, which is the reactance between two phases of the stator. The other type is the inductance between the stator and the rotor. The former does not change with the rotation of the rotor, whereas the latter changes accordingly with the rotation of the rotor. Both types of mutual inductance can be obtained through static or dynamic motor auto-tuning.
F1-10	Asynchronous motor no-load current	0.1 A to F1-03 (Rated motor current)	This parameter defines the current passing through the three-phase winding of the stator when the motor is running without load. It can be obtained by dynamic auto-tuning of the motor.
F1-17	Synchronous motor axis D inductance	0.01 mH to 655.35 mH (power ≤ 55 kW) 0.001 mH to 65.535 mH (power > 55 kW)	This is the inductance of the main magnetic pole axis (vertical axis) of a synchronous motor.
F1-18	Synchronous motor axis Q inductance	0.01 mH to 655.35 mH (power ≤ 55 kW) 0.001 mH to 65.535 mH (power > 55 kW)	This is the inductance of the central line (quadrature axis) between adjacent magnetic pole axes of the synchronous motor rotor.
F1-19	Synchronous motor back EMF coefficient	0.0 V to 6553.5 V	This is the valid value of the back EMF line of the motor at the rated frequency specified by F1-04.
F1-20	Filter time constant (PMVVC)	0.003 to 65.535	This is a parameter applicable to the PMVVC mode.
F1-21	Oscillation suppression gain (PMVVC)	0 to 65535	This is a parameter applicable to the PMVVC mode.

Parameter	Name	Value Range	Description
F1-23	Percentage of the frictional moment	0.00% to 100.00%	-
F1-24	Number of motor pole pairs	0 to 65535	-
F1-26	Auto-tuning direction (inertia auto-tuning and synchronous motor auto-tuning)	0 to 1	-
F1-27	Encoder pulses per revolution	1 to 20000	This is the number of pulses generated by the encoder disk per revolution. In feedback vector control (FVC) mode, an improper number of such pulses may cause malfunction of the motor. Set a proper value of this parameter.
F1-28	Encoder type	0: ABZ incremental encoder 1: 23-bit encoder 2: Resolver	Encoders are classified into incremental encoders and absolute encoders. An incremental encoder converts displacement signals into periodic electrical signals, and then converts the electrical signals into pulses that are counted. The number of pulses describes the magnitude of the displacement. Each position of an absolute encoder corresponds to a certain digital code. Therefore, its indication is related only to the start and end positions of the measurement.
F1-29	PG signal filter	0: Non-adaptive filter 1: Adaptive filter 2: Fixed interlock 3: Automatic interlock	-
F1-30	Encoder wiring flag	Ones (position): AB signal direction or rotational direction Tens (position): Reserved	-
F1-31	Encoder zero position angle	0.0° to 359.9°	-
F1-32	Motor gear ratio numerator	1 to 65535	-
F1-33	Motor gear ratio denominator	1 to 65535	-

2.2.6 Performing Motor Auto-tuning

Enter motor parameters (F1-00 to F1-05) correctly according to its nameplate. Set F1-37 to 1 (asynchronous motor static auto-tuning) and press **ENTER**. The operating panel displays **TUNE**. Press the **RUN** key. The motor auto-tuning starts. When the operating panel displays **50.00**, motor auto-tuning has been completed. Then parameters F1-06 to F1-10 are obtained and written automatically.

Parameter	Name	Default	Value Range	Description
F1-37	Auto-tuning selection	0	0: No auto-tuning	No auto-tuning is performed.
			1: Static auto-tuning on partial parameters (Rs, Rr, L0) of the asynchronous motor	This method is applicable to scenarios where the motor cannot be disconnected from the load and dynamic auto-tuning is not allowed. In this mode, some motor parameters are auto-tuned, including F1-06 (asynchronous motor stator resistance), F1-07 (asynchronous motor rotor resistance), and F1-08 (asynchronous motor leakage inductance). For other parameters, their default values are used.
			2: Dynamic auto-tuning on all parameters of the asynchronous motor (supporting dynamic auto-tuning with load)	This method is applicable to asynchronous motors and application systems that support high speed rotation. Motor auto-tuning can be performed in scenarios with no-load, light load (below 50%), and pure inertia load. Auto-tuning is performed on all the motor parameters, including F1-06 (asynchronous motor stator resistance), F1-07 (asynchronous motor rotor resistance), F1-08 (asynchronous motor leakage inductance), F1-09 (asynchronous motor mutual inductance), F1-10 (asynchronous motor no-load current), and F1-30 (encoder phase sequence).
Continued			1: Static auto-tuning on all parameters (Rs, Rr, L0, Lm, IO) of the asynchronous motor	This method is applicable to scenarios where the motor cannot be disconnected from the load and dynamic complete auto-tuning is not allowed. In this mode, all motor parameters are auto-tuned, including F1-06 (asynchronous motor stator resistance), F1-07 (asynchronous motor rotor resistance), F1-08 (asynchronous motor leakage inductance), F1-09 (asynchronous motor mutual inductance), and F1-10 (asynchronous motor no-load current).
			4: Dynamic auto-tuning 2 on all parameters of the asynchronous motor (inertia auto-tuning supported only in FVC mode)	This method is applicable to asynchronous motors and application systems that support high speed rotation. Motor auto-tuning can be performed with no-load, light load (below 80%), and pure inertia load. Auto-tuning is performed on all the motor parameters, including F1-06 (asynchronous motor stator resistance), F1-07 (asynchronous motor rotor resistance), F1-08 (asynchronous motor leakage inductance), F1-09 (asynchronous motor mutual inductance), F1-10 (asynchronous motor no-load current), F1-30 (encoder phase sequence), and F2-35 (system inertia).

Parameter	Name	Default	Value Range	Description
Continued			5. Dynamic auto-tuning 3 on all parameters of the asynchronous motor (mutual inductance auto-tuning applicable to no-load, light load, or pure inertia load sceneries; supporting V/f, SVC, and FVC modes)	This method is applicable to asynchronous motors and application systems that support high speed rotation. Motor auto-tuning can be performed with no-load, light load (below 10%), and pure inertia load. Auto-tuning is performed on all the motor parameters, including F1-06 (asynchronous motor stator resistance), F1-07 (asynchronous motor rotor resistance), F1-08 (asynchronous motor leakage inductance), F1-09 (asynchronous motor mutual inductance), F1-10 (asynchronous motor no-load current), and F1-30 (encoder phase sequence).
			11: Static auto-tuning on partial parameters of the synchronous motor (excluding back EMF)	This method is applicable to scenarios where the motor cannot be disconnected from the load. In FVC mode, auto-tuning is performed on the following parameters: F1-06 (motor stator resistance), F1-17 (synchronous motor d-axis inductance), F1-18 (synchronous motor q-axis inductance), F1-20 (filter time constant), F1-21 (oscillation suppression gain), F1-30 (encoder phase sequence), and F1-31 (encoder zero position angle). In other modes, auto-tuning is performed on the following parameters: F1-06 (motor stator resistance), F1-17 (synchronous motor d-axis inductance), F1-18 (synchronous motor q-axis inductance), F1-20 (filter time constant), and F1-21 (oscillation suppression gain).

Parameter	Name	Default	Value Range	Description
Continued			12: No-load dynamic auto-tuning on all parameters of synchronous motor	This method is applicable to applications where the motor cannot be disconnected from the load. In FVC mode, auto-tuning is performed on the following parameters: F1-06 (motor stator resistance), F1-17 (synchronous motor d-axis inductance), F1-18 (synchronous motor q-axis inductance), F1-20 (filter time constant), F1-21 (oscillation suppression gain), F1-30 (encoder phase sequence), and F1-31 (encoder zero position angle). In other modes, auto-tuning is performed on the following parameters: F1-06 (motor stator resistance), F1-17 (synchronous motor d-axis inductance), F1-18 (synchronous motor q-axis inductance), F1-20 (filter time constant), and F1-21 (oscillation suppression gain).
			13: Static auto-tuning on all parameters of the synchronous motor (excluding the encoder installation angle)	This method is applicable to applications where the motor cannot be disconnected from the load. Auto-tuning is performed on all parameters, including F1-06 (motor stator resistance), F1-17 (synchronous motor d-axis inductance), F1-18 (synchronous motor q-axis inductance), F1-20 (filter time constant), and F1-21 (oscillation suppression gain).
			14: Synchronous motor inertia auto-tuning (only in FVC mode)	This method is applicable to scenarios where fast dynamic response is required and the motor must connect to the load. Auto-tuning is performed on the following parameters: F2-35 (system inertia) and F2-36 (motor and load inertia).

2.2.7 Selecting a Command Source

Set F0-02 to select a command source, which is the source or input mode of commands to control the startup, stop, forward run, reverse run, and jog of the AC drive.

Para. No.	Name	Default	Value Range	Description
F0-02	Command source selection	0	0: Operating panel 1: Terminal 2: Communication	This parameter specifies the input mode of AC drive control commands, including start/stop, forward run, reverse run, and jog. 0: Operating panel Control commands are input using the RUN, STOP/RES, and MF.K keys on the operating panel. This mode is suitable for initial commissioning. 1: Terminal Control commands are input through DI terminals of the AC drive. These commands are set as appropriate to the application, such as start/stop, forward/reverse run, jog, two-wire/three-wire mode, and multi-speed operation. This mode is suitable for most applications. 2: Communication Control commands are input through remote communication. The AC drive must be equipped with a communication card to realize communication with the host controller. This mode is suitable for remote control and centralized control on multiple devices or systems.

2.2.8 Selecting a Frequency Source

Para. No.	Name	Default	Value Range	Description
F0-03	Main frequency source X selection	0	0: Digital setting (preset frequency (F0-08) that can be changed by pressing UP/ DOWN; non-retentive upon power failure) 1: Digital setting (preset frequency (F0-08) that can be changed by pressing UP/ DOWN; retentive at power failure) 2: AI1 3: AI2 4: AI3 5: Pulse reference (DI5) 6: Multi-reference 7: Simple PLC 8: PID 9: Communication	0: Digital setting (non-retentive upon power failure) The initial value of the frequency reference is the value of F0-08 (preset frequency). The value can be changed by pressing ▲/▼ on the operating panel (or pressing UP/DOWN of the multi-function terminals). When the AC drive is powered on again after power failure, the value is restored to the value of F0-08. 1: Digital setting (retentive at power failure) The initial value of the frequency reference is the value of F0-08 (preset frequency). The value can be changed by pressing ▲/▼ on the operating panel (or pressing UP/DOWN of the multi-function terminals). After a power cycle, the frequency reference is that before the last power failure. The value set by pressing ▲/▼ or pressing UP/DOWN is retained. 2: AI1 The frequency reference is input by AI1. The frequency is calculated by the current or voltage signal input by AI1 according to the set AI curve. 3: AI2 The frequency reference is input by AI2. The frequency is calculated by the current or voltage signal input by AI2 according to the set AI curve. 4: AI3 The frequency reference is input by AI3. The frequency is calculated by the current or voltage signal input by AI3 according to the set AI curve. 5: Pulse reference (DI5) The frequency reference is set by DI5. The frequency is calculated by the mapping curve of the pulse frequency and frequency reference.

Para. No.	Name	Default	Value Range	Description
(Continued)				6: Multi-reference When a multi-reference is configured for the frequency reference, you can set different frequency reference values by flexibly combining DI terminal states. The four multi-reference terminals can have 16 state combinations, representing 16 frequency reference values. 7: Simple PLC The value is a multi-reference used to control the running time and acceleration/deceleration time. FC-00 to FC-15 are used to set the values of each frequency. FC-18 to FC-49 are used to set the running time and acceleration/deceleration time of each frequency. A maximum of 16 references can be set. 8: PID PID is selected as the main frequency source. PID control is a common process control method, which calculates the proportion, integral, and differential of the difference between feedback signals and target signals of the controlled variable, and adjusts the output frequency of the AC drive accordingly. This method finally creates a closed-loop system to stabilize the controlled variable at the target value. Generally, PID output can be used as the frequency reference for on-site closed-loop process control applications, such as closed-loop pressure control and closed-loop tension control. 9: Communication The main frequency value is set through communication. The frequency reference is input through remote communication. The AC drive must be equipped with a communication card to realize communication with the host controller. This mode is suitable for remote control and centralized control on multiple devices or systems.

2.2.9 Setting the Control Mode

Para. No.	Name	Default	Value Range	Description
F0-01	Motor 1 control mode	0	0: Sensorless vector control (SVC) 1: Feedback vector control (FVC) 2: V/f control 5: PMVVC (applicable only to synchronous motors)	0: Sensorless vector control (SVC) This is open-loop vector control applied to high-performance control applications. One AC drive can drive only one motor. It is used for loads such as machine tools, centrifuges, wire drawing machines, and injection molding machines. 1: Feedback vector control (FVC) This is closed-loop vector control. An encoder must be installed at the motor end, and the AC drive must be equipped with a PG card of the same type as the encoder. It is applicable to applications requiring high-precision speed control and torque control. One AC drive can drive only one motor. It is used for loads such as high-speed paper machines, cranes, and elevators. 2: V/f control This mode is applicable to applications that do not require high load control performance, such as fans and pumps. If one AC drive is required to drive multiple motors, only the V/f control mode can be used. 5: PMVVC (open-loop speed control of synchronous motor) This mode is used for loads such as fans and water pumps that do not require high accuracy.

2.2.10Setting V/f Parameters (Optional)

Para.	Name	Default	Value Range	Description
F3-00	V/f curve setting	0	0: Linear V/f curve 1: Multi-point V/f curve 2 to 9: Reserved 10: V/f complete separation mode 11: V/f half separation mode	0: Linear V/f curve Below the rated frequency, the output voltage and output frequency of the AC drive change linearly. This curve is applicable to common mechanical drive applications such as large inertia fan acceleration, punch presses, centrifuges, and water pumps. 1: Multi-point V/f curve The frequency points range from 0.00 Hz to the rated motor frequency. The voltage points range from 0.0% to 100.0%, corresponding to the voltage range from 0 V to the rated motor voltage. Generally, the multi-point V/f curve is set based on the motor load. Ensure the following conditions are met: F3-03 ⩽ F3-05 ⩽ F3-07. 2 to 9: Reserved 10: V/f complete separation mode The output frequency of the AC drive is independent from its output voltage. The output frequency is determined by the frequency source, and the output voltage is determined by the voltage source for V/f separation. This mode is applicable to scenarios such as motor torque control. 11: V/F half separation mode In this mode, the voltage is proportional to the frequency. The proportional relationship can be set through the voltage source, and the relationship between the voltage and the frequency is also related to the rated motor voltage and the rated motor frequency in group 1. If the voltage source input is X (0 to 100%), the relationship between the voltage and the frequency is as follows: V/f = 2 x X x (Rated motor voltage)/(Rated motor frequency)

2.2.11Setting SVC Parameters (Optional)

Parameter	Name	Default	Value Range	Description
F2-00	Low speed loop Kp	30 (asynchronous motor) 20 (synchronous motor)	1 to 300	This is the PID control parameter Kp for the speed loop, which affects the response speed of the motor speed. A larger Kp value indicates higher sensitivity and more intensive tuning. A smaller Kp value indicates lower sensitivity and less intensive tuning. The low-speed speed loop Kp is effective at low speed.
F2-01	Low-speed speed loop Ti	0.500s	0.001s to 10.000s	The reciprocal of the speed loop integral time constant is the integral gain. The speed loop integral time constant affects the steady-state speed error of the motor and the stability of the speed loop system. If the speed loop integral time constant increases, the speed loop response slows down. For quicker response, a larger speed loop proportional gain is required. The low-speed speed loop Ti is effective at low speed.
F2-02	Switchover frequency 1	5.00 Hz	0.00 to F2-05	Speed loop PI parameters are divided into low-speed and high-speed groups. If the running frequency is lower than switchover frequency 1 (F2-02), the speed loop PI parameters are adjusted by F2-00 and F2-01. If the running frequency is higher than switchover frequency 2 (F2-05), the speed loop PI parameters are adjusted by F2-03 and F3-04. If the running frequency is between switchover frequency 1 and switchover frequency 2, the speed loop PI parameters switch linearly between the two groups of PI parameters. This parameter must be set to a value lower than switchover frequency 2 (F2-05).
F2-03	High speed loop Kp	20	1 to 300	This is the PID control parameter Kp for the speed loop, which affects the response speed of the motor speed. A larger Kp value indicates higher sensitivity and more intensive tuning. A smaller Kp value indicates lower sensitivity and less intensive tuning. The high-speed speed loop Kp is effective at high speed.
F2-04	High-speed speed loop Ti	1.000s	0.001s to 10.000s	The reciprocal of the speed loop integral time constant is the integral gain. The speed loop integral time constant affects the steady-state speed error of the motor and the stability of the speed loop system. If the speed loop integral time constant increases, the speed loop response slows down. For quicker response, a larger speed loop proportional gain is required. The high-speed speed loop Ti is effective at high speed.

Parameter	Name	Default	Value Range	Description
F2-05	Switchover frequency 2	10.00 Hz	F2-02 to F0-10	Speed loop PI parameters are divided into low-speed and high-speed groups. If the running frequency is lower than switchover frequency 1 (F2-02), the speed loop PI parameters are adjusted by F2-00 and F2-01. If the running frequency is higher than switchover frequency 2 (F2-05), the speed loop PI parameters are adjusted by F2-03 and F3-04. If the running frequency is between switchover frequency 1 and switchover frequency 2, the speed loop PI parameters switch linearly between the two groups of PI parameters. This parameter must be set to a value lower than switchover frequency 2 (F2-05).
F2-06	VC slip compensation gain	100%	50% to 200%	In SVC mode, this parameter can be used to adjust the speed stability accuracy. For example, increase this parameter when the running frequency of the motor is lower than the output frequency of the AC drive. In FVC mode, this parameter can be used to adjust output current of the AC drive. For example, decrease this parameter gradually when a high-power AC drive is used to control a motor with low load capacity. Generally, you do not need to change the value of this parameter.

2.2.12Setting the FVC Parameters (Optional)

Parameter	Name	Default	Value Range	Description
F1-27	Encoder pulses per revolution	1024	1 to 20000	This is the number of pulses generated per revolution of the encoder disk. In feedback vector control (FVC) mode, you must set a proper number of such pulses; otherwise, the motor may malfunction.
F1-34	Number of pole pairs of resolver	1	1 to 32	A resolver is an electromagnetic transducer, also known as a synchronous resolver. It is a small AC motor used to measure angles. It consists of stators and rotors and is used to measure the shaft angular displacement and angular velocity of a revolving object. This parameter indicates the number of pole pairs of a resolver. A larger number of pole pairs indicates higher accuracy.
F2-00	Low-speed speed loop Kp	30 (asynchronous motor) 20 (synchronous motor)	1 to 200	This parameter indicates the speed loop PID control parameter Kp, which affects the response to the motor speed. A greater Kp value indicates higher adjustment sensitivity and adjustment intensity. A smaller Kp value indicates lower adjustment sensitivity and adjustment intensity. The low-speed speed loop Kp is used in the case of low speed.

Parameter	Name	Default	Value Range	Description
F2-01	Low-speed speed loop Ti	0.500s	0.001s to 10.000s	The reciprocal of the speed loop integral time constant is the integral gain. The speed loop integral time constant affects the steady-state speed error of the motor and the stability of the speed loop system. Increasing the speed loop integral time constant slows down the response of the speed loop. In this case, increase the speed loop proportional gain to shorten the response time of the speed loop. The low-speed speed loop Ti is used in the case of low speed.
F2-02	Switchover frequency 1	5.00 Hz	0.00 to F2-05	The speed loop PI parameters are divided into two groups: low speed and high speed. When the running frequency is lower than switchover frequency 1 (F2-02), the speed loop PI is adjusted by F2-00 and F2-01. When the running frequency is higher than switchover frequency 2 (F2-05), the speed loop PI is adjusted by F2-03 and F3-04. When the running frequency falls between switchover frequency 1 and switchover frequency 2, PI parameters are obtained from linear switchover between the two groups of PI parameters. The value of this parameter must be smaller than F2-05 (switchover frequency 2).
F2-03	High-speed speed loop Kp	20	1 to 200	This parameter indicates the speed loop PID control parameter Kp, which affects the response to the motor speed. A greater Kp value indicates higher adjustment sensitivity and adjustment intensity. A smaller Kp value indicates lower adjustment sensitivity and adjustment intensity. The high-speed speed loop Kp is used in the case of high speed.
F2-04	High-speed speed loop Ti	1.000s	0.001s to 10.000s	The reciprocal of the speed loop integral time constant is the integral gain. The speed loop integral time constant affects the steady-state speed error of the motor and the stability of the speed loop system. Increasing the speed loop integral time constant slows down the response of the speed loop. In this case, increase the speed loop proportional gain to shorten the response time of the speed loop. The high-speed speed loop Ti is used in the case of high speed.

Parameter	Name	Default	Value Range	Description
F2-05	Switchover frequency 2	10.00 Hz	F2-02 to F0-10	The speed loop PI parameters are divided into two groups: low speed and high speed. When the running frequency is lower than switchover frequency 1 (F2-02), the speed loop PI is adjusted by F2-00 and F2-01. When the running frequency is higher than switchover frequency 2 (F2-05), the speed loop PI is adjusted by F2-03 and F3-04. When the running frequency falls between switchover frequency 1 and switchover frequency 2, PI parameters are obtained from linear switchover between the two groups of PI parameters. The value of this parameter must be smaller than F2-05 (switchover frequency 2).
F2-06	VC slip compensation gain	100%	50% to 200%	In SVC control mode, this parameter is used to adjust the speed stability accuracy of the motor. For example, when the running frequency of the motor is lower than the output frequency of the AC drive, you can increase the value of this parameter. In FVC mode, this parameter can be used to adjust output current of the AC drive. For example, decrease this parameter gradually when a high-power AC drive is used to control a motor with low load capacity. You do not need to change the value of this parameter in most cases.
F2-07	Speed loop feedback filter time	0.004s	0.000s to 0.100s	In FVC mode (F0-01 set to 1), the speed loop feedback filter time is effective. Adjusting the parameter can improve the motor stability. A larger value indicates better motor stability but slower dynamic response, and a smaller value indicates faster dynamic response. A small value of this parameter may result in motor oscillation. Generally, the motor stability meets requirements, and no adjustment is required.
F1-27	Encoder pulses per revolution	1024	1 to 20000	This is the number of pulses generated per revolution of the encoder disk. In feedback vector control (FVC) mode, you must set a proper number of such pulses; otherwise, the motor may malfunction.

Parameter	Name	Default	Value Range	Description
F1-28	Encoder type	1	0: ABZ incremental encoder 1: 23-bit encoder 2: Resolver	Encoders are classified into incremental encoders and absolute encoders. An incremental encoder converts displacement into periodic electrical signals, and then converts the electrical signals into pulses that are counted. The number of pulses describes the magnitude of the displacement. Each position of an absolute encoder corresponds to a certain digital code. Therefore, its indication is related only to the start and end positions of the measurement.
F1-34	Number of pole pairs of resolver	1	1 to 32	A resolver is an electromagnetic transducer, also known as a synchronous resolver. It is a small AC motor used to measure angles. It consists of stators and rotors and is used to measure the shaft angular displacement and angular velocity of a revolving object. This parameter indicates the number of pole pairs of a resolver. A larger number of pole pairs indicates higher accuracy.

2.2.13Setting the PMVVC Parameters (Optional)

Parameter	Name	Default	Value Range	Description
F0-01	Motor 1 control mode	0	0: Sensorless vector control (SVC) 1: Feedback vector control (FVC) 2: V/f control 5: PMVVC (applicable only to synchronous motors)	0: Sensorless vector control (SVC) This is open-loop vector control applied to high-performance control applications. One AC drive can drive only one motor. It is used for loads such as machine tools, centrifuges, wire drawing machines, and injection molding machines. 1: Feedback vector control (FVC) This is closed-loop vector control. An encoder must be installed at the motor end, and the AC drive must be equipped with a PG card of the same type as the encoder. It is applicable to applications requiring high-precision speed control and torque control. One AC drive can drive only one motor. It is used for loads such as high-speed paper machines, cranes, and elevators. 2: V/f control (speed open loop control) This mode is applicable to applications that do not have high requirements on load control, such as fans and pumps. If one AC drive is required to drive multiple motors, only the V/f control mode can be used. 5: PMVVC (open-loop speed control of synchronous motor) This mode is used for loads such as fans and water pumps that do not require high accuracy.
F1-00	Motor type	0	0: Common asynchronous motor 1: Variable frequency asynchronous motor 2: Synchronous motor	A variable frequency motor can adjust its frequency and speed according to the load. Where the voltage is low, it can reduce the frequency and start reliably. Where the load is light, it can reduce the frequency, speed, and current to save electric energy. A common asynchronous motor is suitable for applications with normal voltage but often full load. It is designed based on constant frequency and constant voltage. Therefore, it may not meet all the frequency and speed control requirements.
F1-20	Filter time constant (PMVVC)	0.100	0.003 to 65.535	This parameter is applicable to the PMVVC mode.
F1-21	Oscillation suppression gain (PMVVC)	100	0 to 65535	This parameter is applicable to the PMVVC mode.

Parameter	Name	Default	Value Range	Description
F1-24	Number of motor pole pairs	2	0 to 65535	-
F1-37	Auto-tuning	0	0: No auto-tuning 1: Static auto-tuning of asynchronous motors (Rs, Rr, L0) 2: Dynamic auto-tuning of asynchronous motors (supporting auto-tuning with load) 3: Static auto-tuning on all parameters of asynchronous motors (Rs, Rr, L0, Lm, IO) 4: Dynamic auto-tuning 2 of asynchronous motors (inertia auto-tuning only in FVC) 5: Dynamic auto-tuning 3 of asynchronous motors (mutual inductance auto-tuning requires no-load, light load, or inertia load; supporting V/f, SVC, and FVC) 11: Static auto-tuning on partial parameters of synchronous motors (excluding back EMF) 12: No-load dynamic auto-tuning on all parameters of synchronous motors 13: Static auto-tuning on all parameters of synchronous motors (excluding the encoder installation angle) 14: Inertia auto-tuning of synchronous motors (only in FVC mode)	-
A9-40	Low-speed closed-loop current selection (for VVC)	0	0 to 1	-
A9-41	Low-speed closed-loop current (for VVC)	50%	30% to 200%	-

Parameter	Name	Default	Value Range	Description
A9-42	Oscillation suppression damping coefficient (for VVC)	100%	0% to 500%	-
A9-43	Initial position compensation angle (for VVC)	0	0 to 5	-

2.2.14Setting the Acceleration/Deceleration Time

Para. No.	Name	Default	Value Range	Description
F0-17	Acceleration time 1	20.0s	0.0–6500.0s	This is the time required for the output frequency to increase from 0 to the acceleration/deceleration time base frequency (F0-25). Generally, the acceleration time is determined by the increase of the frequency reference signal. The frequency reference rise rate must be limited to prevent overcurrent during acceleration of the motor. The acceleration time must be set such that the acceleration current is below the overcurrent capacity of the AC drive to avoid that the AC drive trips due to overcurrent stall.
F0-18	Deceleration time 1	20.0s	0.0–6500.0s	This is the time required for the output frequency to decrease from the acceleration/deceleration time base frequency (F0-25) to 0. Generally, the deceleration time is determined by the decrease of the frequency reference signal. The frequency reference drop rate must be limited to prevent overvoltage during deceleration of the motor. The deceleration time must be set such that the smoothing circuit voltage is not excessive to avoid that the AC drive trips due to overvoltage stall.
F0-25	Acceleration/ Deceleration time base frequency	0	0: Maximum frequency (F0-10) 1: Target frequency 2: 100 Hz	This parameter is used for setting the target frequency for acceleration and the start frequency for deceleration.

2.2.15Setting the Startup Mode (Optional)

Parameter	Name	Default	Value Range	Description
F6-00	Start mode	0	0: Direct start 1: Flying start 2: Vector pre-excited start (asynchronous motor)	0: Direct start This mode is applicable to most load conditions. Startup with the startup frequency is applicable to lifting loads, such as elevators and cranes. 1: Flying start This mode is applicable to scenarios where the motor is not static upon the startup of AC drive, for example, large-inertia restart upon an instantaneous power failure. In some applications, the motor rotates before the AC drive is started. In this mode, the AC drive can automatically follow the motor speed and direction, allowing smooth startup of the motor without impact. For example, when the AC drive is running, an instantaneous power failure of the grid occurs and the AC drive is powered down and restarted, whereas the motor is still running due to inertia. In this case, to recover control on the asynchronous motor, the AC drive must detect the current speed of the motor to avoid overcurrent, overvoltage, and even burn-out of the power transistor of the AC drive. 2: Vector pre-excited start (asynchronous motor) This mode is applicable to scenarios with large static load resistance that requires great starting torque. Pre-excited start can increase the starting torque. This mode is applicable only to the SVC and FVC modes of asynchronous motors. Before startup, the AC drive performs pre-excitation on the motor, which speeds up response of the motor and reduces the startup current. The startup time sequence of pre-excitation is the same as the restart time sequence of the DC braking unit.

