Yolico

YD280 Series

General-Purpose Drive

220V 1-phase 0.4~2.2kW
380V 3-phase 0.75~22kW

Ver 1.3

Preface

First of all, thank you for purchasing the YD280 series inverter developed and produced by YOLICO!
YD280 series inverter is a general-purpose high-performance current vector inverter, which is mainly used to control and regulate 3-phase AC asynchronous motors Speed & Torque.
YD280 adopts high-performance vector control technology, low speed and high torque Output, with good dynamic characteristics, super overload capacity, with user programmable functions , RS485-communication, It supports stable performance. It can be used in textile, papermaking, wire drawing, machine tools, packaging, food， Drives for fans, pumps and various automated production equipment.

First use

For users who use this product for the first time, they should read this manual carefully first. If you have any questions about some features and performance, please contact us
Our company's technical support staff to get help that is beneficial for the proper use of this product.

Meets standards

The relevant certification directives and standards are shown in the following table, and whether the relevant certification qualifications are obtained are subject to the product nameplate identification.

Certification	Mark	Directives		Standard
CE	CE	EMC directives	2014/30/EU	EN 61800-3
		LVD directives	2014/35/EU	EN 61800-5-1
		RoHS directives	2011/65/EU	EN 50581

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Safety Precautions

Security Notice

- When installing, operating, and maintaining the product, please read and comply with this safety precautions first.
- In order to ensure the safety of people and equipment, when installing, operating and maintaining the product, please follow all the instructions on the product logo and manual Safety Precautions.
- The "Caution", "Warning" and "Danger" items in the manual do not represent all safety precautions that should be observed
  There are additions with safety precautions.
- This product should be used in an environment that meets the requirements of the design specifications, otherwise it may cause failure and work caused by failure to comply with relevant regulations
  Abnormal or damaged parts are not within the scope of product quality assurance.
- Our company will not assume any legal responsibility for personal safety accidents and property losses caused by illegal operation of products.

Definition of security level

Danger	"Danger" means that failure to do so would result in death or serious bodily injury.
Warning	"Warning" means that failure to do so could result in death or serious bodily injury.
Caution	"Caution" If not performed as directed, it may result in minor bodily injury or damage to the device.

Safety Precautions

Unpacking and acceptance

Caution

- Before unpacking, check the outer packaging of the product is good、damaged、soake、 damp or deformed, etc.
- Please open the package in hierarchical order, and it is strictly forbidden to knock violently!
- When unpacking, check the surface of the product and accessories for damage, rust, bruises, etc.
- After unpacking, carefully check the packing list the number and information and accessories are complete.

Warning

- When unpacking, please do not install and accessories if you find that there are signs of damage, rust, and use!
- Do not install if you find water has entered product, some parts are missing,or damaged when you open the box!
- Carefully check the packing list, if you find the packing list does not match the product name, do not install it!

Storage and transportation

Caution

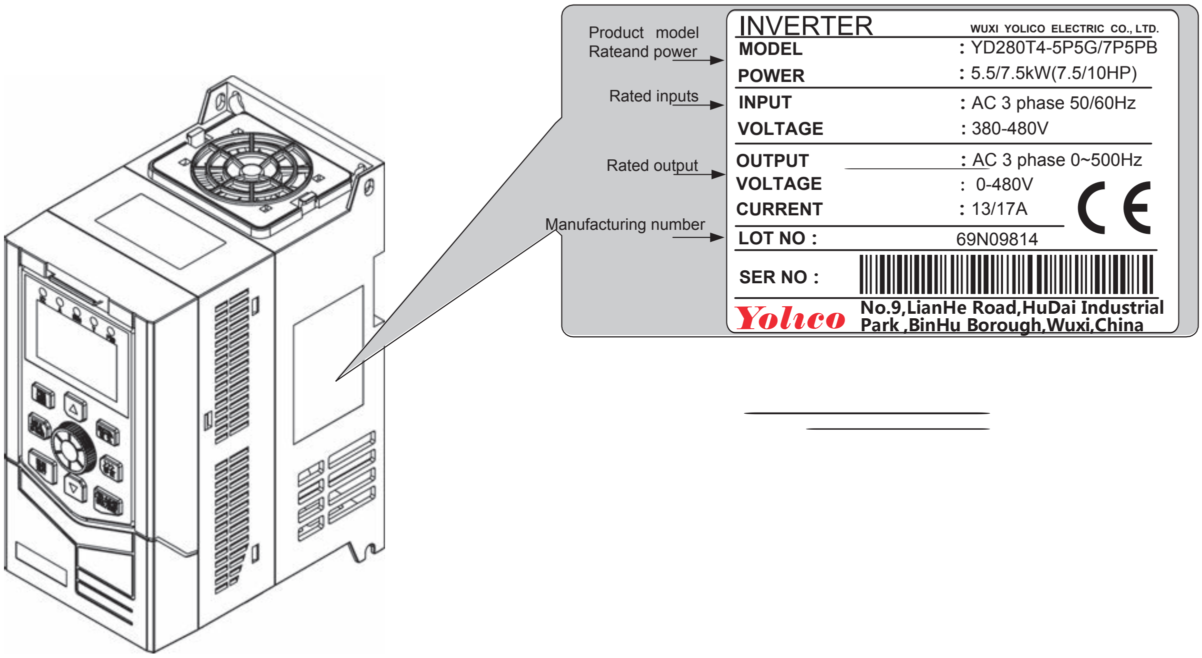
- The storage temperature and humidity meet the requirements according to conditions of the product.
- Avoid storage and transportation such as water or rain, strong sunlight,electric field, magnetic field, vibration, etc.
- Avoid storing for more than 3 months, and if too long, take closer precautions and carry out inspections.
- The products are packaged and then transported by vehicle, using a closed box for long-distance transportation.
- It is strictly forbidden to transport this product in combination with equipment or items that may affect or damage it.

Chapter 1 Product Information

Safety Precautions

⚠ note	● Do not grasp the front or terminal cover to carry the inverter. If only the front cover is grasped, Inverter will fall and there is a risk of smashing; ● When operating drive, follow the step set forth in the ESD prevention measures.or the inside of the inverter will be damaged due to static electricity circuits.

1.1 Nameplate Model



YD280 T4- 5P5G / 7P5P B

Mark	Product name
YD280	Asynchronous drive

Mark	Voltage level
T4-	3PH 380V~480V
T2S	1PH 200V~240V

Mark	Power Rating (kW)
0P7	0.75
...	...
22	22

Mark	Type
G	General type

Mark	Note
NULL	Standard
	Non-standard

Mark	Brake unit
NULL	without
B	with

Mark	Type
P	Pump and fan type

Mark	Power Rating (kW)
1P5	1.5
2P2	2.2
...	...
22	22

Figure 1-1 Product naming and nameplate identification

Chapter 2 System Connection

Safety Precautions

Danger

- It is strictly forbidden to wire when power on, or there will be a risk of electric shock!
- Be sure to keep the circuit breaker in the OFF state.

Warning

- When install inverter in a closed cabinet , use a cooling fan to fully cool it to make the inverter keep inlet air temperature of inverter below 50°C, or it may cause overheating.

Caution

- When install inverter, cover the upper of the inverter with cloth or paper to prevent metal shaving, oil, and water from the hole during drilling into inside of the inverter. If foreign matter gets inside inverter, it may cause inverter to malfunction, so remove it after the work is finished If cloth or paper continues to be covered on it, the ventilation effect will be worse, resulting in abnormal heating of inverter!
- When using the drive, please follow the steps specified in the ESD prevention measures, otherwise the drive will be damaged due to static electricity!
- The torque characteristics are different when driving with an inverter and when driving with a commercial power supply, so check the load torque characteristics of the machine to be connected Sex.
- Do not lift the inverter with the housing removed, as this may cause damage to the inverter's circuit board or terminal strip!

2.1 YD280 System Connection Diagram

When using YD280 series inverter to control asynchronous motor to form a control system, it is necessary to install various electrical components on the input and output sides of the inverter to ensure the safety and stability of the system. The product system compositionis sh -own in the following figure：

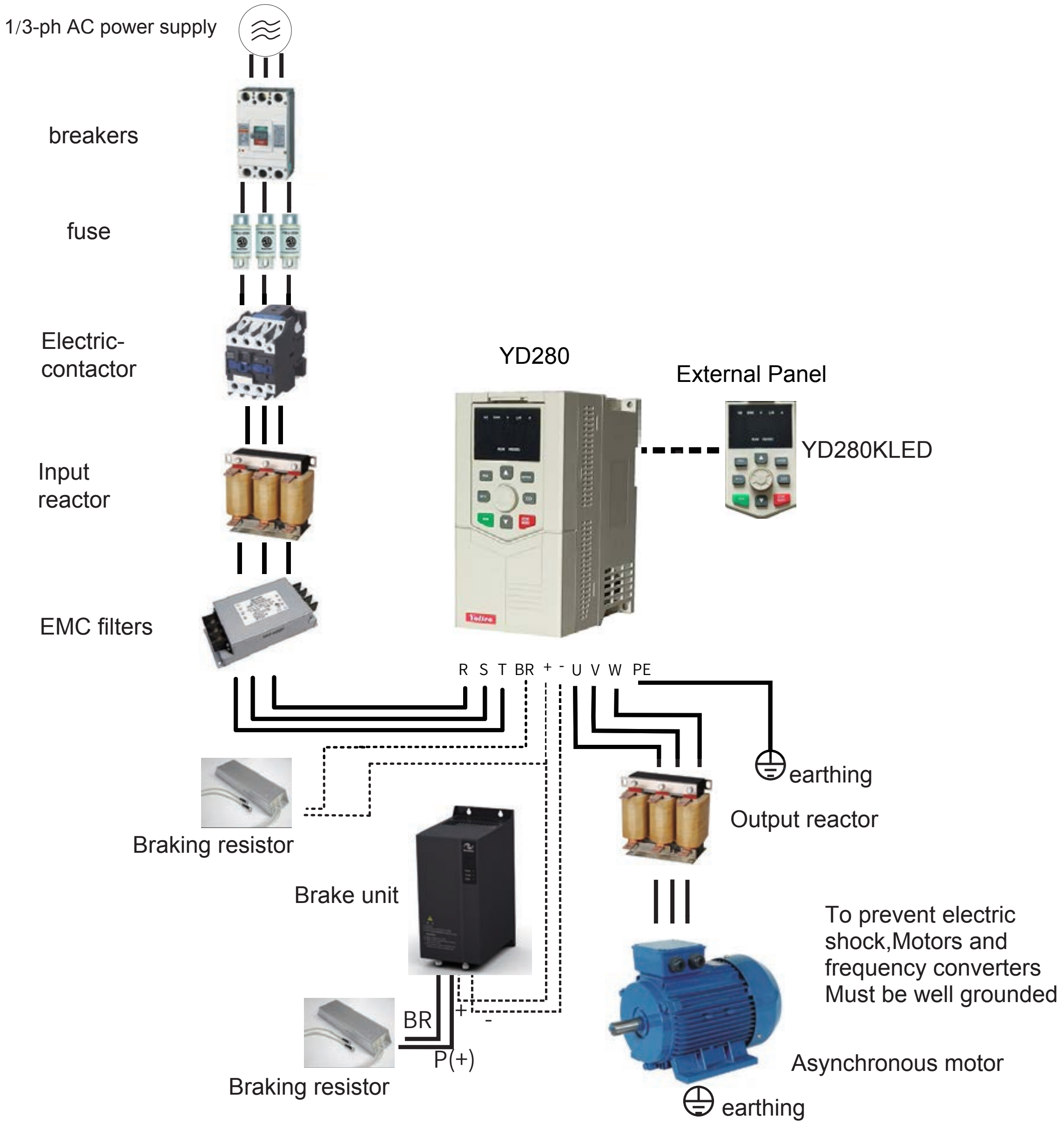


Figure 2-1 YD280 series system configuration

NOTE

● The above picture is only used as a schematic diagram of the YD280 inverter system connection, please refer to Chapter 9 "Specifications and Selection" for the selection of peripheral equipment.。

Chapter 3 Installation and Wiring

3.1 Installation

3.1.1 Installation Environment

1) Ambient temperature: The ambient temperature has a great impact on the life of the inverter, and the operating ambient temperature of the inverter is not allowedExceeding the allowable temperature range (-10°C~ 50°C).

2) Install the inverter on the surface of a flame-retardant object, and there should be enough space around it to dissipate heat. The inverter is prone to produce a large amount when working

Heat. And install it vertically on the mounting support with screws.

3) Install it in a place where it is not easy to vibrate. The vibration should not be greater than 0.6G. Pay special attention to stay away from equipment such as punches.

4) Avoid direct sunlight, humidity, and water droplets.

5) Avoid places with corrosive, flammable and explosive gases in the air.

6) Avoid installation in places with oil and dust.

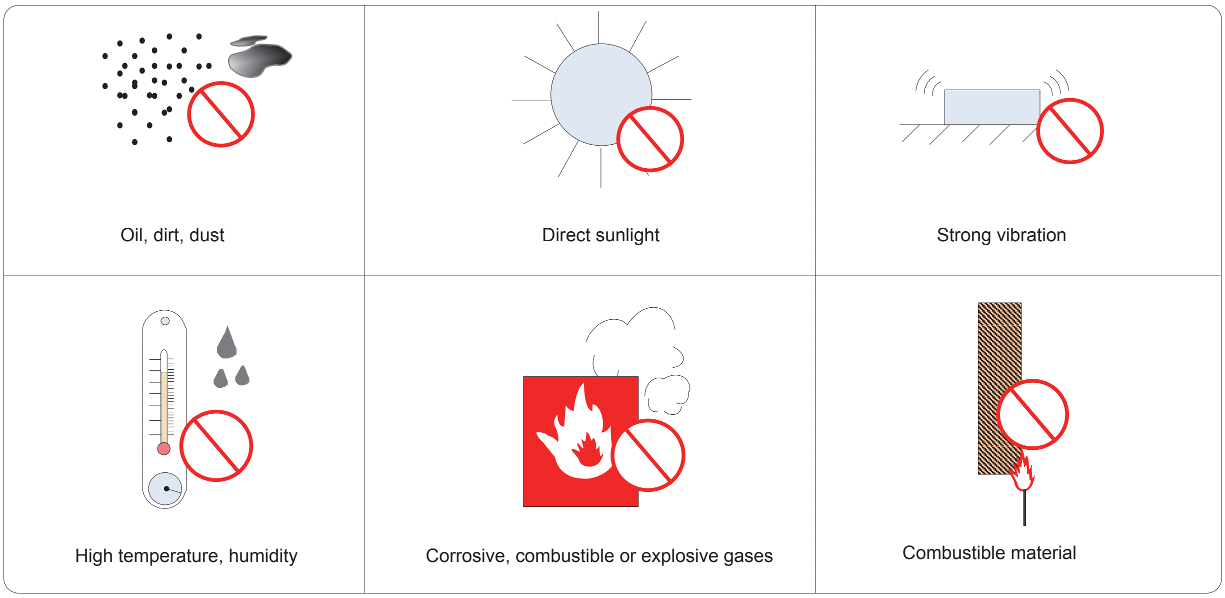
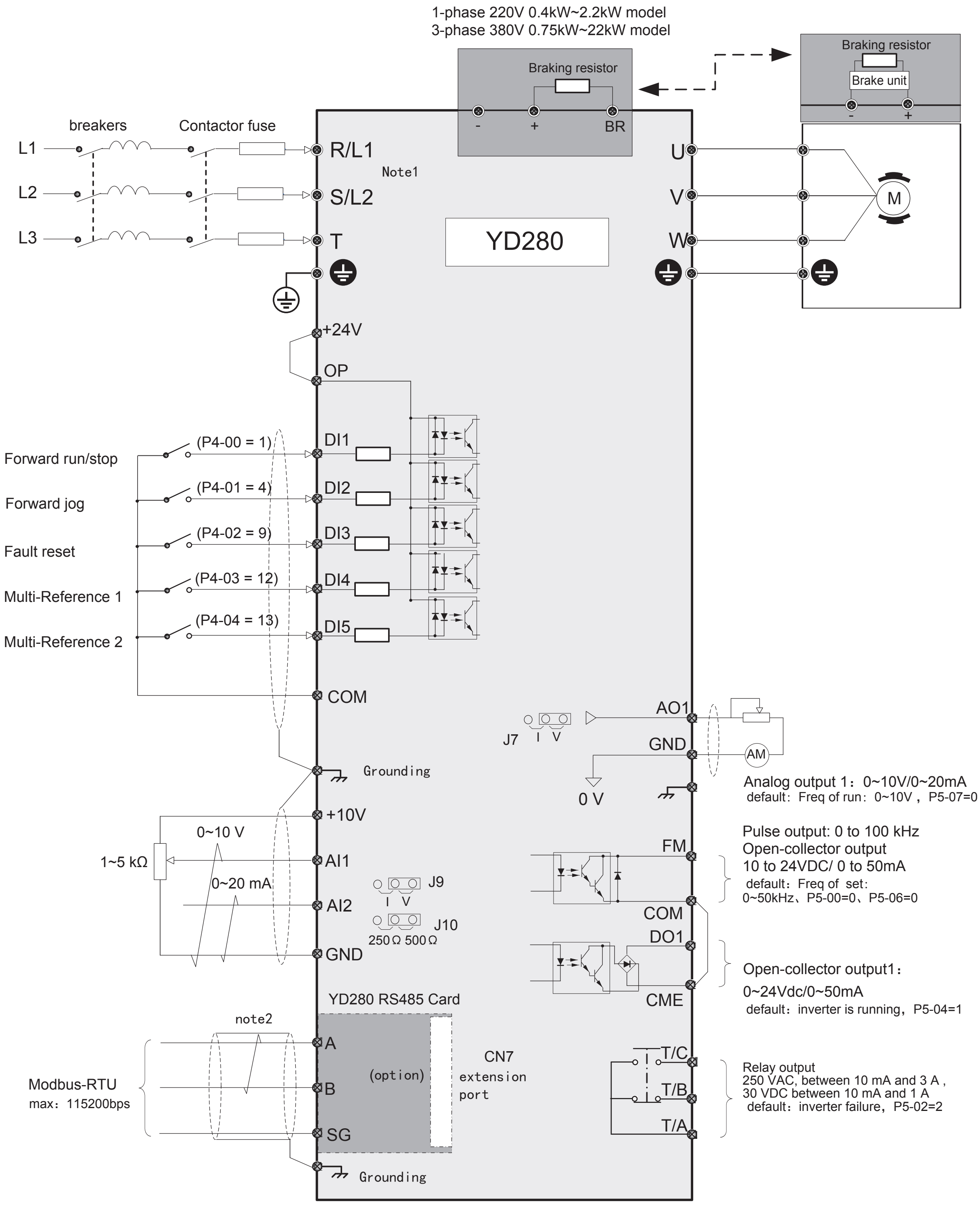


Figure 3-1 Requirements for the installation environment

7) YD280 series products are cabinet installation products, which need to be installed in the final system for use, and the final system should be provided corresponding fireproof enclosures, electrical protective enclosures and mechanical protective enclosures, etc., and comply with local laws and regulations and relevant IEC Standard requirements:

3.2 Connection

3.2.1 Standard wiring diagram



Note2: ——shielding ——Twisted pair

Figure 3-26 Typical wiring diagram of YD280

3.2.2 Function of main circuit terminal

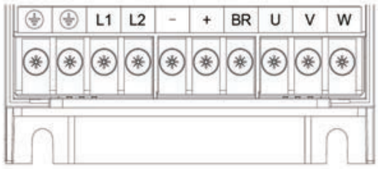


Figure 3-27 YD280T2S-0P4GB ~ YD280T2S-2P2GB main circuit terminal

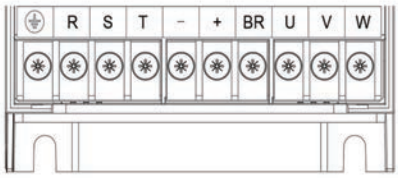


Figure 3-28 YD280T4-0P7G/1P5PB ~ YD280T4-3P7G/5P5PB main circuit terminal

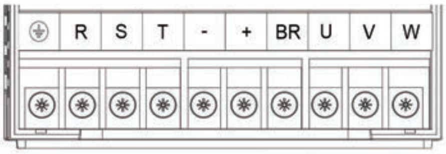


Figure 3-29 YD280T4-5P5G/7P5PB ~ YD280T4-7P5GB main circuit terminal

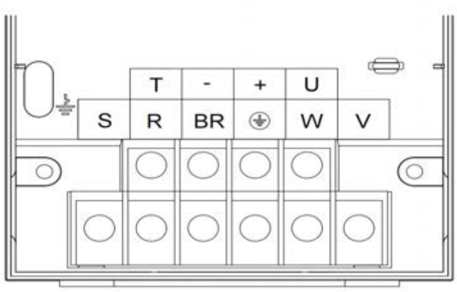


Figure 3-30 YD280T4-11G/15PB ~ YD280T4-15G/18P5PB and YD280T4-18P5G/22PB ~ YD280T4-22GB main circuit terminal

Table 3-3 Main circuit terminals of YD280 series inverters

Terminal marking	Terminal name	Feature description
R、S、T/L1、L2	3/1-phase power input	AC input power connection point
(+) 、 (-)	DC bus positive、negative	Common DC bus input , and connect external braking units
(+) 、BR	Braking resistor connection	Braking resistor connection point
U、V、W	Inverter output terminal	Connect a three-phase motor
⏚	Ground Terminal (PE)	Protective grounding

3.2.6 Distribution of Control circuit terminal

◆ <u>Control loop terminal arrangement</u>

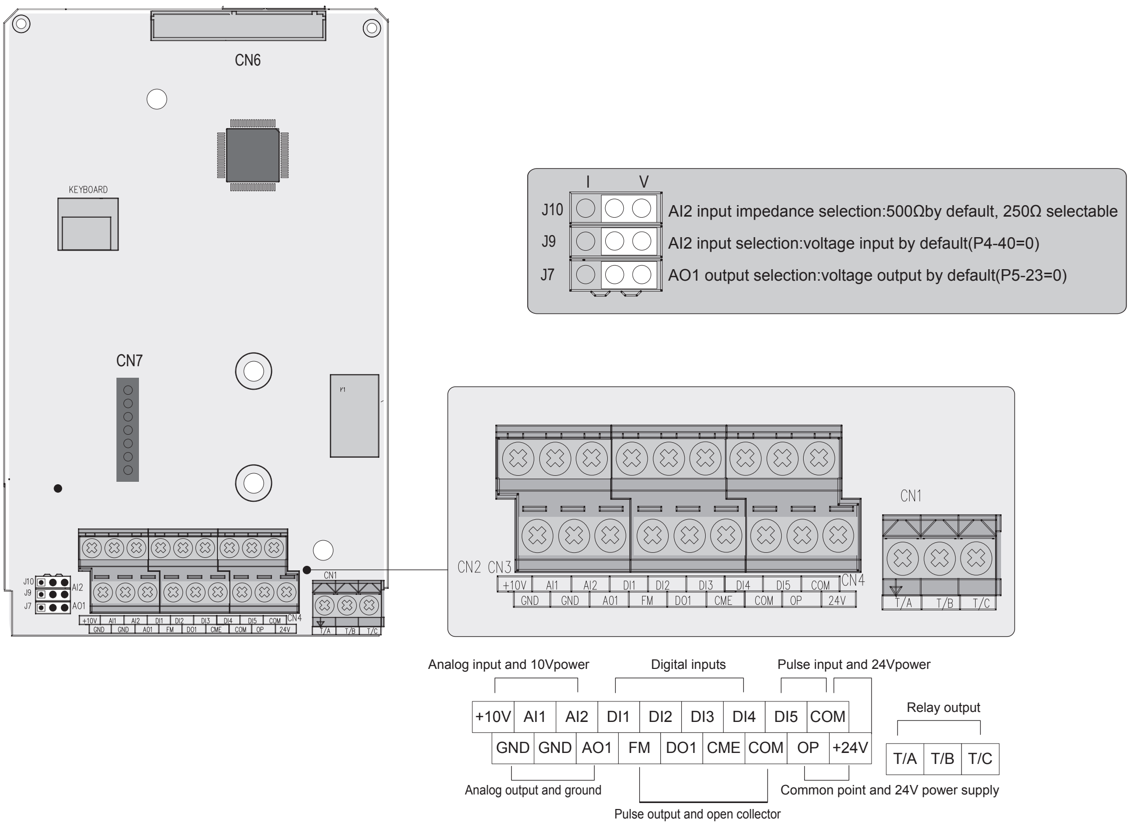


Figure 3-57 Terminal layout of the control circuit

Table 3-17 YD280 inverter control terminal function description

Type	Terminal	Name	Description
Power supply	+10V-GND	+10 V power supply	Provides +10 V power supply to an external unit., Max. output current: 10 mA Generally used to supply an external potentiometer of 1 to 5 kΩ
	+24V-COM	+24 V power supply	Provides +24 V power supply to an external unit.Generally used to supply the DI/DO terminals and external sensors Max. output current: 170 mA 【note 1】
	OP	Input terminal for external power supply	Connected to +24 V by default. When DI1 to DI5 need to be driven by external signals, OP must be disconnected from + 24 V and connected to an external power supply.
Analog inputs	AI1-GND	Analog input 1	Voltage range of inputs: 0 to 10 VDC Input impedance: 22 kΩ
	AI2-GND	Analog input 2	Input voltage range: 0-10 VDC/0-20 mA，Either voltage or current input,determined by jumper J9. 【note 4】 Input impedance：22 kΩ (voltage),，500/250 Ω (current) by J10 【note 2】
Analog output	AO1-GND	Analog output 1	Either a voltage or a current output,determined by jumper J7. Output voltage range：0V~10V Output current range：0mA~20mA
Digital inputs	DI1- OP	Digital input 1	Optical lotus isolation, compatible with bipolar inputs Input impedance: 1.39kΩ Voltage range at effective level input: 9V~30V
	DI2- OP	Digital input 2	
	DI3- OP	Digital input 3	
	DI4- OP	Digital input 4	
	DI5- OP	Digital input 5	
Digital outputs	DO1-CME	Digital output 1	Optical lotus isolation, bipolar open collector output Output voltage range: 0V~24V Output current range: 0mA~50mA Note: The digital output ground CME is internally isolated from the digital input ground COM, but at the factory the CME and COM have been externally shorted (DO1 is driven by +24V by default). When DO1 If you want to drive from an external power supply, you must disconnect the external shorting of the CME from the COM.
	FM- COM	High-speed pulse output	Constrained by parameter P5-00 "FM terminal output mode selection"; When output as a high-speed pulse, the maximum frequency is 100kHz; When used as an open collector output, it is the same as the DO1 specification.
Relay outputs	T/A-T/B	(NC) terminal	Contact actuation capability: 250Vac，3A，COSØ=0.4 30Vdc，1A
	T/A-T/C	(NO) terminal	
Auxiliary interfaces	CN7	Extension card interface	7-pin terminals, interface with optional cards (RS485 cards, etc.).
	J11	External OP interface	External Keyboard
Jumpers 【Note 3】	J7	AO1-Out select	Voltage and current Output are optional, and the default is voltage input
	J9	AI2-Input select	Voltage and current input are optional, and the default is voltage input
	J10	AI2-input impedance select	500Ω, 250Ω optional, default is 500Ω

NOTE

- [Note 1] When the ambient temperature is greater than 23°C, the user needs to derate the output current by 1.8mA for every 1°C increase in ambient temperature. The maximum output current is 170mA at 40°C ambient temperature, and the current of the DI terminal must also be taken into account when the user shorts the OP to 24V.
- [Note 2] Please choose 500Ω or 250Ω impedance according to the load capacity of the signal source, and the selection is based on the maximum output voltage of the signal source, for example, if you use 500Ω impedance, you need to ensure that the maximum output voltage of the signal source is not less than 10V, so as to ensure that AI2 can measure a current of 20mA.
- [Note 3] : Figure 3-57 shows the position of jumpers J7, J9, and J10 on the control board.
- [Note 4]: AI2 voltage/current selection, in addition to J9 selection, parameters P4-40 also need to be set（0=voltage，1=current）

Chapter 4 Operating Panel

4.1 Introduction

YD280 series inverter can be operated by LED operation panel for parameter operation, status monitoring and control.

4.2 Introduction to LED Operator Panel

With the operation panel, you can set and modify the parameters of the inverter, monitor the working status, and control the operation (start, stop) and other operations.
The appearance of the operation panel and the names of the operation keys are shown in the following figure:

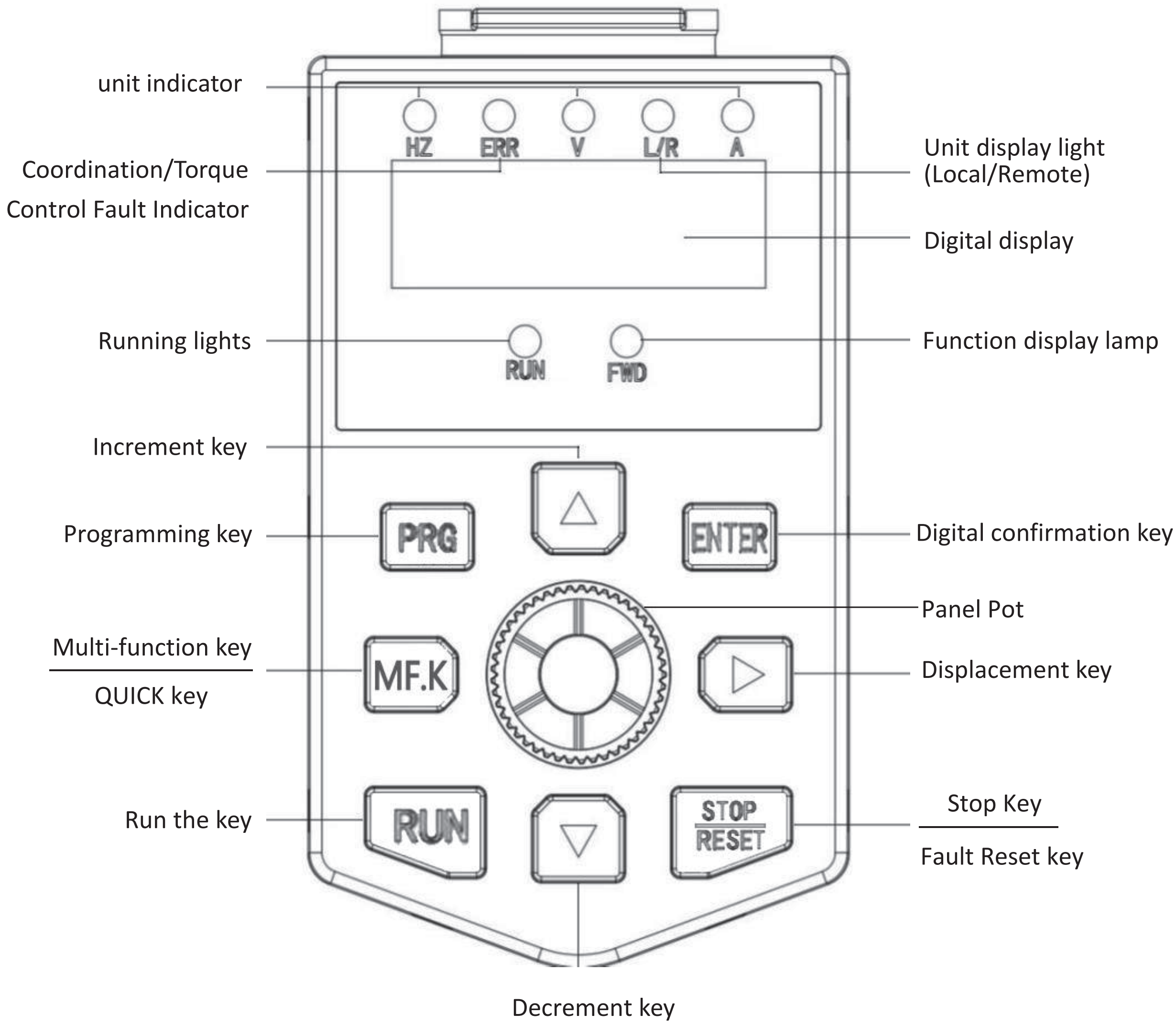


Figure 4-1 Details of the operating panel

4.2.1 Function Indicator

Table 4-1 Indicator descriptions on the operation panel

1) Description of the function indicator lamp

Indicator lamp name	Indicator light description
RUN	Running state indicator: when the light is out, the inverter is in shutdown state; when the light is on, the frequency converter is in running state;
FWD/REV	Positive verse indicator: the light out indicates the positive state; the light indicates the reverse state.
L/R	Control mode indicator: the light out indicates the keyboard control status; the light flashing indicates the communication control status; the light on indicates the terminal control status.
ERR	Tuning / torque control / fault indicator lamp with light light indicating torque control mode, light slow flash indicating tuning state and light flash indicating fault state.

2）Unit indicator light instructions

Indicator lamp name	Indicator light description
Hz	Frequency unit
A	unit of current
V	voltage unit

4.2.2 LED display area

There are a total of 5-digit LED displays on the operation panel, which can display the setting frequency, output frequency, various monitoring data, and alarm codes.

Table 4-2 Actual correspondence and LED display correspondence table

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

4.2.3 Keyboard Button Function

Table 4-3 Keyboard key function list

Keynote symbol	name	function declaration
PRG	Programming key	The Level 1 menu enters or exits
ENTER	Determine the key	Enter the menu screen step by step and confirm the setting parameters
∧	UP increasing key	Increment of the data or function code
∨	The DOWN diminishing key	Declining number of the data or function codes
>	Right displacement key	Under the shutdown display interface and the running display interface, the display parameter can be selected by the right shift cycle; when modifying the parameter, the modification bit of the parameter can be selected
RUN	Run the key	In keyboard operation mode, used for running operations
STOP/RESET	Stop / reset key	When running state, press this key to stop operation; this function code P7-02 restriction. In the fault alarm state, all control modes can be reset with the key
MF.K	Multi-function key	According to P7-01, it can be defined as the command source, or direction rapid switch

4.2.4 How to view and modify parameters

YD280 The operation panel of the inverter adopts a three-level menu structure for parameter setting and other operations. The three-level menus are:

Function Parameter Group (Level I Menu) → Function Parameter Group (Level II Menu) → Function Parameter Group (Level III Menu)

After entering each level of menu, when the display bit flashes, you can press  keys,  keys, and  keys to modify them. Figure 4-2 shows the operation process.

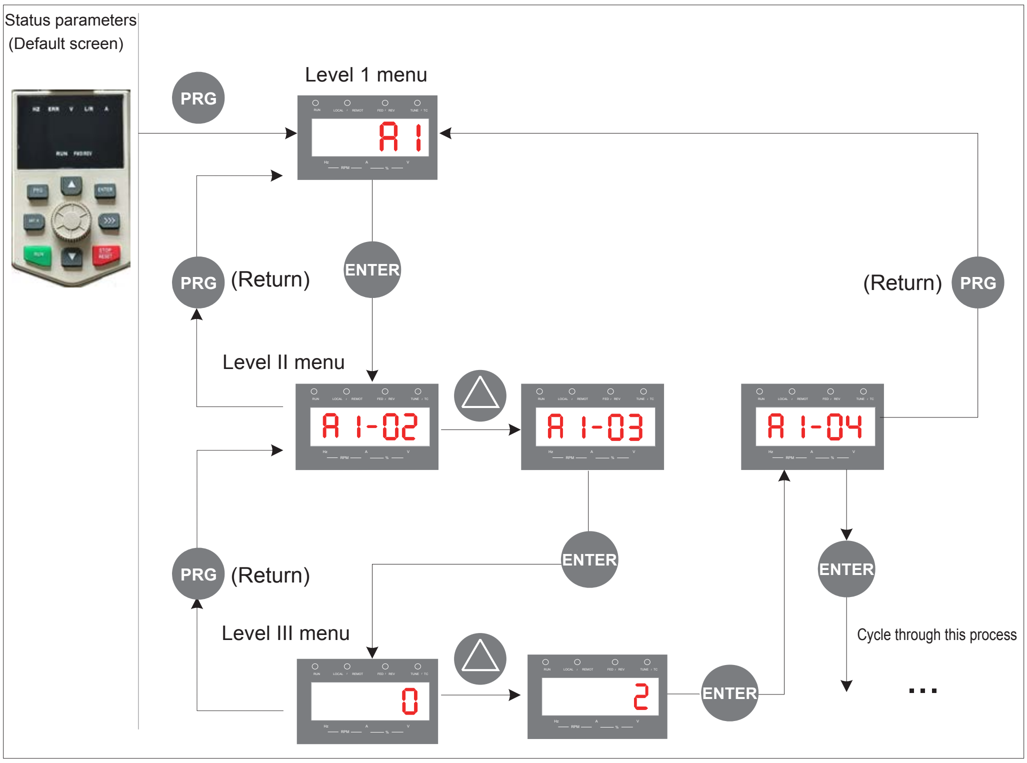


Figure 4-2 Flowchart of the three-level menu

Example

Example of changing the parameter PC-01 from 0000.0% to 0050.0%。

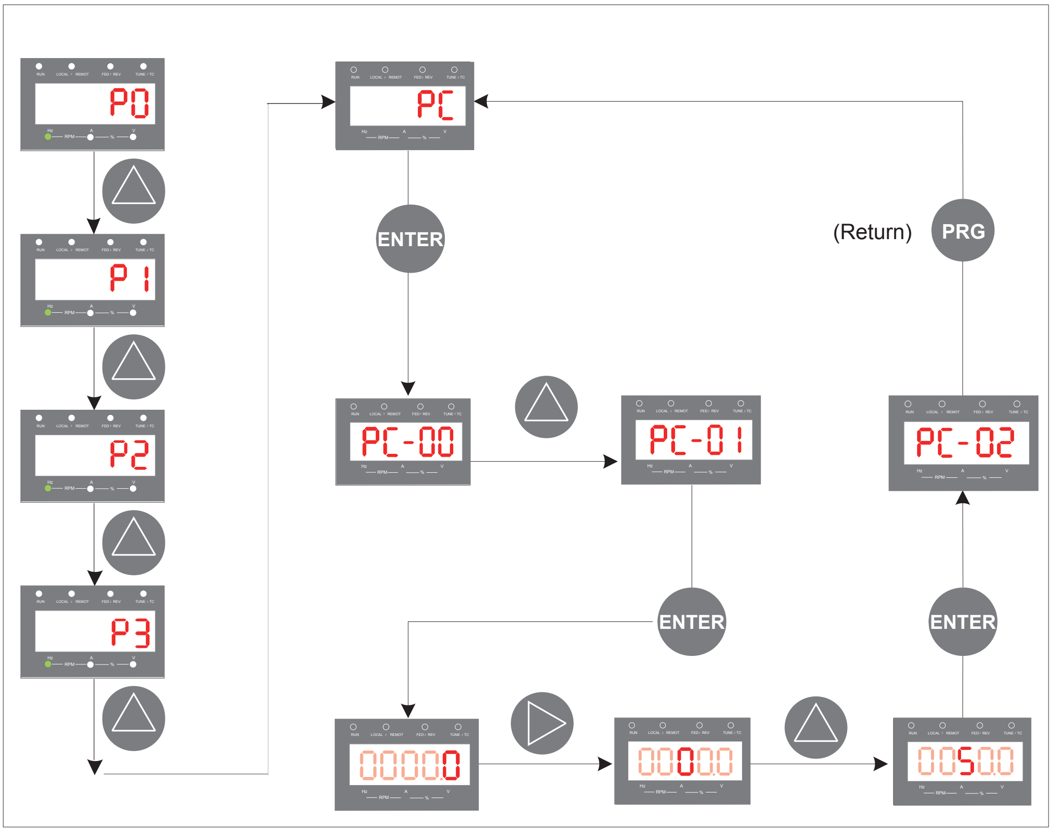


Figure 4-3 Parameter modification

a） When operating in the third-level menu, you can press (PRG) key or ENTER key to return to the second-level menu. The differences between the two are:

Press the ENTER key to save the set parameters and return to the secondary menu and automatically transfer to the next parameter, and press the (PRG) key to discard the current parameter modification and directly return to the secondary menu of the current parameter serial number.

b） In the third-level menu state, if the parameter does not have a flashing bit, it means that the parameter cannot be modified, which may be due to the following reasons:

(1) The parameter is a parameter that cannot be modified, such as the type of inverter, the actual detection parameter, the operation record parameter, etc.

(2) This parameter cannot be modified in the running state, and can only be modified after the shutdown.

4.2.5 Parameter composition

Table 4-4 Parameter components

Parameter Group	Functional Description	Explain
P0～PP	Basic parameter	Operation instruction, frequency instruction, motor parameters, control mode, AI/AO characteristic correction, optimization control and other parameters.
A0～AC	Advanced parameters	
U0	Monitoring parameter	Display of basic monitoring parameters of frequency converter

Before viewing parameters with the operation panel, set parameter A1-07 (function parameter group display selection) to ensure that the parameter group you want to view is in the display state. The following figure shows how to view the parameter group number:

Function	define	default	range of set	Description
PP-02	Functional parameters are displayed in groups to select	11	Single-digit: U-group display select 0: No display; 1: Display Ten-digit: A-group display select 0: No display; 1: Display	Used for group A, group U parameters or not Controls for display.

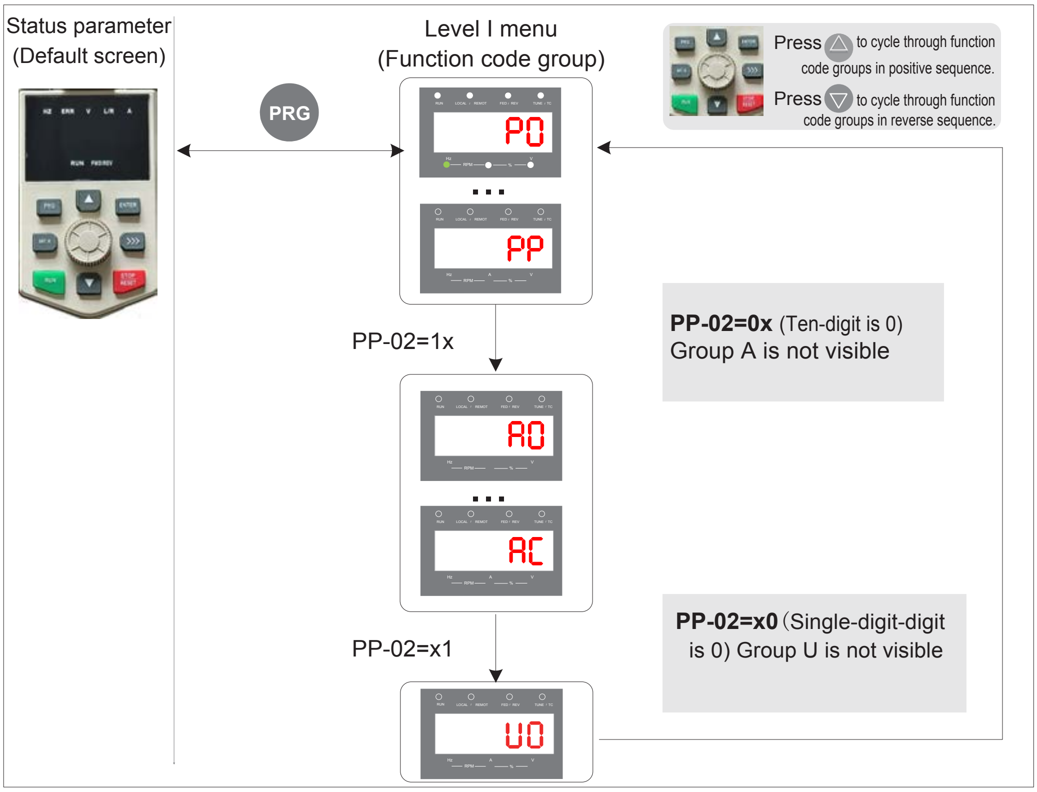


Figure 4-4 Viewing the parameter group number

4.2.6 Parameter Lookup

YD280 series inverter has many parameters, and a total of three parameter check methods are provided. By default, it is the basic viewing method (you can view all parameter groups), and through the parameter settings (PP-03), you can also provide two ways to quickly check the parameters, so that users can quickly find them.

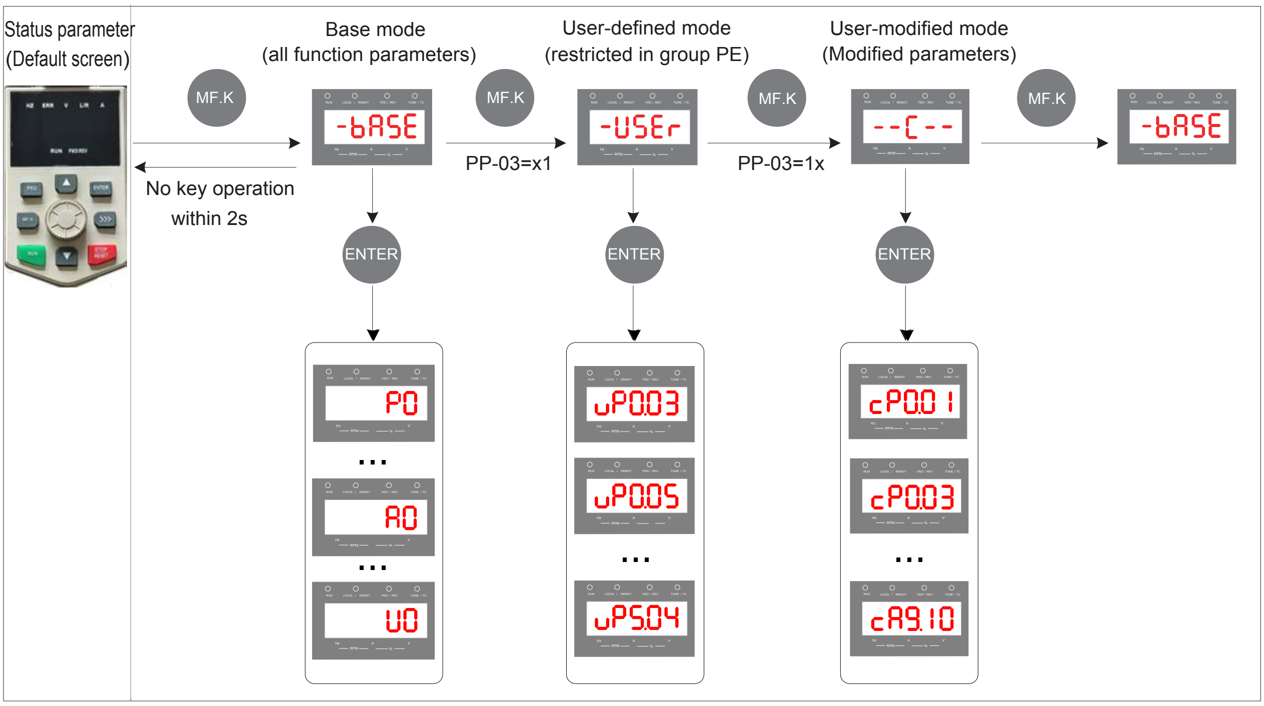
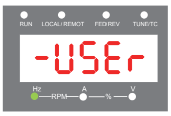
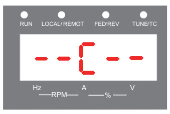
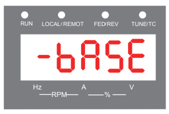


Figure 4-5 Schematic diagram of how to view parameters and parameters

In the figure above, in the user-defined mode menu, the display form of the parameters is "uP3.02", which indicates the function parameter P3-02, which is defined by the user Modifying the parameters in the menu is the same as modifying the corresponding parameters in the normal programming state.

There are three parameter query methods provided, and the display mode and display code of each parameter are as follows:

How to diaplay parameters	display	illustrate
User-defined parameters		View user-defined parameters
User-changed parameters		Look at the different parameters from the factory value
Functional parameter mode		See all parameters

1) Basic access methods

The basic parameter group is all the parameters of the inverter, which can be queried or modified according to the operation method introduced in subsection 4.2.。 Three parameters are displayed

The mode is switched by the MF.K key on the panel, and the method of consulting or modifying after entering each group of parameters is the same as 4.2 small

The method of operation by keyboard is the same in the section.

2) Quick access method

If you want to display the user-defined groups and the user-changed parameter groups, you need to set the parameter PP-03 to 11。

parameter	define	default	range of set	illustrate
PP-03	The function parameter group displays the selection	00	Single-digit: -USEr display-sel 0: Not displayed; 1: Visible	Decide on user custom groups, user changes Change whether the parameter group is displayed.
			Sen-digit: --C-- display-sel 0: Not displayed; 1: Visible	

For example, PP-03=11 and P7-01=0, then the MF.K button function is to switch the group display mode selected by PP-03. Switched back and forth between -USEr,--C--,-bASE.

◆ View user-defined parameter groups -USEr

Press the MF.K key on the panel to enter the "User-Defined Parameters" mode and view the user-defined parameters.

User-defined parameter method: Users can customize commonly used parameters by setting the parameters of PE group (PE-00 ~ PE-29), up to 30 parameters, and PE group has 16 custom parameters (PE-00 ~ PE-15) by default, and users can also modify the default parameters according to their specific needs. If one of the parameters of the PE group is set to uP0.00, it means that no custom parameters have been formulated.

Table 4-5 Common parameters of user-defined menus

parameter	define	name	parameter	define	name
PE-00	P0-01	Control Mode	PE-01	P0-02	Run command select
PE-02	P0-03	Main-freq command select	PE-03	P0-07	Freq-source overlay select
PE-04	P0-08	Preset frequency	PE-05	P0-17	Acceleration time
PE-06	P0-18	Decelerate time	PE-07	P3-00	V/F curve setting
PE-08	P3-01	Torque boost	PE-09	P4-00	DI1 function select
PE-10	P4-01	DI2 terminal function select	PE-11	P4-02	DI3 function select
PE-12	P5-04	DO1 output selection	PE-13	P5-07	AO1 output selection
PE-14	P6-00	Startup Mode	PE-15	P6-10	Stop Mode

◆ Review the parameters that have been changed by the user --C--

Press the MF.K key on the panel to enter the "User Change Parameters" mode to view the parameters that are different from the factory values.

This mode allows the user to quickly access the modified parameters. In the Parameters changed by the user group, the parameters that have been modified by the user are listed, that is, the current set value is different from the factory value. These parameters are lists that are automatically generated by the drive.

3） Status parameter

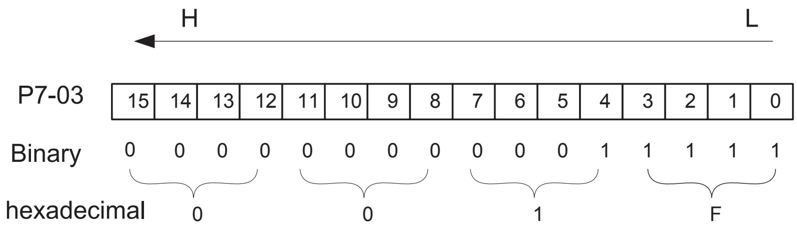
In the shutdown or running state, use the keys on the operation panel to switch each byte of the parameters P7-03、P7-04、P7-05.Multiple status parameters can be displayed.

There are 32 running state parameters in the running state, and the parameters P7-03 (running display parameter 1) and P7-04 (running display parameter 2) select whether the corresponding parameter of each parameter is displayed according to the binary bits. There are 13 shutdown state parameters in the shutdown state, and the parameter P7-05 (shutdown display parameter) selects whether the corresponding parameter of each bit is displayed according to the binary bits.

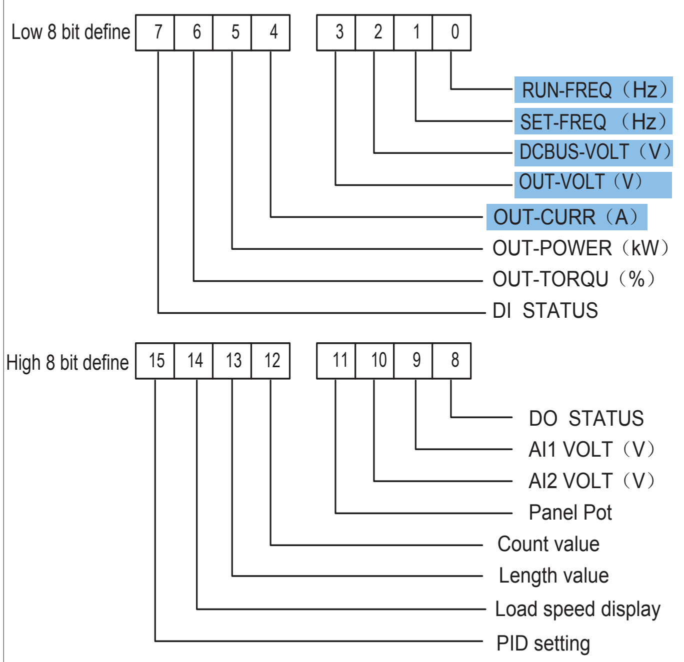
In the shutdown or running state, use the keys on the operation panel to switch each byte of the parameters P7-03、P7-04、P7-05.Multiple status parameters can be displayed.

1. Set the corresponding bit to 1 according to the correspondence between each byte in the parameter P7-03 (operation display parameter 1) and the above parameters.
2. Convert this binary number to hexadecimal and set it to P7-03. The keyboard setting value is displayed as P.001F.

3. Use the keys on the operation panel to toggle each byte of the parameter P7-03 to view the value of the relevant parameter. The settings are shown in the following figure:



The method of viewing other status parameters is the same as that of P7-03. The correspondence of each byte of the status parameter in P7-03、P7-04、P7-05 is as follows:

<table>
<tr><th>parameter</th><th>define</th><th>default</th><th>range of set</th><th>Parameter description</th></tr>
<tr><td>P7-03</td><td>Run display parameter 1</td><td>1F</td><td>0000～FFFF</td><td>If you need to display the following parameters during operation, set the corresponding position to 1, convert the binary number to hexadecimal and set it to P7-03.


Note: The shaded part is the default factory display.</td></tr>
</table>

parameter	define	default	range of set	Parameter description
P7-04	Run display parameter 2	33	0000 ～ FFFF	If you need to display the following parameters during operation, set the corresponding position to 1, convert the binary number to hexadecimal and set it to P7-04. Low 8 bit define 0: PID feedback 1: PLC stage 2: Keep 3: Operating Frequency2 (Hz) 4: Remaining run time 5: AI1 Before adjust (V) 6: AI2 Before adjust (V) 7: Panel Pot High 8 bit define 8: Motor speed 9: Current power-on time (Hour) 10: Current Running Time (Min) 11: Keep 12: Communication setpoint 13: Keep 14: Main Frequency Display (Hz) 15: Secondary Frequency Display (Hz)
P7-05	Stop display parameter	0	0000 ～ FFFF	If you need to display the following parameters during stopping, set the corresponding position to 1, convert the binary number to hexadecimal and set it to P7-05. Low 8 bit define 0: SET-FREQ（Hz） 1: DCBUS-VOLT（V） 2: DI STATUS 3: DO STATUS 4: AI1 Voltage (V) 5: AI2 Voltage (V) 6: Panel Pot 7: Count value High 8 bit define 8: Length value 9: PLC stage Load 10: speed PID Set 11: 12: reserved 13: reserved 14: reserved 15: reserved Note: The shaded part is the default factory display.

NOTE

- After the inverter is powered off, the parameters displayed are the parameters selected before the inverter is powered off.

4.2.7 Multi-function button operation

The MF.K key on the operation panel is a multi-function key, which can be used by the parameter P7-01 (MF. K key function selection) sets the function of the MF.K key. In the shutdown or running state, you can use this key to switch the operation command or the rotation direction of the inverter, or realize the jog of forward and reverse rotation.

parameter	define	default	range of set	Parameter description
P7-01	MF.K Choice of features	0	0: MF.K	Select the menu type, according to the PP-03 setting method, MF. K toggles the display mode
			1: Operation panel and terminals Toggle or operate the panel with Communication switching	P0-02 is set to 0 (operation panel), and there is no effect when the MF.K key is pressed; P0-02 is set to 1 (terminal), and the terminal and operation surface can be realized by the MF.K key switching between plates; P0-02 is set to 2 (communication), and communication and operation surfaces can be realized through the MF.K key switching between plates;
			2: Forward and reverse switching	Use the MF.K key to switch the direction of the frequency command. This feature is only run from the command source The command is valid when the command is an operation panel.
			3: Forward jog	Forward jog action (FJOG) is achieved by using the MF.K key of the keyboard. The function is only in commands Source Run Command is valid when the operation panel is used.
			4: Reverse jog	Reverse jog action (RJOG) is achieved by using the MF.K key of the keyboard. The function is only in commands Source Run Command is valid when the operation panel is used.

parameter	define	range of set	Parameter description	Default
PP-03	Personality parameter Group display selection	00 01 10 11	Unit: user-defined parameters 0: Do not display 1: Display Ten digits: user-changes parameters. 0: Do not display 1: Display	00

Chapter 5 Basic Operation and Trial Operation

This chapter introduces the basic debugging steps of the inverter, mainly including the frequency command setting of the inverter, the control of start and shutdown, and the trial operation of the inverter-controlled motor can be realized according to the content of this chapter.

5.1 Quick adjusting Guide

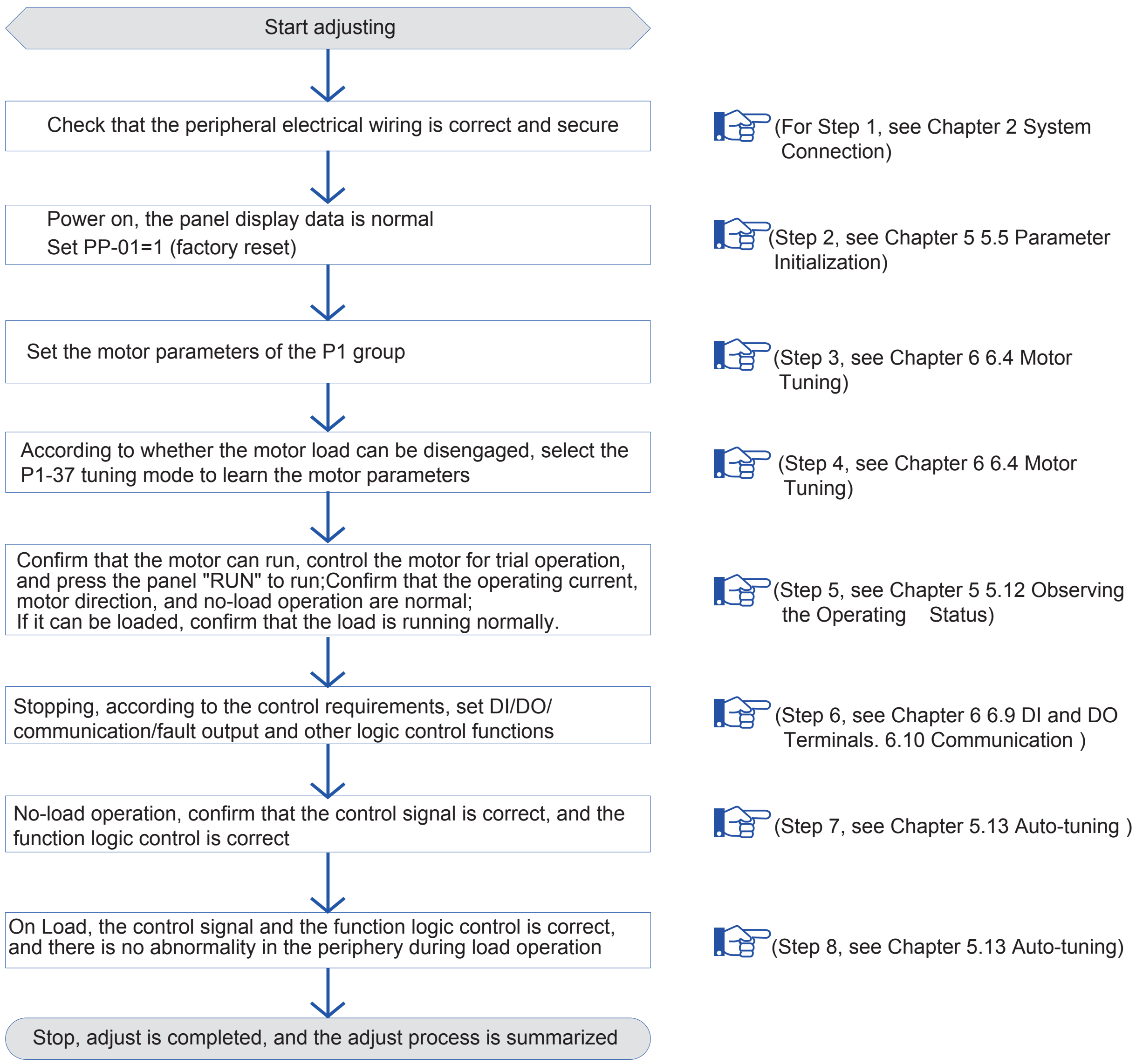


Figure 5-1 Quick adjusting steps

5.2 Flow chart of inverter commissioning

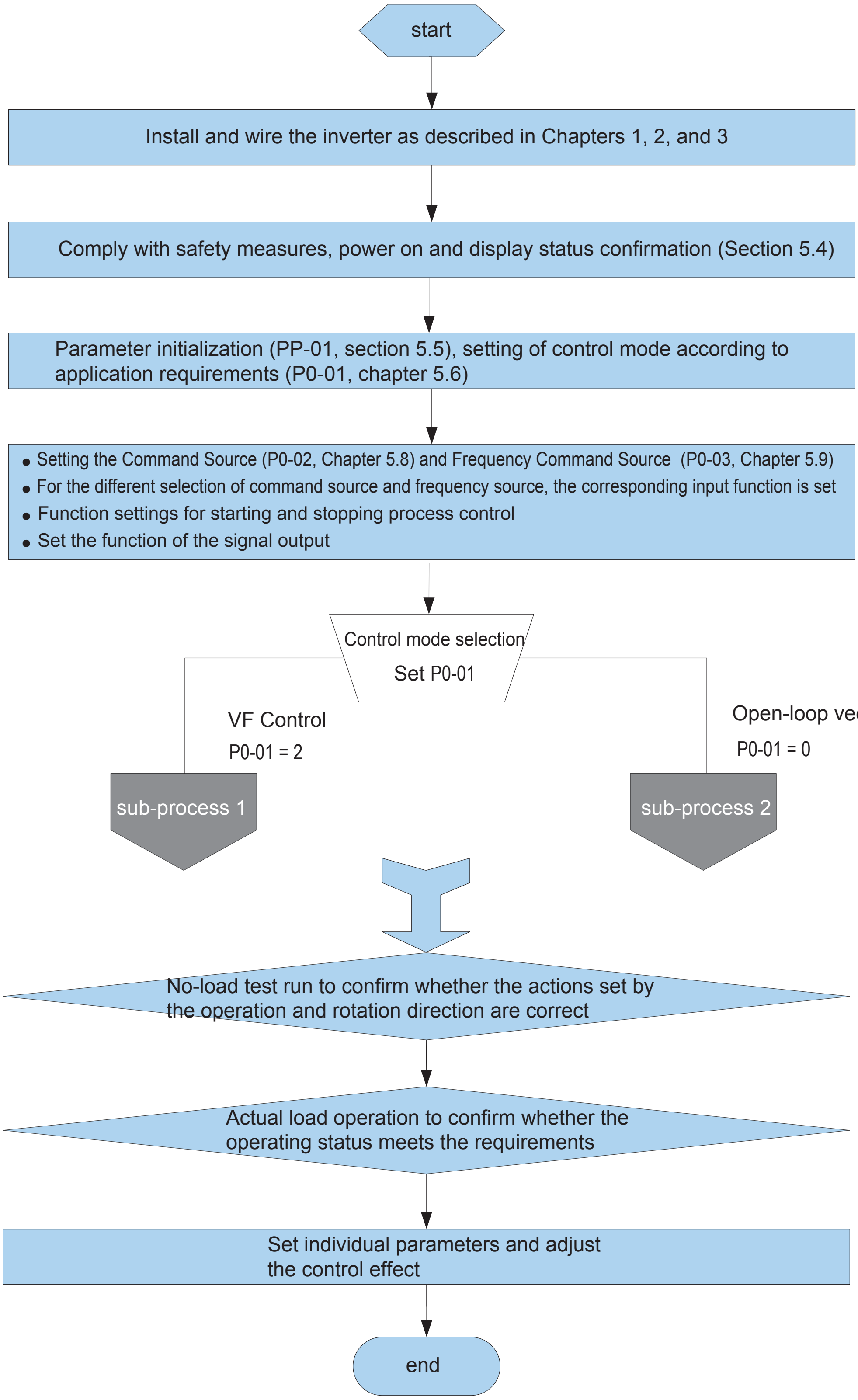


Figure 5-2 Flow chart of inverter commissioning

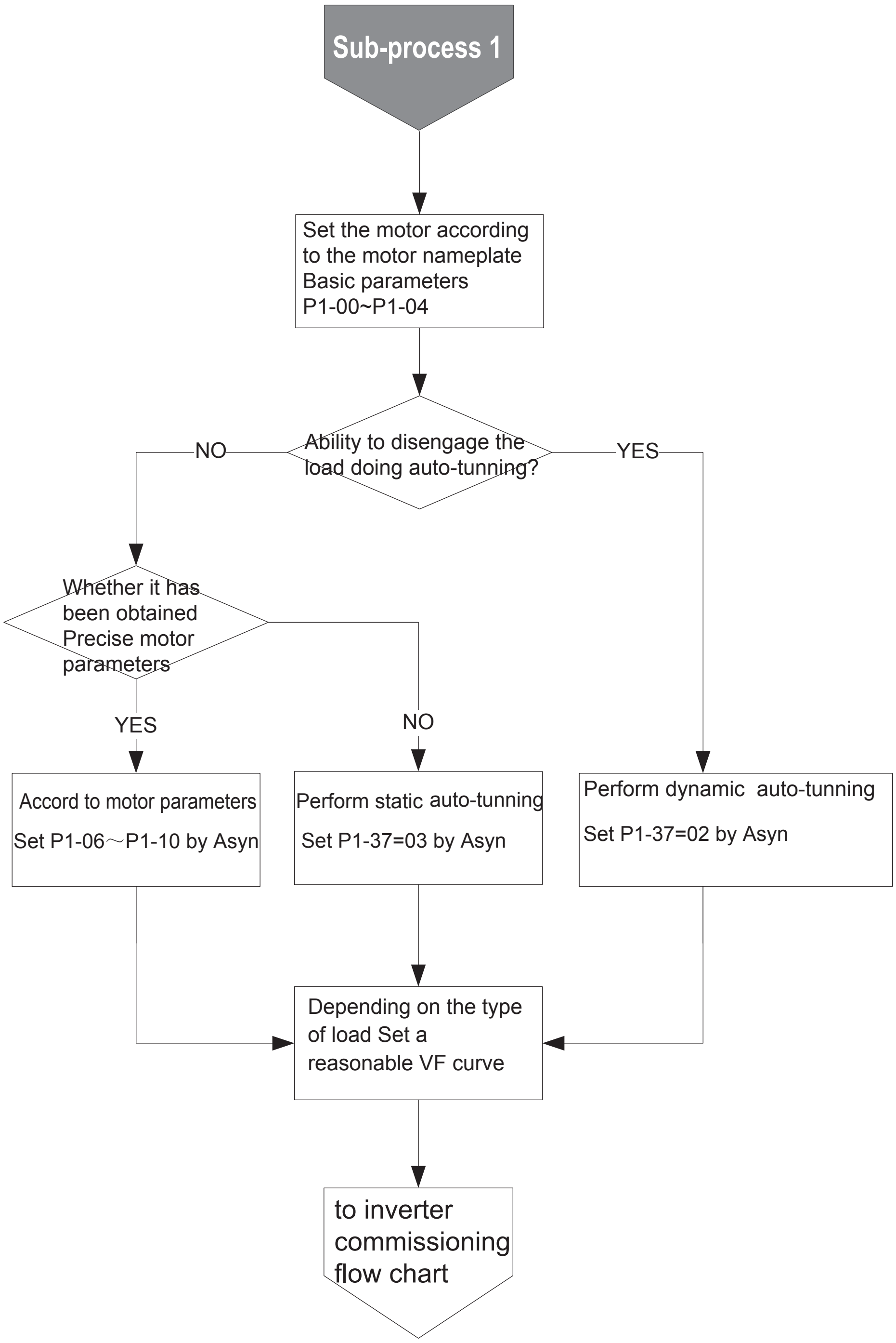


Figure 5-3 Inverter debugging Sub-process 1 (V/F control)

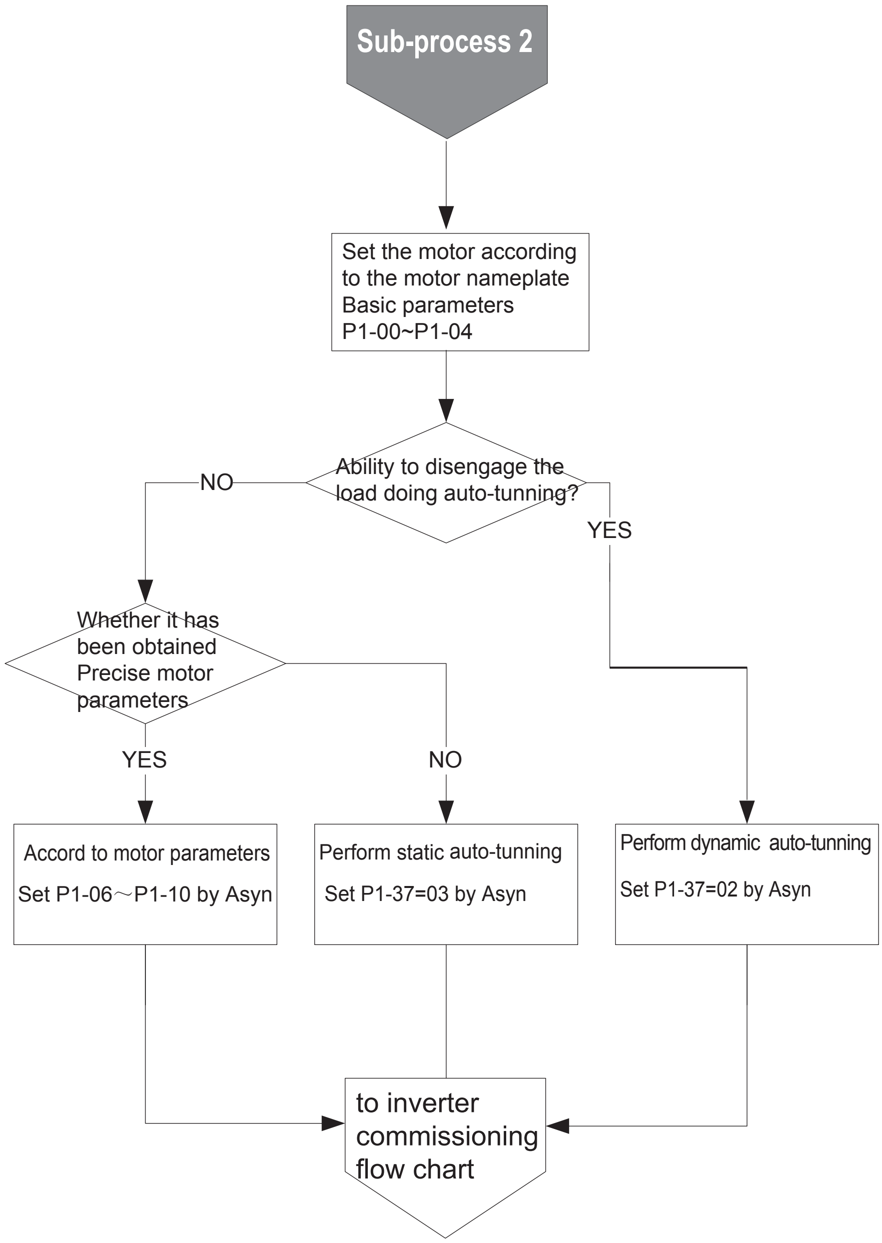


Figure 5-4 Inverter debugging Sub-process 2 (vector control)

5.3 Confirm before turning on the power

Be sure to check the following items before turning on the power supply.

item	content
Confirmation the power voltage	Confirm the power voltage is correct: AC380V or 220V 50/60Hz.
	Reliable wiring of the power input terminals (R/S/T) or (L1/L2).
	Confirm that the drive and motor are properly grounded
Confirm the connection between output terminal of inverter and terminal of motor	Check inverter output (U/V/W) and motor terminal are firmly connected
Confirm the connect of inverter control terminal	Confirm control terminal of inverter and other device are securely connected.
Confirm the status of inverter control terminal	Check all terminals of inverter control loop are in OFF state (inverter not in run)
Confirmation of the load	Confirm motor is unloaded and not connected to the mechanical system

5.4 Display status confirmation after power on

When the power is turned on, the operator in normal state is displayed as shown below.

state	display	illustrate
Normal	50.00	The factory default display is a digital setting of 50.00Hz
fault	Err02	When the inverter is in a shutdown state, the fault type is displayed

5.5 Parameter Initialization

The inverter's settings can be restored to factory settings, and after initialization, the A1-03 will automatically reset to zero.

PP-01	Parameter initialization		default value	0
	range of set	0	No action	
		1	Factory restore parameters, excluding motor parameters	
		2	Clear the record information	
		4	Back up the user's current parameters	
		501	Restore user backup parameters	

1：Factory restore parameters, excluding motor parameters

After setting PP-01 to 1, most of the functional parameters of the inverter are restored to the manufacturer's 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) and the temperature of the inverter module radiator (P7-07) are not restored.

2：Clear the record information

Clear the inverter fault record information, cumulative running time (P7-09), cumulative power-on time (P7-13), and cumulative power consumption (P7-14).

4: Back up the user's current parameters

Back up the parameters set by the current user. Back up the current set values of all function parameters. In order to facilitate the recovery of customers after parameter adjustment is out of order.

501: Restore user backup parameters

Restore the previously backed up user parameters, i.e. restore the parameters backed up by setting PP-01 to 4.

5.6 Basis for selection of Motor Control Mode

parameter	illustrate	Applications
P0-01: Motor control Method	Set to 0: No Speed Sensor Vector Control (SVC)	Refers to open-loop vector control, which is suitable for the usual high-performance control occasions The inverter can only drive one motor. Such as machine tools, centrifuges, wire drawing machines, Injection molding machine and other loads.
	Set to 2: V/F control (speed open- loop control)	It is suitable for those with low load requirements, or one inverter dragging multiple motors Occasions, such as fans, pump loads. It can be used to drag multiple units with one inverter The occasion of the motor.

5.7 Frequency Command Selection

P0-03	Main frequency select		default	0
	Set the range	0	Digital setting (preset frequency P0-08, UP/DOWN can be modified, no memory when power is off)	
		1	Digital setting (preset frequency P0-08, UP/DOWN can be modified, power-down memory)	
		2	AI1	
		3	AI2	
		4	Panel potentiometers	
		5	Keep	
		6	Multi-speed instructions	
		7	PLC	
		8	PID	
		9	Communication given	

5.7.1 Digital setting of the operation panel

1) Set P0-03 = 0: Digital setting (no memory when power off)

Set the initial value of the frequency to the value of P0-08 "Provisioned frequency". The set frequency value of the inverter can be changed by the ▲ key and ▼ key of the keyboard (or the UP and DOWN of the multi-function input terminal). After the inverter is powered off and powered on again, the set frequency value is restored to the P0-08 "Digital Setting Preset Frequency" value.

2) Set P0-03 = 1: Digital setting (power-off memory)

When the inverter is powered off and powered on again, the set frequency is the set frequency at the time of the last power failure, and it is remembered by the correction amount of the keyboard ▲ and ▼ keys or terminals UP and DOWN.

5.7.2 Analog Input (AI)

The YD280 control board provides 2 analog input terminals (AI1, AI2)

Table 5-1 Analog (AI) terminal characteristics

Terminal	name	type	range	Input impedance
AI1-GND [1]	The analog input 1	Voltage	DC 0V~10V	22kΩ
AI2-GND [1]	The analog input 2	Voltage [2]	DC 0V~10V	22kΩ
		[2] Voltage	0mA~20mA	Impedance 500Ω or 250Ω adjust via J10

[1] Please refer to "Chapter 3 Figure 3-19" for terminal wiring.

[2] The J9 jumper selects whether AI2 is a voltage or current input.

Table 5-2 Procedure for setting an analog quantity (AI) as a frequency command

Setup steps	parameters	illustrate	
AI Selection: The frequency index is selected according to the characteristics of the AI input of the order	P0-03	P0-03 = 2	choice AI1
		P0-03 = 3	choice AI2
The AI voltage [1] corresponds to the frequency curve: Select any of the 5 curves individually Meaning one	P4-33	In general, the default value P4-33 = 321 is used, AI1 uses curve 1, AI2 uses curve 2,	
The AI voltage [1] corresponds to the frequency Line Setting: Set the input and setting of the AI voltage Correspondence of quantities	P4-13 ～ P4-16 【2】	Curve 1	Typical Setting Curve [3]
	P4-18 ～ P4-21	Curve 2	Typical Setting Curve [4]
	P4-23 ～ P4-27	Curve 3	Typical Setting Curve [5]
	A6-00 ～ A6-07	Curve 4	See Section 6.2.3 for instructions
	A6-08 ～ A6-15	Curve 5	
	P4-34	AI Below Minimum Input Setting Selection [2]	
	P0-10	When AI is used as a given frequency, the voltage/current input corresponds to 100.0% of the setting, which is the relative maximum frequency P0-10.	
AI filter time	P4-17	The default is 0.1s, the parameter is set according to the fast response requirements and the interference of the field signal, the parameter should be reduced if the fast response is required, and the filtering time should be increased if the field interference is large.	

【1】 When analog input is set current type, 1mA is equivalent to 0.5V voltage, i.e., 20mA corresponds to 10V.

【2】 When analog input voltage is greater than the set "Maximum Input" (P4-15), the analog voltage is calculated as the "Maximum Input", and similarly, when analog input voltage is less than the set "Minimum Input" (P4-13), it is calculated as the minimum input or 0.0% according to the setting of "AI Below Minimum Input Setting Selection" (P4-34).

【3】 A typical setup curve for AI1 is shown in the figure below.

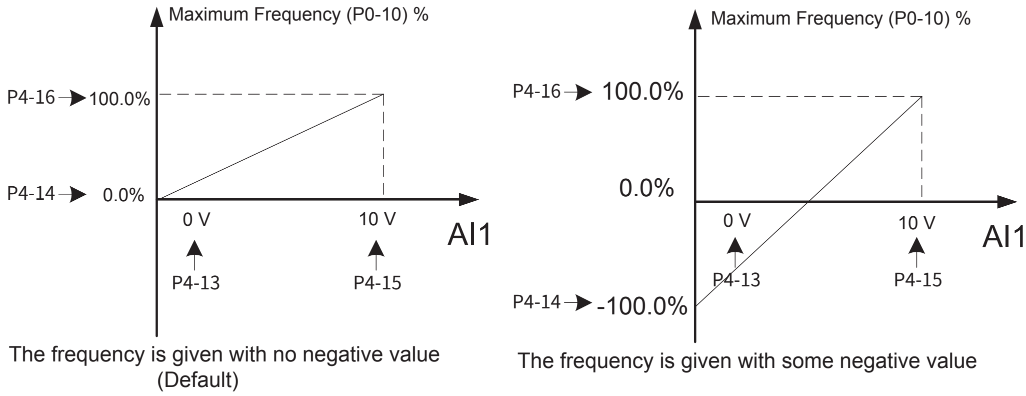


Figure 5-5 Typical setup curve for AI1

【4】 AI2 is used as a voltage input with a typical setting curve similar to AI1, and when used as a curr ent type, it is generally set at 4~20mA for 0 ~ 50Hz or -50 ~ 50Hz·

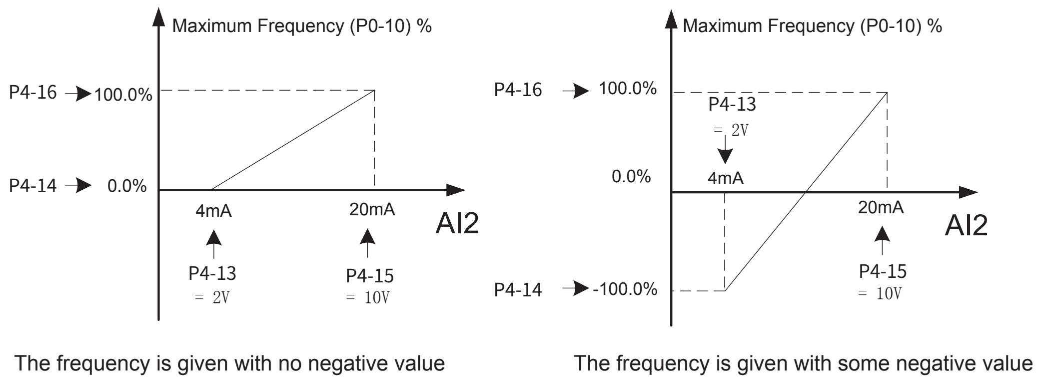


Figure 5-6 Typical setup curve for AI2

5.7.4 Master Frequency communication given

YD280 installation communication card (optional) can realize 1 upper computer communication methods: Modbus. Different communication methods can be set up via the P0-28, as detailed in the table below.

For details of the optional card, please refer to "Chapter 11 Optional Card", and users can choose according to their needs.

Setup steps	parameters	illustrate	
communication is used as the frequency command	P0-03	P0-03=9	
Choose the method of communication	P0-28	MODBUS	P0-28 = 0

5.7.5 Multi-Speed command

When selecting the multi-segment command operation mode, it is necessary to digitally input different state combinations of DI terminals to correspond to different set frequency values.

Table 5-4 Procedure for setting a multi-speed as a frequency command

<table>
<tr><th>Setup steps</th><th>parameters</th><th colspan="2">illustrate</th></tr>
<tr><td>Multi-Speed as main frequency</td><td>P0-03</td><td colspan="2">P0-03= 6</td></tr>
<tr><td>Determine the number of segments that require multi-stage speeds</td><td>-----</td><td colspan="2">Max 16 speeds with 4 DI terminals. The correspondence between the number of segments and DI is as follows:
2 speeds: 1 DI terminal K1
3-4 speeds: 2 DI terminals K1, K2
5-8 speeds: 3 DI terminals K1, K2, K3
9-16 speeds: 4 DI terminals K1, K2, K3, K4</td></tr>
<tr><td rowspan="4">Set the DI terminal to a multi-speed function</td><td rowspan="4">P4-00 ～ P4-04</td><td>Multi-command terminal K1</td><td>Set 12</td></tr>
<tr><td>Multi-command terminal K2</td><td>Set 13</td></tr>
<tr><td>Multi-command terminal K3</td><td>Set 14</td></tr>
<tr><td>Multi-command terminal K4</td><td>Set 15</td></tr>
<tr><td rowspan="2">Set the frequency corresponding to each multi-band speed 【note】</td><td>PC-00 ～ PC-15</td><td colspan="2">The frequency setting corresponding to the speed is set as %, and 100% corresponds to the maximum frequency P0-10.</td></tr>
<tr><td>P0-10</td><td colspan="2">When the frequency command is Multi-Speed, 100.0% of the parameter PC-00~PC-15 corresponds to max frequency P0-10.</td></tr>
</table>

[Note]: 4 multi-segment command terminals can be combined into 16 states, and these 16 states correspond to 16 command settings. The details are shown in the following table:

Table 5-5 Terminal combinations for the multi-speed command function

K4	K3	K2	K1	Command settings	Corresponds to Max %
OFF	OFF	OFF	OFF	Multi-speed 0	PC-00
OFF	OFF	OFF	ON	Multi-speed 1	PC-01
OFF	OFF	ON	OFF	Multi-speed 2	PC-02
OFF	OFF	ON	ON	Multi-speed 3	PC-03
OFF	ON	OFF	OFF	Multi-speed 4	PC-04
OFF	ON	OFF	ON	Multi-speed 5	PC-05
OFF	ON	ON	OFF	Multi-speed 6	PC-06
OFF	ON	ON	ON	Multi-speed 7	PC-07
ON	OFF	OFF	OFF	Multi-speed 8	PC-08
ON	OFF	OFF	ON	Multi-speed 9	PC-09
ON	OFF	ON	OFF	Multi-speed 10	PC-10
ON	OFF	ON	ON	Multi-speed 11	PC-11
ON	ON	OFF	OFF	Multi-speed 12	PC-12
ON	ON	OFF	ON	Multi-speed 13	PC-13
ON	ON	ON	OFF	Multi-speed 14	PC-14
ON	ON	ON	ON	Multi-speed 15	PC-15

5.8 Start and Stop Commands

P0-02	command select		default	0
	range	0	panel（LED OFF）	
		1	terminal（LED ON）	
		2	commuication（LED FLASH）	

Select the input channel for the inverter control command.

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

0: Operation panel command channel ("LOCAL/REMOT" light is off);

The RUN, STOP/RES buttons on the operation panel are used to control the operation command.

1: Terminal command channel ("LOCAL/REMOT" light is on);

The multi-function input terminal functions such as FWD, REV, JOGF, JOGR, etc., are used to control the operation command.

2: Communication command channel ("LOCAL/REMOT" light flashes)

5.8.1 Start-stop operation panel

The operation command is controlled by the RUN, STOP/RES buttons on the operation panel, and the "LOCAL/REMOT" on the operator is the light
Extinguished state. For details on the buttons, please refer to "Chapter 4 Panel Operation".

5.8.2 Terminal start-stop (DI)

P4-11	terminal command method		dafault	0
	range	0	2-wire 1	
		1	2-wire 2	
		2	3-wire 1	
		3	3-wire 2	

This parameter defines 4 different ways in which the operation of the drive can be controlled via an external terminal.

For the convenience of explanation, the following three terminals of DI1 ~ DI5 multi-function input terminals, DI1, DI2, and DI3, are arbitrarily selected as external terminals. That is, by setting the value of P4-00 ~ P4-02 to select the function of DI1, DI2, DI3 three terminals, the detailed function definition is see P4-00 ~ P4-04 setting range.

0: 2-wire 1: This mode is the most commonly used two-wire mode. Terminals DI1 and DI2 determine the forward and reverse operation of the motor.

The parameters are set as follows:

parameter	name	vaule	Description
P4-11	Terminal command mode	0	2-wire 1
P4-00	DI1 function selection	1	Forward (FWD)
P4-01	DI2 function selection	2	Reverse (REV)

K1	K2	Run command
1	0	FWD
0	1	REV
1	1	STOP
0	0	STOP

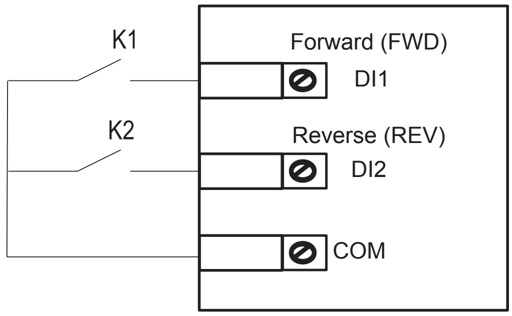


Figure 5-9 2-wire 1

As shown in the figure above, in this control mode, the K1 is closed and the inverter is running in a forward rotation. K2 is closed and reversed, K1 and K2 are closed or disconnected at the same time, and the inverter stops running.

1: 2-wire 2: When using this mode, the DI1 terminal function is the enable terminal for operation, and the DI2 terminal function determines the direction of operation.

The parameters are set as follows:

parameter	name	vaule	Description
P4-11	Terminal command mode	1	2-wire 2
P4-00	DI1 function selection	1	Enable operation
P4-01	DI2 function selection	2	Forward/Reverse

K1	K2	Run command
1	0	FWD
1	1	REV
0	0	Stop
0	1	Stop

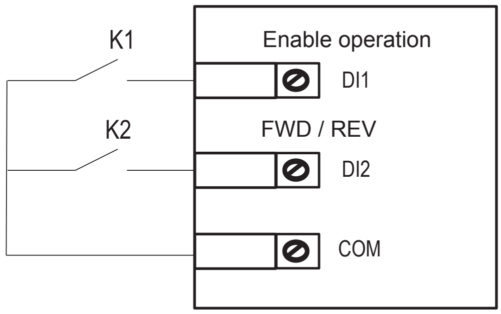


Figure 5-10 2-wire 2

As shown in the figure above, in the closed state of K1, K2 disconnects the inverter and rotates forward, and K2 closes the inverter reverse; The K1 is disconnected and the drive stops.

2: 3-wire 1: DI3 in this mode is the enabling terminal, and the direction is controlled by DI1 and DI2 respectively.

The parameters are set as follows:

parameter	name	vaule	Description
P4-11	Terminal command mode	2	3-wire 1
P4-00	DI1 function selection	1	Forward (FWD)
P4-01	DI2 function selection	2	Reverse (REV)
P4-02	DI3 function selection	3	3-wire control

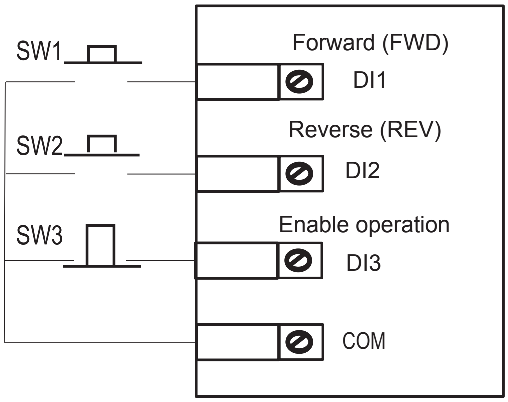


Figure 5-11 3-wire 1

As shown in the figure above, in this control mode, when the SW3 button is closed, press the SW1 button to turn the inverter forward, press the SW2 button to reverse the inverter, and the SW3 button to disconnect the inverter to stop instantly. In normal start and operation, it is necessary to keep the SW3 button closed, and the command of the SW1 and SW2 buttons will take effect at the closing action edge, and the operation state of the inverter shall be subject to the last key action of the 3 buttons.

3: 3-wire 2: DI3 in this mode is the enable terminal, the command is given by DI1, and the direction is determined by the state of DI2.

The parameters are set as follows:

parameter	name	vaule	Description
P4-11	Terminal command mode	3	3-wire 2
P4-00	DI1 function selection	1	Enable operation
P4-01	DI2 function selection	2	Forward/reverse
P4-02	DI3 function selection	3	3-wire control

K	Run Way
0	FWD
1	REV

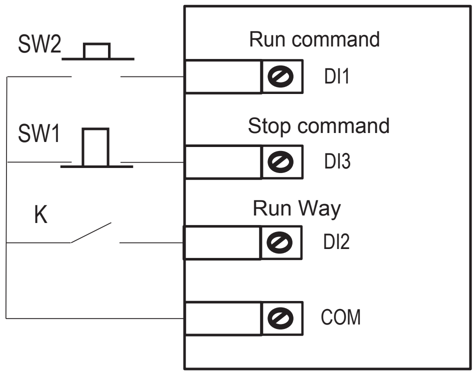


Figure 5-12 3-wire 2

As shown in the figure above, in this control mode, in the closed state of the SW1 button, press the SW2 button inverter to run, K disconnects the inverter to rotate, and K closes the inverter to reverse; The SW1 push-button disconnects and stops the inverter instantly. During normal start-up and operation, the SW1 button must be kept closed, and the command of the SW2 button takes effect at the closing action edge.

5.8.3 Communication start-stop

Communication start and stop means that the running command is given by the host computer through communication, and YD280 needs to install a communication card (optional) to communicate with the host computer.
For details of the optional card, please refer to Chapter 11 "Optional Card", and users can choose according to their needs.

Setup steps	parameters	illustrate	
frequency command is communication	P0-02	P0-02 = 2	
Select a communication method	P0-28	MODBUS	P0-28 = 0

5.9 Startup Process Setup

5.9.1 Startup Mode Selection

P6-00	Startup mode		default	0
	range	0	Direct start	
		1	Speed search	T4 only
		2	Pre-excitation start (AC asynchronous motor)	T4 only
		3	SVC Quick Start	T4 only

0：Direct start

If the starting DC braking time is set to 0, the inverter will start to operate from the starting frequency. If the starting DC braking time is not 0, the DC braking will be done first, and then the operation will start from the starting frequency. It is suitable for small inertial loads, and the motor may rotate when starting.

It is suitable for most small inertial loads, and the frequency curve of the start-up process is shown below. Its "DC braking" function before starting is suitable for elevators and heavy load drives, and "starting frequency" is suitable for equipment drives that require starting torque impact starting, such as cement mixer equipment.。

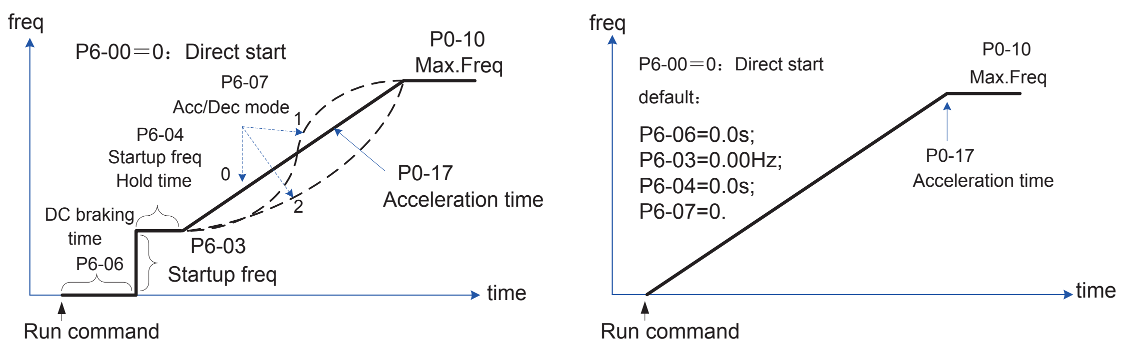


Figure 5-13 Direct startup mode

1：Speed search

It is suitable for the drive of large inertial mechanical load, the frequency curve of the starting process is as shown in the following figure, if the inverter starts running, the load motor is still running by inertia, and the speed tracking is taken to start and then start, which can avoid the occurrence of overcurrent in the start.

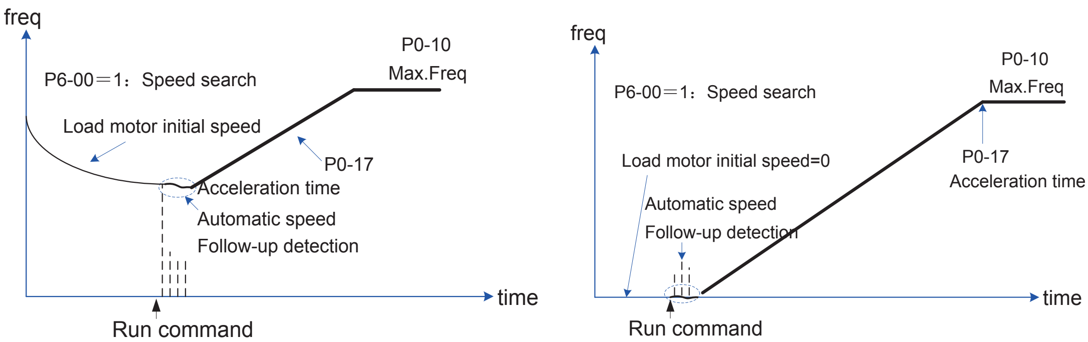


Figure 5-14 speed search mode

2：Pre-excitation start (AC asynchronous motor)

This method is only applicable to inductive asynchronous motor loads. Pre-excitation of the motor before start-up can improve the fast response characteristics of the asynchronous motor and meet the application requirements of short acceleration time, and the frequency curve of the start-up process is as follows:

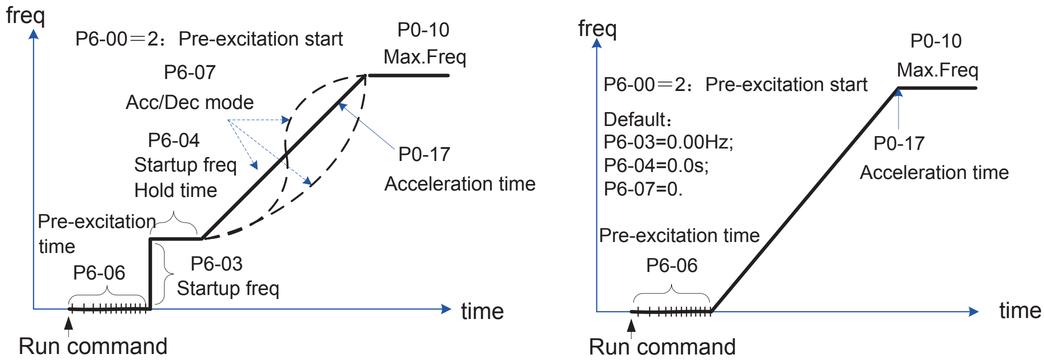


Figure 5-15 Pre-excitation start-up mode

3：SVC Quick Start

Set P6-00=3, this mode is only applicable to the SVC control mode of the asynchronous machine, which can shorten the acceleration time, and can enable the mode when the system inertia is large and needs to be started quickly, but there will be torque impact.

5.9.2 Startup Frequency

P6-03	Startup frequency	default	0.00Hz
	range	0.00Hz ～ 10.00Hz	
P6-04	Startup frequency hold time	default	0.0s
	range	0.0s ～ 100.0s	

In order to ensure the motor torque at start-up, set the appropriate starting frequency. In order for the magnetic flux to be fully established when the motor starts, the starting frequency needs to be maintained for a certain period of time.

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

The start-up frequency hold time is not included in the acceleration time, but is included in the runtime of the simple PLC.

5.10 Stopping Process Setup

There are 2 Stopping modes of the inverter, which are deceleration stop and free stop, which are selected by the parameter P6-10. It is possible to choose whether or not to use the DC braking function at the end of the shutdown section.

5.10.1 Stopping mode selection

P6-10	Stopping mode	default	0
	range	0	deceleration stop
		1	free stop

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

1：free stop After the stop command is valid, the inverter immediately terminates the output, and the motor stops freely according to the mechanical inertia.

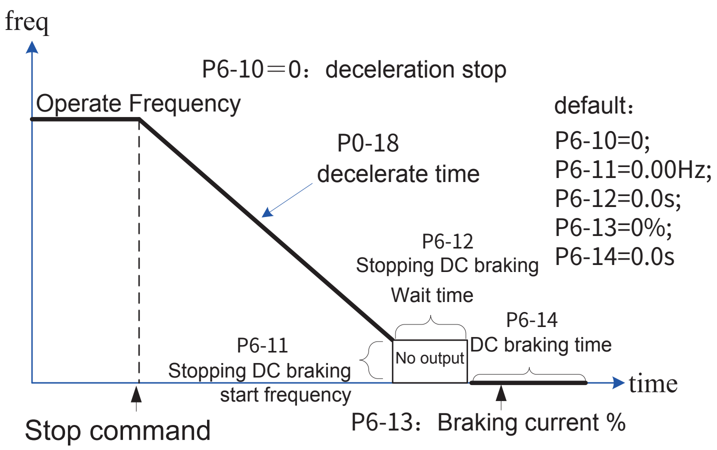


Figure 5-16 deceleration and stopping

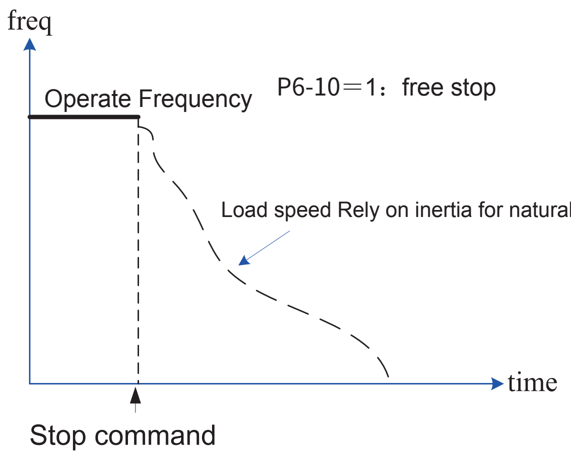


Figure 5-17 Free stop

5.10.2 Stopping DC braking

parameter	define	dafault	range	description
P6-11	Stopping DC braking Start frequency	0.00Hz	0.00Hz~ Max-freq	During the deceleration shutdown, when the operating frequency is reduced to that frequency, it starts DC braking process.
P6-12	Stopping DC braking Wait time	0.0s	0.0s~ 100.0s	After operating-freq is reduced to the start-freq of DC braking of the shutdown, the inverter is the first Stop the output for a while before starting the DC braking process. For defense Stop the overcurrent and other faults that may be caused by DC braking at a higher speed.
P6-13	Stopping DC braking current	50%	0%~ 100%	There are two cases of the relative base value of the parking DC braking current. 1) When the rated current of the motor is less than or equal to 80% of the rated current of the inverter, is the percentage base value of the relative motor rated current. 2) When the rated current of the motor is greater than 80% of the rated current of the inverter, it is Relative to 80% of the inverter current rating is a percentage basis.
P6-14	Stopping DC braking Time	0.0s	0.0s~ 100.0s	The amount of time the DC braking amount is maintained. If this value is 0, the DC braking process is canceled.

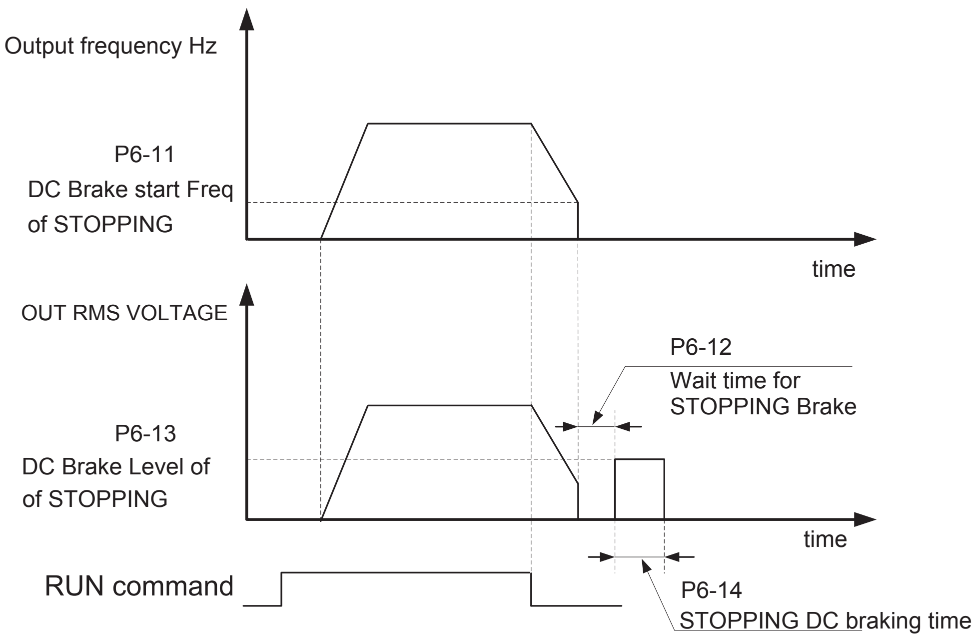


Figure 5-18 DC braking process of STOPPING

5.11 Acceleration and Deceleration Time Setting

P0-17	Acceleration time 1	dafault	model determine
	range	0.00s ～ 650.00s（P0-19=2） 0.0s ～ 6500.0s（P0-19=1） 0s ～ 65000s（P0-19=0）	
P0-18	Decelerate time1	default	model determine
	range	0.00s ～ 650.00s（P0-19=2） 0.0s ～ 6500.0s（P0-19=1） 0s ～ 65000s（P0-19=0）	
P0-25	Acc/Dec time reference frequency	default	0
	range	0	Max.Freq（P0-10）
		1	Set frequency
		2	100Hz

Acceleration time refers to the time required for the inverter to accelerate from zero frequency to the reference frequency of acceleration and deceleration (determined by P0-25), as shown in Figure 5-19 t1.

The deceleration time refers to the time required for the inverter to decelerate from the base frequency of acceleration and deceleration (determined by P0-25) to the zero frequency, as shown in Figure 5-19 t2.

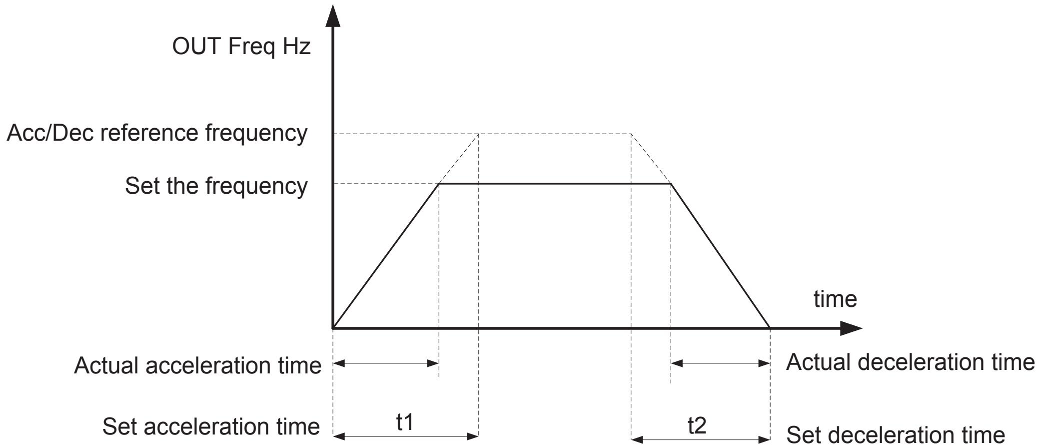


Figure 5-19 Acceleration and deceleration times

YD280 provides 4 groups of acceleration and deceleration time, users can use the digital input terminal DI to switch the selection (terminal function 16, 17), and the four groups of acceleration and deceleration time can be set by the following parameters:

Group 1: P0-17、P0-18;

Group 2: P8-03、P8-04;

Group 3: P8-05、P8-06;

Group 4: P8-07、P8-08;

P0-19	unit of acc/dec time		default	1
	range	0	1 s	
		1	0.1 s	
		2	0.01 s	

In order to meet the needs of various fields, YD280 provides 3 acceleration and deceleration time units, which are 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 times will change, and the corresponding acceleration and deceleration time will also change, so special attention should be paid to the application process.

5.12 Observe the running status

5.12.1 Digital output DO

The control board comes with 3 DO outputs, namely FM, DO1, and TA/TB/TC, of which FM and DO1 are transistor outputs, which can drive 24Vdc low-voltage signal circuits, and TA/TB/TC are relay outputs, which can drive 250Vac control circuits.

By setting the values of the function parameters P5-01 to P5-04, each DO output function can be defined, which can be used to indicate various working states and alarms of the inverter, with a total of about 40 function settings, so that users can realize specific automatic control requirements. For specific setting values, refer to "6.9.2 Digital Output Terminal Functions (DO)" for details.

PORT	parameter	Output signal characteristics
FM-COM	P5-00=0，P5-06	Transistor, can output high-frequency pulse 10Hz ~ 100kHz; Drive capacity: 24Vdc, 50mA
	P5-00=1，P5-01	Transistor; Drive capacity: 24Vdc, 50mA
TA-TB-TC	P5-02	Relays; Drive capacity: 250Vac, 3A
DO1-CME	P5-04	Transistor; Drive capacity: 24Vdc, 50mA

When P5-00, the FM port is a high-speed pulse output working mode, the frequency of the output pulse is used to indicate the value of the internal operating parameters, the larger the reading, the higher the output pulse frequency, when 100% of the reading, it corresponds to the maximum frequency of FMP output set in P5-09. As for the properties to be indicated for the internal parameters, they are defined by the P5-06 parameter.

5.12.2 Analog output AO

The inverter supports a total of 1 AO outputs, of which AO1 is the control board . AO1 can be used to indicate inte rnal operating parameters in analog
mode, and the indicated parameter properties can be selected by parameters P5-07 .

PORT	Input signal characteristics
AO1-GND	J7 short circuit "V" identification position, can output 0 ~ 10Vdc signal
	J7 short circuit "I" identification position, can output 0 ~ 20mAc signal

P5-10	AO1 bias coefficient	default	0.0%
	range of set	-100.0% ～ +100.0%	
P5-11	AO1 gain	default	1.00
	range of set	-10.00 ～ +10.00	

The above parameters can be used to customize the desired AO output curve.

If the zero bias is denoted by "b", the gain denoted by k, the actual output denoted by Y, and the standard output denoted by X, then the actual output is:

Y=kX ＋ b。

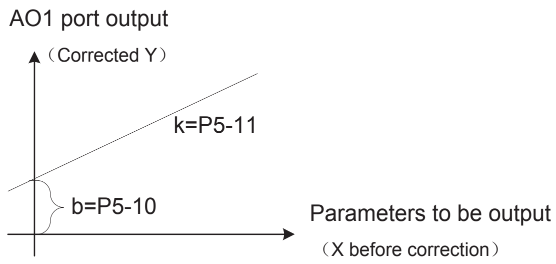


Figure 5-20 AO signal correction characteristic curve

Among them, the bias coefficient of AO1 corresponds to 10V (or 20mA) at 100%, and the standard output refers to the amount represented by the analog output corresponding to the output of 0V ~ 10V (or 0mA ~ 20mA) without bias and gain correction.

For example, if the analog output content is the operating frequency, if you want the frequency to be 0 Hz, the corrected output is 8 V, and when the frequency is 40 Hz, the corrected output is 4V. Then the AO1 gain (P5-11) should be set to -0.5 and the AO1 bias coefficient (P5-10) should be set to 80%.

5.13 Auto-tuning

The methods for the inverter to obtain the internal electrical parameters of the controlled motor are: dynamic tuning, static tuning 1, static tuning 2, manual input of motor parameters, etc.

Tuning method	Availability	Tuning effects
No-load dynamic tuning P1-37 = 2	The motor is most convenient to detach from the application system	Best
On-load dynamic tuning P1-37 = 2	When it is inconvenient to detach the motor from the application system, it can be transported with the load. The friction of the load is small, and it is close to no-load when running at a constant speed.	The less friction, better
Static tuning 1 P1-37 = 1	It is difficult to detach the motor from the load, and dynamic tuning operation is not allowed.	normal
Static tuning 2 P1-37 = 3	It is difficult to detach the motor from the load, and it is not allowed to be dynamically tuned to run the occasion, static This mode is recommended for tuning, and the tuning time is longer than static tuning1.	better
Enter the parameters manually	The previous inverter was successfully tuned The parameters of the same type of motor are copied and input to the corresponding parameters of P1-00 ~ P1-20	better

The steps for auto-tuning of motor parameters are as follows:

The following takes the parameter tuning method of the default motor 1 as an example to explain, and the tuning method of motor 2 is the same, but the parameter number should be changed in a targeted manner.

Step 1: If the motor can be completely disconnected from the load, in the case of power failure, the motor is mechanically separated from the load part, so that the motor can rotate freely without load.

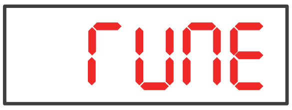
Step 2: After powering on, first select the inverter command command (P0-02) as the command channel of the operation panel.

Step 3: Accurately enter the nameplate parameters of the motor (such as P1-00 ~ P1-05), please enter the following parameters according to the actual parameters of the motor (selected according to the current motor):

Motor selection	parameter
Motor 1	P1-00：Motor type　P1-01　Motor power rating P1-02：Motor rated voltage　P1-03　Motor rated current P1-04：Motor rated frequency　P1-05　Motor rated speed
Motor 2	A2-00～A2-05: Same definitions as above

If you have an encoder, enter the encoder parameters (P1-27、P1-28、P1-30).

Step 4: If it is an asynchronous motor, then P1-37 (tuning selection, motor 2 corresponds to A2-37 parameters) please select 2 (complete tuning of asynchronous machine), press ENTER key to confirm, at this time, the keyboard will display TUNE, as shown in the following figure:



Then press the RUN key on the keyboard panel, the inverter will drive the motor to accelerate and decelerate, forward and reverse operation, the running indicator light is lit, and the tuning operation duration is about 2 minutes.

After this complete tuning, the inverter automatically calculates the following parameters of the motor:

Motor selection	parameter
Motor 1	P1-06：Stator resistance of asynchronous motors P1-08：Rotor resistance of asynchronous motors P1-10：leakage inductance resistance of asynchronous motors P1-07：mutual inductance reactance of asynchronous motors P1-09：No-load current of asynchronous motor
Motor 2	A2-06～A2-10：Same definitions as above

If the motor cannot be completely disconnected from the load, select 3 (static tuning 2 of asynchronous machine 2) for P1-37 (A2-37 for motor 2), and then press the RUN key on the keyboard panel to start the tuning operation of motor parameters.

Chapter 6 Parameter Description

6.1 How to set the operation command

The operation command is used to control the start, stop, forward rotation, reversal, jog operation of the inverter, etc. There are 3 ways to run commands, namely operation panel, terminal, and communication. Set the parameters P0-02 and select the input mode for running the command.

parameter	define	default	range	illustrate
P0-02	Run command selection	0	0	Operator panel
			1	Terminal
			2	communication

1) Set the operation command through the "Operation Panel".

Set the parameter P0-02=0, and use the RUN key and STOP RES key on the operation panel to control the operation command of the inverter. Press the RUN button on the keyboard to start the inverter (the RUN indicator lights up), and when the inverter is running, press the STOP/RES key on the keyboard.

The inverter stops running (the RUN indicator goes off). For details on how to operate the Control Panel, refer to "Chapter 4 Panel Usage".

2) Set the operation command through the "terminal".

Set the parameter P0-02=1, and use the terminal to control the start and stop of the inverter.

Set the parameters P4-11 and set the control mode of the terminal command. There are four command modes for terminals, which are 2-wire type 1, 2-wire type 2, 3-wire type 1, and 3-wire type 2.

parameter	define	default	range	illustrate
P4-11	Terminal command mode	0	0：2-wire 1 1：2-wire 2 2：3-wire 1 3：3-wire 2	Four different ways to control the operation of the drive via an external terminal

The multi-function input terminal of DI1~DI5 can be arbitrarily selected as the external input terminal. That is, the function of the DI1~DI5 input terminal is selected by setting the value of P4-00~P4-04, and the detailed function definition is referred to the function selection of P4-00(DI1)~P4-04(DI5) terminal in the "Appendix A Function Parameter Table".

- 2-wire 1: P4-11=0   This is the most commonly used 2-wire pattern.

