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MD580 Series Low-Voltage High-Performance Engineering AC Drive

Commissioning Guide

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

Data code 19012184A01

Preface

Introduction

The MD580 series is the low-voltage, high-performance engineering AC drive that can be used to drive both permanent magnet synchronous motors and AC asynchronous motors. Adopting the high-performance vector control technology, the MD580 series features high torque output at a low speed, excellent dynamic characteristics, superior overload capabilities, and stable performance. It provides rich and powerful combined functions, such as user programming and software monitoring, and supports multiple encoder types and communication buses.

The MD580 series is a new-generation AC drive (single-drive system) designed for single-drive applications in the end user (EU) heavy industry and in the traditional original equipment manufacturer (OEM) industry. It is widely applied in industries such as petrochemical engineering, metallurgy, papermaking, printing, packaging, woodworking machine tool, food and beverage, logistics and warehousing, textile printing and dyeing, fans, and water pumps.

This guide describes commissioning software, commissioning flowchart, commissioning procedure, parameter list, operating panel, and so on.

More documents

Name	Data Code	Description
MD580 Series Low-voltage High-performance Engineering AC Drive Hardware Guide	19011706 (400 V) 19012181 (690 V)	This guide describes the system composition, technical specifications, components, dimensions, options (including installation accessories, cables, and peripheral electrical components), expansion cards, certifications, and standards.
MD580 Series Low-Voltage High-Performance Engineering AC Drive Safety Installation Guide.	19012111 (400 V) 19012183 (690 V)	This guide describes the installation and wiring of the drive, including pre-installation preparations, unpacking and transportation,mechanical installation, and electrical installation.
MD580 Series Low-voltage High-performance Engineering AC Drive Maintenance Guide	19012182	This guide describes the routine maintenance and component replacement.
MD580 Series Low-voltage High-performance Engineering AC Drive Communication Guide	19011708	This guide describes the communication expansion card in brief, composition, size, installation, electrical connection, and parameter configuration.

Name	Data Code	Description
MD580 Series Low-voltage High-performance Engineering AC Drive Function Guide	19011709	This guide describes function applications, fault codes, and parameters.
MD580 Series Low-voltage High-performance Engineering AC Drive Commissioning Guide	19012184	This guide describes the parameters, troubleshooting, operating panel, commissioning software, commissioning flowchart, and commissioning procedure.

Revision History

Date	Version	Description
August 2023	A01	• Added information of explosion-proof cards, I/O cards, and PG cards in section 3.1.2.2 Introduction to the Expansion Modules. • Added information of encoders in section 3.5 Setting the SVC, FVC, or V/f Mode. • Added information of explosion-proof cards, I/O cards, and PG cards in section 3.7 Setting the Encoder. • Updated the fault information in section 4.3 Fault List.
March 2023	A00	First release

Access to the Guide

This guide is not delivered with the product. You can obtain the PDF version in the following way:

- Visit *http://www.inovance.com*, go to Support > Download, search by keyword, and then download the PDF file.
- Scan the QR code on the product with your smart phone.
- Scan the QR code below to install the app, where you can search for and download manuals.

Warranty

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

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

- Damage caused by operations not following the instructions in the user guide
- Damage caused by fire, flood, or abnormal voltage
- Damage caused by unintended use of the product
- Damage caused by use beyond the specified scope of application of the product
- Damage or secondary damage caused by force majeure (natural disaster, earthquake, and lightning strike)

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

For details, see the Product Warranty Card.

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Fundamental Safety Instructions

Safety Precautions

- 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 precautions may result in death, serious injury, or equipment damage.
- "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.
- Use this equipment according to the designated environment requirements. Damage caused by improper use is not covered by warranty.
- 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.

Fundamental 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.
- Users must take mechanical precautions to protect personal safety and wear protective equipment, such as anti-smashing shoes, safety clothing, safety glasses, protective gloves, and protective sleeves.

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. Non-professionals are not allowed.

- 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 equipments with strong electromagnetic interference, such as a transformer, install a shielding equipment 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 can result in electric shock.

- Do not connect the input power supply to the output end of the equipment. Failure to comply can 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.

- Follow the proper electrostatic discharge (ESD) procedure and wear an anti-static wrist strap to perform wiring. Failure to comply may result in damage to the equipment or to the internal circuit of the product.
- 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.

- Submit the repair request according to the warranty agreement.
- 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

- 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.

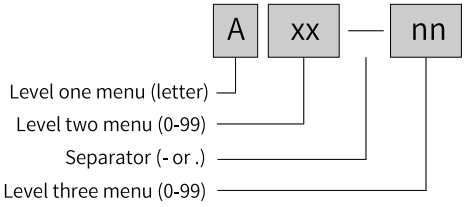
Safety label

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

Safety label	Description
	• Read through the safety instructions before operating the equipment. Failure to comply may result in death, personal injuries, or equipment damage. • Do not touch the terminals or remove the cover with power ON or within 10 min after power-off. Failure to comply will result in an electric shock.

1 Parameter Reference and Output Value

The parameters of the MD580 series are represented by a three-level menu, as shown in the following figure.



- A is the level one menu indicated by one letter. It corresponds to a complete function group. The level one menu uses English letters including A/b/C/d/E/F/H/L/n/o/P/U, which are case-sensitive for easy display on the LED panel. Groups A to P contain common parameters. Group U contains connector parameters, which are divided into bit (B) connector and word (K) connector parameters.
- XX is the level two menu, which uses one or two digits. The level one and level two menus are combined to represent a specific set of functions.
- nn is the level three menu, which uses two digits. The level one, level two, and level three menus are combined to represent a specific parameter or a connector parameter.

Note

The separator for the parameter menu can use "-" and ".", which have the same meaning. That is, A0-00 and A0.00 have the same meaning. The A0-00 representation is usually used in this guide, but the A0.00 representation may be used on the LED panel.

- The set value of a parameter is the value of the parameter set by the user for the parameter.
- The output value of a parameter is the value obtained by the drive reading the parameter.

For most parameters, the output value is equal to the set value. However, if a parameter is set to “B connector” or “K connector”, the set value of the parameter can be the output value of a connector parameter. The output value of the B connector is a binary signal with a value of 0 or 1, and the output value of the K connector is a single- or double-word.

In this guide, the value of the parameter represents the set value, and the value of the [parameter] represents the output value, as shown in the following examples:

- [U19-22] = 10%
- C0-00 = “U9-22”

- [C0-00]= 10%

C0-00 represents the primary speed source of channel 1 in the speed control mode. Its value is the value of connector U9-22. If the output value of U9-22 is 10%, the actual output value of C0-00 is 10%. If the value of connector U9-22 is modified to 20%, the output value of C0-00 changes to 20.

2 Commissioning Tools

2.1 Commissioning Tools

The MD580 series supports the following commissioning tools:

- MDKE-10 operating panel
- SOP-20-880 operating panel
- InoDriveStudio commissioning software

For the MD580 series, you can use the operation panel to modify and view parameters, perform simple commissioning and view operation status, etc.

Note

In addition to modifying and viewing parameters, performing simple commissioning and viewing operation status, it is necessary to further confirm and record operation waveform, perform visualized commissioning, view fault information and the black box, etc. It is recommended to use InoDriveStudio commissioning software for commissioning.

2.2 SOP-20-880 Operating Panel

2.2.1 Overview

The SOP-20-880 operating panel is a commissioning tool of Inovance suitable for single-drive/multi-drive systems.

- The panel features a wide power supply range and LCD display.
- It provides rich functions, such as parameter settings, status monitoring, parameter copy, fault analysis and diagnosis, parameter upload and download, and USB relay/large capacity storage.

2.2.2 Component Description

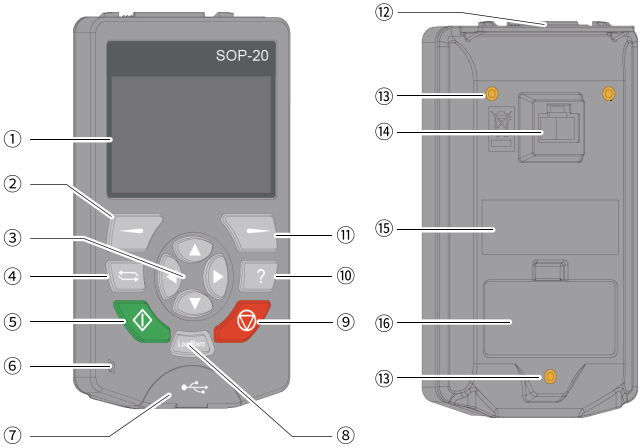


Figure 2-1 Appearance and keys of SOP-20-880

Table 2–1 Components of SOP-20-880

No.	Name
①	Display
②	Left soft key
③	Arrow keys
④	Switchover key
⑤	Running key
⑥	State indicator
⑦	USB terminal
⑧	Loc/Rem toggle key
⑨	Stop/Reset key
⑩	Help key
⑪	Right soft key
⑫	Snap-fit joint
⑬	Fixing screw
⑭	RJ45 interface
⑮	Nameplate
⑯	Battery cover

Table 2–2 Key descriptions

Key	Name	Description
	Left soft key	Used for exit or cancellation purpose. The soft key at the lower left corner on the display features difference functions in different interfaces. For example, this key on the homepage is used to enter the device selection page.
	Right soft key	Enter or confirm The soft key at the lower right corner on the display features different functions in different interfaces. For example, this key on the homepage is used to enter the menu interface.
	Switchover key	Used to quickly enter the device list In interfaces that do not allow operations to be interrupted, the device shift function is inhibited. In this case, the shift key is inactive.
	Help key	Used to open the help page. The help page depends on the context, which means the contents of the help page is related to the menu or view.
	Running key	Used to start the equipment in the local control mode.
	Stop/Reset key	Used to stop the equipment in the local control mode. When the device is in the fault state, use this key to reset the fault.
	Loc/Rem toggle key	Used to switch between SOP-20-880 (local) and remote control.
	Arrow keys	The up and down keys are used to select options in a displayed menu and list, scroll up and down a text page, and adjust a value (such as setting time, entering a password, or changing a parameter value). The left and right keys are used to move the cursor left and right.

2.2.3 Operating Panel Display

The SOP-20-880 adopts the monocolour LCD with white backlight and a resolution of 240x160 pixels.

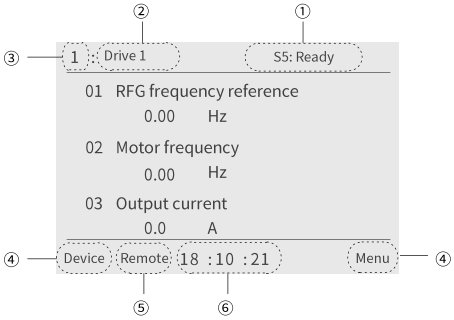


Figure 2-2 Main interface

Table 2–3 Descriptions of the main interface

No.	Display Content	Description
①	Device status and fault	It displays information about the operating status of the device, including the status, fault, and alarm. When the device is faulty, the fault information blinks and the operating status is no longer displayed.
②	Device name	It displays the name of the device being controlled by the SOP-20-880.
③	Station number	It displays the station number of the device being controlled by the SOP-20-880.
④	Function selection	Device: Device list Menu: Menu list Selection: Select the specified item. OK: Confirm the information. Back: Back to the previous menu.
⑤	Local/Remote control	Local: The device is controlled by the SOP-20-880. Remote: The device is controlled by the I/O interface or bus. No display: The feature is not available for the device.
⑥	Internal clock time	It displays the clock time in the device controller.

2.2.4 Parameter Setting

Table 2–4 Description of parameter setting

Function	Button	Description
Viewing or modifying parameters	Operation buttons	Go to the menu, and select the parameter settings option. Select the parameter group to change, view or modify the parameter, and then click the back or OK button.
Adding or removing shortcut parameters		• Adding a parameter to the shortcut interfaceOn the parameter setting interface, enter any parameter group, move the cursor to the required parameter, and press the left arrow and right arrow buttons at the same time for more than 1.5 seconds to add the parameter to the shortcut interface. • Deleting a parameter from the shortcut interfaceOn the shortcut interface, move the cursor to the parameter to be deleted, and press the  and  buttons at the same time for more than 1.5 seconds to delete the parameter from the shortcut interface.
Viewing shortcut parameters	Operation buttons	Go to the menu, and select the quick commissioning option.

Modifying digit parameters

For example, to set C8-08 (namely, ramp 1 acceleration time) to 30.00s, do as follows:

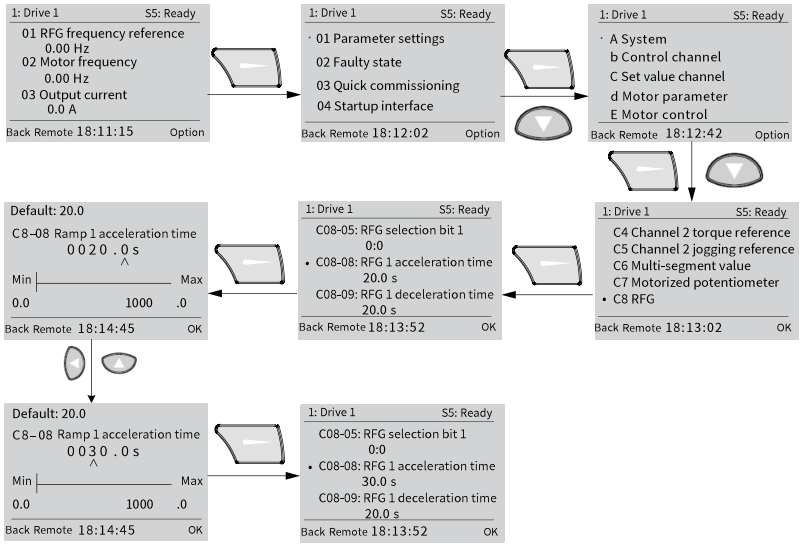


Figure 2-3 Modifying digit parameters

After setting the parameter, press  to save the setting and exit or press  to quit and exit.

Press  and  at the same time for more than 1.5 seconds to restore the parameter to the default value and then press  to make the default value take effect.

2.2.5 Viewing Parameters

Parameter groups are arranged by name. If you select a parameter group, all the parameters in this group will be displayed, and you can view and edit these parameters. Pressing the  key can display the help information.

When the cursor points to a read-only parameter, "Select" is not displayed in the lower right corner on the screen, and pressing  has no effect.

If a parameter is preceded by "0x", the parameter is a hexadecimal value.

2.2.6 Status Indicator

The SOP-20-880 smart operating panel is equipped with a status indicator to indicate faults and alarms, as below.

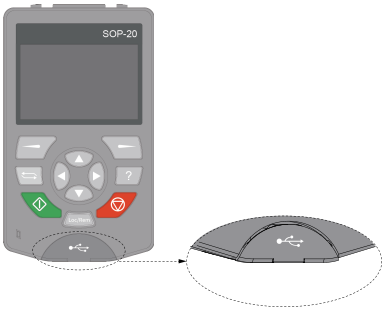
Table 2–5 Status indicators

Indicator	Illustration	Meaning
Steady green		The device is running properly.
Blinking green		The SOP-20-880 is interchanging data with the PC through USB connection.
Steady red		Communication between the SOP-20-880 and the device is normal, but the device is faulty.
Blinking red		Communication between the SOP-20-880 and the device is interrupted.

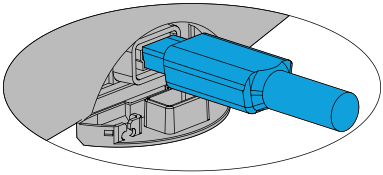
2.2.7 Connecting the SOP-20-880 to the PC

You can connect the SOP-20-880 to the PC through the type-B mini USB port at its bottom. The length of the connection cable cannot exceed three meters. The SOP-20-880 communicates with the PC by using the USB 2.0 communication protocol.

1. Open the USB port cover.

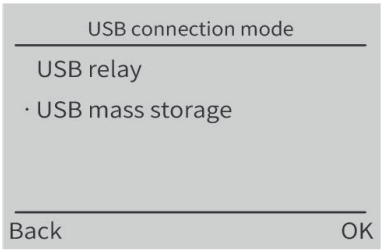


2. Plug in the USB cable and connect the cable to the PC. It is recommended to use cables with ferrite magnetic rings.



3. After the SOP-20-880 is connected to the PC, you will be prompted to choose the USB relay mode or USB mass storage mode.

- When "USB relay" is selected, the SOP-20-880 can be used as a relay to enable communication between the drive and the PC. To commission the drive using the InoDriveStudio, select "USB relay".
- When “USB mass storage” is selected, the SOP-20-880 can be used for storage.



Note

For details about how to use the SOP-20-880, see the *SOP-20-880 Smart Operating Panel Guide*.

2.3 MDKE-10 Operating Panel

2.3.1 Overview

The MDKE-10 is the standard LED operating panel for the MD580.

- The MDKE-10 provides functions such as status and data display, parameter settings, fault information prompts, and USB trunking.

- The MDKE-10 is installed to the drive by default. It also can be connected to the drive by cable to facilitate commissioning.

2.3.2 Component Description

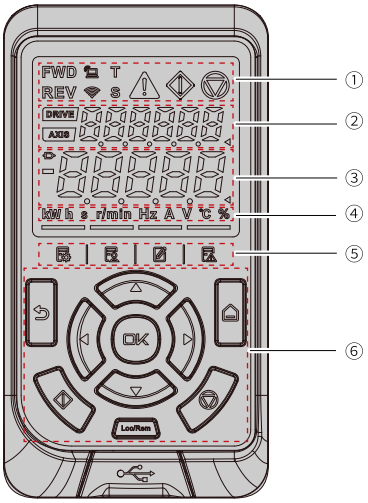


Figure 2-4 MDKE-10 LED operating panel

Table 2–6 MDKE-10 description

No.	Name	Description
①	State indicator	-
②	Multi-function display area	• Key test and auto-tuning • Fault and system status monitoring • Site number, jog, and STO status
③	Parameter display area	-
④	Unit display area	-
⑤	Menu	Parameter menu, shortcut setup menu, differential parameter menu, historical fault menu
⑥	Key area	-

Table 2–7 Key descriptions

Key	Name	Function
	Back key	• Short press: Return to the previous menu; switch between the menu bar and the status parameter display. • Long press: Enter or exit the parameters menu of the key.
	Menu key	• Short press: Switch among different menus. • Long press: Switch between the parameter display area and the multi-function display area.
	Running key	Start the device in the local control mode.
	Stop/Fault reset key	• Stop the running device in the local control mode. • Reset a fault when the device is in the faulty state.
	Local/Remote control switchover key	Switch between the local control mode (MDKE-10) and the remote control mode.
	Up key	Increase the parameter value or increase the target speed in the local control mode.
	Down key	Decrease the parameter value or decrease the target speed in the local control mode.
	Left key	• Parameter display area: Move the cursor to the left when selecting or setting a parameter. • Multi-function display area: Switch the interface to the left.
	Right key	• Parameter display area: Move the cursor to the right when selecting or setting a parameter. • Multi-function display area: Switch the interface to the right.
	OK key	Go to the next level or confirm parameters, values, etc.

2.3.3 Operating Panel Display

This section describes the status indicators, multi-function display area, unit display, menu icons, and parameter display area.

Description of status indicators

Table 2–8 Description of status indicators

Status		Status Description
FWD REV	Forward running Reverse running	FWD ON: The current target speed is positive. REV ON: The Current target speed is negative. Both FWD and REV are OFF: The current target speed is 0.
	Remote mode	OFF: The local mode takes effect, i.e. controlled by MDKE-10. ON: The remote mode takes effect, i.e. controlled by I/O terminals or bus.
	Torque control mode	ON: The system is in the torque control mode.
	Speed control mode	ON: The system is in the speed control mode.
	Alarm state	OFF: No fault ON: Device failure Flashing: Alarm occurred
	Operation state	OFF: Stop ON: Running
	Stop status	OFF: Running ON: Stop
	Station No. indicator ON	The station No. is displayed in the auxiliary display area.
	Station No. indicator OFF	The value displayed in the auxiliary display area is not the station No.
	Station No. indicator ON	The station No. is displayed in the auxiliary display area.
	Station No. indicator OFF	The value displayed in the auxiliary display area is not the station No.
	Connector indicator ON	The connector variable is displayed in the main display area.
	Connector indicator OFF	The variable displayed in the main display area is not the connector variable.
	Minus sign indicator ON	The value displayed in the main display area is a negative number.
	Minus sign indicator OFF	The value displayed in the main display area is a positive number.

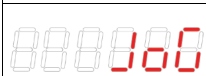
Status		Status Description
	Operating cursor 1 ON	The operating area is the main display area.
	Operating cursor 2 ON	The operating area is the auxiliary display area.
	Unit indicator ON	The unit displayed in the main display area is the unit with indicator ON.
	Indicator 1 ON	The main display area is the parameter menu
	Indicator 2 ON	The main display area is the shortcut menu
	Indicator 3 ON	The main display area is the difference parameter menu
	Indicator 4 ON	The main display area is the history fault menu

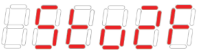
Multi-function display area

Both the parameter display area and the multi-function display area of the MDKE-10 operation panel include a triangle cursor on the right side. The cursor prompts the user for the current operating area. The default operating area is the parameter display area. The multi-function display area can display a total of four interfaces, which are as follows:

- Operating status display (default interface). The types of status supported are described in the following table:

Table 2–9 Description of operating status display

Code	Name	Applicable Occasion	Description
	reset Initializing	During system power-up initialization	The device is in the power-up initialization phase and will switch to another state after initialization is complete.
	nr(no ready) Not ready	When OFF2 or OFF3, STO, or fault state is active	The current device is not operational.
	ry(ready) Ready	OFF2 and OFF3, STO and fault state are not active, waiting for command OFF1	The current device is in an operational state, waiting for the run command.
	rn(run) Running	When a run command is given in the ready state	The current device is operational.
	JoG Jogging	After the jog command takes effect	The current device is jogging.

Code	Name	Applicable Occasion	Description
	busy Parameter recovery or downloading	After the parameter reset or parameter download command is confirmed	The current device is restoring or downloading the parameters; or the device is not connected successfully.
	tune Tuning	After tuning is selected	The current device is tuning.
	STO STO1 and STO2 are active simultaneously	The input circuits of STO1 and STO2 are disconnected.	The current device is in STO activated state.
	STO1F STO1 input active	The input circuit of STO1 is disconnected due to wiring, power supply, etc.	The current device is in STO activated state. STO1 input is active but STO2 input is normal.
	STO2F STO2 input active	The input circuit of STO2 is disconnected due to wiring, power supply, etc.	The current device is in STO activated state. STO2 input is active but STO1 input is normal.
	STOF STO fault active	Power supply abnormality, BUFFER abnormality, detection of optical coupling abnormality, FLASH or RAM abnormality	The current device is in STO active state.

- Station number display. The device's station number corresponds to the parameter A10-03 and ranges from 1 to 64. When the station number is displayed, the DRIVE status indicator is ON. For example, when the station number is 2, the last two digits of the multi-function display area will be displayed as "02". This is shown in the following figure:

Figure 2-5 Device station number display

- Current motor parameter group display. The motor parameter group corresponds to the parameter A0-24 and the parameter values 0 to 3 represent the motor parameter groups 1 to 4, respectively. For example, when the current motor parameter group is 1, the multi-function display is shown in the following figure:

Figure 2-6 Motor parameter group display

- Fault code display. This interface will only be displayed when the system is in an abnormal state. When there is a fault, minor fault, or alarm on the device, the multi-function display area will display this interface. You can switch the display interface by pressing the left and right keys. If there is no switch command within 5 seconds, it will automatically switch to the fault code display interface. When multiple faults are present at the same time, you can switch to the fault code display interface in the multi-function display area and view the fault codes sequentially by pressing the UP/DOWN keys. You can view up to 6 faults, 6 minor faults, and 6 alarms. When the exception is reset, the multi-function display area automatically switches back to the original display. For example, the following figures show the display of fault 15-1, minor fault 15-2, and alarm 63-1:

Figure 2-7 Fault display

Figure 2-8 Minor fault display

Figure 2-9 Alarm display

Unit indicator

Table 2–10 Description of unit indicators

State indicator	Description
kW	Power unit, kW
h	Time unit, hours
s	Time unit, seconds
r/min	Speed unit, revolutions per minute
Hz	Frequency unit, Hertz
A	Current unit, Amps
V	Voltage unit, Volts
°C	Temperature unit, degrees Celsius
%	Percentage

Menu icons

The menu icons are used to inform the user of the current menu type. The MDKE-10 operation panel has four types of menus and one current status parameter display interface. The status parameters are displayed by default, not limited by the menu type. You can switch between the status parameter display and the current level 1 menu by short pressing the back key. The four indicators and their corresponding icons indicate the menu types. When the indicator is on, it indicates that you are under the menu currently indicated. The correspondence between menu types and respective indicators are described in the following table:

Table 2–11 Description of menu icons

Menu icon	Menu name	Indicator display
	Parameter menu	
	Shortcut settings menu	
	Difference parameter menu (reserved)	
	Historical fault menu (reserved)	

Parameter display area

- Status parameter interface
  It is the default interface after the device is powered on and it displays some necessary device operation information. The left and right keys allow you to view different parameters. The parameters displayed when the device is stopped are different from those displayed when the device is running. The parameters flash when the device is stopped and are solid on when the device is running. The parameters displayed at stop or during running are described in Table 1-6. You can set whether to display the parameters through parameter A10-30 and A10-32.

Table 2–12 Parameters displayed on the status parameter interface

No.	Parameters displayed at stop	Is displayed by default?	Parameters displayed during running	Is displayed by default?
①	Current state machine	Yes	Motor frequency reference	Yes
②	Frequency reference	Yes	Actual motor frequency	Yes
③	Target speed	Yes	Motor speed reference	No
④	Bus voltage	Yes	Actual motor speed	No
⑤	Module temperature	Yes	Reserved	No
⑥	AI1 input ratio	No	RFG frequency setpoint	No
⑦	AI2 input ratio	No	RFG speed reference	No
⑧	Reserved	No	Bus voltage	Yes
⑨	Reserved	No	Output voltage	Yes
⑩	Reserved	No	Output current	Yes
⑪	Reserved	No	Output torque	No
⑫	Reserved	No	Output power	No
⑬	Reserved	No	Module temperature	No
⑭	Reserved	No	Current state machine	Yes
⑮	Reserved	No	AI1 input ratio	No
⑯	Reserved	No	AI2 input ratio	No

- Parameter menu
  The parameter menu of MDKE-10 is divided into three levels:
  - Level one menu: Parameter group
  - Level one menu: Parameter value
  - Level one menu: The numerical value corresponding to the parameter

  In each level of menu, the bit you are operating will flash. You can use the up and down keys to increase or decrease numerical values, and the left and right keys to switch between the bits you are operating on. For example, if you want to change the value of parameter b0-00 to 1, do as follows:

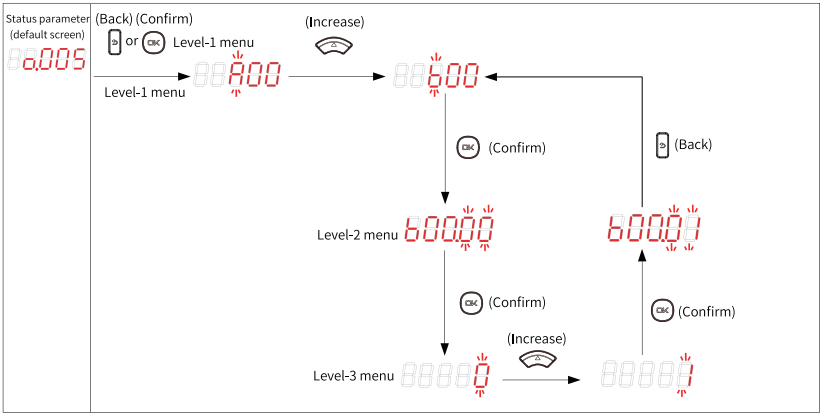


Figure 2-10 Operation procedure in the three-level menu

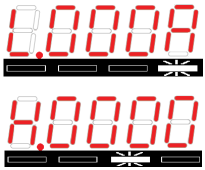
Note

- You can return to the level-II menu from the level-III menu by pressing the OK key or Back key.
  - If you press the OK key, the system saves the parameter setting, and then returns to the level-II menu and automatically shifts to the next parameter.
  - If you press the Back key, the system directly returns to the level-II menu without saving the parameter setting.
- If no bit of a parameter value in level-III menu is blinking, the parameter cannot be set. The possible causes include:
  - The parameter is not modifiable. For example, it is a parameter indicating the current running state or indicates the product type.
  - The parameter is modifiable only when the AC drive is in stop state.

The following table provides examples of different types of parameter displays.

Table 2–13 Example of parameter display

Parameter	Parameter value display	Data type and value meaning	Remarks
-		Current state machine S5: Power-on preparation	-
A02-41		Time October 11	-

Parameter	Parameter value display	Data type and value meaning	Remarks
U5-40		Hexadecimal single word 0x000E	-
U19-18		Hexadecimal double word Data is 0x0000000A Low word: 0x000A High word: 0x0000	• Double-word data needs to be displayed on two screens, with menu markers to indicate which screen the user is currently on. • The rightmost indicator flashes to indicate that the current screen is the first screen (low word). You can move to the left to view the second screen. • The second indicator light on the right flashes to indicate that the current screen is the second screen (high word). You can move to the right to view the first screen.
A4-00		Decimal digits 12.0	The MD580 series supports displaying up to 4 decimal places. If the data exceeds 4 decimal places, it will be rounded to 4 decimal places.
L9-02		Negative number -100.0	Negative symbol is displayed in the first place of the data.
L10-11		Connector parameter U0-00	The icon to the left of the parameter display area lits when the value of the current parameter is sourced from an optional connector. The displayed data 1000 corresponds to connector U0-00.

