NZ2400-DR Series

Decentralized Variable Frequency Drive
User Manual

Contents

Thank you for choosing NZ200DR distributed dedicated vector inverter.

Before installing, operating, maintaining and inspecting the drive, please read this instruction manual carefully to give full play to the functions of the drive and ensure the safety of the user.

In this instruction manual, safety is divided into two categories: danger and attention. Please pay special attention to"⚠warning""⚠caution"symbols and related content.

"⚠Warning" Incorrect or wrong operation, the harm caused may cause death or serious injury.

"⚠Caution" Incorrect or wrong operation, the harm caused may cause personal injury or drive and mechanical system failure. Depending on the situation, precautions may also cause serious consequences.

The illustrations in this instruction manual are for the convenience of explanation and may be slightly different from the product. Due to product upgrades, they may also be slightly different. Please refer to the actual product.

Please pay attention to handing this instruction manual to the end user and keep it properly for future inspection and maintenance.

If you have any questions, please contact our company or our agent in time, and we will serve you wholeheartedly.

1：Safety precautions

Please read this manual carefully before installation, operation, maintenance or inspection.
The precautions for safe operation in the manual are classified as "Warning" or "Caution".

Indicates a potentially hazardous situation which, if not avoided, could result in personal injury or death.

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury to personnel and damage to equipment. It can also be used to warn against unsafe operations.

In some cases, even the contents described here can lead to serious accidents. So please follow these important precautions in any case.

★ Pay attention to the steps taken to ensure correct operation.

Warning signs appear on the front cover of the drive.

Follow these instructions when using the drive.

DANGER
· Risk of injury and electric shock. · Read the manual and follow the safety instruction before use. · lsolate from supply and wait 10minutes before removing his cover. · Ensure proper earth connection. · Mount the inverter on a non-combustible surface.

2：Unpacking and inspection


· Do not install or operate any drive that is damaged or has faulty parts; otherwise, there is a risk of injury.

After unpacking the drive, please check the following items.

1. Confirm that the drive has no damage during transportation (damage or gaps on the body).
2. Confirm that there is an instruction manual and warranty card in the packaging box.
3. Check the drive nameplate and confirm that it is the product you ordered.
4. If you ordered optional accessories for the drive, please confirm that the optional accessories you received are what you need.

If you find that the drive or optional accessories are damaged, please call your local dealer immediately.

3：Removal and Installation Warnings


· The design, installation, commissioning and operation of the equipment must be carried out by trained and qualified professionals; during the work process, all the provisions in the "Warning" must be followed, otherwise serious personal injury or significant property loss may occur. · The input power line is only allowed to be permanently fastened, and the equipment must be

reliably grounded.

· Even if the drive is not working, the following terminals may still carry dangerous voltages:

—Power terminals R、S、T

—Terminals U, V, W for connecting the motor

· After the power switch is turned off, you must wait for more than 10 minutes and the drive is discharged before you can start the installation work.

· The minimum cross-sectional area of the grounding conductor is at least $10mm^2$, or the corresponding data in the table below requires the maximum value of the two to be selected as the grounding conductor area:

Power line conductor cross-sectional area S mm^2	Cross-sectional area of ground conductor
S≤6	S
16<S≤35	16
35<S	S/2

· The driver should be installed on flame-retardant materials such as metal, away from heat sources and flammable objects to avoid fire.

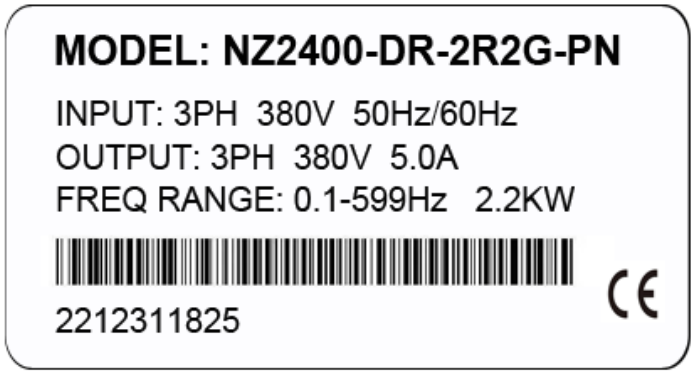
Chapter 1 Overview

1-1. Comprehensive technical characteristics of inverter

Item	Specification	
Basic Functions	Control method	V/F control Open-loop vector control (no PG)
	Maximum frequency	0～599Hz
	Input Voltage	AC380V～500V±10%
	Carrier frequency	0.5kHz～16kHz The carrier frequency can be automatically adjusted according to the load characteristics.
	Input frequency resolution	0.01Hz
	Starting torque	0.5Hz/150%（no PG）；
	Speed range	1:100
	Steady speed accuracy	±0.5%
	Overload capacity	150% rated current60s； 200% rated current3.5s。
	Torque boost	Self-torque boost; Manual torque boost 0.1%～30.0%
	V/F curve	Three modes: linear type; multi-point type; N-power type V/F curve (1.2 power, 1.4 power, 1.6 power, 1.8 power, 2 power)
	V/F separation	2 methods: full separation, semi-separation
	Acceleration and deceleration curve	Straight or S-curve acceleration and deceleration mode. Four acceleration and deceleration times, acceleration and deceleration time range 0.0～6500.0s
	DC braking	DC braking frequency: 0.00Hz~maximum frequency Braking time: 0.0s~36.0s Braking action current value: 0.0%~100.0%
	Jog control	Jog frequency range: 0.00Hz～50.00Hz. Jog acceleration/deceleration time: 0.0s～6500.0s.
	Simple PLC, Multi-speed operation	Achieve up to 4 speeds through built-in PLC or control terminals
	Built-in PID	It is easy to realize the closed-loop control system of process control
	Automatic voltage regulation AVR）	When the grid voltage changes, it can automatically keep the output voltage constant
	Overpressure and overcurrent speed control	Automatically limit current and voltage during operation to prevent frequent over-current and over-voltage tripping
	Fast current limiting function	Minimize overcurrent faults and protect the normal operation of the inverter
	Torque limitation and control	Automatically limit the torque during operation to prevent frequent overcurrent tripping; closed-loop vector mode can achieve torque control
Personalisation	Excellent	Asynchronous motor control with high-performance

functions	performance	current vector control technology
	Power outage Non-stop	During a momentary power outage, the load feedback energy compensates for the voltage drop, allowing the inverter to continue running for a short period of time.
	Fast current limiting	Avoid frequent overcurrent faults in inverters
	Timing control	Timing control function: set time range 0.0min～6500.0min
	Communication method support	ASI, Profinet
Operation Control	Command source	Operation panel setting, control terminal setting, ASI communication setting
	Frequency Source	Digital setting, ASI setting. Switchable
	Auxiliary frequency source	Flexible auxiliary frequency fine-tuning and frequency synthesis
	Input Terminals	2 digital input terminals 1 STO terminal 1 motor temperature input terminal (TF/PT100/PT1000 optional)
Display and protection configuration	LED display	Display parameters
	Protection function	Power-on motor short circuit detection, input and output phase loss protection, overcurrent protection, overvoltage protection, undervoltage protection, overheating protection, overload protection, etc.
	EMC filter	Built-in, C3 level
	Braking resistor	Built-in, specification 250W 200Ω
	Place of use	Indoors, away from direct sunlight, dust, corrosive gas, flammable gas, oil mist, water vapor, dripping water or salt, etc.
Environmental conditions	Altitude	Less than 1000m
	Ambient temperature	－25℃～＋40℃ (When the ambient temperature is 40℃～50℃, please use it at a reduced rating)
	Humidity	Less than 95% RH, no condensation
	Vibration	Less than 5.9m/s²（0.6g）
	Storage temperature	－20℃～＋60℃
	Protection level	IP65

1-2. Inverter nameplate description



NZ2400-DR - 2R2G -PN

AS - AS Interface
PN - Profinet

2R2 - 2.2kW
G - Constant torque

Series Decentralized VFD

Chapter 2 Installation and Wiring of Inverter

2-1. Installation environment and requirements

The inverter installation environment has a direct impact on the inverter's service life and normal function. Using the inverter in an environment that does not meet the allowable range of the instruction manual may cause the inverter to protect or malfunction.

NZ200DR series inverters are wall-mounted inverters. Please install them vertically to facilitate air convection and achieve better heat dissipation.

Please make sure that the installation environment of the inverter meets the following requirements:

(1) Ambient temperature -25℃ to +40℃

(2) Ambient humidity 0% to 95% without condensation

(3) Avoid direct sunlight

(4) The environment does not contain corrosive gases or liquids

(5) The environment does not contain dust, floating fibers, cotton wool, or metal particles

(6) Stay away from radioactive materials and combustibles

(7) Stay away from electromagnetic interference sources (such as welding machines and large power machines)

(8) The installation surface is firm and vibration-free. If vibration cannot be avoided, please install anti-vibration pads to reduce vibration

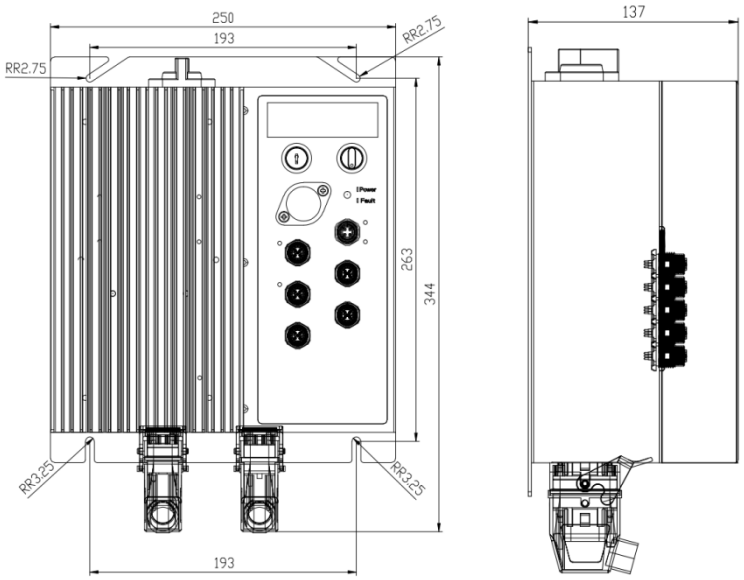
(9) Please install the inverter in a well-ventilated place that is easy to inspect and maintain, and install it on a firm non-combustible material away from heating elements

(10) Please reserve enough space for the installation of the inverter, especially when installing multiple inverters. Please pay attention to the placement of the inverter.

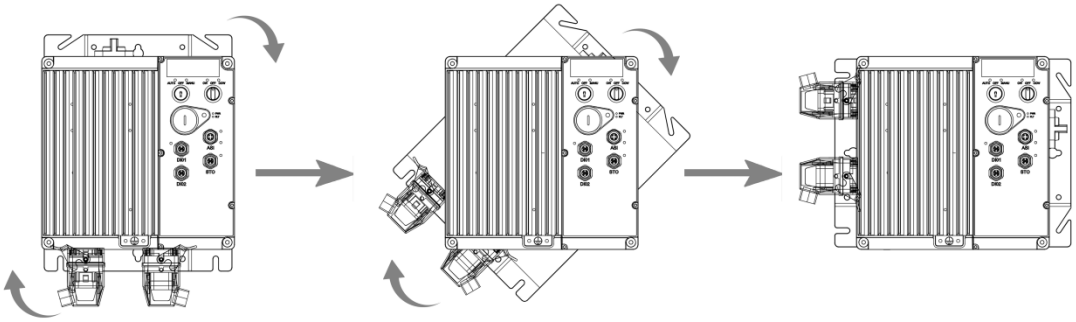
2-2. Inverter Series Models

Inverter models	Input voltage	Rated output power（kW）	Rated input current（A）	Rated output current（A）	Adaptive motor (kW)	Main circuit diameter（mm^2）
NZ2400-DR-0R75G-AS/PN	3PH AC380V～500V, ±10%	0.75	5.0	3.8	0.75	0.75
NZ2400-DR -1R5G- AS/PN		1.5	5.8	5.1	1.5	0.75
NZ2400-DR -3R0G- AS/PN		3.0	10.0	9.0	2.2	1.5

2-3. Product dimensions

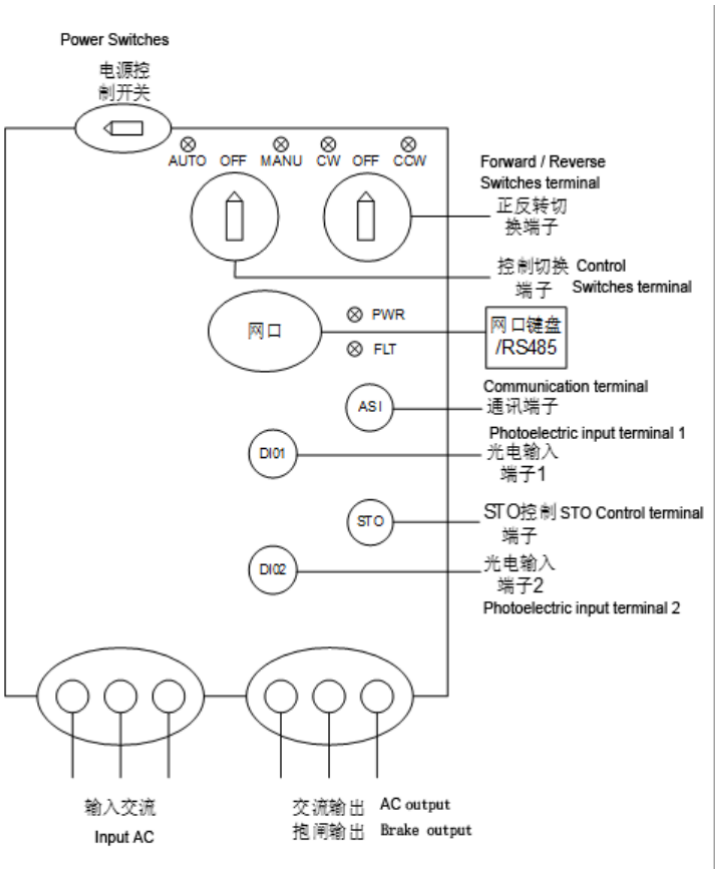


Inverter support assembly diagram:



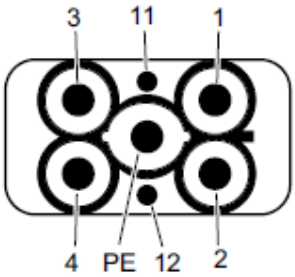
Note: The inverter cover can be installed with a 90-degree rotation.

2-4. Main circuit terminal diagram



(1) Main power interface

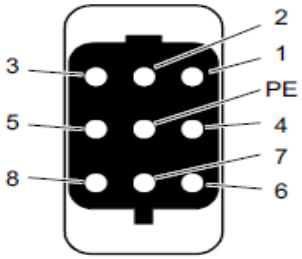
Connection type：Han Q4/2,male



1	2	3	4	11	12	PE
L1	L2	L3	空	空	空	PE

(2) Motor side wire outlet interface

Connection type：Han Q8/0,female



1	2	3	4	5	6	7	8	PE
U	null	W	brake-	TF+	brake+	V	TF-	PE

（3）Main circuit terminal description

Name	Function description
PE	Ground terminal
L1、L2、L3	Power input terminal
U、V、W	Connect to three-phase AC/DC motor
TF+、TF-	Motor temperature sensor (compatible with PT100/PT1000)
brake+、brake-	DC180V output, connected to motor brake

2-5. Control board terminal definition

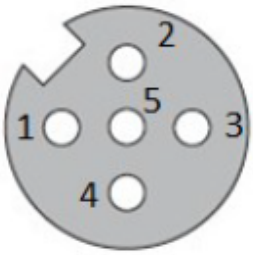
（1）ASI Communication interface

Connection Type：M12,4-pin,male,A-coded

1	2	3	4
ASI+	null	ASI-	null

（2）Input terminal interface

Connection Type：M12,5-pin,female,A-coded



Needle port definition					Function
1	2	3	4	5	
24V	null	GND	DI01	PE	Sensor1
24V	null	GND	DI02	PE	Sensor2
24V	null	GND	STO	null	STO

Note: The default STO terminal is PNP function.

（3）Control Terminal Description

Terminal name	Function Definition Description	Remark
DI01	Sensor input terminal	
DI02	Sensor input terminal	
STO	STO input terminal	PNP input
24V	24V Power supply	

GND	24V Public terminal	
ASI+/ASI-	ASI Communication interface	

（4）ASI Communication process word

Process Word：4DI/4DO：

DO1～DO3: (2 control words are optional, the default control word is 1)

DO	Control Word 1	Control Word 2
DO0	Forward operation	Forward operation
DO1	Reverse operation	Reverse operation
DO2	Multi-segment instructions 1	Multi-segment instructions 1
DO3	Multi-segment instructions 2	Acceleration/deceleration time selection terminal 1

DI0～DI3:

DI	Status word
DI0	Automatic mode（1）/Manual Mode(0)
DI1	Normal(1)/ Fault（0）
DI2	DI01（Optical input）
DI3	DI02（Optical input)

Chapter 3 Operation Instructions

3-1.Panel diagram

3-1-1、Key Function Description

Key name	Name	Functional description
PRG	Programming	Enter or exit the first level menu
ENTER	Confirm	Enter the menu screen step by step, set parameters and confirm
▲	UP Increment	Increment of data or function code
▼	DOWN Decrement	Decrement of data or function code
▶	Shift key	In the stop display interface and the operation display interface, you can cycle through the display parameters; when modifying parameters, you can select the parameter modification position.
	Run Key	In keyboard operation mode, it is used to run the operation
	Stop/Reset	In the running state, pressing this key can be used to stop the operation, which is restricted by function code P7.02; in the fault alarm state, this key can be used to reset the fault, which is not restricted by function code P7.02.
JOG	Shortcut multi-function key	The function of this key is determined by function code P7.01 0: No function 1: Switching between keyboard command and remote operation. Refers to the switching of command source, that is, the switching between the current command source and keyboard control (local operation). If the current command source is keyboard control, this key function is invalid. 2: Forward and reverse switching, this function is only valid when the command source is the keyboard operation command channel.

		3: Forward jog 4: Reverse jog

3-1-2、Indicator Light Description

Indicator light name	Indicator light description
Hz	Frequency indicator
A	Current indicator light
V	Voltage indicator
FWD/REV	Forward and reverse indicator light; The light is off when it is in forward state, and the light is on when it is in reverse state.
LOCAL/REMOT	Control mode indicator light; The light is off when it indicates keyboard control status, the light is on when it indicates terminal control status, and the light flashes when it indicates communication control status.
FUNC/ERR	Alarm indicator light; The light is off when the inverter is in normal state, the light flashes when the inverter is in overload pre-alarm state, and the light is on when the inverter is in fault state.
	Running status indicator light; When the light is off, it means the inverter is in shutdown state; when the light flashes, it means the inverter is in parameter self-learning state; when the light is on, it means the inverter is in running state.

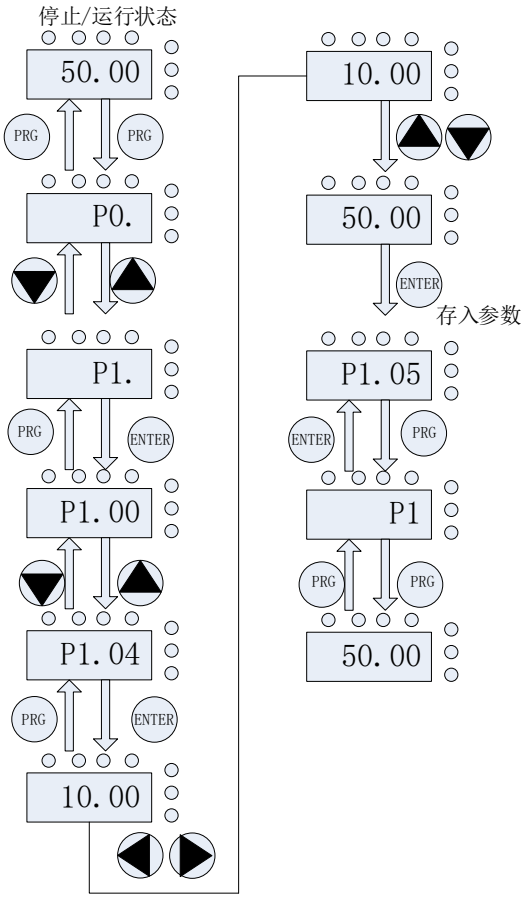
3-1-3、Parameter settings

The three levels of menus are:

1) Function code group number (first level menu);
2) Function code number (second level menu);
3) Function code setting value (third level menu).

Note: When operating in the third-level menu, you can press PRG or ENTTER to return to the second-level menu. The difference between the two is: pressing ENTER will store the set parameters in the control panel, then return to the second-level menu and automatically transfer to the next function code; pressing PRG will directly return to the second-level menu without storing parameters and remain at the current function code.

