Unity Drive



MD880-50 Series

Inverter Software User Guide

软件手册

A00

Document No. 19010988

Preface

Thank you for purchasing the Inovance MD880 high-performance multidrive system.

The MD880 has set an new industrial benchmark in terms of structure, power density, response, control precision, and scope of application. Product Advantages:

- Voltage class: 400/690 V
- Rated power range: 3.7 to 5,600kW
- Complete rectifier module types: basic rectifier, regenerative rectifier and active rectifier
- Compatible with asynchronous induction motors
- Excellent dynamic response and control accuracy

Wide application range:

- Metallurgy

  High-speed wire rod and hot steel strip continuous rolling equipment, wide and thick plate equipment, cold rolling machine, pickling line, annealing line, galvanizing line, color coating line, non-ferrous metal alloy manufacturing equipment, and non-ferrous metal rolling equipment

- Papermaking

  Papermaking combined equipment, including continuous production lines such as headbox, wire section, press section, drying section, sizing, hard calendering, coating, supercalender, and rewinding machine

- Harbor equipment and other large lifting equipment

  Shore container bridge crane, rubber tired (rail type) container gantry crane, grab ship unloader, grab door seat crane, large shipbuilding gantry crane, and large metallurgical casting crane

- Ships

  Marine electric main and auxiliary machine system equipment and installation ships

- Cables

  Large frame stranding machine, coiling machine, copper aluminum multi-motor large drawing machine

- Other

Wind power converter, unit test bench, military equipment, power low voltage control, oil and gas transportation, mine transmission

This software guide is applicable to MD880-50, MD880-01S and HE200-011 series inverter products. The guide provides detailed information about the software, including basic usage, function blocks, parameters, connector resources, data flow diagrams and troubleshooting. New users must read this manual carefully. If you have any doubts about the contents of this guide, please consult our technical support personnel for assistance.

Precautions
◆ The drawings in the user guide sometimes show the product without covers or protective guards to display more details. When using this product, be sure to install the casing or cover according to the regulations, and operate in accordance with the guide.
◆ The drawings in the user guide are shown for reference only and may not match the product you purchased.
◆ The copy right of this guide belongs to Inovance. The guide is subject to change without notice.
◆ In case of any questions during use, please contact our regional agents or customer service center.

■ Related Manuals

Rectifiers	Document No.
MD880-40 Series AFE Hardware User Guide	19010987
MD880-40 Series AFE Software User Guide	19010986
MD880-40D Series AFE User Guide	19011220
MD880-30 Series Regenerative Rectifier Hardware User Guide	19010984
MD880-30 Series Regenerative Rectifier Software User Guide	19010985
MD880-20 Series Basic Rectifier Hardware User Guide	19010983
MD880-20 Series Basic Rectifier Software User Guide	19010982
Inverters	Document No.
MD880-50 Series Inverter Hardware User Guide	19010989
MD880-50 Series Inverter Software User Guide	19010988
MD880MN-50 Series Inverter User Guide	19010990
MD880 Series Multi-Drive Cabinet Design and Maintenance Guide	19010782
MD880 Series Multi-Drive Cabinet Mechanical Installation Guide	19010725
Others	Document No.
SOP-20-880 Smart Operation Panel User Guide	19010368
SOP-20-880 Base Kit Installation Guide	19010401
HCU Control Module User Guide	19010528
HPCU Parallel Control Module User Guide	19010690
HPG-10-HTL Incremental Encoder Signal Detection Module User Guide	19010500
HPG-50-TTL Incremental Encoder Signal Detection Module User Guide	19010501
HPG-40 Resolver Signal Detection Module User Guide	19010892
HDP-10 PROFIBUS DP Fieldbus Adaptation Module User Guide	19010490
HSVM-10 Synchronous Voltage Measuring Module User Guide	19010588
HOFM-10/30 Optical fiber Expansion Module User Guide	19010443
HMBA-10 Modbus RTU Fieldbus Adaptation Module User Guide	19010489
HCAN-10 Fieldbus Adaptation Module User Guide	19010727
HPFN-10 PROFINET I/O Industrial Ethernet Adaptation Module User Guide	19010877
HSVM-20 Synchronous Voltage Measuring Module User Guide	19010726
HIO-10 I/O Function Module User Guide	19010749
HOFR-50 Optical Fiber Routing Control Module User Guide	19010791
HCBC-A0 Pulse-by-pulse Current Limit Control Module User Guide	19010792
HMBT-10 Modbus TCP Adaptation Module User Guide	19011166
HETN-10 Ethernet Test Module User Guide	19011167
HIBA-10 Data Conversion Module User Guide	19011182
HDVN-10 Bus Communication Module User Guide	19011233
MD880-61 Series Single-phase Braking Unit User Guide	19011170

Terminology and Abbreviations

Term	Definition
HCU-50/51	High performance inverter control modules HCU-50 and HCU-51 which can control MD880-50, MD880-01S and HE200-011 series products
SOP-20-880	Smart operation panel used with HCU-50/51 control modules
InoDriveStudio	PC software debugging tool used with HCU-50/51
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/Stop command, corresponding to bit0 of control word 1. The rising edge corresponds to the start command, and the low level corresponds to the start command
OFF2	Emergency stop command, corresponding to bit1 of control word 1, taking effect immediately in any state. High level allows operation, and low level stops IGBT output
OFF3	Quick stop command, corresponding to bit2 of control word 1, taking effect immediately in any state. High level allows operation, and low level slows the drive down to zero speed according to the OFF3 stop time, and then stops the IGBT output
Operation enable	Corresponds to bit3 of control word 1 and is evaluated after the start (OFF1) command is effective. High level allows entering the running state and enables IGBT output; low level lock the drive in preparation state and stops the IGBT output
Connector	Special read-only parameter to record the operation data of HCU-50/51. The value can be read through the reference source parameter. The changing waveform of the data can be recorded by an oscilloscope
Bit connector	Connector parameter that records only one bit of data, with two values: 0 and 1
B connector	Bit connector
Word connector	Connector parameter that record an analog data entry
K connector	Word connector
Reference source parameter	Special parameter through which you can read the parameter value of a connector by setting the number of the connector parameter
Bit reference source parameter	Reads the reference source parameter of a bit connector, and outputs 1-bit data
Word reference source parameter	Reads the reference source parameter of a word connector, and outputs 1-bit data
Terminal Start/Stop Module	Collection of common ways to control the start and stop of a drive through terminals
Motorized potentiometer	A software-based virtual potentiometer output, which can be adjusted by the increase/decrease command of the C4-05/C4-06 motorized potentiometer

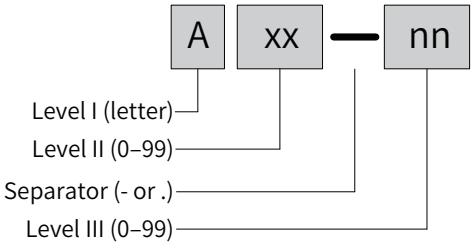


NOTE

◆ The "word" and "bit" appear in this guide indicate the length of data, such as word connectors, bit connectors and control words; "bit" is a value of 0 or 1 that represents a bit of information; "word" represents 16-bit information which is in the range of 0–65535 in the case of an unsigned number, and-32768 ~ 32767 int the case of a signed number.

Setpoint and output value of a parameter

The HCU-50/51 parameters are represented by a three-level menu structure, as shown in the following figure:



NOTE

- The menu uses two separators: "-" and ".", which are interchangeable, that is, A0-00 and A0.00 are the same. A0-00 is generally used in this guide, but A0.00 may be used on the LED panel.
- The English letters that can be used in the first-level menu include A/B/C/D/E/F/H/L/N/O/P/U, and the case of English letters is only for convenient display on the LED panel.

- The setpoint of a parameter refers to the value set by the user for the parameter.
- The output value of the parameter refers to the value obtained by reading the parameter from the HCU-50/51 control module.

For most parameters, the output value is equal to the setpoint. But in the parameters of HCU-50/51 control module, there is a kind of reference source parameters, whose setpoint indicates that their value comes from another parameter. code

In this guide, the parameter number is used to represent its setpoint, and [parameter number] is used to represent the output value of the parameter, for example:

- U9-32 = 10%
- C0-00 = 1932
- [C0-00] = 10%

C0-00 represents the channel 1 speed control master setting selection and comes from the value of a connector U9-32. When U9-32 = 10%, the actual output value of [C0-00] is 10%.

For C0-00 (reference source), the setpoint 1932 only indicates that the setpoint comes from the U9-32 connector value. We are more concerned about the output value of the channel 1 speed control master setting. [C0-00] is used to indicate the actual output value of the parameter, that is, 10%.

Revision History

Date	Version	Change Description
2021.04	A00	First issue.

Safety Instructions

Safety Precautions

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

Safety Levels and Definitions

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

Safety Instructions

Unpacking
 CAUTION ◆ Check whether the packing is intact and whether there is damage, water seepage, damp, and deformation. ◆ Unpack the package by following the package sequence. Do not hit the package with force. ◆ Check whether there are damage, rust, or injuries on the surface of the equipment or equipment accessories. ◆ Check whether the number of packing materials is consistent with the packing list.
 WARNING ◆ Do not install the equipment if you find damage, rust, or indications of use on the equipment or accessories. ◆ Do not install the equipment if you find water seepage, component missing or damage upon unpacking. ◆ Do not install the equipment if you find the packing list does not conform to the equipment you received.

Storage and Transportation

CAUTION

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

WARNING

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

Installation

WARNING

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

DANGER

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

Wiring



- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed by only professionals.
- Never perform wiring at power-on. Failure to comply will result in an electric shock.
- Before wiring, cut off all equipment power supplies. Wait at least 10 minutes before further operations because residual voltage exists after power-off.
- Make sure that the equipment is well grounded. Failure to comply will result in an electric shock.
- During wiring, follow the proper electrostatic discharge (ESD) procedures, and wear an antistatic wrist strap. Failure to comply will result in damage to internal equipment circuits.



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

Power-on



- Before power-on, make sure that the equipment is installed properly with reliable wiring and the motor can be restarted.
- Before power-on, make sure that the power supply meets equipment requirements to prevent equipment damage or even a fire.
- At power-on, unexpected operations may be triggered on the equipment. Therefore, stay away from the equipment.
- After power-on, do not open the cabinet door and protective cover of the equipment. Failure to comply will result in an electric shock.
- Do not touch any wiring terminals at power-on. Failure to comply will result in an electric shock.
- Do not remove any part of the equipment at power-on. Failure to comply will result in an electric shock.

Operation



- Do not touch any wiring terminals during operation. Failure to comply will result in an electric shock.
- Do not remove any part of the equipment during operation. Failure to comply will result in an electric shock.
- Do not touch the equipment shell, fan, or resistor for temperature detection. Failure to comply will result in heat injuries.
- Signal detection must be performed by only professionals during operation. Failure to comply will result in personal injuries or equipment damage.



- Prevent metal or other objects from falling into the device during operation. Failure to comply may result in equipment damage.
- Do not start or stop the equipment using the contactor. Failure to comply may result in equipment damage.

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

Safety Signs

■ Description of safety signs in the user guide


Read the user guide before installation and operation.


Reliably ground the system and equipment.


Danger!


High temperature!


Prevent personal injuries caused by machines.


High voltage!



Wait xx minutes before further operations.

■ Description of safety signs on the equipment

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

Safety Sign	Description
	◆ Read the user guide before installation and operation. Failure to comply will result in an electric shock. ◆ Do not remove the cover at power-on or within 10 minutes after power-off. ◆ Before maintenance, inspection, and wiring, cut off input and output power, and wait at least 10 minutes until the power indicator is off.

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1 Commissioning Tool

MD880 series products provide two ways to set and test parameter: an SOP-20-880 smart operation panel and a software tool InoDriveStudio. The commissioning steps and involved parameters of both means are basically the same. This chapter introduces how to use the SOP-20-880 smart operation panel and InoDriveStudio for commissioning.

1.1 SOP-20-880

The SOP-20-880 smart operation panel features wide power supply range and LCD display. It is suitable for single/multi-motor drive systems and delivers functions including parameter setting, state monitoring, parameter copy, fault analysis and locating, program download, and USB relay/mass storage.

1.1.1 Keys and Display

1.1. 1.1 Description of Keys

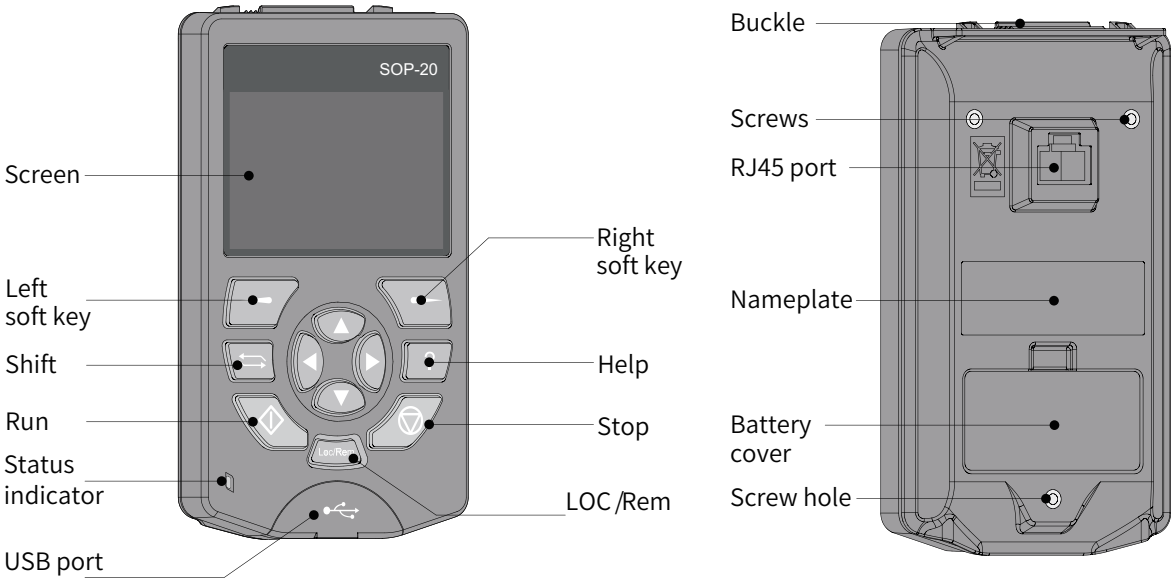
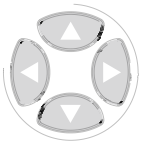


Figure 1-1 SOP-20-880

Table 1-1 Shortcut Keys

Key	Name	Description
	Left soft key	Usually used to exit or cancel. The lower left corner of the display screen will show its contextual function. For example, when on the home page, you can press this key to enter the device selection page.
	Right softkey	Usually used for selection and confirmation. The lower right corner of the display screen will show its contextual function. For example, when on the home page, you can press this key to enter the menu page.
	Shift	For quick access to the device selection page. On some pages that cannot be interrupted, this key is disabled.
	Help	You can press it to open the help page. The content of the help page is contextual.

Key	Name	Description
	RUN	In local control mode, it is used to start the device.
	Stop/ Reset key	In local control mode, used to stop the device. When the equipment is in a fault state, the stop key is used to reset the fault.
	Loc/Rem Swap	Used to switch control between SOP-20-880 (local) and remote.
	Arrow key	The up and down arrow keys are used to select items in menus and lists, scroll pages up and down, and adjust values (such as setting time, entering password or changing parameter values). The left and right arrow keys are used to move the cursor left and right during parameter editing.

1.1.1.2 Home Page

The SOP-20-880 features a monochrome 240 × 160 LCD display with a white backlight.

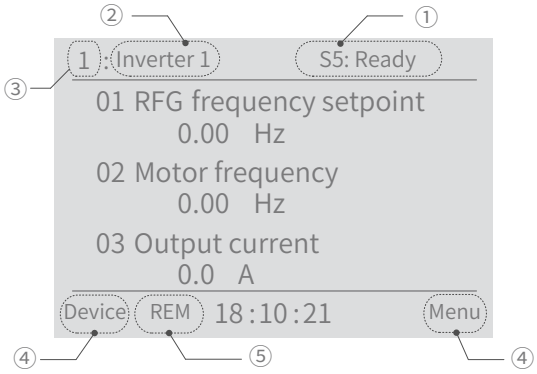


Figure 1-2 Home Page

Table 1-2 Table Description of the home page

No.	Display	Description
①	Device status and fault information	Displays the running status information of the current device. When the device is faulty, the fault information flashes and the running status is no longer displayed.
②	Controlled device	Displays the name of the device currently being controlled by SOP-20-880.
③	Station No. of controlled device	Displays the station number of the device currently being controlled by SOP-20-880.
④	Operation	Devices: displays the device list. Menu: displays the menu list. Select: selects the specified item. OK: confirms a message. Back: returns to the previous menu.
⑤	LOC/REM switchover	Local: The device is controlled locally, that is, by SOP-20-880. Remote: The device is controlled remotely, that is, by I/O or bus. No display: The currently operated device does not have this function.

1.1.1.3 Status indicator

The SOP-20-880 smart operation panel provides status indicators, which can display whether there is an active fault or alarm.

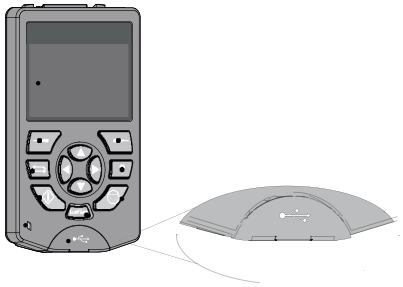
Table 1-3 Description of status indicators

Indicator Status	Illustration	Description
Green light is steady on		The device is running normally
Green light flashes		SOP-20-880 transmits data with PC through USB connection.
Red light is steady on		The communication between SOP-20-880 and the device is normal, but the device is faulty.
Red light flashes		The communication between SOP-20-880 and the equipment is interrupted.

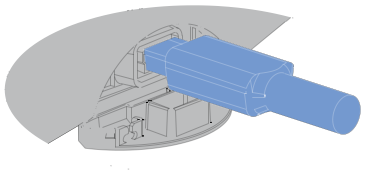
1.1.2 Connection with PC

The mini USB port of the SOP-20-880 is used to connect the PC. The USB cable length cannot exceed 3 m. The communication protocol is USB2.0 between the SOP-20-880 and the PC.

6. Open the USB port cover



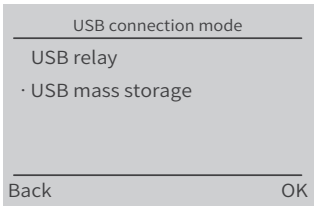
7. Plug in the cable. It is recommended to use a cable with ferrite bead. Connect the cable to the PC



8. After the cable is connected to the PC, your are prompted to choose between the USB relay mode and USB mass storage mode.

◆ When "USB Relay Mode" is selected, SOP-20-880 can be used as a relay to realize the communication between the device and the PC. When you commission with InoDriveStudio, "USB Relay Mode" is required.

◆ When the USB mass storage mode is selected, the SOP-20-880 can be used as a memory.



NOTE

◆ For detailed use of SOP-20-880, see SOP-20-880 Smart Operation Panel User Guide.

1.2 Introduction to InoDriveStudio

InoDriveStudio (IDS for short) is a proprietary software product developed by Inovance for commissioning Inovance high-performance industrial drive products. Users can use this software to commission, troubleshoot and monitor drives.

InoDriveStudio is Windows-based and supports operating systems including but not limited to the following: WindowsXP Professional, Windows2003 Server, Windows Vista, Windows7, Windows 8 and Windows 10.

1.2.1 Main View

Double-click the IDS InoDriveStudio icon to start the software and the following window will appear:

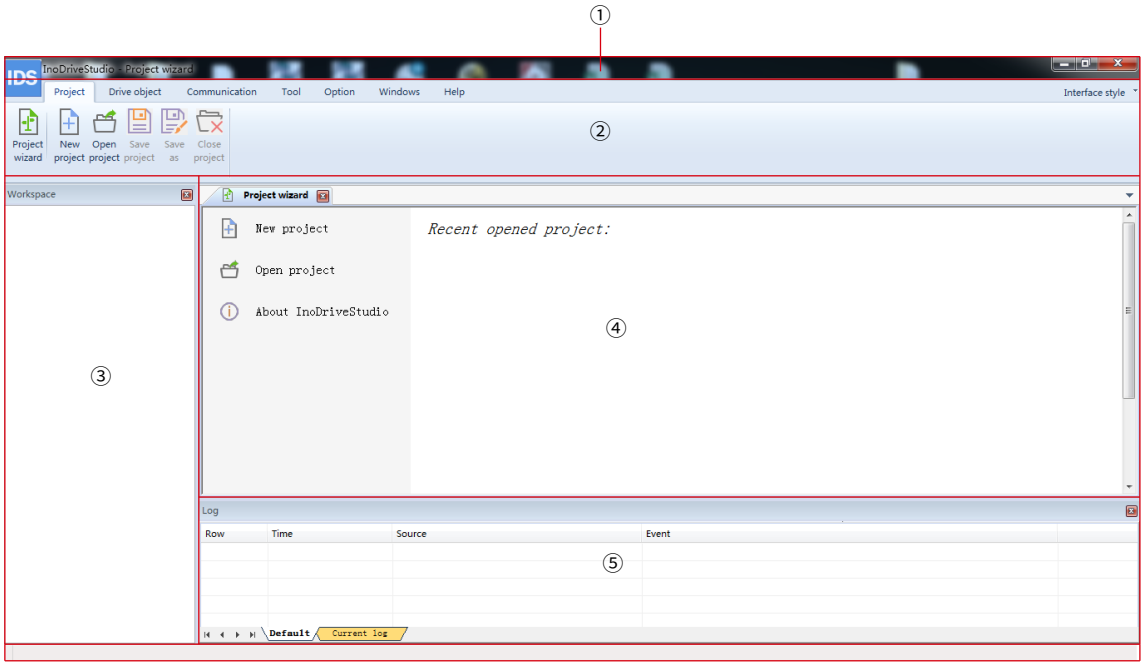


Figure 1-3 Main view

No.	Name	Description
①	Title bar	Displays information such as window title or currently opened file
②	Ribbon menu	Displays functions by group
③	Navigation pane	Navigation for projects
④	Window area	Displays the detailed information of an item specified in the workspace
⑤	Multifunctional area	Integrates log window, monitor window, control panel window, and fault alarm window
⑥	Statusbar	Displays brief information of the current project status

1.2.2 Creating a Project

1 Create an online project through "Project" → "New Project", and the "New Project" dialog box Figure 1-5shows:

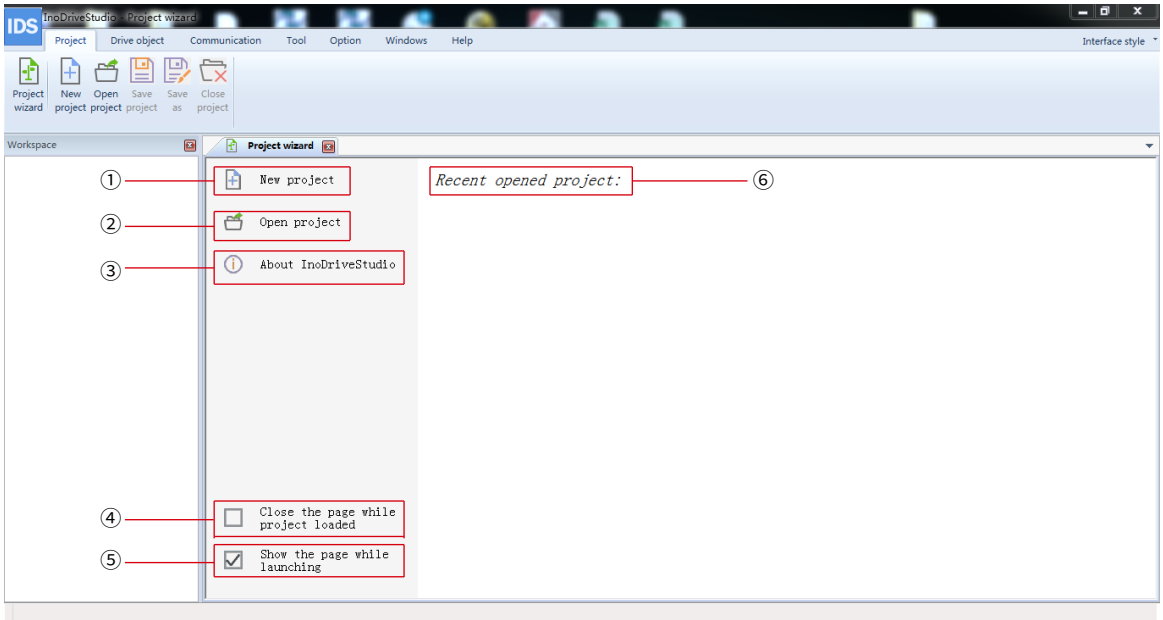


Figure 1-4 New project

No.	Name	Description
①	Create a Project	Click this button to open the New Project dialog box, where you can create a new project as required
②	Open project	Click this button to open the Open dialog box, and select the project file you want to open
③	About InoDriveStudio	Displays information about the software version
④	Help	Click this button to display the Help document
⑤	Close this page after the project is loaded	If this is selected, the project wizard page will be automatically closed after the project is loaded
⑥	Show this page at startup	If this is selected, the Project Wizard page will be opened automatically after the software is started. The user can click Project Wizard under the Project menu bar to open this page
⑦	Recently opened projects	It lists 8 projects that have been opened recently, and the most recent one is shown at the top. Users can double-click the file name to open the project. Move the mouse over the file name and an icon will be displayed. Click the icon to remove the file from the list.

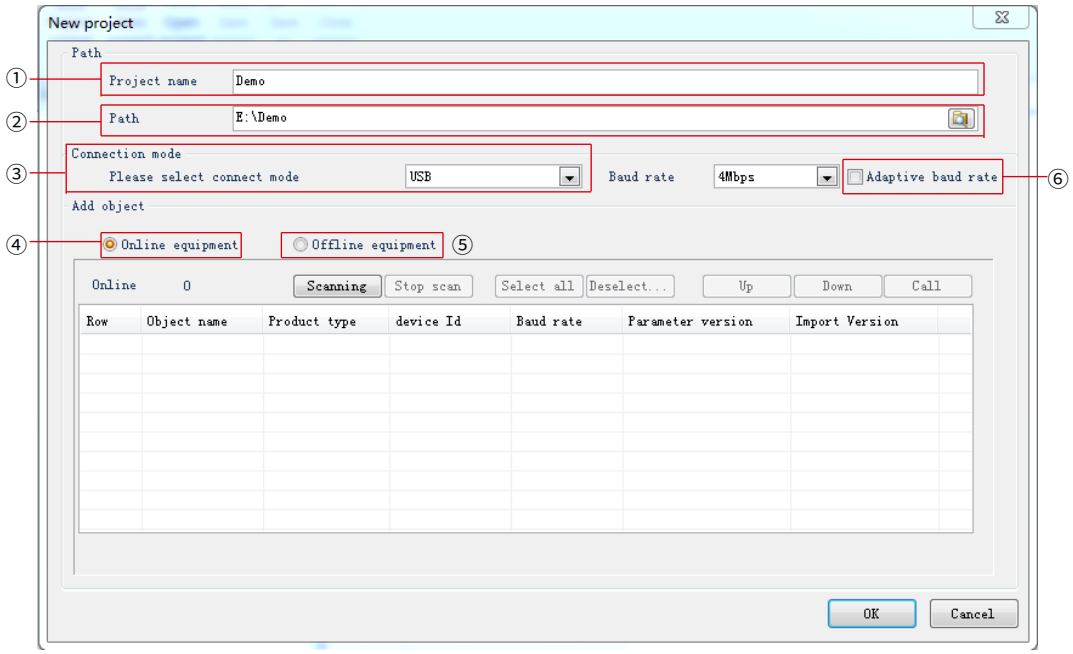


Figure 1-5 New Project page

No.	Name	Description
①	Project Name	Specifies the name of the project to be created
②	Path	Specifies where the project to be created is stored on the computer
③	Connection method	Specifies the communication mode and related parameters to be adopted for the new project. Currently, only USB and TCP/IP communication modes are supported. After loading the project, you can also modify the connection method through Communication Settings under the Communication menu bar. The project will be connected with the equipment in the set connection mode
④	Online devices	Select this to add online objects to the project to be created, Online objects can be displayed by scanning
⑤	Offline devices	Select this to add offline objects to the project to be created. Offline objects can be identified by information such as product type version

⑥	Adaptive baud rate	When USB communication mode is selected, specify whether the drive controller is scanned by adaptive baud rate. If checked, all objects on the supported baud rate will be scanned during scanning; Otherwise, only the drive objects on the currently specified baud rate are scanned

NOTE

- When multiple devices are cascaded, it is necessary to ensure that the communication addresses of the devices are different and the communication baud rates are all consistent; A10-03 sets the communication address, and A10-04 sets the communication rate.
- When multiple devices are cascaded, ensure that device names are different, otherwise the new project cannot be created.

2 Click Start Scan.

If USB mode is selected:

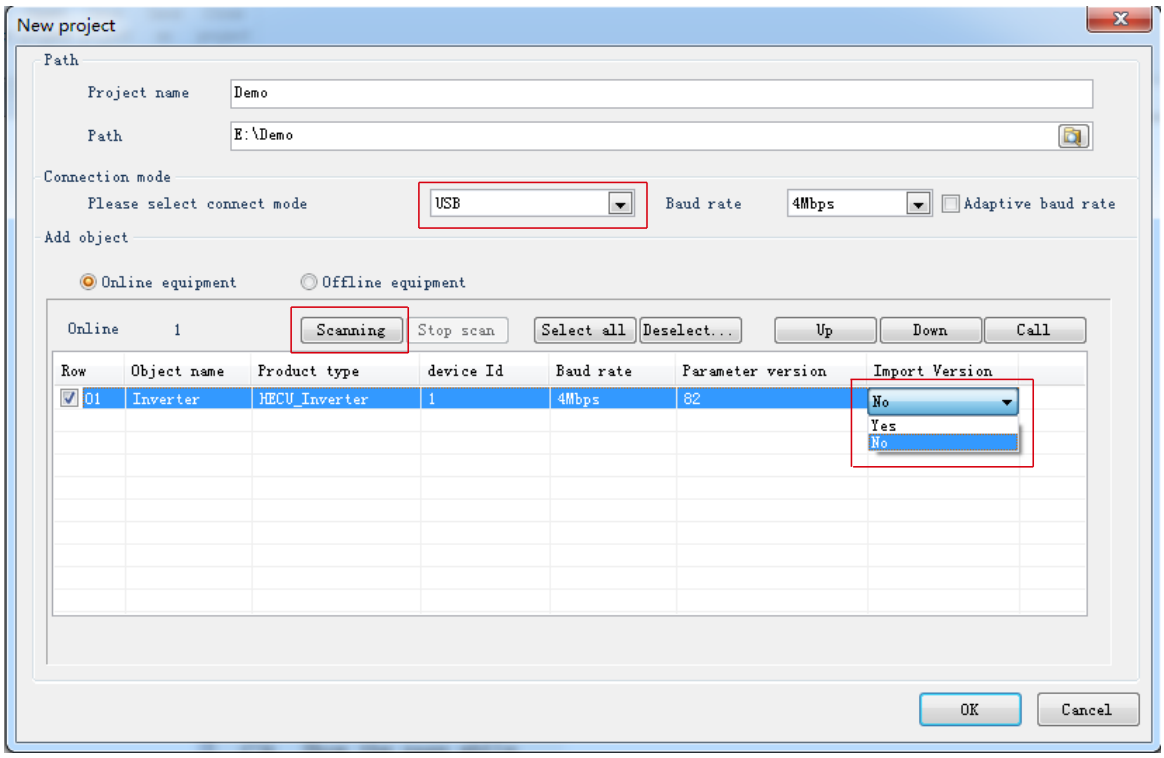


Figure 1-6 Starting scanning in USB mode

NOTE

- When importing the software configuration table for the first time, select Yes for Import Version.

If the connection method is TCP/IP:

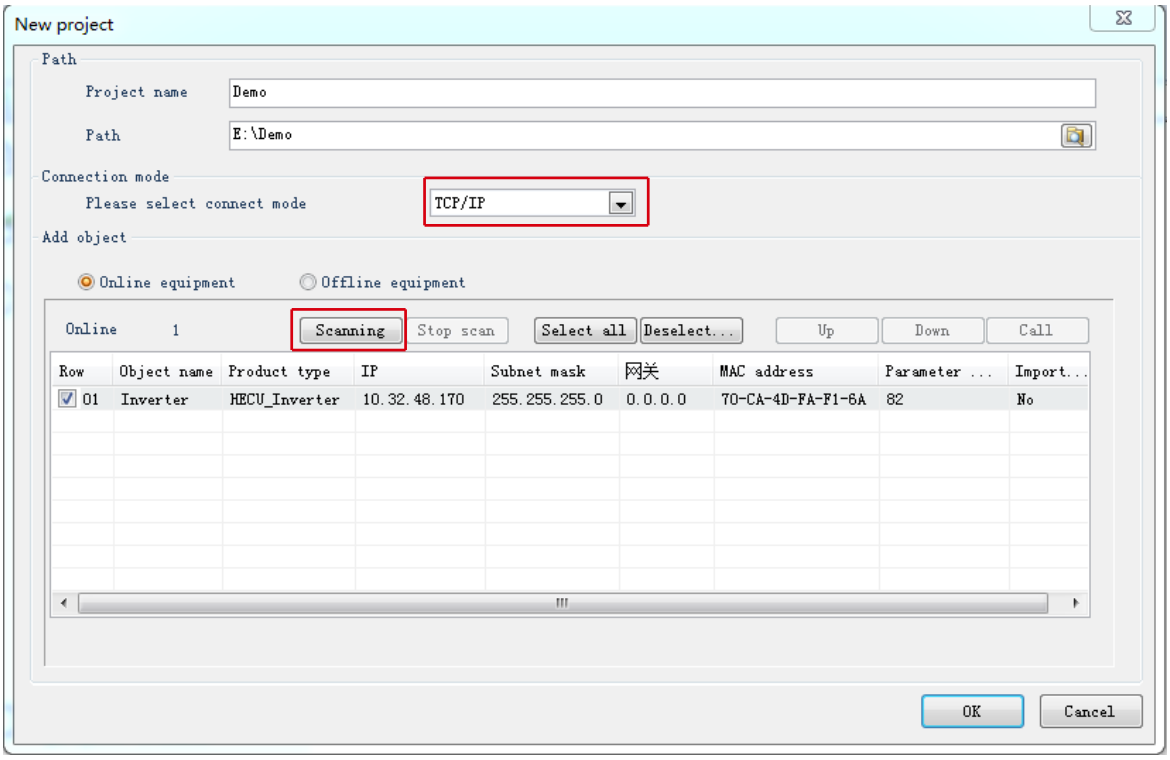


Figure 1-7 Starting scanning in TCP/IP connection mode

NOTE

◆ See HETN-10 Ethernet Test Module Instructions for the setting of the IP address, subnet mask and gateway address.

3 After you click OK, the new project is created and you can set up and commission a device now.

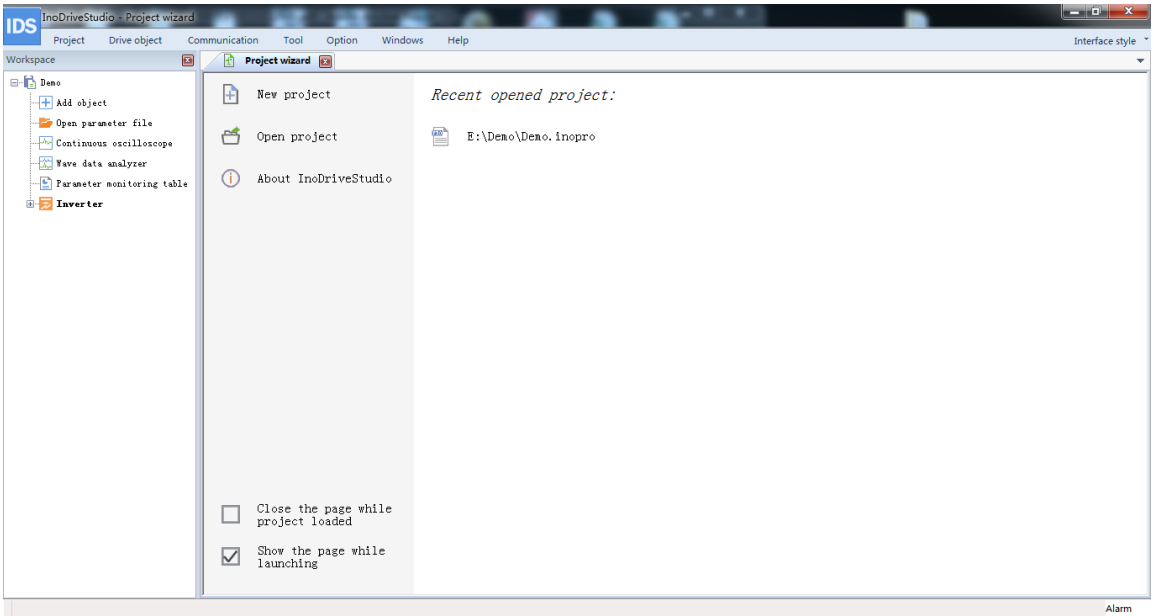


Figure 1-8 Main page

1.2.3 Basic Functions

1.2.3.1 View and Modification of Parameters

Parameter viewing and modification are the basic functions of InoDriveStudio. After a device is connected, go to "Inverter" → "Parameter List" → "Parameter List" in the workspace to open the parameter list of the current device. As shown in the following figure:

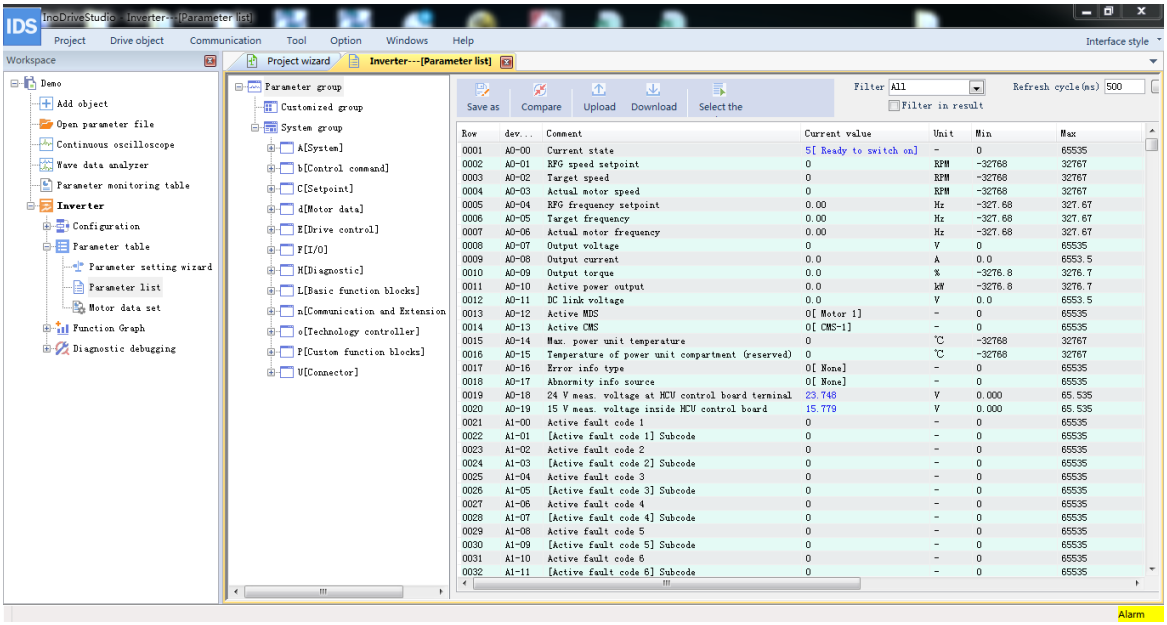


Figure 1-9 Parameter list

- The left side of the parameter list is the parameter group, and the right side is the parameter information of this group.
- You can view parameter name, current value, default value, unit, modification method, communication address and other information in the parameter information column.
- After the parameters are modified, they will be downloaded to the device.
- When the current value of the parameter is inconsistent with the default value, the current value is displayed in blue.
- When the modified value of a parameter exceeds the limited range of the parameter, the parameter value modification will not take effect.
- When the device is running, you cannot modify a parameter which only allow modification when the device stops.
- With the filter on the toolbar, you can perform fuzzy search for the parameters on the current page. For example, if you click "System Group" to select all parameters and enter "torque" in the filter and press Enter, all parameters whose description contains "torque" will be selected.

1.2.3.2 Control Panel

InoDriveStudio can start and stop the equipment and reset a fault through the "Control Panel". You can open the control panel through"Inverter" → "Diagnosis and Commissioning" → "Commissioning" → "Control Panel".

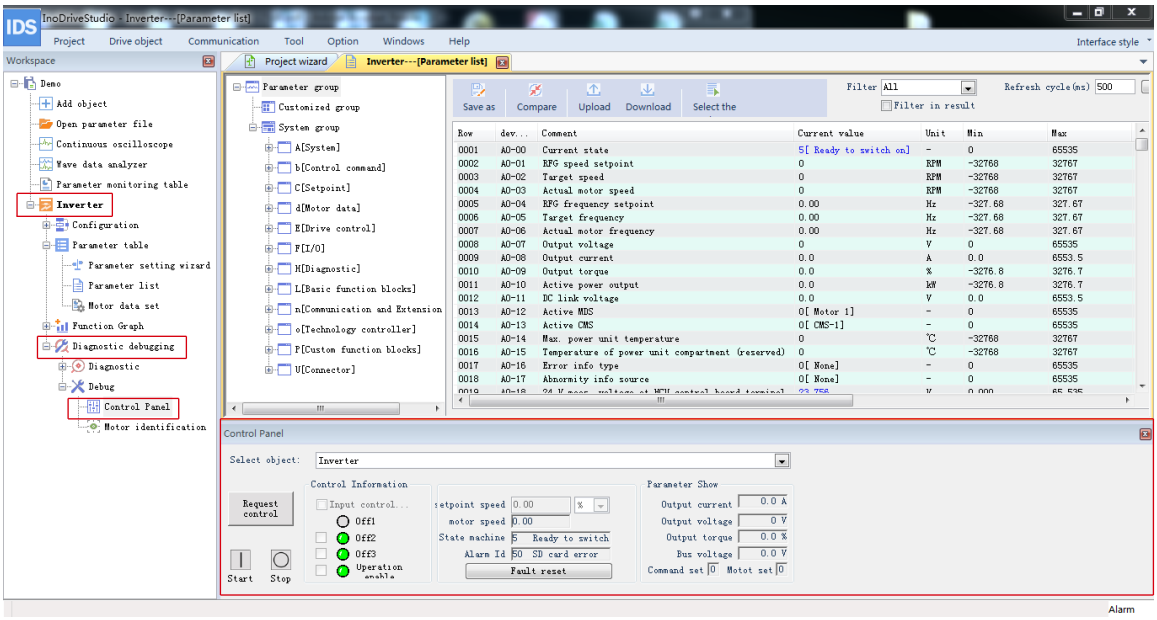


Figure 1-10 Accessing the control panel

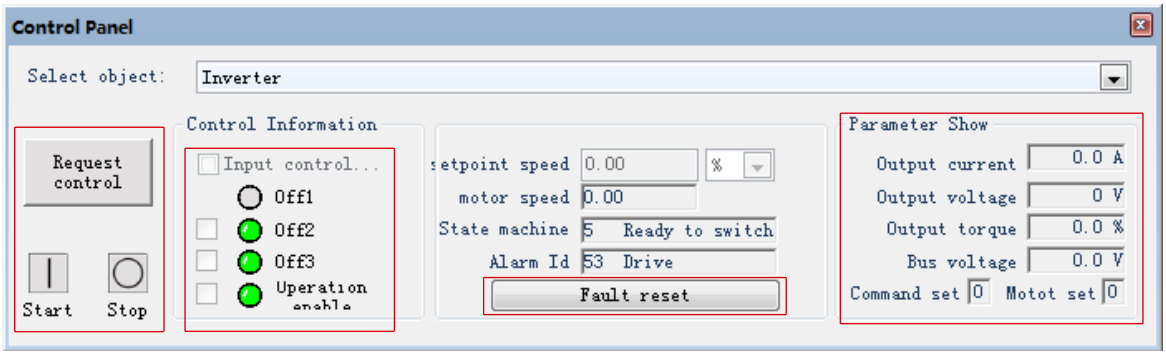


Figure 1-11 Control panel

- The control panel can start and stop the device and monitor the device status.
- When controlling a device through the Control Panel, you first need to click Request Control to obtain control rights for the device.
- After obtaining the control rights, the device can be started and stopped through the "Start" and "Stop" buttons.
- When "Input control bit" is checked, you can click "OFF1", "OFF2", "OFF3" and "Operation enable" to switch the control word and realize the start-stop control of the device.
- Click the "Fault reset" button to rest the fault.
- Pressing the space bar 3 times will automatically trigger OFF2 stop.
- After the drive is started by the control panel, if HCU fails to communicate with InoDriveStudio, a 52-1 error will be reported.

1.2.3.3 Fault Alarm View

There are two ways to view current or history faults through InoDriveStudio:

1) Viewing active fault

Mode 1: Open the fault alarm list through “Inverter”→“Diagnosis and Commissioning”→“Diagnosis”→“Fault alarm list" → " Active fault ", as shown in the following figure.

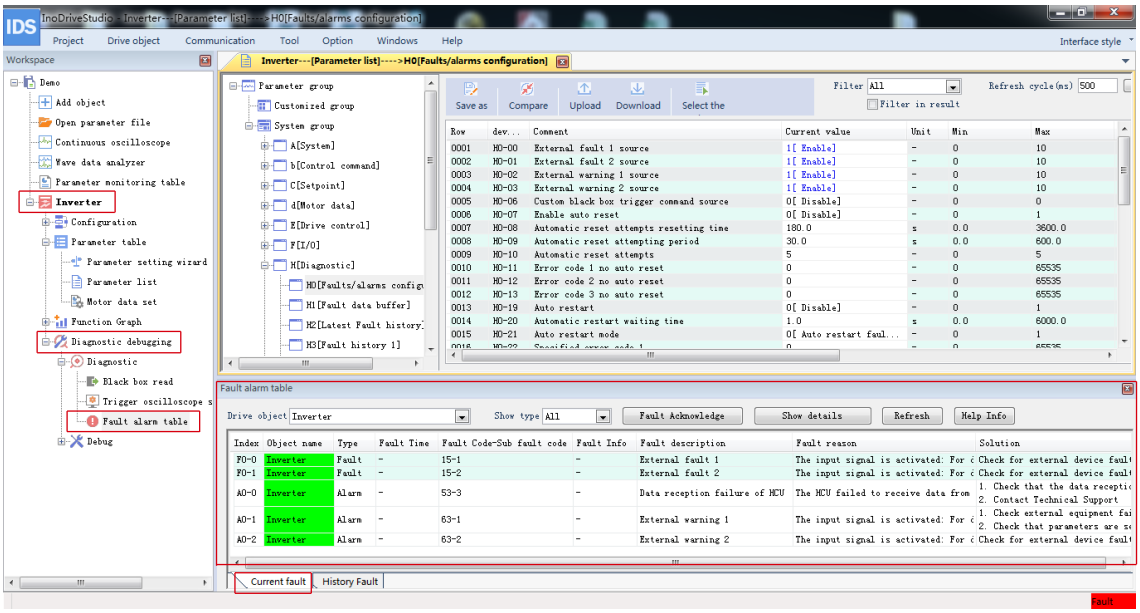


Figure 1-12 Active fault alarm list

Mode 2: View the active fault and alarm information by accessing group A1 parameters, as shown in the following figure.

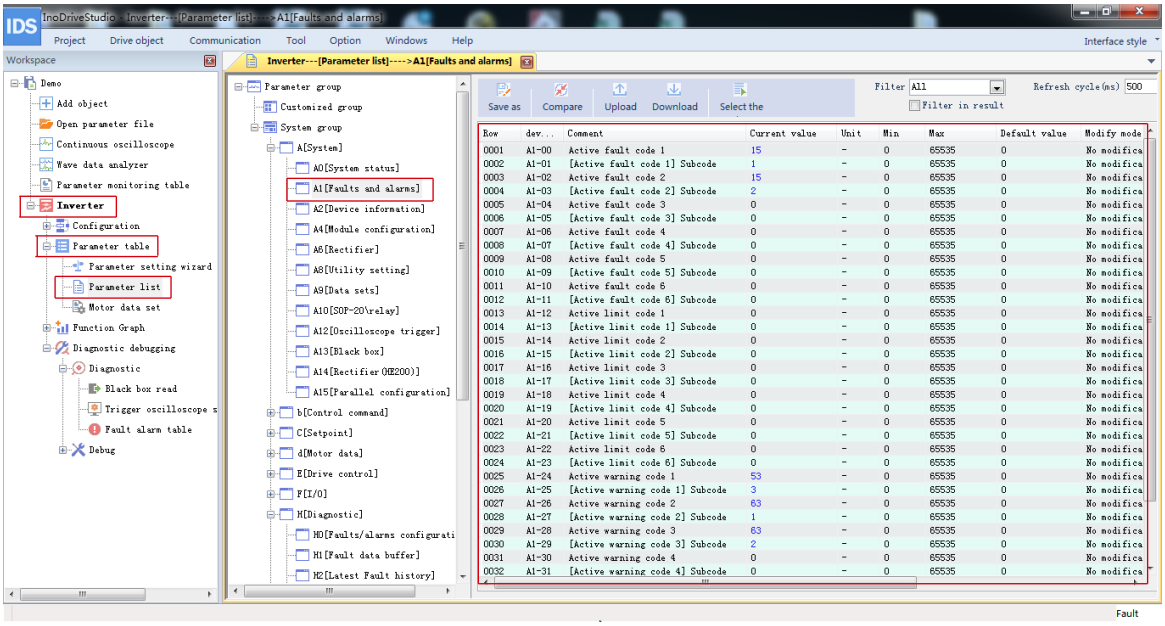


Figure 1-13 Viewing information on active fault

2) View history faults

Mode 1: Open the fault alarm list through "Inverter" → "Diagnosis and Commissioning" → "Diagnosis" → "Fault Alarm List" → "History Faults", as shown in the following figure.

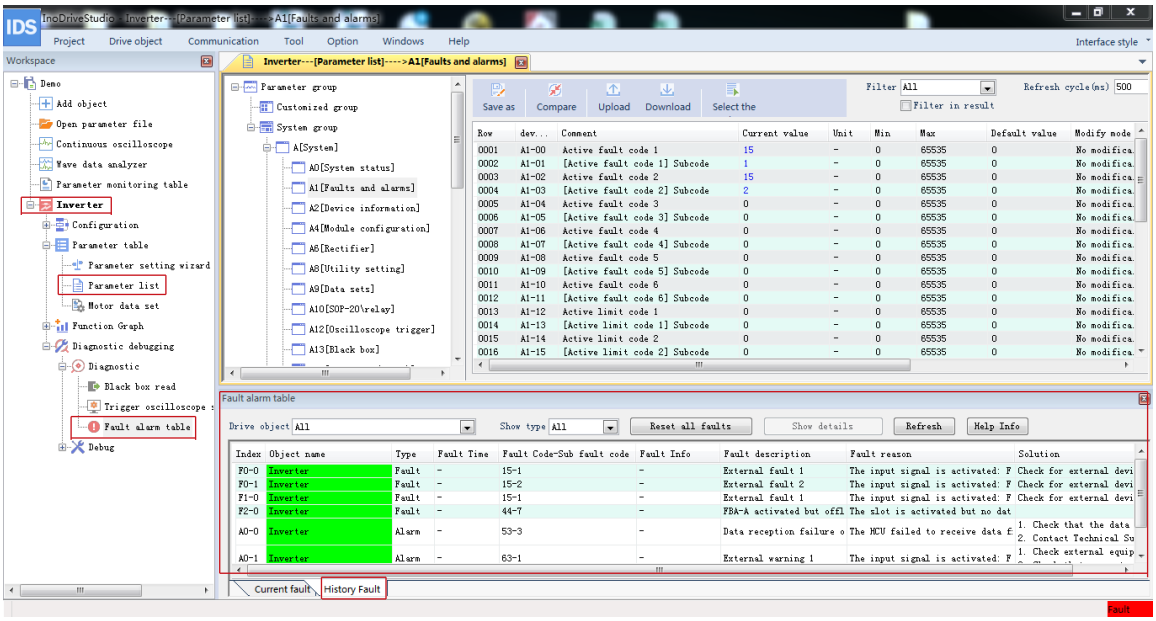


Figure 1-14 History fault alarm List

Mode 2: View the history faults and alarm information as shown in the following figure by opening groups H2–H8 parameters.

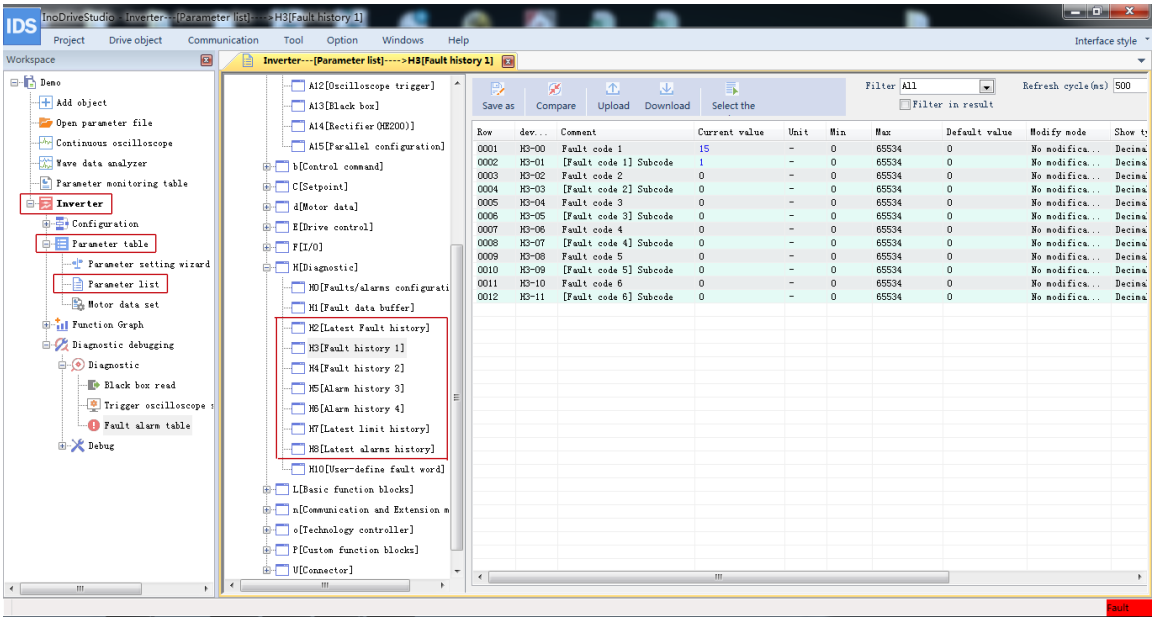


Figure 1-15 Viewing history faults through parameter

NOTE

◆ You can double-click a fault in the list to obtain the fault help file and learn the detailed information of the fault.

1.2.3.4 Parameter Comparison

InoDriveStudio supports the parameter comparison, and you can enter the comparison page in two ways:

■ ■ "Drive Object" → "Compare" on the menu bar.

■ ■ Compare button in parameter list options.

The following figure shows two ways to enter the comparison page.

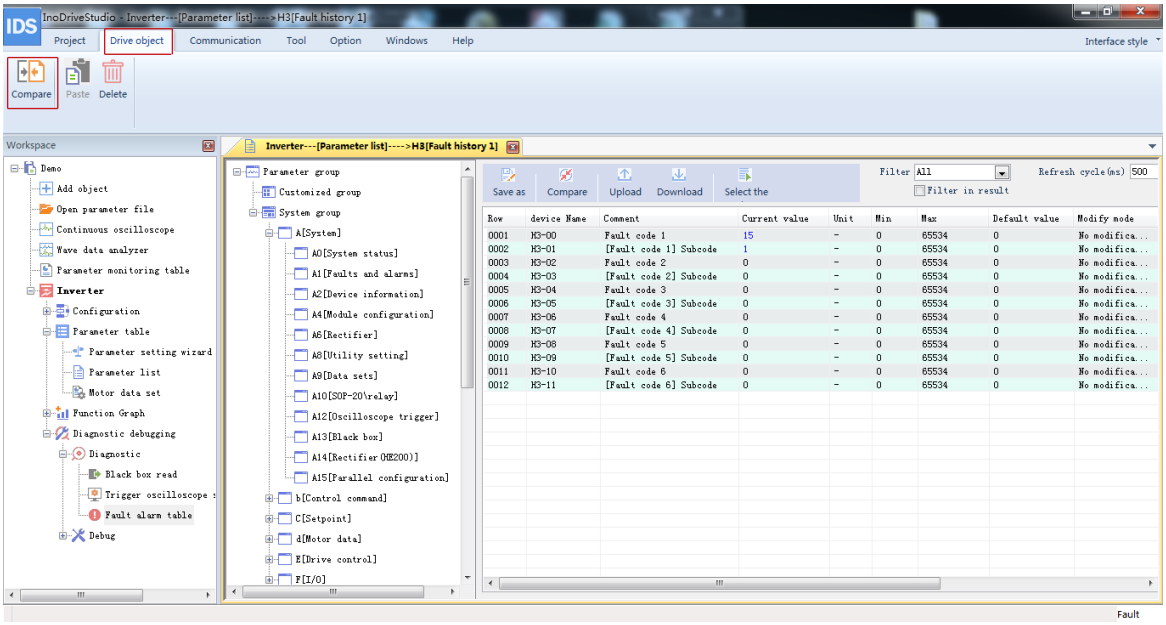


Figure 1-16 Accessing the comparison page

After entering the comparison page, you can compare two offline parameter files, and you can also compare the current parameters of the drive module with the factory default parameters. You can choose to display different parameters, the same parameters and all parameters.

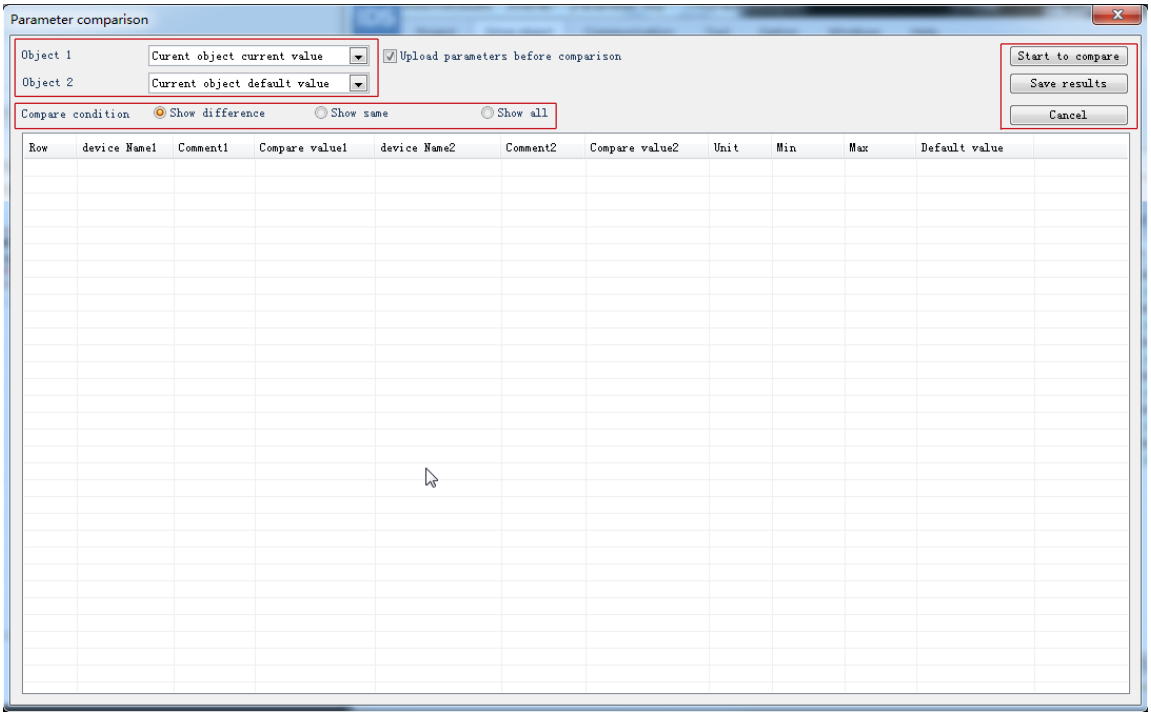
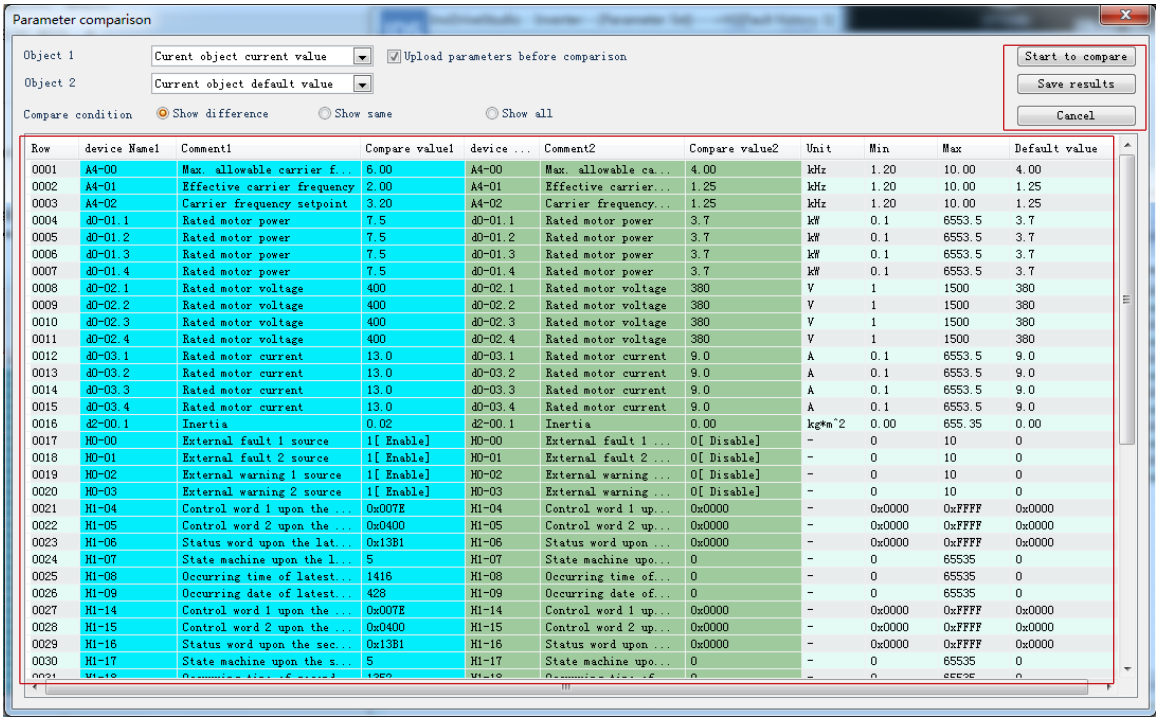


Figure 1-17 Comparison page



Row	device Name1	Comment1	Compare value1	device ...	Comment2	Compare value2	Unit	Min	Max	Default value
0001	A4-00	Max. allowable carrier f...	6.00	A4-00	Max. allowable ca...	4.00	kHz	1.20	10.00	4.00
0002	A4-01	Effective carrier frequency	2.00	A4-01	Effective carrier...	1.25	kHz	1.20	10.00	1.25
0003	A4-02	Carrier frequency setpoint	3.20	A4-02	Carrier frequency...	1.25	kHz	1.20	10.00	1.25
0004	d0-01.1	Rated motor power	7.5	d0-01.1	Rated motor power	3.7	kW	0.1	6553.5	3.7
0005	d0-01.2	Rated motor power	7.5	d0-01.2	Rated motor power	3.7	kW	0.1	6553.5	3.7
0006	d0-01.3	Rated motor power	7.5	d0-01.3	Rated motor power	3.7	kW	0.1	6553.5	3.7
0007	d0-01.4	Rated motor power	7.5	d0-01.4	Rated motor power	3.7	kW	0.1	6553.5	3.7
0008	d0-02.1	Rated motor voltage	400	d0-02.1	Rated motor voltage	380	V	1	1500	380
0009	d0-02.2	Rated motor voltage	400	d0-02.2	Rated motor voltage	380	V	1	1500	380
0010	d0-02.3	Rated motor voltage	400	d0-02.3	Rated motor voltage	380	V	1	1500	380
0011	d0-02.4	Rated motor voltage	400	d0-02.4	Rated motor voltage	380	V	1	1500	380
0012	d0-03.1	Rated motor current	13.0	d0-03.1	Rated motor current	9.0	A	0.1	6553.5	9.0
0013	d0-03.2	Rated motor current	13.0	d0-03.2	Rated motor current	9.0	A	0.1	6553.5	9.0
0014	d0-03.3	Rated motor current	13.0	d0-03.3	Rated motor current	9.0	A	0.1	6553.5	9.0
0015	d0-03.4	Rated motor current	13.0	d0-03.4	Rated motor current	9.0	A	0.1	6553.5	9.0
0016	d2-00.1	Inertia	0.02	d2-00.1	Inertia	0.00	kg*m^2	0.00	655.35	0.00
0017	H0-00	External fault 1 source	1[Enable]	H0-00	External fault 1 ...	0[Disable]	-	0	10	0
0018	H0-01	External fault 2 source	1[Enable]	H0-01	External fault 2 ...	0[Disable]	-	0	10	0
0019	H0-02	External warning 1 source	1[Enable]	H0-02	External warning ...	0[Disable]	-	0	10	0
0020	H0-03	External warning 2 source	1[Enable]	H0-03	External warning ...	0[Disable]	-	0	10	0
0021	H1-04	Control word 1 upon the ...	0x007E	H1-04	Control word 1 up...	0x0000	-	0x0000	0xFFFF	0x0000
0022	H1-05	Control word 2 upon the ...	0x0400	H1-05	Control word 2 up...	0x0000	-	0x0000	0xFFFF	0x0000
0023	H1-06	Status word upon the lat...	0x13B1	H1-06	Status word upon ...	0x0000	-	0x0000	0xFFFF	0x0000
0024	H1-07	State machine upon the l...	5	H1-07	State machine upo...	0	-	0	65535	0
0025	H1-08	Occurring time of latest...	1416	H1-08	Occurring time of...	0	-	0	65535	0
0026	H1-09	Occurring date of latest...	428	H1-09	Occurring date of...	0	-	0	65535	0
0027	H1-14	Control word 1 upon the ...	0x007E	H1-14	Control word 1 up...	0x0000	-	0x0000	0xFFFF	0x0000
0028	H1-15	Control word 2 upon the ...	0x0400	H1-15	Control word 2 up...	0x0000	-	0x0000	0xFFFF	0x0000
0029	H1-16	Status word upon the sec...	0x13B1	H1-16	Status word upon ...	0x0000	-	0x0000	0xFFFF	0x0000
0030	H1-17	State machine upon the s...	5	H1-17	State machine upo...	0	-	0	65535	0

Figure 1-18 Example of comparison results between current value and factory value

1.2.3.5 Parameter Backup and Download

With InoDriveStudio, HCU parameters can be backed up to the computer through the "Upload" function in the parameter list, or the selected parameter group can be backed up through the "Save As" function; Use the "Download" function to restore the parameter files in the computer to the HCU.

■ Backing up parameters with the Upload button

Go to "Parameter List" → "Upload", enter the name of the file to be saved in the "Save As" dialog box, select the file type as "Parameter File (*. inoprm)", click Save, and wait for the upload to complete.

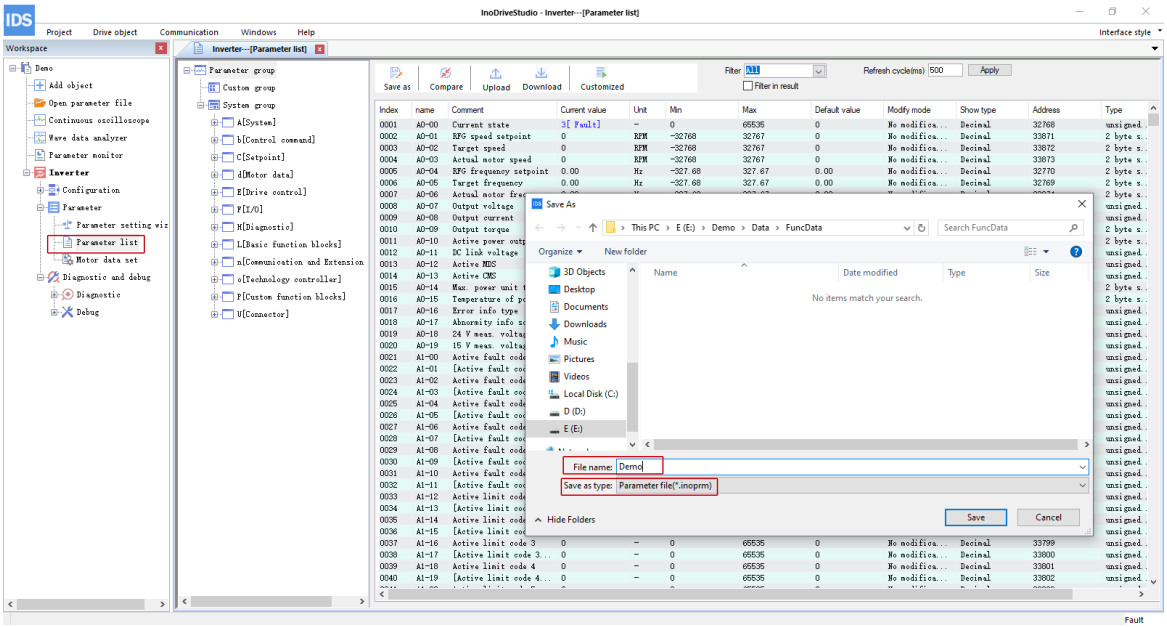


Figure 1-19 Back up the parameters through the Upload button

■ Backing up parameters with "Save As"

In the parameter list, select the parameter group to be backed up and click the Save As button. In the "Save As" dialog box, enter the file name and select the file type as "Parameter File (*. inoprm)". Check

"Upload parameters before saving" and click Save. Wait for the upload to be completed.

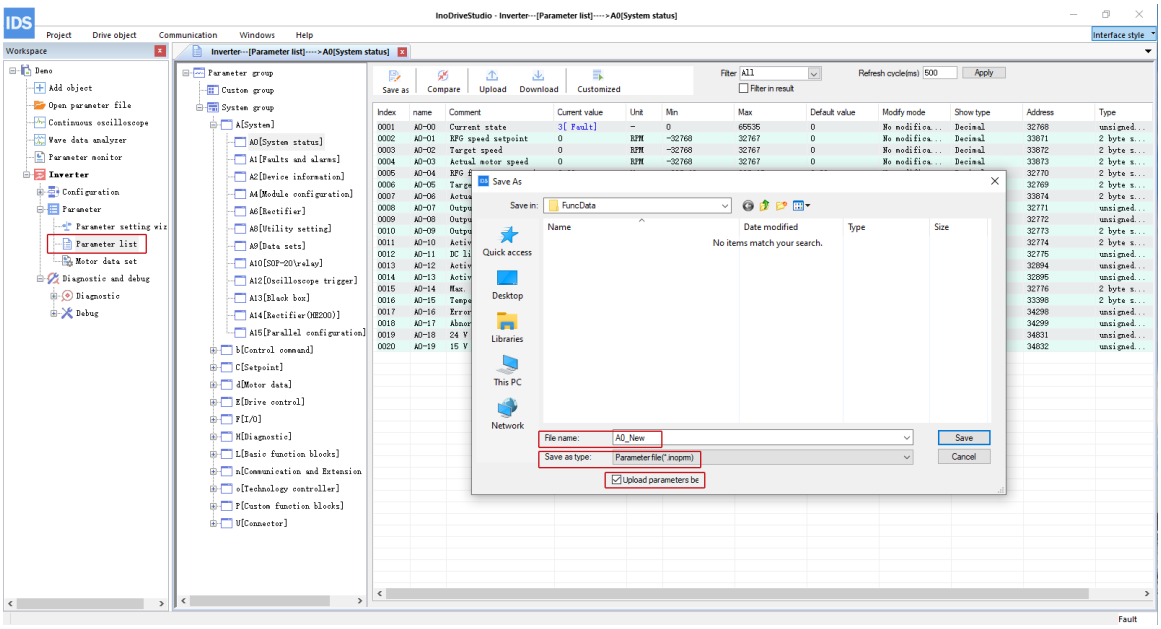


Figure 1-20 Backing up parameters through the Save As button

NOTE

- When you back up parameters through the Upload button, all parameters are included.
- When you need to back up the parameters in your selection, see the next section "User-defined Parameter Groups."
- When you back up parameters through the "Save As" button, you need to select the file type as "Parameter File (*. inoprm)" and check to upload parameters before saving.

■ Parameter download steps:

In the parameter list, click the Download button. In the pop-up dialog box, select the file to be downloaded, select the download mode and click Open. Wait for the download to complete.

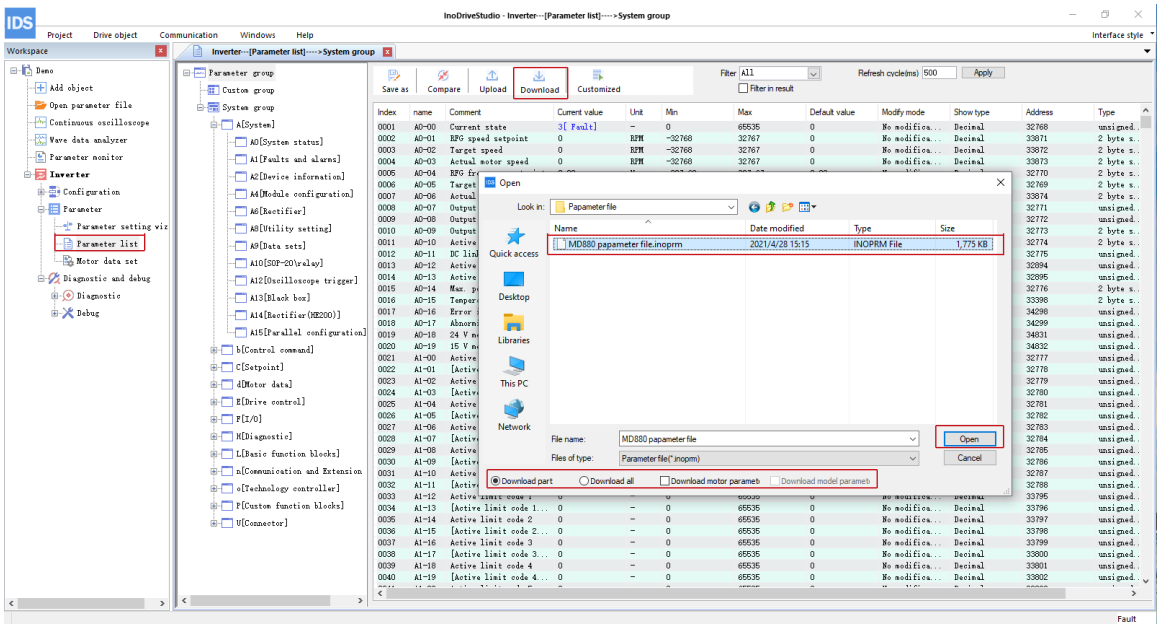


Figure 1-21 Parameter downloading

Two download methods are available:

■ Filtered download: Parameters except motor parameters (group d parameters) and model-related parameters are downloaded. SOP-20-880 communication rate (A10-04) and communication address (A10-03) are not downloaded either. You can check "Download motor parameters" to download motor parameters, which is suitable for most occasions where backup parameters are restored.

■ Complete download: Parameters except motor parameters (group d parameters) and model-related parameters are downloaded. If the communication rate (A10-04) and communication address (A10-03) of SOP-20-880 are different from the current parameters, you need to choose whether to change the parameters (be careful not to create duplicate station numbers which can cause communication failure). You can check "Download motor parameters" and "Download model-related parameters" to download all parameters.

NOTE

◆ Non-professionals are not recommend to download model-related parameters!

1.2.3.6 User-defined Parameter Group

InoDriveStudio allows users to customize and select the required parameters to combine into user-defined parameter groups, which can be saved as parameter files or configuration files.

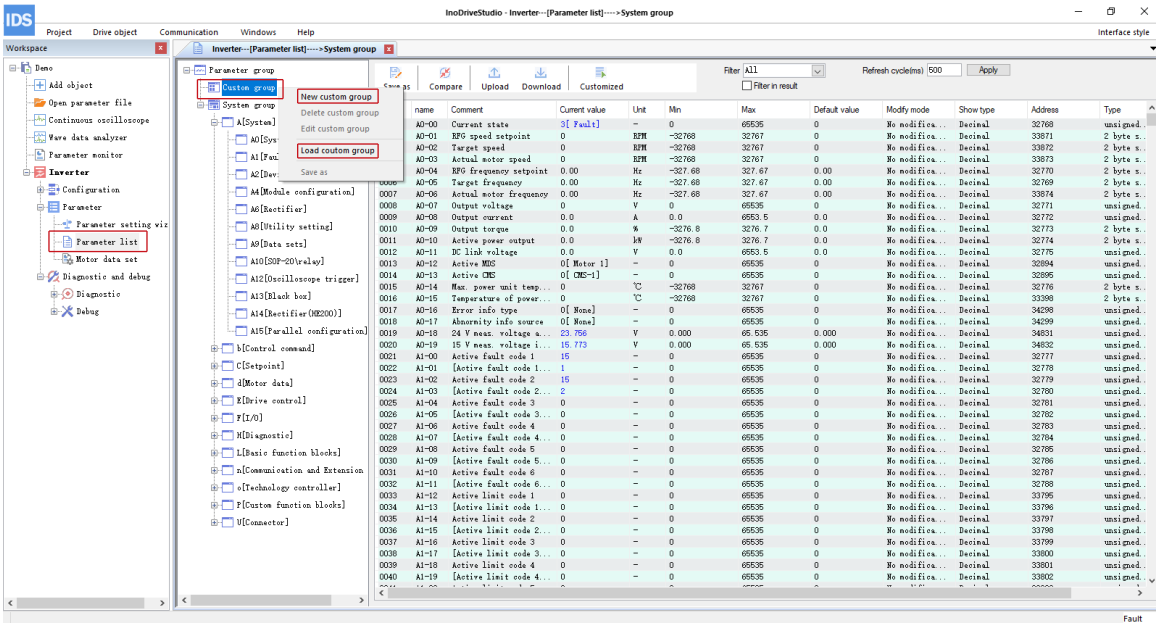


Figure 1-22 Steps to access the user-defined parameter group

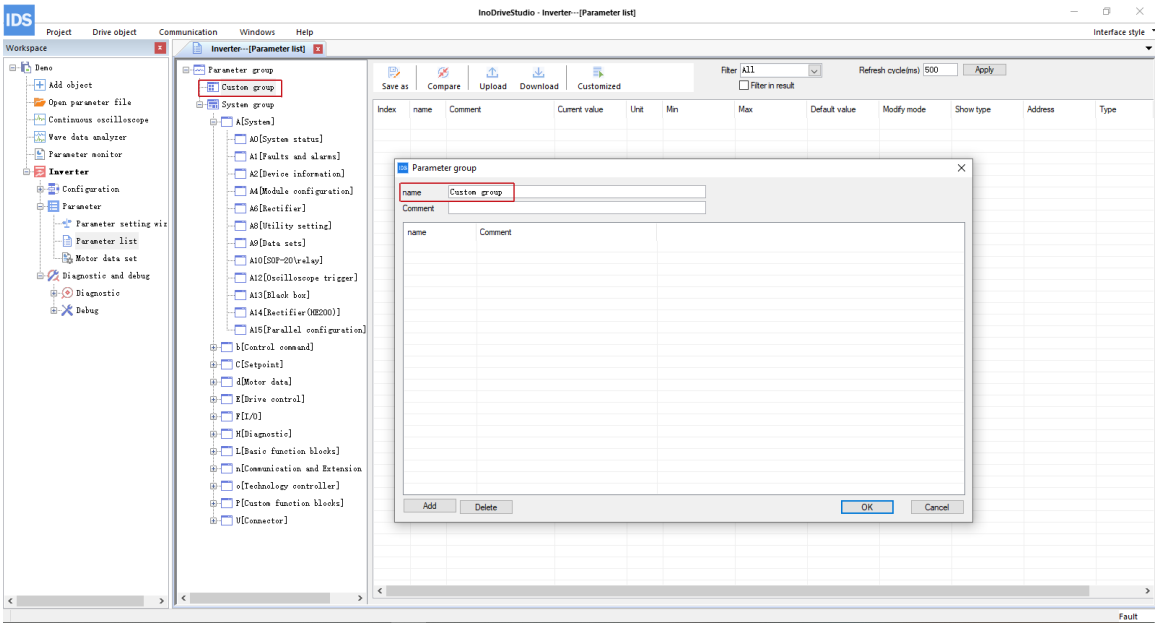


Figure 1-23 User-defined parameter group page

■ Creating a user-defined parameter group

Right-click User-defined group and select New or Load. In the pop-up window, enter the name of the

group and click the Add or delete button to add or delete the parameters to be customized, and click OK to generate a user-defined parameter group.

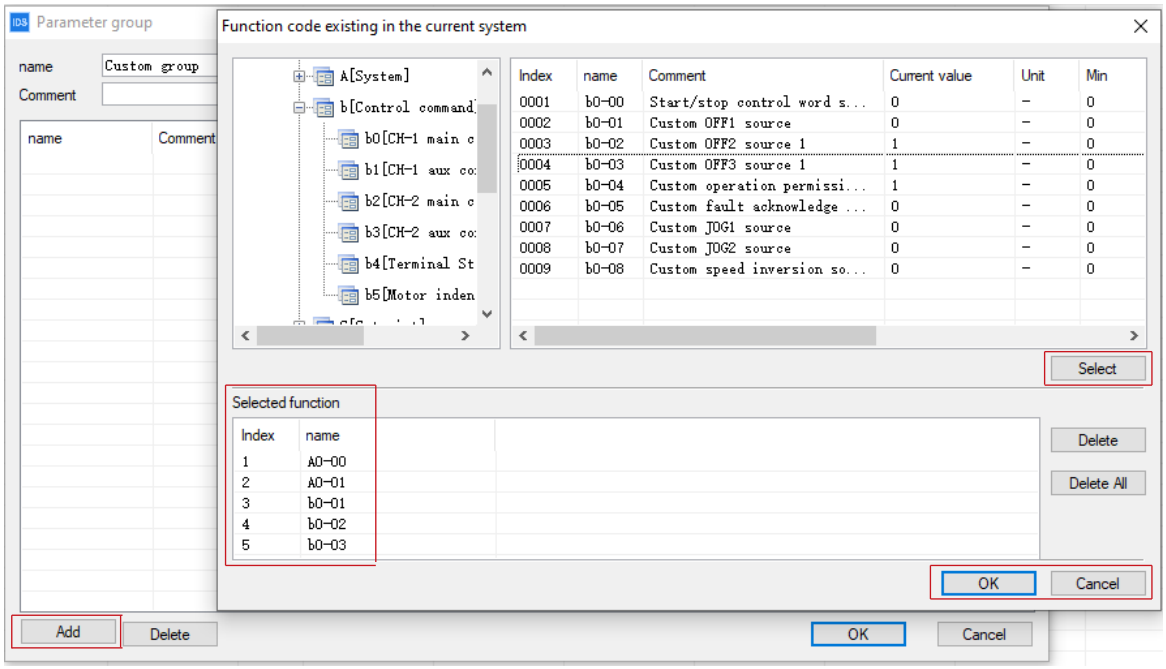


Figure 1-24 Parameters in user-defined parameter group

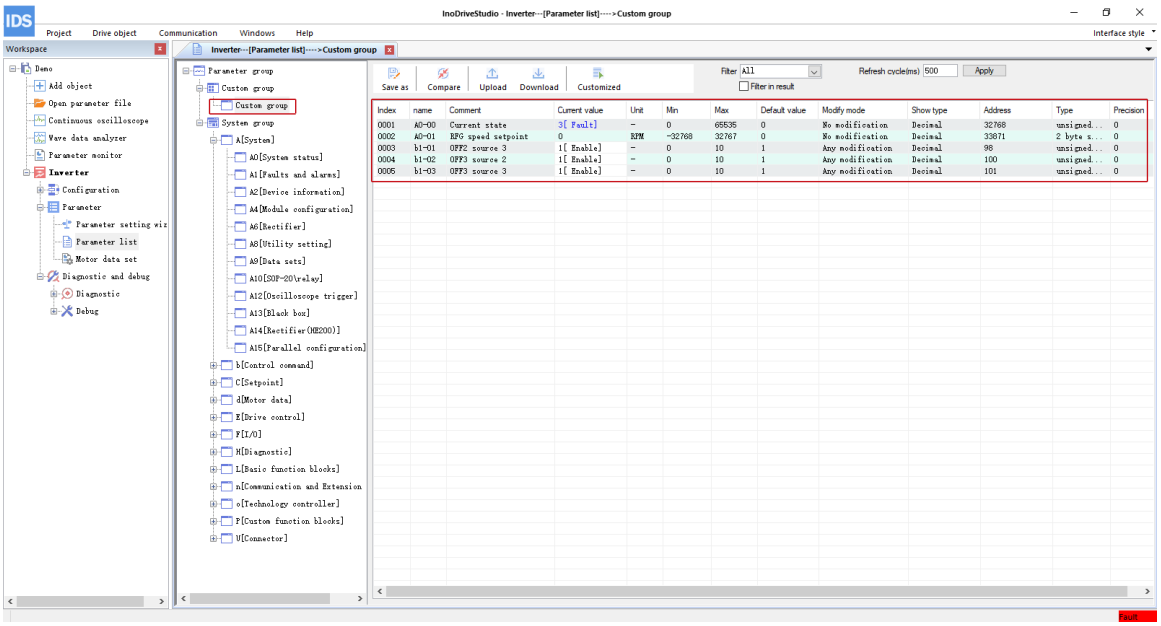


Figure 1-25 New user-defined parameter group file

You can right-click the new user-defined parameter group to delete, edit, load and save the parameter group.

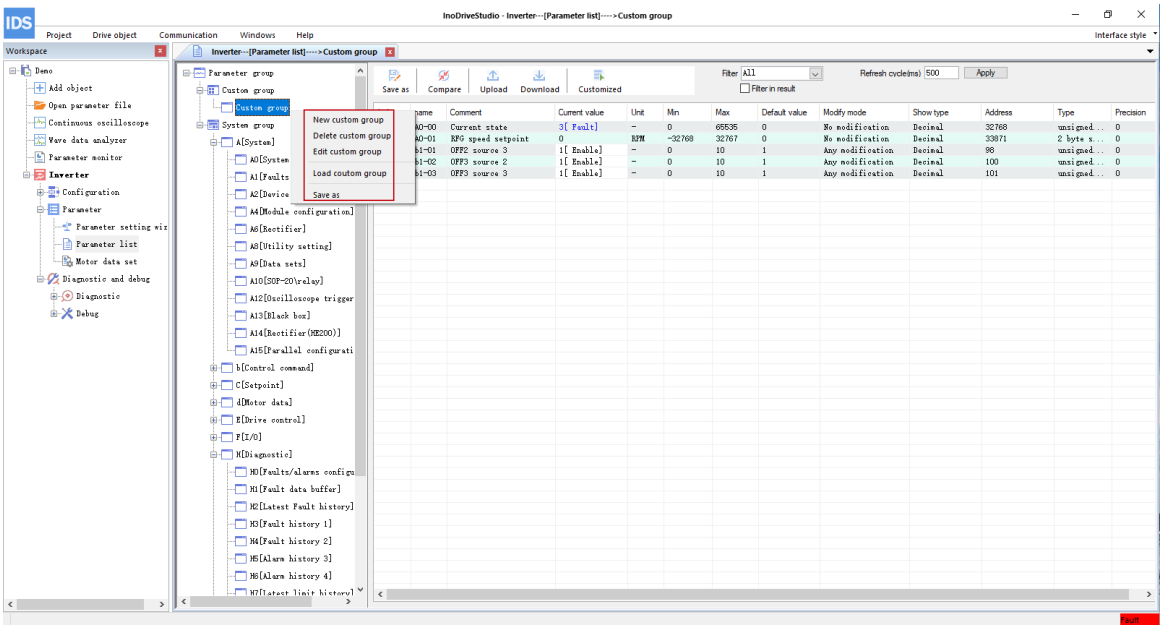


Figure 1-26 Handling the user-defined parameter group

When saving a user-defined parameter group, you can select different file types:

- Parameter file (*. inoprm): The saved file supports parameter download. The file contains parameter value information and can be downloaded to other devices.
- Parameter group file (*. inogrp): The saved file is a parameter group configuration file, which can be reloaded into a user-defined group and contains only the user-defined parameter group information.
- CSV file (*. csv): You can directly open the saved csv file to view the information.

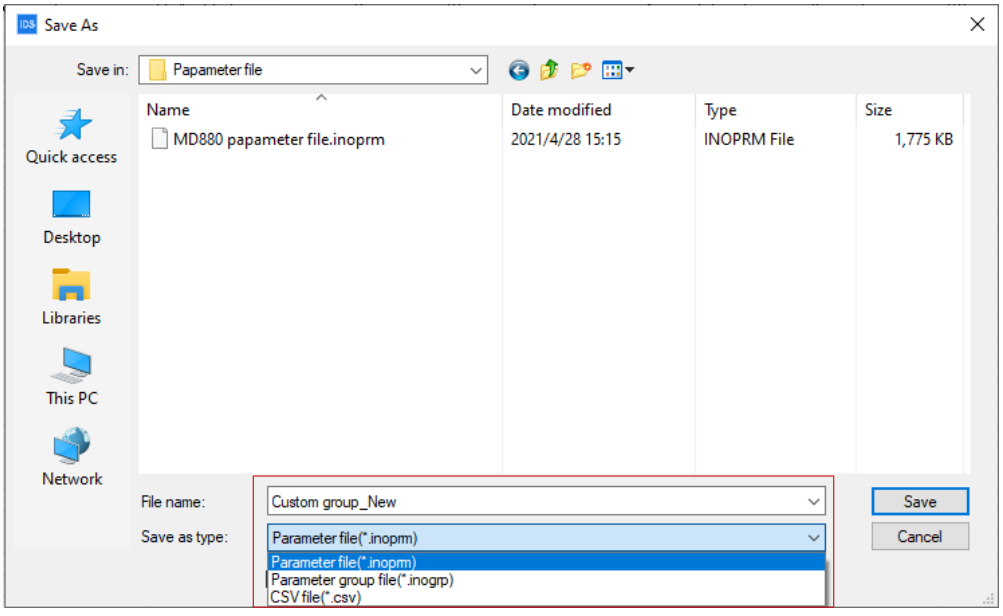


Figure 1-27 User-defined parameter group

1.2.4 Waveform Recording and Analysis

The most important thing for commissioning performance is the analysis of real-time data curves. InoDriveStudio provides three different means to achieve online real-time recording of data curves, conditional trigger recording and offline viewing of waveforms.

1.2.4.1 Continuous Oscilloscope

During on-site commissioning, it is usually necessary to monitor the running status of the equipment in real time. The continuous oscilloscope in InoDriveStudio can monitor and record the relevant data or status of the equipment in real time. Click the working area " Continuous Oscilloscope " to start the oscilloscope. The oscilloscope mainly includes " Channel Selection ", "Waveform Display ", "Waveform Configuration" and "Toolbar", as shown in the following figure:

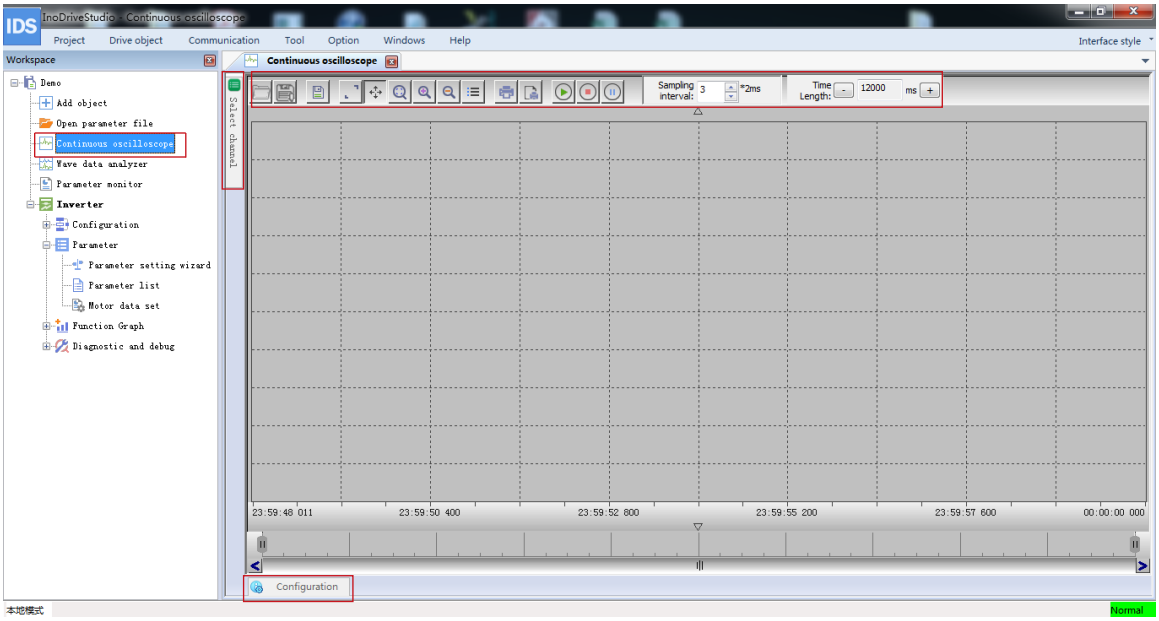


Figure 1-28 How to start a continuous oscilloscope

Only one continuous oscilloscope window can be opened for each project, and waveform recording and analysis can be carried out for all devices in the current project in the continuous oscilloscope. The left part ① of the continuous oscilloscope window is for channel selection, the right middle part ② is the main interface for waveform display, the right lower part ③ is for waveform configuration, and the right upper part ④ is a toolbar, which can be used for starting, stopping, pausing, zooming and other operations. Set the same "group number" In ③ , you can set the same group number to display connectors with the same physical quantity signification in the same coordinate system. In ④ , you can delete the currently selected channel by clicking the "Stop" button in the toolbar and then selecting "Channel parameters", as shown in Figure 1-30.

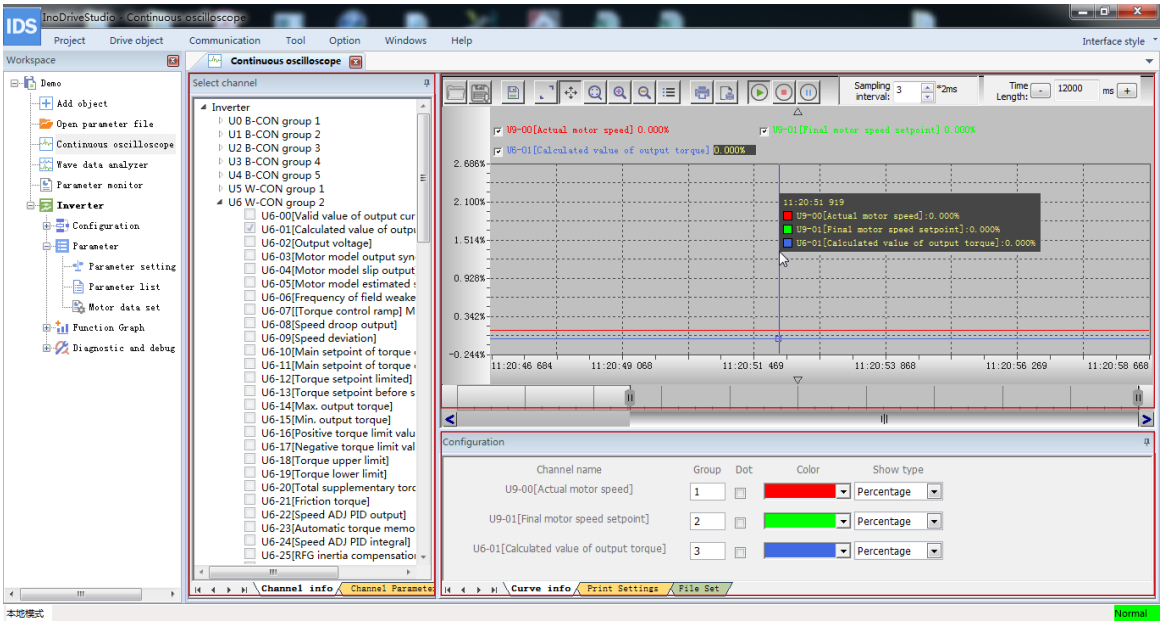


Figure 1-29 Continuous oscilloscope window

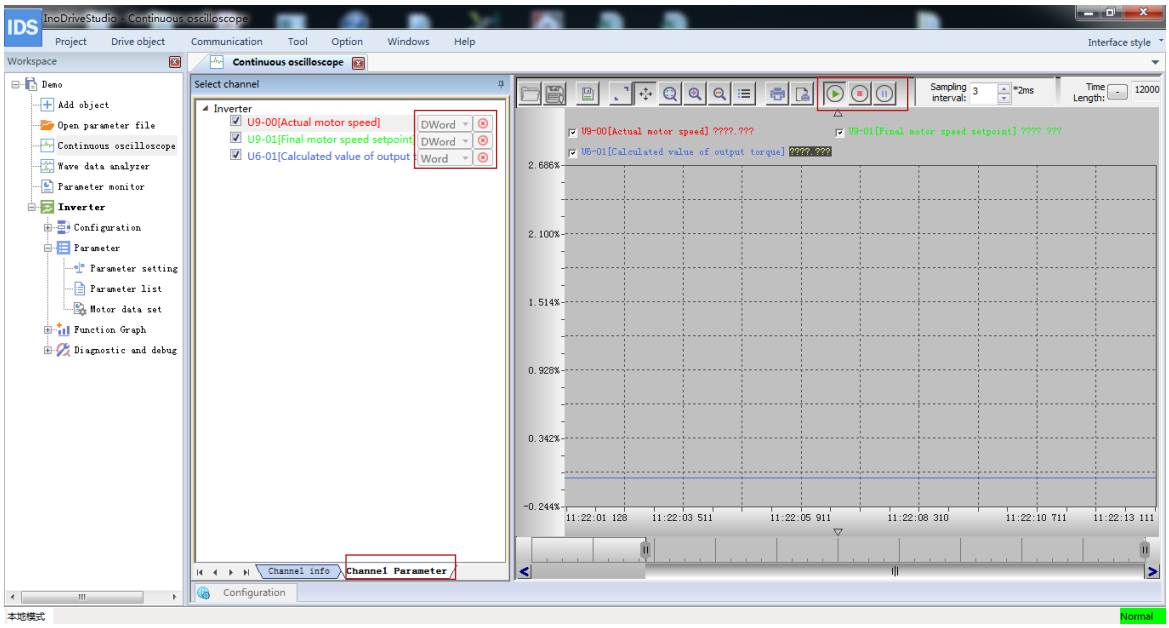


Figure 1-30 Continuous oscilloscope channel deletion

In channel selection, you can select data channels to be monitored. All group U parameters can be used as data sources for recording curves.

- For (U5-U8, U10-U11, U15), each piece of data occupies one recording channel;
- For (U9, U19) each piece of data occupies one recording channel; If you want to obtain a waveform with higher precision, you can also modify it to double-word recording in the configuration and occupy two recording channels through "Stop" → "Channel parameters" → "DWord", as shown in Figure 1-31.
- (U0–U4) are digital, which can record up to 8 digital quantities in a device, and all digital waveforms in a device only occupy one recording channel.

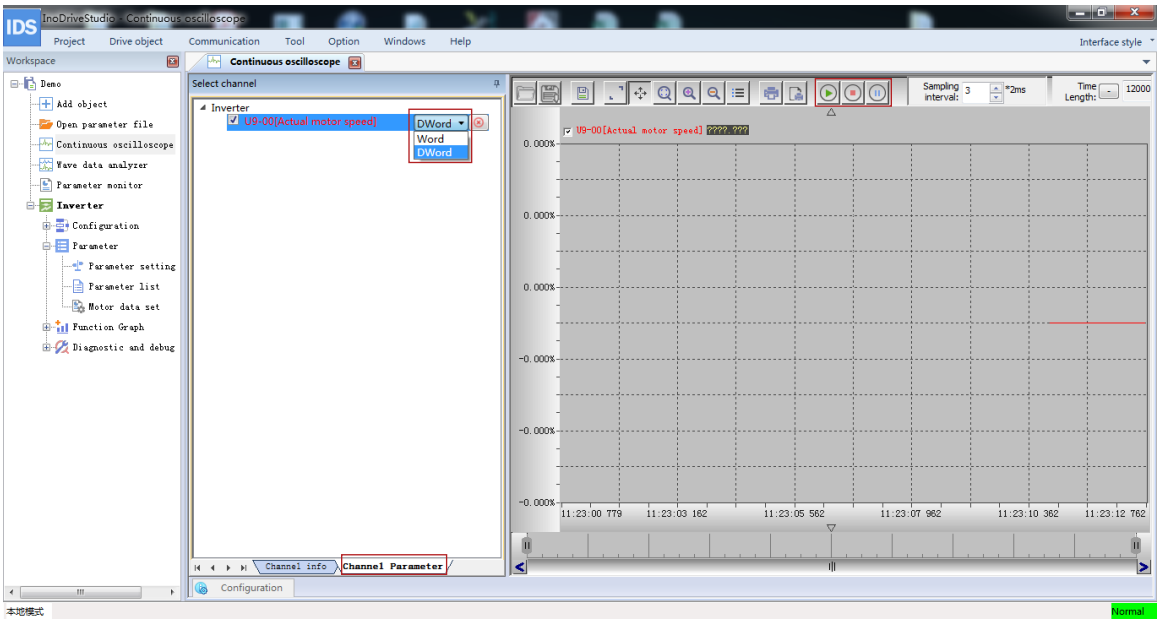


Figure 1-31 Single and double word display of continuous oscilloscope connector

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

Baud rate	Sample interval	Max. number of channels	Sample interval	Max. number of channels	Sample interval	Max. number of channels
115200bps	2ms	4	4ms	7	>4ms	8
1Mbps	2ms	8	4ms	8	>4ms	8
2Mbps	2ms	8	4ms	8	>4ms	8
4Mbps	2ms	8	4ms	8	>4ms	8

Use of waveform configuration and toolbars are detailed in the help documents included with InoDriveStudio software.

1.2.4.2 Triggering Oscilloscope

When it is necessary to trigger the recorded waveform according to alarm, fault or other conditions, the triggering oscilloscope function can be used.

The method is as follows:

① Open the fault alarm list to trigger the oscilloscope page

Select "Inverter" → "Diagnostic Debugging" → "Diagnosis" → "Trigger Oscilloscope Setting and Reading":

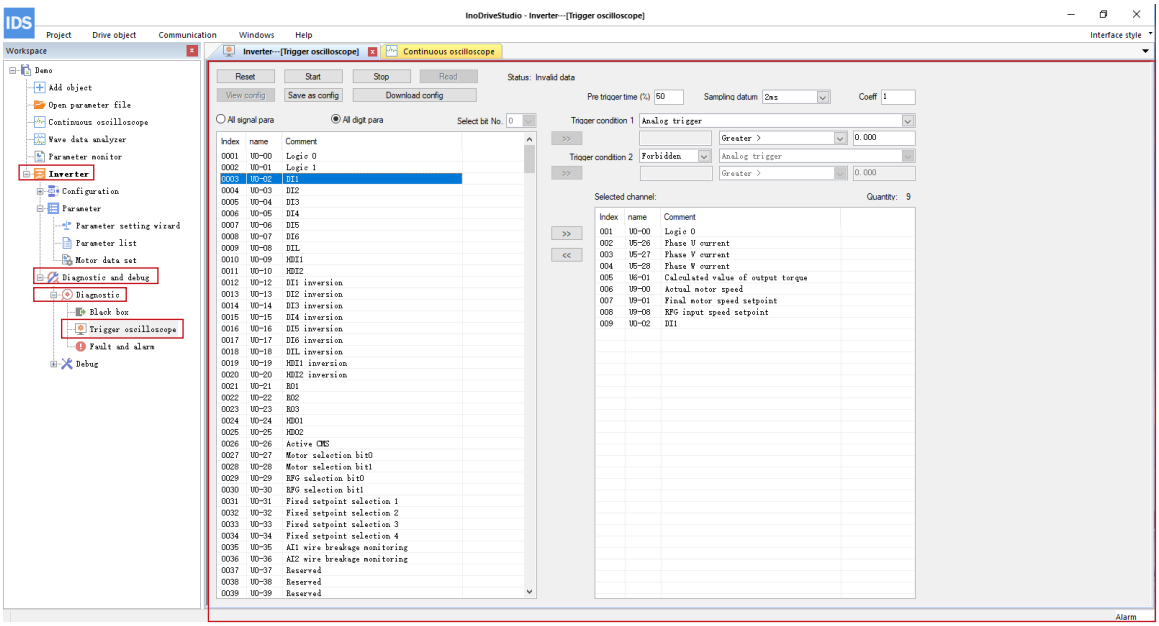


Figure 1-32 Triggering oscilloscope setting page

② Select the parameters to be recorded

The recorded parameters can be analog or digital. If U5-26 (U phase current) is selected, check "All analog" and select U5-26 and click >> to move U5-26 to the "Selected channels" list box, as shown in the following figure:

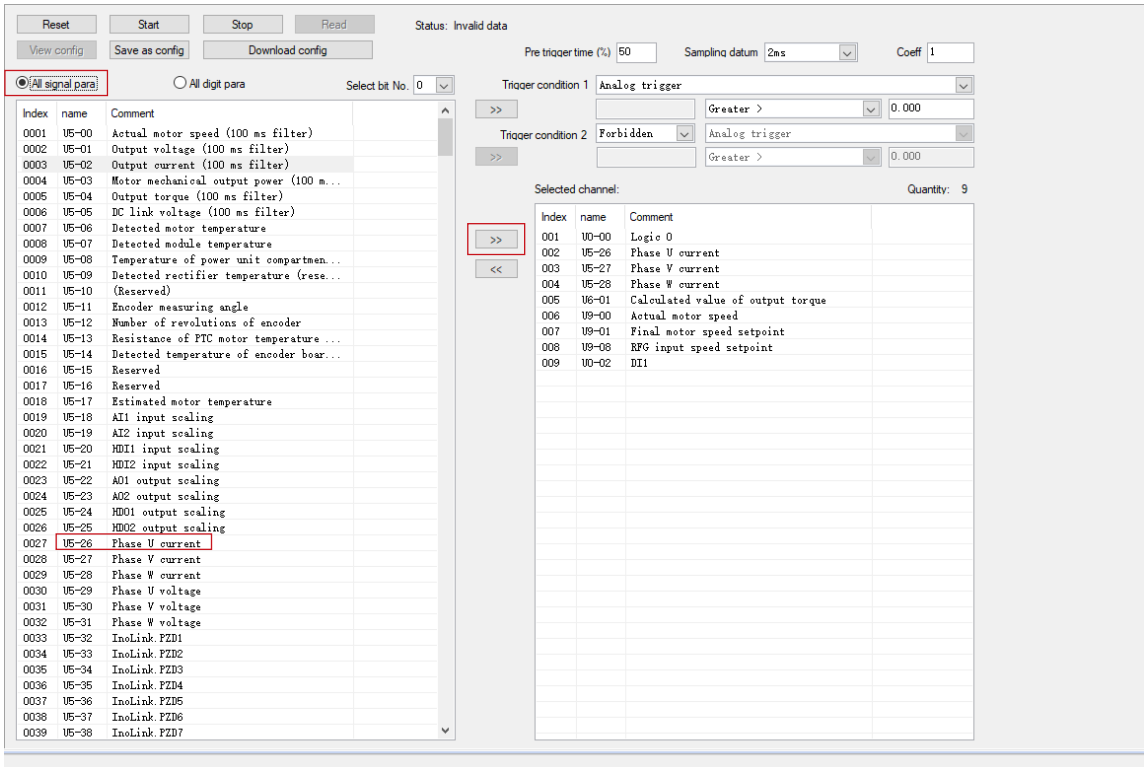


Figure 1-33 Recording parameters

You can also double-click the selected parameter to move it to the "Selected channels" list box. To remove a parameter from "Selected channels", double-click the parameter.

③ Trigger setting

Trigger conditions include:

■ Sampling base value, which can be the carrier period or 2 ms and its multiples.

- Pre-trigger time, which refers to the time when the trigger is ready to start. When set to 50%, it means the trigger waveform is recorded at in the middle of the whole waveform time axis.
- Set trigger conditions and select trigger quantity and its value. You can also set two trigger conditions. Only when both conditions are met will the trigger be effective. When only one condition is used, the trigger condition 2 is disabled.

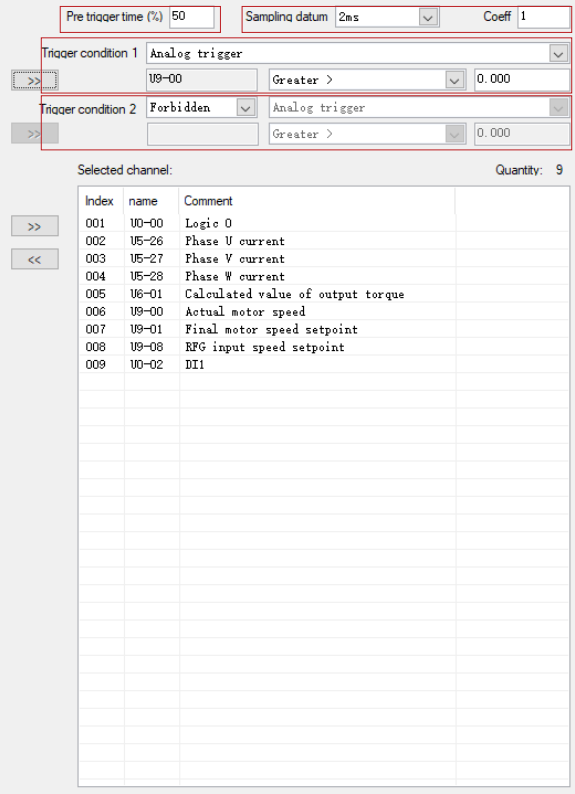


Figure 1-34 Trigger settings

When all settings (including parameter selection and trigger settings) are completed, the trigger settings can be "saved" into a file, which can be directly "downloaded" for use next time.

4. Start

After the setting is completed, click Start. When the trigger conditions are met, you will be prompted the trigger is executed. After the waveform recording is completed, the status will change to ready. Select Read and save the file name, as shown in the following figure:

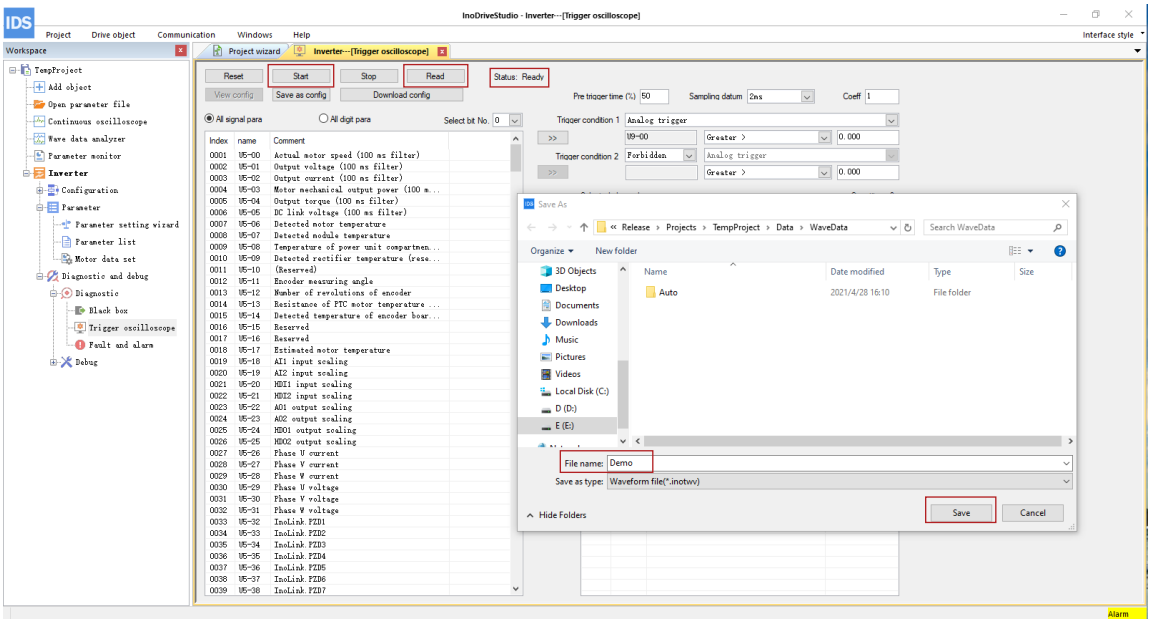


Figure 1-35 Saving file

When the saving is completed, the software will automatically open the recorded waveform and you can select the channel you want to view.

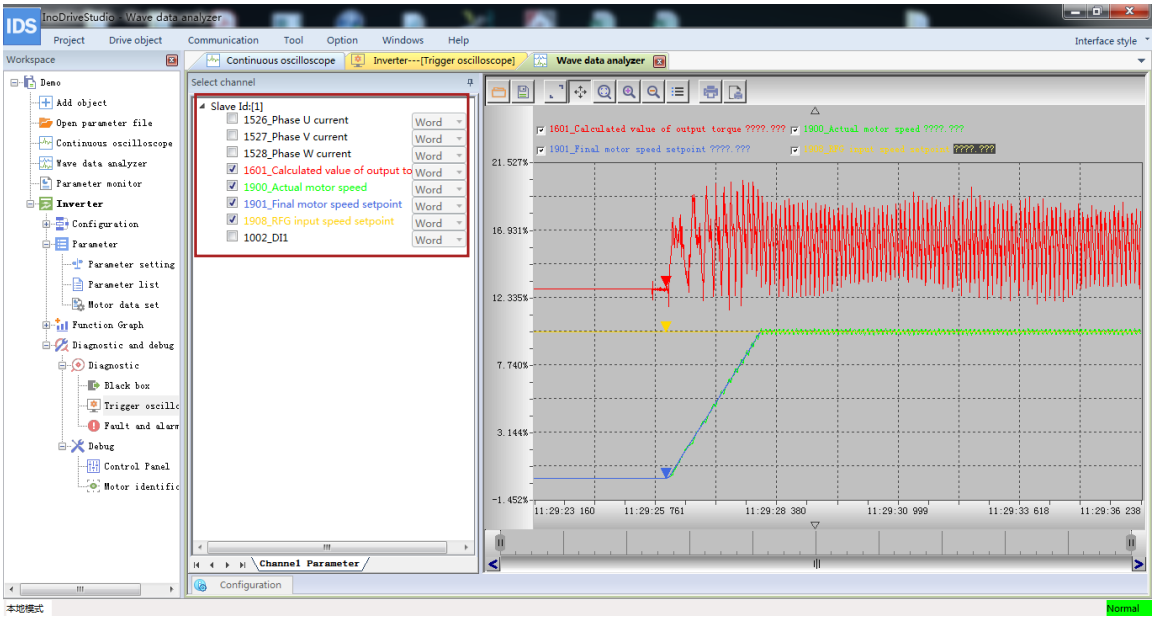


Figure 1-36 Waveform recorded by trigger oscilloscope

1.2.4.3 Black Box

When the device fails, MD880 controller will collect data 1.5 seconds before and 0.5 seconds after the failure, including 16 ADC interrupt internal data, 48 2ms-period internal data and 16 2ms-period user-defined data. The collected data will be automatically saved to the SD card provided by HCU, which can store up to 1,000 recent fault data.

The black box supports automatic triggering of failure and user-defined instruction triggering, either of which will trigger the black box recording.

1 automatic fault trigger condition: when the inverter module enters the fault state from the no-fault state, the black box recording will be automatically triggered once;

2 User-defined instruction trigger condition: The user can set the parameter H0-06, and the black box recording will be triggered once on the rising edge.

You can use the parameter H0-60 to set the black box fault recording conditions and choose to record faults in operation or faults at any time.

Para. No.	Name	Setpoint
H0-06	User-define black box trigger command source	0: Disabled Other: B-CON

H0-60	Enable exception detection 1	Ones position-: OFF2/OFF3 activation warning 0: Disabled 1: Enabled Tens position-: HCU RTC battery voltage low warning 0: Disabled 1: Enabled Hundreds position: Reserved 0: Disabled 1: Enabled Thousands position-: SD card offline/error warning 0: Disabled 1: Enabled Ten thousands position-: Condition to activate SD card black box fault recording 0: Fault occurring during running 1: Fault occurring at any time

① Go to the black box page through "Inverter" → "Diagnosis and Commissioning" → "Diagnosis" → "Read Black Box", and click "Refresh" to see the faults and time of the device.

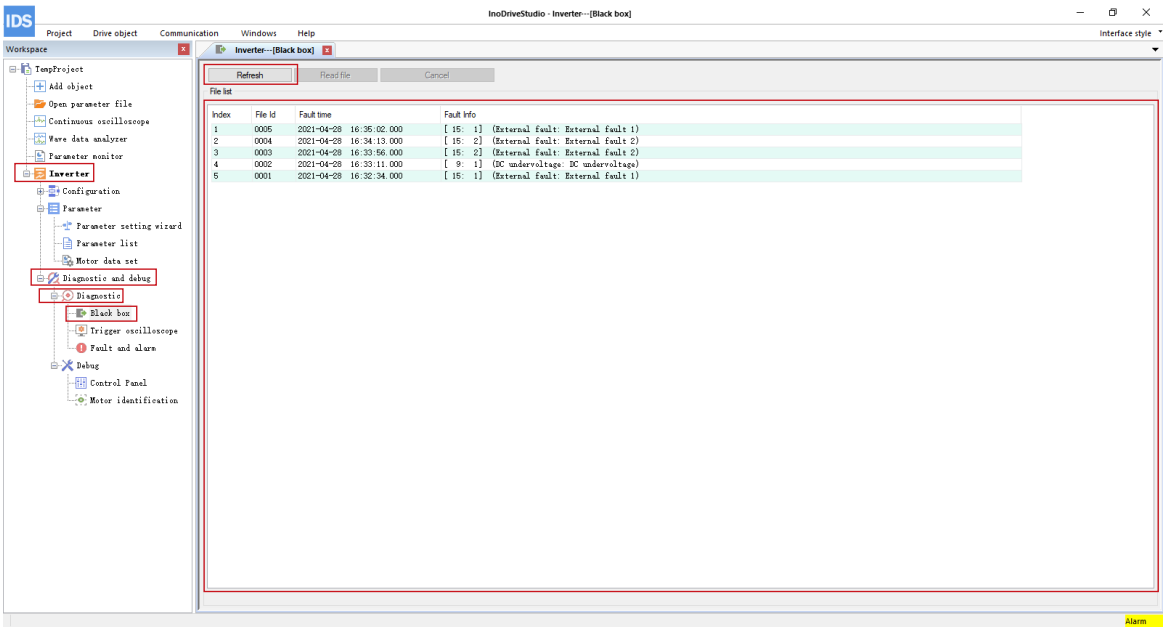


Figure 1-37 Black box page

(2) Select one of the faults, such as the 4th one, click "Read file", and name and save it.

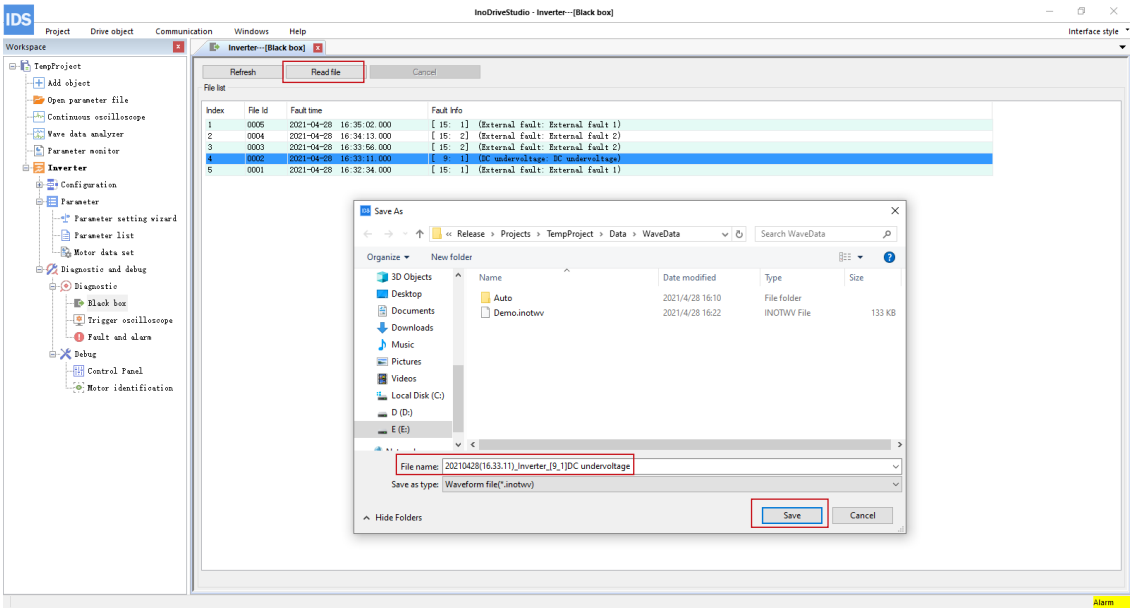


Figure 1-38 Save black box fault data

(3) After you click Save, InoDriveStudio will automatically open the saved waveform. Select the channel you want to view, and the corresponding waveform will appear.

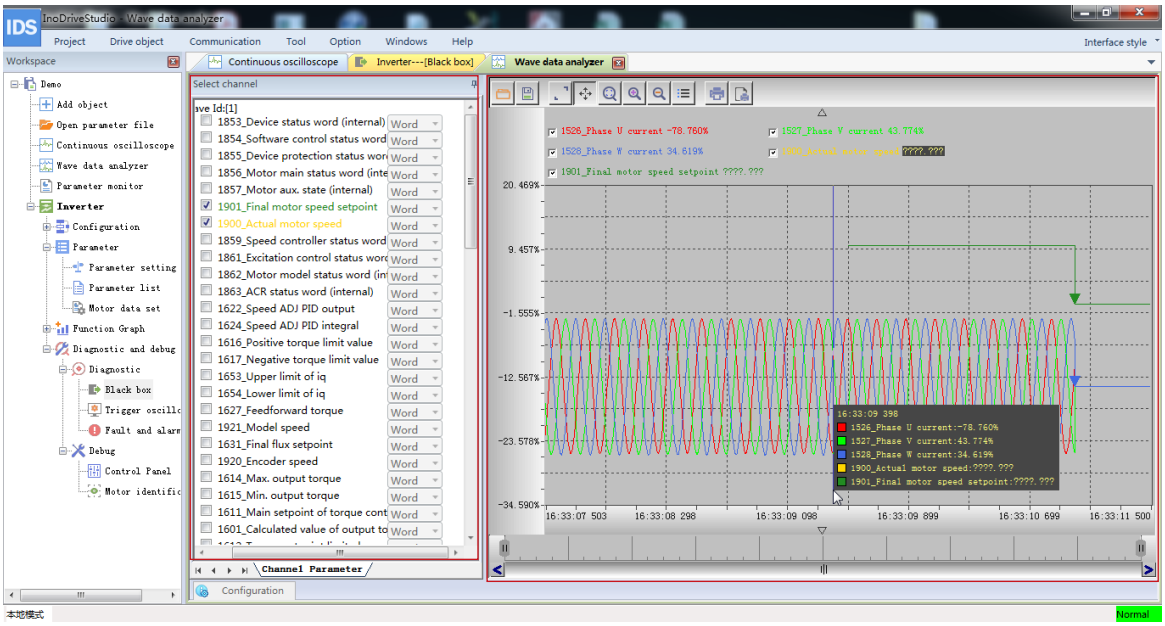


Figure 1-39 Waveform opened by black box

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2 System Description

2.1 Typical Topology of MD880 System

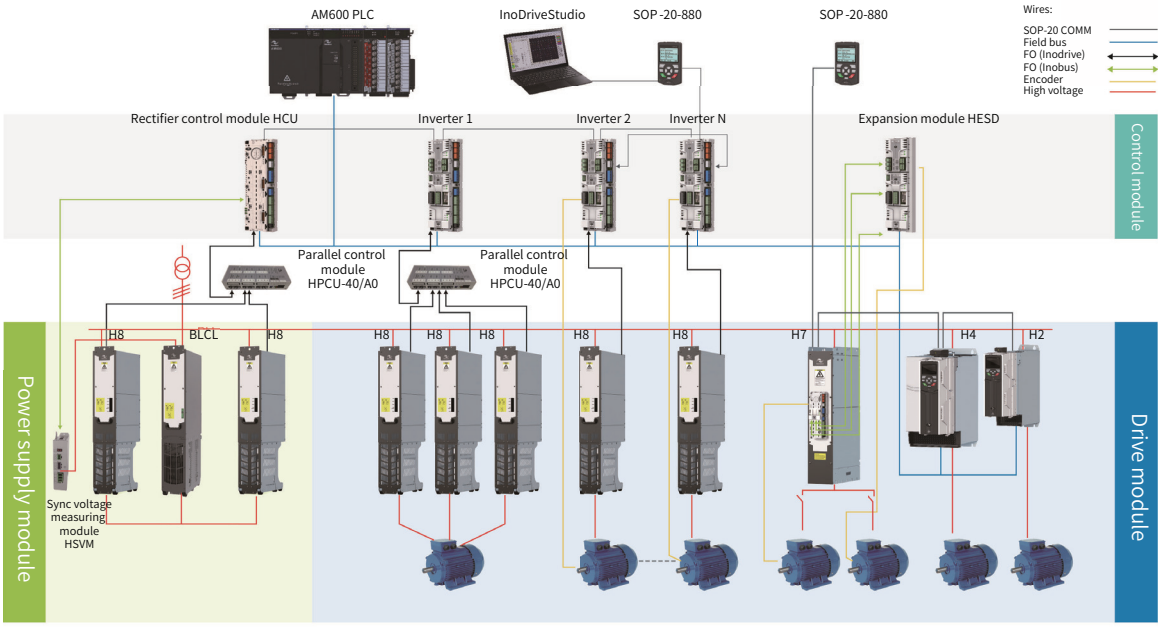


Figure 2-1 Topology of MD880 system

The typical topology of MD880 multidrive system is shown in the above figure. It consists of a power supply part (which can be a basic line module, a regenerative rectifier module or an AFE) and a drive part. The expansion of the power supply module and the drive module can be realized in parallel through HPCU. The power supply module and the drive module HCU are connected with PLC through field bus to realize centralized control. The HCU control modules can also realize centralized commissioning and monitoring through RS485 bus.

2.1.1 Description of Parallel Connection of MD880 Drive Module

MD880 drive modules are connected in parallel through HPCU, and up to 10 modules can be connected in parallel. The electrical diagram of the parallel topology is as follows:

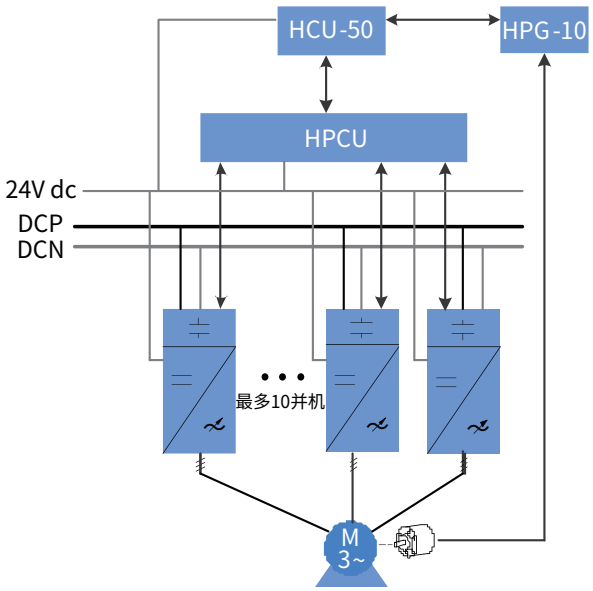


Figure 2-2 Parallel topology of drive modules

When drive modules are connected in parallel, output reactors must be installed. It is recommended that each drive module use a separate cable to connect to the motor; a bus bar can also be used to short-circuit the outputs of all drive modules and then connect them to the motor with a cable. For wiring requirements, see "MD880-50 Series Inverter Hardware User Guide"; For the setting of power module and parallel related parameters, see *"3.3 Inspection and Setup of Power Module"*.

The simple information of the module can be viewed through the parameters in the following table.

Table 2-1 Module information view

Para. No.	Name	Description
A2-00	Product type	Displays current device type 0: Diode rectifier 1: Basic rectifier 2: Inverter 3: Regenerative rectifier 4: 3-phase braking 5:DC-DC
A2-01	Module rated power	Displays module rated power
A2-02	Module rated voltage	Displays module rated voltage
A2-03	Module rated current	Displays module rated Current
A15-07	Online parallel modules	Displays online parallel modules. Agrees with A15-04
A15-12	Total rated device power	Displays total rated power of parallel modules
A15-13	Total rated device current	Displays total rated current of parallel modules

For example: If 2x 500 kW power modules are connected in parallel, A2-01 displays 500kW. The derating coefficient for parallel connection is 0.95, so the power of the two 500kW parallel modules is 950 kW, and thus A15-12 should display 950 kW.

2.1.2 Use of HCU Control Module

2.1.2.1 Indicators

HCU comes with three indicator lights:

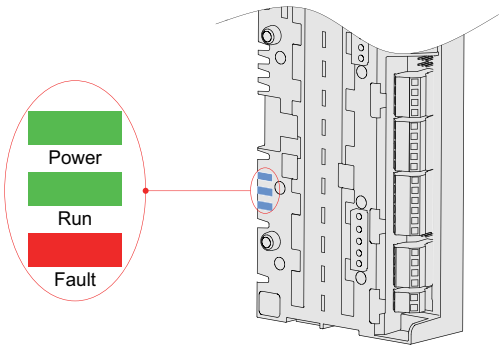


Figure 2-3 HCU indicator

No.	Name	Status	Description
1	Power	Steady ON	HCU power supply is normal
		Off	HCU is not energized or the power supply has failed
2	Run	Steady ON	Power module is running
		Off	Power module is not running

No.	Name	Status	Description
3	Fault	Steady ON	System fault occurs
		Off	System is normal
		Flashing	HCU auxiliary power 24V failed. Check all auxiliary power supplies for short circuit or overload.
4	Fault, Run	Flashing	PC or SOP-20-880 selects the HCU and ends after 10s

2.1.2.2 Description of Standard Peripheral Terminals and Parameter Settings

See the HCU Control Module User Guide for the use of HCU standard peripheral connectors. This guide only describes the terminals and corresponding parameter groups. See the following table:

Terminal	Parameter Groups	Remarks
RS485	A10	Sets the communication speed and address
DI	F0	Displays DI status and switch-on/off delay settings
RO	F1	Output source selection Displayed in U0-21 to U0-23
AI	F2	The final results are shown in U5-18/U5-19
AO	F3	Output source selection Displayed in U5-22/U5-23
HDI	F4	High Speed DI Input Related Settings
HDO	F5	High Speed DO Output Related Settings
InoLink	n0	Data transfer between HCUs U5-32 to U5-39 display the data of receive word PZD1–PZD8 U2-32 to U2-47 display bit 0–bit 15 data of receive word PZD1

2.1.2.3 Expansion Modules

For detailed information on the hardware of an expansion module, see the user guide specific for this module. There are 3 steps when using the expansion module:

1) Determine the module type.

2) Select the slot where the module should be installed. For the input/output module or encoder detection module, up to 3 are supported at the same time. Each module needs to be configured separately.

3) Set other parameters of the module. In the case of a communication expansion module, you also need to set the n1/n2 group fieldbus adapter. See *"4.9 Communication Module"*.

Table 2-2 List of common expansion modules

Model	Name	Type	Parameter Group	Related Parameter Group
HPG-10	HTL incremental encoder signal detection module	Encoder detection module	n4/n5/n6	/
HPG-40	Resolver encoder signal detection module			/
HPG-50	TTL incremental encoder signal detection module			/
HIO-10/20/30	Digital-analog expansion module	I/O module	n7	n23/n24/n25
			n8	n26/n27/n28
			n9	n29/n30/n31

Model	Name	Type	Parameter Group	Related Parameter Group
HMBA-10	Modbus RTU fieldbus adaptation module	Fieldbus module	n10	n1/n2/n3
HDP-10	PROFIBUS DP fieldbus adaptation module		n16	n1/n2/n3
HCAN-10	CANopen fieldbus adaptation module		n12	n1/n2/n3
HETC-10/20	EtherCAT industrial Ethernet module	Industrial Ethernet module	n14	n1/n2/n3
HPFN-10	PROFINET I/O industrial Ethernet module		n17	n1/n2/n3
HMBT-10	Modbus TCP industrial Ethernet module		n18	n1/n2/n3
HETN-10	Ethernet test module	Ethernet module	n13	n1/n2/n3
HSVM-10	Sync voltage detection module	Voltage detection module	n19	/
HOFR-50	FO routing data exchange control module	FO routing control module	n22	/
HIBA-10	Data conversion module	Data conversion module	n18	n1/n2/n3

The A2 group parameters display the type of the currently inserted expansion module and software version number.

Table 2-3 Expansion module view

Slot	Module Type Parameter	Software Version Parameter	Slot	Module Type Parameter	Software Version Parameter
SLOT1_1	A2-24	A2-25	SLOT2_1	A2-30	A2-31
SLOT1_2	A2-26	A2-27	SLOT2_2	A2-32	A2-33
SLOT1_3	A2-28	A2-29	SLOT2_3	A2-34	A2-35
SLOT3_1	A2-36	A2-37	-	-	-

2.2 Parameter Backup and Restore

2.2.1 Restoring Factory Settings

In the A8 group (environment setting) parameters, select the operation to be performed through A8-00 and set A8-01 to confirm the selection, then the specified parameter value can be restored to the factory value.

2.2.1.1 Partial Parameters (motor parameters are not restored)

Set:

1) A8-00 = 1, to only restore some of the parameters, excluding motor parameters in group d
2) A8-01 = 1, to confirm the operation set by A8-00.
3) Parameter values except group d are restored to factory values

NOTE

◆ Parameters related to the power module model will be restored to the default value instead of the factory value, such as carrier frequency setpoint A4-02; The record parameters of H1–H8 parameter group will not be restored; The device name is not recoverable.

2.2.1.2 All Parameters

Set:

1) A8-00 = 2, to restore all parameters to factory values

2) A8-01 = 1, to confirm the operation set by A8-00

3) All parameter values (including Group d) are restored to the factory value (information such as motor power and current will be restored to the value corresponding to the model)


NOTE

◆ Parameters related to the power module model will be restored to the default value instead of the factory value, such as carrier frequency setpoint A4-02; The record parameters of H1–H8 parameter group will not be restored.

2.2.1.3 Record Parameters

Set:

1) A8-00 = 3, to select Clear Fault Record

2) A8-01 = 1, to confirm the operation set by A8-00

3) The record parameters of H1–H8 are cleared, and other parameters are not affected

2.2.1.4 Clearing SD Card Record Parameters of HCU

Set:

1) A8-00 = 4, to select Clear Black Box Records

2) A8-01 = 1, to confirm the operation set by A8-00

3) The parameter file backed up on the SD card of HCU is deleted, and all parameters are not affected

2.2.1.5 Clearing Time Records

Set:

1) A8-17 to select the time record information to be cleared

2) A8-18 = 1 to confirm the operation set by A8-17.

3) The selected time record information will be cleared

2.2.2 SD Card Backup Parameters of HCU

In the A8 group (environment setting) parameters, select the operation to be performed through A8-05 and set A8-06 to confirm the selection, then the value of all parameters can be saved to the SD card or parameters saved in the SD card can be restored to the HCU.

2.2.2.1 Saving Parameters to SD Card

Set:

1) A8-05 = 1 to select "Back up all HCU parameters to SD card"

2) A8-06 = 1 to confirm the operation set by A8-05.

3) The parameters of HCU can be saved in SD card, which is convenient for spare parts replacement. Only one backup parameter file is allowed. A new backup will overwrite the previous one.

4) If backup is successful, A8-07 will display status 2 "Parameter saved".

2.2.2.2 Recovering Parameters from SD Card to HCU

Set:

1) A8-05 = 2, to select "Restore all HCU parameters from SD card"

2) A8-06 = 1, to confirm the operation set by A8-05

3) Use the parameters backed up in the SD card to overwrite the current parameters of the HCU. When using a new HCU, you can use this function to quickly restore the parameters from the SD card of the old HCU

4) If the recovery is successful, you are supposed to read status 5 "Parameter recovery completed" in A8-07, otherwise there may be no backup file in the SD card, or the SD card is currently being used by other processes

2.2.2.3 Checking Parameter File

Set:

1) A8-05 = 3, to select parameter check

2) A8-06 = 1, to confirm the operation set by A8-05

3) The program will check the parameters backed up in SD card against the current parameters in HCU. If the parameters are consistent, status 9 "Parameters are consistent" is displayed in A8-07. Otherwise, status 10 "Parameters are inconsistent" is displayed, indicating that the backup parameters in the SD card are different from those in the HCU.

2.2.2.4 Clearing SD Card Record File

Set:

1) A8-00 = 4, to select "Clear black box records"

2) A8-01 = 1 to confirm the operation set by A8-00

The parameter file backed up on SD card is deleted, and all parameters are not affected.

2.2.3 Backing up Parameters with SOP-20-880

After selecting the equipment to be operated on SOP-20-880 and logging in the system, you can backup and restore the parameters through menu "07 System Operation → 01 Parameter Copy".

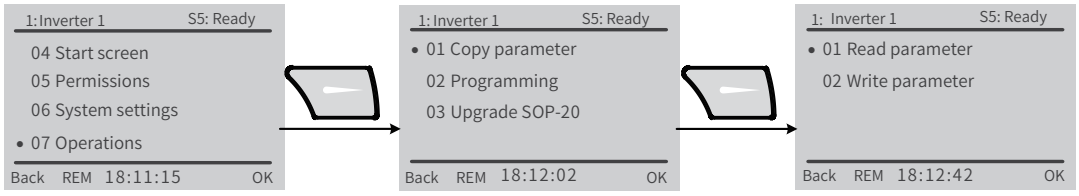


Figure 2-4 After logging in, enter the parameter copy page

2.2.3.1 Saving Parameters in SOP-20-880 File

"Read parameters" will read all the parameters of the device and save them to the SD card file provided by SOP-20-880.

After selecting "Read parameters", you need to set the user-defined part of the parameter file name, which includes 5 characters. The left and right arrow keys move the characters to be set, and the up and down arrow keys set the character values. The characters can be 0–9 and A –Z. The format of the file name is: device name-5-character user-defined name.ipv.

Example: Inverter 1-12ABC.ipv,

Which means the equipment is inverter 1, and the user-defined name is 12ABC.

After setting the file name, press the right soft key to start reading the parameters. After reading, a "Parameter copy completed" message shows. If the reading fails, the screen will display the detailed information on the failure.

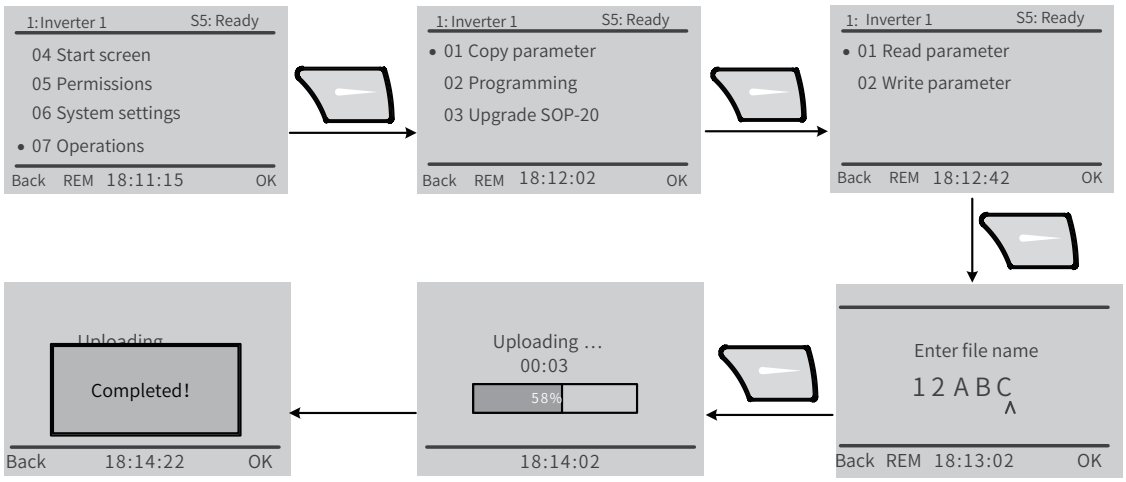


Figure 2-5 Parameter reading example

2.2.3.2 Recovering Parameters from SOP-20-880 File

"Write parameters" will download the parameters saved in SOP-20-880 to HCU.

After selecting "Write parameters", you need to select a parameter file in SD card, and then select the Copy All mode to restore all parameters in the file to HCU.

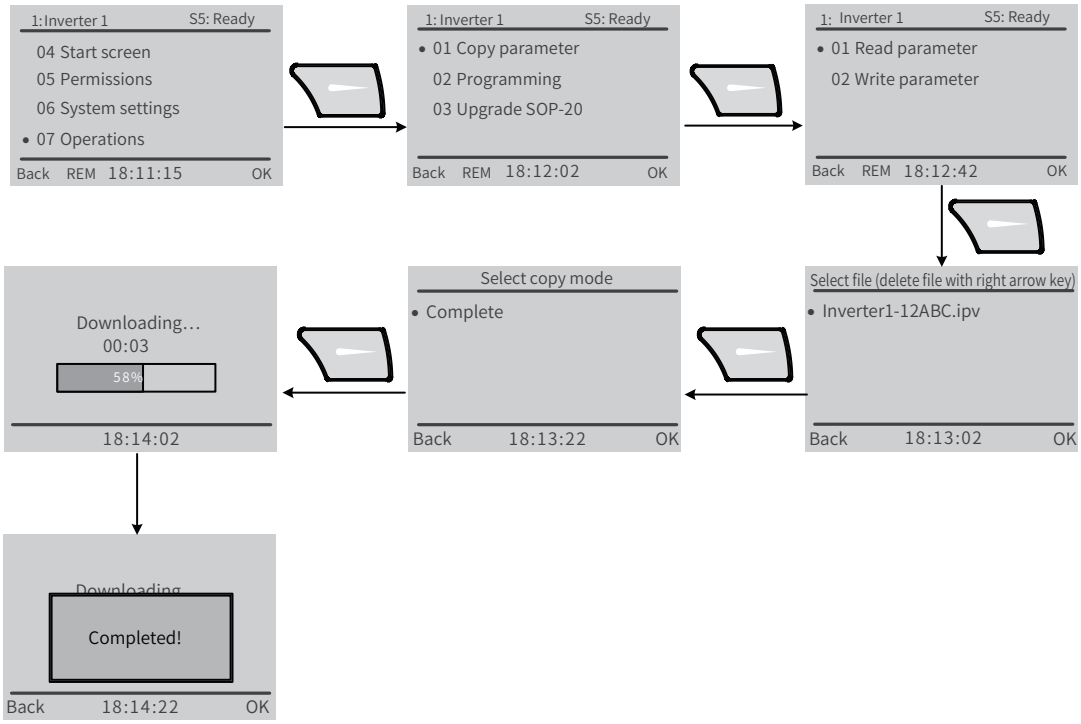


Figure 2-6 Parameter writing example

NOTE

◆ The files saved and read by the parameter copy function are stored in the SD card of SOP-20-880. Therefore an SD card must be correctly installed in SOP-20-880.

2.2.4 Backing up Parameters with InoDriveStudio

Using InoDriveStudio, you can back up the parameters of HCU to a computer through the "Upload" function in the "Parameter List" page. You can also restore the parameter file in the computer to the HCU through the "Download" function. For details, see *“1.2.3.5 Parameter Backup and Download”* in “”.

2.3 Drive Object Configuration Information

2.3.1 Station Number and Baud Rate

When SOP-20-880 or InoDriveStudio connects to HCU, it is necessary to set the correct station number and communication speed; When multiple HCUs are cascaded in the same network, the station number and communication speed of each HCU must be set separately through SOP-20-880/InoDriveStudio. Before cascading, ensure that the communication speeds of all devices in the same network are the same but the station numbers are different.

Method 1: Connect the SOP-20-880 to HCU, and set the communication speed and station number through "Menu" → "01 Parameter Setting" → "A System" → "A10 SOP-20/Relay Communication" → "A10-03 SOP-20/Relay Communication Address" and "A10-04 SOP-20/Relay Communication Speed".

Method 2: Directly change the baud rate and station number of a device after it is detected when you are creating a project in InoDriveStudio, as shown in the following figure.

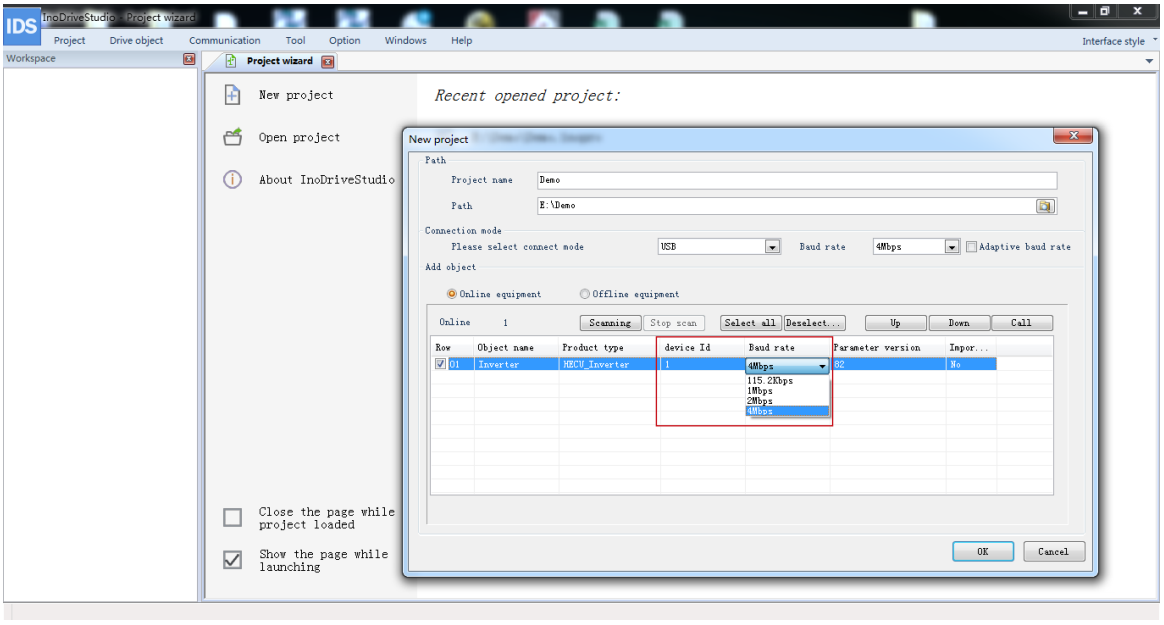


Figure 2-7 Change station number and baud rate

Method 3: After InoDriveStudio connects a device, directly modify the station number (A10-03) and baud rate (A10-04) in the parameter list.

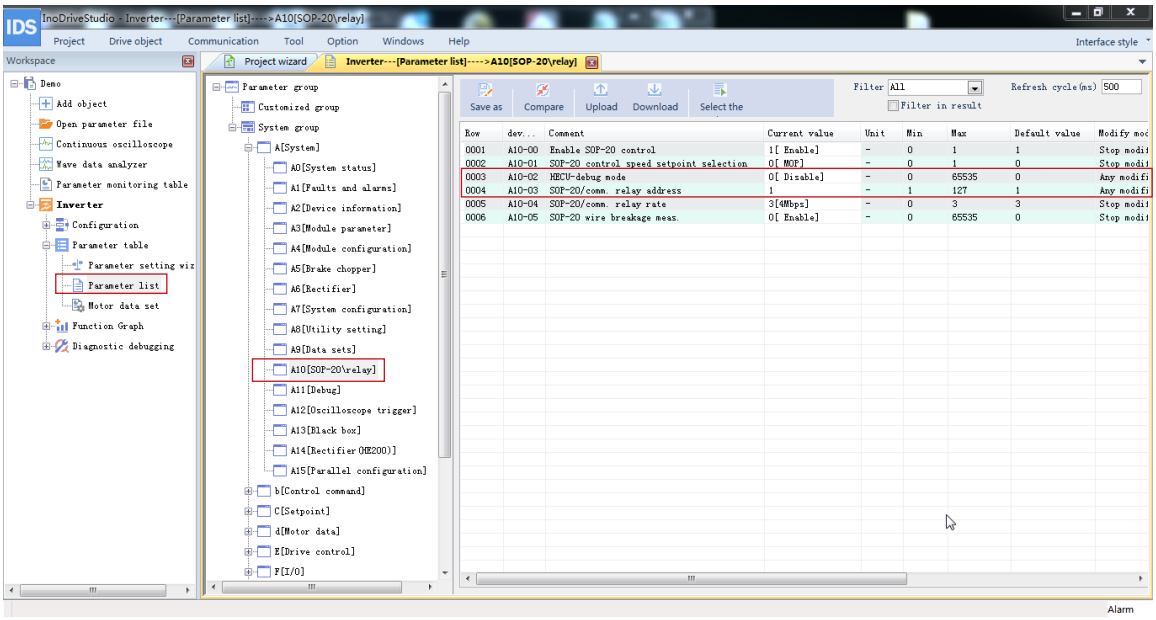


Figure 2-8 Changing station number and baud rate in parameter list

Method 4: In the drive object configuration page of InoDriveStudio, directly change the station number and baud rate.

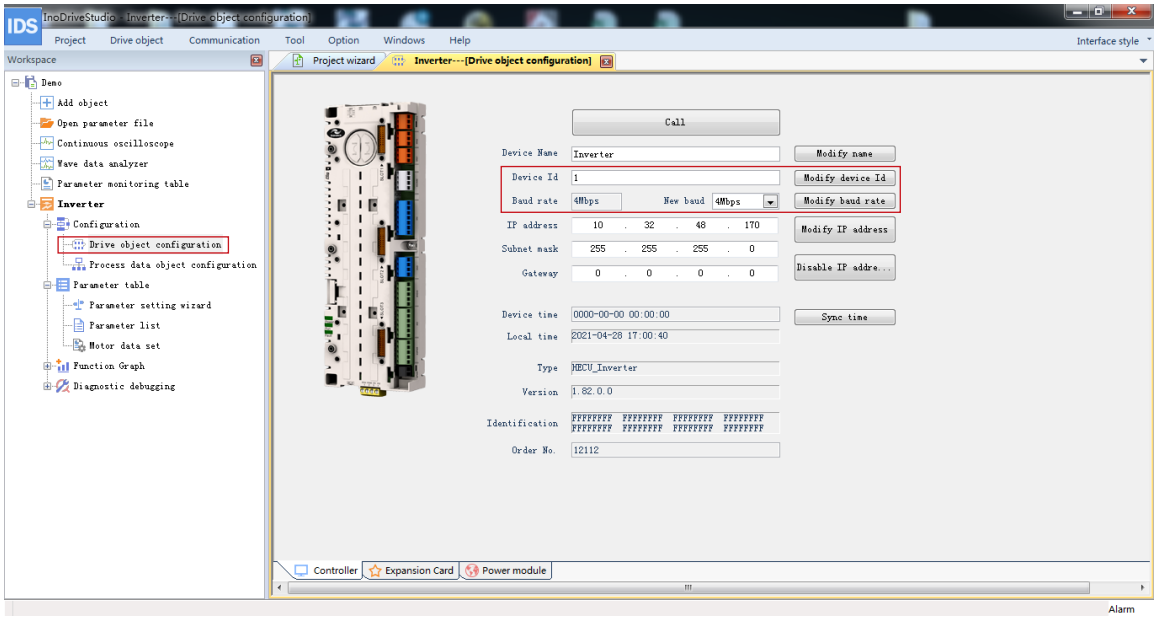


Figure 2-9 Changing station number and baud rate in configuration page

2.3.2 System Time

The HCU has a built-in RTC clock chip that supports system date and time recording. You can view and modify the system date and time through SOP-20-880 and InoDriveStudio.

2.3.2.1 Viewing and Modifying System Date and Time with SOP-20-880

Method 1: Enter the system time page through "Menu" → "06 System Settings" → "04 Date/Time" and "02 Device Object Time" to view and change the current system date and time.

Method 2: Sync the date/time of SOP-20-880 with HCU through "Menu" → "06 System Settings" → "04 Date/Time" and "03 Sync Time".

2.3.2.2 Viewing and Modifying System Date and Time through InoDriveStudio

In InoDriveStudio, go to "Config" → "Drive Object Config" to view the HCU system time (object time) and PC time (local time). Click "Sync Time" button to synchronize PC time to HCU.

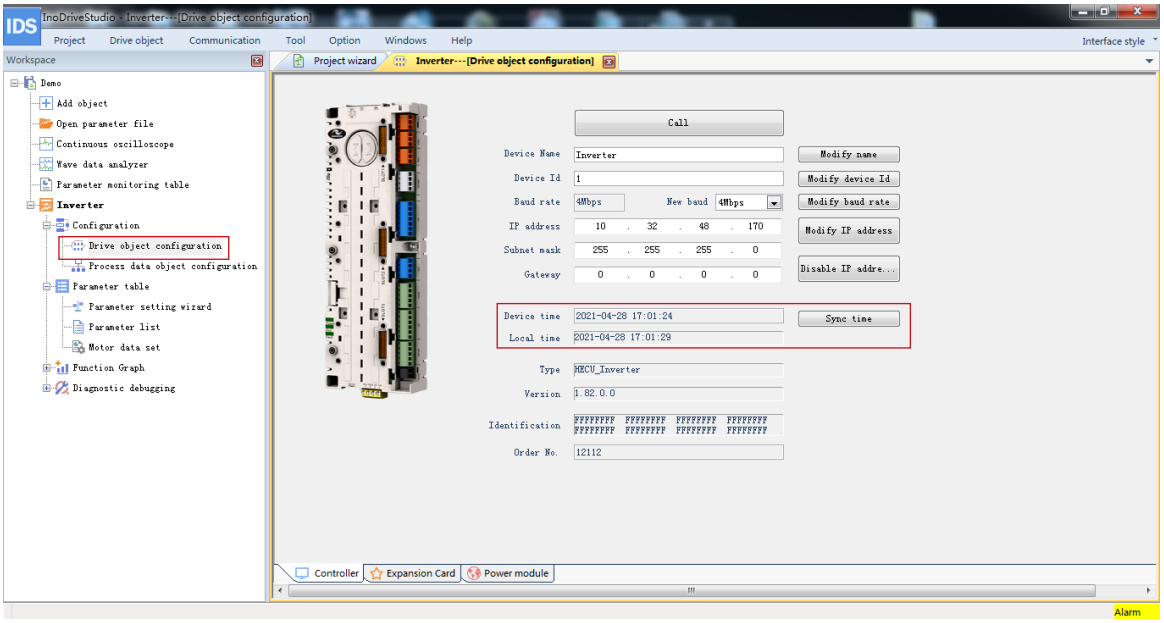


Figure 2-10 InoDriveStudio system time

2.3.2.3 Viewing System Date and Time through Parameters

Enter the A2 group parameter list, and you can directly view the system date and time through the parameters.

Para. No.	Name
A2-44	Current year
A2-45	Current date
A2-46	Current time

2.3.3 Device Name

HCU allows a user-defined device name which is power-failure retentive; When some parameters are restored to the factory value (A8-00=1), the device name will not be restored; When all parameters are restored to the factory value (A8-00=2), the device name will be restored to the factory value; HCU provides three ways to view and change the device name.

Method 1: Directly change the name of a device after it is detected when you are creating a project in InoDriveStudio, as shown in the following figure.

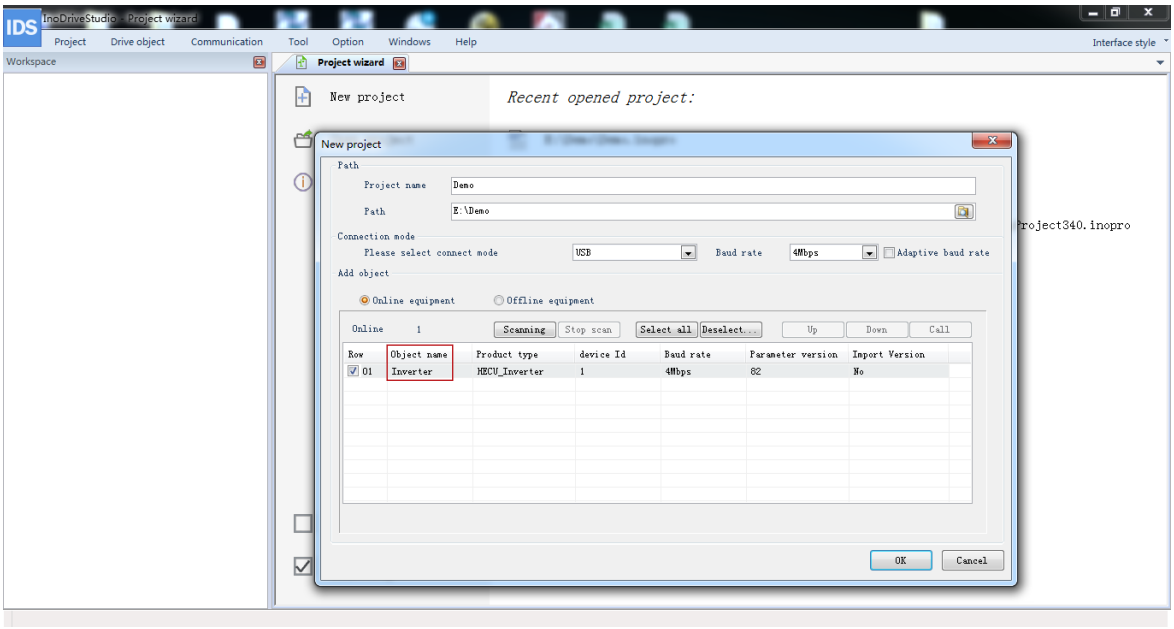


Figure 2-11 Directly changing the device name in InoDriveStudio

Method 2: In the InoDriveStudio workspace, right click the device object and select "Rename" to change the device name.

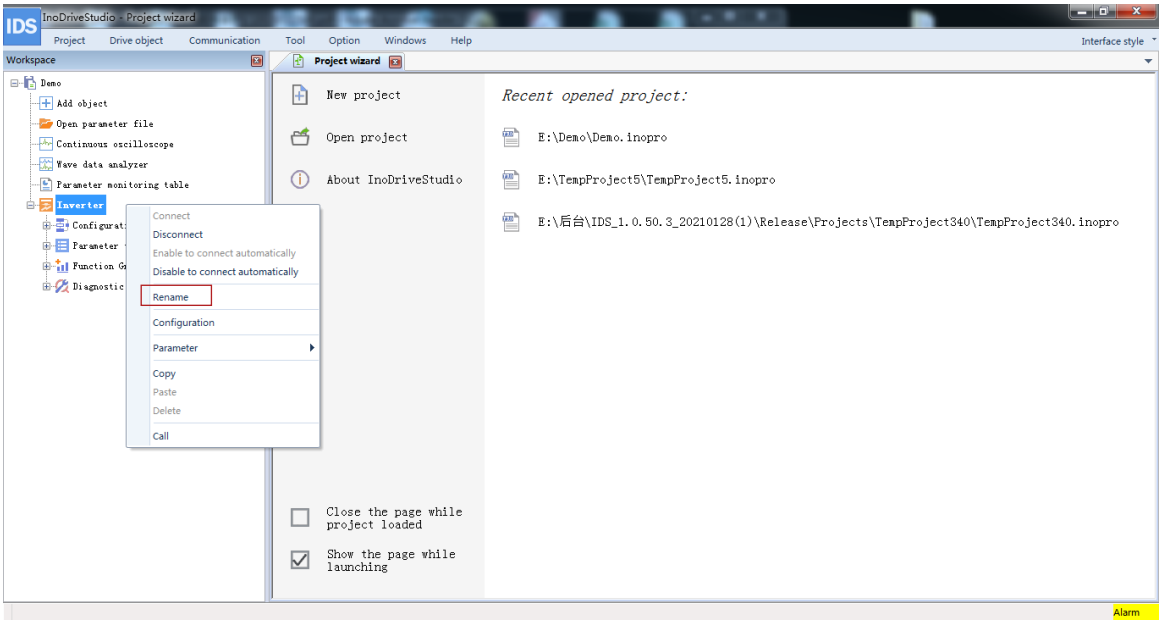


Figure 2-12 Right-click to rename a device

Method 3: In InoDriveStudio, go to "Config" → "Drive Object Config" and change the device name, as shown in the following figure:

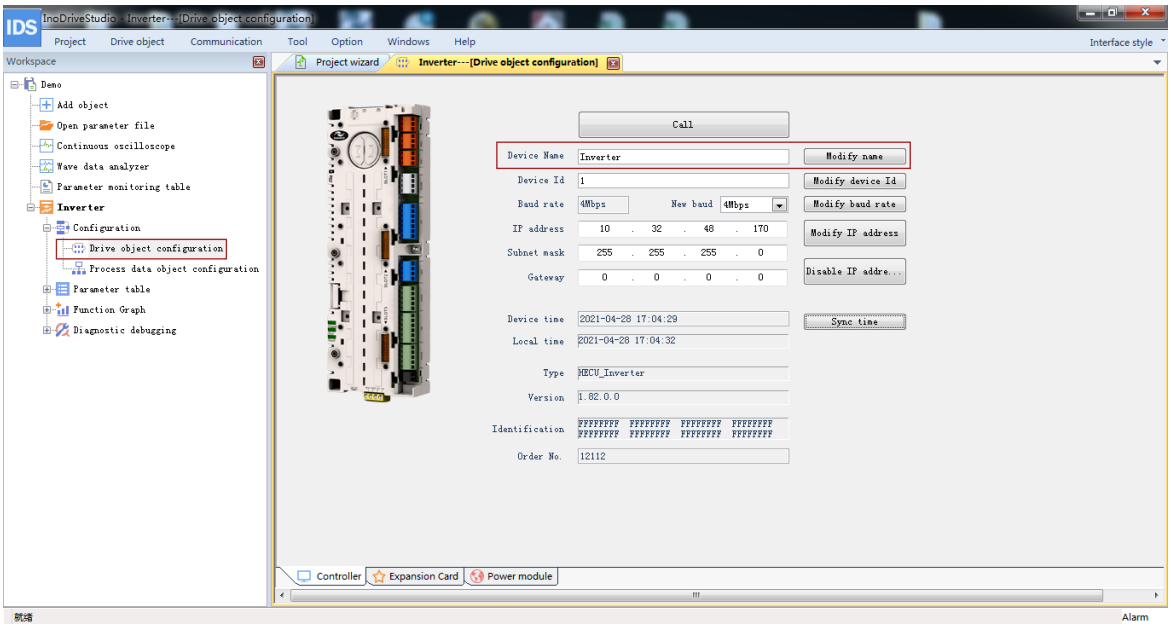


Figure 2-13 Changing device name through InoDriveStudio

NOTE

◆ When multiple devices are cascaded in the same monitoring network and connected through InoDriveStudio, ensure that the device names are different.

2.4 Per Unit Value System

In common circuit calculation, the units of current, voltage, power and impedance are A, V and W respectively, which are called the named unit system.

Calculation with the named unit system is inconvenient, because motors of the same type may have different capacities and parameters. In engineering, the per unit system is usually used for calculation, which can simplify the calculation and make it easier to analyze the change of physical state.

A per unit value represents the relative value of a physical value or parameter. The PU value is relative to a base value. For the same named value, different reference values result in different PU values. The conversion between a per unit value and a named value is as follows:

PU value = Named value/Base value

In the motor control system, the rated value of the motor is usually used as the base value of the PU system. For example, if the rated motor current is 100 A and the no-load current is 40 A, the per unit value of 40A no-load current is 40% when the rated motor current is used as the base value.

2.4.1 Selection of Per Unit Value

To make motor control easier, the HCU uses rated motor parameters as base values:

Name	Base Value
Alternating voltage	The motor's RMS line voltage (see d0-02) is used as the base value and is displayed in d3-00
Alternating current	The motor's RMS current (see d0-03) is used as the base value and is displayed in d3-01 The AC drive's heavy-duty rated current divided by four is used as the base value when the heavy-duty rated current is four times greater than the rated motor current
Motor speed	The synchronous speed of the motor (calculated according to d0-04, and not the rotor speed) is used as the base value, which is displayed in d3-02
Output frequency	The rated motor frequency (see d0-04) is used as the base value and is displayed in d3-03
Motor torque	The rated motor torque is used as the base value. The rated torque is calculated based on the basic parameters input by users and does not need to be set manually

Motor power	The rated power of the motor (based on d0-01. If the input deviation of d0-01 is large, it is calculated according to d0-02 and d0-03) is the base value, which is displayed in d3-04

2.4.2 Representation of Per Unit Values

The HCU provides 16-bit and 32-bit integer display parameters. 为了表示出标幺值，做如下定义：

- When per unit values are represented by 16-bit parameters, 100% is represented by 4096 (hexadecimal 0x1000) with precision up to 0.0244%. This value range is –799.9% to 799.9%. It is usually used to indicate the PU value of current, voltage and torque.
- When per unit values are represented by 32-bit parameters, 100% is indicated by the hexadecimal value 0x1000 0000. This method represents numerical values with higher precision. The applicable value range is –799.99% to 799.99%. It is used to represent the per unit value of motor speed.

16- and 32-bit numerical values can be converted mutually. A 32-bit value with the 16 least significant bits (LSBs) removed can be used as a 16-bit value. A 16-bit value added with 16 zeros in the LSB position can be used as a 32-bit value.

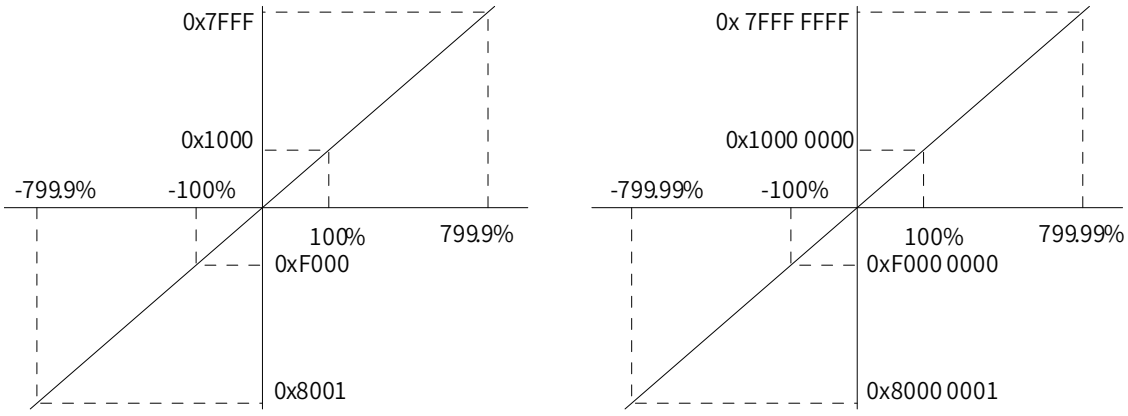


Figure 2-14 PU values of 16-bit and 32-bit values

2.4.3 Per Unit Value Range

In HCU control module, 16-bit and 32-bit PU values are all in the range of -799. 9%–799. 9%. However, 32-bit values have more significant numbers, so the values that can be represented will be more accurate. See the following table for details.

Value Type	Stored Value	PU Value	Absolute Error	Relative Error
16-bit PU value	5056	123.4375%	-0.0125%	1.0126%
32-bit PU value	331383570	123.44999984%	-0.00000016%	< 0.0001%

2.5 Parameter Interconnection System

When setting HCU parameters, you must first find the corresponding parameter, and then select the setpoint source. For example:

- Using the DI1 input to implement the user-defined OFF1 command (start/stop command) for channel 1 requires setting b0-01=U0-02. Where U0-02 stores the input status of DI1, called connector parameters (see Section 2.5. 1 for details); b0-01 is used to select the source of the function, which is called a setpoint source parameter. Any connector parameter can be selected as the input source of the setpoint source parameter.

Example:

- A9-00 = U0-04: U0-04 stores the input status of DI3, and A9-00 is the switch that controls channel

selection. This setting indicates that DI3 is used to switch control channels: when DI3 is disabled, control channel 1 is enabled; when the DI3 bit is enabled; control channel 2 is enabled.

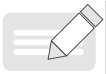
- C0-00 = U5-45: U5-45 stores the value of process data PZD2 received by bus adapter A, and C0-00 is the main speed setpoint source of the setpoint channel 1. This setting indicates that the main speed setpoint of setpoint channel 1 is from the process data PZD2 received by bus adapter A.

2.5.1 Connector Parameters

The parameters in group U are read-only and stores the intermediate data calculated by all modules of the AC drive during operation. These parameters are called connector parameters, which can be viewed by users, or read or used by other parameters.

Connector parameters are classified as follows based on different signal types:

- Bit connectors: includes DI, digital output (DO), a bit of a communication word, a bit of a control word or a state word, and status information of a hardware board or a fault. Bit connectors are located in groups U0–U4 and U0–U11.
- Word connectors: includes the calculated values (speed, voltage, current, and torque) related to AC drive control, as well as the data received through communication or the analog input (AI) and analog output (AO) signals for hardware testing. Word connectors are located in groups U5 to U9 and U15 to U19. Where U5-U8 and U15 are single-word connectors and U9 and U19 are double-word connectors.


NOTE

◆ Connector parameters are also needed when you use InoDriveStudio's continuous oscilloscope/trigger oscilloscope/black box data recording function. Only connector parameters can be used for continuous oscilloscope/black box recording.

2.5. 2 Setpoint Source Parameters

The parameters used to read connector parameters are called setting sources, which are classified as follows based on different connector types:

- Bit setting source: Sets the parameter No. of a bit connector and reads the connector value as the setting source parameter output.
- Word setting source: Sets the parameter No. of a word connector and reads the connector value as the setting source parameter output.

All parameters must be set to numerical values. Connectors in groups U0-00 to U9-99 are numbered from 1000 to 1999 and that in U10-00~U19-99 are numbered from 2000 to 2999, during setting source configuration.

The same connector parameter can be read by multiple setpoint source parameters; For each setpoint source parameter, only one connector parameter can be selected at a time.

2.6 Command Channel and Local Control

2.6.1 Local and Remote

The terms "local" and "remote" in this guide are defined based on the HCU-50/51 control module. Controlling device start/stop through the control channel is defined as "remote control", and through SOP-20-880 or InoDriveStudio is defined as "local control".

Some products may come with some start-stop buttons and potentiometers on the drive cabinet door which are defined as local control, while PLC control is defined as remote control. This is not the case in this guide. As for the HCU-50/51 control module, "remote control" covers cabinet door, PLC and other

host controller control. Two control channels are used for switching. The "LOC/REM" control button on the cabinet door should be connected to the HCU-50/51 control module through a DI, which must be set as the source of A9-00 (control channel selection).

In some production sites, the operation cabinet beside the machine will be defined as local control, while PLC will be defined as centralized control or remote control, which is equivalent to switching between two control channels in HCU-50/51. It is necessary to configure the IO signal of the operation cabinet and the communication protocol of PLC as two control channels, and switch through A9-00 (control channel selection).

2.6.2 Local/Remote Control

Controlling the start-stop of the drive module through control channel is called remote control, which is the most commonly used mode. During commissioning, using SOP-20-880 or InoDriveStudio to control the start and stop of the drive module is called local control. The local control is mainly used for commissioning and maintenance. When the local control takes effect, the start-stop control word set by the control channel and the setpoint of the setpoint channel are ineffective.

- The local control of InoDriveStudio has the highest commissioning priority. When enabled, the instruction channel and SOP-20-880 are ineffective. Switching between local and remote control is only allowed in the stop state.
- The local/remote control status can be viewed through U1-78: 0 means that the local control is activated and the instruction channel is inactive; 1 means remote control, and the instruction channel is active.
- The instruction channel is switched through A9-00, and the status can be viewed in U0-26: 0 means that the instruction channel 1 is active; 1 means instruction channel 2 is active.

See the following table for the control sources and connector status that actually take effect in the end:

A9-00	SOP Local/ Remote	IDS Local/Remote	U1-78	U0-26	Control source
0	0	0	1	0	Instruction channel 1
0	1	0	0	0	SOP-20-880
0	0	1	0	0	InoDriveStudio
0	1	1	0	0	InoDriveStudio
1	0	0	1	1	Instruction channel 2
1	1	0	0	1	SOP-20-880
1	0	1	0	1	InoDriveStudio
1	1	1	0	1	InoDriveStudio

2.6.2.1 SOP-20-880 Local Control

After SOP-20-880 is normally connected to HCU-50/51, after pressing the "Loc/Rem" (local/remote) key of SOP-20-880, the control mode will be switched. The switching is only allowed when the drive is shut down. When "local" is displayed at the bottom left of SOP-20-880, it means that SOP-20-880 has taken control, and the start-stop control of the control channel and the setpoint channel are disabled. To restore the function of the control channel, you need to switch back to remote control on SOP-20-880.

You can use A10-00 to prevent SOP-20-880 from taking control. After local control is disabled, the **Loc/ Rem** button of the SOP-20-880 is unavailable.

When SOP-20-880 local control is allowed, the start/stop command source is the buttons of the SOP-20-880, but the speed setting source can be selected using the parameter A10-01.

- When A10-01 = 0, the speed setpoint is controlled by group C4 (output of motorized potentiometer), and the increase or decrease command of the motorized potentiometer comes from the up and down keys of SOP-20-880.
- When A10-01=1, the speed setpoint still comes from the speed setpoint channel.

When SOP-20-880 is used, you can start and stop the device with the "RUN" and "STOP" keys. For detailed use of SOP-20-880, see SOP-20-880 Smart Operation Panel User Guide.

NOTE

- When the drive module is in operation, the control mode cannot be switched through the "Loc/Rem" key, and the key is ineffective.

2.6.2.2 InoDriveStudio Control

For details, see *"1.2.3.2 Control Panel"* in *""*.

2.6.2.3 Control Channel Control

For details, see *"4.3 Terminal Start/Stop Module"*.

2.6.3 Control Channel and Setpoint Channel

HCU-50/51 has two instruction channels Each channel includes a group of control channels and a group of setpoint channels:

- The control channels set the control instructions of the drive, to control, for example, start or stop, the drive. Groups b0 and b1 are for channel 1 control setting, and groups b2 and b3 are for channel 2 control setting. The control setting mainly include start-stop control word setting.
- The setpoint channels set motor speed and torque commands, and can change the running state of the motor. Groups C0 and C1 correspond to the channel 1 setpoint, and groups C2 and C3 correspond to channel 2 setpoint.

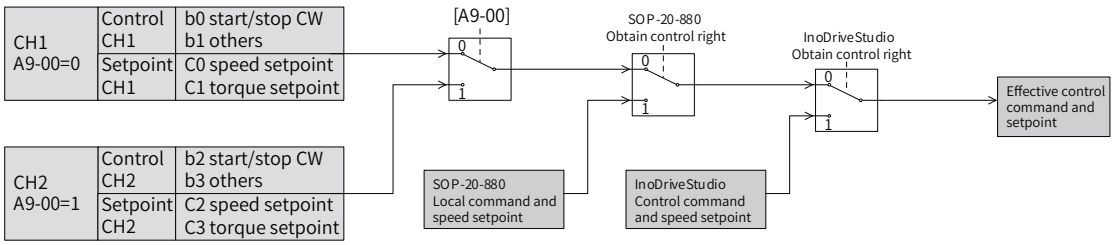


Figure 2-15 Control command data flow diagram

In remote control, you need to set the parameters of the control channel to set start-stop command word and speed/torque.

You can select control channel 1 or 2 to switch between two different control modes, dynamically changing the RUN command source. For example, you can select channel 1 for terminal-based start/stop control and analog speed setting, or select channel 2 for speed setting and start/stop command execution through PLC communication.

You can select the currently activated control channel through A9-00. The parameters in groups b0, b1, C0, and C1 are enabled when channel 1 is selected. The parameters in groups b2, b3, C2, and C3 are enabled when channel 2 is selected. Other parameters in groups b and C are always enabled.

A9-00	b0-00	b0-01~b0-08	Group b1	b2-00	b2-01~b2-08	Group b3	Group b4	U5-44	U5-60
0	0	-	Active	-	-	-	Active	-	-
	1	-	Active	-	-	-	-	Active	-
	2	-	Active	-	-	-	-	-	Active
	3	Active	Active	-	-	-	-	-	-
1	-	-	-	0	-	Active	Active	-	-
	-	-	-	1	-	Active	-	Active	-
	-	-	-	2	-	Active	-	-	Active
	-	-	-	3	Active	Active	-	-	-

2.6.4 Switchover of Control Channels

Local and remote control switching is only allowed when the drive is shut down.

The two groups of control channels of remote control are allowed to switch in any state. In the switched control channel, if the OFF1 command is 0, the drive will stop after switching; If the OFF1 command is 1, the state before the switching is maintained. After the control channel is switched, the drive module state machine jumps as follows:

Table 2-4 State change of control channel switching

State before switching	OFF1 before switching	OFF1 after switching	State after switching
Power-on inhibit	1	0	Power-on preparation
Power-on inhibit	1	1	Power-on inhibit
Power-on preparation	0	0	Power-on preparation
Power-on preparation	0	1	Power-on inhibit
Running	1	0	Power-on preparation
Running	1	1	Running

NOTE

- If the state machine is "ready to switch on" (OFF1=0) before control channel switching, and OFF1 is 1 after switching, the state machine will become switch on inhibited. At this time, OFF1 must be set to 0 again before returning to the "ready to switch on" state.
- When A9-00 command channel selection and start-stop control command are configured as the same DI signal, DI signal is active and the system enters S4 switch on inhibited state.
- Control channel switching can switch the control between two places. For example, after the field operation box channel DI is started, it can be directly switched to the centralized control of PLC, or the equipment operated under the centralized control of PLC can be switched to the field operation box for manual operation.
- The OFF1 command is only allowed in the "ready to switch on" state. For a detailed description of each state of the state machine, see *"4.1.9 State Machine 104"*.

2.7 Motor Data Set

2.7.1 Multi-Motor Data Set Switchover

The HCU-50/51 can store a maximum of four different motor data groups. Each group contains motor parameters (parameters in group d) and corresponding motor control parameters (parameters in group E).

You can switch the currently activated motor data group using the parameters A9-01 and A9-02. Switching the motor data set is only allowed in the shutdown state.

Para. No.	Name	Description
A9-01	Motor data set selection 0 source	Bit1 Bit0: 00: group 1 motor parameters 01: group 2 motor parameters 10: group 3 motor parameters 11: group 4 motor parameters
A9-02	Motor data set selection 1 source	

Groups d and E display the parameter values of the currently activated motor data group. The communication addresses of parameters vary with different motor data groups.

The communication addresses of the parameters with the same function in the four motor data groups are sorted in the ascending order. The communication addresses in this document belong to the first group, and the communication addresses of the other groups must be calculated manually. The rated motor current is used as an example.

Para. No.	Name	Current Range (A)	Change Level	Default	Communication Address
d0-03	Rated motor current	0.1~6553.5	Change after stop.	9.0	245

In the preceding table:

- The communication address of the rated current parameter of motor 1 is 245.

The communication addresses of the corresponding parameters of motors 2, 3, and 4 are as follows:

- The communication address of the rated current parameter of motor 2 is 246.
- The communication address of the rated current parameter of motor 3 is 247.
- The communication address of the rated current parameter of motor 4 is 248.

