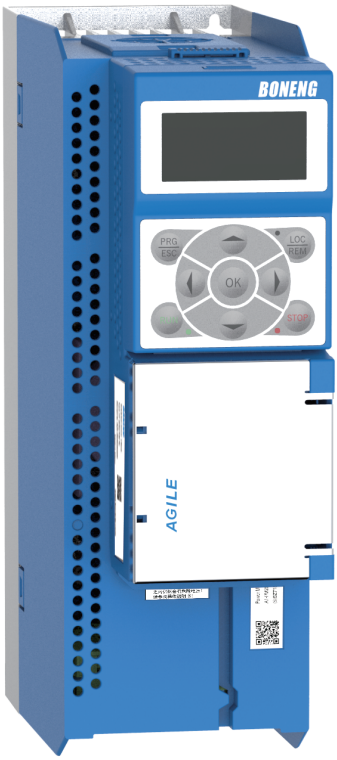
BONENG



A Series Drive (CM22) Manual

12/2021

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1 Fundamental safetyinstructions

1.1 General safety instructions



⚠ DANGER

Electric shock and danger to life due to other energy sources
Touching live components can result in death or severe injury.
- Only work on electrical devices when you are qualified for this job
- Always observe the country-specific safety rules.

Generally, the following six steps apply when establishing safety:
1.Prepare for disconnection. Notify all those who will be affected by the procedure.
2.Isolate the drive system from the power supply.
—Stop the drive.
—Wait until the discharge time specified on the warning labels has elapsed.
—Check that there is no voltage between any of the power connections, and between any of the power connections and the protective conductor connection.
—Check whether the existing auxiliary supply circuits are de-energized.
—Ensure that the motors cannot move.
3.Identify all other dangerous energy sources, e.g. compressed air, hydraulic systems, or water.
4.Switch the energy sources to a safe state.
5.Take measures to prevent energy sources being switched back on again.
6.Check that the correct drive system is completely locked.



⚠ WARNING

Electric shock due to connection to an unsuitable power supply if touched, this can result in death or severe injury.



⚠ WARNING

Electric shock due to equipment damage Improper handling may cause damage to equipment. For damaged devices, hazardous voltages can be present at the enclosure or at exposed components; if touched, this can result in death or severe injury.
- Ensure compliance with the limit values specified in the technical data during transport, storage and operation.
- Do not use any damaged devices.



⚠ WARNING

Electric shock due to unconnected cable shield Hazardous touch voltages can occur through capacitive cross-coupling due to unconnected cable shields.

● As a minimum, connect cable shields and the conductors of power cables that are not used (e.g. brake cores) at one end at the grounded housing potential.



⚠ WARNING

Electric shock if there is no ground connection For missing or incorrectly implemented protective conductor connection for devices with protection class I, high voltages can be present at open, exposed parts, which when touched, can result in death or severe injury.

● Ground the device in compliance with the applicable regulations.



⚠ WARNING

Arcing when a plug connection is opened during operation Opening a plug connection when a system is operation can result in arcing that may cause serious injury or death.

● Only open plug connections when the equipment is in a voltage-free state, unless it has been explicitly stated that they can be opened in operation.



⚠ WARNING

Spread of fire from built-in devices In the event of fire outbreak, the enclosures of built-in devices cannot prevent the escape of fire and smoke. This can result in serious personal injury or property damage.

● Install built-in units in a suitable metal cabinet in such a way that personnel are protected against fire and smoke, or take other appropriate measures to protect personnel.

● Ensure that smoke can only escape via controlled and monitored paths.



⚠ DANGER

Unexpected movement of machines caused by radio devices or mobile phones When radio devices or mobile phones with a transmission power >1 W are used in the immediate vicinity of components, they may cause the equipment to malfunction.
Malfunctions may impair the functional safety of machines and can therefore put people in danger or lead to property damage.
●If you come closer than around 2 m to such components, switch off any radios or mobile phones.



⚠ DANGER

Overloading of insulation can cause fire which can cause life threatening Damage to motor insulation due to excessive voltages When operated on systems with grounded line conductor. Insulation failure can cause smoke and fire, which can result in serious injury or death.
●Use monitor equipment that can report insulation failures
●Eliminate the fault as soon as possible to avoid motor insulation overload



⚠ DANGER

Fire due to inadequate ventilation clearances Inadequate ventilation clearances can cause overheating of components with subsequent fire and smoke.
This can cause severe injury or even death. This can also result in increased downtime and reduced service lives for devices/systems.
●Ensure compliance with the specified minimum clearance as ventilation clearance for the respective component



⚠ DANGER

Unrecognized dangers due to missing or illegible warning labels
Dangers might not be recognized if warning labels are missing or illegible. Unrecognized dangers may cause accidents resulting in serious injury or death.
●Check that the warning labels are complete based on the documentation.
●Attach any missing warning labels to the components, where necessary in the national language.
●Replace illegible warning labels.



⚠ WARNING

Device damage caused by incorrect voltage/insulation tests Incorrect voltage/insulation tests can damage the device.

● Before carrying out a voltage/insulation check of the system/machine, disconnect the devices as all converters and motors have been subject to a high voltage test by the manufacturer, and therefore it is not necessary to perform an additional test within the system/machine.



⚠ WARNING

Unexpected movement of machines caused by inactive safety functions Inactive or non-adapted safety functions can trigger unexpected machine movements that may result in serious injury or death.

● Observe the information in the appropriate product documentation before commissioning.

● Carry out a safety inspection for functions relevant to safety on the entire system, including all safety-related components.

Ensure that the safety functions used in your drives and automation tasks are adjusted and activated through appropriate parameterizing.

● Perform a function test.

● Only put your plant into live operation once you have guaranteed that the functions relevant to safety are running correctly



⚠ WARNING

Unexpected movement of machines caused by mistaken parameters Mistaken parameters can trigger unexpected machine movements that may result in serious injury or death.

● Prevent malicious setting of parameters.

● Take appropriate measures(e.g. suspend or emergency stop) to do mistaken operation.

1.2 Electromagnetic fields (EMF) instructions



⚠ WARNING

Active implant malfunctions due to electromagnetic fields

Inverters generate electromagnetic fields (EMF) in operation.

People with active implants in the immediate vicinity of this equipment are at particular risk.

● You must come closer than around 2 m.

1.3 Operate electrostatic sensitive devices(ESD)

Electrostatic sensitive devices (ESD) are individual components, integrated circuits,modules or devices that may be damaged by either electric fields or electrostatic discharge.



⚠ DANGER

Equipment damage due to electric fields or electrostatic discharge
Electric fields or electrostatic discharge can cause malfunctions through damaged individual components, integrated circuits, modules or devices.
● Only pack, store, transport and send electronic components, modules or devices in their original packaging or in other suitable materials.(e.g. conductive foam rubber or aluminum foil)
● Only touch components, modules and devices when you are grounded by one of the following methods:
—Wearing an ESD wrist strap
—Wearing ESD shoes or ESD grounding straps in ESD areas with conductive flooring
● Only place electronic components, modules or devices on conductive surfaces (table with ESD surface, conductive ESD foam, ESD packaging, ESD transport container).

1.4 Industrial security

Boneng provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.
In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement - and continuously maintain - a holistic, state - of - the - art industrial security concept.
Boneng' products and solutions constitute one element of such a concept. Boneng' products and solutions undergo continuous development to make them more secure. Boneng strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used.

⚠ DANGER

Unsafe operating states resulting from software manipulation
Software manipulations (e.g. viruses, trojans, malware or worms) can cause unsafe operating states in your system that may lead to death, serious injury, and property damage.
● Keep the software up to date.
Further information is provided on the Internet:www.boneng.com
● Incorporate the automation and drive components into a holistic, state - of - the - art industrial security concept for the installation or machine.
Further information is provided on the Internet:www.boneng.com
● Make sure that you include all installed products into the holistic industrial security concept.

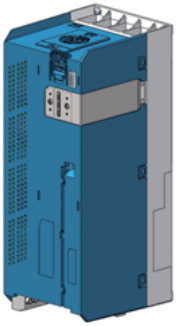
1.5 Residual risks of power drive systems

The control components and drive components of the drive system are allowed to be used in industrial and commercial situations with in the industrial power grid.
When it is used in the civil power grid, special design or additional measures are required.
This component is only allowed to operate in the enclosed shell or control cabinet, and protection device and cover must be installed.
Only professional technicians who have been trained，understood and followed all safety precautions indicated in the component and user manual can work on the component.
When assessing the machine-or system-related risk in accordance with the respective local regulations (e.g. EC Machinery Directive), the machine manufacturer or system installer must take into account the following residual risks emanating from the control and drive components of a drive system:
1.Unintentional movements of driven machine or system components during commissioning，operation，maintenance, and repairs caused by, for example,
— Hardware and/or software errors in the sensors, control system, actuators, and cables and connections
— Response times of the control system and of the drive
— Operation and/or environmental conditions outside the specification
— Condensation/conductive contamination
— Parameterization, programming，cabling, and installation errors
—Use of wireless devices/mobile phones in the immediate vicinity of electronic components
— External influences/damage
2.Unusually high temperatures, including open flames, as well as emissions of light, noise, particles, gases, etc., can occur inside and outside the components under fault conditions caused by, for example:
— Component failure
— Software errors
— Operation and/or environmental conditions outside the specification
— External influences/damage
The equipment with the protection grade of" open type/IP20 "must be installed in the metal cabinet (or protected with the same effect measures), so as to avoid the internal and external contact of the driver with open fire.
3.Hazardous shock voltages caused by, for example:
— Component failure
— Influence during electrostatic charging
— Induction of voltages in moving motors
— Operation and/or environmental conditions outside the specification
— Condensation/conductive contamination
— External influences/damage
4.Electrical, magnetic and electromagnetic fields generated in operation that can pose a risk to people with a pacemaker, implants or metal replacement joints, etc., if they are too close.
5.Release of environmental pollutants or emissions as a result of improper operation of the system and/or failure to dispose of components safely and correctly.

2. Description

2.1 Structure of the inverter

Main components of the inverter



Power Module
①



Control Module
②

Every A1 series inverter comprises a Control Module (CM)and a Power Module (PM).

● The Control Module monitors and controls the Power Module and the motors connected to Power Module.

● The Power Module is suitable for motors with power range from 0.75kW to 37kW.

The following data can be found on the Power Module nameplate (①):

● Name: e.g. Power ModulePM25

● Technical data: Voltage、Current、Power

● Article No.: e.g. A1-PM25-B3B55-N

● Versions: e.g. …

The following data can be found on the Power Module nameplate(②):

● Name: e.g. Control ModuleCM22

● Article No.: e.g. A1-CM22-MB-PE

● Versions: e.g. …

2.1 Control Module

The difference between Control Module CM25 various models lies in different field bus and encoders			
	Name	Article No.	Field bus/encoder
	CM22	A1-CM22-MB-PE	Modbus/Photoelectric

2.3 Power Module

This section contains important notes of Power Modules.
The power data always refer to rated power or a load cycle according to Low Overload.
The Control Module CM25 can operate with the following Power Modules:

● PM25(IP20)



Figure 2 - 1 e. g. The Power Modules are devices with protection IP20

PM25,3AC400V - Standard applied range:
The Power Modules with protection IP20 have 2 models: inverters without integrated filter and inverters with integrated class A filter. PM25 using an external braking resistor to realize dynamic braking function.

The range of Article No.:A1 - PM25 - B3XXX - N(or F)

Frame size	B1	B2	B3	B4	B6
The range of power (KW)with protection IP20	0.75～3.0	4～7.5	11～15	18.5～37	45～132

table 2 - 1 Article No. of the shield connection kit

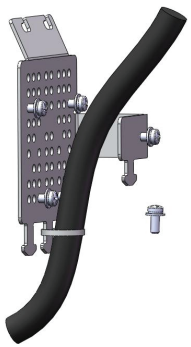
2.4 Compo nents for Power Module

2.4.1 Additional components - Power Module

Shield connection kit can realize the Shield of terminal and strain relief.
shield connection kit composed of shield plate, cable tie and screws

table 2 - 1 Article No. of the shield connection kit

Frame size	Article No.
B1	A1 - H06 - B1
B2	
B3	A1 - H06 - B3
B4	A1 - H06 - B4



2.4.2 Line filter (Accessories can be provided by userself)

Using line filter can make the inverter reach a higher level of anti-radio frequency interference. inverters with integrated filter no need more filter outside.

2.4.3 Line reactor (Accessories can be provided by userself)

A line reactor protects the inverter when connected to dirty line supplies (line supply environment). A line reactor supports the overvoltage protection, smooths the harmonics in the line supply and buffers commutation dips.

2.4.4 Output reactor (Accessories can be provided by userself)

Output reactors reduce the voltage stress on the motor windings and the load placed on the inverter as a result of capacitive recharging currents in the cables. A output reactor is necessary when the motor cable (with shielded cable) length over 50m, or the motor cable (without shielded cable) length over 100m.

2.4.5 Braking resistor (Accessories can be provided by userself)

The braking resistor enables loads with a large moment of inertia to be braked quickly.

2.5 Allowed encoders

Connect the following encoders to Control Module:

HTL encoder	Used for speed control
TTL encoder	Used for speed control

2.6 Commisioning tools

The following tools are used for commisioning, diagnosing and controlling drives as well as backing and transferring drive settings.

Operation keyboard		Article No.
	OP25 ●LCD Screen ●With menu guidance and application wizard program	A1-OP25

PC tools		
Connect to the keyboard with a USB-RS485 cable to access the drive tool under Boneng Drivesoft	Website of Boneng Drivesoft:	www.boneng.com
	USB-RS485 cable	It is recommended to use stable and reliable cables with brand

3. Installing

3.1 Installing conditions

Prerequisites for installing a drive

Checked:

● Complete element?

—Power Module

—Control Module

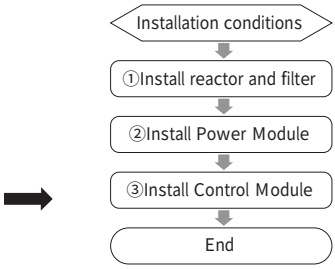
—Accessories, e. g. line reactor or braking resistor

● Complete spare parts, toolkit?

Step

As shown by the right arrow:

If you have installed, start to debugging



3.2 EMC –compliant installation of a inverter or system

3.2.1 the EMC installation regulations of inverter

Reliable and disturbance - free operation is only guaranteed for EMC - compliant installation. To achieve this, install and operate an inverter fulfill IP20 degree of protection in a closed control cabinet.

the inverter fulfill IP55 is suitable for installation outside the control cabinet. The design and Cable routing of the control cabinet are briefly described below.

Refer to the Power Module installation instructions for details.

The EMC installation instructions for the inverter is described as below.

3.2.2 The protection specification of EMI

The inverter is designed to be used in a working environment that is prone to high EMI. Reliable and distuebance - free operation is only guaranteed for professional installation.

The design of control cabinet

● All metal parts and components of the control cabinet must be well connected with the control cabinet frame.

- top plate
- side panels
- base plate
- back plate

Choose a large area contact frame or use a large number of screws for multi - point contact frame.

● Connect the PE bar and the shield support to the control cabinet frame through a large surface area to establish a good electrical connection.

● All metal parts installed in the control cabinet, such as: inverter or power filters, etc., must contact the control cabinet frame over a large area. It is recommended to install these devices on a bare metal mounting plate with good electrical conductivity.

● For screw connections onto painted or anodized surfaces, establish a good conductive contact using one of the following methods:

- Use special (serrated) contact washers that cut through the painted or anodized surface.
- Remove the insulating coating at the contact locations.

● Connect surge voltage protection circuits to the following components:

- Coils of contactors
- Relays
- Solenoid valves
- Motor holding brakes

Use RC elements or varistors for AC - operated coils and freewheeling diodes or varistors for DC - operated coils

Wiring and shielding

● Signal cable and data cable must be wired separately from all power cables of inverter，power cables includes Cable between the line filter and inverter，Motor cable，Cable at the inverter DC link connection, Cable between the inverter and braking resistor. There is a minimum clearance of 25 cm to power cables. If the minimum clearance of 25 cm is not possible, insert separating metal sheets between the power cables and signal cable, data cable.

● The connecting cable between power supply and power filter must be separated from the following cables;Cable between the line filter and inverter Cable between the inverter and braking resistor Motor cable:

- 电源滤波器和驱动器之间的连接电缆
- 制动斩波器和制动电阻之间的连接电缆
- 电机电缆

● Signal cable/data cable and filtered power cable can only be placed perpendicular to unfiltered power cable.

● Keep all of the cables as short as possible.

● Route signal and data cables - as well as the associated equipotential bonding cables - parallel and close to one another.

● Use shielded motor cable.

● Shielded motor cables shall be wired separately from motor temperature sensor (PTC/KTY).

● The grounding of power cable shielding layer shall adopt EMC shielding bar.

● The shielding layer shall be connected to the grounded metal shell in large area at both ends.

● The shielding layer shall be earthed near the position where the cable enters the control cabinet as close as possible.

● The grounding of power cable shielding layer shall adopt EMC shielding bar.

The signal cable and data cable shall be grounded with the shielding elements provided on the inverter.

● Do not break the cable shield through the middle terminal.

3.2.3 Mounting the Power Modules shield plates

Shielding method with shielding plate:

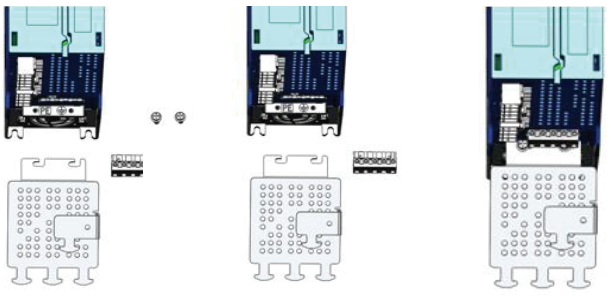
The cable shielding layer must be connected with the shielding plate in a large area through the line plate.

Depending on the power module type, the shield is either included in the scope of supply or available as an option in the form of a shield connection kit.

Shielding mode without shielding plate:

●Without shielding board, the shielding can also be achieved in accordance with the specification of electromagnetic compatibility. At this time, it is necessary to ensure that the cable shielding layer and the grounding position are connected in a large area.

Mounting the shield plate:PM25(Take B1 for example, others similar)

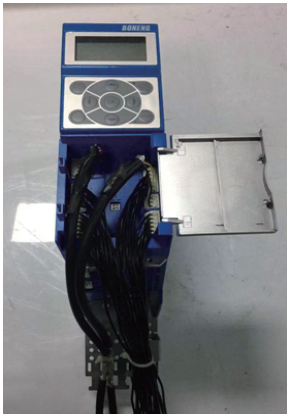


The cabling example of EMC - compliant installation





the EMC wiring of Power Module B1 B1





Detailed connection diagram of shield

Connect the encoder cable and signal cable to the terminal block meet the require-ments of electromagnetic compatibility.

Please use the shielded cable.

● Mounting the Power Modules shield plates.

● Connect the shield layer of the signal cable/encoder cable to the shield plate of the power module.

● Install the cable clamp on the shield.

● In addition, the shielding layer shall be connected to the shielding bar of the control cabinet.

3.3 the installation of Reactor filter, braking resistance

Reactor	The installation position of reactor is 20cm away from the inverter
Filter	The installation position of filter is 20cm away from the inverter
Braking resistance	It is recommended to make an additional electrical cabinet to install the brake resistor

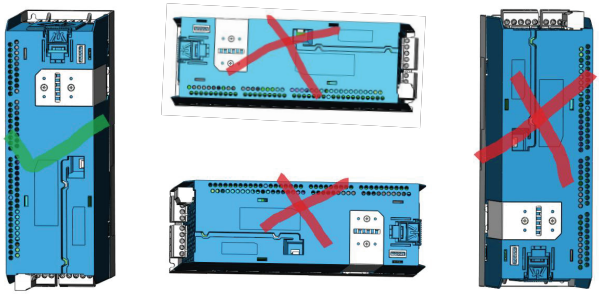
3.4 Mounting the Power Module

Mounting the Power Module

Take note of the following listed specifications when installing the Power Module.

● The Power Modules are designed for installation in a control cabinet

● Only mount the Power Module in a vertical position with the motor connectors at the bottom



● Rules for admissible mounting:

— Maintain the minimum clearances to other components.

— Use the specified installation parts and components.

— Comply with the specified torques.

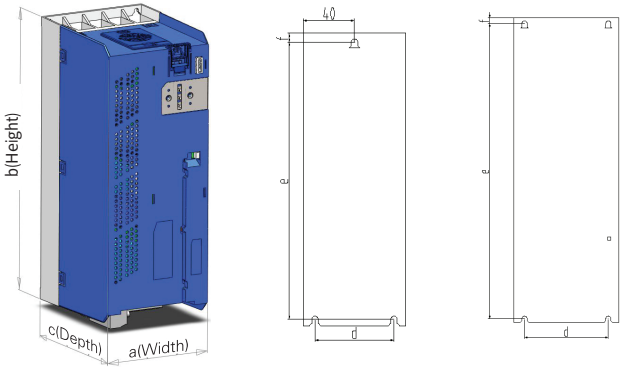


Table 3-1 Dimension of PM25

Boundary dimension	Dimension (mm)			Boundary dimension		
	a (Width)	b (Height)	c (Depth)	d	e	f
B1	80	230	165	62	218	6
B2	100	292	165	80	281	6
B3	140	355	165	120	343	6
B4	200	472	237	170	430	10

1) with shield plate: B1:+94mm;B2:+94mm;B3:+80mm
2) The total depth of converter: see below for description (the total depth of converter).

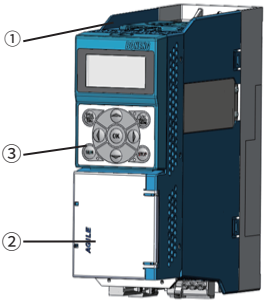
Table 3-2 The mounting materials of A1 and the spacing between other equipment

Boundary dimension	fixing	torque (Nm)	Cooling air clearances (mm)			
			Top	Bottom	Side	Front
B1	M4 screw	2.5	80	100	0	0
B2	M4 screw	2.5	80	100	0	0
B3	M5 screw	3.0	80	100	0	0
B4	M5 screw	3.0	300	350	0	100

1) PM25 mounting without any lateral cooling air clearance. For tolerance reasons, we recommend a lateral clearance of approx.1 mm.
2) Enough space between Control Module and Operator Panel.

The total depth of converter

①	Power Module	PM25
②	Control Module	CM22
③	Operator Panel	OP25



① + ②
The converter consists of at least one Power Module and one inserted Control Module,
The total depth of converter =The depth of Power Module+53mm (Control Module)

① + ② + ③
Inverter with Operator Panel inserted
The total depth of converter
=The depth of Power Module+53 mm (Control Module+ Operator Panel OP25)

Power Module, overall dimension B1...B4

3.5 Connect the line system, motor, and inverter assembly

3.5.1 Permissible line supplies

requirements on altitude:
Above an installation altitude of 4000 m, the permissible line supplies are restricted, above 1000 m the permissible inverter output current is reduced.

Requirements on line supply:
The plant builder or machine manufacturer must ensure for operation with rated current that the voltage drop between the transformer input terminals and the inverter when operated with its rated values is less than 4% of the transformer rated current.

TN line system
Generally, in a TN system the neutral point is grounded.
There are versions of a T A TN system can transfer the neutral conductor N and the PE protective conductor either separately or combined.
N system with a grounded line conductor, e.g. with grounded L1.

Inverter connected to a TN system
● Inverters with integrated line filter or an external line filter:
Operation on TN line systems with grounded neutral point permissible Operation on TN line systems with grounded line conductor not permissible.
● inverter without line filter:
Operation on all TN line systems ≤600 V permissible.

Power Module diagram on TN system

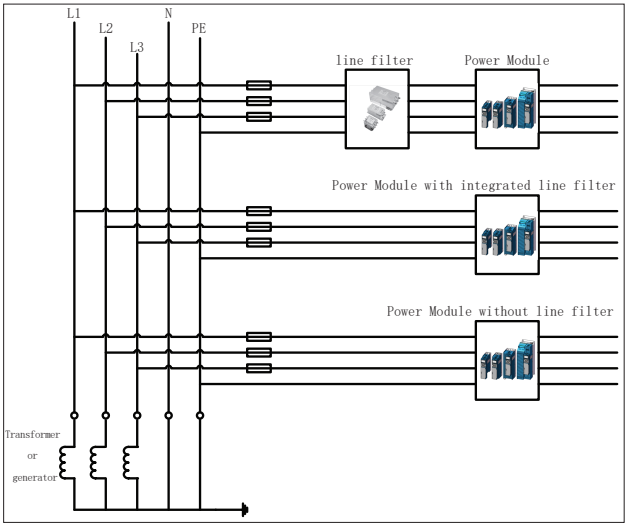


Figure 3-1 TN line system with separate transfer of N and PE, grounded neutral point

TT line system
In a TT line system, the transformer grounding and the installation grounding are independent of one another
There are TT line supplies where the neutral conductor N is either transferred - or not.

Inverter connected to a TT system
●Inverters with integrated line filter or an external line filter:
– Operation on TT line systems with grounded neutral point permissible
– Operation on TT line systems without grounded neutral point not permissible.
●Inverter without line filter:
– Operation on all TT line systems permissible.

Power Module diagram on TT system

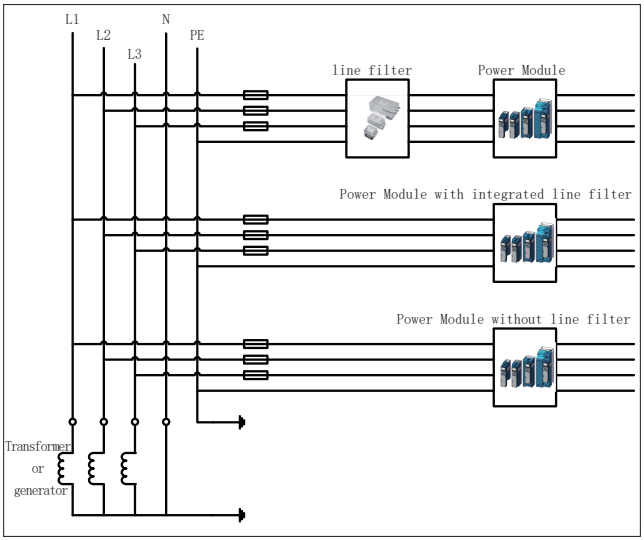


Figure 3 - 2 transfer of N, ground neutral point

IT system

In an IT line system, all of the conductors are insulated with respect to the PE protective conductor - or connected to the PE protective conductor through an impedance.

There are IT systems with and without transfer of the neutral conductor N.

Inverter connected to an IT system

●Inverters with integrated line filter:

– Operation on IT line systems not permissible

●Inverter without line filter:

– Operation on all IT line systems permissible.

Power Module diagram on IT system

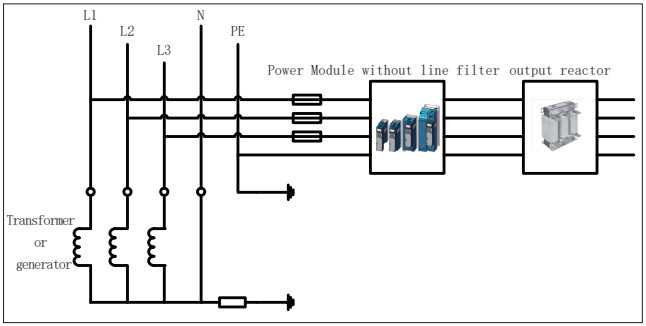


Figure 3 - 3 IT system with transfer of N and protective conductor impedance with respect to PE

Behavior of the inverter when a ground fault occurs:

If the inverter is to remain operable even when a ground fault occurs at the inverter output, you must install an output reactor. This prevents an over current trip or damage to the drive.

3.5.2 Protector

It must be in accordance with the relevant regulations of high leakage current (above 3.5mA), ground the inverter. If local and national regulations require upstream protection through residual protectors, type B leakage circuit breakers shall be used for the inverter.
In order to avoid accidental triggering of the leakage circuit breaker due to leakage current, the star point of the power supply must be grounded, and the leakage circuit breaker with the limiting current of more than 300mA and the action time of more than 0.1 s shall be selected.

According to IEC61800-5-1，if the leakage current exceeds 3.5ma, special attention shall be paid.

One of the following methods is needed to enhance the grounding:

●The cross-sectional area of the ground wire shall be at least 1 Omm2 (8 AWG).

●Use two separate grounding wires that meet the size specifications.

3.5.3 Connect inverter

Connect the power module to the motor and power supply

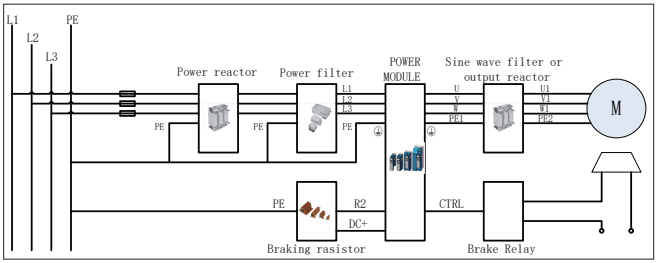


Figure 3-4 3AC wiring diagram of power module PM25



DANGER

Dangerous voltage on the motor interface can cause life hazard.
Once the inverter is powered on, there may be dangerous voltage on the motor interface of the inverter. If the motor is connected to the inverter and the motor junction box is open, electric shock hazard due to contact with motor interface.

●Please close the terminal box of the motor before the inverter is powered on.

Connect the power cable to the inverter

Step/connect the inverter to the power supply as follows:
1.If there is an outer cover on the inverter terminal, open the outer cover.
2.Connect the power supply to terminals L1，L2 and L3.
3.Connect the protective grounding wire of the power supply to the PE terminal of the inverter.
4.If there is an outer cover on the inverter terminal, close the outer cover.You have connected the power cable to the inverter.

Connect the motor cable to the asynchronous motor

Step/connect the motor cable to the asynchronous motor as follows:
1.Open the junction box of the motor.
2.Connect the motor with star connection or triangle connection.
3.If shielded motor cables are required，the following must be done:
–Strip the sheath of the motor cable around the incoming hole of the junction box to expose the shielding layer.
–Ground the shield through a suitable cable gland on the motor terminal box.
4. 连接电机的接线盒
You have successfully connected the motor cable to the asynchronous motor.

You must choose star or triangle (Y/△) to connect the motor according to your application.
Example: inverter connected motor operates on 400V power supply
Assumption: Mark 230/400V△/Y on the motor data plate.
Case 1: generally, the motor rises from static state to rated speed (that is, the speed corresponding to the power frequency) At this time, the motor must use Y wiring.
In this case, the motor can only operate beyond the rated speed if the flux weakening is adopted，that is to say, the available torque of the motor can be reduced above the rated speed.
Before connecting the motor, check whether the wiring of the motor is in accordance with your application.

Star or delta connection of motor
Wiring diagram:
●Star connection (Y)
●triangle connection(△)

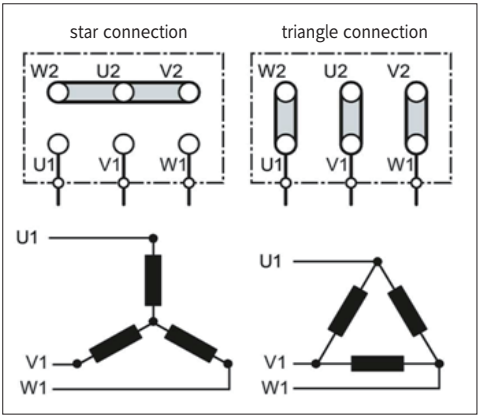


Figure 3-5 star and triangle connection of motor

Connect the motor cable to the inverter
Step/connect the motor cable to the inverter as follows:
1.If there is an outer cover on the inverter terminal, open the outer cover.
2.Connect the motor to terminals U, V and W.
Please pay attention to compliance with EMC Wiring Regulations.
3.Connect the protective ground wire of the motor to the PE terminal of the inverter.
4.If there is an outer cover on the inverter terminal, close the outer cover.
You have connected the motor cable to the inverter.

3.5.4 Connect the brake resistance

Connect the power module to the motor and power supply

⚠ WARNING

Incorrect installation or inappropriate installation of brake resistor may cause fire and life danger.
Open fire and smoke can cause heavy casualties or property damage.
The use of not matching brake resistors can cause open fire or smoke, resulting in casualties or property damage.

- Only the brake resistor matched with the inverter is allowed to be used.
- Install the brake resistor as specified.
- Monitor the temperature of the brake resistor.

⚠ NOTICE

Contact with hot surfaces can cause burns.
The temperature of the brake resistor will rise sharply during operation.

- Do not touch the brake resistor during operation

Step/follow the steps below to connect the brake resistor and monitor the temperature of the brake resistor:

1.Connect the brake resistance to the terminals DC +and R2 on the inverter.
2.Connect the braking resistance to the grounding bar of the control cabinet. The braking resistance is not allowed to be grounded through the PE terminal on the inverter.
3.Please follow the shielding regulations to ensure compliance with electromagnetic compatibility requirements.
4.Connect the temperature monitoring terminal of the brake resistor to the idle digital input on the inverter.
5.When debugging the inverter, define the function of the digital input as an external fault.
The brake resistor has now been successfully connected and the temperature monitoring has been set.

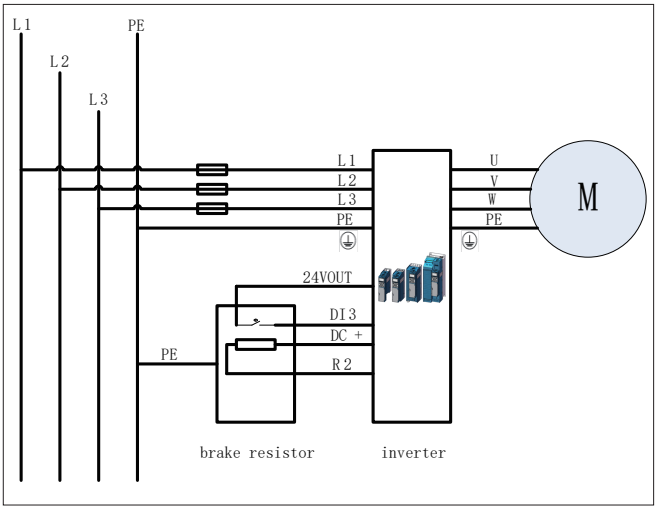


Figure 3-6 directly connect the brake resistor on the inverter (example: temperature monitoring through DI3)

3.6 Installing the Control Unit



> ⚠ WARNING
>
> Dangerous voltage generated by connecting improper power supply may cause life danger. In case of failure, contact with live parts may cause serious injury or even death.
> ●All connections and terminals of the electronic module are only allowed to use class 2 PELV power supply (protective extra low voltage

3.6.1 Installing the control module into the power module

Inserting the Control unit into the power module B1..B4



Removing the Control Unit

Inserting the Control Unit

Steps

Proceed as follows to plug the Control Unit onto a Power Module:

1.Place the two catches of the Control Unit in the matching grooves of the Power Module.

2.Press the Control Unit onto the Power Module until you hear that it latches.

You have now plugged the Control Unit onto the Power Module.

If you want to remove the Control unit. You just need to remove the Control Unit from the Power Module by pressing the release mechanism.

3.6.2 Overview of the interfaces

To access the interfaces at the front of the Control Unit, you must unplug the Operator Panel (if one is being used) and open the front doors.

①Terminal strips

②Status LED

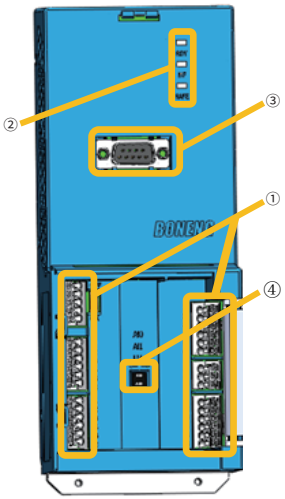


③Operation panel interface

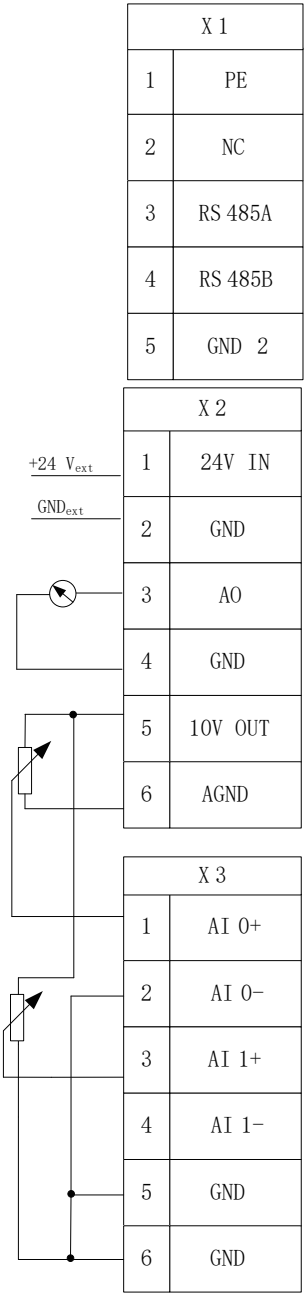
④Switch for analog inputs

I 0/4 mA ⋯ 20 mA

U -10/0 V ⋯ 10 V



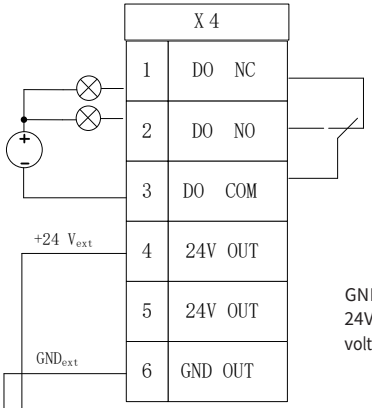
3.6.3 Terminal strips behind top front protection cover



Modbus communication terminal, maximum support 115200bps

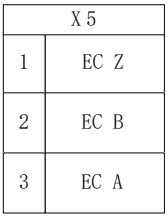
24VIN is Optional external power supply(18V~30V)
AGND and GND are connected inside
AO output 0~10V
10V OUT is internal power supply (11V max. 10mA)and can connect with potentiometer expediently

AI supports voltage type and current type input, the range is -10V~10V or -20mA~20mA
AI0 and AI1 are belong to differential input

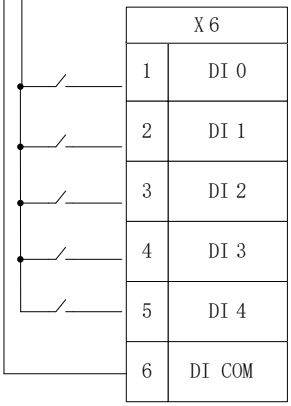


Digital outputs (Relay) max. 0.5A, 30V

GND OUT connects with internal GND
24VGND generates inside the machine,
voltage is 24V±10%



The encoder supports 5~30V single-ended signal input



DI0~DI4 are ordinary digital quantity input
low voltage <5v, high > 11V, max. 30V

GND — All terminals with reference potential "GND" interconnected inside the driver

GND OUT — GND OUT and GND are interconnected inside.

AGND — AGND and GND are interconnected inside.

X2-1,2 Connection of the optional 24 V supply has the following advantages:

●The Control Unit remains in operation after disconnection of the Power Module from the line supply. The Control Unit thus maintains the fieldbus communication, for example.Power supplies in conformance with SELV (Safety Extra Low Voltage) or PELV (Protective Extra Low Voltage) are permissible.

3.7 Installing encoder

Encoder for speed control
The encoder must be mounted on the motor shaft

Table 3-3 Permitted encoders

Encoder type	Terminal strip-X7
HTL encoder	✓
TTL encoder	✓

If the encoder supports 24V input, you can use the 24V power supply provided by the single board X4 directly.

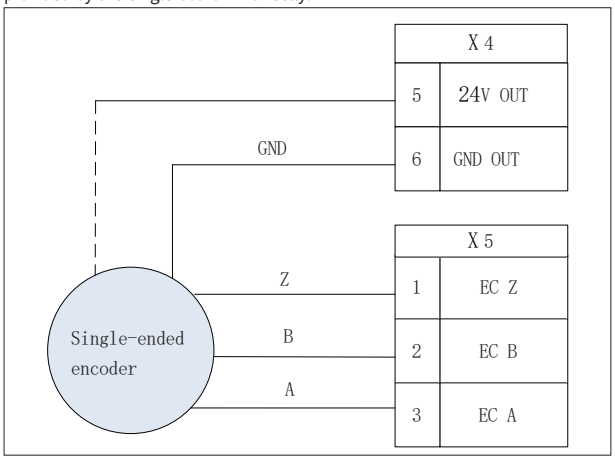


Figure 3-7 Connect the HTL/TTL encoder single-ended signal

If the encoder supports 24V input, you can use the 24V power supply provided by the single board X4 directly.

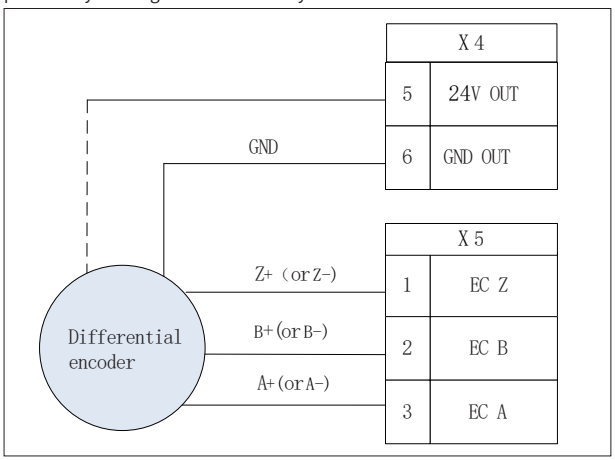


Figure 3-7 Connect the HTL/TTL encoder differential signal

Note: If using differential signals, it must be noted that only A+, B+, C+ or A-, B-, C- can be used simultaneously.

4 Commisioning

4.1 Commisioning guide

1.Determining the demand of the drive for your apply.