- Shortcut settings menu
  The shortcut settings menu provides a quick way for users to set up commonly used parameters. The shortcut menu contains parameters as described in the following table:

Table 2–14 List of shortcut setting menu parameters

No.	Parameter	Parameter name	Setting range
①	A8-02	Parameter access level	0: Monitoring parameters 1: Basic parameters 2: Expert parameters 3: Maintenance parameters
②	A8-03	Default password	0 to 65535
③	A10-03	Operating panel/Relay communication address	1 to 64
④	A10-04	Operating panel/Relay communication address	0: 115200 bps 1: 1 Mbps 2: 2 Mbps 3: 4 Mbps
⑤	A8-08	Para. operating mode	0: No operation 1: Restore some parameters to default 2: Restore all parameters to default 3: Clear fault records
⑥	A8-01	Parameter operation confirmation	0: Cancel 1: Confirm

- Correspondence between LED display character and actual data

Table 2–15 Correspondence between LED display character and actual data

LED display	Actual data	LED display	Actual data	LED display	Actual data	LED display	Actual data
	1		9		G		r
	2		0		H		t
	3		A		J		y
	4		b		L		Upper segment
	5/S		C		n		Middle segment
	6		d		o		Lower segment

	7		E		P		Point
	8		F		U	-	-

2.3.4 Setting the Operating Panel

You can set parameters related to the operating panel as needed. The related parameters are listed as follows.

Table 2–16 Parameters related to the operating panel

Parameter	Parameter Name	Function
A10-00	Operating panel control enable	Specifies whether the local control mode of the operating panel is available.
A10-01	Speed reference source in operating panel control mode	Specifies the speed reference source in local control mode of the operating panel.
A10-03	Operating panel/Relay communication address	-
A10-04	Operating panel/Relay communication rate	-
A10-05	Operating panel disconnection detection	Specifies whether to detect the disconnection fault.
A10-06	Operating panel disconnection detection time	Specifies the disconnection detection time. If the actual disconnection time exceeds the time specified by this parameter, a fault is reported.
A10-07	Fault reset always valid by the operating panel	If this function is enabled, you can reset the fault by the operating panel no matter whether the local mode is used.
A10-10	Frequency reference reset by the UP/DOWN key on the operating panel	You can reset the frequency reference by the UP/DOWN key on the operating panel to 0 Hz.
A10-15	Maximum value set by the UP/ DOWN key on the operating panel	The default value 100% corresponds to 100% of the rated motor frequency.
A10-16	Minimum value set by the UP/ DOWN key on the operating panel	The default value –100% corresponds to –100% of the rated motor frequency.

Parameter	Parameter Name	Function
A10-30	LED operating panel parameter display (during running) selection 1	Selects the parameters displayed on the status parameter interface of the operating panel during running.
A10-32	LED operating panel parameter display (at stop) selection 1	Selects parameters displayed on the status parameter interface of the operating panel at stop.

You can long-press the Back key to enter or exit the parameter menu of the operating panel to set or view related parameters.

- Switch the connected device. When the equipment is cascaded, you can modify PF-00 to switch the current equipment. PF-00 indicates the communication address of the current equipment. You can set the communication address of the equipment using A10-03.
- Adjust the brightness. You can adjust the brightness by modifying PF-04. The value ranges from 1 to 16, and a larger value indicates greater brightness.
- View the version of the operating panel. You can view the current version by using PF-34 and PF-35.

2.3.5 Driving the Motor with the Operating Panel

Procedure:

1. Check the equipment before power-on. Check the installation and wiring according to the installation guide. For details, see the *MD580 Series Low-Voltage High-Performance Engineering AC Drive Hardware Guide (690 V)*.
2. Power on the AC drive. Turn on the power supply of the AC drive. The MDKE-10 operating panel displays the interface, which indicates that the AC drive is powered on successfully.
3. Restore parameters to default settings. Set A8-00 to 2 (Restore all parameters to default settings) and A8-01 to 1 (Confirm). The status display area displays "Busy", indicating that the system is restoring parameters.
4. Check system status. If the status display area displays "ry", the AC drive is normal and ready to run. Otherwise, the drive is abnormal, and you need to find the cause. For example, a fault occurs, STO is activated, or OFF2/OFF3 is activated.
5. Set the following parameters according to the motor nameplate.

Table 2–17 Setting rated motor parameters

Parameter	Parameter Name	Value Range	Remarks
d0-00	Motor type	0: Induction motor 1: PMSM	-
d0-01	Rated motor power	0.1 kW to 6553.5 kW	-
d0-02	Rated motor voltage	1 V to 1500 V	Line voltage
d0-03	Rated motor current	0.1 A to 6553.5 A	Line current

Parameter	Parameter Name	Value Range	Remarks
d0-04	Rated motor frequency	0.1 Hz to 600.0 Hz	-
d0-05	Rated motor speed	1 RPM to 36000 RPM	-

6. Enable local control by pressing the 

key. The local control mode takes effect when the status indicator  becomes OFF.
7. Perform auto-tuning. The following table describes the auto-tuning mode parameter b5-00.

Table 2–18 Motor auto-tuning setting

Parameter	Parameter Name	Value Range	Remarks
b5-00	Auto-tuning mode	0: No operation 1: Static auto-tuning for asynchronous motor 2: No-load auto-tuning on all parameters of asynchronous motor 4: Inertia auto-tuning for asynchronous motor (SVC or FVC) 11: With-load auto-tuning (FVC) for synchronous motor 12: No-load auto-tuning for synchronous motor 13: Static auto-tuning for synchronous motor 14: Inertia auto-tuning for synchronous motor	Set this parameter based on the motor type and whether the motor can be disconnected from its load during auto-tuning.

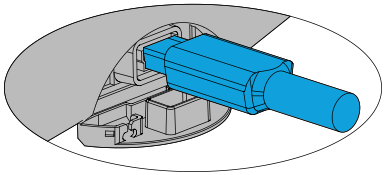
After b5-00 is set, the status display area displays "tUnE". Press the Run key. The AC drive starts auto-tuning, and the running state indicator  becomes steady ON. The auto-tuning process is completed when the running state indicator  becomes OFF and the stop state indicator  becomes steady ON. At this time, if no fault is displayed in the status display area, auto-tuning is successful.

8. Set the running frequency. Switch to the target frequency parameter (displayed at stop) of the status parameter display interface in the data display area. The parameter value now is 0.00 Hz. Long-press the increment key  . At this time,

the FWD indicator of FWD / REV becomes steady ON. Gradually increase the frequency reference to 50.00 Hz.

9. Run the AC drive by pressing the  key. The AC drive starts running, and the motor starts rotating. At this time, the status display area displays "rn", the running state indicator  becomes steady ON, and the actual frequency displayed on the status parameter display interface in the data display area gradually increases to 50.00 Hz.
10. Adjust the speed. Increase or decrease the target frequency by pressing the  or  key. When you hold down the increment/decrement key, the target frequency is displayed; when you release the key, the actual frequency is displayed.
11. Stop the AC drive. You can set E1-27 (OFF1 stop mode) to set the stop mode, which is deceleration to stop by default. After you press the  key, the running frequency decreases gradually to 0 Hz until the AC drive stops. The status indicator  becomes OFF, and the stop state indicator  becomes steady ON, indicating that the stop is completed.

2.3.6 Connecting the MDKE-10 Used as the Relay to the PC

1.Open the USB port cover.	
2. Connect the MDKE-10 to the PC by using a cable with the Type-C connector and the ferrite magnetic ring.	
3.After the MDKE-10 and the PC are connected, the MDKE-10 automatically enters the USB relay mode. USb is displayed in the status display area, which indicates the USB relay mode. You can use the InoDriveStudio to commission the drive.	

2.4 InoDriveStudio Commissioning Software

2.4.1 Overview

- The InoDriveStudio (hereinafter referred to as IDS) is the commissioning software independently developed by Inovance for high-performance engineering drives. It can be used to commission, troubleshoot, and monitor the operating status of devices.
- The InoDriveStudio supports only the Windows operating systems, including but not limited to those listed below: Windows XP Professional, Windows 2003 Server, Windows Vista, Windows 7, Windows 8, and Windows 10.

2.4.2 Installation

1. To obtain the InoDriveStudio, do as follows:

   a. Visit the website of Inovance:

http://www.inovance.com

b. Go to Support > Download > Search, and then enter InoDriveShop.
c. Click Download.

2. Unzip the package downloaded.
3. Install the InoDriveShop according to the onscreen instructions.

2.4.3 Common Functions

2.4.3.1 Main Interface

Double-click the icon  to open the InoDriveStudio. The following interface appears:

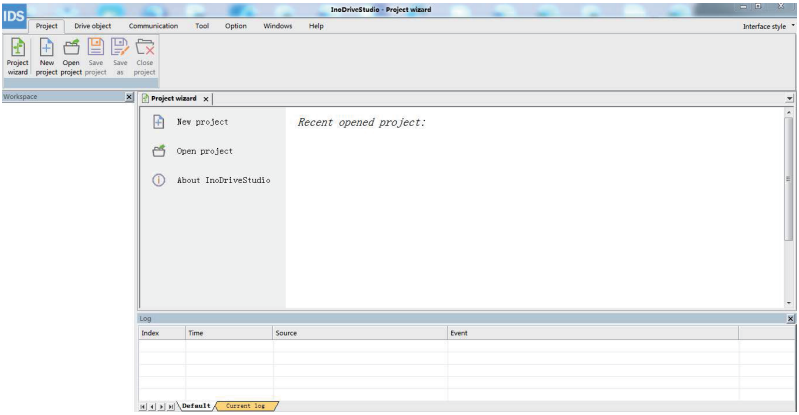


Figure 2-11 Home interface

No.	Name	Description
①	Title bar	Displays information such as window titles or files that are open.
②	Menu bar	Displays each functional module.
③	Navigation pane	Displays navigation information such as the current project.
④	Main workspace	Displays the specific content of an item specified in the navigation pane.
⑤	Multi-functional area	Displays the log pane, monitoring pane, control panel pane, fault pane, etc.
⑥	Status bar	Displays the current project status.

2.4.3.2 Creating Projects

1. Go to Project > New project. The following figure is displayed.

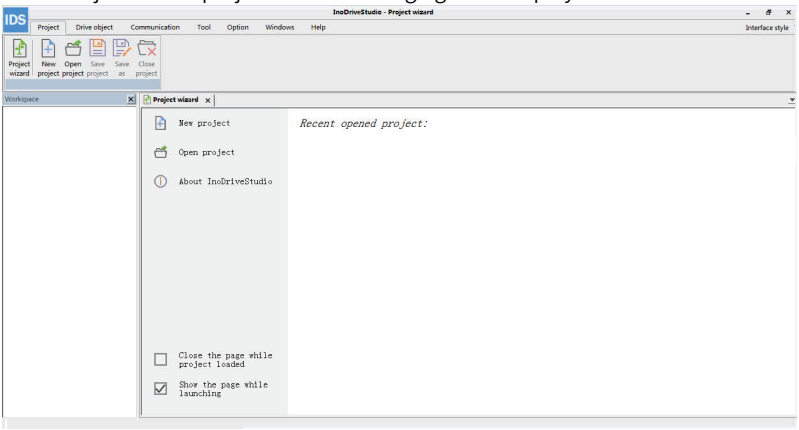


Figure 2-12 New project interface

No.	Name	Description
①	New project	Click New project to create a project in the displayed dialog box.
②	Open project	Click Open project to open a wanted project.
③	About InoDriveStudio	Click About InoDrive Studio to view information about the current InoDriveStudio version.
④	Help	Click Help to show the help document.
⑤	Close the page while project loaded	If the option is selected, the project wizard is automatically closed when the project is loaded. If the option is cleared, the project wizard is not automatically closed when the project is loaded.
⑥	Show the page while launching	If the option is selected, the project wizard will open automatically when the software is started. If the option is cleared, the project wizard will not open automatically when the software is started. You can go to Project > Project wizard to open this page.
⑦	Recent opened project	You can view eight recently opened projects in the descending order of time. Double-click a file name to open the specified recent project. Move your cursor over the file name. The file name will be highlighted in light blue and  is displayed. Click the icon to hide the project from the recently opened project list.

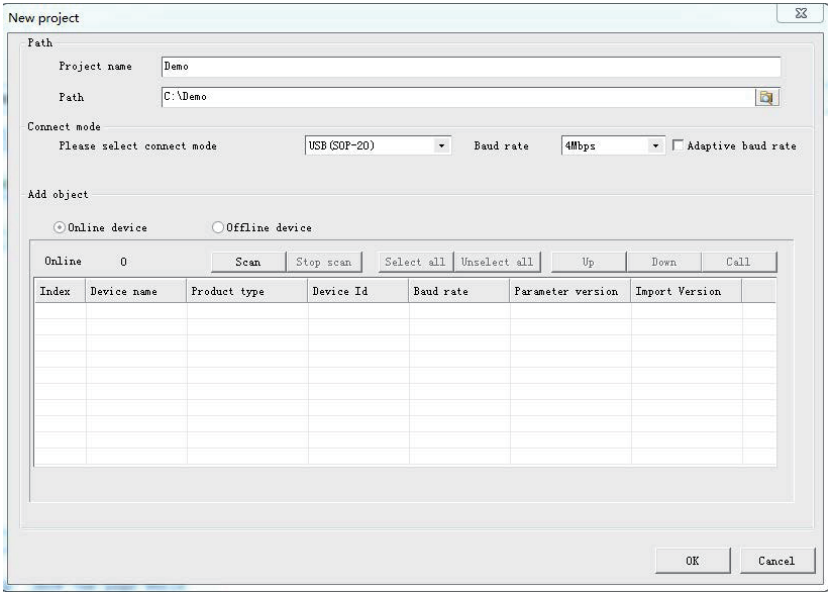


Figure 2-13 New project dialog box

No.	Name	Description
①	Project name	It specifies the name of the project to be created.
②	Path	It specifies the path where the new project will be stored.
③	Connect mode	It specifies the communication method and related parameters for the project to be created. Currently, USB, TCP/IP, and gateway communication methods are supported. After a project is loaded, you can go to Communication > Communication setting to change the connection method. The InoDriveStudio will connect to the device using the set connection method.
④	Online device	It specifies the online device to be added to the project that will be created. The online device can be displayed by scanning.
⑤	Offline device	It specifies the offline device to be added to the project that will be created. The offline device can be determined by information such as product type and version.
⑥	Adaptive baud rate	When selecting the USB communication method, you can select or clear the option to determine whether to scan the device with an adaptive baud rate. If the option is selected, devices whose baud rates are supported will be scanned; otherwise, only devices whose baud rate is the specified baud rate will be scanned.

Note

- When multiple devices are cascaded, ensure that the communication addresses of the devices are different and the communication baud rates of the devices are consistent. Set the communication address by A10-03 and set the communication baud rate by A10-04.
- When multiple devices are cascaded, ensure that the device names are different; otherwise, the new project cannot be completed.

2. Click Scan.
   In the following figure, USB connection is selected.

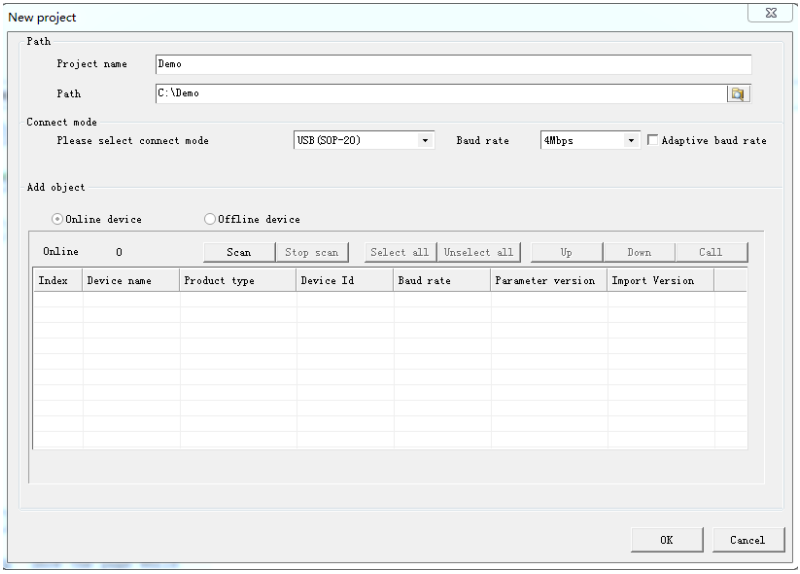


Figure 2-14 Scanning when USB connection is selected

3. Click OK. The project is created. You can proceed with settings and commissioning work.

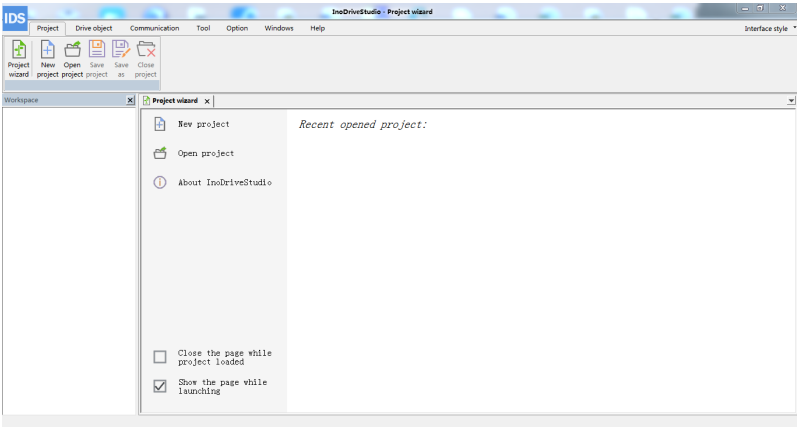
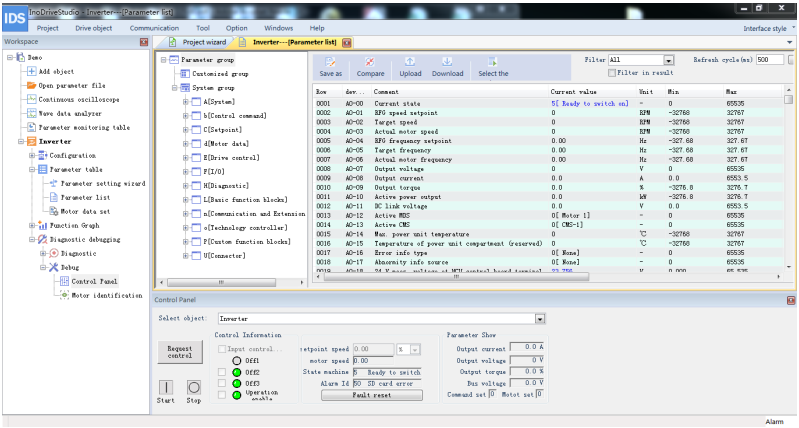


Figure 2-15 Main interface

2.4.3.3 Control Panel

You can use the control panel of the InoDriveStudio to start and stop the drive, reset faults, and so on. Go to MD580 > Diagnostic debugging > Debug > Control Panel to open the control panel.

Click Basic Panel to collapse the control panel. In the collapsed control panel, the device cannot be selected, the device name is displayed in the title bar, and an indicator icon is added. If the device is stopped, the indicator is gray. If the device encounters a fault, the indicator flashes red. If the device encounters an alarm or minor fault, the indicator flashes yellow. If the device is operating normally, the indicator flashes green. Click the Restore Panel button to expand the control panel.



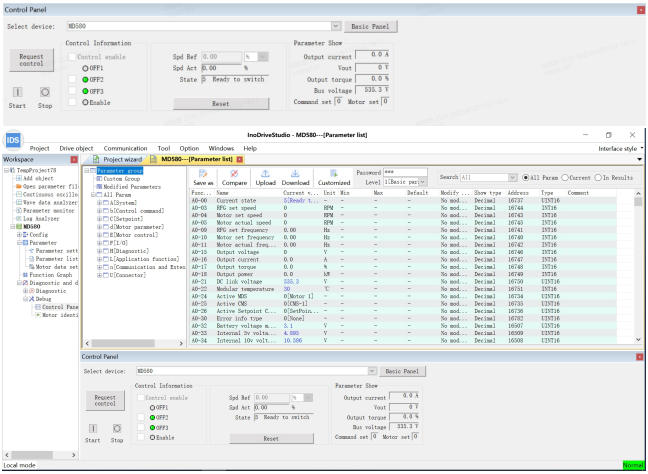


Figure 2-16 Control panel

- You can start or stop the device and monitor the device status on the control panel.
- Before controlling a device from the control panel, click Request control to gain control permission of the device.
- After you obtain control permissions, you can click Start or Stop to start or stop the device.
- After Input control bit is checked, you can select OFF1, OFF2, OFF3, and Operation Enable to start or stop the device.
- Click Reset to reset the fault.
- Clicking the space key for three consecutive times will automatically trigger the OFF2 stop command.
- After the device is started using the control panel and the communication between the device and the InoDriveStudio fails, fault 52-1 (IDS communication fault) is reported.

2.4.3.4 Fault View

There are two ways to view faults on the InoDriveStudio.

- Viewing current faults
  - Mode 1: Go to MD580 > Diagnostic debugging > Diagnostic > Fault alarm table > Current fault, as shown in the following figure.

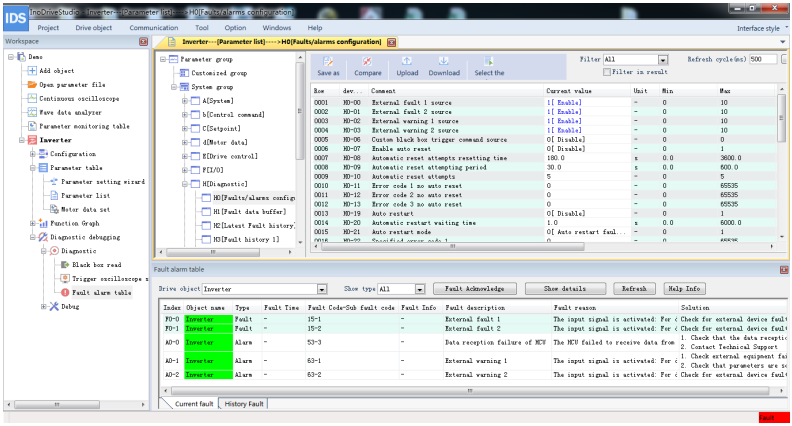


Figure 2-17 Fault List

- Mode 2: In the Workspace pane, go to MD580 > Parameter table > Parameter list. In the middle pane, go to Parameter group > System group > A[System] to view the current fault and alarm information, as shown in the figure below.

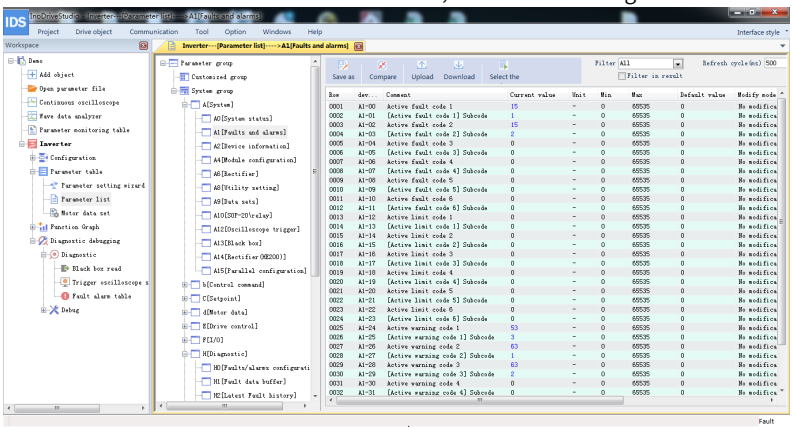


Figure 2-18 Viewing faults in group A1

- Viewing the history fault information
  - Mode 1: Go to MD580 > Diagnostic debugging > Diagnostic > Fault alarm table > History Fault, as shown in the following figure.

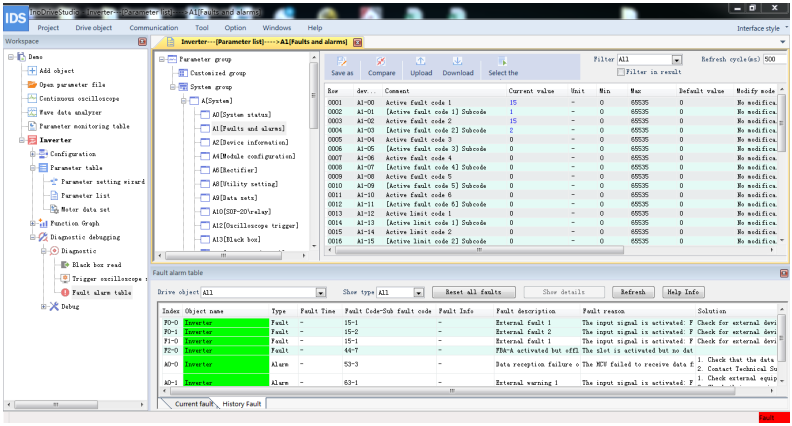


Figure 2-19 Historical fault list

- Mode 2: In the Workspace pane, go to MD580 > Parameter table > Parameter list. In the middle pane, go to Parameter group > System group > H[Diagnostic], and click H2[Latest Fault history] to H7[Latest limit history], as shown in the following figure.

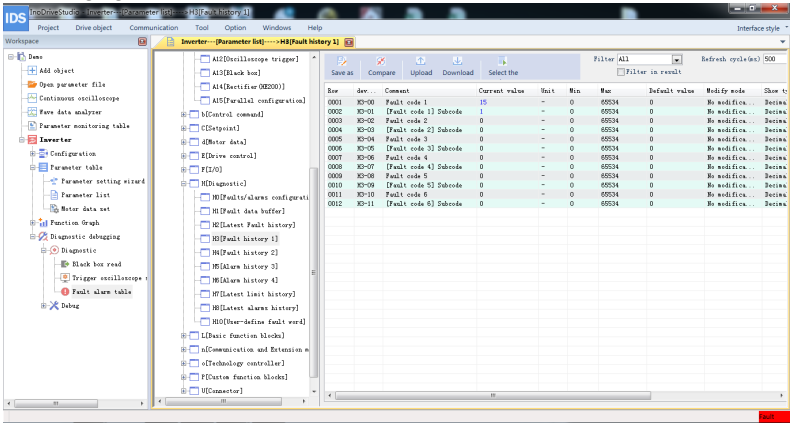


Figure 2-20 Viewing historical faults

2.4.3.5 Parameter View and Modification

Parameter view and modification are basic functions of the InoDriveStudio (IDS). After the device is connected, go to MD580 > Parameter table > Parameter list on the main interface of the IDS. The parameter list of the current device is displayed, as shown in the following figure.

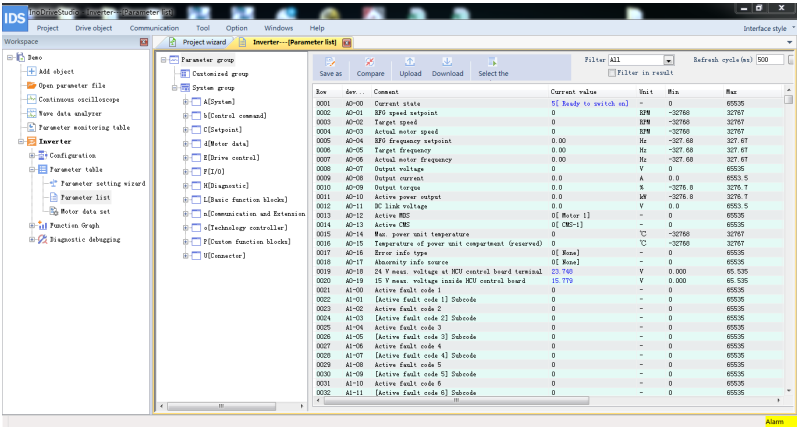


Figure 2-21 Parameter list

- Parameter groups are displayed in the middle pane, and parameters in a selected parameter group are displayed in the right pane.
- You can view information such as the name, current value, default value, unit, modification method, and communication address of a parameter.
- After the parameters have been modified, they are downloaded to the device.
- When the current value of a parameter does not match the default value, the current value is displayed in blue.
- When the parameter is changed to a value out of the allowed range, the modification does not take effect.
- When you change a parameter whose modification method is “At stop” during the device running, the modification does not take effect.
- You can enter some words of the parameter description to realize fuzzy match. For example, click System group in the middle pane. In the middle pane, enter Torque in the search box and press Enter. All parameters containing Torque will be displayed.

2.4.3.6 Parameter Comparison

InoDriveStudio supports the comparison of parameters. You can access the Compare function in either of the following two ways.

- Go to Drive object > Compare.
- Click the Compare button in the Parameter list interface.

The figure below shows two ways to access the Compare function.