For example, the DI1 terminal assigns the forward running function, and the DI2 terminal assigns the reverse running function. Connect the forward running switch to the DI1 terminal and the reverse running switch to the DI2 terminal.

parameter	name	value	illustrate
P4-11	Terminal command mode	0	2-wire 1
P4-00	DI1 function selection	1	Forward rotation (FWD)
P4-01	DI2 function selection	2	Reverse rotation (REV)

When the control switch SW1 is closed and SW2 is disconnected, the motor rotates forward; When the control switch SW1 is disconnected and SW2 is closed, the motor reverses;

When both SW1 and SW2 are disconnected or both closed, the motor is not running. As shown in the figure below:

SW1	SW2	Run command
1	0	FWD
0	1	REV
1	1	STOP
0	0	STOP

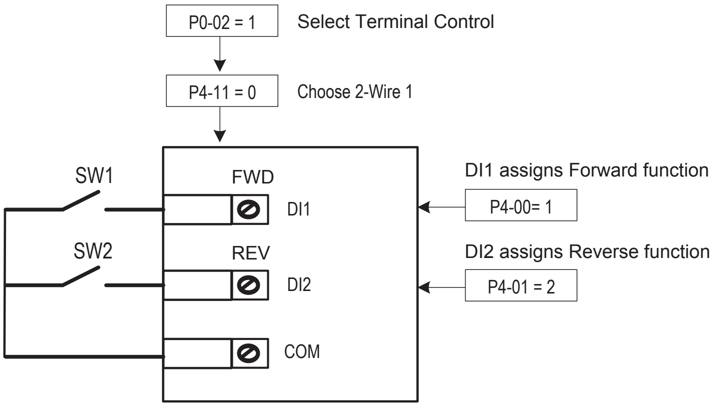


Figure 6-1 Schematic diagram of wiring and parameter settings in 2-wire 1

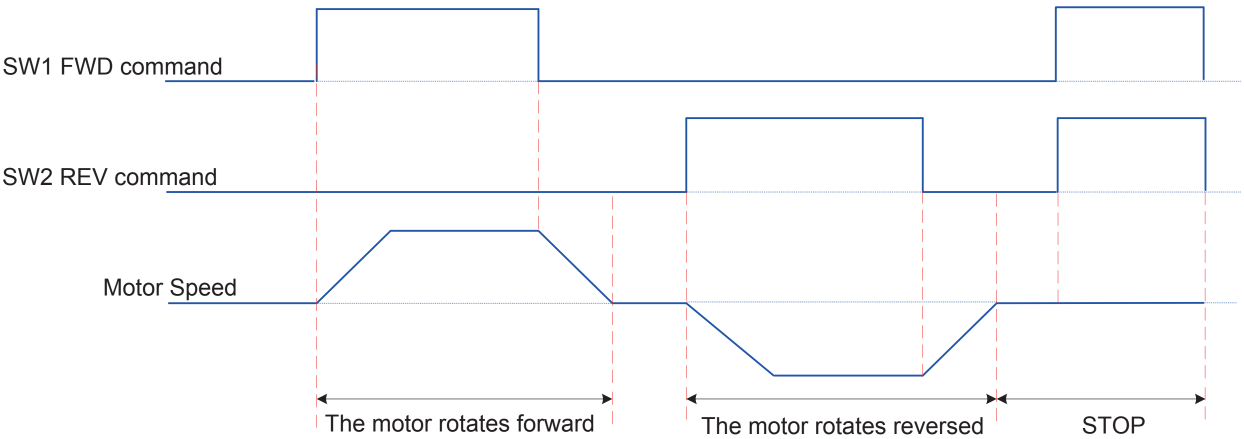


Figure 6-2 2-wire mode1 Timing diagram (normal)

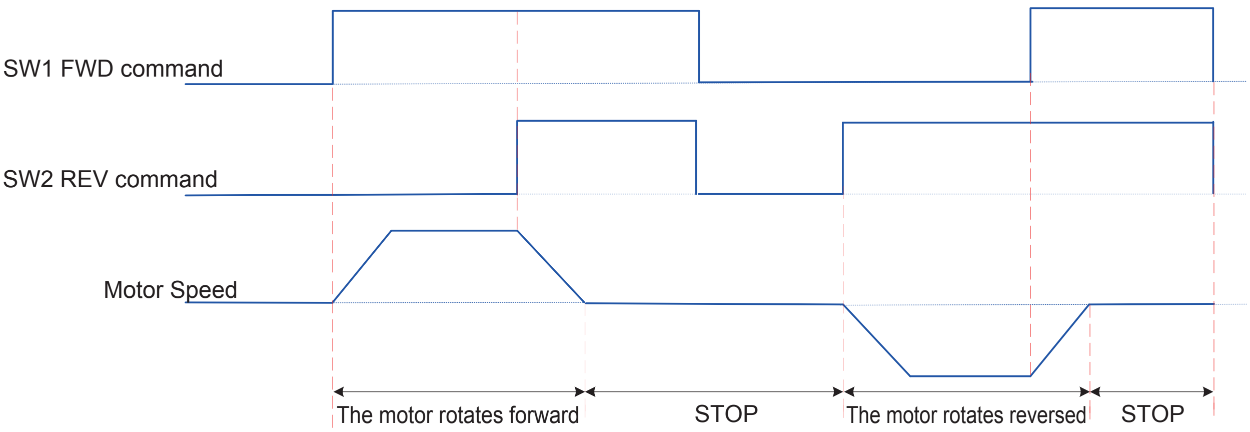


Figure 6-3 2-wire mode 1 Timing diagram (exception)

- 2-wire 2: P4-11=1

For example, the DI1 terminal assigns the running command function, and the DI2 terminal assigns the positive and negative running direction functions, and the methods used and set the parameters are as follows:

parameter	name	value	illustrate
P4-11	Terminal command mode	1	2-wire 2
P4-00	DI1 function selection	1	Run command
P4-01	DI2 function selection	2	FWD/REV running direction

When the control switch SW1 is closed, operation is enabled. The motor rotates forward when SW2 is disconnected; The motor reverses when SW2 is closed. When SW1 is disconnected,The SW2 does not operate when the motor is disconnected or closed. As shown in the figure below:

SW1	SW2	Run command
1	0	FWD
1	1	REV
0	0	STOP
0	1	STOP

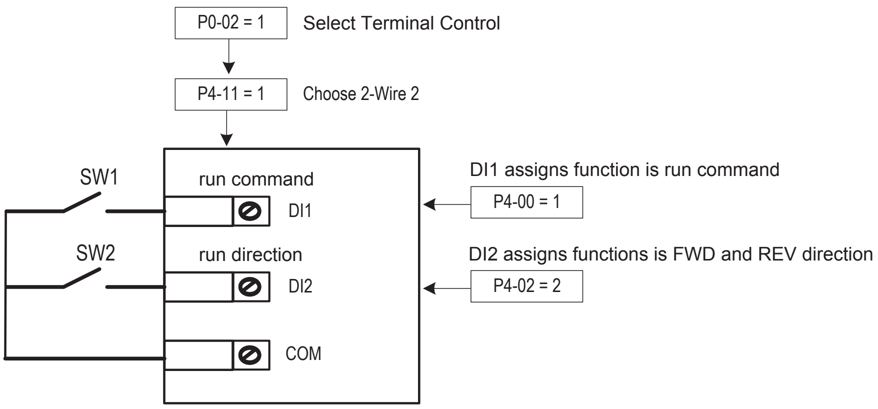


Figure 6-4 Schematic diagram of wiring and parameter settings in 2-wire mode 2

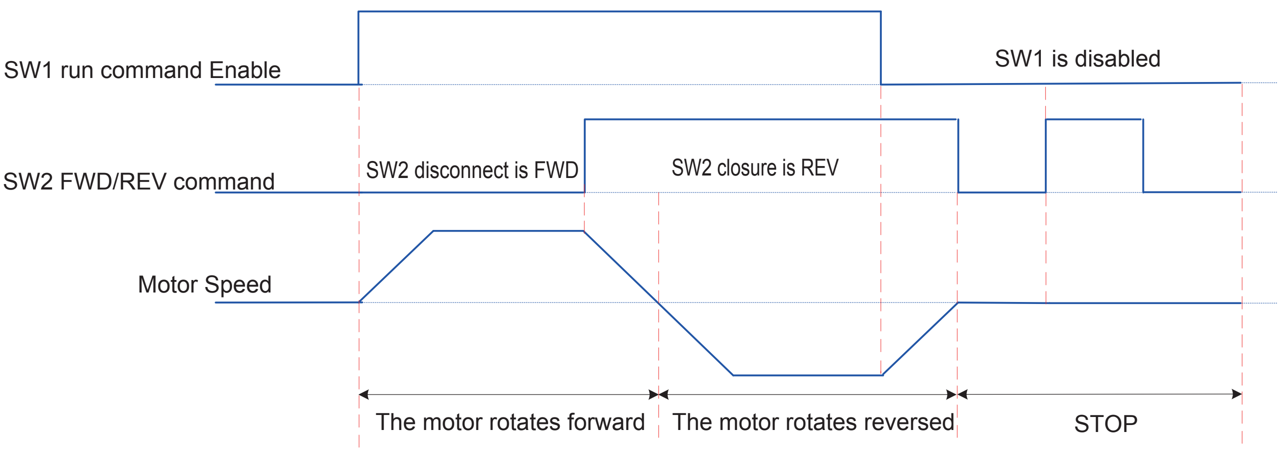


Figure 6-5 2-wire 2 Timing diagram

- 3-wire 1: P4-11 = 2

For example, the DI3 terminal assigns a three-wire operation control function, the DI1 terminal assigns a forward operation function, and the DI2 terminal assigns a reverse operation function. This control mode requires the inverter to use the button as the inverter start-stop switch, connect the start-stop button to the DI3 terminal, the forward running button to the DI1 terminal, and the reverse operation button to the DI2 terminal. The following table describes how to use and set parameters:

parameter	name	value	illustrate
P4-11	Terminal command mode	2	3-wire 1
P4-00	DI1 function selection	1	Forward rotation (FWD)
P4-01	DI2 function selection	2	Reverse rotation (REV)
P4-02	DI3 function selection	3	3-wire control

SW3 is a normally closed button, and SW1 and SW2 are normally open buttons. When the SW3 button is closed, press the SW1 button to turn the inverter forward, press the SW2 button to reverse the inverter, and the SW3 button to disconnect the inverter to stop instantly. During normal start-up and operation, the SW3 button must be kept closed, and the commands of the SW1 and SW2 buttons take effect immediately after the closing action.

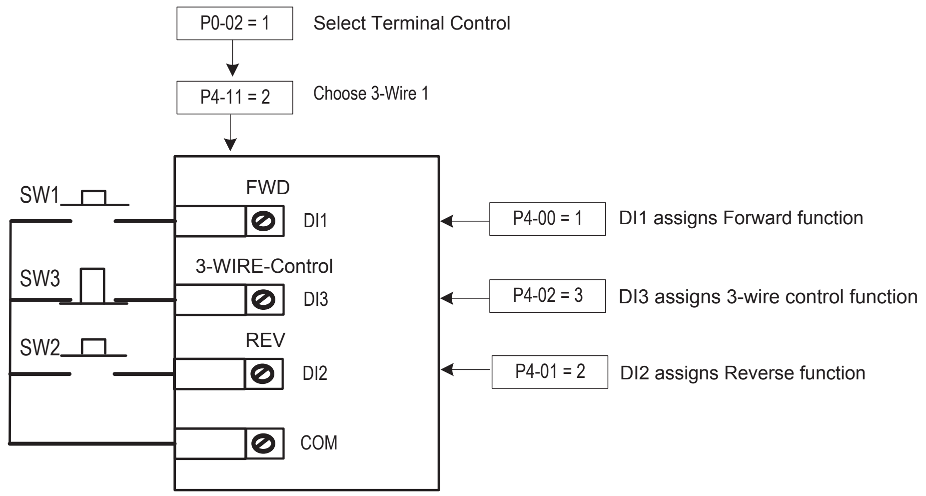


Figure 6-6 Wiring and parameter settings in 3-wire mode 1

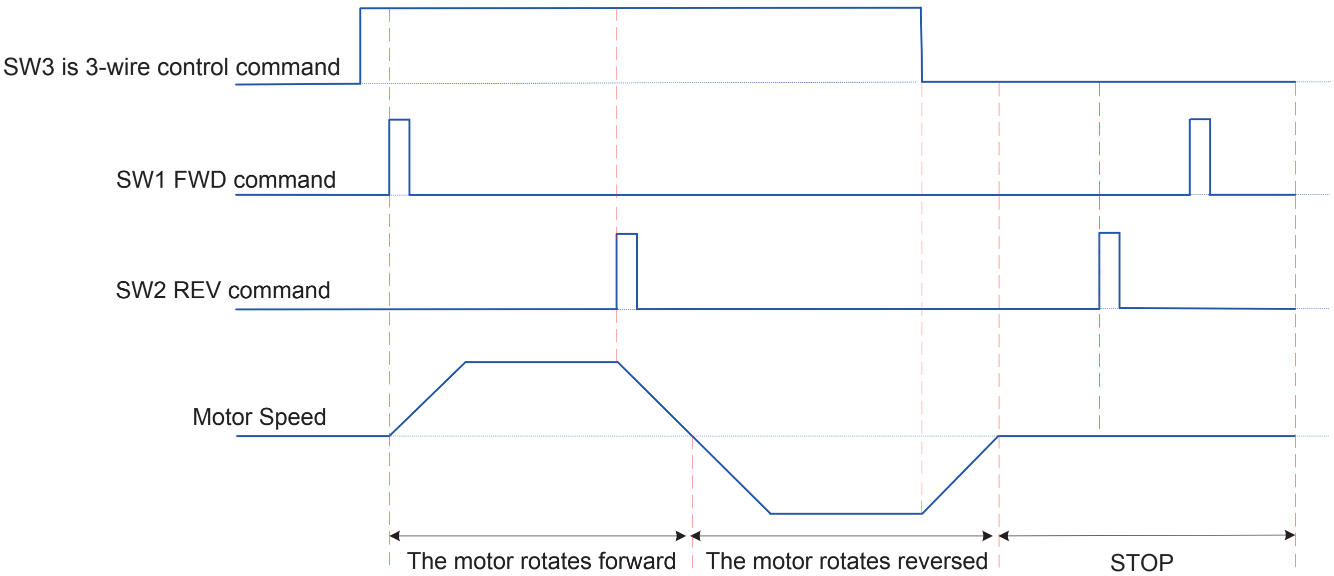


Figure 6-7 Timing diagram of 3-wire mode 1

- 3-wire 2: P4-11=3

For example, the DI3 terminal assigns a three-wire operation control function, the DI1 terminal assigns the running command function, and the DI2 terminal assigns the forward/reverse running direction function. Connect the start-stop button to the DI3 terminal, and enable the operation to connect to the DI1 terminal; The forward/reverse running button is connected to the DI2 terminal. The parameters are set as follows:

parameter	name	value	illustrate
P4-11	Terminal command mode	3	3-wire 2
P4-00	DI1 function selection	1	Run command
P4-01	DI2 function selection	2	FWD/REV running direction
P4-02	DI3 function selection	3	3-wire control

When the SW3 button is closed, and the SW1 button is pressed, if SW2 is open, the inverter is forward, and if SW2 is closed, the inverter is reversed. The SW3 push-button disconnects and the inverter stops instantly. During normal start-up and operation, the SW3 button must be kept closed, and the command of the SW1 button is in effect along the closing action.

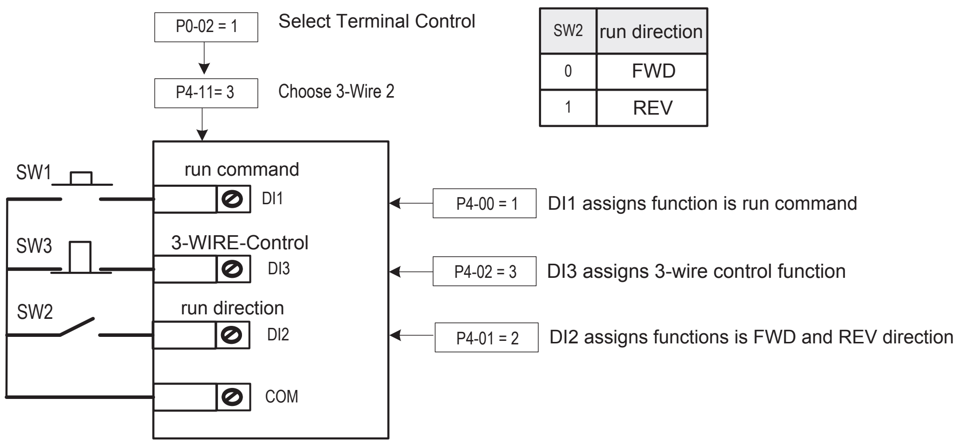


Figure 6-8 3-wire mode 2 Wiring and parameter settings

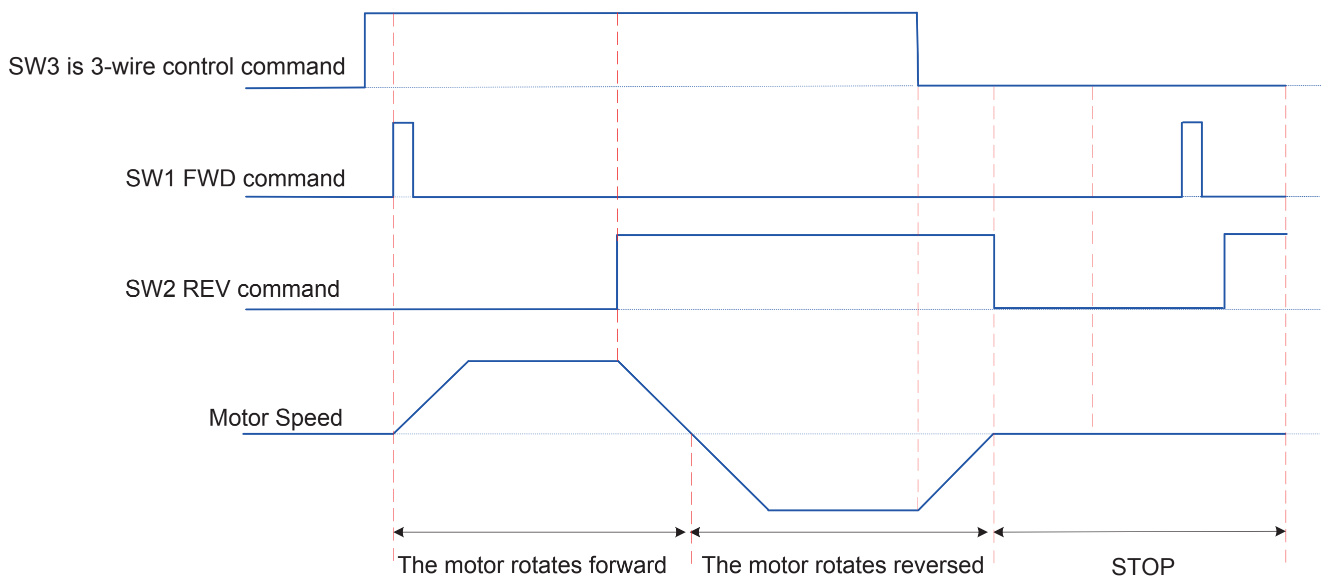


Figure 6-9 Timing diagram of 3-Wire mode 2

3) Set the operation command through "Communication".

Set the parameter P0-02=2 and communicate the given running command with the communication (the "LOCAL/REMOT" light flashes on the operation panel). Reversal can be realized
Command control related to the start and stop of the frequency.

YD280 supports 1 host computer communication modes: Modbus,
these communication methods cannot be used at the same time. When using communication, you must install a communication card, YD280's communication cards are optional, users can choose according to their needs, if the communication protocol is Modbus, you need to select the corresponding serial communication protocol according to P0-28.

parameter	define	value	range
P0-28	Serial communication protocol selection	0	0：MODBUS protocol

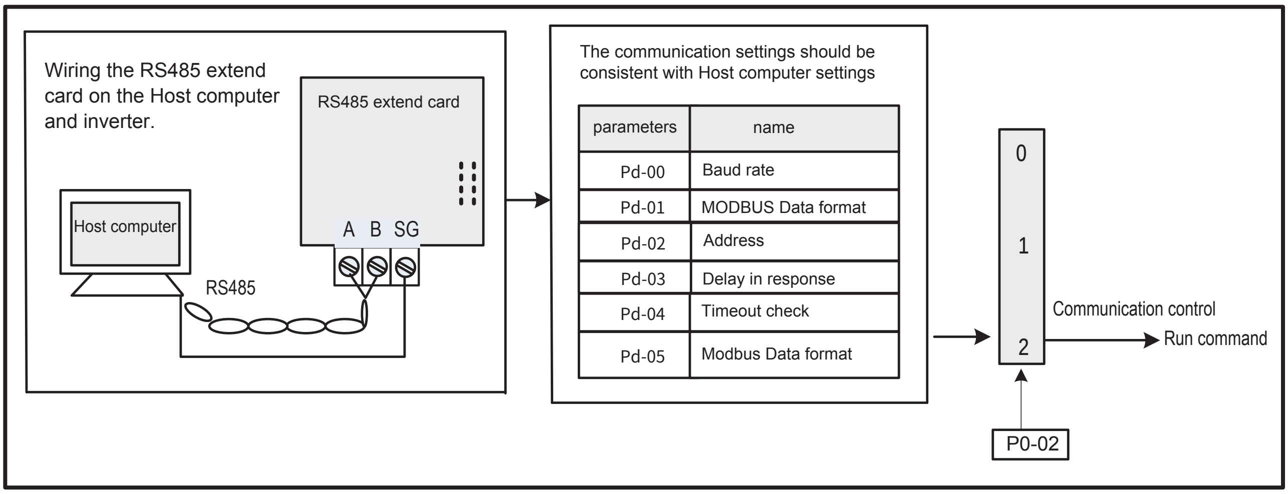


Figure 6-10 Schematic diagram of running commands using communication settings

When the operation instruction is given by communication, the host computer should send a write command to the inverter. The following uses the Modobus protocol as an example to illustrate the process of communicating a given running instruction. For example, when using communication to make the inverter run in reverse, send a write command to 01 06 20 00 00 02 03 CB. The meaning of each byte is as follows: inverter identity: 01H (can be set), write command: 06H, control command communication address: 2000H, control command: 02H (reverse running), CRC check: 03CBH. (For other communication addresses and control commands, please refer to "Appendix B: Communication Data Address Definition and Modbus Communication Protocol")

Host computer command		response from inverter	
ID	01H	ID	01H
CMD	06H	CMD	06H
Address H	20H	Address H	20H
Address L	00H	Address L	00H
Data H	00H	Data H	00H
Data L	02H	Data L	02H
CRC H	03H	CRC H	03H
CRC L	CBH	CRC L	CBH

6.2 Frequency Command Input Method

There are four input methods for frequency commands, namely, selecting primary frequency commands, selecting auxiliary frequency commands, selecting primary and secondary frequency instruction overlays, and selecting command sources to bind primary frequency commands.

6.2.1 Method for Master Frequency commands

Set the parameter P0-03 and select the input of the main
frequency command. There are 8 kinds of main frequency instructions of the inverter, which are
Digital setting (no memory when power off)、
Digital setting (memory when power off),
Analogy AI1, AI2,、
Multi-segment instruction、
Simple PLC、 PID、
Communication..etc

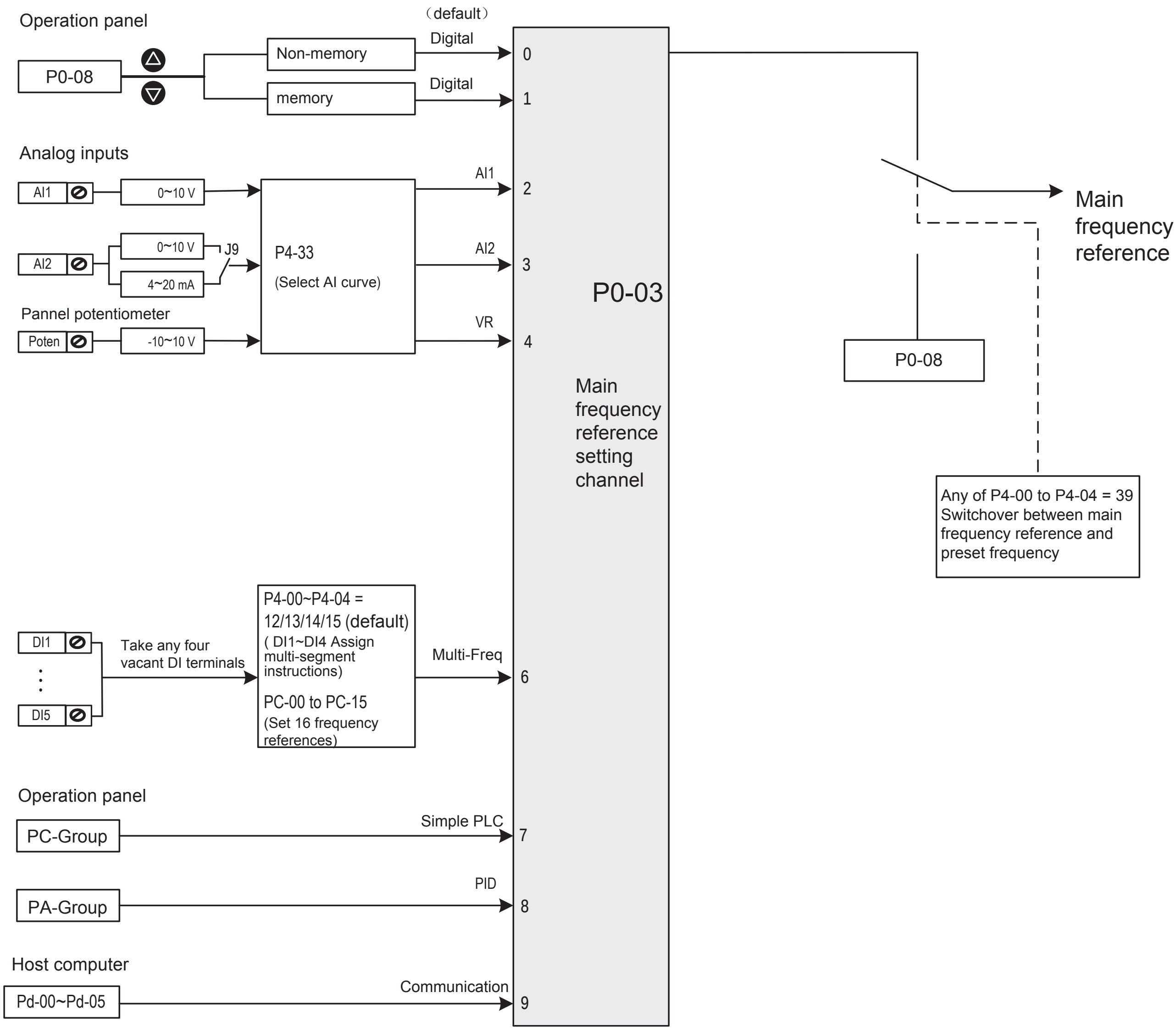


Figure 6-11 Main frequency command selection

parameter	define	default	range	illustrate
P0-03	Main frequency command select	0	0	Digital setting (no memory when power off)
			1	Digital setting (memory when power off)
			2	Analogy AI1
			3	Analogy AI2
			4	Panel potentiometers
			5	Keep
			6	Multi-Step
			7	Simple PLC
			8	PID
			9	Communication

6.2.2 Master Frequency (digital setting) via "Panel"

There are two ways to set the master frequency with the control panel:

- P0-03=0（no memory when power off），That is, after the inverter is shut down or powered back on after power failure, the set frequency value is restored to the "preset frequency" (P0-08) set value. The method of setting the preset frequency (P0-08) is passed by the keyboard △ keys and ▽ keys (or UP/DOWN of the multi-function input terminal) to modify the set frequency value of the inverter.
- P0-03=1（memory when power off），That is, when the inverter is powered off and powered on again, the set frequency is the frequency set value at the time of the last power failure.

parameter	define	default	range
P0-08	Preset frequency	50.00Hz	0.00Hz~ Maximum frequency（P0-10）
P0-10	Maximum frequency	50.00Hz	0.00Hz~500.00HZ

NOTE

- In contrast to the parameter P0-23 "Digitally set frequency stop memory selection", P0-23 is used to select whether the frequency correction is memorized or zeroed out when the inverter is stopped. P0-23 is related to shutdown and not to power down memory.
- P0-23=0 "do not remember", use the panel to set P0-08 "preset frequency", and then correct the frequency through the △ keys and ▽ keys of the keyboard or the terminal UP and DOWN, after the inverter stops, the frequency correction value is cleared.
- P0-23=1 "memory", set P0-08 "preset frequency" with the panel, and then correct the frequency through the △ keys and ▽ keys of the keyboard or the terminal UP and DOWN, and the frequency correction value is retained after the inverter stops.

For example, if the P0-28 "Preset Frequency" is set to 40Hz, the preset frequency is adjusted to 45Hz by the △ keys of the keyboard. If P0-23 is set to 0 (no memory), the target frequency after the inverter is stopped will be restored to 40 Hz (the value corresponding to the "preset frequency" of P0-08), and if P0-23 is set to 1 (memory), the target frequency will remain at 45 Hz after the inverter is stopped

parameter	define	value	range
P0-23	Digitally set frequency, stop memory selection	0	0：no memory 1：menory

6.2.3 The main frequency is set by "Analog".

The main frequency is set by analog input, and there are three AI terminals: AI1, AI2, and Pannel-Pot .

P0-03=2：AI1 Set the main frequency；

P0-03=3：AI2 Set the main frequency；

P0-03=4：Panel potentiometers(VR) Set the main frequency；

Given that the AI terminal is used as a frequency source, each AI terminal can choose from 5 different AI curves. Therefore, we will first introduce the setting method of the AI curve, and then introduce how the AI terminal selects the corresponding AI curve, and the setting steps are as follows:

set step	parameter	illustrate	
(Step 1) How to set the AI curve: Set the correspondence between the input of the AI voltage/current and the set amount	P4-13 ~ P4-16	Curve 1	common
	P4-18 ~ P4-21	Curve 2	common
	P4-23 ~ P4-27	Curve 3	common
	A6-00 ~ A6-07	Curve 4	
	A6-08 ~ A6-15	Curve 5	
	P4-34	AI is below the minimum input set selection (AI as frequency, voltage/electricity.The corresponding 100.0% of the stream input is the relative maximum frequency P0-10)	
(Step 2) AI terminal selection AI curve method: AI terminal selection curve and filter time setting	P4-33	AI Curve Selection (The AI terminal can select any AI curve. Generally, default value P4-33 = 321 is used, AI1 selects curve 1, AI2 selects curve 2, and Panel potentiometers selects curve 3)	
	P4-17、P4-22	AI1 ~ AI2 filtering time	
(Step 3) The AI terminal is set as the frequency source: The AI input terminal for frequency commands is selected according to the terminal characteristics	P0-03 (Main Frequency Command Input Select)	P0-03 = 2	Select Use AI1
		P0-03= 3	Choosing to use AI2 selects the voltage or current input for the jumper cap J9 on the control board
		P0-03 = 4	Select Use Panel potentiometers

- How to set AI curves

There are 5 types of AI curves, of which curve 1, curve 2, and curve 3 are all 2-point curves, and the relevant parameters are P4-13~P4-27. Curves 4 and 5 are both 4-point curves, and the relevant parameters are Group A6. The setting of an AI curve is actually setting the relationship between the analog input voltage (or analog input current) and the set value it represents.

Taking the setting method of AI curve 1 as an example, the relevant parameters are P4-13~P4-16, Figure 6-12 corresponds to the factory default value of AI curve 1, and the detailed parameters and descriptions are shown in the following table:

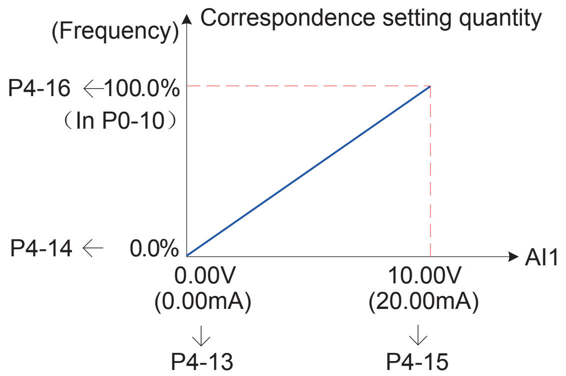


Figure 6-12 AI curve 1 is configured

parameter	define	default	range	illustrate
P4-13	AI curve 1 min. input	0.00V	0.00V~P4-15	When the analog input voltage is less than the set "minimum input" (P4-13), it is calculated as the minimum input or 0.0% according to the setting of "AI below minimum input setting selection" (P4-34).
P4-14	Corresponding percentage of AI curve 1 min. input	0.0%	-100.00%~100.0%	
P4-15	AI curve 1 max. input	10.00V	P4-13~10.00V	When the analog input voltage is greater than the set "Maximum Input" (P4-15), the analog voltage is calculated as "Maximum Input".
P4-16	Corresponding percentage of AI curve 1 max. input	100.0%	-100.00%~100.0%	

NOTE

- When AI is used as a frequency, 100.0% of the voltage or current input is set and is a percentage relative to the "maximum frequency P0-10". When the analog input is a current input, 1mA current is equivalent to 0.5V voltage, and 0~20mA is equivalent to 0~10V voltage.
- Curves 2 and 3 are set up in the same way as curve 1. The relevant parameters of curve 2 are P4-18~P4-21, and the relevant parameters of curve 3 are P4-23~P4-26. Figure 6-13 corresponds to the settings of AI Curve 2.

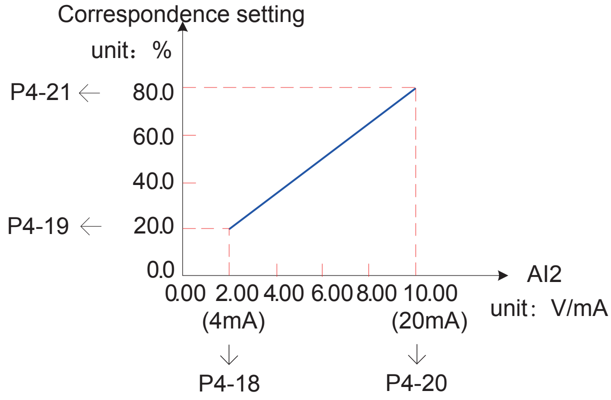


Figure 6-13 AI Curve 2 is configured

parameter	define	default	range	illustrate
P4-18	AI curve 2 min. input	0.00V	0.00V~P4-20	-
P4-19	Corresponding percentage of AI curve 2 min. input	0.0%	-100.00%~100.0%	-
P4-20	AI2 curve max. input	10.00V	P4-18~10.00	-
P4-21	Corresponding percentage of AI curve 2 max. input	100.0%	-100.00%~100.0%	-
P4-23	AI curve 3 min. input	-10V	-10.00V~P4-25	-
P4-24	Corresponding percentage of AI curve 3 min. input	0.0%	-100.00%~100.0%	-
P4-25	AI curve 3 max. input	10.00V	P4-23~10.00V	-
P4-26	Corresponding percentage of AI curve 3 max. input	100.0%	-100.00%~100.0%	-

Curves 4 and 5 function similarly to curves 1~ 3, but curves 1~ 3 are straight lines, while curves 4 and 5 are 4-point curves, which can achieve a more flexible correspondence. Figure 6-14 shows the schematic diagram of curves 4~ 5.

NOTE

- When curves 4 and 5 are set, the minimum input voltage, knee point 1 voltage, knee point 2 voltage, and maximum voltage of the curve must be increased sequentially.

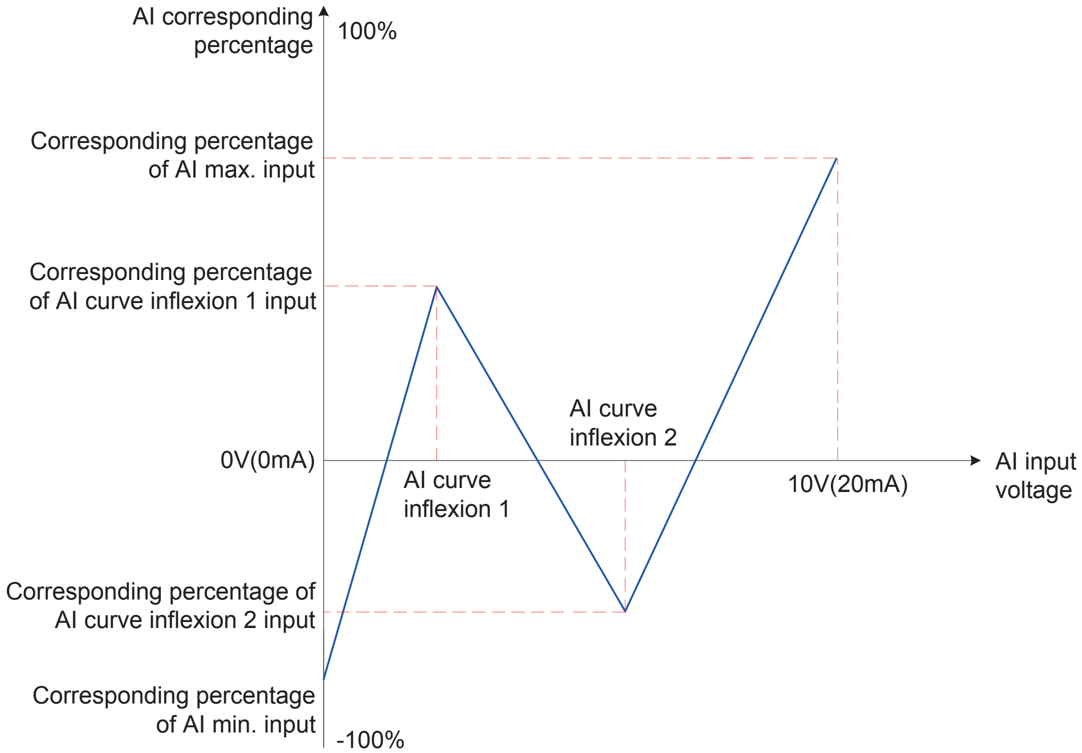


Figure 6-14 Curves 4 and 5 are schematic

parameter	define	default	range	illustrate
A6-00	AI curve 4 min. input	0.00V	-10.00V~A6-02	-
A6-01	Corresponding percentage of AI curve 4 min. input	0.0%	-100.00%~100.0%	-
A6-02	AI curve 4 inflexion 1 input	3.00V	A6-00~A6-04	-
A6-03	Corresponding percentage of AI curve 4 inflexion 1 input	30.0%	-100.0%~100.0%	-
A6-04	AI curve 4 inflexion 1 input	6.00V	A6-02~A6-06	-
A6-05	Corresponding percentage of AI curve 4 inflexion 1 input	60.0%	-100.0%~100.0%	-
A6-06	AI curve 4 max. input	10.00V	A6-04~10.00V	-
A6-07	Corresponding percentage of AI curve 4 max. input	100.0%	-100.0%~100.0%	-
A6-08	AI curve 5 min. input	-10.00V	-10.00V~A6-10	-
A6-09	Corresponding percentage of AI curve 5 min. input	-100.0%	-100.0%~100.0%	-
A6-10	AI curve 5 inflexion 1 input	-3.00V	A6-08~A6-12	-
A6-11	Corresponding percentage of AI curve 5 inflexion 1 input	-30.0%	-100.0%~100.0%	-
A6-12	AI curve 5 inflexion 1 input	3.00V	A6-10~A6-14	-
A6-13	Corresponding percentage of AI curve 5 inflexion 1 input	30.0%	100.0%~100.0%	-
A6-14	AI curve 5 max. input	10.00V	A6-12~10.00V	-
A6-15	Corresponding percentage of AI curve 5 max. input	100.0%	-100.0%~100.0%	-

- The method by which the AI terminal selects the AI curve

The setting curves corresponding to the analog input terminals AI1, AI2, are selected by the one, ten digits of the parameter P4-33, and any of the five curves can be selected for the three analog input terminals.

parameter	define	default	range	illustrate
P4-33	AI curve selection	321	one： AI1 curve select Curve 1 (2 points, see“P4-13~P4-16") Curve 2 (2 points, see“P4-18~P4-21”) Curve 3 (2 points, see“P4-23~P4-26") Curve 4 (4 points, see“A6-00~A6-07") Curve 5 (4 points, see“A6-08~A6-15") ten： AI2 curve select (1~5, same as above) hud： keep	P4-33=321, it means AI1 selects curve 1，AI2 selects curve 2，
P4-17	AI1 filter time	0.10s	0.00s~10.00s	software filter time for the AI input terminal
P4-22	AI2 filter time	0.10s	0.00s~10.00s	

The larger the filtering time of the AI input, the stronger the anti-interference ability, but the slower the adjustment response. The smaller the filtering time, the faster the adjustment response, but the weaker the anti-interference ability. When the field analog quantity is easy to be disturbed, it is necessary to increase the filtering time to make the detected analog quantity tend to be stable, but the larger the filtering time, the slower the response speed to the analog detection, and how to set it needs to be weighed according to the actual application situation.

- The AI terminal is used as a method for setting the main frequency

The YD280 control board provides 2 analog input terminals AI1 and AI2, and the optional I/O expansion card provides an additional 1 analog input

AI1 terminal is a voltage type input of 0~10V. The AI2 terminal can be a voltage input of 0~10V or a current input of 0mA~20mA, which can be selected by the J9 jumper on the control board (for specific operation methods, please refer to "Chapter 3 Installation and Wiring").

For example, if curve 1 is selected for the AI1 terminal (P4-33 digits are set to 1), and the AI1 voltage input terminal is used as the frequency source, it needs to reach 2V~10V orresponding to 10 Hz~40Hz, and the parameter setting method is as follows:

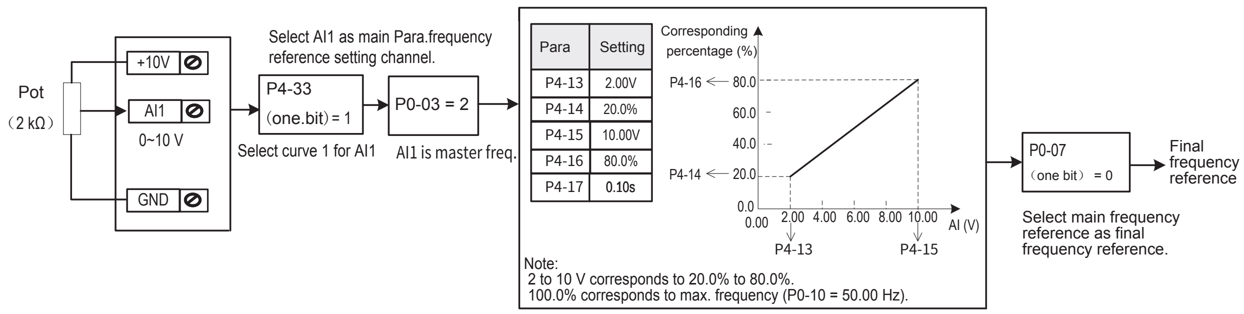


Figure 6-15 Voltage input at AI1 to control frequency reference

The AI2 can be used as an analog voltage input (0V~10V) or as an analog current input (0mA~20mA).

When AI2 is an analog current input, if the input current is 0mA ~ 20mA, the corresponding input voltage is 0V ~ 10V. If the input current is 4mA ~ 20mA, then 4mA corresponds to 2V and 20mA corresponds to 10V.

For example, if AI2 selects curve 2 (P4-33 ten digits are set to 2), AI2 current input needs to reach 4mA~20mA corresponding to 0Hz~50Hz, and the parameter setting method is as follows:

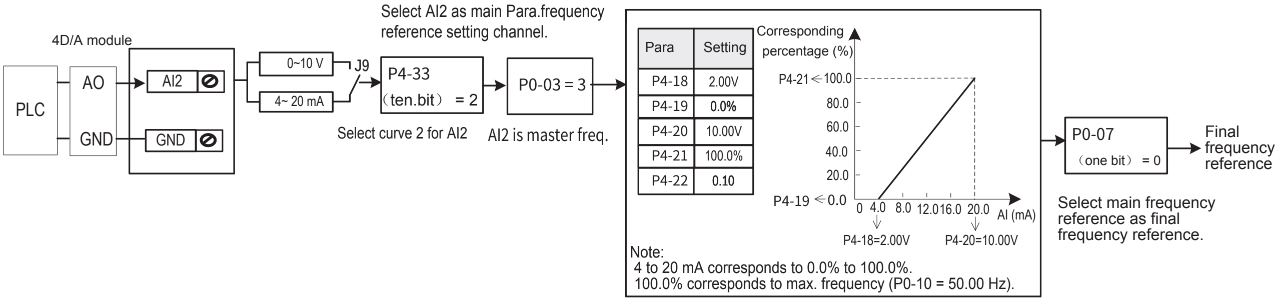


Figure 6-16 Current input at AI2 to control frequency reference

6.2.5 Master Frequency via "Multi-Speed

Set the parameter P0-03=6, and select the multi-segment command as the main frequency. Ideal for applications where the frequency of the drive does not need to be continuously adjusted, only a few frequency values need to be used.

The YD280 can be set to run up to 16 levels, which can be selected by the combination of 4 DI terminai input signals. It is also allowed for less than 4 DI terminals for multi-segment frequency givens, and for missing set bits, it is always calculated as status 0.

The correspondence between the number of segments and the number of DI terminals at multi-stage speed:

2 speed: 1 DI terminal K1;

3-4 speeds: 2 DI terminals K1, K2;

5-8 speeds: 3 DI terminals K1, K2, K3;

9-16 speeds: 4 DI terminals K1, K2, K3, K4.

The required multi-band frequency is set by the multi-band frequency table of PC-00~PC-15, and the parameters are as follows:

parameter	define	default	range	illustrate
PC-00	Reference 0	0.0%	-100.0%~100.0%	The parameter value is the set frequency, which is a percentage of the relative maximum frequency. The positive and negative signs are the direction of travel. The acceleration and deceleration times are P0-17 and P0-18 by default.
PC-01	Reference 1	0.0%	-100.0%~100.0%	
PC-02	Reference 2	0.0%	-100.0%~100.0%	
PC-03	Reference 3	0.0%	-100.0%~100.0%	
PC-04	Reference 4	0.0%	-100.0%~100.0%	
PC-05	Reference 5	0.0%	-100.0%~100.0%	
PC-06	Reference 6	0.0%	-100.0%~100.0%	
PC-07	Reference 7	0.0%	-100.0%~100.0%	
PC-08	Reference 8	0.0%	-100.0%~100.0%	
PC-09	Reference 9	0.0%	-100.0%~100.0%	
PC-10	Reference 10	0.0%	-100.0%~100.0%	
PC-11	Reference 11	0.0%	-100.0%~100.0%	
PC-12	Reference 12	0.0%	-100.0%~100.0%	
PC-13	Reference 13	0.0%	-100.0%~100.0%	
PC-14	Reference 14	0.0%	-100.0%~100.0%	
PC-15	Reference 15	0.0%	-100.0%~100.0%	
PC-51	Reference 0 Given method	0	0~6	0：parameter PC-00 is given 1：AI1 analog 2：AI2 analog 3：Panel potentiometers 4：Keep 5：PID 6：The preset frequency (P0-08) is given, and UP/DOWN can be modified

If the main frequency command is a multi-speed command, the function value of 12~15 is set to the DI terminal function selection, that is, the multi-segment frequency index is specified order input terminal.

parameter	name	value	illustrate
P4-01	DI2 function selection	12	Multi-Speed terminal 1
P4-02	DI3 function selection	13	Multi-Speed terminal 2
P4-03	DI4 function selection	14	Multi-Speed terminal 3
P4-04	DI5 function selection	15	Multi-Speed terminal 4

In the figure below, DI2, DI3, DI4, and DI5 are selected as the signal inputs specified by the multi-speed frequency, and the 4-digit binary number is composed from them in turn, and the multi-frequency is selected according to the state combination value. When (DI2, DI3, DI4, DI5) = (0, 0, 1, 0) and the number of state combinations is 2, the frequency value set by the PC-02 parameter is selected (see Table 6-1 for details on how to select). The target operating frequency is automatically calculated by (PC-02)*(P0-10). The detailed settings are shown in the figure below:

The target operating frequency is calculated. The detailed settings are shown in the figure below:

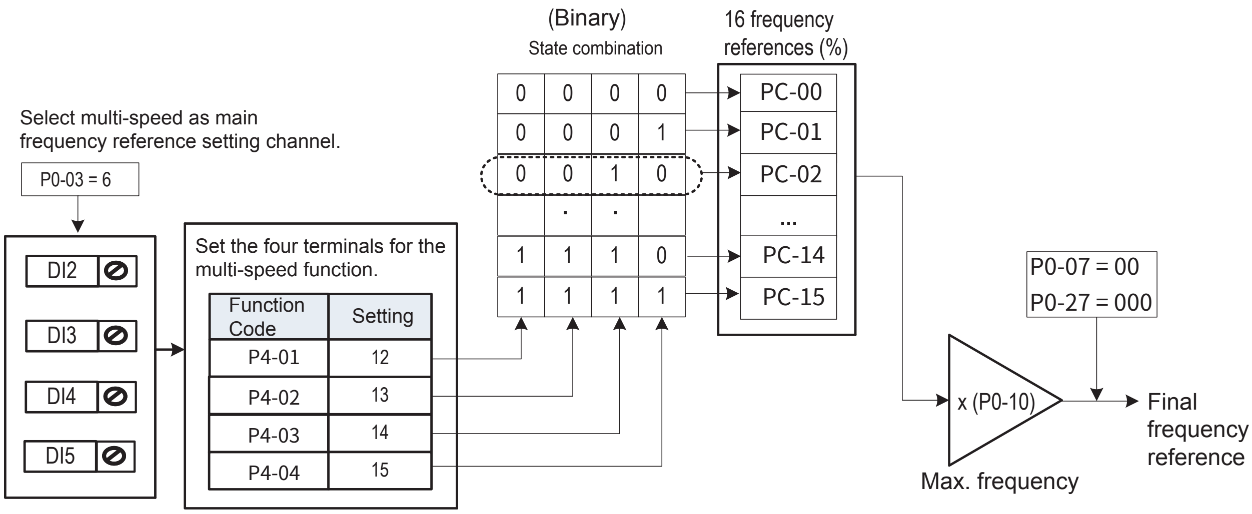


Figure 6-19 Using multi-speed to control frequency reference

4 multi-speed command terminals, which can be combined into 16 states, each of which corresponds to 16 command settings. The details are shown in the following table:

Table 6-1 Functions of multi-speed commands

K4	K3	K2	K1	Multi-set	parameter
OFF	OFF	OFF	OFF	Reference 0	PC-00（PC-51=0)
OFF	OFF	OFF	ON	Reference 1	PC-01
OFF	OFF	ON	OFF	Reference 2	PC-02
OFF	OFF	ON	ON	Reference 3	PC-03
OFF	ON	OFF	OFF	Reference 4	PC-04
OFF	ON	OFF	ON	Reference 5	PC-05
OFF	ON	ON	OFF	Reference 6	PC-06
OFF	ON	ON	ON	Reference 7	PC-07
ON	OFF	OFF	OFF	Reference 8	PC-08
ON	OFF	OFF	ON	Reference 9	PC-09
ON	OFF	ON	OFF	Reference 10	PC-10
ON	OFF	ON	ON	Reference 11	PC-11
ON	ON	OFF	OFF	Reference 12	PC-12
ON	ON	OFF	ON	Reference 13	PC-13
ON	ON	ON	OFF	Reference 14	PC-14
ON	ON	ON	ON	Reference 15	PC-15

NOTE

- In addition to being used as the main frequency command, the multi-command can also be used as a voltage source for V/F separation (see "6.5.1" for details).
- Setting of the V/F curve" P3-13 in detail) as a setting source for the process PID (see "6.2.1 Selecting the Master Frequency" for details
- The input method of the command "PA-00 Detailed Description").

6.2.6 Master Frequency via "simple PLC

Set the parameter P0-03=7, and select the simple PLC as the main frequency.

When the simple PLC is used as the main frequency, you need to set the parameters PC-00~PC-15 (see subsection 6.2.5 for details of the setting method), and PC-18~PC-49 to set the running time and acceleration and deceleration time of each section. The parameters are detailed in the following table:

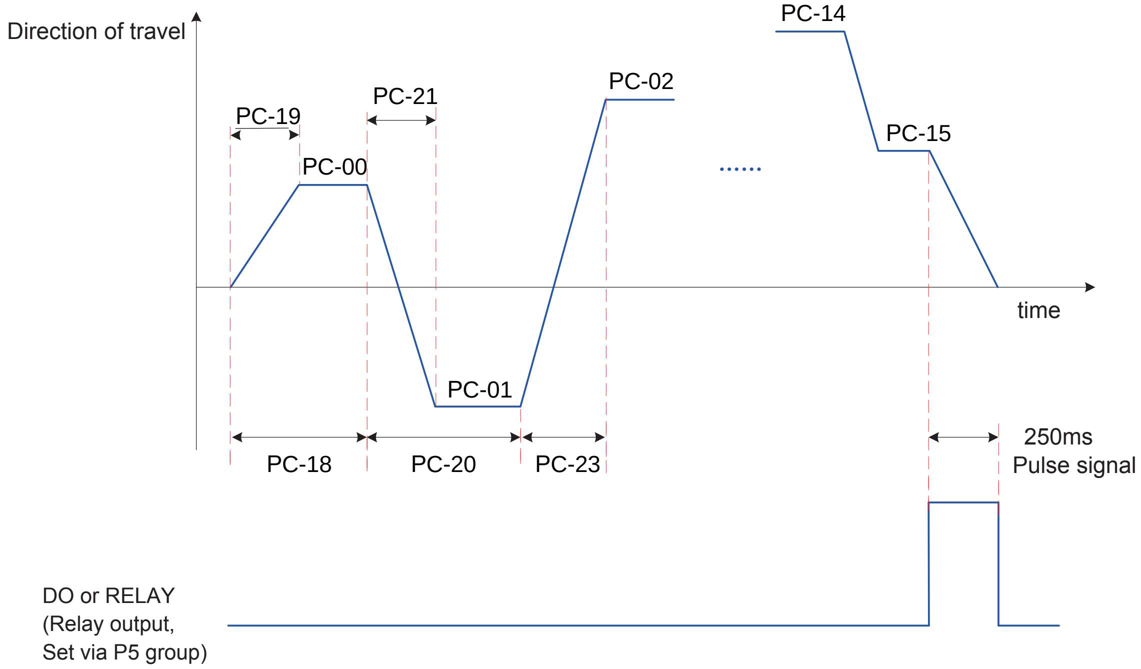


Figure 6-20 A simple PLC as a schematic diagram of the main frequency

parameter	define	default	range	illustrate
PC-18	Running time of simple PLC reference 0	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-19	Acceleration/deceleration time of simple PLC reference 0	0	0~3	-
PC-20	Running time of simple PLC reference 1	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-21	Acceleration/deceleration time of simple PLC reference 1	0	0~3	-
PC-22	Running time of simple PLC reference 2	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-23	Acceleration/deceleration time of simple PLC reference 2	0	0~3	-
PC-24	Running time of simple PLC reference 3	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-25	Acceleration/deceleration time of simple PLC reference 3	0	0~3	-
PC-26	Running time of simple PLC reference 4	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-27	Acceleration/deceleration time of simple PLC reference 4	0	0~3	-
PC-28	Running time of simple PLC reference 5	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-29	Acceleration/deceleration time of simple PLC reference 5	0	0~3	-
PC-30	Running time of simple PLC reference 6	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-31	Acceleration/deceleration time of simple PLC reference 6	0	0~3	-
PC-32	Running time of simple PLC reference 7	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-33	Acceleration/deceleration time of simple PLC reference 7	0	0~3	-
PC-34	Running time of simple PLC reference 8	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-35	Acceleration/deceleration time of simple PLC reference 8	0	0~3	-

parameter	define	default	range	illustrate
PC-36	Running time of simple PLC reference 9	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-37	Acceleration/deceleration time of simple PLC reference 9	0	0~3	-
PC-38	Running time of simple PLC reference 10	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-39	Acceleration/deceleration time of simple PLC reference 10	0	0~3	-
PC-40	Running time of simple PLC reference 11	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-41	Acceleration/deceleration time of simple PLC reference 11	0	0~3	-
PC-42	Running time of simple PLC reference 12	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-43	Acceleration/deceleration time of simple PLC reference 12	0	0~3	-
PC-44	Running time of simple PLC reference 13	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-45	Acceleration/deceleration time of simple PLC reference 13	0	0~3	-
PC-46	Running time of simple PLC reference 14	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-47	Acceleration/deceleration time of simple PLC reference 14	0	0~3	-
PC-48	Running time of simple PLC reference 15	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-49	Acceleration/deceleration time of simple PLC reference 15	0	0~3	-
PC-50	Simple PLC run time unit	0	0：s（sec）；1：h（hour）	-

When the simple PLC is used as the main frequency, the operation mode of the simple PLC is selected by setting PC-16, and the operation stage and operating frequency of the PLC before the power failure or shutdown are selected by setting PC-17. The detailed parameters are as follows:

parameter	define	default	range	illustrate
PC-16	Simple PLC running mode	0	0：Stop after running one cycle	The inverter automatically stops after completing a single cycle, and needs to be given a running command again to start.
			1：Keep final values after running one cycle	After the inverter completes a single cycle, it automatically maintains the operating frequency and direction of the last section, and starts to run from the initial state of the PLC after stopping and restarting.
			2：Repeat after running one cycle	After the inverter completes one cycle, it automatically starts the next cycle and does not stop until there is a stop command.
PC-17	Simple PLC retentive selection	00	one bit：Retentive at power down	
			0：no memory	Restart the PLC process every time you power up.
			1：menory	Memorize the running stage and running frequency of the PLC before power-off, and continue to run from the memory stage when the next power is turned on
			ten bit：Retentive at stop	
			0：no memory	The PLC process is restarted with each start-up.
			1：memory	When machine is stopped, the operation stage and frequency of the previous PLC are recorded, and the operation continues from the memory stage during the next operation.
PC-50	Time unit of simple PLC running	0	0：s（sec）；1：h（hour）	Set the unit of time for PLC operation.
PC-51	Reference 0 source	0	0：PC-00 is given 1：AI1 2：AI2 3：Pannel Pot. 4：Keep 5：PID 6：The preset frequency (P0-08) is given, UP/DOWN can be modified	-

< Complementary> Simple PLC function can be used as a voltage source for V/F separation in addition to the main frequency. (For details, see "Setting the 6.5.1 V/F Curve" P0-13 for details.)

6.2.7 Master Frequency via "PID"

Set the parameter P0-03=8 and select PID as the main frequency.

PID control is a common method of process control, through the proportional, integral, and differential operations of the difference between the feedback signal of the controlled quantity and the target signal, and by adjusting the output frequency of the inverter, a closed-loop system is formed to stabilize the controlled quantity at the target value. The output of PID control is selected as the operating frequency, which is generally used for on-site process closed-loop control, such as constant pressure closed-loop control, constant tension closed-loop control, etc.

- **Proportional Gain Kp:** Once a deviation between the output and input of the PID is generated, the PID will adjust the control output to reduce the amount under control. The larger the Kp, the faster the deviation decreases, but it is easy to cause oscillation, especially when the lag link is relatively large, Kp decreases, and the possibility of oscillation decreases. But the adjustment speed has become slower. (A proportional gain of 100.0 means that when the deviation between the PID feedback amount and the given amount is 100.0%, the PID regulator adjusts the output frequency command to the maximum frequency.)
- **Integration Time Ti:** Determines the strength of the integration regulation of the PID regulator. The shorter the integration time, the greater the intensity of adjustment. (Integration time.) This means that when the deviation between the PID feedback amount and the given amount is 100.0%, the integration regulator will continuously adjust and adjust the amount to the maximum frequency after this time)
- **Differential time Td:** determines the strength of the PID regulator's adjustment of the rate of change of deviation. The longer the differentiation time, the greater the intensity of adjustment. (Micro.)Minute time means that when the feedback amount changes by 100.0% in that time, the adjustment amount of the differential regulator is the maximum frequency)

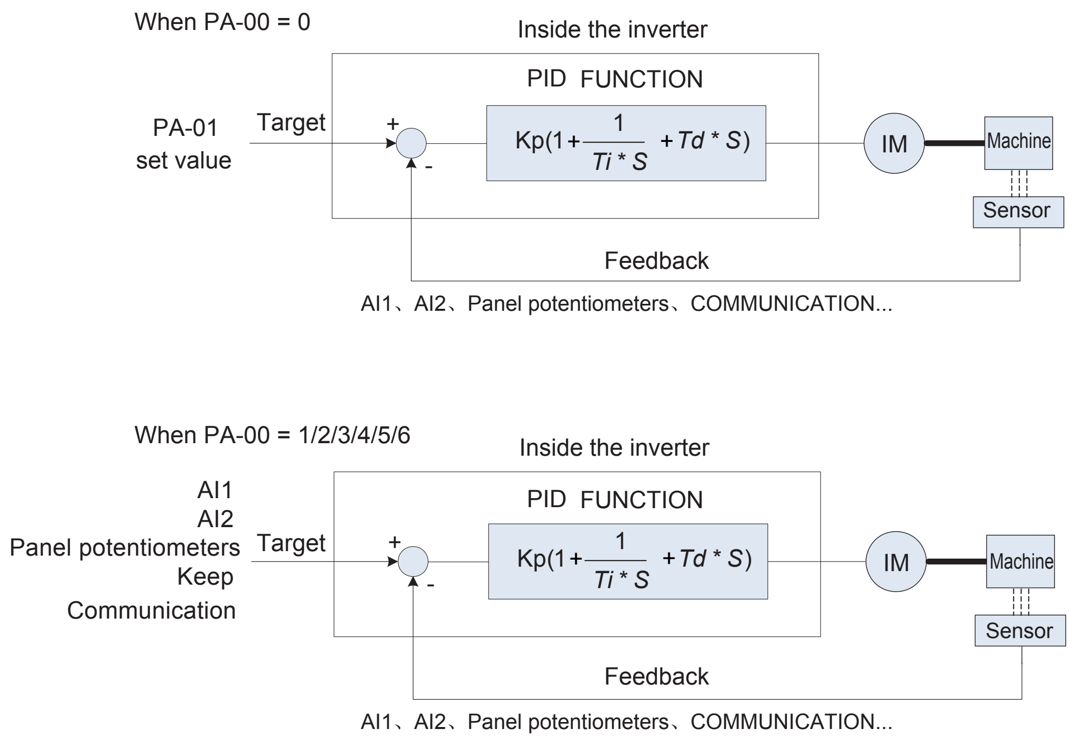


Figure 6-21 PID control function diagram

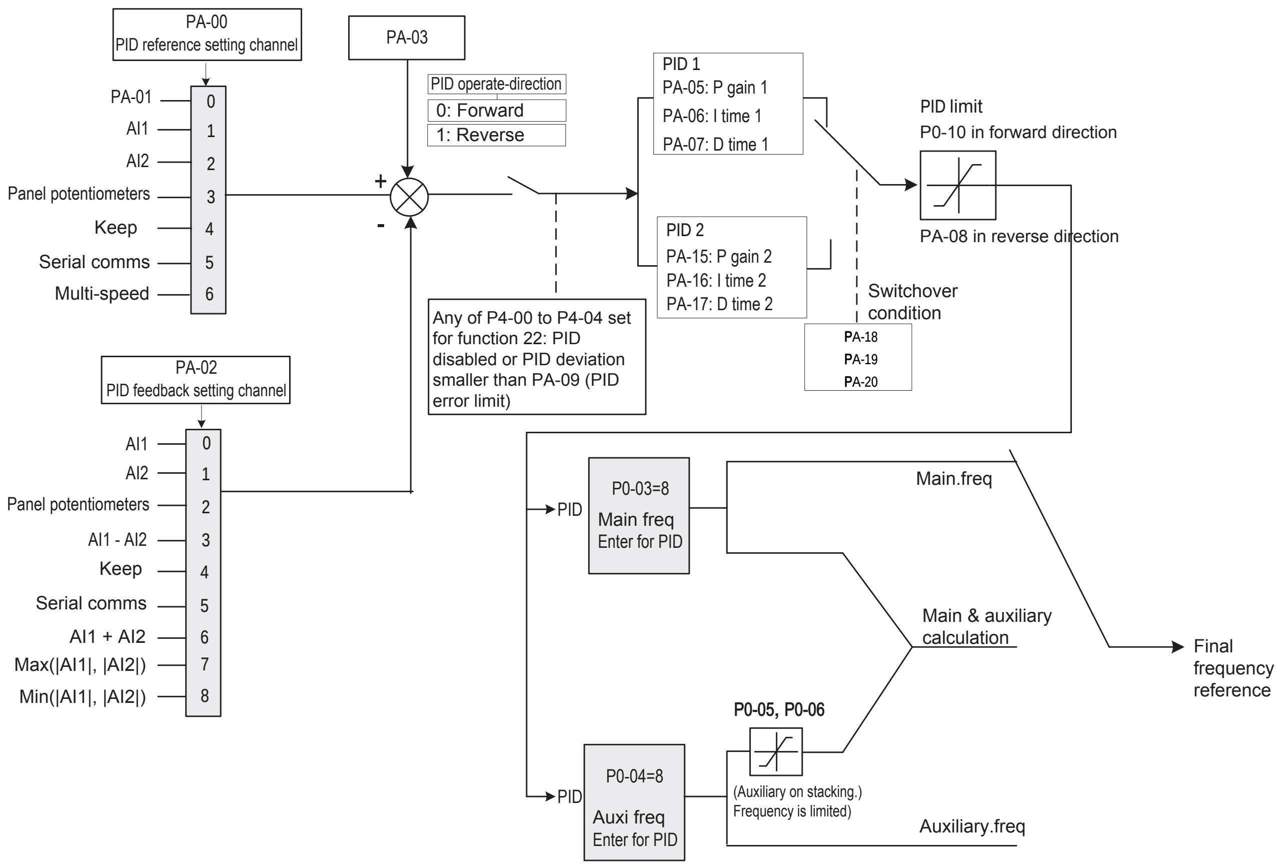


Figure 6-22 Block diagram of process PID control parameters

parameter	define	default	range	illustrate
PA-00	PID reference setting channel	0	0: Set by PA-01 1: AI1 2: AI2 3: Panel potentiometer 4: Keep 5: Serial comms. 6: Multi-speed	The target amount used to select the PID for a given channel. The set target amount of PID is relative, and the set 100% corresponds to 100% of the feedback signal of the controlled system. Note: When PA-00 selects 6 (multi-stage speed), PC-51 (multi-segment instruction 0 given mode) cannot select 5 (PID given).
PA-01	PID digital setting	50.0%	0.0%~100.0%	This parameter needs to be set when PA-00 is set to 0. 100% of this parameter corresponds to the maximum value of the feedback amount
PA-02	PID feedback setting channel	0	0: AI1 1: AI2 2: Panel potentiometer 3: AI1 - AI2 4: Keep 5: Serial comms. 6: AI1 + AI2 7: Max. (|AI1|, |AI2|) 8: Min. (|AI1|, |AI2|)	The feedback channel used to select the PID
PA-03	PID operation direction	0	0: Forward	If feedback signal is less than the given signal of the PID, output frequency of the inverter rises.
			1: Reverse	If feedback signal is larger than the given signal of the PID, output frequency of the inverter drops.
PA-04	PID reference and feedback range	1000	0~65535	For example, the parameter value is set to 1000 and the PID is given(0%~100%) and feedback (0~1000) linear correspondence.

parameter	define	default	range	illustrate
PA-05	Proportional gain Kp1	20.0	0.0~1000.0	Most systems can be adjusted using PI
PA-06	Integral time Ti1	2.00s	0.01s~10.00s	
PA-07	Differential time Td1	0.000s	0.000s~10.000s	
PA-08	PID output limit in reverse direction	2.00Hz	0.00~ Max.freq	When the frequency source is pure PID, the reverse cut-off frequency of PID is the minimum value of the current PID output, and when the frequency source is primary+PID, PA-08 acts on the main + PID as a whole and outputs the minimum frequency value after the "main + PID" operation.
PA-09	PID error limit	0.0%	0.0%~100.0%	It helps to balance the accuracy and stability of the system output
PA-10	PID differential limit	0.10%	0.00%~100.0%	In PID regulators, the differential can easily cause the system to oscillate, so the PID differential effect is generally limited to a small range, and PA-10 is used to set the range of the PID differential output.
PA-11	PID reference change time	0.00s	0.00s~650.00s	Refers to the time it takes for a given PID to change from 0.0% to 100.0%.
PA-12	PID feedback filter time	0.00s	0.00s~60.00s	The PID feedback is filtered, which is conducive to reducing the impact of feedback interference, but it will reduce the response performance of the process closed-loop system.
PA-13	PID output filter time	0.00s	0.00s~60.00s	The PID output frequency is filtered, which will attenuate the sudden change in the output frequency of the inverter, but will bring about the degradation of the response performance of the process closed-loop system.
PA-15	Proportional gain Kp2	20.0	0.0~1000.0	If it is used to switch between two sets of PID parameters, it can be switched through the DI terminal, or it can be switched automatically according to the deviation of the PID. The setting of parameters PA-15~PA-17 is similar to that of parameters PA-05~PA-07.
PA-16	Integral time Ti2	2.00s	0.01s~10.00s	
PA-17	Differential time Td2	0.000s	0.000s~10.000s	
PA-18	PID parameter switchover condition	0	0: No switchover	-
			1: Switchover via DI	DI terminal function selection to set to 43 (PID parameter switching terminal), when terminal is invalid, select group 1 (PA-05~PA-07), when terminal is active, select group 2 (PA-15~PA-17).
			2: Auto switchover based on PID error	The absolute value of the deviation between the given and feedback is less than the PID parameter switching deviation 1 (PA-19), and the PID selects parameter group 1. The absolute value of the deviation between the given and feedback is greater than the PID switching bias 2 (PA-20), and the PID selects parameter group 2. When the given deviation from the feedback is between the switching bias 1 and the switching bias 2, the PID parameter is the linear interpolation value of the two sets of PID parameters, as shown in Figure 6-23.
			3: Auto switchover based on running frequency	When the inverter runs between 0 and maximum frequency when it is selected to automatically switch according to the operating frequency, the PID parameter is the linear interpolation value of the two sets of PID parameters.
PA-19	PID error 1 for auto switchover	20.0%	0.00~PA-20	100% of this parameter corresponds to the maximum deviation from the feedback, if PA-18=2.
PA-20	PID error 2 for auto switchover	80.0%	PA-19~100.0%	
PA-21	PID initial value	0.0%	0.0%~100.0%	When the inverter is started, the PID outputs the initial value of the PID (PA-21), and the initial value of the PID is held for a time (PA-22), and the PID starts the closed-loop adjustment operation. Figure 6-21 shows the initial value of PID.
PA-22	PID initial value active time	0.00s	0.00s~650.00s	-
PA-25	PID integral property	00	one bit: Integral separation 0: Disabled 1: Enabled	When the integral separation is invalid, the integral separation is invalid regardless of whether the multi-function digital DI is valid or not. The integration separation is valid, and when the DI terminal integration pause (function 22) is in effect, the PID integration stops the calculation, and only the PID proportional and differential effects are in effect.
			Tens bit: Whether to stop integral when the PID output reache limit 0: Continue integral 1: Stop integral	After the output of the PID operation reaches the maximum or minimum value, you can choose to stop the integration effect, which helps to reduce the overshoot of the PID.

parameter	define	default	range	illustrate
PA-26	Detection level of PID feedback loss	0.0%	0.0%：Nodetection； 0.1%~100.0%；	-
PA-27	Detection time of PID feedback loss	0.0s	0.0s~20.0s	It is used to determine whether the PID feedback is missing. When the PID feedback quantity is less than the feedback loss detection value (PA-26) and the duration exceeds the PID feedback loss detection time (PA-27), the inverter fault alarm Err31 is called.
PA-28	Selection of PID operation at stop	0	0: Disabled 1: Enabled	This parameter is used to select whether the PID will continue to be calculated when the PID is in the shutdown state.In general applications, the PID should stop computation during a shutdown state.

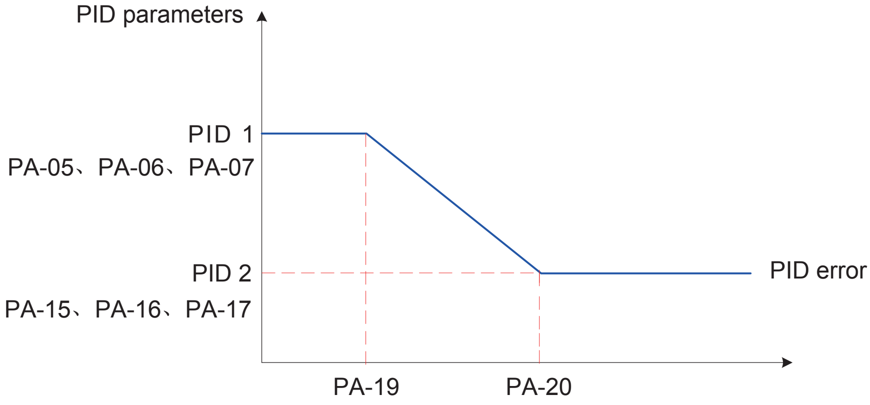


Figure 6-23 Switchover of two groups of PID parameters

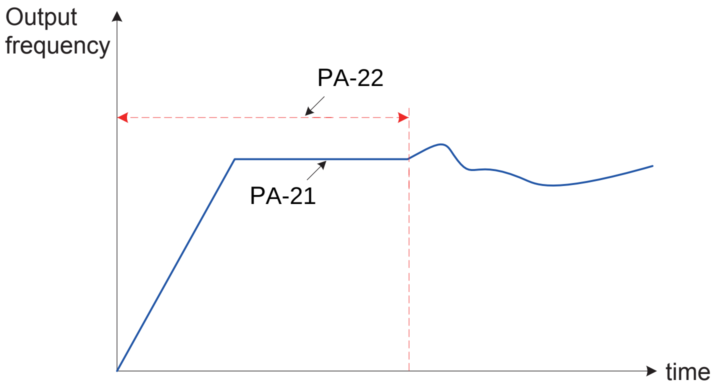


Figure 6-24 The PID initial value function

NOTE

For the upper and lower limits and range of the frequency output when PID is the dominant frequency, the following descriptions are made
(e.g., the frequency source is pure PID or primary + PID)

- When the reversal cut-off frequency is 0 or reversal is prohibited
  (i.e., any of the following three types)
  ①PA-08=0，P8-13=0； ②PA-08=0，P8-13=1； ③PA-08≠0，P8-13=1
  Output upper Limit: The upper of frequency
  Output lower Limit: The lower of frequency
  Output range: lower frequency ~ upper frequency (i.e. P0-14~P0-12)

- When the reversal cut-off frequency is not 0 and reversal is not prohibited
  (i.e., PA-08 ≠ 0,P8-13=0)
  Output upper Limit: The upper of frequency
  Output lower Limit: - Invert the cut-off frequency
  Output range: - Invert the cut-off frequency ~ upper frequency (i.e. -PA-08~P0-12)

6.2.8 Main Frequency via "Communication"

parameter P0-03=9 and select communication as the main frequency.

YD280 supports 1 host computer communication modes: Modbus. When using communication, you must install a communication card.

parameter	define	default	range
P0-28	Serial port communication protocol	0	0：Modbus protocol

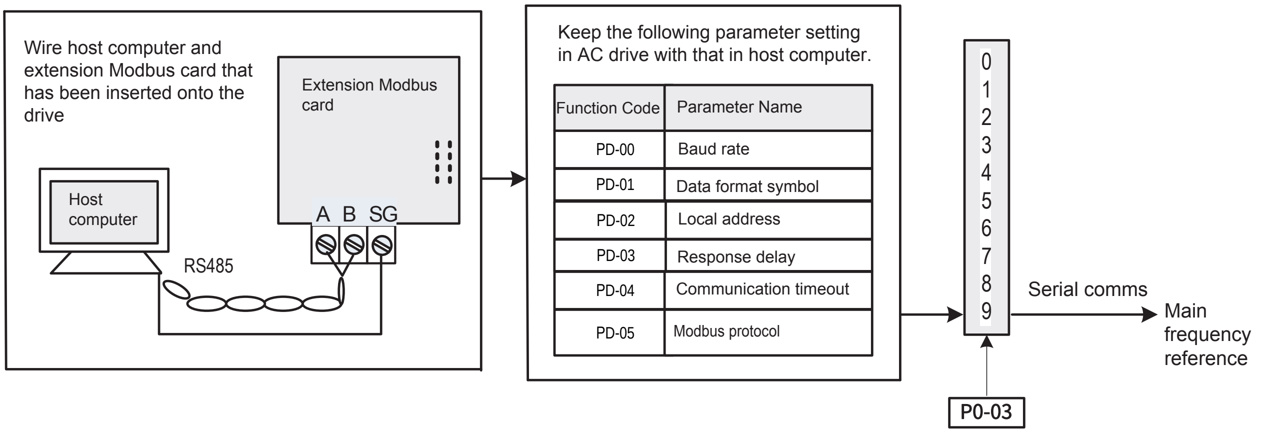


Figure 6-25 Communication is used as a parameter for the main frequency

When the frequency is given by the communication mode, the host computer should send a write command to the inverter. The following is an example of the Modobus protocol to illustrate the process of communicating a given master frequency.

For example, if the frequency is set to 10000 using a given communication method, the write command is 01 06 10 00 27 10 97 36. The meaning of each byte is as follows: Inverter address: 01H (can be set), write command: 06H, address of a given frequency: 1000H, target frequency value: 2710H (converted to decimal 10000), CRC check: 9736H.

Similarly, when the frequency is set to -10000 in a given mode of communication, the write command is 01 06 10 00 D8 F0 D7 4E. where D8F0 -10000 is converted to hexadecimal and takes the lower four digits.

NOTE

- The range of the given frequency of the communication method is -10000 ~ +10000 (decimal), and the corresponding frequency range is -100.00%~+100.00% (-100.00% corresponds to the negative maximum frequency, +100.00% corresponds to the maximum frequency).
- Assume P0-10 "maximum frequency"Set to 50Hz, if the frequency value written in the write command is 2710H, convert the decimal to 10000. The actual write frequency is 50*100%=50Hz.

master command		response from slavor	
ID address	01H	ID address	01H
CMD	06H	CMD	06H
Parameter address H-BYTE	10H	Parameter address H-BYTE	10H
Parameter address L-BYTE	00H	Parameter address L-BYTE	00H
Data content H-BYTE	27H	Data content H-BYTE	27H
Data content L-BYTE	10H	Data content L-BYTE	10H
CRC H-BYTE	97H	CRC H-BYTE	97H
CRC L-BYTE	36H	CRC L-BYTE	36H

6.2.9 Method for Auxiliary Frequency Commands

Set the parameter P0-04 and select the input of the auxiliary frequency command. There are 10 kinds of auxiliary frequency instructions of the inverter, which are digital setting (no memory when power off), digital setting (memory when power down), AI1, AI2, pulse input, multi-segment instruction, simple PLC, PID, Panel potentiometers and communication given. As shown in the image:

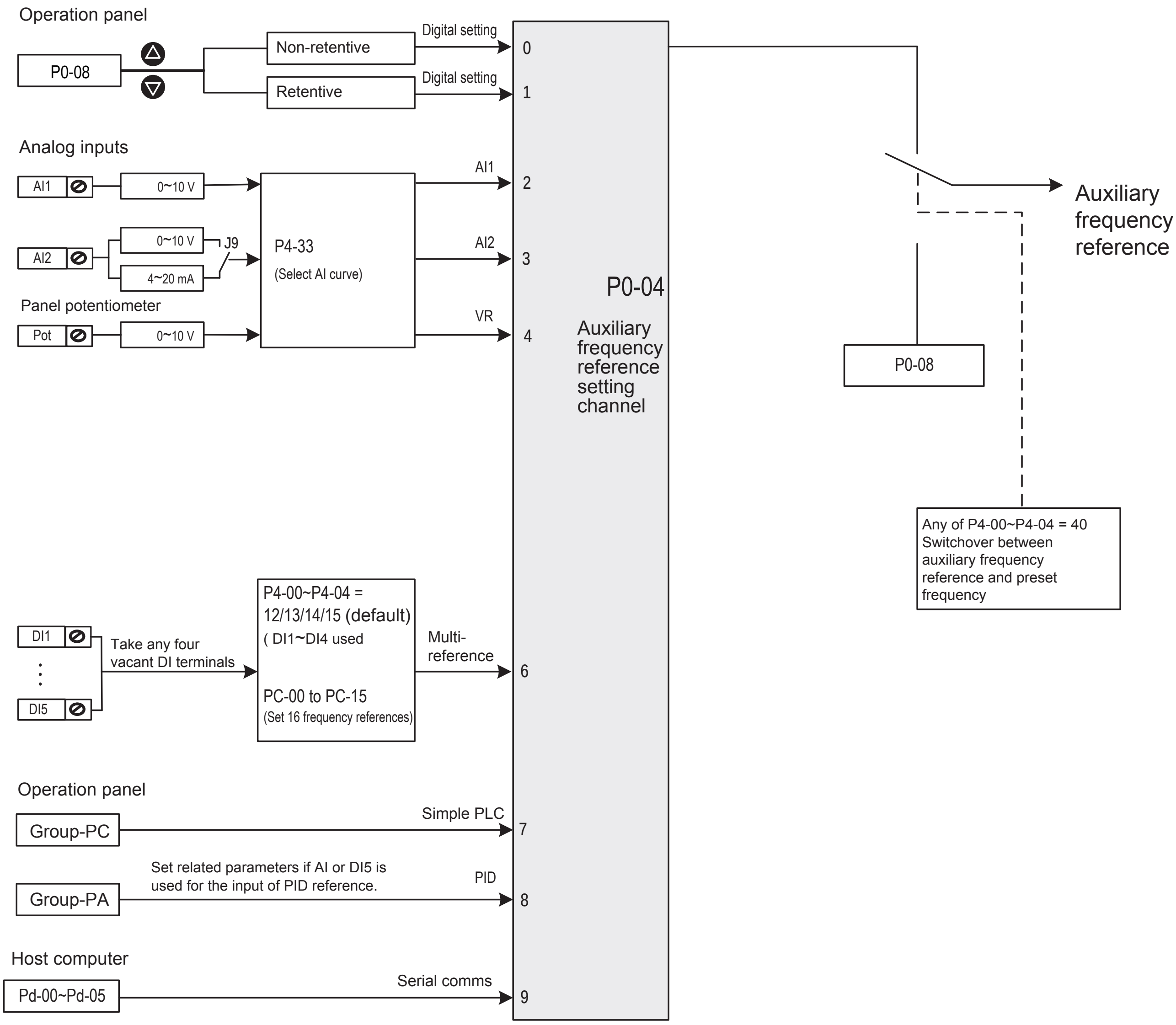


Figure 6-26 select a proper channel to set auxiliary frequency reference

parameter	define	default	range	illustrate
P0-04	Auxiliary frequency reference setting channel selection	0	0	Digital setting (non-retentive at power down)
			1	Digital setting (retentive at power down)
			2	AI1
			3	AI2
			4	Panel potentiometer
			5	Keep
			6	Multi-reference
			7	Simple PLC
			8	PID reference
			9	Serial comms

When used as an independent frequency-given channel, the auxiliary frequency command is used in the same way as the main frequency instruction, which can be used in subsection 6.2.10. When the auxiliary frequency instruction is used as an overlay given (i.e., a composite implementation frequency given of the main frequency instruction and the auxiliary frequency instruction), the use of the auxiliary frequency instruction can be described in subsection 6.2.11.

6.2.10 Method for Master and Auxiliary superposition

Set the relationship between the target frequency and the primary and secondary frequency commands by setting the parameter P0-07. There are 4-types of relationships:

1. Main frequency command: The main frequency is directly given as the target frequency
2. Auxiliary frequency command: The auxiliary frequency is directly given as the target frequency
3. Main and auxiliary operations: There are 4 situations of main and auxiliary operations, which are

   case1:main + auxiliary,
   case2:main - auxiliary,
   case3:main and auxiliary take the larger value,
   case4:main and auxiliary take the smaller value

4. Frequency switching: the above 3 types, selected or switched by DI. The function of DI is set to 18 (frequency command switching).

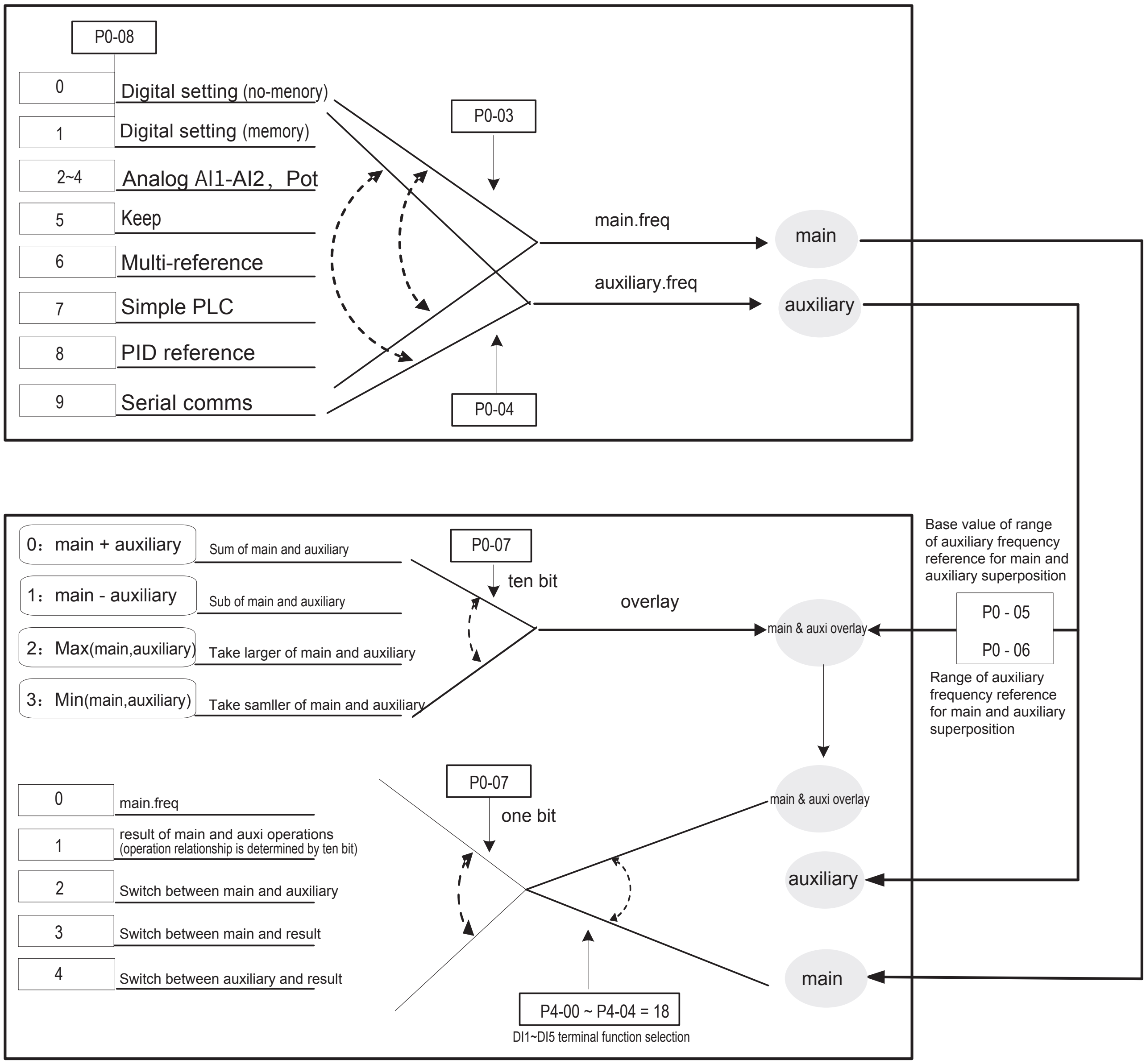


Figure 6-27 Frequency commands are overlay on the main and auxiliary frequency commands

parameter	define	default	range
P0-07	Frequency command overlay selection	00	one bit：Frequency command selection 0：main frequency 1：result of main and auxiliary operations (operation relationship is determined by ten bit) 2：Switch between main and auxiliary 3：Switch between main and result 4：Switch between auxiliary and result ten bit：relationship between main and auxiliary freq 0：main + auxiliary 1：main - auxiliary 2：Max (main,auxiliary) 3：Min (main,auxiliary)
P0-05	Auxiliary frequency command range selection when overlay	0	0：Relative to the maximum frequency 1：Relative to the main frequency instruction
P0-06	Auxiliary Frequency Command Range When overlay	100%	0%~150%

- When main and auxiliary frequencies are compounded to achieve a given frequency, it is necessary to pay attention to:
- 1. When the auxiliary frequency is digital, the preset frequency (P0-08) does not work, and the user adjusts the frequency by UP/DOWN of the keys of the keyboard △ and ▽ key /or terminals.
- 2. When the auxiliary frequency is analog (AI1, AI2, Pot) or pulse given, the input set 100% corresponds to the auxiliary frequency range, which can be set by P0-05 and P0-06.
- 3. The auxiliary frequency and main frequency cannot be set to the same channel, that is, P0-03 and P0-04 should not be set to the same value, otherwise it is easy to cause confusion.

6.2.11 Run Command Binding Master Frequency

By setting P0-27, there are 3 types of operation commands that can be set to their respective frequency commands, as shown in the figure below. The command can be switched at any time with the main frequency. This function defines a combination between 3 running commands and 9 frequency givens. When the specified command channel (P0-02) is set with a frequency-bound channel (P0-27 corresponding bit), P0-03 does not work, but is determined by the frequency given channel specified by P0-27.

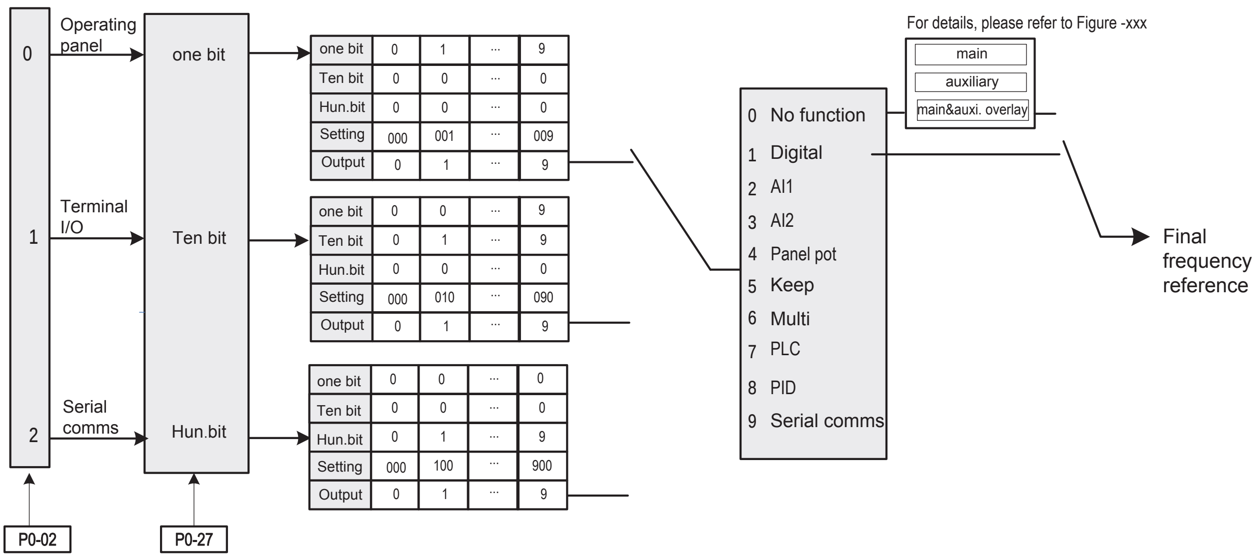


Figure 6-28 Running instructions are bound to the main frequency command

parameter	define	default	range
P0-27	Run command bundles main frequency instruction selection	000	one bit: panel binds main freq. cmd selection 0： No binding 1： Digital setting 2： AI1 3： AI2 4： Panel potentiometers 5： Keep 6： Multi-speed 7： Simple-PLC 8： PID 9： Communication settings tens bit: terminal binds main freq. cmd selection Hundred bit: comm. binds main freq. cmd selection

6.2.12 Frequency Command Limit (Frequency Setting)

Upper frequency: limit the maximum frequency, do not allow the motor to run above a certain frequency;

Lower frequency: limit the minimum frequency , do not allow the motor to run below a certain frequency;

Maximum Frequency: Limit the maximum output frequency;

Upper Frequency Selection: Used to select a given channel for the upper frequency of the upper limit;

Upper Frequency Offset: An offset used to set the upper frequency offset.

parameter	define	default	range
P0-10	Maximum Frequency	50.00 Hz	50.00Hz~500.00Hz
P0-11	Upper Frequency Selection	0	0： P0-12 setting 1： AI1 2： AI2 3： Panel potentiometers 4： Keep 5： Communication given
P0-12	Upper frequency	50.00Hz	Lower Frequency (P0-14) ~ Upper Frequency (P0-10)
P0-13	Upper Frequency Offset	0.00Hz	0.00Hz~ Maximum Frequency P0-10
P0-14	Lower frequency	0.00Hz	0.00Hz~ Upper frequency

6.2.13 Below the Lower Limit Frequency Setting

Set the frequency below the lower limit frequency to run the action: if the running frequency is lower than the lower frequency, to select the operating state of the inverter, set the parameter P8-14.

Zero-speed operation: the inverter is in the running state, the output frequency is 0, and the operation panel RUN light is on.

Stopping: The inverter does not run, and the operation panel RUN light is off.

parameter	define	default	range	illustrate
P8-14	Running mode when frequency reference lower than frequency lower limit	0	0： Run at Lower frequency	Run at frequency reference lower limit
			1： Stop	If the operation is below the lower frequency, the drive will be shut down
			2： Run at zero speed	If the operation is below the lower frequency, the drive will be zero speed

6.3 Start-stop method

This section describes how to start/stop the AC drive.

6.3.1 Startup Method

You can set start mode of the AC drive in P6-00, direct start, catching a spinning motor, preexcited start or SVC quick start.

parameter	define	default	range	illustrate
P6-00	Start mode	0	0: Direct start 1: Catching a spinning motor 2: Pre-excited start 3: Magnetic field orientation	If you need to start a motor that is spinning at high speed, it is recommended to use speed tracking to start again, and pre-excitation start PS:(2,3 item can only be used for T4(380V) machines)
P6-01	Mode of catching a spinning motor	0	0: From stop frequency 1: From 50 Hz 2: From max.frequency	-
P6-02	Speed of catching a spinning motor	20	20	-
P6-03	Start frequency	0.00Hz	0.00Hz~10.00Hz	When the given frequency is less than the starting frequency, the inverter does not start and is in standby mode.
P6-04	Start frequency holding time	0.0s	0.0s~ 100.0s	This parameter does not work during forward and reverse switching. The start-up frequency hold time is not included in the acceleration time, but is included in the runtime of the simple PLC.
P6-05	DC injection braking 1 level /Pre-excitation level	50%	0%~ 100%	The larger the DC braking current, the greater the braking force, 100% corresponds to the rated current of the motor (the upper limit of the current is 80% of the rated current of the inverter).
P6-06	DC injection braking 1 active time /Pre-excitation active time	0.0s	0.0s~ 100.0s	Activating DC braking is only effective when the starting mode is direct start.

1) Direct Start

Set the parameter P6-00=0, the inverter is directly started, which is suitable for most loads, as shown in Figure 6-29. Adding "starting frequency" before starting is suitable for lifting load occasions such as elevators and lifting, as shown in Figure 6-30. Adding "DC braking" before starting is suitable for occasions when the motor may rotate during starting, as shown in Figure 6-31.

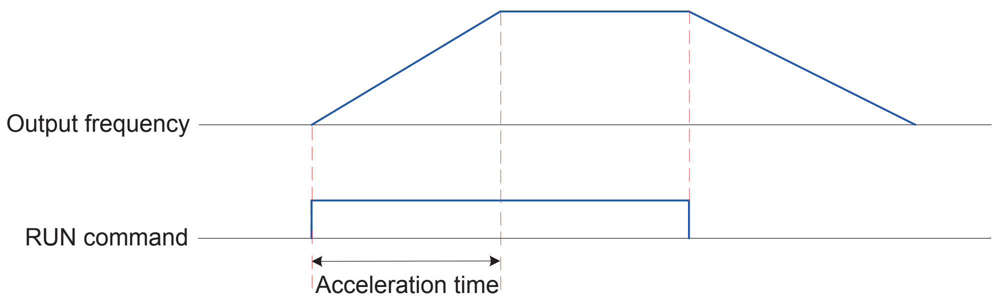


Figure 6-29 Sequence of direct start

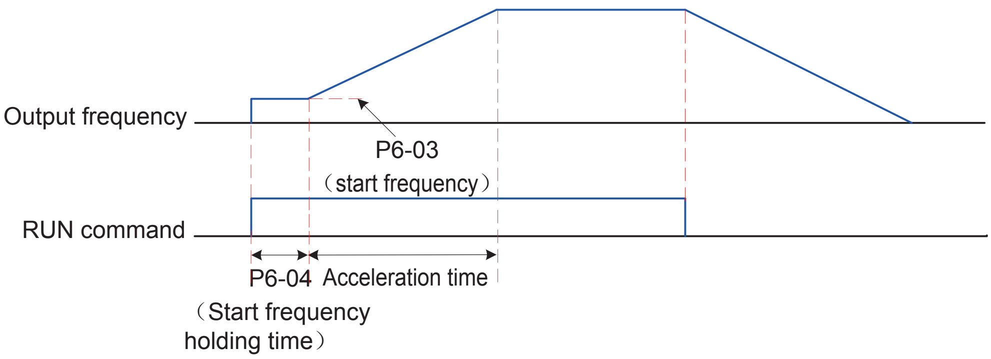


Figure 6-30 Sequence of start with start frequency

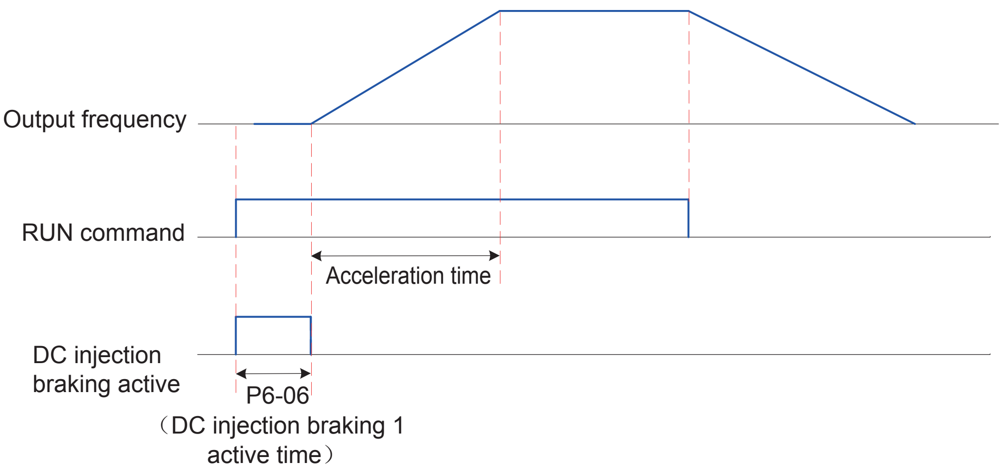


Figure 6-31 Sequence of start with DC injection braking

2） Catching a Spinning Motor

Set P6-00=1, the inverter is speed tracking and then start (the inverter first judges the speed and direction of the motor, and then starts with the frequency of the tracked motor) is suitable for the drive of large inertial mechanical loads, if the inverter starts running, the load motor is still running by inertia, and the speed tracking is taken to start again, which can avoid the occurrence of overcurrent starting. This startup method is only valid in vector control mode.The frequency curve of the start-up process is shown below:

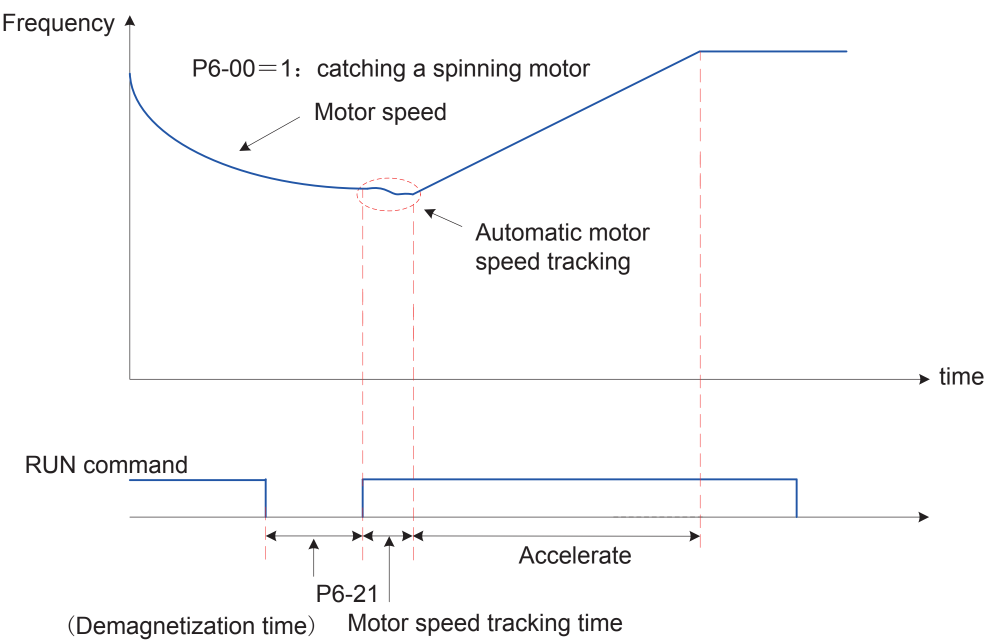


Figure 6-32 Catching a spinning motor

3） Pre-excited Start

Set P6-00=2, the inverter is pre-excited start, this mode is only applicable to the SVC control mode of asynchronous motor, pre-excitation of the motor before starting, can improve the fast response of the motor and reduce the starting current, the starting sequence is consistent with the DC braking restart.

4） SVC quick start

Set P6-00=3, this mode is only applicable to the SVC control mode of the asynchronous machine, which can shorten the acceleration time, and can enable the mode when the system inertia is large and needs to be started quickly, but there will be torque impact.

6.3.2 Stopping Method

There are two stopping methods for the inverter, which are deceleration parking and free parking. Set parameter P6-10 Select the stop method of the inverter.

parameter	define	default	range	illustrate
P6-10	Stop mode	0	0: Decelerate to stop 1: Coast to stop	
P6-11	DC injection braking 2 start frequency	0.00Hz	0.00 Hz to max.freq	During the deceleration shutdown, when the operating frequency is reduced to this frequency, the DC braking process begins.
P6-12	DC injection braking 2 delay time	0.0s	0.0s~ 100.0s	After the operating frequency is reduced to the starting frequency of DC braking when the machine is stopped, the inverter stops the output for a period of time before starting the DC braking process.
P6-13	DC injection braking 2 level	50%	0%~ 100%	The larger the DC braking current, the greater the braking force, 100% corresponds to the rated current of the motor (the upper limit of the current is 80% of the rated current of the inverter)
P6-14	DC injection braking 2 active time	0.0s	0.0s~ 100.0s	The DC braking process is canceled when the DC braking time is 0.

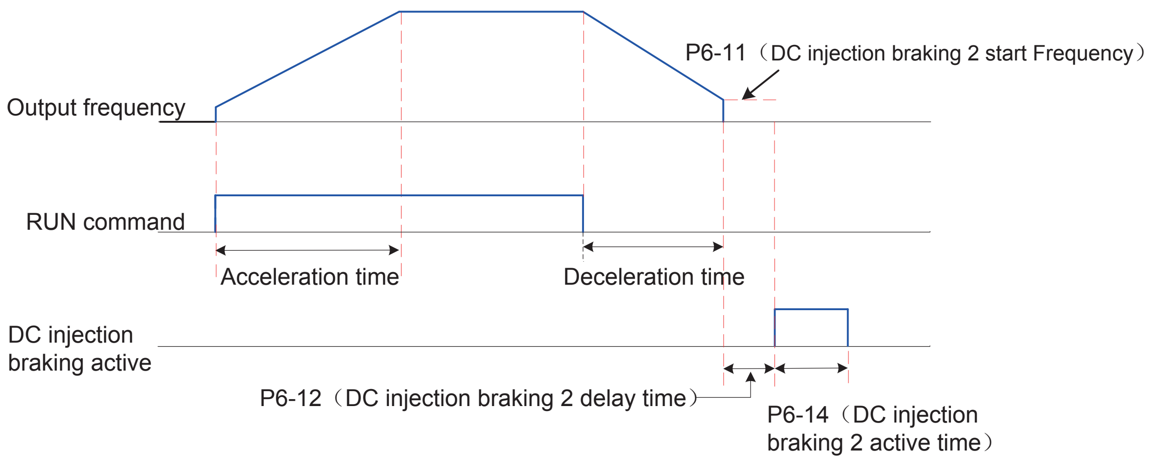


Figure 6-33 Decelerate to stop

1） Decelerate to Stop

Set P6-10=0, the inverter decelerates and stops. (After the shutdown command is valid, the inverter will reduce the output frequency according to the deceleration time, and stop after the frequency drops to 0)

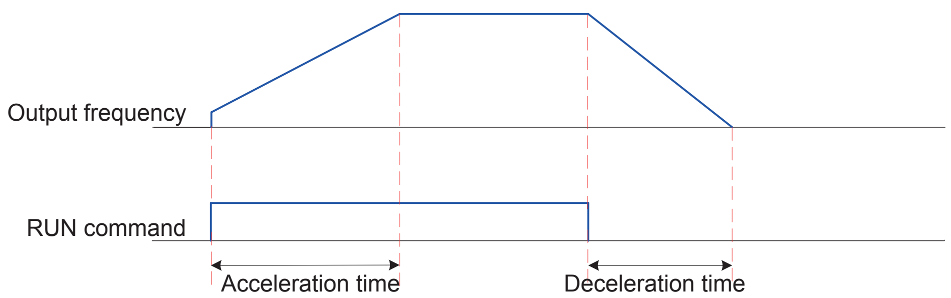


Figure 6-34 Decelerate to stop

2） Coast to Stop

Set P6-10=1, the inverter is free to stop. (After the stop command is effective, the inverter immediately terminates the output, and the motor stops freely according to the mechanical inertia）

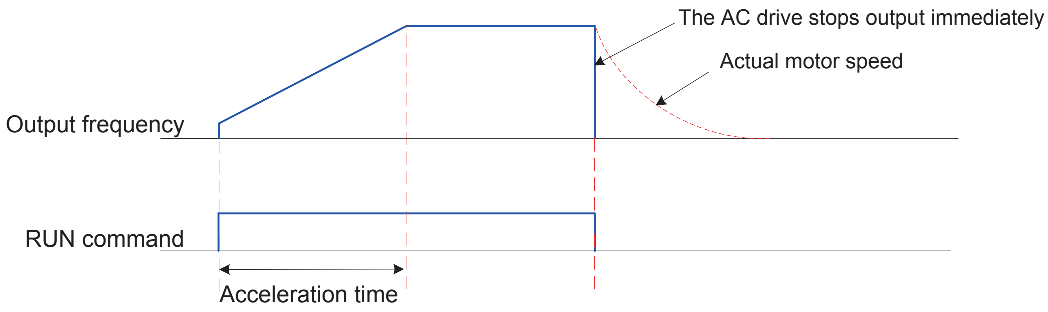


Figure 6-35 Free-parking sequence diagram

6.3.3 Acceleration/Deceleration time & curve set

Acceleration time refers to the time it takes for the inverter to accelerate from zero frequency to the acceleration and deceleration reference frequency (P0-25), and deceleration time refers to the time it takes for the inverter to decelerate from the "acceleration and deceleration reference frequency (P0-25)" to the zero frequency.

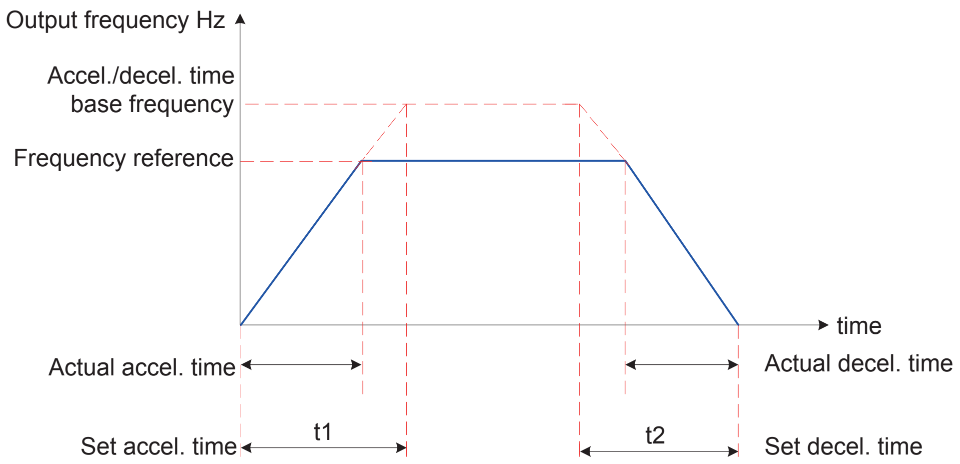


Figure 6-36 Acceleration/Deceleration time

YD280 provides 4 sets of acceleration and deceleration times, which can be switched by using the digital input terminal DI.

DI5	DI4	Accel/Decel Time Selection
OFF	OFF	Accel/Decel time 1：P0-17、P0-18
OFF	ON	Accel/Decel time 2：P8-03、P8-04
ON	OFF	Accel/Decel time 3：P8-05、P8-06
ON	ON	Accel/Decel time 4：P8-07、P8-08

Table 6-2 Selecting acceleration and deceleration times by DI

parameter	define	default	range	illustrate
P0-17	Acceleration time 1	depending on model	0s~65000s	P0-19=0
			0.0s~6500.0s	P0-19=1
			0.00s~650.00s	P0-19=2
P0-18	Deceleration time 1	depending on model	0s~65000s	P0-19=0
			0.0s~6500.0s	P0-19=1
			0.00s~650.00s	P0-19=2
P8-03	Acceleration time 2	depending on model	range is the same as P0-17	-
P8-04	Deceleration time 2	depending on model	range is the same as P0-18	-
P8-05	Acceleration time 3	depending on model	range is the same as P0-17	-
P8-06	Deceleration time 3	depending on model	range is the same as P0-18	-
P8-07	Acceleration time 4	0.0s	range is the same as P0-17	-
P8-08	Deceleration time 4	0.0s	range is the same as P0-18	-
P0-19	Acceleration/ Deceleration time unit	1	0：1 S 1：0.1 S 2：0.01 S	When this parameter is modified, the number of decimal places displayed for the 4 sets of acceleration and deceleration times changes.
P0-25	Acceleration/ Deceleration time base frequency	0	0：Max.Fequ (P0-10) 1：Frequency reference 2：100Hz	-
P6-07	Acceleration/ Deceleration mode	0	0: Linear acceleration /deceleration 1: Static S-curve acceleration/ deceleration 2: Dynamic S-curve acceleration/ deceleration	Select the way the frequency of the inverter changes during the start and stop process. 0: The output frequency increases or decreases in a straight line. 1, 2: In the case of real-time dynamic change of the target frequency, the output frequency increases or decreases in real time according to the S-curve. It is suitable for high comfort requirements and quick real-time response occasions.
P6-08	Time proportion of S-curve start segment	30.0%	0.0%~(100.0%-P6-09)	Parameters P6-08 and P6-09 are to meet: P6-08+P6-09 ≤ 100.0%.
P6-09	Time proportion of S-curve end segment	30.0%	0.0%~(100.0%-P6-08)	-

6.4 Auto Tuning

Auto Tuning:You can obtain parameters of controlled motor through motor auto-tuning.
The methods of asynchronous motor tuning are: static part parameter tuning, dynamic complete tuning, stationary complete tuning.

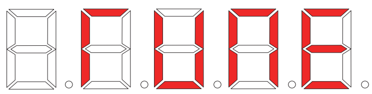
parameter	define	default	range	illustrate
P1-37	asyn-Motor auto-tuning method selection	0	0：No auto-tuning	does not work
			1：Static auto-tuning 1	Only Stator resistance, rotor resistance, leakage inductance
			2：Dynamic auto-tuning	Identify all motor parameters
			3：Static auto-tuning 2	All motor parameters are recognized

The following table compares the tuning effects of several tuning methods:

Tuning method	Availability	effect
Static auto-tuning 1	It is difficult to detach the motor from the load, and dynamic tuning operation is not allowed	general
Dynamic auto-tuning	When the motor is conveniently separated from the application system	best
Static auto-tuning 2	It is difficult to detach the motor from the load, and it is not allowed to operate in full dynamic tuning	better

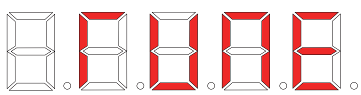
The following describes the method of motor tuning using the parameters of motor 1 (P0-24 set to 0, motor parameter group 1) as an example. If you want to tune the motor 2, first set P0-24 to 1 (motor parameter group 2), the tuning method of motor 2 is similar to that of motor 1, and the relevant parameters refer to A2 group.

1) Static part parameters tuning method of asynchronous motor

step	process
Step 1	After powering on, select inverter operation command as the panel (P0-02 is set to 0)
Step 2	Accurate input of motor nameplate parameters (P1-00~P1-05)
Step 3	asyn-motor P1-37 is set to 01 (Static auto-tuning 1), press ENTER to confirm, and display 
Step 4	Press the RUN key on the panel. The motor does not rotate, and the running indicator light is on. When the TUNE message disappears, the normal parameter display status is returned, indicating that the tuning is complete. The inverter will automatically calculate the value of P1-06~ P1-08(asyn-motor)

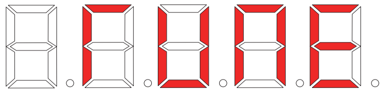
2) Dynamic complete tuning method of asynchronous motor

When using a motor with constant output characteristics and high-precision applications, it is necessary to perform dynamic complete tuning under a separate load state for optimal tuning.

step	process
Step 1	After powering on, select inverter operation command as the panel (P0-02 is set to 0)
Step 2	Accurate input of motor nameplate parameters (P1-00~P1-05)
Step 3	asyn-motor P1-37 is set to 02 (Dynamic auto-tuning), press ENTER to confirm, and display 
Step 4	Press the RUN key on the panel. The motor does acceleration, deceleration, forward/ reverse operation, and the running indicator light is on. When the TUNE message disappears, the normal parameter display status is returned, indicating that the tuning is complete. The inverter will automatically calculate the value of P1-06~ P1-10 .

3) Static complete parameters tuning method of asynchronous motor .