- cable diameter of input source
- cable diameter of output power
- the resistance of braking resistor

2.Please restore factory parameters at the first powered on

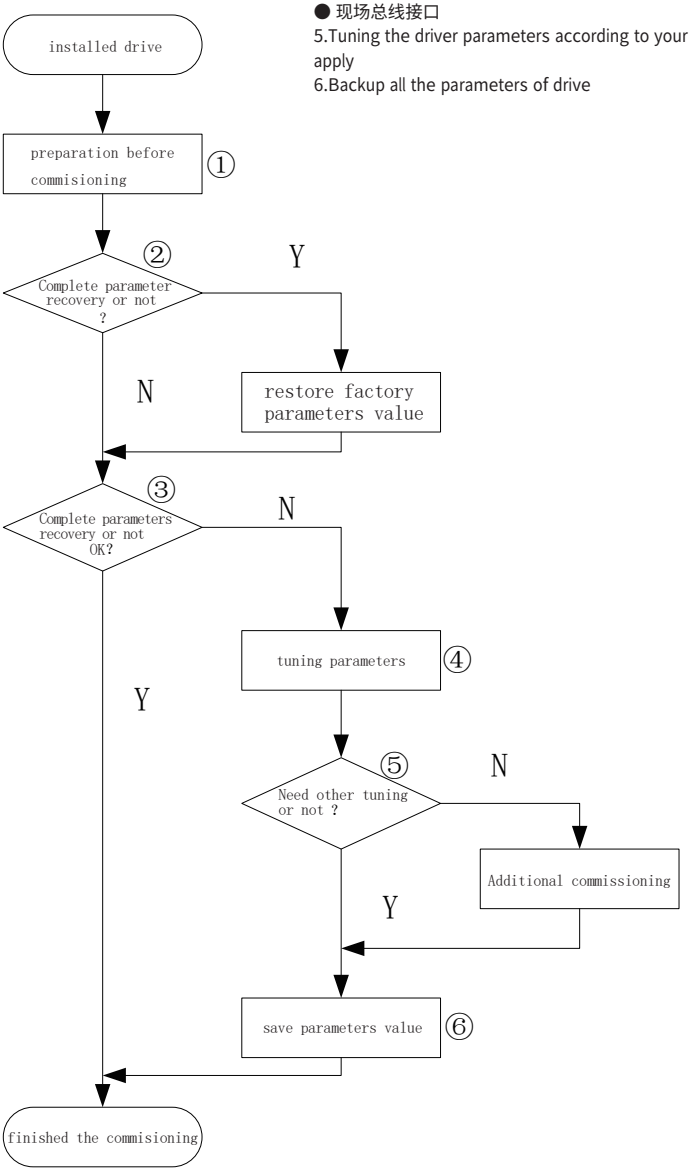
3.Check default parameters value for meeting your apply

4.Set the following items during commisioning：

- Input and output IOs
- The interface of communication
- 现场总线接口

5.Tuning the driver parameters according to your apply

6.Backup all the parameters of drive



4.2 Preparation before tuning

4.2.1 Collecting motor information

Before commisioning, the follow items must be confirmed

●Witch type motor is connected to drive?

Please record the product ID and nameplate data on the motor, and set corresponding parameters in drive.

●How connect motor to drive?

Paying attention to connect type of motor(type star(Y) or type delta(j), and record the nameplate data of motor that is related to the connect type.

4.2.2 Restore factory parameter value

set power type of drive

before drive consignment, the power type of drive was set by manufacturer, according to power modular.

control command source of drive

the default control command source is input terminals，the default setting of input terminals depended on logic of control modular.

X6:1	DI0	Forward rotation
X6:2	DI1	reverse rotation
X6:3	DI2	… (no define)
X6:4	DI3	…
X6:5	DI4	…

X3:1	AI0+	…
X3:2	AI0-	
X3:3	AI1+	…
X3:4	AI1-	

X2:4	AO	…
X2:3	GND	

X4:1	DO NC	running
X4:2	DO NO	
X4:3	DO COM	

Motor start or stop

when default parameters value, taking the setting frequency of 5Hz as an example (the rated motor frequency is 50Hz), drive makes motor accelerate in 5 seconds after drive was enabled and makes motor speed up to 5Hz. as the same start, drive makes motor decelerate in 5 seconds after drive was disabled.

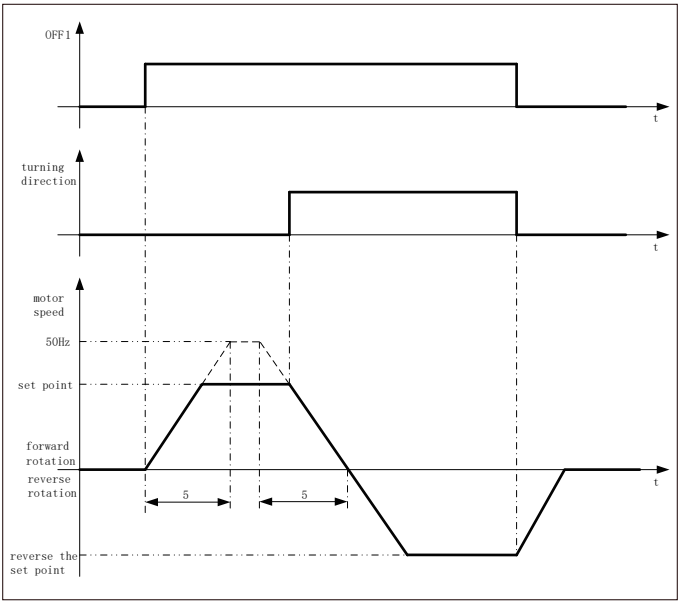


Figure 4 - 1 motor start, stop and turn direction in default parameters value

4.3 Restore factory parameter value

In some cases, commisioning will lead to exceptions, for examples:

● Power off during commisioning, and cannot end the commisioning

● You cannot continue to set parameters, because you cannot understand the parameters' mean.

● It is not clear whether the drive has been used in these cases, please make drive to restore factory parameter value

table 4-1 Restore factory parameter value

parameters	name	description
A04.00	Restore factory mode	0: Invalid 1:Restore factory setting of partial parameters 1 (power type of drive and motor information will not be restored) 2: Restore factory setting of partial parameters 2 (motor information will not be restored) 3: Restore factory setting of all parameters 4: Clear fault record(E01 and E07 groups)
A04.01	Confirm the recovery	0: cancel 1: yes

Type parameters of drive: set type parameters related to drive power of the PM drive modular

Motor information: the nameplate parameters of motor that be connected to drive

Examples:

Target:

Restore factory setting of partial parameters 1 (power type of drive and motor information will not be restored)

Step:

1. A04.00=1；
2. A04.01=1；

waiting 5 seconds and making drive finish to restore the factory setting

4.4 Operation panel and display

Operation and introduction of display panel

The Drive's display panel can set parameters, monitor status of drive，start or stop drive，and so on. The outline drawing and function diagram of the drive as follow:

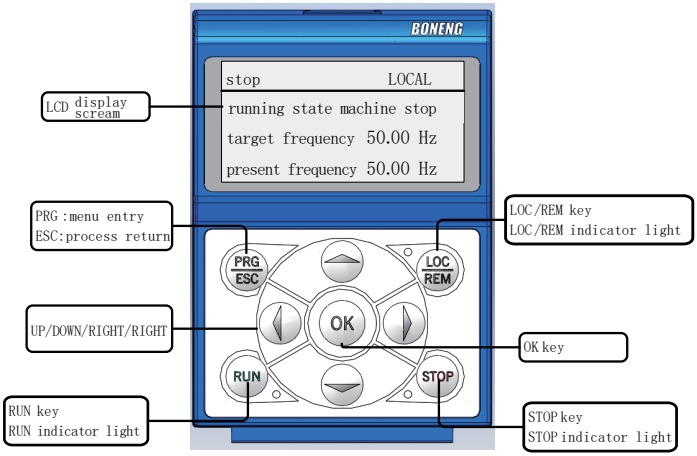


Figure 4-2 Schematic diagram of operation panel

1) Introduction of indicator light

LOC/REM indicator light: The control command is decided by operation panel when the light is powered on, and the control command is decided by remote operation when the light is powered off.

STOP indicator light: The drive be in stop state when the light is powered on

RUN indicator light: The drive be in run state when the light is powered on.

2) Introduction of the key on operation panel

Key	Name	Function
PRG/ESC	Program key/return key	Pressing this key, it will enter the function menu in main monitoring interface, or it will return to upper interface in other interface.
LOC/REM	Local key/remote key	Getting or giving up the control of the operation panel
STOP	Stop key	Pressing this key, it will stop the drive in run status or it will reset the fault in stop status.
RUN	Run key	This key can start or stop drive in local mode
▲	Increase key	increase the data value or function code index
▼	Decrease key	Decrease the data value or function code index
▶	Right shift key	Pressing this key, you can circularly select the bit that you want to modify towards to right.
◀	Left shift key	Pressing this key, you can circularly select the bit that you want to modify towards to left.
OK	Confirm key	Pressing this key, you can enter the next menu or confirm the value that you have been modified.

3) introducing the content of display scream

LCD displays content by way of four line characters, the first line is the status of drive.
The present operation status(stop/run), status of step control, mode of local or remote control will be displayed when drive is not faulty. The first line displays the current error information at a high priority when drive is faulty.

Stop	Local
Running state machine	Stop
Target frequency	50.00 Hz
Present frequency	50.00 Hz

Figure 2 example of LCD display in normal state

Fault: drive over temperature 1	
Running state machine	Stop
Target frequency	50.00 Hz
Present frequency	50.00 Hz

Figure 3 example of LCD display in error state

Introduction of checking and modifying the parameters

AThe operation panel of A1 series drive changes the parameters by type of multilevel menu, and displays content by way of four line characters, it is very visual and convenient.
You can check the parameter groups circularly in turn by pressing up or down key in the parameter setting interface.
pressing ok key, you can enter the parameters setting interface.
For example:
The example of the parameter value of B05.00 is changed to SVC control mode from VF control mode as follow, and the possible result will be listed as follow:
1) Modified success
2) Read - only parameter
3) No right to modify
4) Modifying just in stop mode

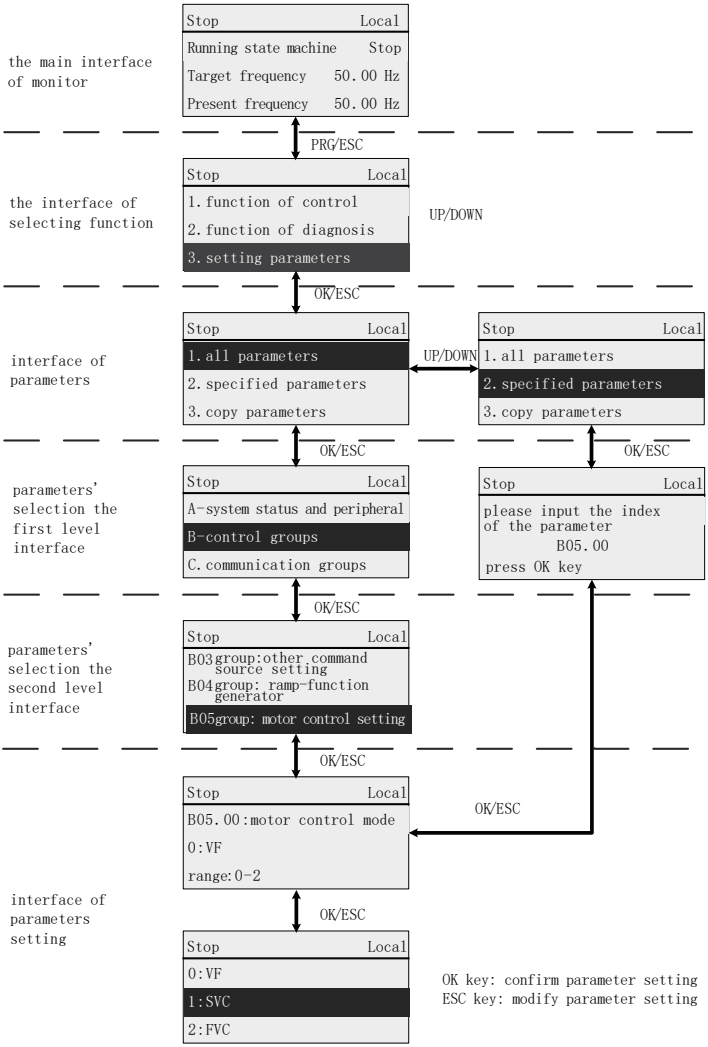


Figure 4-3 parameter modification process diagram

Status parameters selecting in main monitoring scream

The number of status parameters that can be display in main monitoring scream are up to six. The range of the monitoring parameters is from A00.00 to A00.40, the total number is up to 41. The status parameters that was displayed in main monitoring scream can be select by setting the parameters from A00.41 to A00.46.

For example:

if A00.14(DC-link voltage) is displayed in the second line of main monitoring interface, only the value of the A00.42 need to be modified.

5 Advanced commissioning

5.1 Overview of the converter functions

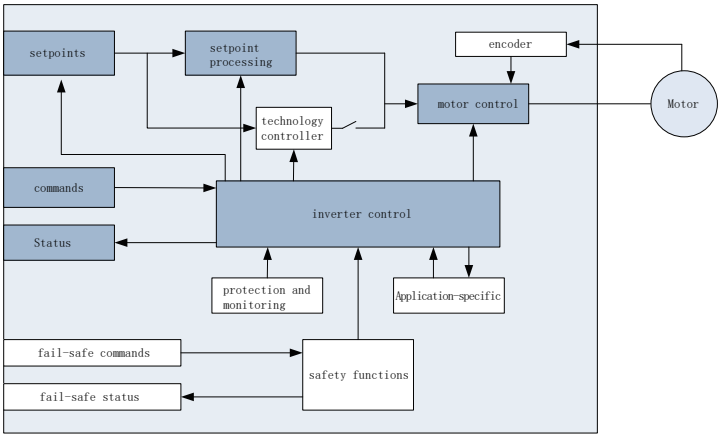


Figure 5-1 Overview of inverter functions

Functions relevant to all applications		Functions required in special applications only	
The functions that you require in each application are shown in a dark color in the function overview above. You set these functions during the basic commissioning, so that in many cases, the motor can be operated without having to make any additional settings.		The functions whose parameters you only need to adapt when actually required are shown in white in the function overview above.	
Inverter control	Inverter control is responsible for all of the other inverter functions, Among other things, it defines how the inverter responds to commands from the higher-level control system.	Protection and monitoring	The protection and monitoring fun ctions prevent damage to the motor, inverter and driven load, e.g. using temperature monitoring or torque monitoring.
Commands and status	The commands from the higher-level control are sent to the inverter via digital inputs or the fieldbus. The inverter returns its status signals to the outputs of the Control Unit or to the fieldbus.	Applica-tion -specific	The application-specific functions control, for example, a motor holding brake-or allow higher-level closed-loop pressure or temperature controls to be implemented using the technology controller.
Setpoints	You must define a setpoint, which defines the motor speed, for example.	Safety functions	The safety functions fulfill increased requirements regarding the functional safety of the drive. The safety functions include STO, SBC, SS1, SLS and so on
Setpoint process-ing	The setpoint processing uses a ramp-function generator to prevent speed steps occurring and to limit the speed to a permissible maximum value.		
Motor control	The motor closed-loop control ensures that the motor follows the speed setpoint. You can selecteither vector control or V/f control.		

5.2 Inverter control

5.2.1 Switching the motor on and off

After switching the supply voltage on, the converter normally goes into the "ready to start" state. In this state, the converter waits for the command to switch-on the motor:

● The converter switches on the motor with the ON command.
The converter changes to the "Operation" state,
● The converter brakes the motor after the OFF1 command.
The converter switches off the motor once standstill has been reached.
The converter is again "ready to start".

Converter states and commands for switching the motor on and off
In addition to the OFF1 command, there are other commands that are used to switch off the motor:

● OFF2 - the converter immediately switches off the motor without first braking it.
● OFF3 - this command means "quick stop". After OFF3, the converter brakes the motor with the OFF3 ramp-down time. After reaching standstill, the converter switches off the motor.
The command is frequently used for exceptional operating situations where it is necessary to brake the motor especially quickly. Collision protection is a typical application for this function.
● Pause run - inverter stop with OFF1 or OFF2 or OFF3.
● Normal run - inverter drive motor.

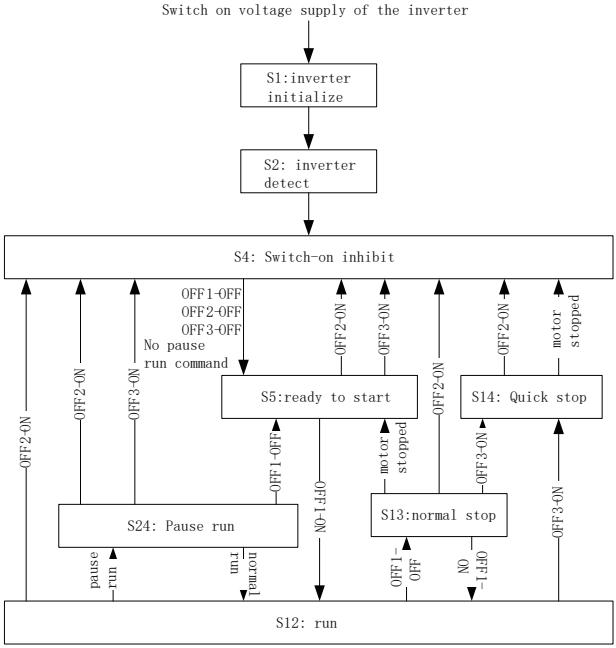


Figure 5-2 Internal sequence control of the converter when the motor is switched on and off

Converter status	Explanation
S1	Initial state after the converter is switched on
S2	Detect power devices after converter initialization
S4	The state of the converter when it meets the operating conditions of the motor
S5	The state of the converter when it does not meet the motor operating conditions
S12	Motor is running
S13	The motor was switched off with OFF1 and brakes with the ramp-down time of the ramp-function generator.
S14	The motor was switched off with OFF3 and brakes with the OFF3 ramp-down time, or at the current limit.
S24	Motor is paused running.

5.2.2 Adapt the default setting of the terminal strip

This chapter describes how you adapt the function of individual digital and analog inputs and outputs of the inverter.

5.2.2.1 Digital inputs

Changing the function of a digital input

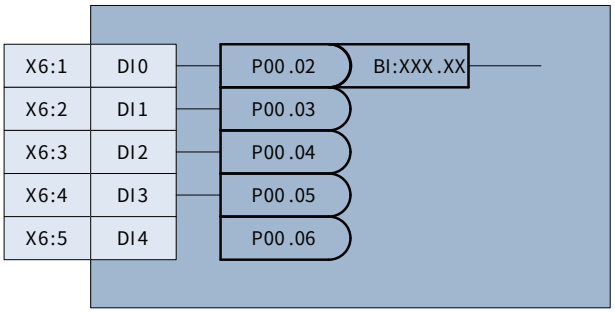


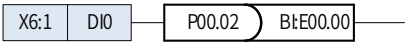
Figure 5-3 Digital input function diagram

Note: To change the function of a digital input, you must interconnect the status parameter of the digital input with a binector input of your choice.

Table 5-1 Binector inputs (BI) of the inverter (Some commonly used)

BI	Significance	BI	Significance
B00.01	Custom OFF1 source	B03.15	Fixed speed setpoint selection 4
B00.02	Custom OFF2 source	B04.00	Ramp-time select 1
B00.13	Fault reset source	B04.01	Ramp-time select 1
B01.00	Terminal control command selection	B04.20	RFG force output enable
B01.03	Terminal control command 1 input 1	E00.00	External fault 1
B01.04	Terminal control command 1 input 2	E00.01	External fault 2
B01.05	Terminal control command 1 input 3	E00.02	External alarm 1
B03.09	Motorized potentiometer, setpoint, raise	E00.03	External alarm 2
B03.10	Motorized potentiometer, setpoint, lower	F03.00	PID valid
B03.12	Fixed speed setpoint selection 1	F03.01	PID calculation enable
B03.13	Fixed speed setpoint selection 2	F04.03	Brake switch on
B03.14	Fixed speed setpoint selection 3	F04.09	Force brake switch off

Changing the function of a digital input-Example



To acknowledge fault messages of the inverter(E00.00) using digital input DIO, you must interconnect DIO with the command to acknowledge faults (E00.00: Set E00.00=1002.

Note: The coding rules of interconnection parameters are as follows: parameter number+1000; that is, P00.02 is numbered 1002; P13.11 is numbered 2311; P15.89 is numbered 2589; other interconnection parameters are analogized.

5.2.2.2 Digital outputs

Changing the function of a digital output

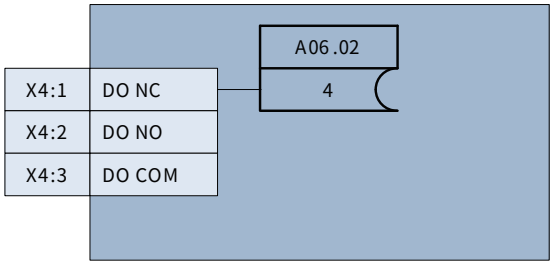


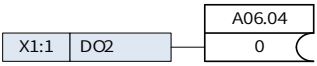
Figure 5-4 Changing the function of a digital output

Note: To change the function of a digital output, you must interconnect the digital output with a binector output of your choice.

Table 5-2 Function selection table of the inverter digital output

setpoints	significance	setpoints	significance
0	Low level	6	Negative speed
1	High level	7	Zero speed running
2	Ready to start	8	Over speed
3	Run allowed	9	Alarm
4	Running	10	Fault
5	Comparison value arrived	Other: binary interconnection parameters	

Changing the function of a digital output-Example



Connect D0 with the brake open (P01.58) interconnection parameter to represent the current state of the brake relay by digital output D0; Laser paper A06.04=1158.

5.2.2.3 Analog inputs

Overview

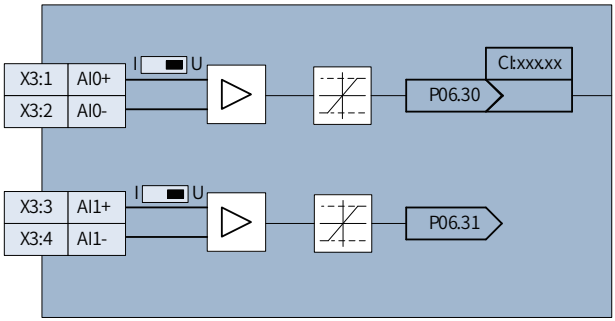


Figure 5-5 Changing the function figure of an analog input

Changing the function of an analog input:

1.Define the analog input type using parameter A07.04 and A07.05, and the switch on the inverter.

2.You define the analog input function by interconnecting parameter P06.30 or P06.31 with a connector input CI of your choice.

Note: Connector inputs are marked with "CI" in the parameter list of the List Manual

Defining the type of an analog input

A07.04	AI0 input type	0:-10～10V 1:0～10V 2:-20～20mA 3:0～20mA 4:4～20mA
A07.05	AI1 input type	0:-10～10V 1:0～10V 2:-20～20mA 3:0～20mA 4:4～20mA

In addition, you must set the switch belonging to the analog input.
the switch on the Control Module behind the lower front door.

●Voltage input; Switch position U (factory setting)

●Current input; Switch position I

Characteristics

If you change the analog input type，then the inverter automatically selects the appropriate scaling of the analog input. The linear scaling characteristic is defined using two points. Parameters A07.06 - A07.09 correspond to A10 analog input; Parameters A07.10 - A07.13 correspond to A11 analog input.

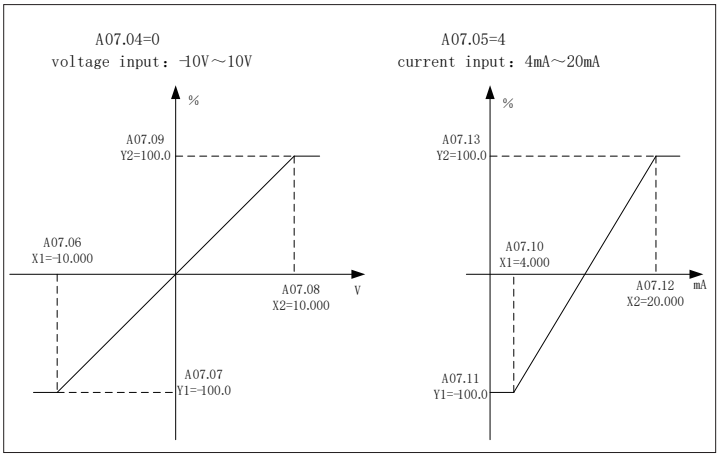


Figure 5 - 6 Examples for scaling characteristics

Parameter number	Parameter name	Parameter setting range
A07.06	AI0 curve minimum input value	-20.000～20.000
A07.07	AI0 curve minimum input ratio	-600.0%～600.0%
A07.08	AI0 curve maximum input value	-20.000～20.000
A07.09	AI0 curve maximum input ratio	-600.0%～600.0%
A07.10	AI1 curve minimum input value	-20.000～20.000
A07.11	AI1 curve minimum input ratio	-600.0%～600.0%
A07.12	AI1 curve maximum input value	-20.000～20.000
A07.13	AI1 curve maximum input ratio	-600.0%～600.0%

Adapting the characteristic

You must define your own characteristic if none of the default types match your particular application.

Example

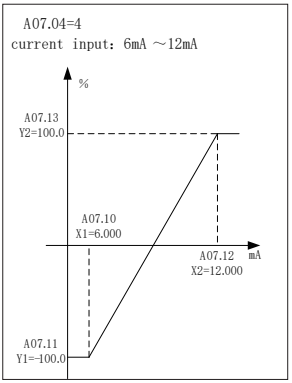
Example

The inverter should convert a 6 mA…12 mA signal into the value range - 100%… 100%via analog input 0. The wire break monitoring of the inverter should respond when 4 mA is fallen below.

1)Precondition

You have set analog input 0 as a current input (" I ") via the DIP switch on the Control Unit.

2) Procedure



Set the following parameters to set the analog input as current input with monitoring:

1.Set A07.24=01,This means that you define analog input 0 as current input with wire breakage monitoring.

2.Set pA07.20=4.000, This means that you define analog input 0 as current input with wire breakage value.

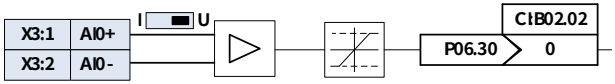
3.Set A07.06=6.000(X1)

4.Set A07.07=-100.0(Y1)

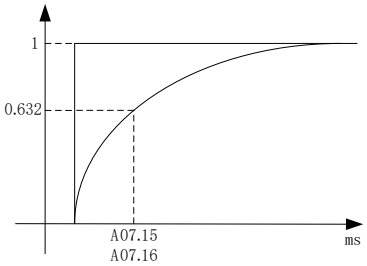
5.Set A07.08=12,000(X2)

6.Set A07.09=100.0(Y2)

Defining the function of an analog input-example

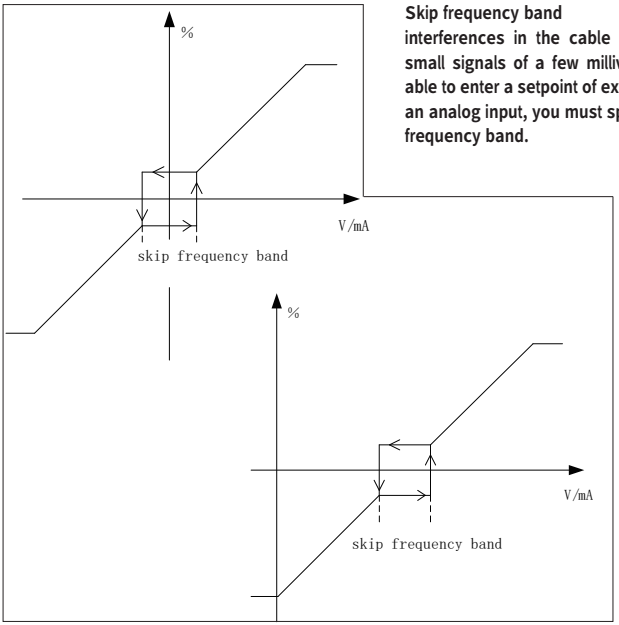


To enter a supplementary setpoint via analog input AI0, you must interconnect AI 0 with the signal source for the supplementary setpoint: Set B02.02=1630.



Advanced settings

Signal smoothing When required,you can smooth the signal,which you read-in via an analog input, using parameter A07.15 or A07.16.



Skip frequency band

interferences in the cable can corrupt small signals of a few millivolts. To be able to enter a setpoint of exactly 0 V via an analog input, you must specify a skip frequency band.

parameter number	parameter name	parameter setting range
A07.19	AI zero crossing threshold	0.0%～1.0%

5.2.2.4 Analog output

overview

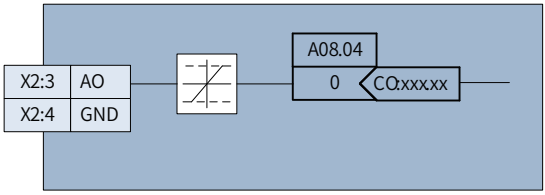


Figure 5-7 Changing the function figure of an analog output

Changing the function of an analog output:

1 .Define the analog output type using parameter A08.06 or A08.07,

2. Interconnect parameter A08.04 or A08.05 with a connector output of your choice.

Defining the analog output type

the analog output of CM22 currently only supports 0-10V analog output

Characteristics

If you change the analog output type, then the inverter automatically selects the appropriate scaling of the analog output. The linear scaling characteristic is defined using parameter(A08.08—A08.11).

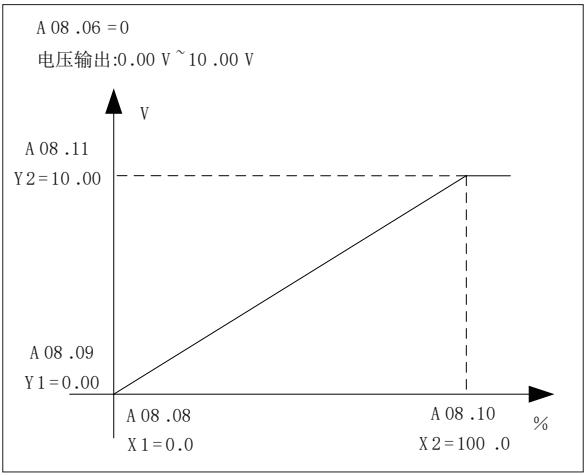


Figure 5-8 Examples for scaling characteristic

Table 5-3 Parameters for the scaling characteristic

parameter number	parameter name	参数设定范围
A08.08	AO curve minimum output ratio	-600.0%～600.0%
A08.09	AO curve minimum output value	0.00～20.00
A08.10	AO curve maximum output ratio	-600.0%～600.0%
A08.11	AO curve maximum output value	0.00～20.00

Setting the characteristic

You must define your own characteristic if none of the default types match your particular application.

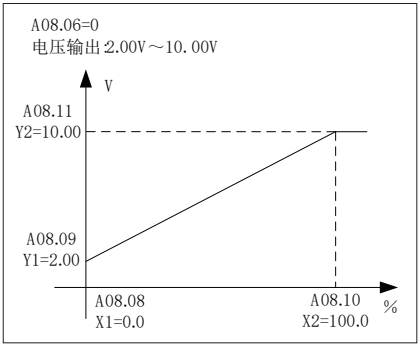
Example:

Via analog output 0, the inverter should convert a signal in the value range 0%…100% into an output signal 6 mA…12 mA.

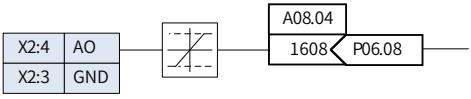
Procedure：

Set the following parameters to set the characteristic to match the example:

1.set A08.08=0.0
2.set A08.09=2.00
3.set A08.10=100.0
4.set A08.11=10.00



Defining t he function of an analog output—example



interconnect AO 0 with the signal for the output current:Set A08.04=1608.

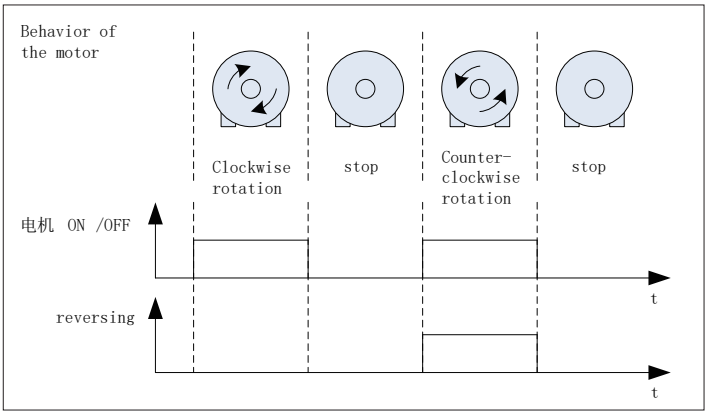
5.2.3 Inverter control using digital inputs(DI)

Six different methods are available for controlling the motor via digital inputs.

Single-wire control

Single-wire control:The input terminals only control the start and stop of the motor. The rotation direction of the motor is determined by the current wiring phase sequence of the inverter output.

Two-wire control method 1



Control commands

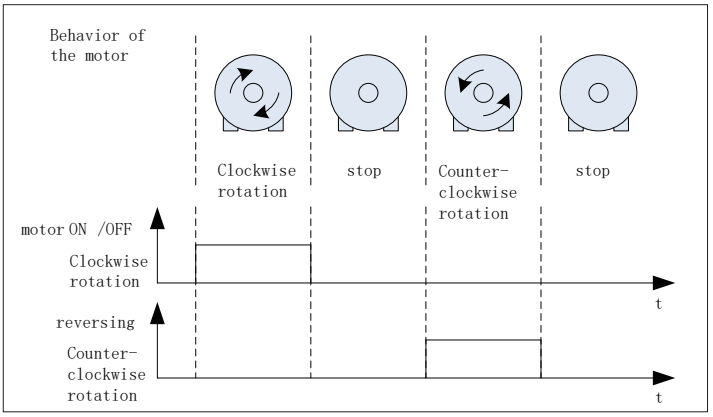
1 .Switching the motor on and off (ON/OFF1).

2 .Reverse the motor direction of rotation.

Typical application

Local control in conveyor systems.

Two-wire control method 2



Control commands

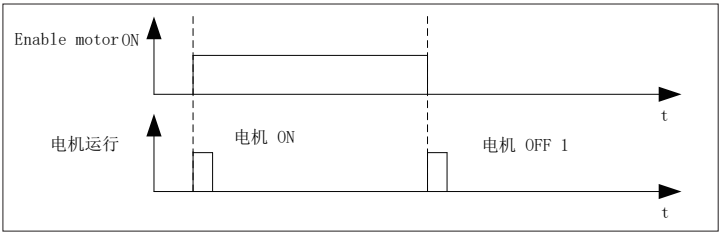
1 .Switch the motor on and off (ON/OFF1)，clockwise rotation.

2.Switch the motor on and off (ON/OFF1)，counter-clockwise rotation.

Typical application

Traction drives with control via joystick

Two-wire control method 3

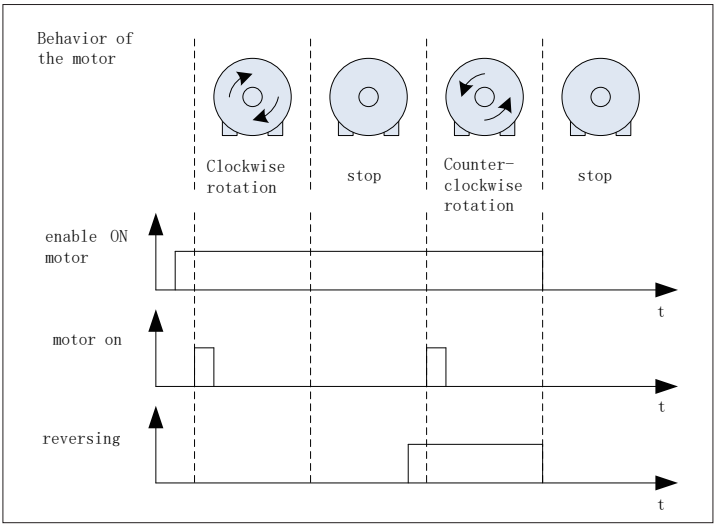


Control commands

1 .Enable motor or stop motor(OFF1)

2 .Enable motor,the rotation direction of the motor is determined by the current wiring phase sequence of the inverter output.

Three-wire control method 1



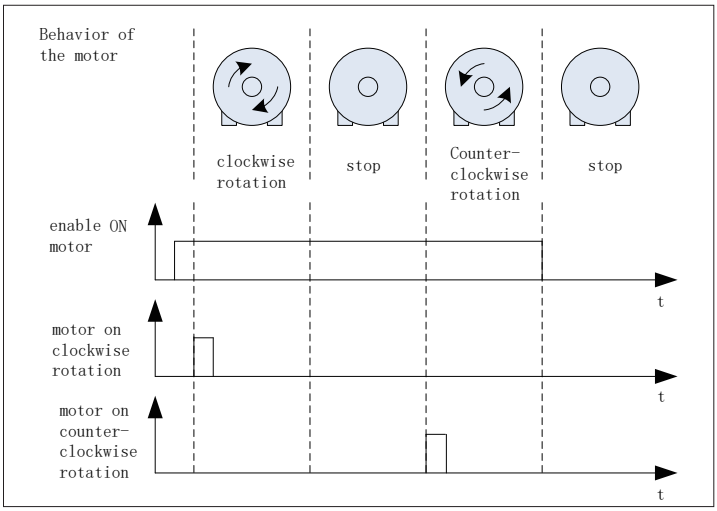
Control commands

1 .Enable signal for switching the motor on and off (OFF1).

2. Switch on motor (ON).

3. Reverse the motor direction of rotation.

Three-wire control method 2



Control commands:
1 .Enable signal for switching the motor on and off (OFF1).
2 .Switch on the motor (ON), clockwise rotation.
3. Switch on the motor (ON), counterclockwise rotation.
Typical application:
Traction drives with control via joystick

5.2.4 Two-wire control, method 1

You switch the motor on and off using a control command (ON/OFF1) while the other control command reverses the motor direction of rotation.

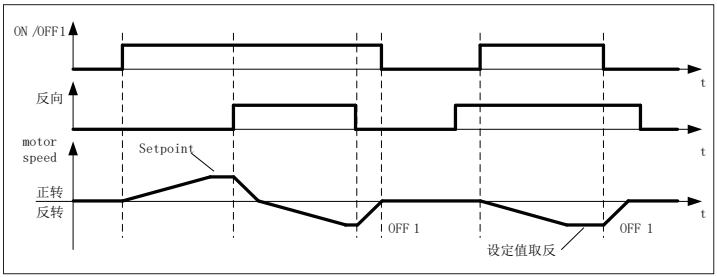


Figure 5-9 Two-wire control, method 1

表5-4 Function table

ON/OFF1	reversing	Function
0	0	OFF1: The motor stops.
0	1	OFF1: The motor stops.
1	0	ON: Clockwise motor rotation.
1	1	ON: Counter-clockwise motor rotation.

Related parameter settings

parameter number	parameter name	Parameter description
B01.00	Terminal control command 1/2 selection	Select terminal start / stow effective module
B01.01	Terminal control command 1 mode	选择端子启停有效模块1的端子控制模式， B01.01=2表示双线制控制，方法1。
B01.03	Terminal control command 1 input 1	Select the terminal source of the terminal start/ stop valid module 1 This parameter is a binary interconnection parameter
B01.04	Terminal control command 1 input 2	Select the terminal source of the terminal start/ stop valid module 1 This parameter is a binary interconnection parameter
B01.06	Terminal control command 2 mode	Select the terminal control mode of the electronic start/stop effective module 2. B01.06=2 means two-wire control.method1
B01.08	Terminal control command 2 input 1	Select the terminal source of the terminal start/ stop valid module 2 This parameter is a binary interconnection parameter
B01.09	Terminal control command 2 input 2	Select the terminal source of the terminal start/ stop valid module 2 This parameter is a binary interconnection parameter

5.2.5 Two - wire control method 2

You switch the motor on and off using a control command (ON/OFF1) and at the same time select clockwise motor rotation. You also use the other control command to switch the motor on and off, but in this case you select counter - clockwise rotation for the motor.

The inverter only accepts a new control command when the motor is at a standstill.

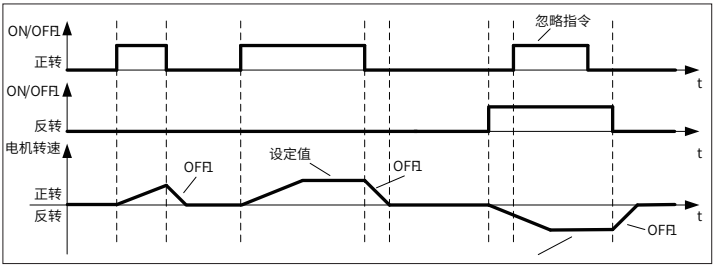


Figure 5 - 10 Two - wire control, method 2

Table 5 - 5 function table

ON/OFF1正转	ON/OFF1反转	功能
0	0	OFF1：电机停止
1	0	ON：Clockwise motor rotation.
0	1	ON：counter-Clockwise motor rotation.
1	1	ON：motor rotation direction subject to the signal that is "1" firstly

相关参数表

parameter number	parameter name	parameter description
B01.00	Terminal control command 1/2 selection	Select terminal start / stow effective module
B01.01	Terminal control command 1 mode	选择端子启停有效模块1的端子控制模式， B01.01=3表示双线制控制，方法2。
B01.03	Terminal control command 1 input 1	Select the terminal source of the terminal start/stop valid module 1 This parameter is a binary interconnection parameter
B01.04	Terminal control command 1 input 2	Select the terminal source of the terminal start/stop valid module 1 This parameter is a binary interconnection parameter
B01.06	Terminal control command 2 mode	选择端子启停有效模块2的端子控制模式， B01.06=3表示双线制控制，方法2。
B01.08	Terminal control command 2 input 1	Select the terminal source of the terminal start/stop valid module 2 This parameter is a binary interconnection parameter
B01.09	Terminal control command 2 input 2	Select the terminal source of the terminal start/stop valid module 2 This parameter is a binary interconnection parameter

5.2.6 Two - wire control, method 3

You switch the motor on and off using a control command (ON/OFF1) and at the same time select clockwise motor rotation.
You also use the other control command to switch the motor on and off, but in this case you select counter - clockwise rotation for the motor.