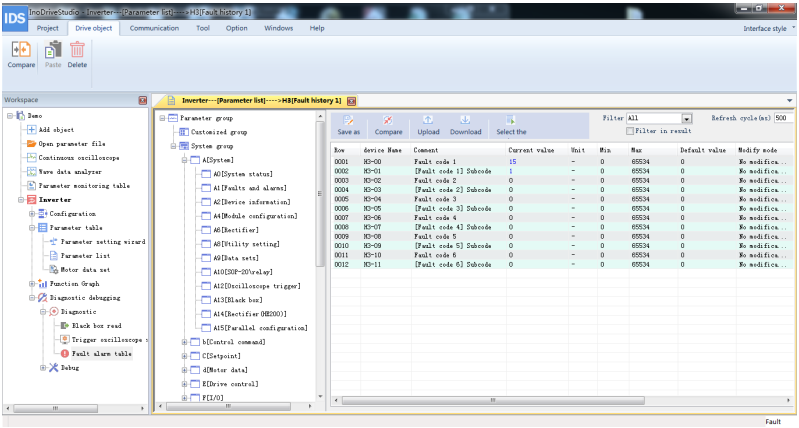


Figure 2-22 Accessing the Compare function

As shown in the figure below, you can compare two offline parameter files. Also, you can compare the current parameters and the default parameters of the drive unit. You can select to show the different parameters, the same parameters, or all parameters.

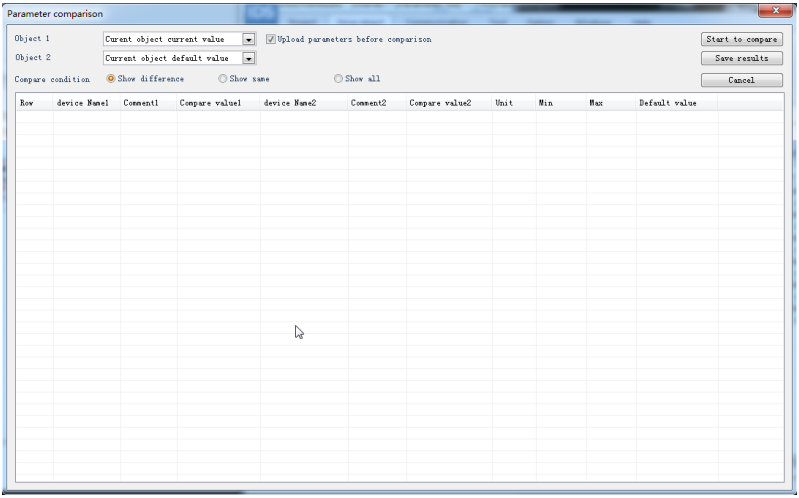


Figure 2-23 Comparison page

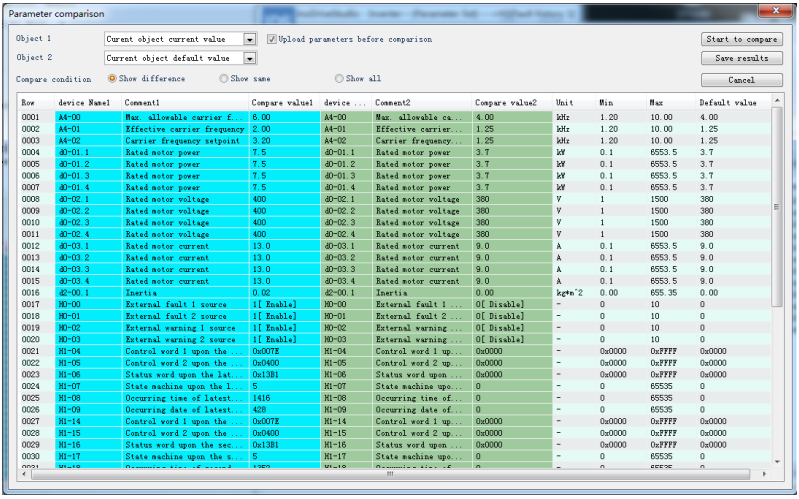


Figure 2-24 Example of comparison between current values and default values

2.4.3.7 Parameter Backup and Download

You can use the InoDriveStudio software to back up the MD580 parameters to your computer by the Upload or Save as function. Also, you can restore the backup parameters from the computer to MD580 by the Download function.

- To back up parameters by the Upload function:
  Go to Parameter list, click Upload, enter the file name, select Parameter file (*. inoprm) for Save as type, and click Save.

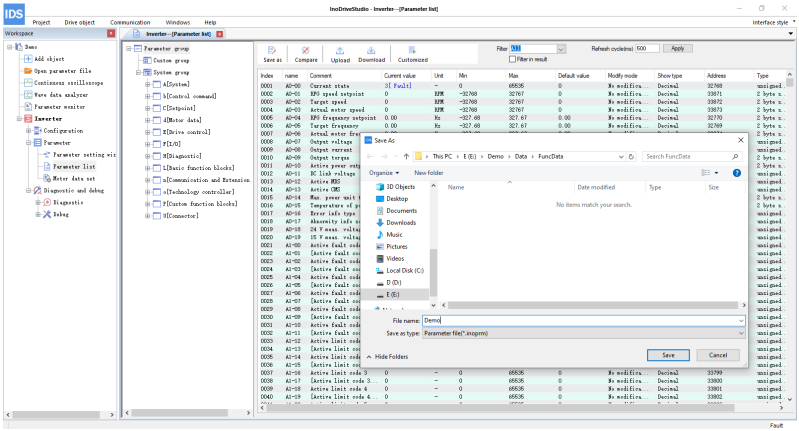


Figure 2-25 Parameter backup by upload function

- To back up parameters by the Save as function, do as follows:
  Go to Parameter list, select the parameter group you want to back up, enter the file name, select Parameter file (*.inoprm) for Save as type, check Upload parameter before save, and then click Save.

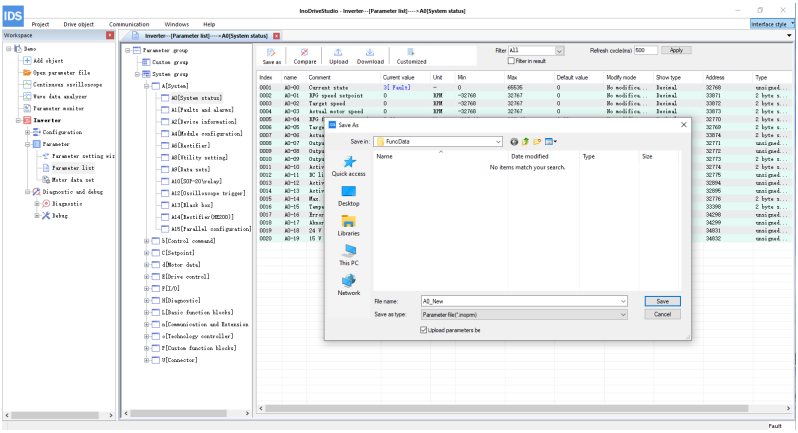


Figure 2-26 Parameter backup by Save as function

Note

- When you click Upload to back up parameters, all parameters are backed up.
- When you need to back up customized parameters, see the section of Customizing Parameter Groups.
- When you click Save as to back up parameters, select Parameter file (*.inoprm) for Save as type and select the uploaded parameters before saving.

- To download parameters, do as follows:
  Go to Parameter list, click Download, select the file you want to download, select the download mode, and then click Open.

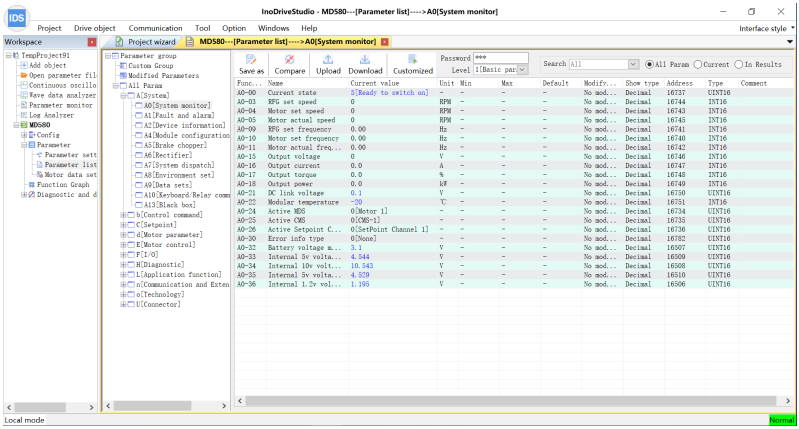


Figure 2-27 Parameter download

There are two modes for parameter download:

- Partial download: By default, parameters other than motor parameters (group d) and model-related parameters, as well as parameters A10-04 and A10-03 will be downloaded. To download the parameters, check Download motor parameters. Partial download is suitable for most cases where backup parameters need to be restored.
- Full download: By default, parameters other than motor parameters (group d) and model-related parameters will be downloaded. If the values of parameters A10-04 and A10-03 are different from the current parameters, you will be prompted whether changes need to be made. Please be cautious when making changes to avoid situations where duplicate station numbers may cause communication to be disconnected. You can check Download motor parameters and Download model parameters to download all parameters.

Note

Be cautious when downloading model parameters. It is not recommended for non-professionals to download model parameters.

2.4.3.8 Customizing Parameter Groups

The InoDriveStudio allows you to select required parameters to form a new group, save the customized parameter group as a parameter file or a configuration file.

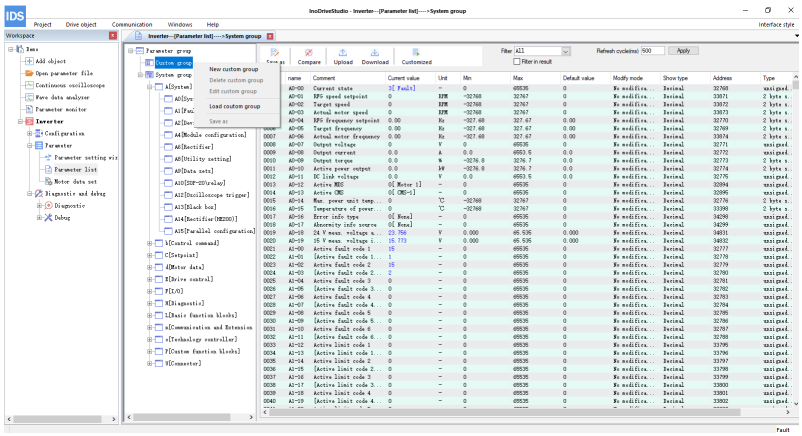


Figure 2-28 Entering the customized parameter group

- Procedure for customizing the parameter group
  In Workspace, go to MD580 > Parameter > Parameter list. In the middle pane, right-click Custom group under Parameter group and select New custom group or Load custom group. In the Parameter group dialog box, name the customized group, and click Add. Add parameters to the customized group or delete unwanted parameters from the group. Finally, click OK.

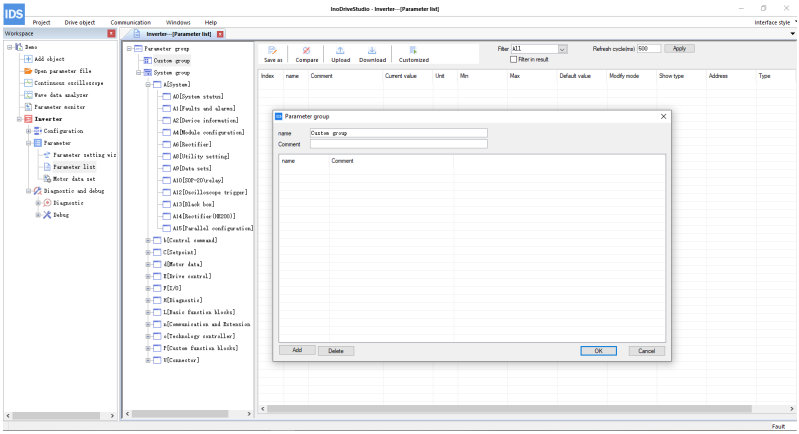


Figure 2-29 Customizing parameter groups

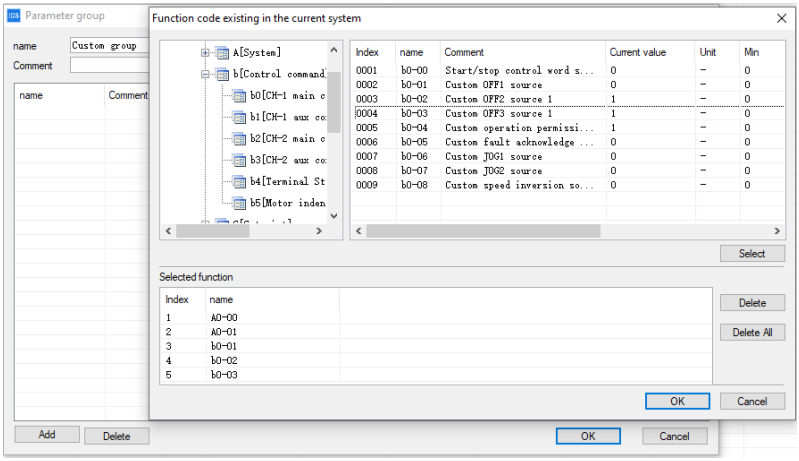


Figure 2-30 Parameters that can be customized

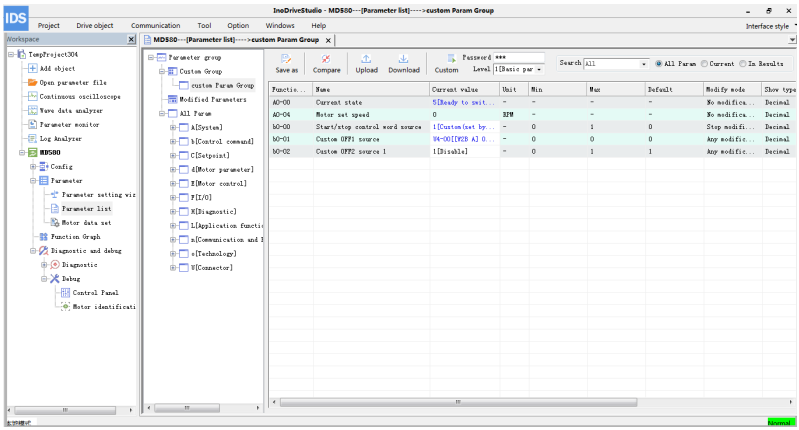


Figure 2-31 New customized parameter group file

Right-click a new customized parameter group and select Delete custom group, Edit custom group, Load custom group, and Save as to perform related operations.

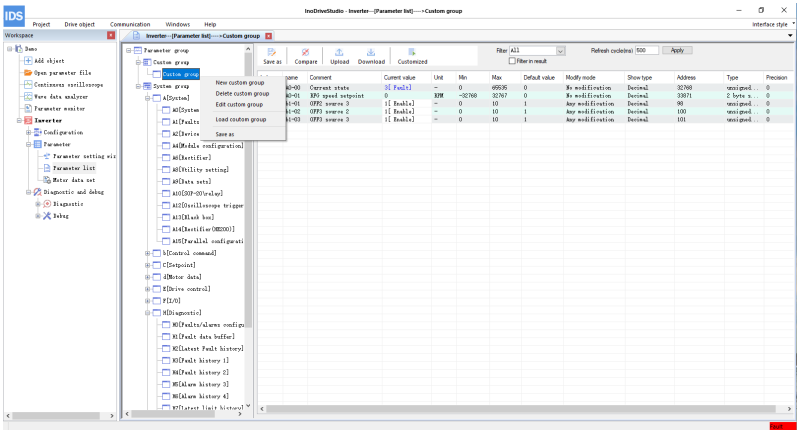


Figure 2-32 Operations on the customized parameter group

When saving a customized parameter group, you can select the following file types:

- Parameter file (*.inoprm): The saved file contains parameters and parameter values. It allows you to download parameters to other devices.
- Parameter group file (*.inogrp): The saved file is the parameter group configuration file that contains only customized parameter group information. The file can be reloaded to a customized group.
- CSV file (*.csv): The saved .csv file can be viewed directly.

2.4.3.9 Viewing Modified Parameters

The InoDriveStudio allows you to view modified parameters. They refer to parameters whose values are different from the factory settings. Go to MD580 > Parameter list > Parameter group > Modified Parameters. Double-click Modified Parameters. The Uploading parameters, please wait… dialog box pops up. After the upload is complete, all modified parameters will be displayed.

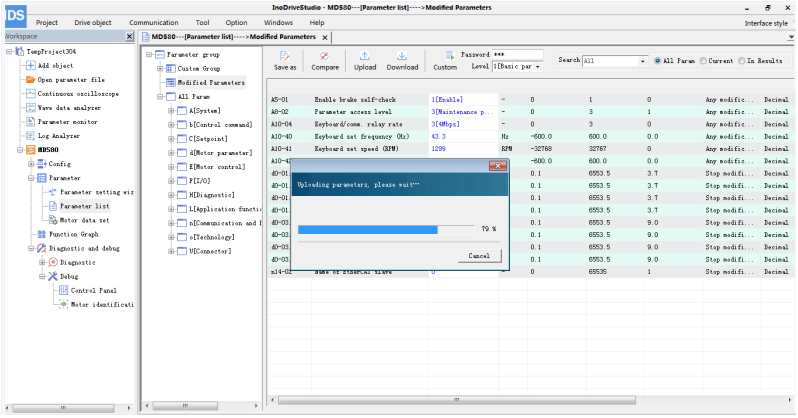


Figure 2-33 Double-clicking Modified Parameters

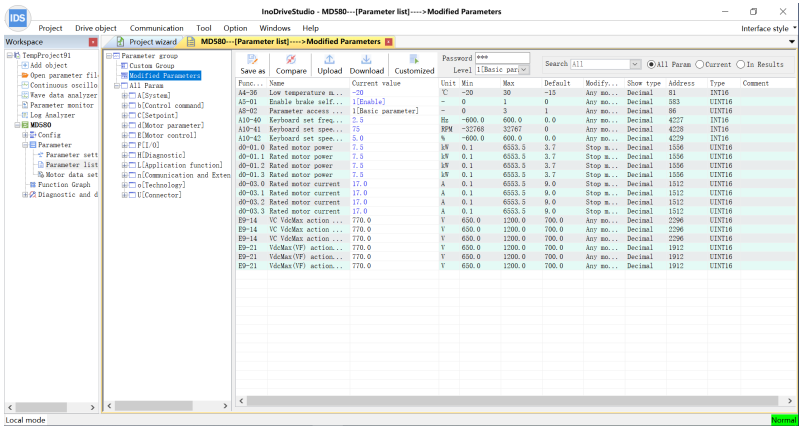


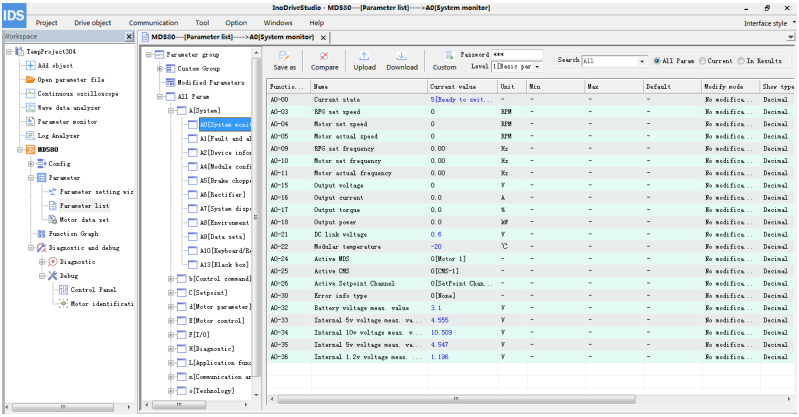
Figure 2-34 Modified parameters

2.4.3.10 Search

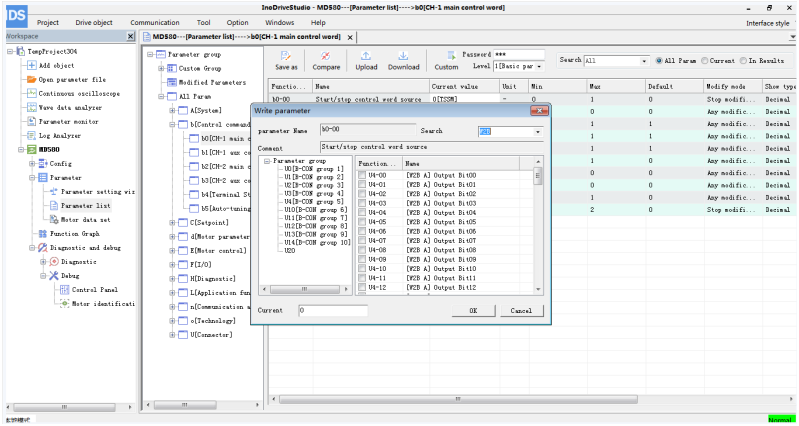
The InoDriveStudio allows you to search for parameters and connectors by key word.

You can search for parameters by the following methods:

- All parameters: You can search for all parameters in the parameter list.
- Current group: You can search for parameters in the current parameter group.
- Search the current results: You can search for parameters in the current list.



When the value of a parameter is set to be given by a connector, you can search for required connectors quickly, as shown below.



2.4.4 Waveform Recording and Analysis

Real-time analysis of data curves is key for commissioning performance. The InoDriveStudio provides three ways for online real-time recording of data curves, conditional recording of data curves, and offline view of waveforms.

2.4.4.1 Continuous Oscilloscope

The operation status of the equipment needs to be monitored in real time during on-site commissioning. The continuous oscilloscopes in the InoDriveStudio can be used to monitor and record the relevant data or status of the equipment in real time. Click Continuous Oscilloscope in the Workspace pane to open the oscilloscope. The

oscilloscope consists of the channel selection area, waveform display area, waveform configuration area, and toolbar, as shown in the following figure.

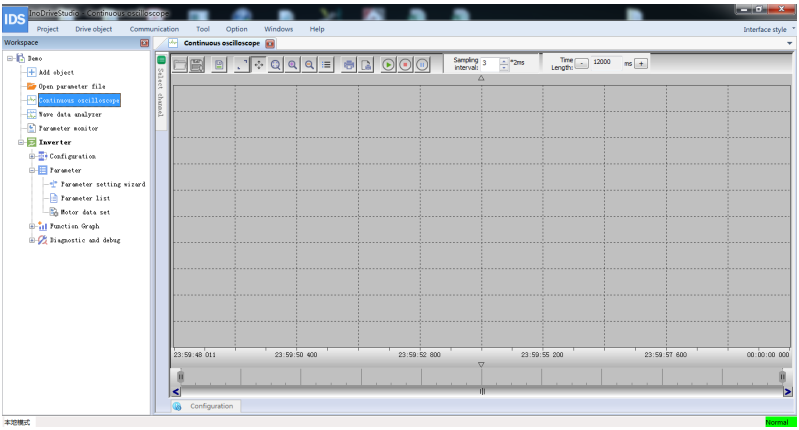


Figure 2-35 Opening the continuous oscilloscope

Only one continuous oscilloscope can be opened for each project. The oscilloscope is used to record and analyze waveform of all equipment in the current project. In the continuous oscilloscope tab, area ① is the channel selection area, area ② is the main interface of the waveform display, area ③ is the waveform configuration area, and area ④ is the toolbar. You can perform operations such as start, stop, pause, and zooming. In area ③, set the group number to the same value to show the connectors with the same physical meanings in the same coordinate system. To delete the selected channel, click the Stop button in the toolbar ④ and then select Channel Parameter, as shown below.

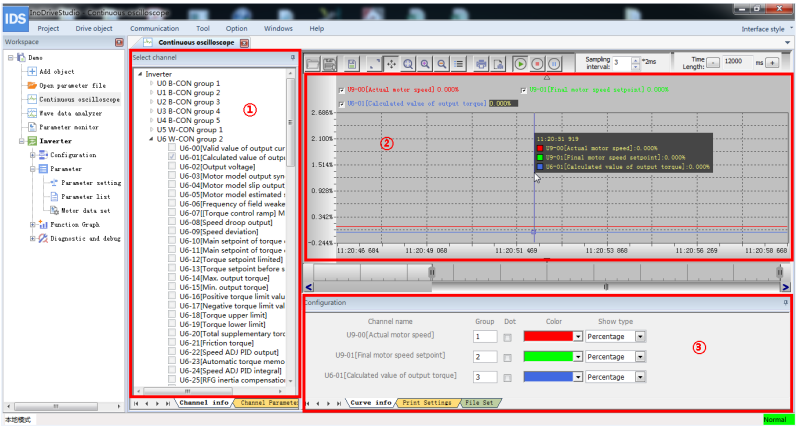


Figure 2-36 Continuous oscilloscope interface

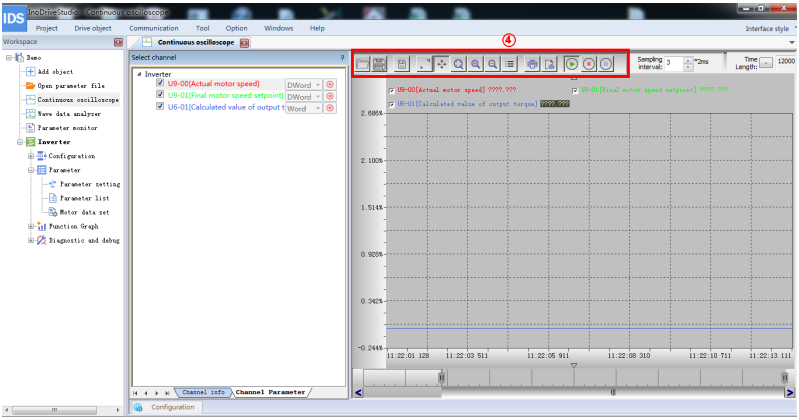


Figure 2-37 Deleting channels from the continuous oscilloscope

In the Select channel pane, customize the data channel to be monitored. All parameters in the U group can be used as the data source to record curves, wherein:

- When U5 to U8 and U15 to U18 are used as the data source to record curves, each data occupies one recording channel.
- By default, when U9 and U19 are used as the data source to record curves, each data occupies one recording channel. If you want to obtain more accurate waveform, you can also modify the configuration to double-word recording, and each data occupies two recording channels.
- Parameters U0 to U4 and U10 to U14 are digital values. Up to eight digital values can be recorded in a device. All digital waveforms in a device only occupy one recording channel.

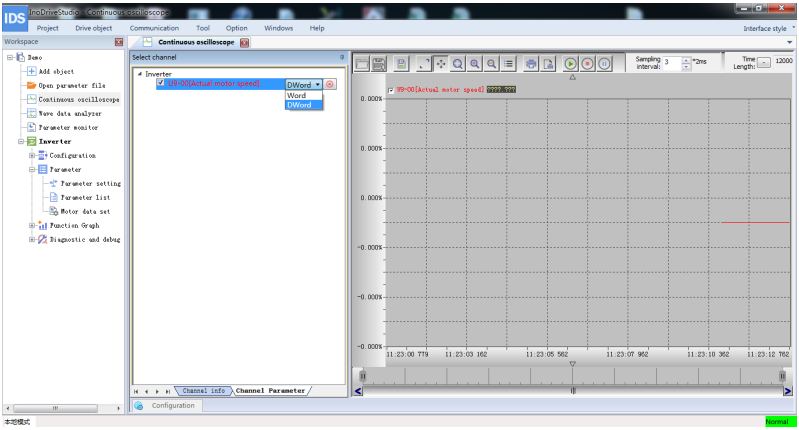


Figure 2-38 Single- or double-word display of connectors

The number of channels is related to the communication baud rate and sampling interval, as shown in the following table:

Table 2–19 Baud rate and sampling interval

Baud Rate	Sampling Interval	Max. Number of Channels	Sampling Interval	Max. Number of Channels	Sampling Interval	Max. Number of Channels
115200 bps	2 ms	4	4 ms	8	> 4 ms	8
1 Mbps	2 ms	8	4 ms	8	> 4 ms	8
2 Mbps	2 ms	8	4 ms	8	> 4 ms	8
4 Mbps	2 ms	8	4 ms	8	> 4 ms	8

For details on waveform configuration and toolbar usage, see the help documentation of the InoDriveStudio software.

Button descriptions:

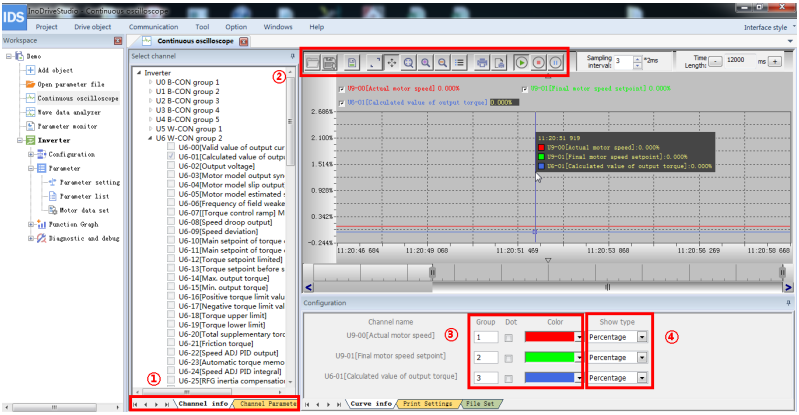


Figure 2-39 Using the continuous oscilloscope

In the lower part of the Select channel pane (①), click the Channel info tab to select a device and configure the oscilloscope channel for the device. Click the Channel Parameter tab to show the current and configured oscilloscope channels. You can also select the recording accuracy of the 32-bit connector. Selecting Dword indicates higher accuracy, but occupies two oscilloscope channels.

The following table describes buttons in the oscilloscope tool bar (②).