In a state where the load cannot be separated, use an asynchronous motor to the full tuning.

step	process
Step 1	After powering on, select inverter operation command as the panel (P0-02 is set to 0)
Step 2	Accurate input of motor nameplate parameters (P1-00~P1-05)
Step 3	Parameter P1-37 is set to 3 (Static auto-tuning 2), press ENTER key to confirm, and display 
Step 4	Press the RUN key on the panel. The motor does not rotate, and the running indicator light is on. When the TUNE message disappears, the normal parameter display status is returned, indicating that the tuning is complete. The inverter will automatically calculate the value of P1-06~ P1-10.

NOTE

- In addition to the above three ways, motor tuning can also be manually entered in motor parameters.
- In addition to the operation instructions through the operation panel, the motor can also be tuned through the communication command. Select the Run command by setting P0-02.

parameter	define	default	range	illustrate
P1-00	Motor type selection	0	0: Common asynchronous motor	--
			1: Variable frequency asynchronous motor	--
P1-01	Rated power	on model	0.1kW~1000.0kW	P1-00~P1-05 is the motor nameplate ginseng Number. In the use of V/F, SVC control time, in order to get better control performance, the motor parameters need to be adjusted harmonic, and the accuracy of the tuning results,Closely related to the correct setting of motor nameplate arameters Relevance.
P1-02	Rated voltage	on model	1V~2000V	
P1-03	Rated current	on model	0.01A~655.35A	
P1-04	Rated frequency	on model	0.01Hz~ max. frequency	
P1-05	Rated speed	on model	1rpm~65535rpm	
P1-06	Stator resistance	on model	0.001Ω~65.535Ω	P1-06~P1-10 is an asynchronous motor Parameters, which can be obtained by motor tuning. Among them, the asynchronous machine is stationary part of the parameters Tuning can only get P1-06~P1-08 3 parameters, the asynchronous machine is dynamic and complete Tunable to obtain P1-06~P1-10. If the motor is not tuned on site, the above corresponding parameters can be input according to the parameters provided by the motor manufacturer.
P1-07	Rotor resistance	on model	0.001Ω~65.535Ω	
P1-08	Leakage inductive reactance	on model	0.01mH~655.35mH	
P1-09	Mutual inductive reactance	on model	0.1mH~6553.5mH	
P1-10	No-load current	on model	0.01A~P1-03	

6.5 Control Performance

6.5.1 Setting the V/F Curve

1) Linear, Multi-point and Square V/F Curve

parameter	define	default	range	illustrate
P3-00	V/F curve setting	0	0: Linear V/F 1: Multi-point V/F 2~9: Linear V/F (T4 only) 2: Square V/F (T2S only) 3: 1.2-power V/F (T2S only) 4: 1.4-power V/F (T2S only) 6: 1.6-power V/F (T2S only) 8: 1.8-power V/F (T2S only) 9: Reserved 10: V/F complete separation 11: V/F half separation	-
P3-01	Torque boost	on model	0.0%~30.0%	-
P3-02	Cut-off frequency of torque boost	50.00Hz	0.00Hz~ max. frequency	-
P3-03	Multi-point V/F frequency 1	0.00Hz	0.00Hz~P3-05	-
P3-04	Multi-point V/F voltage 1	0.0%	0.0%~100.0%	
P3-05	Multi-point V/F frequency 2	0.00Hz	P3-03~P3-07	
P3-06	Multi-point V/F voltage 2	0.0%	0.0%~100.0%	
P3-07	Multi-point V/F frequency 3	0.00Hz	P3-05~ Rated frequency (P1-04)	
P3-08	Multi-point V/F voltage 3	0.0%	0.0%~100.0%	

- General constant-torque linear V/F curve

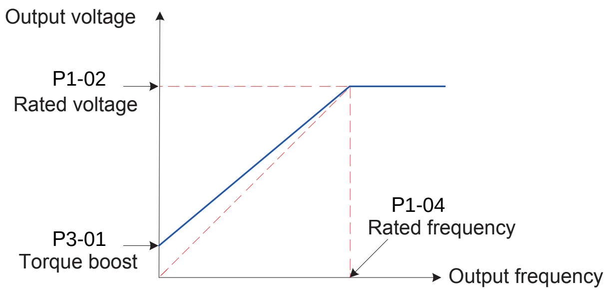


Figure 6-37 General constant-torque linear V/F curve

Below the rated frequency, the output voltage changes linearly with the frequency, which is suitable for general mechanical transmission applications such as large inertia fan acceleration, punch press, centrifuge, water pump, etc.

- User-defined Multi-point V/F curve

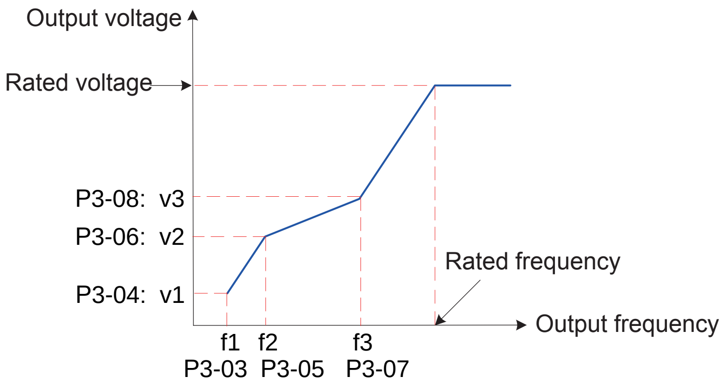


Figure 6-38 User-defined Multi-point V/F curve

P3-03 ~ P3-08 Six parameters define a multi-point V/F curve, the frequency point setting range is 0.00Hz ~ motor rated frequency, the voltage point setting range is 0.0%~100%, corresponding to 0V~ motor rated voltage, the setting value of multi-point V/F curve is usually set according to the load characteristics of the motor. Make sure to set it as follows: P3-03 ≤ P3-05 ≤ P3-07. In order to ensure that the setting is correct, the inverter restricts the relationship between the upper and lower limits of the frequency points P3-03, P3-05 and P3-07, and sets P3-07 first, then P3-05, and finally sets it when setting P3-03；

2） V/F Separation Curve

parameter	define	default	range	illustrate
P3-13	Voltage source for V/F separation	0	0: Set by (P3-14) 1: AI1 2: AI2 3: Panel potentiometers 4: Keep 5: Multi-reference 6: Simple PLC 7: PID reference 8: Serial comms. note：100.0% corresponds to the rated voltage	-
P3-14	Digital setting of voltage for V/F separation	0V	0V~ motor rated voltage	In V/F semi-split mode, the output voltage is 2 times the set value
P3-15	Voltage rise time of V/F separation	0.0s	0.0s~1000.0s note:The time takes 0V to change to rated voltage	This parameter does not work in V/F semi-split mode, and the voltage acceleration time is the same as P0-17

parameter	define	default	range	illustrate
P3-16	Voltage decline time of V/F separation	0.0s	0.0s~1000.0s note:The time takes 0V to change to rated voltage	This parameter does not work in V/F semi-split mode, and the voltage deceleration time is the same as P0-18
P3-17	Stop mode selection for V/F separation	0	0: Frequency and voltage declining to 0 independently 1: Frequency declining after voltage declines to 0	-

Voltage rise time of V/F separation indicates time required by voltage to rise from 0 to rated motor voltage. See Fig 6-39 t1。

Voltage decline time of V/F separation indicates time required by voltage to decline from rated motor voltage to 0. See 6-39 t2。

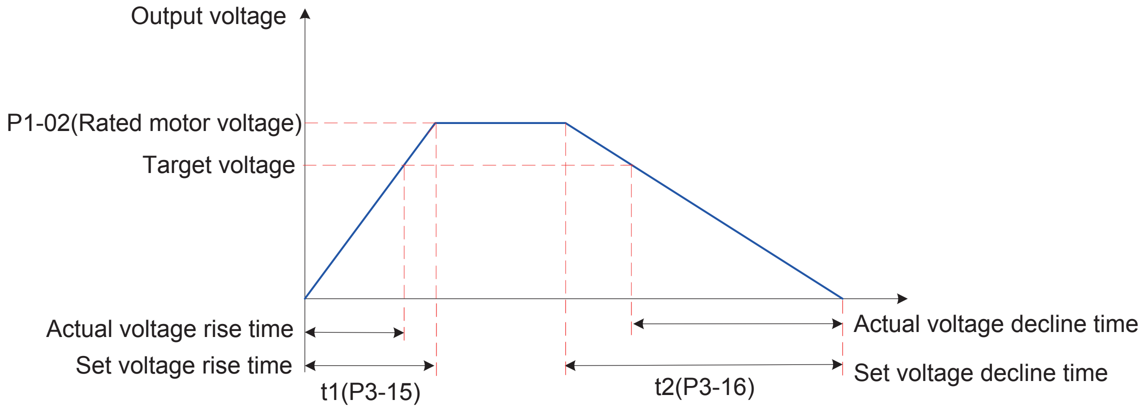


Figure 6-39 V/F separation

6.5.2 Inverter Output Current (Torque) Limit

In the process of acceleration, constant speed and deceleration, if the current exceeds the over-run-out action current (factory value 150%, indicating 1.5 times of the rated current of the inverter), the over-run-out will work, and the output frequency will begin to decrease, until the current returns below the over-run-out speed point, the frequency will begin to accelerate upwards to the target frequency, and the actual acceleration time will be automatically extended, if the actual acceleration time can not meet the requirements, you can appropriately increase the "P3-18 over-run-out speed loss action current".

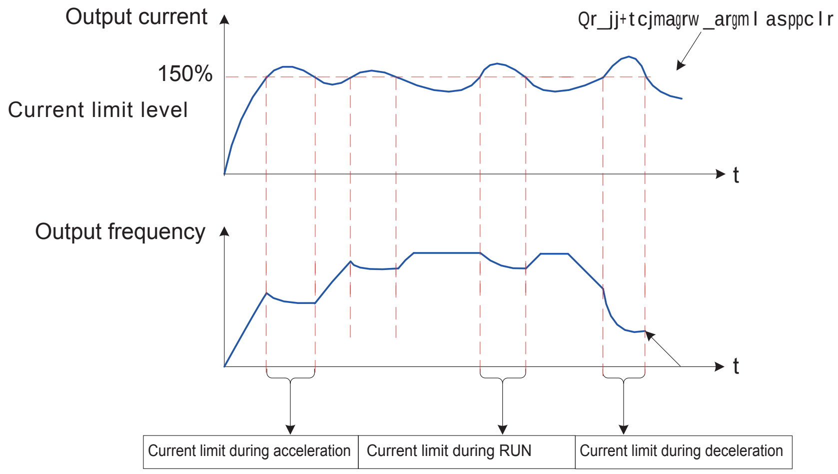


Figure 6-40 Current limit

parameter	define	default	range	illustrate
P3-18	Current limit level	150%	50%~200%	The current that stall-velocity loss suppression action

P3-19	Current limit selection	1	0，1	0: Disabled
P3-20	Current limit gain	20	0~100	If the current exceeds the over-velocity current point, over-velocity reduction will work,The actual acceleration time is automatically extended.
P3-21	Compensation factor of speed multiplying current limit	50%	50%~200%	Reduce high-speed stall-level and deceleration operating current, the compensation factor is 50% and is ineffective.The operating current in the weak field corresponds to 100% of the recommended setting value of P3-18.

In the high-frequency area, the motor driving current is smaller, relative to the rated frequency below, the same stall current, the speed of the motor drops greatly, in order to improve the running characteristics of the motor, the stall action current above the rated frequency can be reduced, in some centrifuges and other operating frequency is higher, several times the weak magnetic field is required and the load inertia is larger, this method has a good effect on the acceleration performance, can effectively prevent the motor from stalling.

The current limit level above rated frequency = (fs/fn) x k x LimitCur.

- fs: running frequency
- fn: rated motor frequency
- k: compensation factor of speed multiplying current limit level (P3-21)
- LimitCur: current limit level (P3-18)

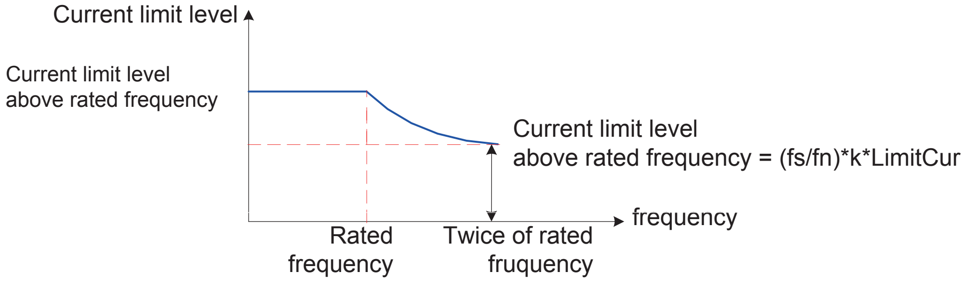


Figure 6-41 Current limit above rated frequency

NOTE

- Current limit level 150% indicates 1.5 times of rated current of the AC drive. For high-power motor with carrier frequency below 2 kHz, lower the current limit level. This is because the overcurrent fast prevention function is enabled in advance of the current limit function due to increase of pulsating current, which will result in insufficient torque output.

6.5.3 Inverter overvoltage stall suppression

If the bus voltage exceeds the overvoltage stall action voltage (P3-22), it means that the electromechanical system has been in the state of power generation (motor speed> output frequency), the overvoltage stall will play a role, adjust the output frequency, the actual deceleration time will be automatically extended, to avoid tripping protection, if the actual deceleration time can not meet the requirements, the overexcitation gain can be appropriately increased.

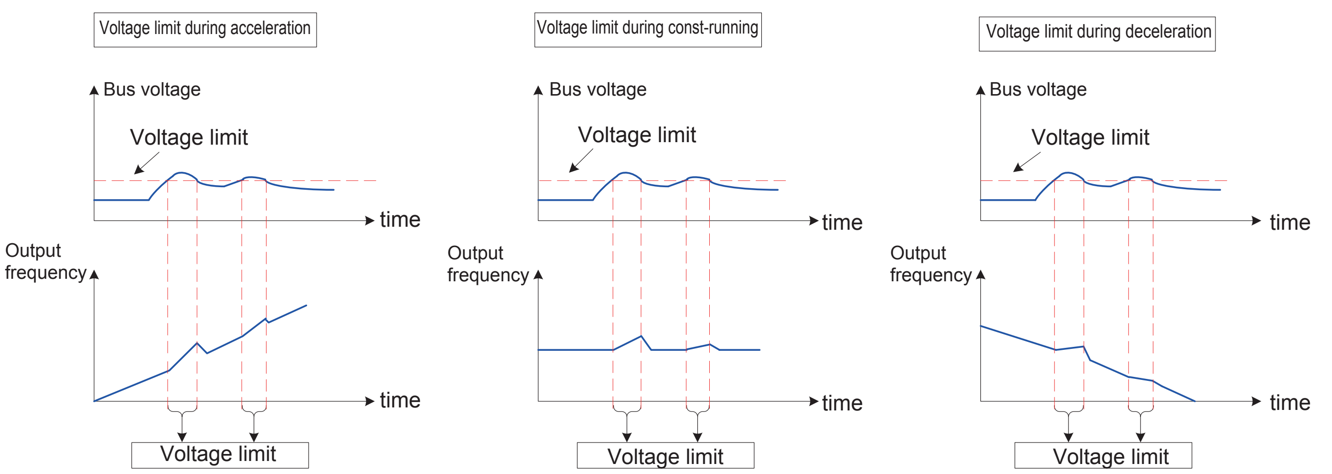


Figure 6-42 Voltage limit

parameter	define	default	range	illustrate
P3-22	Voltage limit	370/770V	330V~800V	The fun P3-22 is equivalent to that of P9-04.
P3-23	Voltage limit selection	1	0，1	0: Disabled 1: Enabled
P3-24	Frequency gain for voltage limit	30	0~100	Increasing P3-24 will improve the control effect of bus voltage, but the output frequency will fluctuate, and P3-24 can be appropriately reduced, and the function is equivalent to P9-03. Increasing P3-25 can reduce the overshoot of the bus voltage.
P3-25	Voltage gain for voltage limit	30	0~100	
P3-26	Frequency rise threshold during voltage limit	5Hz	0~50Hz	Overvoltage suppresse max.rise freq limit
P9-08	Braking unit applied voltage	370/760V	330V~800V	-
P3-10	V/F over-excitation gain	64	0~200	The greater the over-excitation gain, the stronger the suppression effect.
P3-11	V/F oscillation suppression gain	40	0~100	-
P9-03	Overvoltage protection gain	30	0~100	The functionality is equivalent to P3-24 and will change with P3-24.
P9-04	Overvoltage protection voltage	370/770V	330V~800V	The functionality is equivalent to P3-22 and will change with P3-22.

NOTE

When using a braking resistor or an additional braking unit or using an energy feedback unit, please note that:

- Please set the P3-10 "Over-excitation Gain" value to "0", otherwise it may cause the problem of excessive current during operation.
- Please set the P3-23 "Over-voltage Stall Enable" value to "0", otherwise it may cause the problem of prolonged deceleration time.

6.5.4 Improving V/F Running Performance

1) How can I reduce the actual acceleration time in V/F control mode?

phenomenon	measure
Accelerate the process if the motor is found to be solid The acceleration time is much greater than the set fixed acceleration time, which can be taken to The following measures are taken:	If no braking resistor or feedback unit is installed, please increase the P3-18 "V/F Over-Excitation Gain" setting value to "±20" each adjustment.After increasing the P3-18 "V/F Over-excitation Gain" setting value, if the motor oscillation overvoltage fault is caused, reduce the "Overvoltage Stall". Suppress Voltage Gain" setpoint.
	If the target frequency is 3 times or more than 4 times the rated frequency, it is very likely that the motor stall phenomenon will occur during the rapid acceleration process The output frequency of the frequency converter has reached the target frequency, but the actual speed of the motor has been staying at a certain speed in the middle speed section, but the motor is real The speed has been stuck at a lower frequency, or the acceleration time is too long), at this time, the P3-21" double speed loss speed can be adjusted as the current compensation factor" is set to 100%.

1) How can I reduce the actual deceleration time in V/F control mode?

phenomenon	measure
Deceleration process if found that the motor is solid The deceleration time is much greater than the set Fixed deceleration time, which can be taken to The following measures are taken:	If no braking resistor or feedback unit is installed, please increase the P3-10 "V/F Over-Excitation Gain" setting value to "±20" each adjustment.After increasing the P3-10 "V/F Over-excitation Gain" setting value, if the motor oscillation overvoltage fault is caused, reduce the "Overvoltage Stal". Suppress Voltage Gain" setpoint.
	If the inverter is equipped with a braking resistor or energy feedback unit, and the input voltage level of the inverter is 360~420V, please adjust the P9-08 "Brake Unit Action Starting Voltage" setting value to 690V, and adjust the P3-10 "V/F Overexcitation Gain" setting value to 0.
	When using shutdown DC braking, the recommended setting value: P6-11 (stopping DC braking start frequency) = 0.5Hz, P6-13 (stopping DC Braking Current) = 50%; P6-14 (stopping DC Braking Time) = 1s;

3) How to limit the output current under V/F control mode and how to prevent over-current failure in the case of extreme shock loads?

phenomenon	measure
In order to better protect the motor, the upper limit of the input current of the inverter can be adjusted by controlling the upper limit of the motor current:	The "upper limit of inverter output current" can be controlled by adjusting P3-18 "over-velocity loss operating current", "inverter output"Current Limit" = Rated current of the inverter X "Over-velocity operation current" (150% of factory value). It is recommended that "the inverter is lost."The minimum upper limit of the output current should not be less than the rated current of the motor, and the recommended value is 1.5 times of the rated current of the motor.
	Rapid acceleration, rapid deceleration, or shock load types may cause overcurrent faults" or "rapid current limiting faults."EER40", please increase the P3-20 "Overflow Velocity Suppression Gain" setting value, and adjust the amount to "±10" each time There is a high probability that the current will oscillate.

4) How to limit the bus voltage under V/F control mode to prevent over-voltage failure?

phenomenon	measure
In some constant-speed power generation loads (e.g type of oilfield pumping unit), impact sudden loading and unloading (e.g. typically large power punch), the operation process is extremely easy cause overvoltage faults, in order to avoid cause overvoltage failure, if factory ginseng several overvoltage faults will still occur, but also to take the following actions:	Constant speed intermittent power generation load: please reduce the P3-22 "overvoltage stall operating voltage" set value (factory value 770V), non-special If the overvoltage fault still occurs, please adjust the P3-24 "Overvoltage Stall Maximum Rise Frequency Limit" setting value to 10Hz or 20Hz (such as oilfield pumping unit for loads with long periodic power generation time).
	In the event of a voltage failure due to the sudden loading and unloading of the shock, please reduce the P3-22 "overvoltage stall operating voltage" setting value, and it is recommended to adjust it.It is about 720V.
	Large inertia rapid deceleration load: If the inverter is equipped with a braking resistor, and the input voltage level of the inverter is 360~420V,Please adjust the P9-08 "Brake Unit Operation Starting Voltage" setting value to 690V, and adjust the P3-10" V/F overexcitation increase benefit" set to 0. If the voltage is still overvoltage, please reduce the P3-22 "overvoltage stall operating voltage" setting value, it is recommended to adjust it.Around 740V.

6.5.5 Speed Loop （P2 Group only for T4-380V Model）

parameter	define	default	range	illustrate
P2-00	Speed loop proportional gain 1	30	1~100	-
P2-01	Speed loop integral time 1	0.50s	0.01s~10.00s	-
P2-02	Switchover frequency 1	5.00Hz	0.00~P2-05	-
P2-03	Speed loop proportional gain 2	20	1~100	-
P2-04	Speed loop integral time 2	1.00s	0.01s~10.00s	-
P2-05	Switchover frequency 2	10.00Hz	P2-02~ max. frequency	-

P2-00 to P2-01 are speed loop PI parameters.

● If running frequency ≤ P2-02 (Switchover frequency 1), PI parameters are P2-00 and P2-01.

● If running frequency ≥ P2-05 (Switchover frequency 2), PI parameters are P2-03 and P3-04.

● If running frequency is between P2-02 and P2-05, PI parameters are obtained from linear switchover between two groups of PI parameters, as shown in Figure 9-2.

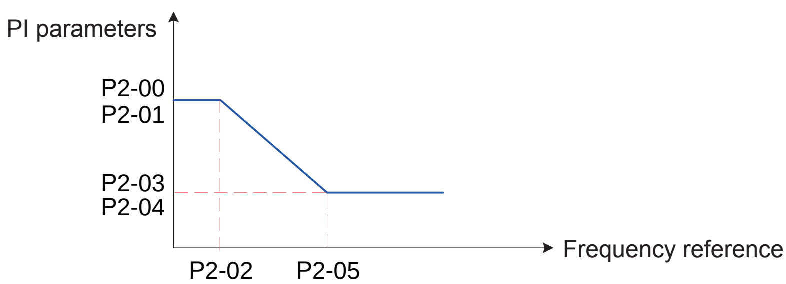


Figure 6-43 Speed loop PI parameters

By setting the scale factor and integration time of the speed regulator, the dynamic response characteristics of the vector control can be adjusted.

Increasing the proportional gain and decreasing the integration time can speed up the dynamic response of the velocity ring. However, too much proportional gain or too little integration time can cause the system to oscillate.

The suggested adjustment method is as follows: if the factory parameters cannot meet the requirements, the factory value parameters should be fine-tuned, first increase the proportional gain to ensure that the system does not oscillate, and then reduce the integration time, so that the system has faster response characteristics and less overshoot.

NOTE

- If the PI parameter is not set properly, it may cause the speed to overshoot too much. Overvoltage faults can even occur when overshoot falls.

6.5.6 Vector Control Slip Adjustment （P2 Group only for T4-380V Model）

parameter	define	default	range	illustrate
P2-06	SVC slip compensate gain	100%	50%~200%	Slip adjust to improve control performance

For vector control (P0-01=0), this parameter can adjust the speed stability accuracy of the motor, for example, when the motor runs at a frequency lower than the output frequency of the inverter, this parameter can be increased.

Note: In general, there is no need to adjust this parameter.

6.5.7 SVC Speed Feedback Stability（P2 Group only for T4-380V Model）

parameter	define	default	range	illustrate
P2-07	Speed feedback filter time in SVC	0.015s	0.000s~0.100s	-

SVC velocity feedback filtering time only takes effect when P0-01=0, increasing P2-07 can improve the stability of the motor, but the dynamic response becomes weaker, otherwise, the dynamic response is strengthened, but too small will cause the motor to oscillate. In general, no adjustment is required.

6.5.8 Upper torque

SVC velocity feedback filtering time only takes effect when P0-01=0, increasing A0-00 can improve the stability of the motor, but the dynamic response becomes weaker, otherwise, the dynamic response is strengthened, but too small will cause the motor to oscillate. In general, no adjustment is required.

1） Speed control torque upper limit setting（P2 Group only for T4-380V Model）

parameter	define	default	range	illustrate
P2-09	Torque limit source in speed control	0	0: P2-10 1: AI1 2: AI2 3: Pot 4: Keep 5: Serial comms. 6: Min. (AI1, AI2) 7: Max. (AI1, AI2) 1-7 full-scale range corresponds to P2-10	-
P2-10	Digital setting of torque limit in speed control	150.0%	0.0%~200.0%	The upper limit of torque in the electric state is based on the rated current of the inverter
P2-11	(Regenerative) power limit selection	0	0: P2-10 (motoring & regenerative) 1: AI1 2: AI2 3: Pot 4: Keep 5: Serial comms. 6: Min. (AI1, AI2) 7: Max. (AI1, AI2) 8: Reference P2-12 （T4） 1-7 full-scale range corresponds to P2-12	-
P2-12	(Regenerative) power limit	150.0%	0.0%~200.0%	The upper limit of torque in the power generation state is based on the rated current of the inverter

- In the speed control mode, there are 8 ways to set the upper torque source. In the Motoring state, the upper torque source is selected by P2-09, and in the power generation state, the upper torque source is selected by P2-11.
- In the speed control mode, if P2-11 is set to 1~8, the upper torque limit is divided into Motoring state and power generation state, where the upper limit of torque in Motoring state full scale range is set by P2-10, and the upper limit of torque full scale range in power generation state is set by P2-12, the schematic diagram is as follows:

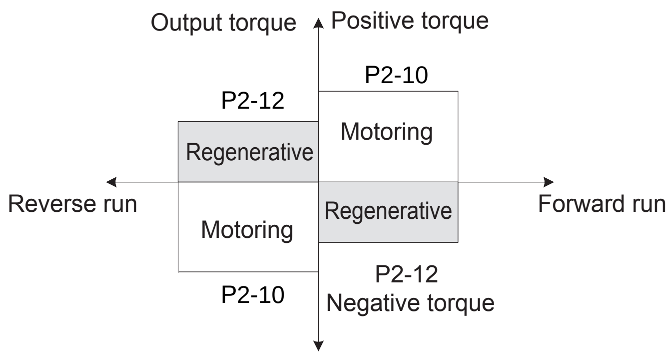


Figure 6-44 Torque limit in speed control

parameter	define	default	range	illustrate
P2-22	Regenerative power limit selection	0	0: Disabled 1: Enabled in the whole process 2: Enabled at constant speed 3: Enabled during deceleration	-
P2-23	Regenerative power limit	In model	0.0~200.0%	

- In applications such as cam, quick acceleration/deceleration and sudden unloading without using braking resistor, reduce bus voltage overshoot during motor braking so as to prevent occurrence of overvoltage.
- P2-23 is a percentage of rated motor power. If overvoltage still occurs after you set P2-22 = 1 , decrease setting of P2-23

2) Setting Torque Limit in Torque Control （P2 Group only for T4-380V Model）

parameter	define	default	range	illustrate
A0-00	Speed/Torque control selection	0	0: Speed control 1: Torque control	-
A0-01	Torque reference source in torque control	0	0: Set by A0-03 1: AI1 2: AI2 3: Pot 4: Keep 5: Communication reference 6: MIN (AI1, AI2) 7: MAX (AI1, AI2) 1-7 full-scale range corresponds to A0-03	-
A0-03	Torque digital setting in torque control	150.0%	-200.0%~200.0%	-
A0-05	Forward max. frequency in torque control	50.00Hz	0.00Hz~ max. frequency(P0-10)	-
A0-06	Reverse max. frequency in torque control	50.00Hz	0.00Hz~ max. frequency(P0-10)	-
A0-07	Acceleration time in torque control	0.00s	0.00s~650.00s	-
A0-08	Deceleration time in torque control	0.00s	0.00s~650.00s	-

- Speed/torque control mode selection（A0-00）

The speed/torque control mode is set by A0-00.

The YD280 has a multi-function digital DI terminal with two functions related to torque control: torque control prohibition (function 29) and speed control/torque control switching (function 46). These two terminals should be used in conjunction with the A0-00 to achieve speed and torque control.

When the speed control/torque control switching terminal (function 46) is invalid, the control mode is determined by A0-00, and if the speed control/torque control switching is effective, the value of the control mode equivalent to A0-00 is reversed.

In any case, when the torque control prohibition terminal is active, the inverter is fixed in a speed control mode.

- Torque control torque command setting（A0-01、A0-03）

A0-01 It is used to select the torque setting command, and there are a total of 8 torque setting methods.

The torque setting is a relative value, 100.0% of the rated torque of the strain inverter (the output torque of the inverter can be viewed through U0-74, 100% of the rated torque of the strain inverter, and the output torque of the motor can be viewed by U0-06, which corresponds to the rated torque of the motor at 100%). The setting range is -200.0%~200.0%, indicating that the maximum torque of the inverter is 2 times the rated torque of the inverter.

When torque command is positive, the inverter runs in the forward direction.

When torque command is negative, the inverter runs in the reverse direction.

- Torque control frequency upper limit setting（A0-05、A0-06）

When torque is controlled, acc/dec time of the upper frequency limit is set at P8-07 (acc) / P8-08 (dec).

It is used to set the forward or reverse maximum operating frequency of the inverter in the torque control mode.

When the inverter torque is controlled, if the load torque is less than the motor output torque, the motor speed will continue to rise, in order to prevent accidents such as flying in the mechanical system, the maximum speed of the motor during torque control must be limited（A0-05/A0-06）。

If it is necessary to dynamically and continuously change the maximum frequency of torque control, it can be achieved by controlling the upper frequency.

- Torque control: torque acceleration and deceleration time setting（A0-07、A0-08）

In the torque control mode, the difference between the output torque of the motor and the load torque determines the speed change rate of the motor and the load, so the speed of the motor may change rapidly, causing problems such as noise or excessive mechanical stress. By setting the torque control acceleration and deceleration time, the motor speed can be changed smoothly, and the torque acceleration and deceleration time corresponds to the time when the torque increases from 0 to A0-03.

It is not recommended to set the torque acceleration and deceleration time in the torque control of small torque start, and the torque control acceleration and deceleration time is 0.00s when the torque response is required quickly.

For example: two motors are hard connected to drag the same load, in order to ensure that the load is evenly distributed, set up a frequency converter as the main engine, adopt the speed control mode, the other frequency converter is the slave and adopt torque control, the actual output torque of the host is used as the torque command of the slave, the torque of the slave needs to follow the master quickly, then the torque control acceleration and deceleration time of the slave is 0.00s.

6.5.9 Current Loop Parameter Description（P2 Group only for T4-380V Model）

parameter	define	default	range	illustrate
P2-13	Excitation adjustment proportional gain	2000	0~60000	It is obtained automatically when the motor parameters are tuned
P2-14	Excitation adjustment integral gain	1300	0~60000	
P2-15	Torque adjustment proportional gain	2000	0~60000	
P2-16	Torque adjustment integral gain	1300	0~60000	

The vector control current loop PI adjustment parameters are divided into two groups: excitation and torque, which are automatically obtained after the complete tuning of the asynchronous machine, and generally do not need to be modified.

It should be reminded that the integration regulator of the current loop does not use the integration time as the dimension, but directly sets the integration gain. The PI gain of the current loop is set too large, which may cause the entire control loop to oscillate, so when the current oscillation or torque fluctuates greatly, the proportional gain or integral gain of the PI can be manually reduced.

6.5.10 Boost for weak magnetic field

parameter	define	default	range	illustrate
A5-05	Voltage over modulation coefficient	105%	100%~110% 105% (T2S)	maximum output voltage coefficient indicates the ability of the maximum output voltage of inverter to be lifted. Increasing A5-05 can improve the maximum load capacity of the weak magnetic field of the motor, but increase of motor current ripple will increase the heat generation of the motor; On the contrary, the maximum load capacity of motor in the weak magnetic field will decrease, but motor current ripple will be reduced, which will reduce heat generated by motor. Generally, no adjustment is required.
P2-21	Max. torque coefficient of field weakening area	100%	50%~200%	This parameter only takes effect if the motor is running above the rated frequency. When the motor needs to accelerate to more than 2 times the rated frequency of the motor and the actual acceleration time is longer, reduce P2-21 appropriately, and when the speed drops greatly after the motor runs at 2 times the rated frequency, increase P2-21 appropriately, and generally does not need to change.

6.5.12 Auxiliary Control

parameter	define	default	range	illustrate
A5-00	DPWM switchover frequency upper limit	8.00Hz	5.00Hz~ max.freq	Increasing this parameter to the max. frequency will reduce motor audible noise
A5-01	PWM modulation pattern	0	0: Asynchronous modulation 1: Synchronous modulation	When the carrier frequency divided by the operating frequency is less than 10, it will cause the output current oscillation or current harmonic to be large, and it can be adjusted to "synchronous modulation" to reduce electricity The effect of harmonics of streaming.
A5-03	Random PWM depth	0	0: Random PWM invalid 1 to 10	"0" indicates that the random PWM is invalid; If the motor is noisy, the setting value can be adjusted (increase by 1 each time) to improve the motor noise.

6.6 Protection Functions

This section describes the functions associated with the protection of frequency converters and motors.

6.6.1 Enabling Protection

The safety protection function of the frequency converter. If P8-18 is set to 1, you can protect against the following two scenarios:

Situation 1: If the inverter is valid when the inverter is powered on (for example, the terminal is closed before the inverter is powered on), the inverter does not respond to the inverter, and the inverter must be removed once first, and the inverter will respond only after the inverter is effective again.

Situation 2: If the inverter fails to reset the inverter and the inverter does not respond to the inverter, the inverter must be removed first to eliminate the operation protection state.

parameter	define	default	range	illustrate
P8-18	Initiate protection selection	0	0: Not protected 1: protection	This setting to 1 prevents the motor from responding to operating commands when powering on or when a fault is reset without knowing it.

6.6.2 Motor Overload Protection Setting

parameter	define	default	range	illustrate
P9-00	Motor overload protection	1	0: Disabled	There is no motor overload protection function, and it is recommended to heat the relay before the motor at this time;
			1: Enabled	The inverter judges whether the motor is overloaded according to the inverse time curve of the motor overload protection.
P9-01	Motor overload protection gain	1.00	0.20~10.00	If you need to adjust the motor overload current and time, set P9-01.
P9-02	Motor overload pre-warning coefficient	80%	50%~100%	The early warning factor is used to determine the extent to which an early warning is given before the motor is overloaded. The higher the value, the smaller the early warning amount.

In order to effectively protect the motor with different loads, the motor overload protection gain needs to be set according to the motor overload capacity. The motor overload protection is an inverse time curve, and the motor overload protection curve is shown in the following figure:

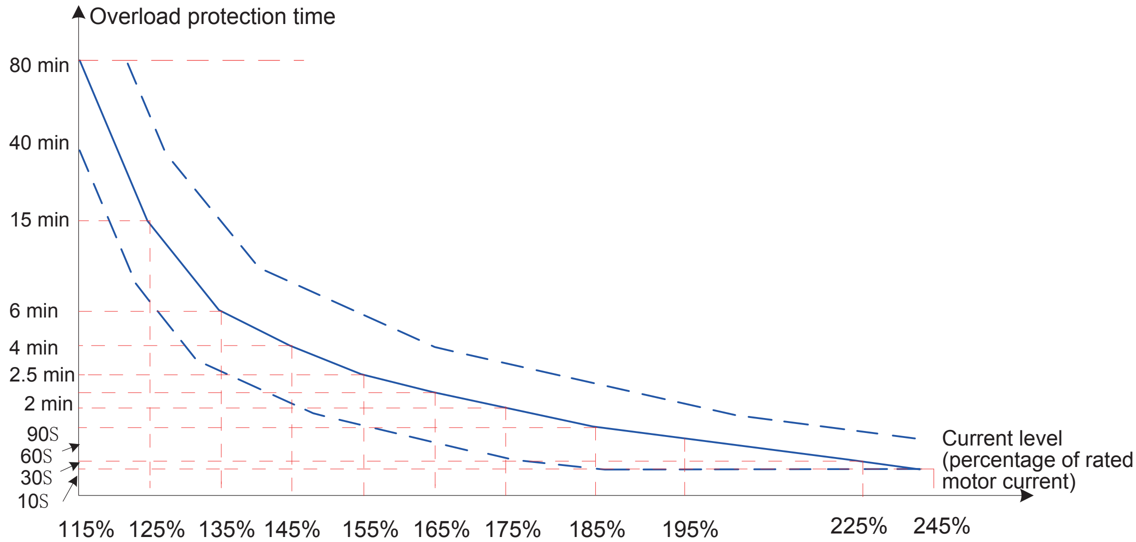


Figure 6-45 Inverse time-lag curve

When the current reaches 175% of the rated current of the motor, it will give an alarm after 2 minutes of continuous operation (Err11);

When the current reaches 115% of the rated current of the motor, it will give an alarm after 80 minutes of continuous operation (Err11);

For example, let's assume that the rated current of the motor is 100A

If P9-01 is set to 1.00, when the motor running current reaches 125% of 100A (125A), after 40 minutes, the inverter will report "Motor Overload Fault (Err11)";

If P9-01 is set to 1.20, when the motor running current reaches 125% (125A) of 100A, after 40*1.2=48 minutes, the inverter reports "motor overload fault (Err11)";

Note: The maximum overload is 80 minutes and the minimum is 10 seconds. Motor overload protection adjustment example: the motor needs to run at 150% motor current for 2 minutes to report overload

From the motor overload graph, it is known that the current of 150% (I) is located in the current range of 145% (I1) and 155% (I2), and the current of 145% is overloaded for 6 minutes (T1) and 155% is overloaded for 4 minutes (T2), and the rated current of 150% of the motor is overloaded for 5 minutes under the default setting. The calculation is as follows:

$$T = T1 + (T2 - T1)*(I - I1)/(I2 - I1) = 4 + (6 - 4)*(150\% - 145\%)/(155\% - 145\%) = 5 \text{ (minutes)}$$

Therefore, it can be concluded that if the motor needs to report overload for 2 minutes at 150% motor current, the "motor overload protection gain" needs to be set to P9-01 = 2 ÷ 5 = 0.4

Note: The user needs to set the value of P9-01 correctly according to the actual overload capacity of the motor, which is too large and prone to the danger of motor overheating damage and the inverter not being protected by alarm in time!

- The motor overload warning coefficient indicates that when the motor overload detection level reaches the set value of this parameter, the multi-function output terminal DO or fault relay (RELAY) outputs the "motor overload pre-warning signal", which is calculated according to the percentage of time that the motor continues to run under an overload point without reporting an overload fault.

For example, when the motor overload protection gain is set to 1.00 and the motor overload warning factor is set to 80%, if the motor current reaches 145% of the rated motor current for 4.8 minutes (80% × 6 minutes), the multi-function output terminal DO or the fault relay RELAY outputs a motor overload warning signal.

- The motor overload warning function is used to give an early warning signal to the control system through DO before the motor overload fault protection. This early warning factor is used to determine the extent to which an early warning is given before the motor is overloaded. The higher the value, the smaller the early warning amount. When the cumulative output current of the inverter is greater than the product of the overload time (Y value of the inverse time curve of motor overload protection) and the "motor overload warning coefficient (P9-02)", the multi-function digital DO of the inverter outputs the effective signal of "motor overload pre-warning". In special cases, when the motor overload warning coefficient P9-02 is set to 100%, the early warning amount is 0, and the pre-alarm and overload protection occur at the same time.

6.6.3 Phase Loss Protection Settings

parameter	define	default	range	illustrate
P9-12	Input phase loss/ precharge relay protection	11	one bit: Input phase loss protection 0: Disabled 1: Enabled Ten bit: Pre-charge relay protection 0: Disabled 1: Enabled	Select whether to protect the input phase loss or contactor pick-up.
P9-13	Output phase loss protection	01	one bit: Output phase loss protection 0: Disabled 1: Enabled Ten bit: Output phase loss protection before running 0: Disabled 1: Enabled	one bit: choose whether to protect the output phase loss, if you select 0 and the actual output phase loss will not report the fault, the actual current is larger than the current displayed on the panel, there is a risk, use with caution Ten bit: It takes about a few seconds to detect the output phase loss during operation, and when there is a risk of starting up after phase loss or low-frequency operation, enabling this function can quickly detect whether there is an output during startup It is recommended not to enable this function when there is a lack of phase, but there are strict requirements for the startup time.

6.6.4 Fault Reset

NOTE

- The undervoltage fault (Err09) will automatically reset when the bus voltage returns to normal, and is not included in the number of fault automatic resets;
- The short-circuit fault to ground (Err23) cannot be reset automatically or manually, and can only be completely powered off by the inverter and reset after being powered on again;
- After the number of fault automatic resets is reached, the fault action protection selection is executed.

parameter	define	default	range	illustrate
P9-09	Auto reset times	0	0 ~20	When inverter selects fault automatic reset, it is used to set the number of times that can be automatically reset. After this number, the inverter remains in a faulty state.
P9-10	Selection of DO action during auto reset	0	0: Not act 1: Act	If the inverter is equipped with a fault auto-reset function, the fault DO (DO terminal function is selected as 2) during the fault auto-reset period, whether or not it is operated can be set by P9-10.
P9-11	Delay of auto reset	1.0s	0.1s ~100.0s	The waiting time between the inverter fault alarm and the automatic fault reset.

6.6.5 Fault Enabling Protection Selection

parameter	define	default	range	illustrate
P9-47	Fault protection action selection 1	00000	0: Coast to stop 1: Stop according to the stop mode 2: Continue to run one bit: Motor overload (Err11) Ten bit: Input phase loss (Err12) Hundred bit: Output phase loss (Err13) Thousand bit: External fault (Err15) Ten thousand bit: Communication fault(Err16)	-
P9-48	Fault protection action selection 2	00000	one Keep Ten bit: EEPROM read-write fault (Err21) 0: Coast to stop 1: Stop according to the stop mode Hundred bit: Inverter overload fault action selection (Err10) 0: Coast to stop 1: Stop according to the stop mode Thousand bit: Motor overheat (Err25) Ten thousand bit: Accumulative running time reached (Err26)	When set to 0, the inverter will report an overload fault when it is overloaded, and the output will be blocked at the same time; when set to 1, the inverter will auto reduce the output current to the vicinity of the rated current of the inverter when it is about to be overloaded, so as to avoid the occurrence of overload fault, but the running speed may be reduced or stalled. For lifting loads, set this parameter to 0.

parameter	define	default	range	illustrate
P9-49	Fault protection action selection 3	00000	one bit: User-defined fault 1 (Err27) 0: Coast to stop 1: Stop according to the stop mode 2: Continue to run Ten bit: User-defined fault 2 (Err28) Hundreds bit: User-defined fault 3 (Err29) Thousands position: Load lost (Err30) 0: Coast to stop 1: Stop according to the stop mode 2: Continue to run at 7% of rated motor frequency and restore to the frequency reference if the load recovers Ten thousands position: PID feedback lost during drive running (Err31)	-
P9-50	Fault protection action selection 4	00000	one bit: Too large speed feedback error(Err42) 0: Coast to stop 1: Stop according to the stop mode 2: Continue to run Ten bit: Motor overspeed (Err43) Hundred bit: Initial position fault (Err51) Thousand bit: Speed feedback fault (Err52) Ten thousand bit: Reserved	-
P9-54	Frequency selection for continuing to run upon fault	0	0: Current running frequency 1: Frequency reference 2: Frequency upper limit 3: Frequency lower limit 4: Backup frequency upon abnormality	When a fault occurs during the operation of the inverter, and the handling mode of the fault is set to continue operation, the inverter displays A** and operates at the frequency determined by P9-54
P9-55	Backup frequency upon fault	100.0%	0.0~100.0%（100.0% max. frequency）	

6.6.7 Running instantaneous non-stop(power loss)

The instantaneous stop function allows the system to continue to operate in the event of a short power outage. When the system has a power failure, the inverter makes the motor in the state of power generation, so that the bus voltage is maintained at about "instantaneous stop and non-stop action judgment voltage", so as to prevent the inverter from shutting down due to undervoltage fault caused by too low input voltage. As shown in the figure below:

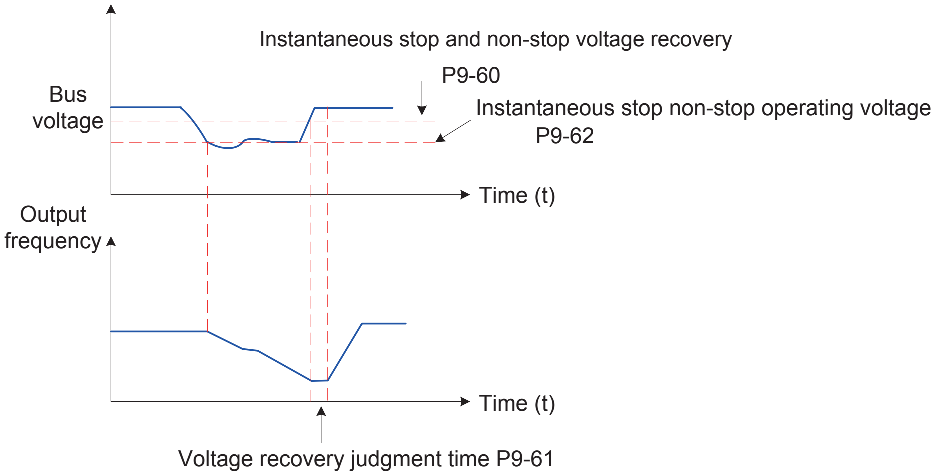


Figure 6-46 Power dip ride-through

parameter	define	default	range	illustrate
P9-59	Power dip ride-through function selection	0	0:Disabled 1: Bus voltage constant control 2:Decelerate to stop	It is recommended to use the "bus voltage constant control" mode for large inertia occasions such as fans, pumps, centrifuges, etc., and the "deceleration and shutdown" mode is recommended for the textile industry.
P9-60	Threshold of power dip ridethrough function disabled	85%	80%~100%	(380V class) 100% 540V compliant
P9-61	Judging time of bus voltage recovering from power dip	0.5s	0.0~100.0s	It is only valid for "bus voltage constant control (P9-59=1)".
P9-62	Threshold of power dip ridethrough function enabled	80%	60%~100%	(380V class) 100% 540V compliant
P9-71	Power dip ride-through gain Kp	0~100	40	It is only effective for "bus voltage constant control (P9-59=1)", if it is easy to under-voltage in the process of instantaneous stopping, please increase Kp and Ki ...
P9-72	Power dip ride-through integral coefficient	0~100	30	
P9-73	Deceleration time of power dip ride-through	0~300.0s	20.0s	Valid only for "Deceleration and Stopping (P9-59=2)" mode

NOTE

- In the "bus voltage constant control" mode, when the power supply is restored to the grid, the output frequency of the inverter will be restored to the target frequency according to the acceleration time;
- In the "Deceleration Stopping" mode, when the grid restores power, the inverter continues to decelerate to 0Hz and shut down until the inverter gives the start command again.

6.6.8 Upper torque

parameter	define	default	range	illustrate
P9-63	Load lost protection	0	0: Disabled 1: Enabled	If the load loss protection function is effective, the output current of the inverter is less than the load loss detection level P9-64, and the duration is greater than the drop detection When the load detection time is P9-65, the inverter performs the load loss protection action (the load loss action can be selected by P9-49, and the default free stop). During the load drop protection, if the load is restored, the drive automatically resumes to operate at the set frequency.
P9-64	Load lost detection level	10.0%	0.0%~100.0%	
P9-65	Load lost detection time	1.0s	0.0~60.0s	

6.6.11 Under Overvoltage 、 Current limit protection

parameter	define	default	range	illustrate
A5-06	Undervoltage threshold	200/350V	140 ~ 420V	When the bus voltage exceeds the set value of A5-06/A5-09, the inverter fault alarm (Err09/Err05~07)
A5-09	Overvoltage threshold	400/820V	330V~820V	
A5-04	Overcurrent fast prevention	1	0: Disabled 1: Enabled	It is recommended to turn off this function in lifting occasions such as lifting.

6.7 Monitoring

The monitoring function is to display the status of the inverter on the LED display area of the inverter. There are two ways to view monitoring parameters:

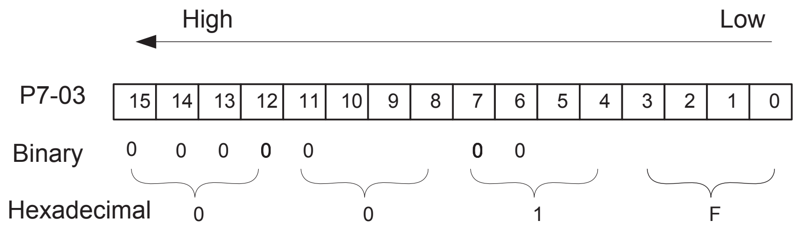
1) In the shutdown or running state, you can use the ▷ keys on the operation panel to switch each byte of the parameters P7-03, P7-04, and P7-05 to display multiple status parameters.

There are 32 running state parameters in the running state, and the parameters P7-03 (running display parameter 1) and P7-04(running display parameter 2) select whether the corresponding parameter of each parameter is displayed according to the binary bits. There are 13 shutdown state parameters in the shutdown state, and the corresponding parameters of each parameter are selected by parameter P7-05 (shutdown display parameter) according to the binary bits.

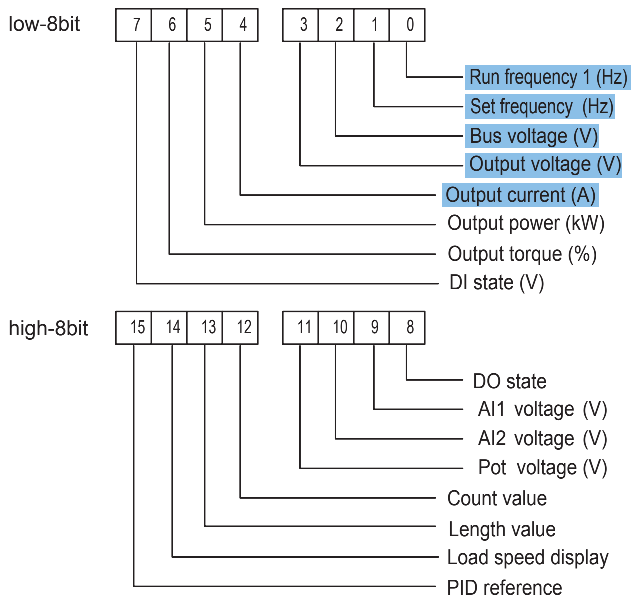
For example, you want to monitor the parameters in the operating state through the panel: (operating frequency, bus voltage, output voltage, output current, output power, PID setting).

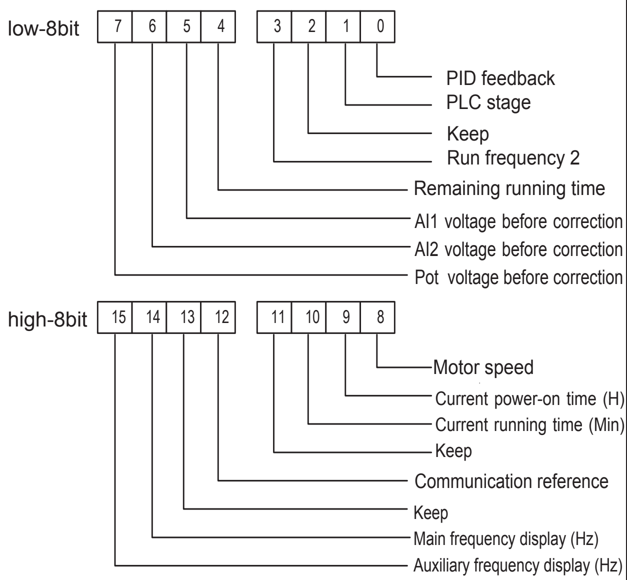
- Set the corresponding bit to 1 according to the correspondence of each byte in parameter P7-03 (running display parameter 1) to the above parameters.
- Convert this binary number to hexadecimal and set it to P7-03. (See below for binary to hexadecimal method)

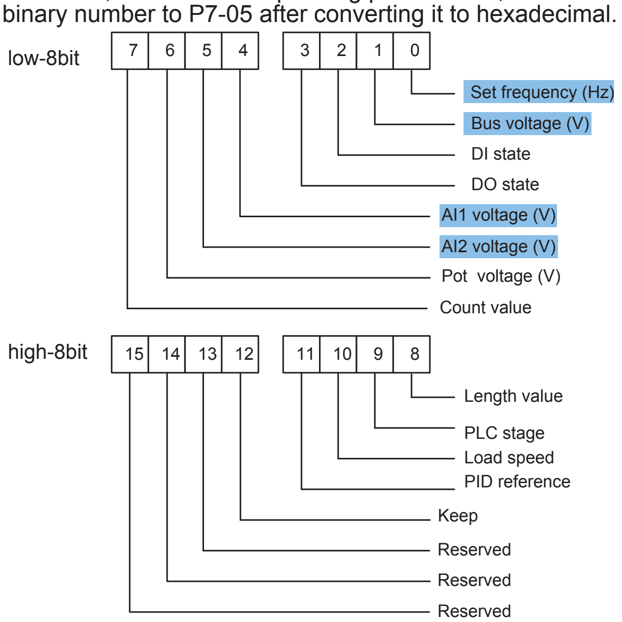
- Use the ▷ key on the operation panel to toggle each byte of parameter P7-03 to view the value of the relevant parameter. The settings are shown in the following figure：



The method of viewing other monitoring parameters is the same as that of P7-03. The correspondence of each byte of the monitoring parameter in P7-03, P7-04, and P7-05 is as follows:

<table>
<tr><th>parameter</th><th>define</th><th>default</th><th>range</th><th>illustrate</th></tr>
<tr><td>P7-03</td><td>LED display running parameters 1</td><td>1F</td><td>0000~FFFF</td><td>If you need to display the following parameters during operation, set the corresponding position to 1, convert the binary number to hexadecimal and set it to P7-03.


Note: The shaded part is the default factory display.</td></tr>
<tr><td>P7-04</td><td>LED display running parameters 2</td><td>00</td><td>0000~FFFF</td><td>If you need to display the following parameters in operation, set the corresponding position to 1, and set the binary number to P7-04 after converting it to hexadecimal.

</td></tr>
</table>

parameter	define	default	range	illustrate
P7-05	LED display stop parameters	33	0000~FFFF	If the following parameters need to be displayed during shutdown, set their corresponding position to 1, and set the binary number to P7-05 after converting it to hexadecimal.  Note: The shaded part is the default factory display.

NOTE

- Once the AC drive is re-powered on after power down, the display includes the selected parameters before power down by default.
- If parameters to be monitored cannot be found in P7-03、P7-04、P7-05, view them in group U0

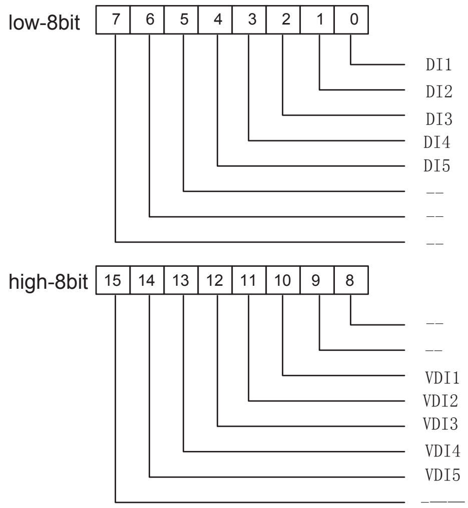
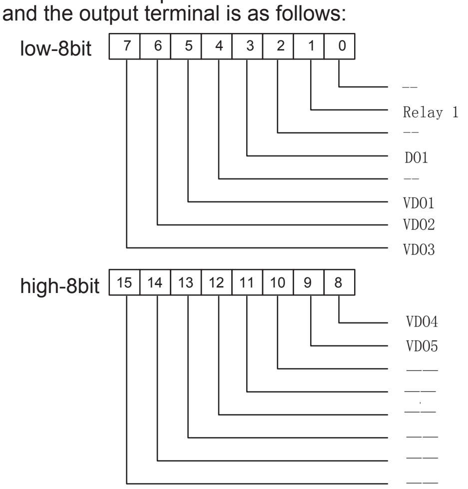
Binary to Hexadecimal Conversion Method:

· Binary numbers, from right to left, correspond to one hexadecimal number for every four digits. If the highest digit is less than four digits, 0 is used to make up. Then convert each four-digit binary into decimal respectively, 0000~1111 corresponds to 0~15 in decimal and 0~F in hexadecimal. According to the correspondence between decimal and hexadecimal, convert decimal to the corresponding hexadecimal. (See the table below for the correspondence)

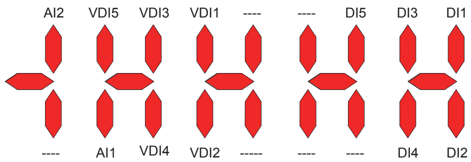
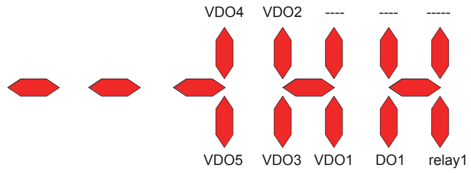
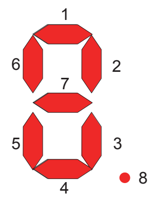
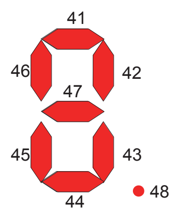
For example, 011 1101 1111 1001 can be divided into 0011 1101 1111 1001 and the hexadecimal number is obtained by looking up the following table 3DF9。

Binary	1111	1110	1101	1100	1011	1010	1001	1000	0111	0110	0101	0100	0011	0010	0001	0000
decimal	15	14	13	12	11	10	9	8								
hexadecimal	F	E	D	C	B	A	9	8								

2) Use the operation panel to enter the U0 group of parameters and view the monitoring parameters. (For more information on how to operate the panel, please refer to "Chapter 4 Panel Usage"), and the monitoring parameters shown below are only readable.

parameter	define	default	range	illustrate
U0-00	Run frequency	0.01Hz	0.00~500.00Hz	Display absolute value of operating frequency of inverter.
U0-01	Set frequency	0.01Hz	0.00~500.00Hz	Display absolute value of setting frequency of inverter.
U0-02	Bus voltage	0.1V	0.0V~3000.0V	Display the bus voltage value of the inverter
U0-03	Output voltage	1V	0V~1140V	Display output voltage value of inverter during operation
U0-04	Output current	0.01A	0.00A~655.35A	Display output current value of inverter during operation
U0-05	Output power	0.1kW	0~32767	Display output power value of inverter during operation
U0-06	Output torque	0.1%	-200.0%~200.0%	Display output torque value of inverter during operation. The 100% base is rated torque of motor
U0-07	DI state	1	0x0000~0x7FFF	Displays the current DI terminal input status value. When converted to binary data, each bit corresponds to a DI input signal. 1 means the input is high, and 0 means the input is low. The correspondence between each bit and the input terminal is as follows: 
U0-08	DO state	1	0x0000~0x03FF	Displays the current DO terminal output status value. When converted to binary data, each bit corresponds to a DO output signal. 1 indicates an output high level and 0 indicates an output low level. The correspondence between each bit bit and the output terminal is as follows: 
U0-09	AI1 voltage (V)	0.01V	0.00V~10.57V	
U0-10	AI2 voltage (V)/ current (mA)	0.01V /0.01mA	0.00V~10.57V 0.00mA~20.00mA	The voltage input or current input can be selected by jumper cap J9 on the control board
U0-11	Pot voltage	0.01V	0.00~10.57V	-

parameter	define	default	range	illustrate
U0-12	Count value	1	1~65535	The count value is displayed in the count function
U0-13	Length value	1	1~65535	The length value is displayed in the cut-to-length function
U0-14	Keep	-	-	-
U0-15	PID reference	1	0~65535	PID setting = PID setting (%) * PA-04 (PID given feedback range)
U0-16	PID feedback	1	0~65535	PID feedback = PID feedback (%) * PA-04 (PID given feedback range)
U0-17	PLC stage	1	0~15	A total of 16 speeds
U0-18	Keep	-	-	-
U0-19	Keep	-	-	-
U0-20	Remaining running time	0.1Min	0.0~6500.0Min	Displays the remaining run time when the scheduled run
U0-21	AI1 voltage before correction	0.001V	0.000V~10.570V	Display actual value of the analog input Voltage/current. The actual voltage/current used is linearly corrected to make the sample voltage/current deviate from the actual input voltage/current to a smaller extent. The actual corrected voltage/current used is shown for U0-09, U0-10, and U0-11.
U0-22	AI2 voltage (V)/ current (mA) before correction)	0.001V /0.01mA	0.000V~10.570V 0.000mA~20.000mA	
U0-23	Pot voltage before correction	0.001V	-10.570V~10.570V	
U0-24	Motor speed	1RPM	0~ motor rated speed	Display current operate speed of the motor
U0-25	Current power-on time	1Min	0Min~65000Min	-
U0-26	Current running time	0.1Min	0.0Min~6500.0Min	-
U0-27	Keep	-	-	-
U0-28	Communication setpoint	0.01%	-100.00%~100.00%	Displays the data written through the mailing address 0x1000. The percentage base is determined by the set value of the address 0x1000.
U0-29	Keep			
U0-30	Main frequency display	0.01Hz	0.00Hz~500.00Hz	Display master frequency setpoint
U0-31	Auxiliary frequency display	0.01Hz	0.00Hz~500.00Hz	Display auxiliary frequency setpoint
U0-34	Keep			
U0-35	Target Torque (%)	0.1%	-200.0%~200.0%	Display the current upper torque setting value, and the percentage base is the rated torque of the motor
U0-36	Keep			
U0-37	Power factor angle	0.1°	——	Displays the angle of the power factor that is currently running

parameter	define	default	range	illustrate
U0-38	Keep			
U0-39	Target voltage upon V/F separation	1V	0V~ Motor rated voltage	Display target output voltage when running in the V/F split state
U0-40	Output voltage upon V/F separation	1V	0V~ Motor rated voltage	Display actual output voltage when running in the V/F split state
U0-41	DI state display	1	—	DI status display: bright is high, off is low, see 6.9.5 details of AI status 
U0-42	DO state display	1	—	DO status display: bright is high, off is low 
U0-43	DI set for function state display 1 （fun 01-40）	1	—	Displays whether terminal function 1~40 is valid. The keyboard has a total of 5 digital tubes, and the digital tubes represent functions 1~8, 9~16, 17~24, 25~32, and 33~40 respectively from right to left. Each digital tube can represent 8 function options, which are defined as follows: Figure: DI terminal function display: bright is high, off is low 
U0-44	DI set for function state display 1 （fun 41-80）	1	—	Displays whether terminal function 41~59 is valid. The keyboard has a total of 5 digital tubes, and the digital tubes represent functions from right to left 41~48、49~56、57~59。 Each digital tube can represent 8 function options, and the definition of digital tube is as follows: The DI terminal function displays: on is high, off is low 
U0-45	Fault information	1	0~51	Displays the fault code of the drive section

parameter	define	default	range	illustrate
U0-58	Keep			
U0-59	Setting frequency (%)	0.01%	-100.00%~100.00%	Displays the current set frequency, the 100% base is the maximum frequency of the inverter (P0-10)
U0-60	Running frequency (%)	0.01%	-100.00%~100.00%	Displays the current run frequency, the 100% base is the maximum frequency of the inverter (P0-10)
U0-61	drive state	1	Bit1 Bit0	0: Stop 1: Forward 2: Reverse
			Bit3 Bit2	0: constant speed, 1: acceleration, 2: deceleration
			Bit4	0: bus voltage is normal 1: voltage is undervoltage
U0-62	Current fault code	1	0~99	Displays the current fault code, 2 for Err02
U0-63	Sending value of point-point communication	0.01%	-100.0%~100.0%	Display value of torque set by the host when the point-to-point communication is effective, and the 100% base rated torque of motor
U0-64	Number of slaves	1	0~63	Display the number of online slaves that can be viewed by the master
U0-65	Torque upper limit	0.1%	-200.0%~200.0%	Display upper limit of the current given torque, with the 100% base on rated speed of motor
U0-76	Low bit of acc-power consumption	0.1 °	0.0~999.9	The maximum power consumption can be recorded to 65535999.9 kWh, which is sufficient The full power range is used for more than 10 years, the accuracy is 0.1 degrees, and it is displayed by the combination of two parameters: U0-76, U0-77, and U0-76 the low position is displayed, and U0-77 shows the high position, and the conversion relationship is as follows: cumulative power consumption = u0-77 * 10000 + u0-66 Low power and ensure no overflow, compatible with old customers to read the cumulative power consumption P7-14, high power machine customers can directly read the value of U0-77, U0-76
U0-77	High bit of acc-power consumption	1 °	0~65535	

6.8 Process Function

This section mainly introduces the two commonly used process functions of fixed-length control and counting

6.8.1 Fixed-length control function

YD280 has a fixed-length control function, the length pulse can only be collected with the DI5 terminal, and the DI5 terminal function selection should be set to 27 (length count input).

parameter	define	default	range	illustrate
Pb-05	Set length	1000m	0m~65535m	-
Pb-06	Actual length	0m	0m~65535m	The actual length is the monitored value Actual length (P1-06) = number of pulses sampled by the terminal / number of pulses per meter (P1-07)
Pb-07	Number of pulses per meter	100.0	0.1~6553.5	-

In the figure below, the actual length is the monitoring value, and the actual length (Pb-07) = the number of pulses sampled by the terminal / the number of pulses per meter (Pb-08). When the actual length (Pb-07) is greater than the set length (Pb-06), the relay or DO output terminal "lengths arrive" at the ON signal (function selection is 10). During cut-to-length control, the length can be reset via the multi-function DI terminal (DI function set to 28). The specific settings are shown in the following figure:

parameter	define	default	illustrate
P4-04	DI5 terminal function selection	27	Length count input
P4-00~P4-04（one of them)	DI1~DI5 Terminal function selection	28	Length reset
P5-01~P5-05（one of them)	Terminal output function selection	10	The length arrives

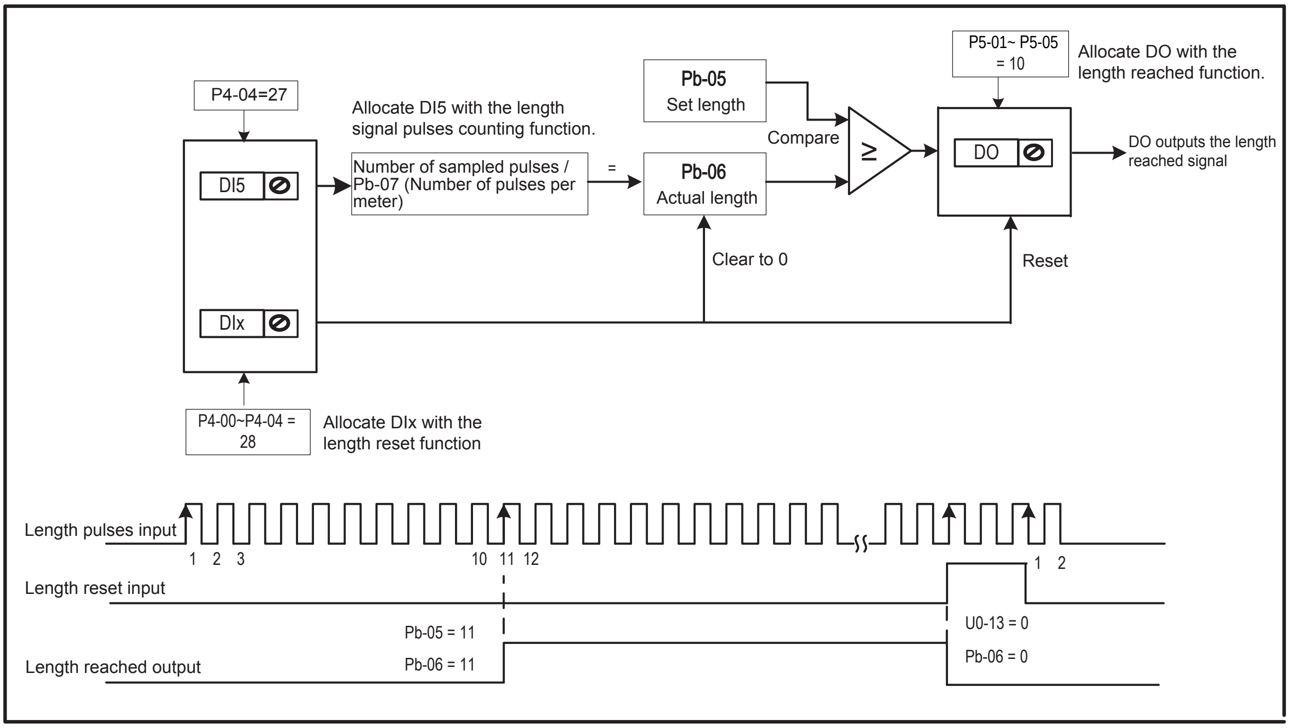


Figure 6-47 Fixed length control

The direction cannot be recognized in the fixed-length control mode, and the length can only be calculated based on the number of pulses.
An automatic shutdown system can be made by feeding back the output T/A-T/B output signal of the relay (RELAY) that reaches the length to the inverter shutdown input terminal.

6.8.2 Counting function

The count value needs to be collected via the DI terminal and the DI terminal function is set to 25 (counter input).

parameter	define	default	range	illustrate
Pb-08	Set count value	1000	1~65535	-
Pb-09	Designated count value	1000	1~65535	The specified count value Pb-09 should not be greater than the set count value Pb-08

In the figure below, the count value needs to be collected by the DI terminal, and the DI terminal function needs to be set to 25 (counter input)

If the count value reaches the set count value (Pb-08), the multi-function digital DO outputs the ON signal "The set count value has arrived".

If the count value reaches the specified count value (Pb-09), the multi-function digital DO outputs the "Specified Count Value Arrived" ON signal

parameter	define	default	illustrate
P4-00~P4-04（one of them）	DI1~DI5 Terminal function selection	25	Counter input
P4-00~P4-04（one of them）	DI1~DI5 Terminal function selection	26	Counting reset
P5-01~P5-05（one of them）	Terminal function selection	8	Set counting value reached
P5-01~P5-04（one of them）	Terminal function selection	9	Designated counting value reached

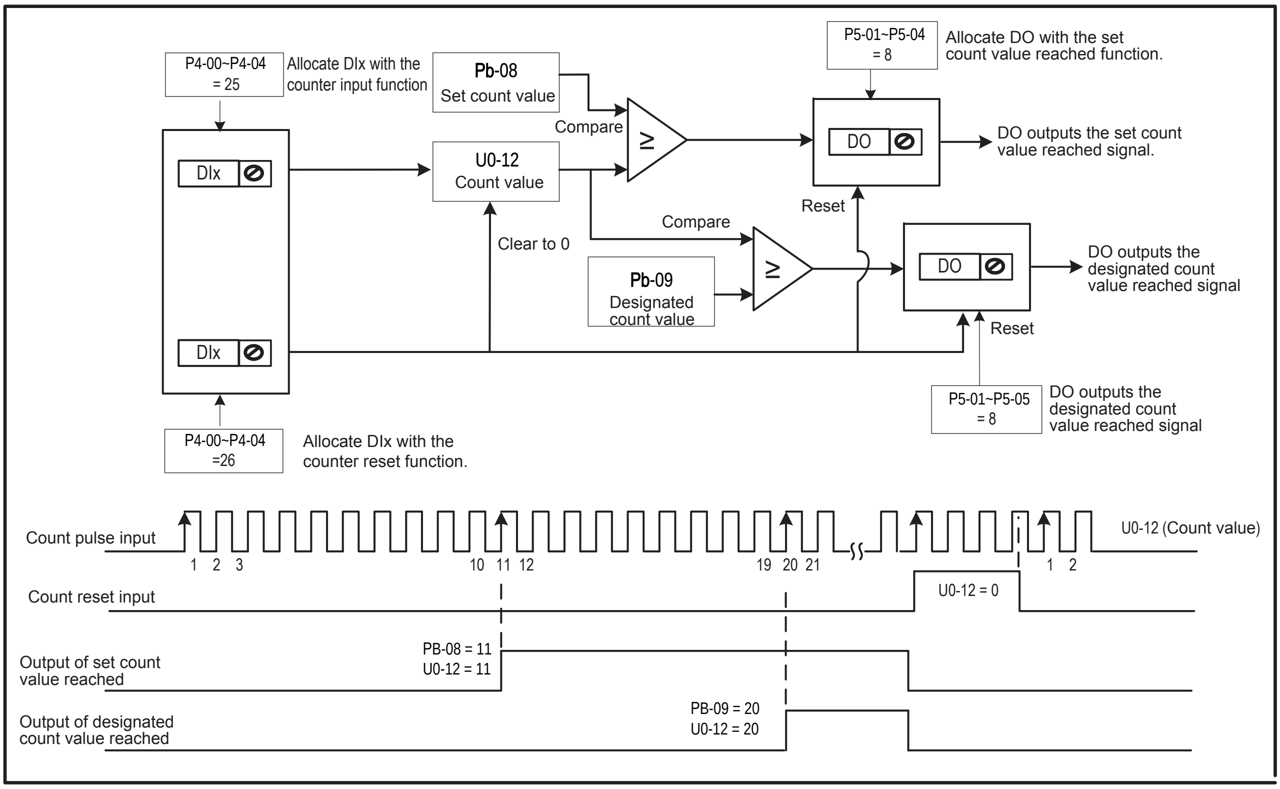


Figure 6-51 Counting function

At higher pulse frequencies, the DI5 port must be used;
The DO ports of Set Count Arrival and Specified Count Arrival cannot be reused.
In the RUN/STOP state of the inverter, the counter will continue to count until the "set counting value" arrives.
The count value can be held in power failure;
The count reaches the DO output signal and feeds back to the inverter shutdown input terminal, which can be made into an automatic shutdown system.

6.8.3 Second motor parameter

YD280 inverter supports two sets of motor parameter switching, motor 1 parameter corresponds to A2 group parameters, motor 2 corresponds to A2 group parameter. There are two ways to switch the parameters of the first motor and the second motor:

1) Select the current effective motor parameter group by setting the parameter P0-24 (motor parameter group selection).

parameter	define	default	range	illustrate
P0-24	Motor parameter group selection	0	0：Motor Parameter Group 1	Select Motor Parameter Group 1
			1：Motor Parameter Group 2	Select Motor Parameter Group 2

2) Select the current valid motor parameter group through the DI terminal function

DI1~DI5 (P4-00~P4-04), select one of the DI terminals arbitrarily, and set the function to 41 (motor selection terminal 1).

If the DI terminal is invalid, motor parameter group 1 is selected, and if the DI terminal is valid, motor parameter group 2 is selected.

parameter	define	value	illustrate
P4-00~P4-04	DI1~DI5 terminal function selection	41	Motor selection terminal 1

If any of the DI terminals in P4-00~P4-04 is set to 41, then the DI terminals preferentially determine which group of motors to choose, and the motor selection is not related to the parameter P0-24. Only when all DI terminals of P4-00~P4-04 are not set to 41, then the motor parameter selection is determined by P0-24 (motor parameter group selection).

3） Motor 2 parameters are as follows:

parameter	define	default	range	illustrate
A2-00	Motor type	0	0	General motors
			1	Inverter motors
A2-01	Rated power	Model	0.1kW~1000.0kW	A2-01~ A2-05 is the motor nameplate parameter. When V/F control or vector control is employed In order to obtain better control performance, it is necessary to tune the motor parameters, and the accuracy of the adjustment results is closely related to the correct setting of the motor nameplate parameters.
A2-02	Rated voltage	Model	1V~2000V	
A2-03	Rated current	Model	0.01A~655.35A	
A2-04	Rated frequency	Model	0.01Hz~ max. frequency	
A2-05	Rated speed	Model	1rpm~65535rpm	
A2-06	Stator resistance	Model	0.001Ω~65.535Ω	A2-06~A2-10 is the parameter of the asynchronous motor, which can be obtained by motor tuning Static tuning 1 can only obtain three parameters: A2-06~A2-08, In addition to A2-06~A2-10, the encoder phase sequence A2-30 can also be obtained by dynamic tuning. If the motor is not tuned on site, the above corresponding parameters can be input according to the parameters provided by the motor manufacturer.
A2-07	Rotor resistance	Model	0.001Ω~65.535Ω	
A2-08	Leakage inductive reactance	Model	0.01mH~655.35mH	
A2-09	Mutual inductive reactance	Model	0.1mH~6553.5mH	
A2-10	No-load current	Model	0.01A~A2-03	
A2-37	Asyn-Motor auto-tuning method selection	0	0: Do not act	-
			1: Static tuning (some parameters)	Only identify the stator resistance, rotor resistance, and leakage inductance of the motor parameters
			2: Dynamic Tuning (Full Parameter)	Identify all motor parameters
			3: Static Tuning (Full Parameter)	Identify all motor parameters

6.8.5 Master-slave control

The master-slave control function is designed for multi-drive applications, where the system is driven by several frequency converters and the motor shafts are coupled together by gears, chains, or conveyor belts. With master-slave control, the load can be evenly distributed between the transmission units. The external control signal is only connected to the main unit. The master controls the slave through a serial communication link.

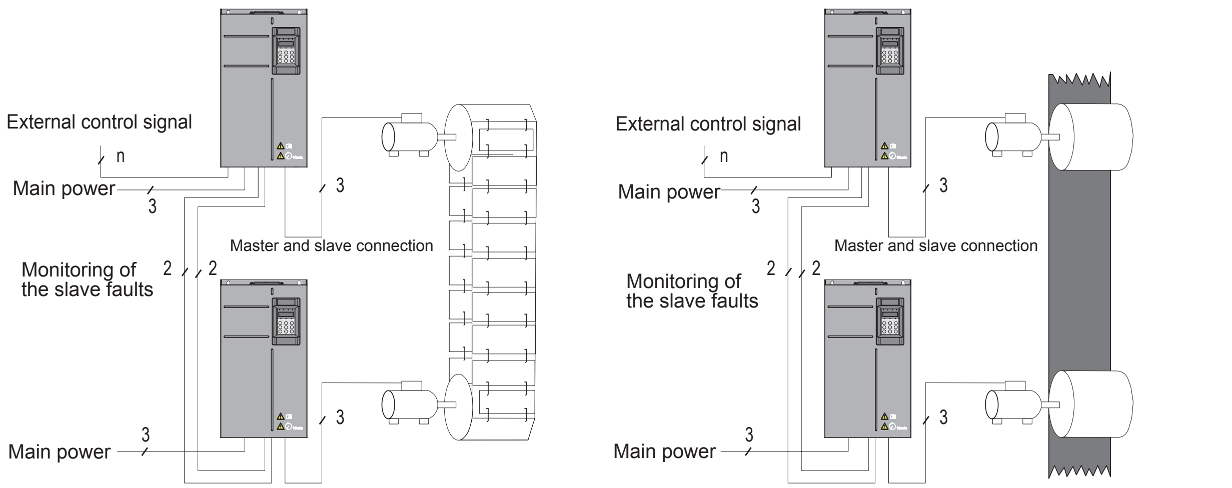
The master is a typical speed control, and the other slavor units follow the torque or speed of the master for a given moment. In general:

· When the motor shaft of the master and slave are rigidly connected by gears, chains, etc., the slave should adopt the torque control mode so that there is no speed difference between the transmission units. (See Figure 6-52.)

· When the motor shaft of the master and slave are flexibly connected, the slave should adopt the speed control mode, because small speed differences are allowed between the transmission units. When both the master and slave are speed controlled, the sag rate is generally used. (See Figure 6-52.)

❑ Rigid connection of the master and slave
- The master is in speed control.
- The slave follows the torque reference of the master..

❑ Flexible connection of the master and slave
- The master is in speed control.
- The slave follows the speed reference of the master.



Master-slave rigid connection schematic   Master-slave flexible connection schematic

Figure 6-52 Master-slave connection

To avoid control conflict, please:

· Connect all the external control signals to the master only.
· Do not use the operating panel or the field bus to control the slave .

1） Installation

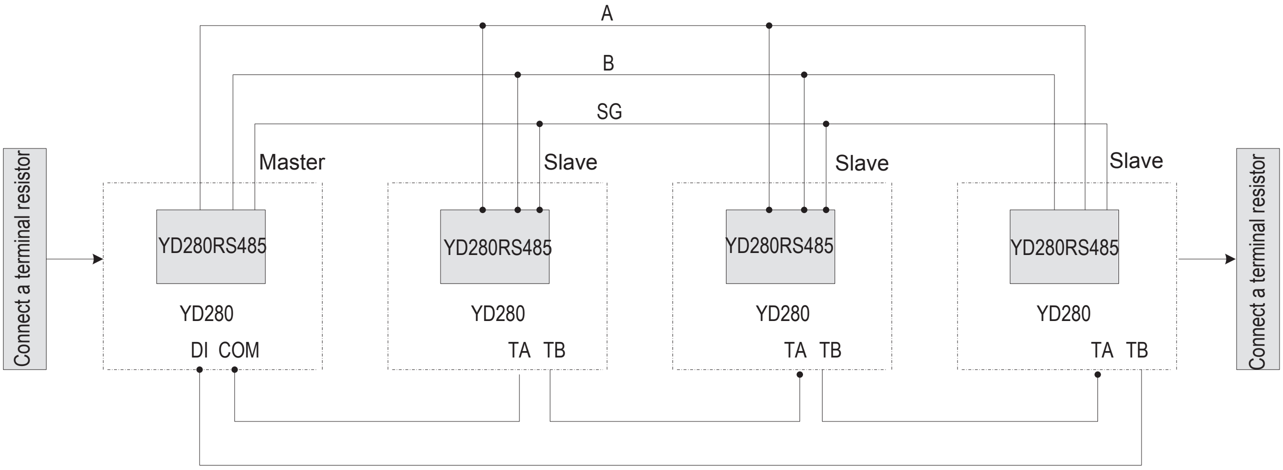


Figure 6-53 Connection of the master and slaves

① The relay acts as a slave fault feedback

② When the slave fails, the slave (A8-02 ten bit = 1) can be selected sends fault information to the master through communication

In the above two ways (choose one can be selected), when the slave fails, the master will stop running

2) Parameter Setting

- Rigid connection

· master：speed control（A0-00=0）

parameter	define	range	default	adjust
PD-00	Baud rate	0000~6009	Keep the same set of thousand bit of parameter for master and slave.	NO
A8-00	Point-point communication	0~1	1	YES
A8-01	Master and slave selection	0~1	0	NO
P0-10	Max. frequency	5.00~500.00Hz	50.00Hz (Master-slave alignment)	NO
P2-10	Upper torque limit	0.0~200.0%	130.0%	YES

· slave：torque control（A0-00=1，When in torque control mode, please do not set the starting frequency, otherwise it will cause a large starting inrush current

parameter	define	range	default	adjust
PD-00	Baud rate	0000~6009	Keep the same set of thousand bit of parame--ter for master and slave.	NO
A8-00	Point-point communication	0~1	1	NO
A8-01	Master and slave selection	0~1	1	NO

parameter	define	range	default	adjust
A8-02	Selection of action of the slave in point to point communication	0: No 1: Yes one bit: slaver to follow master's command ten bit: slaver to send fault information to master when a fault occurs Hundreds bit: slaver to alarm when it becomes off-line(ERR16)	one bit：1 ten bit：1	NO
A8-03	The slave received data	0: Output frequency 1: Frequency reference	0	NO
A8-11	Window width	0.20~10.00Hz	0.50Hz	YES
P0-10	Max. frequency	5.00~500.00Hz	50.00Hz (Master-slave alignment）	NO
P8-07	Acceleration time 4	0.0~6500.0s	0.0s	NO
P8-08	Deceleration time 4	0.0~6500.0s	0.0s	NO
P0-02	Command source selection	0~2	2	NO
A0-00	Speed/Torque control selection	0~1	1	NO
A0-01	Reference source in torque control	0~7	0	NO
A0-03	Torque digital setting in torque control	-200.0~200.0%	130.0%	Same as master P2-10
A0-07	Acceleration time in torque control	0.00~650.00s	0.00s	NO
A0-08	Deceleration time in torque control	0.00~650.00s	0.00s	NO

NOTE

- When the master-slave control, appropriately reduce the A8-11 of the slave, which can improve the starting smoothness, but it should be greater than 0.20Hz, and if the system acceleration and deceleration time is short, it is a rapid acceleration/deceleration, please increase A8-11 appropriately, the larger the A8-11, the weaker the window will take effect.

It is recommended that the initial value of A8-11 be set to half of the rated slip of the motor.

Calculation of the rated slip of the motor

Number of pole pairs of motor (take an integer) = (60 x rated motor frequency)/rated motor speed Synchronous motor speed = (60 x rated motor frequency)/number of pole pairs of motor

Rated motor slip = (synchronous motor speed - rated motor speed)/synchronous motor speed x rated motor frequency

- Flexible connection

· master：speed control（A0-00=0）

parameter	define	range	default	adjust
Pd-00	Baud rate	0000~6009	Keep the same set of thousand bit of parame--ter for master and slave.	NO
A8-00	Point-point communication	0~1	1	NO
A8-01	Master and slave selection	0~1	0	NO
P0-10	Max. frequency	5.00~500.00Hz	50.00Hz (Master-slave alignment)	NO
P8-15	Droop rate	0.00~10.00Hz	1.00Hz	YES
P0-17	Acceleration time 1	0.0~6500.0s	Keep the same set of parameter for the master and slave.	NO
P0-18	Deceleration time 1	0.0~6500.0s	Keep the same set of parameter for the master and slave.	NO

· slave：speed control（A0-00=1）

parameter	define	range	default	adjust
PD-00	Baud rate	0000~6009	Keep the same set of thousand bit of parame--ter for master and slave.	NO
A8-00	Point-point communication	0~1	1	NO
A8-01	Master and slave selection	0~1	1	NO
A8-02	Selection of action of the slave in point to point communication	0: No 1: Yes one bit: slaver to follow master's command ten bit: slaver to send fault information to master when a fault occurs Hundreds bit:slaver to alarm (ERR16)	one bit：1 ten bit：1	NO
A8-03	The slave received data	0: Output frequency 1: Frequency reference	0	NO
P0-02	Command source selection	0~2	2	NO
P0-03	Main frequency reference setting channel selection	0~9	9	NO
P0-10	Max. frequency	5.00~500.00Hz	50.00Hz (Master-slave alignment)	NO
P0-17	Acceleration time 1	0.0~6500.0s	Keep the same set of parameter for the master and slave.	NO
P0-18	Deceleration time 1	0.0~6500.0s	Keep the same set of parameter for the master and slave.	NO
P8-15	Droop rate	0.00~10.00Hz	1.00Hz	YES
A0-00	Speed/Torque control selection	0~1	0	NO

- Droop Control P8-15：

Droop Control allows for a slight speed difference between the master and slave stations, which in turn avoids collisions between them. The default value for this parameter is 0.00Hz. Only when the master and slave both adopt the speed control mode, the droop rate needs to be adjusted, for each transmission process, the appropriate droop rate needs to be gradually found in practice, it is recommended not to set the P8-15 too much, otherwise the steady-state speed will be reduced when the load is large. Both the master and slave must be set to P8-15.

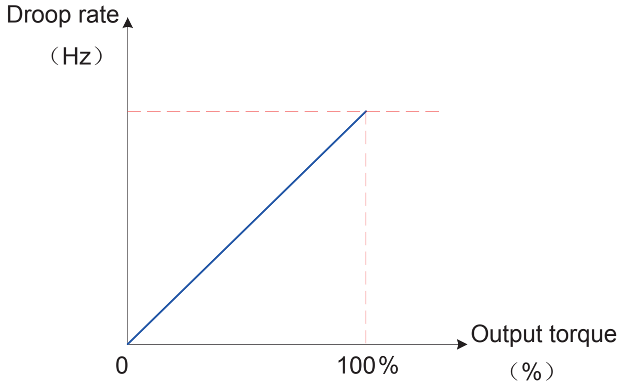


Figure 6-54 Relationship between droop rate and output torque

- Droop speed = rated motor frequency x output torque x droop rate
- Actual AC drive frequency = frequency reference - droop speed

Suppose that P8-15 is set to 10%, rated motor frequency is 50 Hz, and output torque is 50%. Actual drive frequency = 50 Hz – 50 x 50% x (1.00/10) = 47.5 Hz.

parameter	define	default	range	illustrate
A8-00	Point-point communication	0	0: Disabled 1: Enabled	-
A8-01	Master and slave selection	0	0: Master 1: Slave	This function parameter determines whether the AC drive is master or slave
A8-02	Selection of action of the slave in point to point communication	011	one bit:whether to follow master's command 0:NO 1:YES ten bit:whether to send fault information to master when a fault occurs 0:NO 1:YES(Err55 fault from slaver) hundred bit:whether to alarm when it becomes offline 0:NO 1:YES(Err16 fault from slaver)	Note: In the case of an abnormal connection with the slave, the master does not report the fault when it is not running, and the fault is reported when it is running Err16). When the slave controlled by master and slave is P0-02 = 2 (communication control), if A8-02 one bit set 1, the slave runs with the master operation command/stops. if A8-02 ten bit set 1, and when the slave fails, a fault message is sent to the host; if A8-02 hundred bit set 1, and the slave is alarmed when the slave drops.
A8-03	The slave received data	0	0: Output frequency 1: Frequency reference	0: The frequency transmitted by the master to the slave is the running frequency of the master, if the droop rate of P8-15 is not 0, then the frequency transmitted by the master to the slave is the droop control frequency, this situation is applied to the droop control or speed synchronization control (i.e., the slave is the speed mode); in the load distribution control (i.e., the slave is the torque mode), the master is passed to the slave as the master of the running frequency, at this time the value of P8-15 should be ensured to be 0. 1: The target frequency that the master passes to the slave as the master.
A8-04	Zero offset of received data	0.00%	-100.00%~100.00%	Correction of received data A0-00=0, A8-04、A8-05 correct the frequency command A0-00=1, A8-04、A8-05 correct the torque command For details on how to calculate A8-04、A8-05, see subsection 6.9.6
A8-05	Gain of received data	1.00	-10.00~10.00	

parameter	define	default	range	illustrate
A8-06	Point-point comm. interruption detection time	1.0s	0.0s~10.0s	Set the detection time of master or slave communication interruption for peer-to-peer communication, and set it to 0 to indicate that it will not be detected.
A8-07	Master data sending cycle in point-point communication	0.001s	0.001s~10.000s	-
A8-11	Window width	0.50Hz	0.20Hz~10.00Hz	It is used to ensure that the speed of the slave is synchronized with the master within the window range. Appropriately reduce the A8-11 of the slave to improve the starting smoothness, and increase the A8-11 appropriately in the case of rapid acceleration and deceleration, the larger the A8-11, the weaker the window will take effect.

6.9 Input and output terminals

This section describes functions of DI, DO, virtual DI, virtual DO, AI and AO terminals.

6.9.1 Digital input terminal function (DI)

YD280 series inverter is equipped with 5 multi-function digital input terminals as standard

parameter	define	default	range	illustrate
P4-00	DI1 function selection	1	0~59	See the table below for details
P4-01	DI2 function selection	4		
P4-02	DI3 function selection	9		
P4-03	DI4 function selection	12		
P4-04	DI5 function selection	13		
P4-05	keep	0		
P4-06	keep	0		
P4-07	keep	0		
P4-08	keep	0		
P4-09	keep	0		
P4-35	DI1 delay time	0.0s	0.0s~3600.0s	Sets the delay time for the inverter to change the status of the DI terminal Only DI1, DI2, DI3 have the function to set the delay time.
P4-36	DI2 delay time	0.0s	0.0s~3600.0s	
P4-37	DI3 delay time	0.0s	0.0s~3600.0s	
P4-38	DI High and Low Levels Valid Selection1	00000	0: Valid high 1: Valid low bit 0：DI1 valid status setting bit 1：DI2 valid status setting bit 2：DI3 valid status setting bit 3：DI4 valid status setting bit 4：DI5 valid status setting	When active-high is selected, the corresponding DI terminal is valid when it is connected to COM and invalid when it is disconnected. When active-low is selected, the corresponding DI terminal is invalid when it is connected to COM, and it is valid when it is disconnected.

parameter	define	default	range	illustrate
P4-40	AI2 voltage / current selection	00000	0:voltage 1:current	It has to be selected in the matching control board J9

- Detailed description of DI terminal function selection：

set value	function	description
0	No function	Set reserved terminals to 0 to avoid malfunction
1	Forward run (FWD)	2-wire type 1 (P4-11=0) is forward operation, and 2-wire type 2 (P4-11=1) is run command.
2	Reverser run (REV)	3-wire type 1 (P4-11=2) is reversed operation, and 2-wire type 2 (P4-11=3) is reversed direction.
3	3-wire control	It is determined that the inverter operation mode is a 3-wire control mode. If you want to run the command by terminal setting, set parameter P4-11 (terminal command method) to 2 (3-wire type 1) or 3 (3-wire type 2), the terminal function should be set to this function.
4	Forward jog (FJOG)	The operation mode of the inverter is forward jog operation. For details about the jog running frequency and jog acceleration and deceleration time, see the parameters P8-00、P8-01、P8-02 in "6.11.1 Jog Operation".
5	Reverse jog (RJOG)	The operation mode of the inverter is reverse jog operation. For details about the jog running frequency and jog acceleration and deceleration time, see the parameters P8-00、P8-01、P8-02 in "6.11.1 Jog Operation".
6	Terminal UP	The terminals selecting these two functions are used for increment and decrement when frequency reference is input via external DI terminal, or when frequency source is digital setting.
7	Terminal DOWN	
8	Coast to stop	The inverter stops, and the motor stops according to inertia.
9	Fault reset (RESET)	Resets the failure of the inverter, which functions the same as the STOP/RES key on the keyboard. This function enables remote fault reset.
10	RUN disabled	When the terminal set for this function becomes on, the AC drive decelerates to stop and retains all running parameters, such as PLC, wobble and PID parameters. Once the terminal becomes off,the AC drive resumes the running status before stop
11	External fault NO input	When terminal set this function and on, drive detects ERR15 and performs fault protection.
12	Multi-reference terminal 1	16 speeds or 16 other references can be implemented through combinations of 16 states of these four terminals.
13	Multi-reference terminal 2	
14	Multi-reference terminal 3	
15	Multi-reference terminal 4	
16	T1 for acc/dec time select	4 types of acceleration and deceleration times can be selected through the four states of the two terminals, as shown in Table 6-2 for details
17	T2 for acc/dec time select	
18	Frequency command switching	The terminal set for this function is used to perform switchover between two frequency reference setting channels according to setting in P0-07.
19	UP/DOWN setting to zero (terminals, keypads)	When the main frequency is set through the panel, the terminal selects this function to clear the frequency value changed by the key, key, or terminal function UP/DOWN (6 or 7) on the keyboard, returning the given frequency to the value set by P0-08.
20	Command source switchover 1	If command source is terminal control (P0-02 = 1), this terminal is used to perform switchover between terminal control and operation panel control. If command source is communication control (P0-02 =2), this terminal is used to perform switchover between communication control and operation panel control.

set value	function	description
21	Acc/Dec prohibited	This function ensures drive to maintain current frequency output without being affected by external signals (except STOP command).
22	PID disabled	This function disables PID function. drive maintains current frequency output without supporting PID adjustment of frequency reference.
23	PLC state reset	Simple PLC function is enabled again after it was disabled in execution process, this function restores original state of simple PLC drive
24	Wobble disabled	When terminal set for this function becomes on, the wobble function becomes disabled and the drive outputs center frequency.
25	Counter input	Terminal set for this function is used to count pulses..
26	Counter reset	Terminal set for this function is used to clear counter
27	Length signal pulses count	Terminal set for this function is used to count pulses of the length signal
28	Length reset	The terminal set for this function is used to clear length
29	Torque control prohibited	Terminal set for this function becomes on, torque control is disabled and drive enters speed control.
30	Keep	-
31	Reserved	Reserved
32	Immediate DC injection braking	Once terminal set for this function becomes on, drive directly switches over to DC injection braking state.
33	External fault NC input	Once terminal set for this function becomes on, drive detects ERR15 and stops.
34	Frequency modification enabled	When terminal set for this function becomes on, the AC drive responds to frequency modification.
35	PID operation direction reverse	When terminal set for this function becomes on, PID operation direction is reversed to direction set in PA-03.
36	External stop 1	When the "Run Command Selection" is set to the operation panel (P0-02=0), the inverter is stopped, which is equivalent to the function of the STOP/RES key on the keyboard.
37	Command source switchover 2	Terminal set for this function is used to perform switchover between terminal control and communication control. If command source is terminal control, the AC drive switches over to communication control after the terminal becomes ON.
38	PID integral disabled	the integral function becomes disabled. However, the proportional and differentiation functions are still effective
39	Switch between main and preset frequency	The main frequency is switched to the preset frequency set in P0-08.
40	Switch between aux. and preset frequency	The auxiliary frequency is switched to the preset frequency in P0-08.
41	Motor selection	Select motor 2 when the terminal is active, and motor 1 when the terminal is invalid.
42	Reserved	--
43	PID parameter switchover	If PID parameters switchover is done via DI terminal (PA-18 =1), PID parameters are PA-05~PA-07 when terminal set for this function becomes off; PID parameters are PA-05~PA-07 when terminal set for this function becomes on.
44	User-defined fault 1	If Err27 alarm, inverter process it according to the setting value of P9-49 (fault protection action selection).
45	User-defined fault 2	If Err28 alarm, inverter process it according to the setting value of P9-49 (fault protection action selection).
46	Speed control/ Torque control	This function enables inverter to switch between speed control and torque control. A0-00=0, when the terminal is active, the control mode is torque mode, and when the terminal is invalid, the control mode is speed mode. A0-00=1, when the terminal is active, the control mode is speed mode, and when the terminal is invalid, the control mode is torque mode.
47	Emergency stop (ES)	When the system is in an emergency state, the inverter decelerates according to the P8-55 terminal emergency stop and deceleration time, and the V/F mode emergency stop deceleration time is 0s and decelerates according to the minimum unit time. The input terminal does not need to be closed continuously, and will stop in an emergency even if it is closed for only a moment. Different from the general deceleration time, after the emergency stop deceleration time, disconnect the emergency stop input terminal, if the inverter terminal operation signal is still in the closed state at this time, the inverter will not start, you need to disconnect the running terminal first and then enter the terminal operation instruction again, the inverter will start again.
48	External stop 2	Under any operation command mode (panel control, terminal control, communication control), the inverter slows down and stops. At this time The deceleration time is fixed at deceleration time 4 (P8-08).
49	Deceleration DC injection braking	The inverter first decelerates to the stop DC braking starting frequency (P6-11), and then enters the DC braking state.
50	Clear running time this time	The timer of the inverter was cleared to zero The running time is less than the set value of P8-53, the terminal is valid, and the timing of this operation is cleared. The running time is greater than the set value of P8-53, the terminal is valid, and the timing of this operation is not clear.

set value	function	description
51	2-wire control/3-wire control	Switch between 2-wire and 3-wire control. If P4-11 = 0 (2-wire type 1), switch to (3-wire type 1) when the terminal of this function is active. If P4-11 = 1 (2-wire type 2), switch to (3-wire type 2) when the terminal of this function is active. If P4-11 = 2 (3-wire type 1), switch to (2-wire type 1) when the terminal of this function is active. If P4-11 = 3 (3-wire type 2), switch to (2-wire type 2) when the terminal of this function is active.
52	Reserved	When the terminal is active, the actual frequency set by the inverter is limited to 0 even if the reverse frequency is set. The same function as the reverse frequency inhibition (P8-13).

6.9.2 Digital Output Terminal Function (DO)

YD280 series inverter comes standard with 1 multi-function digital output terminal, 1 multi-function relay output terminal, 1 FM terminal.

parameter	define	default	range	illustrate
P5-00	FM terminal output mode	0	0: Pulse output (FMP) 1: Digital output (FMR)	FM is a programmable multiplexed terminal that can be used as a high-speed pulse output (FMP) or open-collector output (FMR). When FM used as a pulse, the maximum frequency of the output pulse is 100kHz, and the FMP related functions are described in P5-06.
P5-01	FMR function selection	0	0~41	Functions for selecting 5 digital outputs, where (T/A-T/B-T/C)
P5-02	Relay (T/A-T/B-T/C) function selection	2		
P5-03	keep	0		
P5-04	DO1 function selection	1		
P5-05	keep	-		
P5-17	FMR output delay	0.0s	0.0s~3600.0s	-
P5-18	Relay 1 output delay	0.0s	0.0s~3600.0s	-
P5-19	keep	-	-	-
P5-20	DO1 output delay	0.0s	0.0s~3600.0s	-
P5-21	keep	-	-	-
P5-22	DO active mode selection 1	00000	0: Positive logic active 1: Negative logic active bit 0: FMR active mode bit 1: Relay1 active mode bit 2: keep bit 3: DO1 active mode bit 4: keep	0: Positive logic (Equivalent normally open contact) Active Status :DO terminal and COM/CME terminal are internally connected. Invalid Status :DO terminal and COM/CME terminal are disconnected. 1: Antilogic (Equivalent Normally Closed Contact) Active Status :DO terminal and COM/CME terminal are disconnected. Invalid Status:DO terminal and the COM/CME terminal communicate internally.

● The functions of the digital output terminals are described in the following figure.

value	function	description
0	No output	Terminal has no function
1	AC drive running	When the AC drive is running and has output frequency (can be zero), terminal set for this function becomes on.
2	Fault output	When a fault occurs and the AC drive stops due to the fault, terminal set for this function becomes on.
3	Frequency level detection 1 output	When the operating frequency is higher than the frequency detection value, the DO outputs a "valid" signal, and when the operating frequency is lower than the detected value minus the FDT hysteresis value (the product of P8-19 and P8-20), the DO output "active" signal is canceled. For detailed descriptions of P8-19 and P8-20, please refer to Appendix C Functional Parameter Table.
4	Frequency reached	Operating frequency of inverter is within a certain range of the target frequency (the product of target frequency ±P8-21 set value and maximum frequency), and DO outputs an "active" signal.
5	Zero-speed running (no output at stop)	When output frequency is 0 during drive running, terminal set for this function becomes on. When the drive stops, terminal becomes off.
6	Motor overload pending	Before motor overload protection action, it is judged according to the overload warning coefficient (P9-02), and the "effective" signal is output after the pre-alarm threshold is exceeded. (For the calculation of the pre-alarm threshold, refer to 6.6 Protection Function)
7	Drive overload pending	10 seconds before inverter overload protection occurs, a "valid" signal is output.
8	Set count value reached	Terminal set for this function becomes on when count value reaches the value set in PB-08.
9	Designated count value reached	Turn on when count value reaches the value set in PB-09. When the count value reaches the value set by PB-09, a "valid" signal is output. Refer to subsection 6.8.3 for the counting function.
10	Length reached	Turn on when detected actual length exceeds value set in PB-05.
11	PLC cycle completed	Turn on because output a pulse signal with 250ms width when PLC runs one cycle.
12	Accumulative running time reached	Turn on when accumulative running time of the AC drive exceeds value set in P8-17.
13	Frequency limited	Turn on when frequency reference exceeds frequency upper or lower limit, and output frequency of inverter also reaches the upper or lower limit.
14	Torque limited	Turn on when inverter output torque reaches toque limit in speed control.
15	Ready for RUN	After inverter is powered on, and non-abnormal state, outputs a "valid" signal.
16	AI1>AI2	When AI1 input is greater than AI2 input, terminal set for this function becomes on.
17	Frequency upper limit reached	Operating frequency reach upper limit frequency (P0-12), a "valid" signal is output.
18	Frequency lower limit reached (no output at stop)	When P8-14 (the operating mode for a given frequency below the lower limit) is set to 1 (shutdown), an "invalid" signal is output regardless of whether the operating frequency reaches the lower limit frequency. When P8-14 (the mode of operation with a given frequency below the lower limit) is set to 0 (operation at the lower limit) or 2 (operation at zero speed) and the operating frequency reaches the lower frequency, a "valid" signal is output.
19	Undervoltage	Terminal set for this function becomes on when undervoltage occurs on AC drive.
20	Communication set	Terminal is active or inactive is determined by communication address 0x2001.
21	Reserved	Reserved
22	Reserved	Reserved
23	Zero-speed running 2 (having output at stop)	When inverter is in operation and the output frequency is 0, a "valid" signal is output. The signal is also "active" when the drive is in a standstill.
24	Accumulative power-on time reached	When cumulative power-on time (P7-13) of inverter exceeds set time set by P8-16 (set cumulative power-on arrival time), a "valid" signal is output.
25	Frequency level detection 2	When operating frequency is higher than frequency detection value, DO output "active" , and when operating frequency is lower than detection value, DO output "valid" that frequency detection lag value (P8-28*P8-29), and the DO output "valid" is canceled. For more information about P8-28、P8-29, refer to Appendix C Function Parameter Table.
26	Frequency 1 reached	Operating frequency of inverter is within the frequency detection range of P8-30 (any arrival frequency detection value 1), and the DO output is "active"Signal. Frequency detection range: P8-30-P8-31×P0-10 (maximum frequency to) ~ P8-30+P8-31×P0-10.
27	Frequency 2 reached	Operating frequency of inverter is within the frequency detection range of P8-32 (any arrival frequency detection value 2), and the DO output is "active"Signal. Frequency detection range: P8-32-P8-33×P0-10 (maximum frequency to) ~ P8-32+P8-33×P0-10.
28	Current 1 reached	Output current of inverter, which is within the range of P8-38 (arbitrary arrival current 1), Outputs a "valid" signal from DO. Current detection range=P8-38-P8-39×P1-03 (motor rated current)~P8-38+P8-39×P1-03.
29	Current 2 reached	Output current of inverter, which is within the range of P8-40 (arbitrary arrival current 2), Outputs a "valid" signal from DO. Current detection range=P8-40-P8-41×P1-03 (motor rated current)~P8-40+P8-41×P1-03.

set value	function	description
30	Timing reached	When timing function selection (P8-42) is valid, the inverter outputs an "active" signal after the running time reaches the set timing time. The timing time is set by P8-43 and P8-44.
31	AI1 input exceeding limit	Terminal set for this function becomes on when AI1 input is larger than value set in P8-46 (AI1 input voltage upper limit) or smaller than value set in P8-45 (AI1 input voltage lower limit).
32	Load lost	Terminal set for this function becomes on when load gets lost.
33	Reverse running	Terminal set for this function becomes on when the AC drive runs in reverse direction.
34	Zero current	Output current of inverter is within the range of zero current and lasts longer than P8-35 (when there is a zero current detection delay), DO outputs a "valid" signal. Zero current detection range =0~ P8-34×P1-03.
35	IGBT temperature reached	When the heat sink temperature of the inverter module (P7-07) reaches the set module temperature arrival value (P8-47), a "valid" signal is output.
36	Output current exceeding limit	When output current of inverter is greater than P8-36 (the output current exceeds the limit value) and the duration exceeds P8-37 (the delay time for the detection of the output current exceeds the limit), the DO outputs a "valid" signal.
37	Frequency lower limit reached (having output at stop)	When operating frequency reaches the lower limit frequency (P0-14), a "valid" signal is output. In the event of a stop, an "valid" signal is also output.
38	Alarm output	When the inverter fails, and the fault protection action is selected to continue operation, the DO terminal outputs a "valid" signal. The fault protection action selection can refer to P9-47~P9-50.
39	Motor overheat pending	Terminal set for this function becomes on when motor temperature reaches value set in P9-58 (Motor overheat pending threshold). You can view motor temperature by using U0-34.
40	Current running time reached	Terminal set for this function becomes on when current running time of the AC drive exceeds value set in P8-53.
41	Fault output	When a fault occurs on the AC drive (except undervoltage), terminal set for this function becomes on.

6.9.3 Virtual Digital Input Terminal Function (VDI)

The virtual digital input function, similar to the DI input function of the control board, can be used as a multi-function digital input.

Here's an example of how to use virtual VDI.

Example 1: When the effective status setting mode (A1-05) of the virtual VDI terminal is set to 00000 (select VDO status to determine the VDI status), the following functions need to be completed: "If the AI1 input exceeds the upper and lower limits, the inverter needs to be alarmed and shut down". You can set it up as follows:：

step	set value
1	Set the function of VDI1 to "User Defined Fault 1" (A1-00=44)
2	Set the VDI1 terminal valid state mode to be determined by VDO1 (A1-05=00000)
3	Set the VDO1 output function to "AI1 input exceeds upper and lower limits" (A1-11=31)

After setting the above steps, when the AI1 input exceeds the upper and lower limits, the VDO1 output is in the ON state, and the VDI1 input terminal status is valid, and the inverter VDI1 receives the user-defined fault 1, and the inverter will alarm Err27 and shut down.

Example 2: When the effective state setting mode (A1-05) of the virtual VDI terminal is set to 11111 (select parameter A1-06 to set the VDI state), the following functions can be completed to complete the following functions: "When the inverter is powered on, the inverter needs to automatically enter the running state", the following setting methods can be adopted:

step	set value
1	Set the function of VDI1 to "Forward Run" (A1-00=1)
2	Setting the VDI1 terminal valid state mode to be set by the parameter (A1-05 = 11111)
3	Set VDI1 terminal status to valid (A1-06=11111)
4	Set the command source to "Terminal Control" (P0-02=1)
5	Set boot protection selection to "Do Not Protect" (P8-18=0)

After setting the above steps, if VDI1 is detected to be valid after the inverter is initialized after powering on, and this terminal corresponds to the forward rotation operation, it is equivalent to the inverter receiving a terminal forward rotation operation command, and the inverter will start forward rotation operation.

parameter	define	default	range	description
A1-00	VDI1 function selection	0	0~59	Virtual VDI1~VDI5 can be used as: Multi-function digital input is used, function 0~52 is the same as ordinary DI setting, 53~59 is retained. For details, please refer to section 6.9.1 P4-00~P4-04.
A1-01	VDI2 function selection	0	0~59	
A1-02	VDI3 function selection	0	0~59	
A1-03	VDI4 function selection	0	0~59	
A1-04	VDI5 function selection	0	0~59	
A1-05	VDI active state setting mode	00000	0: Decided by state of VDOx 1: Decided by A1-06 bit 0: VDI1 bit 1: VDI2 bit 2: VDI3 bit 3: VDI4 bit 4: VDI5	The status of virtual VDI can be set in two ways, and it can be selected by A1-05. Set to 0: Whether VDI is valid depends on whether the VDO output is valid or invalid, and VDIx is uniquely bound to VDOx (x is 1~5). Set to 1: The status of the virtual input terminals is determined by the binary bits of parameter A1-06.
A1-06	Selection of VDI active state	00000	0: Inactive 1: Active bit 0: VDI1 bit 1: VDI2 bit 2: VDI3 bit 3: VDI4 bit 4: VDI5	-

6.9.4 Virtual Digital Output Terminal Function (VDO)

The virtual digital output function, similar to the DO output function of the control board, can be used in conjunction with the virtual digital input VDIx to achieve some simple logic control.
VDO and VDI can be used together to achieve flexible control methods, please refer to the example in Section 6.9.3 Virtual VDI.

parameter	define	default	range	description
A1-11	VDO1 function selection	0	0: Short with physical DIx internally 1~41:See P5 Group Physical DO Output Selection	When the virtual VDOx output function is selected as 0, the output status of VDO1~VDO5 is determined by the DI1~DI5 input state on the control board, and the VDOx and DIx correspond one-to-one. The work of the VDOx when the virtual VDOx output function selected as non-0 The parameters related to the DO output of the P5 group are the same as those of the P5 group, please refer to the relevant parameters of the P5 group in subsection 6.9.6
A1-12	VDO2 function selection	0		
A1-13	VDO3 function selection	0		
A1-14	VDO4 function selection	0		
A1-15	VDO5 function selection	0		
A1-16	VDO1 output delay	0.0s	0.0s~3600.0s	-

parameter	define	default	range	description
A1-17	VDO2 output delay	0.0s	0.0s~3600.0s	-
A1-18	VDO3 output delay	0.0s	0.0s~3600.0s	-
A1-19	VDO4 output delay	0.0s	0.0s~3600.0s	-
A1-20	VDO5 output delay	0.0s	0.0s~3600.0s	-
A1-21	VDO active mode selection	00000	0: Positive logic active 1: Negative logic active bit 0: VDO1 bit 1: VDO2 bit 2: VDO3 bit 3: VDO4 bit 4: VDO5	Positive logic: terminal invalid is 0; terminal valid is 1; Anti-logic: terminal invalid is 1; terminal valid is 0;

6.9.5 Analog input terminals

YD280 series inverter is equipped with 2 analog multi-function input terminals as standard.

The following parameters are used to use AI as DI (see "6.2.3 Setting the Master Frequency" with "Analog Quantities" for more AI functions).

When the AI is used as a DI, the AI terminal state is high if the AI input voltage is greater than 7V and if the AI input voltage is lower

When the AI terminal is 3V, the AI terminal state is low, and when the AI input voltage is between 3V~7V, it is hysteresis. Figure 6-56 illustrates the relationship between the AI input voltage and the corresponding DI state.