Example: Change the function code P1.04 from 00.00 Hz to 50.00 Hz.



Note: In the third-level menu state, if the parameter does not flash, it means that the function code cannot be modified. Possible reasons are:

1) The function code is a non-modifiable parameter. Such as actual detection parameters, operation record parameters, etc.;

2) The function code cannot be modified in the running state and can only be modified after stopping;

3-1-4、Fault reset

After the inverter fails, the inverter will prompt the relevant fault information. The user can reset the fault through the STOP key on the keyboard or the terminal function (P4 group). After the inverter fault is reset, it is in standby state. If the inverter is in a fault state and the user does not reset the fault, the inverter is in a running protection state and cannot run.

3-2.Motor parameter self-learning

1）：Comprehensive parameter self-learning

When selecting the PG-free vector control operation mode, the nameplate parameters of the motor must be accurately entered. The inverter will match the standard motor parameters based on the nameplate parameters. In order to obtain good control performance, it is recommended to perform motor parameter self-learning. The self-learning operation steps are as follows:

First, select the operation command channel selection (P0.02) as the keyboard command channel.

Then please enter the following parameters according to the actual motor parameters:

P1.01: Motor rated power;

P1.02: Motor rated voltage;

P1.03: Motor rated current;

P1.04: Motor rated frequency;

P1.05: Motor rated speed.

P1.37=2 displays STUDY, press the run key to start self-learning.

**Note: During the comprehensive parameter self-learning process, the motor must be disconnected from the load, otherwise the motor parameters obtained through self-learning may be incorrect.

2）：Static parameter self-learning

When the motor static parameters are self-learned, it is not necessary to disconnect the motor from the load.

Before the motor parameters are self-learned, the motor nameplate parameters (P1.01~P1.05) must be correctly entered. P1.37=1 displays STUDY, and the run key is pressed to start self-learning. After self-learning, the motor stator resistance and the motor DQ axis inductance will be detected. The motor back electromotive force cannot be learned, and the user can enter the corresponding value according to the motor nameplate.

Chapter 4 Detailed description of function parameters

P0Group Basic Function Group

P0.00	GP Type Display		Factory value	Depends on the model
	Setting range	1	G type (constant torque load type)	
		2	P type (fan, water pump load type)	

1: Applicable to constant torque load with specified rated parameters

2: Applicable to variable torque load with specified rated parameters

The inverter factory parameters are set to G type. If you want to select P type, you need to set this function code to 2 and reset the P1 group motor parameters.

P0.01	Control mode selection		Factory value	0
	Setting range	0	No-speed sensor vector control (no PG)	
		1	Speed sensor vector control (with PG)	
		2	V/F control	

0: No-speed sensor vector control

Refers to open-loop vector control, which is suitable for common high-performance control occasions. One inverter can only drive one motor. Such as machine tools, centrifuges, wire drawing machines, injection molding machines and other loads.

1: Speed sensor vector control

The motor end of closed-loop vector control must be equipped with an encoder, and the inverter must be equipped with a PG card of the same type as the encoder. It is suitable for high-precision speed control or torque control occasions. One inverter can only drive one motor, such as high-speed papermaking machinery, lifting machinery, elevators and other loads.

2: V/F control

It is suitable for occasions with low load requirements, or one inverter drives multiple motors, such as fans and pumps. It can be used for occasions where one inverter drives multiple motors.

**Note: When selecting the vector control mode, the motor parameter self-learning process must be performed. Only accurate motor parameters can give full play to the advantages of vector control.

P0.02	Command source selection		Factory value	0
	Setting range	0	Operation panel command channel (LED off)	
		1	Terminal command channel (LED on)	
		2	Communication command channel (LED flashing)	

Select the input channel of the inverter control command.

The inverter control commands include: start, stop, forward, reverse, jog, etc.

0: Operation panel command channel ("LOCAL/REMOT" light is off); the operation command is controlled by the RUN and STOP/RESET buttons on the operation panel.

1: Terminal command channel ("LOCAL/REMOT" light is on); the operation command is controlled by the multi-function input terminals FWD, REV, S1~S4.

2: Communication command channel ("LOCAL/REMOT" light flashes) The operation command is given by the host computer through communication.

P0.03	Main frequency source X selection		Factory value	6
	Setting range	0	Digital setting (preset frequency P0.08, UP/DOWN can be modified, power off no remember)	
		1	Digital setting (preset frequency P0.08, UP/DOWN can be modified, power off	

			remember)
		2～5	Reserved
		6	ASI Communication
		7～8	Reserved
		9	RS485 Communication given

Select the input channel of the inverter's main given frequency. There are 10 main given frequency channels:

0: Digital setting (no memory after power failure)

The initial value of the set frequency is the value of P0.08 "preset frequency". The set frequency value of the inverter can be changed by the ▲ and ▼ keys on the keyboard (or the UP and DOWN keys of the multi-function input terminal).

When the inverter is powered off and powered on again, the set frequency value is restored to the value of P0.08 "digital set preset frequency".

1: Digital setting (power failure memory)

The initial value of the set frequency is the value of P0.08 "preset frequency". The set frequency value of the inverter can be changed by the ▲ and ▼ keys on the keyboard (or the UP and DOWN keys of the multi-function input terminal). When the inverter is powered off and powered on again, the set frequency is the set frequency at the last power failure, and the correction amount by the keyboard ▲ and ▼ keys or the terminal UP and DOWN is memorized.

It should be noted that P0.23 is "Digital setting frequency stop memory selection". P0.23 is used to select whether the frequency correction is memorized or cleared when the inverter stops. P0.23 is related to shutdown, not power-off memory, so please pay attention to it in application.

6: ASI communication means that the main frequency source is given by the host computer through ASI communication.

9: Communication setting means that the main frequency source is given by the host computer through communication.

Note: The communication methods supported by the NZ200DR series are: RS-485; ASI communication.

When the auxiliary frequency source is used as an independent frequency setting channel (i.e. the

P0.04	Auxiliary frequency		Factory value	0
	Setting range	0	Digital setting (preset frequency P0.08, UP/DOWN can be modified, power off no remember)	
		1	Digital setting (preset frequency P0.08, UP/DOWN can be modified, power-off memory)	
		2～5	Reserved	
		6	ASI Communication	
		7～8	Reserved	
		9	RS485 Communication given	

frequency source selection is X to Y switching), its usage is the same as the main frequency source X. For usage, please refer to the relevant instructions of P0.03.

When the auxiliary frequency source is used as a superimposed setting (i.e. the frequency source selection is X+Y, X to X+Y switching or Y to X+Y switching), please note:

When the auxiliary frequency source is digitally given, the preset frequency (P0.08) does not work. The user adjusts the frequency directly on the basis of the main given frequency through the ▲ and ▼ keys on the keyboard (or the UP and DOWN of the multi-function input terminal).

**Note: The auxiliary frequency source Y selection and the main frequency source X selection cannot be set to the same channel, that is, P0.03 and P0.04 should not be set to the same value,

otherwise it will easily cause confusion.

P0.05	Auxiliary frequency source Y range selection when superimposing		Factory value	0
	Setting range	0	Relative to the maximum frequency	
		1	Relative to the main frequency source X	
P0.06	Auxiliary frequency source Y range selection when superimposing		Factory value	100
	Setting range		0%～150%	

When the frequency source is selected as "frequency superposition" (i.e. P0.07 is set to 1, 3 or 4), these two parameters are used to determine the adjustment range of the auxiliary frequency source.

P0.05 is used to determine the object corresponding to the auxiliary frequency source range. It can be selected relative to the maximum frequency or relative to the main frequency source X. If it is selected relative to the main frequency source, the range of the auxiliary frequency source will change with the change of the main frequency X.

P0.07	Frequency source		Factory value	02
	Setting range	Units	Frequency source selection	
		0	Main frequency source X	
		1	Results of main and auxiliary operations (the operation	
		2	Switch between main frequency source X and auxiliary frequency	
		3	Switch between main frequency source X and main and auxiliary	
		4	Auxiliary frequency source Y and main and auxiliary operation	
		Tens	Frequency source main and auxiliary operation relationship	
		0	Main + auxiliary	
		1	Main - auxiliary	
		2	The maximum value of the two	
		3	The minimum value of the two	

Use this parameter to select the frequency setting channel. The frequency setting is achieved by combining the main frequency source X and the auxiliary frequency source Y.

Units: Frequency source selection:

0: Main frequency source X Main frequency X is used as the target frequency.

1: The result of the main and auxiliary operations is used as the target frequency. For the main and auxiliary operation relationship, see the "tens" description of this function code.

2: Switch between main frequency source X and auxiliary frequency source Y When the multi-function input terminal function 18 (frequency switching) is invalid, the main frequency X is used as the target frequency. When the multi-function input terminal function 18 (frequency source switching) is valid, the auxiliary frequency Y is used as the target frequency.

3: Switch between main frequency source X and main and auxiliary operation results When the multi-function input terminal function 18 (frequency switching) is invalid, the main frequency X is used as the target frequency. When the multi-function input terminal function 18 (frequency switching) is valid, the main and auxiliary operation results are used as the target frequency.

4: Switch between auxiliary frequency source Y and main and auxiliary operation results When the multi-function input terminal function 18 (frequency switching) is invalid, the auxiliary frequency Y is used as the target frequency. When the multi-function input terminal function 18 (frequency switching) is valid, the main and auxiliary operation results are used as the target frequency.

Tens: Main and auxiliary operation relationship of frequency source:

0: Main frequency source X + auxiliary frequency source Y

The sum of main frequency X and auxiliary frequency Y is used as the target frequency. Realize the frequency superposition setting function.

1: Main frequency source X - auxiliary frequency source Y

The difference between main frequency X and auxiliary frequency Y is used as the target frequency.

2: MAX (main frequency source X, auxiliary frequency source Y) takes the main frequency X and auxiliary frequency Y with the largest absolute value as the target frequency.

3: MIN (main frequency source X, auxiliary frequency source Y) takes the main frequency X and auxiliary frequency Y with the smallest absolute value as the target frequency. In addition, when the frequency source is selected as the main and auxiliary operation, the offset frequency can be set through P0.21, and the offset frequency can be superimposed on the main and auxiliary operation results to flexibly respond to various needs.

P0.08	Preset frequency	Factory value+	50.00Hz
	Setting range	0.00～Maximum frequency (valid for digital setting of frequency source selection)	

When the frequency source is selected as "digital setting" or "terminal UP/DOWN", the function code value is the initial value of the inverter's frequency digital setting.

P0.09	Running direction		Factory value	0
	Setting range	0	Consistent direction	
		1	Opposite direction	

By changing this function code, the purpose of changing the motor direction can be achieved without changing the motor wiring. Its function is equivalent to adjusting any two lines of the motor (U, V, W) to achieve the conversion of the motor rotation direction.

**Note: After the parameters are initialized, the motor running direction will return to the original state. Use with caution in situations where it is strictly forbidden to change the motor direction after the system is debugged.

P0.10	Maximum frequency	Factory value	50.00 Hz
	Setting range	50.00Hz～599.00Hz	

In the NZ200DR series, when multiple instructions are used as frequency sources, their respective 100.0% are calibrated relative to P0.10.

P0.11	Upper frequency source		Factory value	0
	Setting range	0	P0.12 Setting	
		1～4	Reserved	
		5	Communication Setting	
P0.12	Upper frequency		Factory value	50.00Hz
	Setting range		Lower frequency limit P0.14～maximum frequency P0.10	

Define the source of the upper limit frequency. The upper limit frequency can come from the digital setting (P0.12) or the communication setting channel. When the upper limit frequency is given by communication, 100% of the communication setting corresponds to P0.12.

P0.14	Lower frequency	Factory value	0.00Hz
	Setting range	0.00Hz～Upper frequency P0.12	

When the frequency command is lower than the lower limit frequency set by P0.14, the inverter can stop, run at the lower limit frequency or run at zero speed. The operating mode can be set by P8.14 (setting the frequency lower than the lower limit frequency operating mode).

P0.15	Carrier frequency	Factory value	Depends on the model
	Setting range	0.5kHz～8.0kHz	

This function adjusts the carrier frequency of the inverter. By adjusting the carrier frequency, the motor noise can be reduced, the resonance point of the mechanical system can be avoided, the line leakage current to the ground can be reduced, and the interference generated by the inverter can be reduced.

When the carrier frequency is low, the output current high-order harmonic components increase, the motor loss increases, and the motor temperature rise increases. When the carrier frequency is high, the motor loss decreases, the motor temperature rise decreases, but the inverter loss increases, the inverter temperature rise increases, and the interference increases.

Adjusting the carrier frequency will affect the following performance:

Carrier frequency	Low → High
Motor noise	Big → Small
Output current waveform	Bad → Good
Motor temperature rise	High → Low
Inverter temperature rise	Low → High
Leakage Current	Small → Big
External radiation interference	Small → Big

The factory settings of carrier frequency are different for inverters of different powers. Although users can modify it as needed, it should be noted that if the carrier frequency is set higher than the factory value, the inverter heat sink temperature will increase. At this time, users need to reduce the inverter rating, otherwise the inverter will have the risk of overheating alarm.

P0.16	Carrier frequency adjusts with temperature	Factory value	1
	Setting range	0：no 1：yes	

The carrier frequency is adjusted with the temperature. When the inverter detects that the temperature of its own radiator is high, it automatically reduces the carrier frequency to reduce the temperature rise of the inverter. When the radiator temperature is low, the carrier frequency gradually returns to the set value. This function can reduce the chance of the inverter overheating alarm.

P0.17	Acceleration time 1	Factory value	Model confirmation
	Setting range	0.00s～65000s	
P0.18	Deceleration time 1	Factory value	Model confirmation
	Setting range	0.00s～65000s	

Acceleration time refers to the time required for the inverter to accelerate from zero frequency to the acceleration/deceleration reference frequency (determined by P0.25).

Deceleration time refers to the time required for the inverter to decelerate from the acceleration/deceleration reference frequency (determined by P0.25) to zero frequency.

The acceleration/deceleration time range is related to the P0.19 setting.

P0.19	Acceleration and deceleration time unit	Factory value	1
	Setting range 0	1 second	
	1	0.1 second	
	2	0.01 second	

To meet the needs of various sites, the NZ200DR series provides 3 acceleration and deceleration

time units, namely 1 second, 0.1 second and 0.01 second.

**Note: When modifying this function parameter, the number of decimal places displayed in the 4 groups of acceleration and deceleration time will change, and the corresponding acceleration and deceleration time will also change. Pay special attention during application.

P0.21	Auxiliary frequency source offset frequency when superimposed	Factory value	0.00Hz
	Setting range	0.00Hz～Maximum frequency P0.10	

This function code is only valid when the frequency source is selected as the main and auxiliary operation.

When the frequency source is the main and auxiliary operation, P0.21 is used as the bias frequency, and is superimposed with the main and auxiliary operation results as the final frequency setting value, making the frequency setting more flexible.

P0.22	Frequency command resolution	Factory value	2
	Setting range	1	Reserved
		2	0.01Hz

This parameter is used to determine the resolution of all frequency-related function codes.

This parameter cannot be changed at present.

P0.23	Digital setting frequency stop memory selection	Factory value	0
	Setting range	0	No memory
		1	Memory

This function is only valid when the frequency source is digitally set.

"No memory" means that after the inverter stops, the digital setting frequency value is restored to the value of P0.08 (preset frequency), and the frequency correction performed by the keyboard ▲, ▼ keys or terminals UP, DOWN is cleared.

"Memory" means that after the inverter stops, the digital setting frequency is retained as the set frequency at the last stop time, and the frequency correction performed by the keyboard ▲, ▼ keys or terminals UP, DOWN remains valid.

P0.25	Acceleration/deceleration time reference frequency	Factory value	0
	Setting range	0	Maximum frequency（P0.10）
		1	Setting frequency
		2	100Hz

Acceleration and deceleration time refers to the acceleration and deceleration time from zero frequency to the frequency set by P0.25.

When P0.25 is selected as 1, the acceleration and deceleration time is related to the set frequency. If the set frequency changes frequently, the acceleration of the motor will change, so you need to pay attention to it when applying it.

P0.26	Frequency command UP/DOWN reference during operation	Factory value	0
	Setting range	0	Operating frequency
		1	Setting frequency

This parameter is valid only when the frequency source is set digitally.

It is used to determine the method to correct the set frequency when the keyboard ▲, ▼ keys or terminal UP/DOWN are in action, that is, whether the target frequency is increased or decreased

based on the operating frequency or based on the set frequency.

The difference between the two settings is obvious when the inverter is in the acceleration and deceleration process, that is, if the operating frequency of the inverter is different from the set frequency, the different choices of this parameter will be very different.

P0.27	Command source bundled with frequency source		Factory value	0000
	Setting range	Units	Operation panel command binding frequency source selection	
		0	No Bundle	
		1	Digital frequency source setting	
		2～5	Reserved	
		6	ASI Communication given	
		7～8	Reserved	
		9	RS485 Communication given	
		Tens	Terminal command binding frequency source selection (0~9, same as the ones digit)	
		Hundreds	Communication command binding frequency source selection (0~9, same as the ones digit)	

Define the bundled combination between three operation command channels and nine frequency given channels to facilitate synchronous switching.

The meaning of the above frequency given channels is the same as that of the main frequency source X selection P0.03, please refer to the P0.03 function code description. Different operation command channels can be bundled with the same frequency given channel. When the command source has a bundled frequency source, the frequency source set by P0.03~P0.07 will no longer work during the validity period of the command source.

P1Group Motor Parameters

P1.00	Motor Type Selection	Factory value	0
	Setting range	Ordinary asynchronous motor Variable frequency asynchronous motor	
P1.01	Rated Power	Factory value	Model confirmation
	Setting range	0.1kW～3.7kW	
P1.02	Rated Voltage	Factory value	Model confirmation
	Setting range	1V～2000V	
P1.03	Rated current	Factory value	Model confirmation
	Setting range	0.01A～655.35A	
P1.04	Rated frequency	Factory value	Model confirmation
	Setting range	0.01Hz～Maximum frequency	
P1.05	Rated speed	Factory value	Model confirmation
	Setting range	1rpm～65535rpm	

The above function codes are the motor nameplate parameters. Regardless of whether VF control or vector control is used, the relevant parameters need to be accurately set according to the motor nameplate.

In order to obtain better vector control performance, motor parameter self-learning is required, and the accuracy of the learning results is closely related to the correct setting of the motor nameplate parameters.

P1.06	Stator resistance of asynchronous motor	Factory value	Learning parameters
	Setting range	0.001Ω～65.535Ω	
P1.07	Asynchronous motor rotor resistance	Factory value	Learning parameters
	Setting range	0.001Ω～65.535Ω	
P1.08	Asynchronous motor leakage inductance	Factory value	Learning parameters
	Setting range	0.01mH～655.35mH	
P1.09	Asynchronous motor mutual inductance	Factory value	Learning parameters
	Setting range	0.1mH～6553.5mH	
P1.10	Asynchronous motor no-load current	Factory value	Learning parameters
	Setting range	0.01A～P1.03	

P1.06~P1.10 are the parameters of asynchronous motors. These parameters are generally not on the motor nameplate and need to be obtained through inverter parameter self-learning. Among them, "asynchronous motor static self-learning" can only obtain three parameters P1.06~P1.08, while "asynchronous motor dynamic self-learning" can obtain all 5 parameters here, as well as current loop PI parameters.

If the asynchronous motor cannot be self-learned on site, the corresponding function code can be entered according to the parameters provided by the motor manufacturer.

P1.27	Encoder line number	Factory value	1024
	Setting range	1～65535	

Set the number of pulses per revolution of the ABZ incremental encoder.

In the vector mode with speed sensor, the number of encoder pulses must be set correctly, otherwise the motor will not run normally.

P1.28	Encoder Type	Factory value	0
	Setting range 0	ABZ Incremental encoder	

The NZ200DR series supports ABZ incremental encoders. Please set P1.28 correctly when using it, otherwise the inverter may not operate normally.

P1.30	ABZ incremental encoder AB phase sequence	Factory value	0
	Setting range	0: Forward 1: Reverse	

This function code is only valid for ABZ incremental encoder, that is, only valid when P1.28=0. It is used to set the phase sequence of AB signal of ABZ incremental encoder. During the dynamic self-learning of asynchronous motor, the AB phase sequence of ABZ encoder can be obtained.

P1.36	Speed feedback PG disconnection detection time	Factory value	0.0s
	Setting range	0.0s：No action 0.1-10.0 s	

It is used to set the detection time of encoder disconnection fault. When it is set to 0.0 s, the inverter

does not detect encoder disconnection fault. When the inverter detects a disconnection fault and the duration exceeds the time set by P1.36, the inverter alarms PG.

P1.37	Self-learning selection		Factory value	0
	Setting range	0	No Action	
		1	Asynchronous machine static self-learning	
		2	Asynchronous machine dynamic self-learning	
		3	Asynchronous motor fully static self-learning	

0: No operation, i.e. self-learning is prohibited.