2.2.16Setting the Startup Frequency (Optional)

Para. No.	Name	Default	Value Range	Description
F6-03	Startup frequency	0.00 Hz	0.00–10.00 Hz	This is the startup frequency for direct start of the AC drive. When the startup frequency is lower than the frequency reference, the AC drive stays in the standby state.
F6-04	Startup frequency hold time	0.0s	0.0–100.0s	The output frequency stays at the startup frequency for a period of time as specified by this parameter. At the expiry of this time , the output frequency will accelerate to the frequency reference.

2.2.17Setting the S-curve (Optional)

Para. No.	Name	Default	Value Range	Description
F6-07	Acceleration/ Deceleration mode	0	0: Linear acceleration/ deceleration 1: S-curve acceleration/ deceleration	This parameter specifies the frequency change mode in the AC drive start/stop process. 0: The output frequency increases or decreases linearly. 1: The output frequency increases or decreases according to the S-curve when the target frequency is changing dynamically. This mode is applicable to applications requiring supreme riding comfort and real-time fast response.
F6-08	Time proportion of S-curve at start	30.0%	0.0% to (100.0% – Value of F6-09)	The sum of the time proportion of S-curve at start (F6-08) and the time proportion of S-curve at end segment (F6-09) cannot exceed 100%.
F6-09	Time proportion of S-curve at end	30.0%	0.0% to (100.0% – Value of F6-08)	The sum of the time proportion of S-curve at start (F6-08) and the time proportion of S-curve at end (F6-09) cannot exceed 100%.

2.2.18Setting Stop Parameters

Para. No.	Name	Default	Value Range	Description
F6-10	Stop mode	0	0: Decelerate to stop 1: Coast to stop	0: Decelerate to stop After the stop command takes effect, the AC drive reduces the output frequency based on the deceleration time and stops when the frequency decreases to zero. 1: Coast to stop After the stop command takes effect, the AC drive immediately stops output. Then, the motor coasts to stop following mechanical inertia.
F6-11	Starting frequency of DC braking at stop	0.00 Hz	0 to the maximum frequency (F0-10)	In a decelerate-to-stop process, the AC drive starts DC braking when the running frequency drops to this frequency.
F6-12	Waiting time of DC braking at stop	0.0s	0.0–100.0s	When the running frequency decreases to the starting frequency of DC braking at stop, the AC drive stops output and starts DC braking after this waiting time. Such delay is intended to prevent faults such as overcurrent from occurring when DC braking starts at a high speed.
F6-13	DC braking current at stop	0%	0% to 150%	A greater DC braking current at stop indicates a greater braking force. 100% corresponds to the rated motor current, with an upper limit being 80% of the rated current of the AC drive. You can use F6-34 to set the current upper limit. The maximum current upper limit can be set to 135% of the rated current of the AC drive.
F6-14	DC braking time at stop	0.0s	0.0–100.0s	This parameter specifies the hold time of DC braking. If it is set to 0, DC braking is disabled.

2.2.19Setting AI (Optional)

Para. No.	Name	Default	Value Range	Description
F4-13	AI curve 1 minimum input	–10.00 V	–10.00 to the value of F4-15	When the main frequency is set by analog input, each AI terminal, as a frequency source, supports five types of AI curves. The AI curve is used to set the mapping between the analog input voltage (or current) and the percentage with respect to the maximum frequency (F0-10). The x axis of this curve indicates the analog input voltage (or current), and the y axis indicates the percentage corresponding to analog input, that is, the percentage with respect to the maximum frequency (F0-10). Five types of AI curves are provided, where curves 1, 2, and 3 are two-point curves set by parameters F4-13 to F4-27. Curves 4 and 5 are four-point curves set by parameters A6-00 to A6-15. The two points on curves 1 to 3 are the minimum input point and maximum input point, respectively. F4-13 corresponds to the x axis of AI curve 1 minimum input, that is, the minimum analog input voltage (or current).
F4-14	Percentage corresponding to AI curve 1 minimum input	–100.0%	–100.0% to +100.0%	F4-14 corresponds to the y axis of AI curve 1 minimum input, that is, the percentage corresponding to the minimum analog input.
F4-15	AI curve 1 maximum input	10.00 V	Value of F4-13 to 10.00 V	F4-15 corresponds to the x axis of AI curve 1 maximum input, that is, the maximum analog input voltage (or current).
F4-16	Percentage corresponding to AI curve 1 maximum input	100.0%	–100.0% to +100.0%	F4-16 corresponds to the y axis of AI curve 1 maximum input, that is, the percentage corresponding to the maximum analog input.

2.2.20Setting the AO (Optional)

Parameter	Name	Default	Value Range	Description
F5-07	AO1 function selection	0	0: Running frequency 1: Frequency reference 2: Output current 3: Output torque 4: Output power 5: Output voltage 6: Pulse input (100.0% corresponds to 100.00 kHz) 7: AI1 8: AI2 9: AI3 10: Length 11: Count value 12: Communication 13: Motor 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) 19: Taper output 20: Roll diameter output 21: Tension output 22: Encoder feedback frequency	0: Running frequency (100.0% corresponds to the maximum frequency F0-10) 1: Frequency reference 2: Output voltage (100.0% corresponds to 2 times the rated motor current) 3: Motor output current (100.0% corresponds to 2 times the rated motor torque) (absolute value, a percentage relative to the rated motor torque) 4: Output power (100.0% corresponds to 2 times the rated motor power) 5: Output voltage (100.0% corresponds to 1.2 times the rated motor voltage) 6: Pulse input (100.0% corresponds to 100.0 kHz) 7: AI1 (100.0% corresponds to 10 V) 8: AI2 (100.0% corresponds to 10 V) 9: AI3 (100.0% corresponds to 10 V) 10: Length (100.0% corresponds to the value of FB-05) 11: Count value (100.0% corresponds to the value of FB-08) 12: Communication (100.0% corresponds to AO communication) 13: Motor speed (100.0% corresponds to the maximum frequency F0-10) 14: Output current (100.0% corresponds to 1000.0 A) 15: Output voltage (100.0% corresponds to 1000.0 V) 16: Motor output torque (100.0% corresponds to 2 times the rated motor torque in one direction, 50.0% corresponds to 0, and 0 corresponds to 2 times the rated motor torque in reverse direction) (actual value, a percentage relative to the rated motor torque) 19: Taper output 20: Roll diameter (100.0% corresponds to the maximum roll diameter B0-08) 21: Tension output (100.0% corresponds to the maximum tension output B1-02) 22: Encode feedback frequency (100.0% corresponds to the maximum frequency F0-10)

Parameter	Name	Default	Value Range	Description
F5-08	AO2 function selection	1	0: Running frequency 1: Frequency reference 2: Output current 3: Output torque 4: Output power 5: Output voltage 6: Pulse input (100.0% corresponds to 100.0 kHz) 7: AI1 8: AI2 9: AI3 10: Length 11: Count value 12: Communication 13: Motor 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) 19: Taper output 20: Roll diameter output 21: Tension output 22: Encoder feedback frequency	0: Running frequency (100.0% corresponds to the maximum frequency F0-10) 1: Frequency reference 2: Output voltage (100.0% corresponds to 2 times the rated motor current) 3: Motor output current (100.0% corresponds to 2 times the rated motor torque) (absolute value, a percentage relative to the rated motor torque) 4: Output power (100.0% corresponds to 2 times the rated motor power) 5: Output voltage (100.0% corresponds to 1.2 times the rated motor voltage) 6: Pulse input (100.0% corresponds to 100.0 kHz) 7: AI1 (100.0% corresponds to 10 V) 8: AI2 (100.0% corresponds to 10 V) 9: AI3 (100.0% corresponds to 10 V) 10: Length (100.0% corresponds to the value of FB-05) 11: Count value (100.0% corresponds to the value of FB-08) 12: Communication (100.0% corresponds to AO communication) 13: Motor speed (100.0% corresponds to the maximum frequency F0-10) 14: Output current (100.0% corresponds to 1000.0 A) 15: Output voltage (100.0% corresponds to 1000.0 V) 16: Motor output torque (100.0% corresponds to 2 times the rated motor torque in one direction, 50.0% corresponds to 0, and 0 corresponds to 2 times the rated motor torque in reserve direction) (actual value, a percentage of the rated motor torque) 19: Taper output 20: Roll diameter (100.0% corresponds to the maximum roll diameter B0-08) 21: Tension output (100.0% corresponds to the maximum tension output B1-02) 22: Encode feedback frequency (100.0% corresponds to the maximum frequency F0-10)

2.2.21Setting the DI (Optional)

Parameter	Name	Default	Value Range		Description
F4-00	DI1 function selection	1	0: No function 1: Forward run (FWD) 2: Reverse run (REV) 3: Three-wire motion control 4: Forward jog (FJOG) 5: Reverse jog (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Coast to stop 9: Fault reset (RESET) 10: Running pause 11: NO input of external fault 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 selection 17: Terminal 2 for acceleration/deceleration selection 18: Frequency source switchover 19: UP/DOWN setting clear (terminal and keypad) 20: Running command switchover terminal 21: Acceleration/ Deceleration disabled 22: PID pause 23: PLC status reset 24: Wobble pause 25: Counter input (DI5) 26: Counter reset 27: Length count input (DI5) 28: Length reset 29: Torque control inhibited 30: Pulse input 31: Reserved 32: Immediate DC braking 33: NC input of external fault	34: Frequency modification enabled 35: PID action direction reversal 36: External stop terminal 1 37: Command source switchover terminal 2 38: PID integral pause 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 enabled 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 braking 50: Clear the current running time 51: Two-wire/three-wire control switchover 52: Electromagnetic shorting 53: Thickness accumulation 54: Winding diameter reset 55: Initial winding diameter 1 56: Initial winding diameter 2 57: Pre-drive 58: Winding/unwinding switchover 59: Winding diameter calculation disabled 60: Exiting tension mode 61: Terminal tension rise 62: Thickness selection 1 63: Thickness selection 2 90: Water cooling system fault 91: Low liquid level fault 92: Revolution number reset 93: Reserved	See below.
F4-01	DI2 function selection	4			
F4-02	DI3 function selection	9			
F4-03	DI4 function selection	12			
F4-04	DI5 function selection	13			
F4-05	DI6 function selection	0			
F4-06	DI7 function selection	0			
F4-07	DI8 function selection	0			
F4-08	DI9 function selection	0			
F4-09	DI10 function selection	0			

0: No function

The DI terminal has no function.

1: Forward run

The AC drive runs in the forward direction. FWD indicates forward running direction. In two-wire mode 1 (F4-11=0), the terminal is used to set the AC drive to forward run. In two-wire mode 2 (F4-11=1), the terminal gives a running command.

2: Reverse run

The terminal is used to set the AC drive to reverse run. REV indicates reverse running direction. In three-wire mode 1 (F4-11=2), the terminal is used to set the AC drive to reverse run. In three-wire mode 2 (F4-11=3), the terminal is used to set the forward/ reverse run direction.

3: Three-wire motion control

The terminal is used to set the AC drive to run in three-wire control mode. To use a terminal as the command source, set F4-11 (terminal control mode) to 2 (three-wire mode 1) or 3 (three-wire mode 2), and set this parameter to 3. The three-wire control modes include three-wire mode 1 and three-wire mode 2.

4: Forward jog (FJOG)

The terminal is used to set the AC drive to run in FJOG mode. In jog mode, the AC drive runs at a low speed for a short time. This mode is typically used for maintenance and commissioning of field equipment.

5: Reverse jog (RJOG)

The terminal is used to set the AC drive to run in RJOG mode.

6: Terminal UP

Activating the terminal gives a frequency increase command when the frequency is set using a terminal. When the terminal is active, the effect is equivalent to holding down the increment key. When the terminal is inactive, the effect is equivalent to releasing the increment key.

7: Terminal DOWN

Activating the terminal gives a frequency decrease command when the frequency is set using a terminal. When the terminal is active, the effect is equivalent to holding down the decrement key. When the terminal is inactive, the effect is equivalent to releasing the decrement key.

8: Coast to stop

When a coast to stop command is given through the terminal, the AC drive stops output immediately, and the load stops according to mechanical inertia. When the AC drive stops output, the motor is powered off, and the system enters free braking. Since the stopping time is determined by the inertia of the system, this is also called inertia stop.

9: Fault reset (RESET) Activating the terminal resets the AC drive. This function is the same as that of the STOP/RES key on the operating panel. This function can remotely reset the AC drive upon a fault.

10: Running pause

When the terminal is active with this function, the AC drive decelerates to stop, and the settings of all the running parameters, such as the PLC, wobble, and PID parameters, are saved. When the terminal is inactive, the AC drive restores the previously memorized running state.

11: NO input of external fault

When the terminal is active, the AC drive reports the Err15 alarm upon receiving an external signal.

12–15: Multi-reference terminals 1–4

Multi-reference is selected as the main frequency source. You can set the 16 states of the four terminals to 16 speeds or 16 references. This function is applicable to scenarios where continuous adjustment of the AC drive running frequency is not required and only several frequency values are required.

16 and 17: Terminals 1 and 2 for acceleration/deceleration selection

Four groups of acceleration/deceleration time can be selected through combinations of four states of these two terminals.

The acceleration time is the time required by the AC drive to accelerate from zero frequency to the acceleration/deceleration base frequency (F0-25). The deceleration time is the time required by the AC drive to decelerate from the acceleration/deceleration base frequency (F0-25) to zero frequency.

18: Frequency source switchover

The terminal is used to switch among input methods of the frequency reference. The frequency reference is set through F0-07 (frequency reference superposition).

19: UP/DOWN setting clear

When the main frequency is set using the operating panel, activating the terminal clears the main frequency that is set using the increment or decrement key on the operating panel or the terminals UP and DOWN and resumes the main frequency to the value specified by F0-08.

20: Command source switchover terminal 1

- With the command source set to terminal control (F0-02=1), activating the terminal switches between terminal control and operating panel control.
- With the command source set to communication control (F0-02=2), activating the terminal switches between communication control and operating panel control.

21: Acceleration/Deceleration inhibited

The terminal is used to keep the the current running frequency of the AC drive unchanged even if the external input frequency changes (unless a stop command is received).

22: PID pause

The terminal is used to disable PID control temporarily, so that the AC drive keeps the current output frequency unchanged without PID tuning on the frequency source.

23: PLC status reset

The terminal is used to reset the AC drive to the initial state of simple PLC.

24: Wobble pause

In the wobble process, the terminal being active suspends the wobble function, so that the AC drive provides output at the central frequency.

25: Counter input

In the counting process, the terminal being active inputs the pulses counted by the counter.

26: Counter reset

In a counting process, the terminal being active resets the counter.

27: Length count input

In a fixed length process, the terminal being active inputs the length count.

28: Length reset

In a fixed length process, the terminal being active resets the length.

29: Torque control inhibited

When the terminal is active, the AC drive is switched from the torque control mode to the speed control mode. When the terminal is inactive, the AC drive resumes the torque control mode.

30: Pulse input

This function must be selected when DI5 is used for pulse input.

32: Immediate DC braking

The terminal is used to set the AC drive to immediate DC braking. DC braking means that the AC drive outputs DC to the stator winding of the asynchronous motor to form a static magnetic field. In this case, the motor is in the state of energy consumption-based braking. The rotor cuts the static magnetic field to generate braking torque, which stops the motor quickly.

33: NC input of external fault

When the terminal is active, the AC drive reports the Err15 alarm upon receiving an external signal.

34: Frequency modification enabled

When the terminal is active, frequency modification is enabled. When the terminal is inactive, frequency modification is disabled.

35: PID action direction reversal

The terminal is used to reverse the PID action direction specified by FA-03.

36: External stop terminal 1

If the command source is set to operating panel control (F0-02=0), the terminal is used to stop the AC drive. This function is the same as that of the STOP/RES key on the operating panel.

37: Command source switchover terminal 2

The terminal is used to switch the AC drive between terminal control and communication control.

- With the command source set to terminal control, the terminal being active switches the system to communication control.
- With the command source set to communication control, the terminal being active switches the system to terminal control.

38: PID integral pause

The terminal is used to suspend integral tuning of PID without disabling its proportional and derivative tuning.

39: Switchover between main frequency source X and preset frequency

The terminal is used to switch main frequency reference X to the preset frequency (F0-08).

40: Switchover between auxiliary frequency source Y and preset frequency

The terminal is used to switch auxiliary frequency reference Y to the preset frequency (F0-08).

41: Reserved

42: Position lock enabled

When the terminal is active, the AC drive decelerates to 0 Hz and then enters the position lock state.

43: PID parameter switchover

When the PID parameter switchover condition is set to "Switchover by DI terminal" (FA-18=1):

- When the terminal is inactive, the PID parameters are FA-05 to FA-07 (proportional gain Kp1, integral time Ti1, and derivative time Td1).
- When the terminal is active, the PID parameters are FA-15 to FA-17 (proportional gain Kp2, integral time Ti2, and derivative time Td2).

44: User-defined fault 1

The terminal is used to make the AC drive report the Err27 alarm and proceed according to the value of F9-49 (fault protection action selection).

45: User-defined fault 2

The terminal is used to make the AC drive report the Err28 alarm and proceed according to the value of F9-49 (fault protection action selection).

46: Speed control/Torque control switchover

The terminal is used to switch the AC drive between speed control and torque control.

- If A0-00 (speed/torque control mode) is set to 0, the torque control mode is used when the terminal is active, and the speed control mode is used when the terminal is inactive.
- If A0-00 (speed/torque control mode) is set to 1, the speed control mode is used when the terminal is active, and the torque control mode is used when the terminal is inactive.

47: Emergency stop

Upon an emergency, the AC drive decelerates to stop within the deceleration time for emergency stop specified by F8-55. In V/f control mode, if the deceleration time for emergency stop is 0s, the AC drive decelerates to stop within the minimum unit time. The terminal does not need to be in the closed state. Even if it stays closed only for a short moment, the AC drive will come to an emergency stop. Different from the general deceleration time, the emergency stop input terminal is disconnected after the emergency stop deceleration time expires. In this case, if the running signal of the AC drive terminal is still closed, the AC drive will not start. To start the AC drive, disconnect the running terminal and input the running command.

48: External stop terminal 2

The AC drive decelerates to stop regardless of the command source (operation panel, terminal, or communication control). In this mode, the deceleration time is fixed to deceleration time 4 (F8-08).

49: Deceleration DC braking

The AC drive decelerates to the DC braking frequency during stop (F6-11) before entering the DC braking state.

50: Clear the current running time

The terminal is used to clear the current running time of the AC drive.

- If the current running time is shorter than the value of F8-53 (current running time threshold, which is greater than 0), and the terminal is active in the process, the current running time is cleared.
- If the current running time is longer than the value of F8-53 (greater than 0), and the the terminal is active in the process, the current running time is not cleared.

51: Two-wire/Three-wire switchover. The terminal is used to switch the AC drive between the two-wire control mode and three-wire control mode.

- When F4-11 is set to 0 (two-wire mode 1), and the terminal is active, the AC drive switches to three-wire mode 1. When the terminal is inactive, two-wire mode 1 is used.
- When F4-11 is set to 1 (two-wire mode 2), and the terminal is active, the AC drive switches to three-wire mode 2. When the terminal is inactive, two-wire mode 2 is used.
- When F4-11 is set to 2 (three-wire mode 1), and the terminal is active, the AC drive switches to two-wire mode 1. When the terminal is inactive, three-wire mode 1 is used.
- When F4-11 is set to 3 (three-wire mode 2), and the terminal is active, the AC drive switches to two-wire mode 2. When the terminal is inactive, three-wire mode 2 is used.

52: Electromagnetic shorting

When the terminal is active, the AC drive enters the electromagnetic shorting state.

53: Revolution count signal

When the winding diameter is calculated based on accumulative thickness, the terminal is used to record the number of revolutions.

54: Winding diameter reset

When the terminal is active, the initial winding diameter is reset. When the tension mode is used, the initial winding diameter is reset upon reel replacement.

55: Initial winding diameter 1

56: Initial winding diameter 2

When the tension mode is used, select the initial winding diameter B0-11/12/13 through the terminal combination. If neither the terminal for initial winding diameter 1 nor that for initial winding diameter 2 is active, select the minimum winding diameter B0-09 as the initial winding diameter. If the terminal only for initial winding diameter 1 is active, select B0-11 as the initial winding diameter. If the terminal only for initial winding diameter 2 is active, select B0-12 as the initial winding diameter. If both the terminal for initial winding diameter 1 and that for initial winding diameter 2 are active, select B0-13 as the initial winding diameter.

When the terminal is active, the AC drive will not run reversely even if the reverse frequency is set. In this case, the AC drive runs fast at 0 Hz. This function is the same as F8-13.

57: Pre-drive

When the terminal is active, the AC drive is switched to the pre-drive speed mode. When the tension mode is used, this function synchronizes the linear speed for the

axis that requires automatic reel replacement. After reel replacement, the terminal is deactivated. In this case, tension control can function properly.

58: Winding/unwinding switchover

This function is used to switch between winding and unwinding when the tension mode is used.

59: Winding diameter calculation disabled

When the terminal is active, the roll diameter calculation is disabled. When the tension mode is used, this function disables winding diameter calculation to prevent automatic reel replacement and pre-drive from affecting roll diameter calculation.

60: Exiting tension mode

This function is used to exit the tension control mode.

61: When the terminal is active, the tension torque is increased by certain ratio. After the DI terminal is inactive, the increased torque will be decreased gradually based on time.

62: Thickness selection 1

63: Thickness selection 2. When the tension mode is used, select the material thickness B0-32/33/34/35 through the terminal combination. If neither the terminal for thickness selection 1 nor that for thickness selection 2 is active, select the material thickness B0-32. If the terminal only for the thickness selection 1 is active, select the material thickness B0-33. If the terminal only for the thickness selection 2 is active, select the material thickness B0-34. If both the terminal for thickness selection 1 and that for thickness selection 2 are active, select the material thickness B0-35.

64 to 89: Reserved

90: Water-cooling system failure. For T13 models, when the water-cooling system fails, this terminal will receive the signal, and the AC drive will report fault E64.

91: Low liquid level fault. For T13 models, when the water tank level is too low, this terminal will receive the signal, and the AC drive will report warning A63.

92: Revolution counting reset. When the terminal is active, the number of revolutions is cleared.

93: Reserved

2.2.22Setting the DO (Optional)

Parameter	Name	Default	Value Range		Description
F5-04	DO1 function selection	0	0: No output 1: AC drive running 2: Fault output (stop upon 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 to run 16: AI1 > AI2 17: Frequency upper limit reached 18: Frequency lower limit reached (related to running) 19: Undervoltage output 20: Communication setting 21: Reserved	22: Reserved 23: Zero-speed running 2 (having output at stop) 24: Accumulative power-on time reached 25: Frequency level detection FDT2 output 26: Frequency 1 reached 27: Frequency 2 reached 28: Current 1 reached 29: Current 2 reached 30: Output as scheduled 31: AI1 input limit exceeded 32: Output load loss 33: Reverse running 34: Zero current state 35: Module temperature reached 36: Output current limit exceeded 37: Frequency lower limit reached (having output at stop) 38: Alarm (all faults) 39: Current over-temperature pre-warning 40: Current running time reached 41: Fault (coast-to-stop fault and no output upon undervoltage) 42: Fault output 3	See below.
F5-05	Expansion card DO2 output selection	4			

Expansion card relay terminal function selection

0: No output

The DO has no function.

1: AC drive running

The DO outputs the ON signal when the AC drive is running with an output frequency, which can be zero.

2: Fault output (coast-to-stop fault)

The DO outputs the ON signal when the AC drive stops due to a fault.

3: Frequency level detection FDT1 output

The DO outputs the ON signal when the running frequency exceeds the frequency detection value and stops outputting the ON signal when the running frequency is lower than the result of the frequency detection value minus the frequency detection hysteresis (FDT, which equals the result of F8-19 multiplied by F8-20).

4: Frequency reached

The DO outputs the ON signal when the running frequency of the AC drive is within a particular range (target frequency±result of F8-21 multiplied by the maximum frequency).

5: Zero-speed running (no output at stop)

The DO outputs the ON signal when the AC drive is running with the output frequency being 0. The DO outputs the OFF signal when the AC drive is stopped.

6: Motor overload pre-warning

When detecting that the motor load has exceeded the warning threshold specified by F9-02 (overload pre-warning coefficient), the DO outputs the ON signal before an overload protection action is taken.

7: AC drive overload pre-warning

The DO outputs the ON signal 10s before an AC drive overload protection action.

8: Set count value reached

In a counting process, the DO outputs the ON signal when the count reaches the value of FB-08.

9: Designated count value reached

In a counting process, the DO outputs the ON signal when the count reaches the value of FB-09.

10: Length reached

In a fixed length process, the DO outputs the ON signal when the detected length exceeds the value of FB-05.

11: Simple PLC cycle completed

The DO outputs a pulse signal with the width of 250 ms when the simple PLC completes one cycle.

12: Accumulative running time reached

The DO outputs the ON signal when the accumulative running time of the AC drive exceeds the value of F8-17 (accumulative power-on time threshold).

13: Frequency limited

The DO outputs the ON signal when the frequency reference rises above the upper limit or falls below the lower limit and the output frequency of the AC drive reaches the upper limit or lower limit.

14: Torque limited

In speed control mode, the DO outputs the ON signal when the output torque reaches the torque limit.

15: Ready to run

After the AC drive is powered on, the DO outputs the ON signal if no exception occurs.

16: AI1 > AI2

The DO outputs the ON signal when the value of AI1 is greater than that of AI2.

e17: Frequency upper limit reached

The DO outputs the ON signal when the running frequency reaches the upper limit (F0-12).

18: Frequency lower limit reached (no output at stop)

When F8-14 (running mode when the frequency reference is lower than the lower limit) is set to 1 (stop), the DO outputs the OFF signal regardless of whether the running frequency has reached the lower limit.

When F8-14 (running mode when the frequency reference is lower than the lower limit) is set to 0 (running at the lower limit frequency) or 2 (zero-speed running), and the running frequency has reached the lower limit, the DO outputs the ON signal.

19: Undervoltage

The DO outputs the ON signal when the AC drive is in the undervoltage state.

20: Communication

Whether the terminal is active or inactive is determined by communication address 0x2001.

21: Reserved

22: Reserved

23: Zero-speed running 2 (having output at stop)

The DO outputs the ON signal when the AC drive is running with the output frequency being 0. The DO outputs the ON signal when the AC drive is stopped.

24: Accumulative power-on time reached

The DO outputs the ON signal when the accumulative power-on time (F7-13) of the AC drive exceeds the accumulative power-on time threshold (F8-16).

25: Frequency level detection FDT2 output

The DO outputs the ON signal when the running frequency exceeds the frequency detection value and stops outputting the ON signal when the running frequency is lower than the result of the detection value minus the frequency detection hysteresis (which equals the result of F8-28 multiplied by F8-29).

26: Frequency 1 reached

The DO outputs the ON signal when the running frequency of the AC drive is within the frequency detection range specified by F8-30 (detection of frequency 1).

Frequency detection range: Value of F8-30 – Value of F8-31 x Value of F0-10 (maximum frequency) to Value of F8-30 + Value of F8-31 x Value of F0-10

27: Frequency 2 reached

The DO outputs the ON signal when the running frequency of the AC drive is within the frequency detection range specified by F8-32 (detection of frequency 2).

Frequency detection range: Value of F8-32 – Value of F8-33 x Value of F0-10 (maximum frequency) to Value of F8-32 + Value of F8-33 x Value of F0-10

28: Current 1 reached

The DO outputs the ON signal when the output current of the AC drive is within the current detection range specified by F8-38 (free reach current 1).

Current detection range: Value of F8-38 – Value of F8-39 x Value of F1-03 (rated motor current) to Value of F8-38 + Value of F8-39 x Value of F1-03

29: Current 2 reached

The DO outputs the ON signal when the output current of the AC drive is within the current detection range specified by F8-40 (free reach current 2).

Current detection range: Value of F8-40 – Value of F8-41 x Value of F1-03 (rated motor current) to Value of F8-40 + Value of F8-41 x Value of F1-03

30: Output as scheduled

With the timing function (F8-42) enabled, the DO outputs the ON signal when the current running time of the AC drive reaches the set timing duration. The timing duration is set using F8-43 and F8-44.

31: AI1 input limit exceeded

The DO outputs the ON signal when the value of AI1 is greater than that of F8-46 (AI1 input voltage upper limit) or less than that of F8-45 (AI1 input voltage lower limit).

32: Load lost

The DO outputs the ON signal when load of the AC drive is lost.

33: Reverse running

The DO outputs the ON signal when the AC drive is in reverse run.

34: Zero current state

The DO outputs the ON signal when the output current of the AC drive stays in the zero current range for the time longer than the zero current detection delay (F8-35). Zero current detection range: 0 to Value of F8-34 x Value of F1-03

35: Module temperature reach

The DO outputs the ON signal when the IGBT heatsink temperature (F7-07) reaches the IGBT temperature threshold (F8-47).

36: Output current limit exceeded

The DO outputs the ON signal when the output current of the AC drive stays higher than the output overcurrent threshold (F8-36) for the time longer than the output overcurrent detection delay (F8-37).

37: Frequency lower limit reach (having output at stop)

The DO outputs the ON signal when the running frequency reaches the lower limit (F0-14), even when the AC drive is stopped.

38: Alarm (all faults)

The DO outputs the ON signal when the AC drive is faulty and "Continue to run" is selected as the fault protection action.