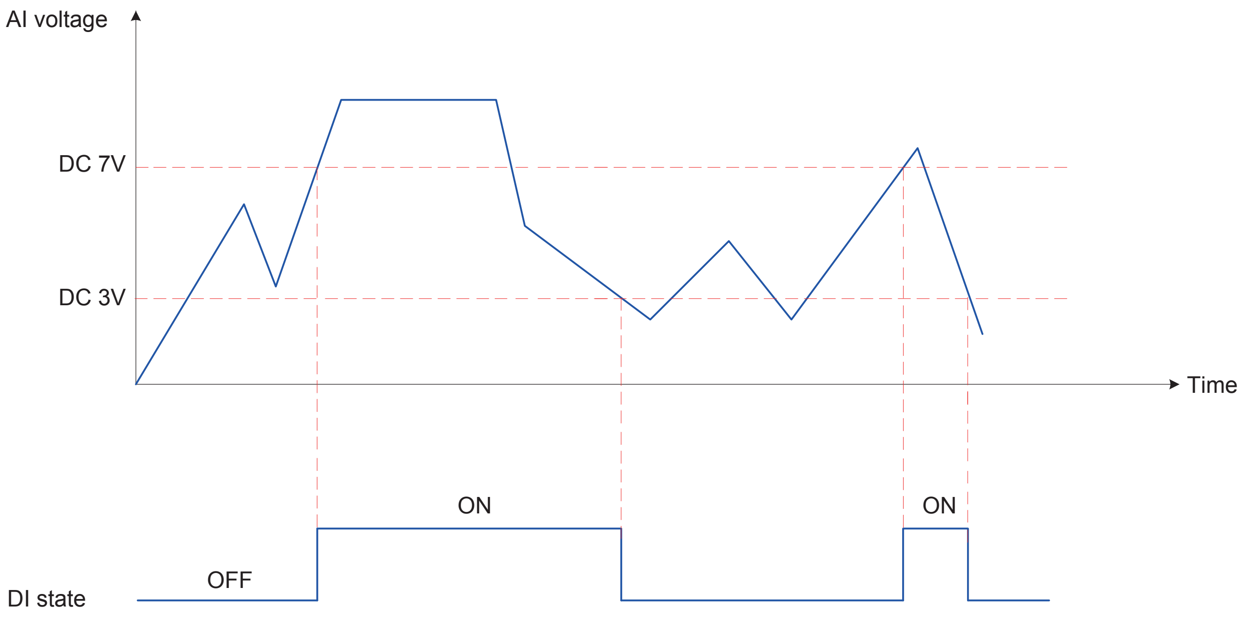


Figure 6-55 Relationship between AI input voltage and DI state

parameter	define	default	range	description
A1-07	Function selection for AI1 used as DI	0	0~59	The function setting when AI is used as DI, the function 0~52 is the same as the normal DI setting, and 53~59 is retained. For details, please refer to Section 6.9.1 for instructions on DI settings for group P4.
A1-08	Function selection for AI2 used as DI	0	0~59	
A1-09	Function selection for Panel Pot used as DI	0	0~59	
A1-10	Active state selection for AI used as DI	000	0: High level active 1: Low level active） bit 0: AI1 bit 1: AI2	When AI terminal is high, if A1-10 set to 0, the AI, terminal is valid, if A1-10 set to 1, the AI terminal is invalid, When AI terminal is low, if A1-10 set to 0, the AI terminal is invalid, if A1-10 set to 1, the AI terminal is valid.

6.9.6 Analog and pulse output terminals

YD280 series inverter is equipped with 1 analog output terminal AO1 as standard. The following parameters are generally used to correct the zero drift of the analog output and the deviation of the output amplitude. It can also be used to customize the desired AO output curve.

parameter	define	default	range	description
P5-00	FM terminal output mode	0	0: Pulse output (FMP) 1: Digital output (FMR)	The FM terminal is a programmable, multiplexed terminal that can be used as a high-speed pulse output terminal (FMP) or as an open-collector switching output terminal (FMR). When the output FMP is used as a pulse, the maximum frequency of the output pulse is 100kHz, and the FMP related functions are described in P5-06.
P5-06	FMP function selection	0	0~16	See Table 6-5 below for details.
P5-07	AO1 function selection	0	0~16	
P5-08	keep	-	-	
P5-09	Max. FMP output frequency	50.00kHz	0.01kHz~100.00kHz	When the FM terminal is selected as the pulse output, this parameter is used to select the maximum frequency value of the output pulse.
P5-10	AO1 zero offset coefficient	0.0%	-100.0%~+100.0%	100% of AO1 bias coefficient corresponds to 10V or 20mA. Bias = bias coefficient ×10v (or 20mA)
P5-11	AO1 gain	1.00	-10.00~+10.00	-
P5-12	keep	-	-	-
P5-13	keep	-	-	-

AO (analog output) 0~10V corresponds to 0%~100%,

FM (pulse output) 0~100kHz corresponds to 0%~100%, when the FM output function is 1 (frequency setting), if the frequency converter is set to 50% of the maximum frequency, P5-09 is set to 100kHz, then the output frequency of the FM terminal is 50%×100kHz = 50kHz.

Table 6-5 Correspondence between the functions and ranges of pulse or analog outputs

Value	Output Function	Range
0	Running frequency	0 to max. frequency
1	Frequency reference	0 to max. frequency
2	Output current	0 to 2 times of rated motor current
3	Motor output torque (absolute, percentage of rated torque relative to motor)	0 to 2 times of rated motor torque
4	Output power	0 to 2 times of rated power
5	Output voltage	0 to 1.2 times of rated AC drive voltage
6	Keep	-
7	AI1	0 to 10 V
8	AI2	0 to 10 V (or 0 to 20 mA)
9	Panel pot.	0 to 10 V
10	Length	0 to max. set length
11	Counting value	0 to max. count value
12	Communication reference	0.0% to 100.0%
13	Motor speed	0 to motor speed corresponding to max.output frequency
14	Output current	0.0 to 1000.0 A
15	Output voltage	0.0 to 1000.0 V
16	Motor output torque (actual, percentage relative to motor)	-2 times of rated motor torque to 2 times of rated motor torque

- The AO bias coefficient (P5-10) and AO gain (P5-11) are calculated as follows:

For example, if the analog output is the operating frequency, if you want the frequency to be 0 Hz (X1), the corrected output is 8 V (Y1), and when the frequency is 40 Hz (X2), the corrected output is 4 V (Y2). The gain is calculated as follows:

$$K = \frac{(Y1\text{-}Y2) * Xmax}{(X1\text{-}X2) * Ymax}$$

The formula for calculating the bias coefficient is:

$$b = \frac{(X1*Y2) - (X2*Y1)}{(X1\text{-}X2) * Ymax} \times 100\%$$

From Table 6-6 and Table 6-7, it can be seen that Xmax is the maximum output frequency of 50Hz (assuming that the maximum frequency P0-10 is 50Hz) and Ymax is the voltage and the value is 10V.

$$K = \frac{(8 - 4) \times 50}{(0 - 40) \times 10} = -0.5 \text{ (gain)} \qquad b = \frac{(0 \times 4 - 40 \times 8)}{(0 - 40) \times 10} = 80\% \text{ (bias coefficient)}$$

Therefore, the AO1 gain (P5-11) should be set to -0.5, and the AO1 bias coefficient (P5-10) should be set to 80%.

Table 6-6 Relationship between analog output signal types and their corresponding maximum values (Ymax):

AO1 output signal	Corresponding Max. Output (Ymax)
Voltage	10 V
Current	20 mA

Table 6-7 Relationship between the analog output content and its corresponding maximum value (Xmax).

analog output content	corresponding maximum value (Xmax)
Running frequency	max. out frequency
Frequency reference	max. out frequency
Output current	2 times of rated motor current
Output torque (absolute value)	2 times of rated motor torque
Output power	2 times of rated power
Output voltage	1.2 times of rated AC drive voltage
Pulse input	100.00 kHz
AI1	10 V
AI2	10 V or 20 mA
Panel potentiometers	10 V
Length	max. set length
Counting value	max. count value
Communication reference	100.0%
Motor speed	motor speed corresponding to max. output frequency
Output current	1000.0 A
Output voltage	1000.0 V
Output torque (actual value)	±2 times of rated motor torque

6.10 Communication

The drive support communication links, such as Modbus
You can monitor and control of the AC drive, for example, view or modify function parameters by using a host computer.
Make sure to set communication parameters correctly. Otherwise, communication may fail.

parameter	define	default	range	description
P0-28	Serial port communication protocol	0	0: Modbus protocol	-
Pd-00	Baud rate	5005	Single digits：Modbus 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. The higher the baud rate, the faster the communication speed. Note that the baud rate set by the host computer and the inverter must be consistent, otherwise, the communication cannot be carried out.
Pd-01	Modbus data format symbol	0	0: No check: The data format < 8, N, 2, > 1: Even test: data format<8,E,1> 2: Odd check: data format<8,O,1> 3: No check: The data format < 8, N, 1>	The data format set by the host computer and the inverter must be consistent, otherwise, the communication cannot be carried out
Pd-02	Local address	1	1~247	it is the broadcast address, and the upper computer broadcasts the function. The local address is unique (except for the broadcast address), which is the basis for the point-to-point communication between the host computer and the inverter.
Pd-03	Modbus response delay	2	0~20ms	The interval between the end of inverter data acceptance and the sending of data to the upper computer. If the response delay is less than the system processing time, the response delay is subject to the system processing time. If the response delay is greater than the system processing time, the system will delay waiting until the response delay time is reached, and then send data to the host computer after the system has finished processing the data.
Pd-04	Serial port communication timeout	0.0	0.0s（invalid） 0.1~60.0s	If this parameter is set to 0.0s, the communication timeout period is invalid. Normally, it is set to be invalid. In a system of continuous communication, this parameter can be used to monitor the communication situation. If the interval between this communication and the next communication exceeds PD-04 (communication timeout period), the system will report a communication fault error false (Err16).

parameter	define	default	range	description
Pd-05	MODBUS	01	Single digit: Modbus 0: Non-standard Modbus protocol 1: Standard Modbus protocol Ten bits: keep	Single digits: 0: When reading the command, the slave returns one byte more than the standard Modbus protocol. 1: Select the standard Modbus protocol.
Pd-06	Current resolution read by comm.	0	0：0.01A	The output unit used to determine the current value when the communication reads the output current

NOTE

- Pd-06=0 (the low power current is displayed to two bit)

6.10.1 Read and Write Parameters

1） Read Function Parameters

For function parameters in groups P0 to PF and A0 to AF, the highest eight bits in communication address indicate function code group, while the lowest eight bits indicate hexadecimal number converted from SN in function code group.

For example, communication address of P0-16 is F010H, in which F0H indicates function code group F0 and 10H is the hexadecimal number converted from 16. Communication address of AC-08 is AC08H, in which ACH indicates function code group AC and 08H is the hexadecimal number converted from 8.

To read desired function parameter, host computer needs to send a read command to the AC drive. Here takes the Modbus protocol as an example to describe communication process of reading the drive data.

For example, to read P0-10, read command is 01 03 F0 0A 01 DE D7 (hexadecimal). In the command,

Table 6-8 The host computer reads the inverter data

Master Command		Slave Response	
ADDR	01H	ADDR	01H
CMD	03H	CMD	03H
Parameter address high bits	F0H	Parameter address high bits	F0H
Parameter address low bits	0AH	Parameter address low bits	0AH
Number of function parameters	01H	Number of function parameters	01H
CRC high bits	DEH	CRC high bits	DEH
CRC low bits	D7H	CRC low bits	D7H
-	-	-	

2) Write Function Parameters

For function parameters in groups P0 to PF, the highest eight bits in communication address indicate 00 to 0F or F0 to FF according to whether to write parameter to EEPROM, while the lowest eight bits indicate the hexadecimal number converted from SN in function code group.
For example, host computer writes data to P0-16. If not writing to EEPROM, communication address is 0010H. If writing to EEPROM, communication address is F010H.
For function parameters in groups A0 to AF, the highest eight bits in communication address indicate 40 to 4F or A0 to AF according to whether to write parameter to EEPROM, while the lowest eight bits indicate the hexadecimal number converted from SN in function code group.
For example, host computer writes data to AC-08. If not writing to EEPROM, communication address is 4C08H. If writing to EEPROM, communication address is AC08H.
To write data, host computer needs to send a write command to the AC drive. Here takes Modbus protocol as an example to describe communication process of writing data to the AC drive.
For example, to write 2 to AC-16 (not writing to EEPROM), write command is 01064C1000021F5E (hexadecimal). In the command,

- 01H (settable): AC drive address
- 06H: write command
- 4C10H: communication address of AC-16
- 02H: writing data
- 1F5EH: CRC check

Master Command		Slave Response	
ADDR	01H	ADDR	01H
CMD	06H	CMD	06H
Parameter address high bits	4CH	Parameter address high bits	4CH
Parameter address low bits	10H	Parameter address low bits	10H
Writing data high bits	00H	Number of function parameters	00H
Writing data low bits	02H	CRC high bits	02H
CRC high bits	1FH	CRC high bits	1FH
CRC low bits	5EH	CRC low bits	5EH

6.10.2 Reading Status Parameters

State parameters include monitoring parameters in group U (U0 to UF), drive fault information and drive running status.

- The highest 8 bits in communication of parameters in U0 to UF is 70 to 7F, while lowest eight bits indicate the hexadecimal number converted from SN in function code group. For example, communication address of U0-11 is 700BH.
- Communication address of the drive fault information is 8000H. You can obtain current fault codes by using host computer to read the address.
- Communication address of drive running status is 3000H. Word in the read information is defined as 1: forward run, 2: reverse run, 3: stop.

6.10.3 Control Command

When P0-02 = 2, you can write running command via communication on host computer, such as forward run, reverse run, forward jog, reverse jog and stop of the AC drive.
Communication address and descriptions of running command are defined in the following table.

RUN Command Communication Address	RUN Command Description
2000H	1: Forward run
	2: Reverse run
	3: Forward jog
	4: Reverse jog
	5: Coast to stop
	6: Decelerate to stop
	7: Fault reset

6.10.4 Setting Frequency, Torque

If the main frequency, upper torque, V/F separation voltage, PID given, PID feedback, etc. are selected as "communication given", the frequency, torque, etc. should be written through the communication address 1000H. The data range that can be set by the host computer is -10000~10000, which corresponds to -100.00%~100.00% of the given value.

For example, the main frequency selection (P0-03) of the inverter is set to a given communication, and when the host computer wants to write the frequency, it must send a write command to the inverter. The following uses the Modbus protocol as an example to illustrate the process. When the frequency is set to 8000 using the communication method, the write command is 01 06 10 00 1F 40 84 CA

Each byte represents the following meanings, inverter address: 01H (can be set), write command: 06H, address of a given frequency: 1000H, target frequency value: 1F40H (converted to decimal 8000), CRC check: 84CAH. Similarly, when the torque is set to -8000 in a given way of communication, the write command is sent

01 06 10 00 E0 C0 C4 9A 。 where E0C0 is -8000 converted to hexadecimal and takes four lower digits.

Note: The range of the given frequency for the communication method is -10000 ~ +10000 (decimal), and the corresponding frequency range is -100.00%~ +100.00% (-100.00% corresponds to the negative maximum frequency, 0.00 corresponds to the minimum frequency, and +100.00% corresponds to the maximum frequency). Assuming that F0-10 Max Frequency is set to 50Hz, if the frequency value written in the write command is 1F40H, convert the decimal to 8000. Then the actual write frequency value is 50*80.00%=40Hz.

Master Command		Slave Response	
ADDR	01H	ADDR	01H
CMD	06H	CMD	06H
Parameter address high bits	4CH	Parameter address high bits	4CH
Parameter address low bits	10H	Parameter address low bits	10H
Writing data high bits	00H	Number of function parameters	00H
Writing data low bits	02H	CRC high bits	02H
CRC high bits	1FH	CRC high bits	1FH
CRC low bits	5EH	CRC low bits	5EH

6.10.5 Digital outputs (DO, RELAY, FMR)

If a digital output terminal is set for function 20: Communication setting, you can control digital output by using host computer.
The communication address and command of digital outputs are defined in the following table. Related communication address and command are as follows:

Communication Address	Command Description
2001H	Bit0: DO1 output
	Bit1: keep
	Bit2: Relay1 output
	Bit3: keep
	Bit4: FMR output
	Bit5: VDO1
	Bit6: VDO2
	Bit7: VDO3
	Bit8: VDO4
	Bit9: VDO5

6.10.6 Control of Analog and High-speed Pulse Output (AO, FMR)

When the analog output AO1 (P5-07) and the FMP output (P5-06) output function is selected as 12 (communication setting), the host computer can control the analog and high-speed pulse output of the inverter by using the communication mode. The control address and command content are defined as follows:

Communication Address		Command Description
AO1	2002H	0 to 7FFF indicates 0% to 100%.
FMP	2004H	

NOTE

- The data that is used to write commands to the inverter by means of communication is corrected and output.

6.10.7 Initializing Parameter

You can initialize parameters via host computer by using this function. If FP-00 (user password) is set to a non-zero value, verify password on host computer.
Once password passes verification, host computer performs parameter initialization within 30s. The communication address of password verification is 1F00H. Directly write correct user password to this address to complete verification.
The communication address and parameter initialization command are defined in the following table.

Communication Address	Command Description
1F01H	1: Restore factory parameters
	2: Clear the records
	4: Restore the user backup parameters
	501: Back up the current user parameters

6.11 Accessibility

6.11.1 Jog

Jog is used to test equipment. In jog running, P6-00 must be set to 0 (direct start) and P6-10 must be set to 0 (Decelerate to stop).

parameter	define	default	range	description
P0-25	Acceleration/ Deceleration time base frequency	0	0: Max freq (P0-10) 1: Freq reference 2: 100 Hz	-
P8-00	Jog frequency	2.00Hz	0.00Hz~ Max freq	-
P8-01	Jog acceleration time	20.0s	0.0s~6500.0s	Jog acceleration time refers to the time it takes for inverter to accelerate from zero to the P0-25.
P8-02	Jog deceleration time	20.0s	0.0s~6500.0s	Jog deceleration time refers to the time it takes for inverter to accelerate from zero to the P0-25.
P8-27	Set highest priority to terminal JOG function	0	0: Disabled 1: Enabled	When P8-27=1, any DI terminal function (P4-00~P4-04) is set to 4 (forward jog) or 5 (reverse jog) during operation, the jog operation status will take effect immediately.

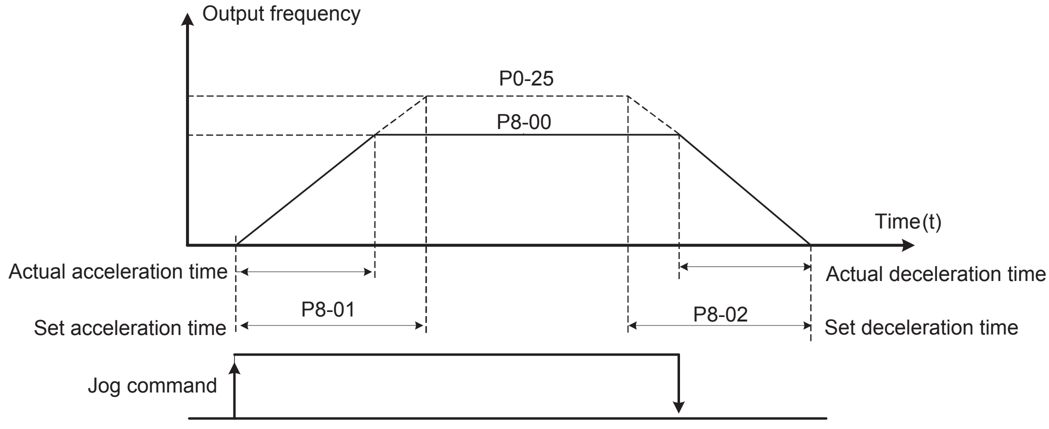


Figure 6-56 Schematic diagram of jog operation

Table 6-13 Parameter settings for jog operation with the operation panel

Steps	Forward jog	Reverse jog
1	Set P7-01 = 3 to allocate the MF.K key with forward jog.	Set P7-01 = 4 to allocate the MF.K key with reverse jog. Set P8-13 = 0 to allow reverse running.
2	Set P0-02 = 0 to select operation panel as command source.	Set P0-02 = 0 to select operation panel as command source.
3	Set P8-00, P8-01 and P8-02 properly.	Set P8-00, P8-01 and P8-02 properly.
4	In stop status, press down the MF.K key. The drive starts to jog in forward direction. After you release the MF.K key, the AC drive decelerates to stop.	In stop status, press down the MF.K key. The drive starts to jog in reverse direction. After you release the MF.K key, the AC drive decelerates to stop.

6.11.2 Jump Frequency, FWD/REV Switchover Dead-zone Time, Reverse Run Prohibited

1) Jump Frequency

The frequency jump function enables the AC drive to avoid mechanical resonance point of load. The drive can be set with two separate frequencies. If both are set to 0, the frequency jump function is disabled.

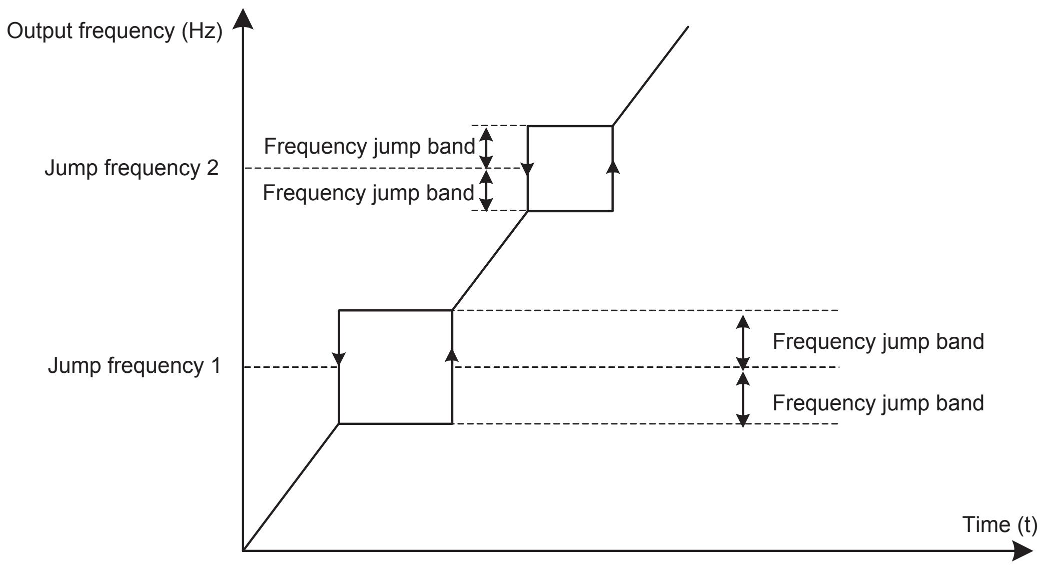


Figure 6-57 Jump frequency

In the figure above, during the acceleration process, the operating frequency accelerates to the jump frequency boundary, and the inverter will run at the current operating frequency for a period of time, and then the operating frequency will skip the jump frequency, and the jump amplitude is 2 times P8-11 (jump frequency amplitude);

During the deceleration, the operating frequency is slowed down to the jump frequency boundary, and the inverter runs at the current operating frequency for a period of time, and then the operating frequency skips the jump frequency by 2 times the jump frequency P8-11 (jump frequency amplitude).

parameter	define	default	range	description
P8-09	Frequency jump 1	0.00Hz	0.00 Hz to max. freq	-
P8-10	Frequency jump 2	0.00Hz	0.00 Hz to max. freq	-
P8-11	Frequency jump band	0.00Hz	0.00 Hz to max. freq	-
P8-22	Jump frequency function	0	0: Disabled 1: Enabled	jump frequency is valid or not during acc/dec process. When set to valid, during acceleration and deceleration, the running frequency reaches the jump frequency boundary, and the running frequency skips the jump frequency, and the jump amplitude is 2 times P8-11 (jump frequency amplitude). When set to invalid, during acceleration and deceleration, the operating frequency reaches the jumping frequency boundary, and the inverter will continue to run at the operating frequency.

2) FWD/REV Switchover Dead-zone Time

parameter	define	default	range	description
P8-12	Forward/Reverse run switch dead-zone time	0.0s	0.0s~3000.0s	Set transition time at 0Hz during forward and reverse transition of the inverter.

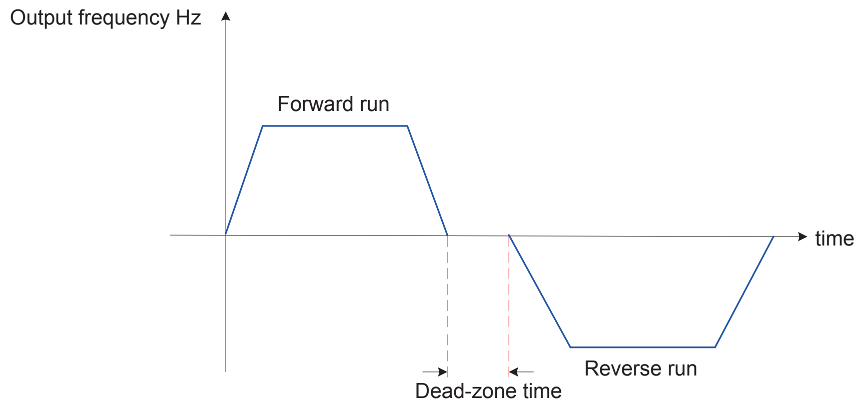


Figure 6-58 Forward/Reverse run switchover dead-zone time

3) Reverse Run Prohibited

parameter	define	default	range	description
P8-13	Reverse selection	0	0: Enabled 1: Disabled	-

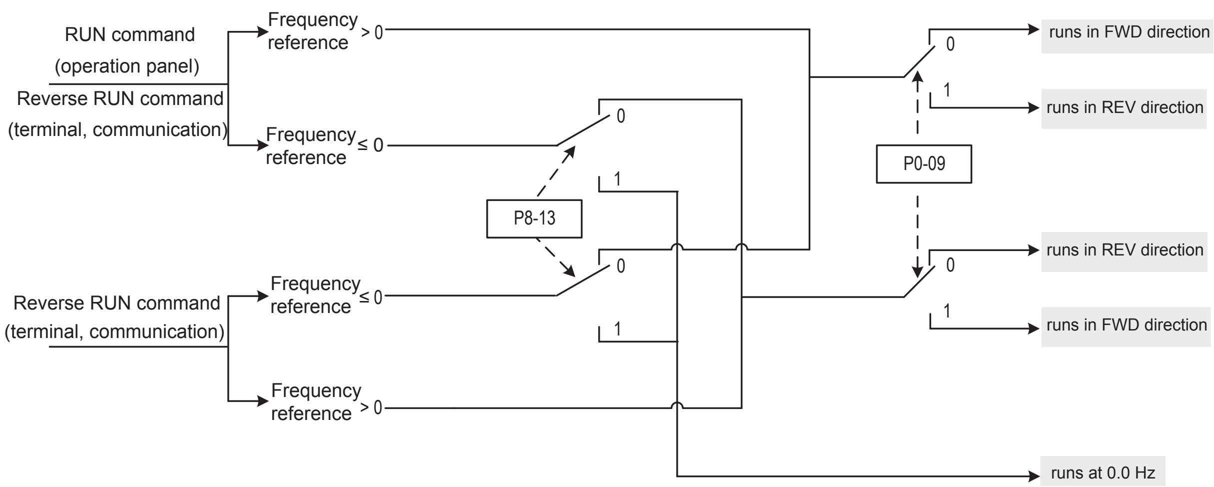


Figure 6-59 Control of reverse run

parameter	define	default	range	description
P0-09	Running direction	0	0: Run in the default direction (FWD/REV indicator off) 1: Run in the default reverse direction (FWD/REV indicator on)	-

By changing this parameter, the purpose of changing the motor steering can be realized without changing the motor wiring, and its function is equivalent to adjusting any two lines of the motor (U, V, W) to realize the conversion of the motor rotation direction.

NOTE

- After the parameters are initialized, the motor will return to its original state in the direction of operation. It is strictly forbidden to change the motor steering after the system is debugged.

6.11.3 User-defined parameter

PE-00~PE-29: This parameter group is a user-defined parameter group. The user can select the required parameters from all the parameters and summarize them into the FE group as user-customized parameters for easy viewing and changing operations. The FE group provides up to 30 user-defined parameters, if the display value of the FE group parameter is P0.00, it means that the user parameter is empty, when entering the user-defined parameter mode, the display parameter is defined by PE-00~PE-29, the order is the same as the PE group parameter, and the P0-00 is skipped;

6.11.4 Frequency Detection (FDT)

This function sets detection values of output frequency and sets hysteresis level for the frequency detection function.

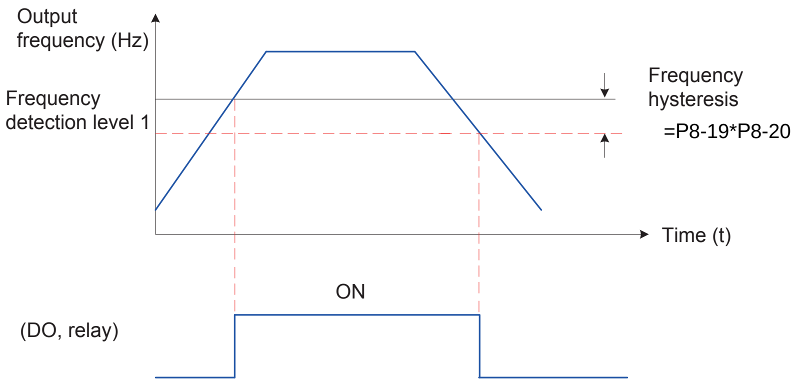


Figure 6-60 Frequency detection

parameter	define	default	range	description
P8-19	Frequency detection value 1	50.00Hz	0.00 Hz to max. frequency	When the operating frequency is higher than the frequency detection value, the DO terminal outputs an effective signal; When the operating frequency is lower than the frequency detection value minus the frequency check hysteresis value, the DO terminal outputs an invalid signal.
P8-20	Frequency detection hysteresis 1	5.0%	0.0% to 100.0%	The percentage of frequency lag value is based on the frequency detection value P8-19.
P8-28	Frequency detection value 2	50.00Hz	0.00 Hz to max. frequency	-
P8-29	Frequency detection hysteresis 2	5.0%	0.0% to 100.0%	-

6.11.5 Frequency Reaches Detection Amplitude

This function sets the detection width of the frequency reference.
Figure 6-64 Frequency reached detection width

parameter	define	default	range	description
P8-21	Detection width of target frequency reached	0.00%	0.0% to 100.0%	The percentage base is the maximum frequency. When the operating frequency of the inverter is within the range of the set frequency ± the maximum frequency * P8-21 (frequency detection amplitude), the DO terminal outputs a valid signal.

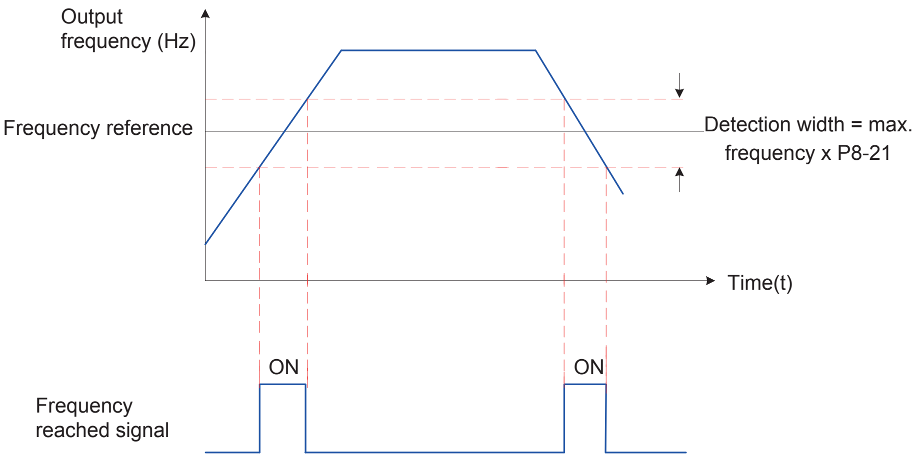


Figure 6-61 Frequency reached detection width

6.11.6 Switching Frequency of Acc/ Dec Time

parameter	define	default	range	description
P8-25	Switchover frequency of acceleration time 1 and acceleration time 2	0.00 Hz	0.00 Hz to max. frequency	-
P8-26	Switchover frequency of deceleration time 1 and deceleration time 2	0.00 Hz	0.00 Hz to max. frequency	-

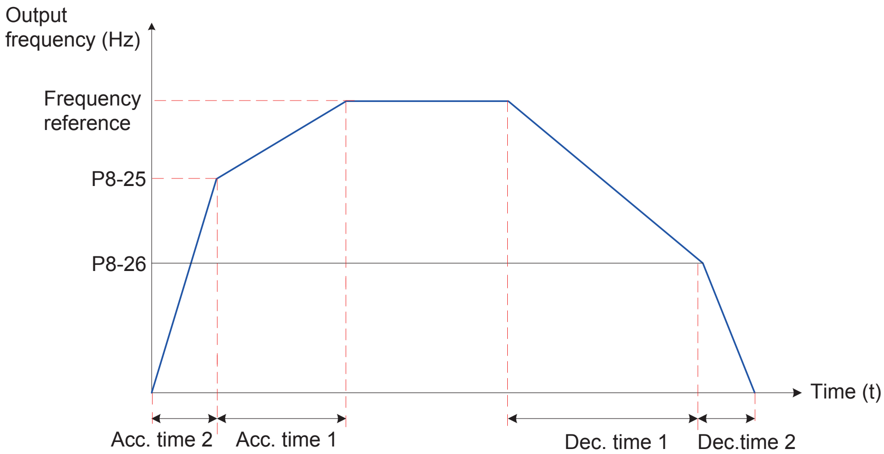


Figure 6-62 Acceleration and deceleration time switching

In acceleration process, if running freq. is less than P8-25, select Acceleration Time 2, and if running freq. is greater than P8-25, select Acceleration Time 1.
In deceleration process, if running freq. is greater than P8-26, select Deceleration Time 1, and if running freq. is less than P8-26, select Deceleration Time 2

6.11.7 Arbitrary Arrival Frequency Detection Value

parameter	define	default	range	description
P8-30	Detection of frequency 1	50.00Hz	0.00 Hz to max. frequency	When inverter is running, it is at any level arrival frequency check value± arbitrary arrival frequency rate the DO when the amplitude range is detected output a valid signal
P8-31	Detection width of frequency 1	0.0%	0.0% to 100.0% (max. freq)	
P8-32	Detection of frequency 2	50.00Hz	0.00 Hz to max. frequency	-
P8-33	Detection width of frequency 2	0.0%	0.0% to 100.0% (max. freq)	-

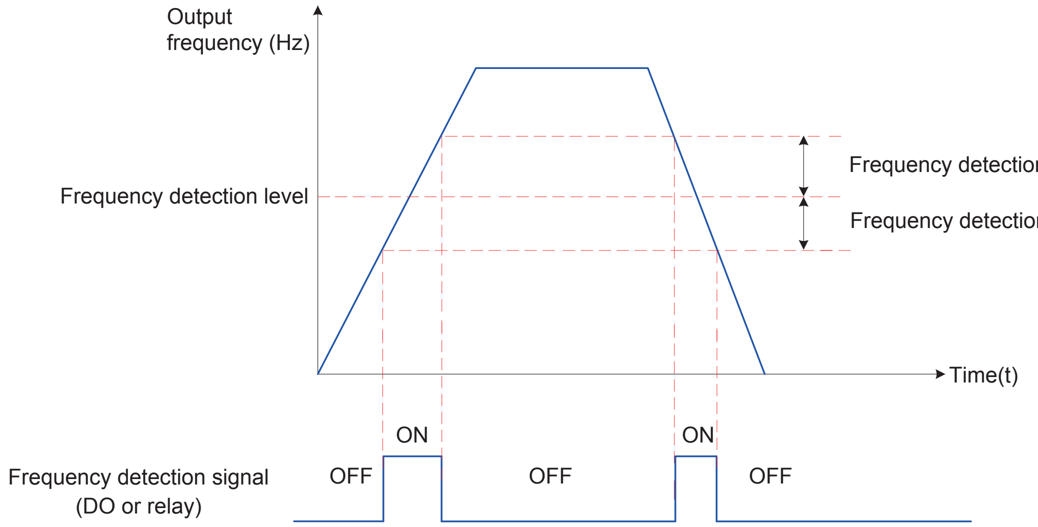


Figure 6-63 Arbitrary arrival frequency detection

6.11.8 Zero-current detection

parameter	define	default	range	description
P8-34	Zero current detection level	5.0%	0.0% to 300.0% (rated motor current)	When the output current of the inverter is less than or equal to the zero-current detection level P8-34 and the duration exceeds the zero-current detection delay time P8-35, the DO terminal outputs a valid signal
P8-35	Zero current detection delay	0.10s	0.00s to 600.00s	

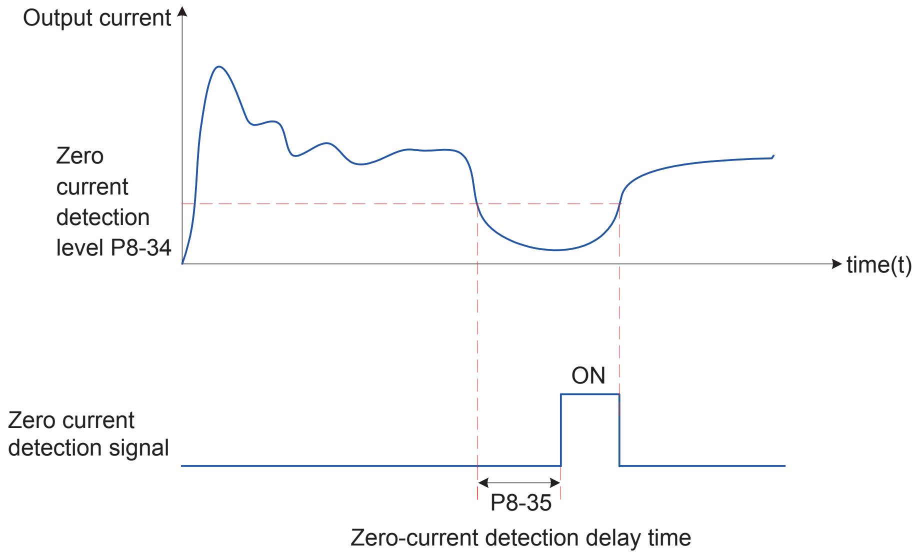


Figure 6-64 Zero current detection

6.11.9 Output Current Overrun

parameter	define	default	range	description
P8-36	Output current exceeds the limit value	200.0%	0.0% (no detection); 0.1%~300.0% (Motor rated current)	When the output current of the inverter is greater than the output current exceeding value P8-36, and the duration exceeds the software overcurrent point detection delay time P8-37, the DO terminal outputs a valid signal.
P8-37	Output current exceeds detection delay time	0.00s	0.00s~600.00s	-

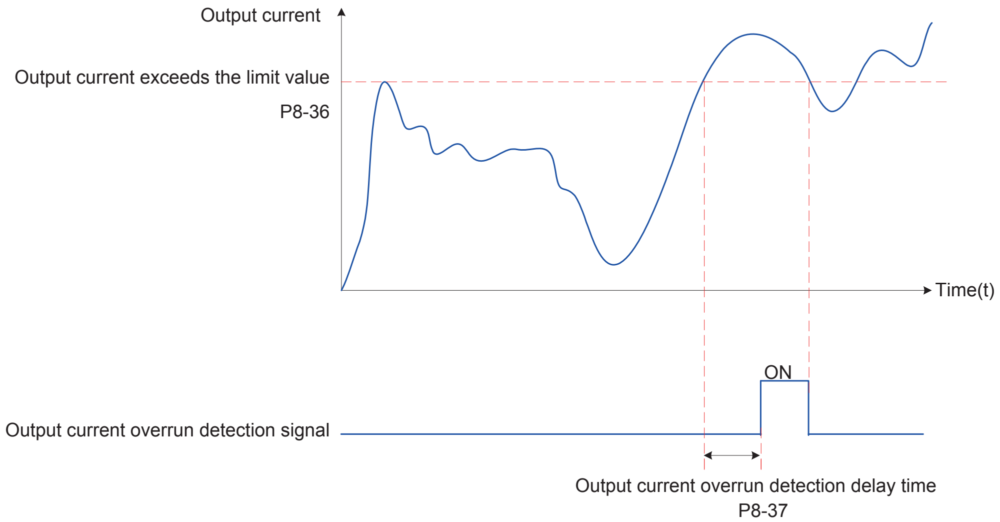


Figure 6-65 Detection of output current overrun

6.11.10 Arbitrary Arrival Current

parameter	define	default	range	description
P8-38	Detection level of current 1	100.0%	0.0% to 300.0% (rated motor current)	When output current of inverter is within the range of (arbitrary arrival current 1± arbitrary arrival current 1 width) * motor rated current, the DO terminal outputs a valid signal
P8-39	Detection width of current 1	0.0%	0.0% to 300.0% (rated motor current)	
P8-40	Detection level of current 2	100.0%	0.0% to 300.0% (rated motor current)	-
P8-41	Detection width of current 2	0.0%	0.0% to 300.0% (rated motor current)	-

The YD280 provides two sets of arbitrary arrival current and detection width parameters, Figure 6-69 is a schematic diagram.

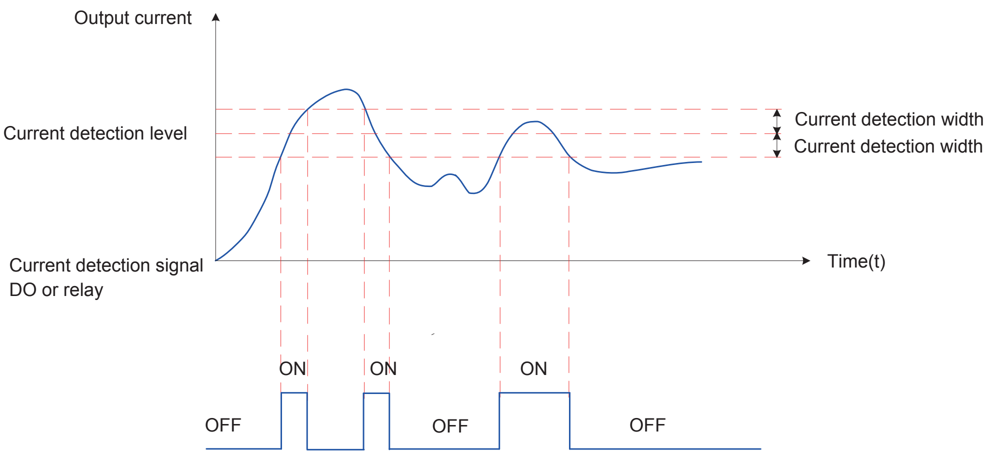


Figure 6-66 Current detection

6.11.11 Timer

Inverter timer operation function. Every time the inverter is started, the clock starts from 0, and the remaining running time of the timer can be checked through the U0-20.

parameter	define	default	range	description
P8-42	Timer function	0	0: Disabled 1: Enabled	Inverter timed operation function. Every time the inverter is started, the clock starts from 0, and the remaining running time of the timer can be checked through the U0-20.
P8-43	Running time setting channel	0	0: Set by P8-44 1: AI1 2: AI2 3: Pot	When set to 1, timer running time = (AI1 voltage/10V)* P8-44. The analog input range is 100% corresponding to P8-44
P8-44	Running time	0.0	0.0 to 6500.0 min	The timer is set by P8-43 and P8-44

1) Power-on arrival time

parameter	define	default	range	description
P8-16	Set cumulative power-on arrival time	0h	0h~65000h	When the cumulative power-on time (P7-13) reaches the power-on time set by P8-16, the DO terminal of the inverter outputs a valid signal

2) Running arrival time

parameter	define	default	range	description
P8-17	Set cumulative Running arrival time	0h	0h~65000h	Used to set the operating hours of inverter. When the cumulative running time of the inverter (P7-09) exceeds the set cumulative power-on arrival time (P8-17), the DO terminal outputs a valid signal.

6.11.12 AI1 Upper/Lower Limit of Volt-Protection

parameter	define	default	range	description
P8-45	AI1 input voltage lower limit	3.10 V	0.00V~P8-46	When value of analog input AI1 is greater than P8-46, or the input of AI1 is less than P8-45, the DO terminal of the inverter outputs a valid signal of "AI1 input overrun", which is used to indicate whether the input voltage of AI1 is within the set range
P8-46	AI1 input voltage upper limit	6.80 V	P8-45~11.00V	

6.11.13 Module Temperature

parameter	define	default	range	description
P8-47	IGBT temperature threshold	75°C	0°C to 100°C	When the temperature of the inverter radiator reaches the set value of P8-47, the DO terminal outputs a valid signal.

6.11.14 Cooling Fan

parameter	define	default	range	description
P8-48	Cooling fan working mode	0	0: Working during drive running	Set 0: When inverter is running, the fan will run, and when inverter is in the shutdown state, if the radiator temperature is higher than 40 degrees, the fan will run, and when the radiator temperature is lower than 40 degrees, the fan will not run.
			1: Working continuously	Set 1: Fan runs all the time after powering on.

6.11.15 Sleep and wake-up

Used to implement sleep and wake-up functions in water supply applications. In general, set the wake-up frequency (P8-49) to be greater than or equal to the sleep frequency (P8-51). If both the wake-up frequency and the hibernation frequency are 0.00Hz, the hibernation and wake-up functions are invalid.

When the PID is being calculated, the sleep function is enabled, if you want the PID to continue the calculation, PA-28 (PID stop calculation) is set to 1 (stop calculation), if you want the PID to stop the calculation, PA-28 (PID stop calculation) is set to 0 (stop no calculation).

parameter	define	default	range	description
P8-49	Wakeup frequency	0.00Hz	Hibernating freq(P8-51) to max.freq(P0-10)	If inverter is in a sleep state and the run command is valid, the inverter will start after the set frequency is greater than or equal to (P8-49) wake-up frequency and the wake-up delay time (P8-50) has passed
P8-50	Wakeup delay time	0.0s	0.0s to 6500.0s	
P8-51	Hibernating frequency	0.00Hz	0.00 Hz to wakeup frequency (P8-49)	During the operation of the inverter, when the set frequency is less than or equal to the P8-51 sleep frequency, after the P8-52 delay time, the inverter enters the sleep state and stops freely.
P8-52	Hibernating delay time	0.0s	0.0s to 6500.0s	

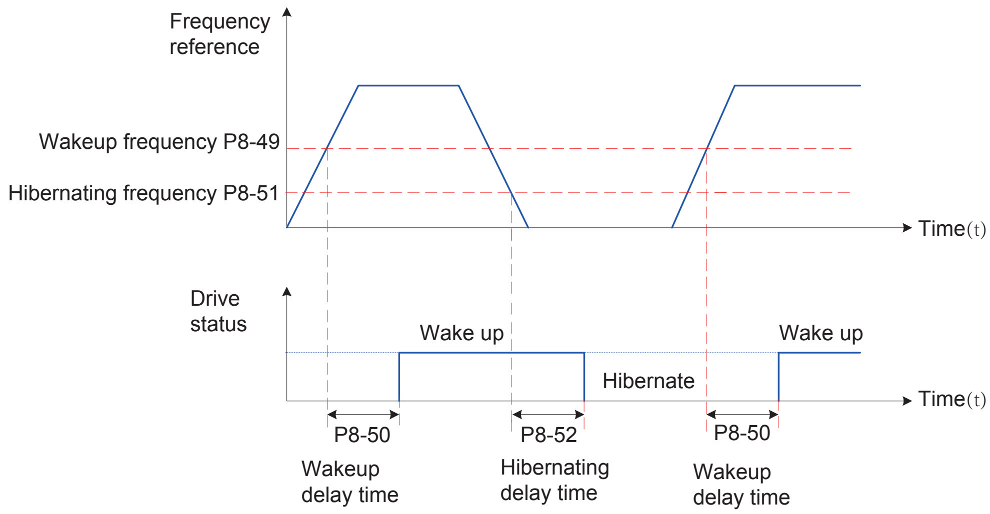


Figure 6-67 Sleep and wake-up settings

6.11.16 The time of this operation is

parameter	define	default	range	description
P8-53	Running time threshold this time	0.0Min	0.0Min~6500.0Min	When running time of this start reaches the set value of P8-53, DO terminal of the inverter outputs a valid signal. Valid only for this time, the time of the previous run is not accumulated

6.11.17 Output Power Correction

parameter	define	default	range	description
P8-54	Output power correction coefficient	100.0%	0.0%~200.0%	When output power (U0-05) does not correspond to the expected value, the output power can be linearly corrected by this value

6.11.18 Emergency stop and deceleration time

parameter	define	default	range	description
P8-55	Emergency stop and deceleration time	MODEL	0~6553.5	P8-55 as emergency stop deceleration time, the terminal emergency stop function decelerates according to the set dec. time

Chapter 7 Fault Diagnosis and Countermeasures

7.1 Safety Precautions

Safety Precautions

Danger

- It is strictly forbidden to wire when the power is on, and be sure to keep all circuit breakers in the OFF state. Otherwise, there will be an electric shock of the danger.

Warning

- Please ensure that the inverter is grounded in accordance with local regulations. Otherwise, there is a risk of electric shock or fire.
- Do not disassemble the shell or touch the internal circuit after the inverter is energized. Otherwise, there is a risk of electric shock.
- Fault inspection must be carried out by professionals, and non-professionals are strictly forbidden to inspect, maintain and repair the inverter. Otherwise it would There is a risk of electric shock or fire.
- When installing the inverter in a closed cabinet or enclosure box, please use a cooling fan or cooling air conditioner to fully cool it to make the inverter the inlet air temperature of the frequency converter is kept below 50°C. Failure to do so can result in overheating or fire.
- Tighten all screws according to the specified torque. Failure to do so may pose a risk of fire or electric shock.
- Please confirm that the input voltage of the product is within the rated voltage range of the nameplate, otherwise there will be a risk of electric shock or fire.
- Do not place flammable and explosive materials near the inverter.

Note

- When installing the inverter, cover the upper part of the inverter with cloth or paper to prevent metal shaving, oil, and water from entering the hole during drilling into the inside of the inverter. If foreign objects get inside the inverter, it may cause the inverter to malfunction.
- When you are finished with work, remove the cloth or paper. If it continues to be covered, it will make the ventilation worse, causing the inverter to be different fever is common.
- When operating the inverter, please follow the steps specified in the ESD prevention measures, otherwise the inverter will be damaged due to static electricity ministry of circuits.

7.5 Fault alarm and countermeasures

Troubleshoot the fault according to the following table. If the fault cannot be eliminated, contact the agent or Inovance

Fault Name	Panel Display	Cause	Possible Solution
Over-current during acceleration	Err02	Ground fault or short circuit exists in the output circuit.	● Check whether short-circuit occurs on the motor, motor cable or contactor.
		Control mode is SVC but motor auto-tuning is not performed.	● Set motor parameters according to motor nameplate and perform motor auto-tuning.
		Acceleration time is too short.	● Increase acceleration time.
		The over-current stall prevention parameter are set improperly.	● Ensure that current limit is enabled (P3-19=1). ● The set of current limit level (P3-18) is too large . Adjust it between 120% and 150%. ● The setting of the current limit gain (P3-20) is too small. Adjust it between 20 and 40.
		Customized torque boost or V/F curve is not appropriate.	● Adjust the customized torque boost or V/F curve
		The spinning motor is started.	● Enable the catching a spinning motor function or start the motor after it stops.
		Drive suffers external interference.	● View historical fault records. If the current value is far from the over-current level, find interference source. If external interference does not exist, it is the drive board or hall device problem.
Over-current during deceleration	Err03	Ground fault or short circuit exists in the output circuit.	● Check whether short-circuit occurs on the motor, motor cable or contactor.
		Control mode is SVC but motor auto-tuning is not performed.	● Set motor parameters according to motor nameplate and perform motor auto-tuning.
		Deceleration time is too short.	● Increase deceleration time.
		The over-current stall prevention parameter are set improperly.	● Ensure that current limit is enabled (P3-19=1). ● The setting of current limit level (P3-18) is too large. Adjust it between 120% and 150%. ● The setting of the current limit gain (P3-20) is too small. Adjust it between 20 and 40.
		Braking unit and braking resistor are not installed.	● Install braking unit and braking resistor
		Drive suffers external interference.	● View historical fault records. If the current value is far from the over-current level, find interference source. If external interference does not exist, it is the drive board or hall device problem.
Over-current at constant speed	Err04	Ground fault or short circuit exists in the output circuit.	● Check whether short-circuit occurs on the motor, motor cable or contactor.
		Control mode is SVC but motor auto-tuning is not performed.	● Set motor parameters according to motor nameplate and perform motor auto-tuning.
		The over-current stall prevention parameters are set improperly.	● Ensure that current limit is enabled (P3-19=1). ● The setting of current limit level (P3-18) is too large. Adjust it between 120% and 150%. ● The setting of current limit gain (P3-20) is too small. Adjust it between 20 and 40.
		Drive power class is small.	● If output current exceeds rated motor current or rated output current of the AC drive during stable running, replace a drive of larger power class.
		Drive suffers external interference.	● View historical fault records. If the current value is far from the over-current level, find interference source. If external interference does not exist, it is the drive board or hall device problem.

Fault Name	Panel Display	Cause	Possible Solution
Over-voltage during acceleration	Err05	Input voltage is too high.	● Adjust input voltage to normal range.
		An external force drives motor during acceleration.	● Cancel the external force or install a braking resistor.
		The over-voltage stall prevention parameters are set improperly.	● Ensure voltage limit function is enabled (P3-23=1). ● The setting of voltage limit (P3-22) is too large. Adjust it between 360~380V or 700~770 V. ● The setting of frequency gain for voltage limit (P3-24) is too small. Adjust it between 30 and 50.
		Braking unit and braking resistor are not installed.	● Install braking unit and braking resistor.
		Acceleration time is too short.	● Increase acceleration time.
Over-voltage during deceleration	Err06	The over-voltage stall prevention parameters are set improperly	● Ensure voltage limit function is enabled (P3-23=1). ● The setting of voltage limit (P3-22) is too large. Adjust it between 360~380V or 700~770 V. ● The setting of frequency gain for voltage limit (P3-24) is too small. Adjust it between 30 and 50.
		An external force drives motor during deceleration.	● Cancel the external force or install braking resistor.
		Deceleration time is too short.	● Increase deceleration time.
		Braking unit and braking resistor are not installed.	● Install braking unit and braking resistor.
Over-voltage at constant speed	Err07	The overvoltage stall prevention parameters are set improperly.	● Ensure voltage limit function is enabled (P3-23=1). ● The setting of voltage limit (P3-22) is too large. Adjust it between 360~380V or 700~770 V. ● The setting of frequency gain for voltage limit (P3-24) is too small. Adjust it between 30 and 50. ● The setting of frequency rise threshold during voltage limit (P3-26) is too small. Adjust it between 5 Hz and 20 Hz.
		An external force drives motor during running.	● Cancel the external force or install a braking resistor
Pre-charge resistor fault	Err08	Bus voltage fluctuates around undervoltage threshold continuously	● Contact the agent or yolico.
Under-voltage	Err09	Instantaneous power failure occurs	● Enable the power dip ride through function (P9-59 ≠ 0).
		The AC drive's input voltage is not within the permissible range.	● Adjust the voltage to normal range.
		The bus voltage is abnormal.	● Contact the agent or yolico.
		The rectifier bridge, the buffer resistor, the drive board or the control board are abnormal.	● Contact the agent or yolico.
Drive overload	Err 10	Load is too heavy or locked-rotor occurs on motor	● Reduce load or check motor and mechanical condition
		The AC drive power class is small.	● Replace a drive of larger power class.
Motor overload	Err 11	P9-01 (Motor overload protection gain) is set improperly.	● Set P9-01 correctly.
		Load is too heavy or locked-rotor occurs on motor	● Reduce load or check motor and mechanical condition
Input phase loss	Err 12	Input phase loss occurs	● Eliminate faults in external circuitry.
		Drive board, lightning protection board, control board, or rectifier bridge is abnormal.	● Contact the agent or yolico.
Output phase loss	Err 13	Motor winding is damaged.	● Replace motor is winding is damaged.
		Cable connecting drive and motor is abnormal.	● Correct wiring.
		Drive's 3-phase output are unbalanced when motor is running.	● Check the motor 3-phase winding is normal.
		Drive board or IGBT is abnormal.	● Contact the agent or yolico.

Fault Name	Panel Display	Cause	Possible Solution
IGBT over-heat	Err 14	Ambient temperature is too high.	● Lower the ambient temperature.
		Ventilation is clogged.	● Lower the ambient temperature.
		Fan is damaged.	● Replace the cooling fan.
		Thermally sensitive resistor of IGBT is damaged.	● Replace the damaged thermally sensitive resistor.
		Drive IGBT is damaged.	● Replace the AC Drive IGBT.
External fault	Err 15	External fault signal is input via DI.	● Confirm mechanical condition allows restart (P8-18)and reset the operation.
		External fault signal is input via virtual I/O.	● Confirm that the virtual I/O parameters in group A1 are set correctly and reset the operation.
Communication fault	Err 16	Host computer is in abnormal state.	● Check the cable of host computer.
		Communication cable is abnormal	● Check the communication cables.
		P0-28 of extend comm.card is set wrong	● Set P0-28 of extension comm.card correctly.
		Group PD are set improperly	● Set communication parameters in group PD properly
		After all the preceding checkings are done but the fault still exists, restore the default settings.	
Contactor fault	Err 17	Drive board are abnormal.	● Replace drive board or power supply board.
		Contactor is abnormal	● Replace contactor.
		Lightning protection board is abnormal.	● Replace the lightning protection board
Current detection fault	Err 18	The hall is abnormal.	● Replace the hall .
		The drive board is abnormal	● Replace the drive board.
Motor auto-tuning fault	Err 19	Motor parameters are not set according to nameplate.	● Set motor parameters correctly according to nameplate
		Motor auto-tuning times out.	● Check the cable connecting AC drive and motor.
EEPROM read-write fault	Err21	EEPROM chip is damaged	● Replace the main control board
Short circuit to ground	Err23	Motor is short circuited to the ground	● Replace cable or motor
Accumulative running time reached	Err26	Accumulative running time reaches the setting value	● Clear the record through parameter initialization
User-defined fault 1	Err27	User-defined fault 1 is input via DI.	● Reset the operation
		User-defined fault 1 is input via virtual I/O.	● Reset the operation
User-defined fault 2	Err28	User-defined fault 2 is input via DI.	● Reset the operation
		User-defined fault 2 is input via virtual I/O.	● Reset the operation
Accumulative power-on time reached	Err29	Accumulative power-on time reaches the setting value	● Clear the record through parameter initialization
Load loss	Err30	The output current of AC drive is smaller than P9-64 (load loss detection level).	● Check load is disconnected or the setting of P9-64 and P9-65 (load lost detection time) satisfies actual running condition.
PID feedback lost during running	Err31	PID feedback is smaller than the setting value of PA-26 (detection level of PID feedback loss).	● Check PID feedback or set PA-26 properly
Pulse-by-pulse current limit fault	Err40	Load is too heavy or locked-rotor occurs on motor	● Reduce load or check motor and mechanical condition
		The AC drive power class is small	● Replace a drive of larger power class

Fault Name	Panel Display	Cause	Possible Solution
Motor switchover fault during running	Err41	Motor switchover via terminal during running of the AC drive.	● Perform motor switchover after the AC drive stops
Motor over-temperature.	Err45	Temper sensor cable loose	● Check cable connection of temperature sensor
		Motor temperature is too high	● Increase carrier.freq or take other cool the motor
Master-slave controls slave fault	Err55	Check slaver.	● Troubleshoot according to the slave fault code
Braking unit overload	Err61	Resistance of braking resistor is too small	● Please refer to "Table 9-27 YD280 Inverter Brake Assembly Selection Table"
Short-circuit of braking circuit	Err62	Braking IGBT is abnormal	● Contact the agent or Inovance.

7.6 Common Faults and Handling Methods

Item	Panel Display	Cause	Possible Solution
1	no display while power-on	Main voltage is not input or too low	● Check input Voltage
		Power on drive board is faulty	● Check +10v/+24v of C/B is right.
		Wire between C/B、D/B or panel is break.	● Reseat the cable or pin header
		Pre-charge resistor of drive is damaged.	● Contact the agent or Yolico
		Control board or operating panel is faulty.	
		Rectifier bridge is damaged	
2	"HC" is displayed while power-on. HC	Wire between D/B and C/B is in poor contact	● Reseat the cable or pin header
		Related component on C/B are damaged	● Contact the agent or Yolico
		Motor or cable is short circuited to ground	
		The hall is damaged.	
		Mains voltage is too low.	
3	"Err23" is displayed at power-on. Err23	Motor or output cable is short circuited to ground.	● Measure insulation resistance of motor and cable
		The AC drive is damaged	● Contact the agent or Yolico

Item	Panel Display	Cause	Possible Solution
4	The display is normal while power-on. But after running, “HC” is displayed and the drive stops immediately. HC	Cooling fan is damaged or locked-rotor occurs	● Replace the fan.
		Short circuit exists in wiring of control terminals	● Eliminate short circuit fault in control circuit wiring.
5	Err14 (IGBT overheat) is detected frequently. Err 14	Setting of carrier freq. is too high	● Reduce carrier frequency（P0-15）
		Fan is damaged, or ventilation is clogged	● Replace the fan or clean the ventilation
		Components inside the AC drive are damaged (thermistor or others).	● Contact the agent or Yolico
6	The motor does not rotate after the AC drive runs.	Wiring between drive and motor is incorrect	● Check wiring between drive and motor is normal
		Related drive and motor parameters are set improperly.	● Restore factory dafault and re-set following parameters properly: ● Motor ratings, such as rate frequency、rate speed etc. ● Motor 1 control mode (P0-01) and command source (P0-02) ● selection P0-02 and P3-01 (torque boost) in V/F control under heavy-load start.
		Cable connection between drive board and control board is in poor contact.	● Re-connect wirings and ensure secure connection.
		The drive board is faulty	● Contact the agent or Yolico
7	DI terminals are disabled.	Related parameters are set incorrectly	● Check and set parameters in group P4 again.
		External signals are incorrect	● Re-connect external signal cables
		Jumper across OP and +24 V becomes loose.	● Re-confirm jumper bar across OP and +24 V.
		The control board is faulty	● Contact the agent or Yolico
9	Drive detects over-current and over-voltage frequently.	Motor parameters are set improperly	● Set motor parameter or auto-tuning again
		Acceleration/deceleration time is improper.	● Set proper acceleration/deceleration time.
		Load fluctuates.	● Contact the agent or Yolico
10	Err17 is detected upon power-on or running. Err 17	The pre-charge relay or contactor is not closed.	● Check whether the relay or contactor cable is loose. ● Check whether the relay or contactor is faulty. ● Check whether 24 V power supply of the contactor is faulty. ● Contact the agent or Yolico
11	Decelerating or stopping, the motor stops freely or no braking ability	Over-voltage stall protection takes effect	● If the braking resistor has been configured, select "Overvoltage Stall Enable" as "Invalid" (set P3-23=0) and turn off the overvoltage stall

Chapter 8 Routine Maintenance and Maintenance

8.1 Routine Maintenance

Safety Information

WARNING

- Do not connect or disconnect wiring while the power is on.
- Disconnect all power and wait for several minutes. Do not touch any terminals before the capacitors have fully discharged.
- Do not modify or disconnect wiring, remove optional extension card or replace the cooling fan while the power is on.
- Make sure to connect the motor-side grounding terminal. Failure to comply may result in electric shock due to touching motor housing.
- e work.
- Installation, wiring, commissioning, repair & maintenance, and component

CAUTION

- Do not run the AC drive with front cover removed.
- Drawings in the manual are sometimes shown without covers or protective guards. Remember to install the covers or protective guards as and then perform operations in accordance with instructions.
- T
- Ensure that input voltage is within permissible range. Incorrect input voltage of main circuit may result in abnormal running.
- Keep combustible materials far away from the AC drive or mount the AC drive on incombustible surfaces such as a metal wall.
- pter. Ensure correct air outlet direction of the fan. Incorrect air direction will diminish the
- Do not connect or disconnect motor while the drive is running. Failure to comply may result in electric shock and damage to the AC drive.
- Use shielded cables for control circuit wiring. Meanwhile, ground the shield to the grounding terminal reliably.
- Do not modify the drive circuitry. Failure to comply will damage the AC drive.
- Make sure to connect the output terminals of the AC drive and the motor terminals correctly.
- If it is necessary to change the motor rotation direction, exchange any two of UVW cables of the AC drive.
- Do not operate the AC drive that has been damaged. This is to prevent further damage to external equipments.

8.1.1 Routine inspection items

Influence of ambient temperature, humidity, dust and vibration will cause aging of components in the AC drive, which may cause potential faults or reduce the product life. Therefore, it is necessary to carry out routine and periodic maintenance.

More frequent inspection will be required if it is used in harsh environments, such as:

- High ambient temperature
- Frequent starting and stopping
- Fluctuations in the AC power supply or load
- Excessive vibrations or shock loading
- Dust, metal dust, salt, sulfuric acid, chlorine atmospheres
- Poor storage conditions.

Check the following items daily to avoid deterioration in performance or product. Copy this checklist and sign the "checked" column after each inspection.

Inspection Item	Inspection Points	Solutions	Checked
Motor	Inspect whether abnormal oscillation or noise exists.	● Check mechanical connections. ● Check power phases of the motor. ● Tighten all loose screws.	
Fan	Inspect whether the cooling fan of the AC drive and the motor works abnormally.	● Check running of the drive-side cooling fan. ● Check running of the motor-side cooling fan. ● Check whether the cooling fan is clogged or dirty. ● Check whether ambient temperature is within the permissible range.	
Installation environment	Inspect whether the cabinet and cable duct are abnormal.	● Check for input and output cables with insulation damaged. ● Check for vibration of hanging bracket. ● Check whether ground bars and terminals become loose or get corroded.	
Load	Inspect whether the drive output current exceeds the drive or motor rating for an extended period of time.	● Check for setting of motor parameters. ● Check for excessive load. ● Check for mechanical vibration (< 0.6 g on normal condition).	
Input voltage	Inspect whether the power voltage of the main and control circuits is within the allowed range.	● Adjust the input voltage to the permissible range. ● Check whether start of heavy load exists.	

8.2 Periodic inspection

8.2.1 Periodic inspection items

Always keep the AC drive clean. Clear away dusts especially metal powder on the surface of the AC drive, to prevent dust from entering the drive. Clear oil dirt from the cooling fan of the AC drive.

WARNING

- Do not perform inspection work while the power is on.
- Disconnect all power and wait for several minutes. Do not touch any terminal before the capacitors have fully discharged.

Check the following items every day to avoid deterioration in performance or product. Copy this checklist and sign the "checked" column after each inspection.

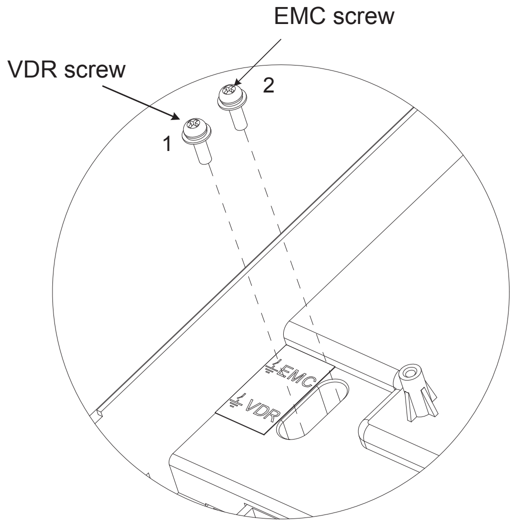
Inspection Item	Inspection Points	Solutions	Checked
General	Inspect for wastes, dirt and dust on the surface of the AC drive.	Use a vacuum cleaner to suck up wastes and dust to prevent direct touching. Wipe surface dirt gently with a soft cloth immersed in neutral detergent.	
Cables	Inspect power cables and connections for discoloration. Inspect wiring insulation for aging or wear.	Replace cracked cable. Replace damaged terminals.	
Peripheral devices such as relay and contactor	Inspect contactors and relays for excessive noise during operation. Inspect coils for signs of overheating such as melted or cracked insulation.	Check whether the coil voltage is normal. Replace abnormal peripheral device.	
Ventilation	Inspect whether ventilation and heatsink are clogged. Check whether the fan is damaged.	Clean ventilation. Replace the fan.	
Control circuit	Inspect for control components in poor contact. Inspect for loose terminal screws. Inspect for control cables with cracked insulation.	Clear away foreign matters on the surface of control cables and terminals. Replace damaged or corroded control cables.	

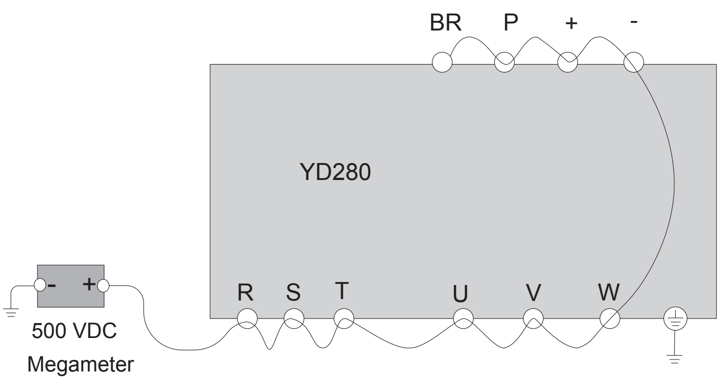
8.2.2 Insulation Test on Main Circuit

Note	- Before measuring insulation resistance with megameter (500 VDC megameter recommended), disconnect the main circuit from the AC drive. - Do not conduct the dielectric strength test. High voltage (> 500 V) test need not be performed again because it has been completed before delivery.

Figure 8-1 Test insulation on the main circuit

The measured insulation resistance must be greater than 5 MΩ. Before test, remove the VDR screw, as shown in the following position.





8.3 Lifetime of Fans and Electrolytic DC Bus Capacitors

■ 8.3.1 Number of Fans on the Drive

The lifetime of fans and electrolytic DC bus capacitors is related to the operating environment and maintenance status. Generally, the lifetime is shown as follows:

Component	Service Life	Possible Cause	Judging Criteria
Fan	≥ 5 years	● Bearing worn ● Blade aging	● Whether there is crack on the blade ● Whether there is abnormal vibration noise upon startup
Electrolytic DC bus capacitor	≥ 5 years	● Input power supply in poor quality ● High ambient temperature ● Frequent load jumping ● Electrolytic aging	● Whether there is liquid leakage. ● Whether the safe valve has projected. ● Measure the static capacitance. ● Measure the insulation resistance.

The standard service time indicates the service time when the AC drive is used on the following conditions:

- Ambient temperature: about 40°C on average yearly
- Load rate: below 80%
- Operating rate: below 24 hours per day

You can determine when to replace these parts according to the actual operating time.

■ 8.3.2 Number of Fans on the Drive

TYPE	FAN Number
3PH 380~480V，50/60Hz	
YD280T4-0P7G/1P5PB	1
YD280T4-1P5G/2P2PB	1
YD280T4-2P2G/3P0PB	1
YD280T4-3P0G/3P7PB	1
YD280T4-3P7G/5P5PB	1
YD280T4-5P5G/7P5PB	1
YD280T4-7P5GB	1
YD280T4-11G/15PB	1
YD280T4-15G/18P5PB	1
YD280T4-18P5G/22PB	1
YD280T4-22GB	1

1-PH 200~240V，50/60Hz	
YD280T2S-0P4GB	0
YD280T2S-0P7GB	1
YD280T2S-1P5GB	1
YD280T2S-2P2GB	1

Chapter 9 Specifications and Selection

9.1 YD280 Specifications and Dimensions

9.1.1 Technical Specifications.

Table 9-1 YD280 inverter model and technical data (3-phase 380V~480V)

Voltage Class			380 to 480 VAC										
Model: YD280T4-☐G/☐PB			0P7/1P5	1P5/2P2	2P2/3P0	3P0/3P7	3P7/5P5	5P5/7P5	7P5	11/15	15/18P5	18P5/22	22
Frame Size			F1					F2		F3		F4	
Dimension	Height (mm)		[H]:197.5					[H]: 202		[H]: 242.5		[H]: 297	
	Width (mm)		[W]:90					[W]:102		[W]:125		[W]:165	
	Depth (mm)		[D]:141					[D]:163.5		[D]: 173		[D]: 208.3	
Mounting Hole (mm)			Φ5					Φ6		Φ6.5		Φ7.2	
Drive input	Rated input voltage[V]		3-phase 380 to 480V, -15% to +10%										
	Rated input current [A]		2.4/4.6	4.6/6.3	6.3/9.0	9.0/11.4	11.4/16.7	16.7/21.9	21.9	32.2/41.3	41.3/49.5	49.5/59	59
	Rated input frequency, voltage		50/60 Hz, ±5% 3-phase 380~480VAC-15~+10%; (Actual 323~528VAC)										
	Power capacity, [kVA]		2.8/5.0	5.0/6.7	6.7/9.5	9.5/12.0	12.0/17.5	17.5/22.8	22.8	33.4/42.8	42.8/45.0	45.0/54.0	54.0
Drive Output	Applicable motor	[kW]	0.75/1.5	1.5/2.2	2.2/3.0	3.0/3.7	3.7/5.5	5.5/7.5	7.5	11/15	15/18.5	18.5/22	22
		[HP]	1/2	2/3	3/4	4/5	5/7.5	7.5/10	10	15/20	20/25	25/30	30
	Output current, [A]		2.1/3.8	3.8/5.1	5.1/7.2	7.2/9.0	9.0/13.0	13.0/17.0	17.0	25.0/32.0	32.0/37.0	37.0/45.0	45.0
	Default carrier frequency, [kHz]		6	6	6	6	6	6	6	6	6	6	6
	Overload capacity		G type 150% for 60 Sec P type 120% for 60 Sec										
	Output Voltage		3 phase 0 V to input voltage										
	Max. output frequency		50 to 500 Hz										
Braking Resistor	Recommended power, [kW] at 10%		0.14	0.3	0.44	0.6	0.74	1.1	1.5	2.2	3	4	4.5
	Recommended resistance, [Ω]		800	380	260	190	150	100	75	50	38	32	27
Thermal Design	Thermal design power, [kW]		0.046	0.068	0.081	0.138	0.138	0.201	0.24	0.355	0.454	0.478	0.551
	[CFM]		9	9	9	20	20	24	30	40	42	51.9	57.4
Enclosure			IP20										

Table 9-2 YD280 inverter model and technical data (1-phase 200V~240V)

Voltage Class			200 to 240 VAC				
Model: YD280T2S-□GB			0P4	0P7	1P5	2P2	
Frame Size			F1				
Dimension	Height (mm)		[H]: 197.5				
	Width (mm)		[W]:90				
	Depth (mm)		[D]:141				
Mounting Hole (mm)			Φ5				
Depth	Rated input voltage[V]		1-phase 200 to 240V, -15% to +10%				
	Rated input current [A]		5.4	8.0	15.0	22.0	
	Rated input frequency, voltage		50/60 Hz, ±5%	1-phase 200~240VAC-15~+10%; (Actual 170~264VAC)			
	Power capacity, [kVA]		1.4	2.2	3.7	6.0	
Drive Output	Applicable motor	[kW]	0.4	0.75	1.5	2.2	
		[HP]	0.5	1	2	3	
	Output current, [A]		2.3	3.8	7.2	9.0	
	Default carrier frequency, [kHz]		6	6	6	6	
	Overload capacity		G type 150% for 60 Sec	P type 120% for 60 Sec			
	Output Voltage		3 phase 0 V to input voltage				
	Max. output frequency		50 to 500 Hz				
Braking Resistor	Recommended power, [kW] at 10%		0.08	0.08	0.1	0.1	
	Recommended resistance, [Ω]		200	150	100	70	
Thermal Design	Thermal design power, [kW]		0.043	0.065	0.098	0.121	
	[CFM]		9	9	9	9	
Enclosure			IP20				

Table 9-3 Technical specifications of YD280

Item		Description
Standard functions	Input frequency resolution	Digital setting: 0.01 Hz Analog setting: Max. frequency x 0.025%
	Control mode	Sensorless vector control (SVC) Voltage/Frequency (V/F) control
	Startup torque	0.25 Hz/150% (SVC)
	Speed range	1：200 （SVC)
	Speed stability accuracy	±0.5% （SVC)
	Torque control accuracy	SVC：5Hz above ±5%。
	Torque boost	Customized boost 0.1 % to 30.0 %
	V/F curve	Straight-line；Multi-point；Square；Complete and Half V/F separation
	Ramp mode	Straight-line ramp、S-curve ramp Four separate acceleration/deceleration time settings in the range of 0s to 6500s.
	DC injection braking	DC injection braking frequency: 0 Hz to max. frequency DC injection braking active time: 0.0s to 36.0s. Current level of DC injection braking: 0% to 100%.
	Jog running	Frequency range of jog running: 0.00 to 50.00 Hz Acceleration/Deceleration time of jog running:0.0s to 6500.0s
	Onboard multiple preset speeds	The system implements up to 16 speeds by using simple PLC function or by using digital input signals.
	Onboard PID	The system implements the proportionalegral-derivative (PID) function in the closed-loop control.
	Automatic voltage regulation (AVR)	The system maintains a constant output voltage automatically when the grid voltage changes through the permissible range.
	Overvoltage and overcurrent stall control	The system limits the output current and voltage automatically during operation to prevent frequent or excessive trips.
	Fast current limiting function.	Minimize overcurrent faults and protect the normal operation of the inverter.
	Torque limit and control	The system limits the torque automatically to prevent frequent overcurrent tripping during operation.Torque control is applied in vector control.
Individualized functions	Power dip ride-through	Load feedback energy compensates for any voltage reduction, allowing the drive to continue to operate for a short time during power dips.
	Overcurrent fast prevention	The function helps to avoid frequent overcurrent faults.
	Virtual I/O	Five groups of virtual digital input/outputs (DI/DO)support simple logic control.
	Timing control	Time range: 0.0 to 6500.0 minutes
	Dual-motor switchover	The drive have two groups of motor parameters and can control up to two motors.
	Multiple field buses	Drive support field buses：Modbus

Item		Description
RUN	Command source	Panel、Terminal、communication and switching between different commands
	Main frequency reference setting channel	Supports up to 10 frequency reference setting channels and allows different methods of switching between frequency reference setting channels:Digital setting、Analog、voltage reference、Analog current reference、Pulse reference、Communication reference
	Auxiliary frequency reference setting channel	Supports up to 10 auxiliary frequency sources
	Input terminals	Standard: Five digital input (DI) terminals Two analog input (AI) terminals, one of which supports only 0 to10 V input, and the other supports 0 to 10 V and 4 to 20 mA current input.
	Output terminals	Standard: Single high-speed pulse output terminal (open-collector) for a square-wave Signal output in the frequency range 0 to 100 kHz Single digital output (DO) terminal Single relay output terminal Single analog output (AO) terminal that supports either a current output in the range 0 to 20 mA or a voltage output in the range 0 to 10 V.
Operating Display and Panel	LED display	The 6-character LED display shows parameter values
	Key locking and function selection	Implement partial or full locking of keys, and define the scope of action of some keys to prevent misoperation
Protections	Phase loss protection	Input phase loss protection、Output phase loss protection
	Instantaneous overcurrent protection	Stop when 250% of rated output current is exceeded
	Overvoltage protection	Stop when the DC bus voltage is above 410V/820 V
	Undervoltage protection	Stop when the DC bus voltage is below 170V/350 V
	Overheat protection	Protection triggered when the AC Drive bridge gets overheated
	Overload protection	G type is running at 150% of rated current for 60 s P type is running at 120% of rated current for 60 s
	Overcurrent protection	Stop when 2.5 times of rated current of the AC drive is exceeded.
	Braking protection	Braking unit overload protection Braking resistor short-circuit protection
	Short-circuit protection	Output phase-to-phase short-circuit protection Output phase-to-ground short-circuit protection
Environment	Installation location	Install the AC Drive where it is indoors and protected from direct sunlight, dust, corrosive or combustible gases, oil smoke, vapour, ingress from water or any other liquid, and salt.
	Altitude	There is no need to derate below 1000m, derating 1% for every 100m above 1000m, and please contact the manufacturer for more than 3000m.
	Operation temperature	- 10°C ~ +40°C, the temperature over 40°C needs to be de-rated, the ambient temperature is de-rated by 1.5% for every 1°C increase, and the maximum ambient temperature is 50°C
	Humidity	Less than 95% RH non-condensing
	Vibration	Less than 5.9 m/s² (0.6 g).
	Storage temperature	－ 20°C ~ ＋ 60°C

9.1.2 Appearance and installation dimensions

◆ <u>YD280 series size</u>

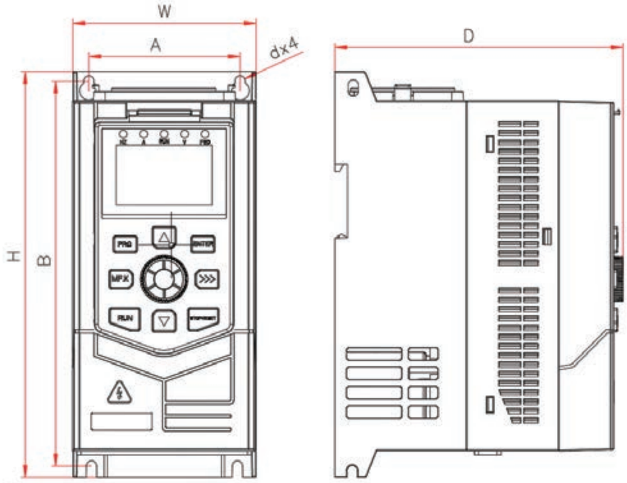


Figure 9-1 Schematic diagram of YD280T2S-0P4GB ~ YD280T2S-2P2GB /YD280T4-0P7G/1P5PB~YD280T4-3P7G/5P5PB exterior and installation dimensions

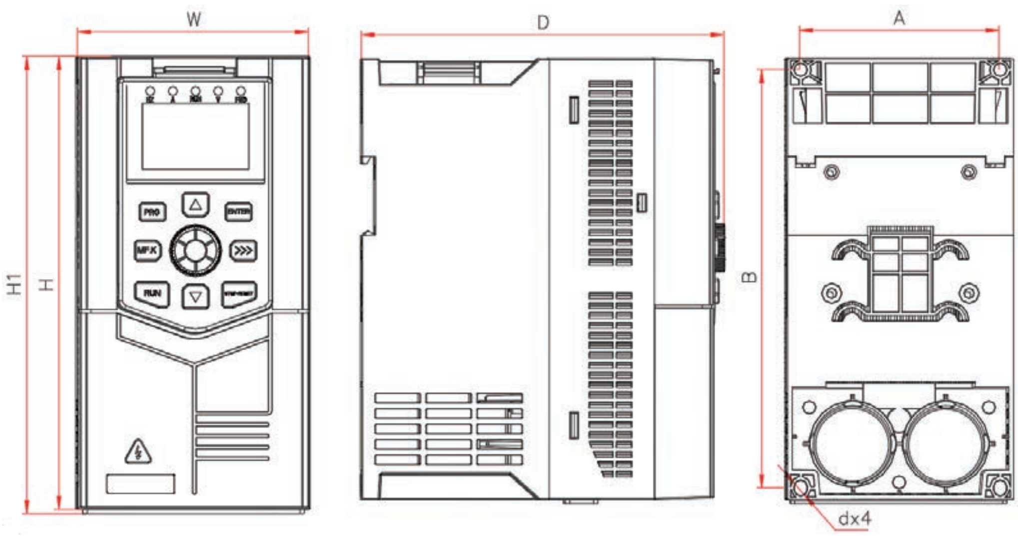


Figure 9-2 Schematic diagram of YD280T4-5P5G/7P5PB~YD280T4-7P5GB exterior and installation dimensions

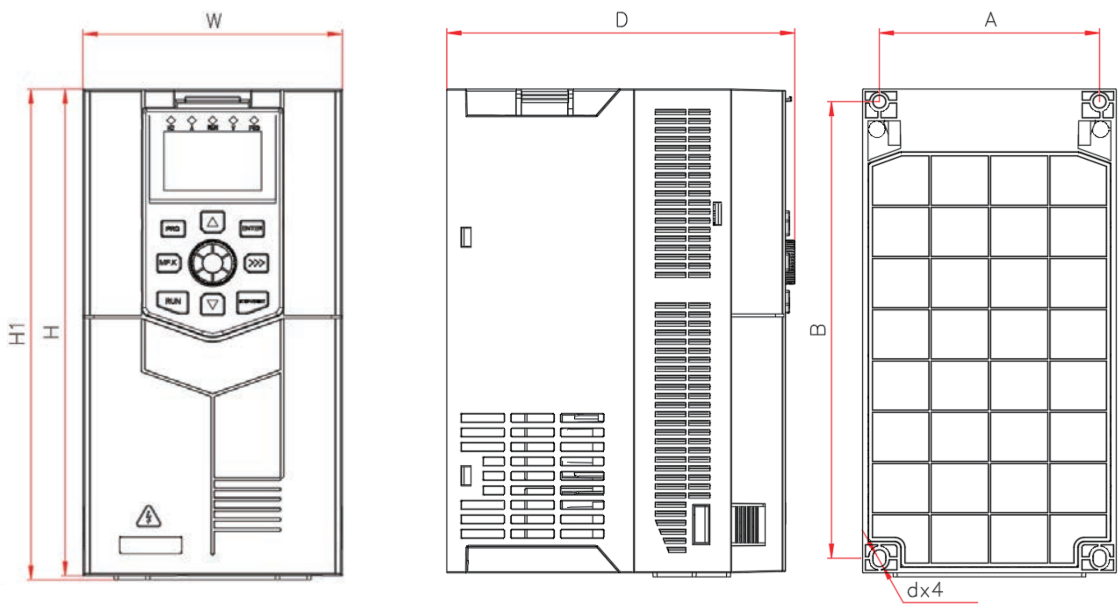


Figure 9-3 Schematic diagram of YD280T4-11G/15PB~YD280T4-15G/18P5PB Exterior and installation dimensions

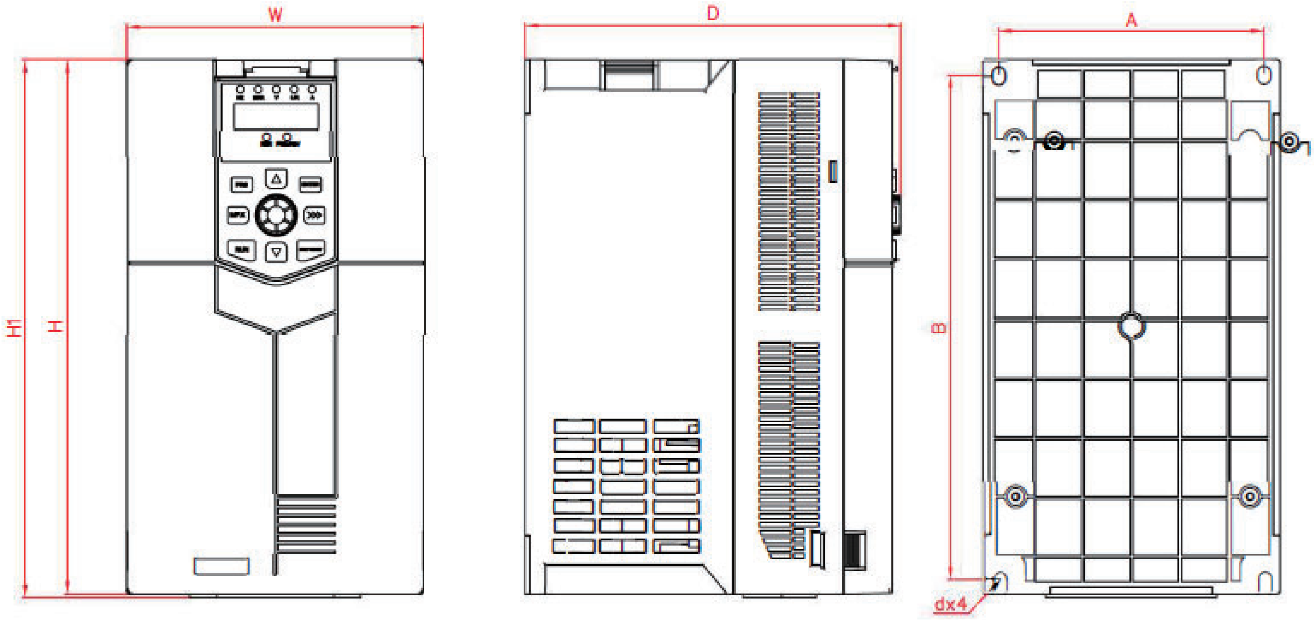


Figure 9-4 Schematic diagram of YD280T4-18P5G/22PB~YD280T4-22GB Exterior and installation dimensions

Table 9-4 YD280T4-0P7G/1P5PB~22G/30PB Mounting Hole Size(3-phase 380V~480V)

Frame	Model	Mounting holes (mm)		Dimensions (mm)				Mounting hole mm	Weight kg
		A	B	H	H1	W	D		
F1	YD280T4-0P7G/1P5PB YD280T4-1P5G/2P2PB YD280T4-2P2G/3P0PB YD280T4-3P0G/3P7PB YD280T4-3P7G/5P5PB	74	187	197.5	-	90	141	Ø5	1.6
F2	YD280T4-5P5G/7P5PB YD280T4-7P5GB	90	190	200	202	102	163.5	Ø6	1.8
F3	YD280T4-11G/15PB YD280T4-15G/18P5PB	108.5	227	240.5	242.5	125	173	Ø6.5	2.0
F4	YD280T4-18P5G/22PB YD280T4-22GB	147	278.5	295	297	165	208.3	Ø7.2	2.4

Table 9-5 YD280T2S-0P4G~2P2G Mounting Hole Size(1-phase 200V~240V)

Frame	Model	Mounting holes (mm)		Dimensions (mm)				Mounting hole mm	Weight kg
		A	B	H	H1	W	D		
F1	YD280T2S-0P4GB YD280T2S-0P7GB YD280T2S-1P5GB YD280T2S-2P2GB	74	187	197.5	-	90	141	Ø5	1.6

9.8.3 Brake Component Selection Table

Table 9-39 YD280 Brake Component Selection Table（3-phase 380~480V）

Model	Brake unit	125% braking torque (10% ED, Max 10 s) Resistance	num	Note	Min brake resistance Ω
YD280T4-0P7G/1P5PB	Built-in standard	140W 800Ω	1	Add "B" to suffix of model number	96
YD280T4-1P5G/2P2PB		300W 380Ω	1		96
YD280T4-2P2G/3P0PB		440W 260Ω	1		96
YD280T4-3P0G/3P7PB		600W 190Ω	1		96
YD280T4-3P7G/5P5PB		740W 150Ω	1		64
YD280T4-5P5G/7P5PB		1100W 100Ω	1		32
YD280T4-7P5GB		1500W 75Ω	1		32
YD280T4-11G/15PB		2200W 50Ω	1		20
YD280T4-15G/18P5PB		3000W 38Ω	1		20
YD280T4-18P5G/22PB		4000W 32Ω	1		24
YD280T4-22GB		4500W 27Ω	1		24

Table 9-40 YD280 Brake Component Selection Table（1-phase 200~240V）

Model	power motor kW	Brake unit	125% braking torque (10% ED, Max 10 s) Resistance	num	Note	Min brake resistance Ω
YD280T2S-0P4GB		Built-in standard	80W 200Ω	1	Add "B" to suffix of model number	64
YD280T2S-0P7GB			80W 150Ω	1		64
YD280T2S-1P5GB			100W 100Ω	1		32
YD280T2S-2P2GB			100W 70Ω	1		32

NOTE

- The braking resistance values in the table above are based on a 10% braking usage (ED) with a maximum braking time of 10 seconds per brake.
- For 380~480V model, the default starting braking voltage of the built-in braking unit is 760VDC;
- For 200~240V model, the default starting braking voltage of the built-in braking unit is 350VDC.

- The above table is a guide data, and users can choose different resistance values and power according to the actual situation (but the resistance value must not be less than the minimum braking resistance value in the table, and the power can be large). The selection of braking resistor needs to be determined according to the power of the motor power generated in the actual application system, which is related to the system inertia, deceleration time, energy of potential load, etc., and needs to be selected by the user according to the actual situation. The larger the inertia of the system, the shorter the required deceleration time, and the more frequent the braking, the greater the power and the smaller the resistance value of the braking resistor.

Chapter 11 Matching Card

YD280 series inverter external expansion card supports RS485 fieldbus

11.3.3 RS485 Extend Card(YD280 RS485 Card) Function

11.3.3.1 YD280 RS485 Card Terminal distribution and function description

YD280 RS485 communication card is specially developed for YD280 series inverter to provide 485 communication function, using isolation scheme, electrical parameters in line with international standards, users can choose according to needs, to achieve remote serial port control inverter operation and parameter setting and other functions.

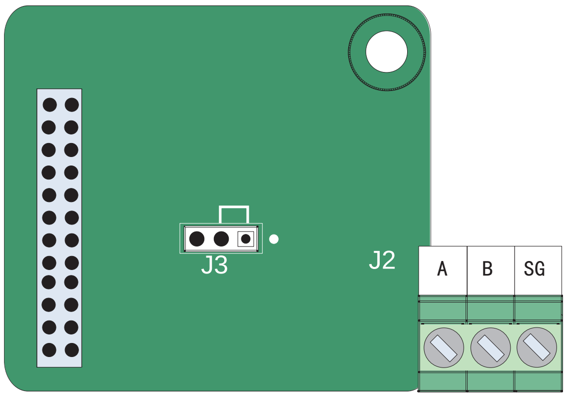


Figure 11-9 YD280 RS485 terminal distribution

Table 11-16 YD28RS485 Functions of expansion card terminals

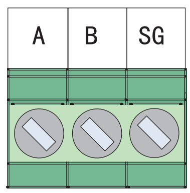
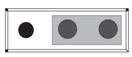
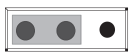
Type		Terminal Name	Function Description	Terminal
J2	A	RS485 positive input	RS485 communication terminal with isolation input	
	B	RS485 negative input	RS485 communication terminal with isolation input	
	SG	RS485 Power ground	Isolated power	

Table 11-17 Jumper descriptions of YD280 RS485

Jumper	Description	Meaning	Setting
J3	RS485 terminal resistor matching selection	Matching terminal resistor	
		Not matching terminal resistor	

Appendix A Asynchronous Parameter Table

Introduction

Note	Password protection is available for use with the drive. If this protection has been enabled, you will need to know the user-defined password before you can edit the function codes described in this chapter. See *"4.2.6 Password Security"* for instructions to set and remove password protection.

Groups P and A include standard function parameters. Group U includes the monitoring function parameters and extension card communication parameters.

The parameter description tables in this chapter use the following symbols.

The symbols in the parameter table are described as follows:

Symbol	Meaning
☆	It is possible to modify the parameter with the drive in the stop or in the Run status.
★	It is not possible to modify the parameter with the drive in the Run status.
●	The parameter is the actual measured value and cannot be modified.
*	The parameter is a factory parameter and can be set only by the manufacturer.

A.1 Standard Parameters

Para. No.	Param. Name	Setting Range	Default	Property	Page
Group P0: Standard Parameters					
P0-00	G/P type display	1: G type (constant torque load model) 2: P-type (fan and pump load type)	Model dependent	●	-
P0-01	Motor 1 control mode	0：SVC (only -T4) 2：VF	0 /2	★	-
P0-02	Command source selection	0: Operating panel 1: Terminal I/O control 2: Serial communication.	0	☆	110
P0-03	Main frequency reference setting channel selection	0-1: Digital setting 2-4: AI1-3 5: Keep 6: Multi-reference 7: S-PLC 8: PID 9: Serial communication	0	★	116
P0-04	Auxiliary frequency reference setting channel selection	Same as P0-03	0	★	133
P0-05	Base value of range of auxiliary frequency reference for Main and auxiliary calculation	0: Relative to maximum frequency 1: Relative to main frequency reference	0	☆	135
P0-06	Range of auxiliary frequency reference for main and auxiliary calculation	0% to 150%	100%	☆	135
P0-07	Final Frequency reference setting selection	00 to 34	00	☆	135
P0-08	Preset frequency	0.00 to max. frequency (P0-10)	50.00 Hz	☆	117
P0-09	Running direction	0, 1	0	☆	202
P0-10	Max. frequency	50.00 to 500.00 Hz	50.00 Hz	★	117
P0-11	Setting channel of frequency upper limit	0 to 5	0	★	136
P0-12	Frequency reference upper limit	Frequency lower limit (P0-14) to max. frequency (P0-10)	50.00 Hz	☆	136
P0-13	Frequency reference upper limit offset	0.00 Hz to max. frequency (P0-10)	0.00 Hz	☆	136
P0-14	Frequency reference lower limit	0.00 Hz to frequency upper limit (P0-12)	0.00 Hz	☆	136
P0-15	Carrier frequency	Model dependent	Model dependent	☆	-
P0-16	Carrier frequency adjusted with temperature	0: Disabled 1: Enabled	1	☆	-
P0-17	Acceleration time 1	0.00s to 650.00s (P0-19 = 2) 0.0s to 6500.0s (P0-19 = 1) 0s to 65000s (P0-19 = 0)	Model dependent	☆	141 179
P0-18	Deceleration time 1	0.00s to 650.00s (P0-19 = 2) 0.0s to 6500.0s (P0-19 = 1) 0s to 65000s (P0-19 = 0)	Model dependent	☆	141 179
P0-19	Acceleration/Deceleration time unit	0: 1s 1: 0.1s 2: 0.01s	1	★	141

Para. No.	Param. Name	Setting Range	Default	Property	Page
P0-21	Frequency offset of Auxiliary frequency setting channel for main and auxiliary calculation	0.00 Hz to max. frequency (P0-10)	0.00 Hz	☆	-

Para. No.	Para. Name	Setting Range	Default	Property	Page
P0-22	Frequency reference resolution	2	2	★	-
P0-23	Retentive of digital setting frequency upon stop	0, 1	0	☆	117
P0-24	Motor parameter group selection	0, 1	0	★	170
P0-25	Acceleration/Deceleration time base frequency	0 to 2	0	★	141
P0-26	Base frequency for UP/DOWN modification during running	0, 1	0	★	-
P0-27	Command source + frequency source	000 to 999	000	☆	136
P0-28	Serial port comms. protocol	0	0	★	114
Group P1: Motor 1 Parameters					
P1-00	Motor type selection	0, 1	0	★	143
P1-01	Rated motor power	0.1 to 1000.0 kW	Model dependent	★	143
P1-02	Rated motor voltage	1 to 2000 V	Model dependent	★	143
P1-03	Rated motor current	0.01 to 655.35 A	Model dependent	★	143
P1-04	Rated motor frequency	0.01 Hz to max. frequency	Model dependent	★	143
P1-05	Rated motor speed	1 to 65535 rpm	Model dependent	★	143
P1-06	Stator resistance	0.001 to 65.535 Ω	Auto-tuning dependent	★	143
P1-07	Rotor resistance	0.001 to 65.535 Ω	Auto-tuning dependent	★	143
P1-08	Leakage inductive reactance	0.01 to 655.35 mH	Auto-tuning dependent	★	143
P1-09	Mutual inductive reactance	0.1 to 6553.5 mH	Auto-tuning dependent	★	143

Para. No.	Para. Name	Setting Range	Default	Property	Page
P1-10	No-load current	0.01 A to P1-03	Auto-tuning dependent	★	143
P1-37	Motor auto-tuning method selection	0 to 3	0	★	141

Group P2: Vector Control Parameters		★Group 2 only for T4(380V) Model			
P2-00	Speed loop proportional gain 1	1 to 100	30	☆	149
P2-01	Speed loop integral time 1	0.01s to 10.00s	0.50s	☆	149
P2-02	Switchover frequency 1	0.00 to P2-05	5.00 Hz	☆	149
P2-03	Speed loop proportional gain 2	1 to 100	20	☆	149
P2-04	Speed loop integral time 2	0.01s to 10.00s	1.00s	☆	149
P2-05	Switchover frequency 2	P2-02 to max. frequency	10.00 Hz	☆	149
P2-06	SVC slip compensation gain	50% to 200%	100%	☆	150
P2-07	Speed feedback filter time constant	0.000s to 0.100s	0.015s	☆	150
P2-09	Torque limit source in speed control	0 to 7	0	☆	151
P2-10	Digital setting of torque limit in speed control	0.0% to 200.0%	150.0%	☆	151 177
P2-11	Torque limit source in speed control (in regenerative state)	0 to 7 (for T2S) 0 to 8 (for T4)	0	☆	151
P2-12	Digital setting of torque limit in speed control (in regenerative state)	0.0% to 200.0%	150.0%	☆	151
P2-13	Excitation adjustment proportional gain	0 to 60000	2000	☆	153
P2-14	Excitation adjustment integral gain	0 to 60000	1300	☆	153
P2-15	Torque adjustment proportional gain	0 to 60000	2000	☆	153
P2-16	Torque adjustment integral gain	0 to 60000	1300	☆	153
P2-17	Speed loop integral separation selection	0: Disabled 1: Enabled	0	☆	-
P2-21	Max. torque coefficient of field weakening area	50% to 200%	100%	☆	154

Para. No.	Para. Name	Setting Range	Default	Property	Page
P2-22	Regenerative power limit selection	0: Disabled 1: Enabled in the whole process 2: Enabled at constant speed 3: Enabled during deceleration	0	☆	152
P2-23	Regenerative power limit	0.0% to 200.0% 100.0% to 120.0%	Model dependent	☆	152

Para. No.	Para. Name	Setting Range	Default	Property	Page
Group P3: V/F Control Parameters					
P3-00	V/F curve setting	0: Linear V/F 1: Multi-point V/F 2~9: Linear V/F (T4 only) 2: Square V/F (T2S only) 3: 1.2-power V/F (T2S only) 4: 1.4-power V/F (T2S only) 6: 1.6-power V/F (T2S only) 8: 1.8-power V/F (T2S only) 9: Reserved 10: V/F complete separation 11: V/F half separation	0	★	144
P3-01	Torque boost	0.0%: automatic torque boost 0.1% to 30%	Model dependent	☆	144
P3-02	Cut-off frequency of torque boost	0.00 Hz to max. frequency	50.00 Hz	★	144
P3-03	Multi-point V/F frequency 1	0.00 Hz to P3-05	0.00 Hz	★	144
P3-04	Multi-point V/F voltage 1	0.0% to 100.0%	0.0%	★	144
P3-05	Multi-point V/F frequency 2	P3-03 to P3-07	0.00 Hz	★	144
P3-06	Multi-point V/F voltage 2	0.0% to 100.0%	0.0%	★	144
P3-07	Multi-point V/F frequency 3	P3-05 to rated motor frequency (P1-04)	0.00 Hz	★	144
P3-08	Multi-point V/F voltage 3	0.0% to 100.0%	0.0%	★	144
P3-10	V/F over-excitation gain	0 to 200	64	☆	148
P3-11	V/F oscillation suppression gain	0 to 100	40	☆	148
P3-13	Voltage source for V/F separation	0 to 8	0	☆	145
P3-14	Digital setting of voltage for V/F separation	0 V to rated motor voltage	0 V	☆	145
P3-15	Voltage rise time of V/F separation	0.0s to 1000.0s	0.0s	☆	145
P3-16	Voltage decline time of V/F separation	0.0s to 1000.0s	0.0s	☆	146

Para. No.	Para. Name	Setting Range	Default	Property	Page
P3-17	Stop mode selection for V/F separation	0: Frequency and voltage declining to 0 independently 1: Frequency declining after voltage declines to 0	0	☆	146
P3-18	Current limit level	50% to 200%	150%	★	146
P3-19	Current limit selection	0, 1	1	★	147
P3-20	Current limit gain	0 to 100	20	☆	147
P3-21	Compensation factor of speed multiplying current limit level	50% to 200%	50%	★	147
P3-22	Voltage limit	650 to 800 V (T4) 330 to 400 V (T2S)	770 V 370 V	★	148
P3-23	Voltage limit selection	0, 1	1	★	148
P3-24	Frequency gain for voltage limit	0 to 100	30	☆	148
P3-25	Voltage gain for voltage limit	0 to 100	30	☆	148
P3-26	Frequency rise threshold during voltage limit	0 to 50 Hz	5 Hz	★	148

Para. No.	Para. Name	Setting Range	Default	Property	Page
Group P4: Input Terminals					
P4-00	DI1 function selection	0 to 59	1	★	181
P4-01	DI2 function selection	0 to 59	4	★	181
P4-02	DI3 function selection	0 to 59	9	★	181
P4-03	DI4 function selection	0 to 59	12	★	181
P4-04	DI5 function selection	0 to 59	13	★	181
P4-05	Keep	-	0	-	
P4-06	Keep	-	0	-	
P4-07	Keep	-	0	-	
P4-08	Keep	-	0	-	
P4-09	Keep	-	0	-	
P4-10	DI filter time	0.000s to 1.000s	0.010s	☆	-
P4-11	Terminal I/O control mode	0 to 3	0	★	110
P4-12	Terminal UP/DOWN rate	0.001 to 65.535 Hz/s	1.000 Hz/s	☆	-
P4-13	AI curve 1 min. input	0.00 V to P4-15	0.00 V	☆	118
P4-14	Corresponding percentage of AI curve 1 min. input	-100.00% to 100.0%	0.0%	☆	118
P4-15	AI curve 1 max. input	P4-13 to 10.00 V	10.00 V	☆	118

Para. No.	Para. Name	Setting Range	Default	Property	Page
P4-16	Corresponding percentage of AI curve 1 max. input	-100.00% to 100.0%	100.0%	☆	118
P4-17	AI1 filter time	0.00s to 10.00s	0.10s	☆	121
P4-18	AI curve 2 min. input	0.00 V to P4-20	0.00 V	☆	119
P4-19	Corresponding percentage of AI curve 2 min. input	-100.00% to 100.0%	0.0%	☆	119
P4-20	AI curve 2 max. input	P4-18 to 10.00 V	10.00 V	☆	119
P4-21	Corresponding percentage of AI curve 2 max. input	-100.00% to 100.0%	100.0%	☆	119
P4-22	AI2 filter time	0.00s to 10.00s	0.10s	☆	121
P4-23	Panel Pot curve min. input	-10.00 V to P4-25	-10.00 V	☆	119
P4-24	Corresponding percentage of AI curve 3 min. input	-100.00% to 100.0%	0.0%	☆	119
P4-25	AI curve 3 max. input	P4-23 to 10.00 V	10.00 V	☆	119
P4-26	Corresponding percentage of AI curve 3 max. input	-100.00% to 100.0%	100.0%	☆	119
P4-27	Panel Pot	0.00s to 10.00s	0.10s	☆	-
P4-28	Keep	-	-	☆	-
P4-29	Keep	-	-	☆	-
P4-30	Keep	-	-	☆	-
P4-31	Keep	-	-	☆	-

Para. No.	Para. Name	Setting Range	Default	Property	Page
P4-32	Pulse filter time	0.00s to 10.00s	0.10s	☆	123
P4-33	AI curve selection	111 to 555	321	☆	121
P4-34	Setting selection when AI less than min. input	000 to 111 0: Corresponding percentage of min. input 1: 0.0% Units position: AI1 Tens position: AI2 Hundreds position: Panel Pot	000	☆	-
P4-35	DI1 delay	0.0s to 3600.0s	0.0s	☆	181
P4-36	DI2 delay	0.0s to 3600.0s	0.0s	★	181
P4-37	DI3 delay	0.0s to 3600.0s	0.0s	★	181
P4-38	DI active mode selection 1	00000 to 11111	00000	★	181
P4-40	AI2 voltage / current selection	0:voltage 1:current	0	★	182

Para. No.	Para. Name	Setting Range	Default	Property	Page
Group P5: Output Terminals					
P5-00	FM terminal output mode	0,1	0	☆	184
P5-01	FMR function selection	0 to 41	0	☆	184
P5-02	Relay (T/A-T/B-T/C) function selection	0 to 41	2	☆	184
P5-04	DO1 function selection	0 to 41	1	☆	184
P5-06	FMP function selection	0 to 16	0	☆	189
P5-07	AO1 function selection	0 to 16	0	☆	189
P5-09	Max. FMP output frequency	0.01 to 100.00 kHz	50.00 kHz	☆	189
P5-10	AO1 zero offset coefficient	-100.0% to 100.0%	0.0%	☆	189
P5-11	AO1 gain	-10.00 to 10.00	1.00	☆	189
P5-17	FMR output delay	0.0s to 3600.0s	0.0s	☆	184
P5-18	Relay 1 output delay	0.0s to 3600.0s	0.0s	☆	189
P5-19	Keep	-	-	☆	
P5-20	DO1 output delay	0.0s to 3600.0s	0.0s	☆	184
P5-21	-	-	-	☆	184
P5-22	DI active mode selection 1	00000 to 11111	00000	☆	184
P5-23	AO1 mode selection	0： voltage 1： current	0	☆	-

Para. No.	Para. Name	Setting Range	Default	Property	Page
Group P6: Start/Stop Control					
P6-00	Start mode (2,3 item T4 model only)	0: Direct start 1: Speed Search 2: Pre-excited start 3: Magnetic field orientation	0	☆	137
P6-01	Mode of catching a spinning motor	0: From stop frequency 1: From 50 Hz 2: From max. frequency	0	★	137
P6-02	Speed of catching a spinning motor	20	20	☆	137
P6-03	Start frequency	0.00 to 10.00 Hz	0.00 Hz	☆	137

Para. No.	Para. Name	Setting Range	Default	Property	Page
P6-04	Start frequency holding time	0.0s to 100.0s	0.0s	★	137
P6-05	DC injection braking 1 level/Pre-excitation level	0% to 100%	50%	★	137
P6-06	DC injection braking 1 active time /Pre-excitation active time	0.0s to 100.0s	0.0s	★	137
P6-07	Acceleration/Deceleration mode	0 to 2	0	★	141
P6-08	Time proportion of S-curve start segment	0.0% to (100.0% – P6-09)	30.0%	★	141
P6-09	Time proportion of S-curve end segment	0.0% to (100.0% – P6-08)	30.0%	★	141
P6-10	Stop mode	0: Decelerate to stop 1: Coast to stop	0	☆	139
P6-11	DC injection braking 2 start frequency	0.00 Hz to maximum frequency	0.00 Hz	☆	139
P6-12	DC injection braking 2 delay time	0.0 to 100.0s	0.0s	☆	139
P6-13	DC injection braking 2 level	0% to 100%	50%	☆	139
P6-14	DC injection braking 2 active time	0.0s to 100.0s	0.0s	☆	139
P6-15	Braking use ratio	0% to 100%	100%	☆	-
P6-18	Catching a spinning motor current limit (T4 only)	100%	Model dependent	★	-
P6-21	Demagnetization time (effective for SVC) (T4 only)	0.00s to 5.00s	Model dependent	☆	-
P6-23	Overexcitation selection (T4 only)	0: Disabled 1: Enabled during deceleration 2: Enabled in the whole process	0	☆	-
P6-24	Overexcitation suppression current level (T4 only)	0% to 150%	100%	☆	-
P6-25	Overexcitation gain (T4 only)	1.00 to 2.50	1.25	☆	-
Group P7: Keypad Operation and LED Display					
P7-00	LED default display check	0	0	☆	-
P7-01	MF.K key function selection	0 to 4	0	★	84
P7-02	STOP/RESET key function	0, 1	1	☆	-
P7-03	LED display running parameters 1	0000 to FFFF	1F	☆	163
P7-04	LED display running parameters 2	0000 to FFFF	00	☆	163
P7-05	LED display stop parameters	0000 to FFFF	33	☆	164
P7-06	Load speed display coefficient	0.0001 to 65.000	1.0000	☆	-
P7-07	Heatsink temperature of AC Drive IGBT	-20°C to 120°C	-	●	-
P7-08	Product number	-	-	●	-
P7-09	Accumulative running time	0 to 65535 h	-	●	-
P7-10	Performance software version	-	-	●	-
P7-11	Function software version	-	-	●	-

Para. No.	Para. Name	Setting Range	Default	Property	Page
P7-12	Number of decimal places for load speed display	10 to 22	20	☆	-
P7-13	Accumulative power-on time	0 to 65535 h	-	●	-
P7-14	Accumulative power consumption	0 to 65535 kWh	-	●	-
Group P8: Auxiliary Functions					
P8-00	Jog frequency reference	0.00 Hz to max. frequency	2.00 Hz	☆	199
P8-01	Jog acceleration time	0.0s to 6500.0s	20.0s	☆	199
P8-02	Jog deceleration time	0.0s to 6500.0s	20.0s	☆	199
P8-03	Acceleration time 2	0.0s to 6500.0s	Model dependent	☆	141
P8-04	Deceleration time 2	0.0s to 6500.0s	Model dependent	☆	141
P8-05	Acceleration time 3	0.0s to 6500.0s	Model dependent	☆	141
P8-06	Deceleration time 3	0.0s to 6500.0s	Model dependent	☆	141
P8-07	Acceleration time 4	0.0s to 6500.0s	0.0s	☆	141
P8-08	Deceleration time 4	0.0s to 6500.0s	0.0s	☆	141
P8-09	Frequency jump 1	0.00 Hz to max. frequency	0.00 Hz	☆	201
P8-10	Frequency jump 2	0.00 Hz to max. frequency	0.00 Hz	☆	201
P8-11	Frequency jump band	0.00 Hz to max. frequency	0.00 Hz	☆	201
P8-12	Forward/Reverse run switchover dead-zone time	0.0s to 3000.0s	0.0s	☆	201
P8-13	Reverse RUN selection	0, 1	0	☆	201
P8-14	Running mode when frequency reference lower than frequency lower limit	0 to 2	0	☆	136
P8-15	Droop rate	0.00% to 10.00Hz	0.00Hz	☆	179
P8-16	Accumulative power-on time threshold	0 to 65000 h	0 h	☆	-
P8-17	Accumulative running time threshold	0 to 65000 h	0 h	☆	-
P8-18	Startup protection selection	0, 1	0	☆	156
P8-19	Frequency detection value 1	0.00 Hz to max. frequency	50.00 Hz	☆	202
P8-20	Frequency detection hysteresis 1	0.0% to 100.0%	5.0%	☆	202
P8-21	Detection width of target frequency reached	0.0% to 100.0%	0.0%	☆	203
P8-22	Jump frequency function	0, 1	0	☆	201
P8-25	Switchover frequency of accel time 1 and accel time 2	0.00 Hz to max. frequency	0.00 Hz	☆	203
P8-26	Switchover frequency of decel time 1 and decel time 2	0.00 Hz to max. frequency	0.00 Hz	☆	203
P8-27	Set highest priority to terminal JOG function	0, 1	0	☆	199
P8-28	Frequency detection value 2	0.00 Hz to max. frequency	50.00 Hz	☆	202