NOTE

- You can use motor data groups to enable an AC drive to drive different motors or enable a motor to operate in different control modes.
- After you switch to a different motor data group, check that the motor control parameters correspond to the motor parameters.
- If a drive module drives different motors, it is necessary to identify the motor parameters of each motor in the commissioning stage.

2.7.2 Multi-Motor Data view

2.7. 2.1 Viewing and Setting with SOP-20-880

When using SOP-20-880 to view different motor data, you need to switch the currently activated motor data group through A9-01/A9-02. After switching, the parameters corresponding to the currently activated motor can be viewed in Group d and Group E.

2.7.2.2 Quick View with InoDriveStudio

When using InoDriveStudio, you can view the currently active motor parameters in the same way as SOP-20-880; You can also view all motor parameters through "Inverter" → "Parameter list" → "Motor data set". As shown in the following figure, all parameters related to motor switching are displayed in the list. When different motors are selected in "Select Data Set", all the parameters in the list will be switched to correspond to the selected motor.

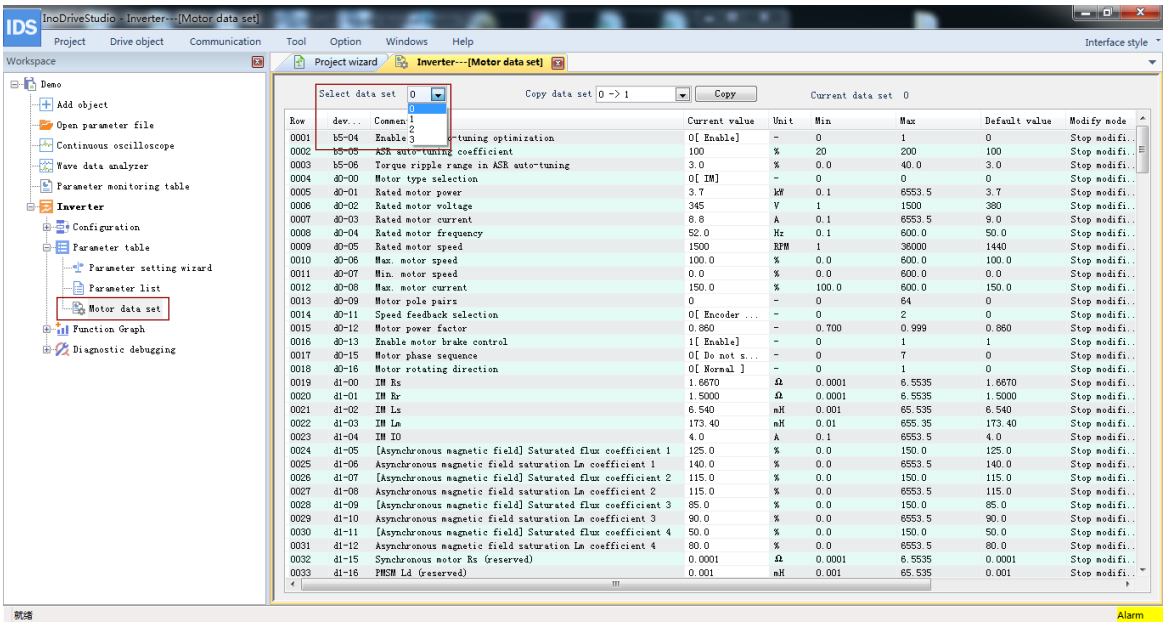


Figure 2-16 Quick viewing motor parameters

2.7.3 Motor Data Set and Motor Control Data Set

The motor data set (Group d) and motor control data set (group E) both have 4 different communication addresses and are switched simultaneously according to the settings of A9-01/A9-02. In applications, both can be regarded as the motor data set.

The difference between them is that when the factory value is partially restored (A8-00 = 1), the group d parameters are not restored, while group E parameters are restored.

2.7.4 Duplicating Motor Data Set

If you need two groups of identical motor parameters, you can select "Inverter" → "Parameter list" → "Motor data set" in InoDriveStudio to open the motor data set, select the duplicate mode through "Duplicate data set", and click the "Duplicate" button, as shown in the following figure.

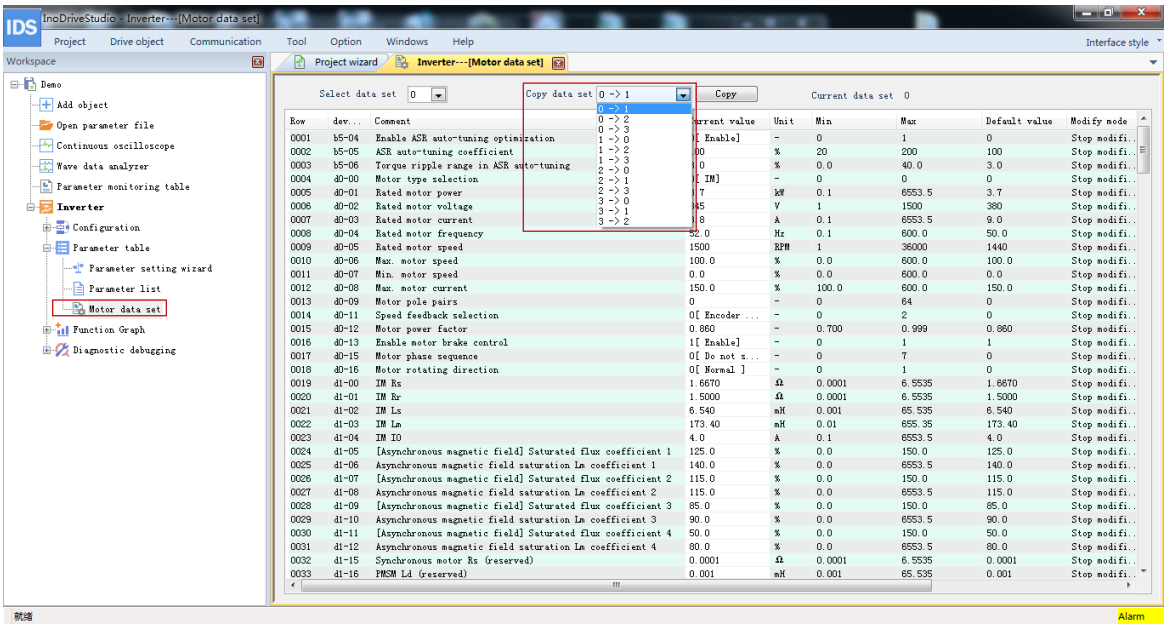


Figure 2-17 Duplicating motor data set

NOTE

◆ In the "Duplicate data set" drop-down list, numbers 0–3 correspond to motor parameter groups 1–4 respectively.



3 Quick Commissioning

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3 Quick Commissioning

This section mainly introduces the basic commissioning steps of MD880-50/MD880-01S series products, including instructions for power-on, trial operation and commissioning of the drive module. If you use Inovance HE200-011 series AC drives, see *"3.3.5 HE200-011 Rectifier Parameters Configuration"* for the details on the power supply module.

Figure 1-1 shows the system commissioning flowchart.

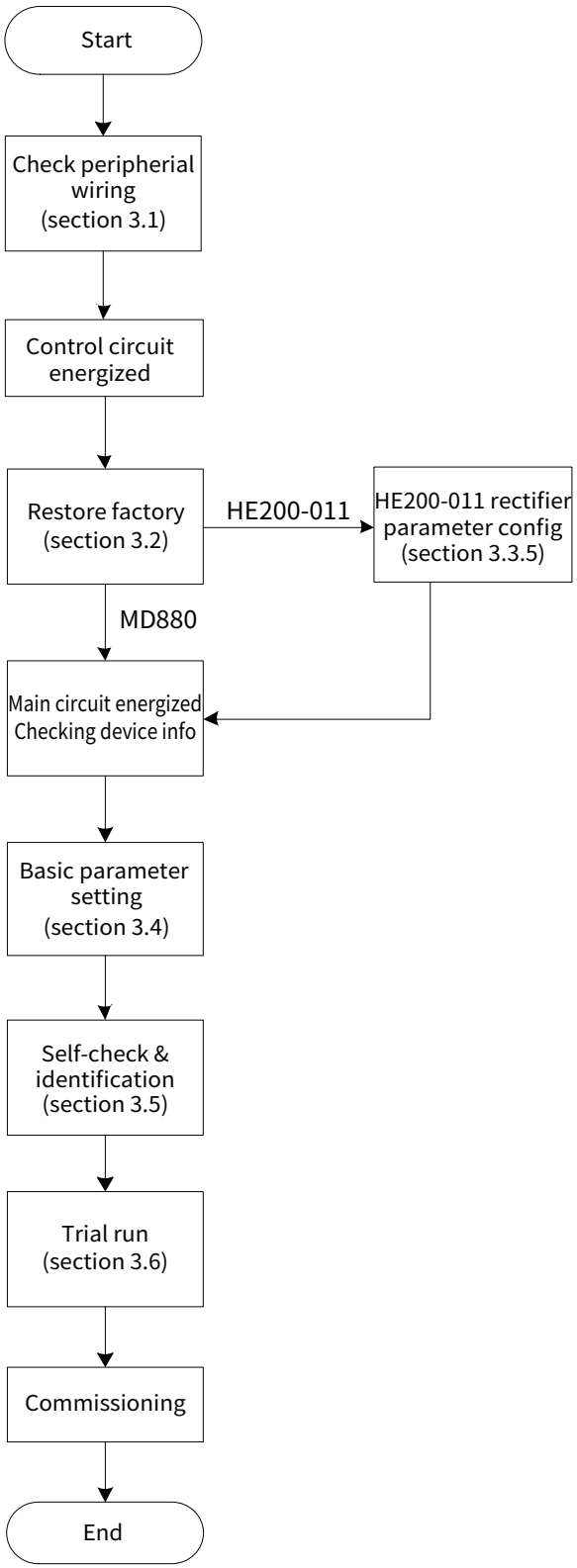


Figure 3-1 Commissioning flowchart for initial power-on

NOTE

◆ The above system power-on commissioning process includes the basic steps for normal use of MD880 series products. You should carefully read the relevant sections and follow the commissioning steps.

3.1 Inspection of Peripheral Wiring

Before you perform power-on commissioning of the control system, ensure that all power-on preparations are completed and check against Table 1-1.

Table 3-1 Items to be checked before running

No.	Check That	Compliance	Completed or Not
1	The power input of the main circuit is correctly connected based on terminal labels (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 input terminals (R, S, and T) and output terminals (U, V, and W) of the main circuit are correctly connected. For example, the power input cable is not connected to the output end.	☐	☐
4	The AC drive and motor are reliably grounded.	☐	☐
5	The encoder is correctly connected and the shield layer is correct.	☐	☐
6	The power input of the auxiliary circuit is correctly connected based on terminal labels (L1, L2, L3, and N).	☐	☐
7	Communication cables are correctly connected.	☐	☐
8	External interfaces such as I/O interfaces are correctly connected.	☐	☐

NOTE

◆ See the operating instructions of each encoder module for encoder wire connection and shielding layer treatment.

3.2 Restoring Factory Settings

Restore default settings after the control circuit is powered on for the first time. The restoration needs to be carried out in two steps, and the relevant parameters are as follows:

1) A8-00 = 2, to restore all parameters to factory values

2) A8-01 = 1, to confirm the operation

After the preceding parameters are executed, the A0-00 state machine is changed to the S20 parameter restoration state machine. Then this state machine is exited after default settings are restored.

NOTE

◆ For details, see *"2.2.1 Restoring Factory Settings"*.

3.3 Inspection and Setup of Power Module

3.3.1 Parameter Setting for Single and Parallel Modules

Item	Para. No.	Description	Remarks
1	A15-00	Parallel function selection	0: Single 1: Parallel
2	A15-01	HPCU online flag	0: Offline 1: Online Read only
3	A15-02	Parallel module enable 1	Ones to ten thousands correspond to the enabling of modules 1 to 5 0: Disabled 1: Enabled
4	A15-03	Parallel module enable 2	Ones to ten thousands correspond to the enabling of modules 6 to 10 0: Disabled 1: Enabled
5	A15-04	Enabled parallel modules	Read-only After A15-02 and A15-03 is set, the number is automatically calculated
6	A15-05	Parallel module online display 1	Read-only
7	A15-06	Parallel module online display 2	Read-only
8	A15-07	Online parallel modules	0~10
9	A15-66	HINT module monitoring selection	Monitoring module 1–10
10	A15-67	HINT module ID	Read-only
11	A15-68	HINT software version	Read-only
12	A15-94	DI/DO status of HINT module	Meaning of HINT module DI/DO status bits bit00：DO1 bit01：DO2 bit02：DO3 bit03：DO4 bit04：DI1 bit05：DI2 bit06：DI3 bit07：DI4 bit08：DI5 bit09：DI6 bit10–bit15: Reserved HE200 series: complete correspondence MD880-50 series: KIN1 corresponds to DI4; KIN2 corresponds to DI5; KOUT corresponds to DO3 DI=1 means the feedback point is open and DI=0 means the feedback point is closed DO=1 means that the output is normal, and DO=0 means that the output is inverted


NOTE

- For the parallel module enable setting, the parallel modules 1-10 correspond to CH1-CH10 on the HPCU.
- Taking the paralleling of two drive modules as an example, the power module is connected to CH1 and CH2 of HPCU:
  ① Set A15-00=1 to enable parallel mode.
  ② Set A15-02=00011 and A15-03=00000 to enable the CH1 and CH2 ports.
- The display of A15-67, A15-68, A15-94 corresponds to the monitoring module selected by A15-66.
- The connector for A15-94 is U7-80.

After the parameter setting is completed, check whether the following read-only parameters: A15-04 to A15-07 are consistent with the actual situation.

3.3.2 Device Information Check

The device information check parameters are shown in the following table.

Para. No.	Name	Description
A2-00	Product type	Displays current device type 0: Diode rectifier 1: Basic rectifier 2: Inverter 3: Regenerative rectifier 4: 3-phase braking 5:DC-DC
A2-01	Module rated power	Displays the rated power of a single module
A2-02	Module rated voltage	Displays module rated voltage
A2-03	Module rated current	Displays module rated Current
A2-04	Total rated device power	Displays total rated power of parallel modules
A2-05	Total rated device current	Displays total rated current of parallel modules
A2-08	HCU-DSP function software version	-
A2-09	HCU-DSP function software subversion	-
A2-10	HCU-DSP performance software version	-
A2-11	HCU-DSP performance software subversion	-
A2-16	HCU-FPGA software version	-
A2-19	HINT software version	-
A2-22	HPCU software version	-


NOTE

- If the rated power, rated voltage, rated current and other information of the power module are inconsistent with the information of the module nameplate, please contact the service personnel.

3.3.3 Pre-charge Resistor Detection

1) When MD880-50 series products are not equipped with a DC pre-charge unit, set A4-11=0 to turn off power-on pre-charge detection.

2) When MD880-50 series products are equipped with a DC pre-charge unit, it is necessary to check the wiring of the unit. (See relevant sections in MD880-50 Series Inverter Hardware User Guide to determine the model of the external power supply) and ensure that A4-11=1 (the detection function is enabled by default). When the feedback signal of the pre-charge contactor is not detected within a period of time after the bus is energized, "ERR82-1 DC pre-charge abnormality" will be reported.

3) For MD880-01S series products, when the feedback signal of the pre-charge contactor is not detected within a period of time after the bus is energized, "ERR73-3 pre-charge contactor feedback abnormality (single drive)" will be reported. At this time, it is necessary to check the DC pre-charge

circuit inside the drive.

4) For HE200-011 series products, you need to set A4-11=0 to turn off the power-on pre-charge detection function.

3.3.4 Load Mode Setting

According to the load characteristics, set A4-21 properly. The load characteristic curve is used for overload protection of power modules to avoid local temperature rise caused by continuous overload and protect power devices from long-term reliable operation.

The load mode should match the hardware design.

MD880-50 factory defaults to heavy overload mode. For working conditions with short-term overload demand, choosing heavy-load mode can improve the short-term maximum output current of power module. The typical application of heavy load mode is that the load runs at heavy load current for a long time for not less than 240 seconds, and then continuously overloads at 1.5 times heavy load current for not more than 60 seconds.

For applications with long-term stable load, light load mode is favorable to make full use of the output capability of the power module.

For more description of load modes, see the relevant sections in the MD880-50 Series Inverter Hardware User Guide.

3.3.5 HE200-011 Rectifier Parameters Configuration

For HE200-011 rectifier parameters, see "A14 HE200 Rectifier Parameters" in *"5.2 Function Parameter Table"*.

3.3.5.1 Setting the rectifier Operation Mode

For HE200 series devices, HCU needs to control the operation of both rectifier and inverter. There are two types of HE200 series devices: single module and two parallel modules. According to the device type, the relevant parameters of rectification mode are set.

Device Type	Para. No.	Name	Setpoint
Single	A14-36	HINT expansion card selection	0: Single-HINT expansion card 1 is active
	A14-37	HINT expansion card 1 slot selection	Depending on to the actual setting
Two parallel modules	A14-36	HINT expansion card selection	1: Parallel-HINT expansion card 1\2 are active
	A14-37	HINT expansion card 1 slot selection	Depending on to the actual setting
	A14-38	HINT expansion card 2 slot selection	Depending on to the actual setting

Set the parameters A14-00 and A14-01 to monitor the online status of the rectifier module.

3.3.5.2 Setting the Source of Switch-on/off Commands

Para. No.	Name	Description
A14-41	Rectifier switch-on/off command source selection	0: Cabinet door 1: Reserved 2: DI1 3: DI2 4: DI3 5: DI4 6: DI5 7: DI6 8: DIL 9: HDI1 10: HDI2 Other: B-CON

A14-41 sets rectifier switch-on/off command source selection:

- When A14-41 is set to 0 (cabinet door), the switch-on/off of the rectifier is controlled by the cabinet door button. The rising edge of the start button (green) triggers the start command, and the rising edge of the switch-off button (red) triggers switch-off.
- When A14-41 is set to other, the start button and the switch-off button on the cabinet door do not work. The start-stop of the rectifier can be controlled through DI terminal of HCU or communication. The rising edge of the selected signal source A14-41 triggers the start command. After start, the signal must be kept at high level. The rectifier switches off at low level.

Set the parameters A14-20, A14-21 to monitor the status of the rectifier modules 1/2.

Para. No.	Name	Description
A14-20	Power-on status of rectifier unit 1	0: Wait for power-on 1: Pre-charge power-on 2: Wait for completion 3: Power-on completed
A14-21	Power-on status of rectifier unit 2	0: Wait for power-on 1: Pre-charge power-on 2: Wait for completion 3: Power-on completed

NOTE

◆ No matter what control command source A14-41 sets, rectifier will switch-off when the following faults occur. The faults include: rectifier module overtemperature, bus overvoltage, rectifier slot number conflict, rectifier wire breakage, charging timeout and abnormal feedback of main circuit breaker.

3.4 Setting of Basic Parameters

3.4.1 Setting of Basic Motor Parameters

The motor parameters must be input based on the rated parameters under the S1 duty displayed on the motor nameplate.

Item	Para. No.	Name	Description
1	d0-00	Motor type selection	Selects motor type

Item	Para. No.	Name	Description
2	d0-01	Rated motor power	Sets rated motor power
3	d0-02	Rated motor voltage	Set rated motor voltage
4	d0-03	Rated motor current	Sets rated motor current. For grouped drive motors, the sum of the output currents of all motors needs to be calculated
5	d0-04	Rated motor frequency	Sets the rated motor frequency, which should correspond to the rated motor voltage
6	d0-05	Rated motor speed	For a synchronous motor, this speed is the speed of the rotor, rather than synchronous speed
7	d0-06	Max. motor speed	Maximum motor speed, which is set based on a percentage of the rated synchronous speed of the motor and depends on the settings of E2-04 to E2-07. See functional diagram H312.
8	d0-07	Min. motor speed	Minimum motor speed. This parameter is not required by the motors that do not support. low-speed operation.
9	d0-08	Max. motor current	Maximum motor current, which is set based on a percentage of the rated motor current
10	d0-09	Number of motor pole pairs	If the number < = 12, it is automatically calculated by the drive module; if the number is greater than 12, it must be set manually
11	d0-11	Speed feedback selection	0: Encoder feedback signal comes from PG card 1 set by group n4
12	d0-12	Motor power factor	The motor power factor is set based on the nameplate

3.4.2 Encoder Configuration

HCU supports up to 3 encoder detection modules, which are configured in N4/N5/N6 respectively. Take the encoder detection module 1 as an example, the setting of n4 group parameters is as follows.

Item	Para. No.	Name	Description
1	n4-00	Expansion slot selection	Set according to the used encoder module slots
2	n4-02	Encoder type	Sets encoder detection module type
3	n4-01	Module online status	When N4-00 and N4-02 are set correctly, "Online" should be displayed here; Otherwise, you should check hardware problems or setup errors
4	n4-03	Input A/ B phase sequence	Sets the input AB phase sequence, corresponding to the incremental encoder. If the detection speed is opposite to the actual situation, this parameter can be changed.
5	n4-04	Speed test mode	Usually, A pulse speed measurement should be used; When the low-speed response is required, you can try to choose quadruple frequency to measure the speed. But if the encoder signal is not favorable, fluctuation can easily occur
6	n4-07	Encoder resolution (pulses/ revolutions)	Follow the encoder nameplate to set the pulses per revolution for the incremental encoder
7	n4-08	PG quadrature interlock	To improve the anti-interference capability of the incremental encoder, it should be set to 1 (enabled)

Item	Para. No.	Name	Description
8	n4-10	Wire breakage inspection mode for ABZ encoder	Tests the wiring of the incremental encoder. Set it according to the actual wiring of the encoder. For example, for any A/B signal encoder, 4 (AB single-ended positive signal) should be selected, and the encoder line should be connected to the A/B terminal of the detection module; If the wiring is wrong, or 2 (AB differential signal) is selected, an encoder wire breakage may occur.
9	n4-11	Speed feedback PG wire breakage detection time	Sets a delay before an encoder wire breakage error is reported. Set it to 0 to disable encoder wire breakage detection
10	n4-17	Filter time of encoder speed test	Is usually 4ms (the default value), which can filter out certain signal interference and maintain fast response.

3.4.3 Basic Control Parameters

3.4.3.1 Selection of Motor Control Modes

Para. No.	Name	Description	Application
E0-00	Control Mode	0: SVC Speed sensorless vector control	Refers to open-loop vector control, which is suitable for common high-performance control applications.
		1: FVC Speed sensor vector control	Refers to closed-loop vector control. Encoder must be installed on the motor side. MD880-50 supports ABZ encoder and resolver. It is suitable for high-precision speed control and torque control.
		2: VF Speed open-loop control	It is suitable for applications where the requirements for load control performance are not high, or one drive module drives multiple motors, such as fan and pump loads.

3.4.3.2 Selection of Motor Control Mode

Para. No.	Name	Description
E0-01	Control mode	0: Speed control
		1: Torque control

NOTE

- During VF control, only speed control is supported.
- If it is torque control mode under normal working conditions, it is necessary to set the control mode as speed control mode when motor parameter identification is carried out for initial commissioning; After the motor parameter identification is completed, set the mode back to torque control mode.

3.4.4 Motor Parameter Auto Calculation

MD880-50 supports automatic calculation of motor parameters. Before commissioning, motor parameters can be calculated first, and relevant identified motor parameters can be adjusted to empirical values converted according to motor parameters.

Steps:

1) Set b5-02=1 to select motor parameter calculation.

2) Set b5-03=1 to confirm.

3) After the automatic calculation of motor parameters is completed, the following parameters will be updated.

Para. No.	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
E1-02	Pre-excitation time
E1-13	Demagnetization time
E7-04	Speed tracking time

3.5 Self-check and Identification

Before the motor is self-checked and identified, check the following:

1) Whether there is any construction;

2) Whether there are obstacles around the motor shaft that affect the rotation of the shaft;

3) Whether the motor has a brake, and if yes, force it to open;

4) Whether the motor fan is normal;

5) If the motor is connected to the drive, check if the drive is ready for operation, for example, if lubrication is required.

When self-check and identification are carried out, send a switch-on command to start. The source of the switch-on command during identification is the same as that of the start-stop command during normal operation. Under normal circumstances, self-check and identification can be started and stopped by local control. For details, see *"2.6 Command Channel and Local Control"*.

This section illustrates commissioning using SOP-20-880 as an example. The commissioning with InoDriveStudio is basically the same. Moreover, the "Control Panel" and "Commissioning Wizard" functions provided by the software make commissioning easier.

Before using SOP-20-880, ensure that SOP-20-880 has taken control. "Local" is supposed to display at the bottom left of the screen. Press the "Loc/Rem" button of SOP-20-880 to switch between local and remote control. For details, see *"2.6 Command Channel and Local Control"*.

3.5.1 System Self-check

It is recommended that system self-check be performed when the AC drive is used for the first time to check whether internal and external wiring is correct.

Setting in the power-on preparation state:

1) Check that SOP-20-880 has taken control;

2) Check that the drive is fault-free and is ready to switch on;

3) Set b5 to 1 to bring the drive into the ready to self-check state;

4) Press the green RUN key to let the drive enter the self-check state and output current. The AC drive enters the S4 power-on block state after self-check. The AC drive enters the S5 power-on preparation state after the RUN command is canceled.

The jump flow of the state machine in the self-test process is as follows:

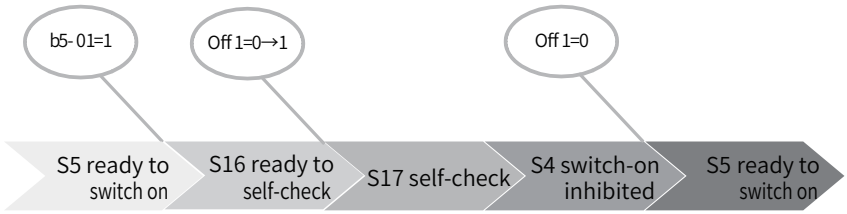


Figure 3-2 Motor self-check state machine change

3.5.2 Motor Identification

You can obtain parameters of the controlled motor through motor identification. Motor identification methods are asynchronous motor static auto-tunning and asynchronous motor no-load complete auto-tuning. Asynchronous motor static identification is applicable when the motor carries loads but cannot rotate. Asynchronous motor no-load complete auto-tuning is applicable when the motor carries no load and can rotate.

Setting in the power-on preparation state:

1) Check that SOP-20-880 has taken control;

2) Check that the drive is fault-free and is ready to switch on;

3) b5-00 motor identification command: No-load identification (b5-00= 2) is recommended for obtaining more accurate motor parameters when the motor can be disconnected from loads and can rotate freely. After parameter b5.00 is set, the AC drive enters the S18 identification preparation state;

4) After a RUN command is sent, the AC drive enters the S19 identification state and outputs current. The motor exits the static state and starts rotating until identification is completed. Then the motor becomes static again. The AC drive enters the S4 power-on block state. The AC drive enters the S5 power-on preparation state after the RUN command is canceled.

The jump flow of the identification process state machine is as follows:



Figure 3-3 Trend graph of the motor identification state machine

After the identification is completed, the motor identification parameters will be automatically saved into the corresponding parameters. The identification parameters of different identification methods are not exactly the same, and the correspondence is shown in the table.

Table 3-2 Motor identification table

Para. No.	Name	b5-00=1	b5-00=2	b5-00=5<2>
d1-00	Asynchronous motor stator resistance	√	√	—
d1-01	Asynchronous motor rotor resistance	√	√	—
d1-02	Asynchronous motor leakage inductance	√	√	—
d1-03	Asynchronous motor mutual inductance	—	√ <3>	—
d1-04	Asynchronous motor no-load current	—	√ <3>	—

Para. No.	Name	b5-00=1	b5-00=2	b5-00=5<2>
d1-05	[Asynchronous magnetic field] Saturated flux coefficient 1	—	√	—
d1-06	Asynchronous magnetic field saturation mutual inductance coefficient 1	—	√	—
d1-07	[Asynchronous magnetic field] Saturated flux coefficient 2	—	√	—
d1-08	Asynchronous magnetic field saturation mutual inductance coefficient 2	—	√	—
d1-09	[Asynchronous magnetic field] Saturated flux coefficient 3	—	√	—
d1-10	Asynchronous magnetic field saturation mutual inductance coefficient 3	—	√	—
d1-11	[Asynchronous magnetic field] Saturated flux coefficient 4	—	√	—
d1-12	Asynchronous magnetic field saturation mutual inductance coefficient 4	—	√	—
n4-03 n5-03<1> n6-03	Input A/B phase sequence	—	√	—
d2-02	Inertia ratio	—	√	√
d2-00	Inertia	—	√	√
d2-05	Electromechanical time constant	—	√	√
d2-03	Friction torque	—	√	√
E1-02	Pre-excitation time	√	√	—
E1-13	Demagnetization time	√	√	—
E7-04	Speed tracking time	√	√	—
E4-02	FVC speed loop Kp	—	√	√
E4-03	FVC speed loop Ti	—	√	√
E4-04	SVC speed loop Kp	—	√	√
E4-05	SVC speed loop Ti	—	√	√

NOTE

- < 1 >: If the encoder detection module corresponding to D0-11 is enabled, the corresponding encoder phase sequence will be detected, and the detection result will be written into n4-03/n5-03/n6-03.
- < 2 >: Inertia identification will only be carried out in FVC or SVC;
- < 3 >: During rotation identification (b5-00=2), more accurate mutual inductance and no-load current of the motor can be obtained, and the magnetic field saturation coefficient of the asynchronous motor can be identified at the same time to improve the torque control accuracy.

When b5-00=2 (asynchronous motor no-load complete identification), the motor will rotate at high speed. E ensure that it is carried out under the conditions permitted by mechanical safety. At the same time, ensure that the load torque of the motor at constant speed is close to no load as much as possible. The smaller the load, the more accurate the identification result. Excessive load may cause overload or overcurrent failure of the drive. You can set parameters b5-02 and b5-03 for automatic calculation of motor parameters and then perform static identification by setting b5-00 to 1 to obtain more accurate motor parameters.

NOTE

- Compared with b5-00=2 no-load identification, parameters such as saturation coefficient and inertia of motor magnetic field cannot be obtained by automatic calculation of motor parameters combined with static identification of asynchronous motor. Therefore, when the conditions are met, no-load complete identification can obtain more accurate parameters.

3.5.3 Speed Controller Parameter Auto Calculation

When the moment of inertia cannot be identified, the user can also manually input the inertia of the load, and the control module can automatically calculate the appropriate speed controller control parameters. The speed controller parameter calculation is carried out in the following three steps:

1) Manually adjust D2-02 to obtain the correct inertia value in D2-00;
2) Set b5-02= 2 to select speed controller parameter calculation;
3) Set b5-03= 1 to confirm b5-02 speed controller parameter calculation.

The calculation of speed controller parameters can only be triggered in the shutdown state. After the automatic calculation of speed controller parameters is completed, the following parameters will be updated.

Para. No.	Name
E4-02	FVC speed controller Kp
E4-03	FVC speed controller Ti
E4-04	SVC speed controller Kp
E4-05	SVC speed controller Ti

NOTE

- d2-00 represents the moment of inertia J of the motor in kg · m^2, which should be distinguished from the flywheel torque GD2 commonly used in engineering. The conversion relationship between them is J=GD2/4g.
- d2-05 is the electromechanical time constant of mechanical systems commonly used in engineering, which indicates the time required for a standstill motor to accelerate to rated speed at rated torque, in seconds. For the same motor, the electromechanical time constant has a fixed proportional relationship with the moment of inertia, which can be adjusted by the d2-02.

3.6 Trial Run

3.6.1 Local Control and Default Terminal Start Device

It is recommended to use InoDriveStudio control panel or SOP-20-880. For details, see *"1.2 Introduction to InoDriveStudio"* and SOP-20-880 Smart Operation Panel User Guide. The motor control method is V/F, and the control mode is speed control. Default configuration is kept for the speed setpoint and ramp. Before trial run, check the related parameters shown in the following table.

Table 3-3 Using InoDriveStudio or SOP-20-880 to check parameters

Para. No.	Name	Setpoint (default)	Description
A9-00	Command channel selection source	0	Selects channel 1
A9-01	Motor data set selection 0 source	0	Selects motor parameter set 1
A9-02	Motor data set selection 1 source	0	
E0-00	Control Mode	2	VF control mode
E0-01	Control mode	0	Speed control
E1-00	Startup mode	0	Direct start
E1-14	OFF1 stop mode	1	Decelerate to stop
E3-00	V/F mode selection	0	VF curve
E3-01	V/F curve selection	0	Linear VF
C7-02	RFG ramp selection 1	0	Selection ramp 1 acc./dec. time
C7-03	RFG ramp selection 2	0	
C7-04	Ramp 1 acceleration time	20	Ramp 1 acceleration time 20s
C7-05	Ramp 1 deceleration time	20	Ramp 1 deceleration time 20s

When using the default terminal start-stop mode, check the following parameters on the basis of the parameters in Table 3-3:

Table 3-4 Operation check parameters of default terminal start-stop mode

Para. No.	Name	Setpoint	Description
b0-00	Start/stop control word source	0	Selects terminal start/stop module
b4-02	Terminal start/stop command 1/2 selection	0	Selects terminal start/stop command 1
b4-03	Terminal start/stop command 1 mode	1	Selects IN1 start mode
b4-05	Terminal start/stop command 1 input	2	Selects DI1 as the command source
C0-00	Speed control main setpoint selection	1	Selects multi-step setpoint 1 as the speed setpoint
C6-05	Multi-step setpoint 1	Sets speed value	-

When the DI1 state changes from the rising edge of 01, the device starts and the standstill motor accelerates to the speed set by C6-05. For detailed settings for terminal start and stop, see *"4.3 Terminal Start/Stop Module"*.

3.6.2 Starting a Device with DI and AI

Digital quantity can be used as the command source for starting and stopping a device, and analog quantity can be used as the speed setpoint to start the device. For example, DI1 is used as the start command, DI2 is used as the fast stop command, DI3 is used as the fault reset command, AI1 is used as the speed setpoint, and the parameters in Table 3-5 are set on the basis of Table 3-3:

Table 3-5 Example

Para. No.	Name	Setpoint	Description
b0-00	Start/stop control word source	3	Custom start/stop control word
b0-01	Custom OFF1 source 1	2	Selects DI1 as the OFF1 command source

Para. No.	Name	Setpoint	Description
b0-03	Custom OFF3 source 1	3	Selects DI2 as the OFF3 command source
b0-04	Custom running permission source	1	Running permitted
b0-05	Custom fault reset source 1	4	Selects DI3 as the fault reset command source
C0-00	Speed control main setpoint selection	2	Selects AI1 as the speed setpoint source

3.6.3 Starting a Device with Fieldbus

This section only describes the source of start, stop and reset commands for the device through the fieldbus and the setpoint source. See Table 3-3 or *"4.6 Vector Control""4.7 VF Control"* for the control mode and operation mode of the motor.

There are two ways to start the device through the fieldbus:

3.6.3.1 Pre-configuration Method

When the preset value configuration mode is used, the command sources such as OFF1 and OFF2 of the device are all from the fieldbus process data PZD1, and the configuration is as follows:

Table 3-6 Start a device command source table use a fieldbus preconfiguration mode

Command	Commnand Source
OFF1	PZD1.0
OFF2	PZD1.1
OFF3	PZD1.2
Running enable source	PZD1.3
Fault reset source	PZD1.7
JOG 1 source	PZD1.8
JOG 2 source	PZD1.9
Remote control request must be 1	PZD1.10
Speed negation source	PZD1.11

The preconfiguration mode only sets the command source, and the setpoint needs to be set separately. The setpoint can come from multi-step values, analog quantities, and communication. For detailed settings, see "".

3.6.3.2 User-defined Method

If you use the user-defined method, you must set a data exchange protocol for the host computer system first, and parameters are set according to the protocol. In the following example, the fieldbus adapter A is configured as a PROFIBUS DP bus to start the device.

■ The data exchange protocol between MD880-50 and the host computer system is:

Word	Description	Remarks
PZD1	Control word	See Table 3-7 for details
PZD2	Speed setpoint	Speed ramp is set by PLC 4096 represents the 100% rated motor frequency

Table 3-7 Control word definition

Bit	Definition
bit0	0: Stop 1: Switch-on start 01 → 1 rising edge start

Bit	Definition
bit1	0: Coast to stop 1: Operational requirements
bit2	0: Quick stop 1: Operational requirements
bit3	0: Output inhibit 1: Operation enable
bit4	0: Ramp output disable 1: Ramp output enable
bit5	0: Ramp halt enable 1: Ramp halt disable
bit6	0: Setting ramp setpoint to 0 enabled 1: Setting ramp setpoint to 0 disabled
bit7	0: Disabled 1: 0 → 1 Fault reset enabled
bit8-9	Reserved
bit10	0: PZD data enabled 1: PZD data disabled
bit11-15	Reserved

Data sent to host computer system:

Word	Description	Remarks
PZD1	Status word 1	See Table 3-8 for details
PZD2	DC bus voltage	For base value calibration, see "4.9 Communication Module" One decimal place, where 1000 represents a voltage of 100.0 V

Table 3-8 Status word definition

Bit	Definition
bit0	0: Not ready to switch on 1: Ready to switch on
bit1	0: Not ready for operation 1: Ready for operation
bit2	0: Not operating 1: Operating
bit3	0: No fault 1: Fault activated
bit4-6	Reserved
bit7	0: No alarm 1: Alarm activated
bit8-15	Reserved

■ Parameter Configuration

1) Bus Adapter PROFIBUS DP Configuration:

Para. No.	Name	Setpoint	Description
n1-00	Bus type of bus adapter	7	Defines bus adapter A as Profibus-DP
n1-01	Comm. wire breakage detection delay	1.00	Report comm. Error after comm. Interrupt 1
n1-02	Bus adapter comm. mode selection	0[standard]	Detects bus adapter communication error

Para. No.	Name	Setpoint	Description
n1-03	Continuous CRC error detection setting	0	The bus adapter receives data without CRC check
n1-04	Process data output 1	U5-86 (1586)	Configures the status word using the bit-to-word function module 1
n1-05	Process data output 2	U5-05 (1505)	U5-05 is DC bus voltage (100 ms filter)
n1-20	Comm. base value of process data output 1	0	No base conversion required
n1-21	Comm. base value of process data output 2	0	No base conversion required
n1-36	[Process data input 1] Comm. base value	0	No base conversion required
n1-37	[Process data input 2] Comm. base value	0	No base conversion required
n16-00	Expansion slot selection	7	The PROFIBUS DP communication module is in expansion slot 3_1
n16-02	Ext. module Node-ID	45	Set the PROFIBUS DP address to 45
n16-10	DP data check bit	0	Set the data check bit of PROFIBUS-DP to PZD1.bit10, that is, the communication data is considered valid only when bit10 in PZD1 received by HCU is 1

2) PZD1 control word configuration:

Para. No.	Name	Setpoint	Description
b0-00	Start/stop control word source	3	User-defined start/stop control word (set by b0)
b0-01	User-defined OFF1 source	U2-00 (1200)	Selects bus adapter A.PZD1.0 as the OFF1 command source
b0-02	User-defined OFF2 source 1	U2-01 (1201)	Selects bus adapter A.PZD1.1 as the OFF2 command source
b0-03	User-defined OFF3 source 1	U2-02 (1202)	Selects bus adapter A.PZD1.2 as the OFF3 command source
b0-04	User-defined running permission source	U2-03 (1203)	Selects bus adapter A.PZD1.3 as the run enable command source
b0-05	User-defined fault reset source 1	U2-07 (1207)	Selects bus adapter A.PZD1.7 as fault reset command source
b1-06	RFG prohibition source	U2-04 (1204)	Selects bus adapter A.PZD1.4 as ramp output enable command source
b1-07	RFG pause source	U2-05 (1205)	Selects bus adapter A.PZD1.5 as the ramp halt command source
b1-08	RFG setpoint to 0 source	U2-06 (1206)	Selects bus adapter A.PZD1.6 as the ramp setpoint to 0 command source
n16-10	DP data check bit	U2-10 (1210)	Selects bus adapter A.PZD1.10 as the DP data check bit command source

3) Speed setpoint setting:

Para. No.	Name	Setpoint	Description
A9-00	Command channel selection source	0	Selects command channel 1
C0-00	Speed control main setpoint selection	U5-45 (1545)	Selects bus adapter A.PZD2 as the speed setpoint source

4) Bit-to-word conversion 1 output

Para. No.	Name	Setpoint	Description
L0-10	Bit-to-word conversion 1-Bit00 selection	U1-00 (1100)	Ready to switch on
L0-11	Bit-to-word conversion 1-Bit01 selection	U1-01 (1101)	Ready to run
L0-12	Bit-to-word conversion 1-Bit02 selection	U1-02 (1102)	Running
L0-13	Bit-to-word conversion 1-Bit03 selection	U1-03 (1103)	Fault activated
L0-14	Bit-to-word conversion 1-Bit04 selection	0	-
L0-15	Bit-to-word conversion 1-Bit05 selection	0	-
L0-16	Bit-to-word conversion 1-Bit06 selection	0	-
L0-17	Bit-to-word conversion 1-Bit07 selection	U1-07 (1107)	Alarm/Minor fault activated
L0-18	Bit-to-word conversion 1-Bit08 selection	0	-
L0-19	Bit-to-word conversion 1-Bit09 selection	0	-
L0-20	Bit-to-word conversion 1-Bit10 selection	0	-
L0-21	Bit-to-word conversion 1-Bit11 selection	0	-
L0-22	Bit-to-word conversion 1-Bit12 selection	0	-
L0-23	Bit-to-word conversion 1-Bit13 selection	0	-
L0-24	Bit-to-word conversion 1-Bit14 selection	0	-
L0-25	Bit-to-word conversion 1-Bit15 selection	0	-

3.6.4 Control through Modbus (Mailbox Data)

3.6.4.1 Continuous Address Control

Due to the limited number of special communication addresses provided in the HCU, Modbus RTU and Modbus TCP support the write operation of process data n1-68 to n1-83 (n2-68 to n2-83). The process data is converted to connectors U5-44 to U5-59 (U5-60 to U5-75) through communication base values of n1-36 to n1-51 (n2-36 to n2-51).

■ Bus adapter A:

Communication Address	Write parameter	Name	Description
33807	n1-68	[Process data input 1] Data display	Written through Modbus communication and updated to connector U5-44 after n1-36 base value conversion
33808	n1-69	[Process data input 2] Data display	Written through Modbus communication and updated to connector U5-45 after n1-37 base value conversion
33809	n1-70	[Process data input 3] Data display	Written through Modbus communication and updated to connector U5-46 after n1-38 base value conversion
33810	n1-71	[Process data input 4] Data display	Written through Modbus communication and updated to connector U5-47 after n1-39 base value conversion

Communication Address	Write parameter	Name	Description
33811	n1-72	[Process data input 5] Data display	Written through Modbus communication and updated to connector U5-48 after n1-40 base value conversion
33812	n1-73	[Process data input 6] Data display	Written through Modbus communication and updated to connector U5-49 after n1-41 base value conversion
33813	n1-74	[Process data input 7] Data display	Written through Modbus communication and updated to connector U5-50 after n1-42 base value conversion
33814	n1-75	[Process data input 8] Data display	Written through Modbus communication and updated to connector U5-51 after n1-43 base value conversion
33815	n1-76	[Process data input 9] Data display	Written through Modbus communication and updated to connector U5-52 after n1-44 base value conversion
33816	n1-77	[Process data input 10] Data display	Written through Modbus communication and updated to connector U5-53 after n1-45 base value conversion
33817	n1-78	[Process data input 11] Data display	Written through Modbus communication and updated to connector U5-54 after n1-46 base value conversion
33818	n1-79	[Process data input 12] Data display	Written through Modbus communication and updated to connector U5-55 after n1-47 base value conversion
33819	n1-80	[Process data input 13] Data display	Written through Modbus communication and updated to connector U5-56 after n1-48 base value conversion
33820	n1-81	[Process data input 14] Data display	Written through Modbus communication and updated to connector U5-57 after n1-49 base value conversion
33821	n1-82	[Process data input 15] Data display	Written through Modbus communication and updated to connector U5-58 after n1-50 base value conversion
33822	n1-83	[Process data input 16] Data display	Written through Modbus communication and updated to connector U5-59 after n1-51 base value conversion

■ Bus adapter B:

Communication Address	Write parameter	Name	Description
33839	n2-68	[Process data input 1] Data display	Written through Modbus communication and updated to connector U5-60 after n2-36 base value conversion
33840	n2-69	[Process data input 2] Data display	Written through Modbus communication and updated to connector U5-61 after n2-37 base value conversion
33841	n2-70	[Process data input 3] Data display	Written through Modbus communication and updated to connector U5-62 after n2-38 base value conversion
33842	n2-71	[Process data input 4] Data display	Written through Modbus communication and updated to connector U5-63 after n2-39 base value conversion
33843	n2-72	[Process data input 5] Data display	Written through Modbus communication and updated to connector U5-64 after n2-40 base value conversion
33844	n2-73	[Process data input 6] Data display	Written through Modbus communication and updated to connector U5-65 after n2-41 base value conversion
33845	n2-74	[Process data input 7] Data display	Written through Modbus communication and updated to connector U5-66 after n2-42 base value conversion
33846	n2-75	[Process data input 8] Data display	Written through Modbus communication and updated to connector U5-67 after n2-43 base value conversion
33847	n2-76	[Process data input 9] Data display	Written through Modbus communication and updated to connector U5-68 after n2-44 base value conversion
33848	n2-77	[Process data input 10] Data display	Written through Modbus communication and updated to connector U5-69 after n2-45 base value conversion
33849	n2-78	[Process data input 11] Data display	Written through Modbus communication and updated to connector U5-70 after n2-46 base value conversion
33850	n2-79	[Process data input 12] Data display	Written through Modbus communication and updated to connector U5-71 after n2-47 base value conversion
33851	n2-80	[Process data input 13] Data display	Written through Modbus communication and updated to connector U5-72 after n2-48 base value conversion

Communication Address	Write parameter	Name	Description
33852	n2-81	[Process data input 14] Data display	Written through Modbus communication and updated to connector U5-73 after n2-49 base value conversion
33853	n2-82	[Process data input 15] Data display	Written through Modbus communication and updated to connector U5-74 after n2-50 base value conversion
33854	n2-83	[Process data input 16] Data display	Written through Modbus communication and updated to connector U5-75 after n2-51 base value conversion

Used for device start-stop, reset command and setpoint source through Modbus communication. For details, see *"3.6.3 Starting a Device with Fieldbus"*.

3.6.4.2 Special Address Control

Modbus communication protocol directly reads and writes parameters through communication addresses and does not generate process data. However, the user-defined OFF1 source b0-01/b2-01 is not allowed to start directly with 1, and a connector data must be selected.

In order for Modbus communication to control start and stop, HCU-50/51 provides several special communication addresses for Modbus, and updates the written data to a specific connector which can be read by the setpoint source parameter.

Communication Address	Connector	Name	Description
34196	U1-75	Start/stop command of Modbus communication	Values: 0 and 1. Recommended for user-defined OFF1 commands
34230	U5-40	Modbus comm. setpoint 1	Value range: -32768 to 32767, which can be used for speed setpoint
34231	U5-41	Modbus comm. setpoint 2	
34232	U9-50	Modbus comm. DWORD reference	The value range is -2 ^ 31 to 2 ^ 31-1, which can be used for high-precision speed setpoint Data high 16-bit is written in address 34232 and data low 16-bit is written in address 34233
34233			

Parameter configuration:

Para. No.	Name	Setpoint	Description
n1-00	Bus type of bus adapter	1	Bus Adapter A selects Modbus RTU type
n10-00	Expansion slot selection	7	The PROFIBUS RTU module is in expansion slot 3-1
n10-04	Modbus local address	4	Sets Modbus RTU Module address to 4
b0-00	Start/stop control word source	3	User-defined start/stop control word (set by b0)
b0-01	User-defined OFF1 source	U1-75(1175)	Selects Modbus start/stop command setpoint as OFF1 command source
C0-00	Speed control main setpoint selection	U5-40 (1540)	Selects Modbus comm. setpoint 1 as the speed setpoint source

After setting, writing 0 to the communication address 34196 through Modbus can stop the device, and writing 1 to 34196 can control device operation; data written in 34230 is used as the main setpoint of speed control, data written in 4096 corresponds to 100% motor rated frequency, and data written in -4096 corresponds to-100% motor rated frequency.



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4 Function Modules

4.1 Control Channel and Start/Stop Command

4.1.1 Start and Run

In HCU-50/51, there are mainly two commands related to motor start/stop control, which can be set by start/stop control word:

4.1.1.1 OFF1 Command

When OFF1=0, OFF2 and OFF3 commands are inactive and there is no fault, and the system enters S5 ready to switch on state. At this time, the OFF1 command issues a start command from 0 → 1, and the system enters S6 precharge state. When the DC bus voltage is normal, the system enters S7 ready for operation state and waits for the operation enable command. After the operation enable command is effective, the system enters S9 check before operation state. If the S9 state is not selected in group E8, the state will be skipped directly. According to the different starting modes of E1-00, the system will enter S10 pre-excitation or S11 speed tracking or S15 start with DC braking state, and then enters S12 operation state.

If OFF1=0, a stop command is issued, and the system will exit the S12 operation state and enter the S13 OFF1 stop state. When the zero speed condition of the motor is met, the system will enter the S5 ready to switch on state.

4.1.1.2 Operation Enable Command

The operation enable command only controls the triggering of IGBT, and the judgment must be made after the OFF1 command is switched on. If operation enable is ineffective, the IGBT will not be triggered at all times. Even if the OFF1 is switched on, the IGBT will remain in the S7 ready for operation state, waiting for the operation enable signal to become active before triggering the IGBT to control the motor operation.

Usually, the operation enable command remains high level, and you can use the OFF1 command to control device operation and stop.

Both OFF1 and operation enable commands belong to start-stop control words and are affected by A9-00. See*"2.6 Command Channel and Local Control"*.

Table 4-1 Start and operation enable commands sources

Command Channel	Command Word Source	OFF1 Command Source	Operation Enable Command Source
[A9-00]=0	[b0-00]=0	Terminal Start/Stop Module	Always active
	[b0-00]=1	bit0 (U2-00) of U5-44	bit3 (U2-03) of U5-44
	[b0-00]=2	bit0 (U2-16) of U5-60	bit3 (U2-19) of U5-60
	[b0-00]=3	b0-01	b0-04
	SOP Control	SOP-20-880 local control	Always active
	IDS Control	InoDriveStudio Control Panel	InoDriveStudio Control Panel

[A9-00]=1	[b2-00]=0	Terminal Start/Stop Module	Always active
	[b2-00]=1	bit0 (U2-00) of U5-44	bit3 (U2-03) of U5-44
	[b2-00]=2	bit0 (U2-16) of U5-60	bit3 (U2-19) of U5-60
	[b2-00]=3	b2-01	b2-04
	SOP Control	SOP-20-880 local control	Always active
	IDS Control	InoDriveStudio Control Panel	InoDriveStudio Control Panel

4.1. 2 Emergency Stop Command

HCU-50/51 has two emergency stop modes:

1) OFF2 emergency stop: IGBT output is unconditionally inhibited after the command is received.

2) OFF3 quick stop: After the command is received, the device decelerates to 0 according to OFF3 stop time configured in E1-16/E1-15, and then IGBT output is inhibited.

The emergency stop command is active low. When the value of the corresponding effective parameter is 0, emergency stop is executed. For more information about OFF3 stop, see *"4.1.4 Stop Mode"*.

OFF2 and OFF3 commands have multiple sources. According to the settings of control channels, the currently effective parameters are also different. Take OFF2 as an example, the effective parameters are shown in the following table. The principle for OFF3 is similar.

Table 4-2 OFF2 command source effectiveness

Command Channel	Command Word Source	OFF2 Command Source									
		b0-02	b1-00	b1-01	b2-02	b3-00	b3-01	U2-01	U2-17	SOP	IDS
[A9-00]=0	[b0-00]=0	X	Active	Active	X	X	X	X	X	X	X
	[b0-00]=1	X	Active	Active	X	X	X	Active	X	X	X
	[b0-00]=2	X	Active	Active	X	X	X	X	Active	X	X
	[b0-00]=3	Active	Active	Active	X	X	X	X	X	X	X
	SOP Control	X	Active	Active	X	X	X	X	X	X	X
	IDS Control	X	Active	Active	X	X	X	X	X	X	Active
[A9-00]=1	[b2-00]=0	X	X	X	X	Active	Active	X	X	X	X
	[b2-00]=1	X	X	X	X	Active	Active	Active	X	X	X
	[b2-00]=2	X	X	X	X	Active	Active	X	Active	X	X
	[b2-00]=3	X	X	X	Active	Active	Active	X	X	X	X
	SOP Control	X	X	X	X	Active	Active	X	X	X	X
	IDS Control	X	X	X	X	Active	Active	X	X	X	Active

NOTE

- An X in the table indicates that the command source is ineffective.
- U2-01 and U2-17 can take effect with the parameters b1-00/b1-01/b3-00/b3-01 after being configured by them. This table only indicates whether they are effective by default when they are not selected by these four parameters.
- When b0-00/b2-00 = 3, U2-01 and U2-17 can take effect with the parameters b0-02/b2-02 after being configured by them. This table only indicates whether they are effective by default when they are not selected by these two parameters.

4.1.2 Start Mode

The asynchronous motor can choose three start modes through E1-00. These modes are also affected by b1-09/b3-09 (forced speed tracking source).

4.1.2.1 Direct Start (pre-excitation)

In VF control, after the OFF1 start command is received, the motor speed setpoint is from RFG output.

In SVC or FVC, the motor needs to enter the pre-excitation state before generating the rotor magnetic field to better control the output torque of the motor. You can select time or current-based excitation. After dynamic identification of the motor, the initial value of excitation time will be set according to rotor time constant.

Para. No.	Name	Description
E1-01	Pre-excitation mode	0: Time-based excitation, and the excitation time is set by E1-02. The excitation current is dynamically calculated according to the excitation time, and the pre-excitation is completed after the excitation time reaches. 1: Current-based excitation. E1-03 and E1-04 determine the magnitude of excitation current. Pre-excitation is completed when the motor magnetic field exceeds the minimum magnetic flux threshold when E6-03 starts.
E1-02	Pre-excitation time	The shorter the time, the greater the excitation current. Too short time may result in insufficient flux of the motor.
E1-03	Pre-excitation current setpoint source	0: Automatic, excitation will be carried out according to the maximum current output capacity to shorten the excitation time. 1: Numeric setpoint, excitation current is determined by E1-04.
E1-04	Numeric setpoint of pre-excitation current	Sets the excitation current used in the pre-excitation stage, 100% corresponding to the rated current of the motor.
E1-13	Demagnetization time	When the asynchronous motor is at non-zero speed (feedback speed > [E1-11]), the IGBT is inhibited, and it needs to wait at least E1-13 before starting again.

4.1.3.2 Speed Track Start

If you need the motor to start again when it is running at high speed, you can select the speed track start mode. When E1-00 setting is not speed track start, a single forced speed track start can also be achieved through b1-09/b3-09 (forced speed track).

For a detailed description of speed track, see *"4.8 Speed Tracking"*.

NOTE

- When L1-00 does not have brake, b1-09/b3-09 is effective or when [E1-00] = 1, the speed track start is effective;
- When L1-00 has brake, b1-09/b3-09 is effective or when [E1-00] = 1, the effective start mode is direct start.

4.1.3.3 DC Braking Start

Before the motor runs, DC braking start applies a braking force to the asynchronous motor through a DC to ensure that the motor stops at zero speed.

Parameter	Name	Description
E1-05	DC ibraking current	The current flowing through the motor during DC braking. 100% corresponds to the motor rated current.
E1-06	DC injection braking time at startup	The duration of the DC braking.Long-term braking can ensure that the asynchronous motor stays at zero speed, but it may cause serious heat generation of the motor.

4.1.4 Stop Mode

The stop command refers to the command source that triggers device stop, including OFF1, OFF2, OFF3, operation enable command and fault.

The stop mode refers to the specific operation of a stop command. There are 4 stops modes: coast to stop, maximum capacity stop, OFF3 decelerating to stop and OFF1 decelerating to stop.

In HCU-50/51, each stop command corresponds to at least one stop mode, which can be configured by parameters. Under the default parameter setting, the stop mode is usually the same as the stop command, but there are exceptions: for example, the stop mode of VF separation can only be coast to stop; The default stop mode of torque control is also coast to stop.

4.1.4.1 Stop Modes of Different Stop Commands

■ 4.1.4.1 Stop Modes of OFF1 Stop Command

Control mode	E1-14	E1-16	E1-18	Stop mode
Speed control	0: Coast to stop	X	X	Coast to stop
	1: Decelerate to stop	X	X	OFF1 Decelerate to stop
	2: Max. capacity stop	X	X	Max. capacity stop
Torque control	0: Coast to stop	X	0: OFF1 stop	Coast to stop
	1: Decelerate to stop	X		OFF1 Decelerate to stop
	2: Max. capacity stop	X		Max. capacity stop
	X	X	1: OFF2 stop	Coast to stop
	X	0: Decelerate to stop	2: OFF3 stop	OFF3 Decelerate to stop
	X	1: Max. capacity stop		Max. capacity stop
VF separation	X	X	X	Coast to stop

NOTE

◆ In torque control mode, the stop mode of OFF1 stop command is related to E1-18.

■ 4.1.4.1 Stop Modes of OFF3 Stop Command

Control mode	E1-16	Stop mode
Speed control	0: Decelerate to stop	OFF3 Decelerate to stop
	1: Max. capacity stop	Max. capacity stop
Torque control	0: Decelerate to stop	OFF3 Decelerate to stop
	1: Max. capacity stop	Max. capacity stop
VF separation	X	Coast to stop

NOTE

◆ When OFF3 is triggered during torque control, it will switch to speed control and execute OFF3 decelerating to stop or max. capacity stop; In torque control mode, the stop mode of the OFF3 stop command is independent of E1-18.

■ Stop modes of operation enable command

Control mode	E1-17	E1-14	E1-16	Stop mode
Speed control	0: OFF1 stop	0: Coast to stop	X	Coast to stop
		1: Decelerate to stop	X	OFF1 Decelerate to stop
		2: Max. capacity stop	X	Max. capacity stop
	1: OFF2 stop	X	X	Coast to stop
	2: OFF3 stop	X	0: Decelerate to stop	OFF3 Decelerate to stop
		X	1: Max. capacity stop	Max. capacity stop

Control mode	E1-17	E1-14	E1-16	Stop mode
Torque control	0: OFF1 stop	0: Coast to stop	X	Coast to stop
		1: Decelerate to stop	X	OFF1 Decelerate to stop
		2: Max. capacity stop	X	Max. capacity stop
	1: OFF2 stop	X	X	Coast to stop
	2: OFF3 stop	X	0: Decelerate to stop	OFF3 Decelerate to stop
		X	1: Max. capacity stop	Max. capacity stop
VF separation	X	X	X	Coast to stop

NOTE

◆ In torque control mode, the stop mode of the operation enable command is independent of E1-18.

■ The stop mode of OFF2 and fault is always coast to stop

4.1.4.2 Operations of Stop Modes

■ Coast to stop

Coast to stop directly inhibits IGBT output, and the motor stops by friction. For equipment with large inertia, the duration is quite long. Coast to stop will be triggered when most faults or OFF2 emergency stop are activated.

When VF runs separately, all stop modes are fixed to coast to stop.

■ OFF1 Decelerating to stop

OFF1 decelerating to stop is usually activated by OFF1 command low level. After OFF1 decelerating to stop is activated, the motor speed setpoint is forced to 0, and the motor decelerates to zero through RFG deceleration time. When zero speed is approached, the pulse is inhibited or stop with DC braking is started. For details of zero speed judgment and stop with DC braking, see *"4.1.5 Zero-speed Judgment and Stop with DC Braking"*.

The OFF1 stop mode can be selected through E1-14, and the default is 1-Decelerating to stop.

■ OFF3 decelerating to stop

After the OFF3 decelerating stop is activated, the motor speed setpoint is forced to 0, and the motor decelerates to zero through the OFF3 stop time (E1-15). There is no rounding in the deceleration process, and IGBT is inhibited after zero speed is reached.

■ Max. capacity stop

After the max. capacity stop is activated, the motor speed setpoint is forced to 0, and the motor decelerates to zero according to the maximum output capacity. During the deceleration process, the torque or current of the motor may reach the limiting value.

Max. capacity stop can occur during OFF1 stop or OFF3 stop.

4.1.5 Zero-speed Judgment and Stop with DC Braking

4.1. 5.1 Zero-speed Judgment

Except coast to stop, the other three stop modes need to reduce the motor speed to zero speed before inhibiting IGBT output. The judgment of zero speed of the motor involves two parameters: the condition of zero speed is considered to be met only after the absolute value of the actual speed of the motor is less than [E1-11] and the duration exceeds [E1-12].

However, it should be noted that:

1) If E1-12 is set too small, it is easy to inhibit IGBT before the motor speed completely reaches zero speed, thus prolonging the time for the motor become completely stationary. Increasing E1-12 time can ensure that the motor is completely stationary.

2) If E1-11 is set too small, due to the error in the measured speed, the stop condition may not be met and the output is always near zero speed.

3) If E1-11 is set too large, the motor may enter a coast to stop state before the motor completely stops.

4) If the brake control is turned on, the IGBT will not be inhibited until the brake is closed after the zero speed condition is met.

Therefore, the zero speed judgment condition should be set according to the operation requirements, and E1-12 should be increased as much as possible to ensure that the motor is completely stationary.

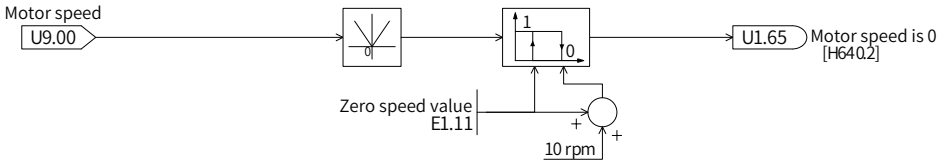


Figure 4-1 Conditions for motor zero speed

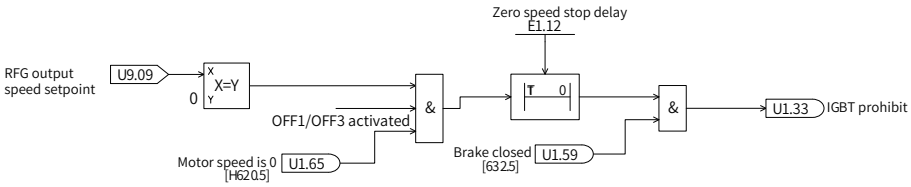


Figure 4-2 Conditions for inhibiting IGBT

4.1.5.2 Stop with DC Braking

Two more stops modes can be derived from the OFF1 decelerating stop mode: one is normal stop ([E1-07] = 0), in which the output of IGBT is inhibited after zero speed conditions are met; The other is stop with DC braking ([E1-07] > 0).

1) Stop with DC braking is triggered when the speed of an asynchronous motor is less than E1-10 (braking starting speed).

2) If E1-13 (demagnetization time) is not zero, the IGBT is inhibited; Otherwise, the device will directly enter the DC braking state.

3) DC braking generates the DC braking current set by E1-05 and lasts for E1-07 to ensure that the motor is completely stationary, and then the IGBT is inhibited.

Para. No.	Name	Description
E1-05	DC braking current	The output current during DC braking. 100% corresponds to the motor rated current.
E1-07	DC injection braking time at stop	If E1-07=0, stop with DC braking is disabled, and the motor stops according to zero speed judgment value. If E1-07 is not 0, stop with DC braking is enabled and the braking duration is set.
E1-10	Initial braking speed	OFF1 decelerating to stop decelerates below this speed before DC braking starts. If DC braking is started at high speed, the braking torque may be reduced.

Para. No.	Name	Description
E1-13	Demagnetization time	Before starting DC braking, wait for the motor to demagnetize, and the motor rotates freely during demagnetization. When it is set to 0, stop with DC braking begins directly.

NOTE

◆ DC braking is only effective for asynchronous motors in OFF1 decelerating to stop mode.

4.1.6 Start/Stop Control Word

The start-stop control word is a bit code instruction that controls drive operation, stop and fault reset. In drive control, the start-stop control word is handled according to the priorities of the following function diagram.

Start/stop control word selection diagram:

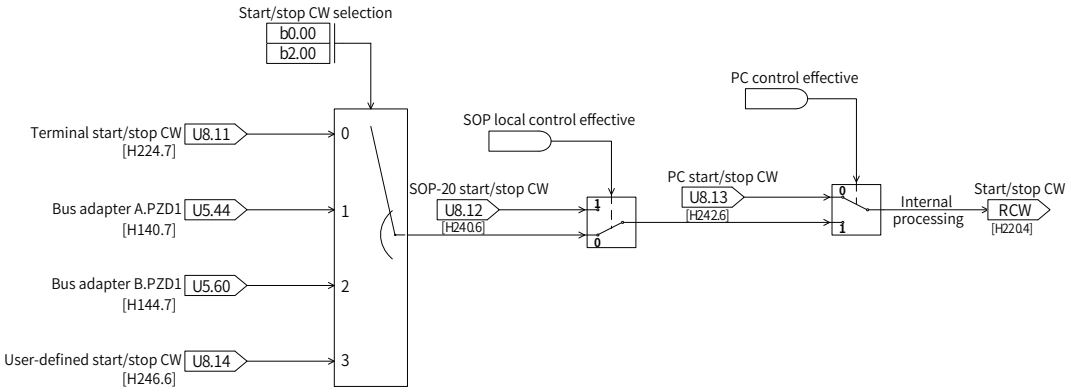


Figure 4-3 Start/stop control word selection

As can be seen from the figure, InoDriveStudio, followed by SOP-20-880, has the highest priority, and when InoDriveStudio local control is effective, other control sources will be ignored.

When the local control is not effective, the corresponding control channel will be activated according to A9.00. There are four sources of control channels, and the corresponding configuration is activated according to the settings of b0.00/b2.00. SOP-20-880 and InoDriveStudio's fault reset function are effective no matter whether they have taken local control.

4.1.6.1 Terminal Start/Stop Control

Terminal start/stop control: see U8-11 terminal start-stop control diagram for detailed settings"4.3 Terminal Start/Stop Module"

bits	Description
00	⌐ = Run 0 = OFF1
01	1= Jog 1
02	1= Jog 2
03	1 = invert speed setpoint 0 = no operation
04	Reserved
05	Reserved
06	Reserved
07	Reserved
08	Reserved
09	Reserved
10	Reserved
11	Reserved
12	Reserved
13	Reserved
14	Reserved
15	Reserved

→ U8.11 Terminal start/stop CW [H248.1]

Figure 4-4

4.1.6.2 User-defined Start/Stop Control Word

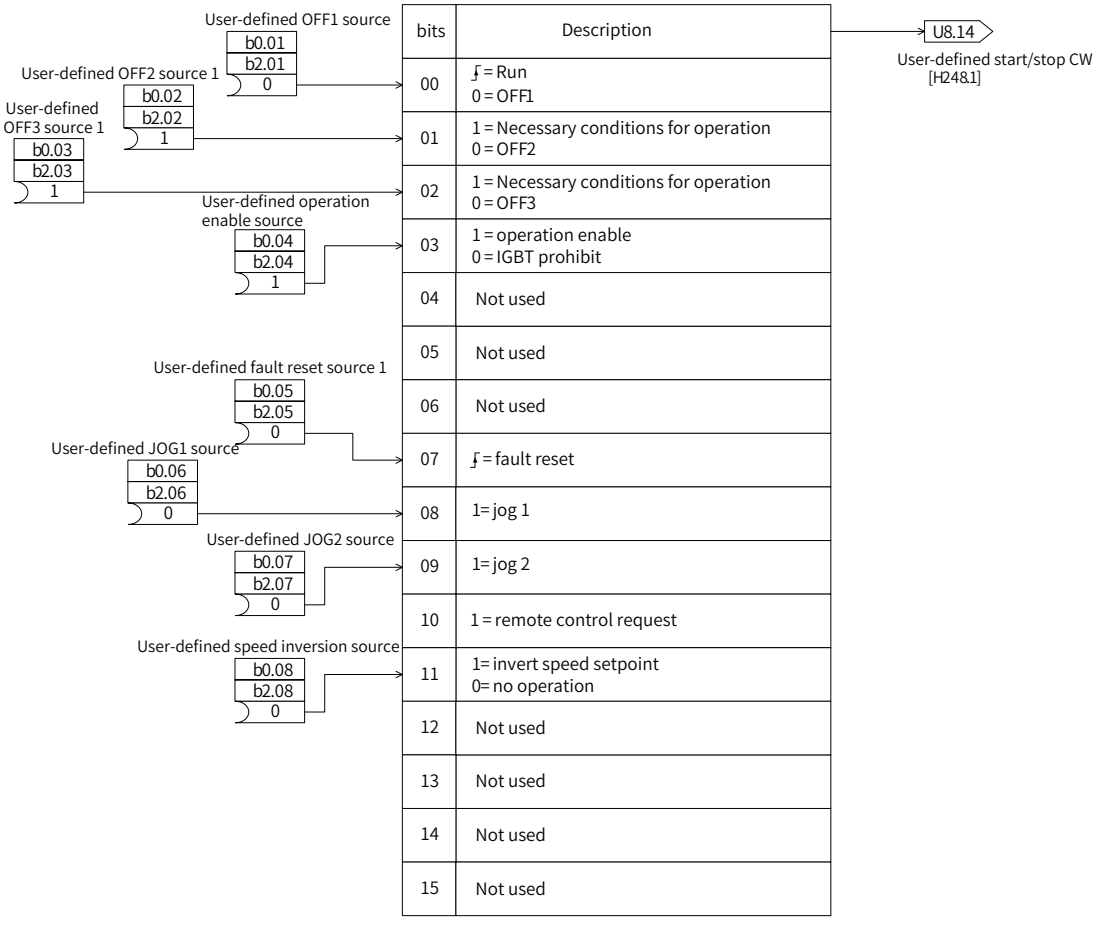


Figure 4-5 U18-14 terminal start/stop control diagram

4.1.6.3 Start/Stop Control Word from Bus Adapter

When the source of the start/stop control word is selected as the bus adapter, the structure of the start/stop control word is basically the same as that of the user-defined start/stop control module, but each control bit no longer needs to be configured separately through the parameter, but is directly obtained from PZD1 of the process data by default.

When the start/stop control module comes from bus adapter A, U5-44 is used as the start/stop control word, and the corresponding bits are U2-00 to U2-15.

When the start/stop control module comes from bus adapter B, U5-60 is used as the start/stop control word, and the corresponding bits are U2-16 to U2-31.

Table 4-3 The start control word comes from the user-defined parameter setting equivalent to the bus adapter

Channel 1 start/ stop control word parameter	Channel 2 start/ stop control word parameter	Name	Equivalent parameter setting when from bus adapter A	Equivalent parameter setting when from bus adapter B
b0-01	b2-01	User-defined OFF1 source	U2-00	U2-16
b0-02	b2-02	User-defined OFF2 source 1	U2-01	U2-17
b0-03	b2-03	User-defined OFF3 source 1	U2-02	U2-18
b0-04	b2-04	User-defined running permission source	U2-03	U2-19
b0-05	b2-05	User-defined fault reset source 1	U2-07	U2-23
b0-06	b2-06	User-defined JOG1 source	U2-08	U2-24
b0-07	b2-07	User-defined JOG2 source	U2-09	U2-25
b0-08	b2-08	Custom speed inversion source	U2-11	U2-27

4.1.6.4 Parameter Setting

As shown in the following table, take control channel 1 as an example.

Table 4-4 Control channel 1 parameter setting

Para. No.	Name	Value	Commnand Source
b0-01	User-defined OFF1 source	The output of the command source is: 0: Normal stop 0 → 1: Start	0: 0 1: Reserved 2: DI1 3: DI2 4: DI3 5: DI4 6: DI5 7: DI6 8: DIL 9: HDI1 10: HDI2 Other: B connector

Para. No.	Name	Value	Commnand Source
b0-02	User-defined OFF2 source 1	The output of the command source is: 0: Enabled, IGBT inhibited, coast to stop 1: Disabled	0: 0 1: 1 2: DI1 3: DI2 4: DI3 5: DI4 6: DI5 7: DI6 8: DIL 9: HDI1 10: HDI2 Other: B connector
b0-03	User-defined OFF3 source 1	The output of the command source is: 0: Enabled 1: Disabled	

Example:

b0-00=3 user-defined (group b0 setting)

b0-01=2, selects DI1 as the command source of OFF1. When DI1 is detected to change from 0 to 1, the device starts

b0-02=3, selects DI2 as the command source of OFF2. When DI2 is 0 (low level), the device coasts to stop

b0-03=4, selects DI3 as the command source of OFF3. When DI3 is 0 (low level), the device decelerates to stop

4.1.6.5 Operation Enable and Fault Reset

Only when the operation enable signal is active can the IGBT trigger pulse be issued and the device output current. The operation enable and fault reset parameters are set as follows:

Table 4-5 Parameter settings of operation enable and fault reset

Para. No.	Name	Value	Command Source
b0-04/ b2-04	User-defined running permission source	The output of the command source is: 0: Disabled 1: Enabled	0:0 1:1 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector
b0-05/ b2-05	User-defined fault reset source 1	The output of the command source is: 0: Disabled 0 → 1: Fault reset	

4.1.6.6 Setting of Enabling Parameters for jog, RFG and ASR

For a detailed explanation of the RFG and ASR function blocks, see *"4.4 Ramp Function Generator"* and *"4.6.7 Speed Controller"*. The relevant parameter settings of the control channel are as follows:

Table 4-6 Parameter setting

Para. No.	Name	Value	Command Source
b0-06/ b2-06	User-defined JOG1 source	The output of the command source is: 0: Disabled 1: Enabled	0: 0 1: Reserved 2: DI1 3: DI2 4: DI3 5: DI4 6: DI5 7: DI6 8: DIL 9: HDI1 10: HDI2 Other: B connector
b0-07/ b2-07	User-defined JOG2 source	The output of the command source is: 0: Disabled 1: Enabled	
b0-08/ b2-08	Custom speed inversion source	The output of the command source is: 0: Disabled 1: Enabled	0: 0 1: 1 2: DI1 3: DI2 4: DI3 5: DI4 6: DI5 7: DI6 8: DIL 9: HDI1 10: HDI2 Other: B connector
b1-06/ b3-06	RFG prohibition source	The output of the command source is: 0: RFG disable is active, RFG output is forced to 0 1: RFG outputs normally	
b1-07/ b3-07	RFG pause source	The output of the command source is: 0: RFG halt is active, RFG maintains current output value 1: RFG runs normally	
b1-08/ b3-08	RFG setpoint to 0 source	The output of the command source is: 0: RFG input is forced to 0 1: RFG gets input normally	
b1-11/ b3-11	Speed regulator enable	The output of the command source is: 0: Disabled 1: Enabled	

4.1.7 Control Word

The control words are a collection of various control commands of the system, which come from the setpoints of control channel parameters.

4.1.7.1 Control Word 1

Control word 1 is displayed in U8-07. See the following table for each bit of control word 1 and its corresponding parameter:

Bit	Name	Parameter	Value	Description
0	Run/Stop (OFF1)	b0-01 b2-01<1>	0	Stop: The AC drive enters S5 ready to switch on state in the OFF1 stop mode defined by E1-14.
			1	Run: The AC drive transitions from the power-on preparation state to the precharge state and then to the running preparation state on the rising edge. You can select self-check (b5-01), identification (b5-00), or normal operation after the AC drive starts running
1	Coast to stop (OFF2)	b0-02 b1-00/b1-01 b2-02 b3-00/b3-01<2>	0	The IGBT is inhibited and the AC drive enters S4 switch on inhibited state.
			1	Normal state
2	Quick stop (OFF3)	b0-03 b1-02/b1-03 b2-03 b3-02/b3-03<2>	0	The motor speed is reduced to 0 with the OFF3 stop mode as specified in E1-16. Then the IGBT is inhibited and the AC drive enters the S4 switch on inhibited state.
			1	Normal state
3	Running permitted	b0-04 b2-04<3>	0	When OFF1 is effective, the device enters S7 ready for operation state as set in E1-17, and the IGBT is inhibited
			1	The AC drive switches from the S7 state to the normal running state only after receiving the operation enable signal
4	Ramp output disabled	b1-06 b3-06	0	The output of RFG is forced to be 0
			1	Normal state
5	Ramp output maintained	b1-07 b3-07	0	The output speed of the RFG remains the value of the previous cycle
			1	Normal state
6	Ramp input 0	b1-08 b3-08	0	The RFG setpoint is forced to be 0, and the output speed is reduced to 0 in the set time
			1	Normal state
7	Fault reset	b0-05 b1-04/b1-05 b2-05 b3-04/b3-05<4>	0	Disabled
			0 to 1	If the active fault is eliminated, the state machine switches from S3 fault state to S4 switch on inhibited state during operation; if OFF1=0, the device enters S5 ready to switch on state
8	Jog 1 (JOG1)	b0-06 b2-06 b4-13	0	Disabled
			1	1. Ready to switch on → Jog. C5-00 JOG1 setpoint setting is speed setpoint 2. Jog switching is effective during operation, and the current speed is C5-00 JOG1 setpoint setting
9	Jog 2 (JOG2)	b0-07 b2-07 b4-14	0	Disabled
			1	1. Ready to switch on → Jog. C5-01 JOG2 setpoint setting is speed setpoint 2. Jog switching is effective during operation, and the current speed is C5-01 JOG2 setpoint setting
10	Remote control	/	0	Remote control disabled
			1	Receives control word command set by channel 1 or channel 2
11	Speed setting negation	b0-08 b2-08<5>	0	The speed setting is used.
			1	The speed setting is negated and then used by the RFG.

Bit	Name	Parameter	Value	Description
12	Motor-driven potentiometer increase	C4-05	0	C4-06 and C4-05 selection 00: Invalid, output value unchanged 01: Motorized potentiometer output increases at the predefined slope 10: Motorized potentiometer output decreases at the predefined slope 11: Invalid, output value unchanged
			1	
13	Motorized potentiometer decreases	C4-06	0	
			1	
14	External fault 1	H0-00	0	Disabled
			1	External fault 1 is triggered.
15	External fault 2	H0-01	0	Disabled
			1	External fault 2 is triggered.

NOTE

- <1>: The OFF1 command may come from the terminal start-stop module, bus adapter or user-defined group setting. B0-01/b2-01 are only effective when the user-defined start-stop control word is selected. See *"4.1.1 Start and Run"* for details.
- <2>: The OFF2/OFF3 command can be set in the start-stop control word and other control words. The settings in other control words have nothing to do with the start-stop control word selection and are always effective. See *"4.1. 2 Emergency Stop Command"* for details.
- <3>: b0-04/b2-04 are only effective when a user-defined start-stop control word is selected; When terminal start-stop is selected, operation enable is always effective; When the bus adapter is selected, operation enable corresponds to the state of PZD1 bit3.
- <4>: Fault reset is described in section *"8.1.3 Fault Reset Mode"*.
- <5>: b0-08/b2-08 are only effective when a user-defined start-stop control word is selected; When terminal start-stop is selected, the speed setpoint inversion is determined by the configuration and input of the terminal start-stop module; When the bus adapter is selected, the speed setpoint inversion corresponds to the state of bit11 of PZD1.

4.1.7.2 Control Word 2

Control word 2 is displayed in U8-08. See the following table for each bit of control word 2 and its corresponding parameter:

Bit	Name	Parameter	Value	Description
0	External alarm 1	H0-02	0	Disabled
			1	External alarm 1 is triggered.
1	External alarm 2	H0-03	0	Disabled
			1	External alarm 2 is triggered.
2 and 3	Motor selection	A9-01 A9-02	0..3	A maximum of four motor groups and related control parameters (groups d and E) can be stored. A9-01 and A9-02 selection The values 0 to 3 correspond to motor data groups 1 to 4 in the active state. The currently active motor data is displayed by the parameters of motor parameter (group d) and motor control (group E).
4..7	Multi-segment data selection	C6-01 ~C6-04	0..15	See C6-01 to C6-04. One of the fixed values of C6-05 to C6-20 is selected as the multi-segment output value.
8	Channel selection	A9-00	0	Channel 1 is activated, and b0, b1, C0, and C1 are selected as the command source and setting source.
			1	Channel 2 is activated, and b2, b3, C2, and C3 are selected as the command source and setting source.
9	Forced speed tracking	b1-09 b3-09	0	E1-00 sets whether to enable speed tracking.
			1	Speed tracking is forcibly enabled.

Bit	Name	Parameter	Value	Description
10	ASR enable	b1-11 b3-11	0	The speed adjuster output is forced to be 0, and the motor can rotate freely.
			1	The speed adjuster works properly and ensures the switch-on speed.
11	Reserved	/	-	-
12	Mandatory torque control	b1-10 b3-10	0	The control mode is determined by E0-01.
			1	Vector control is enforced in torque control mode.
13..15	Reserved	/	-	-

4.1.8 Status Word

The status word is a set of bit codes used when the drive is in the running state. You can check the status word to know the status of the system.

4.1.8.1 Status Word 1

Status word 1 is displayed in U8-09. Status word 1 indicates the main running states of the system. See the following table for details:

Bit	Name	Connector	Value	Description
0	Power-on preparation	U1-00	0	The AC drive is faulty or external conditions are not met. (See the description of power-on block.)
			1	Power-on preparation is completed. The value is fixed to 1 regardless of whether the RUN (OFF1) command is available.
1	Running preparation	U1-01	0	No RUN command is available.
			1	The AC drive receives a RUN command and bus voltage is established. The value is fixed to 1 regardless of whether the running permitted command is available.
2	Running	U1-02	0	The running permitted signal is unavailable.
			1	The value is 1 during normal running.
3	Fault activated	U1-03	0	No fault
			1	Fault activated
4	Coast to stop activation (OFF2)	U1-04	0	Coast to stop activated
			1	Coast to stop not activated
5	Quick stop activation (OFF3)	U1-05	0	Quick stop activated
			1	Quick stop not activated
6	Switch-on prohibited	U1-06	0	Normal
			1	External conditions are not met (OFF2 or OFF3 activated) or a fault occurs.
7	Alarm/Minor fault activated	U1-07	0	Normal
			1	Alarm or limit is present
8	No speed deviation	U1-08	0	The actual speed deviates from the setting.
			1	The actual speed follows the setting.
9	Remote control enabled	U1-78	0	IDS or SOP-20 local control is in effect, and the control channel is disabled
			1	Control channel enable This bit is automatically determined by the state machine and does not support manual setting
10	Comparative speed achievement	U1-09	0	The actual speed is smaller than the comparative speed.
			1	The actual speed is larger than the comparative speed.
11	Limit achievement	U1-10	0	Torque/Current limit not reached
			1	Torque or current limit reached

Bit	Name	Connector	Value	Description
12	The brake is switched off.	U1-11	0	Brake closes
			1	The brake is switched off.
13	Speed direction	U1-12	0	Reverse
			1	Forward
14	Current command channel	U0-26	0	Command channel 1 is effective
			1	Command channel 2 is effective
15	IGBT is running	U1-13	0	IGBT in the blocked state
			1	IGBT triggered

4.1.8.2 Status Word 2

The status word 2, which is the auxiliary status of system operation, is displayed in U8-10.

Bit	Name	Value	Description
0	Ramp	0	The RFG is disabled and the output is 0.
		1	The RFG works properly.
1	Ramp running	0	The output of the RFG remains the same as the value during the past cycle
		1	The RFG works properly.
2	Ramp bypass	0	The input and output of the RFG are the same. The ramp time is invalid.
		1	The RFG works properly.
3	Normal running	0	The AC drive is not running or performs jog running.
		1	The AC drive starts running based on the RUN (OFF1) command.
4	Jog running	0	The AC drive is not running or does not perform jog running.
		1	The AC drive is started by the jog command.
5	Reserved	-	-
6	Motor auto-tuning	0	Motor auto-tuning not performed
		1	Motor auto-tuning in progress
7	Limit activated	0	No minor fault currently
		1	Limit activated
8	Alarm activated	0	No alarm currently
		1	Alarm activated
9 to 10	Current motor selection	0 to 3	Motor data group that is currently activated
11	SOP-20 local control	0	SOP-20 local control is disabled.
		1	SOP-20 local control is enabled using the **Loc/Rem** button of the SOP-20, which controls AC drive operation on behalf of the control channel.
12..15	Reserved	-	-

The status word indicates the working state of HCU. The main status bits change with the control word as shown in the following figure.

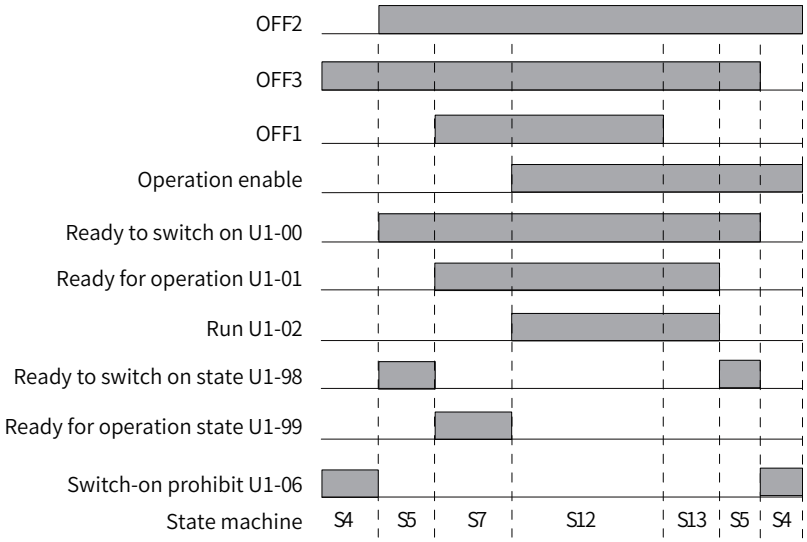


Figure 4-6 status bit timing diagram

4.1.9 State Machine

Definition of each state of the state machine:

Status	Name	Description
S1	System initialization	The program is initialized and waits for control voltage establishment. The system enters state 2 when conditions are met.
S2	Power-on check	If you select power-on self-check items, the system performs self-check after the bus voltage is established and then enters state 4. The system directly enters state 4 if no power-on self-check item is selected.
S3	Fault	The system enters this state when a fault occurs. The system enters state 4 after the fault is cleared and reset is performed.
S4	Power-on inhibit	The system enters state 5 when none of OFF2, OFF3, STO, and OFF1 is activated; If any of them is activated, the system waits in state 4.
S5	Power-on preparation	The system waits for the RUN (OFF1) command and then enters state 6 on the rising edge of the command. The system enters state 6 when the jog command takes effect. The system enters state 18 if b5-00 > 0 The system enters state 16 if b5-01 > 0
S6	Precharge	The system enters state 7 after the DC bus voltage is established. If [A6-00]=0, a 64-1 precharge failure is reported if the bus voltage does not reach the normal level within 3 seconds. If [A6-00] = 1, and the bus voltage fails to become normal after the starting time set by [A6-00] has elapsed, a 64-1 precharge failure error is reported, and the system enters state 3
S7	Running preparation	The system enters state 8 after receiving the running permitted signal.
S8	Demagnetization wait	If the actual motor speed is larger than the zero speed threshold during the past IGBT block, the system waits in this state until the interval is larger than the demagnetization time set by E1-13. The system enters state 9 if the interval from the block time is longer than the demagnetization time.
S9	Pre-running test	The system executes the selected pre-running self-check items. If no item is selected, the system skips this state. The system enters state 10, 11, or 15, depending on the specific power-on mode.
S10	Pre-excitation	A magnetic field is established for the asynchronous motor. Then the system enters state 12.
S11	Speed Tracking	The system searches for the current motor speed and then enters state 12.
S12	Running	The system operates properly and can receive the speed or torque command. The system enters state 13 after receiving the stop (OFF1) command. The system enters state 14 after receiving the quick stop (OFF3) command. The system enters state 4 when OFF2 or STO is activated.

Status	Name	Description
S13	OFF1 stop	The IGBT is blocked when the speed is reduced to 0 within the deceleration time specified by the RFG. Then the system enters state 5.
S14	OFF3 stop	The IGBT is blocked when the speed is reduced to 0 within the OFF3 stop time. Then the system enters state 4.
S15	Enabling DC injection braking	Before DC injection braking is enabled, a direct current is applied to the asynchronous motor to brake the motor to zero speed. The system enters state 12 when the braking time is reached.
S16	Self-check preparation	The system enters state 17 on the rising edge of the RUN (OFF1) command.
S17	Self-test	The system enters state 4 after completion
S18	Auto-tuning preparation	The system enters state 19 on the rising edge of the RUN (OFF1) command.
S19	Auto-tuning	The system performs motor auto-tuning and then enters state 4.
S20	Parameter restoring	The system restores parameters to default settings and then enters state 4.
S21	Parameter downloading	The system downloads parameters in batches in the background and then enters state 4.
S22	Jog running	The system enters state 23 after the jog command is canceled.
S23	Jog stop	The system enters state 4 after completion The system returns to state 22 after the jog command is restored.
S24	Stop during running	The system enters this state when the running permitted command is canceled during operation. Then the system enters state 7.
S25	Stop by DC injection braking	Direct current is applied to the asynchronous motor to force it to stop. Then the system enters state 4 when the specified time is reached.
S26	Wait for stop by DC injection braking	When the motor decelerates to a speed smaller than the threshold, the system enters state 25 after the specified time has elapsed.
S27	Stop upon fault	The system enters this state if a fault is activated, and then decelerates to zero speed based on the fault level or stops directly. The system performs blocking or enters state 3.

State diagram:

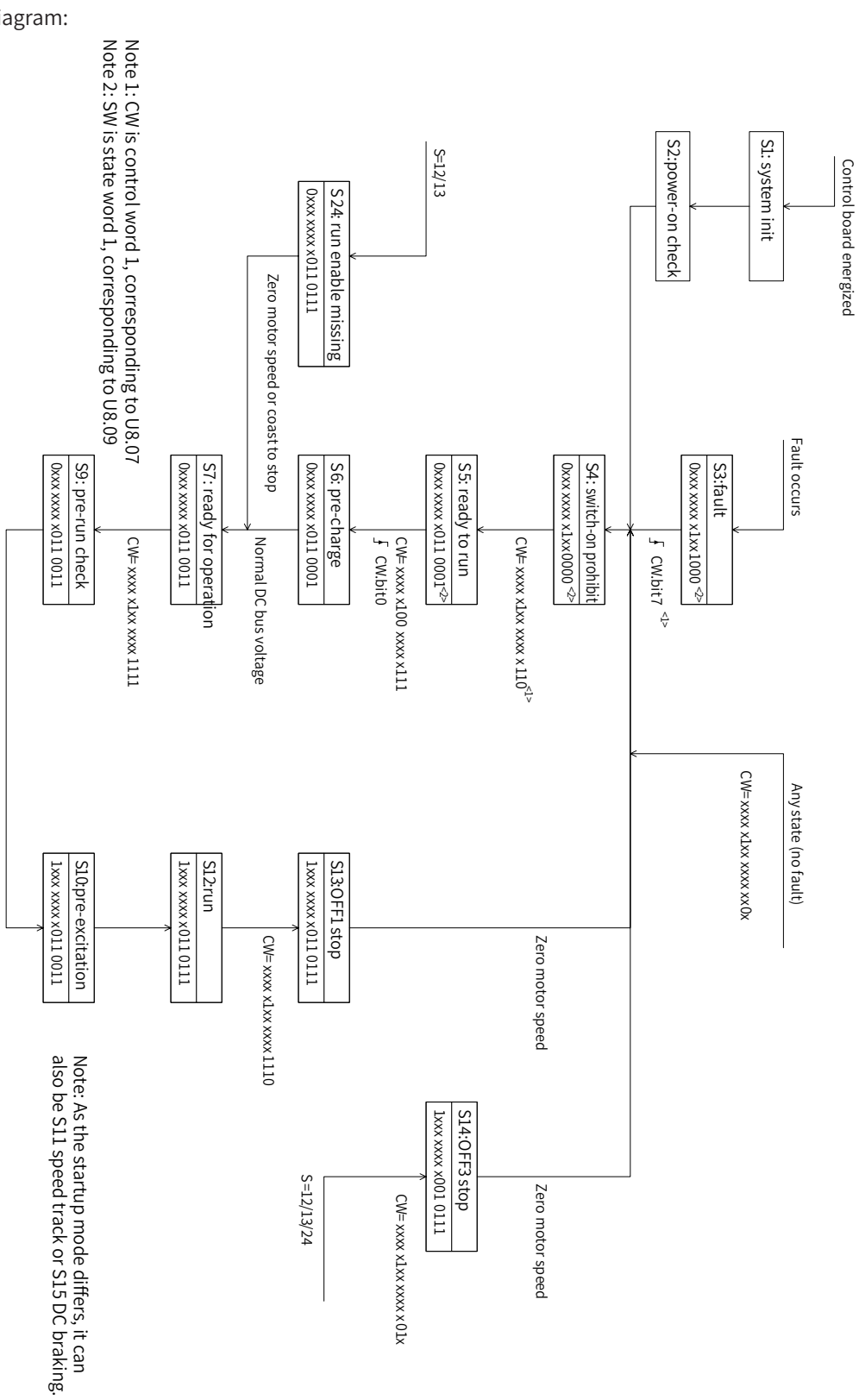


Figure 4-7 State machine jump diagram

4.2 Setpoint Channel

4.2.1 Speed Setpoint

Two channels are available for the speed setpoint. They are called the main setpoint and the auxiliary setpoint, as shown in function diagram H310.

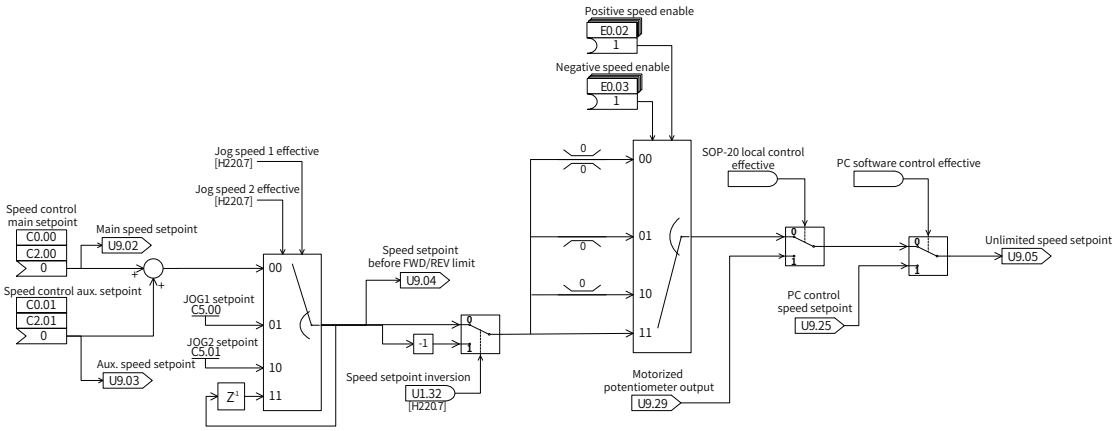


Figure 4-8 Function diagram of speed setpoint

The superposition of the main and auxiliary setpoints is used as the input of the ramp function generator, and the actual speed setpoint is generated after acceleration and deceleration time.

In technology, it is sometimes necessary to use a speed regulation setpoint that takes effect directly without acceleration and deceleration time. In the function diagram H328, a supplementary speed setpoint setting is provided, which is only effective in operation and directly superimposed on RFG output speed when taking effect. The supplementary speed is only effective in FVC and SVC control modes.

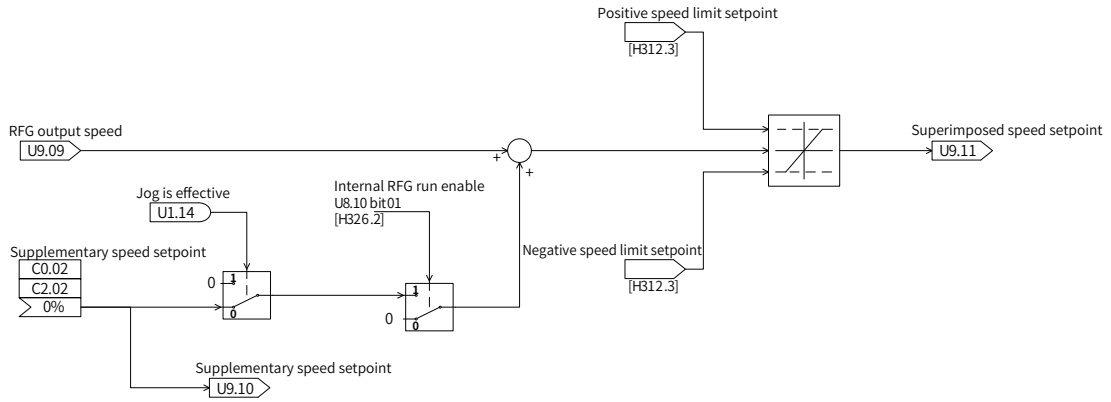


Figure 4-9 Function diagram of speed supplementary setpoint

The speed setpoint source can be analog quantity, communication, and fixed setpoints. Taking Channel 1 as an example, the parameters are described as follows:.

Para. No.	Name	Setpoint
C0-00	Speed control main setpoint selection	0: 0 1: Fixed setpoint 1 2: AI1 3: AI2 4: HDI1 5: HDI2 6: Fixed setpoint 7: MOP 8: Reserved 9: [FBA-A] PZD2 10: [FBA-B] PZD2 Other: K connector
C0-01	Aux. speed control setpoint selection	
C0-02	Supplementary speed setpoint	

The speed setpoint is in percentage, and its base value (100%) is determined by d3-02 (per unit rotational speed).

4.2.2 Torque Setpoint

The torque setpoint is shown in the following function diagram. When the torque control is effective, the torque control main setpoint generates the actual torque setpoint after filtering and ramp acceleration and deceleration time, and then supplementary torque is superimposed to finally generate the torque setpoint before limiting.

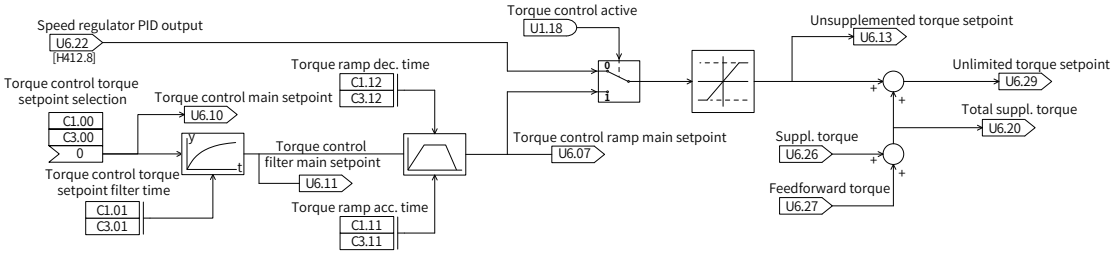


Figure 4-10 Torque reference channel for torque control

Two channels are available for the torque setpoint. Taking channel 1 as an example, the parameters are described as follows:

Para. No.	Name	Setpoint
C1-00	Torque reference selection for torque control	0: 0 1: Fixed setpoint 1 2: AI1 3: AI2 4: HDI1 5: HDI2 6: Fixed setpoint 7: MOP 8: Reserved 9: [FBA-A] PZD2 10: [FBA-B] PZD2 Other: K-CON
C1-01	Torque filter time reference for torque control	0.00s to 10.00s
C1-02<1>	[Torque control] speed window enable	0: Invalid 1: Valid

Para. No.	Name	Setpoint
C1-03<1>	Window speed selection for torque control	0: Channel 1 speed reference 1: Digital setting
C1-04<1>	[Torque control] Digital window speed setpoint	-600.0% to 600.0% 100.0% corresponds to rated motor frequency
C1-05<1>	[Torque control] speed window width	0.0% to 30.0% 100.0% corresponds to rated motor frequency
C1-06	Supplementary torque setpoint 1 selection	0: 0 1: Digital setting Other: K connector
C1-07	Supplementary torque setpoint 1 numeric setpoint	-400.0% to 400.0% 100.0% corresponds to rated motor torque
C1-08	Supplementary torque setpoint 2	0: 0 Other: K connector
C1-09	Friction torque selection (supplementary torque setpoint 3)	0: 0 1: D2-03 Digital setting Other: K connector
C1-10	RFG feedforward torque coefficient selection	0: 0% 1: 100% Other: K connector
C1-11<2>	Torque ramp acceleration time	0.000s to 60.000s
C1-12<3>	Torque ramp deceleration time	0.000s to 60.000s

NOTE

- <1>: Windowed torque control is detailed in section *"4.6.3 Windowed Torque control"*.
- <2>: Acceleration time: the time when the motor torque increases from 0 to the rated torque.
- <3>: Deceleration time: the time when the motor torque drops from the motor rated torque to 0.

4.2.3 Fixed Setpoint

When the fixed setpoint is selected, the fixed setpoints 1–16 (U9-31 to U9-46) can be directly used as the setpoints, and when the fixed setpoints 13–16 are selected, the accuracy is higher; You can also use the fixed setpoint selection output (U9-30) as the setpoint, and C6-01 to C6-04 will determine the actual effective fixed setpoint. Parameter setting is as follows:

Para. No.	Name	Setpoint
C6-01 to C6-04	Multi-step selection 1/2/3/4	0: 0 1: 1 2: DI1 3: DI2 4: DI3 5: DI4 6: DI5 7: DI6 8: DIL 9: HDI1 10: HDI2 Other: B connector
C6-05 to C6-16	Fixed setpoint 1–12	-600.0% to 600.0%
C6-17 to C6-20	Fixed setpoint 13–16	-300.00% to 300.00%

0000 (binary) to 1111 (binary) corresponding to C6-01 to C6-04 correspond to fixed setpoints 1–16. Fixed

setpoints are displayed in C6-00.

Fixed setpoint	[C6-04] bit3	[C6-03] bit2	[C6-02] bit1	[C6-01] bit0	U9-30 Actual effective fixed setpoints	Connector parameters corresponding to fixed setpoints
Multi-step setpoint 1	0	0	0	0	C6-05	U9-31
Multi-step setpoint 2	0	0	0	1	C6-06	U9-32
Multi-step setpoint 3	0	0	1	0	C6-07	U9-33
Multi-step setpoint 4	0	0	1	1	C6-08	U9-34
Multi-step setpoint 5	0	1	0	0	C6-09	U9-35
Multi-step setpoint 6	0	1	0	1	C6-10	U9-36
Multi-step setpoint 7	0	1	1	0	C6-11	U9-37
Multi-step setpoint 8	0	1	1	1	C6-12	U9-38
Multi-step setpoint 9	1	0	0	0	C6-13	U9-39
Multi-step setpoint 10	1	0	0	1	C6-14	U9-40
Multi-step setpoint 11	1	0	1	0	C6-15	U9-41
Multi-step setpoint 12	1	0	1	1	C6-16	U9-42
Multi-step setpoint 13	1	1	0	0	C6-17	U9-43
Multi-step setpoint 14	1	1	0	1	C6-18	U9-44
Multi-step setpoint 15	1	1	1	0	C6-19	U9-45
Multi-step setpoint 16	1	1	1	1	C6-20	U9-46

The values of fixed setpoint selection 1–4 U0-31 to U0-34 are determined by multi-step selection 1–4 C6-01 to C6-04.

Multi-step selection	Multi-step selection connector parameters
Multi-step selection 1 C6-01	U0-31
Multi-step selection 2 C6-02	U0-32
Multi-step selection 3 C6-03	U0-33
Multi-step selection 4 C6-04	U0-34

4.2.4 Motorized Potentiometer

Motorized potentiometer function diagram H302:

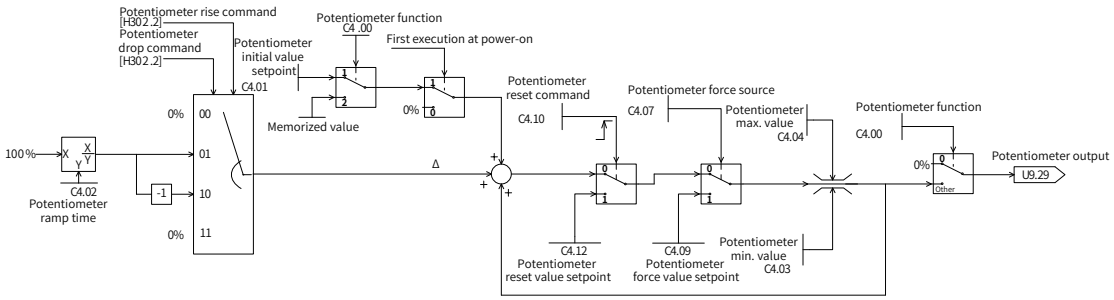


Figure 4-11 Motorized potentiometer output function diagram

When an SOP-20-880 is used to control the device, local control is effective and A10-01 is set to 0. The speed setpoint is from the motorized potentiometer output, and the increase and decrease of the potentiometer is controlled by the SOP-20-880.

The function parameters of the motorized potentiometer are detailed as follows:

Para. No.	Name	Function	Setpoint
C4-00	Motorized potentiometer function	0: Disabled 1: Recover to initial value at power-on 2: Recover to memorized value at power-on	0: Disabled 1: Non-retentive at power failure 2: Retentive at power failure
C4-01	Initial value of motor-driven potentiometer	Initial value after power-on	-600.0% to 600.0%
C4-02	Ramp time of motor-driven potentiometer	Time for output to increase from 0% to 100% or decrease from 100% to 0%.	0.1s to 1000.0s
C4-03	Min. value of motor-driven potentiometer	Lower limit of output value decline	-600.0% to 600.0%
C4-04	Max. value of motor-driven potentiometer	Upper limit of output value increase	-600.0% to 600.0%
C4-05	Increase value source of motor-driven potentiometer	When increase or decrease is effective, the output increases or decreases at a set rate When both increase and decrease are ineffective or both are effective, the output value remains unchanged	0:0 1:1 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector
C4-06	Decrease value source of motor-driven potentiometer		
C4-07	Motorized potentiometer forcing source	When it is 1, the motorized potentiometer output is forced to the force value selected by C4-08	
C4-08	Motorized potentiometer force value source	Set the source of the force value	0: 0 1:100% 2: Set by parameter Other: K connector
C4-09	Motorized potentiometer force setpoint	When C4-08=2, the forced value of numeric setpoint	-600.0% to 600.0%

Para. No.	Name	Function	Setpoint
C4-10	Source of reset command of motor-driven potentiometer	The rising edge of the reset command triggers a reset of the output value to the value selected by C4-11	0: 0 1: 1 2: DI1 3: DI2 4: DI3 5: DI4 6: DI5 7: DI6 8: DIL 9: HDI1 10: HDI2 Other: B connector
C4-11	Motorized potentiometer reset value source	Sets the source of the reset value	0: 0 1:100% 2: Set by parameter Other: K connector
C4-12	Reset value of motor-driven potentiometer	Reset value of numeric setpoint when C4-11=2	-600.0% to 600.0%

4.2. JOG Speed Setpoint

The function diagram of jog speed setpoint is as follows:

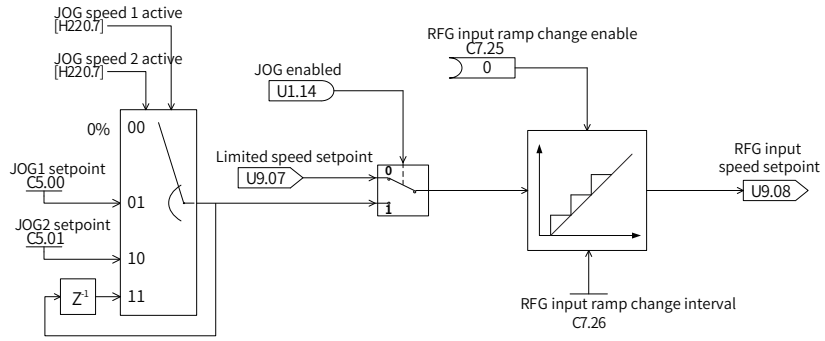


Figure 4-12 Function diagram of jog speed setpoint

The relevant parameters are described in the following table:

Para. No.	Name	Setpoint
C5-00	JOG1 setpoint	-50.0% to 50.0%
C5-01	JOG2 setpoint	-50.0% to 50.0%
C5-02	JOG acceleration time	0.1s to 1000.0s
C5-03	JOG deceleration time	0.1s to 1000.0s

NOTE

◆ For detailed description of RFG ramp change, see *"4.6.13 Acceleration Torque Compensation"*.

4.3 Terminal Start/Stop Module

Six different templates are provided for the terminal-based control of motor start/stop. A maximum of three terminals are required and defined as IN1, IN2, and IN3.

You can configure two different terminal start/stop modes for the terminal start/stop module. Parameters are provided to enable terminal start/stop command 1 or 2. When command 1 is selected, b4-03 to b4-07

take effect; when command 2 is selected, b4-08 to b4-12 take effect. See the following table for the input terminal parameter setting of the terminal start-stop module:

[b4 -02] Terminal start/stop command 1/2 selection	IN1 effective parameter	IN2 effective parameter	IN3 effective parameter
[0]: Terminal start/stop command 1	b4-05	b4-06	b4-07
[1]: Terminal start/stop command 2	b4-10	b4-11	b4-12

Before you configure the terminal start/stop mode, check the mapping between functions and terminal connections. For example, if terminal start/stop command 1 is enabled, b4-05 corresponds to DI1. (DI1 corresponds to b4-05, DI2 corresponds to b4-06, and DI3 corresponds to b4-07, unless otherwise specified in this document.) If terminal start/stop command 2 is enabled, set b4-10 to b4-12.

The following table lists six different terminal start/stop modes defined by the parameters. (The suffix P indicates that the command is enabled on the rising edge.)

Para. No.	Name	Setting Range	Default	Unit	User Setting	Remarks
b4-03/b4-08	Terminal start/stop mode	0: Disabled 1: IN1 start 2: IN1 start, IN2 direction 3: IN1 forward start, IN2 reverse start 4: IN1P start, IN2 stop 5:IN1P start, IN2 stop, IN3 direction 6: IN1P forward start, IN2P reverse start, IN3 stop	The factory setting of B4-03 is 1, and the factory setting of b4-08 is 0	/	/	/

The relationship between the input and the start-stop command OFF1 and the direction setpoint DIR is shown in a table as follows:

Terminal start/ stop mode	IN1 input	IN2 input	IN3 input	Start command OFF1	Direction setpoint DIR
0: Inactive	X	X	X	0-Stop	0-Forward
1: IN1 start	0 to 1	X	X	1-Run	0-Forward
	0	X	X	0-Stop	0-Forward
2: IN1 start, IN2 direction	0	N	X	0-Stop	N=IN2
	0 to 1	N	X	1-Run	N=IN2
3: IN1 forward start, IN2 reverse start	0	0	X	0-Stop	Depending on the direction before stop
	0 to 1	0	X	1-Run	0-Forward
	0	0 to 1	X	1-Run	1-Reverse
	1	1	X	0-Stop	Depending on the direction before stop
4: IN1P start, IN2 stop	X	0	X	0-Stop	0-Forward
	0 to 1	1	X	1-Run	0-Forward
5:IN1P start, IN2 stop, IN3 direction	X	0	N	0-Stop	N=IN3
	0 to 1	1	N	1-Run	N=IN3
6: IN1P forward start, IN2P reverse start, IN3 stop	X	X	0	0-Stop	Depending on the direction before stop
	0 to 1	0	1	1-Run	0-Forward
	0	0 to 1	1	1-Run	1-Reverse

NOTE

◆ 1-represents a high level, 0 represents a low level, N-represents a certain state of 0 or 1, and X-represents that this bit has no effect on the output.

In the following example, DI1, DI2 and DI3 are used as external terminals. That is, the functions of DI1, DI2, and DI3 are selected by setting b4-05 to b4-07 or b-104 to b4-12.

4.3.1 Terminal Start/Stop Mode 1

It is the most commonly used single-wire mode. DI1 determines whether the motor is started or stopped.

K1	Operation Command
close	run
open	stop

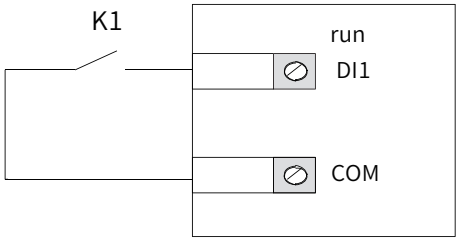


Figure 4-13 Terminal start/stop mode1

As shown in Figure 1-6, DI1 is used for start/stop control. A RUN command is triggered on the rising edge of DI1. The motor stops when DI1 is 0.

4.3.2 Terminal Start/Stop Mode 2

In this mode, DI1 is the RUN enabled terminal, and DI2 determines the running direction.

K1	K2	Operation Command
close	open	FWD
close	close	REV
open	open	stop
open	close	stop

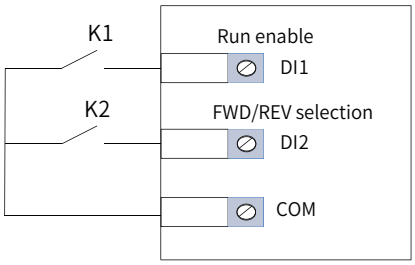


Figure 4-14 Terminal start/stop mode 2

As shown in Figure 1-7, DI1 and DI2 are used to control start/stop and determine the running direction. The start/stop logic of DI1 is the same as that in mode 1, but the speed setting is negated when DI2 is 1.

4.3.3 Terminal Start/Stop Mode 3

K1	K2	Operation Command
close	open	FWD
open	close	REV
close	close	stop
open	open	stop

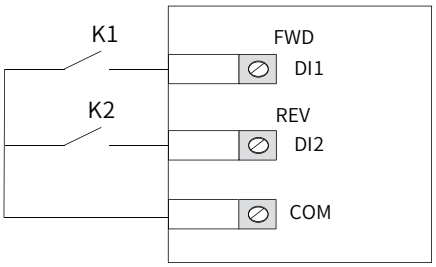


Figure 4-15 Terminal start/stop mode 3

As shown in Figure 1-8, DI1 and DI2 are used to control start/stop and determine the running direction. A RUN command is triggered on the rising edge of DI1 and the speed setting is used directly. A RUN command is also triggered on the rising edge of DI2 but the speed setting is negated. The motor is stopped when DI1 and DI2 are 0.

4.3.4 Terminal Start/Stop Mode 4

SW1	K	Operation Command
X	open	stop
open→close	close	run

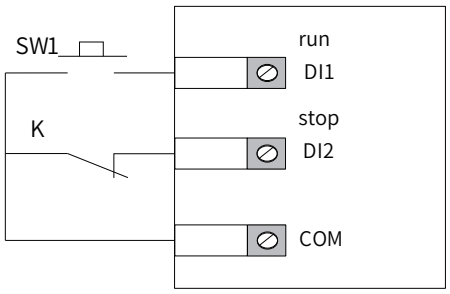


Figure 4-16 Terminal start/stop mode 4

As shown in Figure 1-9, DI1 and DI2 are respectively used for start and stop control. The motor is started when DI2 is 1 and a RUN command is triggered on the rising edge of DI1. The motor is stopped when DI2 is 0.

4.3.5 Terminal Start/Stop Mode 5

SW1	K1	K2	Operation Command
X	open	X	stop
open→close	close	open	FWD
open→close	close	close	REV

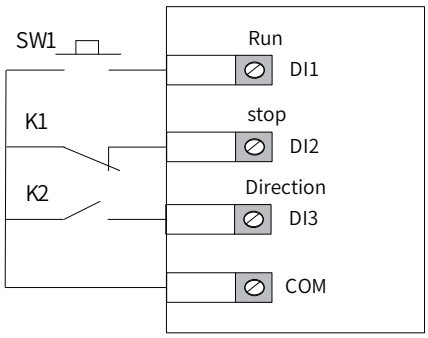


Figure 4-17 Terminal start/stop mode 5

As shown in Figure 1-10, DI1, DI2, and DI3 are used to control start/stop and determine the running direction. The start/stop logic of DI1 and DI2 is the same as that in mode 4, but the speed setting is negated when DI3 is 1.

4.3.6 Terminal Start/Stop Mode 6

SW1	SW2	K	Operation Command
X	X	open	stop
open→close	open	close	FWD
open	open→close	close	REV

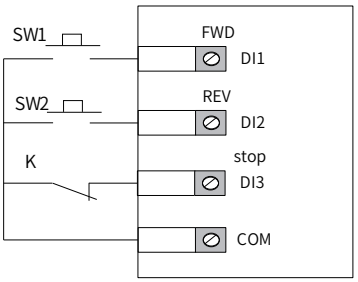


Figure 4-18 Terminal start/stop mode 6

As shown in Figure 1-11, DI1, DI2, and DI3 are used to control start/stop and determine the running direction. When DI3 is 1, the start logic of DI1 and DI2 is the same as that in mode 3. The motor is stopped when DI3 is 0, independent of the status of DI1 and DI2.

4.4 Ramp Function Generator

The group C7 parameters are used to set the characteristics of the ramp function generator (RFG). See function diagram H322/H326 for details. See *"4.6.13 Acceleration Torque Compensation"* for a detailed description of RFG inertia compensation torque in H326.

4.4.1 Setting and Selection of Acceleration and Deceleration Time

The RFG is used to control the acceleration and deceleration time of the motor. A total of 4 groups of different acceleration and deceleration times can be set and switched through external commands. When the rounding time is set to 0, acceleration and deceleration are linear.

- Acceleration time: the time when the motor accelerates from 0 speed to D3-02 (standard rotational speed base value).
- Deceleration time: The time when the motor decelerates from D3-02 (standard rotational speed base value) to 0.
- Start rounding time: the time when the motor starts to accelerate (or decelerate) from steady speed and the acceleration starts from 0 to the maximum acceleration (determined by acceleration/deceleration time).
- End rounding time: The time when the motor transits from maximum acceleration (determined by acceleration/deceleration time) to steady speed before approaching steady speed (acceleration or deceleration process).

Through different combinations of C7-02/C7-03, different acceleration and deceleration curves can be selected, as shown in the following table:

Table 4-7 Acc./dec. curve selection

RFG selection 2 C7-03	RFG selection 1 C7-02	Acceleration time	Deceleration time	Initial rounding time	Final rounding time
0	0	C7-04	C7-05	C7-12	C7-13
0	1	C7-06	C7-07	C7-14	C7-15
1	0	C7-08	C7-09	C7-16	C7-17
1	1	C7-10	C7-11	C7-18	C7-19

4.4.2 Low Speed Compensation Gain

When using VF control or SVC control mode, due to stator resistance voltage drop and parameter deviation of the asynchronous motor, the control characteristics are relatively poor at low speed and the motor output is insufficient, while the operation is normal at medium and high speed.

When the load is heavy and the acceleration is large, the acceleration may be normal at high speed, but stall due to insufficient torque may occur at low speed; Or the reduction of acceleration ensures stable operation at low speed, but leads to the elongation of the overall acceleration time.

The parameters C7-20 (low speed acceleration time gain) and C7-21 (low speed judgment value) can be set in a ratio to enable relatively slow acceleration to be used at speeds lower than C7-21, and normal acceleration be used at medium and high speed above C7-21, as shown in the following figure:

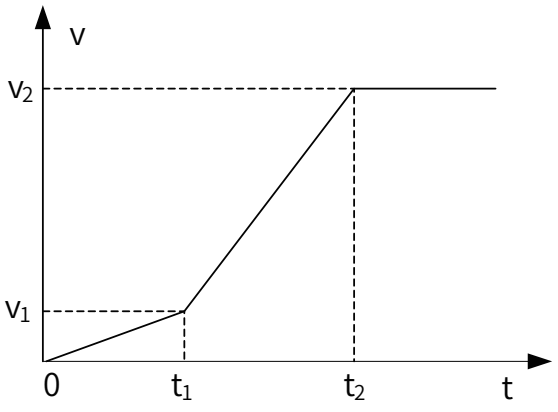


Figure 4-19 Low speed compensation gain

In Figure 4-19, V_1 is the speed set by C7-21. From speed 0 to V_1, acceleration is carried out according to the acceleration time Ta '= [C7-20] * Ta, where Ta is the currently effective acceleration time; from V_1 to V_2, acceleration is carried out according to the normal acceleration time Ta.

NOTE

- The low-speed compensation gain setting is only effective for acceleration, and the deceleration time always follows the currently effective deceleration time.

4.4. 3 Arc Type Selection

When acceleration and deceleration change abruptly, the output frequency of ramp function generator is not smooth and the acceleration of output frequency is not continuous, which will lead to torque oscillation of motor and may cause damage to mechanical gears.

C7-27=0 (continuous arc is not enabled): it will be executed immediately when the input value changes.

C7-27=1 (continuous arc enabled): even if the input value suddenly decreases during acceleration, the device will execute the end arc (overshoot) before decelerating; Even if the input value suddenly increases during deceleration, the device will execute the end arc (overshoot) before accelerating.

Taking the sudden deceleration during forward acceleration as an example. As shown in fig. 4-20, at T_0, the target frequency is F_3 and at T_1, the device accelerates to frequency F_2. At this time, when the target frequency is set to F_1, the RFG output frequency does not change according to curve 2 (acceleration is set to zero at one cycle, and then decelerates), but changes according to curve 3 (acceleration a is first reduced to 0 through the acceleration of the end arc of the acceleration segment, and then decelerates), thus avoiding sudden change of acceleration a at T_1 and reducing the impact of sudden response on mechanical equipment.

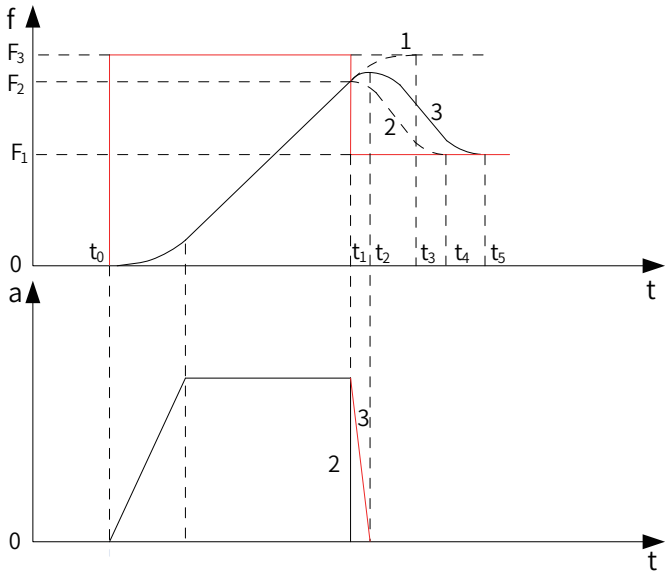


Figure 4-20 Arc type selection

4.5 Brake Control

Group L1 parameters are used to set the logic condition of brake control; See H630/H632 for the functional diagram of brake control.

The motor and driven equipment are inhibited at zero speed using mechanical brakes when the drive module is not running. You can set the parameter L1-00 to determine whether to enable brake control and feedback detection. When brake control is enabled, set related parameters properly based on the actual working conditions of equipment and loads to effectively control the brake logic for safe operation.

If L1-00=2 is set, the brake with feedback is selected, and the system will detect the feedback state of the brake set by L1-15; If the feedback signal of brake opening is not obtained within 2s, the fault ERR84-1 brake failed to open will occur.

If L1-00=1 is set, the brake is only controlled according to the set time, and the actual state is no longer detected.

The conditions for opening the brake can be set through L1-09/L1-10/L1-11. For example, it can be set that the brake is allowed to be opened only when the output torque is greater than a certain value, so as to ensure that the gravity load will not slide down at the moment when the brake is opened.

Note that the speed controller of the system does not work and there is no torque output before the brake is opened. Therefore, after setting the brake opening conditions, you need to set L1-04 to provide a starting torque to meet the brake opening conditions. For the details on brake control, see *"4.5.2 Time Sequence Diagram"*.

4.5.1 Braking Phases

The brake logic is divided into the starting phase, switch-off test phase, switch-off phase, running phase, switch-on test phase, switch-on phase, and block phase.

4.5.1.1 Starting

The starting phase begins when pre-excitation is completed and ends when equipment meets the start setting.

Equipment generates sufficient output torque at the given starting speed or torque to prevent slipping during switch-off. The starting phase is implemented based on the actual control method.

- The starting phase does not exist in torque control mode.
- When the VF speed control method is used, the starting speed set by L1-03 is used as the speed setting after superposition. The value of U9-11 is increased linearly during the time (rated) set by L1-07 until it is the same as the starting speed. Then the starting phase is completed. The starting speed is set by L1-05 or derived from the K connector.
- When the vector control method (SVC/FVC) is used, the starting torque set by L1-04 is used as the speed adjustment integral setting. The value of U6-22 is increased linearly during the time (rated) set by L1-07 until it is the same as the starting torque. Then the starting phase is completed. The starting torque is derived from automatic torque memory (the starting torque is equal to the speed adjustment integral prior to the last switch-on multiplied by the value of L1-06), L1-05 setting, or the K connector.

b. Switch-off Testing

The switch-off test phase begins when the start setting is met and ends when the switch-off command is enabled.

The system determines whether the switch-off condition is met by testing the motor's output current or torque. The parameter L1-08 is used to determine whether to execute switch-off. If the switch-off command (L1-08) is enabled, the switch-off condition is met when the switch-off comparative value set by L1-09 is not smaller than the comparative threshold set by L1-10 during the L1-11 period. Then the switch-off test phase is completed and the U1-11 switch-off command is generated.

4.5.1.3 Switch-on

The switch-off phase begins when the switch-off command is enabled and ends when the switch-off

action is completed.

- If brake feedback is disabled, the switch-off phase is completed after the switch-off time set by L1-01 has elapsed. Then U1-58 is set.
- If brake feedback is enabled, U1-58 is set only when the switch-off time has elapsed and the feedback point set by L1-15 is valid. U1-60 indicates that switch-off fails after the switch-off time has elapsed but the feedback point is still invalid. If this state lasts for more than 2s, ERR84-1 brake open failed will occur.

4.5.1.4 Running

The running phase begins when the brake is switched off and ends when a stop command (OFF1, OFF2, OFF3, running prohibited, or fault) is generated.

4.5.1.5 Switch-on Testing

The switch-on test phase begins when a stop command is generated and ends when the switch-on command is enabled.

The system checks whether the motor feedback speed is lower than the switch-on speed to determine whether the switch-on condition is met. The system determines that the switch-on condition is met when the forced switch-on command set by L1-14 is enabled or the system is in the blocked state (when OFF2 is enabled or a fault occurs). Then U1-31 is set. The system determines that the switch-on condition is met when the motor feedback speed is lower than the speed threshold set by L1-12 during the L1-13 period. Then the switch-on test phase is completed and the switch-on command defined by U1-31 is generated.

4.5.1.6 Switch-on

The switch-on phase begins when the switch-on command is enabled and ends when the switch-on action is completed.

- If brake feedback is disabled, the switch-on phase is completed after the switch-on time set by L1-02 has elapsed. Then U1-59 is set.
- If brake feedback is enabled, U1-59 is set only when the switch-on time has elapsed and the feedback point set by U1-15 is invalid. U1-61 indicates that switch-on fails after the switch-on time has elapsed but the feedback point is still valid. If this state lasts for more than 2s, ERR84-2 brake close failed will occur.

4.5.1.7 Inhibit Waiting

The block waiting phase begins when the switch-on command is enabled and ends when the motor speed is reduced to 0.

The system determines that the motor reaches zero speed when the motor feedback speed is lower than the zero speed set by E1-11 during the E1-12 period. Then U1-65 is set and PWM output is blocked. You can increase the value of E1-12 for a longer excitation time to remove the need for excitation during the next switch-off process.

4.5.2 Time Sequence Diagram

4.5.2.1 Vector Control

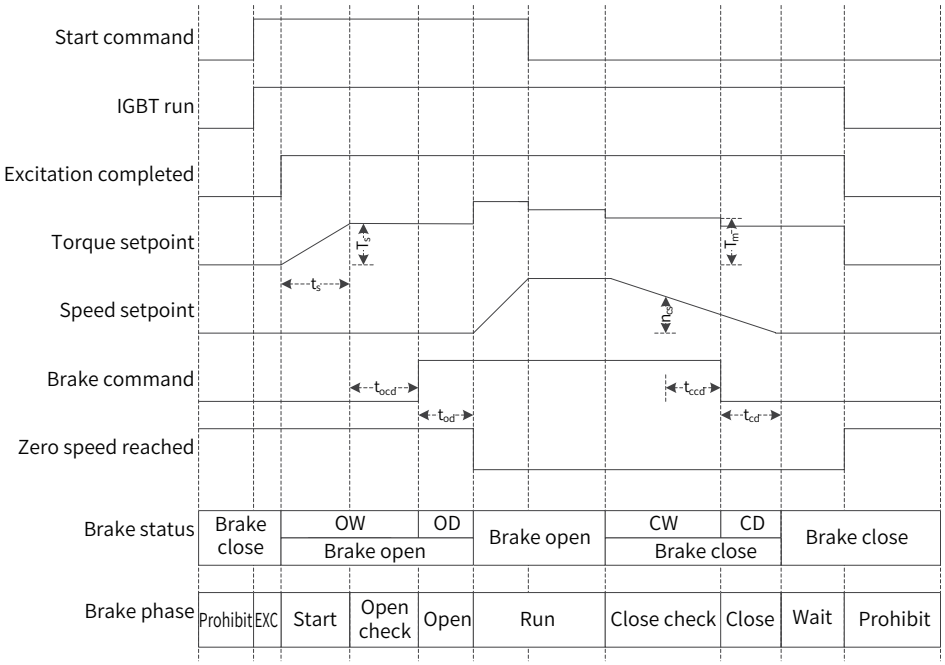


Figure 4-21 Brake time sequence in vector control

Ts: Starting torque during brake open

Tm: Memory torque during brake close

ncs: Brake close speed threshold

ts: Brake start acceleration time setpoint

tocd: Brake open comparative delay

tod: Brake open time

tccd: Bbrake close delay

tcd: Brake close time

OW: Brake open waiting

OD: Brake open delay

CW: Brake close waiting

CD： Brake close delay

4.5.2.2 VF control

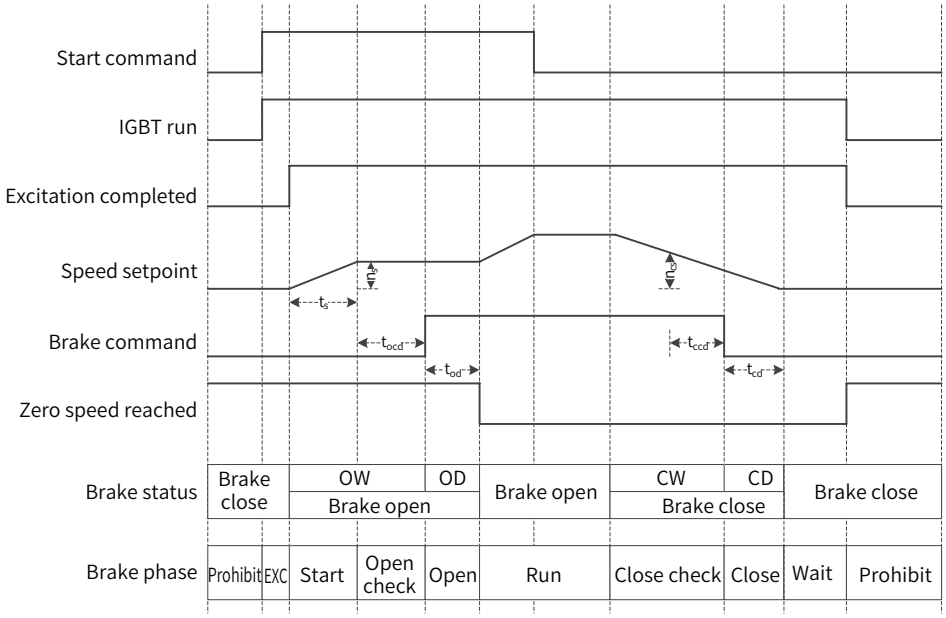


Figure 4-22 Brake time sequence in V/F control

ns: starting speed during brake open

ncs: Brake close speed threshold

ts: Brake start acceleration time setpoint

tocd: Brake open comparative delay

tod: Brake open time

tccd: Bbrake close delay

tcd: Brake close time

OW: Brake open waiting

OD: brake open delay

CW: Brake close waiting

CD: brake close delay

4.6 Vector Control

4.6.1 Speed Control

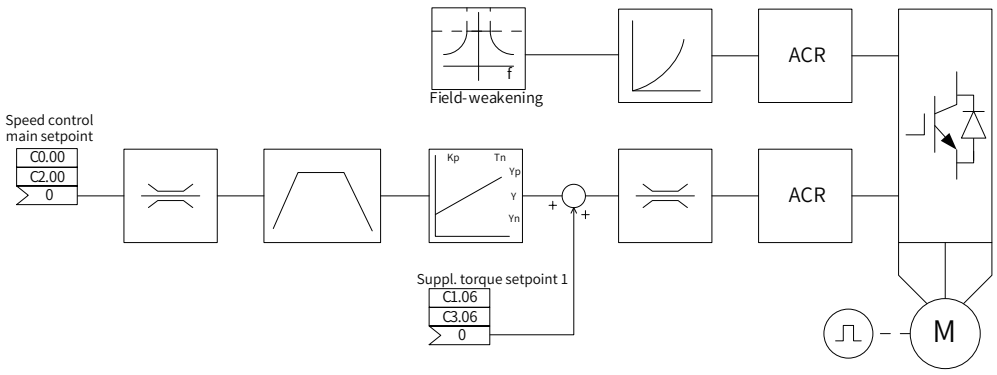


Figure 4-23 Speed control block diagram

In the speed control mode, the speed setpoint is generated as shown in the functional diagram H310/H312, and then processed by the ramp function generator (RFG-function diagram H322/H326) and

superimposed by the supplementary speed setpoint (function diagram H328) to generate the actual operation speed setpoint.

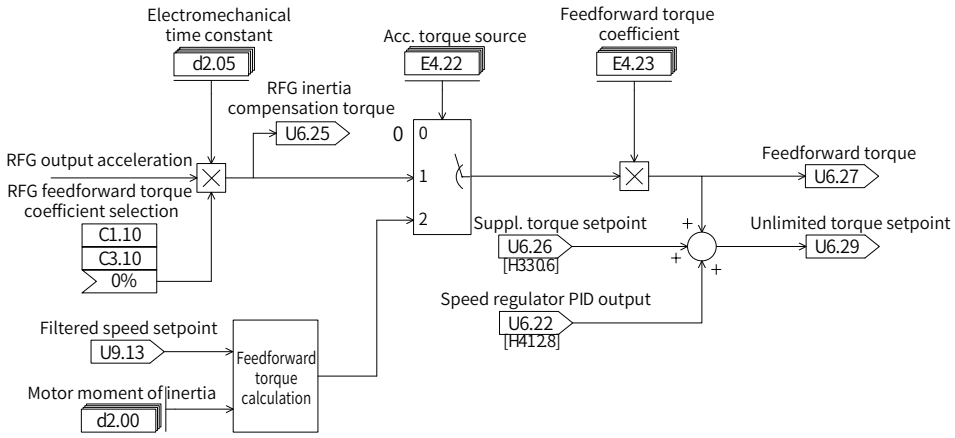


Figure 4-24 Supplementary speed

In the speed control mode, the superposition of the feedforward torque can be achieved by supplementary torque 1 (C1-06/C3-06) or supplementary torque 2 (C1-08/C3-08). The supplementary torque is superimposed on the output of the speed controller PI regulator and converted into a torque setpoint.

Speed control is applicable to all control modes (FVC/SVC/VF is selected in E0-00). See the following table for switching between speed control and torque control modes:

Table 4-8 Motor control mode

E0-00	E0-01	b1-10(b3-10)	Control mode
0/SVC or1/FVC	0/speed control	0/disabled	Speed control
0/SVC or1/FVC	1/torque control	0/disabled	Torque control
0/SVC or1/FVC	0/speed control	1/forced torque control	Torque control
0/SVC or1/FVC	1/torque control	1/forced torque control	Torque control
2/VF	--	--	Speed control

4.6.2 Torque Control

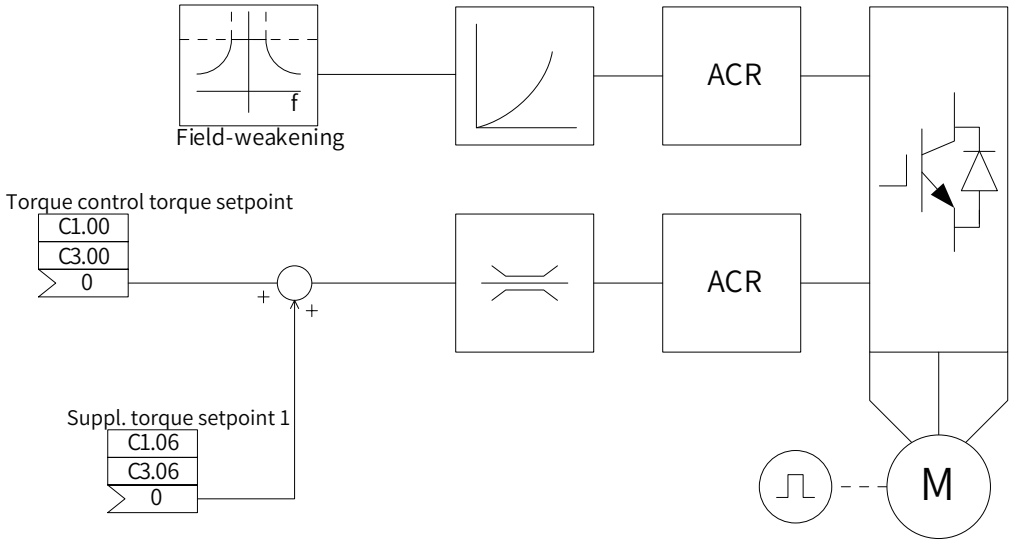


Figure 4-25 Torque control block diagram

When the torque control mode is in effect, the speed regulator is skipped, as in function diagram H430, and the torque control torque setpoint (C1-00/C3-00) takes effect.

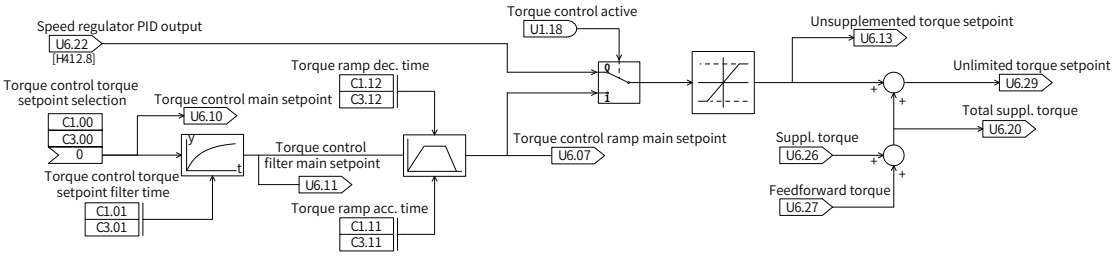


Figure 4-26 Torque reference channel for torque control

When the torque control takes effect, the output torque strictly follows the setpoint; If the load disappears, the motor may be accelerated to the maximum speed. At this time, the runaway protection control module is active, and the output torque is limited and not equal to the setpoint, ensuring that the actual speed of the motor will not exceed the maximum speed limit.

For the details of speed limit and runaway protection, see *"4.6.9 Speed Limit"*.

4.6.3 Windowed Torque control

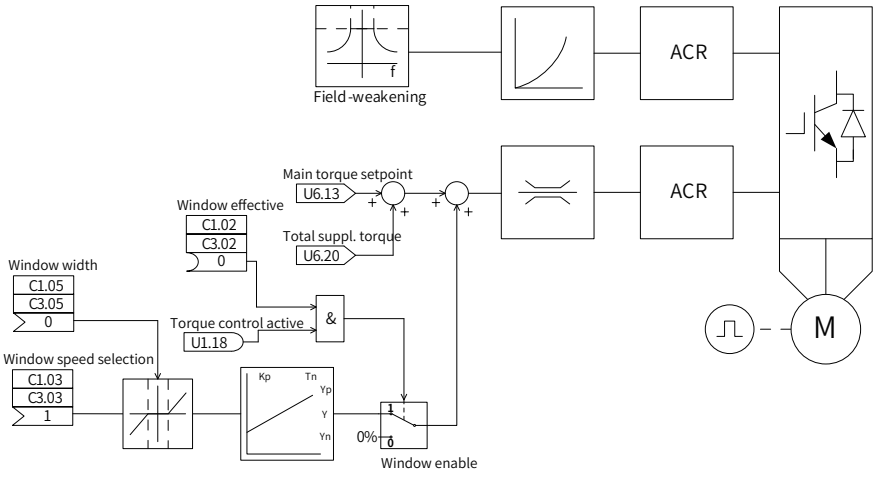


Figure 4-27 Windowed torque control block diagram

During torque control, if the load suddenly disappears, the motor will reach the maximum speed. Adding window control can avoid this situation; When the motor speed is in the window, it shows torque control externally; Even if the load disappears, the regulator controlled by the window will ensure that the actual speed will not exceed the limit of the window.

The window control is determined by the window center speed W and the window width H, and the actual effective window is [W-H, W + H].

The window width H is set by the parameter C1-05 (control channel 1 is effective) or C3-05 (control channel 2 is effective).

There are two ways to set the center speed W of the window:

1) Determined by parameter C1-04/C3-04 and takes effect after RFG. (parameter C1-03/C3-03 is set to 1 digital setting).
2) Determined by the speed reference channel during speed control and takes effect after RFG. (parameter C1-03/C3-03 is set to 0 speed channel).

NOTE

◆ The window width must be set properly to ensure that the speed during normal operation is always within the window range. Otherwise, it will lead to unexpected operating conditions.

4.6.4 Droop Control

Droop control is a control method that uses the output torque of the motor for negative feedback to reduce the speed setpoint of the motor. Droop control features low precision, high stability and simple application. It is widely used in belt conveyors, roller conveyors or continuous casters and many more.

When a load is placed on multiple motors, due to different mechanical characteristics, even if the same rotating speed is set, there will still be slight deviation between the motors, resulting in different output torques, and even mutual interference among the motors.

Applying droop control to all motors can achieve automatic load sharing among motors without communication between them. The motor with higher actual speed will bear more torque, and its own speed setpoint will be automatically reduced through negative feedback, thus distributing torque to other motors.

Features of droop control:

1) The application is simple and communication between motor controllers is not required.
2) Multiple motors can be connected rigidly or flexibly to handle the same load.
3) When multiple motors are used to achieve redundant operation, the faulty equipment can be stopped and other equipment can keep running normally.
4) The adjustment range of rotational speed is usually not greater than the rated slip of the motor.
5) Accurate speed following cannot be achieved. The actual speed has a static difference from the setpoint, and the difference is proportional to the load.
6) Accurate load distribution in dynamic process cannot be guaranteed.

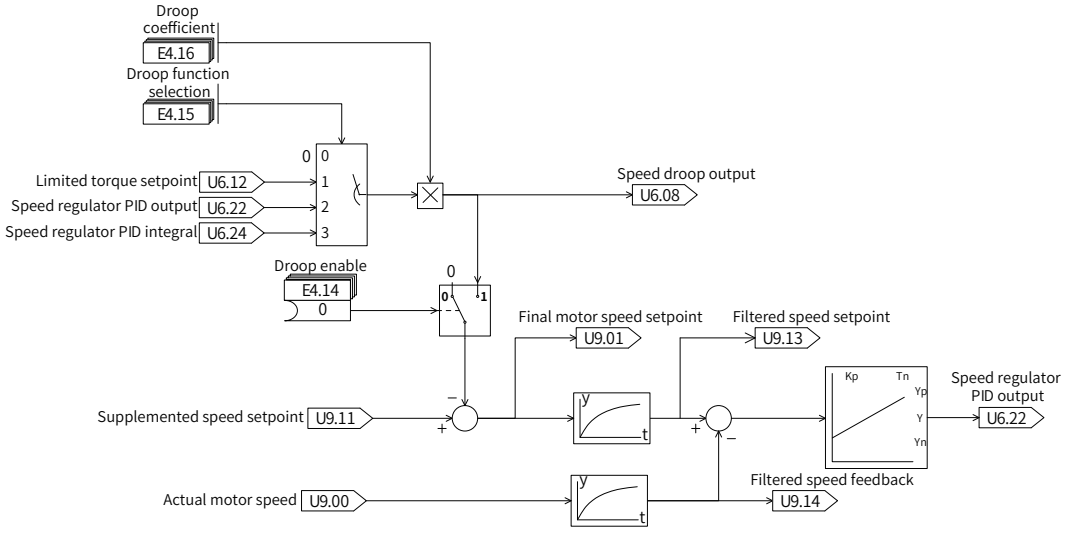


Figure 4-28 Droop control block diagram

To enable droop, only the following 3 parameters need to be set:

Para. No.	Name	Description
E4-14	Droop enable	You can select any bit connector to control: [E4-14] = 0 Turn off droop [E4-14] = 1 Turn on droop
E4-15	Droop source selection	Select the input for droop calculation: 0: Disabled Disable droop 1: Total torque setpoint, corresponding to U6-12 2: Speed ADJ PID output, corresponding to U6-22 3: Speed ADJ PID integral component, corresponding to U6-24

Para. No.	Name	Description
E4-16	Droop coefficient	Speed droop output [U6-08] = [E4-16] * [E4-15] * motor rated frequency. When [E4-15] = 10%, the speed setpoint is reduced by [E4-16] *0.1 * motor rated frequency

There are three droop options available in HCU-50/51, usually E4-15 = 3.

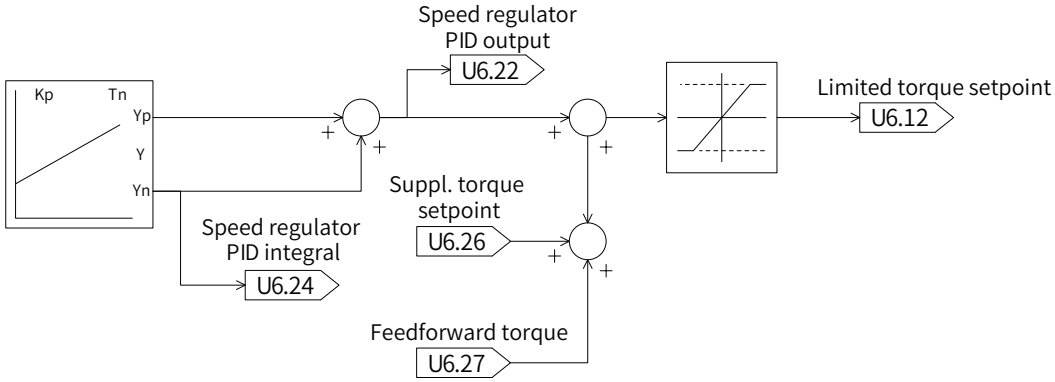


Figure 4-29 Three different droop sources

NOTE

◆ When multiple motors drive the same load, if the motor outputs rated torque under normal conditions, the droop coefficient is rated slip, and the drooped motor will no longer output torque at most. Recommended droop coefficient: not more than rated slip difference.

4.6.5 Master/Slave Control

Master-slave control is used when multiple motors drive a device at the same time. Depending on different devices, master-slave control can be achieved in many different ways. In terms of the coupling mode of the motor, it can be divided into rigid connection and flexible connection:

- Rigid connection is usually realized by gear engagement, and the speed between master and slave motors is strictly synchronized. The most important thing is load torque distribution, which can achieve higher dynamic response characteristics, and even allows multiple motors to be regarded as one high-power motor.
- The most common form of flexible connection is belt transmission. Roller table transmission on some cold rolling processing lines can also be considered as soft connection after steel belt connection is applied. The biggest drawback of soft connection is that the speed of each motor cannot be completely synchronized, and there may be relative movement, so it is impossible to achieve high dynamic response characteristics.

Droop control can be applied to occasions with low speed accuracy requirements, especially for synchronization between soft-connected motors, and there is no need for communication and interaction between control modules. However, accurate control of operation speed cannot be realized, and the dynamic response is poor. If better control effect is needed, these control modules can also be formed into a master-slave control network to control all equipment to follow a designated master.

The realization of master-slave control first requires a fast network for data transmission between devices. In HCU-50/51, InoLink communication network is usually used (see *"4.9.5 Inolink Communication Network"*), and data interaction between 16 HCU-50/51 can be realized in one network at most. If there is a high anti-interference requirement, fiber-optic synchronization detailed in *"4.9. 6 HOFR Optical Fiber Routing Network"* can also be selected. In this section, InoLink communication network is used as an example to illustrate. The configuration of optical fiber communication is similar.

In the master-slave control of HCU-50/51, the controlled master and slave have nothing to do with the

node number of the InoLink network. As long as the InoLink communication network is established normally and data interaction is realized, any node can be configured as the control master. For convenience, it is assumed that the InoLink communication network only contains two nodes: nodes 1 and 2, and node 1 is the control master and node 2 is the control slave.

When configuring master-slave control, it is usually necessary to ensure that the characteristics of master and slave are the same, including acceleration and deceleration time, speed controller parameters and current controller parameters.

Typical master-slave control solutions are as follows:

4.6.5.1 Master Speed + Slave Torque Control

As for master speed control, the slave speed always follows the master due to mechanical reasons; as for slave torque control, the torque setpoint is from the master, through which torque distribution is achieved.

- Applications: The master and slave motors must be rigidly connected, usually through gearbox engagement.
- Features: The slave torque always follows the master torque. The system runs according to the speed controller of the master, and the torque response is relatively fast. However, when the connection between the master and slave is disconnected, the speed of the slave is not controlled and will reach the upper limit of the speed. Window control can be introduced to the slave to reduce this influence.

The working principle is shown in the following figure:

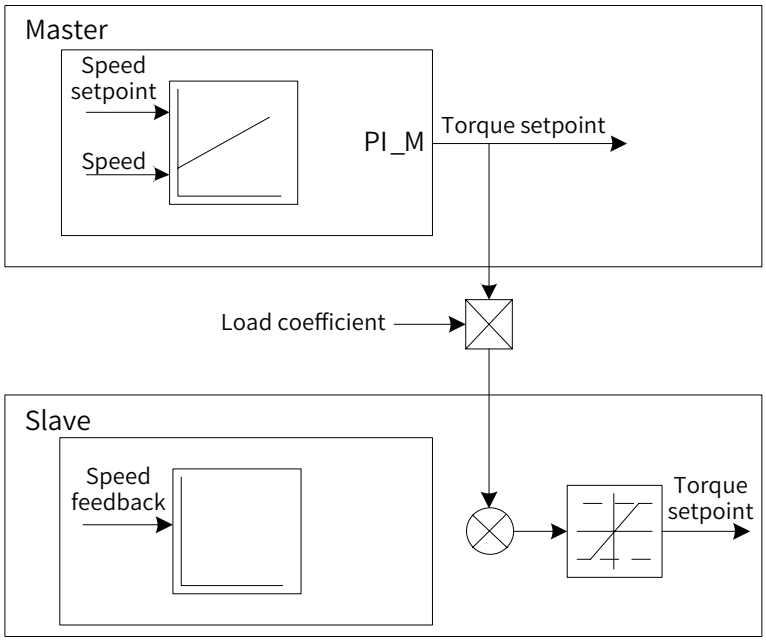


Figure 4-30 Master speed + slave torque control block diagram

Either normal torque control or windowed torque control can be used for the slave. If windowed torque control is selected, the master needs to send the speed to the slave as well, and ensure that the acceleration and deceleration time settings of the master and slave are the same.

Taking the setting of control channel 1 as an example, the parameters required for typical speed control + torque control are as follows:

Para. No.	Name	Master Settings <1>	Slave Settings <1>
E0-00	Control Mode	1-FVC	1-FVC
E0-01	Control mode	0-Speed control	1-Torque Control<2>

Para. No.	Name	Master Settings <1>	Slave Settings <1>
b1-10	Forced torque control source	0-Disabled	1- Enabled<2>
b0-00	Start/stop control word source	3-User-defined (group b0 setting)	3-User-defined (group b0 setting)
b0-01	User-defined OFF1 source	1200(U2-00)<3>	1232(U2-32)<4>
C0-00	Speed control main setpoint selection	1545(U5-45)<3>	-
C1-00	Torque reference selection for torque control	-	1533(U5-33)
n0-00	Enable Inolink comm.	1-Start	1-Start
n0-01	Local node address	1	2
n0-03	Source node selection for received data 1	-	1
n0-04	Data selection for received data 1	-	1
n0-05	Source node selection for received data 2	-	1
n0-06	Data selection for received data 2	-	2
n0-27	[Sent data 1] Selection	1544(U5-44)	-
n0-28	[Sent data 2] Selection	1612(U6-12)	-

NOTE

- < 1 >: Other settings of master and slave must be identical, such as acceleration and deceleration time, acceleration torque compensation and speed controller parameters.
- < 2 >: E0-01 and B1-10 must both be 0 under speed control, and when any parameter is 1, it works in torque control.
- < 3 >: Assume that the control command word comes from PZD1 of bus adapter A, and the speed setpoint is from PZD2 of bus adapter A.
- < 4 >: The slave command word can come from the master or the bus adapter as the master;
- If the master is required to detect the fault status of the slave, the slave can also choose to send its own status word, while the master makes fault judgment.

4.6. 5.2 Master PI + Slave P Control

Both the master and slave operate in speed control mode and accept the same speed setting. The speed regulator of the master adopts PI controller, and the speed regulator of the slave adopts P control module. At the same time, the integral component of the speed regulator of the master is superimposed on the output of the speed regulator of the slave, thus achieving torque distribution in the steady-state process.

- Application: The connection between the master and the slave can be rigid or flexible.
- Features: Since the slave both accepts the setpoint from the master and has its own speed regulator, it can obtain control performance similar to that of the master speed control + slave torque control when applied to rigid connection equipment; The slave speed can still be controlled when the hard connection is disconnected.

The working principle is shown in the following figure:

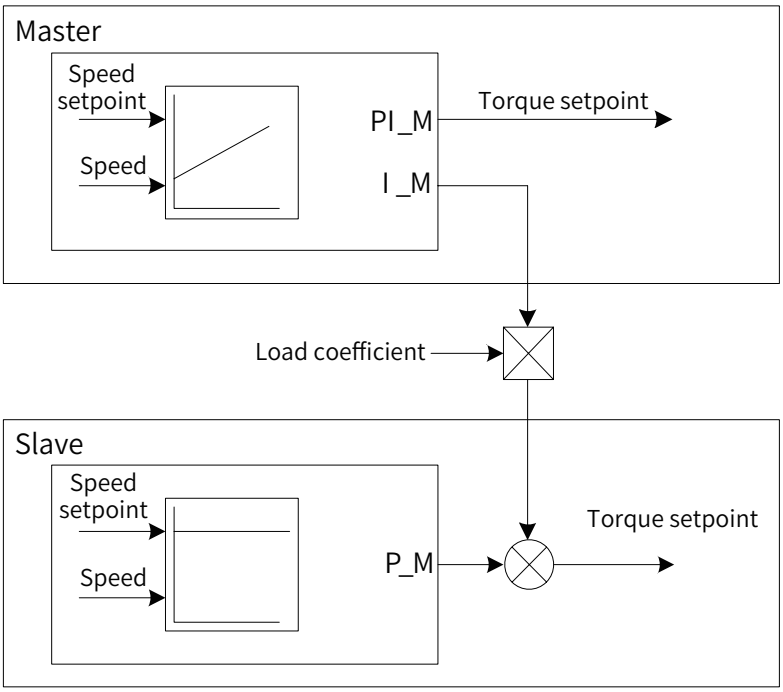


Figure 4-31 Master PI + slave P control block diagram

Taking the setting of control channel 1 as an example, the parameters required for typical master PI + slave P control are as follows:

Para. No.	Name	Master Settings <1>	Slave Settings <1>
E0-00	Control Mode	1-FVC	1-FVC
E0-01	Control mode	0-Speed control	0-Speed control
b1-10	Forced torque control source	0-Disabled	0-Disabled
b0-00	Start/stop control word source	3-User-defined (group b0 setting)	3-User-defined (group b0 setting)
b0-01	User-defined OFF1 source	1200(U2-00)<2>	1200(U2-00)<3>
C0-00	Speed control main setpoint selection	1545(U5-45)<2>	1545(U5-45)<3>
E4-18	Speed controller integral forcing source	0-Disabled	1-Enabled
E4-19	Source of speed loop integral force value	0	1533(U5-33)
n0-00	Enable Inolink comm.	1-Start	1-Start
n0-01	Local node address	1	2
n0-03	Source node selection for received data 1	-	1
n0-04	Data selection for received data 1	-	1
n0-05	Source node selection for received data 2	-	1
n0-06	Data selection for received data 2	-	2
n0-27	[Sent data 1] Selection	1544(U5-44)	-
n0-28	[Sent data 2] Selection	1624(U6-24)	-

NOTE

- < 1 >: Other settings of master and slave must be identical, such as acceleration and deceleration time, acceleration torque compensation and speed controller parameters.
- < 2 >: Assume that the control command word comes from PZD1 of bus adapter A, and the speed setpoint is from PZD2 of bus adapter A.
- < 3 >: Slave command word and speed setpoint can come from the master or from the bus adapter as the master.
- If the master is required to detect the fault status of the slave, the slave can also choose to send its own status word, while the master makes fault judgment.

4.6. 5.3 Slave Speed Deviation + Torque Limit

The master and slave both work in the speed control mode, and the speed regulators all adopt PI controllers; However, the speed setpoint of the slave is superimposed with a speed deviation on the basis of the master setpoint, and the master torque setpoint is transmitted to the slave as torque limit. The superimposed speed deviation is set according to the specific working conditions, and the magnitude is usually 5%~10%. The direction of supplementary speed and torque limiting is related to the running direction.

- Application: When the master and the slave are flexibly connected, better control effect can be obtained.
- Features: Since the slave has its own speed regulator, even when the connection between devices is disconnected, slave speed can still be controlled (the deviation from the speed setpoint does not exceed the supplementary speed, usually 5%~10%). Due to the presence of supplementary speed, the slave accelerates to tighten the flexible connection during startup, and then due to the saturation of the speed regulator, the torque limiting takes effect to limit the slave torque to the same as that of the master, thus realizing torque distribution.

The working principle is shown in the following figure:

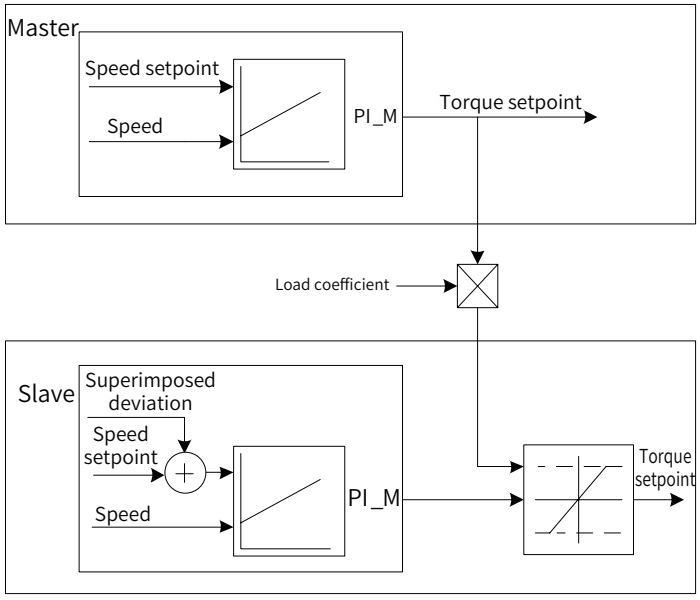


Figure 4-32 Slave speed deviation + torque limiting control block diagram

Taking the setting of control channel 1 as an example, the parameters required for typical slave speed deviation + torque limiting control are as follows:

Para. No.	Name	Master Settings <1>	Slave Settings <1>
E0-00	Control Mode	1-FVC	1-FVC
E0-01	Control mode	0-Speed control	0-Speed control
b1-10	Forced torque control source	0-Disabled	0-Disabled

Para. No.	Name	Master Settings <1>	Slave Settings <1>
b0-00	Start/stop control word source	3-User-defined (group b0 setting)	3-User-defined (group b0 setting)
b0-01	User-defined OFF1 source	1200(U2-00)<2>	1200(U2-00)<3>
C0-00	Speed control main setpoint selection	1545(U5-45)<2>	1545(U5-45)<3>
C0-03	Supplementary speed setpoint	0	1931(U9-31)
C6-05	Multi-step setpoint 1	0	5%<4>
E2-10	Torque upper limit reference selection	400%	1533(U5-33)<4>
E4-18	Speed controller integral forcing source	0-Disabled	0-Disabled
E4-19	Source of speed loop integral force value	0	0
n0-00	Enable Inolink comm.	1-Start	1-Start
n0-01	Local node address	1	2
n0-03	Source node selection for received data 1	-	1
n0-04	Data selection for received data 1	-	1
n0-05	Source node selection for received data 2	-	1
n0-06	Data selection for received data 2	-	2
n0-27	[Sent data 1] Selection	1544(U5-44)	-
n0-28	[Sent data 2] Selection	1612(U6-12)	-

NOTE

- < 1 >: Other settings of master and slave must be identical, such as acceleration and deceleration time, acceleration torque compensation and speed controller parameters;
- < 2 >: Assuming that the control command word comes from PZD1 of bus adapter A, the speed is given from PZD2 of bus adapter A;
- < 3 >: Slave command word and speed setpoint can come from the master or from the bus adapter as the master;
- < 4 >: For forward run, a 5% supplementary speed and torque upper limit are required; For reverse run, a 5% supplementary speed and torque lower limit may be required;
- If the master is required to detect the fault status of the slave, the slave can also choose to send its own status word, while the master makes fault judgment

4.6.6 Sensorless Vector Control (SVC)

In some applications, the signal interference of the encoder is large, the encoder installation is inconvenient or the encoder is not installed due to cost considerations, but the excellent performance of vector control is desired, so the control mode needs to be set to SVC control E0-00 = 0.

The difference between SVC control and FVC control is that the feedback speed of FVC is measured by encoder, while the feedback speed of SVC is calculated by back electromotive force and output current. When running at low speed, the model can not accurately calculate the motor speed, which affects the control accuracy. FVC is preferred for active load. If encoder cannot be installed, SVC can be considered. It is necessary to turn on SVC speed open loop to enable E11-08=1 and set appropriate torque currents E11-09 and E11-10.

- Active load refers to the load that can reverse the motor rotation (such as lifting mechanism load).
- Passive load is a load that can only be driven by the motor, but cannot drive the motor (such as fan, water pump, centrifuge, extruder).

After the speed open-loop function is turned on, the motor will automatically switch to open-loop control

after running to low speed. The switching process is as follows:

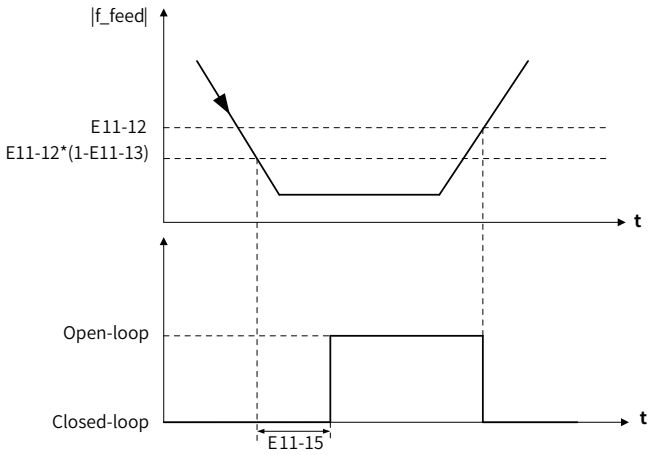


Figure 4-33 Closed-loop to open-loop switching conditions

Open-loop speed control is a speed control mode (E0-01=0), which can ensure that the speed feedback of the motor follows a speed setpoint, but cannot guarantee the accuracy of torque in the torque control mode (E0-01=1). The output torque current E11-09/E11-10 must be set according to the required maximum torque to prevent the motor from being towed away by the load. E11-09/E11-10 represents the maximum torque output capacity. When E11-09+E11-10=100%, the output current is the rated current of the motor, and when E11-09+E11-10=0%, the output current is no-load current.

Torque control cannot output accurate torque in the open-loop state of SVC speed. If tension control is required at zero speed, install an encoder and run in FVC mode.

4.6.7 Speed Controller

The function diagram of the speed controller is as follows:

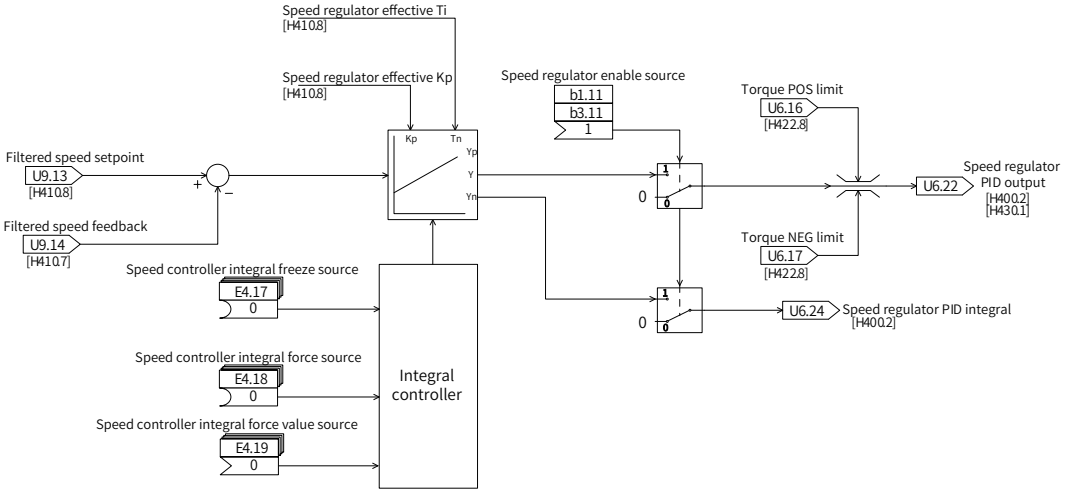


Figure 4-34 Speed controller function diagram

The speed controller obtains the speed setpoint from the setpoint channel, receives the feedback speed value in the feedback channel (FVC feedback speed is measured by the encoder and SVC is calculated by the motor model), and then generates the torque setpoint from the deviation of the setpoint and feedback through the PI controller, and sends it to the current controller. The most important parameters of speed regulator are regulator parameters Kp and Ti.

Because the dynamic response performance of FVC and SVC is different, different regulator parameters Kp and Ti are used: E4-02 and E4-03 for FVC, and E4-04 and E4-05 for SVC.

The parameters Kp and Ti of the speed controller PI regulator can be optimized by no-load complete

auto-tuning (b5-00 = 2) of the asynchronous motor. If the moment of inertia is known, set d2-02 (moment of inertia) and set b5-02 = 2 to calculate the speed controller parameters, and then set b5-03 = 1 to complete the calculation.

If the feedback speed still oscillates after optimization, it is necessary to manually optimize the controller parameters. When Kp is small, the feedback speed overshoot is large. When Kp increases, the adjustment will become faster and the overshoot will decrease. If Kp is too large, the output torque and feedback speed will oscillate. When Ti decreases, the adjustment of the controller accelerates, and if Ti is too small, the output torque and feedback speed oscillation will also occur.

The principles of manually adjusting the speed regulator parameters Kp and Ti are as follows:

1) Set a long integration time, for example Ti = 500 ms;

2) Set a relatively small KP and a 5% speed step, and observe the feedback speed overshoot; When the overshoot is large, increase KP to make speed step response again; When the feedback speed overshoot is controlled within 20%, the effect is considered acceptable;

3) When there are multiple oscillation waveforms in the speed, Kp should be reduced, and the speed stability period should be controlled at 1;

4) Reduce the integration time to eliminate the steady-state output deviation, and the torque output jitter in steady-state cannot exceed 2% of the rated torque;

5) If the controller parameters are too weak to eliminate jitter, the feedback speed filter can be increased (FVC: N4-17/N5-17/N6-17, SVC: E11-07).

NOTE

◆ Step testing should be carried out when mechanical equipment permits.

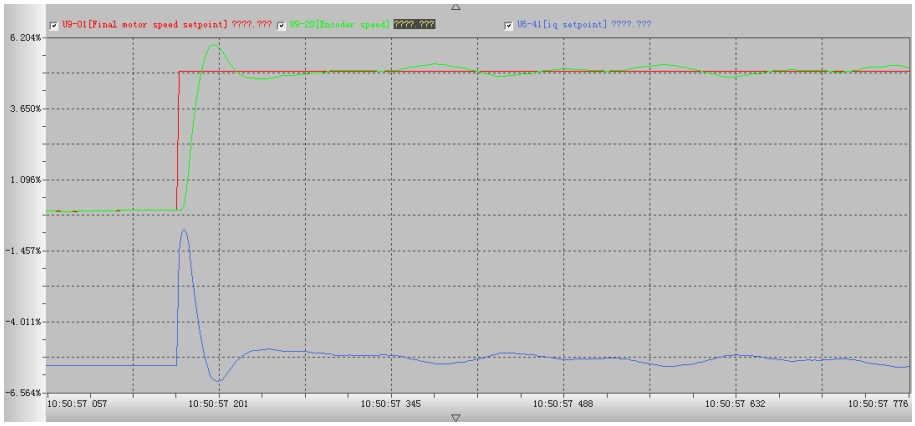


Figure 4-35 5% speed step response ideal converter waveform

When a PLC is used, the speed loop regulator needs the following 3 functions:

1) Speed loop regulator enable: controlled by B1-11 or B3-11. B1-11 and B3-11 are setpoint source parameters which can be controlled through the data from bit connectors;

2) Speed loop integration freeze enable: controlled by E4-17; After integration freeze enable, the integration output value will be fixed and reset to the value of the previous cycle;

3) Speed loop integration forcing enable: controlled by E4-18. E4-19 sets the integration forcing value, and the integration output value will be forced to the value of the word connector set by E4-19 after the integration forcing is enabled.

4.6.8 Speed Controller Adapter

The speed controller adapter can optimize the speed loop parameters under different operating conditions or process requirements, and the adapter includes speed adaptation and adaptive adaptation.

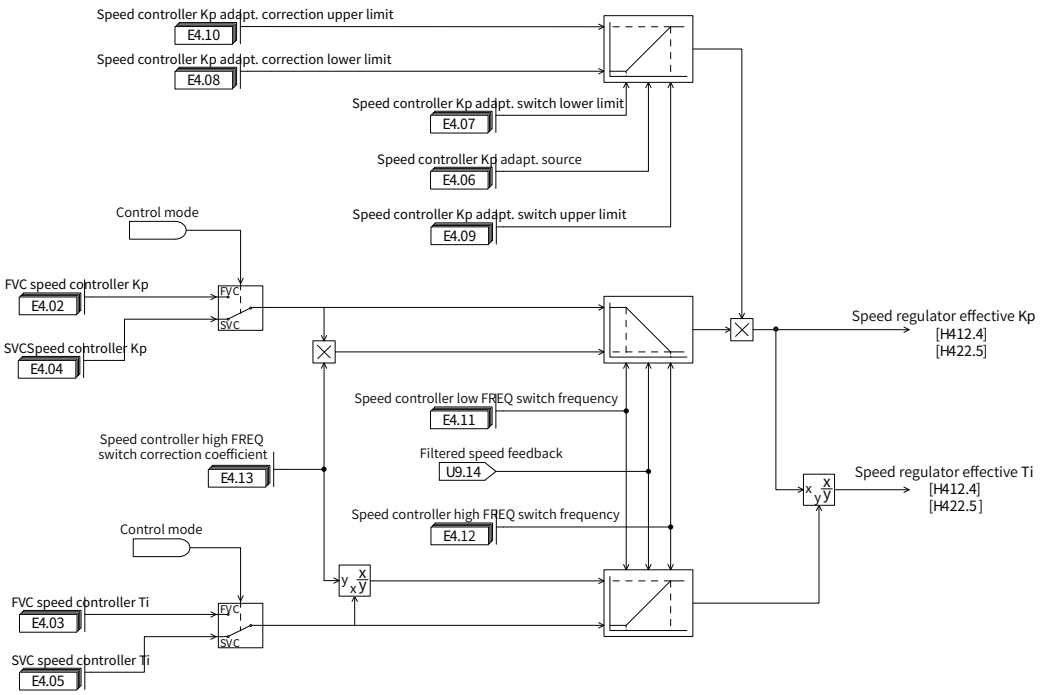
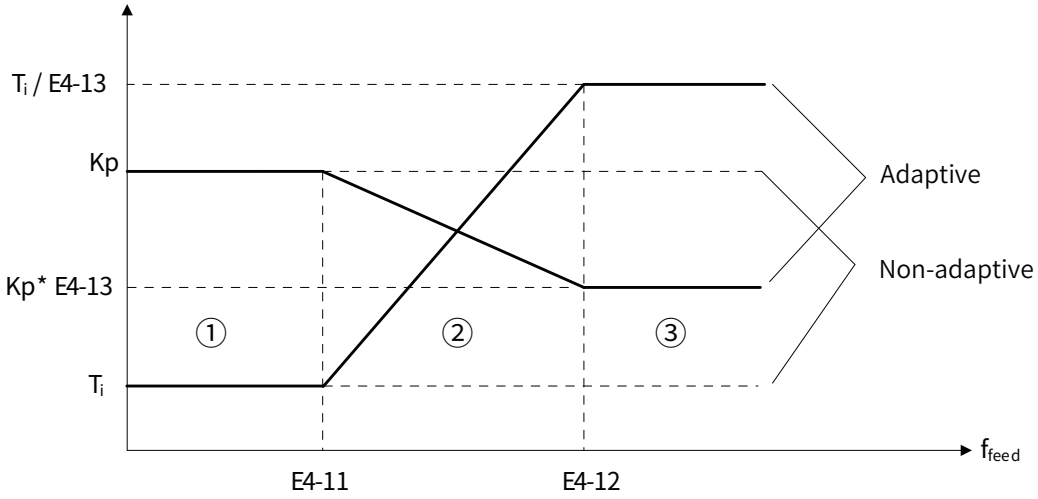


Figure 4-36 Speed controller adapter

Speed adaptation: At high speed, the current control capability becomes weak and the bandwidth of the speed loop decreases, which requires real-time adjustment of the effective Kp and Ti parameters according to the feedback speed. After dynamic parameter identification, the benchmark Kp and Ti (E4-02/E4-03/E4-04/E4-05) are obtained, and the speed adaptation output is obtained through the calculation in the above figure.



① Constant low speed area ② Adaptation area ③ Constant high speed area

Figure 4-37 Speed adapter

The principle of adaptive adaptation and speed adaptation is the same, but the adjustment reference value range of this adapter is wider. For example, if the speed loop controller needs to be modified when the roll diameter changes during winding and unwinding, the roll diameter can be used as the adjustment reference. The adaptive adapter outputs an adjustment coefficient, which acts on Kp and Ti of the speed adaptation output. The adaptive correction coefficient is calculated as follows

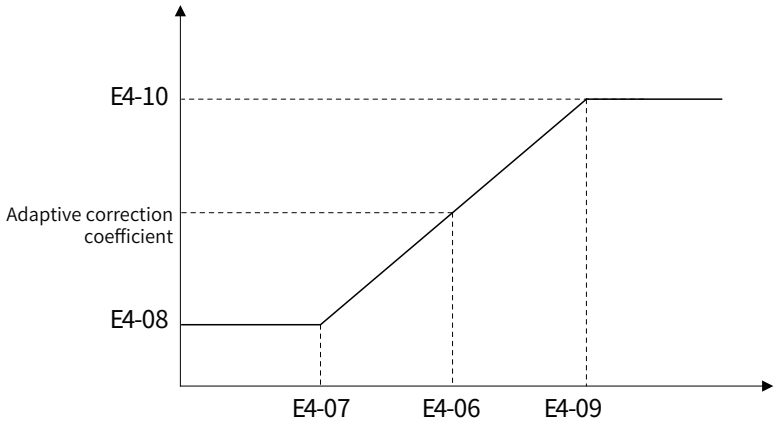


Figure 4-38 Adaptive adapter

The final effective Kp and Ti are calculated as follows:

Kp final effective value = Kp speed adaptation output value * adaptive correction coefficient

Ti final effective value = Ti speed adaptation output value/adaptive correction coefficient

4.6.9 Speed Limit

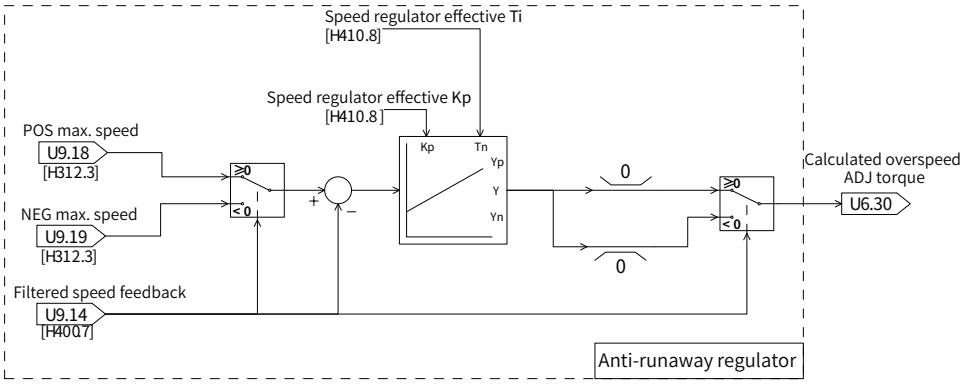
See functional diagram [H312] for speed limit.

The upper limit of motor speed is determined by parameters D0-06, E2-04 and E2-06. The minimum upper limit of motor speed is 0 and cannot be negative.

The lower limit of motor speed is determined by parameters D0-06, E2-05 and E2-07. The maximum upper limit of motor speed is 0 and cannot be positive.

Para. No.	Name	Description
d0-06	Max. motor speed	It is not allowed to exceed d0-06 in both forward and reverse directions. 100% corresponds to d3-02 motor per unit speed (synchronous speed)
E2-04	FWD speed limit	The maximum speed of forward run. 100% corresponds to d3-02 motor per unit speed (synchronous speed)
E2-05	REV speed limit	Negative value, the maximum speed of reverse run. -100% corresponds to d3-02 motor per unit speed (synchronous speed)
E2-06	FWD speed limit selection	Restricted by D0-06 and E2-04, the maximum speed of forward run is restricted through the connector. 100% corresponds to d3-02 motor per unit speed (synchronous speed)
E2-07	REV speed limit selection	Restricted by D0-06 and E2-05, the maximum speed of reverse run is restricted through the connector. -100% corresponds to d3-02 motor per unit speed (synchronous speed)

Speed limiting works for all control modes. Once the speed exceeds the upper and lower limits of the speed, the anti-speed protection function is automatically activated to ensure that the motor speed does not exceed the limit. See function diagram [H422].



4.6.10 Current Limit

The current during normal operation of the motor shall not exceed the maximum motor current set by d0-08.

During VF control, the overcurrent suppression function needs to be turned on to ensure that the current is limited below the maximum current.

When FVC or SVC is controlled, the current regulator will automatically control the current to ensure that the total current output does not exceed the limit of D0-08.

Limiting the maximum current of the motor may affect the overload capacity of the motor and reduce the torque output of the motor.

4.6.11 Torque Limit

The torque limiting of the motor only takes effect during vector control (including FVC and SVC) and is not effective during VF operation.

The actual limitation of motor torque will be affected by current limiting, torque limiting and power limiting at the same time. See the description of function diagrams H330, H420 and H422 for details.