For details about fault protection actions, see the description of parameters F9-47 to F9-50.

39: Motor overtemperature

The DO outputs the ON signal when the motor temperature reaches the value of F9-58 (motor overtemperature pre-warning threshold). (You can check the motor temperature using U0-34.)

40: Current running time reached

The DO outputs the ON signal when the current running time of the AC drive exceeds the value of F8-53 (current running time threshold).

41: Fault (coast-to-stop fault and no output upon undervoltage)

The DO outputs the ON signal when an AC drive fault (other than the undervoltage fault) occurs.

42: Fault output 3

The DO outputs the ON signal when an AC drive fault occurs.

2.2.23Setting Multi-speed References (Optional)

Para. No.	Name	Default	Value Range	Description
FC-00	Multi-reference 0	0.0%	–100.0% to +100.0%	These are the frequency references for multiple speed segments. FC-00 to FC-15 correspond to a total of 16 frequency reference values for segments 0 to 15. A frequency reference value is calculated as a percentage of the maximum frequency instead of an absolute frequency value. 100% corresponds to the maximum frequency (F0-10). The four multi-reference terminals provided by the AC drive together have 16 states, corresponding to the 16 frequency reference values. The parameters in this group are applicable to applications where simple PLC is used as the main frequency source. In some industrial applications, the AC motor is only used to implement the functions of start/stop, timed per-segment speed regulation, and simple automatic forward and reverse running, with simple PLC to provide the control functions that are conventionally provided by an additional PLC. Simple PLC is typically used in industrial equipment such as mixture mixing and industrial washing machines. Parameters in this group are required when simple PLC is used as the main frequency (F0-03 set to 7).
FC-01	Multi-reference 1			
FC-02	Multi-reference 2			
FC-03	Multi-reference 3			
FC-04	Multi-reference 4			
FC-05	Multi-reference 5			
FC-06	Multi-reference 6			
FC-07	Multi-reference 7			
FC-08	Multi-reference 8			
FC-09	Multi-reference 9			
FC-10	Multi-reference 10			
FC-11	Multi-reference 11			
FC-12	Multi-reference 12			
FC-13	Multi-reference 13			
FC-14	Multi-reference 14			
FC-15	Multi-reference 15			

2.2.24Setting the Relay Output (Optional)

Parameter	Name	Default	Value Range		Description
F5-01	Expansion card relay output function selection	0	0: No output 1: AC drive running 2: Fault output (stop upon fault) 3: Frequency level detection FDT1 output 4: Frequency reach 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 to run 16: AI1 > AI2 17: Frequency upper limit reach 18: Frequency lower limit reached (related to running) 19: Undervoltage output 20: Communication setting 21: Reserved	22: Reserved 23: Zero-speed running 2 (having output at stop) 24: Accumulative power-on time reached 25: Frequency-level detection FDT2 output 26: Frequency 1 reached 27: Frequency 2 reached 28: Current 1 reached 29: Current 2 reached 30: Timing reached 31: AI1 input limit exceeded 32: Output load loss 33: Reverse running 34: Zero current state 35: Module temperature reached 36: Output current limit exceeded 37: Frequency lower limit reached (having output at stop) 38: Alarm output (direct output at fault or alarm) 39: Current overtemperature pre-warning 40: Current running time reached 41: Fault output 2 42: Fault output 3	See below.
F5-02	Control board relay 1 function selection (T/A1-T/B1-TC1)	2			
F5-03	Control board relay 2 function selection (T/A2-TC2)	0			

Set the expansion card relay terminal function.

0: No output

The DO has no function.

1: AC drive running

The DO outputs the active signal when the AC drive is running with an output frequency, which can be zero.

2: Fault output (coast-to-stop fault)

The DO outputs the active signal when the AC drive stops due to a fault.

3: Frequency level detection 1

When the running frequency exceeds the frequency detection value, the DO outputs the active signal. When the running frequency is lower than the result of the frequency detection value minus the frequency detection hysteresis (FDT, which equals the value of F8-19 multiplied by the value of F8-20), the DO stops outputting the active signal.

4: Frequency reached

When the running frequency of the AC drive is within a particular range (target frequency ± value of F8-21 multiplied by the maximum frequency), the DO outputs the active signal.

5: Zero-speed running (no output at stop)

The DO outputs the active signal when the AC drive is running with the output frequency 0. The DO outputs the inactive signal when the AC drive is stopped.

6: Motor overload pre-warning

When detecting that the motor load has exceeded the pre-warning threshold specified by F9-02 (overload pre-warning coefficient), the DO outputs the active signal before an overload protection action is taken.

7: AC drive overload pre-warning

The DO outputs the active signal 10s before an AC drive overload protection action.

8: Set count value reached

In a counting process, the DO outputs the active signal when the count reaches the value of FB-08.

9: Designated count value reached

In a counting process, the DO outputs the active signal when the count reaches the value of FB-09.

10: Length reach

In a fixed length process, the DO outputs the active signal when the detected length exceeds the value of FB-05.

11: Simple PLC cycle completed

the DO outputs a pulse signal with the width of 250 ms when the simple PLC completes one cycle.

12: Accumulative running time reached

The DO outputs the active signal when the accumulative running time of the AC drive exceeds the value of F8-17 (accumulative power-on time threshold).

13: Frequency limited

The DO outputs the active signal when the frequency reference rises above the upper limit or falls below the lower limit and the output frequency of the AC drive reaches the upper limit or lower limit.

14: Torque limited

The DO outputs the active signal when the output torque of the AC drive reaches the torque limit in speed control mode.

15: Ready to run

The DO outputs the active signal if no exception occurs after the AC drive is powered on.

16: AI1 > AI2

The DO outputs the active signal when the value of AI1 is greater than that of AI2.

17: Frequency upper limit reached

The DO outputs the active signal when the running frequency reaches the upper limit (F0-12).

18: Frequency lower limit reached (no output at stop)

When F8-14 (running mode when the frequency reference is lower than the lower limit) is set to 1 (stop), the DO outputs the inactive signal regardless of whether the running frequency has reached the lower limit.

When F8-14 (running mode when the frequency reference is lower than the lower limit) is set to 0 (running at the lower limit frequency) or 2 (zero-speed running) and the running frequency has reached the lower limit, the DO outputs the active signal.

19: Undervoltage

The DO outputs the active signal when the AC drive is in the undervoltage state.

20: Communication

The communication address 0x2001 determines the terminal status, including active and inactive.

21: Reserved

22: Reserved

23: Zero-speed running 2 (having output at stop)

The DO outputs the active signal when the AC drive is running with the output frequency 0. The DO outputs the active signal when the AC drive is stopped.

24: Accumulative power-on time reached

The DO outputs the active signal when the accumulative power-on time (F7-13) of the AC drive exceeds the accumulative power-on time threshold (F8-16).

25: Frequency level detection 2

When the running frequency exceeds the frequency detection value, the DO outputs the active signal. When the running frequency is lower than the result of the detection value minus the frequency detection hysteresis (which equals the value of F8-28 multiplied by the value of F8-29), the DO stops outputting the active signal.

26: Frequency 1 reached

The DO outputs the active signal when the running frequency of the AC drive is within the frequency detection range specified by F8-30 (detection of frequency 1).

Frequency detection range: value of F8-30 – value of F8-31 x value of F0-10 (maximum frequency) to value of F8-30 + value of F8-31 x value of F0-10

27: Frequency 2 reached

The DO outputs the active signal when the running frequency of the AC drive is within the frequency detection range specified by F8-32 (detection of frequency 2).

Frequency detection range: value of F8-32 – value of F8-33 x value of F0-10 (maximum frequency) to value of F8-32 + value of F8-33 x value of F0-10

28: Current 1 reached

The DO outputs the active signal when the output current of the AC drive is within the current detection range specified by F8-38 (free reach current 1).

Current detection range: value of F8-38 – value of F8-39 x value of F1-03 (rated motor current) to value of F8-38 + value of F8-39 x value of F1-03

29: Current 2 reach

The DO outputs the active signal when the output current of the AC drive is within the current detection range specified by F8-40 (free reach current 2).

Current detection range: value of F8-40 – value of F8-41 x value of F1-03 (rated motor current) to value of F8-40 + value of F8-41 x value of F1-03

30: Timing reached

With the timing function (F8-42) enabled, the DO outputs the active signal when the current running time of the AC drive reaches the set timing duration. The timing duration is set by F8-43 and F8-44.

31: AI1 input limit exceeded

The DO outputs the active signal when the value of AI1 is greater than that of F8-46 (AI1 input voltage upper limit) or smaller than that of F8-45 (AI1 input voltage lower limit).

32: Load lost

The DO outputs the active signal when load of the AC drive is lost.

33: Reverse running

The DO outputs the active signal when the AC drive is running reversely.

34: Zero current state

The DO outputs the active signal when the output current of the AC drive stays in the zero current range for a duration longer than the value of F8-35 (zero current detection delay). Zero current detection range: 0 to value of F8-34 x value of F1-03

35: Module temperature reached

The DO outputs the active signal when the drive unit heatsink temperature (F7-07) reaches the drive unit temperature threshold (F8-47).

36: Output current limit exceeded

The DO outputs the active signal when the output current of the AC drive stays higher than the output overcurrent threshold (F8-36) for a duration longer than the value of F8-37 (output overcurrent detection delay).

37: Frequency lower limit reached (having output at stop)

The DO outputs the active signal when the running frequency reaches the lower limit (F0-14), even when the AC drive is stopped.

38: Alarm (all faults)

The DO outputs the active signal when the AC drive is faulty and "Continue to run" is selected as the fault protection action.

For details about fault protection actions, see the description of parameters F9-47 to F9-50.

39: Motor overtemperature

The DO outputs the active signal when the motor temperature reaches the value of F9-58 (motor overtemperature pre-warning threshold). (You can check the motor temperature using U0-34.)

40: Current running time reached

The DO outputs the active signal when the current running time of the AC drive exceeds the value of F8-53 (current running time threshold).

41: Fault (coast-to-stop fault and no output upon undervoltage)

The DO outputs the active signal when an AC drive fault (other than the undervoltage fault) occurs.

42: Fault output 3

The DO outputs the active signal when an AC drive fault occurs.

2.3 Commissioning Functions

2.3.1 Commissioning the PMVVC Function (Applicable Only to Synchronous Motors)

Commissioning process

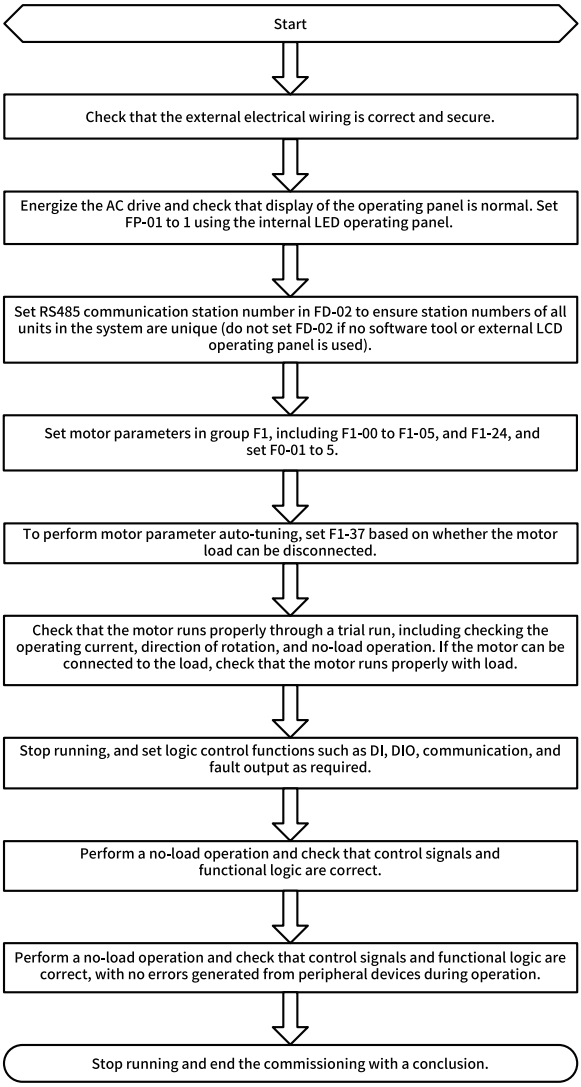


Figure 2-6 Commissioning flowchart

Commissioning procedure

1. Set F0-01 to 5 and F1-00 to 2.
2. Set the motor-related parameters F1-01 to F1-05 and set F1-24 (number of motor pole pairs).
3. Set F1-37 (auto-tuning selection) to 12 (no-load dynamic auto-tuning) or 11 (static auto-tuning).
4. After auto-tuning, set no-load trial run.
5. If low-speed load startup is required, set F3-01 (torque boost).

Parameters

Parameter	Name	Default	Value Range	Reference Value
F0-01	Motor 1 control mode	0	0: Sensorless vector control (SVC) 1: Feedback vector control (FVC) 2: V/f control 5: PMVVC (applicable only to synchronous motors)	0
F1-00	Motor type	0	0: Common asynchronous motor 1: Variable frequency asynchronous motor 2: Synchronous motor	0
F1-01	Rated motor power	Model dependent	0.1 kW to 1000.0 kW	Model dependent
F1-02	Rated motor voltage	Model dependent	1 V to 2000 V	Model dependent
F1-03	Rated motor current	Model dependent	0.1 A to 6553.5 A	Model dependent
F1-04	Rated motor frequency	Model dependent	0.01 Hz to 600.00 Hz	Model dependent
F1-05	Rated motor speed	Model dependent	1 rpm to 65535 rpm	Model dependent
F1-20	Filter time constant (PMVVC)	0.1	0.003 to 65.535	0.040
F1-21	Oscillation suppression gain (PMVVC)	100	0 to 65535	0.100
F1-24	Number of motor pole pairs	2	0 to 65535	1

Parameter	Name	Default	Value Range	Reference Value
F1-37	Auto-tuning	0	0: No auto-tuning 1: Static auto-tuning of asynchronous motors (auto-tuning parameters include Rs, Rr, and L0.) 2: Dynamic auto-tuning of asynchronous motors (supporting dynamic auto-tuning with load) 3. Static auto-tuning on all parameters of asynchronous motors (auto-tuning parameters include Rs, Rr, L0, Lm, and IO.) 4: Dynamic auto-tuning 2 of asynchronous motors (inertia auto-tuning is supported only in FVC mode.)	0

Parameter	Name	Default	Value Range	Reference Value
Continued	Continued	Continued	5: Dynamic auto-tuning 3 of asynchronous motors (mutual inductance curve auto-tuning requires no-load, light load, or pure inertia load; supporting V/f, SVC, and FVC modes) 11: Static auto-tuning on partial parameters of synchronous motors (back EMF is not auto-tuned) 12: No-load dynamic auto-tuning on all parameters of synchronous motors 13: Static auto-tuning on all parameters of synchronous motor (excluding the encoder installation angle) 14: Synchronous motor inertia auto-tuning (only in FVC mode)	Continued

3 Troubleshooting

3.1 Common Faults and Diagnosis

3.1.1 Display of Alarms and Faults

Upon exceptions, the AC drive stops output immediately, the fault indicator 

blinks, and the contact of the fault relay acts. The operating panel of the AC drive displays a fault code (example: 

), as shown in the following figure.

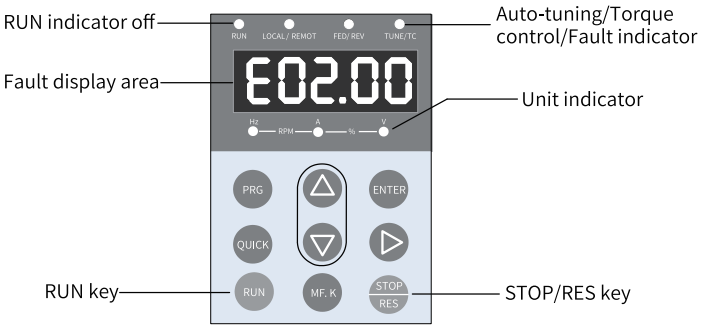


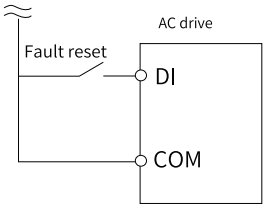
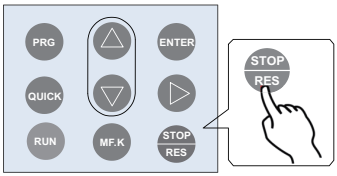
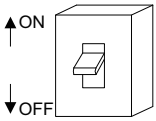
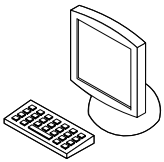
Figure 3-1 Display of faults

Caution

Do not repair or modify the AC drive by yourself. In case of any fault that cannot be rectified, contact the agent or Inovance for technical support.

3.1.2 Restart upon Faults

Table 3–1 Restart methods upon faults

Stage	Solution	Description
When a fault occurs	Check the operating panel for detailed information about the last three faults, such as the fault time, fault type, and frequency, current, bus voltage, input/output terminal state, accumulative power-on time, and accumulative running time upon the faults.	View the information through F9-14 to F9-44. 
Before fault reset	Locate and rectify the fault cause based on the fault code displayed on the operating panel. Then reset to clear the fault.	-
During fault reset	1. Set any of F4-00 to F4-09 to 9 (fault reset).	
	2. Verify that F7-02 is set to 1 (default value), that is, the STOP/RES key is available in any operating mode.	Press the STOP/RES key on the operating panel. 
	3. Power off and then power on the AC drive for automatic reset. Disconnect the main circuit power supply and connect the power supply again after the display on the operating panel disappears.	
	4. Use a host controller for reset (for communication control mode). Verify that F0-02 is set to 2 (communication control mode) and write "7" to the communication address 2000H by using the host controller.	

3.1.3 Common Troubleshooting

Table 3–2 Symptoms and troubleshooting

No.	Symptom	Possible Cause	Action
1	The display does not work upon power-on. 	The grid voltage is not input or too low.	Check the input power supply.
		The switched-mode power supply (SMPS) on the driver board of the AC drive is faulty.	Check whether the 24 V output voltage and 10 V output voltage on the control board are normal.
		The control board is disconnected from the driver board or the operating panel.	Re-connect the 8-conductor and 40-conductor flat cables.
		The pre-charge resistor of the AC drive is damaged.	Contact Inovance.
		The control board or operating panel is faulty.	
		The rectifier bridge is damaged.	
2	"HC" is displayed upon power-on. 	The connection between the driver board and the control board is poor.	Re-connect the 8-conductor and 28-conductor flat cables.
		Related components on the control board are damaged.	Contact Inovance.
		The motor or motor cable is short-circuited to ground.	
		The Hall device is faulty.	
		The grid voltage is too low.	
3	"E23.00" is displayed upon power-on. 	The motor or motor cable is short-circuited to the ground.	Use a megger to measure the insulation resistance of the motor and motor cable.
		The AC drive is damaged.	Contact Inovance.

No.	Symptom	Possible Cause	Action
4	The display is normal upon power-on, but "HC" is displayed and the AC drive stops immediately after startup. 	The fan is damaged, or locked-rotor occurs.	Replace the damaged fan.
		Wiring of any external control terminals is short-circuited.	Rectify the short circuit fault.
5	E14.00 (IGBT overtemperature) is reported frequently.	The carrier frequency is set too high.	Reduce the carrier frequency (F0-15).
		The fan is damaged, or the air filter is blocked.	Replace the fan or clean the air filter.
		Devices (thermistor or other devices) inside the AC drive are damaged.	Contact Inovance.
6	The motor does not rotate when the AC drive is running.	The AC drive and motor are incorrectly connected.	Double check the connection between the AC drive and motor.
		Related AC drive parameters (motor parameters) are set incorrectly.	Restore the AC drive to factory settings and re-set the following parameters correctly:
			Encoder parameters and rated motor specifications (such as rated motor frequency and rated motor speed)
			F0-01 and F0-02
			F3-01 for heavy-load start in V/f control mode
		The connection between the driver board and the control board is poor.	Re-connect the cables and ensure secure wiring.
		The driver board is faulty.	Contact Inovance.
7	DI terminals are inactive.	Related parameters are set incorrectly.	Check and set parameters in group F4 again.
		External signals are incorrect.	Re-connect external signal cables.
		The jumper across OP and +24 V becomes loose.	Check and ensure secure connection of the jumper across OP and +24V.
		The control board is faulty.	Contact Inovance.

No.	Symptom	Possible Cause	Action
8	In FVC mode, the motor cannot speed up.	The encoder is faulty.	Replace the encoder and double check the wiring.
		The encoder wiring is incorrect or in poor contact.	Reconnect the encoder to ensure good contact.
		The PG card is faulty.	Replace the PG card.
		The driver board is faulty.	Contact Inovance.
9	The AC drive detects overcurrent and overvoltage frequently.	Motor parameters are incorrectly set.	Set motor parameters or perform motor auto-tuning again.
		The acceleration/ deceleration time is improper.	Set proper acceleration/ deceleration time.
		The load fluctuates.	Contact Inovance.
10	E17.00 is reported upon power-on or during running.	The soft start contactor is not closed.	Check whether the contactor cable is loose.
			Check whether the contactor is faulty.
			Check whether 24 V power supply of the contactor is faulty.
			Contact Inovance.
11	The motor coasts to stop, or braking is disabled during deceleration or deceleration to stop.	The encoder is disconnected, or overvoltage stall protection is enabled.	Check the encoder wiring in FVC mode (F0-01 is set to 1).
			If a braking resistor is configured, set F3-23 to 0.

3.1.4 Troubleshooting During Trial Run in Different Control Modes

- SVC mode (F0-01 set to 0 (default))
  This mode is used to control the speed and torque of motor in scenarios without an encoder for speed feedback. In this control mode, motor auto-tuning is required to obtain motor-related parameters.

Table 3–3 Troubleshooting in SVC mode

Problem	Action
Overload or overcurrent reported during motor startup	Set motor parameters F1-01 to F1-05 according to motor nameplate. Perform motor auto-tuning (by setting F1-37). Dynamic auto-tuning on all parameters of the motor is preferred when possible.
Slow torque or speed response and motor vibration at frequencies below 5 Hz	In the case of slow motor torque and speed response, increase the value of F2-00 in increments of 10 or decrease the value of F2-01 in increments of 0.05. In the case of motor vibration, decrease the value of F2-00 and increase the value of F2-01.
Slow torque or speed response and motor vibration at frequencies above 5 Hz	In the case of slow motor torque and speed response, increase the value of F2-03 in increments of 10 or decrease the value of F2-04 in increments of 0.05. In the case of motor vibration, decrease the value of F2-03 and increase the value of F2-04.
Low speed accuracy	In the case of excessive speed deviation during with-load running, increase the value of F2-06 in increments of 10%.
Obvious speed fluctuation	In the case of abnormal motor speed fluctuation, increase the value of A9-05 in increments of 0.001s.
Loud motor noise	Increase the value of F0-15 in increments of 1.0 kHz. Note that an increase in the carrier frequency will result in an increase in the leakage current of the motor.
Insufficient motor torque	Check whether the torque upper limit is set too low. If yes, increase the value of F2-10 in speed control mode or increase the torque reference in torque control mode.

- FVC mode (F0-01 set to 1)
  This mode is applicable to scenarios with an encoder for speed feedback. In this mode, you need to set the encoder pulses per revolution, encoder type and encoder direction correctly and perform auto-tuning on motor parameters.

Table 3–4 Troubleshooting in FVC mode

Problem	Action
Overload or overcurrent reported during motor startup	Set the encoder pulses per revolution, encoder type, and signal direction correctly.
Overload or overcurrent reported during motor rotation	Set motor parameters F1-01 to F1-05 according to motor nameplate. Perform motor auto-tuning (by setting F1-37). Dynamic auto-tuning on all parameters of the motor is preferred when possible.

Problem	Action
Slow torque or speed response and motor vibration at frequencies below 5 Hz	In the case of slow motor torque and speed response, increase the value of F2-00 in increments of 10 or decrease the value of F2-01 in increments of 0.05. In the case of motor vibration, decrease the values of F2-00 and F2-01.
Slow torque or speed response and motor vibration at frequencies above 5 Hz	In the case of slow motor torque and speed response, increase the value of F2-03 in increments of 10 or decrease the value of F2-04 in increments of 0.05. In the case of motor vibration, decrease the values of F2-03 and F2-04.
Obvious speed fluctuation	In the case of abnormal motor speed fluctuation, increase the value of F2-07 in increments of 0.001s.
Loud motor noise	Increase the value of F0-15 in increments of 1.0kHz. Note that an increase in the carrier frequency will result in an increase in the leakage current of the motor.
Insufficient motor torque	Check whether the torque upper limit is set too low. If yes, increase the value of F2-10 in speed control mode or increase the torque reference in torque control mode.

- V/f control mode (F0-01 set to 2)
  This mode is applicable to scenarios without an encoder for speed feedback. You need to set rated motor voltage and rated motor frequency only because this mode is not sensitive to motor parameters.

Table 3–5 Troubleshooting in V/f control mode

Problem	Action
Motor oscillation during running	Decrease the value of F3-11 in increments of 5. The minimum value is 5.
Overcurrent during high-power startup	Decrease the value of F3-01 in increments of 0.5%.
High current during running	Set the rated motor voltage (F1-02) and rated motor frequency (F1-04) correctly. Decrease the value of F3-01 in increments of 0.5%.
Loud motor noise	Increase the value of F0-15 in increments of 1.0kHz. Note that an increase in the carrier frequency will result in an increase in the leakage current of the motor.
Overvoltage reported during deceleration or sudden removal of heavy loads	Verify that the overvoltage stall selection (F3-23) is enabled. Increase the overvoltage stall gain (F3-24/F3-25; default value: 30) in increments of 10 (the maximum value is 100). Decrease the value of F3-22 (default value: 770 V) in increments of 10 V (the minimum value is 700 V).
Overcurrent reported during acceleration or sudden connection of heavy loads	Increase the value of F3-20 (default value: 20) in increments of 10 (the maximum value is 100). Decrease the value of F3-18 (default value: 150%) in increments of 10% (the minimum value is 50%).

3.2 List of Fault Codes

The following faults may occur during the use of the AC drive. Troubleshoot and rectify faults by taking actions described in the following table.

Table 3–6 Fault codes

Fault Name	Display	Possible Cause	Action
Overcurrent during acceleration	E02.00	Grounded or short-circuited output circuit of the AC drive	Check whether the motor or relay contactor is short-circuited.
		Auto-tuning is not performed in SVC or FVC control mode.	Set motor parameters according to the motor nameplate and perform motor auto-tuning.
		Excessively short acceleration time	Increase the acceleration time (F0-17).
		Inappropriate overcurrent stall suppression	Ensure that overcurrent stall suppression (F3-19) is enabled. If the value of F3-18 (overcurrent stall suppression level) is too large, adjust it to a level between 120% and 160%. If the value of F3-20 (overcurrent stall suppression gain) is too small, adjust it to a level between 20 and 40.
		Inappropriate customized torque boost or V/f curve	Adjust the customized torque boost or V/f curve.
		Startup of a running motor	Use flying start or restart the motor after the motor stops.
		External interference to the AC drive	View the fault records to check whether the fault current has ever reached the overcurrent suppression level (F3-18). If not, check for external interference source. If no external interference source is found, the driver board or Hall device might be damaged. Contact Inovance for replacement.

Fault Name	Display	Possible Cause	Action
Overcurrent during deceleration	E03.00	Grounded or short-circuited output circuit of the AC drive	Check whether the motor is short-circuited or open-circuited.
		Auto-tuning is not performed in SVC or FVC control mode.	Set motor parameters according to the motor nameplate and perform motor auto-tuning.
		Excessively short deceleration time	Increase the deceleration time (F0-18).
		Inappropriate overcurrent stall suppression	Ensure that overcurrent stall suppression (F3-19) is enabled. If the value of F3-18 (overcurrent stall suppression level) is too large, adjust it to a level between 120% and 150%. If the value of F3-20 (overcurrent stall suppression gain) is too small, adjust it to a level between 20 and 40.
		The braking unit and braking resistor are not installed.	Install a braking unit and a braking resistor.
		External interference to the AC drive	View the fault records to check whether the fault current has ever reached the overcurrent suppression level (F3-18). If not, check for external interference source. If no external interference source is found, the driver board or Hall device might be damaged. Contact Inovance for replacement.
Overcurrent during operation at constant speed	E04.00	Grounded or short-circuited output circuit of the AC drive	Check whether the motor is short-circuited or open-circuited.
		Auto-tuning is not performed in SVC or FVC control mode.	Set motor parameters according to the motor nameplate and perform motor auto-tuning.
		Inappropriate overcurrent stall suppression	Ensure that overcurrent stall suppression (F3-19) is enabled. If the value of F3-18 (overcurrent stall suppression level) is too large, adjust it to a level between 120% and 150%. If the value of F3-20 (overcurrent stall suppression gain) is too small, adjust it to a level between 20 and 40.
		Inadequate power rating of the AC drive	If the running current exceeds the rated motor current or rated output current of the AC drive during stable running, select an AC drive with a higher power rating.
		External interference to the AC drive	View the fault records to check whether the fault current has ever reached the overcurrent suppression level (F3-18). If not, check for external interference source. If no external interference source is found, the driver board or Hall device might be damaged. Contact Inovance for replacement.