Para. No.	Para. Name	Setting Range	Default	Property	Page
P8-29	Frequency detection hysteresis 2	0.0% to 100.0%	5.0%	☆	202
P8-30	Detection of frequency 1	0.00 Hz to max. frequency	50.00 Hz	☆	204
P8-31	Detection width of frequency 1	0.0% to 100.0% (max. frequency)	0.0%	☆	204
P8-32	Detection of frequency 2	0.00 Hz to max. frequency	50.00 Hz	☆	204
P8-33	Detection width of frequency 2	0.0% to 100.0% (max. frequency)	0.0%	☆	204
P8-34	Zero current detection level	0.0% to 300.0% (rated motor current)	5.0%	☆	204
P8-35	Zero current detection delay	0.01s to 600.00s	0.10s	☆	204
P8-36	Output overcurrent threshold	0.0% (no detection) 0.1% to 300.0% (rated motor current)	200.0%	☆	205
P8-37	Output overcurrent detection delay	0.00s to 600.00s	0.00s	☆	205
P8-38	Detection level of current 1	0.0% to 300.0% (rated motor current)	100.0%	☆	205
P8-39	Detection width of current 1	0.0% to 300.0% (rated motor current)	0.0%	☆	205
P8-40	Detection level of current 2	0.0% to 300.0% (rated motor current)	100.0%	☆	205
P8-41	Detection width of current 2	0.0% to 300.0% (rated motor current)	0.0%	☆	205
P8-42	Timing function	0, 1	0	★	206
P8-43	Running time setting channel	0 to 3	0	★	206
P8-44	Running time	0.0 to 6500.0 min	0.0 min	★	206
P8-45	AI1 input voltage lower limit	0.00 V to P8-46	3.10 V	☆	206
P8-46	AI1 input voltage upper limit	P8-45 to 11.00 V	6.80 V	☆	206
P8-47	IGBT temperature threshold	0°C to 100°C	75°C	☆	206
P8-48	Cooling fan working mode	0, 1	0	☆	206
P8-49	Wakeup frequency	P8-51 to max. frequency (P0-10)	0.00 Hz	☆	207
P8-50	Wakeup delay time	0.0s to 6500.0s	0.0s	☆	207
P8-51	Hibernating frequency	0.00 Hz to wakeup frequency (P8-49)	0.00 Hz	☆	207
P8-52	Hibernating delay time	0.0s to 6500.0s	0.0s	☆	207
P8-53	Running time threshold this time	0.0 to 6500.0 min	0.0 min	☆	207
P8-54	Output power correction coefficient	0.0% to 200.0%	100.0%	☆	207
P8-55	Deceleration time for emergency stop T4 only	0s to 6553.5s	Model dependent	☆	207
Group P9: Fault and Protection					
P9-00	Motor overload protection	0, 1	1	☆	157
P9-01	Motor overload protection gain	0.20 to 10.00	1.00	☆	157

Para. No.	Para. Name	Setting Range	Default	Property	Page
P9-02	Motor overload pre-warning coefficient	50% to 100%	80%	☆	157
P9-03	Overvoltage protection gain	0 (no overvoltage stall) to 100	40/30	☆	148
P9-04	Overvoltage protection voltage	650 to 800 V 330 to 400 V	770 V 370 V	☆	148
P9-07	Detection of short-circuit to ground upon power-on	00 to 01 T2S 00 to 11 T4	01 01	☆	-
P9-08	Braking unit applied voltage	650 to 800 V 330 to 400 V	760/370 V	★	148
P9-09	Auto reset times	0 to 20	0	☆	159
P9-10	Selection of DO action during auto reset	0, 1	0	☆	159
P9-11	Delay of auto reset	0.1s to 100.0s	1.0s	☆	159
P9-12	Input phase loss/pre-charge relay protection	00 to 11	11	☆	158
P9-13	Output phase loss protection	00 to 11	01	☆	158
P9-14	1st fault type	0 to 55	-	●	-
P9-15	2nd fault type	0 to 55	-	●	-
P9-16	3rd (latest) fault type	0 to 55	-	●	-
P9-17	Frequency upon 3rd fault	0.00Hz~655.35Hz	0.00Hz	●	-
P9-18	Current upon 3rd fault	0.00Hz~655.35A	0.00A	●	-
P9-19	Bus voltage upon 3rd fault	0.0V~6553.5V	0.0V	●	-
P9-20	DI state upon 3rd fault	0~9999	0	●	-
P9-21	DO state upon 3rd fault	0~9999	0	●	-
P9-22	AC drive state upon 3rd fault	0~65535	0	●	-
P9-23	Power-on time upon 3rd fault	0s~65535s	0s	●	-
P9-24	Running time upon 3rd fault	0.0s~6553.5s	0.0s	●	-
P9-27	Frequency upon 2nd fault	0.00Hz~655.35Hz	0.00Hz	●	-
P9-28	Current upon 2nd fault	0.00A~655.35A	0.00A	●	-
P9-29	Bus voltage upon 2nd fault	0.0V~6553.5V	0.0V	●	-
P9-30	DI state upon 2nd fault	0~9999	0	●	-
P9-31	DO state upon 2nd fault	0~9999	0	●	-
P9-32	AC drive state upon 2nd fault	0~65535	0	●	-
P9-33	Power-on time upon 2nd fault	0s~65535s	0	●	-
P9-34	Running time upon 2nd fault	0.0s~6553.5s	0s	●	-
P9-37	Frequency upon 1st fault	0.00Hz~655.35Hz	0.00Hz	●	-
P9-38	Current upon 1st fault	0.00A~655.35A	0.00A	●	-
P9-39	Bus voltage upon 1st fault	0.0V~6553.5V	0.0V	●	-
P9-40	DI state upon 1st fault	0~9999	0	●	-
P9-41	DO state upon 1st fault	0~9999	0	●	-
P9-42	AC drive state upon 1st fault	0~65535	0	●	-
P9-43	Power-on time upon 1st fault	0s~65535s	0s	●	-
P9-44	Running time upon 1st fault	0.0s~6553.5s	0.0s	●	-

Para. No.	Para. Name	Setting Range	Default	Property	Page
P9-47	Fault protection action selection 1	00000 to 22222	00000	☆	159
P9-48	Fault protection action selection 2	00000 to 22110	00000	☆	159
P9-49	Fault protection action selection 3	00000 to 22222	00000	☆	160
P9-50	Fault protection action selection 4	00000 to 22222	00000	☆	160
P9-54	Frequency selection for continuing to run upon fault	0 to 4	0	☆	160
P9-55	Backup frequency upon fault	0.0% to 100.0% (max. frequency)	100.0%	☆	160
P9-56	Keep	-	-	☆	160
P9-57	Keep	-	-	☆	-
P9-58	Keep	-	-	☆	-
P9-59	Power dip ride-through function selection	0 to 2	0	★	161
P9-60	Threshold of power dip ride-through function disabled	80% to 100%	85%	★	161
P9-61	Judging time of bus voltage recovering from power dip	0.0s to 100.0s	0.5s	★	161
P9-62	Threshold of power dip ride-through function enabled	60% to 100%	80%	★	161
P9-63	Load lost protection	0: Disabled 1: Enabled	0	☆	161
P9-64	Load lost detection level	0.0% to 100.0%	10.0%	☆	161
P9-65	Load lost detection time	0.0s to 60.0s	1.0s	☆	161
P9-70	Keep				
P9-71	Power dip ride-through gain Kp	0 to 100	40	☆	161
P9-72	Power dip ride-through integral coefficient	0 to 100	30	☆	161
P9-73	Deceleration time of power dip ride-through	0.0s to 300.0s	20.0s	★	161
P9-74	Shaking suppression time T4 only	0.1s to 600.0s	0.5s	★	-

Group PA: PID Function					
PA-00	PID reference setting channel	0 to 6	0	☆	129
PA-01	PID digital setting	0.0% to 100.0%	50.0%	☆	129
PA-02	PID feedback setting channel	0 to 8	0	☆	129

Para. No.	Para. Name	Setting Range	Default	Property	Page
PA-03	PID operation direction	0, 1	0	☆	129
PA-04	PID reference and feedback range	0 to 65535	1000	☆	129
PA-05	Proportional gain Kp1	0.0 to 1000.0	20.0	☆	130
PA-06	Integral time Ti1	0.01s to 10.00s	2.00s	☆	130
PA-07	Differential time Td1	0.000s to 10.000s	0.000s	☆	130
PA-08	PID output limit in reverse direction	0.00 Hz to max. frequency	0.00 Hz	★	130
PA-09	PID error limit	0.0% to 100.0%	0.0%	☆	130
PA-10	PID differential limit	0.00% to 100.00%	0.10%	☆	130
PA-11	PID reference change time	0.00s to 650.00s	0.00s	☆	130
PA-12	PID feedback filter time	0.00s to 60.00s	0.00s	☆	130
PA-13	PID output filter time	0.00s to 60.00s	0.00s	☆	130
PA-14	Reserved	-	-	-	-
PA-15	Proportional gain Kp2	0.0 to 1000.0	20.0	☆	130
PA-16	Integral time Ti2	0.01s to 10.00s	2.00s	☆	130
PA-17	Differential time Td2	0.000s to 10.000s	0.000s	☆	130
PA-18	PID parameter switchover condition	0 to 3	0	☆	130
PA-19	PID error 1 for auto switchover	0.0% to PA-20	20.0%	☆	130
PA-20	PID error 2 for auto switchover	PA-19 to 100.0%	80.0%	☆	130
PA-21	PID initial value	0.0% to 100.0%	0.0%	☆	130
PA-22	PID initial value active time	0.00s to 650.00s	0.00s	☆	130
PA-23	Max deviation between two outputs	0.00%~100.00%	1.00%	☆	-
PA-24	Min deviation between two outputs	0.00%~100.00%	1.00%	☆	-
PA-25	PID integral property	00 to 11	00	☆	130
PA-26	Detection level of PID feedback loss	0.0%: No detection 0.1% to 100.0%	0.0%	☆	131
PA-27	Detection time of PID feedback loss	0.0s to 20.0s	0.0s	☆	131
PA-28	Selection of PID operation at stop	0, 1	0	☆	131

Group Pb: Wobble Function, Fixed Length and Count					
Pb-05	Set length	0 to 65535 m	1000 m	☆	168
Pb-06	Actual length	0 to 65535 m	0 m	☆	168
Pb-07	Number of pulses per meter	0.1 to 6553.5	100.0	☆	168
Pb-08	Set count value	1 to 65535	1000	☆	169
Pb-09	Designated count value	1 to 65535	1000	☆	169
Group PC: Multi-Reference and Simple PLC Function					

Para. No.	Para. Name	Setting Range	Default	Property	Page
PC-00	Reference 0	-100.0% to 100.0%	0.0%	☆	124
PC-01	Reference 1	-100.0% to 100.0%	0.0%	☆	124
PC-02	Reference 2	-100.0% to 100.0%	0.0%	☆	124
PC-03	Reference 3	-100.0% to 100.0%	0.0%	☆	124
PC-04	Reference 4	-100.0% to 100.0%	0.0%	☆	124
PC-05	Reference 5	-100.0% to 100.0%	0.0%	☆	124
PC-06	Reference 6	-100.0% to 100.0%	0.0%	☆	124
PC-07	Reference 7	-100.0% to 100.0%	0.0%	☆	124
PC-08	Reference 8	-100.0% to 100.0%	0.0%	☆	124
PC-09	Reference 9	-100.0% to 100.0%	0.0%	☆	124
PC-10	Reference 10	-100.0% to 100.0%	0.0%	☆	124
PC-11	Reference 11	-100.0% to 100.0%	0.0%	☆	124
PC-12	Reference 12	-100.0% to 100.0%	0.0%	☆	124
PC-13	Reference 13	-100.0% to 100.0%	0.0%	☆	124
PC-14	Reference 14	-100.0% to 100.0%	0.0%	☆	124
PC-15	Reference 15	-100.0% to 100.0%	0.0%	☆	124
PC-16	Simple PLC running mode	0 to 2	0	☆	127
PC-17	Simple PLC retentive selection	00 to 11	00	☆	127
PC-18	Running time of simple PLC reference 0	0.0s (h) to 6500.0s (h)	0.0s (h)	☆	126
PC-19	Acceleration/deceleration time of simple PLC reference 0	0 to 3	0	☆	126
PC-20	Running time of simple PLC reference 1	0.0s (h) to 6500.0s (h)	0.0s (h)	☆	126
PC-21	Acceleration/deceleration time of simple PLC reference 1	0 to 3	0	☆	126
PC-22	Running time of simple PLC reference 2	0.0s (h) to 6500.0s (h)	0.0s (h)	☆	126

Para. No.	Para. Name	Setting Range	Default	Property	Page
PC-23	Acceleration/deceleration time of simple PLC reference 2	0 to 3	0	☆	126
PC-24	Running time of simple PLC reference 3	0.0s (h) to 6500.0s (h)	0.0s (h)	☆	126
PC-25	Acceleration/deceleration time of simple PLC reference 3	0 to 3	0	☆	126
PC-26	Running time of simple PLC reference 4	0.0s (h) to 6500.0s (h)	0.0s (h)	☆	126
PC-27	Acceleration/deceleration time of simple PLC reference 4	0 to 3	0	☆	126
PC-28	Running time of simple PLC reference 5	0.0s (h) to 6500.0s (h)	0.0s (h)	☆	126
PC-29	Acceleration/deceleration time of simple PLC reference 5	0 to 3	0	☆	126

Para. No.	Para. Name	Setting Range	Default	Property	Page
PC-30	Running time of simple PLC reference 6	0.0s (h) to 6500.0s (h)	0.0s (h)	☆	126
PC-31	Acceleration/deceleration time of simple PLC reference 6	0 to 3	0	☆	126
PC-32	Running time of simple PLC reference 7	0.0s (h) to 6500.0s (h)	0.0s (h)	☆	126
PC-33	Acceleration/deceleration time of simple PLC reference 7	0 to 3	0	☆	126
PC-34	Running time of simple PLC reference 8	0.0s (h) to 6500.0s (h)	0.0s (h)	☆	126
PC-35	Acceleration/deceleration time of simple PLC reference 8	0 to 3	0	☆	126
PC-36	Running time of simple PLC reference 9	0.0s (h) to 6500.0s (h)	0.0s (h)	☆	127
PC-37	Acceleration/deceleration time of simple PLC reference 9	0 to 3	0	☆	127
PC-38	Running time of simple PLC reference 10	0.0s (h) to 6500.0s (h)	0.0s (h)	☆	127
PC-39	Acceleration/deceleration time of simple PLC reference 10	0 to 3	0	☆	127
PC-40	Running time of simple PLC reference 11	0.0s (h) to 6500.0s (h)	0.0s (h)	☆	127
PC-41	Acceleration/deceleration time of simple PLC reference 11	0 to 3	0	☆	127
PC-42	Running time of simple PLC reference 12	0.0s (h) to 6500.0s (h)	0.0s (h)	☆	127
PC-43	Acceleration/deceleration time of simple PLC reference 12	0 to 3	0	☆	127
PC-44	Running time of simple PLC reference 13	0.0s (h) to 6500.0s (h)	0.0s (h)	☆	127
PC-45	Acceleration/deceleration time of simple PLC reference 13	0 to 3	0	☆	127
PC-46	Running time of simple PLC reference 14	0.0s (h) to 6500.0s (h)	0.0s (h)	☆	127
PC-47	Acceleration/deceleration time of simple PLC reference 14	0 to 3	0	☆	127
PC-48	Running time of simple PLC reference 15	0.0s (h) to 6500.0s (h)	0.0s (h)	☆	127
PC-49	Acceleration/deceleration time of simple PLC reference 15	0 to 3	0	☆	127
PC-50	Time unit of simple PLC running	0, 1	0	☆	127
PC-51	Reference 0 source	0 to 6	0	☆	127
Group Pd: Communication					
Pd-00	Baud rate	0000 to 6009	5005	☆	192
Pd-01	Data format symbol	0 to 3	0	☆	192
Pd-02	Local address	1 to 247	1	☆	192
Pd-03	Response delay	0 to 20 ms	2	☆	192

Para. No.	Para. Name	Setting Range	Default	Property	Page
Pd-04	Communication timeout	0.0: invalid 0.1s to 60.0s	0.0s	☆	192
Pd-05	Modbus protocol selection	00 to 01	01	☆	193
Pd-06	Current resolution read by communication	0: 0.01	0	☆	193

Group PE: User-Defined Parameters					
PE-00	User-defined parameter 0	P0-00 to PP-xx, A0-00 to Ax-xx, U0-00 to U0-xx, U3-00 to U3-xx	U3.17	☆	-
PE-01	User-defined parameter 1	Same as PE-00	U3.16	☆	-
PE-02	User-defined parameter 2	Same as PE-00	P0.00	☆	-
PE-03	User-defined parameter 3	Same as PE-00	P0.00	☆	-
PE-04	User-defined parameter 4	Same as PE-00	P0.00	☆	-
PE-05	User-defined parameter 5	Same as PE-00	P0.00	☆	-
PE-06	User-defined parameter 6	Same as PE-00	P0.00	☆	-
PE-07	User-defined parameter 7	Same as PE-00	P0.00	☆	-
PE-08	User-defined parameter 8	Same as PE-00	P0.00	☆	-
PE-09	User-defined parameter 9	Same as PE-00	P0.00	☆	-
PE-10	User-defined parameter 10	Same as PE-00	P0.00	☆	-
PE-11	User-defined parameter 11	Same as PE-00	P0.00	☆	-
PE-12	User-defined parameter 12	Same as PE-00	P0.00	☆	-
PE-13	User-defined parameter 13	Same as PE-00	P0.00	☆	-
PE-14	User-defined parameter 14	Same as PE-00	P0.00	☆	-
PE-15	User-defined parameter 15	Same as PE-00	P0.00	☆	-
PE-16	User-defined parameter 16	Same as PE-00	P0.00	☆	-
PE-17	User-defined parameter 17	Same as PE-00	P0.00	☆	-
PE-18	User-defined parameter 18	Same as PE-00	P0.00	☆	-
PE-19	User-defined parameter 19	Same as PE-00	P0.00	☆	-
PE-20	User-defined parameter 20	Same as PE-00	U0.68	☆	-
PE-21	User-defined parameter 21	Same as PE-00	U0.69	☆	-
PE-22	User-defined parameter 22	Same as PE-00	P0.00	☆	-
PE-23	User-defined parameter 23	Same as PE-00	P0.00	☆	-
PE-24	User-defined parameter 24	Same as PE-00	P0.00	☆	-
PE-25	User-defined parameter 25	Same as PE-00	P0.00	☆	-
PE-26	User-defined parameter 26	Same as PE-00	P0.00	☆	-
PE-27	User-defined parameter 27	Same as PE-00	P0.00	☆	-
PE-28	User-defined parameter 28	Same as PE-00	P0.00	☆	-
PE-29	User-defined parameter 29	Same as PE-00	P0.00	☆	-
PE-30	User-defined parameter 30	Same as PE-00	P0.00	☆	-

Para. No.	Para. Name	Setting Range	Default	Property	Page
PE-31	User-defined parameter 31	Same as PE-00	P0.00	☆	-
Group PF: Manufacturer Parameters, Access Denied					
Group PP: Function Parameter Management					
PP-00	User password	0 to 65535	0	☆	-
PP-01	Parameter initialization	0: No operation 1: Restore factory parameters except motor parameters 2: Clear records 4: Back up current user parameters 501: Restore user backup parameters	0	★	-
PP-02	Parameter display property	00 to 11	11	☆	-
PP-03	Selection of individualized parameter display	00 to 11	00	☆	-
PP-04	Selection of parameter modification	0, 1	0	☆	-
Group A0: Torque Control and Limit Note：Only for 380V Model，SVC Mode					
A0-00	Speed/Torque control selection	0, 1	0	★	152
A0-01	Torque reference source in torque control	0 to 7	0	★	152
A0-03	Torque digital setting in torque control	-200.0% to 200.0%	150.0%	☆	152
A0-05	Forward max. frequency in torque control	0.00 Hz to max. frequency (P0-10)	50.00 Hz	☆	152
A0-06	Reverse max. frequency in torque control	0.00 Hz to max. frequency (P0-10)	50.00 Hz	☆	152
A0-07	Acceleration time in torque control	0.00s to 650.00s	0.00s	☆	152
A0-08	Deceleration time in torque control	0.00s to 650.00s	0.00s	☆	152
Group A1: Virtual DI/DO					
A1-00	VDI1 function selection	0 to 59	0	★	187
A1-01	VDI2 function selection	0 to 59	0	★	187
A1-02	VDI3 function selection	0 to 59	0	★	187
A1-03	VDI4 function selection	0 to 59	0	★	187
A1-04	VDI5 function selection	0 to 59	0	★	187
A1-05	VDI active state setting mode	00000 to 11111	00000	★	187
A1-06	Selection of VDI active state	00000 to 11111	00000	★	187
A1-07	Function selection for AI1 used as DI	0 to 59	0	★	189
A1-08	Function selection for AI2 used as DI	0 to 59	0	★	189
A1-09	Function selection for Panel Pot used as DI	0 to 59	0	★	189

Para. No.	Para. Name	Setting Range	Default	Property	Page
A1-10	Active state selection for AI used as DI	000 to 111	000	☆	189
A1-11	VDO1 function selection	0 to 41	0	☆	187
A1-12	VDO2 function selection	0 to 41	0	☆	187
A1-13	VDO3 function selection	0 to 41	0	☆	187
A1-14	VDO4 function selection	0 to 41	0	☆	187
A1-15	VDO5 function selection	0 to 41	0	☆	187
A1-16	VDO1 output delay	0.0s to 3600.0s	0.0s	☆	187
A1-17	VDO2 output delay	0.0s to 3600.0s	0.0s	☆	188
A1-18	VDO3 output delay	0.0s to 3600.0s	0.0s	☆	188
A1-19	VDO4 output delay	0.0s to 3600.0s	0.0s	☆	188
A1-20	VDO5 output delay	0.0s to 3600.0s	0.0s	☆	188
A1-21	VDO active mode selection	00000 to 11111	00000	☆	188
Group A2: Motor 2 Parameters					
A2-00	Motor type selection	0 to 1	0	★	171
A2-01	Rated motor power	0.1 to 6553.5 kW	Model dependent	★	171
A2-02	Rated motor voltage	1 to 2000 V	Model dependent	★	171
A2-03	Rated motor current	0.01 to 655.35 A	Model dependent	★	171
A2-04	Rated motor frequency	0.01 Hz to max. frequency	Model dependent	★	171
A2-05	Rated motor speed	1 to 65535 rpm	Model dependent	★	171
A2-06	Stator resistance	0.001 to 65.535 Ω	Auto-tuning dependent	★	171
A2-07	Rotor resistance	0.001 to 65.535 Ω	Auto-tuning dependent	★	171
A2-08	Leakage inductive reactance	0.01 to 655.35 mH	Auto-tuning dependent	★	171
A2-09	Mutual inductive reactance	0.1 to 6553.5 mH	Auto-tuning dependent	★	171

Para. No.	Para. Name	Setting Range	Default	Property	Page
A2-10	No-load current	0.01 A to A2-03	Auto-tuning dependent	★	171
A2-27	Keep	-	-	★	
A2-28	Keep	-	-	★	
A2-29	Keep	-	-	★	
A2-30	Keep	-	-	★	
A2-31	Keep	-	-	★	
A2-34	Keep	-	-	★	
A2-36	Keep	-	-	★	-
A2-37	Auto-tuning selection	0 to 3	0	★	171
A2-38	Speed loop proportional gain 1 (T4)	1 to 100	30	☆	-
A2-39	Speed loop integral time 1 (T4)	0.01s to 10.00s	0.50	☆	-
A2-40	Switchover frequency 1 (T4)	0.00 to A2-43	5.00	☆	-
A2-41	Speed loop proportional gain 2 (T4)	1 to 100	20	☆	-
A2-42	Speed loop integral time 2 (T4)	0.01s to 10.00s	1.00	☆	-
A2-43	Switchover frequency 2 (T4)	A2-40 to max. frequency	10.00	☆	-
A2-44	Vector control slip gain (T4)	50% to 200%	100%	☆	-
A2-45	Speed loop filter time constant (T4)	0.000s to 0.100s	0.015s	☆	-
A2-47	Torque limit source in speed control (T4)	0 to 7	0	☆	-
A2-48	Digital setting of torque limit in speed control (T4)	0.0% to 200.0%	150.0%	☆	-
A2-49	Torque limit source in speed control (regenerative) (T4)	0 to 7	0	☆	-
A2-50	Digital setting of torque limit in speed control (regenerative) (T4)	0.0% to 200.0%	150.0%	☆	-
A2-51	Excitation adjustment proportional gain (T4)	0 to 60000	2000	☆	-
A2-52	Excitation adjustment integral gain (T4)	0 to 60000	1300	☆	-
A2-53	Torque adjustment proportional gain (T4)	0 to 60000	2000	☆	-
A2-54	Torque adjustment integral gain (T4)	0 to 60000	1300	☆	-

Para. No.	Para. Name	Setting Range	Default	Property	Page
A2-55	Speed loop integral separation selection (T4)	0: Disabled 1: Enabled	0	☆	-
A2-59	Max. torque coefficient in field weakening area (T4)	50% to 200%	100%	☆	-
A2-60	Regenerative power limit selection (T4)	0: Disabled 1: Enabled in whole process 2: Enabled at constant speed (T4 only) 3: Enabled during deceleration (T4 only)	0	☆	-
A2-61	Regenerative power upper limit (T4)	0.0% to 200.0% 100.0% to 120.0% (T2S)	Model dependent	☆	-
A2-62	Motor 2 control mode	0 and 2 2(T2S)	0/2	★	-
A2-63	Motor 2 acceleration /deceleration time selection	0 to 4	0	☆	-
A2-64	Motor 2 torque boost	0.0%: Ineffective 0.1% to 30.0%	Model dependent	☆	-
A2-66	Motor 2 oscillation suppression gain	0 to 100	40	☆	-
Group A5: Control Optimization					
A5-00	DPWM switchover frequency upper limit	5.00 Hz to max. frequency	8.00 Hz	☆	156
A5-01	PWM modulation pattern	0, 1	0	☆	156
A5-02	Dead zone compensation mode selection	0, 1	1	☆	-
A5-03	Random PWM depth	0 to 10	0	☆	156
A5-04	Quick current limit enable	0, 1	1	☆	161
A5-05	Voltage over modulation coefficient	100% to 110% 105%(T2S)	105%	★	154
A5-06	Undervoltage point setting	210 to 420 V / 140 to 230V	350 / 200V	☆	162
A5-08	Low speed carrier frequency T4 only	0-8 Khz	0	★	-
A5-09	Overvoltage threshold	650.0 to 820.0 V 330.0 to 400.0 V	820V 400V	★	162
A5-11	Low-speed DC braking threshold T4 only	01-20	5	★	-
Group A6: AI Curve Setting					
A6-00	AI curve 4 min. input	-10.00 V to A6-02	0.00 V	☆	120

0.5s

Para. No.	Para. Name	Setting Range	Default	Property	Page
A6-01	Corresponding percentage of AI curve 4 min. input	-100.0% to 100.0%	0.0%	☆	120
A6-02	AI curve 4 inflexion 1 input	A6-00 to A6-04	3.00 V	☆	120
A6-03	Corresponding percentage of AI curve 4 inflexion 1 input	-100.0% to 100.0%	30.0%	☆	120
A6-04	AI curve 4 inflexion 2 input	A6-02 to A6-06	6.00 V	☆	120
A6-05	Corresponding percentage of AI curve 4 inflexion 2 input	-100.0% to 100.0%	60.0%	☆	120
A6-06	AI curve 4 max. input	A6-04 to 10.00 V	10.00 V	☆	120
A6-07	Corresponding percentage of AI curve 4 max. input	-100.0% to 100.0%	100.0%	☆	120
A6-08	AI curve 5 min. input	-10.00 V to A6-10	-10.00 V	☆	120
A6-09	Corresponding percentage of AI curve 5 min. input	-100.0% to 100.0%	-100.0%	☆	120
A6-10	AI curve 5 inflexion 1 input	A6-08 to A6-12	-3.00 V	☆	120
A6-11	Corresponding percentage of AI curve 5 inflexion 1 input	-100.0% to 100.0%	-30.0%	☆	120
A6-12	AI curve 5 inflexion 2 input	A6-10 to A6-14	3.00 V	☆	120
A6-13	Corresponding percentage of AI curve 5 inflexion 2 input	-100.0% to 100.0%	30.0%	☆	120
A6-14	AI curve 5 max. input	A6-12 to 10.00 V	10.00 V	☆	120
A6-15	Corresponding percentage of AI curve 5 max. input	-100.0% to 100.0%	100.0%	☆	120
A6-24	Jump point of AI1 input corresponding setting	-100.0% to 100.0%	0.0%	☆	-
A6-25	Jump amplitude of AI1 input corresponding setting	0.0% to 100.0%	0.5%	☆	-
A6-26	Jump point of AI2 input corresponding setting	-100.0% to 100.0%	0.0%	☆	-
A6-27	Jump amplitude of AI2 input corresponding setting	0.0% to 100.0%	0.5%	☆	-
A6-28	Jump point of Panel Pot input corresponding setting	-100.0% to 100.0%	0.0%	☆	-
A6-29	Jump amplitude of Panel Pot input corresponding setting	0.0% to 100.0%	0.5%	☆	-

Group A8: Point-point Communication					
A8-00	Point-point communication	0: Disabled 1: Enabled	0	☆	177
A8-01	Master or slave selection	0: Master 1: Slave	0	☆	177
A8-02	Selection of action of the slave in point-point communication	000 to 111	011	★	178
A8-03	The slave received data	0: Output frequency 1: Frequency reference	0	☆	178
A8-04	Zero offset of received data	-100.00 to 100.00	0.00	☆	180
A8-05	Gain of received data	-10.00 to 10.00	1.00	☆	180
A8-06	Point-point communication interruption detection time	0.0s to 10.0s	1.0s	☆	181
A8-07	Master data sending cycle in point-point communication	0.001s to 10.000s	0.001s	☆	181
A8-11	Window width	0.20 to 10.00 Hz	0.50 Hz		181
Group AC: AI/AO Correction					
AC-00	AI1 measured voltage 1	-10.00 to 10.000 V	Factory-corrected	☆	-
AC-01	AI1 displayed voltage 1	-10.00 to 10.000 V	Factory-corrected	☆	-
AC-02	AI1 measured voltage 2	-10.00 to 10.000 V	Factory-corrected	☆	-
AC-03	AI1 displayed voltage 2	-10.00 to 10.000 V	Factory-corrected	☆	-
AC-04	AI2 measured voltage 1	-10.00 to 10.000 V	Factory-corrected	☆	-
AC-05	AI2 displayed voltage 1	-10.00 to 10.000 V	Factory-corrected	☆	-
AC-06	AI2 measured voltage 2	-10.00 to 10.000 V	Factory-corrected	☆	-
AC-07	AI2 displayed voltage 2	-10.00 to 10.000 V	Factory-corrected	☆	-

Para. No.	Para. Name	Setting Range	Default	Property	Page
AC-08	Keyboard knobs measured voltage 1	-10.00 to 10.000 V	Factory-corrected	☆	-
AC-09	Keyboard knobs displayed voltage 1	-10.00 to 10.000 V	Factory-corrected	☆	-
AC-10	Keyboard knobs measured voltage 2	-10.00 to 10.000 V	Factory-corrected	☆	-
AC-11	Keyboard knobs displayed voltage 2	-10.00 to 10.000 V	Factory-corrected	☆	-
AC-12	AO1 target voltage 1	-10.00 to 10.000 V	Factory-corrected	☆	-
AC-13	AO1 measured voltage 1	-10.00 to 10.000 V	Factory-corrected	☆	-
AC-14	AO1 target voltage 2	-10.00 to 10.000 V	Factory-corrected	☆	-
AC-15	AO1 measured voltage 2	-10.00 to 10.000 V	Factory-corrected	☆	-
AC-20	AI2 measured current 1	0.00 to 20.000 mA	Factory-corrected	☆	-
AC-21	AI2 displayed current 1	0.00 to 20.000 mA	Factory-corrected	☆	-
AC-22	AI2 measured current 2	0.00 to 20.000 mA	Factory-corrected	☆	-
AC-23	AI2 displayed current 2	0.00 to 20.000 mA	Factory-corrected	☆	-
AC-24	AO1 measured current 1	0.00 to 20.000 mA	Factory-corrected	☆	-
AC-25	AO1 displayed current 1	0.00 to 20.000 mA	Factory-corrected	☆	-
AC-26	AO1 measured current 2	0.00 to 20.000 mA	Factory-corrected	☆	-
AC-27	AO1 displayed current 2	0.00 to 20.000 mA	Factory-corrected	☆	-

A.2 Monitoring Parameters

Para. No.	Para. Name	Min Unit	Display Range	Comm.Addr	Page
Group U0: Monitoring Parameters					
U0-00	Running frequency	0.01Hz	0.00 to 500.0 Hz	7000H	165
U0-01	Frequency reference	0.01Hz	0.00 to 500.0 Hz	7001H	165
U0-02	Bus voltage	0.1V	0.0 to 3000.0 V	7002H	165
U0-03	Output voltage	1V	0 to 1140 V	7003H	165
U0-04	Output current	0.01A	0.00 to 655.35 A	7004H	165
U0-05	Output power	0.1kW	0 to 32767	7005H	165
U0-06	Output torque	0.1%	-200.0% to 200.0%	7006H	165
U0-07	DI state	1	0 to 32767	7007H	165
U0-08	DO state	1	0 to 1023	7008H	165
U0-09	AI1 voltage	0.01V	-	7009H	165
U0-10	AI2 voltage	0.01V/0.01mA	-	700AH	165
U0-11	Pannel Pot	0.01V	-	700BH	165
U0-12	Count value	1	-	700CH	166
U0-13	length value	1	-	700DH	166
U0-15	PID reference	1	0 to 65535	700FH	166
U0-16	PID feedback	1	0 to 65535	7010H	166
U0-17	PLC stage	1	-	7011H	166
U0-18	Keep			7012H	-
U0-20	Remaining running time	0.1Min	0.0 to 6500.0 min	7014H	166
U0-21	AI1 voltage before correction	0.001V	0.00 to 10.57 V	7015H	166
U0-22	AI2 voltage (V)/current (mA) before correction	0.01V 0.01mA	0.00 to 10.57 V 0.00 to 20.00 mA	7016H	166
U0-23	Pannel Pot.	0.01V	-10.57 to 10.57 V	7017H	166
U0-24	Motor speed	1RPM	0 to rated motor speed	7018H	166
U0-25	Accumulative power-on time	1Min	-	7019H	166
U0-26	Accumulative running time	0.1Min	-	701AH	166
U0-27	Keep		-	701BH	-
U0-28	Communication reference	0.01%	-100.00% to 100.00%	701CH	166
U0-30	Main frequency reference	0.01Hz	0.00 to 500.00 Hz	701EH	166
U0-31	Auxiliary frequency reference	1	0.00 to 500.00 Hz	701FH	166
U0-32	Viewing any register address value		-	7020H	-
U0-35	Target torque	0.1%	-200.0% to 200.0%	7023H	166

Para. No.	Para. Name	Min Unit	Display Range	Comm.Addr	Page
U0-37	Power factor angle	0.1°	-180.0° to 180.0°	7025H	167
U0-39	Target voltage upon V/F separation		0V- rated motor voltage	7027H	167
U0-40	Output voltage upon V/F separation		0V- rated motor voltage	7028H	167
U0-41	DI state display		-	7029H	167
U0-42	DO state display		-	702AH	167
U0-43	DI set for function state display 1		-	702BH	167
U0-44	DI set for function state display 2		-	702CH	167
U0-45	Fault information		0 to 51	702DH	167
U0-59	Frequency Reference	0.01%	-100.00% to 100.00%	703BH	168
U0-60	Running frequency	0.01%	-100.00% to 100.00%	703CH	168
U0-61	AC drive state		0 to 65535	703DH	168
U0-62	Current fault code		0 to 99	703EH	168
U0-63	Sending value of point-point communication	0.01%	-100.00% to 100.00%	703FH	168
U0-64	Number of slaves		0 to 63	7040H	168
U0-65	Torque upper limit	0.1%	-200.0% to 200.0%	7041H	168
U0-73	Motor SN		0: Motor 1 1: Motor 2	7046H	
U0-74	AC drive output torque	0.1%	-200.0% to 200.00%	7047H	
U0-76 T4 only	Low bits of accumulative power consumption		0.0 to 999.0 (min. unit: 0.1°)	704CH	168
U0-77 T4 only	High bits of accumulative power consumption		0 to 65535 (min. unit: 1°)	704DH	168
U0-78 T4 only	Linear speed	1m/Min	0 to 65535	704EH	

Appendix C Definition of Communication Data Address and Modbus Communication Protocol

C.1 Definition of Communication Data Address

The drive supports four communication protocols (Modbus-RTU).
The host controller can implement control such as monitoring and parameter viewing and modification on the AC drive through their protocols.

The drive's communication data is classified into parameter data and non-parameter data. The non-parameter data includes running commands, running status, running parameters and alarm information.

C.1.1 Parameter Data

The parameter data provides important parameters of the AC drive. In addition to function parameter group P of YD280, provides the function parameter group A.

The parameter data is described as below:

YD280 Parameter Data	Group P (read-write)	P0, P1, P2, P3, P4, P5, P6, P7, P8, P9, PA, Pb, PC, Pd, and PE
	Group A (read-write)	A0, A1, A2, A3, A4, A5, A6, A7, A8, A9, AA, AB, and AC

Communication addresses of parameter data are defined as follows:

1. Read parameters by communication

For groups P0 to PE and A0 to AC, the high 16 bits of the communication address indicate the group number and the low 16 bits indicate the parameter number in the group.

Example: Communication address of P0-16 is F010H, where F0H represents group P0 and 10H is the hexadecimal data format of serial number 16 in the group.

Communication address of AC-08 is AC08H, where ACH represents group AC and 08H is the hexadecimal data format of serial number 8 in the group.

2. Write parameters by communication

For groups P0 to PE, whether the high 16 bits in communication address are 00 to 0E or F0 to FE is decided by whether the high 16 bits are written to EEPROM. The low 16 bits indicate parameter number in the group.
Example:
P0-16:
If it needs not be written to EEPROM, communication address is 0010H.
If it needs to be written to EEPROM, communication address is F010H.
For groups A0 to AE, whether the high 16 bits in communication address are 40 to 0F or A0 to AE is decided by whether the high 16 bits are written to EEPROM. The low 16 bits indicate parameter number in the group.
Example:
AC-08:
If it needs not be written to EEPROM, communication address is 4C08H.
If it needs to be written to EEPROM, communication address is AC08H.

C.1.2 Non-parameter Data

YD280 Non-parameter Data	Status data (read-only)	Group U (monitoring parameters), AC drive fault information and AC drive running status
	Control parameters (write-only)	Control commands, communication setting values, DO control, AO1 control, , high-speed pulse (FMP) output control and parameter initialization

1. Status Data

Status data includes group U (monitoring parameters), AC drive fault description and AC drive running status.

Group U (monitoring parameters):

For details about Group U, see Appendix C of this user guide. The communication address is as follows:

The high 16 bits in communication address of U0 to UF is 70 to 7F and the low 16 bits indicate the parameter number in the group. For example, the communication address of U0-11 is 700BH.

AC drive fault description:

Communication address of the drive fault information is 8000H. You can obtain current fault codes by using host controller to read the address. For fault codes, see definition of P9-14 in Appendix C of this user guide

AC drive running status:

When the drive running status is read through communication, the communication address is 3000H. You can obtain current running status information of the AC drive by reading the address. The running status is defined in the following table.

Communication Address of AC Drive's Running Status	Status Definition
3000H	1: Forward run
	2: Reverse run
	3: Stop

2. Control Parameters

The control parameters include control command, communication setting values, DO control, AO1 high-speed pulse (FMP) output control and parameter initialization.

■ Control commands

When P0-02 (command source selection) is set to 2 (communication control), you can implement control such as start/stop of the AC drive by using communication address. The control commands are defined in the following table.

Control Command Communication Address	Status Definition
2000H	1: Forward run
	2: Reverse run
	3: Forward jog
	4: Reverse jog
	5: Coast to stop
	6: Decelerate to stop
	7: Fault reset

■ Communication reference

Communication setting values include data set through communication such as frequency reference, torque limit, V/F separation voltage, PID reference and PID feedback. Communication address is 1000H. When the communication address is set in the host controller, the data range is -10000−10000 and corresponding relative set value range is -100.00% to 100.00%.

■ DO control

When a DO terminal is set for function 20 (communication control), host controller can implement control on DO terminals of the drive through the communication address. Control on DO terminals of the drive is defined as follows:

Communication Address of Drive Running Status	Command Content
2001H	BIT0: DO1 output control BIT1: - BIT2: Relay1 output control BIT3: - BIT4: FMR output control BIT5: VDO1 BIT6: VDO2 BIT7: VDO3 BIT8: VDO4 BIT9: VDO5

■ Analog output AO1, high-speed pulse (FMP) output control

When AO1, and FMP are set to function 12 (communication control), host controller can implement control on AO and high-speed pulse outputs by means of communication addresses. The definition is provided in the following table.

Communication Address of AO1 and FMP Output		Command Content
AO1	2002H	0 to 7FFF indicates 0% to 100%.
FMP	2004H	

■ Parameter initialization

This function is required when you need to perform parameter initialization on the drive by using the host controller.

If PP-00 (User password) is set to a non-zero value, pass password verification first. The host controller performs parameter initialization within 30s after password verification is successful.

Communication address of password verification through communication is 1F00H. Directly write correct user password to this address to perform password verification.

Communication address of parameter initialization by means of communication is 1F01H, defined in the following table.

Communication Address of Parameter Initialization	Status Definition
1F01H	1: Restore default settings
	2: Clear records
	4: Restore user backup parameters
	501: Back up current user parameters

C.2 Modbus Communication Protocol

The drive provides RS485 communication interface and supports Modbus-RTU slave communication protocol so that the user can implement centralized control, such as setting running commands and parameters, and reading running status and fault information of the AC drive, by using a PC or PLC.

This protocol defines content and format of transmitted messages during serial communication, including master polling (or broadcasting) format and master coding method (parameter for the action, transmission data, and error check). The slave uses the same structure in response, including action confirmation, data returning and error check. If an error occurs when the slave receives a message, or the slave cannot complete the action required by the master, the slave returns a fault message as a response to the master.

C.2.1 Application

The AC drive is connected to a "single-master multi-slave" PC/PLC control network with RS485 bus.

C.2.2 Bus Structure

1. Interface mode

The RS485 extension card YD280 must be inserted into the AC drive.

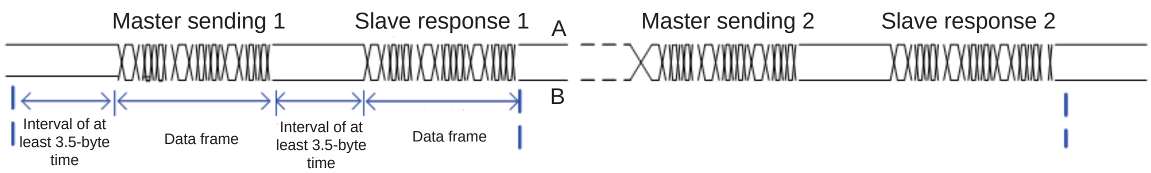
2. Topological structure

The system consists of a single master and multiple slaves. In the network, each communication device has a unique slave address. A device is the master (can be a PC, a PLC or an HMI) and initiates communication to perform parameter read or write operations on slaves. The other devices (slaves) provide data to respond to query or operations from the master. At the same moment, either the master or the slave transmits data and the other can only receives data.

The address range of the slaves is 1 to 247. A slave address must be unique in the network.

3. Transmission mode

The asynchronous serial and half-duplex transmission mode is used. During asynchronous serial communication, data is sent frame by frame in the form of message. In Modbus-RTU protocol, an interval of at least 3.5-byte time marks the end of the previous message. A new message starts to be sent after this interval.

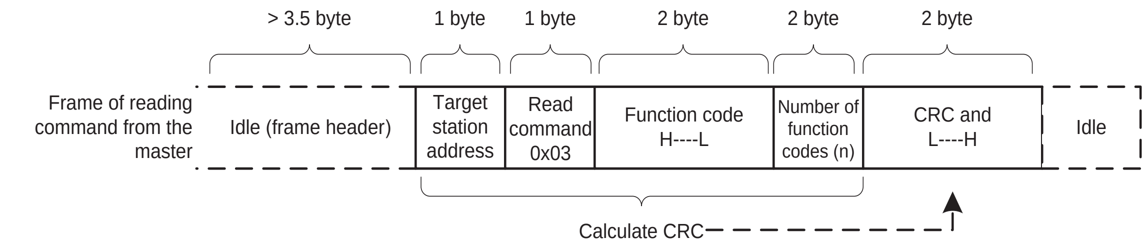


The communication protocol used by the drive is the Modbus-RTU slave communication protocol, which allows the drive to provide data to respond to "query/command" from the master or execute the action according to "query/command" from the master.

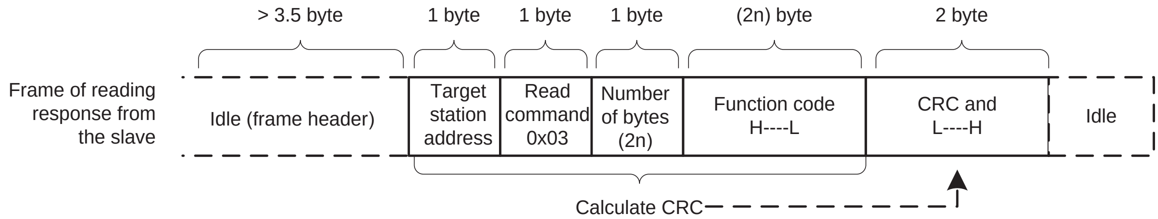
The master can be a PC, an industrial device, or a PLC. The master can communicate with a single slave or send broadcast messages to all slaves. When the master communicates with a single slave, the slave needs to return a message (response) to "query/command" from the master. For a broadcast message sent by the master, the slaves need not return a response.

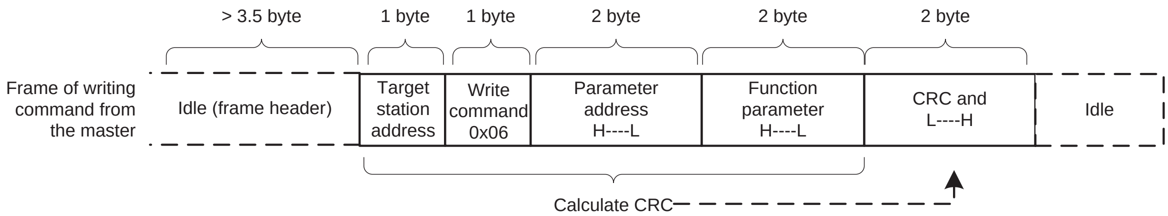
C.3 Data Format

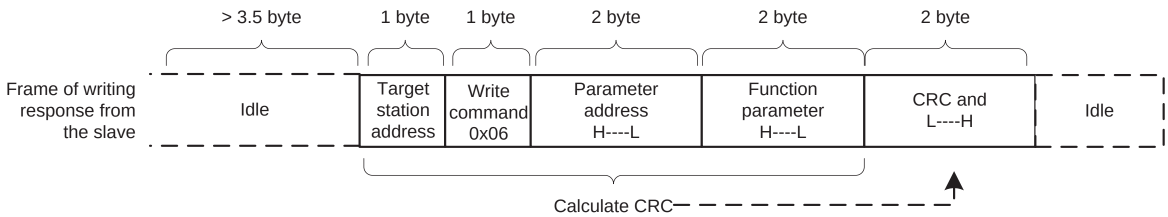
The Modbus-RTU protocol communication data format of the drive is as follows. The drive supports reading and writing of word-type parameters only. Reading command is 0x03 and writing command is 0x06. It does not support reading and writing of bytes or bits.



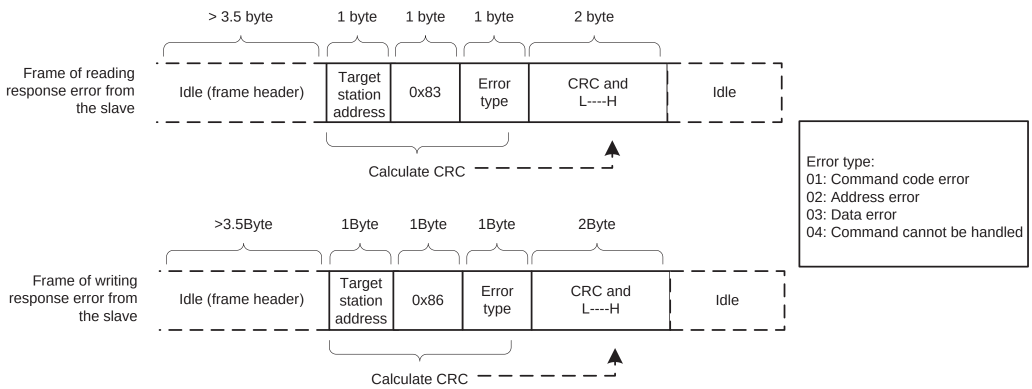
In theory, the host controller can read several consecutive parameters (n can reach up to 12) but the last parameter it reads must not jump to the next parameter group. Otherwise, an error occurs on response.







If the slave detects reading/writing failure caused by a communication frame error or by other reasons, an error frame will be returned.



The frame format is described in the following table.

Frame header (START)	Greater than the 3.5-byte transmission idle time
Slave address (ADR)	Communication address: 1 to 247
Command code (CMD)	03: Read slave parameters; 06: Write slave parameters
Parameter address (H)	It is the internal parameter address of the AC drive, expressed in hexadecimal format. The parameters include functional parameters and non-functional parameters (running status and running command). During transmission, low-order bytes follow the high-order bytes.
Parameter address (L)	
Number of parameters (H)	It is the number of parameters read by this frame. If it is 1, it indicates that one parameter is read. During transmission, low-order bytes follow the high-order bytes. In the present protocol, only one parameter is read once, and this field is unavailable.
Number of parameters (L)	
Data (H)	It is the response data or data to be written. During transmission, low-order bytes follow the high-order bytes.
Data (L)	
CRC CHK low bytes	Detection value: CRC16 verification value During transmission, low-order bytes follow the high-order bytes. For calculation method, see CRC Check.
CRC CHK high bytes	
END	It is 3.5-byte transmission time.

CRC Check

In Modbus-RTU mode, a message includes a CRC-based error-check field. The CRC field checks content of the entire message. The CRC field is two bytes, containing a 16-bit binary value. The CRC field is calculated by the transmitting device, and then added to message. The receiving device recalculates a CRC value after receiving the message, and compares the calculated value with the CRC value in the received CRC field. The CRC is first stored to 0xFFFF. Then a procedure is invoked to process the successive 8-bit byte in the message and the value in the register. Only the eight bits in each character are used for the CRC. The start bit, stop bit and the parity bit do not apply to the CRC.During generation of the CRC, each eight-bit character is in exclusive-OR (XOR) with the content in the register. Then the result is shifted in the direction of the least significant bit (LSB), with a zero filled into the most significant bit (MSB) position. The LSB is extracted and examined. If the LSB was a 1, the register then performs XOR with a preset value. If the LSB was a 0, no XOR is performed. This process is repeated until eight shifts have been performed. After the last (eighth) shift, the next eight-bit byte is in XOR with the register's current value, and the process repeats for eight more shifts as described above. The final value of the register, after all the bytes of the message have been applied, is the CRC value. The CRC is added to the message from the low-order byte followed by the high-order byte. The CRC simple function is as follows:

```
unsigned int crc_chk_value(unsigned char *data_value,unsigned char length)
{
    unsigned int crc_value=0xFFFF;
    int i;
    while（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);
}
```

Definition of Communication Parameter Addresses

Function parameters can be read and written (except those which cannot be changed because they are only for the factory use or for monitoring).

C.4 Rules for Parameter Address Marking

Parameter group No. and parameter identifying No. are used to express parameter address.

High-order bytes: P0 to FF (groups P), A0 to AF (groups A), 70 to 7F (group U)

Low-order bytes: 00 to FF

For example, to read parameter P3-12, communication address of P3-12 is expressed as 0xF30C.

Note	● Group PF: They are factory parameters. The parameters cannot be read or changed. ● Group U: These parameters can only be read.

Some parameters cannot be modified when the AC drive is running. Some parameter cannot be modified regardless of status of the AC drive. In addition, pay attention to setting range, unit and description of parameters when modifying them.

Parameter Group	Visited Address	Parameter Address in RAM
P0 to PE	0xF000 to 0xFEFF	0x0000 to 0x0EFF
A0 to AC	0xA000 to 0xACFF	0x4000 to 0x4CFF
U0	0x7000 to 0x70FF	

Note	● Frequent storage to the EEPROM reduces its service life. Therefore, in communication mode, users can change values of certain parameters in RAM rather than storing the setting.

For groups P parameters, users only need to change high order F of the parameter address to 0.

For groups A parameters, users only need to change high order A of the parameter address to 4.

The parameter addresses are expressed as follows:

High-order bytes: 00 to 0F (groups P), 40 to 4F (groups A)

Low-order bytes: 00 to FF

For example,

if P3-12 is not stored into EEPROM, the address is expressed as 030C;

if A0-05 is not stored into EEPROM, the address is expressed as 4005;

This address can only be marked as RAM. It is an invalid address when being read.

Stop/RUN Parameters

Parameter Address	Description	Parameter Address	Description
1000H	Communication setting value (Decimal): -10000 to 10000	1010H	PID reference
1001H	Running frequency	1011H	PID feedback
1002H	Bus voltage	1012H	PLC process
1003H	Output voltage	1013H	Keep
1004H	Output current	1014H	Feedback speed, unit 0.1Hz
1005H	Output power	1015H	Remaining running time
1006H	Output torque	1016H	AI1 voltage before correction
1007H	Running speed	1017H	AI2 voltage before correction
1008H	DI input indication	1018H	Pannel Pot voltage before correction
1009H	DO output indication	1019H	Linear speed
100AH	AI1 voltage	101AH	Current power-on time
100BH	AI2 voltage	101BH	Current running time
100CH	Keep	101CH	Keep
100DH	Counting value input	101DH	Communication reference
100EH	Length value input	101EH	Keep
100FH	Keep	101FH	Main frequency X display
–	–	1020H	Auxiliary frequency Y display

Note

- Communication setting value indicates percentage: 10000 corresponds to 100.00%, and -10000 corresponds to -100.00%.
- With regard to frequency, communication reference is a percentage of P0-10 (maximum frequency). With regard to torque, communication reference is a percentage of P2-10 and A2-48 (corresponding to motor 1 and motor 2, respectively).

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

Command Word Address	Status Definition
2000H	0001: Forward run
	0002: Reverse run
	0003: Forward jog
	0004: Reverse jog
	0005: Coast to stop
	0006: Decelerate to stop
	0007: Fault reset

Read AC drive state (read-only):

Command Word Address	Command Word Function
3000H	0001: Forward run
	0002: Reverse run
	0003: Stop

Parameter lock password check: If the actual password is returned, it indicates that password check is passed. ("0000H" is returned when password is set to 0 (no password)).

Password Address	Password Content
1F00H	*****

DO terminal control (write-only)

Command Address	Command Content
2001H	BIT0: DO1 output control BIT1: - BIT2: Relay1 output control BIT3: - BIT4: FMR output control BIT5: VDO1 BIT6: VDO2 BIT7: VDO3 BIT8: VDO4 BIT9: VDO5

AO1 control (write-only)

Command Address	Command Content
2002H	0 to 7FFF indicates 0% to 100%.

AC drive fault description:

AC Drive Fault Address	AC Drive Fault Information	
8000H	0000: No fault 0001: Keep 0002: Overcurrent during acceleration 0003: Overcurrent during deceleration 0004: Overcurrent at constant speed 0005: Overvoltage during acceleration 0006: Overvoltage during deceleration 0007: Overvoltage at constant speed 0008: Buffer resistor overload 0009: Undervoltage 000A: AC drive overload 000B: Motor overload 000C: Power input phase loss 000D: Power output phase loss 000E: IGBT overheat 000F: External fault 0010: Communication fault 0011: Contactor fault 0012: Current detection fault 0013: Motor auto-tuning fault 0014: Keep	0015: Parameter read and write fault 0016: AC drive hardware fault 0017: Motor short circuited to ground 0018: Keep 0019: Keep 001A: Accumulative running time reached 001B: User-defined fault 1 001C: User-defined fault 2 001D: Accumulative power-on time reached 001E: Load lost 001F: PID feedback lost during running 0028: Fast current limit timeout 0029: Motor switchover error during running 002A: Keep 002B: Keep 002D: Keep 005A: Keep 005B: Keep 005C: Keep 005E: Keep

C.5 Group PD Communication Parameter Description

Pd-00	Baud rate	Default	5005
	Setting Range	Units position (Modubs)	
		0: 300 bps 1: 600 bps 2: 1200bps 3: 2400 bps 4: 4800 bps	5: 9600 bps 6: 19200 bps 7: 38400 bps 8: 57600 bps 9: 115200 bps

This parameter is used to set transmission speed between host controller and AC drive. Note that baud rate of host controller must be the same as that of AC drive. Otherwise, communication shall fail. The higher baud rate is, the faster communication will be.

Pd-01	Data format	Default	0
	Setting Range	0: No check <8,N,2> 1: Even parity check <8,E,1> 2: Odd parity check <8,O,1> 3: No check, data format <8,N,1>	

Note that data format of host controller must be the same as that of AC drive. Otherwise, communication shall fail.

Pd-02	Local address	Default	1
	Setting Range	1 to 247	

When local address is set to 0 (that is, broadcast address), host controller broadcast is enabled.

This address is unique (except broadcast address), which is basis for point-to-point communication between host controller and AC drive.

Pd-03	Response delay	Default	2 ms
	Setting Range	0 to 20 ms	

This parameter sets interval between AC drive completing receiving data and AC drive sending data to host controller. If response delay is shorter than system processing time, system processing time shall prevail. If response delay is longer than system processing time, system sends data to host controller only after response delay is up.

Pd-04	Communication timeout	Default	0.0s
	Setting Range	0.0s (invalid) 0.1s to 60.0s	

When this parameter is set to 0.0s, system does not detect communication timeout.

When AC drive does not receive communication signal within time set in this parameter, it detects communication timeout fault (Err16). Generally, this parameter is set to 0.0s. In applications with continuous communication, you can use this parameter to monitor communication status.

Pd-05	Communication Protocol Selection	Default	1
	Setting Range	0: Non-standard Modbus protocol 1: Standard Modbus protocol	

When Pd-05 = 1, standard Modbus protocol is used. For details, see C.3

When Pd-05 = 0, an additional byte is returned by the slave computer during read. For other read or write operations, the number of bytes returned is the same in both standard and non-standard protocols.

Pd-06	Current resolution read by communication	Default	0
	Setting Range	0: 0.01A	

This parameter is used to set unit of output current read by communication.

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前 言

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YD280 系列变频器是一款通用高性能电流矢量控制变频器，主要用于控制和调节三相交流异步电机的速度和转矩，YD280 采用高性能的矢量控制技术，低速高转矩输出，具有良好的动态特性、超强的过载能力，具备用户可编程功能、通讯总线功能，功能丰富强大，性能稳定。可用于纺织、造纸、机床、包装、食 品、风机、水泵及各种自动化生产设备的驱动。

初次使用

对于初次使用本产品的用户，应先认真阅读本手册。若对一些功能及性能方面有所疑惑，请咨询我公司的技术支持人员，以获得帮助，对正确使用本产品有利。

符合标准

相关认证指令与标准如下表所示，是否获得相关认证资质以产品铭牌标识为准。

认证名称	指令名称		标准
CE 认证	EMC 指令	2014/30/EU	EN 61800-3
	LVD 指令	2014/35/EU	EN 61800-5-1
	RoHS 指令	2011/65/EU	EN 50581

- 在正确安装和正确使用的条件下，满足 IEC/EN 61800-3 标准要求，或GB/T 12668.1 2002 详细请参照外围设备连接及常见 EMC 问题整改部分。

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安全注意事项

安全声明

- ◆ 在安装、操作、维护产品时，请先阅读并遵守本安全注意事项。
- ◆ 为保障人身和设备安全，在安装、操作和维护产品时，请遵循产品上标识及手册中说明的所有安全注意事项。
- ◆ 手册中的“注意”、“警告”和“危险”事项，并不代表所应遵守的所有安全事项，只作为所有安全注意事项的补充。
- ◆ 本产品应在符合设计规格要求的环境下使用，否则可能造成故障，因未遵守相关规定引发的功能异常或部件损坏等不在产品质量保证范围之内、
- ◆ 因违规操作产品引发的人身安全事故、财产损失等，我司将不承担任何法律责任。

安全等级定义

⚠ 危 险	“危险”表示如果不按规定操作，则导致死亡或严重身体伤害。
⚠ 警 告	“警告”表示如果不按规定操作，则可能导致死亡或严重身体伤害。
⚠ 注 意	“注意”如果不按规定操作，则可能导致轻微身体伤害或设备损坏。

安全注意事项

开箱验收

⚠ 注 意

- ◆ 开箱前请检查产品的外包装是否完好，有无破损、浸湿、受潮、变形等情况。
- ◆ 请按照层次顺序打开包装，严禁猛烈敲打！
- ◆ 开箱时请检查产品和产品附件表面有无残损、锈蚀、碰伤等情况。
- ◆ 开箱后请仔细对照装箱单，查验产品及产品附件数量、资料是否齐全

⚠ 警 告

- ◆ 开箱时发现产品及产品附件有损伤、锈蚀、使用过的迹象等问题，请勿安装！
- ◆ 开箱时发现产品内部进水、部件缺少或有部件损坏时，请勿安装！
- ◆ 请仔细对照装箱单，发现装箱单与产品名称不符时，请勿安装！

储存与运输时

⚠ 注 意

- ◆ 请按照产品的储存与运输条件进行储存与运输，储存温度、湿度满足要求。
- ◆ 避免在水溅雨淋、阳光直射、强电场、强磁场、强烈振动等场所储存与运输。
- ◆ 避免产品储存时间超过 3 个月，储存时间过长时，请进行更严密的防护和必要的检验。
- ◆ 请将产品进行严格包装后再进行车辆运输，长途运输时必须使用封闭的箱体。
- ◆ 严禁将本产品与可能对本产品构成影响或损害的设备或物品一起混装运输。

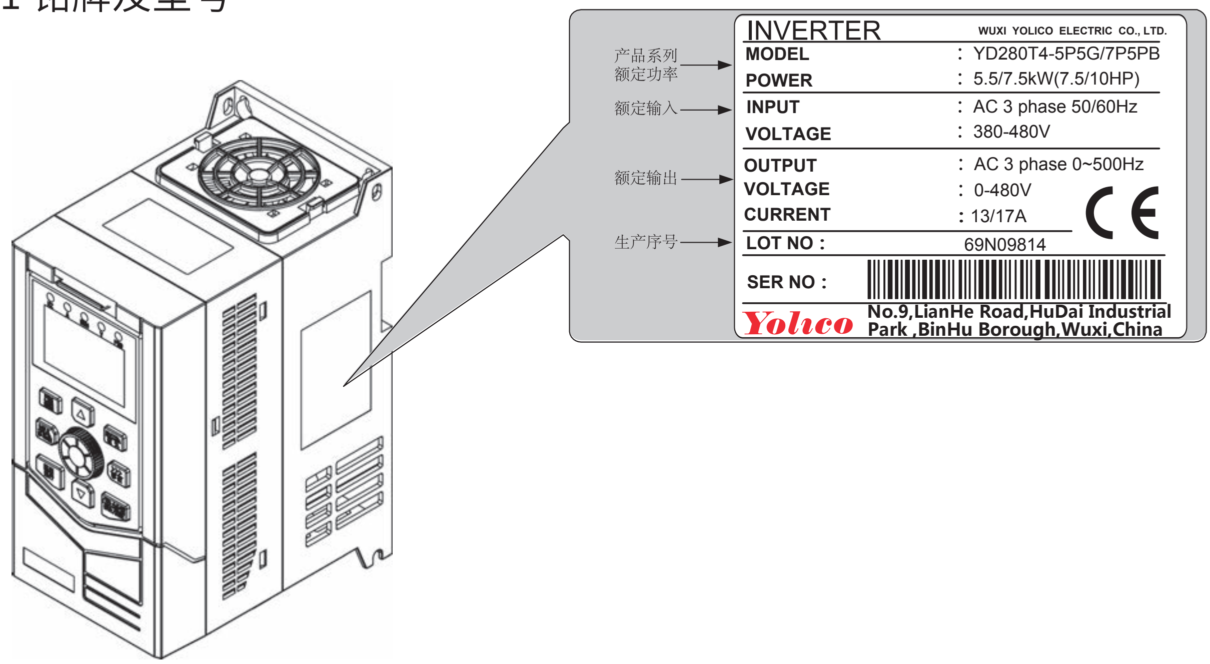
第一章　产品信息

安全注意事项

注意

- 请勿抓住前盖板或端子外罩搬运变频器。如果仅抓住前盖板，则会使主体掉落，有砸伤的危险；
- 操作变频器时，请遵守静电防止措施（ESD）规定的步骤。否则会因静电而损坏变频器内部的回路。

1.1 铭牌及型号



YD280 T4- 5P5G / 7P5P B

标识	产品名称
YD280	变频器异步系列

标识	电压等级
T4-	三相380V~480V
T2S-	单相200V~240V

标识	G型功率等级(kW)
0P7	0.75
1P5	1.5
...	...
22	22

标识	类过载型
G	150%*60秒 通用

标识	尾缀说明
空	标准机
非空	专机

标识	制动单元
空	无
B	含制动单元

标识	过载类型
P	120%*60秒 风机泵

标识	P型功率等级(kW)
1P5	1.5
2P2	2.2
...	...
22	22

图 1-1 产品命名与铭牌标识

第二章　系统连接

安全注意事项	
危险	● 严禁在电源接通的状态下进行接线，否则会有触电的危险！ ● 请务必将断路器保持在 OFF 状态。
警告	● 将变频器安装在封闭的柜内或机壳箱内时，请用冷却风扇或冷却空调等充分冷却，以使变频器进气温度保持在 50°C 以下，否则可能导致过热或火灾！
注意	● 进行安装作业时，请用布或纸等遮住变频器的上部，以防止钻孔时的金属屑、油、水等进入变频器内部。如果异物进入变频器内部，可能导致变频器故障；作业结束后，请拿掉这些布或纸，如果继续盖在上面，则会使通风效果变差，导致变频器异常发热！ ● 在使用变频器时，请遵守静电防止措施（ESD）规定的步骤，否则会因静电而损坏变频器！ ● 用变频器驱动时和用商用电源驱动时的转矩特性不同，请确认要连接的机械的负载转矩特性。 ● 请勿在拆下外壳的状态下吊起变频器，否则可能导致变频器的电路板或端子排损坏！

2.1 YD280 系统连接图

使用 YD280 系列变频器控制电机构成控制系统时，需要在变频器的输入输出侧安装各类电气元件保证系统的安全稳定。产品系统构成如下图所示：

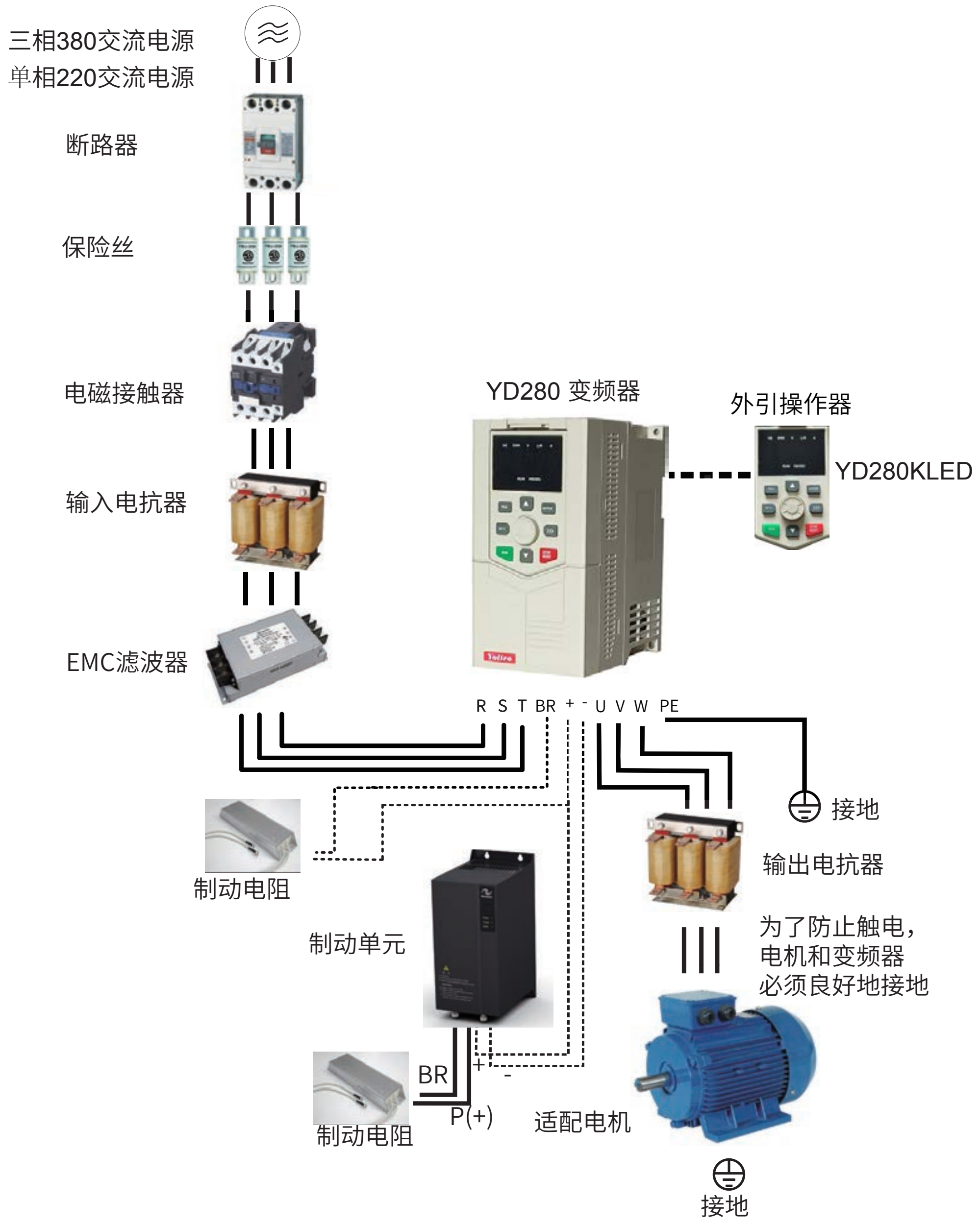


图 2-1 YD280 系列系统构成

NOTE

- 上图仅作为 YD280 变频系统连接示意图，外围设备选型参见第 9 章《规格与选型》。

第三章　安装与接线

3.1 安装

3.1.1 安装环境

1） 环境温度：周围环境温度对变频器寿命有很大影响，不允许变频器的运行环境温度超过允许温度范围（-10°C～50°C）。

2） 将变频器装于阻燃物体的表面，周围要有足够空间散热。变频器工作时易产生大量热量。并用螺丝垂直安装在安装支座上。

3） 请安装在不易振动的地方。振动应不大于 0.6G。特别注意远离冲床等设备。

4） 避免装于阳光直射、潮湿、有水珠的地方。

5） 避免装于空气中有腐蚀性、易燃性、易爆性气体的场所。

6） 避免装在有油污、粉尘的场所。

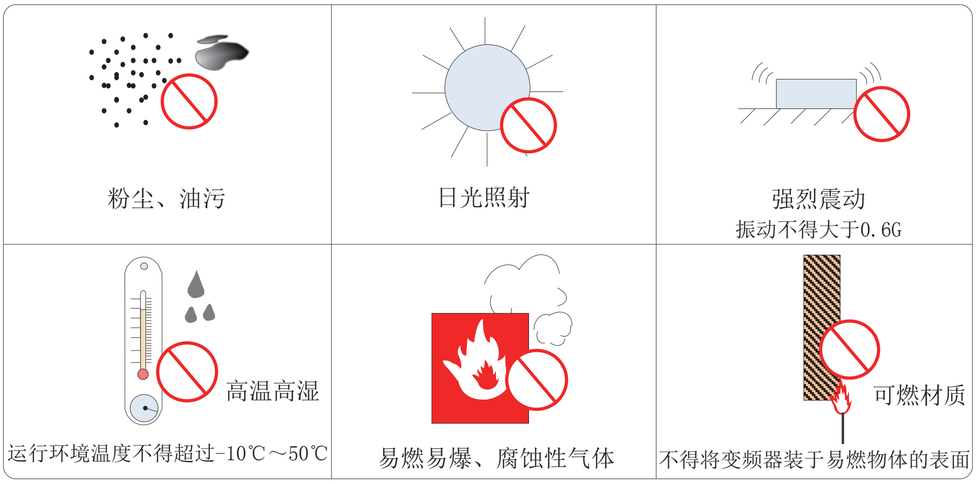
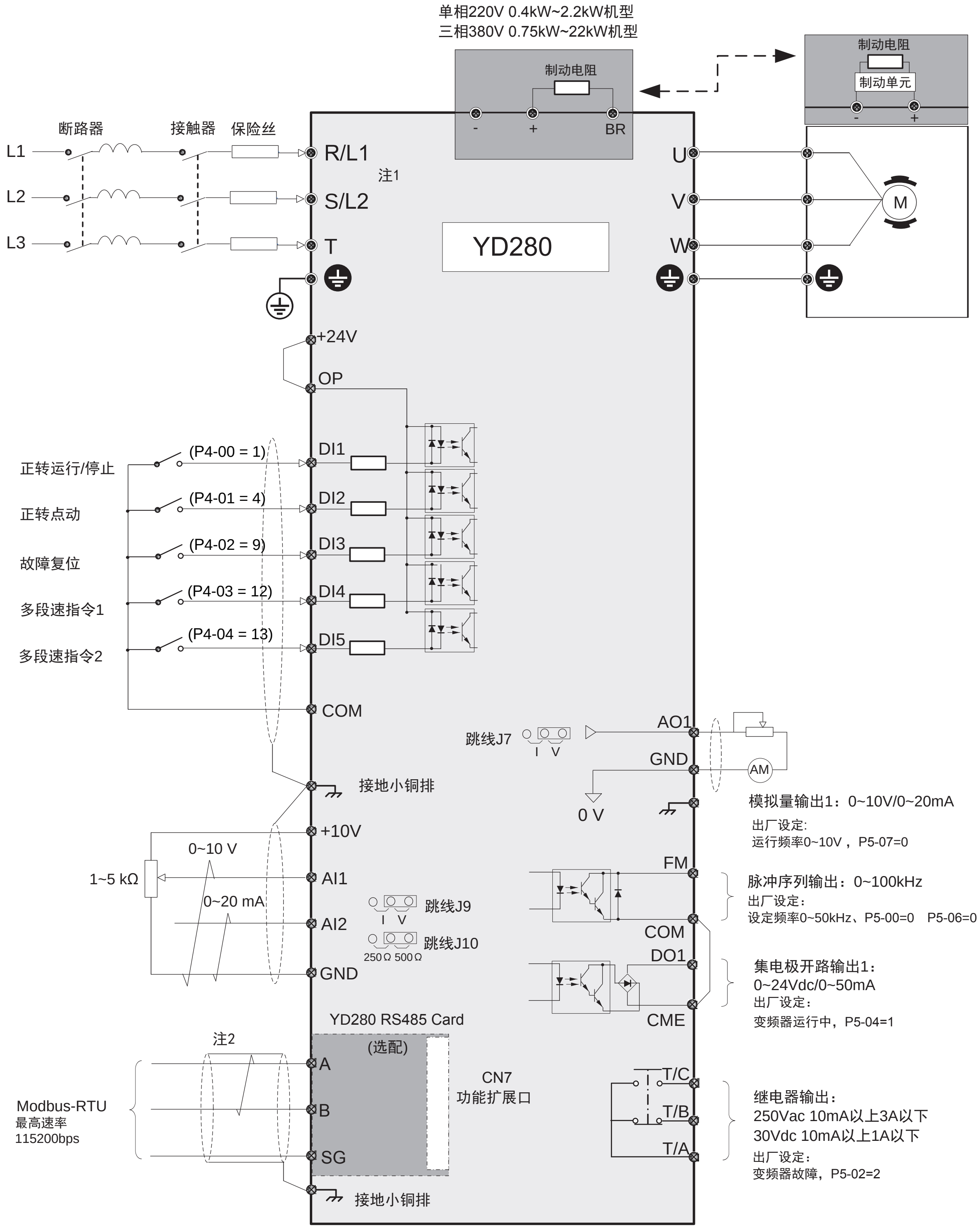


图 3-1 安装环境要求

7） YD280 系列产品为机柜内安装产品，需要安装在最终系统中使用，最终系统应提供相应的防火外壳、电气防护外壳和机械防护外壳等，并符合当地法律法规和相关 IEC 标准要求。

3.2 接线

3.2.1 标准接线图



注1：380V机种接RST，220V机种接L1L2

注2：——屏蔽层；——双绞线

图 3-26 YD280 典型接线图

3.2.2 主回路端子功能说明及注意事项

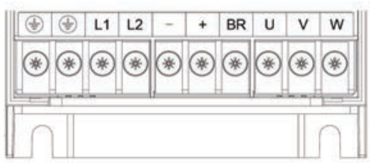


图 3-27 YD280T2S-0P4GB ~ YD280T2S-2P2GB 主回路端子分布图

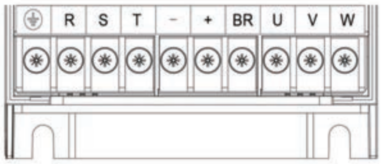


图 3-28 YD280T4-0P7G/1P5PB ~ YD280T4-3P7G/5P5PB 主回路端子分布图

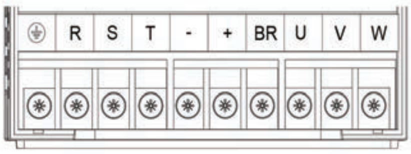


图 3-29 YD280T4-5P5G/7P5PB ~ YD280T4-7P5GB 主回路端子分布图

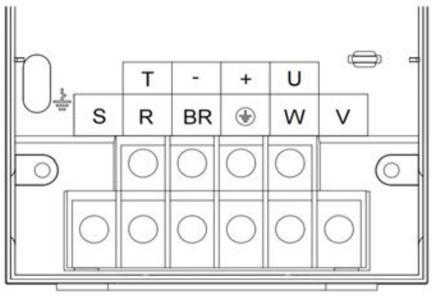


图 3-30 YD280T4-11G/15PB ~ YD280T4-18P5G/22PB 与
YD280T4-18P5G/22PB ~ YD280T4-22GB 主回路端子分布图

图表 3-3 YD280 系列变频器主回路端子说明

端子标记	端子名称	功能说明
R、S、T/L1、L2	三相/单相电源输入端子	交流输入电源连接点
(+) 、 (-)	直流母线正、负端子	共直流母线输入点，或制动单元的连接点
(+) 、BR	制动电阻连接端子	制动电阻连接点
U、V、W	变频器输出端子	连接三相电动机
⏚	接地端子（PE）	保护接地

3.2.6 控制回路端子分布

◆ 控制回路端子布置

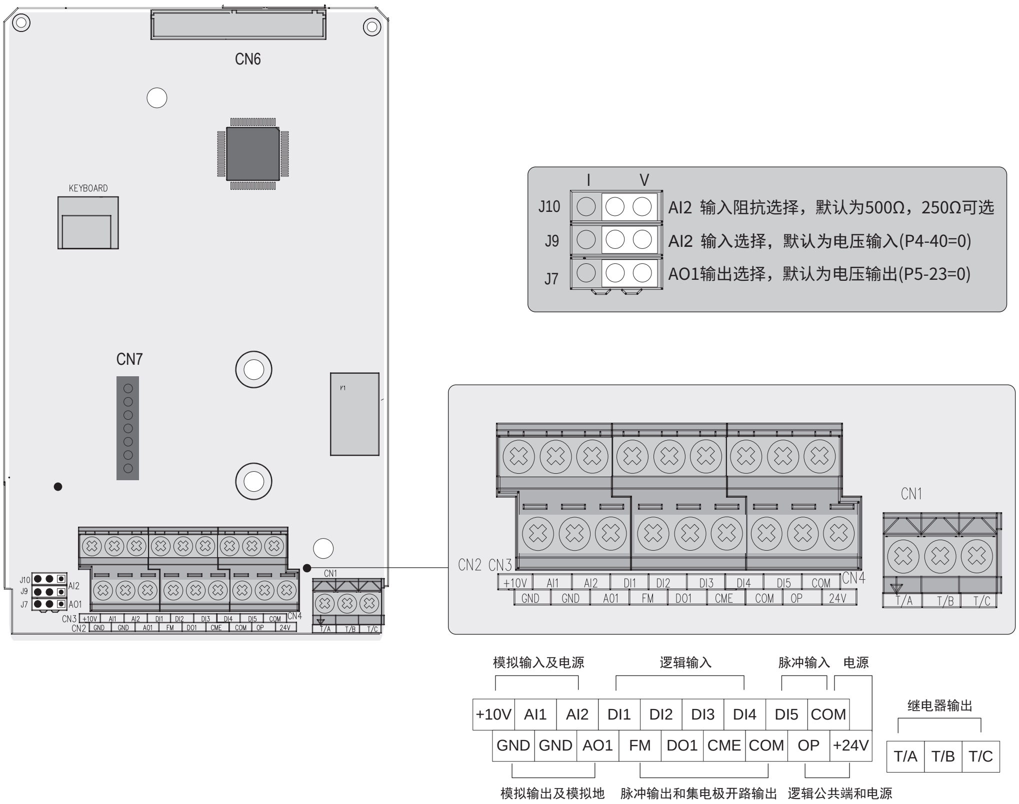


图 3-57 控制回路端子布置图

表 3-17 YD280 变频器控制端子功能说明

类别	端子符号	端子名称	功能说明
电源	+10V-GND	外接＋ 10V 电源	向外提供 +10V 电源，最大输出电流：10mA 一般用作外接电位器工作电源，电位器阻值范围： 1kΩ~5kΩ
	+24V-COM	外接＋ 24V 电源	向外提供 +24V 电源，一般用作数字输入输出端子工作电源和外接传感器电源 最大输出电流：200mA 【注 1】
	OP	外部电源输入端子	出厂默认与＋ 24V 连接 当利用外部信号驱动 DI1~DI5 时，OP 需与外部电源连接，且与＋ 24V 电源端子断开
模拟输入	AI1-GND	模拟量输入端子 1	输入电压范围：DC 0V~10V 输入阻抗：22kΩ
	AI2-GND	模拟量输入端子 2	输入范围：0~10Vdc/0~20mA，由控制板上的 J9 跳线选择决定。【注 4】 输入阻抗：电压输入时 22kΩ，电流输入时通过 J10 跳线可选阻抗为 500Ω 或者 250Ω。【注 2】
模拟输出	AO1-GND	模拟输出 1	由控制板上的 J7 跳线选择决定电压或电流输出。 输出电压范围：0V~10V 输出电流范围：0mA~20mA
数字输入	DI1- OP	数字输入 1	光藕隔离，兼容双极性输入 输入阻抗：1.39kΩ 有效电平输入时电压范围： 9V~30V
	DI2- OP	数字输入 2	
	DI3- OP	数字输入 3	
	DI4- OP	数字输入 4	
	DI5- OP	数字输入 5	
数字输出	DO1-CME	数字输出 1	光藕隔离，双极性开路集电极输出 输出电压范围：0V~24V 输出电流范围：0mA~50mA 注意：数字输出地 CME 与数字输入地 COM 是内部隔离的，但出厂时 CME 与 COM 已经外部短接（此时 DO1 默认为＋ 24V 驱动）。当 DO1 想用外部电源驱动时，必须断开 CME 与 COM 的外部短接。
	FM- COM	高速脉冲输出	受参数 P5-00 “FM 端子输出方式选择”约束； 当作为高速脉冲输出，最高频率到 100kHz； 当作为集电极开路输出，与 DO1 规格一样。
继电器输出	T/A-T/B	常闭端子	触点驱动能力： 250Vac，3A，COSØ=0.4 30Vdc，1A
	T/A-T/C	常开端子	
辅助接口	CN7	功能扩展卡接口	7 芯端子，与可选卡（RS485总线卡等选配卡）的 接口
	J11	外引键盘接口	外引键盘
跳线【注 3】	J7	AO1 输出选择	电压、电流输出可选，默认为电压输出
	J9	AI2 输入选择	电压、电流输入可选，默认为电压输入
	J10	AI2 输入阻抗选择	500Ω、250Ω 可选，默认为 500Ω

NOTE

- 【注 1】在环境温度大于 23°C时，用户需按照“环境温度每升高 1°C，输出电流降低 1.8mA”进行降额使用；40°C环境温度时最大输出电流为 170mA，当用户将 OP 与 24V 短接时，DI 端子的电流也须考虑在内。
- 【注 2】请用户根据信号源带载能力选择 500Ω 或者 250Ω 阻抗，选择的依据是信号源的最大输出电压，例如使用 500Ω 阻抗，需保证信号源最大输出电压不小于 10V，才能保证 AI2 能够测量到 20mA 的电流。
- 【注 3】跳线 J7、J9 与 J10 在控制板上的位置如图 3-57 所示。
- 【注 4】AI2 电压或电流选择，除了J9决定外，参数P4-40也得设定(0=电压，1=电流)。

第四章　面板操作

4.1 面板操作说明

YD280 系列变频器可通过 LED 操作面板进行参数操作、状态监控与控制。
其中通过LED操作面板可实现参数的修改、查看，其外观及使用 介绍

4.2 LED 操作面板介绍

用操作面板，可对变频器进行参数设定 / 修改、工作状态监控、运行控制（起动、停止）等操作。
操作面板的外观和操作键名称如下图所示：

图 4-1 操作面板示意图

4.2.1 功能指示灯

表 4-1 操作面板指示灯说明

1）功能指示灯说明

指示灯名称	指示灯说明
RUN	运行状态指示灯：灯灭时表示变频器处于停机状态；灯亮时表示变频器处于运行状态；
FWD/REV	正反转指示灯：灯灭表示处于正转状态；灯亮表示处于反转状态。
L/R	控制模式指示灯：灯灭表示键盘控制状态；灯闪烁表示通讯控制状态；灯亮表示端子控制状态。
ERR	调谐/ 转矩控制/ 故障指示灯，灯亮表示处于转矩控制模式，灯慢闪表示处于调谐状态，灯快闪表示处于故障状态。

2）单位指示灯说明

指示灯名称	指示灯说明
Hz	频率单位
A	电流单位
V	电压单位

4.2.2 LED 显示区

操作面板上共有 5 位 LED 显示，可以显示设定频率、输出频率，各种监视数据以及报警代码等。

表 4-2 实际对应与 LED 显示对应表

LED 显示	实际对应	LED 显示	实际对应	LED 显示	实际对应	LED 显示	实际对应
0	0	6	6	C	C	n	N
1	1	7	7	c	c	P	P
2	2	8	8	d	D	r	R
3	3	9	9	E	E	Γ	T
4	4	A	A	F	F	U	U
5	5、S	b	B	L	L	u	u

4.2.3 键盘按钮功能

表 4-3 键盘按键功能表

按键符号	名称	功能说明
PRG	编程键	一级菜单进入或退出
ENTER	确定键	逐级进入菜单画面、设定参数确认
∧	UP 递增键	数据或功能码的递增
∨	DOWN 递减键	数据或功能码的递减
>	右位移键	在停机显示界面和运行显示界面下，可右移循环选择显示参数；在修改参数时，可以选择参数的修改位
RUN	运行键	在键盘操作方式下，用于运行操作
STOP/RESET	停止/复位键	运行状态时，按此键可用于停止运行操作；该功能码 P7-02 制约。故障报警状态时，所有控制模式都可用该键来复位操作
MF.K	多功能键	根据P7-01 作功能切换选择，可定义为命令源、或方向快速切换

4.2.4 参数查看、修改方法

YD280 变频器的操作面板采用三级菜单结构进行参数设置等操作。三级菜单分别为：

功能参数组（一级菜单）→ 参数（二级菜单）→ 参数设定值（三级菜单）

进入每一级菜单之后，当显示位闪烁时，可以按△键、▽键、▷键进行修改。操作流程如图 4-2 所示。

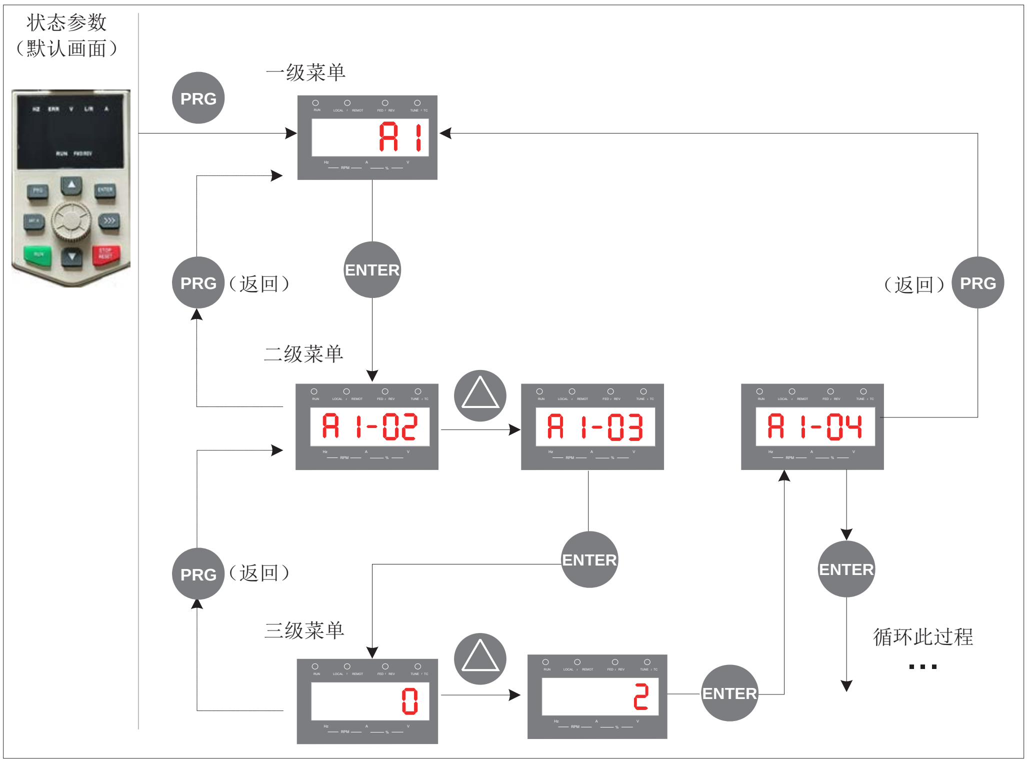


图 4-2 三级菜单操作流程图

举例

将参数 PC-01 从 0000.0% 更改设定为 0050.0% 的示例。

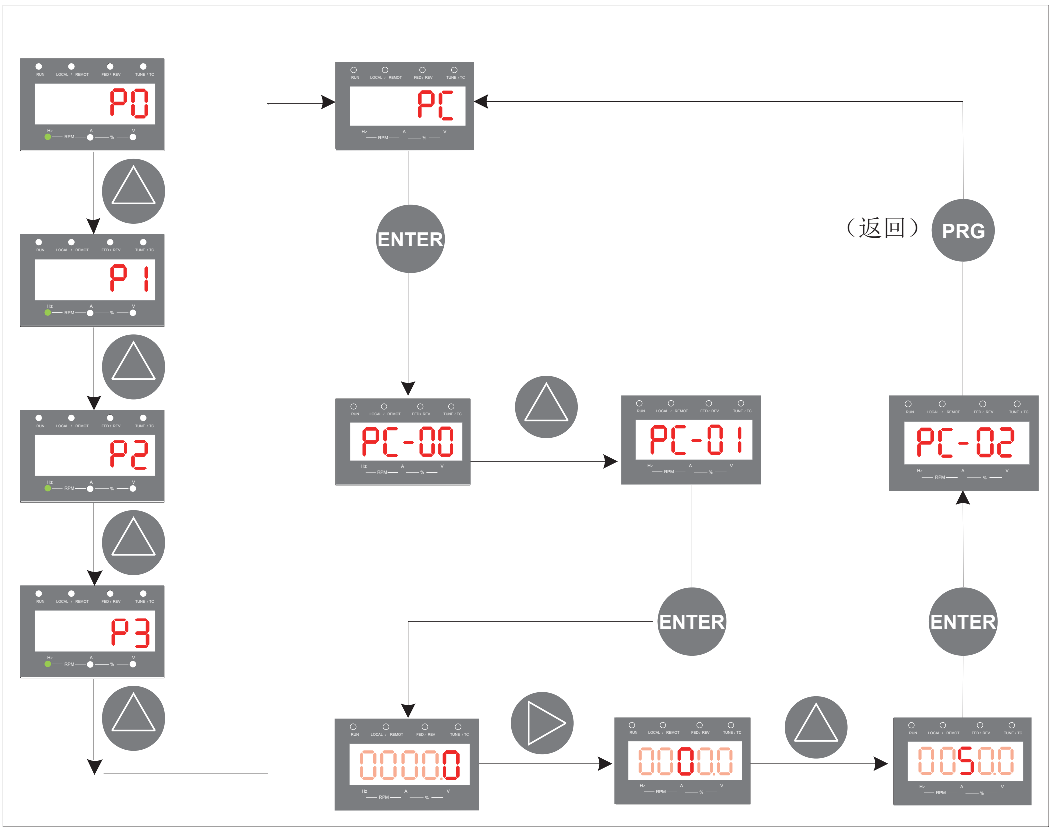


图 4-3 参数修改示意图

a） 在三级菜单操作时，可按 PRG 键或 ENTER 键返回二级菜单。两者的区别是：

按 ENTER 键将设定参数保存后返回二级菜单，并自动转移到下一个参数；按 PRG 键是放弃当前的参数修改，直接返回当前参数序号的二级菜单。

b）在第三级菜单状态下，若参数没有闪烁位，表示该参数不能修改，可能原因有：

（1）该参数为不可修改参数，如变频器类型、实际检测参数、运行记录参数等。

（2）该参数在运行状态下不可修改，需停机后才能进行修改。

4.2.5 参数组成

表 4-4 参数组成

参数组	功能描述	说明
P0 ～ PP	基本参数	运行指令、频率指令、电机参数、控制方式、AI/AO 特性校正、优化控制等参数。
A0 ～ AC	进阶参数	
U0	监视参数组	变频器基本监视参数的显示。

在用操作面板查看参数之前，要先设置参数 PP-02（功能参数组显示选择），确保要查看的参数组是在显示状态。查看参数组号的方式如下图：

参数	功能定义	出厂值	设定范围	参数说明
PP-02	功能参数组显示选择	11	个位：U 组显示选择 0：不显示；1：显示 十位：A 组显示选择 0：不显示；1：显示	用于 A 组、U 组参数是否显示的控制。

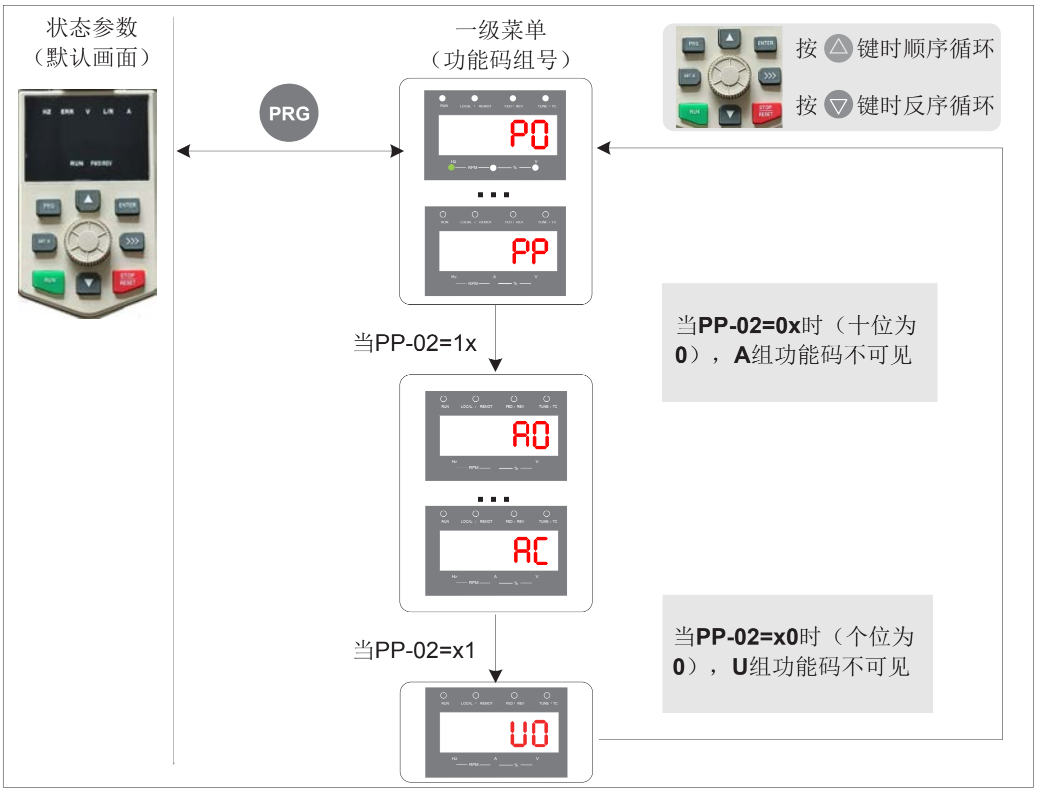


图 4-4 参数组号查看方法示意图

4.2.6 参数查阅

YD280 系列变频器的参数较多，一共提供三种参数查阅方式。默认为基本查看方式（可查看所有的参数组），通过参数设置（PP-03）还可以提供两种快速查阅参数的方法，以方便用户快速查找 。

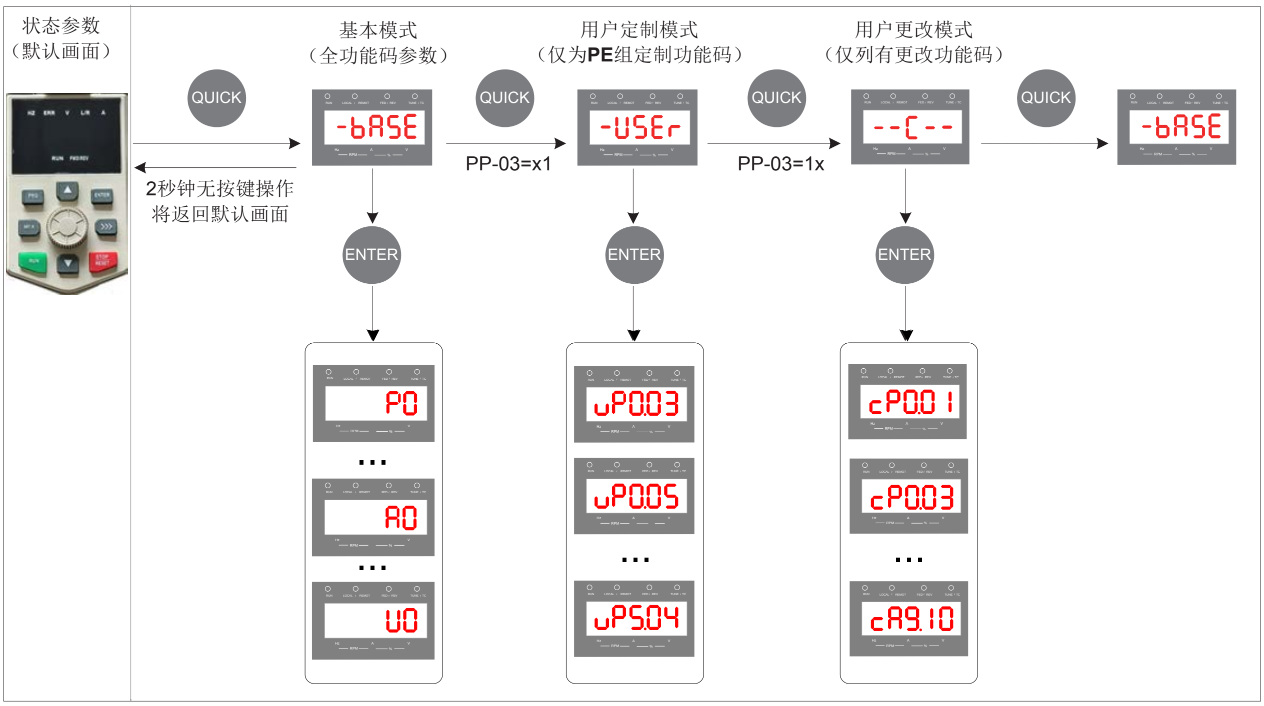
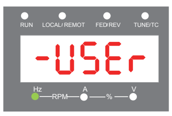
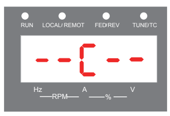
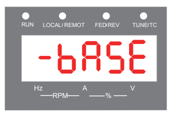


图 4-5 参数参数查阅方法示意图

上图中，用户定制模式菜单中，参数的显示形式如“uP3.02”，表示功能参数 P3-02，在用户定制菜单中修改参数与在普通编程状态下修改相应的参数操作方法是一样的。

提供的三种参数查阅方式，各参数显示方式和显示编码为：

参数显示方式	显示	说明
用户定制参数方式		查看用户自定义的参数
用户更改参数方式		查看与出厂值不同的参数
功能参数方式		查看所有的参数

1） 基本查阅方法

基本参数组即变频器的全部参数，可以按照 4.2 小节介绍的操作方式查询或修改。三种参数显示模式通过面板上的 MF.K 键进行切换，进入各组参数之后的查阅或修改方法，与 4.2 小节中通过键盘操作的方法相同。

2） 快速查阅方法

如果要显示用户自定义组和用户更改参数组，需要将参数 PP-03 设置为11

参数	功能定义	出厂值	设定范围	参数说明
PP-03	功能参数组显示选择	00	个位：-USEr 组显示选择 0：不显示；1：显示 十位：--C-- 组显示选择 0：不显示；1：显示	决定用户自定义组、用户更改参数组是否显示。

功能参数选择PP-03，配合多功能参数P7-01，与按键MF.K，可完成单键切换循环显示。例如PP-03=11，P7-01=0，则MF.K按键功能为切换PP-03选择的组显示模式。由-USEr，--C--，-bASE之间显示来回切换。

◆ 查阅用户自定义参数组

在面板上按 MF.K 键，进入“用户自定义参数”模式 -USEr，查看用户自定义的参数。

用户自定义参数方法：用户通过设置PE组（PE-00~PE-29）的参数，自定义常用的参数，最多可以自定义30个，PE组默认有16个自定义参数（PE-00~PE-15），用户也可以根据自已的具体需要对默认的这些参数进行修改。如果A3组的某个参数设置为uP0.00，则表示未制定自定义参数。

表 4-5 用户定制菜单常用参数

参数	自定义参数	名称	参数	自定义参数	名称
PE-00	P0-01	控制方式	PE-01	P0-02	运行指令选择
PE-02	P0-03	主频率指令输入选择	PE-03	P0-07	频率源叠加选择
PE-04	P0-08	预置频率	PE-05	P0-17	加速时间
PE-06	P0-18	减速时间	PE-07	P3-00	V/F 曲线设定
PE-08	P3-01	转矩提升	PE-09	P4-00	DI1 端子功能选择
PE-10	P4-01	DI2 端子功能选择	PE-11	P4-02	DI3 端子功能选择
PE-12	P5-04	DO1 输出选择	PE-13	P5-07	AO1 输出选择
PE-14	P6-00	启动方式	PE-15	P6-10	停机方式

◆ 查阅用户已更改的参数

在面板上按 MF.K 键，进入“用户更改参数”模式 --C--，查看与出厂值不同的参数。

此模式下便于用户快速访问修改的参数。在用户已更改参数组中，列出了已经被用户修改过的参数，即当前的设定值与出厂值不同。这些参数是由变频器自动生成的列表。

3） 状态参数的查询

在停机或运行状态下，用操作面板上的 ▷ 键，切换参数 P7-03、P7-04、P7-05 的每一字节，可以显示多个状态参数。

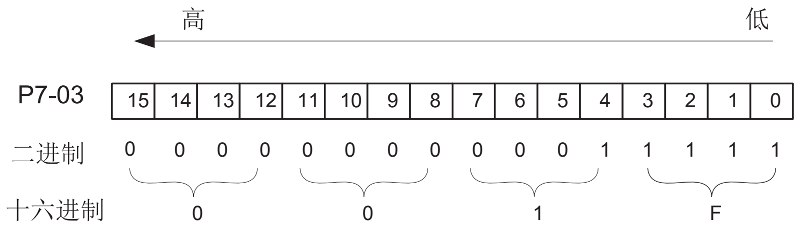
运行状态下有 32 个运行状态参数，由参数 P7-03（运行显示参数 1）和 P7-04（运行显示参数 2）按二进制的位选择每位的对应参数是否显示。停机状态下有13个停机状态参数，由参数P7-05（停机显示参数）按二进制的位选择每位的对应参数是否显示。

通过面板查看运行状态下的参数：运行频率、母线电压、输出电压、输出电流、输出功率、PID 设定。

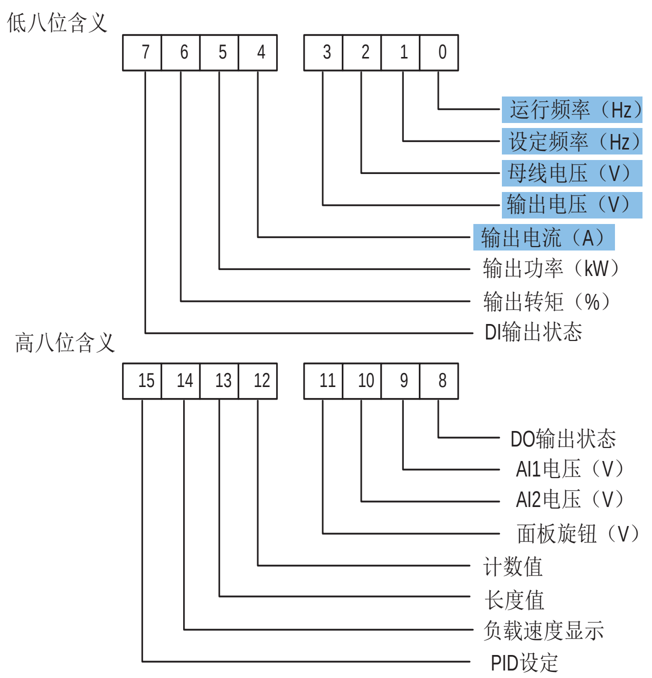
1. 根据参数 P7-03（运行显示参数 1）中的每一字节与上述参数的对应关系，将对应的位设置为 1。

2. 将此二进制数转为十六进制后设置到 P7-03 中。键盘设定值，显示为 P.001F。

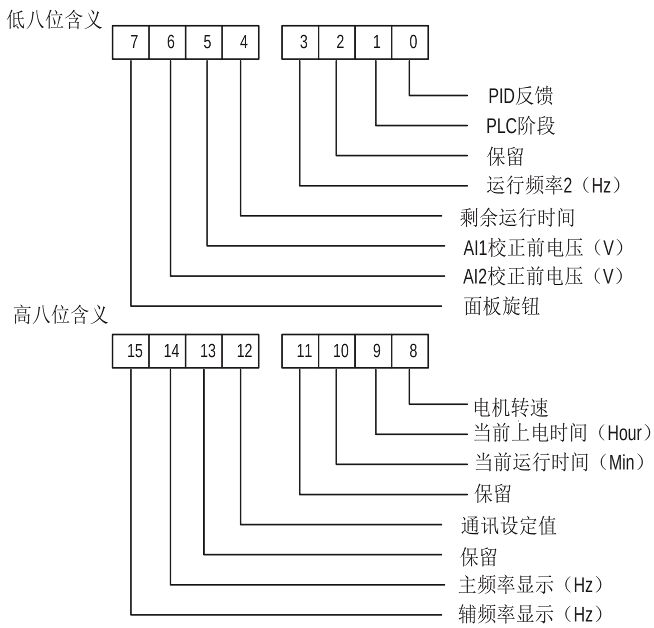
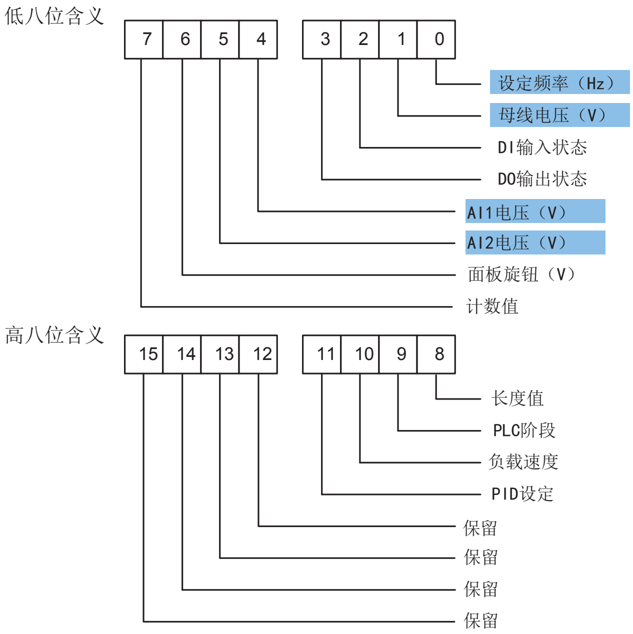
3. 用操作面板上的 ▷ 键，切换参数 P7-03的每一字节，即可查看相关参数的值。设定如下图所示：



其他状态参数的查看方法，同 P7-03 的方法。状态参数在 P7-03、P7-04、P7-05 的每一字节的对应关系如下：

<table>
<tr><th>参数</th><th>功能定义</th><th>出厂值</th><th>设定范围</th><th>参数说明</th></tr>
<tr><td>P7-03</td><td>运行显示参数 1</td><td>1F</td><td>0000 ～ FFFF</td><td>在运行中若需要显示以下各参数时，将其相对应的位置设为 1，将此二进制数转为十六进制后设于 P7-03。


注：带底纹部分为默认出厂显示。</td></tr>
</table>

参数	功能定义	出厂值	设定范围	参数说明
P7-04	运行显示参数 2	33	0000 ～ FFFF	在运行中若需要显示以下各参数时，将其对应的位置设为 1，将此二进制数转为十六进制后设于 P7-04。 
P7-05	停机显示参数	0	0000 ～ FFFF	在停机时若需要显示以下各参数，将其对应的位置设为 1，将此二进制数转为十六进制后设于 P7-05。  注：带底纹部分为默认出厂显示。

NOTE

- 变频器断电后再上电，显示的参数默认为变频器掉电前选择的参数。

4.2.7 多功能按键操作

操作面板上面的 MF.K 键为多功能键，可以通过参数P7-01（ MF.K 键功能选择）设置 MF.K 键的功能。在停机或者运行状态都可以通过此键对运行指令或者变频器的旋转方向进行切换，或者实现正反转的点动。

参数	功能定义	出厂值	设定范围	参数说明
P7-01	MF.K 功能选择	0	0： MF.K 键	选择菜单种类，依据PP-03设定方式，MF.K 切换显示模式
			1：操作面板与端子切换或者操作面板与通讯切换	P0-02 设置为 0（操作面板），按下 MF.K 键后无效果； P0-02 设置为 1（端子），通过 MF.K 键可实现端子与操作面板之间的切换； P0-02 设置为 2（通讯），通过 MF.K 键可实现通讯与操作面板之间的切换；
			2：正反转切换	通过 MF.K 键切换频率指令的方向。该功能只在命令源 运行指令为操作面板时有效。
			3：正转点动	通过键盘 MF.K 键实现正转点动（FJOG）。该功能只在命令源 运行指令为操作面板时有效。
			4：反转点动	通过键盘 MF.K 键实现反转点动（RJOG）该功能只在命令源运行指令为操作面板时有效。

参数	功能定义	设定范围	参数说明	出厂值
PP-03	个性参数组显示选择	00 01 10 11	个位：用户定制参数组显示选择 0：不显示 1：显示 十位：用户变更参数组显示选择 0：不显示 1：显示	00