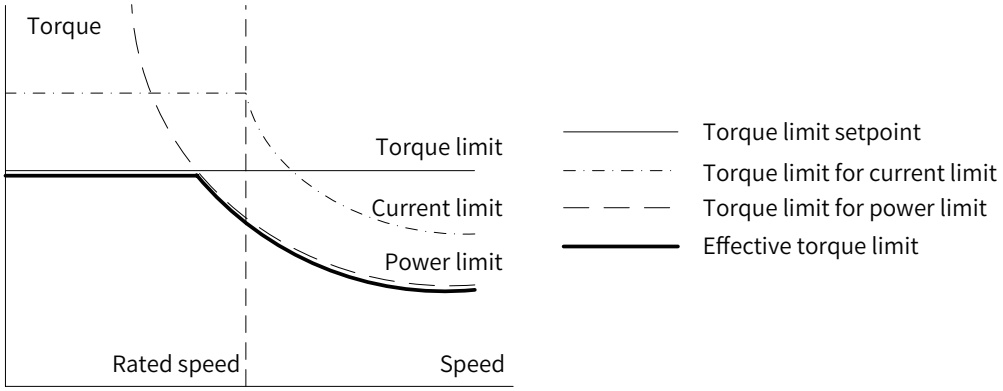


Figure 4-39 Torque limit diagram

The above figure takes the electric working condition as an example to illustrate the influence of three kinds of limits on the actual torque limit. That is, among all restrictions, the most stringent conditions take effect. In the figure, for the convenience of comparison, the actual effective torque limit is slightly lowered, and the actual curve application torque setpoint limit coincides with the power limit torque limit.

See the following table for the torque limit:

Para. No.	Name	Description
E2-08	Digital setting of torque upper limit	The forward direction of the motor is also that of the torque, and the smaller of E2-08 and [E2-10] is taken as the torque upper limit setpoint. The torque limit is a signed value
E2-10	Torque upper limit reference selection	
E2-09	Digital setting of torque lower limit	The Negative direction of the motor is also that of the torque, and the larger of E2-09 and [E2-11] is taken as the torque lower limit setpoint. The torque limit is a signed value
E2-11	Torque lower limit reference selection	

Technically, it is sometimes necessary to separately limit the output torque of the speed regulator:

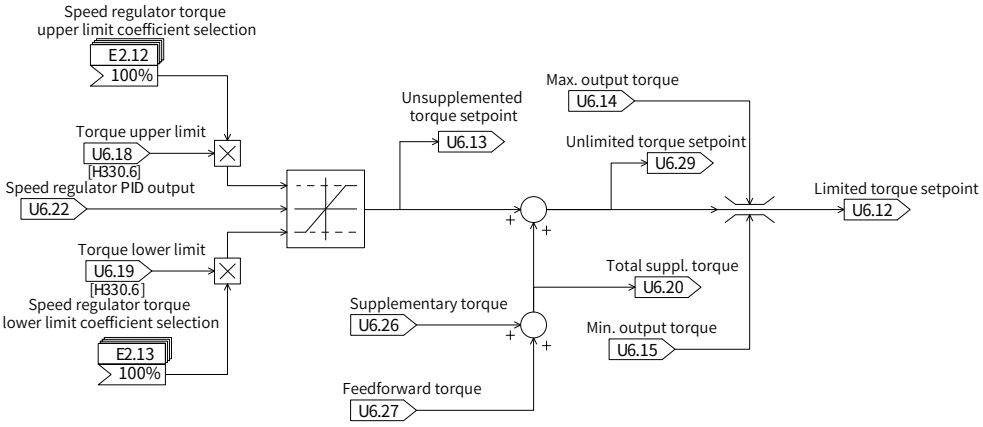


Figure 4-40 Speed regulator output torque limit diagram

Para. No.	Name	Description
E2-12	Speed ADJ torque upper limit coefficient	The default value is 100%. [E2-12] * U6-18 is used to limit the upper limit of speed PID output torque
E2-13	Speed ADJ torque lower limit coefficient	The default value is 100%. [E2-13] * U6-19 is used for speed adjustment PID output torque lower limit

4.6.12 Power Limit

The torque limiting of the motor only takes effect during vector control (including FVC and SVC) and is not effective during VF operation.

Power limiting can limit the total power output by the motor. With the increase of motor speed, the output torque limiting will decrease due to power limiting. The power limit is determined by the power limit value and the power limit coefficient. See the following figure:

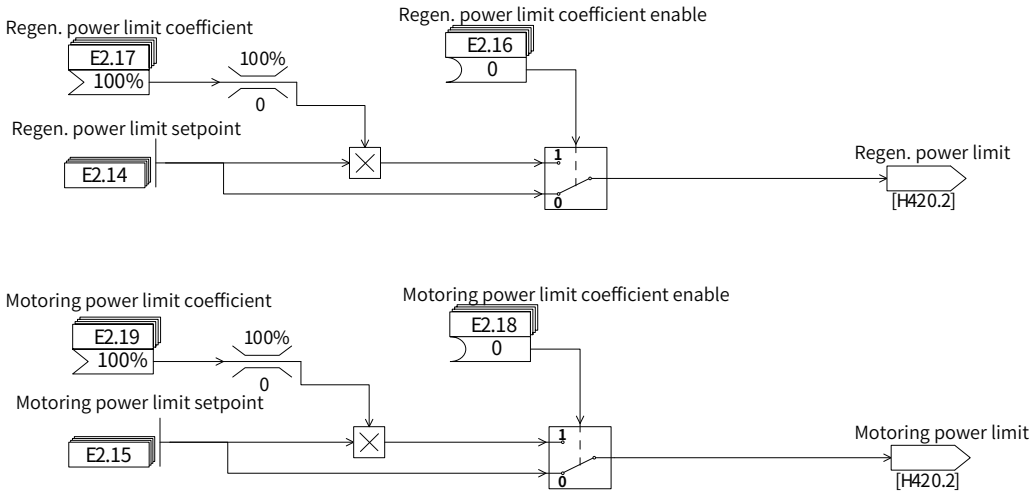


Figure 4-41 Power limit diagram

Para. No.	Name	Description
E2-14	Regen power limit	The maximum allowable regenerative power in regenerative mode. When prohibited by [E2-16], the generated power is limited to E2-14. When [E2-16] is enabled, the power generated is limited to E2-14 * [E2-17].
E2-16	Enable regen. power limit coefficient	
E2-17	Regen. power limit coefficient	
E2-15	Motoring power limit	The maximum power allowed to be output in motoring mode. When [E2-18] is disabled, the motoring power limit is E2-15. When [E2-18] is enabled, the motoring power is limited to E2-15 * [E2-19].
E2-18	Motoring power limit coefficient enable	
E2-19	Motoring power limit coefficient	

4.6.13 Acceleration Torque Compensation

Motor motion equation:

$$T_e - T_L = J\frac{d\omega}{dt}$$

In the above equation:

T_e : motor electromagnetic torque

T_L : load torque and friction torque

J : moment of inertia, displayed in parameter d2-00 after identification, and the per unit value is equal to the electromechanical time constant d2-05

$\frac{d\omega}{dt}$: Motor speed change rate

It can be seen that in order for the motor to accelerate and decelerate according to a given RFG curve, it is necessary to provide the motor with an appropriate acceleration torque T_a=T_e-T_L. It is usually not easy to obtain a very satisfactory effect by relying completely on the speed regulator, and it is easy to generate overshoot at the end of acceleration and speed lag at the beginning of acceleration.

Acceleration torque compensation is the answer to this problem. Using the identified moment of inertia and the expected acceleration, the required acceleration torque is directly calculated and superimposed on the output of the speed regulator (functional diagram H430) to avoid the adjustment of the speed regulator and improve the speed following characteristics.

Using acceleration torque to calculate the output acceleration of RFG can obtain accurate acceleration

torque when a given speed curve is only generated by RFG. Taking the control channel 1 as an example, after setting the parameter E4-22=1/c1-10=1/E4-23=100%, accurate acceleration torque can be obtained, and the current acceleration torque value can be viewed through U6-25/U6-27.

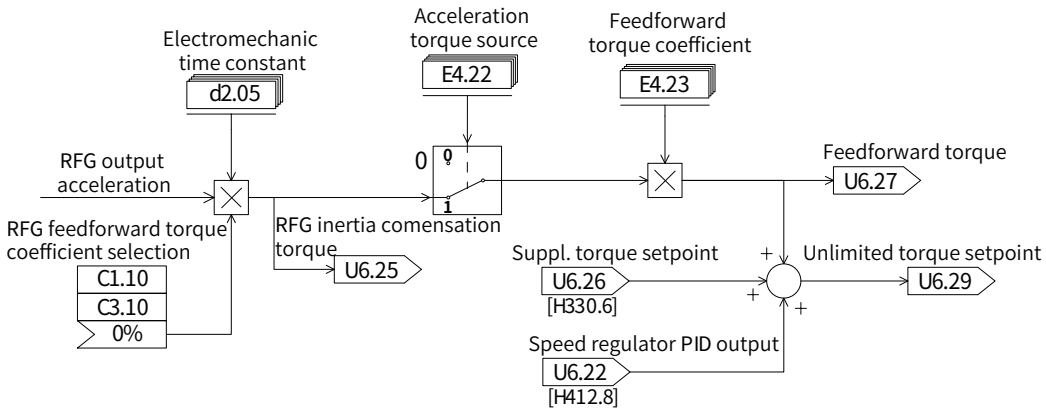
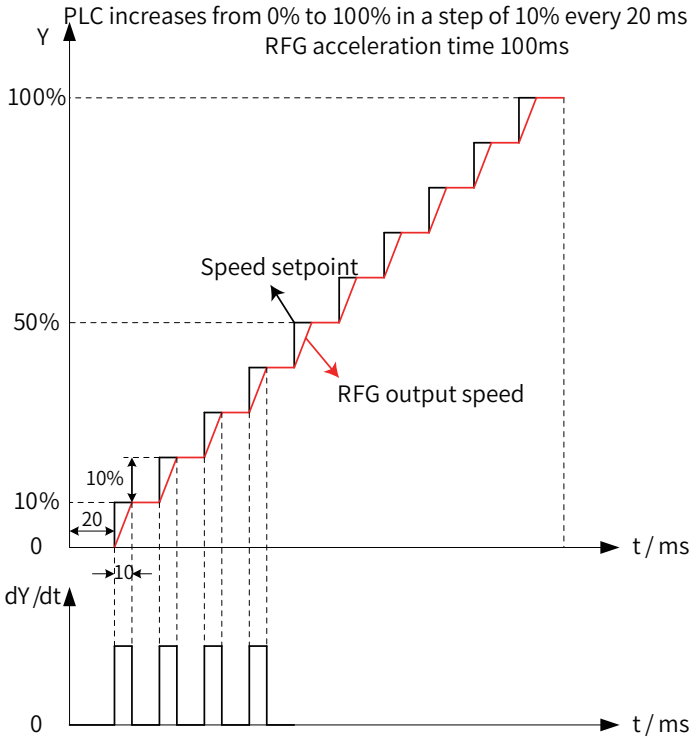


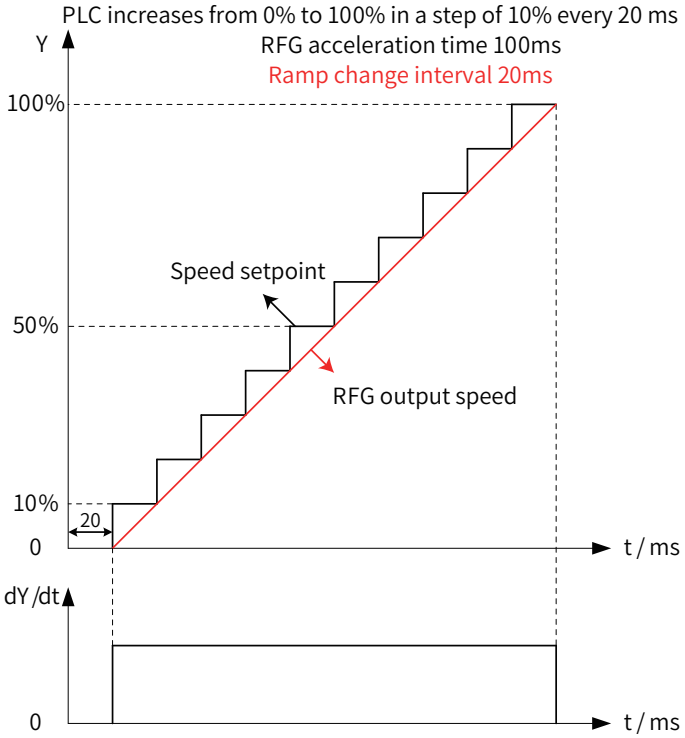
Figure 4-42 Feedforward torque

NOTE

- If the speed setpoint is set through PLC communication, due to the long communication period between PLC and AC drive, the speed setpoint can be discontinuous and the RFG output speed may not be smooth, which result in discontinuous calculated acceleration. For acceleration torque compensation function, the calculated jump feedforward torque will lead to motor output torque oscillation, which may damage the rigid structure connected by gears.



The slope of the speed ramp is controlled during the change of the speed setpoint, resulting in a continuous variable slope change rate. When the signal update time interval of the external control system (PLC issuing time interval) is consistent with the slope change rate C7-26, the output speed of U9-09 RFG is given as a straight line.



To enable the RFG ramp change function, only the following 2 parameters need to be set:

Para. No.	Name	Description
C7-25	Enable RFG input ramp shift	You can select any bit connector to control: [C7-25] = 0: turn off ramp change function [C7-25] = 1: turn on ramp change function
C7-26	RFG input ramp shift interval	Set speed setpoint change rate during slope change

4.6.14 Flux Weakening Control

As the running speed of the motor increases, the back electromotive force of the motor also increases. When the back electromotive force exceeds the maximum output voltage, the AC drive is unable to adjust the current and the motor will lose control. Reducing the magnetic flux can reduce the back electromotive force and prevent the motor from losing control, so that the speed of the motor can rise to a higher level.

The maximum available voltage is calculated from the bus voltage, and a voltage reserve (E6-02) is provided to ensure the current regulation capability. The maximum output voltage is calculated as follows:

$$\text{Vmax} = \frac{\textbf{Bus voltage}}{\sqrt{2}} (100\% - \textbf{E6-02})$$

The voltage reserve (E6-02) can be manually adjusted when the output voltage capability is insufficient.

When the output frequency enters the field weakening region, the back electromotive force is reduced by setting the magnetic flux according to the following curve, thus ensuring that the motor does not lose control at high speed.

$$\psi_{set} = \begin{cases} \psi_N \ldots\ldots\ldots\ldots\ldots\ldots f_{syn} < f_N \\ \psi_N \dfrac{f_N}{f_{syn}} \ldots\ldots\ldots\ldots\ldots\ldots f_{syn} \geq f_N \end{cases}$$

ψ_N ,: ψ_{set} rated magnetic flux, magnetic flux setpoint;

f_N ,: f_{syn} rated frequency, output frequency.

As shown in the following figure, after entering the weak magnetic region, the magnetic flux starts to decrease and the output voltage does not increase. The reserved voltage margin (E6-02) cannot be set too large, otherwise it will affect the high-speed load capacity of the motor.

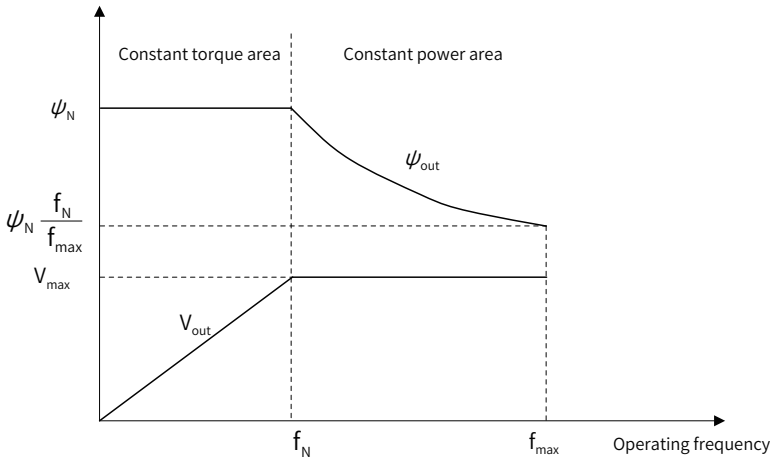


Figure 4-43 Schematic diagram of flux and voltage output of asynchronous motor during operation

4.6.15 Vdc Control in Vector Control

You can enable Vdc control when the power supply does not support feedback and the DC bus has overvoltage or undervoltage. Vdc control consists of VdcMax control and VdcMin control. VdcMax control and VdcMin control use the same PI controller. The controller parameter gain is automatically calculated. When parallel inverters are added to the bus, the gain adjustment coefficient of Vdc control in E9-06 vector control can be adjusted based on the power percentage.

4.6.15.1 DC Bus Overvoltage

The voltage of the DC bus increases when the motor generates electricity. The direct method for suppressing DC bus voltage increase is to reduce torque during electricity generation. After VdcMax control is enabled, it automatically reduces the motor torque during electricity generation to adjust DC bus voltage when torque and feedback energy are beyond the upper limit. The motor may enter the power-driven state to consume the redundant energy of the bus through electric torque when voltage increases too quickly. This prolongs the motor deceleration time.

Note:

1) VdcMax control is recommended only when the power supply does not support feedback.

2) When a braking resistor is used, the configured braking voltage must be smaller than the VdcMax trigger voltage and VdcMax control must be disabled.

3) The VdcMax control function of only one inverter can be enabled in bus sharing applications. Typically, VdcMax control is enabled for the motor with the largest inertia and disabled for other motors.

4) Be cautious when you enable VdcMax control in torque control. The torque may be adjusted to the limit value if the torque does not support bus adjustment.

5) When there is an active load, such as a lifting load, it is forbidden to turn on VdcMax control, because VdcMax will limit the power generation torque, causing the motor to be dragged away by the load.

Figure 1-14 shows the VdcMax control process.

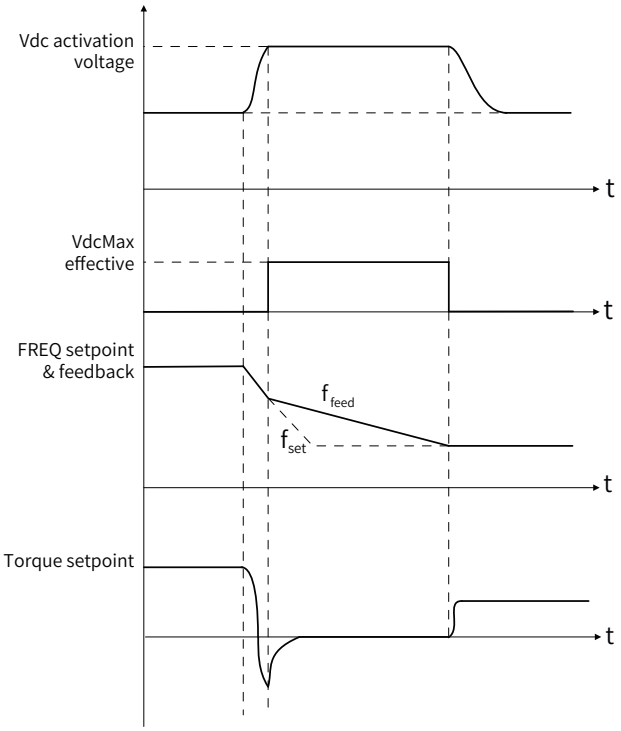


Figure 4-44 VdcMax control process

4.6.15.2 DC Bus Undervoltage

The motor may coast to a stop due to undervoltage if no measure is taken in the case of a short-term blackout or DC bus power failure. VdcMin control can suppress undervoltage within a short time to prevent shutdown due to a momentary power outage. In the case of a long-term blackout or DC bus power failure, you need to enable VdcMin control for electricity generation to compensate for bus energy loss until all motors stop reliably. When detecting that the bus voltage is lower than the permitted value, VdcMin control enables the motor to generate electricity to compensate for energy loss until the DC bus voltage is stabilized.

Figure 1-15 shows the VdcMin control process.

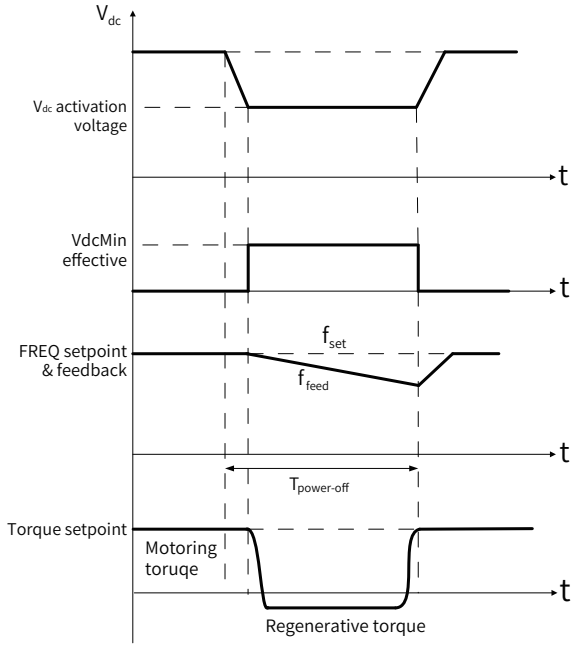


Figure 4-45 VdcMin control process

Related parameters:

Para. No.	Name	Function	Setpoint
E9-00	Auto calculation of Vdc excited voltage in vector control	Set by parameter: Vdc excited voltage is set by E9-02 and E9-05 Auto calculation: dc excited voltage is calculated based on the bus undervoltage and overvoltage thresholds VdcMin excited voltage = Bus undervoltage threshold + 50 V VdcMax excited voltage = Bus overvoltage threshold - 70 V	0: Parameter setting 1: Auto calculated
E9-01	Vdc_max control switch in vector control	0: VdcMax control is disabled 1: VdcMax control is enabled	0: Disabled 1: Enabled
E9-02<1>	Vdc_max excited voltage in vector control	VdcMax excited voltage in vector control takes A2-02 as reference. When A2-02 is 400 V, VdcMax excited voltage is calculated as follows: VdcMax excited voltage = E9-02 x A2-02 x 1.414 = 650 V	110% to 140%
E9-03	Vdc_min control switch in vector control	0: VdcMin control is disabled 1: VdcMin control is enabled	0: Disabled 1: Enabled
E9-04	VdcMin control cut-off frequency in vector control	The VdcMin control cut-off frequency in vector control is the frequency when VdcMin control is exited because the running frequency is smaller than the value of E9-04.	0.0~50.0Hz
E9-05<2>	VdcMin excited voltage in vector control	VdcMin excited voltage in vector control takes A2-02 as reference. When A2-02 is 400 V, the VdcMin excited voltage is calculated as follows: VdcMin excited voltage = E9-05 x A2-02 x 1.414 = 452.4 V	60% to 90%
E9-06	Gain adjustment coefficient of Vdc control in vector control	E9-06 is used to adjust controller performance dynamically	1% to 1500%
E9-07	Bus capacitance ratio	Controller performance is affected by the number of capacitors connected to the bus when multiple drives share the same bus. The capacitance of the inverter module of the bus is typically proportional to the module power. The aggregate power of all inverters of the bus is 2000 kW if the power of the inverter module is 500 kW. In this case, set this parameter to 400%.	100% to 1500%

NOTE

- < 1>: Set E9-02 for VdcMax control to a relatively large value to prevent incorrect trigger in the case of large grid voltage fluctuations. It is better to verify this trigger voltage during application.
- < 2>: Set E9-05 for VdcMin control to a relatively large value to prevent incorrect trigger in the case of large grid voltage fluctuations. It is better to verify this trigger voltage during application.

4.7 VF Control

VF control is suitable for common loads such as fans and water pumps, or applications where a device drives multiple motors, or where the power of the device is quite different from that of the motor. In VF control, the drive runs in open-loop control, without speed feedback, with low dependence on motor parameters and high robustness, which is generally suitable for occasions with low dynamic requirements.

4.7.1 V/F Curve Selection

VF has two control modes: VF curve and VF separation. There are many options for the VF curve, and the relevant parameters are as follows:

Para. No.	Name	Setpoint
E3-00	V/F mode selection	0: VF curve 1: VF separation
E3-01	V/F curve selection	0: Linear VF 1: Multipoint VF 2: Square V/F 3: 1.2 V/F 6: 1.6 V/F 8: 1.8 V/F
E3-02	Frequency point 1 of multi-point VF curve	0.0% to 100.0%
E3-03	Voltage point 1 of multi-point VF curve	0.0% to 100.0%
E3-04	Frequency point 2 of multi-point VF curve	0.0% to 100.0%
E3-05	Voltage point 2 of multi-point VF curve	0.0% to 100.0%
E3-06	Frequency point 3 of multi-point VF curve	0.0% to 100.0%
E3-07	Voltage point 3 of multi-point VF curve	0.0% to 100.0%
E3-26	V/F reference separation voltage	0:[0] 1:[100.0%] 2:[AI1] 3:[AI2] 4:[HDI1] 5:[HDI2] Other: [K connector]
E3-27	V/F separation voltage change time	0.0 ～ 1000.0s

VF separation mode is generally used in induction heating, inverter power supply and torque motor control. This mode can be selected by parameter E3-00. In this mode, the voltage output by the drive is independent of the frequency. The output frequency is determined by the frequency source, and the output voltage source is set by the parameter E3-26. If the set separation voltage changes, the VF separation voltage change time can be set through E3-27 to prevent voltage sudden change.

The VF curve has several modes:

- 0: Linear VF. When the motor runs below the rated frequency, the output voltage and frequency maintain a linear relationship. Suitable for ordinary constant torque load.
- 1: Multipoint VF. Suitable for special loads such as dehydrators and centrifuges. The user can customize the frequency point and voltage point of VF curve by setting the parameter E3-02-E3-07. Multi-point VF needs to be set according to the load characteristics of the motor. It should be noted that the relationship between the three voltage points and frequency points must meet the requirements of V1 ⩽ V2 ⩽ V3 and F1 < F2 < F3. The figure also shows a schematic diagram of multi-point VF setting.
- 2: Square VF. It is suitable for centrifugal loads such as fans and pumps, and the voltage varies squared with frequency.

■ 3/6/8: 1.2 VF, 1.6 VF, 1.8 VF, the voltage changes with frequency to the power of 1.2, 1.6, 1.8, respectively. Between the linear and the square VF.

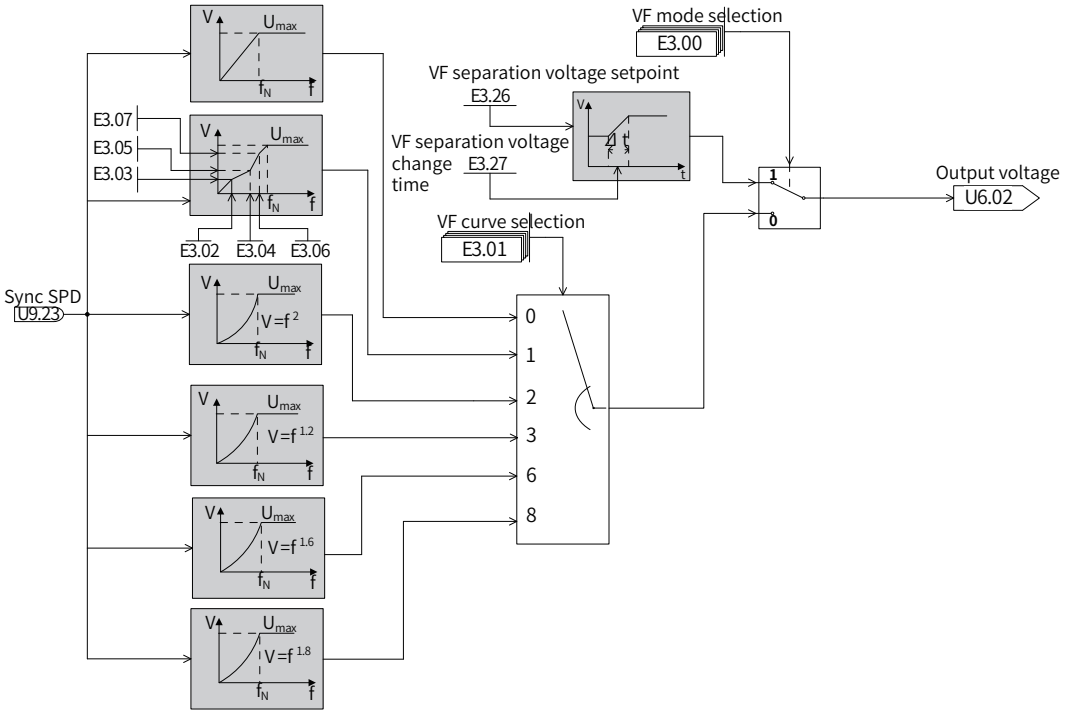


Figure 4-46 V/F mode selection

4.7. 2 VF Low Speed Torque Boost

When the motor adopts VF control, the voltage drop on the stator resistance will lead to small motor output torque, and even poor load capacity of the motor at low speed. Torque boost can compensate the voltage loss on the stator resistance and improve the load capacity of the motor at low speed.

Setting E3-13 enables this function and selects the torque boost mode. In the case of manual torque boost, the voltage compensated by torque boost can be set by E3-14. When the load is heavy and the starting torque of the motor is insufficient, the value of E3-14 can be appropriately increased. However, if the setting is too large, it is easy to cause overheating of the motor and overcurrent of the drive.

To further improve the acceleration capability of the motor at low speed, the voltage increase during the acceleration process of the motor can be set through E3-15, and this part of the increase voltage only takes effect during the acceleration process.

E3-16 sets the cut-off frequency of torque boost, that is, the effective frequency of torque boost. If the frequency is lower than this frequency, the boost is effective, otherwise it is ineffective. See the following figure for the schematic diagram of V/F curve after manual torque boost.

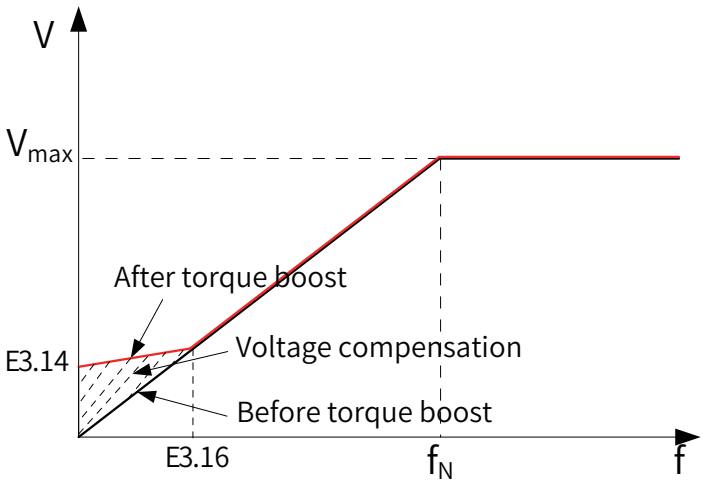


Figure 4-47 Comparison of V/F curves before and after manual torque boost

When auto torque boost is applied, the drive automatically calculates the voltage compensation amount according to the motor parameters, so there is no need to set E3-14 and E3-16. It should be noted that before using this function, be sure to perform motor auto-tuning to ensure the accuracy of motor parameters.

Table 4-9 Parameters related to VF low speed torque boost

Para. No.	Name	Setpoint
E3-13	V/F torque boost mode	0: Disabled 1. Manual 2: Auto
E3-14	V/F manual constant-speed torque boost	0.0% to 25.0%
E3-15	V/F manual acceleration torque boost	0.0% to 20.0%
E3-16	Cut-off frequency of V/F torque boost	0.0% to 100.0%

4.7.3 VF Slip Compensation

VF slip compensation can compensate the decrease of motor speed when the load increases, so that the motor speed can basically remain unchanged when the load changes.

The compensation frequency is adjusted by setting E3-17. When the coefficient is set to 100%, it means that when a reated load is applied to the motor, the compensated slip is the rated slip of the motor. When the coefficient is set to 0, the slip compensation function is turned off. When adjusting VF slip compensation gain, the general principle is that the motor speed is basically the same as the target speed under rated load. When the motor speed is different from the target value, the parameter needs to be fine-tuned.

E3-18 can set VF slip compensation filtering time. The smaller the setting, the faster the response speed of slip compensation, but an over small value will also cause oscillation or instability in the dynamic process of the motor.

E3-19 sets starting frequency of V/F slip compensation. When the operating frequency is higher than this frequency, slip compensation takes effect, otherwise it is inactive.

Para. No.	Name	Setpoint
E3-17	V/F slip compensation coefficient	0.0% to 300.0%
E3-18	Filter time of V/F slip compensation	0.000s ～ 2.000s
E3-19	Starting frequency of V/F slip compensation	0.0~50.0Hz

4.7.4 VF Overcurrent Suppression

After the Imax control function is enabled, if the output current of the drive reaches the overcurrent suppression threshold of the motor during the acceleration process of the motor, the output frequency of the drive starts to decrease, and the frequency does not start to accelerate to the target frequency again until the current returns below the overcurrent suppression threshold, so the actual acceleration time is automatically lengthened. If the actual acceleration time cannot meet the requirements, the value of E3-11 can be appropriately increased.

The following figure shows the frequency modulation diagram after the Imax function is turned on when the motor is in different states.

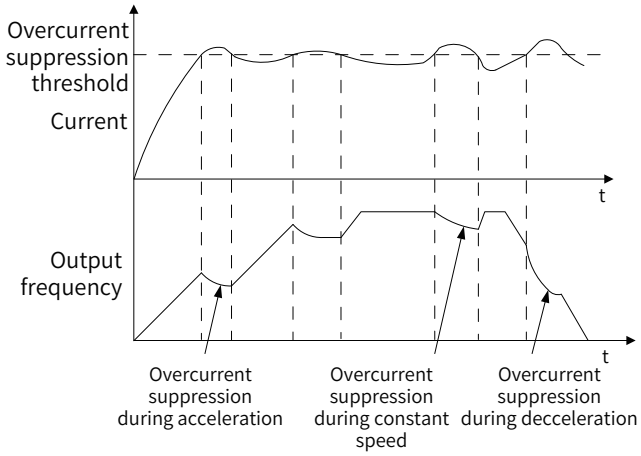


Figure 4-48 VF overcurrent suppression

Table 4-10 Parameters related to VF overcurrent suppression

Para. No.	Name	Setpoint
E3-10	Enable Imax control	0: Disable 1: Enable
E3-11	Frequency regulation scaling for Imax control	0 to 100
E3-12	Flux weakening coefficient for Imax control	0 to 200

4.7.5 VF Resonance Damping

When the motor is running, if the system oscillates due to mechanical resonance or any other reason, the control effect can be improved by setting E3-20 to turn on the oscillation suppression. E3-21, which is VF oscillation suppression gain, should be as small as possible to reduce its influence on normal operation, provided that the oscillation can be effectively suppressed. When the oscillation is obvious, it is necessary to increase the gain. The greater the gain, the more obvious the suppression effect.

Table 4-11 Parameters related to VF oscillation suppression

Para. No.	Name	Setpoint
E3-20	V/F oscillation suppression mode	0: Disable 1: Enable
E3-21	V/F oscillation suppression gain	0 ～ 2000%
E3-23	Cut-off frequency of V/F oscillation suppression	0.5~50.0Hz

NOTE

- When the oscillation suppression function is used, the rated current and no-load current parameters of the motor must be as accurate as possible to ensure good VF oscillation suppression effect.
- If oscillation cannot be effectively suppressed after this function is turned on, ensure that the cut-off frequency E3-23 is lower than the frequency of motor oscillation.

4.7.6 VF Droop Control

VF droop is generally used for load distribution problems when two or more motors drive a load together. When two or more motors drive the same load, uneven load distribution occurs due to the difference in speed of the motors. The motor and drive with higher speed bear heavier load, thus affecting the stability of the whole drive system. VF droop can alleviate this problem.

You can set the parameter E3-08 to enable the droop function and adjust the original frequency setpoint, thus softening the mechanical characteristics of the motor. The parameter E3-09 is the droop coefficient, and the frequency of VF droop is proportional to the droop coefficient and the motor load torque.

Table 4-12 Parameters related to VF droop

Para. No.	Name	Description
E3-08	Enable V/F droop	0: Disable 1: Enable 2: DI1 3: DI2 4: DI3 5: DI4 6: DI5 7: DI6 8: DIL 9: HDI1 10: HDI2 Other: B connector
E3-09	V/F droop coefficient	0.0% to 50.0%

NOTE

- The frequency of VF droop is based on the rated frequency of the motor. Motor droop adjustment =-1* Motor output torque * Motor rated frequency * [E3-09].

4.7.7 V/F Energy-saving Control

Energy-saving control is suitable for the occasions where the motor is running under light load for a long time. After the function is turned on by parameter E3-25, when the motor load is light, the drive will continuously reduce the output voltage, thus reducing the excitation current to save power.

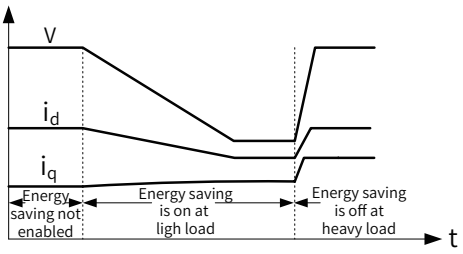


Figure 4-49 V/F energy-saving control

Table 4-13 Parameters related to V/F energy-saving control

Para. No.	Name	Description
E3-25	V/F energy-saving control	0: Disable 1: Enable

NOTE

◆ The motor speed will not be reduced in the energy-saving mode. When the motor load increases, the drive will restore the original output voltage and automatically exit the energy-saving mode.

4.7.8 Vdc Control in VF Control

The Vdc function under VF control is similar to that under vector control. You can enable Vdc control when the power supply is not regenerative and the DC bus has overvoltage or undervoltage. Vdc control consists of VdcMax control and VdcMin control.

VdcMax control and VdcMin control adopt a common PI controller. The parameter gain of the PI controller is automatically calculated. The internal PI parameters can be modified by adjusting E3-28 and E3-29 on the basis of the default values. If overshoot is serious during bus voltage regulation, the proportional gain E3-28 can be increased.

4.7.8.1 Description of VdcMax

When the motor is in a deceleration regenerative state, if the power supply is not regeneration-enabled, energy will be fed into the bus, resulting in voltage rise and overvoltage of the bus, which is especially obvious when the motor inertia is large and the deceleration time is short.

After setting E3-30 to turn on the VdcMax function, when the bus voltage rises to the set point (bus overvoltage threshold-VdcMax voltage reserve E3-31), the drive will adjust the output frequency to maintain the bus voltage stability and inhibit the voltage rise.

Parameter E3-33 can set the upper limit of frequency adjustment. After the function is turned on, the actual deceleration time will be automatically lengthened. If the actual deceleration time cannot meet the requirements, E3-24 (VF overexcitation gain) can be appropriately increased. If the bus voltage overshoot is too large, E3-32 (voltage regulation gain coefficient) can be increased.

4.7.8.2 Description of VdcMin

VdcMin puts the motor in the regenerative state after detecting that the bus voltage is lower than the allowable value (the voltage reserve of the under-voltage threshold VdcMin is E3-38) to compensate the existing power loss and stabilize the voltage in the DC bus. When the power supply or DC bus has a short power failure which is not handled, an undervoltage fault will occur and cause coast to stop.

After the VdcMin function is turned on by setting the E3-36, the undervoltage fault can be suppressed for a short time, so that the power is instantly cut off without stopping. In the case of a long-term blackout or DC bus power failure, you need to enable VdcMin to compensate for bus energy loss until all motors stop reliably.

The relevant parameters of VDC control under VF control are as follows:

Para. No.	Name	Setpoint
E3-28	Proportional coefficient of frequency modulation for Vdc control in V/F control	1 to 100
E3-29	Integral coefficient of frequency modulation for Vdc control in V/F control	10~8000
E3-30	Vdc_max control switch in V/F control	0: Disabled 1: Enabled
E3-31	Vdc_max voltage reserve in V/F control	20.0~300.0V

Para. No.	Name	Setpoint
E3-32	Gain coefficient of Vdc_max voltage adjustment in V/F control	0~100
E3-33	Vdc_max frequency increase limit in V/F control	1.0~30.0Hz
E3-35	VdcMax dynamic coefficient in V/F control	0% to 300%
E3-36	Vdc_min control switch in V/F control	0: Disable 1: Enable
E3-37	Vdc_min min. running frequency in V/F control	0.0~50.0Hz
E3-38	Vdc_min voltage reserve in V/F control	20.0~300.0V
E3-39	Vdc_min voltage rise evaluation time in V/F control	0.1 to 100.0s
E3-40	Vdc_min dynamic coefficient in V/F control	0% to 300%

4.8 Speed Tracking

If the rotating motor adopts direct starting mode, it is easy to cause overcurrent fault due to inrush current during starting. The speed tracking function is suitable for occasions where there is no encoder to measure the speed of the motor and it is necessary to track the starting operation of the rotating motor. In this way, the drive can automatically track the rotation speed and direction of the motor and implement smooth impact-free starting of the rotating motor.

The following figure is a schematic diagram of motor speed tracking start. After startup, the motor synchronization frequency tracks the motor speed. After tracking is completed, it enters the normal operation mode.

- Under FVC control, when the speed tracking function is enabled, the motor is started according to the feedback speed obtained by the encoder.
- In VF control and SVC control, the running speed of the motor needs to be observed through the speed tracking module.

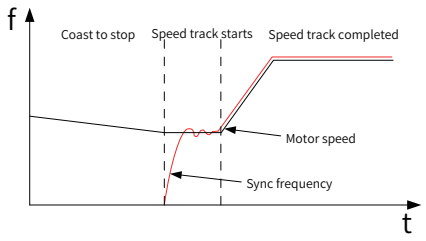


Figure 4-50 Motor speed track start process

The parameters related to speed tracking are as follows. The startup mode of the motor can be set through E1-00.

Para. No.	Name	Setpoint
E1-00	Startup mode	0: Direct startup 1: Speed tracking 2: DC braking
E7-00	Speed tracking current Kp	0.5~2.0
E7-01	Speed tracking filter	5~50ms

Para. No.	Name	Setpoint
E7-02	Cut-off frequency of speed tracking filter	0.1–50.0Hz
E7-03	Speed tracking current setpoint	20.0%-80.0%
E7-04	Speed tracking time	50-5000ms

E7-01 is the proportional coefficient that controls the output current during speed tracking. If the speed tracking fails at high speed, the filter cut-off frequency value of E7-02 can be appropriately increased.

E7-03 is used to set the current in the process of speed tracking, and 100% corresponds to the rated current of the drive. In most cases, there is no need to adjust the values of E7-00 and E7-03. If the rotating speed is in the weak magnetic field area and it is difficult to track successfully, the value of E7-03 can be appropriately reduced. E7-04 sets the time for speed tracking. If the drive cannot complete speed tracking within this time, it will report a fault.

NOTE

- The speed tracking function depends on the relevant parameters of the motor. Therefore, when using this function, be sure to auto-tune the motor.

4.9 Communication Module

4.9.1 Fieldbus Adapter

Fieldbus adapters are used for the communication between the fieldbus and drive control unit. Currently, three fieldbus adapters are supported, with two used independently and the remaining one used for redundancy. The redundant adapter must be selected for fieldbus adapters A and B. The system automatically switches to the redundant adapter for receiving and sending data when adapters A and B fail due to an exception. Each fieldbus adapter supports a maximum of 16 pieces of 16-bit process data. Its working principle is as follows:

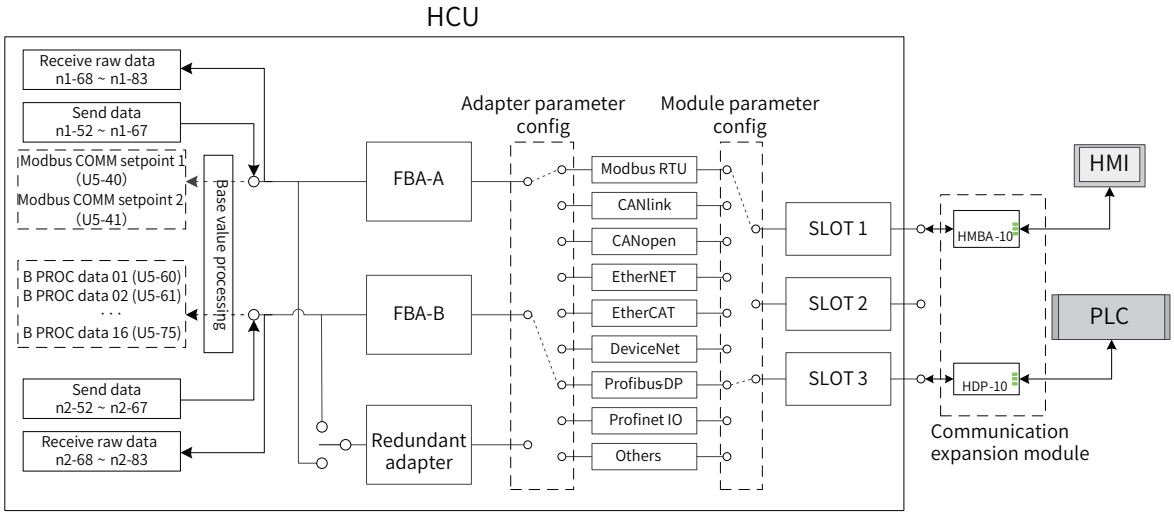


Figure 4-51 Working principle of fieldbus adapter

The fieldbus adapter currently support 9 communication modules: Modbus RTU fieldbus module, CanLink fieldbus module, CANopen fieldbus module, EtherNet/IP industrial EtherNet module, etherCAT industrial EtherNet module, DeviceNet fieldbus module, Profibus-DP fieldbus module, Profinet IO industrial EtherNet module.

Table 4-14 Fieldbus adapters A and B setting

Item	Bus Adapter A	Bus Adapter B	Description
1	n1-00	n2-00	Used to select the required bus protocol type. The value 0 indicates that no fieldbus is selected.

Item	Bus Adapter A	Bus Adapter B	Description
2	n1-01	n2-01	Used to detect communication timeout. The value 0.00 indicates that communication timeout detection is disabled.
3	n1-02	n2-02	Communication error detection enable switch, 0: Enabled; 1: Disabled
4	n1-03	n2-03	Used for cyclic redundancy check (CRC) during communication. The value 0 indicates that CRC is disabled.
5	n1-04~n1-19	n2-04~n2-19	Used to select the output source of the process data of fieldbus adapters.
6	n1-20~n1-35	n2-20~n2-35	Used to set the base value of process data output, calculated as follows: Actually sent data = Data selected for sending x (n1-20 to n1-35)/4096. If this parameter is set to 0, the value 4096 is applied.
7	n1-36~n1-51	n2-36~n2-51	Used to set the base value of process data input, calculated as follows: Used data = Actually received data x (n1-36 to n1-51)/4096. If this parameter is set to 0, the value 4096 is applied.
8	n1-90	n2-90	Used to enable/disable saving written parameters to EEPROM
9	n1-91	n2-91	Used to enable/disable uploading active fault information to the host computer

Table 4-15 Redundant adapter setting

Item	Redundant adapter setting	Description
1	n3-00	Used to select the redundant bus adapter for fieldbus adapters A and B. The value 0 indicates that no redundant bus adapter is used.
2	n3-01	Used to select the redundant communication extension card slot. The communication card setting is consistent with the parameter setting of fieldbus adapters A and B and does not need to be set again.
3	n3-04	Used to enable/disable uploading active fault information to the host computer

Fieldbus adapters support the email and process data formats.

- Email data is transmitted aperiodically and used for parameter read-write, start/stop, fault reset, status monitoring, and command sending.
- Process data is exchanged periodically and used for command setting, status exchange, speed setting, and torque setting.

4.9.2 Configuration of Process Data

When the communication card works normally, the process data can be configured.

4.9.2.1 Reception of Verification Data

16 parameters in N1-68 to N1-83 correspond to 16 process data. If you send a process data in PLC, for example, PZD1 sends 0x0406, you should see the corresponding data in n1-68.

The received data needs to be converted into base value and then saved into 16 connector parameters from U5-44 to U5-59. See *"4.9. 3 Adaptation of Communication Base Values"* for the details of base value conversion.

The PZD1 data will be disassembled into 16 corresponding bits and stored in the bit connectors from U2-00 to U2-15.

The received process data is required to participate in the control, and the parameters of the

corresponding control channel and setpoint channel must also be configured. See *"4.1 Control Channel and Start/Stop Command"*and "".

NOTE

- When PROFIBUS-DP is used for communication, the parity bit of process data PZD1 must be 1 (default is PZD1.bit10, and the parity bit can be modified or closed through n16-10). Otherwise, HCU considers the received process data invalid. U5-44 ~ U5-59 (or U5-60 ~ U5-75) will keep the data of the previous cycle, but n1-68 ~ n1-83 (or n2-68 ~ n2-83) will still display the actually received original data.

4.9.2.2 Configuring Data to be Sent

16 setpoint source parameters in n1-04 to n1-19 can be used to select the data to be sent to PLC. Here, the communication base values of N1-20 to N1 ~ 35 are all 0. See the next section if you need to set the communication base values.

If a connector is selected from N1-04 to N1-19, the corresponding parameters of N1-52 to N1-67 will display the corresponding data, which is sent to PLC and should be completely consistent with the data received by PLC.

If you set n1-04 = 1701 (U7-01 is the per unit value 100% corresponding to hexadecimal 0x1000), you can observe that [n1-52] = 0x1000;

If you set n1-05 = 1702 (U7-02 is the per unit value 200% corresponding to hexadecimal 0x2000), you can observe that [n1-53] = 0x2000.

Usually, the torque, rotation speed, current and other data that PLC needs to receive can be found in Group U connectors.

4.9. 3 Adaptation of Communication Base Values

Most of the connector data of HCU-50/51 control module are stored in a per unit value, the base value of which is the rated value of motor parameters. During data interaction with PLC through fieldbus adapter, inconsistent data calibration may be present. A communication base value is provided for each process data channel in the fieldbus adapter, that is, a value corresponding to 100%. By modifying the communication base value, the gain of receiving and sending data of the fieldbus adapter can be adjusted.

The default value of HCU-50/51 communication base value is 0, which means that no special processing is carried out when sending and receiving data. PLC and HCU-50/51 send and receive the same data.

For data composed of multiple bits, base value conversion should not be carried out, and the corresponding communication base value parameter should be set to 0. For example, the control word issued by PLC or the status word uploaded by HCU-50/51.

The calculation formula of communication base value is:

$$\text{COMM base value} = \frac{\text{Motor PU base value}}{\text{PLC PU base value}} \text{ PLC COMM base value}$$

In the HCU-50/51 system, the base value of motor per unit value is the motor rated value, corresponding to parameters D3-00 to D3-04;

PLC communication base value and PLC per unit base value are used to represent data of PLC communication. For example, if 16384 means that the motor current is 50A, the PLC per unit base value is 50 and the PLC communication base value is 16384; If the actual motor current *10 is used to transmit the current, the PLC per unit base value is 50, and the PLC communication base value is 500.

The communication base value parameter is used to adjust the data format inside HCU-50/51 to the same format as PLC communication.

When the communication base value needs to be modified, see Drive → Configuration → Process Data

Configuration → Adapter A Input/Output Data Configuration → Calculate Base Value.

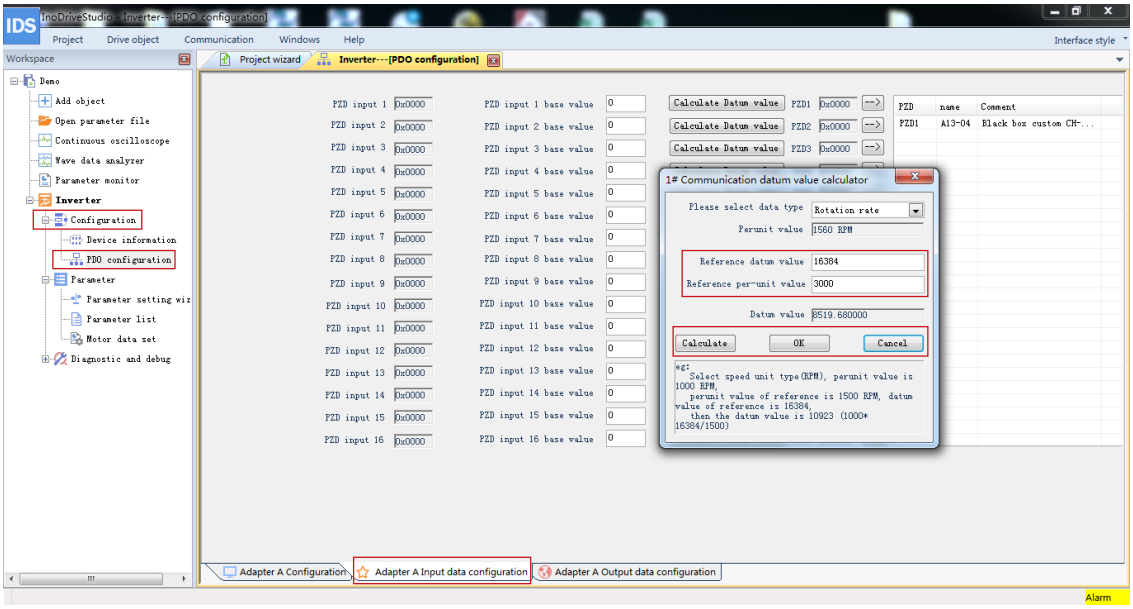


Figure 4-52 Base value calculation

As shown in the above figure, when the base value of the HCU-50/51 rotational speed per unit value is 1500 rpm, that is, the rotational speed 100% corresponds to 1500 revolutions, and the PLC sets the base value of the rotational speed standard to 3000, that is, the PLC system considers that the rotational speed of 100% is 3000 rpm, then it is necessary to modify the communication base value of the HCU-50/51 to run at the actual speed given by the PLC. For example, when the PLC issues the 100% rotational speed command, the actual running speed of the HCU-50/51 is 3000 rpm instead of 1500 rpm.

Assuming that the PLC communication base value is 16384, that is, when the PLC sends the rotational speed 100%, it actually transmits 16384 to HCU-50/51. If you input the communication base value of the other side (PLC communication base value) and the per unit value of the other side (PLC rotational speed per unit value) in the communication base value calculator and click Calculate, you can obtain the communication base value of the corresponding rotational speed transmission channel of HCU.

4.9.4 Communication Module Expansion

Table 4-16 Communication module expansion

Item	Expansion module	Description
1	ModbusRTU Module	Used by the Modbus communication protocol, which is a standard communication protocol. For details, see the communication extension card user manual. The parameters are set in group n10
2	CANlink Module	Used by the CANlink communication protocol, which is a custom protocol of Inovance. For details, see the communication extension card user guide. The CANlink communication extension card supports seven communication rates. The parameters are set in group n11
3	CANopen module	Used by the CANnode communication protocol. For details, see the communication expansion module user guide. The CANopen communication expansion card supports seven communication rates. The parameters are set in group n12
4	EtherNet Module	Used by the Ethernet communication protocol. For details, see the communication expansion module user guide. The Ethernet communication extension card supports automatic IP address assignment. The parameters are set in group n13
5	EtherCAT Module	Used by the EtherCAT communication protocol. For details, see the communication expansion module user guide. The parameters are set in group n14
6	DeviceNet Module	Used by the DeviceNet communication protocol. For details, see the communication expansion module user guide The parameters are set in group n15
7	PROFIBUS-DP Module	Used by the PROFIBUS DP communication protocol. For details, see the communication expansion module user guide. The parameters are set in group n16
8	PROFINET I/O Module	Used by the PROFIBUS NET communication protocol. For details, see the communication expansion module user guide. The parameters are set in group n17
9	Custom Communication Module	Used by the communication protocol customized by a specific manufacturer or application. For details, see the communication expansion module user guide. The parameters are set in group n18

4.9.5 Inolink Communication Network

Inolink is used for the master/slave communication among multiple drive units. In a network system, the logical master site sends data (control bit and setting) to the logical slave site through master/slave communication. Currently, Inolink communication supports eight pieces of 16-bit data.

The existing Inolink communication network supports a maximum of 16 controllers. The controller with site number 1 is the master controller that initiates Inolink communication, and the controllers numbered from 2 to 16 are slave controllers. The master controller initiates master/slave communication, and then the slave controllers respond in sequence. The data sent by each controller is stored on the other controllers in the network.

The master site in Inolink communication is not necessarily a logical site. The logical master site sends data to logical slave sites (other controllers than the master controller), which then use the received data for control purposes. Each logical slave site can set the data reception source as one or more logical master sites.

An Inolink communication network may contain one or more master/slave networks. A master/slave network is a communication network composed of logical master and slave sites.

Currently, the Inolink communication rate is equal to 5M baud rate, and the communication cycle is 2 ms. All controllers in the Inolink communication network exchange data once during each 2 ms cycle.

If a controller receives no data from any other controller within 2 seconds, it reports an offline error. If the controller receives no data from the logical master site, it reports a master site offline error. If the site number of a new controller is the same as that of an existing controller, the new controller reports an address conflict error.

Table 4-17 Inolink communication setting

Item	Inolink communication setting	Description
1	n0-00	Used to enable Inolink communication nodes.
2	n0-01	Used to set the addresses of Inolink communication nodes.
3	n0-02	Used to set Inolink communication mode
4	n0-03, n0-05, n0-07, n0-09, n0-11, n0-13, n0-15, n0-17	Used to set which piece of data sent from the logical master site will be used by the receiving node
5	n0-04, n0-06, n0-08, n0-10, n0-12, n0-14, n0-16, n0-18	Used to set which piece of data sent from the logical master site will be used by the receiving node
6	n0-19~n0-26	Used to set the factor of proportionality of received data. The data used by nodes is the data sent from the logical master site multiplied by the factor of proportionality
7	n0-27~n0-34	Used to select the data to be sent

4.9. 6 HOFR Optical Fiber Routing Network

The purpose of optical fiber synchronization is similar to InoLink communication network, that is, to realize data interaction between multiple transmission devices, but the implementation is different. Optical fiber synchronization is achieved through the optical fiber synchronization expansion module. All HCU-50/51 are connected to the optical fiber synchronization expansion module through an HOFM optical fiber module. The optical fiber synchronization expansion module resembles a data switch which allows data interaction between multiple drive devices. In addition, optical fiber synchronization does not involve any master, but a data switch.

The whole data network supports 11 nodes at most, each node can send and receive 8 pieces of data. A node can select the data 1–8 of any other 3 nodes to form PZD1–PZD8, thus further realizing various control operations. In addition, you can also customize the proportion of each received data, ranging from -8.000 to 8.000, which can meet the requirement of different applications.

Table 4-18 OF sync communication setting

Item	OF sync communication setting	Description
1	n22-00, n22-01, n22 -05	Used to enable the communication node and the communication interruption judgment time, and set the address of the node
2	n22-02, n22-03	Used to set the slot connected to the optical fiber synchronization expansion module and whether it is online
3	n22-04	It is used to view the online nodes in the communication network, and it is convenient to set its own node bit0 to bit10 corresponding to the node address 1 to the node address 11 respectively
4	n22-06 to n22-08	Used to set the 3 nodes that need to receive data
5	n22-09 to n22-16	Used to set which data (any one of data 1 to data 8) sent from which node (any one of 3 nodes) is selected
6	n22-17 to n22-24	Used to set the scaling coefficient of received data. The data used by nodes is the received data multiplied by the coefficient
7	n22-25 to n22-32	Used to select the data to be sent

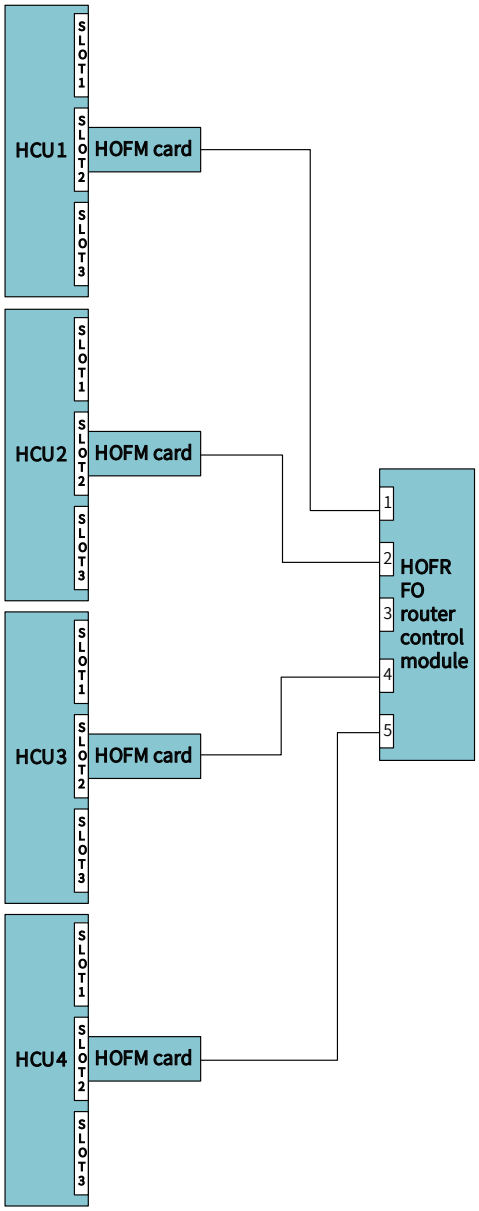


Figure 4-53 Connection diagram

4.9.7 Adapter Slot Configuration

Slot setting is required before inserting an expansion card.
For example, when the PROFIBUS-DP module is installed on SLOT3, n16-00 is set to 7, and the expanded card slot 3_1 is selected. The configuration of the Profibus-DP module expansion slot is shown in the following table:

Para. No.	Name	Setting Range
n16-00	Expansion slot selection	0: Disable 1: Expansion slot 1_1 2: Expansion slot 1_2 3: Expansion slot 1_3 4: Expansion slot 2_1 5: Expansion slot 2_2 6: Expansion slot 2_3 7: Expansion slot 3_1

HCU contains 3 SLOT slots. See the following figure for details:

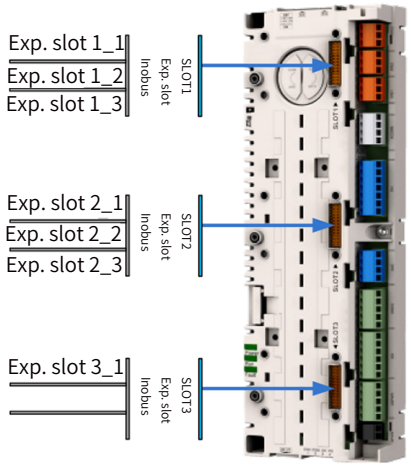


Figure 4-54 Description of expansion slots

When the expansion card is directly inserted into the SLOT slot on the HCU, such as SLOT2, its expansion slot selection parameter can be set to expansion slot 2_1. SLOT1 and SLOT2 slots can be expanded into three slots (1HOFM + 3HESD) by installing HOFM module + HESD function module. Take slot SLOT2 as an example. When the expansion card is inserted into HESD function module, its expansion slot selection parameter should be set to one of expansion slot 2_1, expansion slot 2_2 and expansion slot 2_3. Note that the parameter configuration does not conflict with the expansion slot selection of the other two expansion cards (if existing). Taking SLOT2 as an example, the topology is as follows:

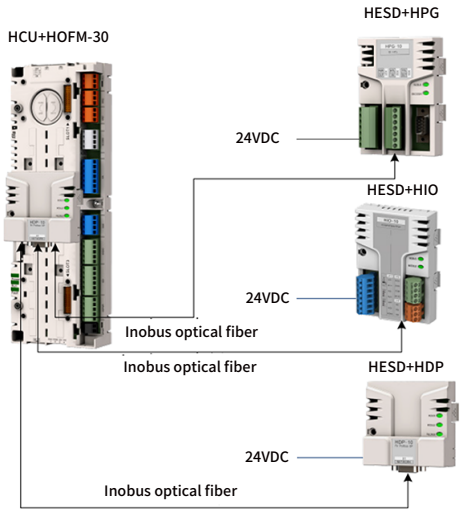


Figure 4-55 SLOT2 topology

When installing functional modules in three SLOT slots, follow the following principles:

- Each SLOT slot supports expansion of 3 expansion slots, but only one of the 3 expansion slots is allowed to connect with communication expansion modules, and the other 2 slots can connect with non-communication expansion modules, such as HIO modules;
- In this case, the HESD function module is not allowed to connect with optical fiber expansion module HOFM;
- The HDP-10 module can theoretically be installed in any slot, but due to the size limitation of its Profibus bus terminal, when it is installed in the SLOT1 slot, it will extend to the SLOT2 slot and thus no modules can be installed in the SLOT2 slot. It is recommended that the HDP-10 be installed in the SLOT3.

4.10 AIO, DIO, HIO Parameter Setting

The MD880 controller comes standard with 7 DIs (DI1–DI6, DIL), 2 high-speed HDI inputs, 3 ROs, 2 high-speed HDO outputs, 2 AIs and 2 AOs. The parameters to be set are in Group F.

The AIO combination can also be used to measure the motor temperature. See *"4.11.2 Motor Temperature Detection with AI/AO"* for the specific usage.

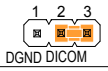
HCU-50/51 supports the simultaneous use of up to 3 HIO input and output function modules to expand the input and output interface of HCU control modules. The HIO-10 module includes 2 DIOs, 2 AIs, 2 AOs and 1 RO; the HIO-20 module includes 5 DIOs and 2 ROs; the HIO-30 module includes 6 DIs, 6 DIOs, 4 ROs, 3 AOs and 3 AIs.

4.10.1 DI

The HCU-50/51 control module comes standard with 7 DIs and 2 HDIs can be configured as DIs. The corresponding functional diagrams are H110 and H114.

Before using DI terminal, you must configure DI internal/external power supply selection jumper J16 according to hardware wiring, as shown in the following table.

Table 4-19 DI internal and external power selection jumper

Jumper J16: power supply selection
 By shorting DGND and DICOM, DI is powered by 24VD internal power supply
 By shorting DGND and DICOM, DI is powered by external power supply

4.10. 1.1 DI Forcing

The DI input status supports the forcing function. F0-02 is used to select the DI to be forced, and F0-03 is used to set the forced DI status; A bit of P156 corresponds to a DI state, bit 0 to bit 5 correspond to DI1 to DI6, bit 6 corresponds to DIL, bit 7 corresponds to HDI1, and bit 8 corresponds to HDI2. The forcing status correspondence table is as follows.

F0-02		DI1 (U0-02)	DI2 (U0-03)	DI3 (U0-04)	DI4 (U0-05)	DI5 (U0-06)	DI6 (U0-07)	DIL (U0-08)	HDI1 (U0-09)	HDI2 (U0-10)
Bit0	0	H/W DI1	x	x	x	x	x	x	x	x
	1	F0-03 (Bit0)	x	x	x	x	x	x	x	x
Bit1	0	x	H/W DI2	x	x	x	x	x	x	x
	1	x	F0-03 (Bit1)	x	x	x	x	x	x	x
Bit2	0	x	x	H/W DI3	x	x	x	x	x	x
	1	x	x	F0-03 (Bit2)	x	x	x	x	x	x
Bit3	0	x	x	x	H/W DI4	x	x	x	x	x
	1	x	x	x	F0-03 (Bit3)	x	x	x	x	x

F0-02		DI1 (U0-02)	DI2 (U0-03)	DI3 (U0-04)	DI4 (U0-05)	DI5 (U0-06)	DI6 (U0-07)	DIL (U0-08)	HDI1 (U0-09)	HDI2 (U0-10)
Bit4	0	x	x	x	x	H/W DI5	x	x	x	x
	1	x	x	x	x	F0-03 (Bit4)	x	x	x	x
Bit5	0	x	x	x	x	x	H/W DI6	x	x	x
	1	x	x	x	x	x	F0-03 (Bit5)	x	x	x
Bit6	0	x	x	x	x	x	x	H/W DIL	x	x
	1	x	x	x	x	x	x	F0-03 (Bit6)	x	x
Bit7	0	x	x	x	x	x	x	x	H/W HDI1	x
	1	x	x	x	x	x	x	x	F0-03 (Bit7)	x
Bit8	0	x	x	x	x	x	x	x	x	H/W HDI2
	1	x	x	x	x	x	x	x	x	F0-03 (Bit8)
Bit9-15	x	x	x	x	x	x	x	x	x	x

4.10.1.2 DI Delay

Each DI of HCU-50/51 can set the switch-on delay and switch-off delay separately. As shown in the figure, both the switch-on and switch-off delays support DI filter. When the DI signal state holding time is less than the set time, the DI state will remain in the original state. The switch-on delay and switch-off delay of each DI can be set through F0-04 to F0-21.

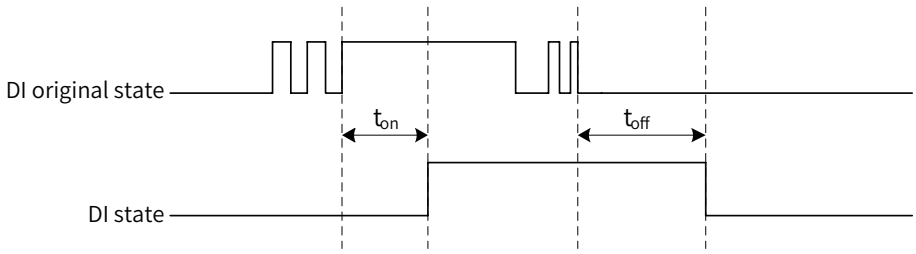


Figure 4-56 DI switch-on/off delay timing diagram

Switch-on delay filters out high-level pulses which is smaller than t_{on}, so the first two pulses of the signal source are filtered out, and the third pulse rises and switches on to high level after t_{on}.

The switch-off delay time is t_{off}. Low levels smaller than toff is filtered out, as shown in the above figure. Switch on/off delays can be used to filter out interference or for logical delay control. The relevant parameters are F0-04 to F0-21.

4.10.1.3 DI Connector

When DI is used in drive control, the corresponding parameters need to be associated with the DI connector. DI status provides 2 DI status bit connectors.

Parameter	Definition	Parameter	Description
U0-02	DI1 status	U0-12	DI1 status inversion
U0-03	DI2 status	U0-13	DI2 status inversion

Parameter	Definition	Parameter	Description
U0-04	DI3 status	U0-14	DI3 status inversion
U0-05	DI4 status	U0-15	DI4 status inversion
U0-06	DI5 status	U0-16	DI5 status inversion
U0-07	DI6 status	U0-17	DI6 status inversion
U0-08	DIL status	U0-18	DIL status inversion
U0-09	HDI1 status	U0-19	HDI1 status inversion
U0-10	HDI2 status	U0-20	HDI2 status inversion

4.10.2 DO

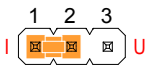
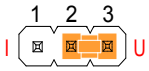
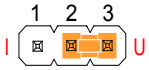
HCU-50/51 supports 3 ROs, and 2 HDOs can also be used as DOs. The DO function is configured according to the function diagrams H112 and H116.

When the 3 ROs and 2 HDOs are used as DOs , their switch-on and switch-off delays can be separately set, and all allow negative logic processing, which can be set through F1-17. When negative logic is active, logic 0 indicates that the output (normally open) is active and logic 1 indicates that the output (normally open) is inactive.

F1-00 displays the status of the DO source signal, and F1-01 displays the status after delay logic and negative logic processing.

4.10.3 AI

The HCU-50/51 provides 2 AIs which support both current and voltage signals. Before using AI, you must determine whether the external signal is a voltage signal or current signal, and configure jumpers J14 and J15 accordingly. After that, also set parameters F2-04 and F2-05.

Jumper J14: AI1 current or voltage signal Input selection
 AI1 current signal Input by shorting 1 and 2
 AI1 voltage signal Input by shorting 2 and 3
Jumper J15: AI2 current and voltage signal selection
AI2 current signal Input by shorting 1 and 2
 AI2 voltage signal Input by shorting 2 and 3

See the function diagram H120 for details. The function parameters are shown in the following table.

Parameter	Name	Description
F2-00	AI1 input value	Displays AI1 input value in V or mA according to the setting of F2-04
F2-01	AI1 input scaling	Displays the percentage corresponding to AI1 input, which is the final output after AI module processing
F2-02	AI2 input value	Displays AI2 input value in V or mA according to the setting of F2-05
F2-03	AI2 input scaling	Displays the percentage corresponding to AI2 input, which is the final output after AI module processing

Parameter	Name	Description
F2-04	AI1 type	Sets the input signal type of AI1 or AI2 through jumpers at HCU side. See MD880-50 Series Inverter Hardware User Guide for details. 0:-10~10V 1:0~10V 2:-20~20mA 3:0~20mA 4:4~20mA
F2-05	AI2 type	
F2-06	AI1 curve min. input value	Calibrates AI1. F2-06 and F2-08 also limit the range of AI1 input (according to F2-04, the unit is V or mA); within the value range, output is linearly converted to an percentage value. When the input is less than F2-06: the default output is [F2-07], or the output can be set to 0.0% by the ones position of F2-14 (AI smaller than min. input setpoint selection).
F2-07	AI1 curve min. input scaling	
F2-08	AI1 curve max. input value	
F2-09	AI1 curve max. input scaling	
F2-10	AI2 curve min. input value	Calibrates AI2. F2-10 and F2-12 also limit the range of AI2 input (according to F2-05, the unit is V or mA); within the value range, output is linearly converted to an percentage value. When the input is less than F2-10: the default output is [F2-11], or the output can be set to 0.0% by the tens position of F2-14 (AI smaller than min. input setpoint selection).
F2-11	AI2 curve min. input scaling	
F2-12	AI2 curve max. input value	
F2-13	AI2 curve max. input scaling	
F2-14	AI smaller than min. input setpoint	Ones: AI1 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0% Tens: AI2 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0%
F2-15	AI1 filter time	Sets AI filter time, which produces delay while removing interference.
F2-16	AI2 filter time	
F2-17	AI1 denoising threshold	Sets the denoising threshold. When the fluctuation of AI input is less than the set threshold, the corresponding scaling of AI does not change.
F2-18	AI2 denoising threshold	
F2-19	AI zero crossover threshold	When the AI input value is less than the set threshold value, the AI value is regarded as 0
F2-20	AI1 enable	Enables/disables AI1. When AI1 is disabled, it is forced to 0
F2-21	AI2 enable	Enables/disables AI2. When AI2 is disabled, it is forced to 0
F2-22	AI1 wire breakage monitoring threshold	0.000–4.000 mA
F2-23	AI2 wire breakage monitoring threshold	0.000–4.000 mA
F2-24	AI1 wire breakage monitoring delay	0.00 to 10.00s
F2-25	AI2 wire breakage monitoring delay	0.00 to 10.00s

Parameter	Name	Description
F2-26	AI wire breakage monitoring enable	Enables wire breakage monitoring. Monitoring is only enabled when the signal type is 4–20 mA; When the AI input value is less than the wire breakage monitoring threshold and the monitoring delay is maintained, wire breakage occurs. Ones position: AI wire breakage monitoring enable 0: Disabled 1: Enabled Tens position: AI2 wire breakage monitoring enable 0: Disabled 1: Enabled

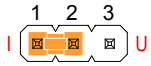
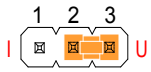
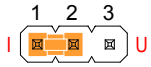
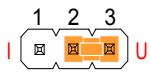
NOTE

◆ When E8-22 is set to "Measure motor temperature through AI1", the setting of AI1 is ineffective; When E8-22 is set to "Measure motor temperature through AI2", the setting of AI2 is ineffective.

4.10.4 AO

The HCU-50/51 control module provides two AOs and supports two signal types: voltage and current. Before using AO, set jumpers J18 and J19, and configure parameters F3-06 and F3-07.

Table 4-20 AO output signal selection jumper

Jumper J19: AO1 current and voltage signal selection	
	AO1 current signal output by shorting 1 and 2
	AO1 voltage signal output by shorting 2 and 3
Jumper J18: AO2 current and voltage signal selection	
	AO2 current signal output by shorting 1 and 2
	AO2 voltage signal output by shorting 2 and 3

See the function diagram H122 for the use of AO function. See the following table for function parameters.

Parameter	Name	Description
F3-00	AO1 output value	Displays the AO1 output value in V or mA according to the setting of F3-06
F3-01	AO1 output scaling	Displays AO1 output scaling corresponding to [F3-04]
F3-02	AO2 output value	Displays the AO2 output value in V or mA according to the setting of F3-07
F3-03	AO2 output scaling	Displays AO2 output scaling corresponding to [F3-05]
F3-04	AO1 signal source	Sets the signal source of AO1 output
F3-05	AO2 signal source	Sets the signal source of AO2 output
F3-06	AO1 type	Sets the signal type output by AO1 or AO2, which requires proper wiring. See MD880-50 Series Inverter Hardware User Guide for details. 0: 0 to 10 V 1: 0 to 20 mA 2: 4 to 20 mA
F3-07	AO2 type	

Parameter	Name	Description
F3-08	AO1 curve min. output scaling	Sets the calibration coefficient of AO1, and F3-08 and F3-10 also limit the range of AO1 output scaling. Within the value range, the output value is linearly calculated (according to F3-06, the unit is V or mA)
F3-09	AO1 curve min. output value	
F3-10	AO1 curve max. output scaling	
F3-11	AO1 curve max. output value	
F3-12	AO2 curve min. output scaling	Sets the calibration coefficient of AO2, and F3-12 and F3-14 also limit the range of AO2 output scaling. Within the value range, the output value is linearly calculated (according to F3-07, the unit is V or mA)
F3-13	AO2 curve min. output value	
F3-14	AO2 curve max. output scaling	
F3-15	AO2 curve max. output value	

NOTE

- When E8-22 is set to "Measure motor temperature through AI1", the setting of AO1 is ineffective; when E8-22 is set to "Measure motor temperature through AI2", the setting of AO2 is ineffective.

4.10.5 HDI

The HCU-50/51 control module supports 2 HDI signals, which are described in detail in the MD880-50 Series Inverter Hardware User Guide. For software function, see function diagram H114.

NOTE

- HDI can be used as DI. When it is set to be used as DI, see *"4.10.1 DI"* for parameter settings.

4.10.6 HDO

The HCU-50/51 control module supports 2 HDO signals, which are described in detail in the MD880-50 Series Inverter Hardware User Guide. For software function, see function diagram H116.

NOTE

- HDO can be used as DO. When it is set to be used as DO, see *"4.10.2 DO"* for parameter settings.

4.10.7 HIO

The N7/N8/N9 parameter groups are for HIO module enable selection and status display; The n23/n26/n29 parameter groups are for the configuration of DIO, RO, AI and AO of the HIO-10 module, and the n24/n27/n30 parameter groups are for the configuration of DIO and RO of the HIO-20 module; The n25/n28/n31 parameter groups are for the configuration of DI, DIO, RO, AI and AO of HIO-30 module. The relationship is shown in the following table:

Parameter	Description
n7-02	0: Disabled 1: HIO-10, group n23 takes effect, and groups n24 and n25 are hidden 2: HIO-20, group n24 takes effect, and groups n23 and n25 are hidden 3: HIO-30, group n25 takes effect, and groups n23 and n24 are hidden

Parameter	Description
n8-02	0: Disabled 1: HIO-10, group n26 takes effect, and groups n27 and n28 are hidden 2: HIO-20, group n27 takes effect, and groups n26 and n28 are hidden 3: HIO-30, group n28 takes effect, and groups n26 and n27 are hidden
n9-02	0: Disabled 1: HIO-10, group n29 takes effect, and groups n30 and n31 are hidden 2: HIO-20, group n30 takes effect, and groups n29 and n31 are hidden 3: HIO-30, parameter n31 takes effect, and groups n29 and n30 are hidden

The parameter description of the HIO-10 module is shown in the following table:

Parameter	Description
N7-00 (n8-00, n9-00)	Sets HIO module expansion slot location
N7-02 (n8-02, n9-02)	Module type selection: 0: Disabled 1: HIO-10 2: HIO-20 3: HIO-30
n7-01 (n8-01, n9-01)	Displays HIO module online status
n7-10 (n8-10, n9-10)	Displays DIO configuration status
N7-11 to n7-14 (n8-11 to n8-14, n9-11 to n9-14)	Displays DI, DIO, RO input and output status
n7-15 (n8-15, n9-15)	Displays AI input status, including AI wire breakage, AI crossover
n7-20 to n7-25 (n8-20 to n8-25, n9-20 to n9-25)	Displays AI input value and AI input scaling
n7-30 to n7-35 (n8-30 to n8-35, n9-30 to n9-35)	Displays AO output scaling and AO output actual value
n23-00 (n26-00, n29-00)	Sets DI/DIO input filter time
n23-09 to n23-15 (n26-09 to n26-15, n29-09 to n29-15)	Sets the positive and negative logic, signal source, switch-on time and switch-off time of DIO
n23-20 to n23-23 (n26-20 to n26-23, n29-20 to n29-23)	Sets positive and negative logic, signal source, switch-on delay and switch-off delay of RO
n23-35 to n23-37 (n26-35 to n26-37, n29-35 to n29-37)	Sets AI smaller than min. input setpoint, AI wire breakage monitoring enable, AI setting zero crossing threshold
n23-40 to n23-59 (n26-40 to n26-59, n29-40 to n29-59)	Sets AI enable, AI type <1>, AI curve parameter, AI filter time, AI denoising threshold, AI wire breakage monitoring threshold, AI wire breakage monitoring delay
n23-70 to n23-85 (n26-70 to n26-85, n29-70 to n29-85)	Sets AO signal source, AO type <1> and AO curve parameters

NOTE

◆ < 1 >: The function selection of AI type and AO type is consistent with the DIP switch (jumper).

4.10.7.1 DI/DIO

Before using the DIO terminal, see the HIO-10 Input and Output Function Module User Guide for peripheral circuit wiring of HIO using internal power supply or external power supply.

Taking HIO-10 as an example. When n7-00 = 1 and n7-02 = 1, DIO1 and DIO2 are configured as DI or DO by parameters n23-10 and n23-13. The figure shows the DIO software function diagram of HIO; When N23-10/N23-13 is set as DI, DI signals are processed in turn by input filtering, switch-on delay, switch-off delay and positive and negative logic; When N23-10/N23-13 is set to connector B, DIO is configured as DO, and N23-10/N23-13 are used as DO signal source of DIO1 and DIO2. DO signals are processed in turn by switch-on delay, switch-off delay and positive and negative logic. When connector B is at low level, a low level is output, and when connector B is at high level, a high level is output.

The HIO-30 module includes 6 DIs, and DI signal processing is the same as when DIO is used as DI.

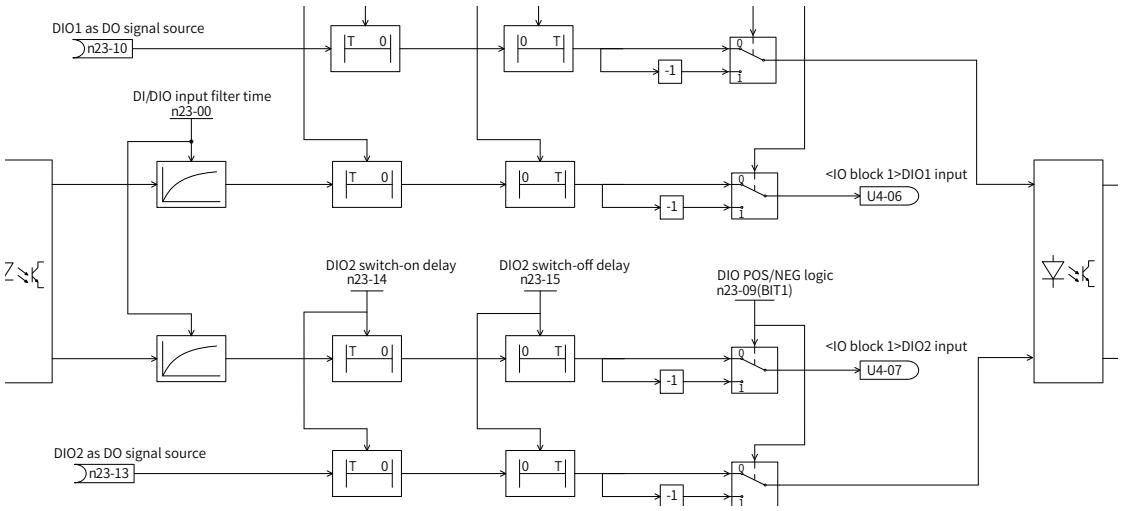


Figure 4-57 DIO software Function diagram of HIO

DIO function parameters are as follows:

Parameter	Name	Description
n7-10 / n8-10 / n9-10	Configuration for DIO used as output	The HIO module has 6 DIOs at most, and DIO1–DOI6 correspond to bit 00–bit 05 of n7-10 0: DIO as DI 1: DIO as DO
n7-11 / n8-11 / n9-11	Original status of DI/ DIO input	Displays the initial state of DI or DIO as DI; bit00–bit05 display the initial state of DIO as DI, and bit08–bit13 display the initial state of DI
n7-12 / n8-12 / n9-12	Final status of DI/DIO input	Displays the final input state of DI or DIO as DI after filtering, delay and positive and negative logic processing; bit00–bit05 display the final status of DIO as DI, and bit08–bit13 display the final status of DI
n7-13 / n8-13 / n9-13	Setting status of RO/ DIO output	Displays the setting status of RO or DIO as DO; bit00–bit05 display the setting status of DIO as DO, and bit08–bit13 display the setting status of RO
n7-14 / n8-14 / n9-14	Final status of RO/DIO output	Displays the final output state of RO or DIO as DO after delay and positive and negative logic processing; bit00–bit05 display the final state of DIO as DO, and bit08 ~ bit13 displays the final state of RO
n23-10 / n26-10 / n29-10	DIO1 as DO signal source	DIO1 is used as DI by default; When the n23-10 is configured as a B connector, DIO1 is used as a DO. 0: DI Other: B connector
n23-13 / n26-13 / n29-13	DIO2 as DO signal source	DIO2 is used as DI by default; When the n23-13 is configured as a B connector, DIO1 is used as a DO. 0: DI Other: B connector
n23-00 / n26-00 / n29-00	DI/DIO input filter time	0.000 to 1.000s
n23-11 / n26-11 / n29-11	DIO1 switch-on delay	0.00 to 360.00s
n23-14 / n26-14 / n29-14	DIO2 switch-on delay	0.00 to 360.00s
n23-12 / n26-12 / n29-12	DIO1 switch-off delay	0.00 to 360.00s
n23-15 / n26-15 / n29-15	DIO2 switch-off delay	0.00 to 360.00s

Parameter	Name	Description
n23-09 / n26-09 / n29-09	DIO positive and negative logic	bit00: DIO1 positive and negative logic 0: Logic 1 corresponds to high level 1: Logic 1 corresponds to low level bit01: DIO2 positive and negative logic 0: Logic 1 corresponds to high level 1: Logic 1 corresponds to low level bit02: DIO3 positive and negative logic 0: Logic 1 corresponds to high level 1: Logic 1 corresponds to low level bit03: DIO4 positive and negative logic 0: Logic 1 corresponds to high level 1: Logic 1 corresponds to low level bit04: DIO5 positive and negative logic 0: Logic 1 corresponds to high level 1: Logic 1 corresponds to low level bit05: DIO6 positive and negative logic 0: Logic 1 corresponds to high level 1: Logic 1 corresponds to low level

The DI/DIO connector parameters are as follows:

Parameter	Description	Parameter	Description	Parameter	Description
U4-00	<I/O module 1>DI1 input	U4-12	<I/O module 2>DI1 input	U4-24	<I/O module 3>DI1 input
U4-01	<I/O module 1>DI2 input	U4-13	<I/O module 2>DI2 input	U4-25	<I/O module 3>DI2 input
U4-02	<I/O module 1>DI3 input	U4-14	<I/O module 2>DI3 input	U4-26	<I/O module 3>DI3 input
U4-03	<I/O module 1>DI4 input	U4-15	<I/O module 2>DI4 input	U4-27	<I/O module 3>DI4 input
U4-04	<I/O module 1>DI5 input	U4-16	<I/O module 2>DI5 input	U4-28	<I/O module 3>DI5 input
U4-05	<I/O module 1>DI6 input	U4-17	<I/O module 2>DI6 input	U4-29	<I/O module 3>DI6 input
U4-06	<I/O module 1>DIO1 input	U4-18	<I/O module 2>DIO1 input	U4-30	<I/O module 3>DIO1 input
U4-07	<I/O module 1>DIO2 input	U4-19	<I/O module 2>DIO2 input	U4-31	<I/O module 3>DIO2 input
U4-08	<I/O module 1>DIO3 input	U4-20	<I/O module 2>DIO3 input	U4-32	<I/O module 3>DIO3 input
U4-09	<I/O module 1>DIO4 input	U4-21	<I/O module 2>DIO4 input	U4-33	<I/O module 3>DIO4 input
U4-10	<I/O module 1>DIO5 input	U4-22	<I/O module 2>DIO5 input	U4-34	<I/O module 3>DIO5 input
U4-11	<I/O module 1>DIO6 input	U4-23	<I/O module 2>DIO6 input	U4-35	<I/O module 3>DIO6 input

NOTE

- For DIO and DI configuration of HIO-20 and HIO-30 modules, see the above information on the configuration of the HIO-10 module.

4.10.7.2 AI

Take HIO-10 as an example. HIO-10 provides 2 AIs and supports current and voltage signal types. Before using AI, you must determine whether the external signal is current or voltage, and select the DIP switch accordingly (for details, see HIO-10 IO Function Module User Guide). When N7-00 = 1 and N7-02 = 1, configuration is carried out through N23-41/N23-51. The AI function is achieved as shown in the following function diagram:

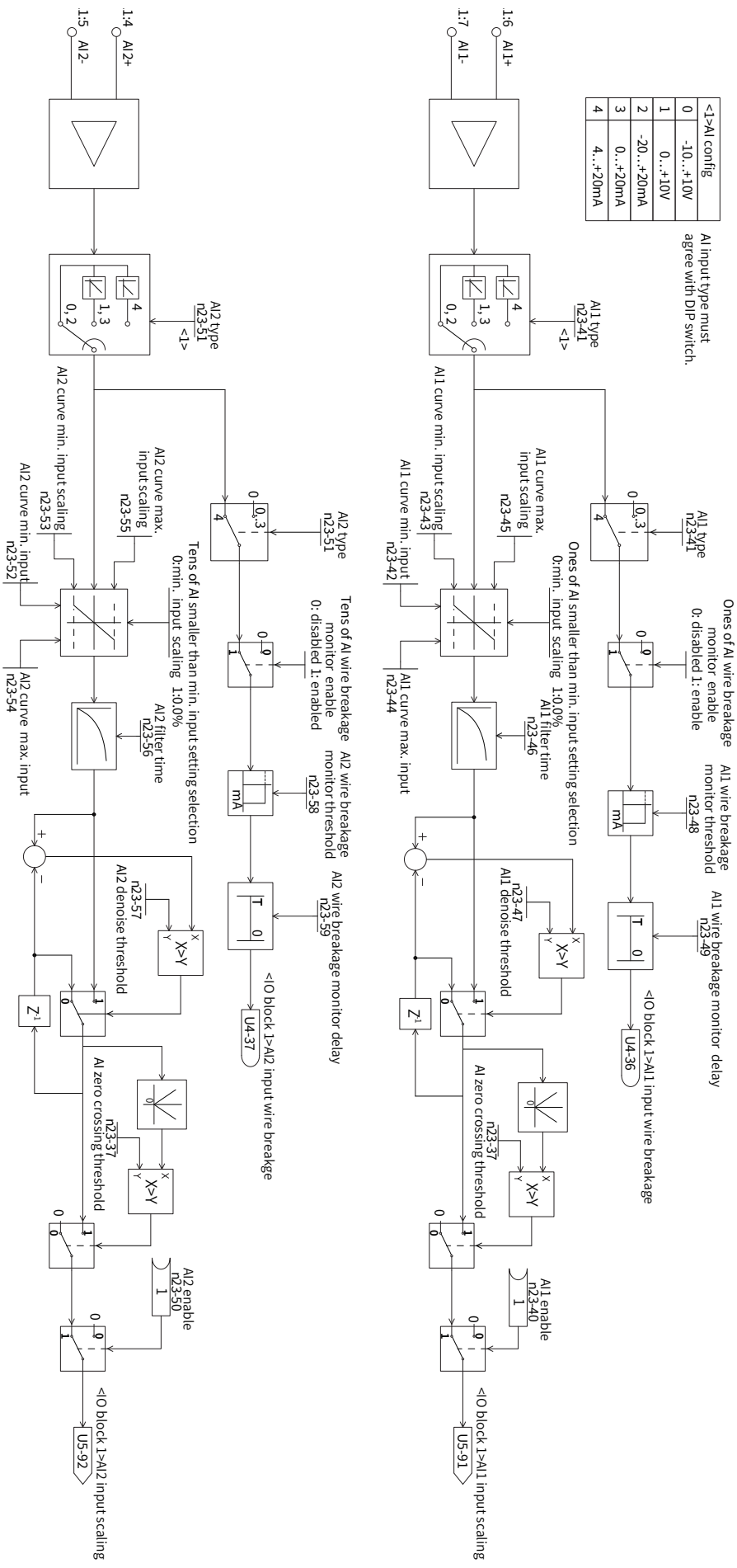


Figure 4-58 AI software Function diagram of HIO

AI function parameters are as follows:

Parameter	Name	Description
n7-20 / n8-20 / n9-20	AI1 input value	Displays AI1 input value in V or mA according to the selection of n23-41
n7-21 / n8-21 / n9-21	AI1 input scaling	Displays the percentage corresponding to AI1 input, which is the final output after AI module processing
n7-22 / n8-22 / n9-22	AI2 input value	Displays AI2 input value in V or mA according to the selection of n23-51
n7-23 / n8-23 / n9-23	AI2 input scaling	Displays the percentage corresponding to AI2 input, which is the final output after AI module processing
n23-41 / n26-41 / n29-41	AI1 type	Sets the input signal type of AI1 or AI2. Different signal types require different HIO AI DIP switches. For details, see HIO-10 IO Function Module User Guide. 0: -10 to +10 V 1: 0 to 10 V 2: -20 to +20 mA 3: 0 to 20 mA 4: 4 to 20 mA
n23-51 / n26-51 / n29-51	AI2 type	
n23-42 / n26-42 / n29-42	AI1 curve min. input value	Calibration of AI1, n23-42 and n23-44 also limit the range of AI1 input (according to n23-41, the unit is V or mA); Within the value range, converts the output percentage value linearly. When the input is less than n23-42: the default output is [n23-43], or the output can be set to 0.0% according to the ones position of n23-35.
n23-43 / n26-43 / n29-43	AI1 curve min. input scaling	
n23-44 / n26-44 / n29-44	AI1 curve max. input value	
n23-45 / n26-45 / n29-45	AI1 curve max. input scaling	
n23-52 / n26-52 / n29-52	AI2 curve min. input value	Calibration of AI2, n23-52 and n23-54 also limit the range of AI2 input (according to n23-51, the unit is V or mA); Within the value range, converts the output percentage value linearly. When the input is less than n23-52: the default output is [n23-53], or the output can be set to 0.0% according to the tens position of n23-35.
n23-53 / n26-53 / n29-53	AI2 curve min. input scaling	
n23-54 / n26-54 / n29-54	AI2 curve max. input value	
n23-55 / n26-55 / n29-55	AI2 curve max. input scaling	
n23-35 / n26-35 / n29-35	AI smaller than min. input setpoint	Ones: AI1 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0% Tens: AI2 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0%
n23-46 / n26-46 / n29-46	AI1 filter time	Sets AI filter time, which produces delay while removing interference.
n23-56 / n26-56 / n29-56	AI2 filter time	

Parameter	Name	Description
n23-47 / n26-47 / n29-47	AI1 denoising threshold	Sets the denoising threshold. When the fluctuation of AI input is less than the set threshold, the corresponding scaling of AI does not change.
n23-57 / n26-57 / n29-57	AI2 denoising threshold	
n23-37 / n26-37 / n29-37	AI zero crossover threshold	When the AI input value is less than the set threshold value, the AI value is regarded as 0
n23-40 / n26-40 / n29-40	AI1 enable	Enables/disables AI1. When AI1 is disabled, it is forced to 0
n23-50 / n26-50 / n29-50	AI2 enable	Enables/disables AI2. When AI2 is disabled, it is forced to 0
n23-36 / n26-36 / n29-36	AI wire breakage monitoring enable	Enables wire breakage monitoring. Monitoring is only enabled when the signal type is 4–20 mA; When the AI input value is less than the wire breakage monitoring threshold and the monitoring delay is maintained, wire breakage occurs. Ones position: AI wire breakage monitoring enable 0: Disabled 1: Enabled Tens position: AI2 wire breakage monitoring enable 0: Disabled 1: Enabled Hundreds position: AI3 wire breakage monitoring enable 0: Disabled 1: Enabled
n23-48 / n26-48 / n29-48	AI1 wire breakage monitoring threshold	0.000–4.000 mA
n23-58 / n26-58 / n29-58	AI2 wire breakage monitoring threshold	0.000–4.000 mA
n23-49 / n26-49 / n29-49	AI1 wire breakage monitoring delay	0.00 to 10.00s
n23-59 / n26-59 / n29-59	AI2 wire breakage monitoring delay	0.00 to 10.00s

AI connector parameters are as follows:

Parameter	Description	Parameter	Description
U4-36	<I/O module 1> AI1 input wire breakage	U5-91	<I/O module 1> AI1 input scaling
U4-37	<I/O module 1> AI2 input wire breakage	U5-92	<I/O module 1> AI2 input scaling
U4-38	<I/O module 1> AI3 input wire breakage	U5-93	<I/O module 1> AI3 input scaling
U4-39	<I/O module 2> AI1 input wire breakage	U5-94	<I/O module 2> AI1 input scaling
U4-40	<I/O module 2> AI2 input wire breakage	U5-95	<I/O module 2> AI2 input scaling
U4-41	<I/O module 2> AI3 input wire breakage	U5-96	<I/O module 2> AI3 input scaling
U4-42	<I/O module 3> AI1 input wire breakage	U5-97	<I/O module 3> AI1 input scaling

Parameter	Description	Parameter	Description
U4-43	<I/O module 3> AI2 input wire breakage	U5-98	<I/O module 3> AI2 input scaling
U4-44	<I/O module 3> AI3 input wire breakage	U5-99	<I/O module 3> AI3 input scaling

NOTE

◆ For AI configuration of HIO-30 module, refer to that of HIO-10 module above.

4.10.7.3 AO

Take HIO-10 as an example. HIO-10 provides 2 AO outputs and supports current and voltage signal types. Before using AO, you need to set the corresponding hardware jumper (see HIO-10 IO Function Module User Guide for details). When n7-00 = 1 and n7-02 = 1, the corresponding configuration is carried out through n23-71/n23-81. The AO function is achieved as shown in the following function diagram:

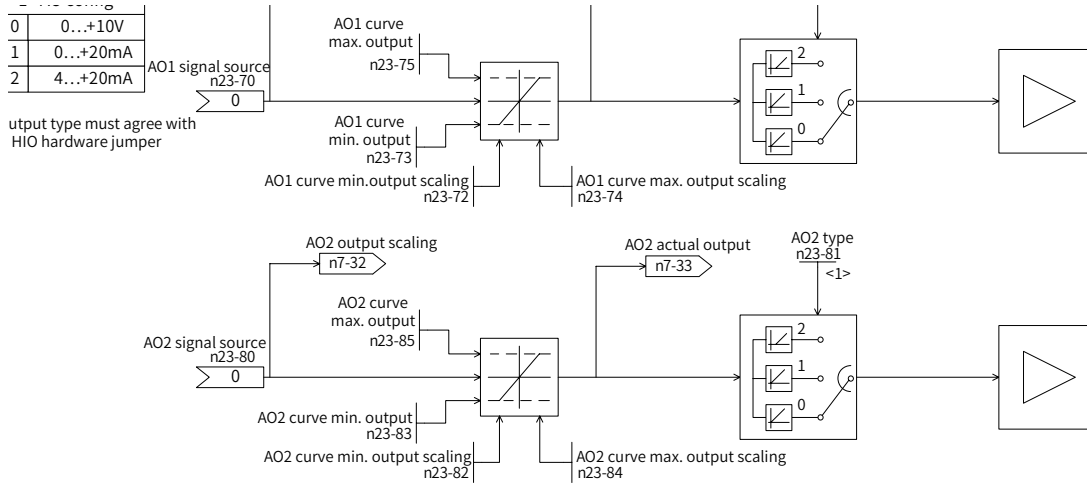


Figure 4-59 AO software Function diagram of HIO

AO function parameters are as follows:

Parameter	Name	Description
n7-30 / n8-30 / n9-30	AO1 output scaling	Displays the AO1 output value in V or mA according to the setting of n23-71
n7-31 / n8-31 / n9-31	Actual AO1 output value	Displays AO1 output scaling corresponding to [n23 -70]
n7-32 / n8-32 / n9-32	AO2 output scaling	Displays the AO2 output value in V or mA according to the setting of n23-81
n7-33 / n8-33 / n9-33	Actual AO2 output value	Displays AO2 output scaling corresponding to [n23 -80]
n23-70 / n26-70 / n29-70	AO1 signal source	Sets the signal source of AO1 output
n23-80 / n26-80 / n29-80	AO2 signal source	Sets the signal source of AO2 output
n23-71 / n26-71 / n29-71	AO1 type	Sets the signal type output by AO1 or AO2. To set the signal type output by AO1 or AO2, you need to wire the signal cable correctly. For details, see HIO-10 IO Module User Guide 0:0~10V 1:0~20mA 2:4~20mA
n23-81 / n26-81 / n29-81	AO2 type	

Parameter	Name	Description
n23-72 / n26-72 / n29-72	AO1 curve min. output scaling	Sets the calibration coefficient of AO1, and n23-73 and n23-75 also limit the range of AO1 output percentage; Within the value range, the output value is obtained by linear conversion (depending on n23-71, the unit is V or mA).
n23-73 / n26-73 / n29-73	AO1 curve min. output value	
n23-74 / n26-74 / n29-74	AO1 curve max. output scaling	
n23-75 / n26-75 / n29-75	AO1 curve max. output value	
n23-83 / n26-83 / n29-83	AO2 curve min. output value	Sets the calibration coefficient of AO2, and n23-83 and n23-85 also limit the range of AO2 output percentage; Within the value range, the output value is obtained by linear conversion (depending on n23-81, the unit is V or mA).
n23-82 / n26-82 / n29-82	AO2 curve min. output scaling	
n23-85 / n26-85 / n29-85	AO2 curve max. output value	
n23-84 / n26-84 / n29-84	AO2 curve max. output scaling	

NOTE

◆ For AO configuration of HIO-30 module, refer to that of HIO-10 module above.

4.10.7.4 RO

Taking HIO-10 as an example, HIO-10 provides one RO. The RO function is achieved as shown in the following function diagram:

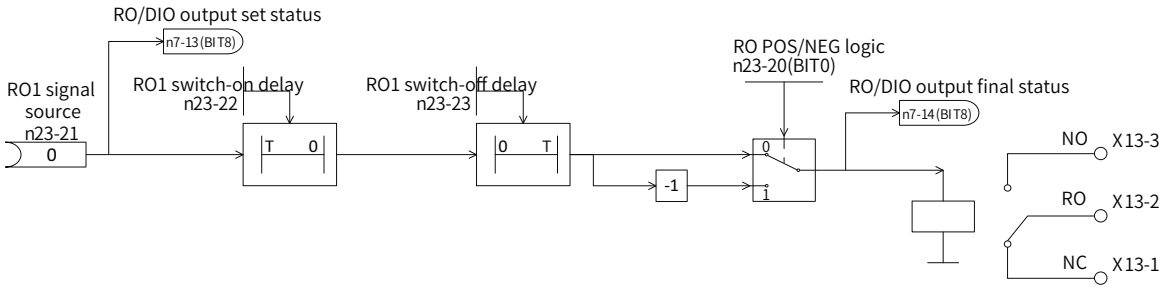


Figure 4-60 RO software Function diagram of HIO

RO function parameters are as follows:

Parameter	Name	Description
n7-13 / n8-13 / n9-13	Setting status of RO/DIO output	Displays the setting status of RO or DIO as DO; bit00–bit05 display the setting status of DIO as DO, and bit08–bit13 display the setting status of RO
n7-14 / n8-14 / n9-14	Final status of RO/DIO output	Displays the final output state of RO or DIO as DO after delay and positive and negative logic processing; bit00–bit05 display the final state of DIO as DO, and bit08 ~ bit13 displays the final state of RO
n23-21 / n26-21 / n29-21	RO1 signal source	0: Low level 1: High level Other: B connector
n23-22 / n26-22 / n29-22	RO1 switch-on delay	0.00 to 360.00s
n23-23 / n26-23 / n29-23	RO1 switch-off delay	0.00 to 360.00s

Parameter	Name	Description
n23-20 / n26-20 / n29-20	RO positive and negative logic	bit00: RO1 positive and negative logic 0: Logic 1 outputs high level 1: Logic 1 outputs low level bit01: RO2 positive and negative logic 0: Logic 1 outputs high level 1: Logic 1 outputs low level bit02: RO3 positive and negative logic 0: Logic 1 outputs high level 1: Logic 1 outputs low level bit03: RO4 positive and negative logic 0: Logic 1 outputs high level 1: Logic 1 outputs low level



NOTE

◆ For RO configuration of HIO-20 and HIO-30 modules, see that of HIO-10 module above.

4.11 Motor Temperature Detection

Motor temperature detection is achieved through simple wiring and setting of a small number of functional parameters. At present, the detection methods supported are: KTY84, PT100, PT1000 and PTC. PG cards or AI/AO allow for motor temperature detection in various ways. Users can choose the detection means through E8-22, and set the motor overtemperature threshold and pre-warning threshold through E8-23 and E8-24 respectively. The detected motor temperature value is displayed in U5-06.

Related Parameter are shown in the following table:

Para. No.	Name	Description
U5-06	Detected motor temperature	Displays the measuring result according to the temperature measurement mode selected by E8-22. Unit: ° C. The actual temperature cannot be obtained by measuring the PTC.
E8-22<1>	Motor temperature detection mode	Selects the encoder module (determined by d0-11): KTY84 and PTC are supported. Selects AI1/AO1 or AI2/AO2 detection: KTY84, PTC, PT100 and PT1000 are supported HCU-50/51 jumper, the AO jumper must be set to the current mode output and the AI jumper to the voltage mode input.
d0-11	Speed feedback selection	When E8-22 is set to measure the temperature through the encoder module, D0-11 determines the active encoder module.
E8-23	Motor over-temperature protection value	When the detected temperature [U5-06] is greater than [E8-23], ERR15-3 is triggered and the motor coasts to stop; When it is greater than [E8-24], only the alarm ERR63-3 is triggered.
E8-24	Motor over-temperature alarm value	



NOTE

◆ < 1 >: When E8-22 is set to "From the connector", the original value of the connector represents the temperature, for example, 204 represents 20.4 °C ..

4.11.1 Motor Temperature Detection with PG card

HPG-10 or HPG-50 has a temperature sampling module, which can realize motor temperature detection in

KTY84 and PTC modes. No matter which encoder signal type is used, the wiring of the motor temperature detection part is the same <1>. Take the HPG-10 HTL incremental encoder as an example:

Connect the temperature sensor (thermistor) in series to pins 2 and 3 of the X31 terminal. According to the sampling value detected inside the module, the resistance value of the thermistor at this time can be obtained through conversion. Further, the motor temperature value at this time can be obtained by looking up the "Resistance-Temperature" table. The wiring diagram is as follows:

When HPG-10 is used to detect the motor temperature, the PG module needs to be inserted into the specified expansion slot and the PG module needs to be configured correctly. Select the encoder detection module to be used in the motor parameter group d0-11 (default is 1). After selection, select the expansion slot and encoder type in the corresponding expansion module group (n4). When the module status is online, the PG card is activated. At this time, the motor temperature detection can be easily achieved by selecting the corresponding motor temperature detection mode through E8-22.

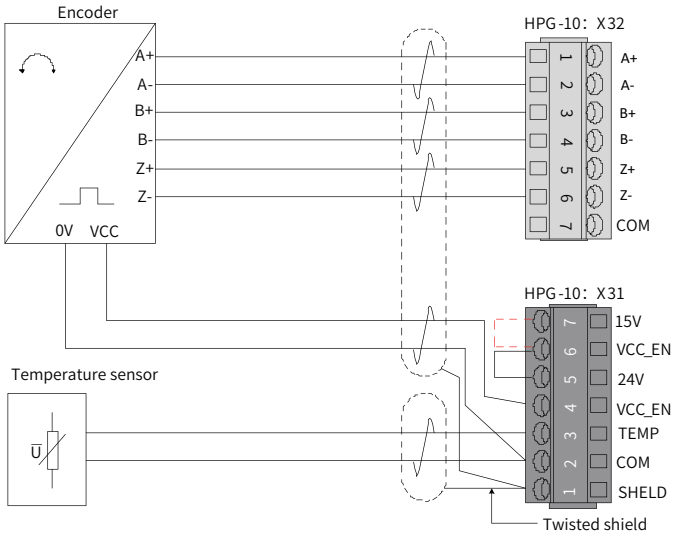


Figure 4-61 Push-pull output HTL encoder interfaces

NOTE

◆ <1>: For detailed introduction of PG module, see HPG-10 HTL Incremental Encoder Detection Module User Guide and HPG-50 TTL Incremental Encoder Detection Module User Guide.

4.11.2 Motor Temperature Detection with AI/AO

To measure motor temperature with analog quantity, AI/AO<1> are required. The supported detection methods include KTY84, PT100, PT100×2, PT100×3, PT1000 and PTC. AI1 can only be used with AO1and AI2 can only be used with AO2. This section takes AI1/AO1 as an example.

When you use AI1/AO1 to measure motor temperature, AI1 must be switched to voltage output mode and AO1 to current output mode with the jumper. According to the detection method selected by E8-22, AO1 outputs a fixed current value <2>, as shown in the following table:

Detection mode (E8-22)	KTY84	PT100	PT100×2	PT100×3	PT1000	PTC
AO output value (F3-00)	2mA	5mA	5mA	5mA	2mA	2mA

The temperature sensor (thermistor) is connected in series to both ends of AO1. By measuring the voltage at both ends of AO1, the resistance value of the thermistor at this time can be obtained according to Ohm's law. Further, the motor temperature value at this time can be obtained by looking up the "Resistance-Temperature" table. Connecting both ends of AO1 to AI1 respectively can achieve automatic measurement of AO voltage value <3> . At this time, the display value of F2-00 (the input value of AI1) is the voltage value across AO1. After the wiring is completed, select the motor temperature detection mode

through E8-22. The wiring diagram is as follows:

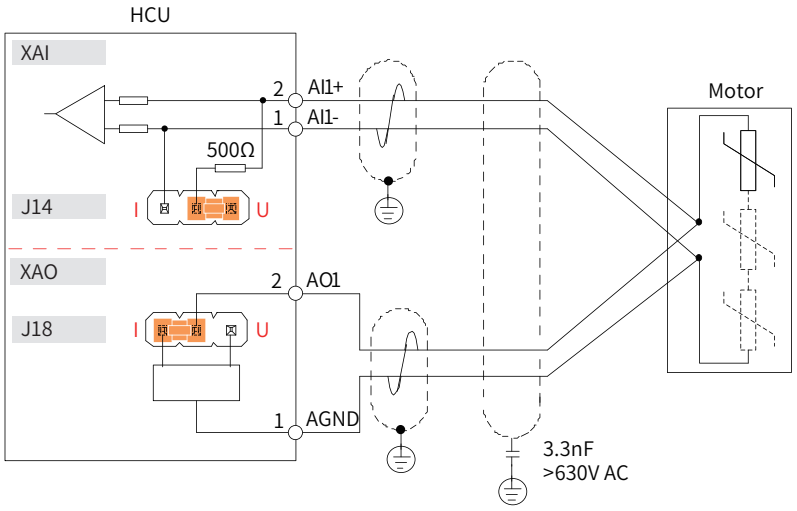


Figure 4-62 Temperature detection wiring with AI1 and AO1

NOTE

- <1>: In order to improve the detection accuracy, it is recommended to calibrate AI and AO in advance.
- <2>: When you use AI1/AO1 to measure the motor temperature, the setting of F3-04 (AO1 signal source) is ineffective.
- <3>: Do not directly ground both ends of the cable shield. Directly ground one end and suspend the other end, or directly ground one end and ground the other end after passing through a string capacitor.

4.12 Process PID Module

In industrial control applications, in order to control the speed, pressure, temperature or flow rate of the controlled object and maintain the stability of the output, closed-loop control is often adopted, and the feedback value is consistent with the setpoint through the combination of proportional control (P), integral control (I) and differential control (D).

The output of the P control is proportional to the deviation.There is a steady-state error in the output of the system when only proportional control is used.

The output of the I control is proportional to the integral of the deviation. The static error of the system can be eliminated by introducing "integral term".

The output of the D control is proportional to the differential of the deviation. The "differential term" can predict the variation trend of deviation, thus optimizing the dynamic response of the controlled object with large inertia or strong lag.

To achieve smooth control, set related parameters in group L4 and adjust PID parameter. PID function is turned on and PID operation is enabled by L4-00 and L4-01, and the execution cycle of PID controller is selected by L4-03.

4.12. 1 PID Input

Through L4-04 and L4-08, the target value and actual value of the controlled quantity are selected as the setpoint source and feedback source of the controller. The setpoint and feedback is filtered (L4-07, L4-09) as needed. For inverse characteristic load, L4-02 (PID action direction) can be set to the opposite direction, so that the PID output is reduced when the input is positive. U9-60 (input deviation) is superimposed with L4-10 (supplementary setpoint) as the final PID input (U9-61). When L4-06 (freeze setpoint enable) is active, the setpoint will remain unchanged. As shown in the following figure.

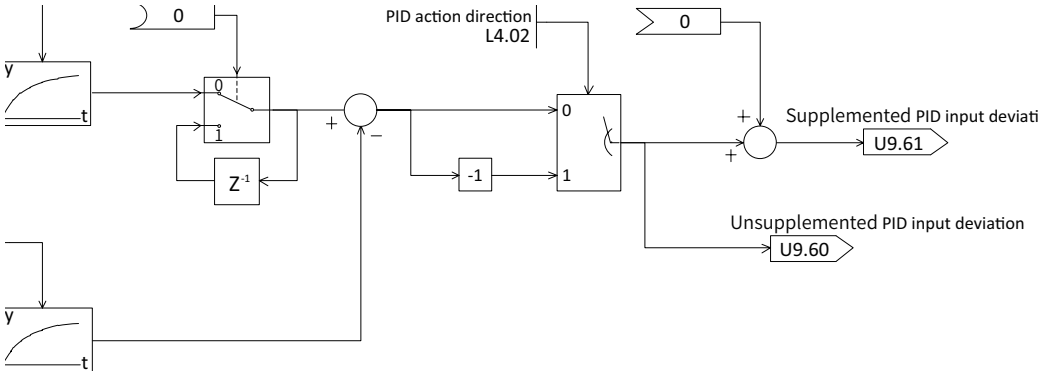


Figure 4-63 PID input

4.12. 2 PID Output

When the input deviation is outside the set dead zone, the PID controller starts to work. When the input of the controller is not 0, the controlled quantity will increase or decrease under the action of PID until the output limit is reached. The proportional gain Kp and integration time Ti are adjusted to ensure the dynamic response and steady-state accuracy of PID output. As shown in the following figure.

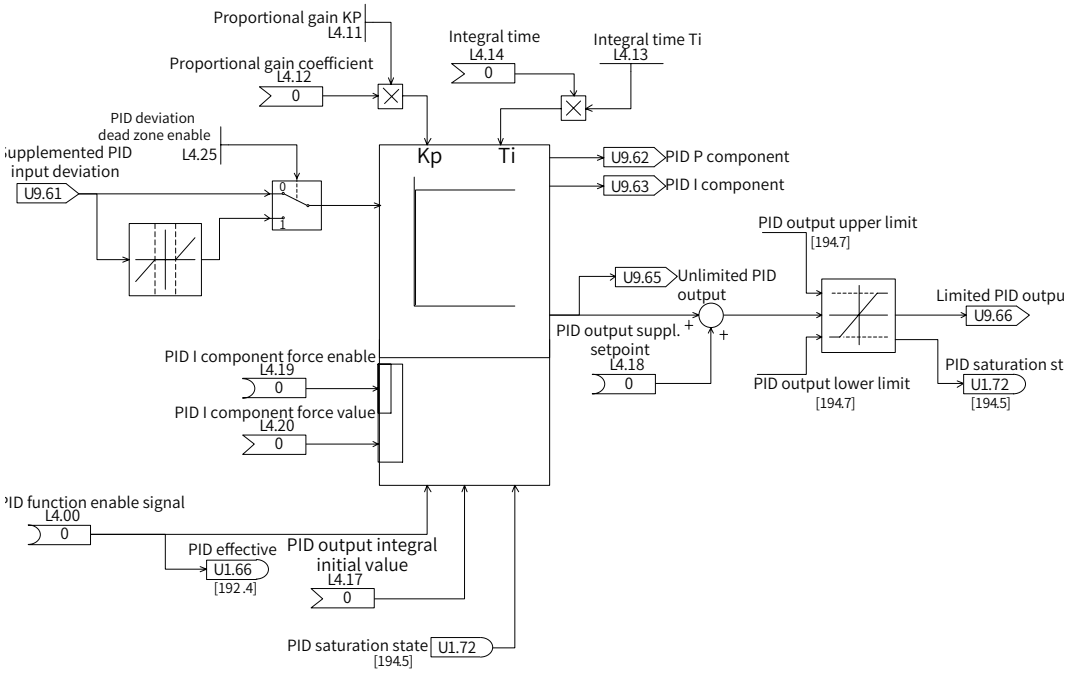


Figure 4-64 PID output

4.12. 3 PID Limit

The output of PID is limited by setting upper and lower limits and rising and falling times, so that the output of the controller is within the controllable range. As shown in the following figure.

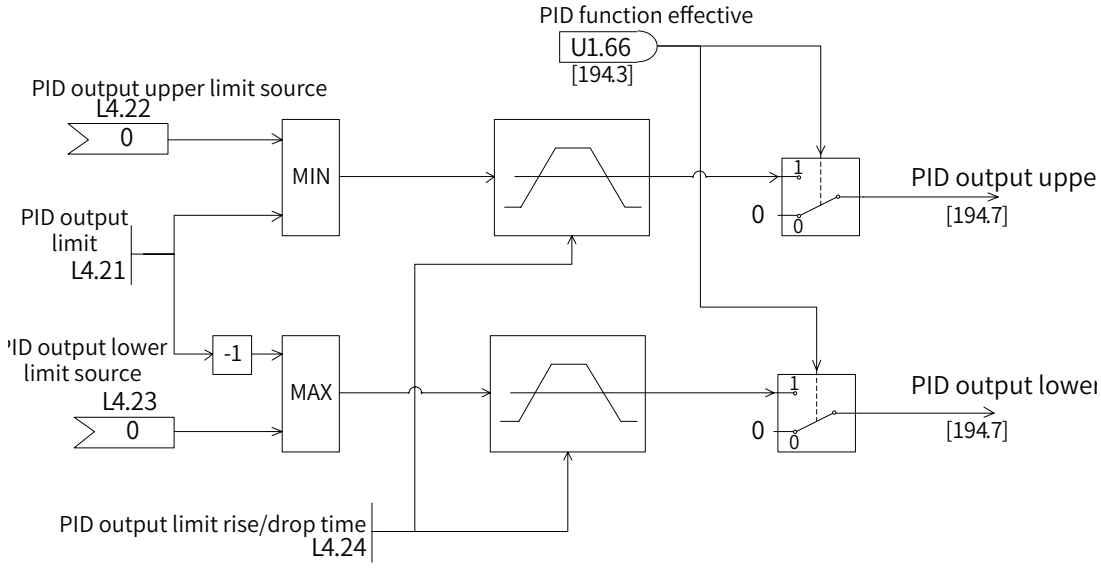


Figure 4-65 PID limit

4.12.4 Detection of PID Feedback Loss

When the absolute value of PID feedback is continuously lower than the detected value (L4-27) during the detection time (L4-28), the PID feedback is considered to be lost and an error code 31 is reported to prompt the user to check the sensor or wiring.

4.13 speed Measurement with Incremental Encoder

HCU-50/51 supports up to 3 encoder detection modules. The parameters in groups N4/N5/N6 correspond to the settings of the 3 modules. The corresponding parameter group parameters need to be selected and set according to d0-11. In motor parameters, d0-11 is set to 0 by default [encoder detection module 1].

4.13.1 Setting of Incremental Encoder

HCU-50/51 supports incremental encoders with HTL and TTL levels, and the corresponding encoder detection module models are HPG-10 and HPG-50 respectively. The software configuration methods of the two are exactly the same. Take encoder detection module 1 (D0-11=0) as an example:

Parameter	Name	Description
n4-00	Expansion slot selection	According to the actual slot position of the encoder detection module in HCU-50/51. When two encoder detection modules are enabled, they must be different.
n4-02	Encoder type	0-Invalid type, encoder function off 1-Generic ABZ encoder with support for HPG-10 and HPG-50 modules. The HPG-10 is a TTL-level ABZ encoder detection module that supports 12V to 24V incremental encoders and supports differential, single-ended, and OC inputs. The HPG-50 is a TTL level ABZ encoder detection module that supports a 5V incremental encoder and does not support the OC input.
n4-01	Module online status	After N4-00 and N4-02 are configured correctly, their status should be displayed as "online".
n4-03	Input A/B phase sequence	If the encoder speed measurement is opposite to the design selection direction of the motor, this parameter can be modified to adjust the speed measurement direction.

Parameter	Name	Description
n4-04	Speed test mode	0: quadruple frequency, faster response at low speed, when the duty cycle of encoder signal is not 50%, or the orthogonality of A/B signal is not good, it will lead to increased fluctuation of speed measurement. 1: A pulse, the speed measurement response at extremely low speed is slightly poor, but relatively stable.
n4-07	Encoder resolution (pulses/revolutions)	The nameplate parameter of the incremental encoder, which indicates how many pulses are generated per revolution

4.13. 2 Anti-interference and Frequency Division Output

Parameter	Name	Description
n4-08	PG quadrature interlock	On by default, it can increase the suppression of interference signals.
n4-17	Filter time of encoder speed test	The detected feedback speed is filtered to smooth glitches.
n4-09	Output coefficient of pulse frequency divider	The encoder input signal is divided and then output. When 1 is selected, the frequency of the output signal is the same as that of the original signal; When n is selected, the output signal is the input signal frequency such as 1/n.
n4-05	Output A/B phase sequence	0-Forward, the A signal of frequency division output is ahead of B. 1-Reverse, the A signal of frequency division output lags behind B.
n4-06	Output Z phase sequence	0-Maintains the polarity of input Z signal 1-Outputs Z signal after reversing the polarity

4.13.3 Detection of Wire Breakage

Parameter	Name	Description
n4-10	Wire breakage inspection mode for ABZ encoder	The encoder detection module monitors the wiring state of the encoder signal wire, and can immediately report the fault once the wire is disconnected. 0: Do not detect, disabled 1: ABZ differential signal, detecting six signal wires A+/A-, B+/B-and Z+/Z- 2: AB differential signal, detecting four signal wires A+/A-and B+/B- 3: ABZ single-ended positive signal, detecting three signal wires A+, B+ and Z+. Note that only these three wires can be used during wiring, otherwise the encoder will be reported to be disconnected 4: AB single-ended positive signal, detecting only two signal wires A+ and B+. Note that only these two lines can be used during wiring, otherwise the encoder will be reported to be disconnected
n4-11	Speed feedback PG wire breakage detection time	Only after the duration of encoder wire breakage exceeds this time will the wire breakage fault be reported. If it turned out to be a false report, this time can be increased. Setting it to 0 indicates that the wire breakage detection function is disabled.

The encoder signal abnormality software detection function can be turned on through n4-20. When it is detected that the speed change exceeds the threshold n4-22 in the adjacent speed measurement period, the software will reject the speed exceeding the change threshold in this cycle to prevent motor jitter caused by abnormal speed measurement. When the speed continues to be abnormal and exceeds the number of times set by n4-23, an encoder speed measurement error will be reported (only in FVC mode).

In the case of poor encoder signals, if false reports occur frequently, you can increase n4-21 or n4-23. However, after n4-22 is increased, when the device runs at low speed, especially at a speed lower than n4-22, it may not be possible to report the error effectively. If the user does not want the drive to report the error, but only want to use glitch removal function to reduce the influence caused by the speed

measurement glitches of the encoder, n4-20 can be turned off and n4-28 can be turned on.

Parameter	Name	Description
n4-20	Enable software detection of encoder signal exception	By detecting the encoder speed in adjacent speed measurement periods, determines whether there is abnormal jump in the speed, and then corrects and reports the error.
n4-21	Software detection coefficient of encoder signal exception	Adjusts n4-22 (speed threshold for determining that the encoder signal is abnormal).
n4-22	Software detection threshold of encoder signal abnormality	If the speed change of two adjacent speed measurement periods exceeds this threshold, it is determined that the speed of this cycle is abnormal.
n4-23	Threshold of encoder signal exception count	The maximum number of times to correct the continuous abnormal jump of speed. When n4-20 or n4-28 is 1, if the consecutive number of abnormal speed does not exceed this value, the abnormal encoder speed is corrected, and if exceeded, the abnormal encoder speed is not corrected.
n4-28	Enable burr removal for encoder speed measuring	The abnormality evaluation of speed jump is carried out, and the abnormal speed value is eliminated.

4.13.4 Pulse Counting and Encoder Angle Simulation

Depending on the internal operation function of HCU-50/51, not only incremental encoder can be used to measure speed, but also pulses can be counted to simulate absolute encoder to realize position measurement. The measured position can also be converted into the rotation angle and revolutions of the motor rotor according to the encoder pulses per revolution. See the following table for the related parameters:

Parameter	Name	Description
U8-77	Encoder pulse count	Displays the number of incremental input pulses counted by the encoder module. Corresponds to the quadruple frequency of the input pulse: that is, when a 1024 PPR encoder rotates one revolution, the count increases by 4096.
U5-11	Encoder measuring angle	Simulates an absolute encoder. The pulse count of the encoder is converted into angle change, and the angle increases during forward operation and decreases during reverse operation. 0–65535 correspond to angles of 0–360 °. The combination of U5-12 and U5-11 can simulate a multi-turn absolute encoder.
U5-12	Number of revolutions of encoder	
n4-18	Encoder initial angle trigger setpoint	Sets the value of U5-11 or U5-12 when the set connector value changes: When the connector is a single word, the changed value will be set to the value of U5-11; When the connector is a double word, the low word of the changed value will be set to the value of U5-11 the high word will be set to the value of U5-12.
U9-12	Encoder pulse count position value (quadruplicated frequency)	A 32-bit connector is used to display the continuous change of U8-77 (encoder pulse count).

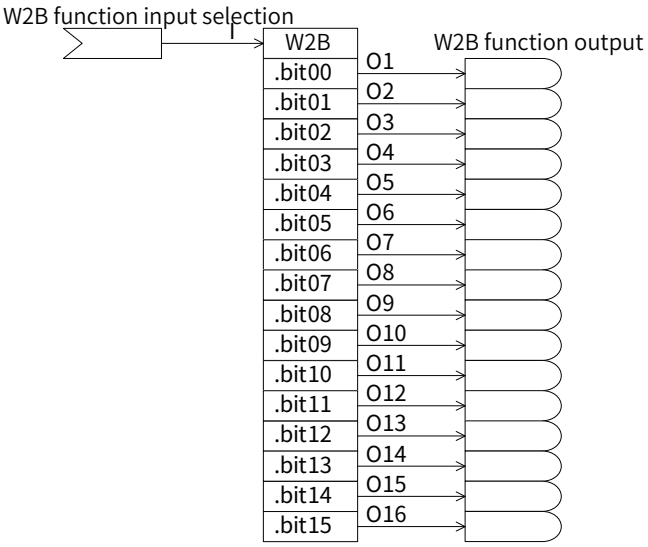
4.14 Application Functions

In engineering applications, the control of AC drives requires logic operation function blocks, which can associate multiple state signals and control signals. The application functions of MD880 include logic operation, arithmetic function, word-to-bit conversion, single-word and double-word conversion, switch function, control function, polyline, constant setting and parameter monitoring and modification block. You can set related parameters in group L to achieve simple logic operation.

4.14.1 Word-Bit Conversion Function

4.14.1.1 Word-to-bit Block (1–4)

■ Diagram



■ Operation

When the input I is a single word, the outputs O1–O16 correspond to bit00–bit15 of the input I; When the input I is a double word, the outputs O1–O16 correspond to bit00–bit15 of the high 16 bits of the input I.

■ Connection

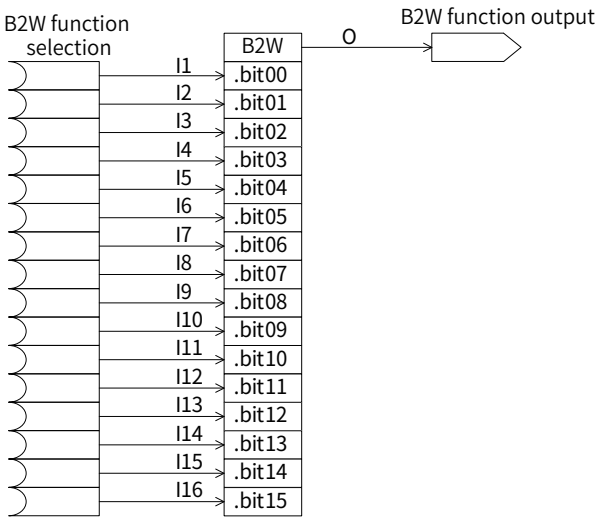
Input I: unsigned number;

Output O1–O16: binary number.

Word-to-bit block		1	2	3	4
Input	I	L0-00	L0-01	L0-02	L0-03
Output	O1(bit00)	U2-48	U2-64	U2-80	U4-76
	O2(bit01)	U2-49	U2-65	U2-81	U4-77
	O3(bit02)	U2-50	U2-66	U2-82	U4-78
	O4(bit03)	U2-51	U2-67	U2-83	U4-79
	O5(bit04)	U2-52	U2-68	U2-84	U4-80
	O6(bit05)	U2-53	U2-69	U2-85	U4-81
	O7(bit06)	U2-54	U2-70	U2-86	U4-82
	O8(bit07)	U2-55	U2-71	U2-87	U4-83
	O9(bit08)	U2-56	U2-72	U2-88	U4-84
	O10(bit09)	U2-57	U2-73	U2-89	U4-85
	O11(bit10)	U2-58	U2-74	U2-90	U4-86
	O12(bit11)	U2-59	U2-75	U2-91	U4-87
	O13(bit12)	U2-60	U2-76	U2-92	U4-88
	O14(bit13)	U2-61	U2-77	U2-93	U4-89
	O15(bit14)	U2-62	U2-78	U2-94	U4-90
	O16(bit15)	U2-63	U2-79	U2-95	U4-91

4.14.1.2 Bit-to-Word Block (1–4)

■ Diagram



■ Operation

bit00–bit16 of output O correspond to inputs I1–I16.

■ Connection

Input I1–I16: binary number.

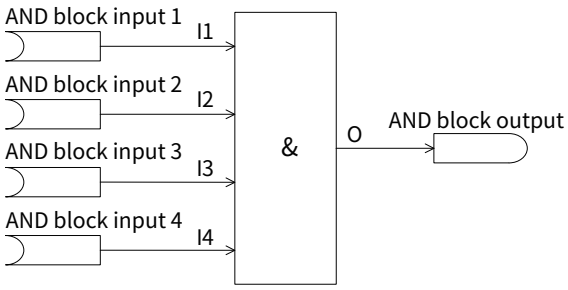
Output O: unsigned number.

Bit-to-word block		1	2	3	4
Input	I1(bit00)	L0-10	L0-26	L0-42	L0-58
	I2(bit01)	L0-11	L0-27	L0-43	L0-59
	I3(bit02)	L0-12	L0-28	L0-44	L0-60
	I4(bit03)	L0-13	L0-29	L0-45	L0-61
	I5(bit04)	L0-14	L0-30	L0-46	L0-62
	I6(bit05)	L0-15	L0-31	L0-47	L0-63
	I7(bit06)	L0-16	L0-32	L0-48	L0-64
	I8(bit07)	L0-17	L0-33	L0-49	L0-65
	I9(bit08)	L0-18	L0-34	L0-50	L0-66
	I10(bit09)	L0-19	L0-35	L0-51	L0-67
	I11(bit10)	L0-20	L0-36	L0-52	L0-68
	I12(bit11)	L0-21	L0-37	L0-53	L0-69
	I13(bit12)	L0-22	L0-38	L0-54	L0-70
	I14(bit13)	L0-23	L0-39	L0-55	L0-71
	I15(bit14)	L0-24	L0-40	L0-56	L0-72
	I16(bit15)	L0-25	L0-41	L0-57	L0-73
Output	O	U5-86	U5-87	U5-88	U5-89

4.14.2 Logical Operation Functions

4.14.2.1 AND Block (A–D)

■ Diagram



■ Operation

$O = I1 \& I2 \& I3 \& I4$

If inputs I1, I2, I3 and I4 are all true, then output O is true, otherwise output O is false. The truth table is:

Input				Output
I1	I2	I3	I4	O
I1	I2	I3	I4	O
0	×	×	×	0
×	0	×	×	0
×	×	0	×	0
×	×	×	0	0
1	1	1	1	1

■ Connection

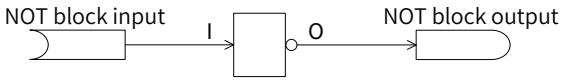
Inputs I1, I2, I3, I4: binary numbers.

Output O: binary number.

AND block	Input				Output
	I1	I2	I3	I4	O
A	L2-00	L2-01	L2-02	L2-03	U3-00
B	L2-04	L2-05	L2-06	L2-07	U3-01
C	L2-08	L2-09	L2-10	L2-11	U3-02
D	L2-12	L2-13	L2-14	L2-15	U3-03

4.14.2.2 NOT Block (A–H)

■ Diagram



■ Operation

$O = \overline{I}$

Output equals inverted input I. The truth table is:

Input	Output
I	O
0	1
1	0

Connection input I: binary number.

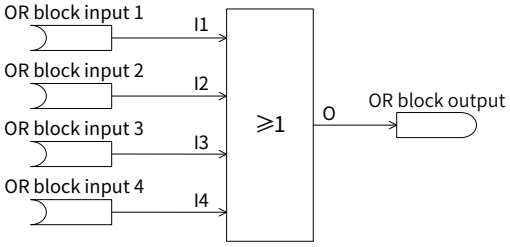
Output O: binary number.

NOT block	Input	Output
	I	O

A	L2-16	U3-04
B	L2-17	U3-05
C	L2-18	U3-06
D	L2-19	U3-07
E	L2-20	U3-08
F	L2-21	U3-09
G	L2-22	U3-10
H	L2-23	U3-11

4.14.2.3 OR Block (A–D)

■ Diagram



■ Operation

$O = I1 | I2 | I3 | I4$

As long as one of the inputs I1, I2, I3, and I4 is true, the output is true. The truth table is:

Input				Output
I1	I2	I3	I4	O
0	0	0	0	0
1	×	×	×	1
×	1	×	×	1
×	×	1	×	1
×	×	×	1	1

■ Connection

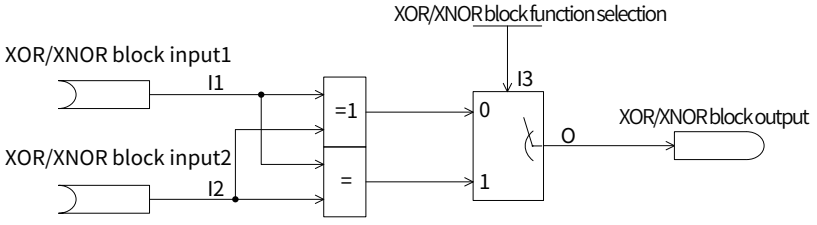
Inputs I1, I2, I3, I4: binary numbers.

Output O: binary number.

OR block	Input				Output
	I1	I2	I3	I4	O
A	L2-24	L2-25	L2-26	L2-27	U3-12
B	L2-28	L2-29	L2-30	L2-31	U3-13
C	L2-32	L2-33	L2-34	L2-35	U3-14
D	L2-36	L2-37	L2-38	L2-39	U3-15

4.14.2.4 XOR/XNOR Block (A–D)

■ Diagram



■ Operation

when XOR\XNOR function selection I3 is 0, XOR is effective $O = \overline{I1}\, I2 + I1\, \overline{I2}$

When input I1 and I2 are the same, output O is 0; When input I1 and I2 are different, output O is 1. The truth table is:

Input		Output
I1	I2	O
0	0	0
1	0	1
0	1	1
1	1	0

when XOR\XNOR function selection I3 is 1, XNOR is effective. $O = I1\, I2 + \overline{I1}\, \overline{I2}$

When the inputs I1 and I2 are the same, the output O is 1; When the inputs I1 and I2 are different, the output O is 0. The truth table is:

Input		Output
I1	I2	O
0	0	1
1	0	0
0	1	0
1	1	1

■ Connection

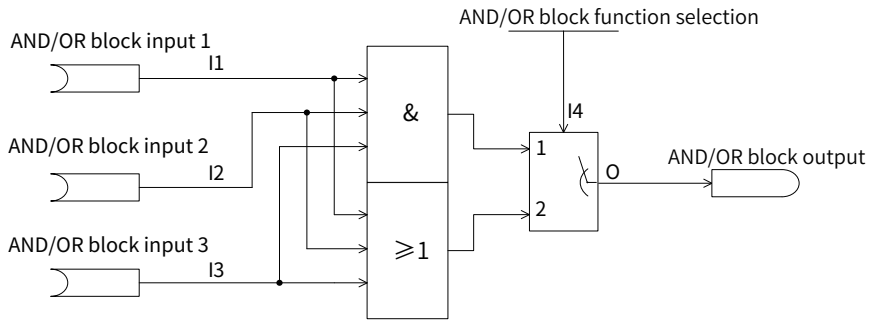
Inputs I1, I2, I3: binary numbers.

Output O: binary number.

XOR/XNOR block	Input			Output
	I1	I2	I3	O
A	L2-41	L2-42	L2-40	U3-16
B	L2-44	L2-45	L2-43	U3-17
C	L2-47	L2-48	L2-46	U3-18
D	L2-50	L2-51	L2-49	U3-19

4.14.2.5 AND/OR Block (A–H)

■ Diagram



■ Operation

When AND/OR function selection I4 is 1, AND is effective. $O = I1 \,\&\, I2 \,\&\, I3$

If the inputs I1, I2 and I3 are all true, the output O is true, otherwise the output O is false. The truth table is:

Input			Output
I1	I2	I3	O
0	0	0	0
1	0	0	0
0	1	0	0
1	1	0	0
0	0	1	0
1	0	1	0
0	1	1	0
1	1	1	1

When AND/OR function selection I4 is 2, OR is effective. $O = I1 | I2 | I3$

As long as one of the inputs I1, I2, and I3 is true, the output is also true. The truth table is:

Input			Output
I1	I2	I3	O
0	0	0	0
1	0	0	1
0	1	0	1
1	1	0	1
0	0	1	1
1	0	1	1
0	1	1	1
1	1	1	1

■ Connection

Inputs I1, I2, I3, I4: binary numbers.

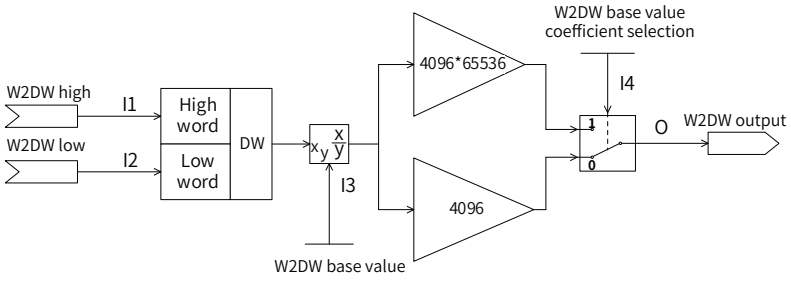
Output O: binary number.

AND/OR block	Input				Output
	I1	I2	I3	I4	O
A	L2-61	L2-62	L2-63	L2-60	U4-92
B	L2-65	L2-66	L2-67	L2-64	U4-93
C	L2-69	L2-70	L2-71	L2-68	U4-94
D	L2-73	L2-74	L2-75	L2-72	U4-95
E	L2-77	L2-78	L2-79	L2-76	U4-96
F	L2-81	L2-82	L2-83	L2-80	U4-97
G	L2-85	L2-86	L2-87	L2-84	U4-98
H	L2-89	L2-90	L2-91	L2-88	U4-99

4.14.3 DW-W Conversion Function

4.14.3.1 WORD-to-DWORD conversion (1–5)

■ Diagram



■ Operation

$$O=\begin{cases}\dfrac{I1\times 65536+I2}{I3}\times 4096\times 65536, & I4=1\\ \dfrac{I1\times 65536+I2}{I3}\times 4096, & I4=0\end{cases}$$

The output is equal to a double word with I1 as the high 16 bits and I2 as the low 16 bits divided by the base value I3 and multiplied by the base value coefficient (the base value coefficient depends on I4); When the input is double word, the high 16 bits are taken.

When I3 is 0, the output is equal to the input.

■ Connection

Inputs I1, I2: signed numbers.

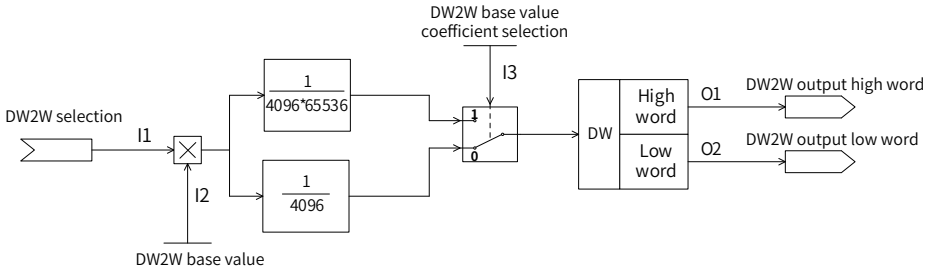
Input I3: unsigned number.

Output O: signed number.

WORD-to-DWORD	Input				Output
	I1	I2	I3	I4	O
1	L3-01	L3-02	L3-03	L3-00(bit0)	U9-47
2	L3-04	L3-05	L3-06	L3-00(bit1)	U9-48
3	L3-07	L3-08	L3-09	L3-00(bit2)	U9-49
4	L3-10	L3-11	L3-12	L3-00(bit3)	U9-26
5	L3-13	L3-14	L3-15	L3-00(bit4)	U9-27

4.14.3.2 DWORD-to-WORD (1–5)

■ Diagram



■ Operation

$$O1=\begin{cases}\left(\dfrac{I1\cdot I2}{4096\times 65536}>>16\right)\&\ 0xFFFF, & I3=1\\ \left(\dfrac{I1\cdot I2}{4096}>>16\right)\&\ 0xFFFF, & I3=0\end{cases}$$

$$O2=\begin{cases}\left(\dfrac{I1\cdot I2}{4096\times 65536}\right)\&\ 0xFFFF, & I3=1\\ \left(\dfrac{I1\cdot I2}{4096}\right)\&\ 0xFFFF, & I3=0\end{cases}$$

The output high word is the high 16 bits from the solution for I1 multiplied by the base value I2 and divided by the base value coefficient (the base value coefficient depends on I3), and the output low word is the low 16 bits from the solution from I1 multiplied by the base value I2 and divided by the base value coefficient (the base value coefficient depends on I3).

When I2 is 0, the output high word is equal to the input high word and the output low word is equal to the input low word.

■ Connection

Input I1: signed number;

Input I2: unsigned number;

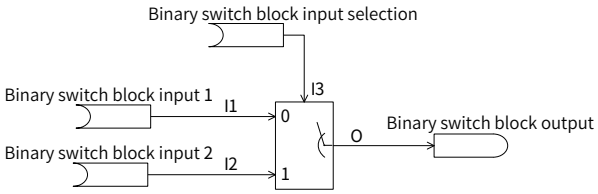
Output O1, O2: signed numbers.

DWORD-to-WORD	Input			Output	
	I1	I2	I3	O1	O2
1	L3-26	L3-27	L3-25(bit0)	U5-76	U5-77
2	L3-28	L3-29	L3-25(bit1)	U5-78	U5-79
3	L3-30	L3-31	L3-25(bit2)	U5-80	U5-81
4	L3-32	L3-33	L3-25(bit3)	U5-82	U5-83
5	L3-34	L3-35	L3-25(bit4)	U5-84	U5-85

4.14.4 Switch Function Block

4.14.4.1 Binary Switch Block (A–E)

■ Diagram



■ Operation

$$O = \begin{cases} I1, & I3=0 \\ I2, & I3=1 \end{cases}$$

If binary switch block input selection I3 is 0, output O is equal to I1 (bit); if binary switch block input selection I3 is 1, output O is equal to I2 (bit).

■ Connection

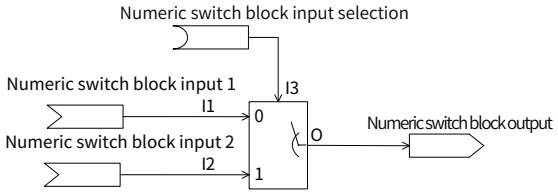
Inputs I1, I2, I3: binary numbers.

Output O: binary number.

Binary switch block	Input			Output
	I1	I2	I3	O
A	L5-01	L5-02	L5-00	U3-20
B	L5-04	L5-05	L5-03	U3-21
C	L5-07	L5-08	L5-06	U3-97
D	L5-10	L5-11	L5-09	U3-98
E	L5-13	L5-14	L5-12	U3-99

4.14.4.2 Numeric Switch Block (A–E)

■ Diagram



■ Operation

$$O = \begin{cases} I1, & I3=0 \\ I2, & I3=1 \end{cases}$$

If numeric switch block input selection I3 is 0, output O is equal to I1 (word); if I3 is 1, output O is equal to I2 (word).

■ Connection

Input I1, I2: signed numbers.

Input I3: binary number.

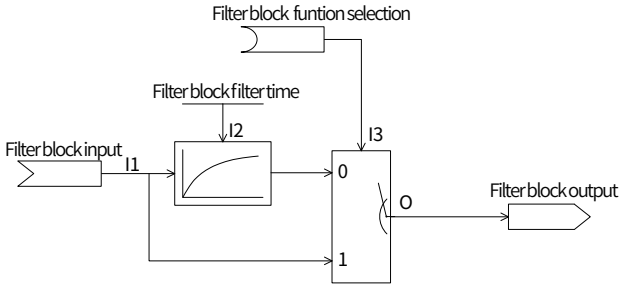
Output O: signed number.

Numeric switch block	Input			Output
	I1	I2	I3	O
A	L5-21	L5-22	L5-20	U9-67
B	L5-24	L5-25	L5-23	U9-68
C	L5-27	L5-28	L5-26	U9-87
D	L5-30	L5-31	L5-29	U9-88
E	L5-33	L5-34	L5-32	U9-89

4.14.5 Control Function Block

4.14.5.1 Filter Block (A–D)

■ Diagram



■ Operation

If filter block function selection I3 is 0, output O is equal to the filter value of input I1; if I3 is 1, output O is equal to input I1.

■ Connection

Input I1: signed number.

Input I2: unsigned number.

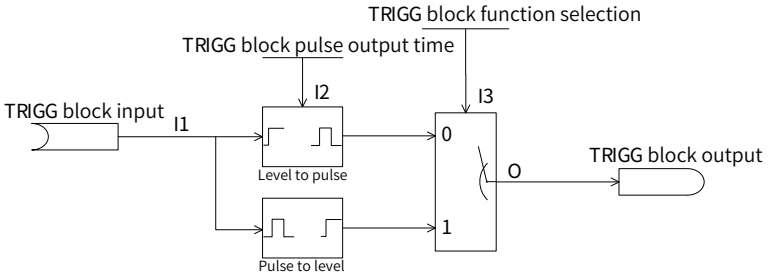
Input I3: binary number.

Output O: signed number.

Filter block	Input			Output
	I1	I2	I3	O
A	L6-01	L6-02	L6-00	U9-69
B	L6-04	L6-05	L6-03	U9-70
C	L6-07	L6-08	L6-06	U9-71
D	L6-10	L6-11	L6-09	U9-72

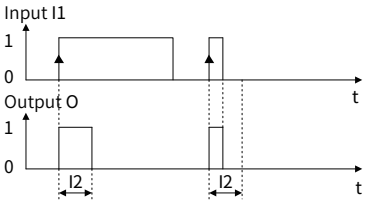
4.14.5.2 Pulse-Level Conversion Block (A–D)

■ Diagram

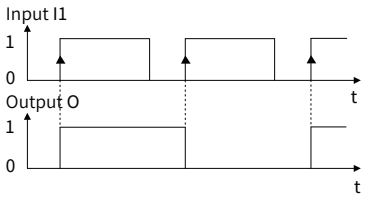


■ Operation

If pulse-level conversion block function selection I3 is 0, level-to-pulse is effective, and the output is set to high within the pulse output time I2 on the rising edge of input I1; If input I1 is 0, the output immediately becomes 0, regardless of the pulse duration.



If pulse-level conversion block function selection is 1, pulse-to-level is effective. The output is set high on the first rising edge of input I1, and low on the second rising edge of input I1, and so on. Odd number of pulses output high level and even number of pulses output low level.



■ Connection

Input I1, I3: binary numbers.

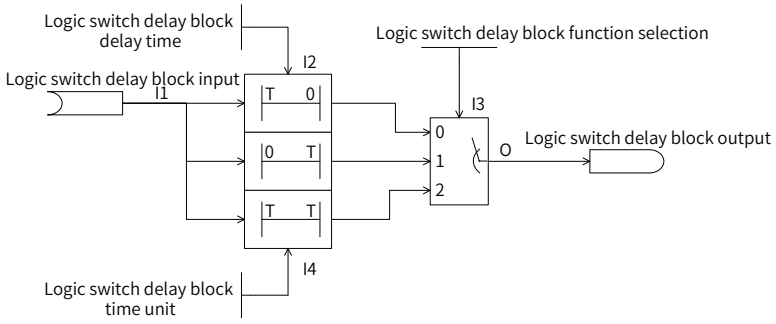
Input I2: unsigned number.

Output O: binary number.

Pulse-level conversion block	Input			Output
	I1	I2	I3	O
A	L6-13	L6-14	L6-12	U3-22
B	L6-16	L6-17	L6-15	U3-23
C	L6-19	L6-20	L6-18	U3-24
D	L6-22	L6-23	L6-21	U3-25

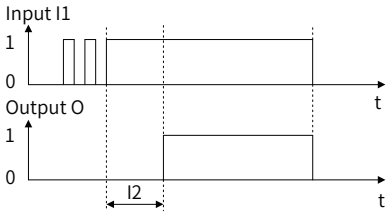
4.14.5.3 Logic Switch Delay Block (A–D)

■ Diagram

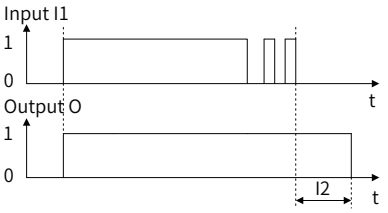


■ Operation

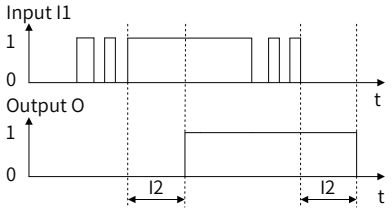
When logic switch delay block function selection I3 is 0 and the input is 0 → 1, switch-on delay is active; The delay time depends on I2 delay time and I4 time unit; The switch-on delay filters out high-level pulses less than I2 time, as shown in the following figure.



When logic switch delay block function selection I3 is 1 and the input is 1 → 0, switch-off delay is active. The delay time depends on I2 delay time and I4 time unit; The switch-off delay filters out low-level pulses less than I2 time, as shown in the following figure.



When logic switch delay block function selection I3 is 2, the input is delayed during 0 → 1 switch-on and 1 → 0 switch-off. The delay time depends on I2 delay time and I4 time unit. Both switch-on and switch-off delays will filter the pulse, as shown in the following figure.



■ Connection

Input I1: binary number.

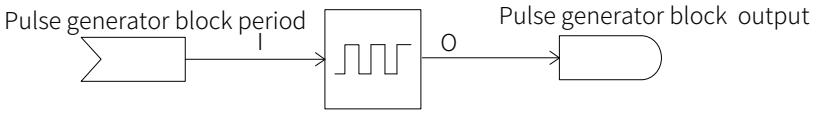
Input I2, I3: unsigned numbers.

Output O: binary number.

Logic switch delay block	Input				Output
	I1	I2	I3	I4	O
A	L6-24	L6-26	L6-25	L6-27	U3-26
B	L6-28	L6-30	L6-29	L6-31	U3-27
C	L6-32	L6-34	L6-33	L6-35	U3-28
D	L6-36	L6-38	L6-37	L6-39	U3-29

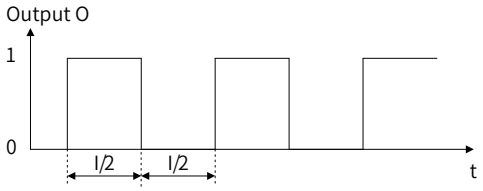
4.14.5.4 Pulse Generator Block

■ Diagram



■ Operation

When the cycle input of the pulse generator block is 0, the block always outputs a low level; If input I is not 0, the block output is a square wave.



■ Connection

Input I: unsigned number;

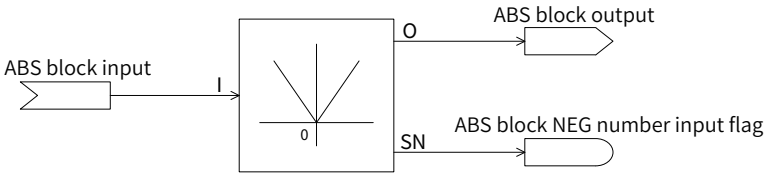
Output O: binary number.

Pulse generator block	Input	Output
	I	O
A	L6-45	U4-45

4.14.6 Arithmetic Function Block

4.14.6.1 Absolute Block (A–D)

■ Diagram



■ Operation

$$O = |I|$$

$$SN = \begin{cases} 1 & I < 0 \\ 0 & I \geq 0 \end{cases}$$

The output is equal to the absolute value of the input I; When the input is negative, the flag bit SN is 1,

otherwise, the flag bit is 0.

■ Connection

Input I: signed number.

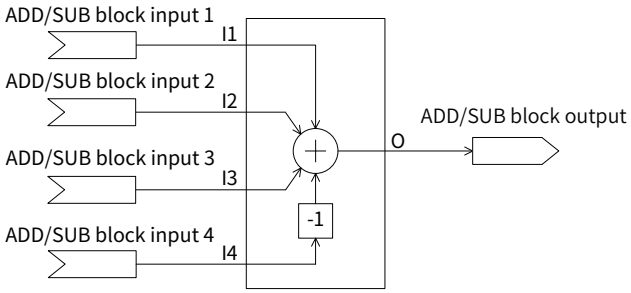
Output O: signed number.

Output SN: binary number.

Absolute block	Input	Output	
	I	SN	O
A	L7-00	U3-30	U9-73
B	L7-01	U3-31	U9-74
C	L7-02	U3-32	U9-75
D	L7-03	U3-33	U9-76

4.14.6.2 Adder and Subtractor Block (A–D)

■ Diagram



■ Operation

$O = I1+I2+I3-I4$

The value of output O is equal to the sum of inputs I1, I2, and I3 minus I4.

■ Connection

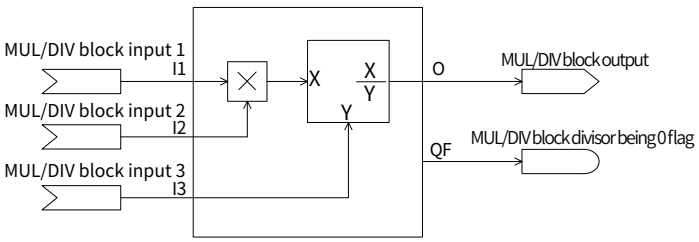
Input I1, I2, I3, I4: signed numbers;

Output O: signed number.

Adder and substractor block	Input				Output
	I1	I2	I3	I4	O
A	L7-04	L7-05	L7-06	L7-07	U9-77
B	L7-08	L7-09	L7-10	L7-11	U9-78
C	L7-12	L7-13	L7-14	L7-15	U9-79
D	L7-16	L7-17	L7-18	L7-19	U9-80

4.14.6.3 Multiplier and Divider Block (A–D)

■ Diagram



■ Operation

$$O=(I1\cdot I2)/I3$$

$$QF=\begin{cases}1, & I3=0\\ 0, & I3\neq 0\end{cases}$$

■ Connection

Input I1, I2, I3: signed numbers.

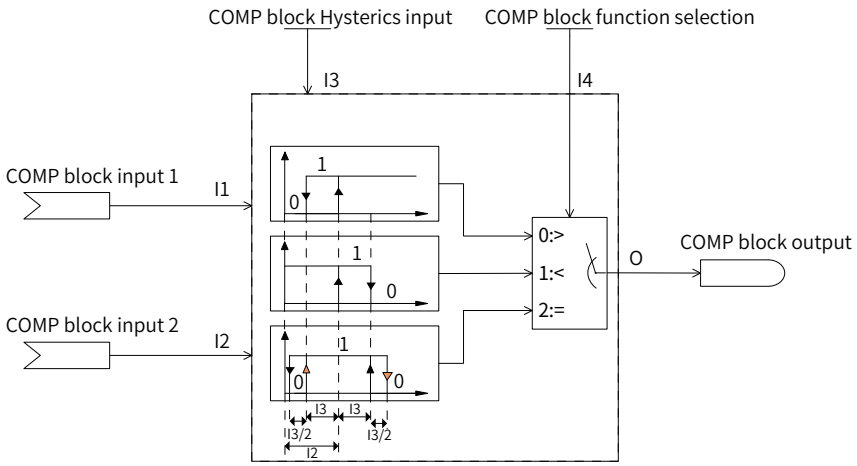
Output O: signed number.

Output QF: binary number.

Multiplier and divider block	Input			Output	
	I1	I2	I3	QF	O
A	L7-20	L7-21	L7-22	U3-34	U9-81
B	L7-23	L7-24	L7-25	U3-35	U9-82
C	L7-26	L7-27	L7-28	U3-36	U9-83
D	L7-29	L7-30	L7-31	U3-37	U9-84

4.14.6.4 Numeric Comparator Block (A–E)

■ Diagram



■ Operation

If the function of the numeric comparator block selects I4 as 0, when I1 increases from zero in positive direction to close to I2, the output O keeps low level all the time; When I1 increases to greater than I2, the output O jumps from low level to high level, I1 increases again, and the output O keeps high level; If I1 decreases, as long as I1 > I2-I3, the output O will always remain high level, and only when I1 < I2-I3, the output O will jump from high level to low level.

If the function of the numeric comparator block selects I4 as 1, when I1 increases from zero in positive direction to close to I2+I3, the output O keeps high level all the time; When I1 increases to more than I2+I3, the output O jumps from high level to low level, I1 increases again, and the output O keeps low level; If I1 decreases, as long as I1 > I2, the output O will always remain low, and only when I1 < I2, the output O will jump from low to high.

If the function of the numeric comparator block selects I4 as 2, when I1 increases from zero in positive direction to close to I2-I3, the output O keeps low level all the time, when I1 increases to greater than I2-I3 and less than I2+I3, the output O jumps from low level to high level, I1 increases to greater than I2+1.5 × I3, and the output O jumps from high level to low level; If I1 is reduced, as long as I1 < I2+I3, the output

O will always maintain a low level. When it is reduced to I2-1.5 × I3 < I1 < I2+I3, the output O jumps from a low level to a high level. When it is reduced to I1 < I2-1.5 × I3, the output O jumps from a high level to a low level.

The hysteresis input I3 suppresses frequent on-off.

■ Connection

Input I1, I2: signed numbers.

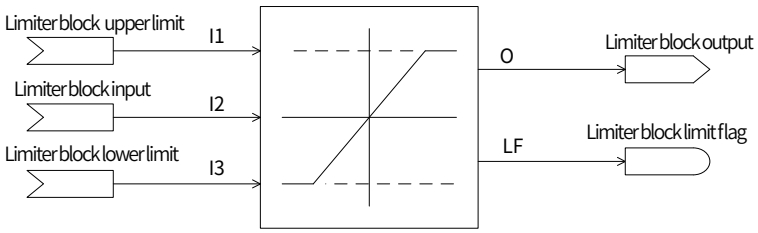
Input I3, I4: unsigned numbers.

Output O: binary number.

Numeric comparator block	Input				Output
	I1	I2	I3	I4	O
A	L7-33	L7-34	L7-35	L7-32	U3-38
B	L7-37	L7-38	L7-39	L7-36	U3-39
C	L7-41	L7-42	L7-43	L7-40	U4-69
D	L7-45	L7-46	L7-47	L7-44	U4-70
E	L7-49	L7-50	L7-51	L7-48	U4-71

4.14.6.5 Limit Block (A–D)

■ Diagram



■ Operation

$$O=\begin{cases} I1 & I2 > I1 \\ I2 & I3 \le I2 \le I1 \\ I3 & I2 < I3 \end{cases}$$

$$LF=\begin{cases} 1, & I2 > I1 \text{或} I2 < I3 \\ 0, & I3 \le I2 \le I1 \end{cases}$$

When the input I2 is greater than the upper limit I1, the output O is equal to I1; When the input I2 is less than the lower limit I3, the output O is equal to I3; When the input I2 is within the upper and lower limiting range, the output is equal to the input value; When the input I2 is greater than the upper limit I1 or less than the lower limit I3, the limit flag bit is set to 1.

■ Connection

Input I1, I2, I3: signed numbers.

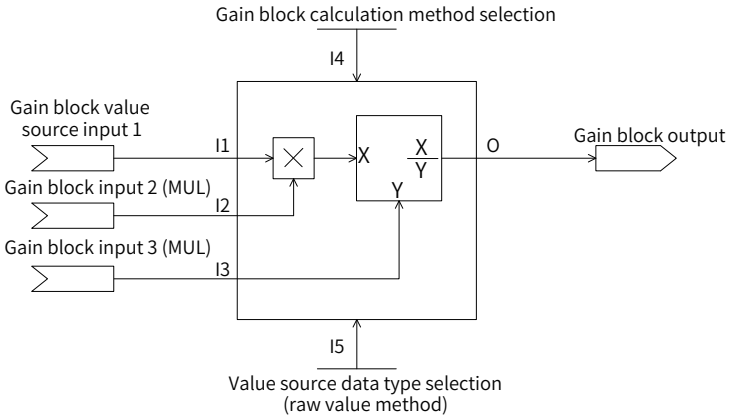
Output O: signed number.

Output LF: binary number.

Limit block	Input			Output	
	I1	I2	I3	LF	O
A	L7-61	L7-60	L7-62	U4-72	U9-90
B	L7-64	L7-63	L7-65	U4-73	U9-91
C	L7-67	L7-66	L7-68	U4-74	U9-92
D	L7-70	L7-69	L7-71	U4-75	U9-93

4.14.6.6 Gain Block (1–15)

■ Diagram



■ Operation

The operation of the gain block is similar to that of the multiplier and divider block, but the calculation method and data type of I1 can be selected as needed. According to Section 2.4.2, for single word connectors, 4096 corresponds to 100%; For dual word connectors, 4096*65536 corresponds to 100%. The gain blocks 1 to 10 are used for processing single-word connector operations, and the gain blocks 11 to 15 are used for processing double-word connector operations.

■ Connection

Input I1, I3, I4, I5: unsigned numbers;

Input I2: signed number;

Output O: signed number;

Gain block	Input					Output
	I1	I2	I3	I4	I5	O
1	L11-02	L11-03	L11-04	L11-00(bit0)	L11-01(bit0)	U15-10
2	L11-05	L11-06	L11-07	L11-00(bit1)	L11-01(bit1)	U15-11
3	L11-08	L11-09	L11-10	L11-00(bit2)	L11-01(bit2)	U15-12
4	L11-11	L11-12	L11-13	L11-00(bit3)	L11-01(bit3)	U15-13
5	L11-14	L11-15	L11-16	L11-00(bit4)	L11-01(bit4)	U15-14
6	L11-17	L11-18	L11-19	L11-00(bit5)	L11-01(bit5)	U15-15
7	L11-20	L11-21	L11-22	L11-00(bit6)	L11-01(bit6)	U15-16
8	L11-23	L11-24	L11-25	L11-00(bit7)	L11-01(bit7)	U15-17
9	L11-26	L11-27	L11-28	L11-00(bit8)	L11-01(bit8)	U15-18
10	L11-29	L11-30	L11-31	L11-00(bit9)	L11-01(bit9)	U15-19
11	L11-32	L11-33	L11-34	L11-00(bit10)	L11-01(bit10)	U19-95
12	L11-35	L11-36	L11-37	L11-00(bit11)	L11-01(bit11)	U19-96
13	L11-38	L11-39	L11-40	L11-00(bit12)	L11-01(bit12)	U19-97
14	L11-41	L11-42	L11-43	L11-00(bit13)	L11-01(bit13)	U19-98
15	L11-44	L11-45	L11-46	L11-00(bit14)	L11-01(bit14)	U19-99

Example:

■ Single word connector U7-47 uses gain block 1 for multiplication and division.

Gain block 1 value source input 1 is from connector U7-47, and gain block 1 input 2 (multiplication) and gain block 1 input 3 (division) are both set to 1.

Para. No.	Name	Setpoint
L11-02	Gain block 1 value source input 1	U7-47 [constant setpoint 1 output]

L11-03	Gain block 1 input 2 (multiply)	1
L11-04	Gain block 1 input 3 (divide)	1

The following table lists the output values of the gain block obtained based on different calculation methods and data types, with the constant setpoint 1 (single word) being ±10.0%.

[L9-00]	[L11-00] bit0	[L11-01] bit0	[U15-10]
10.0	0 (raw value)	0 (signed number)	10%
	0	1 (unsigned number)	10%
	1 (PU value)	-	10%
-10.0	0	0	-10%
	0	1	800%<1>
	1	-	-10%

NOTE

◆ If -10. 0% is regarded as an unsigned number, the output value will reach the positive limiting value.

■ The DWORD connector U9-51 uses the gain block 11 for multiplication and division.

Gain block 11 value source input 1 is from connector U9-51, and gain block 11 input 2 (multiplication) and gain block 11 input 3 (division) are both set to 1.

Para. No.	Name	Setpoint
L11-32	Value source input 1 of gain block 11	U9-51 [constant setpoint 6 output]
L11-33	Gain block 11 input 2 (multiply)	1
L11-34	Gain block 11 input 3 (divide)	1

The following table lists the output values of the gain block obtained based on different calculation methods and data types, with the constant setpoint 6 (double word) being ±10.00%.

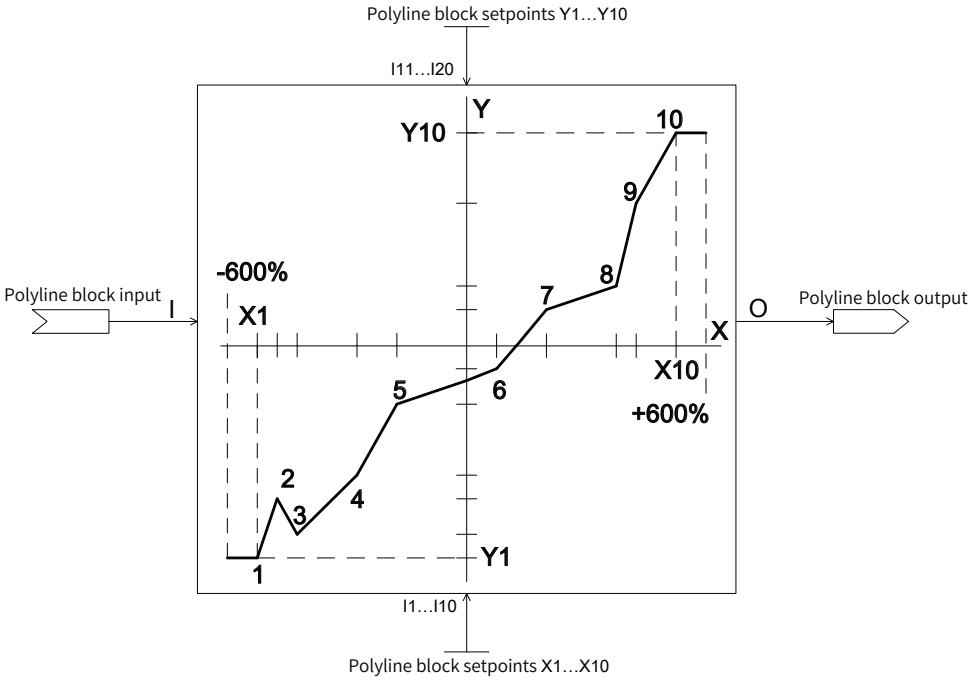
[L9-05]	[L11-00] bit10	[L11-01] bit10	[U19-95]
10.00%	0 (raw value)	0 (signed number)	10%
	0	1 (unsigned number)	10%
	1 (PU value)	-	10%
-10.00%	0	0	-10%
	0	1	800%<1>
	1	-	-10

NOTE

◆ If -10. 0% is regarded as an unsigned number, the output value will reach the positive limiting value.

4.14.7 Polyline Block

■ Diagram



■ Operation

The coordinate points are valid only when X1 < X2 < …; When the input is outside the valid coordinate point, the output is equal to the y-coordinate of the adjacent valid coordinate point; When the input is within the valid coordinate point, the corresponding y-ordinate is calculated and output according to the polyline.

■ Connection

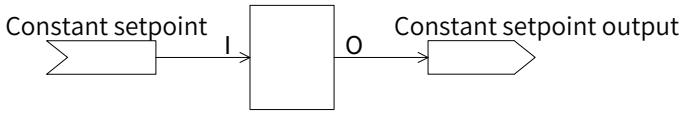
Inputs I, I1–I20: signed number.

Output O: signed number.

Polyline block		A	B
Input	I	L8-00	L8-21
	I1(X1)	L8-01	L8-22
	I2(X2)	L8-03	L8-24
	I3(X3)	L8-05	L8-26
	I4(X4)	L8-07	L8-28
	I5(X5)	L8-09	L8-30
	I6(X6)	L8-11	L8-32
	I7(X7)	L8-13	L8-34
	I8(X8)	L8-15	L8-36
	I9(X9)	L8-17	L8-38
	I10(X10)	L8-19	L8-40
	I11(Y1)	L8-02	L8-23
	I12(Y2)	L8-04	L8-25
	I13(Y3)	L8-06	L8-27
	I14(Y4)	L8-08	L8-29
	I15(Y5)	L8-10	L8-31
	I16(Y6)	L8-12	L8-33
	I17(Y7)	L8-14	L8-35
	I18(Y8)	L8-16	L8-37
	I19(Y9)	L8-18	L8-39
	I20(Y10)	L8-20	L8-41
Output	O	U9-85	U9-86

4.14.8 Constant Setpoint Block

■ Diagram



■ Operation

$O = I$

Output O equals input I. The constant setpoint blocks 1–5 have 1 decimal point, while the constant setpoint blocks 6–10 have 2 decimal points, whose accuracy is higher.

■ Connection

Input I: signed number.

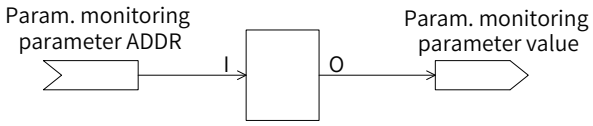
Output O: signed number.

Constant Setting Module	Input	Output
	I	O
1	L9-00	U7-47
2	L9-01	U7-48
3	L9-02	U7-49
4	L9-03	U7-50
5	L9-04	U7-51
6	L9-05	U9-51
7	L9-06	U9-52
8	L9-07	U9-53
9	L9-08	U9-54
10	L9-09	U9-55

4.14.9 Parameter Monitoring and Modification

4.14.9.1 Parameter Monitoring (1–10)

■ Diagram



■ Operation

The parameter monitoring block output O corresponds to the setpoint of the parameter monitoring parameter address I. The parameter monitoring blocks 1 to 4 can monitor the parameters in the range of 0 to 65535, and the parameter monitoring blocks 5 to 10 can monitor the parameters in the range of-32768 to 32767.

■ Connection

Input I: unsigned number;

Output O: blocks 1–4 are unsigned numbers, and blocks 5–10 are signed numbers.

Parameter monitoring block	Input	Output
	I	O
1	L10-00	U7-65
2	L10-01	U7-66
3	L10-02	U7-67
4	L10-03	U7-68
5	L10-04	U7-69
6	L10-05	U7-70
7	L10-06	U7-71
8	L10-07	U7-72
9	L10-08	U7-73
10	L10-09	U7-74

Example:

■ The parameter monitoring blocks 1 and 5 are used to monitor the constant setpoint 1.

Parameter monitoring blocks 1 and 5 are both set to 3429, and 3429 is the address of L9-00 (constant setpoint 1).

Para. No.	Name	Setpoint
L10-00	Address 1 of parameter monitoring parameter	3429
L10-04	Address 5 of parameter monitoring parameter	3429

The following table lists the output values of parameter monitoring blocks 1 and 5, with L9-00 being ± 10.0%.

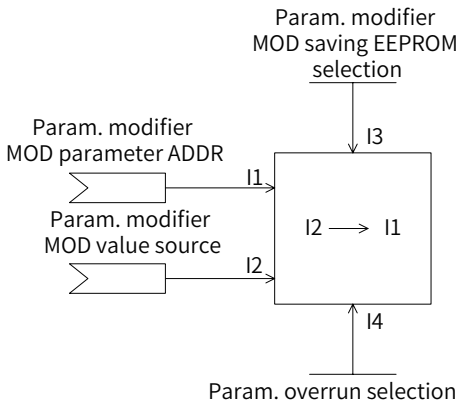
[L9-00]	[U7-65]	[U7-69]
10.0	100	100
-10.0	65436<1>	-100

NOTE

◆ <1>: The output data type of the parameter monitoring blocks 1–4 is 16-bit unsigned number, and the complement of -100 corresponds to 16-bit unsigned number 65436. Therefore, the parameter monitoring blocks 5–10 are needed to monitor the parameters with a signed data type.

4.14.9.2 Parameter Modifier (1–16)

■ Diagram



■ Operation

The modified value of I2 is written into the parameter which address I1 points to. You can select whether the parameter that I1 points to is retentive at power failure after being modified through I3, and select whether to apply limit when the modified value of I2 exceeds the upper/lower limit of the parameter that I1 points to through I4.

■ Connection

Input I1, I2, I3, I4: unsigned numbers.

Parameter mapping block	Input			
	I1	I2	I3	I4
1	L10-18	L10-19	L10-16(bit0)	L10-17(bit0)
2	L10-20	L10-21	L10-16(bit1)	L10-17(bit1)
3	L10-22	L10-23	L10-16(bit2)	L10-17(bit2)
4	L10-24	L10-25	L10-16(bit3)	L10-17(bit3)
5	L10-26	L10-27	L10-16(bit4)	L10-17(bit4)
6	L10-28	L10-29	L10-16(bit5)	L10-17(bit5)
7	L10-30	L10-31	L10-16(bit6)	L10-17(bit6)
8	L10-32	L10-33	L10-16(bit7)	L10-17(bit7)
9	L10-34	L10-35	L10-16(bit8)	L10-17(bit8)
10	L10-36	L10-37	L10-16(bit9)	L10-17(bit9)
11	L10-38	L10-39	L10-16(bit10)	L10-17(bit10)
12	L10-40	L10-41	L10-16(bit11)	L10-17(bit11)
13	L10-42	L10-43	L10-16(bit12)	L10-17(bit12)
14	L10-44	L10-45	L10-16(bit13)	L10-17(bit13)
15	L10-46	L10-47	L10-16(bit14)	L10-17(bit14)
16	L10-48	L10-49	L10-16(bit15)	L10-17(bit15)

Example:

■ C6-05 (fixed setpoint 1) is modified through parameter modifier block 1, and the data comes from connector U7-47 (constant setpoint 1 output)

L10-18 is set to 191, which is the address of C6-05 (fixed setpoint 1); L10-19 is set to U7-47, which is the output of constant setpoint 1.

Para. No.	Name	Setpoint
L10-18	Parameter modifier parameter address 1	191
L10-19	Parameter modifier modification value source 1	U7-47 [constant setpoint 1 output]

The following table lists the setpoints of C6-05 when L9-00 constant setpoint 1 is ±10.0% and ±150.0%.

[L9-00]	[L10-17] bit0	[C6-05]
10.0	-	41.0<1>
-10.0	-	-41.0
150.0	0 (modification invalid)	Disabled
	1 (limited to upper or lower limit)	600.0<2>
-150.0	0 (modification invalid)	Disabled
	1 (limited to upper or lower limit)	-600.0<2>

NOTE

◆ <1>: 4096 corresponds to 100% for single word connectors according to Section 2.4.2; [U7-47] is 10.00%, the per unit value of 10% corresponds to the raw value 410, and C6-05 has a decimal point, so [C6-05] = 41.0.

◆ <2>: The raw value corresponding to ±150.0% PU value exceeds the upper limit/lower limit of C6-05. When the modification range overrun handling is effective, C6-05 is limited to the maximum value/minimum value.

4.15 Free Function Block

The custom function block is enabled by A8-15. When A8-15 is enabled, A4-00 (max. allowable carrier frequency) is limited to 6 kHz.

4.15.1 Technology Parameter Group Switching

The HCU-50/51 control module supports up to 4 groups of technology parameters, each group includes a technology setpoint parameter group and a technology controller parameter group. You can switch the active technology setpoint parameter group and technology controller parameter group through A9-03 and A9-04.

Para. No.	Name	Description
A9-03	[Technology parameter group selection 0] Source	A9-04 / A9-03: 00: o0 (technology setting parameter set 1) o1 (technology controller parameter set 1) 01: o2 (technology setting parameter set 2) o3 (technology controller parameter set 2) 10: o4 (technology setting parameter set 3) o5 (technology controller parameter set 3) 11: o6 (technology setting parameter set 4) o7 (technology controller parameter set 4)
A9-04	[Technology parameter group selection 1] Source	

4.15.2 Execution Sequence

To use Group O (technology parameters) and Group P (user-defined function blocks), the execution sequence needs to be defined first. The execution sequence value ranges from 0 to 65535, and the function block with a smaller execution sequence value will be calculated first. For example, setting P9-04 = 1 indicates that the execution sequence of technology setpoint word parameter 1 is 1 and setting P9-05 = 2 indicates that the execution sequence of technology setpoint word parameter 2 is 2. Technology setpoint word parameter 1 will be calculated before 2.

When the execution sequences of two free function blocks are the same, P9-00 to P9-03 will display the type and group of the two conflict blocks so that they can be located. For example, if P9-04 = 1 and P9-05 = 1, P9-00 to P9-05 display the following:

Para. No.	Name	Current value
P9-00	Type of execution sequence conflict module 1	27[P9 technology setpoint word parameter]
P9-01	Group of execution sequence conflict module 1	1
P9-02	Type of execution sequence conflict module 2	27[P9 technology setpoint word parameter]
P9-03	Group of execution sequence conflict module 2	2
P9-04	Technology setpoint word parameter 1 execution sequence	1
P9-05	Technology setpoint word parameter 2 execution sequence	1



NOTE

- For individual technology parameters and user-defined function blocks, you need to enable A8-15 and set its execution sequence.

4.15.3 Technology setpoint Parameter Group

There are four groups of technology setpoint parameter groups, which can be switched with A9-03 and A9-04.