1: Static self-learning, suitable for situations where the asynchronous motor and the load are not easy to disconnect and dynamic self-learning cannot be performed. Before static self-learning, the motor type and motor nameplate parameters, i.e. P1.01~P1.05 and P1.09, must be set correctly. For static self-learning, the inverter can obtain three parameters, P1.06~P1.08.

Action description: Set this function code to 1, then press the RUN key, and the inverter will perform static self-learning.

2: Dynamic self-learning: To ensure the dynamic control performance of the inverter, the asynchronous motor must be disconnected from the load at this time to keep the asynchronous motor in a no-load state for dynamic self-learning.

During the dynamic self-learning process, the inverter first performs static self-learning, then accelerates to 80% of the rated frequency of the motor according to the acceleration time P0.17, and after a period of time, decelerates and stops according to the deceleration time P0.18 and ends the self-learning.

In the case of speed sensor vector mode, before dynamic self-learning, in addition to setting the motor type and motor nameplate parameters P1.00~P1.05, the encoder pulse number P1.27 and encoder type P1.28 need to be correctly set.

Action description: Set the function code to 2, then press the RUN key, and the inverter will perform dynamic self-learning.

3: Complete static self-learning: Applicable to the case of no encoder, self-learning of motor parameters when the motor is stationary (the motor may still have slight jitter at this time, so pay attention to safety)

Action description: Set the function code to 3, then press the RUN key, and the inverter will perform complete static self-learning.

**Note: When selecting the vector control mode, the motor nameplate parameters must be correctly set and the motor parameters must be self-learned. Only accurate motor parameters can give full play to the advantages of vector control. And self-learning can only be performed in keyboard operation mode, and motor self-learning cannot be performed in terminal operation and communication operation mode.

P2Group Vector Control Parameters

The function codes of group P2 are only valid for vector control and invalid for VF control.

P2.00	Speed loop proportional gain 1	Factory value	30
	Setting range	1～100	
P2.01	Speed loop integral time 1	Factory value	0.50s
	Setting range	0.01s～10.00s	
P2.02	Switching frequency 1	Factory value	5.00Hz
	Setting range	0.00～P3.05	

P2.03	Speed loop proportional gain 2	Factory value	20
	Setting range	0～100	
P2.04	Speed loop integral time 2	Factory value	1.00s
	Setting range	0.01s～10.00s	
P2.05	Switching frequency 2	Factory value	10.00Hz
	Setting range	P3.02～Maximum output frequency	

When the inverter runs at different frequencies, different speed loop PI parameters can be selected. When the operating frequency is less than the switching frequency 1 (P2.02), the speed loop PI adjustment parameters are P2.00 and P2.01. When the operating frequency is greater than the switching frequency 2, the speed loop PI adjustment parameters are P2.03 and P2.04. The speed loop PI parameters between the switching frequency 1 and the switching frequency 2 are two sets of PI parameters linearly switched, as shown in Figure 3-1:

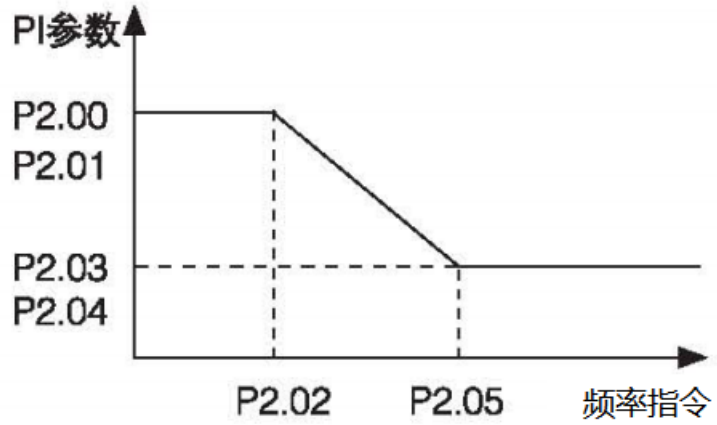


Figure 4-1 PI parameter diagram

By setting the proportional coefficient and integral time of the speed regulator, the speed dynamic response characteristics of the vector control can be adjusted.

Increasing the proportional gain and reducing the integral time can speed up the dynamic response of the speed loop. However, excessive proportional gain or too small integral time may cause the system to oscillate. The recommended adjustment method is:

If the factory parameters cannot meet the requirements, fine-tune based on the factory value parameters, first increase the proportional gain to ensure that the system does not oscillate; then reduce the integral time to make the system have both faster response characteristics and smaller overshoot.

Note: If the PI parameters are set improperly, it may cause excessive speed overshoot. Even overvoltage faults occur when the overshoot falls back.

P2.06	Vector control slip gain	Factory value	100%
	Setting range	50%～200%	

For speed sensorless vector control, this parameter is used to adjust the steady speed accuracy of the motor; when the motor is loaded and the speed is low, increase this parameter, and vice versa.

P2.07	Speed loop filter time constant	Factory value	0.050s
	Setting range	0.000s～0.100s	

In vector control mode, the output of the speed loop regulator is the torque current command. This parameter is used to filter the torque command. This parameter generally does not need to be adjusted. When the speed fluctuates greatly, the filter time can be appropriately increased; if the motor oscillates, the parameter should be appropriately reduced.

The speed loop filter time constant is small, the inverter output torque may fluctuate greatly, but the speed response is fast.

P2.08	Vector control overexcitation gain	Factory value	64
	Setting range	0～200	

During the deceleration process of the inverter, overexcitation control can suppress the rise of bus voltage and avoid overvoltage faults. The larger the overexcitation gain, the stronger the suppression effect.

For situations where the inverter is prone to overvoltage alarm during deceleration, the overexcitation gain needs to be increased. However, if the overexcitation gain is too large, it is easy to increase the output current, which needs to be weighed in the application.

For situations with very small inertia, there will be no voltage rise during motor deceleration, so it is recommended to set the overexcitation gain to 0; for situations with braking resistors, it is also recommended to set the overexcitation gain to 0.

P2.09	Torque upper limit source in speed control mode		Factory value	0
	Setting range	0	P2.10	
		1～4	Reserved	
		5	Communication Settings	
		6～7	Reserved	
P2.10	Digital setting of torque upper limit in speed control mode		Factory value	100.0%
	Setting range	0.0%～200.0%		
P2.11	Torque upper limit source in speed control mode (generation)		Factory value	0
	Setting range	0	P2.10(Does not distinguish between power generation and electric driving)	
		1～4	Reserved	
		5	Communication Settings	
		6～7	Reserved	
		8	Function code P2.12 setting	
P2.12	Digital setting of torque upper limit in speed control mode (power generation)		Factory value	100.0%
	Setting range	0.0%～200.0%		

In speed control mode, the maximum value of the inverter output torque is controlled by the torque upper limit source.

P2.09 is used to select the setting source of the torque upper limit. When set through communication, the corresponding setting of 100% corresponds to P2.10, and 100% of P2.10 is the rated torque of the inverter.

P2.13	Excitation regulation proportional gain	Factory value	2000
	Setting range	0～60000	
P2.14	Excitation regulation integral gain	Factory value	1300
	Setting range	0～60000	
P2.15	Torque regulation proportional gain	Factory value	2000
	Setting range	0～60000	

P2.16	Torque regulation integral gain	Factory value	1300
	Setting range	0～60000	
P2.17	Speed loop integral property formula	Factory value	0
	Units: Integral separation	0	
		1	

Vector control current loop PI adjustment parameter, which is automatically obtained after the asynchronous machine dynamic self-learning, generally does not need to be modified.

It should be noted that the integral regulator of the current loop does not use the integral time as the dimension, but directly sets the integral gain. If the current loop PI gain is set too large, it may cause the entire control loop to oscillate. Therefore, when the current oscillation or torque fluctuation is large, you can manually reduce the PI proportional gain or integral gain here.

P2.22	Power generation limit enable	Factory value	0
	Setting range	0: Invalid 1: Full-time effective 2: Constant speed effective 3: Deceleration effective	
P2.23	Upper limit of power generation	Factory value	Model confirmation
	Setting range	0.0%～200.0%	

P3 Group V/F Control Parameters

Note: This group of function codes is only valid for asynchronous V/F control, not for vector control.

V/F control is suitable for general loads such as fans and pumps, or one inverter with multiple motors, or applications where the inverter power is significantly different from the motor power.

P3.00	V/F Curve Settings		Factory value 0
	Setting range	0	Straight line V/F
		1	Multi-point V/F
		2	Square V/F
		3	1.2 times V/F
		4	1.4 times V/F
		6	1.6 times V/F
		8	1.8 times V/F
		9～11	Reserved

0: Linear V/F. Suitable for ordinary constant torque loads.

1: Multi-point V/F. Suitable for special loads such as dehydrators and centrifuges. At this time, by setting P3.03~P3.08 parameters, any VF relationship curve can be obtained.

2: Square V/F. Suitable for centrifugal loads such as fans and water pumps.

3~8: VF relationship curve between linear VF and square VF.

P3.01	Torque boost	Factory value	Model confirmation
	Setting range	0.0% (automatic torque boost) 0.1%～30%	
P3.02	Torque boost cut-off frequency	Factory value	50.00Hz
	Setting range	0.00Hz～Maximum output frequency	

In order to compensate for the low-frequency torque characteristics of V/F control, some boost

compensation is made to the inverter output voltage at low frequency. However, if the torque boost is set too large, the motor is prone to overheating and the inverter is prone to overcurrent.

When the load is heavy and the motor starting torque is insufficient, it is recommended to increase this parameter. When the load is light, the torque boost can be reduced. When the torque boost is set to 0.0, the inverter is automatic torque boost. At this time, the inverter automatically calculates the required torque boost value based on parameters such as the motor stator resistance.

Torque boost torque cutoff frequency: below this frequency, the torque boost torque is effective. If it exceeds this set frequency, the torque boost is invalid. See Figure 3-2 for details.

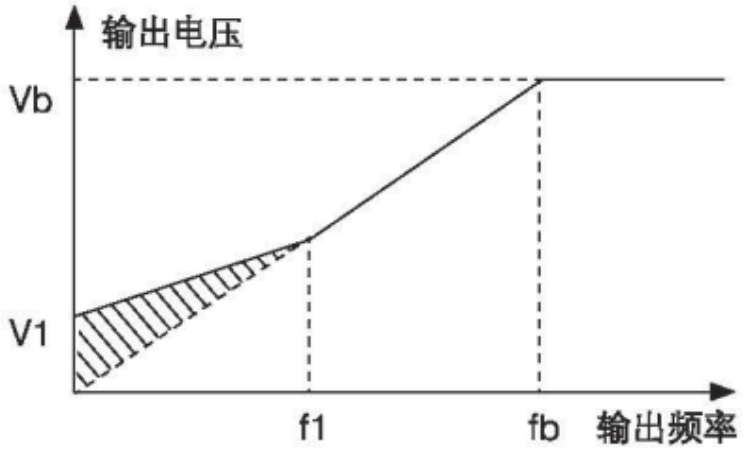


Figure 4-2 Schematic diagram of manual torque boost

V1: Manual torque boost voltage Vb: Motor rated voltage

f1: Manual torque boost cutoff frequency fb: Motor rated frequency

P3.03	Multiple VF frequency points F1	Factory value	0.00Hz
	Setting range	0.00Hz～P3.05	
P3.04	Multiple VF voltage points V1	Factory value	0.0%
	Setting range	0.0%～100.0%	
P3.05	Multiple VF frequency points F2	Factory value	0.00Hz
	Setting range	P3.03～P3.07	
P3.06	Multiple VF voltage points V2	Factory value	0.0%
	Setting range	0.0%～100.0%	
P3.07	Multiple VF frequency points F3	Factory value	0.00Hz
	Setting range	P3.05～电机额定频率（P1.04）	
P3.08	Multiple VF voltage points V3	Factory value	0.0%
	Setting range	0.0%～100.0%	

The six parameters P3.03 to P3.08 define the multi-segment V/F curve.

The multi-point V/F curve should be set according to the load characteristics of the motor. It should be noted that the relationship between the three voltage points and the frequency points must meet the following conditions: V1＜V2＜V3, F1＜F2＜F3. Figure 3-3 is a schematic diagram of the setting of the multi-point V/F curve.

Setting the voltage too high at low frequency may cause the motor to overheat or even burn, and the inverter may lose speed or overcurrent protection due to overcurrent.

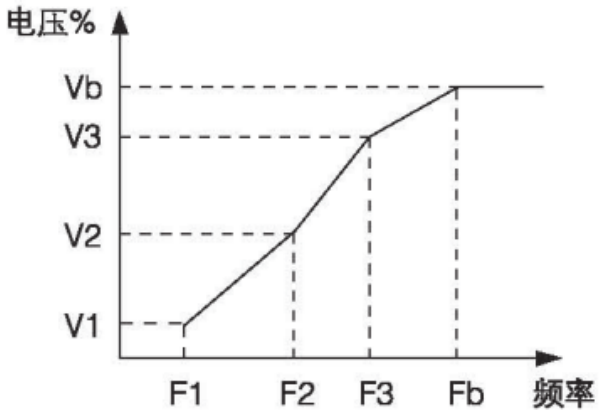


Figure 4-3 Multi-point V/F curve setting diagram

V1--V3: Multi-speed V/F 1st-3rd stage voltage percentage

F1--F3: Multi-speed V/F 1st-3rd stage frequency setting value

Vb: Motor rated voltage

Fb: Motor rated frequency

P3.09	VF slip compensation gain	Factory value	0.0%
	Setting range	0%～200.0%	

This parameter is only valid for asynchronous motors.

VF slip compensation can compensate for the motor speed deviation caused by the asynchronous motor when the load increases, so that the motor speed can basically remain stable when the load changes.

The VF slip compensation gain is set to 100.0%, which means that the slip compensated when the motor is carrying rated load is the rated slip of the motor, and the rated slip of the motor is calculated by the inverter through the rated frequency and rated speed of the motor in group P1.

When adjusting the VF slip compensation gain, the principle is generally that the motor speed is basically the same as the target speed under rated load. When the motor speed is different from the target value, the gain needs to be fine-tuned appropriately.

P3.10	VF overexcitation gain	Factory value	64
	Setting range	0 ～ 200	

During the inverter deceleration process, overexcitation control can suppress the bus voltage rise and avoid overvoltage faults. The larger the overexcitation gain, the stronger the suppression effect.

In situations where the inverter is prone to overvoltage alarm during deceleration, the overexcitation gain needs to be increased. However, if the overexcitation gain is too large, it is easy to increase the output current, so a balance needs to be struck in the application.

For applications with very small inertia, there will be no voltage rise during motor deceleration, so it is recommended to set the overexcitation gain to 0. For applications with a braking resistor, it is also recommended to set the overexcitation gain to 0.

P3.11	VF oscillation suppression gain	Factory value	Model confirmation
	Setting range	0 ～ 100	

The method of selecting this gain is to select as small as possible under the premise of effectively suppressing oscillation, so as to avoid adverse effects on VF operation. When the motor has no oscillation phenomenon, please select this gain as 0. Only when the motor oscillates obviously, it is necessary to increase this gain appropriately. The larger the gain, the more obvious the suppression of oscillation.

When using the oscillation suppression function, the motor rated current and no-load current parameters must be accurate, otherwise the VF oscillation suppression effect will be poor.

P3.18	Over-current stall action current	Factory value	150%
	Setting range	50%～200%	
P3.19	Overcurrent stall enable	Factory value	1
	Setting range	0: Invalid 1: Valid	

During acceleration, constant speed and deceleration, if the current exceeds the over-current stall current point, the over-current stall will take effect. When the current exceeds the over-current stall point, the output frequency begins to decrease until the current returns to below the over-current stall point. The frequency then begins to accelerate upward to the target frequency. The actual acceleration time is automatically extended. If the actual acceleration time cannot meet the requirements, P3.18 can be appropriately increased .

P3.20	Overcurrent stall suppression gain	Factory value	20
	Setting range	0～100	
P3.21	Current compensation coefficient of double-speed Over-current stall action	Factory value	50%
	Setting range	50%～200% Invalid at 50%	

In the high-frequency area, the motor driving current is small. Compared with the rated frequency, the motor speed drops greatly with the same stall current. In order to improve the operating characteristics of the motor, the stall action current above the rated frequency can be reduced. In some centrifuges with high operating frequencies, which require several times the rated frequency of the motor and have a large load inertia, this method has a good effect on the acceleration performance.

Transition stall operating current exceeding rated frequency = (fs/fn) * k * LimitCur;

fs is the operating frequency, fn is the rated frequency of the motor, k is P3.21 "speed overcurrent stall action current compensation coefficient" , LimitCur is P3.18 "overcurrent stall action current";

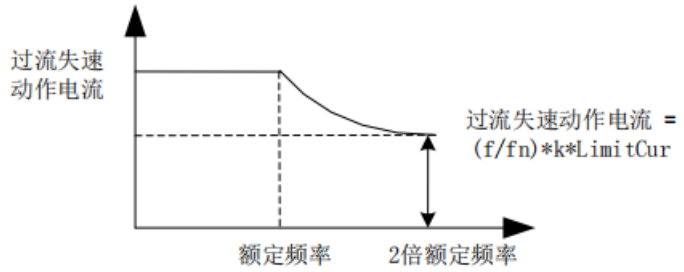


Figure 4-4 Schematic diagram of the stall action during double speed overload

P3.22	Over-current stall action voltage	Factory value	760.0V
	Setting range	200.0V～2000.0V	
P3.23	Overvoltage stall enable	Factory value	1
	Setting range	0: Invalid 1: Valid	
P3.24	Overvoltage stall suppression frequency gain	Factory value	30
	Setting range	0～100	

P3.25	Overvoltage stall suppression voltage gain	Factory value	30
	Setting range	0～100	
P3.26	Overvoltage stall maximum rising frequency limit	Factory value	5Hz
	Setting range	0～50Hz	

Increasing P3.24 will improve the control effect of bus voltage, but the output frequency will fluctuate. If the output frequency fluctuates greatly, P3.24 can be appropriately reduced. Increasing P3.25 can reduce the overshoot of bus voltage. The maximum rising frequency during overvoltage stall is determined by P3.26.

Remark:

Please note when using a braking resistor or installing a braking unit:

Please set the value of P3.11 "overexcitation gain" to "0". If it is not "0", it may cause excessive current during operation.

Please set the value of P3.23 "Overvoltage stall enable" to "0". If it is not "0", it may cause the deceleration time to be extended.

P4 Group Input Terminals

The NZ200DR series inverter comes standard with 2 digital input terminals, 1 STO terminal and a motor temperature input terminal.

P4. 04	ASI-DO1 terminal function selection	Factory value	27
P4. 05	ASI-DO2 terminal function selection	Factory value	28
P4. 06	ASI-DO3 terminal function selection	Factory value	12
P4. 07	TF terminal function selection	Factory value	11
P4.08	ASI-DO4 terminal function selection	Factory value	13
P4.09	STO	Factory value	8

These parameters are used to set the functions of the digital multi-function input terminals. The selectable functions are shown in the following table:

Settings	Function	illustrate
0	No function	Unused terminals can be set to "No Function" to prevent malfunctions.
1	Forward operation (FWD)	The inverter forward and reverse rotation is controlled through external terminals.
2	Reverse operation (REV)	
4	Forward jog (FJOG)	FJOG is jog forward operation, RJOG is jog reverse operation. For jog operation frequency and jog acceleration and deceleration time, refer to the description of function code P8.00, P8.01, and P8.02.
5	Reverse jog (RJOG)	
8	STO	
11	Motor temperature protection TF input	
12	Multi-segment	The four states of these two terminals can realize the setting of

	instruction 1	four speeds or four other commands. See Appendix 1 for details.
13	Multi-segment	
16	Acceleration and deceleration time selection Terminal 1	Through the 4 states of these two terminals, 4 acceleration and deceleration time selections can be achieved. For details, see Appendix 2.
17	Acceleration and deceleration time selection Terminal 2	
18	Manual	When the manual function is valid (MANU), the terminal forward (CW) and reverse (CCW) are valid.
25	automatic	When the automatic function is valid (AUTO), the terminal ASI communication and RS485 communication are valid
27	ASI forward operation	
28	ASI reverse operation	

Appendix 1 Multi-segment instruction function description

2 multi-stage command terminals can be combined into 4 states, which correspond to 4 command setting values. See Table 1 for details :

K2	K1	Command settings	Corresponding parameters
OFF	OFF	Multi-segment instruction 0	PC. 00
OFF	ON	Multi-segment instruction 1	PC. 01
ON	OFF	Multi-segment instruction 2	PC. 02
ON	ON	Multi-segment instruction 3	PC. 03

When the frequency source is selected as multi-speed, 100.0% of the function code PC.00~PC.03 corresponds to the maximum frequency P0.10. In addition to the multi-speed function, the multi-segment instruction can also be used as a given source for PID, or as a voltage source for VF separation control, etc., to meet the need to switch between different given values.