Fault Name	Display	Possible Cause	Action
Overvoltage during acceleration	E05.00	High input grid voltage	Adjust the voltage to the normal range.
		External force driving the motor during acceleration	Cancel the external force or install a braking resistor. If the value of F3-26 (frequency rise threshold during overvoltage suppression) is too small, adjust it to a level between 5 Hz to 15 Hz when an external force drives the motor.
		Inappropriate overvoltage suppression	Ensure that overvoltage suppression (F3-23) is enabled. If the value of F3-22 (overvoltage suppression) is too large, adjust it to a level between 700 V and 770 V. If the value of F3-24 (frequency gain for overvoltage suppression) is too small, adjust it to a level between 30 and 50.
		The braking unit and braking resistor are not installed.	Install a braking unit and a braking resistor.
		Excessively short acceleration time	Increase the acceleration time.
Overvoltage during deceleration	E06.00	Inappropriate overvoltage suppression	Ensure that overvoltage suppression (F3-23) is enabled. If the value of F3-22 (overvoltage suppression) is too large, adjust it to a level between 700 V and 770 V. If the value of F3-24 (frequency gain for overvoltage suppression) is too small, adjust it to a level between 30 and 50.
		External force driving the motor during deceleration	Cancel the external force or install a braking resistor. If the value of F3-26 (frequency rise threshold during overvoltage suppression) is too small, adjust it to a level between 5 Hz to 15 Hz when an external force drives the motor.
		Excessively short deceleration time	Increase the deceleration time.
		The braking unit and braking resistor are not installed.	Install a braking unit and a braking resistor.

Fault Name	Display	Possible Cause	Action
Overvoltage during operation at constant speed	E07.00	Inappropriate overvoltage suppression	Ensure that overvoltage suppression (F3-23) is enabled. If the value of F3-22 (overvoltage suppression) is too large, adjust it to a level between 700 V and 770 V. If the value of F3-24 (frequency gain for overvoltage suppression) is too small, adjust it to a level between 30 and 50.
		External force driving the motor during operation	Cancel the external force or install a braking resistor. If the value of F3-26 (frequency rise threshold during overvoltage suppression) is too small, adjust it to a level between 5 Hz to 15 Hz when an external force drives the motor.
Undervoltage	E09.00	Instantaneous power failure	Enable the power dip ride-through function (F9-59).
		AC drive input voltage out of range	Adjust the voltage to a value within the normal range.
		Abnormal bus voltage	Contact Inovance for technical support.
		Abnormal rectifier, IGBT driver board, or IGBT control board	Contact Inovance for technical support.
AC drive overload	E10.00	Excessively heavy load or stalled motor	Reduce the load and check the motor and mechanical conditions.
		Inadequate power rating of the AC drive	Use an AC drive with a higher power rating.
		Auto-tuning is not performed in SVC or FVC control mode.	Set motor parameters according to the motor nameplate and perform motor auto-tuning.
		Excessively high torque boost (F3-01) in V/f control mode	Decrease the value of F3-01 by 1.0% each time or set F3-01 to 0 (automatic torque boost).
		Output phase loss on the AC drive	Check the output wiring of the AC drive.
Motor overload	E11.00	Inappropriate F9-01 (motor overload protection gain) setting.	Increase the value of F9-01 to prolong the motor overload time.
		Excessively heavy load or stalled motor	Reduce the load and check the motor and mechanical conditions.
Input phase loss	E12.00	Input phase loss	Ensure proper input RST cables and three-phase input voltage.
Output phase loss	E13.00	Motor fault	Check whether the motor is disconnected.
		Abnormal lead wire connecting the AC drive to the motor	Rectify external faults.
		Unbalanced three-phase output of the AC drive during motor operation	Ensure proper functioning of the motor three-phase winding.
		Abnormal driver board or IGBT	Contact the agent or Inovance for technical support.

Fault Name	Display	Possible Cause	Action
IGBT overtemperature	E14.00	High ambient temperature	Lower the ambient temperature.
		Blocked air filter	Clean the air filter.
		Damaged fan	Replace the damaged fan.
		Damaged thermistor of the IGBT	Contact the agent or Inovance for technical support.
		Damaged IGBT	Contact the agent or Inovance for technical support.
External fault	E15.01	External fault signal input to the multi-function DI terminal (normally open)	Rectify the external fault, and ensure that the mechanical condition allows restart (F8-18).
	E15.02	External fault signal input to the multi-function DI terminal (normally closed)	Rectify the external fault, and ensure that the mechanical condition allows restart (F8-18).
Communication fault	E16.01	Modbus communication timeout	Ensure proper wiring of the RS485 communication cable. Ensure proper settings of FD-04 and PLC communication cycle.
	E16.11	CANopen communication timeout	Ensure proper connection of the CAN communication cable. Check the values of FD-15 to FD-17 and eliminate interference.
	E16.12	Inconsistency between the configured CANopen-based PDO mapping and the actual mapping	Check the PDO mapping of parameters in group AF.
	E16.21	CANlink heartbeat timeout	Ensure proper connection of the CAN communication cable. Check the values of FD-15 to FD-17 and eliminate interference.
	E16.22	CANlink station number conflict	Change the value of FD-13 to make CANlink station numbers different from each other.
Contactor fault	E17.00	Abnormal driver board and power supply	Replace the driver board or power supply board.
		Abnormal contactor	Replace the contactor.
		Abnormal lightning protection board	Replace the lightning protection board.
Damaged current sampling circuit	E18.00	Abnormal AC drive current sampling	Power on the main circuit.
			If the Hall sensor or sampling current circuit is damaged, contact Inovance.

Fault Name	Display	Possible Cause	Action
Motor auto-tuning fault	E19.02	Fault in auto-tuning on the magnetic pole position angle of the synchronous motor	Ensure that the motor is connected and there is no output phase loss.
	E19.06 E19.07 E19.08	Fault in auto-tuning on the stator resistance	Ensure that the motor is connected. Set F1-03 (rated motor current) according to the motor nameplate.
	E19.09 E19.10	Fault in auto-tuning on the transient leakage inductance of the asynchronous motor	Check whether the motor is connected or output phase is normal without loss. Ensure that the motor is connected properly.
	E19.11	Inertia auto-tuning fault	Set F1-03 (rated motor current) according to the motor nameplate. Increase the value of F2-43 (inertia auto-tuning and dynamic speed reference).
	E19.20	Timeout of auto-tuning on the no-load zero position angle of the synchronous motor	Check the Z feedback signal.
	E19.23	Fault in auto-tuning on the magnetic pole position of the synchronous motor	Set F1-03 (rated motor current) according to the motor nameplate. Decrease the value of F2-29 (synchronous motor initial angle detection current).
	E19.24	Errors in auto-tuning on the transient leakage inductance of the asynchronous motor	Check whether the power rating of the AC drive is low. If yes, use an AC drive with a proper power rating matching the motor power.

Fault Name	Display	Possible Cause	Action
Encoder fault	E20.00	Encoder disconnected	Restore the connection. Ensure proper wiring of the PG cable. Ensure proper wiring of the PG cable and power supply. Ensure consistency between the encoder pulses per revolution and the value of F1-27. Ensure proper wiring of the AB signal cable.
	E20.01	Encoder fault	
	E20.02	Encoder disconnected	
	E20.03	Encoder fault during no-load auto-tuning of the synchronous motor	
	E20.04	Encoder fault during no-load auto-tuning of the synchronous motor	
	E20.06	Encoder fault during with-load auto-tuning of the synchronous motor	
	E20.07	Encoder fault during no-load auto-tuning of the synchronous motor	
	E20.08	Encoder fault during no-load auto-tuning of the synchronous motor	
	E20.09	Encoder fault during auto-tuning of the synchronous motor	Check the encoder Z signal and wiring of the PG card.
	E20.10	Synchronous motor encoder fault	
	E20.11	The encoder is faulty during FVC no-load auto-tuning of the asynchronous motor.	Ensure that the encoder is properly connected. Ensure consistency between the encoder pulses per revolution and the value of F1-27.
	E20.12	Excessive deviation between the encoder feedback speed and the speed estimated by SVC	Check for encoder disconnection. Ensure proper setting of motor parameters. Ensure that motor auto-tuning is performed.
	E20.13	Resolver encoder disconnected	Check the wiring of the encoder.
	E20.17	23-bit encoder disconnected	Check the wiring of the 23-bit encoder.
EEPROM read/write fault	E21.01	EEPROM read/write abnormality	For communication write parameters, check the RAM addresses and the RAM address mapping of the parameters. For details, see 6.2.4 Parameter Address Rules. If the EEPROM chip is damaged, contact Inovance to replace the control board.
	E21.02		
	E21.03		
	E21.04		

Fault Name	Display	Possible Cause	Action
Motor auto-tuning error	E22.00	Auto-tuned stator resistance out of range	Correctly set F1-02 (rated motor voltage) and F1-03 (rated motor current) in group F1 according to the motor nameplate.
	E22.01	Auto-tuned rotor resistance of the asynchronous motor out of range	Ensure that auto-tuning is performed after the motor stops.
	E22.02	The no-load current and mutual inductance of the asynchronous motor obtained through auto-tuning exceed the allowed range. If this alarm is reported, the AC drive calculates the mutual inductance and no-load current values based on known motor parameters. The calculated values may not be the optimal values.	Set motor parameters in group F1 according to the motor nameplate. Ensure that the motor has no load before auto-tuning.
	E22.03	Auto-tuned back EMF of the synchronous motor out of range.	Set F1-02 (rated motor voltage) according to the motor nameplate. Ensure that the motor has no load before auto-tuning.
	E22.04	Inertia auto-tuning fault	Set F1-03 (rated motor current) according to the motor nameplate.
Short circuit to ground	E23.00	Motor shorted to the ground	Check and replace the motor cables and motor if necessary.
Motor inter-phase short circuit	E24.00	Motor inter-phase short circuit	Check whether a two-phase short circuit occurs on the output UVW.
Rectifier fault	E25.00	Rectifier fault	Rectify corresponding faults, such as input phase loss and overtemperature. 1: Operation enabled 2: Incoming circuit breaker feedback 3: Auxiliary circuit breaker feedback 4: Leakage protection switch feedback. If there is no feedback signal, an alarm is reported. 6: Inverter unit operation inhibited 7: Inverter unit coast-to-stop 8: User-defined inverter unit stop. If the terminal is active, an alarm is reported.
Accumulative running time reach	E26.00	The accumulative running time has reached the reference value.	Clear the record through parameter initialization.
User-defined fault 1	E27.00	The user-defined fault 1 signal is input via the DI.	Perform a reset.
		The user-defined fault 1 signal is input through the virtual I/O function.	Perform a reset.

Fault Name	Display	Possible Cause	Action
User-defined fault 2	E28.00	The user-defined fault 2 signal is input via the DI.	Perform a reset.
		The user-defined fault 2 signal is input through the virtual I/O function.	Perform a reset.
Accumulative power-on time reach	E29.00	The accumulative power-on time has reached the reference value.	Clear the record through parameter initialization.
Load lost	E30.00	Running current of the AC drive less than the value of F9-64	Check for load disconnection and mismatching between the values of F9-64 and F9-65 and actual working conditions.
PID feedback loss during operation	E31.00	PID feedback less than the value of FA-26	Check the PID feedback signals or set FA-26 to a proper value.
Pulse-by-pulse current limit fault	E40.00	Excessively heavy load or stalled motor	Reduce the load and check the motor and mechanical conditions.
		Inadequate power rating of the AC drive	Use an AC drive with a higher power rating.
Excessive speed deviation	E42.00	Incorrect setting of encoder parameters	Set encoder parameters properly.
		Auto-tuning is not performed on parameters.	Perform motor parameter auto-tuning.
		Inappropriate setting of F9-69 and F9-70	Set the parameters correctly based on actual conditions.
Motor overspeed	E43.00	Incorrect setting of encoder parameters	Set encoder parameters properly.
		Auto-tuning is not performed on parameters.	Perform motor parameter auto-tuning.
		Inappropriate setting of F9-67 and F9-68	Set the parameters correctly based on actual conditions.
Motor overtemperature	E45.00	Temperature sensor loosely connected	Check the wiring of the temperature sensor.
		High motor temperature	Increase the carrier frequency or take other heat dissipation measures to cool the motor.
		Excessively low value of F9-57 (motor overtemperature protection threshold)	Adjust the threshold to a level between 90°C and 100°C.
AC drive overtemperature	E60.00	High internal temperature of the AC drive	Replace the fan in the AC drive.
			Contact Inovance.
Braking transistor overload	E61.00	Excessively low resistance of the braking resistor	Use a braking resistor with higher resistance.
Braking transistor short circuit	E62.00	Braking transistor short circuit	Ensure proper functioning of the braking transistor.
			Check whether an external braking resistor is installed.
Low liquid level alarm	E63.00	Low liquid level of the water tank	Add coolant.

Fault Name	Display	Possible Cause	Action
Water cooling system fault	E64.00	Water-cooling system control unit fault	Perform a reset.
			Replace the control unit.

4 Parameter List

4.1 Parameter List

If FP-00 is set to a non-zero value (password protection is enabled), the parameter menu is accessible in parameter mode and user-modification mode only after the correct password is entered. To disable password protection, set FP-00 to 0.

The password is used to lock the operating panel. After the password is set, the password is required every time you exit and then try to read or write parameters using the operating panel. During communication, the values of parameters (excluding parameters in groups FP and FF) can be read and written without password authentication.

Password protection is not available for the parameter menu in user-defined mode.

Groups F and A contain basic function parameters, and group U contains the monitoring parameters. The following symbols are used in the parameter table:

- Non-modifiable
- At stop
- In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F0-00	0xF000	G/P type	1: G type (constant-torque load) 2: P type (fan and pump type load)	1	-	At stop
F0-01	0xF001	Motor 1 control mode	0: Sensorless vector control (SVC) 1: Feedback vector control (FVC) 2: Voltage/Frequency control (V/f control) 3: Reserved 4: Reserved 5: Synchronous motor speed open loop control (PMVVC)	0	-	At stop
F0-02	0xF002	Command source selection	0: LED operating panel/LCD operating panel/Software tool 1: Terminal 2: Communication	0	-	At stop

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F0-03	0xF003	Main frequency source X selection	0: Digital setting (preset frequency F0-08 can be changed by pressing **UP**/**DOWN** key; non-retentive upon power failure) 1: Digital setting (preset frequency F0-08 can be changed by pressing **UP**/**DOWN** key; retentive at power failure) 2: AI1 3: AI2 4: AI3 5: Pulse reference (DI5) 6: Multi-reference 7: Simple PLC 8: PID 9: Communication 10: Reserved	0	-	At stop
F0-04	0xF004	Auxiliary frequency source Y	0: Digital setting (preset frequency F0-08 can be changed by pressing **UP**/**DOWN** key; non-retentive upon power failure) 1: Digital setting (preset frequency F0-08 can be changed by pressing **UP**/**DOWN** key; retentive at power failure) 2: AI1 3: AI2 4: AI3 5: Pulse reference (DI5) 6: Multi-reference 7: Simple PLC 8: PID 9: Communication 10: Reserved	0	-	At stop
F0-05	0xF005	Range selection of auxiliary frequency source Y for superposition	0: Relative to the maximum frequency 1: Relative to main frequency source X	0	-	In real time
F0-06	0xF006	Range of auxiliary frequency source Y for superposition	0% to 150%	100	%	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F0-07	0xF007	Frequency source superposition	Ones: Frequency reference selection 0: Main frequency source X 1: Main and auxiliary operation result (based on tens) 2: Switchover between main frequency source X and auxiliary frequency source Y 3: Switchover between main frequency source X and the main and auxiliary operation result 4: Switchover between auxiliary frequency source Y and the main and auxiliary operation result Tens: Operation result of main and auxiliary frequency reference 0: Main + Auxiliary 1: Main – Auxiliary 2: Max. (main, auxiliary) 3: Min. (main, auxiliary) 4: Main x Auxiliary	0	-	In real time
F0-08	0xF008	Preset frequency	0.00 Hz to F0-10	50	Hz	In real time
F0-09	0xF009	Running direction	0: Same as the default direction 1: Reverse to the default direction	0	-	In real time
F0-10	0xF00A	Maximum frequency	5.00 Hz to 599.00 Hz	50	Hz	At stop
F0-11	0xF00B	Frequency source upper limit	0: Frequency upper limit (F0-12) 1: AI1 2: AI2 3: AI3 4: Pulse reference (DI5) 5: Communication 6: Multi-speed reference	0	-	At stop
F0-12	0xF00C	Frequency upper limit	F0-14 to F0-10	50	Hz	In real time
F0-13	0xF00D	Frequency upper limit offset	0.00 Hz to F0-10	0	Hz	In real time
F0-14	0xF00E	Frequency lower limit	0.00 Hz to F0-12	0	Hz	In real time
F0-15	0xF00F	Carrier frequency	0.8 kHz to 16.0 kHz	6	kHz	In real time
F0-16	0xF010	Carrier frequency adjusted with temperature	0: No 1: Yes	1	-	In real time
F0-17	0xF011	Acceleration time 1	0.0s to 6500.0s	20	s	In real time
F0-18	0xF012	Deceleration time 1	0.0s to 6500.0s	20	s	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F0-19	0xF013	Acceleration/ Deceleration time unit	0: 1s 1: 0.1s 2: 0.01s	1	-	At stop
F0-21	0xF015	Offset of auxiliary frequency source during superposition	0.00 Hz to F0-10	0	Hz	In real time
F0-22	0xF016	Frequency reference resolution	1: 0.1 Hz 2: 0.01 Hz	2	-	At stop
F0-23	0xF017	Retention of digital setting of frequency upon stop	0: Non-retentive 1: Retentive	0	-	In real time
F0-25	0xF019	Acceleration/ Deceleration time base frequency	0: Maximum frequency (F0-10) 1: Frequency reference 2: 100 Hz	0	-	At stop
F0-26	0xF01A	Base frequency for UP/DOWN modification during running	0: Running frequency 1: Frequency reference	0	-	At stop
F0-27	0xF01B	Main frequency coefficient	0.00% to 100.00%	10	%	In real time
F0-28	0xF01C	Auxiliary frequency coefficient	0.00% to 100.00%	10	%	In real time
F1-00	0xF100	Motor type selection	0: Common asynchronous motor 1: Variable frequency asynchronous motor 2: Synchronous motor	0	-	At stop
F1-01	0xF101	Rated motor power	0.1 kW to 1000.0 kW	1.5	kW	At stop
F1-02	0xF102	Rated motor voltage	1 V to 2000 V	380	V	At stop
F1-03	0xF103	Rated motor current	0.1 A to 6553.5 A	9	A	At stop
F1-04	0xF104	Rated motor frequency	0.01 Hz to F0-10	50	Hz	At stop
F1-05	0xF105	Rated motor speed	1 RPM to 65535 RPM	1460	RPM	At stop
F1-06	0xF106	Asynchronous/ Synchronous motor stator resistance	0.001 Ω to 65.535 Ω	1.204	Ω	At stop
F1-07	0xF107	Asynchronous motor rotor resistance	0.001 Ω to 65.535 Ω	0.908	Ω	At stop
F1-08	0xF108	Asynchronous motor leakage inductance	0.01 mH to 655.35 mH	5.28	mH	At stop
F1-09	0xF109	Asynchronous motor mutual inductance	0.1 mH to 6553.5 mH	156.8	mH	At stop
F1-10	0xF10A	Asynchronous motor no-load current	0.1 A to F1-03	4.2	A	At stop

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F1-11	0xF10B	Asynchronous motor core saturation coefficient 1	50.0% to 100.0%	86	%	In real time
F1-12	0xF10C	Asynchronous motor core saturation coefficient 2	100.0% to 150.0%	130	%	In real time
F1-13	0xF10D	Asynchronous motor core saturation coefficient 3	100.0% to 170.0%	140	%	In real time
F1-14	0xF10E	Asynchronous motor core saturation coefficient 4	100.0% to 180.0%	150	%	In real time
F1-17	0xF111	Synchronous motor axis D inductance	0.01 mH to 655.35 mH	15.86	mH	At stop
F1-18	0xF112	Synchronous motor axis Q inductance	0.01 mH to 655.35 mH	15.86	mH	At stop
F1-19	0xF113	Synchronous motor back EMF coefficient	0.0 V to 6553.5 V	0	V	At stop
F1-20	0xF114	Filter time constant (PMVVC)	0.003 to 65.535	0.1	-	In real time
F1-21	0xF115	Oscillation suppression gain (PMVVC)	0 to 65535	100	-	In real time
F1-23	0xF117	Percentage of the frictional moment	0.00% to 100.00%	0	%	At stop
F1-24	0xF118	Number of motor pole pairs	0 to 65535	2	-	In real time
F1-26	0xF11A	Auto-tuning direction (inertia auto-tuning and synchronous motor auto-tuning)	0: Reverse run 1: Forward run	1	-	At stop
F1-27	0xF11B	Encoder pulses per revolution	1 to 20000	1024	-	At stop
F1-28	0xF11C	Encoder type	0: ABZ incremental encoder 1: 23-bit encoder 2: Resolver	0	-	At stop
F1-29	0xF11D	PG signal filter	0: Non-adaptive filter 1: Adaptive filter 2: Fixed interlock 3: Automatic interlock	1	-	At stop
F1-30	0xF11E	Encoder wiring flag	Ones (position): AB signal direction or rotational direction 0: Forward direction 1: Reverse direction Tens (position): Reserved	0	-	At stop

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F1-31	0xF11F	Encoder zero position angle	0.0° to 359.9°	0	°	At stop
F1-32	0xF120	Motor gear ratio numerator	1 to 65535	1	-	At stop
F1-33	0xF121	Motor gear ratio denominator	1 to 65535	1	-	At stop
F1-34	0xF122	Number of pole pairs of resolver	1 to 32	1	-	At stop
F1-36	0xF124	PG open circuit detection	0 to 11	1	-	At stop
F1-37	0xF125	Auto-tuning selection	0: No auto-tuning 1: Static auto-tuning of the asynchronous motor (Rs, Rr, L0) 2: Dynamic auto-tuning of the asynchronous motor (supporting dynamic auto-tuning with load) 3: Static auto-tuning on all parameters of the asynchronous motor (Rs, Rr, L0, Lm, IO) 4: Dynamic auto-tuning of the asynchronous motor 2 (inertia auto-tuning supported only in FVC mode) 5: Dynamic auto-tuning of the asynchronous motor 3 (mutual inductance curve auto-tuning requires no-load, light load, or pure inertia load; supporting the V/f, SVC, and FVC modes) 11: Static auto-tuning on partial parameters of the synchronous motor (excluding back EMF) 12: Dynamic auto-tuning on all parameters of the synchronous motor 13: Static auto-tuning on all parameters of the synchronous motor (excluding the encoder installation angle) 14: Synchronous motor inertia auto-tuning (only in FVC mode)	0	-	At stop
F2-00	0xF200	Low-speed speed loop Kp	1 to 200	30	-	In real time
F2-01	0xF201	Low-speed speed loop Ti	0.001s to 10.000s	0.5	s	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F2-02	0xF202	Switchover frequency 1	0.00 Hz to F2-05	5	Hz	In real time
F2-03	0xF203	High-speed speed loop Kp	1 to 200	20	-	In real time
F2-04	0xF204	High-speed speed loop Ti	0.001s to 10.000s	1	s	In real time
F2-05	0xF205	Switchover frequency 2	F2-02 to F0-10	10	Hz	In real time
F2-06	0xF206	VC slip compensation gain	50% to 200%	100	%	In real time
F2-07	0xF207	Speed feedback filter time	0.000s to 0.1s	0.004	s	In real time
F2-08	0xF208	VC deceleration over-excitation gain	0 to 200	64	-	In real time
F2-09	0xF209	Torque upper limit source in speed control (motoring)	0: Digital setting (F2-10) 1: AI1 2: AI2 3: AI3 4: Pulse reference (DI5) 5: Communication 6: Min. (AI1, AI2) 7: Max. (AI1, AI2)	0	-	In real time
F2-10	0xF20A	Torque upper limit reference in speed control (motoring)	0.0% to 200.0%	150	%	In real time
F2-11	0xF20B	Torque upper limit source in speed control (generating)	0: Digital setting (F2-10) 1: AI1 2: AI2 3: AI3 4: Pulse reference (DI5) 5: Communication 6: Min. (AI1, AI2) 7: Max. (AI1, AI2) 8: Digital setting (F2-12)	0	-	In real time
F2-12	0xF20C	Torque upper limit reference in speed control (generating)	0.0% to 200.0%	150	%	In real time
F2-13	0xF20D	Low-speed current loop Kp adjustment	0.1–10.0	1	-	In real time
F2-14	0xF20E	Low-speed current loop Ki adjustment	0.1 to 10.0	1	-	In real time
F2-15	0xF20F	High-speed current loop Kp adjustment	0.1 to 10.0	1	-	In real time
F2-16	0xF210	High-speed current loop Ki adjustment	0.1 to 10.0	1	-	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F2-17	0xF211	Speed loop Kp upon zero speed lock	1 to 100	30	-	In real time
F2-18	0xF212	Speed loop Ti upon zero speed lock	0.001s to 10.000s	0.5	s	In real time
F2-19	0xF213	Inertia compensation gain	1 to 200	1	-	In real time
F2-20	0xF214	Speed loop switchover frequency upon zero speed lock	0.00 Hz to F2-02	0.05	Hz	In real time
F2-21	0xF215	Maximum output voltage coefficient	100 to 110	100	-	In real time
F2-22	0xF216	Output voltage filter time	0.000s to 0.01s	0	s	In real time
F2-23	0xF217	Zero speed lock	0: Disabled 1: Enabled	0	-	At stop
F2-24	0xF218	Overvoltage suppression Kp in vector control mode	0 to 1000	40	-	In real time
F2-25	0xF219	Acceleration compensation gain	0 to 200	0	-	In real time
F2-26	0xF21A	Acceleration compensation filter time	0 to 500	10	-	In real time
F2-27	0xF21B	Overvoltage suppression in vector control mode	0: Disabled 1: Enabled	1	-	In real time
F2-28	0xF21C	Torque filter cut-off frequency	50 Hz to 1000 Hz	500	Hz	At stop
F2-29	0xF21D	Synchronous motor initial angle detection current	50 to 180	80	-	In real time
F2-30	0xF21E	Speed loop parameter auto-calculation	0: Disabled 1: Enabled	0	-	At stop
F2-31	0xF21F	Expected speed loop bandwidth (high speed)	0 Hz to 3 Hz	0	Hz	At stop
F2-32	0xF220	Expected speed loop bandwidth (low speed)	1 Hz to 10000 Hz	100	Hz	In real time
F2-33	0xF221	Expected speed loop bandwidth (zero speed)	1 Hz to 10000 Hz	100	Hz	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F2-34	0xF222	Damping ratio of expected speed loop (unchanged generally)	0.1 to 65.000	1	-	In real time
F2-35	0xF223	System inertia (equivalent to the start time)	0.001s to 50.000s	0.1	s	At stop
F2-36	0xF224	Single motor inertia ($kg*m^2$)	0.001 $kg*m^2$ to 50.000 $kg*m^2$	0.001	$kg*m^2$	At stop
F2-37	0xF225	Inertia auto-tuning maximum frequency	20%–100%	80	%	At stop
F2-38	0xF226	Inertia auto-tuning acceleration time	1.0s to 50.0s	10	s	At stop
F2-39	0xF227	Bandwidth 1 of speed loop dynamic optimization test	1.0 Hz to 200.0 Hz	5	Hz	Non-modifiable
F2-40	0xF228	Bandwidth 2 of speed loop dynamic optimization test	1.0 Hz to 200.0 Hz	10	Hz	Non-modifiable
F2-41	0xF229	Bandwidth 3 of speed loop dynamic optimization test	1.0 Hz to 100.0 Hz	15	Hz	Non-modifiable
F2-42	0xF22A	Bandwidth 4 of speed loop dynamic optimization test	1.0 Hz to 200.0 Hz	20	Hz	Non-modifiable
F2-43	0xF22B	Inertia auto-tuning and dynamic speed reference	0 to 100	30	-	At stop
F2-44	0xF22C	Rotor time constant check	0: Disabled 1: Enabled	0	-	Non-modifiable
F2-45	0xF22D	Torque amplitude of rotor time constant check	10% to 100%	30	%	Non-modifiable
F2-46	0xF22E	Number of times of rotor constant check	1 to 6	3	-	Non-modifiable
F2-47	0xF22F	Inertia auto-tuning	0: Disabled 1: Enabled	0	-	At stop
F2-48	0xF230	Speed loop bandwidth during inertia auto-tuning	0.1 Hz to 100.0 Hz	10	Hz	At stop
F2-49	0xF231	Back EMF calculation	0: Disabled 1: Enabled	0	-	Non-modifiable
F2-50	0xF232	Inertia auto-tuning mode	0: Acceleration/Deceleration mode 1: Triangular wave mode	0	-	At stop