The technology setpoint word parameter block is the same as the constant setpoint blocks 6–10 (two decimal points) in section 4.14.8. The parameters and connector parameters corresponding to technology setpoint word parameters 1–14 are shown in the following table:

Technology setpoint word parameter	Technology setpoint parameter group 1		Technology setpoint parameter group 2		Technology setpoint parameter group 3		Technology setpoint parameter group 4	
	Input	Output	Input	Output	Input	Output	Input	Output
	I	O	I	O	I	O	I	O
1	o0-00	U19-67	o2-00	U19-67	o4-00	U19-67	o6-00	U19-67
2	o0-01	U19-68	o2-01	U19-68	o4-01	U19-68	o6-01	U19-68
3	o0-02	U19-69	o2-02	U19-69	o4-02	U19-69	o6-02	U19-69
4	o0-03	U19-70	o2-03	U19-70	o4-03	U19-70	o6-03	U19-70
5	o0-04	U19-71	o2-04	U19-71	o4-04	U19-71	o6-04	U19-71
6	o0-05	U19-72	o2-05	U19-72	o4-05	U19-72	o6-05	U19-72
7	o0-06	U19-73	o2-06	U19-73	o4-06	U19-73	o6-06	U19-73
8	o0-07	U19-74	o2-07	U19-74	o4-07	U19-74	o6-07	U19-74
9	o0-08	U19-75	o2-08	U19-75	o4-08	U19-75	o6-08	U19-75
10	o0-09	U19-76	o2-09	U19-76	o4-09	U19-76	o6-09	U19-76
11	o0-10	U19-77	o2-10	U19-77	o4-10	U19-77	o6-10	U19-77
12	o0-11	U19-78	o2-11	U19-78	o4-11	U19-78	o6-11	U19-78
13	o0-12	U19-79	o2-12	U19-79	o4-12	U19-79	o6-12	U19-79
14	o0-13	U19-80	o2-13	U19-80	o4-13	U19-80	o6-13	U19-80

Define the execution sequence of the technology setpoint bit parameter block, activate the corresponding block, and its output bit is equal to the input bit. The parameters and connector parameters corresponding to technology setpoint bit parameters 1–6 are shown in the following table:

Technology controller fixed bit	Technology setpoint parameter group 1		Technology setpoint parameter group 2		Technology setpoint parameter group 3		Technology setpoint parameter group 4	
	Input	Output	Input	Output	Input	Output	Input	Output
	I	O	I	O	I	O	I	O
1	o0-14	U11-64	o2-14	U11-64	o4-14	U11-64	o6-14	U11-64
2	o0-15	U11-65	o2-15	U11-65	o4-15	U11-65	o6-15	U11-65
3	o0-16	U11-66	o2-16	U11-66	o4-16	U11-66	o6-16	U11-66
4	o0-17	U11-67	o2-17	U11-67	o4-17	U11-67	o6-17	U11-67
5	o0-18	U11-68	o2-18	U11-68	o4-18	U11-68	o6-18	U11-68
6	o0-19	U11-69	o2-19	U11-69	o4-19	U11-69	o6-19	U11-69

4.15.41 Technology Controller Parameter Group

There are four groups of technology controller parameter groups, which can be switched with A9-03 and A9-04.

The technology controller consists of setpoint, supplementation, feedback, differential operation, droop, Kp self-adaptation, proportional operation, integral operation, output limiting, and output scaling.
To control an object, you need to set related parameters in groups o1, o3, o5 and o7 and adjust PID parameters. You can set the technology controller execution sequence through P9-24, and enable all four groups of technology controllers by enabling any one of o1-00, o3-00, o5-00 and o7-00.

4.15.4.1 input of Technology Controller

Taking group 1 as an example. You can set the setpoint source and feedback source of the technology controller through o1-02 to o1-05 and o1-09 to o1-12, and set the supplementary setpoints through o1-06 and o1-07. You can filter the setpoint and feedback (o1-08, o1-13) as required. The differential type is selected by the hundreds position of o1-01, and finally the controller differential component U19-83 and

the deviation value U19-86 are obtained.

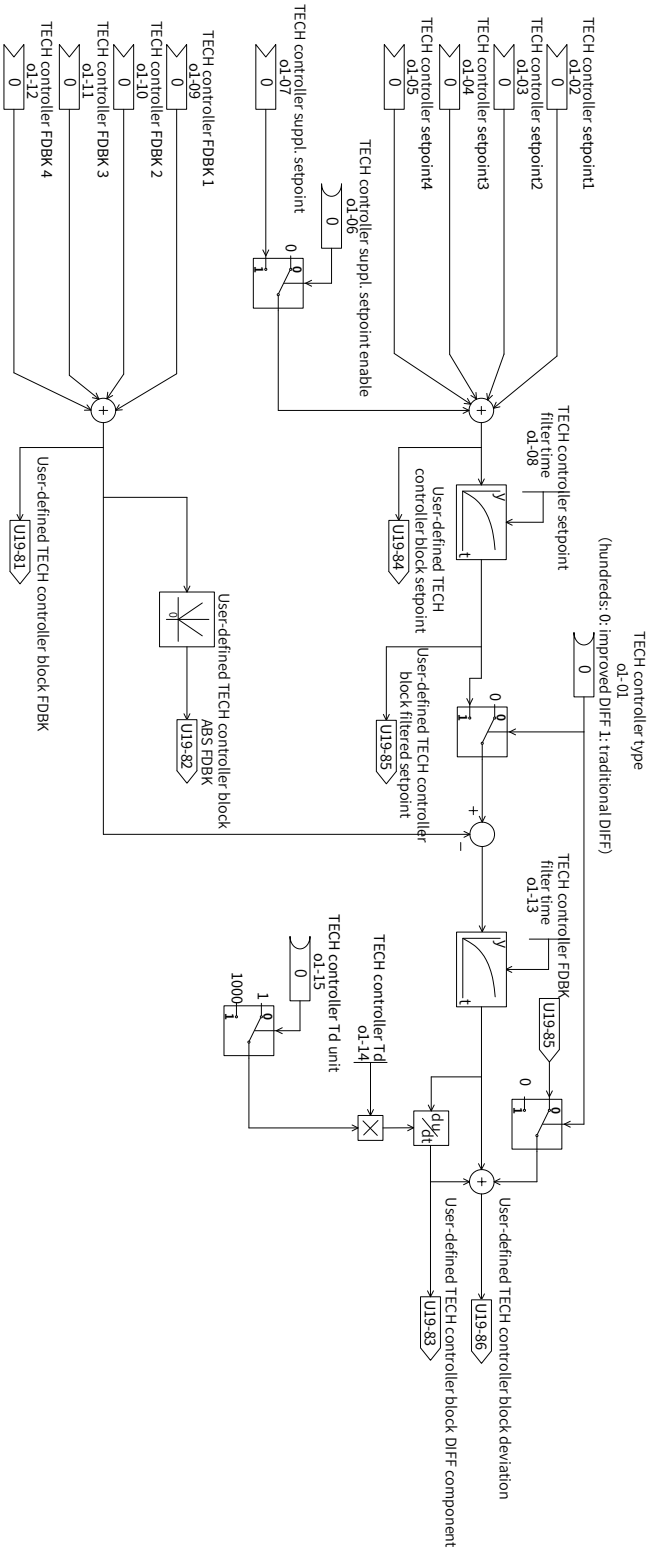


Figure 4-66 input of technology controller

4.15.4.2 Output of Technology Controller

The controller is enabled through o1-00, and the integral, proportion and calculation direction of the technology controller type oO1-01 are set. The negative feedback is introduced through o1-16 to o1-19 to achieve the droop function. The Kp adaptation function is achieved through o1-20 to o1-25. The limiting output of the controller is achieved through o1-30 to o1-33, and finally the output scaling is achieved through o1-34 and o1-35.

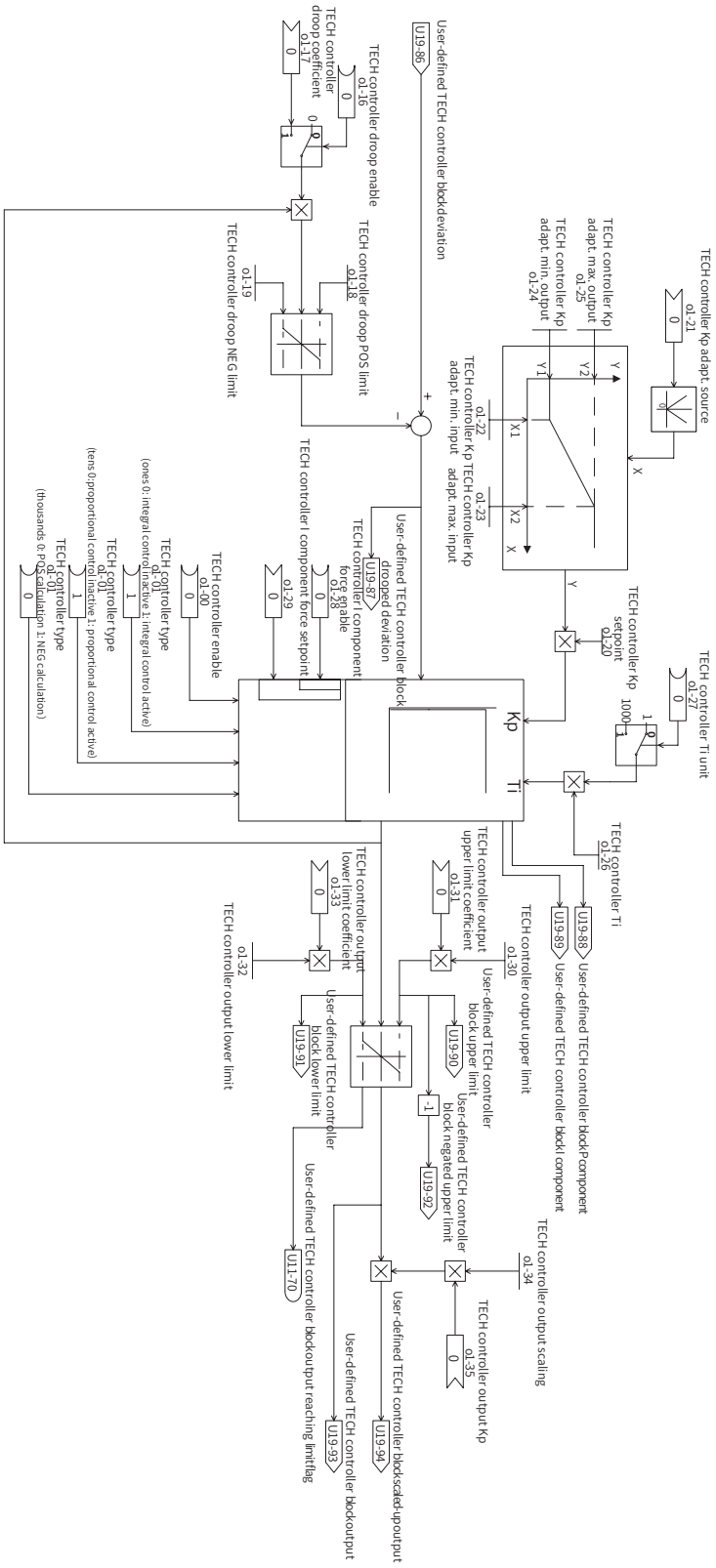


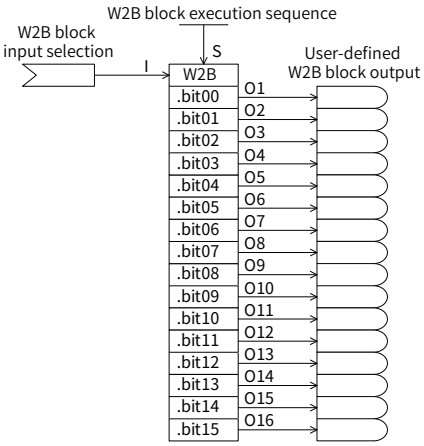
Figure 4-67 Output of technology controller

4.15. 5 User-defined Function Block

4.15.5.1 User-defined Conversion Function Block

1) Word-to-bit block (1–3)

■ Diagram



■ Operation

When the input I is a single word, outputs O1–O16 correspond to bit00–bit15 of input I; When the input I is a double word, outputs O1–O16 correspond to bit00–bit15 of the high 16 bits of input I.

■ Connection

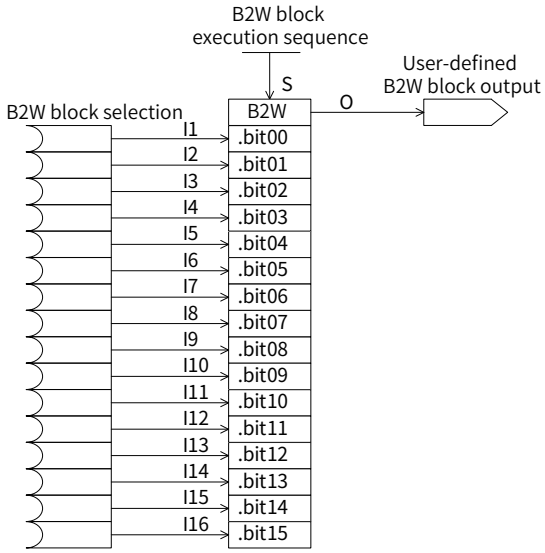
Input I: unsigned number.

Outputs O1–O16: binary numbers.

Word-to-bit block		1	2	3
Input	S	P0-00	P0-02	P0-04
	I	P0-01	P0-03	P0-05
Output	O1(bit00)	U10-00	U10-16	U10-32
	O2(bit01)	U10-01	U10-17	U10-33
	O3(bit02)	U10-02	U10-18	U10-34
	O4(bit03)	U10-03	U10-19	U10-35
	O5(bit04)	U10-04	U10-20	U10-36
	O6(bit05)	U10-05	U10-21	U10-37
	O7(bit06)	U10-06	U10-22	U10-38
	O8(bit07)	U10-07	U10-23	U10-39
	O9(bit08)	U10-08	U10-24	U10-40
	O10(bit09)	U10-09	U10-25	U10-41
	O11(bit10)	U10-10	U10-26	U10-42
	O12(bit11)	U10-11	U10-27	U10-43
	O13(bit12)	U10-12	U10-28	U10-44
	O14(bit13)	U10-13	U10-29	U10-45
	O15(bit14)	U10-14	U10-30	U10-46
	O16(bit15)	U10-15	U10-31	U10-47

2) Bit-to-word block (1–4)

■ Diagram



■ Operation

bit00–bit16 of output O correspond to inputs I1–I16.

■ Connection

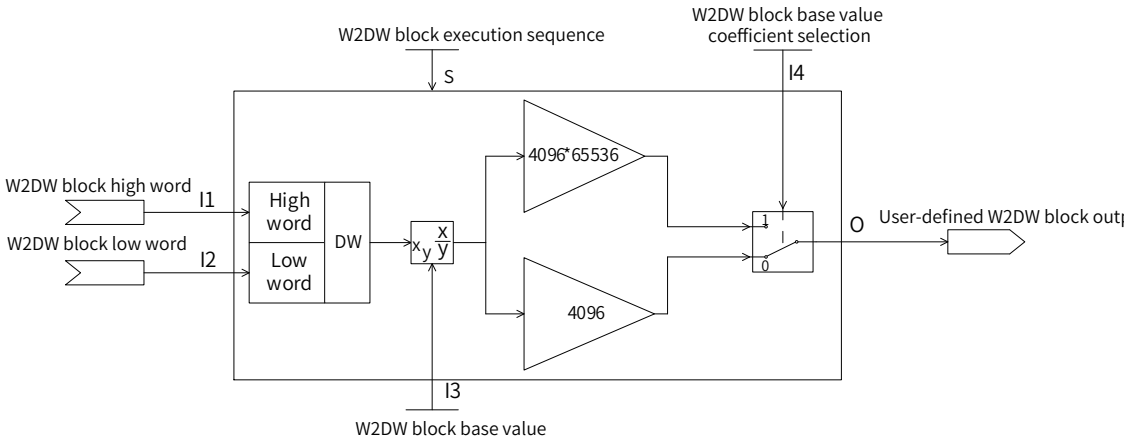
Input I1–I16: binary number.

Output O: unsigned number.

Bit-to-word block		1	2	3	4
Input	S	P0-06	P0-23	P0-40	P0-57
	I1(bit00)	P0-07	P0-24	P0-41	P0-58
	I2(bit01)	P0-08	P0-25	P0-42	P0-59
	I3(bit02)	P0-09	P0-26	P0-43	P0-60
	I4(bit03)	P0-10	P0-27	P0-44	P0-61
	I5(bit04)	P0-11	P0-28	P0-45	P0-62
	I6(bit05)	P0-12	P0-29	P0-46	P0-63
	I7(bit06)	P0-13	P0-30	P0-47	P0-64
	I8(bit07)	P0-14	P0-31	P0-48	P0-65
	I9(bit08)	P0-15	P0-32	P0-49	P0-66
	I10(bit09)	P0-16	P0-33	P0-50	P0-67
	I11(bit10)	P0-17	P0-34	P0-51	P0-68
	I12(bit11)	P0-18	P0-35	P0-52	P0-69
	I13(bit12)	P0-19	P0-36	P0-53	P0-70
	I14(bit13)	P0-20	P0-37	P0-54	P0-71
	I15(bit14)	P0-21	P0-38	P0-55	P0-72
	I16(bit15)	P0-22	P0-39	P0-56	P0-73
Output	O	U15-00	U15-01	U15-02	U15-03

3) WORD-to-DWORD (1–3)

■ Diagram



■ Operation

$$O=\begin{cases}\dfrac{I1\times 65536+I2}{I3}\times 4096\times 65536, & I4=1\\ \dfrac{I1\times 65536+I2}{I3}\times 4096, & I4=0\end{cases}$$

The output is equal to a double word with I1 as the high 16 bits and I2 as the low 16 bits divided by the base value I3 and multiplied by the base value coefficient (the base value coefficient depends on I4); When the input is double word, the high 16 bits are taken.

When I3 is 0, the output is equal to the input.

■ Connection

Inputs I1, I2: signed numbers;

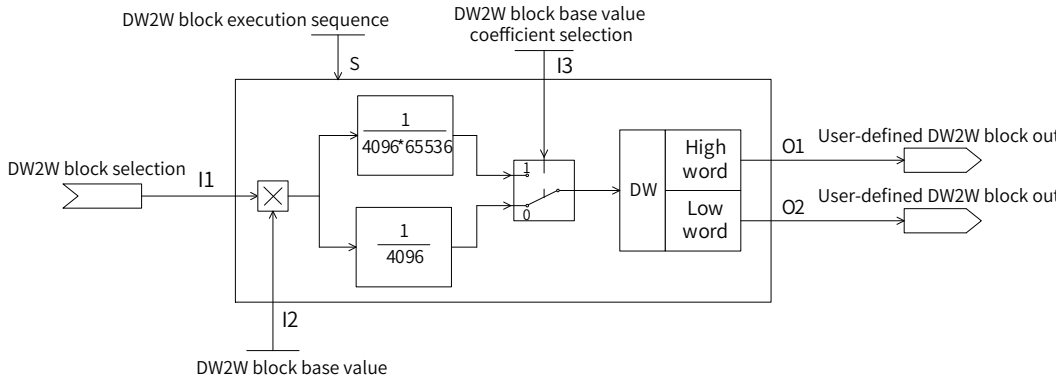
Input I3: unsigned number;

Output O: signed number.

WORD-to-DWORD	Input					Output
	S	I1	I2	I3	I4	O
1	P0-75	P0-76	P0-77	P0-78	P0-74(bit0)	U19-00
2	P0-79	P0-80	P0-81	P0-82	P0-74(bit1)	U19-01
3	P0-83	P0-84	P0-85	P0-86	P0-74(bit2)	U19-02

4) DWORD-to-WORD (1–3)

■ Diagram



■ Operation

$$O1=\begin{cases}\left(\dfrac{I1\cdot I2}{4096\times 65536}>>16\right)\&\ 0xFFFF, & I3=1\\ \left(\dfrac{I1\cdot I2}{4096}>>16\right)\&\ 0xFFFF, & I3=0\end{cases}$$

$$O2=\begin{cases}\left(\dfrac{I1\cdot I2}{4096\times 65536}\right)\&\ 0xFFFF, & I3=1\\ \left(\dfrac{I1\cdot I2}{4096}\right)\&\ 0xFFFF, & I3=0\end{cases}$$

The output high word is the high 16 bits from the solution for I1 multiplied by the base value I2 and divided by the base value coefficient (the base value coefficient depends on I3), and the output low word is the low 16 bits from the solution from I1 multiplied by the base value I2 and divided by the base value coefficient (the base value coefficient depends on I3).

When I2 is 0, the output high word is equal to the input high word and the output low word is equal to the input low word.

■ Connection

Input I1: signed number.

Input I2: unsigned number.

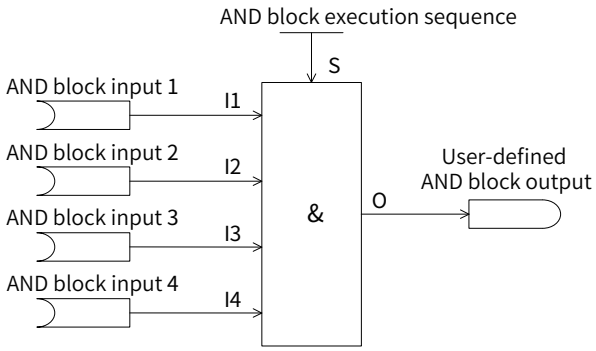
Output O1, O2: signed numbers.

DWORD-to-WORD	Input				Output	
	S	I1	I2	I3	O1	O2
1	P0-88	P0-89	P0-90	P0-87(bit0)	U15-04	U15-05
2	P0-91	P0-92	P0-93	P0-87(bit1)	U15-06	U15-07
3	P0-94	P0-95	P0-96	P0-87(bit2)	U15-08	U15-09

4.15.5.2 User-defined Logic Function Block

1) AND block (1–16)

■ Diagram



■ Operation

$O = I1 \& I2 \& I3 \& I4$

If inputs I1, I2, I3 and I4 are all true, then output O is true, otherwise output O is false. The truth table is:

Input				Output
I1	I2	I3	I4	O
0	×	×	×	0
×	0	×	×	0

Input				Output
I1	I2	I3	I4	O
×	×	0	×	0
×	×	×	0	0
1	1	1	1	1

■ Connection

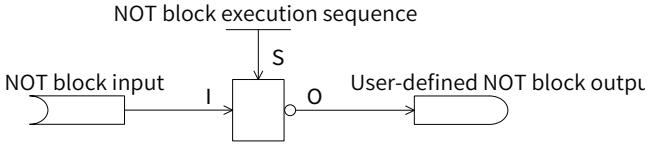
Inputs I1, I2, I3, I4: binary numbers.

Output O: binary number.

AND block	Input					Output
	S	I1	I2	I3	I4	O
1	P1-00	P1-01	P1-02	P1-03	P1-04	U10-48
2	P1-05	P1-06	P1-07	P1-08	P1-09	U10-49
3	P1-10	P1-11	P1-12	P1-13	P1-14	U10-50
4	P1-15	P1-16	P1-17	P1-18	P1-19	U10-51
5	P1-20	P1-21	P1-22	P1-23	P1-24	U10-52
6	P1-25	P1-26	P1-27	P1-28	P1-29	U10-53
7	P1-30	P1-31	P1-32	P1-33	P1-34	U10-54
8	P1-35	P1-36	P1-37	P1-38	P1-39	U10-55
9	P1-40	P1-41	P1-42	P1-43	P1-44	U10-56
10	P1-45	P1-46	P1-47	P1-48	P1-49	U10-57
11	P1-50	P1-51	P1-52	P1-53	P1-54	U10-58
12	P1-55	P1-56	P1-57	P1-58	P1-59	U10-59
13	P1-60	P1-61	P1-62	P1-63	P1-64	U10-60
14	P1-65	P1-66	P1-67	P1-68	P1-69	U10-61
15	P1-70	P1-71	P1-72	P1-73	P1-74	U10-62
16	P1-75	P1-76	P1-77	P1-78	P1-79	U10-63

2) NOT block (1–8)

■ Diagram



■ Operation

$O = \overline{I}$

Output equals inverted input I. The truth table is:

Input	Output
I	O
0	1
1	0

■ Connection

Input I: binary number.

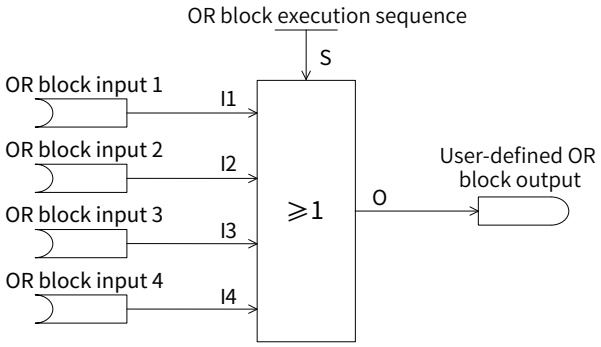
Output O: binary number.

NOT block	Input		Output
	S	I	O
1	P1-80	P1-81	U10-64
2	P1-82	P1-83	U10-65

NOT block	Input		Output
	S	I	O
3	P1-84	P1-85	U10-66
4	P1-86	P1-87	U10-67
5	P1-88	P1-89	U10-68
6	P1-90	P1-91	U10-69
7	P1-92	P1-93	U10-70
8	P1-94	P1-95	U10-71

3) OR block (1–12)

■ Diagram



■ Operation

$O = I1 | I2 | I3 | I4$

As long as one of the inputs I1, I2, I3, and I4 is true, the output is true. The truth table is:

Input				Output
I1	I2	I3	I4	O
0	0	0	0	0
1	×	×	×	1
×	1	×	×	1
×	×	1	×	1
×	×	×	1	1

■ Connection

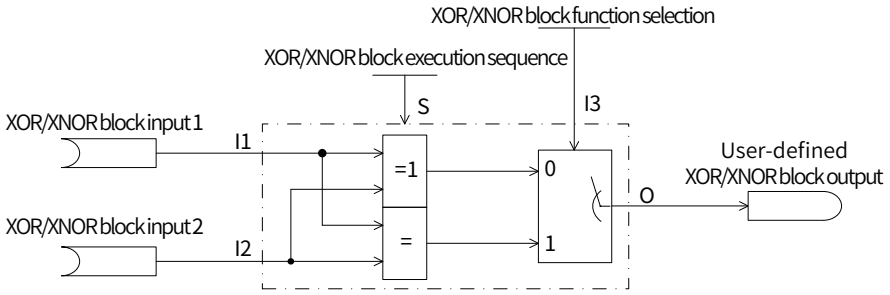
Input I1, I2, I3, I4: binary numbers;

Output O: binary number.

OR block	Input					Output
	S	I1	I2	I3	I4	O
1	P2-00	P2-01	P2-02	P2-03	P2-04	U10-72
2	P2-05	P2-06	P2-07	P2-08	P2-09	U10-73
3	P2-10	P2-11	P2-12	P2-13	P2-14	U10-74
4	P2-15	P2-16	P2-17	P2-18	P2-19	U10-75
5	P2-20	P2-21	P2-22	P2-23	P2-24	U10-76
6	P2-25	P2-26	P2-27	P2-28	P2-29	U10-77
7	P2-30	P2-31	P2-32	P2-33	P2-34	U10-78
8	P2-35	P2-36	P2-37	P2-38	P2-39	U10-79
9	P2-40	P2-41	P2-42	P2-43	P2-44	U10-80
10	P2-45	P2-46	P2-47	P2-48	P2-49	U10-81
11	P2-50	P2-51	P2-52	P2-53	P2-54	U10-82
12	P2-55	P2-56	P2-57	P2-58	P2-59	U10-83

4) XOR/XNOR block (1–4)

■ Diagram



■ Operation

when XOR\XNOR function selection I3 is 0, XOR is effective, $O = \overline{I1}\, I2 + I1\, \overline{I2}$

When the inputs I1 and I2 are the same, the output O is 0; When the inputs I1 and I2 are different, the output O is 1. The truth table is:

Input		Output
I1	I2	O
0	0	0
1	0	1
0	1	1
1	1	0

when XOR\XNOR function selection I3 is 1, XNOR is effective. $O = I1\, I2 + \overline{I1}\, \overline{I2}$

When input I1 and I2 are the same, output O is 1; When input I1 and I2 are different, output O is 0. The truth table is:

Input		Output
I1	I2	O
0	0	1
1	0	0
0	1	0
1	1	1

■ Connection

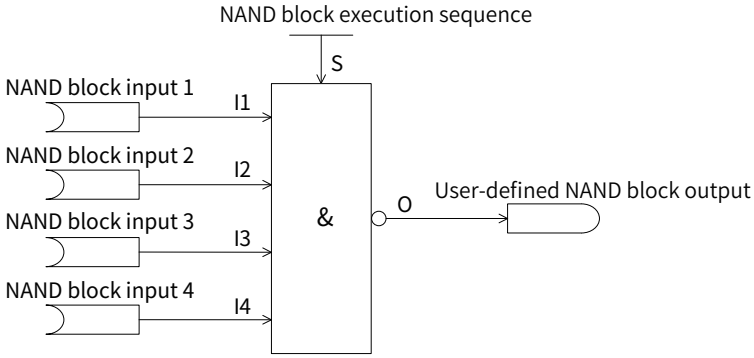
Inputs I1, I2, I3: binary numbers.

Output O: binary number.

XOR/XNOR block	Input				Output
	S	I1	I2	I3	O
1	P2-60	P2-62	P2-63	P2-61	U10-84
2	P2-64	P2-66	P2-67	P2-65	U10-85
3	P2-68	P2-70	P2-71	P2-69	U10-86
4	P2-72	P2-74	P2-75	P2-73	U10-87

5) NAND block (1–4)

■ Diagram



■ Operation

$$O = \overline{I1 \& I2 \& I3 \& I4}$$

If the inputs I1, I2, I3 and I4 are all true, the output O is false, otherwise the output O is true. The truth table is:

Input				Output
I1	I2	I3	I4	O
0	×	×	×	1
×	0	×	×	1
×	×	0	×	1
×	×	×	0	1
1	1	1	1	0

■ Connection

Inputs I1, I2, I3, I4: binary numbers.

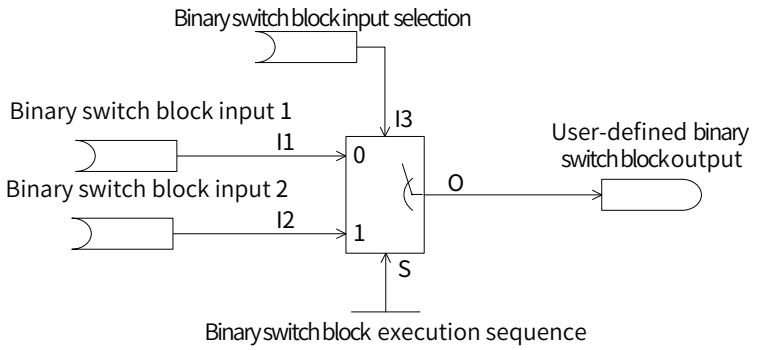
Output O: binary number.

NAND block 1	Input					Output
	S	I1	I2	I3	I4	O
1	P2-76	P2-77	P2-78	P2-79	P2-80	U10-88
2	P2-81	P2-82	P2-83	P2-84	P2-85	U10-89
3	P2-86	P2-87	P2-88	P2-89	P2-90	U10-90
4	P2-91	P2-92	P2-93	P2-94	P2-95	U10--91

4.15.5.3 User-defined Switch Function Block

1) Binary switch block (1–8)

■ Diagram



■ Operation

$$O = \begin{cases} I1, & I3=0 \\ I2, & I3=1 \end{cases}$$

If binary switch block input selection I3 is 0, output O is equal to I1 (bit); if binary switch block input selection I3 is 1, output O is equal to I2 (bit).

■ Connection

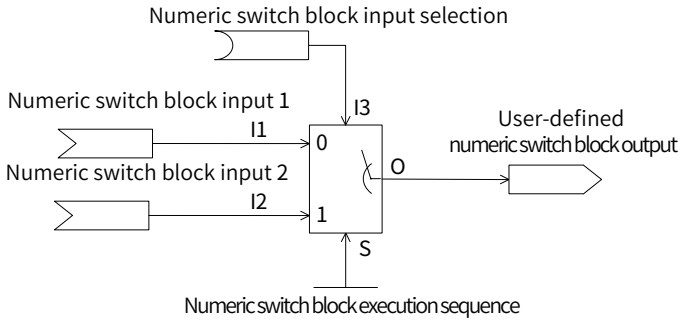
Inputs I1, I2, I3: binary numbers.

Output O: binary number.

Binary switch block	Input				Output
	S	I1	I2	I3	O
1	P3-00	P3-02	P3-03	P3-01	U10-92
2	P3-04	P3-06	P3-07	P3-05	U10-93
3	P3-08	P3-10	P3-11	P3-09	U10-94
4	P3-12	P3-14	P3-15	P3-13	U10-95
5	P3-16	P3-18	P3-19	P3-17	U10-96
6	P3-20	P3-22	P3-23	P3-21	U10-97
7	P3-24	P3-26	P3-27	P3-25	U10-98
8	P3-28	P3-30	P3-31	P3-29	U10-99

2) Numeric switch block (1–12)

■ Diagram



■ Operation

$$O = \begin{cases} I1, & I3=0 \\ I2, & I3=1 \end{cases}$$

If numeric switch block input selection I3 is 0, output O is equal to I1 (word); if I3 is 1, output O is equal to I2 (word).

■ Connection

Input I1, I2: signed numbers.

Input I3: binary number.

Output O: signed number.

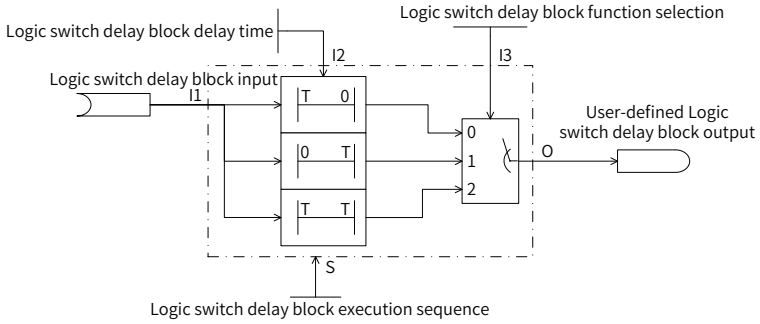
Numeric switch block	Input				Output
	S	I1	I2	I3	O
1	P3-32	P3-34	P3-35	P3-33	U19-03
2	P3-36	P3-38	P3-39	P3-37	U19-04
3	P3-40	P3-42	P3-43	P3-41	U19-05
4	P3-44	P3-46	P3-47	P3-45	U19-06
5	P3-48	P3-50	P3-51	P3-49	U19-07
6	P3-52	P3-54	P3-55	P3-53	U19-08
7	P3-56	P3-58	P3-59	P3-57	U19-09

8	P3-60	P3-62	P3-63	P3-61	U19-10
9	P3-64	P3-66	P3-67	P3-65	U19-11
10	P3-68	P3-70	P3-71	P3-69	U19-12
11	P3-72	P3-74	P3-75	P3-73	U19-13
12	P3-76	P3-78	P3-79	P3-77	U19-14

4.15.5.4 User-defined Control Function Block

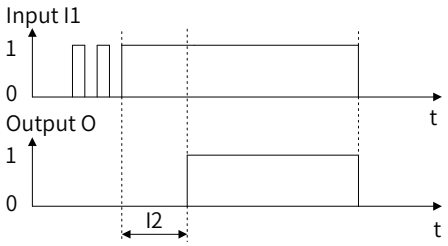
1) Logic switch delay block (1–4)

■ Diagram

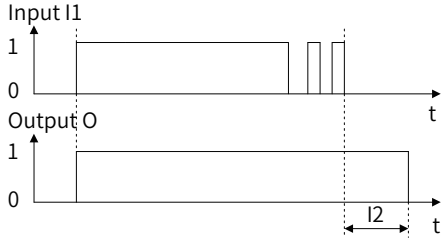


■ Operation

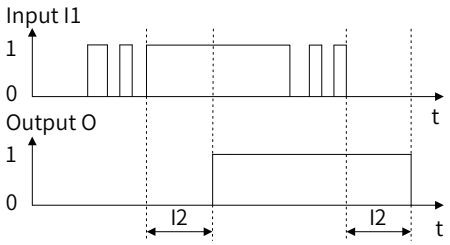
When the function of logic switch delay block selects I3 as 0 and inputs 0 → 1, the switch-on delay is carried out, and the delay time is I2; The switch-on delay will filter out high-level pulses less than I2 time, as shown in the following figure.



When the function of the logic switch delay block selects I3 as 1 and the input is 1 → 0, the switch-off delay is active, with a delay time of I2; The switch-off delay filters out low-level pulses less than I2 time, as shown in the following figure.



When the function of the logic switch delay block selects I3 as 2, the input is delayed during 0 → 1 switch-on and 1 → 0 switch-off, with a delay time of I2; Both switch-on and switch-off delays will filter the pulse, as shown in the following figure.



■ Connection

Input I1: binary number.

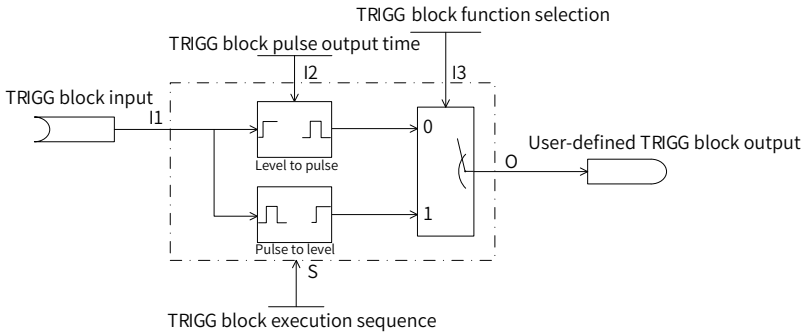
Inputs I2, I3: unsigned numbers.

Output O: binary number.

Logic switch delay block	Input				Output
	S	I1	I2	I3	O
1	P4-00	P4-01	P4-03	P4-02	U11-00
2	P4-04	P4-05	P4-07	P4-06	U11-01
3	P4-08	P4-09	P4-11	P4-10	U11-02
4	P4-12	P4-13	P4-15	P4-14	U11-03

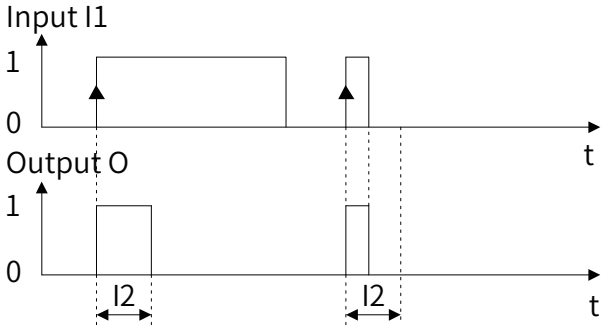
2) Pulse-level conversion block (1–4)

■ Diagram

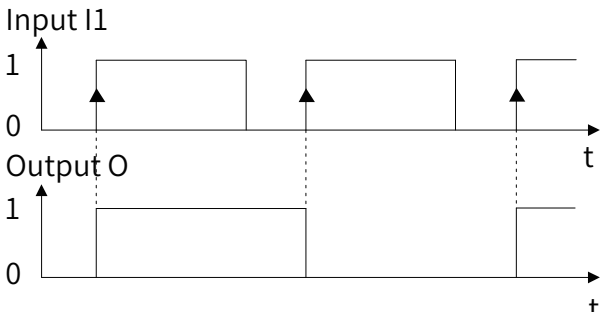


■ Operation

If pulse-level conversion block function selection I3 is 0, level-to-pulse is effective, and the output is set to high within the pulse output time I2 on the rising edge of input I1; If input I1 is 0, the output immediately becomes 0, regardless of the pulse duration.



If pulse-level conversion block function selection is 1, pulse-to-level is effective. The output is set high on the first rising edge of input I1, and low on the second rising edge of input I1, and so on. Odd number of pulses output high level and even number of pulses output low level.



■ Connection

Input I1, I3: binary numbers.

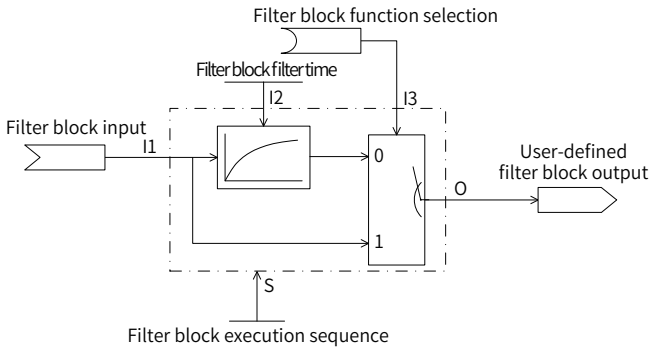
Input I2: unsigned number.

Output O: binary number.

Pulse-level conversion block	Input				Output
	S	I1	I2	I3	O
1	P4-16	P4-18	P4-19	P4-17	U11-04
2	P4-20	P4-22	P4-23	P4-21	U11-05
3	P4-24	P4-26	P4-27	P4-25	U11-06
4	P4-28	P4-30	P4-31	P4-29	U11-07

3) Filter block (1–8)

■ Diagram



■ Operation

If filter block function selection I3 is 0, output O is equal to the filter value of input I1; if I3 is 1, output O is equal to input I1.

■ Connection

Input I1: signed number.

Input I2: unsigned number.

Input I3: binary number.

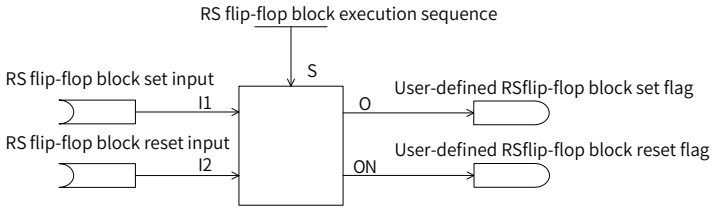
Output O: signed number.

Filter block	Input				Output
	S	I1	I2	I3	O
1	P4-32	P4-34	P4-35	P4-33	U19-15
2	P4-36	P4-38	P4-39	P4-37	U19-16
3	P4-40	P4-42	P4-43	P4-41	U19-17
4	P4-44	P4-46	P4-47	P4-45	U19-18

Filter block	Input				Output
	S	I1	I2	I3	O
5	P4-48	P4-50	P4-51	P4-49	U19-19
6	P4-52	P4-54	P4-55	P4-53	U19-20
7	P4-56	P4-58	P4-59	P4-57	U19-21
8	P4-60	P4-62	P4-63	P4-61	U19-22

4) RS flip-flop block (1–4)

■ Diagram



■ Operation

If both inputs I1 and I2 are set to 0, the output O remains at the current value; If input I1 is set to 1 and input I2 is set to 0, output O is 1; If input I2 is set to 1, output O is 0; If both inputs I1 and I2 are set to 1, the output O is 0; Output ON is always opposite to the value of O. The truth table is:

Input		Output	
I1	I2	O	ON
0	0	Unchanged	Unchanged
1	0	1	0
0	1	0	1
1	1	0	1

■ Connection

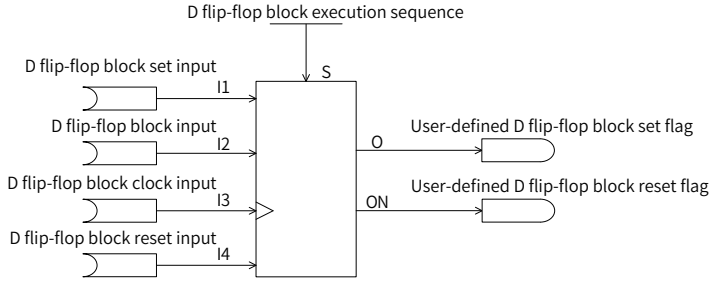
Input I1, I2: binary numbers.

Outputs O, ON: binary numbers.

RS flip-flop block	Input			Output	
	S	I1	I2	O	ON
1	P4-64	P4-65	P4-66	U11-08	U11-09
2	P4-67	P4-68	P4-69	U11-10	U11-11
3	P4-70	P4-71	P4-72	U11-12	U11-13
4	P4-73	P4-74	P4-75	U11-14	U11-15

5) D flip-flop block (1–4)

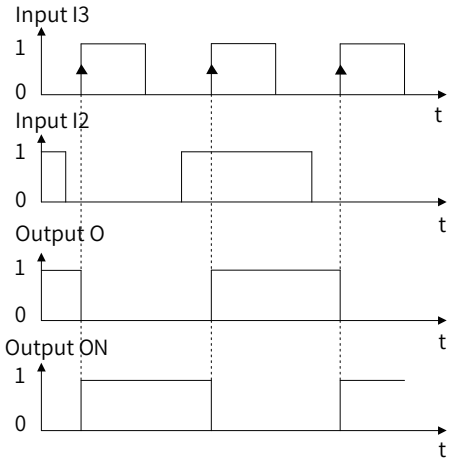
■ Diagram



■ Operation

If the inputs I1 and I4 are both set to 0, output O is equal to input I2 on the rising edge of input I3; If input I1 is set to 1, output O is 1; If input I4 is set to 1, output O is 0; If both inputs I1 and I4 are set to 0 and input I3 has no rising edge, output O remains at the current value; If both inputs I1 and I4 are set to 1, output O is 0; Output ON is always opposite to the value of O.

When I1=I4=0, the outputs O, ON and I2 and clock I3 timing diagram is:



■ Connection

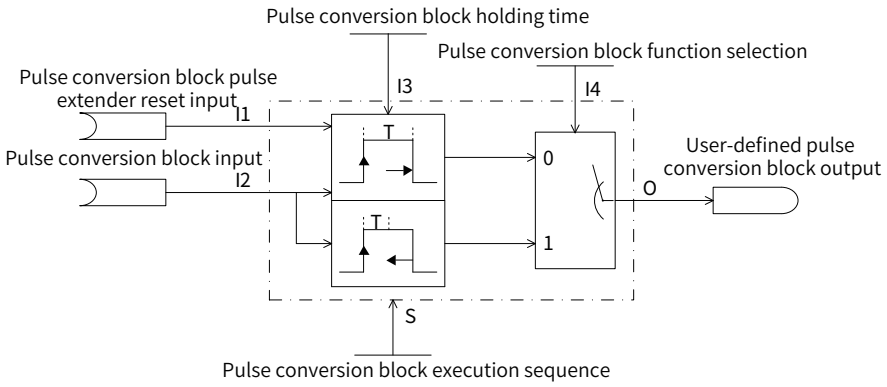
Inputs I1, I2, I3, I4: binary numbers.

Outputs O, ON: binary numbers.

D flip-flop block	Input					Output	
	S	I1	I2	I3	I4	O	ON
1	P4-76	P4-79	P4-77	P4-80	P4-78	U11-16	U11-17
2	P4-81	P4-84	P4-82	P4-85	P4-83	U11-18	U11-19
3	P4-86	P4-89	P4-87	P4-90	P4-88	U11-20	U11-21
4	P4-91	P4-94	P4-92	P4-95	P4-93	U11-22	U11-23

6) Pulse conversion block (1–8)

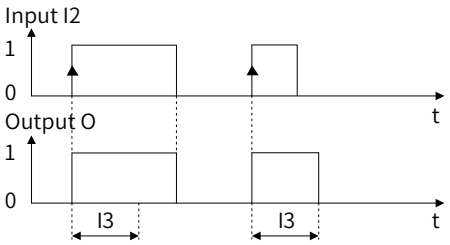
■ Diagram



■ Operation

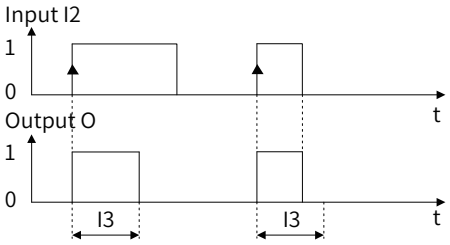
When pulse conversion block function selection I4 is 0, the pulse extension is effective, and the output is set to 1 on the rising edge of input I2. When input I2 is 0 and the pulse duration reaches I3, output O is set to 0, and the output is set to 0 at any time by reset the input I1 to 1.

When I1=0, the output O and input I2 timing diagrams are:



When pulse conversion block function selection I4 is 1, the pulse shortening is effective. The output is set to 1 at the rising edge of input I2, and the output O is set to 0 when input I2 is 0 or the pulse duration reaches I3.

The timing diagram of output O and Input I2 is:



■ Connection

Inputs I1, I2, I4: binary numbers.

Input I3: unsigned number.

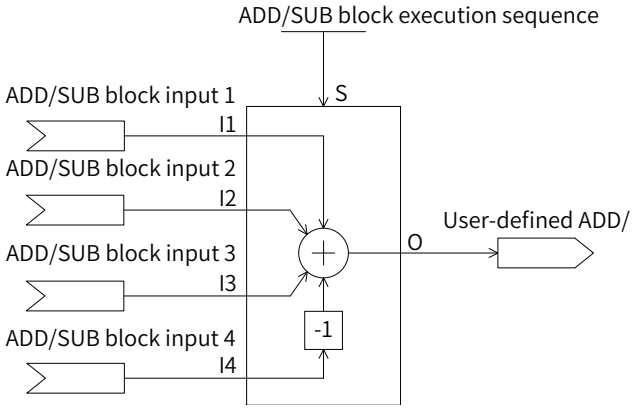
Output O: binary number.

Pulse conversion block	Input					Output
	S	I1	I2	I3	I4	O
1	P5-00	P5-04	P5-22	P5-23	P5-01	U11-24
2	P5-05	P5-09	P5-27	P5-28	P5-06	U11-25
3	P5-10	P5-14	P5-32	P5-33	P5-11	U11-26
4	P5-15	P5-19	P5-37	P5-38	P5-16	U11-27
5	P5-20	P5-24	P5-42	P5-43	P5-21	U11-28
6	P5-25	P5-29	P5-47	P5-48	P5-26	U11-29
7	P5-30	P5-34	P5-52	P5-53	P5-31	U11-30
8	P5-35	P5-39	P5-57	P5-58	P5-36	U11-31

4.15.5.5 User-defined Arithmetic Function Block

1) Adder and substractor block (1–8)

■ Diagram



■ Operation

$O = I1+I2+I3-I4$

The value of output O is equal to the sum of inputs I1, I2, I3 minus I4.

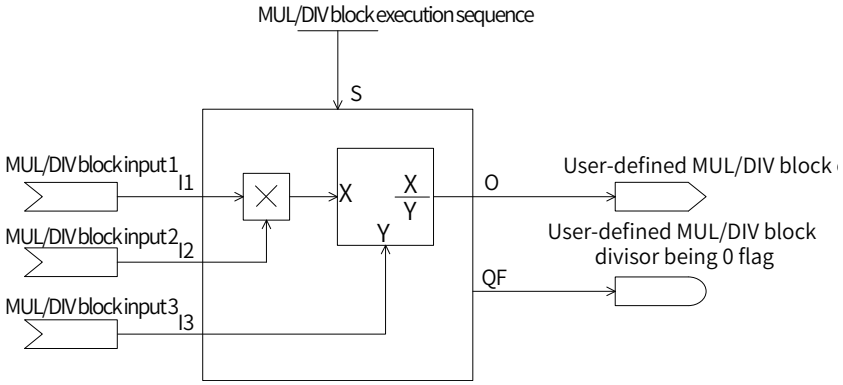
Connect inputs I1, I2, I3, I4: signed numbers.

Output O: signed number.

Adder and substractor block	Input					Output
	S	I1	I2	I3	I4	O
1	P6-00	P6-01	P6-02	P6-03	P6-04	U19-23
2	P6-05	P6-06	P6-07	P6-08	P6-09	U19-24
3	P6-10	P6-11	P6-12	P6-13	P6-14	U19-25
4	P6-15	P6-16	P6-17	P6-18	P6-19	U19-26
5	P6-20	P6-21	P6-22	P6-23	P6-24	U19-27
6	P6-25	P6-26	P6-27	P6-28	P6-29	U19-28
7	P6-30	P6-31	P6-32	P6-33	P6-34	U19-29
8	P6-35	P6-36	P6-37	P6-38	P6-39	U19-30

2) Multiplier and divider block (1–8)

■ Diagram



■ Operation

$O=(I1 \cdot I2)/I3$

$$QF=\begin{cases}1, & I3=0\\ 0, & I3\neq 0\end{cases}$$

■ Connection

Inputs I1, I2, I3: signed numbers.

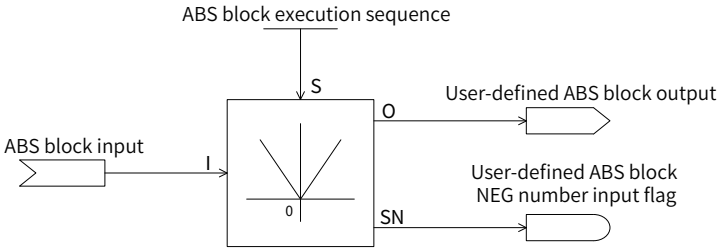
Output O: signed number.

Output QF: Binary number.

Multiplier and divider block	Input				Output	
	S	I1	I2	I3	QF	O
1	P6-40	P6-41	P6-42	P6-43	U11-32	U19-31
2	P6-44	P6-45	P6-46	P6-47	U11-33	U19-32
3	P6-48	P6-49	P6-50	P6-51	U11-34	U19-33
4	P6-52	P6-53	P6-54	P6-55	U11-35	U19-34
5	P6-56	P6-57	P6-58	P6-59	U11-36	U19-35
6	P6-60	P6-61	P6-62	P6-63	U11-37	U19-36
7	P6-64	P6-65	P6-66	P6-67	U11-38	U19-37
8	P6-68	P6-69	P6-70	P6-71	U11-39	U19-38

3) Absolute block (1–4)

■ Diagram



■ Operation

$$O = |I|$$

$$SN = \begin{cases} 1 & I < 0 \\ 0 & I \geq 0 \end{cases}$$

The output is equal to the absolute value of the input I; When the input is negative, the flag bit SN is 1, otherwise, the flag bit is 0.

■ Connection

Input I: signed number.

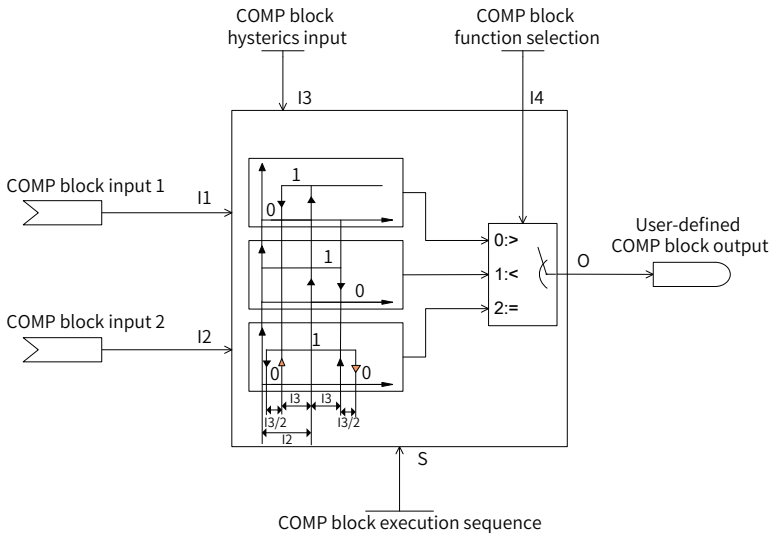
Output O: signed number.

Output SN: Binary number.

Absolute block	Input		Output	
	S	I	SN	O
1	P6-72	P6-73	U11-40	U19-39
2	P6-74	P6-75	U11-41	U19-40
3	P6-76	P6-77	U11-42	U19-41
4	P6-78	P6-79	U11-43	U19-42

4) Numeric comparator block (1–4)

■ Diagram



■ Operation

If the function of the numeric comparator block selects I4 as 0, when I1 increases from zero in positive direction to close to I2, the output O keeps low level all the time; When I1 increases to greater than I2, the output O jumps from low level to high level, I1 increases again, and the output O keeps high level; If I1 decreases, as long as I1 > I2-I3, the output O will always remain high level, and only when I1 < I2-I3, the output O will jump from high level to low level.

If the function of the numeric comparator block selects I4 as 1, when I1 increases from zero in positive direction to close to I2+I3, the output O keeps high level all the time; When I1 increases to more than I2+I3, the output O jumps from high level to low level, I1 increases again, and the output O keeps low level; If I1 decreases, as long as I1 > I2, the output O will always remain low, and only when I1 < I2, the output O will jump from low to high.

If the function of the numeric comparator block selects I4 as 2, when I1 increases from zero in positive direction to close to I2-I3, the output O keeps low level all the time, when I1 increases to greater than I2-I3 and less than I2+I3, the output O jumps from low level to high level, I1 increases to greater than I2+1.5 × I3, and the output O jumps from high level to low level; If I1 is reduced, as long as I1 < I2+I3, the output O will always maintain a low level. When it is reduced to I2-1.5 × I3 < I1 < I2+I3, the output O jumps from a low level to a high level. When it is reduced to I1 < I2-1.5 × I3, the output O jumps from a high level to a low level.

Hysteresis input I3 can suppress frequent on-off.

■ Connection

Inputs I1, I2: signed numbers.

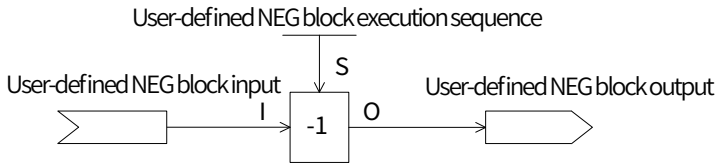
Inputs I3, I4: unsigned numbers.

Output O: binary number.

Numeric comparator block	Input					Output
	S	I1	I2	I3	I4	O
1	P6-80	P6-82	P6-83	P6-84	P6-81	U11-44
2	P6-85	P6-87	P6-88	P6-89	P6-86	U11-45
3	P6-90	P6-92	P6-93	P6-94	P6-91	U11-46
4	P6-95	P6-97	P6-98	P6-99	P6-96	U11-47

5) Inversion block (1–8)

■ Diagram



■ Operation

$$O = -I$$

Output O equals inverted input I.

■ Connection

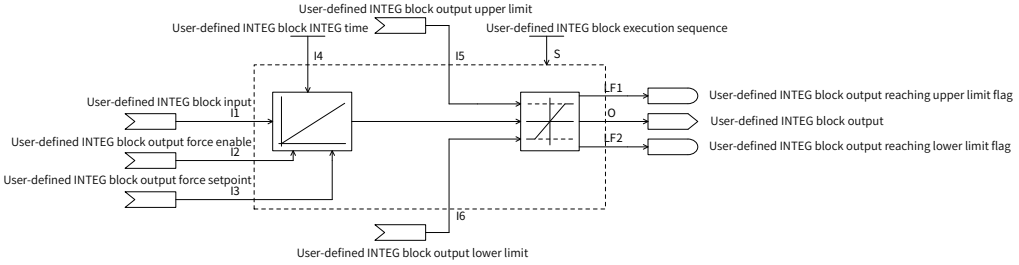
Input I: signed number.

Output O: signed number.

Inversion block	Input		Output
	S	I	O
1	P7-00	P7-01	U19-43
2	P7-02	P7-03	U19-44
3	P7-04	P7-05	U19-45
4	P7-06	P7-07	U19-46
5	P7-08	P7-09	U19-47
6	P7-10	P7-11	U19-48
7	P7-12	P7-13	U19-49
8	P7-14	P7-15	U19-50

6) Integrator (1–4)

■ Diagram



■ Operation

$$Y_n = Y_{n-1} + X_n / T_i$$

Yn is the output value, Yn-1 is the last beat value of the output Yn, Xn is the input value, and Ti is the integration time.

The change of output value is proportional to the input value and inversely proportional to the integration time.

The output of the integrator is limited by I5 and I6. If the output reaches the upper or lower limit, the corresponding output limit flag bit is set, and if I5 ⩽ I6, the output O=I5.

If I2 is forced to 1, output O=I3.

■ Connection

Inputs I1, I3, I5, I6: signed numbers.

Input I4: unsigned number.

Input I2: binary number.

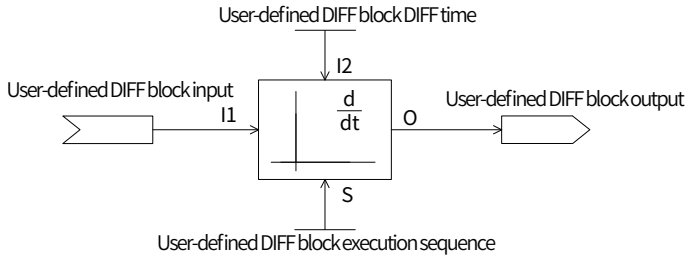
Outputs LF1, LF2: binary numbers.

Output O: signed number.

Integrator	Input							Output		
	S	I1	I2	I3	I4	I5	I6	LF1	LF2	O
1	P7-16	P7-17	P7-20	P7-21	P7-22	P7-18	P7-19	U11-48	U11-49	U19-51
2	P7-23	P7-24	P7-27	P7-28	P7-29	P7-25	P7-26	U11-50	U11-51	U19-52
3	P7-30	P7-31	P7-34	P7-35	P7-36	P7-32	P7-33	U11-52	U11-53	U19-53
4	P7-37	P7-38	P7-41	P7-42	P7-43	P7-39	P7-40	U11-54	U11-55	U19-54

7) Differential block (1–4)

■ Diagram



■ Operation

$$Y_n = (X_n - X_{n-1}) \cdot T_d$$

Yn is the output value, Xn is the input value, Xn-1 is the last beat value of the input Xn, and Td is the differential time.

The output Y is proportional to the input deviation and the differential time.

■ Connection

Input I1: signed number.

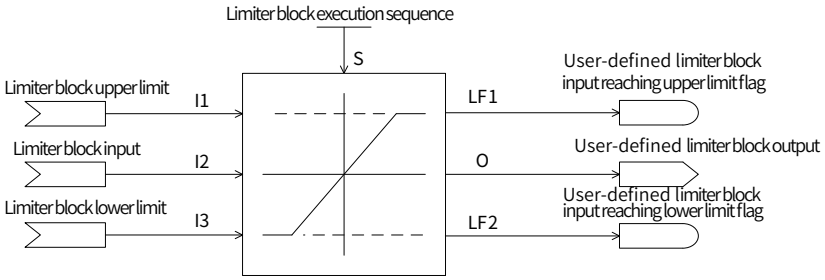
Input I2: unsigned number.

Output O: signed number.

Differential block	Input			Output
	S	I1	I2	O
1	P7-44	P7-45	P7-46	U19-55
2	P7-47	P7-48	P7-49	U19-56
3	P7-50	P7-51	P7-52	U19-57
4	P7-53	P-54	P7-55	U19-58

8) Limiter block

■ Diagram



■ Operation

$$O=\begin{cases} I1 & I2 > I1 \\ I2 & I3 \le I2 \le I1 \\ I3 & I2 < I3 \end{cases}$$

When the input I2 is greater than the upper limit I1, the output O is equal to I1, and the upper limit flag position LF1=1; When the input I2 is less than the lower limit I3, the output O is equal to I3, and the lower limit flag position LF2=1.

When input I2 is within the upper and lower limits, the output is equal to the input value.

■ Connection

Input I1, I2, I3: signed numbers.

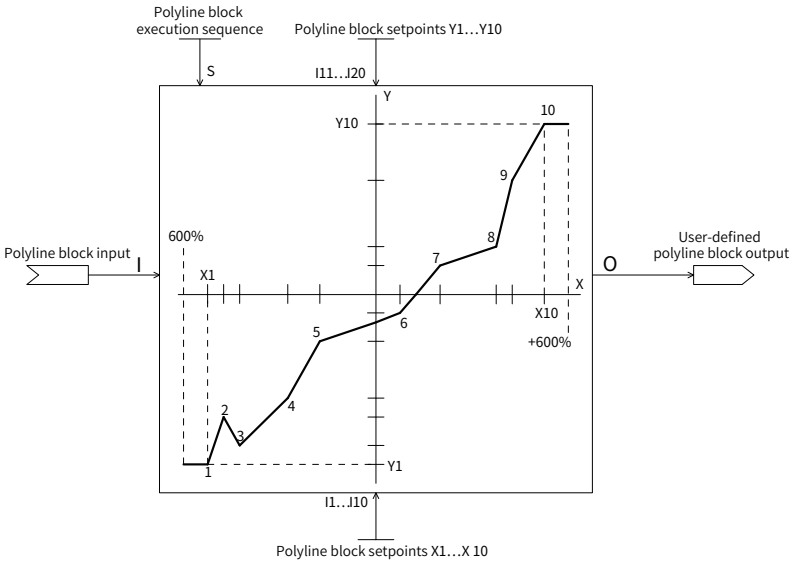
Output O: signed number.

Outputs LF1, LF2: binary numbers.

Limiter block	Input				Output		
	S	I1	I2	I3	LF1	LF2	O
1	P7-56	P7-58	P7-57	P7-59	U11-56	U11-57	U19-59
2	P7-60	P7-62	P7-61	P7-63	U11-58	U11-59	U19-60
3	P7-64	P7-66	P7-65	P7-67	U11-60	U11-61	U19-62
4	P7-68	P7-70	P7-69	P7-71	U11-62	U11-63	U19-63

4.15.5.6 Custom Multi-point Operation Function Block

■ Diagram



■ Operation

The coordinates are valid when X1 < X2 < …; When the input is out of the effective coordinates, the output is the Y-ordinate value of the adjacent valid coordinate point; When

the Input is in the valid coordinate point, the corresponding Y-ordinate value is calculated according to the curve.

■ Connection

Inputs I, I1–I20: signed number.

Output O: signed number.

Polyline block		1	2	3	4
Input	S	P8-00	P8-22	P8-44	P8-66
	I	P8-01	P8-23	P8-45	P8-67
	I1(X1)	P8-02	P8-24	P8-46	P8-68
	I2(X2)	P8-04	P8-26	P8-48	P8-70
	I3(X3)	P8-06	P8-28	P8-50	P8-72
	I4(X4)	P8-08	P8-30	P8-52	P8-74
	I5(X5)	P8-10	P8-32	P8-54	P8-76
	I6(X6)	P8-12	P8-34	P8-56	P8-78
	I7(X7)	P8-14	P8-36	P8-58	P8-80
	I8(X8)	P8-16	P8-38	P8-60	P8-82
	I9(X9)	P8-18	P8-40	P8-62	P8-84
	I10(X10)	P8-20	P8-42	P8-64	P8-86
	I11(Y1)	P8-03	P8-25	P8-47	P8-69
	I12(Y2)	P8-05	P8-27	P8-49	P8-71
	I13(Y3)	P8-07	P8-29	P8-51	P8-73
	I14(Y4)	P8-09	P8-31	P8-53	P8-75
	I15(Y5)	P8-11	P8-33	P8-55	P8-77
	I16(Y6)	P8-13	P8-35	P8-57	P8-79
	I17(Y7)	P8-15	P8-37	P8-59	P8-81
	I18(Y8)	P8-17	P8-39	P8-61	P8-83
	I19(Y9)	P8-19	P8-41	P8-63	P8-85
	I20(Y10)	P8-21	P8-43	P8-65	P8-87
Output	O	U19-63	U19-64	U19-65	U19-66

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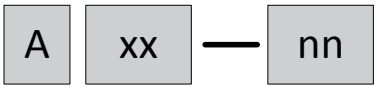
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5 Descriptions of Parameters

5.1 Parameter Classification

The HCU parameter numbers are classified and displayed into three levels based on functions:



- A is level I menu, which is represented by one letter and corresponds to a complete set of functions.
- xx is level II menu, which is represented by one to two digits and indicates, together with level I menu, a group of specific functions.
- nn is level III menu, which is represented by two digits and indicates, together with level I and II menus, a specific function.

Level II menu and level III menu are separated with a separator "-", and the separator "." is also used in LED display. Axx-nn and Axx.nn are the same parameter number.

The parameter numbers are displayed as follows:

Level I Menu	Level I Menu Name	Level II Menu	Level II Menu Name	Remarks
A	System	A0	State monitoring	Common monitoring variables of motor running states
		A1	Faults and alarms	Current active fault and alarm codes
		A2	Drive information	Rated module parameters, indicating the types and software versions of the HCU, HINT, HPCU, and expansion modules
		A4	Power unit control	Settings including carrier frequency, dead zone compensation, power-on buffer detection, load mode selection, parallel control module detection enabling, and fan running control selection
		A6	Rectifier control	-
		A8	Environment setting	Parameter reset, backup and restoration, and parameter access level setting
		A9	Data group setting	Switchover command channel, motor data group, and process parameter group
		A10	SOP-20/ relay communication	SOP-20-880 communication setting (including relay connection of the InoDriveStudio)
		A12	Trigger oscilloscope	Used together with the trigger oscilloscope function page on the InoDriveStudio
		A13	Black box customization channel	Customizing data to be additionally recorded during faults
		A14	HE200 rectifier parameters	Parameters dedicated for HE200 cabinet modules, indicating the status and setting the power-on logic of the rectifier unit
		A15	Parallel parameters	Setting the parameters and viewing the status of parallel modules when using HPCU for parallel control

Level I Menu	Level I Menu Name	Level II Menu	Level II Menu Name	Remarks
b	Control channel	b0	Start/Stop control word setting of channel 1	Start/Stop control word setting when control channel 1 is effective, referring to the functional diagram H246
		b1	Other control word setting of channel 1	Other control word setting when control channel 1 is effective, referring to the functional diagrams H220/H326
		b2	Start/Stop control word setting of channel 2	Start/Stop control word setting when control channel 2 is effective, referring to the functional diagram H246
		b3	Other control word setting of channel 2	Other control word setting when control channel 2 is effective, referring to the functional diagrams H220/H326
		b4	Terminal start/stop module	Setting different start/stop modes with DI terminal control
		b5	Auto-tuning/Self-check	Setting auto-tuning and self-check requests
C	Active setpoint channel	C0	Channel 1 speed reference	Speed control main/auxiliary setting and additional speed reference when control channel 1 is effective, referring to the functional diagram H310
		C1	Channel 1 torque reference	Torque control reference, window control setpoint, additional torque setpoint, and torque ramp time setpoint when control channel 1 is effective, referring to the functional diagram H430/H330
		C2	Channel 2 speed reference	Speed control main/auxiliary setting and additional speed reference when control channel 2 is effective, referring to the functional diagram H310
		C3	Channel 2 torque reference	Torque control reference, window control setpoint, additional torque setpoint, and torque ramp time setpoint when control channel 2 is effective, referring to the functional diagram H430/H330
		C4	MOP	Setting function parameters of the motor potentiometer (MOP)
		C5	Jogging setting	Setting the jogging speed and time
		C6	Multi-reference setting	Setting the 16 fixed references
		C7	Ramp function generator	Setting function parameters of the ramp function generator
d	Motor parameters	d0	Basic motor parameters	Setting rated motor parameters
		d1	Basic auto-tuning parameters	Basic motor parameters through auto-tuning
		d2	Additional auto-tuning parameters	Parameters related to motor mechanical characteristics
		d3	Base value information	System per unit base values
E	Motor control	E0	Control setting	-
		E1	Start/Stop control	-
		E2	Limit	-
		E3	V/F control	-
		E4	Speed regulator	-
		E5	Current regulator	-
		E6	Excitation control	-
		E7	Speed track	-
		E8	Protection	-
		E9	VDC control	-
		E11	Motor model	-

Level I Menu	Level I Menu Name	Level II Menu	Level II Menu Name	Remarks
F	Input/Output	F0	DI	-
		F1	DO	-
		F2	AI	-
		F3	AO	-
		F4	HDI	-
		F5	HDO	-
H	Protection and auxiliary	H0	Fault processing	-
		H1	Fault data record	-
		H2	Latest fault code record	-
		H3	2nd latest fault code record	-
		H4	3rd latest fault code record	-
		H5	4th latest fault code record	-
		H6	5th latest fault code record	-
		H7	Latest limit code record	-
		H8	Latest warning code record	-
		H10	Custom error word	-
L	Application function	L0	Word-Bit Conversion Function	-
		L1	Brake control	-
		L2	Logic operation function	-
		L3	DW-W Conversion Function	-
		L4	PID	-
		L5	Switch function block	-
		L6	Control function block	-
		L7	Algorithm function block 1	-
		L8	Multi-point curve module	-
		L9	Constant setting module	-
		L10	Parameter monitoring and modification	-
		L11	Algorithm function block 2	-

Level I Menu	Level I Menu Name	Level II Menu	Level II Menu Name	Remarks
n	Bus adapter and expansion module	n0	InoLink communication	Used for peer to peer communication between multiple HCUs and load allocation and master-slave control
		n1	Fieldbus Adapter A	Setting receiving and sending of communication data
		n2	Fieldbus Adapter B	
		n3	Redundancy bus adapter	Used for redundancy communication between two same communication cards
		n4	Encoder detection module 1	Setting the encoder and detecting the motor speed
		n5	Encoder detection module 2	
		n6	Encoder detection module 3	
		n7	HIO module 1 configuration	HIO module type selection and parameter monitoring
		n8	HIO module 2 configuration	
		n9	HIO module 3 configuration	
		n10	Modbus RTU module	Setting the slot and inherent parameters of the corresponding communication module
		n11	CANlink module	
		n12	CANopen module	
		n13	Ethernet module	
		n14	EtherCAT module	
		n15	HDVN module	
		n16	Profibus-DP module	
		n17	Profinet I/O module	
		n18	Custom communication module	Setting more other communication modules
		n19	Synchronization voltage detection module 1	Related setting parameters of synchronization voltage detection module
		n22	Optical routing control module	HOFR module parameter setting, data exchange between multiple HCUs
		n23	HIO module 1 parameter settings (HIO-10)	Parameter configuration of group n7 HIO module 1, n23 corresponding to n7-02=HIO-10, n24 corresponding to n7-02=HIO-20, n25 corresponding to n7-02=HIO-30
		n24	HIO module 1 parameter settings (HIO-20)	
		n25	HIO module 1 parameter settings (HIO-30)	
		n26	HIO module 2 parameter settings (HIO-10)	Parameter configuration of group n8 HIO module 2, n26 corresponding to n8-02=HIO-10, n27corresponding to n8-02=HIO-20, n28 corresponding to n8-02=HIO-30
		n27	HIO module 2 parameter settings (HIO-20)	
		n28	HIO module 2 parameter settings (HIO-30)	
		n29	HIO module 3 parameter settings (HIO-10)	Parameter configuration of group n9 HIO module 3, n29 corresponding to n9-02=HIO-10, n30 corresponding to n9-02=HIO-20, n31 corresponding to n9-02=HIO-30
		n30	HIO module 3 parameter settings (HIO-20)	
		n31	HIO module 3 parameter settings (HIO-30)	

Level I Menu	Level I Menu Name	Level II Menu	Level II Menu Name	Remarks
o	Process parameter	o0	Process setting parameter group 1	-
		o1	Process controller parameter group 1	-
		o2	Process setting parameter group 2	-
		o3	Process controller parameter group 2	-
		o4	Process setting parameter group 3	-
		o5	Process controller parameter group 3	-
		o6	Process setting parameter group 4	-
		o7	Process controller parameter group 4	-
P	Custom function block	P0	Custom conversion function block	-
		P1	Custom logic function block 1	-
		P2	Custom logic function block 2	-
		P3	Custom switch function block	-
		P4	Custom control function block 1	-
		P5	Custom control function block 2	-
		P6	Custom algorithm function block 1	-
		P7	Custom algorithm function block 2	-
		P8	Custom multi-point operation function block	-
		P9	Custom process control function block	-
U	Connector	U0 - U10 / U11 / U15/ U19	-	Read-only parameter, used for viewing the input/output and program execution state, and used as input of reference source parameters

5.2 Function Parameter Table

Group A System

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
Group A0: state monitoring						
A0-00	Current state machine	1:System initialization 2:Power-on check 3:Fault 4:Switch-on inhibit 5:Ready to switch on 6:Pre-charge 7:Ready for operation 8:Demagnetizing 9:Check before operation 10:Pre-excitation 11:Speed track 12:Run 13:OFF1 stop 14:OFF3 stop 15:Start with DC braking 16:Ready to self-check 17:Self-check 18:Ready for auto-tuning 19:Auto-tuning 20:Param restore 21:Param download 22:Jogging 23:Jog stop 24:Operation enable missing 25:Stop with DC braking 26:DC braking delay 27:Fault reaction 28:Calc motor param 29:Control mode switchover 30:Cooling unit wait	-	0	No	32768
A0-01	RFG speed setpoint	-32768 - 32767	RPM	0	No	33871
A0-02	Target speed	-32768 - 32767	RPM	0	No	33872
A0-03	Actual motor speed	-32768 - 32767	RPM	0	No	33873
A0-04	RFG frequency setpoint	-327.68 - 327.67	Hz	0	No	32770
A0-05	Target frequency	-327.68 - 327.67	Hz	0	No	32769
A0-06	Actual motor frequency	-327.68 - 327.67	Hz	0	No	33874
A0-07	Output voltage	0 - 65535	V	0	No	32771
A0-08	Output current	0.0 - 6553.5	A	0	No	32772
A0-09	Output torque	-3276.8 - 3276.7	%	0	No	32773
A0-10	Active power output	-3276.8 - 3276.7	kW	0	No	32774
A0-11	DC link voltage	0.0 - 6553.5	V	0	No	32775
A0-12	Active MDS	0:Motor 1 1:Motor 2 2:Motor 3 3:Motor 4	-	0	No	32894
A0-13	Active BDS	0:BDS-1 1:BDS-2	-	0	No	32895
A0-14	Max. power unit temperature	-32768 - 32767	°C	0	No	32776

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
A0-16	Error info type	0:None 1:Power-on block due to OFF1\JOG\terminal start/stop command reset failure 2:Power-on block because OFF2 is activated 3:Power-on block because OFF3 is activated 4:Operation keeps in preparation because operation activation is prohibited 5:External warning 1 activated, para. No. H0.00 (reserved) 6:External warning 2 activated, para. No. H0.01 (reserved) 7:External warning 1 activated, para. No. H0.02 (reserved) 8:External warning 2 activated, para. No. H0.03 (reserved) 9:STO activated (reserved) 10:DP bus data privilege is released but PZD1. check bit is not set to 1 11:Power-on block due to enabling conversion of custom function block 12:Power-on block because OFF2 is activated by three-phase braking A5-01	-	0	No	34298
A0-17	Error info source	0:None 1:Set to normally activated. Check Group b params 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 11:FBA-A.PZD1.0 12:FBA-A.PZD1.1 13:FBA-A.PZD1.2 14:FBA-A.PZD1.3 15:FBA-A.PZD1.8 16:FBA-A.PZD1.9 17:FBA-B.PZD1.0 18:FBA-B.PZD1.1 19:FBA-B.PZD1.2 20:FBA-B.PZD1.3 21:FBA-B.PZD1.8 22:FBA-B.PZD1.9 23:PC control bit activated 24:FBA-A.PZD1.check bit 25:FBA-B.PZD1.check bit 26:Change in enabling function block. HCU failed to power on 27:Three-phase braking setting A5-00=0 28:HINT is not ready due to e.g. PM-param error Other: B connector	-	0	No	34299
A0-18	Port 24V detection voltage of HCU control board	0.000 - 65.535	V	0	No	34831

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
A0-19	Internal 15V detection voltage of HCU control board	0.000 - 65.535	V	0	No	34832
Group A1: fault and warning						
A1-00	Active fault code 1	0 - 65535	-	0	No	32777
A1-01	[Active fault code 1] Subcode	0 - 65535	-	0	No	32778
A1-02	Active fault code 2	0 - 65535	-	0	No	32779
A1-03	[Active fault code 2] Subcode	0 - 65535	-	0	No	32780
A1-04	Active fault code 3	0 - 65535	-	0	No	32781
A1-05	[Active fault code 3] Subcode	0 - 65535	-	0	No	32782
A1-06	Active fault code 4	0 - 65535	-	0	No	32783
A1-07	[Active fault code 4] Subcode	0 - 65535	-	0	No	32784
A1-08	Active fault code 5	0 - 65535	-	0	No	32785
A1-09	[Active fault code 5] Subcode	0 - 65535	-	0	No	32786
A1-10	Active fault code 6	0 - 65535	-	0	No	32787
A1-11	[Active fault code 6] Subcode	0 - 65535	-	0	No	32788
A1-12	Active limit code 1	0 - 65535	-	0	No	33795
A1-13	[Active limit code 1] Subcode	0 - 65535	-	0	No	33796
A1-14	Active limit code 2	0 - 65535	-	0	No	33797
A1-15	[Active limit code 2] Subcode	0 - 65535	-	0	No	33798
A1-16	Active limit code 3	0 - 65535	-	0	No	33799
A1-17	[Active limit code 3] Subcode	0 - 65535	-	0	No	33800
A1-18	Active limit code 4	0 - 65535	-	0	No	33801
A1-19	[Active limit code 4] Subcode	0 - 65535	-	0	No	33802
A1-20	Active limit code 5	0 - 65535	-	0	No	33803
A1-21	[Active limit code 5] Subcode	0 - 65535	-	0	No	33804
A1-22	Active limit code 6	0 - 65535	-	0	No	33805
A1-23	[Active limit code 6] Subcode	0 - 65535	-	0	No	33806
A1-24	Active warning code 1	0 - 65535	-	0	No	32789
A1-25	[Active warning code 1] Subcode	0 - 65535	-	0	No	32790
A1-26	Active warning code 2	0 - 65535	-	0	No	32791
A1-27	[Active warning code 2] Subcode	0 - 65535	-	0	No	32792
A1-28	Active warning code 3	0 - 65535	-	0	No	32793
A1-29	[Active warning code 3] Subcode	0 - 65535	-	0	No	32794
A1-30	Active warning code 4	0 - 65535	-	0	No	32795
A1-31	[Active warning code 4] Subcode	0 - 65535	-	0	No	32796
A1-32	Active warning code 5	0 - 65535	-	0	No	32797
A1-33	[Active warning code 5] Subcode	0 - 65535	-	0	No	32798
A1-34	Active warning code 6	0 - 65535	-	0	No	32799

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
A1-35	[Active warning code 6] Subcode	0 - 65535	-	0	No	32800
Group A2: drive information						
A2-00	Product type	0:Diode rectifier 1:Basic line module 2:Inverter 3:Regenerative rectifier 4:Three-phase braking 5:DC-DC	-	0	No	32867
A2-01	Module rated power	0.0 - 6553.5	kW	0	No	32868
A2-02	Module rated voltage	0 - 65535	V	0	No	32869
A2-03	Module rated current	0.0 - 6553.5	A	0	No	32870
A2-04	Total rated device power	0.0 - 6553.5	kW	0	No	34118
A2-05	Total rated device current	0.0 - 6553.5	A	0	No	34119
A2-07	HCU software type	0:Drive unit (multidrive) 1:Basic line module 2:Active line module 3:Regenerative rectifier 4:Three-phase braking 5:DC-DC 6:Inverter (single drive) 7:HE200 9999:Unknown	-	0	No	34017
A2-08	HCU-DSP function software version	0.00 - 655.35	-	0	No	32871
A2-09	HCU-DSP function software subversion	0.00 - 655.35	-	0	No	34121
A2-10	HCU-DSP drive software version	0.00 - 655.35	-	0	No	32872
A2-11	HCU-DSP drive software subversion	0.00 - 655.35	-	0	No	34120
A2-12	Param version	0 - 65535	-	0	No	34053
A2-16	HCU-FPGA software version	0.00 - 655.35	-	0	No	32873
A2-18	HINT type	0:Diode rectifier 1:Basic line module 2:Active line module 3:Regenerative rectifier 4:Drive unit (multidrive) 5:DC-DC 6:Three-phase braking 7:Shore power 8:Single drive 100:Offline 101:Inconsistent type 102:Inconsistent software version 103:Unknown	-	0	No	33984
A2-19	HINT software version	0.00 - 655.35	-	0	No	32874
A2-22	HPCU software version	0.00 - 655.35	-	0	No	32875

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
A2-24	SLOT 1_1 module type	0: No expansion card 17: I/O module HIO-10 32: Encoder detection module PG-10 35: Encoder detection module PG-40 36: Encoder detection module PG-50 48: Synchronization voltage detection module HSVM-10 49: Synchronization voltage detection module HSVM-20 64: HINT module (HE200 rectifier) 96: HOFR module 112: Profibus-DP module 113: CANopen module 114: CANlink module 115: Modbus RTU module 116: Modbus TCP module 117: Profinet I/O module 118: EtherCAT module 121: Ethernet module 122: HDVN module 124: IBA module 125: Custom communication module	-	0	No	32876
A2-25	SLOT 1_1 software version	0.00 - 655.35	-	0	No	32877
A2-26	SLOT 1_2 module type	0: No expansion card 17: I/O module HIO-10 32: Encoder detection module PG-10 35: Encoder detection module PG-40 36: Encoder detection module PG-50 48: Synchronization voltage detection module HSVM-10 49: Synchronization voltage detection module HSVM-20 64: HINT module (HE200 rectifier) 96: HOFR module 112: Profibus-DP module 113: CANopen module 114: CANlink module 115: Modbus RTU module 116: Modbus TCP module 117: Profinet I/O module 118: EtherCAT module 121: Ethernet module 122: HDVN module 124: IBA module 125: Custom communication module	-	0	No	32878
A2-27	SLOT 1_2 software version	0.00 - 655.35	-	0	No	32879

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
A2-28	SLOT 1_3 module type	0: No expansion card 17: I/O module HIO-10 32: Encoder detection module PG-10 35: Encoder detection module PG-40 36: Encoder detection module PG-50 48: Synchronization voltage detection module HSVM-10 49: Synchronization voltage detection module HSVM-20 64: HINT module (HE200 rectifier) 96: HOFR module 112: Profibus-DP module 113: CANopen module 114: CANlink module 115: Modbus RTU module 116: Modbus TCP module 117: Profinet I/O module 118: EtherCAT module 121: Ethernet module 122: HDVN module 124: IBA module 125: Custom communication module	-	0	No	32880
A2-29	SLOT 1_3 software version	0.00 - 655.35	-	0	No	32881
A2-30	SLOT 2_1 module type	0: No expansion card 17: I/O module HIO-10 32: Encoder detection module PG-10 35: Encoder detection module PG-40 36: Encoder detection module PG-50 48: Synchronization voltage detection module HSVM-10 49: Synchronization voltage detection module HSVM-20 64: HINT module (HE200 rectifier) 96: HOFR module 112: Profibus-DP module 113: CANopen module 114: CANlink module 115: Modbus RTU module 116: Modbus TCP module 117: Profinet I/O module 118: EtherCAT module 121: Ethernet module 122: HDVN module 124: IBA module 125: Custom communication module	-	0	No	32882
A2-31	SLOT 2_1 software version	0.00 - 655.35	-	0	No	32883

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
A2-32	SLOT 2_2 module type	0: No expansion card 17: I/O module HIO-10 32: Encoder detection module PG-10 35: Encoder detection module PG-40 36: Encoder detection module PG-50 48: Synchronization voltage detection module HSVM-10 49: Synchronization voltage detection module HSVM-20 64: HINT module (HE200 rectifier) 96: HOFR module 112: Profibus-DP module 113: CANopen module 114: CANlink module 115: Modbus RTU module 116: Modbus TCP module 117: Profinet I/O module 118: EtherCAT module 121: Ethernet module 122: HDVN module 124: IBA module 125: Custom communication module	-	0	No	32884
A2-33	SLOT 2_2 software version	0.00 - 655.35	-	0	No	32885
A2-34	SLOT 2_3 module type	0: No expansion card 17: I/O module HIO-10 32: Encoder detection module PG-10 35: Encoder detection module PG-40 36: Encoder detection module PG-50 48: Synchronization voltage detection module HSVM-10 49: Synchronization voltage detection module HSVM-20 64: HINT module (HE200 rectifier) 96: HOFR module 112: Profibus-DP module 113: CANopen module 114: CANlink module 115: Modbus RTU module 116: Modbus TCP module 117: Profinet I/O module 118: EtherCAT module 121: Ethernet module 122: HDVN module 124: IBA module 125: Custom communication module	-	0	No	32886
A2-35	SLOT 2_3 software version	0.00 - 655.35	-	0	No	32887

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
A2-36	SLOT 3_1 module type	0: No expansion card 17: I/O module HIO-10 32: Encoder detection module PG-10 35: Encoder detection module PG-40 36: Encoder detection module PG-50 48: Synchronization voltage detection module HSVM-10 49: Synchronization voltage detection module HSVM-20 64: HINT module (HE200 rectifier) 96: HOFR module 112: Profibus-DP module 113: CANopen module 114: CANlink module 115: Modbus RTU module 116: Modbus TCP module 117: Profinet I/O module 118: EtherCAT module 121: Ethernet module 122: HDVN module 124: IBA module 125: Custom communication module	-	0	No	32888
A2-37	SLOT 3_1 software version	0.00 - 655.35	-	0	No	32889
A2-40	Available HCU-FPGA functions	0x0000 - 0xFFFF	-	0	No	34826
A2-41	Enabled HCU-FPGA functions	0x0000 - 0xFFFF	-	0	No	34827
A2-42	Available HINT functions	0x0000 - 0xFFFF	-	0	No	34828
A2-43	Enabled HINT functions	0x0000 - 0xFFFF	-	0	No	34829
A2-44	Current year	0 - 65535	-	0	No	34836
A2-45	Current date	0 - 65535	-	0	No	34837
A2-46	Current time	0 - 65535	-	0	No	34838
A2-47	Year of power-on	0 - 65535	-	0	No	34839
A2-48	Date of power-on	0 - 65535	-	0	No	34840
A2-49	Time of power-on	0 - 65535	-	0	No	34841
Group A4: power unit control						
A4-00	Max. allowable carrier frequency	1.20 - 10.00	kHz	4	No	47
A4-01	Effective carrier frequency	1.20 - 10.00	kHz	1.25	No	48
A4-02	Carrier frequency setpoint	1.20 - 10.00	kHz	1.25	Yes	49
A4-06	DPWM switchover frequency	0.0 - 300.0	Hz	0	Change at stop	53
A4-07	PWM modulation mode	0:Without overmodulation 1:With overmodulation	-	0	Change at stop	54
A4-08	Pulse frequency wobbulation	0 - 10	-	0	Change at stop	55
A4-09	Enable lockout time comp.	0:Disable 1:Enable	-	1	Change at stop	56
A4-10	Enable CBC	0:Disable 1:Enable	-	1	Change at stop	57
A4-11	Enable pre-charge resistor meas.	0:Disable 1:Enable	-	1	Change at stop	58
A4-12	Enable input phase loss meas.	0:Disable 1:Enable	-	1	Change at stop	59

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
A4-15	DC link overvoltage threshold	80.0 - 100.0	%	100	Change at stop	60
A4-18	Effective software undervoltage threshold	0.0 - 6553.5	V	0	No	33760
A4-21	Load pattern selection	0:No overload 1:Light load 2:Heavy load	-	2	Change at stop	64
A4-23	[Power module] Output phase loss meas. enable	0:Disable 1:Enable	-	1	Yes	2864
A4-24	[Power module] DC link voltage meas. enable	0:Disable 1:Enable	-	1	Yes	2868
A4-25	[Power module] Enable current unbalance meas.	0:Disable 1:Enable	-	1	Yes	2910
A4-27	Module pre-overtemp. threshold	0 - 60	℃	5	Yes	2913
A4-30	Module fan operation control selection	0:When system is operating 1:After power-on	-	0	Yes	3211
Group A6: rectifier control						
A6-00	Enable rectifier control	0:Disable 1:Enable	-	0	Change at stop	69
A6-01	Rectifier control start time	0.0 - 100.0	s	10	Change at stop	70
Group A8: environment setting						
A8-00	Factory restore option	0:Disable 1:Partial factory restore 2:Complete factory restore 3:Clear fault records 4:Clear black box records	-	0	Change at stop	33787
A8-01	Factory restore	0:Cancel 1:Confirm	-	0	Change at stop	33788
A8-02	Param access level	0:Standard param 1:Expansion param 2:Expert param 3:Maintenance param	-	0	Yes	34064
A8-03	Default password	0 - 65535	-	0	Yes	78
A8-05	Param backup operation selection	0:None 1:Save to SD card 2:Restore from SD card 3:Check params	-	0	Yes	34236
A8-06	Confirm param backup operation	0:Cancel 1:Confirm	-	0	Yes	34238

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
A8-07	Param backup status	0:None 1:Saving 2:Saving completed 3:Saving failed 4:Restoring 5:Restoring completed 6:Restoring failed 7:Checking 8:Param file error 9:Check succeeded 10:Check failed 11:SD card is busy 12: Software tool parameters transmitting 13: Software tool parameters confirming and taking effect 14: Software tool parameters downloading and copying 15: Software tool parameters downloading and saving 16: Software tool parameters downloading succeeded 17: Software tool parameters downloading failed 18: Software tool parameters downloading canceled	-	0	No	34237
A8-15	Enable function block	0:Disable 1:Enable	-	1	Yes	3210
A8-17	Time statistics reset selection	0:None 1:Reset current statistic time 2:Reset accumulated statistic time 3:Reset all statistic time	-	0	Yes	34842
A8-18	Confirm time statistics reset	0:Cancel 1:Confirm	-	0	Yes	34843
Group A9: data group selection						
A9-00	BDS selection source	0:BDS-1 1:BDS-2 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Change at stop	80
A9-01	MDS selection 0 source	0:0 1:1 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Change at stop	81

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
A9-02	MDS selection 1 source	0:0 1:1 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Change at stop	82
A9-03	[Tech. param. group selection 0] Source	0:0 1:1 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Change at stop	4801
A9-04	[Tech. param. group selection 1] Source	0:0 1:1 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Change at stop	4802
Group A10: SOP-20/Relay communication						
A10-00	SOP-20 control allowed	0:Disable 1:Enable Other: B connector	-	1	Change at stop	84
A10-01	SOP-20 control speed reference selection	0:MOP 1:Speed setpoint channel	-	0	Change at stop	85
A10-03	SOP-20/comm. relay address	1 - 127	-	1	Yes	88
A10-04	SOP-20/comm. relay rate	0: 115200 bps 1: 1 Mbps 2: 2 Mbps 3: 4 Mbps	-	3	Change at stop	89
A10-05	SOP-20 wire-breaking detection	0:Enable 1:Disable	-	0	Change at stop	34195
Group A12: trigger oscilloscope						
A12-00	Trigger oscilloscope state	0:Not triggered 1:Triggered	-	0	No	33784
A12-01	Start trigger oscilloscope	0:Stop 1:Start	-	0	Yes	33783
A12-02	Trigger oscilloscope sampling time selection	0:Carrier cycle 1:2 ms	-	1	Yes	1867
A12-03	Trigger oscilloscope sampling time override	1 - 16	-	1	Yes	1868
A12-04	Trigger oscilloscope trigger ratio	10 - 90	%	50	Yes	1869

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
A12-05	Trigger condition 1 trigger mode	0:By analog 1:By analog bit 2:By digital 3:By state machine 4:By fault 5:By limit 6:By warning	-	0	Yes	1870
A12-06	[Trigger condition 1] Analog selection	0: invalid Other: K connector	-	0	Yes	1871
A12-07	[Trigger condition 1] Analog bit selection	0 - 15	-	0	Yes	1872
A12-08	[Trigger condition 1] Digital selection	0: Invalid Other: B connector	-	0	Yes	1873
A12-09	[Analog condition 1] Analog comparison condition	0:Greater than > 1:Less than < 2:Equal to = 3. Greater than or equal to >= 4. Less than or equal to <=	-	0	Yes	1874
A12-10	Trigger condition 1 bit comparison condition	0:Rising edge 0 -> 1 1:Falling edge 1 -> 0 2:Edge 0 -> 1 or 1 -> 0 3:High signal 1 4:Low signal 0	-	0	Yes	1875
A12-11	Trigger condition 1 analog value	-32768 - 32767	-	0	Yes	1876
A12-12	Trigger condition relation	0:Trigger condition 2 invalid 1:And 2:Or 3:Xor	-	0	Yes	1877
A12-13	Trigger condition 2 trigger mode	0:By analog 1:By analog bit 2:By digital 3:By state machine 4:By fault 5:By limit 6:By warning	-	0	Yes	1878
A12-14	[Trigger condition 2] Analog selection	0: invalid Other: K connector	-	0	Yes	1879
A12-15	[Trigger condition 2] Analog bit selection	0 - 15	-	0	Yes	1880
A12-16	[Trigger condition 2] Digital selection	0: Invalid Other: B connector	-	0	Yes	1881
A12-17	[Analog condition 2] Analog comparison condition	0:Greater than > 1:Less than < 2:Equal to = 3. Greater than or equal to >= 4. Less than or equal to <=	-	0	Yes	1882
A12-18	Trigger condition 2 bit comparison condition	0:Rising edge 0 -> 1 1:Falling edge 1 -> 0 2:Edge 0 -> 1 or 1 -> 0 3:High signal 1 4:Low signal 0	-	0	Yes	1883
A12-19	Trigger condition 2 analog value	-32768 - 32767	-	0	Yes	1884
A12-20	Trigger oscilloscope sampling channels	0 - 50	-	1	Yes	1935
A12-21	Trigger oscilloscope CH-1 selection	1000 - 2999	-	1000	Yes	1885
A12-22	Trigger oscilloscope CH-2 selection	1000 - 2999	-	1000	Yes	1886

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
A12-23	Trigger oscilloscope CH-3 selection	1000 - 2999	-	1000	Yes	1887
A12-24	Trigger oscilloscope CH-4 selection	1000 - 2999	-	1000	Yes	1888
A12-25	Trigger oscilloscope CH-5 selection	1000 - 2999	-	1000	Yes	1889
A12-26	Trigger oscilloscope CH-6 selection	1000 - 2999	-	1000	Yes	1890
A12-27	Trigger oscilloscope CH-7 selection	1000 - 2999	-	1000	Yes	1891
A12-28	Trigger oscilloscope CH-8 selection	1000 - 2999	-	1000	Yes	1892
A12-29	Trigger oscilloscope CH-9 selection	1000 - 2999	-	1000	Yes	1893
A12-30	Trigger oscilloscope CH-10 selection	1000 - 2999	-	1000	Yes	1894
A12-31	Trigger oscilloscope CH-11 selection	1000 - 2999	-	1000	Yes	1895
A12-32	Trigger oscilloscope CH-12 selection	1000 - 2999	-	1000	Yes	1896
A12-33	Trigger oscilloscope CH-13 selection	1000 - 2999	-	1000	Yes	1897
A12-34	Trigger oscilloscope CH-14 selection	1000 - 2999	-	1000	Yes	1898
A12-35	Trigger oscilloscope CH-15 selection	1000 - 2999	-	1000	Yes	1899
A12-36	Trigger oscilloscope CH-16 selection	1000 - 2999	-	1000	Yes	1900
A12-37	Trigger oscilloscope CH-17 selection	1000 - 2999	-	1000	Yes	1901
A12-38	Trigger oscilloscope CH-18 selection	1000 - 2999	-	1000	Yes	1902
A12-39	Trigger oscilloscope CH-19 selection	1000 - 2999	-	1000	Yes	1903
A12-40	Trigger oscilloscope CH-20 selection	1000 - 2999	-	1000	Yes	1904
A12-41	Trigger oscilloscope CH-21 selection	1000 - 2999	-	1000	Yes	1905
A12-42	Trigger oscilloscope CH-22 selection	1000 - 2999	-	1000	Yes	1906
A12-43	Trigger oscilloscope CH-23 selection	1000 - 2999	-	1000	Yes	1907
A12-44	Trigger oscilloscope CH-24 selection	1000 - 2999	-	1000	Yes	1908
A12-45	Trigger oscilloscope CH-25 selection	1000 - 2999	-	1000	Yes	1909
A12-46	Trigger oscilloscope CH-26 selection	1000 - 2999	-	1000	Yes	1910
A12-47	Trigger oscilloscope CH-27 selection	1000 - 2999	-	1000	Yes	1911
A12-48	Trigger oscilloscope CH-28 selection	1000 - 2999	-	1000	Yes	1912
A12-49	Trigger oscilloscope CH-29 selection	1000 - 2999	-	1000	Yes	1913
A12-50	Trigger oscilloscope CH-30 selection	1000 - 2999	-	1000	Yes	1914
A12-51	Trigger oscilloscope CH-31 selection	1000 - 2999	-	1000	Yes	1915

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
A12-52	Trigger oscilloscope CH-32 selection	1000 - 2999	-	1000	Yes	1916
A12-53	Trigger oscilloscope CH-33 selection	1000 - 2999	-	1000	Yes	1917
A12-54	Trigger oscilloscope CH-34 selection	1000 - 2999	-	1000	Yes	1918
A12-55	Trigger oscilloscope CH-35 selection	1000 - 2999	-	1000	Yes	1919
A12-56	Trigger oscilloscope CH-36 selection	1000 - 2999	-	1000	Yes	1920
A12-57	Trigger oscilloscope CH-37 selection	1000 - 2999	-	1000	Yes	1921
A12-58	Trigger oscilloscope CH-38 selection	1000 - 2999	-	1000	Yes	1922
A12-59	Trigger oscilloscope CH-39 selection	1000 - 2999	-	1000	Yes	1923
A12-60	Trigger oscilloscope CH-40 selection	1000 - 2999	-	1000	Yes	1924
A12-61	Trigger oscilloscope CH-41 selection	1000 - 2999	-	1000	Yes	1925
A12-62	Trigger oscilloscope CH-42 selection	1000 - 2999	-	1000	Yes	1926
A12-63	Trigger oscilloscope CH-43 selection	1000 - 2999	-	1000	Yes	1927
A12-64	Trigger oscilloscope CH-44 selection	1000 - 2999	-	1000	Yes	1928
A12-65	Trigger oscilloscope CH-45 selection	1000 - 2999	-	1000	Yes	1929
A12-66	Trigger oscilloscope CH-46 selection	1000 - 2999	-	1000	Yes	1930
A12-67	Trigger oscilloscope CH-47 selection	1000 - 2999	-	1000	Yes	1931
A12-68	Trigger oscilloscope CH-48 selection	1000 - 2999	-	1000	Yes	1932
A12-69	Trigger oscilloscope CH-49 selection	1000 - 2999	-	1000	Yes	1933
A12-70	Trigger oscilloscope CH-50 selection	1000 - 2999	-	1000	Yes	1934
Group A13: black box custom channel						
A13-00	Black box custom CH-1 selection	0: 0 Other: K connector	-	0	Yes	1954
A13-01	Black box custom CH-2 selection	0: 0 Other: K connector	-	0	Yes	1955
A13-02	Black box custom CH-3 selection	0: 0 Other: K connector	-	0	Yes	1956
A13-03	Black box custom CH-4 selection	0: 0 Other: K connector	-	0	Yes	1957
A13-04	Black box custom CH-5 selection	0: 0 Other: K connector	-	0	Yes	1958
A13-05	Black box custom CH-6 selection	0: 0 Other: K connector	-	0	Yes	1959
A13-06	Black box custom CH-7 selection	0: 0 Other: K connector	-	0	Yes	1960
A13-07	Black box custom CH-8 selection	0: 0 Other: K connector	-	0	Yes	1961
A13-08	Black box custom CH-9 selection	0: 0 Other: K connector	-	0	Yes	1962

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
A13-09	Black box custom CH-10 selection	0: 0 Other: K connector	-	1877	Yes	1963
A13-10	Black box custom CH-11 selection	0: 0 Other: K connector	-	1797	Yes	1964
A13-11	Black box custom CH-12 selection	0: 0 Other: K connector	-	1839	Yes	1965
A13-12	Black box custom CH-13 selection	0: 0 Other: K connector	-	1840	Yes	1966
A13-13	Black box custom CH-14 selection	0: 0 Other: K connector	-	1874	Yes	1967
A13-14	Black box custom CH-15 selection	0: 0 Other: K connector	-	1875	Yes	1968
A13-15	Black box custom CH-16 selection	0: 0 Other: K connector	-	1876	Yes	1969
Group A14: HE200 rectifier parameters						
A14-00	[Rectifier module 1] Online status	0:Offline 1:Online	-	0	No	33891
A14-01	[Rectifier module 2] Online status	0:Offline 1:Online	-	0	No	33908
A14-02	[Rectifier module 1] Fault status 1	0 - 65535	-	0	No	33892
A14-03	[Rectifier module 1] Fault status 2	0 - 65535	-	0	No	33893
A14-04	[Rectifier module 2] Fault status 1	0 - 65535	-	0	No	33909
A14-05	[Rectifier module 2] Fault status 2	0 - 65535	-	0	No	33910
A14-06	[Rectifier module 1] DC link voltage	0.0 - 6553.5	V	0	No	33894
A14-07	[Rectifier module 2] DC link voltage	0.0 - 6553.5	V	0	No	33911
A14-08	[Rectifier module 1] Grid voltage	0 - 65535	V	0	No	33895
A14-09	[Rectifier module 2] Grid voltage	0 - 65535	V	0	No	33912
A14-10	[Rectifier module 1] Module temp. 1	-3276.8 - 3276.7	°C	0	No	33898
A14-11	[Rectifier module 1] Module temp. 2	-3276.8 - 3276.7	°C	0	No	33899
A14-12	[Rectifier module 1] Module temp. 3	-3276.8 - 3276.7	°C	0	No	33900
A14-13	[Rectifier module 1] Inlet wire cabinet temp.	-3276.8 - 3276.7	°C	0	No	33901
A14-14	[Rectifier module 1] Brake chopper temp.	-3276.8 - 3276.7	°C	0	No	33902
A14-15	[Rectifier module 2] Module temp. 1	-3276.8 - 3276.7	°C	0	No	33915
A14-16	[Rectifier module 2] Module temp. 2	-3276.8 - 3276.7	°C	0	No	33916
A14-17	[Rectifier module 2] Module temp. 3	-3276.8 - 3276.7	°C	0	No	33917
A14-18	[Rectifier module 2] Inlet wire cabinet temp.	-3276.8 - 3276.7	°C	0	No	33918
A14-19	[Rectifier module 2] Brake chopper temp.	-3276.8 - 3276.7	°C	0	No	33919

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
A14-20	[Rectifier module 1] Power-on status	0:Waiting for power-on 1:Pre-charge power-on 2:Waiting completed 3:Power-on completed	-	0	No	33896
A14-21	[Rectifier module 2] Power-on status	0:Waiting for power-on 1:Pre-charge power-on 2:Waiting completed 3:Power-on completed	-	0	No	33913
A14-22	Grid power overvoltage threshold	0 - 65535	V	0	No	33897
A14-23	Grid power undervoltage threshold	0 - 65535	V	0	No	33914
A14-29	Latch current of brake chopper 1	0.0 - 6553.5	A	0	No	33761
A14-35	Latch current of brake chopper 2	0.0 - 6553.5	A	0	No	33762
A14-36	HINT expansion card selection	0: Single drive-HINT expansion card valid 1: Parallel-both HINT expansion cards 1 and 2 valid 2: HINT expansion card invalid	-	0	Yes	2149
A14-37	HINT expansion card 1 slot selection	0:Disable 1:SLOT 1_1 2:SLOT 1_2 3:SLOT 1_3 4:SLOT 2_1 5:SLOT 2_2 6:SLOT 2_3 7:SLOT 3_1	-	0	Yes	2150
A14-38	HINT expansion card 2 slot selection	0:Disable 1:SLOT 1_1 2:SLOT 1_2 3:SLOT 1_3 4:SLOT 2_1 5:SLOT 2_2 6:SLOT 2_3 7:SLOT 3_1	-	0	Yes	2151
A14-40	Rectifier control source selection	0:Cabinet door 1:"Rectifier switch-on/-off CMD source" param 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	3036
A14-41	Rectifier switch-on/off CMD source selection	0:Cabinet door 1:Reserved 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1000	Yes	2153

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
A14-42	Rectifier and braking unit mode selection	0: Rectifier valid, braking unit invalid 1: Single - both rectifier and braking unit 1 valid 2: Parallel - all rectifier and braking units 1 and 2 valid 3: Only braking unit for single - rectifier invalid, braking unit 1 valid 4: Only braking units for parallel - rectifier invalid, and both braking units 1 and 2 valid	-	0	Yes	2155
A14-43	Built-in brake chopper model	0:U41 1:U42 2:U43 3:U44 4:U45 5:U46 6:U47 7:U48 8:U49 9:U50 10:U71 11:U72 12:U73 13:U74 14:U75 15:U76 16:U77 17:U78 18:U79 19:U80 20:U81 21:U82	-	12	Change at stop	2156
A14-44	Brake opening threshold selection	0:Low 1:High	-	0	Yes	2157
A14-46	Brake opening voltage threshold	500.0 - 1150.0	V	1126	Yes	3035
A14-47	Effective brake opening voltage threshold	0.0 - 6553.5	V	0	No	33983
A14-48	Braking function selection 1	Unit' s position: Overload suppression selection 0: Disabled 1: Enabled Ten' s position: Power-on self-check 0: Enabled 1: Disabled Ten hundred' s position: Braking unit overload fault selection 0: Rectifier not powered off 1: Rectifier powered off Ten hundred' s position: Braking unit overload fault selection 0: Rectifier not powered off 1: Rectifier powered off Ten thousands' position: Braking unit overvoltage fault selection 0: Rectifier not powered off 1: Rectifier powered off	-	100	Yes	2158

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
A14-49	Braking function selection 2	Unit' s position: Braking unit overcurrent selection 0: Rectifier not powered off 1: Rectifier powered off Ten' s position: Braking unit overtemperature selection 0: Rectifier not powered off 1: Rectifier powered on Hundred' s position: Braking unit low temperature selection 0: Rectifier not powered off 1: Rectifier powered on Ten thousand' s position: Braking unit IGBT-VCE fault selection 0: Rectifier not powered off 1: Rectifier powered off Ten thousand' s position: Braking unit IGBT straight through selection 0: Rectifier not powered off 1: Rectifier powered off	-	10000	Yes	3037
A14-50	[rectifier module 1] DC link voltage gain	80.0 - 120.0	%	100	Yes	2159
A14-51	[rectifier module 1] DC link voltage offset	0.0 - 50.0	%	0	Yes	2160
A14-52	[rectifier module 2] DC link voltage gain	80.0 - 120.0	%	100	Yes	2161
A14-53	[rectifier module 2] DC link voltage offset	0.0 - 50.0	%	0	Yes	2162
A14-54	High grid voltage threshold	110.0 - 135.0	%	115	Yes	2217
A14-55	Low grid voltage threshold	30.0 - 85.0	%	85	Yes	2218
Group A15: parallel parameters						
A15-00	Parallel function selection	0:Single 1:Parallel	-	0	Change at stop	2419
A15-01	HSVM online flag	0:Offline 1:Online	-	0	No	34122
A15-02	Enable power module 1	Unit' s position: Module 1 0: Disabled 1: Enabled Ten' s position: Module 2 0: Disabled 1: Enabled Hundred' s position: Module 3 0: Disabled 1: Enabled Ten hundred' s position: Module 4 0: Disabled 1: Enabled Ten thousands' position: Module 5 0: Disabled 1: Enabled	-	0	Change at stop	2420

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
A15-03	Enable power module 2	Unit' s position: Module 6 0: Disabled 1: Enabled Ten' s position: Module 7 0: Disabled 1: Enabled Hundred' s position: Module 8 0: Disabled 1: Enabled Ten hundred' s position: Module 9 0: Disabled 1: Enabled Ten thousands' position: Module 10 0: Disabled 1: Enabled	-	0	Change at stop	2421
A15-04	Enabled power modules	0 - 65535	-	0	No	34123
A15-05	Power module online display 1	00000	-	0	No	34125
A15-06	Power module online display 2	00000	-	0	No	34126
A15-07	Online power modules	0 - 65535	-	0	No	34124
A15-08	Enable parallel current sharing	0:Disable 1:Enable	-	1	Change at stop	2422
A15-11	Parallel current sharing failure PROT threshold	5 - 30	%	10	Yes	2425
A15-12	Total rated device power	0.0 - 6553.5	kW	0	No	34118
A15-13	Total rated device current	0.0 - 6553.5	A	0	No	34119
A15-14	[Power module 1] Temperature	-32768 - 32767	°C	0	No	34108
A15-15	[Power module 1] Ambient temperature	-32768 - 32767	°C	0	No	34098
A15-16	[Power module 2] Temperature	-32768 - 32767	°C	0	No	34109
A15-17	[Power module 2] Ambient temperature	-32768 - 32767	°C	0	No	34099
A15-18	[Power module 3] Temperature	-32768 - 32767	°C	0	No	34110
A15-19	[Power module 3] Ambient temperature	-32768 - 32767	°C	0	No	34100
A15-20	[Power module 4] Temperature	-32768 - 32767	°C	0	No	34111
A15-21	[Power module 4] Ambient temperature	-32768 - 32767	°C	0	No	34101
A15-22	[Power module 5] Temperature	-32768 - 32767	°C	0	No	34112
A15-23	[Power module 5] Ambient temperature	-32768 - 32767	°C	0	No	34102
A15-24	[Power module 6] Temperature	-32768 - 32767	°C	0	No	34113
A15-25	[Power module 6] Ambient temperature	-32768 - 32767	°C	0	No	34103
A15-26	[Power module 7] Temperature	-32768 - 32767	°C	0	No	34114
A15-27	[Power module 7] Ambient temperature	-32768 - 32767	°C	0	No	34104
A15-28	[Power module 8] Temperature	-32768 - 32767	°C	0	No	34115

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
A15-29	[Power module 8] Ambient temperature	-32768 - 32767	°C	0	No	34105
A15-30	[Power module 9] Temperature	-32768 - 32767	°C	0	No	34116
A15-31	[Power module 9] Ambient temperature	-32768 - 32767	°C	0	No	34106
A15-32	[Power module 10] Temperature	-32768 - 32767	°C	0	No	34117
A15-33	[Power module 10] Ambient temperature	-32768 - 32767	°C	0	No	34107
A15-34	HPCU module ID No.	0 - 65535	-	0	No	34162
A15-35	HPCU version No.	0.00 - 655.35	-	0	No	34163
A15-36	Parallel general fault word 1	0x0000 - 0xFFFF	-	0	No	34164
A15-37	Parallel general fault word 2	0x0000 - 0xFFFF	-	0	No	34165
A15-50	HPCU-ARM status word	0x0000 - 0xFFFF	-	0	No	34178
A15-66	HINT monitoring selection	0:Module 1 1:Module 2 2:Module 3 3:Module 4 4:Module 5 5:Module 6 6:Module 7 7:Module 8 8:Module 9 9:Module 10	-	0	Yes	2426
A15-67	HINT ID	0:HINT offline 303:Drive unit (multidrive)/active line module/regen. rectifier/braking/shore power 304:Basic line module 305:DC-DC 307:Single drive	-	0	No	34129
A15-68	HINT software version	0.00 - 655.35	-	0	No	34130
A15-69	HINT module fault word 1	0x0000 - 0xFFFF	-	0	No	34131
A15-70	HINT module fault word 2	0x0000 - 0xFFFF	-	0	No	34132
A15-71	HINT module fault word 1	0x0000 - 0xFFFF	-	0	No	34133
A15-90	[HINT] Available functions	0 - 65535	-	0	No	34152
A15-91	[HINT] Enabled functions	0 - 65535	-	0	No	34153
A15-94	[HINT] DI/DO status	0x0000 - 0xFFFF	-	0	No	34156

Group b Control Channel

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
Group b0: channel 1 start/stop control word setting						
b0-00		0:TSSM 1:FBA-A 2:FBA-B 3:Custom (set by group b0)	-	0	Change at stop	90
b0-01		0:Disable 1:Reserved 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	91
b0-02		0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	96
b0-03		0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	99
b0-04		0:Do not permit 1:Permit 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	92

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
b0-05		0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	102
b0-06		0:Disable 1:Reserved 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	94
b0-07		0:Disable 1:Reserved 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	95
b0-08		0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	93
Group b1: channel 1 other control word setting						
b1-00	OFF2 Source 2	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	97

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
b1-01	OFF2 Source 3	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	98
b1-02	OFF3 Source 2	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	100
b1-03	OFF3 Source 3	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	101
b1-04	Fault acknowledge source 2	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	103
b1-05	Fault acknowledge source 3	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	104

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
b1-06	RFG prohibition source	0:Enable 1:Disable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	105
b1-07	RFG pause source	0:Enable 1:Disable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	106
b1-08	Setting RFG setpoint to 0 source	0:Enable 1:Disable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	107
b1-09	Forced speed track source	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	108
b1-10	Forced torque control source	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	109

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
b1-11	ASR enable source	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	110
Group b2: channel 2 start/stop control word setting						
b2-00	Start/stop control word source	0:TSSM 1:FBA-A 2:FBA-B 3:Custom (set by group b2)	-	0	Change at stop	111
b2-01	Custom OFF1 source	0:Disable 1:Reserved 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	112
b2-02	Custom OFF2 source 1	0:Enable 1:Disable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	117
b2-03	Custom OFF3 source 1	0:Enable 1:Disable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	120

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
b2-04	Custom operation enable source	0:Do not permit 1:Permit 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	113
b2-05	Custom fault acknowledge source 1	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	123
b2-06	Custom JOG1 source	0:Disable 1:Reserved 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	115
b2-07	Custom JOG2 source	0:Disable 1:Reserved 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	116
b2-08	Custom speed inversion source	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	114
Group b3: channel 2 other control word setting						

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
b3-00	OFF2 Source 2	0:Enable 1:Disable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	118
b3-01	OFF2 Source 3	0:Enable 1:Disable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	119
b3-02	OFF3 Source 2	0:Enable 1:Disable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	121
b3-03	OFF3 Source 3	0:Enable 1:Disable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	122
b3-04	Fault acknowledge source 2	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	124

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
b3-05	Fault acknowledge source 3	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	125
b3-06	RFG prohibition source	0:Enable 1:Disable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	126
b3-07	RFG pause source	0:Enable 1:Disable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	127
b3-08	Setting RFG setpoint to 0 source	0:Enable 1:Disable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	128
b3-09	Forced speed track source	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	129

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
b3-10	Forced torque control source	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	130
b3-11	ASR enable source	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	131
Group b4: terminal start/stop module						
b4-00	OFF1 state	0 - 65535	-	0	No	33875
b4-01	REV status	0 - 65535	-	0	No	33876
b4-02	Terminal start/stop command 1/2 selection	0:Terminal start/stop command 1 1:Terminal start/stop command 2 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	134
b4-03	Terminal start/stop command 1 mode	0: Invalid 1: IN1 start 2: IN1 start, IN2 direction 3: IN1 forward start, IN2 reverse start 4: IN1P start, IN2 stop 5: IN1P start, IN2 stop, IN3 direction 6: IN1P forward start, IN2P reverse start, IN3 stop	-	1	Yes	135
b4-05	Terminal start/stop command 1 input 1	0:Disable 1:Reserved 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	2	Yes	137

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
b4-06	Terminal start/stop command 1 input 2	0:Disable 1:Reserved 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	3	Yes	138
b4-07	Terminal start/stop command 1 input 3	0:Disable 1:Reserved 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	139
b4-08	Terminal start/stop command 2 mode	0:Disable 1:IN1 start 2:INT start, IN2 direction 3:IN1 forward start, IN2 reverse start 4:IN1P start, IN2 stop 5:In1P start, In2 stop, In3 direction 6:In1P forward start, In2P reverse start, In3 stop	-	0	Yes	140
b4-10	Terminal start/stop command 2 input 1	0:Disable 1:Reserved 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	142
b4-11	Terminal start/stop command 2 input 2	0:Disable 1:Reserved 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	143

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
b4-12	Terminal start/stop command 2 input 3	0:Disable 1:Reserved 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	144
b4-13	JOG1 source	0:Disable 1:Reserved 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	146
b4-14	JOG2 source	0:Disable 1:Reserved 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	147
Group b5: auto-tuning/self-check						
b5-00	Auto-tuning request	0:None 1:IM static auto-tuning 2:IM no-load complete auto-tuning 4:Auto-tuning of interphase current deviation factor 5:Auto-tuning of IM rotor inertia 6:Auto-tuning of lockout time	-	0	Change at stop	33785
b5-01	Self-check request	0:None 1:Self-check	-	0	Change at stop	33786
b5-02	Param calculation type	0:None 1:Motor param calculation 2:ASR param calculation	-	0	Change at stop	34062
b5-03	Param calculation	0:Cancel 1:Confirm	-	0	Change at stop	34063
b5-04	Enable ASR auto-tuning OPT	0:Enable 1:Disable	-	0	Change at stop	3684
b5-05	ASR auto-tuning coef.	20 - 200	%	100	Change at stop	3168

Group C Setpoint Channel

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
Group C0: channel 1 speed reference						
C0-00	Speed control main setpoint selection	0:0 1:Fixed setpoint 1 2:AI1 3:AI2 4:HDI1 5:HDI2 6:Fixed setpoint 7:MOP 8:Reserved 9:[FBA-A] PZD2 10:[FBA-B] PZD2 Other: K connector	-	0	Yes	150
C0-02	Suppl. speed reference	0:0 1:Fixed setpoint 1 2:AI1 3:AI2 4:HDI1 5:HDI2 6:Fixed setpoint 7:MOP 8:Reserved 9:[FBA-A] PZD2 10:[FBA-B] PZD2 Other: K connector	-	0	Yes	152
C0-00	Speed control main setpoint selection	0:0 1:Fixed setpoint 1 2:AI1 3:AI2 4:HDI1 5:HDI2 6:Fixed setpoint 7:MOP 8:Reserved 9:[FBA-A] PZD2 10:[FBA-B] PZD2 Other: K connector	-	0	Yes	150
Group C1: channel 1 torque reference						
C1-00	[Torque control] Torque setpoint selection	0:0 1:Fixed setpoint 2 2:AI1 3:AI2 4:HDI1 5:HDI2 6:Fixed setpoint 7:Reserved 8:[FBA-A] PZD3 9:[FBA-B] PZD3 10:Reserved Other: K connector	-	0	Yes	153
C1-01	[Torque control] Torque filter time setpoint	0.00 - 10.00	s	0	Yes	154
C1-02	[Torque control] speed window enable	0:Disable 1:Enable	-	0	Yes	157
C1-03	[Torque control] Window speed selection	0:CH-1 speed setpoint 1:Numeric setpoint	-	1	Yes	155
C1-04	[Torque control] Digital window speed setpoint	-600.0 - 600.0	%	0	Yes	156
C1-05	[Torque control] speed window width	0.0 - 30.0	%	0	Yes	158

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
C1-06	Suppl. torque setpoint 1 selection	0:0 1:Numeric setpoint Other: K connector	-	0	Yes	159
C1-07	Suppl. torque setpoint 1 numeric setpoint	-400.0 - 400.0	%	0	Yes	160
C1-08	Suppl. torque setpoint 2	0: 0 Other: K connector	-	0	Yes	161
C1-09	Friction torque selection (suppl. torque setpoint 3)	0: 0 1: D2-03 digital setting Other: K connector	-	0	Yes	162
C1-10	RFG feedforward torque coef. selection	0: 0% 1: 100% Other: K connector	-	0	Yes	163
C1-11	Torque ramp ramp-up time	0.000 - 60.000	s	0	Yes	3903
C1-12	Torque ramp ramp-down time	0.000 - 60.000	s	0	Yes	3904
		Group C2: channel 2 speed reference				
C2-00	Speed control main set-point selection	0:0 1:Fixed setpoint 1 2:AI1 3:AI2 4:HDI1 5:HDI2 6:Fixed setpoint 7:MOP 8:Reserved 9:[FBA-A] PZD2 10:[FBA-B] PZD2 Other: K connector	-	0	Yes	164
C2-01	Aux. speed control setpoint selection	0:0 1:Fixed setpoint 1 2:AI1 3:AI2 4:HDI1 5:HDI2 6:Fixed setpoint 7:MOP 8:Reserved 9:[FBA-A] PZD2 10:[FBA-B] PZD2 Other: K connector	-	0	Yes	165
C2-02	Suppl. speed reference	0:0 1:Fixed setpoint 1 2:AI1 3:AI2 4:HDI1 5:HDI2 6:Fixed setpoint 7:MOP 8:Reserved 9:[FBA-A] PZD2 10:[FBA-B] PZD2 Other: K connector	-	0	Yes	166

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
Group C3: channel 2 torque reference						
C3-00	[Torque control] Torque setpoint selection	0:0 1:Fixed setpoint 2 2:AI1 3:AI2 4:HDI1 5:HDI2 6:Fixed setpoint 7:Reserved 8:[FBA-A] PZD3 9:[FBA-B] PZD3 10:Reserved Other: K connector	-	0	Yes	167
C3-01	[Torque control] Torque filter time setpoint	0.00 - 10.00	s	0	Yes	168
C3-02	[Torque control] speed window enable	0:Disable 1:Enable	-	0	Yes	171
C3-03	[Torque control] Window speed selection	0:CH-2 speed setpoint 1:Numeric setpoint	-	1	Yes	169
C3-04	[Torque control] Digital window speed setpoint	-600.0 - 600.0	%	0	Yes	170
C3-05	[Torque control] speed window width	0.0 - 30.0	%	0	Yes	172
C3-06	Suppl. torque setpoint 1 selection	0:0 1:Numeric setpoint Other: K connector	-	0	Yes	173
C3-07	Suppl. torque setpoint 1 numeric setpoint	-400.0 - 400.0	%	0	Yes	174
C3-08	Suppl. torque setpoint 2	0: 0 Other: K connector	-	0	Yes	175
C3-09	Friction torque selection (suppl. torque setpoint 3)	0: 0 1: D2-03 digital setting Other: K connector	-	0	Yes	176
C3-10	RFG feedforward torque coef. selection	0: 0% 1: 100% Other: K connector	-	0	Yes	177
C3-11	Torque ramp ramp-up time	0.000 - 60.000	s	0	Yes	3905
C3-12	Torque ramp ramp-down time	0.000 - 60.000	s	0	Yes	3906
Group C4: MOP						
C4-00	MOP function	0:Disable 1:Clear after power failure 2:Retentive after power failure	-	1	Change at stop	178
C4-01	[MOP] Initial value	-600.0 - 600.0	%	0	Yes	179
C4-02	[MOP] Ramp time	0.1 - 1000.0	s	10	Yes	180
C4-03	[MOP] Min. value	-600.0 - 600.0	%	0	Yes	181
C4-04	[MOP] Max. value	-600.0 - 600.0	%	100	Yes	182
C4-05	MOP increase value source	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	1944

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
C4-06	MOP decrease value source	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	1945
C4-07	MOP forcing source	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	2589
C4-08	MOP force value source	0:0 1:100% 2:Set by parameter Other: K connector		2	Yes	2899
C4-09	MOP force value	-600.0 - 600.0	%	0	Yes	2590
C4-10	MOP reset command source	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	2900
C4-11	MOP reset value source	0:0 1:100% 2:Set by parameter Other: K connector	-	2	Yes	2901
C4-12	MOP reset value	-600.0 - 600.0	%	0	Yes	2902
Group C5: jog setting						
C5-00	JOG 1 setpoint	-50.0 - 50.0	%	10	Yes	183
C5-01	JOG 2 setpoint	-50.0 - 50.0	%	-10	Yes	184
C5-02	JOG ramp-up time	0.1 - 1000.0	s	10	Yes	185
C5-03	JOG ramp-down time	0.1 - 1000.0	s	10	Yes	186
Group C6: multi-reference						
C6-00	Setpoint	-3276.8 - 3276.7	%	0	No	32801

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
C6-01	Multi-step selection 1	0:0 1:1 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	187
C6-02	Multi-step selection 2	0:0 1:1 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	188
C6-03	Multi-step selection 3	0:0 1:1 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	189
C6-04	Multi-step selection 4	0:0 1:1 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	190
C6-05	Fixed setpoint 1	-600.0 - 600.0	%	10	Yes	191
C6-06	Fixed setpoint 2	-600.0 - 600.0	%	10	Yes	192
C6-07	Fixed setpoint 3	-600.0 - 600.0	%	0	Yes	193
C6-08	Fixed setpoint 4	-600.0 - 600.0	%	0	Yes	194
C6-09	Fixed setpoint 5	-600.0 - 600.0	%	0	Yes	195
C6-10	Fixed setpoint 6	-600.0 - 600.0	%	0	Yes	196
C6-11	Fixed setpoint 7	-600.0 - 600.0	%	0	Yes	197
C6-12	Fixed setpoint 8	-600.0 - 600.0	%	0	Yes	198
C6-13	Fixed setpoint 9	-600.0 - 600.0	%	0	Yes	199
C6-14	Fixed setpoint 10	-600.0 - 600.0	%	0	Yes	200
C6-15	Fixed setpoint 11	-600.0 - 600.0	%	0	Yes	201
C6-16	Fixed setpoint 12	-600.0 - 600.0	%	0	Yes	202
C6-17	Fixed setpoint 13	-300.00 - 300.00	%	0	Yes	203

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
C6-18	Fixed setpoint 14	-300.00 - 300.00	%	0	Yes	204
C6-19	Fixed setpoint 15	-300.00 - 300.00	%	0	Yes	205
C6-20	Fixed setpoint 16	-300.00 - 300.00	%	0	Yes	206
Group C7: ramp function generator						
C7-00	RFG input	-32768 - 32767	RPM	0	No	32802
C7-01	RFG output	-32768 - 32767	RPM	0	No	32803
C7-02	RFG ramp selection 1	0:0 1:1 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	207
C7-03	RFG ramp selection 2	0:0 1:1 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	208
C7-04	Ramp 1 ramp-up time	0.0 - 1000.0	s	20	Yes	209
C7-05	Ramp 1 ramp-down time	0.0 - 1000.0	s	20	Yes	210
C7-06	Ramp 2 ramp-up time	0.0 - 1000.0	s	20	Yes	211
C7-07	Ramp 2 ramp-down time	0.0 - 1000.0	s	20	Yes	212
C7-08	Ramp 3 ramp-up time	0.0 - 1000.0	s	20	Yes	213
C7-09	Ramp 3 ramp-down time	0.0 - 1000.0	s	20	Yes	214
C7-10	Ramp 4 ramp-up time	0.0 - 1000.0	s	20	Yes	215
C7-11	Ramp 4 ramp-down time	0.0 - 1000.0	s	20	Yes	216
C7-12	Ramp 1 Initial rounding time	0.00 - 20.00	s	0	Yes	217
C7-13	Ramp 1 Final rounding time	0.00 - 20.00	s	0	Yes	218
C7-14	Ramp 2 Initial rounding time	0.00 - 20.00	s	0	Yes	219
C7-15	Ramp 2 Final rounding time	0.00 - 20.00	s	0	Yes	220
C7-16	Ramp 3 Initial rounding time	0.00 - 20.00	s	0	Yes	221
C7-17	Ramp 3 Final rounding time	0.00 - 20.00	s	0	Yes	222
C7-18	Ramp 4 Initial rounding time	0.00 - 20.00	s	0	Yes	223
C7-19	Ramp 4 Final rounding time	0.00 - 20.00	s	0	Yes	224
C7-20	Low-speed ramp-up time gain	1.0 - 10.0	-	1	Yes	225
C7-21	Low speed evaluation value	0.0 - 100.0	%	15	Yes	226

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
C7-23	Enable forced RFG output	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	228
C7-24	RFG force setpoint	0: 0 Other: K connector	-	0	Yes	229
C7-25	Enable RFG input ramp shift	0:Disable 1:Enable Other: B connector	-	0	Yes	3217
C7-26	RFG input ramp shift interval	2 - 5000	ms	50	Yes	3218
C7-27	RFG circle mode selection	0:Incontinuous smoothing 1:Continuous smoothing	-	0	Yes	3902

Group d: motor parameters

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
Group D0: basic motor parameters						
d0-00	Motor type selection	0:IM 2:PMSM	-	0	Change at stop	233
d0-01	Rated motor power	0.1 - 6553.5	kW	3.7	Change at stop	237
d0-02	Rated motor voltage	1 - 1500	V	380	Change at stop	241
d0-03	Rated motor current	0.1 - 6553.5	A	9	Change at stop	245
d0-04	Rated motor frequency	0.1 - 600.0	Hz	50	Change at stop	249
d0-05	Rated motor speed	1 - 36000	RPM	1440	Change at stop	253
d0-06	Max. motor speed	0.0 - 600.0	%	100	Change at stop	257
d0-07	Min. motor speed	0.0 - 600.0	%	0	Change at stop	261
d0-08	Max. motor current	100.0 - 600.0	%	150	Change at stop	265
d0-09	Motor pole pairs	0 - 64	-	0	Change at stop	269
d0-11	Speed feedback selection	0:Encoder meas. module 1 1:Encoder meas. module 2 2:Encoder meas. module 3	-	0	Change at stop	277
d0-12	Motor power factor	0.700 - 0.999	-	0.86	Change at stop	1936
d0-13	Enable motor brake control	0:Disable 1:Enable	-	1	Change at stop	3077

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
Group d1: basic auto-tuning parameters						
d1-00	IM Rs	0.0001 - 6.5535	Ω	1.667	Change at stop	281
d1-01	IM Rr	0.0001 - 6.5535	Ω	1.5	Change at stop	285
d1-02	IM Ls	0.001 - 65.535	mH	6.54	Change at stop	289
d1-03	IM Lm	0.01 - 655.35	mH	173.4	Change at stop	293
d1-04	IM I0	0.1 - 6553.5	A	4	Change at stop	297
d1-05	[Async magnetic field] Saturated flux coef. 1	0.0 - 150.0	%	125	Change at stop	2754
d1-06	Async magnetic field saturation Lm coef. 1	0.0 - 6553.5	%	140	Change at stop	301
d1-07	[Async magnetic field] Saturated flux coef. 2	0.0 - 150.0	%	115	Change at stop	2758
d1-08	Async magnetic field saturation Lm coef. 2	0.0 - 6553.5	%	115	Change at stop	305
d1-09	[Async magnetic field] Saturated flux coef. 3	0.0 - 150.0	%	85	Change at stop	2762
d1-10	Async magnetic field saturation Lm coef. 3	0.0 - 6553.5	%	90	Change at stop	309
d1-11	[Async magnetic field] Saturated flux coef. 4	0.0 - 150.0	%	50	Change at stop	2766
d1-12	Async magnetic field saturation Lm coef. 4	0.0 - 6553.5	%	80	Change at stop	313
d1-13	Rotor time constant in async magnetic field	0 - 65535	ms	0	No	33877
d1-14	IM Rr online auto-tuning	0.0 - 6553.5	%	0	No	33095
d1-15	Sync motor Rs (reserved)	0.0001 - 6.5535	Ω	0.0001	Change at stop	321
d1-16	PMSM Ld (reserved)	0.001 - 65.535	mH	0.001	Change at stop	325
d1-17	PMSM Lq (reserved)	0.001 - 65.535	mH	0.001	Change at stop	329
d1-18	PMSM EMF (reserved)	0.1 - 6553.5	V	0.1	Change at stop	333
Group D2: additional auto-tuning parameters						
d2-00	Inertia	0.00 - 655.35	kg*m^2	0	No	337
d2-01	Motor pole pairs	0 - 65535	-	0	No	33780
d2-02	Inertia ratio	0 - 65535	%	100	Change at stop	345
d2-03	Friction torque	0.0 - 100.0	%	0	Change at stop	349
d2-04	Hot-cold res ratio	0 - 300	%	100	Change at stop	353
d2-05	Electromechanical time constant	0 - 65535	ms	0	No	32804
Group D3: base value information						
d3-00	Voltage p.u base	0 - 65535	V	0	No	33791
d3-01	Current p.u base	0.0 - 6553.5	A	0	No	33792
d3-02	Speed p.u base	0 - 65535	RPM	0	No	33789
d3-03	Frequency p.u base	0.0 - 6553.5	Hz	0	No	33790
d3-04	Power p.u base	0.0 - 6553.5	kW	0	No	33794

Group E: motor control

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
Group E0: control setting						
E0-00	Control method	0: SVC 1: FVC 2: V/F	-	2	Change at stop	357
E0-01	Control mode	0:Speed control 1:Torque control 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	361
E0-02	Positive speed enable	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	365
E0-03	Negative speed enable	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	369
Group E1: start/stop control						
E1-00	Startup mode	0:Direct startup 1:Speed track enable 2:DC braking enable	-	0	Change at stop	373
E1-01	Pre-excitation mode	0:By time 1:By current	-	0	Change at stop	377
E1-02	Pre-excitation time	0.00 - 20.00	s	0.1	Change at stop	381
E1-03	Pre-excitation current set-point source	0:Automatic 1:Numeric setpoint	-	0	Change at stop	385
E1-04	Pre-excitation current numeric setpoint	20.0 - 400.0	%	100	Change at stop	389
E1-05	DC braking current	0.0 - 100.0	%	100	Yes	393
E1-06	DC braking time at startup	0.01 - 100.00	s	1	Yes	397
E1-07	DC braking time at stop	0.00 - 100.00	s	0	Yes	401
E1-08	Short-circuit braking time at startup (reserved)	0.00 - 100.00	s	0	Yes	405
E1-09	Short-circuit braking time at stop (reserved)	0.00 - 100.00	s	0	Yes	409

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
E1-10	Initial braking speed	0.0 - 6000.0	RPM	30	Yes	1946
E1-11	Zero speed value	0.1 - 6000.0	RPM	30	Yes	413
E1-12	Zero speed stop delay	0.00 - 10.00	s	0.1	Yes	1950
E1-13	Demagnetization time	0.00 - 100.00	s	0	Yes	417
E1-14	OFF1 stop mode	0:Coast to stop 1:Decelerate to stop 2:Stop at max. capability	-	1	Change at stop	421
E1-15	OFF3 stop time	0.0 - 1000.0	s	1	Yes	425
E1-16	OFF3 stop mode	0:Decelerate to stop 1:Stop at max. capability	-	0	Change at stop	429
E1-17	Stop mode during operation	0:OFF1 mode 1:OFF2 mode 2:OFF3 mode	-	1	Change at stop	433
E1-18	[Torque control] Stop mode	0:OFF1 mode 1:OFF2 mode 2:OFF3 mode	-	1	Change at stop	437
Group E2: limit						
E2-00	[Skip frequency band 1] Lower limit	0.0 - 600.0	%	0	Yes	441
E2-01	[Skip frequency band 1] Upper limit	0.0 - 600.0	%	0	Yes	445
E2-02	[Skip frequency band 2] Lower limit	0.0 - 600.0	%	0	Yes	449
E2-03	[Skip frequency band 2] Upper limit	0.0 - 600.0	%	0	Yes	453
E2-04	FWD speed limit	0.0 - 600.0	%	100	Yes	457
E2-05	REV speed limit	-600.0 - 0.0	%	-100	Yes	461
E2-06	FWD speed limit selection	0:0.0% 1:600.0% 2:AI1 3:AI2 4:HDI1 5:HDI2 6:None 7:None 8:None 9:None 10:None Other: K connector	-	1	Yes	465
E2-07	REV speed limit selection	0:0.0% 1:-600.0% 2:AI1 3:AI2 4:HDI1 5:HDI2 6:None 7:None 8:None 9:None 10:None Other: K connector	-	1	Yes	469
E2-08	Torque upper limit numeric setpoint	0.0 - 400.0	%	150	Yes	473
E2-09	Torque lower limit numeric setpoint	-400.0 - 0.0	%	-150	Yes	477

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
E2-10	Torque upper limit setpoint selection	0:0% 1:400.0% 2:AI1 3:AI2 4:HDI1 5:HDI2 6:None 7:None 8:None 9:None 10:None Other: K connector	-	1	Yes	481
E2-11	Torque lower limit setpoint selection	0:0% 1:-400.0% 2:AI1 3:AI2 4:HDI1 5:HDI2 6:None 7:None 8:None 9:None 10:None Other: K connector	-	1	Yes	485
E2-12	Speed ADJ torque upper limit coef.	0: 100% Other: K connector	-	0	Change at stop	2528
E2-13	Speed ADJ torque lower limit coef.	0: 100% Other: K connector	-	0	Change at stop	2532
E2-14	Regen power limit	0.0 - 400.0	%	200	Yes	489
E2-15	Motoring power limit	0.0 - 400.0	%	200	Yes	493
E2-16	Enable regen. power limit coef.	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	2573
E2-17	Regen. power limit coef.	0: 100% Other: K connector	-	0	Yes	2581
E2-18	Enable motoring power limit coef.	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	2577
E2-19	Motoring power limit scaling	0: 100% Other: K connector	-	0	Yes	2585
E2-20	Restriction selection for torque lower and upper limits	0:Upper limit ⩾ 0%, lower limit ⩽ 0% 1:Limits are not subject to 0%	-	0	Yes	1692
Group E3: V/F control						

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
E3-00	V/F mode selection	0:V/F curve 1:V/F separation	-	0	Change at stop	497
E3-01	V/F curve selection	0: Linear V/F 1: Multi-point V/F 2: Square V/F 3: 1.2-power V/F 6: 1.6-power V/F 8: 1.8-power V/F	-	0	Change at stop	501
E3-02	[VF polyline] Frequency point 1	0.0 - 100.0	%	0	Yes	505
E3-03	[VF polyline] Voltage point 1	0.0 - 100.0	%	0	Yes	509
E3-04	[VF polyline] Frequency point 2	0.0 - 100.0	%	0	Yes	513
E3-05	[VF polyline] Voltage point 2	0.0 - 100.0	%	0	Yes	517
E3-06	[VF polyline] Frequency point 3	0.0 - 100.0	%	0	Yes	521
E3-07	[VF polyline] Voltage point 3	0.0 - 100.0	%	0	Yes	525
E3-08	Enable V/F droop	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	2454
E3-09	V/F droop coef.	0.0 - 50.0	%	0	Yes	2458
E3-10	[Imax controller] Enable	0:Disable 1:Enable	-	0	Yes	529
E3-11	[Imax controller] Frequency regulation Kp	0 - 100	-	20	Yes	533
E3-12	[Imax controller] Field weakening coef.	0 - 200	-	100	Yes	537
E3-13	V/F torque boost mode	0:Disable 1:Manual 2:Auto	-	0	Change at stop	541
E3-14	V/F manual constant-speed torque boost	0.0 - 25.0	%	1	Yes	545
E3-15	V/F manual acceleration torque boost	0.0 - 20.0	%	0	Yes	549
E3-16	[V/F torque boost] Cut-off frequency	0.0 - 100.0	%	100	Change at stop	553
E3-17	V/F slip comp. coef.	0.0 - 300.0	%	0	Yes	557
E3-18	[V/F slip comp.] Filter time	0.000 - 2.000	s	0.5	Yes	561
E3-19	[V/F slip comp.] Starting frequency	0.0 - 50.0	Hz	2	Change at stop	565
E3-20	[V/F resonance damping] Mode	0:Disable 1:Enable	-	1	Change at stop	569
E3-21	[V/F resonance damping] Gain	0 - 2000	%	20	Yes	573
E3-23	[V/F resonance damping] Cut-off frequency	0.5 - 50.0	Hz	2	Yes	581
E3-24	V/F over-excitation gain	0 - 200	-	0	Yes	585

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
E3-25	V/F energy saving control	0:Disable 1:Enable	-	0	Change at stop	589
E3-26	V/F setpoint separation voltage	0: 0 1: 100.0% 2: AI1 3: AI2 4: HDI1 5: HDI2 Other: K connector	-	0	Yes	593
E3-27	V/F separation voltage change time	0.0 - 1000.0	s	0	Yes	597
E3-28	[V/F control] VDC control freq. REG PROP coef.	1 - 100	-	30	Yes	901
E3-29	[V/F control] VDC control freq. REG Ki	10 - 8000	-	250	Yes	905
E3-30	[V/F control] VDC_max control switch	0:Disable 1:Enable	-	0	Change at stop	1970
E3-31	VDC_max voltage reserve in V/F control	20.0 - 300.0	V	100	Change at stop	897
E3-32	[V/F control] VDC_max voltage ADJ gain coef.	0 - 100	-	30	Yes	909
E3-33	[V/F control] VDC_max freq. increase limit	1.0 - 30.0	Hz	5	Yes	913
E3-35	[V/F control] VDC_max dynamic coef.	0 - 300	%	100	Yes	921
E3-36	[V/F control] VDC_min control switch	0:Disable 1:Enable	-	0	Change at stop	1974
E3-37	[V/F control] VDC_min min. operation frequency	0.0 - 50.0	Hz	5	Yes	933
E3-38	[V/F control] VDC_min voltage reserve	20.0 - 300.0	V	50	Change at stop	937
E3-39	[V/F control] VDC_min voltage rise evaluation time	0.1 - 100.0	s	1	Change at stop	941
E3-40	[V/F control] VDC_min dynamic coef.	0 - 300	%	100	Change at stop	945
Group E4: speed regulator						
E4-00	Motor VC speed filter time setpoint	0 - 10000	ms	0	Yes	601
E4-01	Motor VC speed filter time feedback	0 - 10000	ms	0	Yes	605
E4-02	FVC ASR Kp	0.00 - 200.00	-	3	Yes	609
E4-03	FVC ASR Ti	1 - 10000	ms	500	Yes	613
E4-04	SVC ASR Kp	0.00 - 200.00	-	3	Yes	617
E4-05	SVC ASR Ti	1 - 10000	ms	500	Yes	621
E4-06	ASR Kp adaptive source	0: 0 Other: K connector	-	0	Yes	625
E4-07	[ASR] Kp adaptive switchover lower limit	0.0 - 400.0	%	25	Yes	629
E4-08	[ASR] Kp adaptive correction lower limit	0.0 - 400.0	%	25	Yes	633
E4-09	[ASR]Kp adaptive switchover upper limit	0.0 - 400.0	%	100	Yes	637
E4-10	[ASR]Kp adaptive correction upper limit	0.0 - 400.0	%	100	Yes	641
E4-11	[ASR] Switchover low frequency	0.0 - 400.0	%	50	Yes	645
E4-12	[ASR]Switchover high frequency	0.0 - 400.0	%	100	Yes	649

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
E4-13	[ASR] Switchover high-freq. correction coef.	0.0 - 1600.0	%	50	Yes	653
E4-14	Enable droop	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	2341
E4-15	Droop function selection	0:Disabled 1:General torque setpoint 2:Speed ADJ output 3:Speed ADJ integral components	-	0	Yes	657
E4-16	Droop coef.	0.0 - 50.0	%	0	Yes	661
E4-17	[ASR integral] freeze source	0:Run 1:Freeze 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	665
E4-18	[ASR integral] forcing source	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	669
E4-19	[ASR integral] force value source	0: 0 Other: K connector	-	0	Yes	673
E4-20	Torque setpoint current filter selection	0:No filter 1:2nd LPF 2:Band stop filter	-	0	Yes	677
E4-21	Torque setpoint current filter time	0 - 1000	ms	5	Yes	681
E4-22	Acceleration torque source	0:Disable 1:RFG feedforward 2:Feedback speed differential	-	0	Yes	685
E4-23	Feedforward torque coef.	0 - 400	%	0	Yes	689
E4-24	Encoder speed filter selection	0:No filter 1:2nd LPF 2:Band stop filter	-	0	Yes	693
E4-25	Encoder speed filter time	0 - 1000	ms	0	Yes	697
E4-26	Enable load observer	0:Disable 1:Enable	-	0	Change at stop	2556

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
E4-27	[Load observer] PROP gain ADJ coef.	0 - 1000	%	100	Yes	2560
E4-28	[Load observer] Integral gain ADJ coef.	0 - 1000	%	10	Yes	2564
E4-29	[Load observer] inertia ADJ coef.	20 - 1000	%	100	Change at stop	2568
Group E5: current regulator						
E5-00	[ACR] Actual scaling	0.000 - 65.535	-	0	No	33880
E5-01	[ACR] Actual Ti	0.0 - 6553.5	ms	0	No	33881
E5-02	[ACR] Theoretical scaling	0.000 - 65.535	-	0	No	33878
E5-03	[ACR] Theoretical Ti	0.0 - 6553.5	ms	0	No	33879
E5-04	ACR Kp	1 - 1000	%	50	Yes	717
E5-05	ACR Ki	1 - 1000	%	100	Yes	721
E5-06	Enable ACR PROP adaptation	0:Disable 1:Enable	-	0	Yes	725
E5-07	Current lower limit of ACR PROP adaptation	1 - 1000	%	100	Yes	729
E5-08	Current upper limit of ACR PROP adaptation	1 - 1000	%	100	Yes	733
E5-09	ACR PROP adaptation coef.	1 - 1000	%	100	Yes	737
E5-10	ACR feedforward differential coef.	0 - 1000	%	0	Yes	741
Group E6: excitation control						
E6-00	Flux setpoint coef.	50.0 - 200.0	%	100	Change at stop	1033
E6-01	Flux setpoint filter time	0 - 10000	ms	10	Yes	745
E6-02	Voltage reserve	0.0 - 50.0	%	3	Change at stop	749
E6-03	Min. flux threshold at start-up	20.0 - 100.0	%	70	Change at stop	753
E6-04	Excitation differential coef.	0.0 - 400.0	%	100	Change at stop	757
E6-05	Enable flux controller	0:Disable 1:Enable	-	1	Change at stop	761
E6-06	Enable efficiency OPT	0:Disable 1:Enable	-	0	Change at stop	765
E6-07	Min. flux for efficiency OPT	50.0 - 100.0	%	100	Change at stop	769
E6-08	[Efficiency OPT] Additional filter time	0 - 1000	ms	4	Yes	773
E6-09	[Efficiency OPT] Filter exit time	0 - 1000	ms	20	Yes	777
Group E7: speed track						
E7-00	Speed track current Kp	0.5 - 2.0	-	1	Yes	781
E7-01	Speed track filter	5 - 50	ms	10	Yes	785
E7-02	[Speed track filter] Cut-off frequency	0.1 - 50.0	Hz	1	Yes	789
E7-03	Speed track current setpoint	20.0 - 80.0	%	50	Yes	793
E7-04	Speed track time	50 - 5000	ms	1000	Yes	797
Group E8: protection						
E8-00	Motor overload software protection enable	0:Disable 1:Enable	-	1	Yes	801
E8-01	Motor overload software protection gain	20 - 1000	%	100	Yes	805

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
E8-02	Motor overload pre-warning coef.	50 - 100	%	80	Yes	809
E8-04	Overspeed threshold	0.0 - 50.0	%	20	Yes	817
E8-05	Overspeed meas. time	0.0 - 60.0	s	0.5	Yes	821
E8-06	Speed setpoint - actual value deviation out of range threshold	0.0 - 100.0	%	6	Yes	825
E8-07	Meas. time for speed setpoint - actual value deviation out of range	0.0 - 600.0	s	3	Yes	829
E8-08	Compare value reached meas. value	0.0 - 600.0	%	100	Yes	2123
E8-09	Compare value reaching meas. delay	0.0 - 600.0	%	3	Yes	2127
E8-10	Compare value reaching meas. time	0.0 - 100.0	s	3	Yes	2131
E8-11	Leakage current meas.	0:Disable 1:Enable	-	0	Yes	833
E8-12	Leakage current meas. threshold	0.0 - 80.0	%	30	Yes	837
E8-13	Output wire breakage DET (reserved)	0:Disable 1:Enable	-	0	Yes	841
E8-14	PG software fault meas.	0:Disable 1:Enable	-	0	Yes	845
E8-15	VI meas. mode	Unit' s position: power-on detection 0: Invalid 1: Valid Ten' s digit: detection before running 0: Invalid 1: Valid	-	0	Yes	849
E8-16	Bridge arm meas. mode	Unit' s position: power-on detection 0: Invalid 1: Valid Ten' s digit: detection before running 0: Invalid 1: Valid	-	0	Yes	853
E8-17	Output current sensor CM meas. mode	Unit' s position: power-on detection 0: Invalid 1: Valid Ten' s digit: detection before running 0: Invalid 1: Valid	-	0	Yes	857
E8-18	Brake chopper meas. mode	Unit' s position: power-on detection 0: Invalid 1: Valid Ten' s digit: detection before running 0: Invalid 1: Valid	-	0	Yes	861

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
E8-19	DC link capacitor meas. mode	Unit' s position: power-on detection 0: Invalid 1: Valid Ten' s digit: detection before running 0: Invalid 1: Valid	-	0	Yes	865
E8-20	Short-circuit to ground DET mode	Unit' s position: power-on detection 0: Invalid 1: Valid Ten' s digit: detection before running 0: Invalid 1: Valid	-	0	Yes	869
E8-21	Output phase loss meas. mode	Unit' s position: power-on detection 0: Invalid 1: Valid Ten' s digit: detection before running 0: Invalid 1: Valid Hundred' s position: Detection during running 0: Invalid 1: Valid	-	100	Yes	873
E8-22	Motor temperature meas. mode	0: Prohibited 1: Current PG card KTY84 2: AI1 detection KTY84 3: AI1 detection PT100 4: AI1 detection PT100*2 5: AI1 detection PT100*3 6: AI1 detection PT1000 7: Reserved 8: Reserved 9:AI1 detection PTC 10: Current PG card PTC detection 11: Reserved 12: AI2 detection KTY84 13: AI2 detection PT100 14: AI2 detection PT100*2 15: AI2 detection PT100*3 16: AI2 detection PT1000 17: Reserved 18: Reserved 19: AI2 detection PTC 20: Reserved Other: K connector	-	0	Yes	2407
E8-23	Motor overtemp. protection value	0 - 300	°C	130	Yes	2411
E8-24	Motor overtemp. warning value	0 - 300	°C	110	Yes	2415
E8-25	Enable motor locked-rotor meas.	0:Disable 1:Enable Other: B connector	-	1128	Yes	2855
E8-26	Motor locked-rotor speed setpoint	0.0 - 100.0	%	6	Yes	2552
E8-27	Motor locked-rotor meas. time	0.00 - 65.00	s	2	Yes	2536

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
E8-28	Enable motor stall meas.	0:Disable 1:Enable	-	1	Yes	2710
E8-29	Motor stall meas. threshold	10.0 - 80.0	%	20	Yes	2714
E8-30	Motor stall meas. time	0.00 - 10.00	s	0.5	Yes	2718
E8-31	Enable current control fault meas.	0:Disable 1:Enable	-	1	Yes	2742
E8-32	Current control fault meas. threshold	10.0 - 80.0	%	25	Yes	2746
E8-33	Current control fault meas. time	0 - 500	ms	50	Yes	2750
E8-34	Hysteresis value when target speed is reached	0.0 - 600.0	%	3	Yes	2814
E8-35	Meas. time when target speed is reached	0.0 - 100.0	s	3	Yes	2818
E8-36	Bridge arm self-check pulse Opening time	1 - 500	us	100	Change at stop	3164
E8-37	Enable current sampling error meas. for parallel module	0:Disable 1:Enable	-	1	Yes	1073
E8-38	Locked-rotor detection time in SVC I/F	0.000 - 65.000	s	10	Yes	1069
Group E9: VDC control						
E9-00	[Vector control] VDC excited voltage auto calc	0:Parameter setting 1:Auto	-	1	Yes	881
E9-01	VDC_max control switch in vector control	0:Disable 1:Enable	-	0	Change at stop	889
E9-02	[Vector control] VDC_max excited voltage	110.0 - 140.0	%	115	Yes	953
E9-03	[Vector control] VDC_min control switch	0:Disable 1:Enable	-	0	Change at stop	925
E9-04	[Vector control] VDC_min cut-off frequency	0.0 - 50.0	Hz	2	Yes	1978
E9-05	[Vector control] VDC_min excited voltage	60.0 - 90.0	%	80	Yes	949
E9-06	[Vector control] VDC control gain ADJ coef.	1 - 1500	%	100	Yes	885
E9-07	DC link capacitance ratio	100 - 1500	%	100	Change at stop	1940
Group E11: motor model						
E11-00	Model switchover upper frequency	0.0 - 600.0	%	20	Yes	1081
E11-01	Model switchover lower frequency	0.0 - 600.0	%	10	Yes	1085
E11-02	Model switchover coef.	0.0 - 1000.0	%	100	Yes	1089
E11-03	Passive FVC-to-SVC enable	0: Disabled 1: Enabled	-	0	Yes	2544
E11-04	Active FVC-to-SVC enable	0:Disable 1:Enable	-	0	Yes	2540
E11-05	Active FVC-to-SVC upper frequency	0.0 - 100.0	%	25	Yes	1097
E11-06	Active FVC-to-SVC lower frequency	0.0 - 100.0	%	15	Yes	1101
E11-07	SVC speed estimation filter time	0 - 1000	ms	15	Yes	1105
E11-08	Enable SVC I/F	0:Disable 1:Enable	-	1	Change at stop	2706
E11-09	Steady speed iq in SVC I/F	0.0 - 400.0	%	50	Yes	2682
E11-10	Acceleration iq in SVC I/F	0.0 - 400.0	%	0	Yes	2686

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
E11-11	Flux filter time in SVC I/F	0.000 - 1.000	s	0.01	Change at stop	2690
E11-12	SVC I/F exit frequency	0.0 - 100.0	%	5	Change at stop	2694
E11-13	Hysteresis range in SVC I/F	0.0 - 100.0	%	50	Change at stop	2698
E11-14	Enable waiting time for SVC I/F	0:Disable 1:Enable Other: B connector	-	1	Yes	3194
E11-15	[SVC I/F] Waiting time	0.000 - 10.000	s	0.5	Change at stop	2702
E11-16	[SVC I/F] Gain	5.0 - 3000.0	%	300	Change at stop	2846
E11-17	SVC I/F slip coef.	0.0 - 800.0	%	100	Yes	2957
E11-18	Torque coef. for pre-control calculation	0.0 - 800.0	%	100	Yes	3139
E11-19	Resonance damping coef. in SVC I/F	0.0 - 1600.0	%	0	Yes	3696
E11-29	Motor thermal model temperature source	0:Estimation 1:Motor temperature sensor	-	0	Yes	3764
E11-30	Motor thermal model type	0:No estimation 1:Temperature model 1	-	0	Yes	3700
E11-31	Ambient temperature	-50.0 - 100.0	°C	20	Yes	3704
E11-32	Steady state load	0.0 - 800.0	%	100	Yes	3708
E11-33	Zero speed load	0.0 - 800.0	%	100	Yes	3712
E11-34	Frequency at turning point	0.0 - 100.0	Hz	20	Yes	3716
E11-35	Motor temperature rise under rated load	0.0 - 200.0	°C	80	Yes	3720
E11-36	Motor temperature rise time constant	0 - 20000	s	1000	Yes	3724

Group F Input and Output

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
Group F0: DI						
F0-00	DI physical state value	0x0000 - 0xFFFF	-	0	No	32805
F0-01	Processed DI state value	0x0000 - 0xFFFF	-	0	No	32806
F0-02	DI force selection	0x0000 to 0x01FF	-	0	Yes	1117
F0-03	DI force data	0x0000 to 0x01FF	-	0	Yes	1118
F0-04	DI1 switch-on delay	0.00 - 360.00	s	0.01	Yes	1119
F0-05	DI1 switch-off delay	0.00 - 360.00	s	0.01	Yes	1120
F0-06	DI2 switch-on delay	0.00 - 360.00	s	0.01	Yes	1121
F0-07	DI2 switch-off delay	0.00 - 360.00	s	0.01	Yes	1122
F0-08	DI3 switch-on delay	0.00 - 360.00	s	0.01	Yes	1123
F0-09	DI3 switch-off delay	0.00 - 360.00	s	0.01	Yes	1124
F0-10	DI4 switch-on delay	0.00 - 360.00	s	0.01	Yes	1125
F0-11	DI4 switch-off delay	0.00 - 360.00	s	0.01	Yes	1126
F0-12	DI5 switch-on delay	0.00 - 360.00	s	0.01	Yes	1127
F0-13	DI5 switch-off delay	0.00 - 360.00	s	0.01	Yes	1128
F0-14	DI6 switch-on delay	0.00 - 360.00	s	0.01	Yes	1129
F0-15	DI6 switch-off delay	0.00 - 360.00	s	0.01	Yes	1130
F0-16	DIL switch-on delay	0.00 - 360.00	s	0.01	Yes	1131
F0-17	DIL switch-off delay	0.00 - 360.00	s	0.01	Yes	1132

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
F0-18	HDI1 switch-on delay	0.00 - 360.00	s	0.01	Yes	1133
F0-19	HDI1 switch-off delay	0.00 - 360.00	s	0.01	Yes	1134
F0-20	HDI2 switch-on delay	0.00 - 360.00	s	0.01	Yes	1135
F0-21	HDI2 switch-off delay	0.00 - 360.00	s	0.01	Yes	1136
Group F1: DO						
F1-00	DO signal source state value	0x0000 - 0xFFFF	-	0	No	32807
F1-01	Processed DO state value	0x0000 - 0xFFFF	-	0	No	32808
F1-02	RO1 signal source	0:Low level 1:High level 2:Ready to switch on 3:Operation permitted 4:Operating 5:|speed actual| ⩾ speed compare value 6:Speed negative direction 7:Running at zero speed 8:Overspeed 9:Warning 10:Fault Other: B connector	-	0	Change at stop	1138
F1-03	RO2 signal source	0:Low level 1:High level 2:Ready to switch on 3:Operation permitted 4:Operating 5:|speed actual| ⩾ speed compare value 6:Speed negative direction 7:Running at zero speed 8:Overspeed 9:Warning 10:Fault Other: B connector	-	0	Change at stop	1139
F1-04	RO3 signal source	0:Low level 1:High level 2:Ready to switch on 3:Operation permitted 4:Operating 5:|speed actual| ⩾ speed compare value 6:Speed negative direction 7:Running at zero speed 8:Overspeed 9:Warning 10:Fault Other: B connector	-	0	Change at stop	1140
F1-05	HDO1 as DO signal source	0:Low level 1:High level 2:Ready to switch on 3:Operation permitted 4:Operating 5:|speed actual| ⩾ speed compare value 6:Speed negative direction 7:Running at zero speed 8:Overspeed 9:Warning 10:Fault Other: B connector	-	0	Change at stop	1141

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
F1-06	HDO2 as DO signal source	0:Low level 1:High level 2:Ready to switch on 3:Operation permitted 4:Operating 5:|speed actual| ⩾ speed compare value 6:Speed negative direction 7:Running at zero speed 8:Overspeed 9:Warning 10:Fault Other: B connector	-	0	Change at stop	1142
F1-07	RO1 switch-on delay	0.00 - 360.00	s	0	Yes	1143
F1-08	RO1 switch-off delay	0.00 - 360.00	s	0	Yes	1144
F1-09	RO2 switch-on delay	0.00 - 360.00	s	0	Yes	1145
F1-10	RO2 switch-off delay	0.00 - 360.00	s	0	Yes	1146
F1-11	RO3 switch-on delay	0.00 - 360.00	s	0	Yes	1147
F1-12	RO3 switch-off delay	0.00 - 360.00	s	0	Yes	1148
F1-13	HDO1 as DO switch-on delay	0.00 - 360.00	s	0	Yes	1149
F1-14	HDO1 as DO switch-off delay	0.00 - 360.00	s	0	Yes	1150
F1-15	HDO2 as DO switch-on delay	0.00 - 360.00	s	0	Yes	1151
F1-16	HDO2 as DO switch-off delay	0.00 - 360.00	s	0	Yes	1152
F1-17	DO positive and negative logic	0x0000 to 0x001F	-	0	Change at stop	1153
Group F2: AI						
F2-00	AI1 input value	-32.768 - 32.767	-	0	No	32809
F2-01	AI1 input percentage	-3276.8 - 3276.7	%	0	No	32810
F2-02	AI2 input value	-32.768 - 32.767	-	0	No	32811
F2-03	AI2 input percentage	-3276.8 - 3276.7	%	0	No	32812
F2-04	AI1 type	0:-10 to +10 V 1:0 to 10 V 2:-20 to +20 mA 3:0 to 20 mA 4:4 to 20 mA	-	0	Change at stop	1154
F2-05	AI2 type	0:-10 to +10 V 1:0 to 10 V 2:-20 to +20 mA 3:0 to 20 mA 4:4 to 20 mA	-	0	Change at stop	1155
F2-06	[AI1 curve] Min. input value	-20.000 - 20.000	-	-10	Yes	1156
F2-07	[AI1 curve] Min. input scaling	-600.0 - 600.0	%	-100	Yes	1157
F2-08	[AI1 curve] Max. input value	-20.000 - 20.000	-	10	Yes	1158
F2-09	[AI1 curve] Max. input scaling	-600.0 - 600.0	%	100	Yes	1159
F2-10	[AI2 curve] Min. input value	-20.000 - 20.000	-	-10	Yes	1160
F2-11	[AI2 curve] Min. input scaling	-600.0 - 600.0	%	-100	Yes	1161
F2-12	[AI2 curve] Max. input value	-20.000 - 20.000	-	10	Yes	1162
F2-13	[AI2 curve] Max. input scaling	-600.0 - 600.0	%	100	Yes	1163
F2-14	AI1 smaller than min. input setpoint option	Unit' s position: AI1 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0% Ten' s position: AI2 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0%	-	0	Yes	1164

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
F2-15	AI1 filter time	0.000 - 10.000	s	0	Yes	1165
F2-16	AI2 filter time	0.000 - 10.000	s	0	Yes	1166
F2-17	AI1 denoising threshold	0.0 - 20.0	%	0	Yes	1167
F2-18	AI2 denoising threshold	0.0 - 20.0	%	0	Yes	1168
F2-19	AI zero crossover threshold	0.0 - 1.0	%	0	Yes	2185
F2-20	AI1 enable	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	1169
F2-21	AI2 enable	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Yes	1170
F2-22	AI1 wire breakage monitoring threshold	0.000 - 4.000	mA	2	Yes	1171
F2-23	AI2 wire breakage monitoring threshold	0.000 - 4.000	mA	2	Yes	1172
F2-24	AI1 wire breakage monitoring delay	0.00 - 10.00	s	1	Yes	1173
F2-25	AI2 wire breakage monitoring delay	0.00 - 10.00	s	1	Yes	1174
F2-26	Enable AI wire breakage monitoring	Unit' s position: AI1 wire breakage monitoring enable 0: Disabled 1: Enabled Ten' s position: AI2 wire breakage monitoring enable 0: Disabled 1: Enabled	-	0	Yes	1175
Group F3: AO						
F3-00	AO1 output value	0.000 - 65.535	-	0	No	32813
F3-01	AO1 output percentage	-3276.8 - 3276.7	%	0	No	32814
F3-02	AO2 output value	0.000 - 65.535	-	0	No	32815
F3-03	AO2 output percentage	-3276.8 - 3276.7	%	0	No	32816

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
F3-04	AO1 signal source	0:0 1:Actual motor speed 2:Sync frequency 3:Motor current 4:Motor torque 5:DC link voltage 6:Output power 7:Reference speed ramp input 8:Reference speed ramp output 9:Superposed reference speed 10:Reference torque Other: K connector	-	0	Change at stop	1176
F3-05	AO2 signal source	0:0 1:Actual motor speed 2:Sync frequency 3:Motor current 4:Motor torque 5:DC link voltage 6:Output power 7:Reference speed ramp input 8:Reference speed ramp output 9:Superposed reference speed 10:Reference torque Other: K connector	-	0	Change at stop	1177
F3-06	AO1 type	0:0 - 10V 1:0 - 20mA 2:4 - 20mA	-	0	Change at stop	1178
F3-07	AO2 type	0:0 - 10V 1:0 - 20mA 2:4 - 20mA	-	0	Change at stop	1179
F3-08	[AO1 curve] Min. output scaling	-600.0 - 600.0	%	0	Yes	1180
F3-09	[AO1 curve] Min. output value	0.000 - 20.000	-	0	Yes	1181
F3-10	[AO1 curve] Max. output scaling	-600.0 - 600.0	%	100	Yes	1182
F3-11	[AO1 curve] Max. output value	0.000 - 20.000	-	10	Yes	1183
F3-12	[AO2 curve] Min. output scaling	-600.0 - 600.0	%	0	Yes	1184
F3-13	[AO2 curve] Min. output value	0.000 - 20.000	-	0	Yes	1185
F3-14	[AO2 curve] Max. output scaling	-600.0 - 600.0	%	100	Yes	1186
F3-15	[AO2 curve] Max. output value	0.000 - 20.000	-	10	Yes	1187
Group F4: HDI						
F4-00	HDI1 input value	0.00 - 655.35	kHz	0	No	32817
F4-01	HDI1 input percentage	-3276.8 - 3276.7	%	0	No	32818
F4-02	HDI2 input value	0.00 - 655.35	kHz	0	No	32819
F4-03	HDI2 input percentage	-3276.8 - 3276.7	%	0	No	32820

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
F4-04	Use HDI as DI	Unit' s position: HDI1 used as DI selection 0: Not used as DI 1: Used as DI Ten' s position: HDI2 used as DI selection 0: Not used as DI 1: Used as DI	-	0	Change at stop	1188
F4-05	[HDI1 curve] Min. input frequency	10.00 - 100.00	kHz	10	Yes	1191
F4-06	[HDI1 curve] Min. input percentage	-600.0 - 600.0	%	0	Yes	1192
F4-07	[HDI1 curve] Max. input frequency	10.00 - 100.00	kHz	100	Yes	1193
F4-08	[HDI1 curve] Max. input percentage	-600.0 - 600.0	%	100	Yes	1194
F4-09	[HDI2 curve] Min. input frequency	10.00 - 100.00	kHz	10	Yes	1195
F4-10	[HDI2 curve] Min. input percentage	-600.0 - 600.0	%	0	Yes	1196
F4-11	[HDI2 curve] Max. input frequency	10.00 - 100.00	kHz	100	Yes	1197
F4-12	[HDI2 curve] Max. input percentage	-600.0 - 600.0	%	100	Yes	1198
F4-13	HDI smaller than min. input setpoint option	Unit' s position: HDI1 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0% Ten' s position: HDI2 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0%	-	0	Yes	2046
F4-14	HDI1 filter time	0.000 - 10.000	s	0	Yes	1189
F4-15	HDI2 filter time	0.000 - 10.000	s	0	Yes	1190
F4-16	HDI zero crossover threshold	0.0 - 1.0	%	0	Yes	2186
Group F5: HDO						
F5-00	HDO1 output value	0.00 - 655.35	kHz	0	No	32821
F5-01	HDO1 output percentage	-3276.8 - 3276.7	%	0	No	32822
F5-02	HDO2 output value	0.00 - 655.35	kHz	0	No	32823
F5-03	HDO2 output percentage	-3276.8 - 3276.7	%	0	No	32824
F5-04	Use HDO as common DO	Unit' s position: HDO1 used as DO selection 0: Not used as DO 1: Used as DO Ten' s position: HDO2 used as DO selection 0: Not used as DO 1: Used as DO	-	0	Change at stop	1199

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
F5-05	HDO1 signal source	0:0 1:Actual motor speed 2:Sync frequency 3:Motor current 4:Motor torque 5:DC link voltage 6:Output power 7:Reference speed ramp input 8:Reference speed ramp output 9:Superposed reference speed 10:Reference torque Other: K connector	-	0	Change at stop	1200
F5-06	HDO2 signal source	0:0 1:Actual motor speed 2:Sync frequency 3:Motor current 4:Motor torque 5:DC link voltage 6:Output power 7:Reference speed ramp input 8:Reference speed ramp output 9:Superposed reference speed 10:Reference torque Other: K connector	-	0	Change at stop	1201
F5-07	[HDO1 curve] Min. output percentage	-600.0 - 600.0	%	0	Yes	1202
F5-08	[HDO1 curve] Min. output frequency	0.00 - 100.00	kHz	0	Yes	1203
F5-09	[HDO1 curve] Max. output percentage	-600.0 - 600.0	%	100	Yes	1204
F5-10	[HDO1 curve] Max. output frequency	0.00 - 100.00	kHz	100	Yes	1205
F5-11	[HDO2 curve] Min. output percentage	-600.0 - 600.0	%	0	Yes	1206
F5-12	[HDO2 curve] Min. output frequency	0.00 - 100.00	kHz	0	Yes	1207
F5-13	[HDO2 curve] Max. output percentage	-600.0 - 600.0	%	100	Yes	1208
F5-14	[HDO2 curve] Max. output frequency	0.00 - 100.00	kHz	100	Yes	1209

Group H Protection and Auxiliary

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
Group H0: fault processing						
H0-00	External fault 1 source	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	1210
H0-01	External fault 2 source	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	1211
H0-02	External warning 1 source	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	1212
H0-03	External warning 2 source	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	1213
H0-06	Custom black box trigger CMD source	0: Invalid Other: B connector	-	0	Yes	1216
H0-07	Enable auto reset	0:Disable 1:Enable	-	0	Yes	1217
H0-08	Auto reset attempts resetting time	0.0 - 3600.0	s	180	Yes	1218
H0-09	Auto reset attempting period	0.0 - 600.0	s	30	Yes	1219
H0-10	Auto reset attempts	0 - 5	-	5	Yes	1220
H0-11	Error code 1 no auto reset	0 - 65535	-	0	Yes	1221
H0-12	Error code 2 no auto reset	0 - 65535	-	0	Yes	1222
H0-13	Error code 3 no auto reset	0 - 65535	-	0	Yes	1223

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
H0-19	Auto restart	0:Disable 1:Enable	-	0	Yes	1230
H0-20	Auto restart waiting time	0.0 - 6000.0	s	1	Yes	1229
H0-21	Auto restart mode	0:Auto restart faults active 1:Auto restart faults inactive	-	0	Yes	1231
H0-22	Specified error code 1	0 - 65535	-	0	Yes	1232
H0-23	Specified error code 2	0 - 65535	-	0	Yes	1233
H0-24	Specified error code 3	0 - 65535	-	0	Yes	1234
H0-25	Specified error code 4	0 - 65535	-	0	Yes	1235
H0-26	Specified error code 5	0 - 65535	-	0	Yes	1236
H0-33	[Error level change] Error code 1	0 - 65535	-	0	Yes	1243
H0-34	[Error code 1] Level	0:Coast to stop 1:Emergency stop 2:Stop in normal stop mode 3:Running with limited power 4:Running at limited speed 5:Running at limited torque 6:Display warning only 7:No operation	-	0	Yes	1244
H0-35	[Error level change] Error code 2	0 - 65535	-	0	Yes	1245
H0-36	[Error code 2] Level	0:Coast to stop 1:Emergency stop 2:Stop in normal stop mode 3:Running with limited power 4:Running at limited speed 5:Running at limited torque 6:Display warning only 7:No operation	-	0	Yes	1246
H0-37	[Error level change] Error code 3	0 - 65535	-	0	Yes	1247
H0-38	[Error code 3] Level	0:Coast to stop 1:Emergency stop 2:Stop in normal stop mode 3:Running with limited power 4:Running at limited speed 5:Running at limited torque 6:Display warning only 7:No operation	-	0	Yes	1248
H0-39	[Error level change] Error code 4	0 - 65535	-	0	Yes	1249
H0-40	[Error code 4] Level	0:Coast to stop 1:Emergency stop 2:Stop in normal stop mode 3:Running with limited power 4:Running at limited speed 5:Running at limited torque 6:Display warning only 7:No operation	-	0	Yes	1250
H0-41	[Error level change] Error code 5	0 - 65535	-	0	Yes	1251

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
H0-42	[Error code 5] Level	0:Coast to stop 1:Emergency stop 2:Stop in normal stop mode 3:Running with limited power 4:Running at limited speed 5:Running at limited torque 6:Display warning only 7:No operation	-	0	Yes	1252
H0-43	[Error level change] Error code 6	0 - 65535	-	0	Yes	1253
H0-44	[Error code 6] Level	0:Coast to stop 1:Emergency stop 2:Stop in normal stop mode 3:Running with limited power 4:Running at limited speed 5:Running at limited torque 6:Display warning only 7:No operation	-	0	Yes	1254
H0-45	[Error level change] Error code 7	0 - 65535	-	0	Yes	1255
H0-46	[Error code 7] Level	0:Coast to stop 1:Emergency stop 2:Stop in normal stop mode 3:Running with limited power 4:Running at limited speed 5:Running at limited torque 6:Display warning only 7:No operation	-	0	Yes	1256
H0-47	[Error level change] Error code 8	0 - 65535	-	0	Yes	1257
H0-48	[Error code 8] Level	0:Coast to stop 1:Emergency stop 2:Stop in normal stop mode 3:Running with limited power 4:Running at limited speed 5:Running at limited torque 6:Display warning only 7:No operation	-	0	Yes	1258
H0-49	[Error level change] Error code 9	0 - 65535	-	0	Yes	1259
H0-50	[Error code 9] Level	0:Coast to stop 1:Emergency stop 2:Stop in normal stop mode 3:Running with limited power 4:Running at limited speed 5:Running at limited torque 6:Display warning only 7:No operation	-	0	Yes	1260
H0-51	[Error level change] Error code 10	0 - 65535	-	0	Yes	1261

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
H0-52	[Error code 10] Level	0:Coast to stop 1:Emergency stop 2:Stop in normal stop mode 3:Running with limited power 4:Running at limited speed 5:Running at limited torque 6:Display warning only 7:No operation	-	0	Yes	1262
H0-60	Enable abnormity meas. 1	Unit' s position: OFF2/OFF3 activation warning 0: Disabled 1: Enabled Ten' s position: HCU RTC battery low voltage warning 0: Disabled 1: Enabled Hundred' s position: Reserved 0: Disabled 1: Enabled Thousand' s position: SD card offline/abnormal warning 0: Disabled 1: Enabled Ten thousands' position: SD card black box fault record condition 0: Fault during running 1: Fault at any time	-	11110	Yes	3229
H0-61	Enable abnormity meas. 2	Unit' s position: Warning of HCU_24v input voltage being low 0: Disabled 1: Enabled Ten' s position: HOFR optical fiber cross detection 0: Disabled 1: Enabled Hundred' s position: MD880 inverter fan detection 0: Disabled 1: Enabled	-	11111	Yes	3230
Group H1: fault data record						
H1-00	Speed upon the latest fault	-300.00 - 300.00	Hz	0	No	1263
H1-01	[Latest fault] Current	0.0 - 6553.5	A	0	No	1264
H1-02	[Latest fault] DC link voltage	0.0 - 6553.5	V	0	No	1265
H1-03	[Latest fault] Output torque	-800.0 - 800.0	%	0	No	1266
H1-04	[Latest fault] Control word 1	0x0000 - 0xFFFF	-	0	No	1267
H1-05	[Latest fault] Control word 2	0x0000 - 0xFFFF	-	0	No	1268
H1-06	[Latest fault] Status word	0x0000 - 0xFFFF	-	0	No	1269
H1-07	[Latest fault] State machine	0 - 65535	-	0	No	1270
H1-08	Latest fault occurring time	0 - 65535	-	0	No	1271
H1-09	Latest fault occurring date	0 - 65535	-	0	No	1272
H1-10	Speed upon the second latest fault	-300.00 - 300.00	Hz	0	No	1273
H1-11	[Second latest fault] Current	0.0 - 6553.5	A	0	No	1274
H1-12	[Second latest fault] DC link voltage	0.0 - 6553.5	V	0	No	1275

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
H1-13	[Second latest fault] Output torque	-800.0 - 800.0	%	0	No	1276
H1-14	[Second latest fault] Control word 1	0x0000 - 0xFFFF	-	0	No	1277
H1-15	[Second latest fault] Control word 2	0x0000 - 0xFFFF	-	0	No	1278
H1-16	[Second latest fault] Status word	0x0000 - 0xFFFF	-	0	No	1279
H1-17	[Second latest fault] state machine	0 - 65535	-	0	No	1280
H1-18	Second latest fault occurring time	0 - 65535	-	0	No	1281
H1-19	Second latest fault occurring date	0 - 65535	-	0	No	1282
H1-20	Speed upon the third latest fault	-300.00 - 300.00	Hz	0	No	1283
H1-21	[Third latest fault] Current	0.0 - 6553.5	A	0	No	1284
H1-22	[Third latest fault] DC link voltage	0.0 - 6553.5	V	0	No	1285
H1-23	[Third latest fault] Output torque	-800.0 - 800.0	%	0	No	1286
H1-24	[Third latest fault] Control word 1	0x0000 - 0xFFFF	-	0	No	1287
H1-25	[Third latest fault] Control word 2	0x0000 - 0xFFFF	-	0	No	1288
H1-26	[Third latest fault] Status word	0x0000 - 0xFFFF	-	0	No	1289
H1-27	[Third latest fault] State machine	0 - 65535	-	0	No	1290
H1-28	Third latest fault occurring time	0 - 65535	-	0	No	1291
H1-29	Third latest fault occurring date	0 - 65535	-	0	No	1292
Group H2: latest fault code record						
H2-00	Fault code 1	0 - 65534	-	0	No	1293
H2-01	[Fault code 1] Subcode	0 - 65534	-	0	No	1294
H2-02	Fault code 2	0 - 65534	-	0	No	1295
H2-03	[Fault code 2] Subcode	0 - 65534	-	0	No	1296
H2-04	Fault code 3	0 - 65534	-	0	No	1297
H2-05	[Fault code 3] Subcode	0 - 65534	-	0	No	1298
H2-06	Fault code 4	0 - 65534	-	0	No	1299
H2-07	[Fault code 4] Subcode	0 - 65534	-	0	No	1300
H2-08	Fault code 5	0 - 65534	-	0	No	1301
H2-09	[Fault code 5] Subcode	0 - 65534	-	0	No	1302
H2-10	Fault code 6	0 - 65534	-	0	No	1303
H2-11	[Fault code 6] Subcode	0 - 65534	-	0	No	1304
Group H3: 2nd latest fault code record						
H3-00	Fault code 1	0 - 65534	-	0	No	1305
H3-01	[Fault code 1] Subcode	0 - 65534	-	0	No	1306
H3-02	Fault code 2	0 - 65534	-	0	No	1307
H3-03	[Fault code 2] Subcode	0 - 65534	-	0	No	1308
H3-04	Fault code 3	0 - 65534	-	0	No	1309
H3-05	[Fault code 3] Subcode	0 - 65534	-	0	No	1310
H3-06	Fault code 4	0 - 65534	-	0	No	1311
H3-07	[Fault code 4] Subcode	0 - 65534	-	0	No	1312