Appendix 2 Acceleration and deceleration time selection terminal function description

Terminal 2	Terminal 1	Acceleration or deceleration time selection	Corresponding parameters
OFF	OFF	Acceleration time 1	P0.17 , P0.18
OFF	ON	Acceleration time 2	P8.03 , P8.04
ON	OFF	Acceleration time 3	P8.05 , P8.06
ON	ON	Acceleration time 4	P8. 07, P8. 08

P4. 10	Switching filter time	Factory value	0.010s
	Setting range	0.000s ～ 1.000s	

Set the software filter time of the switch input terminal. If the input terminal is susceptible to interference and causes malfunction, this parameter can be increased to enhance the anti-interference ability. However, the increase of the filter time will cause the response of the switch input terminal to slow down.

P4. 38	X terminal effective mode selection 1		Factory value	00000
	Setting	Units	Reserved	

	range	Tens	Reserved	
		Hundreds	Reserved	
		Thousands		Reserved
		Ten thousand		DI01
		0		High level is effective
		1		Low level is effective
P4. 39	X terminal effective mode selection 2		Factory value	1 0000
	Setting range	Units		DI02
		0		High level is effective
		1		Low level is effective
		Tens		Reserved
		Hundreds		TF
		Thousands		Reserved
		Ten thousand		STO

Used to set the effective state mode of the digital input terminal. When the high level is selected as effective, the corresponding S terminal is effective when connected to COM, and it is invalid when disconnected. When the low level is selected as effective, the corresponding S terminal is invalid when connected to COM, and it is effective when disconnected.

P6 Group Start-Stop Control

P6.00	Startup method		Factory value	0
	Setting range	0	Direct Start	
		1	Speed tracking restart	
		2	Pre-excitation starting (AC asynchronous motor)	

0: Direct start

If the start DC braking time is set to 0, the inverter will start running from the start frequency. If the start DC braking time is not 0, DC braking will be performed first, and then the inverter will start running from the start frequency. It is suitable for small inertia loads and occasions where the motor may rotate at startup.

1: Speed tracking restart

When the asynchronous motor is controlled in vector mode, the inverter first determines the speed and direction of the motor, and then starts with the tracked motor frequency, and starts the rotating motor smoothly without impact. It is suitable for restarting after instantaneous power failure of large inertia loads. To ensure the performance of speed tracking restart, the motor parameters of Group P1 need to be set accurately.

2: Asynchronous motor pre-excitation starting

It is only valid for asynchronous motors and is used to establish a magnetic field before the motor runs. For pre-excitation current and pre-excitation time, refer to the description of function code P6.05 and P6.06.

If the pre-excitation time is set to 0, the inverter cancels the pre-excitation process and starts from the starting frequency. If the pre-excitation time is not 0, pre-excitation is performed before starting, which can improve the dynamic response performance of the motor.

P6. 01	Speed tracking mode		Factory value	0
	Setting range	0	Start with downtime frequency	

		1	Starting from zero speed
		2	Start with the maximum frequency

In order to complete the speed tracking process in the shortest time, select the inverter to track the motor speed:

0: Track downward from the frequency when the power outage occurs. This method is usually selected.

1: Track upward from 0 frequency, used when restarting after a long power outage.

2: Track downward from the maximum frequency, generally used for power generation loads.

P6. 02	Speed tracking speed	Factory value	20
	Setting range	1 ～ 100	

When the speed tracking is restarted, select the speed tracking speed.

The larger the parameter, the faster the tracking speed. However, setting it too large may cause unreliable tracking results.

Note: This parameter generally requires special software to modify.

P6. 03	Start frequency	Factory value	0.00Hz
	Setting range	0.00Hz ～ 10.00Hz	
P6. 04	Start frequency holding time	Factory value	0.0s
	Setting range	0.0s ～ 100.0s	

To ensure the motor torque at startup, please set a suitable starting frequency. To fully establish the magnetic flux when the motor starts, the starting frequency needs to be maintained for a certain period of time.

The starting frequency P6.03 is not limited by the lower frequency limit. However, when the target frequency is set lower than the starting frequency, the inverter will not start and will be in standby mode.

During the forward/reverse switching process, the start frequency holding time does not work. The start frequency holding time is not included in the acceleration time, but is included in the running time of the simple PLC.

Example 1:

P0.04＝0 Frequency source is digital given

P0.10＝2.00Hz　Digital setting frequency is 2.00Hz

P6.03＝5.00Hz　starting frequency is 5.00Hz

P6.04＝2.0s　The starting frequency holding time is 2.0s. At this time, the inverter will be in standby state and the inverter output frequency is 0.00Hz.

Example 2:

P0.04＝0 Frequency source is digital given

P010＝10.00Hz　Digital setting frequency is 10.00Hz

P6.03＝5.00Hz　Starting frequency is 5.00Hz

P6.04＝2.0s　Start frequency hold time is 2.0s

At this time, the inverter accelerates to 5.00Hz, lasts for 2.0s, and then accelerates to the given frequency 10.00Hz.

P6. 05	Starting DC braking current/pre-excitation current	Factory value	0%
	Setting range	0% ～ 100%	
P6. 06	Starting DC braking time/pre-excitation time	Factory value	0.0s
	Setting range	0.0s ～ 100.0s	

Starting DC braking is generally used to restart a running motor after stopping it. Pre-excitation is used to build up a magnetic field for an asynchronous motor before starting it, thus improving the response speed.

The start-up DC braking is only valid when the start-up mode is direct start. At this time, the inverter first performs DC braking according to the set start-up DC braking current, and then starts running after the start-up DC braking time. If the DC braking time is set to 0, it will start directly without DC braking. The larger the DC braking current, the greater the braking force.

If the starting mode is asynchronous motor pre-excitation start, the inverter will first establish a magnetic field according to the set pre-excitation current, and then start running after the set pre-excitation time. If the pre-excitation time is set to 0, it will start directly without going through the pre-excitation process.

The starting DC braking current/pre-excitation current is a percentage of the rated current of the inverter.

P6. 07	Acceleration and deceleration method		Factory value	0
	Setting range	0	Linear acceleration and deceleration	
		1	S curve acceleration and deceleration A	
		2	S curve acceleration and deceleration B	

Select the frequency change mode of the inverter during start and stop.

0: Linear acceleration and deceleration. The output frequency increases or decreases in a linear manner. The NZ200DR series provides 4 types of acceleration and deceleration time. They can be selected through the multi-function digital input terminal (P4.00～P4.07).

1: S curve acceleration/deceleration A

The output frequency increases or decreases according to the S curve. The S curve is used in places where smooth start or stop is required, such as elevators, conveyor belts, etc. Function codes P6.08 and P6.09 define the time proportion of the start and end segments of the S curve acceleration and deceleration respectively.

2: S-curve acceleration and deceleration B

In the S-curve acceleration/deceleration B, the motor rated frequency fb is always the inflection point of the S-curve, as shown in Figure 3-5. It is generally used in situations where rapid acceleration/deceleration is required in the high-speed area above the motor rated frequency fb.

When the set frequency is above the rated frequency, the acceleration and deceleration time is:

$$t = (\frac{4}{9} * (\frac{f}{f_b}) + \frac{5}{9}) * T$$

Where, f is the set frequency, fb is the rated frequency of the motor, and T is the time to accelerate from 0 frequency to the rated frequency fb.

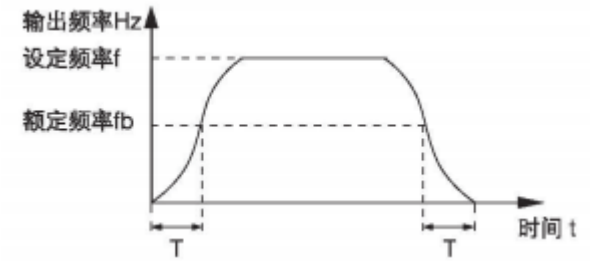


Figure 4-5 Schematic diagram of S-curve acceleration and deceleration B

P6. 08	S curve start time ratio	Factory value	30.0%
	Setting range	0.0% ～(100.0 % -P6.09)	
P6. 09	S curve end period time ratio	Factory value	30.0%
	Setting range	0.0% ～(100.0 % -P6.08)	

Function codes P6.08 and P6.09 define the time ratio of the start and end segments of S-curve

acceleration/deceleration A, respectively. The two function codes must satisfy: P6.08 + P6.09 ≤ 100.0%.

In Figure 3-6, t1 is the parameter defined by parameter P6.08. During this period, the slope of the output frequency change gradually increases. t2 is the time defined by parameter P6.09. During this period, the slope of the output frequency change gradually changes to 0. During the time between t1 and t2, the slope of the output frequency change is fixed, that is, linear acceleration and deceleration are performed in this interval.

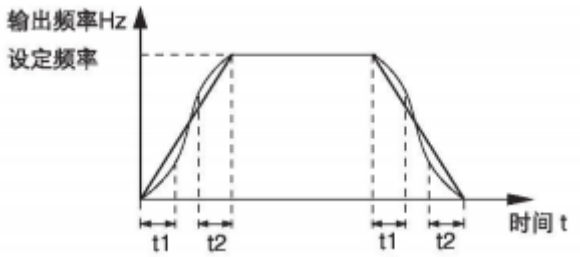


Figure 4-6 Schematic diagram of S-curve acceleration and deceleration A

P6. 10	Shutdown mode		Factory value	0
	Setting range	0	Slow down and stop	
		1	Free parking	

0: decelerate and stop

After the stop command is effective, the inverter reduces the output frequency according to the deceleration time and stops after the frequency drops to 0.

1: Free parking

After the stop command is effective, the inverter stops output immediately, and the motor stops freely according to mechanical inertia.

P6.11	DC braking start frequency at	Factory value	0.00Hz
	Setting range	0.00Hz～Maximum frequency	
P6. 12	DC braking waiting time	Factory value	0.0s
	Setting range	0.0s ～ 100.0s	
P6. 13	DC braking current at shutdown	Factory value	0%
	Setting range	0% ～ 100%	
P6. 14	DC braking time at shutdown	Factory value	0.0s
	Setting range	0.0s ～ 100.0s	

DC braking starting frequency during shutdown: During the asynchronous motor deceleration shutdown process, when the operating frequency drops to this frequency, the DC braking process begins.

DC braking waiting time at shutdown: After the operating frequency drops to the DC braking starting frequency at shutdown, the inverter stops outputting for a period of time before starting the DC braking process. This is used to prevent faults such as overcurrent that may be caused by starting DC braking at a higher speed.

DC braking current at shutdown: refers to the output current during DC braking, which is a percentage of the rated current of the motor. The larger this value is, the stronger the DC braking effect is, but the greater the heat generated by the motor and inverter.

DC braking time at shutdown: the time for which the DC braking value is maintained. If this value is 0, the DC braking process is cancelled. The DC braking process at shutdown is shown in Figure 3-7.

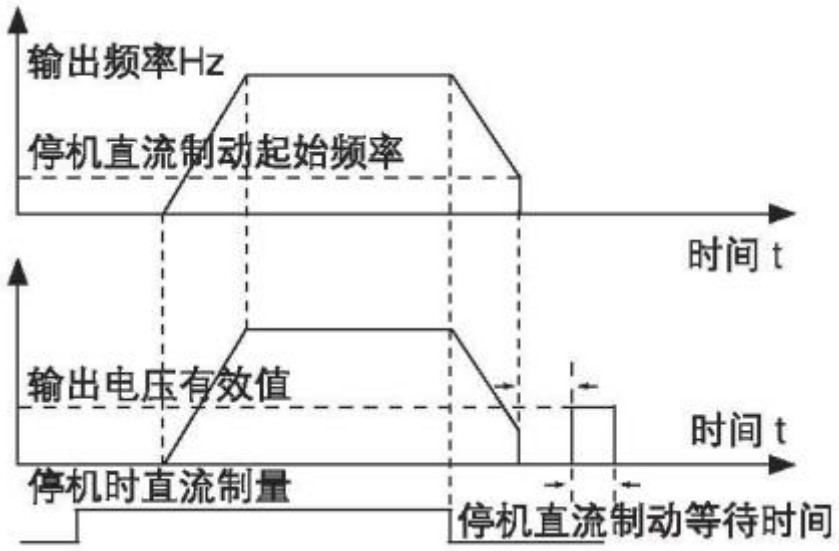


Figure 4-7 Schematic diagram of DC braking during shutdown

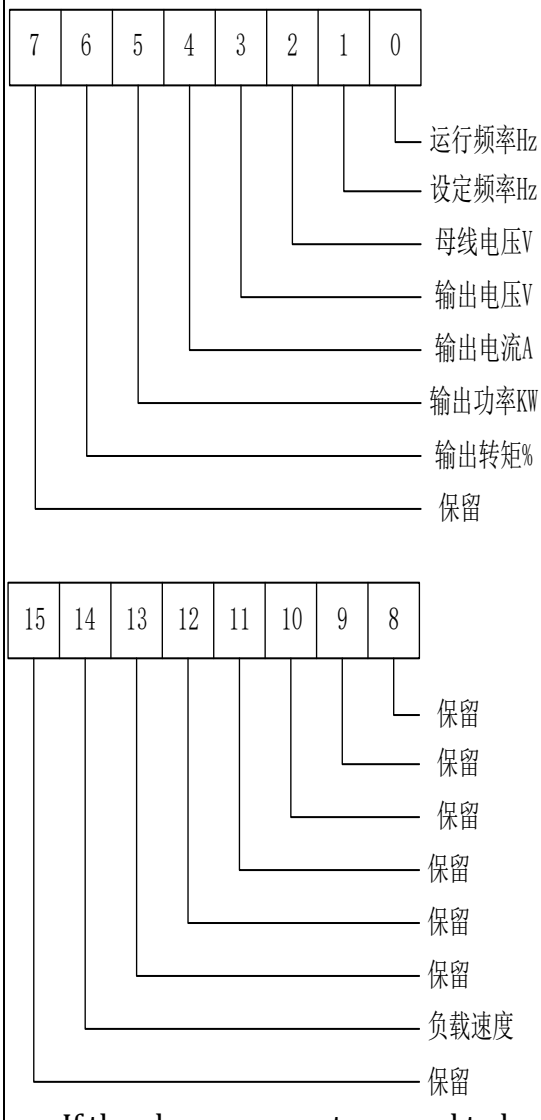
P6. 15	Braking rate		Factory value	100%
	Setting range	0% ～ 100%		

Only valid for inverters with built-in braking units.

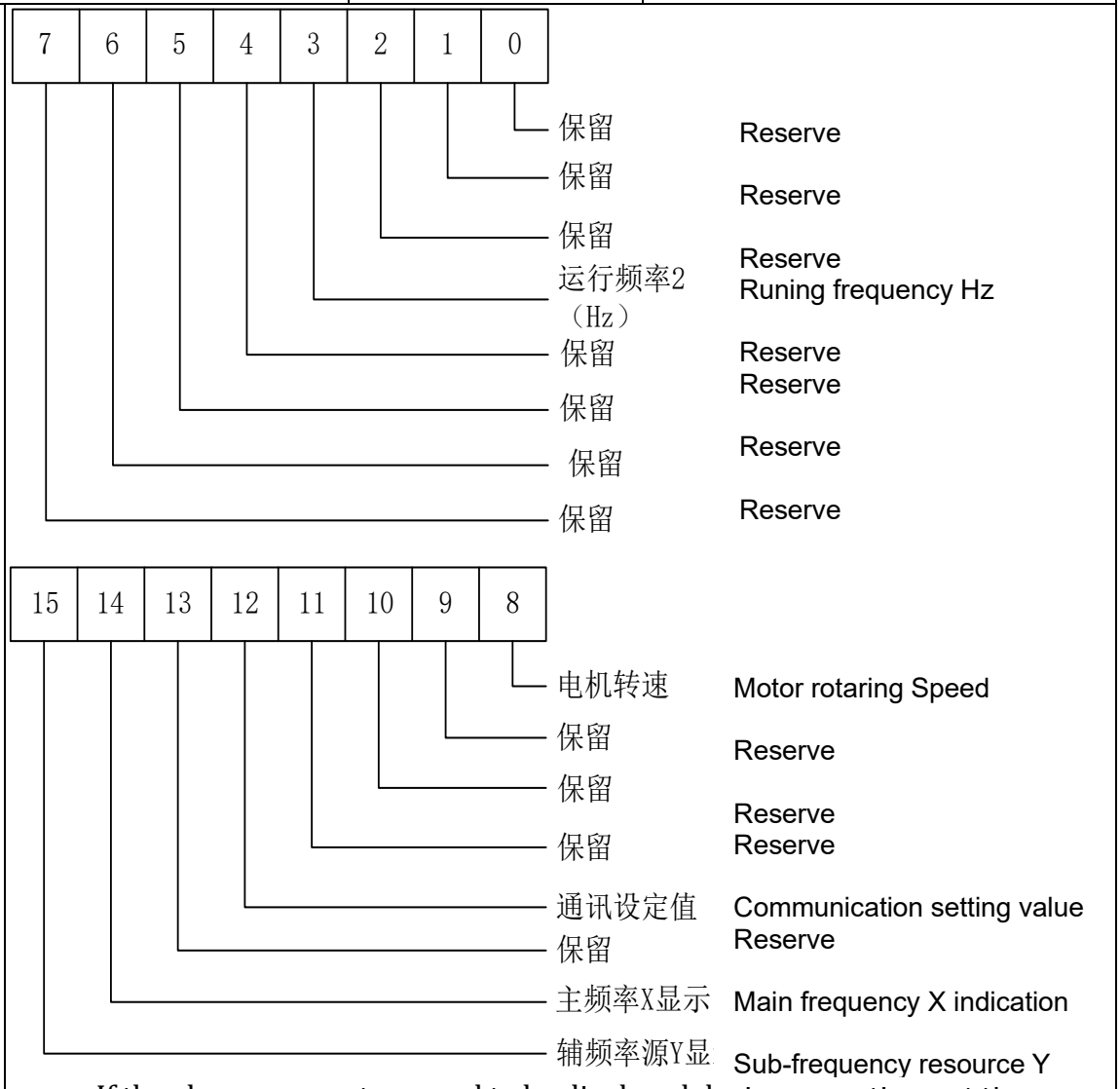
It is used to adjust the duty cycle of the braking unit. If the braking utilization rate is high, the braking unit action duty cycle is high and the braking effect is strong, but the inverter bus voltage fluctuates greatly during the braking process.

P7 Group Keyboard and Display

P7. 02	STOP/RESET key function		Factory value	1
	Setting range	0		STOP/RES ET key shutdown function is only valid in keyboard operation mode .
		1		In any operation mode , the STOP/RES ET key shutdown function is effective
P7. 03	LED operation display parameters 1		Factory value	1F

	Setting range	0000 ~ FFFF	 If the above parameters need to be displayed during operation, set the corresponding position to 1, convert the binary number to hexadecimal and set it in P7.03.

P7. 04	LED operation display parameters 2		Factory value	0
	Setting range	0000 ~ FFFF		

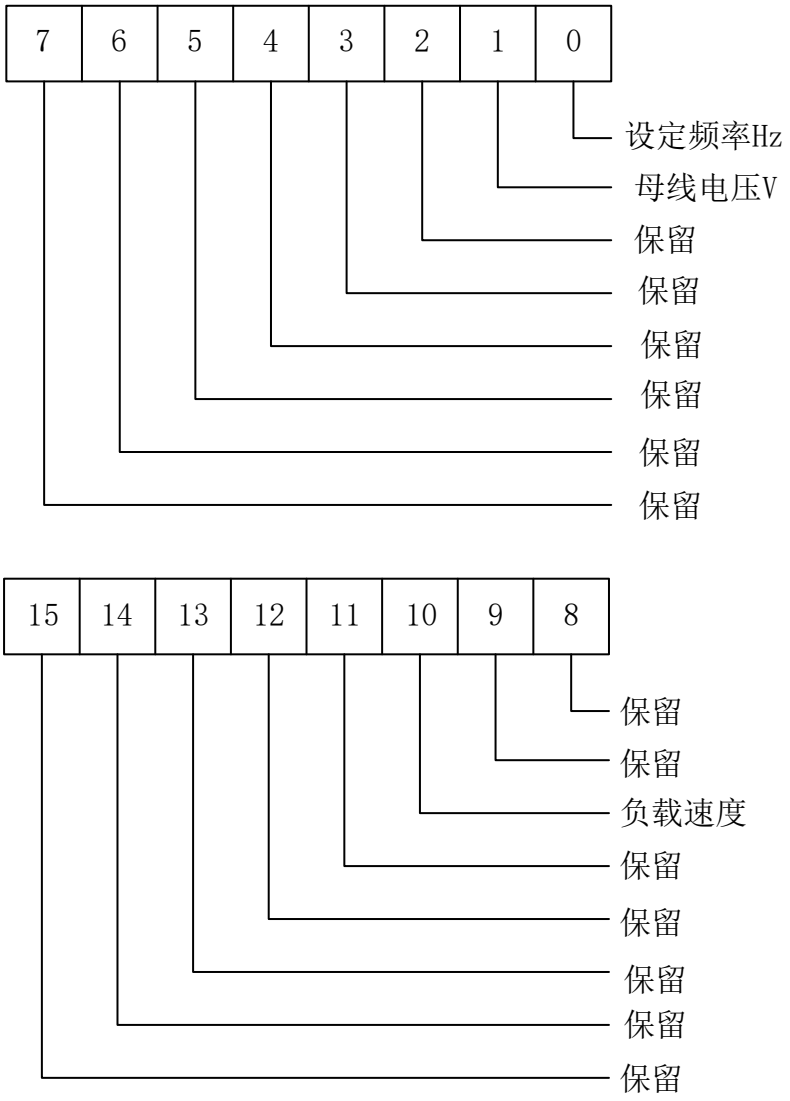


If the above parameters need to be displayed during operation, set the corresponding position to 1, convert the binary number to hexadecimal and set it in P7.04.