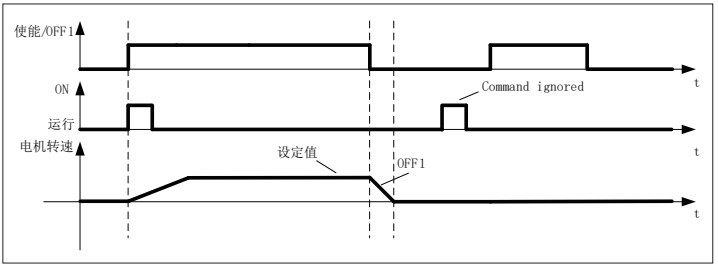


Figure 5 - 11 Two - wire control, method 3

Table 5 - 6 function table

enable/OFF1	ON/OFF1	Functio
0	0	OFF1：电机停止
1	0	OFF1：电机停止
0	1	OFF1：电机停止
1	1	ON:The motor rotates, the direction is based on the wiring order of the driver output line

相关参数表

参数编号	参数名称	参数说明
B01.00	Terminal control command 1/2 selection	选择端子启停有效模块。
B01.01	Terminal control command 1 mode	Select the terminal control mode of the electronic start/stop effective module 1. B01.01=4 means two-wire control.method3
B01.03	Terminal control command 1 input 1	Select the terminal source of the terminal start/stop valid module 1 This parameter is a binary interconnection parameter
B01.04	Terminal control command 1 input 2	Select the terminal source of the terminal start/stop valid module 1 This parameter is a binary interconnection parameter
B01.06	Terminal control command 2 mode	选择端子启停有效模块2的端子控制模式， B01.06=4表示双线制控制，方法3。
B01.08	Terminal control command 2 input 1	Select the terminal source of the terminal start/stop valid module 2 This parameter is a binary interconnection parameter
B01.09	Terminal control command 2 input 2	Select the terminal source of the terminal start/stop valid module 2 This parameter is a binary interconnection parameter

5.2.7 Three - wire control, method 1

With one control command, you enable the two other control commands.
You switch the motor off by withdrawing the enable (OFF1).
You switch on the motor with the positive edge of the second control command (ON).
The third control command defines the motor's direction of rotation (reversing).

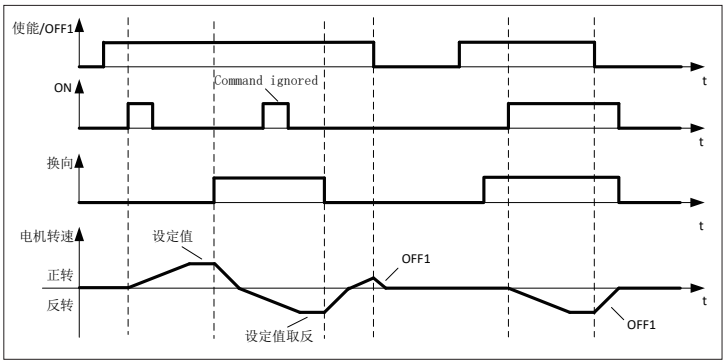


Figure 5 - 12 Three - wire control, method 1

Table 5 - 7 function table

使能/OFF1	ON	换向	the motor stops
0	0或1	0或1	OFF1：电机停止
1	0->1	0	ON：clockwise motor rotation
1	0->1	1	ON：counter-clockwise motor rotation

相关参数表

parameter number	parameter name	parameter description
B01.00	Terminal control command 1/2 selection	选择端子启停有效模块。
B01.01	Terminal control command 1 mode	Select the terminal control mode of the electronic start/stop effective module 1. B01.01=5 means two-wire control.method1
B01.03	Terminal control command 1 input 1	Select the terminal source of the terminal start/stop valid module 1 This parameter is a binary interconnection parameter
B01.04	Terminal control command 1 input 2	Select the terminal source of the terminal start/stop valid module 1 This parameter is a binary interconnection parameter
B01.05	Terminal control command 1 input 3	Select the terminal source of the terminal start/stop valid module 1 This parameter is a binary interconnection parameter
B01.06	Terminal control command 2 mode	选择端子启停有效模块2的端子控制模式，B01.06=5表示双线制控制，方法1。
B01.08	Terminal control command 2 input 1	Select the terminal source of the terminal start/stop valid module 2 This parameter is a binary interconnection parameter
B01.09	Terminal control command 2 input 2	Select the terminal source of the terminal start/stop valid module 2 This parameter is a binary interconnection parameter
B01.10	Terminal control command 2 input 3	Select the terminal source of the terminal start/stop valid module 2 This parameter is a binary interconnection parameter

5.2.8 Three - wire control, method 2

With one control command, you enable the two other control commands. You switch the motor off by withdrawing the enable (OFF1).
You switch the motor's direction of rotation to clockwise rotation with the positive edge of the second control command. If the motor is still switched off, switch it on (ON).
You switch the motor's direction of rotation to counter - clockwise rotation with the positive edge of the third control command. If the motor is still switched off, switch it on (ON).

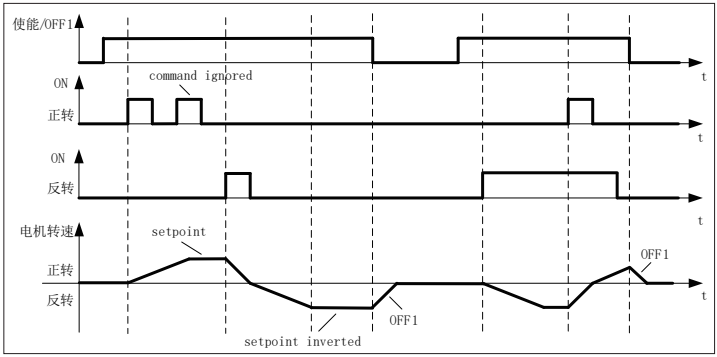


Figure 5 - 13 Three - wire control, method 2

Table 5 - 8 function table

使能/OFF1	ON Clockwise rotation	ON counter-Clockwise rotation	功能
0	0或1	0或1	OFF1：motor stops
1	0->1	0	ON：电机正转
1	0	0->1	ON：电机反转
1	1	1	OFF1：电机停止

相关参数表

parameter number	parameter name	parameter description
B01.00	Terminal control command 1/2 selection	选择端子启停有效模块。
B01.01	Terminal control command 1 mode	Select the terminal control mode of the electronic start/stop effective module 1. B01.01=6 means two-wire control.method1
B01.03	Terminal control command 1 input 1	Select the terminal source of the terminal start/stop valid module 1 This parameter is a binary interconnection parameter
B01.04	Terminal control command 1 input 2	Select the terminal source of the terminal start/stop valid module 1 This parameter is a binary interconnection parameter
B01.05	Terminal control command 1 input 3	Select the terminal source of the terminal start/stop valid module 1 This parameter is a binary interconnection parameter
B01.06	Terminal control command 2 mode	选择端子启停有效模块2的端子控制模式，B01.06=6表示双线制控制，方法2。
B01.08	端子控制命令2输入1	Select the terminal source of the terminal start/stop valid module 2 This parameter is a binary interconnection parameter
B01.09	端子控制命令2输入2	Select the terminal source of the terminal start/stop valid module 2 This parameter is a binary interconnection parameter
B01.10	端子控制命令2输入3	Select the terminal source of the terminal start/stop valid module 2 This parameter is a binary interconnection parameter

5.2.9 Running the motor in jog mode

The "Jog" function is typically used to slowly move a machine part, e.g. a conveyor belt. With the "Jog" function, you switch the motor on and off using a digital input. When the motor is switched on, it accelerates to the jogging setpoint. There are two different setpoints available, e.g. for motor counter-clockwise rotation and clockwise rotation. The differences of JOG acceleration and deceleration time and ON/OFF1 command depend on setpoints of other parameters.

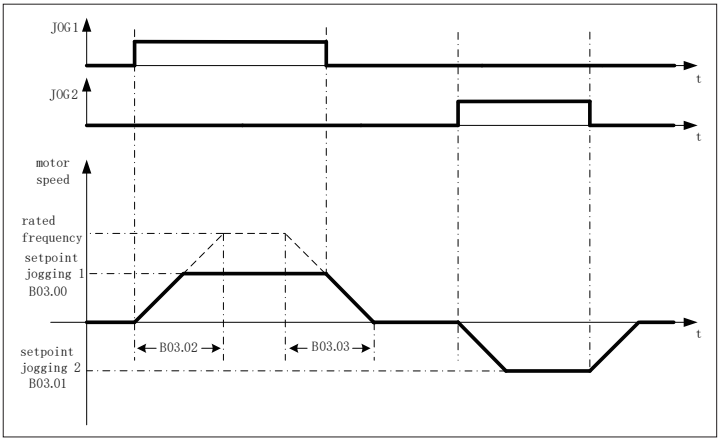


Figure 5-14 Behavior of the motor when "jogging"

The inverter must be ready to start before you issue the "Jog" control command
If the motor is already switched on, then the "Jog" command has no effect.

JOG setting related parameters

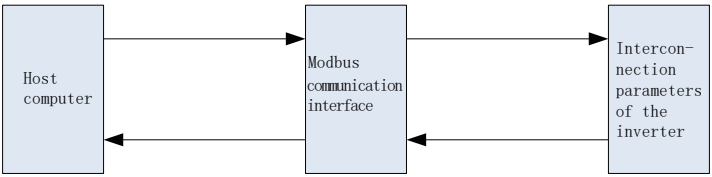
parameter number	parameter name	parameter description
B00.00	Start-stop control command source	Select the resource module of control command
B00.07	Custom JOG1 source	Set JOG1 command source of custom control module
B00.08	Custom JOG2 source	Set JOG2 command source of custom control module
B00.11	Source of terminal control module JOG1	Set command source of terminal control module JOG1
B00.12	Source of terminal control module JOG2	Set command source of terminal control module JOG2
B03.00	JOG1 given setpoint	Select the source of JOG1 setpoint
B03.01	JOG2 given setpoint	Select the source of JOG2 setpoint
B03.02	JOG ramp-up time	Set JOG ramp-up time
B03.03	JOG ramp-down time	Set JOG ramp-down time

5.2.10 Communication control

At present, the inverter supports Modbus communication and ProfiBus-DP communication.

5.2.10.1 Modbus communication control

See Appendix for details of Modbus communication protocol.
The specific structure of Modbus communication is as follows:



Communication address of Modbus:

Communication address	name	significance
0xE720	Modbus communication control command	1：启动；2：点动运行；3：自由停车；4：减速停车；5：故障复位
0xE721	Modbus communication setpoint 1	Modbus communication setpoint; setting range:-600.0%600.0%
0xE722	Modbus communication setpoint 1	Modbus communication setpoint; setting range:-600.0%600.0%

Modbus related parameters

Parameter numbler	Parameter name	Parameter setting range
C02.00	Modbus baudrate	0:1200bps
		1:2400bps
		2:4800bps
		3:9600bps
		4:19200bps
		5:38400bps
		6:57600bps
		7:115200bps
C02.01	Modbus data formats	0:Even parity (8-E-1) 1:odd parity (8-O-1) 2:no parity (8-N-2) 3:no parity (8-N-1)
C02.02	Modbus localhost	1～255
C02.03	Modbus response delay time	0～20ms
C02.04	Modbus communication timeout	0:invalid 0.1s～60.0s
P02.32	Modbus communication start-stop command	0～1
P02.33	Modbus jogging start-stop	0～1
P02.34	Modbus communication freely stop	0～1
P02.35	Modbus communication fault reset	0～1
P07.32	Modbus control command	0～65535
P07.33	Modbus communication setpoint 1	0～65535
P07.34	Modbus communication setpoint 2	0～65535
P07.35	Per-unit value of Modbus communication setpoint 1	0～65535
P07.36	Per-unit value of Modbus communication setpoint 1	0～65535

5.2.11 Control and status word

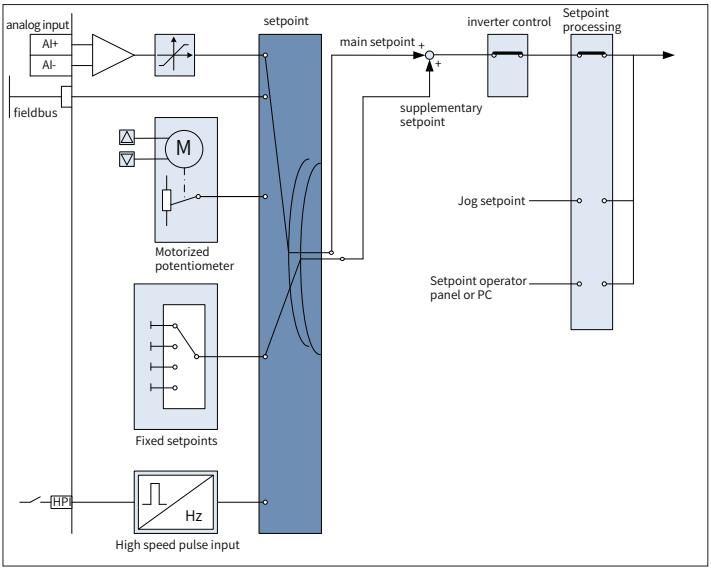
Control word

bit	signigicance	explanation
0	0 = OFF1	The motor brakes with the ramp-down time of the ramp-function generator. The inverter switches off the motor at standstill.
	0 → 1 = ON	The inverter goes into the "run" state, if bit1, bit2, bit3=1
1	0 = OFF2	Switch off the motor immediately, the motor then coasts down to a standstill.
	1 =No OFF2	The motor can be switched on (ON command).
2	0=Quick stop (OFF3)	Quick stop: The motor brakes with the OFF3 ramp-down time down to standstill.
	1= no Quick stop: (OFF3)	The motor can be switched on (ON command).
3	0=Inhibit operation	Immediately switch-off motor
	1=Enable operation	Switch-on motor
4	0=Disable RFG;The inverter immediately sets its ramp-function generator output to 0.	The inverter immediately sets its ramp-function generator output to 0.
	1=Do not disable RFG	The ramp-function generator can be enabled.
5	0=Stop RFG	The output of the ramp-function generator stops at the actual value.
	1=Enable RFG	The output of the ramp-function generator follows the setpoint.
6	0=Inhibit setpoint	The inverter brakes the motor with the ramp-down time of the ramp-function generator.
	1=Enable setpoint	Motor accelerates with the ramp-up time to the setpoint.
7	0→1 =reset faults	Reset the fault. If the ON command is still active, the inverter switches to"Switch-on inhibit" state. The fault still exists, and the reset command is invalid.
8	1=Jog running command 1	Jog command switch-on motor
9	1=Jog running command 2	Jog command switch-on motor
10	reserved	reserved
11	1=Direction reversal	Invert setpoint in the inverter.
12	1=MOP up	Increase the setpoint saved in the motorized potentiometer.
13	1=MOP down	reduce the setpoint saved in the motorized potentiometer.
14	1=Produce external fault	External signal produces fault, then inverter stops.
15	1=Produce external fault	External signal produces fault, then inverter stops.

Status word

bit	Significance	Explanation
0	1=Ready to start	Power supply switched on.The inverter is in pre-run state.
1	1=Ready	Motor is switched on (ON/OFF1=1),no fault is active. With the command "Enable operation", the inverter switches on the motor.
2	1=Operation enabled	Currently inverter is allowed to run.
3	1=Fault active	The inverter has a fault.
4	1=OFF2 inactive	Coast down to standstill is not active.
5	1=OFF3 inactive	Quick stop is not active.
6	1=Closing lockout active	Currently the inverter is in "Switch-on inhibit" state. Only when OFF1=0,OFF2=1,OFF3=1 and permissible operation=1, it can exit the current state.
7	1=Alarm active	Motor remains switched on;no acknowledgement is necessary.
8	1=Speed deviation within the tolerance range	Setpoint/actual value deviation within the tolerance range.
9	1=Local control requests control	The automation system is requested to accept the inverter control.
10	1=Comparison speed reached or exceeded	Speed is greater than or equal to the corresponding maximum speed.
11	1=current or torque limit reached	Comparison value for current or torque has been reached or exceeded.
12	1=Holding brake open	Signal to open and close a motor holding brake.
13	1=Motor rotates clockwise	Internal inverter actual value>0
14	Reserved	
15	Reserved	

5.3 Setpionts
5.3.1 Overview



Ficgure 5-15 Setpoint processing for the inverter

You have the following options when selecting the source of the main setpoint:
Inverter analog input,
Inverter fieldbus interface.
Fixed setpoints saved in the inverter.
Inverter high speed pulse input
You have the same selection options when selecting the source of the supplementary setpoint or additional setpoint.

Under the following conditions, the inverter switches from the main setpoint to other setpoints:
Before debugging, you must be able to confirm the following information:
When the technology controller is active and appropriately interconnected,its output specifies the motor speed.
When controlling from an operator panel or the BonengDrivesoft PC tool

5.3.2 Analog input as setpoint source

Interconnecting an analog input

If you have selected a pre-assignment without a function of the analog input, then you must interconnect the parameter of the main setpoint with an analog input.

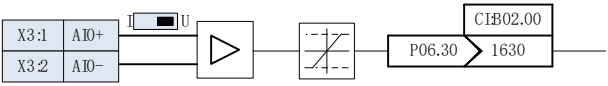


Table 5-9 Setting with analog input 0 as setpoint

Parameter	Remark
B02.00=1630（P06.30）	Select main setpoint of speed resource Interconnect the main setpoint with analog input 0
B02.01=1630（P06.30）	Select supplementary setpoint of speed resource Interconnect the supplementary setpoint with analog input 0
B02.02=1630（P06.30）	Select additional setpoint of speed resource Interconnect the additional setpoint with analog input 0

5.3.3 Specifying the setpoint via the fieldbus

Interconnecting the fieldbus with the main setpoint

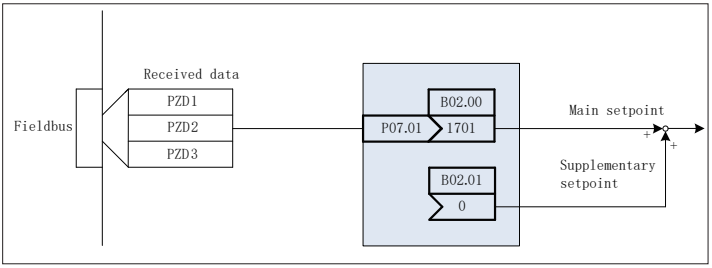


Figure 5-16 Fieldbus as setpoint

Table 5-10 Setting the fieldbus as setpoint

Parameter	Remark
B02.00=1701（P07.01）	Select main setpoint of speed resource Interconnect the main setpoint with process data PZD2 from the fieldbus adapter.
B02.01=1701（P07.01）	Select Supplementary setpoint of speed resource Interconnect the Supplementary setpoint with process data PZD2 from the fieldbus adapter.
B02.02=1701（P07.01）	Select additional setpoint of speed resource Interconnect the additional setpoint with process data PZD2 from the fieldbus adapter.

5.3.4 Motorized potentiometer as setpoint

The "Motorized potentiometer" function emulates an electromechanical potentiometer. The output value of the motorized potentiometer can be set with the "higher" and "lower" control signals. Interconnecting the motorized potentiometer with the setpoint source

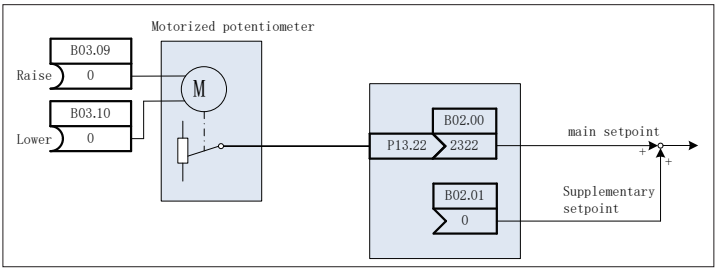


Figure 5-17 Motorized potentiometer as setpoint

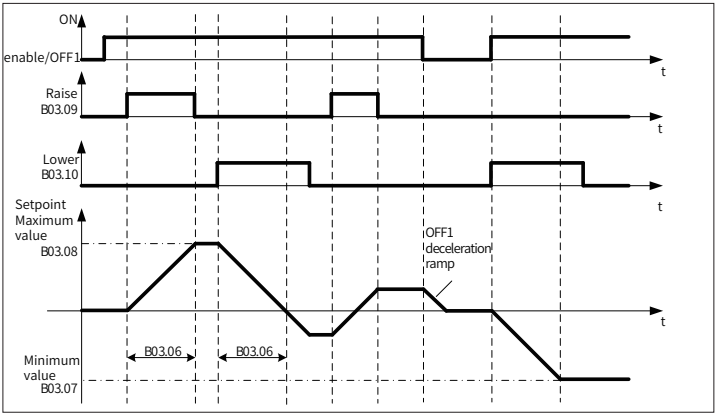


Figure 5-18 Function chart of the motorized potentiometer

Table 5-11 Basic setup of motorized potentiometer

Parameter	Description
B03.04	Select function mode of motorized potentiometer 0:inhibit 1:Power-off clearance
B03.05	Motorized potentiometer start value
B03.06	Motorized potentiometer ramp time
B03.07	Motorized potentiometer minimum value
B03.08	Motorized potentiometer maximum value
B03.09	Select motorized potentiometer higher resource
B03.10	Select motorized potentiometer lower resource

5.3.5 Fixed speed as setpoint

In many applications after switching on the motor, all that is needed is to run the motor at a constant speed or to switch between different speeds. Example: After it has been switched on, a conveyor belt only runs with two different velocities.

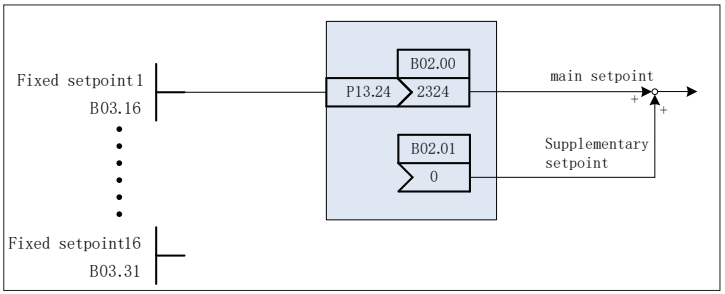


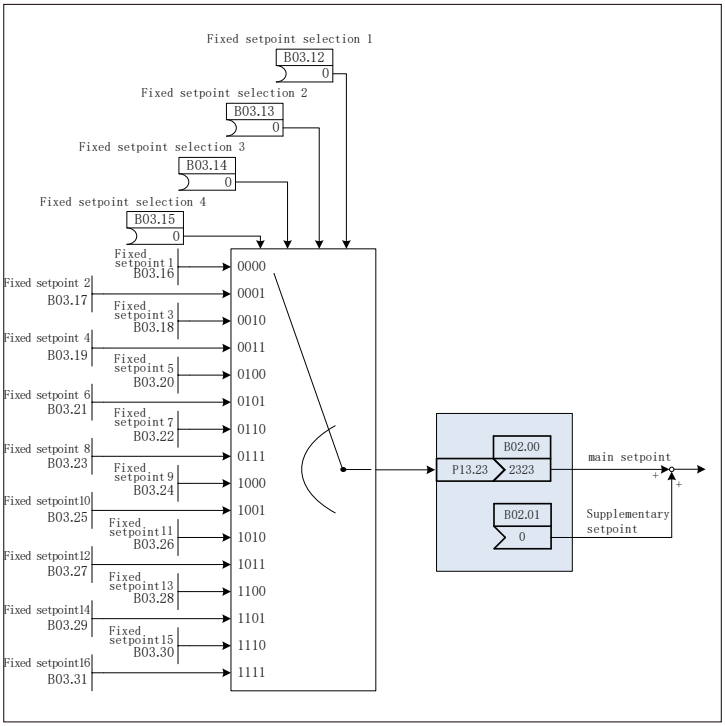
Figure 5-19 Motorized potentiometer as setpoint

表5-12 固定转速设定设定值

Parameter	Remark
B02.00=2324（P13.24）	Select main setpoint of speed resource Interconnecting the main setpoint with fixed setpoint 1.

Fixed setpoint by binary selection

You set 16 different fixed setpoints. You precisely select one of these 16 fixed setpoints by a combination of four selection bits.



Related parameter for setting the fixed setpoints

Parameter	Description
B03.11	Fixed setpoint Read-only parameter,show output value of the current fixed setting
B03.12	Fixed setpoint selection 1
B03.13	Fixed setpoint selection 2
B03.14	Fixed setpoint selection 3
B03.15	Fixed setpoint selection 4
B03.16	Fixed setpoint 1
B03.17	Fixed setpoint 2
B03.18	Fixed setpoint 3
B03.19	Fixed setpoint 4
B03.20	Fixed setpoint 5
B03.21	Fixed setpoint 6
B03.22	Fixed setpoint 7
B03.23	Fixed setpoint 8
B03.24	Fixed setpoint 9
B03.25	Fixed setpoint 10
B03.26	Fixed setpoint 11
B03.27	Fixed setpoint 12
B03.28	Fixed setpoint 13
B03.29	Fixed setpoint 14
B03.30	Fixed setpoint 15
B03.31	Fixed setpoint 16

5.4 Setpoint calculation

5.4.1 Overview of setpoint processing

- Invert setpoint to reverse the motor direction of rotation (reversing).
- Inhibit positive or negative direction of rotation，e.g.for conveyor belts, pumps or fans.
- Skip frequency bands to prevent mechanical resonance effects.
  The skip frequency band at speed=0 results in a minimum speed after switching on the motor.
- Limit to a maximum speed to protect the motor and mechanical system.
- Ramp - function generator to accelerate and brake the motor with anoptimum torque.

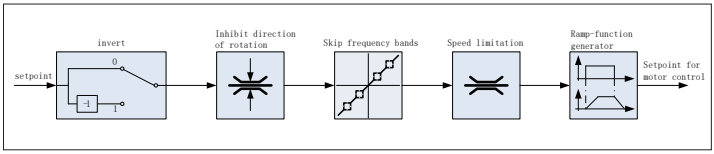
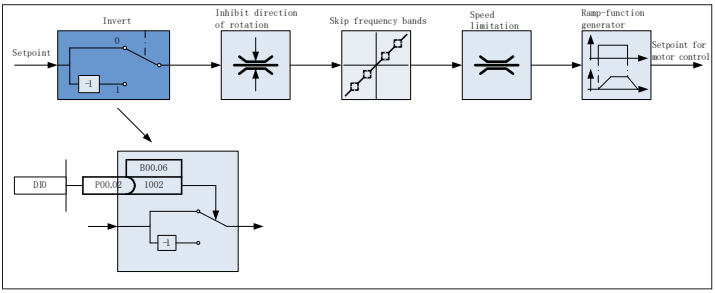


Figure 5 - 20 Setpoint processing in the Inverters

5.4.2 Invert setpoint

The inverter provides an option to invert the setpoint sign using a bit.
As an example, the setpoint inversion is shown through a digital input.



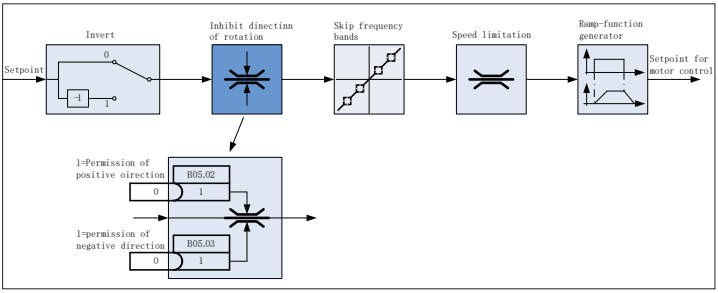
In order to invert the setpoint through the digital input DIO, connect the parameter B00.06 with a binary signal, e.g. the digital input 0.

Table 5 - 13 Basic setup of invert the setpoint

Parameter	Description
B00.06 = 1002（P00.02）	Invert the setpoint DIO=0:Setpoint remains unchanged. DIO=1:Inverts the setpoint.
B00.06 = 1201（P02.01）	Invert the setpoint by bit1 of bus adapter A PZD1

5.4.3 Inhibit direction of rotation

In the factory setting of the inverter, both motor directions of rotation are enabled.



Set the corresponding parameter to a value=0 to permanently block directions of rotation.

Table 5-14 Examples of settings to inhibit the direction of rotation

Parameter	Description
B05.02=0	Select permission of positive direction Rotate the motor in the positive direction is inhibited.
B05.03=1003（P00.03）	Select permission of negative direction Digital input 1=0: Negative direction of rotation is inhibited Digital input 1=1: Negative direction of rotation is enabled.

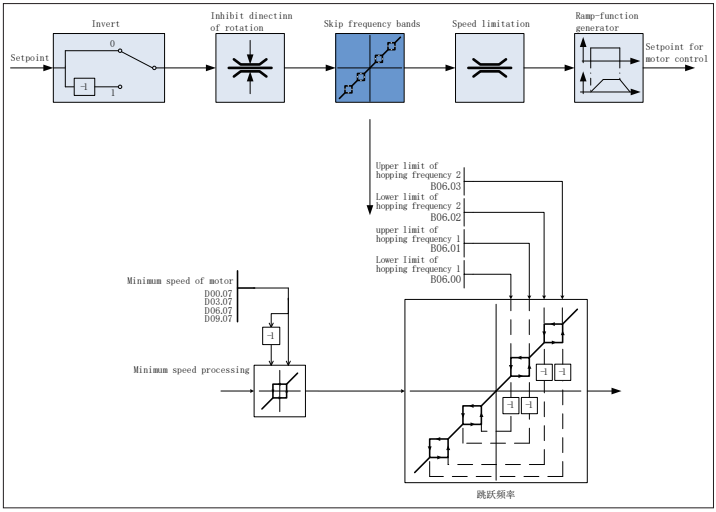
5.4.4 Skip frequency bands and minimum speed

Skip frequency bands

The converter has four skip frequency bands that prevent continuous motor operatior within a specific speed range.

Minimum speed

The converter prevents continuous motor operation at speeds<minimum speed. Speeds where the absolute value is less than the minimum speed are only possible during motor operation when accelerating or braking.



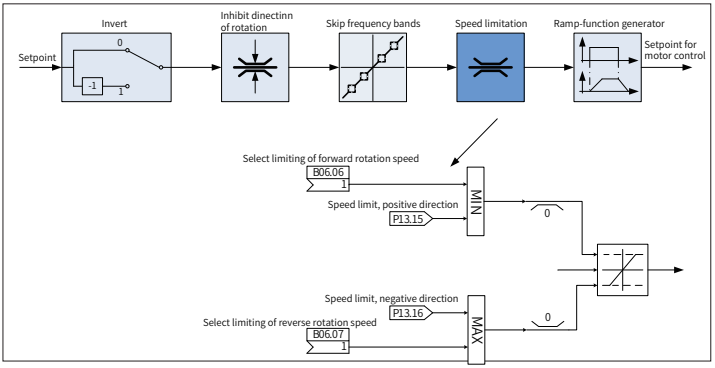
NOTICE:

If you are using an analog input as speed setpoint source, then for a setpoint= 0 V, noise voltages can be superimposed on the analog input signal. After the on command, the motor accelerates up to the minimum frequency in the direction of the random polarity of the noise voltage. A motor rotating in the wrong direction can cause significant material damage to the machine or system.

Inhibit the motor direction of rotation that is not permissible.

5.4.5 Speed limitation

The maximum speed limits the speed setpoint range for both directions of rotation.



The converter generates a message (fault or alarm) when the maximum speed is exceeded. If you must limit the speed depending on the direction of rotation, then you can define speed limits for each direction.

Table 5-15 Parameters for the speed limitation

Parameter	Parameter name
B06.04	Speed limit, positive direction
B06.05	Speed limit, negative direction
B06.06	Select limiting of forward rotation speed
B06.07	Select limiting of reverse rotation speed
D00.06	Maximum speed of motor
D03.06	Maximum speed of motor
D06.06	Maximum speed of motor
D09.06	Maximum speed of motor

5.4.6 Ramp - function generator

The ramp - function generator in the setpoint channel limits the rate of change of the speed setpoint(acceleration).

● Reduced acceleration lowers the accelerating torque of the motor.

In this case, the motor reduces the load on the mechanical system of the driven machine.

● Extended ramp - function generator

The expanded ramp - function generator limits not only the acceleration but also the change in acceleration (jerk) by rounding the setpoint. In this case, the torque does not rise suddenly in the motor.

Basic ramp - function generator

The basic ramp - function generator has no S curve(rounding) times during the process of acceleration and braking.

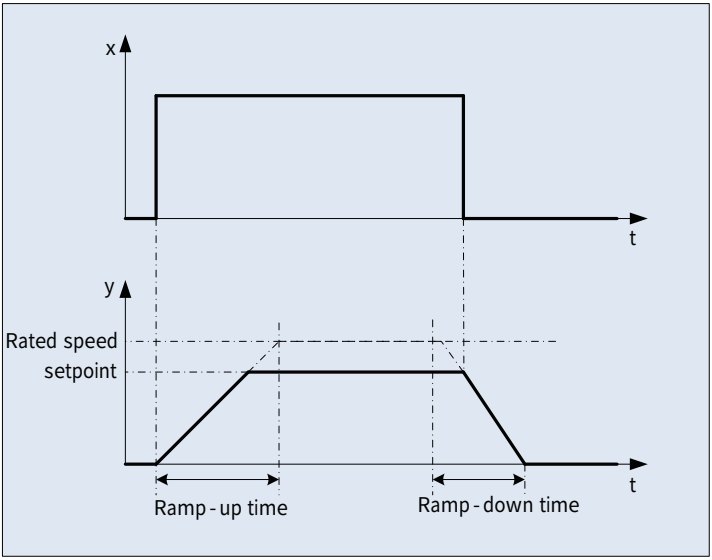
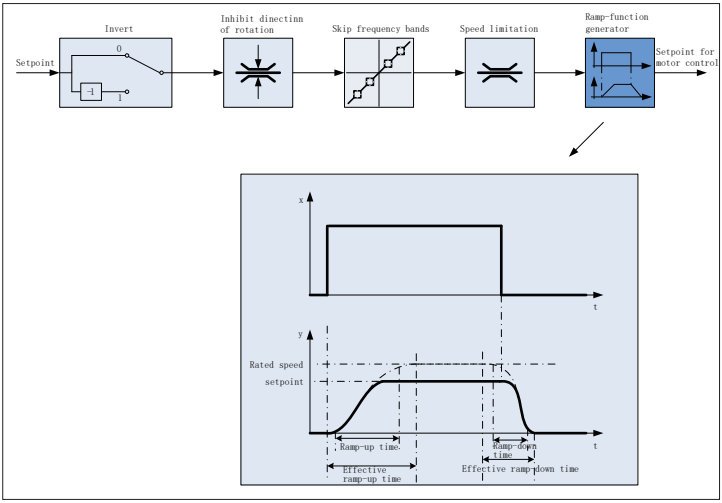


Table 5 - 16 Parameters for setting the basic ramp - function generator

Parameter	Parameter introduction	Parameter name
B04.02	Ramp1 ramp-up time	Accelerating time in seconds from zero speed up to the rated speed, the unit is S.
B04.03	Ramp1 ramp-down time	Braking time in seconds from the rated speed down to standstill, the unit is S.
B04.04	Ramp2 ramp-up time	Accelerating time in seconds from zero speed up to the rated speed, the unit is S.
B04.05	Ramp2 ramp-down time	Braking time in seconds from the rated speed down to standstill, the unit is S.
B04.06	Ramp3 ramp-up time	Accelerating time in seconds from zero speed up to the rated speed, the unit is S.
B04.07	Ramp3 ramp-down time	Braking time in seconds from the rated speed down to standstill, the unit is S.
B04.08	Ramp4 ramp-up time	Accelerating time in seconds from zero speed up to the rated speed, the unit is S.
B04.09	Ramp4 ramp-down time	Braking time in seconds from the rated speed down to standstill, the unit is S.
B05.33	OFF3 downtime	The quick stop (OFF3) has its own ramp-down time.

Extended ramp - function generator

The ramp - up and ramp - down times of the extended ramp - function generator can be set independently of each other. The optimum times that you select depend on your particular application in question and can range from just a few 100 ms (e. g. for belt conveyor drives) to several minutes (e. g. for centrifuges).



Initial and final S curves permit smooth, jerk - free acceleration and braking

- Effective ramp - up time=B04.02+0.5 x (B04.1 O+B04,11).
- Effective ramp - down time=B04,03+0.5 x (B04.10+B04.11).

Table 5 - 17 Parameters for setting the extended ramp - function generator

Parameter	Parameter introduction	Parameter name
B04.02	Ramp1 ramp-up time	Accelerating time in seconds from zero speed up to the rated speed, the unit is S.
B04.03	Ramp1 ramp-down time	Braking time in seconds from the rated speed down to standstill, the unit is S.
B04.04	Ramp2 ramp-up time	Accelerating time in seconds from zero speed up to the rated speed, the unit is S.
B04.05	Ramp2 ramp-down time	Braking time in seconds from the rated speed down to standstill, the unit is S.
B04.06	Ramp3 ramp-up time	Accelerating time in seconds from zero speed up to the rated speed, the unit is S.
B04.07	Ramp3 ramp-down time	Braking time in seconds from the rated speed down to standstill, the unit is S.
B04.08	Ramp4 ramp-up time	Accelerating time in seconds from zero speed up to the rated speed, the unit is S.
B04.09	Ramp4 ramp-down time	Braking time in seconds from the rated speed down to standstill, the unit is S.
B04.10	S curve 1 initial rounding time.	S curve for the extended ramp-function generator. the value applies for ramp up and ramp down.
B04.11	S curve 1 final rounding time.	S curve for the extended ramp-function generator. the value applies for ramp up and ramp down.
B04.12	S curve 2 initial rounding time.	S curve for the extended ramp-function generator. the value applies for ramp up and ramp down.
B04.13	S curve 2 final rounding time.	S curve for the extended ramp-function generator. the value applies for ramp up and ramp down.
B04.14	S curve 3 initial rounding time.	S curve for the extended ramp-function generator. the value applies for ramp up and ramp down.
B04.15	S curve 3 final rounding time.	S curve for the extended ramp-function generator. the value applies for ramp up and ramp down.
B04.16	S curve 4 initial rounding time.	S curve for the extended ramp-function generator. the value applies for ramp up and ramp down.
B04.17	S curve 4 final rounding time.	S curve for the extended ramp-function generator. the value applies for ramp up and ramp down.

Setting the extended ramp-function generator

Proceed as follows to set the extended ramp-function generator:

1.Enter the highest possible speed setpoint.

2.Switch on the motor.

3.Evaluate your drive response.

-If the motor accelerates too slowly, then reduce the ramp-up time.

An excessively short ramp-up time means that the motor will reach its current limiting when accelerating, and will temporarily not be able to follow the speed setpoint. In this case, the drive exceeds the set time.

-If the motor accelerates too fast, then extend the ramp-up time.

-Increase the initial rounding if the acceleration is jerky.

-We recommend that you set the final rounding to the same value as the initial rounding

4.Switch off the motor.

5.Evaluate your drive response.

If the motor decelerates too slowly, then reduce the ramp-down time. The minimum ramp-down time that makes sense depends on your particular application. Depending on the Power Module used, for an excessively short ramp-down time, the converter either reaches the motor current, or the DC link voltage in the converter becomes too high. Depending on the converter setting，the real braking time exceeds the set ramp-down time, or the converter goes into a fault condition when braking.

-Extend the ramp-down time if the motor is braked too quickly or the converter goes into a fault condition when braking.