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
H3-08	Fault code 5	0 - 65534	-	0	No	1313
H3-09	[Fault code 5] Subcode	0 - 65534	-	0	No	1314
H3-10	Fault code 6	0 - 65534	-	0	No	1315
H3-11	[Fault code 6] Subcode	0 - 65534	-	0	No	1316
Group H4: 3rd latest fault code record						
H4-00	Fault code 1	0 - 65534	-	0	No	1317
H4-01	[Fault code 1] Subcode	0 - 65534	-	0	No	1318
H4-02	Fault code 2	0 - 65534	-	0	No	1319
H4-03	[Fault code 2] Subcode	0 - 65534	-	0	No	1320
H4-04	Fault code 3	0 - 65534	-	0	No	1321
H4-05	[Fault code 3] Subcode	0 - 65534	-	0	No	1322
H4-06	Fault code 4	0 - 65534	-	0	No	1323
H4-07	[Fault code 4] Subcode	0 - 65534	-	0	No	1324
H4-08	Fault code 5	0 - 65534	-	0	No	1325
H4-09	[Fault code 5] Subcode	0 - 65534	-	0	No	1326
H4-10	Fault code 6	0 - 65534	-	0	No	1327
H4-11	[Fault code 6] Subcode	0 - 65534	-	0	No	1328
Group H4: 4th latest fault code record						
H5-00	Fault code 1	0 - 65534	-	0	No	1329
H5-01	[Fault code 1] Subcode	0 - 65534	-	0	No	1330
H5-02	Fault code 2	0 - 65534	-	0	No	1331
H5-03	[Fault code 2] Subcode	0 - 65534	-	0	No	1332
H5-04	Fault code 3	0 - 65534	-	0	No	1333
H5-05	[Fault code 3] Subcode	0 - 65534	-	0	No	1334
H5-06	Fault code 4	0 - 65534	-	0	No	1335
H5-07	[Fault code 4] Subcode	0 - 65534	-	0	No	1336
H5-08	Fault code 5	0 - 65534	-	0	No	1337
H5-09	[Fault code 5] Subcode	0 - 65534	-	0	No	1338
H5-10	Fault code 6	0 - 65534	-	0	No	1339
H5-11	[Fault code 6] Subcode	0 - 65534	-	0	No	1340
Group H6: 5th latest fault code record						
H6-00	Fault code 1	0 - 65534	-	0	No	1341
H6-01	[Fault code 1] Subcode	0 - 65534	-	0	No	1342
H6-02	Fault code 2	0 - 65534	-	0	No	1343
H6-03	[Fault code 2] Subcode	0 - 65534	-	0	No	1344
H6-04	Fault code 3	0 - 65534	-	0	No	1345
H6-05	[Fault code 3] Subcode	0 - 65534	-	0	No	1346
H6-06	Fault code 4	0 - 65534	-	0	No	1347
H6-07	[Fault code 4] Subcode	0 - 65534	-	0	No	1348
H6-08	Fault code 5	0 - 65534	-	0	No	1349
H6-09	[Fault code 5] Subcode	0 - 65534	-	0	No	1350
H6-10	Fault code 6	0 - 65534	-	0	No	1351
H6-11	[Fault code 6] Subcode	0 - 65534	-	0	No	1352
Group H7: latest limit code record						
H7-00	Limit code 1	0 - 65534	-	0	No	1353
H7-01	[Limit code 1] Subcode	0 - 65534	-	0	No	1354
H7-02	Limit code 2	0 - 65534	-	0	No	1355
H7-03	[Limit code 2] Subcode	0 - 65534	-	0	No	1356
H7-04	Limit code 3	0 - 65534	-	0	No	1357
H7-05	[Limit code 3] Subcode	0 - 65534	-	0	No	1358
H7-06	Limit code 4	0 - 65534	-	0	No	1359

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
H7-07	[Limit code 4] Subcode	0 - 65534	-	0	No	1360
H7-08	Limit code 5	0 - 65534	-	0	No	1361
H7-09	[Limit code 5] Subcode	0 - 65534	-	0	No	1362
H7-10	Limit code 6	0 - 65534	-	0	No	1363
H7-11	[Limit code 6] Subcode	0 - 65534	-	0	No	1364
Group H8: latest warning code record						
H8-00	Warning code 1	0 - 65534	-	0	No	1365
H8-01	[Warning code 1] Subcode	0 - 65534	-	0	No	1366
H8-02	Warning code 2	0 - 65534	-	0	No	1367
H8-03	[Warning code 2] Subcode	0 - 65534	-	0	No	1368
H8-04	Warning code 3	0 - 65534	-	0	No	1369
H8-05	[Warning code 3] Subcode	0 - 65534	-	0	No	1370
H8-06	Warning code 4	0 - 65534	-	0	No	1371
H8-07	[Warning code 4] Subcode	0 - 65534	-	0	No	1372
H8-08	Warning code 5	0 - 65534	-	0	No	1373
H8-09	[Warning code 5] Subcode	0 - 65534	-	0	No	1374
H8-10	Warning code 6	0 - 65534	-	0	No	1375
H8-11	[Warning code 6] Subcode	0 - 65534	-	0	No	1376
Group H10: custom error word						
H10-00	Custom error word 1	0x0000 - 0xFFFF	-	0	No	34914
H10-01	Custom error word 2	0x0000 - 0xFFFF	-	0	No	34915
H10-02	Fault word 1 - BIT00 error code	0 - 65535	-	0	Yes	3239
H10-03	Fault word 1 - BIT00 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3240
H10-04	Fault word 1 - BIT01 error code	0 - 65535	-	0	Yes	3241
H10-05	Fault word 1 - BIT01 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3242

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
H10-06	Fault word 1 - BIT02 error code	0 - 65535	-	0	Yes	3243
H10-07	Fault word 1 - BIT02 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3244
H10-08	Fault word 1 - BIT03 error code	0 - 65535	-	0	Yes	3245
H10-09	Fault word 1 - BIT03 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3246
H10-10	Fault word 1 - BIT04 error code	0 - 65535	-	0	Yes	3247
H10-11	Fault word 1 - BIT04 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3248
H10-12	Fault word 1 - BIT05 error code	0 - 65535	-	0	Yes	3249

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
H10-13	Fault word 1 - BIT05 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3250
H10-14	Fault word 1 - BIT06 error code	0 - 65535	-	0	Yes	3251
H10-15	Fault word 1 - BIT06 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3252
H10-16	Fault word 1 - BIT07 error code	0 - 65535	-	0	Yes	3253
H10-17	Fault word 1 - BIT07 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3254
H10-18	Fault word 1 - BIT08 error code	0 - 65535	-	0	Yes	3255

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
H10-19	Fault word 1 - BIT08 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3256
H10-20	Fault word 1 - BIT09 error code	0 - 65535	-	0	Yes	3257
H10-21	Fault word 1 - BIT09 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3258
H10-22	Fault word 1 - BIT10 error code	0 - 65535	-	0	Yes	3259
H10-23	Fault word 1 - BIT10 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3260
H10-24	Fault word 1 - BIT11 error code	0 - 65535	-	0	Yes	3261

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
H10-25	Fault word 1 - BIT11 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3262
H10-26	Fault word 1 - BIT12 error code	0 - 65535	-	0	Yes	3263
H10-27	Fault word 1 - BIT12 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3264
H10-28	Fault word 1 - BIT13 error code	0 - 65535	-	0	Yes	3265
H10-29	Fault word 1 - BIT13 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3266
H10-30	Fault word 1 - BIT14 error code	0 - 65535	-	0	Yes	3267

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
H10-31	Fault word 1 - BIT14 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3268
H10-32	Fault word 1 - BIT15 error code	0 - 65535	-	0	Yes	3269
H10-33	Fault word 1 - BIT15 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3270
H10-34	Fault word 2 - BIT00 error code	0 - 65535	-	0	Yes	3271
H10-35	Fault word 2 - BIT00 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3272
H10-36	Fault word 2 - BIT01 error code	0 - 65535	-	0	Yes	3273

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
H10-37	Fault word 2 - BIT01 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3274
H10-38	Fault word 2 - BIT02 error code	0 - 65535	-	0	Yes	3275
H10-39	Fault word 2 - BIT02 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3276
H10-40	Fault word 2 - BIT03 error code	0 - 65535	-	0	Yes	3277
H10-41	Fault word 2 - BIT03 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3278
H10-42	Fault word 2 - BIT04 error code	0 - 65535	-	0	Yes	3279

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
H10-43	Fault word 2 - BIT04 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3280
H10-44	Fault word 2 - BIT05 error code	0 - 65535	-	0	Yes	3281
H10-45	Fault word 2 - BIT05 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3282
H10-46	Fault word 2 - BIT06 error code	0 - 65535	-	0	Yes	3283
H10-47	Fault word 2 - BIT06 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3284
H10-48	Fault word 2 - BIT07 error code	0 - 65535	-	0	Yes	3285

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
H10-49	Fault word 2 - BIT07 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3286
H10-50	Fault word 2 - BIT08 error code	0 - 65535	-	0	Yes	3287
H10-51	Fault word 2 - BIT08 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3288
H10-52	Fault word 2 - BIT09 error code	0 - 65535	-	0	Yes	3289
H10-53	Fault word 2 - BIT09 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3290
H10-54	Fault word 2 - BIT10 error code	0 - 65535	-	0	Yes	3291

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
H10-55	Fault word 2 - BIT10 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3292
H10-56	Fault word 2 - BIT11 error code	0 - 65535	-	0	Yes	3293
H10-57	Fault word 2 - BIT11 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3294
H10-58	Fault word 2 - BIT12 error code	0 - 65535	-	0	Yes	3295
H10-59	Fault word 2 - BIT12 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3296
H10-60	Fault word 2 - BIT13 error code	0 - 65535	-	0	Yes	3297

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
H10-61	Fault word 2 - BIT13 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3298
H10-62	Fault word 2 - BIT14 error code	0 - 65535	-	0	Yes	3299
H10-63	Fault word 2 - BIT14 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3300
H10-64	Fault word 2 - BIT15 error code	0 - 65535	-	0	Yes	3301
H10-65	Fault word 2 - BIT15 error subcode	0:All error subcodes 1:Error subcode 1 2:Error subcode 2 3:Error subcode 3 4:Error subcode 4 5:Error subcode 5 6:Error subcode 6 7:Error subcode 7 8:Error subcode 8 9:Error subcode 9 10:Error subcode 10 11:Error subcode 11 12:Error subcode 12 13:Error subcode 13 14:Error subcode 14 15:Error subcode 15 16:Error subcode 16	-	0	Yes	3302

Group L Application Function

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
Group L0: word-to-bit conversion function						
L0-00	[W2B 1] Input	0: invalid Other: K connector	-	0	Yes	2047
L0-01	[W2B 2] Input	0: invalid Other: K connector	-	0	Yes	2048
L0-02	[W2B 3] Input	0: invalid Other: K connector	-	0	Yes	2049
L0-03	[W2B 4] Input	0: invalid Other: K connector	-	0	Yes	3339
L0-10	[B2W 1] Bit00 selection	0: Invalid Other: B connector	-	0	Yes	2050
L0-11	[B2W 1] Bit01 selection	0: Invalid Other: B connector	-	0	Yes	2051
L0-12	[B2W 1] Bit02 selection	0: Invalid Other: B connector	-	0	Yes	2052
L0-13	[B2W 1] Bit03 selection	0: Invalid Other: B connector	-	0	Yes	2053
L0-14	[B2W 1] Bit04 selection	0: Invalid Other: B connector	-	0	Yes	2054
L0-15	[B2W 1] Bit05 selection	0: Invalid Other: B connector	-	0	Yes	2055
L0-16	[B2W 1] Bit06 selection	0: Invalid Other: B connector	-	0	Yes	2056
L0-17	[B2W 1] Bit07 selection	0: Invalid Other: B connector	-	0	Yes	2057
L0-18	[B2W 1] Bit08 selection	0: Invalid Other: B connector	-	0	Yes	2058
L0-19	[B2W 1] Bit09 selection	0: Invalid Other: B connector	-	0	Yes	2059
L0-20	[B2W 1] Bit10 selection	0: Invalid Other: B connector	-	0	Yes	2060
L0-21	[B2W 1] Bit11 selection	0: Invalid Other: B connector	-	0	Yes	2061
L0-22	[B2W 1] Bit12 selection	0: Invalid Other: B connector	-	0	Yes	2062
L0-23	[B2W 1] Bit13 selection	0: Invalid Other: B connector	-	0	Yes	2063
L0-24	[B2W 1] Bit14 selection	0: Invalid Other: B connector	-	0	Yes	2064
L0-25	[B2W 1] Bit15 selection	0: Invalid Other: B connector	-	0	Yes	2065
L0-26	[B2W 2] Bit00 selection	0: Invalid Other: B connector	-	0	Yes	2066
L0-27	[B2W 2] Bit01 selection	0: Invalid Other: B connector	-	0	Yes	2067
L0-28	[B2W 2] Bit02 selection	0: Invalid Other: B connector	-	0	Yes	2068
L0-29	[B2W 2] Bit03 selection	0: Invalid Other: B connector	-	0	Yes	2069
L0-30	[B2W 2] Bit04 selection	0: Invalid Other: B connector	-	0	Yes	2070
L0-31	[B2W 2] Bit05 selection	0: Invalid Other: B connector	-	0	Yes	2071
L0-32	[B2W 2] Bit06 selection	0: Invalid Other: B connector	-	0	Yes	2072

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
L0-33	[B2W 2] Bit07 selection	0: Invalid Other: B connector	-	0	Yes	2073
L0-34	[B2W 2] Bit08 selection	0: Invalid Other: B connector	-	0	Yes	2074
L0-35	[B2W 2] Bit09 selection	0: Invalid Other: B connector	-	0	Yes	2075
L0-36	[B2W 2] Bit10 selection	0: Invalid Other: B connector	-	0	Yes	2076
L0-37	[B2W 2] Bit11 selection	0: Invalid Other: B connector	-	0	Yes	2077
L0-38	[B2W 2] Bit12 selection	0: Invalid Other: B connector	-	0	Yes	2078
L0-39	[B2W 2] Bit13 selection	0: Invalid Other: B connector	-	0	Yes	2079
L0-40	[B2W 2] Bit14 selection	0: Invalid Other: B connector	-	0	Yes	2080
L0-41	[B2W 2] Bit15 selection	0: Invalid Other: B connector	-	0	Yes	2081
L0-42	[B2W 3] Bit00 selection	0: Invalid Other: B connector	-	0	Yes	2082
L0-43	[B2W 3] Bit01 selection	0: Invalid Other: B connector	-	0	Yes	2083
L0-44	[B2W 3] Bit02 selection	0: Invalid Other: B connector	-	0	Yes	2084
L0-45	[B2W 3] Bit03 selection	0: Invalid Other: B connector	-	0	Yes	2085
L0-46	[B2W 3] Bit04 selection	0: Invalid Other: B connector	-	0	Yes	2086
L0-47	[B2W 3] Bit05 selection	0: Invalid Other: B connector	-	0	Yes	2087
L0-48	[B2W 3] Bit06 selection	0: Invalid Other: B connector	-	0	Yes	2088
L0-49	[B2W 3] Bit07 selection	0: Invalid Other: B connector	-	0	Yes	2089
L0-50	[B2W 3] Bit08 selection	0: Invalid Other: B connector	-	0	Yes	2090
L0-51	[B2W 3] Bit09 selection	0: Invalid Other: B connector	-	0	Yes	2091
L0-52	[B2W 3] Bit10 selection	0: Invalid Other: B connector	-	0	Yes	2092

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
L0-53	[B2W 3] Bit11 selection	0: Invalid Other: B connector	-	0	Yes	2093
L0-54	[B2W 3] Bit12 selection	0: Invalid Other: B connector	-	0	Yes	2094
L0-55	[B2W 3] Bit13 selection	0: Invalid Other: B connector	-	0	Yes	2095
L0-56	[B2W 3] Bit14 selection	0: Invalid Other: B connector	-	0	Yes	2096
L0-57	[B2W 3] Bit15 selection	0: Invalid Other: B connector	-	0	Yes	2097
L0-58	[B2W 4] Bit00 selection	0: Invalid Other: B connector	-	0	Yes	2098
L0-59	[B2W 4] Bit01 selection	0: Invalid Other: B connector	-	0	Yes	2099
L0-60	[B2W 4] Bit02 selection	0: Invalid Other: B connector	-	0	Yes	2100
L0-61	[B2W 4] Bit03 selection	0: Invalid Other: B connector	-	0	Yes	2101
L0-62	[B2W 4] Bit04 selection	0: Invalid Other: B connector	-	0	Yes	2102
L0-63	[B2W 4] Bit05 selection	0: Invalid Other: B connector	-	0	Yes	2103
L0-64	[B2W 4] Bit06 selection	0: Invalid Other: B connector	-	0	Yes	2104
L0-65	[B2W 4] Bit07 selection	0: Invalid Other: B connector	-	0	Yes	2105
L0-66	[B2W 4] Bit08 selection	0: Invalid Other: B connector	-	0	Yes	2106
L0-67	[B2W 4] Bit09 selection	0: Invalid Other: B connector	-	0	Yes	2107
L0-68	[B2W 4] Bit10 selection	0: Invalid Other: B connector	-	0	Yes	2108
L0-69	[B2W 4] Bit11 selection	0: Invalid Other: B connector	-	0	Yes	2109
L0-70	[B2W 4] Bit12 selection	0: Invalid Other: B connector	-	0	Yes	2110
L0-71	[B2W 4] Bit13 selection	0: Invalid Other: B connector	-	0	Yes	2111
L0-72	[B2W 4] Bit14 selection	0: Invalid Other: B connector	-	0	Yes	2112
L0-73	[B2W 4] Bit15 selection	0: Invalid Other: B connector	-	0	Yes	2113
Group L1: brake control						
L1-00	Brake function selection	0:No brake 1:Brake without meas. information 2:Brake with meas. information	-	0	Change at stop	2135
L1-01	Brake opening time	0.00 - 10.00	s	0.2	Yes	2136
L1-02	Brake closing time	0.00 - 60.00	s	0.2	Yes	2137
L1-04	Starting torque source in vector control	0:0 1:Auto torque memory 2:L1-05Numeric setpoint Other: K connector	-	0	Change at stop	2523
L1-05	Starting value numeric setpoint	-200.0 - 200.0	%	0	Change at stop	2524
L1-06	Auto torque memory gain coef.	50.0 - 150.0	%	100	Change at stop	2525

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
L1-07	Activate ramp-up time setpoint	0.00 - 10.00	s	0	Yes	2526
L1-08	Brake opening command source	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	1	Change at stop	2138
L1-09	Brake opening comparison value source	0: 0 Other: K connector	-	0	Change at stop	2140
L1-10	Brake opening comparison threshold	0.0 - 200.0	%	0	Change at stop	2141
L1-11	Brake opening delay	0.00 - 10.00	s	0	Yes	2142
L1-12	Speed threshold on brake closing	1.0 - 200.0	%	3	Change at stop	2144
L1-13	Brake closing delay	0.00 - 10.00	s	0.02	Yes	2145
L1-14	Forced brake closing command source	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Change at stop	2146
L1-15	Brake opening feedback point source	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Change at stop	2147
Group L2: logic operation function						
L2-00	[AND A] Input 1	1: Invalid Other: B connector	-	1	Yes	2301
L2-01	[AND A] Input 2	1: Invalid Other: B connector	-	1	Yes	2302
L2-02	[AND A] Input 3	1: Invalid Other: B connector	-	1	Yes	2303
L2-03	[AND A] Input 4	1: Invalid Other: B connector	-	1	Yes	2304
L2-04	[AND B] Input 1	1: Invalid Other: B connector	-	1	Yes	2305
L2-05	[AND B] Input 2	1: Invalid Other: B connector	-	1	Yes	2306
L2-06	[AND B] Input 3	1: Invalid Other: B connector	-	1	Yes	2307

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
L2-07	[AND B] Input 4	1: Invalid Other: B connector	-	1	Yes	2308
L2-08	[AND C] Input 1	1: Invalid Other: B connector	-	1	Yes	2309
L2-09	[AND C] Input 2	1: Invalid Other: B connector	-	1	Yes	2310
L2-10	[AND C] Input 3	1: Invalid Other: B connector	-	1	Yes	2311
L2-11	[AND C] Input 4	1: Invalid Other: B connector	-	1	Yes	2312
L2-12	[AND D] Input 1	1: Invalid Other: B connector	-	1	Yes	2313
L2-13	[AND D] Input 2	1: Invalid Other: B connector	-	1	Yes	2314
L2-14	[AND D] Input 3	1: Invalid Other: B connector	-	1	Yes	2315
L2-15	[AND D] Input 4	1: Invalid Other: B connector	-	1	Yes	2316
L2-16	[NOT A] Input	0: Invalid Other: B connector	-	0	Yes	2317
L2-17	[NOT B] Input	0: Invalid Other: B connector	-	0	Yes	2318
L2-18	[NOT C] Input	0: Invalid Other: B connector	-	0	Yes	2319
L2-19	[NOT D] Input	0: Invalid Other: B connector	-	0	Yes	2320
L2-20	[NOT E] Input	0: Invalid Other: B connector	-	0	Yes	2321
L2-21	[NOT F] Input	0: Invalid Other: B connector	-	0	Yes	2322
L2-22	[NOT G] Input	0: Invalid Other: B connector	-	0	Yes	2323
L2-23	[NOT H] Input	0: Invalid Other: B connector	-	0	Yes	2324
L2-24	[OR A] Input 1	0: Invalid Other: B connector	-	0	Yes	2325
L2-25	[OR A] Input 2	0: Invalid Other: B connector	-	0	Yes	2326
L2-26	[OR A] Input 3	0: Invalid Other: B connector	-	0	Yes	2327
L2-27	[OR A] Input 4	0: Invalid Other: B connector	-	0	Yes	2328
L2-28	[OR B] Input 1	0: Invalid Other: B connector	-	0	Yes	2329
L2-29	[OR B] Input 2	0: Invalid Other: B connector	-	0	Yes	2330
L2-30	[OR B] Input 3	0: Invalid Other: B connector	-	0	Yes	2331
L2-31	[OR B] Input 4	0: Invalid Other: B connector	-	0	Yes	2332
L2-32	[OR C] Input 1	0: Invalid Other: B connector	-	0	Yes	2333
L2-33	[OR C] Input 2	0: Invalid Other: B connector	-	0	Yes	2334
L2-34	[OR C] Input 3	0: Invalid Other: B connector	-	0	Yes	2335
L2-35	[OR C] Input 4	0: Invalid Other: B connector	-	0	Yes	2336

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
L2-36	[OR D] Input 1	0: Invalid Other: B connector	-	0	Yes	2337
L2-37	[OR D] Input 2	0: Invalid Other: B connector	-	0	Yes	2338
L2-38	[OR D] Input 3	0: Invalid Other: B connector	-	0	Yes	2339
L2-39	[OR D] Input 4	0: Invalid Other: B connector	-	0	Yes	2340
L2-40	[XOR/XNOR A] Function selection	0:XOR 1:XNOR	-	0	Yes	2591
L2-41	[XOR/XNOR A] Input 1	0: Invalid Other: B connector	-	0	Yes	2595
L2-42	[XOR/XNOR A] Input 2	0: Invalid Other: B connector	-	0	Yes	2596
L2-43	[XOR/XNOR B] Function selection	0:XOR 1:XNOR	-	0	Yes	2592
L2-44	[XOR/XNOR B] Input 1	0: Invalid Other: B connector	-	0	Yes	2597
L2-45	[XOR/XNOR B] Input 2	0: Invalid Other: B connector	-	0	Yes	2598
L2-46	[XOR/XNOR C] Function selection	0:XOR 1:XNOR	-	0	Yes	2593
L2-47	[XOR/XNOR C] Input 1	0: Invalid Other: B connector	-	0	Yes	2599
L2-48	[XOR/XNOR C] Input 2	0: Invalid Other: B connector	-	0	Yes	2600
L2-49	[XOR/XNOR D] Function selection	0:XOR 1:XNOR	-	0	Yes	2594
L2-50	[XOR/XNOR D] Input 1	0: Invalid Other: B connector	-	0	Yes	2601
L2-51	[XOR/XNOR D] Input 2	0: Invalid Other: B connector	-	0	Yes	2602
L2-60	[AND-OR A] Function selection	0:Disable 1:AND 2:OR	-	0	Yes	3347
L2-61	[AND-OR A] Input 1	0:Logic 0 Other: B connector	-	0	Yes	3355
L2-62	[AND-OR A] Input 2	0:Logic 0 Other: B connector	-	0	Yes	3363
L2-63	[AND-OR A] Input 3	0:Logic 0 Other: B connector	-	0	Yes	3371
L2-64	[AND-OR B] Function selection	0:Disable 1:AND 2:OR	-	0	Yes	3348
L2-65	[AND-OR B] Input 1	0:Logic 0 Other: B connector	-	0	Yes	3356
L2-66	[AND-OR B] Input 2	0:Logic 0 Other: B connector	-	0	Yes	3364
L2-67	[AND-OR B] Input 3	0:Logic 0 Other: B connector	-	0	Yes	3372
L2-68	[AND-OR C] Function selection	0:Disable 1:AND 2:OR	-	0	Yes	3349
L2-69	[AND-OR C] Input 1	0:Logic 0 Other: B connector	-	0	Yes	3357
L2-70	[AND-OR C] Input 2	0:Logic 0 Other: B connector	-	0	Yes	3365

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
L2-71	[AND-OR C] Input 3	0:Logic 0 Other: B connector	-	0	Yes	3373
L2-72	[AND-OR D] Function selection	0:Disable 1:AND 2:OR	-	0	Yes	3350
L2-73	[AND-OR D] Input 1	0:Logic 0 Other: B connector	-	0	Yes	3358
L2-74	[AND-OR D] Input 2	0:Logic 0 Other: B connector	-	0	Yes	3366
L2-75	[AND-OR D] Input 3	0:Logic 0 Other: B connector	-	0	Yes	3374
L2-76	[AND-OR E] Function selection	0:Disable 1:AND 2:OR	-	0	Yes	3351
L2-77	[AND-OR E] Input 1	0:Logic 0 Other: B connector	-	0	Yes	3359
L2-78	[AND-OR E] Input 2	0:Logic 0 Other: B connector	-	0	Yes	3367
L2-79	[AND-OR E] Input 3	0:Logic 0 Other: B connector	-	0	Yes	3375
L2-80	[AND-OR F] Function selection	0:Disable 1:AND 2:OR	-	0	Yes	3352
L2-81	[AND-OR F] Input 1	0:Logic 0 Other: B connector	-	0	Yes	3360
L2-82	[AND-OR F] Input 2	0:Logic 0 Other: B connector	-	0	Yes	3368
L2-83	[AND-OR F] Input 3	0:Logic 0 Other: B connector	-	0	Yes	3376
L2-84	[AND-OR G] Function selection	0:Disable 1:AND 2:OR	-	0	Yes	3353
L2-85	[AND-OR G] Input 1	0:Logic 0 Other: B connector	-	0	Yes	3361
L2-86	[AND-OR G] Input 2	0:Logic 0 Other: B connector	-	0	Yes	3369
L2-87	[AND-OR G] Input 3	0:Logic 0 Other: B connector	-	0	Yes	3377
L2-88	[AND-OR H] Function selection	0:Disable 1:AND 2:OR	-	0	Yes	3354
L2-89	[AND-OR H] Input 1	0:Logic 0 Other: B connector	-	0	Yes	3362
L2-90	[AND-OR H] Input 2	0:Logic 0 Other: B connector	-	0	Yes	3370
L2-91	[AND-OR H] Input 3	0:Logic 0 Other: B connector	-	0	Yes	3378

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
Group L3: double word-to-word conversion function						
L3-00	[W2DW] Base value coefficient	Bit00:W2DW 1 0: ×65536 1: ×1 Bit01:W2DW 2 0: ×65536 1: ×1 Bit02:W2DW 3 0: ×65536 1: ×1 Bit03:W2DW 4 0: ×65536 1: ×1 Bit04:W2DW 5 0: ×65536 1: ×1	-	0	Yes	4224
L3-01	[W2DW 1] HIWORD	0: invalid Other: K connector	-	0	Yes	2352
L3-02	[W2DW 1] LOWORD	0: invalid Other: K connector	-	0	Yes	2353
L3-03	[W2DW 1] Base value	0 - 65535	-	0	Yes	2354
L3-04	[W2DW 2] HIWORD	0: invalid Other: K connector	-	0	Yes	2355
L3-05	[W2DW 2] LOWORD	0: invalid Other: K connector	-	0	Yes	2356
L3-06	[W2DW 2] Base value	0 - 65535	-	0	Yes	2357
L3-07	[W2DW 3] HIWORD	0: invalid Other: K connector	-	0	Yes	2358
L3-08	[W2DW 3] LOWORD	0: invalid Other: K connector	-	0	Yes	2359
L3-09	[W2DW 3] Base value	0 - 65535	-	0	Yes	2360
L3-10	[W2DW 4] HIWORD	0: invalid Other: K connector	-	0	Yes	4229
L3-11	[W2DW 4] LOWORD	0: invalid Other: K connector	-	0	Yes	4230
L3-12	[W2DW 4] Base value	0 - 65535	-	0	Yes	4231
L3-13	[W2DW 5] HIWORD	0: invalid Other: K connector	-	0	Yes	4232
L3-14	[W2DW 5] LOWORD	0: invalid Other: K connector	-	0	Yes	4233
L3-15	[W2DW 5] Base value	0 - 65535	-	0	Yes	4234

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
L3-25	[DW2W] Base value coefficient	Bit00:DW2W 1 0: ×65536 1: ×1 Bit01:DW2W 2 0: ×65536 1: ×1 Bit02:DW2W 3 0: ×65536 1: ×1 Bit03:DW2W 4 0: ×65536 1: ×1 Bit04:DW2W 5 0: ×65536 1: ×1	-	0	Yes	4225
L3-26	[DW2W 1] Selection	0: invalid Other: K connector	-	0	Yes	2361
L3-27	[DW2W 1] Base value	0 - 65535	-	0	Yes	2362
L3-28	[DW2W 2] Selection	0: invalid Other: K connector	-	0	Yes	2363
L3-29	[DW2W 2] Base value	0 - 65535	-	0	Yes	2364
L3-30	[DW2W 3] Selection	0: invalid Other: K connector	-	0	Yes	2365
L3-31	[DW2W 3] Base value	0 - 65535	-	0	Yes	2366
L3-32	[DW2W 4] Selection	0: invalid Other: K connector	-	0	Yes	4235
L3-33	[DW2W 4] Base value	0 - 65535	-	0	Yes	4236
L3-34	[DW2W 5] Selection	0: invalid Other: K connector	-	0	Yes	4237
L3-35	[DW2W 5] Base value	0 - 65535	-	0	Yes	4238
Group L4: PID						
L4-00	PID activation signal	0:Ineffective 1:Effective 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	2367
L4-01	PID calc enable signal	0:Disable 1:Enable Other: B connector	-	0	Yes	2368
L4-02	PID deviation sign select	0:Positive 1:Negative	-	0	Yes	2369
L4-03	PID calculation cycle coef.	1: 1 x 2 ms 2: 2 x 2 ms 3: 3 x 2 ms 4: 4 x 2 ms 5: 5 x 2 ms 6: 6 x 2 ms 7: 7 x 2 ms 8: 8 x 2 ms 9: 9 x 2 ms 10: 10 x 2 ms	-	1	Yes	2392

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
L4-04	PID setpoint source	0:L4.05 1:Fixed setpoint 1 2:AI1 3:AI2 4:HDI1 5:HDI2 6:Fixed setpoint 7:MOP 8:Reserved 9:[FBA-A] PZD2 10:[FBA-B] PZD2 Other: K connector	-	0	Yes	2370
L4-05	PID setpoint	-600.0 - 600.0	%	0	Yes	2371
L4-06	PID setpoint freeze	0:0 1:1 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	2372
L4-07	PID filter time setpoint	0.00 - 60.00	s	0	Yes	2373
L4-08	PID feedback source	0:0 1:Fixed setpoint 1 2:AI1 3:AI2 4:HDI1 5:HDI2 6:Fixed setpoint 7:MOP 8:Reserved 9:[FBA-A] PZD2 10:[FBA-B] PZD2 Other: K connector	-	0	Yes	2374
L4-09	PID feedback filter time	0.00 - 60.00	s	0	Yes	2375
L4-10	PID deviation suppl. setpoint	0:0 1:Fixed setpoint 1 2:AI1 3:AI2 4:HDI1 5:HDI2 6:Fixed setpoint 7:MOP 8:Reserved 9:[FBA-A] PZD2 10:[FBA-B] PZD2 Other: K connector	-	0	Yes	2376
L4-11	PROP gain KP	0.00 - 125.00	-	1	Yes	2377
L4-12	PROP gain coef.	0:100% 1:Fixed setpoint 1 2:AI1 3:AI2 4:HDI1 5:HDI2 6:Fixed setpoint 7:MOP 8:Reserved 9:[FBA-A] PZD2 10:[FBA-B] PZD2 Other: K connector	-	0	Yes	2378

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
L4-13	Ti	0.01 - 100.00	s	2	Yes	2379
L4-14	Ti coef.	0:100% 1:Fixed setpoint 1 2:AI1 3:AI2 4:HDI1 5:HDI2 6:Fixed setpoint 7:MOP 8:Reserved 9:[FBA-A] PZD2 10:[FBA-B] PZD2 Other: K connector	-	0	Yes	2380
L4-15	Integral time Td1	0 - 10	s	0	Yes	2381
L4-16	Differential time coef.	0 - 0	-	0	Yes	2382
L4-17	PID output initial integral value	0:0 1:Fixed setpoint 1 2:AI1 3:AI2 4:HDI1 5:HDI2 6:Fixed setpoint 7:MOP 8:Reserved 9:[FBA-A] PZD2 10:[FBA-B] PZD2 Other: K connector	-	0	Yes	2427
L4-18	PID output suppl. setpoint	0:0 1:Fixed setpoint 1 2:AI1 3:AI2 4:HDI1 5:HDI2 6:Fixed setpoint 7:MOP 8:Reserved 9:[FBA-A] PZD2 10:[FBA-B] PZD2 Other: K connector	-	0	Yes	2383
L4-19	PID I component forced	0:0 1:1 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	2384
L4-20	PID integral component force value	0:0 1:Fixed setpoint 1 2:AI1 3:AI2 4:HDI1 5:HDI2 6:Fixed setpoint 7:MOP 8:Reserved 9:[FBA-A] PZD2 10:[FBA-B] PZD2 Other: K connector	-	0	Yes	2385
L4-21	PID output limit	0.0 - 600.0	%	100	Yes	2386

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
L4-22	PID output upper limit source	0:100% 1:Fixed setpoint 1 2:AI1 3:AI2 4:HDI1 5:HDI2 6:Fixed setpoint 7:MOP 8:Reserved 9:[FBA-A] PZD2 10:[FBA-B] PZD2 Other: K connector	-	0	Yes	2387
L4-23	PID output lower limit source	0:0 1:Fixed setpoint 1 2:AI1 3:AI2 4:HDI1 5:HDI2 6:Fixed setpoint 7:MOP 8:Reserved 9:[FBA-A] PZD2 10:[FBA-B] PZD2 Other: K connector	-	0	Yes	2388
L4-24	PID output limit increase/decrease time	0.00 - 100.00	s	0	Yes	2389
L4-25	PID deviation dead-band enable	0:Disable 1:Enable	-	0	Yes	2390
L4-26	PID deviation dead zone range	0.0 - 600.0	%	0	Yes	2391
L4-27	PID feedback loss threshold	0.0 - 100.0	%	0	Yes	2393
L4-28	PID feedback loss meas. time	0.00 - 60.00	s	0	Yes	2394
Group L5: switch function block						
L5-00	[BSW module A] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	2603
L5-01	[BSW module A] Input 1	0: Invalid Other: B connector	-	0	Yes	2605
L5-02	[BSW module A] Input 2	0: Invalid Other: B connector	-	0	Yes	2606
L5-03	[BSW module B] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	2604
L5-04	[BSW module B] Input 1	0: Invalid Other: B connector	-	0	Yes	2607
L5-05	[BSW module B] Input 2	0: Invalid Other: B connector	-	0	Yes	2608
L5-06	[BSW module C] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	3381
L5-07	[BSW module C] Input 1	0: Invalid Other: B connector	-	0	Yes	3385
L5-08	[BSW module C] Input 2	0: Invalid Other: B connector	-	0	Yes	3389
L5-09	[BSW module D] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	3382
L5-10	[BSW module D] Input 1	0: Invalid Other: B connector	-	0	Yes	3386
L5-11	[BSW module D] Input 2	0: Invalid Other: B connector	-	0	Yes	3390

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
L5-12	[BSW module E] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	3383
L5-13	[BSW module E] Input 1	0: Invalid Other: B connector	-	0	Yes	3387
L5-14	[BSW module E] Input 2	0: Invalid Other: B connector	-	0	Yes	3391
L5-20	[NSW module A] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	2609
L5-21	[NSW module A] Input 1	0: invalid Other: K connector	-	0	Yes	2611
L5-22	[NSW module A] Input 2	0: invalid Other: K connector	-	0	Yes	2612
L5-23	[NSW module B] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	2610
L5-24	[NSW module B] Input 1	0: invalid Other: K connector	-	0	Yes	2613
L5-25	[NSW module B] Input 2	0: invalid Other: K connector	-	0	Yes	2614
L5-26	[NSW module C] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	3393
L5-27	[NSW module C] Input 1	0: invalid Other: K connector	-	0	Yes	3397
L5-28	[NSW module C] Input 2	0: invalid Other: K connector	-	0	Yes	3401
L5-29	[NSW module D] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	3394
L5-30	[NSW module D] Input 1	0: invalid Other: K connector	-	0	Yes	3398
L5-31	[NSW module D] Input 2	0: invalid Other: K connector	-	0	Yes	3402
L5-32	[NSW module E] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	3395
L5-33	[NSW module E] Input 1	0: invalid Other: K connector	-	0	Yes	3399
L5-34	[NSW module E] Input 2	0: invalid Other: K connector	-	0	Yes	3403
Group L6: control function block						
L6-00	[FILT A] Function selection	0:Filtering 1:No filtering Other: B connector	-	1	Yes	2615
L6-01	[FILT A] Input	0:Input 0 Other: K connector	-	0	Yes	2619
L6-02	[FILT A] Filter time	0.000 - 10.000	s	0	Yes	2623
L6-03	[FILT B] Function selection	0:Filtering 1:No filtering Other: B connector	-	1	Yes	2616
L6-04	[FILT B] Input	0:Input 0 Other: K connector	-	0	Yes	2620
L6-05	[FILT B] Filter time	0.000 - 10.000	s	0	Yes	2624
L6-06	[FILT C] Function selection	0:Filtering 1:No filtering Other: B connector	-	1	Yes	2617

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
L6-07	[FILT C] Input	0:Input 0 Other: K connector	-	0	Yes	2621
L6-08	[FILT C] Filter time	0.000 - 10.000	s	0	Yes	2625
L6-09	[FILT D] Function selection	0:Filtering 1:No filtering Other: B connector	-	1	Yes	2618
L6-10	[FILT D] Input	0:Input 0 Other: K connector	-	0	Yes	2622
L6-11	[FILT D] Filter time	0.000 - 10.000	s	0	Yes	2626
L6-12	[P_L A] Function selection	0:Level to pulse 1:Pulse to level	-	0	Yes	2627
L6-13	[P_L A] Input	0: Invalid Other: B connector	-	0	Yes	2631
L6-14	[P_L A] Pulse output time	0.00 - 600.00	s	0.1	Yes	2635
L6-15	[P_L B] Function selection	0:Level to pulse 1:Pulse to level	-	0	Yes	2628
L6-16	[P_L B] Input	0: Invalid Other: B connector	-	0	Yes	2632
L6-17	[P_L B] Pulse output time	0.00 - 600.00	s	0.1	Yes	2636
L6-18	[P_L C] Function selection	0:Level to pulse 1:Pulse to level	-	0	Yes	2629
L6-19	[P_L C] Input	0: Invalid Other: B connector	-	0	Yes	2633
L6-20	[P_L C] Pulse output time	0.00 - 600.00	s	0.1	Yes	2637
L6-21	[P_L D] Function selection	0:Level to pulse 1:Pulse to level	-	0	Yes	2630
L6-22	[P_L D] Input	0: Invalid Other: B connector	-	0	Yes	2634
L6-23	[P_L D] Pulse output time	0.00 - 600.00	s	0.1	Yes	2638
L6-24	[DELAY A] Input	0: Invalid Other: B connector	-	0	Yes	2395
L6-25	[DELAY A] Function selection	0:Switch-on delay 1:Switch-off delay 2:Bi-directional delay	-	0	Yes	2399
L6-26	[DELAY A] Delay	0 - 65535	-	0	Yes	2403
L6-27	[DELAY A] Time unit	0:0.01s 1:0.1s 2:1s	-	0	Yes	3768
L6-28	[DELAY B] Input	0: Invalid Other: B connector	-	0	Yes	2396
L6-29	[DELAY B] Function selection	0:Switch-on delay 1:Switch-off delay 2:Bi-directional delay	-	0	Yes	2400
L6-30	[DELAY B] Delay	0 - 65535	-	0	Yes	2404
L6-31	[DELAY B] Time unit	0:0.01s 1:0.1s 2:1s	-	0	Yes	3769
L6-32	[DELAY C] Input	0: Invalid Other: B connector	-	0	Yes	2397
L6-33	[DELAY C] Function selection	0:Switch-on delay 1:Switch-off delay 2:Bi-directional delay	-	0	Yes	2401
L6-34	[DELAY C] Delay	0 - 65535	-	0	Yes	2405
L6-35	[DELAY C] Time unit	0:0.01s 1:0.1s 2:1s	-	0	Yes	3770

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
L6-36	[DELAY D] Input	0: Invalid Other: B connector	-	0	Yes	2398
L6-37	[DELAY D] Function selection	0:Switch-on delay 1:Switch-off delay 2:Bi-directional delay	-	0	Yes	2402
L6-38	[DELAY D] Delay	0 - 65535	-	0	Yes	2406
L6-39	[DELAY D] Time unit	0:0.01s 1:0.1s 2:1s	-	0	Yes	3771
Group L7: algorithm function block 1						
L7-00	[ABS A] Input	0: invalid Other: K connector	-	0	Yes	2639
L7-01	[ABS B] Input	0: invalid Other: K connector	-	0	Yes	2640
L7-02	[ABS C] Input	0: invalid Other: K connector	-	0	Yes	2641
L7-03	[ABS D] Input	0: invalid Other: K connector	-	0	Yes	2642
L7-04	ADD/SUBTRACT module A input 1(ADD)	0: invalid Other: K connector	-	0	Yes	2643
L7-05	ADD/SUBTRACT module A input 2(ADD)	0: invalid Other: K connector	-	0	Yes	2644
L7-06	ADD/SUBTRACT module A input 3(ADD)	0: invalid Other: K connector	-	0	Yes	2645
L7-07	ADD/SUBTRACT module A input 4(SUBTRACT)	0: invalid Other: K connector	-	0	Yes	2646
L7-08	ADD/SUBTRACT module B input 1(ADD)	0: invalid Other: K connector	-	0	Yes	2647
L7-09	ADD/SUBTRACT module B input 2(ADD)	0: invalid Other: K connector	-	0	Yes	2648
L7-10	ADD/SUBTRACT module B input 3(ADD)	0: invalid Other: K connector	-	0	Yes	2649
L7-11	ADD/SUBTRACT module B input 4(SUBTRACT)	0: invalid Other: K connector	-	0	Yes	2650
L7-12	ADD/SUBTRACT module C input 1(ADD)	0: invalid Other: K connector	-	0	Yes	2651
L7-13	ADD/SUBTRACT module C input 2(ADD)	0: invalid Other: K connector	-	0	Yes	2652
L7-14	ADD/SUBTRACT module C input 3(ADD)	0: invalid Other: K connector	-	0	Yes	2653
L7-15	ADD/SUBTRACT module C input 4(SUBTRACT)	0: invalid Other: K connector	-	0	Yes	2654
L7-16	[ADD_SUB D] Input 1 (ADD)	0: invalid Other: K connector	-	0	Yes	2655
L7-17	[ADD_SUB D] Input 2 (ADD)	0: invalid Other: K connector	-	0	Yes	2656
L7-18	[ADD_SUB D] Input 3 (ADD)	0: invalid Other: K connector	-	0	Yes	2657
L7-19	[ADD_SUB D] Input 4 (SUB-TRACT)	0: invalid Other: K connector	-	0	Yes	2658
L7-20	[MUL_DIV A] Input 1 (MULTI-PLY)	0:Prohibited by module Other: K connector	-	0	Yes	2659
L7-21	[MUL_DIV A] Input 2 (MULTI-PLY)	0:Do not use Other: K connector	-	0	Yes	2660
L7-22	[MUL_DIV A] Input 3 (DIVIDE)	0:Do not use Other: K connector	-	0	Yes	2661
L7-23	[MUL_DIV B] Input 1 (MULTI-PLY)	0:Prohibited by module Other: K connector	-	0	Yes	2662

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
L7-24	[MUL_DIV B] Input 2 (MULTIPLY)	0:Do not use Other: K connector	-	0	Yes	2663
L7-25	[MUL_DIV B] Input 3 (DIVIDE)	0:Do not use Other: K connector	-	0	Yes	2664
L7-26	[MUL_DIV C] Input 1 (MULTIPLY)	0:Prohibited by module Other: K connector	-	0	Yes	2665
L7-27	[MUL_DIV C] Input 2 (MULTIPLY)	0:Do not use Other: K connector	-	0	Yes	2666
L7-28	[MUL_DIV C] Input 3 (DIVIDE)	0:Do not use Other: K connector	-	0	Yes	2667
L7-29	[MUL_DIV D] Input 1 (MULTIPLY)	0:Prohibited by module Other: K connector	-	0	Yes	2668
L7-30	[MUL_DIV D] Input 2 (MULTIPLY)	0:Do not use Other: K connector	-	0	Yes	2669
L7-31	[MUL_DIV D] Input 3 (DIVIDE)	0:Do not use Other: K connector	-	0	Yes	2670
L7-32	[NCMP A] Function selection	0:Input 1> Input 2 1:Input 1< Input 2 2:Input 1 = Input 2	-	0	Yes	2671
L7-33	[NCMP A] Input 1	0: invalid Other: K connector	-	0	Yes	2673
L7-34	[NCMP A] Input 2	0: invalid Other: K connector	-	0	Yes	2674
L7-35	[NCMP A] Hysteresis input	0.0 - 100.0	%	0	Yes	2675
L7-36	[NCMP B] Function selection	0:Input 1> Input 2 1:Input 1< Input 2 2:Input 1 = Input 2	-	0	Yes	2672
L7-37	[NCMP B] Input 1	0: invalid Other: K connector	-	0	Yes	2676
L7-38	[NCMP B] Input 2	0: invalid Other: K connector	-	0	Yes	2677
L7-39	[NCMP B] Hysteresis input	0.0 - 100.0	%	0	Yes	2678
L7-40	[NCMP C] Function selection	0:Input 1> Input 2 1:Input 1< Input 2 2:Input 1 = Input 2	-	0	Yes	3417
L7-41	[NCMP C] Input 1	0: invalid Other: K connector	-	0	Yes	3421
L7-42	[NCMP C] Input 2	0: invalid Other: K connector	-	0	Yes	3425
L7-43	[NCMP C] Hysteresis input	0.0 - 100.0	%	0	Yes	3341
L7-44	[NCMP D] Function selection	0:Input 1> Input 2 1:Input 1< Input 2 2:Input 1 = Input 2	-	0	Yes	3418
L7-45	[NCMP D] Input 1	0: invalid Other: K connector	-	0	Yes	3422
L7-46	[NCMP D] Input 2	0: invalid Other: K connector	-	0	Yes	3426
L7-47	[NCMP D] Hysteresis input	0.0 - 100.0	%	0	Yes	3342
L7-48	[NCMP E] Function selection	0:Input 1> Input 2 1:Input 1< Input 2 2:Input 1 = Input 2	-	0	Yes	3419
L7-49	[NCMP E] Input 1	0: invalid Other: K connector	-	0	Yes	3423
L7-50	[NCMP E] Input 2	0: invalid Other: K connector	-	0	Yes	3427
L7-51	[NCMP E] Hysteresis input	0.0 - 100.0	%	0	Yes	3343
L7-60	[LIM A] Input	0: invalid Other: K connector	-	0	Yes	3405

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
L7-61	[LIM A] Upper limit	0:Disable Other: K connector	-	0	Yes	3409
L7-62	[LIM A] Lower limit	0:Disable Other: K connector	-	0	Yes	3413
L7-63	[LIM B] Input	0: invalid Other: K connector	-	0	Yes	3406
L7-64	[LIM B] Upper limit	0:Disable Other: K connector	-	0	Yes	3410
L7-65	[LIM B] Lower limit	0:Disable Other: K connector	-	0	Yes	3414
L7-66	[LIM C] Input	0: invalid Other: K connector	-	0	Yes	3407
L7-67	[LIM C] Upper limit	0:Disable Other: K connector	-	0	Yes	3411
L7-68	[LIM C] Lower limit	0:Disable Other: K connector	-	0	Yes	3415
L7-69	[LIM D] Input	0: invalid Other: K connector	-	0	Yes	3408
L7-70	[LIM D] Upper limit	0:Disable Other: K connector	-	0	Yes	3412
L7-71	[LIM D] Lower limit	0:Disable Other: K connector	-	0	Yes	3416
Group L8: multi-point curve module						
L8-00	[PLI10 A] Input	0:Module disabled Other: K connector	-	0	Yes	2770
L8-01	[PLI10 A] Setpoint X1	-600.0 - 600.0	%	0	Yes	2771
L8-02	[PLI10 A] Setpoint Y1	-600.0 - 600.0	%	0	Yes	2781
L8-03	[PLI10 A] Setpoint X2	-600.0 - 600.0	%	10	Yes	2772
L8-04	[PLI10 A] Setpoint Y2	-600.0 - 600.0	%	10	Yes	2782
L8-05	[PLI10 A] Setpoint X3	-600.0 - 600.0	%	20	Yes	2773
L8-06	[PLI10 A] Setpoint Y3	-600.0 - 600.0	%	20	Yes	2783
L8-07	[PLI10 A] Setpoint X4	-600.0 - 600.0	%	30	Yes	2774
L8-08	[PLI10 A] Setpoint Y4	-600.0 - 600.0	%	30	Yes	2784
L8-09	[PLI10 A] Setpoint X5	-600.0 - 600.0	%	40	Yes	2775
L8-10	[PLI10 A] Setpoint Y5	-600.0 - 600.0	%	40	Yes	2785
L8-11	[PLI10 A] Setpoint X6	-600.0 - 600.0	%	50	Yes	2776
L8-12	[PLI10 A] Setpoint Y6	-600.0 - 600.0	%	50	Yes	2786
L8-13	[PLI10 A] Setpoint X7	-600.0 - 600.0	%	60	Yes	2777
L8-14	[PLI10 A] Setpoint Y7	-600.0 - 600.0	%	60	Yes	2787
L8-15	[PLI10 A] Setpoint X8	-600.0 - 600.0	%	70	Yes	2778
L8-16	[PLI10 A] Setpoint Y8	-600.0 - 600.0	%	70	Yes	2788
L8-17	[PLI10 A] Setpoint X9	-600.0 - 600.0	%	80	Yes	2779
L8-18	[PLI10 A] Setpoint Y9	-600.0 - 600.0	%	80	Yes	2789
L8-19	[PLI10 A] Setpoint X10	-600.0 - 600.0	%	90	Yes	2780
L8-20	[PLI10 A] Setpoint Y10	-600.0 - 600.0	%	90	Yes	2790
L8-21	[PLI10 B] Input	0:Module disabled Other: K connector	-	0	Yes	2791
L8-22	[PLI10 B] Setpoint X1	-600.0 - 600.0	%	0	Yes	2792
L8-23	[PLI10 B] Setpoint Y1	-600.0 - 600.0	%	0	Yes	2802
L8-24	[PLI10 B] Setpoint X2	-600.0 - 600.0	%	10	Yes	2793
L8-25	[PLI10 B] Setpoint Y2	-600.0 - 600.0	%	10	Yes	2803
L8-26	[PLI10 B] Setpoint X3	-600.0 - 600.0	%	20	Yes	2794
L8-27	[PLI10 B] Setpoint Y3	-600.0 - 600.0	%	20	Yes	2804
L8-28	[PLI10 B] Setpoint X4	-600.0 - 600.0	%	30	Yes	2795

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
L8-29	[PLI10 B] Setpoint Y4	-600.0 - 600.0	%	30	Yes	2805
L8-30	[PLI10 B] Setpoint X5	-600.0 - 600.0	%	40	Yes	2796
L8-31	[PLI10 B] Setpoint Y5	-600.0 - 600.0	%	40	Yes	2806
L8-32	[PLI10 B] Setpoint X6	-600.0 - 600.0	%	50	Yes	2797
L8-33	[PLI10 B] Setpoint Y6	-600.0 - 600.0	%	50	Yes	2807
L8-34	[PLI10 B] Setpoint X7	-600.0 - 600.0	%	60	Yes	2798
L8-35	[PLI10 B] Setpoint Y7	-600.0 - 600.0	%	60	Yes	2808
L8-36	[PLI10 B] Setpoint X8	-600.0 - 600.0	%	70	Yes	2799
L8-37	[PLI10 B] Setpoint Y8	-600.0 - 600.0	%	70	Yes	2809
L8-38	[PLI10 B] Setpoint X9	-600.0 - 600.0	%	80	Yes	2800
L8-39	[PLI10 B] Setpoint Y9	-600.0 - 600.0	%	80	Yes	2810
L8-40	[PLI10 B] Setpoint X10	-600.0 - 600.0	%	90	Yes	2801
L8-41	[PLI10 B] Setpoint Y10	-600.0 - 600.0	%	90	Yes	2811
Group L9: constant setting module						
L9-00	FIX_WORD 1 (U7-47)	-600.0 - 600.0	%	0	Yes	3429
L9-01	FIX_WORD 2 (U7-48)	-600.0 - 600.0	%	0	Yes	3430
L9-02	FIX_WORD 3 (U7-49)	-600.0 - 600.0	%	0	Yes	3431
L9-03	FIX_WORD 4 (U7-50)	-600.0 - 600.0	%	0	Yes	3432
L9-04	FIX_WORD 5 (U7-51)	-600.0 - 600.0	%	0	Yes	3433
L9-05	FIX_WORD 6 (U9-51)	-300.00 - 300.00	%	0	Yes	3434
L9-06	FIX_WORD 7 (U9-52)	-300.00 - 300.00	%	0	Yes	3435
L9-07	FIX_WORD 8 (U9-53)	-300.00 - 300.00	%	0	Yes	3436
L9-08	FIX_WORD 9 (U9-54)	-300.00 - 300.00	%	0	Yes	3437
L9-09	FIX_WORD 10 (U9-55)	-300.00 - 300.00	%	0	Yes	3438
Group L10: parameter monitoring and modification						
L10-00	[Par Rd parameter] Address 1	0 - 65535	-	0	Yes	3067
L10-01	[Par Rd parameter] Address 2	0 - 65535	-	0	Yes	3068
L10-02	[Par Rd parameter] Address 3	0 - 65535	-	0	Yes	3069
L10-03	[Par Rd parameter] Address 4	0 - 65535	-	0	Yes	3070
L10-04	[Par Rd parameter] Address 5	0 - 65535	-	0	Yes	3071
L10-05	[Par Rd parameter] Address 6	0 - 65535	-	0	Yes	3072
L10-06	[Par Rd parameter] Address 7	0 - 65535	-	0	Yes	3073
L10-07	[Par Rd parameter] Address 8	0 - 65535	-	0	Yes	3074
L10-08	[Par Rd parameter] Address 9	0 - 65535	-	0	Yes	3075
L10-09	[Par Rd parameter] Address 10	0 - 65535	-	0	Yes	3076

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
L10-16	EEPROM selection for storing Par Wr modifications	Bit00:Par Wr modification 1 0: Do not save 1: Save Bit01:Par Wr modification 2 0: Do not save 1: Save Bit02:Par Wr modification 3 0: Do not save 1: Save Bit03:Par Wr modification 4 0: Do not save 1: Save Bit04:Par Wr modification 5 0: Do not save 1: Save Bit05:Par Wr modification 6 0: Do not save 1: Save Bit06:Par Wr modification 7 0: Do not save 1: Save Bit07:Par Wr modification 8 0: Do not save 1: Save Bit08:Par Wr modification 9 0: Do not save 1: Save Bit09:Par Wr modification 10 0: Do not save 1: Save Bit10:Par Wr modification 11 0: Do not save 1: Save Bit11:Par Wr modification 12 0: Do not save 1: Save Bit12:Par Wr modification 13 0: Do not save 1: Save Bit13:Par Wr modification 14 0: Do not save 1: Save Bit14:Par Wr modification 15 0: Do not save 1: Save Bit15:Par Wr modification 16 0: Do not save 1: Save	-	0	Yes	3776

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
L10-17	Modification range out of limit	Bit00:Par Wr modification 1 0: Modification invalid 1: Limit to upper or lower limit Bit01:Par Wr modification 2 0: Modification invalid 1: Limit to upper or lower limit Bit02:Par Wr modification 3 0: Modification invalid 1: Limit to upper or lower limit Bit03:Par Wr modification 4 0: Modification invalid 1: Limit to upper or lower limit Bit04:Par Wr modification 5 0: Modification invalid 1: Limit to upper or lower limit Bit05:Par Wr modification 6 0:Disable 1: Limit to upper or lower limit Bit06:Par Wr modification 7 0: Modification invalid 1: Limit to upper or lower limit Bit07:Par Wr modification 8 0: Modification invalid 1: Limit to upper or lower limit Bit08:Par Wr modification 9 0: Modification invalid 1: Limit to upper or lower limit Bit09:Par Wr modification 10 0: Modification invalid 1: Limit to upper or lower limit Bit10:Par Wr modification 11 0: Modification invalid 1: Limit to upper or lower limit Bit11:Par Wr modification 12 0: Modification invalid 1: Limit to upper or lower limit Bit12:Par Wr modification 13 0: Modification invalid 1: Limit to upper or lower limit Bit13:Par Wr modification 14 0: Modification invalid 1: Limit to upper or lower limit Bit14:Par Wr modification 15 0: Modification invalid 1: Limit to upper or lower limit Bit15:Par Wr modification 16 0: Modification invalid 1: Limit to upper or lower limit	-	0	Yes	3825
L10-18	[Par Wr Param] Address 1	0 - 65535	-	0	Yes	3777
L10-19	[Par Wr modification value] Source 1	0: invalid Other: K connector	-	0	Yes	3793
L10-20	[Par Wr Param] Address 2	0 - 65535	-	0	Yes	3778
L10-21	[Par Wr modification value] Source 2	0: invalid Other: K connector	-	0	Yes	3794
L10-22	[Par Wr Param] Address 3	0 - 65535	-	0	Yes	3779
L10-23	[Par Wr modification value] Source 3	0: invalid Other: K connector	-	0	Yes	3795
L10-24	[Par Wr Param] Address 4	0 - 65535	-	0	Yes	3780

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
L10-25	[Par Wr modification value] Source 4	0: invalid Other: K connector	-	0	Yes	3796
L10-26	[Par Wr Param] Address 5	0 - 65535	-	0	Yes	3781
L10-27	[Par Wr modification value] Source 5	0: invalid Other: K connector	-	0	Yes	3797
L10-28	[Par Wr Param] Address 6	0 - 65535	-	0	Yes	3782
L10-29	[Par Wr modification value] Source 6	0: invalid Other: K connector	-	0	Yes	3798
L10-30	[Par Wr Param] Address 7	0 - 65535	-	0	Yes	3783
L10-31	[Par Wr modification value] Source 7	0: invalid Other: K connector	-	0	Yes	3799
L10-32	[Par Wr Param] Address 8	0 - 65535	-	0	Yes	3784
L10-33	[Par Wr modification value] Source 8	0: invalid Other: K connector	-	0	Yes	3800
L10-34	[Par Wr Param] Address 9	0 - 65535	-	0	Yes	3785
L10-35	[Par Wr modification value] Source 9	0: invalid Other: K connector	-	0	Yes	3801
L10-36	[Par Wr Param] Address 10	0 - 65535	-	0	Yes	3786
L10-37	[Par Wr modification value] Source 10	0: invalid Other: K connector	-	0	Yes	3802
L10-38	[Par Wr Param] Address 11	0 - 65535	-	0	Yes	3787
L10-39	[Par Wr modification value] Source 11	0: invalid Other: K connector	-	0	Yes	3803
L10-40	[Par Wr Param] Address 12	0 - 65535	-	0	Yes	3788
L10-41	[Par Wr modification value] Source 12	0: invalid Other: K connector	-	0	Yes	3804
L10-42	[Par Wr Param] Address 13	0 - 65535	-	0	Yes	3789
L10-43	[Par Wr modification value] Source 13	0: invalid Other: K connector	-	0	Yes	3805
L10-44	[Par Wr Param] Address 14	0 - 65535	-	0	Yes	3790
L10-45	[Par Wr modification value] Source 14	0: invalid Other: K connector	-	0	Yes	3806
L10-46	[Par Wr Param] Address 15	0 - 65535	-	0	Yes	3791
L10-47	[Par Wr modification value] Source 15	0: invalid Other: K connector	-	0	Yes	3807
L10-48	[Par Wr Param] Address 16	0 - 65535	-	0	Yes	3792
L10-49	[Par Wr modification value] Source 16	0: invalid Other: K connector	-	0	Yes	3808

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
Group L11: algorithm function block 2						
L11-00	GAIN calculating method selection	Bit00:GAIN 1 0: Raw value 1: Per unit value Bit01:GAIN 2 0: Raw value 1: Per unit value Bit02:GAIN 3 0: Raw value 1: Per unit value Bit03:GAIN 4 0: Raw value 1: Per unit value Bit04:GAIN 5 0: Raw value 1: Per unit value Bit05:GAIN 6 0: Raw value 1: Per unit value Bit06:GAIN 7 0: Raw value 1: Per unit value Bit07:GAIN 8 0: Raw value 1: Per unit value Bit08:GAIN 9 0: Raw value 1: Per unit value Bit09:GAIN 10 0: Raw value 1: Per unit value Bit10:GAIN 11 0: Raw value 1: Per unit value Bit11:GAIN 12 0: Raw value 1: Per unit value Bit12:GAIN 13 0: Raw value 1: Per unit value Bit13:GAIN 14 0: Raw value 1: Per unit value Bit14:GAIN 15 0: Raw value 1: Per unit value Bit15:Reserved 0: Reserved 1: (Reserved)	-	0	Yes	3824

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
L11-01	Data type selection for value source (raw value)	Bit00:GAIN 1 0: Signed value 1: Unsigned value Bit01:GAIN 2 0: Signed value 1: Unsigned value Bit02:GAIN 3 0: Signed value 1: Unsigned value Bit03:GAIN 4 0: Signed value 1: Unsigned value Bit04:GAIN 5 0: Signed value 1: Unsigned value Bit05:GAIN 6 0: Signed value 1: Unsigned value Bit06:GAIN 7 0: Signed value 1: Unsigned value Bit07:GAIN 8 0: Signed value 1: Unsigned value Bit08:GAIN 9 0: Signed value 1: Unsigned value Bit09:GAIN 10 0: Signed value 1: Unsigned value Bit10:GAIN 11 0: Signed value 1: Unsigned value Bit11:GAIN 12 0: Signed value 1: Unsigned value Bit12:GAIN 13 0: Signed value 1: Unsigned value Bit13:GAIN 14 0: Signed value 1: Unsigned value Bit14:GAIN 15 0: Signed value 1: Unsigned value Bit15:Reserved 0: Reserved 1: (Reserved)	-	0	Yes	4228
L11-02	[GAIN 1] Value source input 1	0: invalid Other: K connector	-	0	Yes	3909
L11-03	[GAIN 1] Input 2 (multiply)	-32768 - 32767	-	1	Yes	3919
L11-04	[GAIN 1] Input 3 (divide)	1 - 65535	-	1	Yes	3929
L11-05	[GAIN 2] Value source input 1	0: invalid Other: K connector	-	0	Yes	3910
L11-06	[GAIN 2] Input 2 (multiply)	-32768 - 32767	-	1	Yes	3920
L11-07	[GAIN 2] Input 3 (divide)	1 - 65535	-	1	Yes	3930
L11-08	[GAIN 3] Value source input 1	0: invalid Other: K connector	-	0	Yes	3911
L11-09	[GAIN 3] Input 2 (multiply)	-32768 - 32767	-	1	Yes	3921
L11-10	[GAIN 3] Input 3 (divide)	1 - 65535	-	1	Yes	3931
L11-11	[GAIN 4] Value source input 1	0: invalid Other: K connector	-	0	Yes	3912
L11-12	[GAIN 4] Input 2 (multiply)	-32768 - 32767	-	1	Yes	3922

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
L11-13	[GAIN 4] Input 3 (divide)	1 - 65535	-	1	Yes	3932
L11-14	[GAIN 5] Value source input 1	0: invalid Other: K connector	-	0	Yes	3913
L11-15	[GAIN 5] Input 2 (multiply)	-32768 - 32767	-	1	Yes	3923
L11-16	[GAIN 5] Input 3 (divide)	1 - 65535	-	1	Yes	3933
L11-17	[GAIN 6] Value source input 1	0: invalid Other: K connector	-	0	Yes	3914
L11-18	[GAIN 6] Input 2 (multiply)	-32768 - 32767	-	1	Yes	3924
L11-19	[GAIN 6] Input 3 (divide)	1 - 65535	-	1	Yes	3934
L11-20	[GAIN 7] Value source input 1	0: invalid Other: K connector	-	0	Yes	3915
L11-21	[GAIN 7] Input 2 (multiply)	-32768 - 32767	-	1	Yes	3925
L11-22	[GAIN 7] Input 3 (divide)	1 - 65535	-	1	Yes	3935
L11-23	[GAIN 8] Value source input 1	0: invalid Other: K connector	-	0	Yes	3916
L11-24	[GAIN 8] Input 2 (multiply)	-32768 - 32767	-	1	Yes	3926
L11-25	[GAIN 8] Input 3 (divide)	1 - 65535	-	1	Yes	3936
L11-26	[GAIN 9] Value source input 1	0: invalid Other: K connector	-	0	Yes	3917
L11-27	[GAIN 9] Input 2 (multiply)	-32768 - 32767	-	1	Yes	3927
L11-28	[GAIN 9] Input 3 (divide)	1 - 65535	-	1	Yes	3937
L11-29	[GAIN 10] Value source input 1	0: invalid Other: K connector	-	0	Yes	3918
L11-30	[GAIN 10] Input 2 (multiply)	-32768 - 32767	-	1	Yes	3928
L11-31	[GAIN 10] Input 3 (divide)	1 - 65535	-	1	Yes	3938
L11-32	[GAIN 11] Value source input 1	0: invalid Other: K connector	-	0	Yes	3809
L11-33	[GAIN 11] Input 2 (multiply)	-32768 - 32767	-	1	Yes	3814
L11-34	[GAIN 11] Input 3 (divide)	1 - 65535	-	1	Yes	3819
L11-35	[GAIN 12] Value source input 1	0: invalid Other: K connector	-	0	Yes	3810
L11-36	[GAIN 12] Input 2 (multiply)	-32768 - 32767	-	1	Yes	3815
L11-37	[GAIN 12] Input 3 (divide)	1 - 65535	-	1	Yes	3820
L11-38	[GAIN 13] Value source input 1	0: invalid Other: K connector	-	0	Yes	3811
L11-39	[GAIN 13] Input 2 (multiply)	-32768 - 32767	-	1	Yes	3816
L11-40	[GAIN 13] Input 3 (divide)	1 - 65535	-	1	Yes	3821
L11-41	[GAIN 14] Value source input 1	0: invalid Other: K connector	-	0	Yes	3812
L11-42	[GAIN 14] Input 2 (multiply)	-32768 - 32767	-	1	Yes	3817
L11-43	[GAIN 14] Input 3 (divide)	1 - 65535	-	1	Yes	3822
L11-44	[GAIN 15] Value source input 1	0: invalid Other: K connector	-	0	Yes	3813
L11-45	[GAIN 15] Input 2 (multiply)	-32768 - 32767	-	1	Yes	3818
L11-46	[GAIN 15] Input 3 (divide)	1 - 65535	-	1	Yes	3823

Group n Bus Adapter and Expansion Module

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
Group n0: Inolink communication						
n0-00	Enable Inolink comm.	0:Disable 1:Enable Other: B connector	-	0	Yes	1377
n0-01	Local node address	0 - 16	-	0	Yes	1378
n0-02	Comm. mode selection	0:Standard 1:No fault info Other: B connector	-	0	Yes	2911
n0-03	[Received data 1] Source node	0:Disable 1:Node 1 2:Node 2 3:Node 3 4:Node 4 5:Node 5 6:Node 6 7:Node 7 8:Node 8 9:Node 9 10:Node 10 11:Node 11 12:Node 12 13:Node 13 14:Node 14 15:Node 15 16:Node 16	-	0	Yes	2175
n0-04	[Received data 1] Data selection	1:Data 1 2:Data 2 3:Data 3 4:Data 4 5:Data 5 6:Data 6 7:Data 7 8:Data 8	-	1	Yes	1379
n0-05	[Received data 2] Source node	0:Disable 1:Node 1 2:Node 2 3:Node 3 4:Node 4 5:Node 5 6:Node 6 7:Node 7 8:Node 8 9:Node 9 10:Node 10 11:Node 11 12:Node 12 13:Node 13 14:Node 14 15:Node 15 16:Node 16	-	0	Yes	2176
n0-06	[Received data 2] Data selection	1:Data 1 2:Data 2 3:Data 3 4:Data 4 5:Data 5 6:Data 6 7:Data 7 8:Data 8	-	1	Yes	1380

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n0-07	[Received data 3] Source node	0:Disable 1:Node 1 2:Node 2 3:Node 3 4:Node 4 5:Node 5 6:Node 6 7:Node 7 8:Node 8 9:Node 9 10:Node 10 11:Node 11 12:Node 12 13:Node 13 14:Node 14 15:Node 15 16:Node 16	-	0	Yes	2177
n0-08	[Received data 3] Data selection	1:Data 1 2:Data 2 3:Data 3 4:Data 4 5:Data 5 6:Data 6 7:Data 7 8:Data 8	-	1	Yes	1381
n0-09	[Received data 4] Source node	0:Disable 1:Node 1 2:Node 2 3:Node 3 4:Node 4 5:Node 5 6:Node 6 7:Node 7 8:Node 8 9:Node 9 10:Node 10 11:Node 11 12:Node 12 13:Node 13 14:Node 14 15:Node 15 16:Node 16	-	0	Yes	2178
n0-10	[Received data 4] Data selection	1:Data 1 2:Data 2 3:Data 3 4:Data 4 5:Data 5 6:Data 6 7:Data 7 8:Data 8	-	1	Yes	1382

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n0-11	[Received data 5] Source node	0:Disable 1:Node 1 2:Node 2 3:Node 3 4:Node 4 5:Node 5 6:Node 6 7:Node 7 8:Node 8 9:Node 9 10:Node 10 11:Node 11 12:Node 12 13:Node 13 14:Node 14 15:Node 15 16:Node 16	-	0	Yes	2179
n0-12	[Received data 5] Data selection	1:Data 1 2:Data 2 3:Data 3 4:Data 4 5:Data 5 6:Data 6 7:Data 7 8:Data 8	-	1	Yes	1383
n0-13	[Received data 6] Source node	0:Disable 1:Node 1 2:Node 2 3:Node 3 4:Node 4 5:Node 5 6:Node 6 7:Node 7 8:Node 8 9:Node 9 10:Node 10 11:Node 11 12:Node 12 13:Node 13 14:Node 14 15:Node 15 16:Node 16	-	0	Yes	2180
n0-14	[Received data 6] Data selection	1:Data 1 2:Data 2 3:Data 3 4:Data 4 5:Data 5 6:Data 6 7:Data 7 8:Data 8	-	1	Yes	1384

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n0-15	[Received data 7] Source node	0:Disable 1:Node 1 2:Node 2 3:Node 3 4:Node 4 5:Node 5 6:Node 6 7:Node 7 8:Node 8 9:Node 9 10:Node 10 11:Node 11 12:Node 12 13:Node 13 14:Node 14 15:Node 15 16:Node 16	-	0	Yes	2181
n0-16	[Received data 7] Data selection	1:Data 1 2:Data 2 3:Data 3 4:Data 4 5:Data 5 6:Data 6 7:Data 7 8:Data 8	-	1	Yes	1385
n0-17	[Received data 8] Source node	0:Disable 1:Node 1 2:Node 2 3:Node 3 4:Node 4 5:Node 5 6:Node 6 7:Node 7 8:Node 8 9:Node 9 10:Node 10 11:Node 11 12:Node 12 13:Node 13 14:Node 14 15:Node 15 16:Node 16	-	0	Yes	2182
n0-18	[Received data 8] Data selection	1:Data 1 2:Data 2 3:Data 3 4:Data 4 5:Data 5 6:Data 6 7:Data 7 8:Data 8	-	1	Yes	1386
n0-19	Received data 1 scaling	-8.000 - 8.000	-	1	Yes	1387
n0-20	Received data 2 scaling	-8.000 - 8.000	-	1	Yes	1388
n0-21	Received data 3 scaling	-8.000 - 8.000	-	1	Yes	1389
n0-22	Received data 4 scaling	-8.000 - 8.000	-	1	Yes	1390
n0-23	Received data 5 scaling	-8.000 - 8.000	-	1	Yes	1391
n0-24	Received data 6 scaling	-8.000 - 8.000	-	1	Yes	1392
n0-25	Received data 7 scaling	-8.000 - 8.000	-	1	Yes	1393
n0-26	Received data 8 scaling	-8.000 - 8.000	-	1	Yes	1394
n0-27	[Sent data 1] Selection	0: 0 Other: K connector	-	0	Yes	1395
n0-28	[Sent data 2] Selection	0: 0 Other: K connector	-	0	Yes	1396

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n0-29	[Sent data 3] Selection	0: 0 Other: K connector	-	0	Yes	1397
n0-30	[Sent data 4] Selection	0: 0 Other: K connector	-	0	Yes	1398
n0-31	[Sent data 5] Selection	0: 0 Other: K connector	-	0	Yes	1399
n0-32	[Sent data 6] Selection	0: 0 Other: K connector	-	0	Yes	1400
n0-33	[Sent data 7] Selection	0: 0 Other: K connector	-	0	Yes	1401
n0-34	[Sent data 8] Selection	0: 0 Other: K connector	-	0	Yes	1402
Group n1: fieldbus adapter A						
n1-00	[FBA] Bus type	0: None 1: Modbus RTU module 2: CANlink module 3: CANopen module 4: Ethernet module 5: EtherCAT module 6: HDVN module 7: Profibus-DP module 8: Profinet I/O module 9: Custom communication module	-	0	Change at stop	1403
n1-01	Comm. wire breakage DET delay	0.00 - 60.00	s	0.01	Yes	1404
n1-02	FBA comm. mode selection	0:Standard 1:No fault info Other: B connector	-	0	Yes	3907
n1-03	Continuous CRC error meas. setpoint	0 - 5000	-	0	Yes	1406
n1-04	PZD output 1	0: 0 Other: K connector	-	0	Yes	1407
n1-05	PZD output 2	0: 0 Other: K connector	-	0	Yes	1408
n1-06	PZD output 3	0: 0 Other: K connector	-	0	Yes	1409
n1-07	PZD output 4	0: 0 Other: K connector	-	0	Yes	1410
n1-08	PZD output 5	0: 0 Other: K connector	-	0	Yes	1411
n1-09	PZD output 6	0: 0 Other: K connector	-	0	Yes	1412
n1-10	PZD output 7	0: 0 Other: K connector	-	0	Yes	1413
n1-11	PZD output 8	0: 0 Other: K connector	-	0	Yes	1414
n1-12	PZD output 9	0: 0 Other: K connector	-	0	Yes	1415
n1-13	PZD output 10	0: 0 Other: K connector	-	0	Yes	1416
n1-14	PZD output 11	0: 0 Other: K connector	-	0	Yes	1417
n1-15	PZD output 12	0: 0 Other: K connector	-	0	Yes	1418
n1-16	PZD output 13	0: 0 Other: K connector	-	0	Yes	1419
n1-17	PZD output 14	0: 0 Other: K connector	-	0	Yes	1420

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n1-18	PZD output 15	0: 0 Other: K connector	-	0	Yes	1421
n1-19	PZD output 16	0: 0 Other: K connector	-	0	Yes	1422
n1-20	[PZD output 1] Comm. base value	0 - 65535	-	0	Yes	1439
n1-21	[PZD output 2] Comm. base value	0 - 65535	-	0	Yes	1440
n1-22	[PZD output 3] Comm. base value	0 - 65535	-	0	Yes	1441
n1-23	[PZD output 4] Comm. base value	0 - 65535	-	0	Yes	1442
n1-24	[PZD output 5] Comm. base value	0 - 65535	-	0	Yes	1443
n1-25	[PZD output 6] Comm. base value	0 - 65535	-	0	Yes	1444
n1-26	[PZD output 7] Comm. base value	0 - 65535	-	0	Yes	1445
n1-27	[PZD output 8] Comm. base value	0 - 65535	-	0	Yes	1446
n1-28	[PZD output 9] Comm. base value	0 - 65535	-	0	Yes	1447
n1-29	[PZD output 10] Comm. base value	0 - 65535	-	0	Yes	1448
n1-30	[PZD output 11] Comm. base value	0 - 65535	-	0	Yes	1449
n1-31	[PZD output 12] Comm. base value	0 - 65535	-	0	Yes	1450
n1-32	[PZD output 13] Comm. base value	0 - 65535	-	0	Yes	1451
n1-33	[PZD output 14] Comm. base value	0 - 65535	-	0	Yes	1452
n1-34	[PZD output 15] Comm. base value	0 - 65535	-	0	Yes	1453
n1-35	[PZD output 16] Comm. base value	0 - 65535	-	0	Yes	1454
n1-36	[PZD input 1] Comm. base value	0 - 65535	-	0	Yes	1423
n1-37	[PZD input 2] Comm. base value	0 - 65535	-	0	Yes	1424
n1-38	[PZD input 3] Comm. base value	0 - 65535	-	0	Yes	1425
n1-39	[PZD input 4] Comm. base value	0 - 65535	-	0	Yes	1426
n1-40	[PZD input 5] Comm. base value	0 - 65535	-	0	Yes	1427
n1-41	[PZD input 6] Comm. base value	0 - 65535	-	0	Yes	1428
n1-42	[PZD input 7] Comm. base value	0 - 65535	-	0	Yes	1429
n1-43	[PZD input 8] Comm. base value	0 - 65535	-	0	Yes	1430
n1-44	[PZD input 9] Comm. base value	0 - 65535	-	0	Yes	1431
n1-45	[PZD input 10] Comm. base value	0 - 65535	-	0	Yes	1432
n1-46	[PZD input 11] Comm. base value	0 - 65535	-	0	Yes	1433
n1-47	[PZD input 12] Comm. base value	0 - 65535	-	0	Yes	1434
n1-48	[PZD input 13] Comm. base value	0 - 65535	-	0	Yes	1435
n1-49	[PZD input 14] Comm. base value	0 - 65535	-	0	Yes	1436

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n1-50	[PZD input 15] Comm. base value	0 - 65535	-	0	Yes	1437
n1-51	[PZD input 16] Comm. base value	0 - 65535	-	0	Yes	1438
n1-52	[PZD output 1] Data display	0x0000 - 0xFFFF	-	0	No	33823
n1-53	[PZD output 2] Data display	0x0000 - 0xFFFF	-	0	No	33824
n1-54	[PZD output 3] Data display	0x0000 - 0xFFFF	-	0	No	33825
n1-55	[PZD output 4] Data display	0x0000 - 0xFFFF	-	0	No	33826
n1-56	[PZD output 5] Data display	0x0000 - 0xFFFF	-	0	No	33827
n1-57	[PZD output 6] Data display	0x0000 - 0xFFFF	-	0	No	33828
n1-58	[PZD output 7] Data display	0x0000 - 0xFFFF	-	0	No	33829
n1-59	[PZD output 8] Data display	0x0000 - 0xFFFF	-	0	No	33830
n1-60	[PZD output 9] Data display	0x0000 - 0xFFFF	-	0	No	33831
n1-61	[PZD output 10] Data display	0x0000 - 0xFFFF	-	0	No	33832
n1-62	[PZD output 11] Data display	0x0000 - 0xFFFF	-	0	No	33833
n1-63	[PZD output 12] Data display	0x0000 - 0xFFFF	-	0	No	33834
n1-64	[PZD output 13] Data display	0x0000 - 0xFFFF	-	0	No	33835
n1-65	[PZD output 14] Data display	0x0000 - 0xFFFF	-	0	No	33836
n1-66	[PZD output 15] Data display	0x0000 - 0xFFFF	-	0	No	33837
n1-67	[PZD output 16] Data display	0x0000 - 0xFFFF	-	0	No	33838
n1-68	[PZD input 1] Data display	0x0000 - 0xFFFF	-	0	No	33807
n1-69	[PZD input 2] Data display	0x0000 - 0xFFFF	-	0	No	33808
n1-70	[PZD input 3] Data display	0x0000 - 0xFFFF	-	0	No	33809
n1-71	[PZD input 4] Data display	0x0000 - 0xFFFF	-	0	No	33810
n1-72	[PZD input 5] Data display	0x0000 - 0xFFFF	-	0	No	33811
n1-73	[PZD input 6] Data display	0x0000 - 0xFFFF	-	0	No	33812
n1-74	[PZD input 7] Data display	0x0000 - 0xFFFF	-	0	No	33813
n1-75	[PZD input 8] Data display	0x0000 - 0xFFFF	-	0	No	33814
n1-76	[PZD input 9] Data display	0x0000 - 0xFFFF	-	0	No	33815
n1-77	[PZD input 10] Data display	0x0000 - 0xFFFF	-	0	No	33816
n1-78	[PZD input 11] Data display	0x0000 - 0xFFFF	-	0	No	33817
n1-79	[PZD input 12] Data display	0x0000 - 0xFFFF	-	0	No	33818
n1-80	[PZD input 13] Data display	0x0000 - 0xFFFF	-	0	No	33819
n1-81	[PZD input 14] Data display	0x0000 - 0xFFFF	-	0	No	33820
n1-82	[PZD input 15] Data display	0x0000 - 0xFFFF	-	0	No	33821
n1-83	[PZD input 16] Data display	0x0000 - 0xFFFF	-	0	No	33822
n1-90	Email box data writing saving selection	0:Do not save EEPROM 1:Save EEPROM	-	1	Yes	4189
n1-91	Device diagnosis information upload selection	0:Enable 1:Disable	-	1	Yes	1809
Group n2: fieldbus adapter B						
n2-00	[FBA] Bus type	0: None 1: Modbus RTU module 2: CANlink module 3: CANopen module 4: Ethernet module 5: EtherCAT module 6: HDVN module 7: Profibus-DP module 8: Profinet I/O module 9: Custom communication module	-	0	Yes	1455
n2-01	Comm. wire breakage DET delay	0.00 - 60.00	s	0.01	Yes	1456

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n2-02	FBA comm. mode selection	0:Standard 1:No fault info Other: B connector	-	0	Yes	3908
n2-03	Continuous CRC error meas. setpoint	0 - 5000	-	0	Yes	1458
n2-04	PZD output 1	0: 0 Other: K connector	-	0	Yes	1459
n2-05	PZD output 2	0: 0 Other: K connector	-	0	Yes	1460
n2-06	PZD output 3	0: 0 Other: K connector	-	0	Yes	1461
n2-07	PZD output 4	0: 0 Other: K connector	-	0	Yes	1462
n2-08	PZD output 5	0: 0 Other: K connector	-	0	Yes	1463
n2-09	PZD output 6	0: 0 Other: K connector	-	0	Yes	1464
n2-10	PZD output 7	0: 0 Other: K connector	-	0	Yes	1465
n2-11	PZD output 8	0: 0 Other: K connector	-	0	Yes	1466
n2-12	PZD output 9	0: 0 Other: K connector	-	0	Yes	1467
n2-13	PZD output 10	0: 0 Other: K connector	-	0	Yes	1468
n2-14	PZD output 11	0: 0 Other: K connector	-	0	Yes	1469
n2-15	PZD output 12	0: 0 Other: K connector	-	0	Yes	1470
n2-16	PZD output 13	0: 0 Other: K connector	-	0	Yes	1471
n2-17	PZD output 14	0: 0 Other: K connector	-	0	Yes	1472
n2-18	PZD output 15	0: 0 Other: K connector	-	0	Yes	1473
n2-19	PZD output 16	0: 0 Other: K connector	-	0	Yes	1474
n2-20	[PZD output 1] Comm. base value	0 - 65535	-	0	Yes	1491
n2-21	[PZD output 2] Comm. base value	0 - 65535	-	0	Yes	1492
n2-22	[PZD output 3] Comm. base value	0 - 65535	-	0	Yes	1493
n2-23	[PZD output 4] Comm. base value	0 - 65535	-	0	Yes	1494
n2-24	[PZD output 5] Comm. base value	0 - 65535	-	0	Yes	1495
n2-25	[PZD output 6] Comm. base value	0 - 65535	-	0	Yes	1496
n2-26	[PZD output 7] Comm. base value	0 - 65535	-	0	Yes	1497
n2-27	[PZD output 8] Comm. base value	0 - 65535	-	0	Yes	1498
n2-28	[PZD output 9] Comm. base value	0 - 65535	-	0	Yes	1499
n2-29	[PZD output 10] Comm. base value	0 - 65535	-	0	Yes	1500

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n2-30	[PZD output 11] Comm. base value	0 - 65535	-	0	Yes	1501
n2-31	[PZD output 12] Comm. base value	0 - 65535	-	0	Yes	1502
n2-32	[PZD output 13] Comm. base value	0 - 65535	-	0	Yes	1503
n2-33	[PZD output 14] Comm. base value	0 - 65535	-	0	Yes	1504
n2-34	[PZD output 15] Comm. base value	0 - 65535	-	0	Yes	1505
n2-35	[PZD output 16] Comm. base value	0 - 65535	-	0	Yes	1506
n2-36	[PZD input 1] Comm. base value	0 - 65535	-	0	Yes	1475
n2-37	[PZD input 2] Comm. base value	0 - 65535	-	0	Yes	1476
n2-38	[PZD input 3] Comm. base value	0 - 65535	-	0	Yes	1477
n2-39	[PZD input 4] Comm. base value	0 - 65535	-	0	Yes	1478
n2-40	[PZD input 5] Comm. base value	0 - 65535	-	0	Yes	1479
n2-41	[PZD input 6] Comm. base value	0 - 65535	-	0	Yes	1480
n2-42	[PZD input 7] Comm. base value	0 - 65535	-	0	Yes	1481
n2-43	[PZD input 8] Comm. base value	0 - 65535	-	0	Yes	1482
n2-44	[PZD input 9] Comm. base value	0 - 65535	-	0	Yes	1483
n2-45	[PZD input 10] Comm. base value	0 - 65535	-	0	Yes	1484
n2-46	[PZD input 11] Comm. base value	0 - 65535	-	0	Yes	1485
n2-47	[PZD input 12] Comm. base value	0 - 65535	-	0	Yes	1486
n2-48	[PZD input 13] Comm. base value	0 - 65535	-	0	Yes	1487
n2-49	[PZD input 14] Comm. base value	0 - 65535	-	0	Yes	1488
n2-50	[PZD input 15] Comm. base value	0 - 65535	-	0	Yes	1489
n2-51	[PZD input 16] Comm. base value	0 - 65535	-	0	Yes	1490
n2-52	[PZD output 1] Data display	0x0000 - 0xFFFF	-	0	No	33855
n2-53	[PZD output 2] Data display	0x0000 - 0xFFFF	-	0	No	33856
n2-54	[PZD output 3] Data display	0x0000 - 0xFFFF	-	0	No	33857
n2-55	[PZD output 4] Data display	0x0000 - 0xFFFF	-	0	No	33858
n2-56	[PZD output 5] Data display	0x0000 - 0xFFFF	-	0	No	33859
n2-57	[PZD output 6] Data display	0x0000 - 0xFFFF	-	0	No	33860
n2-58	[PZD output 7] Data display	0x0000 - 0xFFFF	-	0	No	33861
n2-59	[PZD output 8] Data display	0x0000 - 0xFFFF	-	0	No	33862
n2-60	[PZD output 9] Data display	0x0000 - 0xFFFF	-	0	No	33863
n2-61	[PZD output 10] Data display	0x0000 - 0xFFFF	-	0	No	33864
n2-62	[PZD output 11] Data display	0x0000 - 0xFFFF	-	0	No	33865
n2-63	[PZD output 12] Data display	0x0000 - 0xFFFF	-	0	No	33866
n2-64	[PZD output 13] Data display	0x0000 - 0xFFFF	-	0	No	33867
n2-65	[PZD output 14] Data display	0x0000 - 0xFFFF	-	0	No	33868
n2-66	[PZD output 15] Data display	0x0000 - 0xFFFF	-	0	No	33869
n2-67	[PZD output 16] Data display	0x0000 - 0xFFFF	-	0	No	33870
n2-68	[PZD input 1] Data display	0x0000 - 0xFFFF	-	0	No	33839
n2-69	[PZD input 2] Data display	0x0000 - 0xFFFF	-	0	No	33840
n2-70	[PZD input 3] Data display	0x0000 - 0xFFFF	-	0	No	33841

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n2-71	[PZD input 4] Data display	0x0000 - 0xFFFF	-	0	No	33842
n2-72	[PZD input 5] Data display	0x0000 - 0xFFFF	-	0	No	33843
n2-73	[PZD input 6] Data display	0x0000 - 0xFFFF	-	0	No	33844
n2-74	[PZD input 7] Data display	0x0000 - 0xFFFF	-	0	No	33845
n2-75	[PZD input 8] Data display	0x0000 - 0xFFFF	-	0	No	33846
n2-76	[PZD input 9] Data display	0x0000 - 0xFFFF	-	0	No	33847
n2-77	[PZD input 10] Data display	0x0000 - 0xFFFF	-	0	No	33848
n2-78	[PZD input 11] Data display	0x0000 - 0xFFFF	-	0	No	33849
n2-79	[PZD input 12] Data display	0x0000 - 0xFFFF	-	0	No	33850
n2-80	[PZD input 13] Data display	0x0000 - 0xFFFF	-	0	No	33851
n2-81	[PZD input 14] Data display	0x0000 - 0xFFFF	-	0	No	33852
n2-82	[PZD input 15] Data display	0x0000 - 0xFFFF	-	0	No	33853
n2-83	[PZD input 16] Data display	0x0000 - 0xFFFF	-	0	No	33854
n2-90	Email box data writing saving selection	0:Do not save EEPROM 1:Save EEPROM	-	1	Yes	4190
n2-91	Device diagnosis information upload selection	0:Enable 1:Disable	-	1	Yes	1808
Group n3: redundancy bus adapter						
n3-00	Adapter bound to redundant FBA	0:No binding 1:FBA-A 2:FBA-B	-	0	Yes	1507
n3-01	Redundant FBA comm. module SLOT	0:Disable 1:SLOT 1_1 2:SLOT 1_2 3:SLOT 1_3 4:SLOT 2_1 5:SLOT 2_2 6:SLOT 2_3 7:SLOT 3_1	-	0	Yes	1508
n3-02	Redundant FBA comm. module online status	0:Offline 1:Online	-	0	No	34194
n3-04	Device diagnosis information upload selection	0:Enable 1:Disable	-	1	Yes	1807
Group n4: encoder detection module 1						
n4-00	SLOT selection	0:Disable 1:SLOT 1_1 2:SLOT 1_2 3:SLOT 1_3 4:SLOT 2_1 5:SLOT 2_2 6:SLOT 2_3 7:SLOT 3_1	-	0	Change at stop	1509
n4-01	Module online status	0:Offline 1:Online	-	0	No	32825
n4-02	Encoder type	0:Invalid 1:Ordinary ABZ encoder 3:Resolver	-	0	Change at stop	1512
n4-03	Input A/B phase sequence	0:Forward direction 1:Reverse direction	-	0	Change at stop	1515
n4-04	Speed test mode	0:Quadruplicated frequency 1:A pulse	-	1	Change at stop	1518
n4-05	Output A/B phase sequence	0:Forward direction 1:Reverse direction	-	0	Change at stop	1521
n4-06	Output Z phase sequence	0:Forward direction 1:Reverse direction	-	0	Change at stop	1524
n4-07	Encoder resolution (pulses/r)	0 - 16000	-	2500	Change at stop	1527

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n4-08	Enable PG quadrature interlock	0:Disable 1:Enable	-	1	Change at stop	1530
n4-09	[Pulse frequency divider] Output coef.	1 - 64	-	1	Change at stop	1533
n4-10	ABZ encoder wire breakage insp.mode	0:No operation 1:ABZ differential signal 2:AB differential signal 3:ABZ single-ended positive signal 4:AB single-ended positive signal	-	2	Yes	1536
n4-11	SPD FDBK PG wire breakage DET time	0.0 - 10.0	s	0.5	Yes	1554
n4-12	Encoder installation position angle	0.0 - 359.9	°	0	Yes	1539
n4-13	[U/V/W encoder] U/V/W phase sequence	0:Forward direction 1:Reverse direction	-	0	Change at stop	1542
n4-14	[U/V/W encoder] Zero point position angle	0.0 - 359.9	°	0	Yes	1545
n4-15	Resolver pole pairs	0 - 32	-	1	Change at stop	1548
n4-16	UVW pole pairs	0 - 32	-	4	Yes	1551
n4-17	Encoder speed test filter time	0 - 100	ms	4	Yes	1557
n4-18	[Encoder initial angle] Trigger setpoint	0: 0 Other: K connector	-	0	Yes	2428
n4-19	Encoder angle reverse calculation	0:Disable 1:Enable	-	1	Yes	2451
n4-20	Enable software meas. of encoder signal abnormity	0:Disable 1:Enable	-	0	Yes	1237
n4-21	Software meas. coefficient of encoder signal abnormity	0.0 - 800.0	%	100	Yes	1240
n4-22	Software meas. threshold of encoder signal abnormality	0.0 - 6553.5	%	0	No	33094
n4-23	Threshold of encoder signal abnormity count	1 - 100	-	10	Yes	3176
n4-24	[Encoder signal abnormality] S/W DET mode selection	0:Surge and dip 1:Dip 2:Surge	-	0	Yes	3829
n4-25	Resolver type	0:7Vp-p, ratio 0.5 1:7Vrms, ratio 0.5 2:7Vrms, ratio 0.286 3:4Vrms, ratio 0.3	-	0	Change at stop	3191
n4-26	Resolver excitation signal frequency	0:10 1:12 2:15 3:20	kHz	0	Change at stop	3899
n4-27	Resolver wire breakage DET time	0 - 2000	ms	50	Yes	3896
n4-28	Enable burr removal for encoder speed measuring	0:Disable 1:Enable	-	1	Yes	2869
Group n5: encoder detection module 2						
n5-00	SLOT selection	0:Disable 1:SLOT 1_1 2:SLOT 1_2 3:SLOT 1_3 4:SLOT 2_1 5:SLOT 2_2 6:SLOT 2_3 7:SLOT 3_1	-	0	Change at stop	1510

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n5-01	Module online status	0:Offline 1:Online	-	0	No	32826
n5-02	Encoder type	0:Invalid 1:Ordinary ABZ encoder 3:Resolver	-	0	Change at stop	1513
n5-03	Input A/B phase sequence	0:Forward direction 1:Reverse direction	-	0	Change at stop	1516
n5-04	Speed test mode	0:Quadruplicated frequency 1:A pulse	-	1	Change at stop	1519
n5-05	Output A/B phase sequence	0:Forward direction 1:Reverse direction	-	0	Change at stop	1522
n5-06	Output Z phase sequence	0:Forward direction 1:Reverse direction	-	0	Change at stop	1525
n5-07	Encoder resolution (pulses/r)	0 - 16000	-	2500	Change at stop	1528
n5-08	Enable PG quadrature interlock	0:Disable 1:Enable	-	1	Change at stop	1531
n5-09	[Pulse frequency divider] Output coef.	1 - 64	-	1	Change at stop	1534
n5-10	ABZ encoder wire breakage insp.mode	0:No operation 1:ABZ differential signal 2:AB differential signal 3:ABZ single-ended positive signal 4:AB single-ended positive signal	-	2	Yes	1537
n5-11	SPD FDBK PG wire breakage DET time	0.0 - 10.0	s	0.5	Yes	1555
n5-12	Encoder installation position angle	0.0 - 359.9	°	0	Yes	1540
n5-13	[U/V/W encoder] U/V/W phase sequence	0:Forward direction 1:Reverse direction	-	0	Change at stop	1543
n5-14	[U/V/W encoder] Zero point position angle	0.0 - 359.9	°	0	Yes	1546
n5-15	Resolver pole pairs	0 - 32	-	1	Change at stop	1549
n5-16	UVW pole pairs	0 - 32	-	4	Yes	1552
n5-17	Encoder speed test filter time	0 - 100	ms	4	Yes	1558
n5-18	[Encoder initial angle] Trigger setpoint	0: 0 Other: K connector	-	0	Yes	2429
n5-19	Encoder angle reverse calculation	0:Disable 1:Enable	-	1	Yes	2452
n5-20	Enable software meas. of encoder signal abnormity	0:Disable 1:Enable	-	0	Yes	1238
n5-21	Software meas. coefficient of encoder signal abnormity	0.0 - 800.0	%	100	Yes	1241
n5-22	Software meas. threshold of encoder signal abnormality	0.0 - 6553.5	%	0	No	33094
n5-23	Threshold of encoder signal abnormity count	1 - 100	-	10	Yes	3177
n5-24	[Encoder signal abnormality] S/W DET mode selection	0:Surge and dip 1:Dip 2:Surge	-	0	Yes	3830
n5-25	Resolver type	0:7Vp-p, ratio 0.5 1:7Vrms, ratio 0.5 2:7Vrms, ratio 0.286 3:4Vrms, ratio 0.3	-	0	Change at stop	3192

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n5-26	Resolver excitation signal frequency	0:10 1:12 2:15 3:20	kHz	0	Change at stop	3900
n5-27	Resolver wire breakage DET time	0 - 2000	ms	50	Yes	3897
n5-28	Enable burr removal for encoder speed measuring	0:Disable 1:Enable	-	1	Yes	2870
Group n6: encoder detection module 3						
n6-00	SLOT selection	0:Disable 1:SLOT 1_1 2:SLOT 1_2 3:SLOT 1_3 4:SLOT 2_1 5:SLOT 2_2 6:SLOT 2_3 7:SLOT 3_1	-	0	Change at stop	1511
n6-01	Module online status	0:Offline 1:Online	-	0	No	32827
n6-02	Encoder type	0:Invalid 1:Ordinary ABZ encoder 3:Resolver	-	0	Change at stop	1514
n6-03	Input A/B phase sequence	0:Forward direction 1:Reverse direction	-	0	Change at stop	1517
n6-04	Speed test mode	0:Quadruplicated frequency 1:A pulse	-	1	Change at stop	1520
n6-05	Output A/B phase sequence	0:Forward direction 1:Reverse direction	-	0	Change at stop	1523
n6-06	Output Z phase sequence	0:Forward direction 1:Reverse direction	-	0	Change at stop	1526
n6-07	Encoder resolution (pulses/r)	0 - 16000	-	2500	Change at stop	1529
n6-08	Enable PG quadrature interlock	0:Disable 1:Enable	-	1	Change at stop	1532
n6-09	[Pulse frequency divider] Output coef.	1 - 64	-	1	Change at stop	1535
n6-10	ABZ encoder wire breakage insp.mode	0:No operation 1:ABZ differential signal 2:AB differential signal 3:ABZ single-ended positive signal 4:AB single-ended positive signal	-	2	Yes	1538
n6-11	SPD FDBK PG wire breakage DET time	0.0 - 10.0	s	0.5	Yes	1556
n6-12	Encoder installation position angle	0.0 - 359.9	°	0	Yes	1541
n6-13	[U/V/W encoder] U/V/W phase sequence	0:Forward direction 1:Reverse direction	-	0	Change at stop	1544
n6-14	[U/V/W encoder] Zero point position angle	0.0 - 359.9	°	0	Yes	1547
n6-15	Resolver pole pairs	0 - 32	-	1	Change at stop	1550
n6-16	UVW pole pairs	0 - 32	-	4	Yes	1553
n6-17	Encoder speed test filter time	0 - 100	ms	4	Yes	1559
n6-18	[Encoder initial angle] Trigger setpoint	0: 0 Other: K connector	-	0	Yes	2430

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n6-19	Encoder angle reverse calculation	0:Disable 1:Enable	-	1	Yes	2453
n6-20	Enable software meas. of encoder signal abnormity	0:Disable 1:Enable	-	0	Yes	1239
n6-21	Software meas. coefficient of encoder signal abnormity	0.0 - 800.0	%	100	Yes	1242
n6-22	Software meas. threshold of encoder signal abnormality	0.0 - 6553.5	%	0	No	33094
n6-23	Threshold of encoder signal abnormity count	1 - 100	-	10	Yes	3178
n6-24	[Encoder signal abnormality] S/W DET mode selection	0:Surge and dip 1:Dip 2:Surge	-	0	Yes	3831
n6-25	Resolver type	0:7Vp-p, ratio 0.5 1:7Vrms, ratio 0.5 2:7Vrms, ratio 0.286 3:4Vrms, ratio 0.3	-	0	Change at stop	3193
n6-26	Resolver excitation signal frequency	0:10 1:12 2:15 3:20	kHz	0	Change at stop	3901
n6-27	Resolver wire breakage DET time	0 - 2000	ms	50	Yes	3898
n6-28	Enable burr removal for encoder speed measuring	0:Disable 1:Enable	-	1	Yes	2871
Group n7: HIO module 1 configuration						
n7-00	SLOT selection	0:Disable 1:SLOT 1_1 2:SLOT 1_2 3:SLOT 1_3 4:SLOT 2_1 5:SLOT 2_2 6:SLOT 2_3 7:SLOT 3_1	-	0	Change at stop	3439
n7-01	Module online status	0:Not enabled 1:Ext. module not found 2:Communication is normal	-	0	No	35116
n7-02	Module type selection	0:Disable 1:HIO-10 2:HIO-20 3:HIO-30	-	0	Change at stop	3673
n7-10	Config. for DIO used as output	0x0000 - 0xFFFF	-	0	No	35167
n7-11	[DI/DIO input] Original status	0x0000 - 0xFFFF	-	0	No	35119
n7-12	[DI/DIO input] Final status	0x0000 - 0xFFFF	-	0	No	35122
n7-13	[RO/DIO output] Set status	0x0000 - 0xFFFF	-	0	No	35290
n7-14	[RO/DIO output] Final status	0x0000 - 0xFFFF	-	0	No	35128
n7-15	AI input status word	0x0000 - 0xFFFF	-	0	No	35125
n7-20	AI1 input value	-327.68 - 327.67	-	0	No	35131
n7-21	AI1 input percentage	-3276.8 - 3276.7	%	0	No	35245
n7-22	AI2 input value	-327.68 - 327.67	-	0	No	35137
n7-23	AI2 input percentage	-3276.8 - 3276.7	%	0	No	35248
n7-24	AI3 input value	-327.68 - 327.67	-	0	No	35143
n7-25	AI3 input percentage	-3276.8 - 3276.7	%	0	No	35251
n7-30	AO1 output percentage	-3276.8 - 3276.7	%	0	No	35254
n7-31	Actual AO1 output value	-327.68 - 327.67	-	0	No	35149
n7-32	AO2 output percentage	-3276.8 - 3276.7	%	0	No	35257

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n7-33	Actual AO2 output value	-327.68 - 327.67	-	0	No	35155
n7-34	AO3 output percentage	-3276.8 - 3276.7	%	0	No	35260
n7-35	Actual AO3 output value	-327.68 - 327.67	-	0	No	35161
Group n8: HIO module 2 configuration						
n8-00	SLOT selection	0:Disable 1:SLOT 1_1 2:SLOT 1_2 3:SLOT 1_3 4:SLOT 2_1 5:SLOT 2_2 6:SLOT 2_3 7:SLOT 3_1	-	0	Change at stop	3440
n8-01	Module online status	0:Not enabled 1:Ext. module not found 2:Communication is normal	-	0	No	35117
n8-02	Module type selection	0:Disable 1:HIO-10 2:HIO-20 3:HIO-30	-	0	Change at stop	3674
n8-10	Config. for DIO used as output	0x0000 - 0xFFFF	-	0	No	35168
n8-11	[DI/DIO input] Original status	0x0000 - 0xFFFF	-	0	No	35120
n8-12	[DI/DIO input] Final status	0x0000 - 0xFFFF	-	0	No	35123
n8-13	[RO/DIO output] Set status	0x0000 - 0xFFFF	-	0	No	35291
n8-14	[RO/DIO output] Final status	0x0000 - 0xFFFF	-	0	No	35129
n8-15	AI input status word	0x0000 - 0xFFFF	-	0	No	35126
n8-20	AI1 input value	-327.68 - 327.67	-	0	No	35132
n8-21	AI1 input percentage	-3276.8 - 3276.7	%	0	No	35246
n8-22	AI2 input value	-327.68 - 327.67	-	0	No	35138
n8-23	AI2 input percentage	-3276.8 - 3276.7	%	0	No	35249
n8-24	AI3 input value	-327.68 - 327.67	-	0	No	35144
n8-25	AI3 input percentage	-3276.8 - 3276.7	%	0	No	35252
n8-30	AO1 output percentage	-3276.8 - 3276.7	%	0	No	35255
n8-31	Actual AO1 output value	-327.68 - 327.67	-	0	No	35150
n8-32	AO2 output percentage	-3276.8 - 3276.7	%	0	No	35258
n8-33	Actual AO2 output value	-327.68 - 327.67	-	0	No	35156
n8-34	AO3 output percentage	-3276.8 - 3276.7	%	0	No	35261
n8-35	Actual AO3 output value	-327.68 - 327.67	-	0	No	35162
Group n9: HIO module 3 configuration						
n9-00	SLOT selection	0:Disable 1:SLOT 1_1 2:SLOT 1_2 3:SLOT 1_3 4:SLOT 2_1 5:SLOT 2_2 6:SLOT 2_3 7:SLOT 3_1	-	0	Change at stop	3441
n9-01	Module online status	0:Not enabled 1:Ext. module not found 2:Communication is normal	-	0	No	35118
n9-02	Module type selection	0:Disable 1:HIO-10 2:HIO-20 3:HIO-30	-	0	Change at stop	3675
n9-10	Config. for DIO used as output	0x0000 - 0xFFFF	-	0	No	35169
n9-11	[DI/DIO input] Original status	0x0000 - 0xFFFF	-	0	No	35121

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n9-12	[DI/DIO input] Final status	0x0000 - 0xFFFF	-	0	No	35124
n9-13	[RO/DIO output] Set status	0x0000 - 0xFFFF	-	0	No	35292
n9-14	[RO/DIO output] Final status	0x0000 - 0xFFFF	-	0	No	35130
n9-15	AI input status word	0x0000 - 0xFFFF	-	0	No	35127
n9-20	AI1 input value	-327.68 - 327.67	-	0	No	35133
n9-21	AI1 input percentage	-3276.8 - 3276.7	%	0	No	35247
n9-22	AI2 input value	-327.68 - 327.67	-	0	No	35139
n9-23	AI2 input percentage	-3276.8 - 3276.7	%	0	No	35250
n9-24	AI3 input value	-327.68 - 327.67	-	0	No	35145
n9-25	AI3 input percentage	-3276.8 - 3276.7	%	0	No	35253
n9-30	AO1 output percentage	-3276.8 - 3276.7	%	0	No	35256
n9-31	Actual AO1 output value	-327.68 - 327.67	-	0	No	35151
n9-32	AO2 output percentage	-3276.8 - 3276.7	%	0	No	35259
n9-33	Actual AO2 output value	-327.68 - 327.67	-	0	No	35157
n9-34	AO3 output percentage	-3276.8 - 3276.7	%	0	No	35262
n9-35	Actual AO3 output value	-327.68 - 327.67	-	0	No	35163
Group n10: Modbus RTU module						
n10-00	SLOT selection	0: Disabled 1: Expansion slot 1_1 2: Expansion slot 1_2 3: Expansion slot 1_3 4: Expansion slot 2_1 5: Expansion slot 2_2 6: Expansion slot 2_3 7: Expansion slot 3_1	-	0	Change at stop	1728
n10-01	Module online status	0:Offline 1:Online	-	0	No	33882
n10-02	Modbus comm. rate	0:1200bps 1:2400bps 2:4800bps 3:9600bps 4:19200bps 5:38400bps 6:57600bps 7:115200bps	-	7	Change at stop	1731
n10-03	Modbus data format	0: Even check (8-E-1) 1: Odd check (8-O-1) 2: No check (8-N-2) 3: 8-N-1	-	1	Change at stop	1732
n10-04	Modbus local address	1 - 255	-	1	Change at stop	1733
n10-05	Modbus response delay	0 - 20	ms	4	Change at stop	1734
n10-06	Modbuscomm. timeout	0.0 - 60.0	s	20	Change at stop	1735
n10-07	(Reserved)	0 - 65535	-	0	Change at stop	1736
n10-08	(Reserved)	0 - 65535	-	0	Change at stop	1737
n10-09	(Reserved)	0 - 65535	-	0	Change at stop	1738
n10-10	(Reserved)	0 - 65535	-	0	Change at stop	1739
Group n11: CANlink module						
n11-00	SLOT selection	0:Disable 1:SLOT 1_1 2:SLOT 1_2 3:SLOT 1_3 4:SLOT 2_1 5:SLOT 2_2 6:SLOT 2_3 7:SLOT 3_1	-	0	Change at stop	1740

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n11-01	Module online status	0:Offline 1:Online	-	0	No	33883
n11-02	CANlink slave Node-ID	0 - 63	-	1	Change at stop	1743
n11-03	CANlink slave comm. rate	0:20kbps 1:50kbps 2:100kbps 3:125kbps 4:250kbps 5:500kbps 6:1Mbps	-	5	Change at stop	1744
n11-04	Received CANlink frames per unit time	1 - 65535	-	1	Change at stop	1745
n11-05	CAN reception error count per unit time	0 - 255	-	0	Change at stop	1746
n11-06	CAN transmission error count per unit time	0 - 255	-	0	Change at stop	1747
n11-07	Disconnections from bus (since power-on)	0 - 65535	-	0	Change at stop	1748
Group n12: CANopen module						
n12-00	SLOT selection	0:Disable 1:SLOT 1_1 2:SLOT 1_2 3:SLOT 1_3 4:SLOT 2_1 5:SLOT 2_2 6:SLOT 2_3 7:SLOT 3_1	-	0	Change at stop	1752
n12-01	Module online status	0:Offline 1:Online	-	0	No	33884
n12-02	CANopen Node-ID	0 - 63	-	1	Change at stop	1755
n12-03	CANopen comm. rate	0:20kbps 1:50kbps 2:100kbps 3:125kbps 4:250kbps 5:500kbps 6:1Mbps	-	5	Change at stop	1756
n12-04	Max. interval of adjacent RPDO frames	0 - 65535	ms	0	Yes	33090
n12-05	Reception errors per unit time	0 - 65535	-	0	Yes	33091
n12-06	Transmission errors per unit time	0 - 65535	-	0	Yes	33092
n12-07	Enable auto OP after power-on	0:Disable 1:Enable	-	0	Change at stop	1760
n12-08	Enable boot-up trans. upon comm. timeout	0:Disable 1:Enable	-	0	Change at stop	1761
n12-09	Comm. timeout period	0.0 - 60.0	s	0	Change at stop	1762
n12-10	CANopen config. source	0:Default 1:Custom	-	0	Change at stop	1763
n12-11	RPDO1 CAN-ID	0x0180 - 0x057F	-	512	Yes	3055
n12-12	RPDO1 mode	0 - 255	-	255	Yes	3059
n12-13	RPDO1 mappings	0 - 4	-	4	Yes	3063
n12-14	RPDO2 CAN-ID	0x0180 - 0x057F	-	768	Yes	3056
n12-15	RPDO2 mode	0 - 255	-	255	Yes	3060
n12-16	RPDO2 mappings	0 - 4	-	4	Yes	3064
n12-17	RPDO3 CAN-ID	0x0180 - 0x057F	-	1024	Yes	3057

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n12-18	RPDO3 mode	0 - 255	-	255	Yes	3061
n12-19	RPDO3 mappings	0 - 4	-	0	Yes	3065
n12-20	RPDO4 CAN-ID	0x0180 - 0x057F	-	1280	Yes	3058
n12-21	RPDO4 mode	0 - 255	-	255	Yes	3062
n12-22	RPDO4 mappings	0 - 4	-	0	Yes	3066
n12-23	TPDO1 CAN-ID	0x0180 - 0x057F	-	384	Yes	3039
n12-24	TPDO1 mode	0 - 255	-	255	Yes	3043
n12-25	TPDO1 mappings	0 - 4	-	4	Yes	3047
n12-26	TPDO1 transmission interval	0 - 65535	ms	50	Yes	3051
n12-27	TPDO2 CAN-ID	0x0180 - 0x057F	-	640	Yes	3040
n12-28	TPDO2 mode	0 - 255	-	255	Yes	3044
n12-29	TPDO2 mappings	0 - 4	-	4	Yes	3048
n12-30	TPDO2 transmission interval	0 - 65535	ms	50	Yes	3052
n12-31	TPDO3 CAN-ID	0x0180 - 0x057F	-	896	Yes	3041
n12-32	TPDO3 mode	0 - 255	-	255	Yes	3045
n12-33	TPDO3 mappings	0 - 4	-	0	Yes	3049
n12-34	TPDO3 transmission interval	0 - 65535	ms	100	Yes	3053
n12-35	TPDO4 CAN-ID	0x0180 - 0x057F	-	1152	Yes	3042
n12-36	TPDO4 mode	0 - 255	-	255	Yes	3046
n12-37	TPDO4 mappings	0 - 4	-	0	Yes	3050
n12-38	TPDO4 transmission interval	0 - 65535	ms	100	Yes	3054
Group n13: Ethernet module						
n13-00	SLOT selection	0:Disable 1:SLOT 1_1 2:SLOT 1_2 3:SLOT 1_3 4:SLOT 2_1 5:SLOT 2_2 6:SLOT 2_3 7:SLOT 3_1	-	0	Change at stop	1764
n13-01	Module online status	0:Offline 1:Online	-	0	No	33885
n13-03	TCP/IP address 1	0 - 255	-	192	Change at stop	1767
n13-04	TCP/IP address 2	0 - 255	-	168	Change at stop	1768
n13-05	TCP/IP address 3	0 - 255	-	10	Change at stop	1769
n13-06	TCP/IP address 4	0 - 255	-	253	Change at stop	1770
n13-07	TCP/IP subnet mask address 1	0 - 255	-	255	Change at stop	2114
n13-08	TCP/IP subnet mask address 2	0 - 255	-	255	Change at stop	2115
n13-09	TCP/IP subnet mask address 3	0 - 255	-	255	Change at stop	2116
n13-10	TCP/IP subnet mask address 4	0 - 255	-	0	Change at stop	2117
n13-11	TCP/IP network gateway address 1	0 - 255	-	0	Change at stop	2118
n13-12	TCP/IP network gateway address 2	0 - 255	-	0	Change at stop	2119
n13-13	TCP/IP network gateway address 3	0 - 255	-	0	Change at stop	2120
n13-14	TCP/IP network gateway address 4	0 - 255	-	0	Change at stop	2121

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
Group n14: EtherCAT module						
n14-00	SLOT selection	0:Disable 1:SLOT 1_1 2:SLOT 1_2 3:SLOT 1_3 4:SLOT 2_1 5:SLOT 2_2 6:SLOT 2_3 7:SLOT 3_1	-	0	Change at stop	1776
n14-01	Module online status	0:Offline 1:Online	-	0	No	33886
n14-02	EtherCAT slave name	0 - 65535	-	1	Change at stop	1779
n14-03	EtherCAT slave alias	0 - 65535	-	1	Change at stop	1780
n14-04	Allowed EtherCAT sync interrupt loss count	4 - 20	-	4	Change at stop	1781
n14-05	EtherCAT sync meas. mechanism	0 - 1	-	0	Change at stop	1782
Group n15: HDVN module						
n15-00	SLOT selection	0:Disable 1:SLOT 1_1 2:SLOT 1_2 3:SLOT 1_3 4:SLOT 2_1 5:SLOT 2_2 6:SLOT 2_3 7:SLOT 3_1	-	0	Change at stop	1788
n15-01	Module online status	0:Offline 1:Online	-	0	No	33887
n15-02	Comm. card parameter update	0: Canceled 1: Confirmed	-	0	Change at stop	35556
n15-03	HDVN node address configuration	0 - 63	-	63	Change at stop	1791
n15-04	HDVN node actual address	0 - 65535	-	0	No	35552
n15-05	HDVN node baud rate configuration	0:125kbps 1:250kbps 2:500kbps 3: Automatic identification	-	0	Change at stop	1792
n15-06	HDVN node actual baud rate	0:125kbps 1:250kbps 2:500kbps 3: Automatic identification	-	0	No	35553
n15-07	Number of I/O connection input words	0 - 40	-	0	Change at stop	4185
n15-08	[I/O input words] Actual number	0 - 65535	-	0	No	35554
n15-09	Number of I/O connection output words	0 - 40	-	0	Change at stop	4186
n15-10	[I/O output words] Actual number	0 - 65535	-	0	No	35555
n15-16	Communication configuration monitoring automatic setting mode	0:Disable 1:Enable	-	0	Change at stop	4188
n15-17	Threshold for PDO length inconsistency evaluation count	0 - 255	-	3	Change at stop	4192
n15-18	Info display timeout period	0.0 - 60.0	s	0.0	Yes	4187

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n15-19	I/O information timeout period	0.0 - 60.0	s	0.3	Yes	1793
n15-20	Comm. offline action	0:Keep offline 1:Reset and continue comm.	-	1	Change at stop	1794
n15-27	VendorID	1 - 65535	-	1	Change at stop	1795
n15-28	ProductType	0 - 65535	-	0	Change at stop	1796
n15-29	ProductCode	0 - 65535	-	0	Change at stop	1797
n15-30	MajorRevision	0 - 255	-	0	Change at stop	1798
n15-31	MinorRevision	0 - 255	-	0	Change at stop	1799
Group n16: Profibus-DP module						
n16-00	SLOT selection	0:Disable 1:SLOT 1_1 2:SLOT 1_2 3:SLOT 1_3 4:SLOT 2_1 5:SLOT 2_2 6:SLOT 2_3 7:SLOT 3_1	-	0	Change at stop	1800
n16-01	Module online status	0:Offline 1:Online	-	0	No	33888
n16-02	Ext. module Node-ID	1 - 125	-	1	Change at stop	1803
n16-09	Signature code	0: Default 1:0806 2:0956 3:8045 4:0812 5:0815 6:6012 7:80b5 8:4149 9:0572 10:4150 11:0612+JH 12:0812+SL 13:0959v2.145 14:0959v2.161 15: Reserved 16: Reserved	-	0	Change at stop	1810
n16-10	DP data check bit	0: Default PZD1.bit10 1: Disabled 2:PZD1.bit0 3:PZD1.bit1 4:PZD1.bit2 5:PZD1.bit3 6:PZD1.bit4 7:PZD1.bit5 8:PZD1.bit6 9:PZD1.bit7 10:PZD1.bit8 11:PZD1.bit9 12:PZD1.bit10 13:PZD1.bit11 14:PZD1.bit12 15:PZD1.bit13 16:PZD1.bit14 17:PZD1.bit15	-	0	Change at stop	1811

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
Group n17: Profinet I/O module						
n17-00	SLOT selection	0:Disable 1:SLOT 1_1 2:SLOT 1_2 3:SLOT 1_3 4:SLOT 2_1 5:SLOT 2_2 6:SLOT 2_3 7:SLOT 3_1	-	0	Change at stop	1812
n17-01	Module online status	0:Offline 1:Online	-	0	No	33889
n17-03	MAC address word1	0x0000 - 0xFFFF	-	0	No	34833
n17-04	MAC address word2	0x0000 - 0xFFFF	-	0	No	34834
n17-05	MAC address word3	0x0000 - 0xFFFF	-	0	No	34835
Group n18: custom communication module						
n18-00	SLOT selection	0:Disable 1:SLOT 1_1 2:SLOT 1_2 3:SLOT 1_3 4:SLOT 2_1 5:SLOT 2_2 6:SLOT 2_3 7:SLOT 3_1	-	0	Change at stop	2163
n18-01	Module online status	0:Offline 1:Online	-	0	No	33925
n18-02	Custom comm. card param 1	0 - 65535	-	0	Change at stop	2166
n18-03	Custom comm. card param 2	0 - 65535	-	0	Change at stop	2164
n18-04	Custom comm. card param 3	0 - 65535	-	0	Change at stop	2165
n18-05	Custom comm. card param 4	0 - 65535	-	0	Change at stop	2167
n18-06	Custom comm. card param 5	0 - 65535	-	0	Change at stop	2168
n18-07	Custom comm. card param 6	0 - 65535	-	0	Change at stop	2169
n18-08	Custom comm. card param 7	0 - 65535	-	0	Change at stop	2170
n18-09	Custom comm. card param 8	0 - 65535	-	0	Change at stop	2171
n18-10	Custom comm. card param 9	0 - 65535	-	0	Change at stop	2172
n18-11	Custom comm. card param 10	0 - 65535	-	0	Change at stop	2173
n18-12	Custom comm. card param 11	0 - 65535	-	0	Change at stop	2174
n18-13	Custom comm. card param 12	0 - 65535	-	0	Change at stop	2345
n18-14	Custom comm. card param 13	0 - 65535	-	0	Change at stop	2346
n18-15	Custom comm. card param 14	0 - 65535	-	0	Change at stop	2347
n18-16	Custom comm. card param 15	0 - 65535	-	0	Change at stop	2348
n18-17	Custom comm. card param 16	0 - 65535	-	0	Change at stop	2349
n18-18	Custom comm. card param 17	0 - 65535	-	0	Change at stop	2350

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n18-19	Custom comm. card param 18	0 - 65535	-	0	Change at stop	2351
Group n19: synchronization voltage detection module 1						
n19-00	SLOT selection	0: Disabled 1: Expansion slot 1_1 2: Expansion slot 1_2 3: Expansion slot 1_3 4: Expansion slot 2_1 5: Expansion slot 2_2 6: Expansion slot 2_3 7: Expansion slot 3_1	-	0	Change at stop	2236
n19-01	Module online status	0: Offline 1: Online	-	0	No	33945
n19-02	[HSVM-10] voltage sampling frequency	0: 40K sampling frequency 1: 80K sampling frequency 2: 160K sampling frequency 2: 160K sampling frequency	-	0	Change at stop	2237
n19-03	[HSVM-10] voltage sampling delay selection	0:No delay 1:Delay	-	0	Change at stop	2238
n19-04	[HSVM -10] Data entries received by module	0 - 65535	-	0	No	33946
n19-05	[HSVM-10] module state register	0 - 65535	-	0	No	33947
n19-07	[HSVM-10] module Usr sampling AD	0 - 65535	-	0	No	33949
n19-08	[HSVM-10] module Ust sampling AD	0 - 65535	-	0	No	33950
n19-09	[HSVM-10] module temp. sampling AD	0 - 65535	-	0	No	33951
Group n22: optical routing control module						
n22-00	Start comm. network	0: Disabled 1: On Other: B connector	-	0	Yes	2922
n22-01	Comm. interrupt meas. time	0.00 - 60.00	s	0.01	Yes	2955
n22-02	SLOT selection	0:Disable 1:SLOT 1_1 2:SLOT 1_2 3:SLOT 1_3 4:SLOT 2_1 5:SLOT 2_2 6:SLOT 2_3 7:SLOT 3_1	-	0	Change at stop	2923
n22-03	Module online status	0:Offline 1:Online	-	0	No	34303
n22-04	Online Node-ID on comm. network	0x0000 - 0xFFFF	-	0	No	33512
n22-05	Local address	0 - 11	-	0	Change at stop	2924

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n22-06	Source node A of received data	0: Invalid 1: Address 1 2: Address 2 3: Address 3 4: Address 4 5: Address 5 6: Address 6 7: Address 7 8: Address 8 9: Address 9 10: Address 10 11: Address 11	-	0	Yes	2925
n22-07	Source node B of received data	0: Invalid 1: Address 1 2: Address 2 3: Address 3 4: Address 4 5: Address 5 6: Address 6 7: Address 7 8: Address 8 9: Address 9 10: Address 10 11: Address 11	-	0	Yes	2926
n22-08	Source node C of received data	0: Invalid 1: Address 1 2: Address 2 3: Address 3 4: Address 4 5: Address 5 6: Address 6 7: Address 7 8: Address 8 9: Address 9 10: Address 10 11: Address 11	-	0	Yes	2927
n22-09	Received data 1 selection	Unit' s position: Data selection 1: Data 1 2: Data 2 3: Data 3 4: Data 4 5: Data 5 6: Data 6 7: Data 7 8: Data 8 Ten' s position: data source node 0: Invalid 1: Node A 2: Node B 3: Node C	-	1	Yes	2928

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n22-10	Received data 2 selection	Unit' s position: Data selection 1: Data 1 2: Data 2 3: Data 3 4: Data 4 5: Data 5 6: Data 6 7: Data 7 8: Data 8 Ten' s position: data source node 0: Invalid 1: Node A 2: Node B 3: Node C	-	1	Yes	2929
n22-11	Received data 3 selection	Unit' s position: Data selection 1: Data 1 2: Data 2 3: Data 3 4: Data 4 5: Data 5 6: Data 6 7: Data 7 8: Data 8 Ten' s position: data source node 0: Invalid 1: Node A 2: Node B 3: Node C	-	1	Yes	2930
n22-12	Received data 4 selection	Unit' s position: Data selection 1: Data 1 2: Data 2 3: Data 3 4: Data 4 5: Data 5 6: Data 6 7: Data 7 8: Data 8 Ten' s position: data source node 0: Invalid 1: Node A 2: Node B 3: Node C	-	1	Yes	2931
n22-13	Received data 5 selection	Unit' s position: Data selection 1: Data 1 2: Data 2 3: Data 3 4: Data 4 5: Data 5 6: Data 6 7: Data 7 8: Data 8 Ten' s position: data source node 0: Invalid 1: Node A 2: Node B 3: Node C	-	1	Yes	2932

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n22-14	Received data 6 selection	Unit' s position: Data selection 1: Data 1 2: Data 2 3: Data 3 4: Data 4 5: Data 5 6: Data 6 7: Data 7 8: Data 8 Ten' s position: data source node 0: Invalid 1: Node A 2: Node B 3: Node C	-	1	Yes	2933
n22-15	Received data 7 selection	Unit' s position: Data selection 1: Data 1 2: Data 2 3: Data 3 4: Data 4 5: Data 5 6: Data 6 7: Data 7 8: Data 8 Ten' s position: data source node 0: Invalid 1: Node A 2: Node B 3: Node C	-	1	Yes	2934
n22-16	Received data 8 selection	Unit' s position: Data selection 1: Data 1 2: Data 2 3: Data 3 4: Data 4 5: Data 5 6: Data 6 7: Data 7 8: Data 8 Ten' s position: data source node 0: Invalid 1: Node A 2: Node B 3: Node C	-	1	Yes	2935
n22-17	Received data 1 scaling	-8.000 - 8.000	-	1	Yes	2936
n22-18	Received data 2 scaling	-8.000 - 8.000	-	1	Yes	2937
n22-19	Received data 3 scaling	-8.000 - 8.000	-	1	Yes	2938
n22-20	Received data 4 scaling	-8.000 - 8.000	-	1	Yes	2939
n22-21	Received data 5 scaling	-8.000 - 8.000	-	1	Yes	2940
n22-22	Received data 6 scaling	-8.000 - 8.000	-	1	Yes	2941
n22-23	Received data 7 scaling	-8.000 - 8.000	-	1	Yes	2942
n22-24	Received data 8 scaling	-8.000 - 8.000	-	1	Yes	2943
n22-25	[Sent data 1] Selection	0: 0 Other: K connector	-	0	Yes	2944
n22-26	[Sent data 2] Selection	0: 0 Other: K connector	-	0	Yes	2945
n22-27	[Sent data 3] Selection	0: 0 Other: K connector	-	0	Yes	2946

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n22-28	[Sent data 4] Selection	0: 0 Other: K connector	-	0	Yes	2947
n22-29	[Sent data 5] Selection	0: 0 Other: K connector	-	0	Yes	2948
n22-30	[Sent data 6] Selection	0: 0 Other: K connector	-	0	Yes	2949
n22-31	[Sent data 7] Selection	0: 0 Other: K connector	-	0	Yes	2950
n22-32	[Sent data 8] Selection	0: 0 Other: K connector	-	0	Yes	2951
Group n23: HIO module 1 parameter setting (HIO-10)						
n23-00	DI/DIO input filter time	0.000 - 1.000	s	0.001	Change at stop	3442
n23-09	DIO positive and negative logic	Bit00: DIO1 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit01: DIO2 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit02: DIO3 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit03: DIO4 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit04: DIO5 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit05: DIO6 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level]	-	0	Change at stop	3460
n23-10	DIO1 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3463
n23-11	DIO1 switch-on delay	0.00 - 360.00	s	0	Change at stop	3466
n23-12	DIO1 switch-off delay	0.00 - 360.00	s	0	Change at stop	3469
n23-13	DIO2 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3472

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n23-14	DIO2 switch-on delay	0.00 - 360.00	s	0	Change at stop	3475
n23-15	DIO2 switch-off delay	0.00 - 360.00	s	0	Change at stop	3478
n23-20	RO positive and negative logic	Bit00: RO1 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit01: RO2 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit02: RO3 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit03: RO4 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level]	-	0	Change at stop	3493
n23-21	RO1 signal source	0:Low level 1:High level Other: B connector	-	0	Change at stop	3496
n23-22	RO1 switch-on delay	0.00 - 360.00	s	0	Change at stop	3499
n23-23	RO1 switch-off delay	0.00 - 360.00	s	0	Change at stop	3502
n23-35	AI1 smaller than min. input setpoint option	Unit’ s position: AI1 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0% Ten’ s position: AI2 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0% Hundred’ s position: AI3 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0%	-	0	Change at stop	3520

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n23-36	Enable AI wire breakage monitoring	Unit' s position: AI1 wire breakage monitoring enable 0: Disabled 1: Enabled Ten' s position: AI2 wire breakage monitoring enable 0: Disabled 1: Enabled Hundred' s position: AI3 wire breakage monitoring enable 0: Disabled 1: Enabled	-	0	Change at stop	3523
n23-37	AI zero crossover threshold	0.0 - 1.0	%	0	Change at stop	3526
n23-40	AI1 enable	0:Disable 1:Enable Other: B connector	-	1	Change at stop	3529
n23-41	AI1 type	0:-10 to +10 V 1:0 to 10 V 2:-20 to +20 mA 3:0 to 20 mA 4:4 to 20 mA	-	0	Change at stop	3532
n23-42	[AI1 curve] Min. input value	-20.000 - 20.000	-	-10	Yes	3535
n23-43	[AI1 curve] Min. input scaling	-600.0 - 600.0	%	-100	Yes	3538
n23-44	[AI1 curve] Max. input value	-20.000 - 20.000	-	10	Yes	3541
n23-45	[AI1 curve] Max. input scaling	-600.0 - 600.0	%	100	Yes	3544
n23-46	AI1 filter time	0.000 - 10.000	s	0	Yes	3547
n23-47	AI1 denoising threshold	0.0 - 20.0	%	0	Yes	3550
n23-48	AI1 wire breakage monitoring threshold	0.000 - 4.000	mA	2	Yes	3553
n23-49	AI1 wire breakage monitoring delay	0.00 - 10.00	s	1	Yes	3556
n23-50	AI2 enable	0:Disable 1:Enable Other: B connector	-	1	Change at stop	3559
n23-51	AI2 type	0:-10 to +10 V 1:0 to 10 V 2:-20 to +20 mA 3:0 to 20 mA 4:4 to 20 mA	-	0	Change at stop	3562
n23-52	[AI2 curve] Min. input value	-20.000 - 20.000	-	-10	Yes	3565
n23-53	[AI2 curve] Min. input scaling	-600.0 - 600.0	%	-100	Yes	3568
n23-54	[AI2 curve] Max. input value	-20.000 - 20.000	-	10	Yes	3571
n23-55	[AI2 curve] Max. input scaling	-600.0 - 600.0	%	100	Yes	3574
n23-56	AI2 filter time	0.000 - 10.000	s	0	Yes	3577
n23-57	AI2 denoising threshold	0.0 - 20.0	%	0	Yes	3580
n23-58	AI2 wire breakage monitoring threshold	0.000 - 4.000	mA	2	Yes	3583
n23-59	AI2 wire breakage monitoring delay	0.00 - 10.00	s	1	Yes	3586
n23-70	AO1 signal source	0: 0 Other: K connector	-	0	Change at stop	3619
n23-71	AO1 type	0:0 to 10 V 1:0 to 20 mA 2:4 to 20 mA	-	0	Change at stop	3622
n23-72	[AO1 curve] Min. output scaling	-600.0 - 600.0	%	0	Yes	3625

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n23-73	[AO1 curve] Min. output value	0.000 - 20.000	-	0	Yes	3628
n23-74	[AO1 curve] Max. output scaling	-600.0 - 600.0	%	100	Yes	3631
n23-75	[AO1 curve] Max. output value	0.000 - 20.000	-	10	Yes	3634
n23-80	AO2 signal source	0: 0 Other: K connector	-	0	Change at stop	3637
n23-81	AO2 type	0:0 to 10 V 1:0 to 20 mA 2:4 to 20 mA	-	0	Change at stop	3640
n23-82	[AO2 curve] Min. output scaling	-600.0 - 600.0	%	0	Yes	3643
n23-83	[AO2 curve] Min. output value	0.000 - 20.000	-	0	Yes	3646
n23-84	[AO2 curve] Max. output scaling	-600.0 - 600.0	%	100	Yes	3649
n23-85	[AO2 curve] Max. output value	0.000 - 20.000	-	10	Yes	3652
Group n24: HIO module 1 parameter setting (HIO-20)						
n24-00	DI/DIO input filter time	0.000 - 1.000	s	0.001	Change at stop	3442
n24-09	DIO positive and negative logic	Bit00: DIO1 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit01: DIO2 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit02: DIO3 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit03: DIO4 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit04: DIO5 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit05: DIO6 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level]	-	0	Change at stop	3460
n24-10	DIO1 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3463
n24-11	DIO1 switch-on delay	0.00 - 360.00	s	0	Change at stop	3466
n24-12	DIO1 switch-off delay	0.00 - 360.00	s	0	Change at stop	3469

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n24-13	DIO2 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3472
n24-14	DIO2 switch-on delay	0.00 - 360.00	s	0	Change at stop	3475
n24-15	DIO2 switch-off delay	0.00 - 360.00	s	0	Change at stop	3478
n24-16	DIO3 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3481
n24-17	DIO4 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3484
n24-18	DIO5 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3487
n24-20	RO positive and negative logic	Bit00: RO1 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit01: RO2 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit02: RO3 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit03: RO4 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level]	-	0	Change at stop	3493
n24-21	RO1 signal source	0:Low level 1:High level Other: B connector	-	0	Change at stop	3496
n24-22	RO1 switch-on delay	0.00 - 360.00	s	0	Change at stop	3499
n24-23	RO1 switch-off delay	0.00 - 360.00	s	0	Change at stop	3502
n24-24	RO2 signal source	0:Low level 1:High level Other: B connector	-	0	Change at stop	3505
n24-25	RO2 switch-on delay	0.00 - 360.00	s	0	Change at stop	3508
n24-26	RO2 switch-off delay	0.00 - 360.00	s	0	Change at stop	3511
Group n25: HIO module 1 parameter setting (HIO-30)						
n25-00	DI/DIO input filter time	0.000 - 1.000	s	0.001	Change at stop	3442

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n25-01	DI positive and negative logic	Bit00: DI1 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit01: DI2 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit02: DI3 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit03: DI4 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit04: DI5 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit05: DI6 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level]	-	0	Change at stop	3445
n25-02	DI1 switch-on delay	0.00 - 360.00	s	0	Change at stop	3448
n25-03	DI1 switch-off delay	0.00 - 360.00	s	0	Change at stop	3451
n25-04	DI2 switch-on delay	0.00 - 360.00	s	0	Change at stop	3454
n25-05	DI2 switch-off delay	0.00 - 360.00	s	0	Change at stop	3457

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n25-09	DIO positive and negative logic	Bit00: DIO1 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit01: DIO2 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit02: DIO3 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit03: DIO4 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit04: DIO5 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit05: DIO6 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level]	-	0	Change at stop	3460
n25-10	DIO1 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3463
n25-11	DIO1 switch-on delay	0.00 - 360.00	s	0	Change at stop	3466
n25-12	DIO1 switch-off delay	0.00 - 360.00	s	0	Change at stop	3469
n25-13	DIO2 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3472
n25-14	DIO2 switch-on delay	0.00 - 360.00	s	0	Change at stop	3475
n25-15	DIO2 switch-off delay	0.00 - 360.00	s	0	Change at stop	3478
n25-16	DIO3 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3481
n25-17	DIO4 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3484
n25-18	DIO5 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3487
n25-19	DIO6 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3490

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n25-20	RO positive and negative logic	Bit00: RO1 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit01: RO2 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit02: RO3 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit03: RO4 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level]	-	0	Change at stop	3493
n25-21	RO1 signal source	0:Low level 1:High level Other: B connector	-	0	Change at stop	3496
n25-22	RO1 switch-on delay	0.00 - 360.00	s	0	Change at stop	3499
n25-23	RO1 switch-off delay	0.00 - 360.00	s	0	Change at stop	3502
n25-24	RO2 signal source	0:Low level 1:High level Other: B connector	-	0	Change at stop	3505
n25-25	RO2 switch-on delay	0.00 - 360.00	s	0	Change at stop	3508
n25-26	RO2 switch-off delay	0.00 - 360.00	s	0	Change at stop	3511
n25-27	RO3 signal source	0:Low level 1:High level Other: B connector	-	0	Change at stop	3514
n25-28	RO4 signal source	0:Low level 1:High level Other: B connector	-	0	Change at stop	3517
n25-35	AI1 smaller than min. input setpoint option	Unit' s position: AI1 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0% Ten' s position: AI2 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0% Hundred' s position: AI3 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0%	-	0	Change at stop	3520

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n25-36	Enable AI wire breakage monitoring	Unit' s position: AI1 wire breakage monitoring enable 0: Disabled 1: Enabled Ten' s position: AI2 wire breakage monitoring enable 0: Disabled 1: Enabled Hundred' s position: AI3 wire breakage monitoring enable 0: Disabled 1: Enabled	-	0	Change at stop	3523
n25-37	AI zero crossover threshold	0.0 - 1.0	%	0	Change at stop	3526
n25-40	AI1 enable	0:Disable 1:Enable Other: B connector	-	1	Change at stop	3529
n25-41	AI1 type	0:-10 - 10V 1:0 - 10V 2:-20 - 20mA 3:0 - 20mA 4:4 - 20mA	-	0	Change at stop	3532
n25-42	[AI1 curve] Min. input value	-20.000 - 20.000	-	-10	Yes	3535
n25-43	[AI1 curve] Min. input scaling	-600.0 - 600.0	%	-100	Yes	3538
n25-44	[AI1 curve] Max. input value	-20.000 - 20.000	-	10	Yes	3541
n25-45	[AI1 curve] Max. input scaling	-600.0 - 600.0	%	100	Yes	3544
n25-46	AI1 filter time	0.000 - 10.000	s	0	Yes	3547
n25-47	AI1 denoising threshold	0.0 - 20.0	%	0	Yes	3550
n25-48	AI1 wire breakage monitoring threshold	0.000 - 4.000	mA	2	Yes	3553
n25-49	AI1 wire breakage monitoring delay	0.00 - 10.00	s	1	Yes	3556
n25-50	AI2 enable	0:Disable 1:Enable Other: B connector	-	1	Change at stop	3559
n25-51	AI2 type	0:-10 - 10V 1:0 - 10V 2:-20 - 20mA 3:0 - 20mA 4:4 - 20mA	-	0	Change at stop	3562
n25-52	[AI2 curve] Min. input value	-20.000 - 20.000	-	-10	Yes	3565
n25-53	[AI2 curve] Min. input scaling	-600.0 - 600.0	%	-100	Yes	3568
n25-54	[AI2 curve] Max. input value	-20.000 - 20.000	-	10	Yes	3571
n25-55	[AI2 curve] Max. input scaling	-600.0 - 600.0	%	100	Yes	3574
n25-56	AI2 filter time	0.000 - 10.000	s	0	Yes	3577
n25-57	AI2 denoising threshold	0.0 - 20.0	%	0	Yes	3580
n25-58	AI2 wire breakage monitoring threshold	0.000 - 4.000	mA	2	Yes	3583
n25-59	AI2 wire breakage monitoring delay	0.00 - 10.00	s	1	Yes	3586
n25-60	AI3 enable	0:Disable 1:Enable Other: B connector	-	1	Change at stop	3589

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n25-61	AI3 type	0:-10 - 10V 1:0 - 10V 2:-20 - 20mA 3:0 - 20mA 4:4 - 20mA	-	0	Change at stop	3592
n25-62	[AI3 curve] Min. input value	-20.000 - 20.000	-	-10	Yes	3595
n25-63	[AI3 curve] Min. input scaling	-600.0 - 600.0	%	-100	Yes	3598
n25-64	[AI3 curve] Max. input value	-20.000 - 20.000	-	10	Yes	3601
n25-65	[AI3 curve] Max. input scaling	-600.0 - 600.0	%	100	Yes	3604
n25-66	AI3 filter time	0.000 - 10.000	s	0	Yes	3607
n25-67	AI3 denoising threshold	0.0 - 20.0	%	0	Yes	3610
n25-68	AI3 wire breakage monitoring threshold	0.000 - 4.000	mA	2	Yes	3613
n25-69	AI3 wire breakage monitoring delay	0.00 - 10.00	s	1	Yes	3616
n25-70	AO1 signal source	0: 0 Other: K connector	-	0	Change at stop	3619
n25-71	AO1 type	0:0 - 10V 1:0 - 20mA 2:4 - 20mA	-	0	Change at stop	3622
n25-72	[AO1 curve] Min. output scaling	-600.0 - 600.0	%	0	Yes	3625
n25-73	[AO1 curve] Min. output value	0.000 - 20.000	-	0	Yes	3628
n25-74	[AO1 curve] Max. output scaling	-600.0 - 600.0	%	100	Yes	3631
n25-75	[AO1 curve] Max. output value	0.000 - 20.000	-	10	Yes	3634
n25-80	AO2 signal source	0: 0 Other: K connector	-	0	Change at stop	3637
n25-81	AO2 type	0:0 - 10V 1:0 - 20mA 2:4 - 20mA	-	0	Change at stop	3640
n25-82	[AO2 curve] Min. output scaling	-600.0 - 600.0	%	0	Yes	3643
n25-83	[AO2 curve] Min. output value	0.000 - 20.000	-	0	Yes	3646
n25-84	[AO2 curve] Max. output scaling	-600.0 - 600.0	%	100	Yes	3649
n25-85	[AO2 curve] Max. output value	0.000 - 20.000	-	10	Yes	3652
n25-90	AO3 signal source	0: 0 Other: K connector	-	0	Change at stop	3655
n25-91	AO3 type	0:0 - 10V 1:0 - 20mA 2:4 - 20mA	-	0	Change at stop	3658
n25-92	[AO3 curve] Min. output scaling	-600.0 - 600.0	%	0	Yes	3661
n25-93	[AO3 curve] Min. output value	0.000 - 20.000	-	0	Yes	3664
n25-94	[AO3 curve] Max. output scaling	-600.0 - 600.0	%	100	Yes	3667
n25-95	[AO3 curve] Max. output value	0.000 - 20.000	-	10	Yes	3670
Group n26: HIO module 2 parameter setting (HIO-10)						
n26-00	DI/DIO input filter time	0.000 - 1.000	s	0.001	Change at stop	3443

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n26-09	DIO positive and negative logic	Bit00: DIO1 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit01: DIO2 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit02: DIO3 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit03: DIO4 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit04: DIO5 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit05: DIO6 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level]	-	0	Change at stop	3461
n26-10	DIO1 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3464
n26-11	DIO1 switch-on delay	0.00 - 360.00	s	0	Change at stop	3467
n26-12	DIO1 switch-off delay	0.00 - 360.00	s	0	Change at stop	3470
n26-13	DIO2 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3473
n26-14	DIO2 switch-on delay	0.00 - 360.00	s	0	Change at stop	3476
n26-15	DIO2 switch-off delay	0.00 - 360.00	s	0	Change at stop	3479

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n26-20	RO positive and negative logic	Bit00: RO1 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit01: RO2 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit02: RO3 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit03: RO4 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level]	-	0	Change at stop	3494
n26-21	RO1 signal source	0:Low level 1:High level Other: B connector	-	0	Change at stop	3497
n26-22	RO1 switch-on delay	0.00 - 360.00	s	0	Change at stop	3500
n26-23	RO1 switch-off delay	0.00 - 360.00	s	0	Change at stop	3503
n26-35	AI1 smaller than min. input setpoint option	Unit' s position: AI1 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0% Ten' s position: AI2 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0% Hundred' s position: AI3 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0%	-	0	Change at stop	3521
n26-36	Enable AI wire breakage monitoring	Unit' s position: AI1 wire breakage monitoring enable 0: Disabled 1: Enabled Ten' s position: AI2 wire breakage monitoring enable 0: Disabled 1: Enabled Hundred' s position: AI3 wire breakage monitoring enable 0: Disabled 1: Enabled	-	0	Change at stop	3524

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n26-37	AI zero crossover threshold	0.0 - 1.0	%	0	Change at stop	3527
n26-40	AI1 enable	0:Disable 1:Enable Other: B connector	-	1	Change at stop	3530
n26-41	AI1 type	0:-10 - 10V 1:0 - 10V 2:-20 - 20mA 3:0 - 20mA 4:4 - 20mA	-	0	Change at stop	3533
n26-42	[AI1 curve] Min. input value	-20.000 - 20.000	-	-10	Yes	3536
n26-43	[AI1 curve] Min. input scaling	-600.0 - 600.0	%	-100	Yes	3539
n26-44	[AI1 curve] Max. input value	-20.000 - 20.000	-	10	Yes	3542
n26-45	[AI1 curve] Max. input scaling	-600.0 - 600.0	%	100	Yes	3545
n26-46	AI1 filter time	0.000 - 10.000	s	0	Yes	3548
n26-47	AI1 denoising threshold	0.0 - 20.0	%	0	Yes	3551
n26-48	AI1 wire breakage monitoring threshold	0.000 - 4.000	mA	2	Yes	3554
n26-49	AI1 wire breakage monitoring delay	0.00 - 10.00	s	1	Yes	3557
n26-50	AI2 enable	0:Disable 1:Enable Other: B connector	-	1	Change at stop	3560
n26-51	AI2 type	0:-10 - 10V 1:0 - 10V 2:-20 - 20mA 3:0 - 20mA 4:4 - 20mA	-	0	Change at stop	3563
n26-52	[AI2 curve] Min. input value	-20.000 - 20.000	-	-10	Yes	3566
n26-53	[AI2 curve] Min. input scaling	-600.0 - 600.0	%	-100	Yes	3569
n26-54	[AI2 curve] Max. input value	-20.000 - 20.000	-	10	Yes	3572
n26-55	[AI2 curve] Max. input scaling	-600.0 - 600.0	%	100	Yes	3575
n26-56	AI2 filter time	0.000 - 10.000	s	0	Yes	3578
n26-57	AI2 denoising threshold	0.0 - 20.0	%	0	Yes	3581
n26-58	AI2 wire breakage monitoring threshold	0.000 - 4.000	mA	2	Yes	3584
n26-59	AI2 wire breakage monitoring delay	0.00 - 10.00	s	1	Yes	3587
n26-70	AO1 signal source	0: 0 Other: K connector	-	0	Change at stop	3620
n26-71	AO1 type	0:0 - 10V 1:0 - 20mA 2:4 - 20mA	-	0	Change at stop	3623
n26-72	[AO1 curve] Min. output scaling	-600.0 - 600.0	%	0	Yes	3626
n26-73	[AO1 curve] Min. output value	0.000 - 20.000	-	0	Yes	3629
n26-74	[AO1 curve] Max. output scaling	-600.0 - 600.0	%	100	Yes	3632
n26-75	[AO1 curve] Max. output value	0.000 - 20.000	-	10	Yes	3635
n26-80	AO2 signal source	0: 0 Other: K connector	-	0	Change at stop	3638
n26-81	AO2 type	0:0 to 10 V 1:0 to 20 mA 2:4 to 20 mA	-	0	Change at stop	3641
n26-82	[AO2 curve] Min. output scaling	-600.0 - 600.0	%	0	Yes	3644
n26-83	[AO2 curve] Min. output value	0.000 - 20.000	-	0	Yes	3647
n26-84	[AO2 curve] Max. output scaling	-600.0 - 600.0	%	100	Yes	3650
n26-85	[AO2 curve] Max. output value	0.000 - 20.000	-	10	Yes	3653

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
Group n27: HIO module 2 parameter setting (HIO-20)						
n27-00	DI/DIO input filter time	0.000 - 1.000	s	0.001	Change at stop	3443
n27-09	DIO positive and negative logic	Bit00: DIO1 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit01: DIO2 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit02: DIO3 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit03: DIO4 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit04: DIO5 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit05: DIO6 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level]	-	0	Change at stop	3461
n27-10	DIO1 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3464
n27-11	DIO1 switch-on delay	0.00 - 360.00	s	0	Change at stop	3467
n27-12	DIO1 switch-off delay	0.00 - 360.00	s	0	Change at stop	3470
n27-13	DIO2 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3473
n27-14	DIO2 switch-on delay	0.00 - 360.00	s	0	Change at stop	3476
n27-15	DIO2 switch-off delay	0.00 - 360.00	s	0	Change at stop	3479
n27-16	DIO3 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3482
n27-17	DIO4 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3485
n27-18	DIO5 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3488

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n27-20	RO positive and negative logic	Bit00: RO1 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit01: RO2 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit02: RO3 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit03: RO4 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level]	-	0	Change at stop	3494
n27-21	RO1 signal source	0:Low level 1:High level Other: B connector	-	0	Change at stop	3497
n27-22	RO1 switch-on delay	0.00 - 360.00	s	0	Change at stop	3500
n27-23	RO1 switch-off delay	0.00 - 360.00	s	0	Change at stop	3503
n27-24	RO2 signal source	0:Low level 1:High level Other: B connector	-	0	Change at stop	3506
n27-25	RO2 switch-on delay	0.00 - 360.00	s	0	Change at stop	3509
n27-26	RO2 switch-off delay	0.00 - 360.00	s	0	Change at stop	3512
Group n28: HIO module 2 parameter setting (HIO-30)						
n28-00	DI/DIO input filter time	0.000 - 1.000	s	0.001	Change at stop	3443

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n28-01	DI positive and negative logic	Bit00: DI1 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit01: DI2 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit02: DI3 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit03: DI4 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit04: DI5 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit05: DIO6 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level]	-	0	Change at stop	3446
n28-02	DI1 switch-on delay	0.00 - 360.00	s	0	Change at stop	3449
n28-03	DI1 switch-off delay	0.00 - 360.00	s	0	Change at stop	3452
n28-04	DI2 switch-on delay	0.00 - 360.00	s	0	Change at stop	3455
n28-05	DI2 switch-off delay	0.00 - 360.00	s	0	Change at stop	3458

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n28-09	DIO positive and negative logic	Bit00: DIO1 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit01: DIO2 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit02: DIO3 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit03: DIO4 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit04: DIO5 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit05: DIO6 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level]	-	0	Change at stop	3461
n28-10	DIO1 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3464
n28-11	DIO1 switch-on delay	0.00 - 360.00	s	0	Change at stop	3467
n28-12	DIO1 switch-off delay	0.00 - 360.00	s	0	Change at stop	3470
n28-13	DIO2 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3473
n28-14	DIO2 switch-on delay	0.00 - 360.00	s	0	Change at stop	3476
n28-15	DIO2 switch-off delay	0.00 - 360.00	s	0	Change at stop	3479
n28-16	DIO3 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3482
n28-17	DIO4 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3485
n28-18	DIO5 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3488
n28-19	DIO6 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3491

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n28-20	RO positive and negative logic	Bit00: RO1 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit01: RO2 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit02: RO3 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit03: RO4 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level]	-	0	Change at stop	3494
n28-21	RO1 signal source	0:Low level 1:High level Other: B connector	-	0	Change at stop	3497
n28-22	RO1 switch-on delay	0.00 - 360.00	s	0	Change at stop	3500
n28-23	RO1 switch-off delay	0.00 - 360.00	s	0	Change at stop	3503
n28-24	RO2 signal source	0:Low level 1:High level Other: B connector	-	0	Change at stop	3506
n28-25	RO2 switch-on delay	0.00 - 360.00	s	0	Change at stop	3509
n28-26	RO2 switch-off delay	0.00 - 360.00	s	0	Change at stop	3512
n28-27	RO3 signal source	0:Low level 1:High level Other: B connector	-	0	Change at stop	3515
n28-28	RO4 signal source	0:Low level 1:High level Other: B connector	-	0	Change at stop	3518
n28-35	AI1 smaller than min. input setpoint option	Unit' s position: AI1 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0% Ten' s position: AI2 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0% Hundred' s position: AI3 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0%	-	0	Change at stop	3521

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n28-36	Enable AI wire breakage monitoring	Unit' s position: AI1 wire breakage monitoring enable 0: Disabled 1: Enabled Ten' s position: AI2 wire breakage monitoring enable 0: Disabled 1: Enabled Hundred' s position: AI3 wire breakage monitoring enable 0: Disabled 1: Enabled	-	0	Change at stop	3524
n28-37	AI zero crossover threshold	0.0 - 1.0	%	0	Change at stop	3527
n28-40	AI1 enable	0:Disable 1:Enable Other: B connector	-	1	Change at stop	3530
n28-41	AI1 type	0:-10 - 10V 1:0 - 10V 2:-20 - 20mA 3:0 - 20mA 4:4 - 20mA	-	0	Change at stop	3533
n28-42	[AI1 curve] Min. input value	-20.000 - 20.000	-	-10	Yes	3536
n28-43	[AI1 curve] Min. input scaling	-600.0 - 600.0	%	-100	Yes	3539
n28-44	[AI1 curve] Max. input value	-20.000 - 20.000	-	10	Yes	3542
n28-45	[AI1 curve] Max. input scaling	-600.0 - 600.0	%	100	Yes	3545
n28-46	AI1 filter time	0.000 - 10.000	s	0	Yes	3548
n28-47	AI1 denoising threshold	0.0 - 20.0	%	0	Yes	3551
n28-48	AI1 wire breakage monitoring threshold	0.000 - 4.000	mA	2	Yes	3554
n28-49	AI1 wire breakage monitoring delay	0.00 - 10.00	s	1	Yes	3557
n28-50	AI2 enable	0:Disable 1:Enable Other: B connector	-	1	Change at stop	3560
n28-51	AI2 type	0:-10 - 10V 1:0 - 10V 2:-20 - 20mA 3:0 - 20mA 4:4 - 20mA	-	0	Change at stop	3563
n28-52	[AI2 curve] Min. input value	-20.000 - 20.000	-	-10	Yes	3566
n28-53	[AI2 curve] Min. input scaling	-600.0 - 600.0	%	-100	Yes	3569
n28-54	[AI2 curve] Max. input value	-20.000 - 20.000	-	10	Yes	3572
n28-55	[AI2 curve] Max. input scaling	-600.0 - 600.0	%	100	Yes	3575
n28-56	AI2 filter time	0.000 - 10.000	s	0	Yes	3578
n28-57	AI2 denoising threshold	0.0 - 20.0	%	0	Yes	3581
n28-58	AI2 wire breakage monitoring threshold	0.000 - 4.000	mA	2	Yes	3584
n28-59	AI2 wire breakage monitoring delay	0.00 - 10.00	s	1	Yes	3587
n28-60	AI3 enable	0:Disable 1:Enable Other: B connector	-	1	Change at stop	3590

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n28-61	AI3 type	0:-10 - 10V 1:0 - 10V 2:-20 - 20mA 3:0 - 20mA 4:4 - 20mA	-	0	Change at stop	3593
n28-62	[AI3 curve] Min. input value	-20.000 - 20.000	-	-10	Yes	3596
n28-63	[AI3 curve] Min. input scaling	-600.0 - 600.0	%	-100	Yes	3599
n28-64	[AI3 curve] Max. input value	-20.000 - 20.000	-	10	Yes	3602
n28-65	[AI3 curve] Max. input scaling	-600.0 - 600.0	%	100	Yes	3605
n28-66	AI3 filter time	0.000 - 10.000	s	0	Yes	3608
n28-67	AI3 denoising threshold	0.0 - 20.0	%	0	Yes	3611
n28-68	AI3 wire breakage monitoring threshold	0.000 - 4.000	mA	2	Yes	3614
n28-69	AI3 wire breakage monitoring delay	0.00 - 10.00	s	1	Yes	3617
n28-70	AO1 signal source	0: 0 Other: K connector	-	0	Change at stop	3620
n28-71	AO1 type	0:0 - 10V 1:0 - 20mA 2:4 - 20mA	-	0	Change at stop	3623
n28-72	[AO1 curve] Min. output scaling	-600.0 - 600.0	%	0	Yes	3626
n28-73	[AO1 curve] Min. output value	0.000 - 20.000	-	0	Yes	3629
n28-74	[AO1 curve] Max. output scaling	-600.0 - 600.0	%	100	Yes	3632
n28-75	[AO1 curve] Max. output value	0.000 - 20.000	-	10	Yes	3635
n28-80	AO2 signal source	0: 0 Other: K connector	-	0	Change at stop	3638
n28-81	AO2 type	0:0 - 10V 1:0 - 20mA 2:4 - 20mA	-	0	Change at stop	3641
n28-82	[AO2 curve] Min. output scaling	-600.0 - 600.0	%	0	Yes	3644
n28-83	[AO2 curve] Min. output value	0.000 - 20.000	-	0	Yes	3647
n28-84	[AO2 curve] Max. output scaling	-600.0 - 600.0	%	100	Yes	3650
n28-85	[AO2 curve] Max. output value	0.000 - 20.000	-	10	Yes	3653
n28-90	AO3 signal source	0: 0 Other: K connector	-	0	Change at stop	3656
n28-91	AO3 type	0:0 - 10V 1:0 - 20mA 2:4 - 20mA	-	0	Change at stop	3659
n28-92	[AO3 curve] Min. output scaling	-600.0 - 600.0	%	0	Yes	3662
n28-93	[AO3 curve] Min. output value	0.000 - 20.000	-	0	Yes	3665
n28-94	[AO3 curve] Max. output scaling	-600.0 - 600.0	%	100	Yes	3668
n28-95	[AO3 curve] Max. output value	0.000 - 20.000	-	10	Yes	3671
Group n29: HIO module 3 parameter setting (HIO-10)						
n29-00	DI/DIO input filter time	0.000 - 1.000	s	0.001	Change at stop	3444

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n29-09	DIO positive and negative logic	Bit00: DIO1 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit01: DIO2 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit02: DIO3 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit03: DIO4 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit04: DIO5 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit05: DIO6 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level]	-	0	Change at stop	3462
n29-10	DIO1 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3465
n29-11	DIO1 switch-on delay	0.00 - 360.00	s	0	Change at stop	3468
n29-12	DIO1 switch-off delay	0.00 - 360.00	s	0	Change at stop	3471
n29-13	DIO2 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3474
n29-14	DIO2 switch-on delay	0.00 - 360.00	s	0	Change at stop	3477
n29-15	DIO2 switch-off delay	0.00 - 360.00	s	0	Change at stop	3480

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n29-20	RO positive and negative logic	Bit00: RO1 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit01: RO2 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit02: RO3 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit03: RO4 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level]	-	0	Change at stop	3495
n29-21	RO1 signal source	0:Low level 1:High level Other: B connector	-	0	Change at stop	3498
n29-22	RO1 switch-on delay	0.00 - 360.00	s	0	Change at stop	3501
n29-23	RO1 switch-off delay	0.00 - 360.00	s	0	Change at stop	3504
n29-35	AI1 smaller than min. input setpoint option	Unit' s position: AI1 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0% Ten' s position: AI2 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0% Hundred' s position: AI3 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0%	-	0	Change at stop	3522
n29-36	Enable AI wire breakage monitoring	Unit' s position: AI1 wire breakage monitoring enable 0: Disabled 1: Enabled Ten' s position: AI2 wire breakage monitoring enable 0: Disabled 1: Enabled Hundred' s position: AI3 wire breakage monitoring enable 0: Disabled 1: Enabled	-	0	Change at stop	3525

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n29-37	AI zero crossover threshold	0.0 - 1.0	%	0	Change at stop	3528
n29-40	AI1 enable	0:Disable 1:Enable Other: B connector	-	1	Change at stop	3531
n29-41	AI1 type	0:-10 - 10V 1:0 - 10V 2:-20 - 20mA 3:0 - 20mA 4:4 - 20mA	-	0	Change at stop	3534
n29-42	[AI1 curve] Min. input value	-20.000 - 20.000	-	-10	Yes	3537
n29-43	[AI1 curve] Min. input scaling	-600.0 - 600.0	%	-100	Yes	3540
n29-44	[AI1 curve] Max. input value	-20.000 - 20.000	-	10	Yes	3543
n29-45	[AI1 curve] Max. input scaling	-600.0 - 600.0	%	100	Yes	3546
n29-46	AI1 filter time	0.000 - 10.000	s	0	Yes	3549
n29-47	AI1 denoising threshold	0.0 - 20.0	%	0	Yes	3552
n29-48	AI1 wire breakage monitoring threshold	0.000 - 4.000	mA	2	Yes	3555
n29-49	AI1 wire breakage monitoring delay	0.00 - 10.00	s	1	Yes	3558
n29-50	AI2 enable	0:Disable 1:Enable Other: B connector	-	1	Change at stop	3561
n29-51	AI2 type	0:-10 - 10V 1:0 - 10V 2:-20 - 20mA 3:0 - 20mA 4:4 - 20mA	-	0	Change at stop	3564
n29-52	[AI2 curve] Min. input value	-20.000 - 20.000	-	-10	Yes	3567
n29-53	[AI2 curve] Min. input scaling	-600.0 - 600.0	%	-100	Yes	3570
n29-54	[AI2 curve] Max. input value	-20.000 - 20.000	-	10	Yes	3573
n29-55	[AI2 curve] Max. input scaling	-600.0 - 600.0	%	100	Yes	3576
n29-56	AI2 filter time	0.000 - 10.000	s	0	Yes	3579
n29-57	AI2 denoising threshold	0.0 - 20.0	%	0	Yes	3582
n29-58	AI2 wire breakage monitoring threshold	0.000 - 4.000	mA	2	Yes	3585
n29-59	AI2 wire breakage monitoring delay	0.00 - 10.00	s	1	Yes	3588
n29-70	AO1 signal source	0: 0 Other: K connector	-	0	Change at stop	3621
n29-71	AO1 type	0:0 - 10V 1:0 - 20mA 2:4 - 20mA	-	0	Change at stop	3624
n29-72	[AO1 curve] Min. output scaling	-600.0 - 600.0	%	0	Yes	3627
n29-73	[AO1 curve] Min. output value	0.000 - 20.000	-	0	Yes	3630
n29-74	[AO1 curve] Max. output scaling	-600.0 - 600.0	%	100	Yes	3633
n29-75	[AO1 curve] Max. output value	0.000 - 20.000	-	10	Yes	3636
n29-80	AO2 signal source	0: 0 Other: K connector	-	0	Change at stop	3639
n29-81	AO2 type	0:0 to 10 V 1:0 to 20 mA 2:4 to 20 mA	-	0	Change at stop	3642
n29-82	[AO2 curve] Min. output scaling	-600.0 - 600.0	%	0	Yes	3645
n29-83	[AO2 curve] Min. output value	0.000 - 20.000	-	0	Yes	3648
n29-84	[AO2 curve] Max. output scaling	-600.0 - 600.0	%	100	Yes	3651
n29-85	[AO2 curve] Max. output value	0.000 - 20.000	-	10	Yes	3654

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
Group n30: HIO module 3 parameter setting (HIO-20)						
n30-00	DI/DIO input filter time	0.000 - 1.000	s	0.001	Change at stop	3444
n30-09	DIO positive and negative logic	Bit00: DIO1 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit01: DIO2 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit02: DIO3 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit03: DIO4 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit04: DIO5 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit05: DIO6 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level]	-	0	Change at stop	3462
n30-10	DIO1 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3465
n30-11	DIO1 switch-on delay	0.00 - 360.00	s	0	Change at stop	3468
n30-12	DIO1 switch-off delay	0.00 - 360.00	s	0	Change at stop	3471
n30-13	DIO2 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3474
n30-14	DIO2 switch-on delay	0.00 - 360.00	s	0	Change at stop	3477
n30-15	DIO2 switch-off delay	0.00 - 360.00	s	0	Change at stop	3480
n30-16	DIO3 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3483
n30-17	DIO4 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3486
n30-18	DIO5 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3489

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n30-20	RO positive and negative logic	Bit00: RO1 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit01: RO2 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit02: RO3 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit03: RO4 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level]	-	0	Change at stop	3495
n30-21	RO1 signal source	0:Low level 1:High level Other: B connector	-	0	Change at stop	3498
n30-22	RO1 switch-on delay	0.00 - 360.00	s	0	Change at stop	3501
n30-23	RO1 switch-off delay	0.00 - 360.00	s	0	Change at stop	3504
n30-24	RO2 signal source	0:Low level 1:High level Other: B connector	-	0	Change at stop	3507
n30-25	RO2 switch-on delay	0.00 - 360.00	s	0	Change at stop	3510
n30-26	RO2 switch-off delay	0.00 - 360.00	s	0	Change at stop	3513
Group n31: HIO module 3 parameter setting (HIO-30)						
n31-00	DI/DIO input filter time	0.000 - 1.000	s	0.001	Change at stop	3444

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n31-01	DI positive and negative logic	Bit00: DI1 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit01: DI2 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit02: DI3 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit03: DI4 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit04: DI5 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit05: DI6 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level]	-	0	Change at stop	3447
n31-02	DI1 switch-on delay	0.00 - 360.00	s	0	Change at stop	3450
n31-03	DI1 switch-off delay	0.00 - 360.00	s	0	Change at stop	3453
n31-04	DI2 switch-on delay	0.00 - 360.00	s	0	Change at stop	3456
n31-05	DI2 switch-off delay	0.00 - 360.00	s	0	Change at stop	3459

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n31-09	DIO positive and negative logic	Bit00: DIO1 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit01: DIO2 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit02: DIO3 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit03: DIO4 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit04: DIO5 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level] Bit05: DIO6 positive and negative logic 0 [Logic 1 corresponds to high level] 1 [Logic 1 corresponds to low level]	-	0	Change at stop	3462
n31-10	DIO1 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3465
n31-11	DIO1 switch-on delay	0.00 - 360.00	s	0	Change at stop	3468
n31-12	DIO1 switch-off delay	0.00 - 360.00	s	0	Change at stop	3471
n31-13	DIO2 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3474
n31-14	DIO2 switch-on delay	0.00 - 360.00	s	0	Change at stop	3477
n31-15	DIO2 switch-off delay	0.00 - 360.00	s	0	Change at stop	3480
n31-16	DIO3 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3483
n31-17	DIO4 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3486
n31-18	DIO5 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3489
n31-19	DIO6 as DO signal source	0:As DI Other: B connector	-	0	Change at stop	3492

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n31-20	RO positive and negative logic	Bit00: RO1 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit01: RO2 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit02: RO3 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level] Bit03: RO4 positive and negative logic 0 [Logic 1 outputs high level] 1 [Logic 1 outputs low level]	-	0	Change at stop	3495
n31-21	RO1 signal source	0:Low level 1:High level Other: B connector	-	0	Change at stop	3498
n31-22	RO1 switch-on delay	0.00 - 360.00	s	0	Change at stop	3501
n31-23	RO1 switch-off delay	0.00 - 360.00	s	0	Change at stop	3504
n31-24	RO2 signal source	0:Low level 1:High level Other: B connector	-	0	Change at stop	3507
n31-25	RO2 switch-on delay	0.00 - 360.00	s	0	Change at stop	3510
n31-26	RO2 switch-off delay	0.00 - 360.00	s	0	Change at stop	3513
n31-27	RO3 signal source	0:Low level 1:High level Other: B connector	-	0	Change at stop	3516
n31-28	RO4 signal source	0:Low level 1:High level Other: B connector	-	0	Change at stop	3519
n31-35	AI1 smaller than min. input setpoint option	Unit' s position: AI1 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0% Ten' s position: AI2 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0% Hundred' s position: AI3 smaller than min. input setpoint option 0: Min. input percentage 1: 0.0%	-	0	Change at stop	3522

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n31-36	Enable AI wire breakage monitoring	Unit' s position: AI1 wire breakage monitoring enable 0: Disabled 1: Enabled Ten' s position: AI2 wire breakage monitoring enable 0: Disabled 1: Enabled Hundred' s position: AI3 wire breakage monitoring enable 0: Disabled 1: Enabled	-	0	Change at stop	3525
n31-37	AI zero crossover threshold	0.0 - 1.0	%	0	Change at stop	3528
n31-40	AI1 enable	0:Disable 1:Enable Other: B connector	-	1	Change at stop	3531
n31-41	AI1 type	0:-10 - 10V 1:0 - 10V 2:-20 - 20mA 3:0 - 20mA 4:4 - 20mA	-	0	Change at stop	3534
n31-42	[AI1 curve] Min. input value	-20.000 - 20.000	-	-10	Yes	3537
n31-43	[AI1 curve] Min. input scaling	-600.0 - 600.0	%	-100	Yes	3540
n31-44	[AI1 curve] Max. input value	-20.000 - 20.000	-	10	Yes	3543
n31-45	[AI1 curve] Max. input scaling	-600.0 - 600.0	%	100	Yes	3546
n31-46	AI1 filter time	0.000 - 10.000	s	0	Yes	3549
n31-47	AI1 denoising threshold	0.0 - 20.0	%	0	Yes	3552
n31-48	AI1 wire breakage monitoring threshold	0.000 - 4.000	mA	2	Yes	3555
n31-49	AI1 wire breakage monitoring delay	0.00 - 10.00	s	1	Yes	3558
n31-50	AI2 enable	0:Disable 1:Enable Other: B connector	-	1	Change at stop	3561
n31-51	AI2 type	0:-10 - 10V 1:0 - 10V 2:-20 - 20mA 3:0 - 20mA 4:4 - 20mA	-	0	Change at stop	3564
n31-52	[AI2 curve] Min. input value	-20.000 - 20.000	-	-10	Yes	3567
n31-53	[AI2 curve] Min. input scaling	-600.0 - 600.0	%	-100	Yes	3570
n31-54	[AI2 curve] Max. input value	-20.000 - 20.000	-	10	Yes	3573
n31-55	[AI2 curve] Max. input scaling	-600.0 - 600.0	%	100	Yes	3576
n31-56	AI2 filter time	0.000 - 10.000	s	0	Yes	3579
n31-57	AI2 denoising threshold	0.0 - 20.0	%	0	Yes	3582
n31-58	AI2 wire breakage monitoring threshold	0.000 - 4.000	mA	2	Yes	3585
n31-59	AI2 wire breakage monitoring delay	0.00 - 10.00	s	1	Yes	3588
n31-60	AI3 enable	0:Disable 1:Enable Other: B connector	-	1	Change at stop	3591

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
n31-61	AI3 type	0:-10 - 10V 1:0 - 10V 2:-20 - 20mA 3:0 - 20mA 4:4 - 20mA	-	0	Change at stop	3594
n31-62	[AI3 curve] Min. input value	-20.000 - 20.000	-	-10	Yes	3597
n31-63	[AI3 curve] Min. input scaling	-600.0 - 600.0	%	-100	Yes	3600
n31-64	[AI3 curve] Max. input value	-20.000 - 20.000	-	10	Yes	3603
n31-65	[AI3 curve] Max. input scaling	-600.0 - 600.0	%	100	Yes	3606
n31-66	AI3 filter time	0.000 - 10.000	s	0	Yes	3609
n31-67	AI3 denoising threshold	0.0 - 20.0	%	0	Yes	3612
n31-68	AI3 wire breakage monitoring threshold	0.000 - 4.000	mA	2	Yes	3615
n31-69	AI3 wire breakage monitoring delay	0.00 - 10.00	s	1	Yes	3618
n31-70	AO1 signal source	0: 0 Other: K connector	-	0	Change at stop	3621
n31-71	AO1 type	0:0 - 10V 1:0 - 20mA 2:4 - 20mA	-	0	Change at stop	3624
n31-72	[AO1 curve] Min. output scaling	-600.0 - 600.0	%	0	Yes	3627
n31-73	[AO1 curve] Min. output value	0.000 - 20.000	-	0	Yes	3630
n31-74	[AO1 curve] Max. output scaling	-600.0 - 600.0	%	100	Yes	3633
n31-75	[AO1 curve] Max. output value	0.000 - 20.000	-	10	Yes	3636
n31-80	AO2 signal source	0: 0 Other: K connector	-	0	Change at stop	3639
n31-81	AO2 type	0:0 - 10V 1:0 - 20mA 2:4 - 20mA	-	0	Change at stop	3642
n31-82	[AO2 curve] Min. output scaling	-600.0 - 600.0	%	0	Yes	3645
n31-83	[AO2 curve] Min. output value	0.000 - 20.000	-	0	Yes	3648
n31-84	[AO2 curve] Max. output scaling	-600.0 - 600.0	%	100	Yes	3651
n31-85	[AO2 curve] Max. output value	0.000 - 20.000	-	10	Yes	3654
n31-90	AO3 signal source	0: 0 Other: K connector	-	0	Change at stop	3657
n31-91	AO3 type	0:0 - 10V 1:0 - 20mA 2:4 - 20mA	-	0	Change at stop	3660
n31-92	[AO3 curve] Min. output scaling	-600.0 - 600.0	%	0	Yes	3663
n31-93	[AO3 curve] Min. output value	0.000 - 20.000	-	0	Yes	3666
n31-94	[AO3 curve] Max. output scaling	-600.0 - 600.0	%	100	Yes	3669
n31-95	[AO3 curve] Max. output value	0.000 - 20.000	-	10	Yes	3672

Group o Process Parameters

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
Group o0: process setting parameter group 1						
o0-00	[Tech. ctrl] Fixed word 1	-300.00 - 300.00	%	0	Yes	4721
o0-01	[Tech. ctrl] Fixed word 2	-300.00 - 300.00	%	0	Yes	4725
o0-02	[Tech. ctrl] Fixed word 3	-300.00 - 300.00	%	0	Yes	4729
o0-03	[Tech. ctrl] Fixed word 4	-300.00 - 300.00	%	0	Yes	4733
o0-04	[Tech. ctrl] Fixed word 5	-300.00 - 300.00	%	0	Yes	4737
o0-05	[Tech. ctrl] Fixed word 6	-300.00 - 300.00	%	0	Yes	4741
o0-06	[Tech. ctrl] Fixed word 7	-300.00 - 300.00	%	0	Yes	4745
o0-07	[Tech. ctrl] Fixed word 8	-300.00 - 300.00	%	0	Yes	4749
o0-08	[Tech. ctrl] Fixed word 9	-300.00 - 300.00	%	0	Yes	4753
o0-09	[Tech. ctrl] Fixed word 10	-300.00 - 300.00	%	0	Yes	4757
o0-10	[Tech. ctrl] Fixed word 11	-300.00 - 300.00	%	0	Yes	4761
o0-11	[Tech. ctrl] Fixed word 12	-300.00 - 300.00	%	0	Yes	4765
o0-12	[Tech. ctrl] Fixed word 13	-300.00 - 300.00	%	0	Yes	4769
o0-13	[Tech. ctrl] Fixed word 14	-300.00 - 300.00	%	0	Yes	4773
o0-14	[Tech. ctrl] Fixed bit 1	0:Logic 0 1:Logic 1	-	0	Yes	4777
o0-15	[Tech. ctrl] Fixed bit 2	0:Logic 0 1:Logic 1	-	0	Yes	4781
o0-16	[Tech. ctrl] Fixed bit 3	0:Logic 0 1:Logic 1	-	0	Yes	4785
o0-17	[Tech. ctrl] Fixed bit 4	0:Logic 0 1:Logic 1	-	0	Yes	4789
o0-18	[Tech. ctrl] Fixed bit 5	0:Logic 0 1:Logic 1	-	0	Yes	4793
o0-19	[Tech. ctrl] Fixed bit 6	0:Logic 0 1:Logic 1	-	0	Yes	4797
Group o1: process controller parameter group 1						
o1-00	[Tech. ctrl] Enable	0: Disabled 1: Enabled 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	4926
o1-01	[Tech. ctrl] type	Unit' s position: 0: Integral control invalid 1: Integral control valid Ten' s position: 0 Proportional control invalid 1: Proportional control valid Hundred' s position: 0: Improved differential control 1: Traditional differential control Thousand' s position: 0: Positive calculation 1: Negative calculation	-	11	Yes	4899

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
o1-02	[Tech. ctrl] Setpoint 1	0: 0 Other: K connector	-	0	Yes	4919
o1-03	[Tech. ctrl] Setpoint 2	0: 0 Other: K connector	-	0	Yes	4920
o1-04	[Tech. ctrl] Setpoint 3	0: 0 Other: K connector	-	0	Yes	4921
o1-05	[Tech. ctrl] Setpoint 4	0: 0 Other: K connector	-	0	Yes	4922
o1-06	[Tech. ctrl] Suppl. setpoint enable	0: Disabled 1: Enabled 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	4923
o1-07	[Tech. ctrl] suppl. setpoint	0: 0 Other: K connector	-	0	Yes	4851
o1-08	[Tech. ctrl] Filter time setpoint	0.00 - 60.00	s	0	Yes	4855
o1-09	[Tech. ctrl] Feedback value 1	0: 0 Other: K connector	-	0	Yes	4915
o1-10	[Tech. ctrl] Feedback value 2	0: 0 Other: K connector	-	0	Yes	4916
o1-11	[Tech. ctrl] Feedback value 3	0: 0 Other: K connector	-	0	Yes	4917
o1-12	[Tech. ctrl] Feedback value 4	0: 0 Other: K connector	-	0	Yes	4918
o1-13	[Tech. ctrl] Feedback filter time	0.00 - 60.00	s	0	Yes	4839
o1-14	[Tech. ctrl] Td	0 - 100	-	0	Yes	4843
o1-15	[Tech. ctrl] Unit Td	0: ms 1: s	-	0	Yes	4847
o1-16	[Tech. ctrl] Droop enable	0: Disabled 1: Enabled 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	4925
o1-17	[Tech. ctrl] droop coef.	-600.0 - 600.0	%	0	Yes	4887
o1-18	[Tech. ctrl] Positive limit droop	0.00 - 300.00	%	100	Yes	4891
o1-19	[Tech. ctrl] Negative limit droop	-300.00 - 0.00	%	-100	Yes	4895
o1-20	[Tech. ctrl] Kp setpoint	0.00 - 125.00	-	3	Yes	4859
o1-21	[Tech. ctrl] Source Kp adaption	0: 0 Other: K connector	-	0	Yes	4924
o1-22	[Tech. ctrl] Min. input value Kp adaption	0.00 - 200.00	%	0	Yes	4863
o1-23	[Tech. ctrl] Max. input value Kp adaption	0.00 - 200.00	%	100	Yes	4867
o1-24	[Tech. ctrl] Min. output value Kp adaption	0.10 - 30.00	-	1	Yes	4871