Button	Description
	It is used to save the waveform. Waveforms are automatically saved in the project directory during running of the continuous oscilloscope. However, the previous waveform is automatically deleted when the waveform file exceeds the limit. It is recommended that important waveforms be manually saved to another directory for backup.
	It is an adaptive zooming button used to zoom in or out the ordinate of all curves based on the displayed value to ensure that all curve points are displayed.
	It is used to pan the current curve by the left mouse button.
	It is used to enlarge an area. Click the button and select an area with the mouse to enlarge the area to the current screen. When the ordinate range of the current curve changes, the timeline of all curves changes simultaneously. You can enlarge the abscissa or ordinate separately.
	It is used to zoom in or out the interface according to the specific scale. When the ordinate range of the current curve changes, the timeline of all curves changes simultaneously.
	It is used to show or hide the cursor. Measurement of curve data can be achieved using two cursors.
	It is used to capture the entire interface and save the file as the *.Bmp, *.jpg, or *.png file.
	It is used to set the background. You can set the background color, axis color, font size, grid color, and cursor color of the oscilloscope. After setting the background, click the saving button to save the settings.

You can change the color of each curve in area ③. After the curve point is checked, each sampling point of the curve is bold. When the group numbers of both curves are set to the same, the two curves share the same set of ordinates, which will be zoomed simultaneously.

The display type of certain signals can be changed in area ④. For example, the speed can be displayed as the per unit value by percentage, or displayed by frequency or speed unit.

Table 2–20 Common shortcut descriptions

shortcut	Description
Right button of the mouse	Click the right button of the mouse to zoom in or out the coordinates of all curves.
Mouse wheel	It is used to zoom in or out the curve. In the waveform area, the mouse wheel can be used to zoom in or out the coordinates. In the coordinate area, the mouse wheel can be used only to zoom in or out the current coordinate. When the ordinate range of the current curve changes, the timeline of all curves changes simultaneously.
Ctrl+mouse wheel	It is used to pan the curve. In the waveform area, pressing the Ctrl key+mouse wheel can be used to pan the coordinates. In the coordinate area, pressing the Ctrl key+mouse wheel can be used only to pan the current coordinate. When the ordinate range of the current curve changes, the timeline of all curves changes simultaneously.
Up and down arrows (↑ ↓)	They are used to pan the current curve up and down.
Alt	It is used to perform operations on all curves forcibly. For example, pressing the Alt key+up/down arrow can move all curves up/down.
Shift	It is used to force the operation to zooming. For example, pressing the Shift key+up/down arrow can zoom in or out the current curve ordinate.
Ctrl	It is used to force the operation to panning. For example, pressing the Ctrl key+mouse wheel can pan the curve.

2.4.4.2 Black Box

The MD580 is equipped with the built-in black box function. The black box function is enabled automatically upon power-on. The black box records when a fault occurs or when user-defined conditions are met.

- Triggering by fault: When the drive enters the fault state, the black box records once.
- Triggering by user-defined conditions: You can set A13-03 to set the triggering condition. If the condition is met, the black box records once.

The MD580 controller collects the data 0.9 seconds before the fault occurs and the data 0.1 seconds after the fault occurs. The data includes 8 pieces of ADC internal interruption data, 4 pieces of data collected at an interval of 0.5 ms, 48 pieces of interval data collected at an interval of 2 ms, 16 pieces of customized data collected at an interval of 2 ms, and 5 pieces of data collected at an interval of 16 ms. The black box also records the time when the fault was triggered and the conditions under which the fault was triggered. The collected data will be automatically saved to the flash of the controller. Up to 80 sets of fault data can be stored. If more than 80 faults are triggered, the latest 80 sets of fault data will overwrite the earlier ones.

The MD580 supports two sets of customized triggering conditions. The two sets of conditions can be triggered independently or according to logic. The relevant parameters of customized triggering conditions are shown in the figure below.

A13-03	User defined trigger conditi...	0[The user-defined trigger...
A13-04	User defined trigger conditi...	0[Analog comparison]
A13-05	User defined trigger conditi...	0[Greater than >]
A13-06	User defined trigger conditi...	0[Disable]
A13-07	User defined trigger conditi...	0[Disable]
A13-08	User defined trigger conditi...	0[Rising edge 0 -> 1]
A13-09	User defined trigger conditi...	0[Disable]
A13-10	User defined trigger conditi...	0[Greater than >]
A13-11	User defined trigger conditi...	0[Disable]
A13-12	User defined trigger conditi...	0[Analog comparison]
A13-13	User defined trigger conditi...	0[Greater than >]
A13-14	User defined trigger conditi...	0[Disable]
A13-15	User defined trigger conditi...	0[Disable]
A13-16	User defined trigger conditi...	0[Rising edge 0 -> 1]
A13-17	User defined trigger conditi...	0[Disable]
A13-18	Custom trigger condition 2 S...	0[Greater than >]
A13-19	Custom trigger condition 2 s...	0[Disable]

Figure 2-40 Parameters of customized triggering conditions

Parameter	Value	Combination
A13-03 Configuration mode for customized triggering conditions	0	Customized triggering conditions are invalid.
	1	Only customized triggering condition 1 is valid.
	2	Only customized triggering condition 2 is valid.
	3	The logic between condition 1 and condition 2 is AND.
	4	The logic between condition 1 and condition 2 is OR.
	5	The logic between condition 1 and condition 2 is XOR.

Each customized triggering condition can be configured to three modes: analog comparison, digit triggering, and state machine triggering.

The following five comparison methods are supported when analog comparison is selected.

Table 2–21 Triggering by analog comparison

Customized Condition	Comparison Value 1	Comparison Value 2	Comparison Mode	Description
Customized condition 1	A13-06	A13-07	A13-05 = 0	Valid when comparative value 1 > comparative value 2
			A13-05 = 1	Valid when comparative value 1 < comparative value 2
			A13-05 = 2	Valid when comparative value 1 = comparative value 2
			A13-05 = 3	Valid when comparative value 1 ⩾ comparative value 2
			A13-05 = 4	Valid when comparative value 1 ⩽ comparative value 2
Customized condition 2	A13-14	A13-15	A13-13 = 0	Valid when comparative value 1 > comparative value 2
			A13-13 = 1	Valid when comparative value 1 < comparative value 2
			A13-13 = 2	Valid when comparative value 1 = comparative value 2
			A13-13 = 3	Valid when comparative value 1 ⩾ comparative value 2
			A13-13 = 4	Valid when comparative value 1 ⩽ comparative value 2

Five configuration modes are supported when digit triggering is selected.

Table 2–22 Triggering by digit

Customized Condition	Comparison Value 1	Comparison Mode	Description
Customized condition 1	A13-09	A13-08 = 0	Valid when the input signal changes along the rising edge
		A13-08 = 1	Valid when the input signal changes along the falling edge
		A13-08 = 2	Valid when the input signal changes along the rising or falling edge
		A13-08 = 3	Valid when the input signal logic is 1
		A13-08 = 4	Valid when the input signal logic is 0
Customized condition 2	A13-17	A13-16 = 0	Valid when the input signal changes along the rising edge
		A13-16 = 1	Valid when the input signal changes along the falling edge
		A13-16 = 2	Valid when the input signal changes along the rising or falling edge
		A13-16 = 3	Valid when the input signal logic is 1
		A13-16 = 4	Valid when the input signal logic is 0

Five configuration modes are supported when state machine-based triggering is selected.

Table 2–23 State machine-based triggering

Customized Condition	Comparison Value 1	Comparison Mode	Description
Customized condition 1	A13-11	A13-10 = 0	Current state machine value > State machine comparison value
		A13-10 = 1	Current state machine value < State machine comparison value
		A13-10 = 2	Current state machine value = State machine comparison value
		A13-10 = 3	Current state machine value ⩾ State machine comparison value
		A13-10 = 4	Current state machine value ⩽ State machine comparison value
Customized condition 2	A13-19	A13-18 = 0	Current state machine value > State machine comparison value
		A13-18 = 1	Current state machine value < State machine comparison value
		A13-18 = 2	Current state machine value = State machine comparison value
		A13-18 = 3	Current state machine value ⩾ State machine comparison value
		A13-18 = 4	Current state machine value ⩽ State machine comparison value

To view the waveform recorded by the black box, do as follows:

1. Go to MD580 > Diagnostic and debug > Diagnostic > Black box, and click Refresh to view the faults and time.

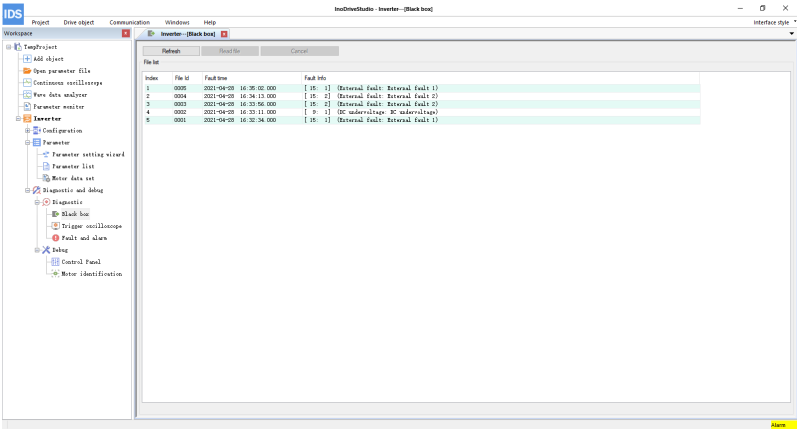


Figure 2-41 Black box interface

2. Select one of the faults, click Read file, and name and save the file.

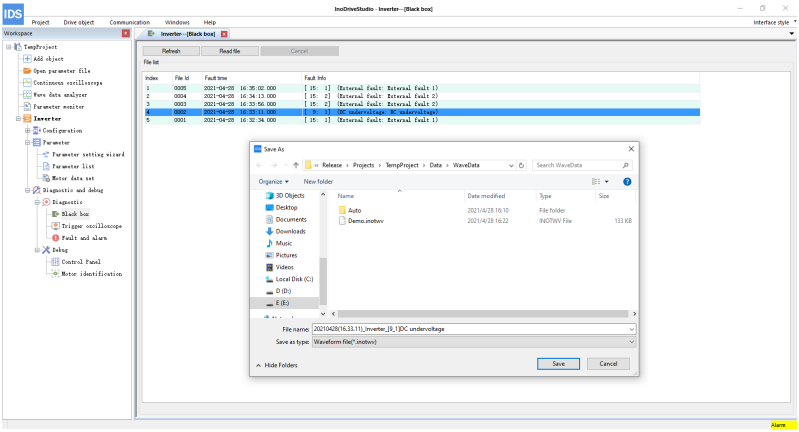


Figure 2-42 Saving interface of the black box

3. After you click Save, the InoDriveStudio will automatically open the waveform that has been saved. Select a required channel to view the corresponding waveform.

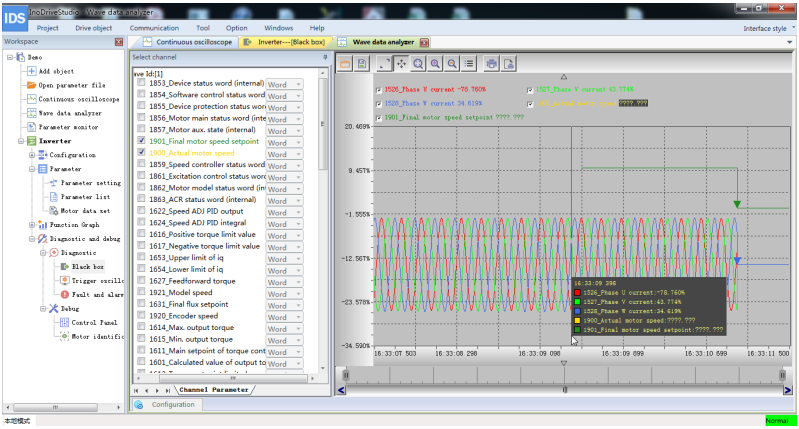


Figure 2-43 Black box waveform

Batch reading of black box files is supported, as shown in the following figure. Click Batch read and select the storage path to read consecutive black box files. Note that the progress bar during the read process only represents that of a single black box file.

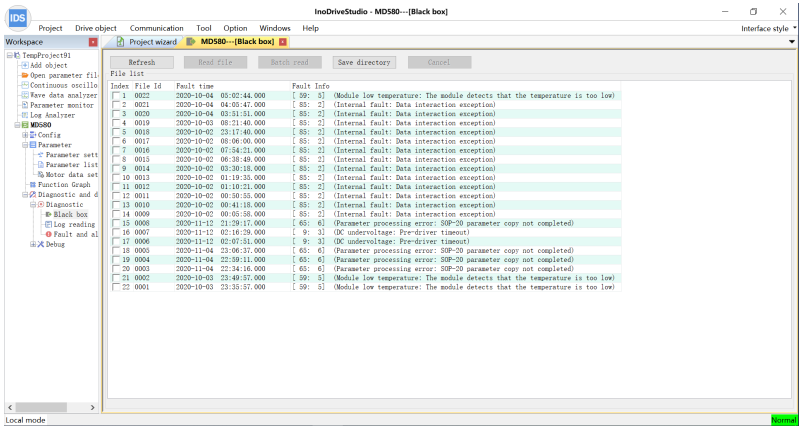


Figure 2-44 Batch reading of black box files

Waveforms can be recorded based on customized conditions. You can set A13-03 to A13-19 to configure triggering conditions. Two conditions (1 and 2) can be configured. When one condition is met or when two conditions are met the following: 1 AND 2, 1 OR 2, or 1 XOR 2, the black box is triggered to record.

When the configured conditions are met, refresh the fault list on the black box interface. You can view the information recorded by the black box.

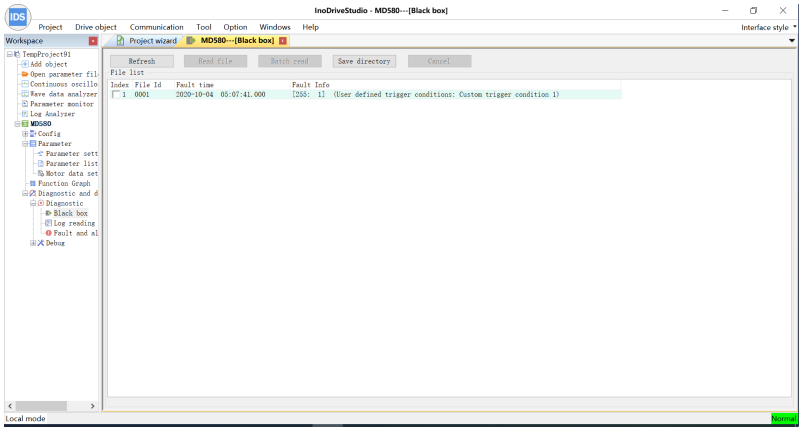


Figure 2-45 Customized conditions to trigger the black box to record

The black box of the MD580 supports two reset modes:

- Clear the black box record. Set A13-01 to 1 and A13-02 to 1. All black box records will be cleared.
- Restore black box configuration parameters.

Note

- The operation that some or all parameters are restored to factory settings by A8-00 will restore the black box configuration parameters.
- When A13-01 is set to 2, the black box configuration parameters are restored. However, the black box failure trigger mode H1-79 is not restored.

3 Commissioning and Operation

3.1 Overview

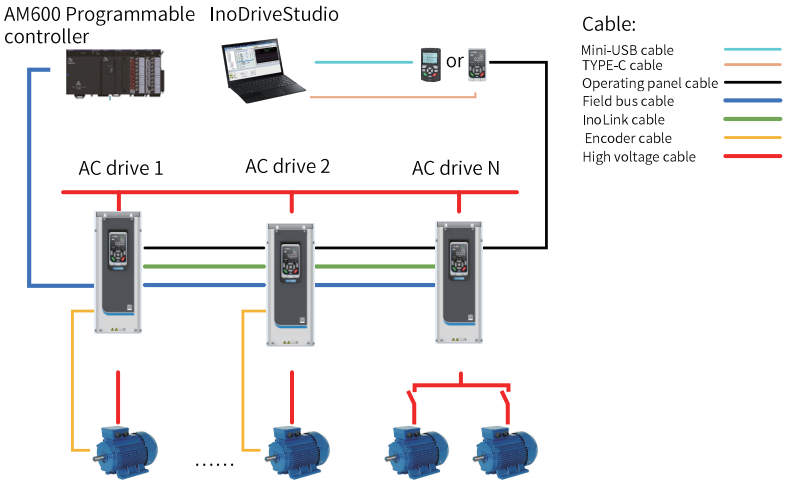


Figure 3-1 Typical topology of the MD580

The typical topology of the drive is shown in the above figure. The drive can be connected to the PLC via the field bus for centralized control. It can also be connected to the operating panel via the network cable (RS485 bus) for commissioning and monitoring. In addition, data interaction can be achieved between the drives via the InoLink master and slave communication bus.

3.1.1 Drive Unit Description

The MD580 drive unit (400 V) has two load application modes: heavy overload and light overload. The MD580 drive unint (690 V) has three load application modes: heavy overload, light overload and no overload. Select the appropriate load application mode according to the rated parameters of the drive unit and the load. Refer to the following table to check the drive unit information.

Table 3–1 Drive unit information

Parameter Code	Parameter Name	Description
A2-00	Product type	It displays the current device type. 0: MD580
A2-01	Module rated power	It displays the module rated power.
A2-02	Module rated voltage	It displays the module rated voltage.

Parameter Code	Parameter Name	Description
A2-03	Module rated current	It displays the module rated current.
A2-04	Overload current reference	It displays the overload current reference in the load mode.
A4-28	Overload mode selection	It is used to select the load application mode.

3.1.2 Control module

3.1.2.1 Introduction to Standard Peripheral Terminals

For details on the standard peripheral terminals, see *MD580 Series Low-Voltage High-Performance Engineering AC Drive Hardware Guide* and *MD580 Series Low-Voltage High-Performance Engineering AC Drive Hardware Guide (690 V)*. This section introduces terminals and related parameter group, as shown in the following table.

Terminal Name	Parameter Group	Remarks
RJ45 for communication with the operating panel	A10	The terminal allows you to set the communication rate and address.
DI	F0	The terminal allows you to set the DI status and set the switch-on/switch-off delay, which are displayed in U0-02 to U0-15.
DO	F1	The terminal allows you to view the DO status, set switch-on/switch-off delay, and select output source, which are displayed in U0-16 to U0-19.
AI	F2	The terminal allows you to view AI values and types and set curves, which are displayed in U5-20, U5-21, U5-27, and U5-28.
AO	F3	The terminal allows you to view AO values and types and select output source, which are displayed in U5-23, U5-24, U5-30, and U5-31.
HDI	F4	The terminal allows you to set high-speed DI input-related information, which are displayed in U5-22 and U5-29.
HDO	F5	The terminal allows you to set high-speed DO input-related information, which are displayed in U5-25 and U5-32.
PT temperature detection	F6	The terminal allows you to set temperature detection-related information, which are displayed in U6-91 to U6-94. After temperature protection is set by E8-29 to E8-43, the motor overheat protection function can be achieved.

Terminal Name	Parameter Group	Remarks
InoLink	n0	The terminal is used to transfer data between modules. U15-00 to U15-07 are used to display PZD1 to PZD8. U0-80 to U0-95 are used to display bit 0 to bit 15 data of PZD1.
Onboard Modbus RTU	n1	The terminal allows you to set standard Modbus RTU communication-related information. U15-08 to U15-17 are ten consecutive addresses, which can be written by the host controller at one time. U10-12 to U10-27 display data of bit 0 to bit 15 of U15-08.

3.1.2.2 Introduction to the Expansion Module

For the hardware of the expansion module, see the corresponding guides of each module. The expansion module includes the PG encoder, communication expansion card, and I/O expansion card.

The MD580 series drive supports incremental encoders, resolvers, sin/cos encoders, and SSI encoders. The following table describes the encoder detection module.

Table 3–2 PG encoder module

Model	Module Name	Module Type	Parameter Group
MD38PGMD	Incremental encoder signal detection module	Encoder	n5/n6
MD38PG4	Resolver signal detection module	Encoder	n5/n6
MD580-PG-AR1	Sin/cos and SSI dual encoder detection module	Encoder	n5/n6
MD580-PG-AU1	ABZ and SSI dual encoder detection module	Encoder	n5/n6

See *"3.7 Setting the Encoder" on page 79* for related parameters.

To use the communication expansion module, do as follows:

1. Confirm the module type.
2. Select the slot where the communication module is located and configure other parameters of the communication module.
3. Set communication parameters in n2/n3 groups for the bus adapter.

Table 3–3 List of communication expansion modules

Model	Module Name	Module Type	Parameter Group	Related Parameter Group
MD580-SI-RS1	Modbus RTU field bus adapter module	Field bus module	n10	n2/n3
MD580-SI-DP1	PROFIBUS DP bus adaption module		n16	n2/n3
MD580-SI-CAN1	CANopen field bus module		n12	n2/n3
MD580-SI-PN1	PROFINET IO industrial Ethernet module	Industrial Ethernet module	n17	n2/n3
MD580-SI-EM1	Modbus TCP industrial Ethernet module		n18	n2/n3
MD580-SI-ECAT1	EtherCAT industrial Ethernet module		n14	n2/n3
MD580-SI-EN1	Ethernet IP industrial Ethernet module		n19	n2/n3

The slot number of the MD580 series drive can be expanded to three by using the HESD-10 module, namely, slots 1-1, 1-2, and 1-3.

You can view the inserted communication expansion modules and their versions through parameters in group A2.

Table 3–4 Expansion module view

Expansion Module Slot	Module Type Parameter	Software Version Parameter
Slot 1_1	A2-29	A2-30
Slot 1_2	A2-31	A2-32
Slot 1_3	A2-33	A2-34

The expansion cards that can be installed in the I/O expansion slots of the MD580 are as follows.

Model	Module Name	Module Type	Parameter Group
MD580-IO-M1	MD580 I/O terminal expansion module	I/O expansion card	F7
HSMT-10	Motor safety temperature detection module	Function safety detection card	F7

You can view the inserted expansion modules and their versions through parameters A2-38 and A2-39.

3.2 Commissioning Flowchart

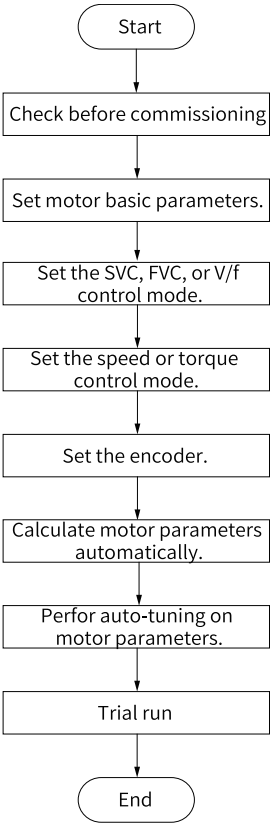


Figure 3-2 Commissioning flowchart

3.3 Inspections Before Commissioning

3.3.1 Checklist

The following table describes parameters used to check device information.

Parameter Code	Parameter Name	Description
A2-00	Product type	It displays the current device type. 0: MD580
A2-01	Module rated power	It displays the module rated power.
A2-02	Module rated voltage	It displays the module rated voltage.

Parameter Code	Parameter Name	Description
A2-03	Module rated current	It displays the module rated current.
A2-04	Overload current reference	It displays the overload current reference in the load mode.
A2-07	Software type	0: Standard software 1: Customized software 2: Temporary software
A2-08	ARM function software version	-
A2-09	ARM function software sub-version	-
A2-10	DSP performance software version	-
A2-12	DSP function software version	-

Note

If the rated power, voltage, and current of the power module do not match the module nameplate information, contact Inovance technical support engineers.

3.3.2 Checking the Wiring

Before power-on and commissioning, ensure that all preparations are completed and check the situation according to the following checklist.

☑	No.	Operation
☐	1	The power supply input of the main circuit is correctly connected to terminals R, S, and T.
☐	2	The main circuit output terminals (U, V, and W) and motor cables (U, V, and W) are connected by the same phase sequence.
☐	3	The power supply input terminals (R, S, and T) and output terminals (U, V, and W) of the main circuit are correctly connected. The power supply input cables are not connected to the output end.
☐	4	The drive and motor are grounded properly.
☐	5	The encoder is correctly connected and the shield is correctly handled.
☐	6	The power supply input of the auxiliary circuit is correctly connected based on terminal labels L1, L2, L3, and N.

☑	No.	Operation
☐	7	Communication cables are correctly connected.
☐	8	External interfaces such as I/O interfaces are correctly connected.

Note

For encoder cable connection and shield processing, see *MD38PGMD Multi-Function Encoder Expansion Card User Guide* and *MD38PG4D Resolver Frequency Division PG Card User Guide*.

3.3.3 Restoring Parameters to Default Settings

Restore parameters to default settings before initial commissioning. In A8 group (environment setting), set A8-00 to select the factory restoration operation and set A8-01 to confirm the operation to restore the specified parameter to the default value. Then, the state machine (A0-00) is in the S20 parameter restoration state. The state machine exists the state after the default settings are restored.

- To restore all parameters to default settings, do as follows:

  1. Set A8-00 to 2 to restore all parameters to default settings.
  2. Set A8-01 to 1 to confirm the operation set by A8-00.
  3. All parameters (including motor parameters in group d) are restored to default settings. The motor power and current are restored to values corresponding to the drive model.

- To restore some parameters (excluding motor parameters) to default settings, do as follows:

  1. Set A8-00 to 1 to restore some parameters to default settings.
  2. Set A8-01 to 1 to confirm the operation set by A8-00.
  3. Parameters excluding those in group d are restored to default settings.

Note

The parameters (such as carrier frequency A4-02) related to the power module model are restored to the default values of the model instead of the factory values. The recorded parameters for group H2 to H7 are not restored. The device name is not restored.

3.3.4 Setting the Load Mode

Depending on the load, set A4-28 to select a appropriate load mode. The load curve is used to protect the power module from overload. The settings can avoid local temperature increase due to continuous overload conditions, and ensure that the power module can run reliably for long time.

Parameter Code	Parameter Name	Value	Unit	Default	Modification Mode	Address
A4–28	Overload mode selection	0: No overload<1> 1: Light overload 2: Heavy overload	-	1	At stop	503

Note

<1>: The no-overload mode is available only for the MD580 series 690 V model.

The selection of the load mode must match the hardware selection design.

The drive is set to the light overload mode by default. For applications with overload requirements for a short time, selecting the heavy overload mode can increase the maximum output current of the power module in a short time. The typical application for the heavy overload mode is that the drive runs at the heavy overload current for a period no shorter than 240 seconds and then runs at 1.5 times the heavy overload current for no more than 60 seconds.

For applications with long-time stable load, the light overload mode is recommended to use the output capability of the power module to the maximum. For details on the load mode, see *MD580 Series Low-Voltage High-Performance Engineering AC Drive Hardware Guide* and *MD580 Series Low-Voltage High-Performance Engineered AC Drive (690V) Hardware Guide*.

3.4 Setting Motor Parameters

The motor parameters must be set based on the rated parameter values on the motor nameplate when the motor is in the S1 status.

Item	Parameter Code	Parameter Name	Description
1	d0-00	Motor type	It is used to set the motor type.
2	d0-01	Rated motor power	It is used to set the rated motor power.

Item	Parameter Code	Parameter Name	Description
3	d0-02	Rated motor voltage	It is used to set the rated motor voltage.
4	d0-03	Rated motor current	It is used to set the rated motor current. For motors in a group, output current of all motor needs to be calculated.
5	d0-04	Rated motor frequency	It is used to set the rated motor frequency which corresponds to the rated motor voltage.
6	d0-05	Rated motor speed	It is used to set the rated motor speed which can be obtained through the motor nameplate.
7	d0-06	Maximum motor speed	It is used to set the maximum speed at which the motor can rotate. The maximum speed of the motor is also subject to E2-10 and E2-13.
8	d0-07	Minimum motor speed	It is used to set the minimum motor speed. This parameter is not required for the motors that do not support low-speed operation.
9	d0-08	Maximum motor current	It is used to set the maximum motor current which is set based on a percentage of the rated motor current.
10	d0-09	Number of motor pole pairs	It is automatically calculated by the drive unit and does not need to be set.
11	d0-10	Motor power factor	Set the motor power factor according to the motor nameplate.
12	d0-16	Motor brake apply	0: Disable 1: Enable. Set the parameter according to actual applications.

3.5 Setting the SVC, FVC, or V/f Mode

Parameter	Control Mode	Default	Description
E0-00	0: SVC Speed sensorless vector control	2	Open loop vector control
	1: FVC Feedback vector control		It is the closed loop vector control mode. The motor must have an encoder installed, and the MD580 supports ABZ encoders, resolvers, sin-cos encoders, and SSI encoders. This mode is applicable to highly-accurate speed control or torque control applications.
	2: V/f Voltage/frequency control		It is applicable to scenarios without high requirements on load control performance or scenarios where one AC drive is used to drive multiple motors, such as fans and pumps.

Note

When the motor type (d0-00) is set to thepermanent magnet synchronous motor, and E0-00 is set to the V/f control mode, it is the SVC control mode that actually takes effect.

3.6 Setting the Speed/Torque Control Mode

Parameter Code	Parameter Name	Description
E0-01	Control mode	0: Speed control
		1: Torque control

Note

In the V/f control mode, only the speed control mode is supported.

3.7 Setting the Encoder

The MD580 supports four encoder types and four encoder detection modules. For details, see *"Table 3–2 PG encoder module" on page 71*. You can select a supported encoder for speed feedback according to the following parameters.