Running display parameters are used to set the parameters that can be viewed when the inverter is in running state.

A maximum of 32 status parameters can be viewed. The status parameters to be displayed are selected according to the binary bits of the P7.03 and P7.04 parameter values. The display order starts from the lowest bit of P7.03.

P7. 05	LED stop display parameters		Factory value	33
	Setting range	0000 ~ FFFF		



If the above parameters need to be displayed during operation, set the corresponding position to 1, convert the binary number to hexadecimal and set it in P7.05.

P7. 06	Load speed display factor		Factory value	1.0000
	Setting range	0.0001 ～ 6 5.000		

When the load speed needs to be displayed, this parameter is used to adjust the corresponding relationship between the inverter output frequency and the load speed. For the specific corresponding relationship, refer to the description of P7.12.

P7. 07	Inverter module heat sink temperature		Read-only	-
	Setting range	0.0 ℃ ～ 150.0 ℃		

Displays the temperature of the inverter module IGBT.

The over-temperature protection values of IGBTs in inverter modules of different models are different.

P7. 09	Cumulative running time		Factory value	-
	Setting range	0h ～ 65535h		

Displays the accumulated running time of the inverter. When the running time reaches the set running time P8.17, the inverter alarms END1 and stops.

P7. 11	Software Version		Factory value	-
P7. 12	Load speed display decimal places		Factory value	Twenty one
	Setting range	Units	0	0 decimal places
			1	1 decimal place
			2	2 decimal places
			3	3 decimal places
		Tens	Reserved	

Units:

Used to set the number of decimal places for load speed display. The following example illustrates the calculation method of load speed:

If the load speed display coefficient P7.06 is 2.000, the load speed decimal point P7.12 is 2 (2 decimal places), when the inverter operating frequency is 40.00Hz, the load speed is: 40.00*2.000 = 80.00 (2 decimal places display)

If the inverter is in the stop state, the load speed is displayed as the speed corresponding to the set frequency, that is, "set load speed". Taking the set frequency of 50.00Hz as an example, the load speed in the stop state is: 50.00*2.000 = 100.00 (displayed with 2 decimal places)

Tens:

1: D0.19/D0.29 are both displayed with 1 decimal point.

2: D0.19/D0.29 are both displayed with 2 decimal points.

P7. 13	Cumulative power-on time	-	
	Setting range	0h ～ 65535h	

Displays the cumulative power-on time of the inverter since leaving the factory.

the set power-on time (P8.16) , the inverter alarm END2 and shuts down.

P7. 14	Cumulative power consumption	Factory value	-
	Setting range	0～65535 degrees	

Displays the inverter's cumulative power consumption so far.

P8 Group Auxiliary Functions

P8.00	Jog operation frequency	Factory value	2.00Hz
	Setting range	0.00Hz～Maximum frequency	
P8.01	Jog acceleration time	Factory value	20.0s
	Setting range	0.0s ～ 6500.0s	
P8. 02	Jog deceleration time	Factory value	20.0s
	Setting range	0.0s ～ 6500.0s	

Define the given frequency and acceleration/deceleration time of the inverter during jogging.

During jog operation, the starting mode is fixed to direct starting mode (P6.00 = 0), and the stopping mode is fixed to deceleration stop (P6.10 = 0).

P8.03	Acceleration time 2	Factory value	20.0s
	Setting range	0. 0s～6500.0s	

P8.04	Deceleration time 2	Factory value	20.0s
	Setting range	0. 0s～6500.0s	
P8.05	Acceleration time 3	Factory value	20.0s
	Setting range	0. 0s～6500.0s	
P8.06	Deceleration time 3	Factory value	20.0s
	Setting range	0. 0s～6500.0s	
P8.07	Acceleration time 4	Factory value	20.0s
	Setting range	0. 0s～6500.0s	
P8.08	Deceleration time 4	Factory value	20.0s
	Setting range	0. 0s～6500.0s	

The NZ200DR series provides 4 groups of acceleration and deceleration time, namely P0.17/P0.18 and the above 3 groups of acceleration and deceleration time.

The definitions of the 4 groups of acceleration and deceleration time are exactly the same, please refer to the relevant instructions of P0.17 and P0.18. Through different combinations of multi-function digital input terminals, you can switch to select 4 groups of acceleration and deceleration time. For specific usage methods, please refer to the relevant instructions in function code P4.00~P4.07.

P8. 09	Hop frequency 1	Factory value	0.00Hz
	Setting range	0.00Hz～Maximum frequency	
P8. 10	Hop frequency 2	Factory value	0.00Hz
	Setting range	0.00 Hz～Maximum frequency	
P8. 11	Jump frequency amplitude	Factory value	0.00Hz
	Setting range	0.00～Maximum frequency	

When the set frequency is within the jump frequency range, the actual operating frequency will run at the jump frequency that is closer to the set frequency. By setting the jump frequency, the inverter can avoid the mechanical resonance point of the load.

The NZ200DR series can set two hopping frequency points. If both hopping frequencies are set to 0, the hopping frequency function is canceled. For the principle diagram of hopping frequency and hopping frequency amplitude, please refer to Figure 3-8.

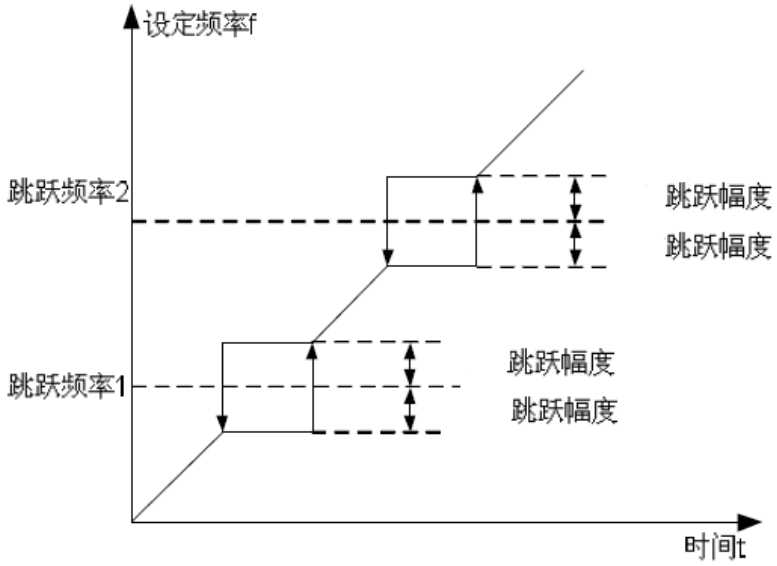


Figure 4-8 Schematic diagram of jump frequency

P8. 12	Forward and reverse dead time	Factory value	0.0s
	Setting range	0.00s ～ 3000.0s	

Set the transition time at output 0Hz during the inverter forward and reverse transition process, as shown in Figure 3-9:

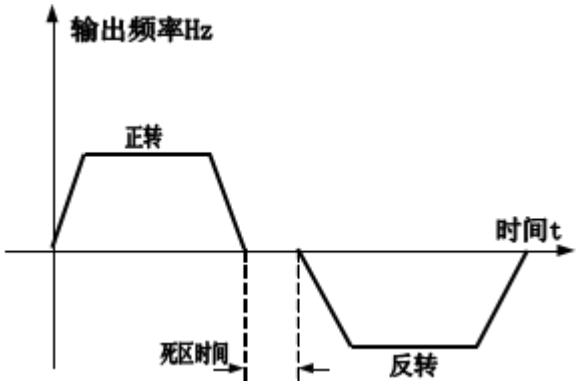


Figure 4-9 Schematic diagram of forward and reverse dead time

P8. 13	Reverse control enable		Factory value	0
	Setting range	0	Allow	
		1	Prohibit	

This parameter is used to set whether the inverter is allowed to run in reverse state. If the motor is not allowed to run in reverse state, set P8.13=1.

P8. 14	The set frequency is lower than the lower limit frequency operation mode		Factory value	0
	Setting range	0	Run at the lower frequency limit	
		1	Downtime	
		2	Zero speed operation	

When the set frequency is lower than the lower limit frequency, the inverter's operating state can be selected by this parameter. NZ200DR series provides three operating modes to meet various application requirements.

P8. 15	Droop control	Factory value	0.00Hz
	Setting range	0.00Hz ～ 10.00Hz	

This function is generally used for load distribution when multiple motors are driving the same load.

Droop control means that as the load increases, the inverter output frequency decreases. In this way, when multiple motors are dragging the same load, the output frequency of the motor in the load decreases more, thereby reducing the load of the motor and achieving uniform load distribution for multiple motors.

This parameter refers to the frequency drop value when the inverter outputs rated load.

P8. 16	Set the cumulative power-on arrival time	Factory value	0h
	Setting range	0h ～ 65000h	

When the accumulated power-on time (P7.13) reaches the power-on time set by P8.16, the inverter alarms END2 and shuts down.

P8. 17	Set the cumulative running arrival time	Factory value	0h
	Setting range	0h ～ 65000h	

Used to set the running time of the inverter.

When the accumulated running time (P7.09) reaches the set running time, the inverter alarm END1 and shuts down.

P8. 18	Start protection selection		Factory value	0
	Setting range	0	No protection	
		1	Protection	

This parameter is related to the safety protection function of the inverter.

If this parameter is set to 1, if the run command is valid when the inverter is powered on (for example, the terminal run command is in a closed state before power-on), the inverter will not respond to the run command. The run command must be removed once, and the inverter will respond only after the run command is valid again.

In addition, if this parameter is set to 1, if the running command is valid when the inverter fault resets, the inverter will not respond to the running command. The running command must be removed first to eliminate the running protection state.

Setting this parameter to 1 can prevent the motor from responding to a run command without your knowledge when power is turned on or a fault is reset.

P8. 22	Is the jump frequency valid during acceleration and deceleration?	Factory value	0
	Setting range	0: Invalid 1: Valid	

This function code is used to set whether the jump frequency is valid during acceleration and deceleration.

When set to valid, when the operating frequency is within the jump frequency range, the actual operating frequency will jump over the set jump frequency boundary. Figure 3-10 is a schematic diagram of the jump frequency being valid during acceleration and deceleration.

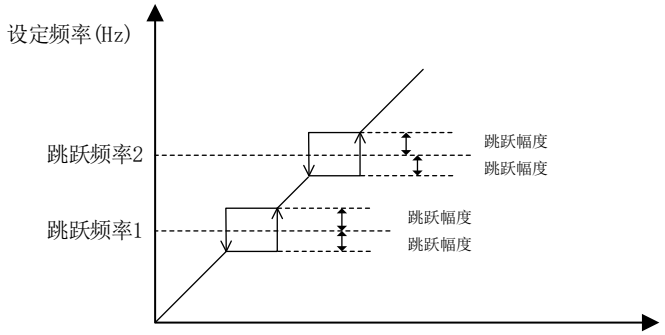


Figure 4-10 Schematic diagram of effective jump frequency during acceleration and deceleration

P8. 25	Switching frequency point between acceleration time 1 and acceleration time 2	Factory value	0.00Hz
	Setting range	0.00Hz～Maximum frequency	
P8. 26	Switching frequency point between deceleration time 1 and deceleration time 2	Factory value	0.00Hz
	Setting range	0.00Hz～Maximum frequency	

It is effective when the acceleration/deceleration time is not selected through the X terminal. It is used to select different acceleration/deceleration times according to the operating frequency range instead of through the X terminal during the operation of the inverter.

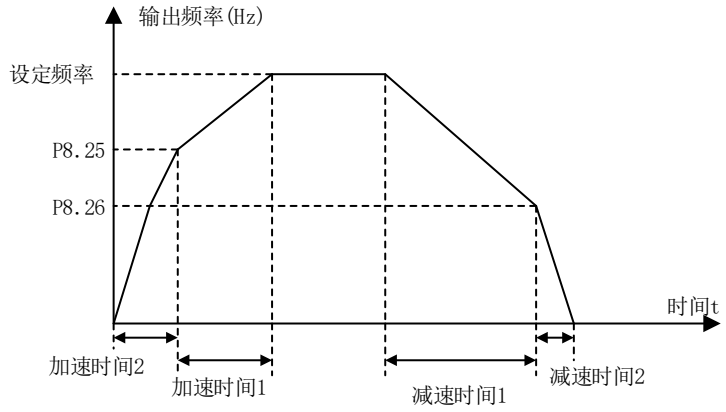


Figure 4-11 Schematic diagram of acceleration and deceleration time switching

Figure 4-11 is a schematic diagram of the acceleration and deceleration time switching. During the acceleration process, if the operating frequency is less than P8.25, select acceleration time 2; if the operating frequency is greater than P8.25, select acceleration time 1.

During deceleration, if the operating frequency is greater than P8.26, deceleration time 1 is selected; if the operating frequency is less than P8.26, deceleration time 2 is selected.

P8. 27	Terminal jog priority	Factory value	0
	Setting range	0: Invalid 1: Valid	

This parameter is used to set whether the terminal jog function has the highest priority.

When the terminal jog priority is valid, if a terminal jog command appears during operation, the inverter switches to the terminal jog operation state.

P8. 42	Timing function selection		Factory value	0
	Setting range	0	Invalid	
		1	Valid	
P8. 43	Scheduled running time selection		Factory value	0
	Setting range	0	P8.44 Setting	
		1	Reserved	
		2	Reserved	
		3	Reserved	
		Analog input range 100% corresponds to P8. 44		
P8. 44	Scheduled running time		Factory value	0.0Min
	Setting range	0.0Min ～ 6500.0Min		

This group of parameters is used to complete the inverter timing operation function.

When the timing function of P8.42 is selected to be valid, the inverter starts timing when it starts, and the inverter automatically stops after the set timing running time is reached.

Each time the inverter is started, the timing starts from 0, and the remaining time of the timing operation can be viewed through D0.20. The timing operation time is set by P8.43 and P8.44, and the time unit is minutes.

P8. 47	Module temperature reaches	Factory value	75℃

	Setting range	0.00V ～100 ℃

When the inverter radiator temperature reaches this temperature, the inverter multi-function MO1 outputs the "module temperature reached" ON signal (P5.02=35). This function is for reference only.

P8.48	Cooling fan control	Factory value	0
	Setting range	0: Fan runs during operation 1: The fan is always running	

Used to select the action mode of the cooling fan. When 0 is selected, the fan runs when the inverter is in operation. In the stopped state, if the radiator temperature is higher than 40 degrees, the fan runs. In the stopped state, if the radiator temperature is lower than 40 degrees, the fan does not run.

When 1 is selected, the fan keeps running after power-on.

P8.53	This running time has arrived	Factory value	0.0min
	Setting range	0.0～6500.0min	

When the running time of this startup reaches this time, the inverter multi-function digital MO1 outputs the "this running time is reached" ON signal (P5.01=40). This function is for reference only.

P8.54	Output power correction factor	Factory value	100.0%
	Setting range	0.0%～200.0%	

When the output power (D0.05) does not correspond to the expected value, this value can be used to perform linear correction on the output power.

P8.55	Rapid deceleration time	Factory value	Model confirmation
	Setting range	0.0-6553.5	

When the output current (D0.04) does not correspond to the expected value, this value can be used to perform linear correction on the output current.

P9 Group Fault and Protection

P9.00	Motor overload protection selection		Factory value	1
	Setting range	0	prohibit	
		1	allow	
P9. 01	Motor overload protection gain		Factory value	1.00
	Setting range		0.20 ～ 10.00	

P9.00=0: No motor overload protection function, there may be a risk of motor overheating and damage, it is recommended to heat the relay between the inverter and the motor;

P9.00=1: At this time, the inverter determines whether the motor is overloaded based on the inverse time curve of the motor overload protection.

Motor overload current ratio (%)	115	125	150	155	175	195
Overload detection time	1h20min	40min	5min	4min	2min	1min

Example: P9.01=1, motor overload 150% detection time=1.00*5min

P9.01=0.5, motor overload 150% detection time=0.5*5min

P9. 02	Motor overload warning factor	Factory value	80%
	Setting range	50% ～ 100%	

This function is used to give the control system an early warning signal through MO1 before the motor overload fault protection. The early warning coefficient is used to determine the extent to which the early warning is given before the motor overload protection. The larger the value, the smaller the early warning amount.

When the inverter output current accumulation is greater than the product of the motor overload inverse time curve and P9.02, the inverter multi-function digital MO1 outputs the "motor overload pre-alarm" ON signal. This function is for reference only.

P9. 03	Overvoltage stall gain	Factory value	0

	Setting range	0 (no overvoltage stall) ~ 100		
P9. 04	Overvoltage stall protection		Factory value	770V
	Setting range	650V—800V (three-phase)		

During the inverter deceleration process, when the DC bus voltage exceeds the overvoltage stall protection voltage, the inverter stops decelerating and maintains the current operating frequency, and continues to decelerate after the bus voltage drops.

Overvoltage stall gain is used to adjust the inverter's ability to suppress overvoltage during deceleration. The larger the value, the stronger the ability to suppress overvoltage. Under the premise that no overvoltage occurs, the smaller the gain is set, the better.

For small inertia loads, the overvoltage stall gain should be small, otherwise it will cause the system dynamic response to slow down. For large inertia loads, this value should be large, otherwise the suppression effect will be poor and overvoltage faults may occur.

When the overvoltage stall gain is set to 0, the overvoltage stall function is canceled.

P9. 07	Power-on short-circuit protection		Factory value	1
	Setting range	0	Invalid	
		1	Valid	

The inverter can be selected to detect whether the motor is short-circuited to ground when it is powered on.

If this function is effective, the inverter UVW terminal will have voltage output for a period of time after power-on.

P9. 09	Fault automatic reset times	Factory value	0
	Setting range	0 ～ 20	

When the inverter selects automatic fault reset, it is used to set the number of times it can be automatically reset. After exceeding this number, the inverter will remain in the fault state. It is invalid when set to 0.

P9. 11	Fault automatic reset interval	Factory value	1.0s
	Setting range	0.1s ～ 100.0s	

The waiting time between inverter fault alarm and automatic fault reset.

P9. 12	Input phase loss /contactor pick-up protection selection	Factory value	01
	Setting range	Units: Input phase loss protection selection Tens: Contactor pick-up protection selection 0: Disable 1: Allow	

Select whether to protect input phase loss and contactor closure.

P9. 13	Output phase loss protection selection	Factory value	1
	Setting range	Units: Output phase loss protection selection Tens digit: Output phase loss protection selection before operation 0: Disable 1: Allow	

Select whether to protect the output from phase loss.

P9. 14	First failure type	0 ~ 99
P9. 15	Second failure type	
P9. 16	The third (most recent) fault type	

Record the three most recent fault types of the inverter, 0 means no fault. About the possible causes and solutions for each fault code.

P9. 17	The third fault frequency		The frequency of the most recent fault	
P9. 18	The third fault current		Current at the time of the most recent fault	
P9. 19	Bus voltage at the third fault		Bus voltage at the time of the most recent fault	
P9. 27	Second fault frequency		Same as P9. 17～ P9. 24	
P9. 28	Second fault current			
P9. 29	Bus voltage at the second fault			
P9. 37	First failure frequency		Same as P9. 17～ P9. 24	
P9. 38	First fault current			
P9. 39	Bus voltage at the first fault			
P9.47	Fault protection action selection 1		Factory value	00000
	Setting range	Units	Motor overload (OL1)	
		0	Free stop	
		1	Stop according to the shutdown mode	
		2	Keep running	
		Tens	Input phase loss (LI) (same as ones place)	
		Hundreds	Output phase loss (LO) (same as ones position)	
		Thousands	TF alarm (EF) (same as units digit)	
		Ten thousand	Communication abnormality (CE) (same as units digit)	
P9.48	Fault protection action selection 2		Factory value	00000
	Setting range	Units	Encoder fault (PG)	
		0	Free stop	
		Tens	Function code reading and writing abnormality (EEP)	
		0	Free stop	
		1	Stop according to the shutdown mode	
		Hundreds	Reserved	
		Thousands	Reserved	
		Ten thousand	Running time reached (END1) (same as P9.47 digit)	
P9.49	Fault protection action selection 3		Factory value	00000
	Setting range	Units	Reserved	
		Tens	Reserved	
		Hundreds	Power-on time reached (END2) (same as P9.47 units	
		Thousands	LOAD	
		0	Free stop	
		1	Stop according to the stop mode	
		2	The motor will continue to run after decelerating to 7% of its rated	
		Ten thousand	Reserved	
P9.50	Fault protection action selection 4		Factory value	00000
	Setting range	Units	Speed deviation is too large (ESP) (same as P9.47 units digit)	
		Tens	reserve	
		Hundreds	reserve	
		Thousands	reserve	
		Ten thousand	reserve	

When “Free Stop” is selected, the inverter displays a fault code and stops directly.