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
o1-25	[Tech. ctrl] Max. output value Kp adaption	0.10 - 30.00	-	1	Yes	4875
o1-26	[Tech. ctrl] Ti	1 - 10000	-	3000	Yes	4879
o1-27	[Tech. ctrl] Unit Ti	0: ms 1: s	-	0	Yes	4883
o1-28	[Tech. ctrl] Integral component forcing enable	0: Disabled 1: Enabled 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	4928
o1-29	[Tech. ctrl] Integral component forcing	0: 0 Other: K connector	-	0	Yes	4927
o1-30	[Tech. ctrl] Upper limit output	0.0 - 600.0	%	100	Yes	4903
o1-31	[Tech. ctrl] Upper limit coef. output	0: 0% 1: 100% 2: -100% Other: K connector	-	1	Yes	4929
o1-32	[Tech. ctrl] Lower limit output	0.0 - 600.0	%	100	Yes	4907
o1-33	[Tech. ctrl] Lower limit coef. output	0: 0% 1: 100% 2: -100% Other: K connector	-	2992	Yes	4930
o1-34	[Tech. ctrl] Output scaling	0.0 - 600.0	%	100	Yes	4911
o1-35	[Tech. ctrl] Output Kp coef.	0: 0% 1: 100% 2: -100% Other: K connector	-	1	Yes	4931
Group o2: process setting parameter group 2						
o2-00	[Tech. ctrl] Fixed word 1	-300.00 - 300.00	%	0	Yes	4722
o2-01	[Tech. ctrl] Fixed word 2	-300.00 - 300.00	%	0	Yes	4726
o2-02	[Tech. ctrl] Fixed word 3	-300.00 - 300.00	%	0	Yes	4730
o2-03	[Tech. ctrl] Fixed word 4	-300.00 - 300.00	%	0	Yes	4734
o2-04	[Tech. ctrl] Fixed word 5	-300.00 - 300.00	%	0	Yes	4738
o2-05	[Tech. ctrl] Fixed word 6	-300.00 - 300.00	%	0	Yes	4742
o2-06	[Tech. ctrl] Fixed word 7	-300.00 - 300.00	%	0	Yes	4746
o2-07	[Tech. ctrl] Fixed word 8	-300.00 - 300.00	%	0	Yes	4750
o2-08	[Tech. ctrl] Fixed word 9	-300.00 - 300.00	%	0	Yes	4754
o2-09	[Tech. ctrl] Fixed word 10	-300.00 - 300.00	%	0	Yes	4758
o2-10	[Tech. ctrl] Fixed word 11	-300.00 - 300.00	%	0	Yes	4762
o2-11	[Tech. ctrl] Fixed word 12	-300.00 - 300.00	%	0	Yes	4766
o2-12	[Tech. ctrl] Fixed word 13	-300.00 - 300.00	%	0	Yes	4770
o2-13	[Tech. ctrl] Fixed word 14	-300.00 - 300.00	%	0	Yes	4774
o2-14	[Tech. ctrl] Fixed bit 1	0:Logic 0 1:Logic 1	-	0	Yes	4778
o2-15	[Tech. ctrl] Fixed bit 2	0:Logic 0 1:Logic 1	-	0	Yes	4782
o2-16	[Tech. ctrl] Fixed bit 3	0:Logic 0 1:Logic 1	-	0	Yes	4786

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
o2-17	[Tech. ctrl] Fixed bit 4	0:Logic 0 1:Logic 1	-	0	Yes	4790
o2-18	[Tech. ctrl] Fixed bit 5	0:Logic 0 1:Logic 1	-	0	Yes	4794
o2-19	[Tech. ctrl] Fixed bit 6	0:Logic 0 1:Logic 1	-	0	Yes	4798
Group o3: process controller parameter group 2						
o3-00	[Tech. ctrl] Enable	0: Disabled 1: Enabled 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	4926
o3-01	[Tech. ctrl] type	Unit' s position: 0: Integral control invalid 1: Integral control valid Ten' s position: 0 Proportional control invalid 1: Proportional control valid Hundred' s position: 0: Improved differential control 1: Traditional differential control Thousand' s position: 0: Positive calculation 1: Negative calculation	-	11	Yes	4900
o3-02	[Tech. ctrl] Setpoint 1	0: 0 Other: K connector	-	0	Yes	4919
o3-03	[Tech. ctrl] Setpoint 2	0: 0 Other: K connector	-	0	Yes	4920
o3-04	[Tech. ctrl] Setpoint 3	0: 0 Other: K connector	-	0	Yes	4921
o3-05	[Tech. ctrl] Setpoint 4	0: 0 Other: K connector	-	0	Yes	4922
o3-06	[Tech. ctrl] Suppl. setpoint enable	0: Disabled 1: Enabled 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	4923
o3-07	[Tech. ctrl] suppl. setpoint	0:0 Other: K connector	-	0	Yes	4852
o3-08	[Tech. ctrl] Filter time setpoint	0.00 - 60.00	s	0	Yes	4856
o3-09	[Tech. ctrl] Feedback value 1	0:0 Other: K connector	-	0	Yes	4915
o3-10	[Tech. ctrl] Feedback value 2	0:0 Other: K connector	-	0	Yes	4916

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
o3-11	[Tech. ctrl] Feedback value 3	0:0 Other: K connector	-	0	Yes	4917
o3-12	[Tech. ctrl] Feedback value 4	0:0 Other: K connector	-	0	Yes	4918
o3-13	[Tech. ctrl] Feedback filter time	0.00 - 60.00	s	0	Yes	4840
o3-14	[Tech. ctrl] Td	0 - 100	-	0	Yes	4844
o3-15	[Tech. ctrl] Unit Td	0: ms 1: s	-	0	Yes	4848
o3-16	[Tech. ctrl] Droop enable	0: Disabled 1: Enabled 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	4925
o3-17	[Tech. ctrl] droop coef.	-600.0 - 600.0	%	0	Yes	4888
o3-18	[Tech. ctrl] Positive limit droop	0.00 - 300.00	%	100	Yes	4892
o3-19	[Tech. ctrl] Negative limit droop	-300.00 - 0.00	%	-100	Yes	4896
o3-20	[Tech. ctrl] Kp setpoint	0.00 - 125.00	-	3	Yes	4860
o3-21	[Tech. ctrl] Source Kp adaption	0:0 Other: K connector	-	0	Yes	4924
o3-22	[Tech. ctrl] Min. input value Kp adaption	0.00 - 200.00	%	0	Yes	4864
o3-23	[Tech. ctrl] Max. input value Kp adaption	0.00 - 200.00	%	100	Yes	4868
o3-24	[Tech. ctrl] Min. output value Kp adaption	0.10 - 30.00	-	1	Yes	4872
o3-25	[Tech. ctrl] Max. output value Kp adaption	0.10 - 30.00	-	1	Yes	4876
o3-26	[Tech. ctrl] Ti	1 - 10000	-	3000	Yes	4880
o3-27	[Tech. ctrl] Unit Ti	0: ms 1: s	-	0	Yes	4884
o3-28	[Tech. ctrl] Integral component forcing enable	0: Disabled 1: Enabled 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	4928
o3-29	[Tech. ctrl] Integral component forcing	0:0 Other: K connector	-	0	Yes	4927
o3-30	[Tech. ctrl] Upper limit output	0.0 - 600.0	%	100	Yes	4904
o3-31	[Tech. ctrl] Upper limit coef. output	0:0 1: 100% 2: -100% Other: K connector	-	1	Yes	4929
o3-32	[Tech. ctrl] Lower limit output	0.0 - 600.0	%	100	Yes	4908

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
o3-33	[Tech. ctrl] Lower limit coef. output	0:0 1: 100% 2: -100% Other: K connector	-	2992	Yes	4930
o3-34	[Tech. ctrl] Output scaling	0.0 - 600.0	%	100	Yes	4912
o3-35	[Tech. ctrl] Output Kp coef.	0:0 1: 100% 2: -100% Other: K connector	-	1	Yes	4931
Group o4: process setting parameter group 3						
o4-00	[Tech. ctrl] Fixed word 1	-300.00 - 300.00	%	0	Yes	4723
o4-01	[Tech. ctrl] Fixed word 2	-300.00 - 300.00	%	0	Yes	4727
o4-02	[Tech. ctrl] Fixed word 3	-300.00 - 300.00	%	0	Yes	4731
o4-03	[Tech. ctrl] Fixed word 4	-300.00 - 300.00	%	0	Yes	4735
o4-04	[Tech. ctrl] Fixed word 5	-300.00 - 300.00	%	0	Yes	4739
o4-05	[Tech. ctrl] Fixed word 6	-300.00 - 300.00	%	0	Yes	4743
o4-06	[Tech. ctrl] Fixed word 7	-300.00 - 300.00	%	0	Yes	4747
o4-07	[Tech. ctrl] Fixed word 8	-300.00 - 300.00	%	0	Yes	4751
o4-08	[Tech. ctrl] Fixed word 9	-300.00 - 300.00	%	0	Yes	4755
o4-09	[Tech. ctrl] Fixed word 10	-300.00 - 300.00	%	0	Yes	4759
o4-10	[Tech. ctrl] Fixed word 11	-300.00 - 300.00	%	0	Yes	4763
o4-11	[Tech. ctrl] Fixed word 12	-300.00 - 300.00	%	0	Yes	4767
o4-12	[Tech. ctrl] Fixed word 13	-300.00 - 300.00	%	0	Yes	4771
o4-13	[Tech. ctrl] Fixed word 14	-300.00 - 300.00	%	0	Yes	4775
o4-14	[Tech. ctrl] Fixed bit 1	0:Logic 0 1:Logic 1	-	0	Yes	4779
o4-15	[Tech. ctrl] Fixed bit 2	0:Logic 0 1:Logic 1	-	0	Yes	4783
o4-16	[Tech. ctrl] Fixed bit 3	0:Logic 0 1:Logic 1	-	0	Yes	4787
o4-17	[Tech. ctrl] Fixed bit 4	0:Logic 0 1:Logic 1	-	0	Yes	4791
o4-18	[Tech. ctrl] Fixed bit 5	0:Logic 0 1:Logic 1	-	0	Yes	4795
o4-19	[Tech. ctrl] Fixed bit 6	0:Logic 0 1:Logic 1	-	0	Yes	4799
Group o5: process controller parameter group 3						
o5-00	[Tech. ctrl] Enable	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	4926

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
o5-01	[Tech. ctrl] type	Unit' s position: 0: Integral control invalid 1: Integral control valid Ten' s position: 0 Proportional control invalid 1: Proportional control valid Hundred' s position: 0: Improved differential control 1: Traditional differential control Thousand' s position: 0: Positive calculation 1: Negative calculation	-	11	Yes	4901
o5-02	[Tech. ctrl] Setpoint 1	0: 0 Other: K connector	-	0	Yes	4919
o5-03	[Tech. ctrl] Setpoint 2	0: 0 Other: K connector	-	0	Yes	4920
o5-04	[Tech. ctrl] Setpoint 3	0: 0 Other: K connector	-	0	Yes	4921
o5-05	[Tech. ctrl] Setpoint 4	0: 0 Other: K connector	-	0	Yes	4922
o5-06	[Tech. ctrl] Suppl. setpoint enable	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	4923
o5-07	[Tech. ctrl] suppl. setpoint	0: 0 Other: K connector	-	0	Yes	4853
o5-08	[Tech. ctrl] Filter time setpoint	0.00 - 60.00	s	0	Yes	4857
o5-09	[Tech. ctrl] Feedback value 1	0: 0 Other: K connector	-	0	Yes	4915
o5-10	[Tech. ctrl] Feedback value 2	0: 0 Other: K connector	-	0	Yes	4916
o5-11	[Tech. ctrl] Feedback value 3	0: 0 Other: K connector	-	0	Yes	4917
o5-12	[Tech. ctrl] Feedback value 4	0: 0 Other: K connector	-	0	Yes	4918
o5-13	[Tech. ctrl] Feedback filter time	0.00 - 60.00	s	0	Yes	4841
o5-14	[Tech. ctrl] Td	0 - 100	-	0	Yes	4845
o5-15	[Tech. ctrl] Unit Td	0: ms 1: s	-	0	Yes	4849

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
o5-16	[Tech. ctrl] Droop enable	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	4925
o5-17	[Tech. ctrl] droop coef.	-600.0 - 600.0	%	0	Yes	4889
o5-18	[Tech. ctrl] Positive limit droop	0.00 - 300.00	%	100	Yes	4893
o5-19	[Tech. ctrl] Negative limit droop	-300.00 - 0.00	%	-100	Yes	4897
o5-20	[Tech. ctrl] Kp setpoint	0.00 - 125.00	-	3	Yes	4861
o5-21	[Tech. ctrl] Source Kp adaption	0: 0 Other: K connector	-	0	Yes	4924
o5-22	[Tech. ctrl] Min. input value Kp adaption	0.00 - 200.00	%	0	Yes	4865
o5-23	[Tech. ctrl] Max. input value Kp adaption	0.00 - 200.00	%	100	Yes	4869
o5-24	[Tech. ctrl] Min. output value Kp adaption	0.10 - 30.00	-	1	Yes	4873
o5-25	[Tech. ctrl] Max. output value Kp adaption	0.10 - 30.00	-	1	Yes	4877
o5-26	[Tech. ctrl] Ti	1 - 10000	-	3000	Yes	4881
o5-27	[Tech. ctrl] Unit Ti	0: ms 1: s	-	0	Yes	4885
o5-28	[Tech. ctrl] Integral component forcing enable	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	4928
o5-29	[Tech. ctrl] Integral component forcing	0: 0 Other: K connector	-	0	Yes	4927
o5-30	[Tech. ctrl] Upper limit output	0.0 - 600.0	%	100	Yes	4905
o5-31	[Tech. ctrl] Upper limit coef. output	0: 0% 1: 100% 2: -100% Other: K connector	-	1	Yes	4929
o5-32	[Tech. ctrl] Lower limit output	0.0 - 600.0	%	100	Yes	4909
o5-33	[Tech. ctrl] Lower limit coef. output	0: 0% 1: 100% 2: -100% Other: K connector	-	2992	Yes	4930
o5-34	[Tech. ctrl] Output scaling	0.0 - 600.0	%	100	Yes	4913
o5-35	[Tech. ctrl] Output Kp coef.	0: 0% 1: 100% 2: -100% Other: K connector	-	1	Yes	4931

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
Group o6: process setting parameter group 4						
o6-00	[Tech. ctrl] Fixed word 1	-300.00 - 300.00	%	0	Yes	4724
o6-01	[Tech. ctrl] Fixed word 2	-300.00 - 300.00	%	0	Yes	4728
o6-02	[Tech. ctrl] Fixed word 3	-300.00 - 300.00	%	0	Yes	4732
o6-03	[Tech. ctrl] Fixed word 4	-300.00 - 300.00	%	0	Yes	4736
o6-04	[Tech. ctrl] Fixed word 5	-300.00 - 300.00	%	0	Yes	4740
o6-05	[Tech. ctrl] Fixed word 6	-300.00 - 300.00	%	0	Yes	4744
o6-06	[Tech. ctrl] Fixed word 7	-300.00 - 300.00	%	0	Yes	4748
o6-07	[Tech. ctrl] Fixed word 8	-300.00 - 300.00	%	0	Yes	4752
o6-08	[Tech. ctrl] Fixed word 9	-300.00 - 300.00	%	0	Yes	4756
o6-09	[Tech. ctrl] Fixed word 10	-300.00 - 300.00	%	0	Yes	4760
o6-10	[Tech. ctrl] Fixed word 11	-300.00 - 300.00	%	0	Yes	4764
o6-11	[Tech. ctrl] Fixed word 12	-300.00 - 300.00	%	0	Yes	4768
o6-12	[Tech. ctrl] Fixed word 13	-300.00 - 300.00	%	0	Yes	4772
o6-13	[Tech. ctrl] Fixed word 14	-300.00 - 300.00	%	0	Yes	4776
o6-14	[Tech. ctrl] Fixed bit 1	0:Logic 0 1:Logic 1	-	0	Yes	4780
o6-15	[Tech. ctrl] Fixed bit 2	0:Logic 0 1:Logic 1	-	0	Yes	4784
o6-16	[Tech. ctrl] Fixed bit 3	0:Logic 0 1:Logic 1	-	0	Yes	4788
o6-17	[Tech. ctrl] Fixed bit 4	0:Logic 0 1:Logic 1	-	0	Yes	4792
o6-18	[Tech. ctrl] Fixed bit 5	0:Logic 0 1:Logic 1	-	0	Yes	4796
o6-19	[Tech. ctrl] Fixed bit 6	0:Logic 0 1:Logic 1	-	0	Yes	4800
Group o7: process controller parameter group 4						
o7-00	[Tech. ctrl] Enable	0: Disabled 1: Enabled 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	4926
o7-01	[Tech. ctrl] type	Unit' s position: 0: Integral control invalid 1: Integral control valid Ten' s position: 0 Proportional control invalid 1: Proportional control valid Hundred' s position: 0: Improved differential control 1: Traditional differential control Thousand' s position: 0: Positive calculation 1: Negative calculation	-	11	Yes	4902
o7-02	[Tech. ctrl] Setpoint 1	0: 0 Other: K connector	-	0	Yes	4919

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
o7-03	[Tech. ctrl] Setpoint 2	0: 0 Other: K connector	-	0	Yes	4920
o7-04	[Tech. ctrl] Setpoint 3	0: 0 Other: K connector	-	0	Yes	4921
o7-05	[Tech. ctrl] Setpoint 4	0: 0 Other: K connector	-	0	Yes	4922
o7-06	[Tech. ctrl] Suppl. setpoint enable	0: Disabled 1: Enabled 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	4923
o7-07	[Tech. ctrl] suppl. setpoint	0: 0 Other: K connector	-	0	Yes	4854
o7-08	[Tech. ctrl] Filter time setpoint	0.00 - 60.00	s	0	Yes	4858
o7-09	[Tech. ctrl] Feedback value 1	0: 0 Other: K connector	-	0	Yes	4915
o7-10	[Tech. ctrl] Feedback value 2	0: 0 Other: K connector	-	0	Yes	4916
o7-11	[Tech. ctrl] Feedback value 3	0: 0 Other: K connector	-	0	Yes	4917
o7-12	[Tech. ctrl] Feedback value 4	0: 0 Other: K connector	-	0	Yes	4918
o7-13	[Tech. ctrl] Feedback filter time	0.00 - 60.00	s	0	Yes	4842
o7-14	[Tech. ctrl] Td	0 - 100	-	0	Yes	4846
o7-15	[Tech. ctrl] Unit Td	0: ms 1: s	-	0	Yes	4850
o7-16	[Tech. ctrl] Droop enable	0: Disabled 1: Enabled 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	4925
o7-17	[Tech. ctrl] droop coef.	-600.0 - 600.0	%	0	Yes	4890
o7-18	[Tech. ctrl] Positive limit droop	0.00 - 300.00	%	100	Yes	4894
o7-19	[Tech. ctrl] Negative limit droop	-300.00 - 0.00	%	-100	Yes	4898
o7-20	[Tech. ctrl] Kp setpoint	0.00 - 125.00	-	3	Yes	4862
o7-21	[Tech. ctrl] Source Kp adaption	0: 0 Other: K connector	-	0	Yes	4924
o7-22	[Tech. ctrl] Min. input value Kp adaption	0.00 - 200.00	%	0	Yes	4866
o7-23	[Tech. ctrl] Max. input value Kp adaption	0.00 - 200.00	%	100	Yes	4870
o7-24	[Tech. ctrl] Min. output value Kp adaption	0.10 - 30.00	-	1	Yes	4874
o7-25	[Tech. ctrl] Max. output value Kp adaption	0.10 - 30.00	-	1	Yes	4878

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
o7-26	[Tech. ctrl] Ti	1 - 10000	-	3000	Yes	4882
o7-27	[Tech. ctrl] Unit Ti	0: ms 1: s	-	0	Yes	4886
o7-28	[Tech. ctrl] Integral component forcing enable	0: Disabled 1: Enabled 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	4928
o7-29	[Tech. ctrl] Integral component forcing	0: 0 Other: K connector	-	0	Yes	4927
o7-30	[Tech. ctrl] Upper limit output	0.0 - 600.0	%	100	Yes	4906
o7-31	[Tech. ctrl] Upper limit coef. output	0: 0% 1: 100% 2: -100% Other: K connector	-	1	Yes	4929
o7-32	[Tech. ctrl] Lower limit output	0.0 - 600.0	%	100	Yes	4910
o7-33	[Tech. ctrl] Lower limit coef. output	0: 0% 1: 100% 2: -100% Other: K connector	-	2992	Yes	4930
o7-34	[Tech. ctrl] Output scaling	0.0 - 600.0	%	100	Yes	4914
o7-35	[Tech. ctrl] Output Kp coef.	0: 0% 1: 100% 2: -100% Other: K connector	-	1	Yes	4931

Group P Custom Function Block

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
Group P0: custom conversion function block						
P0-00	[W2B 1] Execution sequence	0 - 65535	-	0	Yes	3939
P0-01	[W2B 1] Input	0: invalid Other: K connector	-	0	Yes	4239
P0-02	[W2B 2] Execution sequence	0 - 65535	-	0	Yes	3940
P0-03	[W2B 2] Input	0: invalid Other: K connector	-	0	Yes	4240
P0-04	[W2B 3] Execution sequence	0 - 65535	-	0	Yes	3941
P0-05	[W2B 3] Input	0: invalid Other: K connector	-	0	Yes	4241
P0-06	[B2W 1] Execution sequence	0 - 65535	-	0	Yes	3942
P0-07	[B2W 1] Bit00	0: Invalid Other: B connector	-	0	Yes	4242
P0-08	[B2W 1] Bit01	0: Invalid Other: B connector	-	0	Yes	4243
P0-09	[B2W 1] Bit02	0: Invalid Other: B connector	-	0	Yes	4244
P0-10	[B2W 1] Bit03	0: Invalid Other: B connector	-	0	Yes	4245
P0-11	[B2W 1] Bit04	0: Invalid Other: B connector	-	0	Yes	4246

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P0-12	[B2W 1] Bit05	0: Invalid Other: B connector	-	0	Yes	4247
P0-13	[B2W 1] Bit06	0: Invalid Other: B connector	-	0	Yes	4248
P0-14	[B2W 1] Bit07	0: Invalid Other: B connector	-	0	Yes	4249
P0-15	[B2W 1] Bit08	0: Invalid Other: B connector	-	0	Yes	4250
P0-16	[B2W 1] Bit09	0: Invalid Other: B connector	-	0	Yes	4251
P0-17	[B2W 1] Bit10	0: Invalid Other: B connector	-	0	Yes	4252
P0-18	[B2W 1] Bit11	0: Invalid Other: B connector	-	0	Yes	4253
P0-19	[B2W 1] Bit12	0: Invalid Other: B connector	-	0	Yes	4254
P0-20	[B2W 1] Bit13	0: Invalid Other: B connector	-	0	Yes	4255
P0-21	[B2W 1] Bit14	0: Invalid Other: B connector	-	0	Yes	4256
P0-22	[B2W 1] Bit15	0: Invalid Other: B connector	-	0	Yes	4257
P0-23	[B2W 2] Execution sequence	0 - 65535	-	0	Yes	3943
P0-24	[B2W 2] Bit00	0: Invalid Other: B connector	-	0	Yes	4258
P0-25	[B2W 2] Bit01	0: Invalid Other: B connector	-	0	Yes	4259
P0-26	[B2W 2] Bit02	0: Invalid Other: B connector	-	0	Yes	4260
P0-27	[B2W 2] Bit03	0: Invalid Other: B connector	-	0	Yes	4261
P0-28	[B2W 2] Bit04	0: Invalid Other: B connector	-	0	Yes	4262
P0-29	[B2W 2] Bit05	0: Invalid Other: B connector	-	0	Yes	4263
P0-30	[B2W 2] Bit06	0: Invalid Other: B connector	-	0	Yes	4264
P0-31	[B2W 2] Bit07	0: Invalid Other: B connector	-	0	Yes	4265
P0-32	[B2W 2] Bit08	0: Invalid Other: B connector	-	0	Yes	4266
P0-33	[B2W 2] Bit09	0: Invalid Other: B connector	-	0	Yes	4267
P0-34	[B2W 2] Bit10	0: Invalid Other: B connector	-	0	Yes	4268
P0-35	[B2W 2] Bit11	0: Invalid Other: B connector	-	0	Yes	4269
P0-36	[B2W 2] Bit12	0: Invalid Other: B connector	-	0	Yes	4270
P0-37	[B2W 2] Bit13	0: Invalid Other: B connector	-	0	Yes	4271
P0-38	[B2W 2] Bit14	0: Invalid Other: B connector	-	0	Yes	4272
P0-39	[B2W 2] Bit15	0: Invalid Other: B connector	-	0	Yes	4273
P0-40	[B2W 3] Execution sequence	0 - 65535	-	0	Yes	3944

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P0-41	[B2W 3] Bit00	0: Invalid Other: B connector	-	0	Yes	4274
P0-42	[B2W 3] Bit01	0: Invalid Other: B connector	-	0	Yes	4275
P0-43	[B2W 3] Bit02	0: Invalid Other: B connector	-	0	Yes	4276
P0-44	[B2W 3] Bit03	0: Invalid Other: B connector	-	0	Yes	4277
P0-45	[B2W 3] Bit04	0: Invalid Other: B connector	-	0	Yes	4278
P0-46	[B2W 3] Bit05	0: Invalid Other: B connector	-	0	Yes	4279
P0-47	[B2W 3] Bit06	0: Invalid Other: B connector	-	0	Yes	4280
P0-48	[B2W 3] Bit07	0: Invalid Other: B connector	-	0	Yes	4281
P0-49	[B2W 3] Bit08	0: Invalid Other: B connector	-	0	Yes	4282
P0-50	[B2W 3] Bit09	0: Invalid Other: B connector	-	0	Yes	4283
P0-51	[B2W 3] Bit10	0: Invalid Other: B connector	-	0	Yes	4284
P0-52	[B2W 3] Bit11	0: Invalid Other: B connector	-	0	Yes	4285
P0-53	[B2W 3] Bit12	0: Invalid Other: B connector	-	0	Yes	4286
P0-54	[B2W 3] Bit13	0: Invalid Other: B connector	-	0	Yes	4287
P0-55	[B2W 3] Bit14	0: Invalid Other: B connector	-	0	Yes	4288
P0-56	[B2W 3] Bit15	0: Invalid Other: B connector	-	0	Yes	4289
P0-57	[B2W 4] Execution sequence	0 - 65535	-	0	Yes	3945
P0-58	[B2W 4] Bit00	0: Invalid Other: B connector	-	0	Yes	4290
P0-59	[B2W 4] Bit01	0: Invalid Other: B connector	-	0	Yes	4291
P0-60	[B2W 4] Bit02	0: Invalid Other: B connector	-	0	Yes	4292
P0-61	[B2W 4] Bit03	0: Invalid Other: B connector	-	0	Yes	4293
P0-62	[B2W 4] Bit04	0: Invalid Other: B connector	-	0	Yes	4294
P0-63	[B2W 4] Bit05	0: Invalid Other: B connector	-	0	Yes	4295
P0-64	[B2W 4] Bit06	0: Invalid Other: B connector	-	0	Yes	4296
P0-65	[B2W 4] Bit07	0: Invalid Other: B connector	-	0	Yes	4297
P0-66	[B2W 4] Bit08	0: Invalid Other: B connector	-	0	Yes	4298
P0-67	[B2W 4] Bit09	0: Invalid Other: B connector	-	0	Yes	4299
P0-68	[B2W 4] Bit10	0: Invalid Other: B connector	-	0	Yes	4300
P0-69	[B2W 4] Bit11	0: Invalid Other: B connector	-	0	Yes	4301

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P0-70	[B2W 4] Bit12	0: Invalid Other: B connector	-	0	Yes	4302
P0-71	[B2W 4] Bit13	0: Invalid Other: B connector	-	0	Yes	4303
P0-72	[B2W 4] Bit14	0: Invalid Other: B connector	-	0	Yes	4304
P0-73	[B2W 4] Bit15	0: Invalid Other: B connector	-	0	Yes	4305
P0-74	[W2DW] Base value coefficient	Bit00:W2DW 1: 0: ×65536 1: ×1 Bit01:W2DW 2: 0: ×65536 1: ×1 Bit02:W2DW 3: 0: ×65536 1: ×1	-	0	Yes	4226
P0-75	[W2DW module 1] Execution sequence	0 - 65535	-	0	Yes	4046
P0-76	[W2DW module 1] HIWORD	0: invalid Other: K connector	-	0	Yes	4622
P0-77	[W2DW module 1] LOWORD	0: invalid Other: K connector	-	0	Yes	4623
P0-78	[W2DW module 1] Base value	0 - 65535	-	0	Yes	4624
P0-79	[W2DW module 2] Execution sequence	0 - 65535	-	0	Yes	4047
P0-80	[W2DW module 2] HIWORD	0: invalid Other: K connector	-	0	Yes	4625
P0-81	[W2DW module 2] LOWORD	0: invalid Other: K connector	-	0	Yes	4626
P0-82	[W2DW module 2] Base value	0 - 65535	-	0	Yes	4627
P0-83	[W2DW module 3] Execution sequence	0 - 65535	-	0	Yes	4048
P0-84	[W2DW module 3] HIWORD	0: invalid Other: K connector	-	0	Yes	4628
P0-85	[W2DW module 3] LOWORD	0: invalid Other: K connector	-	0	Yes	4629
P0-86	[W2DW module 3] Base value	0 - 65535	-	0	Yes	4630
P0-87	[DW2W] Base value coefficient	Bit00:DW2W 1 0: ×655361 1: × 1 Bit01:DW2W 2 0: ×655361 1: × 1 Bit02:DW2W 3 0: ×655361 1: 1	-	0	Yes	4227
P0-88	[DW2W module 1] Execution sequence	0 - 65535	-	0	Yes	4049
P0-89	DW2W module 1 selection	0: invalid Other: K connector	-	0	Yes	4631
P0-90	[DW2W module 1] Base value	0 - 65535	-	0	Yes	4632
P0-91	[DW2W module 2] Execution sequence	0 - 65535	-	0	Yes	4050
P0-92	DW2W module 2 selection	0: invalid Other: K connector	-	0	Yes	4633
P0-93	[DW2W module 2] Base value	0 - 65535	-	0	Yes	4634
P0-94	[DW2W module 3] Execution sequence	0 - 65535	-	0	Yes	4051

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P0-95	DW2W module 3 selection	0: invalid Other: K connector	-	0	Yes	4635
P0-96	[DW2W module 3] Base value	0 - 65535	-	0	Yes	4636
Group P1: custom logic function block 1						
P1-00	[AND 1] Execution sequence	0 - 65535	-	0	Yes	3946
P1-01	[AND 1] Input 1	1: Invalid Other: B connector	-	1	Yes	4306
P1-02	[AND 1] Input 2	1: Invalid Other: B connector	-	1	Yes	4307
P1-03	[AND 1] Input 3	1: Invalid Other: B connector	-	1	Yes	4308
P1-04	[AND 1] Input 4	1: Invalid Other: B connector	-	1	Yes	4309
P1-05	[AND 2] Execution sequence	0 - 65535	-	0	Yes	3947
P1-06	[AND 2] Input 1	1: Invalid Other: B connector	-	1	Yes	4310
P1-07	[AND 2] Input 2	1: Invalid Other: B connector	-	1	Yes	4311
P1-08	[AND 2] Input 3	1: Invalid Other: B connector	-	1	Yes	4312
P1-09	[AND 2] Input 4	1: Invalid Other: B connector	-	1	Yes	4313
P1-10	[AND 3] Execution sequence	0 - 65535	-	0	Yes	3948
P1-11	[AND 3] Input 1	1: Invalid Other: B connector	-	1	Yes	4314
P1-12	[AND 3] Input 2	1: Invalid Other: B connector	-	1	Yes	4315
P1-13	[AND 3] Input 3	1: Invalid Other: B connector	-	1	Yes	4316
P1-14	[AND 3] Input 4	1: Invalid Other: B connector	-	1	Yes	4317
P1-15	[AND 4] Execution sequence	0 - 65535	-	0	Yes	3949
P1-16	[AND 4] Input 1	1: Invalid Other: B connector	-	1	Yes	4318
P1-17	[AND 4] Input 2	1: Invalid Other: B connector	-	1	Yes	4319
P1-18	[AND 4] Input 3	1: Invalid Other: B connector	-	1	Yes	4320
P1-19	[AND 4] Input 4	1: Invalid Other: B connector	-	1	Yes	4321
P1-20	[AND 5] Execution sequence	0 - 65535	-	0	Yes	3950
P1-21	[AND 5] Input 1	1: Invalid Other: B connector	-	1	Yes	4322
P1-22	[AND 5] Input 2	1: Invalid Other: B connector	-	1	Yes	4323
P1-23	[AND 5] Input 3	1: Invalid Other: B connector	-	1	Yes	4324
P1-24	[AND 5] Input 4	1: Invalid Other: B connector	-	1	Yes	4325
P1-25	[AND 6] Execution sequence	0 - 65535	-	0	Yes	3951
P1-26	[AND 6] Input 1	1: Invalid Other: B connector	-	1	Yes	4326
P1-27	[AND 6] Input 2	1: Invalid Other: B connector	-	1	Yes	4327
P1-28	[AND 6] Input 3	1: Invalid Other: B connector	-	1	Yes	4328

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P1-29	[AND 6] Input 4	1: Invalid Other: B connector	-	1	Yes	4329
P1-30	[AND 7] Execution sequence	0 - 65535	-	0	Yes	3952
P1-31	[AND 7] Input 1	1: Invalid Other: B connector	-	1	Yes	4330
P1-32	[AND 7] Input 2	1: Invalid Other: B connector	-	1	Yes	4331
P1-33	[AND 7] Input 3	1: Invalid Other: B connector	-	1	Yes	4332
P1-34	[AND 7] Input 4	1: Invalid Other: B connector	-	1	Yes	4333
P1-35	[AND 8] Execution sequence	0 - 65535	-	0	Yes	3953
P1-36	[AND 8] Input 1	1: Invalid Other: B connector	-	1	Yes	4334
P1-37	[AND 8] Input 2	1: Invalid Other: B connector	-	1	Yes	4335
P1-38	[AND 8] Input 3	1: Invalid Other: B connector	-	1	Yes	4336
P1-39	[AND 8] Input 4	1: Invalid Other: B connector	-	1	Yes	4337
P1-40	[AND 9] Execution sequence	0 - 65535	-	0	Yes	3954
P1-41	[AND 9] Input 1	1: Invalid Other: B connector	-	1	Yes	4338
P1-42	[AND 9] Input 2	1: Invalid Other: B connector	-	1	Yes	4339
P1-43	[AND 9] Input 3	1: Invalid Other: B connector	-	1	Yes	4340
P1-44	[AND 9] Input 4	1: Invalid Other: B connector	-	1	Yes	4341
P1-45	[AND 10] Execution sequence	0 - 65535	-	0	Yes	3955
P1-46	[AND 10] Input 1	1: Invalid Other: B connector	-	1	Yes	4342
P1-47	[AND 10] Input 2	1: Invalid Other: B connector	-	1	Yes	4343
P1-48	[AND 10] Input 3	1: Invalid Other: B connector	-	1	Yes	4344
P1-49	[AND 10] Input 4	1: Invalid Other: B connector	-	1	Yes	4345
P1-50	[AND 11] Execution sequence	0 - 65535	-	0	Yes	3956
P1-51	[AND 11] Input 1	1: Invalid Other: B connector	-	1	Yes	4346
P1-52	[AND 11] Input 2	1: Invalid Other: B connector	-	1	Yes	4347
P1-53	[AND 11] Input 3	1: Invalid Other: B connector	-	1	Yes	4348
P1-54	[AND 11] Input 4	1: Invalid Other: B connector	-	1	Yes	4349
P1-55	[AND 12] Execution sequence	0 - 65535	-	0	Yes	3957
P1-56	[AND 12] Input 1	1: Invalid Other: B connector	-	1	Yes	4350
P1-57	[AND 12] Input 2	1: Invalid Other: B connector	-	1	Yes	4351
P1-58	[AND 12] Input 3	1: Invalid Other: B connector	-	1	Yes	4352
P1-59	[AND 12] Input 4	1: Invalid Other: B connector	-	1	Yes	4353
P1-60	[AND 13] Execution sequence	0 - 65535	-	0	Yes	3958

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P1-61	[AND 13] Input 1	1: Invalid Other: B connector	-	1	Yes	4354
P1-62	[AND 13] Input 2	1: Invalid Other: B connector	-	1	Yes	4355
P1-63	[AND 13] Input 3	1: Invalid Other: B connector	-	1	Yes	4356
P1-64	[AND 13] Input 4	1: Invalid Other: B connector	-	1	Yes	4357
P1-65	[AND 14] Execution sequence	0 - 65535	-	0	Yes	3959
P1-66	[AND 14] Input 1	1: Invalid Other: B connector	-	1	Yes	4358
P1-67	[AND 14] Input 2	1: Invalid Other: B connector	-	1	Yes	4359
P1-68	[AND 14] Input 3	1: Invalid Other: B connector	-	1	Yes	4360
P1-69	[AND 14] Input 4	1: Invalid Other: B connector	-	1	Yes	4361
P1-70	[AND 15] Execution sequence	0 - 65535	-	0	Yes	3960
P1-71	[AND 15] Input 1	1: Invalid Other: B connector	-	1	Yes	4362
P1-72	[AND 15] Input 2	1: Invalid Other: B connector	-	1	Yes	4363
P1-73	[AND 15] Input 3	1: Invalid Other: B connector	-	1	Yes	4364
P1-74	[AND 15] Input 4	1: Invalid Other: B connector	-	1	Yes	4365
P1-75	[AND 16] Execution sequence	0 - 65535	-	0	Yes	3961
P1-76	[AND 16] Input 1	1: Invalid Other: B connector	-	1	Yes	4366
P1-77	[AND 16] Input 2	1: Invalid Other: B connector	-	1	Yes	4367
P1-78	[AND 16] Input 3	1: Invalid Other: B connector	-	1	Yes	4368
P1-79	[AND 16] Input 4	1: Invalid Other: B connector	-	1	Yes	4369
P1-80	[NOT 1] Execution sequence	0 - 65535	-	0	Yes	3962
P1-81	[NOT 1] Input	0: Invalid Other: B connector	-	0	Yes	4370
P1-82	[NOT 2] Execution sequence	0 - 65535	-	0	Yes	3963
P1-83	[NOT 2] Input	0: Invalid Other: B connector	-	0	Yes	4371
P1-84	[NOT 3] Execution sequence	0 - 65535	-	0	Yes	3964
P1-85	[NOT 3] Input	0: Invalid Other: B connector	-	0	Yes	4372
P1-86	[NOT 4] Execution sequence	0 - 65535	-	0	Yes	3965
P1-87	[NOT 4] Input	0: Invalid Other: B connector	-	0	Yes	4373
P1-88	[NOT 5] Execution sequence	0 - 65535	-	0	Yes	3966
P1-89	[NOT 5] Input	0: Invalid Other: B connector	-	0	Yes	4374
P1-90	[NOT 6] Execution sequence	0 - 65535	-	0	Yes	3967
P1-91	[NOT 6] Input	0: Invalid Other: B connector	-	0	Yes	4375
P1-92	[NOT 7] Execution sequence	0 - 65535	-	0	Yes	3968
P1-93	[NOT 7] Input	0: Invalid Other: B connector	-	0	Yes	4376

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P1-94	[NOT 8] Execution sequence	0 - 65535	-	0	Yes	3969
P1-95	[NOT 8] Input	0: Invalid Other: B connector	-	0	Yes	4377
Group P2: custom logic function block 2						
P2-00	[OR 1] Execution sequence	0 - 65535	-	0	Yes	3970
P2-01	[OR 1] Input 1	0: Invalid Other: B connector	-	0	Yes	4378
P2-02	[OR 1] Input 2	0: Invalid Other: B connector	-	0	Yes	4379
P2-03	[OR 1] Input 3	0: Invalid Other: B connector	-	0	Yes	4380
P2-04	[OR 1] Input 4	0: Invalid Other: B connector	-	0	Yes	4381
P2-05	[OR 2] Execution sequence	0 - 65535	-	0	Yes	3971
P2-06	[OR 2] Input 1	0: Invalid Other: B connector	-	0	Yes	4382
P2-07	[OR 2] Input 2	0: Invalid Other: B connector	-	0	Yes	4383
P2-08	[OR 2] Input 3	0: Invalid Other: B connector	-	0	Yes	4384
P2-09	[OR 2] Input 4	0: Invalid Other: B connector	-	0	Yes	4385
P2-10	[OR 3] Execution sequence	0 - 65535	-	0	Yes	3972
P2-11	[OR 3] Input 1	0: Invalid Other: B connector	-	0	Yes	4386
P2-12	[OR 3] Input 2	0: Invalid Other: B connector	-	0	Yes	4387
P2-13	[OR 3] Input 3	0: Invalid Other: B connector	-	0	Yes	4388
P2-14	[OR 3] Input 4	0: Invalid Other: B connector	-	0	Yes	4389
P2-15	[OR 4] Execution sequence	0 - 65535	-	0	Yes	3973
P2-16	[OR 4] Input 1	0: Invalid Other: B connector	-	0	Yes	4390
P2-17	[OR 4] Input 2	0: Invalid Other: B connector	-	0	Yes	4391
P2-18	[OR 4] Input 3	0: Invalid Other: B connector	-	0	Yes	4392
P2-19	[OR 4] Input 4	0: Invalid Other: B connector	-	0	Yes	4393
P2-20	[OR 5] Execution sequence	0 - 65535	-	0	Yes	3974
P2-21	[OR 5] Input 1	0: Invalid Other: B connector	-	0	Yes	4394
P2-22	[OR 5] Input 2	0: Invalid Other: B connector	-	0	Yes	4395
P2-23	[OR 5] Input 3	0: Invalid Other: B connector	-	0	Yes	4396
P2-24	[OR 5] Input 4	0: Invalid Other: B connector	-	0	Yes	4397
P2-25	[OR 6] Execution sequence	0 - 65535	-	0	Yes	3975
P2-26	[OR 6] Input 1	0: Invalid Other: B connector	-	0	Yes	4398
P2-27	[OR 6] Input 2	0: Invalid Other: B connector	-	0	Yes	4399
P2-28	[OR 6] Input 3	0: Invalid Other: B connector	-	0	Yes	4400

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P2-29	[OR 6] Input 4	0: Invalid Other: B connector	-	0	Yes	4401
P2-30	[OR 7] Execution sequence	0 - 65535	-	0	Yes	3976
P2-31	[OR 7] Input 1	0: Invalid Other: B connector	-	0	Yes	4402
P2-32	[OR 7] Input 2	0: Invalid Other: B connector	-	0	Yes	4403
P2-33	[OR 7] Input 3	0: Invalid Other: B connector	-	0	Yes	4404
P2-34	[OR 7] Input 4	0: Invalid Other: B connector	-	0	Yes	4405
P2-35	[OR 8] Execution sequence	0 - 65535	-	0	Yes	3977
P2-36	[OR 8] Input 1	0: Invalid Other: B connector	-	0	Yes	4406
P2-37	[OR 8] Input 2	0: Invalid Other: B connector	-	0	Yes	4407
P2-38	[OR 8] Input 3	0: Invalid Other: B connector	-	0	Yes	4408
P2-39	[OR 8] Input 4	0: Invalid Other: B connector	-	0	Yes	4409
P2-40	[OR 9] Execution sequence	0 - 65535	-	0	Yes	3978
P2-41	[OR 9] Input 1	0: Invalid Other: B connector	-	0	Yes	4410
P2-42	[OR 9] Input 2	0: Invalid Other: B connector	-	0	Yes	4411
P2-43	[OR 9] Input 3	0: Invalid Other: B connector	-	0	Yes	4412
P2-44	[OR 9] Input 4	0: Invalid Other: B connector	-	0	Yes	4413
P2-45	[OR 10] Execution sequence	0 - 65535	-	0	Yes	3979
P2-46	[OR 10] Input 1	0: Invalid Other: B connector	-	0	Yes	4414
P2-47	[OR 10] Input 2	0: Invalid Other: B connector	-	0	Yes	4415
P2-48	[OR 10] Input 3	0: Invalid Other: B connector	-	0	Yes	4416
P2-49	[OR 10] Input 4	0: Invalid Other: B connector	-	0	Yes	4417
P2-50	[OR 11] Execution sequence	0 - 65535	-	0	Yes	3980
P2-51	[OR 11] Input 1	0: Invalid Other: B connector	-	0	Yes	4418
P2-52	[OR 11] Input 2	0: Invalid Other: B connector	-	0	Yes	4419
P2-53	[OR 11] Input 3	0: Invalid Other: B connector	-	0	Yes	4420
P2-54	[OR 11] Input 4	0: Invalid Other: B connector	-	0	Yes	4421
P2-55	[OR 12] Execution sequence	0 - 65535	-	0	Yes	3981
P2-56	[OR 12] Input 1	0: Invalid Other: B connector	-	0	Yes	4422
P2-57	[OR 12] Input 2	0: Invalid Other: B connector	-	0	Yes	4423
P2-58	[OR 12] Input 3	0: Invalid Other: B connector	-	0	Yes	4424
P2-59	[OR 12] Input 4	0: Invalid Other: B connector	-	0	Yes	4425

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P2-60	[XOR\XNOR 1] Execution sequence	0 - 65535	-	0	Yes	3982
P2-61	[XOR\XNOR 1] Function selection	0:XOR 1:XNOR	-	0	Yes	4426
P2-62	[XOR\XNOR 1] Input 1	0: Invalid Other: B connector	-	0	Yes	4427
P2-63	[XOR\XNOR 1] Input 2	0: Invalid Other: B connector	-	0	Yes	4428
P2-64	[XOR\XNOR 2] Execution sequence	0 - 65535	-	0	Yes	3983
P2-65	[XOR\XNOR 2] Function selection	0:XOR 1:XNOR	-	0	Yes	4429
P2-66	[XOR\XNOR 2] Input 1	0: Invalid Other: B connector	-	0	Yes	4430
P2-67	[XOR\XNOR 2] Input 2	0: Invalid Other: B connector	-	0	Yes	4431
P2-68	[XOR\XNOR 3] Execution sequence	0 - 65535	-	0	Yes	3984
P2-69	[XOR\XNOR 3] Function selection	0:XOR 1:XNOR	-	0	Yes	4432
P2-70	[XOR\XNOR 3] Input 1	0: Invalid Other: B connector	-	0	Yes	4433
P2-71	[XOR\XNOR 3] Input 2	0: Invalid Other: B connector	-	0	Yes	4434
P2-72	[XOR\XNOR 4] Execution sequence	0 - 65535	-	0	Yes	3985
P2-73	[XOR\XNOR 4] Function selection	0:XOR 1:XNOR	-	0	Yes	4435
P2-74	[XOR\XNOR 4] Input 1	0: Invalid Other: B connector	-	0	Yes	4436
P2-75	[XOR\XNOR 4] Input 2	0: Invalid Other: B connector	-	0	Yes	4437
P2-76	[NAND module 1] Execution sequence	0 - 65535	-	0	Yes	4056
P2-77	[NAND 1] Input 1	1: Invalid Other: B connector	-	1	Yes	4803
P2-78	[NAND 1] Input 2	1: Invalid Other: B connector	-	1	Yes	4804
P2-79	[NAND 1] Input 3	1: Invalid Other: B connector	-	1	Yes	4805
P2-80	[NAND 1] Input 4	1: Invalid Other: B connector	-	1	Yes	4806
P2-81	[NAND module 2] Execution sequence	0 - 65535	-	0	Yes	4057
P2-82	[NAND 2] Input 1	1: Invalid Other: B connector	-	1	Yes	4807
P2-83	[NAND 2] Input 2	1: Invalid Other: B connector	-	1	Yes	4808
P2-84	[NAND 2] Input 3	1: Invalid Other: B connector	-	1	Yes	4809
P2-85	[NAND 2] Input 4	1: Invalid Other: B connector	-	1	Yes	4810
P2-86	[NAND module 3] Execution sequence	0 - 65535	-	0	Yes	4058
P2-87	[NAND 3] Input 1	1: Invalid Other: B connector	-	1	Yes	4811
P2-88	[NAND 3] Input 2	1: Invalid Other: B connector	-	1	Yes	4812

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P2-89	[NAND 3] Input 3	1: Invalid Other: B connector	-	1	Yes	4813
P2-90	[NAND 3] Input 4	1: Invalid Other: B connector	-	1	Yes	4814
P2-91	[NAND module 4] Execution sequence	0 - 65535	-	0	Yes	4059
P2-92	[NAND 4] Input 1	1: Invalid Other: B connector	-	1	Yes	4815
P2-93	[NAND 4] Input 2	1: Invalid Other: B connector	-	1	Yes	4816
P2-94	[NAND 4] Input 3	1: Invalid Other: B connector	-	1	Yes	4817
P2-95	[NAND 4] Input 4	1: Invalid Other: B connector	-	1	Yes	4818
Group P3: custom switch function block						
P3-00	[BSW module 1] Execution sequence	0 - 65535	-	0	Yes	4026
P3-01	[BSW module 1] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	4562
P3-02	[BSW module 1] Input 1	0: Invalid Other: B connector	-	0	Yes	4563
P3-03	[BSW module 1] Input 2	0: Invalid Other: B connector	-	0	Yes	4564
P3-04	[BSW module 2] Execution sequence	0 - 65535	-	0	Yes	4027
P3-05	[BSW module 2] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	4565
P3-06	[BSW module 2] Input 1	0: Invalid Other: B connector	-	0	Yes	4566
P3-07	[BSW module 2] Input 2	0: Invalid Other: B connector	-	0	Yes	4567
P3-08	[BSW module 3] Execution sequence	0 - 65535	-	0	Yes	4028
P3-09	[BSW module 3] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	4568
P3-10	[BSW module 3] Input 1	0: Invalid Other: B connector	-	0	Yes	4569
P3-11	[BSW module 3] Input 2	0: Invalid Other: B connector	-	0	Yes	4570
P3-12	[BSW module 4] Execution sequence	0 - 65535	-	0	Yes	4029
P3-13	[BSW module 4] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	4571
P3-14	[BSW module 4] Input 1	0: Invalid Other: B connector	-	0	Yes	4572
P3-15	[BSW module 4] Input 2	0: Invalid Other: B connector	-	0	Yes	4573
P3-16	[BSW module 5] Execution sequence	0 - 65535	-	0	Yes	4030
P3-17	[BSW module 5] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	4574
P3-18	[BSW module 5] Input 1	0: Invalid Other: B connector	-	0	Yes	4575

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P3-19	[BSW module 5] Input 2	0: Invalid Other: B connector	-	0	Yes	4576
P3-20	[BSW module 6] Execution sequence	0 - 65535	-	0	Yes	4031
P3-21	[BSW module 6] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	4577
P3-22	[BSW module 6] Input 1	0: Invalid Other: B connector	-	0	Yes	4578
P3-23	[BSW module 6] Input 2	0: Invalid Other: B connector	-	0	Yes	4579
P3-24	[BSW module 7] Execution sequence	0 - 65535	-	0	Yes	4032
P3-25	[BSW module 7] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	4580
P3-26	[BSW module 7] Input 1	0: Invalid Other: B connector	-	0	Yes	4581
P3-27	[BSW module 7] Input 2	0: Invalid Other: B connector	-	0	Yes	4582
P3-28	[BSW module 8] Execution sequence	0 - 65535	-	0	Yes	4033
P3-29	[BSW module 8] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	4583
P3-30	[BSW module 8] Input 1	0: Invalid Other: B connector	-	0	Yes	4584
P3-31	[BSW module 8] Input 2	0: Invalid Other: B connector	-	0	Yes	4585
P3-32	[NSW module 1] Execution sequence	0 - 65535	-	0	Yes	4034
P3-33	[NSW module 1] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	4586
P3-34	[NSW module 1] Input 1	0: invalid Other: K connector	-	0	Yes	4587
P3-35	[NSW module 1] Input 2	0: invalid Other: K connector	-	0	Yes	4588
P3-36	[NSW module 2] Execution sequence	0 - 65535	-	0	Yes	4035
P3-37	[NSW module 2] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	4589
P3-38	[NSW module 2] Input 1	0: invalid Other: K connector	-	0	Yes	4590
P3-39	[NSW module 2] Input 2	0: invalid Other: K connector	-	0	Yes	4591
P3-40	[NSW module 3] Execution sequence	0 - 65535	-	0	Yes	4036
P3-41	[NSW module 3] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	4592
P3-42	[NSW module 3] Input 1	0: invalid Other: K connector	-	0	Yes	4593
P3-43	[NSW module 3] Input 2	0: invalid Other: K connector	-	0	Yes	4594
P3-44	[NSW module 4] Execution sequence	0 - 65535	-	0	Yes	4037

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P3-45	[NSW module 4] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	4595
P3-46	[NSW module 4] Input 1	0: invalid Other: K connector	-	0	Yes	4596
P3-47	[NSW module 4] Input 2	0: invalid Other: K connector	-	0	Yes	4597
P3-48	[NSW module 5] Execution sequence	0 - 65535	-	0	Yes	4038
P3-49	[NSW module 5] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	4598
P3-50	[NSW module 5] Input 1	0: invalid Other: K connector	-	0	Yes	4599
P3-51	[NSW module 5] Input 2	0: invalid Other: K connector	-	0	Yes	4600
P3-52	[NSW module 6] Execution sequence	0 - 65535	-	0	Yes	4039
P3-53	[NSW module 6] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	4601
P3-54	[NSW module 6] Input 1	0: invalid Other: K connector	-	0	Yes	4602
P3-55	[NSW module 6] Input 2	0: invalid Other: K connector	-	0	Yes	4603
P3-56	[NSW module 7] Execution sequence	0 - 65535	-	0	Yes	4040
P3-57	[NSW module 7] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	4604
P3-58	[NSW module 7] Input 1	0: invalid Other: K connector	-	0	Yes	4605
P3-59	[NSW module 7] Input 2	0: invalid Other: K connector	-	0	Yes	4606
P3-60	[NSW module 8] Execution sequence	0 - 65535	-	0	Yes	4041
P3-61	[NSW module 8] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	4607
P3-62	[NSW module 8] Input 1	0: invalid Other: K connector	-	0	Yes	4608
P3-63	[NSW module 8] Input 2	0: invalid Other: K connector	-	0	Yes	4609
P3-64	[NSW module 9] Execution sequence	0 - 65535	-	0	Yes	4042
P3-65	[NSW module 9] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	4610
P3-66	[NSW module 9] Input 1	0: invalid Other: K connector	-	0	Yes	4611
P3-67	[NSW module 9] Input 2	0: invalid Other: K connector	-	0	Yes	4612
P3-68	[NSW module 10] Execution sequence	0 - 65535	-	0	Yes	4043
P3-69	[NSW module 10] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	4613
P3-70	[NSW module 10] Input 1	0: invalid Other: K connector	-	0	Yes	4614

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P3-71	[NSW module 10] Input 2	0: invalid Other: K connector	-	0	Yes	4615
P3-72	[NSW module 11] Execution sequence	0 - 65535	-	0	Yes	4044
P3-73	[NSW module 11] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	4616
P3-74	[NSW module 11] Input 1	0: invalid Other: K connector	-	0	Yes	4617
P3-75	[NSW module 11] Input 2	0: invalid Other: K connector	-	0	Yes	4618
P3-76	[NSW module 12] Execution sequence	0 - 65535	-	0	Yes	4045
P3-77	[NSW module 12] Input selection	0:Input 1 1:Input 2 Other: B connector	-	0	Yes	4619
P3-78	[NSW module 12] Input 1	0: invalid Other: K connector	-	0	Yes	4620
P3-79	[NSW module 12] Input 2	0: invalid Other: K connector	-	0	Yes	4621
Group P4: custom control function block 1						
P4-00	[DELAY 1] Execution sequence	0 - 65535	-	0	Yes	3986
P4-01	[DELAY 1] Input	0: Invalid Other: B connector	-	0	Yes	4438
P4-02	[DELAY 1] Function selection	0:Switch-on delay 1:Switch-off delay 2:Bi-directional delay	-	0	Yes	4439
P4-03	[DELAY 1] Delay	0.00 - 600.00	s	0	Yes	4440
P4-04	[DELAY 2] Execution sequence	0 - 65535	-	0	Yes	3987
P4-05	[DELAY 2] Input	0: Invalid Other: B connector	-	0	Yes	4441
P4-06	[DELAY 2] Function selection	0:Switch-on delay 1:Switch-off delay 2:Bi-directional delay	-	0	Yes	4442
P4-07	[DELAY 2] Delay	0.00 - 600.00	s	0	Yes	4443
P4-08	[DELAY 3] Execution sequence	0 - 65535	-	0	Yes	3988
P4-09	[DELAY 3] Input	0: Invalid Other: B connector	-	0	Yes	4444
P4-10	[DELAY 3] Function selection	0:Switch-on delay 1:Switch-off delay 2:Bi-directional delay	-	0	Yes	4445
P4-11	[DELAY 3] Delay	0.00 - 600.00	s	0	Yes	4446
P4-12	[DELAY 4] Execution sequence	0 - 65535	-	0	Yes	3989
P4-13	[DELAY 4] Input	0: Invalid Other: B connector	-	0	Yes	4447
P4-14	[DELAY 4] Function selection	0:Switch-on delay 1:Switch-off delay 2:Bi-directional delay	-	0	Yes	4448
P4-15	[DELAY 4] Delay	0.00 - 600.00	s	0	Yes	4449
P4-16	[P_L 1] Execution sequence	0 - 65535	-	0	Yes	3990
P4-17	[P_L 1] Function selection	0:Level to pulse 1:Pulse to level	-	0	Yes	4450
P4-18	[P_L 1] Input	0: Invalid Other: B connector	-	0	Yes	4451
P4-19	[P_L 1] Pulse output time	0.00 - 600.00	s	0	Yes	4452
P4-20	[P_L 2] Execution sequence	0 - 65535	-	0	Yes	3991

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P4-21	[P_L 2] Function selection	0:Level to pulse 1:Pulse to level	-	0	Yes	4453
P4-22	[P_L 2] Input	0: Invalid Other: B connector	-	0	Yes	4454
P4-23	[P_L 2] Pulse output time	0.00 - 600.00	s	0	Yes	4455
P4-24	[P_L 3] Execution sequence	0 - 65535	-	0	Yes	3992
P4-25	[P_L 3] Function selection	0:Level to pulse 1:Pulse to level	-	0	Yes	4456
P4-26	[P_L 3] Input	0: Invalid Other: B connector	-	0	Yes	4457
P4-27	[P_L 3] Pulse output time	0.00 - 600.00	s	0	Yes	4458
P4-28	[P_L 4] Execution sequence	0 - 65535	-	0	Yes	3993
P4-29	[P_L 4] Function selection	0:Level to pulse 1:Pulse to level	-	0	Yes	4459
P4-30	[P_L 4] Input	0: Invalid Other: B connector	-	0	Yes	4460
P4-31	[P_L 4] Pulse output time	0.00 - 600.00	s	0	Yes	4461
P4-32	[FILT 1] Execution sequence	0 - 65535	-	0	Yes	4010
P4-33	[FILT 1] Function selection	0:Enable 1:Disable Other: B connector	-	0	Yes	4518
P4-34	[FILT 1] Input	0: invalid Other: K connector	-	0	Yes	4519
P4-35	[FILT 1] Filter time	0.000 - 60.000	s	0	Yes	4520
P4-36	[FILT 2] Execution sequence	0 - 65535	-	0	Yes	4011
P4-37	[FILT 2] Function selection	0:Enable 1:Disable Other: B connector	-	0	Yes	4521
P4-38	[FILT 2] Input	0: invalid Other: K connector	-	0	Yes	4522
P4-39	[FILT 2] Filter time	0.000 - 60.000	s	0	Yes	4523
P4-40	[FILT 3] Execution sequence	0 - 65535	-	0	Yes	4012
P4-41	[FILT 3] Function selection	0:Enable 1:Disable Other: B connector	-	0	Yes	4524
P4-42	[FILT 3] Input	0: invalid Other: K connector	-	0	Yes	4525
P4-43	[FILT 3] Filter time	0.000 - 60.000	s	0	Yes	4526
P4-44	[FILT 4] Execution sequence	0 - 65535	-	0	Yes	4013
P4-45	[FILT 4] Function selection	0:Enable 1:Disable Other: B connector	-	0	Yes	4527
P4-46	[FILT 4] Input	0: invalid Other: K connector	-	0	Yes	4528
P4-47	[FILT 4] Filter time	0.000 - 60.000	s	0	Yes	4529
P4-48	[FILT 5] Execution sequence	0 - 65535	-	0	Yes	4014
P4-49	[FILT 5] Function selection	0:Enable 1:Disable Other: B connector	-	0	Yes	4530
P4-50	[FILT 5] Input	0: invalid Other: K connector	-	0	Yes	4531
P4-51	[FILT 5] Filter time	0.000 - 60.000	s	0	Yes	4532
P4-52	[FILT 6] Execution sequence	0 - 65535	-	0	Yes	4015
P4-53	[FILT 6] Function selection	0:Enable 1:Disable Other: B connector	-	0	Yes	4533

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P4-54	[FILT 6] Input	0: invalid Other: K connector	-	0	Yes	4534
P4-55	[FILT 6] Filter time	0.000 - 60.000	s	0	Yes	4535
P4-56	[FILT 7] Execution sequence	0 - 65535	-	0	Yes	4016
P4-57	[FILT 7] Function selection	0:Enable 1:Disable Other: B connector	-	0	Yes	4536
P4-58	[FILT 7] Input	0: invalid Other: K connector	-	0	Yes	4537
P4-59	[FILT 7] Filter time	0.000 - 60.000	s	0	Yes	4538
P4-60	[FILT 8] Execution sequence	0 - 65535	-	0	Yes	4017
P4-61	[FILT 8] Function selection	0:Enable 1:Disable Other: B connector	-	0	Yes	4539
P4-62	[FILT 8] Input	0: invalid Other: K connector	-	0	Yes	4540
P4-63	[FILT 8] Filter time	0.000 - 60.000	s	0	Yes	4541
P4-64	[RS flip-flop module 1] Execution sequence	0 - 65535	-	0	Yes	4064
P4-65	[RS flip-flop module 1] Setting input	0: Invalid Other: B connector	-	0	Yes	4831
P4-66	[RS flip-flop module 1] Reset input	0: Invalid Other: B connector	-	0	Yes	4832
P4-67	[RS flip-flop module 2] Execution sequence	0 - 65535	-	0	Yes	4065
P4-68	[RS flip-flop module 2] Setting input	0: Invalid Other: B connector	-	0	Yes	4833
P4-69	[RS flip-flop module 2] Reset input	0: Invalid Other: B connector	-	0	Yes	4834
P4-70	[RS flip-flop module 3] Execution sequence	0 - 65535	-	0	Yes	4066
P4-71	[RS flip-flop module 3] Setting input	0: Invalid Other: B connector	-	0	Yes	4835
P4-72	[RS flip-flop module 3] Reset input	0: Invalid Other: B connector	-	0	Yes	4836
P4-73	[RS flip-flop module 4] Execution sequence	0 - 65535	-	0	Yes	4067
P4-74	[RS flip-flop module 4] Setting input	0: Invalid Other: B connector	-	0	Yes	4837
P4-75	[RS flip-flop module 4] Reset input	0: Invalid Other: B connector	-	0	Yes	4838
P4-76	[DFF module 1] Execution sequence	0 - 65535	-	0	Yes	4097
P4-77	[DFF module 1] Input	0: Invalid Other: B connector	-	0	Yes	4964
P4-78	[DFF module 1] Reset input	0: Invalid Other: B connector	-	0	Yes	4965
P4-79	[DFF module 1] Setting input	0: Invalid Other: B connector	-	0	Yes	4966
P4-80	[DFF module 1] Clock input	0: Invalid Other: B connector	-	0	Yes	4967
P4-81	[DFF module 2] Execution sequence	0 - 65535	-	0	Yes	4098
P4-82	[DFF module 2] Input	0: Invalid Other: B connector	-	0	Yes	4968
P4-83	[DFF module 2] Reset input	0: Invalid Other: B connector	-	0	Yes	4969

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P4-84	[DFF module 2] Setting input	0: Invalid Other: B connector	-	0	Yes	4970
P4-85	[DFF module 2] Clock input	0: Invalid Other: B connector	-	0	Yes	4971
P4-86	[DFF module 3] Execution sequence	0 - 65535	-	0	Yes	4099
P4-87	[DFF module 3] Input	0: Invalid Other: B connector	-	0	Yes	4972
P4-88	[DFF module 3] Reset input	0: Invalid Other: B connector	-	0	Yes	4973
P4-89	[DFF module 3] Setting input	0: Invalid Other: B connector	-	0	Yes	4974
P4-90	[DFF module 3] Clock input	0: Invalid Other: B connector	-	0	Yes	4975
P4-91	[DFF module 4] Execution sequence	0 - 65535	-	0	Yes	4100
P4-92	[DFF module 4] Input	0: Invalid Other: B connector	-	0	Yes	4976
P4-93	[DFF module 4] Reset input	0: Invalid Other: B connector	-	0	Yes	4977
P4-94	[DFF module 4] Setting input	0: Invalid Other: B connector	-	0	Yes	4978
P4-95	[DFF module 4] Clock input	0: Invalid Other: B connector	-	0	Yes	4979
Group P5: custom control function block 2						
P5-00	[PULSE 1] Execution sequence	0 - 65535	-	0	Yes	4089
P5-01	[PULSE 1] Function selection	0:Pulse width extension 1:Pulse width shortening	-	0	Yes	4932
P5-02	[PULSE 1] Input	0: 0 Other: B connector	-	0	Yes	4933
P5-03	[PULSE 1] Holding time	0.00 - 600.00	s	0	Yes	4934
P5-04	[PULSE 1] Pulse extender reset input	0: 0 Other: B connector	-	0	Yes	4935
P5-05	[PULSE 2] Execution sequence	0 - 65535	-	0	Yes	4090
P5-06	[PULSE 2] Function selection	0:Pulse width extension 1:Pulse width shortening	-	0	Yes	4936
P5-07	[PULSE 2] Input	0: 0 Other: B connector	-	0	Yes	4937
P5-08	[PULSE 2] Holding time	0.00 - 600.00	s	0	Yes	4938
P5-09	[PULSE 2] Pulse extender reset input	0: 0 Other: B connector	-	0	Yes	4939
P5-10	[PULSE 3] Execution sequence	0 - 65535	-	0	Yes	4091
P5-11	[PULSE 3] Function selection	0:Pulse width extension 1:Pulse width shortening	-	0	Yes	4940
P5-12	[PULSE 3] Input	0: 0 Other: B connector	-	0	Yes	4941
P5-13	[PULSE 3] Holding time	0.00 - 600.00	s	0	Yes	4942
P5-14	[PULSE 3] Pulse extender reset input	0: 0 Other: B connector	-	0	Yes	4943
P5-15	[PULSE 4] Execution sequence	0 - 65535	-	0	Yes	4092
P5-16	[PULSE 4] Function selection	0:Pulse width extension 1:Pulse width shortening	-	0	Yes	4944
P5-17	[PULSE 4] Input	0: 0 Other: B connector	-	0	Yes	4945
P5-18	[PULSE 4] Holding time	0.00 - 600.00	s	0	Yes	4946

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P5-19	[PULSE 4] Pulse extender reset input	0: 0 Other: B connector	-	0	Yes	4947
P5-20	[PULSE 5] Execution sequence	0 - 65535	-	0	Yes	4093
P5-21	[PULSE 5] Function selection	0:Pulse width extension 1:Pulse width shortening	-	0	Yes	4948
P5-22	[PULSE 5] Input	0: 0 Other: B connector	-	0	Yes	4949
P5-23	[PULSE 5] Holding time	0.00 - 600.00	s	0	Yes	4950
P5-24	[PULSE 5] Pulse extender reset input	0: 0 Other: B connector	-	0	Yes	4951
P5-25	[PULSE 6] Execution sequence	0 - 65535	-	0	Yes	4094
P5-26	[PULSE 6] Function selection	0:Pulse width extension 1:Pulse width shortening	-	0	Yes	4952
P5-27	[PULSE 6] Input	0: 0 Other: B connector	-	0	Yes	4953
P5-28	[PULSE 6] Holding time	0.00 - 600.00	s	0	Yes	4954
P5-29	[PULSE 6] Pulse extender reset input	0: 0 Other: B connector	-	0	Yes	4955
P5-30	[PULSE 7] Execution sequence	0 - 65535	-	0	Yes	4095
P5-31	[PULSE 7] Function selection	0:Pulse width extension 1:Pulse width shortening	-	0	Yes	4956
P5-32	[PULSE 7] Input	0: 0 Other: B connector	-	0	Yes	4957
P5-33	[PULSE 7] Holding time	0.00 - 600.00	s	0	Yes	4958
P5-34	[PULSE 7] Pulse extender reset input	0: 0 Other: B connector	-	0	Yes	4959
P5-35	[PULSE 8] Execution sequence	0 - 65535	-	0	Yes	4096
P5-36	[PULSE 8] Function selection	0:Pulse width extension 1:Pulse width shortening	-	0	Yes	4960
P5-37	[PULSE 8] Input	0: 0 Other: B connector	-	0	Yes	4961
P5-38	[PULSE 8] Holding time	0.00 - 600.00	s	0	Yes	4962
P5-39	[PULSE 8] Pulse extender reset input	0: 0 Other: B connector	-	0	Yes	4963
Group P6: custom algorithm function block 1						
P6-00	[ADD_SUB 1] Execution sequence	0 - 65535	-	0	Yes	3994
P6-01	[ADD_SUB 1] Input 1 (ADD)	0: invalid Other: K connector	-	0	Yes	4462
P6-02	[ADD_SUB 1] Input 2 (ADD)	0: invalid Other: K connector	-	0	Yes	4463
P6-03	[ADD_SUB 1] Input 3 (ADD)	0: invalid Other: K connector	-	0	Yes	4464
P6-04	[ADD_SUB 1] Input 4 (SUBTRACT)	0: invalid Other: K connector	-	0	Yes	4465
P6-05	[ADD_SUB 2] Execution sequence	0 - 65535	-	0	Yes	3995
P6-06	[ADD_SUB 2] Input 1 (ADD)	0: invalid Other: K connector	-	0	Yes	4466
P6-07	[ADD_SUB 2] Input 2 (ADD)	0: invalid Other: K connector	-	0	Yes	4467
P6-08	[ADD_SUB 2] Input 3 (ADD)	0: invalid Other: K connector	-	0	Yes	4468
P6-09	[ADD_SUB 2] Input 4 (SUBTRACT)	0: invalid Other: K connector	-	0	Yes	4469

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P6-10	[ADD_SUB 3] Execution sequence	0 - 65535	-	0	Yes	3996
P6-11	[ADD_SUB 3] Input 1 (ADD)	0: invalid Other: K connector	-	0	Yes	4470
P6-12	[ADD_SUB 3] Input 2 (ADD)	0: invalid Other: K connector	-	0	Yes	4471
P6-13	[ADD_SUB 3] Input 3 (ADD)	0: invalid Other: K connector	-	0	Yes	4472
P6-14	[ADD_SUB 3] Input 4 (SUBTRACT)	0: invalid Other: K connector	-	0	Yes	4473
P6-15	[ADD_SUB 4] Execution sequence	0 - 65535	-	0	Yes	3997
P6-16	[ADD_SUB 4] Input 1 (ADD)	0: invalid Other: K connector	-	0	Yes	4474
P6-17	[ADD_SUB 4] Input 2 (ADD)	0: invalid Other: K connector	-	0	Yes	4475
P6-18	[ADD_SUB 4] Input 3 (ADD)	0: invalid Other: K connector	-	0	Yes	4476
P6-19	[ADD_SUB 4] Input 4 (SUBTRACT)	0: invalid Other: K connector	-	0	Yes	4477
P6-20	[ADD_SUB 5] Execution sequence	0 - 65535	-	0	Yes	3998
P6-21	[ADD_SUB 5] Input 1 (ADD)	0: invalid Other: K connector	-	0	Yes	4478
P6-22	[ADD_SUB 5] Input 2 (ADD)	0: invalid Other: K connector	-	0	Yes	4479
P6-23	[ADD_SUB 5] Input 3 (ADD)	0: invalid Other: K connector	-	0	Yes	4480
P6-24	[ADD_SUB 5] Input 4 (SUBTRACT)	0: invalid Other: K connector	-	0	Yes	4481
P6-25	[ADD_SUB 6] Execution sequence	0 - 65535	-	0	Yes	3999
P6-26	[ADD_SUB 6] Input 1 (ADD)	0: invalid Other: K connector	-	0	Yes	4482
P6-27	[ADD_SUB 6] Input 2 (ADD)	0: invalid Other: K connector	-	0	Yes	4483
P6-28	[ADD_SUB 6] Input 3 (ADD)	0: invalid Other: K connector	-	0	Yes	4484
P6-29	[ADD_SUB 6] Input 4 (SUBTRACT)	0: invalid Other: K connector	-	0	Yes	4485
P6-30	[ADD_SUB 7] Execution sequence	0 - 65535	-	0	Yes	4000
P6-31	[ADD_SUB 7] Input 1 (ADD)	0: invalid Other: K connector	-	0	Yes	4486
P6-32	[ADD_SUB 7] Input 2 (ADD)	0: invalid Other: K connector	-	0	Yes	4487
P6-33	[ADD_SUB 7] Input 3 (ADD)	0: invalid Other: K connector	-	0	Yes	4488
P6-34	[ADD_SUB 7] Input 4 (SUBTRACT)	0: invalid Other: K connector	-	0	Yes	4489
P6-35	[ADD_SUB 8] Execution sequence	0 - 65535	-	0	Yes	4001
P6-36	[ADD_SUB 8] Input 1 (ADD)	0: invalid Other: K connector	-	0	Yes	4490
P6-37	[ADD_SUB 8] Input 2 (ADD)	0: invalid Other: K connector	-	0	Yes	4491
P6-38	[ADD_SUB 8] Input 3 (ADD)	0: invalid Other: K connector	-	0	Yes	4492

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P6-39	[ADD_SUB 8] Input 4 (SUB-TRACT)	0: invalid Other: K connector	-	0	Yes	4493
P6-40	[MUL_DIV 1] Execution sequence	0 - 65535	-	0	Yes	4002
P6-41	[MUL_DIV 1] Input 1 (MULTIPLY)	0:Prohibited by module Other: K connector	-	0	Yes	4494
P6-42	[MUL_DIV 1] Input 2 (MULTIPLY)	0:Do not use Other: K connector	-	0	Yes	4495
P6-43	[MUL_DIV 1] Input 3 (DIVIDE)	0:Do not use Other: K connector	-	0	Yes	4496
P6-44	[MUL_DIV 2] Execution sequence	0 - 65535	-	0	Yes	4003
P6-45	[MUL_DIV 2] Input 1 (MULTIPLY)	0:Prohibited by module Other: K connector	-	0	Yes	4497
P6-46	[MUL_DIV 2] Input 2 (MULTIPLY)	0:Do not use Other: K connector	-	0	Yes	4498
P6-47	[MUL_DIV 2] Input 3 (DIVIDE)	0:Do not use Other: K connector	-	0	Yes	4499
P6-48	[MUL_DIV 3] Execution sequence	0 - 65535	-	0	Yes	4004
P6-49	[MUL_DIV 3] Input 1 (MULTIPLY)	0:Prohibited by module Other: K connector	-	0	Yes	4500
P6-50	[MUL_DIV 3] Input 2 (MULTIPLY)	0:Do not use Other: K connector	-	0	Yes	4501
P6-51	[MUL_DIV 3] Input 3 (DIVIDE)	0:Do not use Other: K connector	-	0	Yes	4502
P6-52	[MUL_DIV 4] Execution sequence	0 - 65535	-	0	Yes	4005
P6-53	[MUL_DIV 4] Input 1 (MULTIPLY)	0:Prohibited by module Other: K connector	-	0	Yes	4503
P6-54	[MUL_DIV 4] Input 2 (MULTIPLY)	0:Do not use Other: K connector	-	0	Yes	4504
P6-55	[MUL_DIV 4] Input 3 (DIVIDE)	0:Do not use Other: K connector	-	0	Yes	4505
P6-56	[MUL_DIV 5] Execution sequence	0 - 65535	-	0	Yes	4006
P6-57	[MUL_DIV 5] Input 1 (MULTIPLY)	0:Prohibited by module Other: K connector	-	0	Yes	4506
P6-58	[MUL_DIV 5] Input 2 (MULTIPLY)	0:Do not use Other: K connector	-	0	Yes	4507
P6-59	[MUL_DIV 5] Input 3 (DIVIDE)	0:Do not use Other: K connector	-	0	Yes	4508
P6-60	[MUL_DIV 6] Execution sequence	0 - 65535	-	0	Yes	4007
P6-61	[MUL_DIV 6] Input 1 (MULTIPLY)	0:Prohibited by module Other: K connector	-	0	Yes	4509
P6-62	[MUL_DIV 6] Input 2 (MULTIPLY)	0:Do not use Other: K connector	-	0	Yes	4510
P6-63	[MUL_DIV 6] Input 3 (DIVIDE)	0:Do not use Other: K connector	-	0	Yes	4511
P6-64	[MUL_DIV 7] Execution sequence	0 - 65535	-	0	Yes	4008
P6-65	[MUL_DIV 7] Input 1 (MULTIPLY)	0:Prohibited by module Other: K connector	-	0	Yes	4512
P6-66	[MUL_DIV 7] Input 2 (MULTIPLY)	0:Do not use Other: K connector	-	0	Yes	4513
P6-67	[MUL_DIV 7] Input 3 (DIVIDE)	0:Do not use Other: K connector	-	0	Yes	4514
P6-68	[MUL_DIV 8] Execution sequence	0 - 65535	-	0	Yes	4009
P6-69	[MUL_DIV 8] Input 1 (MULTIPLY)	0:Prohibited by module Other: K connector	-	0	Yes	4515
P6-70	[MUL_DIV 8] Input 2 (MULTIPLY)	0:Do not use Other: K connector	-	0	Yes	4516

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P6-71	[MUL_DIV 8] Input 3 (DIVIDE)	0:Do not use Other: K connector	-	0	Yes	4517
P6-72	[ABS 1] Execution sequence	0 - 65535	-	0	Yes	4018
P6-73	[ABS 1] Input	0: invalid Other: K connector	-	0	Yes	4542
P6-74	[ABS 2] Execution sequence	0 - 65535	-	0	Yes	4019
P6-75	[ABS 2] Input	0: invalid Other: K connector	-	0	Yes	4543
P6-76	[ABS 3] Execution sequence	0 - 65535	-	0	Yes	4020
P6-77	[ABS 3] Input	0: invalid Other: K connector	-	0	Yes	4544
P6-78	[ABS 4] Execution sequence	0 - 65535	-	0	Yes	4021
P6-79	[ABS 4] Input	0: invalid Other: K connector	-	0	Yes	4545
P6-80	[NCMP 1] Execution sequence	0 - 65535	-	0	Yes	4022
P6-81	[NCMP 1] Function selection	0:Greater than > 1:Less than < 2:Equal to =	-	0	Yes	4546
P6-82	[NCMP 1] Input 1	0: 0 Other: K connector	-	0	Yes	4547
P6-83	[NCMP 1] Input 2	0: 0 Other: K connector	-	0	Yes	4548
P6-84	[NCMP 1] Hysteresis input	0.0 - 100.0	%	0	Yes	4549
P6-85	[NCMP 2] Execution sequence	0 - 65535	-	0	Yes	4023
P6-86	[NCMP 2] Function selection	0:Greater than > 1:Less than < 2:Equal to =	-	0	Yes	4550
P6-87	[NCMP 2] Input 1	0: 0 Other: K connector	-	0	Yes	4551
P6-88	[NCMP 2] Input 2	0: 0 Other: K connector	-	0	Yes	4552
P6-89	[NCMP 2] Hysteresis input	0.0 - 100.0	%	0	Yes	4553
P6-90	[NCMP 3] Execution sequence	0 - 65535	-	0	Yes	4024
P6-91	[NCMP 3] Function selection	0:Greater than > 1:Less than < 2:Equal to =	-	0	Yes	4554
P6-92	[NCMP 3] Input 1	0: 0 Other: K connector	-	0	Yes	4555
P6-93	[NCMP 3] Input 2	0: 0 Other: K connector	-	0	Yes	4556
P6-94	[NCMP 3] Hysteresis input	0.0 - 100.0	%	0	Yes	4557
P6-95	[NCMP 4] Execution sequence	0 - 65535	-	0	Yes	4025
P6-96	[NCMP 4] Function selection	0:Greater than > 1:Less than < 2:Equal to =	-	0	Yes	4558
P6-97	[NCMP 4] Input 1	0: 0 Other: K connector	-	0	Yes	4559
P6-98	[NCMP 4] Input 2	0: 0 Other: K connector	-	0	Yes	4560
P6-99	[NCMP 4] Hysteresis input	0.0 - 100.0	%	0	Yes	4561
Group P7: custom algorithm function block 2						
P7-00	[NEG 1] Execution sequence	0 - 65535	-	0	Yes	4109
P7-01	[NEG 1] Input	0: 0 Other: K connector	-	0	Yes	5012
P7-02	[NEG 2] Execution sequence	0 - 65535	-	0	Yes	4110

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P7-03	[NEG 2] Input	0: 0 Other: K connector	-	0	Yes	5013
P7-04	[NEG 3] Execution sequence	0 - 65535	-	0	Yes	4111
P7-05	[NEG 3] Input	0: 0 Other: K connector	-	0	Yes	5014
P7-06	[NEG 4] Execution sequence	0 - 65535	-	0	Yes	4112
P7-07	[NEG 4] Input	0: 0 Other: K connector	-	0	Yes	5015
P7-08	[NEG 5] Execution sequence	0 - 65535	-	0	Yes	4113
P7-09	[NEG 5] Input	0: 0 Other: K connector	-	0	Yes	5016
P7-10	[NEG 6] Execution sequence	0 - 65535	-	0	Yes	4114
P7-11	[NEG 6] Input	0: 0 Other: K connector	-	0	Yes	5017
P7-12	[NEG 7] Execution sequence	0 - 65535	-	0	Yes	4115
P7-13	[NEG 7] Input	0: 0 Other: K connector	-	0	Yes	5018
P7-14	[NEG 8] Execution sequence	0 - 65535	-	0	Yes	4116
P7-15	[NEG 8] Input	0: 0 Other: K connector	-	0	Yes	5019
P7-16	[INTEGRAL 1] Execution sequence	0 - 65535	-	0	Yes	4101
P7-17	[INTEGRAL 1] Input	0: 0 Other: K connector	-	0	Yes	4980
P7-18	[INTEGRAL 1] Output upper limit	0: 0 Other: K connector	%	0	Yes	4981
P7-19	[INTEGRAL 1] Output lower limit	0: 0 Other: K connector	%	0	Yes	4982
P7-20	[INTEGRAL 1] Output forcing enable	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	4984
P7-21	[INTEGRAL 1] Output force	0: 0 Other: K connector	%	0	Yes	4983
P7-22	[INTEGRAL 1] Ti	0.000 - 60.000	s	0	Yes	4985
P7-23	[INTEGRAL 2] Execution sequence	0 - 65535	-	0	Yes	4102
P7-24	[INTEGRAL 2] Input	0: 0 Other: K connector	-	0	Yes	4986
P7-25	[INTEGRAL 2] Output upper limit	0: 0 Other: K connector	%	0	Yes	4987
P7-26	[INTEGRAL 2] Output lower limit	0: 0 Other: K connector	%	0	Yes	4988

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P7-27	[INTEGRAL 2] Output forcing enable	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	4990
P7-28	[INTEGRAL 2] Output force	0: 0 Other: K connector	%	0	Yes	4989
P7-29	[INTEGRAL 2] Ti	0.000 - 60.000	s	0	Yes	4991
P7-30	[INTEGRAL 3] Execution sequence	0 - 65535	-	0	Yes	4103
P7-31	[INTEGRAL 3] Input	0: 0 Other: K connector	-	0	Yes	4992
P7-32	[INTEGRAL 3] Output upper limit	0: 0 Other: K connector	%	0	Yes	4993
P7-33	[INTEGRAL 3] Output lower limit	0: 0 Other: K connector	%	0	Yes	4994
P7-34	[INTEGRAL 3] Output forcing enable	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	4996
P7-35	[INTEGRAL 3] Output force	0: 0 Other: K connector	%	0	Yes	4995
P7-36	[INTEGRAL 3] Ti	0.000 - 60.000	s	0	Yes	4997
P7-37	[INTEGRAL 4] Execution sequence	0 - 65535	-	0	Yes	4104
P7-38	[INTEGRAL 4] Input	0: 0 Other: K connector	-	0	Yes	4998
P7-39	[INTEGRAL 4] Output upper limit	0: 0 Other: K connector	%	0	Yes	4999
P7-40	[INTEGRAL 4] Output lower limit	0: 0 Other: K connector	%	0	Yes	5000
P7-41	[INTEGRAL 4] Output forcing enable	0:Disable 1:Enable 2:DI1 3:DI2 4:DI3 5:DI4 6:DI5 7:DI6 8:DIL 9:HDI1 10:HDI2 Other: B connector	-	0	Yes	5002
P7-42	[INTEGRAL 4] Output force	0: 0 Other: K connector	%	0	Yes	5001
P7-43	[INTEGRAL 4] Ti	0.000 - 60.000	s	0	Yes	5003

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P7-44	[DIFF 1] Execution sequence	0 - 65535	-	0	Yes	4105
P7-45	[DIFF 1] Input	0: 0 Other: K connector	-	0	Yes	5004
P7-46	[DIFF 1] Differential time	0.01 - 300.00	s	0.01	Yes	5005
P7-47	[DIFF 2] Execution sequence	0 - 65535	-	0	Yes	4106
P7-48	[DIFF 2] Input	0: 0 Other: K connector	-	0	Yes	5006
P7-49	[DIFF 2] Differential time	0.01 - 300.00	s	0.01	Yes	5007
P7-50	[DIFF 3] Execution sequence	0 - 65535	-	0	Yes	4107
P7-51	[DIFF 3] Input	0: 0 Other: K connector	-	0	Yes	5008
P7-52	[DIFF 3] Differential time	0.01 - 300.00	s	0.01	Yes	5009
P7-53	[DIFF 4] Execution sequence	0 - 65535	-	0	Yes	4108
P7-54	[DIFF 4] Input	0: 0 Other: K connector	-	0	Yes	5010
P7-55	[DIFF 4] Differential time	0.01 - 300.00	s	0.01	Yes	5011
P7-56	[LIM 1] Execution sequence	0 - 65535	-	0	Yes	4060
P7-57	[LIM 1] Input	0: 0 Other: K connector	-	0	Yes	4819
P7-58	[LIM 1] Upper limit	0: 0 Other: K connector	-	0	Yes	4820
P7-59	[LIM 1] Lower limit	0: 0 Other: K connector	-	0	Yes	4821
P7-60	[LIM 2] Execution sequence	0 - 65535	-	0	Yes	4061
P7-61	[LIM 2] Input	0: 0 Other: K connector	-	0	Yes	4822
P7-62	[LIM 2] Upper limit	0: 0 Other: K connector	-	0	Yes	4823
P7-63	[LIM 2] Lower limit	0: 0 Other: K connector	-	0	Yes	4824
P7-64	[LIM 3] Execution sequence	0 - 65535	-	0	Yes	4062
P7-65	[LIM 3] Input	0: 0 Other: K connector	-	0	Yes	4825
P7-66	[LIM 3] Upper limit	0: 0 Other: K connector	-	0	Yes	4826
P7-67	[LIM 3] Lower limit	0: 0 Other: K connector	-	0	Yes	4827
P7-68	[LIM 4] Execution sequence	0 - 65535	-	0	Yes	4063
P7-69	[LIM 4] Input	0: 0 Other: K connector	-	0	Yes	4828
P7-70	[LIM 4] Upper limit	0: 0 Other: K connector	-	0	Yes	4829
P7-71	[LIM 4] Lower limit	0: 0 Other: K connector	-	0	Yes	4830
Group P8: custom multi-point operation function block						
P8-00	[PLI10 1] Execution sequence	0 - 65535	-	0	Yes	4052
P8-01	[PLI10 1] Input	0: 0 Other: K connector	-	0	Yes	4637
P8-02	[PLI10 1] Setpoint X1	-600.0 - 600.0	%	0	Yes	4638
P8-03	[PLI10 1] Setpoint Y1	-600.0 - 600.0	%	0	Yes	4648
P8-04	[PLI10 1] Setpoint X2	-600.0 - 600.0	%	10	Yes	4639
P8-05	[PLI10 1] Setpoint Y2	-600.0 - 600.0	%	10	Yes	4649
P8-06	[PLI10 1] Setpoint X3	-600.0 - 600.0	%	20	Yes	4640
P8-07	[PLI10 1] Setpoint Y3	-600.0 - 600.0	%	20	Yes	4650
P8-08	[PLI10 1] Setpoint X4	-600.0 - 600.0	%	30	Yes	4641

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P8-09	[PLI10 1] Setpoint Y4	-600.0 - 600.0	%	30	Yes	4651
P8-10	[PLI10 1] Setpoint X5	-600.0 - 600.0	%	40	Yes	4642
P8-11	[PLI10 1] Setpoint Y5	-600.0 - 600.0	%	40	Yes	4652
P8-12	[PLI10 1] Setpoint X6	-600.0 - 600.0	%	50	Yes	4643
P8-13	[PLI10 1] Setpoint Y6	-600.0 - 600.0	%	50	Yes	4653
P8-14	[PLI10 1] Setpoint X7	-600.0 - 600.0	%	60	Yes	4644
P8-15	[PLI10 1] Setpoint Y7	-600.0 - 600.0	%	60	Yes	4654
P8-16	[PLI10 1] Setpoint X8	-600.0 - 600.0	%	70	Yes	4645
P8-17	[PLI10 1] Setpoint Y8	-600.0 - 600.0	%	70	Yes	4655
P8-18	[PLI10 1] Setpoint X9	-600.0 - 600.0	%	80	Yes	4646
P8-19	[PLI10 1] Setpoint Y9	-600.0 - 600.0	%	80	Yes	4656
P8-20	[PLI10 1] Setpoint X10	-600.0 - 600.0	%	90	Yes	4647
P8-21	[PLI10 1] Setpoint Y10	-600.0 - 600.0	%	90	Yes	4657
P8-22	[PLI10 2] Execution sequence	0 - 65535	-	0	Yes	4053
P8-23	[PLI10 2] Input	0: 0 Other: K connector	-	0	Yes	4658
P8-24	[PLI10 2] Setpoint X1	-600.0 - 600.0	%	0	Yes	4659
P8-25	[PLI10 2] Setpoint Y1	-600.0 - 600.0	%	0	Yes	4669
P8-26	[PLI10 2] Setpoint X2	-600.0 - 600.0	%	10	Yes	4660
P8-27	[PLI10 2] Setpoint Y2	-600.0 - 600.0	%	10	Yes	4670
P8-28	[PLI10 2] Setpoint X3	-600.0 - 600.0	%	20	Yes	4661
P8-29	[PLI10 2] Setpoint Y3	-600.0 - 600.0	%	20	Yes	4671
P8-30	[PLI10 2] Setpoint X4	-600.0 - 600.0	%	30	Yes	4662
P8-31	[PLI10 2] Setpoint Y4	-600.0 - 600.0	%	30	Yes	4672
P8-32	[PLI10 2] Setpoint X5	-600.0 - 600.0	%	40	Yes	4663
P8-33	[PLI10 2] Setpoint Y5	-600.0 - 600.0	%	40	Yes	4673
P8-34	[PLI10 2] Setpoint X6	-600.0 - 600.0	%	50	Yes	4664
P8-35	[PLI10 2] Setpoint Y6	-600.0 - 600.0	%	50	Yes	4674
P8-36	[PLI10 2] Setpoint X7	-600.0 - 600.0	%	60	Yes	4665
P8-37	[PLI10 2] Setpoint Y7	-600.0 - 600.0	%	60	Yes	4675
P8-38	[PLI10 2] Setpoint X8	-600.0 - 600.0	%	70	Yes	4666
P8-39	[PLI10 2] Setpoint Y8	-600.0 - 600.0	%	70	Yes	4676
P8-40	[PLI10 2] Setpoint X9	-600.0 - 600.0	%	80	Yes	4667
P8-41	[PLI10 2] Setpoint Y9	-600.0 - 600.0	%	80	Yes	4677
P8-42	[PLI10 2] Setpoint X10	-600.0 - 600.0	%	90	Yes	4668
P8-43	[PLI10 2] Setpoint Y10	-600.0 - 600.0	%	90	Yes	4678
P8-44	[PLI10 3] Execution sequence	0 - 65535	-	0	Yes	4054
P8-45	[PLI10 3] Input	0: 0 Other: K connector	-	0	Yes	4679
P8-46	[PLI10 3] Setpoint X1	-600.0 - 600.0	%	0	Yes	4680
P8-47	[PLI10 3] Setpoint Y1	-600.0 - 600.0	%	0	Yes	4690
P8-48	[PLI10 3] Setpoint X2	-600.0 - 600.0	%	10	Yes	4681
P8-49	[PLI10 3] Setpoint Y2	-600.0 - 600.0	%	10	Yes	4691
P8-50	[PLI10 3] Setpoint X3	-600.0 - 600.0	%	20	Yes	4682
P8-51	[PLI10 3] Setpoint Y3	-600.0 - 600.0	%	20	Yes	4692
P8-52	[PLI10 3] Setpoint X4	-600.0 - 600.0	%	30	Yes	4683
P8-53	[PLI10 3] Setpoint Y4	-600.0 - 600.0	%	30	Yes	4693
P8-54	[PLI10 3] Setpoint X5	-600.0 - 600.0	%	40	Yes	4684
P8-55	[PLI10 3] Setpoint Y5	-600.0 - 600.0	%	40	Yes	4694
P8-56	[PLI10 3] Setpoint X6	-600.0 - 600.0	%	50	Yes	4685
P8-57	[PLI10 3] Setpoint Y6	-600.0 - 600.0	%	50	Yes	4695

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P8-58	[PLI10 3] Setpoint X7	-600.0 - 600.0	%	60	Yes	4686
P8-59	[PLI10 3] Setpoint Y7	-600.0 - 600.0	%	60	Yes	4696
P8-60	[PLI10 3] Setpoint X8	-600.0 - 600.0	%	70	Yes	4687
P8-61	[PLI10 3] Setpoint Y8	-600.0 - 600.0	%	70	Yes	4697
P8-62	[PLI10 3] Setpoint X9	-600.0 - 600.0	%	80	Yes	4688
P8-63	[PLI10 3] Setpoint Y9	-600.0 - 600.0	%	80	Yes	4698
P8-64	[PLI10 3] Setpoint X10	-600.0 - 600.0	%	90	Yes	4689
P8-65	[PLI10 1] Setpoint Y10	-600.0 - 600.0	%	90	Yes	4699
P8-66	[PLI10 4] Execution sequence	0 - 65535	-	0	Yes	4055
P8-67	[PLI10 4] Input	0: 0 Other: K connector	-	0	Yes	4700
P8-68	[PLI10 4] Setpoint X1	-600.0 - 600.0	%	0	Yes	4701
P8-69	[PLI10 4] Setpoint Y1	-600.0 - 600.0	%	0	Yes	4711
P8-70	[PLI10 4] Setpoint X2	-600.0 - 600.0	%	10	Yes	4702
P8-71	[PLI10 4] Setpoint Y2	-600.0 - 600.0	%	10	Yes	4712
P8-72	[PLI10 4] Setpoint X3	-600.0 - 600.0	%	20	Yes	4703
P8-73	[PLI10 4] Setpoint Y3	-600.0 - 600.0	%	20	Yes	4713
P8-74	[PLI10 4] Setpoint X4	-600.0 - 600.0	%	30	Yes	4704
P8-75	[PLI10 4] Setpoint Y4	-600.0 - 600.0	%	30	Yes	4714
P8-76	[PLI10 4] Setpoint X5	-600.0 - 600.0	%	40	Yes	4705
P8-77	[PLI10 4] Setpoint Y5	-600.0 - 600.0	%	40	Yes	4715
P8-78	[PLI10 4] Setpoint X6	-600.0 - 600.0	%	50	Yes	4706
P8-79	[PLI10 4] Setpoint Y6	-600.0 - 600.0	%	50	Yes	4716
P8-80	[PLI10 4] Setpoint X7	-600.0 - 600.0	%	60	Yes	4707
P8-81	[PLI10 4] Setpoint Y7	-600.0 - 600.0	%	60	Yes	4717
P8-82	[PLI10 4] Setpoint X8	-600.0 - 600.0	%	70	Yes	4708
P8-83	[PLI10 4] Setpoint Y8	-600.0 - 600.0	%	70	Yes	4718
P8-84	[PLI10 4] Setpoint X9	-600.0 - 600.0	%	80	Yes	4709
P8-85	[PLI10 4] Setpoint Y9	-600.0 - 600.0	%	80	Yes	4719
P8-86	[PLI10 4] Setpoint X10	-600.0 - 600.0	%	90	Yes	4710
P8-87	[PLI10 4] Setpoint Y10	-600.0 - 600.0	%	90	Yes	4720

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
Group P9: custom process control function block						
P9-00	Execution sequence conflict module 1 type	0:No conflict 1:Group P0 W2B block 2:Group P0 B2W block 3:Group P0 W2DW block 4:Group P0 DW2W block 5:Group P1 AND block 6:Group P1 NOT block 7:Group P2 OR block 8:Group P2 XOR/XNOR block 9:Group P2 NAND block 10:Group P3 BSW block 11:Group P3 NSW block 12:Group P4 DELAY block 13:Group P4 P_L 14:Group P4 FILT 15:Group P4 RS flip-flop block 16:Group P4 DFF block 17:Group P5 PULSE 18:Group P6 ADD_SUB 19:Group P6 MUL_DIV 20:Group P6 ABS 21:Group P6 NCMP 22:Group P7 inversion block 23:Group P7 integrators 24:Group P7 differential block 25:Group P7 LIM 26:Group P8 PLI10 27:Group P9 tech. ctrl fixed word 28:Group P9 tech. ctrl fixed bit 29:Group P9 tech. ctrl	-	0	No	35799
P9-01	Execution sequence conflict module 1 group	0 - 65535	-	0	No	35800

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P9-02	Execution sequence conflict module 2 type	0:No conflict 1:Group P0 W2B block 2:Group P0 B2W block 3:Group P0 W2DW block 4:Group P0 DW2W block 5:Group P1 AND block 6:Group P1 NOT block 7:Group P2 OR block 8:Group P2 XOR/XNOR block 9:Group P2 NAND block 10:Group P3 BSW block 11:Group P3 NSW block 12:Group P4 DELAY block 13:Group P4 P_L 14:Group P4 FILT 15:Group P4 RS flip-flop block 16:Group P4 DFF block 17:Group P5 PULSE 18:Group P6 ADD_SUB 19:Group P6 MUL_DIV 20:Group P6 ABS 21:Group P6 NCMP 22:Group P7 inversion block 23:Group P7 integrators 24:Group P7 differential block 25:Group P7 LIM 26:Group P8 PLI10 27:Group P9 tech. ctrl fixed word 28:Group P9 tech. ctrl fixed bit 29:Group P9 tech. ctrl	-	0	No	35801
P9-03	Execution sequence conflict module 2 group	0 - 65535	-	0	No	35802
P9-04	[Tech. ctrl fixed word 1] Execution sequence	0 - 65535	-	0	Yes	4068
P9-05	[Tech. ctrl fixed word 2] Execution sequence	0 - 65535	-	0	Yes	4069
P9-06	[Tech. ctrl fixed word 3] Execution sequence	0 - 65535	-	0	Yes	4070
P9-07	[Tech. ctrl fixed word 4] Execution sequence	0 - 65535	-	0	Yes	4071
P9-08	[Tech. ctrl fixed word 5] Execution sequence	0 - 65535	-	0	Yes	4072
P9-09	[Tech. ctrl fixed word 6] Execution sequence	0 - 65535	-	0	Yes	4073
P9-10	[Tech. ctrl fixed word 7] Execution sequence	0 - 65535	-	0	Yes	4074
P9-11	[Tech. ctrl fixed word 8] Execution sequence	0 - 65535	-	0	Yes	4075
P9-12	[Tech. ctrl fixed word 9] Execution sequence	0 - 65535	-	0	Yes	4076
P9-13	[Tech. ctrl fixed word 10] Execution sequence	0 - 65535	-	0	Yes	4077
P9-14	[Tech. ctrl fixed word 11] Execution sequence	0 - 65535	-	0	Yes	4078
P9-15	[Tech. ctrl fixed word 12] Execution sequence	0 - 65535	-	0	Yes	4079

Parameter No.	Name	Setting Range	Unit	Default	Change Allowed	Address
P9-16	[Tech. ctrl fixed word 13] Execution sequence	0 - 65535	-	0	Yes	4080
P9-17	[Tech. ctrl fixed word 14] Execution sequence	0 - 65535	-	0	Yes	4081
P9-18	[Tech. ctrl fixed bit 1] Execution sequence	0 - 65535	-	0	Yes	4082
P9-19	[Tech. ctrl fixed bit 2] Execution sequence	0 - 65535	-	0	Yes	4083
P9-20	[Tech. ctrl fixed bit 3] Execution sequence	0 - 65535	-	0	Yes	4084
P9-21	[Tech. ctrl fixed bit 4] Execution sequence	0 - 65535	-	0	Yes	4085
P9-22	[Tech. ctrl fixed bit 5] Execution sequence	0 - 65535	-	0	Yes	4086
P9-23	[Tech. ctrl fixed bit 6] Execution sequence	0 - 65535	-	0	Yes	4087
P9-24	[Tech. ctrl] Execution sequence	0 - 65535	-	0	Yes	4088



6 Connectors

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6 Connectors

6.1 Descriptions of Common Connectors

The connectors indicate the parameters in group U, and store and display the intermediate variables in system control. The connectors are classified into bit connectors (corresponding to U0-00 to U4-99, U10-00 to U14-99) and word connectors (corresponding to U5-00 to U9-99, U15-00 to U19-99) based on the data type.

Word connectors are further classified into single-word connectors (16 bits, occupying one storage address, corresponding to U5-00 to U8-99, U15-00 to U15-99) and double-word connectors (32 bits, occupying two storage addresses, corresponding to U9-00 to U9-99, U19-00 to U19-99). Double-word connectors express more effective digits, which improves the precision of values.

Bit connectors are classified into three types based on the unit: per unit value (expressed as a percentage relative to a base value, displaying values such as speed, torque, and current), actual value (unit being V, A, kW and etc, having actual physical meaning), and unitless value (such as communication receiving data, displayed only as original value, through which the physical meaning cannot be determined).

The per unit value system is expressed based on the following rules:

1) For a single-word connector, 0×1000 (being 4096 in decimal) represents 100%. The actual value or per unit value as percentage can be used during display, and the conversion relationship is Percentage = Value/4096.

2) For a double-word connector, 0×1000 0000(4096 * 65536) represents 100%. The actual value or per unit value as percentage can be used during display, and the conversion relationship is: Percentage = Value/4096/65536.

3) The per unit value ranges expressed by single-word and double-word connectors are the same, that is, -800.00% to +799.99%.

4) A single-word connector and a double-word connector can be converted to each other. When assigning a single-word connector to a double-word connector, the value of the double-word connector is 0 in the low word and the value of the single-word connector in the high word. When assigning a double-word connector to a single-word connector, the low word is discarded and the high word is assigned to the single-word connector, which means that the number of the effective bits of the value is reduced and the value range keeps the same.

6.1.1 Speed and Frequency

Parameter No.	Name	Description
U5-00	Actual motor speed (100 ms filter)	100% corresponding to the rated motor speed, voltage after 100 ms smooth filtering.
U9-00	Actual motor speed	100% corresponding to the rated motor speed, without filtering.
U9-01	Final motor speed setpoint	100% corresponding to the rated motor speed, speed setpoint before speed adjustment PID filtering.
U9-13	Filtered speed setpoint	100% corresponding to the rated motor speed, speed setpoint after speed adjustment PID.
U9-14	Filtered speed feedback	100% corresponding to the rated motor speed, speed feedback after speed adjustment PID.
U9-20	Encoder speed	100% corresponding to the rated motor speed, speed detected by the encoder.

6.1.2 Current and Voltage

Parameter No.	Name	Description
U5-01	Output voltage (100 ms filter)	100% corresponding to the rated motor voltage, voltage after 100 ms smooth filtering.
U5-02	Output current (100 ms filter)	100% corresponding to the rated motor speed, current after 100 ms smooth filtering.
U5-05	DC bus voltage (100 ms filter)	Actual bus voltage, in unit of 0.1 V, after smooth 100 ms filtering.
U5-26	Phase U current	Can be switched over to per unit value, actual value, and unitless value by changing the display mode. 100% corresponds to the rated motor current.
U5-27	Phase V current	Can be switched over to per unit value, actual value, or unitless value by changing the display mode. 100% corresponds to the rated motor current.
U5-28	Phase W current	Can be switched over to per unit value, actual value, or unitless value by changing the display mode. 100% corresponds to the rated motor current.

6.1.3 Torque

Parameter No.	Name	Description
U5-04	Output torque (100 ms filter)	100% corresponding to the rated motor torque (rated power kw * 9550/rated torque RPM), torque after 100 ms smooth filtering.
U6-07	[Torque control ramp] Main setpoint	Torque setpoint from U6-11 after the acceleration and deceleration time of the torque ramp, 100% corresponding to the rated motor torque.
U6-10	Torque control main setpoint	Torque control main setpoint of the setting channel, 100% corresponding to the rated torque.
U6-11	Torque control filter main setpoint	Torque setpoint from U6-10 after filtering of the delay time C1-01/C3-01, 100% corresponding to the rated motor torque.
U6-12	Torque setpoint limited	Actual effective torque setpoint after limited by the torque setpoint limit, power limit, and Vdc control, 100% corresponding to the rated motor torque.
U6-13	Torque setpoint before suppl. torque	Torque setpoint without the total supplementary torque U6-20, 100% corresponding to the rated motor torque.
U6-14	Max. output torque	Actual effective torque upper limit after limited by power limit and Vdc control, 100% corresponding to the rated motor torque.
U6-15	Min. output torque	Actual effective torque lower limit after limited by power limit and Vdc control, 100% corresponding to the rated motor torque.
U6-16	Positive torque limit value	Positive torque limit output after speed adjustment PID, which is limited by the torque upper limit U6-18 and anti-runaway regulator, 100% corresponding to the rated motor torque.
U6-17	Negative torque limit value	Negative torque limit output after speed adjustment PID, which is limited by the torque lower limit U6-19 and anti-runaway regulator, 100% corresponding to the rated motor torque.
U6-18	Torque upper limit	Smaller of the torque upper limit digital setpoint in E2-08 and torque upper limit setpoint selection in E2-10, 100% corresponding to the rated motor torque.
U6-19	Torque lower limit	Smaller of the torque lower limit digital setpoint in E2-09 and torque upper limit setpoint selection in E2-11, 100% corresponding to the rated motor torque.
U6-20	Total suppl. torque	Torque setpoint with the feedforward torque value in U6-27 plus the total supplementary torque U6-26, 100% corresponding to the rated motor torque.

Parameter No.	Name	Description
U6-21	Friction torque	Dependent on the friction torque selection in C1-09/C3-09 (suppl. torque setpoint 3)
U6-22	Speed ADJ PID output	Output value of speed adjustment PID, 100% corresponding to the rated motor torque.
U6-23	Automatic torque memory value	Speed adjustment PID output in U6-22 before brake applied.
U6-24	Speed ADJ PID integral	Integral of speed adjustment PID, 100% corresponding to the rated motor torque.
U6-25	RFG inertia comp. torque	Compensation torque calculated based on the electromechanical time constant and RFG output acceleration rate, 100% corresponding to the rated motor torque.
U6-26	Suppl. torque	Torque setpoint with the supplementary torque setpoint 1 plus supplementary torque setpoint 2, 100% corresponding to the rated motor torque.
U6-27	Feedforward torque	Feedforward torque calculated based on the RFG feedforward or speed differential, 100% corresponding to the rated motor torque.
U6-28	Calculated load and friction torque	Dependent on the friction torque selection in C1-09/C3-09 (suppl. torque setpoint 3)
U6-29	Torque setpoint before limit	Actual effective torque setpoint after limited by the torque setpoint limit, power limit, Vdc control, and U6-18/U6-19 limit, 100% corresponding to the rated motor torque.
U6-30	Calculated torque for overspeed ADJ	Output after speed regulator' s processing on the speed feedback from filtering of the maximum positive speed or maximum negative speed, which prevents the motor speed from exceeding the limits; 100% corresponding to the rated motor torque.
U6-39	[Load observer] Output torque	Torque output by the load observer, 100% corresponding to the rated motor torque.

6.1.4 Other Word Connectors

Parameter No.	Name	Description
U8-00	Current state machine	Current state of the system.
U8-07	Control word 1	Word formed by bit0 to bit15 in control word 1.
U8-08	Control word 2	Word formed by bit0 to bit15 in control word 2.
U8-09	Status word 1	Word formed by bit0 to bit15 in status word 1.
U8-10	Status word 2	Word formed by bit0 to bit15 in status word 2.
U5-40	Modbus comm. setpoint 1	Writing to the address 34230 through Modbus changes the value of U5-40. This parameter can be used for speed and other settings.
U5-41	Modbus comm. setpoint 2	Writing to the address 34231 through Modbus changes the value of U5-41. This parameter can be used for speed and other settings.
U9-50	Modbus comm. DWORD setpoint	Writing to the address 34232 through Modbus changes the value of high 16 bits in U9-50. Writing to the address 34233 through Modbus changes the value of low 16 bits in U9-50. This parameter can be used for 32-bit speed setting and other settings.

6.1.5 Common Bit Connectors

Parameter No.	Name	Description
U0-00	Logic 0	Constant 0
U0-01	Logic 1	Constant 1

Parameter No.	Name	Description
U0-02/U0-12	DI1/ DI1 negation	Status after the DI terminal is processed with group F0 parameters.
U0-03/U0-13	DI2/ DI2 negation	
U0-04/U0-14	DI3/ DI3 negation	
U0-05/U0-15	DI4/ DI4 negation	
U0-06/U0-16	DI5/ DI5 negation	
U0-07/U0-17	DI6/ DI6 negation	
U0-08/U0-18	DIL/ DIL negation	
U0-09/U0-19	HDI1/ HDI1 negation	Status after the HDI terminal used as DI is processed with group F0 parameters.
U0-10/U0-20	HDI2/ HDI2 negation	
U1-00	Ready to switch on	bit0 of status word 1, indicating the system has no emergency stop or fault.
U1-01	Ready for operation	bit1 of status word 1, indicating that the system receives the OFF1 command, there is no RUN enable signal, and the bus voltage is built up.
U1-02	Running	bit2 of status word 1, indicating that the system is in normal operation state.
U1-98	Switch-on preparation status	System in switch-on preparation state, corresponding to [U1-00] = 1 and [U1-01] = 0.
U1-99	Running preparation status	System in running preparation state, corresponding to [U1-01] = 1 and [U1-02] = 0.
U1-03	Fault activated	bit3 of status word 1, indicating that there is a fault activated currently.
U1-04	OFF2 inactive	bit4 of status word 1, the value “0” indicating that the emergency stop command OFF2 is activated.
U1-05	OFF3 inactive	bit5 of status word 1, the value “0” indicating that the quick stop command OFF3 is activated.
U1-06	Switch-on inhibited	bit6 of status word 1, indicating that the current status does not allow entering switch-on preparation or receiving the OFF1 command, which is because of a emergency stop or fault activated.
U1-07	Warning/Limit activated	bit7 of status word 1, indicating that there is a warning or limit activated currently.
U1-08	Speed setpoint reached	bit8 of status word 1, the value “1” indicating that the feedback speed follows the setpoint.
U1-09	|speed actual| >= speed compare value	bit10 of status word 1, the value “1” indicating that the feedback speed is larger than the value of E8-08.
U1-10	Torque/Current limit reached	bit11 of status word 1, the value “1” indicating that the torque or current reaches the limit.
U1-11	Brake opening	bit12 of status word 1, the value “1” indicating that the brake is released; for the brake control module, refer to group L1.
U1-12	Speed positive direction	bit13 of status word 1, the value “1” indicating positive speed.
U1-64	DC bus energized	The value “1” indicates that DC bus voltage is built up.
U1-65	Motor speed zero	The value “1” indicates that the absolute feedback speed is smaller than E1-11.
U1-75	Start command (Modbus)	Writing 0 or 1 to the address 34196 through Modbus changes the value of U1-75. This parameter can be used for the custom OFF1 command.
U1-78	Remote control enable	The value “1” indicates the normal control channel is enabled.
The value “0” indicates that local control by SOP-20 or IDS is enabled.	Bus adapter A.PZD1.0 to bus adapter A.PZD1.15.	Corresponding to each bit of the connector U5.44, used for control channel setting.

Parameter No.	Name	Description
U2-00 to U2-15	Bus adapter A.PZD1.0 to bus adapter A.PZD1.15.	Corresponding to each bit of the connector U5.44, used for control channel setting.
U2-16 to U2-31	Bus adapter B.PZD1.0 to bus adapter B.PZD1.15.	Corresponding to each bit of the connector U5.60, used for control channel setting.
U2-32 to U2-47	InoLink.PZD1.0 to InoLink. PZD1.15	Corresponding to each bit of the connector U5.32, used for control channel setting.

6.2 Table of Connectors

Parameter No.	Name	Unit	Address	Remarks
Group U0: bit connector 1				
U0-00	Logic 0	-	32896	
U0-01	Logic 1	-	32897	
U0-02	DI1	-	32898	
U0-03	DI2	-	32899	
U0-04	DI3	-	32900	
U0-05	DI4	-	32901	
U0-06	DI5	-	32902	
U0-07	DI6	-	32903	
U0-08	DIL	-	32904	
U0-09	HDI1	-	32905	
U0-10	HDI2	-	32906	
U0-12	DI1 inversion	-	32908	
U0-13	DI2 inversion	-	32909	
U0-14	DI3 inversion	-	32910	
U0-15	DI4 inversion	-	32911	
U0-16	DI5 inversion	-	32912	
U0-17	DI6 inversion	-	32913	
U0-18	DIL inversion	-	32914	
U0-19	HDI1 inversion	-	32915	
U0-20	HDI2 inversion	-	32916	
U0-21	RO1	-	32917	
U0-22	RO2	-	32918	
U0-23	RO3	-	32919	
U0-24	HDO1	-	32920	
U0-25	HDO2	-	32921	
U0-26	Active CMS	-	32922	
U0-27	Motor selection bit0	-	32923	
U0-28	Motor selection bit1	-	32924	
U0-29	RFG selection bit0	-	32925	
U0-30	RFG selection bit1	-	32926	
U0-31	Fixed setpoint selection 1	-	32927	
U0-32	Fixed setpoint selection 2	-	32928	
U0-33	Fixed setpoint selection 3	-	32929	
U0-34	Fixed setpoint selection 4	-	32930	
U0-35	AI1 wire breakage monitoring	-	32931	

Parameter No.	Name	Unit	Address	Remarks
U0-36	AI2 wire breakage monitoring	-	32932	
U0-41	SLOT 1_1 status	-	32937	
U0-42	SLOT 1_2 status	-	32938	
U0-43	SLOT 1_3 status	-	32939	
U0-44	SLOT 2_1 status	-	32940	
U0-45	SLOT 2_2 status	-	32941	
U0-46	SLOT 2_3 status	-	32942	
U0-47	SLOT 3_1 status	-	32943	
U0-48	Technology parameter set selection bit0	-	32944	
U0-49	Technology parameter set selection bit1	-	32945	
U0-51	Positive speed enable	-	32966	
U0-52	Negative speed enable	-	32967	
U0-53	Trigger oscilloscope state	-	33784	
U0-84	FO sync module. PZD1.0	-	32980	
U0-85	FO sync module. PZD1.1	-	32981	
U0-86	FO sync module. PZD1.2	-	32982	
U0-87	FO sync module. PZD1.3	-	32983	
U0-88	FO sync module. PZD1.4	-	32984	
U0-89	FO sync module. PZD1.5	-	32985	

Parameter No.	Name	Unit	Address	Remarks
U0-90	FO sync module. PZD1.6	-	32986	
U0-91	FO sync module. PZD1.7	-	32987	
U0-92	FO sync module. PZD1.8	-	32988	
U0-93	FO sync module. PZD1.9	-	32989	
U0-94	FO sync module. PZD1.10	-	32990	
U0-95	FO sync module. PZD1.11	-	32991	
U0-96	FO sync module. PZD1.12	-	32992	
U0-97	FO sync module. PZD1.13	-	32993	
U0-98	FO sync module. PZD1.14	-	32994	
U0-99	FO sync module. PZD1.15	-	32995	
Group U1: bit connector 2				
U1-00	Ready to switch on	-	32996	
U1-01	Ready for operation	-	32997	
U1-02	Running	-	32998	
U1-03	Fault activated	-	32999	
U1-04	OFF2 inactive	-	33000	
U1-05	OFF3 inactive	-	33001	
U1-06	Switch-on inhibited	-	33002	
U1-07	Warning/Limit activated	-	33003	
U1-08	Speed setpoint reached	-	33004	
U1-09	|speed actual| >= speed compare value	-	33005	
U1-10	Torque/Current limit reached	-	33006	
U1-11	Brake opening	-	33007	
U1-12	Speed positive direction	-	33008	
U1-13	IGBT Firing	-	33009	
U1-14	Jog active	-	33010	
U1-15	Pre-excitation enable	-	33011	
U1-16	DC braking enable	-	33012	
U1-17	Speed track enable	-	33013	
U1-18	Torque control active	-	33014	
U1-19	Droop enable	-	33015	
U1-20	Not ready to switch on	-	33016	
U1-21	Not ready for operation	-	33017	
U1-22	Not operating	-	33018	
U1-23	No fault	-	33019	
U1-24	OFF2 active	-	33020	
U1-25	OFF3 active	-	33021	
U1-26	Switch-on enable	-	33022	

Parameter No.	Name	Unit	Address	Remarks
U1-27	No warning/limit	-	33023	
U1-28	Speed setpoint - actual value deviation out of range	-	33024	
U1-29	|speed actual| < speed compare value	-	33025	
U1-30	Torque/Current limit not reached	-	33026	
U1-31	Brake is closing	-	33027	
U1-32	Speed negative direction	-	33028	
U1-33	IGBT Pulse inhibited	-	33029	
U1-34	No jog	-	33030	
U1-35	Pre-excitation completed	-	33031	
U1-36	DC braking ended	-	33032	
U1-37	Speed track completed	-	33033	
U1-38	ASR enable	-	33034	
U1-39	ASR hold I command	-	33035	
U1-40	ASR set I command	-	33036	
U1-41	RFG disable	-	33037	
U1-42	RFG pause	-	33038	
U1-43	RFG speed setpoint disable	-	33039	
U1-44	RFG speed ramping up	-	33040	
U1-45	RFG speed ramping down	-	33041	
U1-46	RFG speed constant	-	33042	
U1-47	RFG input invalid	-	33043	
U1-48	Vdc_min activated	-	33044	
U1-49	Vdc_max activated	-	33045	
U1-50	Torque limit, upper, active	-	33046	
U1-51	Torque limit, lower, active	-	33047	
U1-52	Current limit, upper, active	-	33048	
U1-53	Current limit, lower, active	-	33049	
U1-54	Imax (V/F) activated	-	33050	
U1-55	ACR output limiting active	-	33051	
U1-56	Voltage model active	-	33052	
U1-57	Fan operating	-	33053	
U1-58	Brake opened	-	33054	
U1-59	Brake closed	-	33055	
U1-60	Brake opening failed	-	33056	
U1-61	Brake closing failed	-	33057	
U1-62	Motor OL warning	-	33058	
U1-63	Zero speed operation	-	33059	
U1-64	DC bus energized	-	33060	
U1-65	Motor speed zero	-	33061	

Parameter No.	Name	Unit	Address	Remarks
U1-66	PID activated	-	33062	
U1-67	PID calc enable	-	33063	
U1-68	PID deviation sign select	-	33064	
U1-69	PID setpoint freeze	-	33065	
U1-70	PID I component forced	-	33066	
U1-71	PID deviation dead-band enable	-	33067	
U1-72	PID saturation status	-	33068	
U1-73	Motor overtemp. fault	-	33069	
U1-74	Motor overtemp. warning	-	33070	
U1-75	Start command (Modbus)	-	33071	
U1-76	Setpoint enable from the brake control	-	33072	
U1-77	Overspeed	-	33073	
U1-78	Remote control enable	-	33074	
U1-79	Rectifier operation (HE200)	-	33079	
U1-80	Switch-on completed (HE200)	-	33080	
U1-97	Target speed reached	-	33078	
U1-98	Switch-on preparation status	-	33076	
U1-99	Running preparation status	-	33077	
Group U2: bit connector 3				
U2-00	Bus adapter A.PZD1.0	-	33096	
U2-01	Bus adapter A.PZD1.1	-	33097	
U2-02	Bus adapter A.PZD1.2	-	33098	
U2-03	Bus adapter A.PZD1.3	-	33099	
U2-04	Bus adapter A.PZD1.4	-	33100	
U2-05	Bus adapter A.PZD1.5	-	33101	
U2-06	Bus adapter A.PZD1.6	-	33102	
U2-07	Bus adapter A.PZD1.7	-	33103	
U2-08	Bus adapter A.PZD1.8	-	33104	
U2-09	Bus adapter A.PZD1.9	-	33105	
U2-10	Bus adapter A.PZD1.10	-	33106	
U2-11	Bus adapter A.PZD1.11	-	33107	
U2-12	Bus adapter A.PZD1.12	-	33108	
U2-13	Bus adapter A.PZD1.13	-	33109	
U2-14	Bus adapter A.PZD1.14	-	33110	
U2-15	Bus adapter A.PZD1.15	-	33111	
U2-16	Bus adapter B.PZD1.0	-	33144	
U2-17	Bus adapter B.PZD1.1	-	33145	
U2-18	Bus adapter B.PZD1.2	-	33146	
U2-19	Bus adapter B.PZD1.3	-	33147	
U2-20	Bus adapter B.PZD1.4	-	33148	
U2-21	Bus adapter B.PZD1.5	-	33149	
U2-22	Bus adapter B.PZD1.6	-	33150	

Parameter No.	Name	Unit	Address	Remarks
U2-23	Bus adapter B.PZD1.7	-	33151	
U2-24	Bus adapter B.PZD1.8	-	33152	
U2-25	Bus adapter B.PZD1.9	-	33153	
U2-26	Bus adapter B.PZD1.10	-	33154	
U2-27	Bus adapter B.PZD1.11	-	33155	
U2-28	Bus adapter B.PZD1.12	-	33156	
U2-29	Bus adapter B.PZD1.13	-	33157	
U2-30	Bus adapter B.PZD1.14	-	33158	
U2-31	Bus adapter B.PZD1.15	-	33159	
U2-32	InoLink.PZD1.0	-	33176	
U2-33	InoLink.PZD1.1	-	33177	
U2-34	InoLink.PZD1.2	-	33178	
U2-35	InoLink.PZD1.3	-	33179	
U2-36	InoLink.PZD1.4	-	33180	
U2-37	InoLink.PZD1.5	-	33181	
U2-38	InoLink.PZD1.6	-	33182	
U2-39	InoLink.PZD1.7	-	33183	
U2-40	InoLink.PZD1.8	-	33184	
U2-41	InoLink.PZD1.9	-	33185	
U2-42	InoLink.PZD1.10	-	33186	
U2-43	InoLink.PZD1.11	-	33187	
U2-44	InoLink.PZD1.12	-	33188	
U2-45	InoLink.PZD1.13	-	33189	
U2-46	InoLink.PZD1.14	-	33190	
U2-47	InoLink.PZD1.15	-	33191	
U2-48	Output bit0 of word-to-bit conversion 1	-	33112	
U2-49	Output bit1 of word-to-bit conversion 1	-	33113	
U2-50	Output bit2 of word-to-bit conversion 1	-	33114	
U2-51	Output bit3 of word-to-bit conversion 1	-	33115	
U2-52	Output bit4 of word-to-bit conversion 1	-	33116	
U2-53	Output bit5 of word-to-bit conversion 1	-	33117	
U2-54	Output bit6 of word-to-bit conversion 1	-	33118	
U2-55	Output bit7 of word-to-bit conversion 1	-	33119	
U2-56	Output bit8 of word-to-bit conversion 1	-	33120	
U2-57	Output bit9 of word-to-bit conversion 1	-	33121	
U2-58	Output bit10 of word-to-bit conversion 1	-	33122	
U2-59	Output bit11 of word-to-bit conversion 1	-	33123	
U2-60	Output bit12 of word-to-bit conversion 1	-	33124	
U2-61	Output bit13 of word-to-bit conversion 1	-	33125	

Parameter No.	Name	Unit	Address	Remarks
U2-62	Output bit14 of word-to-bit conversion 1	-	33126	
U2-63	Output bit15 of word-to-bit conversion 1	-	33127	
U2-64	Output bit0 of word-to-bit conversion 2	-	33128	
U2-65	Output bit1 of word-to-bit conversion 2	-	33129	
U2-66	Output bit2 of word-to-bit conversion 2	-	33130	
U2-67	Output bit3 of word-to-bit conversion 2	-	33131	
U2-68	Output bit4 of word-to-bit conversion 2	-	33132	
U2-69	Output bit5 of word-to-bit conversion 2	-	33133	
U2-70	Output bit6 of word-to-bit conversion 2	-	33134	
U2-71	Output bit7 of word-to-bit conversion 2	-	33135	
U2-72	Output bit8 of word-to-bit conversion 2	-	33136	
U2-73	Output bit9 of word-to-bit conversion 2	-	33137	
U2-74	Output bit10 of word-to-bit conversion 2	-	33138	
U2-75	Output bit11 of word-to-bit conversion 2	-	33139	
U2-76	Output bit12 of word-to-bit conversion 2	-	33140	
U2-77	Output bit13 of word-to-bit conversion 2	-	33141	
U2-78	Output bit14 of word-to-bit conversion 2	-	33142	
U2-79	Output bit15 of word-to-bit conversion 2	-	33143	
U2-80	Output bit0 of word-to-bit conversion 3	-	33160	
U2-81	Output bit1 of word-to-bit conversion 3	-	33161	
U2-82	Output bit2 of word-to-bit conversion 3	-	33162	
U2-83	Output bit3 of word-to-bit conversion 3	-	33163	
U2-84	Output bit4 of word-to-bit conversion 3	-	33164	
U2-85	Output bit5 of word-to-bit conversion 3	-	33165	
U2-86	Output bit6 of word-to-bit conversion 3	-	33166	
U2-87	Output bit7 of word-to-bit conversion 3	-	33167	
U2-88	Output bit8 of word-to-bit conversion 3	-	33168	

Parameter No.	Name	Unit	Address	Remarks
U2-89	Output bit9 of word-to-bit conversion 3	-	33169	
U2-90	Output bit10 of word-to-bit conversion 3	-	33170	
U2-91	Output bit11 of word-to-bit conversion 3	-	33171	
U2-92	Output bit12 of word-to-bit conversion 3	-	33172	
U2-93	Output bit13 of word-to-bit conversion 3	-	33173	
U2-94	Output bit14 of word-to-bit conversion 3	-	33174	
U2-95	Output bit15 of word-to-bit conversion 3	-	33175	
Group U3: bit connector 4				
U3-00	[AND A] Output	-	33196	
U3-01	[AND B] Output	-	33197	
U3-02	[AND C] Output	-	33198	
U3-03	[AND D] Output	-	33199	
U3-04	[NOT A] Output	-	33200	
U3-05	[NOT B] Output	-	33201	
U3-06	[NOT C] Output	-	33202	
U3-07	[NOT D] Output	-	33203	
U3-08	[NOT E] Output	-	33204	
U3-09	[NOT F] Output	-	33205	
U3-10	[NOT G] Output	-	33206	
U3-11	[NOT H] Output	-	33207	
U3-12	[OR A] Output	-	33208	
U3-13	[OR B] Output	-	33209	
U3-14	[OR C] Output	-	33210	
U3-15	[OR D] Output	-	33211	
U3-16	[XOR/XNOR A] Output	-	33216	
U3-17	[XOR/XNOR B] Output	-	33217	
U3-18	[XOR/XNOR C] Output	-	33218	
U3-19	[XOR/XNOR D] Output	-	33219	
U3-20	[BSW module A] Output	-	33220	
U3-21	[BSW module B] Output	-	33221	
U3-22	[P_L A] Output	-	33222	
U3-23	[P_L B] Output	-	33223	
U3-24	[P_L C] Output	-	33224	
U3-25	[P_L D] Output	-	33225	
U3-26	[DELAY A] Output	-	33212	
U3-27	[DELAY B] Output	-	33213	
U3-28	[DELAY C] Output	-	33214	
U3-29	[DELAY D] Output	-	33215	
U3-30	[ABS A] Negative number input flag	-	33226	
U3-31	[ABS B] Negative number input flag	-	33227	
U3-32	[ABS C] Negative number input flag	-	33228	

Parameter No.	Name	Unit	Address	Remarks
U3-33	[ABS D] Negative number input flag	-	33229	
U3-34	[MUL_DIV A] Divisor being 0 flag	-	33230	
U3-35	[MUL_DIV B] Divisor being 0 flag	-	33231	
U3-36	[MUL_DIV C] Divisor being 0 flag	-	33232	
U3-37	[MUL_DIV D] Divisor being 0 flag	-	33233	
U3-38	[NCMP A] Output	-	33234	
U3-39	[NCMP B] Output	-	33235	
U3-40	Hardware fault	-	33236	
U3-41	SD card fault	-	33237	
U3-42	Low RTC battery voltage	-	33238	
U3-43	Local control failure	-	33239	
U3-44	Drive comm. failure	-	33240	
U3-45	Ext. module offline	-	33241	
U3-46	Ext. module slot address conflict	-	33242	
U3-47	FBA fault	-	33243	
U3-48	Encoder fault	-	33244	
U3-49	IGBT drive fault	-	33245	
U3-50	Overcurrent	-	33246	
U3-51	Overvoltage	-	33247	
U3-52	Undervoltage	-	33248	
U3-53	Input phase loss	-	33249	
U3-54	Output phase loss	-	33250	
U3-55	Self-check fault	-	33251	
U3-56	Drive overload	-	33252	
U3-57	Short circuit to ground	-	33253	
U3-58	Module overtemp.	-	33254	
U3-59	Low module temperature	-	33255	
U3-60	High ambient temperature	-	33256	
U3-61	Incorrect parameter setting	-	33257	
U3-62	Motor auto-tuning fault	-	33258	
U3-63	Motor overload	-	33259	
U3-64	Speed track failure	-	33260	
U3-65	Motor overspeed	-	33261	
U3-66	Speed setpoint - actual value deviation out of range	-	33262	
U3-67	AC drive fuse failure	-	33263	
U3-68	STO activated (error info)	-	33264	
U3-69	PID feedback loss	-	33265	
U3-70	External fault activated	-	33266	

Parameter No.	Name	Unit	Address	Remarks
U3-71	External warning activated	-	33267	
U3-72	Pre-charge fault	-	33268	
U3-73	EEPROM power failure	-	33269	
U3-74	Excessive leakage current	-	33270	
U3-75	Abnormal motor auto-tuning result	-	33271	
U3-76	DC pre-charge fault	-	33272	
U3-77	Inverter fan fault	-	33273	
U3-78	MFC link fault (InoLink & FO sync)	-	33274	
U3-79	Brake feedback error	-	33275	
U3-80	Incorrect PM-param	-	33276	
U3-81	Internal fault	-	33277	
U3-82	Abnormality	-	33278	
U3-83	Insufficient voltage of 24 V power	-	33279	
U3-84	Brake chopper fault	-	33280	
U3-85	Parallel module warning	-	33281	
U3-86	Parallel mode fault	-	33282	
U3-87	Motor control fault	-	33283	
U3-88	FBA warning	-	33284	
U3-89	Excessive brake res	-	33285	
U3-90	Over-low brake res	-	33286	
U3-91	Brake module fault	-	33287	
U3-92	Brake res overtemp.	-	33288	
U3-93	Module pre-overtemp.	-	33289	
U3-94	Rectifier brake chopper short flag	-	33291	
U3-97	[BSW module C] Output	-	35067	
U3-98	[BSW module D] Output	-	35068	
U3-99	[BSW module E] Output	-	35069	
Group U4: bit connector 5				
U4-00	<I/O module 1>DI1 input	-	35263	
U4-01	<I/O module 1>DI2 input	-	35264	
U4-02	<I/O module 1>DI3 input	-	35265	
U4-03	<I/O module 1>DI4 input	-	35266	
U4-04	<I/O module 1>DI5 input	-	35267	
U4-05	<I/O module 1>DI6 input	-	35268	
U4-06	<I/O module 1>DIO1 input	-	32946	
U4-07	<I/O module 1>DIO2 input	-	32947	

Parameter No.	Name	Unit	Address	Remarks
U4-08	<I/O module 1>DIO3 input	-	32948	
U4-09	<I/O module 1>DIO4 input	-	32949	
U4-10	<I/O module 1>DIO5 input	-	32950	
U4-11	<I/O module 1>DIO6 input	-	32951	
U4-12	<I/O module 2>DI1 input	-	35269	
U4-13	<I/O module 2>DI2 input	-	35270	
U4-14	<I/O module 2>DI3 input	-	35271	
U4-15	<I/O module 2>DI4 input	-	35272	
U4-16	<I/O module 2>DI5 input	-	35273	
U4-17	<I/O module 2>DI6 input	-	35274	
U4-18	<I/O module 2>DIO1 input	-	32952	
U4-19	<I/O module 2>DIO2 input	-	32953	
U4-20	<I/O module 2>DIO3 input	-	32954	
U4-21	<I/O module 2>DIO4 input	-	32955	
U4-22	<I/O module 2>DIO5 input	-	32956	
U4-23	<I/O module 2>DIO6 input	-	32957	
U4-24	<I/O module 3>DI1 input	-	35275	
U4-25	<I/O module 3>DI2 input	-	35276	
U4-26	<I/O module 3>DI3 input	-	35277	
U4-27	<I/O module 3>DI4 input	-	35278	
U4-28	<I/O module 3>DI5 input	-	35279	
U4-29	<I/O module 3>DI6 input	-	35280	
U4-30	<I/O module 3>DIO1 input	-	32958	
U4-31	<I/O module 3>DIO2 input	-	32959	
U4-32	<I/O module 3>DIO3 input	-	32960	
U4-33	<I/O module 3>DIO4 input	-	32961	
U4-34	<I/O module 3>DIO5 input	-	32962	

Parameter No.	Name	Unit	Address	Remarks
U4-35	<I/O module 3>DIO6 input	-	32963	
U4-36	<I/O module 1>AI1 input wire breakage	-	35281	
U4-37	<I/O module 1>AI2 input wire breakage	-	35282	
U4-38	<I/O module 1>AI3 input wire breakage	-	35283	
U4-39	<I/O module 2>AI1 input wire breakage	-	35284	
U4-40	<I/O module 2>AI2 input wire breakage	-	35285	
U4-41	<I/O module 2>AI3 input wire breakage	-	35286	
U4-42	<I/O module 3>AI1 input wire breakage	-	35287	
U4-43	<I/O module 3>AI2 input wire breakage	-	35288	
U4-44	<I/O module 3>AI3 input wire breakage	-	35289	
U4-69	[NCMP C] Output	-	35106	
U4-70	[NCMP D] Output	-	35107	
U4-71	[NCMP E] Output	-	35108	
U4-72	[LIM A] Limit flag	-	35102	
U4-73	[LIM B] Limit flag	-	35103	
U4-74	[LIM C] Limit flag	-	35104	
U4-75	[LIM D] Limit flag	-	35105	
U4-76	Output bit0 of word-to-bit conversion 4	-	35070	
U4-77	Output bit1 of word-to-bit conversion 4	-	35071	
U4-78	Output bit2 of word-to-bit conversion 4	-	35072	
U4-79	Output bit3 of word-to-bit conversion 4	-	35073	
U4-80	Output bit4 of word-to-bit conversion 4	-	35074	
U4-81	Output bit5 of word-to-bit conversion 4	-	35075	
U4-82	Output bit6 of word-to-bit conversion 4	-	35076	
U4-83	Output bit7 of word-to-bit conversion 4	-	35077	
U4-84	Output bit8 of word-to-bit conversion 4	-	35078	
U4-85	Output bit9 of word-to-bit conversion 4	-	35079	
U4-86	Output bit10 of word-to-bit conversion 4	-	35080	
U4-87	Output bit11 of word-to-bit conversion 4	-	35081	
U4-88	Output bit12 of word-to-bit conversion 4	-	35082	
U4-89	Output bit13 of word-to-bit conversion 4	-	35083	

Parameter No.	Name	Unit	Address	Remarks
U4-90	Output bit14 of word-to-bit conversion 4	-	35084	
U4-91	Output bit15 of word-to-bit conversion 4	-	35085	
U4-92	[AND-OR A] Output	-	35094	
U4-93	[AND-OR B] Output	-	35095	
U4-94	[AND-OR C] Output	-	35096	
U4-95	[AND-OR D] Output	-	35097	
U4-96	[AND-OR E] Output	-	35098	
U4-97	[AND-OR F] Output	-	35099	
U4-98	[AND-OR G] Output	-	35100	
U4-99	[AND-OR H] Output	-	35101	
Group U5: word connector 1				
U5-00	Actual motor speed (100 ms filter)	%	34057	
U5-01	Output voltage (100 ms filter)	%	34058	
U5-02	Output current (100 ms filter)	%	34059	
U5-03	Motor mechanical output power (100 ms filter)	%	34060	
U5-04	Output torque (100 ms filter)	%	34061	
U5-05	DC bus voltage (100 ms filter)	V	34348	
U5-06	Detected motor temperature	°C	33396	
U5-07	Detected module temperature	°C	33397	
U5-09	Detected rectifier temperature (reserved)	°C	33399	
U5-11	Encoder measuring angle	-	33478	
U5-12	Number of revolutions of encoder	-	33479	
U5-13	PTC motor temperature sensor res.	Ω	33511	
U5-14	Encoder board 1 detected temperature (reserved)	-	33482	
U5-17	Estimated motor temperature	°C	34575	
U5-18	AI1 input percentage	%	33401	
U5-19	AI2 input percentage	%	33402	
U5-20	HDI1 input percentage	%	33403	
U5-21	HDI2 input percentage	%	33404	
U5-22	AO1 output percentage	%	33405	
U5-23	AO2 output percentage	%	33406	
U5-24	HDO1 output percentage	%	33407	

Parameter No.	Name	Unit	Address	Remarks
U5-25	HDO2 output percentage	%	33408	
U5-26	Phase U current	%	34365	
U5-27	Phase V current	%	34366	
U5-28	Phase W current	%	34367	
U5-29	Phase U voltage	%	34372	
U5-30	Phase V voltage	%	34373	
U5-31	Phase W voltage	%	34374	
U5-32	InoLink.PZD1	-	33409	
U5-33	InoLink.PZD2	-	33410	
U5-34	InoLink.PZD3	-	33411	
U5-35	InoLink.PZD4	-	33412	
U5-36	InoLink.PZD5	-	33413	
U5-37	InoLink.PZD6	-	33414	
U5-38	InoLink.PZD7	-	33415	
U5-39	InoLink.PZD8	-	33416	
U5-40	Modbus comm. setpoint 1	-	33449	
U5-41	Modbus comm. setpoint 2	-	33450	
U5-44	Bus adapter A.PZD1	-	33417	
U5-45	Bus adapter A.PZD2	-	33418	
U5-46	Bus adapter A.PZD3	-	33419	
U5-47	Bus adapter A.PZD4	-	33420	
U5-48	Bus adapter A.PZD5	-	33421	
U5-49	Bus adapter A.PZD6	-	33422	
U5-50	Bus adapter A.PZD7	-	33423	
U5-51	Bus adapter A.PZD8	-	33424	
U5-52	Bus adapter A.PZD9	-	33425	
U5-53	Bus adapter A.PZD10	-	33426	
U5-54	Bus adapter A.PZD11	-	33427	
U5-55	Bus adapter A.PZD12	-	33428	
U5-56	Bus adapter A.PZD13	-	33429	
U5-57	Bus adapter A.PZD14	-	33430	
U5-58	Bus adapter A.PZD15	-	33431	
U5-59	Bus adapter A.PZD16	-	33432	
U5-60	Bus adapter B.PZD1	-	33433	
U5-61	Bus adapter B.PZD2	-	33434	
U5-62	Bus adapter B.PZD3	-	33435	
U5-63	Bus adapter B.PZD4	-	33436	
U5-64	Bus adapter B.PZD5	-	33437	
U5-65	Bus adapter B.PZD6	-	33438	
U5-66	Bus adapter B.PZD7	-	33439	
U5-67	Bus adapter B.PZD8	-	33440	
U5-68	Bus adapter B.PZD9	-	33441	
U5-69	Bus adapter B.PZD10	-	33442	
U5-70	Bus adapter B.PZD11	-	33443	
U5-71	Bus adapter B.PZD12	-	33444	
U5-72	Bus adapter B.PZD13	-	33445	
U5-73	Bus adapter B.PZD14	-	33446	
U5-74	Bus adapter B.PZD15	-	33447	
U5-75	Bus adapter B.PZD16	-	33448	

Parameter No.	Name	Unit	Address	Remarks
U5-76	DW2W 1.output HIWORD	-	33453	
U5-77	DW2W 1.output LOWORD	-	33454	
U5-78	DW2W 2.output HIWORD	-	33455	
U5-79	DW2W 2.output LOWORD	-	33456	
U5-80	DW2W 3.output HIWORD	-	33457	
U5-81	DW2W 3.output LOWORD	-	33458	
U5-82	DW2W 4.output HIWORD	-	33459	
U5-83	DW2W 4.output LOWORD	-	33460	
U5-84	DW2W 5.output HIWORD	-	33461	
U5-85	DW2W 5.output LOWORD	-	33462	
U5-86	[B2W 1] Output	-	33463	
U5-87	[B2W 2] Output	-	33464	
U5-88	[B2W 3] Output	-	33465	
U5-89	[B2W 4] Output	-	33466	
U5-91	<I/O module 1>AI1 input percentage	%	33467	
U5-92	<I/O module 1>AI2 input percentage	%	33470	
U5-93	<I/O module 1>AI3 input percentage	%	33473	
U5-94	<I/O module 2>AI1 input percentage	%	33468	
U5-95	<I/O module 2>AI2 input percentage	%	33471	
U5-96	<I/O module 2>AI3 input percentage	%	33474	
U5-97	<I/O module 3>AI1 input percentage	%	33469	
U5-98	<I/O module 3>AI2 input percentage	%	33472	
U5-99	<I/O module 3>AI3 input percentage	%	33475	
Group U6: word connector 2				
U6-00	Effective output current	%	34353	
U6-01	Calculated output torque	%	34449	
U6-02	Output voltage	%	34355	
U6-03	Motor model output sync frequency	%	34534	
U6-04	Motor model slip output	%	34535	

Parameter No.	Name	Unit	Address	Remarks
U6-05	Motor model estimated speed	%	34536	
U6-06	Field weakening point frequency	%	34513	
U6-07	[Torque control ramp] Main setpoint	%	35315	
U6-08	Speed droop output	%	34505	
U6-09	Speed deviation	%	34506	
U6-10	Torque control main setpoint	%	33497	
U6-11	Torque control filter main setpoint	%	33496	
U6-12	Torque setpoint limited	%	34485	
U6-13	Torque setpoint before suppl. torque	%	34487	
U6-14	Max. output torque	%	34503	
U6-15	Min. output torque	%	34504	
U6-16	Positive torque limit value	%	34499	
U6-17	Negative torque limit value	%	34500	
U6-18	Torque upper limit	%	33488	
U6-19	Torque lower limit	%	33489	
U6-20	Total suppl. torque	%	34507	
U6-21	Friction torque	%	34508	
U6-22	Speed ADJ PID output	%	34489	
U6-23	Automatic torque memory value	%	33498	
U6-24	Speed ADJ PID integral	%	34490	
U6-25	RFG inertia comp. torque	%	33491	
U6-26	Suppl. torque	%	33492	
U6-27	Feedforward torque	%	34447	
U6-28	Calculated load and friction torque	%	33493	
U6-29	Torque setpoint before limit	%	34488	
U6-30	Calculated torque for overspeed ADJ	%	34501	
U6-31	Final flux setpoint	%	34519	
U6-32	Flux setpoint	%	34514	
U6-33	Flux curve output value	%	34516	
U6-34	Flux setpoint after efficiency OPT	%	34517	
U6-35	Flux curve filtered	%	34518	
U6-36	[Field weakening controller] Output value	%	34515	
U6-37	Flux meas. value	%	34533	

Parameter No.	Name	Unit	Address	Remarks
U6-38	[Load observer] Output speed	%	34509	
U6-39	[Load observer] Output torque	%	34510	
U6-40	id setpoint	%	34544	
U6-41	iq setpoint	%	34545	
U6-42	id feedback	%	34370	
U6-43	iq feedback	%	34371	
U6-44	ASR torque current output	%	34486	
U6-45	Excitation module id setpoint	%	34523	
U6-46	Torque per ampere	%	34574	
U6-47	id steady state component	%	34520	
U6-48	id setpoint differential	%	34521	
U6-49	Flux controller output	%	34522	
U6-50	SVC suppl. current setpoint	%	34524	
U6-51	Current model flux limit	%	34537	
U6-52	Voltage model flux AMP	%	34538	
U6-53	iq upper limit	%	34493	
U6-54	iq lower limit	%	34494	
U6-55	Max. possible output current	%	33494	
U6-56	Max. available iq	%	34495	
U6-57	Calculated iq limit	%	34496	
U6-58	Power-limited current upper limit	%	34497	
U6-59	Power-limited current lower limit	%	34498	
U6-62	Alpha current	%	34368	
U6-63	Beta current	%	34369	
U6-64	Voltage AMP setpoint before limit	%	34558	
U6-65	Voltage AMP setpoint limited	%	34559	
U6-66	V/F voltage setpoint	%	33495	
U6-69	[Axis D] ACR output	%	34550	
U6-70	[Axis D] ACR integral	%	34553	
U6-71	[Axis Q] ACR output	%	34551	
U6-72	[Axis Q] ACR integral	%	34552	
U6-74	[Axis D] Feedforward voltage	%	34554	
U6-75	[Axis Q] Feedforward voltage	%	34555	
U6-76	DC bus voltage	V	34379	
U6-77	Max. available voltage	%	34512	
U6-78	Max. possible output voltage	%	34440	
U6-79	Ud setpoint	%	34556	
U6-80	Uq setpoint	%	34557	

Parameter No.	Name	Unit	Address	Remarks
U6-81	Axis D feedback voltage	%	34377	
U6-82	Axis Q feedback voltage	%	34378	
U6-83	Alpha voltage	%	34375	
U6-84	Beta voltage	%	34376	
U6-85	Sampled phase U current	-	34384	
U6-86	Sampled phase V current	-	34385	
U6-87	Sampled phase W current	-	34386	
U6-88	Voltage angle	-	34356	
U6-89	Sync rotation angle	-	34358	
U6-90	Unfiltered encoder speed	%	34480	
U6-91	Unlimited speed ADJ PID output	%	34483	
U6-92	Modulation depth output	%	34388	
U6-94	Flux phase angle	-	34532	
U6-95	Pulse output delay comp. angle	-	34360	
U6-96	Out. voltage effective phase angle	-	34359	
U6-97	Current output angle	-	34354	
U6-98	Motor mechanical power	kW	34435	
U6-99	Active power output	%	34357	
Group U7: word connector 3				
U7-00	Fixed value 0%	%	33520	
U7-01	Fixed value 100%	%	33521	
U7-02	Fixed value 200%	%	33522	
U7-03	Fixed value 400%	%	33523	
U7-04	Fixed value 600%	%	33524	
U7-05	Fixed value -100%	%	33525	
U7-06	Fixed value -200%	%	33526	
U7-07	Fixed value -400%	%	33527	
U7-08	Fixed value -600%	%	33528	
U7-09	Module phase U temperature	℃	33529	
U7-10	Module phase V temperature	℃	33530	
U7-11	Module phase W temperature	℃	33531	
U7-12	Current state machine	-	33532	
U7-13	Last state machine	-	33533	
U7-14	Second-last state machine	-	33534	
U7-15	Third-last state machine	-	33535	
U7-16	Fourth-last state machine	-	33536	

Parameter No.	Name	Unit	Address	Remarks
U7-17	Fifth-last state machine	-	33537	
U7-18	Sixth-last state machine	-	33538	
U7-19	Seventh-last state machine	-	33539	
U7-20	Eighth-last state machine	-	33540	
U7-21	Ninth-last state machine	-	33541	
U7-22	Motor self-check result	-	33542	
U7-23	Single-step status	-	33543	
U7-24	Motor auto-tuning method	-	33544	
U7-25	Motor auto-tuning state	-	33545	
U7-26	Module that is processing PM-parameter	-	33547	
U7-27	Single module PM-code	-	33546	
U7-28	[Module 01] PM-code	-	33548	
U7-29	[Module 02] PM-code	-	33549	
U7-30	[Module 03] PM-code	-	33550	
U7-31	[Module 04] PM-code	-	33551	
U7-32	[Module 05] PM-code	-	33552	
U7-33	[Module 06] PM-code	-	33553	
U7-34	[Module 07] PM-code	-	33554	
U7-35	[Module 08] PM-code	-	33555	
U7-36	[Module 09] PM-code	-	33556	
U7-37	[Module 10] PM-code	-	33557	
U7-45	Regen. power limit value	%	33499	
U7-46	Motoring power limit value	%	33500	
U7-47	[FIX_WORD 1] Output	%	33514	
U7-48	[FIX_WORD 2] Output	%	33515	
U7-49	[FIX_WORD 3] Output	%	33516	
U7-50	[FIX_WORD 4] Output	%	35316	
U7-51	[FIX_WORD 5] Output	%	35317	
U7-52	Power-on monitoring	-	33519	
U7-55	FO sync module.PZD1	-	33622	
U7-56	FO sync module.PZD2	-	33623	
U7-57	FO sync module.PZD3	-	33624	
U7-58	FO sync module.PZD4	-	33625	
U7-59	FO sync module.PZD5	-	33626	
U7-60	FO sync module.PZD6	-	33627	
U7-61	FO sync module.PZD7	-	33628	
U7-62	FO sync module.PZD8	-	33629	
U7-65	[Par Rd parameter 1] Value	-	34816	
U7-66	[Par Rd parameter 2] Value	-	34817	

Parameter No.	Name	Unit	Address	Remarks
U7-67	[Par Rd parameter 3] Value	-	34818	
U7-68	[Par Rd parameter 4] Value	-	34819	
U7-69	[Par Rd parameter 5] Value	-	34820	
U7-70	[Par Rd parameter 6] Value	-	34821	
U7-71	[Par Rd parameter 7] Value	-	34822	
U7-72	[Par Rd parameter 8] Value	-	34823	
U7-73	[Par Rd parameter 9] Value	-	34824	
U7-74	[Par Rd parameter 10] Value	-	34825	
U7-80	[HINT] DI/DO status	-	34156	
U7-90	Memory variable 1	-	33508	
U7-91	Memory variable 2	-	33509	
U7-92	Memory variable 3	-	33510	
U7-96	STO-enabled online module	-	33772	
U7-97	Online module with activated STO	-	33773	
U7-98	STO in. terminal state of active meas. module	-	33480	
U7-99	CODE_K0250	-	33513	
Group U8: word connector 4				
U8-00	Current state machine	-	32768	
U8-01	Active MDS	-	32894	
U8-02	Active BDS	-	32895	
U8-03	Current RFG	-	33570	
U8-04	Active fault	-	33571	
U8-05	Active limit	-	33572	
U8-06	Active warning	-	33573	
U8-07	Control word 1	-	33574	
U8-08	Control word 2	-	33575	
U8-09	Status word 1	-	33576	
U8-10	Status word 2	-	33577	
U8-11	Terminal start/stop control word	-	33578	
U8-12	SOP-20 start/stop control word	-	33579	
U8-13	PC start/stop control word	-	33580	
U8-14	Custom start/stop control word	-	33581	
U8-17	DI status	-	33584	
U8-18	DO status	-	33585	
U8-19	Encoder measuring revolutions (reserved)	-	33586	
U8-20	Custom error word 1	-	34914	
U8-21	Custom error word 2	-	34915	

Parameter No.	Name	Unit	Address	Remarks
U8-22	AI1 input value	-	33589	
U8-23	AI2 input value	-	33590	
U8-24	HDI1 input value	-	33591	
U8-25	HDI2 input value	-	33592	
U8-26	AO1 output value	-	33593	
U8-27	AO2 output value	-	33594	
U8-28	HDO1 output value	-	33595	
U8-29	HDO2 output value	-	33596	
U8-39	Single module HINT status word 1\Parallel module master fault word 1	-	33606	
U8-40	Single module HINT status word 2\Parallel module master fault word 2	-	33607	
U8-41	[FBA-A] comm. error count	-	33608	
U8-42	[FBA-B] comm. error count	-	33609	
U8-43	[FBA-C] comm. error count	-	33610	
U8-44	Param setting error code	-	33481	
U8-45	Carrier frequency (internal)	-	34393	
U8-46	Carrier period (internal)	-	34394	
U8-47	Phase U PWM comparison value (internal)	-	34390	
U8-48	Phase V PWM comparison value (internal)	-	34391	
U8-49	Phase W PWM comparison value (internal)	-	34392	
U8-50	Phase U lockout time comp. value (internal)	-	34395	
U8-51	Phase V lockout time comp. value (internal)	-	34396	
U8-52	Phase W lockout time comp. value (internal)	-	34397	
U8-53	Device status word (internal)	-	34336	
U8-54	Software control status word (internal)	-	34337	
U8-55	Device protection status word (internal)	-	34404	
U8-56	Motor main status word (internal)	-	34431	
U8-57	Motor aux. state (internal)	-	34432	
U8-58	Motor protection status word (internal)	-	34464	

Parameter No.	Name	Unit	Address	Remarks
U8-59	Speed controller status word (internal)	-	34484	
U8-60	Vdc control status word (internal)	-	34502	
U8-61	Excitation control status word (internal)	-	34511	
U8-62	Motor model status word (internal)	-	34531	
U8-63	ACR status word (internal)	-	34543	
U8-64	Drive main status word (internal)	-	34398	
U8-65	Drive aux. status word (internal)	-	34399	
U8-66	V/F control status word (internal)	-	34579	
U8-67	Speed controller PROP coef. (internal)	-	34491	
U8-68	Speed controller Ki (internal)	-	34492	
U8-69	Application ACR PROP gain (internal)	-	34548	
U8-70	Application ACR Ti (internal)	-	34549	
U8-71	[FBA-A] comm. status	-	33611	
U8-72	[FBA-B] comm. status	-	33612	
U8-73	[FBA-C] comm. status	-	33613	
U8-74	Status word of FPGA main control operation status control	-	33615	
U8-75	Fault word of FPGA main control operation status control 1	-	33616	
U8-76	Fault word of FPGA main control operation status control 2	-	33617	
U8-77	Original value of encoder pulses (FPGA-4 multiple frequency)	-	33618	
U8-78	FPGA time LOWORD	-	33619	
U8-79	FPGA time HIWORD	-	33620	
U8-80	[Imax controller] Frequency ADJ	-	34580	
U8-81	[Imax controller] Voltage ADJ	-	34581	
U8-82	over-excitation output voltage ADJ	-	34582	

Parameter No.	Name	Unit	Address	Remarks
U8-83	Vdc_Min frequency ADJ	-	34583	
U8-84	Vdc_Max frequency ADJ	-	34584	
U8-85	Vdc_Max voltage ADJ	-	34585	
U8-86	Slip comp. freq. comp. value	-	34586	
U8-87	Torque boost voltage comp. value	-	34587	
U8-88	Energy-saving V/F out. voltage	-	34588	
U8-89	Resonance damping freq. superposition	-	34589	
U8-90	Monitoring variable 1	-	34415	
U8-91	Monitoring variable 2	-	34416	
U8-92	Monitoring variable 3	-	34417	
U8-93	Monitoring variable 4	-	34418	
U8-94	Monitoring variable 5	-	34419	
U8-95	Monitoring variable 6	-	34420	
U8-96	Monitoring variable 7	-	34421	
U8-97	Monitoring variable 8	-	34422	
U8-98	Monitoring variable 9	-	34423	
U8-99	Monitoring variable 10	-	34424	
Group U9: double-word connector 1				
U9-00	Actual motor speed	%	34702	
U9-01	Final motor speed setpoint	%	34700	
U9-02	Main speed setpoint	%	33630	
U9-03	Aux. speed setpoint	%	33632	
U9-04	Speed setpoint before FWD/REV rotation limiting	%	33634	
U9-05	Speed setpoint before limit	%	33636	
U9-06	Limited speed setpoint	%	33638	
U9-07	Limited speed setpoint	%	33640	
U9-08	RFG input speed setpoint	%	33642	
U9-09	RFG output speed setpoint	%	33644	
U9-10	Suppl. speed reference	%	33646	
U9-11	Superposed speed setpoint	%	33648	
U9-12	Encoder pulse count position value (quadruplicated freq.)	-	33774	
U9-13	Filtered speed setpoint	%	34716	

Parameter No.	Name	Unit	Address	Remarks
U9-14	Filtered speed feedback	%	34718	
U9-15	Band-stop filtered speed feedback	%	34706	
U9-18	Max. positive speed	%	33650	
U9-19	Max. negative speed	%	33652	
U9-20	Encoder speed	%	34708	
U9-21	Model speed	%	34704	
U9-23	Sync speed	%	34698	
U9-24	Speed setpoint from SOP-20	%	33654	
U9-25	Speed setpoint from PC control	%	33656	
U9-26	[W2DW 4] Output	%	33776	
U9-27	[W2DW 5] Output	%	33778	
U9-29	MOP output	%	33658	
U9-30	Fixed setpoint selection output	%	33660	
U9-31	Fixed setpoint 1	%	33662	
U9-32	Fixed setpoint 2	%	33664	
U9-33	Fixed setpoint 3	%	33666	
U9-34	Fixed setpoint 4	%	33668	
U9-35	Fixed setpoint 5	%	33670	
U9-36	Fixed setpoint 6	%	33672	
U9-37	Fixed setpoint 7	%	33674	
U9-38	Fixed setpoint 8	%	33676	
U9-39	Fixed setpoint 9	%	33678	
U9-40	Fixed setpoint 10	%	33680	
U9-41	Fixed setpoint 11	%	33682	
U9-42	Fixed setpoint 12	%	33684	
U9-43	Fixed setpoint 13	%	33686	
U9-44	Fixed setpoint 14	%	33688	
U9-45	Fixed setpoint 15	%	33690	
U9-46	Fixed setpoint 16	%	33692	
U9-47	[W2DW 1] Output	%	33694	
U9-48	[W2DW 2] Output	%	33696	
U9-49	[W2DW 3] Output	%	33698	
U9-50	Modbus comm. DWORD setpoint	%	33700	
U9-51	[FIX_WORD 6] Output	%	35318	
U9-52	[FIX_WORD 7] Output	%	35320	
U9-53	[FIX_WORD 8] Output	%	35322	
U9-54	[FIX_WORD 9] Output	%	35324	
U9-55	[FIX_WORD 10] Output	%	35326	
U9-56	RFG acceleration rate	-	33712	
U9-57	Motor rotor angle setpoint (internal)	-	34710	
U9-58	Motor rotor feedback angle (internal)	-	34712	
U9-59	Carrier freq. change angle step (internal)	-	34714	

Parameter No.	Name	Unit	Address	Remarks
U9-60	PID input deviation (before suppl. deviation)	%	34066	
U9-61	PID input deviation (after suppl. deviation)	%	34068	
U9-62	PID PROP component	%	34070	
U9-63	PID integral component	%	34072	
U9-64	PID differential component	%	34074	
U9-65	PID output (before limit)	%	34076	
U9-66	PID output (limited)	%	34078	
U9-67	[NSW module A] Output	%	33716	
U9-68	[NSW module B] Output	%	33718	
U9-69	[FILT A] Output	%	33720	
U9-70	[FILT B] Output	%	33722	
U9-71	[FILT C] Output	%	33724	
U9-72	[FILT D] Output	%	33726	
U9-73	[ABS A] Output	%	33728	
U9-74	[ABS B] Output	%	33730	
U9-75	[ABS C] Output	%	33732	
U9-76	[ABS D] Output	%	33734	
U9-77	[ADD_SUB A] Output	%	33736	
U9-78	[ADD_SUB B] Output	%	33738	
U9-79	[ADD_SUB C] Output	%	33740	
U9-80	[ADD_SUB D] Output	%	33742	
U9-81	[MUL_DIV A] Output	%	33744	
U9-82	[MUL_DIV B] Output	%	33746	
U9-83	[MUL_DIV C] Output	%	33748	
U9-84	[MUL_DIV D] Output	%	33750	
U9-85	[PLI10 A] Output	%	33752	
U9-86	[PLI10 B] Output	%	33754	
U9-87	[NSW module C] Output	%	35110	
U9-88	[NSW module D] Output	%	35112	
U9-89	[NSW module E] Output	%	35114	
U9-90	[LIM A] Output	%	35086	
U9-91	[LIM B] Output	%	35088	
U9-92	[LIM C] Output	%	35090	
U9-93	[LIM D] Output	%	35092	
U9-94	Duration of power-on	s	33764	
U9-95	Duration of operation	s	33766	
U9-96	Accumulated duration of power-on	s	33768	
U9-97	Accumulated duration of operation	s	33770	

Parameter No.	Name	Unit	Address	Remarks
U9-98	DWORD memory variable 1	-	33756	
U9-99	DWORD memory variable 2	-	33758	
Group U10: bit connector 6				
U10-00	[Custom W2B 1] Output bit0	-	35628	
U10-01	[Custom W2B 1] Output bit1	-	35629	
U10-02	[Custom W2B 1] Output bit2	-	35630	
U10-03	[Custom W2B 1] Output bit3	-	35631	
U10-04	[Custom W2B 1] Output bit4	-	35632	
U10-05	[Custom W2B 1] Output bit5	-	35633	
U10-06	[Custom W2B 1] Output bit6	-	35634	
U10-07	[Custom W2B 1] Output bit7	-	35635	
U10-08	[Custom W2B 1] Output bit8	-	35636	
U10-09	[Custom W2B 1] Output bit9	-	35637	
U10-10	[Custom W2B 1] Output bit10	-	35638	
U10-11	[Custom W2B 1] Output bit11	-	35639	
U10-12	[Custom W2B 1] Output bit12	-	35640	
U10-13	[Custom W2B 1] Output bit13	-	35641	
U10-14	[Custom W2B 1] Output bit14	-	35642	
U10-15	[Custom W2B 1] Output bit15	-	35643	
U10-16	[Custom W2B 2] Output bit0	-	35644	
U10-17	[Custom W2B 2] Output bit1	-	35645	
U10-18	[Custom W2B 2] Output bit2	-	35646	
U10-19	[Custom W2B 2] Output bit3	-	35647	
U10-20	[Custom W2B 2] Output bit4	-	35648	
U10-21	[Custom W2B 2] Output bit5	-	35649	
U10-22	[Custom W2B 2] Output bit6	-	35650	

Parameter No.	Name	Unit	Address	Remarks
U10-23	[Custom W2B 2] Output bit7	-	35651	
U10-24	[Custom W2B 2] Output bit8	-	35652	
U10-25	[Custom W2B 2] Output bit9	-	35653	
U10-26	[Custom W2B 2] Output bit10	-	35654	
U10-27	[Custom W2B 2] Output bit11	-	35655	
U10-28	[Custom W2B 2] Output bit12	-	35656	
U10-29	[Custom W2B 2] Output bit13	-	35657	
U10-30	[Custom W2B 2] Output bit14	-	35658	
U10-31	[Custom W2B 2] Output bit15	-	35659	
U10-32	[Custom W2B 3] Output bit0	-	35660	
U10-33	[Custom W2B 3] Output bit1	-	35661	
U10-34	[Custom W2B 3] Output bit2	-	35662	
U10-35	[Custom W2B 3] Output bit3	-	35663	
U10-36	[Custom W2B 3] Output bit4	-	35664	
U10-37	[Custom W2B 3] Output bit5	-	35665	
U10-38	[Custom W2B 3] Output bit6	-	35666	
U10-39	[Custom W2B 3] Output bit7	-	35667	
U10-40	[Custom W2B 3] Output bit8	-	35668	
U10-41	[Custom W2B 3] Output bit9	-	35669	
U10-42	[Custom W2B 3] Output bit10	-	35670	
U10-43	[Custom W2B 3] Output bit11	-	35671	
U10-44	[Custom W2B 3] Output bit12	-	35672	
U10-45	[Custom W2B 3] Output bit13	-	35673	
U10-46	[Custom W2B 3] Output bit14	-	35674	
U10-47	[Custom W2B 3] Output bit15	-	35675	
U10-48	[Custom AND 1] Output	-	35676	
U10-49	[Custom AND 2] Output	-	35677	

Parameter No.	Name	Unit	Address	Remarks
U10-50	[Custom AND 3] Output	-	35678	
U10-51	[Custom AND 4] Output	-	35679	
U10-52	[Custom AND 5] Output	-	35680	
U10-53	[Custom AND 6] Output	-	35681	
U10-54	[Custom AND 7] Output	-	35682	
U10-55	[Custom AND 8] Output	-	35683	
U10-56	[Custom AND 9] Output	-	35684	
U10-57	[Custom AND 10] Output	-	35685	
U10-58	[Custom AND 11] Output	-	35686	
U10-59	[Custom AND 12] Output	-	35687	
U10-60	[Custom AND 13] Output	-	35688	
U10-61	[Custom AND 14] Output	-	35689	
U10-62	[Custom AND 15] Output	-	35690	
U10-63	[Custom AND 16] Output	-	35691	
U10-64	[Custom NOT 1] Output	-	35692	
U10-65	[Custom NOT 2] Output	-	35693	
U10-66	[Custom NOT 3] Output	-	35694	
U10-67	[Custom NOT 4] Output	-	35695	
U10-68	[Custom NOT 5] Output	-	35696	
U10-69	[Custom NOT 6] Output	-	35697	
U10-70	[Custom NOT 7] Output	-	35698	
U10-71	[Custom NOT 8] Output	-	35699	
U10-72	[Custom OR 1] Output	-	35700	
U10-73	[Custom OR 2] Output	-	35701	
U10-74	[Custom OR 3] Output	-	35702	
U10-75	[Custom OR 4] Output	-	35703	
U10-76	[Custom OR 5] Output	-	35704	
U10-77	[Custom OR 6] Output	-	35705	
U10-78	[Custom OR 7] Output	-	35706	
U10-79	[Custom OR 8] Output	-	35707	
U10-80	[Custom OR 9] Output	-	35708	

Parameter No.	Name	Unit	Address	Remarks
U10-81	[Custom OR 10] Output	-	35709	
U10-82	[Custom OR 11] Output	-	35710	
U10-83	[Custom OR 12] Output	-	35711	
U10-84	[Custom XOR/XNOR 1] Output	-	35712	
U10-85	[Custom XOR/XNOR 2] Output	-	35713	
U10-86	[Custom XOR/XNOR 3] Output	-	35714	
U10-87	[Custom XOR/XNOR 4] Output	-	35715	
U10-88	[Custom NAND 1] Output	-	35716	
U10-89	[Custom NAND 2] Output	-	35717	
U10-90	[Custom NAND 3] Output	-	35718	
U10-91	[Custom NAND 4] Output	-	35719	
U10-92	[Custom BSW module 1] Output	-	35720	
U10-93	[Custom BSW module 2] Output	-	35721	
U10-94	[Custom BSW module 3] Output	-	35722	
U10-95	[Custom BSW module 4] Output	-	35723	
U10-96	[Custom BSW module 5] Output	-	35724	
U10-97	[Custom BSW module 6] Output	-	35725	
U10-98	[Custom BSW module 7] Output	-	35726	
U10-99	[Custom BSW module 8] Output	-	35727	
Group U11: bit connector 7				
U11-00	[Custom DELAY 1] Output	-	35728	
U11-01	[Custom DELAY 2] Output	-	35729	
U11-02	[Custom DELAY 3] Output	-	35730	
U11-03	[Custom DELAY 4] Output	-	35731	
U11-04	[Custom P_L 1] Output	-	35732	
U11-05	[Custom P_L 2] Output	-	35733	
U11-06	[Custom P_L 3] Output	-	35734	
U11-07	[Custom P_L 4] Output	-	35735	
U11-08	[Custom RSFF module 1] Setting flag	-	35736	
U11-09	[Custom RSFF module 1] Reset flag	-	35737	

Parameter No.	Name	Unit	Address	Remarks
U11-10	[Custom RSFF module 2] Setting flag	-	35738	
U11-11	[Custom RSFF module 2] Reset flag	-	35739	
U11-12	[Custom RSFF module 3] Setting flag	-	35740	
U11-13	[Custom RSFF module 3] Reset flag	-	35741	
U11-14	[Custom RSFF module 4] Setting flag	-	35742	
U11-15	[Custom RSFF module 4] Reset flag	-	35743	
U11-16	[Custom DFF module 1] Setting flag	-	35744	
U11-17	[Custom DFF module 1] Reset flag	-	35745	
U11-18	[Custom DFF module 2] Setting flag	-	35746	
U11-19	[Custom DFF module 2] Reset flag	-	35747	
U11-20	[Custom DFF module 3] Setting flag	-	35748	
U11-21	[Custom DFF module 3] Reset flag	-	35749	
U11-22	[Custom DFF module 4] Setting flag	-	35750	
U11-23	[Custom DFF module 4] Reset flag	-	35751	
U11-24	[Custom PULSE 1] Output	-	35752	
U11-25	[Custom PULSE 2] Output	-	35753	
U11-26	[Custom PULSE 3] Output	-	35754	
U11-27	[Custom PULSE 4] Output	-	35755	
U11-28	[Custom PULSE 5] Output	-	35756	
U11-29	[Custom PULSE 6] Output	-	35757	
U11-30	[Custom PULSE 7] Output	-	35758	
U11-31	[Custom PULSE 8] Output	-	35759	
U11-32	[Custom MUL_DIV 1] Divisor being 0 flag	-	35760	
U11-33	[Custom MUL_DIV 2] Divisor being 0 flag	-	35761	
U11-34	[Custom MUL_DIV 3] Divisor being 0 flag	-	35762	
U11-35	[Custom MUL_DIV 4] Divisor being 0 flag	-	35763	
U11-36	[Custom MUL_DIV 5] Divisor being 0 flag	-	35764	

Parameter No.	Name	Unit	Address	Remarks
U11-37	[Custom MUL_DIV 6] Divisor being 0 flag	-	35765	
U11-38	[Custom MUL_DIV 7] Divisor being 0 flag	-	35766	
U11-39	[Custom MUL_DIV 8] Divisor being 0 flag	-	35767	
U11-40	[Custom ABS 1] Negative number input flag	-	35768	
U11-41	[Custom ABS 2] Negative number input flag	-	35769	
U11-42	[Custom ABS 3] Negative number input flag	-	35770	
U11-43	[Custom ABS 4] Negative number input flag	-	35771	
U11-44	[Custom NCMP 1] Output	-	35772	
U11-45	[Custom NCMP 2] Output	-	35773	
U11-46	[Custom NCMP 3] Output	-	35774	
U11-47	[Custom NCMP 4] Output	-	35775	
U11-48	[Custom INTEGRAL 1] Output upper limit reached flag	-	35776	
U11-49	[Custom INTEGRAL 1] Output lower limit reached flag	-	35777	
U11-50	[Custom INTEGRAL 2] Output upper limit reached flag	-	35778	
U11-51	[Custom INTEGRAL 2] Output lower limit reached flag	-	35779	
U11-52	[Custom INTEGRAL 3] Output upper limit reached flag	-	35780	
U11-53	[Custom INTEGRAL 3] Output lower limit reached flag	-	35781	
U11-54	[Custom INTEGRAL 4] Output upper limit reached flag	-	35782	
U11-55	[Custom INTEGRAL 4] Output lower limit reached flag	-	35783	
U11-56	[Custom LIM 1] Input upper limit reached flag	-	35784	
U11-57	[Custom LIM 1] Input lower limit reached flag	-	35785	

Parameter No.	Name	Unit	Address	Remarks
U11-58	[Custom LIM 2] Input upper limit reached flag	-	35786	
U11-59	[Custom LIM 2] Input lower limit reached flag	-	35787	
U11-60	[Custom LIM 3] Input upper limit reached flag	-	35788	
U11-61	[Custom LIM 3] Input lower limit reached flag	-	35789	
U11-62	[Custom LIM 4] Input upper limit reached flag	-	35790	
U11-63	[Custom LIM 4] Input lower limit reached flag	-	35791	
U11-64	[Custom tech. ctrl] fixed bit module 1 output	-	35792	
U11-65	[Custom tech. ctrl] fixed bit module 2 output	-	35793	
U11-66	[Custom tech. ctrl] fixed bit module 3 output	-	35794	
U11-67	[Custom tech. ctrl] fixed bit module 4 output	-	35795	
U11-68	[Custom tech. ctrl] fixed bit module 5 output	-	35796	
U11-69	[Custom tech. ctrl] fixed bit module 6 output	-	35797	
U11-70	[Custom tech. ctrl] Output limit reached flag	-	35798	
Group U15: word connector 5				
U15-00	[Custom B2W module 1] Output	-	35528	
U15-01	[Custom B2W module 2] Output	-	35529	
U15-02	[Custom B2W module 3] Output	-	35530	
U15-03	[Custom B2W module 4] Output	-	35531	
U15-04	Custom DW2W module 1.Output HIWORD	-	35532	
U15-05	Custom DW2W module 1.Output LOWORD	-	35533	
U15-06	Custom DW2W module 2.Output HIWORD	-	35534	

Parameter No.	Name	Unit	Address	Remarks
U15-07	Custom DW2W module 2.Output LOWORD	-	35535	
U15-08	Custom DW2W module 3.Output HIWORD	-	35536	
U15-09	Custom DW2W module 3.Output LOWORD	-	35537	
U15-10	[GAIN 1] Output	%	35293	
U15-11	[GAIN 2] Output	%	35294	
U15-12	[GAIN 3] Output	%	35295	
U15-13	[GAIN 4] Output	%	35296	
U15-14	[GAIN 5] Output	%	35297	
U15-15	[GAIN 6] Output	%	35298	
U15-16	[GAIN 7] Output	%	35299	
U15-17	[GAIN 8] Output	%	35300	
U15-18	[GAIN 9] Output	%	35301	
U15-19	[GAIN 10] Output	%	35302	
U15-22	Internal 15V detection voltage of HCU control board	V	34832	
U15-23	Port 24V detection voltage of HCU control board	V	34831	
Group U19: double-word connector 2				
U19-00	[Custom W2DW module 1] Output	%	35328	
U19-01	[Custom W2DW module 2] Output	%	35330	
U19-02	[Custom W2DW module 3] Output	%	35332	
U19-03	[Custom NSW module 1] Output	%	35334	
U19-04	[Custom NSW module 2] Output	%	35336	
U19-05	[Custom NSW module 3] Output	%	35338	
U19-06	[Custom NSW module 4] Output	%	35340	
U19-07	[Custom NSW module 5] Output	%	35342	
U19-08	[Custom NSW module 6] Output	%	35344	
U19-09	[Custom NSW module 7] Output	%	35346	
U19-10	[Custom NSW module 8] Output	%	35348	
U19-11	[Custom NSW module 9] Output	%	35350	
U19-12	[Custom NSW module 10] Output	%	35352	
U19-13	[Custom NSW module 11] Output	%	35354	
U19-14	[Custom NSW module 12] Output	%	35356	

Parameter No.	Name	Unit	Address	Remarks
U19-15	[Custom FILT 1] Output	%	35358	
U19-16	[Custom FILT 2] Output	%	35360	
U19-17	[Custom FILT 3] Output	%	35362	
U19-18	[Custom FILT 4] Output	%	35364	
U19-19	[Custom FILT 5] Output	%	35366	
U19-20	[Custom FILT 6] Output	%	35368	
U19-21	[Custom FILT 7] Output	%	35370	
U19-22	[Custom FILT 8] Output	%	35372	
U19-23	[Custom ADD_SUB 1] Output	%	35374	
U19-24	[Custom ADD_SUB 2] Output	%	35376	
U19-25	[Custom ADD_SUB 3] Output	%	35378	
U19-26	[Custom ADD_SUB 4] Output	%	35380	
U19-27	[Custom ADD_SUB 5] Output	%	35382	
U19-28	[Custom ADD_SUB 6] Output	%	35384	
U19-29	[Custom ADD_SUB 7] Output	%	35386	
U19-30	[Custom ADD_SUB 8] Output	%	35388	
U19-31	[Custom MUL_DIV 1] Output	%	35390	
U19-32	[Custom MUL_DIV 2] Output	%	35392	
U19-33	[Custom MUL_DIV 3] Output	%	35394	
U19-34	[Custom MUL_DIV 4] Output	%	35396	
U19-35	[Custom MUL_DIV 5] Output	%	35398	
U19-36	[Custom MUL_DIV 6] Output	%	35400	
U19-37	[Custom MUL_DIV 7] Output	%	35402	
U19-38	[Custom MUL_DIV 8] Output	%	35404	
U19-39	[Custom ABS 1] Output	%	35406	
U19-40	[Custom ABS 2] Output	%	35408	
U19-41	[Custom ABS 3] Output	%	35410	

Parameter No.	Name	Unit	Address	Remarks
U19-42	[Custom ABS 4] Output	%	35412	
U19-43	[Custom NEG 1] Output	%	35414	
U19-44	[Custom NEG 2] Output	%	35416	
U19-45	[Custom NEG 3] Output	%	35418	
U19-46	[Custom NEG 4] Output	%	35420	
U19-47	[Custom NEG 5] Output	%	35422	
U19-48	[Custom NEG 6] Output	%	35424	
U19-49	[Custom NEG 7] Output	%	35426	
U19-50	[Custom NEG 8] Output	%	35428	
U19-51	[Custom INTEGRAL 1] Output	%	35430	
U19-52	[Custom INTEGRAL 2] Output	%	35432	
U19-53	[Custom INTEGRAL 3] Output	%	35434	
U19-54	[Custom INTEGRAL 4] Output	%	35436	
U19-55	[Custom DIFF 1] Output	%	35438	
U19-56	[Custom DIFF 2] Output	%	35440	
U19-57	[Custom DIFF 3] Output	%	35442	
U19-58	[DIFF 4] Output	%	35444	
U19-59	[Custom LIM 1] Output	%	35446	
U19-60	[Custom LIM 2] Output	%	35448	
U19-61	[Custom LIM 3] Output	%	35450	
U19-62	[Custom LIM 4] Output	%	35452	
U19-63	[Custom PLI10 1] Output	%	35454	
U19-64	[Custom PLI10 2] Output	%	35456	
U19-65	[Custom PLI10 3] Output	%	35458	
U19-66	[Custom PLI10 4] Output	%	35460	
U19-67	[Custom tech. ctrl] fixed word module 1 output	%	35462	
U19-68	[Custom tech. ctrl] fixed word module 2 output	%	35464	
U19-69	[Custom tech. ctrl] fixed word module 3 output	%	35466	

Parameter No.	Name	Unit	Address	Remarks
U19-70	[Custom tech. ctrl] fixed word module 4 output	%	35468	
U19-71	[Custom tech. ctrl] fixed word module 5 output	%	35470	
U19-72	[Custom tech. ctrl] fixed word module 6 output	%	35472	
U19-73	[Custom tech. ctrl] fixed word module 7 output	%	35474	
U19-74	[Custom tech. ctrl] fixed word module 8 output	%	35476	
U19-75	[Custom tech. ctrl] fixed word module 9 output	%	35478	
U19-76	[Custom tech. ctrl] fixed word module 10 output	%	35480	
U19-77	[Custom tech. ctrl] fixed word module 11 output	%	35482	
U19-78	[Custom tech. ctrl] fixed word module 12 output	%	35484	
U19-79	[Custom tech. ctrl] fixed word module 13 output	%	35486	
U19-80	[Custom tech. ctrl] fixed word module 14 output	%	35488	
U19-81	[Custom tech. ctrl] Feedback value	%	35490	
U19-82	[Custom tech. ctrl] FDBK value with ABS value processing	%	35492	
U19-83	[Custom tech. ctrl] Differential component	%	35494	
U19-84	[Custom tech. ctrl] Setpoint	%	35496	
U19-85	[Custom tech. ctrl] Filtered setpoint	%	35498	
U19-86	[Custom tech. ctrl] Deviation	%	35500	
U19-87	[Custom tech. ctrl] Deviation after droop	%	35502	
U19-88	[Custom tech. ctrl] Proportion component	%	35504	
U19-89	[Custom tech. ctrl] Integral component	%	35506	
U19-90	[Custom tech. ctrl] Upper limit	%	35508	