6. Repeat steps 1…5 until the drive behavior meets the requirements of the machine or plant.

5.5 Motor control

The driver has three control methods, which can be selected according to the actual needs of different applications

parameter	parameter name	Factory default	Set Value range	description
B05.00	Motor control mode	0	0～2	0:VF 1:SVC (Vector control without encoder) 2:FVC (Vector control with encoder)

VF:After the frequency command is given, the driver controls the output voltage according to the VF characteristic curve to control the motor operation

SVC: Open-loop vector control without encoder, suitable for general high-performance control applications. In principle, it can only drive one motor, such as machine tools, centrifuges and other loads

FVC: closed-loop vector control with encoder,suitable for the occasions with high-precision speed or torque control requirements. Inprinciple, only one motor can be driven, such as elevator, hoisting machinery and other loads

*Note:In SVC/FVC mode, if one driver drives multiple motors, the motor parameters must be consistent and rigidly connected

5.5.1 Motor parameter identification

No matter which motor control mode is selected, the basic parameters of the motor must be set accurately according to the motor nameplate before running the motor. (take motor 0 as an example, the same below)

function code	parameter name	Factory default	Set Value range	description
D00.00	Motor type selection	0	0～1	0:Asynchronous motor 1:Permanent magnet synchronous motor
D00.01	Motor type selection	3.7	0.00～655.35kW	Motor nameplate parameters
D00.02	Motor rated power	380	0～1500V	
D00.03	Motor rated voltage	9.00	0.00～655.35A	
D00.04	Motor rated current	50.0	0.0～600.00Hz	
D00.05	Motor rated frequency	1440	0～65535rpm	
D00.09	Motor rated speed Pole pairs of motor	2	0～64	0:Automatic calculation 1 ~64:Manual setting

When choosing vector control as the motor control mode, accurate motor parameters are required. In order to obtain better motor control.

function code	parameter name	Factory default	Set Value range	description
B00.21	Identification request	0	0～3	0:None 1:Simple static identification of asynchronous motor 2:Complete static identification of induction motor 3: Dynamic complete identification of asynchronous motor

The differences among the three parameter identification modes are shown in the table below. Please select according to the actual application

mode	conditions of use	identification parameters	description
Simple static identification of asynchronous motor	Motor cannot run	stator resistance	
Complete static identification of induction motor	Motor cannot run	stator reststance, rotor resistance, Leakage inductance, Mutual inductance,	
Dynamic complete identification of asynchronous motor	Motor cannot run		Before identification, please make sure that the motor is mechanically separated from the load and there is no danger in operation; if the motor is connected to the load, the identification result may not be accurate enough

The steps of motor parameter identification are as follows:

1 .Set the basic parameters of group D motor correctly according to the current motor selection

2. Select the parameter identification mode according to the driver control mode, system mechanical status, etc.

3. Press run to start parameter identification. If you want to stop identification in the process, press stop. After identification, the panel will display stop status

After identification, the following parameter identification results will be saved automatically. On the premise of knowing the accurate parameters of the motor,you can input the parameters manually without identification

function code	parameter name	Factory default	set value range	description
D01.00	Stator resistance of asynchronous motor	1.667	0.000～65.535ohm	Parameter identification or manual input
D01.01	Rotor resistance of asynchronous motor	1.500	0.000～65.535ohm	
D01.02	Leakage inductance of asynchronous motor	6.540	0.00～655.35mH	
D01.03	Mutual inductance of asynchronous motor	173.4	0.00～655.35mH	

5.5.2 V/F control

5.5.2.1 V/F curve

The driver can select the VF characteristic curve according to different load characteristics. The following parameters are only valid when the control mode is VF

function code	parameter name	Factory default	Set Value range	description
B07.00	VF mode selection	0	0～1	0: VF curve 1: VF separation
B07.01	VF curve selection	0	0～3	0: Line VF 1: Multi point VF 2: Square VF 3: The 1.5 power VF

0:Line VF，Suitable for applications where torque does not depend on speed, such as ordinary constant torque load
1:Multi point VF，Suitable for special loads such as dehydrators and centrifuges
2:Square VF，Suitable for occasions where the required torque increases with the speed, such as centrifugal loads such as fans and pumps
3:The 1.5 power VF，Between line VF and square VF curves

VF curve as shown in the figure

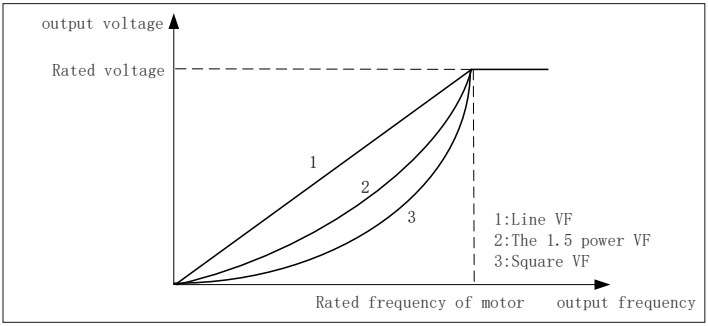


Figure 5-21 VF curve

The multi-point VF curve is defined by parameters B07.02~B07.07, which must be satisfied when setting the curve: frequency point setting B07.02<B07.04<B07.06, voltage point setting B07.03< B07.05 < B07.07.The parameter setting value should be determined according to the load characteristics, otherwise it may not run normally. Setting the voltage too high at low frequencies may cause the motor to overheat or even burn, and the driver may report an overcurrent fault.

function code	parameter name	Factory default	Set Value range	description
B07.02	Multi-point VF curve frequency point 1	2	0.0～B07.04	Select the frequency of the multipoint VF
B07.03	Multi-point VF curve voltage point 1	20	0.0～B07.05	Select the voltage of the multipoint VF
B07.04	Multi-point VF curve frequency point 2	20	0.0～B07.06	Select the frequency of the multipoint VF
B07.05	Multi-point VF curve voltage point 2	152	0.0～B07.07	Select the voltage of the multipoint VF
B07.06	Multi-point VF curve frequency point 3	40	0.0～D00.04	Select the frequency of the multipoint VF
B07.07	Multi-point VF curve voltage point 3	304	380	Select the voltage of the multipoint VF

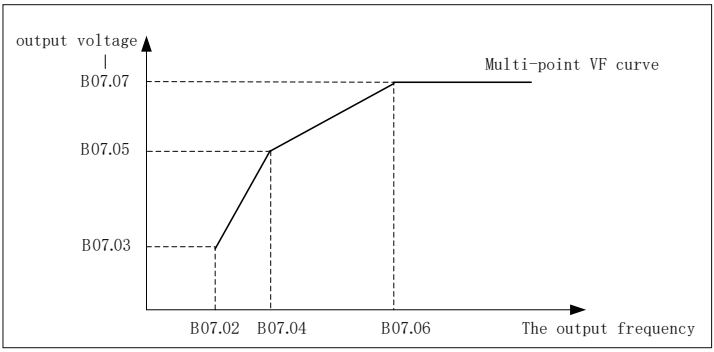


Figure 5-22 Multi-point VF curve

VF voltage separation:The relationship between frequency and output voltage is not calculated in the driver, and the output voltage is independently set by the user. Suitable for applications such as induction heating, inverter power supply, torque motor control, etc.

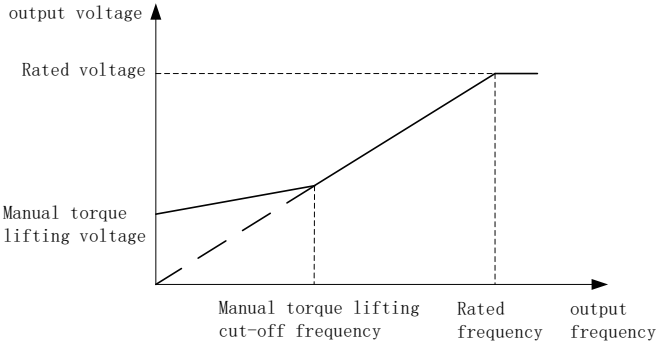
function code	parameter name	Factory default	Set Value range	description
B07.08	VF separation voltage setting	0	0～10	0:0 1:100.0% 2:AI0 3:AI1 4:reserved 5:reserved 6:Multi segment value setting 7:Electric potentiometer 8:Retain 9:reserved 10:reserved others:Analog interconnection parameters
B07.09	VF separation voltage change time	10	0.0s～1000.0s	Select the change time of VF separation voltage

5.5.2.2 Torque lifting

Torque lifting:compensation VF control low-frequency torque characteristics, by increasing the driver output voltage to increase the output torque.
When the load is large and the starting torque is not enough, the value of b07.15 can be increased properly. When the load is small, the value can be reduced properly. This parameter should not be set too large,otherwise it is easy to cause motor overheating or drive over-current fault. It is recommended to gradually increase the setting value with 1%as the step value. After setting, run the motor to check the parameter a00.08 (output current), which should not exceed d00.03 (motor rated current).

function code	parameter name	Factory default	Set Value range	description
B07.13	VF torque lifting mode	1	0～1	0：Disabled 1：Manual
B07.15	VF manual torque lifting	1	0%～50%	The lifting voltage is the percentage of the rated voltage of the motor
B07.16	VF torque lifting cut-off frequency	50	0.00～50.00	When the frequency setting is greater than this value, the torque lifting is invalid

Note: In the state of multi-point VF, VF separation, parameter identification, and speed tracking, torque lifting is invalid.



5.5.2.3 Oscillation suppression

The VF oscillation suppression function is turned off by default, and it needs to be turned on only when there is obvious oscillation in the VF operation of the motor. The larger the oscillation suppression gain, the more obvious the suppression effect. However, if the value is too large, it may adversely affect normal operation.You should choose a smaller value within the range of the value that can effectively suppress theoscillation.

function code	parameter name	Factory default	description
B07.20	VF oscillation suppression mode	0	0：invalid 1：valid
B07.21	VF oscillation suppression gain	20	

5.5.3 vector control

The performance of vector control is susceptible to motor parameters. Obtaining accurate motor parameters is the key to achieving high-performance vector control. In order to obtain good driving performance and operating efficiency, the parameter of the controlled motor must be identified first, and it can be entered manually when the accurate motor parameters are known.Inaccurate motor parameters may cause the motor to malfunction.

When selecting the control mode as FVC(B05.00=2), the relevant parameters of the encoder must be set correctly, otherwise the motor cannot run normally.

function code	parameter name	Factory default	Set Value range	description
D02.00	Encoder type	0	0～2	0: Invalid type 1:ABZ encoder
D02.01	Input AB phase sequence	0	0～1	0: Forward 1:Reverse
D02.02	Speed measurement mode	0	0～2	0:quadruple-frequency 1:A pulser 2:B pulse
D02.05	Encoder resolution (Number of pulses / speed)	1024	0～65535	The pulse number of ABZ encoder must be set correctly
D02.13	Speed feedback PG disconnection detection time	500	0～5000ms	When the driver detects that the encoder is disconnected and the duration exceeds this value, it will report the encoder fault

After connecting the encoder, first set the motor control mode B05.00=1，run the motor at medium speed, and check whether the absolute values and signs of the parameters A00.06 (motor speed) and A00.05 (given speed) are consistent. If the absolute values are not equal, please check the encoder connection and related parameter settings; if the signs are not consistent, please reverse D02.01 (input AB phase sequence).Make sure that the encoder feedback signal is correct before setting B05.00=2 to run the motor.

5.6 Protect Function

5.6.1 Over Current Protect

The Current of motor is always within the set torque limit in vector control.
The Torque Limit Value can not be set when use V/F control. V/F
control mode protects the motor over load from limiting the frequency and voltage of motor(Imax controler).

Imax Controller

The current of motor is limited by the value of torque limit when using vector control,the current of motor is limited by adjusting the output frequency when using VF control.If the current over the set limit value while acceleration，Imax controller will work,and the output frequency would be deceleration automatically to make the current stay within the set value,thus the actual acceleration time increased.If Imax controller works while decelera-tion,then rising the output frequency and thus the actual deceleration time increased.The actual procedure as the picture below:

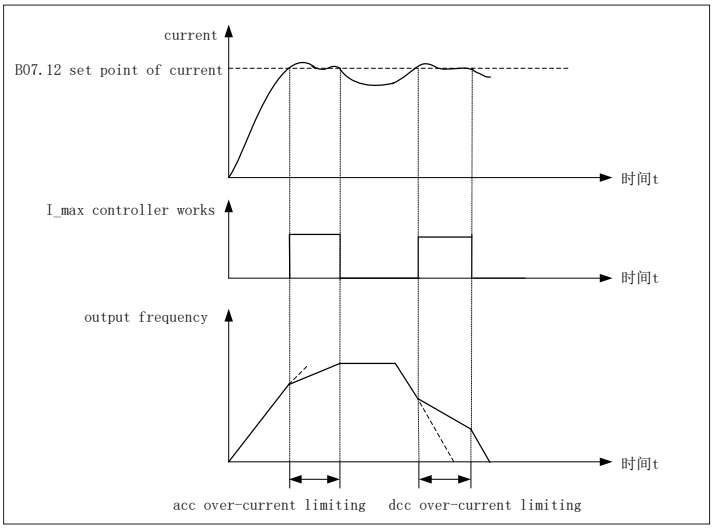


Figure 5-23 Over Current Inhibition procedure

Configure

If the motor is easy to vibrate when reaching the current limit value or trips due to overcurrent ,then the default value of the Imax controller must be changed.

Table 5-18 Imax Controller parameters

function code	parameter name	Factory default	Description
B07.10	I_{max} control enable	0	0:invalid 1:valid
B07.11	I_{max} the gain of control frequency	30	The larger the gain adjustment, the faster the frequency adjustment, the actual acc time shorter
B07.12	I_{max} inhibition point	150%	I_{max} control starting action current point, percentage or reference bus voltage

Note:if the over current trouble is easy to occur even open this function,then the parameter B07.12 should be decreased or increased the B01.11 properly.

5.6.2 DC Bus Over Voltage Inhibition

●How the motor causes Over voltage?

When the asynchronous motor is driven by the connected load, the motor works as a generator,The generator changes mechanical energy into electrical energy. The electrical energy turn back to driver. If the driver can not output the energy to the brake resistor,the DC bus will increase.

High DC voltage not only damage the driver but also the motor. The driver will close the connected motor before the voltage increase to the danger level,and send a fault message "DC bus over voltage".

●Motor and driver over voltage protect

The Vdc_max controller will avoid the Dc bus voltage too high is the application allowed. Vcd_max will delay the motor brake down time to make the motor only feed back a few of electric energy,and these power can be completely consumed by driver loss.

When the motor operate in generator mode,the electrical energy feed back to DC bus,the DC bus voltage increase,if there is no brake resistor connected with the driver,the over voltage will happen when the voltage increase to the over voltage point.DC bus voltage inhibition function can do best to avoid the DC bus voltage too high.

When the motor decrease quickly,the DC bus increase quickly,the Vdc_max controller will work when the voltage over the thread.I n vector control mode,the driver adjust the output frequency by limit the max output torque.In VF control mode,the driver adjust the output frequency directly to delay the decrease time,thus decrease the power back to the BUS,so the bus voltage can stay in the setting value.The procedure as bellow:

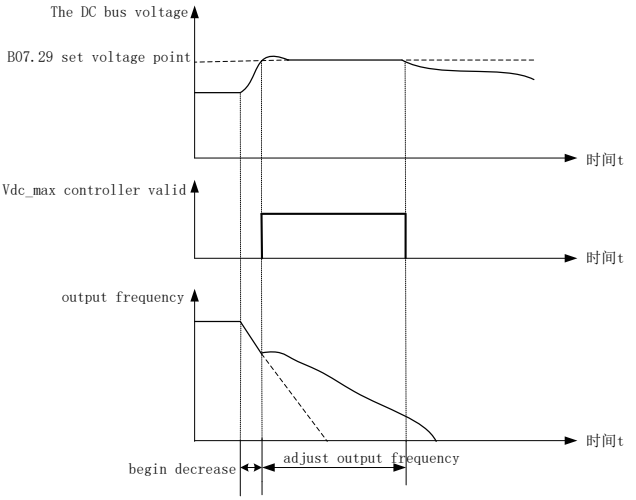


Table 5-19 Vdc-max Controller parameters

function code	parameter name	Factory default	Description
B07.28	Vdc_max control switch	0	0: disable 1: enable
B07.29	Vdc_max voltage margin	125%	Vdc max Control starting actior voltage point, percentage of reference bus voltage

Note:
1)If the over voltage trouble is easy to occur even open this function,then the parameter B07.29 should be decrease properly.
2) The controller is not suitable for the application of the motor to output the regenerated electric energy for a long time.Such as:Crane application or braking of large swinging

5.6.3 DC Bus Under Voltage Inhibition

The undervoltage inhibition function can make use of the kinetic energy of the load to make the driver continue to work as much as possible, and control the motor to run at a regular frequency reduction.When the bus voltage drops to the setting thread,Vdc-min controller valid,the driver decrease the output frequency automatically,make the motor work in generator mode,the electrical power feed back to the DC bus,thus make the bus voltage stay in the setting value.When the power resumed,the driver resume the operation state before loss power.The procedure as bellow:

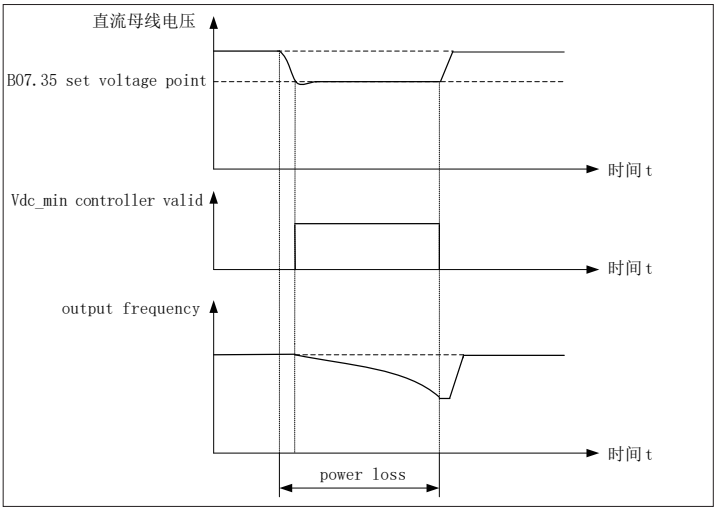


Figure 5-24 The procedure of Voltage Inhibition

Table 5-20 Vdc_max controller parameter

Function code	parameter name	Factory value	description
B07.34	Vdc_min control switch	0	0: disable 1: enable
B07.35	Vdc_ min Voltage regulation gain coefficient	85%	Vdc_ min Control starting action voltage point, percentage of reference bus voltage

Note:
If the under voltage trouble is easy to occur even open this function,then the parameter B07.35 should be increased properly

5.7 Application features

5.7.1 DC braking

DC braking:the actuator outputs DC power to the motor to make it brake, which is faster than the normal speed reduction halt. DC braking converts the braking energy of the motor into heat energy, which can prevent the motor from returning the braking energy to the actuator so that it does not have to process the regenerative power. It is suitable for centrifuge, sawing machine, grinding machine, conveyor belt and other applications that do not return energy to the power grid.

There are two situations of DC braking:

1 .DC braking during machine halt

In the process of speed reduction halt, the motor will rotate due to inertia if the moment of inertia is large. If the DC braking time (B05.11) exceeds 0 during machine halt, the DC braking function will be started. After reducing the speed to halt and the motor speed is lower than the starting speed(B05.12) of DC braking halt, the actuator will start DC braking and output the set DC braking current (B05.09) according to the set time of B05.11，and the motor brakes to reduce the speed to 0. The process of halt DC braking is shown in Figure 5-31.

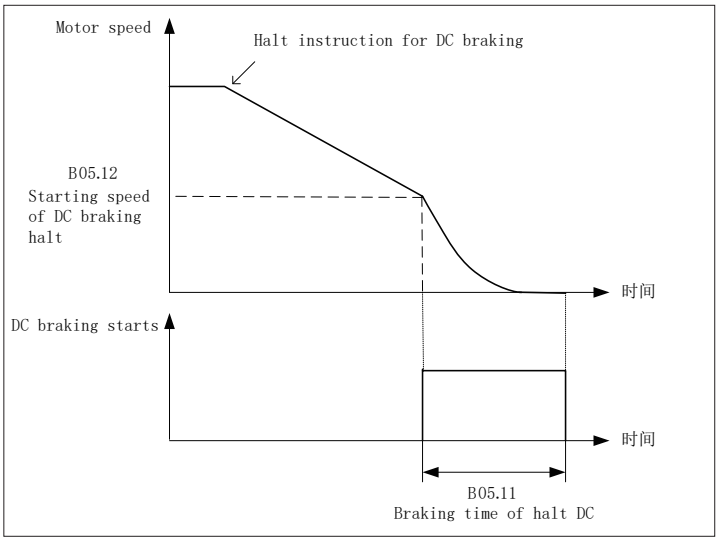


Figure 5-25 Process diagram of DC braking during machine halt

2.DC braking during start

When the motor rotates freely due to external force or inertia, direct start (B05.04=0) may lead to overvoltage or overcurrent failure of the actuator. In this case, DC braking start(B05.04=3) or speed tracking(B05.04=2) can be started.Set the starting DC braking time (B05.10), the motor will brake to 0 speed, and then restart to the specified frequency. The process of starting DC braking is shown in Figure 5-32.

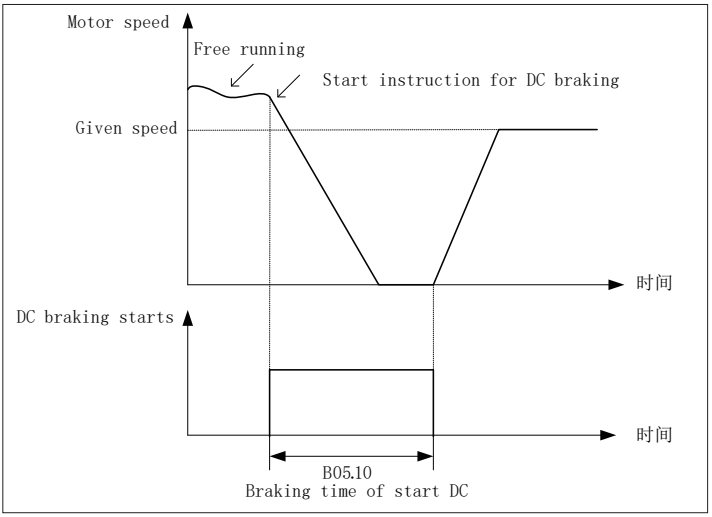


Figure 5-26 Process diagram of DC braking during start

Function code	parameter name	factory default	Set value range	描述
B05.04	Motor starting mode	0	0～3	0：Direct start 1：Preexcitation start 2：Speed tracking start 3：DC braking start
B05.09	DC braking current	0	0.0%～100.0%	Braking current setting during DC braking 100.0% corresponding to rated current of motor
B05.10	DC braking time of start	0	0.00s～100.00s	Time setting of DC braking of start 0 is start without DC braking
B05.11	DC braking time of halt	0	0.00s～100.00s	Time setting of DC braking of halt 0 is halt without DC braking process
B05.12	Starting speed of halt DC braking	0	0～3000rpm	0-3000rpm Starting speed of halt DC braking

Notes:

●ADC braking function is available on asynchronous motors only.

●DC braking can be switched during operation.

●DC braking will make the motor heated fiercely, the braking characteristics are not clear, and there is no constant braking torque. In the static state, there is no braking torque, and braking energy is converted into heat consumption, which cannot be used when the power down.

●If the motor is braked by DC braking for a long time or frequently, it will overheat and may be damaged. Please check the motor temperature during use. If the motor temperature is too high, increase the motor cooling time or use other braking methods.

5.7.2 Speed tracking

When the motor of the actuator starts, the motor may rotate for some reasons, such as the rotation of the fan due to the wind and the rotation of the motor due to the drive of the large inertia load after the halt. It is easy to cause over-current fault when the actuator starts directly from 0Hz because the difference between the output frequency and the actual frequency of the motor is too large. The speed tracking function can detect the actual speed of the motor and run from the current speed to avoid over current during starting.

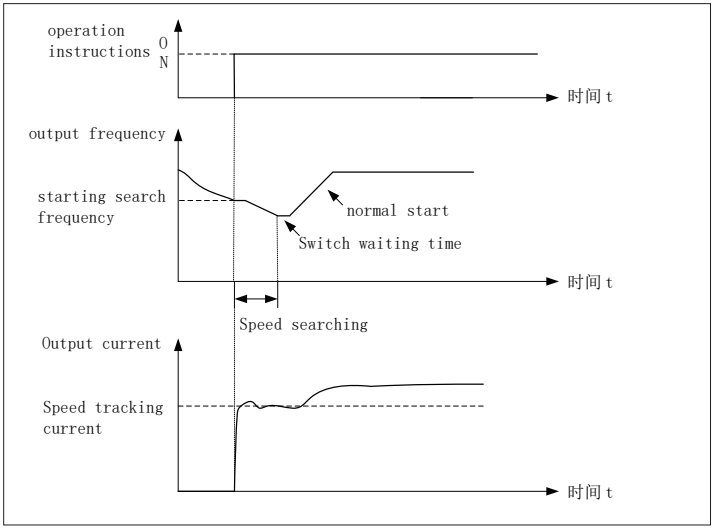


Figure 5-27 Process diagram of speed tracking

Table 5-21 Parameter settings related to speed tracking

Function code	parameter name	factory default	Description
B05.13	Speed tracking mode	0	0: Speed tracking off 1: Search from halt frequency 2: Search from rated frequency 3: Search from maximum frequency
B05.14	Search time of speed tracking	25.0s	Time for frequency reduction from 50Hz to 0Hz
B05.15	Current percentage of speed tracking	50%	Speed search current, Percentage of rated motor current
B05.16	Minimum frequency limit of speed tracking	2Hz	Direct start at less than this frequency Speed tracking does not work
B05.17	Waiting time for speed tracking switching	250ms	Waiting time for switching speed tracking mode to normal operation mode

Note: Please reduce the search time if it is too long. Please increase the search time appropriately if there is over-current or over-voltage fault during the search process.

5.7.3 Motor holding brake

The motor holding brake holds the motor in position when it is switched off. If the setting is correct, the motor will produce an electrical holding torque before the inverter opens the brake.

The inverter does not close the motor holding brake until the motor is at a standstill.

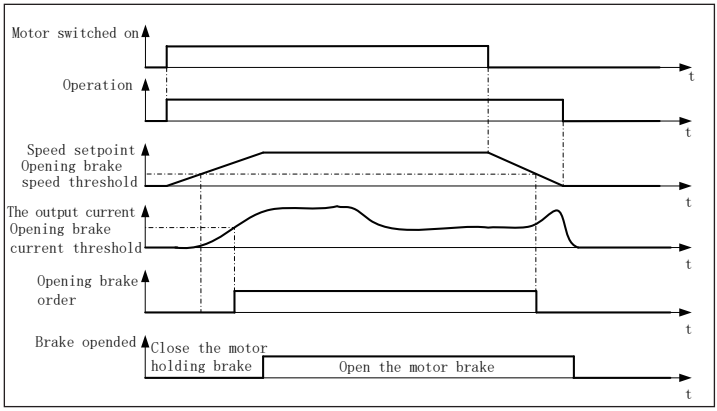


Figure 5-28 Motor holding brake opening sequence diagram

Function after an ON command:

1.With the ON command, the inverter send OFF1-ON comand.

2.The inverter speed setpoint is greater than opening brake speed threshold and the actual output current is greater than opening brake current threshold, the inverter issues the command to open the brake.

3.The inverter keeps the motor at the speed of brake opening until the "pause time of holding brake opening speed" has ended.

4.The inverter accelerates the motor to the speed setpoint.

Function after an OFF1 or OFF3 command:

1.The inverter brakes the motor down to a standstill and switches it off using the OFF1 or OFF3 command.

2.When braking, if the inverter speed setpoint is less than the brake closing speed threshold, the the inverter issues the command to close the brake.

3.The inverter keeps the motor at the speed of brake closing until the pause time of the brake closing speed(F04.16) has ended.

4.The inverter will close the motor.

Function of an OFF2 command:

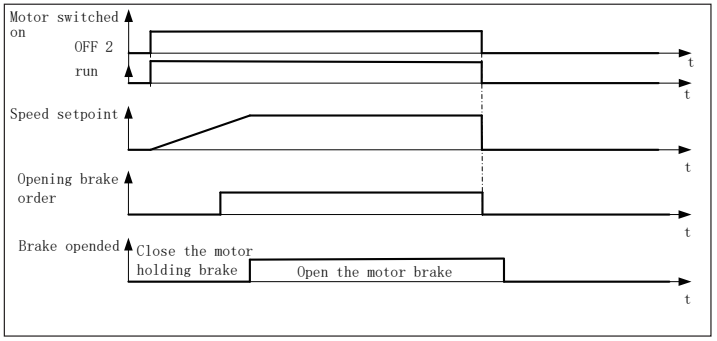


Figure 5-29 Controlling the motor holding brake after OFF2

After an OFF2 command，the inverter issues the signal to immediately close the motor holding brake, irrespective of the motor speed.

Commissioning a motor holding brake

Attention:

Danger to life due to falling loads For applications such as lifting equipment, cranes or elevators, there is a danger to life if the "Motor holding brake" function is incorrectly set.

● When commissioning the "Motor holding brake" function, secure any dangerous loads, e.g. by applying the following measures:

- Lower the load down to the floor
- Cordon off the hazardous area so that nobody can enter it

Procedure

To commission the "motor holding brake" function, proceed as follows:

1.Set F04.00=1 or2. The "brake controlling" function is enabled. F04.00=1 the motor holding brake is effective. Don't check whether the holding brake relay is closed or not. F04.0=2 the motor holding brake is effective. At the same time the system will check whether the holding brake relay is closed or not.

2.Set F04.03(the source of the motor holding brake opening command) Select the motor holding brake opening command, we usually set F04.03=1102(P01.02 operational sign)

3.Set F04.04(the source of the motor holding brake opening comparison value)

Select the motor holding brake opening determining parameters, we usually set F04.04=2311(P13.11 CM speed setpoint)

4.Set F04.05(holding brake opening comparison threshold)

Select the holding brake opening comparison threshold.We need to set according to the actual application requirements.

5. 5.Set F04.13(motor holding brake opening electric current comparison threshold)

Select the motor holding brake opening output current determining threshold, which ensure a certain output torque of the motor when the holding brake opening.Factory setting F04.13=50%can satisfy most field application.

6.Set F04.07(motor holding brake closing speed threshold)

For setting the determining threshold of the holding brake closing speed. We need to set according to the actual application requirements.

7.Set F04.12(the sourse of the motor holding brake closing comparison value)

Select the motor holding brake closing determining parameters, we usually set F04.04=2311(P13.11 CM speed setpoint)

8.Set F04.14(the driving power of the holding brake relay selection)

Select the driving power of the holding brake relay. We need to select the relay according to the actual application.

The steps1-5 above are the process of the holding brake opening setting. The steps6-7 are the process of the holding brake closing setting.

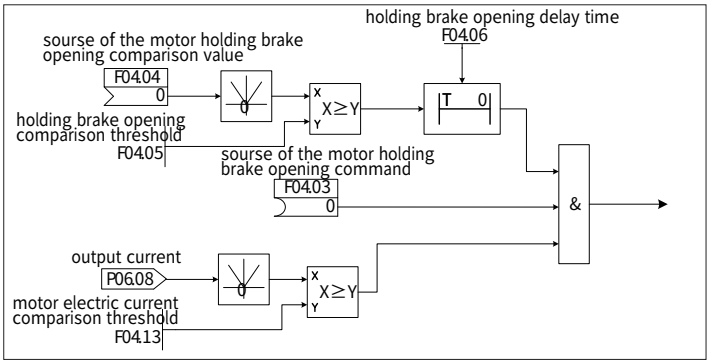


Figure 5-30 Holding brake opening determining function diagram

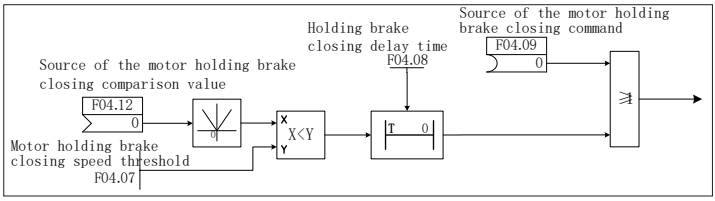


Figure 5-31 Holding brake closing determining function diagram

Table 5-22 Holding brake controlling parameters table

parameter	parameter name	description
F04.00	Holding brake function select	Holding brake enabled setting
F04.01	Motor holding brake opening time	Delay time after sending the holding brake opening command
F04.02	Motor holding brake closing time	Delay time after sending the holding brake closing command
F04.03	Source of the motor holding brake opening command	Select the holding brake opening command
F04.04	Source of the motor holding brake opening comparison value	Select the holding brake opening judgment value
F04.05	Holding brake opening comparison threshold	The comparison threshold of the holding brake opening
F04.06	Holding brake opening delay time	Delay time of the holding brake opening command
F04.07	Motor holding brake closing speed threshold	The comparison threshold of the holding brake closing
F04.08	Holding brake closing delay time	Delay time of the holding brake closing command
F04.09	Source of the motor holding brake closing command	Set the source of the motor holding brake closing command
F04.12	Source of the motor holding brake closing comparison value	Select the holding brake closing judgment value
F04.13	Motor holding brake opening electric current comparison threshold	Motor holding brake opening electric current judgment threshold
F04.14	Driving power of the holding brake relay selection	Driving power of the holding brake relay selection
F04.15	Holding brake opening speed pause time	Set RFG pause time for the holding brake opening
F04.16	Holding brake closing speed pause time	Set RFG pause time for the holding brake closing

5.7.4 Automatic switch-on

The automatic restart includes two different functions:

●The inverter automatically restarts faults.

●After a faults restart action，the inverter automatically switches-on the motor again.

Setting the automatic restart function

The automatic restart function is determined by the following aspects:

Faults restarting time: automatic restart processing for faults within a certain period of time. The starting depends on the first time of the faults after the automatic restart function is enabled.

Fault restarting interval time: the minimum interval time between two faults restarting commands.

Fault resetting times: during the faults restarting，the times number shouldn't bigger than the number of faults restarting commands, or there will be no more faults restarting commands unless the faults restarting time is over.

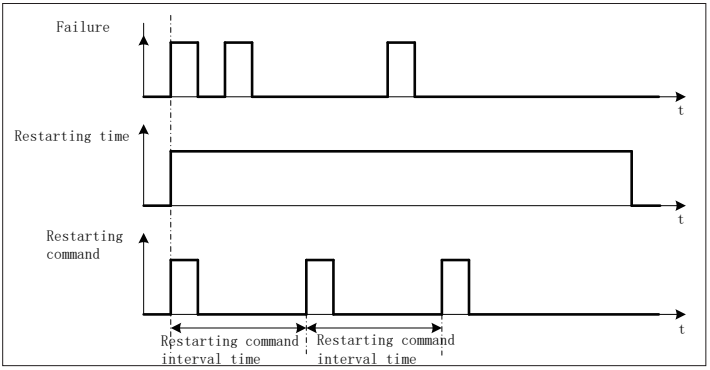


Figure 5-32 The automatic restart function sequence diagram

Note: parameter E00.14,E00.15, E00.16 can set the faults which can't be restarted after enable the the automatic restart function.

Table 5-23 The automatic restart function parameters

parameter	parameter name
E00.10	Fault automatic restart function
E00.11	Fault resetting times resetting time
E00.12	Fault restarting interval time
E00.13	Fault resetting times
E00.14	Non-resettable exception code1
E00.15	Non-resettable exception code2
E00.16	Non-resettable exception code3

Setting the automatic restart function

The automatic restart function is effective after the fault automatic restart. If the motor rotates for a long time after a fault, you must to enable "speed tracking" function，(see 6.7.2).

Table 5-24 The automatic restart function parameter

parameter	parameter name	Description
E00.23	Automatic restart function	Enable the automatic restart function
E00.24	Exception source of a restart	0:Specified exception code allows restart 1:Specified exception code does not allow
E00.25	Specified exception1code1	Set special handing failures
E00.26	Specified exception code2	Set special handing failures
E00.27	Specified exception code3	Set special handing failures
E00.28	Specified exception code4	Set special handing failures
E00.29	Specified exception code5	Set special handing failures

5.7.5 PID technology controller

5.7.5.1 Overview

The technology controller controls process variables, e.g pressure, temperature, level or flow.

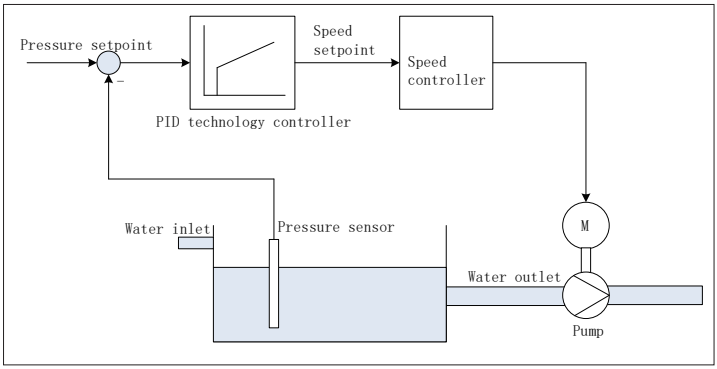
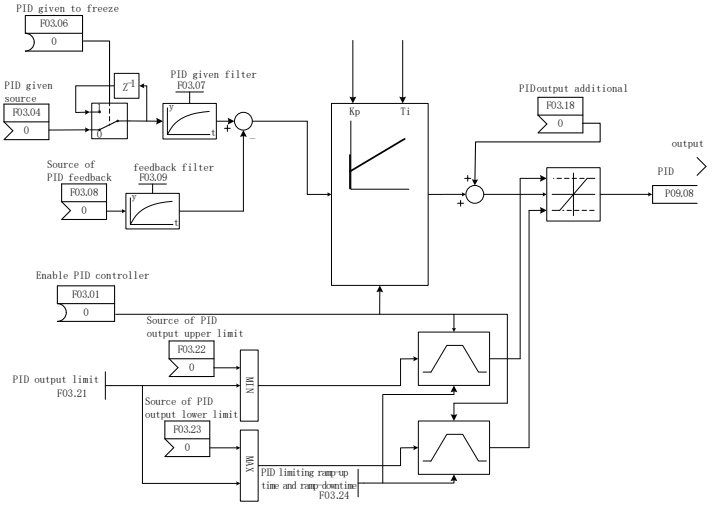


Figure 5-33 Example: Technology controller as a pressure controller

5.7.5.2 Setting the technology controller

Simplified representation of the technology controller

The technology controller is implemented as a PID controller (controller with proportional, integral，and derivative action).



Setting the technology controller

parameter	Parameter name
F03.00	PID function effective signal
F03.01	PID operational enabling signal
F03.04	PID given source
F03.05	PID given value
F03.07	PID given filter time
F03.08	Source of PID feedback
F03.09	PID feedback filter time
F03.11	Proportional gain KP
F03.12	Proportional gain coefficient
F03.13	Integration time Ti
F03.14	Integration time coefficient
F03.15	Derivative Time Td1
F03.16	Derivative Time coefficient

Setting advanced parameters

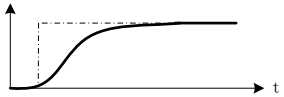
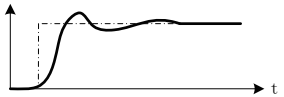
parameter	Parameter name
F03.06	Enable PID given to freeze
F03.10	PID deviation additional
F03.17	PID output integral initial values
F03.18	PID output additional
F03.20	PID integral components values
F03.21	PID output limit
F03.22	Source of PID output upper limit
F03.23	Source of PID output lower limit
F03.24	PID limiting ramp-up time and ramp-down time
F03.25	Enable PID deviation dead band
F03.26	Range of PID deviation dead band
F03.27	PID feedback missing detection value
F03.28	PID feedback missing detection time

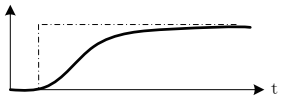
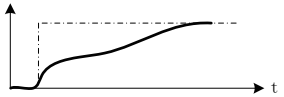
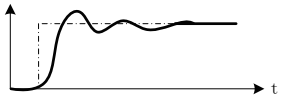
5.7.5.3 Optimizing the controller

Procedure

1 .Enable the PID process controller, enable operation

2.Enter a setpoint step and monitor the associated actual value, e.g. with the trace function of Eoperation.The slower the response of the process to be controlled，the longer you must monitor the controller response, Under certain circumstances (e.g .for a temperature control), you need to wait several minutes until you can evaluate the controller response.

	Optimum controller response for applications that do not permit any overshoot. The actual value approaches the setpoint without any significant overshoot.
	Optimum controller behavior for fast correction and quick compensation of disturbance components. The actual value approaches the setpoint and slightly overshoots, maximum 10% of the setpoint step.

	The actual value only slowly approaches the setpoint Increase the proportional component KP and reduce the integration time TI.
	Actual value only slowly approaches the setpoint with slight oscillation. Increase the proportional component KP and reduce the rate time Td (differentiating time).
	The actual value quickly approaches the setpoint, but overshoots too much. Decrease the proportional component KP and increase the integration time TI.

5.7.6 Free function blocks

5.7.6.1 Overview

The free function blocks permit configurable signal processing in the inverter.

●The following free function blocks are available:

AND, OR, XOR，and NOT logic

●ADD (adder), SUB (subtractor), MUL (multiplier), DIV (divider), AVA (absolute value generated), NCM (comparator).

●Time relay RLY

●Limit value monitoring LVM

●Low - pass filters LPF

●Bit - to - word module

●Word - to - bit module

The number of free function blocks in the inverter is limited. You canonly use a function block once. The inverter has 3 adders, for instance.

Examples: If you have already configured three adders, then no other adders are available.