Parameter Code	Parameter Name	Description
d0-21	Selection of encoder for speed feedback	You can select encoder 1 or encoder 2 for speed feedback. Note that the encoder must be enabled before use.
n5-00	Encoder 1 enable	Enable encoder detection module 1.
n6-00	Encoder 2 enable	Enable encoder detection module 2.

You can configure encoder 1 through parameters in n5 group and configure encoder 2 through parameters in n6 group.

Encoder Type	Parameter Code	Parameter Name	Description
Incremental encoder	n5-02/n6-02	Encoder Type	Set the type according to the encoder detection card that is actually accessed. 0: ABZ encoder (MD38PGMD) 6: ABZ encoder (MD580-PG-AU1)
	n5-03/n6-03	Input A/B phase sequence	It is used to set the input A/B phase sequence. If the detected speed is opposite to the actual speed, change the parameter value.
	n5-07/n6-07	Encoder resolution (pulses/revolutions)	It indicates the number of pulses/revolutions of the incremental encoder.
	n5-08/n6-08	Transmission ratio (numerator)	It indicates the numerator of the mechanical transmission ratio between the motor and the encoder. The parameter is used together with n5-09/ n6-09 and the value is typically 1.
	n5-09/n6-09	Transmission ratio (denominator)	It indicates the denominator of the mechanical transmission ratio between the motor and the encoder. The parameter is used together with n5-08/n6-08 and the value is typically 1.
	n5-10/n6-10	Mode of ABZ encoder disconnection detection by hardware	2: If the cable is connected incorrectly or is disconnected, an encoder disconnection fault is reported. 0: No detection is performed.

Encoder Type	Parameter Code	Parameter Name	Description
Incremental encoder	n5-11/n6-11	Time for encoder disconnection detection by hardware	After the encoder disconnects and the specified time expires, an encoder disconnection fault is reported.
	n5-12/n6-12	Encoder installation position angle	It indicates the pole position of the permanent magnet synchronous motor. After the motor parameters are tuned, the value of this parameter is automatically obtained.
	n5-14/n6-14	Encoder disconnection detection by software	It indicates the encoder disconnection detection function by software.
	n5-16/n6-16	Interval for encoder disconnection detection by software	After the encoder disconnects for the specified time, an encoder disconnection fault is reported.
	n5-17/n6-17	Adjustment factor for software detection threshold upon encoder exception	It indicates the software detection threshold.
	n5-22/n6-22	Encoder disconnection detection by hardware	It indicates the encoder disconnection detection function by hardware.
	E4-13	Speed feedback filter time	The default value is 4 ms, during which certain signal interference can be filtered to ensure fast response.

Encoder Type	Parameter Code	Parameter Name	Description
Resolver encoder	n5-02/n6-02	Encoder type	It is used to set the encoder type. 2: Resolver (MD38PG4)
	n5-03/n6-03	Input A/B phase sequence	It is used to set the input A/B phase sequence. If the detected speed is opposite to the actual speed, change the parameter value.
	n5-08/n6-08	Transmission ratio (numerator)	It indicates the numerator of the mechanical transmission ratio between the motor and the encoder. The parameter is used together with n5-09/ n6-09 and the value is typically 1.
	n5-09/n6-09	Transmission ratio (denominator)	It indicates the denominator of the mechanical transmission ratio between the motor and the encoder. The parameter is used together with n5-08/n6-08 and the value is typically 1.
	n5-12/n6-12	Encoder installation position angle	It indicates the pole position of the permanent magnet synchronous motor. After the motor parameters are tuned, the value of this parameter is automatically obtained.
	n5-13/n6-13	Number of pole pairs of resolver	Set this parameter according to the actual parameters of the resolver. For synchronous motors, the number of motor pole pairs must be an integral multiple of the number of resolver pole pairs; otherwise, the motor will malfunction.

Encoder Type	Parameter Code	Parameter Name	Description
Resolver encoder	n5-14/n6-14	Encoder disconnection detection by software	It indicates the encoder disconnection detection function by software.
	n5-16/n6-16	Time for encoder disconnection detection by software	After the encoder disconnects and the specified time expires, an encoder disconnection fault is reported.
	n5-17/n6-17	Adjustment factor for software detection threshold upon encoder exception	It indicates the software detection threshold.
	n5-22/n6-22	Resolver disconnection detection by hardware	It is used to enable the hardware detection function upon resolver disconnection.
	n5-23/n6-23	Interval for resolver disconnection detection by hardware	After the resolver disconnects for the specified time, a resolver disconnection fault is reported.
	E4-13	Speed feedback filter time	The default value is 4 ms, during which certain signal interference can be filtered to ensure fast response.

Encoder Type	Parameter Code	Parameter Name	Description
Sin-cos encoder	n5-02/n6-02	Encoder type	It is used to set the encoder type. 4: Sin-cos encoder (MD580-PG-AR1)
	n5-03/n6-03	Input A/B phase sequence	It is used to set the input A/B phase sequence. If the detected speed is opposite to the actual speed, change the parameter value.
	n5-07/n6-07	Encoder resolution (waves/revolutions)	It indicates the number of waves for sin-cos encoder.
	n5-08/n6-08	Transmission ratio (numerator)	It indicates the numerator of the mechanical transmission ratio between the motor and the encoder. The parameter is used together with n5-09/ n6-09 and the value is typically 1.
	n5-09/n6-09	Transmission ratio (denominator)	It indicates the denominator of the mechanical transmission ratio between the motor and the encoder. The parameter is used together with n5-08/n6-08 and the value is typically 1.
	n5-11/n6-11	Time for encoder disconnection detection by hardware	After the encoder disconnects and the specified time expires, an encoder disconnection fault is reported.

Encoder Type	Parameter Code	Parameter Name	Description
Sin-cos encoder	n5-12/n6-12	Encoder installation position angle	It indicates the pole position of the permanent magnet synchronous motor. After the motor parameters are tuned, the value of this parameter is automatically obtained.
	n5-14/n6-14	Encoder disconnection detection by software	It indicates the encoder disconnection detection function by software.
	n5-16/n6-16	Interval for encoder disconnection detection by software	After the encoder disconnects for the specified time, an encoder disconnection fault is reported.
	n5-17/n6-17	Adjustment factor for software detection threshold upon encoder exception	It indicates the software detection threshold.

Encoder Type	Parameter Code	Parameter Name	Description
SSI encoder	n5-02/n6-02	Encoder type	Set the type according to the encoder detection card that is actually accessed. 5: SSI encoder (MD580-PG-AR1) 7: SSI encoder (MD580-PG-AU1)
	n5-50/n6-50	SSI encoder clock frequency	Set the parameter according to the parameters of the actually connected SSI encoder.
	n5-51/n6-51	SSI encoder output coding system	Set the parameter according to the parameters of the actually connected SSI encoder.
	n5-52/n6-52	SSI encoder verification mode	Set the parameter according to the parameters of the actually connected SSI encoder.
	n5-53/n6-53	Number of SSI encoder status bits	Set the parameter according to the parameters of the actually connected SSI encoder.
	n5-54/n6-54	Number of SSI encoder single-turn bits	Set the parameter according to the parameters of the actually connected SSI encoder.
	n5-55/n6-55	Number of SSI encoder multi-turn bits	Set the parameter according to the parameters of the actually connected SSI encoder.
	n5-03/n6-03	Input A/B phase sequence	It is used to set the input A/B phase sequence. If the detected speed is opposite to the actual speed, change the parameter value.

Encoder Type	Parameter Code	Parameter Name	Description
SSI encoder	n5-08/n6-08	Transmission ratio (numerator)	It indicates the numerator of the mechanical transmission ratio between the motor and the encoder. The parameter is used together with n5-09/ n6-09 and the value is typically 1.
	n5-09/n6-09	Transmission ratio (denominator)	It indicates the numerator of the mechanical transmission ratio between the motor and the encoder. The parameter is used together with n5-08/ n6-08 and the value is typically 1.
	n5-11/n6-11	Time for encoder disconnection detection by hardware	After the encoder disconnects and the specified time expires, an encoder disconnection fault is reported.
	n5-12/n6-12	Encoder installation position angle	It indicates the pole position of the permanent magnet synchronous motor. After the motor parameters are tuned, the value of this parameter is automatically obtained.
	n5-14/n6-14	Encoder disconnection detection by software	It indicates the encoder disconnection detection function by software.
SSI encoder	n5-16/n6-16	Interval for encoder disconnection detection by software	After the encoder disconnects for the specified time, an encoder disconnection fault is reported.
	n5-17/n6-17	Adjustment factor for software detection threshold upon encoder exception	It indicates the software detection threshold.
	n5-22/n6-22	Encoder disconnection detection by hardware	It indicates the encoder disconnection detection function by hardware.
	E4-13	Speed feedback filter time	The default value is 4 ms, during which certain signal interference can be filtered to ensure fast response.

Note

The maximum number of single-turn or multi-turn bits of the SSI encoder is 24, and the total number of single-turn and multi-turn bits of the SSI encoder is 32.

3.8 Automatic Calculation of Motor Parameters

The drive supports automatic calculation of motor parameters. Before commissioning, calculate motor parameters, and change the tuned motor parameters to the empirical value converted based on the calculated motor parameters.

To calculate motor parameters, do as follows:

1. Set b5-02 to 1 to enable motor parameter calculation.
2. Set b5-03 to 1 to confirm motor parameter calculation.
3. After the automatic calculation of the motor parameters is complete, the following parameters are updated.

Parameter Code	Parameter Name	Value
b5-02	Parameter calculation	0: No operation 1: Calculate motor parameters
b5-03	Parameter calculation confirmation	0: Cancel 1: Confirm

Table 3–5 Asynchronous motor parameters

Parameter Code	Parameter Name
d1-00	Asynchronous motor stator resistance
d1-01	Asynchronous motor rotor resistance
d1-02	Asynchronous motor leakage inductance
d1-03	Asynchronous motor mutual inductance
d1-04	Asynchronous motor no-load current
d1-13	Magnetic field rotor time constant of asynchronous motors
E1-03	Pre-excitation time
E1-15	Demagnetization time (waiting time for DC braking upon stop)
E7-07	Flying start timeout in SVC control mode

Table 3–6 Parameter of permanent magnet synchronous motors

Parameter Code	Parameter Name
d1-20	Synchronous motor stator resistance
d1-21	Axis-D inductance of synchronous motors
d1-22	Axis-Q inductance of synchronous motors
d1-23	Back EMF voltage of synchronous motors

3.9 Motor Auto-tuning

3.9.1 Check Before Motor Auto-Tuning

Before performing self-test and auto-tuning of the motor, check and ensure the following conditions:

1. The device is not on the construction site.
2. There are no obstructions around the motor shaft.
3. The brake for the motor is released.
4. The motor fan is normal.
5. If the motor is connected to the device, ensure that the device meets conditions for operation. For example, if lubrication is required, apply lubrication to the device.

When self-check and auto-tuning are performed, the motor operates after a brake close command is received. The source of the brake close command during auto-tuning is the same as that of the start and stop command during normal operation. In general, self-check and auto-tuning can be started and stopped by local control mode.

Local control permissions through the MDKE-10 and SOP-20-880 operating panels must be obtained before auto-tuning. Pressing the Loc/Rem key on the operating panel can switch between the local control mode and the remote control mode. You can also commission the drive through the control panel and commissioning wizard of the InoDriveStudio to speed up the commission process.

3.9.2 Motor Parameter Auto-tuning

Motor parameter auto-tuning is the process that the AC drive obtains the parameters of the controlled motor.

The methods for motor parameter auto-tuning are as follows:

- Static auto-tuning: It is suitable for asynchronous motors and permanent magnet synchronous motors. The motor will not rotate during the auto-tuning, and the basic parameters of the motor can be obtained. This method applies only to situations where the motor is loaded and cannot be rotated. Parameters such as mutual inductance, no-load current, mutual inductance curve, and inertia speed

loop cannot be tuned. The accuracy of motor parameters is slightly lower than that of the parameters of the motor on which no-load complete auto-tuning is performed. If the asynchronous motor uses the SVC control mode, it is recommended to set b5-00 to 2 or 3 for auto-tuning.

- No-load complete auto-tuning: It is suitable for asynchronous motors and permanent magnet synchronous motors. The motor will rotate during the auto-tuning process. Therefore, before auto-tuning, ensure that the motor is allowed for rotation and the rotation will not cause personal injury or equipment damage. This method applies to the scenario where the motor is unloaded and can be rotate freely. By this method, the most accurate motor parameters can be obtained.
- With-load auto-tuning: It applies to the scenario where the load cannot be disengaged, but accurate motor parameters need to be obtained. Before auto-tuning, ensure that the motor and the connected load are allowed for rotation, the stroke space is enough, and the rotation will not cause personal injury or equipment damage.
- Inertia auto-tuning: In this method, the motor rotates and only inertia parameters are tuned. Before auto-tuning, ensure that the motor and the connected load are allowed for rotation, the stroke space is enough, and the rotation will not cause personal injury or equipment damage.

Parameter Code	Parameter Name	Value
b5-00	Auto-tuning method	0: No operation 1: Static auto-tuning of asynchronous motors 2: No-load complete auto-tuning of asynchronous motors 4: Inertia auto-tuning of asynchronous motors (SVC/FVC) 11: With-load auto-tuning of synchronous motors (FVC) 12: No-load auto-tuning of synchronous motors 13: Static auto-tuning of synchronous motors 14: Inertia auto-tuning of synchronous motors

Do the following when the drive is in the power-on ready state:

1. Ensure that the local control mode by the operating panel is set.
2. Ensure that the drive is not faulty and is in the S5 power-on ready state.
3. Set b5-00 to perform motor parameter auto-tuning. No-load auto-tuning is recommended for motors that can be disconnected from the loads for more

accurate parameters. After b5-00 is set, the drive enters the S18 auto-tuning preparation state.

4. After a running command is sent, the drive enters the S19 Auto-tuning state and outputs current. The motor keeps in the static state and then rotates until auto-tuning is completed. Then the motor becomes static again. The drive enters the S4 power-on inhibition state. After the running command is canceled, the drive enters the S5 power-on ready state.

The state change process during auto-tuning is as follows:

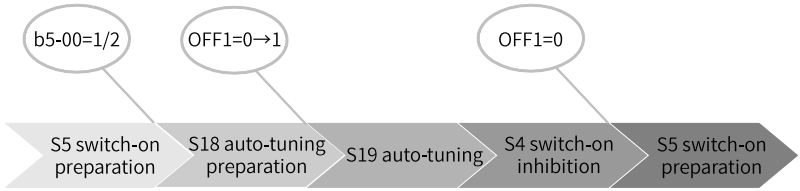


Figure 3-3 State change process during auto-tuning

After auto-tuning is complete, the tuned motor parameters are automatically saved. Parameters to be tuned vary with different auto-tuning methods, as shown in the table below.

Table 3–7 Auto-tuned parameters for asynchronous motors

Parameter Code	Parameter Name	Static Auto-tuning of Asynchronous Motors (b5-00 = 1)	No-load Complete Auto-tuning of Asynchronous Motors (b5-00 = 2)	Inertia Auto-tuning of Asynchronous Motors (SVC/ FVC) (b5-00 = 4)
d1-00	Motor stator resistance	✓	✓	-
d1-01	Rotor resistance of asynchronous motors	✓	✓	-
d1-02	Asynchronous motor leakage inductance	✓	✓	-
d1-03	Asynchronous motor mutual inductance	-	✓	-
d1-04	Asynchronous motor no-load current	-	✓	-
d1-06	Magnetic field saturation mutual inductance coefficient 1 of asynchronous motors	-	✓	-

Parameter Code	Parameter Name	Static Auto-tuning of Asynchronous Motors (b5-00 = 1)	No-load Complete Auto-tuning of Asynchronous Motors (b5-00 = 2)	Inertia Auto-tuning of Asynchronous Motors (SVC/ FVC) (b5-00 = 4)
d1-08	Magnetic field saturation mutual inductance coefficient 2 of asynchronous motors	-	✓	-
d1-10	Magnetic field saturation mutual inductance coefficient 3 of asynchronous motors	-	✓	-
d1-12	Magnetic field saturation mutual inductance coefficient 4 of asynchronous motors	-	✓	-
d1-13	Magnetic field rotor time constant of asynchronous motors	✓	✓	-
n5-03	Input A/B phase sequence	-	✓	-
d2-00	Inertia	-	✓	✓
d2-05	Electromechanical time constant	-	✓	✓
E1-03	Pre-excitation time	✓	✓	-
E1-15	Demagnetization time (waiting time for DC braking upon stop)	✓	✓	-
E7-07	Flying start timeout in SVC control mode	✓	✓	-

Table 3–8 Auto-tuned parameters for synchronous motors

Parameter Code	Parameter Name	With-load Auto-tuning of Synchronous Motors (FVC) (b5-00 = 11)	No-load Auto-tuning of Synchronous Motors (b5-00 = 12)	Static Auto-tuning of Synchronous Motors (b5-00 = 13)	Inertia Auto-tuning of Synchronous Motors (b5-00 = 14)
d1-22	Synchronous motor stator resistance	✓	✓	✓	-
d1-24	D-axis inductance of synchronous motors	✓	✓	✓	✓
d1-25	Q-axis inductance of synchronous motors	✓	✓	✓	✓
d1-26	Synchronous motor back EMF coefficient	-	✓	✓	-
n5-03 [1]	Input A/B phase sequence	✓	✓	-	-
n5-12 [1]	Encoder installation position angle	✓	✓	-	-
d2-00	Inertia	-	✓	-	✓
d2-05	Electrome chanical time constant	-	✓	-	✓

Note

- When b5-00 is set to 2 (no-load complete auto-tuning of asynchronous motors), the motor will rotate at high speed. Therefore, ensure that it is set under conditions allowed by mechanical safety. In addition, ensure that the load torque of the motor at constant speed is close to that of the motor with no load. The lighter the load, the more accurate the auto-tuning result. Overload may cause drive overload or overcurrent.
- In the FVC control mode of the synchronous motor, the mounting position angle of the encoder must be set or recognized correctly before operation. If the load cannot be detached and no-load complete auto-tuning (b5-00 = 12) cannot be performed, set b5-00 to 11 to perform with-load auto-tuning of synchronous motors.

3.10 Trial Run

3.10.1Start by Local Control Mode or via Default Terminal

For the initial trial operation, it is recommended to use the InoDriveStudio, MDKE-10 LED operating panel, or SOP-20-880 operating panel to start the drive. For details, see *"2.1 Commissioning Tools" on page 15*. The V/f control mode and speed control mode are adopted. Default configurations of the speed reference and RFG are used. Before trial operation, check parameters listed in the following table.

Table 3–9 Parameters for start by the InoDriveStudio or operating panel

Parameter Code	Parameter Name	Reference (Default)	Reference Description
A9-00	Control channel selection	0	Select channel 1.
A9-02	Reference channel selection	0	Select reference channel 1.
A9-04	Motor data group selection 0 source	0	Select the first group of motor parameters.
A9-05	Motor data group selection 1 source	0	
E0-00	Control mode	2	V/f control mode
E0-01	Control method	0	Speed control
E1-00	Start mode	0	Direct start
E1-27	OFF1 stop mode	1	Decelerate to stop
E3-00	V/f mode selection	0	V/f curve
E3-01	V/f curve selection	0	Linear V/f

Parameter Code	Parameter Name	Reference (Default)	Reference Description
C8-04	RFG selection 1	0	Select RFG 1 acceleration/ deceleration time.
C8-05	RFG selection 2	0	
C8-08	RFG 1 acceleration time	20	RFG 1 acceleration time of 20s
C8-09	Ramp 1 deceleration time	20	RFG 1 deceleration time of 20s

When using the default terminal to start or stop the drive, check the following parameters in addition to the previous parameters.

Table 3–10 Parameters for start/stop by the default terminal

Parameter Code	Parameter Name	Value	Description
b0-00	Start/Stop control word source	0	Select the terminal start/ stop module.
b4-02	Terminal start/stop module A/B selection	0	Module A
b4-03	Mode of terminal start/ stop module A	1	Select the IN1 start mode.
b4-05	Input 1 of terminal start/stop module A	U0-02 (1002)	Select DI1 as the command source.
C0-00	Source of main speed in speed control mode	U19-02 (2902)	Select multi-reference 1 as the speed reference.
C6-11	Multi-reference 1	Speed reference	-

When the DI1 state changes from 0 to 1 (rising edge), the drive starts and the motor accelerates from the static state to the speed set by C6-11. For more information about terminal-controlled start/stop, see the terminal start/stop module section.

Note

During operation, if the motor runs in the opposite direction to the set direction, you can change the value of d0-15 (motor phase sequence) to change the motor rotation direction without changing the cable sequence.

3.10.2Startup via Field Bus

When using the field bus communication method to start the drive, determine a protocol for data interaction with the host controller and set parameters according to

the protocol. The field bus adapter A is configured for PROFIBUS DP-based startup, which is used as an example in the section.

The following table describes the data sent by the host controller to the MD580.

Data	Definition	Description
PZD1	Control word	For details, see the control word definition table.
PZD2	Speed reference	The speed ramp is set by PLC. 4096 represents 100% of the motor rated frequency.

Table 3–11 Control word definition

Bit	Description
Bit 0	0: Stop 1: Start when bit 0 is set from 0 to 1
Bit 1	0: Coast to stop 1: Required condition for running
Bit 2	0: Quick stop 1: Required condition for running
Bit 3	0: Disable output 1: Enable operation
Bit 4	0: Disable ramp output 1: Enable ramp output
Bit 5	0: Valid ramp pause 1: Invalid ramp pause
Bit 6	0: Setting the ramp reference to 0 is valid. 1: Setting the ramp reference to 0 is invalid.
Bit 7	0: Inactive 1: Fault reset valid when bit 7 is set from 0 to 1.
Bit 8 to bit 9	Reserved
Bit 10	0: Invalid PZD data 1: Valid PZD data
Bit 11 to bit 15	Reserved

The following table describes the data sent by the MD580 to the host controller.

Data	Definition	Description
PZD1	Status word 1	For details meanings, see *"Table 3–12 Status word definition" on page 97*.
PZD2	DC bus voltage	The value has one decimal place. 1000 represents 100.0 V.

Table 3–12 Status word definition

Bit	Description
Bit 0	0: Not ready to switch on 1: Ready to switch on
Bit 1	0: Not ready to run 1: Ready to run
Bit 2	0: Not running 1: Running
Bit 3	0: No fault 1: Fault activated
Bit 4 to bit 6	Reserved
Bit 7	0: No warning 1: Warning activated
Bit 8 to Bit 15	Reserved

Parameter settings

- Bus adapter PROFIBUS DP configuration:

Parameter Code	Parameter Name	Value	Description
n2-00	Bus type of bus adapter	7	The bus adapter A is defined as the PROFIBUS DP type.
n2-01	Communication disconnection detection delay	1.00	A communication failure is reported one second after communication interruption.
n2-02	Bus adapter communication mode selection	0(standard mode)	The fault that the communication card of the bus adapter encounters is detected by default.
n2-03	Continuous CRC error detection on communication	0	The CRC is not performed on the data received by the bus adapter.
n2-04	Process data output 1	U6-20 (1620)	Configure the status word by using the bit-to-word function module A.
n2-05	Process data output 2	U5-05 (1505)	U5-05 indicates the DC bus voltage (filter time of 100 ms)

Parameter Code	Parameter Name	Value	Description
n2-20	Communication base value of process data output 1	0	No base value conversion required
n2-21	Communication base value of process data output 2	0	No base value conversion required
n2-36	Communication base value of process data input 1	0	No base value conversion required
n2-37	Communication base value of process data input 2	0	No base value conversion required
n16-00	Expansion slot selection	1	The PROFIBUS DP communication module is installed in expansion slot 1_1.
n16-02	Expansion card station number	45	Set the PROFIBUS DP address to 45
n16-10	DP data check bit	0	Set the data check bit of the PROFIBUS DP to bit 10 of PZD 1. When bit 10 of the received PZD 1 is set to 1, the communication is valid.

- PZD 1 control word configuration:

Parameter Code	Parameter Name	Value	Description
b0-00	Start/Stop control word source	1	The value description is customized by parameters in group b0.
b0-01	Customize OFF1 source	U0-48 (1048)	Select bit 0 of PZD 1 for the bus adapter A as the OFF1 command source.
b0-02	Customize OFF2 source 1	U0-49 (1049)	Select bit 1 of PZD 1 for the bus adapter A as the OFF2 command source.
b0-03	Customize OFF3 source 1	U0-50 (1050)	Select bit 2 of PZD 1 for the bus adapter A as the OFF3 command source.

Parameter Code	Parameter Name	Value	Description
b0-04	Customize running permission source	U0-51 (1051)	Select bit 3 of PZD 1 for the bus adapter A as the operation enabling command source.
b0-05	Customize fault reset source 1	U0-55 (1055)	Select bit 7 of PZD 1 for the bus adapter A as the source of the fault reset command.
b1-06	RFG prohibition source	U0-52 (1052)	Select bit 4 of PZD 1 for the bus adapter A as the ramp output enabling command source.
b1-07	RFG pause source	U0-53 (1053)	Select bit 5 of PZD 1 for the bus adapter A as the ramp pause command source.
b1-08	Source of setting RFG reference to 0	U0-54 (1054)	Select bit 6 of PZD 1 for the bus adapter A as the source of setting ramp reference to 0.
n16-10	DP data check bit	0 or 12	Select bit 10 of PZD 1 for bus adapter A as the command source of the DP data check bit.

- Speed reference configuration:

Parameter Code	Parameter Name	Value	Description
A9-00	Control channel selection	0	Select command channel 1.
A9-02	Set channel selection	0	Select set channel 1.
C0-00	Main reference selection in speed control mode	U15-19 (2519)	Select PZD 2 of the bus adapter A as the speed reference source.

- Status word output by bit-to-word function 1:

Parameter Code	Parameter Name	Value	Description
L10-10	Bit-to-word module A enable	1	Enable
L10-11	Bit 00 selection of bit-to-word module A	U1-12 (1112)	Ready to switch on

Parameter Code	Parameter Name	Value	Description
L10-12	Bit 01 selection of bit-to-word module A	U1-13 (1113)	Ready to run
L10-13	Bit 02 selection of bit-to-word module A	U1-14 (1114)	Forward run
L10-14	Bit 03 selection of bit-to-word module A	U1-15 (1115)	Fault activated
L10-15	Bit 04 selection of bit-to-word module A	0	-
L10-16	Bit 05 selection of bit-to-word module A	0	-
L10-17	Bit 06 selection of bit-to-word module A	0	-
L10-18	Bit 07 selection of bit-to-word module A	U1-19 (1119)	Alarm/minor fault activated
L10-19	Bit 08 selection of bit-to-word module A	0	-
L10-20	Bit 09 selection of bit-to-word module A	0	-
L10-21	Bit 10 selection of bit-to-word module A	0	-
L10-22	Bit 11 selection of bit-to-word module A	0	-
L10-23	Bit 12 selection of bit-to-word module A	0	-
L10-24	Bit 13 selection of bit-to-word module A	0	-
L10-25	Bit 14 selection of bit-to-word module A	0	-
L10-26	Bit 15 selection of bit-to-word module A	0	-
L10-88	Positive and negative logic selection of bit-to-word module A	0	Bit 0 to bit 15 input of bit-to-word module A take effect based on positive logic.

3.10.3Start Up with Digital and Analog Inputs

You can use digital inputs as the command source to start and stop the device, analog inputs as the speed reference to start the device. For example, you can use DI1 as the start command, DI2 as the quick stop command, DI3 as the fault reset command, AI1 as the speed reference, and set *"Table 3–13 Example of digital input and analog input startup parameter setting" on page 101* parameters on the basis of *"Table 3–10 Parameters for start/stop by the default terminal" on page 95*:

Table 3–13 Example of digital input and analog input startup parameter setting

Param	Param. Name	Value	Description
b0-00	Start/Stop control word source	1	Customize settings.
b0-01	Customize OFF1 source 1	U0-02 (1002)	Select DI1 as the source of OFF1 command.
b0-03	Customize OFF3 source 1	U0-03 (1003)	Select DI2 as the source of OFF3 command.
b0-04	Customize running permission source	1	Running permitted
b0-05	Customize fault reset source 1	U0-04 (1004)	Select DI3 as the source of the fault reset command.
C0-00	Main reference selection in speed control mode	U5-20 (1520)	Select AI1 as the speed reference source.

3.10.4Startup via Modbus

Special address control

As specified by the Modbus communication protocol, parameters are read and written directly through the communication address and no process data will be produced. However, b0-01/b2-01 of the OFF1 source is not allowed to be set to 1 to start the drive and a connector data must be selected. At the same time, when the Modbus is used and the control address is continuous, communication efficiency will be greatly improved.

In order to facilitate start, stop and setup through the Modbus, the drive provides the following special addresses that can be written directly, and updates the data to a specific connector for a given source to read.

Note

The special address control method supports both the bus adapter-Modbus communication module and the onboard Modbus RTU module.

Communication Address	Write Parameter Code	Write Parameter Name	Description
24984	U15-08	Modbus communication setpoint 1	It can be written directly through the Modbus.
24985	U15-09	Modbus communication setpoint 2	It can be written directly through the Modbus.
24986	U15-10	Modbus communication setpoint 3	It can be written directly through the Modbus.
24987	U15-11	Modbus communication setpoint 4	It can be written directly through the Modbus.
24988	U15-12	Modbus communication setpoint 5	It can be written directly through the Modbus.
24989	U15-13	Modbus communication setpoint 6	It can be written directly through the Modbus.
24990	U15-14	Modbus communication setpoint 7	It can be written directly through the Modbus.
24991	U15-15	Modbus communication setpoint 8	It can be written directly through the Modbus.
24992	U15-16	Modbus communication setpoint 9	It can be written directly through the Modbus.
24993	U15-17	Modbus communication setpoint 10	It can be written directly through the Modbus.