Parameter No.	Name	Unit	Address	Remarks
U19-91	[Custom tech. ctrl] Lower limit	%	35510	
U19-92	[Custom tech. ctrl] Upper limit inverted	%	35512	
U19-93	[Custom tech. ctrl] Output	%	35514	
U19-94	[Custom tech. ctrl] Output scaled-up	%	35516	
U19-95	[GAIN 11] Output	%	35518	
U19-96	[GAIN 12] Output	%	35520	
U19-97	[GAIN 13] Output	%	35522	
U19-98	[GAIN 14] Output	%	35524	
U19-99	[GAIN 15] Output	%	35526	

7 Data Flow Diagrams

7.1 Overview of Data Flow Diagrams 468

7.2 Data Flow Diagrams 470

7.2.1 Description of Function Diagrams 470

7.2.2 State Machine 472

7.23 Input and Output 473

7.2 Application Function 485

7.2.5 Command and setting 503

7.2.6 Vector Control 519

7.2.7 V/f Control 532

7.2.8 Auxiliary Function 535

7 Data Flow Diagrams

7.1 Overview of Data Flow Diagrams

Function	Description	Diagram Code
Description of function diagrams		
-	Diagram illustration 1	H010
	Diagram illustration 2	H011
State machine		
-	State machine overview	H030
I/Os		
I/O terminals	Digital input (DI)	H110
	Relay output (RO)	H112
	High-speed digital input (HDI)	H114
	High-speed digital output (HDO)	H116
	Analog input (AI)	H120
	Analog output (AO)	H122
InoLink communication	InoLink communication data reception	H130
	InoLink communication data transmission	H134
Bus adapter A	Process data reception	H140
	Process data transmission	H142
Bus adapter B	Process data reception	H144
	Process data transmission	H146
Application functions		
Conversion functions	Word (W)-to-bit (B) function	H160
	Bit (B)-to-word (W) function	H162
	Word (W)-to-double-word (DW) function	H164
Logic processing	Logic AND/NOT	H170
	Logic OR	H172
	Logic AND/OR	H173
	Logic delay	H174
	XOR and XNOR	H176
	Switch switchover function	H178
	Level-to-pulse function	H182
Arithmetic operations	Absolute value	H184
	ADD/SUBTRACT operation	H186
	MULTIPLY/DIVIDE operation	H188
	Comparison module	H190
Control function blocks	Filter module	H180
	Process PID - input and limit	H192
	Process PID - operation	H194
	Multi-point curve	H196
Command and setting		
Control channels	Control word 1	H220
	Status word 1	H230
	SOP-20 start-stop control word	H240
	PC start-stop control word	H242
	Terminal start-stop control word	H244
	User-defined start-stop control word	H246
	Start-stop control word selection	H248

Function	Description	Diagram Code
Setting channels	Motorized potentiometer	H302
	Regular speed source	H310
	Speed limit	H312
	Jog speed setting	H314
	RFG - acceleration/deceleration time selection	H322
	RFG - ramp function generator	H326
	Supplementary speed and limit	H328
	Supplementary torque and torque limit setting	H330
	Power limit setting	H332
Vector control		
Speed regulator	Speed setting and feedback	H400
	ASR - parameter adaption	H410
	ASR - PI regulator	H412
	Torque reference and supplementary torque	H430
	Torque current conversion	H432
Torque limit	Torque current limit calculation	H420
	Torque limit and runaway prevention	H422
	Bus voltage control	H426
Flux control	Flux setting and flux weakening control	H440
	Flux current setting	H442
Current control	Current regulator	H540
	Output voltage conversion	H550
	Power unit interface	H560
V/f control		
V/f control	Reference voltage in V/f control	H460
	Reference frequency in V/f control	H461
	VDC control in V/f control	H462
Auxiliary function		
Speed judgment	Speed judgment	H620
Brake control	Brake opening/closing control	H630
	Brake state monitoring	H632
Auxiliary control	Pulse inhibit and motor fan control	H640

7.2 Data Flow Diagrams

7.2.1 Description of Function Diagrams

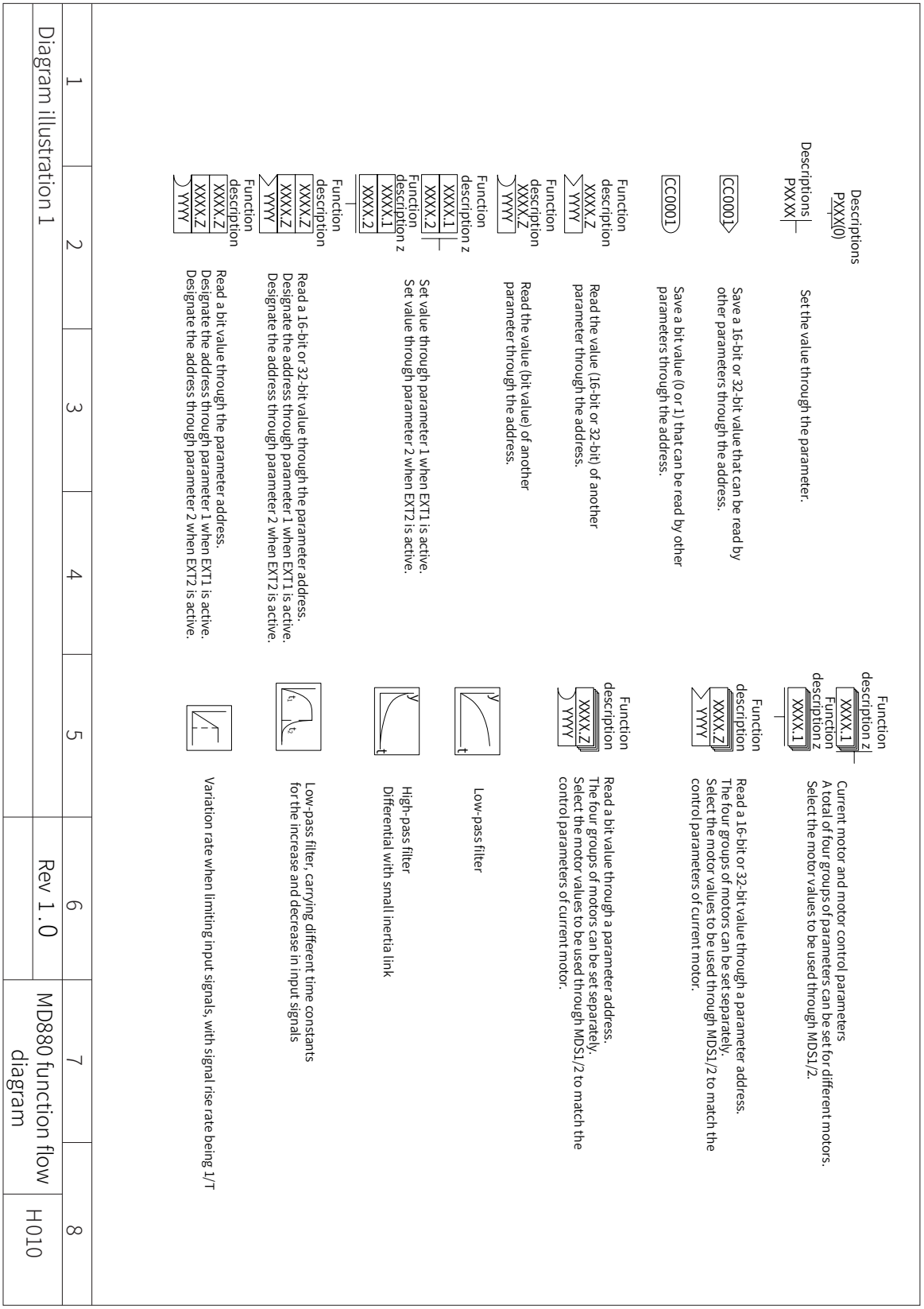


Figure 7-1 H010 - Diagram illustration 1

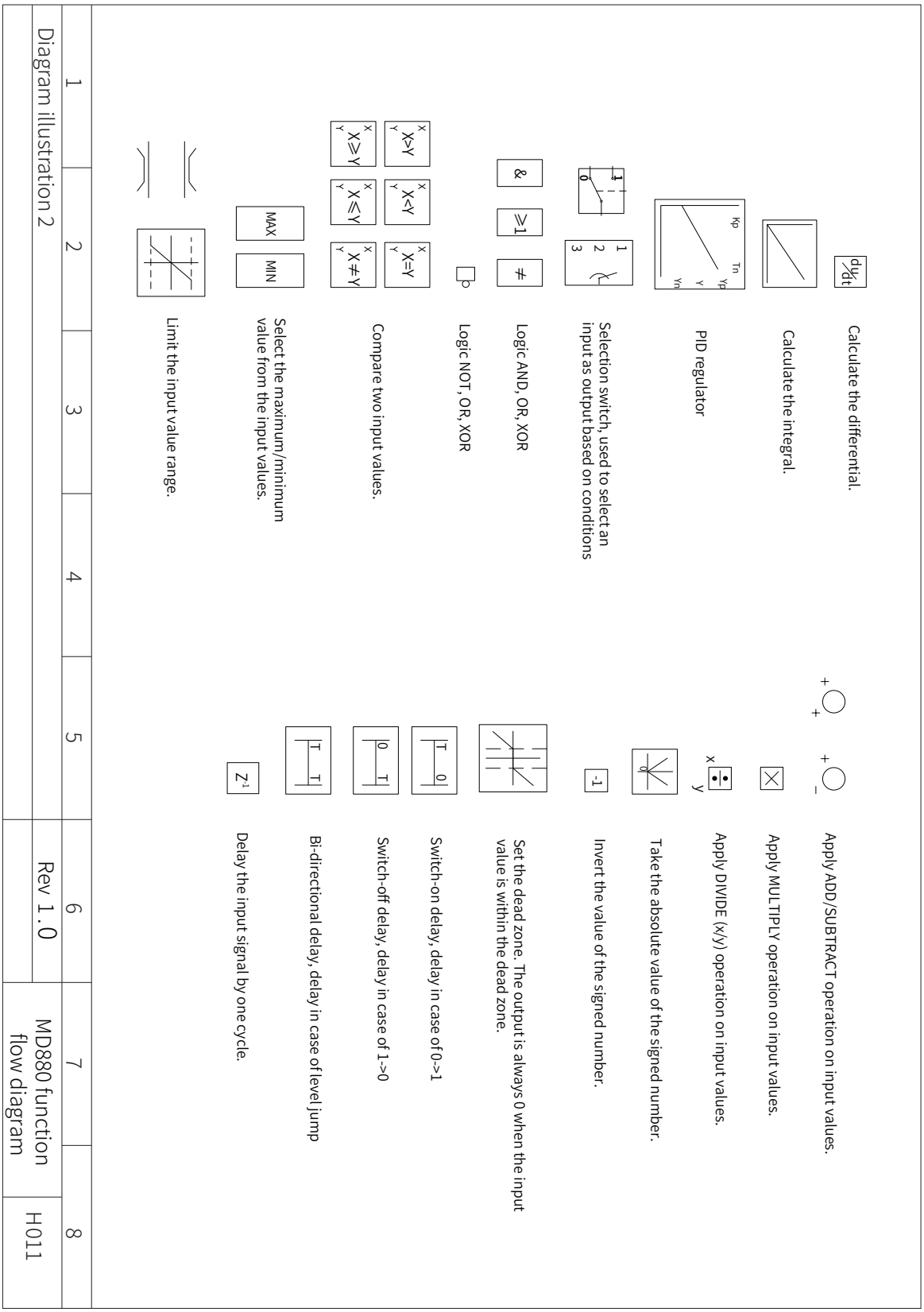


Figure 7-2 H011 - Diagram illustration 2

7.2.2 State Machine

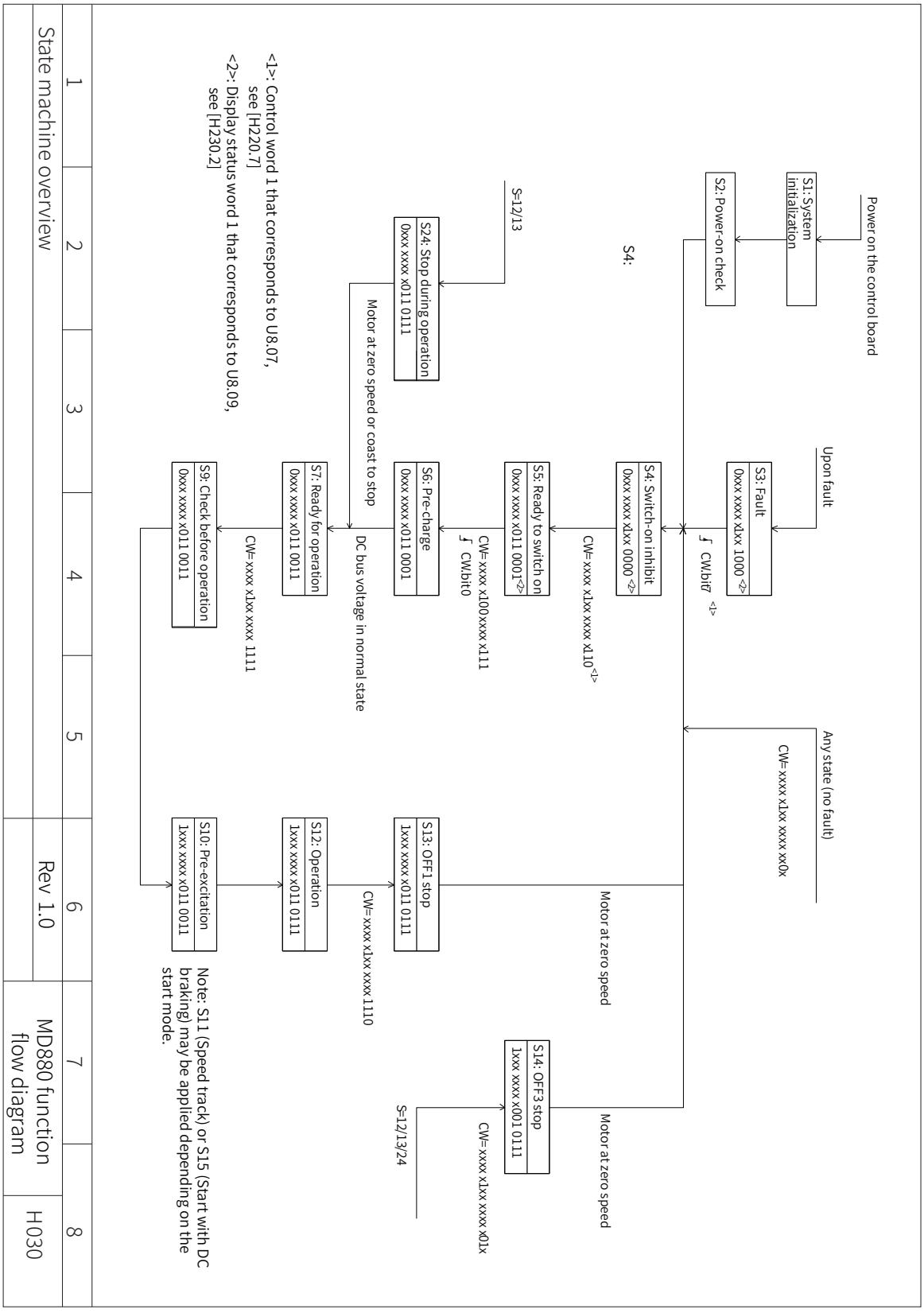


Figure 7-3 H030 - State machine overview

7.23 Input and Output

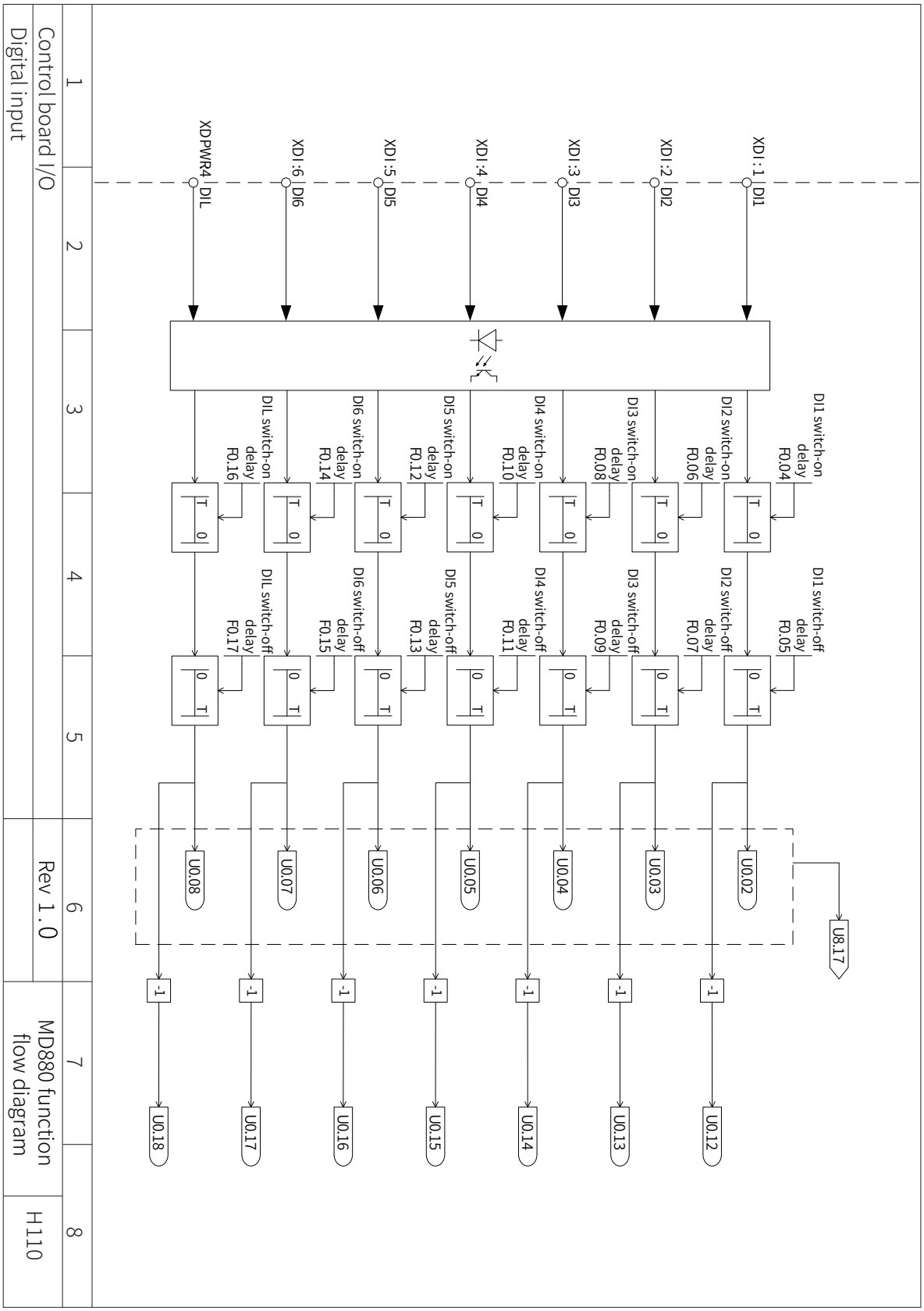


Figure 7-4 H110 - Digital input

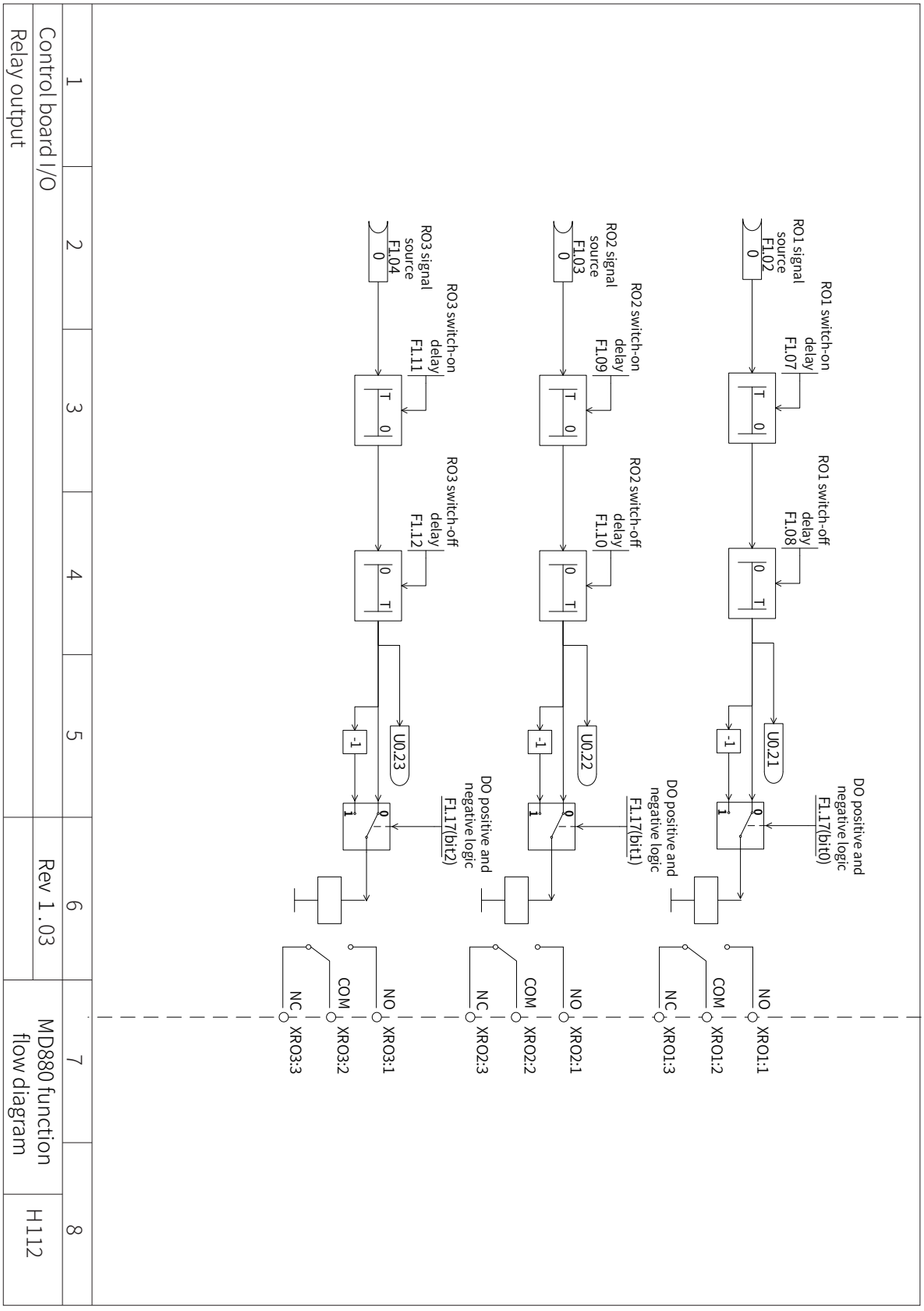


Figure 7-5 H112 - Relay output

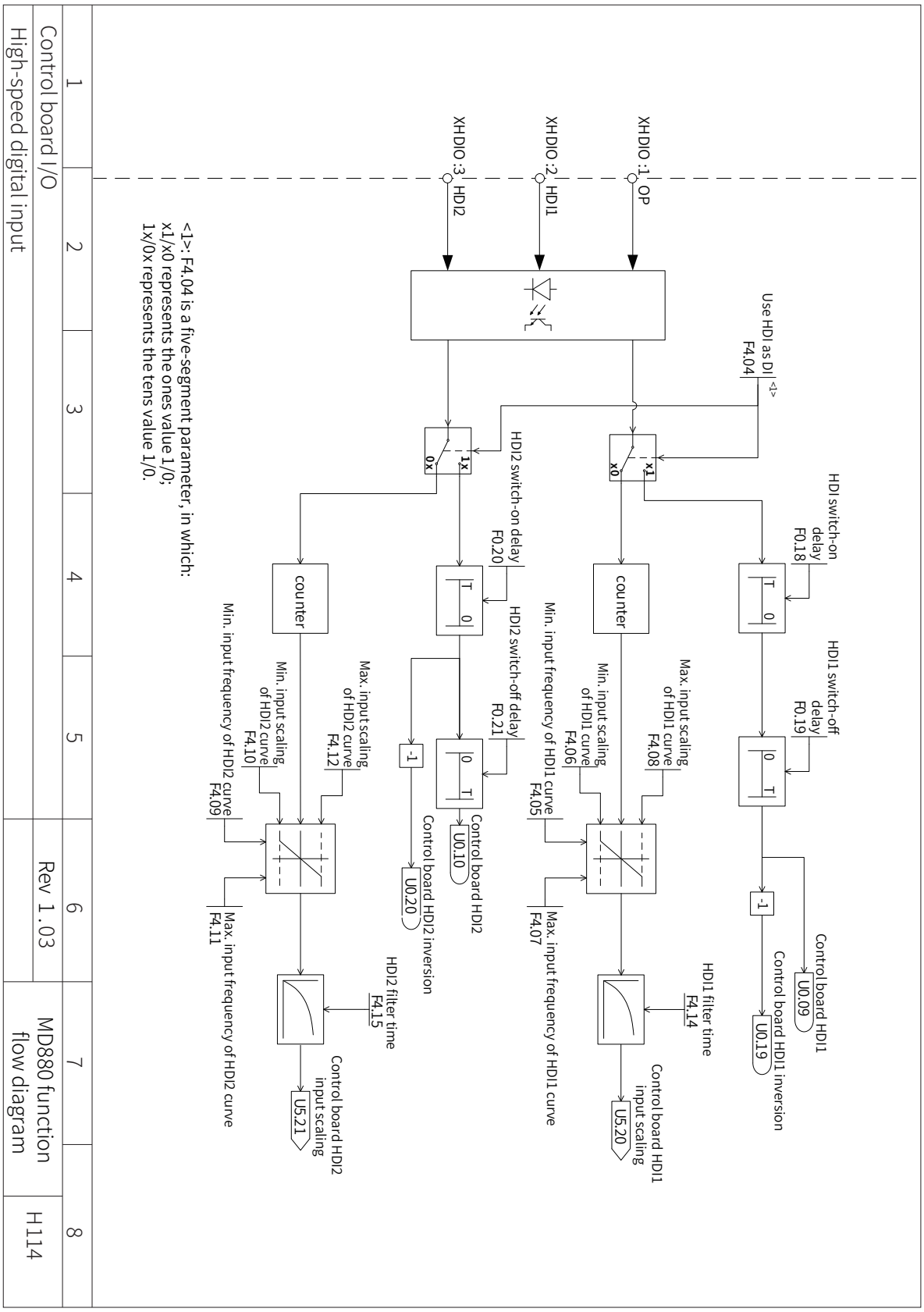


Figure 7-6 H114 - High-speed digital input

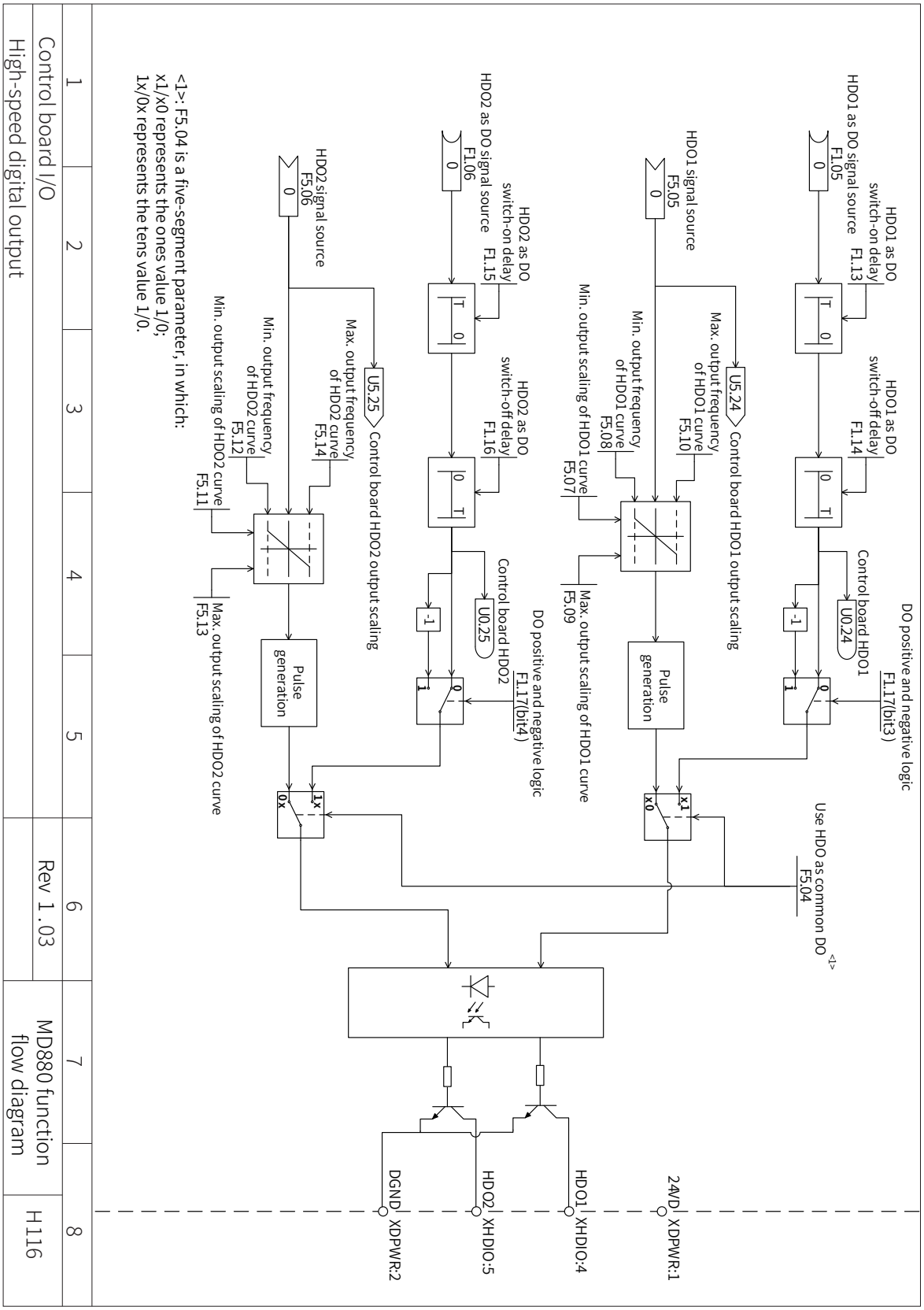


Figure 7-7 H116 - High-speed digital output

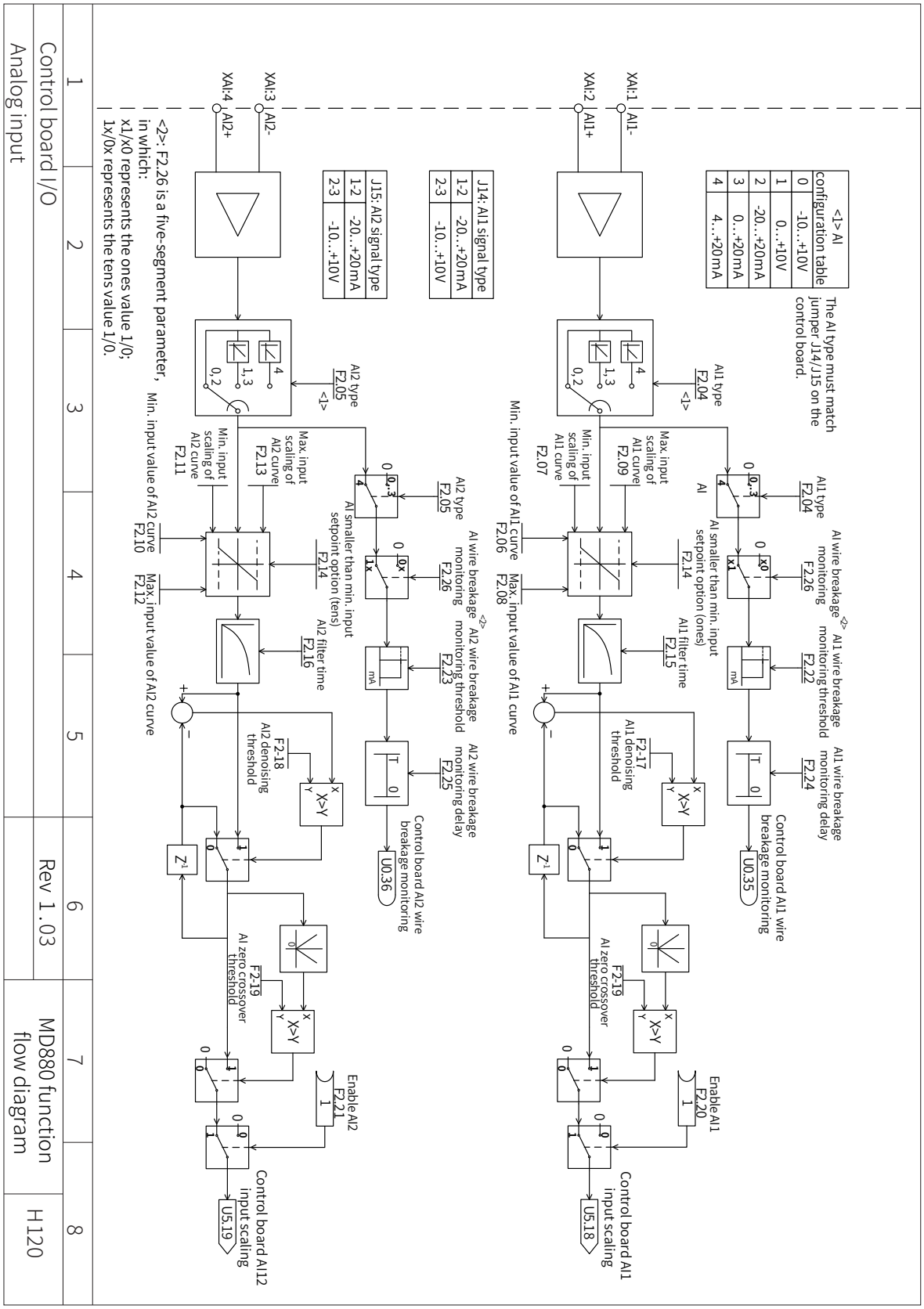


Figure 7-8 H120 - Analog input

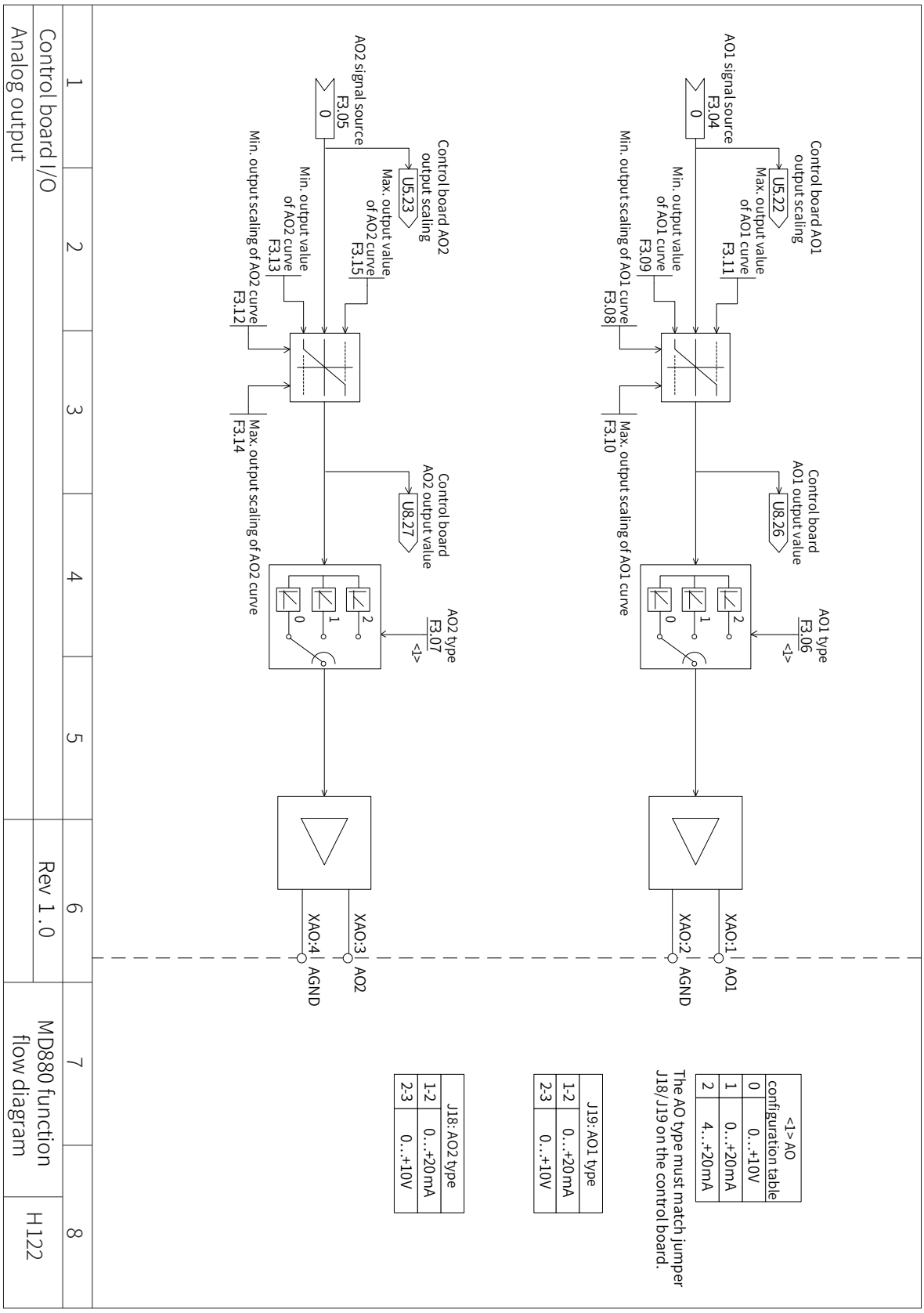


Figure 7-9 H122 - Analog output

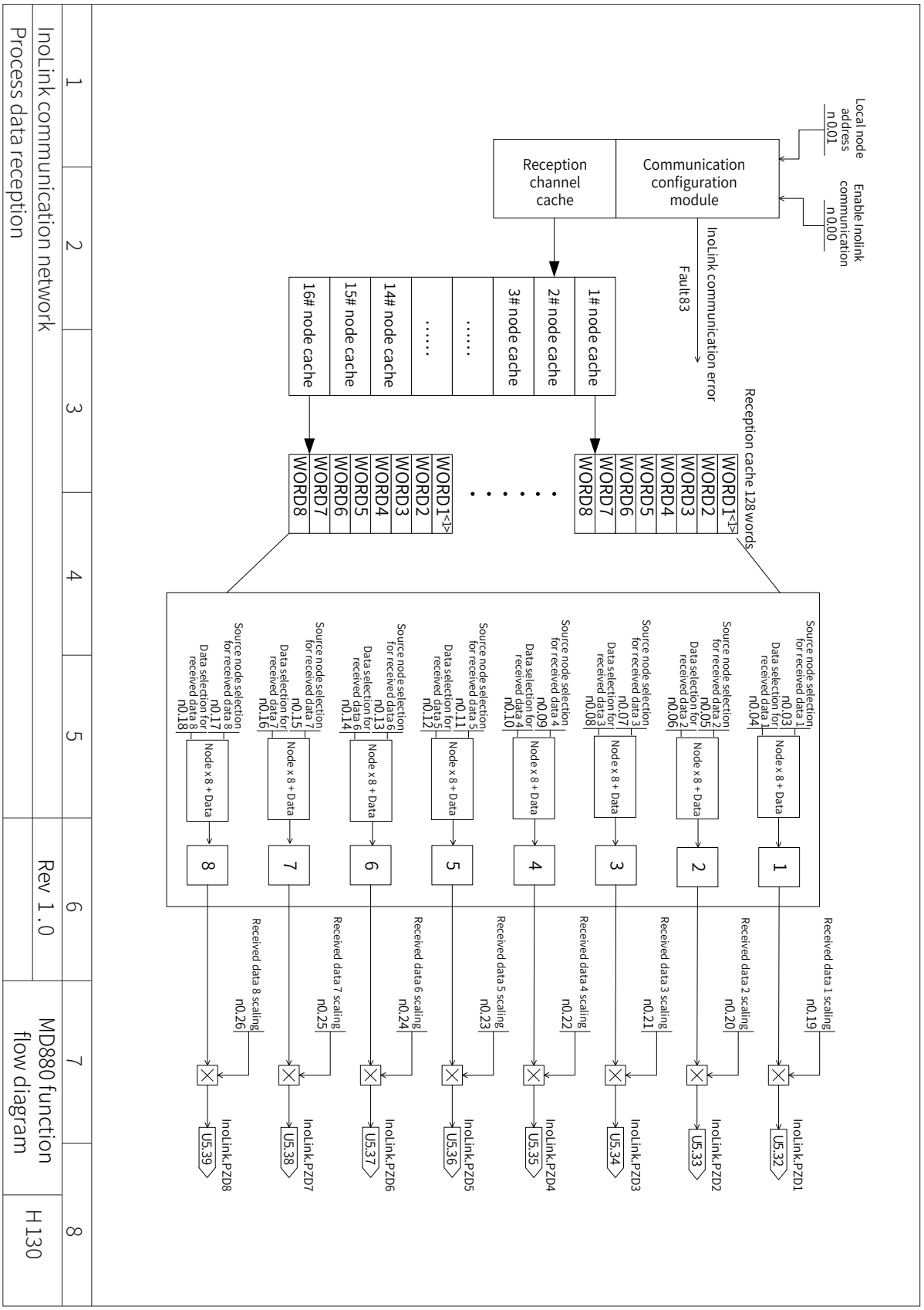


Figure 7-10 H130 - InoLink communication network - process data reception

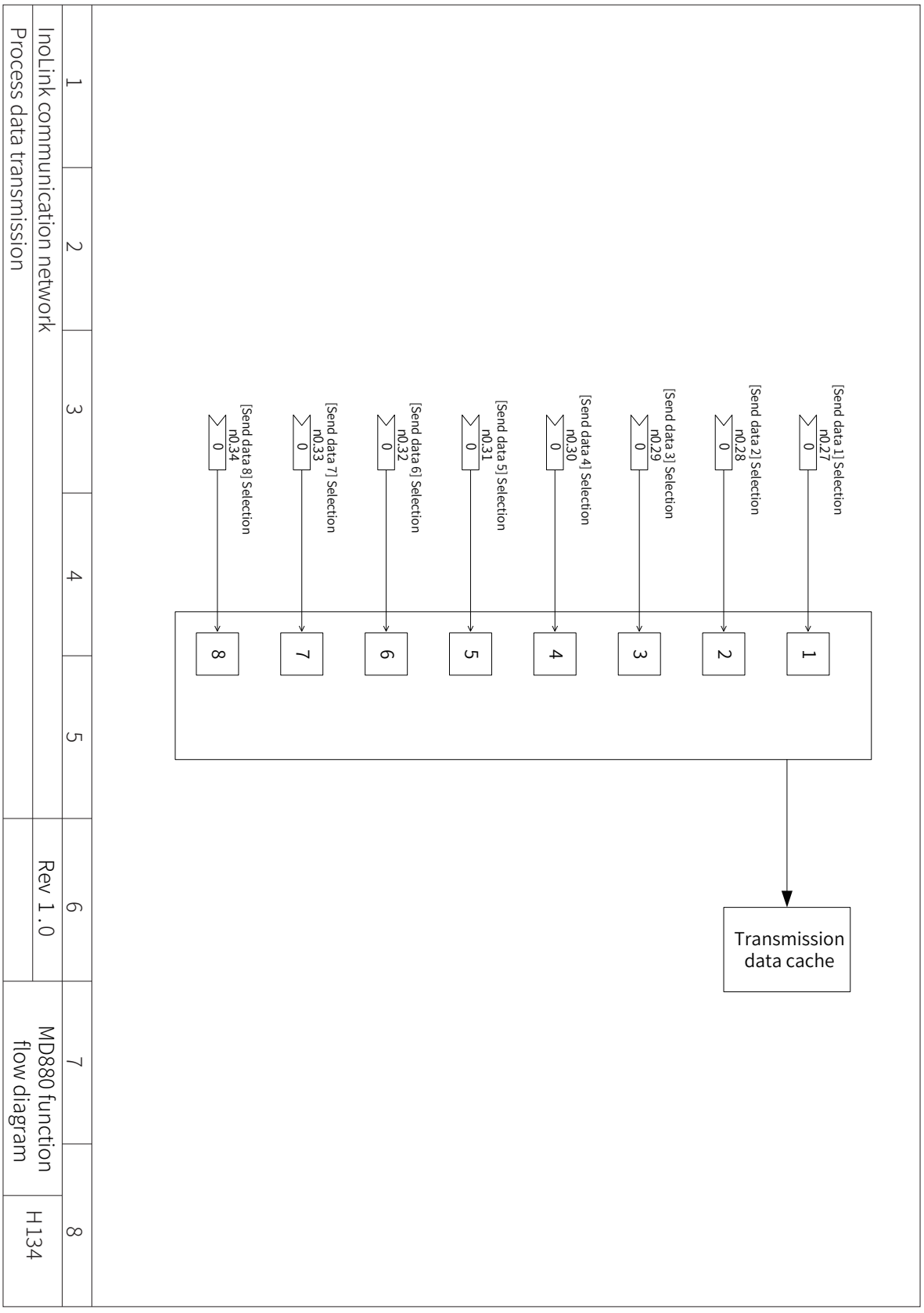


Figure 7-11 H134 - InoLink communication network - process data transmission

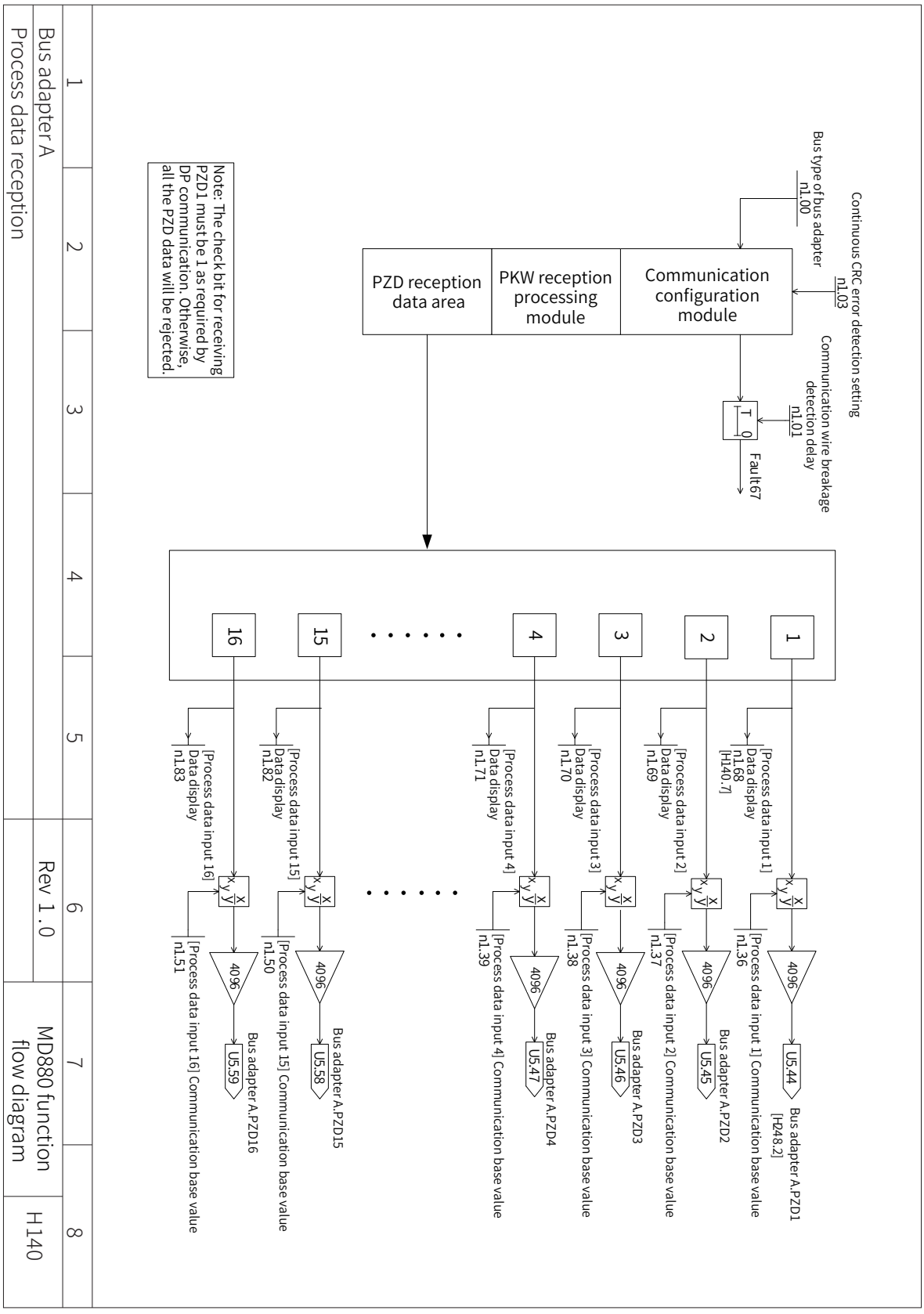


Figure 7-12 H140 - Bus adapter A - Process data reception

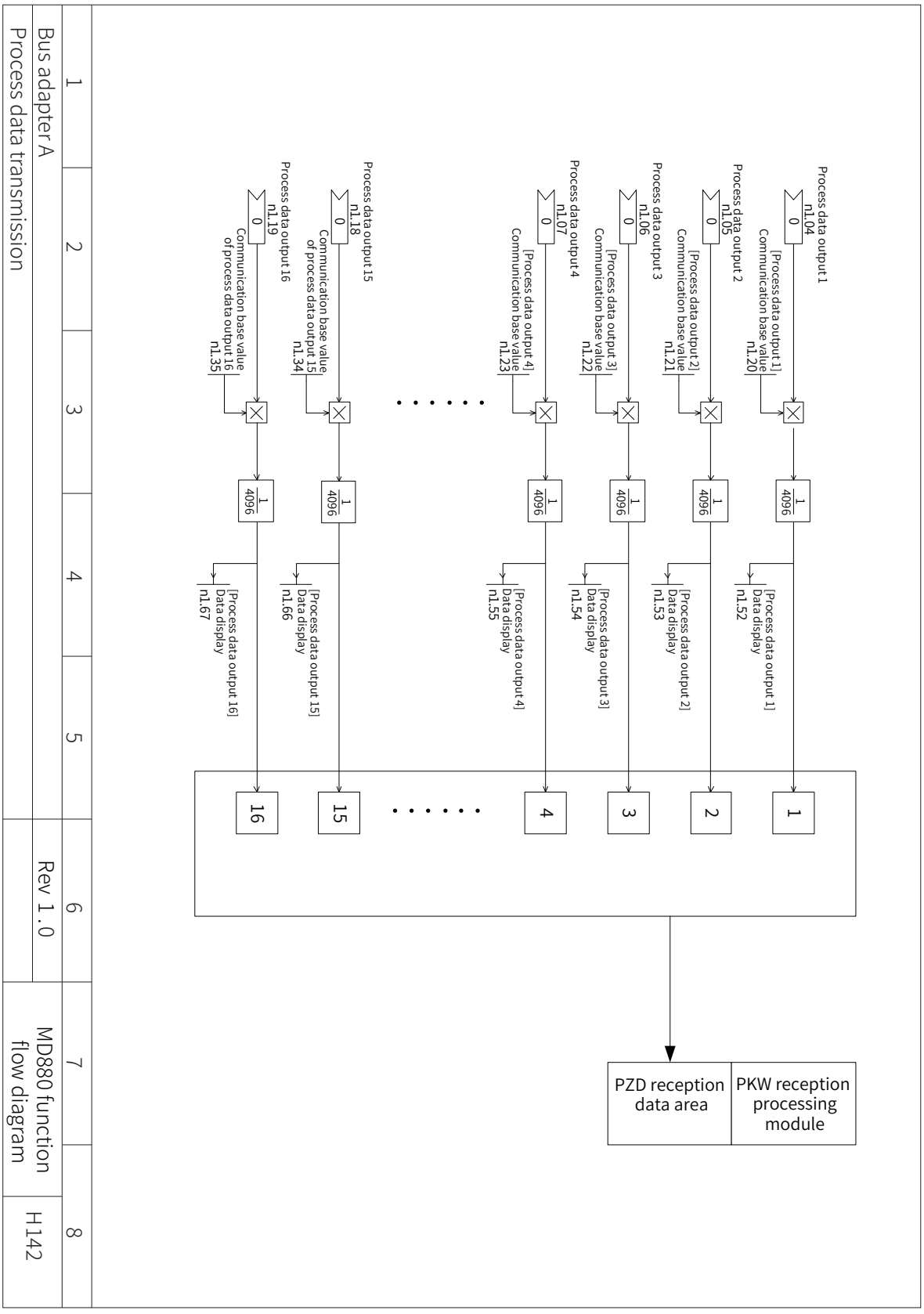


Figure 7-13 H142 - Bus adapter A - Process data transmission

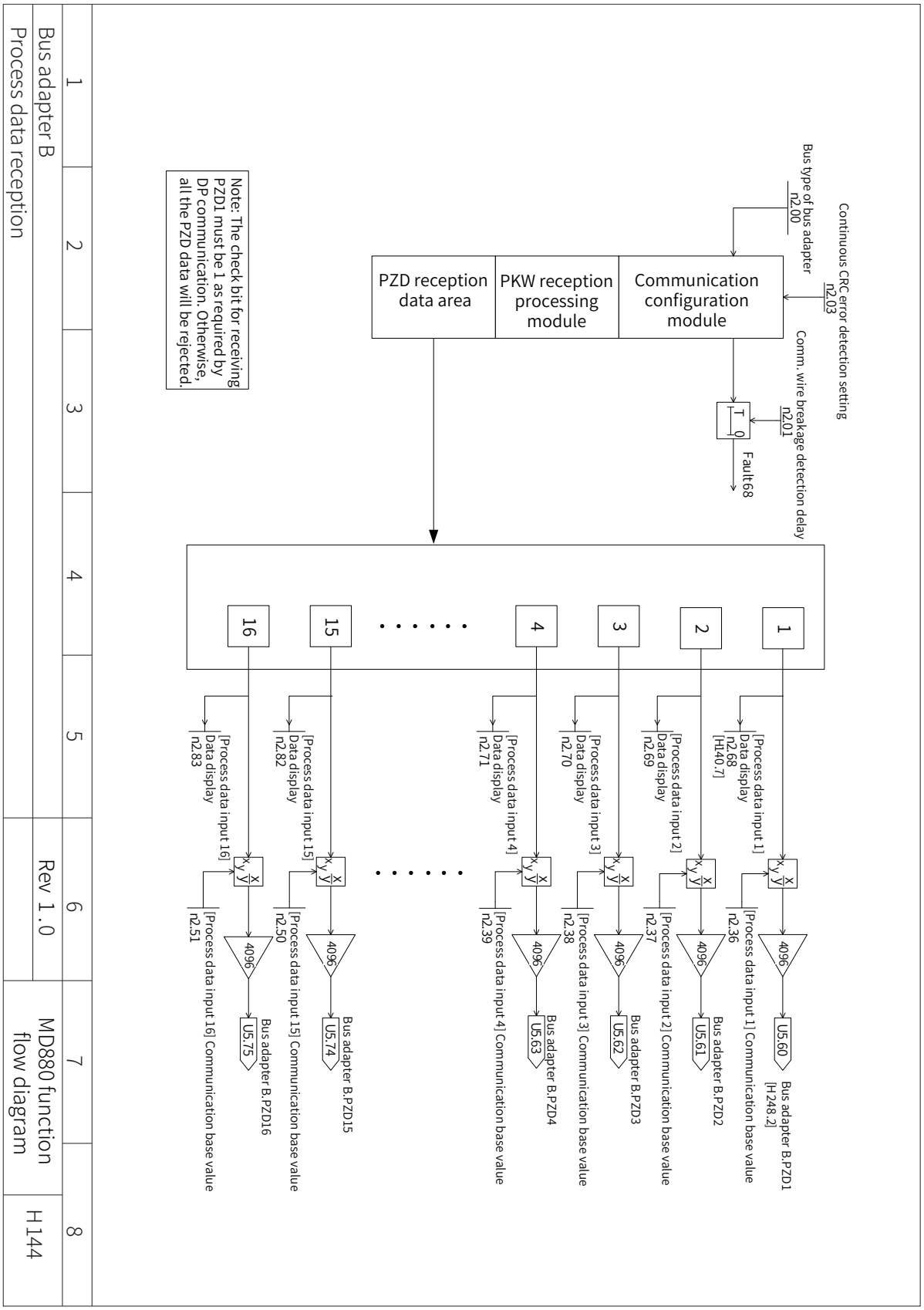


Figure 7-14 H144 - Bus adapter B - Process data reception

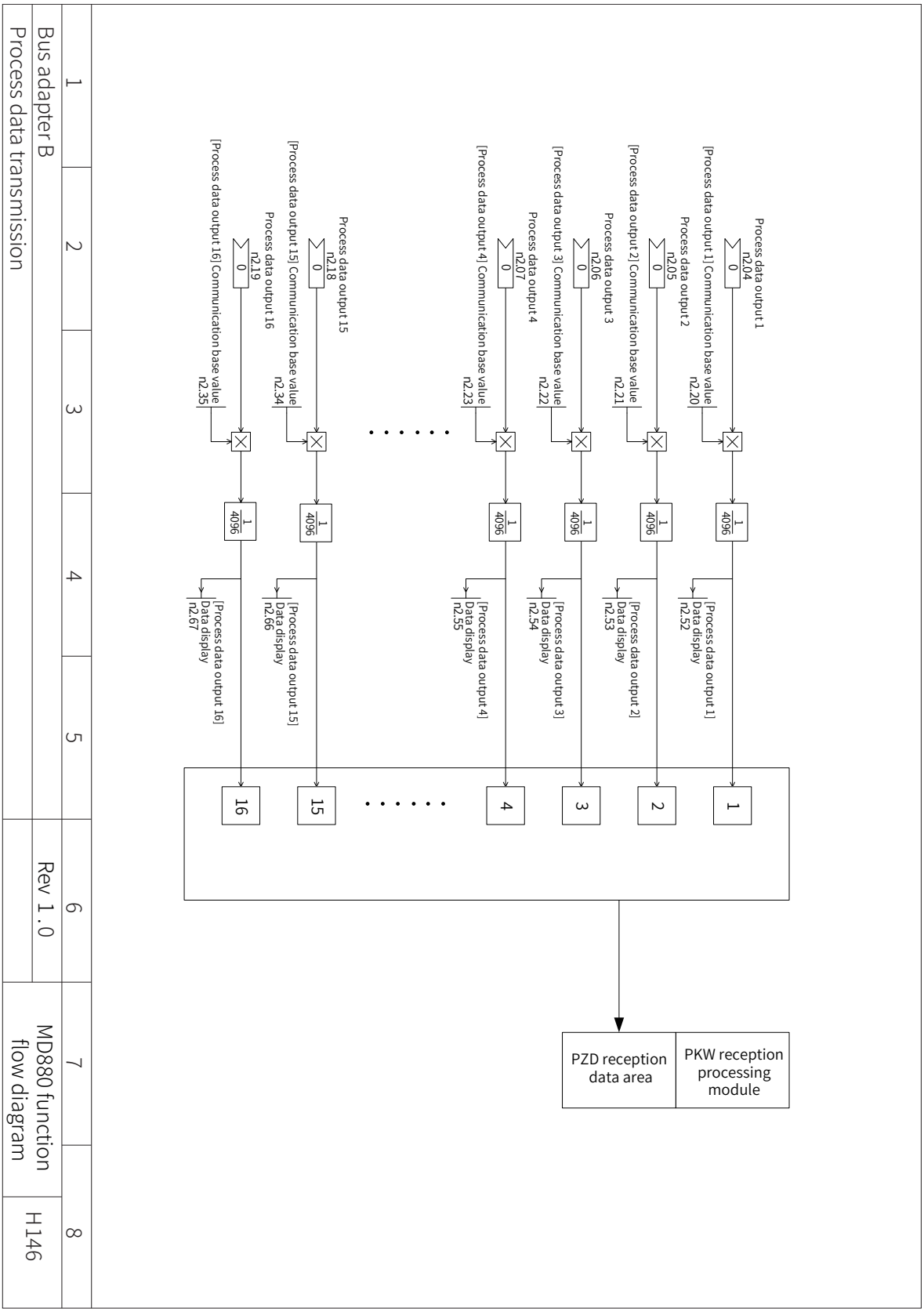


Figure 7-15 H146 - Bus adapter B - Process data transmission

7.2 Application Function

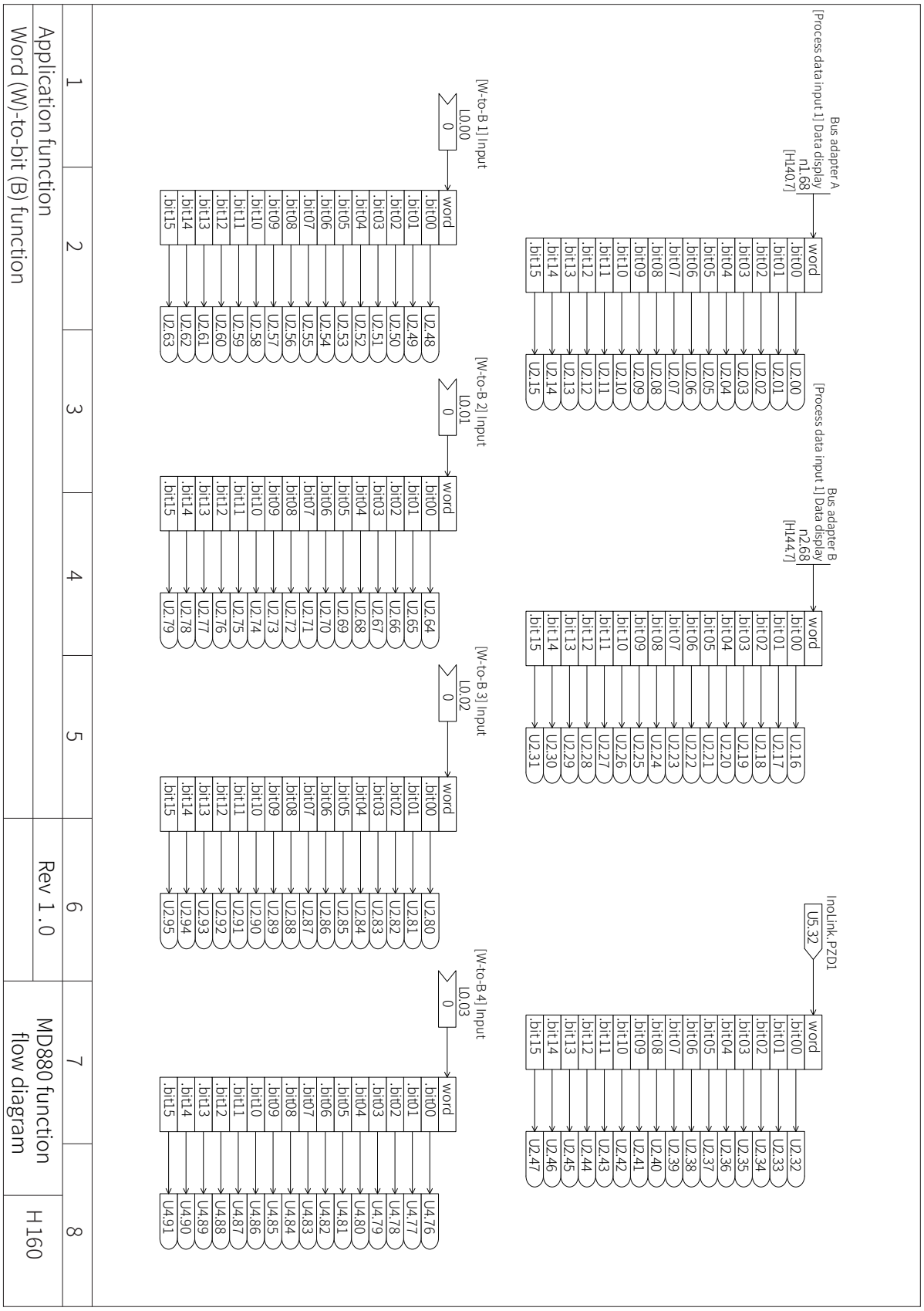


Figure 7-16 H160 - Word-to-bit function

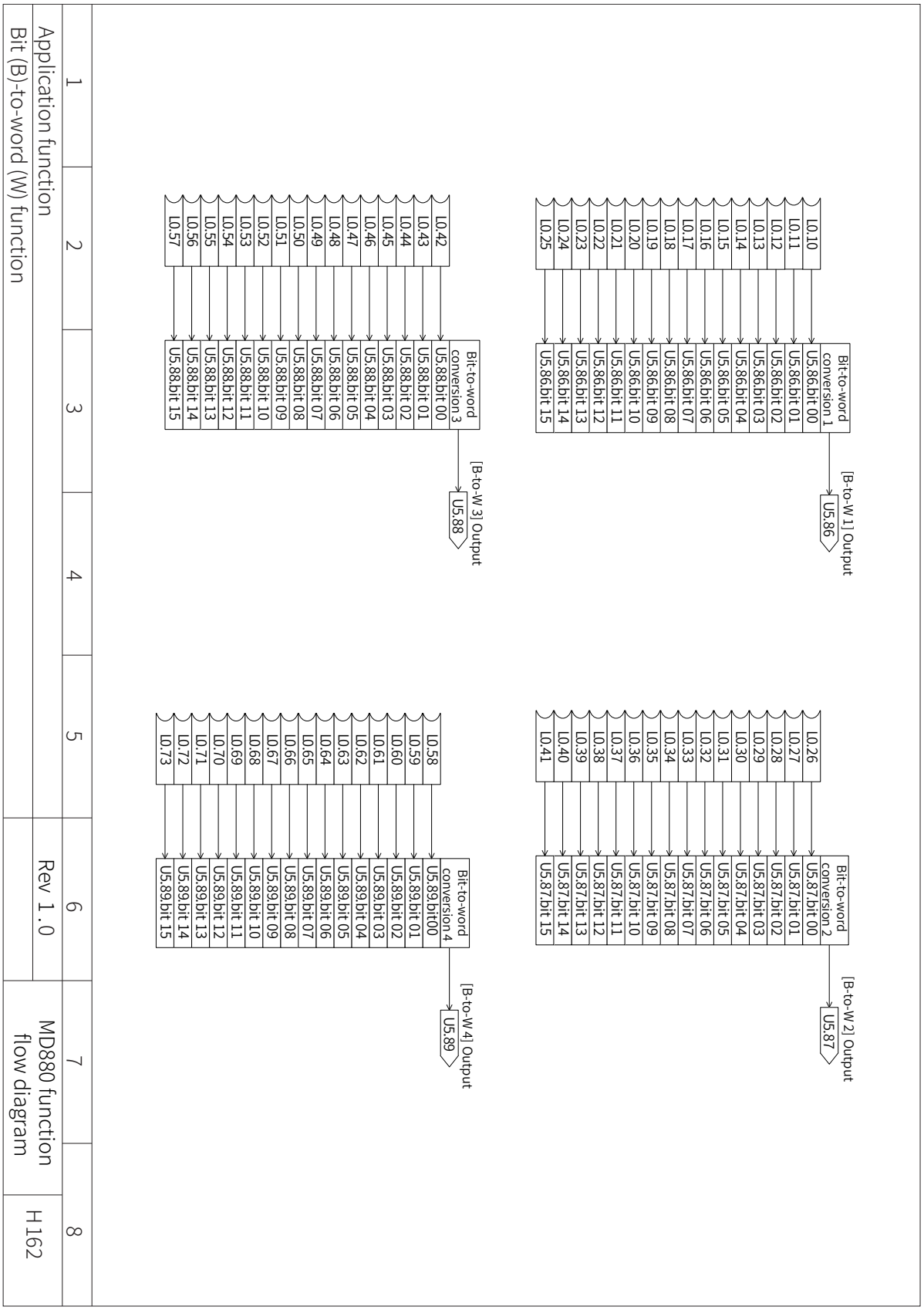
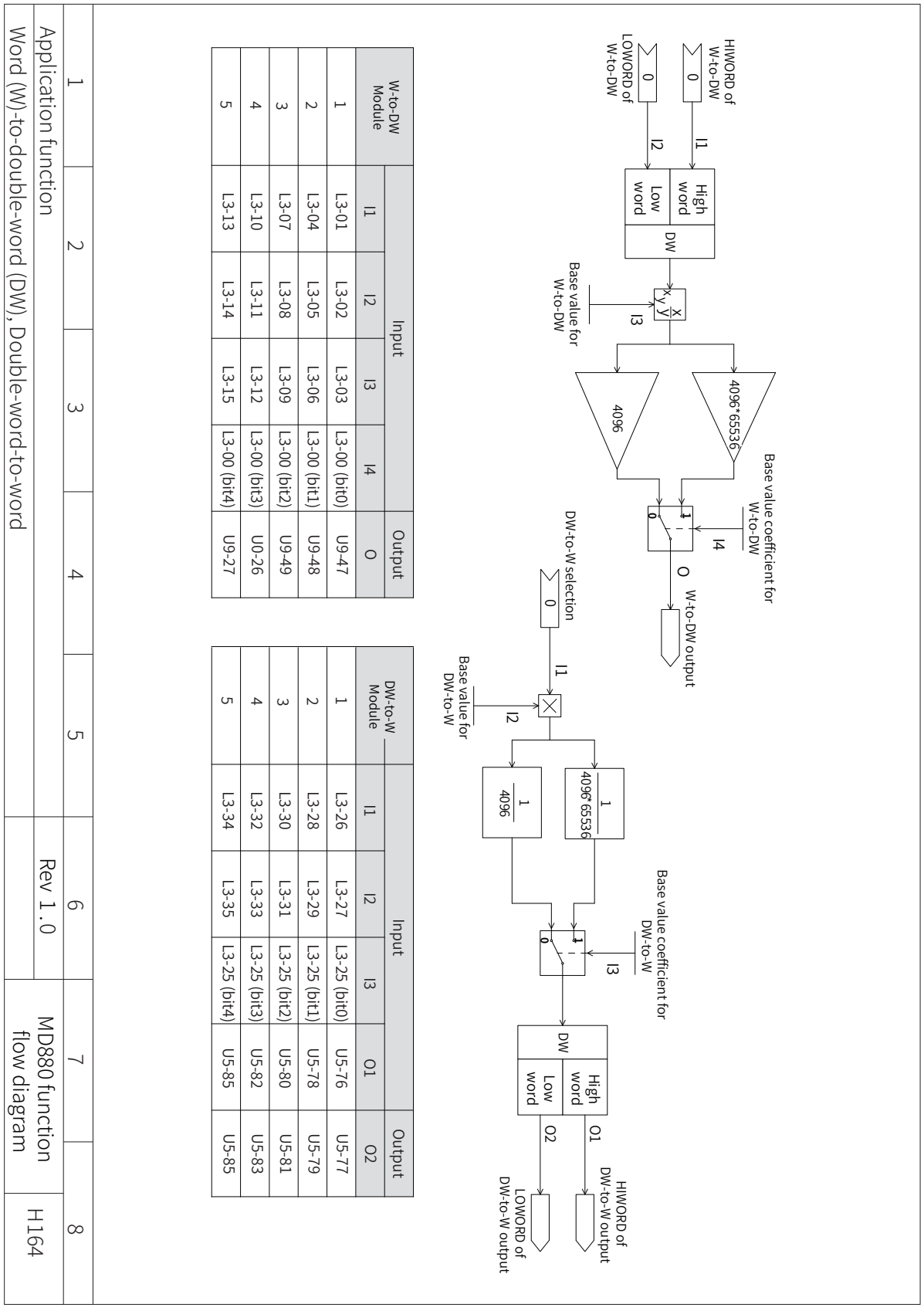


Figure 7-17 H162 - Bit-to-word function



W-to-DW Module	Input				Output
	I1	I2	I3	I4	O
1	L3-01	L3-02	L3-03	L3-00 (bit0)	U9-47
2	L3-04	L3-05	L3-06	L3-00 (bit1)	U9-48
3	L3-07	L3-08	L3-09	L3-00 (bit2)	U9-49
4	L3-10	L3-11	L3-12	L3-00 (bit3)	U0-26
5	L3-13	L3-14	L3-15	L3-00 (bit4)	U9-27

DW-to-W Module	Input			Output	
	I1	I2	I3	O1	O2
1	L3-26	L3-27	L3-25 (bit0)	U5-76	U5-77
2	L3-28	L3-29	L3-25 (bit1)	U5-78	U5-79
3	L3-30	L3-31	L3-25 (bit2)	U5-80	U5-81
4	L3-32	L3-33	L3-25 (bit3)	U5-82	U5-83
5	L3-34	L3-35	L3-25 (bit4)	U5-85	U5-85

1	2	3	4	5	6	7	8
Application function					Rev 1.0	MD880 function flow diagram	H164
Word (W)-to-double-word (DW), Double-word-to-word							

Figure 7-18 H164 - Word-to-double-word, double-word-to-word

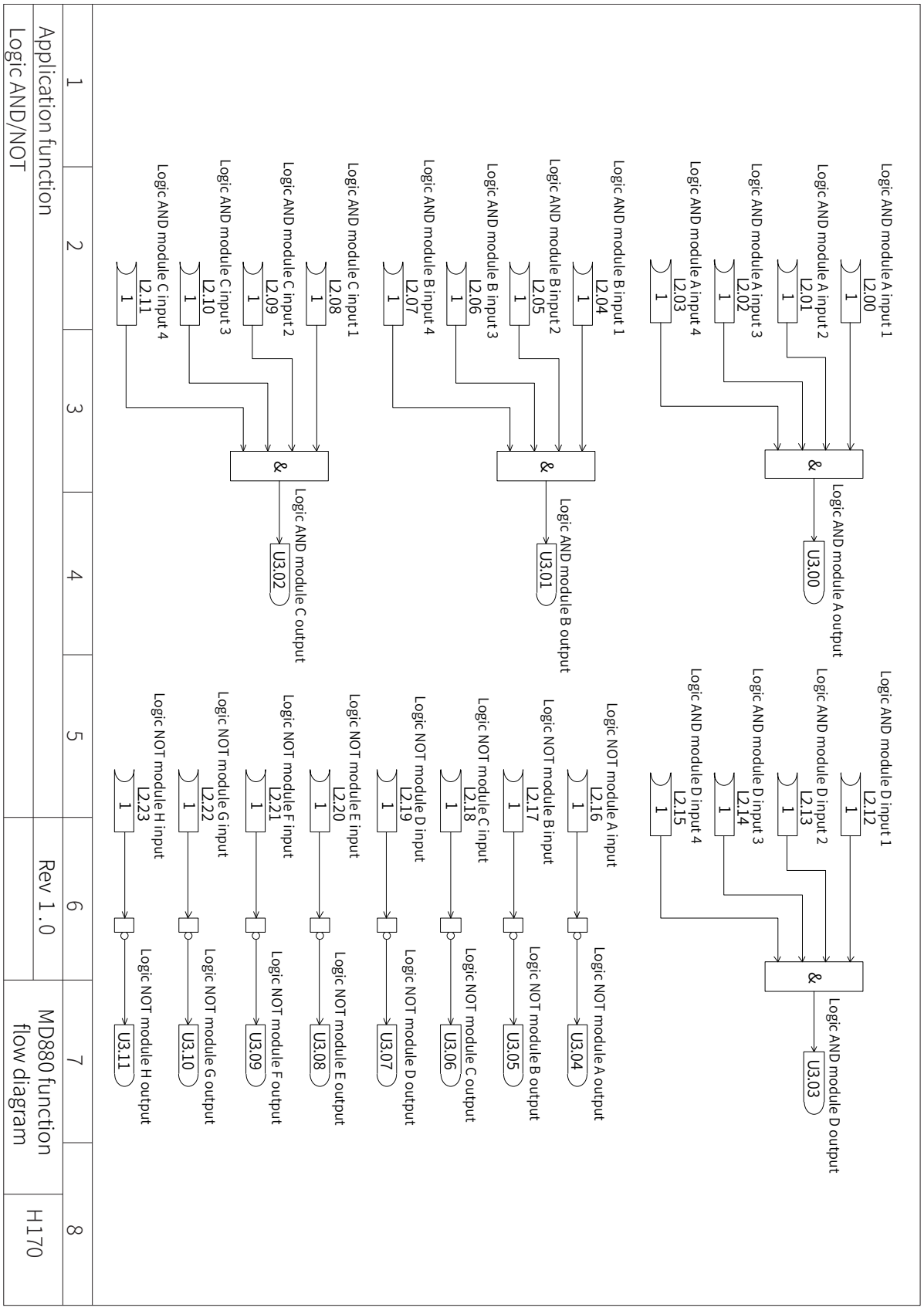


Figure 7-19 H170 - Logic AND/NOT

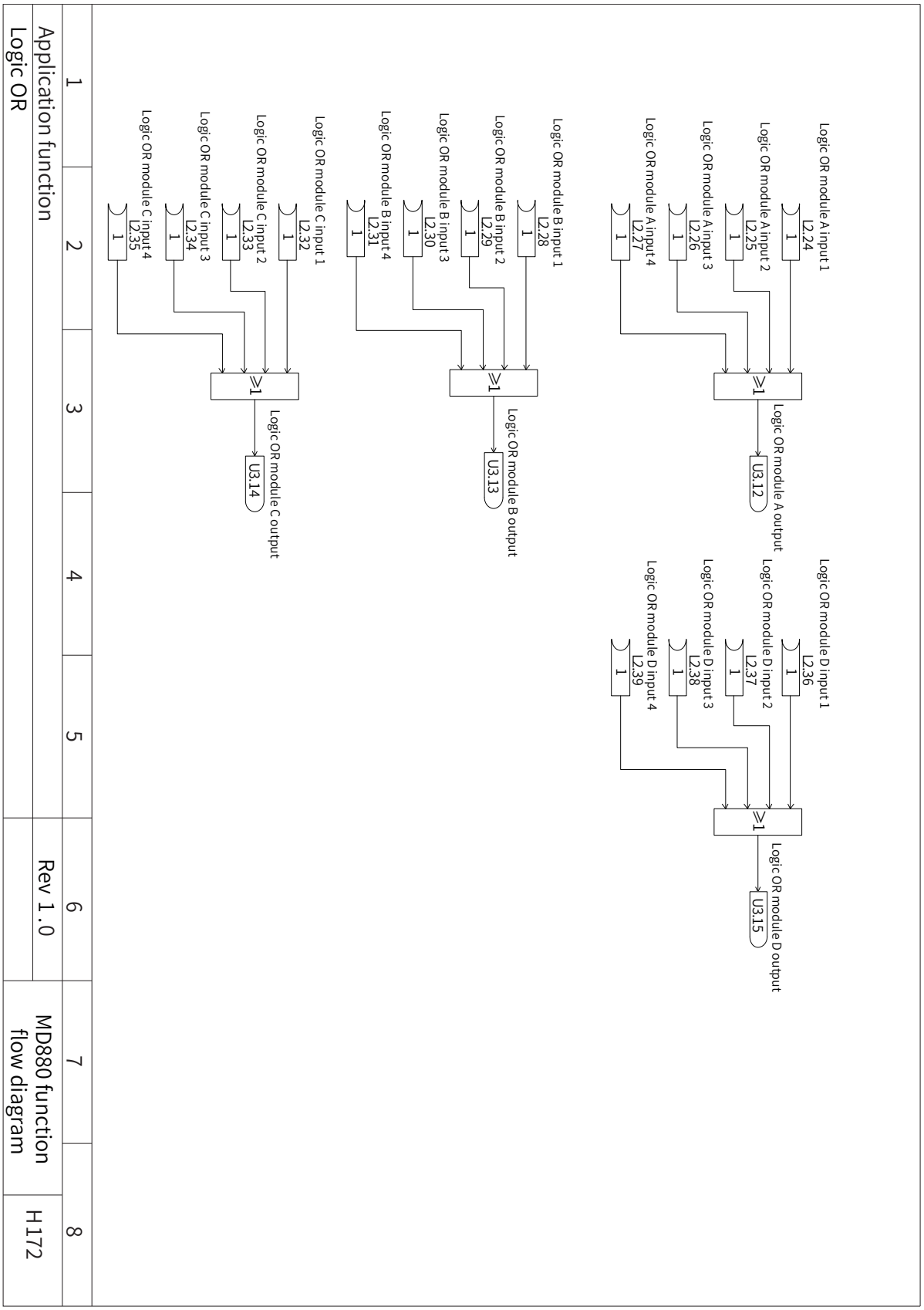
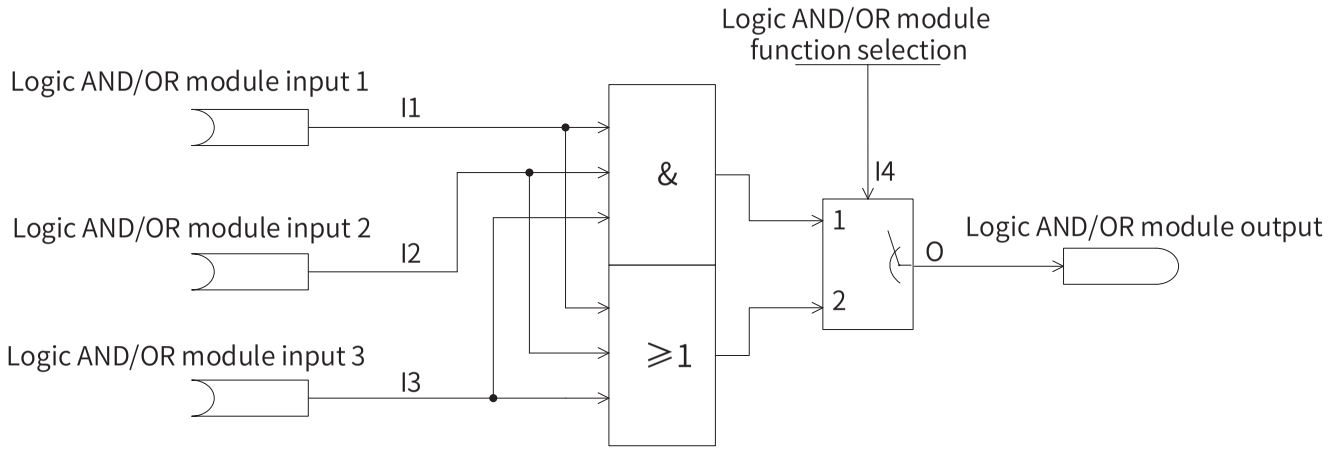


Figure 7-20 H172 - Logic OR



Logic AND/OR Module	Input				Output
	I1	I2	I3	I4	O
A	L2-61	L2-62	L2-63	L2-60	U4-92
B	L2-65	L2-66	L2-67	L2-64	U4-93
C	L2-69	L2-70	L2-71	L2-68	U4-94
D	L2-73	L2-74	L2-75	L2-72	U4-95
E	L2-77	L2-78	L2-79	L2-76	U4-96
F	L2-81	L2-82	L2-83	L2-80	U4-97
G	L2-85	L2-86	L2-87	L2-84	U4-98
H	L2-89	L2-90	L2-91	L2-88	U4-99

1	2	3	4	5	6	7	8
Application function					Rev 1 .0	MD880 function flow diagram	H173
Logic AND/OR							

Figure 7-21 H173 - Logic AND/OR

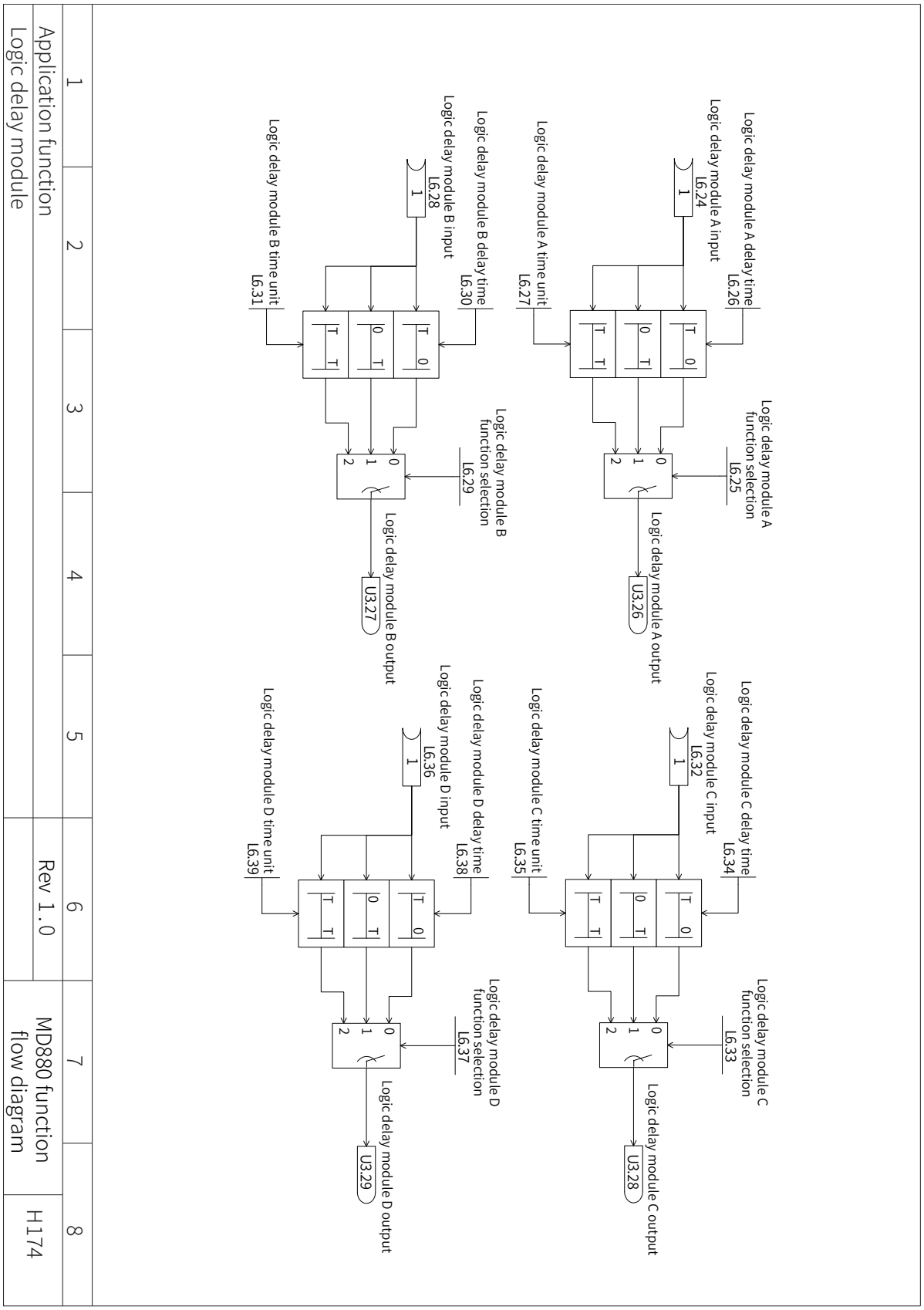


Figure 7-22 H174 - Logic delay module

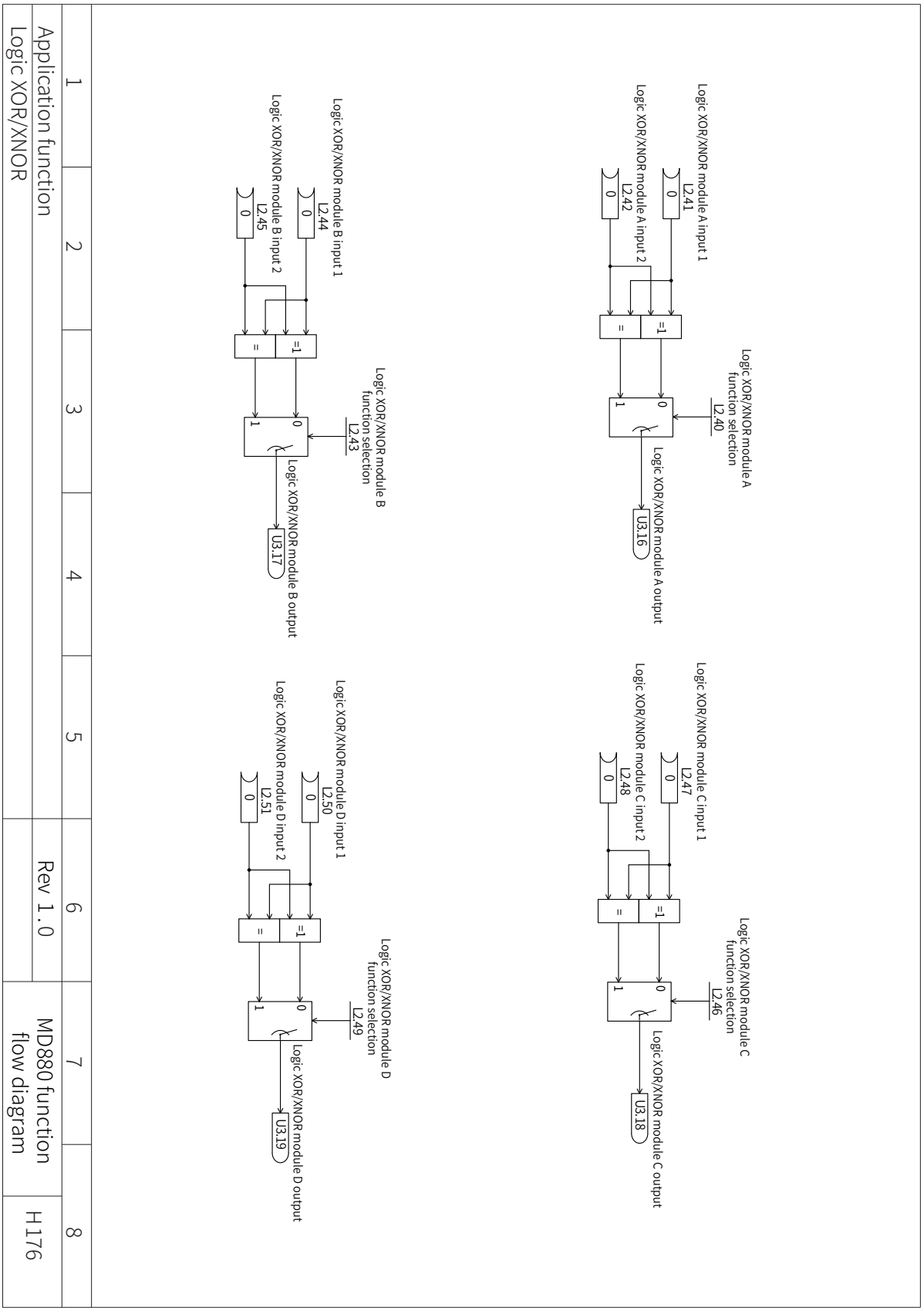
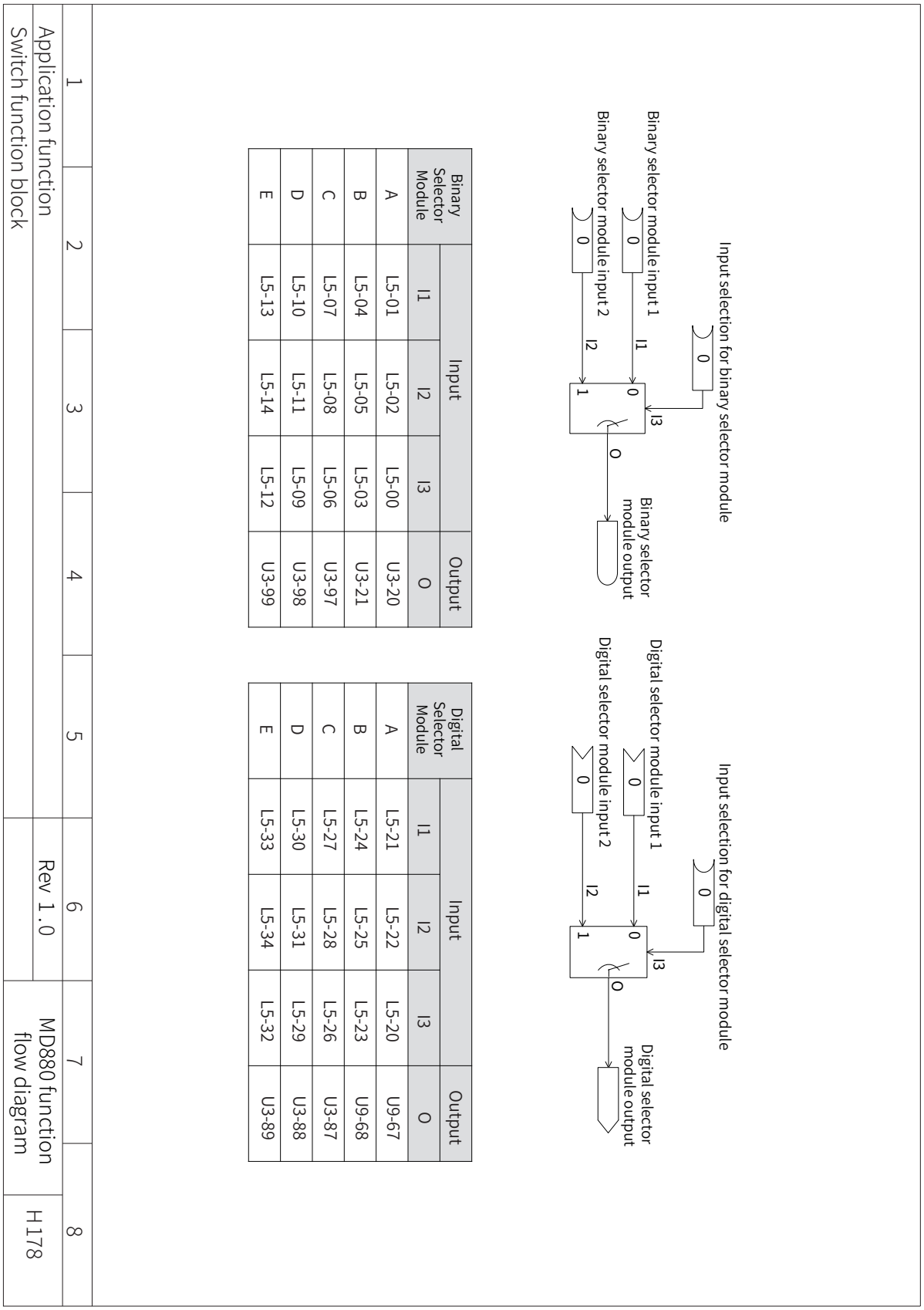


Figure 7-23 H176 - Logic XOR/XNOR



Binary Selector Module	Input			Output
	I1	I2	I3	O
A	L5-01	L5-02	L5-00	U3-20
B	L5-04	L5-05	L5-03	U3-21
C	L5-07	L5-08	L5-06	U3-97
D	L5-10	L5-11	L5-09	U3-98
E	L5-13	L5-14	L5-12	U3-99

Digital Selector Module	Input			Output
	I1	I2	I3	O
A	L5-21	L5-22	L5-20	U9-67
B	L5-24	L5-25	L5-23	U9-68
C	L5-27	L5-28	L5-26	U3-87
D	L5-30	L5-31	L5-29	U3-88
E	L5-33	L5-34	L5-32	U3-89

1	2	3	4	5	6	7	8
Application function					Rev 1.0	MD880 function flow diagram	H178
Switch function block							

Figure 7-24 H178 - Switch function block

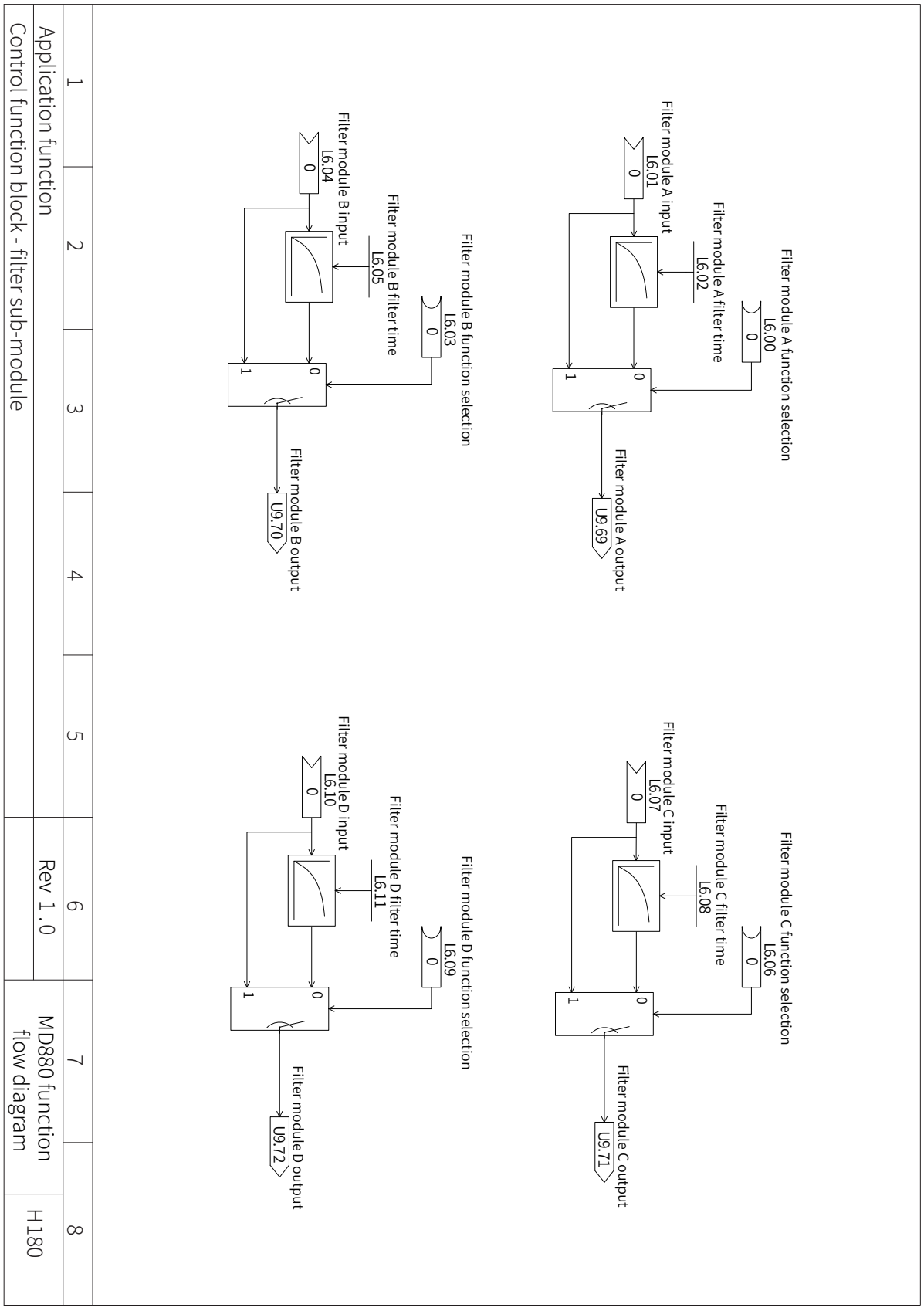


Figure 7-25 H180 - Control function module - filter sub-module

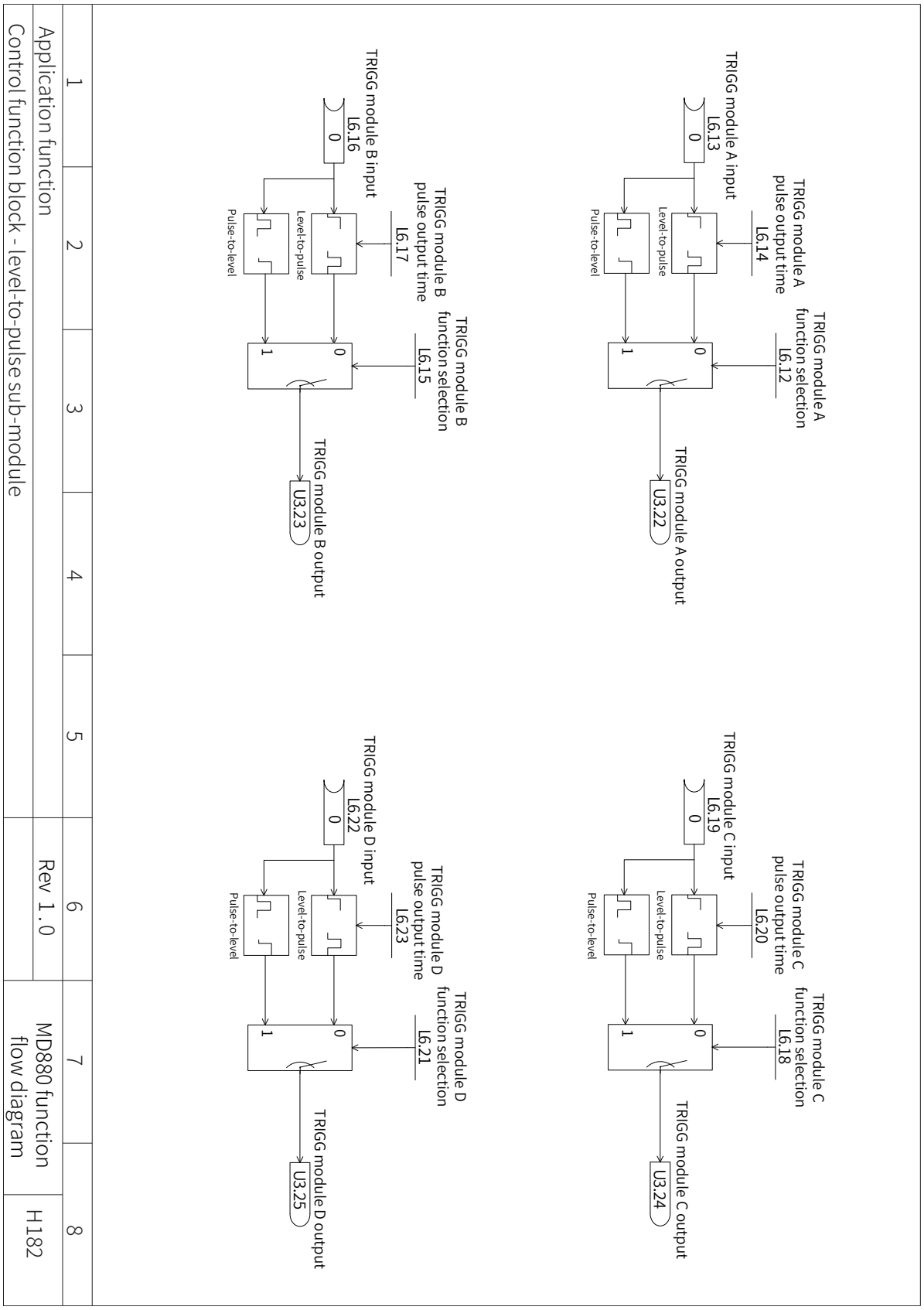


Figure 7-26 H182 - Control function block - level-to-pulse sub-module

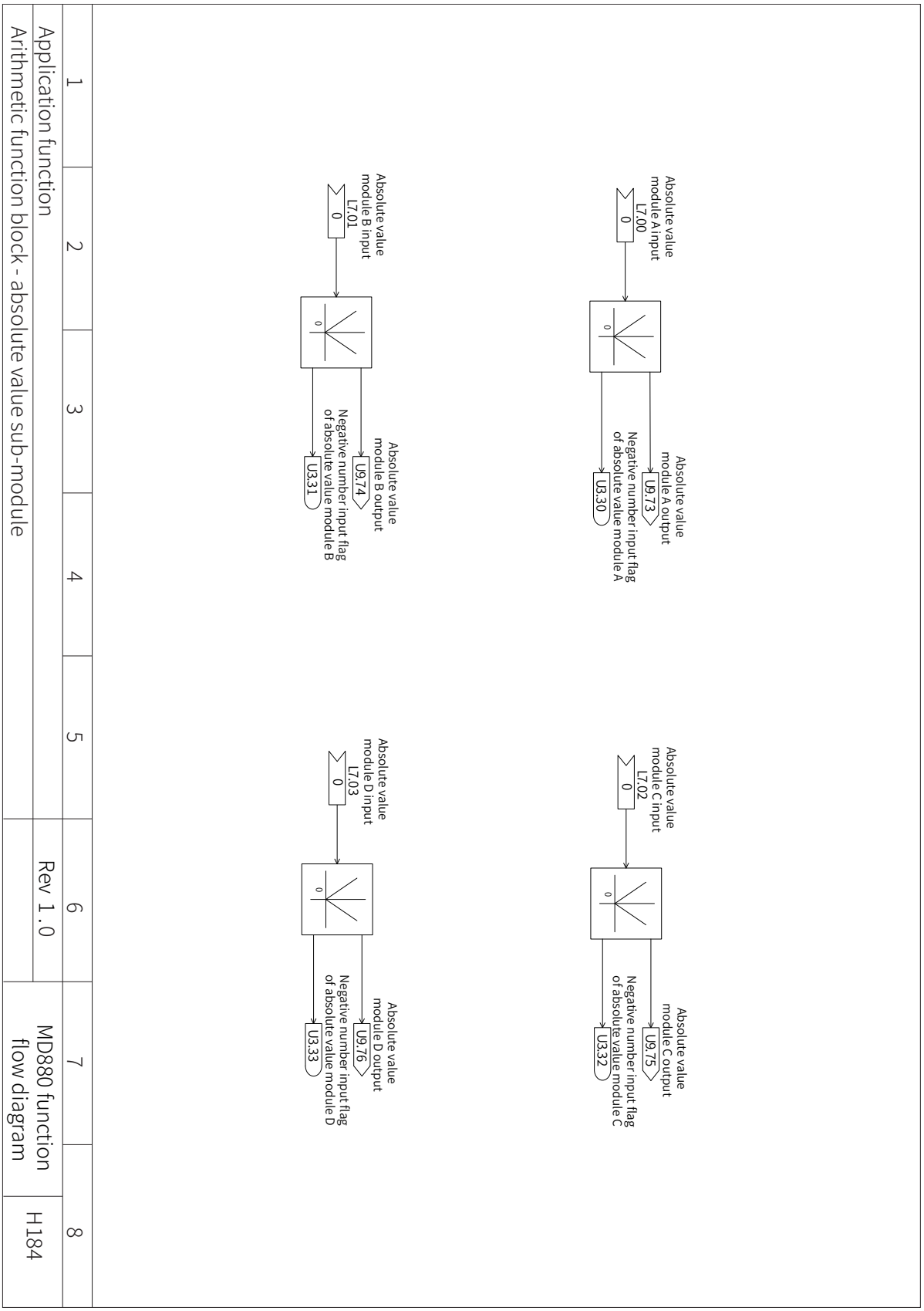


Figure 7-27 H184 - Arithmetic function block - absolute value sub-module

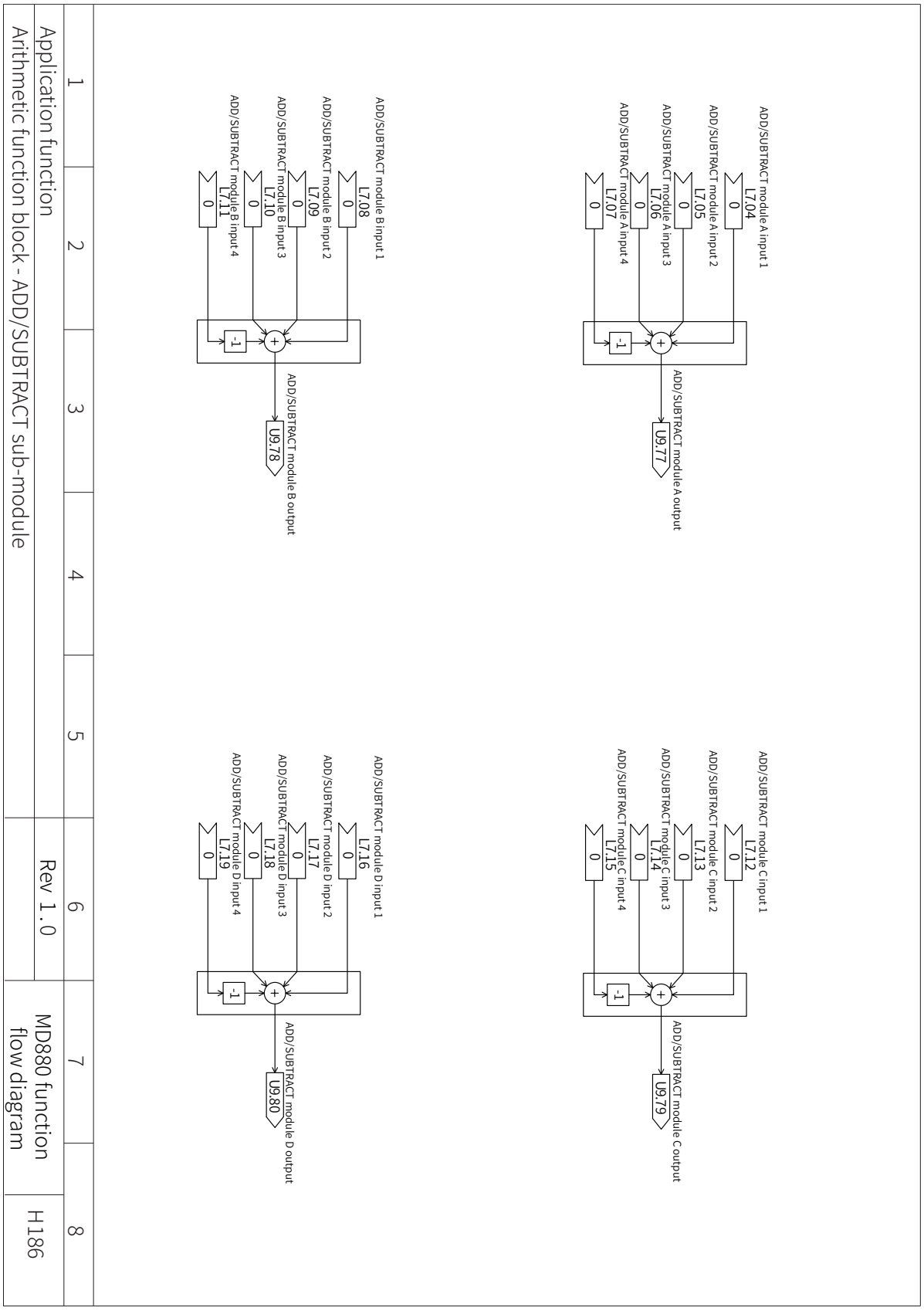


Figure 7-28 H186 - Arithmetic function block - ADD/SUBTRACT sub-module

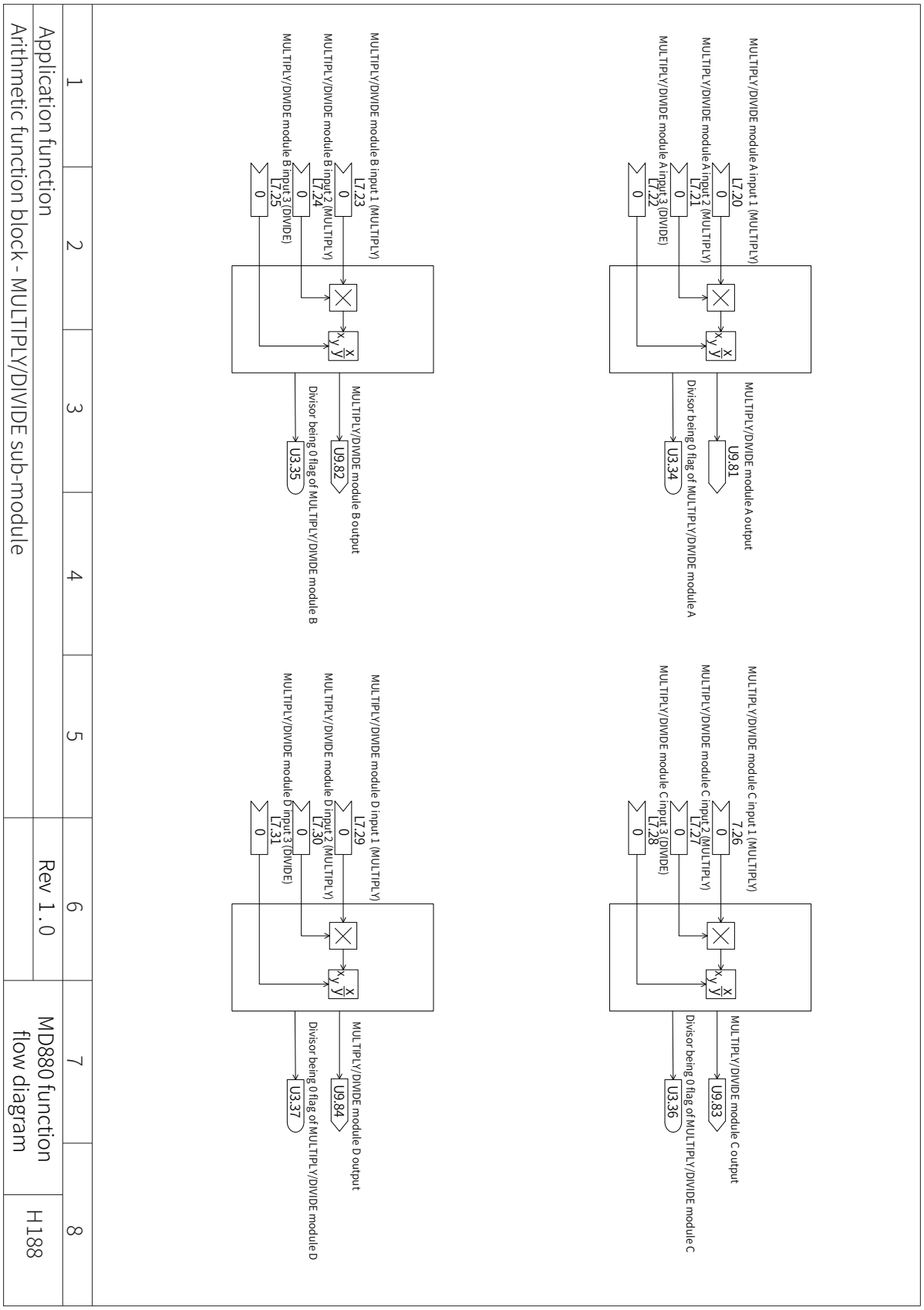


Figure 7-29 H188 - Arithmetic function block - MULTIPLY/DIVIDE sub-module

Comparison module	Input				Output
	I1	I2	I3	I4	O
A	L7-33	L7-34	L7-35	L7-32	U3-38
B	L7-37	L7-38	L7-39	L7-36	U3-39
C	L7-41	L7-42	L7-43	L7-40	U4-69
D	L7-45	L7-46	L7-47	L7-44	U4-70
E	L7-49	L7-50	L7-51	L7-48	U4-71

Note:
The symbol ">" represents input 1 > input 2.
The symbol "<" represents input 1 < input 2.
The symbol "=" represents input 1 = input 2.

1	2	3	4	5	6	7	8
Application function					Rev 1.0	MD880 function flow diagram	H190
Arithmetic function block - comparison sub-module							

Figure 7-30 H190 - Arithmetic function block - comparison sub-module

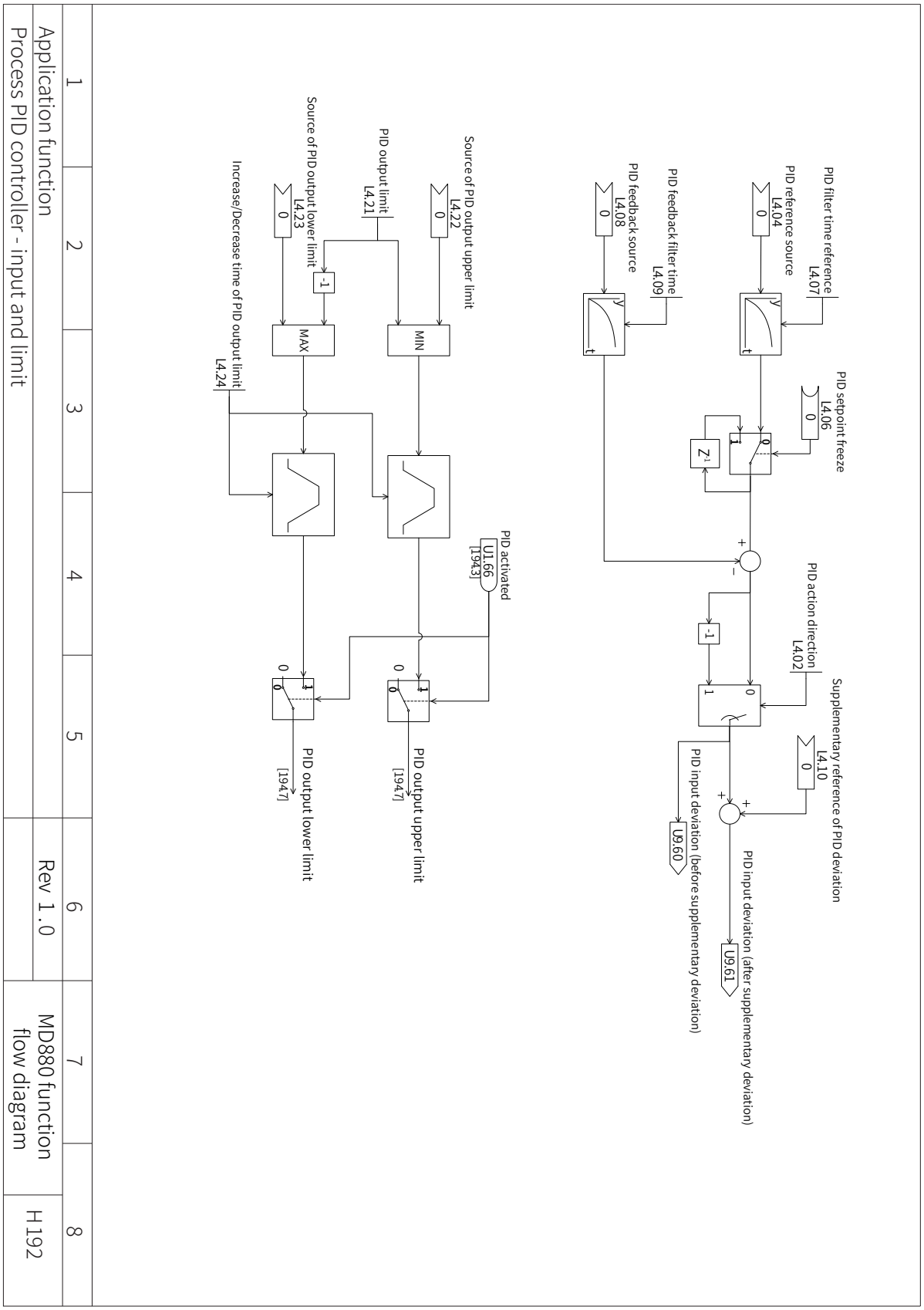


Figure 7-31 H192 - Process PID controller - input and limit

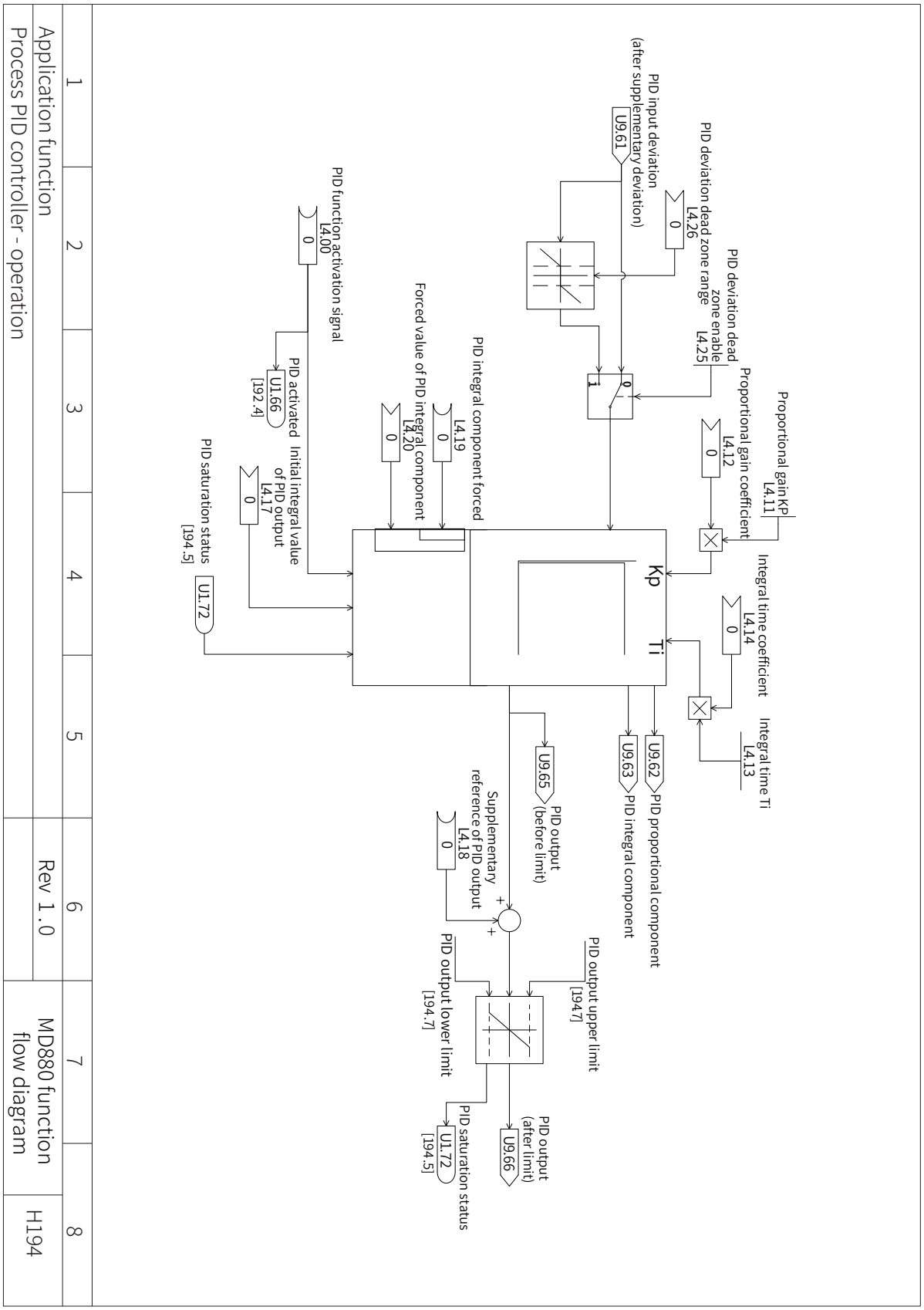


Figure 7-32 H194 - Process PID controller - operation

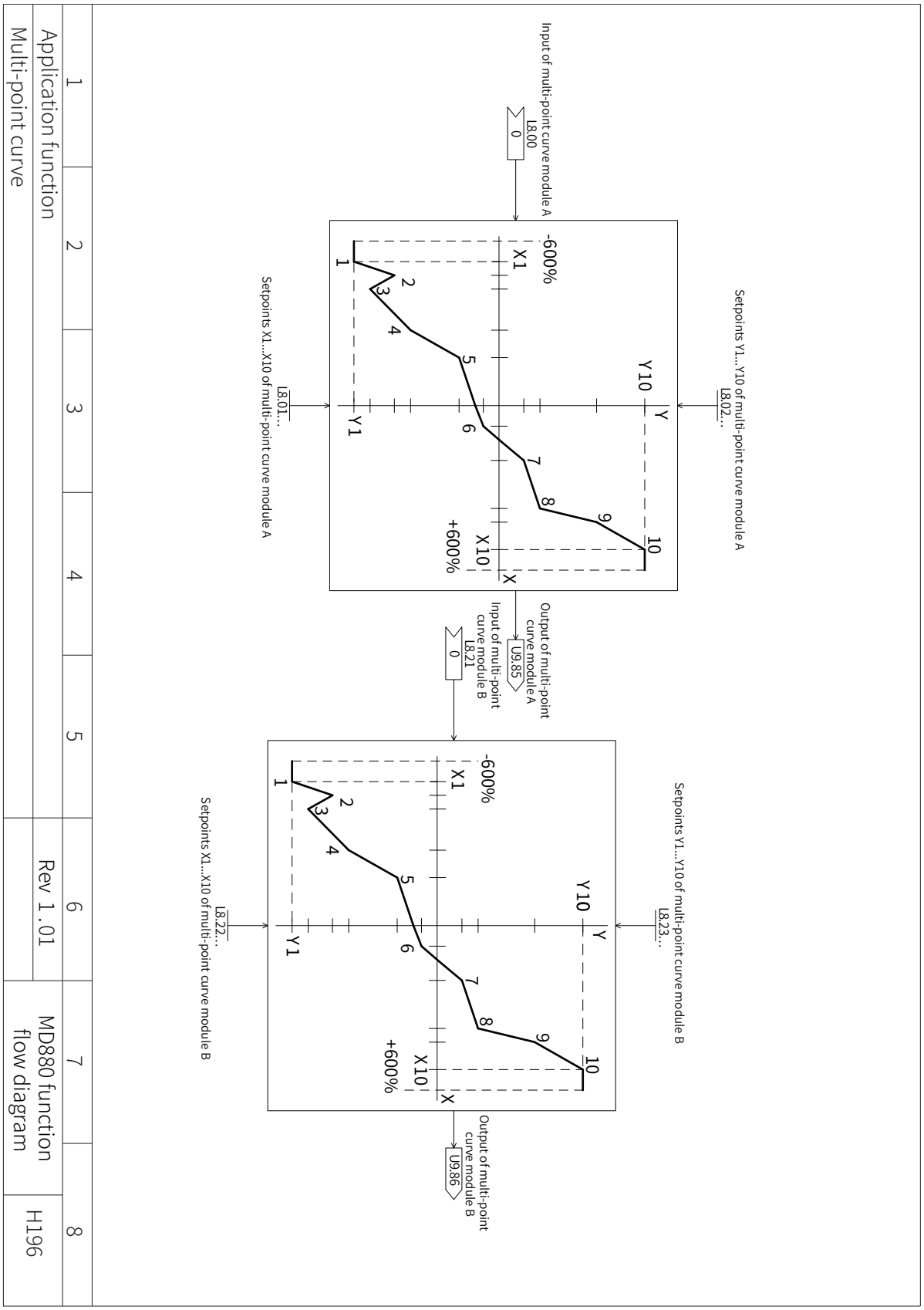


Figure 7-33 H196 - Multi-point curve

7.2.5 Command and setting

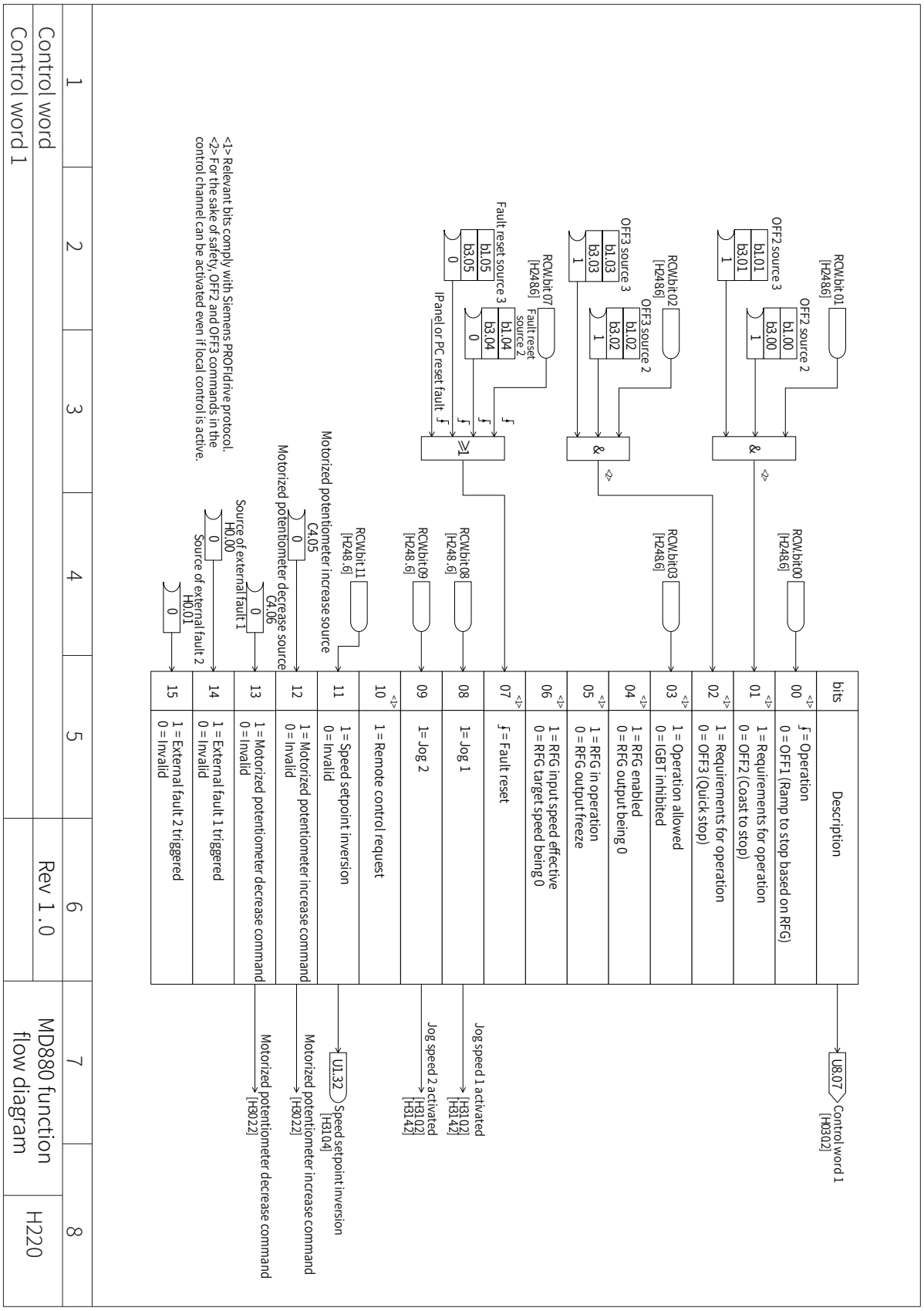


Figure 7-34 H220 - Control word 1

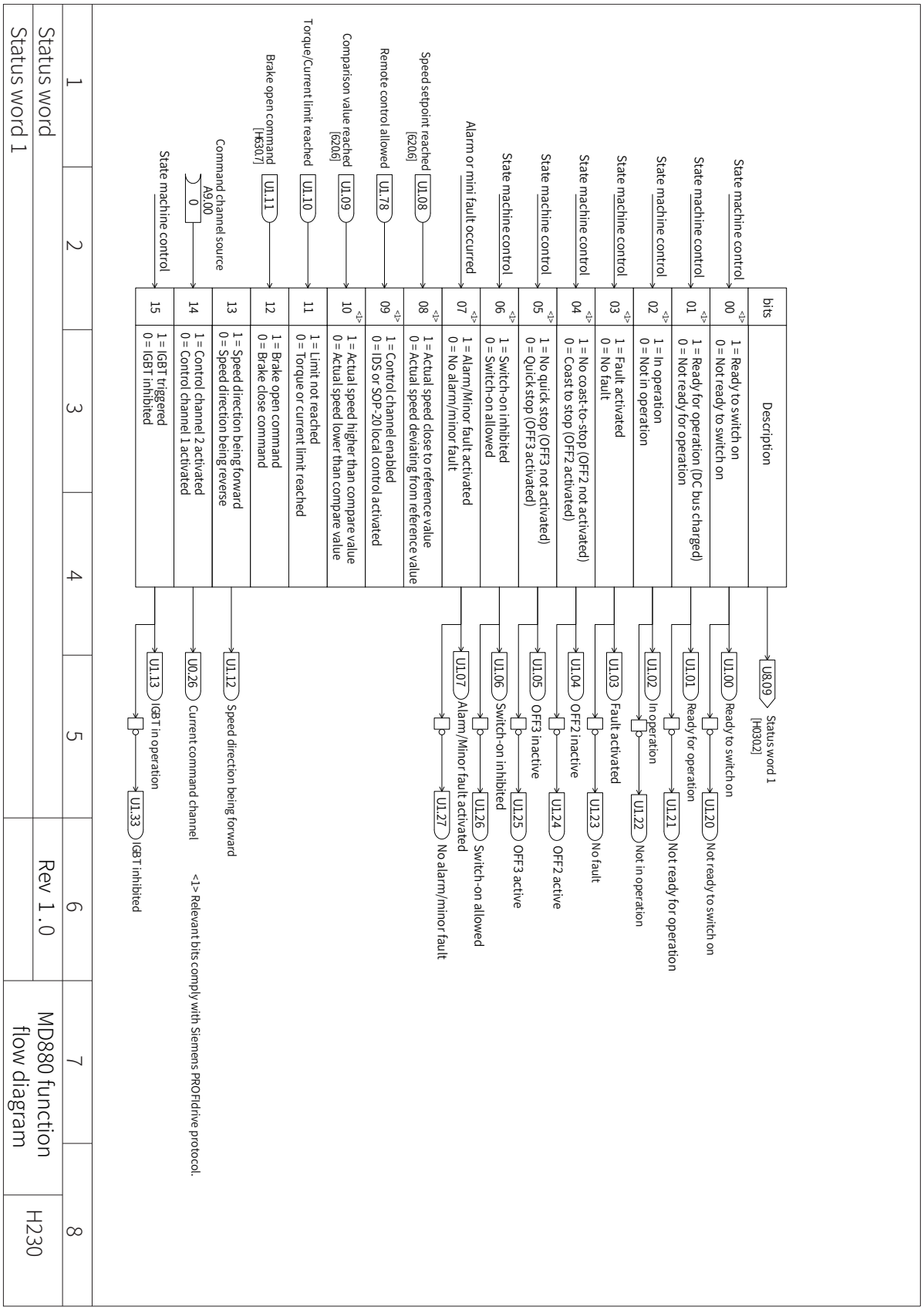


Figure 7-35 H230 - Status word 1

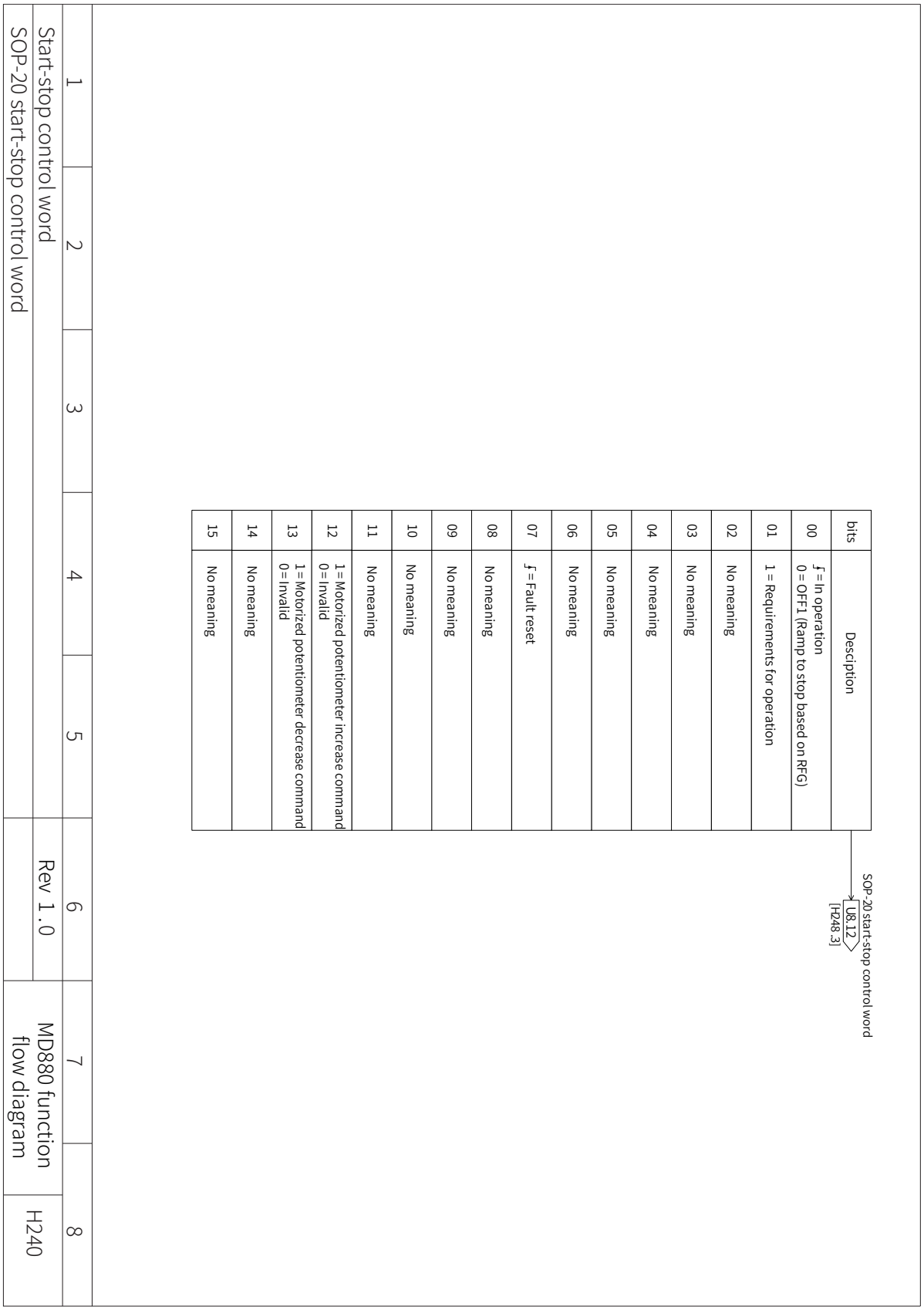


Figure 7-36 H240-SOP-20 start-stop control word

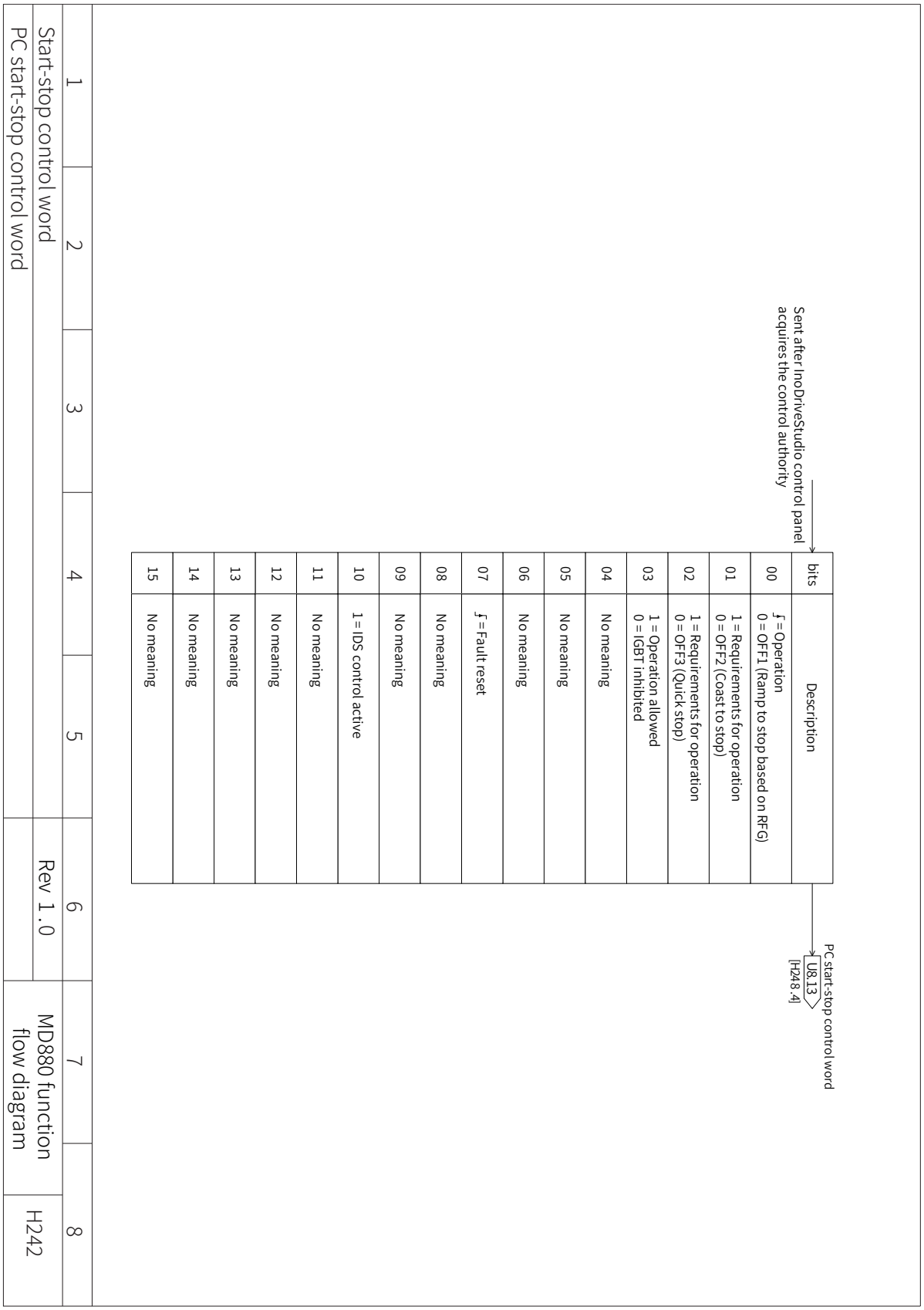


Figure 7-37 H242 - PC start-stop control word

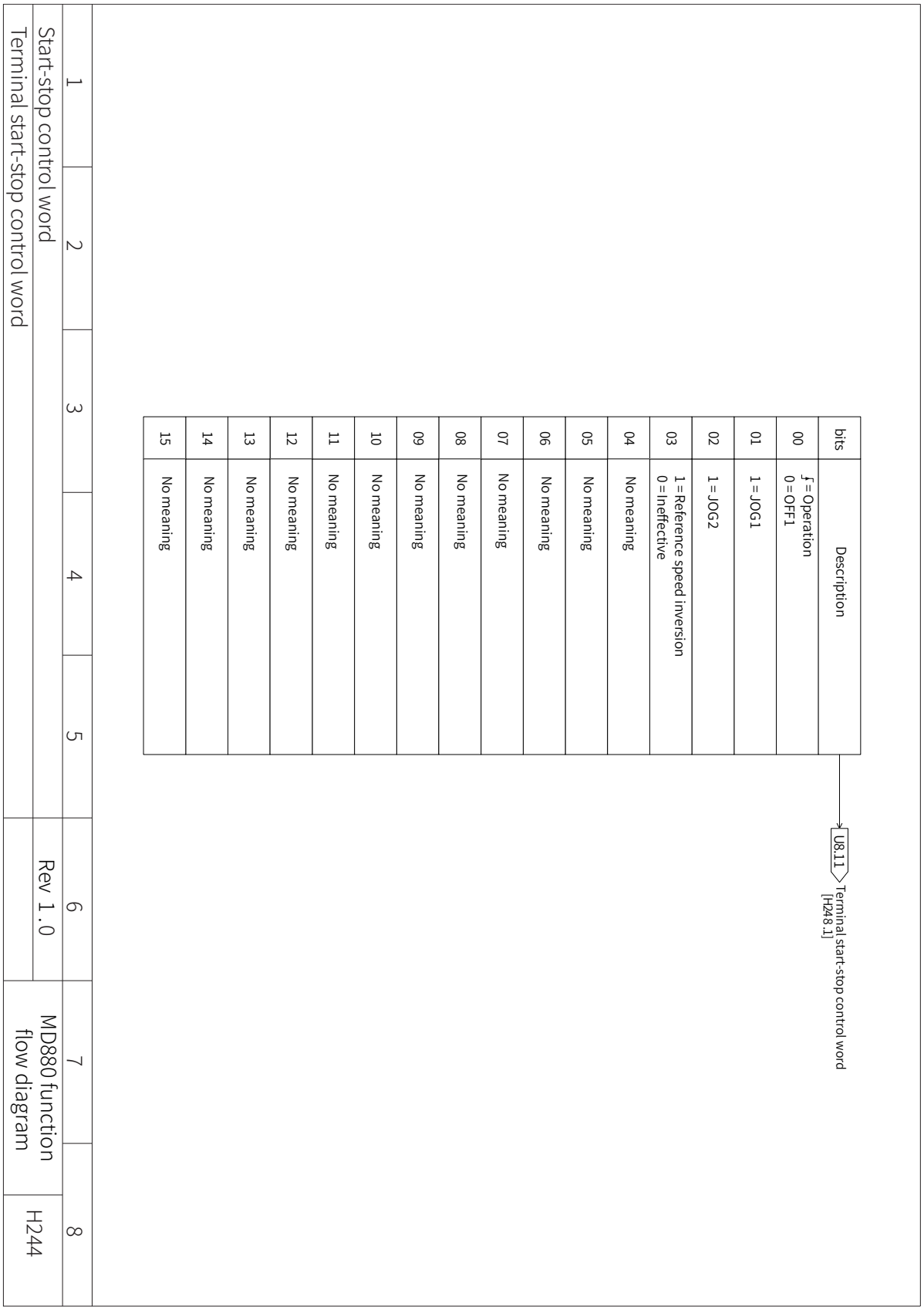


Figure 7-38 H244 - Terminal start-stop control word

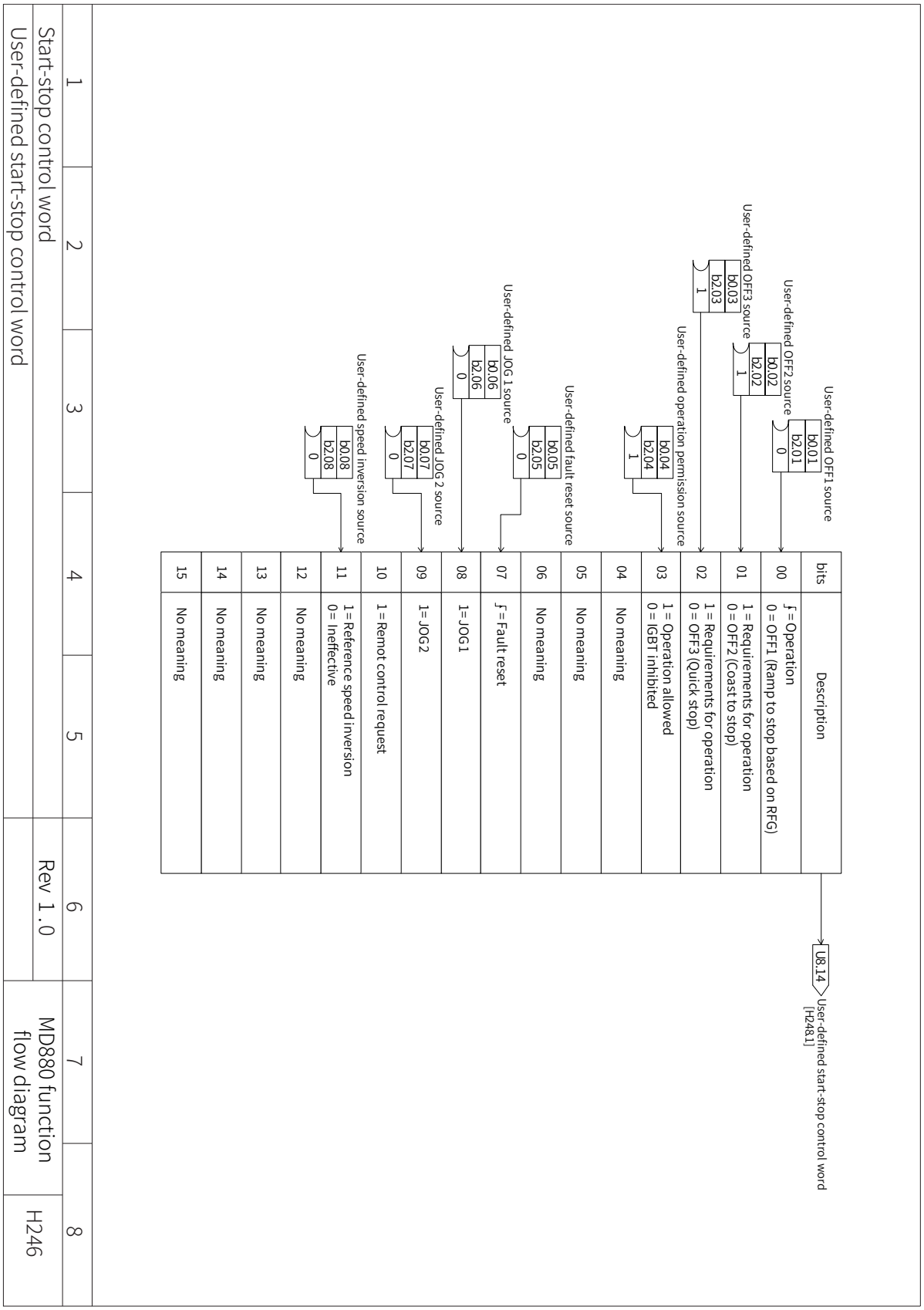


Figure 7-39 H246 - User-defined start-stop control word

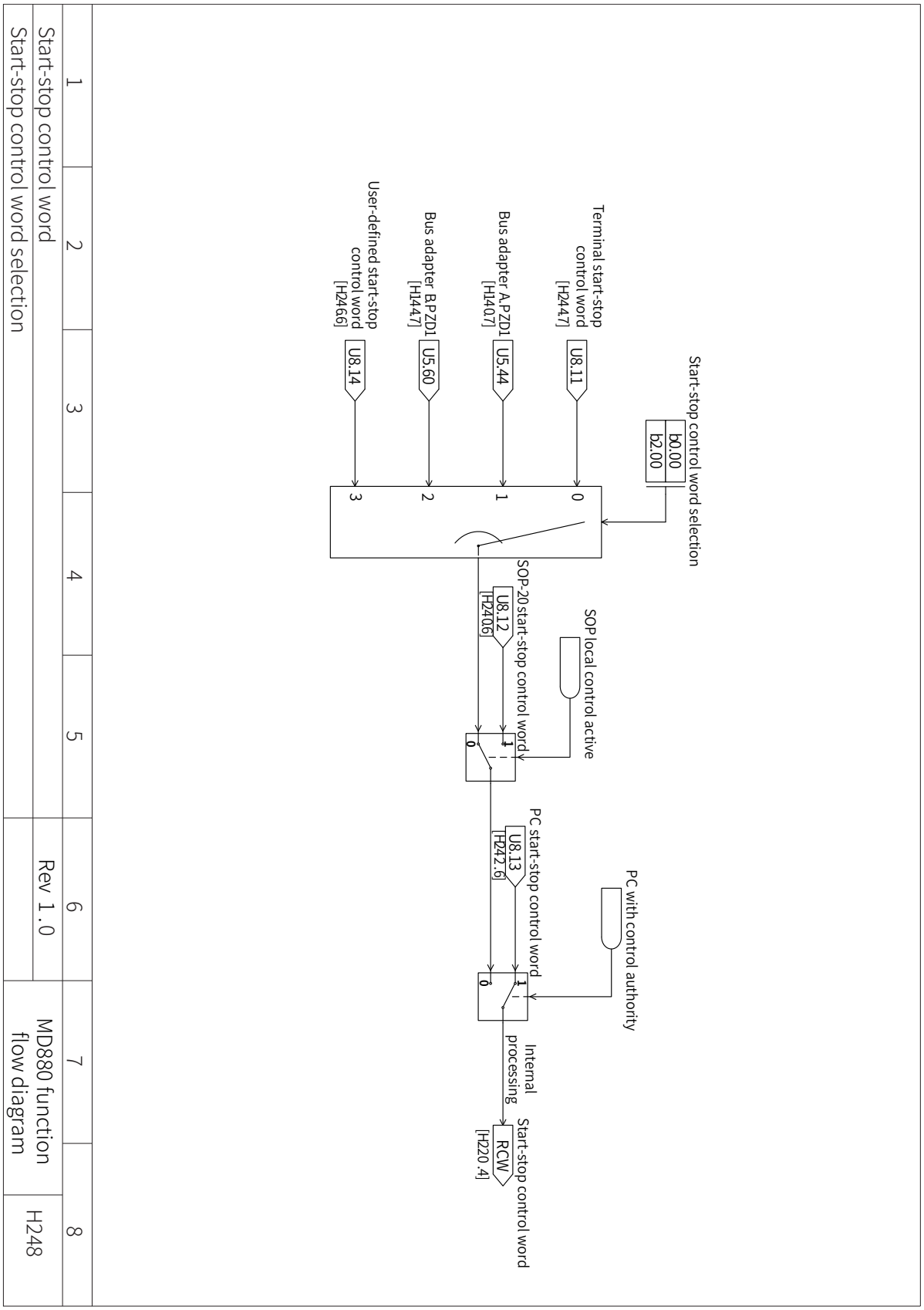


Figure 7-40 H248 - Start-stop control word selection

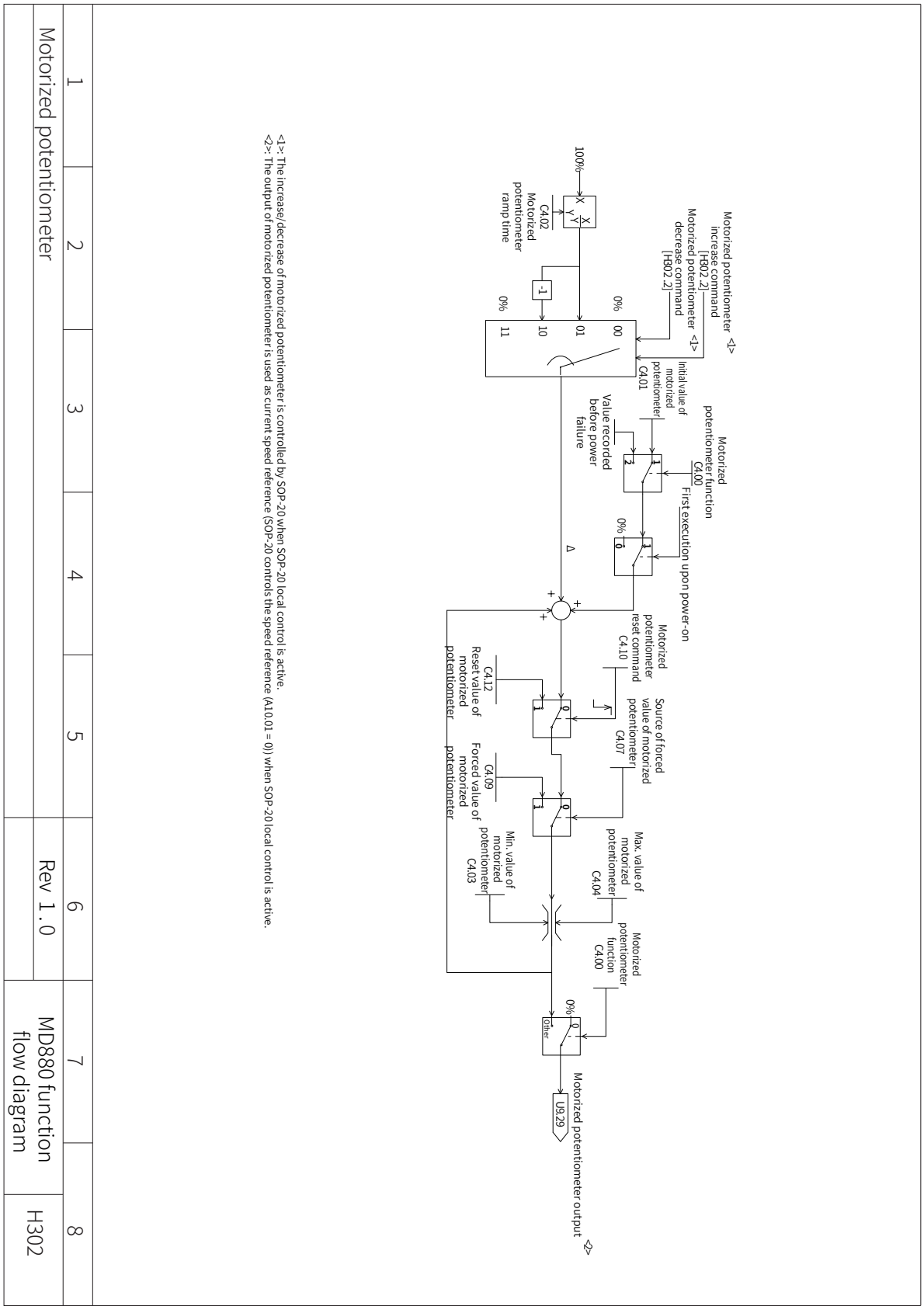


Figure 7-41 H302 - Motorized potentiometer

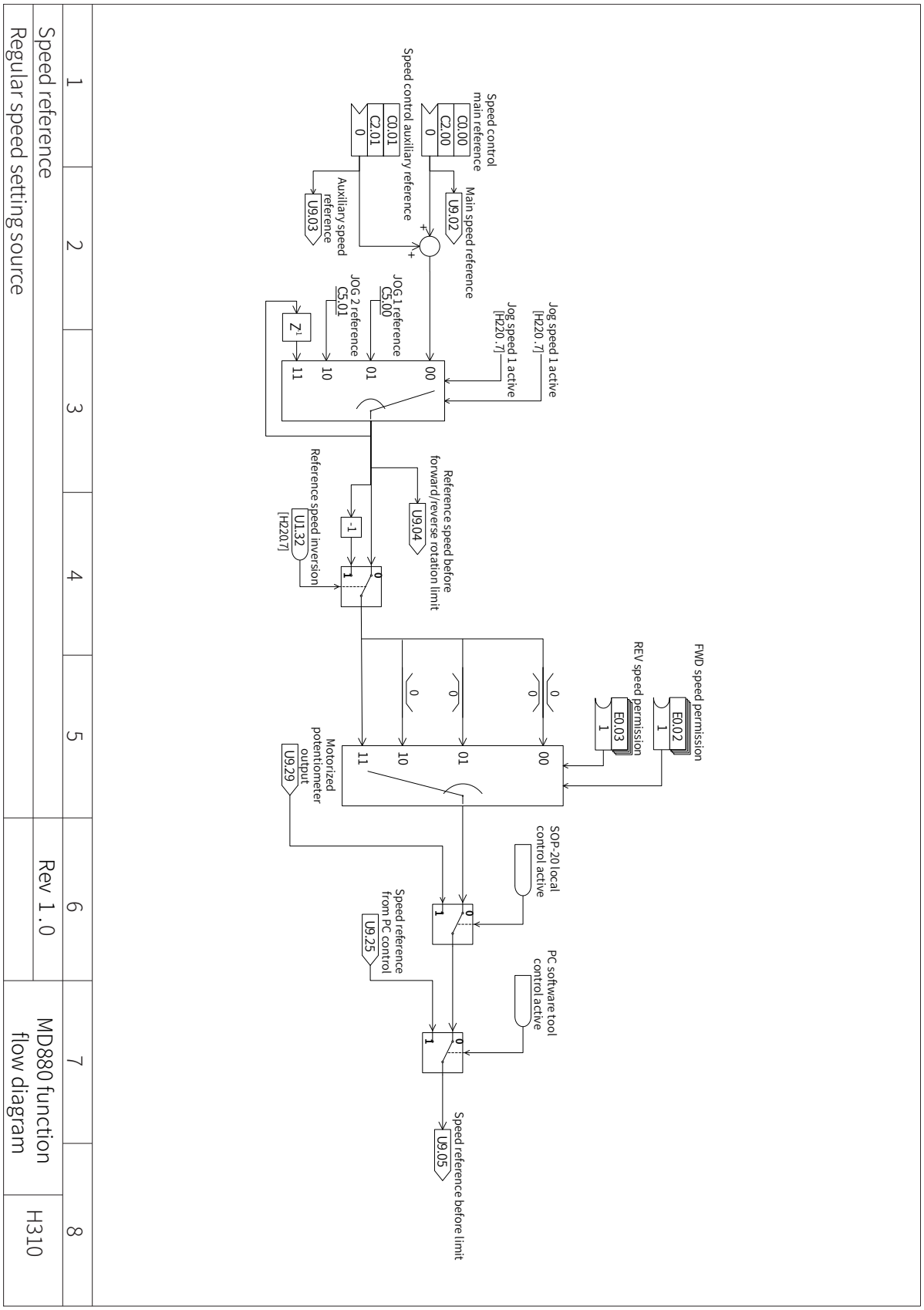


Figure 7-42 H310 - Regular speed setting source

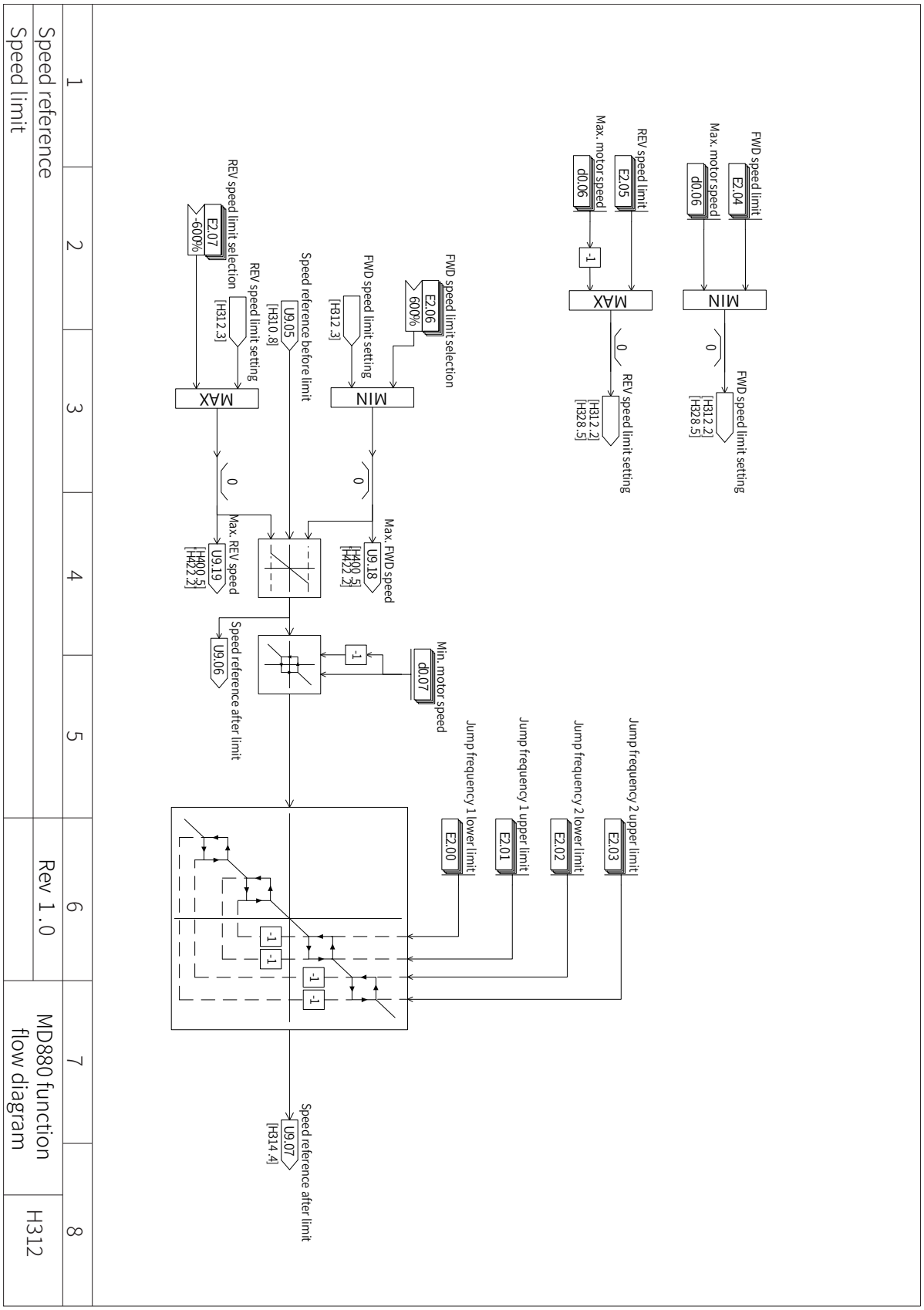


Figure 7-43 H312 - Speed limit

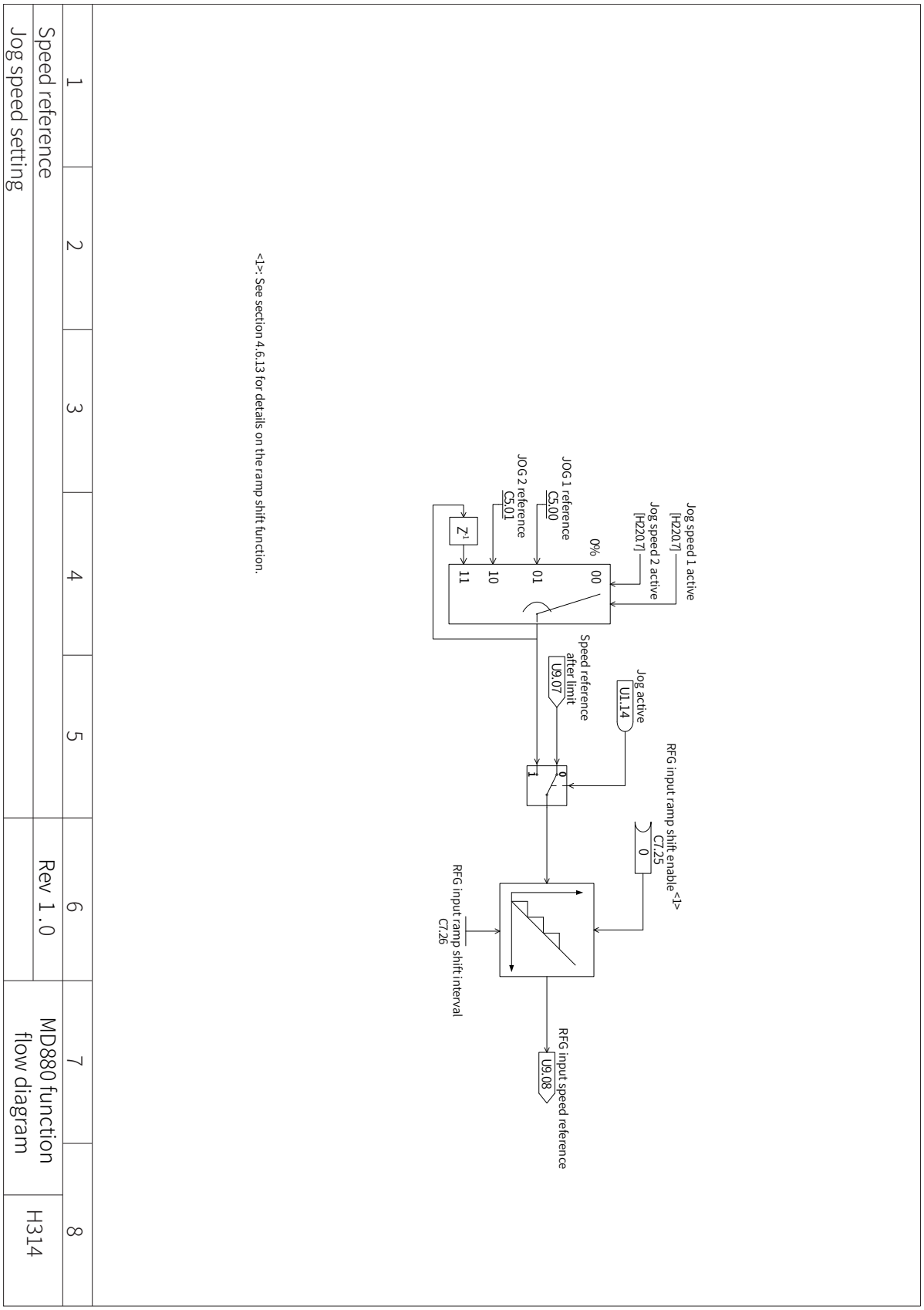
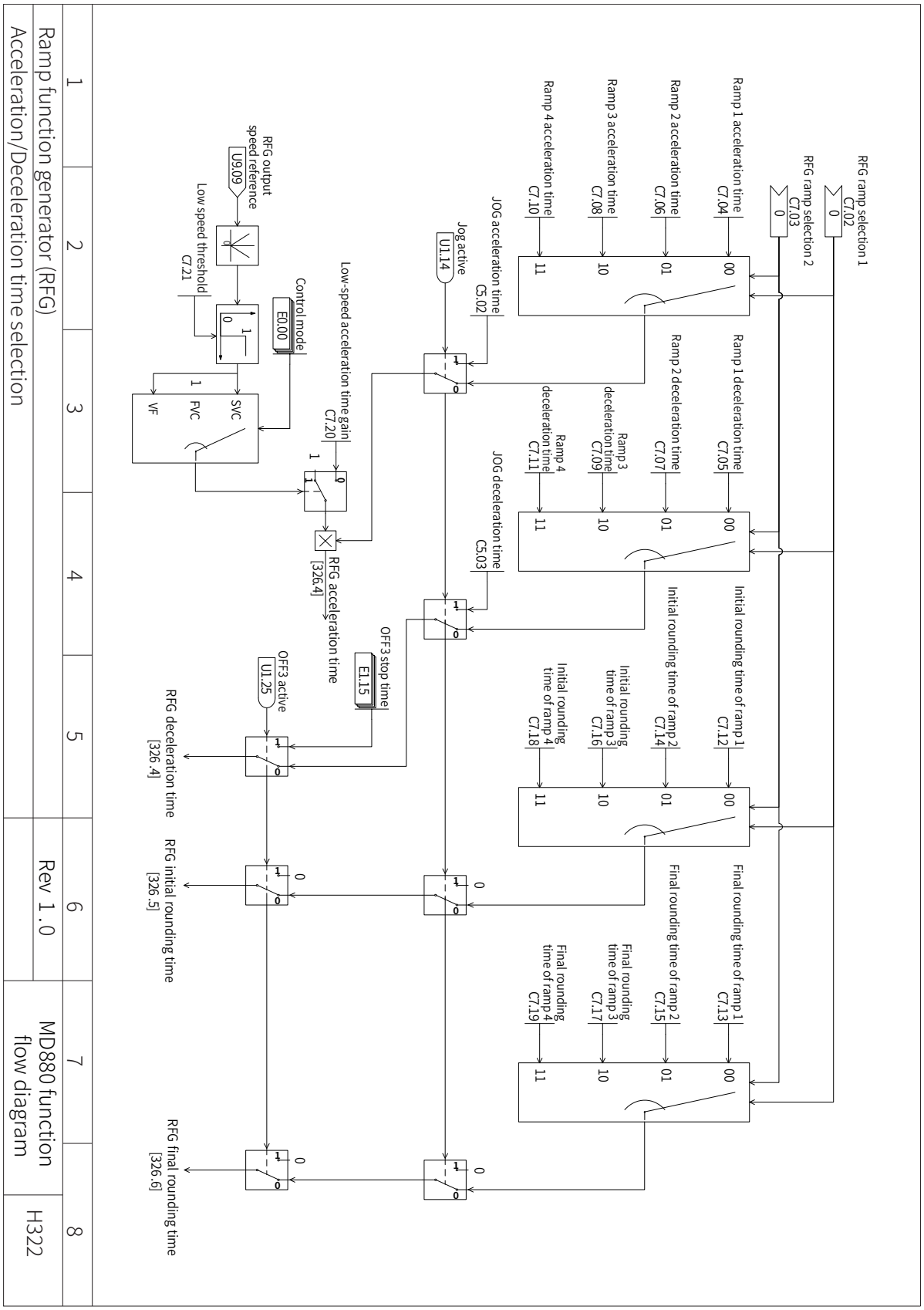


Figure 7-44 H314 - Jog speed setting



1	2	3	4	5	6	7	8
Ramp function generator (RFG)					Rev 1.0	MD880 function flow diagram	H322
Acceleration/Deceleration time selection							