When "Stop according to the stop mode" is selected: the inverter displays the alarm code and stops according to the stop mode, and displays the fault code after stopping. When "Continue to run" is selected: the inverter continues to run and displays the alarm code, and the running frequency is set by P9.54.

P9. 54	Fault-related frequency selection			Factory value	0
	Setting range	0	Run at the current operating frequency		
		1	Run at set frequency		
		2	Running at upper frequency limit		
		3	Run at the lower frequency limit		
		4	Operating at abnormal backup frequency		
P9.55	Abnormal backup frequency			Factory value	100.0%
	Setting range		0.0% ～ 100.0%		

When a fault occurs during the operation of the inverter and the fault handling method is set to continue running, the inverter displays an alarm code and runs at the frequency determined by P9.54.

When abnormal backup frequency operation is selected, the value set by P9.55 is a percentage relative to the maximum frequency.

P9.56	Motor temperature sensor type selection		Factory value	0
	Setting range	0: TF 1: PT100 2: PT1000		
P9.57	Motor alarm temperature setting		Factory value	1 1 0
	Setting range	0～200℃		

P9.59	Momentary stop action selection			Factory value	0
	Setting range	0	Invalid		
		1	Slow down		
		2	Deceleration stop		
P9. 60	Momentary power failure pause judgment voltage			Factory value	85.0 %
	Setting range		80.0%～ 100.0%		
P9. 61	Instantaneous power failure voltage recovery judgment time			Factory value	0.50s
	Setting range		0.00s ～ 100.00s		
P9. 62	Momentary stop action judgment voltage			Factory value	80.0%
	Setting range		60.0%～100.0% (standard bus voltage)		

This function means that when there is a momentary power outage or a sudden drop in voltage, the inverter reduces the output speed and uses the load feedback energy to compensate for the drop in the inverter DC bus voltage to maintain the inverter's continued operation.

If P9.59=1, the inverter will decelerate when there is a power outage or voltage drops suddenly. When the bus voltage returns to normal, the inverter will accelerate to the set frequency. The basis for judging whether the bus voltage returns to normal is that the bus voltage is normal and the duration exceeds the time set by P9.61.

If P9.59=2, the inverter will decelerate until it stops when there is a momentary power outage or a sudden drop in voltage.

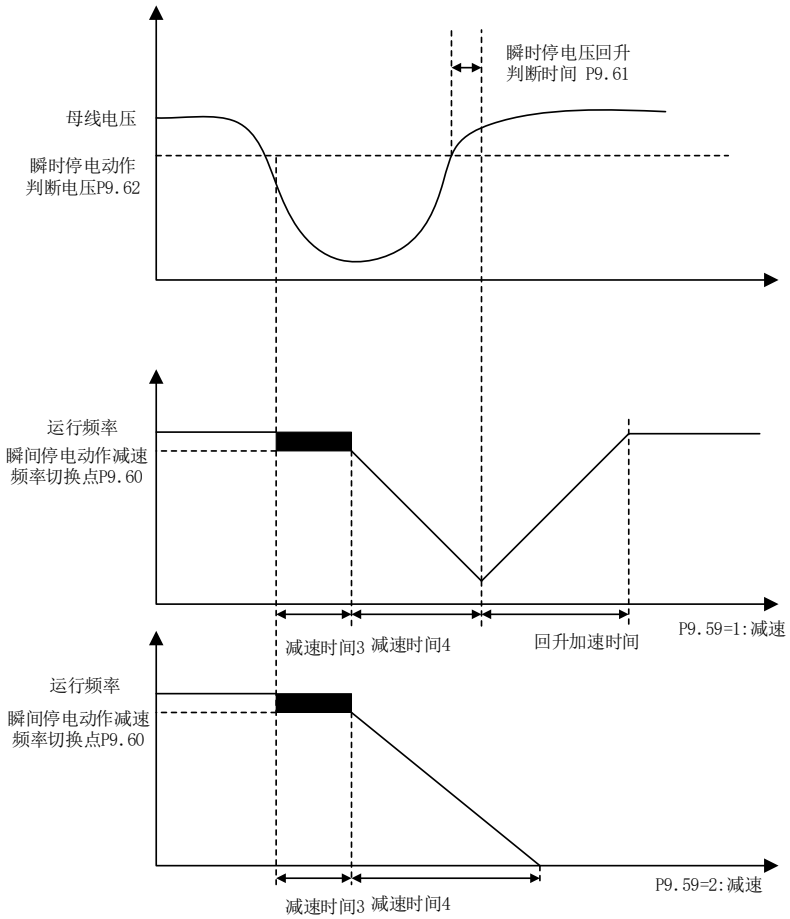


Figure 4-12 Momentary power outage action diagram

P9. 63	Load drop protection option	Factory value	0
	Setting range	0	invalid
		1	efficient
P9. 64	Load drop detection level	Factory value	10.0%
	Setting range		0.0%～100.0% (rated current of motor)
P9. 65	Load drop detection time	Factory value	1.0s
	Setting range		0.0s ～ 60.0s

If the off-load protection function is effective, when the inverter output current is less than the off-load detection level P9.64 and the duration is greater than the off-load detection time P9.65, the inverter output frequency will automatically decrease to 7% of the rated frequency. During the off-load protection period, if the load is restored, the inverter will automatically return to running at the set frequency.

P9. 67	Over speed detection value	Factory value	20 .0%
	Setting range	0.0%～50.0%（maximum frequency）	
P9. 68	Over speed detection time	Factory value	1.0s
	Setting range	0.0 00 s ～ 60.0 s	

This function is only valid when the inverter is running in speed sensor vector control.

When the inverter detects that the actual speed of the motor exceeds the set frequency, the excess value is greater than the overspeed detection value P9.67, and the duration is greater than the

overspeed detection time P9.68, the inverter fault alarm OSP is issued and processed according to the fault protection action mode.

P9. 69	Speed deviation too large detection value	Factory value	20.0%
	Setting range	0.0%～50.0%（maximum frequency）	
P9.70	Speed deviation too large detection time	Factory value	5.0s
	Setting range	0.0s ～ 60.0s	

This function is only valid when the inverter is running in speed sensor vector control.

When the inverter detects that the actual speed of the motor deviates from the set frequency, and the deviation is greater than the speed deviation detection value P9.69, and the duration is greater than the speed deviation detection time P9.70, the inverter fault alarm ESP is triggered and processed according to the fault protection action mode.

When the speed deviation excessive detection time is 0.0s, the speed deviation excessive fault detection is canceled.

PC Group Multi-segment Instructions and Simple PLC Functions

The multi-segment instructions of the NZ200DR series have more functions than the usual multi-segment speed. In addition to realizing the multi-segment speed function, it can also be used as a voltage source for VF separation and a given source for process PID. For this reason, the dimension of the multi-segment instruction is a relative value.

The simple PLC function is different from the user programmable function of the NZ200DR series. The simple PLC can only complete the simple combination operation of multiple instructions. The user programmable function is richer and more practical. Please refer to the relevant instructions of the PC group.

PC. 00	Multi-segment instruction 0	Factory value	0.0%
	Setting range	-100.0% ～ 100.0%	
PC. 01	Multi-segment instruction 1	Factory value	0.0%
	Setting range	-100.0% ～ 100.0%	
PC. 02	Multi-segment instruction 2	Factory value	0.0%
	Setting range	-100.0% ～ 100.0%	
PC. 03	Multi-segment instruction 3	Factory value	0.0%
	Setting range	-100.0% ～ 100.0%	

Multi-segment instructions can be used in three situations: as a frequency source, as a voltage source for VF separation, and as a setting source for process PID.

In the three application scenarios, the dimension of the multi-segment instruction is a relative value, ranging from -100.0% to 100.0%. When used as a frequency source, it is a percentage of the relative maximum frequency; when used as a VF separation voltage source, it is a percentage relative to the rated voltage of the motor; and because the PID setting is originally a relative value, the multi-segment instruction does not require dimension conversion as a PID setting source.

Multi-segment instructions need to be switched and selected according to the different states of the multi-function terminals. For details, please refer to the relevant instructions of Group P4.

PD Group Communication Parameters

Please refer to "NZ200DR Series Communication Protocol"

PP group user function code

PP. 00	User Password	Factory value	0
	Setting range	0 ~ 65535	

If PP.00 is set to any non-zero number, the password protection function will take effect. The next time you enter the menu, you must enter the password correctly, otherwise you will not be able to view and modify the function parameters. Please remember the set user password.

Setting PP.00 to 00000 will clear the set user password and make the password protection function invalid.

PP. 01	Parameter initialization		Factory value	0
	Setting range	0	No Action	
		1	Restore factory parameters, excluding motor parameters	

1: Restore factory settings, excluding motor parameters

After setting PP.01 to 1, most of the inverter function parameters are restored to the factory parameters, but the motor parameters, frequency command decimal point (P0.22), fault record information, cumulative running time (P7.09), cumulative power-on time (P7.13), and cumulative power consumption (P7.14) are not restored.

C5 Group Control Optimization Parameters

C5.00	DPWM switching upper limit	Factory value	8.00Hz
	Setting range	5.00Hz ～Maximum frequency	

Only valid for VF control. Determine the wave mode of the asynchronous machine during VF operation. If it is lower than this value, it is 7-segment continuous modulation mode, otherwise it is 5-segment intermittent modulation mode.

When it is 7-segment continuous modulation, the switching loss of the inverter is large, but the current ripple is small; under the 5-segment intermittent debugging mode, the switching loss is small and the current ripple is large; but at high frequencies it may cause instability in the operation of the motor and generally does not require modification.

C5.01	PWM modulation method		Factory value	0
	Setting range	0	Asynchronous modulation	
		1	Synchronous Modulation	

Only VF control is effective. Generally, when the output frequency is high (above 100Hz), synchronous modulation is used, which is beneficial to the quality of the output voltage.

C5.0 2	Dead zone compensation		Factory value	1
	Setting range	0	No compensation	
		1	Compensation method 1	
		2	Compensation method 2	

This parameter generally does not need to be modified.

C5.03	Random PWM Depth		Factory value	0
	Setting range	0	Random PWM is invalid	
		1-10	PWM carrier frequency random depth	

When setting the depth of random PWM, it can improve motor noise and reduce electromagnetic interference.

C5.04	Fast current limiting on		Factory value	1
	Setting range	0	Disable	
		1	Enable	

The fast current limiting function can minimize the inverter overcurrent fault and ensure the inverter to work continuously. However, long-term fast current limiting will cause the inverter to overheat and report the fault CBC, which means the inverter has a fast current limiting fault and needs to be shut down.

C5.06	Undervoltage point setting	Factory value	350V
	Setting range	200.0V～2000.0V	

It is used to set the voltage value of the inverter undervoltage fault LU. The factory values are different for different voltage levels.

C5.09	Overvoltage point setting	Factory value	900V
	Setting range	200.0V～2200.0V	

It is used to set the voltage value of the inverter overvoltage fault. The factory values are different for different voltage levels.

D0 Group Monitoring Parameters

The D0 parameter group is used to monitor the inverter operation status information. Customers can view it through the panel to facilitate on-site debugging, or read the parameter group value through communication for host computer monitoring. Among them, D0.00~D0.31 are the operation and shutdown monitoring parameters defined in P7.03 and P7.04.

For specific parameter function codes, parameter names and minimum units, see the table below.

Function code	Name	Minimum unit
D0 Group Basic Monitoring Parameters		
D0.00	Operating frequency (Hz)	0.01Hz
D0. 01	Set frequency (Hz)	0.01Hz
D0. 02	Bus voltage (V)	0.1V
D0. 03	Output voltage (V)	1V
D0. 04	Output current (A)	0.01A
D0. 05	Output power (kW)	0.1kW
D0. 06	Output torque (%)	0.1%
D0. 07	Input terminal status	1
D0. 14	Load speed display	1
D0. 19	Feedback speed	0.1Hz
D0. 20	Remaining running time	0.1Min
D0. 25	Current power-on time	1Min
D0. 26	Current running time	0.1Min
D0. 28	Communication setting value	0.01%
D0. 30	Main frequency X display	0.01Hz
D0. 31	Auxiliary frequency Y display	0.01Hz
D0. 34	Motor temperature value	1℃
D0. 38	ABZ position	1
D0.61	Inverter status	1
D0.76	Cumulative power consumption low	0.1 degrees

D0.77	Cumulative power consumption high	1 degree

Note: The actual display parameters refer to the actual software display .

Chapter 5 Function Parameters Table

PP.00 is set to a non-zero value, which means that a parameter protection password is set. In the function parameter mode and the user parameter change mode, the parameter menu can only be entered after the password is correctly entered. To cancel the password, PP.00 needs to be set to 0. Groups P and C are basic function parameters, and Group D is monitoring function parameters.

The symbols in the function table are explained as follows:

"☆": Indicates that the setting value of this parameter can be changed when the inverter is in the stop or running state;

"★": Indicates that the setting value of this parameter cannot be changed when the inverter is in operation;

"●": Indicates that the value of the parameter is the actual test record value and cannot be changed;

"*": Indicates that the parameter is a "factory parameter", which is limited to the manufacturer's setting and is prohibited for users to operate.

5-1. Basic function parameter list:

Function code	Name	Setting range	Factory value	Change
P0 Basic Function Group				
P0.00	G/P type display	1: G type (constant torque load type) 2: P type (fan, water pump load type)	Model confirmation	●
P0.01	Control mode selection	0: No PG vector control 1: With PG vector control 2: V/F control	0	★
P0.02	Command source selection	0: Keyboard command channel (LED off) 1: Terminal command channel (LED on) 2: 485 communication command channel (LED flashing)	0	☆
P0.03	Main frequency source X selection	0: Digital setting (preset frequency P0.08, UP/DOWN can be modified, power off will not be remembered) 1: Digital setting (preset frequency P0.08, UP/DOWN can be modified, power-off memory) 2-5: Reserved 6: ASI communication setting	6	★

		7-8: Reserved 9: 485 communication given		
P0.04	Auxiliary frequency source Y selection	Same as P0.03 (main frequency source X selection)	0	★
P0.05	Auxiliary frequency source Y range selection when superimposing	0: relative to the maximum frequency 1: relative to the main frequency source X	0	☆
P0.06	Auxiliary frequency source Y range when superimposed	0%～150%	100%	☆
P0.07	Frequency source superposition selection	Units: Frequency source selection 0: Main frequency source X 1: Primary and secondary calculation results (The operation relationship is determined by the tens digit) 2: Switch between main frequency source X and auxiliary frequency source Y 3: Switch between main frequency source X and main and auxiliary operation results 4: Switch between auxiliary frequency source Y and main and auxiliary operation results Tens digit: Frequency source main and auxiliary operation relationship 0: Main + Auxiliary 1: Primary-Secondary 2: The maximum value of the two 3: The minimum of the two	02	☆
P0.08	Preset frequency	0.00Hz～maximum frequency (P0.10)	50.00Hz	☆
P0.09	Running direction	0: The direction is consistent	0	☆

		1: Opposite direction		
P0.10	Maximum frequency	50.00Hz～599.00Hz	50.00Hz	★
P0.11	Upper frequency source	0: P0.12 setting 1-4: Reserved 5: 485 communication setting	0	★
P0.12	Upper frequency	Lower frequency limit P0.14～maximum frequency P0.10	50.00Hz	☆
P0.13	Upper frequency offset	0.00Hz～Maximum frequency P0.10	0.00Hz	☆
P0.14	Lower frequency	0.00Hz～upper limit frequency P0.12	0.00Hz	☆
P0.15	Carrier frequency	0.5kHz～8.0kHz	Model confirmation	☆
P0.16	Carrier frequency adjusts with temperature	0: No 1: Yes	1	☆
P0.17	Acceleration time 1	0.00s～65000s	20.0s	☆
P0.18	Deceleration time 1	0.00s～65000s	20.0s	☆
P0.19	Acceleration and deceleration time unit	0:1 seconds 1:0.1 seconds 2: 0.01 seconds	1	★
P0.21	Auxiliary frequency source offset frequency when superimposed	0.00Hz～Maximum frequency P0.10	0.00Hz	☆
P0.22	Frequency command resolution	2:0.01Hz	2	★
P0.23	Digital setting frequency stop memory selection	0: No memory 1: Memory	0	☆
P0.25	Acceleration/deceleration time reference frequency	0: Maximum frequency (P0.10) 1: Set frequency 2:100Hz	0	★
P0.26	Frequency command UP/DOWN reference during operation	0: Running frequency 1: Setting frequency	0	★
P0.27	Command source bundled with frequency source	Units: Operation panel command binding frequency source selection 0: No binding 1: Digital setting frequency 2-5: Reserved 6: ASI communication setting 7-8: Reserved 9: 485 communication given Tens: Terminal	0000	☆

		command binding frequency source selection Hundreds: Communication command binding frequency source selection		
P1Motor parameters				
P1.00	Motor type	0: Ordinary asynchronous motor 1: Inverter asynchronous motor	0	★
P1.01	Motor Rated Power	0.1kW～3.7kW	Model confirmation	★
P1.02	Motor Rated Voltage	1V～2000V	Model confirmation	★
P1.03	Motor rated current	0.01A～655.35A	Model confirmation	★
P1.04	Motor Rated Frequency	0.01Hz～Maximum frequency	Model confirmation	★
P1.05	Motor Rated Speed	1rpm～65535rpm	Model confirmation	★
P1.06	Asynchronous motor stator resistance	0.001Ω～65.535Ω	Learning Parameters	★
P1.07	Asynchronous motor rotor resistance	0.001Ω～65.535Ω	Learning Parameters	★
P1.08	Asynchronous motor leakage inductance	0.01mH～655.35mH	Learning Parameters	★
P1.09	Asynchronous motor mutual inductive resistance	0.1mH～6553.5mH	Learning Parameters	★
P1.10	Asynchronous motor no-load current	0.01A～P1.03	Learning Parameters	★
P1.27	Number of encoder lines	1～65535	1024	★
P1.28	Encoder type	0：ABZincremental encoder	0	★
P1.30	ABZ incremental encoder AB phase sequence	0: Positive 1: Reverse	0	★
P1.36	Speed feedback PG break detection time	0.0：no movement 0.1s～10.0s	0.0	★
P1.37	Self-learning selection	0: No operation 1: Static self-learning 2: Dynamic self-learning 3: Fully static self-learning	0	★
P2 Motor Vector Control Parameters				
P2.00	Speed ring proportional	1～100	30	☆

	gain 1			
P2.01	Speed loop integration time1	0.01s～10.00s	0.50s	☆
P2.02	Switching frequency 1	0.00～P2.05	5.00Hz	☆
P2.03	Speed ring proportional gain 2	1～100	20	☆
P2.04	Speed ring integration time 2	0.01s～10.00s	1.00s	☆
P2.05	Switching frequency 2	P2.02～Maximum frequency	10.00Hz	☆
P2.06	Vector control slew rate gain	50%～200%	100%	☆
P2.07	Speed loop filter time constant	0.000s～0.100s	0.050s	☆
P2.08	Vector control overexcitation gain	0～200	64	☆
P2.09	Upper torque limit source in speed control mode	0：Function code P2.10 setting (does not distinguish between electric and power generation) 5: 485 communication given The full scale range of 1-5 options corresponds to P2.10	0	☆
P2.10	Digital setting of upper torque limit in speed control mode (electric)	0.0%～200.0%	100.0%	☆
P2.11	Torque limit command selection in speed control mode (power generation)	0：Function code P2.10 setting (does not distinguish between power generation and electric power) 5: 485 communication given 8: Function code P2.12 setting The full scale range of option 1-5 corresponds to P2.12	0	☆
P2.12	Digital setting of upper torque limit in speed control mode (power generation)	0.0%～200.0%	100.0%	☆
P2.13	Proportional gain of excitation regulation	0～60000	2000	☆
P2.14	Integral gain of excitation regulation	0～60000	1300	☆