Communication Address	Write Parameter Code	Write Parameter Name	Description
31232	U10-12	Bit 00 of Modbus communication setpoint 1	• Sixteen bits of Modbus communication setpoint 1 • The 16 bits can be automatically generated after Modbus communication setpoint 1 is written. The bit addresses cannot be written separately.
31233	U10-13	Bit 01 of Modbus communication setpoint 1	
31234	U10-14	Bit 02 of Modbus communication setpoint 1	
31235	U10-15	Bit 03 of Modbus communication setpoint 1	
31236	U10-16	Bit 04 of Modbus communication setpoint 1	
31237	U10-17	Bit 05 of Modbus communication setpoint 1	
31238	U10-18	Bit 06 of Modbus communication setpoint 1	

Communication Address	Write Parameter Code	Write Parameter Name	Description
31239	U10-19	Bit 07 of Modbus communication setpoint 1	Continued
31240	U10-20	Bit 08 of Modbus communication setpoint 1	
31241	U10-21	Bit 09 of Modbus communication setpoint 1	
31242	U10-22	Bit 10 of Modbus communication setpoint 1	
31243	U10-23	Bit 11 of Modbus communication setpoint 1	
31244	U10-24	Bit 12 of Modbus communication setpoint 1	
31245	U10-25	Bit 13 of Modbus communication setpoint 1	
31246	U10-26	Bit 14 of Modbus communication setpoint 1	
31247	U10-27	Bit 15 of Modbus communication setpoint 1	

Bus adapter mode parameter configuration:

Parameter Code	Parameter Name	Value	Description
n2-00	Bus type of bus adapter	1	Select the Modbus RTU for bus adapter A.
n10-00	Expansion slot selection	1	The Modbus RTU module is installed in expansion slot 1-1.
n10-04	Modbus local address	4	Set the Modbus RTU communication module address to 4.
b0-00	Start/Stop control word source	1	Set the source by parameters in group b0.

Parameter Code	Parameter Name	Value	Description
b0-01	Customized OFF1 source	U10-12 (2012)	Select the bit 0 of the Modbus communication setpoint 1 to the OFF1 command source.
C0-00	Main reference selection in speed control mode	U15-09 (2509)	Select the Modbus communication setpoint 2 as the speed reference source.

Parameter configuration for the onboard Modbus RTU mode:

Parameter Code	Parameter Name	Value	Description
n1-00	Modbus enable	1	Enable the onboard Modbus RTU.
n1-02	Modbus local address	4	Set the onboard Modbus RTU address to 4.
b0-00	Start/Stop control word source	1	Set the source by parameters in group b0.
b0-01	Customized OFF1 source	U10-12 (2012)	Select bit 0 of the Modbus communication setpoint 1 to the OFF1 command source.
C0-00	Main reference selection in speed control mode	U15-09 (2509)	Select the Modbus communication setpoint 2 as the speed reference source.

Write 0 to communication address 24984 (U15-08) via Modbus for shutdown and write 1 for operation control. Write data to communication address 24985 (U15-09) as the speed reference source. The written data 4096 corresponds to 100% of the motor rated frequency, and -4096 corresponds to -100% of the motor rated frequency.

Continuous address control

Due to the limited number of special communication addresses provided by the drive, the Modbus RTU and Modbus TCP support write operation of process data n2-68 to n2-83 (n3-68 to n3-83). After converted by communication base values of n2-36 to n2-51 (n3-36 to n3-51), the process data is updated to the corresponding connectors U15-18 to U5-33 (U15-34 to U15-49).

Note

The continuous address control method applies only to the bus adapter-Modbus communication module, and does not apply to the on-board Modbus RTU.

Bus adapter A:

Communication Address	Written Parameter Code	Parameter Name	Description
17423	n2-68	Data display of process data input 1	It is written by Modbus, converted by the base value of n2-36, and updated to connector U15-18.
17424	n2-69	Data display of process data input 2	It is written by Modbus, converted by the base value of n2-37, and updated to connector U15-19.
17425	n2-70	Data display of process data input 3	It is written by Modbus, converted by the base value of n2-38, and updated to connector U15-20.
17426	n2-71	Data display of process data input 4	It is written by Modbus, converted by the base value of n2-39, and updated to connector U15-21.
17427	n2-72	Data display of process data input 5	It is written by Modbus, converted by the base value of n2-40, and updated to connector U15-22.
17428	n2-73	Data display of process data input 6	It is written by Modbus, converted by the base value of n2-41, and updated to connector U15-23.
17429	n2-74	Data display of process data input 7	It is written by Modbus, converted by the base value of n2-42, and updated to connector U15-24.
17430	n2-75	Data display of process data input 8	It is written by Modbus, converted by the base value of n2-43, and updated to connector U15-25.
17431	n2-76	Data display of process data input 9	It is written by Modbus, converted by the base value of n2-44, and updated to connector U15-26.
17432	n2-77	Data display of process data input 10	It is written by Modbus, converted by the base value of n2-45, and updated to connector U15-27.
17433	n2-78	Data display of process data input 11	It is written by Modbus, converted by the base value of n2-46, and updated to connector U15-28.
17434	n2-79	Data display of process data input 12	It is written by Modbus, converted by the base value of n2-47, and updated to connector U15-29.
17435	n2-80	Data display of process data input 13	It is written by Modbus, converted by the base value of n2-48, and updated to connector U15-30.
17436	n2-81	Data display of process data input 14	It is written by Modbus, converted by the base value of n2-49, and updated to connector U15-31.

Communication Address	Written Parameter Code	Parameter Name	Description
17437	n2-82	Data display of process data input 15	It is written by Modbus, converted by the base value of n2-50, and updated to connector U15-32.
17438	n2-83	Data display of process data input 16	It is written by Modbus, converted by the base value of n2-51, and updated to connector U15-33.

Bus adapter B

Communication Address	Written Parameter Code	Parameter Name	Description
17471	n3-68	Data display of process data input 1	It is written by Modbus, converted by the base value of n3-36, and updated to connector U15-34.
17472	n3-69	Data display of process data input 2	It is written by Modbus, converted by the base value of n3-37, and updated to connector U15-35.
17473	n3-70	Data display of process data input 3	It is written by Modbus, converted by the base value of n3-38, and updated to connector U15-36.
17474	n3-71	Data display of process data input 4	It is written by Modbus, converted by the base value of n3-39, and updated to connector U15-37.
17475	n3-72	Data display of process data input 5	It is written by Modbus, converted by the base value of n3-40, and updated to connector U15-38.
17476	n3-73	Data display of process data input 6	It is written by Modbus, converted by the base value of n3-41, and updated to connector U15-39.
17477	n3-74	Data display of process data input 7	It is written by Modbus, converted by the base value of n3-42, and updated to connector U15-40.
17478	n3-75	Data display of process data input 8	It is written by Modbus, converted by the base value of n3-43, and updated to connector U15-41.
17479	n3-76	Data display of process data input 9	It is written by Modbus, converted by the base value of n3-44, and updated to connector U15-42.
17480	n3-77	Data display of process data input 10	It is written by Modbus, converted by the base value of n3-45, and updated to connector U15-43.
17481	n3-78	Data display of process data input 11	It is written by Modbus, converted by the base value of n3-46, and updated to connector U15-44.

Communication Address	Written Parameter Code	Parameter Name	Description
17482	n3-79	Data display of process data input 12	It is written by Modbus, converted by the base value of n3-47, and updated to connector U15-45.
17483	n3-80	Data display of process data input 13	It is written by Modbus, converted by the base value of n3-48, and updated to connector U15-46.
17484	n3-81	Data display of process data input 14	It is written by Modbus, converted by the base value of n3-49, and updated to connector U15-47.
17485	n3-82	Data display of process data input 15	It is written by Modbus, converted by the base value of n3-50, and updated to connector U15-48.
17486	n3-83	Data display of process data input 16	It is written by Modbus, converted by the base value of n3-51, and updated to connector U15-49.

Use continuous addresses as the start, stop, and reset command sources of the drive via the Modbus. For details, see *"3.10.2 Startup via Field Bus" on page 95*.

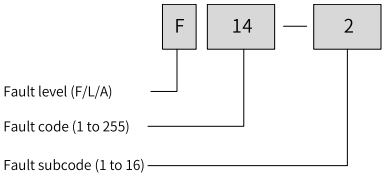
4 Troubleshooting

4.1 Fault View

Faults are divided into three types depending on the urgency.

- Fault: It indicates that a major fault or error has occurred and the device stops running immediately. You must troubleshoot the fault as soon as possible.
- Limit (minor fault): The device has encountered a minor fault and can continue to run after derating. However, the running results may deviate from the settings. Operations at the limited current, speed, and torque are supported.
- Alarm: It is used to indicate that an abnormality has occurred, but normal operation is not affected. You can determine the subsequent handling plan.

A fault code is represented in three segments, as shown in the following figure. F indicates a fault, L indicates a minor fault, and A indicates an alarm.



Viewing current faults

The MD580 can record up to six faults that occur at the same time. When more than six faults occur at the same time, the subsequent faults will not be recorded. Parameters in A1 group indicate the active faults.

Active Fault		Active Minor Fault		Active Alarm	
Code	Subcode	Code	Subcode	Code	Subcode
A1-00	A1-01	A1-18	A1-19	A1-36	A1-37
A1-03	A1-04	A1-21	A1-22	A1-39	A1-40
A1-06	A1-07	A1-24	A1-25	A1-42	A1-43
A1-09	A1-10	A1-27	A1-28	A1-45	A1-46
A1-12	A1-13	A1-30	A1-31	A1-48	A1-49
A1-15	A1-16	A1-33	A1-34	A1-51	A1-52

Viewing fault history

The MD580 records the last six faults.

Current Fault		Last Fault		Second Last Fault		Third Last Fault		Fourth Last Fault		Fifth Last Fault	
Code	Sub code	Code	Subcode	Code	Sub code	Code	Subcode	Code	Sub code	Code	Subcode
H2-00	H2-01	H3-00	H3-01	H4-00	H4-01	H5-00	H5-01	H6-00	H6-01	H7-00	H7-01
H2-03	H2-04	H3-03	H3-04	H4-03	H4-04	H5-03	H5-04	H6-03	H6-04	H7-03	H7-04
H2-06	H2-07	H3-06	H3-07	H4-06	H4-07	H5-06	H5-07	H6-06	H6-07	H7-06	H7-07

Current Fault		Last Fault		Second Last Fault		Third Last Fault		Fourth Last Fault		Fifth Last Fault	
Code	Sub code	Code	Subcode	Code	Sub code	Code	Subcode	Code	Sub code	Code	Subcode
H2-09	H2-10	H3-09	H3-10	H4-09	H4-10	H5-09	H5-10	H6-09	H6-10	H7-09	H7-10
H2-12	H2-13	H3-12	H3-13	H4-12	H4-13	H5-12	H5-13	H6-12	H6-13	H7-12	H7-13
H2-15	H2-16	H3-15	H3-16	H4-15	H4-16	H5-15	H5-16	H6-15	H6-16	H7-15	H7-16

Viewing fault data record

The MD580 records data upon fault occurrence while recording the fault.

Fault Data content	Current Fault Data	Last Fault Data	Second Last Fault Data	Third Last Fault Data	Fourth Last Fault Data	Fifth Last Fault Data
Motor speed upon the current fault	H2-18	H3-18	H4-18	H5-18	H6-18	H7-18
Output current upon the current fault	H2-19	H3-19	H4-19	H5-19	H6-19	H7-19
Bus voltage upon the current fault	H2-20	H3-20	H4-20	H5-20	H6-20	H7-20
Output torque upon the current fault	H2-21	H3-21	H4-21	H5-21	H6-21	H7-21
Current fault control word 1	H2-22	H3-22	H4-22	H5-22	H6-22	H7-22
Current fault control word 2	H2-23	H3-23	H4-23	H5-23	H6-23	H7-23
Current fault status word 1	H2-24	H3-24	H4-24	H5-24	H6-24	H7-24
State machine upon the last fault	H2-25	H3-25	H4-25	H5-25	H6-25	H7-25
Year of the current fault	H2-26	H3-26	H4-26	H5-26	H6-26	H7-26
Date of the current fault	H2-27	H3-27	H4-27	H5-27	H6-27	H7-27
Time of the current fault	H2-28	H3-28	H4-28	H5-28	H6-28	H7-28
Second of the current fault	H2-29	H3-29	H4-29	H5-29	H6-29	H7-29
Millisecond of the current fault	H2-30	H3-30	H4-30	H5-30	H6-30	H7-30

Viewing fault through the SOP-20-880

The SOP-20-880 allows you to view the fault information by the previous parameter and from the fault menu.

Function	Operation Method	Description
Viewing current faults	Key	Go to Menu > Fault status > Fault.
Viewing current minor faults	Key	Go to Menu > Fault status > Limited faults.
Viewing current alarms	Key	Go to Menu > Fault status > Alarms.
Viewing the help information of the fault		Select a fault and press the help key. The help information about the fault is displayed.
Viewing fault history	Key	Go to Menu > Fault status > History fault.

It is recommended to view the fault information by the fault menu. All recorded faults and the related help information can be viewed.

Viewing faults through the InoDriveStudio

When using InoDriveStudio, you can view the fault on the Fault alarm table interface.

On the Fault alarm table interface, you can view the fault descriptions, fault causes and solutions, and data recorded when the fault occurs.

It is recommended to view the fault information by the fault menu. All recorded faults and the related help information can be viewed.

Viewing faults through the MDKE-10

You can view the indicator  on the MDKE-10 to determine if faults or alarms occur on the device. In the status display area, you can view the fault codes without detailed fault information. You can also press the up or down key to view other fault codes or alarm codes.

4.2 Fault Reset

The MD580 supports five fault reset methods, namely SOP-20, MDKE-10, InoDriveStudio (IDS), control channel, parameter set, and power-on. The following table describes the relationship between the reset command source and the control channel.

Method	Description
SOP-20	After connecting to the SOP-20, press the STOP key on any interface to reset the fault.
MDKE-10	After connecting to the MDKE-10, press the STOP key on any interface to reset the fault.
InoDriveStudio	After connecting to the InoDriveStudio, click Reset on the control panel to reset the fault.
Control channel	Fault reset is achieved by parameter configuration, as shown in the table below.
Parameter setting	Set H0-20 to 1. Set the fault reset interval properly. After the number of automatic reset retry times is set, fault reset will be automatically conducted for the set number of times.
Reset upon power-on again	Powering on the MD580 again after power-off will enable fault reset.

The reset command can be given by multiple sources. Depending on the command source selected, the reset command given only by the parameter marked by 0->1 is valid. The following table describes the relationship between the reset command source and the control channel.

Effective Control Channel	Command Word Source	Reset Command Source								
		b0-05	b1-04	b1-05	b2-05	b3-04	b3-05	MDKE-10	SOP-20	IDS
A9-00 = 0	b0-00 = 0	X	0→1	0→1	X	X	X	0→1	0→1	0→1
	b0-00 = 1	0→1	0→1	0→1	X	X	X	0→1	0→1	0→1
	MDKE-10	X	0→1	0→1	X	X	X	0→1	0→1	0→1
	SOP-20	X	0→1	0→1	X	X	X	0→1	0→1	0→1
	IDS	X	0→1	0→1	X	X	X	0→1	0→1	0→1
A9-00 = 1	b2-00 = 0	X	X	X	X	0→1	0→1	0→1	0→1	0→1
	b2-00 = 1	X	X	X	0→1	0→1	0→1	0→1	0→1	0→1
	MDKE-10	X	X	X	X	0→1	0→1	0→1	0→1	0→1
	SOP-20	X	X	X	X	0→1	0→1	0→1	0→1	0→1
	IDS	X	X	X	X	0→1	0→1	0→1	0→1	0→1

Note

- X in the table indicates that the command source is invalid. The reset command takes effect only on the rising edge. Do not remain the signal at high level.
- The reset command from the MDKE-10, SOP-20, and InoDriveStudio is always active after connection, regardless of the control source.

For more information on faults, such as fault level modifications, automatic resets, customized faults, and common fault troubleshooting, see *MD580 Series Low-Voltage High-Performance Engineering AC Drive Function Guide*.

4.3 Fault List

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
1	Hardware fault	1	Current detection circuit error	Coast to stop	Coast to stop	Coast to stop	Power-off and restart	1. The zero drift of three-phase output current is too large. After shutdown, check that the three-phase output current [U7-25]/[U7-26]/[U7-27] is not 0.	1. Check and ensure that the three-phase output Hall sensor is normal.
								2. The Hall sensor is disconnected. After shutdown, check whether the three-phase output current [U7-25]/[U7-26]/[U7-27] is far greater than zero.	2. Replace the power module.
								3. Other causes	3. Contact the agent or Inovance for technical support.
1	Hardware fault	3	Parameter storage to the EEPROM timeout	Coast to stop	Coast to stop	Coast to stop	Power-off and restart	1. The EEPROM chip is damaged.	1. Replace the control board.
								2. The peripheral cable of the EEPROM is abnormal.	2. Contact the agent or Inovance for technical support.
		4	I/O expansion card EEPROM exception	Coast to stop	Coast to stop	Coast to stop	Power-off and restart	1. The EEPROM chip is damaged.	1. Replace the I/O expansion card.
								2. The peripheral cable of the EEPROM is abnormal.	2. Contact the agent or Inovance for technical support.
1	Hardware fault	8	Reading data from the EEPROM timeout	Coast to stop	Coast to stop	Coast to stop	Power-off and restart	1. The EEPROM chip is damaged.	1. Replace the control board.
								2. The peripheral cable of the EEPROM is abnormal.	2. Contact the agent or Inovance for technical support.
		9	Writing data to the EEPROM timeout	Coast to stop	Coast to stop	Coast to stop	Power-off and restart	1. The EEPROM chip is damaged.	1. Replace the control board.
								2. The peripheral cable of the EEPROM is abnormal.	2. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
2	Over current	1	Hardware overcurrent	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The U/V/W output circuit of the drive is grounded or shorted, or the braking resistor is shorted.	2. Rectify peripheral faults and ensure that no short circuit occurs on the motor, output contactor, or braking resistor.
2	Over current	1	Hardware overcurrent	Coast to stop	Coast to stop	Coast to stop	Manual reset	2. The control method is FVC or SVC, and the motor is started without parameter auto-tuning.	2. Set motor parameters correctly according to the motor nameplate, and start the motor after auto-tuning of the motor parameters.
								3. Under fast acceleration/ deceleration conditions, the acceleration/ deceleration time is too short.	3. Set the acceleration/ deceleration time properly.
								4. The manual torque boost parameter is improper.	4. Set the torque boost parameter properly.
								5. The V/f curve is improper.	5. Set the V/f curve properly.
								6. The motor is started when the motor rotates in the forward direction.	6. Enable flying start or start the motor after it stops.
								7. The power rating of the drive is low.	7. Select the drive with a proper power rating.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
2	Over current	1	Hardware overcurrent	Coast to stop	Coast to stop	Coast to stop	Manual reset	8. The DC bus voltage is low.	8. Adjust the DC bus voltage to a normal range.
								9. The motor parameter is set incorrectly.	9. Set the motor parameter correctly.
								10. The peripheral circuits are abnormal.	10. View historical fault records. If the current upon the fault is far from the overcurrent threshold, find the interference source.
								11. Other causes	11. If no external interference exists, the drive board or Hall device may be faulty.
									12. Contact the agent or Inovance for technical support.
2	Over current	2	Software overcurrent	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. A4-18 (software overcurrent evaluation threshold) is set improperly.	1. Set A4-18 properly
		3	Braking transistor software overcurrent	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The braking transistor output current exceeds the limit.	1. Check that the braking resistor is wired properly and the resistance is appropriate.
		5	Synchronous motor instantaneous overcurrent	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. E8-23 (threshold for output current exceeding instantaneous overcurrent) is set improperly.	1. Set E8-23 properly.
									2. Check output for short circuit and rectify the fault.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
5	DC overvoltage	1	DC bus voltage too high	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The DC bus voltage is high.	1. Adjust the DC bus voltage to a normal range.
								2. The DC bus overvoltage threshold is set improperly.	2. Check whether A4-25 and A4-26 are set properly.
								3. Under power generation conditions, no braking unit is installed or the braking resistor model is inappropriate.	3. Install a braking unit or select a proper braking resistor.
								4. The drive voltage class is improper.	4. Select a drive model with the proper voltage class.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
5	DC overvoltage	1	DC bus voltage too high	Coast to stop	Coast to stop	Coast to stop	Manual reset	5. The drive model is incorrect.	5. In the V/f control mode, check whether the overvoltage suppression (E9-20) function is enabled and whether parameters E9-21 to E9-24 are properly set.
								6. The overvoltage suppression parameter is set improperly.	6. In the vector control mode, ensure that E9-12 is set to "Enable" and E9-13 is set properly.
								7. The correction factor of the DC bus voltage is set improperly.	7. Check and ensure that the DC voltage sampling gain (A3-15) is set properly.
								8. In the vector control mode, speed loop parameters are set improperly.	8. On the IDS, check whether the overshoot of the motor actual speed during acceleration is large, which causes overvoltage during recovery from overshoot. Reasonably set the speed loop parameter to reduce the overshoot.
								9. Output short-circuited to ground	9. Ensure that the U/V/W output is not short-circuited to the ground.
								10. Other causes	10. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
9	DC undervoltage	1	DC bus voltage too low	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The DC bus voltage is low.	1. Adjust the DC bus voltage to a normal range.
								2. The DC bus undervoltage threshold is set improperly.	2. Check U5-78 and ensure that the preset DC bus undervoltage threshold is set properly.
								3. The drive voltage class is improper.	3. Check whether A4-23 and A4-24 are set properly.
								4. The drive model is incorrect.	4. Select a drive model with the proper voltage class.
								5. The undervoltage suppression parameter is set improperly.	5. Check whether E9-00 is set to "Enable" and whether parameters E9-01 to E9-07 are set properly.
9	DC undervoltage	1	DC bus voltage too low	Coast to stop	Coast to stop	Coast to stop	Manual reset	6. The correction factor of the DC bus voltage is set improperly.	6. Check and ensure that the DC voltage sampling gain (A3-15) is set properly.
								7. The pre-charge resistor, drive board, or the control board is abnormal.	7. Contact the agent or Inovance for technical support.
								8. The DC bus voltage is abnormal.	-

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
9	DC undervoltage	2	Low voltage	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The input voltage is too low for a long time.	1. Ensure that the input voltage is normal.
								2. The load inertia is too small to maintain the DC bus voltage.	2. Set the frequency threshold E9-09 properly.
								3. The frequency threshold E9-09 is set to a high value.	-
		3	Pre-drive timeout	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The DC bus voltage is low.	1. Adjust the DC bus voltage to a normal range.
								2. The DC bus undervoltage threshold is set improperly.	2. Check U5-78 and ensure that the preset DC bus undervoltage threshold is set properly.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
9	DC under voltage	3	Pre-drive timeout	Coast to stop	Coast to stop	Coast to stop	Manual reset	3. The drive voltage class is improper.	3. Check whether A4-23 and A4-24 are set properly.
								4. The drive model is incorrect.	4. Select a drive model with the proper voltage class.
								5. The undervoltage suppression parameter is set improperly.	5. Check whether E9-00 is set to "Enable" and whether parameters E9-01 to E9-07 are set properly.
								6. The drive is started before the DC bus voltage pre-buffering completes.	6. Start the drive after the DC bus voltage is normal.
								7. The DC bus input contactor is controlled by the drive. Power supply unit control (A6-00) is not enabled or A6-01 is set to a small value.	7. Ensure that power supply unit control (A6-00) is enabled.
								8. The correction factor of the DC bus voltage is set improperly.	8. Set the pre-drive timeout time (A6-01) properly.
								9. The pre-charge resistor, drive board, or the control board is abnormal.	9. Check and ensure that the DC voltage sampling gain (A3-15) is set properly.
								10. The DC bus voltage is abnormal.	10. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
10	Drive overload	1	Drive overload	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The load is too heavy.	1. Set the acceleration/deceleration time properly.
								2. The power rating of the drive is low.	2. Select the drive with a proper power rating.
								3. Motor parameters are set improperly.	3. Check the load.
								4. The torque boost value is set improperly in the V/f control mode.	4: Enable flying start.
								5. The motor is stalled.	5. Check the motor and mechanical conditions.
								6. The overload mode (A4-23) is improper.	6. Reduce the load or check the motor and mechanical conditions.
								7. Other causes	7. Adjust the DC bus voltage to a normal range.
									8. Contact the agent or Inovance for technical support.
10	Drive overload	2	Pulse-by-pulse current limit fault	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The acceleration/deceleration time is too short.	1. Reduce the load or replace with a motor with a higher power rating.
								2. The power rating of the drive is low.	2. Check the motor and mechanical conditions.
								3. Load is added during operation.	3. Ensure that E8-01 is set properly.
								4. The drive is started during motor rotation.	4. Contact the agent or Inovance for technical support.
								5. Output short circuit occurs.	-
								6. The load is too heavy or the motor rotor is locked.	-
								7. The DC bus voltage is low.	-
								8. Other causes	-