第五章　基本操作与试运行

本章介绍变频器的基本调试步骤，主要包括变频器的频率指令设置、启动和停机的控制，根据本章内容可以实现变频器控制电机的试运行。

5.1 快速调试指南

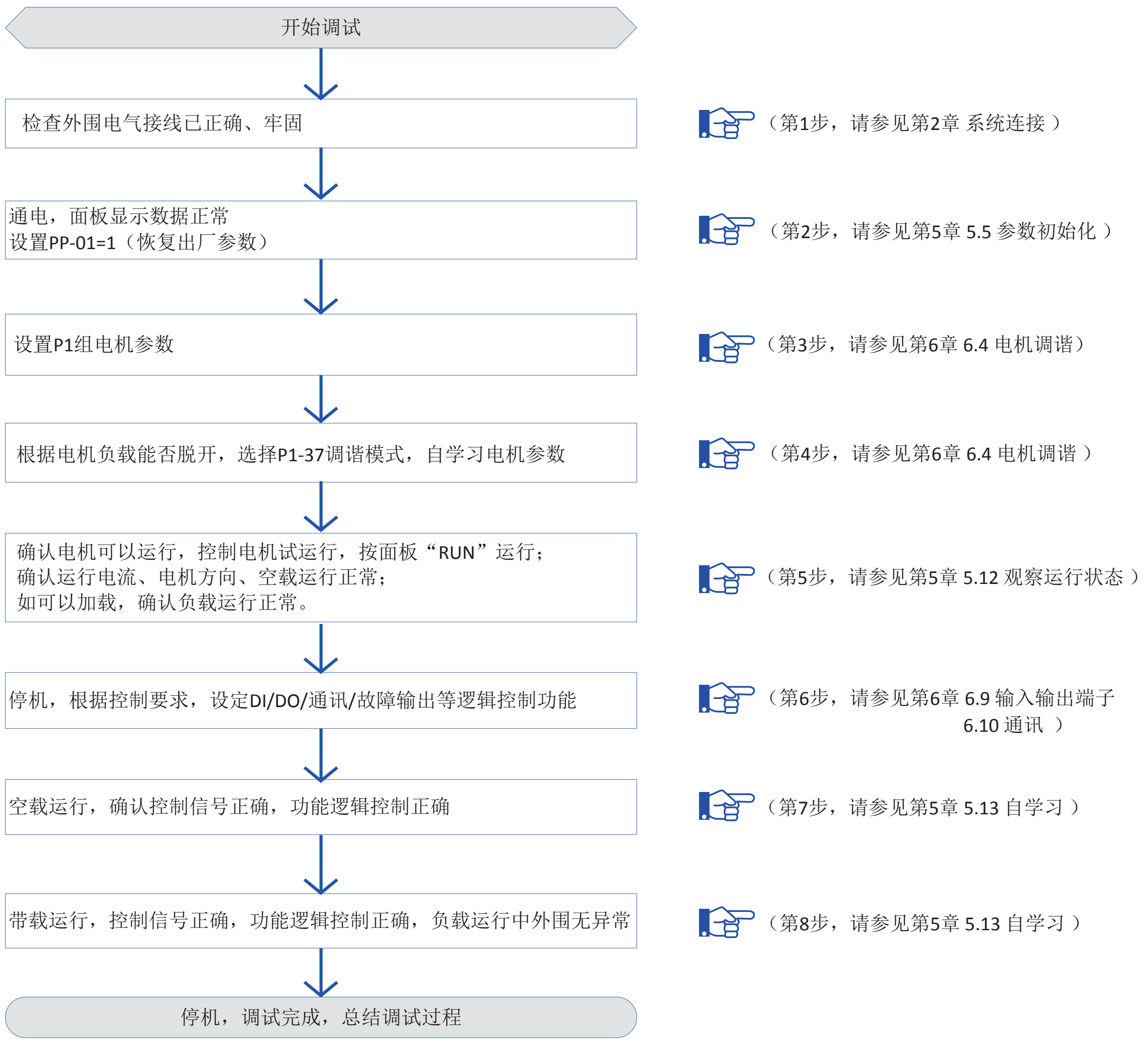


图 5-1 快速调试步骤指南

5.2 变频器调试总流程图

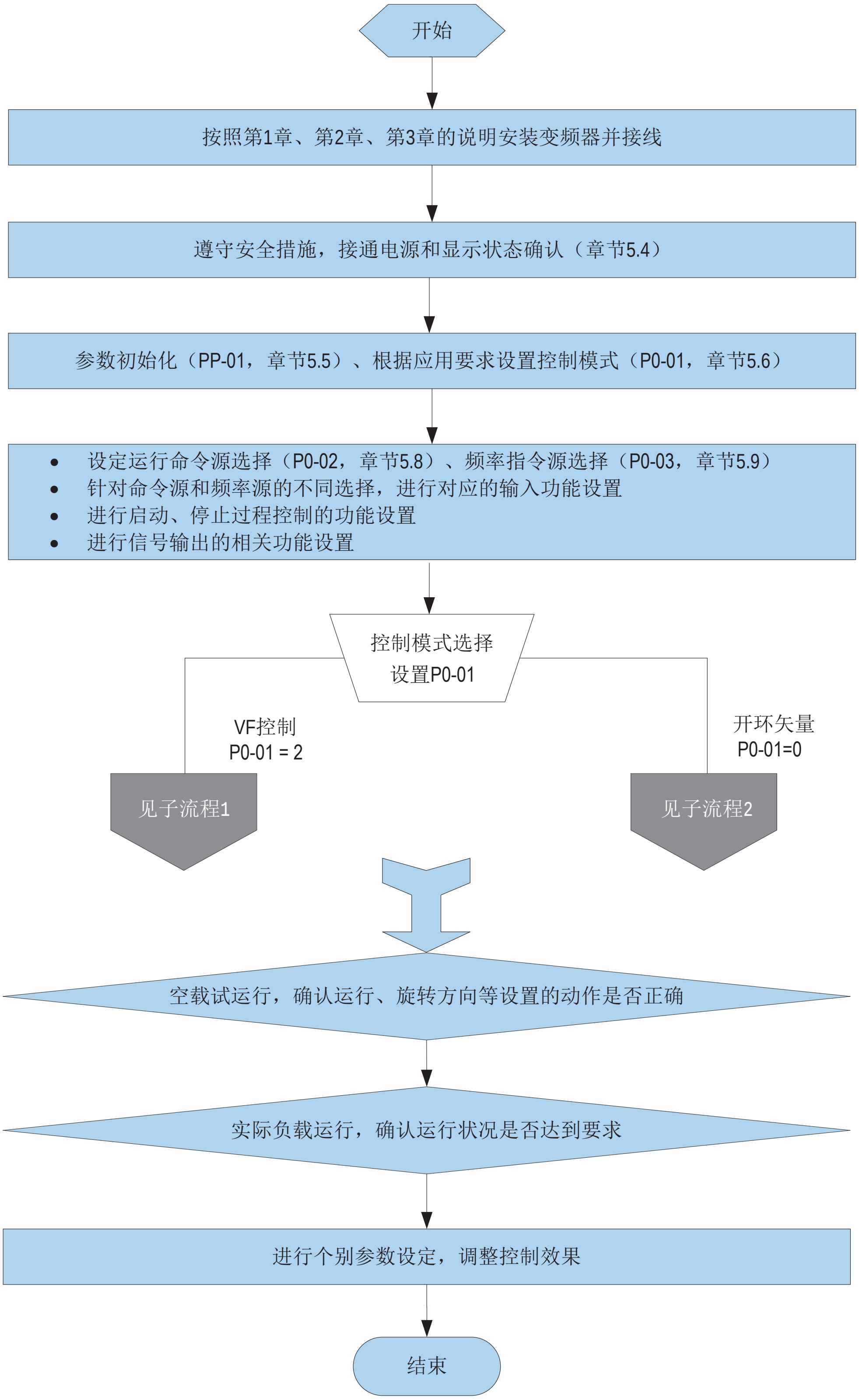


图 5-2 变频器调试总流程图

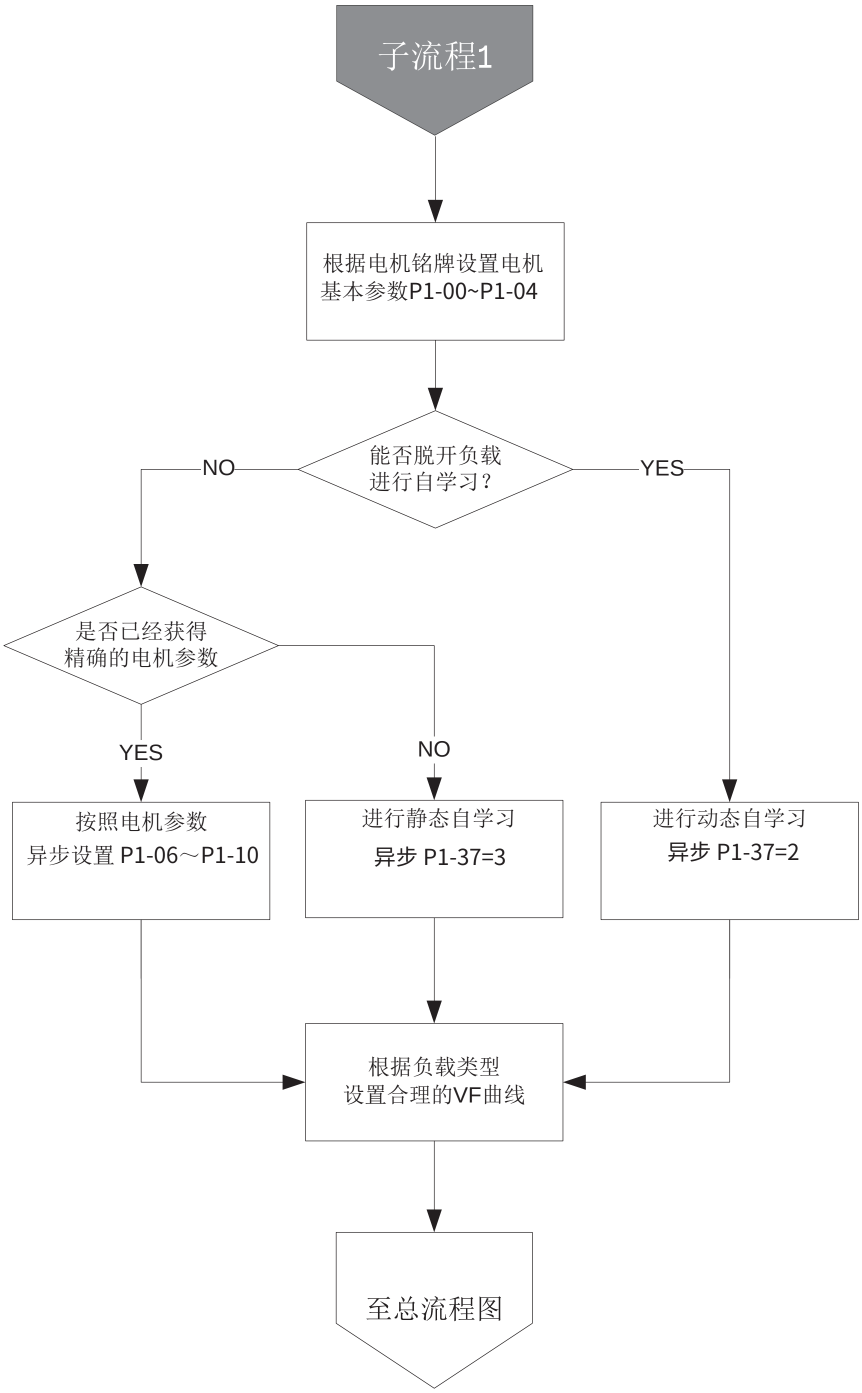


图 5-3 变频器调试子流程图 1（V/F 控制）

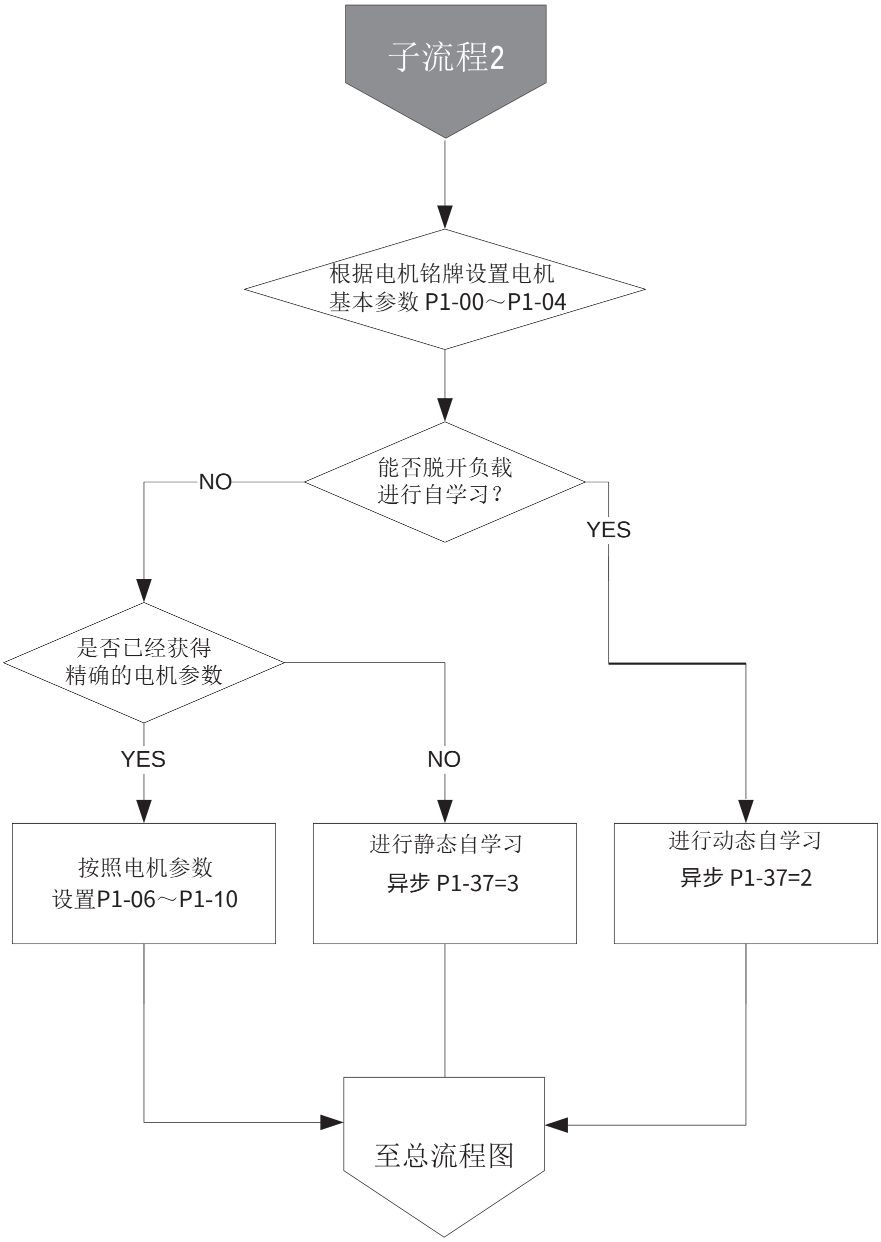


图 5-4 变频器调试子流程图 2（矢量控制）

5.3 接通电源前确认事项

请务必确认以下项目后，再接通电源。

项目	内容
电源电压的确认	请确认电源电压是否正确 AC380V~480V 或AC200~240V 50/60Hz。
	请对电源输入端子（R/S/T）或（L1/L2）可靠接线。
	确认变频器和电机正确接地。
变频器输出端子和电机端子的连接确认	请确认变频器输出端子（U/V/W）和电机端子的连接是否牢固。
和变频器控制回路端子的连接确认	请确认变频器的控制回路端子和其他控制装置的连接是否牢靠。
变频器控制端子的状态确认	请确认变频器控制回路端子是否都处于 OFF 状态（变频器不运行状态）。
负载确认	请确认电机是否为空载状态，未与机械系统连接。

5.4 接通电源后显示状态确认

接通电源后，正常状态下的操作器显示如下所示。

状态	显示	说明
正常时	50.00	出厂默认显示为数字设定 50.00Hz
故障时	Err02	故障时变频器处停机状态，显示故障类型

5.5 参数初始化

可将变频器的设定恢复到出厂设定，初始化后，PP-01 自动归零。

PP-01	参数初始化		出厂值	0
	设定范围	0	无操作	
		1	恢复出厂参数，不包括电机参数	
		2	清除记录信息	
		4	备份用户当前参数	
		501	恢复用户备份参数	

1：恢复出厂设定值，不包括电机参数

设置 PP-01 为 1 后，变频器功能参数大部分都恢复为厂家出厂参数，但是电机参数、频率指令小数点（P0-22）、故障记录信息、累计运行时间（P7-09）、累计上电时间（P7-13）、累计耗电量（P7-14）、逆变器模块散热器温度（P7-07）不恢复。

2：清除记录信息

清除变频器故障记录信息、累计运行时间（P7-09）、累计上电时间（P7-13）、累计耗电量（P7-14）。

4：备份用户当前参数

备份当前用户所设置的参数。将当前所有功能参数的设置值备份下来。
以方便客户在参数调整错乱后恢 复。

501：恢复用户备份参数

恢复之前备份的用户参数，即恢复通过设置 PP-01 为 4 所备份参数。

5.6 电机控制方式选择依据

参数	说明	应用场合
P0-01：选择电机控制方式	设置为 0：无速度传感器矢量控制（SVC）	指开环矢量控制，适用于通常的高性能控制场合，一台变频器只能驱动一台电机。如机床、离心机、拉丝机、注塑机等负载。
	设置为 2：V/F 控制（速度开环控制）	适用于对负载要求不高，或一台变频器拖动多台电机的场合，如风机、泵类负载。可用于一台变频器拖动多台电机的场合。

5.7 频率指令选择

P0-03	主频率指令选择		出厂值	0
	设定范围	0	数字设定（预置频率 P0-08，UP/DOWN 可修改，掉电不记忆）	
		1	数字设定（预置频率 P0-08，UP/DOWN 可修改，掉电记忆）	
		2	AI1	
		3	AI2	
		4	面板旋钮	
		5	保留	
		6	多段指令	
		7	PLC	
		8	PID	
		9	通讯给定	

5.7.1 操作面板数字设定

1） 设置 P0-03 = 0：数字设定（掉电不记忆）

设定频率初始值为 P0-08 “预置频率”的值。可通过键盘的▲键与▼ 键（或多功能输入端子的 UP、DOWN）来改变变频器的设定频率值。变频器掉电后并再次上电时，设定频率值恢复为 P0-08 “数字设定预置频率”值。

2） 设置 P0-03 = 1：数字设定（掉电记忆）

变频器掉电后并再次上电时，设定频率为上次掉电时刻的设定频率，通过键盘▲、▼ 键或者端子 UP、DOWN 的修正量被记忆。

5.7.2 模拟量输入（AI）

YD280 控制板提供 2 个模拟量输入端子（AI1，AI2）。

表 5-1 模拟量（AI）端子特性说明

端子	名称	类型	输入范围	输入阻抗
AI1-GND [1]	控制板模拟量输入端子 1	电压型	DC 0V~10V	22kΩ
AI2-GND [1]	控制板模拟量输入端子 2	电压型 [2]	DC 0V~10V	22kΩ
		电流型 [2]	0mA~20mA	通过 J10 阻抗 500Ω 或者 250Ω 可调

[1] 端子接线请参考“第 3 章 图 3-19”；

[2] 通过控制板上的 J9 跳线可以选择 AI2 是电压型输入还是电流型输入。

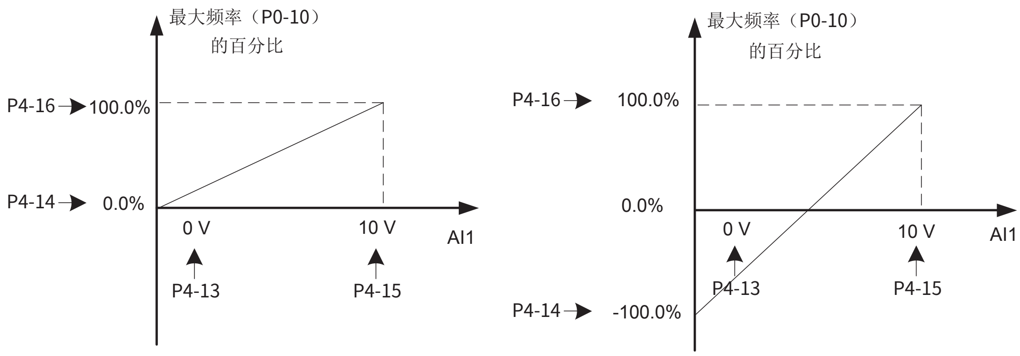
表 5-2 模拟量（AI）作为频率指令时的设置步骤

设置步骤	相关参数	说明	
AI 端子选择： 根据端子特性选择频率指令的 AI 输入端子	P0-03	P0-03 = 2	选择使用 AI1
		P0-03 = 3	选择使用 AI2
AI 电压 [1] 与频率对应曲线选择： 分别选择 5 种曲线中的任意一个	P4-33	一般使用默认值 P4-33 = 321， AI1 使用曲线 1，AI2 使用曲线 2， AI3 使用曲线 3。	
AI 电压 [1] 与频率对应曲线设定： 设定 AI 电压的输入与设定量的对应关系	P4-13 ～ P4-16【2】	曲线 1 设置	典型设置曲线 [3]
	P4-18 ～ P4-21	曲线 2 设置	典型设置曲线 [4]
	P4-23 ～ P4-27	曲线 3 设置	典型设置曲线 [5]
	A6-00 ～ A6-07	曲线 4 设置	参见 6.2.3 章节相关说明
	A6-08 ～ A6-15	曲线 5 设置	
	P4-34	AI 低于最小输入设定选择 [2]	
	P0-10	AI 作为频率给定时，电压 / 电流输入对应设定的 100.0%，是相对最大频率 P0-10。	
AI 滤波时间	P4-17	默认 0.1s，根据快速响应要求及现场信号的干扰设置该参数，需要快速响应的应减小该参数，现场干扰大的应增大该滤波时间。	

【1】 电流型的模拟量输入曲线设置时， 1mA 电流相当于 0.5V 电压，即 20mA 对应于 10V。

【2】 当模拟量输入的电压大于所设定的“最大输入” （P4-15）时，则模拟量电压按照“最大输入”计算；同理，当模拟输入电压小于所设定的“最小输入” （P4-13）时，则根据“AI 低于最小输入设定选择” (P4-34) 的设置，以最小输入或者 0.0% 计算。

【3】 AI1 的典型设置曲线如下图所示。

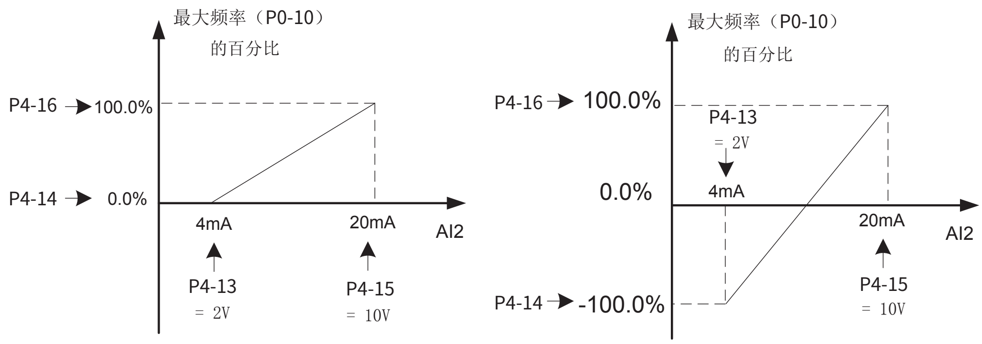


频率给定没有负值时的设置
（默认设置）

频率给定有负值的设置

图 5-5 AI1 的典型设置曲线

【4】 AI2 用作电压输入时典型设置曲线与 AI1 一致，用作电流型时，一般设置 4 ～ 20mA 对应 0 ～ 50Hz 或者 -50 ～ 50Hz。



频率给定没有负值时的设置

频率给定有负值的设置

图 5-6 AI2 的典型设置曲线

5.7.4 主频率通讯给定

YD280 安装通讯卡（选配）可实现 1 种上位机通讯方式：Modbus。可通过 P0-28 设置不同的通讯方式，详见如下表。选配卡具体内容详见“第十一章 选配卡”，用户可根据需要自行选择。

设置步骤	相关参数	说明	
频率指令选择通讯给定	P0-03	P0-03=9	
选择通讯方式	P0-28	使用 MODBUS 通讯	P0-28 = 0

5.7.5 多段速指令

选择多段指令运行方式时，需要通过数字量输入 DI 端子的不同状态组合，对应不同的设定频率值。

表 5-4 多段速作为频率指令时的设置步骤

<table>
<tr><th>设置步骤</th><th>相关参数</th><th colspan="2">说明</th></tr>
<tr><td>选择多段速指令作为频率指令</td><td></td><td colspan="2"></td></tr>
<tr><td>确定需要多段速的段数</td><td>无</td><td colspan="2">最多可支持 16 段速，需要运用 4 个 DI 端子。多段速的段数与 DI 端子数的对应关系为：
2 段速：1 个 DI 端子 K1
3-4 段速：2 个 DI 端子 K1、K2
5-8 段速：3 个 DI 端子 K1、K2、K3
9-16 段速：4 个 DI 端子 K1、K2、K3、K4</td></tr>
<tr><td rowspan="4">设置 DI 端子为多段速功能</td><td rowspan="4">P4-00 ～ P4-04</td><td>多段指令端子 K1</td><td>设置为 12</td></tr>
<tr><td>多段指令端子 K2</td><td>设置为 13</td></tr>
<tr><td>多段指令端子 K3</td><td>设置为 14</td></tr>
<tr><td>多段指令端子 K4</td><td>设置为 15</td></tr>
<tr><td rowspan="2">设置各多段速对应的频率【注】</td><td>PC-00 ～ PC-15</td><td colspan="2">各段速度对应的频率设置，以百分比设置，100% 对应最大频率 P0-10。</td></tr>
<tr><td>P0-10</td><td colspan="2">当频率指令选择为多段速时，参数 PC-00~PC-15 的 100.0%，对应最大频率 P0-10。</td></tr>
</table>

【注】 4 个多段指令端子，可以组合为 16 种状态，这 16 个状态对应 16 个指令设定值。具体如下表所示：

表 5-5 多段速指令功能的端子组合说明

K4	K3	K2	K1	指令设定	对应最大频率百分比
OFF	OFF	OFF	OFF	多段指令 0	PC-00
OFF	OFF	OFF	ON	多段指令 1	PC-01
OFF	OFF	ON	OFF	多段指令 2	PC-02
OFF	OFF	ON	ON	多段指令 3	PC-03
OFF	ON	OFF	OFF	多段指令 4	PC-04
OFF	ON	OFF	ON	多段指令 5	PC-05
OFF	ON	ON	OFF	多段指令 6	PC-06
OFF	ON	ON	ON	多段指令 7	PC-07
ON	OFF	OFF	OFF	多段指令 8	PC-08
ON	OFF	OFF	ON	多段指令 9	PC-09
ON	OFF	ON	OFF	多段指令 10	PC-10
ON	OFF	ON	ON	多段指令 11	PC-11
ON	ON	OFF	OFF	多段指令 12	PC-12
ON	ON	OFF	ON	多段指令 13	PC-13
ON	ON	ON	OFF	多段指令 14	PC-14
ON	ON	ON	ON	多段指令 15	PC-15

5.8 启动和停机命令

P0-02	命令指令选择		出厂值	0
	设定范围	0	操作面板（LED 灭）	
		1	端子（LED 亮）	
		2	通讯（LED 闪烁）	

选择变频器控制命令的输入通道。变频器控制命令包括：启动、停机、正转、反转、点动等。

0：操作面板命令通道（“LOCAL/REMOT”灯灭）；

由操作面板上的 RUN、STOP/RES 按键进行运行命令控制。

1：端子命令通道（“LOCAL/REMOT”灯亮）；

由多功能输入端子功能 FWD、REV、JOGF、JOGR 等，进行运行命令控制。

2：通讯命令通道（“LOCAL/REMOT”灯闪烁）

5.8.1 操作面板启停

由操作面板上的 RUN、STOP/RES 按键进行运行命令控制，操作器上的“LOCAL/REMOT”为灯灭状态。按键说明请参考“第 4 章 面板操作”。

5.8.2 端子启停（DI）

P4-11	端子命令方式		出厂值	0
	设定范围	0	两线式 1	
		1	两线式 2	
		2	三线式 1	
		3	三线式 2	

该参数定义了通过外部端子控制变频器运行的四种不同方式。

为方便说明，下面任意选取 DI1 ～ DI5 的多功能输入端子中的 DI1、DI2、DI3 三个端子作为外部端子。即通过设定 P4-00 ～ P4-02 的值来选择 DI1、DI2、DI3 三个端子的功能，详细功能定义见 P4-00 ～ P4-04 的设定范围。

0：两线式模式 1：此模式为最常使用的两线模式。由端子 DI1、DI2 来决定电机的正、反转运行。

参数设定如下：

参数	名称	设定值	功能描述
P4-11	端子命令方式	0	两线式 1
P4-00	DI1 端子功能选择	1	正转运行 (FWD)
P4-01	DI2 端子功能选择	2	反转运行 (REV)

K1	K2	运行命令
1	0	正转
0	1	反转
1	1	停止
0	0	停止

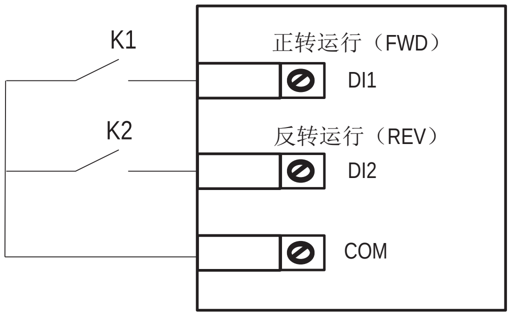


图 5-9 两线式模式 1

如上图所示，该控制模式下，K1 闭合，变频器正转运行。K2 闭合反转，K1、K2 同时闭合或者断开，变频器停止运转。

1：两线式模式 2：用此模式时 DI1 端子功能为运行使能端子，而 DI2 端子功能确定运行方向。

参数设定如下：

参数	名称	设定值	功能描述
P4-11	端子命令方式	1	两线式 2
P4-00	DI1 端子功能选择	1	运行使能
P4-01	DI2 端子功能选择	2	正反运行方向

K1	K2	运行命令
1	0	正转
1	1	反转
0	0	停止
0	1	停止

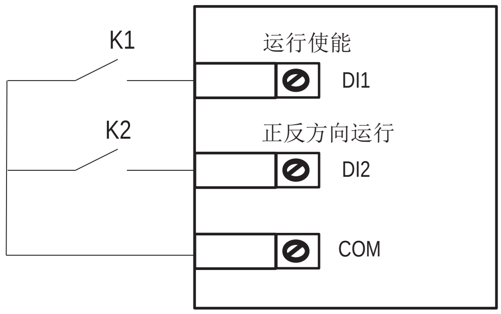


图 5-10 两线式模式 2

如上图所示，该控制模式在 K1 闭合状态下，K2 断开变频器正转，

K2 闭合变频器反转；K1 断开， 变频器停止运转。

2：三线式控制模式 1：此模式 DI3 为使能端子，方向分别由 DI1、DI2 控制。

参数设定如下：

参数	名称	设定值	功能描述
P4-11	端子命令方式	2	三线式 1
P4-00	DI1 端子功能选择	1	正转运行 (FWD)
P4-01	DI2 端子功能选择	2	反转运行 (REV)
P4-02	DI3 端子功能选择	3	三线式运行控制

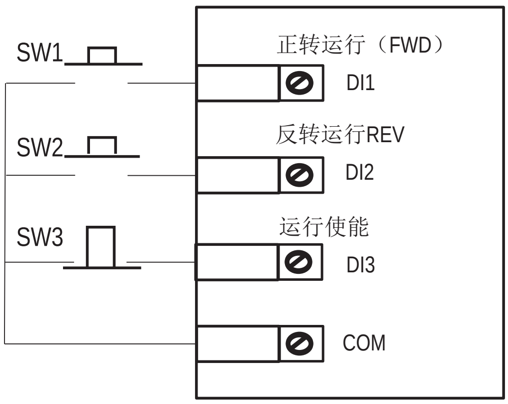


图 5-11 三线式控制模式 1

如上图所示，该控制模式在 SW3 按钮闭合状态下，按下 SW1 按钮变频器正转，按下 SW2 按钮变频器反转，SW3 按钮断开瞬间变频器停机。正常启动和运行中，必需保持 SW3 按钮闭合状态，SW1、SW2 按钮的命令则在闭合动作沿即生效，变频器的运行状态以该 3 个按钮最后的按键动作为准。

3: 三线式控制模式 2: 此模式的 DI3 为使能端子，运行命令由 DI1 来给出，方向由 DI2 的状态来决定。

参数设定如下：

参数	名称	设定值	功能描述
P4-11	端子命令方式	3	三线式 2
P4-00	DI1 端子功能选择	1	运行使能
P4-01	DI2 端子功能选择	2	正反运行方向
P4-02	DI3 端子功能选择	3	三线式运行控制

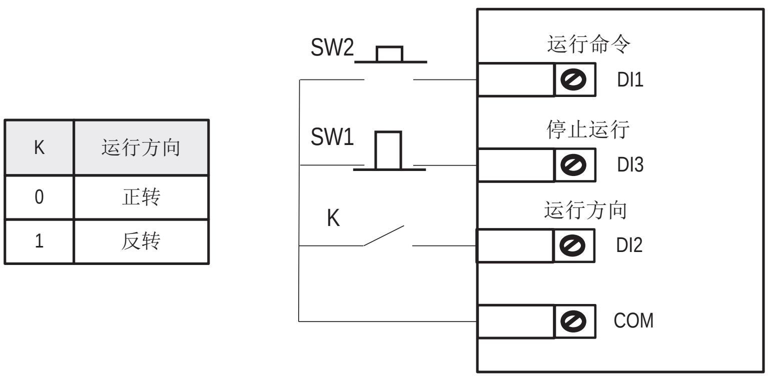


图 5-12 三线式控制模式 2

如上图所示，该控制模式在 SW1 按钮闭合状态下，按下 SW2 按钮变频器运行，K 断开变频器正转，K 闭合变频器反转；SW1 按钮断开瞬间变频器停机。正常启动和运行中，必需保持 SW1 按钮闭合状态，SW2 按钮的命令则在闭合动作沿即生效。

5.8.3 通讯启停

通讯启停是指运行命令由上位机通过通讯方式给出，YD280需要安装通讯卡（选配）可实现与 上位机通讯。通过 P0-28 设置不同的通讯方式，详见如下表，

设置。选配卡具体内容详见第 11 章《通讯选配卡》，用户可根据需要自行选择。

设置步骤	相关参数	说明	
频率指令选择通讯给定	P0-02	P0-02 = 2	
选择通讯方式	P0-28	使用 MODBUS 通讯	P0-28 = 0

5.9 启动过程设置

5.9.1 启动方式选择

P6-00	启动方式		出厂值	0
	设定范围	0	直接启动	
		1	转速跟踪再启动	
		2	预励磁启动（交流异步电机）	
		3	SVC 快速启动	

0：直接启动

若启动直流制动时间设置为 0，则变频器从启动频率开始运行。若启动直流制动时间不为 0，则先直流制动，然后再从启动频率开始运行。适用小惯性负载，在启动时电机可能有转动的场合。

适用于大多数小惯性负载，启动过程频率曲线如下图。其启动前的“直流制动”功能适用于电梯、起重型负载的驱动；“启动频率”适用于需要启动力矩冲击启动的设备驱动，如水泥搅拌机设备。

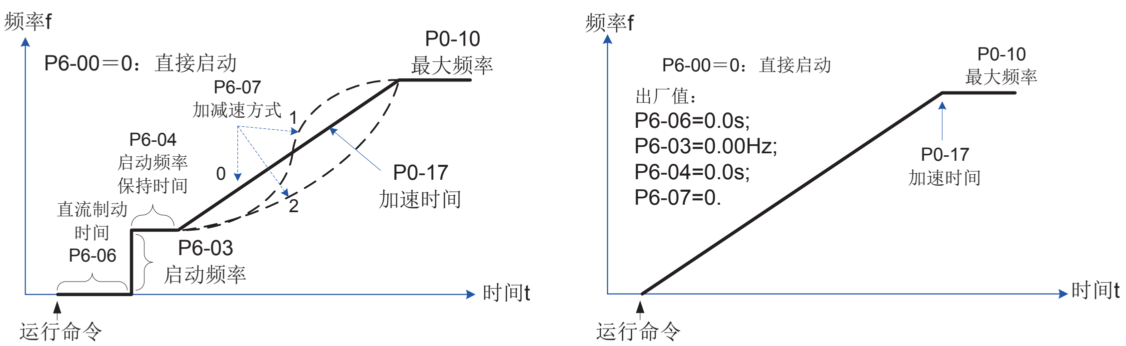


图 5-13 直接启动方式

1：转速跟踪再启动

适用于大惯性机械负载的驱动，启动过程频率曲线如下图，若变频器启动运行时，负载电机仍在靠惯性运转，采取转速跟踪再启动，可以避免启动过流的情况发生。

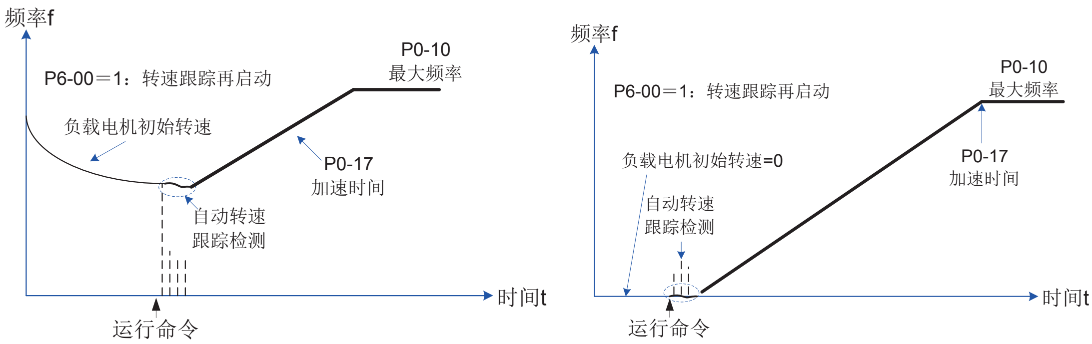


图 5-14 转速跟踪再启动方式

2：异步机预励磁启动

该方式只适用于感应式异步电机负载。启动前对电机进行预励磁，可以提高异步电机的快速响应特性，满足要求加速时间比较短的应用要求，启动过程频率曲线如下：

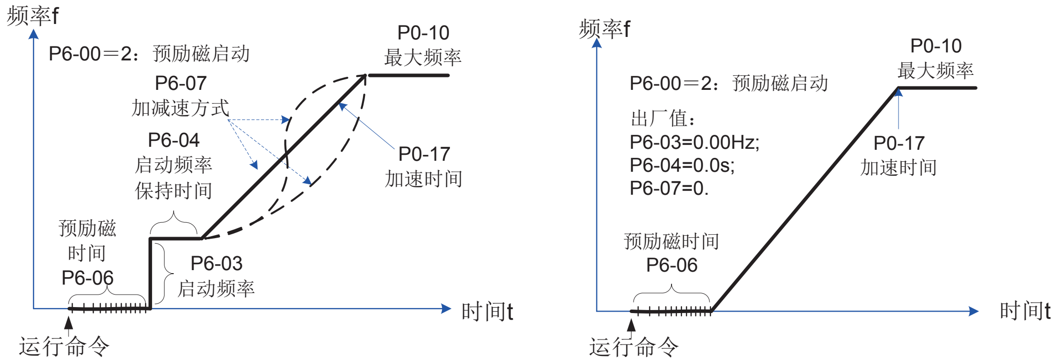


图 5-15 预励磁启动方式

3：SVC 快速启动

设定 P6-00=3，该方式只适用于异步机 SVC 控制模式，使用该方式可以缩短加速时间，当系统惯量较大且需要快速启动时可以使能该模式，但会存在力矩冲击。

5.9.2 启动频率

P6-03	启动频率	出厂值	0.00Hz
	设定范围	0.00Hz ～ 10.00Hz	
P6-04	启动频率保持时间	出厂值	0.0s
	设定范围	0.0s ～ 100.0s	

为保证启动时的电机转矩，请设定合适的启动频率。为使电机启动时充分建立磁通，需要启动频率保持一定时间。

启动频率 P6-03 不受下限频率限制。但是设定目标频率小于启动频率时，变频器不启动，处于待机状态。

启动频率保持时间不包含在加速时间内，但包含在简易 PLC 的运行时间里。

5.10 停机过程设置

变频器的停机模式有 2 种，分别为减速停车、自由停车，由参数 P6-10 选择。可以选择在停机结束段是否使用直流制动功能。

5.10.1 停机方式选择

P6-10	停机方式	出厂值	0
	设定范围	0	减速停车
		1	自由停车

0：减速停车

停机命令有效后，变频器按照减速时间降低输出频率，频率降为 0 后停机。

1：自由停车

停机命令有效后，变频器立即终止输出，此时电机按照机械惯性自由停车。

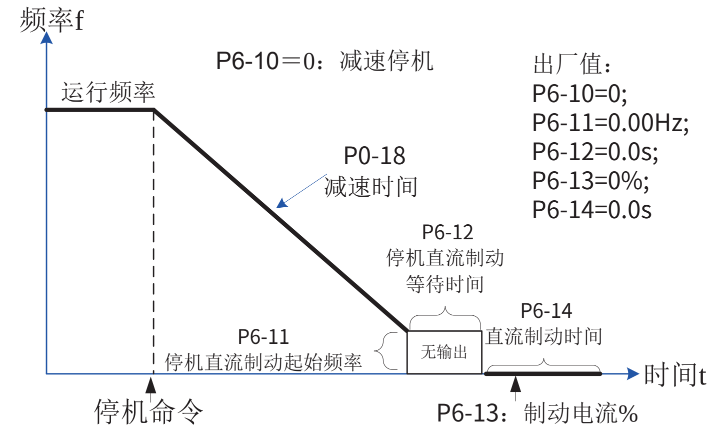


图 5-16 减速停车

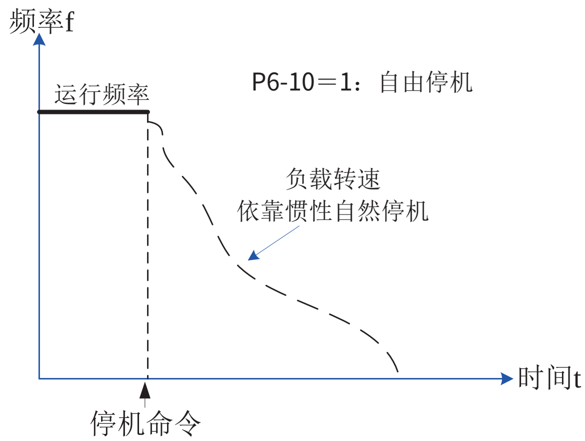


图 5-17 自由停车

5.10.2 停机直流制动

参数	功能定义	出厂值	设定范围	参数说明
P6-11	停机直流制动起始频率	0.00Hz	0.00Hz~ 最大频率	减速停机过程中，当运行频率降低到到该频率时，开始直流制动过程。
P6-12	停机直流制动等待时间	0.0s	0.0s~ 100.0s	在运行频率降低到停机直流制动起始频率后，变频器先停止输出一段时间，然后再开始直流制动过程。用于防止在较高速度时开始直流制动可能引起的过流等故障。
P6-13	停机直流制动电流	50%	0%~ 100%	停车直流制动电流，相对基值有两种情形。 1) 当电机额定电流小于或等于变频器额定电流的 80% 时，是相对电机额定电流为百分比基值。 2）当电机额定电流大于变频器额定电流的 80% 时，是相对 80% 的变频器额定电流为百分比基值。
P6-14	停机直流制动时间	0.0s	0.0s~ 100.0s	直流制动量保持的时间。此值为 0 则直流制动过程被取消。

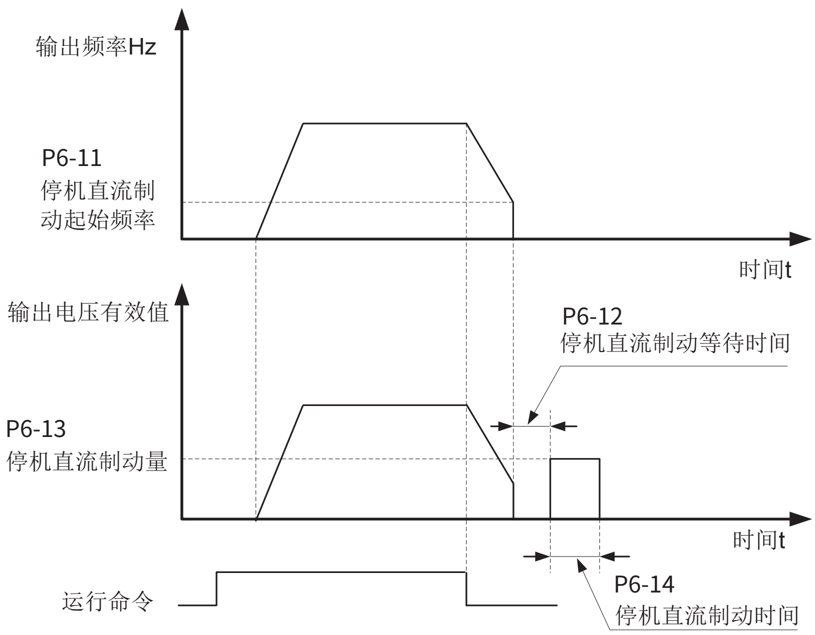


图 5-18 停机直流制动过程示意图

5.11 加减速时间设置

P0-17	加速时间 1	出厂值	机型确定
	设定范围	0.00s ～ 650.00s（P0-19=2） 0.0s ～ 6500.0s（P0-19=1） 0s ～ 65000s（P0-19=0）	
P0-18	减速时间 1	出厂值	机型确定
	设定范围	0.00s ～ 650.00s（P0-19=2） 0.0s ～ 6500.0s（P0-19=1） 0s ～ 65000s（P0-19=0）	
P0-25	加减速时间基准频率	出厂值	0
	设定范围	0	最大频率（P0-10）
		1	设定频率
		2	100Hz

加速时间指变频器从零频，加速到加减速基准频率 (P0-25 确定) 所需时间，见图 5-19 中的 t1。

减速时间指变频器从加减速基准频率 (P0-25 确定)，减速到零频所需时间，见图 5-19 中的 t2。

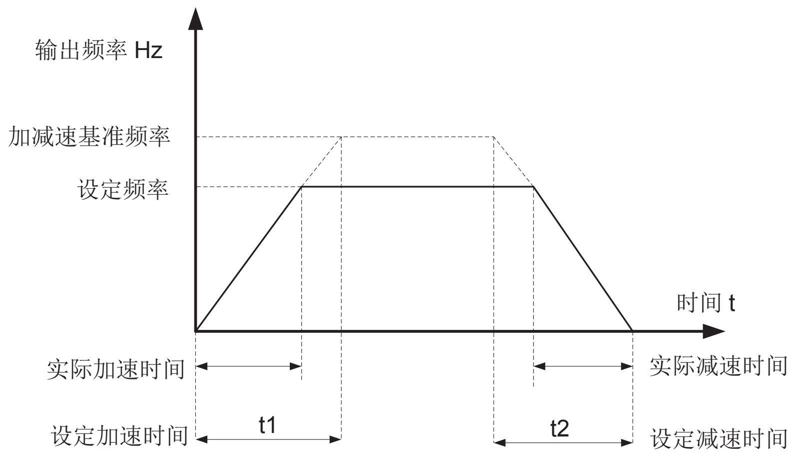


图 5-19 加减速时间示意图

YD280 提供 4 组加减速时间，用户可利用数字量输入端子 DI 切换选择（端子功能 16、17），四组加减速时间通过如下参数设置：

第一组：P0-17、P0-18；

第二组：P8-03、P8-04；

第三组：P8-05、P8-06；

第四组：P8-07、P8-08。

P0-19	加减速时间单位		出厂值	1
	设定范围	0	1 秒	
		1	0.1 秒	
		2	0.01 秒	

为满足各类现场的需求，YD280 提供 3 种加减速时间单位，分别为 1 秒、0.1 秒和 0.01 秒。

NOTE

- 修改该功能参数时，4 组加减速时间所显示小数点位数会变化，所对应的加减速时间也发生变化，应用过程中要特别留意。

5.12 观察运行状态

5.12.1 数字量输出 DO

控制板自带 3 路 DO 输出，分别为 FM、DO1、TA/TB/TC，其中 FM、DO1 为晶体管型输出，可驱动 24Vdc 低压信号回路，TA/TB/TC 则为继电器输出，可驱动 250Vac 控制回路。

通过设置功能参数 P5-01 到 P5-04 的值可以定义各路 DO 输出功能，可以用于指示变频器的各种工作状态、各种告警，共有约 40 个功能设定，以便用户实现特定的自动控制要求。具体设定值请参考“6.9.2 数字输出端子功能（DO）”详细说明。

端口名称	对应参数	输出特性说明
FM-COM	P5-00=0 时，P5-06	晶体管，可输出高频脉冲 10Hz ～ 100kHz；驱动能力：24Vdc， 50mA
	P5-00=1 时，P5-01	晶体管；驱动能力：24Vdc， 50mA
TA-TB-TC	P5-02	继电器；驱动能力：250Vac，3A
DO1-CME	P5-04	晶体管；驱动能力：24Vdc，50mA

当 P5-00=0 时，FM 端口为高速脉冲输出工作模式，以输出脉冲的频率来指示内部运行参数的数值，读数越大，输出脉冲频率越高，100%读数时，对应 P5-09 中设定的 FMP 输出最大频率。至于所要指示内部参数的属性，由 P5-06 参数定义。

5.12.2 模拟量输出 AO

变频器共支持 1 路 AO 输出， AO1 为控制板自带。AO1 可用于
模拟量方式指示内部运行参数，所指示的参数属性可通过参数 P5-07 来选择。

端口	输入信号特性
AO1-GND	J7 短接“V”标识位置，可输出 0 ～ 10Vdc 信号
	J7 短接“I”标识位置，可输出 0 ～ 20mA 电流信号

P5-10	AO1 零偏系数	出厂值	0.0%
	设定范围	-100.0% ～ +100.0%	
P5-11	AO1 增益	出厂值	1.00
	设定范围	-10.00 ～ +10.00	

上述参数可以用于自定义所需要的 AO 输出曲线。

若零偏用“b”表示，增益用 k 表示，实际输出用 Y 表示，标准输出用 X 表示，则实际输出为：

Y=kX ＋ b。

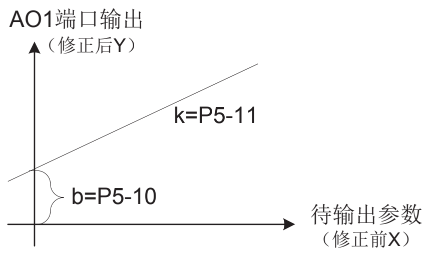


图 5-20 AO 信号修正特性曲线

其中，AO1 的零偏系数 100% 对应 10V（或者 20mA），标准输出是指在无零偏及增益修正下， 输出 0V ～ 10V（或者 0mA ～ 20mA）对应模拟输出表示的量。

例如，若模拟输出内容为运行频率，希望频率为 0Hz 时，修正后输出 8V，频率为 40Hz 时，修正后输出 4V。则 AO1 增益（P5-11）应该设为 -0.5，AO1 零偏系数（P5-10）应该设为 80%。

5.13 自学习

让变频器获得被控电机内部电气参数的方法有：动态调谐、静态调谐 1、静态调谐 2、手动输入电机参数等方式。

调谐方式	适用情况	调谐效果
空载动态调谐 P1-37 = 2	电机与应用系统方便脱离的场合	最佳
带载动态调谐 P1-37 = 2	电机与应用系统不方便脱离的场合，但可以带着负载一起运行。负载的摩擦力较小，恒速运行时接近空载。	摩擦力越小，效果越好
静态调谐 1 P1-37 = 1	电机与负载很难脱离，且不允许动态调谐运行的场合。	一般
静态调谐 2 P1-37 = 3	电机与负载很难脱离，且不允许动态调谐运行的场合，静态调谐建议使用该模式，调谐时间相对于静态调谐 1 较长。	较好
手动输入参数	电机与应用系统很难脱离的场合，将之前变频器成功调谐过的同型号电机参数复制输入到 P1-00 ～ P1-10（或 P1-00~P1-05 和 P1-16~P1-20） 对应参数	较好

电机参数自动调谐步骤如下：

以下以默认电机 1 的参数调谐方法为例进行讲解，电机 2 的调谐方法与之相同，只是参数号要作针对性的改变。

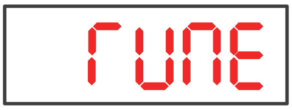
第一步：如果是电机可和负载完全脱开，在断电的情况下，从机械上将电机与负载部分脱离，让电机能空载自由转动。

第二步：上电后，首先将变频器命令指令（P0-02）选择为操作面板命令通道。

第三步：准确输入电机的铭牌参数（如 P1-00 ～ P1-05），请按电机实际参数输入下面的参数（根据当前电机选择）：

电机选择	参　数
电机 1	P1-00：电机类型选择　　P1-01：电机额定功率 P1-02：电机额定电压　　P1-03：电机额定电流 P1-04：电机额定频率　　P1-05：电机额定转速
电机 2	A2-00 ～ A2-05: 与上述定义相同

第四步：如果是异步电机，则 P1-37（调谐选择，电机 2 则对应为 A2-37 参数）请选择 2（异步机完整调谐），按 ENTER 键确认，此时，键盘显示 TUNE，如下图所示：



然后按键盘面板上 RUN 键，变频器会驱动电机加减速、正反转运行，运行指示灯点亮，调谐运行持续时间约 2 分钟，当上述显示信息消失，退回正常参数显示状态，表示调谐完成。

经过该完整调谐，变频器会自动算出电机的下列参数：

异步电机选择	参　数
电机 1	P1-06：异步电机定子电阻　P1-07：异步电机转子电阻 P1-08：异步电机漏感抗　　P1-09：异步电机互感抗 P1-10：异步电机空载电流
电机 2	A2-06 ～ A2-10：定义同上

如果电机不可和负载完全脱开，则 P1-37（电机 2 为 A2-37）请选择 1或3（异步机静止调谐 2），然后按键盘面板上 RUN 键，开始电机参数的调谐操作。

第六章 参数说明

6.1 运行指令设定方法

运行指令用于控制变频器的启动、停止、正转、反转、点动运行等。运行指令有 3 种方式，分别是操作面板、端子、通讯。设定参数 P0-02，选择运行指令的输入方式。

参数	功能定义	出厂值	设定范围	参数说明
P0-02	运行指令选择	0	0	操作面板
			1	端子
			2	通讯

1） 通过“操作面板”设定运行指令

设置参数 P0-02=0，用操作面板上的 RUN 键、STOP 键进行变频器的运行命令控制。按下键盘上 RUN 键，变频器即开始运行（RUN 指示灯点亮）；在变频器运行的状态下，按下键盘上 STOP/RES 键，变频器即停止运行（RUN 指示灯熄灭）。关于“操作面板”详细操作，请参照“第 4 章 面板使用”。

2） 通过“端子”设定运行指令

设置参数 P0-02=1，用端子控制变频器的启动、停止。

设定参数 P4-11=0/1/2/3，设置端子命令的控制方式。端子的命令方式有四种，分别是两线式 1、两线式 2、三线式 1、三线式 2。

参数	功能定义	出厂值	设定范围	参数说明
P4-11	端子命令方式	0	0：两线式 1 1：两线式 2 2：三线式 1 3：三线式 2	通过外部端子控制变频器运行的四种不同方式

可以任意选取 DI1~D15 的多功能输入端子作为外部输入端子。即通过设定 P4-00~P4-04的值来选 择 DI1~ DI5 输入端子的功能，详细功能定义参考“附录 A或B 功能参数表”中 P4-00(DI1)~P4-04(DI5)端子功能选择。

● 两线式 1:P4-11=0 此模式为最常使用的两线模式。

例如， DI1 端子分配正转运行功能，DI2 端子分配反转运行功能。将正转运行开关接 DI1 端子、反转运行开关接 DI2 端子。

相关参数	名称	设定值	功能描述
P4-11	端子命令方式	0	两线式 1
P4-00	DI1 端子功能选择	1	正转运行 (FWD)
P4-01	DI2 端子功能选择	2	反转运行 (REV)

当控制开关 SW1 闭合，SW2 断开时电机正转；当控制开关 SW1 断开，SW2 闭合时电机反转；SW1 和 SW2 都断开或者均闭合时，电机不运行。如下图所示：

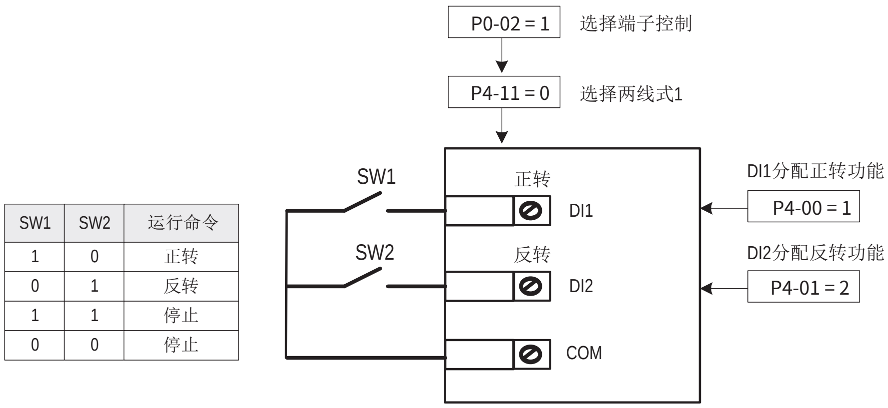


图 6-1 两线式模式 1 接线和参数设置示意图

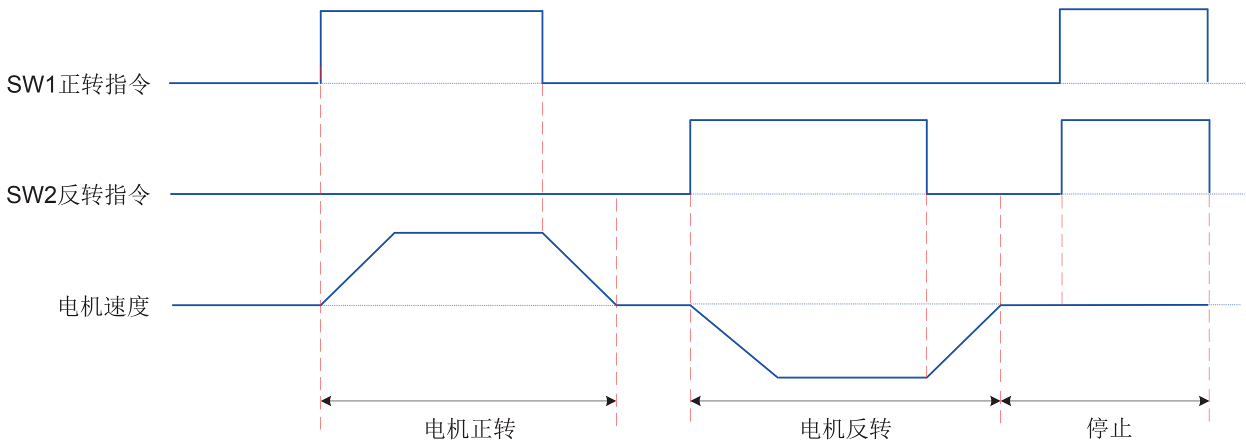


图 6-2 两线模式 1 时序图（正常情况）

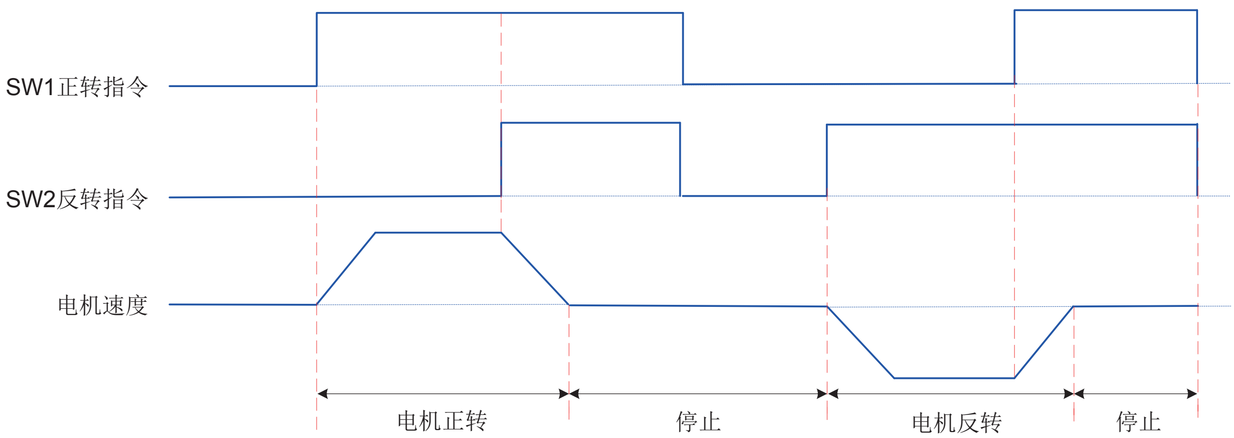


图 6-3 两线模式 1 时序图（异常情况）

- 两线式 2：P4-11 = 1

例如，DI1 端子分配运行命令功能，DI2 端子分配正反运行方向功能，使用与设置参数的方法如下表:

相关参数	名称	设定值	功能描述
P4-11	端子命令方式	1	两线式 2
P4-00	DI1 端子功能选择	1	运行命令
P4-01	DI2 端子功能选择	2	正反运行方向

当控制开关 SW1 闭合时，运行使能。SW2 断开时电机正转；SW2 闭合时电机反转。SW1 断开时，SW2 断开或者闭合电机都不运行。如下图所示：

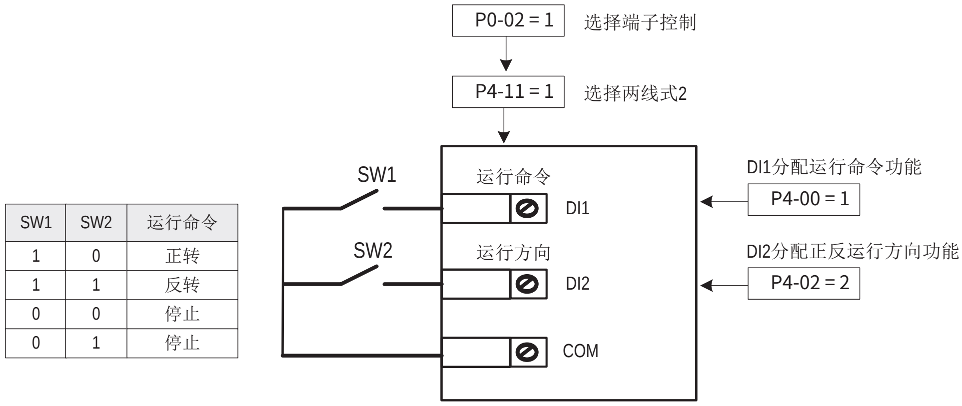


图 6-4 两线式模式 2 接线和参数设置示意图

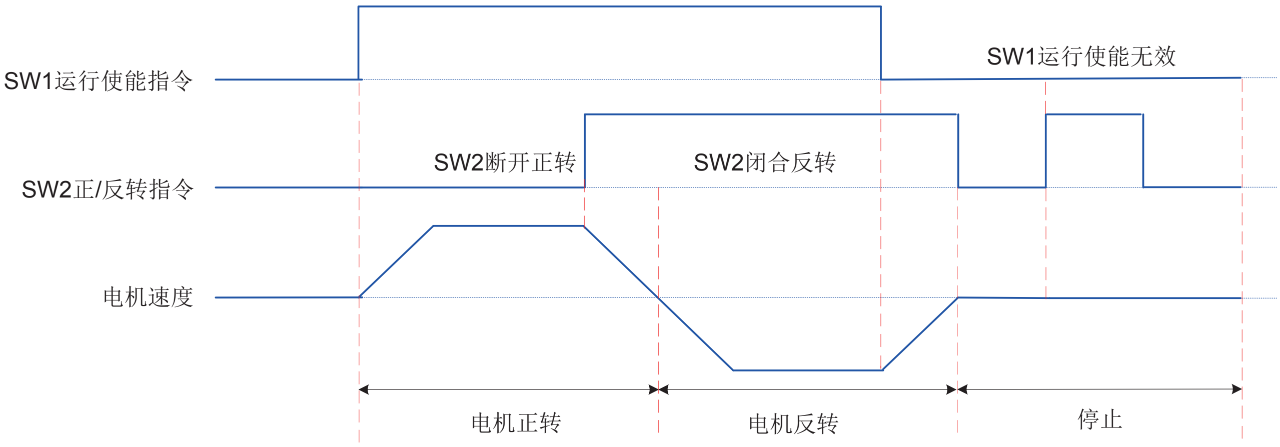


图 6-5 两线模式 2 时序图

- 三线式 1：P4-11 = 2

例如，DI3 端子分配三线式运行控制功能，DI1 端子分配正转运行功能，DI2 端子分配反转运行功能。该控制模式要求变频器用按键作为变频器起停开关，将启停按钮接 DI3 端子、正转运行按钮接 DI1 端子，反转运行按钮接 DI2 端子。使用与设置参数的方法如下表：

相关参数	名称	设定值	功能描述
P4-11	端子命令方式	2	三线式 1
P4-00	DI1 端子功能选择	1	正转运行 (FWD)
P4-01	DI2 端子功能选择	2	反转运行 (REV)
P4-02	DI3 端子功能选择	3	三线式运行控制

SW3 为常闭按钮，SW1、SW2 为常开按钮。当 SW3 按钮闭合时，按下 SW1 按钮变频器正转，按下 SW2 按钮变频器反转，SW3 按钮断开瞬间变频器停机。正常启动和运行中，必需保持 SW3 按钮闭合状态，SW1、SW2 按钮的命令则在闭合动作沿立即生效。

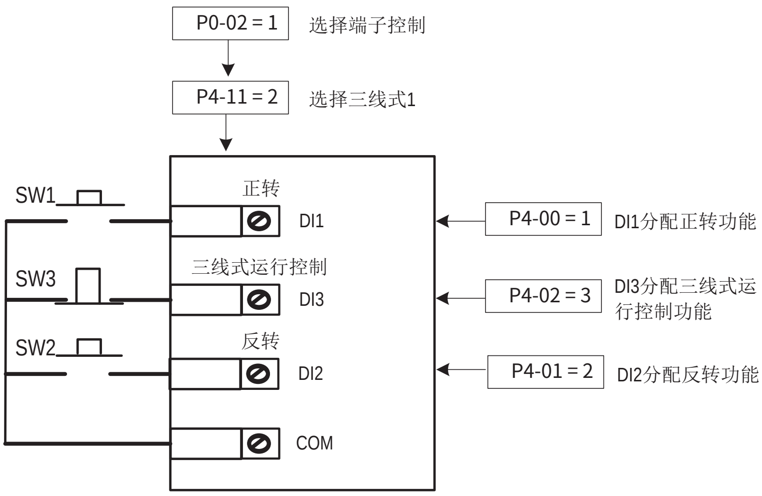


图 6-6 三线式模式 1 接线和参数设置示意图

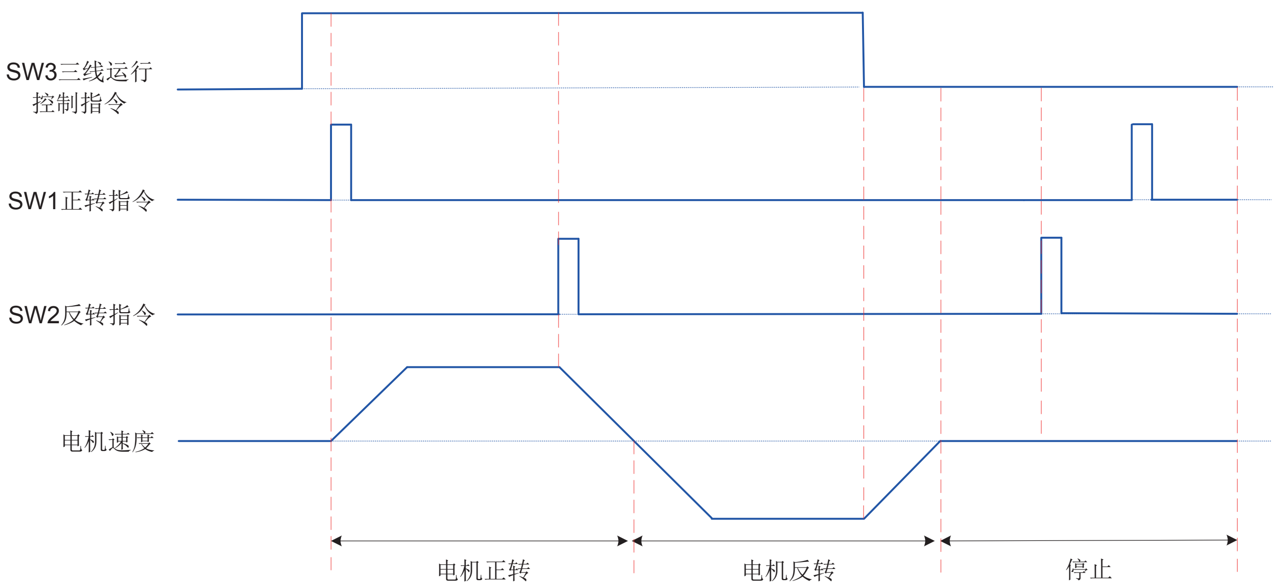


图 6-7 三线模式 1 时序图

- 三线式 2： P4-11 = 3

例如，DI3 端子分配三线式运行控制功能，DI1 端子分配运行命令功能，DI2 端子分配正 / 反运行方向功能。将启停按钮接 DI3 端子，运行使能接 DI1 端子；正 / 反转运行按钮接 DI2 端子。参数设定如下：

相关参数	名称	设定值	功能描述
P4-11	端子命令方式	3	三线式 2
P4-00	DI1 端子功能选择	1	运行命令
P4-01	DI2 端子功能选择	2	正 / 反运行方向
P4-02	DI3 端子功能选择	3	三线式运行控制

当 SW3 按钮闭合时，且按下 SW1 按钮变频器运行，如果 SW2 是断开状态，变频器正转，如果 SW2 是闭合状态，变频器反转。SW3 按钮断开瞬间变频器停机。正常的启动和运行过程中，必须保持 SW3 按钮是闭合状态，SW1 按钮的命令在闭合动作沿生效。

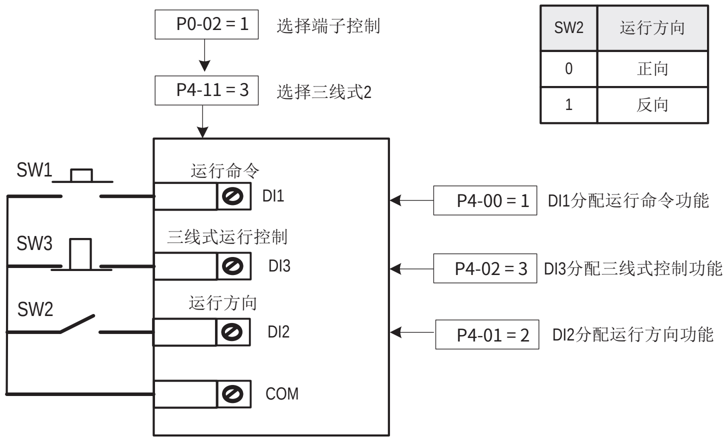


图 6-8 三线式模式 2 接线和参数设置示意图

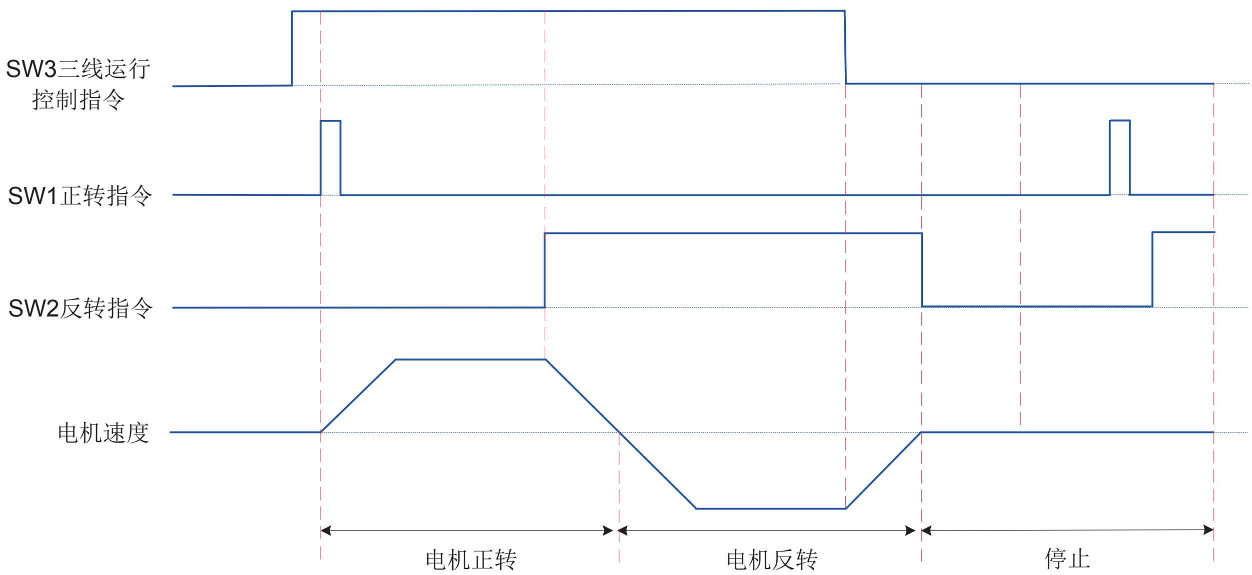


图 6-9 三线模式 2 时序图

3） 通过“通讯”设定运行指令

设置参数 P0-02=2，用通讯给定运行命令（操作面板“LOCAL/REMOT”灯闪烁）。可以实现对变频器的启动、停止等相关命令控制。

YD280支持1种上位机通讯方式：Modbus，使用通讯时必须安装通讯卡，YD280的通讯卡都是选配的，用户根据需要自 行选择，如果通讯协议为 Modbus，需要根据 P0-28 选择相应的串口通讯协议。

参数	功能定义	出厂值	设定范围
P0-28	串口通讯协议选择	0	0：MODBUS 协议

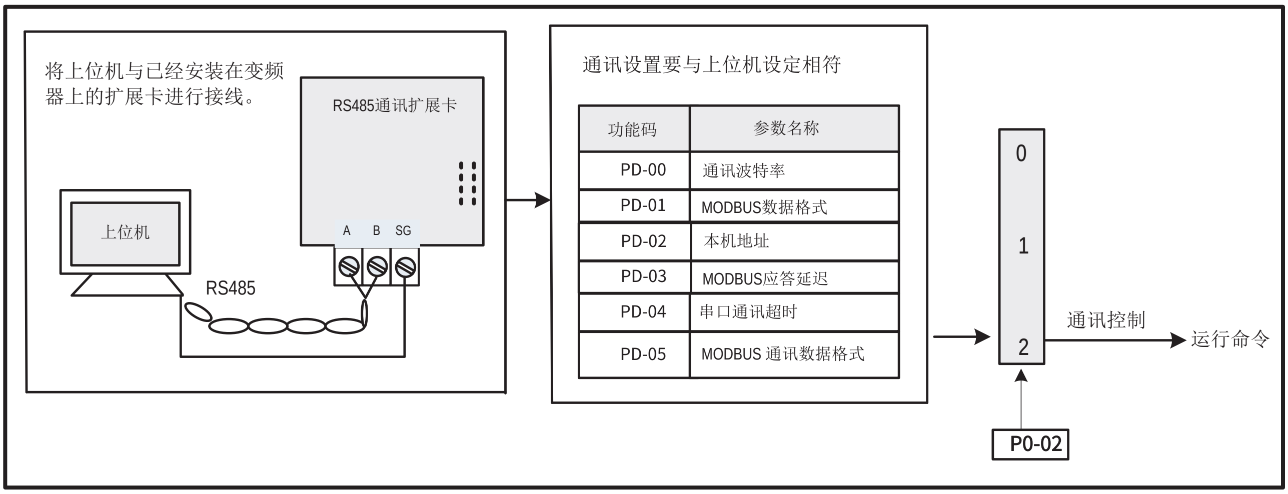


图 6-10 用通讯设定运行指令示意图

用通讯方式给定运行指令时，上位机要给变频器发送写命令。下面以 Modobus 协议为例说明用通讯给定运行指令的过程。例如，利用通讯方式让变频器反转运行时，发送写命令为 01 06 20 00 00 02 03 CB 。每一字节代表的含义如下：变频器地址：01H（可以设置）；写命令：06H；控制命令通讯地址：2000H；控制命令：02H（反转运行）；CRC 校验：03CBH。（其他通讯地址和控制命令可参考“附录 B：通讯数据地址定义与 Modbus 通讯协议）

主机命令信息		从机回应信息	
ADDR	01H	ADDR	01H
CMD	06H	CMD	06H
参数地址高位	20H	参数地址高位	20H
参数地址低位	00H	参数地址低位	00H
数据内容高位	00H	数据内容高位	00H
数据内容低位	02H	数据内容低位	02H
CRC 高位	03H	CRC 高位	03H
CRC 低位	CBH	CRC 低位	CBH

6.2 频率指令输入方法

频率指令的输入方法有四种，即选择主频率指令、选择辅助频率指令、选择主辅频率指令叠加、和选择命令源绑定主频率指令。

6.2.1 选择主频率指令的输入方法

设定参数 P0-03，选择主频率指令的输入。 变频器的主频率指令共有 8 种， 分别为

数字设定 (掉电不记忆)、

数字设定 (掉电记忆)、

AI1、AI2、

面板电位器旋钮模拟量输入、

多段指令、

简易PLC、PID、

通讯给定等。

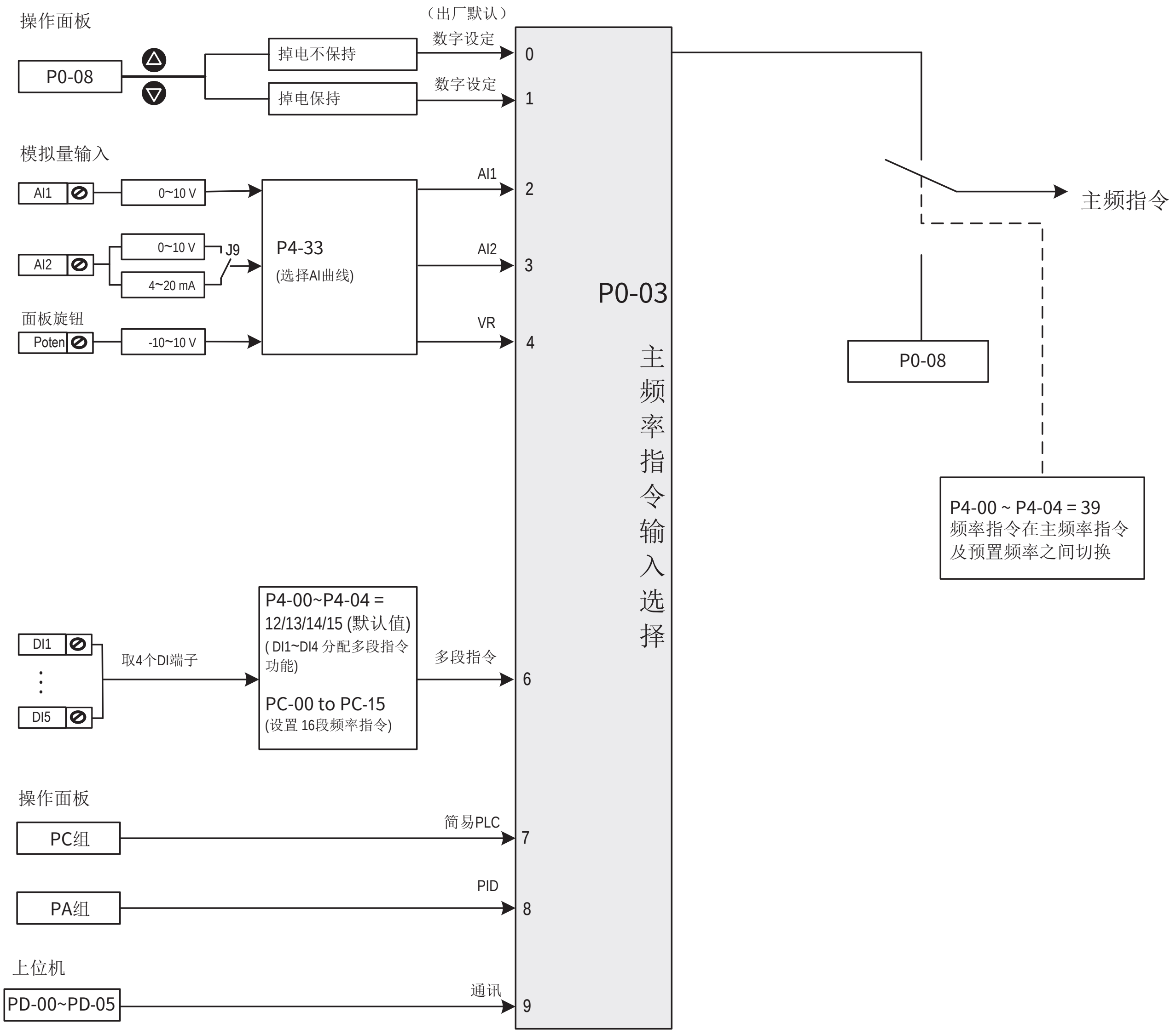


图 6-11 主频率指令选择示意图

参数	功能定义	出厂值	设定范围	参数说明
P0-03	主频率指令输入选择	0	0	数字设定（掉电不记忆）
			1	数字设定（掉电记忆）
			2	AI1
			3	AI2
			4	面板电位器
			5	保留
			6	多段指令
			7	简易 PLC
			8	PID
			9	通讯给定

6.2.2 通过“操作面板”设定主频率（数字设定）

用操作面板设定主频率有两种情况：

- P0-03=0（掉电不记忆），即在变频器停机后或掉电后重新上电，设定频率值恢复为“预置频率”（P0-08）设定值。预置频率（P0-08）的设置方法，通过键盘 △ 键和 ▽ 键（或多功能输入端子的 UP/DOWN ）来修改变频器的设定频率值。

- P0-03=1（掉电记忆），即变频器在掉电后并再次上电时，设定频率为上次掉电时刻的频率设定值。

参数	功能定义	出厂值	设定范围
P0-08	预置频率	50.00Hz	0.00Hz~ 最大频率（P0-10）
P0-10	最大频率	50.00Hz	0.00Hz~500.00HZ

NOTE

- 与参数 P0-23“数字设定频率停机记忆选择”区分，P0-23 用于选择在变频器停机时，频率的修正量是被记忆还是被清零。P0-23 与停机有关，与掉电记忆无关。

- P0-23=0“不记忆”，用面板设置 P0-08“预置频率”，再通过键盘的 △ 键和 ▽ 键或者端子 UP、DOWN 进行频率的修正，变频器停机后，频率的修正值被清零。

- P0-23=1“记忆”，用面板设置了 P0-08“预置频率”，再通过键盘的 △ 键和 ▽ 键或者端子 UP、DOWN 进行频率的修正，变频器停机后，频率的修正值被保留。

例如，P0-28“预置频率”设置为 40Hz，通过键盘的 △ 键将预置频率调整到 45Hz。如果 P0-23 设置为 0（不记忆），变频器停机后的目标频率恢复为 40Hz（P0-08“预置频率”对应的值）；如果 P0-23 设置为 1（记忆），变频器停机后的目标频率仍然为 45Hz。

参数	功能定义	出厂值	设定范围
P0-23	数值设定频率停机记忆选择	0	0：不记忆 1：记忆

6.2.3 通过“模拟量”设定主频率

通过模拟量输入设定主频率，有 AI1、AI2、**面板电位器** 三种 AI 端子可选择。其中，

P0-03=2：AI1 端子输入设定主频率；

P0-03=3：AI2 端子输入设定主频率；

P0-03=4：**面板电位器**。

AI 端子作为频率源的给定，每个 AI 端子可以选择 5 种不同的 AI 曲线。因此先介绍 AI 曲线的设定方法，然后再介绍 AI 端子如何选择相应的 AI 曲线，设置步骤如下：

设置步骤	相关参数	说明	
（步骤 1）AI 曲线设定方法： 设定 AI 电压 / 电流的输入与设定量的对应关系	P4-13 ~ P4-16	曲线 1 设置	常用
	P4-18 ~ P4-21	曲线 2 设置	常用
	P4-23 ~ P4-27	曲线 3 设置	常用
	A6-00 ~ A6-07	曲线 4 设置	
	A6-08 ~ A6-15	曲线 5 设置	
	P4-34	AI 低于最小输入设定选择（AI 作为频率给定时，电压 / 电流输入对应设定的 100.0%，是相对最大频率 P0-10。）	
(步骤 2) AI 端子选择 AI 曲线方法： AI 端子选择曲线及滤波时间设定	P4-33	AI 曲线选择（AI 端子可以选择任何一条 AI 曲线。一般使用默认值 P4-33 = 321，AI1 选择曲线 1，AI2 选择曲线 2， 面板旋钮选择曲线 3。）	
	P4-17、P4-22	AI1 ~ AI2 滤波时间	
（步骤 3）AI 端子作为频率源设定： 根据端子特性选择频率指令的 AI 输入端子	P0-03（主频率指令输 入选择）	P0-03 = 2	选择使用 AI1
		P0-03 = 3	选择使用 AI2，可通过控制板上跳线帽 J9 选择电压输入或电流输入
		P0-03 = 4	选择使用面板旋钮

- AI 曲线设定方法

AI 曲线一共有 5 种，其中曲线 1、曲线 2、曲线 3 均为 2 点式曲线，相关参数为 P4-13~P4-27。而曲线4与曲线5均为4点式曲线，相关参数在A6 组。AI 曲线的设置，实际是设置模拟量输入电压（或模拟量输入电流）与其代表的设定值之间的关系。

AI曲线的设置，实际是设置模拟量输入电压（或模拟量输入电流）与其代表的设定值之间的关系。以 AI 曲线 1 的设置方法为例，相关参数为 P4-13 ~ P4-16，图 6-12 对应 AI 曲线 1 的出厂默认值，详细的参数及说明如下表所示：

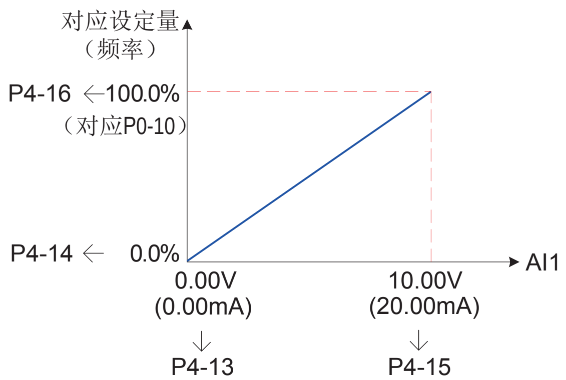


图 6-12 AI 曲线 1 设定

参数	功能定义	出厂值	设定范围	参数说明
P4-13	AI 曲线 1 最小输入	0.00V	0.00V~P4-15	当模拟输入电压小于所设定的“最小输入”（P4-13）时，则根据“AI 低于最小输入设定选择”（P4-34）的设置，以最小输入或者 0.0% 计算。
P4-14	AI 曲线 1 最小输入对应设定	0.0%	-100.00%~100.0%	
P4-15	AI 曲线 1 最大输入	10.00V	P4-13~10.00V	当模拟输入电压大于所设定的“最大输入”（P4-15）时，则模拟量电压以“最大输入”计算。
P4-16	AI 曲线 1 最大输入对应设定	100.0%	-100.00%~100.0%	

NOTE

● AI 作为频率给定时，电压或电流输入对应设定的 100.0%，是指相对“最大频率 P0-10”的百分比。当模拟输入为电流输入时，1mA 电流相当于 0.5V 电压，0~20mA 相当于 0~10V 电压。

● 曲线 2 与曲线 3 的设置方法，与曲线 1 的设置方法相同。曲线 2 的相关参数为 P4-18~P4-21，曲线 3 的相关参数为 P4-23~P4-26。如图 6-13 所示对应 AI 曲线 2 的设定。

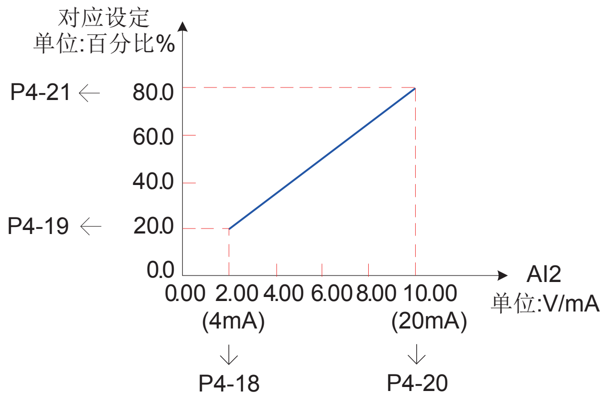


图 6-13 AI 曲线 2 设定

参数	功能定义	出厂值	设定范围	参数说明
P4-18	AI 曲线 2 最小输入	0.00V	0.00V~P4-20	-
P4-19	AI 曲线 2 最小输入对应设定	0.0%	-100.00%~100.0%	-
P4-20	AI 曲线 2 最大输入	10.00V	P4-18~10.00	-
P4-21	AI 曲线 2 最大输入对应设定	100.0%	-100.00%~100.0%	-
P4-23	面板旋钮最小输入	-10V	-10.00V~P4-25	-
P4-24	面板旋钮最小输入对应设定	0.0%	-100.00%~100.0%	-
P4-25	面板旋钮最大输入	10.00V	P4-23~10.00V	-
P4-26	面板旋钮最大输入对应设定	100.0%	-100.00%~100.0%	-

曲线 4 和曲线 5 的功能与曲线 1~ 曲线 3 类似，但是曲线 1~ 曲线 3 为直线，而曲线 4 和曲线 5 为4 点曲线 , 可以实现更为灵活的对应关系。图 6-14 为曲线 4~ 曲线 5 的示意图。

NOTE

● 曲线 4 与曲线 5 设置时，曲线的最小输入电压、拐点 1 电压、拐点 2 电压、最大电压必须依次增大。

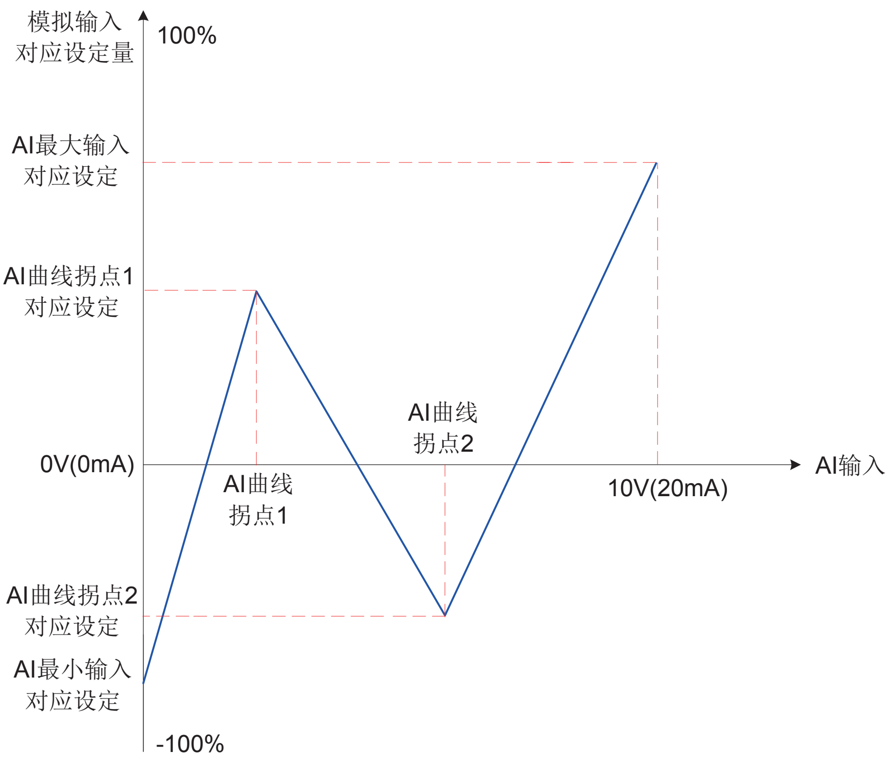


图 6-14 曲线 4 和曲线 5 示意图

参数	功能定义	出厂值	设定范围	参数说明
A6-00	AI 曲线 4 最小输入	0.00V	-10.00V~A6-02	-
A6-01	AI 曲线 4 最小输入对应设定	0.0%	-100.00%~100.0%	-
A6-02	AI 曲线 4 拐点 1 输入	3.00V	A6-00~A6-04	-
A6-03	AI 曲线 4 拐点 1 输入对应设定	30.0%	-100.0%~100.0%	-
A6-04	AI 曲线 4 拐点 2 输入	6.00V	A6-02~A6-06	-
A6-05	AI 曲线 4 拐点 2 输入对应设定	60.0%	-100.0%~100.0%	-
A6-06	AI 曲线 4 最大输入	10.00V	A6-04~10.00V	-
A6-07	AI 曲线 4 最大输入对应设定	100.0%	-100.0%~100.0%	-
A6-08	AI 曲线 5 最小输入	-10.00V	-10.00V~A6-10	-
A6-09	AI 曲线 5 最小输入对应设定	-100.0%	-100.0%~100.0%	-
A6-10	AI 曲线 5 拐点 1 输入	-3.00V	A6-08~A6-12	-
A6-11	AI 曲线 5 拐点 1 输入对应设定	-30.0%	-100.0%~100.0%	-
A6-12	AI 曲线 5 拐点 2 输入	3.00V	A6-10~A6-14	-
A6-13	AI 曲线 5 拐点 2 输入对应设定	30.0%	100.0%~100.0%	-
A6-14	AI 曲线 5 最大输入	10.00V	A6-12~10.00V	-
A6-15	AI 曲线 5 最大输入对应设定	100.0%	-100.0%~100.0%	-

- AI 端子选择 AI 曲线的方法

模拟量输入端子 AI1、AI2、对应的设定曲线，是由参数 P4-33 的个位、十位、分别选择的，3 个模拟量输入端子可以分别选择 5 种曲线中的任意一个。

参数	功能定义	出厂值	设定范围	参数说明
P4-33	AI 曲线选择	321	个位：AI1 曲线选择 1：曲线1（2点，见 P4-13~P4-16） 2：曲线2（2点，见 P4-18~P4-21） 3：曲线3（2点，见 P4-23~P4-26） 4：曲线4（4点，见 A6-00~A6-07） 5：曲线5（4点，见 A6-08~A6-15） 十位：AI2 曲线选择（1~5，同上） 百位：keep	P4-33=321， 则表示 AI1端子选择了曲线 1, AI2端子选择了曲线 2,
P4-17	AI1 滤波时间	0.10s	0.00s~10.00s	设置 AI 输入端子的软件滤波时间
P4-22	AI2 滤波时间	0.10s	0.00s~10.00s	
P4-27	keep	-	-	

AI 输入滤波时间越大，抗干扰能力越强，但调节响应变慢；滤波时间越小，调节响应越快，但抗干扰能力变弱。当现场模拟量容易被干扰时，需加大滤波时间，以使检测的模拟量趋于稳定，但是滤波时间越大则对模拟量检测的响应速度变慢，如何设置需要根据实际应用情况权衡。

- AI 端子作为主频率的设定方法

YD280 控制板提供 2 个模拟量输入端子 AI1 和 AI2。

AI1端子为0~10V的电压型输入，AI2端子可以是0~10V的电压型输入，或者是0mA~20mA 电流输入，可通过控制板上 J9 跳线选择(具体操作方法可参照“第三章 安装与接线”)。下面分别介绍每个 AI 端子作为主频率的设定方法。

例如，AI1 端子选择了曲线 1（P4-33 个位设置为 1），AI1 电压型输入端子作为频率源时，需要达到 2V~10V 对应 10 Hz~40Hz，参数设定方法如图：

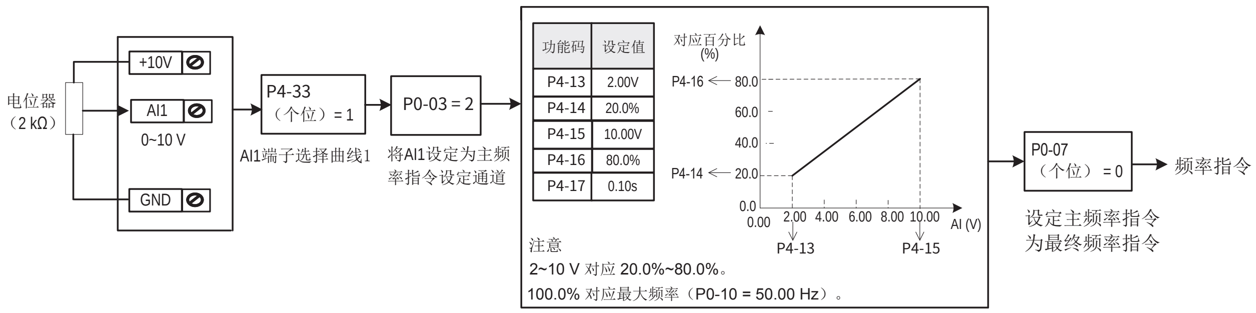


图 6-15 AI1 电压型输入给定主频率参数设置

AI2 端子可以作为模拟电压输入（0V~10V）也可作为模拟电流输入（0mA~20mA）。

当 AI2 通道为模拟电流输入时，如果输入电流为 0mA ~ 20mA，则对应输入电压 0V ~ 10V。如果输入电流为 4mA ~ 20mA，则 4mA 对应于 2V，20mA 对应于 10V。

例如，AI2 端子选择了曲线 2（P4-3 十位设置为 2），AI2 电流型输入端子作为频率源时，需要达到 4mA~20mA 对应 0 Hz~50Hz，参数设定方法如图：

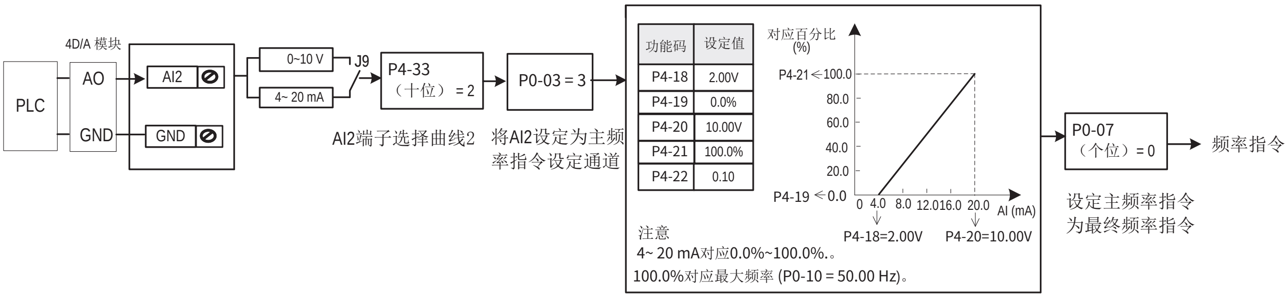


图 6-16 AI2 电流输入给定主频率参数设置

6.2.5 通过“多段指令”设定主频率

设定参数 P0-03=6，选择了多段指令作为主频率。适合不需要连续调整变频器运行频率，只需使用若干个频率值的应用场合。

YD280 最多可以设定 16 段运行频率，可用 4 个 DI 端子输入信号的组合来选择。也允许少于 4 个DI 端子进行多段频率给定的情况，对于缺少的设置位，一直按状态 0 计算。

多段速的段数与DI端子数的对应关系：

2 段速： 1 个 DI 端子 K1；
3-4 段速：2 个 DI 端子 K1、K2 ；
5-8 段速：3 个 DI 端子 K1、K2、K3；
9-16 段速：4 个 DI 端子 K1、K2、K3、K4。

所需的多段频率 通过 PC 的多段频率表来设定，参数如下：

参数	功能定义	出厂值	设定范围	参数说明
PC-00	多段指令 0	0.0%	-100.0%~100.0%	多段指令的量纲为相对值，是相对最大频率的百分比。 参数的正负决定了运行方向，若为负值则表示变频器反方向运行。 加减速时间分别默认为 P0-17，P0-18。
PC-01	多段指令 1	0.0%	-100.0%~100.0%	
PC-02	多段指令 2	0.0%	-100.0%~100.0%	
PC-03	多段指令 3	0.0%	-100.0%~100.0%	
PC-04	多段指令 4	0.0%	-100.0%~100.0%	
PC-05	多段指令 5	0.0%	-100.0%~100.0%	
PC-06	多段指令 6	0.0%	-100.0%~100.0%	
PC-07	多段指令 7	0.0%	-100.0%~100.0%	
PC-08	多段指令 8	0.0%	-100.0%~100.0%	
PC-09	多段指令 9	0.0%	-100.0%~100.0%	
PC-10	多段指令 10	0.0%	-100.0%~100.0%	
PC-11	多段指令 11	0.0%	-100.0%~100.0%	
PC-12	多段指令 12	0.0%	-100.0%~100.0%	
PC-13	多段指令 13	0.0%	-100.0%~100.0%	
PC-14	多段指令 14	0.0%	-100.0%~100.0%	
PC-15	多段指令 15	0.0%	-100.0%~100.0%	
PC-51	多段指令 0 给定方式	0	0~6	0：参数 PC-00 给定 1：AI1 2：AI2 3：面板旋钮 4：保留 5：PID 6：预置频率（P0-08）给定，UP/DOWN 可修改

主频率指令为多段指令时，要将 DI 端子功能选择设置为 12~15 的功能值，即指定了多段频率指令输入端子。

参数	名称	设定值	功能描述
P4-01	DI2 端子功能选择	12	多段指令端子 1
P4-02	DI3 端子功能选择	13	多段指令端子 2
P4-03	DI4 端子功能选择	14	多段指令端子 3
P4-04	DI5 端子功能选择	15	多段指令端子 4

下图中，选择了DI2、DI3、DI4、DI5作为多段频率指定的信号输入端，并由之依次组成4位二进制数，按状态组合值，选择多段频率。当 (DI2、DI3、DI4、DI5)=(0、0、1、0) 时，形成的状态组合数为2，就会选择 PC-02 参数所设定的频率值（挑选的方法详见表 6-1）。

由（PC-02）*（P0-10）自动计算得到目标运行频率。详细设定情况如下图所示：

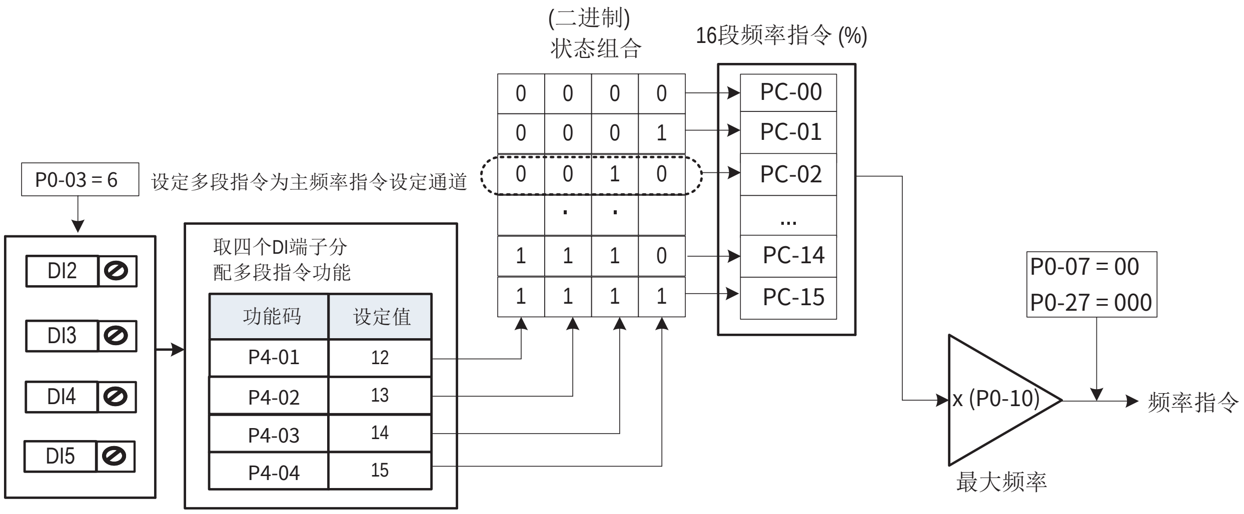


图 6-19 多段速模式的设置

4 个多段指令端子，可以组合为 16 种状态，这 16 各状态对应 16 个指令设定值。具体如表下表所示:

表 6-1 多段指令功能说明

K4	K3	K2	K1	指令设定	对应参数
OFF	OFF	OFF	OFF	多段指令 0	PC-00（PC-51=0）
OFF	OFF	OFF	ON	多段指令 1	PC-01
OFF	OFF	ON	OFF	多段指令 2	PC-02
OFF	OFF	ON	ON	多段指令 3	PC-03
OFF	ON	OFF	OFF	多段指令 4	PC-04
OFF	ON	OFF	ON	多段指令 5	PC-05
OFF	ON	ON	OFF	多段指令 6	PC-06
OFF	ON	ON	ON	多段指令 7	PC-07
ON	OFF	OFF	OFF	多段指令 8	PC-08
ON	OFF	OFF	ON	多段指令 9	PC-09
ON	OFF	ON	OFF	多段指令 10	PC-10
ON	OFF	ON	ON	多段指令 11	PC-11
ON	ON	OFF	OFF	多段指令 12	PC-12
ON	ON	OFF	ON	多段指令 13	PC-13
ON	ON	ON	OFF	多段指令 14	PC-14
ON	ON	ON	ON	多段指令 15	PC-15

NOTE

- 多段指令除了可以作为主频率指令之外，多指令还可作为 V/F 分离的电压源（详见“6.5.1 V/F 曲线的设定”P3-13 详细说明）、作为过程 PID 的设定源（详见“6.2.1 选择主频率指令的输入方法”PA-00 详细说明）。

6.2.6 通过“简易 PLC”设定主频率

设定参数 P0-03=7，选择了简易 PLC 作为主频率。
简易 PLC 作为主频率时，需要设置参数 PC-00~PC-15（设置方法详见 6.2.5 小节），PC-18~PC-49设置每一段的运行时间和加减速时间。参数详见下表：

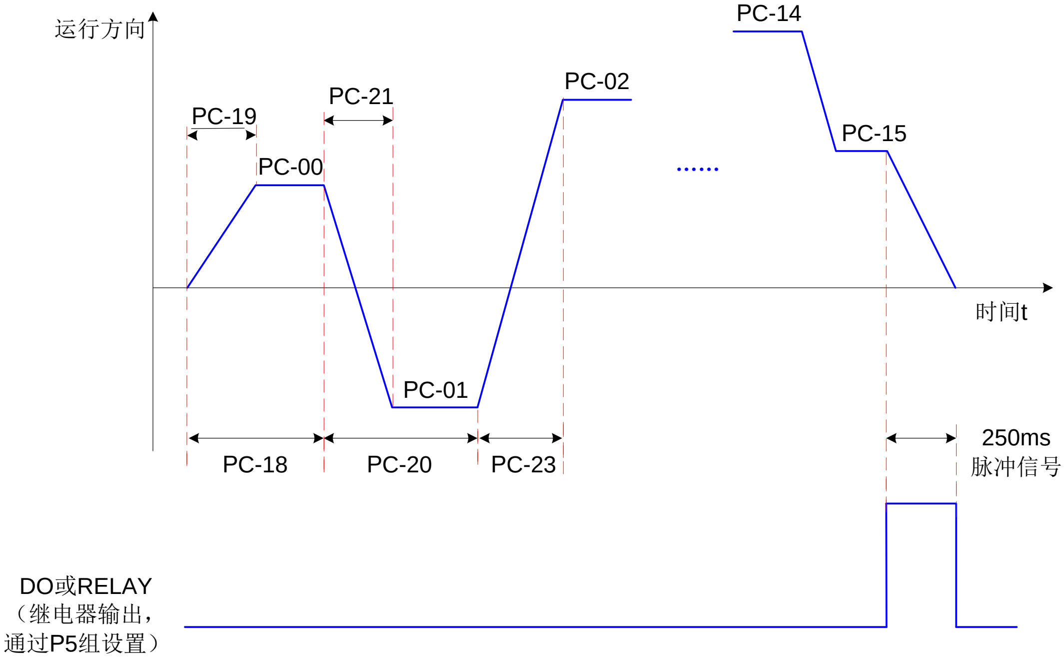


图 6-20 简易 PLC 作为主频率示意图

参数	功能定义	出厂值	设定范围	参数说明
PC-18	简易 PLC 第 0 段运行时间	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-19	简易 PLC 第 0 段加减速时间选择	0	0~3	-
PC-20	简易 PLC 第 1 段运行时间	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-21	简易 PLC 第 1 段加减速时间选择	0	0~3	-
PC-22	简易 PLC 第 2 段运行时间	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-23	简易 PLC 第 2 段加减速时间选择	0	0~3	-
PC-24	简易 PLC 第 3 段运行时间	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-25	简易 PLC 第 3 段加减速时间选择	0	0~3	-
PC-26	简易 PLC 第 4 段运行时间	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-27	简易 PLC 第 4 段加减速时间选择	0	0~3	-
PC-28	简易 PLC 第 5 段运行时间	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-29	简易 PLC 第 5 段加减速时间选择	0	0~3	-
PC-30	简易 PLC 第 6 段运行时间	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-31	简易 PLC 第 6 段加减速时间选择	0	0~3	-
PC-32	简易 PLC 第 7 段运行时间	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-33	简易 PLC 第 7 段加减速时间选择	0	0~3	-
PC-34	简易 PLC 第 8 段运行时间	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-35	简易 PLC 第 8 段加减速时间选择	0	0~3	-

参数	功能定义	出厂值	设定范围	参数说明
PC-36	简易 PLC 第 9 段运行时间	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-37	简易 PLC 第 9 段加减速时间选择	0	0~3	-
PC-38	简易 PLC 第 10 段运行时间	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-39	简易 PLC 第 10 段加减速时间选择	0	0~3	-
PC-40	简易 PLC 第 11 段运行时间	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-41	简易 PLC 第 11 段加减速时间选择	0	0~3	-
PC-42	简易 PLC 第 12 段运行时间	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-43	简易 PLC 第 12 段加减速时间选择	0	0~3	-
PC-44	简易 PLC 第 13 段运行时间	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-45	简易 PLC 第 13 段加减速时间选择	0	0~3	-
PC-46	简易 PLC 第 14 段运行时间	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-47	简易 PLC 第 14 段加减速时间选择	0	0~3	-
PC-48	简易 PLC 第 15 段运行时间	0.0s(h)	0.0s(h)~6500.0s(h)	-
PC-49	简易 PLC 第 15 段加减速时间选择	0	0~3	-
PC-50	简易 PLC 运行时间单位	0	0：s（秒）；1：h（小时）	-

简易 PLC 作为主频率时，通过设置 PC-16 来选择简易 PLC 的运行方式，通过设置 PC-17 来选择在掉电或者停机之后，是否记忆掉电前 PLC 的运行阶段及运行频率。详细参数如下：

参数	功能定义	出厂值	设定范围	参数说明
PC-16	简易 PLC 运行方式	0	0：单次运行结束停机	变频器完成一个单循环后自动停机，需要再次给出运行命令才能启动。
			1：单次运行结束保持终值	变频器完成一个单循环后自动保持最后一段的运行频率和方向，停机重新启动后，从 PLC 初始状态开始运行。
			2：一直循环	变频器完成一个循环后自动开始进行下一个循环，直到有停机命令时才停机。
PC-17	简易 PLC 掉电记忆选择	00	个位：掉电记忆选择 0：掉电不记忆 1：掉电记忆	每次上电都重新开始 PLC 过程。
				记忆掉电前 PLC 的运行阶段及运行频率，下次上电时从记忆阶段继续运行
			十位：停机记忆选择 0：停机不记忆 1：停机记忆	每次启动都重新开始 PLC 过程。
				停机时记录前一次 PLC 的运行阶段及运行频率，下次运行时从记忆阶段继续运行。
PC-50	简易 PLC 运行时间单位	0	0：s（秒）；1：h（小时）	设定 PLC 运行的时间单位。
PC-51	多段指令 0 给定方式	0	0：参数 PC-00 给定 1：AI1 2：AI2 3：面板旋钮 4：保留 5：PID 6：预置频率（P0-08）给定，UP/DOWN 可修改	-

<补充>简易 PLC 功能除了作为主频率之外，还可以作为 V/F 分离的电压源。（详见“6.5.1 V/F 曲线的设定”F3-13 详细说明 "）

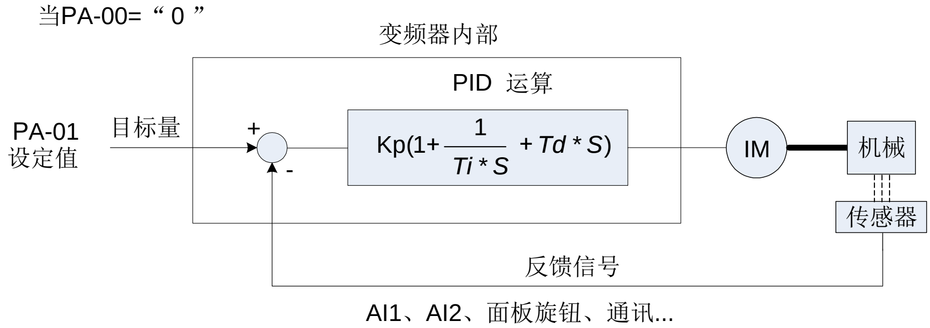
6.2.7 通过“PID”设定主频率

设定参数 P0-03=8，选择了 PID 作为主频率。

PID 控制是过程控制的一种常用方法，通过对被控量的反馈信号与目标信号的差量进行比例、积分、微分运算，通过调整变频器的输出频率，构成闭环系统，使被控量稳定在目标值。 选择 PID 控制的输出作为运行频率，一般用于现场的工艺闭环控制，例如恒压力闭环控制、恒张力闭环控制等场合。

- 比例增益 Kp：PID 的输出与输入的偏差一旦产生，PID 会调节控制输出，使被控量朝着减小偏差的方向变化，偏差减小的速度取决于比例系数 Kp，Kp 越大偏差减小的越快，但是很容易引起振荡，尤其是在迟滞环节比较大的情况下，Kp 减小，发生振荡的可能性减小但是调节速度变慢。（比例增益为 100.0 表示当 PID 反馈量和给定量的偏差为 100.0% 时，PID 调节器对输出频率指令的调节幅度为最大频率。）
- 积分时间 Ti：决定 PID 调节器积分调节的强度。积分时间越短调节强度越大。（积分时间是指当 PID 反馈量和给定量的偏差为 100.0% 时，积分调节器经过该时间连续调整，调整量达到最大频率。）
- 微分时间 Td：决定 PID 调节器对偏差变化率调节的强度。微分时间越长调节强度越大。（微分时间是指当反馈量在该时间内变化 100.0%，微分调节器的调整量为最大频率。）

当PA-00=“ 0 ”



当PA-00=“1/2/3/4/5/6”