5.7.6.2 List of the free function blocks

AND block

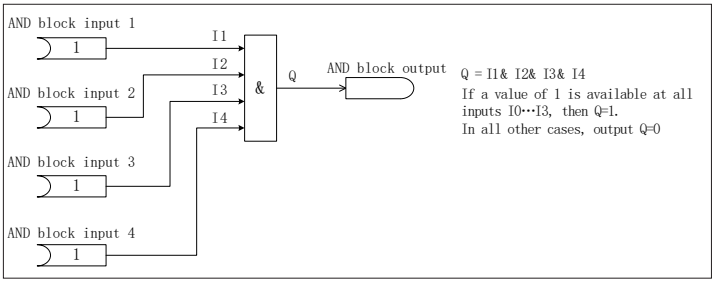


Table 5 - 25 AND block setting parameter

	AND A	AND B	AND C	AND D
I1	F00.00	F00.05	F00.10	F00.15
I2	F00.01	F00.06	F00.11	F00.16
I3	F00.02	F00.07	F00.12	F00.17
I4	F00.03	F00.08	F00.13	F00.18
Q	P03.00	P03.01	P03.02	P03.03

OR block

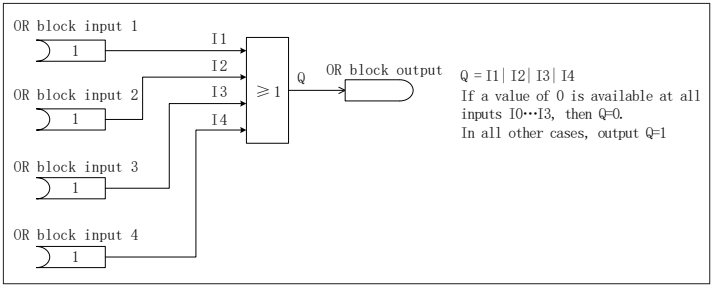


Table 5-26 OR block setting parameter

	OR A	OR B	OR C	OR D
I1	F00.36	F00.41	F00.46	F00.51
I2	F00.37	F00.42	F00.47	F00.52
I3	F00.38	F00.43	F00.48	F00.53
I4	F00.39	F00.44	F00.49	F00.54
Q	P03.12	P03.13	P03.14	P03.15

NOT block

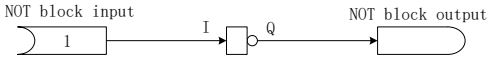


Table 5-27 NOT block setting parameter

	NOT A	NOT B	NOT C	NOT D	NOT E	NOT F	NOT G	NOT H
I	F00.20	F00.22	F00.24	F00.26	F00.28	F00.30	F00.32	F00.34
Q	P03.04	P03.05	P03.06	P03.07	P03.08	P03.09	P03.10	P03.11

EXCLUSIVE OR block

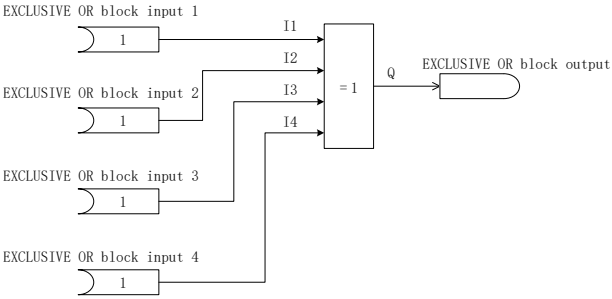


Table 5-28 Truth table

I0	I1	I2	I3	Q
0	0	0	0	0
0	0	0	1	1
0	0	1	0	1
0	0	1	1	0
0	1	0	0	1
0	1	0	1	0
0	1	1	0	0
0	1	1	1	1
1	0	0	0	1
1	0	0	1	0
1	0	1	0	0
1	0	1	1	1
1	1	0	0	0
1	1	0	1	1
1	1	1	0	1
1	1	1	1	0

Table 5-29 EXCLUSIVE OR block setting parameter

	XOR A	XOR B	XOR C	XOR D
I1	F00.56	F00.61	F00.66	F00.71
I2	F00.57	F00.62	F00.67	F00.72
I3	F00.58	F00.63	F00.68	F00.73
I4	F00.59	F00.64	F00.69	F00.74
Q	P03.16	P03.17	P03.18	P03.19

Arithmetic block-adder

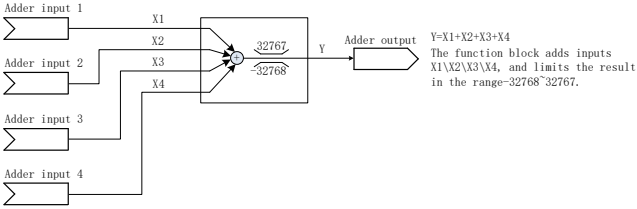


Table 5-30 Adder setting paramerter

	ADD A	ADD B	ADD C
X1	F01.00	F01.05	F01.10
X2	F01.01	F01.06	F01.11
X3	F01.02	F01.07	F01.12
X4	F01.03	F01.08	F01.13
Y	P08.00	P08.01	P08.02

Arithmetic block-subtracter

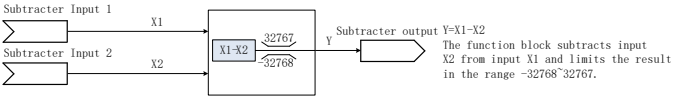


Table 5-31 Subtracter setting parameter

	SUB A	SUB B
X1	F01.15	F01.18
X2	F01.16	F01.19
Y	P08.04	P08.05

Arithmetic block-multiplier

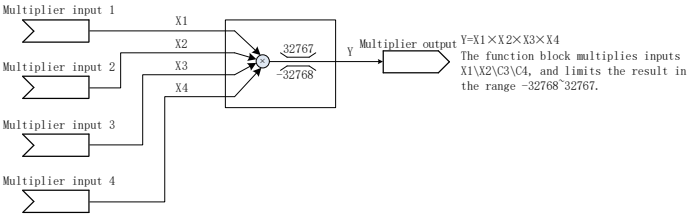


Table 5-32 Multiplier setting parameter

	MUL A	MUL B
X1	F01.21	F01.26
X2	F01.22	F01.27
X3	F01.23	F01.28
X4	F01.24	F01.29
Y	P08.08	P08.09

Arithmetic block - divider

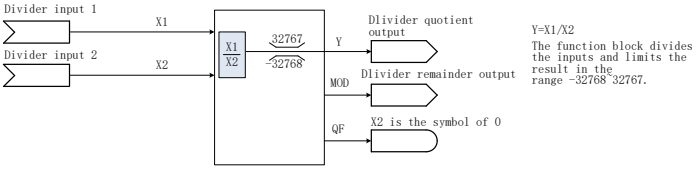


Table 5-33 Dlivider setting parameter

	DIV A	DIV B
X1	F01.31	F01.34
X2	F01.32	F01.35
Y	P08.13	P08.16
MOD	P08.14	P08.17
QF	P03.30	P03.31

Arithmetic block - numeric comparator

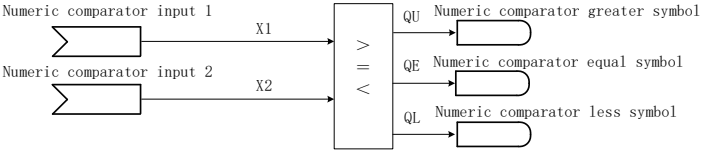


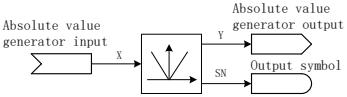
Table 5-34 Function table

输入端比较	QU	QE	QL
X1＞X2	1	0	0
X1＝X2	0	1	0
X1＜X2	0	0	1

表5-35 比较器设置参数

	NCM A	NCM B
X1	F01.41	F01.44
X2	F01.42	F01.45
QU	P03.24	P03.27
QE	P03.25	P03.28
QL	P03.26	P03.29

Arithmetic block - absolute value generator



Y=abs (X)
This function block calculates the absolute value of the value present at input X.
When X<0, then the inverter sets SN=1.

Table 5-36 Absolute value generator setting parameter

	AVA A	AVA B
X	F01.37	F01.39
Y	P08.24	P08.25
SN	P03.32	P03.33

Time relay

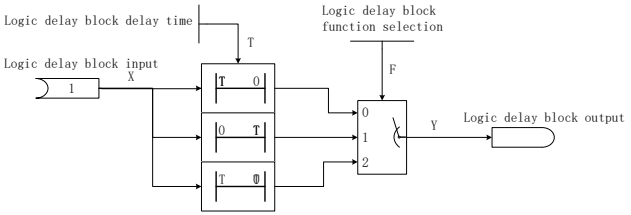
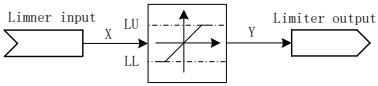


Table 5-37 Logic delay block setting parameter

	RLY A	RLY B	RLY C	RLY D
X	F00.76	F00.79	F00.82	F00.85
F	F00.77	F00.80	F00.83	F00.86
T	F00.78	F00.81	F00.84	F00.87
Y	P03.20	P03.21	P03.22	P03.23

Limiter block



Y=LU, if X≧LU
Y=X, if LL<X<LU
Y=LL, if X≦LL
The function block limits output Y to values within LU~LL

Table 5-38 Limiter block setting parameter

	LIM A	LIM B
X	F01.47	F01.51
LU	F01.48	F01.52
LL	F01.49	F01.53
Y	P08.28	P08.29

Low-pass filters

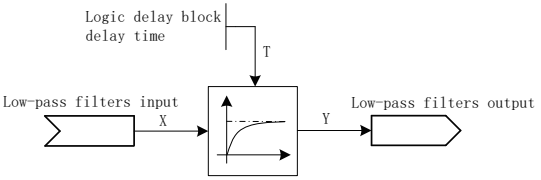


Table 5-39 Low-pass filters block setting parameter

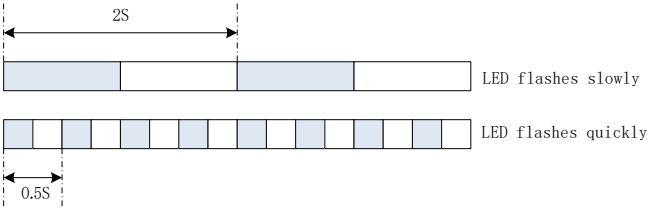
	LPF A	LPF B
X	F01.55	F01.58
T	F01.56	F01.59
Y	P08.32	P08.33

6. Alarms, faults and system messages

6.1 The LEDs inform inverter states

LED RDY(Ready)is always on after the inverter is powered on. When LED RDY turns to red or green,it shows the states of the inverter.

LED states
LED has 2 different flash frequency except ON and OFF:



LED states description	
1	LED is ON
2	LED is OFF
3	LED flashes slowly(2 seconds period)
4	LED flashes quickly(0.5 seconds period)

Table 6-1 inverter LED states

LED		explain
RDY (green and red)	BF(green and red)	
green, ON		inverter is running
green, LED flashes slowly		inverter is ready
green, LED flashes quickly		Boot block
inverter is red		ON error
	red, LED flashes slowly	firmware update is active
	red, LED flashes quickly	firmware update is over, restart the inverter
	green, LED flashes slowly	software is running

6.2 Error and Alarm list

number	name	error sub-code	Explanation	Remedy
1	overcurrent	1	U phase overcurrent	1. If the power cable is broken
				2. Power cables for short-circuit fault
				3. Increase the acceleration ramp
				4. V/f control operation: decrease the torque compensation value
		2	V phase overcurrent	5. motor stops and then start
		4	W phase overcurrent	6. Reduce or remove the load
		8	Brake overcurrent	7. Vector control operation: the parameter identification operates correctly
		15	software overcurrent	8. contact the after sale or manufacture for technical support
2	overvoltage	1	DC-link overvoltage during fast detection operation	1 .Check the device supply voltage
				2. Increase the acceleration ramp time
				3. add brake resistor or brake module
		2	DC-link overvoltage during slow detection operation	4. contact the after sale or manufacture for technical support
3	Undervoltage	1	DC-link undervoltage	1. Please check the power line cable is connected properly
				2. Make sure the motor runs smoothly and steadily
				3. Contact the after sale or manufacture for technical support
4	Inrush resistor over-temperature	1	Inrush resistor over-temperature	1. Make sure that the power line cable is connected properly
				2. Contact the after sale or manufacture for technical support
5	Inverter overload	1	Inverter overload	1. check the inverter selection is suitable or exchange a larger capacity inverter
				2. V/f control operation: decrease the torque compensation value
				3. Vector control operation: decrease the toraue limitationvalue
				4. check if there is an overload situation or motor holding brake is locked.
				5. Vector control operation: check the parameter self-learn operates correctly
				6. closed-loop control with encoder operation please confirm the encoder direction and parameter identification are all right.
				7. contact the after sale or manufacture for technical support
6	Motor overload	1	Motor overload	1. Confirm the motor load is not too large
				2. Vector control operation: the parameter self-learn operates correctly
				3. closed-loop control with encoder operation, please confirm the encoder direction and parameter identification are all right.
				4. check if there is an overload situation or motor holding brake is locked.
				5. Please confirm that the parameter configuration follows the motor type plate correctly
				6. Contact the after sale or manufacture for technical support
7	Input line phase lack	1	Line phase lack detection	1. Make sure that the power line cable is connected properly
				2. Contact the after sale or manufacture for technical support
8	Output line phase lack	1	Output U phase lack	1. Please check the power line cable is connected properly
		2	Output V phase lack	2. Make sure the motor runs smoothly and steadily
		3	Output W phase lack	3. Contact the after sale or manufacture for technical support
		4	FVC control output lack	
		5	Stator resistor identification lack	
		6	3-phase unbalance	

number	name	error sub-code	Explanation	Remedy
9	Inverter over-temperature	1	Inverter over-temperature	1. Make sure that if the environment temperature is too high. 2. Make sure that if the fan runs properly. 3. Make sure that wind tunnel of the heat sink is not blocked. 4. Contact the after sale or manufacture for technical support
10	PWM wave fault	1	U phase wave fault	1. Shut off the inverter and restart it, if the fault is still exist, please contact the after sale or manufacture for technical support
		2	V phase wave fault	
		4	W phase wave fault	
11	Current zero shift detection fault	1	U phase zero shift is too large	1. PM fault, contact the after sale or manufacture for technical support
		2	V phase zero shift is too large	
12	Ground fault	1	U phase overcurrent ground fault	1. Check the corresponding output phase if there is a short-circuit to ground situation
		2	V phase overcurrent ground fault	2. Check if the power cable is broken
		4	W phase overcurrent ground fault	3. Contact the after sale or manufacture for technical support
		5	overcurrent ground fault	
		6	overvoltage ground fault	
13	Motor tuning fault	1	Dynamic motor tuning fault	1. Please confirm that the parameter identification follows the motor type plate correctly
		2	static motor tuning fault	2. Contact the after sale or manufacture for technical support
14	Encoder fault	1	Closed-loop dynamic tuning with encoder disconnection	1. Please check the encoder line cable is connected properly 2. Please check the encoder line cable is connected stably 3. Please confirm that the parameter configuration of the encoder is correct
		2	Closed-loop dynamic tuning with speed measurement not match	4. Check that the encoder power supply is correct
		3	Closed-loop operation with encoder signal line broken	5. Contact the after sale or manufacture for technical support
15	Vector speed loss fault	1	Speed is forced reverse	1. Please confirm that the parameter configuraton follows the motor type plate correctly 2. Check the motor parameter self-learn operation is done 3. Please check the parameter setting of the speed loss is correct
		2	Excessive velocity deviation	4. Contact the after sale or manufacture for technical support
16	FPGA data read and write error	1	FPGA data read and write error in initialization process	1. PM fault, shut off the inverter and restart it, if the fault is still exist, please contact the after sale or manufacture for technical support
17	Drive power fault	1	Driver power supply voltage is too low	Contact the after sale or manufacture for technical support
18	First-class power fault	1	24V power supply voltage of the first class is too low	Contact the after sale or manufacture for technical support
19	CM and PM communication fault	1	CM and PM communication fault	1. Please confirm CM release mechanism is locked
		2		2. Contact the after sale or manufacture for technical support
		3		
		4		
20	PM-EEPROM fault	1	PM module EEPROM fault	1. Contact the after sale or manufacture for technical support
21	PM type configuration fault	1	PM type configuration fault	1. Please confirm CM release mechanism is locked 2. Contact the after sale or manufacture for technical support
33	Inverter pre overload	1	Inverter pre overload alarm	1. Please confirm that the motor type configuration follows the motor type plate correctly 2. Contact the after sale or manufacture for technical support

number	name	error sub-code	Explanation	Remedy
34	Motor pre overload	1	Motor pre overload alarm	1.Please confirm the motor pre overload function is enable 2.Contact the after sale or manufacture for technical support
35	Communicatior abnormal	1	Background software abnormally disconnection during stating process	1.Please confirm the inverter communication cable connect correctly 2.Contact the after sale or manufacture for technical support
		2	Operation panel software abnormally disconnection during stating process	1.Please confirm the operation panel communication cable connect correctly 2.Contact the after sale or manufacture for technical support
		3	Modbus abnormally disconnection after communication process has been established	1.Please confirm the Modbus communication cable connect correctly 2.Contact the after sale or manufacture for technical support
37	Motor speed over limitation	1	Motor speed over maximum limitation	1.Please confirm the parameter configuration of the speed over limitation is correct 2.Contact the after sale or manufacture for technical support
38	Motor speed deviation is too large	1	Motor actual speed has too largedeviation compare to setting speed	1.Please confirm the parameter configuration of the speed deviation is correct 2.Contact the after sale or manufacture for technical support
40	PID feedback missing	1	PID feedback sampling value missing	1.Please confirm the feedback signal 2.Contact the after sale or manufacture for technical support
41	External fault	1	External fault 1	Check the external input signal
		2	External fault 2	
42	External alarm	1	External alarm 1	
		2	External alarm 2	
43	Pre-drive failure	1	No DC-link voltage is detected after the run order is given	1.Please confirm the line supply voltage is correct 2.Contact the after sale or manufacture for technical support
45	Brake control abnormal	1	Brake open abnormally	1.Please confirm the line supply voltage is correct
		2	Brake close abnormally	2.Contact the after sale or manufacture for technical support
46	CM voltage abnormal	1	PM 24V voltage is too large	1.Please confirm the external supply voltage is correct
		2	External 24V voltage is too large	2.Contact the after sale or manufacture for technical support
		3	External 24V or PM 24V voltage is too low	
		4	3.3V voltage is too large	
		5	3.3V voltage is too low	
		6	Brake relay short circuit	
47	Motor over temperature	1	Motor over temperature	1.Reduce the load of motor 2.Check the environment temperature 3.Check the senor layout and connection
48	Motor over temperature alarm	1	Motor over temperature alarm	4.Contact the after sale or manufacture for technical support
49	AI input line broker	1	AI0 4~20mA input line broken	1.Check the line layout is not disconnected 2.Check the signal voltage
		2	AI1 4~20mA input line broken	3.Contact the after sale or manufacture for technical support
50	Fan alarm of the capacitor side	1	Fan line broken of the capacitor side	1.Check the fan line of the capacitor side is not disconnected. 2.The fan of the capacitor side is broken, Contact the manufacture for exchanging
51	CM-EEPROM fault	1	CM-EEPROM fault	3.Contact the after sale or manufacture for technical support

7 Technical data

7.1 Technical data of control module

Attribute	Technical data		
Product number	CM22- MB-PE	Including RS485 interface support for Modbus RTU	Product number: refer to Chapter: control module(Page 30)
Operating voltage	The control module has two power options		
	Powered by power module		
	The total current of the following interfaces is limited to 0.6A		
	Power supply for encoder		
	Power supply for operation panel		
	Analog outputs		
	Output voltage of 24V (terminal X5)		
	Power supply for fan		
	If there is a short circuit on the output terminal when the control module is connected to the load, the power module may activate the overcurrent protection		
	Powered by terminal X2(Pin1 and Pint, DC 18V...30V)		
	Powered by class-2 protection extra low voltage power		
	The 0V terminal of the power supply must be connected with the PE terminal of the equipment in a low impedance way		
	The power supply and the remaining terminal blocks are electrically isolated		
Current consumption when power is supplied through pins 1 and 2 of terminal X2	Max 2A		
Power dissipation	12.0W	Including loss power of all output voltage	
Output voltage	+24V output (terminal X5)	18V…30V, the maximum is 100mA	
	+10Voutput (terminal X2)	10V…12V, the maximum is 40mA	
	output power of encoder	5V…30V, the maximum is 350mA	
Resolution of the set value	0.01Hz		
Maximum frequency of HTL encoder	200kHz		
Digital outputs	5 common COM inputs	DI0 … DI4	
		Electrical isolation	
		Support for two-way input	
Analog inputs	2个（AI 0,AI1）	Differential input	
		12-bit resolution	
		AI0 andAI1 can be selected:	
		-10V … 10V	
		-20mA … 20mA	
Brake relay power output	output 24v power supply	max. current 32mA	
Digital outputs	1 relay output	DO 0	
		The maximum is 30Vdc and 500mA	
Analog outputs	One channel（AO）	0V … 10V	
		The reference potential is DGND	
		12-bit resolution	
Encoder inputs	HTL，TTL	The maximum frequency is 200kHz	
		Support for push-pull and open collector encoder	
		Support both 5V and 30V power supply	
		The maximum power output is 350mA	
Boundary dimension (w *h*d)	80mm×268mm× 53mm	The depth data is for the control module fixed to the power module	
weight	0.7kg		
Operating temperature	-10℃ … 50℃	With operation panel OP25	
	0℃ … 50℃	Without operation panel OP25	
	Please note that the power module also has restrictions on the operating temperature		
Storage temperature	-40℃ … 70℃		
Relative air humidity	< 95℃	No condensation allowed	

Allowable length of encoder cable

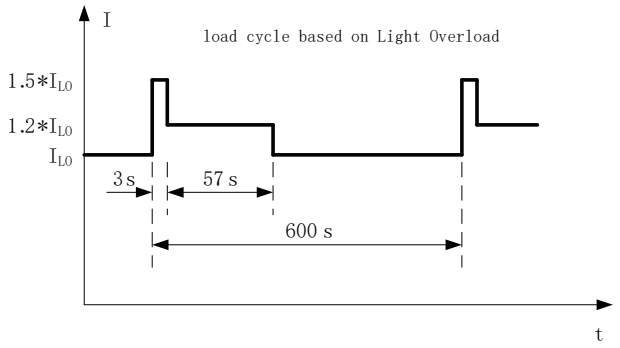
The allowable length of cable depends on the encoder type and encoder cable

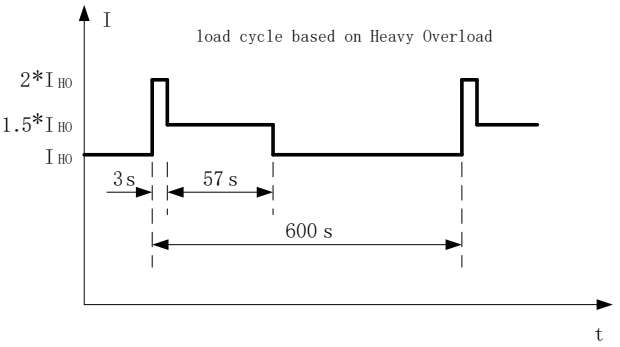
Table 7-1 Maximum cable length

TTL encoder	100m
	100m

7.2 Technical data of the Power Module

Typical inverter load cycles





7.2.1 General data of the PM25

property	Technical data
Line voltage	3AC 380V ～ 480V ±10%
output voltage	3AC 0V~Output voltage(max)
Input frequency	50Hz ～ 60Hz ±3Hz
Output frequency	0Hz-600Hz, depending on the control mode
Line impedance	Uk≥1%.For Uk<1%, we recommend a line reactor, or a Power Module with the next higher power rating.
Inrush current	<LO base load input current
Pulse frequency	●4 kHz (factory setting)
	●2kHz-8kHz, Adjustable
rated Short-circuit current	●≤ 65kA rms
	●Short-circuit current with fuses
Electromagnetic compatibility	Inverters with integrated filter are suitable for operation in the second environment Category C2.
According to IEC/EN 61800-3	
Braking methods	DC braking, compound braking, dynamic braking with integrated braking chopper
Degree of protection	IP20.Install built-in a control cabinet
According to EN60529	
ambient temperature	●For operation according to Low Overload without current berating:-10℃~+40℃
	●For operation according to High Overload without current berating:-10℃~+50℃
	●For operation according to Low/High Overload with current berating:-10℃~+50℃
storage temperature	-40℃ ～ +70℃
According to 60721-3-3	
Cooling air	Clean and dry air
Relative humidity	<95%.No condensation allowed
Pollution	Suitable for environments with degree of pollution 2
According to EN61800-5-1	
Installation altitude	● Up to 1000 m above sea level without limitations
	● At installation altitudes between 1000 m and 4000m the permissible inverter output current is reduced

7.2.2 Technical data, PM25

Line voltage 380V...480V 3AC

Line voltage 380V...480V 3AC			
Technical data		A1-PM25-B3A75	A1-PM25-B3B15
rated output power	LD base load output power(KW)	-	1.5
	HD base load output power(KW)	0.75	1.1
rated input current	With Line reactor (A)	2.3	4.3
	Without Line reactor(A)	2.6	4.9
rated output current	LD base load output current(A)	-	4.1
	HD base load output current(A)	2.2	3.1
rated pulse frequency (kHz)		4	4
efficiency η		＞0.95	＞0.95
power lost(kw)		0.1	0.1
Noise emission db (A)		＜40	＜40
Maximum permissible lengths of braking resistor connecting cables (m)		15	15
The connection of input cable	L1、L2、L3	Screw-type terminal	Screw-type terminal
	Conductor cross-section(mm^2)	1…2.5	1…2.5
The connection of motor cable	U、V、W	Screw-type terminal	Screw-type terminal
	Conductor cross-section(mm^2)	1…2.5	1…2.5
Cable at the inverter DC link connection (Cable between the inverter and braking resistor)	DC+、DC-、R	Screw-type terminal	Screw-type terminal
	Conductor cross-section(mm^2)	1…2.5	1…2.5
The connection of PE		M4 screws on enclosure	M4 screws on enclosure
Maximum permissible lengths of motor connecting cables	Shielded cable(m)	50	50
	Unshielded cable(m)	100	100
Degree of protection		IP20	IP20
dimension size	Width（W）mm	80	80
	Height（H）mm	230	230
	Depth（D）mm	165	165
Frame size		B1	B1
Approximate weight(kg)		2	2

A1-PM25-B3B22	A1-PM25-B3B30	A1-PM25-B3B40	A1-PM25-B3B55	A1-PM25-B3B75
2.2	3	4	5.5	7.5
1.5	2.2	3	4	5.5
6.1	8	10.4	15.3	18.7
7.6	10.2	13.4	17.2	21.9
5.9	7.7	10.2	13.2	18
4.1	5.9	7.7	10.2	13.2
4	4	4	4	4
＞0.95	＞0.95	＞0.95	＞0.95	＞0.95
0.11	0.14	0.16	0.18	0.24
＜40	＜40	＜50	＜50	＜50
15	15	15	15	15
Screw-type terminal	Screw-type terminal	Screw-type terminal	Screw-type terminal	Screw-type terminal
1…2.5	1…2.5	2.5…6	2.5…6	2.5…6
Screw-type terminal	Screw-type terminal	Screw-type terminal	Screw-type terminal	Screw-type terminal
1…2.5	1…2.5	2.5…6	2.5…6	2.5…6
Screw-type terminal	Screw-type terminal	Screw-type terminal	Screw-type terminal	Screw-type terminal
1…2.5	1…2.5	2.5…6	2.5…6	2.5…6
M4 screws on enclosure	M4 screws on enclosure	M5 screws on enclosure	M5 screws on enclosure	M5 screws on enclosure
50	50	50	50	50
100	100	100	100	100
IP20	IP20	IP20	IP20	IP20
80	80	100	100	100
230	230	270	270	270
165	165	165	165	165
B1	B1	B2	B2	B2
2	2	4	4	4

Line voltage 380V...480V 3AC			
Technical data		A1-PM25-B3C11	A1-PM25-B3C15
rated output power	LD base load output power(KW)	11	15
	HD base load output power(KW)	7.5	11
rated input current	With Line reactor (A)	26	33
	Without Line reactor(A)	32	39
rated output current	LD base load output current(A)	26	32
	HD base load output current(A)	18	26
rated pulse frequency (kHz)		4	4
efficiency η		＞0.95	＞0.95
Noise emission db (A)		＜50	＜50
Maximum permissible lengths of braking resistor connecting cables (m)		15	15
The connection of input cable	L1、L2、L3	Screw-type terminal	Screw-type terminal
	Conductor cross-section(mm²)	4…10	4…10
The connection of motor cable	U、V、W	Screw-type terminal	Screw-type terminal
	Conductor cross-section(mm²)	4…10	4…10
Cable at the inverter DC link connection (Cable between the inverter and braking resistor)	DC+、DC-、R	Screw-type terminal	Screw-type terminal
	Conductor cross-section(mm²)	4…10	4…10
The connection of PE		M5 screws on enclosure	M5 screws on enclosure
Maximum permissible lengths of motor connecting cables	Shielded cable (m)	50	50
	Unshielded cable (m)	100	100
Degree of protection		IP20	IP20
dimension size	Width（W）mm	140	140
	Height（H）mm	355	355
	Depth（D）mm	165	165
Frame size		B3	B3
Approximate weight(kg)		7	7

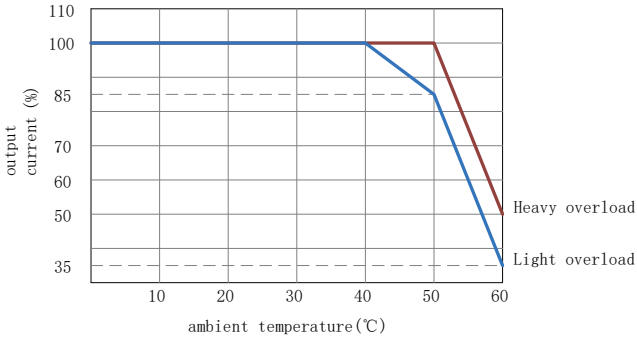
A1-PM25-B3C18	A1-PM25-B3C22	A1-PM25-B3C30	A1-PM25-B3C37
18.5	22	30	37
15	18.5	22	30
39	46	63	78
46	53	73	88
38	45	60	75
32	38	45	69
4	4	4	4
＞0.95	＞0.95	＞0.95	＞0.95
＜50	＜50	＜50	＜50
15	15	15	15
Screw-type terminal	Screw-type terminal	Screw-type terminal	Screw-type terminal
6…25	6…25	6…25	6…25
Screw-type terminal	Screw-type terminal	Screw-type terminal	Screw-type terminal
6…25	6…25	6…25	6…25
Screw-type terminal	Screw-type terminal	Screw-type terminal	Screw-type terminal
6…25	6…25	6…25	6…25
M4 screws on enclosure	M4 screws on enclosure	M5 screws on enclosure	M5 screws on enclosure
50	50	50	50
100	100	100	100
IP20	IP20	IP20	IP20
200	200	200	200
472	472	472	472
237	237	237	237
B4	B4	B4	B4
16	16	16	16

Line voltage 380V...480V 3AC			
Technical data		A1-PM25-B3C45	A1-PM25-B3C55
rated output power	LD base load output power(KW)	45	55
	HD base load output power(KW)	37	45
rated input current	With Line reactor (A)	86	104
	Without Line reactor(A)	78	94
rated output current	LD base load output current(A)	90	110
	HD base load output current(A)	75	90
rated pulse frequency (kHz)		4	4
efficiency η		＞0.95	＞0.95
power lost(kw)		1.3	1.67
The cooling air flow m^3/s		0.083	0.083
Noise emission db (A)		＜75	＜75
24V DC output power supply (designed for Control Module)		1	1
Maximum permissible lengths of braking resistor connecting cables (m)		15	15
The connection of input cable	L1、L2、L3	cable lug	cable lug
	Conductor cross-section(mm^2)	35…2x120	35…2x120
电机连接	U、V、W	cable lug	cable lug
	Conductor cross-section(mm^2)	35…2x120	35…2x120
The connection of motor cable	DC+、DC-、R	Screw-type terminal	Screw-type terminal
	Conductor cross-section(mm^2)	25…70	25…70
The connection of PE		cable lug	cable lug
Cable at the inverter DC link connection (Cable between the inverter and braking resistor)	Shielded cable (m)	50	50
	Unshielded cable (m)	100	100
Degree of protection		IP20	IP20
dimension size	Width (W) mm	305	305
	Height (H) mm	750	750
	Depth (D) mm	357	357
dimension size		B6	B6
Approximate weight(kg)		65	65

A1-PM25-B3C75	A1-PM25-B3C90	A1-PM25-B3D11	A1-PM25-B3D13
75	90	110	132
55	75	90	110
140	172	198	242
117	154	189	218
145	178	205	250
110	145	178	205
4	4	2	2
＞0.95	＞0.95	＞0.95	＞0.95
1.93	2.48	2.3	3.02
0.153	0.153	0.153	0.153
＜75	＜75	＜75	＜75
1	1	1	1
15	15	15	15
Cable lug	Cable lug	Cable lug	Cable lug
35…2x120	35…2x120	35…2x120	35…2x120
Cable lug	Cable lug	Cable lug	Cable lug
35…2x120	35…2x120	35…2x120	35…2x120
Screw-type terminal	Screw-type terminal	Screw-type terminal	Screw-type terminal
25…70	25…70	25…70	25…70
Cable lug	Cable lug	Cable lug	Cable lug
50	50	50	50
100	100	100	100
IP20	IP20	IP20	IP20
305	305	305	305
750	750	750	750
357	357	357	357
B6	B6	B6	B6
65	65	65	65

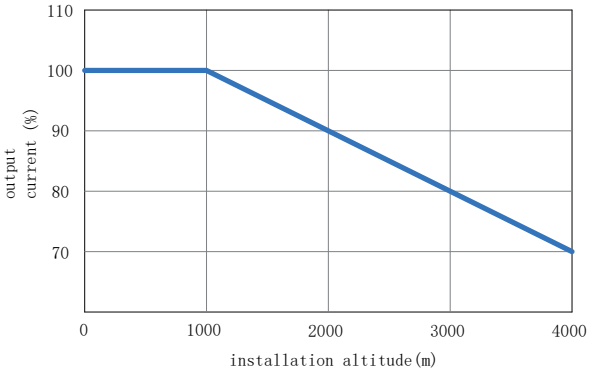
7.3 Restrictions for special ambient conditions

Current reduction as a function of the ambient temperature



CM and OP can limit the maximum operating ambient temperature allowed by PM

Current reduction as a function of the installation altitude
At installation altitudes above 1000 m the permissible inverter output current is reduced.



Permissible line supplies dependent on the installation altitude

● For installation altitudes ≤ 2000 m above sea level
– It is permissible to connect the inverter to any of the line supplies that are specified for it.
● For installation altitudes 2000 m…4000 m above sea level
– Connection to a TN line system with grounded neutral point is permissible.
– TN systems with grounded line conductor are not permitted.
– The TN line system with grounded neutral point can also be supplied using an isolation transformer.
– The phase-to-phase voltage does not have to be reduced.

8 Parameter list

8.1 A group status and peripherals of system

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
A00 group:status monitoring and setting						
A00.00	Current state machine	0～65535	0	0	65535	0x2000
A00.01	Target Frequency	-327.68～327.67Hz	0	-327.7	327.67	0x2001
A00.02	Current Frequency	-327.68～327.67Hz	0	-327.7	327.67	0x2002
A00.03	Output Frequency	-327.68～327.67Hz	0	-327.7	327.67	0x2003
A00.04	Target speed	-32768～32767rpm	0	-32768	32767	0x2004
A00.05	Current speed	-32768～32767rpm	0	-32768	32767	0x2005
A00.06	Motor speed	-32768～32767rpm	0	-32768	32767	0x2006
A00.07	Output voltage	0～1000V	0	0	1000	0x2007
A00.08	Output current	0～655.35A	0	0	655.35	0x2008
A00.09	Output power	0～655.35kw	0	0	655.35	0x2009
A00.10	Setting torque	-300.0～300.0%	0	-300	300	0x200A
A00.11	Output torque	-300.0～300.0%	0	-300	300	0x200B
A00.14	DC link voltage	0～1000.0V	0	0	1000	0x200E
A00.15	Radiator temperature	-40～150℃	0	-40	150	0x200F
A00.16	DI status	0～65535	0	0	65535	0x2010
A00.17	DO status	0～65535	0	0	65535	0x2011
A00.41	Boot display selection 1	0～40 Equivalent parameters' index of A00 - A00.40 Easy to differentiate the state parameters in monitoring screen	1	0	40	0x2029
A00.42	Boot display selection 2	same as above	3	0	40	0x202A
A00.43	Boot display selection 3	same as above	8	0	40	0x202B
A00.44	Boot display selection 4	same as above	11	0	40	0x202C
A00.45	Boot display selection 5	same as above	14	0	40	0x202D
A00.46	Boot display selection 6	same as above	15	0	40	0x202E
A01 group:Faults and warnings						0x2100
A01.00	Current fault code 1	0～65535	0	0	65535	0x2100
A01.01	Current fault code 1 Subcode	0～65535	0	0	65535	0x2101
A01.02	Current fault code 2	0～65535	0	0	65535	0x2102
A01.03	Current fault code 2 Subcode	0～65535	0	0	65535	0x2103
A01.04	Current fault code 3	0～65535	0	0	65535	0x2104
A01.05	Current fault code 3 Subcode	0～65535	0	0	65535	0x2105
A01.06	Current fault code 4	0～65535	0	0	65535	0x2106
A01.07	Current fault code 4 Subcode	0～65535	0	0	65535	0x2107
A01.08	Current fault code 5	0～65535	0	0	65535	0x2108
A01.09	Current fault code 5 Subcode	0～65535	0	0	65535	0x2109
A01.10	Current fault code 6	0～65535	0	0	65535	0x210A
A01.11	Current fault code 6 Subcode	0～65535	0	0	65535	0x210B
A01.12	Current warning code 1	0～65535	0	0	65535	0x210C
A01.13	Current warning code 1 Subcode	0～65535	0	0	65535	0x210D
A01.15	Current warning code 2 Subcode	0～65535	0	0	65535	0x210F
A01.16	Current warning code 3	0～65535	0	0	65535	0x2110
A01.17	Current warning code 3 Subcode	0～65535	0	0	65535	0x2111
A01.18	Current warning code 4	0～65535	0	0	65535	0x2112
A01.19	Current warning code 4 Subcode	0～65535	0	0	65535	0x2113
A01.20	Current warning code 5	0～65535	0	0	65535	0x2114
A01.21	Current warning code 5 Subcode	0～65535	0	0	65535	0x2115
A01.22	Current warning code 6	0～65535	0	0	65535	0x2116
A01.23	Current warning code 6 Subcode	0～65535	0	0	65535	0x2117
A02 group:Inverter information and setting						
A02.00	CM - ARM Software Version	0.00～655.35	0	0	655.35	0x2200
A02.01	CM - FPGA Version Number	0.00～655.35	0	0	655.35	0x2201
A02.02	PM - DSP Software Version	0.00～655.35	0	0	655.35	0x2202
A02.03	PM - FPGA Version Number	0.00～655.35	0	0	655.35	0x2203
A02.04	PM rated power of power unit	0.00～655.35	0	0	655.35	0x2204
A02.05	PM rated voltage of power unit	0～65535	0	0	65535	0x2205
A02.06	PM rated CUR of power unit	0.00～655.35	0	0	655.35	0x2206

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
A03 group:Protecting and setting the power module						
A03.00	Set type of PM power unit	0～336	0	0	336	0x2300
A03.08	Set carrier Frequency	0.8～16.0kHz	4	0.8	16	0x2308
A03.09	Load mode selection	0:Light load 1:Overload	1	0	1	0x2309
A03.13	Switching frequency of DPWM	0.0Hz～ 600.0Hz	8	0	60	0x230D
A03.16	Dead-time compensate selection	0:No 1:Dead-time COMP method 1 2:Dead-time COMP method 2	0	0	2	0x2310
A03.19	Loss detection of input phase	0:No 1:Yes	0	0	1	0x2313
A03.20	Brake resistance action point	600.0～800.0V	700	600	800	0x2314
A03.21	Software under-voltage point	85.0%～150.0%	100	85	150	0x2315
A04 group. System application and environment setting						
A04.00	parameter reset mode	0:ineffective 1:Partial PARM restore factory 1(Model PARM、motor PARM not restore) 2:Partial PARM restore factory 2(Motor PARM not restore) 3:Restore all PARMs to factory 4:Clear record PARMs	0	0	4	0x2400
A04.01	parameter reset	0:No 1:Yes	0	0	1	0x2401
A04.02	parameter access level	0:Common PARM 1:Extended PARM 2:Expert PARM 3:Manufacturer PARM	0	0	3	0x2402
A04.03	Manufacturer password	0～65535	0	0	65535	0x2403
A04.04	User password	0～65535	0	0	65535	0x2404
A04.05	Source 0 of motor selection Motor SEL	0:00 1:01 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:RESV 8:RESV 9:RESV 10:RESV Others: Binary interconnection of parameters	0	0	10	0x2405
A04.06	Source 1 of motor selection Motor SEL	0:00 1:01 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:RESV 8:RESV 9:RESV 10:RESV Others: Binary interconnection of parameters	0	0	10	0x2406

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
A05 group:Digital input						
A05.00	DI physical state value	0x0～0xFFFF	0x0	0x0	0xFFFF	0x2500
A05.02	DI processed state value	0x0～0xFFFF	0x0	0x0	0xFFFF	0x2502
A05.04	DI forced function selection	0x0～0xFFFF	0x0	0x0	0xFFFF	0x2504
A05.06	DI forced selective value	0x0～0xFFFF	0x0	0x0	0xFFFF	0x2506
A05.08	DIO turn - on delay	0.0～6553.5s	0	0	6553.5	0x2508
A05.09	DIO turn - off delay	0.0～6553.5s	0	0	6553.5	0x2509
A05.10	D11 turn - on delay	0.0～6553.5s	0	0	6553.5	0x250A
A05.11	D11 turn - off delay	0.0～6553.5s	0	0	6553.5	0x250B
A05.12	D12 turn - on delay	0.0～6553.5s	0	0	6553.5	0x250C
A05.13	D12 turn - off delay	0.0～6553.5s	0	0	6553.5	0x250D
A05.14	D13 turn - on delay	0.0～6553.5s	0	0	6553.5	0x250E
A05.15	D13 turn - off delay	0.0～6553.5s	0	0	6553.5	0x250F
A05.16	D14 turn - on delay	0.0～6553.5s	0	0	6553.5	0x2510
A05.17	D14 turn - off delay	0.0～6553.5s	0	0	6553.5	0x2511
A06 group:Digital output						
A06.00	State value of DO signal source	0x0～0xFFFF	0x0	0x0	0xFFFF	0x2600
A06.01	State value of processed DO	0x0～0xFFFF	0x0	0x0	0xFFFF	0x2601
A06.02	Output selection of DO0 function	0:Low level 1:High level 2:Running ready 3:Run permission 4:Running 5:Comparison arrived 6:Negative speed 7:Zero speed operation 8:Overspeed 9:Warning 10:Fault Others:Binary interconnection of parameters	4	0	10	0x2602
A06.09	DO0 turn - on delay	0.0～6553.5s	0	0	6553.5	0x2609
A06.10	DO0 turn - off delay	0.0～6553.5s	0	0	6553.5	0x260A
A07 group:Analog input						
A07.00	A0 input value	-20.000～20.000	0	-20	20	0x2700
A07.01	A10 input ratio	-600.0%～600.0%	0	-600	600	0x2701
A07.02	AI1 input value	-20.000～20.000	0	-20	20	0x2702
A07.03	AI1 input ratio	-600.0%～600.0%	0	-600	600	0x2703
A07.04	AI0 type	0:-10～10V 1:0～10V 2:-20～20mA 3:0～20mA 4:4～20mA	0	0	4	0x2704
A07.05	AI1 type	0:-10～10V 1:0～10V 2:-20～20mA 3:0～20mA 4:4～20mA	0	0	4	0x2705
A07.06	AI0 min input value of curve	-20.000～20.000	-10	-20	20	0x2706
A07.07	AI0 min input ratio of curve	-600.0%～600.0%	-100	-600	600	0x2707
A07.08	AI0 max input value of curve	-20.000～20.000	10	-20	20	0x2708
A07.09	AI0 max input ratio of curve	-600.0%～600.0%	100	-600	600	0x2709
A07.10	AI1 min input value of curve	-20.000～20.000	-10	-20	20	0x270A
A07.11	AI1 min input ratio of curve	-600.0%～600.0%	-100	-600	600	0x270B
A07.12	AI1 max input value of curve	-20.000～20.000	10	-20	20	0x270C
A07.13	AI1 max input ratio of curve	-600.0%～600.0%	100	-600	600	0x270D
A07.14	Selecting lower limit of AI	Bit0:Selecting lower limit of AI1 0:Min input ratio 1:0.0% Bit1:Selecting lower limit of AI2 0:Min input ratio 1:0.0%	0	0	11	0x270E