P2.15	Torque regulation proportional gain	0～60000	2000	☆
P2.16	Integral gain of torque regulation	0～60000	1300	☆
P2.17	Speed Ring Points Properties	Single digit: Separation of points 0: Invalid 1: valid	0	☆
P2.22	Generation power limit enable	0: Invalid 1: in force throughout 2: constant speed in effect 3: deceleration in effect	0	☆
P2.23	Generation power ceiling	0.0%～200.0%	Model confirmation	☆
P3 V/F control parameters				
P3.00	VF Curve setting	0: Linear V/F 1: Multi-point V/F 2:Square V/F 3:1.2 power V/F 4:1.4 power V/F 6:1.6 power V/F 8:1.8 power V/F	0	★
P3.01	Torque Boost	0.0%：（Automatic Torque Boost） 0.1%～30.0%	Model confirmation	☆
P3.02	Torque boost cut-off frequency	0.00Hz～Maximum frequency	50.00Hz	★
P3.03	Multi-point VF frequency point 1	0.00Hz～P3.05	0.00Hz	★
P3.04	Multi-point VF voltage point 1	0.0%～100.0%	0.0%	★
P3.05	Multi-point VF frequency point 2	P3.03～P3.07	0.00Hz	★
P3.06	Multi-point VF voltage point 2	0.0%～100.0%	0.0%	★
P3.07	Multi-point VF frequency point 3	P3.05～Motor rated frequency（P1.04）	0.00Hz	★
P3.08	Multi-point VF voltage point 3	0.0%～100.0%	0.0%	★
P3.09	VF Differential Compensation Gain	0.0%～200.0%	0.0%	☆
P3.10	VF Overexcitation gain	0～200	64	☆
P3.11	VF oscillation suppression gain	0～100	Model confirmation	☆
P3.18	Overshoot current	50%～200%	150%	★
P3.19	Overcurrent loss enable	0: Invalid 1: valid	1	★
P3.20	Overcurrent loss suppression gain	0～100	20	☆
P3.21	Over-voltage stall	50%～200%	50%	★

	current compensation factor			
P3.22	Overvoltage stall voltage	200.0V～2000.0V	760.0V	★
P3.23	Overvoltage stall enable	0: Invalid 1: valid	1	★
P3.24	Overvoltage stall suppression frequency gain	0～100	30	☆
P3.25	Overvoltage stall suppression voltage gain	0～100	30	☆
P3.26	Overvoltage stall maximum rise frequency limit	0～50Hz	5Hz	★
P4 input terminal				
P4.04	ASI-DO1 Terminal Function Selection	0: No function 1: Forward rotation operation 2: Reverse rotation operation 8: STO 11：Motor temperature protection TF input 12：Multi-segment instruction 1 13：Multi-segment instruction 2 16：Acceleration and deceleration time selection terminal 1 17: Acceleration and deceleration time selection terminal 2 18: Manual 25: Automatic 27: ASI Forward Running 28: ASI reverse operation	27	★
P4.05	ASI-DO2 terminal function selection		28	★
P4.06	ASI-DO3 terminal function selection		12	★
P4.07	TF		11	★
P4.08	ASI-DO4 terminal function selection		13	
P4.09	STO		8	★
P4.10	Switching filter time	0.000s～1.000s	0.010s	☆
P4.38	Multi-function terminal effective mode selection1	0: High level active 1: active low Single digit: Reserved Tenth digit: Reserved Hundred: Reserved Thousand: Reserved 10,000 bits: DI01	00000	★
P4.39	Multi-function terminal effective mode selection 2	0: High level active 1: active low Bit: DI02 Tenth digit: Reserved	10000	★

		Hundred bits: TF Thousand: Reserved Ten thousand bits: STO		
P6 Start-Stop parameter set				
P6.00	Start-up method	0: Direct start 1: Speed tracking restart 2: Pre-excitation start (AC asynchronous machine)	0	☆
P6.01	Speed tracking method	0: From stop frequency 1: from zero speed 2: Starting from maximum frequency	0	★
P6.02	Speed tracking speed	1～100	20	☆
P6.03	Starting frequency	0.00Hz～10.00Hz	0.00Hz	☆
P6.04	Start frequency hold time	0.0s～100.0s	0.0s	★
P6.05	Start DC braking current/pre-excitation current	0%～100%	0%	★
P6.06	Start DC braking time/pre-excitation time	0.0s～100.0s	0.0s	★
P6.07	Acceleration and deceleration mode	0: Straight line acceleration and deceleration 1: S-curve acceleration and deceleration A 2: S-curve acceleration and deceleration B	0	★
P6.08	S-curve start time proportional	0.0%～(100.0%-P6.09)	30.0%	★
P6.09	S-curve end time scaling	0.0%～(100.0%-P6.08)	30.0%	★
P6.10	Stopping method	0：Deceleration stop 1: Free stop	0	☆
P6.11	Stopping DC braking start frequency	0.00Hz～Maximum frequency	0.00Hz	☆
P6.12	Stopping DC braking waiting time	0.0s～100.0s	0.0s	☆
P6.13	Stopping DC braking current	0%～100%	0%	☆
P6.14	Stopping DC braking time	0.0s～100.0s	0.0s	☆
P6.15	Brake utilisation rate	0%～100%	100%	☆
P7 Keyboard and Display				
P7.02	STOP/RESET Key function	0: STOP/RESET key stop function is effective only in keypad operation mode. 1: The STOP/RESET key stop function is effective	1	☆

		in any operation mode.		
P7.03	LED Run Display Parameters1	0000～FFFF Bit00: Operating frequency 1 (Hz) Bit01: Setting frequency (Hz) Bit02: Bus voltage (V) Bit03: Output voltage (V) Bit04: Output current (A) Bit05: Output power (kW) Bit06: Output torque (%) Bit14: Load speed display	1F	☆
P7.04	LED Run display parameter 2	0000～FFFF Bit03: Operating frequency 2 (Hz) Bit08: Motor speed Bit12: Communication set value Bit14: Main frequency X display (Hz) Bit15: Auxiliary frequency Y display (Hz)	0	☆
P7.05	LED stop display parameters	0000～FFFF Bit00: Setting frequency (Hz) Bit01: Bus voltage (V) Bit10: Load speed	33	☆
P7.06	Load Speed Display Factor	0.0001～65.000	1.0000	☆
P7.07	Inverter module heat sink temperature	0.0℃～150.0℃	-	●
P7.09	Accumulated running time	0h～65535h	-	●
P7.11	Software version	-	-	●
P7.12	Load speed display in decimal places	Single digit: D0.14 number of decimal places 0:0 decimal places 1:1 decimal place 2:2 decimal places 3:3 decimal places Tenth digit: Reserved	21	☆
P7.13	Cumulative power-up time	0h～65535h	-	●
P7.14	Cumulative power consumption	0kW～65535°	-	●

P8 Accessibility				
P8.00	Tap operation frequency	0.00Hz～Maximum frequency	2.00Hz	☆
P8.01	Tap acceleration time	0.0s～6500.0s	20.0s	☆
P8.02	Tap deceleration time	0.0s～6500.0s	20.0s	☆
P8.03	Acceleration time 2	0.00s～65000s	Model confirmation	☆
P8.04	Deceleration time 2	0.0s～65000s	Model confirmation	☆
P8.05	Acceleration time 3	0.0s～65000s	Model confirmation	☆
P8.06	Deceleration time 3	0.0s～65000s	Model confirmation	☆
P8.07	Acceleration time 4	0.0s～65000s	Model confirmation	☆
P8.08	Deceleration time 4	0.0s～65000s	Model confirmation	☆
P8.09	Jump Frequency 1	0.00Hz～Maximum frequency	0.00Hz	☆
P8.10	Jump frequency 2	0.00Hz～Maximum frequency	0.00Hz	☆
P8.11	Jump frequency amplitude	0.00Hz～Maximum frequency	0.00Hz	☆
P8.12	Forward and reverse dead time	0.0s～3000.0s	0.0s	☆
P8.13	Reverse control enable	0: Permitted 1: Prohibited	0	☆
P8.14	Set frequency below lower limit frequency operation mode	0: Run at lower frequency limit 1: Shutdown 2: Zero speed operation	0	☆
P8.15	Sag control	0.00Hz～10.00Hz	0.00Hz	☆
P8.16	Set cumulative power-up arrival time	0h～65000h	0h	☆
P8.17	Sets the cumulative runtime arrival time	0h～65000h	0h	☆
P8.18	Start-up protection selection	0： No protection 1: Protection	0	☆
P8.22	Whether jump frequency is effective during acceleration and deceleration	0: Invalid 1: valid	0	☆
P8.25	Switching frequency point between acceleration time 1 and acceleration time 2	0.00Hz～Maximum frequency	0.00Hz	☆
P8.26	Switching frequency point between deceleration time 1 and deceleration time 2	0.00Hz～Maximum frequency	0.00Hz	☆

P8.27	Priority of terminal triggering	0: Invalid 1: valid	0	☆
P8.42	Timing function selection	0: Invalid 1: valid	0	☆
P8.43	Timer operation time selection	0：P8.44preferences	0	☆
P8.44	Timed Runtime	0.0Min～6500.0Min	0.0Min	☆
P8.47	Module temperature reached	0℃～100℃	75℃	☆
P8.48	Cooling Fan Control	0: Fan running during operation 1: Fan running all the time	0	☆
P8.49	wake-up call frequency	Dormant frequency (P8.51) ~ Maximum frequency(P0.10)	0.00Hz	☆
P8.50	Wake-up delay time	0.0s～6500.0s	0.0s	☆
P8.51	Sleep Frequency	0.00Hz～wake-up call frequency（P8.49）	0.00Hz	☆
P8.52	Hibernation delay time	0.0s～6500.0s	0.0s	☆
P8.53	Current Run Arrival Time Setting	0.0Min～6500.0Min	0.0Min	☆
P8.54	Output power correction factor	0%～200%	100%	☆
P8.55	Rapid deceleration time	0～6553.5s	Model confirmation	☆
P9 Faults and protection				
P9.00	Motor Overload Protection Selection	0: Prohibit 1: Allow	1	☆
P9.01	Motor overload protection gain	0.20～10.00	1.00	☆
P9.02	Motor overload warning factor	50%～100	80%	☆
P9.03	Overvoltage stall gain	0 (no overvoltage stall) ～100	30	
P9.04	Overvoltage stall protection voltage	200V-2000V (three-phase)	760V	
P9.07	Power-on to ground short-circuit protection selection	0: Invalid 1: Valid	1	☆
P9.09	Fault automatic reset times	0～20	0	☆
P9.11	Fault automatic reset interval time	0.1s～100.0s	1.0s	☆
P9.12	Input phase loss/contactor suction protection selection	Single digit: input phase loss protection selection	01	☆
P9.13	Output phase loss protection selection	Ten bits: contactor suction protection selection	1	☆

P9.14	Type of first failure	0: No faults 1: Reserved 2：Acceleration overcurrent 3: Deceleration overcurrent 4：Constant speed overcurrent 5：Acceleration overvoltage 6: Deceleration overvoltage 7：Constant speed overvoltage 8：Control power failure 9：Under voltage 10：Inverter overload 11：Motor overload 12：Input phase loss	—	●
P9.15	Second failure type	13: Output out of phase 14: Module overheating 15: TF alarm 16：Abnormal 485 communication 17：Relay abnormality 18: Abnormal current detection19: Motor self-learning exception 20：Reservation 21：Parameter read/write abnormality 22：Reservation 23：Motor short circuit to ground 24：Hold 25：Hold	—	●
P9.16	Third (most recent) failure type	26: Runtime Arrival 29: Power-up time reached 30: Dropout 31: Hold 40: Fast current limit timeout 41: Reserved 42: Speed deviation too large 43: Motor overspeed 45: Motor over temperature	—	●

		51: Reserved		
P9.17	Frequency at third (latest) fault	—	—	●
P9.18	Current at third (last) fault	—	—	●
P9.19	Busbar voltage at third (latest) fault	—	—	●
P9.27	Frequency at second fault	—	—	●
P9.28	Current at second fault	—	—	●
P9.29	Bus voltage at second fault	—	—	●
P9.30	Input terminal status at second fault	—	—	●
P9.37	Frequency at first fault	—	—	●
P9.38	Current at first fault	—	—	●
P9.39	Bus voltage at first fault	—	—	●
P9.47	Fail-safe action selection 1	Bit: Motor overload (OL1) 0: Free stop 1: Stop by stopping 2： Continue to run Ten bits: Reserved Hundred bits: output phase loss (LO)Thousandths: TF alarm (EF) 10,000 bits: 485 communication exception (CE)	00000	☆
P9.48	Fail-safe action selection 2	Bit: Encoder fault 0: Free stop Ten bits: Function code read/write abnormality (EEP) 0: Free stop 1: Stop by stopping Hundred bits: Reserved Thousand bits: Reserved Ten thousand bits: runtime arrival (END1)	00000	☆

P9.49	Fail-safe action selection 3	Single digit: reserved 0: Free stop 1: Stop by stopping 2: Continue running Ten digits: Reserved 0: Free stop 1: Stop by stopping 2: Continue running Hundred bits: power-up time arrived (END2) 0: Free stop 1: Stop by stopping 2: Continue running Thousand position: Load off (LOAD) 0: Free stop 1: Stop by deceleration 2: Decelerate to 7% of the rated frequency of the motor and continue to run, and automatically return to the set frequency to run when no load is lost *** Translated with www.DeepL.com/Translator (free version) ***	00000	☆
P9.50	Fail-safe action selection 4	digit: excessive speed deviation (42) 0: Free stop 1: Stop by stopping 2: Continue running Ten bits: Reserved Hundredth digit: Reserved	00000	☆
P9.54	Frequency selection for continued operation in case of failure	0: Run at current operating frequency 1: Run at set frequency 2: Run at upper limit frequency 3: Run at the lower limit frequency 4: Run at abnormal standby frequency	0	☆
P9.55	Abnormal Standby Frequency	0.0%～100.0% (100.0 per cent corresponds to maximum frequency P0.10)	100.0%	☆

P9.56	Motor Temperature Sensor Type Selection	0：TF 1：PT100 2：PT1000	0	☆
P9.57	Motor alarm temperature setting	0～200℃	110℃	☆
P9.59	Instantaneous power failure action selection	0: Invalid 1: Deceleration 2: Deceleration stop	0	☆
P9.60	Instantaneous power failure suspension judgement voltage	80.0%～100.0%	85.0%	☆
P9.61	Instantaneous non-stop voltage recovery judgement time	0.00s～100.00s	0.50s	☆
P9.62	Instantaneous non-stop action judgement voltage	60.0%～100.0% （Standard busbar voltage）	80.0%	☆
P9.63	Load shedding protection selection	0：Invalid 1：efficiently	0	☆
P9.64	Load shedding detection level	0.0%～100.0%	10.0%	☆
P9.65	Load shedding detection time	0.0～60.0s	1.0s	☆
P9.67	Over speed detection value	0.0％～50.0％ （Maximum frequency）	20.0%	☆
P9.68	Over speed detection time	0.0s～60.0s	1.0s	☆
P9.69	Over speed deviation detection value	0.0％～50.0％ （Maximum frequency）	20.0%	☆
P9.70	Over speed deviation detection time	0.0s～60.0s	5.0s	☆
PC Multi-segment instruction, simple PLC				
PC.00	ASI Multi-Segment Instruction 0	-100.0%～100.0%	0.0%	☆
PC.01	ASI Multi-Segment Instruction 1	-100.0%～100.0%	0.0%	☆
PC.02	ASI Multi-Segment Instruction 2	-100.0%～100.0%	0.0%	☆
PC.03	ASI Multi-Segment Instruction 3	-100.0%～100.0%	0.0%	☆
Pd Communication parameters				
PD.00	Baud	Bit：MODBUS 0:300BPS 1:600BPS 2:1200BPS 3:2400BPS 4:4800BPS	6	☆

		5:9600BPS 6:19200BPS 7:38400BPS 8:57600BPS 9:115200BPS		
PD.01	Data format	0： No checksum (8-N-2) 1: Even Check (8-E-1) 2: Odd checksum (8-O-1) 3:8-N-1	3	☆
PD.02	Local address	1～247	1	☆
PD.03	Latency of reply	0ms～20ms	2	☆
PD.04	Communication timeout	0.0（Invalid）,0.1s～60.0s	0.0	☆
PD.05	Data transfer format selection	Bit: MODBUS 0: Non-standard MODBUS protocol 1: Standard MODBUS protocol Ten bits: Reserved	1	☆
PD.06	Communication reading current resolution	0:0.01A 1:0.1A	1	☆
PP Group User Function Code				
PP.00	User password	0～65535	0	☆
PP.01	Parameter initialisation	00： no operation 01: Restore factory parameters, excluding motor parameters	0	★
Group C5 Control optimisation parameters				
C5.00	DPWM switching upper frequency	5.00Hz to maximum frequency	8.00Hz	☆
C5.01	PWM modulation mode	0: Asynchronous modulation	0	☆
C5.02	Deadband compensation mode selection	1: Synchronous modulation	1	☆
C5.03	Random PWM depth	0: No compensation	0	☆
C5.04	Fast current limit enable	1: Compensation mode 1	1	☆
C5.06	Undervoltage point setting	200.0V～2000.0V	350V	☆
C5.09	Overvoltage point setting	200.0V～2200.0V	900V	

5-2. Summary Table of Monitoring Parameters：

Function code	Name	Smallest unit
Group D0 Basic monitoring parameters		
D0.00	Operating frequency	0.01Hz

	(Hz)	
D0.01	Setting frequency (Hz)	0.01Hz
D0.02	Bus voltage (V)	0.1V
D0.03	Output voltage (V)	1V
D0.04	Output current (A)	0.01A
D0.05	Output power (kW)	0.1kW
D0.06	Output torque (%)	0.1%
D0.07	Input terminal status	1
D0.14	Load speed display	1
D0.19	Feedback speed	0.1Hz
D0.20	Remaining running time	0.1Min
D0.25	Current power-up time	1Min
D0.26	Current running time	0.1Min
D0.28	Communication set value	0.01%
D0.30	Main frequency X display	0.01Hz
D0.31	Auxiliary frequency Y display	0.01Hz
D0.34	Motor temperature value	1℃
D0.38	ABZ position	1
D0.61	Frequency converter status	1
D0.76	Accumulated power consumption low position	0.1°
D0.77	High cumulative electricity consumption	1°

5-3. Fault Code Table：

Fault code	Name	Fault code	Name
OC1	Acceleration overcurrent	EF	TF Alarm
OC2	Deceleration overcurrent	CE	Communication Failure
OC3	Constant speed overcurrent	RAY	Relay fault
OU1	Acceleration overvoltage	IE	Current detection fault
OU2	Deceleration overvoltage	TE	Motor self-learning fault
OU3	Constant speed overvoltage	EEP	EEPROM read/write fault
POF	Control power failure	GND	Short circuit to ground fault
LU	Undervoltage fault	END1	Accumulated runtime reached fault
OL2	Frequency converter	END2	Accumulated power-up time

	overload		reached fault
OL1	Motor overload	LOAD	Load shedding fault
LI	Input phase loss	CBC	Fast current limit fault
LO	Output phase loss	ESP	Excessive speed deviation fault
OH	Module overheat	OSP	Motor overspeed fault

Chapter 6 Troubleshooting

6-1. Fault Alarms and Countermeasures

The frequency converter has several warning messages and protection functions, once the fault occurs, the protection function acts, the frequency converter stops the output, the frequency converter fault relay contact acts, and the fault code is displayed on the display panel of the frequency converter.Users can follow the tips in this section for self-checking, analysing the cause of the fault and finding out the solution before seeking service.If belongs to the dotted line box within the reasons described, please seek service, with your purchase of the inverter agent or directly with our company contact.