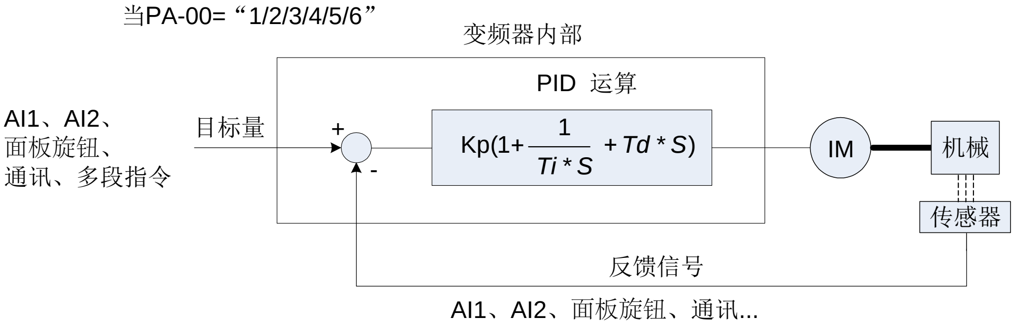


图 6-21 过程 PID 控制原理框图

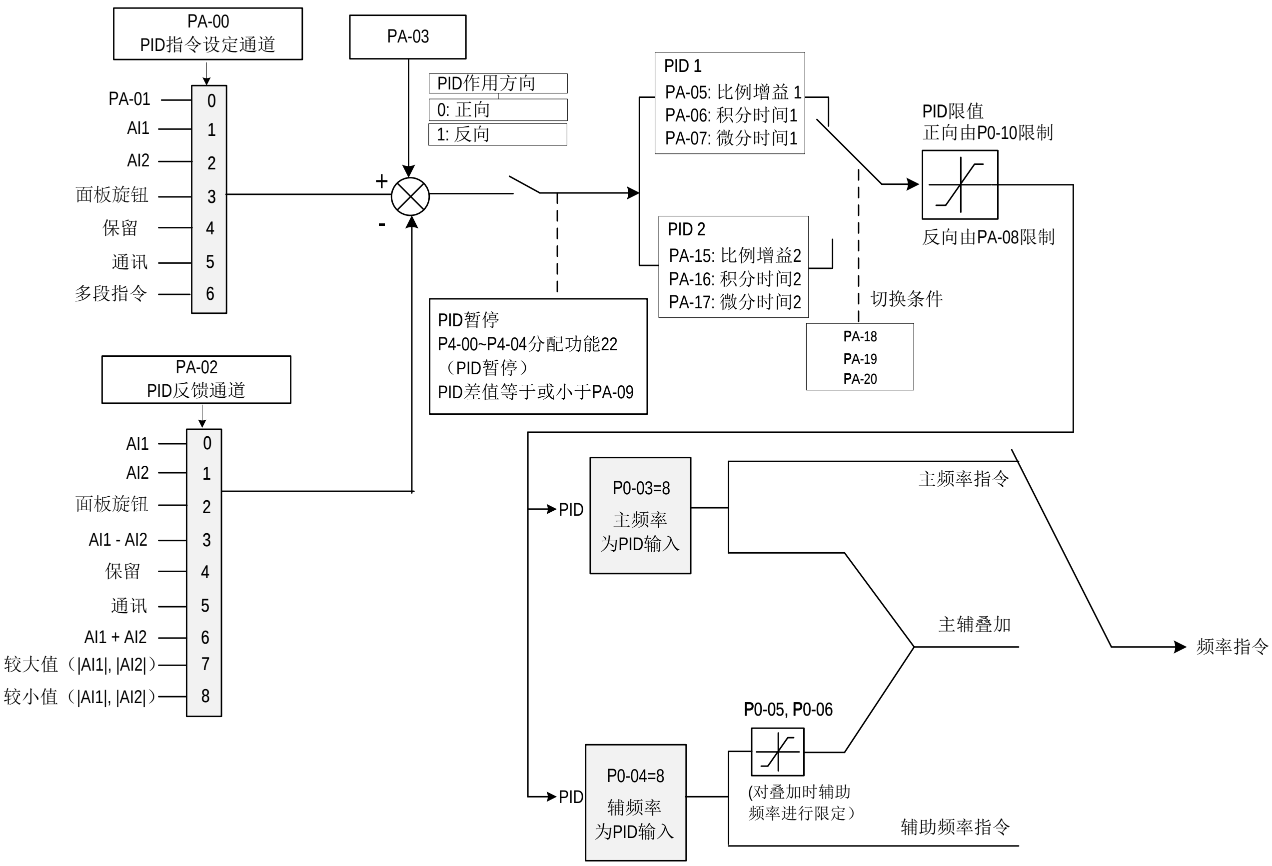


图 6-22 过程 PID 控制参数设置框图

参数	功能定义	出厂值	设定范围	参数说明
PA-00	PID 给定源	0	0：PA-01 1：AI1 2：AI2 3：面板电位器 4：保留 5：通讯 6：多段指令	用于选择 PID 的目标量给定通道。PID 的设定目标量为相对值，设定的 100% 对应于被控系统的反馈信号的 100%。注意：PA-00 选择 6(多段速) 时，PC-51（多段指令 0 给定方式）不能选择 5（PID 给定）。
PA-01	PID 数值给定	50.0%	0.0%~100.0%	当 PA-00 设定为 0 时，需设定此参数。此参数 100% 对应反馈量的最大值
PA-02	PID 反馈源	0	0：AI1 1：AI2 2：面板电位器 3：AI1 - AI2 4：保留 5：通讯 6：AI1 + AI2 7：MAX(|AI1|,|AI2|) 8：MIN (|AI1|,|AI2|)	用于选择 PID 的反馈通道
PA-03	PID 作用方向	0	0：正作用	如果反馈信号小于 PID 的给定信号，变频器输出频率上升。
			1：反作用	如果反馈信号小于 PID 的给定信号，变频器输出频率下降。
PA-04	PID 给定反馈量程	1000	0~65535	无量纲单位，仅用于当前显示 PID 给定和反馈量。例如：该参数值设定为 1000，PID 给定（0%~100%）和反馈量（0~1000）线性对应。

参数	功能定义	出厂值	设定范围	参数说明
PA-05	比例增益 KP1	20.0	0.0~1000.0	大多数系统使用 PI 调节即可
PA-06	积分时间 TI1	2.00s	0.01s~10.00s	
PA-07	微分时间 TD1	0.000s	0.000s~10.000s	
PA-08	PID 反转截止频率	0.00Hz	0.00~ 最大频率	当频率源为纯 PID 时，PID 反向截止频率为当前 PID 输出最小值；当频率源为主 +PID 时，PA-08 对主 +PID 整体进行作用，输出“主 +PID”运算后的频率最小值。
PA-09	PID 偏差极限	0.0%	0.0%~100.0%	有助于兼顾系统输出的精度和稳定度
PA-10	PID 微分限幅	0.10%	0.00%~100.0%	PID 调节器中，微分很容易造成系统振荡，为此，一般把 PID 微分作用限制在一个较小范围，PA-10 是用来设置 PID 微分输出的范围。
PA-11	PID 给定变化时间	0.00s	0.00s~650.00s	指 PID 给定值由 0.0% 变化到 100.0% 所需时间。
PA-12	PID 反馈滤波时间	0.00s	0.00s~60.00s	对 PID 反馈量进行滤波，该滤波有利于降低反馈量被干扰的影响，但是会带来过程闭环系统的响应性能下降。
PA-13	PID 输出滤波时间	0.00s	0.00s~60.00s	对 PID 输出频率进行滤波，该滤波会减弱变频器输出频率的突变，但是会带来过程闭环系统的响应性能下降。
PA-15	比例增益 KP2	20.0	0.0~1000.0	用于两组PID参数切换的，可以通过DI端子切换，也可以根据 PID 的偏差自动切换。 参数 PA-15~PA-17 的设置方式，与参数 PA-05~PA-07 类似。
PA-16	积分时间 TI2	2.00s	0.01s~10.00s	
PA-17	微分时间 TD2	0.000s	0.000s~10.000s	
PA-18	PID 参数切换条件	0	0：不切换	-
			1：通过 DI 端子切换	DI端子功能选择要设置为43（PID参数切换端子），当该 端子无效时选择参数组1（PA-05~PA-07）。 端子有效时选择参数组2（PA-15~PA-17）。
			2：根据偏差自动切换	给定与反馈之间偏差绝对值小于 PID 切换偏差 1（PA-19），PID 选择参数组 1。 给定与反馈之间偏差绝对值大于 PID 切换偏差 2（PA-20），PID 选择参数组 2。 给定与反馈之间偏差处于切换偏差 1 和切换偏差 2 之间时，PID 参数为两组 PID 参数线性插补值，如图 6-23 所示。
			3：根据运行频率自动切换	选择为根据运行频率自动切换时，变频器运行在 0—最大频率之间时，PID 参数为两组 PID 参数线性插补值。
PA-19	PID 参数切换偏差 1	20.0%	0.00~PA-20	此参数 100% 对应给定与反馈的最大偏差值，PA-18=2 时生效。
PA-20	PID 参数切换偏差 2	80.0%	PA-19~100.0%	
PA-21	PID 初值	0.0%	0.0%~100.0%	变频器启动时，PID 输出 PID 初值（PA-21），和PID 初值保持时间后（PA-22），PID 才开始闭环调节运算。图 6-21 为 PID 初值的功能示意图。
PA-22	PID 初值保持时间	0.00s	0.00s~650.00s	-
PA-25	PID 积分属性	00	个位：积分分离 0：无效 1：有效	积分分离无效时，无论多功能数字 DI 是否有效，积分分离都无效。 积分分离有效，当 DI 端子积分暂停（功能 22）有效时，PID 积分停止运算，此时仅 PID 比例和微分作用有效。
			十位：输出到限值后是否停止积分 0：继续积分 1：停止积分	在 PID 运算输出到达最大值或最小值后，可以选择是否停止积分作用。若选停止积分，此时 PID 积分停止计算，有助于降低 PID 的超调量。

参数	功能定义	出厂值	设定范围	参数说明
PA-26	PID 反馈丢失检测值	0.0%	0.0%：不判断反馈丢失；0.1%~100.0%	-
PA-27	PID 反馈丢失检测时间	0.0s	0.0s~20.0s	用来判断 PID 反馈是否丢失。 当 PID 反馈量小于反馈丢失检测值（PA-26），且持续时间超过 PID 反馈丢失检测时间（PA-27）后，变频器故障报警 Err31。
PA-28	PID 停机运算	0	0：停机不运算 1：停机运算	用于选择 PID 停机状态下，PID 是否继续运算。一般应用场合，在停机状态下 PID 应该停止运算。

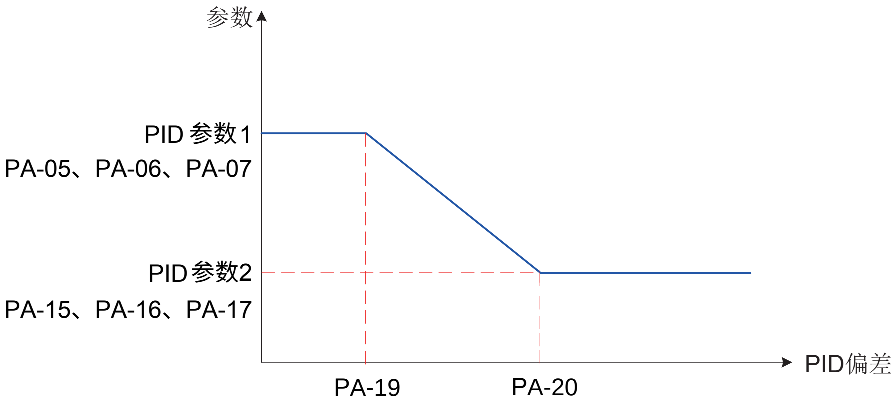


图 6-23 PID 参数切换

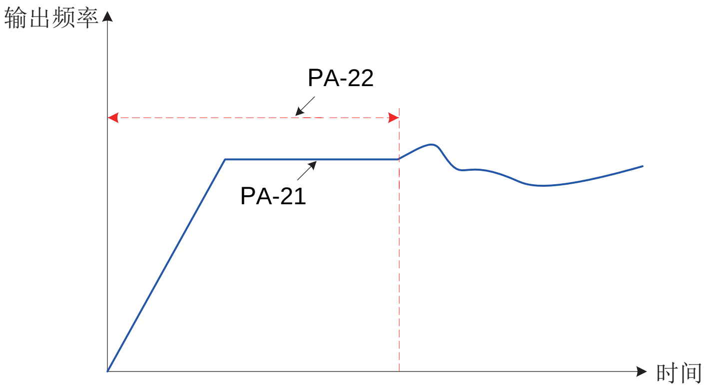


图 6-24 PID 初值功能示意图

NOTE

对于 PID 为主频率时的频率输出的上下限和范围，作如下说明（如：频率源为纯 PID 或为主 +PID）

- 反转截止频率为 0 或者禁止反转时（即如下三种任意一种）

  ① PA-08=0，P8-13=0； ② PA-08=0，P8-13=1； ③ PA-08 ≠ 0，P8-13=1

  输出上限：上限频率

  输出下限：下限频率

  输出范围：下限频率 ~ 上限频率（即 P0-14~P0-12）

- 反转截止频率不为 0 且不禁止反转时 (即 PA-08 ≠ 0，P8-13=0)

  输出上限：上限频率 输出下限：- 反转截止频率

  输出范围：- 反转截止频率 ~ 上限频率（即 -PA-08~P0-12）

6.2.8 通过“通讯”设定主频率

设定参数 P0-03=9，选择了通讯作为主频率。

YD280 支持 1 种上位机通讯方式：Modbus使用通讯时必须安装通讯卡。

参数	功能定义	出厂值	设定范围
P0-28	串口通讯协议选择	0	0：Modbus 协议

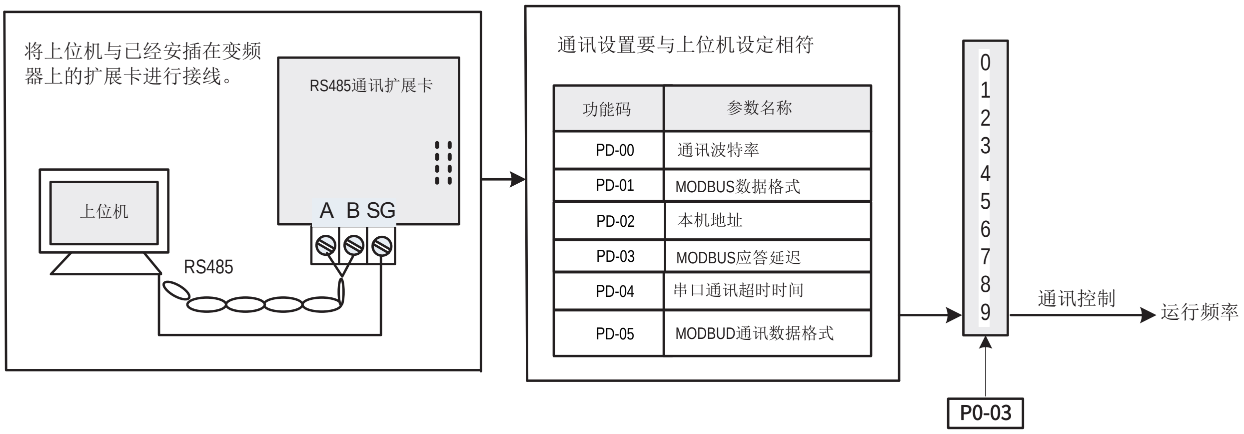


图 6-25 通讯作为主频率相关参数设置

用通讯方式给定频率时，上位机要给变频器发送写命令。下面以 Modobus 协议为例说明用通讯给定主频率的过程。例如，利用通讯给定方式设置频率为 10000 时，发送写命令为 01 06 10 00 27 10 97 36 。每一字节代表的含义如下 , 变频器地址：01H（可以设置），写命令：06H，给定频率的地址 :1000H，目标频率值：2710H（转换为十进制为 10000）；CRC 校验：9736H。同理，利用通讯给定方式设置频率为 -10000 时，发送写命令为 01 06 10 00 D8 F0 D7 4E 。其中，D8F0 为 -10000 转换为十六进制取低四位。

NOTE

- 通讯方式给定频率的范围为 -10000 ~ +10000（十进制），对应的频率范围为 -100.00%~ +100.00% （-100.00% 对应负最大频率，+100.00% 对应最大频率）。假设 P0-10“最大频率”设为 50Hz，如果写命令中写入的频率值 2710H，转换 10 进制为 10000。那么实际写入的频率值为 50*100%=50Hz。

主机命令信息		从机回应信息	
ADDR	01H	ADDR	01H
CMD	06H	CMD	06H
参数地址高位	10H	参数地址高位	10H
参数地址低位	00H	参数地址低位	00H
数据内容高位	27H	数据内容高位	27H
数据内容低位	10H	数据内容低位	10H
CRC 高位	97H	CRC 高位	97H
CRC 低位	36H	CRC 低位	36H

6.2.9 选择辅助频率指令的输入方法

设定参数 P0-04，选择辅频率指令的输入。变频器的辅助频率指令共有 10 种，分别为数字设定(掉电不记忆)、数字设定(掉电记忆)、AI1、AI2、多段指令、简易 PLC、PID、通讯给定、面板电位器。如图所示：

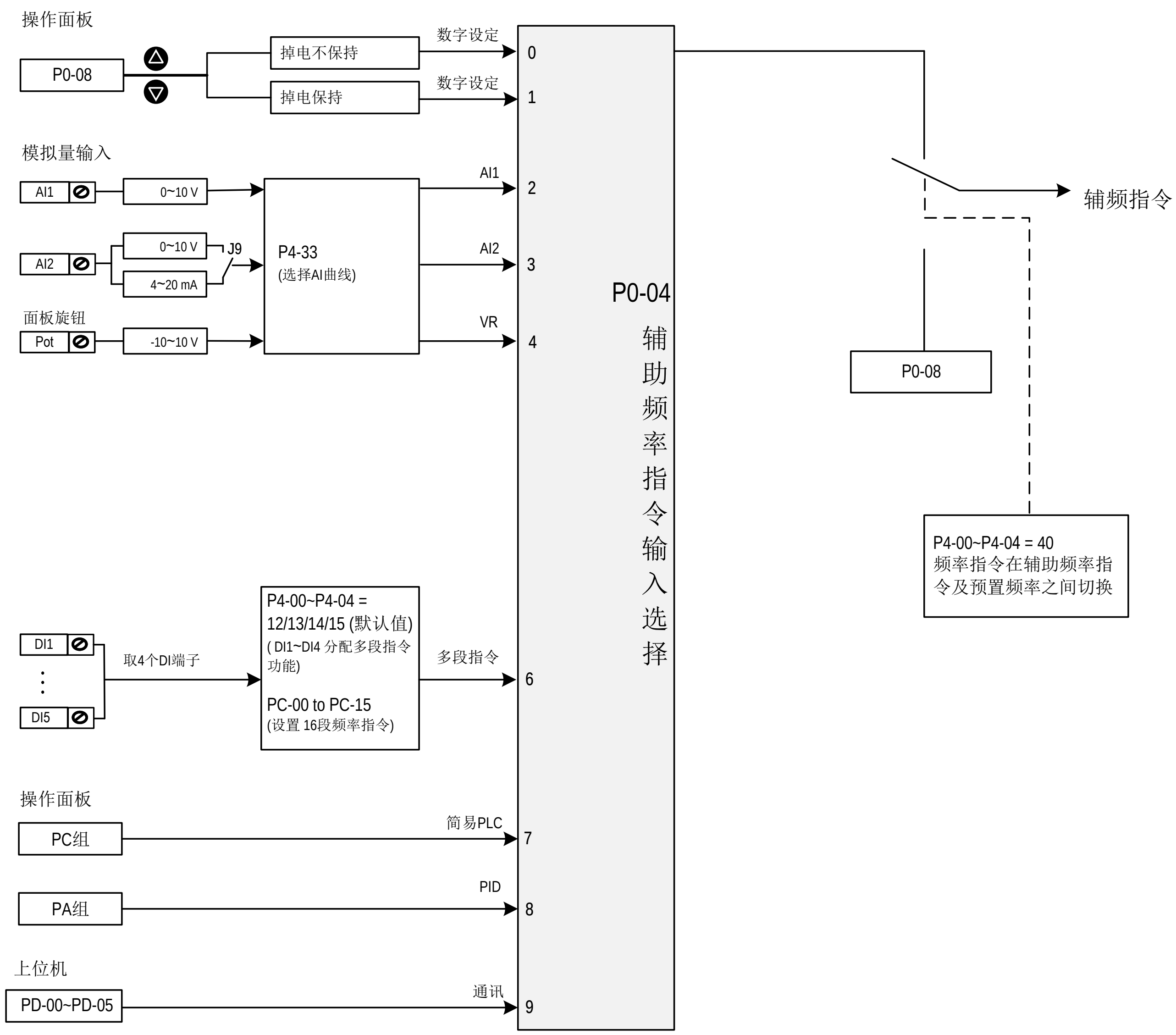


图 6-26 辅助频率给定来源选择示意图

参数	功能定义	出厂值	设定范围	参数说明
P0-04	辅助频率指令输入选择	0	0	操作面板（数字设定，掉电不记忆）
			1	操作面板（数字设定，掉电记忆）
			2	AI1
			3	AI2
			4	面板电位器
			5	保留
			6	多段指令
			7	简易 PLC
			8	PID
			9	通讯给定

辅助频率指令在作为独立的频率给定通道时，其用法与主频率指令相同，使用方法可以参考 6.2.10 小节相关说明。当辅助频率指令用作叠加给定 (即主频率指令和辅助频率指令的复合实现频率给定) 时，其使用方法可以参考 6.2.11 小节相关说明。

6.2.10 选择主、辅频率叠加指令的输入方法

主、辅频率指令叠加选择，即通过主频率指令和辅助频率指令的复合实现频率给定。通过设定参数 P0-07 设定目标频率与主、辅频率指令的关系。共有以下四种关系：

1、主频率指令：主频率指令直接作为目标频率给定

2、辅助频率指令：辅助频率指令直接作为目标频率给定

3、主辅运算：主辅运算有 4 种情况，分别为主频率 + 辅助频率、主频率 - 辅助频率、主频率和辅助频率中较大值、主频率和辅助频率较小值

4、频率切换：上述 3 种频率，通过 DI 端子选择或切换。此时 DI 端子的功能选择要设置为18（频率指令切换）。

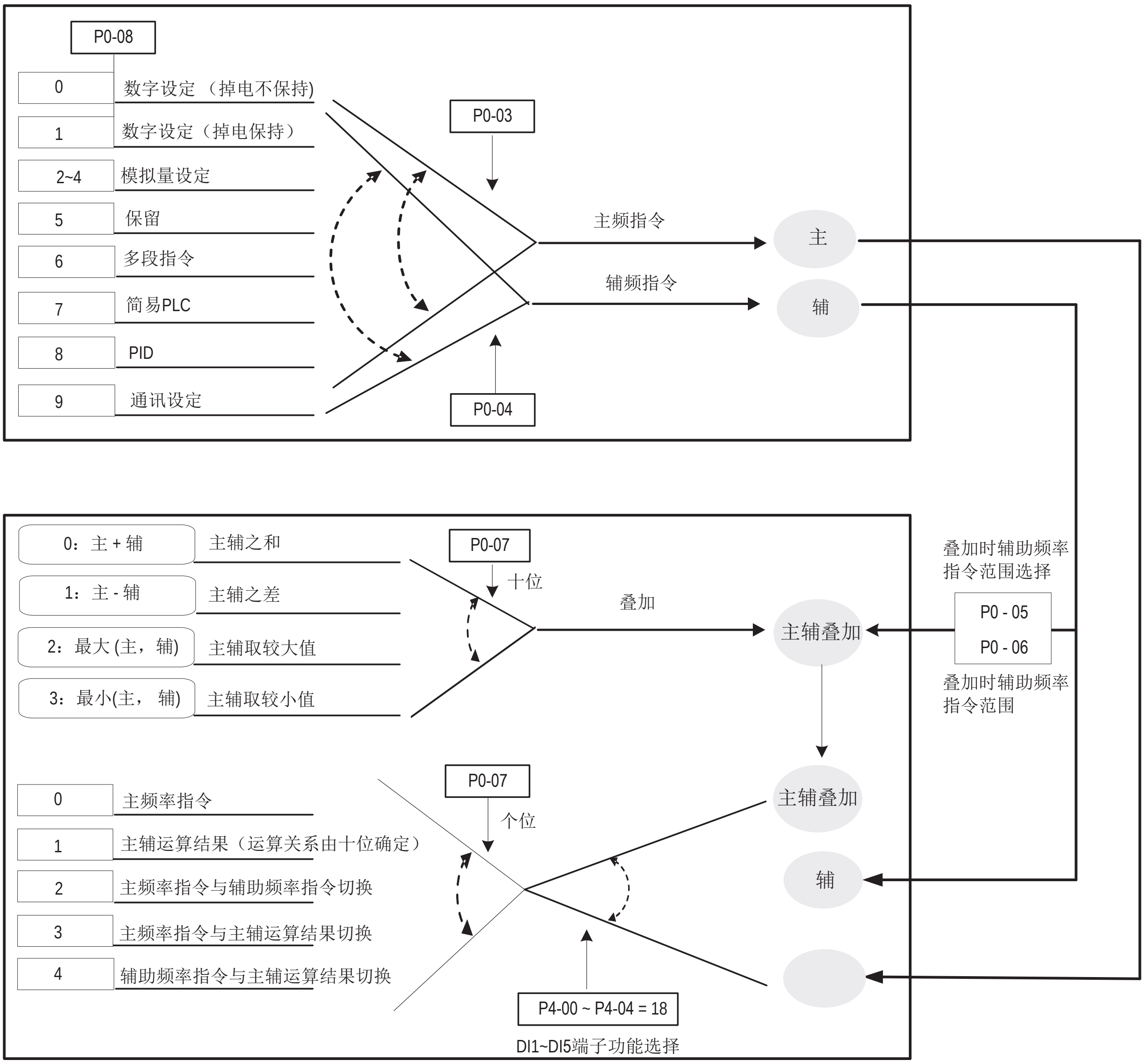


图 6-27 频率指令为主辅助频率指令叠加给定示意图

参数	功能定义	出厂值	设定范围
P0-07	频率指令叠加选择	00	个位：频率指令选择 0：主频率指令 1：主辅运算结果（运算关系由十位确定） 2：主频率指令与辅助频率指令切换 3：主频率指令与主辅运算结果切换 4：辅助频率指令与主辅运算结果切换 十位：频率指令主辅运算关系 0：主 + 辅 1：主 - 辅 2：二者最大值 3：二者最小值
P0-05	叠加时辅助频率指令范围选择	0	0：相对于最大频率 1：相对于主频率指令
P0-06	叠加时辅助频率指令范围	100%	0%~150%

- 当主频率指令和辅助频率指令复合实现频率给定时，需要注意：
- 1、 当辅助频率指令为数字给定时，预置频率（P0-08）不起作用，用户通过键盘 △键和▽键（或多功能输入端的子的 UP、DOWN）进行的频率调整，直接在主给定频率的基础上调整。
- 2、 当辅助频率指令为模拟输入给定（AI1、AI2、Pot）或脉冲输入给定时，输入设定的 100% 对应辅助频率范围，可通过 P0-05 和 P0-06 进行设置。
- 3、辅助频率指令选择与主频率指令选择，不能设置为同一个通道，即 P0-03 与 P0-04 不要设置为相同的值，否则容易引起混乱。

6.2.11 运行指令绑定主频率指令

通过设置 P0-27，变频器的 3 种运行指令可以设定各自的频率指令，如下图所示。运行命令通道与主频率给定通道可以任意捆绑，同步切换。该功能定义了 3 种运行命令通道和 9 种频率给定通道之间的捆绑组合。当指定的命令通道（P0-02）设置了频率绑定通道（P0-27 对应位）后，此时P0-03 均不起作用，而是由 P0-27 指定的频率给定通道确定。

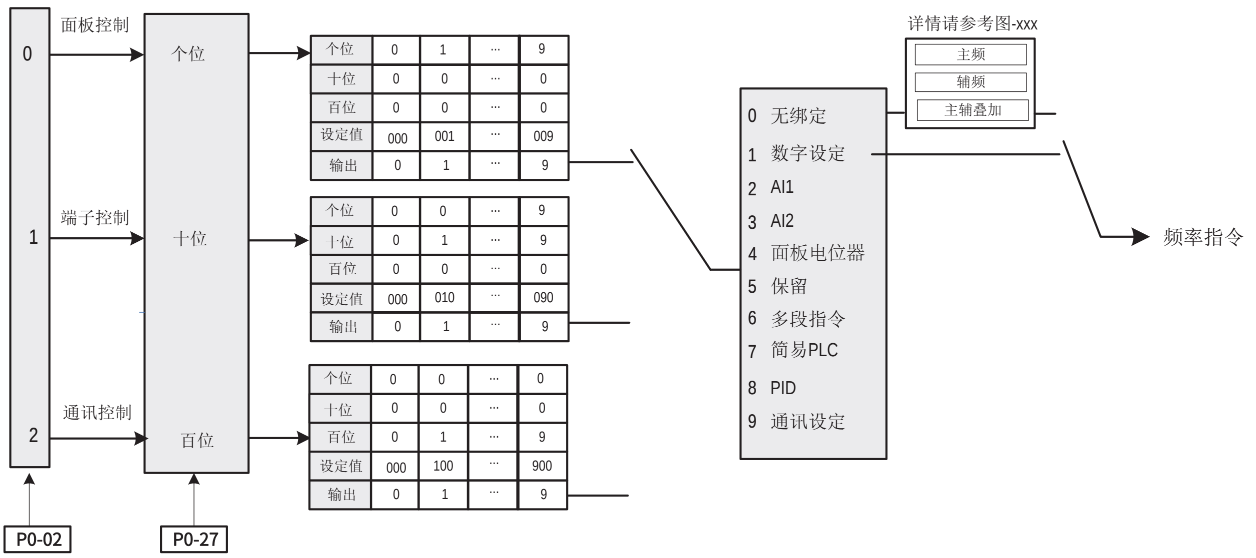


图 6-28 运行指令绑定主频率指令图

参数	功能定义	出厂值	设定范围
P0-27	运行指令捆绑主频率指令选择	000	个位：操作面板绑定频率指令选择 0：无捆绑 1：数字设定 2：AI1 3：AI2 4：面板电位器 5：保留 6：多段速 7：PLC 8：PID 9：通讯设定 十位：端子命令绑定主频率指令选择 百位：通讯命令绑定主频率指令选择

6.2.12 频率指令极限（频率设定）

上限频率：限制最高频率，如果不允许电机在某个频率以上运行；

下限频率：限制最低频率，如果不允许电机在某个频率以下运行；

最大频率：限制最高输出频率；

上限频率选择：用于选择上限频率的给定通道；

上限频率偏置：用于设定上限频率的偏移量。

参数	功能定义	出厂值	设定范围
P0-10	最大频率	50.00 Hz	50.00Hz~500.00Hz
P0-11	上限频率指令选择	0	0：P0-12 设定 1：AI1 2：AI2 3：面板电位器 4：保留 5：通讯给定
P0-12	上限频率	50.00Hz	下限频率（P0-14）~ 最大频率（P0-10）
P0-13	上限频率偏置	0.00Hz	0.00Hz~ 最大频率 P0-10
P0-14	下限频率	0.00Hz	0.00Hz~ 上限频率

6.2.13 低于下限频率动作设定

设定频率低于下限频率运行动作：如果运行频率低于下限频率时，要选择变频器的运行状态，设置参数 P8-14。

零速运行：变频器处于运行状态，输出频率为 0，操作面板 RUN 灯亮。

停机：变频器不运行，操作面板 RUN 灯灭。

参数	功能定义	出厂值	设定范围	参数说明
P8-14	设定频率低于下限频率运行动作	0	0： 以下限频率运行	如果运行频率低于下限频率，则变频器将以下限频率运行
			1： 停机	如果运行频率低于设置的下限频率，则变频器将停机
			2： 零速运行	如果运行频率低于下限频率，则变频器以零速运行

6.3 启停方法

本小节主要介绍变频器的启动和停止方法。

6.3.1 启动方法

变频器有三种启动方法，分别是直接启动、转速跟踪再启动、预励磁启动。设定参数 P6-00 选择变频器的启动方法。

参数	功能定义	出厂值	设定范围	参数说明
P6-00	启动方式	0	0： 直接启动 1： 转速跟踪再启动 2： 预励磁启动 3： SVC 快速启动	如果需要启动正在高速旋转的电机建议使用转速跟踪再启动； 预励磁启动（只能用于交流异步机） 2,3选项 仅 T4
P6-01	转速跟踪方式	0	0: 从停机频率开始 1: 从工频开始 2: 从最大频率开始	-
P6-02	转速跟踪快慢	20	20	-
P6-03	启动频率	0.00Hz	0.00Hz~10.00Hz	给定频率小于启动频率时，变频器不启动，处于待机状态。
P6-04	启动频率保持时间	0.0s	0.0s~ 100.0s	正反转切换过程中，本参数不起作用。 启动频率保持时间不包含在加速时间内，但包含在简易 PLC 的运行时间里。
P6-05	启动直流制动电流 / 预励磁电流	50%	0%~ 100%	直流制动电流越大，制动力越大，100%对应电机额定电流（电流上限为变频器额定电流的 80%）。
P6-06	启动直流制动时间 / 预励磁时间	0.0s	0.0s~ 100.0s	启动直流制动只在启动方式为直接启动时有效。

1） 直接启动

设置参数 P6-00=0，变频器为直接启动，适用于大多数负载，如图 6-29。启动前加“启动频率”适用于电梯、起重等提升类负载场合，如图 6-30。启动前加“直流制动”适用于在启动时电机可能有转动的场合，如图 6-31。

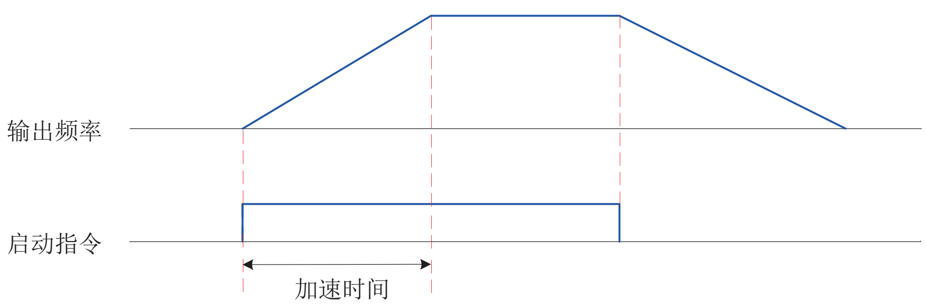


图 6-29 直接启动时序图

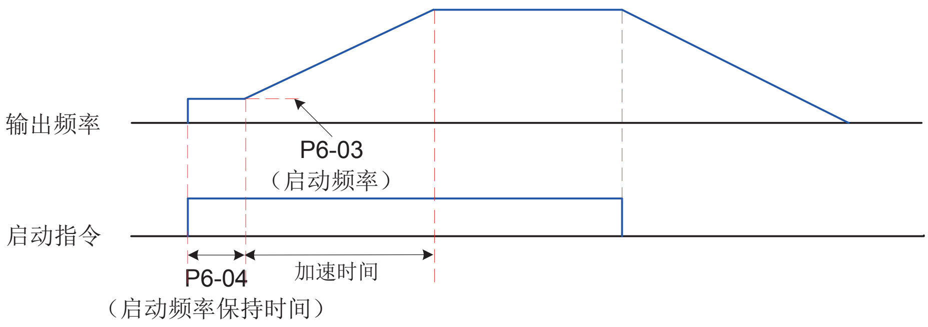


图 6-30 带启动频率的启动时序图

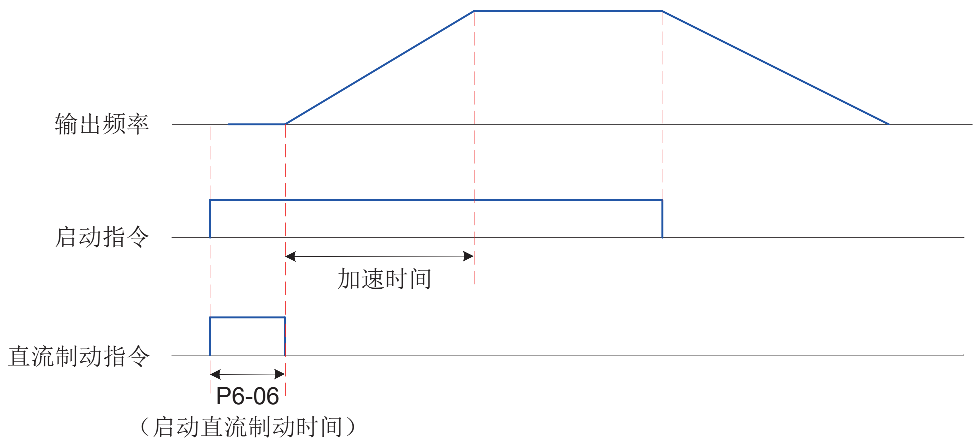


图 6-31 带直流制动的启动时序图

2） 转速跟踪再启动

设定 P6-00=1，变频器为转速跟踪再启动（变频器先对电机的转速和方向进行判断，再以跟踪到的电机频率启动）适用于大惯性机械负载的驱动，若变频器启动运行时，负载电机仍在靠惯性运转，采取转速跟踪再启动，可以避免启动过流的情况发生。该启动方式只在矢量控制模式下有效。启动过程频率曲线如下图：

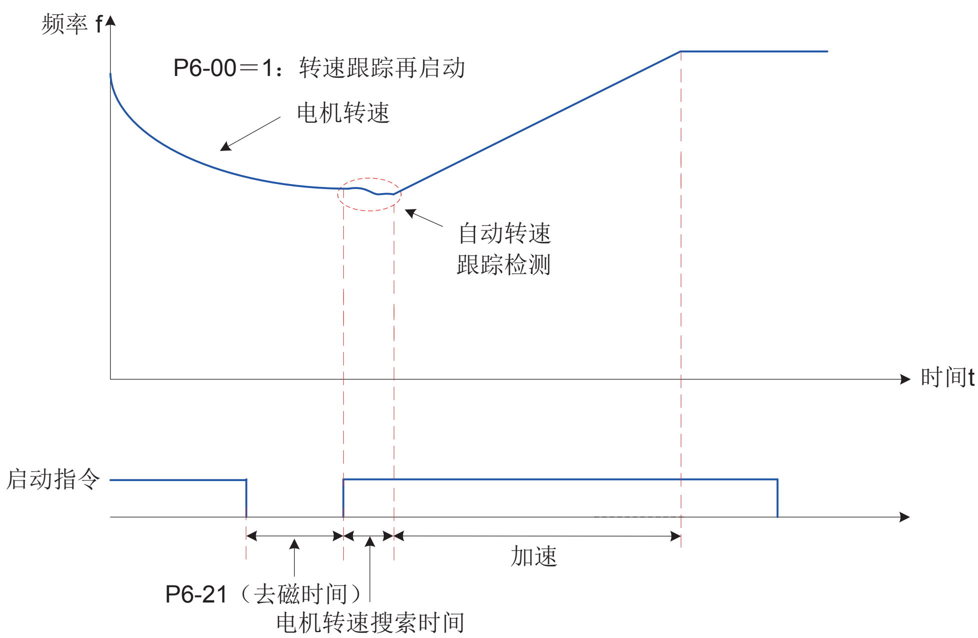


图 6-32 转速跟踪再启动方式

3） 预励磁启动

设定 P6-00=2，变频器为预励磁启动，该方式只适用于异步电机的 SVC 控制模式，启动前对电机进行预励磁，可以提高电机的快速响应和减小启动电流，启动时序与直流制动再启动一致。

4） SVC 快速启动

设定 P6-00=3，该方式只适用于异步机 SVC 控制模式，使用该方式可以缩短加速时间，当系统惯量较大且需要快速启动时可以使能该模式，但会存在力矩冲击。

6.3.2 停止方式

变频器的停止方法有两种，分别是减速停车和自由停车。设定参数 P6-10 选择变频器的停止方法。

参数	功能定义	出厂值	设定范围	参数说明
P6-10	停机方式	0	0：减速停车 1：自由停车	
P6-11	停机直流制动起始频率	0.00Hz	0.00Hz~ 最大频率	减速停机过程中，当运行频率降低到到该频率时，开始直流制动过程。
P6-12	停机直流制动等待时间	0.0s	0.0s~ 100.0s	在运行频率降低到停机直流制动起始频率后，变频器先停止输出一段时间，然后再开始直流制动过程。
P6-13	停机直流制动电流	50%	0%~ 100%	直流制动电流越大，制动力越大，100% 对应电机额定电流（电流上限为变频器额定电流的 80%）
P6-14	停机直流制动时间	0.0s	0.0s~ 100.0s	直流制动时间为 0 时直流制动过程被取消。

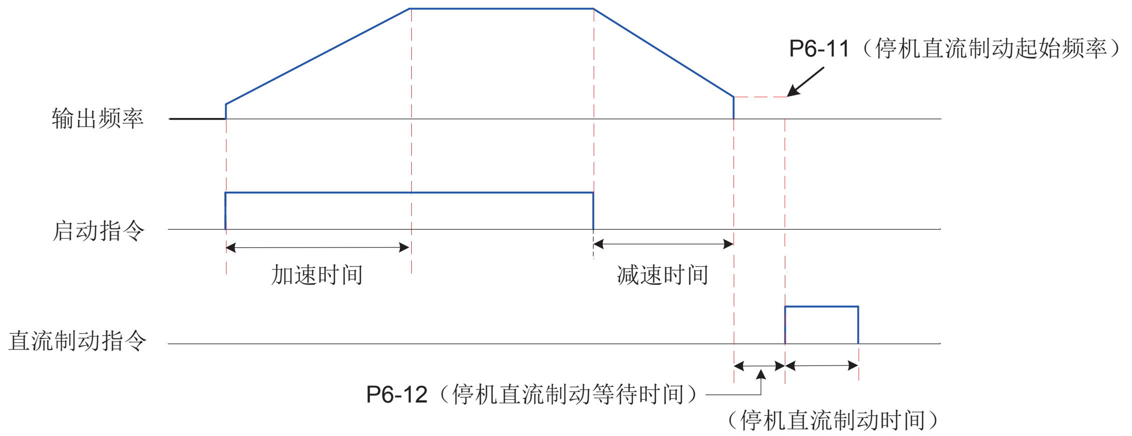


图 6-33 停机直流制动时序图

1） 减速停车

设定 P6-10=0，变频器减速停车。（停机命令有效后，变频器按照减速时间降低输出频率，频率降为 0 后停机。）

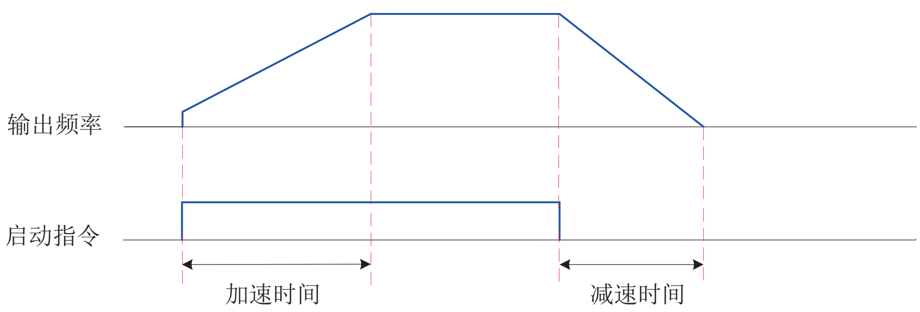


图 6-34 减速停车时序图

2） 自由停车

设定 P6-10=1，变频器为自由停车。（停机命令有效后，变频器立即终止输出，此时电机按照机械惯性自由停车。）

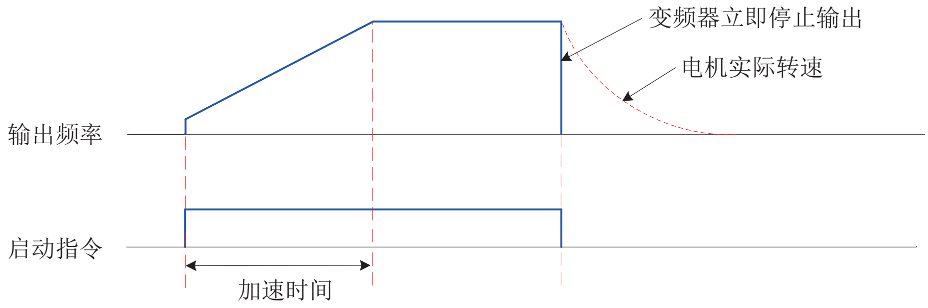


图 6-35 自由停车时序图

6.3.3 加减速时间和曲线设定

加速时间指变频器从零频，加速到加减速基准频率（P0-25）所需时间；减速时间指变频器从“加减速基准频率 (P0-25) 减速到零频所需时间。

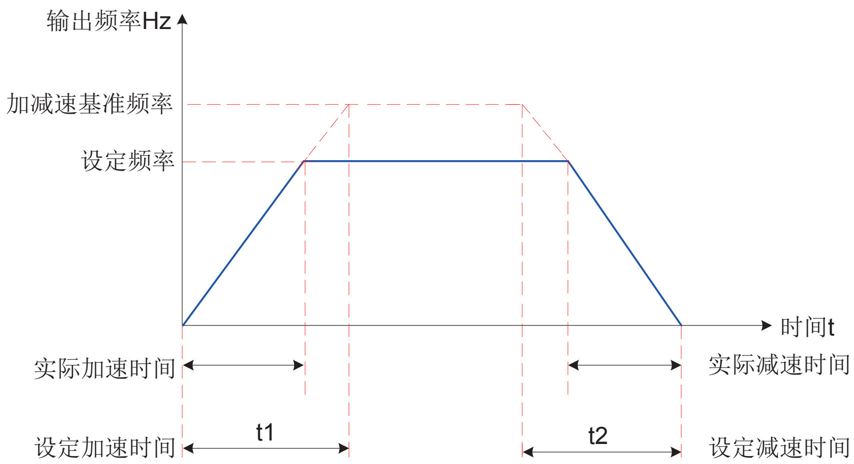


图 6-36 加减速时间示意图

YD280 提供 4 组加减速时间，可利用数字输入端子 DI 切换选择。

DI5 端子状态	DI4 端子状态	对应加减速时间选择
OFF	OFF	第一组：P0-17、P0-18
OFF	ON	第二组：P8-03、P8-04
ON	OFF	第三组：P8-05、P8-06
ON	ON	第四组：P8-07、P8-08

表 6-2 通过 DI 端子选择加减速时间

参数	功能定义	出厂值	设定范围	参数说明
P0-17	加速时间 1	机型确定	0s~65000s	P0-19=0
			0.0s~6500.0s	P0-19=1
			0.00s~650.00s	P0-19=2
P0-18	减速时间 1	机型确定	0s~65000s	P0-19=0
			0.0s~6500.0s	P0-19=1
			0.00s~650.00s	P0-19=2
P8-03	加速时间 2	机型确定	设定范围同 P0-17	-
P8-04	减速时间 2	机型确定	设定范围同 P0-18	-
P8-05	加速时间 3	机型确定	设定范围同 P0-17	-
P8-06	减速时间 3	机型确定	设定范围同 P0-18	-
P8-07	加速时间 4	0.0s	设定范围同 P0-17	-
P8-08	减速时间 4	0.0s	设定范围同 P0-18	-
P0-19	加减速时间单位	1	0：1 秒 1：0.1 秒 2：0.01 秒	修改此参数时，4 组加减速时间所显示小数点位数会变化。
P0-25	加减速时间基准频率	0	0：最大频率 1：设定频率 2：100Hz	-
P6-07	加减速方式	0	0：直线加减速	选择变频器在启、停动过程中频率变化的方式。 0：输出频率按照直线递增或递减。 1、2：在目标频率实时动态变化的情况下，输出频率按照 S 曲线实时递增或递减。适用在舒适感要求较高及实时响应快速的场合。
			1、2：动态 S 曲线加减速	
P6-08	S 曲线开始段时间比例	30.0%	0.0%~（100.0%-P6-09）	参数P6-08 和 P6-09 要 满 足：P6-08 + P6-09 ≤ 100.0%。
P6-09	S 曲线结束段时间比例	30.0%	0.0%~（100.0%-P6-08）	-

6.4 电机调谐

电机调谐：变频器获得被控电机参数的过程。

异步电机调谐的方法有：异步机静止部分参数调谐、异步机动态完整调谐、异步机静止完整调谐。

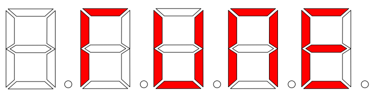
参数	功能定义	出厂值	设定范围	参数说明
P1-37	异步电机调谐选择	0	0：无操作	不调谐
			1：异步机静止部分参数调谐	只辨识部分电机参数定子电阻、转子电阻、漏感
			2：异步机动态完整调谐	辨识所有电机参数
			3：异步机静止完整调谐	辨识所有电机参数

几种调谐方式的调谐效果比较如下表：

调谐方式	适用情况	调谐效果
静止部分参数调谐	电机与负载很难脱离，且不允许动态调谐运行的场合	一般
动态完整调谐	电机与应用系统方便脱离的场合	最佳
静止完整调谐或手动输入电机参数	电机与负载很难脱离，且不允许动态完整调谐运行的场合	较好

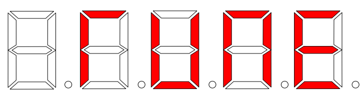
以下用电机 1 的参数（P0-24 设置为 0，电机参数组 1）为例介绍电机调谐的方法。如果要对电机2 进行调谐，首先将 P0-24 设置为 1（电机参数组 2），电机 2 的调谐方法与电机 1 类似，相关参数参考 A2 组。

1） 异步机的静止部分参数调谐方法

步骤	过程
步骤 1	上电后，将变频器运行指令选择为操作面板（P0-02 设置为 0）
步骤 2	准确输入电机的铭牌参数（P1-00~P1-05）
步骤 3	参数 P1-37 设置为 01（异步机静止部分参数调谐），按 ENTER 键确认，键盘显示 
步骤 4	按操作面板上 RUN 键。电机不旋转，但是变频器会使电机通电。运行指示灯亮。当上述显示信息消失，退回正常参数显示状态，表示调谐完成。经过该调谐，异步电机变频器会自动算出 P1-06~ P1-08 的值。

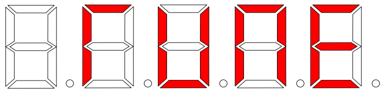
2） 异步机的动态完整调谐方法

使用有恒定输出特性的电机和有高精度用途，请在分离负载状态下，实施动态完整调谐，调谐效果最佳。

步骤	过程
步骤 1	上电后，将变频器运行指令选择为操作面板（P0-02 设置为 0）；
步骤 2	准确输入电机的铭牌参数（P1-00~P1-05）；
步骤 3	参数 P1-37 设置为 02（异步机动态完整调谐），按 ENTER 键确认，键盘显示： 
步骤 4	按操作面板上 RUN 键。变频器会驱动电机加减速、正 / 反转运行，运行指示灯亮，调谐运行持续一段时间。当上述显示信息消失，退回正常参数显示状态，表示调谐完成。 经过该完整调谐，异步机变频器会自动算出 P1-06~ P1-10 的值。

3） 异步机静止完整调谐方法

在无法分离负载的状态下，请使用静止完整调谐。

步骤	过程
步骤 1	上电后，将变频器运行指令选择为操作面板（P0-02 设置为 0）；
步骤 2	准确输入电机的铭牌参数（P1-00~P1-05）；
步骤 3	参数 P1-37 设置为 3（异步机静止完整调谐），按 ENTER 键确认，键盘显示：
步骤 4	按操作面板上 RUN 键。电机不旋转，但是变频器会使电机通电。运行指示灯亮。当上述显示信息消失，退回正常参数显示状态，表示调谐完成。经过该调谐，变频器会自动算出 P1-06~ P1-10 的值。

NOTE

- 电机调谐除了上述的三种方式外，还可以手动输入电机参数。
- 电机调谐可以通过操作面板给运行指令外，还可以通过通讯指令进行电机调谐。通过设置 P0-02 选择运行指令。

参数	功能定义	出厂值	设定范围	参数说明
P1-00	电机类型选择	0	0	普通异步电机
			1	变频异步电机
P1-01	电机额定功率	机型确定	0.1kW~1000.0kW	P1-00~P1-05 为电机铭牌参数。 在采用 V/F、SVC 控制时，为了获得更好的控制性能，需要进行电机参数调谐，而调谐结果的准确性，与正确设置电机铭牌参数密切相关。
P1-02	电机额定电压	机型确定	1V~2000V	
P1-03	电机额定电流	机型确定	0.01A~655.35A	
P1-04	电机额定频率	机型确定	0.01Hz~ 最大频率	
P1-05	电机额定转速	机型确定	1rpm~65535rpm	
P1-06	异步电机定子电阻	机型确定	0.001Ω~65.535Ω	P1-06~P1-10 是异步电机的参数，可通过电机调谐获得。其中，异步机静止部分参数调谐只能获得 P1-06~P1-08 三个参数，异步机动态完整调谐可以获得P1-06~P1-10 若现场不对电机调谐，可以根据电机厂家提供的参数，输入上述相应参数。
P1-07	异步电机转子电阻	机型确定	0.001Ω~65.535Ω	
P1-08	异步电机漏感抗	机型确定	0.01mH~655.35mH	
P1-09	异步电机互感抗	机型确定	0.1mH~6553.5mH	
P1-10	异步电机空载电流	机型确定	0.01A~P1-03	

6.5.1 V/F 曲线的设定

1） 直线型 V/F、多点 V/F 设定

参数	功能定义	出厂值	设定范围	参数说明
P3-00	V/F 曲线设定	0	0：直线 V/F 1：多点 V/F 2~9：直线 V/F （仅T4) 2：平方 V/F （仅T2S) 3：1.2 次方 V/F（仅T2S) 4：1.4 次方 V/F（仅T2S) 6：1.6 次方 V/F （仅T2S) 8：1.8 次方 V/F （仅T2S) 9：保留 10：V/F 完全分离模式 11：V/F 半分离模式	
P3-01	转矩提升	机型确定	0.0%~30.0%	-
P3-02	转矩提升截止频率	50.00Hz	0.00Hz~ 最大频率	-
P3-03	多点 V/F 频率点 1	0.00Hz	0.00Hz~P3-05	-
P3-04	多点 V/F 电压点 1	0.0%	0.0%~100.0%	
P3-05	多点 V/F 频率点 2	0.00Hz	P3-03~P3-07	
P3-06	多点 V/F 电压点 2	0.0%	0.0%~100.0%	
P3-07	多点 V/F 频率点 3	0.00Hz	P3-05~ 电机额定频率 (P1-04)	
P3-08	多点 V/F 电压点 3	0.0%	0.0%~100.0%	

● 通用恒转矩直线 V/F 曲线

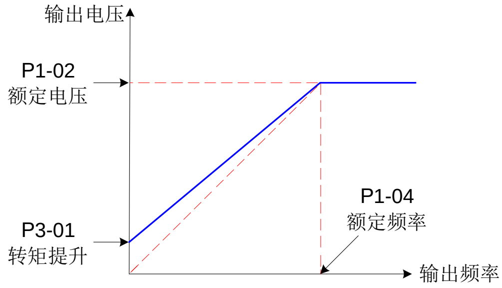


图 6-37 通用恒转矩直线 V/F 曲线

在额定频率以下，输出电压与频率成线性变化，适用于大惯量风机加速、冲床、离心机、水泵等一般机械传动应用场合。

● 自定义多点 V/F 曲线

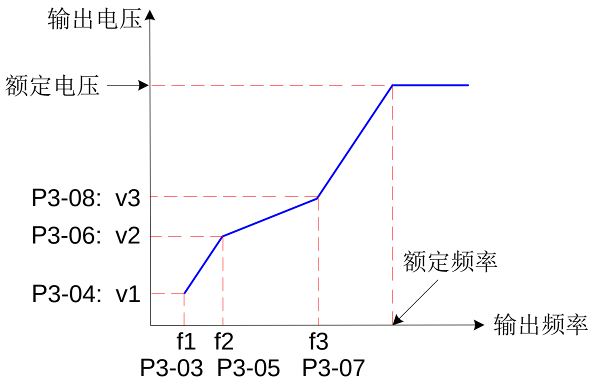


图 6-38 自定义多点 V/F 曲线

P3-03 ~ P3-08 六个参数定义多点 V/F 曲线，频率点设置范围为 0.00Hz ~ 电机额定频率，电压点设置范围为 0.0% ~ 100%，对应 0V ~ 电机额定电压，多点 V/F 曲线的设定值通常根据电机的负载特性来设定。务必如下设定：P3-03 ≤ P3-05 ≤ P3-07。为了保证设置无误，本变频器对频率点 P3-03、 P3-05 和 P3-07 上下限的关系进行了约束，设置时先设置 P3-07，再设置 P3-05，最后设置 P3-03；

2） V/F 分离曲线设定

参数	功能定义	出厂值	设定范围	参数说明
P3-13	V/F 分离的电压源	0	0：数字设定（P3-14） 1：AI1 2：AI2 3：面板电位器 4：保留 5：多段指令 6：简易 PLC 7：PID 8：通讯给定 注：100.0% 对应电机额定电压	-
P3-14	V/F 分离的电压数字设定	0V	0V~ 电机额定电压	V/F 半分离模式下，输出电压为此设定值的 2 倍
P3-15	V/F 分离的电压加速时间	0.0s	0.0s~1000.0s 注：表示 0V 变化到电机额定电压的时间	V/F 半分离模式下此参数不起作用，电压加速时间与 P0-17 一致

参数	功能定义	出厂值	设定范围	参数说明
P3-16	V/F 分离的电压减速时间	0.0s	0.0s~1000.0s 注：表示 0V 变化到电机额定电压的时间	V/F 半分离模式下此参数不起作用，电压减速时间与 P0-18 一致
P3-17	V/F 分离停机方式选择	0	0：频率 / 电压独立减至 0 1：电压减为 0 后频率再减	-

V/F 分离的电压加速时间指输出电压从 0 加速到电机额定电压所需时间，见图中的 t1。

V/F 分离的电压减速时间指输出电压从电机额定电压减速到 0 所需时间，见图中的 t2。

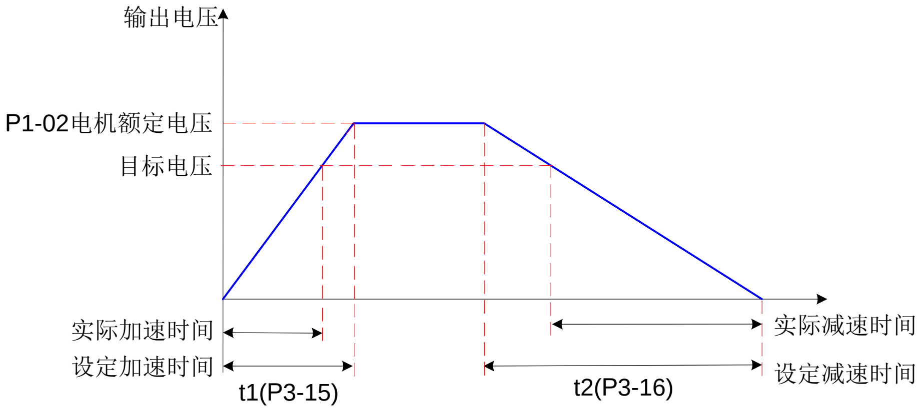


图 6-39 V/F 分离示意图

6.5.2 变频器输出电流（转矩）限制

在加速、恒速、减速过程中，如果电流超过过流失速动作电流（出厂值 150%，表示变频器额定电流的 1.5 倍），过流失速将起作用，输出频率开始降低，直到电流回到过流失速点以下后，频率才开始向上加速到目标频率，实际加速时间自动拉长，如果实际加速时间不能满足要求，可以适当增加“P3-18 过流失速动作电流”。

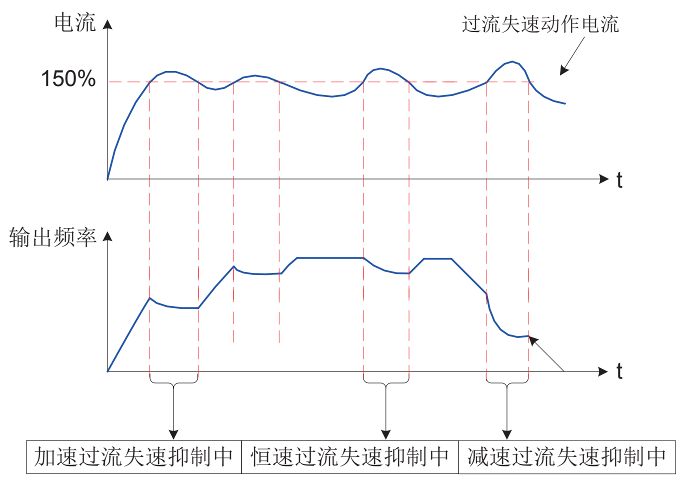


图 6-40 过流失速动作示意图

参数	功能定义	出厂值	设定范围	参数说明
P3-18	过流失速动作电流	150%	50%~200%	启动过流失速抑制动作的电流。

P3-19	过流失速抑制	1	0，1	0：无效；1：有效
P3-20	过流失速抑制增益	20	0~100	如果电流超过过流失速电流点，过流失速抑制将起作用，实际加速时间自动拉长。
P3-21	倍速过流失速动作电流补偿系数	50%	50%~200%	降低高速过流失速动作电流，补偿系数为 50% 时无效，弱磁区动作电流对应 P3-18 推荐设定值 100%。

在高频区域，电机驱动电流较小，相对于额定频率以下，同样的失速电流，电机的速度跌落很大，为了改善电机的运行特性，可以降低额定频率以上的失速动作电流，在一些离心机等运行频率较高、要求几倍弱磁且负载惯量较大的场合，这种方法对加速性能有很好的效果，可有效防止电机失速。

超过额定频率的过流失速动作电流 = (fs/fn) * k * LimitCur;

fs 为运行频率，
fn 为电机额定频率，
k 为 P3-21“倍速过流失速动作电流补偿系数”，
LimitCur 为 P3-18“过流失速动作电流”；

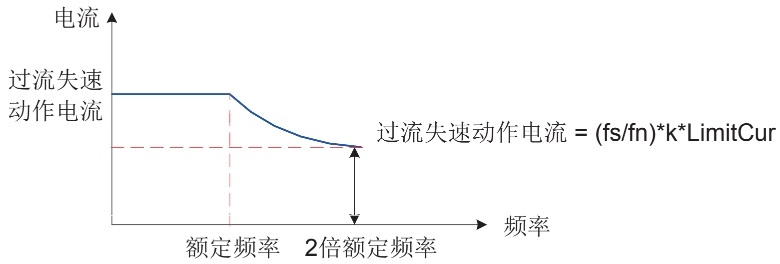


图 6-41 倍速过流失速动作示意图

NOTE

- 大功率电机，载波频率在 2kHz 以下，由于脉动电流的增加导致逐波限流响应先于过流失速防止动作启动，而产生转矩不足，这种情况下，请降低过流失速动作电流。

6.5.3 变频器过压失速抑制

如果母线电压超过过压失速动作电压(P3-22)，表示机电系统已经处于发电状态（电机转速 > 输出频率），过压失速将起作用，调节输出频率，实际减速时间将自动拉长，避免跳闸保护，如果实际减速时间不能满足要求，可以适当增加过励磁增益。

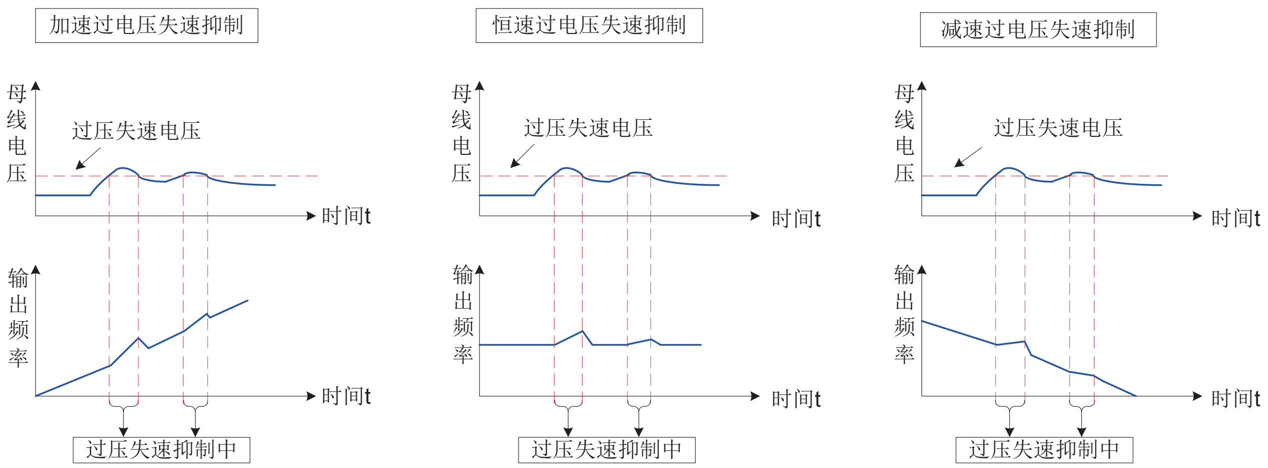


图 6-42 过压失速动作示意图

参数	功能定义	出厂值	设定范围	参数说明
P3-22	过压失速动作电压	370/770V	330.0V~800.0V	P3-22 的功能作用等同于 P9-04。
P3-23	过压失速抑制	1	0，1	0: 无效; 1: 有效 (默认过压失速增益有效)
P3-24	过压失速频率增益	30	0~100	增大 P3-24 会改善母线电压的控制效果，但是输出频率会产生波动，如果输出频率波动较大，可以适当减少 P3-24。P3-24 的功能作用等同于 P9-03。
P3-25	过压失速电压增益	30	0~100	增大 P3-25 可以减少母线电压的超调量。
P3-26	过压失速最大上升频率限制	5Hz	0~50Hz	过压抑制最大上升频率限制
P9-08	制动单元动作起始电压	370/760V	330V~800V	-
P3-10	V/F 过励磁增益	64	0~200	过励磁增益越大，抑制效果越强。
P3-11	V/F 振荡抑制增益	40	0~100	-
P9-03	过压失速增益	30	0~100	功能等同于 P3-24，将会跟随 P3-24 一起变化。
P9-04	过压失速保护电压	370/770V	330V~800V	功能等同于 P3-22，将会跟随 P3-22 一起变化。

NOTE

使用制动电阻或加装制动单元或者使用能量回馈单元时请注意：

- 请设定 P3-10“过励磁增益”值为“0”，否则有可能引起运行中电流过大问题。
- 请设定 P3-23“过压失速使能”值为“0”，否则有可能引起减速时间延长问题。

6.5.4 提高 V/F 运行性能

1） 如何缩短 V/F 控制方式下的实际加速时间?

现象	措施
加速过程如果发现电机实际加速时间，远远大于设定加速时间，可以采取以下措施：	目标频率小于 2 倍额定频率，加速过程发现实际加速时间满足不了要求时，可以加大 P3-18“过流失速动作电流”，每次调整 10%，P3-18“过流失速动作电流”设定值超过 170%，容易引起“变频器过载故障 EER10”或“快速限流故障 EER40”。
	如果目标频率为 3 倍或 4 倍额定频率以上，在急加速过程，很可能会出现电机失速现象（变频器输出频率已经达到目标频率，但电机实际转速一直停留中速段的某一转速，但电机实际速度一直停留在较低频率，或者加速时间过长），此时可以调节 P3-21“倍速过流失速动作电流补偿系数”设定值为 100%。

2） 如何缩短 V/F 控制方式下的实际减速时间?

现象	措施
减速过程如果发现电机实际减速时间，远远大于设定减速时间，可以采取以下措施：	如果无加装制动电阻或回馈单元，请增加P3-10“V/F过励磁增益”设定值，每次调整量“±20”。增加 P3-10“V/F 过励磁增益”设定值后，如果引起电机振荡过压故障，请减小“过压失速抑制电压增益”设定值。
	如果变频器加装了制动电阻或能量回馈单元，如变频器输入电压等级为 360~420V，请调整 P9-08“制动单元动作起始电压”设定值为 690V，调整 P3-10“V/F 过励磁增益”设定值为 0。
	使用停机直流制动，推荐设定值： P6-11（停机直流制动启始频率） 0.5Hz; P6-13（停机直流制动电流） 50%; P6-14（停机直流制动时间） 1s;

3） 如何限制 V/F 控制方式下的输出电流，及极端冲击负载情况下如何防止过流故障?

现象	措施
为了更好的保护电机，控制电机电流上限，可以采取以下措施调整变频器输出电流上限：	“变频器输出电流上限”可以通过调整 P3-18“过流失速动作电流”来控制，“变频器输出电流上限”＝变频器额定电流 X“过流失速动作电流”（出厂值 150%）。建议“变频器输出电流上限”最小不应小于电机额定电流，推荐值为电机额定电流的 1.5 倍。
	急加速、急减速、或者冲击性负载类型时有可能引起“过流故障”或者“快速限流故障 EER40”，请增加 P3-20“过流失速抑制增益”设定值，每次调整量为“±10”，调整得过大有可能引起电流振荡。

4） 如何限制 V/F 控制方式下的母线电压，防止过压故障?

现象	措施
在一些恒速发电负载（如典型的油田抽油机），冲击性突加突卸负载（如典型的大功率冲床），运行过程极易引起过电压故障，为了避免引起过压故障，如果出厂参数仍然会出现过压故障，可以采取以下措施：	恒速间歇性发电负载：请降低 P3-22“过压失速动作电压”设定值（出厂值 770V），非特定要求限制母线电压上限值，建议调整成 720V 左右，如果仍然发生过压故障，请调整 P3-24“过压失速最大上升频率限制”设定值为 10Hz 或 20Hz（如油田抽油机这种周期性发电时间较长的负载）。
	冲击性突加突卸负载发生压故障时，请降低 P3-22“过压失速动作电压”设定值，建议调整成 720V 左右。
	大惯量急减速负载：如果变频器加装了制动电阻，且变频器输入电压等级为 360~420V，请调整 P9-08“制动单元动作起始电压”设定值为 690V，调整 P3-10“V/F 过励磁增益”设定值为 0。如果仍然过压，请降低 P3-22“过压失速动作电压”设定值，建议调整成 740V 左右。

6.5.5 速度环

参数	功能定义	出厂值	设定范围	参数说明
P2-00	速度环比例增益 1	30	1~100	-
P2-01	速度环积分时间 1	0.50s	0.01s~10.00s	-
P2-02	切换频率 1	5.00Hz	0.00~P2-05	-
P2-03	速度环比例增益 2	20	1~100	-
P2-04	速度环积分时间 2	1.00s	0.01s~10.00s	-
P2-05	切换频率 2	10.00Hz	P2-02~ 最大频率	-

速度环 PI 参数分低速和高速两组，

运行频率小于“切换频率 1"（P2-02)时，速度环 PI 调节参数为 P2-00 和 P2-01。

运行频率大于“切换频率 2"（P2-05)时，速度环 PI 调节参数为 P2-03 和 P3-04。

切换频率 1 和切换频率 2 之间的速度环 PI 参数，为两组 PI 参数线性切换，如下图所示：

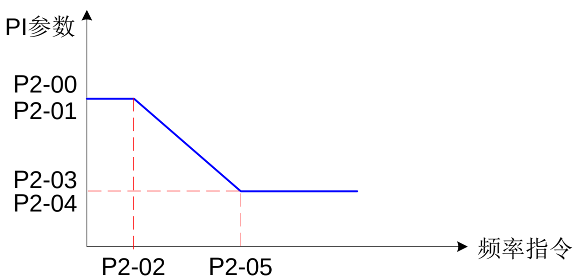


图 6-43 速度环 PI 参数示意图

通过设定速度调节器的比例系数和积分时间，可以调节矢量控制的速度动态响应特性。

增加比例增益，减小积分时间，均可加快速度环的动态响应。但是比例增益过大或积分时间过小均可能使系统产生振荡。

建议调节方法为：如果出厂参数不能满足要求，则在出厂值参数基础上进行微调，先增大比例增益，保证系统不振荡；然后减小积分时间，使系统既有较快的响应特性，超调又较小。

NOTE

- 如 PI 参数设置不当，可能会导致速度超调过大。甚至在超调回落时产生过电压故障。

6.5.6 矢量控制转差调节

参数	功能定义	出厂值	设定范围	参数说明
P2-06	矢量控制转差增益	100%	50%~200%	转差调节参数，改善控制性能

对矢量控制（P0-01=0），此参数可调节电机的稳速精度，例如电机运行频率低于变频器输出频率时，可增大该参数。

注意：一般情况下，无需调节此参数。

6.5.7 SVC 速度反馈稳定性

参数	功能定义	出厂值	设定范围	参数说明
P2-07	SVC 速度反馈滤波时间	0.015s	0.000s~0.100s	-

SVC 速度反馈滤波时间只有当 P0-01=0 时生效，加大 P2-07 可以改善电机稳定性，但动态响应变弱，反之则动态响应加强，但太小会引起电机震荡。一般情况下无需调整。

6.5.8 转矩上限

在矢量控制（SVC）下，有两种控制方式：

速度控制和转矩控制（A0-00），

两种控制方式的转矩上限不同，分两组参数进行设置。

1） 速度控制转矩上限设定

参数	功能定义	出厂值	设定范围	参数说明
P2-09	速度控制方式下转矩上限指令选择	0	0：参数 P2-10 设定 1：AI1 2：AI2 3：面板电位器 4：保留 5：通讯给定 6：MIN(AI1,AI2） 7：MAX(AI1,AI2) 1-7 选项的满量程对应P2-10	-
P2-10	速度控制方式下转矩上限数字设定	150.0%	0.0%~200.0%	电动状态下的转矩上限，以变频器额定电流为基值
P2-11	速度控制方式下转矩上限指令选择（发电）	0	0：参数 P2-10 设定（不区分电动和发电） 1：AI1 2：AI2 3：面板电位器 4：保留 5：通讯给定 6：MIN(AI1,AI2） 7：MAX(AI1,AI2) 1-7 选项的满量程对应P2-12	-
P2-12	速度控制方式下转矩上限数字设定（发电）	150.0%	0.0%~200.0%	发电状态下的转矩上限，以变频器额定电流为基值

- 速度控制模式下，转矩上限源有 8 种设定方式。其中电动状态时，转矩上限源由 P2-09 进行选择，在发电状态时，转矩上限源选择由 P2-11 确定。

- 速度控制模式下，若 P2-11 设为 1~8，转矩上限区分电动状态和发电状态，其中电动状态转矩上限满量程由 P2-10 设定，发电状态转矩上限满量程由 P2-12 设定，示意图如下所示:

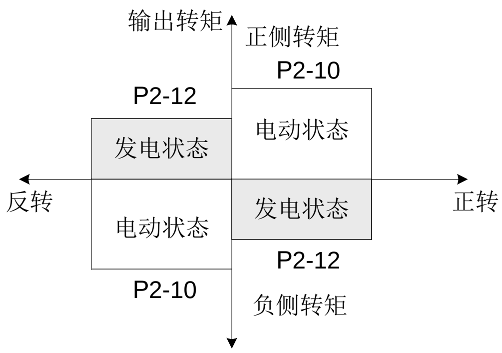


图 6-44 速度控制转矩上限示意图

参数	功能定义	出厂值	设定范围	参数说明
P2-22	发电功率限制使能	0	0：无效 1：有效 2：恒速生效 3：减速生效	-
P2-23	发电功率上限	机型确定	0.0~200.0%	-

- 针对凸轮负载、快速加减速、负载突卸等应用场合，且未使用制动电阻时，可以通过使能发电功率限制，有效减小电机制动过程中母线电压过冲，避免过压故障的发生。
- 发电功率上限 P2-23 为电机额定功率的百分比，当使能发电功率限制后依然发生过压时，请将P2-23 向下调整。

2） 转矩控制转矩上限说明

参数	功能定义	出厂值	设定范围	参数说明
A0-00	速度 / 转矩控制方式选择	0	0：速度控制 1：转矩控制	-
A0-01	转矩控制方式下转矩设定选择	0	0：数字设定 1(A0-03) 1：AI1 2：AI2 3：面板电位器 4：保留 5：通讯给定 6：MIN(AI1,AI2) 7：MAX(AI1,AI2) （1-7 选项的满量程，对应 A0-03 数 字设定）	-
A0-03	转矩控制方式下转矩数字设定	150.0%	-200.0%~200.0%	-
A0-05	转矩控制正向最大频率	50.00Hz	0.00Hz~ 最大频率	-
A0-06	转矩控制反向最大频率	50.00Hz	0.00Hz~ 最大频率	-
A0-07	转矩加速时间	0.00s	0.00s~650.00s	-
A0-08	转矩减速时间	0.00s	0.00s~650.00s	-

- 速度 / 转矩控制方式选择（A0-00）

速度 / 转矩控制方式由 A0-00 进行设定。

YD280 的多功能数字 DI 端子，具备两个与转矩控制相关的功能：转矩控制禁止（功能 29）、速度控制 / 转矩控制切换（功能 46）。这两个端子要跟 A0-00
配合使用，实现速度与转矩控制的切换。

当速度控制 / 转矩控制切换端子（功能 46）无效时，控制方式由 A0-00 确定，若速度控制 / 转矩控制切换有效，则控制方式相当于 A0-00 的值取反。

无论如何，当转矩控制禁止端子有效时，变频器固定为速度控制方式。

- 转矩控制转矩指令设定（A0-01、A0-03）

A0-01 用于选择转矩设定指令，共有 8 种转矩设定方式。

转矩设定采用相对值，100.0% 对应变频器额定转矩（可通过 U0-74 查看变频器输出转矩，100% 对应变频器额定转矩；U0-06 查看电机输出转矩，100% 对应电机额定转矩）。设定范围 -200.0%~200.0%，表明变频器最大转矩为 2 倍变频器额定转矩。

当转矩给定值为正时，变频器正向运行。

当转矩给定值为负时，变频器反向运行。

- 转矩控制频率上限设定（A0-05、A0-06）

转矩控制时，频率上限的加减速时间在 P8-07（加速）/ P8-08（减速）设定。
用于设置转矩控制方式下，变频器的正向或反向最大运行频率。

当变频器转矩控制时，如果负载转矩小于电机输出转矩，则电机转速会不断上升，为防止机械系统出现飞车等事故，必须限制转矩控制时的电机最高转速（A0-05/A0-06）。

如果需要实现动态连续更改转矩控制最大频率，可以采用控制上限频率的方式实现。

- 转矩控制转矩加减速时间设定（A0-07、A0-08）

转矩控制方式下，电机输出转矩与负载转矩的差值，决定电机及负载的速度变化率，所以，电机转速有可能快速变化，造成噪音或机械应力过大等问题。通过设置转矩控制加减速时间，可以使电机转速平缓变化，转矩加减速时间对应转矩从 0 增加到 A0-03 的时间。

在小转矩启动的转矩控制中，不建议设置转矩加减速时间；需要转矩快速响应的场合，设置转矩控制加减速时间为 0.00s。

例如：两个电机硬连接拖动同一负载，为确保负荷均匀分配，设置一台变频器为主机，采用速度控制方式，另一台变频器为从机并采用转矩控制，主机的实际输出转矩作为从机的转矩指令，此时从机的转矩需要快速跟随主机，那么从机的转矩控制加减速时间为 0.00s。

6.5.9 电流环参数说明

参数	功能定义	出厂值	设定范围	参数说明
P2-13	励磁调节比例增益	2000	0~60000	电机参数调谐时自动获得
P2-14	励磁调节积分增益	1300	0~60000	
P2-15	转矩调节比例增益	2000	0~60000	
P2-16	转矩调节积分增益	1300	0~60000	

矢量控制电流环 PI 调节参数分为励磁和转矩两组，该参数在异步机完整调谐后会自动获得，一般不需要修改。

需要提醒的是，电流环的积分调节器，不是采用积分时间作为量纲，而是直接设置积分增益。电流环 PI 增益设置过大，可能导致整个控制环路振荡，故当电流振荡或者转矩波动较大时，可以手动减小此处的 PI 比例增益或者积分增益。

6.5.10 提高弱磁区性能

参数	功能定义	出厂值	设定范围	参数说明
A5-05	最大输出电压系数	105%	100%~110%	最大输出电压系数表示变频器最大输出电压的提升能力。 加大A5-05可以提高电机弱磁区的最大带载能力，但是电机电流纹波增加，会加重电机发热量；反之电机弱磁区的最大带载能力会下降，但是电机电流纹波减少，会减轻电机发热量。一般无需调节。
P2-21	弱磁区最大转矩系数	100%	50%~200%	该参数只有当电机运行在额定频率以上时才会生效。 当电机需要急加速运行至2倍电机额定频率以上且出现实际加速时间较长时，适当减少P2-21；当电机运行在2倍额定频率加载后速度跌落较大时，适当增加P2-21，一般无需更改。

6.5.12 辅助控制参数

参数	功能定义	出厂值	设定范围	参数说明
A5-00	DPWM 切换上限频率	8.00Hz	5.00Hz~ 最大频率	调整参数 A5-00 到最大频率可以减少电机噪音
A5-01	PWM 调制方式	0	0：异步调制 1：同步调制	当载波频率除以运行频率小于 10 时，会引起输出电流振荡或电流谐波较大，此时可以调整成“同步调制”达到减少电流谐波的效果。
A5-03	随机 PWM 深度	0	0：随机 PWM 无效 1~10：PWM 载频随机深度	“0”表示随机 PWM 无效； 如果电机噪音较大，可以调整设定值（每次增加 1），来改善电机噪音。

6.6 保护功能

本小节介绍保护变频器和电机的相关功能。

6.6.1 启动保护

变频器的安全保护功能。若 P8-18 设置为 1 时，可以对以下两种情况进行保护。

情况 1：如果变频器上电时运行命令有效（例如端子运行命令上电前为闭合状态），则变频器不响应运行命令，必须先将运行命令撤除一次，运行命令再次有效后变频器才响应。

情况 2：如果变频器故障复位时运行命令有效，变频器也不响应运行命令，必须先将运行命令撤除才能消除运行保护状态。

参数	功能定义	出厂值	设定范围	参数说明
P8-18	启动保护选择	0	0：不保护 1：保护	设置为 1，可以防止在不知情的状况下，发生上电时或者故障复位时，电机响应运行命令而造成的危险。

6.6.2 电机过载保护设定

参数	功能定义	出厂值	设定范围	参数说明
P9-00	电机过载保护选择	1	0：禁止	无电机过载保护功能，建议此时电机前加热继电器；
			1：允许	变频器根据电机过载保护的反时限曲线，判断电机是否过载。
P9-01	电机过载保护增益	1.00	0.20~10.00	如果需要对电机过载电流和时间进行调整，请设置 P9-01。
P9-02	电机过载预警系数	80%	50%~100%	预警系数用于确定，在电机过载保护前多大程度进行预警。该值越大则预警提前量越小。

为了对不同的负载电机进行有效保护，需要根据电机过载能力对电机过载保护增益进行设置。电机过载保护为反时限曲线，电机过载保护曲线如下图所示：

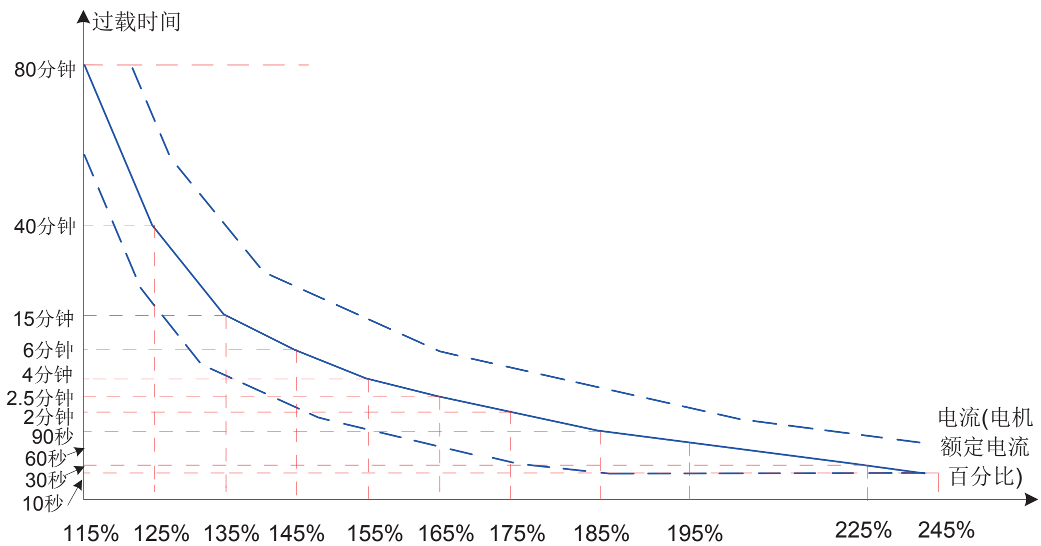


图 6-45 电机过载保护反时限曲线示意图

在电机运行电流到达 175% 倍电机额定电流条件下，持续运行 2 分钟后报电机过载（Err11）；

在电机运行电流到达 115% 倍电机额定电流条件下，持续运行 80 分钟后报电机过载（**Err11**）。

举例：假设电机额定电流 100A

如果 P9-01 设定成 1.00，那么根据上图所示，当电机运行电流达到 100A 的 125%（125A）时，持续 40 分钟后，变频器报“电机过载故障（Err11）”；

如果 P9-01设定成 1.20，那么根据上图所示，当电机运行电流达到 100A 的 125%（125A）时，持续 40*1.2=48 分钟后，变频器报“电机过载故障（Err11）”；

注意：最长 80 分钟过载，最短时间 10 秒过载。

电机过载保护调整举例：需要电机在 150% 电机电流的情况下运行 2 分钟报过载

通过电机过载曲线图得知，150%(I) 的电流位于 145%(I1) 和 155%(I2) 的电流区间内，145% 的电流 6 分钟（T1）过载，155% 的电流 4 分钟（T2）过载，则可以得出默认设置下 150% 的电机额定电流 5 分钟过载。计算方法如下：

T = T1 + (T2 - T1)*(I – I1)/(I2 –I1) = 4 + (6 - 4)*(150% – 145%)/(155% –145%) = 5（分钟）

从而可以得出需要电机在 150% 电机电流情况下 2 分钟报过载，则需要设置的“电机过载保护增益”为 P9-01 = 2 ÷ 5 = 0.4

注意：用户需要根据电机的实际过载能力，正确设置 P9-01 的值，该参数设置过大容易发生电机过热损坏而变频器未及时报警保护的危险！

- 电机过载预警系数表示：当电机过载检测水平达到该参数设定值时，多功能输出端子 DO 或故障继电器（RELAY）输出“电机过载预报警信号”，该参数是根据电机在某过载点下持续运行而不报过载故障的时间百分比计算。

例如：当电机过载保护增益设置为 1.00，电机过载预警系数设置为 80% 时，如果电机电流达到 145% 的额定电机电流下持续运行 4.8 分钟（80%×6 分钟）时，多功能输出端子 DO 或故障继电器 RELAY 输出电机过载预警信号。

- 电机过载预警功能用于在电机过载故障保护前，通过 DO 给控制系统一个预警信号。该预警系数用于确定，在电机过载保护前多大程度进行预警。该值越大则预警提前量越小。当变频器输出电流累积量，大于过载时间（电机过载保护反时限曲线的 Y 值）与“电机过载预警系数（P9-02）”乘积后，变频器多功能数字 DO 输出“电机过载预报警”有效信号。特殊情况下，当电机过载预警系数 P9-02 设置为 100% 时，预警提前量为 0，此时预报警和过载保护同时发生。

6.6.3 缺相保护设定

参数	功能定义	出厂值	设定范围	参数说明
P9-12	输入缺相\接触器吸合保护选择	11	个位：输入缺相保护选择 0：禁止 1：允许 十位：接触器吸合保护选择 0：禁止 1：允许	选择是否对输入缺相或接触器吸合进行保护。
P9-13	输出缺相保护选择	01	个位：输出缺相保护选择 0：禁止 1：允许 十位：运行前输出缺相保护选择 0：禁止 1：允许	个位：选择是否对输出缺相的进行保护，如果选择 0 而实际发生输出缺相时不会报故障，此时实际电流比面板显示的电流大一些，存在风险，谨慎使用。 十位：运行中输出缺相检测大概需要几秒钟的时间，对于缺相后启动存在风险或低频运行的场合，使能该功能，可以快速检测出启动时是否存在输出缺相，但对启动时间有严格要求的场合建议不要使能该功能。

6.6.4 故障复位

NOTE

- 欠压故障（Err09）在母线电压恢复正常时会自动复位，且不包含在故障自动复位次数之内；
- 对地短路故障（Err23）不能自动或者手动复位，只能通过变频器完全断电，再次上电后才能复位；
- 到达故障自动复位次数后，再执行故障动作保护选择。

参数	功能定义	出厂值	设定范围	参数说明
P9-09	故障自动复位次数	0	0 ~20	当变频器选择故障自动复位时，用来设定可自动复位的次数。超过此次数后，变频器保持故障状态。
P9-10	故障自动复位期间故障 DO 动作选择	0	0：不动作 1：动作	如果变频器设置了故障自动复位功能，则在故障自动复位期间，故障 DO（DO 端子功能选择为 2）是否动作，可以通过 P9-10 设置。
P9-11	故障自动复位等待时间	1.0s	0.1s ~100.0s	从变频器故障报警，到故障自动复位之间的等待时间。

6.6.5 故障动作保护选择

参数	功能定义	出厂值	设定范围	参数说明
P9-47	故障保护动作选择 1	00000	个位：电机过载（Err11） 0：自由停车 1：按停机方式停机 2：继续运行 十位：输入缺相（Err12）（同个位） 百位：输出缺相（Err13）（同个位） 千位：外部故障（Err15）（同个位） 万位：通信异常（Err16）（同个位）	-
P9-48	故障保护动作选择 2	00000	个位：保留 十位：参数读写异常（Err21） 0：自由停车 1：按停机方式停机 百位：变频器过载故障动作选择（Err10） 0：自由停机 1：降额运行 千位：电机过热（Err45） 万位：运行时间到达（Err26）（同千位）	百位用于选择变频器发生过载时的故障动作选择，当设置为 0 时，变频器过载时将报过载故障，同时封锁输出；当设置为 1 时，变频器即将过载时将自动降低输出电流至变频器额定电流附近，避免过载故障的发生，但可能会发生运行速度降低或堵转。 对于提升类负载请将该参数设置为 0。

参数	功能定义	出厂值	设定范围	参数说明
P9-49	故障保护动作选择 3	00000	个位：用户自定义故障 1（Err27） 0：自由停车 1：按停机方式停机 2：继续运行 十位：用户自定义故障 2（Err12）（同个位） 百位：上电时间到达（Err29）（同个位） 千位：掉载（Err30） 0：自由停车 1：按停机方式停机 2: 直接跳至电机额定频率的 7% 继续运行，不掉载则自动恢复到设定频率运行 万位：运行时 PID 反馈丢失（Err31）（同个位）	-
P9-50	故障保护动作选择 4	00000	个位：速度偏差过大（Err42） 0：自由停车 1：按停机方式停机 2：继续运行 十位：电机超速度（Err43）（同个位） 百位：初始位置错误（Err51）（同个位） 千位：速度反馈错误（Err52）（同个位） 万位：保留	-
P9-54	故障时继续运行频率选择	0	0：以当前的运行频率运行 1：以设定频率运行 2：以上限频率运行 3：以下限频率运行 4：以异常备用频率运行	当变频器运行过程中产生故障，且该故障的处理方式设置为继续运行时，变频器显示 A**，并以 P9-54 确定的频率运行
P9-55	异常备用频率	100.0%	0.0~100.0%（100.0% 对应最大频率）	

6.6.7 瞬时停电连续运行（瞬停不停）

瞬停不停功能使得系统在短时停电时能持续运行。系统发生停电时，变频器使电机处于发电状态，使母线电压维持在“瞬停不停动作判断电压”左右，防止变频器因输入电压过低导致欠压故障而停机。如下图所示：

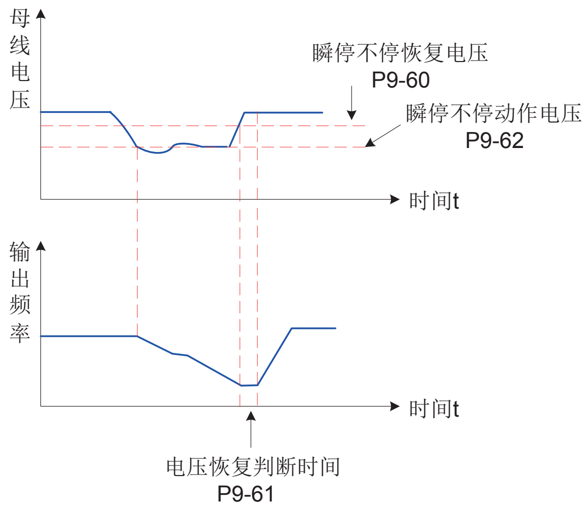


图 6-46 瞬停不停过程示意图

参数	功能定义	出厂值	设定范围	参数说明
P9-59	瞬停不停功能选择	0	0：无效 1：母线电压恒定控制 2：减速停机	风机水泵、离心机等大惯量场合建议使用“母线电压恒定控制”模式，纺织行业建议使用“减速停机”模式。
P9-60	瞬停不停恢复电压	85%	80%~100%	（380V 等级）100% 对应 540V
P9-61	瞬停不停电压恢复判断时间	0.5s	0.0~100.0s	只对“母线电压恒定控制（P9-59=1）”有效
P9-62	瞬停不停动作电压	80%	60%~100%	（380V 等级）100% 对应 540V
P9-71	瞬停不停增益 Kp	0~100	40	只对“母线电压恒定控制（P9-59=1）”有效如果瞬停不停过程容易欠压请加大 Kp 和 Ki
P9-72	瞬停不停积分系数 Ki	0~100	30	
P9-73	瞬停不停动作减速时间	0~300.0s	20.0s	只对“减速停机（P9-59=2）”模式有效

NOTE

- “母线电压恒定控制”模式时，当电网恢复供电时，变频器输出频率会按加速时间恢复到目标频率;
- “减速停机”模式时，当电网恢复供电时，变频器继续减速到 0Hz 停机，直到变频器再次发出启动命令变频器才会启动。

6.6.8 掉载保护

参数	功能定义	出厂值	设定范围	参数说明
P9-63	掉载保护选择	0	0: 无效 1: 有效	如果掉载保护功能有效，则当变频器输出电流小于掉载检测水平 P9-64，且持续时间大于掉载检测时间 P9-65 时，变频器执行掉载保护动作（掉载动作可由P9-49选择，默认自由停车）。在掉载保护期间，如果负载恢复，则变频器自动恢复为按设定频率运行。
P9-64	掉载检测水平	10.0%	0.0%~100.0%	
P9-65	掉载检测时间	1.0s	0.0~60.0s	

6.6.11 欠压点、过压点设定、快速限流保护

参数	功能定义	出厂值	设定范围	参数说明
A5-06	欠压点设置	200/350V	140~420V	当母线电压超出 A5-06/A5-09 的设定值时，变频器故障报警（Err09/Err05~07）
A5-09	过压点设置	400/820V	330V~820V	
A5-04	快速限流使能	1	0：不使能 1：使能	在起重等提升场合建议关闭此功能。

6.7 监视

监视功能是在变频器的 LED 显示区域上显示变频器的状态。查看监视参数的方法有两种：

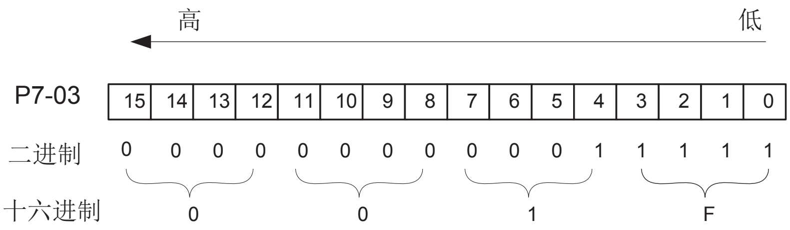
1） 在停机或运行状态下，用操作面板上的▷键，切换参数 P7-03、P7-04、P7-05 的每一字节，可以显示多个状态参数。

运行状态下有 32 个运行状态参数，由参数 P7-03（运行显示参数 1）和 P7-04（运行显示参数 2）按二进制的位选择每位的对应参数是否显示。停机状态下有 13 个停机状态参数，由参数P7-05（停机显示参数）按二进制的位选择每位的对应参数是否显示。

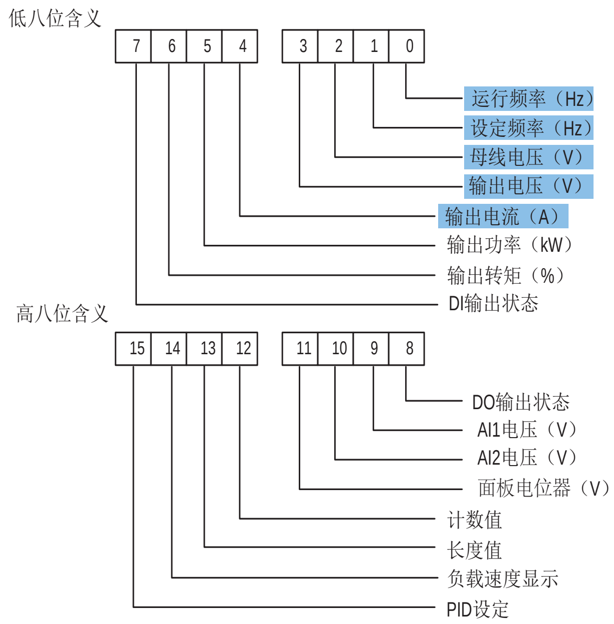
例如：要通过面板监视运行状态下的参数：（运行频率、母线电压、输出电压、输出电流、输出功率、 PID 设定）。

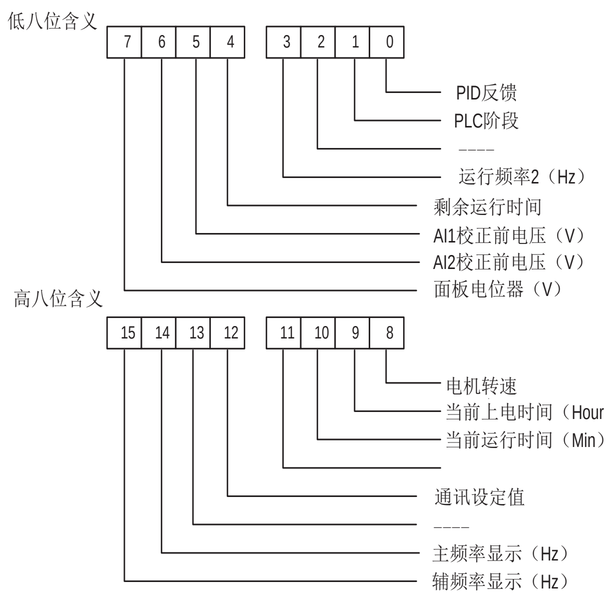
- 根据参数 P7-03（运行显示参数 1）中的每一字节与上述参数的对应关系，将对应的位设置为 1。
- 将此二进制数转为十六进制后设置到 P7-03中。（二进制转换十六进制方法请参见下文）

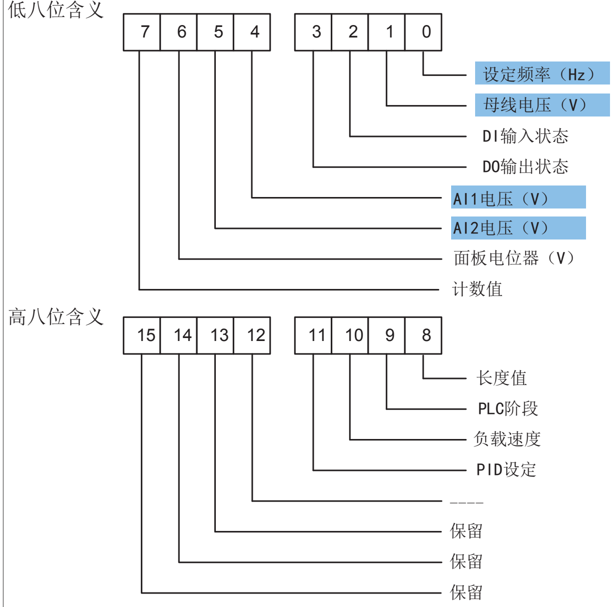
● 用操作面板上的▷切换参数 P7-03 的每一字节，即可查看相关参数的值。设定如下图所示：



其他监视参数的查看方法，同 P7-03 的方法。监视参数在 P7-03、P7-04、P7-05 的每一字节的对应关系如下：

<table>
<tr><th>参数</th><th>功能定义</th><th>出厂值</th><th>设定范围</th><th>参数说明</th></tr>
<tr><td>P7-03</td><td>运行显示参数1</td><td>1F</td><td>0000~FFFF</td><td>在运行中若需要显示以下各参数时，将其相对应的位置设为 1，将此二进制数转为十六进制后设于 P7-03。


注：带底纹部分为默认出厂显示。</td></tr>
<tr><td>P7-04</td><td>运行显示参数2</td><td>00</td><td>0000~FFFF</td><td>在运行中若需要显示以下各参数时，将其相对应的位置设为 1，将此二进制数转为十六进制后设于 P7-04。

</td></tr>
</table>

<table>
<tr><th>参数</th><th>功能定义</th><th>出厂值</th><th>设定范围</th><th>参数说明</th></tr>
<tr><td>P7-05</td><td>停机显示参数</td><td>33</td><td>0000~FFFF</td><td>在停机时若需要显示以下各参数，将其相对应的位置设为 1，将此二进制数转为十六进制后设于 P7-05。

注：带底纹部分为默认出厂显示。</td></tr>
</table>

NOTE

- 变频器断电后再上电，显示的参数默认为变频器掉电前选择的参数。
- P7-03、P7-04、P7-05 中每一字节对应的监视参数，不完全对应 U0 组的每一个监视参数。如果要监视的参数在 P7-03、P7-04、P7-05 中不存在，需要用方法 2 利用操作面板在 U0 组查找监视参数。

二进制转换成十六进制方法：

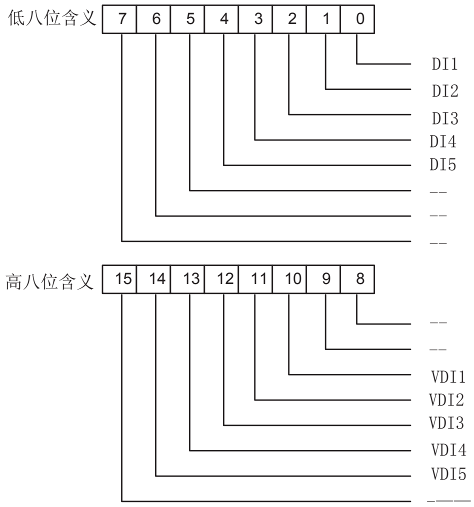
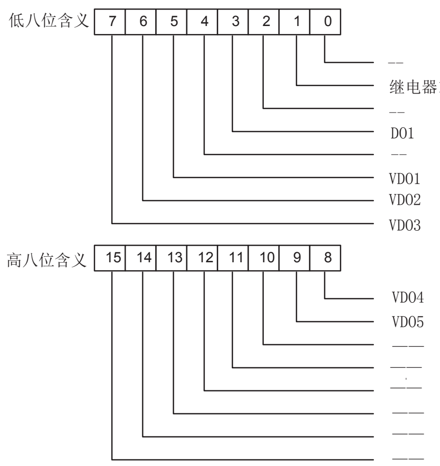
· 二进制数从右往左每四位对应一位十六进制数。如果最高位不满四位用 0 补上。再把分好的每四位二进制分别转换成十进制，0000~1111 对应十进制的 0~ 15，对应十六进制的 0~F。根据十进制和十六进制的对应关系，将十进制转换成对应的十六进制。（对应关系见下表）

例如，011 1101 1111 1001 可以分为 0011 1101 1111 1001 ，查找下表后得到十六进制数3DF9。

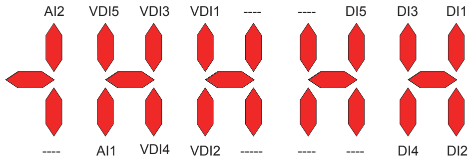
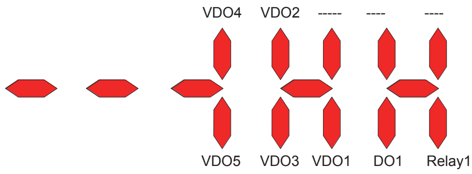
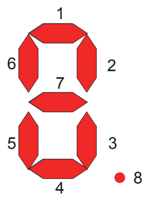
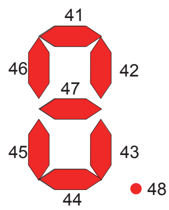
二进制	1111	1110	1101	1100	1011	1010	1001	1000	0111	0110	0101	0100	0011	0010	0001	0000
十进制	15	14	13	12	11	10	9	8								
十六进制	F	E	D	C	B	A	9	8								

2）直接用操作面板进入 U0 组参数，查看监视参数。（面板的操作方法可参考“第 4 章 面板使用”）

，以下所示的监视参数，仅仅是可读的。

参数	功能定义	最小单位	监控范围	参数说明
U0-00	运行频率 (Hz)	0.01Hz	0.00~500.00Hz	显示变频器的运行频率的绝对值。
U0-01	设定频率 (Hz)	0.01Hz	0.00~500.00Hz	显示变频器的设定频率的绝对值。
U0-02	母线电压 (V)	0.1V	0.0V~3000.0V	显示变频器母线电压值
U0-03	输出电压 (V)	1V	0V~1140V	显示运行时变频器输出电压值。
U0-04	输出电流 (A)	0.01A	0.00A~655.35A	显示运行时变频器输出电流值。
U0-05	输出功率 (kW)	0.1kW	0~32767	显示运行时变频器输出功率值
U0-06	输出转矩 (%)	0.1%	-200.0%~200.0%	显示运行时变频器输出转矩值。百分比基数是电机额定转矩
U0-07	DI 输入状态	1	0x0000~0x7FFF	显示当前 DI 端子输入状态值。转化为二进制数据后，每个 bit 位对应一个 DI 输入信号。1 表示输入为高电平，0 表示输入为低电平。每个 bit 位和输入端子对应关系如下： 
U0-08	DO 输出状态	1	0x0000~0x03FF	显示当前 DO 端子输出状态值。转化为二进制数据后，每个 bit 位对应一个 DO 输出信号。1 表示输出高电平，0 表示输出低电平。每个 bit 位和输出端子对应关系如下： 
U0-09	AI1 电压 (V)	0.01V	0.00V~10.57V	
U0-10	AI2 电压（V）/ 电流（mA）	0.01V /0.01mA	0.00V~10.57V 0.00mA~20.00mA	可通过控制板上跳线帽 J9 选择电压输入或电流输入
U0-11	Pot 电压 (V)	0.01V	0.00V~10.57V	-

参数	功能定义	最小单位	监控范围	参数说明
U0-12	计数值	1	1~65535	计数功能中显示计数值
U0-13	长度值	1	1~65535	定长功能中显示长度值
U0-14	负载转速显示	由P7-12个位决定	0~ 电机额定转速	显示负载转速
U0-15	PID 设定	1	0~65535	PID 设定 = PID 设定(百分比)*PA-04(PID给定反馈量程)
U0-16	PID 反馈	1	0~65535	PID 反馈 = PID 反馈(百分比)*PA-04(PID给定反馈量程)
U0-17	PLC 阶段	1	0~15	一共 16 段速
U0-18	保留	-	-	-
U0-19	Keep	-	-	-
U0-20	剩余运行时间	0.1Min	0.0~6500.0Min	显示定时运行时，剩余运行时间。
U0-21	AI1 校正前电压	0.001V	0.000V~10.570V	显示模拟输入采样电压 / 电流的实际值。
U0-22	AI2校正前电压/电流（V）/（mA）	0.001V /0.01mA	0.000V~10.570V 0.000mA~20.000mA	实际使用的电压 / 电流经过了线性校正，使采样电压 / 电流与实际输入电压 / 电流偏差更小。实际使用的校正电压 / 电流见 U0-09、U0-10、U0-11。
U0-23	面板旋钮校正前电压	0.001V	-10.570V~10.570V	
U0-24	电机转速	1RPM	0~ 电机额定转速	显示电机当前运行转速
U0-25	当前上电时间	1Min	0Min~65000Min	-
U0-26	当前运行时间	0.1Min	0.0Min~6500.0Min	-
U0-27	保留	-	-	-
U0-28	通讯设定值	0.01%	-100.00%~100.00%	显示通过通讯地址 0x1000 写入的数据。百分比基数根据地址 0x1000 的设定值作用决定。
U0-29	保留			
U0-30	主频率显示	0.01Hz	0.00Hz~500.00Hz	显示主频率设定值
U0-31	辅助频率显示	0.01Hz	0.00Hz~500.00Hz	显示辅助频率设定值。
U0-34	保留			
U0-35	目标转矩（%）	0.1%	-200.0%~200.0%	显示当前转矩上限设定值，百分比基数为电机额定转矩
U0-36	保留			
U0-37	功率因素角度	0.1°	——	显示当前运行的功率因素角度

参数	功能定义	最小单位	监控范围	参数说明
U0-39	V/F 分离目标电压	1V	0V~ 电机额定电压	显示运行在 V/F 分离状态时，目标输出电压
U0-40	V/F 分离输出电压	1V	0V~ 电机额定电压	显示运行在 V/F 分离状态时，当前实际输出电压。
U0-41	DI 输入状态直观显示	1	——	DI 端子状态显示：亮为高电平；灭为低电平 AI 状态详见 6.9.5 小节。 
U0-42	DO 输出状态直观显示	1	——	DO 端子状态显示：亮为高电平；灭为低电平 
U0-43	DI 功能状态直观显示 1（功能 01-40）	1	——	显示端子功能 1~40 是否有效。键盘共有 5 个数码管，数码管从右到左分别代表功能 1~8、9~16、17~24、25~32、33~40。每个数码管可代表 8 个功能选择，数码管定义如图： DI 端子功能显示：亮为高电平；灭为低电平 
U0-44	DI 功能状态直观显示 2（功能 41-80）	1	——	显示端子功能 41~59 是否有效。键盘共有 5 个数码管，数码管从右到左分别代表功能 41~48、49~56、57~59。每个数码管可代表 8 个功能选择，数码管定义如图： DI 端子功能显示：亮为高电平；灭为低电平 
U0-45	故障信息	1	0~51	显示驱动部分的故障编码。

参数	功能定义	最小单位	监控范围	参数说明
U0-59	设定频率（%）	0.01%	-100.00%~100.00%	显示当前设定频率，百分比基数是变频器最大频率 (P0-10)。
U0-60	运行频率（%）	0.01%	-100.00%~100.00%	显示当前运行频率，百分比基数是变频器最大频率 (P0-10)。
U0-61	变频器状态	1	Bit1 Bit0	0：停机；1：正转；2：反转
			Bit3 Bit2	0：恒速；1：加速；2：减速
			Bit4	0：母线电压正常；1：欠压
U0-62	当前故障编码	1	0~99	显示当前故障编码，2 表示 Err02
U0-63	点对点主机通讯发送转矩值	0.01%	-100.0%~100.0%	显示点对点通讯有效时主机发送转矩的数据值，百分比基数为电机额定转矩。
U0-64	从站的个数	1	0~63	显示主站可以查看的在线从站个数。
U0-65	转矩上限	0.1%	-200.0%~200.0%	显示当前给定转矩上限，百分比基数是电机额定转矩。
U0-76	累计用电量低位	0.1 度	0.0~999.9	耗电量最大可记录到 65535999.9 度，足够全功率范围使用 10 年以上，精度为 0.1 度，由 U0-76,U0-77 两个参数组合显示，U0-76显示低位，U0-77 显示高位，换算关系如下： 累计用电量 =u0-77*10000 + u0-76。 小功率及确保不溢出情况，兼容老客户读取累计用电量 P7-14，大功率机器客户可直接读取 U0-77，U0-76 的值。
U0-77	累计用电量高位	1 度	0~65535	

6.8 工艺功能

本小节主要介绍定长控制、计数这两种常用的工艺功能。

6.8.1 定长控制功能

YD280 带有定长控制功能，长度脉冲只能使用 DI5 端子采集，要将 DI5 端子功能选择设置为27（长度计数输入）。

参数	功能定义	出厂值	设定范围	参数说明
Pb-05	设定长度	1000m	0m~65535m	-
Pb-06	实际长度	0m	0m~65535m	实际长度为监视值 实际长度 (Pb-06) = 端子采样的脉冲个数 / 每米脉冲数 (Pb-07)
Pb-07	每米脉冲数	100.0	0.1~6553.5	-

下图中，实际长度为监视值，实际长度 (Pb-06) = 端子采样的脉冲个数 / 每米脉冲数（Pb-07）。
当实际长度（Pb-06）大于设定长度（Pb-05）时，继电器或 DO 输出端子“长度到达”ON 信号（功能选择为 10）。
定长控制过程中，可以通过多功能 DI 端子，进行长度复位操作（DI 功能设置为28）。具体设置如下图

参数	名称	设定值	功能描述
P4-04	DI5 端子功能选择	27	长度计数输入
P4-00~P4-04 (任选其中一个)	DI1~DI5 端子功能选择 (任选其中一个)	28	长度复位
P5-01~P5-05 (任选其中一个)	端子输出功能选择（任选其中一个）	10	长度到达

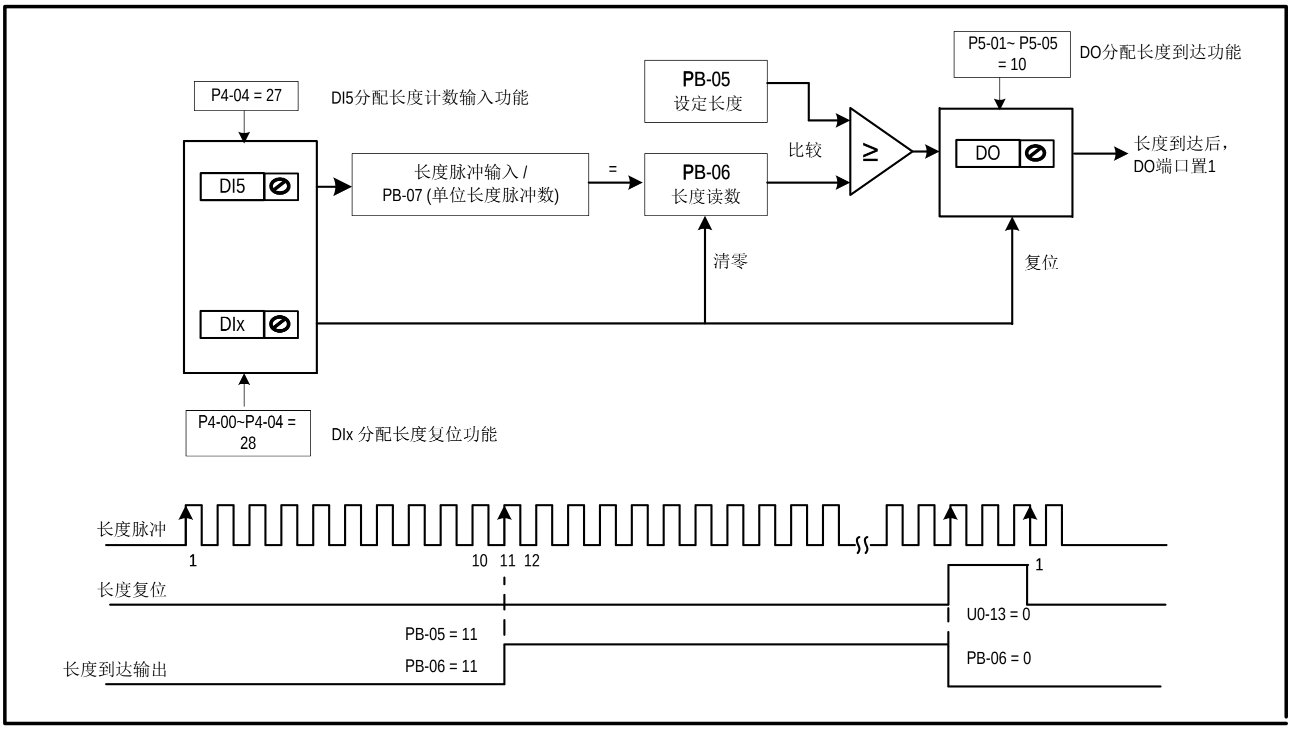


图 6-47 定长功能示意图

定长控制模式下不能识别方向，只能根据脉冲个数计算长度。

将长度到达的继电器（RELAY）输出 T/A-T/B 输出信号反馈到变频器停机输入端子，可做成自动停机系统。

6.8.2 计数功能

计数值需要通过 DI 端子采集（在脉冲频率较高时，必须使用 DI5 端口），DI 端子功能设置为 25（计数器输入）。

参数	功能定义	出厂值	设定范围	参数说明
Pb-08	设定计数值	1000	1~65535	-
Pb-09	指定计数值	1000	1~65535	指定计数值 Pb-09 不应大于设定计数值 Pb-08