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F2-51	0xF233	Inertia auto-tuning acceleration/ deceleration coefficient	0.1–10.0	1	-	At stop
F2-52	0xF234	Decoupling control	0: Disabled 1: Enabled	0	-	At stop
F2-53	0xF235	Power limit during generating	0: Disabled 1: Enabled	0	-	At stop
F2-54	0xF236	Power limit during generating	0.0% to 200.0%	20	%	At stop
F2-55	0xF237	Flux closed loop and torque linearity optimization in FVC mode	Ones (position): Flux closed loop in torque control mode 0: Disabled 1: Enabled Tens (position): Flux closed loop in speed control mode 0: Disabled 1: Enabled Hundreds (position): Torque upper limit and torque linearity in speed control mode 0: Disabled 1: Enabled	10	-	At stop
F2-56	0xF238	AC drive output current upper limit	0.0% to 170.0%	150	%	At stop
F3-00	0xF300	V/f curve setting	0: Linear V/f curve 1: Multi-point V/f curve 2: Square V/f curve 3: 1.2-power V/f curve 4: 1.4-power V/f curve 6: 1.6-power V/f curve 8: 1.8-power V/f curve 10: V/f complete separation mode 11: V/f half separation mode	0	-	At stop
F3-01	0xF301	Torque boost	0.0% to 30.0%	0	%	In real time
F3-02	0xF302	Cutoff frequency of torque boost	0.00 Hz to F0-10	50	Hz	At stop
F3-03	0xF303	Multi-point V/f frequency 1	0.00 Hz to F3-05	0	Hz	At stop
F3-04	0xF304	Multi-point V/f voltage 1	0.0% to 100.0%	0	%	At stop
F3-05	0xF305	Multi-point V/f frequency 2	F3-03 to F3-07	0	Hz	At stop
F3-06	0xF306	Multi-point V/f voltage 2	0.0% to 100.0%	0	%	At stop

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F3-07	0xF307	Multi-point V/f frequency 3	F3-05 to F1-04	0	Hz	At stop
F3-08	0xF308	Multi-point V/f voltage 3	0.0% to 100.0%	0	%	At stop
F3-09	0xF309	V/f slip compensation gain	0.0% to 200.0%	0	%	In real time
F3-10	0xF30A	V/f over-excitation gain	0 to 200	64	-	In real time
F3-11	0xF30B	V/f oscillation suppression gain	0 to 100	0	-	In real time
F3-12	0xF30C	Oscillation suppression gain mode	0: Invalid 1: Reserved 2: Reserved 3: Valid	3	-	At stop
F3-13	0xF30D	Voltage source for V/f separation	0: Digital setting (F3-14) 1: AI1 2: AI2 3: AI3 4: Pulse reference (DI5) 5: Multi-reference 6: Simple PLC 7: PID 8: Communication (1000H)	0	-	In real time
F3-14	0xF30E	Digital setting of voltage for V/f separation	0 V to F1-02	0	V	In real time
F3-15	0xF30F	Voltage rise time of V/f separation	0.0s to 1000.0s	0	s	In real time
F3-16	0xF310	Voltage decline time of V/f separation	0.0s to 1000.0s	0	s	In real time
F3-17	0xF311	Stop mode selection for V/f separation	0: Frequency and voltage decline to 0 independently 1: Frequency declines to 0 after voltage declines to 0	0	-	At stop
F3-18	0xF312	V/f overcurrent stall action current	50% to 200%	150	%	At stop
F3-19	0xF313	V/f overcurrent stall	0: Disabled 1: Enabled	1	-	At stop
F3-20	0xF314	V/f overcurrent stall suppression gain	0 to 100	20	-	In real time
F3-21	0xF315	Compensation coefficient of V/f speed multiplying overcurrent stall action current	50 to 200	50	-	At stop

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F3-22	0xF316	V/f overvoltage stall action voltage	200.0 V to 2000.0 V	770	V	At stop
F3-23	0xF317	V/f overvoltage stall	0: Disabled 1: Enabled	1	-	At stop
F3-24	0xF318	V/f overvoltage stall suppression frequency gain	0 to 100	30	-	In real time
F3-25	0xF319	V/f overvoltage stall suppression voltage gain	0 to 100	30	-	In real time
F3-26	0xF31A	Frequency rise threshold during overvoltage stall suppression	0 to 50	5	-	At stop
F3-27	0xF31B	Slip compensation time constant	0.1 Hz to 10.0 Hz	0.5	Hz	In real time
F3-28	0xF31C	V/f parameter setting inertia coefficient	0.00 to 10.00	0.1	-	At stop
F3-29	0xF31D	Minimum motoring torque current	10 to 100	50	-	At stop
F3-30	0xF31E	Maximum generating torque current	10 to 100	20	-	At stop
F3-31	0xF31F	Automatic frequency rise Kp	0 to 100	50	-	In real time
F3-32	0xF320	Automatic frequency rise Ki	0 to 100	50	-	In real time
F3-33	0xF321	Online torque compensation gain	80 to 150	100	-	At stop
F4-00	0xF400	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: Running pause 11:NO input of external fault 12: Multi-reference terminal 1 13: Multi-reference terminal 2 14: Multi-reference terminal 3	1	-	At stop

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
Continued	Continued	Continued	15: Multi-reference terminal 4 16:Terminal 1 for acceleration/ deceleration selection 17: Terminal 2 for acceleration/ deceleration selection 18: Frequency source switchover 19: UP and DOWN setting clear (terminal, operating panel) 20: Command source switchover terminal 21: Acceleration/Deceleration inhibited 22: PID pause 23: PLC state reset 24: Wobble pause 25:Counter input (DI5) 26: Counter reset 27: Length count input (DI5) 28: Length reset	Continued	Continued	Continued
Continued	Continued	Continued	29: Torque control inhibited 30: Pulse input 31: Reserved 32: Immediate DC braking 33: NC input of external fault 34: Frequency modification enabled 35: PID action direction reversal 36: External stop terminal 1 37: Command source switchover terminal 2 38: PID integral pause 39: Switchover between main frequency source X and preset frequency	1	-	At stop

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
Continued	Continued	Continued	40: Switchover between auxiliary frequency source Y and preset frequency 41: Reserved 42: Position lock enabled 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 braking 50: Clear the current running time	Continued	Continued	Continued
Continued	Continued	Continued	51: Two-wire/three-wire control switchover 52: Electromagnetic shorting 53: Thickness overlaying 54: Roll diameter reset 55: Initial roll diameter 1 56: Initial roll diameter 2 57: Pre-drive 58: Winding/Unwinding switchover 59: Roll diameter calculation disabled 60: Exit tension control 61: Terminal tension rise 62: Thickness selection 1 63: Thickness selection 2 90: Water cooling system fault 91: Low liquid level fault 92: Revolution count reset 93: Reserved	Continued	Continued	Continued
F4-01	0xF401	DI2 function selection	0 to 93	4	-	At stop
F4-02	0xF402	DI3 function selection	0 to 93	9	-	At stop
F4-03	0xF403	DI4 function selection	0 to 93	12	-	At stop
F4-04	0xF404	DI5 function selection	0 to 93	13	-	At stop
F4-05	0xF405	DI6 function selection	0 to 93	0	-	At stop
F4-06	0xF406	DI7 function selection	0 to 93	0	-	At stop

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F4-07	0xF407	DI8 function selection	0 to 93	0	-	At stop
F4-08	0xF408	DI9 function selection	0 to 93	0	-	At stop
F4-09	0xF409	DI10 function selection	0 to 93	0	-	At stop
F4-10	0xF40A	DI filter time	0.000s to 1.000s	0.01	s	In real time
F4-11	0xF40B	Terminal control mode	0: Two-wire mode 1 1: Two-wire mode 2 2: Three-wire mode 1 3: Three-wire mode 2	0	-	At stop
F4-12	0xF40C	Terminal UP/DOWN change rate	0.001 Hz/s to 65.535 Hz/s	1	Hz/s	In real time
F4-13	0xF40D	AI curve 1 minimum input	-10.00 V to F4-15	-10	V	In real time
F4-14	0xF40E	Percentage corresponding to AI curve 1 minimum input	-100.0% to +100.0%	-100	%	In real time
F4-15	0xF40F	AI curve 1 maximum input	F4-13 to 10.00 V	10	V	In real time
F4-16	0xF410	Percentage corresponding to AI curve 1 maximum input	-100.0% to +100.0%	100	%	In real time
F4-17	0xF411	AI1 fitter time	0.00s to 10.00s	0.1	s	In real time
F4-18	0xF412	AI curve 2 minimum input	–10.00 V to F4-20	-10	V	In real time
F4-19	0xF413	Percentage corresponding to AI curve 2 minimum input	-100.0% to +100.0%	-100	%	In real time
F4-20	0xF414	AI curve 2 maximum input	F4-18 to 10.00 V	10	V	In real time
F4-21	0xF415	Percentage corresponding to AI curve 2 maximum input	-100.0% to +100.0%	100	%	In real time
F4-22	0xF416	AI2 fitter time	0.00s to 10.00s	0.1	s	In real time
F4-23	0xF417	AI curve 3 minimum input	–10.00 V to F4-25	-10	V	In real time
F4-24	0xF418	Percentage corresponding to AI curve 3 minimum input	-100.0% to +100.0%	-100	%	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F4-25	0xF419	AI curve 3 maximum input	F4-23 to 10.00 V	10	V	In real time
F4-26	0xF41A	Percentage corresponding to AI curve 3 maximum input	-100.0% to +100.0%	100	%	In real time
F4-27	0xF41B	AI3 filter time	0.00s to 10.00s	0.1	s	In real time
F4-28	0xF41C	Pulse minimum input	0.00 kHz to F4-30	0	kHz	In real time
F4-29	0xF41D	Percentage corresponding to pulse minimum input	-100.0% to +100.0%	0	%	In real time
F4-30	0xF41E	Pulse maximum input	F4-28 to 100.00 kHz	50	kHz	In real time
F4-31	0xF41F	Percentage corresponding to pulse maximum input	-100.0% to +100.0%	100	%	In real time
F4-32	0xF420	Pulse filter time	0.00s to 10.00s	0.1	s	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F4-33	0xF421	AI curve selection	Ones: AI1 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, A6-08 to A6-15) Tens: AI2 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) Hundreds: AI3 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)	0x321	-	In real time
F4-34	0xF422	Setting for AI lower than the minimum input	Ones: AI1 0: Percentage corresponding to the minimum input 1: 0.0% Tens: AI2 0: Percentage corresponding to the minimum input 1: 0.0% Hundreds: AI3 0: Percentage corresponding to the minimum input 1: 0.0%	0	-	In real time
F4-35	0xF423	DI1 delay	0.0s to 3600.0s	0	s	In real time
F4-36	0xF424	DI2 delay	0.0s to 3600.0s	0	s	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F4-37	0xF425	DI3 delay	0.0s to 3600.0s	0	s	In real time
F4-38	0xF426	DI active mode setting 1	Ones: DI1 active mode setting 0: Active high 1: Active low Tens: DI2 active mode setting 0: Active high 1: Active low Hundreds: DI3 active mode setting 0: Active high 1: Active low Thousands: DI4 active mode setting 0: Active high 1: Active low Ten thousands: DI5 active mode setting 0: Active high 1: Active low	0	-	At stop
F4-39	0xF427	DI active mode setting 2	Ones: DI6 active mode setting 0: Active high 1: Active low Tens: DI7 active mode setting 0: Active high 1: Active low Hundreds: DI8 active mode setting 0: Active high 1: Active low Thousands: DI9 active mode setting 0: Active high 1: Active low Ten thousands: DI10 active mode setting 0: Active high 1: Active low	0	-	At stop
F4-42	0xF42A	AI input range selection	0: -10 V to +10 V 1: 0 V to 10 V	0	-	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F5-01	0xF501	Expansion card relay output function selection	0: No output 1: AC drive running 2: Fault output (stop at fault) 3: Frequency level detection FDT1 output 4: Frequency reach 5: Zero-speed running (no output at stop) 6: Motor overload pre-warning 7: AC drive overload pre-warning 8: Set count value reach 9: Designated count value reach 10: Length reach 11: PLC cycle completed 12: Accumulative running time reach 13: Frequency limited 14: Torque limited	0	-	In real time
Continued	Continued	Continued	15: Ready to run 16: AI1 > AI2 17: Frequency upper limit reach 18: Frequency lower limit reach (operation related) 19: Undervoltage output 20: Communication setting 21: Reserved 22: Reserved 23: Zero-speed running 2 (at stop) 24: Accumulative power-on time reach 25: Frequency level detection FDT2 output 26: Frequency 1 reach output 27: Frequency 2 reach output 28: Current 1 reach output 29: Current 2 reach output	Continued	Continued	Continued

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
Continued	Continued	Continued	30: Timing reach output 31: AI1 input limit exceeded 32: AC drive output load lost 33: Reverse running 34: Zero current state 35: Module temperature reach 36: Output current limit exceeded 37: Frequency lower limit reach (output at stop) 38: Alarm output (direct output at fault or alarm) 39: Current over-temperature pre-warning 40: Current running time reach 41: Fault output 2 42: Fault output 3	Continued	Continued	Continued
F5-02	0xF502	Control board relay 1 function selection (T/A1-T/B1-TC1)	0 to 42	2	-	In real time
F5-03	0xF503	Control board relay 2 function selection (T/A2-TC2)	0 to 42	0	-	In real time
F5-04	0xF504	DO1 function selection	0 to 42	1	-	In real time
F5-05	0xF505	Expansion card DO2 output selection	0 to 42	4	-	In real time
F5-06	0xF506	FMP output function selection	0: Running frequency 1: Frequency reference 2: Output current 3: Output torque 4: Output power 5: Output voltage 6: Pulse input (100.0% corresponds to 100.0 kHz) 7: AI1 8: AI2 9: AI3 10: Length	0	-	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
Continued	Continued	Continued	11: Count value 12: Communication 13: Motor 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) 19: Taper output 20: Roll diameter output 21: Tension output 22: Encoder feedback frequency	Continued	Continued	Continued
F5-07	0xF507	AO1 function selection	0: Running frequency 1: Frequency reference 2: Output current 3: Output torque 4: Output power 5: Output voltage 6: Pulse input (100.0% corresponds to 100.0 kHz) 7: AI1 8: AI2 9: AI3	0	-	In real time
Continued	Continued	Continued	10: Length 11: Count value 12: Communication 13: Motor 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) 19: Taper output 20: Roll diameter output 21: Tension output 22: Encoder feedback frequency	Continued	Continued	Continued
F5-08	0xF508	AO1 output selection	0: Running frequency 1: Frequency reference 2: Output current 3: Output torque 4: Output power 5: Output voltage 6: Pulse input (100.0% corresponds to 100.0 kHz) 7: AI1 8: AI2 9: AI3	1	-	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
Continued	Continued	Continued	10: Length 11: Count value 12: Communication 13: Motor 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) 19: Taper output 20: Roll diameter output 21: Tension output 22: Encoder feedback frequency	Continued	Continued	Continued
F5-09	0xF509	Maximum FMP output frequency	0.01 kHz to 100.00 kHz	50	kHz	In real time
F5-10	0xF50A	AO1 zero offset coefficient	-100.0% to +100.0%	0	%	In real time
F5-11	0xF50B	AO1 gain	–10.00 to +10.00	1	-	In real time
F5-12	0xF50C	AO2 zero offset coefficient	-100.0% to +100.0%	0	%	In real time
F5-13	0xF50D	AO2 gain	–10.00 to +10.00	1	-	In real time
F5-17	0xF511	Expansion card relay output delay	0.0s to 3600.0s	0	s	In real time
F5-18	0xF512	Control board relay 1 output delay	0.0s to 3600.0s	0	s	In real time
F5-19	0xF513	Control board relay 2 output delay	0.0s to 3600.0s	0	s	In real time
F5-20	0xF514	DO1 output delay	0.0s to 3600.0s	0	s	In real time
F5-21	0xF515	Expansion card DO2 output delay	0.0s to 3600.0s	0	s	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F5-22	0xF516	DO active mode selection	Ones (position): Expansion card relay 0: Positive logic 1: Negative logic Tens (position): Control board relay 1 0: Positive logic 1: Negative logic Hundreds (position): Control board relay 2 0: Positive logic 1: Negative logic Thousands (position): Control board DO1 0: Positive logic 1: Negative logic Ten thousands (position): Expansion card DO2 0: Positive logic 1: Negative logic	0	-	In real time
F6-00	0xF600	Start Modes	0: Direct start 1: Flying start 2: Vector pre-excited start (asynchronous motor)	0	-	In real time
F6-01	0xF601	Speed tracking mode	0: From stop frequency 1: From 50 Hz 2: From the maximum frequency 3: Reserved	0	-	At stop
F6-02	0xF602	Speed of speed tracking	1 to 100	20	-	In real time
F6-03	0xF603	Startup frequency	0.00 Hz to 10.00 Hz	0	Hz	In real time
F6-04	0xF604	Startup frequency hold time	0.0s to 100.0s	0	s	At stop
F6-05	0xF605	DC braking current/ Pre-excitation current at startup	0% to 150%	0	%	At stop
F6-06	0xF606	DC braking time/pre-excitation time at startup	0.0s to 100.0s	0	s	At stop
F6-07	0xF607	Acceleration/ Deceleration mode	0: Linear acceleration/ deceleration 1: S-curve acceleration/ deceleration	0	-	At stop
F6-08	0xF608	Time proportion of S-curve start segment	0.0% to 70.0%	30	%	At stop

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F6-09	0xF609	Time proportion of S-curve end segment	0.0% to 70.0%	30	%	At stop
F6-10	0xF60A	Stop mode	0: Decelerate to stop 1: Coast to stop	0	-	In real time
F6-11	0xF60B	Start frequency of DC braking at stop	0.00 Hz to F0-10	0	Hz	In real time
F6-12	0xF60C	Waiting time of DC braking at stop	0.0s to 100.0s	0	s	In real time
F6-13	0xF60D	DC braking current at stop	0% to 150%	0	%	In real time
F6-14	0xF60E	DC braking time at stop	0.0s to 100.0s	0	s	In real time
F6-15	0xF60F	Brake usage	0% to 100%	100	%	At stop
F6-16	0xF610	Closed-loop current Kp of speed tracking	0 to 1000	500	-	In real time
F6-17	0xF611	Closed-loop current Ki of speed tracking	0 to 1000	800	-	In real time
F6-18	0xF612	Current of speed tracking	30 to 200	100	-	In real time
F6-21	0xF615	Demagnetization time	0.00s to 10.00s	1	s	In real time
F6-22	0xF616	Start pre-torque setting	0.0% to 200.0%	0	%	In real time
F6-26	0xF61A	Electromagnetic shorting current	0% to 200%	100	%	In real time
F6-27	0xF61B	Electromagnetic shorting time upon startup	0.0s to 100.0s	0	s	At stop
F6-28	0xF61C	Electromagnetic shorting time upon stop	0.0s to 100.0s	0	s	At stop
F6-29	0xF61D	Electromagnetic shorting voltage reserve	20.0 V to 100.0 V	20	V	At stop
F6-30	0xF61E	Trial current for synchronous motor speed tracking	5.0 to 50.0	10	-	At stop
F6-31	0xF61F	Minimum tracking frequency for synchronous motor speed tracking	0.0 to 100.0	0	-	At stop
F6-32	0xF620	Angle compensation for synchronous motor speed tracking	0 to 360	0	-	At stop

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F6-33	0xF621	Proportion of synchronous motor speed tracking	0.1 to 10.0	1	-	At stop
F6-34	0xF622	Integral of synchronous motor speed tracking	0.1 to 10.0	1	-	At stop
F6-35	0xF623	Maximum current limit for DC braking	80% to 135%	80	%	At stop
F6-36	0xF624	Speed loop feedforward	-200.0% to +200.0%	0	%	In real time
F7-01	0xF701	MF.K key function	0: MF.K key disabled 1: Switchover between operating panel control and remote command control (terminal or communication) 2: Switchover between forward and reverse running 3: Forward jog 4: Reverse jog	0	-	At stop
F7-02	0xF702	STOP/RES key function	0: STOP/RES key enabled only in operating panel control mode 1: STOP/RES key enabled in any operating mode	0	-	In real time
F7-03	0xF703	LED display 1 in running state	Bit 00: Running frequency (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 status Bit 08: DO status 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	0x1F	-	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F7-04	0xF704	LED display 2 in running state	Bit 00: PID feedback Bit 01: PLC stage Bit 02: Pulse input reference (kHz) Bit 03: Running frequency 2 (Hz) 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 (hour) Bit 10: Current running time (min.) Bit 11: Pulse input reference (Hz) Bit 12: Communication Bit 13: Encoder feedback speed (Hz) Bit 14: Roll diameter (mm) Bit 15: Taper tension (N)	0	-	In real time
F7-05	0xF705	LED display in stop state	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 Bit 09: PLC state Bit 10: Load speed display Bit 11: PID setting Bit 12: Pulse input frequency (kHz) Bit 13: Roll diameter (mm) Bit 14: Tension (N)	0x33	-	In real time
F7-06	0xF706	Load speed display coefficient	0.0000 to 6.5	1	-	In real time
F7-07	0xF707	Heatsink temperature of the inverter	-20°C to +120°C	0	°C	Non-modifiable
F7-08	0xF708	Product SN	0 to 999	0	-	Non-modifiable
F7-09	0xF709	Accumulative running time	0 h to 65535 h	0	h	Non-modifiable
F7-10	0xF70A	Performance software version	-	0	-	Non-modifiable

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F7-11	0xF70B	Function software version	-	0	-	Non-modifiable
F7-12	0xF70C	Number of decimal places for load speed display	0: 0 decimal place 1: 1 decimal place 2: 2 decimal places 3: 3 decimal places	1	-	In real time
F7-13	0xF70D	Accumulative power-on time	0 h to 65535 h	0	h	Non-modifiable
F7-14	0xF70E	Accumulative power consumption	0 kWh to 65535 kWh	0	kWh	Non-modifiable
F7-15	0xF70F	Temporary performance software version	-	0	-	Non-modifiable
F7-16	0xF710	Temporary function software version	-	0	-	Non-modifiable
F8-00	0xF800	Jog frequency	0.00 Hz to F0-10	2	Hz	In real time
F8-01	0xF801	Jog acceleration time	0.0s to 6500.0s	20	s	In real time
F8-02	0xF802	Jog deceleration time	0.0s to 6500.0s	20	s	In real time
F8-03	0xF803	Acceleration time 2	0.0s to 6500.0s	20	s	In real time
F8-04	0xF804	Deceleration time 2	0.0s to 6500.0s	20	s	In real time
F8-05	0xF805	Acceleration time 3	0.0s to 6500.0s	20	s	In real time
F8-06	0xF806	Deceleration time 3	0.0s to 6500.0s	20	s	In real time
F8-07	0xF807	Acceleration time 4	0.0s to 6500.0s	20	s	In real time
F8-08	0xF808	Deceleration time 4	0.0s to 6500.0s	20	s	In real time
F8-09	0xF809	Jump frequency 1	0.00 Hz to F0-10	0	Hz	In real time
F8-10	0xF80A	Jump frequency 2	0.00 Hz to F0-10	0	Hz	In real time
F8-11	0xF80B	Jump frequency amplitude	0.00 Hz to 5.00 Hz	0	Hz	In real time
F8-12	0xF80C	Forward/Reverse run dead-zone time	0.0s to 3000.0s	0	s	In real time
F8-13	0xF80D	Reverse running	0: Reverse running allowed 1: Reverse running inhibited	0	-	In real time
F8-14	0xF80E	Running mode when the frequency reference is below the lower limit	0: Frequency lower limit 1: Stop by the way specified by F6-10 2: Zero speed running 3: Coast to stop	0	-	In real time
F8-15	0xF80F	Mechanical braking frequency	0.00 Hz to 10.00 Hz	0	Hz	In real time
F8-16	0xF810	Accumulative power-on time threshold setting	0 h to 65000 h	0	h	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F8-17	0xF811	Accumulative running time threshold setting	0 h to 65000 h	0	h	In real time
F8-18	0xF812	Startup protection selection	0: Disabled 1: Enabled	0	-	In real time
F8-19	0xF813	Frequency detection value (FDT1)	0.00 Hz to F0-10	50	Hz	In real time
F8-20	0xF814	Frequency detection hysteresis (FDT1)	0.0% to 100.0%	5	%	In real time
F8-21	0xF815	Detection width for frequency reach	0.0% to 100.0%	0	%	In real time
F8-22	0xF816	Jump frequency validity during acceleration/ deceleration	0: Inactive 1: Active	0	-	In real time
F8-25	0xF819	Switchover frequency of acceleration time 1 and acceleration time 2	0.00 Hz to F0-10	0	Hz	In real time
F8-26	0xF81A	Switchover frequency of deceleration time 1 and deceleration time 2	0.00 Hz to F0-10	0	Hz	In real time
F8-27	0xF81B	Jog preferred	0: No 1: Yes	0	-	In real time
F8-28	0xF81C	Frequency detection value (FDT2)	0.00 Hz to F0-10	50	Hz	In real time
F8-29	0xF81D	Frequency detection hysteresis (FDT2)	0.0% to 100.0%	5	%	In real time
F8-30	0xF81E	Detection value 1 for frequency reach	0.00 Hz to F0-10	50	Hz	In real time
F8-31	0xF81F	Detection width 1 for frequency reach	0.0% to 100.0%	0	%	In real time
F8-32	0xF820	Detection value 2 for frequency reach	0.00 Hz to F0-10	50	Hz	In real time
F8-33	0xF821	Detection width 2 for frequency reach	0.0% to 100.0%	0	%	In real time
F8-34	0xF822	Zero current detection level	0.0% to 300.0%	5	%	In real time
F8-35	0xF823	Zero current detection delay	0.01s to 600.00s	0.1	s	In real time
F8-36	0xF824	Output overcurrent threshold	0.0% to 300.0%	200	%	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F8-37	0xF825	Software overcurrent detection delay	0.00s to 600.00s	0	s	In real time
F8-38	0xF826	Detection level of current 1	0.0% to 300.0%	100	%	In real time
F8-39	0xF827	Detection width of current 1	0.0% to 300.0%	0	%	In real time
F8-40	0xF828	Detection level of current 2	0.0% to 300.0%	100	%	In real time
F8-41	0xF829	Detection width of current 2	0.0% to 300.0%	0	%	In real time
F8-42	0xF82A	Timing function	0: Inactive 1: Active	0	-	At stop
F8-43	0xF82B	Timing duration source	0: Timing duration (specified by F8-44) 1: AI1 2: AI2 3: AI3	0	-	At stop
F8-44	0xF82C	Timing duration	0.0 min to 6500.0 min	0	min	At stop
F8-45	0xF82D	AI1 input voltage lower limit	0.00 V to F8-46	3.1	V	In real time
F8-46	0xF82E	AI1 input voltage upper limit	F8-45 to 11.00 V	6.8	V	In real time
F8-47	0xF82F	Module temperature reach	0°C to 100°C	75	°C	In real time
F8-48	0xF830	Cooling fan control	0: Working during drive running 1: Working continuously	0	-	In real time
F8-49	0xF831	Wakeup frequency	F8-51 to F0-10	0	Hz	In real time
F8-50	0xF832	Wakeup delay	0.0s to 6500.0s	0	s	In real time
F8-51	0xF833	Hibernation frequency	0.00 Hz to F8-49	0	Hz	In real time
F8-52	0xF834	Hibernation delay	0.0s to 6500.0s	0	s	In real time
F8-53	0xF835	Current running time threshold	0.0 min to 6500.0 min	0	min	In real time
F8-55	0xF837	Emergency stop deceleration time	0.0s to 6500.0s	0	s	In real time
F8-57	0xF839	Accumulative power consumption clearing	0: Clearing inactive Clearing active	0	-	At stop
F8-58	0xF83A	Output power correction coefficient	0.0% to 200.0%	100	%	At stop
F9-00	0xF900	AC drive overload suppression protection	0: Disabled 1: Enabled	0	-	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F9-01	0xF901	Motor overload protection gain	0.2 to 10.00	1	-	In real time
F9-02	0xF902	Motor overload pre-warning coefficient	50% to 100%	80	%	In real time
F9-04	0xF904	Overvoltage threshold	350.0 V to 820.0 V	820	V	In real time
F9-06	0xF906	Output phase loss detection before startup	0: Invalid 1: Active	0	-	In real time
F9-07	0xF907	Detection of short circuit to ground	0: No detection 1: Detection before power-on 2: Detection before running 3: Detection before power-on and running	1	-	At stop
F9-08	0xF908	Braking unit action start voltage	200.0 V to 2000.0 V	760	V	In real time
F9-09	0xF909	Fault auto reset attempts	0 to 20	0	-	In real time
F9-10	0xF90A	DO action during auto fault reset	0: Not act 1: Act	0	-	In real time
F9-11	0xF90B	Interval for fault auto reset	0.1s to 100.0s	1	s	In real time
F9-12	0xF90C	Input phase loss/ Contactor close protection	Ones (position): Input phase loss protection selection 0: Input phase loss detection inhibited 1: Input phase loss detected by software and hardware 2: Input phase loss detected by software 3: Input phase loss detected by hardware Tens (position): Contactor close/ Fan fault protection 0: Inhibited 1: Enabled	11	-	In real time
F9-13	0xF90D	Restart interval upon fault reset	0.0s to 600.0s	10	s	In real time
F9-14	0xF90E	1st fault type	0 to 99	0	-	Non-modifiable
F9-15	0xF90F	2nd fault type	0 to 99	0	-	Non-modifiable
F9-16	0xF910	3rd (latest) fault type	0 to 99	0	-	Non-modifiable
F9-17	0xF911	Frequency upon the 3rd (latest) fault	0 Hz to 65535 Hz	0	Hz	Non-modifiable