Figure 7-45 H322 - Acceleration/Deceleration time selection

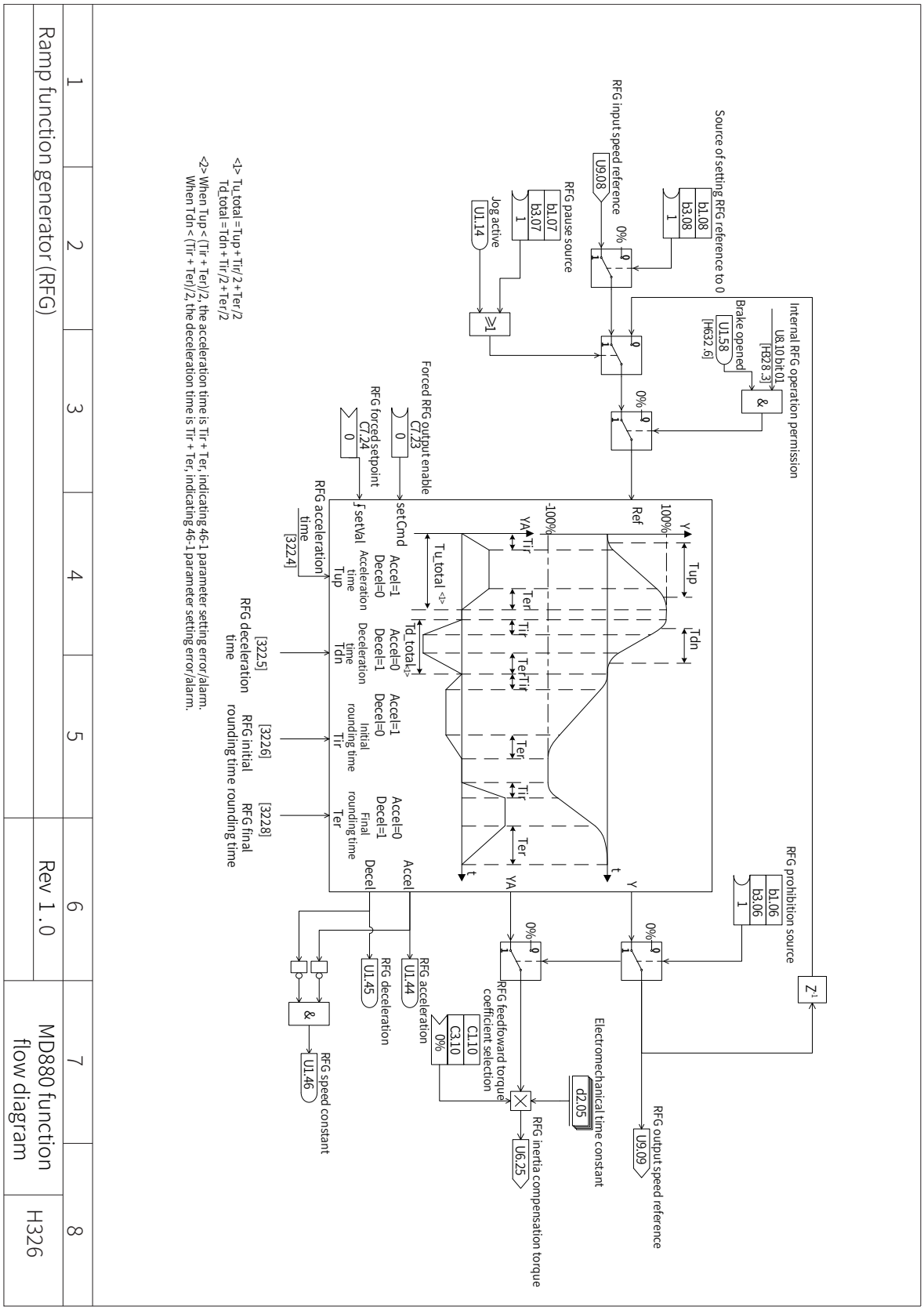


Figure 7-46 H326 - Ramp function generator

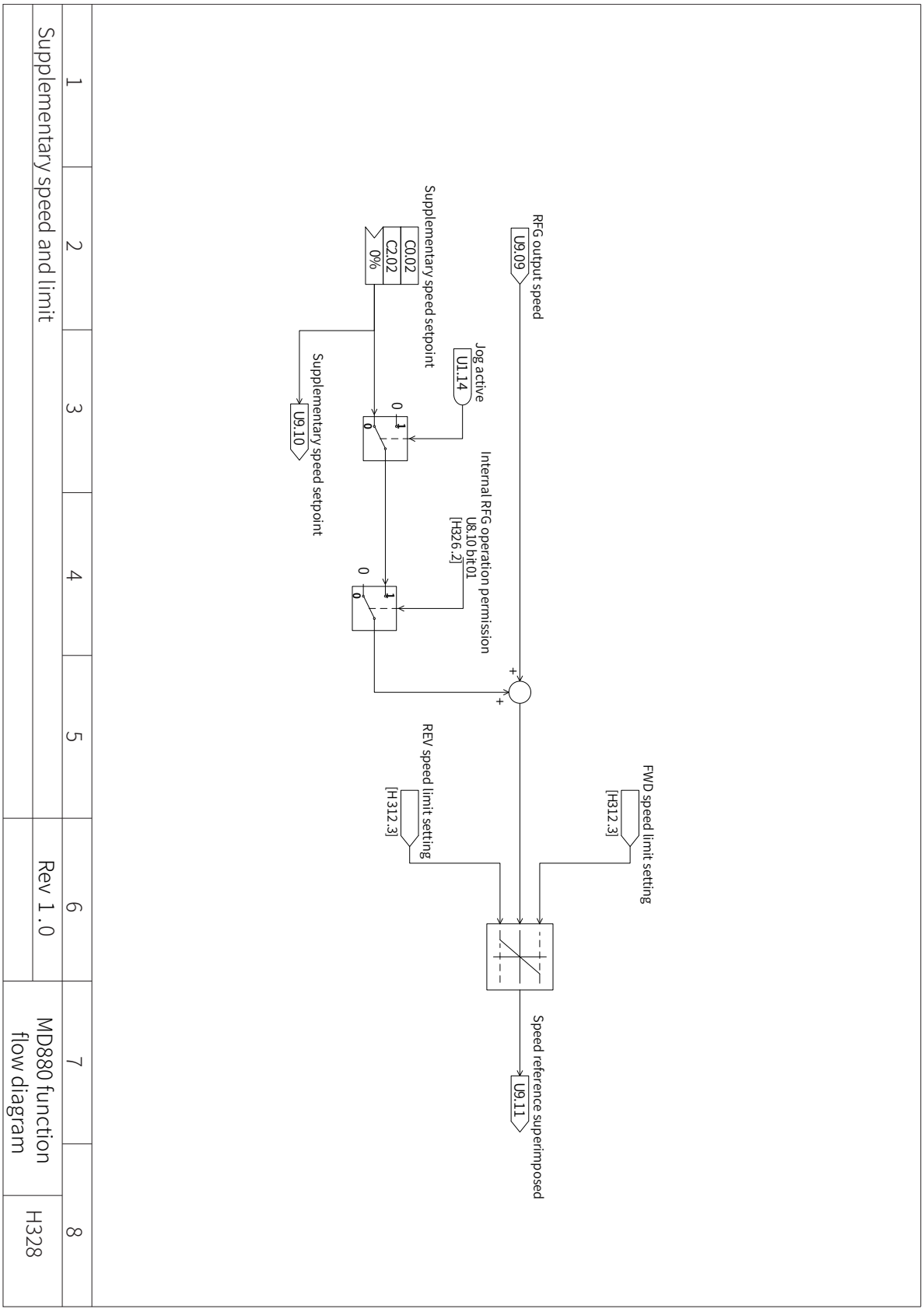


Figure 7-47 H328 - Supplementary speed and limit

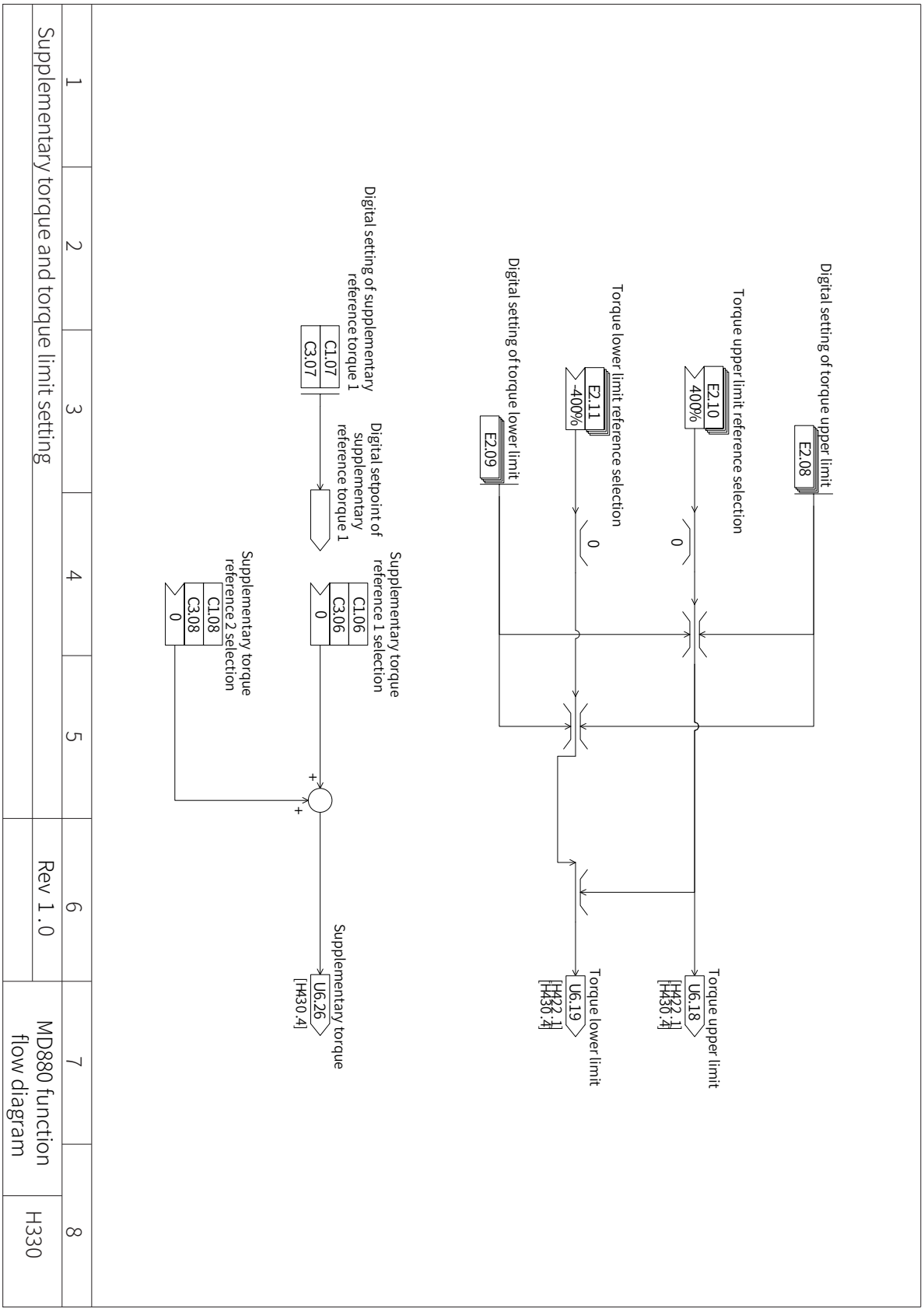


Figure 7-48 H330 - Supplementary torque and torque limit setting

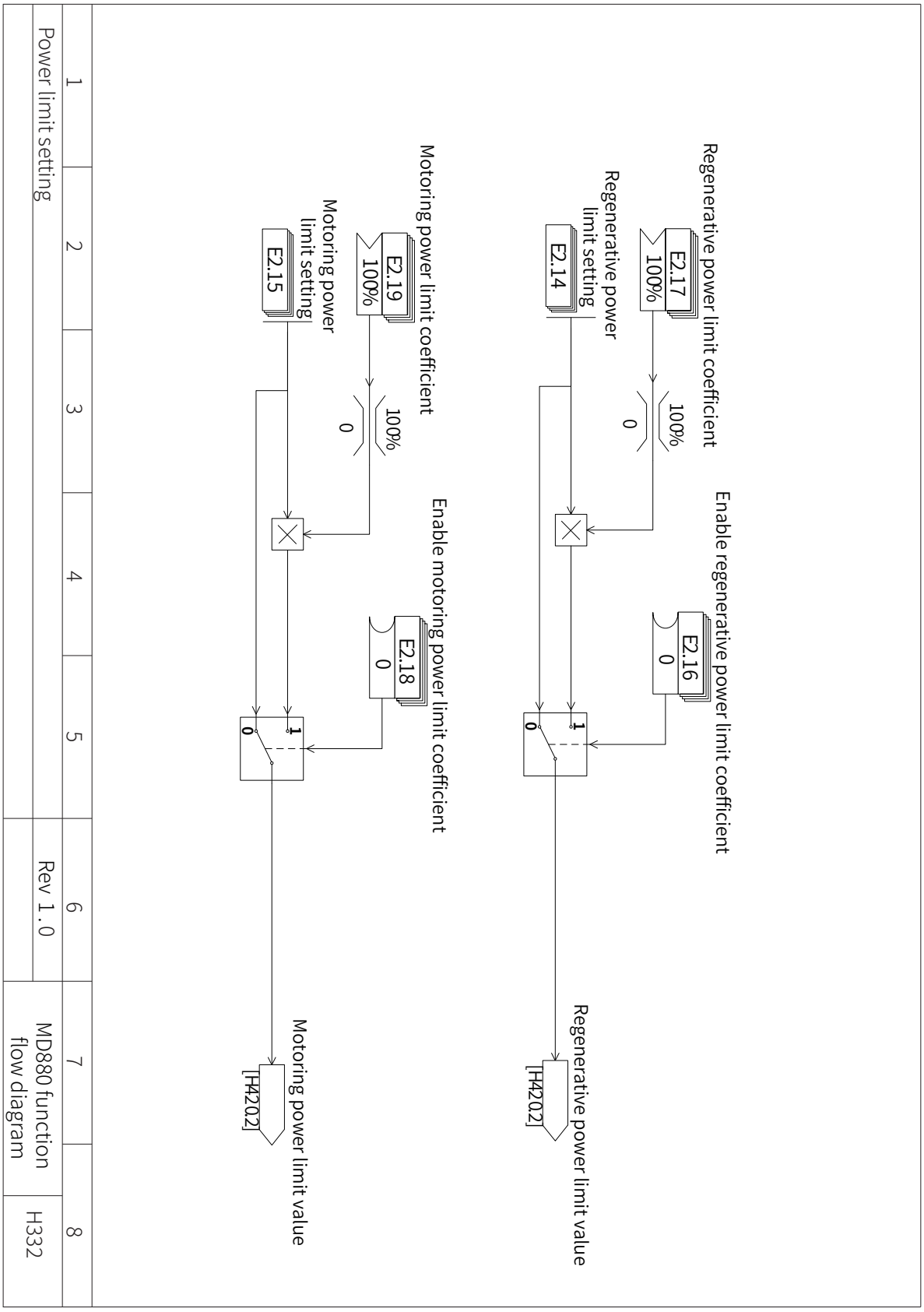


Figure 7-49 H332 - Power limit setting

7.2.6 Vector Control

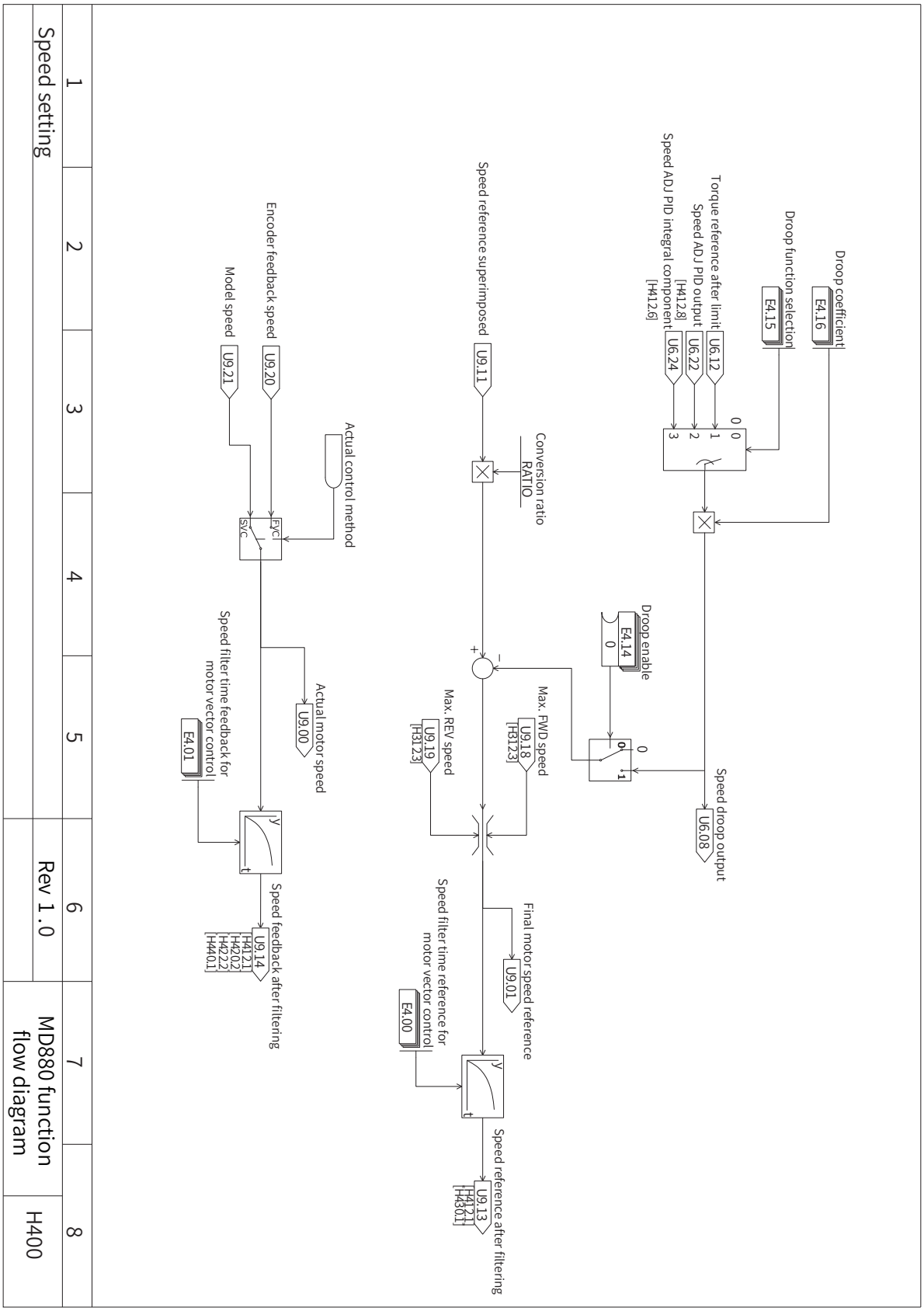


Figure 7-50 H400 - Speed setting

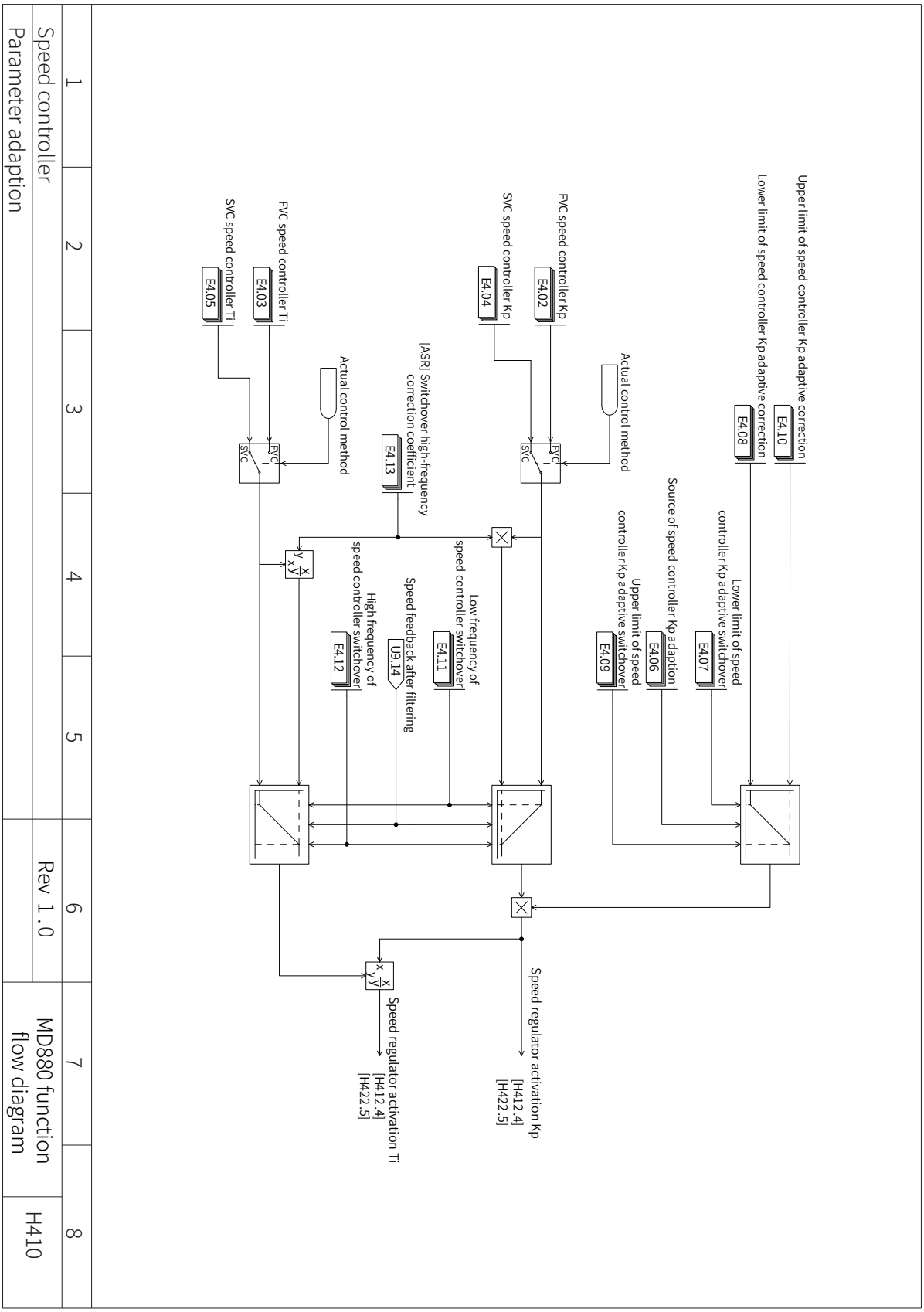


Figure 7-51 H410 - Parameter adaption

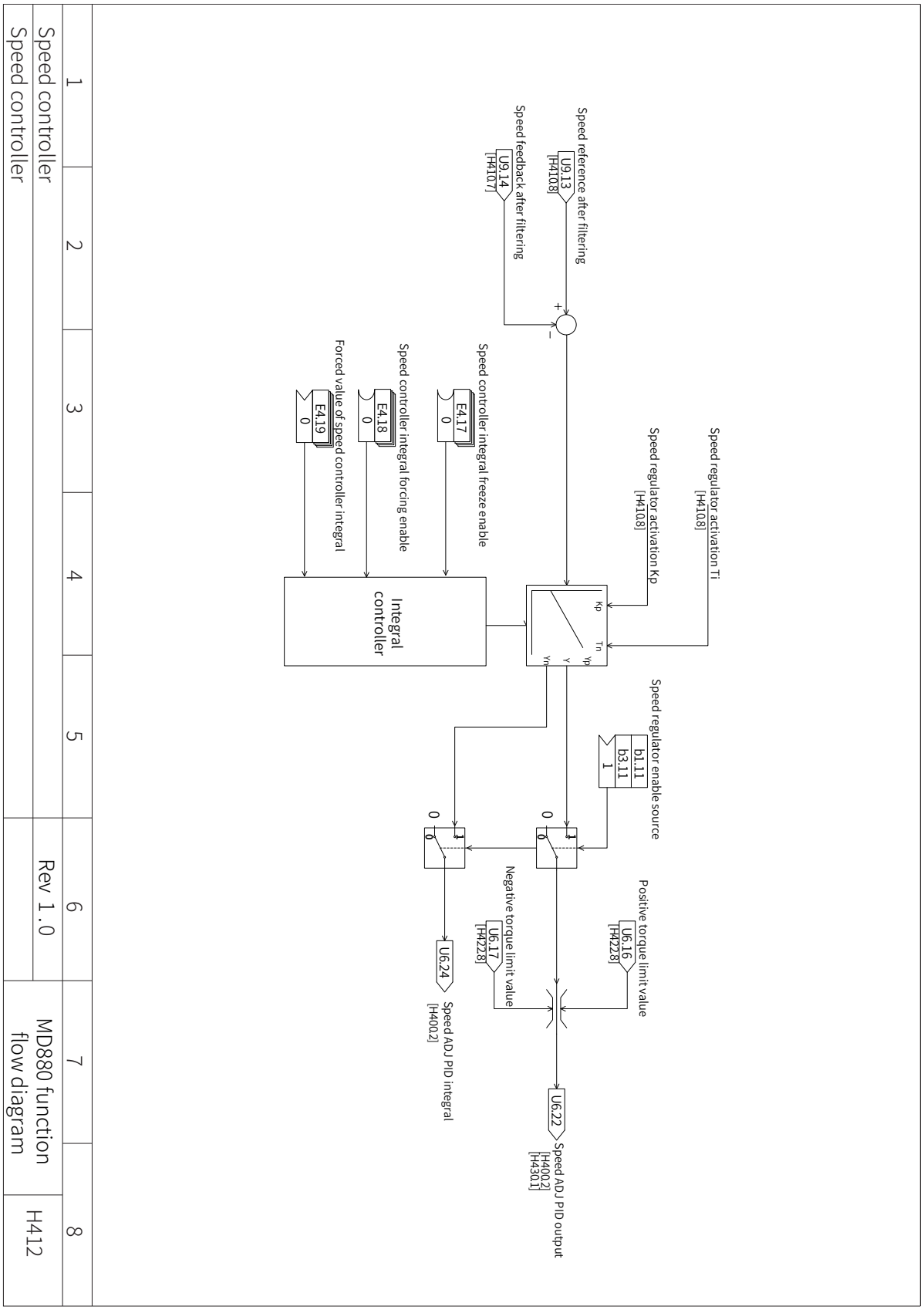


Figure 7-52 H412 - Speed controller

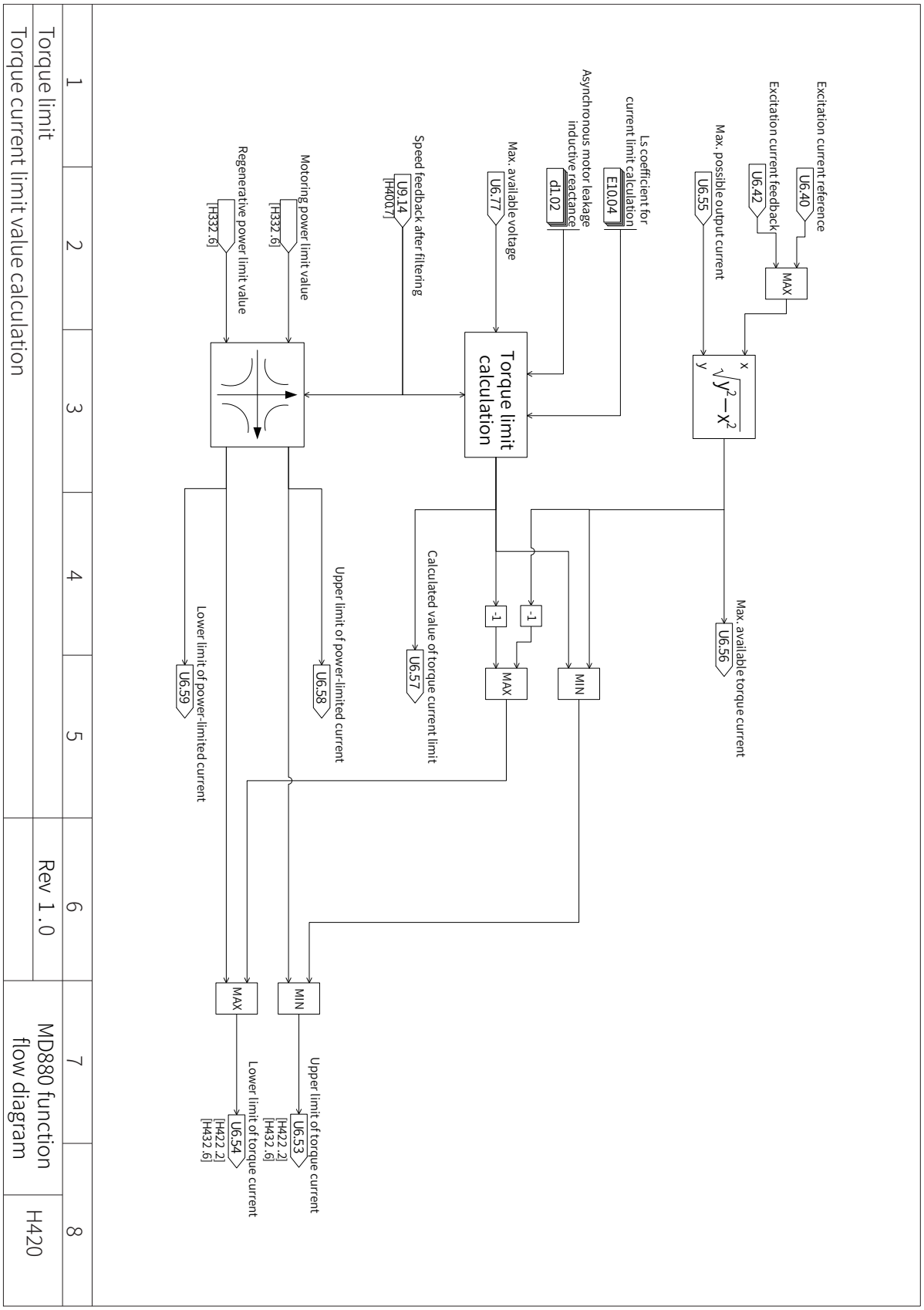


Figure 7-53 H420 - Torque current limit value calculation

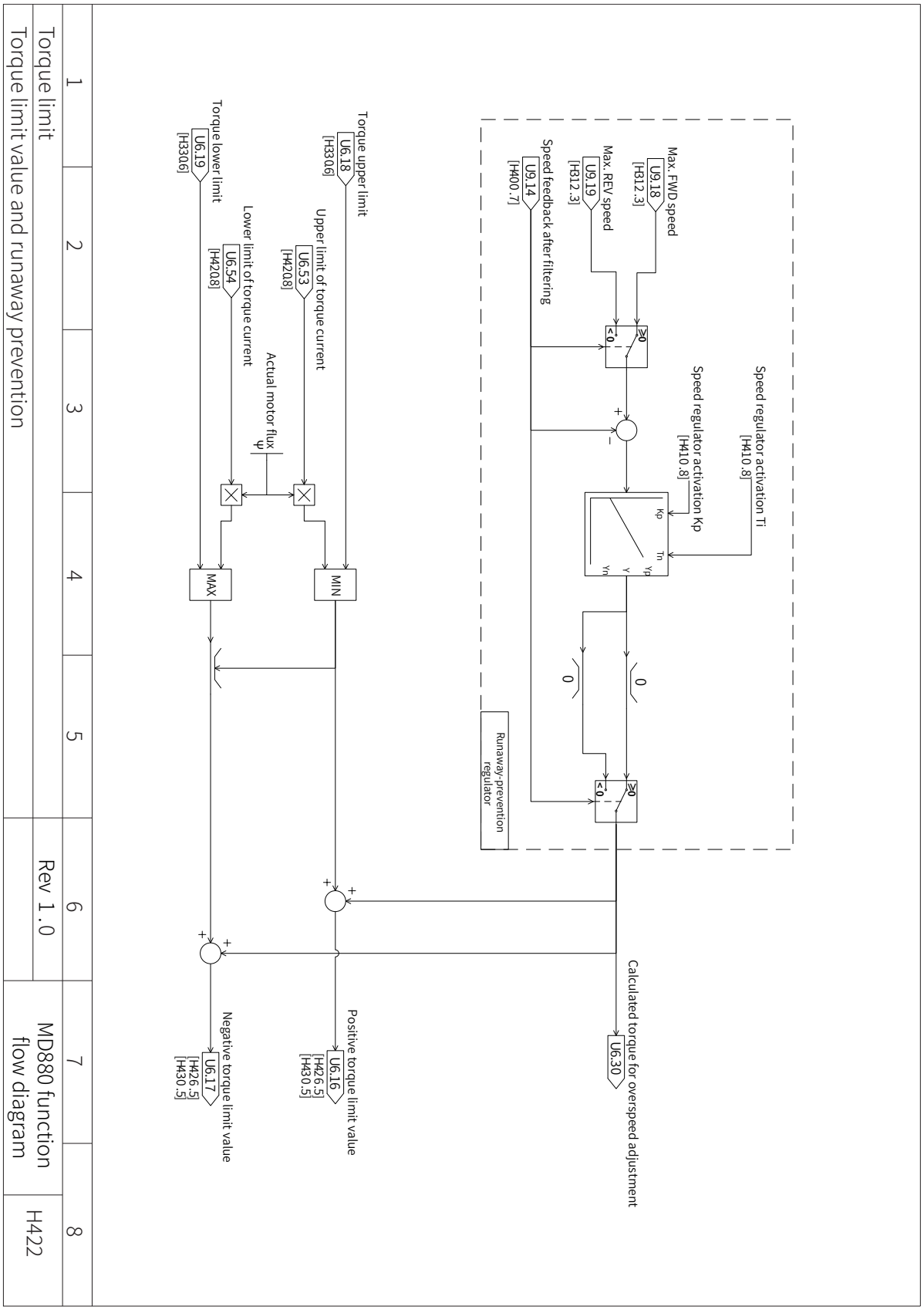


Figure 7-54 H422 - Torque limit and runaway prevention

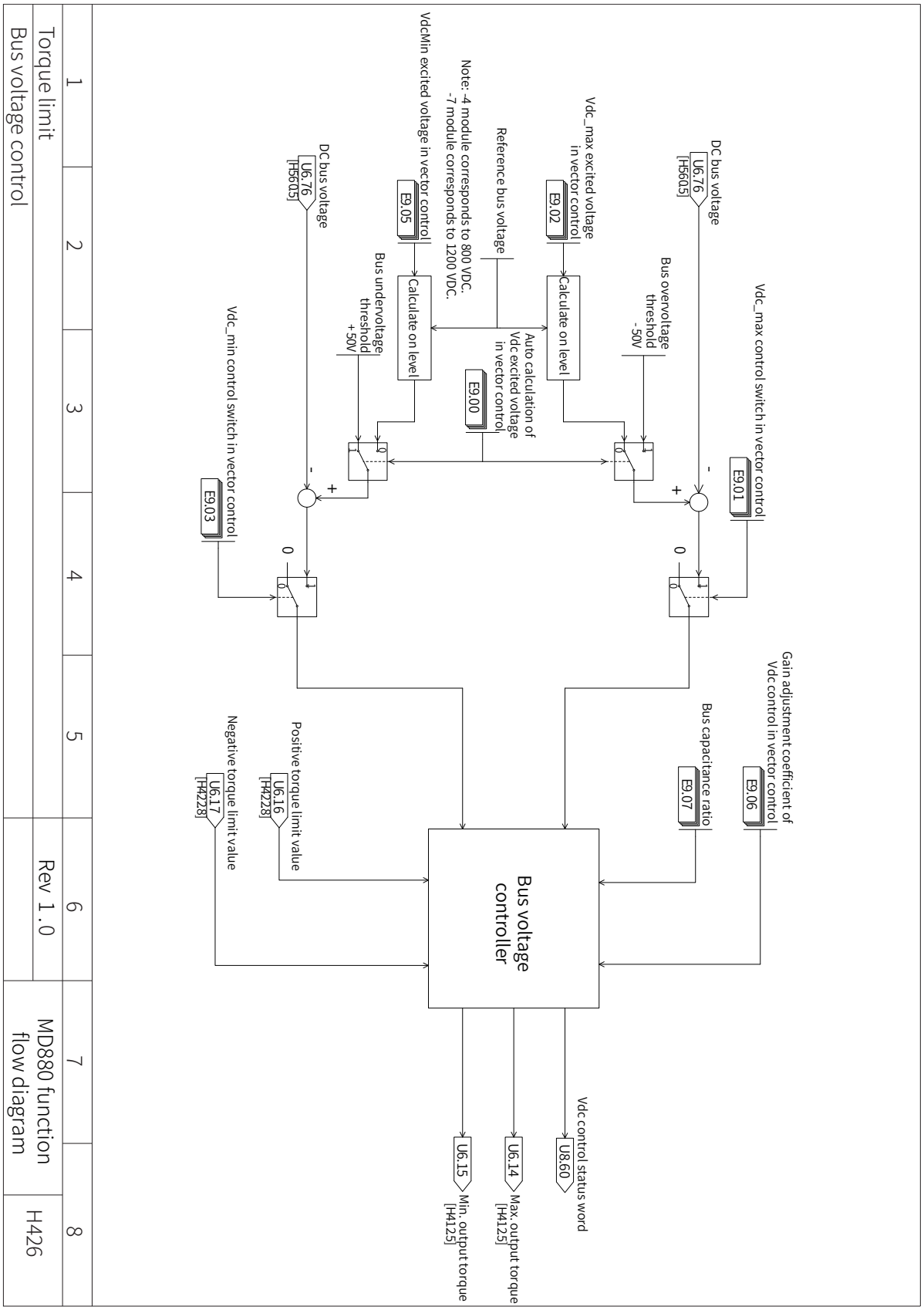


Figure 7-55 H426 - Bus voltage control

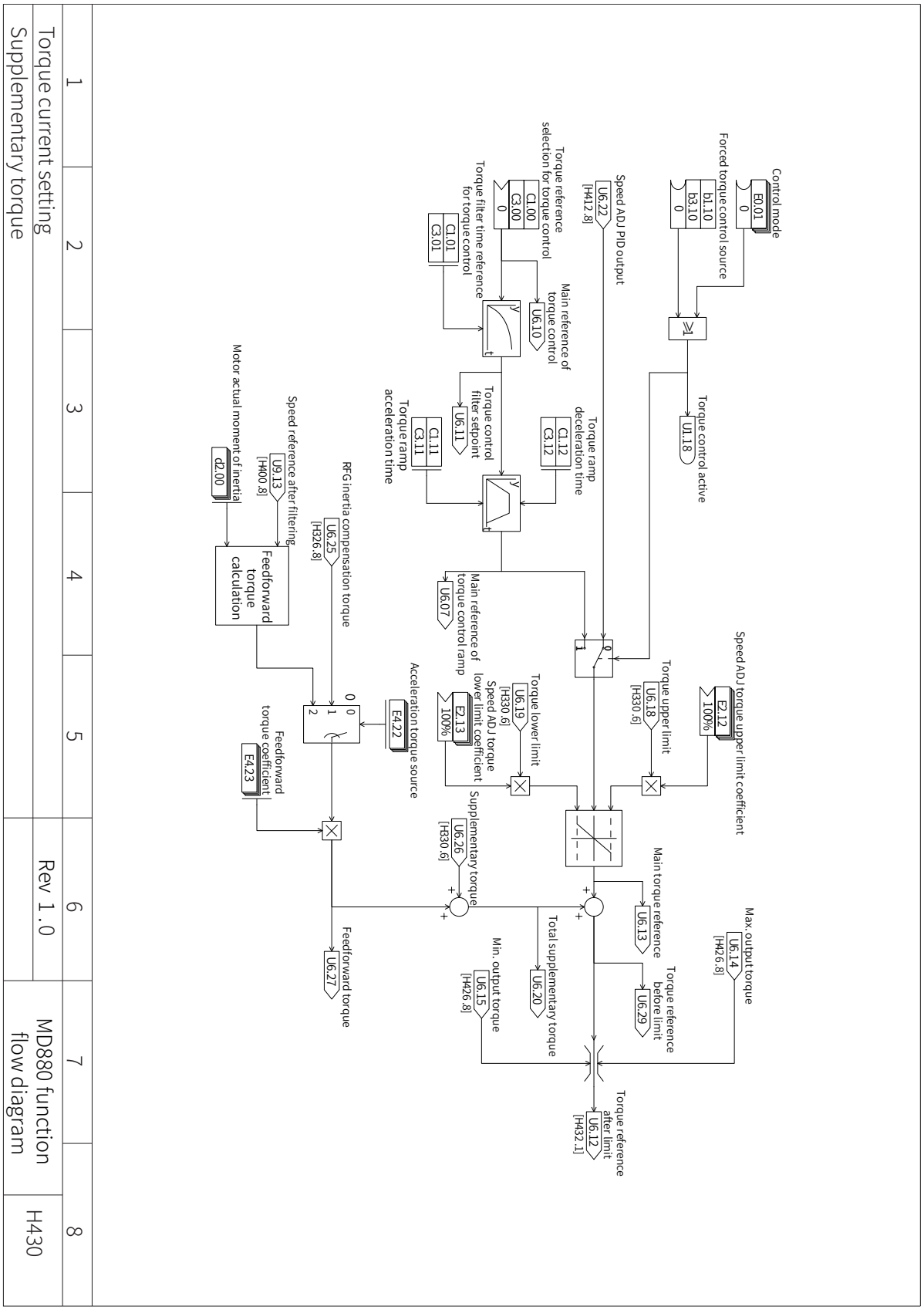


Figure 7-56 H430 - Supplementary torque

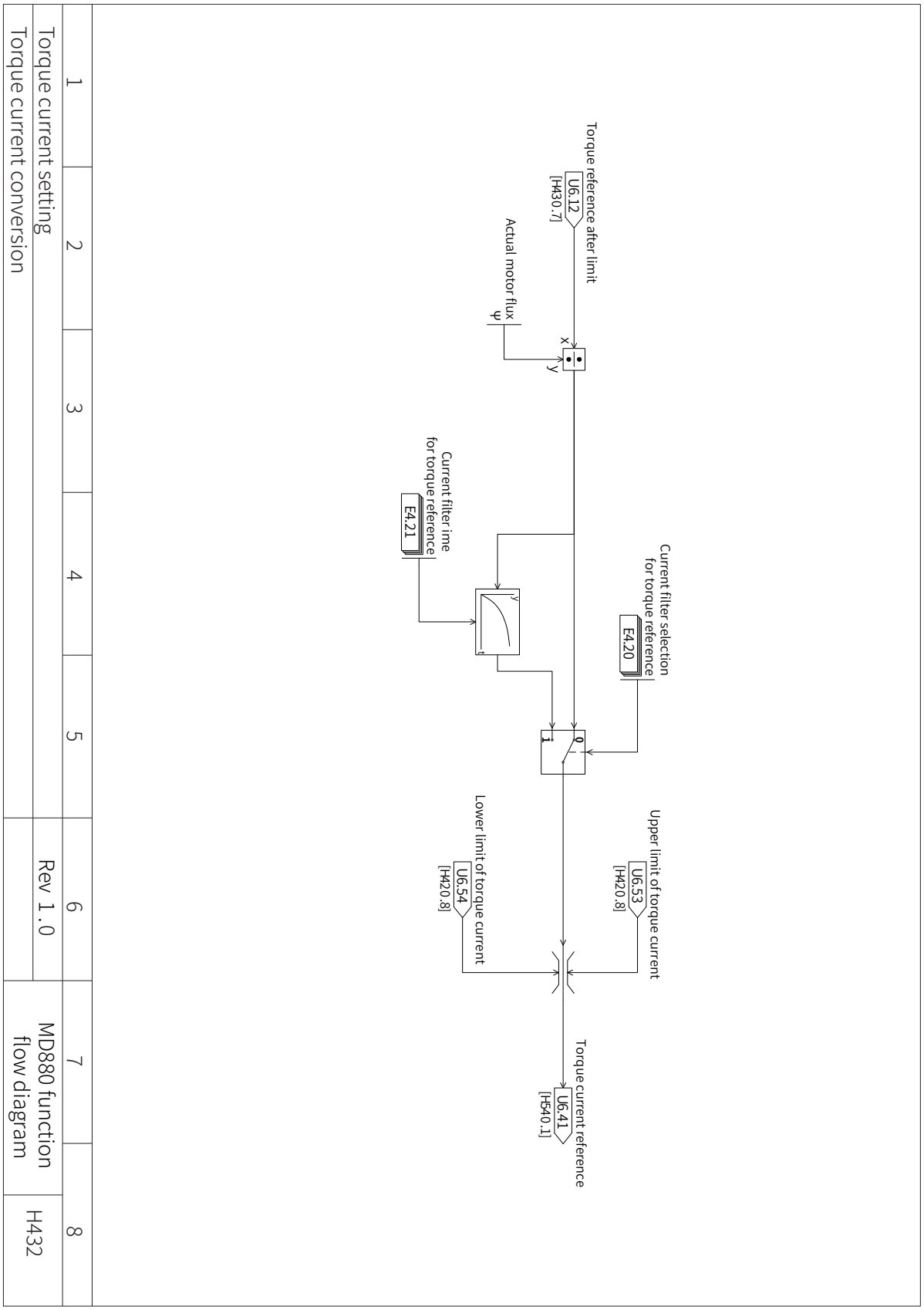


Figure 7-57 H432 - Torque current conversion

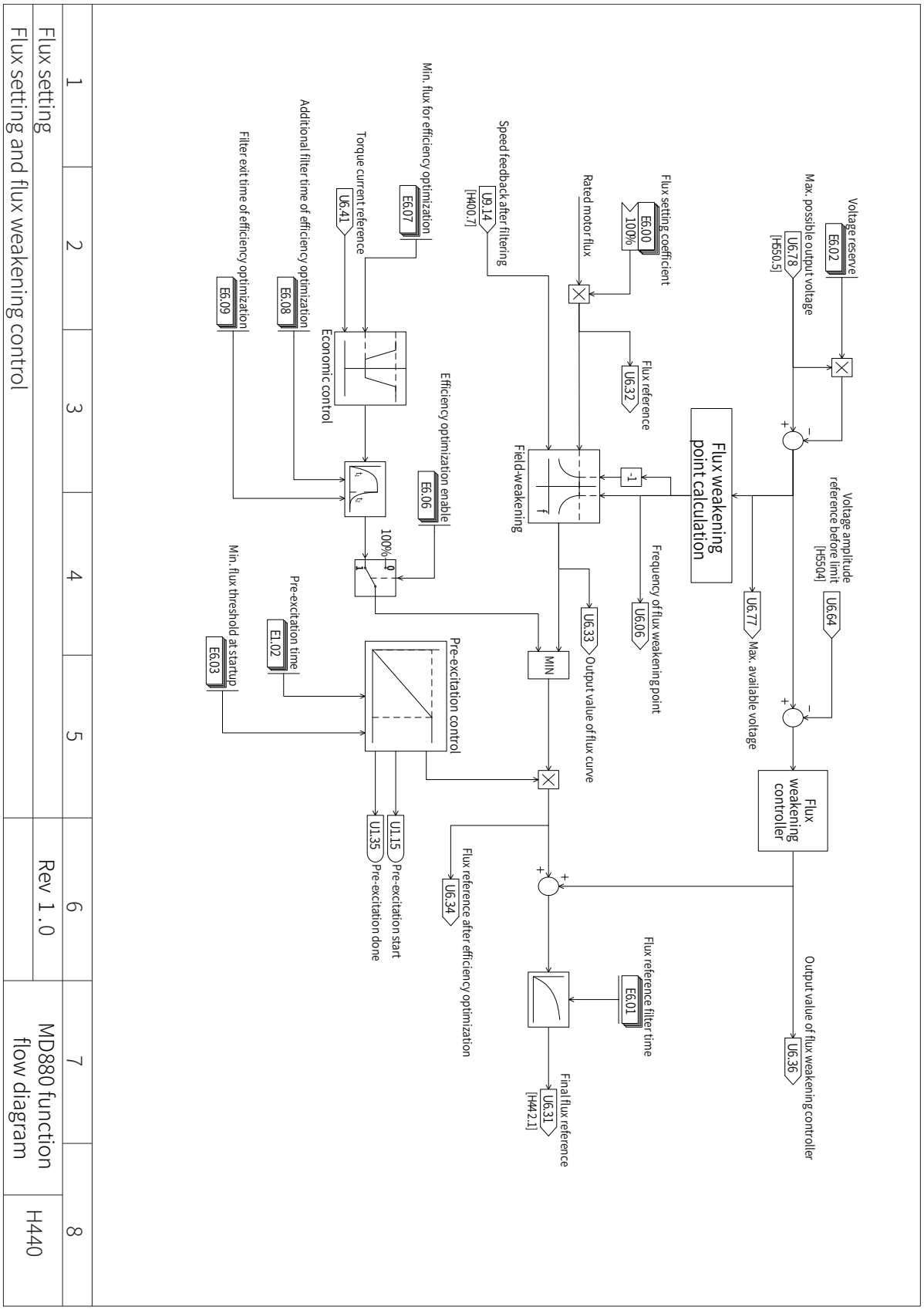


Figure 7-58 H440 - Flux setting and flux weakening control

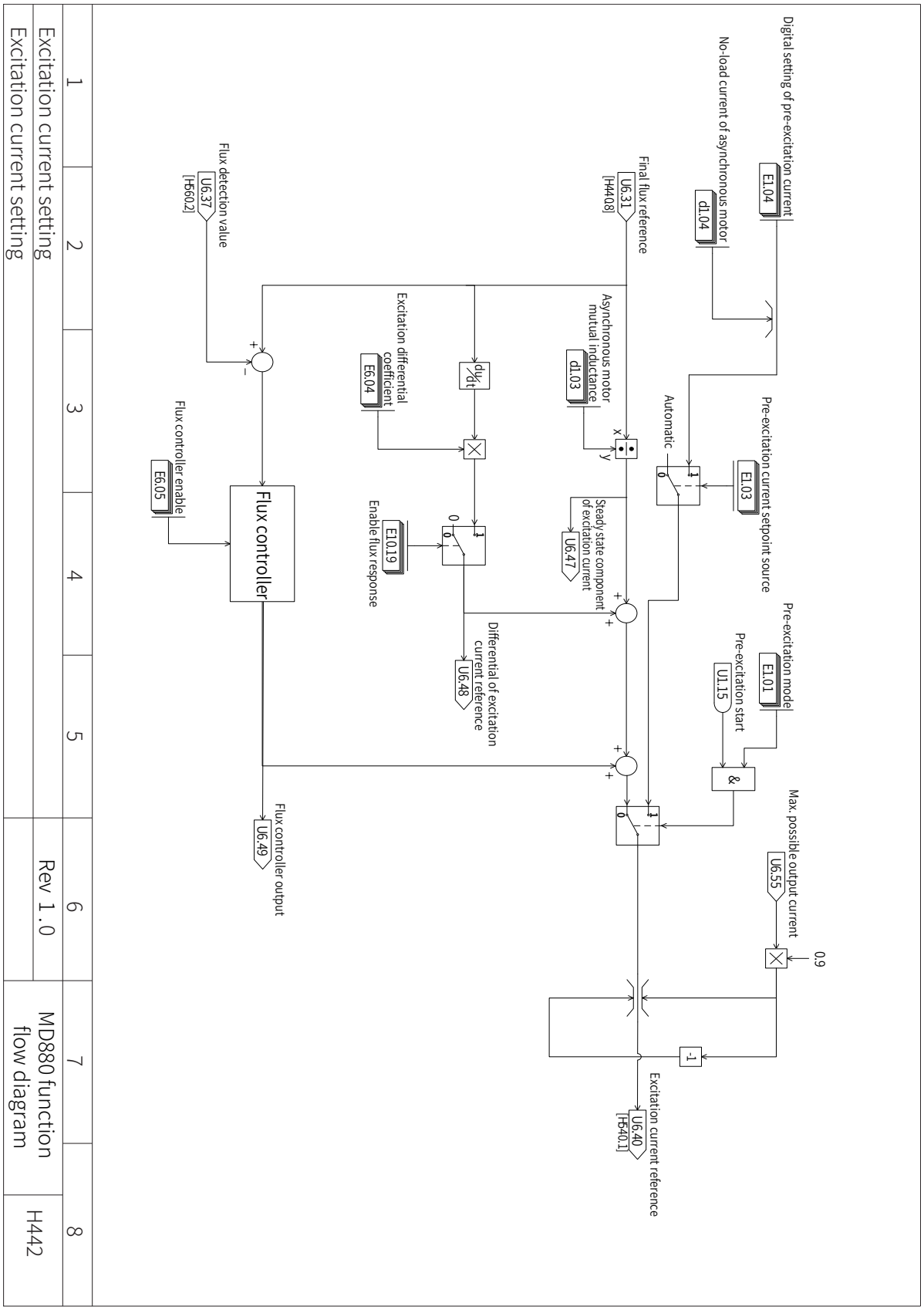


Figure 7-59 H442 - Excitation current setting

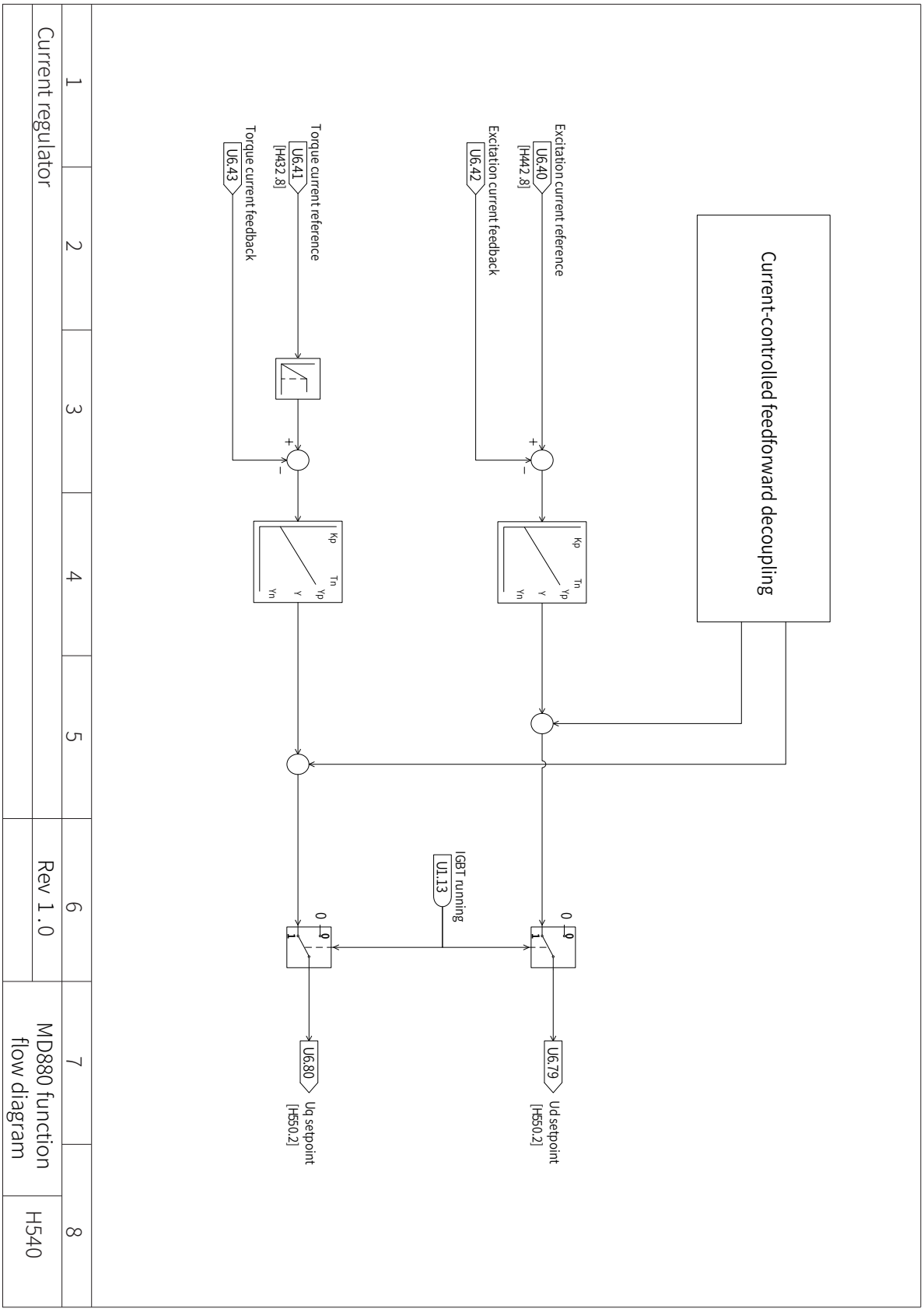


Figure 7-60 H540 - Current regulator

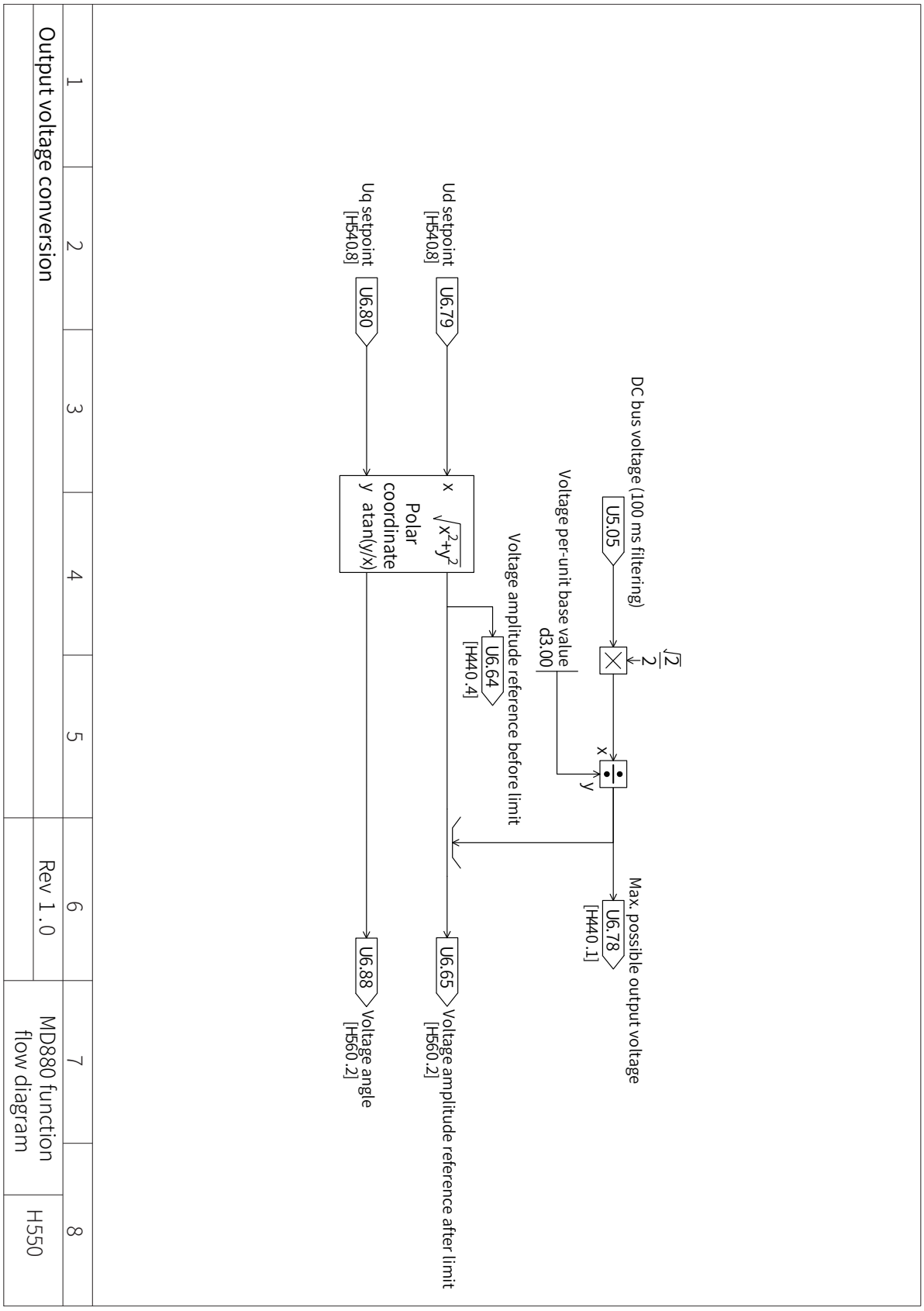


Figure 7-61 H550 - Output voltage conversion

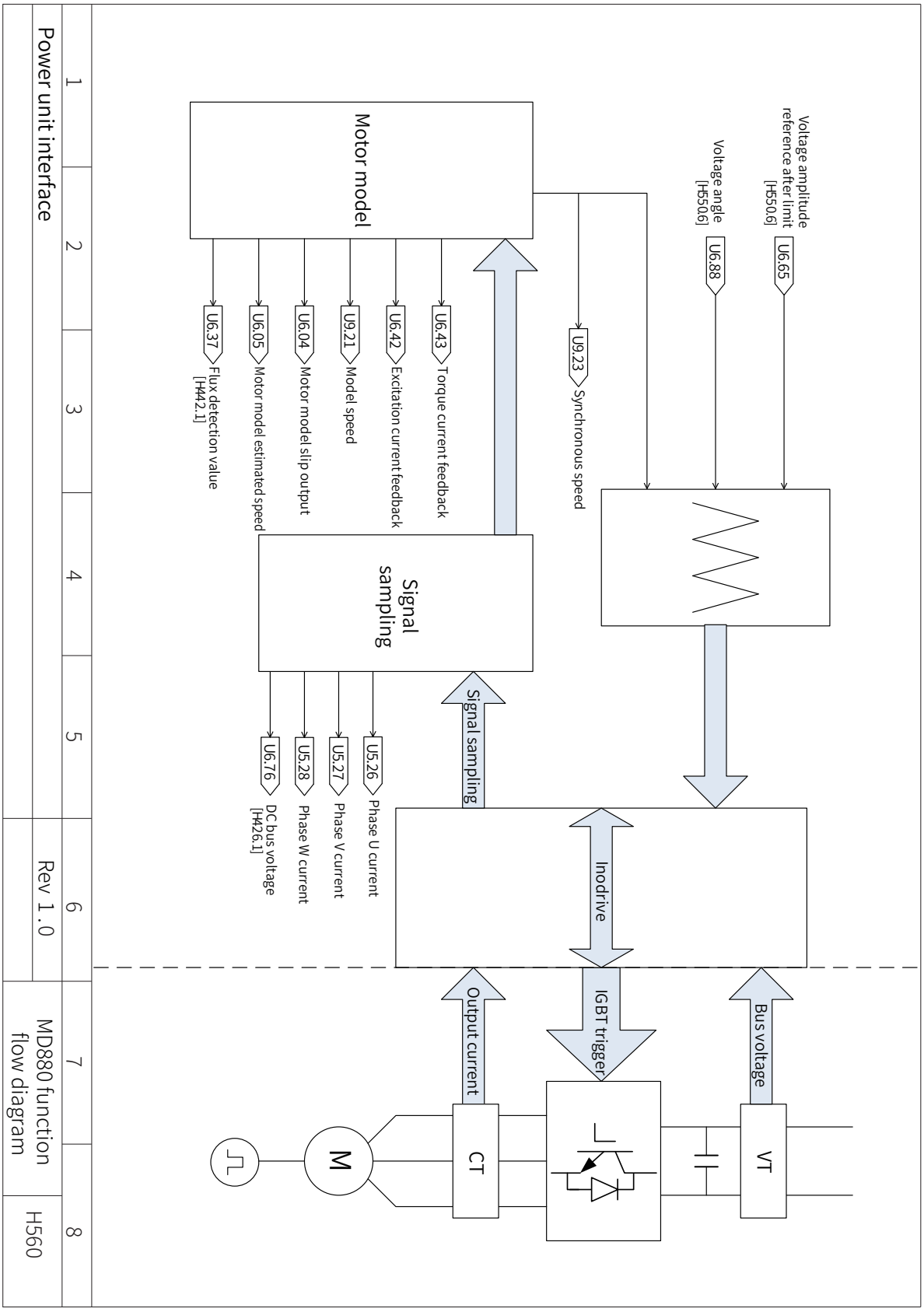


Figure 7-62 H560 - Power unit interface

7.2.7 V/f Control

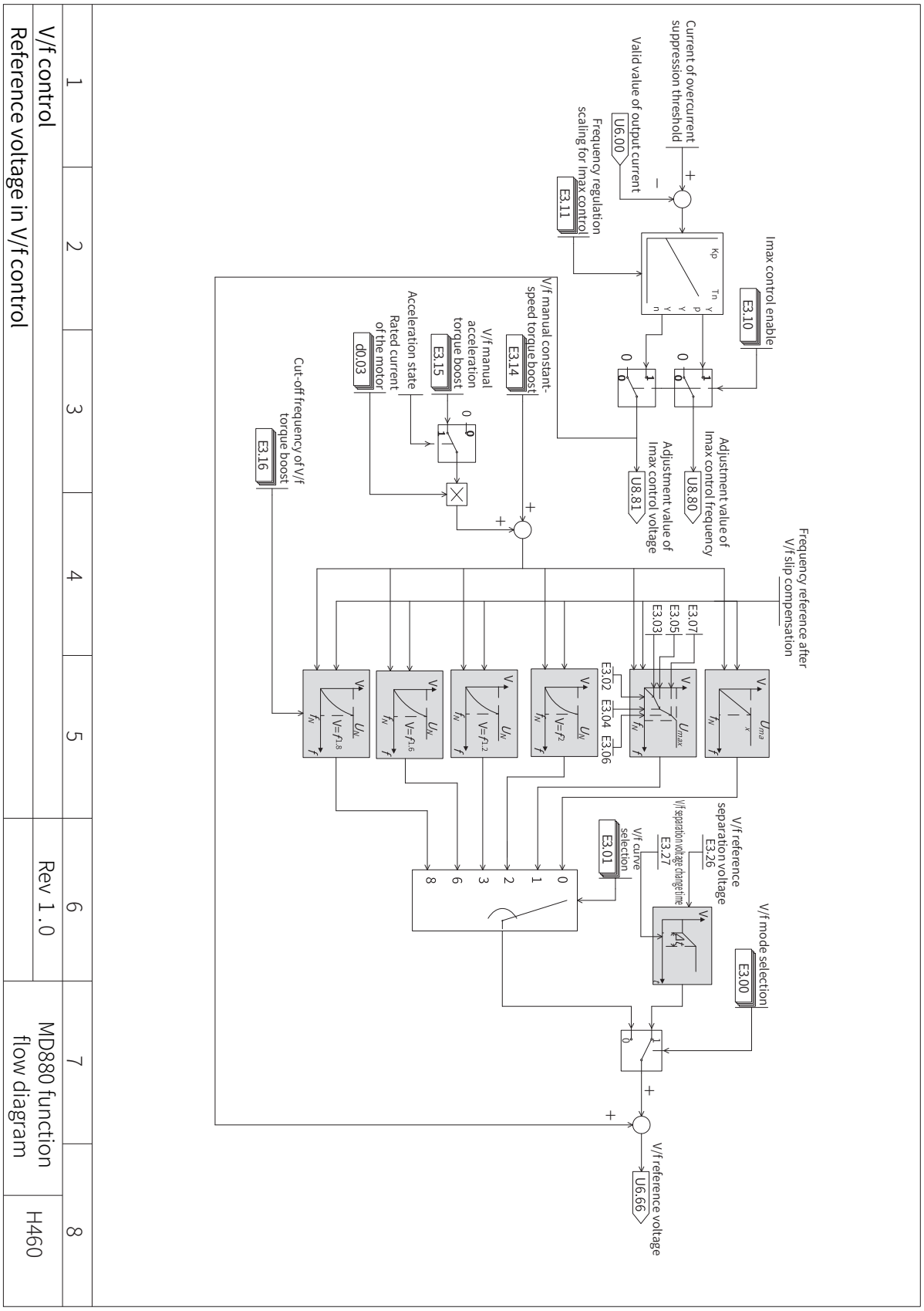


Figure 7-63 H460 - Reference voltage in V/f control

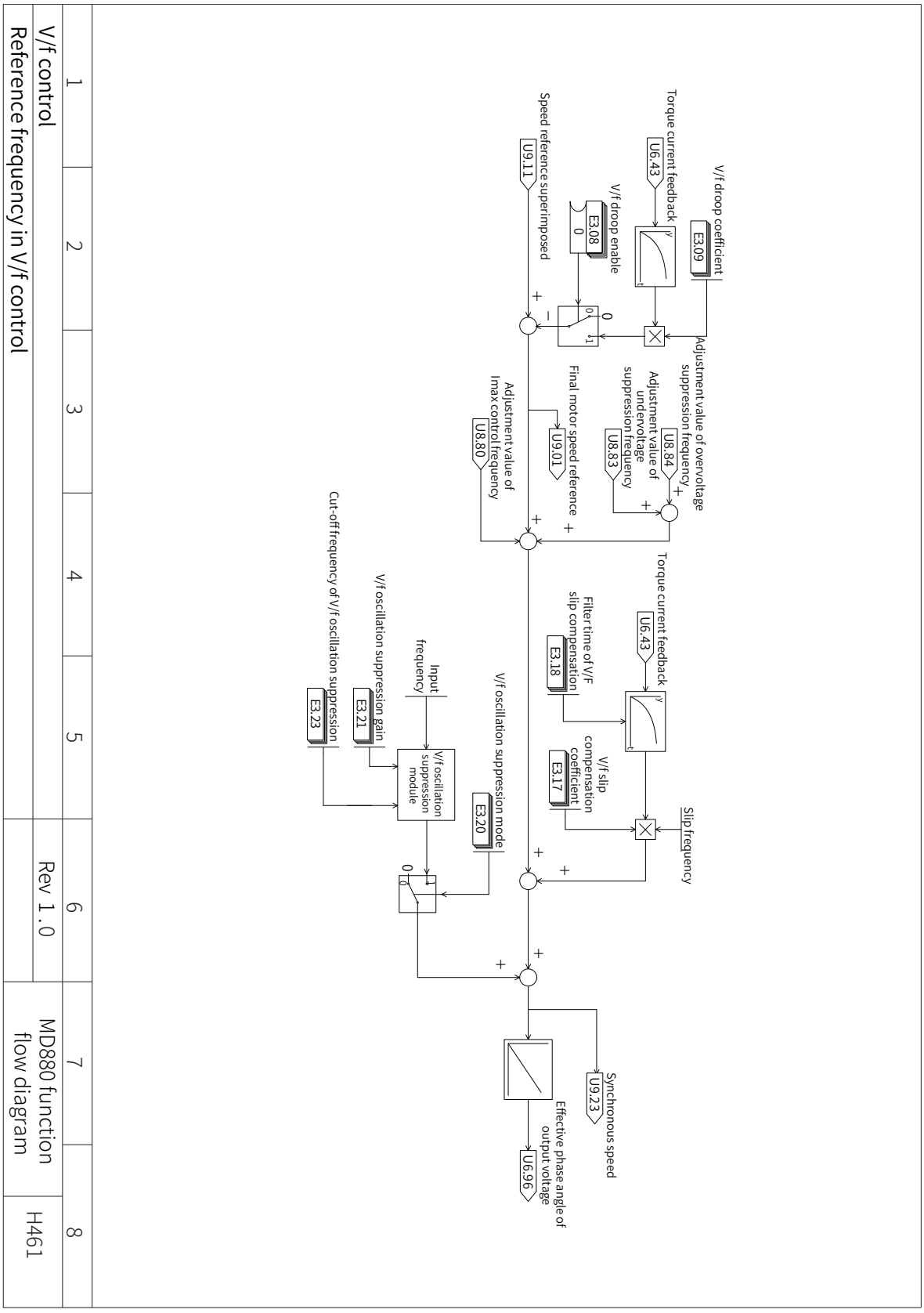


Figure 7-64 H461 - Reference frequency in V/f control

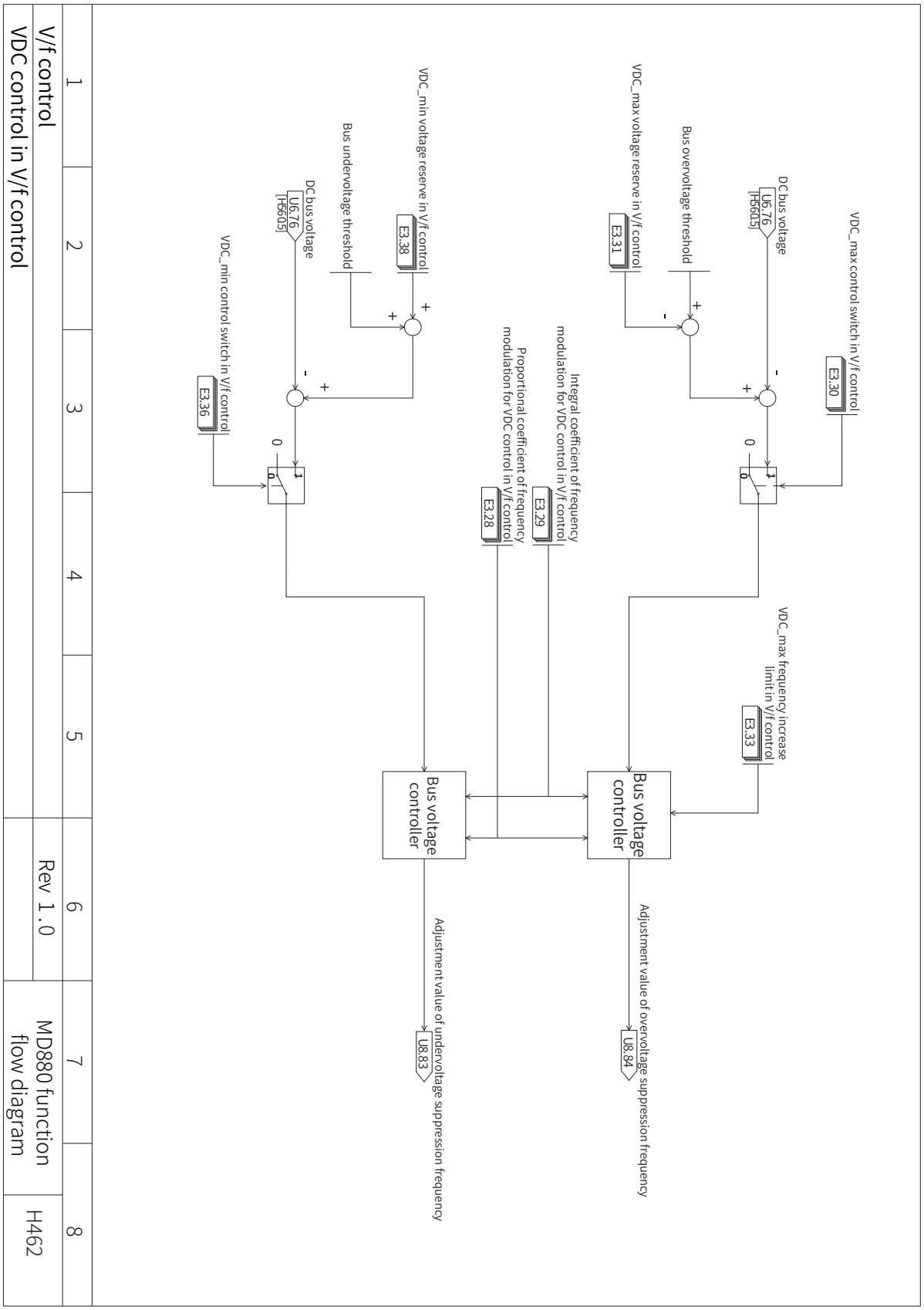


Figure 7-65 H462 - VDC control in V/f control

7.2.8 Auxiliary Function

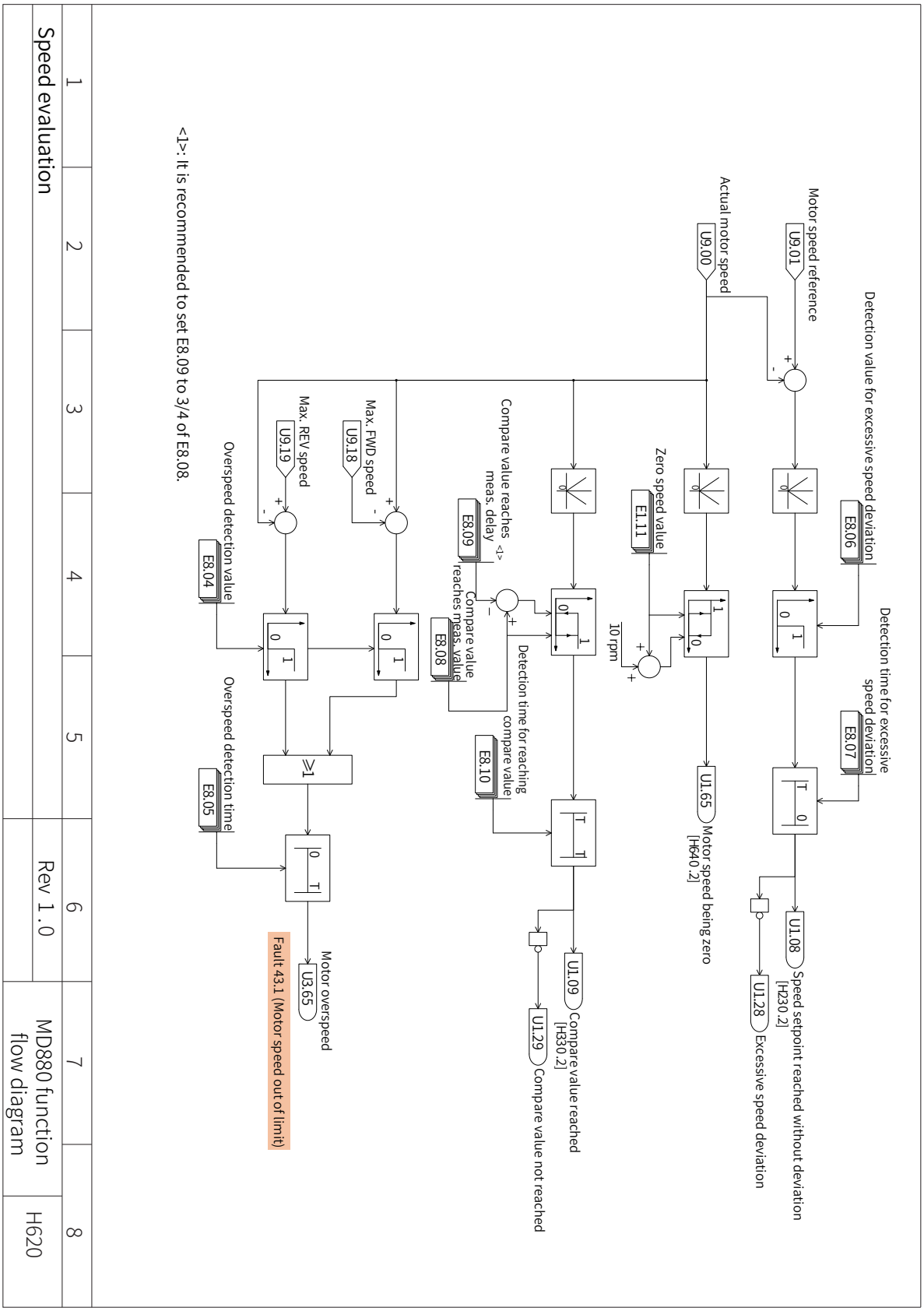


Figure 7-66 H620 - Speed evaluation

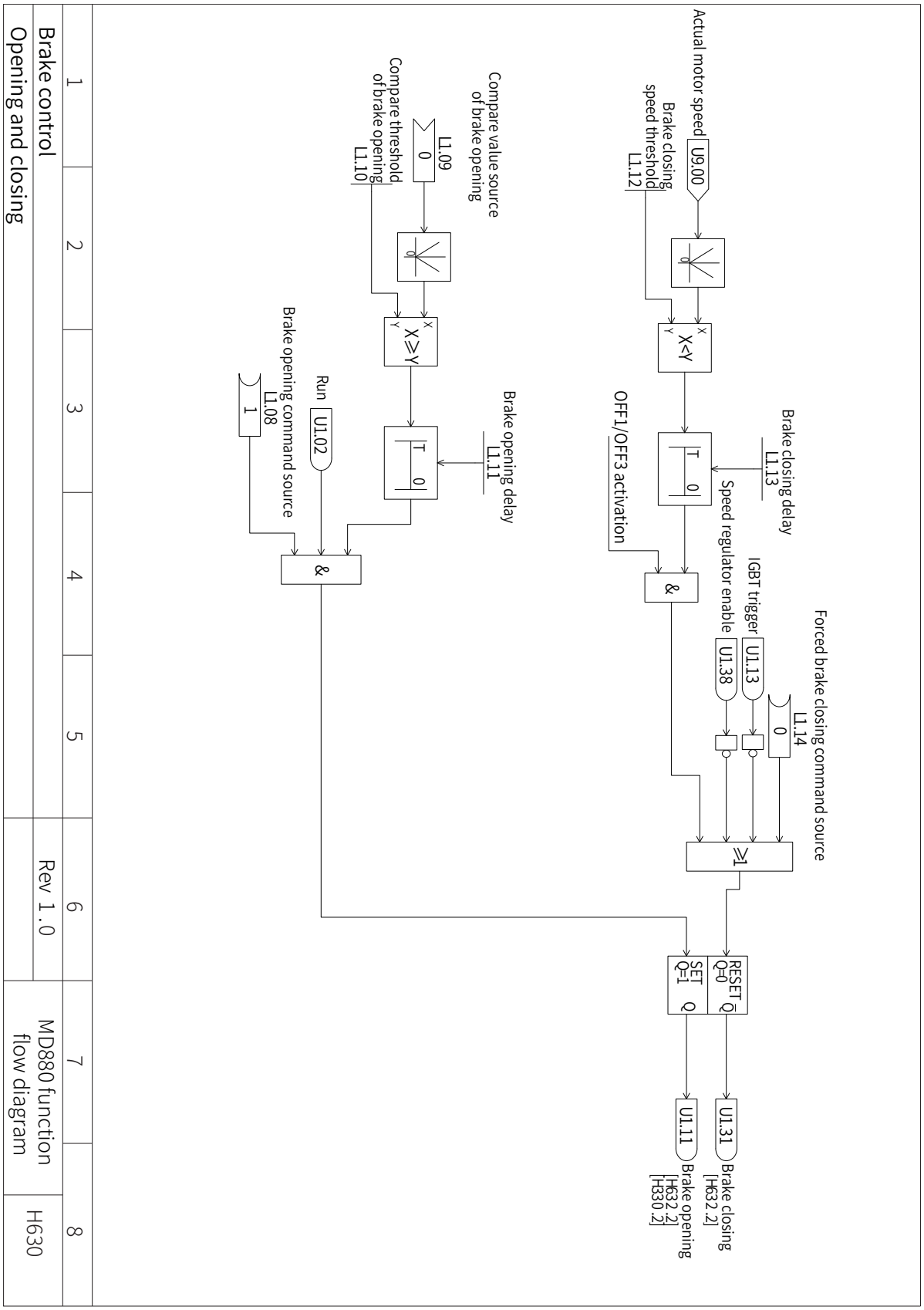


Figure 7-67 H630 - Opening and closing

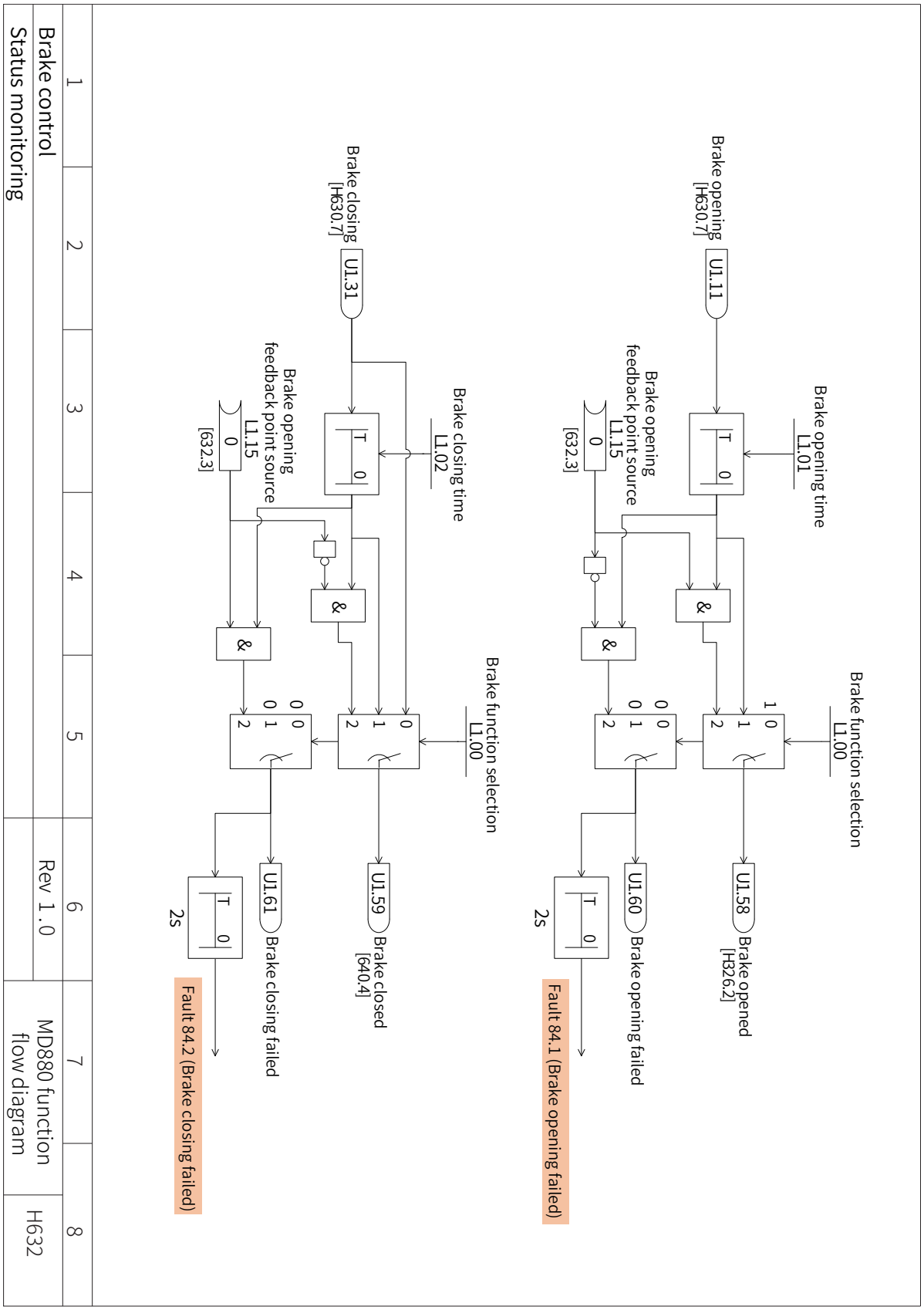


Figure 7-68 H632 - Status monitoring

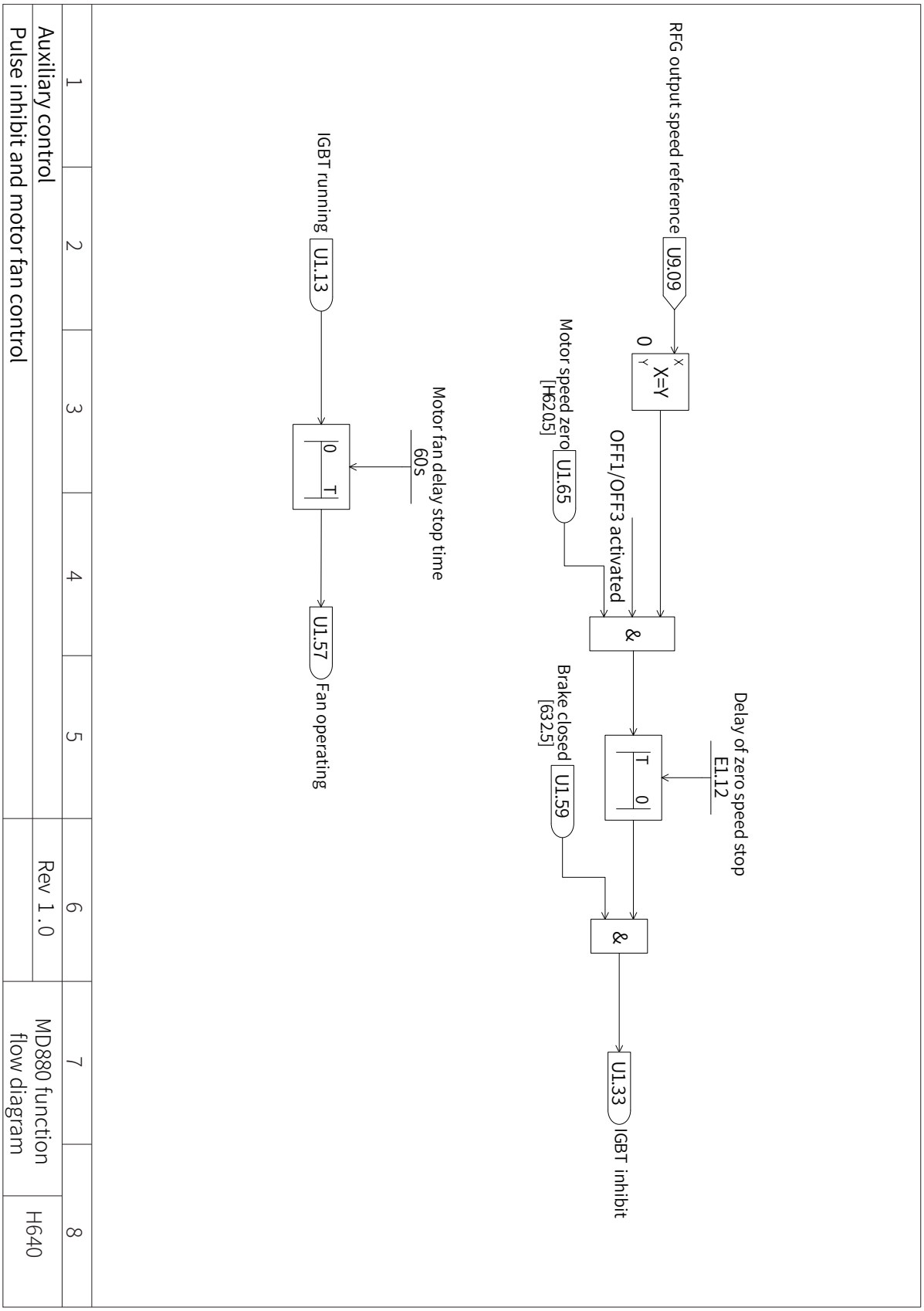


Figure 7-69 H640 - Pulse inhibit and motor fan control



8 Troubleshooting

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8 Troubleshooting

8.1 Fault View

8.1. 1 Fault Classification

According to the emergency degree of the fault, it can be divided into three categories:

- Fault: Indicates that a major fault or error has occurred in the system. The system must stop immediately for troubleshooting.
- Limit: The system fails, but it can continue to operate after derating, but the output may deviate from the setting. The derated operation includes three modes: limited power operation, limited torque operation and limited current operation.
- Alarm: used to prompt the user that there is a minor abnormality which does not affect operation, and the user can decide what to do later.

The fault code is expressed in three segments: F-Fault, L-Limit and A-Alarm, as shown in the following figure:

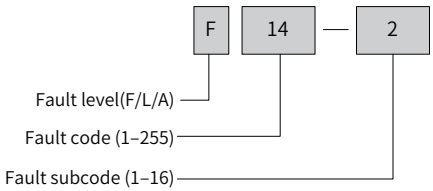


Figure 8-1 Fault code

NOTE

◆ Limits are currently not supported.

8.1.2 Fault information View

Faults are represented by fault codes and fault subcodes. Fault codes indicate the classification of faults, and fault subcodes signify specific faults. Take fault ERR14-2 as an example, fault code 14 indicates IGBT overtemperature; fault subcode 2 indicates that an overtemperature fault occurred in the V-phase IGBT.

1) Active fault

HCU can record up to 6 simultaneous faults. Any fault occurs after them are not recorded. The active fault can be viewed in the A1 parameters.

Active fault		Active limit		Active alarm	
Fault code	Fault Subcode	Fault code	Fault Subcode	Fault code	Fault Subcode
A1-00	A1-01	A1-12	A1-13	A1-24	A1-25
A1-02	A1-03	A1-14	A1-15	A1-26	A1-27
A1-04	A1-05	A1-16	A1-17	A1-28	A1-29
A1-06	A1-07	A1-18	A1-19	A1-30	A1-31
A1-08	A1-09	A1-20	A1-21	A1-32	A1-33
A1-10	A1-11	A1-22	A1-23	A1-34	A1-35

2) History faults

HCU supports recording the information of 5 latest failures, 1 latest minor failure and 1 latest warning.

Latest fault		Second latest fault		Third latest fault		Fourth latest fault	
Fault code	Fault Subcode	Fault code	Fault Subcode	Fault code	Fault Subcode	Fault code	Fault Subcode
H2-00	H2-01	H3-00	H3-01	H4-00	H4-01	H5-00	H5-01
H2-02	H2-03	H3-02	H3-03	H4-02	H4-03	H5-02	H5-03
H2-04	H2-05	H3-04	H3-05	H4-04	H4-05	H5-04	H5-05
H2-06	H2-07	H3-06	H3-07	H4-06	H4-07	H5-06	H5-07
H2-08	H2-09	H3-08	H3-09	H4-08	H4-09	H5-08	H5-09
H2-10	H2-11	H3-10	H3-11	H4-10	H4-11	H5-10	H5-11

Fifth latest fault		Latest limit		Latest alarm	
Fault code	Fault Subcode	Fault code	Fault Subcode	Fault code	Fault Subcode
H6-00	H6-01	H7-00	H7-01	H8-00	H8-01
H6-02	H6-03	H7-02	H7-03	H8-02	H8-03
H6-04	H6-05	H7-04	H7-05	H8-04	H8-05
H6-06	H6-07	H7-06	H7-07	H8-06	H8-07
H6-08	H6-09	H7-08	H7-09	H8-08	H8-09
H6-10	H6-11	H7-10	H7-11	H8-10	H8-11

3) Fault data record

HCU will record the data of the time when the fault occurs while recording the fault itself. Fault data are recorded in group H1, as shown in the following table.

Item	Latest Fault Data	Second Latest Fault Data	Third Latest Fault Data
Speed	H1-00	H1-10	H1-20
Current	H1-01	H1-11	H1-21
Bus voltage	H1-02	H1-12	H1-22
Output torque	H1-03	H1-13	H1-23
Fault control word 1	H1-04	H1-14	H1-24
Fault control word 2	H1-05	H1-15	H1-25
Fault status word	H1-06	H1-16	H1-26
State machine upon the latest fault	H1-07	H1-17	H1-27
Occurring time of latest fault	H1-08	H1-18	H1-28
Occurring date of latest fault	H1-09	H1-19	H1-29

4) Viewing faults through SOP-20-880

Through the SOP-20-880, you can view fault information directly through the above parameters or in the fault menu.

Function	Key	Description
View active fault	Key	Select Menu → Fault Status → Active Fault
View active limit	Key	Select Menu → Fault Status → Active Limit
View active alarm	Key	Select Menu → Fault Status → Active Alarm
View help Information		When viewing a fault, press this key after selecting the fault, and the relevant help information of the fault will be displayed.
Viewhistory faults	Key	Select Menu → Fault Status → History Faults

It is recommended to use the fault menu to view the fault information. You can see all the faults at the same time, with detailed description and help information.

5) View faults through InoDriveStudio

When using InoDriveStudio, you can view faults by opening the "Fault alarm list". See Section 1.2.3 for details.

When using the "Fault alarm list" to view the fault, you can intuitively see the fault description, fault cause and solution, and you can choose to view the relevant data recorded when the fault occurs.

8.1.3 Fault Reset Mode

HCU supports 5 fault reset modes: SOP-20-880, InoDriveStudio, control channel, parameter setting and re-poweron.

Mode	Description
SOP-20-880	After connection, press the "STOP" key in any page to reset the fault.
InoDriveStudio	After connection, click the Fault Reset button in the Control Panel to reset the fault.
Control Channel	Fault reset is achieved through parameter configuration, as shown in the following table.
Parameter setting	Fault auto-reset is achieved by setting H0-07=1 and setting the fault reset time properly.
Reset after re-poweron	Power on the HCU again to reset the fault.

There are multiple sources of reset commands. Depending on the selected command source, the corresponding reset command is valid while other commands are invalid. The relationship between the source of the reset command and the control channel is shown in the following table: (SOP in the table represents the reset key of SOP-20-880, and IDS represents the reset command issued by InoDriveStudio)

Active control channel	Instruction word source	Reset instruction source									
		b0-05	b1-04	b1-05	b2-05	b3-04	b3-05	U2-07	U2-23	SOP	IDS
A9-00=0	b0-00=0	X	0→1	0→1	X	X	X	X	X	0→1	0→1
	b0-00=1	X	0→1	0→1	X	X	X	0→1	X	0→1	0→1
	b0-00=2	X	0→1	0→1	X	X	X	X	0→1	0→1	0→1
	b0-00=3	0→1	0→1	0→1	X	X	X	X	X	0→1	0→1
	SOP Control	X	0→1	0→1	X	X	X	X	X	0→1	0→1
	IDS Control	X	0→1	0→1	X	X	X	X	X	0→1	0→1
A9-00=1	b0-00=0	X	X	X	X	0→1	0→1	X	X	0→1	0→1
	b0-00=1	X	X	X	X	0→1	0→1	0→1	X	0→1	0→1
	b0-00=2	X	X	X	X	0→1	0→1	X	0→1	0→1	0→1
	b0-00=3	X	X	X	0→1	0→1	0→1	X	X	0→1	0→1
	SOP Control	X	X	X	X	0→1	0→1	X	X	0→1	0→1
	IDS Control	X	X	X	X	0→1	0→1	X	X	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 and therefore do not keep a high level all the time.
- After configured by parameters b1-04/b1-05/b3-04/b3-05, U2-07 and U2-23 can take effect with them; This table only shows the activeness if not selected by the 4 parameters.
- When only B0-00=3, after configured by parameters b0-05/b2-05, U2-07 and U2-23 can take effect with them; This table only shows the activeness if not selected by the 2 parameters.
- The reset command from SOP-20-880 and InoDriveStudio is always effective after connection, regardless of the control source.

8.1. 4 Fault Level Modification and Auto Reset

1) Fault Level Modification

This system provides three types of prompts: fault, limit and alarm. The three types are further divided

into 7 levels. Users can set different levels for specific fault prompts according to actual applications. A total of 10 fault levels can be customized. See the following table for details:

Parameter	Value
Level change abnormity code 1–10	Fault Code
Level of abnormity code 1–10	0: Coast to stop 1: Emergency stop 2: Stop in normal stop mode 3: Running with limited power 4: Running at limited speed 5: Running at limited torque 6: Display alarm only 7: No operation

Fault Level	Description	Remarks
0: Coast to stop	Direct block output	Fault
1: Emergency stop	Stop according to the maximum capacity of the system, and then cannot run again	
2: Stop as specified	Stop according to the set mode, and then cannot run again	
3: Run with limited power	Normal operation in a range	Limit
4: Run at limited speed		
5: Run at limited torque		
6: Alarm only	Display an alarm that does not affect the operation	Alarm
7: Treat as normal	No alert	Normal

NOTE

- Fault code: the fault code prompted when the system is abnormal, such as ERR15 external fault 1.
- For some faults, you can only change their level in a range automatically determined by the system.

2) List of faults with modifiable levels

Name of Fault Main Code	Default Level	Highest	Lowest
11: Motor overload	0: Coast to stop	0: Coast to stop	6: Alarm only
13: Output phase loss	0: Coast to stop	0: Coast to stop	6: Alarm only
15: External fault	0: Coast to stop	0: Coast to stop	6: Alarm only
20: Encoder fault	0: Coast to stop	0: Coast to stop	6: Alarm only
31: PID feedback loss	0: Coast to stop	0: Coast to stop	6: Alarm only
44: Expansion module offline	0: Coast to stop	0: Coast to stop	6: Alarm only
45: Expansion module slot address conflict	0: Coast to stop	0: Coast to stop	6: Alarm only
46: Incorrect parameter setting	6: Alarm only	6: Alarm only	7: Treat as normal
50: SD card error	6: Alarm only	6: Alarm only	7: Treat as normal
51: RTC error	6: Alarm only	6: Alarm only	7: Treat as normal
59: Low IGBT temperature	0: Coast to stop	0: Coast to stop	6: Alarm only
66: Leakage current	0: Coast to stop	0: Coast to stop	6: Alarm only
67: Bus adapter A communication card error	0: Coast to stop	0: Coast to stop	6: Alarm only
68: Bus adapter B communication card error	0: Coast to stop	0: Coast to stop	6: Alarm only
70: Inverter fan fault	0: Coast to stop	0: Coast to stop	6: Alarm only
74: Rectifier brake unit fault	0: Coast to stop	0: Coast to stop	6: Alarm only
83: Master-slave communication error	0: Coast to stop	0: Coast to stop	6: Alarm only
84: Brake control error	0: Coast to stop	0: Coast to stop	6: Alarm only

90: Braking transistor fault	0: Coast to stop	0: Coast to stop	6: Alarm only
91: Parallel mode error	0: Coast to stop	0: Coast to stop	6: Alarm only
93: Motor control fault	0: Coast to stop	0: Coast to stop	6: Alarm only
170: I/O expansion module wiring fault	6: Alarm only	0: Coast to stop	6: Alarm only

3) Auto reset

In some applications, to ensure continuous application, a limited number of auto fault resets can be set when the system is faulty. This system can set fault reset interval time Tr, fault reset attempts ResetNum, fault reset attempts reset time Ts. There are 3 abnormity codes that cannot be auto reset.

Tr: When the system fails, the reset command ResetCmd is generated once every Tr time

ResetNum: auto reset attempts. Every time when ResetCmd is generated, the remaining auto attempts is ResetNum-1. When the remaining number of auto reset attempts is 0, the auto reset function is disabled.

Ts: auto reset attempts reset time. After Ts, the remaining fault reset attempts are restored to the initially set value

Non-auto reset abnormity code: When the current system fault list contains any non-resettable abnormity code, the system will not generate an auto reset command and only manual reset is possible. Details are as follows:

Parameter	Value	Remarks
Enable auto reset	0: Disable 1: Enable	Enable
Automatic reset attempts resetting time	0.0 to 3600.0s	Tset
Automatic reset attempting period	0.0 to 600.0s	Tr
Automatic reset attempts	0~5	ResetNum
Error code 1 no auto reset	Fault Code	
Error code 2 no auto reset	Fault Code	
Error code 3 no auto reset	Fault Code	

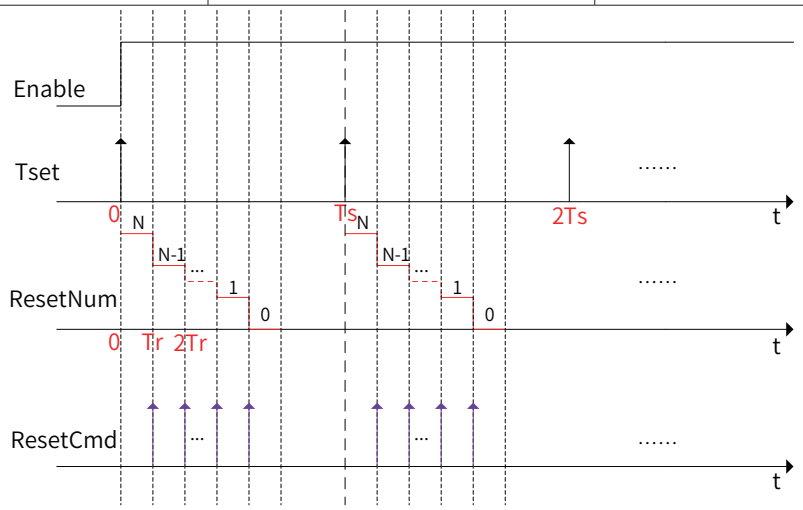


Figure 8-2 Fault reset timing diagram

NOTE

- Enable signal: active when the auto fault reset function is selected as enabled and fault reset attempts ResetNum is not 0.
- If the fault reset interval time > fault reset attempts reset time, this function is ineffective.

8.2 User-defined External Faults and Alarms

1) External fault

H0-00 and H0-01 provide two ways to customize external faults, which can realize user-defined fault

triggering and block the output of the AC drive in case of a fault. The user can select a bit connector from U0-00 to U4-99 as the trigger source of the user-defined fault. When the status bit is 0, it indicates that the system is working normally, and when the status bit is 1, it triggers the external fault ERR15-1 or ERR15-2.

2) External alarm

H0-02 and H0-03 provide two ways to customize external alarms. When the alarms are triggered, they only serve as prompts, and the AC drive can still continue to operate. The user can select a bit connector from U0-00 to U4-99 as the trigger source of the user-defined alarm. When the status bit is 0, the system is working normally. When the status bit is 1, the external alarm ERR63-1 or ERR63-2 is triggered.

3) Abnormal motor temperature

If the motor is equipped with a temperature sensor, the motor temperature measurement can be configured through section *"8 Troubleshooting"*, and the alarm and fault of excessive generator temperature will be triggered at the same time.

- When the measured motor temperature exceeds the protection value set by E8-23, the AC drive will stop outputting current to protect the motor from overheating and report the motor overtemperature fault ERR15-3.
- When the measured motor temperature is lower than E8-23 but higher than the alarm value set by E8-24, the AC drive will output a motor overtemperature alarm ERR63-3, prompting the user to check the problem in time.

8.3 User-defined Abnormity Word

Group H10 contains two groups of user-defined abnormity words: H10-02 ~ H10-33 fault word 1 and H10-34 ~ H10-65 fault word 2. The H10 group can be set by the user with a fault main code and a fault subcode. When the fault occurred on the AC drive is consistent with the fault main code and subcode set by the user, the abnormity word bit corresponding to H10-00 ~ H10-01 is set to high. When the user sets the abnormity subcode to 0 [all abnormity subcodes], as long as the main code of the fault is consistent with the main code of the fault set by the user, the corresponding abnormity word bit is set to high.

For example, if set [H10-02] = 15 and [H10-03] = 1, bit00 of [H10-00] indicates the fault state of ERR15-1 external fault 1. When you set [H0-00] = 1 and manually activate ERR15-1 external fault 1, H10-00 displays 0x0001; Then set [H0-00] = 0, cancel the trigger source of ERR15-1 external fault 1, and H10-00 still displays 0x0001; reset the fault, and the H10-00 will display 0x0000. That is, the fault trigger signal can still indicate the fault that has occurred before reset after it is inactive.

Para. No.	Name	Function	Setpoint
H10-00	User-defined abnormity word 1	Abnormity code corresponding to fault word 1	-
H10-01	User-defined abnormity word 2	Abnormity code corresponding to fault subcode 2	-
H10-02	Fault word 1-BIT00 abnormity code	Fault main code that can be set by user	0~65535

Para. No.	Name	Function	Setpoint
H10-03	Fault word 1-BIT00 abnormity subcode	The abnormity subcode that can be set by the user, corresponding to the H10-02 main code	0: All abnormity subcodes 1: Abnormity subcode 1 2: Abnormity subcode 2 3: Abnormity subcode 3 4: Abnormity subcode 4 5: Abnormity subcode 5 6: Abnormity subcode 6 7: Abnormity subcode 7 8: Abnormity subcode 8 9: Abnormity subcode 9 10: Abnormity subcode 10 11: Abnormity subcode 11 12: Abnormity subcode 12 13: Abnormity subcode 13 14: Abnormity subcode 14 15: Abnormity subcode 15 16: Abnormity subcode 16
…	…	…	…
H10-32	Fault word 1-BIT15 abnormity code	Fault main code that can be set by user	0~65535
H10-33	Fault word 1-BIT15 abnormity subcode	The abnormity subcode that can be set by the user, corresponding to the H10-32 main code	The same as H10-03
H10-34	Fault word 2-BIT00 abnormity code	Fault main code that can be set by user	0~65535
H10-35	Fault word 2-BIT00 abnormity subcode	The abnormity subcode that can be set by the user, corresponding to the H10-34 main code	The same as H10-03
…	…	…	…
H10-64	Fault word 2-BIT15 abnormity code	Fault main code that can be set by user	0~65535
H10-65	Fault word 2-BIT15 abnormity subcode	The abnormity subcode that can be set by the user, corresponding to the H10-64 main code	The same as H10-03
U8-20	User-defined abnormity word 1	Corresponds to H10-00	
U8-21	User-defined abnormity word 2	Corresponds to H10-01	

8.4 Handling of Common Issues

8.4.1 Switch-on Inhibit and Operation Preparation

1) Switch-on inhibit and operation preparation are two kinds of state machines in the system, code-named S4 and S7 respectively.

2) When the system is in the switch-on inhibit or operation preparation state for a long time, it is generally caused by the fact that the signal states such as OFF1, OFF2, OFF3 or operation permission are not in the normal state, for instance, the activation of OFF2 and OFF3 signals brings the system

into the switch-on inhibit state.

3) Troubleshooting: You can quickly find the cause of the problem by looking at A0-16 and A0-17. See the following table for details.

Parameter	Value	Description	Remarks
A0-16 Abnormity message type	0	None	Normal state
	1	The OFF1\ JOG\ start-stop command is not reset, resulting in switch-on inhibit	Switch-on inhibit: the corresponding command of the active control channel is activated
	2	OFF2 is activated, resulting in switch-on inhibit	
	3	OFF3 is activated, resulting in switch-on inhibit	
	4	Operation is not allowed to be activated, resulting in operation preparation	Operation preparation: the corresponding command of the active control channel is activated
	10	DP Bus-Data Right Release, PZD1. check bit is not set to 1	The source of the start-stop control is the bus adapter, but the PZD1. check bit of the data received by the adapter is not 1
	11	User-defined function block enable switchover causes switch-on inhibit	
	12	Three-phase brake A5-01 activates OFF2, resulting in switch-on inhibit	

Parameter	Value	Description	Remarks
A0-17 Abnormity message source	0	None	Normal state
	1	Is set to normally active, check group b parameters	The corresponding channel command of group b is set to a constant value of 1
	2	DI1	The terminal signal is active
	3	DI2	
	4	DI3	
	5	DI4	
	6	DI5	
	7	DI6	
	8	DIL	
	9	HDI1	
	10	HDI2	
	11	Bus adapter A.PZD0.0	Start/stop control source is adapter A and corresponding bit is effective
	12	Bus adapter A.PZD0.1	
	13	Bus adapter A.PZD0.2	
	14	Bus adapter A.PZD0.3	
	15	Bus adapter A.PZD0.8	
	16	Bus adapter A.PZD0.9	
	17	Bus adapter B.PZD0.0	Start/stop control source is adapter B and corresponding bit is effective
	18	Bus adapter B.PZD0.1	
	19	Bus adapter B.PZD0.2	
	20	Bus adapter B.PZD0.3	
	21	Bus adapter B.PZD0.8	
	22	Bus adapter B.PZD0.9	
	23	PC software control bit active	The software tool has acquired control rights and the corresponding bit is active
	24	Bus adapter A.PZD1 parity bit	Start-stop control source is adapter A and received PZD1. check bit ≠ 1
	25	Bus adapter B.PZD1 parity bit	Start-stop control source is adapter B and received PZD1. check bit ≠ 1
	26	User-defined function block enable is changed, but HCU is not powered on again	
	27	Three-phase braking setting A5-00= 0	
	28	HINT is not ready due to e.g. model parameter error	
	Others	B connector	The corresponding command of the active control channel is selected as the B connector which is active

NOTE

◆ There may be multiple abnormity types or abnormity sources in the system at the same time, so you can find and solve them one by one according to the prompts.

8.4.2 System Initialization Errors

Phenomena:

After the HCU-50/51 control power is powered on, the state machine (A0-00) is always "0 System Initializing".

Measure:

1) Check whether the voltage of the 24VDC power supply of HCU-50/51 is too low.

2) Check whether the 24VDC and 15VDC power supply detection circuits of HCU-50/51 are abnormal.

3) Check whether the EEPROM of HCU-50/51 are abnormal.

4) Ask for technical support.

8.4 Locked-rotor

The motor locked rotor fault ERR93-1 is a protective measure against the abnormal control of the motor, which can prevent the motor from being stopped because the output torque of the motor cannot overcome the load torque.

The motor locked-rotor detection enable signal comes from U1-28 by default [speed deviation is too large]. When U1-28 is enabled, the locked-rotor detection enable is activated. Some applications require the motor to work in locked-rotor, mainly including some applications that work in speed mode, but torque control needs to be realized by adjusting the torque limiting of the motor. E8-25 can be set to 0 to turn off locked-rotor detection.

For example, the coiler on the cold rolling line usually needs to work in torque mode, and speed control + torque limiting can also be set to control the output torque. However, the actual speed of the motor is usually not equal to the speed setpoint. Even in the construction phase, the actual speed of the motor is 0. Under such conditions, it is suggested to turn off the locked-rotor detection or set E8-26 (locked-rotor speed setpoint) to a value large enough.

8.4.4 Incorrect Parameter Setting

If there is a conflict between the parameters set by the user, HCU-50/51 will internally limit the setting values to ensure that the system can work normally. At the same time, an alarm 46-1 will be reported to prompt the user to enter the parameters incorrectly, and the working state of the system may be different from expected.

By looking at U8-44, you can know the specific reason of parameter setting error. When there is no error, [U8-44] = 0. If the set maximum speed of the motor is less than the minimum speed of the motor, then [U8-44] = 11, and the motor will be forced to the minimum speed at the maximum speed. The detailed information of U8-44 is as follows:

Parameter Value	Description
0	Parameter setting is correct
1	Conflict of pulse-by-pulse current limiting count
2	Conflict between min. and max. values of motor-driven potentiometer
3	Conflict between RFG arc time 1 and acceleration time 1
4	Conflict between RFG arc time 1 and deceleration time 1
5	Conflict between RFG arc time 2 and acceleration time 2
6	Conflict between RFG arc time 2 and deceleration time 2
7	Conflict between RFG arc time 3 and acceleration time 3
8	Conflict between RFG arc time 3 and deceleration time 3
9	Conflict between RFG arc time 4 and acceleration time 4
10	Conflict between RFG arc time 4 and deceleration time 4
11	Conflict between max. speed and min. speed of motor
12	Conflict between lower and upper limits of skip frequency band 1
13	Conflict between lower and upper limits of skip frequency band 2
14	Conflict between torque limit digital setting lower and upper limits
15	Conflict between lower and upper limits of speed controller Kp adaptive switchover
16	Conflict between lowand high frequencies of speed controller switchover
17	Conflict between lower and upper limits of current controller proportion adaptive current
18	Conflict between lower and upper frequencies of model switchover

Parameter Value	Description
19	Conflict between FVC-to-SVC lower and upper frequencies
20	Conflict between min. and max. input values of AI1 curve
21	Conflict between min. and max. input values of AI2 curve
22	Conflict between min. and max. output scalings of AO1 curve
23	Conflict between min. and max. output scalings of AO2 curve
24	Conflict between min. and max. input frequencies of HDI1 curve
25	Conflict between min. and max. input frequencies of HDI2 curve
26	Conflict between min. and max. output scalings of HDO1 curve
27	Conflict between min. and max. output scalings of HDO2 curve
28	Slot number of the communication card selected by fieldbus adapter A is not set
29	Slot number of the communication card selected by field bus adapter B is not set
30	Drive calibrated rated current is greater than 6 × rated motor current
31	Fault reset attempting period is greater than attempts reset time
32	Encoder module slot setting conflict
34	Fault handling level setting conflict
35	Linear V/f curve frequency point setting conflict
36	Multipoint curve module A X points are not incremental
37	Multipoint curve module B X points are not incremental
38	Brake opening threshold setting error
39	The number of channels triggering the oscilloscope (A12.20) is more than 8 during ADC cycle operation
40	AO1 selected signal source conflicts with motor temperature measurement
41	AO2 selected signal source conflicts with motor temperature measurement
42	execution sequence conflict of user-defined function blocks. See parameters P9-00 ~ P9-03 for details
43	User-defined multipoint curve module X points are not incremental
44	Incorrect brake full open point setting
45	Start-stop control word is bus adapter but DP data check bit (n16.10) is not bit10
46	Parallel function enabled (A15-00) but the number of unit modules enabled is 0
47	Parameter setting conflict of input/output expansion module 1 (min. input of AI curve > max. input, or min. output ratio of AO curve >max. output ratio)
48	Parameter setting conflict of input/output expansion module 2 (min. input of AI curve > max. input, or min. output ratio of AO curve >max. output ratio)
49	Parameter setting conflict of input/output expansion module 3 (min. input of AI curve > max. input, or min. output ratio of AO curve >max. output ratio)

8.4 Pre-charging Fault

During the startup of the inverter, when the state machine goes to S6 precharge state and detects that the bus voltage value is too low for a period of time, the precharge fault ERR64-1 will be reported.

When A6-00 rectification control is not enabled, the precharge time is 6s and cannot be changed; When the A6-00 rectification control is enabled, the precharge time depends on the rectification control start time A6-01.

Therefore, it is necessary to ensure that the bus voltage reaches the normal value during the pre-drive time.

8.5 Faults and Protection

8.5. 1 Motor Control Faults

8.5.1.1 Locked Rotor

Para. No.	Name	Setpoint
E8-25	Enable motor locked-rotor detection	0: Disabled 1: Enabled Other: B-CON
E8-26	Motor locked-rotor speed reference	0.0% to 100.0%
E8-27	Motor locked-rotor detection time	0.00s to 65.00s

When [E8-25] = 1, the torque reaches the torque limit, the feedback speed is lower than the threshold set by E8-26, and the duration exceeds the time set by E8-27, then the locked rotor fault 93-1 is triggered.

The possible causes are as follows:

Possible Cause	Measure
When used in process, the torque limiting takes effect and the running speed is very low	Remove the locked rotor fault
Check whether the torque limit is set properly	Check the setting of E2-08 ~ E2-13, especially where the communication setpoint is set
Excessive load	Check motor load
motor parameter setting is incorrect	Check motor parameter setting
Encoder fault	1. Check encoder connection 2. Check whether the encoder is damaged 3. Check whether the encoder parameters are configured correctly
Motor auto-tuning is required	Set motor parameters and perform motor auto-tuning
Output phase loss or output failure	1. Check motor cable connection 2. Check the connection of the contactor at motor side.
The motor starts directly while it is still rotating or the speed track is incorrect	Set the starting mode to speed track, and adjust the speed track parameters
Other causes	Ask for technical support

8.5.1.2 Motor stall

Para. No.	Name	Setpoint
E8-28	Enable motor stall detection	0: Disabled 1: Enabled
E8-29	Motor stall detection threshold	10.0% to 80.0%
E8-30	Motor stall detection time	0.00s to 10.00s

In FVC control mode, when [E8-28] = 1 and the speed deviation exceeds the motor stall detection threshold set by E8-29 and the duration exceeds the time set by E8-30, the motor stall fault 93-2 will be triggered.

The possible causes are as follows:

Possible Cause	Measure
Excessive high speed load	Check motor load
The motor starts while rotating, which brings the motor to regenerative mode and causes bus overvoltage	E1-00 (start mode) is set as speed track starting (speed track requires auto-tuning) or starting after motor stops
motor parameter setting is incorrect	Check motor parameter setting

Possible Cause	Measure
Encoder fault	1. Check encoder connection 2. Check whether the encoder is damaged 3. Check whether the encoder parameters are configured correctly
Excessive motor parameter deviation	Set motor parameters and perform motor auto-tuning
Output phase loss or output failure	1. Check motor cable connection 2. Check the connection of the contactor at motor side.
Other causes	Ask for technical support

8.5.1.3 Current control error

Para. No.	Name	Setpoint
E8-31	Enable current control fault detection	0: Disabled 1: Enabled
E8-32	Current control fault detection threshold	10.0% to 80.0%
E8-33	Current control fault detection time	0 ms–500 ms

When [E8-31] = 1, if the deviation between the setpoint and feedback of torque current or excitation current exceeds the current abnormality detection threshold set by E8-32 and the duration exceeds the time set by E8-33, the current control abnormality fault 93-3 is triggered.

The possible causes are as follows:

Possible Cause	Measure
Motor side wire breakage	1. Check the connection of motor phases 2. Check the connection of the contactor at motor side.
The encoder wire is broken or the encoder signal is interfered with seriously	Check encoder wiring and deal with the interference
Incorrect motor parameter setting	Correct motor parameter settings and perform complete motor auto-tuning
Other causes	Ask for technical support

8.5.1.4 Locked-rotor in SVC Speed Open-loop Control

Para. No.	Name	Setpoint
E8-38	Locked-rotor detection time in SVC speed open-loop control	0.000s to 65.000s

When the SVC running speed open-loop is enabled, a locked-rotor can trigger the SVC speed open-loop locked-rotor fault 93-5.

The possible causes are as follows:

Possible Cause	Measure
Check whether the torque limit is set properly	Check the setting of E2-08 ~ E2-13, especially where the communication setpoint is set
Excessive load	Check motor load
motor parameter setting is incorrect	Check motor parameter setting
Motor auto-tuning is required	Set motor parameters and perform motor auto-tuning
Output phase loss or output failure	1. Check motor cable connection 2. Check the connection of the contactor at motor side.
Other causes	Ask for technical support

8.5.2 Motor Overload Protection

Para. No.	Name	Setpoint
E8-00	Enable motor overload software protection	0: Disabled 1: Enabled
E8-01	Gain of motor overload software protection	20% to 1000%
E8-02	Motor overload pre-warning coefficient	50% to 100%

E8-00 = 0: The motor has no overload protection function and there may be a risk of overheat damage to the motor. It is recommended to add a thermal relay between the drive and the motor.

E8-00 = 1: Judging whether the motor is overloaded according to the inverse time limit curve of motor overload protection. The default inverse time limit curve of motor overload is shown in the solid line in the figure.

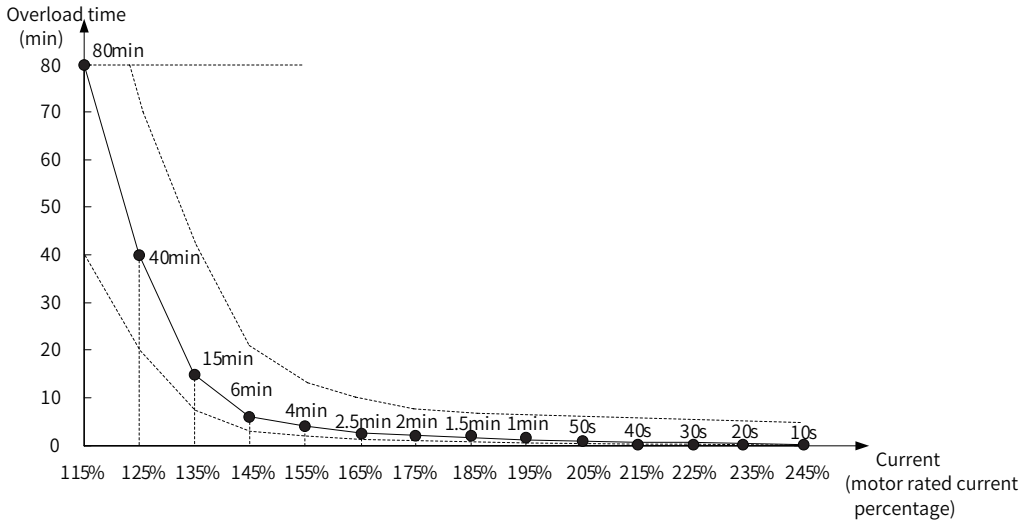


Figure 8-3 Inverse time limit curve of motor overload protection

The upper limit time of motor overload protection is 80 minutes and the lower limit time is 10s. However, the default motor overload curve may not be consistent with the actual motor overload characteristics. The overload curve can be adjusted through the E8-01 (motor overload software protection gain). As shown by the dotted line in the above figure, with the same current, the actual overload protection time is the corresponding time on the default curve multiplied by the motor overload software protection gain.

For example, if the motor is required to report overload under the condition of 130% current for 22 minutes, the calculation method is as follows:

According to the motor overload curve, the 125% current overload time is 40 min and the 135% current overload time is 15 min, then under the default setting, the 130% rated motor current 27.5 min overload is calculated as follows:

$$40+(40-15)/(125\%-135\%)*(130\%-125\%) = 27.5\text{min}$$

Therefore, it can be concluded that the motor is required to report overload under the condition of 130% motor current for 22min, and the motor overload software protection gain is as follows:

$$E8\text{-}01=22/27.5=80\%$$

NOTE

◆ The user needs to correctly set the value of E8-01 according to the actual overload capacity of the motor. When this parameter is set too large, the drive will fail to report ERR11-1 in time, resulting in overheating and damage of the motor.

The motor overload warning coefficient is used for the drive to give an alarm signal in advance before the

motor overload fault occurs. The smaller the coefficient, the greater the advance time. If it is set to 100%, the pre-overload alarm and overload fault will occur simultaneously.

For example, if the motor is required to report overload under the condition of 130% current for 22 minutes, it can be known from the above calculation that E8-01=80%. If E8-02=80% is set under this condition, when the motor runs continuously for 17.6 min (80% × 22 min) under 130% current, the pre-overload state U1-62 of the motor is set to 1.

8.6 Description of Fault Codes

Table 8-1 Description of fault codes

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
1	Hardware fault	1	Current detection circuit fault	The zero drift of three-phase output current is too large	1. Check Hall sensors (HAU, HAV and HAW) 2. Ask for technical support.	Coast to stop	Level cannot be changed	Reset after re-poweron
		2	15 V power supply failure	The 15 V power supply of the HCU is abnormal	Ask for technical support			
		3	EEPROM abnormal	A parameter read-write error occurred	Ask for technical support			
		4	Failed to download model setting too many times	The HINT is faulty or there is too much interference	Ask for technical support			
		5	Failure to upgrade HCU-FPGA software	An error has occurred in the HCU-FPGA program	Ask for technical support			
		6	Failure to upgrade HINT-FPGA software	1. Wrong connection among HINT, HPCU and HCU 2. The HINT-FPGA program is abnormal	1. Check the connection among HINT, HPCU and HCU 2. Ask for technical support			
		8	EEPROM parameter reading timeout	Reading parameters from EEPROM times out	Ask for technical support			
		9	EEPROM parameter storage timeout	Storing parameters to EEPROM times out	Ask for technical support			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
2	Overcurrent	1	Hardware overcurrent	The transient current of a phase exceeds the hardware overcurrent threshold (which is 2.5 times the rated current), and the hardware overcurrent signal lasts for more than 2 us	1. Check the output circuit of the drive for ground fault or short circuit 2. Inverter: Adjust the acceleration and deceleration time 3. Inverter: Check the motor parameter settings	Coast to stop	Level cannot be changed	Manual reset
		2	Software overcurrent	1, A4-20 (software overcurrent evaluation threshold) is too small 2. Drive output circuit is grounded or short-circuited 3. Under the condition of rapid acceleration or deceleration, the acceleration and deceleration time is too short	1, Set A4-20 properly 2. Eliminate peripheral faults and check the motor or output contactor for short circuit 3. Properly set the acc./dec. time			
		6	Phase U hardware overcurrent	The transient current of phase U exceeds the hardware overcurrent threshold (which is 2.5 times the rated current), and the hardware overcurrent signal lasts for more than 2 us	1. Check that the output circuit of the drive is not grounded or short circuited 2. Adjust the acceleration and deceleration time 3. Check that the motor parameters are correct			
		7	Phase V hardware overcurrent	The transient current of phase V exceeds the hardware overcurrent threshold (which is 2.5 times the rated current), and the hardware overcurrent signal lasts for more than 2 us	1. Check that the output circuit of the drive is not grounded or short circuited 2. Adjust the acceleration and deceleration time 3. Check that the motor parameters are correct			
		8	Phase W hardware overcurrent	The transient current of phase W exceeds the hardware overcurrent threshold (which is 2.5 times the rated current), and the hardware overcurrent signal lasts for more than 2 us	1. Check that the output circuit of the drive is not grounded or short circuited 2. Adjust the acceleration and deceleration time 3. Check that the motor parameters are correct			
5	DC overvoltage	1	DC overvoltage	The DC voltage exceeds the upper limit	1. Enable the Vdc_Max overvoltage suppression algorithm 2. Optimize Vdc_Max overvoltage suppression parameters 3. Check that a braking module is equipped and works properly 4. Adjust the deceleration time	Coast to stop	Level cannot be changed	Manual reset

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
9	DC undervoltage	1	DC undervoltage	The DC voltage is smaller than the software undervoltage threshold	1. Enable the Vdc_Min undervoltage suppression algorithm 2. Check that the input voltage is stable	Coast to stop	Level cannot be changed	Manual reset
		2	Low voltage	The motor speed is smaller than the lower limit when Vdc_Min control is enabled	1. Check that the input voltage is stable			
10	Drive overload	1	Drive overload	1. External loads are increased abnormally 2. The power of the AC drive is insufficient 3. Selected load mode is incorrect	1. Reduce the load 2. Use a drive with higher power 3. Set the working mode reasonably according to the actual load conditions. See the corresponding sections of the software user guide for the selection of load mode	Coast to stop	Level cannot be changed	Manual reset
		2	CBC fault	The current is two times the peak rated current, and the number of actions exceeds CBC upper limit	1. Check that the acceleration and deceleration times set by parameters are sufficient 2. Check that the cabinet output circuit is not short circuited 3. Check the DC link voltage 4. Check whether the motor is restarted before it stops rotating. If yes, start the motor through speed track or after it stops 5. Check that no load is unexpectedly added during operation 6. Install a brake chopper or braking resistor			
11	Motor overload	1	Motor overload	The output current remains above the rated motor current for a time period	Reduce the output power	Coast to stop	Coast to stop-Alarm	Manual reset

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
13	Output phase loss	1	U phase loss	Phase U current is significantly smaller than the current of other two phases in multiple current cycles during running	1. Check the output wiring 2. Check that the drive board is normal	Coast to stop	Coast to stop-Alarm	Manual reset
		2	V phase loss	Phase V current is significantly smaller than the current of other two phases in multiple current cycles during running	1. Check the output wiring 2. Check that the drive board is normal			
		3	W phase loss	Phase W current is significantly smaller than the current of other two phases in multiple current cycles during running	1. Check the output wiring 2. Check that the drive board is normal			
		4	Two- or three-phase loss	The output current is constantly smaller than one-fourth of the no-load current in the running process. This error is reported only in asynchronous motor vector control.	1. Check the output wiring 2. Check that the drive board is normal			
14	Module overtemp.	1	Phase U module overtemperature	The temperature of the U phase module exceeds the overtemperature threshold.	1. Check the U phase temperature detection circuit 2. Reduce the ambient temperature 3. Reduce the load ratio	Coast to stop	Level cannot be changed	Manual reset
		2	Phase V module overtemperature	The temperature of the V phase module exceeds the overtemperature threshold.	1. Check the V phase temperature detection circuit 2. Reduce the ambient temperature 3. Reduce the load ratio			
		3	Phase W module overtemperature	The temperature of the W phase module exceeds the overtemperature threshold.	1. Check the W phase temperature detection circuit 2. Reduce the ambient temperature 3. Reduce the load ratio			
		4	Temperature switch fault	The module temperature exceeds the overtemperature threshold	1. Check that the temperature detection circuit is normal 2. Reduce the ambient temperature			
		5	Rectifier module overtemperature	The temperature of the rectifier module exceeds the overtemperature threshold	1. Check the rectifier temperature detection circuit; 2. Reduce the ambient temperature. 3. Reduce the load ratio.			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
15	External fault	1	External fault 1	The input signal is activated: For details, see parameter H0-00	Check whether the setting source is enabled	Coast to stop	Coast to stop-Alarm	Manual reset
		2	External fault 2	The input signal is activated: For details, see parameter H0-01	Check whether the setting source is enabled			
		3	Motor overtemperature	Motor temperature exceeds E8-23	Check the heat dissipation of the motor			
19	Motor auto-tuning error	1	Dynamic auto-tuning failure of UV/UW sampling gain scaling	1. The maximum time defined for an independent auto-tuning step has expired 2. The current auto-tuning step is abnormal according to performance self-test results	1. Check that basic motor parameters are set correctly 2. Check that the power and rated current of the motor and AC drive match 3. Check motor cable connection	Coast to stop	Level cannot be changed	Manual reset
		2	Dynamic auto-tuning failure of stator resistance and transistor voltage drop	1. The maximum time defined for an independent auto-tuning step has expired 2. The current auto-tuning step is abnormal according to performance self-test results	1. Check that basic motor parameters are set correctly 2. Check that the power and rated current of the motor and AC drive match 3. Check motor cable connection			
		3	Dynamic auto-tuning failure of rotor resistance and leakage inductance	1. The maximum time defined for an independent auto-tuning step has expired 2. The current auto-tuning step is abnormal according to performance self-test results	1. Check that basic motor parameters are set correctly 2. Check that the power and rated current of the motor and AC drive match 3. Check motor cable connection			
		4	No-load auto-tuning failure of no-load current and mutual inductance	1. The motor speed upper limit is less than 75% 2. The maximum time defined for an independent auto-tuning step has expired 3. The current auto-tuning step is abnormal according to performance self-test results	1. Change the motor speed upper limit to be more than 75% 2. Check that basic motor parameters are set correctly and that the power and rated current of the motor and AC drive match 3. Check the motor for locked-rotor 4. Check the encoder setting (when a PG card is online)			
		5	With-load auto-tuning failure of asynchronous motor no-load current and mutual inductance	1. The maximum time defined for an independent auto-tuning step has expired 2. The current auto-tuning step is abnormal according to performance self-test results	1. Check that basic motor parameters are set correctly 2. Check that the power and rated current of the motor and AC drive match 3. Check motor cable connection			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
19		6	Failure of motor auto-tuning and load inertia auto-tuning	1. The motor speed upper limit is less than 75% 2. The maximum time defined for an independent auto-tuning step has expired 3. The current auto-tuning step is abnormal according to performance self-test results	1. Change the motor speed upper limit to be more than 75% 2. Check that basic motor parameters are set correctly and that the power and rated current of the motor and AC drive match 3. Check the motor for locked-rotor 4. Check the encoder setting (when a PG card is online)	Coast to stop	Level cannot be changed	Manual reset
		16	Auto-tuning interruption	1. Auto-tuning interruption 2. Auto-tuning error	1, Ensure that the start/stop control word is normal during auto-tuning 2. Troubleshoot according to reported information			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
20[1]	Encoder fault	1	Encoder wire breakage (hardware detection)	Encoder wire breakage is detected	Check the encoder and cabling. Switch to SVC before running	Coast to stop (alarm)	Coast to stop-Alarm	Manual reset
		2	Encoder parameter error	The encoder feedback speed and command speed are not the same during no-load current auto-tuning in V/F control	Check and correct the motor and encoder parameters			
		3	Speed test error (software) (reserved)	The difference between the SVC estimated speed and encoder feedback speed is too large	Check that the software test parameters are correct. Switch to SVC if the problem remains			
		4	The motor runs with no encoder in FVC	The motor runs with no encoder in FVC	Check that the PG card is inserted and activated			
		5	Encoder speed test fluctuation exceeding the allowable range	The encoder feedback speed or pulse abrupt change exceeds the encoder signal abnormality detection threshold	1. Check that the encoder is firmly mounted and that the encoder shaft and the motor shaft are concentric 2. Check the encoder for wire breakage and pulse loss. Check that the shielding layer of the signal cable is connected as required, and that the signal cable is grounded and separated from the power cable 3. If the above requirements are not met, set n4/n5/n6-21 to a larger value to increase the threshold or set n4/n5/n6-20 to 0 to disable the fault detection 4. When possible, switch to SVC mode or use E11-03 to enable passive SVC switchover			
		6	Passive switchover from FVC to SVC is effective	The running mode is passively switched to SVC due to encoder feedback error even if FVC is enabled and E11-03 is set to 1. An error is reported after the motor is stopped	1. Check the encoder and cabling 2. Switch to SVC when possible			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
22	Motor auto-tuning result error	1	Encoder not connected	No encoder signal is detected during dynamic auto-tuning	1. Check that the encoder related parameters are set correctly and match the encoder type (check the setting of group n4/n5/n6 parameters according to the selection of d0.11) 2. Check that the encoder wiring is correct 3. In the case of SVC or V/F, if no encoder is required, disable the encoder module (according to the setting of d0.11, set n4.00/n5.00/n6.00 to 0)	Coast to stop	Level cannot be changed	Manual reset
		2	Wrong encoder pulses per revolution	The speed feedback value detected during dynamic auto-tuning is inconsistent with the speed reference	Check that the encoder pulses per revolution is set correctly			
		4	Wrong basic motor parameters	The basic motor parameter setting is out of normal range	Check that the basic motor parameter settings are consistent with motor parameters			
		5	Wrong motor expansion parameters	The parameter setting obtained by auto-tuning is out of normal range	Check that the basic motor parameter settings are consistent with motor parameters			
31	PID feedback loss	1	PID feedback loss	When process PID is enabled, the PID feedback value is smaller than the feedback loss detection threshold L4-27 and the time exceeds the preset time L4-28	Check the feedback circuit and adjust the parameter settings	Coast to stop	Coast to stop-Alarm	Manual reset
32	MD880 Inverter fan fault	2	MD880 Inverter fan fault	1. Check the fan 2. Check the power board of the fan	3. Check the fan and fan wiring 2. Check the power board of the fan	Alarm	Coast to stop-No abnormity handling	Automatic alarm reset
42	Motor speed setpoint - actual value deviation out of range	1	Motor speed setpoint - actual value deviation out of range	The difference between the motor feedback speed and the speed reference exceeds the error set by software	Modify the corresponding parameter setting, for example, speed loop parameters	Alarm	Level cannot be changed	Automatic alarm reset
43	Motor speed out of limit	1	Motor speed out of limit	The motor feedback speed remains above the maximum speed for a time period	1. Check the actual load of the motor 2. Check whether the torque limit setting is normal 3. Use a drive with proper power class	Coast to stop	Level cannot be changed	Manual reset

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
44	Expansion module offline	1	Encoder detection module 1 activated but offline	The slot is activated but no data is received in 0.5s	Reinstall the expansion card	Coast to stop	Coast to stop-Alarm	Manual reset
		2	Encoder detection module 2 activated but offline	The slot is activated but no data is received in 0.5s	Reinstall the expansion card			
		3	Encoder detection module 3 activated but offline	The slot is activated but no data is received in 0.5s	Reinstall the expansion card			
		4	I/O Module 1 activated but offline	The slot is activated but no data is received in 0.5s	Reinstall the expansion card			
		5	I/O Module 2 activated but offline	The slot is activated but no data is received in 0.5s	Reinstall the expansion card			
		6	I/O Module 3 activated but offline	The slot is activated but no data is received in 0.5s	Reinstall the expansion card			
		7	Bus adapter A activated but offline, configured comm. card offline	The slot is activated but no data is received in 0.5s	Reinstall the expansion card			
		8	Bus adapter B activated but offline, configured comm. card offline	The slot is activated but no data is received in 0.5s	Reinstall the expansion card			
		9	Redundant bus adapter activated but offline, configured comm. card offline	The slot is activated but no data is received in 1s	Reinstall the expansion card			
		10	Synchronous voltage detection module activated but offline	The slot is activated but no data is received in 1s	Reinstall the expansion card			
		11	Dual-port RAM card activated but offline	The slot is activated but no data is received in 1s	Reinstall the expansion card			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
45	Expansion module slot address conflict	1	Slot address conflict between encoder detection modules 1 and 2	The slot addresses conflict. n4-00 and n5-00 may set the same slot number	Check and reset n4-00 and n5-00.	Coast to stop	Coast to stop-Alarm	Manual reset
		2	Slot address conflict between encoder detection modules 1 and 3	The slot addresses conflict. n4-00 and n6-00 may set the same slot number	Check and reset n4-00 and n6-00.			
		3	Slot address conflict between encoder detection modules 2 and 3	The slot addresses conflict. n5-00 and n6-00 may set the same slot number	Check and reset n5-00 and n6-00			
		4	Slot address conflict between I/O modules 1 and 2	The slot addresses conflict. n7-00 and n8-00 may set the same slot number	Check and reset n7-00 and n8-00			
		5	Slot address conflict between I/O modules 1 and 3	The slot addresses conflict. n7-00 and n9-00 may set the same slot number	Check and reset n7-00 and n9-00			
		6	Slot address conflict between I/O modules 2 and 3	The slot addresses conflict. n8-00 and n9-00 may set the same slot number	Check and reset n8-00 and n9-00			
45	Expansion module slot address conflict	7	Slot address range conflict between bus adapters A and B	The slot address ranges conflict: 1. The slot numbers of two communication modules conflict 2. The slot number of the communication module specified by bus adapter A/B is incorrect	1. Correctly set the card slot position of the corresponding communication module 2. Correctly install the card slot position of the corresponding communication module	Coast to stop	Coast to stop-Alarm	Manual reset
		8	Slot address range conflict between bus adapter A and the redundant bus adapter	The slot address ranges conflict: 1. The slot numbers of two communication modules conflict 2. The slot number of the communication module specified by bus adapter A/B is incorrect	1. Correctly set the card slot position of the corresponding communication module 2. Correctly install the card slot position of the corresponding communication module			
		9	Slot address range conflict of bus adapter B and the redundant bus adapter	The slot address ranges conflict: 1. The slot numbers of two communication modules conflict 2. The slot number of the communication module specified by bus adapter A/B is incorrect	1. Correctly set the card slot position of the corresponding communication module 2. Correctly install the card slot position of the corresponding communication module			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
46	Parameter setting warning	1	Incorrect parameter setting	For details, see parameter U8-44	Check that parameters are set correctly. The alarm is automatically reset after parameters are set correctly	Alarm	Alarm-No abnormity handling	Automatic alarm reset
50	SD card error	1	SD card not detected	No SD card is inserted in the slot	1. Reinstall the SD card 2. Replace the SD card	Alarm	Alarm-No abnormity handling	Automatic alarm reset
		2	SD card error	No data is exchanged during communication for a time period	1. Reinstall the SD card 2. Replace the SD card			
51	RTC error	1	Insufficient power supply for the HCU-RTC unit	The battery voltage is lower than 2.2 V	Replace the RTC battery	Alarm	Alarm-No abnormity handling	Automatic alarm reset
		2	HCU-RTC read/ write timeout	The RTC read/write time exceeds the preset value (1.6s)	Ask for technical support			Reset after re-poweron
52	Local control fault	1	IDS communication error	Communication failure is detected after the AC drive is started by the InoDriveStudio	Check the communication between the InoDriveStudio and controller	Coast to stop	Level cannot be changed	Manual reset
		2	SOP-20 communication error	The SOP-20 is offline after the AC drive is started by the SOP-20	Check the cable connection between the SOP-20 and controller			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
53[2]	Drive communication error	1	CRC detected error in data received by HINT	A CRC error occurred in the data the HINT receives from the HCU or HPCU	1. Check connection of data reception FO cable on the HINT board 2. Ask for technical support	Coast to stop	Level cannot be changed	Manual reset
		2	HINT authentication error	The ID of the HINT board is wrong	1. Check that the HINT board matches the HCU 2. Ask for technical support			
		3	Data reception failure of HCU	The HCU failed to receive data from the HINT or HPCU	1. Check that the data reception FO cable on the HCU is properly connected 2. Ask for technical support			
		4	HCU-received data CRC error	A CRC error occurred in the data the HCU receives from the HINT or HPCU	1. Check that the data reception FO cable on the HCU is properly connected 2. Ask for technical support			
		5	HINT sync fault	A HINT carrier synchronization fault occurred	Ask for technical support			
		6	PWM data write time out	A timeout error occurs during real-time downstream data interaction of DSP and FPGA of the control board	Ask for technical support			
		7	Data reception failure of HINT	The HINT failed to receive data from the HCU or HPCU	1. Check that the data reception FO cable on the HINT board is properly connected 2. Ask for technical support			
		8	CRC error in data received by HPCU from HCU	A CRC error occurred in the data the HPCU receives from the HCU	1. Check that the FO cable between the HPCU and HCU is properly connected 2. Ask for technical support			
		9	Data reception failure of HPCU from HCU	The HPCU failed to receive data from the HCU	1. Check that the FO cable between the HPCU and HCU is properly connected 2. Ask for technical support			
		10	CRC error in data received by HPCU from HINT	A CRC error occurred in the data the HPCU receives from the HINT	1. Check that the FO cable between the HPCU and HINT is properly connected 2. Ask for technical support			
		11	Data reception failure of HPCU from HINT	The HPCU failed to receive data from the HINT	1. Check that the FO cable between the HPCU and HINT is properly connected 2. Ask for technical support			
		12	HPCU synchronization error	An error occurred during HPCU carrier synchronization	Ask for technical support			
		13	HINT is not ready	HINT is not ready	1. Reset the fault 2. Ask for technical support			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
57	IGBT fault	1	U-phase upper bridge arm fault	1. Drive output circuit is grounded or short-circuited 2. IGBG is damaged 3. The power board is damaged 4. The cable between the interface board and the power board is not reliably connected 5. The cable between the power board and the gate driver board is not reliably connected	1. Check whether the output cable and motor are grounded 2. Check the motor cable for phase-to-phase short circuit 3. If the motor cable is not in good contact, tighten the wiring screws 4. Replace the drive board or module. 5. Ask for technical support.	Coast to stop	Level cannot be changed	Manual reset
		2	U-phase lower bridge arm fault	1. Drive output circuit is grounded or short-circuited 2. IGBG is damaged 3. The power board is damaged 4. The cable between the interface board and the power board is not reliably connected 5. The cable between the power board and the gate driver board is not reliably connected	1. Check whether the output cable and motor are grounded 2. Check the motor cable for phase-to-phase short circuit 3. If the motor cable is not in good contact, tighten the wiring screws 4. Replace the drive board or module. 5. Ask for technical support.			
		3	V-phase upper bridge arm fault	1. Drive output circuit is grounded or short-circuited 2. IGBG is damaged 3. The power board is damaged 4. The cable between the interface board and the power board is not reliably connected 5. The cable between the power board and the gate driver board is not reliably connected	1. Check whether the output cable and motor are grounded 2. Check the motor cable for phase-to-phase short circuit 3. If the motor cable is not in good contact, tighten the wiring screws 4. Replace the drive board or module. 5. Ask for technical support.			
		4	V-phase lower bridge arm fault	1. Drive output circuit is grounded or short-circuited 2. IGBG is damaged 3. The power board is damaged 4. The cable between the interface board and the power board is not reliably connected 5. The cable between the power board and the gate driver board is not reliably connected	1. Check whether the output cable and motor are grounded 2. Check the motor cable for phase-to-phase short circuit 3. If the motor cable is not in good contact, tighten the wiring screws 4. Replace the drive board or module. 5. Ask for technical support.			
		5	W-phase upper bridge arm fault	1. Drive output circuit is grounded or short-circuited 2. IGBG is damaged 3. Power board is damaged 4. The cable between the interface board and the power board is not reliably connected 5. The cable between the power board and the gate driver board is not reliably connected	1. Check whether the output cable and motor are grounded 2. Check the motor cable for phase-to-phase short circuit 3. If the motor cable is not in good contact, tighten the wiring screws 4. Replace the drive board or module. 5. Ask for technical support.			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
57	IGBT fault	6	W-phase lower bridge arm fault	1. Drive output circuit is grounded or short-circuited 2. IGBG is damaged 3. The power board is damaged 4. The cable between the interface board and the power board is not reliably connected 5. The cable between the power board and the gate driver board is not reliably connected	1. Check whether the output cable and motor are grounded 2. Check the motor cable for phase-to-phase short circuit 3. If the motor cable is not in good contact, tighten the wiring screws 4. Replace the drive board or module. 5. Ask for technical support.	Coast to stop	Level cannot be changed	Manual reset
		7	IGBT fault	1. There is ground or short circuit in the drive output loop 2. IGBG is damaged 3. The power board is damaged 4. The cable between the interface board and the power board is not reliably connected 5. The cable between the power board and the gate driver board is not reliably connected	1. Check whether the output cable and motor are grounded 2. Check the motor cable for phase-to-phase short circuit 3. If the motor cable is not in good contact, tighten the wiring screws 4. Replace the drive board or module. 5. Ask for technical support.			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
58	Self-check error	1	IGBT short circuit	IGBT short circuit	Check the drive board	Coast to stop	Level cannot be changed	Manual reset
		2	AC drive output short circuited	AC drive output short circuited	1. Check the output cable for short circuit 2. Check the motor winding for short circuit			
		3	AC drive output phase loss	Output phase loss occurred before the AC drive runs or during power-on detection	1. Check output wiring 2. Check the motor winding for wire breakage			
		4	Sensor detection error	The current of one phase in three-phase output is too large	Replace the corresponding current sensor			
		5	Sensor inversely installed	The current of one phase in three-phase current is reversed	Reverse the sensor installation direction			
		6	Short circuit to ground	The output end is short circuited to ground	1. Check whether the output end of the AC drive is short circuited to ground 2. Check whether motor winding is short circuited to ground			
		7	Three-phase current unbalance	Three-phase current unbalance is detected	1. Check the values of current sensors 2. Check that motor winding is not short circuited to ground			
		8	Two-phase current unbalance	The detection error is too large for the two-phase output current among the one current input and two current outputs of three-phase motor winding	1. Check the values of current sensors 2. Check the motor winding for three-phase symmetry			
		16	Self-check interruption	1. Self-check interrupted 2. Self-check error	1. Ensure that the start-stop control word is normal in the self-check process 2. Troubleshoot according to reported information			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
59	Low module temperature	1	Phase U IGBT low temperature	Phase U temperature is lower than the preset low temperature detection threshold (default: -15° C)	1. Check phase U temperature detection circuit 2. Increase IGBT temperature	Coast to stop	Coast to stop-Alarm	Manual reset
		2	Phase V IGBT low temperature	Phase V temperature is lower than the preset low temperature detection threshold (default: -15° C)	1. Check phase V temperature detection circuit 2. Increase IGBT temperature			
		3	Phase W IGBT low temperature	Phase W temperature is lower than the preset low temperature detection threshold (default: -15° C)	1. Check phase W temperature detection circuit 2. Increase IGBT temperature			
		4	Rectifier module temperature too low	The rectifier module temperature is lower than the preset low temperature fault test threshold (default: -15° C)	1. Check the rectifier module temperature detection circuit 2. Increase IGBT temperature			
60	Ambient temperature out of the normal range	1	High ambient temperature	The ambient temperature is higher than 65° C	1. Check the ambient temperature detection circuit 2. Reduce the ambient temperature	Alarm	Level cannot be changed	Automatic alarm reset
61	Speed track failure	1	Speed tracking current too large	The output current is 1.2 times larger than the rated motor current during speed tracking	Properly increase the speed tracking current reference, speed tracking time, and scaling for speed tracking current	Coast to stop	Level cannot be changed	Manual reset
		2	Speed tracking time too long	The speed tracking time is five times larger than the rotor time constant	Properly increase the speed tracking current reference, speed tracking time, and scaling for speed tracking current			
63	External alarm	1	External alarm 1	The input signal is activated: For details, see parameter H0-02	1. Check whether the setting source is enabled 2. Check that parameters are set correctly	Alarm	Level cannot be changed	Automatic alarm reset
		2	External alarm 2	The input signal is activated: For details, see parameter H0-03	1. Check whether the setting source is enabled 2. Check that parameters are set correctly			
		3	Motor overtemperature alarm	The motor temperature exceeds the value of E8-24.	Check that the heat dissipation of the motor is normal			
		4	OFF2/OFF3 stop	The OFF2/OFF3 input signal is activated. For details, see the notes for A0-16 and A0-17 and relevant parameters in group b	1. Check the state of the external signal 2. Check the parameter configuration			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
64	Precharge failure	1	Precharge failure	1. No or low DC bus voltage 2. Improper drive voltage class 3: Incorrect drive model 4. Start the drive when the DC bus voltage is not pre-charged 5. Improper DC bus voltage correction coefficient	1. Set DC bus voltage correctly 2. Use a drive with proper voltage class 3. Start the drive after the DC bus voltage is normal 4. Check the DC bus voltage sampling gain A3-06 5. Ask for technical support.	Coast to stop	Level cannot be changed	Manual reset
65	Parameter processing error	1	Default setting restoration interrupted	HCU encounters a power failure when default settings are restored	Execute the Restore All Default Settings command	Coast to stop	Level cannot be changed	Manual reset
		2	Parameter downloading interrupted (restoration from the SD card)	1. HCU power failure or SD card error occurred during downloading SD card parameters 2. SOP-20 power failure or SOP-20 SD card error occurred during downloading SOP-20 parameters	Execute the Restore All Default Settings command, or run the Parameter Backup-Restore from SD card/ SOP-20 function			
		3	Parameter cache capacity exceeded	The preset parameter storage cache capacity is exceeded due to massive abnormal storage operations	Ask for technical support			
		4	Parameter storage timeout during parameter downloading	Parameter storage timeout during parameter downloading	Restore default settings again after power-on			
66	Leakage current error	2	Excessive leakage current (software detection)	The detected leakage current is larger than the permitted value	1. Check that the positive and negative buses are properly grounded 2. Check that the leakage current detection circuit is normal 3. Check and set the leakage current detection threshold	Coast to stop	Coast to stop-Alarm	Manual reset

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
67	Bus adapter A communication card error	1	External bus timeout	The communication between the communication card and host computer times out	Check the cable connection between the communication card and host computer	Coast to stop	Coast to stop-Alarm	Manual reset
		2	Incorrect communication parameter setting (The address or baud rate is incorrectly set.)	The address or baud rate is incorrectly set	Check and set the communication address or baud rate			
		3	Adapter A bus address conflict	Address conflict between slave stations	Set the addresses of slave stations again			
		4	Wrong adapter A DP parameter settings	The DP communication parameters are incorrectly set	Check the DP communication setting			
		5	Wrong adapter A DP configuration	The DP communication configuration is incorrect	Check the DP communication setting			
		6	Mismatch between PDO transmission length and configured length of adapter A	The process data length does not match the setting	Check the DP communication setting			
		7	Adapter A EtherCAT EEPROM loading error	The EtherCAT card encounters an EEPROM loading error	1. Perform the EEPROM write operation again 2. Ask for technical support			
		8	Adapter A EtherCAT initialization error	An error occurred when the communication parameters of the EtherCAT card are initialized	Check the parameters			
		9	Adapter A EtherCAT master station switchover error	Master station switchover error	Switchover failure due to wrong configuration of slave station			
		15	Communication card receiving data CRC error	The number of CRC errors of the data transmitted by the bus adapter reaches the threshold	1. Modify the CRC threshold 2. Ask for technical support			
		16	Communication card sending data CRC error	The number of CRC errors of the data received by the bus adapter reaches the threshold	1. Modify the CRC threshold 2. Ask for technical support			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
68	Bus adapter B communication card error	1	External bus timeout	The communication between the communication card and host computer times out	Check the cable connection between the communication card and host computer	Coast to stop	Coast to stop-Alarm	Manual reset
		2	Incorrect communication parameter setting (The address or baud rate is incorrectly set.)	The address or baud rate is incorrectly set	Check and set the communication address or baud rate			
		3	Adapter B bus address conflict	Address conflict between slave stations	Set the addresses of slave stations again			
		4	Wrong adapter B DP parameter settings	The DP communication parameters are incorrectly set	Check the DP communication setting			
		5	Wrong adapter B DP configuration	The DP communication configuration is incorrect	Check the DP communication setting			
		6	Mismatch between PDO transmission length and configured length of adapter B	The process data length does not match the setting	Check the DP communication setting			
		7	Adapter B EtherCAT EEPROM loading error	The EtherCAT card encounters an EEPROM loading error	1. Perform the EEPROM write operation again 2. Ask for technical support			
		8	Adapter B EtherCAT initialization error	An error occurred when the communication parameters of the EtherCAT card are initialized	Check the parameters			
		9	Adapter B EtherCAT master station switchover error	Master station switchover error	Switchover failure due to wrong configuration of slave station			
		15	Communication card receiving data CRC error	The number of CRC errors of the data transmitted by the bus adapter reaches the threshold	1. Modify the CRC threshold 2. Ask for technical support			
		16	Communication card sending data CRC error	The number of CRC errors of the data received by the bus adapter reaches the threshold	1. Modify the CRC threshold 2. Ask for technical support			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
69	Redundant adapter communication card error	1	Redundant adapter external bus timeout	The communication between the communication card and host computer times out	Check the cable connection between the communication card and host computer	Coast to stop	Coast to stop-Alarm	Manual reset
		2	Redundant adapter wrong comm. parameter settings (address or baud rate)	The address or baud rate is incorrectly set	Check and set the communication address or baud rate			
		3	Redundant adapter bus address conflict	Address conflict between slave stations	Set the addresses of slave stations again			
		4	Redundant adapter wrong DP parameter	The DP communication parameters are incorrectly set	Check the DP communication setting			
		5	Redundant adapter wrong DP configuration	The DP communication configuration is incorrect	Check the DP communication setting			
		6	Redundant adapter mismatch between PDO transmission length and configured length	The process data length does not match the setting	Check the DP communication setting			
		7	Redundant adapter EtherCAT EEPROM loading error	The EtherCAT card encounters an EEPROM loading error	1. Perform the EEPROM write operation again 2. Ask for technical support			
		8	Redundant adapter EtherCAT initialization error	An error occurred when the communication parameters of the EtherCAT card are initialized	1. Modify the CRC threshold 2. Ask for technical support			
		9	Redundant adapter EtherCAT master station switchover error	Master station switchover error	1. Switchover failure due to wrong configuration of slave station 2. Re-configure the slave station according to the ESC feedback error command before switchover			
		15	Redundant adapter comm. card received data CRC error	The number of CRC errors of the data transmitted by the bus adapter reaches the threshold	1. Modify the CRC threshold 2. Ask for technical support			
		16	Redundant adapter comm. card transmitted data CRC error	The number of CRC errors of the data received by the bus adapter reaches the threshold	1. Modify the CRC threshold 2. Ask for technical support			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
70	Inverter fan fault	1	Incorrect inverter fan phase sequence	1. Check fan power supply phase sequence 2. Check the input power of the phase sequence detector for low voltage or phase loss	1. Check fan power supply phase sequence 2. Check the input power of the phase sequence detector for low voltage or phase loss	Coast to stop	Coast to stop-Alarm	Manual reset
		2	Abnormal inverter fan status	1. Fan is overheated 2. Abnormal DI feedback circuit	1. Check the fan for locked-rotor 2. Check the fan for phase loss 3. Check whether the fan feedback DI signal is loose or disconnected 4. Ask for technical support.			
74	Rectifier brake unit abnormal	2	Braking transistor overtemperature	The braking transistor temperature exceeds the protection value	1. Check that system heat dissipation is normal 2. Ask for technical support	Coast to stop	Coast to stop-Alarm	Manual reset
		5	Braking transistor temperature too low or not connected to the NTC	Braking transistor temperature too low or not connected to the NTC	1. Check the wiring 2. Ask for technical support			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
76	Rectifier module temperature out of the normal range	1	Module 1 overtemperature	The module temperature exceeds the overtemperature threshold	1. Check that the load is not too large 2. Check that the temperature detection circuit is normal 3. Check that the ambient temperature is not too high 4. Ask for technical support	Coast to stop	Level cannot be changed	Manual reset
		2	Module 2 overtemperature	The module temperature exceeds the overtemperature threshold	1. Check that the load is not too large 2. Check that the temperature detection circuit is normal 3. Check that the ambient temperature is not too high 4. Ask for technical support			
		3	Module 3 overtemperature	The module temperature exceeds the overtemperature threshold	1. Check that the load is not too large 2. Check that the temperature detection circuit is normal 3. Check that the ambient temperature is not too high 4. Ask for technical support			
		4	Module 1 temperature too low or not connected to the NTC	IGBT temperature is lower than A4-22	1. Check that the temperature detection circuit is normal 2. Check that the ambient temperature is not too low 3. Ask for technical support			
		5	Module 2 temperature too low or not connected to the NTC	IGBT temperature is lower than A4-22	1. Check that the temperature detection circuit is normal 2. Check that the ambient temperature is not too low 3. Ask for technical support			
		6	Module 3 temperature too low or not connected to the NTC	IGBT temperature is lower than A4-22	1. Check that the temperature detection circuit is normal 2. Check that the ambient temperature is not too low 3. Ask for technical support			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
77	Abnormal reactor temperature	1	Reactor overtemperature	The reactor temperature exceeds the overtemperature threshold	1. Check that the temperature switch signal is normal 2. Check that the ambient temperature is not too high 3. Ask for technical support	Coast to stop	Level cannot be changed	Manual reset
78	Rectifier cabinet internal temperature out of the normal range	1	High temperature	The cabinet internal temperature exceeds the overtemperature threshold	1. Check that the temperature detection circuit is normal 2. Check that the ambient temperature is not too high 3. Ask for technical support	Coast to stop	Level cannot be changed	Manual reset
		2	Low temperature or NTC not connected	Cabinet internal temperature is lower than A4-22	1. Check that the temperature detection circuit is connected 2. Check that the ambient temperature is not too low 3. Ask for technical support			
79	Abnormal DC voltage	2	High voltage	[Software check] DC link voltage exceeds the overvoltage threshold	1. Check that the voltage at the input side is not too high 2. Check that the post-load is not too large 3. Check that the preset current limit is correct 4. Check that the voltage class is correctly set 5. Ask for technical support	Coast to stop	Level cannot be changed	Manual reset
		3	Low voltage	The software determines that the bus voltage is below the undervoltage threshold	1. Check that the voltage at the input side is not too low 2. Check that the post-load is not too large 3. Check that the preset current limit is correct 4. Check that the voltage class is correctly set 5. Ask for technical support			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
80	Rectifier unit abnormal	1	HE200-1# rectifier unit offline	Rectifier unit 1 of the HE200 is improperly connected or the expansion slot number is incorrectly set	Check the cable connection and set the expansion slot number correctly	Coast to stop	Level cannot be changed	Manual reset
		2	HE200-2# rectifier unit offline	Rectifier unit 1 of the HE200 is improperly connected or the expansion slot number is incorrectly set	Check the cable connection and set the expansion slot number correctly			
		3	HE200 rectifier unit expansion card setting conflict	The expansion slot settings of HE200 rectifier units conflict	Set the expansion slot numbers correctly			
		5	HE200-ZINT board voltage level mismatching	The voltage class of the ZINT board is incorrectly set	1. Check the DIP switch of the ZINT board 2. Ask for technical support			
82<2>	DC precharge fault	1	DC precharge fault	1. Poor contact or failure of DC precharge unit 2. The main pole of the DC precharge unit has opened	1. If there is no DC precharge unit, set A4-11 to prohibit precharge resistance detection to reset the fault 2. If a DC precharge unit is equipped, check the precharge unit for normal contact and manual switch-off 3. Replace the DC precharge unit 4. Ask for technical support	Coast to stop	Level cannot be changed	Manual reset

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
83[2]	Master-slave comm. fault	1	InoLink: address conflict	Node-ID setting conflict	Correct node addresses	Coast to stop	Coast to stop-Alarm	Manual reset
		2	InoLink: Communication offline	The node receives no data	Check comm. cable connection			
		3	InoLink: receiver offline	The node does not receive the required data	Check that the node that stores the required data is correctly connected			
		4	InoLink communication: same address of data sending and receiving nodes	A node cannot receive data from itself	Check the setting of the node that receives the data			
		5	FO sync comm. expansion module: node address conflict	The address of the local node conflicts with that of another node on the network	Reset the node address			
		6	FO sync comm. expansion module: data interruption of the data receiving node A	Node A is offline after communication is established. For details, check n22-06	1. Check the wiring of the corresponding address of the data receiving node A 2. Adjust the communication interruption evaluation time			
		7	FO sync comm. expansion module: data interruption of the data receiving node B	Node B is offline after communication is established. For details, check n22-07	1. Check the wiring of the corresponding address of the data receiving node B 2. Adjust the communication interruption evaluation time			
		8	FO sync comm. expansion module: data interruption of the data receiving node C	Node C is offline after communication is established. For details, check n22-08	1. Check the wiring of the corresponding address of the data receiving node C 2. Adjust the communication interruption evaluation time			
		9	FO sync comm. expansion module: module offline	The communication network is started but the local heartbeat feedback value is not updated for more than 0.3s	Check the wiring of the FO sync comm. expansion module			
		10	FO sync comm. expansion module: data reception error	1. Received data is not requested by the local machine 2. The data sending and receiving cables between modules are incorrectly connected	Check the wiring of the FO sync comm. expansion module			
84	Brake control error	1	Brake opening failed	The braking command is generated but there is no feedback signal	Check the cabling of the signal feedback point or feedback source	Coast to stop	Coast to stop-Alarm	Manual reset
		2	Brake closing failed	The braking command is generated but there is no feedback signal	Check the cabling of the signal feedback point or feedback source			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
85	Internal fault	1	HCU internal data exchange error	The DSP data interaction of the HCU module is abnormal	Ask for technical support	Coast to stop	Level cannot be changed	Manual reset
		3	State machine out of range	The state machine is out of the predefined range	Ask for technical support			
		4	Abnormal interrupt generation	The HCU module generates an abnormal interrupt	Ask for technical support			
		5	HCU internal data synchronization error	Data synchronization of DSP and FPGA of the HCU module is abnormal	Ask for technical support			
88	Model parameter error	1	Model code does not exist	1. The HINT is abnormal 2. The model displayed on the HINT does not exist 3. The model set by parameters does not exist	1. Restart and replace the HINT. 2. Set the model again and download the model setting to the HINT. 3. Set a proper model and download the model setting to the HINT.	Coast to stop	Level cannot be changed	Manual reset
		2	Model parameter changed	The model parameters are modified but not downloaded	Download the parameters			
		3	Model parameter mismatch	The model parameters preset on the HCU are inconsistent with that read from the HINT	Reset the error directly because the model parameters read from the HINT will overwrite those preset on the HCU			
		4	Inconsistent model codes	Not all the model codes on the HINT modules of parallel modules are consistent	Set parameter A3-00 correctly and download the setting to the problematic HINT module(s)			
		6	Mismatch between model and software	The power-related model parameters are not suitable for the controller software, and the controller cannot work properly	1. Check that the software type of the HCU controller matches the function unit 2. If the power unit is not the expected type, replace it 3. If the HCU controller software is not the expected type, replace the HCU controller			
		7	Model code not identified	The HCU does not recognize the model code read from the HINT	Set parameter A3-00 correctly and download the setting			
		8	Unknown set PM-code	The HCU does not recognize the model code set in A3-00	Set parameter A3-00 correctly and download the setting			
88	Model parameter error	9	Correction coefficient out of range	The correction coefficient read from the HINT is out of the normal range	Set the correction coefficient correctly and download the setting	Coast to stop	Level cannot be changed	Manual reset:
		16	Mismatch between model setting and function parameter	The HE200 is used as a rectifier only but inverter function is not disabled in parameter A14-39	Reset the model or disable the inverter function			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
89[3]	HCU 24 V power supply failure	1	Over-low 24 V power supply voltage	The 24 V power supply voltage is too low	Check the HCU power supply	Alarm (coast to stop)	Level cannot be changed	Automatic alarm reset
91	Parallel mode error	1	Mode setting conflict	1. Parameters are set to single mode but the HPCU is connected 2. Parameters are set to parallel mode but the HPCU is not connected	1. Check that the HINT and HPCU are properly connected 2. Set parameters correctly	Coast to stop	Coast to stop-Alarm	Manual reset
		2	Mismatch of enabled units and online units	Mismatch of enabled module and online module	1. Check the cable connection of each module 2. Check the setting of enabled module			
		4	HPCU is offline	The HCU fails to receive data from the HPCU in parallel mode	1. Check that the power supply of the HPCU is normal 2. Check that the HPCU and HCU are properly connected			
92	Parallel mode fault	2	Parallel unit phase U loss	Phase U current is significantly smaller than the current of other two phases in multiple current cycles during running	1. Check the output wiring 2. Check that the drive board is normal	Coast to stop	Level cannot be changed	Manual reset
		3	Parallel unit phase V loss	Phase V current is significantly smaller than the current of other two phases in multiple current cycles during running	1. Check the output wiring 2. Check that the drive board is normal			
		4	Parallel unit phase W loss	Phase W current is significantly smaller than the current of other two phases in multiple current cycles during running	1. Check the output wiring 2. Check that the drive board is normal			
		5	Parallel unit bus voltage detection error	The bus voltage sampling value in parallel mode is incorrect	1. Check bus connection 2. Ask for technical support			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
93	Motor control fault	1	Motor with locked rotor	1. The load is too large 2. The motor parameter is incorrect 3. The encoder is faulty 4. Output phase loss occurred	1. Check the motor load 2. Check that the motor is properly connected 3. Check the motor parameters. If any error is found, perform motor parameter auto-tuning again 4. Check that the encoder is properly connected 5. Ask for technical support	Coast to stop	Coast to stop-Alarm	Manual reset
		2	Motor stall	1. The motor parameter is abnormal 2. Output phase loss occurs 3. The encoder has a fault 4. The load is too large	1. Check that the motor is properly connected 2. Check the motor parameters. If any error is found, perform motor parameter auto-tuning again 3. Check that the encoder is properly connected 4. Ask for technical support			
		3	Current control error	In the vector control mode, the motor feedback current does not follow the reference for a long time	1. Check that the motor is properly connected 2. Ask for technical support			
		4	Two- or three-phase loss	During running, the output current is continuously smaller than one-fourth of the no-load current. This fault only occurs in asynchronous motor vector control	1. Check the output wiring 2. Check that the drive board is normal			
99	Parallel module current unbalance warning	1	Power module phase U current unbalance	1. Phase U current circuit is abnormal 2. The phase U IGBT is faulty	1. Check deviation for the actual output current 2. Ask for technical support	Alarm	Level cannot be changed	Automatic alarm reset
		2	Power module phase V current unbalance	1. Phase V current circuit is abnormal 2. The phase V IGBT is faulty	1. Check deviation for the actual output current 2. Ask for technical support			
		3	Power module phase W current unbalance	1. Phase W current circuit is abnormal 2. The phase W IGBT is faulty	1. Check deviation for the actual output current 2. Ask for technical support			
100	Abnormal fault information	1	Generation of abnormal fault information	The generated drive fault is out of range	Ask for technical support	Coast to stop	Level cannot be changed	Manual reset
		2	Subcode error	The generated fault subcode is out of range	Ask for technical support			
		3	Main fault code error	The generated main fault code is out of range	Ask for technical support			
		4	Exchange data error	The exchange table version is incorrect	Ask for technical support			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
101	HINT error	1	The HINT type does not match the HCU	The HINT type does not match the HCU	1. Check that the HINT is not replaced with a wrong one 2. Ask for technical support	Coast to stop	Level cannot be changed	Manual reset
		2	Mismatch of HINT software versions	In the parallel mode, the HINT modules are inconsistent in software version	1. Check that the HINT is not replaced by a wrong one 2. Upgrade the HINT software version 3. Ask for technical support			
		4	The HINT module does not have synchronous motor pole auto-tuning function, which conflicts with the settings	The HINT module does not have synchronous motor pole auto-tuning function,, but the motor type is set to synchronous	1. Check that the HINT board is not replaced by a wrong one 2. Upgrade the HINT software to ensure that the software of all the HINT modules are of the same version 3. Check the actual motor type and correct the setting 3. Ask for technical support			
102	HINT warning	1	HINT model parameter check not completed	HINT model parameter check is not completed during running preparation	1. Wait until the HINT model parameter check is completed 2. Set the model parameters correctly and download the setting 3. Power on the HCU again 4. Power on the HINT again 5. Ask for technical support	Alarm	Level cannot be changed	Automatic alarm reset
		2	Mismatch between HINT current sampling function and setting	N-point sampling is enabled by the parameter but is not available in the active HINT	1. Update the HINT program 2. Select another sampling mode. See A3-23 3. Ask for technical support			
117	AC drive pre-overload	1	AC drive pre-overload	1. External loads are increased abnormally 2. The power of the AC drive is insufficient 3. Selected load mode is incorrect	1. Check mechanical parts and motor load 2. Select a drive with proper capacity based on motor overload condition 3. Set working mode according to load condition. See related sections in the software user guide for the selection of an overload mode	Alarm	Level cannot be changed	Automatic alarm reset

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
156	Bus adapter communication error	1	Communication fault between bus adapter A and host computer	The bus adapter receives no valid data in 200 ms due to, for example, wire breakage	1. Modify the time setting of the communication card 2. Check communication cabling	Alarm	Level cannot be changed	Automatic alarm reset
		2	Communication fault between bus adapter B and host computer	The bus adapter receives no valid data in 200 ms due to, for example, wire breakage	1. Modify the time setting of the communication card 2. Check communication cabling			
		3	Communication fault between redundant bus adapter and host computer	The bus adapter receives no valid data in 200 ms due to, for example, wire breakage	1. Modify the time setting of the communication card 2. Check communication cabling			
		4	Bus adapter A data CRC error	The number of consecutive CRC errors of the data received by the bus adapter reaches 10	Ask for technical support			
		5	Bus adapter B data CRC error	The number of consecutive CRC errors of the data received by the bus adapter reaches 10	Ask for technical support			
		6	Redundant bus adapter data CRC error	The number of consecutive CRC errors of the data received by the bus adapter reaches 10	Ask for technical support			
158	Self-check error	1	VI self-check: IGBT U+ short circuited during turn-on	IGBT phase U lower bridge arm is short circuited	Ask for technical support	Coast to stop	Level cannot be changed	Manual reset
		2	VI self-check: IGBT U- short circuited during turn-on	IGBT phase U upper bridge arm is short circuited	Ask for technical support			
		3	VI self-check: IGBT V+ short circuited during turn-on	IGBT phase V lower bridge arm is short circuited	Ask for technical support			
		4	VI self-check: IGBT V- short circuited during turn-on	IGBT phase V upper bridge arm is short circuited	Ask for technical support			
		5	VI self-check: IGBT W+ short circuited during turn-on	IGBT phase W lower bridge arm is short circuited	Ask for technical support			
		6	VI self-check: IGBT W- short circuited during turn-on	IGBT phase W upper bridge arm is short circuited	Ask for technical support			
		7	Output short circuit to ground	The output end is short circuited to ground	1. Check short circuit to ground at the output end of the AC drive 2. Check the motor winding for short circuit to ground			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
158	Self-check error	8	Bridge arm self-check: IGBT U+V-W- short circuited during pulse output	UV or UW output end is short circuited	Check the output end of the AC drive for interphase short circuit	Coast to stop	Level cannot be changed	Manual reset
		9	Bridge arm self-check: IGBT U- V+ W+ short circuited during pulse output	UV or UW output end is short circuited	Check the output end of the AC drive for interphase short circuit			
		10	Bridge arm self-check: IGBT V+U-W- short circuited during pulse output	VU or VW output end is short circuited	Check the output end of the AC drive for interphase short circuit			
		11	Bridge arm self-check: IGBT V- U+ W+ short circuited during pulse output	VU or VW output end is short circuited	Check the output end of the AC drive for interphase short circuit			
		12	Bridge arm self-check: IGBT W+U-V- short circuited during pulse output	WU or WV output end is short circuited	Check the output end of the AC drive for interphase short circuit			
		13	Bridge arm self-check: IGBT W- U+ V+ short circuited during pulse output	WU or WV output end is short circuited	Check the output end of the AC drive for interphase short circuit			
		14	System output phase U loss	1. At the output side of the system, phase loss or current sensor fault occurred in phase U 2. Self-test is performed when the motor is rotating	1. Check the output wiring 2. Check that the motor winding is properly connected 3. Ask for technical support			
		15	System output phase V loss	1. At the output side of the system, phase loss or current sensor fault occurred in phase V 2. Self-test is performed when the motor is rotating	1. Check the output wiring 2. Check that the motor winding is properly connected 3. Ask for technical support			
		16	System output phase W loss	1. At the output side of the system, phase loss or current sensor fault occurred in phase W 2. Self-test is performed when the motor is rotating	1. Check the output wiring 2. Check that the motor winding is properly connected 3. Ask for technical support			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
159	Self-check error	1	Abnormal detection value of the module U phase current sensor	The phase U current sensor of this module is abnormal and the detection value is exceptionally large	Ask for technical support	Coast to stop	Level cannot be changed	Manual reset
		2	Abnormal detection value of the module V phase current sensor	The phase V current sensor of this module is abnormal and the detection value is exceptionally large	Ask for technical support			
		3	Abnormal detection value of the module W phase current sensor	The phase W current sensor of this module is abnormal and the detection value is exceptionally large	Ask for technical support			
		4	Module U phase current sensor inversely installed	The phase U current sensor of this module is inversely installed	1. Check that the current sensor is installed correctly 2. Ask for technical support			
		5	Module V phase current sensor inversely installed	The phase V current sensor of this module is inversely installed	1. Check that the current sensor is installed correctly 2. Ask for technical support			
		6	Module W phase current sensor inversely installed	The phase W current sensor of this module is inversely installed	1. Check that the current sensor is installed correctly 2. Ask for technical support			
		7	Module U phase output phase loss or IGBT- bridge open circuited	Phase U loss occurred at the output end of the module or the IGBT lower bridge arm of this phase is open circuited	1. Check the output wiring 2. Ask for technical support			
		8	Module V phase output phase loss or lower bridge arm IGBT open circuited	Phase V loss occurred at the output end of the module or the IGBT lower bridge arm of this phase is open circuited	1. Check the output wiring 2. Ask for technical support			
		9	Module W phase output phase loss or lower bridge arm IGBT open circuited	Phase W loss occurred at the output end of the module or the IGBT lower bridge arm of this phase is open circuited	1. Check the output wiring 2. Ask for technical support			
		10	Module UV phase sensor incorrectly inserted	The UV two-phase sensor feedback cable of this module is inversely connected	Check the output wiring			
		11	Module UW phase sensor incorrectly inserted	The UW two-phase sensor feedback cable of this module is inversely connected	Check the output wiring			
		12	Module VW phase sensor incorrectly inserted	The VW two-phase sensor feedback cable of this module is inversely connected	Check the output wiring			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
159	Self-check error Self-check error	13	Module U phase output phase loss or upper bridge arm IGBT open circuited	Phase U loss occurred at the output end of the module or the IGBT upper bridge arm of this phase is open circuited	1. Check the output wiring 2. Ask for technical support	Coast to stop	Level cannot be changed	Manual reset
		14	Module V phase output phase loss or upper bridge arm IGBT open circuited	Phase V loss occurred at the output end of the module or the IGBT upper bridge arm of this phase is open circuited	1. Check the output wiring 2. Ask for technical support			
		15	Module W phase output phase loss or upper bridge arm IGBT open circuited	Phase W loss occurred at the output end of the module or the IGBT upper bridge arm of this phase is open circuited	1. Check the output wiring 2. Ask for technical support	Coast to stop	Level cannot be changed	Manual reset
		16	Self-check interruption	1. Self-check interrupted 2. Self-check error	1. Ensure that the start-stop control word is normal in the self-check process 2. Troubleshoot according to reported information			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
160	Self-check error	1	Three-phase current unbalance	The sum of output currents of three phases is above 20% of the rated motor current	Ask for technical support	Coast to stop	Level cannot be changed	Manual reset
		2	VW two-phase sampling deviation too large	1. The VW current sampling deviation is above 20% of the rated motor current 2. Self-test is performed when the motor rotates	Ask for technical support			
		3	UW two-phase sampling deviation too large	1. The UW current sampling deviation is above 20% of the rated motor current 3. Self-test is performed when the motor rotates	Ask for technical support			
		4	UV two-phase sampling deviation too large	1. The UV current sampling deviation is above 20% of the rated motor current 4. Self-test is performed when the motor rotates	Ask for technical support			
		5	Module phase U current unbalance	The deviation between the module phase U current and the total current of the parallel phase U is above 10% of the rated heavy load current	1. Check the model of parallel modules 2. Check balance between the parallel module cable and the reactor			
		6	Module phase V current unbalance	The deviation between the module phase V current and the total current of the parallel phase V is above 10% of the rated heavy load current	1. Check the model of parallel modules 2. Check balance between the parallel module cable and the reactor			
		7	Module phase W current unbalance	The deviation between the module phase W current and the total current of the parallel phase W is above 10% of the rated heavy load current	1. Check the model of parallel modules 2. Check balance between the parallel module cable and the reactor			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
170	I/O expansion module wiring fault	1	<I/O expansion module 1>DIO output short circuit	When DIO is used for output, the output cable is short circuited	Check each DIO pin used for output for short circuit	Alarm	Coast to stop-Alarm	Automatic alarm reset
		2	<I/O expansion module 2>DIO output short circuit	When DIO is used for output, the output cable is short circuited	Check each DIO pin used for output for short circuit			
		3	<I/O expansion module 3>DIO output short circuit	When DIO is used for output, the output cable is short circuited	Check each DIO pin used for output for short circuit			
		4	<I/O extension module 1>AI input disconnected	When a 4..20 mA current signal is selected for AI, the input current is lower than the minimum threshold.	1. Check the AI input voltage/current of the I/O ext. module 2. Check the AI input current			
		5	<I/O extension module 2>AI input disconnected	When a 4..20 mA current signal is selected for AI, the input current is lower than the minimum threshold.	1. Check the AI input voltage/current of the I/O ext. module 2. Check the AI input current			
		6	<I/O extension module 3>AI input disconnected	When a 4..20 mA current signal is selected for AI, the input current is lower than the minimum threshold.	1. Check the AI input voltage/current of the I/O ext. module 2. Check the AI input current			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
170	I/O expansion module wiring fault	7	<I/O extension module 1>EEPROM operation error	EEPROM write error. The calibration parameter cannot be saved because the EEPROM may be damaged	Rewrite the calibration parameter to the EEPROM. If the fault persists, replace the I/O expansion card	Alarm	Coast to stop-Alarm	Automatic alarm reset
		8	<I/O extension module 2>EEPROM operation error	EEPROM write error. The calibration parameter cannot be saved because the EEPROM may be damaged	Rewrite the calibration parameter to the EEPROM. If the fault persists, replace the I/O expansion card			
		9	<I/O extension module 3>EEPROM operation error	EEPROM write error. Calibration parameter cannot be saved because the EEPROM may be damaged	Rewrite the calibration parameter to the EEPROM. If the fault persists, replace I/O expansion card			
		10	<I/O expansion module 1> calibration coefficient error	1. AI factory calibration parameter is wrong and calibration is canceled 2. AO factory calibration parameter is wrong and calibration is canceled	Check n7-15 (feedback status of the expansion module) and modify the corresponding correction coefficient 1. Bits 3/7/11 of [n7-15] corresponds to the correction parameter of channels AI1/AI2/AI3 respectively. If the value of a bit is 1, it means the corresponding correction parameter is wrong 2. Bits 13/14/15 of [n7-15] corresponds to the correction parameter of channels AO1/AO2/AO3 respectively. If the value of a bit is 1, it means the corresponding correction parameter is wrong			
		11	<I/O expansion module 2> calibration coefficient error	1. The factory calibration parameter of AI is wrong and calibration is canceled 2. The factory calibration parameter of AO is wrong and calibration is canceled	Check n8-15 (feedback status of the expansion module) and modify the correction coefficient 1. Bits 3/7/11 of [n8-15] corresponds to the correction parameter of channels AI1/AI2/AI3. If the value of a bit is 1, it means the corresponding correction parameter is wrong 2. Bits 13/14/15 of [n8-15] corresponds to the correction parameter of channels AO1/AO2/AO3 respectively. If the value of a bit is 1, it means the corresponding correction parameter is wrong			
		12	<I/O expansion module 3> calibration coefficient error	1. The factory calibration parameter of AI is wrong and calibration is canceled 2. The factory calibration parameter of AO is wrong and calibration is canceled	Check n9-15 (feedback status of the expansion module) and modify the correction coefficient 1. Bits 3/7/11 of [n9-15] corresponds to the correction parameter of channels AI1/AI2/AI3 respectively. If the value of a bit is 1, it means the corresponding correction parameter is wrong 2. Bits 13/14/15 of [n9-15] corresponds to the correction parameter of channels AO1/AO2/AO3 respectively. If the value of a bit is 1, it means the corresponding correction parameter is wrong			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
172	Module pre-overtemperature	1	Phase U IGBT pre-overtemperature	1. The air duct is blocked 2. Fan is abnormal 3. High ambient temperature 4. Overtemperature prewarning advance threshold too large	1. Clean up the air duct 2. Check the fan 3. Reduce the ambient temperature. 4. Set A4-27 properly	Alarm	Level cannot be changed	Automatic alarm reset
		2	Phase V IGBT overtemperature	1. The air duct is blocked 2. Fan is abnormal 3. High ambient temperature 4. Overtemperature prewarning advance threshold too large	1. Clean up the air duct 2. Check the fan 3. Reduce the ambient temperature. 4. Set A4-27 properly			
		3	Phase W IGBT pre-overtemperature	1. The air duct is blocked 2. Fan is abnormal 3. High ambient temperature 4. Overtemperature prewarning advance threshold too large	1. Clean up the air duct 2. Check the fan 3. Reduce the ambient temperature. 4. Set A4-27 properly			

Fault ID	Fault Name	Fault Subcode	Fault Subcode Name	Possible Causes	Solutions	Default Fault Level	Fault Level Range	Reset Method
183	Master-slave communication error warning	4	InoLink communication: same address of data sending and receiving nodes	A node cannot receive data from itself	Check the setting	Alarm	Level cannot be changed	Automatic alarm reset
		5	FO sync comm. module: node address conflict	The address of the local node conflicts with that of another node on the network	Reset the node address			
		6	FO sync comm. module: data receiving node A not enabled	The source address of node A failed to update the heartbeat for a long time. For details, check n22 -06	Check that the source address of node A is enabled and the wiring is normal			
		7	FO sync comm. expansion module: data receiving node B not enabled	The source address of node B failed to update the heartbeat for a long time. For details, check n22-07	Check that the source address of node B is enabled and the wiring is normal			
		8	FO sync comm. expansion module: data receiving node C not enabled	The source address of node C failed to update the heartbeat for a long time. For details, check n22 -08	Check that the source address of node C is enabled and the wiring is normal			
		9	FO sync comm. module: local node address not set	The communication network is started when no local node address is set	Check the local node address setting			
		10	FO sync comm. module: same addresses of the data sending and receiving nodes	A node cannot receive data from itself	Check the setting for data receiving nodes A\B\C			
		11	FO sync comm. module not activated	The communication network is started but no slot is set for the FO sync comm. module	Check the slot setting of the FO sync comm. module			
		12	FO sync comm. expansion module: data receiving node A not in the network	The source address of node A does not exist. For details, check n22-06	Reset the data receiving node A or check the wiring			
183	Master-slave communication error warning	13	FO sync comm. expansion module: data receiving node B not in the network	The source address of node B does not exist. For details, check n22-07	Reset the data receiving node B or check the wiring	Alarm	Level cannot be changed	Automatic alarm reset
		14	FO sync comm. expansion module: data receiving node C not in the network	The source address of node C does not exist. For details, check n22-08	Reset the data receiving node C or check the wiring			


NOTE

- < 1 >: ERR20 default fault level is coast to stop. In SVC or VF control mode, the fault level is automatically switched to alarm; In FVC control mode, the fault level is coast to stop.
- < 2 >: The default fault level of ERR53, ERR82 and ERR83 is coast to stop. When U1-01 is ineffective, the fault level automatically switches to alarm.
- < 3 >: ERR89 default fault level is alarm. If H0-61 is enabled, the fault level is alarm when the input voltage is higher than 18.5 V and lower than 21V, and is fault when the input voltage is lower than 18.5 V.