Fault name	Keypad display	Troubleshooting	Troubleshooting Countermeasures
acceleration overcurrent	OC1	1、Driver output circuit there is a ground or short circuit 2、Control mode is vector and no parameter self-learning 3、Acceleration time is too short 4、Manual torque increase or V / F curve is not appropriate 5、Low voltage 6、Starting the rotating motor 7、Accelerate the process of sudden load 8, drive selection is small	1、Remove peripheral faults 2、Self-learning motor parameters 3、Increase the acceleration time 4、Adjust the manual lifting torque or V / F curve 5、Adjust the voltage to the normal range 6、Select the speed tracking start or wait for the motor to stop before starting 7、Cancel the sudden load 8、Select a drive with a larger power rating
Deceleration overcurrent	OC2	1、Driver output circuit there is a ground or short circuit 2、Control mode is vector and no parameter self-learning 3、Deceleration time is too short 4、Low voltage 5、Suddenly loaded during deceleration 6、No additional braking unit and braking resistance	1、Remove peripheral faults 2、Self-learning motor parameters 3、Increase the deceleration time 4、Adjust the voltage to the normal range 5、Cancel the sudden load 6、Adding brake unit and resistance
Constant speed overcurrent	OC3	1、Driver output circuit there is a ground or short circuit 2、Control mode is vector and no parameter self-learning 3、Low voltage 4、Whether there is a sudden load in operation 5、Drive selection is small	1、Remove peripheral faults 2、Self-learning motor parameters 3、Adjust the voltage to the normal range 4、Cancel the sudden load 5、Select a larger power level drive

Acceleration Voltage	OU1	1、Input voltage is high 2、Acceleration process there is an external force to drag the motor to run 3、Acceleration time is too short 4、No braking unit and braking resistor are installed.	1、Adjust the voltage to the normal range 2、Cancel this power or add braking resistance 3、Increase the acceleration time 4、Adding brake unit and resistance
Deceleration overvoltage	OU2	1、Input voltage is high 2、Deceleration process there is an external force drag motor operation 3、The deceleration time is too short 4、No braking unit and braking resistor are installed.	1、Adjust the voltage to the normal range 2、Cancel this power or add braking resistance 3、Increase the deceleration time 4、Adding brake unit and resistance
Constant speed overvoltage	OU3	1、High input voltage 2、There are external forces dragging the motor operation during operation	1、Adjust voltage to normal range 2、Cancel this power or add braking resistor
Control power failure	POF	1、Input voltage not within specification	1、Adjust voltage to within specification requirements
undervoltage fault	LU	1、Instantaneous power failure 2、Drive input voltage is not in the range required by the specification 3, Bus voltage is not normal 4, rectifier bridge and buffer resistance is not normal 5、Driver board abnormality 6、Control board abnormality	1、Reset fault 2、Adjust the voltage to normal range 3、Seek technical support 4、Seek technical support 5、Seek technical support 6、Seek technical support
Drive Overload	OL2	1、Whether the load is too large or motor blocking occurs 2、Drive selection is small	1、Reduce load and check motor and mechanical condition 2、Select a drive with a larger power rating
Motor overload	OL1	1、Whether the load is too large or motor blocking occurs 2、Drive selection is small	1、Set this parameter correctly 2、Reduce the load and check the motor and mechanical condition. 3、Select a drive with a larger power rating
Input out of phase	LI	1、Three-phase input power is not normal 2、Driver board abnormality 3、Abnormal lightning protection board 4、Main control board abnormal	1、Check and troubleshoot the problems in the peripheral lines 2、Seek technical support 3、Seek technical support 4、Seek technical support
Output Out-of-Phase	Lo	1, drive to the motor lead is not normal 2, motor operation drive three-	1、Remove peripheral faults 2、Check whether the motor three-phase winding is normal and

		phase output imbalance 3、Drive board abnormality 4、Module abnormality	troubleshooting 3、Seek technical support 4、Seek technical support
Module overheating	OH	1、High ambient temperature 2, air duct blockage 3, fan damage 4, module thermistor damage 5, inverter module damage	1、Lower the ambient temperature 2、Clean the air duct 3、Replace the fan 4、Replace the thermistor 5、Replace the inverter module
Motor overheating	EF	1、Signalling of external faults via multi-function terminals	1、reset operation
485malfunction of communications	CE	1、The upper computer does not work properly 2、Communication line is not normal 3、Communication parameter PD group is not set correctly	1、Check the wiring of the upper computer 2、Check the communication connection line 3、Correctly set the type of communication expansion card 4、Correctly set the communication parameters
relay failure	RAy	1, the driver board and power supply is not normal 2, drive board relay is not normal	1. Replace the driver board or power board 2、Replace the driver board relay
Current Detection Fault	IE	1、Check the Hall device abnormality 2、Driver board abnormality	1. Replacement of Hall devices 2、Replace the driver board
Self-learning of electric motors learning faults	TE	1、Motor parameters are not set according to the nameplate 2、Parameter self-learning process timeout	1, according to the nameplate correctly set the parameters of the motor 2、Check the drive to motor lead
EEPROM failures to read or write	EEP	1、EEPROM chip damage	1、Replacement of the main control board
short-circuit fault to ground	GND	1、Motor shorted to ground	1、Replacement of cables or motors
Cumulative running time to reach failure	END1	1、Accumulated running time to set value	1、Clearing logging information using the parameter initialisation function
Cumulative power-up time to reach fault	END2	1、Cumulative power-up time to set value	1、Use the parameter initialisation function to clear Recorded information
Fast current limiting faults	CBC	1, whether the load is too large or occurs motor blocking 2、Drive selection is small	1, reduce the load and check the motor and mechanical conditions 2、Select a drive with a larger power rating
Excessive speed deviation fault	ESP	1, the encoder parameters are not set correctly 2、No self-learning parameters	1、Correctly set the encoder parameters 2、Self-learning motor parameters

		3、Speed deviation is too large detection parameter P9.03, P9.04 setting is not appropriate unreasonable	3、Reasonable setting of testing parameters according to the actual situation.
Motor overspeed fault	oSP	1. Incorrect encoder parameter setting 2、No parameter self-learning	1、Correctly set the encoder parameters 2、Self-learning motor parameters 3、Reasonable setting of testing parameters according to the actual situation.

6-2. Common faults and their solutions

The following fault conditions may be encountered during the use of the inverter, please refer to the following methods for simple fault analysis：

No.	Fault phenomenon	Possible causes	Solutions
1	No display on power up	Grid voltage is absent or too low; Failure of the switching power supply on the inverter drive board; Damage to the rectifier bridge; Damage to the inverter buffer resistor; Failure of the control board and keypad; Broken wires between the control board and the driver board, keypad；	Check input power; Check busbar voltage; Seek factory service;
2	Power on display	Motor or output wire shorted to ground; Damage to the inverter；	Measure the insulation of the motor and output wires with a rocking meter; Seek factory service;
3	"GND" alarm	Carrier frequency setting is too high. The fan is damaged or the air duct is blocked. Damage to internal components of the inverter	Reduce the carrier frequency (P0.15). Replace the fan and clean the air ducts. Seek factory service.
4	Frequent OH alarm	Motor and motor wires; Wrong setting of inverter parameters (motor parameters); Poor contact between the driver board and control board connecting wires; Failure of the drive board；	Reconfirming the connection between the inverter and the motor; Replacing the motor or clearing mechanical faults; Checking and resetting motor parameters;
5	(IGBT overheat) fault	Parameter setting error; External signal error; Control board faults；	Check and reset P4 group related parameters; Reconnect external signal lines; Seek factory service;
6	Motor does not rotate after inverter operation.	Incorrect setting of motor parameters; Incorrect acceleration and deceleration times; Load fluctuations;	Reset motor parameters or perform motor self-learning; Setting the appropriate acceleration and

			deceleration times; Seeking service from the manufacturer;
7	S-terminal failure.	The driver board relay is not engaged;	Check for loose drive board relay cables; Checking the drive board relay for faults; Checking for faults in the 24V power supply to the driver board relay; Seeking service from the manufacturer;

Chapter 7 Care and maintenance

Caution
·Maintenance personnel must carry out maintenance and servicing as specified. -Maintenance personnel need to be professional and qualified personnel to carry out -Before carrying out maintenance, the power supply of the inverter must be cut off, and the maintenance work can be carried out only after 10 minutes. -The components on the PCB board must not be touched directly, otherwise the inverter will be easily damaged by static electricity. -After the maintenance is completed, must confirm that all the screws have been tightened.

7-1：Daily Maintenance

In order to prevent the failure of the frequency converter, to ensure the normal operation of the equipment, and to extend the service life of the frequency converter, it is necessary to carry out routine maintenance of the frequency converter, and the contents of routine maintenance are as follows：

Inspection Items	Content
Temperature/Humidity	Confirm that the ambient temperature is 0℃～40℃, humidity is 20%～90% and no condensation.
Oil mist and dust	Confirm that there is no oil mist and dust, no condensation in the inverter.
Inverter	Check the inverter for abnormal heat and vibration.
Input power	Confirm that the voltage and frequency of the input power supply are within the permitted range.
Motor	Check the motor for abnormal vibration, heat, abnormal noise and lack of phase and other problems.

7-2：Regular Maintenance

In order to prevent the frequency converter from malfunctioning and ensure its long time high performance and stable operation, the user must check the frequency converter regularly (within half a year), and the content of the check is expressed as follows：

Inspection Items	Inspection contents	Troubleshooting
Inspection items Inspection contents Remedy	Inspection items Inspection contents Remedy	Inspection items Inspection contents Remedy
Screws on external terminals Loose screws Tighten them.	Screws on external terminals Loose screws Tighten them.	Screws on external terminals Loose screws Tighten them.
PCB board Dust and debris Remove all debris with dry compressed air.	PCB board Dust and debris Remove all debris with dry compressed air.	PCB board Dust and debris Remove all debris with dry compressed air.
Electrolytic capacitors Discolouration and odour Replace electrolytic capacitors.	Electrolytic capacitors Discolouration and odour Replace electrolytic capacitors.	Electrolytic capacitors Discolouration and odour Replace electrolytic capacitors.
Heat sink Dust, debris Remove all debris with dry compressed air.	Heat sink Dust, debris Remove all debris with dry compressed air.	Heat sink Dust, debris Remove all debris with dry compressed air.

Power components Dust, dirt Full removal of debris with dry compressed air	Power components Dust, dirt Full removal of debris with dry compressed air	Power components Dust, dirt Full removal of debris with dry compressed air

7-3：Replacement of inverter wearing parts

The fan and electrolytic capacitor in the inverter are easy to damage parts, in order to ensure long-term, safe and trouble-free operation of the inverter, the fragile devices should be replaced regularly.Replacement time of wearing parts is as follows：

◆Electrolytic capacitors: need to be replaced after 30,000 to 40,000 hours of use.

7-4：Warranty for inverters

Our company provides 12-month warranty service for NZ200DR series inverter from the date of delivery.。

Chapter 8 NZ200DR Modbus Communication Protocol

NZ200DR series inverter provides RS485 communication interface and supports Modbus communication protocol.Users can realise centralized control through computer or PLC, set inverter running commands, modify or read function code parameters, read inverter working status and fault information through this communication protocol.

I. Protocol content

The serial communication protocol defines the content of the information transmitted in the serial communication and the use of format.It includes: polling (or broadcasting) format of the host; coding method of the host, including: function code of the required action, transmission data and error check, etc. The slave ground response also uses the function code parameter of the inverter.The slave's ground response adopts the same structure, including action confirmation, return data and error checking.If an error occurs when the slave receives the information, or it cannot complete the action required by the host, it will organise a fault message as a response back to the host.

II. Application Mode

The frequency converter is connected to the PC/PLC control network with RS485 bus.

III. Bus structure

(1) Interface

RS485 hardware interface

(2) Transmission mode Asynchronous serial, half-duplex transmission mode.At the same time the host and the slave can only have a send data and the other can only receive data.Data in the serial asynchronous communication process, is in the form of telegrams, a frame by frame to send.

(3) Topology Single-master-multi-slave system.The slave address is set in the range of 1 to 247, with 0 being the broadcast communication address.The slave address must be unique in the network.

IV. Protocol Description

The communication protocol of NZ200DR series inverter is a kind of asynchronous serial master-slave Modbus communication protocol, only one device (master) in the network can establish the protocol (called "query/command").Other devices (slaves) can only respond to the "query/command" of the master by providing data, or make corresponding actions according to the "query/command" of the master.The master refers to a personal computer (PC), industrial control device or programmable logic controller (PLC), etc., and the slave refers to the NZ200DR inverter.The master can communicate with a slave individually, and can also broadcast messages to all subordinate slaves.For individually accessed "queries/commands" of the host, the slaves are required to return a message (called a response), and for broadcast messages issued by the host, the slaves do not need to return a response to the host.

Communication Data Structure

The communication data format of Modbus protocol of NZ200DR series inverter is as follows: Using RTU mode, the message sending should be started with a pause interval of at least 3.5 character time.

With diverse character times at network baud rates, this is the easiest to achieve.The first field transmitted is the device address.

The transmission characters that can be used are hexadecimal 0....9,A...F.The network device continuously detects the network bus, including during the pause interval.When the first field (address field) is received, each device decodes it to determine if it is addressed to itself.After the last transmitted character, a pause of at least 3.5 character time marks the end of the message.A new message may begin after this pause.

The entire message frame must be transmitted as a continuous stream.If there is a pause of more than 1.5 characters before the frame is complete, the receiving device refreshes the incomplete message and assumes that the next byte is the address field of a new message.Similarly, if a new message begins after a previous message in less than 3.5 character time, the receiving device will assume that it is a continuation of the previous message.This results in an error because the value in the last CRC field cannot be correct.

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)	Data content: Function code parameter address, number of function code parameters, function code parameter values, etc.
Data content DATA (N-2)	
.....	
Data content DATA0	
CRC CHK high bit	Detection value: the CRC value.
CRC CHK low bit	
END	3.5 character time

CMD (Command Message) and DATA (Data Word Description)

Command code: 03H, read N words (Word) (up to 12 words) e.g.: read 2 consecutive values continuously from the start address F105 of inverter with machine address 01.

Host command information

ADR	01H
CMD	03H
Start Address High	F1H
Start Address Low	05H
Number of registers high	00H
Number of registers low	02H
CRC CHK low	CRC CHK value to be calculated
CRC CHK high	

Slave Response Information

ADR	01H
CMD	03H
Number of bytes	04H
Profile F002H High	00H
Profile F002H Low	00H
Profile F003H High	00H
Profile F003H low	01H
CRC CHK low	CRC CHK value to be calculated
CRC CHK high	

Command Code: 06H Write a word (Word) Example: Write 3000 (BB8H) to the slave address 05H at the F00AH address of the inverter.

Host Command Information

ADR	05H
CMD	06H
Data address high	F0H
Data address low	0AH

Slave	Data content high	0BH
	Data content low	B8H
	CRC CHK low	CRC CHK value to be calculated
	CRC CHK high	

Response Information

Slave response information

Check Method - CRC Check Method: CRC (Cyclical Redundancy Check) Using the RTU frame format, the message includes an error detection field based on the CRC method. the CRC field detects the entire contents of the message. the CRC field is two bytes and contains a 16-bit binary value.It is calculated by the transmitting device and added to the message.The receiving device recalculates the CRC of the received message and compares it with the value in the received CRC field. if the two CRC values are not equal, there is an error in transmission.

The CRC is first deposited into 0xFFFF, and then a procedure is called to process the consecutive 8-bit bytes in the message against the value in the current register.Only the 8 bits of data in each

ADR	02H
CMD	06H
Data address high	F0H
Data address low	0AH
Data content high	0BH
Data content low	B8H
CRC CHK low	CRC CHK value to be calculated
CRC CHK high	

character are valid for the CRC, the start and stop bits and the parity bits are not.

During the CRC generation process, each 8-bit character is individually dissimilar to the register contents (XOR), resulting in a shift towards the least significant bit, with the most significant bit filled with a 0. The LSB is extracted and detected, and the register is individually dissimilar to the preset value if the LSB is 1, or not if the LSB is 0. The entire process is repeated 8 times.The whole process is repeated 8 times.After the last bit (8th bit) is completed, the next 8-bit byte is again individually dissimilar to the current value of the register.The final value in the register is the CRC value after all the bytes in the message have been executed.

The CRC is added to the message with the low byte first, then the high byte. The simple CRC function is as follows：

```
    unsigned int crc_cal_value(unsigned char *data_value,unsigned char 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;
            }
        }
    Return(crc_value);
    }
```

Address definition of communication parameters:

This part is the content of communication, which is used to control the operation of the inverter, inverter status and related parameter settings. Read and write function code parameters (some function codes can not be changed, only for the manufacturer's use or monitoring use), function code parameter address identification rules.

Function code group number and label as the parameter address indication rule:

High byte: F0 ~ FF (P group), A0 ~ AF (C group), 70 ~ 7F (D group)

Low byte: 00 ~ FF

For example: P3.12, the address is indicated as F30C; Note: PF group: neither read parameters nor change parameters; D group: only read, not change parameters.

Some parameters can not be changed when the inverter is in running state; some parameters can not be changed no matter what state the inverter is in; change the function code parameters, but also pay attention to the parameter range, unit, and related instructions.

In addition, because EEPROM is frequently stored, it will reduce the service life of EEPROM, so some function codes in the mode of communication, no need to store, just change the value in RAM.

If it is a P group parameter, the function can be realised by changing the high bit F of the function code address to 0. If it is a parameter of group L, the function can be realised by changing the high bit A of the function code address to 4. The corresponding function code address is expressed as follows: Higher byte: 00 to 0F (P group), 40 to 4F (C group) Lower byte: 00 to FF

For example: function code P3.12 is not stored in the EEPROM, the address is 030C; function code C0.05 is not stored in the EEPROM, the address is 4005; the address can only be done to write the RAM, can not be done to read the action, read, for the invalid address.

parameter address	Parameter Description
1000	*Communication set value (-10000 to 10000) (decimal)
1001	Operation frequency
1002	Bus voltage
1003	Output voltage
1004	Output current
1005	Output power
1006	Output torque
1007	Operating speed
1008	Input Terminal Symbol
1009	Output Terminal Symbol
100F	Load speed
101D	Communication set value

Shutdown/Operation Parameters section:

**Caution：

The communication setpoint is a percentage of the relative value, with 10000 corresponding to 100.00 per cent and -10000 corresponding to -100.00 per cent.The percentage is a percentage relative to the maximum frequency (P0.10) for data in the frequency scale, and P2.10 for data in the torque scale.

Control command input to the inverter: (write only)

Command word	Command Function

address	
2000	0001: Forward Running
	0002: Reverse rotation running
	0003: Forward Tap
	0004: Reverse rotation
	0005: Free stop
	0006: Deceleration stop
	0007: Fault reset

Read inverter status: (read only)

Status word address	Status word function
3000	0001: Forward Running
	0002: Reverse operation
	0003: Shutdown

Parameter lock password verification: (If the return is 8888H, it means the password verification passed)

Password address Enter the	Password address Enter the contents of the password
1F00	*****

Current fault description of the inverter：

Inverter Fault Address	Current fault information of the inverter
8000	0000: No faults 0001: Inverter unit protection 0002: Acceleration overcurrent 0003: Deceleration overcurrent 0004: Constant speed overcurrent 0005: Acceleration overvoltage 0006: Deceleration Overvoltage 0007: Constant Speed Overvoltage 0008: Control Power Fault 0009: Undervoltage fault 000A: Inverter Overload 000B: Motor Overload 000C: Input phase loss 000D: Output phase loss 000E: Module overheat 000F: Motor overheating 0010: Abnormal 485 communication 0011: Relay Abnormal 0012: Current detection fault 0013: Motor self-learning fault 0015: Parameter read/write exception 0017： Motor short circuit fault to ground 001A： Runtime Arrival 001D： Power-up time arrival 001E： off-loading 0028： Fast Current Limit Timeout Fault
Communications Fault Address	Failure Function Description
8001	0000： trouble-free

	0001：incorrect password 0002：Command Code Error 0003：CRC Checksum Error 0004：invalid address 0005：Invalid parameters 0006：Invalid parameter change 0007：The system is locked. 0008：EEPROM operation is in progress

Description of PD group communication parameters

PD.00	Baud	Factory value	0005
	Setting range	Bit: MODUBS baud rate 0:300BPS 1:600BPS 2:1200BPS 3:2400BPS 4:4800BPS 5:9600BPS 6:19200BPS 7:38400BPS 8:57600BPS 9:115200BPS	

This parameter is used to set the data transmission rate between the host computer and the inverter.Note that the baud rate set by the upper computer and the inverter must be the same, otherwise, the communication cannot be carried out.The larger the baud rate, the faster the communication speed.

PD.01	Data format	Factory value	3
	Setting range	0: no checksum: data format <8,N,2> 1: even check: data format <8,E,1> 2: Odd check: Data format <8,O,1> 3: No checksum: Data format <8,N,1>	

The data format set by the host computer and the inverter must be the same; otherwise, communication is not possible.

PD.02	Local address	Factory value	1
	Setting range	1～247,0 is the broadcast address	

When the local address is set to 0, it is the broadcasting address to realise the upper computer broadcasting function.

The local address is unique (except the broadcast address), which is the basis for realising the point-to-point communication between the upper computer and the inverter.

PD.03	Response time	Factory value	2ms
	Setting range	0～20ms	

Answer delay: It is the intermediate interval between the end of inverter data reception and the sending of data to the host computer.If the answer delay time is smaller than the system processing time, the answer delay time will be based on the system processing time. If the answer delay time is longer than the system processing time, the system will delay and wait after processing the data until the answer delay time arrives before sending the data to the host computer.

PD.04	Communication timeout	Factory value	0.0s
	Setting range	0.0 s（Invalid）	

		0.1～60.0s	

When this function code is set to 0.0 s, the communication timeout time parameter is invalid.When this function code is set to a valid value, if the interval between one communication and the next exceeds the communication timeout period, the system will report a communication fault error (CE).Normally, it is set to invalid.If this parameter is set in a system with continuous communication, the communication status can be monitored.

PD.05	Communication protocol selection	Factory value	1
	setting range	1：Standard Modbus protocol	
PD.06	Communication reading current resolution	Factory value	1
	Setting range	0:0.01A 1:0.1A	

Used to determine the output unit of the current value when the communication reads the output current.