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F9-18	0xF912	Current upon the 3rd (latest) fault	0.0 A to 6553.5 A	0	A	Non-modifiable
F9-19	0xF913	Bus voltage upon the 3rd (latest) fault	0.0 V to 6553.5 V	0	V	Non-modifiable
F9-20	0xF914	Input terminal state upon the 3rd (latest) fault	0 to 65535	0	-	Non-modifiable
F9-21	0xF915	Output terminal state upon the 3rd (latest) fault	0 to 65535	0	-	Non-modifiable
F9-22	0xF916	AC drive state upon the 3rd (latest) fault	0 to 65535	0	-	Non-modifiable
F9-23	0xF917	Power-on time upon the 3rd (latest) fault	0 to 65535	0	-	Non-modifiable
F9-24	0xF918	Running time upon the 3rd (latest) fault	0.0 to 6553.5	0	-	Non-modifiable
F9-25	0xF919	IGBT temperature upon the 3rd (latest) fault	-20°C to +120°C	0	°C	Non-modifiable
F9-26	0xF91A	Fault subcode of the 3rd (latest) fault	0 to 65535	0	-	Non-modifiable
F9-27	0xF91B	Frequency upon the 2nd fault	0 Hz to 65535 Hz	0	Hz	Non-modifiable
F9-28	0xF91C	Current upon the 2nd fault	0.0 A to 6553.5 A	0	A	Non-modifiable
F9-29	0xF91D	Bus voltage upon the 2nd fault	0.0 V to 6553.5V	0	V	Non-modifiable
F9-30	0xF91E	Input terminal state upon the 2nd fault	0 to 65535	0	-	Non-modifiable
F9-31	0xF91F	Output terminal state upon the 2nd fault	0 to 65535	0	-	Non-modifiable
F9-32	0xF920	AC drive state upon 2nd fault	0 to 65535	0	-	Non-modifiable
F9-33	0xF921	Power-on time upon the 2nd fault	0 to 65535	0	-	Non-modifiable
F9-34	0xF922	Running time upon the 2nd fault	0.0 to 6553.5	0	-	Non-modifiable
F9-35	0xF923	IGBT temperature upon the 2nd fault	-20°C to +120°C	0	°C	Non-modifiable
F9-36	0xF924	Fault subcode of the 2nd fault	0 to 65535	0	-	Non-modifiable
F9-37	0xF925	Frequency upon the 1st fault	0 Hz to 65535 Hz	0	Hz	Non-modifiable
F9-38	0xF926	Current upon the 1st fault	0.0 A to 6553.5 A	0	A	Non-modifiable

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F9-39	0xF927	Bus voltage upon the 1st fault	0.0 V to 6553.5V	0	V	Non-modifiable
F9-40	0xF928	Input terminal state upon the 1st fault	0 to 65535	0	-	Non-modifiable
F9-41	0xF929	Output terminal state upon the 1st fault	0 to 65535	0	-	Non-modifiable
F9-42	0xF92A	AC drive status upon 1st fault	0 to 65535	0	-	Non-modifiable
F9-43	0xF92B	Power-on time upon the 1st fault	0 to 65535	0	-	Non-modifiable
F9-44	0xF92C	Running time upon the 1st fault	0.0 to 6553.5	0	-	Non-modifiable
F9-45	0xF92D	IGBT temperature upon the 1st fault	-20°C to +120°C	0	°C	Non-modifiable
F9-46	0xF92E	Fault subcode of the 1st fault	0 to 65535	0	-	Non-modifiable
F9-47	0xF92F	Fault protection action selection 0	Ones (position): Value of E02/E03/E04 0: Coast to stop 2: Fault reset Tens (position): Value of E05/E06/E07 0: Coast to stop 2: Fault reset Hundreds (position): Value of E08 0: Coast to stop Thousands (position): Value of E09 0: Coast to stop 2: Fault reset Ten thousands (position): Value of E10 0: Coast to stop 2: Fault reset	0	-	At stop
F9-48	0xF930	Fault protection action selection 1	Ones (position): Value of E11 0: Coast to stop 1: Decelerate to stop 2: Fault reset 4: Warning 5: Canceled Tens (position): Value of E12 0: Coast to stop 1: Decelerate to stop 2: Fault reset 4: Warning 5: Canceled	0	-	At stop

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
Continued	Continued	Continued	Hundreds (position): Value of E13 0: Coast to stop 1: Decelerate to stop 2: Fault reset 4: Warning 5: Canceled Thousands (position): Value of E14 0: Coast to stop Ten thousands (position): Value of E15 0: Coast to stop 1: Decelerate to stop 3: Electromagnetic shorting 4: Warning 5: Canceled	Continued	Continued	Continued
F9-49	0xF931	Fault protection action selection 2	Ones (position): Value of E16 0: Coast to stop 1: Decelerate to stop 4: Warning 5: Canceled Tens (position): Value of E17 0: Coast to stop 1: Decelerate to stop 4: Warning 5: Canceled	0	-	At stop
Continued	Continued	Continued	Hundreds (position): Value of E18 0: Coast to stop Thousands (position): Value of E19 0: Coast to stop 3: Electromagnetic shorting 4: Warning 5: Canceled Ten thousands (position): Value of E20 0: Coast to stop 3: Electromagnetic shorting 4: Warning 5: Canceled	Continued	Continued	Continued

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F9-50	0xF932	Fault protection action selection 3	Ones (position): Reserved 0: Coast to stop Tens (position): Value of E63 0: Coast to stop 1: Decelerate to stop 4: Warning 5: Canceled Hundreds (position): Value of E23 0: Coast to stop 5: Canceled Thousands (position): Value of E24 0: Coast to stop 5: Canceled Ten thousands (position): Value of E25 0: Coast to stop 1: Decelerate to stop 4: Warning 5: Canceled	5040	-	At stop
F9-51	0xF933	Fault protection action selection 4	Ones (position): Value of E26 0: Coast to stop 1: Decelerate to stop 4: Warning 5: Canceled Tens position: Value of E27 0: Coast to stop 1: Decelerate to stop 3: Electromagnetic shorting 4: Warning 5: Canceled Hundreds (position): Value of E28 0: Coast to stop 1: Decelerate to stop 3: Electromagnetic shorting 4: Warning 5: Canceled	51111	-	At stop
Continued	Continued	Continued	Thousands (position): Value of E29 0: Coast to stop 1: Decelerate to stop 4: Warning 5: Canceled Ten thousands (position): Value of E30 0: Coast to stop 1: Decelerate to stop 4: Warning 5: Canceled	Continued	Continued	Continued

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F9-52	0xF934	Fault protection action selection 5	Ones (position): Value of E31 0: Coast to stop 1: Decelerate to stop 4: Warning 5: Canceled Tens (position): Value of E40 0: Coast to stop 2: Fault reset Hundreds (position): Value of E41 0: Coast to stop 1: Decelerate to stop 4: Warning 5: Canceled	101	-	At stop
Continued	Continued	Continued	Thousands (position): Value of E42 0: Coast to stop 1: Decelerate to stop 2: Fault reset 3: Electromagnetic shorting 4: Warning 5: Canceled Ten thousands (position): Value of E43 0: Coast to stop 1: Decelerate to stop 3: Electromagnetic shorting 4: Warning 5: Canceled	Continued	Continued	Continued
F9-53	0xF935	Fault protection action selection 6	Ones (position): Value of E45 0: Coast to stop 1: Decelerate to stop 4: Warning 5: Canceled Tens (position): Value of E60 0: Coast to stop 1: Decelerate to stop 4: Warning 5: Canceled Hundreds (position): Value of E61 0: Coast to stop 1: Decelerate to stop 4: Warning 5: Canceled Thousands (position): Value of E62 0: Coast to stop 5: Canceled Ten thousands (position): Reserved 5: Canceled	0	-	At stop

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F9-54	0xF936	Frequency selection for continuing to run upon fault	0: Current running frequency 1: Frequency reference 2: Frequency upper limit 3: Frequency lower limit 4: Alternative frequency upon exception	1	-	In real time
F9-55	0xF937	Backup frequency reference	0.0% to 100.0%	100	%	In real time
F9-56	0xF938	Type of motor temperature sensor	0: No sensor (AI3 available) 1: PT100 2: PT1000 3: KTY84 4: PTC130	0	-	In real time
F9-57	0xF939	Motor overtemperature protection threshold	0°C to 200°C	110	°C	In real time
F9-58	0xF93A	Motor overtemperature pre-warning threshold	0°C to 200°C	90	°C	In real time
F9-59	0xF93B	Selection of power dip ride-through	0: Disabled 1: Bus voltage constant control 2: Decelerate to stop 3: Voltage dip depression	0	-	At stop
F9-60	0xF93C	Voltage threshold for pause upon power dip ride-through	80% to 100%	85	%	In real time
F9-61	0xF93D	Duration for judging voltage recovery from power dip ride-through	0.0s to 100.0s	0.5	s	In real time
F9-62	0xF93E	Threshold for enabling the power dip ride-through function	60% to 100%	80	%	In real time
F9-63	0xF93F	Runaway protection time in FVC mode	0 to 10000	0	-	At stop
F9-64	0xF940	Load loss detection level	0.0% to 100.0%	10	%	In real time
F9-65	0xF941	Load loss detection time	0.0s to 60.0s	1	s	In real time
F9-66	0xF942	Voltage dip suppression time	0.0s to 600.0s	0	s	Non-modifiable
F9-67	0xF943	Overspeed threshold	0.0% to 50.0%	5	%	In real time
F9-68	0xF944	Overspeed detection time	0.0 to 60.0	1	-	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
F9-69	0xF945	Excessive speed deviation threshold	0.0% to 50.0%	20	%	In real time
F9-70	0xF946	Excessive speed deviation detection time	0.0s to 60.0s	5	s	In real time
F9-71	0xF947	Power dip ride-through gain	0 to 100	40	-	In real time
F9-72	0xF948	Power dip ride-through integral	0 to 100	30	-	In real time
F9-73	0xF949	Deceleration time of power dip ride-through	0.0s to 300.0s	20	s	In real time
FA-00	0xFA00	PID reference source	0: Digital setting of PID (FA-01) 1: AI1 2: AI2 3: AI3 4: Pulse reference (DI5) 5: Communication (1000H) 6: Multi-reference	0	-	In real time
FA-01	0xFA01	Digital setting of PID	0.0% to 100.0%	50	%	In real time
FA-02	0xFA02	PID feedback source	0: AI1 1: AI2 2: AI3 3: AI1 – AI2 4: Pulse reference (DI5) 5: Communication 6:AI1 + AI2 7: Max. (|AI1|, |AI2|) 8: Min. (|AI1|, |AI2|)	0	-	In real time
FA-03	0xFA03	PID action direction	0: Forward 1: Reverse	0	-	In real time
FA-04	0xFA04	PID reference and feedback range	0 to 65535	1000	-	In real time
FA-05	0xFA05	Proportional gain Kp1	0.0 to 1000.0	20	-	In real time
FA-06	0xFA06	Integral time Ti1	0.01s to 100.00s	2	s	In real time
FA-07	0xFA07	Derivative time Td1	0.000s to 10.000s	0	s	In real time
FA-08	0xFA08	PID cut-off frequency in reverse direction	0.00 Hz to F0-10	2	Hz	In real time
FA-09	0xFA09	PID deviation limit	0.0% to 100.0%	0	%	In real time
FA-10	0xFA0A	PID differential limit	0.00% to 100.00%	0.1	%	In real time
FA-11	0xFA0B	PID reference change time	0.00s to 650.00s	0	s	In real time
FA-12	0xFA0C	PID feedback filter time	0.00s to 60.00s	0	s	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
FA-13	0xFA0D	PID deviation gain	0.0% to 100.0%	100	%	In real time
FA-14	0xFA0E	PID optimization	0 to 100	0	-	In real time
FA-15	0xFA0F	Proportional gain Kp2	0.0 to 1000.0	20	-	In real time
FA-16	0xFA10	Integral time Ti2	0.01s to 100.00s	2	s	In real time
FA-17	0xFA11	Differential time Td2	0.000s to 10.000s	0	s	In real time
FA-18	0xFA12	PID parameter switchover condition	0: No switchover 1: Switchover by DI 2: Automatic switchover based on deviation 3: Switchover based on running frequency 6: Automatic adjustment based on roll diameter 7: Automatic adjustment based on maximum roll diameter percentage	0	-	In real time
FA-19	0xFA13	PID parameter switchover deviation 1	0.0% to FA-20	20	%	In real time
FA-20	0xFA14	PID parameter switchover deviation 2	FA-19 to 100.0%	80	%	In real time
FA-21	0xFA15	PID initial value	0.0% to 100.0%	0	%	In real time
FA-22	0xFA16	Hold time of PID initial value	0.00s to 650.00s	0	s	In real time
FA-23	0xFA17	Maximum value (positive) between two output deviations	0.00% to 100.00%	1	%	In real time
FA-24	0xFA18	Minimum value (negative) between two output deviations	0.00% to 100.00%	1	%	In real time
FA-25	0xFA19	PID integral property	0: Inactive 1: Active	0	-	In real time
FA-26	0xFA1A	Detection level of PID feedback loss	0.0% to 100.0%	0	%	In real time
FA-27	0xFA1B	Detection time of PID feedback loss	0.0s to 20.0s	0	s	In real time
FB-00	0xFB00	Wobble setting mode	0: Relative to the center frequency 1: Relative to the maximum frequency	0	-	In real time
FB-01	0xFB01	Wobble amplitude	0.0% to 100.0%	0	%	In real time
FB-02	0xFB02	Wobble step	0.0% to 50.0%	0	%	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
FB-03	0xFB03	Wobble cycle	0.1s to 3000.0s	10	s	In real time
FB-04	0xFB04	Triangular wave rise time of wobble	0.1% to 100.0%	50	%	In real time
FB-05	0xFB05	Reference length	0 m to 65535 m	1000	m	In real time
FB-06	0xFB06	Actual length	0 m to 65535 m	0	m	In real time
FB-07	0xFB07	Number of pulses per meter	0.1 to 6553.5	100	-	In real time
FB-08	0xFB08	Reference count value	1 to 65535	1000	-	In real time
FB-09	0xFB09	Designated count value	1 to 65535	1000	-	In real time
FB-10	0xFB0A	Revolution count reset mode	0: Rising edge trigger 1: Level trigger	0	-	In real time
FB-11	0xFB0B	Revolution count reset signal	0: Disable 1: Enable	0	-	In real time
FB-12	0xFB0C	Revolution count retentive at power failure	0: Non-retentive 1: Retentive	0	-	In real time
FB-13	0xFB0D	Revolution count clear	0 to 65535	0	-	In real time
FB-14	0xFB0E	Transmission ratio numerator	1 to 65535	1	-	In real time
FB-15	0xFB0F	Transmission ratio denominator	1 to 65535	1	-	In real time
FB-16	0xFB10	Actual running revolutions	0 to 65535	0	-	Non-modifiable
FB-17	0xFB11	Running revolutions	0 to 65535	0	-	Non-modifiable
FB-18	0xFB12	Running revolution accuracy	0: 1 revolution 1: 0.1 revolution	0	-	In real time
FB-19	0xFB13	Revolution direction	0: Forward 1: Reverse	0	-	In real time
FC-00	0xFC00	Multi-reference 0	-100.0% to +100.0%	0	%	In real time
FC-01	0xFC01	Multi-reference 1	-100.0% to +100.0%	0	%	In real time
FC-02	0xFC02	Multi-reference 2	-100.0% to +100.0%	0	%	In real time
FC-03	0xFC03	Multi-reference 3	-100.0% to +100.0%	0	%	In real time
FC-04	0xFC04	Multi-reference 4	-100.0% to +100.0%	0	%	In real time
FC-05	0xFC05	Multi-reference 5	-100.0% to +100.0%	0	%	In real time
FC-06	0xFC06	Multi-reference 6	-100.0% to +100.0%	0	%	In real time
FC-07	0xFC07	Multi-reference 7	-100.0% to +100.0%	0	%	In real time
FC-08	0xFC08	Multi-reference 8	-100.0% to +100.0%	0	%	In real time
FC-09	0xFC09	Multi-reference 9	-100.0% to +100.0%	0	%	In real time
FC-10	0xFC0A	Multi-reference 10	-100.0% to +100.0%	0	%	In real time
FC-11	0xFC0B	Multi-reference 11	-100.0% to +100.0%	0	%	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
FC-12	0xFC0C	Multi-reference 12	-100.0% to +100.0%	0	%	In real time
FC-13	0xFC0D	Multi-reference 13	-100.0% to +100.0%	0	%	In real time
FC-14	0xFC0E	Multi-reference 14	-100.0% to +100.0%	0	%	In real time
FC-15	0xFC0F	Multi-reference 15	-100.0% to +100.0%	0	%	In real time
FC-16	0xFC10	Simple PLC running mode	0: Stop after running for one cycle 1: Keep final values after running for one cycle 2: Repeat after running for one cycle	0	-	In real time
FC-17	0xFC11	Simple PLC memory retention	Ones (position): Retentive upon power failure 0: No 1: Yes Tens (position): Retentive upon stop 0: No 1: Yes	0	-	In real time
FC-18	0xFC12	Running time of PLC reference 0	0.0s (h) to 6553.5s (h)	0	s (h)	In real time
FC-19	0xFC13	Acceleration/ Deceleration time of PLC reference 0	0: Group 1 acceleration/ deceleration time (F0-17 and F0-18) 1: Group 2 acceleration/ deceleration time (F8-03 and F8-04) 2: Group 3 acceleration/ deceleration time (F8-05 and F8-06) 3: Group 4 acceleration/ deceleration time (F8-07 and F8-08)	0	-	In real time
FC-20	0xFC14	Running time of PLC reference 1	0.0s (h) to 6553.5s (h)	0	s (h)	In real time
FC-21	0xFC15	Acceleration/ Deceleration time of PLC reference 1	0: Group 1 acceleration/ deceleration time (F0-17 and F0-18) 1: Group 2 acceleration/ deceleration time (F8-03 and F8-04) 2: Group 3 acceleration/ deceleration time (F8-05 and F8-06) 3: Group 4 acceleration/ deceleration time (F8-07 and F8-08)	0	-	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
FC-22	0xFC16	Running time of PLC reference 2	0.0s (h) to 6553.5s (h)	0	s (h)	In real time
FC-23	0xFC17	Acceleration/ Deceleration time of PLC reference 2	0: Group 1 acceleration/ deceleration time (F0-17 and F0-18) 1: Group 2 acceleration/ deceleration time (F8-03 and F8-04) 2: Group 3 acceleration/ deceleration time (F8-05 and F8-06) 3: Group 4 acceleration/ deceleration time (F8-07 and F8-08)	0	-	In real time
FC-24	0xFC18	Running time of PLC reference 3	0.0s (h) to 6553.5s (h)	0	s (h)	In real time
FC-25	0xFC19	Acceleration/ Deceleration time of PLC reference 3	0: Group 1 acceleration/ deceleration time (F0-17 and F0-18) 1: Group 2 acceleration/ deceleration time (F8-03 and F8-04) 2: Group 3 acceleration/ deceleration time (F8-05 and F8-06) 3: Group 4 acceleration/ deceleration time (F8-07 and F8-08)	0	-	In real time
FC-26	0xFC1A	Running time of PLC reference 4	0.0s (h) to 6553.5s (h)	0	s (h)	In real time
FC-27	0xFC1B	Acceleration/ Deceleration time of PLC reference 4	0: Group 1 acceleration/ deceleration time (F0-17 and F0-18) 1: Group 2 acceleration/ deceleration time (F8-03 and F8-04) 2: Group 3 acceleration/ deceleration time (F8-05 and F8-06) 3: Group 4 acceleration/ deceleration time (F8-07 and F8-08)	0	-	In real time
FC-28	0xFC1C	Running time of PLC reference 5	0.0s (h) to 6553.5s (h)	0	s (h)	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
FC-29	0xFC1D	Acceleration/ Deceleration time of PLC reference 5	0: Group 1 acceleration/ deceleration time (F0-17 and F0-18) 1: Group 2 acceleration/ deceleration time (F8-03 and F8-04) 2: Group 3 acceleration/ deceleration time (F8-05 and F8-06) 3: Group 4 acceleration/ deceleration time (F8-07 and F8-08)	0	-	In real time
FC-30	0xFC1E	Running time of PLC reference 6	0.0s (h) to 6553.5s (h)	0	s (h)	In real time
FC-31	0xFC1F	Acceleration/ Deceleration time of PLC reference 6	0: Group 1 acceleration/ deceleration time (F0-17 and F0-18) 1: Group 2 acceleration/ deceleration time (F8-03 and F8-04) 2: Group 3 acceleration/ deceleration time (F8-05 and F8-06) 3: Group 4 acceleration/ deceleration time (F8-07 and F8-08)	0	-	In real time
FC-32	0xFC20	Running time of PLC reference 7	0.0s (h) to 6553.5s (h)	0	s (h)	In real time
FC-33	0xFC21	Acceleration/ Deceleration time of PLC reference 7	0: Group 1 acceleration/ deceleration time (F0-17 and F0-18) 1: Group 2 acceleration/ deceleration time (F8-03 and F8-04) 2: Group 3 acceleration/ deceleration time (F8-05 and F8-06) 3: Group 4 acceleration/ deceleration time (F8-07 and F8-08)	0	-	In real time
FC-34	0xFC22	Running time of PLC reference 8	0.0s (h) to 6553.5s (h)	0	s (h)	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
FC-35	0xFC23	Acceleration/ Deceleration time of PLC reference 8	0: Group 1 acceleration/ deceleration time (F0-17 and F0-18) 1: Group 2 acceleration/ deceleration time (F8-03 and F8-04) 2: Group 3 acceleration/ deceleration time (F8-05 and F8-06) 3: Group 4 acceleration/ deceleration time (F8-07 and F8-08)	0	-	In real time
FC-36	0xFC24	Running time of PLC reference 9	0.0s (h) to 6553.5s (h)	0	s (h)	In real time
FC-37	0xFC25	Acceleration/ Deceleration time of PLC reference 9	0: Group 1 acceleration/ deceleration time (F0-17 and F0-18) 1: Group 2 acceleration/ deceleration time (F8-03 and F8-04) 2: Group 3 acceleration/ deceleration time (F8-05 and F8-06) 3: Group 4 acceleration/ deceleration time (F8-07 and F8-08)	0	-	In real time
FC-38	0xFC26	Running time of PLC reference 10	0.0s (h) to 6553.5s (h)	0	s (h)	In real time
FC-39	0xFC27	Acceleration/ Deceleration time of PLC reference 10	0: Group 1 acceleration/ deceleration time (F0-17 and F0-18) 1: Group 2 acceleration/ deceleration time (F8-03 and F8-04) 2: Group 3 acceleration/ deceleration time (F8-05 and F8-06) 3: Group 4 acceleration/ deceleration time (F8-07 and F8-08)	0	-	In real time
FC-40	0xFC28	Running time of PLC reference 11	0.0s (h) to 6553.5s (h)	0	s (h)	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
FC-41	0xFC29	Acceleration/ Deceleration time of PLC reference 11	0: Group 1 acceleration/ deceleration time (F0-17 and F0-18) 1: Group 2 acceleration/ deceleration time (F8-03 and F8-04) 2: Group 3 acceleration/ deceleration time (F8-05 and F8-06) 3: Group 4 acceleration/ deceleration time (F8-07 and F8-08)	0	-	In real time
FC-42	0xFC2A	Running time of PLC reference 12	0.0s (h) to 6553.5s (h)	0	s (h)	In real time
FC-43	0xFC2B	Acceleration/ Deceleration time of PLC reference 12	0: Group 1 acceleration/ deceleration time (F0-17 and F0-18) 1: Group 2 acceleration/ deceleration time (F8-03 and F8-04) 2: Group 3 acceleration/ deceleration time (F8-05 and F8-06) 3: Group 4 acceleration/ deceleration time (F8-07 and F8-08)	0	-	In real time
FC-44	0xFC2C	Running time of PLC reference 13	0.0s (h) to 6553.5s (h)	0	s (h)	In real time
FC-45	0xFC2D	Acceleration/ Deceleration time of PLC reference 13	0: Group 1 acceleration/ deceleration time (F0-17 and F0-18) 1: Group 2 acceleration/ deceleration time (F8-03 and F8-04) 2: Group 3 acceleration/ deceleration time (F8-05 and F8-06) 3: Group 4 acceleration/ deceleration time (F8-07 and F8-08)	0	-	In real time
FC-46	0xFC2E	Running time of PLC reference 14	0.0s (h) to 6553.5s (h)	0	s (h)	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
FC-47	0xFC2F	Acceleration/ Deceleration time of PLC reference 14	0: Group 1 acceleration/ deceleration time (F0-17 and F0-18) 1: Group 2 acceleration/ deceleration time (F8-03 and F8-04) 2: Group 3 acceleration/ deceleration time (F8-05 and F8-06) 3: Group 4 acceleration/ deceleration time (F8-07 and F8-08)	0	-	In real time
FC-48	0xFC30	Running time of PLC reference 15	0.0s (h) to 6553.5s (h)	0	s (h)	In real time
FC-49	0xFC31	Acceleration/ Deceleration time of PLC reference 15	0: Group 1 acceleration/ deceleration time (F0-17 and F0-18) 1: Group 2 acceleration/ deceleration time (F8-03 and F8-04) 2: Group 3 acceleration/ deceleration time (F8-05 and F8-06) 3: Group 4 acceleration/ deceleration time (F8-07 and F8-08)	0	-	In real time
FC-50	0xFC32	PLC running time unit	0: s (second) 1: h (hour)	0	-	In real time
FC-51	0xFC33	Multi-reference 0 source	0: Multi-reference 0 (FC-00) 1: AI1 2: AI2 3: AI3 4: Pulse reference (DI5) 5: PID 6: Preset frequency (value of F0-08 that can be changed by pressing UP/DOWN)	0	-	In real time
FD-00	0xFD00	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	-	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
FD-01	0xFD01	Modbus data format	0: No check (8-N-2) 1: Even parity check (8-E-1) 2: Odd parity check (8-O-1) 3: No check (8-N-1)	0	-	In real time
FD-02	0xFD02	Local address	1 to 247	1	-	In real time
FD-03	0xFD03	Response delay	0 ms to 20 ms	2	ms	In real time
FD-04	0xFD04	Modbus communication timeout time	0.0s to 60.0s	0	s	In real time
FD-06	0xFD06	Communication fault reset	0: Disabled 1: Enabled	1	-	At stop
FD-09	0xFD09	CANopen/CANlink communication state	Ones: CANopen 0: Stop 1: Initializing 2: Pre-running 8: Running Tens: CANlink 0: Stop 1: Initializing 2: Pre-running 8: Running Hundreds: Reserved	2	-	Non-modifiable
FD-10	0xFD0A	CANopen/CANlink switchover	1: CANopen 2: CANlink	1	-	At stop
FD-12	0xFD0C	CAN baud rate	0: 20 kbps 1: 50 kbps 2: 100 kbps 3: 125 kbps 4: 250 kbps 5: 500 kbps 6: 1 Mbps	5	-	At stop
FD-13	0xFD0D	CAN station number	1 to 127	1	-	At stop
FD-14	0xFD0E	Number of CAN frames received per unit time	0 to 65535	0	-	Non-modifiable
FD-15	0xFD0F	Maximum value of error counters received by node	0 to 65535	0	-	Non-modifiable
FD-16	0xFD10	Maximum value of error counters sent by node	0 to 65535	0	-	Non-modifiable
FD-17	0xFD11	Bus disconnection times per unit time	0 to 65535	0	-	Non-modifiable
FD-19	0xFD13	CAN communication failure coefficient	1 to 15	3	-	At stop