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
A07.15	A10 filtering time	0～10000ms	10	0	10000	0x270F
A07.16	A11 filtering time	0～10000ms	10	0	10000	0x2710
A07.17	AI0 denoising threshold	0.0%～～20.0%	0	0	20	0x2711
A07.18	Al1 denoising threshold	0.0%～20.0%	0	0	20	0x2712
A07.19	AI zero - crossing threshold	0.0%～1.0%	0.5	0	1	0x2713
A07.20	AI0 breakage detection threshold	0～4.000mA	0	0	4	0x2714
A07.21	A11 breakage detection threshold	0～4.000mA	0	0	4	0x2715
A07.22	A10 breakage detection delay	0～1.00s	0	0	1	0x2716
A07.23	A11 breakage detection delay	0～1.00s	0	0	1	0x2717
A07.24	AI breakage detection enable	Bit0:Enable detection of AI1 wire break 0:Disable 1:Enable Bit1:Enable detection of AI2 wire break 0:Disable 1:Enable	0	0	11	0x2718
A08 group:Analog output						
A08.00	AO0 output value	0.00～20.00	0	0	20	0x2800
A08.01	AO0 output ratio	-600.0%～600.0%	0	-600	600	0x2801
A08.04	AO0 signal source	0:00 1:Motor speed 2:Synchronous frequency 3:Output current 4:Output torque 5:DC link voltage 6:Output power 7:RFG input 8:RFG slope output 9:Speed reference 10:Reserve Others:Binary interconnection of parameters	0	0	10	0x2804
A08.08	A00 min output ratio of curve	-600.0%～600.0%	0	-600	600	0x2808
A08.09	A00 min output value of curve	0.00～20.00	0	0	20	0x2809
A08.10	A00 max output ratio of curve	-600.0%～600.0%	100	-600	600	0x280A
A08.11	A00 max output value of curve	0.00～20.00	10	0	20	0x280B

8.2. B: Control Parameters

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
B00 group: System control command settings						
B00.00	Source of start-stop control command	0:Terminal control module 1:Custom control module	0	0	1	0x3000
B00.01	Custom OFF1 source	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x3001
B00.02	Custom OFF2 source1	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	1	0	10	0x3002
B00.03	Custom OFF3 source	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	1	0	10	0x3003
B00.04	Custom run allowed source	0:run not allowed 1:run allowed 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	1	0	10	0x3004
B00.05	Custom fault reset source1	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x3005

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
B00.06	Custom speed command reverse source	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x3006
B00.07	Costom JOG1 source	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x3007
B00.08	Costom JOG2 source	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x3008
B00.09	OFF2 source2	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	1	0	10	0x3009
B00.10	OFF2 source3	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	1	0	10	0x300A

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
B00.11	OFF3 source2	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	1	0	10	0x300B
B00.12	OFF3 source3	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	1	0	10	0x300C
B00.13	Fault reset source 2	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x300D
B00.14	Fault reset source 3	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x300E
B00.15	Prohibition source of Ramp function generator(RFG)	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x300F

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
B00.16	Suspension source of Ramp function generator(RFG)	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x3010
B00.17	Given 0 source Ramp function generator(RFG)	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x3011
B00.21	Identification request	0:None 1:Simple identification for Asynchronous motor 1:Static identification for Asynchronous motor 1:Rotating identification for Asynchronous motor	0	0	3	0x3015

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
B01 group: Terminal control module						
B01.00	Terminal control command 1/2 selection	0:Terminal control command1 1:Terminal control command2 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x3100
B01.01	Terminal control command 1 mode	0:Ineffective 1:IN1 start up 2:IN1 start up, IN2direction 3:IN1 forward start, IN2reverse start 4:IN1P start up, IN2stop 5:IN1P start up, IN2stop, IN3direction 6:IN1P forward start, IN2P reverse start, IN3stop	3	0	6	0x3101
B01.03	Terminal control command 1 input IN1	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	2	0	10	0x3103
B01.04	Terminal control command 1 input IN2	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	3	0	10	0x3104
B01.05	Terminal control command 1 input IN3	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x3105

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
B01.06	Terminal control command 2 mode	0:Ineffective 1:IN1 start up 2:IN1 start up, IN2direction 3:IN1 forward start, IN2reverse start 4:IN1Pstart up, IN2stop 5:IN1Pstart up, IN2stop, IN3direction 6:IN1Pforward start, IN2Preverse start, IN3stop	3	0	6	0x3106
B01.08	Terminal control command 2 input IN1	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	2	0	10	0x3108
B01.09	Terminal control command 2 input IN2	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	3	0	10	0x3109
B01.10	Terminal control command 2 input IN3	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x310A
B01.11	Terminal control module JOG1 source	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x310B

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
B01.12	Terminal control module JOG2 source	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x310C
B02 group: Command source settings						
B02.00	Speed control main setting selection	0:00 1:Multi-stage setting 1 2:AI0 3:AI1 4:Reserve 5:Reserve 6:Multi-segment value given 7:Electric potentiometer 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	1	0	10	0x3200
B02.01	Speed control secondary setting selection	0:00 1:Multi-stage setting 1 2:AI0 3:AI1 4:Reserve 5:Reserve 6:Multi-segment value given 7:Electric potentiometer 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x3201
B02.02	Additional speed given	0:00 1:Multi-stage setting 1 2:AI0 3:AI1 4:Reserve 5:Reserve 6:Multi-segment value given 7:Electric potentiometer 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x3202

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
B03 group: Other command source settings						
B03.00	JOG1 given settings	0:00 1:Multi-stage setting 1 2:AI0 3:AI1 4:Reserve 5:Reserve 6:Multi-segment value given 7:Electric potentiometer 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x3300
B03.01	JOG2 given settings	0:00 1:Multi-stage setting 1 2:AI0 3:AI1 4:Reserve 5:Reserve 6:Multi-segment value given 7:Electric potentiometer 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x3301
B03.02	JOG acceleration time	0.0～1000.0	0	0	1000	0x3302
B03.03	JOG deceleration time	0.0～1000.0	0	0	1000	0x3303
B03.04	Electric potentiometer function	0:No 1:Power-off clear 2:Power-off memory	1	0	2	0x3304
B03.05	Electric potentiometer initial value	-600.0～600.0%	0	-600	600	0x3305
B03.06	Electric potentiometer ramp time	0.0～1000.0s	10	0	1000	0x3306
B03.07	Electric potentiometer minimum value	-600.0～600.0%	0	-600	600	0x3307
B03.08	Electric potentiometer Maximum value	-600.0～600.0%	100	-600	600	0x3308
B03.09	Electric potentiometer increased source selection	0:00 1:01 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x3309
B03.10	Electric potentiometer descent source selection	0:00 1:01 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x330A
B03.11	Multisegment given value	-600.0～ 600.0%	0	-600	600	0x330B

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
B03.12	Multisegment given value choice 1	0:00 1:01 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x330C
B03.13	Multisegment given value choice 2	0:00 1:01 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x330D
B03.14	Multisegment given value choice 3	0:00 1:01 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x330E
B03.15	Multisegment given value choice 4	0:00 1:01 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x330F
B03.16	Multisegment given value 1	-600.0~600.0%	10	-600	600	0x3310
B03.17	Multisegment given value 2	-600.0~600.0%	20	-600	600	0x3311
B03.18	Multisegment given value 3	-600.0~600.0%	30	-600	600	0x3312
B03.19	Multisegment given value 4	-600.0~600.0%	-10	-600	600	0x3313
B03.20	Multisegment given value 5	-600.0~600.0%	-20	-600	600	0x3314
B03.21	Multisegment given value 6	-600.0~600.0%	-30	-600	600	0x3315
B03.22	Multisegment given value 7	-600.0~600.0%	0	-600	600	0x3316
B03.23	Multisegment given value 8	-600.0~600.0%	0	-600	600	0x3317
B03.24	Multisegment given value 9	-600.0~600.0%	0	-600	600	0x3318
B03.25	Multisegment given value 10	-600.0~600.0%	0	-600	600	0x3319
B03.26	Multisegment given value 11	-600.0~600.0%	0	-600	600	0x331A
B03.27	Multisegment given value 12	-600.0~600.0%	0	-600	600	0x331B
B03.28	Multisegment given value 13	-600.0~600.0%	0	-600	600	0x331C
B03.29	Multisegment given value 14	-600.0~600.0%	0	-600	600	0x331D
B03.30	Multisegment given value 15	-600.0~600.0%	0	-600	600	0x331E
B03.31	Multisegment given value 16	-600.0~600.0%	0	-600	600	0x331F

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
B04 group: Ramp function generator						
B04.00	RFG Ramp time selection 1	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x3400
B04.01	RFG Ramp time selection 2	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x3401
B04.02	Ramp 1 acceleration time	0.0～1000.0s	20	0	1000	0x3402
B04.03	Ramp 1 deceleration time	0.0～1000.0s	20	0	1000	0x3403
B04.04	Ramp 2 acceleration time	0.0～1000.0s	20	0	1000	0x3404
B04.05	Ramp 2 deceleration time	0.0～1000.0s	20	0	1000	0x3405
B04.06	Ramp 3 acceleration time	0.0～1000.0s	20	0	1000	0x3406
B04.07	Ramp 3 deceleration time	0.0～1000.0s	20	0	1000	0x3407
B04.08	Ramp 4 acceleration time	0.0～1000.0s	20	0	1000	0x3408
B04.09	Ramp 4 deceleration time	0.0～1000.0s	20	0	1000	0x3409
B04.10	S curve 1 starting time	0.00～20.00s	0	0	20	0x340A
B04.11	S curve 1 end time	0.00～20.00s	0	0	20	0x340B
B04.12	S curve 2 starting time	0.00～20.00s	0	0	20	0x340C
B04.13	S curve 2 end time	0.00～20.00s	0	0	20	0x340D
B04.14	S curve 3 starting time	0.00～20.00s	0	0	20	0x340E
B04.15	S curve 3 end time	0.00～20.00s	0	0	20	0x340F
B04.16	S curve 4 starting time	0.00～20.00s	0	0	20	0x3410
B04.17	S curve 4 end time	0.00～20.00s	0	0	20	0x3411
B04.20	RFG forced output enable	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	0	0	10	0x3414
B04.21	RFG forced set point	0:00 Others: Analog interconnection parameters	0	0	0	0x3415

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
B05 group: Motor control selection						
B05.00	Motor control mode	0:VF 1:SVC 2:FVC	0	0	2	0x3500
B05.01	System control mode	0:Speed control 1:Torque control	0	0	1	0x3501
B05.02	Positive speed allowed	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	1	0	10	0x3502
B05.03	Negative speed allowed	0:Ineffective 1:Effective 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve Others:Binary interconnection parameters	1	0	10	0x3503
B05.04	Motor starting mode	0:Direct start 1:Pre-excitation start 2:Speed tracking start 3:DC brake start	0	0	3	0x3504
B05.06	Pre-excitation time setting	0.00s～100.00s	0	0	100	0x3506
B05.08	Digital setting of pre-excitation current	10.0%～400.0% 100.0% relative to motor rated current	100	10	400	0x3508
B05.09	DC braking current	0.0%～100.0% 100.0% corresponding to motor rated current	0	0	100	0x3509
B05.10	DC braking time at start-up	0.00s～100.00s	0	0	100	0x350A
B05.11	DC braking time at stop	0.00s～100.00s	0	0	100	0x350B
B05.12	DC braking starting speed at stop	0～3000rpm	0	0	3000	0x350C
B05.13	Speed tracking mode	0:Speed tracking off 1:Search from shutdown frequency 2:Search from rated frequency 3:Search from maximum frequency	0	0	3	0x350D
B05.14	Speed tracking search time	0.0～120.0s	25	0	120	0x350E
B05.15	Speed tracking current percentage	0～100%	50	0	100	0x350F
B05.16	Speed tracking minimum frequency limitation	0.00～50.00Hz	2	0	50	0x3510
B05.17	Speed tracking switching waiting time	0～60000ms	250	0	60000	0x3511
B05.29	Zero speed judgement value	0～3000rpm	30	0	3000	0x351D
B05.30	Zero speed shutdown delay time	0.00s～100.00s	0	0	100	0x351E
B05.31	Demagnetization time	0.00s～100.00s	0	0	100	0x351F
B05.32	OFF1 stop mode	0:Free shutdown 1:Deceleration shutdown	1	0	1	0x3520
B05.33	OFF3 downtime	0.0s～1000.0s	10	0	1000	0x3521
B05.34	OFF3 stop mode	0:Deceleration shutdown 1:Maximum capacity shutdown(RESV)	0	0	1	0x3522
B05.35	Operation allowed stop mode	0:Mode OFF1 shutdown 1:Mode OFF2 shutdown 2:Mode OFF3 shutdown	0	0	2	0x3523

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
B06 group: Motor control limit and protection						
B06.00	Lower limit of jump frequency 1	0.0%～600.0% 100.0% relative to motor rated frequency	0	0	B06.01	0x3600
B06.01	Upper limit of jump frequency 1	0.0%～600.0% 100.0% relative to motor rated frequency	0	B06.00	B06.02	0x3601
B06.02	Lower limit of jump frequency 2	0.0%～600.0% 100.0% relative to motor rated frequency	0	B06.01	B06.03	0x3602
B06.03	Upper limit of jump frequency 2	0.0%～600.0% 100.0% relative to motor rated frequency	0	B06.02	600	0x3603
B06.04	Forward limit speed	0.0%～600.0%	100	0	600	0x3604
B06.05	Reverse limit speed	-600.0%～0.0%	-100	-600	0	0x3605
B06.06	Forward speed limit selection	0:00 1:600.0% 2:AI0 3:AI1 4:Reserve 5:Reserve 6:Multi-segment value given 7:Electric potentiometer 8:Reserve 9:Reserve 10:Reserve Others:Connector PARM	1	0	10	0x3606
B06.07	Negative speed limit selection	0:00 1:600.0% 2:AI0 3:AI1 4:Reserve 5:Reserve 6:Multi-segment value given 7:Electric potentiometer 8:Reserve 9:Reserve 10:Reserve Others:Connector PARM	1	0	10	0x3607
B06.12	Vector control torque limitation	0.0%～200.0%	180	0	200	0x360C
B06.13	Torque limitation before opening brake	0.0%～200.0%	180	0	200	0x360D
B06.25	Selection of motor overload software protection	0:No 1:Yes	0	0	1	0x3619
B06.26	Motor overload software protection gain	20～1000%	100	20	1000	0x361A
B06.27	Motor overload warning coefficient	50%～100%	80	50	100	0x361B
B06.28	Overspeed detection value	0.0%～50.0% 100.0% relative to motor rated speed	20	0	50	0x361C
B06.29	Overspeed detection time	0.0S: Non-detection 0.1s～60.0s	5	0	60	0x361D
B06.30	Excessive speed deviation deviation value	0.0～100.0% 100.0% relative to motor rated speed	20	0	100	0x361E
B06.31	Excessive speed deviation deviation time	0.0S: Non-detection 0.1s～600.0s	0	0	600	0x361F
B06.32	Comparison value reachese detection value	0.0～600.0% 100.0% relative to motor rated speed	100	0	600	0x3620
B06.33	Comparison value reachese detection hysteresis value	0.0%～B06.32 100.0% relative to motor rated speed	3	0	B06.32	0x3621
B06.34	Comparison value reachese detection time	0.0S: Non-detection 0.1s～600.0s	3	0	600	0x3622
B06.37	Output phase loss detection	0:No 1:Yes	1	0	1	0x3625
B06.59	Stall detection time 1	0～5000ms	500	0	5000	0x363B
B06.60	Stall detection time 2	0～5000ms	500	0	5000	0x363C
B06.61	Vector stall detection coefficient	0～ 100%	20	0	100	0x363D

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
B06.62	SVC control mode	0:Control mode 1 1:Control mode 2 2:Control mode 3	0	2	0	0x363E
B06.63	FVC control mode	0:Control mode 1 1:Control mode 2 2:Control mode 3	0	2	0	0x363F
B06.64	Slip compensation coefficient of vector control	50～200%	100	50	200	0x3640
B07 group: VF control						
B07.00	VF mode selection	0:VF curve 1:VF separate	0	0	1	0x3700
B07.01	VF curve selection	0:Line VF 1:Multipoint VF 2:Square V/F 3:1.5 power V/F	0	0	3	0x3701
B07.02	frequency point 1 of multipoint VF curve	0.0～B07.04	2	0	B07.04	0x3702
B07.03	Voltage point 1 of multipoint VF curve	0.0～B07.05	20	0	B07.05	0x3703
B07.04	frequency point 2 of multipoint VF curve	B07.02～B07.06	20	B07.02	B07.06	0x3704
B07.05	Voltage point 2 of multipoint VF curve	B07.03～B07.07	152	B07.03	B07.07	0x3705
B07.06	frequency point 3 of multipoint VF curve	B07.04～D00.04	40	B07.04	D00.04	0x3706
B07.07	Voltage point 3 of multipoint VF curve	B07.05～380.0	304	B07.05	380	0x3707
B07.08	VF separation given	0:00 1:100.0% 2:AI0 3:AI1 4:Reserve 5:Reserve 6:Multi-segment value given 7:Electric potentiometer 8:Reserve 9:Reserve 10:Reserve Others:Connector PARM	0	0	10	0x3708
B07.09	VF separation voltage change time	0.0s～1000.0s	10	0	1000	0x3709
B07.10	Imax control enable	0:Ineffective 1:Effective	1	0	1	0x370A
B07.11	Imax control gain	0～100%	30	0	100	0x370B
B07.12	Imax inhibition point	0～200%	150	0	200	0x370C
B07.13	VF torque lifting mode	0:Not enabled 1:Manual 2:AUTO	1	0	2	0x370D
B07.15	VF manual acceleration torque lifting	0%～250%	1	0	50	0x370F
B07.16	VF torque lifting cut-off frequency	0.00～50.00Hz	50	0	50	0x3710
B07.17	VF slip compensation coefficient	0.0%～300.0%	0	0	300	0x3711
B07.20	VF oscillation suppression mode	0:Ineffective 1:Effective	1	0	1	0x3714
B07.21	VF oscillation suppression gain	0～500%	0	0	500	0x3715
B07.24	VF overexcitation gain	0～200.0%	0	0	200	0x3718
B07.28	Vdc_max control switch	0:No 1:Yes	0	0	1	0x371C
B07.29	Vdc_max voltage regulation gain coefficient	20.0～300.0V	125	100	150	0x371D
B07.34	Vdc_ min control switch	0:No 1:Yes	0	0	1	0x3722
B07.35	Vdc_ min voltage regulation gain coefficient	65～100%	85	65	100	0x3723
B08 group: Speed regulator						
B08.00	Motor vector control setting speed filter time	0～10000ms	0	0	10000	0x3800
B08.01	Motor vector control feedback speed filter time	0～10000ms	0	0	10000	0x3801
B08.02	Speed loop low speed Kp	0.00～20.00	1	0	20	0x3802
B08.03	Speed loop low speed Ti	1～65535ms	500	1	65535	0x3803
B08.04	Speed loop high speed Kp	0.00～20.00	1	0	20	0x3804
B08.05	Speed loop high speed Ti	1～65535ms	500	1	65535	0x3805
B08.11	Speed loop switching low frequency	0.00～50.00Hz	5	0	B08.12	0x380B
B08.12	Speed loop switching high frequency	0.00～50.00Hz	10	B08.11	400	0x380C
B08.13	Speed loop switching high frequency correction factor	0.0～400.0%	100	0	400	0x380D
B08.25	Encoder feedback speed filtering time	0～1000ms	0	0	1000	0x3819
B08.26	Estimated speed loop filtering time	0～1000ms	35	0	1000	0x381A
B09 group: Current regulator						
B09.04	Proportional coefficient of current loop	1%～1000%	100	1	1000	0x3904
B09.05	Intergral coefficient of current loop	1%～1000%	100	1	1000	0x3905

8.3 C: Communication parameter group

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
C02 group; Modbus Communication settings						
C02.00	Modbus baud rate	0:1200bps 1:2400bps 2:4800bps 3:9600bps 4:19200bps 5:38400bps 6:57600bps 7:115200bps	7	0	7	0x4200
C02.01	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	2	0	3	0x4201
C02.02	Modbus local address	1～247	1	1	255	0x4202
C02.03	Modbus response delay	0～20ms	0	0	20	0x4203
C02.04	Modbus communication timeout	0:Ineffective. 0.1 s～60.0s	2	0	60	0x4204

8.4 D-Motor parameter group

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
D00 group: motor 0 basic parameters						
D00.00	Motor type seletion	0:Induction motor 1:Permanent magnet synchronous motor(reserve)	0	0	1	0x5000
D00.01	Motor rated power	0.00～655.35kW	3.7	0	655.35	0x5001
D00.02	Motor rated voltage	0～1500V	380	0	1500	0x5002
D00.03	Motor rated current	0.00～655.35A	9	0	655.35	0x5003
D00.04	Motor rated frequency	0.0～600.00Hz	50	0	600	0x5004
D00.05	Motor rated speed	0～65535rpm	1440	0	65535	0x5005
D00.06	Motor maximum speed	0.0%～600.0% rated speed	100	0	600	0x5006
D00.07	Motor minimum speed	0.0%～600.0% rated speed	0	0	600	0x5007
D00.08	Motor maximum current	0.0%～600.0% rated current	100	0	600	0x5008
D00.09	Number of pole pairs	0～64	2	0	64	0x5009
D01 group: motor 0 identification parameters						
D01.00	Asynchronous motor stator resistance	0.000～65.535ohm	1.667	0	65.535	0x5100
D01.01	Asynchronous motor rotor resistance	0.000～65.535ohm	1.5	0	65.535	0x5101
D01.02	Asynchronous motor leakage inductance	0.000～65.535mH	6.54	0	65.535	0x5102
D01.03	Asynchronous motor mutual inductance	0.00～655.35mH	173.4	0	6553.5	0x5103
D01.04	Asynchronous motor no-load current	0.0～655.35A	4	0	655.35	0x5104
D02 group: motor 0 encoder parameters						
D02.00	Encoder type	0:Invalid type 1:Normal ABZ encoder	1	0	2	0x5200
D02.01	Input AB phase sequence	0:Forward 1:Reverse	0	0	1	0x5201
D02.02	Speed measuring method	0:quadruple-frequency 1:A pulse 2:B pulse	0	0	2	0x5202
D02.05	Encoder resolution (pulse count/Rrvolutions)	0～65535	1024	0	65535	0x5205
D02.13	Speed feedback PG disconnection detect time	0～5000ms	500	0	5000	0x520D
D03 group: motor 1 basic parameters						
D03.00	Motor type seletion	0:Induction motor 1:Permanent magnet synchronous motor(reserve)	0	0	1	0x5300
D03.01	Motor rated power	0.00～655.35kW	3.7	0	655.35	0x5301
D03.02	Motor rated voltage	0～1500V	380	0	1500	0x5302
D03.03	Motor rated current	0.0～6553.5A	9	0	655.35	0x5303
D03.04	Motor rated frequency	0.0～600.00Hz	50	0	600	0x5304
D03.05	Motor rated speed	0～65535rpm	1440	0	65535	0x5305
D03.06	Motor maximum speed	0.0%～600.0% rated speed	100	0	600	0x5306
D03.07	Motor minimum speed	0.0%～600.0% rated speed	0	0	600	0x5307
D03.08	Motor maximum current	0.0%～600.0% rated current	100	0	600	0x5308
D03.09	Number of pole pairs	0～64	2	0	64	0x5309
D04 group: motor 1 identification parameters						
D04.00	Asynchronous motor stator resistance	0.000～6.5535ohm	1.667	0	65.535	0x5400
D04.01	Asynchronous motor rotor resistance	0.000～6.553ohm	1.5	0	6.553	0x5401
D04.02	Asynchronous motor leakage inductance	0.000～65.535mH	6.54	0	65.535	0x5402
D04.03	Asynchronous motor mutual inductance	0.00～655.35mH	173.4	0	655.35	0x5403
D04.04	Asynchronous motor no-load current	0.0～6553.5A	4	0	6553.5	0x5404
D05 group:motor 1 encoder parameters						
D05.00	Encoder type	0:Invalid type 1:Normal ABZ encoder	1	0	2	0x5500
D05.01	Input AB phase sequence	0:Forward 1:Reverse	0	0	1	0x5501
D05.02	Speed measuring method	0:quadruple-frequency 1:A pulse 2:B pulse	0	0	2	0x5502
D05.05	Encoder resolution(pulse count/Rrvolutions)	0～65535	1024	0	65535	0x5505
D05.13	Speed feedback PG disconnection detect time	0～5000ms	500	0	5000	0x550D

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
D06 group: motor 2 basic parameters						
D06.00	Motor type seletion	0:Induction motor 1:Permanent magnet synchronous motor(reserve)	0	0	1	0x5600
D06.01	Motor rated power	0.00～655.35kW	3.7	0	655.35	0x5601
D06.02	Motor rated voltage	0～1500V	380	0	1500	0x5602
D06.03	Motor rated current	0.0～6553.5A	9	0	655.35	0x5603
D06.04	Motor rated frequency	0.0～600.00Hz	50	0	600	0x5604
D06.05	Motor rated speed	0～65535rpm	1440	0	65535	0x5605
D06.06	Motor maximum speed	0.0%～600.0% rated speed	100	0	600	0x5606
D06.07	Motor minimum speed	0.0%～600.0% rated speed	0	0	600	0x5607
D06.08	Motor maximum current	0.0%～600.0% rated current	100	0	600	0x5608
D06.09	Number of pole pairs	0～64:Manual set	2	0	64	0x5609
D07 group: motor 2 identification parameters						
D07.00	Asynchronous motor stator resistance	0.000～6.5535ohm	1.667	0	65.535	0x5700
D07.01	Asynchronous motor rotor resistance	0.000～6.553ohm	1.5	0	6.553	0x5701
D07.02	Asynchronous motor leakage inductance	0.000～65.535mH	6.54	0	65.535	0x5702
D07.03	Asynchronous motor mutual inductance	0.00～655.35mH	173.4	0	655.35	0x5703
D07.04	Asynchronous motor no-load current	0.0～6553.5A	4	0	6553.5	0x5704
D08 group: motor 2 encoder parameters						
D08.00	Encoder type	0:Invalid type 1:Normal ABZ encoder	1	0	2	0x5800
D08.01	Input AB phase sequence	0:Forward 1:Reverse	0	0	1	0x5801
D08.02	Speed measuring method	0:quadruple-frequency 1:A pulse 2:B pulse	0	0	2	0x5802
D08.05	Encoder resolution(pulse count/Rrvolutions)	0～65535	1024	0	65535	0x5805
D08.13	Speed feedback PG disconnection detect time	0～5000ms	500	0	5000	0x580D
D09 group: motor 3 basic parameters						
D09.00	Motor type seletion	0:Induction motor 1:Permanent magnet synchronous motor(reserve)	0	0	1	0x5900
D09.01	Motor rated power	0.00～655.35kW	3.7	0	655.35	0x5901
D09.02	Motor rated voltage	0～1500V	380	0	1500	0x5902
D09.03	Motor rated current	0.0～655.35A	9	0	655.35	0x5903
D09.04	Motor rated frequency	0.0～600.00Hz	50	0	600	0x5904
D09.05	Motor rated speed	0～65535rpm	1440	0	65535	0x5905
D09.06	Motor maximum speed	0.0%～600.0% rated speed	100	0	600	0x5906
D09.07	Motor minimum speed	0.0%～600.0% rated speed	0	0	600	0x5907
D09.08	Motor maximum current	0.0%～600.0% rated current	100	0	600	0x5908
D09.09	Number of pole pairs	0～64	2	0	64	0x5909
D10 group: motor 3 identification parameters						
D10.00	Asynchronous motor stator resistance	0.000～6.5535ohm	1.667	0	65.535	0x5A00
D10.01	Asynchronous motor rotor resistance	0.000～6.553ohm	1.5	0	6.553	0x5A01
D10.02	Asynchronous motor leakage inductance	0.000～65.535mH	6.54	0	65.535	0x5A02
D10.03	Asynchronous motor mutual inductance	0.00～655.35mH	173.4	0	655.35	0x5A03
D10.04	Asynchronous motor no-load current	0.0～6553.5A	4	0	6553.5	0x5A04
D11 group:motor 3 encoder parameters						
D11.00	Encoder type	0:Invalid type 1:Normal ABZ encoder	1	0	2	0x5B00
D11.01	Input AB phase sequence	0:Forward 0:Forward	0	0	1	0x5B01
D11.02	Speed measuring method	0:quadruple-frequency 1:A pulse 2:B pulse	0	0	2	0x5B02
D11.05	Encoder resolution(pulse count/Rrvolutions)	0～65535	1024	0	65535	0x5B05
D11.13	Speed feedback PG disconnection detect time	0～5000ms	500	0	5000	0x5B0D

8.5 E-Fault protection and recording

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
E00 grouop：fault handling						
E00.00	External fault 1 source	0:Ineffective 1:Reserve 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:DI5 8:DI6 9:DI7 10:Reserve Others:Binary interconnection parameters	0	0	10	0x6000
E00.01	External fault 2 source	0:Ineffective 1:Reserve 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:DI5 8:DI6 9:DI7 10:Reserve Others:Binary interconnection parameters	0	0	10	0x6001
E00.02	External warning 1 source	0:Ineffective 1:Reserve 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:DI5 8:DI6 9:DI7 10:Reserve Others:Binary interconnection parameters	0	0	10	0x6002
E00.03	External warning 2 source	0:Ineffective 1:Reserve 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:DI5 8:DI6 9:DI7 10:Reserve Others:Binary interconnection parameters	0	0	10	0x6003
E00.10	Automatic fault reset function	0:Ineffective 1:Effective	0	0	1	0x600A
E00.11	reset time of failure reset number	0.0～3600.0s	180	0	3600	0x600B
E00.12	Failure reset interval	0.0～600.0s	30	0	600	0x600C
E00.13	Fault reset times	0～5	5	0	5	0x600D
E00.14	Non-resetable exception code 1	0～65535	0	0	65535	0x600E
E00.15	Non-resetable exception code 2	0～65535	0	0	65535	0x600F
E00.16	Non-resetable exception code 3	0～65535	0	0	65535	0x6010
E00.23	Restart after automatic reset	0:Ineffective 1:Effective	0	0	1	0x6017
E00.24	Source of exception allowed to restart	0:Specified exception code allows restart 1:Specified exception code does not allow restart	1	0	1	0x6018
E00.25	Specified exception code 1	0～65535	0	0	65535	0x6019
E00.26	Specified exception code 2	0～65535	0	0	65535	0x601A
E00.27	Specified exception code 3	0～65535	0	0	65535	0x601B
E00.28	Specified exception code 4	0～65535	0	0	65535	0x601C
E00.29	Specified exception code 5	0～65535	0	0	65535	0x601D

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
E00 grouop：fault handling						
E00.36	Exception level modification exception code1	0～65535	0	0	65535	0x6024
E00.37	Exception level of exception code1	0:Free stop 1:Emergency stop 2:Stop mode shutdown 3:warning 4:No exception handling	0	0	4	0x6025
E00.38	Exception level modification exception code 2	0～65535	0	0	65535	0x6026
E00.39	Exception level of exception code 2	0:Free stop 1:Emergency stop 2:Stop mode shutdown 3:warning 4:No exception handling	0	0	4	0x6027
E00.40	Exception level modification exception code 3	0～65535	0	0	65535	0x6028
E00.41	Exception level of exception code 3	0:Free stop 1:Emergency stop 2:Stop mode shutdown 3:warning 4:No exception handling	0	0	4	0x6029
E00.42	Exception level modification exception code 4	0～65535	0	0	65535	0x602A
E00.43	Exception level of exception code 4	0:Free stop 1:Emergency stop 2:Stop mode shutdown 3:warning 4:No exception handling	0	0	4	0x602B
E00.44	Exception level modification exception code 5	0～65535	0	0	65535	0x602C
E00.45	Exception level of exception code 5	0:Free stop 1:Emergency stop 2:Stop mode shutdown 3:warning 4:No exception handling	0	0	4	0x602D
E00.46	Exception level modification exception code 6	0～65535	0	0	65535	0x602E
E00.47	Exception level of exception code 6	0:Free stop 1:Emergency stop 2:Stop mode shutdown 3:warning 4:No exception handling	0	0	4	0x602F
E00.48	Exception level modification exception code 7	0～65535	0	0	65535	0x6030
E00.49	Exception level of exception code 7	0:Free stop 1:Emergency stop 2:Stop mode shutdown 3:warning 4:No exception handling	0	0	4	0x6031
E00.50	Exception level modification exception code 8	0～65535	0	0	65535	0x6032
E00.51	Exception level of exception code 8	0:Free stop 1:Emergency stop 2:Stop mode shutdown 3:warning 4:No exception handling	0	0	4	0x6033
E00.52	Exception level modification exception code 9	0～65535	0	0	65535	0x6034
E00.53	Exception level of exception code 9	0:Free stop 1:Emergency stop 2:Stop mode shutdown 3:warning 4:No exception handling	0	0	4	0x6035
E00.54	Exception level modification exception code 10	0～65535	0	0	65535	0x6036
E00.55	Exception level of exception code 10	0:Free stop 1:Emergency stop 2:Stop mode shutdown 3:warning 4:No exception handling	0	0	4	0x6037

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
E01 group：Latest fault and fault data records						
E01.00	Fault code 1	0～65535	0	0	65535	0x6100
E01.01	Fault code 1 subcode	1～16	1	1	16	0x6101
E01.02	Fault code 2	0～65535	0	0	65535	0x6102
E01.03	Fault code 2 subcode	1～16	1	1	16	0x6103
E01.04	Fault code 3	0～65535	0	0	65535	0x6104
E01.05	Fault code 3 subcode	1～16	1	1	16	0x6105
E01.06	Fault code 4	0～65535	0	0	65535	0x6106
E01.07	Fault code 4 subcode	1～16	1	1	16	0x6107
E01.08	Fault code 5	0～65535	0	0	65535	0x6108
E01.09	Fault code 5 subcode	1～16	1	1	16	0x6109
E01.10	Fault code 6	0～65535	0	0	65535	0x610A
E01.11	Fault code 6 subcode	1～16	1	1	16	0x610B
E01.12	Fault speed	-300.00～300.00Hz	0	-300	30	0x610C
E01.13	Fault current	0.0～6553.5A	0	0	6553.5	0x610D
E01.14	Fault DC - link voltage	0.0～800.0V	0	0	800	0x610E
E01.15	Fault output torque	-300.0%～300.0%	0	-300	300	0x610F
E01.16	Fault control word 1	0～65535	0	0	65535	0x6110
E01.17	Fault control word 2	0～65535	0	0	65535	0x6111
E01.18	Fault state word 1	0～65535	0	0	65535	0x6112
E01.19	Fault state word 2	0～65535	0	0	65535	0x6113
E01.20	Fault state machine	0～29	0	0	29	0x6114
E01.21	Fault temperature	0～300 °	0	0	300	0x6115
E01.22	Fault output voltage	0～6553.5V	0	0	65535	0x6116
E01.23	Fault PM state word	0～65535	0	0	65535	0x6117
E02 group：Previous fault and fault data records						
E02.00	Fault code 1	0～65535	0	0	65535	0x6200
E02.01	Fault code 1 subcode	1～16	1	1	16	0x6201
E02.02	Fault code 2	0～65535	0	0	65535	0x6202
E02.03	Fault code 2 subcode	1～16	1	1	16	0x6203
E02.04	Fault code 3	0～65535	0	0	65535	0x6204
E02.05	Fault code 3 subcode	1～16	1	1	16	0x6205
E02.06	Fault code 4	0～65535	0	0	65535	0x6206
E02.07	Fault code 4 subcode	1～16	1	1	16	0x6207
E02.08	Fault code 5	0～65535	0	0	65535	0x6208
E02.09	Fault code 5 subcode	1～16	1	1	16	0x6209
E02.10	Fault code 6	0～65535	0	0	65535	0x620A
E02.11	Fault code 6 subcode	1～16	1	1	16	0x620B
E02.12	Fault speed	-300.00～300.00Hz	0	-300	30	0x620C
E02.13	Fault current	0.0～6553.5A	0	0	6553.5	0x620D
E02.14	Fault DC - link voltage	0.0～800.0V	0	0	800	0x620E
E02.15	Fault output torque	-300.0～300.0%	0	-300	300	0x620F
E02.16	Fault control word1	0～65535	0	0	65535	0x6210
E02.17	Fault control word2	0～65535	0	0	65535	0x6211
E02.18	Fault state word1	0～65535	0	0	65535	0x6212
E02.19	Fault state word2	0～65535	0	0	65535	0x6213
E02.20	Fault state machine	0～29	0	0	29	0x6214
E02.21	Fault temperature	-0～300 °	0	-40	300	0x6215
E02.22	Fault output voltage	0～65535V	0	0	65535	0x6216
E02.23	Fault PM status word	0～65535	0	0	65535	0x6217
E03 group：Previous two faults and fault data records						
E03.00	Fault code 1	0～65535	0	0	65535	0x6300
E03.01	Fault code 1 subcode	1～16	1	1	16	0x6301
E03.02	Fault code 2	0～65535	0	0	65535	0x6302
E03.03	Fault code 2 subcode	1～16	1	1	16	0x6303
E03.04	Fault code 3	0～65535	0	0	65535	0x6304
E03.05	Fault code 3 subcode	1～16	1	1	16	0x6305
E03.06	Fault code 4	0～65535	0	0	65535	0x6306
E03.07	Fault code 4 subcode	1～16	1	1	16	0x6307
E03.08	Fault code 5	0～65535	0	0	65535	0x6308
E03.09	Fault code 5 subcode	1～16	1	1	16	0x6309
E03.10	Fault code 6	0～65535	0	0	65535	0x630A
E03.11	Fault code 6 subcode	1～16	1	1	16	0x630B
E03.12	Fault speed	-300.00～300.00Hz	0	-300	30	0x630C
E03.13	Fault current	0.0～6553.5A	0	0	6553.5	0x630D
E03.14	Fault DC - link voltage	0.0～800.0V	0	0	800	0x630E
E03.15	Fault output torque	-300.0～300.0%	0	-300	300	0x630F
E03.16	Fault control word1	0～65535	0	0	65535	0x6310
E03.17	Fault control word2	0～65535	0	0	65535	0x6311
E03.18	Fault status word1	0～65535	0	0	65535	0x6312
E03.19	Fault status word2	0～65535	0	0	65535	0x6313
E03.20	Fault status machine	0～29	0	0	29	0x6314
E03.21	Fault temperature	0～300 °	0	0	300	0x6315
E03.22	Fault output voltage	0～65535V	0	0	65535	0x6316
E03.23	Fault PM state word	0～65535	0	0	65535	0x6317

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
E04 group：Previous three faults and fault data records						
E04.00	Fault code 1	0～65535	0	0	65535	0x6400
E04.01	Fault code 1 subcode	1～16	1	1	16	0x6401
E04.02	Fault code 2	0～65535	0	0	65535	0x6402
E04.03	Fault code 2 subcode	1～16	1	1	16	0x6403
E04.04	Fault code 3	0～65535	0	0	65535	0x6404
E04.05	Fault code 3 subcode	1～16	1	1	16	0x6405
E04.06	Fault code 4	0～65535	0	0	65535	0x6406
E04.07	Fault code 4 subcode	1～16	1	1	16	0x6407
E04.08	Fault code 5	0～65535	0	0	65535	0x6408
E04.09	Fault code 5 subcode	1～16	1	1	16	0x6409
E04.10	Fault code 6	0～65535	0	0	65535	0x640A
E04.11	Fault code 6 subcode	1～16	1	1	16	0x640B
E04.12	Fault speed	-300.00～300.00Hz	0	-300	30	0x640C
E04.13	Fault current	0.0～6553.5A	0	0	6553.5	0x640D
E04.14	Fault DC - link voltage	0.0～800.0V	0	0	800	0x640E
E04.15	Fault output torque	-300.0～300.0%	0	-300	300	0x640F
E04.16	Fault control word1	0～65535	0	0	65535	0x6410
E04.17	Fault control word2	0～65535	0	0	65535	0x6411
E04.18	Fault state word1	0～65535	0	0	65535	0x6412
E04.19	Fault state word2	0～65535	0	0	65535	0x6413
E04.20	Fault state machine	0～29	0	0	29	0x6414
E04.21	Fault temperature	0～300 °	0	0	300	0x6415
E04.22	Fault output voltage	0～65535V	0	0	65535	0x6416
E04.23	Fault PM state word	0～65535	0	0	65535	0x6417
E05 group：Previous four faults and fault data records						
E05.00	Fault code 1	0～65535	0	0	65535	0x6500
E05.01	Fault code 1 subcode	1～16	1	1	16	0x6501
E05.02	Fault code 2	0～65535	0	0	65535	0x6502
E05.03	Fault code 2 subcode	1～16	1	1	16	0x6503
E05.04	Fault code 3	0～65535	0	0	65535	0x6504
E05.05	Fault code 3 subcode	1～16	1	1	16	0x6505
E05.06	Fault code 4	0～65535	0	0	65535	0x6506
E05.07	Fault code 4 subcode	1～16	1	1	16	0x6507
E05.08	Fault code 5	0～65535	0	0	65535	0x6508
E05.09	Fault code 5 subcode	1～16	1	1	16	0x6509
E05.10	Fault code 6	0～65535	0	0	65535	0x650A
E05.11	Fault code 5 subcode	1～16	1	1	16	0x650B
E05.12	Fault speed	-300.00～300.00Hz	0	-300	30	0x650C
E05.13	Fault current	0.0～6553.5A	0	0	6553.5	0x650D
E05.14	Fault DC - link voltage	0.0～800.0V	0	0	800	0x650E
E05.15	Fault output torque	-300.0～300.0%	0	-300	300	0x650F
E05.16	Fault control word1	0～65535	0	0	65535	0x6510
E05.17	Fault control word2	0～65535	0	0	65535	0x6511
E05.18	Fault state word1	0～65535	0	0	65535	0x6512
E05.19	Fault state word2	0～65535	0	0	65535	0x6513
E05.20	Fault state machine	0～29	0	0	29	0x6514
E05.21	Fault temperature	0～300 °	0	0	300	0x6515
E05.22	Fault output voltage	0～65535V	0	0	65535	0x6516
E05.23	Fault PM state word	0～65535	0	0	65535	0x6517
E06 group：Previous five faults and fault data records						
E06.00	Fault code 1	0～65535	0	0	65535	0x6600
E06.01	Fault code 1 subcode	1～16	1	1	16	0x6601
E06.02	Fault code 2	0～65535	0	0	65535	0x6602
E06.03	Fault code 2 subcode	1～16	1	1	16	0x6603
E06.04	Fault code 3	0～65535	0	0	65535	0x6604
E06.05	Fault code 3 subcode	1～16	1	1	16	0x6605
E06.06	Fault code 4	0～65535	0	0	65535	0x6606
E06.07	Fault code 4 subcode	1～16	1	1	16	0x6607
E06.08	Fault code 5	0～65535	0	0	65535	0x6608
E06.09	Fault code 5 subcode	1～16	1	1	16	0x6609
E06.10	Fault code 6	0～65535	0	0	65535	0x660A
E06.11	Fault code 6 subcode	1～16	1	1	16	0x660B
E06.12	Fault speed	-300.00～300.00Hz	0	-300	30	0x660C
E06.13	Fault current	0.0～6553.5A	0	0	6553.5	0x660D
E06.14	Fault DC - link voltage	0.0～800.0V	0	0	800	0x660E
E06.15	Fault output torque	-300.0～300.0%	0	-300	300	0x660F
E06.16	Fault control word1	0～65535	0	0	65535	0x6610
E06.17	Fault control word2	0～65535	0	0	65535	0x6611
E06.18	Fault state word1	0～65535	0	0	65535	0x6612
E06.19	Fault state word2	0～65535	0	0	65535	0x6613
E06.20	Fault state machine	0～29	0	0	29	0x6614
E06.21	Fault temperature	0～300 °	0	0	300	0x6615
E06.22	Fault output voltage	0～65535V	0	0	65535	0x6616
E06.23	Fault PM state word	0～65535	0	0	65535	0x6617
E07 group：Lastest warning excerption code record						
E07.00	Fault code 1	0～65535	0	0	65535	0x6700
E07.01	Fault code 1 subcode	1～16	1	1	16	0x6701
E07.02	Fault code 2	0～65535	0	0	65535	0x6702
E07.03	Fault code 2 subcode	1～16	1	1	16	0x6703
E07.04	Fault code 3	0～65535	0	0	65535	0x6704
E07.05	Fault code 3 subcode	1～16	1	1	16	0x6705
E07.06	Fault code 4	0～65535	0	0	65535	0x6706
E07.07	Fault code 4 subcode	1～16	1	1	16	0x6707
E07.08	Fault code 5	0～65535	0	0	65535	0x6708
E07.09	Fault code 5 subcode	1～16	1	1	16	0x6709
E07.10	Fault code 6	0～65535	0	0	65535	0x670A
E07.11	Fault code 6 subcode	1～16	1	1	16	0x670B