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
11	Motor overload	1	Motor overload	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The load is too heavy.	1. Reduce the load or replace with a motor with a higher power rating.
								2. The motor is stalled.	2. Check the motor and mechanical conditions.
								3. The motor overload protection gain is set improperly.	3. Ensure that E8-01 is set properly.
								4. Other causes	4. Contact the agent or Inovance for technical support.
		2	Motor overload warning	Warning displayed	Warning displayed	Not detected	Automatic reset	1. The load is too heavy.	1. Reduce the load or replace with a motor with a higher power rating.
								2. The motor is stalled.	2. Check the motor and mechanical conditions.
								3. The motor overload protection gain is set improperly.	3. Ensure that E8-01 is set properly.
								4. The warning factor for motor overload protection is set improperly.	4. Ensure that E8-02 is set properly.
								5. Other causes	5. Contact the agent or Inovance for technical support.
12	Input phase loss	1	Input phase loss occurs on the drive.	Coast to stop	Coast to stop	Not detected	Manual reset	1. The input R/S/T cable is disconnected or connected unreliably.	-
								2. Other causes	1. Ensure that the input R/S/T cable is properly connected.
									2. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
13	Output phase loss	5	Drive output phase loss	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The motor U/V/W cable is disconnected or connected unreliably.	1. Ensure that the motor U/V/W cable is properly connected.
								2. The output contactor is not closed or is abnormal.	2. Ensure that the output contactor is normally closed.
								3. The motor three-phase winding is abnormal.	3. Replace the motor.
								4. Other causes	4. Contact the agent or Inovance for technical support.
14	Drive over temperature	5	Power supply unit overtemperature	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The temperature of the power supply unit exceeds the overtemperature threshold.	1. Check the temperature detection circuit of the power supply unit. 2. Lower down the ambient temperature. 3. Reduce the load ratio.
		6	Drive overtemperature	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The ambient temperature is too high. 2. The air filter is blocked. 3. The fan is damaged. 4. The thermistor is abnormal. 5. The module is damaged.	1. Lower down the ambient temperature. 2. Clean the air filter. 3: Replace the fan. 4. Contact the agent or Inovance for technical support.
15	External fault	1	External fault 1	Coast to stop	Coast to stop	Warning displayed	Manual reset	1. H0-00 is set incorrectly.	1. Set H0-00 to 0.
								2. The setting source of H0-00 is active.	2. Set H0-00 to a correct value.
								-	3. Check whether the setting source is active.
		2	External fault 2	Coast to stop	Coast to stop	Warning displayed	Manual reset	1. H0-01 is set incorrectly.	1. Set H0-00 to 0.
								2. The setting source of H0-01 is active.	2. Set H0-01 to a correct value.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
15	External fault	2	External fault 2	Coast to stop	Coast to stop	Warning displayed	Manual reset	-	3. Check whether the setting source is active.
16	Communication fault	1	Onboard Modbus RTU communication exception	Coast to stop	Coast to stop	Not detected	Manual reset	1. The host controller is abnormal.	1. Check the connection for communication.
								2. The communication cable is faulty.	2. Set communication parameters properly.
								3. The communication parameters in group n1 are set incorrectly.	-
19	Auto-tuning fault	1	Motor auto-tuning timeout	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The motor is not connected.	1. Check whether the motor is connected properly.
								2: Output phase loss	2. Check and ensure that the output contactor is connected properly.
								3. The motor parameter is set incorrectly.	3. Check whether the motor is connected properly.
								4. The power rating of the drive is low.	4. Check and ensure that the output contactor is connected properly.
								5. Other causes	5. Set motor basic parameters correctly according to the motor nameplate.
								-	6. Select the drive with a proper power rating.
								-	7. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
19	Auto-tuning fault	2	Motor auto-tuning interruption	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The auto-tuning process is interrupted.	1. Ensure that the start/stop control word is normal during motor auto-tuning.
								2. A fault occurs during auto-tuning.	2. Troubleshoot issues based on the reported fault.
								3. The motor auto-tuning process is interrupted during normal operation.	3: Reset the drive.
		3	Dynamic auto-tuning in the brake apply state	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. Dynamic auto-tuning is performed in the brake apply state.	1. Disable brake apply (L1-00) and then perform dynamic auto-tuning.
20	Encoder fault	1	Encoder disconnection detection by hardware	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The encoder is damaged.	1. Replace the encoder.
								2. The encoder power supply is abnormal.	2. Check whether encoder power supply cables are connected properly.
								3. The encoder wiring is incorrect.	3. Check and ensure that the encoder A/B phase wiring is correct.
								4. The encoder disconnection detection method is set improperly.	4. Check whether the encoder cable is connected securely.
								5. Other causes	5. Ensure that n5-10 is set correctly.
								-	6. Contact the agent or Inovance for technical support.
		2	Encoder parameter error	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The pulse per revolution (PPR) of the encoder is set incorrectly.	1. Set the PPR of the encoder correctly.
								2. The encoder is abnormal.	2. Replace the encoder.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
20	Encoder fault	2	Encoder parameter error	Coast to stop	Coast to stop	Coast to stop	Manual reset	3. Other causes	3. Contact the agent or Inovance for technical support.
		3	The encoder Z signal suffers from interference.	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The Z signal is interfered when the synchronous motor is equipped with the ABZ encoder in closed-loop control mode. 2. The encoder power supply is abnormal. 3. The encoder wiring is incorrect. 4. Other causes	1. Replace the encoder. 2. Check whether encoder power supply cables are connected properly. 3. Check and ensure that the encoder A/B/Z phase wiring is correct. 4. Check whether the encoder cable is connected securely. 5. Check that the zero point position angle of the encoder is correct. 6. Contact the agent or Inovance for technical support.
		4	The encoder card is disconnected from the control board.	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The wiring between the encoder card and the control board is loose. 2. The encoder card is abnormal. 3. The encoder card is not grounded properly. 4. Other causes	1. Check wiring and grounding. 2. Replace the encoder card. 3. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
20	Encoder fault	5	Encoder disconnection detection by software	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The encoder is damaged.	1. Replace the encoder.
								2. The encoder power supply is abnormal.	2. Check whether encoder power supply cables are connected properly.
								3. The encoder wiring is incorrect.	3. Check and ensure that the encoder A/B phase wiring is correct.
								4. Other causes	4. Check whether the encoder cable is connected securely.
								-	5. Contact the agent or Inovance for technical support.
		6	2. The communication in the encoder card is abnormal.	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The encoder card is damaged. 2. The encoder power supply is abnormal. 3. The encoder card wiring is incorrect. 4. Other causes	1. Replace the encoder card. 2. Check whether the encoder cable is connected securely. 3. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
20	Encoder fault	7	Encoder 1 type and encoder 2 type are set incorrectly.	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The detection modules corresponding to the encoder types set for encoder 1 and encoder 2 are different. 2. The type of encoder in effect is determined by d0-12 (speed feedback encoder selection). 3. Other causes	1. The detection modules corresponding to the encoder types set for encoder 1 and encoder 2 must be the same. For example, when n5-02 of encoder 1 is set to "4: Sin-cos encoder", n6-02 of encoder 2 can only be set to 4 or 5. 2. Contact the agent or Inovance for technical support.
		8	The communication between the encoder card and the control board times out.	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The wiring between the encoder card and the control board is loose. 2. The encoder card is abnormal. 3. The encoder card is not grounded properly. 4. The encoder type does not match the actual encoder. 5. Other causes	1. Check wiring and grounding. 2. Replace the encoder card. 3. Set n5-02 and n6-02 (encoder type) correctly 4. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
20	Encoder fault	9	The SSI encoder is disconnected.	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The wiring between the SSI encoder and the detection card is loose or the SSI encoder is not grounded properly. 2. The encoder is damaged. 3. The encoder card is damaged. 4. Other causes	1. Check wiring and grounding. 2. Replace the encoder card. 3. Contact the agent or Inovance for technical support.
		10	Passive switchover from FVC to SVC is activated.	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The FVC mode is passively switched to SVC during operation due to an encoder feedback error.	1. Check the encoder and the encoder wiring. 2. Change the mode to SVC if allowed by the operating conditions.
		11	Encoder (not for speed feedback) cable disconnection	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. If you do not need to run the encoder, you can set n5-00 to "Disable". 2. The encoder is damaged. 3. The encoder power supply is abnormal. 4. The encoder wiring is incorrect. 5. Other causes	1. Replace the encoder. 2. Check whether encoder power supply cables are connected properly. 3. Check and ensure that the encoder A/B/Z phase wiring is correct. 4. Check whether the encoder cable is connected securely. 5. Check that the zero point position angle of the encoder is correct. 6. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
20	Encoder fault	13	The speed feedback encoder is not enabled in the FVC mode.	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The speed feedback encoder selected by d0-12 is not enabled in the FVC mode.	1. Set n5-00 or n6-00 to "1" to enable the related encoder according to the actual situation.
		14	The types of encoder 1 and encoder 2 are the same, but parameters for encoder 1 and encoder 2 are different.	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The types of encoder 1 and encoder 2 are the same, but parameters for encoder 1 and encoder 2 are different.	1. Set n5-00 or n6-00 to "1" to enable the related encoder according to the actual situation. 2. The encode parameter is incorrectly set.
		15	Encoder Z signal loss	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The Z signal is lost. 2. The encoder power supply is abnormal. 3. The encoder wiring is incorrect. 4. Other causes	1. Replace the encoder. 2. Check whether encoder power supply cables are connected properly. 3. Check and ensure that the encoder A/B/Z phase wiring is correct. 4. Check whether the encoder cable is connected securely. 5. Check that the zero point position angle of the encoder is correct. 6. Contact the agent or Inovance for technical support.
22	Auto-tuning result error	1	Abnormal motor auto-tuning result	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The motor parameter is set incorrectly.	1. Set motor basic parameters correctly according to the motor nameplate.
								2. The motor is loaded during auto-tuning.	2. Ensure that the motor is not loaded before auto-tuning.
								3. The model parameter is set incorrectly.	3. Contact the agent or Inovance for technical support.
								4. Other causes	-

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
22	Auto-tuning result error	2	1. The PPR of the encoder is set incorrectly.	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The speed feedback value detected during dynamic auto-tuning is inconsistent with the reference speed.	1. Check that the PPR of the encoder is set correctly.
		3	Encoder Z signal loss	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. Z signals are not obtained during auto-tuning of synchronous motors.	1. Check the connection of the Z signal cable of the encoder.
23	Short-circuited to ground	1	Overcurrent during motor-to-ground short circuit detection	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The motor is short-circuited to ground.	1. Check the motor cable.
								2. The output circuit is short-circuited to ground.	2. Replace the motor.
								3. The IGBT fails.	3. Check and ensure that the output circuit is connected correctly.
								4. Other causes	4. Contact the agent or Inovance for technical support.
24	Inter-phase short circuit occurs on the motor.	1	Overcurrent during inter-phase short circuit detection	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. Inter-phase short circuit occurs. The motor is abnormal.	1. Check whether the motor is normal.
								2. Short circuit exists between two phases of U, V, and W. The output circuit is abnormal.	2. Replace the motor.
								3. The IGBT fails.	3. Check and ensure that the output circuit is free from short circuit.
								4. Other causes	4. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
27	User-defined fault	1	User-defined fault	Coast to stop	Coast to stop	Warning displayed	Manual reset	1. H0-10 is set incorrectly.	1. Set H0-10 to 0.
								2. The setting source of H0-10 is active.	2. Set H0-10 to a correct value.
								-	3. Check whether the setting source is active.
		2	User-defined fault 2	Coast to stop	Coast to stop	Warning displayed	Manual reset	1. H0-11 is set incorrectly.	1. Set H0-11 to 0.
								2. The setting source of H0-11 is active.	2. Set H0-11 to a correct value.
								-	3. Check whether the setting source is active.
27	User-defined fault	3	User-defined fault 3	Coast to stop	Coast to stop	Warning displayed	Manual reset	1. H0-12 is set incorrectly.	1. Set H0-12 to 0.
								2. The setting source of H0-12 is active.	2. Set H0-12 to a correct value.
								-	3. Check whether the setting source is active.
		4	User-defined fault 4	Coast to stop	Coast to stop	Warning displayed	Manual reset	1. H0-13 is set incorrectly.	1. Set H0-13 to 0.
								2. The setting source of H0-13 is active.	2. Set H0-13 to a correct value.
								-	3. Check whether the setting source is active.
28	User-defined warning	1	User-defined warning 1	Warning displayed	Coast to stop	Coast to stop	Automatic reset	1. H0-15 is set incorrectly.	1. Set H0-15 to 0.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
28	User-defined warning	1	User-defined warning 1	Warning displayed	Coast to stop	Coast to stop	Automatic reset	2. The setting source of H0-15 is active.	2. Set H0-15 to a correct value.
								-	3. Check whether the setting source is active.
		2	User-defined warning 2	Warning displayed	Coast to stop	Coast to stop	Automatic reset	1. H0-16 is set incorrectly.	1. Set H0-16 to 0.
								2. The setting source of H0-16 is active.	2. Set H0-16 to a correct value.
								-	3. Check whether the setting source is active.
		3	User-defined warning 3	Warning displayed	Coast to stop	Coast to stop	Automatic reset	1. H0-17 is set incorrectly.	1. Set H0-17 to 0.
								2. The setting source of H0-17 is active.	2. Set H0-17 to a correct value.
								-	3. Check whether the setting source is active.
		4	User-defined warning 4	Warning displayed	Coast to stop	Coast to stop	Automatic reset	1. H0-18 is set incorrectly.	1. Set H0-18 to 0.
								2. The setting source of H0-18 is active.	2. Set H0-18 to a correct value.
								-	3. Check whether the setting source is active.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
31	PID fault	1	PID feedback loss	Coast to stop	Coast to stop	Warning displayed	Manual reset	1. The PID feedback value is abnormal or is set incorrectly.	1. Check and ensure that the PID feedback value is normal.
								2. The PID feedback abnormality detection value is set improperly.	2. Check and ensure that the PID feedback source is set properly.
								3. The PID feedback fluctuates greatly, and the time for PID feedback abnormality detection is too short.	3. Check and ensure that the feedback abnormality detection threshold L4-56 is set properly.
								-	4. Check whether the PID feedback value fluctuates greatly and whether the feedback signal source is interfered, and troubleshoot the feedback signal source problem.
								-	5. Appropriately increase the PID feedback abnormality detection threshold L4-56.
41	IGBT fault	1	U-phase IGBT fault	Coast to stop	Coast to stop	Coast to stop	Manual reset	Overcurrent or short circuit occurs on the phase-U IGBT. Undervoltage occurs on the drive power supply of the phase-U IGBT.	1. Check and ensure that the IGBT is intact. 2. Check and ensure that the power supply of the IGBT is normal.
		2	Phase-V IGBT fault	Coast to stop	Coast to stop	Coast to stop	Manual reset	Overcurrent or short circuit occurs on the phase-V IGBT. Undervoltage occurs on the drive power supply of the phase-V IGBT.	1. Check and ensure that the IGBT is intact. 2. Check and ensure that the power supply of the IGBT is normal.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
41	IGBT fault	3	Phase-W IGBT fault	Coast to stop	Coast to stop	Coast to stop	Manual reset	Overcurrent or short circuit occurs on the phase-W IGBT. Undervoltage occurs on the drive power supply of the phase-W IGBT.	1. Check and ensure that the IGBT is intact. 2. Check and ensure that the power supply of the IGBT is normal.
41	IGBT fault	4	IGBT fault	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The IGBT is short-circuited. 2. The U/V/W output circuit of the drive is grounded or shorted, or the braking resistor is shorted. 3. The control method is FVC or SVC, and the motor is started without parameter auto-tuning. 4. Under fast acceleration/ deceleration conditions, the acceleration/ deceleration time is too short. 5. The manual torque boost parameter is improper. To be continued	1. Check and ensure that the IGBT is intact. 2. Rectify peripheral faults and ensure that no short circuit occurs on the motor, output contactor, or braking resistor. 3. Set motor parameters correctly according to the motor nameplate, and start the motor after auto-tuning of the motor parameters. 4. Set the acceleration/ deceleration time properly. 5. Set the torque boost parameter properly. To be continued

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
41	IGBT fault	4	IGBT fault	Coast to stop	Coast to stop	Coast to stop	Manual reset	Continued 6. The V/f curve is improper. 7. The motor is started when the motor rotates in the forward direction. 8. The power rating of the drive is low. 9. The DC bus voltage is low. 10. The motor parameter is set incorrectly. 11. The peripheral circuits are abnormal. 12. Other causes	Continued 6. Set the V/f curve properly. 7. Enable flying start or start the motor after it stops. 8. Select the drive with a proper power rating. 9. Adjust the DC bus voltage to a normal range. 10. Set the motor parameter correctly. 11. View historical fault records. If the current upon the fault is far from the overcurrent threshold, find the interference source. 12. If no external interference exists, the drive board or Hall device may be faulty. 13. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
42	Excessive motor speed deviation	1	Excessive motor speed deviation	Warning displayed	Warning displayed	Warning displayed	Automatic reset	1. The acceleration/deceleration time is too short. The motor cannot rotate according to the set speed.	1. Set the acceleration/deceleration time properly.
								2. The load is too heavy or the motor rotor is locked.	2. Perform acceleration feedforward compensation.
								3. The detection threshold for excessive deviation (E8-09) is too low or the detection time for excessive deviation (E8-10) is too short.	3. Check the load condition. Reduce the load or select an appropriate drive.
								4. The speed loop PI parameter value is small in the vector control mode.	4. Check the motor and mechanical conditions.
								5. The encode parameter is incorrectly set.	5. Set E8-09 and E8-10 properly.
								-	6. Increase the value of the speed loop PI parameter.
								-	7. Set the encoder parameter correctly.
43	Motor over speed	1	Motor overspeed	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The motor is dragged to run by external force.	2. Check the actual motor load.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
43	Motor over speed	1	Motor overspeed	Coast to stop	Coast to stop	Coast to stop	Manual reset	2. Under heavy load conditions, the torque limit setting is abnormal, and the load is accelerated by its own gravity.	2. Check for proper torque limit settings.
								3. Under heavy load conditions, the power rating of the drive is too low to drive the load.	3. Select the drive with a proper power rating.
								4. Motor control abnormality occurs.	4. Contact the agent or Inovance for technical support.
45	Expansion module abnormality	7	The addresses of bus adapter A and B slots conflict.	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. Slot numbers of two communication cards conflict.	1. Check that the slot number of the communication card is set correctly.
								2. The bus adapters A and B specify the same communication card.	2. Check the communication card type.
		13	The communication card for bus adapter A is not online.	Coast to stop	Coast to stop	Warning displayed	Manual reset	1. The communication card slot is incorrect.	1. Reinstall the communication card.
								2. The card ID is not set for the customized communication card.	2. Reconfigure parameters correctly.
								3. No program is set for the communication card.	3. Check and ensure that the communication card is intact and has programs.
								4. The communication card is abnormal.	

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
45	Expansion module abnormality	14	The communication card for bus adapter B is not online.	Coast to stop	Coast to stop	Warning displayed	Manual reset	1. The communication card slot is incorrect.	1. Reinstall the communication card.
								2. The card ID is not set for the customized communication card.	2. Reconfigure parameters correctly.
								3. No program is set for the communication card.	3. Check and ensure that the communication card is intact and has programs.
								4. The communication card is abnormal.	-
46	Parameter setting fault	1	Parameters are set incorrectly.	Warning displayed	Warning displayed	Warning displayed	Automatic reset	For details, see U5-92.	-
47	STO activation	1	STO status activation	Warning displayed	Warning displayed	Not detected	Automatic reset	STO1 and STO2 are activated simultaneously.	1. Check STO1 and STO2 for 24 VDC input.
									2. Check whether the polarities of 24 VDC input power supply for STO1 and STO2 are connected inversely.
									3. Contact the agent or Inovance for technical support.
		2	STO1F	Coast to stop	Coast to stop	Coast to stop	Manual reset	STO1 is activated and STO2 is normal.	1. Check STO1 and STO2 for 24 VDC input.
									2. Check whether the polarities of 24 VDC input power supply for STO1 and STO2 are connected inversely.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
47	STO activation	2	STO1F	Coast to stop	Coast to stop	Coast to stop	Manual reset	STO1 is activated and STO2 is normal.	3. Contact the agent or Inovance for technical support.
		3	STO2F	Coast to stop	Warning displayed	Coast to stop	Manual reset	STO2 is activated and STO1 is normal.	1. Check STO1 and STO2 for 24 VDC input. 2. Check whether the polarities of 24 VDC input power supply for STO1 and STO2 are connected inversely. 3. Contact the agent or Inovance for technical support.
		4	STO power supply fault	Coast to stop	Warning displayed	Coast to stop	Manual reset	The STO power supply voltage is abnormal.	1. Check whether the STO power supply is normal. 2. Contact the agent or Inovance for technical support.
		5	STO pulse self-check abnormality	Coast to stop	Warning displayed	Coast to stop	Manual reset	The STO-L pulse optical coupling self-check is abnormal.	1. Check whether the STO power supply is normal. 2. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
47	STO activation	6	STO buffer self-check abnormality	Coast to stop	Warning displayed	Coast to stop	Manual reset	The STO buffer self-check is abnormal.	1. Check whether the STO power supply is normal. 2. Contact the agent or Inovance for technical support.
		7	STO RAM self-check abnormality	Coast to stop	Warning displayed	Coast to stop	Manual reset	The STO RAM self-check is abnormal.	1. Check whether the STO power supply is normal. 2. Contact the agent or Inovance for technical support.
		8	STO FLASH self-check abnormality	Coast to stop	Warning displayed	Coast to stop	Manual reset	The STO FLASH self-check is abnormal.	1. Check whether the STO power supply is normal. 2. Contact the agent or Inovance for technical support.
48	Abnormal motor temperature	1	Overheat reported by motor temperature sensor 1	Coast to stop	Coast to stop	Warning displayed	Manual reset	1. The actual temperature of the motor is high, and the thermal dissipation of the motor is abnormal.	1. Take measures for better dissipation of the motor.
								2. After the motor temperature detection is enabled, the temperature sensor type is incorrect.	2. Set the temperature sensor type correctly.
								3. After the motor temperature detection is enabled, the temperature sensor is disconnected.	3. Check and ensure that the temperature sensor wiring is reliable.
								4. The motor overheat threshold is too low.	4. Set the motor overheat threshold properly.
								5. The temperature detection module is abnormal.	5. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
48	Abnormal motor temperature	2	Overheat warning reported by motor temperature sensor 1	Warning displayed	Warning displayed	Not detected	Automatic reset	1. The actual temperature of the motor is high, and the thermal dissipation of the motor is abnormal.	1. Take measures for better dissipation of the motor.
								2. After the motor temperature detection is enabled, the temperature sensor type is incorrect.	2. Set the temperature sensor type correctly.
								3. After the motor temperature detection is enabled, the temperature sensor is disconnected.	3. Check and ensure that the temperature sensor wiring is reliable.
								4. The motor overheat warning threshold is too low.	4. Set the motor overheat warning threshold properly.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
48	Abnormal motor temperature	2	Overheat warning reported by motor temperature sensor 1	Warning displayed	Warning displayed	Not detected	Automatic reset	5. The temperature detection module is abnormal.	5. Contact the agent or Inovance for technical support.
		3	Overheat reported by motor temperature sensor 2	Coast to stop	Coast to stop	Warning displayed	Manual reset	1. The actual temperature of the motor is high, and the thermal dissipation of the motor is abnormal.	1. Take measures for better dissipation of the motor.
								2. After the motor temperature detection is enabled, the temperature sensor type is incorrect.	2. Set the temperature sensor type correctly.
								3. After the motor temperature detection is enabled, the temperature sensor is disconnected.	3. Check and ensure that the temperature sensor wiring is reliable.
								4. The motor overheat threshold is too low.	4. Set the motor overheat threshold properly.
								5. The temperature detection module is abnormal.	5. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
48	Abnormal motor temperature	4	Overheat warning reported by motor temperature sensor 2	Warning displayed	Warning displayed	Not detected	Automatic reset	1. The actual temperature of the motor is high, and the thermal dissipation of the motor is abnormal.	1. Take measures for better dissipation of the motor.
								2. After the motor temperature detection is enabled, the temperature sensor type is incorrect.	2. Set the temperature sensor type correctly.
								3. After the motor temperature detection is enabled, the temperature sensor is disconnected.	3. Check and ensure that the temperature sensor wiring is reliable.
								4. The motor overheat warning threshold is too low.	4. Set the motor overheat warning threshold properly.
								5. The temperature detection module is abnormal.	5. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
48	Abnormal motor temperature	5	Overheat reported by motor temperature sensor 3	Coast to stop	Coast to stop	Warning displayed	Manual reset	1. The actual temperature of the motor is high, and the thermal dissipation of the motor is abnormal.	1. Take measures for better dissipation of the motor.
								2. After the motor temperature detection is enabled, the temperature sensor type is incorrect.	2. Set the temperature sensor type correctly.
								3. After the motor temperature detection is enabled, the temperature sensor is disconnected.	3. Check and ensure that the temperature sensor wiring is reliable.
								4. The motor overheat threshold is too low.	4. Set the motor overheat threshold properly.
								5. The temperature detection module is abnormal.	5. Contact the agent or Inovance for technical support.
48	Abnormal motor temperature	6	Overheat warning reported by motor temperature sensor 3	Warning displayed	Warning displayed	Not detected	Automatic reset	1. The actual temperature of the motor is high, and the thermal dissipation of the motor is abnormal.	1. Take measures for better dissipation of the motor.
								2. After the motor temperature detection is enabled, the temperature sensor type is incorrect.	2. Set the temperature sensor type correctly.
								3. After the motor temperature detection is enabled, the temperature sensor is disconnected.	3. Check and ensure that the temperature sensor wiring is reliable.
								4. The motor overheat warning threshold is too low.	4. Set the motor overheat warning threshold properly.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
48	Abnormal motor temperature	6	Overheat warning reported by motor temperature sensor 3	Warning displayed	Warning displayed	Not detected	Automatic reset	5. The temperature detection module is abnormal.	5. Contact the agent or Inovance for technical support.
		7	Motor overtemperature detected by HSMT-10	Coast to stop	Coast to stop	Not detected	Manual reset	1. The actual temperature of the motor is high, and the thermal dissipation of the motor is abnormal. 2. The temperature sensor is disconnected. 3. The temperature detection module HSMT-10 is abnormal.	1. Take measures for better dissipation of the motor. 2. Check and ensure that the temperature sensor wiring is reliable. 3. Contact the agent or Inovance for technical support.
		8	Reserved	-	-	-	-	-	-
		9	Short circuit in the circuit detected by HSMT-10	Coast to stop	Coast to stop	Not detected	Manual reset	1. A short circuit is detected in the temperature sampling circuit of the HSMT-10 detection module.	1. Check and ensure that the temperature sensor wiring is reliable. 2. Contact the agent or Inovance for technical support.
50	Built-in memory abnormality	2	Storage to the black box timeout	Coast to stop	Coast to stop	Not detected	Manual reset	1. The flash memory is abnormal.	Contact the agent or Inovance for technical support.
								2. Other causes	-
		3	The flash memory is abnormal.	Warning displayed	Coast to stop	Not detected	Automatic reset	1. The flash memory is abnormal.	Contact the agent or Inovance for technical support.
								2. Other causes	-

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
51	RTC abnormality	1	Low RTC battery power	Warning displayed	Warning displayed	Not detected	Automatic reset	1. The RTC battery power is low.	1. Replace the RTC battery.
								2. The module is faulty.	2. Contact the agent or Inovance for technical support.
		2	RTC read/write timeout (reserved)	Warning displayed	Coast to stop	Not detected	Automatic reset	1. The RTC clock chip is abnormal.	1. Contact the agent or Inovance for technical support.
								2. The peripheral cable of the RTC is abnormal.	-
		3	RTC time error	Warning displayed	Warning displayed	Not detected	Automatic reset	1. The RTC clock chip is abnormal.	1. Contact the agent or Inovance for technical support.
								2. Other causes	-