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
FD-37	0xFD25	DHCP function	0: Disabled 1: Enabled	0	-	At stop
FD-38	0xFD26	IP address highest byte	0 to 255	0	-	At stop
FD-39	0xFD27	IP address second highest byte	0 to 255	0	-	At stop
FD-40	0xFD28	IP address third highest byte	0 to 255	0	-	At stop
FD-41	0xFD29	IP address lowest byte	0 to 255	0	-	At stop
FD-42	0xFD2A	Subnet mask highest byte	0 to 255	0	-	At stop
FD-43	0xFD2B	Subnet mask second highest byte	0 to 255	0	-	At stop
FD-44	0xFD2C	Subnet mask third highest byte	0 to 255	0	-	At stop
FD-45	0xFD2D	Subnet mask lowest byte	0 to 255	0	-	At stop
FD-46	0xFD2E	Gateway highest byte	0 to 255	0	-	At stop
FD-47	0xFD2F	Gateway second highest byte	0 to 255	0	-	At stop
FD-48	0xFD30	Gateway third highest byte	0 to 255	0	-	At stop
FD-49	0xFD31	Gateway lowest byte	0 to 255	0	-	At stop
FD-58	0xFD3A	Internet IP expansion card error code	0 to 255	0	-	Non-modifiable
FD-61	0xFD3D	MAC address highest byte	0 to value of 0xFFFF	0	-	At stop
FD-62	0xFD3E	MAC address middle byte	0 to value of 0xFFFF	0	-	At stop
FD-63	0xFD3F	MAC address lowest byte	0 to value of 0xFFFF	0	-	At stop
FD-94	0xFD5E	Modbus software version	0 to 65535	0	-	Non-modifiable
FD-95	0xFD5F	CANlink software version	0 to 65535	0	-	Non-modifiable
FD-96	0xFD60	CANopen software version	0 to 65535	0	-	Non-modifiable
FE-00	0xFE00	User-defined parameter 0	0 to 65535	7017	-	In real time
FE-01	0xFE01	User-defined parameter 1	0 to 65535	7016	-	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
FE-02	0xFE02	User-defined parameter 2	0 to 65535	0	-	In real time
FE-03	0xFE03	User-defined parameter 3	0 to 65535	0	-	In real time
FE-04	0xFE04	User-defined parameter 4	0 to 65535	0	-	In real time
FE-05	0xFE05	User-defined parameter 5	0 to 65535	0	-	In real time
FE-06	0xFE06	User-defined parameter 6	0 to 65535	0	-	In real time
FE-07	0xFE07	User-defined parameter 7	0 to 65535	0	-	In real time
FE-08	0xFE08	User-defined parameter 8	0 to 65535	0	-	In real time
FE-09	0xFE09	User-defined parameter 9	0 to 65535	0	-	In real time
FE-10	0xFE0A	User-defined parameter 10	0 to 65535	0	-	In real time
FE-11	0xFE0B	User-defined parameter 11	0 to 65535	0	-	In real time
FE-12	0xFE0C	User-defined parameter 12	0 to 65535	0	-	In real time
FE-13	0xFE0D	User-defined parameter 13	0 to 65535	0	-	In real time
FE-14	0xFE0E	User-defined parameter 14	0 to 65535	0	-	In real time
FE-15	0xFE0F	User-defined parameter 15	0 to 65535	0	-	In real time
FE-16	0xFE10	User-defined parameter 16	0 to 65535	0	-	In real time
FE-17	0xFE11	User-defined parameter 17	0 to 65535	0	-	In real time
FE-18	0xFE12	User-defined parameter 18	0 to 65535	0	-	In real time
FE-19	0xFE13	User-defined parameter 19	0 to 65535	0	-	In real time
FE-20	0xFE14	User-defined parameter 20	0 to 65535	6768	-	In real time
FE-21	0xFE15	User-defined parameter 21	0 to 65535	6769	-	In real time
FE-22	0xFE16	User-defined parameter 22	0 to 65535	0	-	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
FE-23	0xFE17	User-defined parameter 23	0 to 65535	0	-	In real time
FE-24	0xFE18	User-defined parameter 24	0 to 65535	0	-	In real time
FE-25	0xFE19	User-defined parameter 25	0 to 65535	0	-	In real time
FE-26	0xFE1A	User-defined parameter 26	0 to 65535	0	-	In real time
FE-27	0xFE1B	User-defined parameter 27	0 to 65535	0	-	In real time
FE-28	0xFE1C	User-defined parameter 28	0 to 65535	0	-	In real time
FE-29	0xFE1D	User-defined parameter 29	0 to 65535	0	-	In real time
FE-30	0xFE1E	User-defined parameter 30	0 to 65535	0	-	In real time
FE-31	0xFE1F	User-defined parameter 31	0 to 65535	0	-	In real time
FP-00	0x1F00	User password	0 to 65535	0	-	In real time
FP-01	0x1F01	Parameter initialization	0: No action 1:Restore default settings (mode 1) 2: Clear records 4: Back up current user parameters 501: Restore user backup parameters 503:Restore default settings (mode 2)	1	-	At stop
FP-02	0x1F02	Parameter display	Ones (position): Group U display 0: Hide 1: Display Tens (position): Group A display 0: Hide 1: Display Hundreds (position): Group B display 0: Hide 1:Display Thousands (position): Reserved	111	-	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
FP-03	0x1F03	Individualized parameter display mode	Ones (position): User-defined parameter group display 0: Hide 1: Display Tens (position): User-modified parameter group display 0: Hide 1: Display	11	-	In real time
FP-04	0x1F04	Parameter modification	0: Modification allowed 1: Modification prohibited	0	-	In real time
A0-00	0xA000	Speed/Torque control mode	0: Speed control 1: Torque control	0	-	At stop
A0-01	0xA001	Torque reference source	0: Digital setting (A0-03) 1: AI1 2: AI2 3: AI3 4: Pulse reference (DI5) 5: Communication (1000H) 6: Min. (AI1, AI2) 7: Max. (AI1, AI2)	0	-	At stop
A0-03	0xA003	Torque digital setting	-200.0% to +200.0%	100	%	In real time
A0-04	0xA004	Torque filter time	0.000s to 5.000s	0	s	In real time
A0-05	0xA005	Speed limit digital setting	-120.0% to +120.0%	0	%	In real time
A0-06	0xA006	Frequency modulation coefficient in window mode	0.0 to 50.0	0	-	In real time
A0-07	0xA007	Torque acceleration time	0.00s to 650.00s	1	s	In real time
A0-08	0xA008	Torque deceleration time	0.00s to 650.00s	1	s	In real time
A0-09	0xA009	Speed limit reference source	0: A0-05 1: Frequency source	0	-	In real time
A0-10	0xA00A	Speed limit offset/ Windows frequency	0.00 Hz to F0-10	5	Hz	In real time
A0-11	0xA00B	Effective mode of speed limit offset	0: Bidirectional offset valid 1: Unidirectional offset valid 2: Windows mode	1	-	At stop
A0-12	0xA00C	Acceleration time (frequency)	0.0s to 6500.0s	1	s	In real time
A0-13	0xA00D	Frequency deceleration time	0.0s to 6500.0s	1	s	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
A0-14	0xA00E	Torque mode switchover	0: Not switched 1: Switched to speed mode upon stop 2: Target torque changed to 0 upon stop	1	-	At stop
A1-00	0xA100	VDI1 function	Same as F4-00	0	-	At stop
A1-01	0xA101	VDI2 function	Same as F4-00	0	-	At stop
A1-02	0xA102	VDI3 function	Same as F4-00	0	-	At stop
A1-03	0xA103	VDI4 function	Same as F4-00	0	-	At stop
A1-04	0xA104	VDI5 function	Same as F4-00	0	-	At stop
A1-05	0xA105	VDI terminal state setting mode	Ones: VDI1 0: Parameter setting (A1-06) 1: DO state 2: DI state Tens: VDI2 0: Parameter setting (A1-06) 1: DO state 2: DI state	0	-	At stop
Continued	Continued	Continued	Hundreds: VDI3 0: Parameter setting (A1-06) 1: DO state 2: DI state Thousands: VDI4 0: Parameter setting (A1-06) 1: DO state 2: DI state Ten thousands: VDI5 0: Parameter setting (A1-06) 1: DO state 2: DI state	Continued	Continued	Continued

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
A1-06	0xA106	VDI terminal state setting	Ones: VDI1 0: Inactive 1: Active Tens: VDI2 0: Inactive 1: Active Hundreds: VDI3 0: Inactive 1: Active Thousands: VDI4 0: Inactive 1: Active Ten thousands: VDI5 0: Inactive 1: Active	0	-	In real time
A1-07	0xA107	AI1 function (used as DI)	Same as F4-00	0	-	At stop
A1-08	0xA108	AI2 function (used as DI)	Same as F4-00	0	-	At stop
A1-09	0xA109	AI3 function (used as DI)	Same as F4-00	0	-	At stop
A1-10	0xA10A	AI active mode (used as DI)	Ones: AI1 0: Active high 1: Active low Tens: AI2 0: Active high 1: Active low Hundreds: AI3 0: Active high 1: Active low	0	-	At stop
A5-00	0xA500	DPWM switchover frequency upper limit	0.00 Hz to F0-10	12	Hz	In real time
A5-01	0xA501	PWM modulation mode	0: Asynchronous modulation 1: Synchronous modulation 2: Synchronous modulation mode 2 3: Synchronous modulation mode 3	0	-	In real time
A5-02	0xA502	Dead-zone compensation	0: Disabled 1: Enabled	2	-	At stop
A5-03	0xA503	Random PWM depth	0 to 10	0	-	In real time
A5-04	0xA504	Fast current limit	0: Disabled 1: Enabled	0	-	In real time
A5-05	0xA505	Sampling delay	1 to 13	5	-	In real time
A5-06	0xA506	Undervoltage threshold	150.0 V to 700.0 V	350	V	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
A5-07	0xA507	SVC optimization mode	0: No optimization 1: Optimization mode 1 2: Optimization mode 2	1	-	At stop
A5-13	0xA50D	Bus voltage in function part	100 to 20000	5310	-	Non-modifiable
A5-14	0xA50E	Temperature correction	0 to 1	0	-	At stop
A5-16	0xA510	Display parameter address 1	0 to 100	0	-	Non-modifiable
A5-17	0xA511	Display parameter address 2	0 to 100	1	-	Non-modifiable
A5-18	0xA512	Display parameter address 3	0 to 100	2	-	Non-modifiable
A5-19	0xA513	Display parameter address 4	0 to 100	3	-	Non-modifiable
A5-21	0xA515	Low speed carrier frequency	0.0 to 16.0	0	-	In real time
A5-22	0xA516	Dead-zone compensation auto-tuning	0: Disabled 1: Enabled	0	-	At stop
A6-00	0xA600	Curve 4 minimum input	–10.00 V to value of A6-02	0	V	In real time
A6-01	0xA601	Percentage corresponding to curve 4 minimum input	-100.0% to +100.0%	0	%	In real time
A6-02	0xA602	Curve 4 inflection point 1 input	A6-00 to A6-04	3	V	In real time
A6-03	0xA603	Percentage corresponding to curve 4 inflection point 1 input	-100.0% to +100.0%	30	%	In real time
A6-04	0xA604	Curve 4 inflection point 2 input	A6-02 to A6-06	6	V	In real time
A6-05	0xA605	Percentage corresponding to curve 4 inflection point 2 input	-100.0% to +100.0%	60	%	In real time
A6-06	0xA606	Curve 4 maximum input	A6-04 to 10.00 V	10	V	In real time
A6-07	0xA607	Percentage corresponding to curve 4 maximum input	-100.0% to +100.0%	100	%	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
A6-08	0xA608	Curve 5 minimum input	-10.00 V to A6-10	-10	V	In real time
A6-09	0xA609	Percentage corresponding to curve 5 minimum input	-100.0% to +100.0%	-100	%	In real time
A6-10	0xA60A	Curve 5 inflection point 1 input	A6-08 to A6-12	-3	V	In real time
A6-11	0xA60B	Percentage corresponding to curve 5 inflection point 1 input	-100.0% to +100.0%	-30	%	In real time
A6-12	0xA60C	Curve 5 inflection point 2 input	A6-10 to A6-14	3	V	In real time
A6-13	0xA60D	Percentage corresponding to curve 5 inflection point 2 input	-100.0% to +100.0%	30	%	In real time
A6-14	0xA60E	Curve 5 maximum input	A6-12 to 10.00 V	10	V	In real time
A6-15	0xA60F	Percentage corresponding to curve 5 maximum input	-100.0% to +100.0%	100	%	In real time
A6-16	0xA610	AI1 gain	–10.00 to +10.00	1	-	In real time
A6-17	0xA611	AI1 offset	-100.0% to +100.0%	0	%	In real time
A6-18	0xA612	AI2 gain	–10.00 to +10.00	1	-	In real time
A6-19	0xA613	AI2 offset	-100.0% to +100.0%	0	%	In real time
A6-20	0xA614	AI3 gain	–10.00 to +10.00	1	-	In real time
A6-21	0xA615	AI3 offset	-100.0% to +100.0%	0	%	In real time
A6-22	0xA616	AI disconnection detection threshold	0.0% to 100.0%	0	%	In real time
A6-23	0xA617	AI disconnection detection time	0.0s to 6553.5s	0	s	In real time
A6-24	0xA618	Jump point of AI1 setting	-100.0% to +100.0%	0	%	In real time
A6-25	0xA619	Jump amplitude of AI1 setting	0.0% to 100.0%	0.1	%	In real time
A6-26	0xA61A	Jump point of AI2 setting	-100.0% to +100.0%	0	%	In real time
A6-27	0xA61B	Jump amplitude of AI2 setting	0.0% to 100.0%	0.1	%	In real time
A6-28	0xA61C	Jump point of AI3 setting	-100.0% to +100.0%	0	%	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
A6-29	0xA61D	Jump amplitude of AI3 setting	0.0% to 100.0%	0.1	%	In real time
A6-30	0xA61E	AI disconnection detection	Ones: AI1 disconnection detection 0: Disable 1: Enable Tens: AI2 disconnection detection 0: Disable 1: Enable Hundreds: AI3 disconnection detection 0: Disable 1: Enable	0	-	In real time
A9-00	0xA900	Online auto-tuning on rotor time constant of asynchronous motors	0: Disabled 1: Enabled	0	-	In real time
A9-01	0xA901	Auto-tuning on rotor resistance gain of asynchronous motors in FVC mode	0 to 100	5	-	In real time
A9-02	0xA902	Auto-tuning on rotor resistance start frequency for asynchronous motors in FVC mode	2 Hz to 100 Hz	7	Hz	In real time
A9-03	0xA903	Observation magnetic field coefficient for asynchronous motors in FVC mode	30 to 150	40	-	In real time
A9-04	0xA904	Maximum torque limit coefficient for the field-weakening range of asynchronous motors	30 to 150	80	-	In real time
A9-05	0xA905	Speed filter time of asynchronous motors in SVC mode	5 ms to 32 ms	15	ms	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
A9-06	0xA906	Speed feedback processing of asynchronous motors in SVC mode	0: No specific processing 1: Limit minimum synchronization frequency based on load change 2: Output fixed current during low-speed running 3: Output fixed current during low-speed running 4: Perform fine torque optimization	0	-	In real time
A9-07	0xA907	Magnetic field adjustment bandwidth of asynchronous motors in SVC mode	0.0 to 8.0	2	-	In real time
A9-08	0xA908	Low-speed running current of asynchronous motors in SVC mode	30 to 170	100	-	In real time
A9-09	0xA909	Switchover frequency of fixed current output for asynchronous motors in SVC mode	0.1 Hz to 1.0 Hz	0.3	Hz	At stop
A9-10	0xA90A	Speed fluctuation suppression coefficient of asynchronous motors in SVC mode	80 to 100	95	-	At stop
A9-11	0xA90B	Acceleration/ Deceleration time of asynchronous motors in SVC mode	10s to 3000s	200	s	At stop
A9-12	0xA90C	Quick auto-tuning of stator resistance before asynchronous motor startup	0: Disabled 1: Enabled	0	-	At stop
A9-13	0xA90D	Quick auto-tuning of stator resistance coefficient 1 for asynchronous motors	0 to 65535	10	-	At stop
A9-14	0xA90E	Quick auto-tuning of stator resistance coefficient 2 for asynchronous motors	0 to 65535	10	-	At stop

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
A9-17	0xA911	Synchronous motor real-time angle	0.0 to 359.9	0	-	Non-modifiable
A9-18	0xA912	Initial position angle detection of synchronous motors	0: Detected upon running 1: Not detected 2: Detected upon initial running after power-on	0	-	In real time
A9-20	0xA914	Flux weakening mode	0: Automatic mode 1: Synchronous motor adjustment mode 2: Synchronous motor hybrid mode 3: Disabled	1	-	At stop
A9-21	0xA915	Flux weakening gain of synchronous motors	0 to 50	5	-	In real time
A9-22	0xA916	Output voltage upper limit margin of synchronous motors	0% to 50%	5	%	In real time
A9-23	0xA917	Maximum output adjustment gain of synchronous motors	20% to 300%	100	%	In real time
A9-24	0xA918	Exciting current adjustment gain calculated by synchronous motors	40% to 200%	100	%	In real time
A9-25	0xA919	Estimated speed integral gain of synchronous motors in SVC mode	5% to 1000%	30	%	In real time
A9-26	0xA91A	Estimated speed proportional gain of synchronous motors in SVC mode	5% to 300%	20	%	In real time
A9-27	0xA91B	Estimated speed filter of synchronous motors in SVC mode	10 to 2000	100	-	In real time
A9-28	0xA91C	Minimum carrier frequency of synchronous motors in SVC mode	0.8 to F0-15	2	-	In real time
A9-29	0xA91D	Low-speed excitation current of synchronous motors in SVC mode	0% to 80%	30	%	In real time
A9-30	0xA91E	Low-speed closed-loop current (for VVC)	0% to 65535%	0	%	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
A9-31	0xA91F	Oscillation suppression damping coefficient (for VVC)	0% to 65535%	0	%	In real time
A9-32	0xA920	Reserved parameter 8 for synchronous motor control	0 to 65535	0	-	In real time
A9-33	0xA921	Reserved parameter 9 for synchronous motor control	0 to 5	0	-	At stop
A9-34	0xA922	Reserved parameter 10 for synchronous motor control	0% to 65535%	0	%	In real time
A9-35	0xA923	Performance fault subcode upon 1st fault	0 to 65535	0	-	Non-modifiable
A9-36	0xA924	Performance fault subcode upon 2nd fault	0 to 65535	0	-	Non-modifiable
A9-37	0xA925	Performance fault subcode upon 3rd fault	0 to 65535	0	-	Non-modifiable
A9-40	0xA928	Low-speed closed-loop current selection (for VVC)	0: Disabled 1: Enabled	0	-	At stop
A9-41	0xA929	Low-speed closed-loop current (for VVC)	30% to 200%	50	%	At stop
A9-42	0xA92A	Oscillation suppression damping coefficient (for VVC)	0% to 500%	100	%	In real time
A9-43	0xA92B	Initial position compensation angle (for VVC)	0 to 5	0	-	At stop
A9-44	0xA92C	Initial position compensation angle of synchronous motors	0.0 to 360.0	0	-	In real time
A9-45	0xA92D	Synchronous motor low-speed handling	0: Disabled 1: Enabled	0	-	At stop
A9-46	0xA92E	Switchover frequency for synchronous motor low-speed handling	0.01 to F0-10	5	-	At stop
A9-47	0xA92F	Low-speed handling current of synchronous motors	10 to 200	100	-	At stop

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
A9-48	0xA930	Feedback suppression coefficient of low-speed handling for synchronous motors	0 to 300	32	-	At stop
A9-49	0xA931	Energy-saving control for synchronous motors	0: Disabled 1: Enabled	0	-	At stop
A9-50	0xA932	Limit margin for the maximum flux weakening current	200 to 1000	1000	-	At stop
A9-51	0xA933	Advanced settings for auto-tuning of asynchronous motor parameters	Ones: Rotor resistance and leakage inductance DC offset 0: Standard offset 1: Large offset Tens: New rotor resistance and leakage inductance auto-tuning algorithm 0: Disabled 1: Enabled Hundreds: New mutual inductance static auto-tuning algorithm 0: Disabled 1: Enabled Thousands: Stator resistance auto-tuning algorithm 0: Current open loop 1: Current closed loop	111	-	At stop
A9-52	0xA934	U0-06 feedback torque selection	0: Motoring torque being positive and generating torque being negative 1: Torque direction being positive in the case of positive speed direction; torque direction being negative in the case of negative speed direction	1	-	In real time
A9-54	0xA936	Transistor voltage drop	0 to 10000	700	-	At stop
A9-55	0xA937	Dead-zone time 0	0 to 10000	352	-	At stop
A9-56	0xA938	Dead-zone time 1	0 to 10000	1052	-	At stop
A9-57	0xA939	Dead-zone time 2	0 to 10000	1270	-	At stop
A9-58	0xA93A	Dead-zone time 3	0 to 10000	1358	-	At stop
A9-59	0xA93B	Dead-zone time 4	0 to 10000	1404	-	At stop
A9-60	0xA93C	Dead-zone time 5	0 to 10000	1449	-	At stop

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
A9-61	0xA93D	Dead-zone time 6	0 to 10000	1661	-	At stop
A9-62	0xA93E	Dead-zone time 7	0 to 10000	1689	-	At stop
A9-63	0xA93F	Dead-zone compensation current 0	0 to 10000	94	-	At stop
A9-64	0xA940	Dead-zone compensation current 1	0 to 10000	376	-	At stop
A9-65	0xA941	Dead-zone compensation current 2	0 to 10000	658	-	At stop
A9-66	0xA942	Dead-zone compensation current 3	0 to 10000	940	-	At stop
A9-67	0xA943	Dead-zone compensation current 4	0 to 10000	1222	-	At stop
A9-68	0xA944	Dead-zone compensation current 5	0 to 10000	1504	-	At stop
A9-69	0xA945	Dead-zone compensation current 6	0 to 10000	3478	-	At stop
A9-70	0xA946	Dead-zone compensation current 7	0 to 10000	5452	-	At stop
A9-71	0xA944	Flexible oscillation suppression	0: Disabled 1: Target frequency 2: Reference frequency	0	-	At stop
A9-72	0xA945	Filter time of flexible oscillation suppression	20 ms to 1000 ms	300	ms	In real time
A9-73	0xA946	Flexible oscillation suppression gain	10 to 1000	100	-	In real time
AC-00	0xAC00	AI1 measured voltage 1	-10.000 V to +10.000 V	2	V	In real time
AC-01	0xAC01	AI1 displayed voltage 1	-10.000 V to +10.000 V	2	V	In real time
AC-02	0xAC02	AI1 measured voltage 2	-10.000 V to +10.000 V	8	V	In real time
AC-03	0xAC03	AI1 displayed voltage 2	-10.000 V to +10.000 V	8	V	In real time
AC-04	0xAC04	AI2 measured voltage 1	-10.000 V to +10.000 V	2	V	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
AC-05	0xAC05	AI2 displayed voltage 1	-10.000 V to +10.000 V	2	V	In real time
AC-06	0xAC06	AI2 measured voltage 2	-10.000 V to +10.000 V	8	V	In real time
AC-07	0xAC07	AI2 displayed voltage 2	-10.000 V to +10.000 V	8	V	In real time
AC-08	0xAC08	AI3 measured voltage 1	-10.000 V to +10.000 V	2	V	In real time
AC-09	0xAC09	AI3 displayed voltage 1	-10.000 V to +10.000 V	2	V	In real time
AC-10	0xAC0A	AI3 measured voltage 2	-10.000 V to +10.000 V	8	V	In real time
AC-11	0xAC0B	AI3 displayed voltage 2	-10.000 V to +10.000 V	8	V	In real time
AC-12	0xAC0C	AO1 measured voltage 1	-10.000 V to +10.000 V	2	V	In real time
AC-13	0xAC0D	AO1 target voltage 1	-10.000 V to +10.000 V	2	V	In real time
AC-14	0xAC0E	AO1 measured voltage 2	-10.000 V to +10.000 V	8	V	In real time
AC-15	0xAC0F	AO1 target voltage 2	-10.000 V to +10.000 V	8	V	In real time
AC-16	0xAC10	AO2 measured voltage 1	-10.000 V to +10.000 V	2	V	In real time
AC-17	0xAC11	AO2 target voltage 1	-10.000 V to +10.000 V	2	V	In real time
AC-18	0xAC12	AO2 measured voltage 2	-10.000 V to +10.000 V	8	V	In real time
AC-19	0xAC13	AO2 target voltage 2	-10.000 V to +10.000 V	8	V	In real time
AC-20	0xAC14	PT100 measured voltage 1	0.000 V to 3.3 V	0.44	V	In real time
AC-21	0xAC15	PT100 displayed voltage 1	0.000 V to 3.3 V	0.44	V	In real time
AC-22	0xAC16	PT100 measured voltage 2	0.000 V to 3.3 V	2.16	V	In real time
AC-23	0xAC17	PT100 displayed voltage 2	0.000 V to 3.3 V	2.16	V	In real time
AC-24	0xAC18	PT1000 measured voltage 1	0.000 V to 3.3 V	1.136	V	In real time
AC-25	0xAC19	PT1000 displayed voltage 1	0.000 V to 3.3 V	1.136	V	In real time
AC-26	0xAC1A	PT1000 measured voltage 2	0.000 V to 3.3 V	2.122	V	In real time
AC-27	0xAC1B	PT1000 displayed voltage 2	0.000 V to 3.3 V	2.122	V	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
AC-28	0xAC1C	AO1 measured current 1	0.000 mA to 20.000 mA	4	mA	In real time
AC-29	0xAC1D	AO1 target current 1	0.000 mA to 20.000 mA	4	mA	In real time
AC-30	0xAC1E	AO1 measured current 2	0.000 mA to 20.000 mA	16	mA	In real time
AC-31	0xAC1F	AO1 target current 2	0.000 mA to 20.000 mA	16	mA	In real time
AF-00	0xAF00	RPDO1-SubIndex0-H	0 to value of 0xFFFF	0	-	In real time
AF-01	0xAF01	RPDO1-SubIndex0-L	0 to value of 0xFFFF	0	-	In real time
AF-02	0xAF02	RPDO1-SubIndex1-H	0 to value of 0xFFFF	0	-	In real time
AF-03	0xAF03	RPDO1-SubIndex1-L	0 to value of 0xFFFF	0	-	In real time
AF-04	0xAF04	RPDO1-SubIndex2-H	0 to value of 0xFFFF	0	-	In real time
AF-05	0xAF05	RPDO1-SubIndex2-L	0 to value of 0xFFFF	0	-	In real time
AF-06	0xAF06	RPDO1-SubIndex3-H	0 to value of 0xFFFF	0	-	In real time
AF-07	0xAF07	RPDO1-SubIndex3-L	0 to value of 0xFFFF	0	-	In real time
AF-08	0xAF08	RPDO2-SubIndex0-H	0 to value of 0xFFFF	0	-	In real time
AF-09	0xAF09	RPDO2-SubIndex0-L	0 to value of 0xFFFF	0	-	In real time
AF-10	0xAF0A	RPDO2-SubIndex1-H	0 to value of 0xFFFF	0	-	In real time
AF-11	0xAF0B	RPDO2-SubIndex1-L	0 to value of 0xFFFF	0	-	In real time
AF-12	0xAF0C	RPDO2-SubIndex2-H	0 to value of 0xFFFF	0	-	In real time
AF-13	0xAF0D	RPDO2-SubIndex2-L	0 to value of 0xFFFF	0	-	In real time
AF-14	0xAF0E	RPDO2-SubIndex3-H	0 to value of 0xFFFF	0	-	In real time
AF-15	0xAF0F	RPDO2-SubIndex3-L	0 to value of 0xFFFF	0	-	In real time
AF-16	0xAF10	RPDO3-SubIndex0-H	0 to value of 0xFFFF	0	-	In real time
AF-17	0xAF11	RPDO3-SubIndex0-L	0 to value of 0xFFFF	0	-	In real time
AF-18	0xAF12	RPDO3-SubIndex1-H	0 to value of 0xFFFF	0	-	In real time
AF-19	0xAF13	RPDO3-SubIndex1-L	0 to value of 0xFFFF	0	-	In real time
AF-20	0xAF14	RPDO3-SubIndex2-H	0 to value of 0xFFFF	0	-	In real time
AF-21	0xAF15	RPDO3-SubIndex2-L	0 to value of 0xFFFF	0	-	In real time
AF-22	0xAF16	RPDO3-SubIndex3-H	0 to value of 0xFFFF	0	-	In real time
AF-23	0xAF17	RPDO3-SubIndex3-L	0 to value of 0xFFFF	0	-	In real time
AF-24	0xAF18	RPDO4-SubIndex0-H	0 to value of 0xFFFF	0	-	In real time
AF-25	0xAF19	RPDO4-SubIndex0-L	0 to value of 0xFFFF	0	-	In real time
AF-26	0xAF1A	RPDO4-SubIndex1-H	0 to value of 0xFFFF	0	-	In real time
AF-27	0xAF1B	RPDO4-SubIndex1-L	0 to value of 0xFFFF	0	-	In real time
AF-28	0xAF1C	RPDO4-SubIndex2-H	0 to value of 0xFFFF	0	-	In real time
AF-29	0xAF1D	RPDO4-SubIndex2-L	0 to value of 0xFFFF	0	-	In real time
AF-30	0xAF1E	RPDO4-SubIndex3-H	0 to value of 0xFFFF	0	-	In real time
AF-31	0xAF1F	RPDO4-SubIndex3-L	0 to value of 0xFFFF	0	-	In real time
AF-32	0xAF20	TPDO1-SubIndexO-H	0 to value of 0xFFFF	0	-	In real time
AF-33	0xAF21	TPDO1-SubIndexO-L	0 to value of 0xFFFF	0	-	In real time
AF-34	0xAF22	TPDO1-SubIndex1-H	0 to value of 0xFFFF	0	-	In real time
AF-35	0xAF23	TPDO1-SubIndex1-L	0 to value of 0xFFFF	0	-	In real time
AF-36	0xAF24	TPDO1-SubIndex2-H	0 to value of 0xFFFF	0	-	In real time
AF-37	0xAF25	TPDO1-SubIndex2-L	0 to value of 0xFFFF	0	-	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
AF-38	0xAF26	TPDO1-SubIndex3-H	0 to value of 0xFFFF	0	-	In real time
AF-39	0xAF27	TPDO1-SubIndex3-L	0 to value of 0xFFFF	0	-	In real time
AF-40	0xAF28	TPDO2-SubIndex0-H	0 to value of 0xFFFF	0	-	In real time
AF-41	0xAF29	TPDO2-SubIndex0-L	0 to value of 0xFFFF	0	-	In real time
AF-42	0xAF2A	TPDO2-SubIndex1-H	0 to value of 0xFFFF	0	-	In real time
AF-43	0xAF2B	TPDO2-SubIndex1-L	0 to value of 0xFFFF	0	-	In real time
AF-44	0xAF2C	TPDO2-SubIndex2-H	0 to value of 0xFFFF	0	-	In real time
AF-45	0xAF2D	TPDO2-SubIndex2-L	0 to value of 0xFFFF	0	-	In real time
AF-46	0xAF2E	TPDO2-SubIndex3-H	0 to value of 0xFFFF	0	-	In real time
AF-47	0xAF2F	TPDO2-SubIndex3-L	0 to value of 0xFFFF	0	-	In real time
AF-48	0xAF30	TPDO3-SubIndex0-H	0 to value of 0xFFFF	0	-	In real time
AF-49	0xAF31	TPDO3-SubIndex0-L	0 to value of 0xFFFF	0	-	In real time
AF-50	0xAF32	TPDO3-SubIndex1-H	0 to value of 0xFFFF	0	-	In real time
AF-51	0xAF33	TPDO3-SubIndex1-L	0 to value of 0xFFFF	0	-	In real time
AF-52	0xAF34	TPDO3-SubIndex2-H	0 to value of 0xFFFF	0	-	In real time
AF-53	0xAF35	TPDO3-SubIndex2-L	0 to value of 0xFFFF	0	-	In real time
AF-54	0xAF36	TPDO3-SubIndex3-H	0 to value of 0xFFFF	0	-	In real time
AF-55	0xAF37	TPDO3-SubIndex3-L	0 to value of 0xFFFF	0	-	In real time
AF-56	0xAF38	TPDO4-SubIndex0-H	0 to value of 0xFFFF	0	-	In real time
AF-57	0xAF39	TPDO4-SubIndex0-L	0 to value of 0xFFFF	0	-	In real time
AF-58	0xAF3A	TPDO4-SubIndex1-H	0 to value of 0xFFFF	0	-	In real time
AF-59	0xAF3B	TPDO4-SubIndex1-L	0 to value of 0xFFFF	0	-	In real time
AF-60	0xAF3C	TPDO4-SubIndex2-H	0 to value of 0xFFFF	0	-	In real time
AF-61	0xAF3D	TPDO4-SubIndex2-L	0 to value of 0xFFFF	0	-	In real time
AF-62	0xAF3E	TPDO4-SubIndex3-H	0 to value of 0xFFFF	0	-	In real time
AF-63	0xAF3F	TPDO4-SubIndex3-L	0 to value of 0xFFFF	0	-	In real time
AF-66	0xAF42	Number of valid RPDOs	0 to value of 0xFFFF	0	-	Non-modifiable
AF-67	0xAF43	Number of valid TPDOs	0 to value of 0xFFFF	0	-	Non-modifiable
B0-00	0xB000	Tension control mode	0: Disabled 1: Open loop torque control 2: Closed loop speed control 3: Closed loop torque control 4: Constant linear speed control	0	-	At stop
B0-01	0xB001	Winding mode	0: Winding 1: Unwinding	0	-	In real time
B0-02	0xB002	Unwinding reverse tightening selection	0.0 m/min to 500.0 m/min	0	m/min	In real time
B0-03	0xB003	Mechanical transmission ratio	0.01 to 300.00	1	-	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
B0-04	0xB004	Linear speed input source	0: No input 1: AI1 2: AI2 3: AI3 4: Pulse input (DI5) 5: Communication (1000H) 6: Communication (731AH)	0	-	At stop
B0-05	0xB005	Maximum linear speed	0.0 m/min to 6500.0 m/min	1000	m/min	In real time
B0-06	0xB006	Minimum linear speed for roll diameter calculation	0.0 m/min to 6500.0 m/min	20	m/min	In real time
B0-07	0xB007	Roll diameter calculation method	0: Calculated based on linear speed 1:Calculated based on accumulative thickness 2: AI1 3: AI2 4: AI3 5: Pulse input (DI5) 6: Communication 7: Specified by B0-14	0	-	At stop
B0-08	0xB008	Maximum roll diameter	0.1 mm to 6000.0 mm	500	mm	In real time
B0-09	0xB009	Empty roll diameter	0.1 mm to 6000.0 mm	100	mm	In real time
B0-10	0xB00A	Initial roll diameter source	0: Specified by B0-11 to B0-13 1: AI1 2: AI2 3: AI3 4: Communication (1000H)	0	-	At stop
B0-11	0xB00B	Initial roll diameter 1	0.1 mm to 6000.0 mm	100	mm	In real time
B0-12	0xB00C	Initial roll diameter 2	0.1 mm to 6000.0 mm	100	mm	In real time
B0-13	0xB00D	Initial roll diameter 3	0.1 mm to 6000.0 mm	100	mm	In real time
B0-14	0xB00E	Current roll diameter	0.1 mm to 6000.0 mm	100	mm	In real time
B0-15	0xB00F	Roll diameter filter time	0.00s to 10.00s	5	s	In real time
B0-16	0xB010	Roll diameter change rate	0.0 to 1000.0	0	-	In real time
B0-17	0xB011	Roll diameter change direction limit	0: Disabled 1: Decrease disabled during winding, and increase disabled during unwinding	0	-	In real time
B0-18	0xB012	Roll diameter reset during running	0 to 1	0	-	In real time
B0-19	0xB013	Pre-drive speed gain	-100.0% to +200.0%	0	%	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
B0-20	0xB014	Pre-drive torque limit source	0: Based on the value of F2-09 1: Based on tension control torque	1	-	At stop
B0-21	0xB015	Pre-drive torque correction	-100.0% to +100.0%	0	%	In real time
B0-23	0xB017	Pre-drive acceleration time	0.0s to 6000.0s	20	s	In real time
B0-24	0xB018	Pre-drive deceleration time	0.0s to 6000.0s	20	s	In real time
B0-25	0xB019	Pre-drive roll diameter calculation	0: Disabled 1: Enabled	0	-	In real time
B0-26	0xB01A	Tension frequency limit range	0.0% to 100.0%	50	%	In real time
B0-27	0xB01B	Tension frequency limit offset	0.00 Hz to 100.00 Hz	5	Hz	In real time
B0-28	0xB01C	Tension frequency limit	0: Disabled 1: Enabled	0	-	In real time
B0-29	0xB01D	Pulses per revolution	1 to 60000	1	-	In real time
B0-30	0xB01E	Revolutions per layer	1 to 10000	1	-	In real time
B0-31	0xB01F	Material thickness reference source	0: Digital setting 1: AI1 2: AI2 3: AI3	0	-	At stop
B0-32	0xB020	Material thickness 0	0.01 mm to 100.00 mm	0.01	mm	In real time
B0-33	0xB021	Material thickness 1	0.01 mm to 100.00 mm	0.01	mm	In real time
B0-34	0xB022	Material thickness 2	0.01 mm to 100.00 mm	0.01	mm	In real time
B0-35	0xB023	Material thickness 3	0.01 mm to 100.00 mm	0.01	mm	In real time
B0-36	0xB024	Maximum thickness	0.01 mm to 100.00 mm	1	mm	In real time
B0-37	0xB025	Roll diameter not reset upon stop	0: Disabled 1: Enabled	0	-	In real time
B0-38	0xB026	Closed-loop tension torque mode selection	0: Torque calculated through PID only 1: Torque calculated through main + PID	0	-	At stop
B0-40	0xB028	Minimum pre-drive torque limit	0.0% to 100.0%	0	%	In real time
B0-41	0xB029	Constant linear speed source selection	0: AI1 1: AI2 2: AI3 3: Pulse reference (DI5) 4: Communication (1000H) 5: Communication (731AH)	0	-	At stop