8.6 F - Free function block and process parameter group

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
F00 group：Logic operation module						
F00.00	Logic "AND" maodule A Input 1	1:Invalid other:Binary interconnection parameters	1	1	1	0x7000
F00.01	Logic "AND" maodule A Input 2	1:Invalid other:Binary interconnection parameters	1	1	1	0x7001
F00.02	Logic "AND" maodule A Input 3	1:Invalid other:Binary interconnection parameters	1	1	1	0x7002
F00.03	Logic "AND" maodule A Input 4	1:Invalid other:Binary interconnection parameters	1	1	1	0x7003
F00.04	Logic "AND" module A sample processing time	1～20	2	1	20	0x7004
F00.05	Logic "AND" module B Input 1	1:Invalid other:Binary interconnection parameters	1	1	1	0x7005
F00.06	Logic "AND" module B Input 2	1:Invalid other:Binary interconnection parameters	1	1	1	0x7006
F00.07	Logic "AND" module B Input 3	1:Invalid other:Binary interconnection parameters	1	1	1	0x7007
F00.08	Logic "AND" module B Input 4	1:Invalid other:Binary interconnection parameters	1	1	1	0x7008
F00.09	Logic "AND" module B sample processing time	1～20	2	1	20	0x7009
F00.10	Logic "AND" module C Input 1	1:Invalid other:Binary interconnection parameters	1	1	1	0x700A
F00.11	Logic "AND" module C Input 2	1:Invalid other:Binary interconnection parameters	1	1	1	0x700B
F00.12	Logic "AND" module C Input 3	1:Invalid other:Binary interconnection parameters	1	1	1	0x700C
F00.13	Logic "AND" module C Input 4	1:Invalid other:Binary interconnection parameters	1	1	1	0x700D
F00.14	Logic "AND" module C sample processing time	1～20	2	1	20	0x700E
F00.15	Logic "AND" module D Input 1	1:Invalid other:Binary interconnection parameters	1	1	1	0x700F
F00.16	Logic "AND" module D Input 2	1:Invalid other:Binary interconnection parameters	1	1	1	0x7010
F00.17	Logic "AND" module D Input 3	1:Invalid other:Binary interconnection parameters	1	1	1	0x7011
F00.18	Logic "AND" module D Input 4	1:Invalid other:Binary interconnection parameters	1	1	1	0x7012
F00.19	Logic "AND" module D sample processing time	1～20	2	1	20	0x7013
F00.20	Logic "NOT" module A Input	0:Invalid other:Binary interconnection parameters	0	0	0	0x7014
F00.21	Logic "NOT" module A sample processing time	1～20	2	1	20	0x7015
F00.22	Logic "NOT" module B Input	0:Invalid other:Binary interconnection parameters	0	0	0	0x7016
F00.23	Logic "NOT" module B sample processing time	1～20	2	1	20	0x7017
F00.24	Logic "NOT" module C Input	0:Invalid other:Binary interconnection parameters	0	0	0	0x7018
F00.25	Logic "NOT" module B sample processing time	1～20	2	1	20	0x7019
F00.26	Logic "NOT" module D Input	0:Invalid other:Binary interconnection parameters	0	0	0	0x701A
F00.27	Logic "NOT" module D sample processing time	1～20	2	1	20	0x701B
F00.28	Logic "NOT" module E Input	0:Invalid other:Binary interconnection parameters	0	0	0	0x701C
F00.29	Logic "NOT" module E sample processing time	1～20	2	1	20	0x701D
F00.30	Logic "NOT" module F Input	0:Invalid other:Binary interconnection parameters	0	0	0	0x701E
F00.31	Logic "NOT" module F sample processing time	1～20	2	1	20	0x701F
F00.32	Logic "NOT" module G Input	0:Invalid other:Binary interconnection parameters	0	0	0	0x7020
F00.33	Logic "NOT" module G sample processing time	1～20	2	1	20	0x7021
F00.34	Logic "NOT" module H Input	0:Invalid other:Binary interconnection parameters	0	0	0	0x7022
F00.35	Logic "NOT" module H sample processing time	1～20	2	1	20	0x7023
F00.36	Logic "OR" module A Input 1	0:Invalid other:Binary interconnection parameters	0	0	0	0x7024
F00.37	Logic "OR" module A Input 2	0:Invalid other:Binary interconnection parameters	0	0	0	0x7025
F00.38	Logic "OR" module A Input 3	0:Invalid other:Binary interconnection parameters	0	0	0	0x7026
F00.39	Logic "OR" module A Input 4	0:Invalid other:Binary interconnection parameters	0	0	0	0x7027
F00.40	Logic "OR" module A sample processing time	1～20	2	1	20	0x7028
F00.41	Logic "OR" module B Input 1	0:Invalid other:Binary interconnection parameters	0	0	0	0x7029
F00.42	Logic "OR" module B Input 2	0:Invalid other:Binary interconnection parameters	0	0	0	0x702A
F00.43	Logic "OR" module B Input 3	0:Invalid other:Binary interconnection parameters	0	0	0	0x702B
F00.44	Logic "OR" module B Input 4	0:Invalid other:Binary interconnection parameters	0	0	0	0x702C
F00.45	Logic "OR" module B sample processing time	1～20	2	1	20	0x702D

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
F00 group：Logic operation module						
F00.46	Logic "OR" module C Input 1	0:Invalid other:Binary interconnection parameters	0	0	0	0x702E
F00.47	Logic "OR" module C Input 2	0:Invalid other:Binary interconnection parameters	0	0	0	0x702F
F00.48	Logic "OR" module C Input 3	0:Invalid other:Binary interconnection parameters	0	0	0	0x7030
F00.49	Logic "OR" module C Input 4	0:Invalid other:Binary interconnection parameters	0	0	0	0x7031
F00.50	Logic "OR" module C sample processing time	1~20	2	1	20	0x7032
F00.51	Logic "OR" module D Input 1	0:Invalid other:Binary interconnection parameters	0	0	0	0x7033
F00.52	Logic "OR" module D Input 2	0:Invalid other:Binary interconnection parameters	0	0	0	0x7034
F00.53	Logic "OR" module D Input 3	0:Invalid other:Binary interconnection parameters	0	0	0	0x7035
F00.54	Logic "OR" module D Input 4	0:Invalid other:Binary interconnection parameters	0	0	0	0x7036
F00.55	Logic "OR" module D sample processing time	1~20	2	1	20	0x7037
F00.56	Logic "XOR" module A Input 1	0:Invalid other:Binary interconnection parameters	0	0	0	0x7038
F00.57	Logic "XOR" module A Input 2	0:Invalid other:Binary interconnection parameters	0	0	0	0x7039
F00.58	Logic "XOR" module A Input 3	0:Invalid other:Binary interconnection parameters	0	0	0	0x703A
F00.59	Logic "XOR" module A Input 4	0:Invalid other:Binary interconnection parameters	0	0	0	0x703B
F00.60	Logic "OR" module A sample processing time	1~20	2	1	20	0x703C
F00.61	Logic "XOR" module B Input 1	0:Invalid other:Binary interconnection parameters	0	0	0	0x703D
F00.62	Logic "XOR" module B Input 2	0:Invalid other:Binary interconnection parameters	0	0	0	0x703E
F00.63	Logic "XOR" module B Input 3	0:Invalid other:Binary interconnection parameters	0	0	0	0x703F
F00.64	Logic "XOR" module B Input 4	0:Invalid other:Binary interconnection parameters	0	0	0	0x7040
F00.65	Logic "OR" module B sample processing time	1~20	2	1	20	0x7041
F00.66	Logic "XOR" module C Input 1	0:Invalid other:Binary interconnection parameters	0	0	0	0x7042
F00.67	Logic "XOR" module C Input 2	0:Invalid other:Binary interconnection parameters	0	0	0	0x7043
F00.68	Logic "XOR" module C Input 3	0:Invalid other:Binary interconnection parameters	0	0	0	0x7044
F00.69	Logic "XOR" module C Input 4	0:Invalid other:Binary interconnection parameters	0	0	0	0x7045
F00.70	Logic "OR" module C sample processing time	1~20	2	1	20	0x7046
F00.71	Logic "XOR" module D Input 1	0:Invalid other:Binary interconnection parameters	0	0	0	0x7047
F00.72	Logic "XOR" module D Input 2	0:Invalid other:Binary interconnection parameters	0	0	0	0x7048
F00.73	Logic "XOR" module D Input 3	0:Invalid other:Binary interconnection parameters	0	0	0	0x7049
F00.74	Logic "XOR" module D Input 4	0:Invalid other:Binary interconnection parameters	0	0	0	0x704A
F00.75	Logic "OR" module D sample processing time	1~20	2	1	20	0x704B
F00.76	Logic Delay Module A Input	0:Invalid other:Binary interconnection parameters	0	0	0	0x704C
F00.77	Logic Delay Module A function select	0:ON delay 1:OFF delay 2:Double - side delay	0	0	2	0x704D
F00.78	Logic Delay Module A delay time(N*2ms)	0~10000ms	0	0	10000	0x704E
F00.79	Logic Delay Module B Input	0:Invalid other:Binary interconnection parameters	0	0	0	0x704F
F00.80	Logic Delay Module B function select	0:ON delay 1:OFF delay 2:Double - side delay	0	0	2	0x7050
F00.81	Logic Delay Module B delay time(N*2ms)	0~10000ms	0	0	10000	0x7051
F00.82	Logic Delay Module C Input	0:Invalid other:Binary interconnection parameters	0	0	0	0x7052
F00.83	Logic Delay Module C function select	0:ON delay 1:OFF delay 2:Double - side delay	0	0	2	0x7053
F00.84	Logic Delay Module C delay time(N*2ms)	0~10000ms	0	0	10000	0x7054
F00.85	Logic Delay Module D Input	0:Invalid other:Binary interconnection parameters	0	0	0	0x7055
F00.86	Logic Delay Module D function select	0:ON delay 1:OFF delay 2:Double - side delay	0	0	2	0x7056
F00.87	Logic Delay Module D delay time(N*2ms)	0~10000ms	0	0	10000	0x7057

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
F01 group：Arthmetic Operation Module						
F01.00	Addition module A Input 1	0:0 other:Analog interconnection parameters	0	0	0	0x7100
F01.01	Addition module A Input 2	0:0 other:Analog interconnection parameters	0	0	0	0x7101
F01.02	Addition module A Input 3	0:0 other:Analog interconnection parameters	0	0	0	0x7102
F01.03	Addition module A Input 4	0:0 other:Analog interconnection parameters	0	0	0	0x7103
F01.04	Addition module A sample processing time	1~20	2	1	20	0x7104
F01.05	Addition module B Input 1	0:0 other:Analog interconnection parameters	0	0	0	0x7105
F01.06	Addition module B Input 2	0:00 other:Analog interconnection parameters	0	0	0	0x7106
F01.07	Addition module B Input 3	0:00 other:Analog interconnection parameters	0	0	0	0x7107
F01.08	Addition module B Input 4	0:0 other:Analog interconnection parameters	0	0	0	0x7108
F01.09	Addition module B sample processing time	1~20	2	1	20	0x7109
F01.10	Addition module C Input 1	0:0 other:Analog interconnection parameters	0	0	0	0x710A
F01.11	Addition module C Input 2	0:0 other:Analog interconnection parameters	0	0	0	0x710B
F01.12	Addition module C Input 3	0:00 other:Analog interconnection parameters	0	0	0	0x710C
F01.13	Addition module C Input 4	0:0 other:Analog interconnection parameters	0	0	0	0x710D
F01.14	Addition module C sample processing time	1~20	2	1	20	0x710E
F01.15	Subtraction module A input 1	0:0 other:Analog interconnection parameters	0	0	0	0x710F
F01.16	Subtraction module A input 2	0:0 other:Analog interconnection parameters	0	0	0	0x7110
F01.17	Subtraction module A sample processing time	1~20	2	1	20	0x7111
F01.18	Subtraction module B input 1	0:0 other:Analog interconnection parameters	0	0	0	0x7112
F01.19	Subtraction module B input 2	0:0 other:Analog interconnection parameters	0	0	0	0x7113
F01.20	Subtraction module B sample processing time	1~20	2	1	20	0x7114
F01.21	Multiplication module A Input 1	1:1 other:Analog interconnection parameters	1	1	1	0x7115
F01.22	Multiplication module A Input 2	1:1 other:Analog interconnection parameters	1	1	1	0x7116
F01.23	Multiplication module A Input 3	1:1 other:Analog interconnection parameters	1	1	1	0x7117
F01.24	Multiplication module A Input 4	1:1 other:Analog interconnection parameters	1	1	1	0x7118
F01.25	Multiplication module A sample processing time	1~20	2	1	20	0x7119
F01.26	Multiplication module B Input 1	1:1 other:Analog interconnection parameters	1	1	1	0x711A
F01.27	Multiplication module B Input 2	1:1 other:Analog interconnection parameters	1	1	1	0x711B
F01.28	Multiplication module B Input 3	1:1 other:Analog interconnection parameters	1	1	1	0x711C

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
F01 group：Arthmetic Operation Module						
F01.29	Multiplication module B Input 4	1:1 other:Analog interconnection parameters	1	1	1	0x711D
F01.30	Multiplication module B sample processing time	1~20	2	1	20	0x711E
F01.31	Division module A dividor input	1:1 other:Analog interconnection parameters	1	1	1	0x711F
F01.32	Division module A dividend input	1:1 other:Analog interconnection parameters	1	1	1	0x7120
F01.33	Division module A sample processing time	1~20	2	1	20	0x7121
F01.34	Division module B dividor input	1:1 other:Analog interconnection parameters	1	1	1	0x7122
F01.35	Division module B dividend input	1:1 other:Analog interconnection parameters	1	1	1	0x7123
F01.36	Division module B sample processing time	1~20	2	1	20	0x7124
F01.37	Absolute value module A Input	0:0 other:Analog interconnection parameters	0	0	0	0x7125
F01.38	Absolute value module A sample processing time	1~20	2	1	20	0x7126
F01.39	Absolute value module B Input	0:0 other:Analog interconnection parameters	0	0	0	0x7127
F01.40	Absolute value module B sample processing time	1~20	2	1	20	0x7128
F01.41	Comparison module A Input 1	0:0 other:Analog interconnection parameters	0	0	0	0x7129
F01.42	Comparison module A Input 2	0:0 other:Analog interconnection parameters	0	0	0	0x712A
F01.43	Comparison module A sample processing time	1~20	2	1	20	0x712B
F01.44	Comparison module B Input 1	0:0 other:Analog interconnection parameters	0	0	0	0x712C
F01.45	Comparison module B Input 2	0:0 other:Analog interconnection parameters	0	0	0	0x712D
F01.46	Comparison module B sample processing time	1~20	2	1	20	0x712E
F01.47	Limit module A Input	0:0 other:Analog interconnection parameters	0	0	0	0x712F
F01.48	Limit module A upper limit selection	0:0 other:Analog interconnection parameters	0	0	0	0x7130
F01.49	Limit module A lower limit selection	0:0 other:Analog interconnection parameters	0	0	0	0x7131
F01.50	Limit module A sample processing time	1~20	2	1	20	0x7132
F01.51	Limit module B Input	0:0 other:Analog interconnection parameters	0	0	0	0x7133
F01.52	Limit module B upper limit selection	0:0 other:Analog interconnection parameters	0	0	0	0x7134
F01.53	Limit module B lower limit setect	0:0 other:Analog interconnection parameters	0	0	0	0x7135
F01.54	Limit module B sample processing time	1~20	2	1	20	0x7136
F01.55	First-order low-pass filter module A Input	0:0 other:Analog interconnection parameters	0	0	0	0x7137
F01.56	Filter time of First-order low-pass filter module A (N*2ms)	0~20000ms	0	0	20000	0x7138
F01.57	First-order low-pass filter module A sample processing time	1~20	2	1	20	0x7139
F01.58	First-order low-pass filter module B Input	0:0 other:Analog interconnection parameters	0	0	0	0x713A
F01.59	Filter time of First-order low-pass filter module B (N*2ms)	0~20000ms	0	0	20000	0x713B
F01.60	First-order low-pass filter module B sample processing time	1~20	2	1	20	0x713C

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
F02 group：Word bit conversion module						
F02.00	Word to bit function A Input select	0:0 other:Analog interconnection parameters	0	0	0	0x7200
F02.01	Word to bit function A sample processing time	1~20	2	1	20	0x7201
F02.02	Word to bit function B Input select	0:0 other:Analog interconnection parameters	0	0	0	0x7202
F02.03	Word to bit function B sample processing time	1~20	2	1	20	0x7203
F02.04	Word to bit function C Input select	0:0 other:Analog interconnection parameters	0	0	0	0x7204
F02.05	Word to bit function C sample processing time	1~20	2	1	20	0x7205
F02.06	Word to bit function D Input select	0:0 other:Analog interconnection parameters	0	0	0	0x7206
F02.07	Word to bit function D sample processing time	1~20	2	1	20	0x7207
F02.08	Bit to word function A - Bit00 select	0:0 other:Analog interconnection parameters	0	0	0	0x7208
F02.09	Bit to word function A - Bit01 select	0:0 other:Analog interconnection parameters	0	0	0	0x7209
F02.10	Bit to word function A - Bit02 select	0:0 other:Analog interconnection parameters	0	0	0	0x720A
F02.11	Bit to word function A - Bit03 select	0:0 other:Analog interconnection parameters	0	0	0	0x720B
F02.12	Bit to word function A - Bit04 select	0:0 other:Analog interconnection parameters	0	0	0	0x720C
F02.13	Bit to word function A - Bit05 select	0:0 other:Analog interconnection parameters	0	0	0	0x720D
F02.14	Bit to word function A - Bit06 select	0:0 other:Analog interconnection parameters	0	0	0	0x720E
F02.15	Bit to word function A - Bit07 select	0:0 other:Analog interconnection parameters	0	0	0	0x720F
F02.16	Bit to word function A - Bit08 select	0:0 other:Analog interconnection parameters	0	0	0	0x7210
F02.17	Bit to word function A - Bit09 select	0:0 other:Analog interconnection parameters	0	0	0	0x7211
F02.18	Bit to word function A - Bit10 select	0:0 other:Analog interconnection parameters	0	0	0	0x7212
F02.19	Bit to word function A - Bit11 select	0:0 other:Analog interconnection parameters	0	0	0	0x7213
F02.20	Bit to word function A - Bit12 select	0:0 other:Analog interconnection parameters	0	0	0	0x7214
F02.21	Bit to word function A - Bit13 select	0:0 other:Analog interconnection parameters	0	0	0	0x7215
F02.22	Bit to word function A - Bit14 select	0:0 other:Analog interconnection parameters	0	0	0	0x7216
F02.23	Bit to word function A - Bit15 select	0:0 other:Analog interconnection parameters	0	0	0	0x7217
F02.24	Bit to word function A sample processing time	1~20	2	1	20	0x7218
F02.25	Bit to word function B - Bit00 select	0:0 other:Analog interconnection parameters	0	0	0	0x7219
F02.26	Bit to word function B - Bit01 select	0:0 other:Analog interconnection parameters	0	0	0	0x721A
F02.27	Bit to word function B - Bit02 select	0:0 other:Analog interconnection parameters	0	0	0	0x721B
F02.28	Bit to word function B - Bit03 select	0:0 other:Analog interconnection parameters	0	0	0	0x721C
F02.29	Bit to word function B - Bit04 select	0:0 other:Analog interconnection parameters	0	0	0	0x721D
F02.30	Bit to word function B - Bit05 select	0:0 other:Analog interconnection parameters	0	0	0	0x721E
F02.31	Bit to word function B - Bit06 select	0:0 other:Analog interconnection parameters	0	0	0	0x721F
F02.32	Bit to word function B - Bit07 select	0:0 other:Analog interconnection parameters	0	0	0	0x7220
F02.33	Bit to word function B - Bit08 select	0:0 other:Analog interconnection parameters	0	0	0	0x7221
F02.34	Bit to word function B - Bit09 select	0:0 other:Analog interconnection parameters	0	0	0	0x7222
F02.35	Bit to word function B - Bit10 select	0:0 other:Analog interconnection parameters	0	0	0	0x7223
F02.36	Bit to word function B - Bit11 select	0:0 other:Analog interconnection parameters	0	0	0	0x7224
F02.37	Bit to word function B - Bit12 select	0:0 other:Analog interconnection parameters	0	0	0	0x7225

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
F02 group：Word bit conversion module						
F02.38	Bit to word function B - Bit13 select	0:0 other:Analog interconnection parameters	0	0	0	0x7226
F02.39	Bit to word function B - Bit14 select	0:0 other:Binary interconnection parameters	0	0	0	0x7227
F02.40	Bit to word function B - Bit15 select	0:0 other:Binary interconnection parameters	0	0	0	0x7228
F02.41	Bit to word function B sample processing time	1~20	2	1	20	0x7229
F02.42	Bit to word function C - Bit00 select	0:0 other:Binary interconnection parameters	0	0	0	0x722A
F02.43	Bit to word function C - Bit01 select	0:0 other:Binary interconnection parameters	0	0	0	0x722B
F02.44	Bit to word function C - Bit02 select	0:0 other:Binary interconnection parameters	0	0	0	0x722C
F02.45	Bit to word function C - Bit03 select	0:0 other:Binary interconnection parameters	0	0	0	0x722D
F02.46	Bit to word function C - Bit04 select	0:0 other:Binary interconnection parameters	0	0	0	0x722E
F02.47	Bit to word function C - Bit05 select	0:0 other:Binary interconnection parameters	0	0	0	0x722F
F02.48	Bit to word function C - Bit06 select	0:0 other:Binary interconnection parameters	0	0	0	0x7230
F02.49	Bit to word function C - Bit07 select	0:0 other:Binary interconnection parameters	0	0	0	0x7231
F02.50	Bit to word function C - Bit08 select	0:0 other:Binary interconnection parameters	0	0	0	0x7232
F02.51	Bit to word function C - Bit09 select	0:0 other:Binary interconnection parameters	0	0	0	0x7233
F02.52	Bit to word function C - Bit10 select	0:0 other:Binary interconnection parameters	0	0	0	0x7234
F02.53	Bit to word function C - Bit11 select	0:0 other:Binary interconnection parameters	0	0	0	0x7235
F02.54	Bit to word function C - Bit12 select	0:0 other:Binary interconnection parameters	0	0	0	0x7236
F02.55	Bit to word function C - Bit13 select	0:0 other:Binary interconnection parameters	0	0	0	0x7237
F02.56	Bit to word function C - Bit14 select	0:0 other:Binary interconnection parameters	0	0	0	0x7238
F02.57	Bit to word function C - Bit15 select	0:0 other:Binary interconnection parameters	0	0	0	0x7239
F02.58	Bit to word function C sample processing time	1~20	2	1	20	0x723A
F02.59	Bit to word function D - Bit00 select	0:0 other:Binary interconnection parameters	0	0	0	0x723B
F02.60	Bit to word function D - Bit01 select	0:0 other:Binary interconnection parameters	0	0	0	0x723C
F02.61	Bit to word function D - Bit02 select	0:0 other:Binary interconnection parameters	0	0	0	0x723D
F02.62	Bit to word function D - Bit03 select	0:0 other:Binary interconnection parameters	0	0	0	0x723E
F02.63	Bit to word function D - Bit04 select	0:0 other:Binary interconnection parameters	0	0	0	0x723F
F02.64	Bit to word function D - Bit05 select	0:0 other:Binary interconnection parameters	0	0	0	0x7240
F02.65	Bit to word function D - Bit06 select	0:0 other:Binary interconnection parameters	0	0	0	0x7241
F02.66	Bit to word function D - Bit07 select	0:0 other:Binary interconnection parameters	0	0	0	0x7242
F02.67	Bit to word function D - Bit08 select	0:0 other:Binary interconnection parameters	0	0	0	0x7243
F02.68	Bit to word function D - Bit09 select	0:0 other:Binary interconnection parameters	0	0	0	0x7244
F02.69	Bit to word function D - Bit10 select	0:0 other:Binary interconnection parameters	0	0	0	0x7245
F02.70	Bit to word function D - Bit11 select	0:0 other:Binary interconnection parameters	0	0	0	0x7246
F02.71	Bit to word function D - Bit12 select	0:0 other:Binary interconnection parameters	0	0	0	0x7247
F02.72	Bit to word function D - Bit13 select	0:0 other:Binary interconnection parameters	0	0	0	0x7248
F02.73	Bit to word function D - Bit14 select	0:0 other:Binary interconnection parameters	0	0	0	0x7249
F02.74	Bit to word function D - Bit15 select	0:0 other:Binary interconnection parameters	0	0	0	0x724A
F02.75	Bit to word function D sample processing time	1~20	2	1	20	0x724B

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
F03 group：Process PID module						
F03.00	Effective signal of PID function	0:Invalid 1:Valid 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:DI5 8:DI6 9:DI7 10:Reserve other:Binary interconnection parameters	0	0	10	0x7300
F03.01	Enable signal of PID function	0:Invalid 1:Valid 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:DI5 8:DI6 9:DI7 10:Reserve other:Binary interconnection parameters	0	0	10	0x7301
F03.02	Direction of PID	0:Positive 1:Negative	0	0	1	0x7302
F03.03	PID sampling calculate	1~20	2	1	20	0x7303
F03.04	PID given source	0:F03.05 1:Multi-segment setting value 1 2:AI0 3:AI1 4:HPI0 5:HPI1 6:Multi-segment value given 7:Motorized potentiometer 8:Reserve 9:Bus adapter A-PZD2 10:Bus adapter B-PZD2 other:Analog interconnection parameters	0	0	10	0x7304
F03.05	PID value given	-600.0~600.0%	0	-600	600	0x7305
F03.06	PID given freeze enable	0:Invalid 1:Valid 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:DI5 8:DI6 9:DI7 10:Reserve other:Binary interconnection parameters				0x7306
F03.07	PID given filter time	0~60000ms	0	0	60000	0x7307
F03.08	PID feedback source	0:0 1:Multi-segment setting value 1 2:AI0 3:AI1 4:HPI0 5:HPI1 6:Multi-segment value given 7:Electric potentiometer 8:Reserve 9:Bus adapter A process data2 10:Bus adapter B process data 2 other:Analog interconnection parameters	0	0	10	0x7308
F03.09	PID feedback filter time	0~60000ms	0	0	60000	0x7309
F03.10	PID deviation additional given	0:0 1:Multi-segment setting value 1 2:AI0 3:AI1 4:HPI0 5:HPI1 6:Multi-segment value given 7:Electric potentiometer 8:Reserve 9:Bus adapter A process data2 10:Bus adapter B process data 2 other:Analog interconnection parameters	0	0	10	0x730A

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
F03 group：Process PID module						
F03.11	Proportional gain KP	0.00~125.00	1	0	125	0x730B
F03.12	Proportional gain coefficient	0:100.0% 1:Multi-segment setting value 1 2:AI0 3:AI1 4:HPI0 5:HPI1 6:Multi-segment value given 7:Electric potentiometer 8:Reserve 9:Bus adapter A process data2 10:Bus adapter B process data 2 other:Analog interconnection parameters	0	0	10	0x730C
F03.13	Integral time Ti	0~60000ms	2000	0	60000	0x730D
F03.14	Integral time coefficient	0:100.0% 1:Multi-segment setting value 1 2:AI0 3:AI1 4:HPI0 5:HPI1 6:Multi-segment value given 7:Electric potentiometer 8:Reserve 9:Bus adapter A process data2 10:Bus adapter B process data 2 other:Analog interconnection parameters	0	0	10	0x730E
F03.15	Derivative time Td1	0~60000ms	0	0	60000	0x730F
F03.16	Derivative time coefficient	0:100.0% 1:Multi-segment setting value 1 2:AI0 3:AI1 4:HPI0 5:HPI1 6:Multi-segment value given 7:Electric potentiometer 8:Reserve 9:Bus adapter A process data2 10:Bus adapter B process data 2 other:Analog interconnection parameters	0	0	10	0x7310
F03.17	Initial value of PID output integral	0:100.0% 1:Multi-segment setting value 1 2:AI0 3:AI1 4:HPI0 5:HPI1 6:Multi-segment value given 7:Motorized potentiometer 8:Reserve 9:Bus adapter A process data2 10:Bus adapter B process data 2 other:Analog interconnection parameters	0	0	10	0x7311
F03.18	Additional given of PID output	0:100.0% 1:Multi-segment setting value 1 2:AI0 3:AI1 4:HPI0 5:HPI1 6:Multi-segment value given 7:Electric potentiometer 8:Reserve 9:Bus adapter A process data2 10:Bus adapter B process data 2 other:Analog interconnection parameters	0	0	10	0x7312
F03.19	PID integral component forced enable	0:Invalid 1:Valid 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:DI5 8:DI6 9:DI7 10:Reserve other:Binary interconnection parameter	0	0	10	0x7313

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
F03 group：Process PID module						
F03.20	PID integral component forced value	0:0 1:Multi-segment setting value 1 2:AI0 3:AI1 4:HPI0 5:HPI1 6:Multi-segment value given 7:Motorized potentiometer 8:Reserve 9:Bus adapter A process data2 10:Bus adapter B process data 2 other:Analog interconnection parameters	0	0	10	0x7314
F03.21	PID output limit	0.0~600.0	100	0	600	0x7315
F03.22	PID output upper limit source	0:100% 1:Multi-segment setting value 1 2:AI0 3:AI1 4:HPI0 5:HPI1 6:Multi-segment value given 7:Electric potentiometer 8:Reserve 9:Bus adapter A process data2 10:Bus adapter B process data 2 other:Analog interconnection parameters	0	0	10	0x7316
F03.23	PID output lower limit source	0:0 1:Multi-segment setting value 1 2:AI0 3:AI1 4:HPI0 5:HPI1 6:Multi-segment value given 7:Motorized potentiometer 8:Reserve 9:Bus adapter A process data2 10:Bus adapter B process data 2 other:Analog interconnection parameters	0	0	10	0x7317
F03.24	PID output limit up/down time	0.00~100.00s	0	0	100	0x7318
F03.25	PID deviation dead zone enable	0:Forbid 1:Enable	0	0	1	0x7319
F03.26	PID deviation dead zone range	0.0~100.0%	0	0	100	0x731A
F03.27	PID feedback loss detection value	0.0~100.0%	0	0	100	0x731B
F03.28	PID feedback loss detection value	0.0~60.0s	0	0	60	0x731C

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
F04 group：Holding brake control						
F04.00	Holding brake function selection	0:No holding brake 1:Holding brake without detection information 2:Holding brake with detection information	0	0	2	0x7400
F04.01	Brake opening working time	0.00~10.00s	0	0	10	0x7401
F04.02	Brake closing working time	0.00~10.00s	0	0	10	0x7402
F04.03	Brake open command source	0:Invalid 1:Valid 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve other:Binector parameters	0	0	10	0x7403
F04.04	Brake open comparison source	0:00 other:connertor parameters	0	0	0	0x7404
F04.05	Brake open comparison threshold	0.0~200.0%	0	0	200	0x7405
F04.06	Brake opening delay time	0.00~10.00s	0	0	10	0x7406
F04.07	Brake closing speed threshold	1.0~200.0%	1	1	200	0x7407
F04.08	Brake closing delay time	0.00~10.00s	0	0	10	0x7408
F04.09	Forced brake closing command source	0:Invalid 1:Valid 2:DI0 3:DI1 4:DI2 5:DI3 6:DI4 7:Reserve 8:Reserve 9:Reserve 10:Reserve other:Binector parameters	0	0	10	0x7409
F04.12	Source of brake closing comparison value	0:00 other:connertor parameters	0	0	0	0x740C
F04.13	Brake opening motor current comparison threshold	0.0~200.0%	50	0	200	0x740D
F04.15	Brake opening speed pause time	0.00~10.00s	0	0	10	0x740F
F04.16	Brake closing speed pause time	0.00~10.00s	0	0	10	0x7410

8.7 P-Interconnection parameter group

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
P00 group: Binary interconnection parameter(hardware status)						
P00.00	Logic 0	0	0	0	0	0xE000
P00.01	Logic 1	1	1	1	1	0xE001
P00.02	Multifunctional digital input DI0	0～1	0	0	1	0xE002
P00.03	Multifunctional digital input DI1	0～1	0	0	1	0xE003
P00.04	Multifunctional digital input DI2	0～1	0	0	1	0xE004
P00.05	Multifunctional digital input DI3	0～1	0	0	1	0xE005
P00.06	Multifunctional digital input DI4	0～1	0	0	1	0xE006
P00.23	Multifunctional digital input DI0 reverse	0～1	0	0	1	0xE017
P00.24	Multifunctional digital input DI1 reverse	0～1	0	0	1	0xE018
P00.25	Multifunctional digital input DI2 reverse	0～1	0	0	1	0xE019
P00.26	Multifunctional digital input DI3 reverse	0～1	0	0	1	0xE01A
P00.27	Multifunctional digital input DI4 reverse	0～1	0	0	1	0xE01B
P00.50	Multifunctional digital output DO	0～1	0	0	1	0xE032
P00.57	Multifunctional digital output DO reverse	0～1	0	0	1	0xE039
P01 group:Binary interconnection parameter(system control words and state)						
P01.00	P01.00:Startup ready	0～1	0	0	1	0xE100
P01.01	P01.01:Running ready	0～1	0	0	1	0xE101
P01.02	P01.02:Run	0～1	0	0	1	0xE102
P01.03	P01.03:Fault activation	0～1	0	0	1	0xE103
P01.04	P01.04:OFF2 invalid	0～1	0	0	1	0xE104
P01.05	P01.05:OFF3 invalid	0～1	0	0	1	0xE105
P01.06	P01.06:Startup block	0～1	0	0	1	0xE106
P01.07	P01.07:Alarm activation	0～1	0	0	1	0xE107
P01.08	P01.08:Set speed reached	0～1	0	0	1	0xE108
P01.09	P01.09:Comparison value reached	0～1	0	0	1	0xE109
P01.10	P01.10:Torque/current limiting reached	0～1	0	0	1	0xE10A
P01.11	P01.11:Holding brake opening	0～1	0	0	1	0xE10B
P01.12	P01.12:Positive speed	0～1	0	0	1	0xE10C
P01.13	P01.13:IGBT operating	0～1	0	0	1	0xE10D
P01.14	P01.14:Jog operation in effect	0～1	0	0	1	0xE10E
P01.15	P01.15:Pre-excitation start	0～1	0	0	1	0xE10F
P01.16	P01.16:Open DC brake	0～1	0	0	1	0xE110
P01.17	P01.17:Speed tracking start	0～1	0	0	1	0xE111
P01.18	P01.18:Effective torque control	0～1	0	0	1	0xE112
P01.19	P01.19:Softening function enable	0～1	0	0	1	0xE113
P01.20	P01.20:Not ready to start	0～1	0	0	1	0xE114
P01.21	P01.21:Not ready to run	0～1	0	0	1	0xE115
P01.22	P01.22:Not running	0～1	0	0	1	0xE116
P01.23	P01.23:No fault	0～1	0	0	1	0xE117
P01.24	P01.24:OFF2 in effect	0～1	0	0	1	0xE118
P01.25	P01.25:OFF3 in effect	0～1	0	0	1	0xE119
P01.26	P01.26:Startup unblocked	0～1	0	0	1	0xE11A
P01.27	P01.27:No warning	0～1	0	0	1	0xE11B
P01.28	P01.28:Set speed not reached	0～1	0	0	1	0xE11C
P01.29	P01.29:Comparison value not reached	0～1	0	0	1	0xE11D
P01.30	P01.30:Torque/current limiting not reached	0～1	0	0	1	0xE11E
P01.31	P01.31:Holding brake closing	0～1	0	0	1	0xE11F
P01.32	P01.32:Negative speed	0～1	0	0	1	0xE120
P01.33	P01.33:IGBT blockade	0～1	0	0	1	0xE121
P01.34	P01.34:Jog operation in effect	0～1	0	0	1	0xE122
P01.35	P01.35:Pre-excitation completed	0～1	0	0	1	0xE123
P01.36	P01.36:DC braking ends	0～1	0	0	1	0xE124
P01.41	P01.41:RFG output forbid	0～1	0	0	1	0xE129
P01.42	P01.42:RFG pause	0～1	0	0	1	0xE12A
P01.43	P01.43:RFG input forbid	0～1	0	0	1	0xE12B
P01.44	P01.44:RFG acceleration	0～1	0	0	1	0xE12C
P01.45	P01.45:RFG deceleration	0～1	0	0	1	0xE12D
P01.46	P01.46:RFG constant speed	0～1	0	0	1	0xE12E
P01.58	P01.58:Holding brake is open	0～1	0	0	1	0xE13A
P01.59	P01.59:Holding brake is closed	0～1	0	0	1	0xE13B
P01.60	P01.60:Holding brake can not be opened	0～1	0	0	1	0xE13C

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
P01.61	P01.61:Holding brake can not be closed	0～1	0	0	1	0xE13D
P01.62	P01.62:Motor pre-overload status	0～1	0	0	1	0xE13E
P01.63	P01.63:Zero speed given operation	0～1	0	0	1	0xE13F
P01.64	P01.64:DC bus charged flag	0～1	0	0	1	0xE140
P01.65	P01.65:Motor speed is zero	0～1	0	0	1	0xE141
P01.66	P01.66:PID function is valid	0～1	0	0	1	0xE142
P01.67	P01.67:PID operation enable	0～1	0	0	1	0xE143
P01.68	P01.68:PID action direction	0～1	0	0	1	0xE144
P01.69	P01.69:PID given freeze enable	0～1	0	0	1	0xE145
P01.70	P01.70:PID integral component forced enable	0～1	0	0	1	0xE146
P01.71	P01.71:PID deviation dead band enable	0～1	0	0	1	0xE147
P01.72	P01.72:PID saturation state	0～1	0	0	1	0xE148
P01.75	P01.75:Motor select bit0	0～1	0	0	1	0xE14B
P01.76	P01.76:Motor select bit1	0～1	0	0	1	0xE14C
P01.77	P01.77:RFG select bit0	0～1	0	0	1	0xE14D
P01.78	P01.78:RFG select bit1	0～1	0	0	1	0xE14E
P01.79	P01.79:Multi-segment value given select 1	0～1	0	0	1	0xE14F
P01.80	P01.80:Multi-segment value given select 2	0～1	0	0	1	0xE150
P01.81	P01.81:Multi-segment value given select 3	0～1	0	0	1	0xE151
P01.82	P01.82:Multi-segment value given select 4	0～1	0	0	1	0xE152
P01.83	P01.83:Process PID feedback disconnection flag	0～1	0	0	1	0xE153
P01.84	P01.84:Brake control feedback flag	0～1	0	0	1	0xE154
P01.85	P01.85:RFG running flag	0～1	0	0	1	0xE155
P02 group: Binary interconnection parameters(FBA and fault flag)						
P02.00	P02.00:Bus adapter A.PZD1.0	0～1	0	0	1	0xE200
P02.01	P02.01:Bus adapter A.PZD1.1	0～1	0	0	1	0xE201
P02.02	P02.02:Bus adapter A.PZD1.2	0～1	0	0	1	0xE202
P02.03	P02.03:Bus adapter A.PZD1.3	0～1	0	0	1	0xE203
P02.04	P02.04:Bus adapter A.PZD1.4	0～1	0	0	1	0xE204
P02.05	P02.05:Bus adapter A.PZD1.5	0～1	0	0	1	0xE205
P02.06	P02.06:Bus adapter A.PZD1.6	0～1	0	0	1	0xE206
P02.07	P02.07:Bus adapter A.PZD1.7	0～1	0	0	1	0xE207
P02.08	P02.08:Bus adapter A.PZD1.8	0～1	0	0	1	0xE208
P02.09	P02.09:Bus adapter A.PZD1.9	0～1	0	0	1	0xE209
P02.10	P02.10:Bus adapter A.PZD1.10	0～1	0	0	1	0xE20A
P02.11	P02.11:Bus adapter A.PZD1.11	0～1	0	0	1	0xE20B
P02.12	P02.12:Bus adapter A.PZD1.12	0～1	0	0	1	0xE20C
P02.13	P02.13:Bus adapter A.PZD1.13	0～1	0	0	1	0xE20D
P02.14	P02.14:Bus adapter A.PZD1.14	0～1	0	0	1	0xE20E
P02.15	P02.15:Bus adapter A.PZD1.15	0～1	0	0	1	0xE20F
P02.16	P02.16:Bus adapter B.PZD1.0	0～1	0	0	1	0xE210
P02.17	P02.17:Bus adapter B.PZD1.1	0～1	0	0	1	0xE211
P02.18	P02.18:Bus adapter B.PZD1.2	0～1	0	0	1	0xE212
P02.19	P02.19:Bus adapter B.PZD1.3	0～1	0	0	1	0xE213
P02.20	P02.20:Bus adapter B.PZD1.4	0～1	0	0	1	0xE214
P02.21	P02.21:Bus adapter B.PZD1.5	0～1	0	0	1	0xE215
P02.22	P02.22:Bus adapter B.PZD1.6	0～1	0	0	1	0xE216
P02.23	P02.23:Bus adapter B.PZD1.7	0～1	0	0	1	0xE217
P02.24	P02.24:Bus adapter B.PZD1.8	0～1	0	0	1	0xE218
P02.25	P02.25:Bus adapter B.PZD1.9	0～1	0	0	1	0xE219
P02.26	P02.26:Bus adapter B.PZD1.10	0～1	0	0	1	0xE21A
P02.27	P02.27:Bus adapter B.PZD1.11	0～1	0	0	1	0xE21B
P02.28	P02.28:Bus adapter B.PZD1.12	0～1	0	0	1	0xE21C
P02.29	P02.29:Bus adapter B.PZD1.13	0～1	0	0	1	0xE21D
P02.30	P02.30:Bus adapter B.PZD1.14	0～1	0	0	1	0xE21E
P02.31	P02.31:Bus adapter B.PZD1.15	0～1	0	0	1	0xE21F
P02.32	P02.32:Modbus communication run/stop command	0～1	0	0	1	0xE220
P02.33	P02.33:Modbus communication JOG run/stop	0～1	0	0	1	0xE221
P02.34	P02.34:Modbus communication free stop	0～1	0	0	1	0xE222
P02.35	P02.35:Modbus communication fault reset	0～1	0	0	1	0xE223