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
52	Local control abnormality	1	IDS communication fault	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The operating panel is disconnected from the PC where the IDS is installed.	1. Check whether the cable is connected securely.
								2. The operating panel is disconnected from the drive.	2. Check whether the cable is connected securely.
								3. Interference exists.	3. Check that the cable is properly routed, and install the magnetic ring to eliminate interference.
		2	Operating panel communication fault	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The operating panel is used to control multiple cascaded devices. When the panel is used to start one device, another device may be switched.	1. When the operating panel is used to control one device, disable the switchover to another device.
								2. The operating panel is disconnected from the drive.	2. Set A10-05 to 0 to disable detection on operating panel communication disconnection.
								3. Interference exists.	3. Check whether the cable is connected securely.
								-	4. Check and ensure that the cable is routed reasonably, and install the magnetic ring to eliminate interference.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
59	Low module temperature	4	Low power supply unit temperature	Coast to stop	Coast to stop	Not detected	Manual reset	1. The ambient temperature is too low. 2. The low temperature warning threshold (A4-36) is too high. 3. The thermistor is abnormal.	1. Increase the ambient temperature. 2. Set the low temperature warning threshold (A4-36) properly. 3. Contact the agent or Inovance for technical support.
		5	Low module temperature	Warning displayed	Coast to stop	Not detected	Automatic reset	1. The ambient temperature is too low.	1. Increase the ambient temperature.
								2. The low temperature warning threshold (A4-31) is too high.	2. Set the low temperature warning threshold (A4-31) properly.
								3. The thermistor is abnormal.	3. Contact the agent or Inovance for technical support.
								4. The module is damaged.	4. Contact the agent or Inovance for technical support.
61	Flying start failure	2	The flying start time is too long.	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. Motor parameters are set improperly.	1. Set motor basic parameters correctly and perform motor parameter auto-tuning again.
								2. The flying start timeout time is set improperly.	2. Set E7-07 and E7-08 properly.
								3. Flying start is abnormal.	3. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
63	External warning	1	External warning 1	Warning displayed	Warning displayed	Warning displayed	Automatic reset	1. H0-05 is set incorrectly.	1. Set H0-05 to 0.
								2. The setting source of H0-05 is active.	2. Set H0-05 to a correct value.
								-	3. Check whether the setting source is active.
		2	External warning 2	Warning displayed	Warning displayed	Warning displayed	Automatic reset	1. H0-06 is set incorrectly.	1. Set H0-06 to 0.
								2. The setting source of H0-06 is active.	2. Set H0-06 to a correct value.
								-	3. Check whether the setting source is active.
63	External warning	4	OFF2/OFF3 activation	Warning displayed	Coast to stop	Not detected	Automatic reset	1. OFF2 and OFF3 on the control panel of the InoDriveStudio are not checked.	1. Select OFF2 and OFF3 on the control panel of the InoDriveStudio.
								2. When the drive is controlled by InoDriveStudio, sources 2 and 3 of OFF2 for the selected control channel, and sources 2 and 3 of OFF3 for the selected control channel are activated.	2. Check whether sources 2 and 3 of OFF2 for the selected control channel, and sources 2 and 3 of OFF3 for the selected control channel are activated.
								3. When the control channel is used to send start/stop commands, OFF2 or OFF3 of the selected control channel is activated.	3. Check if OFF2 or OFF3 is activated in the start/stop control word and other control words.
		5	AI1 abnormality when used for temperature detection	Warning displayed	Coast to stop	Not detected	Automatic reset	1. When AI1 is used for temperature detection, the input voltage over AI1 exceeds ±6 V.	1. Check and ensure that AI1 has no abnormal voltage input.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
65	Parameter processing abnormality	1	Abnormal interruption of default setting restoration	Coast to stop	Coast to stop	Not detected	Manual reset	1. When parameters are being restored to default settings or fault records are being cleared, the drive is powered off.	1. Restore parameters to default settings to eliminate the fault.
								2. Other causes	2. Contact the agent or Inovance for technical support.
		2	Abnormal interruption of parameter copy by SOP-20	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. An abnormal interruption occurs during parameter copy by SOP-20. Some parameters are not copied, and values of other parameters have taken effect.	1. Restore parameters to default settings.
								-	2. Copy parameters through the SOP-20 again.
								-	3. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
65	Parameter processing abnormality	3	Parameter cache capacity exceeded	Coast to stop	Coast to stop	Not detected	Manual reset	1. Large numbers of parameters are saved to the EEPROM, leading to insufficient parameter cache capacity.	1. Avoid duplicate parameters to be written.
								-	2. Contact the agent or Inovance for technical support.
		5	Abnormal interruption of motor parameter copy	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The power is off during motor parameter copy.	1. Copy motor parameters again or restore all parameters to default settings.
								2. Built-in memory abnormality	2. Change the control board of the drive.
								3. Too many parameters are written.	3. Avoid too many parameters to be written.
								-	4. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
65	Parameter processing abnormality	6	Parameter copy by SOP-20 not completed	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. An abnormal interruption occurs during parameter download by SOP-20. Some parameters are not downloaded, and values of the downloaded parameters have not taken effect.	1: Reset the drive.
								-	2. Power off and then power on the drive.
								-	3. Contact the agent or Inovance for technical support.
		7	Abnormal interruption of parameter backup to internal memory	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. An abnormal interruption occurs during parameter restoration from the internal memory.	1. Back up parameters again or restore all parameters to default settings.
								2. The internal memory is abnormal.	2. Change the control board of the drive.
								-	3. Contact the agent or Inovance for technical support.
67	Abnormality of bus adapter A communication card	1	Communication timeout of adapter A external bus	Coast to stop	Coast to stop	Not detected	Manual reset	1. The communication between the communication card and host controller times out.	Check the cable connection between the communication card and host controller.
								2. The communication card is offline.	-
		2	Communication parameter (address or baud rate) setting error of adapter A	Coast to stop	Coast to stop	Not detected	Manual reset	The address or baud rate is set incorrectly.	Check and set the communication address or baud rate correctly.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
67	Abnormality of bus adapter A communication card	3	Adapter A bus address conflict	Coast to stop	Coast to stop	Not detected	Manual reset	The slave addresses conflict.	Set the slave addresses again.
		4	PZD1 data CRC error of adapter A DP communication	Coast to stop	Coast to stop	Not detected	Manual reset	1. The check bit (n16-10) of input PZD1 is set improperly.	1. Set the check bit for input PZD1 properly.
								2. The host controller does not send the PZD1 check bit normally.	2. Correct the host controller program to ensure that the PZD1 check bit is normal.
								3. Other causes	3. Contact the agent or Inovance for technical support.
		5	DP configuration error of adapter A	Coast to stop	Coast to stop	Not detected	Manual reset	The DP communication configuration is incorrect.	Check the DP communication setting.
		6	Mismatch between PDO transmission length and configured length of adapter A	Coast to stop	Coast to stop	Not detected	Manual reset	The PDO data length does not match the configured length.	Check the DP communication setting.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
67	Abnormality of bus adapter A communication card	7	EtherCAT EEPROM loading error of adapter A	Coast to stop	Coast to stop	Not detected	Manual reset	The EtherCAT card encounters an EEPROM loading error.	1. Perform the EEPROM write operation again.
								-	2. Contact the agent or Inovance for technical support.
		8	Communication card initialization error of adapter A	Coast to stop	Coast to stop	Not detected	Manual reset	An abnormality occurs when communication parameters of the communication card is being initialized.	Check the initialization parameters.
		9	EtherCAT master switchover error of adapter A	Coast to stop	Coast to stop	Not detected	Manual reset	A master switchover error occurs.	Switchover fails due to incorrect slave configurations.
								-	Reconfigure the slave according to the ESC error feedback and then switch the status.
		10	Adapter A Sync signal exception	Coast to stop	Coast to stop	Not detected	Manual reset	The Sync signal loss rate exceeds the limit.	1. Check the real-time capability of the master.
								-	2. Check the communication network to reduce interference.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
67	Abnormality of bus adapter A communication card	11	Abnormality of adapter A PDI synchronization signal	Coast to stop	Coast to stop	Not detected	Manual reset	The Sync signal loss rate exceeds the limit.	1. Check the real-time capability of the master.
								-	2. Check the communication network to reduce interference.
		14	Ethernet/IP communication error of adapter A	Coast to stop	Coast to stop	Not detected	Manual reset	Fault codes and fault causes: 82: An error occurs on the Ethernet hardware. 83: The MAC address is not programmed. 84: IP address conflict 85: LINK loss	Solutions: 82: Contact Inovance or the agent for technical support. 83: Contact Inovance or the agent for technical support. 84: Check and ensure that the device has been assigned with a unique IP address. 85. Check whether the network cable is connected properly.
		15	CRC error in data received by the communication card of adapter A	Coast to stop	Coast to stop	Not detected	Manual reset	The number of CRC errors in data received by the bus adapter reaches the threshold.	1. Modify the CRC error threshold.
								-	2. Contact the agent or Inovance for technical support.
67	Abnormality of bus adapter A communication card	16	CRC error in data transmitted by the communication card of adapter A	Coast to stop	Coast to stop	Not detected	Manual reset	The number of CRC errors in data transmitted by the bus adapter reaches the threshold.	1. Modify the CRC error threshold.
								-	2. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
68	Abnormality of bus adapter B communication card	1	Communication timeout of adapter B external bus	Coast to stop	Coast to stop	Not detected	Manual reset	1. The communication between the communication card and host controller times out.	Check the cable connection between the communication card and host controller.
								2. The communication card is offline.	-
		2	Communication parameter (address or baud rate) setting error of adapter B	Coast to stop	Coast to stop	Not detected	Manual reset	The address or baud rate is set incorrectly.	Check and set the communication address or baud rate correctly.
		3	Adapter B bus address conflict	Coast to stop	Coast to stop	Not detected	Manual reset	The slave addresses conflict.	Set the slave addresses again.
		4	PZD1 data CRC error of adapter B DP communication	Coast to stop	Coast to stop	Not detected	Manual reset	1. The check bit (n16-10) of input PZD1 is set improperly.	1. Set the check bit for input PZD1 properly.
								2. The host controller does not send the PZD1 check bit normally.	2. Correct the host controller program to ensure that the PZD1 check bit is normal.
								3. Other causes	3. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
68	Abnormality of bus adapter B communication card	5	DP configuration error of adapter B	Coast to stop	Coast to stop	Not detected	Manual reset	The DP communication configuration is incorrect.	Check the DP communication setting.
		6	Mismatch between PDO transmission length and configured length of adapter B	Coast to stop	Coast to stop	Not detected	Manual reset	The PDO data length does not match the configured length.	Check the DP communication setting.
		7	EtherCAT EEPROM loading error of adapter B	Coast to stop	Coast to stop	Not detected	Manual reset	The EtherCAT card encounters an EEPROM loading error.	1. Perform the EEPROM write operation again.
								-	2. Contact the agent or Inovance for technical support.
		8	Communication card initialization error of adapter B	Coast to stop	Coast to stop	Not detected	Manual reset	An abnormality occurs when communication parameters of the communication card is being initialized.	Check the initialization parameters.
68	Abnormality of bus adapter B communication card	9	EtherCAT master switchover error of adapter B	Coast to stop	Coast to stop	Not detected	Manual reset	A master switchover error occurs.	Switchover fails due to incorrect slave configurations.
								-	Reconfigure the slave according to the ESC error feedback and then switch the status.
		10	Adapter B Sync signal exception	Coast to stop	Coast to stop	Not detected	Manual reset	The Sync signal loss rate exceeds the limit.	1. Check the real-time capability of the master.
								-	2. Check the communication network to reduce interference.
		11	Abnormality of adapter B PDI synchronization signal	Coast to stop	Coast to stop	Not detected	Manual reset	The Sync signal loss rate exceeds the limit.	1. Check the real-time capability of the master.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
68	Abnormality of bus adapter B communication card	11	Abnormality of adapter B PDI synchronization signal	Coast to stop	Coast to stop	Not detected	Manual reset	-	2. Check the communication network to reduce interference.
		14	Ethernet/IP communication error of adapter B	Coast to stop	Coast to stop	Not detected	Manual reset	Fault codes and fault causes: 82: An error occurs on the Ethernet hardware. 83: The MAC address is not programmed. 84: IP address conflict 85: LINK loss	Solutions: 82: Contact Inovance or the agent for technical support. 83: Contact Inovance or the agent for technical support. 84: Check and ensure that the device has been assigned with a unique IP address. 85. Check whether the network cable is connected properly.
68	Abnormality of bus adapter B communication card	15	CRC error in data received by the communication card of adapter B	Coast to stop	Coast to stop	Not detected	Manual reset	The number of CRC errors in data received by the bus adapter reaches the threshold.	1. Modify the CRC error threshold.
								-	2. Contact the agent or Inovance for technical support.
		16	CRC error in data transmitted by the communication card of adapter B	Coast to stop	Coast to stop	Not detected	Manual reset	The number of CRC errors in data transmitted by the bus adapter reaches the threshold.	1. Modify the CRC error threshold.
								-	2. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
74	Braking unit abnormality	4	Braking IGBT shoot through	Coast to stop	Coast to stop	Coast to stop	Manual reset	The braking IGBT is damaged or shorted.	1. Check whether the braking transistor is damaged.
									2. Check whether the braking IGBT is shorted.
									3. Contact the agent or Inovance for technical support.
		8	Braking resistor overload	Coast to stop	Coast to stop	Coast to stop	Manual reset	The braking resistor continuously outputs large current for a certain period.	1. Check whether the braking resistor is proper.
									2. Check whether the braking resistor is connected properly.
									3. Contact the agent or Inovance for technical support.
80	3. The cooling fan is damaged.	1	Drive fan fault	Warning displayed	Coast to stop	Not detected	Automatic reset	The fan feedback is abnormal. The fan power supply is abnormal.	Check whether the fan power supply is normal. Check whether the fan operates properly. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
82	DC pre-charge fault	1	Pre-charge resistor fault	Coast to stop	Coast to stop	Coast to stop	Manual reset	The pre-charge resistor circuit is abnormal. The thyristor drive is abnormal. The thyristor is damaged.	Check and ensure that the pre-charge resistor circuit is normal. Check and ensure that the thyristor is normal. Contact the agent or Inovance for technical support.
		2	Pre-charge contactor feedback error	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The pre-charge contactor is damaged.	1. Replace the faulty pre-charge contactor.
								2. The module is faulty.	2. Contact the agent or Inovance for technical support.
								3. Other causes	3. Contact the agent or Inovance for technical support.
		3	Frequent action of pre-charge contactor	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The DC bus voltage fluctuates abnormally.	1. Check the front rectifier for phase loss.
								2. The fault is caused by manual operations.	2. Check and ensure that the module is normal.
								3. Other causes	3. Avoid frequent power-on/power-off in a short period of time.
82	DC pre-charge fault	3	Frequent action of pre-charge contactor	Coast to stop	Coast to stop	Coast to stop	Manual reset	-	4. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
83	InoLink communication exception	1	InoLink address conflict	Coast to stop	Coast to stop	Not detected	Manual reset	1. Duplicate node addresses exist on the InoLink network.	1. Set a unique address to each InoLink node.
		2	InoLink communication offline	Coast to stop	Coast to stop	Not detected	Manual reset	1. InoLink wiring is abnormal or disconnected.	1. Check and ensure that CANH/CANL is connected correctly.
								2. The termination resistor is abnormal.	2. Check and ensure that the CAN link is connected properly.
								3. Other causes	3. Check and ensure that the DIP switch of the termination resistor is normal.
								-	4. Contact the agent or Inovance for technical support.
83	InoLink communication exception	3	Timeout for InoLink to receive specified node data	Coast to stop	Coast to stop	Not detected	Manual reset	1. The specified node is not online.	1. Check and ensure that wiring is correct.
								2. The specified node address does not exist.	2. Check and ensure that the node address is set correctly.
								3. The specified node data is not sent.	3. Check and ensure that the specified node data is sent.
								4. Because the InoLink network load rate is too high, the data cannot be sent.	4. Ensure that n0-7 is set correctly.
								5. The termination resistor is abnormal.	5. Increase the communication baud rate. The maximum baud rate is 1 Mbps.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
83	InoLink communication exception	3	Timeout for InoLink to receive specified node data	Coast to stop	Coast to stop	Not detected	Manual reset	6. Other causes	6. Reduce the number of InoLink nodes.
								-	7. Reduce the amount of data sent by each node.
								-	8. Check and ensure that the InoLink network termination resistor is configured properly.
								-	9. Contact the agent or Inovance for technical support.
83	InoLink communication exception	4	Local address as the target address for the InoLink to receive data	Warning displayed	Coast to stop	Not detected	Automatic reset	1. The specified node address for receiving data is set incorrectly.	1. Set the node address for receiving data correctly.
								2. The local address is set incorrectly.	2. Set the local address correctly.
		5	High InoLink bus load rate	Warning displayed	Coast to stop	Not detected	Automatic reset	1. There are too many InoLink communication nodes.	1. Reduce the number of InoLink nodes.
								2. The InoLink communication node sends large amount of data.	2. Set n0-7 (transmission mode of data 5 to 8) to 0 (indicating that the data is not sent).
								3. The InoLink communication node sends data at a short interval.	3. Set n0-7 (transmission mode of data 5 to 8) to 2 (indicating that the data is transmitted at an interval of 16 ms).
84	Brake apply control abnormality	1	The brake cannot be released.	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The brake feedback wiring is incorrect or disconnected.	1. Check and ensure that the brake feedback circuit is normal.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
84	Brake apply control abnormality	1	The brake cannot be released.	Coast to stop	Coast to stop	Coast to stop	Manual reset	2. The brake function is set incorrectly.	2. When there is no brake feedback signal, set L1-00 to 1.
								3. The brake release feedback signal source is set incorrectly.	3. Ensure that L1-03 is set correctly.
		2	The brake cannot be closed.	Coast to stop	Coast to stop	Warning displayed	Manual reset	1. The brake feedback wiring is incorrect or disconnected.	1. Check and ensure that the brake feedback circuit is normal.
								2. The brake function is set incorrectly.	2. When there is no brake feedback signal, set L1-00 to 1.
								3. The brake release feedback signal source is set incorrectly.	3. Ensure that L1-03 is set correctly.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
84	Brake apply control abnormality	3	Brake verification failure	Coast to stop	Coast to stop	Not detected	Manual reset	1. During brake verification, the torque cannot reach the set value. 2. Brake verification is not allowed when the V/f control mode is selected.	1. Ensure that the brake is normally closed. 2. Ensure that the motor parameters are configured correctly and the cable is properly connected. 3. Check for wear of the brake. 4. If the control mode is V/f, disable brake verification (L1-35 = 0).
		4	Brake verification failure	Coast to stop	Coast to stop	Not detected	Manual reset	1. The encoder is displaced.	1. Ensure that the brake is normally closed. 2. Check for wear of the brake.
		5	Automatic activation of protection upon brake failure	Warning displayed	Warning displayed	Not detected	Automatic reset	1. The encoder pulse change exceeds the judgment threshold at stop. Protection for brake is activated automatically. Suspension at zero speed is maintained and the stop command does not respond. Re-send the running command, set the speed, slowly lower down the device to a safe area, and then power off the drive.	1. Check for wear of the brake. 2. If you do not want to enable the function, disable the function (L1-32 = 0)

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
85	Internal Faults	1	Internal data interaction abnormality	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The software internal execution program is abnormal.	1. Power off and then power on the drive.
								2. Other causes	2. Contact the agent or Inovance for technical support.
		2	Internal data interaction abnormality	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The program is upgraded.	1. Power off and then power on the drive.
								2. The drive control board fails.	2. Contact the agent or Inovance for technical support.
								3. Other causes	-
		5	Carrier interruption	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The software internal execution program is abnormal.	1. Power off and then power on the drive.
								2. The drive control board fails.	2. Replace the control board.
								3. Other causes	2. Contact the agent or Inovance for technical support.
88	The model parameter is set incorrectly.	2	Model setting error (voltage level)	Coast to stop	Coast to stop	Coast to stop	Manual reset	The 400 V model is set to the 690 V model, and the 690 V model is set to the 400 V model. Other causes	Identify the model and set A3-00 to the correct model. Contact Inovance for technical support.
88	Model parameter abnormality	3	Model hardware ID reading failure	Coast to stop	Coast to stop	Coast to stop	Manual reset	The drive control board fails. Other causes	Power off and then power on the device again. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
88	Model parameter abnormality	4	Model mismatch	Coast to stop	Coast to stop	Coast to stop	Manual reset	The function software version of the control board does not match the performance software version of the control board. Other causes	Upgrade the function software and the performance software of the control board properly. Check and ensure that the correct upgrade file is selected. Check and ensure that both the function software and the performance software are upgraded. Contact the agent or Inovance for technical support.
93	Motor control abnormal	1	Motor stall	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The load is too heavy.	1. Check whether the load is too heavy.
								2. Motor parameters are set improperly.	2. Check and ensure that the motor parameter is set correctly.
								3. The PG card is not installed or the encoder is abnormal.	3. Check and ensure that the PG card or encoder is connected properly.
								4. Motor parameter auto-tuning is not performed.	4. Check and ensure that the encoder is intact.
								5. Output phase is lost or output is disconnected.	5. Check and ensure that encoder parameters are configured correctly.
								6. Other causes	6. Set motor basic parameters correctly and perform motor parameter auto-tuning again.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
93	Motor control abnormal	1	Motor stall	Coast to stop	Coast to stop	Coast to stop	Manual reset	-	7. Check whether the motor cable is connected securely.
								-	8. Check whether the contactor on the motor side is open.
								-	9. Contact the agent or Inovance for technical support.
93	Motor control abnormal	3	Current control abnormal	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The PG card is not installed or the encoder is abnormal.	1. Check and ensure that the PG card or encoder is connected properly.
								2. Output phase loss occurs.	2. Check and ensure that the encoder is intact.
								3. Other causes	3. Check and ensure that encoder parameters are configured correctly.
								-	4. Check whether the motor cable is connected securely.
								-	5. Check whether the contactor on the motor side is connected properly.
								-	6. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
100	Abnormal fault information	1	Generating of abnormal fault information	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. The function software version of the control board does not match the performance software version of the control board.	1. Upgrade the function software and the performance software of the control board properly.
								2. The software internal execution program is abnormal.	2. Check and ensure that the correct upgrade file is selected.
								3. Other causes	3. Check and ensure that both the function software and the performance software are upgraded.
								-	4. Power off and then power on the drive.
100	Abnormal fault information	1	Generating of abnormal fault information	Coast to stop	Coast to stop	Coast to stop	Manual reset	-	5. Contact the agent or Inovance for technical support.
		4	Exchange data error	Coast to stop	Coast to stop	Not detected	Manual reset	1. The software internal execution program is abnormal.	1. Power off and then power on the drive.
								2. Other causes	2. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
117	Drive pre-overload	1	Drive pre-overload	Warning displayed	Warning displayed	Not detected	Automatic reset	1. The load is too heavy.	1. Reduce the load.
								2. The power rating of the drive is low.	2. Select the drive with a proper power rating.
								3. Motor parameters are set improperly.	3. Set the motor parameter correctly.
								4. The torque boost value is set improperly in the V/f control mode.	4. Set the torque boost parameter properly.
								5. The motor is stalled.	5. Check the motor and mechanical conditions.
								6. The overload mode (A4-23) is improper.	6. Set the operating mode appropriately according to the actual load conditions. Refer to the corresponding section in the software guide for the overload mode selection.
								7. Other causes	7. Contact the agent or Inovance for technical support.
169	Error in automatic reset upon a fault and automatic restart upon a fault activated	1	Automatic fault reset failure	Coast to stop	Coast to stop	Coast to stop	Manual reset	1. Some faults are not allowed for automatic reset.	1. Check and ensure that parameters for faults that are not allowed for automatic reset are set properly.
								2. The maximum number of automatic fault reset times has reached.	2. Reset the number of automatic fault reset times.
		2	Automatic restart upon a fault activated	Warning displayed	Warning displayed	Not detected	Automatic reset	1. The automatic fault reset and automatic restart function are enabled.	1. The fault is used to indicate that the function is enabled. Set H1-43 to disable the function if required.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
172	Module pre-over temperature	4	Drive overheat warning	Warning displayed	Warning displayed	Not detected	Automatic reset	1. The air filter is blocked.	1. Clean the air filter.
								2. The fan is abnormal.	2. Ensure that the fan works normally.
								3. The ambient temperature is too high.	3. Lower down the ambient temperature.
								4. The overheat warning threshold is too high.	4. Set the overheat warning threshold properly.
								5. The module is faulty.	5. Contact the agent or Inovance for technical support.
174	AI input disconnection	1	I/O expansion card communication disconnection	Warning displayed	Coast to stop	Not detected	Automatic reset	1. The wiring between the I/O expansion card and the control board is loose.	1. Check whether the cable is connected securely.
								2. The I/O expansion card is abnormal.	2. Contact the agent or Inovance for technical support.
								3. The control board is faulty.	-
								4. Interference exists during communication.	-
		3	AI1 disconnection	Warning displayed	Coast to stop	Not detected	Automatic reset	1. AI1 is disconnected.	1. Check and ensure that AI1 is connected.
								2. The AI1 signal type is set incorrectly.	2. Check whether the voltage signal type is set to 4 mA to 20 mA.
								3. The detection threshold is too high.	3. Check whether the signal type of 0 mA to 20 mA is set to 4 mA to 20 mA.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
174	AI input disconnection	3	AI1 disconnection	Warning displayed	Coast to stop	Not detected	Automatic reset	4. The AI1 correction factor is set improperly.	4. Set a proper detection threshold.
								5. The control board is faulty.	5. Check and ensure that the correction factor is set properly by group F15.
								-	6. Contact the agent or Inovance for technical support.
174	AI input disconnection	4	AI2 disconnection	Warning displayed	Coast to stop	Not detected	Automatic reset	1. AI2 is disconnected.	1. Check and ensure that AI2 is connected.
								2. The AI2 signal type is set incorrectly.	2. Check and ensure that the voltage signal type is set to 4 mA to 20 mA.
								3. The detection threshold is too high.	3. Check whether the signal type of 0 mA to 20 mA is set to 4 mA to 20 mA.
								4. The AI2 correction factor is set improperly.	4. Set a proper detection threshold.
								5. The control board is faulty.	5. Check and ensure that the correction factor is set properly by group F15.
								-	6. Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
174	AI input disconnection	5	AI1 input value limit exceeded	Not detected	Coast to stop	Not detected	Automatic reset	The input value F2-00 of AI1 is smaller than the minimum value (F2-08) or greater than the maximum value (F2-10). The AI monitoring function (F2-36) is activated. The AI1-related judgment conditions F2-37 (AI monitoring activation condition selection) and F2-38 (AI monitoring control channel selection) are valid.	Ensure that the actual input value does not exceed the limit. If you do not want to enable the fault, set F2-36 (AI monitoring function) to 0 Contact the agent or Inovance for technical support.
		6	AI2 input value limit exceeded	Not detected	Coast to stop	Not detected	Automatic reset	The input value F2-02 of AI2 is smaller than the minimum value (F2-12) or greater than the maximum value (F2-14). The AI monitoring function (F2-36) is activated. The AI2-related judgment conditions F2-37 (AI monitoring activation condition selection) and F2-38 (AI monitoring control channel selection) are valid.	Ensure that the actual input value does not exceed the limit. If you do not want to enable the fault, set F2-36 (AI monitoring function) to 0 Contact the agent or Inovance for technical support.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
174	AI input disconnection	7	AI3 (expansion terminal) disconnection	Warning displayed	Coast to stop	Not detected	Automatic reset	1. AI3 is disconnected.	1. Check and ensure that AI3 is connected.
								2. The AI3 signal type is set incorrectly.	2. Set a proper detection threshold.
								3. The detection threshold is too high.	3. Check and ensure that the correction factor is set properly by group F14.
								4. The AI3 correction factor is set improperly.	4. Contact the agent or Inovance for technical support.
								5. The expansion I/O board is faulty.	-
		8	AI4 (expansion terminal) disconnection	Warning displayed	Coast to stop	Not detected	Automatic reset	1. AI4 is disconnected.	1. Check and ensure that AI4 is connected.
174	AI input disconnection	8	AI4 (expansion terminal) disconnection	Warning displayed	Coast to stop	Not detected	Automatic reset	2. The AI4 signal type is set incorrectly.	2. Set a proper detection threshold.
								3. The detection threshold is too high.	3. Check and ensure that the correction factor is set properly by group F14.
								4. The AI4 correction factor is set improperly.	4. Contact the agent or Inovance for technical support.
								5. The expansion I/O board is faulty.	-

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
187	Position control fault	1	Excessive position deviation	Coast to stop	Coast to stop	Coast to stop	Manual reset	The difference between the feedback position and the set position exceeds the deviation threshold set by software.	Modify the corresponding parameters, such as the deviation threshold or detection time.
		2	Home search timeout	Coast to stop	Coast to stop	Coast to stop	Manual reset	The home search operation exceeds the set time.	1. Check the home search mode. 2. Check the proximity switch signal. 3. Check the running direction.
		3	Positioning completion timeout	Coast to stop	Coast to stop	Coast to stop	Manual reset	The actual position is not in the allowed range within the preset period.	1. Check whether the parameter settings are properly. 2. Check whether the transmission is stuck or the torque is insufficient.
		4	Position feedback encoder disconnection	Coast to stop	Coast to stop	Coast to stop	Manual reset	In the position control mode, encoder disconnection is detected by hardware.	Check the position feedback encoder and wiring.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
188	Position control warning	1	Home point invalid during operation in the positioning control mode	Warning displayed	Coast to stop	Not detected	Automatic reset	The home point is invalid during operation in the positioning control mode.	Perform home point reset to ensure that the home point is valid.
		2	Home point invalid during interruption of fixed length motion	Warning displayed	Coast to stop	Not detected	Automatic reset	The home point is invalid during interruption of fixed length motion.	Perform home point reset to ensure that the home point is valid.
		3	Proximity switches 1 and 2 active at the same time	Warning displayed	Coast to stop	Not detected	Automatic reset	Proximity switches 1 and 2 are too close to each other.	Keep a certain distance between proximity switches 1 and 2.
		4	Proximity switch 1 signal loss	Warning displayed	Coast to stop	Not detected	Automatic reset	The proximity switch 1 signal is lost. It is not detected during motion.	Check the position and signal circuit of the proximity switch.
		5	Proximity switch 2 signal loss	Warning displayed	Coast to stop	Not detected	Automatic reset	The proximity switch 2 signal is lost. It is not detected during motion.	Check the position and signal circuit of the proximity switch.
188	Position control warning	6	Proximity switch 1 position deviation too large	Warning displayed	Coast to stop	Not detected	Automatic reset	The deviation between the detection position of proximity switch 1 and the set position exceeds the set range.	Check the position and signal circuit of the proximity switch.
		7	Proximity switch 2 position deviation too large	Warning displayed	Coast to stop	Not detected	Automatic reset	The deviation between the detection position of proximity switch 2 and the set position exceeds the set range.	Check the position and signal circuit of the proximity switch.
		8	Position setpoint overlimit	Warning displayed	Coast to stop	Not detected	Automatic reset	The position control position setpoint is out of the forward/ reverse software limit range.	Reset parameters properly.

Fault Code	Fault Name	Fault Subcode	Fault Subcode Name	Default Fault Level	Highest Fault Level	Lowest Fault Level	Reset Method	Cause	Solution
189	Limit activation alarm	1	Forward hardware limit switch 1 activated	Warning displayed	Coast to stop	Not detected	Automatic reset	The forward limit switch signal 1 is activated.	Check whether the limit switch signal and parameter settings are correct, or check for reverse running disconnection.
189	Limit activation alarm	2	Reverse hardware limit switch 1 activated	Warning displayed	Coast to stop	Not detected	Automatic reset	The reverse limit switch signal 1 is activated.	Check whether the limit switch signal and parameter settings are correct, or check for reverse running disconnection.
		3	Forward software limit switch activated	Warning displayed	Coast to stop	Not detected	Automatic reset	The current position value (U29-00) is greater than the forward software limit setpoint (o17-62).	Check whether parameter settings are correct, or check for reverse running disconnection.
		4	Reverse software limit switch activated	Warning displayed	Coast to stop	Not detected	Automatic reset	The current position value (U29-00) is lower than the forward software limit setpoint (o17-63).	Check whether parameter settings are correct, or check for reverse running disconnection.
		5	Forward hardware limit switch 2 activated	Warning displayed	Coast to stop	Not detected	Automatic reset	The forward limit switch signal 2 is activated.	Check whether the limit switch signal and parameter settings are correct, or check for reverse running disconnection.
		6	Reverse hardware limit switch 2 activated	Warning displayed	Coast to stop	Not detected	Automatic reset	The reverse limit switch signal 2 is activated.	Check whether the limit switch signal and parameter settings are correct, or check for reverse running disconnection.

5 Terms and Abbreviations

Term	Description
MDKE-10	LED operating panel for the MD580
SOP-20-880	Smart operating panel for the MD580
InoDriveStudio	PC-based commissioning software for the MD580
IDS	Abbreviation for InoDriveStudio
AI	Analog input
AO	Analog output
DI	Digital input
DO	Digital output
RO	Relay output
HDI	High-speed digital input
HDO	High-speed digital output
OFF1	Start and stop command, corresponding to bit 0 of control word 1. The rising edge (0->1) corresponds to the start command. When bit 0 is set to 0 (low level), OFF1 is the stop command.
OFF2	Emergency stop command, corresponding to bit 1 of control word 1. The emergency stop command takes effect immediately in any state. Operation is allowed at high level and IGBT output is prohibited at low level.
OFF3	Fast stop command, corresponding to bit 2 of control word 1. The fast stop command takes effect immediately in any state. Operation is allowed at high level. At low level, the device decelerates to zero speed according to the OFF3 stop time and then the IGBT output is prohibited.
Enable operation	It corresponds to bit 3 of control word 1. Whether to enable the operation is determined after the OFF1 start command is valid. At high level, the device is allowed to enter the operation state and IGBT output is enabled. At low level, the device keeps in the operation ready state and IGBT output is prohibited.
Connector	It is a special read-only parameter that records data during operation of the MD580. The value can be read by a given source parameter or the waveform change of the data can be recorded by an oscilloscope.
Bit connector	It is a connector parameter that records one piece of bit data. The values are 0 and 1
B connector	Bit connector
Word connector	It is a connector parameter that records one piece of analog data.
K connector	Word connector
Source reference parameter	It is a special parameter. The value of the connector parameter can be read for control by the MD580 by setting the number of the connector parameter.

Term	Description
Bit given source parameter	A given source parameter of one bit connector is read and one piece of bit data is output.
Word given source parameter	A given source parameter of one word connector is read and an analog value is output.
Terminal start/ stop module	It is used to start or stop the drive through terminals.
Motorized potentiometer	It refers to the virtual potentiometer implemented by software. You can increase or decrease the value of motorized potentiometer through the C7-05 or C7-06.

Note

References to “words” and “bits” in this guide indicate the length of the data information, such as word connectors, bit connectors, control words.

- “Bit” refers to a bit of information and its value is 0 or 1.
- “Word” refers to a 16-bit message and its value range is 0 to 65,535 as an unsigned number or -32,768 to 32,767 as a signed number.

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