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
B1-00	0xB100	Tension reference source	0: Specified by B0-01 1: AI1 2: AI2 3: AI3 4: Pulse reference (DI5) 5: Communication (1000H)	0	-	At stop
B1-01	0xB101	Tension digital setting	0 N to 65000 N	50	N	In real time
B1-02	0xB102	Maximum tension	0 N to 65000 N	500	N	In real time
B1-03	0xB103	Zero-speed threshold	0.0% to 20.0%	0	%	In real time
B1-04	0xB104	Zero-speed tension rise	0.0% to 100.0%	0	%	In real time
B1-05	0xB105	Frequency acceleration time in torque control mode	0.0s to 6500.0s	0	s	In real time
B1-06	0xB106	Frequency deceleration time in torque control mode	0.0s to 6500.0s	0	s	In real time
B1-07	0xB107	Friction force compensation	0.0% to 50.0%	0	%	In real time
B1-08	0xB108	Mechanical inertia compensation coefficient	0 N m^2 to 65535 N m^2	0	N•m^2	In real time
B1-09	0xB109	Correction coefficient of acceleration inertia compensation	0.0% to 200.0%	100	%	In real time
B1-10	0xB10A	Correction coefficient of deceleration inertia compensation	0.0% to 200.0%	100	%	In real time
B1-11	0xB10B	Material density	0 kg/m^3 to 65535 kg/m^3	0	kg/m^3	In real time
B1-12	0xB10C	Material width	0 mm to 65535 mm	0	mm	In real time
B1-13	0xB10D	Inertia compensation exit delay	0 ms to 1000 ms	0	ms	In real time
B1-14	0xB10E	Transition frequency for zero speed compensation	0.00 Hz to 20.00 Hz	2	Hz	In real time
B1-15	0xB10F	Open-loop torque reverse	0: Disabled 1: Enabled	0	-	In real time
B1-16	0xB110	Tension closed-loop torque limit	0.0% to 200.0%	100	%	In real time
B1-17	0xB111	Friction force compensation correction coefficient	-50.0 to +50.0	0	-	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
B1-18	0xB112	Friction force compensation curve	0: Frequency 1: Linear speed 2: Multi-friction compensation curve 1 3: Multi-friction compensation curve 2	0	-	At stop
B1-19	0xB113	Multi-friction force compensation torque 1	0.0 to 50.0	0	-	In real time
B1-20	0xB114	Multi-friction force compensation torque 2	0.0 to 50.0	0	-	In real time
B1-21	0xB115	Multi-friction force compensation torque 3	0.0 to 50.0	0	-	In real time
B1-22	0xB116	Multi-friction force compensation torque 4	0.0 to 50.0	0	-	In real time
B1-23	0xB117	Multi-friction force compensation torque 5	0.0–50.0	0	-	In real time
B1-24	0xB118	Multi-friction force compensation torque 6	0.0–50.0	0	-	In real time
B1-25	0xB119	Multi-friction force compensation inflection point 1	0.00 Hz to F0-10	0	Hz	In real time
B1-26	0xB11A	Multi-friction force compensation inflection point 2	0.00 Hz to F0-10	0	Hz	In real time
B1-27	0xB11B	Multi-friction force compensation inflection point 3	0.00 Hz to F0-10	0	Hz	In real time
B1-28	0xB11C	Multi-friction force compensation inflection point 4	0.00 Hz to F0-10	0	Hz	In real time
B1-29	0xB11D	Multi-friction force compensation inflection point 5	0.00 Hz to F0-10	0	Hz	In real time
B1-30	0xB11E	Multi-friction force compensation inflection point 6	0.00 Hz to F0-10	0	Hz	In real time
B1-31	0xB11F	Tension establishment	0: Disabled 1: Enabled	0	-	At stop

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
B1-32	0xB120	Tension establishment dead zone	0.0% to 100.0%	2	%	In real time
B1-33	0xB121	Tension establishment frequency	0.00 Hz to F0-10	0.1	Hz	In real time
B1-34	0xB122	Terminal torque boost proportion	0.0% to 500.0%	50	%	In real time
B1-35	0xB123	Terminal torque boost cancellation time	0.0s to 50.0s	0	s	In real time
B1-37	0xB125	Initial roll diameter auto-tuning	0: Disabled 1: Enabled	0	-	At stop
B1-38	0xB126	Rod length	1 mm to 65535 mm	300	mm	At stop
B1-39	0xB127	Rod angle	0.1° to 360.0°	40	°	At stop
B2-00	0xB200	Taper curve	0: Curve taper 1: Multi-linear taper	0	-	At stop
B2-01	0xB201	Tension taper source selection	0: Specified by B2-02 1: AI1 2: AI2 3: AI3 4: Communication (1000H)	0	-	At stop
B2-02	0xB202	Digital setting of taper	0.0% to 100.0%	0	%	In real time
B2-03	0xB203	Correction coefficient of taper compensation	0 mm to 10000 mm	0	mm	In real time
B2-05	0xB205	Setting channel of external taper AO	0: Specified by B2-06 1: AI1 2: AI2 3: AI3 4: Communication (1000H)	0	-	At stop
B2-06	0xB206	External taper setting	0.0% to 100.0%	100	%	In real time
B2-08	0xB208	Minimum roll diameter taper	0.0% to 100.0%	100	%	In real time
B2-09	0xB209	Linear taper switchover point 1	B0-09 to B0-08	150	mm	In real time
B2-10	0xB20A	Taper of switchover point 1	0.0% to 100.0%	100	%	In real time
B2-11	0xB20B	Linear taper switchover point 2	B2-09 to B0-08	200	mm	In real time
B2-12	0xB20C	Taper of switchover point 2	0.0% to 100.0%	90	%	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
B2-13	0xB20D	Linear taper switchover point 3	B2-11 to B0-08	250	mm	In real time
B2-14	0xB20E	Taper of switchover point 3	0.0% to 100.0%	80	%	In real time
B2-15	0xB20F	Linear taper switchover point 4	B2-13 to B0-08	300	mm	In real time
B2-16	0xB210	Taper of switchover point 4	0.0% to 100.0%	70	%	In real time
B2-17	0xB211	Linear taper switchover point 5	B2-15 to B0-08	400	mm	In real time
B2-18	0xB212	Taper of switchover point 5	0.0% to 100.0%	50	%	In real time
B2-19	0xB213	Taper at maximum roll diameter	0.0 to 100.0	30	-	In real time
B6-00	0xB600	Source address 1	0 to 0xFFFF	0xE012	-	In real time
B6-01	0xB601	Mapping address 1	0 to 0xFFFF	0x500E	-	In real time
B6-02	0xB602	Write gain 1	0.00 to 100.00	10	-	In real time
B6-03	0xB603	Read gain 1	0.00 to 100.00	0.1	-	In real time
B6-04	0xB604	Source address 2	0 to 0xFFFF	0	-	In real time
B6-05	0xB605	Mapping address 2	0 to 0xFFFF	0	-	In real time
B6-06	0xB606	Write gain 2	0.00 to 100.00	0	-	In real time
B6-07	0xB607	Read gain 2	0.00 to 100.00	0	-	In real time
B6-08	0xB608	Source address 3	0 to 0xFFFF	0	-	In real time
B6-09	0xB609	Mapping address 3	0 to 0xFFFF	0	-	In real time
B6-10	0xB60A	Write gain 3	0.00 to 100.00	0	-	In real time
B6-11	0xB60B	Read gain 3	0.00 to 100.00	0	-	In real time
B6-12	0xB60C	Source address 4	0 to 0xFFFF	0	-	In real time
B6-13	0xB60D	Mapping address 4	0 to 0xFFFF	0	-	In real time
B6-14	0xB60E	Write gain 4	0.00 to 100.00	0	-	In real time
B6-15	0xB60F	Read gain 4	0.00 to 100.00	0	-	In real time
B6-16	0xB610	Source address 5	0 to 0xFFFF	0	-	In real time
B6-17	0xB611	Mapping address 5	0 to 0xFFFF	0	-	In real time
B6-18	0xB612	Write gain 5	0.00 to 100.00	0	-	In real time
B6-19	0xB613	Read gain 5	0.00 to 100.00	0	-	In real time
B6-20	0xB614	Source address 6	0 to 0xFFFF	0	-	In real time
B6-21	0xB615	Mapping address 6	0 to 0xFFFF	0	-	In real time
B6-22	0xB616	Write gain 6	0.00 to 100.00	0	-	In real time
B6-23	0xB617	Read gain 6	0.00 to 100.00	0	-	In real time
B6-24	0xB618	Source address 7	0 to 0xFFFF	0	-	In real time
B6-25	0xB619	Mapping address 7	0 to 0xFFFF	0	-	In real time
B6-26	0xB61A	Write gain 7	0.00 to 100.00	0	-	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
B6-27	0xB61B	Read gain 7	0.00 to 100.00	0	-	In real time
B6-28	0xB61C	Source address 8	0 to 0xFFFF	0	-	In real time
B6-29	0xB61D	Mapping address 8	0 to 0xFFFF	0	-	In real time
B6-30	0xB61E	Write gain 8	0.00 to 100.00	0	-	In real time
B6-31	0xB61F	Read gain 8	0.00 to 100.00	0	-	In real time
B6-32	0xB620	Source address 9	0 to 0xFFFF	0	-	In real time
B6-33	0xB621	Mapping address 9	0 to 0xFFFF	0	-	In real time
B6-34	0xB622	Write gain 9	0.00 to 100.00	0	-	In real time
B6-35	0xB623	Read gain 9	0.00 to 100.00	0	-	In real time
B6-36	0xB624	Source address 10	0 to 0xFFFF	0	-	In real time
B6-37	0xB625	Mapping address 10	0 to 0xFFFF	0	-	In real time
B6-38	0xB626	Write gain 10	0.00 to 100.00	0	-	In real time
B6-39	0xB627	Read gain 10	0.00 to 100.00	0	-	In real time
B6-40	0xB628	Source address 11	0 to 0xFFFF	0	-	In real time
B6-41	0xB629	Mapping address 11	0 to 0xFFFF	0	-	In real time
B6-42	0xB62A	Write gain 11	0.00 to 100.00	0	-	In real time
B6-43	0xB62B	Read gain 11	0.00 to 100.00	0	-	In real time
B6-44	0xB62C	Source address 12	0 to 0xFFFF	0	-	In real time
B6-45	0xB62D	Mapping address 12	0 to 0xFFFF	0	-	In real time
B6-46	0xB62E	Write gain 12	0.00 to 100.00	0	-	In real time
B6-47	0xB62F	Read gain 12	0.00 to 100.00	0	-	In real time
B6-48	0xB630	Source address 13	0 to 0xFFFF	0	-	In real time
B6-49	0xB631	Mapping address 13	0 to 0xFFFF	0	-	In real time
B6-50	0xB632	Write gain 13	0.00 to 100.00	0	-	In real time
B6-51	0xB633	Read gain 13	0.00 to 100.00	0	-	In real time
B6-52	0xB634	Source address 14	0 to 0xFFFF	0	-	In real time
B6-53	0xB635	Mapping address 14	0 to 0xFFFF	0	-	In real time
B6-54	0xB636	Write gain 14	0.00 to 100.00	0	-	In real time
B6-55	0xB637	Read gain 14	0.00 to 100.00	0	-	In real time
B6-56	0xB638	Source address 15	0 to 0xFFFF	0	-	In real time
B6-57	0xB639	Mapping address 15	0 to 0xFFFF	0	-	In real time
B6-58	0xB63A	Write gain 15	0.00 to 100.00	0	-	In real time
B6-59	0xB63B	Read gain 15	0.00 to 100.00	0	-	In real time
B6-60	0xB63C	Source address 16	0 to 0xFFFF	0	-	In real time
B6-61	0xB63D	Mapping address 16	0 to 0xFFFF	0	-	In real time
B6-62	0xB63E	Write gain 16	0.00 to 100.00	0	-	In real time
B6-63	0xB63F	Read gain 16	0.00 to 100.00	0	-	In real time
B6-64	0xB640	Source address 17	0 to 0xFFFF	0	-	In real time
B6-65	0xB641	Mapping address 17	0 to 0xFFFF	0	-	In real time
B6-66	0xB642	Write gain 17	0.00 to 100.00	0	-	In real time

Parameter	Communication Address	Name	Value Range	Default	Unit	Change Property
B6-67	0xB643	Read gain 17	0.00 to 100.00	0	-	In real time
B6-68	0xB644	Source address 18	0 to 0xFFFF	0	-	In real time
B6-69	0xB645	Mapping address 18	0 to 0xFFFF	0	-	In real time
B6-70	0xB646	Write gain 18	0.00 to 100.00	0	-	In real time
B6-71	0xB647	Read gain 18	0.00 to 100.00	0	-	In real time
B6-72	0xB648	Source address 19	0 to 0xFFFF	0	-	In real time
B6-73	0xB649	Mapping address 19	0 to 0xFFFF	0	-	In real time
B6-74	0xB64A	Write gain 19	0.00 to 100.00	0	-	In real time
B6-75	0xB64B	Read gain 19	0.00 to 100.00	0	-	In real time
B6-76	0xB64C	Source address 20	0 to 0xFFFF	0	-	In real time
B6-77	0xB64D	Mapping address 20	0 to 0xFFFF	0	-	In real time
B6-78	0xB64E	Write gain 20	0.00 to 100.00	0	-	In real time
B6-79	0xB64F	Read gain 20	0.00 to 100.00	0	-	In real time
B6-80	0xB650	Source address 21	0 to 0xFFFF	0	-	In real time
B6-81	0xB651	Mapping address 21	0 to 0xFFFF	0	-	In real time
B6-82	0xB652	Write gain 21	0.00 to 100.00	0	-	In real time
B6-83	0xB653	Read gain 21	0.00 to 100.00	0	-	In real time
B6-84	0xB654	Source address 22	0 to 0xFFFF	0	-	In real time
B6-85	0xB655	Mapping address 22	0 to 0xFFFF	0	-	In real time
B6-86	0xB656	Write gain 22	0.00 to 100.00	0	-	In real time
B6-87	0xB657	Read gain 22	0.00 to 100.00	0	-	In real time
B6-88	0xB658	Source address 23	0 to 0xFFFF	0	-	In real time
B6-89	0xB659	Mapping address 23	0 to 0xFFFF	0	-	In real time
B6-90	0xB65A	Write gain 23	0.00 to 100.00	0	-	In real time
B6-91	0xB65B	Read gain 23	0.00 to 100.00	0	-	In real time
B6-92	0xB65C	Source address 24	0 to 0xFFFF	0	-	In real time
B6-93	0xB65D	Mapping address 24	0 to 0xFFFF	0	-	In real time
B6-94	0xB65E	Write gain 24	0.00 to 100.00	0	-	In real time
B6-95	0xB65F	Read gain 24	0.00 to 100.00	0	-	In real time
B6-96	0xB660	Source address 25	0 to 0xFFFF	0	-	In real time
B6-97	0xB661	Mapping address 25	0 to 0xFFFF	0	-	In real time
B6-98	0xB662	Write gain 25	0.00 to 100.00	0	-	In real time
B6-99	0xB663	Read gain 25	0.00 to 100.00	0	-	In real time

4.2 List of Monitoring Parameters

Table 4–1 Monitoring parameters

Parameter	Name	Basic Unit	Communication Address
Group U0: basic monitoring parameters			
U0-00	Running frequency (Hz)	0.01 Hz	0x7000
U0-01	Frequency reference (Hz)	0.01 Hz	0x7001
U0-02	Bus voltage (V)	0.1 V	0x7002
U0-03	Output voltage (V)	1 V	0x7003
U0-04	Output current (A)	0.1 A	0x7004
U0-05	Output power (kW)	0.1 kW	0x7005
U0-06	Output torque (%)	0.1%	0x7006
U0-07	DI state	1	0x7007
U0-08	DO state	1	0x7008
U0-09	AI1 voltage (V)	0.01 V	0x7009
U0-10	AI2 voltage (V)	0.01 V	0x700A
U0-11	AI3 voltage (V)	0.01 V	0x700B
U0-12	Count value	1	0x700C
U0-13	Length value	1	0x700D
U0-14	Load speed display	1	0x700E
U0-15	PID reference	1	0x700F
U0-16	PID feedback	1	0x7010
U0-17	PLC stage	1	0x7011
U0-18	Pulse input reference (kHz)	0.01 kHz	0x7012
U0-19	Feedback speed (Hz)	0.01 Hz	0x7013
U0-20	Remaining running time	0.1 min	0x7014
U0-21	AI1 voltage before correction	0.001 V	0x7015
U0-22	AI2 voltage (V)/current (mA) before correction	0.001 V	0x7016
U0-23	AI3 voltage before correction	0.001 V	0x7017
U0-24	Linear speed	1 m/min	0x7018
U0-25	Current power-on time	1 min	0x7019
U0-26	Current running time	0.1 min	0x701A
U0-27	Pulse input reference (Hz)	1Hz	0x701B
U0-28	Communication	0.01%	0x701C
U0-29	Encoder feedback speed (Hz)	0.01 Hz	0x701D
U0-30	Display of main frequency X	0.01 Hz	0x701E
U0-31	Display of auxiliary frequency Y	0.01 Hz	0x701F
U0-32	Any memory address	1	0x7020
U0-33	Synchronous motor rotor position	0.1°	0x7021
U0-34	Motor temperature	1°C	0x7022

Parameter	Name	Basic Unit	Communication Address
U0-35	Target torque (%)	0.1%	0x7023
U0-36	Resolver position	1	0x7024
U0-37	Power factor angle	0.1°	0x7025
U0-38	ABZ position	1	0x7026
U0-39	Target voltage upon V/f separation	1 V	0x7027
U0-40	Output voltage upon V/f separation	1 V	0x7028
U0-41	DI state display	1	0x7029
U0-42	DO state display	1	0x702A
U0-43	DI function state display 1 (function 01 to 40)	1	0x702B
U0-44	DI function state display 2 (functions 41 to 80)	1	0x702C
U0-45	Fault information	1	0x702D
U0-46	Inverter unit temperature	1°C	0x702E
U0-47	PTC channel voltage before correction	0.001 V	0x702F
U0-48	PTC channel voltage after correction	0.001 V	0x7030
U0-49	Number of offset pulses of position lock	1	0x7031
U0-50	Roll diameter	1 mm	0x7032
U0-51	Tension (after taper setting)	1 N	0x7033
U0-58	Z signal counting	1	0x7034
U0-59	Frequency reference (%)	0.01%	0x7035
U0-60	Running frequency (%)	0.01%	0x7036
U0-61	AC drive state	1	0x7037
U0-62	Current fault code	1	0x7038
U0-63	Running frequency (after droop)	0.01 Hz	0x7039
U0-64	Back EMF	0.1 V	0x703A
U0-65	Stator resistance auto-tuning upon startup	1	0x703B
U0-66	Communication extension card model	1	0x703C
U0-67	Software version of the communication extension card	1	0x703D
U0-68	AC drive state on the communication extension card	1	0x703E
U0-69	Frequency transmitted to the communication extension card/0.01 Hz	1	0x703F
U0-70	Speed transmitted to the communication extension card/RPM	1 RPM	0x7040
U0-71	Current specific to communication extension card (A)	1	0x7041
U0-72	Communication card error state	1	0x7042
U0-73	Target torque before filter	0.1	0x7043
U0-74	Target torque after filter	0.1	0x7044

Parameter	Name	Basic Unit	Communication Address
U0-75	Torque reference after acceleration/ deceleration	0.1	0x7045
U0-76	Torque upper limit in the motoring state	0.1	0x7046
U0-77	Torque upper limit in the generating state	0.01	0x7047
U0-80	EtherCAT slave name	1	0x7048
U0-81	EtherCAT slave alias	1	0x7049
U0-82	EtherCAT ESM transmission fault code	1	0x704A
U0-83	EtherCAT XML file version	0.01	0x704B
U0-84	Times of EtherCAT synchronization loss	1	0x704C
U0-85	Maximum error value and invalid frames of EtherCAT port 0 per unit time	1	0x704D
U0-86	Maximum error value and invalid frames of EtherCAT port 1 per unit time	1	0x7050
U0-87	Maximum forwarding error of the EtherCAT port per unit time	1	0x7051
U0-88	Maximum error of the EtherCAT data frame processing unit per unit time	1	0x7058
U0-89	Maximum link loss of the EtherCAT port per unit time	1	0x7059
U0-96	No-load current of asynchronous motor vector online observation	0.1	0x7060
U0-97	Mutual inductive reactance of asynchronous motor vector online observation	0.1	0x7061
Group U1: tension control monitoring parameters			
U1-00	Linear speed	0.1 m/min	0x7100
U1-01	Current roll diameter	0.1 mm	0x7101
U1-02	Linear speed synchronous frequency	0.01 Hz	0x7102
U1-03	PID output frequency	0.01 Hz	0x7103
U1-04	Current tension reference	1 N	0x7104
U1-05	Tension reference after taper	1 N	0x7105
U1-06	Open-loop torque	0.1%	0x7106
U1-07	PID output torque	0.1%	0x7107
U1-08	Tension control mode	1	0x7108
U1-09	PID reference	0.1%	0x7109
U1-10	PID feedback	0.1%	0x710A
U1-11	Tension PID proportional gain	1	0x710B
U1-12	Tension PID integral time Ti	1s	0x710C
U1-13	Tension PID differential time Td	1s	0x710D
U1-14	Tension time	1s	0x710E
U1-15	Winding/Unwinding mode	1	0x710F

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