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
P03 group: Binary interconnection parameters(Free function modulel 1)						
P03.00	Logic "AND" module A output	0～1	0	0	1	0xE300
P03.01	Logic "AND" module B output	0～1	0	0	1	0xE301
P03.02	Logic "AND" module C output	0～1	0	0	1	0xE302
P03.03	Logic "AND" module D output	0～1	0	0	1	0xE303
P03.04	Logic "NOT" module A output	0～1	0	0	1	0xE304
P03.05	Logic "NOT" module B output	0～1	0	0	1	0xE305
P03.06	Logic "NOT" module C output	0～1	0	0	1	0xE306
P03.07	Logic "NOT" module D output	0～1	0	0	1	0xE307
P03.08	Logic "NOT" module E output	0～1	0	0	1	0xE308
P03.09	Logic "NOT" module F output	0～1	0	0	1	0xE309
P03.10	Logic "NOT" module G output	0～1	0	0	1	0xE30A
P03.11	Logic "NOT" module H output	0～1	0	0	1	0xE30B
P03.12	Logic "OR" module A output	0～1	0	0	1	0xE30C
P03.13	Logic "OR" module B output	0～1	0	0	1	0xE30D
P03.14	Logic "OR" module C output	0～1	0	0	1	0xE30E
P03.15	Logic "OR" module D output	0～1	0	0	1	0xE30F
P03.16	Logic "XOR" module A output	0～1	0	0	1	0xE310
P03.17	Logic "XOR" module B output	0～1	0	0	1	0xE311
P03.18	Logic "XOR" module C output	0～1	0	0	1	0xE312
P03.19	Logic "XOR" module D output	0～1	0	0	1	0xE313
P03.20	Logic delay module A output	0～1	0	0	1	0xE314
P03.21	Logic delay module B output	0～1	0	0	1	0xE315
P03.22	Logic delay module C output	0～1	0	0	1	0xE316
P03.23	Logic delay module D output	0～1	0	0	1	0xE317
P03.24	Comparison module A is larger then flag	0～1	0	0	1	0xE318
P03.25	Comparison module A equals flag	0～1	0	0	1	0xE319
P03.26	Comparison module A smaller than flag	0～1	0	0	1	0xE31A
P03.27	Comparison module B is larger then flag	0～1	0	0	1	0xE31B
P03.28	Comparison module B equals flag	0～1	0	0	1	0xE31C
P03.29	Comparison module B smaller than flag	0～1	0	0	1	0xE31D
P03.30	Division module A dividend equals 0	0～1	0	0	1	0xE31E
P03.31	Division module B dividend equals 1	0～1	0	0	1	0xE31F
P03.32	Absolute value module A Input symbol	0～1	0	0	1	0xE320
P03.33	Absolute value module B Input symbol	0～1	0	0	1	0xE321
P04 group: Binary interconnection parameters(Free function modulel 2)						
P04.00	Word to bit function 1 output bit0	0～1	0	0	1	0xE400
P04.01	Word to bit function 1 output bit1	0～1	0	0	1	0xE401
P04.02	Word to bit function 1 output bit2	0～1	0	0	1	0xE402
P04.03	Word to bit function 1 output bit3	0～1	0	0	1	0xE403
P04.04	Word to bit function 1 output bit4	0～1	0	0	1	0xE404
P04.05	Word to bit function 1 output bit5	0～1	0	0	1	0xE405
P04.06	Word to bit function 1 output bit6	0～1	0	0	1	0xE406
P04.07	Word to bit function 1 output bit7	0～1	0	0	1	0xE407
P04.08	Word to bit function 1 output bit8	0～1	0	0	1	0xE408
P04.09	Word to bit function 1 output bit9	0～1	0	0	1	0xE409
P04.10	Word to bit function 1 output bit10	0～1	0	0	1	0xE40A
P04.11	Word to bit function 1 output bit11	0～1	0	0	1	0xE40B
P04.12	Word to bit function 1 output bit12	0～1	0	0	1	0xE40C
P04.13	Word to bit function 1 output bit13	0～1	0	0	1	0xE40D
P04.14	Word to bit function 1 output bit14	0～1	0	0	1	0xE40E
P04.15	Word to bit function 1 output bit15	0～1	0	0	1	0xE40F
P04.16	Word to bit function 2 output bit0	0～1	0	0	1	0xE410
P04.17	Word to bit function 2 output bit1	0～1	0	0	1	0xE411
P04.18	Word to bit function 2 output bit2	0～1	0	0	1	0xE412
P04.19	Word to bit function 2 output bit3	0～1	0	0	1	0xE413
P04.20	Word to bit function 2 output bit4	0～1	0	0	1	0xE414
P04.21	Word to bit function 2 output bit5	0～1	0	0	1	0xE415
P04.22	Word to bit function 2 output bit6	0～1	0	0	1	0xE416
P04.23	Word to bit function 2 output bit7	0～1	0	0	1	0xE417

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
P04.24	Word to bit function 2 output bit8	0～1	0	0	1	0xE418
P04.25	Word to bit function 2 output bit9	0～1	0	0	1	0xE419
P04.26	Word to bit function 2 output bit10	0～1	0	0	1	0xE41A
P04.27	Word to bit function 2 output bit11	0～1	0	0	1	0xE41B
P04.28	Word to bit function 2 output bit12	0～1	0	0	1	0xE41C
P04.29	Word to bit function 2 output bit13	0～1	0	0	1	0xE41D
P04.30	Word to bit function 2 output bit14	0～1	0	0	1	0xE41E
P04.31	Word to bit function 2 output bit15	0～1	0	0	1	0xE41F
P04.32	Word to bit function 3 output bit0	0～1	0	0	1	0xE420
P04.33	Word to bit function 3 output bit1	0～1	0	0	1	0xE421
P04.34	Word to bit function 3 output bit2	0～1	0	0	1	0xE422
P04.35	Word to bit function 3 output bit3	0～1	0	0	1	0xE423
P04.36	Word to bit function 3 output bit4	0～1	0	0	1	0xE424
P04.37	Word to bit function 3 output bit5	0～1	0	0	1	0xE425
P04.38	Word to bit function 3 output bit6	0～1	0	0	1	0xE426
P04.39	Word to bit function 3 output bit7	0～1	0	0	1	0xE427
P04.40	Word to bit function 3 output bit8	0～1	0	0	1	0xE428
P04.41	Word to bit function 3 output bit9	0～1	0	0	1	0xE429
P04.42	Word to bit function 3 output bit10	0～1	0	0	1	0xE42A
P04.43	Word to bit function 3 output bit11	0～1	0	0	1	0xE42B
P04.44	Word to bit function 3 output bit12	0～1	0	0	1	0xE42C
P04.45	Word to bit function 3 output bit13	0～1	0	0	1	0xE42D
P04.46	Word to bit function 3 output bit14	0～1	0	0	1	0xE42E
P04.47	Word to bit function 3 output bit15	0～1	0	0	1	0xE42F
P04.48	Word to bit function 4 output bit0	0～1	0	0	1	0xE430
P04.49	Word to bit function 4 output bit1	0～1	0	0	1	0xE431
P04.50	Word to bit function 4 output bit2	0～1	0	0	1	0xE432
P04.51	Word to bit function 4 output bit3	0～1	0	0	1	0xE433
P04.52	Word to bit function 4 output bit4	0～1	0	0	1	0xE434
P04.53	Word to bit function 4 output bit5	0～1	0	0	1	0xE435
P04.54	Word to bit function 4 output bit6	0～1	0	0	1	0xE436
P04.55	Word to bit function 4 output bit7	0～1	0	0	1	0xE437
P04.56	Word to bit function 4 output bit8	0～1	0	0	1	0xE438
P04.57	Word to bit function 4 output bit9	0～1	0	0	1	0xE439
P04.58	Word to bit function 4 output bit10	0～1	0	0	1	0xE43A
P04.59	Word to bit function 4 output bit11	0～1	0	0	1	0xE43B
P04.60	Word to bit function 4 output bit12	0～1	0	0	1	0xE43C
P04.61	Word to bit function 4 output bit13	0～1	0	0	1	0xE43D
P04.62	Word to bit function 4 output bit14	0～1	0	0	1	0xE43E
P04.63	Word to bit function 4 output bit15	0～1	0	0	1	0xE43F
P06 group:Analog interconnection parameters(running state and peripheral)						
P06.00	Current state machine	0～65535	0	0	65535	0xE600
P06.01	Target frequency	0～65535	0	0	65535	0xE601
P06.02	Given frequency	0～65535	0	0	65535	0xE602
P06.03	Output frequency	0～65535	0	0	65535	0xE603
P06.04	Target speed	0～65535	0	0	65535	0xE604
P06.05	Given speed	0～65535	0	0	65535	0xE605
P06.06	Motor speed	0～65535	0	0	65535	0xE606
P06.07	Output voltage	0～65535	0	0	65535	0xE607
P06.08	Output current	0～65535	0	0	65535	0xE608
P06.09	Output power	0～65535	0	0	65535	0xE609
P06.10	Given torque	0～65535	0	0	65535	0xE60A
P06.11	Output torque	0～65535	0	0	65535	0xE60B
P06.12	Torque current	0～65535	0	0	65535	0xE60C
P06.13	Excitation current	0～65535	0	0	65535	0xE60D
P06.14	DC - link voltage	0～65535	0	0	65535	0xE60E
P06.15	Radiator temperature	0～65535	0	0	65535	0xE60F
P06.16	Encoder feedback frequency	0～65535	0	0	65535	0xE610
P06.30	Conversion result of analog input AI0	0～65535	0	0	65535	0xE61E
P06.31	Conversion result of analog input AI1	0～65535	0	0	65535	0xE61F
P06.34	Output value of control board AO	0～65535	0	0	65535	0xE622

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
P07 group:Analog interconnection parameters(communication)						
P07.00	Bus adapter A.PZD1	0～65535	0	0	65535	0xE700
P07.01	Bus adapter A.PZD2	0～65535	0	0	65535	0xE701
P07.02	Bus adapter A.PZD3	0～65535	0	0	65535	0xE702
P07.03	Bus adapter A.PZD4	0～65535	0	0	65535	0xE703
P07.04	Bus adapter A.PZD5	0～65535	0	0	65535	0xE704
P07.05	Bus adapter A.PZD6	0～65535	0	0	65535	0xE705
P07.06	Bus adapter A.PZD7	0～65535	0	0	65535	0xE706
P07.07	Bus adapter A.PZD8	0～65535	0	0	65535	0xE707
P07.08	Bus adapter A.PZD9	0～65535	0	0	65535	0xE708
P07.09	Bus adapter A.PZD10	0～65535	0	0	65535	0xE709
P07.10	Bus adapter A.PZD11	0～65535	0	0	65535	0xE70A
P07.11	Bus adapter A.PZD12	0～65535	0	0	65535	0xE70B
P07.12	Bus adapter A.PZD13	0～65535	0	0	65535	0xE70C
P07.13	Bus adapter A.PZD14	0～65535	0	0	65535	0xE70D
P07.14	Bus adapter A.PZD15	0～65535	0	0	65535	0xE70E
P07.15	Bus adapter A.PZD16	0～65535	0	0	65535	0xE70F
P07.16	Bus adapter B.PZD1	0～65535	0	0	65535	0xE710
P07.17	Bus adapter B.PZD2	0～65535	0	0	65535	0xE711
P07.18	Bus adapter B.PZD3	0～65535	0	0	65535	0xE712
P07.19	Bus adapter B.PZD4	0～65535	0	0	65535	0xE713
P07.20	Bus adapter B.PZD5	0～65535	0	0	65535	0xE714
P07.21	Bus adapter B.PZD6	0～65535	0	0	65535	0xE715
P07.22	Bus adapter B.PZD7	0～65535	0	0	65535	0xE716
P07.23	Bus adapter B.PZD8	0～65535	0	0	65535	0xE717
P07.24	Bus adapter B.PZD9	0～65535	0	0	65535	0xE718
P07.25	Bus adapter B.PZD10	0～65535	0	0	65535	0xE719
P07.26	Bus adapter B.PZD11	0～65535	0	0	65535	0xE71A
P07.27	Bus adapter B.PZD12	0～65535	0	0	65535	0xE71B
P07.28	Bus adapter B.PZD13	0～65535	0	0	65535	0xE71C
P07.29	Bus adapter B.PZD14	0～65535	0	0	65535	0xE71D
P07.30	Bus adapter B.PZD15	0～65535	0	0	65535	0xE71E
P07.31	Bus adapter B.PZD16	0～65535	0	0	65535	0xE71F
P07.32	Modbus control command	0	0	0	0	0xE720
P07.33	Modbus communication setting value 1	0	0	0	0	0xE721
P07.34	Modbus communication setting value 2	0	0	0	0	0xE722
P07.35	Modbus communication setting value 1 P.U	0	0	0	0	0xE723
P07.36	Modbus communication setting value 2 P.U	0	0	0	0	0xE724
P08 group; Analog interconnection parameters(Free function module)						
P08.00	Addition module A output	0～65535	0	0	65535	0xE800
P08.01	Addition module B output	0～65535	0	0	65535	0xE801
P08.02	Addition module C output	0～65535	0	0	65535	0xE802
P08.04	Subtraction module A output	0～65535	0	0	65535	0xE804
P08.05	Subtraction module B output	0～65535	0	0	65535	0xE805
P08.08	Multiplication module A output	0～65535	0	0	65535	0xE808
P08.09	Multiplication module B output	0～65535	0	0	65535	0xE809
P08.13	Division module A quotient	0～65535	0	0	65535	0xE80D
P08.14	Division module A remainder	0～65535	0	0	65535	0xE80E
P08.16	Division module B quotient	0～65535	0	0	65535	0xE810
P08.17	Division module B remainder	0～65535	0	0	65535	0xE811
P08.24	Absolute value module A output	0～65535	0	0	65535	0xE818
P08.25	Absolute value module B output	0～65535	0	0	65535	0xE819
P08.28	Limit moudle A output	0～65535	0	0	65535	0xE81C
P08.29	Limit moudle B output	0～65535	0	0	65535	0xE81D
P08.32	First order low pass filter module A output	0～65535	0	0	65535	0xE820
P08.33	First order low pass filter module B output	0～65535	0	0	65535	0xE821
P08.36	Bit to word function A output	0～65535	0	0	65535	0xE824
P08.37	Bit to word function B output	0～65535	0	0	65535	0xE825
P08.38	Bit to word function C output	0～65535	0	0	65535	0xE826
P08.39	Bit to word function D output	0～65535	0	0	65535	0xE827

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
P09 group: Analog interconnection parameters(Process application)						
P09.00	Process PID output (After limiting)	0～65535	0	0	65535	0xE900
P09.01	Process PID output （berore limiting)	0～65535	0	0	65535	0xE901
P09.02	Process PID proportional output	0～65535	0	0	65535	0xE902
P09.03	Process PID integral output	0～65535	0	0	65535	0xE903
P09.04	Process PID differential output	0～65535	0	0	65535	0xE904
P09.05	Process PID given value	0～65535	0	0	65535	0xE905
P09.06	Process PID feedback value	0～65535	0	0	65535	0xE906
P09.07	Process PID deviation value	0～65535	0	0	65535	0xE907
P09.08	Process PID deviation value before added	0～65535	0	0	65535	0xE908
P09.20	Simply PLC output	0～65535	0	0	65535	0xE914
P10 group: Analog interconnection parameters(System internal variables of PM)						
P10.00	PM Monitoring variables 0	0～65535	0	0	65535	0xEA00
P10.01	PM Monitoring variables 1	0～65535	0	0	65535	0xEA01
P10.02	PM Monitoring variables 2	0～65535	0	0	65535	0xEA02
P10.03	PM Monitoring variables 3	0～65535	0	0	65535	0xEA03
P10.04	PM Monitoring variables 4	0～65535	0	0	65535	0xEA04
P10.05	PM Monitoring variables 5	0～65535	0	0	65535	0xEA05
P10.06	PM Monitoring variables 6	0～65535	0	0	65535	0xEA06
P10.07	PM Monitoring variables 7	0～65535	0	0	65535	0xEA07
P10.08	PM Monitoring variables 8	0～65535	0	0	65535	0xEA08
P10.09	PM Monitoring variables 9	0～65535	0	0	65535	0xEA09
P10.10	PM Monitoring variables 10	0～65535	0	0	65535	0xEA0A
P10.11	PM Monitoring variables 11	0～65535	0	0	65535	0xEA0B
P10.12	PM Monitoring variables 12	0～65535	0	0	65535	0xEA0C
P10.13	PM Monitoring variables 13	0～65535	0	0	65535	0xEA0D
P10.14	PM Monitoring variables 14	0～65535	0	0	65535	0xEA0E
P10.15	PM Monitoring variables 15	0～65535	0	0	65535	0xEA0F
P10.16	PM Monitoring variables 16	0～65535	0	0	65535	0xEA10
P10.17	PM Monitoring variables 17	0～65535	0	0	65535	0xEA11
P10.18	PM Monitoring variables 18	0～65535	0	0	65535	0xEA12
P10.19	PM Monitoring variables 19	0～65535	0	0	65535	0xEA13
P10.20	PM Monitoring variables 20	0～65535	0	0	65535	0xEA14
P10.21	PM Monitoring variables 21	0～65535	0	0	65535	0xEA15
P10.22	PM Monitoring variables 22	0～65535	0	0	65535	0xEA16
P10.23	PM Monitoring variables 23	0～65535	0	0	65535	0xEA17
P10.24	PM Monitoring variables 24	0～65535	0	0	65535	0xEA18
P10.25	PM Monitoring variables 25	0～65535	0	0	65535	0xEA19
P10.26	PM Monitoring variables 26	0～65535	0	0	65535	0xEA1A
P10.27	PM Monitoring variables 27	0～65535	0	0	65535	0xEA1B
P10.28	PM Monitoring variables 28	0～65535	0	0	65535	0xEA1C
P10.29	PM Monitoring variables 29	0～65535	0	0	65535	0xEA1D
P10.30	PM Monitoring variables 30	0～65535	0	0	65535	0xEA1E
P10.31	PM Monitoring variables 31	0～65535	0	0	65535	0xEA1F
P10.32	PM Monitoring variables 32	0～65535	0	0	65535	0xEA20
P10.33	PM Monitoring variables 33	0～65535	0	0	65535	0xEA21
P10.34	PM Monitoring variables 34	0～65535	0	0	65535	0xEA22
P11 group: Analog interconnection parameters(System internal variables of CM)						
P11.00	Fixed value 0%	0～65535	0	0	65535	0xEB00
P11.01	Fixed value 100%	0～65535	0	0	65535	0xEB01
P11.02	Fixed value 200%	0～65535	0	0	65535	0xEB02
P11.03	Fixed value 400%	0～65535	0	0	65535	0xEB03
P11.04	Fixed value 600%	0～65535	0	0	65535	0xEB04
P11.05	Fixed value - 100%	0～65535	0	0	65535	0xEB05
P11.06	Fixed value - 200%	0～65535	0	0	65535	0xEB06
P11.07	Fixed value - 400%	0～65535	0	0	65535	0xEB07
P11.08	Fixed value - 600%	0～65535	0	0	65535	0xEB08
P11.18	FPGA receive error counter	0～65535	0	0	65535	0xEB12
P11.19	FPGA send non - response counter	0～65535	0	0	65535	0xEB13
P11.20	Current state machine	0～65535	0	0	65535	0xEB14
P11.21	Previous state machine	0～65535	0	0	65535	0xEB15
P11.22	First two state machine	0～65535	0	0	65535	0xEB16
P11.23	First three state machine	0～65535	0	0	65535	0xEB17
P11.24	First four state machine	0～65535	0	0	65535	0xEB18
P11.25	First five state machine	0～65535	0	0	65535	0xEB19
P11.26	First six state machine	0～65535	0	0	65535	0xEB1A
P11.27	First seven state machine	0～65535	0	0	65535	0xEB1B
P11.28	First eight state machine	0～65535	0	0	65535	0xEB1C
P11.29	First nine state machine	0～65535	0	0	65535	0xEB1D
P11.30	Motor tuning status	0～65535	0	0	65535	0xEB1E

function code	name	value scope	default value	Lower limit	Upper limit	Communication address
P12 group: Analog interconnection parameters(system control and state)						
P12.00	Current state machine	0~65535	0	0	65535	0xEC00
P12.01	Current motor	0~65535	0	0	65535	0xEC01
P12.02	Current RFG	0~65535	0	0	65535	0xEC02
P12.03	Current fault	0~65535	0	0	65535	0xEC03
P12.04	Current warning	0~65535	0	0	65535	0xEC04
P12.05	Control word 1	0~65535	0	0	65535	0xEC05
P12.06	Control word 2	0~65535	0	0	65535	0xEC06
P12.07	State word 1	0~65535	0	0	65535	0xEC07
P12.08	State word 2	0~65535	0	0	65535	0xEC08
P12.09	Terminal run/stop control word	0~65535	0	0	65535	0xEC09
P12.10	OP start and stop control word	0~65535	0	0	65535	0xEC0A
P12.11	PC start and stop control word	0~65535	0	0	65535	0xEC0B
P12.12	Customized run/stop control word	0~65535	0	0	65535	0xEC0C
P12.13	Panel given value	0~65535	0	0	65535	0xEC0D
P12.14	PC given value	0~65535	0	0	65535	0xEC0E
P12.16	DI state	0~65535	0	0	65535	0xEC10
P12.17	DO state	0~65535	0	0	65535	0xEC11
P12.20	Voltage of analog input AI0	0~65535	0	0	65535	0xEC14
P12.21	Voltage of analog input AI1	0~65535	0	0	65535	0xEC15
P12.24	Voltage of control board A0	0~65535	0	0	65535	0xEC18
P12.28	Holding brake Ibr	0~65535	0	0	65535	0xEC1C
P12.29	Holding brake Vbr	0~65535	0	0	65535	0xEC1D
P12.31	PM24V voltage	0~65535	0	0	65535	0xEC1F
P12.32	External 24V voltage	0~65535	0	0	65535	0xEC20
P13 group; Analog interconnection parameters(system setting and feedback)						
P13.00	Motor actual speed	0~65535	0	0	65535	0xED00
P13.01	Motor final setting speed	0~65535	0	0	65535	0xED01
P13.02	Main speed given	0~65535	0	0	65535	0xED02
P13.03	Auxiliary speed given	0~65535	0	0	65535	0xED03
P13.04	Speed given before forward/reverse limit	0~65535	0	0	65535	0xED04
P13.05	Speed given before limiting	0~65535	0	0	65535	0xED05
P13.06	Speed given after limiting	0~65535	0	0	65535	0xED06
P13.07	Speed given after minimum speed limit	0~65535	0	0	65535	0xED07
P13.08	RFG input speed given	0~65535	0	0	65535	0xED08
P13.09	RFG output speed given	0~65535	0	0	65535	0xED09
P13.10	Additional speed given	0~65535	0	0	65535	0xED0A
P13.11	CM given speed	0~65535	0	0	65535	0xED0B
P13.15	Positive maximum speed	0~65535	0	0	65535	0xED0F
P13.16	Reverse maximum speed	0~65535	0	0	65535	0xED10
P13.17	Encoder feedback speed	0~65535	0	0	65535	0xED11
P13.22	Electric potentiometer output	0~65535	0	0	65535	0xED16
P13.23	Multi segment given selection output	0~65535	0	0	65535	0xED17
P13.24	Multi segment given value 1	0~65535	0	0	65535	0xED18
P13.25	Multi segment given value 2	0~65535	0	0	65535	0xED19
P13.26	Multi segment given value 3	0~65535	0	0	65535	0xED1A
P13.27	Multi segment given value 4	0~65535	0	0	65535	0xED1B
P13.28	Multi segment given value 5	0~65535	0	0	65535	0xED1C
P13.29	Multi segment given value 6	0~65535	0	0	65535	0xED1D
P13.30	Multi segment given value 7	0~65535	0	0	65535	0xED1E
P13.31	Multi segment given value 8	0~65535	0	0	65535	0xED1F
P13.32	Multi segment given value 9	0~65535	0	0	65535	0xED20
P13.33	Multi segment given value 10	0~65535	0	0	65535	0xED21
P13.34	Multi segment given value 11	0~65535	0	0	65535	0xED22
P13.35	Multi segment given value 12	0~65535	0	0	65535	0xED23
P13.36	Multi segment given value 13	0~65535	0	0	65535	0xED24
P13.37	Multi segment given value 14	0~65535	0	0	65535	0xED25
P13.38	Multi segment given value 15	0~65535	0	0	65535	0xED26
P13.39	Multi segment given value 16	0~65535	0	0	65535	0xED27

9 Overhaul

9.1 Replace the drive group

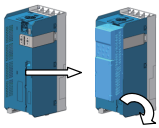
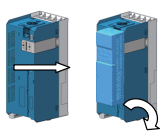
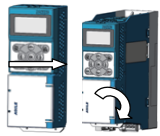
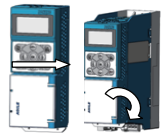
9.1.1 Drive part replacement

Allows components to be placed

After a continuous malfunction,The power module or control module of the drive must be replaced.

The power and control modules of the drive can be replaced separately.

The drive can be replaced in the following situations:

<table>
<tr><td colspan="2">Replace power module</td><td colspan="2">Replace control module</td></tr>
<tr><td>Spare parts:</td><td>Spare parts:</td><td>Spare parts:</td><td>Spare parts:</td></tr>
<tr><td>• Same model</td><td>• Same model</td><td>• Same model</td><td>• Same model</td></tr>
<tr><td rowspan="2">• Same power</td><td>• Same dimensions</td><td>• The firmware version is the same</td><td>• Higher firmware version</td></tr>
<tr><td>• More power</td><td></td><td>(E. g. by firmware version V4.3 replace V4.2)</td></tr>
<tr><td>x kW x kW
</td><td>y kW > x kW
</td><td>Firmwar A Firmwar A
</td><td>Firmwar A > Firmwar B
</td></tr>
<tr><td></td><td>Power module and motor must be matched, In other words; Motor and power module power ratio must be greater than 1/8</td><td colspan="2">The drive must be reset to factory settings after replacing the control module</td></tr>
</table>

警告

Improper drive operation can cause injury.

Replacing a different type of drive may cause abnormal operation

If the drive replacement does not meet the requirements in the table above,The drive must be retried after replacement.

9.1.2 Replace power module when safety functions are enabled

Attention

Damage to the motor by changing the connecting cable of the motor

Swap two phases of motor cables cause the motor to reverse rotation.

Reverse rotation of the motor can cause damage to the machine or equipment.

•Connect the three phases of the motor cable in the correct order.

•Check the motor rotation direction after replacing the power module.

Step

Follow the steps below to replace the power module:

1 .Disconnect the main power of the power module.

If the control module uses an external 24V power supply,The power supply may not be turned off.

2.Unplug the connection cable of the power module.

3.Remove the CM module from the power module.

4.Replace power module

5.Insert the CM module into the new power module.

6.Connect the connection cables to the new power module.

7.Switch on the main power again，and switch on the 24V power supply of the control module if necessary.

■ You have replaced the power module again.

9.1.3 Replace a power module that is not used by the safety function.



Danger

Danger to life due to dangerous voltages on the drive terminals.
Wait at least 5 minutes after disconnecting the power.
Until the capacitor in the drive is discharged to a safe voltage level.
•Before unplugging the connection cable, verify the voltage on the drive interface again.

Step

Follow the steps below to replace the power module:
1 .Disconnect the main power of the power module.
If the control module uses an external 24V power supply,The power supply may not be turned off.
2.Unplug the connection cable of the power module.
3.Remove the CM module from the power module.
4.Replace power module
5.Insert the CM module into the new power module.
6.Connect the connection cables to the new power module.

Attention

Damage to the motor by changing the connecting cable of the motor
Swap two phases of motor cables cause the motor to reverse rotation.
• Connect the three phases of the motor cable in the correct order.
•Check t he motor rotation direction after replacing the power module.

7.Switch on the main power again, and switch on the 24V power supply of the control module if necessary.

■ You have replaced the power module again.

Appendix

Appendix A Modbus-RTU Communication protocol

A1 driver uses standard RS485 communication interface and uses Modbus communication protocol to support serial communication between driver and host computer or PLC. The communication protocol of the A1 driver includes three layers: the physical layer, the data link layer, and the application layer. The physical layer and data link layer use Modbus protocol based on RS485, and the application layer contains various operation methods to control the operation, stop, parameter read and write of the A1 driver.

Modbus protocol is a master-slave protocol.There are two types of communication between the master and the slave: the master requests and the slave responds; the master broadcasts and the slave does not respond. Only one device on the bus is transmitting at any time. The master polls the slave, and the slave cannot send a message without obtaining the command from the master. The master can repeatedly send commands when the communication is incorrect. If no response is received within a given time, the polled slave is considered lost. If the slave cannot execute a certain message, it sends an exception message to the master. The slaves cannot directly communicate with each other. The data of one slave must be read through the software of the master and then sent to another slave. The range of the slave address: 0 to 247. The message of address 0 is a broadcast message.

RTU data frame

Data format and transmission sequence of each byte:1 start bit +7/8 data bits(lower bit is transmitted first)+1 parity bit or no parity bit+1 or 2 stop bits.

起始位	Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	校验位	停止位

10 bit character frame

起始位	Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7	校验位	停止位

11 bit character frame

With the RTU mode, message transmission should begin with a pause interval of at least 3.5 characters. This is the easiest to achieve at various network baud rates (see T1-T2-T3-T4 in the figure below). The first field transmitted is the device address. The transfer characte-rs that can be used are 0…9, A…F in hexadeci-mal. Network devices continuously detect the network bus, including the pause interval. When the first domain (address domain) is received, each device decodes to deter mine whether it is addressed to itself. After the last transmitted character, a pause of at least 3.5 characters time marks the end of the message. A new message can begin after this pause.

The entire message frame must be transmitted as a continuous stream. If there is a pause longer than 1.5 character time before the frame is completed, the receiving device will refresh the incomplete message and assume that the next byte is the address field of a new message. Similarly, if a new message begins in less than 3.5 characters and follows the previous message, the receiving device will consider it acontinuation of the previous message. This will cause an error because the value in the final CRC field cannot be correct.

Free at least 3.5 characters	Slave address	Function code	Data	Check	Free at least 3.5 characters

RTU frame format:

Frame header START	3.5 character time
Slave address ADR	Communication address: 1-247
Command code CMD	03: read slave parameters; 06: write slave parameters
Data content DATA(N-1)	Information content: Function code parameter address, function code parameter number, function code parameter value.
Data content DATA(N-2)	
……	
Data content DATA 0	
CRC CHK Low post	Detection value: CRC value
CRC CHK High post	
END	3.5 character time

A1 driver supports the Modbus protocol in RTU (Remote Terminal Unit) mode.
The Modbus function codes supported by the driver are as follows:
Command code and communication data description:

CMD	Meaning	Broadcast	Maximum number of registers
03H	Read multiple registers	NO	30
06H	Write a single register	YES	1
10H	Write multiple registers	YES	27

Command code: 03H

The command code 03H (0000 0011)reads N words (Word, 16bit data), and can read up to 16 words continuously.

For example: the driver with the slave address of 0x55 reads the target speed of the motor, the given speed, the current motor speed, the modbus logic start address is 0x2004, and reads three consecutive words.

Host sends:

START	T1-T2-T3-T4
Slave address	0x55
Modbus function code	0x03
High address	0x20
Low address	0x04
Read high byte	0x00
Read low byte	0x03
CRC low order	0x42
CRC high order	0x1E

The slave responds normally:

START	T1-T2-T3-T4
Slave address	0x55
Modbus function code	0x03
Returns the number of data bytes	0x06
First data high	0x05
First data low	0xDC
Second data high	0x00
Second data low	0x00
…	
Nth data high bit	0x00
Nth data low bit	0x00
CRC low order	0x30
CRC high order	0x3E

The driver responds to the target speed of the motor 0x05DC (1500rpm), given the speed 0x0000, the current motor speed 0x0000

Slave abnormal response:

START	T1-T2-T3-T4
Slave address	0x55
Modbus function code	0x03
Error code	0x02
CRC low order	0xE2
CRC high order	0x17

Command code: 06H

Command code 06H (0000 0110), write a word (Word)
For example: if the slave address is 0x55, set the target speed of the drive to 100%，that is, modbus logical address OxE721 is written as Ox03E8, then the structure of the frame is described as follows:

RTU host command information

START	T1-T2-T3-T4
Slave address	0x55
Modbus function code	0x06
High address	0xE7
Low address	0x21
Data high	0x03
Data low	0xE8
CRC low order	0xE2
CRC high order	0x1E

Slave responds normally

START	T1-T2-T3-T4
Slave address	0x55
Modbus function code	0x06
High address	0xE7
Low address	0x21
Data high	0x03
Data low	0xE8
CRC low order	0xE2
CRC high order	0x1E

Slave abnormal response

START	T1-T2-T3-T4
Slave address	0x55
Modbus function code	0x86
Error code	0x03
CRC low order	0x43
CRC high order	0xB1

Command code: 10H

Command code: 10H (0001 0000), write N words (Word)
For example: the drive with the slave address of 0x55 writes 3 data to the address of 0x3500. The structure of the frame is described as follows:

RTU host command information

START	T1-T2-T3-T4
Slave address	0x55
Modbus function code	0x10
High address	0x35
Low address	0x00
High byte number written	0x00
Low byte number written	0x03
Total number of bytes written	0x06
First data high	0x00
First data low	0x01
……	……
Nth data high bit	
Nth data low bit	
CRC low order	0x4A
CRC high order	0x12

Slave responds normally

START	T1-T2-T3-T4
Slave address	0x55
Modbus function code	0x90
High address	0x35
Low address	0x00
Data high	0x00
Data low	0x03
CRC low order	0x4A
CRC high order	0x12

Slave abnormal response

START	T1-T2-T3-T4
Slave address	0x55
Modbus function code	0x90
Error code	0x03
CRC low order	0x43
CRC high order	0xB1

Exception code

Code	Name	Meaning
1	Illegal Function Code	Received unsupported function code
2	Illegal address	The requested register address is illegal, or the combination of the register address and the number of requested data is illegal
3	Illegal data value	The received data field contains at least one illegal data value
4	Number of illegally requested data	The number of requested data is greater than the maximum number
5	Read-only	Read-only
6	Can only be stopped to modify	Can only be stopped to modify

Communication frame error check

Using the RTU frame format, the frame contains the frame error detection field calculated based on the CRC method. The CRC field detects the contents of the entire frame. The CRC field is two bytes and contains a 1-bit binary value. It is calculated by the transmitting device and added to the frame. The receiving device recalculates the CRC of the received frame and compares it with the value in the received CRC field. If the two CRC values are not equal, it means that there is an error in the transmission. The CRC is first stored in 0xFFFF, and then a process is called to process more than 6 consecutive bytes in the frame with the value in the current register. Only the 8-bit data in each character is valid for the CRC, and the start and stop bits and parity are invalid. During the CRC generation, each 8-bit character is XORed with the contents of the register individually, and the result moves to the least significant bit direction, and the most significant bit is filled with 0. The LSB is extracted and detected. If the LSB is 1, the register alone is exclusive-ORed with the preset value. If the LSB is 0, it is not performed. The whole process is repeated 8 times.

After the last bit (eighth bit) is completed, the next 8-bit byte is XORed with the current value of the register separately. The final register value is the CRC value after all bytes in the frame have been executed. For example,"11001110" needs to be transmitted. The data contains 5"1"s. If even parity is used, its even parity bit is"1". If odd parity is used, its odd parity bit is "0".When data is received, the parity bit is calculated and placed in the position of the parity bit of the frame. The receiving device also performs parity check. If the parity of the received data is found to be inconsistent with the preset, a communication error is considered to have occurred. This CRC calculation method uses the international standard CRC check rule. When editing the CRC algorithm, users can refer to the relevant standard CRC algorithm to write a CRC calculation program that truly meets the requirements.

Standard: CRC-16/MODBUS
Polynomial: x16+x15+x2+1(0x8501)
CRC initial value: 0xFFFF

Now provide a simple function for CRC calculation for user reference (programming in C language):

```
unsigned int crc_cal_value(unsigned char *data_value,unsignedchar data_length)
{
int i;
unsigned int crc_value=0xffff;
    while(data_length--)
{
crc_value^=*data_value++;
for(i=0;i<8;i++)
{
if(crc_value&0x0001)
crc_value=(crc_value>>1)^0xa001;
else
            {
crc_value=crc_value>>1;
            }
        }
        }
        returncrc_value;
}
```

Modbus communication parameter address

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

Command word address	Command function
0xE720	0001: Run
	0002: Jog operation
	0003: Free parking
	0004: Slow down
	0005: Fault reset
0xE721	Modbus communication setpoint 1
0xE722	Modbus communication setpoint 2

Note: The range of communication setting value is -600,0%~600.0%

The parameter address table of the function parameter is as follows:

Drive parameter	Modbus communication address
Group A	
A00.00 - A00.99	0x2000
A01.00 - A01.99	0x2100
A02.00 - A02.99	0x2200
A03.00 - A03.99	0x2300
A04.00 - A04.99	0x2400
A05.00 - A05.99	0x2500
A06.00 - A06.99	0x2600
A07.00 - A07.99	0x2700
A08.00 - A08.99	0x2800
A09.00 - A09.99	0x2900
Group B	
B00.00 - B00.99	0x3000
B01.00 - B01.99	0x3100
B02.00 - B02.99	0X3200
B03.00 - B03.99	0X3300
B04.00 - B04.99	0X3400
B05.00 - B05.99	0X3500
B06.00 - B06.99	0X3600
B07.00 - B07.99	0X3700
B08.00 - B08.99	0X3800
B09.00 - B09.99	0X3900
B10.00 - B10.99	0X3A00
B11.00 - B11.99	0X3B00
Group C	
C00.00 - C00.99	0X4000
C01.00 - C01.99	0X4100
C02.00 - C02.99	0X4200
C03.00 - C03.99	0X4300
C04.00 - C04.99	0X4400
C05.00 - C05.99	0X4500
C06.00 - C06.99	0X4600
C07.00 - C07.99	0X4700
C08.00 - C08.99	0X4800
Group D	
D00.00 - D00.99	0X5000
D01.00 - D01.99	0X5100
D02.00 - D02.99	0X5200
D03.00 - D03.99	0X5300
D04.00 - D04.99	0X5400
D05.00 - D05.99	0X5500
D06.00 - D06.99	0X5600
D07.00 - D07.99	0X5700
D08.00 - D08.99	0X5800
D09.00 - D09.99	0X5900
D10.00 - D10.99	0X5A00
D11.00 - D11.99	0X5B00

Drive parameter	Modbus communication address
Group E	
E00.00 - E00.99	0X6000
E01.00 - E01.99	0X6100
E02.00 - E02.99	0X6200
E03.00 - E03.99	0X6300
E04.00 - E04.99	0X6400
E05.00 - E05.99	0X6500
E06.00 - E06.99	0X6600
E07.00 - E07.99	0X6700
Group F	
F00.00 - F00.99	0X7000
F01.00 - F01.99	0X7100
F02.00 - F02.99	0X7200
F03.00 - F03.99	0X7300
F04.00 - F04.99	0X7400
F05.00 - F05.99	0X7500
F06.00 - F06.99	0X7600
F07.00 - F07.99	0X7700
Group P	
P00.00 - P00.99	0XE000
P01.00 - P01.99	0XE100
P02.00 - P02.99	0XE200
P03.00 - P03.99	0XE300
P04.00 - P04.99	0XE400
P05.00 - P05.99	0XE500
P06.00 - P06.99	0XE600
P07.00 - P07.99	0XE700
P08.00 - P08.99	0XE800
P09.00 - P09.99	0XE900
P10.00 - P10.99	0XEA00
P11.00 - P11.99	0XEB00
P12.00 - P12.99	0XEC00
P13.00 - P13.99	0XED00
P14.00 - P14.99	0XEE00
P15.00 - P15.99	0XEF00

After-sale Service

For various driver products, when the customer finds a quality problem, do not disassemble the machine first. Please explain the following conditions and then contact the company's after-sales service department. After explaining the phenomenon, confirm the problem and then adopt a more ideal method.

Model specifications: _____

Date of manufacture: _____

Numbering: _____

Elapsed time: _____

Use occasion or host name: _____

Host production unit: _____

Quality problem description: _____

_____

_____

_____

_____

User unit: _____

Address: _____

Phone number: _____ Fax: _____

Postcode: _____ Contact: _____

Boneng After-sale Service Hotline: _____

Fax: _____

NOTE: _____

_____

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BONENG