下图中，计数值需要通过 DI 端子采集，要将 DI 端子功能设置为 25（计数器输入）。如果计数值到达设定计数值（Pb-08）时，多功能数字 DO 输出“设定计数值到达”ON 信号；如果计数值到达指定计数值（Pb-09）时，多功能数字 DO 输出“指定计数值到达”ON 信号。

参数	名称	设定值	功能描述
P4-00~P4-04（任选其中一个）	DI1~DI5 端子功能选择（任选其中一个）	25	计数器输入
P4-00~P4-04（任选其中一个）	DI1~DI5 端子功能选择（任选其中一个）	26	计数复位
P5-01~P5-05（任选其中一个）	端子输出功能选择（任选其中一个）	8	设定计数值到达
P5-01~P5-04（任选其中一个）	端子输出功能选择（任选其中一个）	9	指定计数值到达

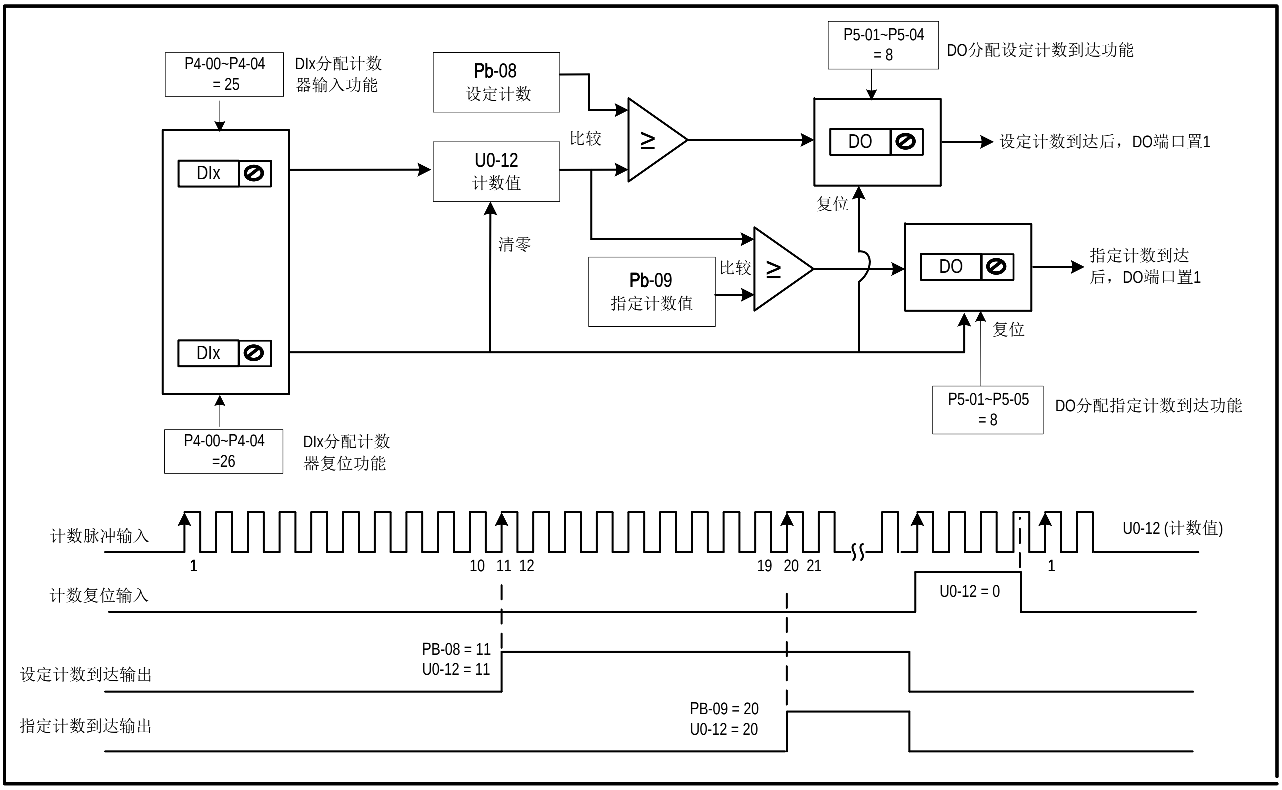


图 6-48 计数功能示意图

在脉冲频率较高时，必须使用 DI5 端口；
“设定计数到达”与“指定计数到达”的 DO 端口不能重复使用；
在变频器 RUN/STOP 状态下，计数器都会一直计数，直到“设定计数值”到达时才停止计数；
计数值可以掉电保持；
将计数到达 DO 输出信号反馈到变频器停机输入端子，可做成自动停机系统。

6.8.3 第二电机参数

YD280 变频器支持两组电机参数切换，电机 1 参数对应 P1 组参数；电机 2 对应 A2 组参数。
第一电机和第二电机参数切换有两种方法：

1） 通过设置参数 P0-24（电机参数组选择）选择当前有效电机参数组。

参数	功能定义	出厂值	设定范围	参数说明
P0-24	电机参数组选择	0	0：电机参数组 1	选择电机参数组 1
			1：电机参数组 2	选择电机参数组 2

2） 通过 DI 端子功能选择当前有效电机参数组

DI1~DI5（P4-00~P4-04），任意选择其中一个 DI 端子，将功能设置为 41（电机选择端子 1）。如果 DI 端子无效，则选择了电机参数组 1；如果 DI 端子有效，则选择了电机参数组 2。

参数	名称	设定值	功能描述
P4-00~P4-04	DI1~DI5 端子功能选择	41	电机选择端子 1

如果 P4-00~P4-04 其中任意一个 DI 端子设置为 41，那么 DI 端子优先决定了选择哪组电机，此时电机选择与参数 P0-24 无关。

只有当 P4-00~P4-04所有 DI 端子都**都没有**设置为 41，此时电机参数选择才由 P0-24（电机参数组选择）决定。

两组电机参数在运行过程中，不允许切换。如果需要进行电机切换操作，请在变频器停机后再进行。否则变频器报故障 Err41。

3） 电机 2 参数如下：

参数	功能定义	出厂值	设定范围	参数说明
A2-00	电机类型选择	0	0	普通异步电机
			1	变频异步电机
A2-01	电机额定功率	机型确定	0.1kW~1000.0kW	A2-01~ A2-05为电机铭牌参数。 在采用V/F控制或矢量控制时，为了获得更好的控制性能，需要进行电机参数调谐，而调节结果的准确性，与正确设置电机铭牌参数密切相关。
A2-02	电机额定电压	机型确定	1V~2000V	
A2-03	电机额定电流	机型确定	0.01A~655.35A	
A2-04	电机额定频率	机型确定	0.01Hz~ 最大频率	
A2-05	电机额定转速	机型确定	1rpm~65535rpm	
A2-06	异步电机定子电阻	机型确定	0.001Ω~65.535Ω	A2-06~A2-10 是异步电机的参数，可通过电机调谐获得。其中，静止调谐 1 只能获得 A2-06~A2-08 三个参数，动态调谐可以获得 A2-06~A2-10 外，还可以获得编码器相序 A2-30。 若现场不对电机调谐，可以根据电机厂家提供的参数，输入上述相应参数。
A2-07	异步电机转子电阻	机型确定	0.001Ω~65.535Ω	
A2-08	异步电机漏感抗	机型确定	0.01mH~655.35mH	
A2-09	异步电机互感抗	机型确定	0.1mH~6553.5mH	
A2-10	异步电机空载电流	机型确定	0.01A~A2-03	
A2-37	异步电机调谐选择	0	0：无操作	-
			1：异步机静止部分参数调谐	只辨识部分电机参数定子电阻、转子电阻、漏感
			2：异步机动态完整调谐	辨识所有电机参数
			3：异步机静止完整调谐	辨识所有电机参数

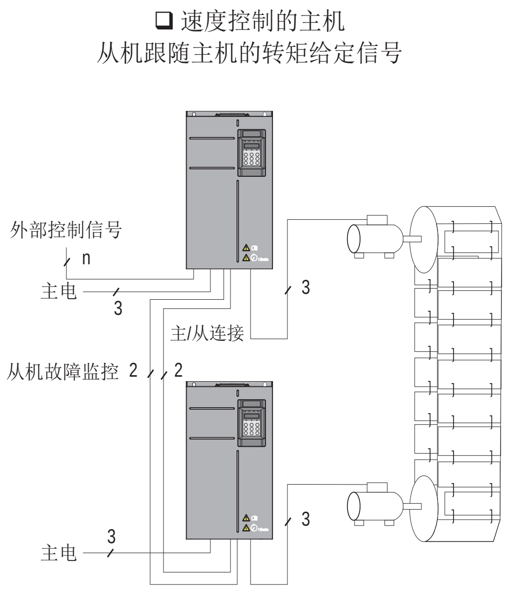
6.8.5 主从控制

主从控制功能是为多传动应用而设计的，其中系统由若干个变频器驱动，同时电机轴通过齿轮、链条或传送带等相互耦合在一起。通过主从控制，负载可以均匀地分配在传动单元之间。外部控制信号只与主机连接。主机通过串行通讯链路来控制从机。

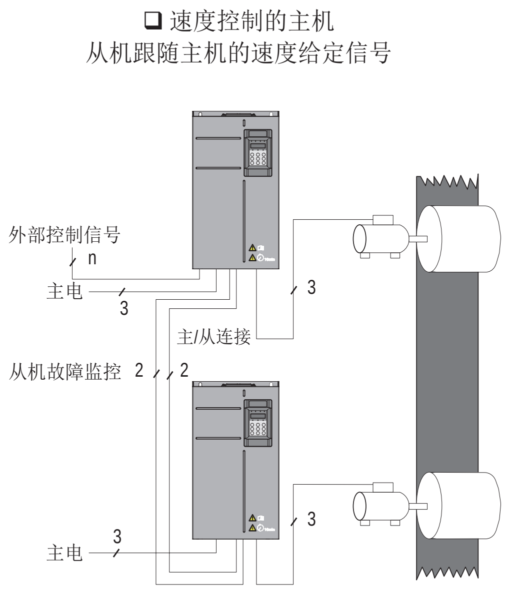
主机是典型的速度控制，其它传动单元跟随主机的转矩或速度给定。一般情况下：

· 当主机和从机的电机轴通过齿轮、链条等进行刚性连接时，从机应该采用转矩控制模式，以使传动单元之间不存在速度差异。（请参见图 6-52）

· 当主机和从机的电机轴采用柔性连接时，从机应该采用速度控制模式，因为传动单元之间允许存在微小的速度差异。当主机和从机都为速度控制时，一般要使用下垂率。（请参见图 6-52）



主从刚性连接示意



主从柔性连接示意

图 6-52 主从连接示意图

为了避免控制上的冲突，所有传动单元（连接到同一个机械设备上）应该只通过主机来接收外部控制信号。一般规则：

· 将所有的外部控制信号只连接到主机上。

· 不要用键盘或现场总线系统来控制从机。

1） 接线

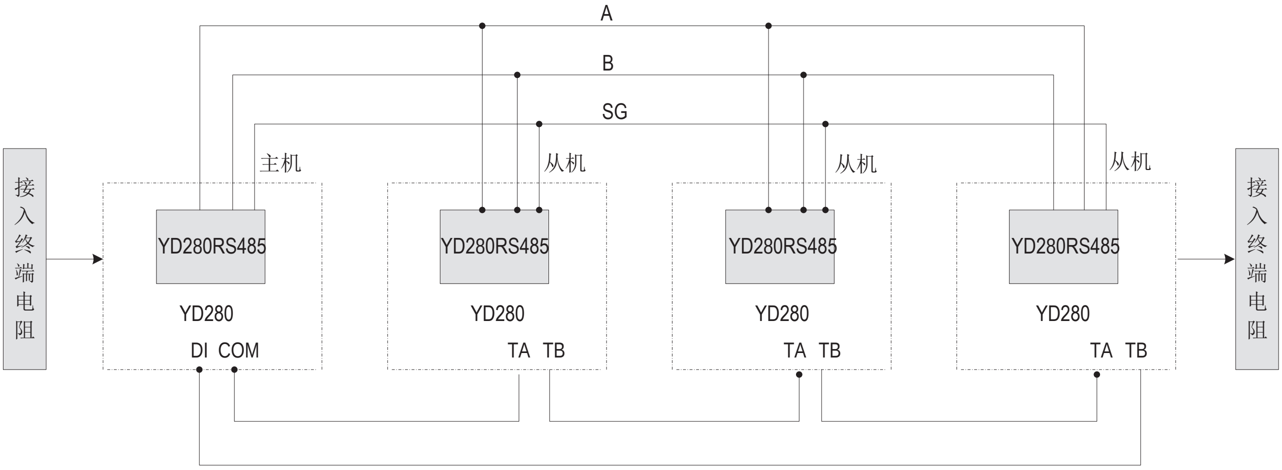


图 6-53 主从连接示意图

① 继电器作为从机故障反馈。

② 从机故障时，从机（可选择 A8-02 个位 =1）通过通讯向主机发送故障信息。

以上两种方式（选一种即可），从机出现故障停机时，主机都会停止运行。

2) 参数设置

- 刚性连接

· 主机：速度控制（A0-00=0）

参数	名称	设定范围	设置值	是否需调整
PD-00	通讯波特率	0000~6009	千位设置值 主机、从机一样	否
A8-00	点对点通讯有效选择	0~1	1	是
A8-01	主从选择	0~1	0	否
P0-10	最大频率	5.00~500.00Hz	50.00Hz (主从一致)	否
P2-10	转矩上限	0.0~200.0%	130.0%	是

· 从机：转矩控制（A0-00=1，转矩控制模式时，请不要设置启动频率，否则将导致启动冲击电流较大）

参数	名称	设定范围	设置值	是否需调整
PD-00	通讯波特率	0000~6009	千位设置值 主机、从机一样	否
A8-00	点对点通讯有效选择	0~1	1	否
A8-01	主从选择	0~1	1	否

参数	名称	设定范围	设置值	是否需调整
A8-02	从机命令跟随主从信息交互	个位：从机命令跟随 0：从机不跟随主机运行命令运行 1：从机跟随主机运行命令运行 十位：从机故障信息传输 0：从机故障信息不传输 1：从机故障信息传输 百位：主机显示从机掉线 0：从机掉线主机不报故障 1：从机掉线主机报故障（Err16）	个位：1 十位：1	否
A8-03	从机接收数据作用选择	0：运行频率 1：目标频率	0	否
A8-11	视窗	0.20~10.00Hz	0.50Hz	是
P0-10	最大频率	5.00~500.00Hz	50.00Hz（主从一致）	否
P8-07	加速时间 4 (转矩控制频率加速时间)	0.0~6500.0s	0.0s	否
P8-08	减速时间 4 (转矩控制频率减速时间)	0.0~6500.0s	0.0s	否
P0-02	运行指令选择	0~2	2	否
A0-00	速度 / 转矩控制方式选择	0~1	1	否
A0-01	转矩给定选择	0~7	0	否
A0-03	转矩数字设定	-200.0~200.0%	130.0%	和主机 P2-10 一致
A0-07	转矩加速时间	0.00~650.00s	0.00s	否
A0-08	转矩减速时间	0.00~650.00s	0.00s	否

NOTE

- 主从控制时，适当减小从机的 A8-11，可以改善启动平滑性，但要大于 0.20Hz，同时若系统加减速时间较短，属于急加速急减速请适当加大 A8-11，A8-11 越大视窗生效越弱。

建议 A8-11 初始值设置为电机额定滑差的一半。电机额定滑差的计算：

电机极对数 = （60 * 电机额定频率）/ 电机额定转速，对其取整

电机同步转速 = （60 * 电机额定频率）/ 电机极对数

电机额定滑差 = （电机同步转速 - 电机额定转速）/ 电机同步转速 * 电机额定频率

- 柔性连接

· 主机：速度控制（A0-00=0）

参数	名称	设定范围	设置值	是否需调整
Pd-00	通讯波特率	0000~6009	千位设置值 主机、从机一样	否
A8-00	点对点通讯有效选择	0~1	1	否
A8-01	主从选择	0~1	0	否
P0-10	最大频率	5.00~500.00Hz	50.00Hz（主从一致）	否
P8-15	下垂控制	0.00~10.00Hz	1.00Hz	是
P0-17	加速时间 1	0.0~6500.0s	主机、从机一样	否
P0-18	减速时间 1	0.0~6500.0s	主机、从机一样	否

· 从机：速度控制（A0-00=1）

参数	名称	设定范围	设置值	是否需调整
PD-00	通讯波特率	0000~6009	千位设置值 主机、从机一样	否
A8-00	点对点通讯有效选择	0~1	1	否
A8-01	主从选择	0~1	1	否
A8-02	个位： 0：不跟主机命令 1：跟随主机命令 十位： 0：不发故障信息 1：发送故障信息	0~11	个位：1 十位：1	否
A8-03	从机接收数据作用选择	0：运行频率 1：目标频率	0	否
P0-02	运行指令选择	0~2	2	否
P0-03	主频率指令选择	0~9	9	否
P0-10	最大频率	5.00~500.00Hz	50.00Hz（主从一致）	否
P0-17	加速时间 1	0.0~6500.0s	主机、从机一样	否
P0-18	减速时间 1	0.0~6500.0s	主机、从机一样	否
P8-15	下垂控制	0.00~10.00Hz	1.00Hz	是
A0-00	速度 / 转矩控制方式选择	0~1	0	否

- 下垂控制 P8-15：

下垂控制允许主机站和从机站之间存在微小的速度差，进而可以避免它们之间的冲突。该参数的默认值是 0.00Hz 。只有当主机和从机都采用速度控制模式时，才需要调整下垂率，对每个传动过程而言，合适的下垂率需要在实践中逐渐寻找，建议不要将 P8-15 设置太大，否则负载较大时，稳态速度将会有明显下降。主机和从机都必须设置 P8-15 。

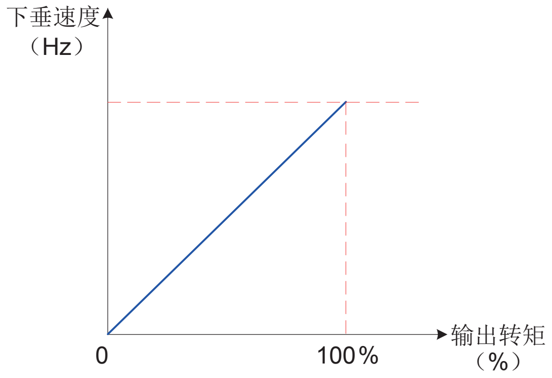


图 6-54 下垂速度与输出转矩关系示意下垂速

度 = 同步频率 * 输出转矩 *（P8-15 / 10）

比如：P8-15 = 1.00，同步频率 50Hz，输出转矩 50%，则：

变频器实际频率 = 50Hz – 50Hz *（50%）*（1.00 / 10）= 47.5Hz

参数	功能定义	出厂值	设定范围	参数说明
A8-00	点对点通讯有效选择	0	0：无效 1：有效	-
A8-01	主从选择	0	0：主机 1：从机	选择变频器为主机还是从机。 点对点通讯时，需要设定Modbus通讯波特率（PD-00）；通讯地址则根据当前为主机或从机内部自动分配，无需专门设置。
A8-02	主从信息交互	011	个位：从机命令跟随 0：从机不跟随主机运行命令运行 1：从机跟随主机运行命令运行 十位：从机故障信息传输 0：从机故障信息不传输（此时主机仍可运行） 1：从机故障信息传输（当从机发生任何故障，主机报 Err55 提示从机发生故障） 百位：主机显示从机掉线（掉线：先连上再断开，一直没连上不属于掉线） 0：从机掉线主机不报故障 1：从机掉线主机报故障（Err16）	注：在与从机连接发生异常的情况下，主机没有运行时不报故障，运行时报故障（Err16）。 当主从控制的从机且 P0-02 设定为 2（通讯控制）时，如果 A8-02 个位设定为 1，则从机跟随主机的运行命令一起运行 / 停机。 A8-02 十位设置为 1，从机故障时，向主机发送故障信息； A8-02 百位设置为 1，从站掉站时报警。
A8-03	从机接收数据作用选择	0	0：运行频率 1：目标频率	0：主机传递给从机频率为主机的运行频率，如果 P8-15 下垂率不为 0，那么主机传递给从机频率为下垂控制频率，这种情况应用在下垂控制或者速度同步控制中（即从机为速度模式）；在负荷分配控制中（即从机为转矩模式），主机传递给从机为主机的运行频率，此时应确保 P8-15 的值为 0。 1：主机传递给从机为主机的目标频率。
A8-04	接收数据零偏	0.00%	-100.00%~100.00%	对接收数据进行修正，用于用户自定义主机和从机之间指令的关系。 A0-00=0 时，A8-04、A8-05 对频率指令修正； A0-00=1 时，A8-04、A8-05 对转矩指令修正。 A8-04 和 A8-05 的计算方法请参考 6.9.6 小节。
A8-05	接收数据增益	1.00	-10.00~100.00	

参数	功能定义	出厂值	设定范围	参数说明
A8-06	点对点通讯中断检测时间	1.0s	0.0s~10.0s	设置点对点通讯的主机或从机通讯中断检测时间，设置为 0 表示不检测。
A8-07	点对点通讯主机数据发送周期	0.001s	0.001s~10.000s	-
A8-11	视窗	0.50Hz	0.20Hz~10.00Hz	用来保证从机的速度在视窗范围内与主机同步。 适当减小从机的 A8-11，可以改善启动平滑性；急加速急减速场合请适当加大 A8-11，A8-11 越大视窗生效越弱。

6.9 输入输出端子

本小节主要介绍数字输入端子 DI、数字输出端子 DO、虚拟 DI、虚拟 DO、模拟量输入端子 AI、模拟量输出端子的功能。

6.9.1 数字输入端子功能（DI）

YD280 系列变频器标配 5 个多功能数字输入端子。

参数	功能定义	出厂值	设定范围	参数说明
P4-00	DI1 端子功能选择	1	0~59	详见下表
P4-01	DI2 端子功能选择	4		
P4-02	DI3 端子功能选择	9		
P4-03	DI4 端子功能选择	12		
P4-04	DI5 端子功能选择	13		
P4-05	保留	0		
P4-06	保留	0		
P4-07	保留	0		
P4-08	保留	0		
P4-09	保留	0		
P4-35	DI1 延迟时间	0.0s	0.0s~3600.0s	设置 DI 端子状态发生变化时，变频器对该变化进行的延时时间。 目前仅 DI1、DI2、DI3 有设置延迟时间的功能。
P4-36	DI2 延迟时间	0.0s	0.0s~3600.0s	
P4-37	DI3 延迟时间	0.0s	0.0s~3600.0s	
P4-38	DI 端子有效模式选择 1	00000	个位：DI1 端子有效状态设定 0：高电平有效 1：低电平有效 十位：DI2 端子有效状态设定（0~1，同上） 百位：DI3 端子有效状态设定（0~1，同上） 千位：DI4 端子有效状态设定（0~1，同上） 万位：DI5 端子有效状态设定（0~1，同上）	选择高电平有效时，相应的 DI 端子与 COM 连通时有效，断开无效。 选择低电平有效时，相应的 DI 端子与 COM 连通时无效，断开有效。

参数	功能定义	出厂值	设定范围	参数说明
P4-40	AI2 模拟量 电压、电流模式选择	00000	0：电压0-10V输入 1：电流0-20mA输入	搭配控制板J9选择

- DI 端子功能选择详细说明如下：

设定值	功能	详细说明
0	无功能	可将不使用的端子设定为“无功能”，以防止误动作。
1	正向运行（FWD）或运行命令	两线式 1（P4-11=0）时为正向运行；两线式 2（P4-11=1）时为运行命令。
2	反向运行（REV）或正反运行方向	三线式 1（P4-11=2）时为反向运行；两线式 2（P4-11=3）时为正反运行方向。
3	三线式运行控制	确定变频器运行方式是三线控制模式。 如果要通过端子设定运行指令，参数 P4-11（端子命令方式）设置为 2（三线式 1）或者 3（三线式 2），端子功能要设置为此功能。
4	正转点动（FJOG）	变频器的运行方式为正转点动运行。 点动运行频率、点动加减速时间参见“6.11.1 点动运行”参数 P8-00、P8-01、P8-02 的说明。
5	反转点动（RJOG）	变频器的运行方式为反转点动运行。 点动运行频率、点动加减速时间参见“6.11.1 点动运行”参数 P8-00、P8-01、P8-02 的说明。
6	端子 UP	通过端子给定频率时修改频率的递增指令。端子有效相当于一直按着△键，端子无效相当于松开△键。
7	端子 DOWN	通过端子给定频率时修改频率的递减指令。端子有效相当于一直按着▽键，端子无效相当于松开▽键。
8	自由停车	变频器停机，电机根据惯性停车。
9	故障复位（RESET）	对变频器的故障进行复位，与键盘上的 STOP/RES 键功能相同。用此功能可实现远距离故障复位。
10	运行暂停	变频器减速停车，端子有效时，所有运行参数均被记忆（如 PLC 参数、摆频参数、PID 参数）端子无效后，变频器恢复之前所记忆的运行状态。
11	外部故障常开输入	当外部信号送给变频器后，变频器报出故障 Err15。
12	多段指令端子 1	可通过这四个端子的 16 种状态，实现 16 段速度或者 16 种其他指令的设定。详细内容见表 6-1 多段指令功能说明。
13	多段指令端子 2	
14	多段指令端子 3	
15	多段指令端子 4	
16	加减速时间选择端子 1	通过两个端子的 4 种状态，实现 4 种加减速时间的选择，详细内容见表 6-2 “通过 DI 端子选择加减速时间”。
17	加减速时间选择端子 2	
18	频率指令切换	用来切换选择不同的频率指令输入方法。 根据 P0-07（频率指令叠加选择）的设置，实现在两种频率指令的切换。
19	UP/DOWN 设定清零（端子、键盘）	当通过面板设定主频率时，端子选择此功能可清除通过键盘上△键、▽键或者端子功能 UP/DOWN（6 或 7）所改变的频率值，使给定频率恢复到 P0-08 设定的值。
20	控制命令切换端子 1	当通过端子设定运行指令时（P0-02=1），端子选择此功能可以进行端子控制与键盘控制的切换。 当通过通讯设定运行指令时（P0-02=2），端子选择此功能可以进行通讯控制与键盘控制的切换。

设定值	功能	详细说明
21	加减速禁止	变频器维持当前运行频率（停机命令除外），不受外部输入频率变化的影响。
22	PID 暂停	PID 暂时失效，变频器维持当前的输出频率，不再进行频率源的 PID 调节。
23	简易 PLC 状态复位	使变频器恢复到简易 PLC 的初始状态。
24	摆频暂停	在摆频工艺功能中，端子选择此功能使摆频功能暂停（变频器以中心频率输出）。
25	记数器输入	在计数工艺功能中， 端子选择此功能输入计数脉冲。
26	计数器复位	在计数工艺功能中，端子选择此功能对计数器状态进行清零处理。
27	长度计数输入	在定长工艺功能中，端子选择此功能输入长度计数。
28	长度复位	在定长工艺功能中使用此端子功能，使长度清零。
29	转矩控制禁止	转矩控制模式下，转矩控制到速度控制切换。端子无效后，恢复到转矩控制模式。
30	保留	保留
31	保留	保留
32	立即直流制动	变频器直接切换到直流制动状态。
33	外部故障常闭输入	当外部信号送给变频器后，变频器报出故障 Err15。
34	频率修改使能	如果端子有效，允许修改频率，如果端子无效，禁止修改频率。
35	PID 作用方向取反	PID 作用方向与 PA-03（PID 作用方向）设定的方向相反。
36	外部停车端子 1	“运行指令选择”为操作面板时（P0-02=0），使变频器停机，相当于键盘上 STOP/RES 键的功能。
37	控制命令切换端子 2	用于在端子和通讯设定运行指令之间的切换。 如果用端子控制运行命令，则选择此功能的端子有效时系统切换为通讯控制；如果用通讯控制运行命令，则选择此功能的端子有效时系统切换为端子控制；
38	PID 积分暂停	PID 的积分调节功能暂停，但 PID 的比例调节和微分调节功能仍然有效。
39	主频率与预置频率切换	主频率切换成预置频率 (P0-08)；
40	辅频率与预置频率切换	辅频率切换成预置频率 (P0-08)。
41	电机端子选择功能	选择电机参数。端子有效时选择电机 2；端子无效时选择电机 1。
42	保留	保留
43	PID 参数切换	当 PID 参数切换条件选择（PA-18）设置为 1（通过端子切换），端子无效时，PID参数使用 PA-05~PA-07；端子有效时则使用 PA-15~PA-17；
44	用户自定义故障 1	变频器报警 Err27，变频器会根据 P9-49（故障保护动作选择）的设定值进行处理。
45	用户自定义故障 2	变频器报警 Err28，变频器会根据 P9-49（故障保护动作选择）的设定值进行处理。
46	速度控制 / 转矩控制切换	变频器在转矩控制与速度控制模式之间切换。 A0-00(速度/转矩控制方式)设置为0，端子有效时，控制方式为转矩模式；端子无效时，控制方式为速度模式。 A0-00(速度/转矩控制方式)设置为1，端子有效时，控制方式为速度模式；端子无效时，控制方式为转矩模式。
47	紧急停车	系系统处于紧急状态时，变频器按照 P8-55 端子急停减 速时间减速，V/F 模式急停减速时间为 0s 时按照最小单位时间进行减速。该输入端子无须持续处于闭合状态，即使处于闭合状态的时间仅仅为一瞬间，也会紧急停止。与一般的减速时间不同，在经过紧急停止减速时间后断开紧急停车输入端子，如果此时变频器端子运行信号仍处于闭合状态，变频器也不会启动，需先断开运行端子后再次输入端子运行指令，变频器才会重新起动。
48	外部停车端子 2	在任何运行指令方式下（面板控制、端子控制、通讯控制），变频器减速停车。此时减速时间固定为减速时间 4（P8-08）。
49	减速直流制动	变频器先减速到停机直流制动起始频率（P6-11），然后进入直流制动状态。
50	本次运行时间清零	变频器本次运行计时时间被清零。 如果本次运行时间小于 P8-53（本次运行到达时间）的设定值（大于 0），在此过程中端子有效，本次运行计时清零。 如本次运行时间大于P8-53的设定值（大于0），此时端子有效，本运行计时不清零。

设定值	功能	详细说明
51	两线式 / 三线式切换	用于在两线式和三线式控制之间进行切换。 如果 P4-11 设为 0（两线式 1），则该功能的端子有效时，切换为三线式 1。 如果 P4-11 设为 1（两线式 2），则该功能的端子有效时，切换为三线式 2。 如果 P4-11 设为 2（三线式 1），则该功能的端子有效时，切换为两线式 1。 如果 P4-11 设为 3（三线式 2），则该功能的端子有效时，切换为两线式 2。
52	反向频率禁止	端子有效时，即使设定了反向频率，但变频器实际设定频率被限定为 0。 与反向频率禁止（P8-13）功能相同。

6.9.2 数字输出端子功能（DO）

YD280 系列变频器标配，1 个多功能数字量输出端子，1 个多功能继电器输出端子，1 个 FM 端子。

参数	功能定义	出厂值	设定范围	参数说明
P5-00	FM 端子输出模式选择	0	0：脉冲输出（FMP） 1：开关量输出（FMR）	FM 端子是可编程的复用端子，可作为高速脉冲输出端子（FMP），也可以作为集电极开路的开关量输出端子（FMR）。 作为脉冲输出 FMP 时，输出脉冲的最高频率为 100kHz，FMP 相关功能参见 P5-06 说明。
P5-01	FMR 功能选择（集电极开路输出端子）	0	0~41	用于选择 5 个数字输出的功能，其中（T/A-T/B-T/C）为控制板上的继电器。
P5-02	控制板继电器输出功能选择（T/A-T/B-T/C）	2		
P5-04	DO1 输出功能选择	1		
P5-17	FMR 输出延迟时间	0.0s	0.0s~3600.0s	-
P5-18	RELAY1 输出延迟时间	0.0s	0.0s~3600.0s	-
P5-20	DO1 输出延迟时间	0.0s	0.0s~3600.0s	-
P5-22	DO 输出端子有效状态选择	00000	个位：FMR 有效状态选择 0：正逻辑 1：反逻辑 十位：RELAY1 有效状态 0：正逻辑 1：反逻辑 百位：无 千位：DO1 端子有效状态 0：正逻辑 1：反逻辑 万位：无	0：正逻辑（等效常开接点） “有效状态”：DO 端子和 COM/CME 端子内部连通。 “无效状态”：DO 端子和 COM/CME 端子断开。 1：反逻辑（等效常闭接点） “有效状态”：DO 端子和 COM/CME 端子断开。 “无效状态”：DO 端子和 COM/CME 端子内部连通。

● 输出端子功能选择详细说明：

设定值	功能	说明
0	无输出	输出端子无任何功能
1	变频器运行中	变频器正处于运行状态，有输出频率（可以为零），此时输出“有效”信号。
2	故障输出 (为自由停机的故障)	当变频器故障停机时，输出”有效”信号。
3	频率水平检测 1	当运行频率高于频率检测值时，DO 输出“有效”信号，当运行频率低于检测值减去 FDT 滞后值（P8-19 设定值与 P8-20 的乘积），DO 输出“有效”信号取消。P8-19、P8-20 的详细说明参考“附录 A或B 功能参数表”。
4	频率到达	变频器的运行频率，处于目标频率一定范围内（目标频率 ±P8-21 的设定值与最大频率的乘积），DO 输出”有效”信号。
5	零速运行中（停机时不输出）	变频器运行且输出频率为 0 时，输出”有效”信号。在变频器处于停机状态时，该信号“无效”。
6	电机过载预报警	电机过载保护动作之前，根据过载预警系数（P9-02）进行判断，在超过预报警阈值后输出”有效”信号。（预报警阈值的计算参照 6.6 保护功能）
7	变频器过载预报警	在变频器过载保护发生前 10s，输出”有效”信号。
8	设定计数值到达	在计数功能中，当计数值达到 PB-08 所设定的值时，输出”有效”信号。
9	指定计数值到达	在计数功能中，当计数值达到 PB-09 所设定的值时，输出”有效”信号。 当计数值达到 PB-09 所设定的值时，输出”有效”信号。计数功能参考 6.8.3 小节说明。
10	长度到达	在定长功能中，当检测的实际长度超过 PB-05 所设定的长度时，输出”有效”信号。
11	简易 PLC 循环完成	当简易 PLC 运行完成一个循环后，输出一个宽度为 250ms 的脉冲信号。
12	累计运行时间到达	变频器累计运行时间超过 P8-17（设定累计上电到达时间）所设定时间时，输出”有效”信号。
13	频率限定中	当设定频率超出上限频率或者下限频率，且变频器输出频率达到上限频率或者下限频率时，输出”有效”信号。
14	转矩限定中	变频器在速度控制模式下，当输出转矩达到转矩限定值时，输出”有效”信号。
15	运行准备就绪	变频器上电后，处于无异常状态时，输出”有效”信号。
16	AI1>AI2	当模拟量输入 AI1 的值大于 AI2 的输入值时，输出”有效”信号。
17	上限频率到达	当运行频率到达上限频率（P0-12）时，输出”有效”信号。
18	下限频率到达（停机时不输出）	当 P8-14（给定频率低于下限频率运行模式）设置为 1（停机）时，无论运行频率是否到达下限频率，都输出”无效”信号。 当 P8-14（给定频率低于下限频率运行模式）设置为 0（以下限频率运行）或者 2（零速运行）时，且运行频率到达下限频率时，输出”有效”信号。
19	欠压状态	变频器处于欠压状态时，输出”有效”信号。
20	通讯设定	端子“有效”或者“无效”状态由通讯地址 0x2001 的设定值控制。
21	保留	保留
22	保留	保留
23	零速运行中 2（停机时也输出）	变频器运行且输出频率为 0 时，输出”有效”信号。在变频器处于停机状态时，该信号也为”有效”。
24	累计上电时间到达	变频器累计上电时间（P7-13）超过 P8-16（设定累计上电到达时间）所设定时间时，输出”有效”信号。
25	频率水平检测 2	当运行频率高于频率检测值时，DO 输出”有效”信号，当运行频率低于检测值减去频率检测滞后值（P8-28 设定值与 P8-29 的乘积），DO 输出”有效”信号取消。 P8-28、P8-29 的详细说明参考“附录 A或B 功能参数表”。
26	频率 1 到达	变频器的运行频率，处于 P8-30（任意到达频率检测值 1）频率检出范围内，DO 输出”有效”信号。 频率检出范围：P8-30-P8-31×P0-10（最大频率）~P8-30+P8-31×P0-10
27	频率 2 到达	变频器的运行频率，处于 P8-32（任意到达频率检测值 2）频率检出范围内，DO 输出”有效”信号。 频率检出范围：P8-32-P8-33×P0-10（最大频率到）~P8-32+P8-33×P0-10。
28	电流 1 到达	变频器的输出电流，处于 P8-38（任意到达电流 1）电流的范围内，DO 输出”有效”信号。电流检出范围 = P8-38-P8-39×P1-03（电机额定电流）~P8-38+P8-39×P1-03。
29	电流 2 到达	变频器的输出电流，处于 P8-40（任意到达电流 2）电流的范围内，DO 输出”有效”信号。电流检出范围 = P8-40-P8-41×P1-03（电机额定电流）~P8-40+P8-41×P1-03。

设定值	功能	说明
30	定时到达	当定时功能选择 (P8-42) 有效时，变频器本次运行时间达到所设置的定时时间后，输出”有效”信号。定时时间由 P8-43 和 P8-44 设置。
31	AI1 输入超限	当模拟量输入 AI1 的值大于 P8-46(AI1 输入保护上限) 或小于 P8-45(AI1 输入保护下限) 时，输出”有效”信号。
32	掉载中	变频器处于掉载状态时，输出”有效”信号。
33	反向运行中	变频器处于反向运行时，输出”有效”信号。
34	零电流状态	变频器的输出电流，处于零电流的范围内，且持续时间超过 P8-35（零电流检测延迟时间）后，DO 输出”有效”信号。 零电流检出范围 =0~ P8-34×P1-03。
35	模块温度到达	逆变模块散热器温度（P7-07）达到所设置的模块温度到达值（P8-47）时，输出”有效”信号。
36	输出电流超限	变频器的输出电流，大于 P8-36（输出电流超限值），且持续时间超过 P8-37（输出电流超限检测延迟时间）后，DO 输出”有效”信号。
37	下限频率到达 (停机也输出)	当运行频率到达下限频率 (P0-14) 时，输出”有效”信号。在停机状态时，也输出”有效”信号。
38	告警	当变频器发生故障，且该故障保护动作选择为继续运行时，DO 端子输出”有效”信号。故障保护动作选择可以参照 P9-47~P9-50。
39	电机过温	当电机温度达到 P9-58（电机过热预报警阈值）时，输出”有效”信号。（电机温度可通过 U0-34 查看）
40	本次运行时间到达	变频器本次开始运行时间超过 P8-53（本次运行到达时间设定）所设定的时间时，输出”有效”信号。
41	故障（为自由停机的故障且欠压不输出）	当变频器发生故障时（除了欠压故障之外），DO 输出”有效”信号。

6.9.3 虚拟数字输入端子功能（VDI）

虚拟数字量输入功能，与控制板 DI 输入功能相似，可以作为多功能数字量输入使用。

下面举例说明虚拟 VDI 的使用方法。

例 1: 当虚拟 VDI 端子有效状态设置模式 (A1-05)，设置为 00000 时 (选择 VDO 状态决定 VDI 状态)，要完成如下功能：“如果 AI1 输入超出上下限时，需要变频器故障报警并停机”。可以采用如下设置方法：

步骤	参数设置
1	设置 VDI1 的功能为“用户自定义故障 1”（A1-00=44）
2	设置 VDI1 端子有效状态模式为由 VDO1 确定（A1-05=00000）
3	设置 VDO1 输出功能为“AI1 输入超出上下限”（A1-11=31）

设置完上述步骤后，当 AI1 输入超出上下限时，则 VDO1 输出为 ON 状态，此时 VDI1 输入端子状态有效，变频器 VDI1 接收到用户自定义故障 1，变频器会故障报警 Err27 并停机。

例 2: 当虚拟 VDI 端子有效状态设置模式 (A1-05)，设置为 11111 时 (选择参数 A1-06 设定 VDI 状态)，要完成如下功能：“当变频器上电后，需要变频器自动进入运行状态”，可以采用如下设置方法：

步骤	参数设置
1	设置 VDI1 的功能为“正转运行”（A1-00=1）
2	设置 VDI1 端子有效状态模式为由参数设置（A1-05= 11111）
3	设置 VDI1 端子状态为有效（A1-06=11111）
4	设置命令源为“端子控制”（P0-02=1）
5	设置启动保护选择为“不保护”（P8-18=0）

设置完上述步骤后，如果变频器上电完成初始化后，检测到 VDI1 为有效，且此端子对应正转运行，相当于变频器接收到一个端子正转运行命令，变频器随即开始正转运行。

参数	功能定义	出厂值	设定范围	参数说明
A1-00	虚拟 VDI1 端子功能选择	0	0~59	虚拟 VDI1~VDI5 可以作为多功能数字量输入使用，功能 0~52 与普通 DI 设置相同，53~59 保留。详细设置请参考 6.9.1 小节 P4-00~P4-04 的介绍。
A1-01	虚拟 VDI2 端子功能选择	0	0~59	
A1-02	虚拟 VDI3 端子功能选择	0	0~59	
A1-03	虚拟 VDI4 端子功能选择	0	0~59	
A1-04	虚拟 VDI5 端子功能选择	0	0~59	
A1-05	虚拟 VDI 端子有效状态设置模式	00000	个位：虚拟 VDI1 0：由虚拟 VDOx 的状态决定 VDI 是否有效 1：由参数 A1-06 设定 VDI 是否有效 十位：虚拟 VDI2（0~1，同上） 百位：虚拟 VDI3（0~1，同上） 千位：虚拟 VDI4（0~1，同上） 万位：虚拟 VDI5（0~1，同上）	虚拟 VDI 的状态可以有两种设定方式，并通过 A1-05 来选择。 设置为 0：VDI 是否为有效状态，取决于 VDO 输出为有效或无效，且 VDIx 唯一绑定 VDOx（x 为 1~5）。 设置为 1：通过参数 A1-06 的二进制位，分别确定虚拟输入端子的状态。
A1-06	虚拟 VDI 端子状态设置	00000	个位：虚拟 VDI1 0：无效 1：有效 十位：虚拟 VDI2 0：无效 1：有效 百位：虚拟 VDI3 0：无效 1：有效 千位：虚拟 VDI4 0：无效 1：有效 万位：虚拟 VDI5 0：无效 1：有效	-

6.9.4 虚拟数字输出端子功能（VDO）

虚拟数字量输出功能，与控制板 DO 输出功能相似，可用于与虚拟数字量输入 VDIx 配合，实现一些简单的逻辑控制。

VDO 与 VDI 可以配合使用，用来实现灵活的控制方式，使用方法参考 6.9.3 虚拟 VDI 小节的举例。

参数	功能定义	出厂值	设定范围	参数说明
A1-11	虚拟 VDO1 输出功能选择	0	0：与物理 DIx 内部短接 1~41：见 P5 组物理 DO 输出选择	当虚拟 VDOx 输出功能选择为 0 时，VDO1~VDO5 的输出状态由控制板上的 DI1~DI5 输入状态确定，此时 VDOx 与 DIx 一一对应。 当虚拟 VDOx 输出功能选择为非 0 时，VDOx 的功能设置及使用方法，与P5 组DO输出相关参数相同，请参考6.9.6小节中 P5 组相关参数说明。
A1-12	虚拟 VDO2 输出功能选择	0	0：与物理 DIx 内部短接 1~41：见 P5 组物理 DO 输出选择	
A1-13	虚拟 VDO3 输出功能选择	0	0：与物理 DIx 内部短接 1~41：见 P5 组物理 DO 输出选择	
A1-14	虚拟 VDO4 输出功能选择	0	0：与物理 DIx 内部短接 1~41：见 P5 组物理 DO 输出选择	
A1-15	虚拟 VDO5 输出功能选择	0	0：与物理 DIx 内部短接 1~41：见 P5 组物理 DO 输出选择	
A1-16	VDO1 输出延迟时间	0.0s	0.0s~3600.0s	-

参数	功能定义	出厂值	设定范围	参数说明
A1-17	VDO2 输出延迟时间	0.0s	0.0s~3600.0s	-
A1-18	VDO3 输出延迟时间	0.0s	0.0s~3600.0s	-
A1-19	VDO4 输出延迟时间	0.0s	0.0s~3600.0s	-
A1-20	VDO5 输出延迟时间	0.0s	0.0s~3600.0s	-
A1-21	VDO 输出端子有效状态选择	00000	个位：VDO1 0：正逻辑 1：反逻辑 十位：VDO2 0：正逻辑 1：反逻辑 百位：VDO3 0：正逻辑 1：反逻辑 千位：VDO4 0：正逻辑 1：反逻辑 万位：VDO5 0：正逻辑 1：反逻辑	正逻辑：端子无效输出 0;端子有效输出 1; 反逻辑：端子无效输出 1;端子有效输出 0;

6.9.5 模拟量输入端子

YD280 系列变频器标配 2 个模拟量多功能输入端子。

以下参数用于将 AI 当做 DI 使用（AI 的更多功能请参见“6.2.3 通过“模拟量”设定主频率”）。当 AI 作为 DI 使用时，如果 AI 输入电压大于 7V 时，AI 端子状态为高电平；如果 AI 输入电压低于 3V 时，AI 端子状态为低电平；当 AI 输入电压在 3V~7V 之间为滞环。图 6-56 说明了 AI 输入电压与相应 DI 状态的关系：

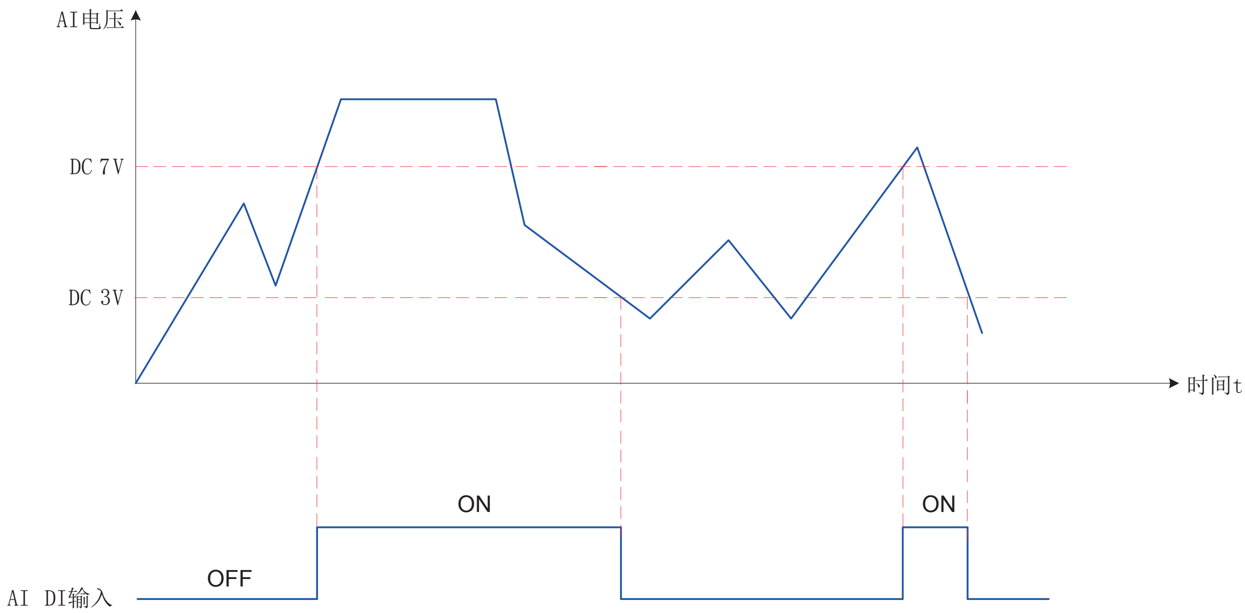


图 6-55 AI 输入电压与 DI 状态的关系图

参数	功能定义	出厂值	设定范围	参数说明
A1-07	AI1 端子作为 DI 时的功能选择	0	0~59	AI 作为 DI 时的功能设置，功能 0~52 与普通 DI 设置相同，53~59 保留。具体请参考 6.9.1 小节 P4 组相关DI 设置的说明。
A1-08	AI2 端子作为 DI 时的功能选择	0	0~59	
A1-09	面板旋钮 作为 DI 时的功能选择	0	0~59	
A1-10	AI 作为 DI 时有效模式选择	000	个位：AI1 0：高电平有效 1：低电平有效 十位：AI2（0~1，同个位） 百位：保留	AI 端子为高电平时，A1-10 对应位的值设置为 0 时，此时认为 AI 端子有效，A1-10 设置为 1 时，此时认为 AI 端子无效； AI 端子为低电平时，A1-10 对应位的值设置为 0 时，此时认为 AI 端子无效，A1-10 设置为 1 时，此时认为 AI 端子有效。

6.9.6 模拟量、脉冲输出端子

YD280 系列变频器标配 1 个模拟量输出端子 AO1。

以下参数一般用于修正模拟输出的零漂及输出幅值的偏差。也可以用于自定义所需要的 AO 输出曲线。

参数	功能定义	出厂值	设定范围	参数说明
P5-00	FM 端子输出模式选择	0	0：脉冲输出（FMP） 1：开关量输出（FMR）	FM 端子是可编程的复用端子，可作为高速脉冲输出端子（FMP），也可以作为集电极开路的开关量输出端子（FMR）。 作为脉冲输出 FMP 时，输出脉冲的最高频率为 100kHz，FMP 相关功能参见 P5-06 说明。
P5-06	FMP 输出功能选择（脉冲输出端子）	0	0~16	详细见下表 6-5。
P5-07	AO1 输出功能选择	0	0~16	
P5-08	保留	-	-	
P5-09	FMP 输出最大频率	50.00kHz	0.01kHz~100.00kHz	当 FM 端子选择作为脉冲输出时，该参数用于选择输出脉冲的最大频率值。
P5-10	AO1 零偏系数	0.0%	-100.0%~+100.0%	AO1 零偏系数的 100% 对应 10V 或者 20mA。 零偏 = 零偏系数 ×10v(或者 20mA)
P5-11	AO1 增益	1.00	-10.00~+10.00	-
P5-12	保留	-	-	-
P5-13	保留	-	-	-

AO（模拟量输出）0~10V 对应 0%~100%。

FM（脉冲输出） 0~100kHz 对应 0%~100%，当 FM 输出功能为 1（频率设定）时，如果变频器设定频率为最大频率的 50%，P5-09 设定为 100kHz，则 FM 端子的输出频率为 50%×100kHz = 50kHz。

表 6-5 脉冲或者模拟量输出的功能与范围对应关系表

设定值	功能定义	功能范围
0	运行频率	0~ 最大输出频率
1	设定频率	0~ 最大输出频率
2	输出电流	0~2 倍电机额定电流
3	电机输出转矩 （绝对值，相对电机额定转矩的百分比）	0~2 倍电机额定转矩
4	输出功率	0~2 倍额定功率
5	输出电压	0~1.2 倍变频器额定电压
6	保留	保留
7	AI1	0V~10V
8	AI2	0V~10V（或者 0~20mA）
9	**面板电位器**	0V~10V
10	长度	0~ 最大设定长度
11	计数值	0~ 最大计数值
12	通讯设定	0.0%~100.0%
13	电机转速	0~ 最大输出频率对应的转速
14	输出电流	0.0A~1000.0A
15	母线电压	0.0V~1000.0V
16	电机输出转矩（实际值，相对电机的百分比）	-2 倍电机额定转矩 ~2 倍电机额定转矩

● AO 零偏系数（P5-10）和 AO 增益的（P5-11）计算方法如下：

例如，若模拟输出内容为运行频率，希望频率为 0Hz（X1）时，修正后输出 8V（Y1），频率为 40Hz（X2）时，修正后输出 4V（Y2）。

增益计算公式为：

$$K = \frac{(Y1-Y2)*Xmax}{(X1-X2)*Ymax}$$

零偏系数计算公式为：

$$b = \frac{(X1*Y2)-(X2*Y1)}{(X1-X2)*Ymax}\times 100\%$$

通过查表 6-6 和表 6-7 可知，Xmax 为最大输出频率 50Hz（假设最大频率 P0-10 为 50Hz）；Ymax 为电压，值为 10V。

$$K = \frac{(8-4)\times 50}{(0-40)\times 10} = -0.5\text{（增益）}$$

$$b = \frac{(0\times 4-40\times 8)}{(0-40)\times 10}\times 100\% = 80\%\text{（零偏系数）}$$

故 AO1 增益（P5-11）应该设为－0.5，AO1 零偏系数（P5-10）应该设为 80%。

表 6-6 模拟量输出信号类型与其对应的最大值（Ymax）关系表：

输出信号类型	输出信号对应的最大值（Ymax）
电压	10V
电流	20mA

表 6-7 模拟输出内容与其对应的最大值（Xmax）关系表

模拟输出内容	模拟输出内容对应的最大值（Xmax）
运行频率	最大输出频率
设定频率	最大输出频率
输出电流	2 倍电机额定电流
输出转矩 (绝对值)	2 倍电机额定转矩
输出功率	2 倍额定功率
输出电压	1.2 倍变频器额定电压
脉冲输入	100.00kHz
AI1	10V
AI2	10V 或者 20mA
面板电位器	10V
长度	最大设定长度
计数值	最大计数值
通讯设定	100.0%
电机转速	最大输出频率对应的转速
输出电流	1000.0A
输出电压	1000.0V
输出转矩 (实际值)	相对 2 倍电机额定转矩

6.10 通讯

YD280 系列变频器支持 Modbus通讯协议。

上位机通过这些通讯协议可以实现对变频器的控制、监视及参数的修改查看操作。在变频器通讯之前要保证相关通讯参数设置正确，否则可能无法通讯。

参数	功能定义	出厂值	设定范围	参数说明
P0-28	串口通讯协议选择	0	0：Modbus 协议	
Pd-00	通讯波特率	5005	个位：Modbus 波特率 0：300bps 1：600bps 2：1200bps 3：2400bps 4：4800bps 5：9600bps 6：19200bps 7：38400bps 8：57600bps 9：115200bps	此参数用来设定上位机与变频器之间的数据传输速率。波特率越大，通讯速度越快。 注意，上位机与变频器设定的波特率必须一致，否则，通讯无法进行。
Pd-01	MODBUS 数据格式	0	0：无校验：数据格式 <8，N，2> 1：偶检验：数据格式 <8，E，1> 2：奇校验：数据格式 <8，O，1> 3：无校验：数据格式 <8，N，1>	上位机与变频器设定的数据格式必须一致，否则，通讯无法进行。
Pd-02	本机地址	1	1~247	本机地址具有唯一性 是实现上位机与变频器点对点通讯的基础。
Pd-03	MODBUS 应答延迟	2	0~20ms	变频器数据接受结束到向上位机发送数据的中间间隔时间。 如果应答延时小于系统处理时间，则应答延时以系统处理时间为准； 如果应答延时大于系统处理时间，则系统处理完数据后，要延迟等待，直到到达应答延迟时间，才往上位机发送数据。
Pd-04	串口通讯超时时间	0.0	0.0s（无效） 0.1~60.0s	当设置为 0.0s，通讯超时时间无效。通常情况下，都将其设置成无效。在连续通讯的系统中，此参数可以监视通讯状况。 设置成有效值时，如果本次通讯与下一次通讯的间隔时间超出 PD-04（通讯超时时间），系统将报通讯故障错误（Err16）。

参数	功能定义	出厂值	设定范围	参数说明
Pd-05	MODBUS、 通讯数据格式	01	个位：Modbus 0：非标准的 Modbus 协议 1：标准的 Modbus 协议 十位：保留	个位： 0：读命令时，从机返回字节数比标准的 Modbus 协议多一个字节。 1：选择标准的 Modbus 协议。
Pd-06	通讯读取电流分辨率	0	0：0.01A	用来确定通讯读取输出电流时，电流值的输出单位。

NOTE

- Pd-06=0（电流显示为两位小数），通讯读取电流时可通过选择该参数确定电流值输出单位。目的是客户上位机编程读取电流时可统一按一位小数计算，不需要考虑变频器大小功率存在电流小数点不一致的转换。

6.10.1 读写参数

1） 读取参数

对于 P0~PF、A0~AF 组参数数据，其通讯地址高八位是功能组编号，低八位是参数在功能组中的序号转换为十六进制的数，但参数P群组以十六进制F表示,参数A群组还是以十六进制A表示。例如：

参数 P0-16，其通讯地址为 F010H，其中 F0H 代表 P0 组参数，10H 代表参数在功能组中序号为 16 转换为十六进制数后的值；

参数 AC-08，其通讯地址为 AC08H，其中 ACH 代表 AC 组参数，08H 代表参数在功能组中序号 8 转换为十六进制数后的值。

上位机要读取参数时，要给变频器发送读命令。下面以标准 Modobus 协议为例说明上位机读取变频器数据时的通讯过程。

例如，要读取参数 P0-10（最大频率），发送读命令为 01 03 F0 0A 01 DE D7 。每一字节代表的含义如下：变频器地址：01H（可以设置）；读命令：03H；参数 P0-10 地址：F0 0AH；参数个数：01H；CRC 校验：DE D7H。（读取其他参数的方法与上述相同）

表 6-8 上位机读取变频器数据

主机读取命令帧		从机应答帧	
地址	01H	地址	01H
读命令	03H	读命令	03H
P0-10 地址	F0H	字节数	02H
	0AH	参数内容	13H
参数个数高位	00H		88H
参数个数低位	01H	CRC 高位	B5H
CRC 高位	97H	CRC 低位	12H
CRC 低位	08H	-	-

2） 写入参数

对于 P0~PF 组参数，其通讯地址高八位，根据是否写入 EEPROM，区分为 00~0F 或 P0~FF，低八位是参数在功能组中的序号转换为十六进制的数，例如：写功能参数 P0-16，不需要写入 EEPROM 时，其通讯地址为 0010H；需要写入 EEPROM 时，其通讯地址为 F010H。

对于 A0~AF 组参数数据，其通讯地址高八位，根据是否需要写入 EEPROM，区分为 40~4F 或 A0~AF，低八位是参数在功能组中的序号转换为十六进制的数，例如：写功能参数 AC-08，不需要写入 EEPROM 时，其通讯地址为 4C08H；需要写入 EEPROM 时，其通讯地址为 AC08H。

例如，要给参数 AC-16 写入 2（不写 EEPROM），发送写入命令为：

01 06 4C 10 00 02 1F 5E

每一字节代表的含义如下：变频器地址：01H（可以设置）；写入命令：06H；参数 AC-16 地址：4C 10H；写入值：0002H；CRC 校验：1F 5EH。（给其他参数写入数据的方法与上述相同）

主机写入命令帧		从机应答帧	
ADDR	01H	ADDR	01H
CMD	06H	CMD	06H
参数地址高位	4CH	参数地址高位	4CH
参数地址低位	10H	参数地址低位	10H
写入数据高位	00H	写入数据高位	00H
写入数据高位	02H	写入数据高位	02H
CRC 高位	1FH	CRC 高位	1FH
CRC 低位	5EH	CRC 低位	5EH

6.10.2 读取状态参数

状态参数包括，U 组监视参数、变频器故障描述、变频器运行状态。

- U 组监视参数地址定义如下：U0~UF，其通讯地址高八位为 70~7F，低八位为监视参数在组中的序号转换成十六进制数据的值，例如：U0-11，其通讯地址为 700BH。
- 通讯读取变频器故障描述时，通讯地址固定为 8000H，上位机通过读取该地址数据，可以获取当前变频器故障代码，故障代码描述见“附录 C 功能参数表”中 P9-14 参数定义。
- 通讯读取变频器运行状态时，通讯地址固定为 3000H，上位机通过读取该地址数据，可以获取当前变频器运行状态信息，读取状态字定义如下：1：正转运行；2：反转运行；3：停机。

6.10.3 控制命令

P0-02(运行指令选择) 设置为 2（通讯控制）时，上位机选择利用通讯设定运行指令，可以实现对变频器的正、反转、启停等控制。控制命令通讯地址和命令功能定义如下：

控制命令通讯地址	命令功能
2000H	1：正转运行
	2：反转运行
	3：正转点动
	4：反转点动
	5：自由停机
	6：减速停机
	7：故障复位

6.10.4 设定频率、转矩

如果主频率、转矩上限、V/F 分离电压、PID 给定、PID 反馈等选择为“通讯给定”时，要通过通讯地址 1000H，写入频率、转矩等值。上位机可以设定的数据范围为 -10000~10000，对应相对给定值的 -100.00%~100.00%。

例如，变频器的主频率选择（P0-03）设置为通讯给定，上位机要写入频率时，要给变频器发送写命令。下面以 Modobus 协议为例说明过程。利用通讯给定方式设置频率为 8000 时，发送写命令为 01 06 10 00 1F 40 84 CA

每一字节代表的含义如下，变频器地址：01H（可以设置），写命令：06H，给定频率的地址：1000H，目标频率值：1F40H（转换为十进制为 8000）；CRC 校验：84CAH。同理，利用通讯给定方式设置转矩为 -8000 时，发送写命令为

01 06 10 00 E0 C0 C4 9A 。其中，E0C0 为 -8000 转换为十六进制取低四位。

注意：通讯方式给定频率的范围为 -10000 ~ +10000（十进制），对应的频率范围为 -100.00%~ +100.00% （-100.00% 对应负最大频率，0.00 对应最小频率，+100.00% 对应最大频率）。假设 P0-10“最大频率”设为 50Hz，如果写命令中写入的频率值 1F40H，转换 10 进制为 8000。那么实际写入的频率值为 50*80.00%=40Hz。

主机命令信息		从机回应信息	
ADDR	01H	ADDR	01H
CMD	06H	CMD	06H
参数地址高位	10H	参数地址高位	10H
参数地址低位	00H	参数地址低位	00H
数据内容高位	1FH	数据内容高位	1FH
数据内容低位	40H	数据内容低位	40H
CRC 高位	84H	CRC 高位	84H
CRC 低位	CAH	CRC 低位	CAH

6.10.5 控制数字输出（DO、RELAY、FMR）

当数字输出端子功能选择为 20 时（通讯控制），上位机利用通讯方式，实现对变频器数字输出端子的控制。数字输出端子控制通讯地址和命令内容定义如下：

数字输出端子控制通讯地址	命令内容
2001H	BIT0：DO1 输出控制 BIT1：- BIT2：RELAY1 输出控制 BIT3：- BIT4：FMR 输出控制 BIT5：VDO1 BIT6：VDO2 BIT7：VDO3 BIT8：VDO4 BIT9：VDO5

当模拟量输出 AO1（P5-07）、FMP 输出（P5-06）输出功能选择为 12 时（通讯设定），上位机利用通讯方式，可以实现对变频器模拟量、高速脉冲输出的控制。控制通讯地址和命令内容定义如下：

输出控制通讯地址		命令内容
AO1	2002H	0~7FFF 表示 0% ~100%
FMP	2004H	

NOTE

- 利用通讯方式给变频器写命令的数据是经过校正后输出。

6.10.7 初始化参数

当需要通过上位机实现对变频器的参数初始化操作时，需要使用该功能。在通讯恢复出厂值操作时，无论用户密码为 0 还是非 0，均需要进行用户密码校验，校验通过后，在 30 秒内，上位机进行参数初始化操作。用户密码校验的通讯地址为 1F00H，直接将正确的用户密码写入该地址，则可以完成密码校验。数据内容定义如下：

参数初始化通讯地址	命令功能
1F01H	1：恢复出厂参数
	2：清楚记录信息
	4：恢复用户备份参数
	501：备份用户当前参数

6.11 辅助功能

6.11.1 点动运行

在有些应用场合需要变频器短暂低速运行，便于测试设备的状况，此时采用点动运行。点动运行时，启动方式固定为直接启动方式（P6-00=0），停机方式固定为减速停机（P6-10=0）。

参数	功能定义	出厂值	设定范围	参数说明
P0-25	加减速时间基准频率	0	0：最大频率 P0-10 1：设定频率 2：100Hz	-
P8-00	点动运行频率	2.00Hz	0.00Hz~ 最大频率	-
P8-01	点动加速时间	20.0s	0.0s~6500.0s	点动加速时间指变频器从零频，加速到“加减速基准频率 P0-25”所需时间
P8-02	点动减速时间	20.0s	0.0s~6500.0s	点动减速时间指变频器从“加减速基准频率 (P0-25 确定)”减速到零频所需时间。
P8-27	端子点动优先	0	0：无效；1：有效	设置是否端子点动功能的优先级最高。 P8-27 设置为 1 时，在运行过程中任意一个DI端子功能（P4-00~P4-04）设置为 4（正转点动）或者 5（反转点动）时，点动运行状态立即生效。

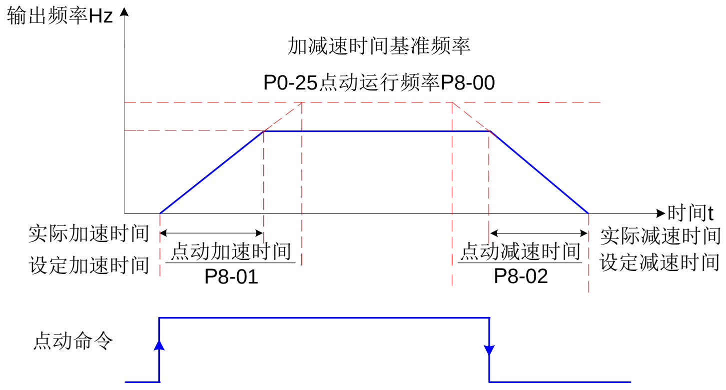


图 6-56 点动运行示意图

表 6-13 用操作面板点动运行的参数设置

步骤	点动正转	点动反转
1	MF.K 键功能选择 P7-01 设置为 3（点动正转）	MF.K 键功能选择 P7-01 设置为 4（点动反转） 反向频率禁止 P8-13 设置为 0，即允许反转运行。
2	运行指令选择 P0-02 设置为 0（操作面板）	运行指令选择 P0-02 设置为 0（操作面板）
3	设置点动运行频率 P8-00、点动加速时间 P8-01、点动减速时间 P8-02	设置点动运行频率 P8-00、点动加速时间 P8-01、点动减速时间 P8-02
4	在变频器停机状态下，按下 MF.K 键，变频器开始点动正转运行，放开 MF.K 键，变频器即减速停机。	在变频器停机状态下，按下 MF.K 键，变频器开始点动反转运行，放开 MF.K 键，变频器即减速停机。

6.11.2 跳频、正反转死区时间、反向频率禁止

1） 跳跃频率设置

通过设置跳跃频率，可以使变频器避开负载的机械共振点。YD280 可设置两个跳跃频率点，若将两个跳跃频率均设为 0，则跳跃频率功能取消。

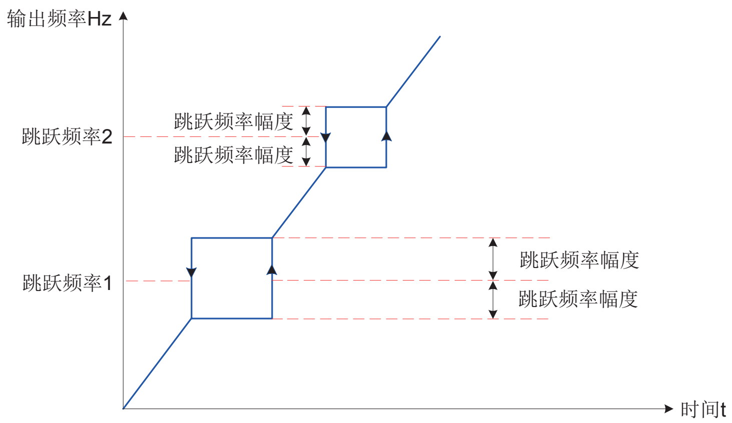


图 6-57 跳跃频率示意图

上图中，在加速过程中，运行频率加速到跳跃频率边界，变频器会以当前的运行频率运行一段时间，然后运行频率会跳过跳跃频率，跳跃幅度为 2 倍的 P8-11（跳跃频率幅度）；

在减速过程中，运行频率减速到跳跃频率边界，变频器会以当前的运行频率运行一段时间，然后运行频率会跳过跳跃频率，跳跃幅度为 2 倍的 P8-11（跳跃频率幅度）。

参数	功能定义	出厂值	设定范围	参数说明
P8-09	跳跃频率 1	0.00Hz	0.00Hz~ 最大频率	-
P8-10	跳跃频率 2	0.00Hz	0.00Hz~ 最大频率	-
P8-11	跳跃频率幅度	0.00Hz	0.00Hz~ 最大频率	-
P8-22	加减速过程中跳频是否有效	0	0：无效 1：有效	设置加减速过程中，跳跃频率是否有效。 设为有效时，在加减速过程中，运行频率到达跳跃频率边界，运行频率会跳过跳跃频率，跳跃幅度为 2 倍的 P8-11（跳跃频率幅度）。 设为无效时，在加减速过程中，运行频率到达跳跃频率边界，变频器会以运行频率继续运行。

2） 正反转死区时间

参数	功能定义	出厂值	设定范围	参数说明
P8-12	正反转死区时间	0.0s	0.0s~3000.0s	设定变频器正反转过渡过程中，在输出 0Hz 处的过渡时间。

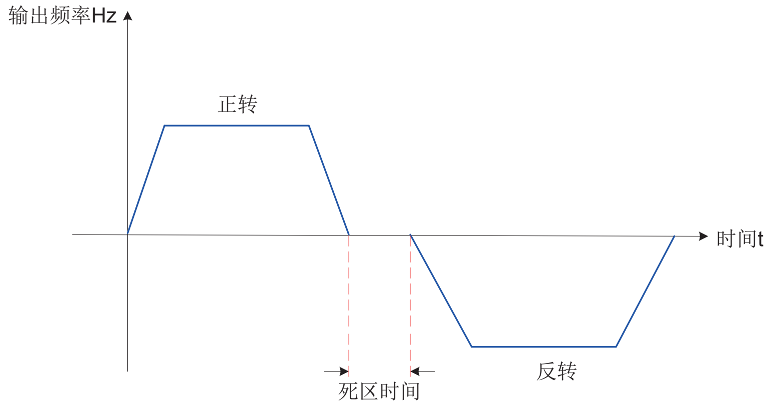


图 6-58 正反转死区时间示意图

3） 反向频率禁止

参数	功能定义	出厂值	设定范围	参数说明
P8-13	反向频率禁止	0	0：无效 1：有效	-

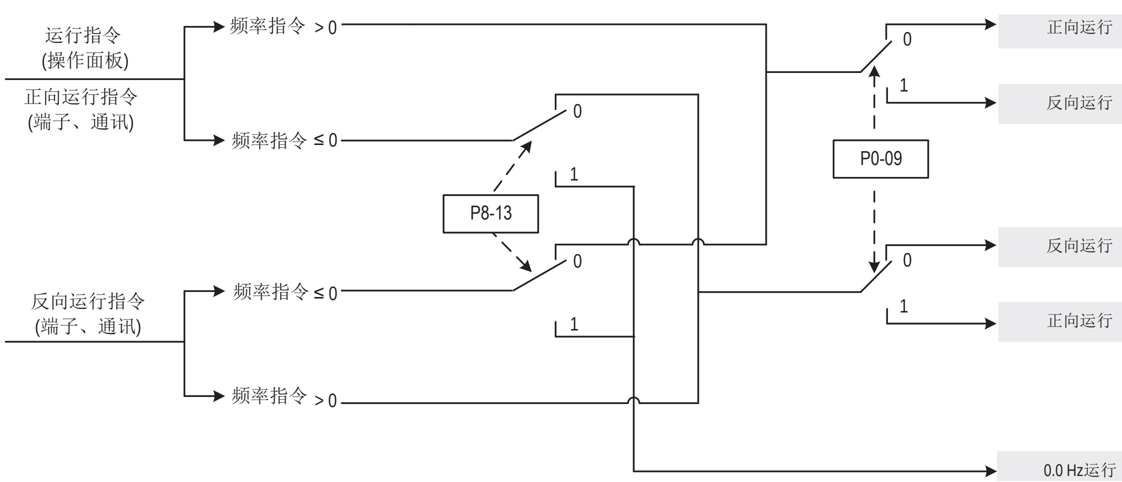


图 6-59 反向频率禁止示意图

参数	功能定义	出厂值	设定范围	参数说明
P0-09	运行方向选择	0	0：默认方向运行 1：与默认方向相反方向运行	-

通过更改该参数，可以不改变电机接线而实现改变电机转向的目的，其作用相当于调整电机（U、V、W）任意两条线实现电机旋转方向的转换。

NOTE

- 参数初始化后电机运行方向会恢复原来的状态。对于系统调试好后严禁更改电机转向的场合慎用。

6.11.3 用户定制参数

PE-00~PE-29：此组参数是用户定制参数组。用户可以在所有参数中，选择所需要的参数汇总到 PE 组，作为用户定制参数，以方便查看和更改等操作。

PE 组最多提供 30 个用户定制参数，PE 组参数显示值为 P0.00 的，则表示该用户参数为空，进入用户定制参数模式时，显示参数由 PE-00~PE-31 定义，顺序与 PE 组参数一致，为 P0-00 则跳过；

6.11.4 频率检测（FDT）

用于设定输出频率的检测值，及输出动作解除的滞后值。滞后值仅在减速过程中有效，加速过程中的检测不滞后。图 6-60 为频率检测功能的示意图。

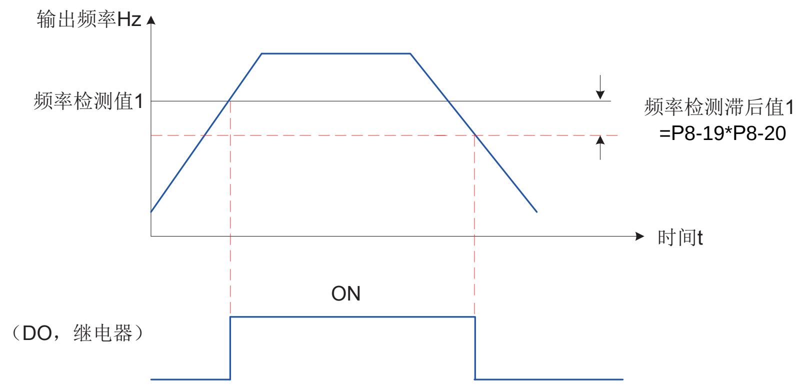


图 6-60 频率检测示意图

参数	功能定义	出厂值	设定范围	参数说明
P8-19	频率检测值 1	50.00Hz	0.00Hz~ 最大频率（P0-04）	当运行频率高于频率检测值时，DO 端子输出有效信号； 当运行频率低于频率检测值减去频率检查滞后值时，DO 端子输出无效信号。
P8-20	频率检测滞后率 1	5.0%	0.0%~100.0%（FDT1 电平）	频率滞后值百分比基数为频率检测值 P8-19。
P8-28	频率检测值 2	50.00Hz	0.00Hz~ 最大频率	-
P8-29	频率检测滞后率 2	5.0%	0.0%~100.0%（FDT2 电平）	-

6.11.5 频率到达检出幅度

用于设定频率到达的检测范围，图 6-64 为频率到达的示意图：

参数	功能定义	出厂值	设定范围	参数说明
P8-21	频率到达检出幅度	0.00%	0.00~100%(最大频率)	百分比基数是最大频率。 变频器的运行频率处于设定频率 ± 最大频率 *P8-21（频率检测幅度）范围内时，DO 端子输出有效信号。

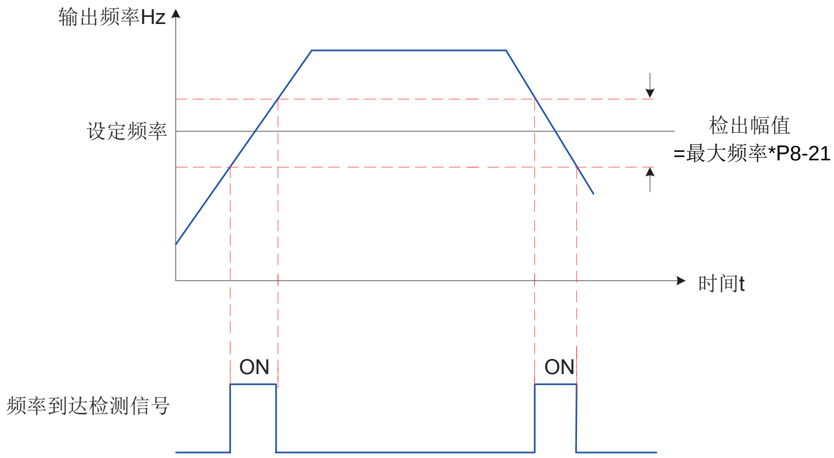


图 6-61 频率到达检出幅值时序图

6.11.6 加减速时间切换频率点

用于在变频器运行过程中，根据运行频率范围自行选择不同加减速时间。即当电机选择为电机 1（P0-24 电机参数组选择设置为 0），且 DI 端子功能没有设置为 16（加减速时间选择端子 1）或者 17（加减速时间选择端子 2）时该功能才有效。

参数	功能定义	出厂值	设定范围	参数说明
P8-25	加速时间 1 与加速时间 2 切换频率点	0.00Hz	0.00Hz~ 最大频率	-
P8-26	减速时间 1 与减速时间 2 切换频率点	0.00Hz	0.00Hz~ 最大频率	-

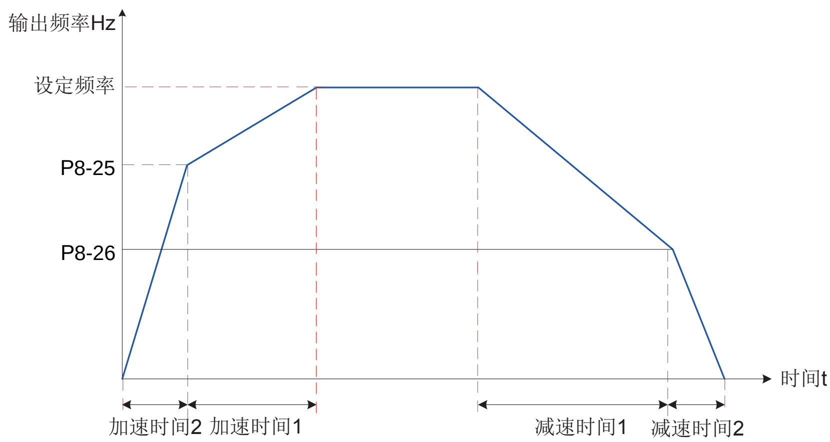


图 6-62 加减速时间切换示意图

如上图所示，

在加速过程中，如果运行频率小于 P8-25 则选择加速时间 2；如果运行频率大于 P8-25 则选择 加速时间 1。

在减速过程中，如果运行频率大于 P8-26 则选择减速时间 1；如果运行频率小于 P8-26 则选择 减速时间 2。

6.11.7 任意到达频率检测值

参数	功能定义	出厂值	设定范围	参数说明
P8-30	任意到达频率检测值 1	50.00Hz	0.00Hz~ 最大频率	当变频器的运行频率，处于任意到达频率检查值 ± 任意到达频率检出幅度范围内时，DO 端子输出有效信号。
P8-31	任意到达频率检出幅度 1	0.0%	0.0%~100.0%（最大频率）	
P8-32	任意到达频率检测值 2	50.00Hz	0.00Hz~ 最大频率	-
P8-33	任意到达频率检出幅度 2	0.0%	0.0%~100.0%（最大频率）	-

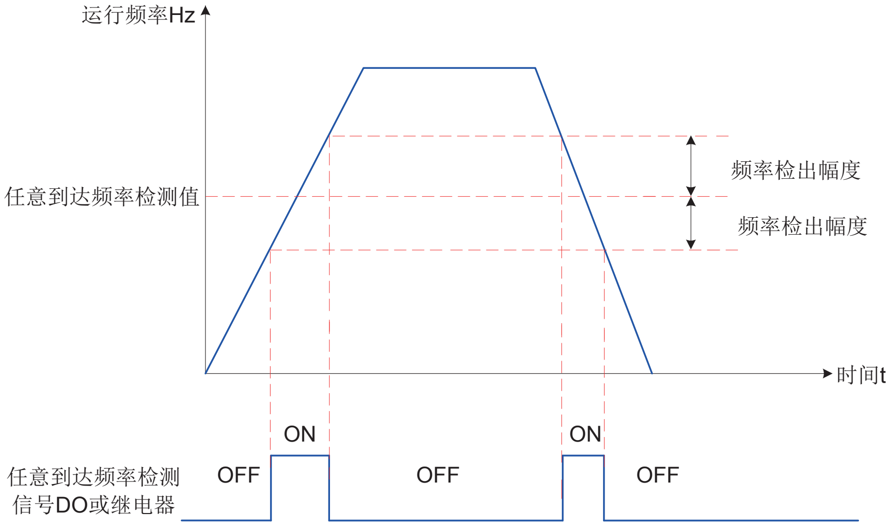


图 6-63 任意到达频率检测示意图

6.11.8 零电流检测

参数	功能定义	出厂值	设定范围	参数说明
P8-34	零电流检测水平	5.0%	0.0%~300.0%（电机额定电流）	当变频器的输出电流，小于或等于零电流检测水平 P8-34，且持续时间超过零电流检测延迟时间 P8-35，DO 端子输出有效信号。
P8-35	零电流检测延迟时间	0.10s	0.00s~600.00s	

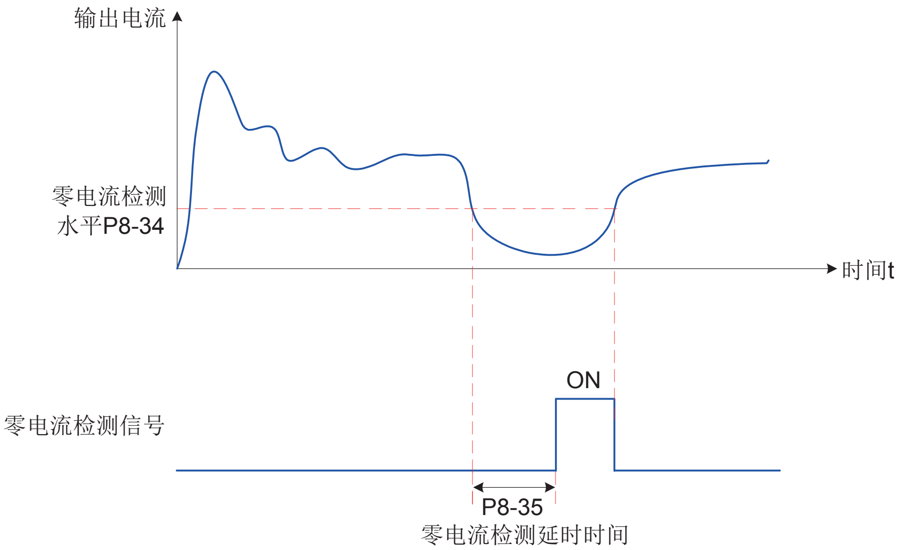


图 6-64 零电流检测示意图

6.11.9 输出电流超限

参数	功能定义	出厂值	设定范围	参数说明
P8-36	输出电流超限值	200.0%	0.0% (不检测); 0.1%~300.0% (电机额定电流)	当变频器的输出电流大于输出电流超限值 P8-36，且持续时间超过软件过流点检测延迟时间 P8-37， DO 端子输出有效信号。
P8-37	输出电流超限检测延迟时间	0.00s	0.00s~600.00s	-

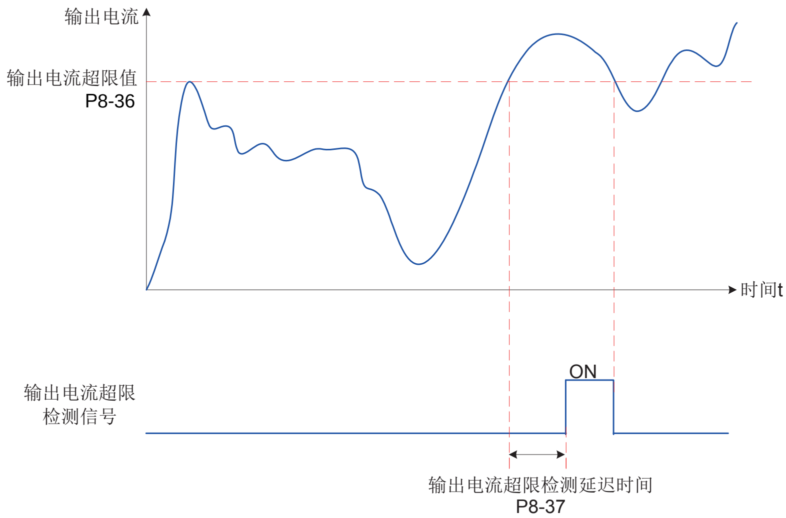


图 6-65 输出电流超限检测示意图

6.11.10 任意到达电流

参数	功能定义	出厂值	设定范围	参数说明
P8-38	任意到达电流 1	100.0%	0.0%~300.0%（电机额定电流）	当变频器的输出电流，在（任意到达电流 1± 任意到达电流 1 宽度）* 电机额定电流范围内时，DO 端子输出有效信号。
P8-39	任意到达电流 1 幅度	0.0%	0.0%~300.0%（电机额定电流）	
P8-40	任意到达电流 2	100.0%	0.0%~300.0%（电机额定电流）	-
P8-41	任意到达电流 2 幅度	0.0%	0.0%~300.0%（电机额定电流）	-

YD280 提供两组任意到达电流及检出宽度参数，图 6-69 为功能示意图。

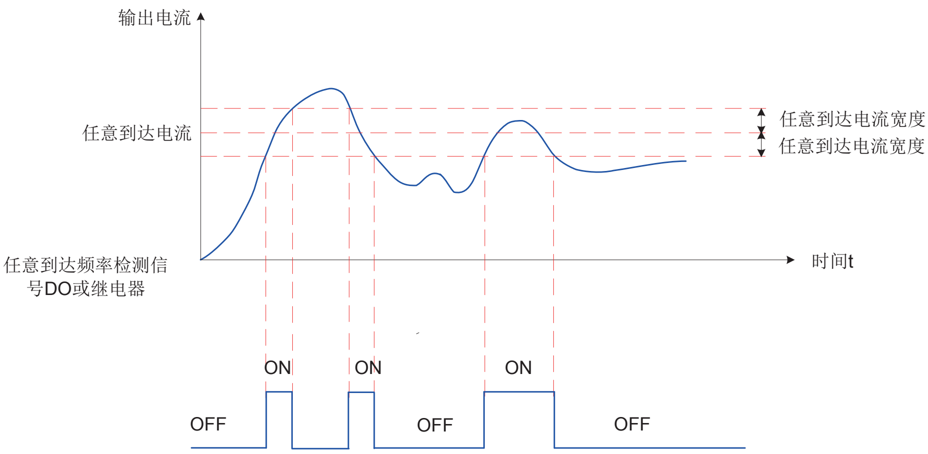


图 6-66 任意到达电流时序图

6.11.11 定时功能

变频器定时运行功能。变频器每次启动时，都从 0 开始计时，定时剩余运行时间可通过 U0-20 查看。

参数	功能定义	出厂值	设定范围	参数说明
P8-42	定时功能选择	0	0：无效 1：有效	定时功能选择（P8-42）设置为 1（有效），变频器启动时开始计时，到达定时运行时间（P8-44）后，变频器自动停机，同时 DO端子输出有效信号。
P8-43	定时运行时间选择	0	0：P8-44 设定 1：AI1 2：AI2 3：面板旋钮	设置为1时， 定时运行时间=(AI1电压 /10V)* P8-44。 模拟输入量程 100% 对应 P8-44
P8-44	定时运行时间	0.0Min	0.0Min~6500.0Min	定时运行时间由 P8-43、P8-44 设置

1） 上电到达时间

参数	功能定义	出厂值	设定范围	参数说明
P8-16	设定累计上电到达时间	0h	0h~65000h	当累计上电时间（P7-13）到达 P8-16 所设定的上电时间，变频器 DO 端子输出有效信号。

2） 运行到达时间

参数	功能定义	出厂值	设定范围	参数说明
P8-17	设定累计运行到达时间	0h	0h~65000h	用于设置变频器的运行时间。 变频器累计运行时间（P7-09）超过设定累计上电到达时间（P8-17）时，DO 端子输出有效信号。

6.11.12 AI1 电压保护上下限

参数	功能定义	出厂值	设定范围	参数说明
P8-45	AI1 输入电压保护值下限	3.10V	0.00V~P8-46	当模拟量输入 AI1 的值大于 P8-46，或AI1 输入小于 P8-45 时，变频器 DO 端子输出“AI1 输入超限”有效信号，用于指示 AI1 的输入电压是否在设定范围内。
P8-46	AI1 输入电压保护值上限	6.80V	P8-45~11.00V	

6.11.13 模块温度

参数	功能定义	出厂值	设定范围	参数说明
P8-47	模块温度到达	75°C	0°C ~100°C	逆变器散热器温度达到 P8-47 的设定值时，DO 端子输出有效信号。

6.11.14 散热风扇

参数	功能定义	出厂值	设定范围	参数说明
P8-48	散热风扇控制	0	0：运行时风扇运转	设置为 0：当变频器在运行状态时，风扇运转；当变频器在停机状态时，如果散热器温度高于 40 度则风扇运转，散热器温度低于 40 度则风扇不运转。
			1：风扇一直运转	设置为 1：风扇在上电后一直运转。

6.11.15 休眠与唤醒

用于实现供水应用中的休眠和唤醒功能。一般情况下，请设置唤醒频率（P8-49）大于等于休眠频率（P8-51）。如果唤醒频率和休眠频率均为 0.00Hz，则休眠和唤醒功能无效。

当 PID 正在运算时，启用了休眠功能，如果想让 PID 继续运算，PA-28（PID 停机运算）设置为 1（停机运算）；如果让 PID 停止运算，PA-28（PID 停机运算）设置为 0（停机不运算）。

参数	功能定义	出厂值	设定范围	参数说明
P8-49	唤醒频率	0.00Hz	休眠频率（P8-51）~ 最大频率（P0-10）	若变频器处于休眠状态，且当前运行命令有效，则当设定频率大于等于 P8-49（唤醒频率），经过唤醒延迟时间（P8-50）后，变频器直接启动。
P8-50	唤醒延迟时间	0.0s	0.0s~6500.0s	
P8-51	休眠频率	0.00Hz	0.00Hz~ 唤醒频率（P8-49）	变频器运行过程中，当设定频率小于等于 P8-51 休眠频率时，经过 P8-52 延迟时间后，变频器进入休眠状态，并自由停机。
P8-52	休眠延迟时间	0.0s	0.0s~6500.0s	

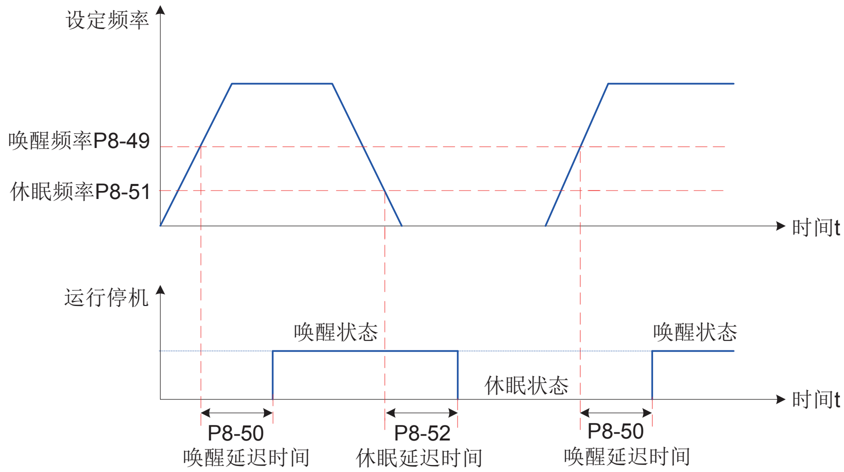


图 6-67 休眠与唤醒功能设置

6.11.16 本次运行达到时间

参数	功能定义	出厂值	设定范围	参数说明
P8-53	本次运行到达时间	0.0Min	0.0Min~6500.0Min	当本次启动的运行时间到达 P8-53 的设定值后，变频器 DO 端子输出有效信号。仅对本次有效，前一次运行时间不累加。

6.11.17 输出功率校正

参数	功能定义	出厂值	设定范围	参数说明
P8-54	输出功率校正系数	100.0%	0.0%~200.0%	当输出功率 (U0-05) 与期望值不对应时，可以通过该值对输出功率进行线性校正。

6.11.18 急停减速时间

参数	功能定义	出厂值	设定范围	参数说明
P8-55	急停减速时间	机型确定	0~6553.5	增加 P8-55 作为端子急停减速时间，端子急停功能按照设定减速时间减速，V/F 模式减速时间为 0s时按照最小单位时间进行减速。

第七章　故障诊断及对策

7.1 安全注意事项

安全注意事项

危险

- 严禁在电源接通的状态下进行接线，请务必将所有断路器保持在 OFF 状态。否则会有触电的危险。

警告

- 请保证变频器按照当地法规进行接地。否则会有触电危险或火灾危险。
- 变频器带电后请勿拆卸外壳或触摸内部电路。否则会有触电危险。
- 故障查检必须由专业人员进行，非专业人员严禁对变频器进行查检、维护、维修。否则会有触电危险或火灾危险。
- 将变频器安装在封闭的柜内或机壳箱内时，请用冷却风扇或冷却空调等充分冷却，以使变频器进气温度保持在 50°C以下。否则会导致过热或火灾。
- 请按规定扭矩锁紧所有螺钉。否则可能有火灾或触电危险。
- 请确认产品的输入电压在铭牌的额定电压范围内，否则会有触电或火灾危险。
- 变频器附近请勿放置易燃易爆物品。

注意

- 进行安装作业时，请用布或纸等遮住变频器的上部，以防止钻孔时的金属屑、油、水等进入变频器内部。如果异物进入变频器内部，可能导致变频器故障。
- 作业结束后，请拿掉这些布或纸。如果继续盖在上面，则会使通气性变差，导致变频器异常发热。
- 操作变频器时，请遵守静电防止措施（ESD）规定的步骤，否则会因静电而损坏变频器内部的电路。

7.5 故障报警及对策

变频器使用过程中可能会遇到下列故障类型情况，请参考下述方法进行简单故障分析：

故障名称	操作面板显示	故障原因排查	故障处理对策
加速过电流	Err02	变频器输出回路存在接地或短路	● 排除外围故障，检测电机或者中断接触器是否发生短路
		控制方式为 SVC矢量控制且没有进行参数辨识	● 按照电机铭牌设置电机参数，进行电机参数辨识
		急加速工况，加速时间设定太短	● 增大加速时间
		过流失速抑制设定不合适	● 确认过流失速抑制功能（P3-19）已经使能； ● 过流失速动作电流（P3-18）设定值太大，推荐在120% 到 150% 之内调整； ● 过流失速抑制增益（P3-20）设定太小，推荐在20到 40 之内调整；
		手动转矩提升或 V/F 曲线不合适	● 调整手动提升转矩或 V/F 曲线
		对正在旋转的电机进行启动	● 选择转速追踪启动或等电机停止后再启动
		受外部干扰	● 查看历史故障记录，若故障时电流值远未达到过流点值，需查找干扰源。若无其它干扰源则可能为驱动板或霍尔器件问题。
减速过电流	Err03	变频器输出回路存在接地或短路	● 排除外围故障，检测电机是否发生短路或断路
		控制方式为 SVC矢量控制且没有进行参数辨识	● 按照电机铭牌设置电机参数，进行电机参数辨识
		急减速工况，减速时间设定太短	● 增大减速时间
		过流失速抑制设定不合适	● 确认过流失速抑制功能（P3-19）已经使能； ● 过流失速动作电流（P3-18）设定值太大，推荐在120% 到 150% 之内调整； ● 过流失速抑制增益（P3-20）设定太小，推荐在20到 40 之内调整；
		没有加装制动单元和制动电阻	● 加装制动单元及电阻
		受外部干扰	● 查看历史故障记录，若故障时电流值远未达到过流点值，需查找干扰源。若无其它干扰源则可能为驱动板或霍尔器件问题。
恒速过电流	Err04	变频器输出回路存在接地或短路	● 排除外围故障，检测电机是否发生短路或断路
		控制方式为 SVC且没有进行参数辨识	● 按照电机铭牌设置电机参数，进行电机参数辨识
		过流失速抑制设定不合适	● 确认过流失速抑制功能（P3-19）已经使能； ● 过流失速动作电流（P3-18）设定值太大，推荐在120% 到 150% 之内调整； ● 过流失速抑制增益（P3-20）设定太小，推荐在20到 40 之内调整；
		变频器选型偏小	● 在稳定运行状态下，若运行电流已超过电机额定电流或变频器额定输出电流值，请选用功率等级更大的变频器
		受外部干扰	● 查看历史故障记录，若故障时电流值远未达到过流点值，需查找干扰源。若无其它干扰源则可能为驱动板或霍尔器件问题。

故障名称	操作面板显示	故障原因排查	故障处理对策
加速过电压	Err05	输入电压偏高	● 将电压调至正常范围
		加速过程中存在外力拖动电机运行	● 取消此外动力或加装制动电阻
		过压抑制设定不合适	● 确认过压抑制功能（P3-23）已经使能； ● 过压抑制动作电压（P3-22）设定值太大，推荐在380~360V 或 770V~700V 之内调整； ● 过压抑制增益（P3-24）设定太小，推荐在 30 到50 之内调整；
		没有加装制动单元和制动电阻	● 加装制动单元及电阻
		加速时间过短	● 增大加速时间
减速过电压	Err06	过压抑制设定不合适	● 确认过压抑制功能（P3-23）已经使能； ● 过压抑制动作电压（P3-22）设定值太大，推荐在380~360V 或 770V~700V之内调整； ● 过压抑制增益（P3-24）设定太小，推荐在 30 到50 之内调整；
		减速过程中存在外力拖动电机运行	● 取消此外动力或加装制动电阻
		减速时间过短	● 增大减速时间
		没有加装制动单元和制动电阻	● 加装制动单元及电阻
恒速过电压	Err07	过压抑制设定不合适	● 确认过压抑制功能（P3-23）已经使能； ● 过压抑制动作电压（P3-22）设定值太大，推荐在380~360V 或 770V~700V之内调整； ● 过压抑制频率增益（P3-24）设定太小，推荐在30到 50 之内调整； ● 过压抑制最大上升频率（P3-26）设定太小，推荐在 5~20Hz 之内调整；
		运行过程中存在外力拖动电机运行	● 取消此外动力或加装制动电阻
缓冲电源故障	Err08	母线电压在欠压点上下波动	● 寻求技术支持
欠压故障	Err09	瞬时停电	● 使能瞬停不停功能（P9-59），可以防止瞬时停电欠压故障
		变频器输入端电压不在规范要求的范围	● 调整电压到正常范围
		母线电压不正常	● 寻求技术支持
		整流桥、缓冲电阻、驱动板、控制板异常	● 寻求技术支持
变频器过载	Err 10	负载是否过大或发生电机堵转	● 减小负载并检查电机及机械情况
		变频器选型偏小	● 选用功率等级更大的变频器
电机过载	Err 11	电机保护参数 P9-01 设定是否合适	● 正确设定此参数
		负载是否过大或发生电机堵转	● 减小负载并检查电机及机械情况
输入缺相	Err 12	三相输入电源不正常	● 检查并排除外围线路中存在的问题
		驱动板、防雷板、主控板、整流桥异常	● 寻求技术支持
输出缺相	Err 13	电机故障	● 检测电机是否断路
		变频器到电机的引线不正常	● 排除外围故障
		电机运行时变频器三相输出不平衡	● 检查电机三相绕组是否正常并排除故障
		驱动板、IGBT 模块异常	● 寻求技术支持

故障名称	操作面板显示	故障原因排查	故障处理对策
模块过热	Err 14	环境温度过高	● 降低环境温度
		风道堵塞	● 清理风道
		风扇损坏	● 更换风扇
		模块热敏电阻损坏	● 寻求厂家服务
		逆变模块损坏	● 寻求厂家服务
外部设备故障	Err 15	通过多功能端子 DI 输入外部故障的信号	● 排查外围故障，确认机械允许重新启动（P8-18），复位运行
		通过虚拟 IO 功能输入外部故障的信号	● 确认 A1 组 虚拟 IO 组参数设置正确，复位运行
通讯故障	Err 16	上位机工作不正常	● 检查上位机接线
		通讯线不正常	● 检查通讯连接线
		通讯参数 PD 组设置不正确	● 正确设置通讯参数
		以上检测完成后故障仍无法排除，可尝试恢复出厂设置。	
接触器故障	Err 17	驱动板和电源异常	● 寻求厂家服务
		接触器异常	● 寻求厂家服务
		防雷板异常	● 寻求厂家服务
电流检测故障	Err 18	检查霍尔器件异常	● 寻求厂家服务
		驱动板异常	● 寻求厂家服务
电机调谐故障	Err 19	电机参数未按铭牌设置	● 根据铭牌正确设定电机参数
		参数辨识过程超时	● 检查变频器到电机引线
EEPROM 读写故障	Err21	EEPROM 芯片损坏	● 寻求厂家服务
对地短路故障	Err23	电机对地短路	● 更换电缆或电机
累计运行时间到达故障	Err26	累计运行时间达到设定值	● 使用参数初始化功能清除记录信息
用户自定义故障 1	Err27	通过多功能端子 DI 输入用户自定义故障 1 的信号	● 复位运行
		通过虚拟 IO 功能输入用户自定义故障 1 的信号	● 复位运行
用户自定义故障 2	Err28	通过多功能端子 DI 输入用户自定义故障 2 的信号	● 复位运行
		通过虚拟 IO 功能输入用户自定义故障 2 的信号	● 复位运行
累计上电时间到达故障	Err29	累计上电时间达到设定值	● 使用参数初始化功能清除记录信息
掉载故障	Err30	变频器运行电流小于 P9-64	● 确认负载是否脱离或 P9-64、P9-65 参数设置是否符合实际运行工况
运行时 PID 反馈丢失故障	Err31	PID 反馈小于 PA-26 设定值	● 检查 PID 反馈信号或设置 PA-26 为一个合适值
逐波限流故障	Err40	负载是否过大或发生电机堵转	● 减小负载并检查电机及机械情况
		变频器选型偏小	● 选用功率等级更大的变频器

故障名称	操作面板显示	故障原因排查	故障处理对策
运行时切换电机故障	Err41	在变频器运行过程中通过端子更改当前电机选择	● 变频器停机后再进行电机切换操作
电机过温故障	Err45	温度传感器接线松动	● 检测温度传感器接线并排除故障
		电机温度过高	● 提高载频或采取其它散热措施对电机进行散热处理
主从控制从机故障	Err55	从机发生故障，检查从机	● 按照从机故障码进行排查
制动单元过载	Err61	制动电阻值偏小	● 请参考“表 9-27 YD280 变频器制动组件选型表”
制动回路短路	Err62	制动模块异常	● 寻求技术支持

7.6 常见故障及处理方法

序号	故障现象	可能原因	解决方法
1	上电无显示	电网电压没有或者过低	● 检查输入电源
		变频器驱动板上的开关电源故障	● 检查控制板上 24V 和 10V 输出电压是否正常
		控制板与驱动板、键盘之间连线断	● 重新拔插 8 芯和 40 芯排线
		变频器缓冲电阻损坏	● 寻求厂家服务
		控制板、键盘故障	
		整流桥损坏	
2	上电一直显示 HC HC	驱动板与控制板之间的连线接触不良	● 重新拔插 8 芯和 28 芯排线
		控制板上相关器件损坏	● 寻求厂家服务
		电机或者电机线有对地短路	
		霍尔故障	
		电网电压过低	
3	上电显示“Err23”报警 Err23	电机或者输出线对地短路	● 用摇表测量电机和输出线的绝缘
		变频器损坏	● 寻求厂家服务
4	上电变频器显示正常，运行后显示“HC”并马上停机 HC	风扇损坏或者堵转	● 更换风扇
		外围控制端子接线有短路	● 排除外部短路故障
5	频繁报 Err14（模块过热）故障 Err14	载频设置太高	● 降低载频（P0-15）
		风扇损坏或者风道堵塞	● 更换风扇、清理风道
		变频器内部器件损坏（热敏电阻或其他）	● 寻求厂家服务

序号	故障现象	可能原因	解决方法
6	变频器运行后电机不转动	电机及电机线	● 重新确认变频器与电机之间连线正确
		变频器参数设置错误（电机参数）	● 恢复出厂参数，重新设置使用参数组； ● 检查电机额定参数设置正确，如电机额定频率、额定转速等； ● 检查 P0-01（控制方式）、P0-02（运行方式）、设置正确； ● V/F 模式下，重载起动下，调整 P3-01(转矩提升) 参 数 .
		驱动板与控制板连线接触不良	● 重新拔插连接线吗，确认接线牢固；
		驱动板故障	● 寻求厂家服务
7	DI 端子失效	参数设置错误	● 检查并重新设置 P4 组相关参数
		外部信号错误	● 重新接外部信号线
		OP 与 +24V 跳线松动	● 重新确认 OP 与 +24V 跳线，并确保紧固。
		控制板故障	● 寻求厂家服务
9	变频器频繁报过流和过压故障。	电机参数设置不对	● 重新设置电机参数或者进行电机调谐
		加减速时间不合适	● 设置合适的加减速时间
		负载波动	● 寻求厂家服务
10	上电（或运行）报 Err17 	软启动接触器未吸合	● 检查接触器电缆是否松动 ● 检查接触器是否有故障 ● 检查接触器 24V 供电电源是否有故障 ● 寻求厂家服务
11	减速或减速停车时电机自由停车或无制动能力	过压失速保护生效	● 如果已配置制动电阻，需将“过压失速使能”选择为“无效”（设置 P3-23=0），关闭过压失速

第八章　日常保养与维护

8.1 日常保养

安全注意事项

危险

- 请勿在电源接通条状态下进行操作接线，否则有触电危险！
- 进行检查前，请切断所有的设备电源，切断变频器输入电源后，因变频器内部直流电容上仍有残压，请至少等待几分钟待电源指示灯熄灭后方可操作，再次上电操作时，需要等待变频器规定的间隔上电时间；
- 在变频器上电后，请勿更改接线、拆下线缆、拆下选配卡和更换冷却风扇，否则有触电危险；
- 请务必将电机的接地端子接地，否则与电机外壳接触有触电危险；
- 非专业电气人员，请勿进行维护、保养和维修；
- 安装、接线、调试、修理、检查和元器件更换，请由熟悉变频器的安装、调试、维修、电气专业施工人员进行。

警告

- 请勿在拆下变频器外壳下，使变频器处于运行状态；
- 为说明产品细节部分，本说明书中的图解有时为拆下外罩和端盖状态，请务必在安装有规定的外罩下和安全遮盖物下遵照说明书运行变频器；
- 请按指定的拧固力紧固螺钉端子，防止连接松动导致电线连接处发热而引发火灾；
- 请勿接错主回路输入电压的范围，防止因输入变频器的额定电压超出变频器允许的范围，导致运行异常；
- 请勿使易燃物紧密接触变频器或将变频器安装易燃物体上。

注意

- 请遵照本说明书指示正确更换风扇。特别针对风扇出风口方向，如果方向错误，会导致冷却效果差，不能发挥冷却作用；
- 在变频器运行时，请勿拆装电机。否则会引起触电和变频器损坏；
- 对控制回路接线时，请使用屏蔽性电缆；
- 防止变频器异动作，同时将屏蔽层单端可靠接地。
- 请勿更改变频器回路，否则会引起变频器损坏；
- 请正确连接变频器输出回路端子同电机回路接线端子；
- 如果需要更改电机运行方向，请任意调换变频器输出端子；
- 请勿操作已损坏的变频器，以免波及变频器以外的设备器件损坏。

8.1.1 日常检查项目

由于环境的温度、湿度、粉尘及振动的影响，会导致变频器内部的器件老化，导致变频器潜在的故障发生或降低了变频器的使用寿命。因此，有必要对变频器实施日常和定期的保养及维护，特别是针对高温环境、频繁起停场合、存在交流电源和负载波动环境、存在大震动或冲击的环境、存在粉尘/盐酸类腐蚀性环境中应该缩短定期检查周期间隔。

为确保变频器功能正常和产品免受损坏，请每日对以下项目进行确认，请复印该检查确认表进行使用，每次确认后在确认栏上盖签“确认”章。

检查项目	检查内容	故障时对策	确认栏
电机	电机是否存在异常声音和振动现象	● 确认机械连接是否异常； ● 确认电机是否缺相； ● 确认电机固定螺丝是否牢固。	
风扇	变频器和电机冷却风扇使用异常	● 确认变频器冷却风扇是否运行； ● 确认电机侧冷却风扇是否异常； ● 确认通风通道是否堵塞； ● 确认环境温度是否在允许范围内。	
安装环境	电柜和线缆槽是否异常	● 确认变频器进出线缆是否有绝缘破损； ● 确认安装固定支架是否有震动； ● 确认铜排和连接线缆端子是否有松动和被腐蚀穿。	
负载	变频器运行电流是否超出变频器额定和电机额定一定时间	● 确认电机参数设置是否正确； ● 确认电机是否过载； ● 确认机械振动是否过大（正常情况＜0.6g）。	
输入电压	主回路和控制回路间电源电压是否	● 确认输入电压是否在允许范围内； ● 确认周围是否有大负载起动。	

8.2 定期检查

8.2.1 定期检查项目

请定期对运行中难以检查的地方检查， 应始终保持变频器处于清洁状态，有效清除变频器上表面积尘，防止积尘进入变频器内部，特别是金属粉尘，有效清除变频器散热风扇的油污。

危险

- 为防止触电，请勿在带电状态下进行检查作业，否则有触电危险。
- 检查前请切断所有设备的电源，并等待 10 分钟以上，以免变频器内部电容的残余电压造成危险。

检查项目	检查内容	故障时对策	检查栏
整机	表面是否有垃圾、污垢、粉尘堆积	● 确认变频器柜是否断电； ● 用吸尘器清除垃圾或粉尘，以免接触部件； ● 用软布浸入中性清洁剂轻轻擦去油污。	
线缆	动力线及连接处是否变色； 绝缘层是否老化或开裂。	● 更换已经开裂的线缆； ● 更换已经损坏的连接端子。	
电磁接触器外围	动作时是否吸合不牢或发出异响； 是否有短路、被水污、膨胀、破裂的外围器件	● 更换已异常的元器件。	
风道通风口	风道、散热片是否阻塞； 风扇是否损坏；	● 清扫风道； ● 更换风扇。	
控制回路	控制元器件是否有接触不良；端子螺丝是否松动；控制线缆是否有绝缘开裂。	● 清扫控制线路和连接端子表面异物； ● 更换已破损腐蚀的控制线缆。	

8.2.2 主回路绝缘测试

- 提醒：在用兆欧表（请用直流 500V 兆欧表）测量绝缘电阻时，要将主回路线与变频器脱开。不要用绝缘电阻表测试控制回路绝缘，请参考下图。（严禁进行高压（> 500V）测试，出厂时已完成）。

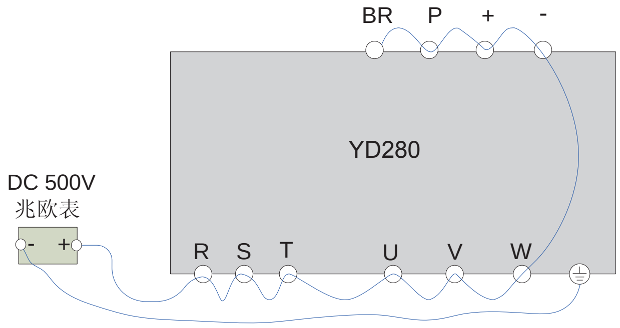


图 8-1 主回路绝缘测试示意图

要求测量结果大于 5 MΩ。

测试前需将压敏电阻螺钉卸下，断开压敏接入：

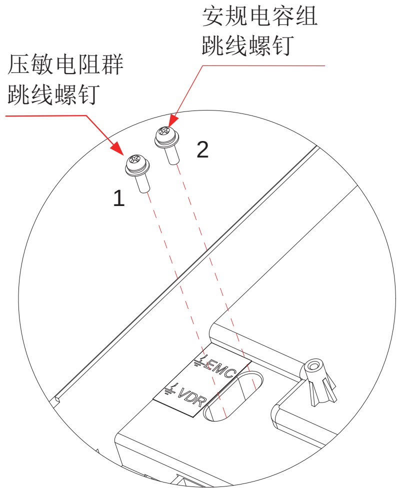


图 8-2 压敏电阻（VDR）、安规电容（EMC）对地跳线位置示意图

8.3 变频器易损件更换

8.3.1 易损件寿命

变频器易损件主要有冷却风扇和滤波用电解电容器，其寿命与使用的环境及保养状况密切相关。一般寿命时间为：

器件名称	寿命时间【注】
风扇	⩾ 5 年
电解电容	⩾ 5 年

【注】：寿命时间为在下列条件下使用时的时间，用户可以根据运行时间确定更换年限。

1） 环境温度：40°C
2） 负载率：80%
3） 运行率：24 小时 / 日

8.3.2 冷却风扇的使用数量

表 3-16 冷却风扇使用数量

型号	冷却风扇
三相 380~480V，50/60Hz	
YD280T4-0P7G/1P5PB	1
YD280T4-1P5G/2P2PB	1
YD280T4-2P2G/3P0PB	1
YD280T4-3P0G/3P7PB	1
YD280T4-3P7G/5P5PB	1
YD280T4-5P5G/7P5PB	1
YD280T4-7P5GB	1
YD280T4-11G/15PB	1
YD280T4-15G/18P5PB	1
YD280T4-18P5G/22PB	1
YD280T4-22GB	1

单相 200~240V，50/60Hz	
YD280T2S-0P4GB	0
YD280T2S-0P7GB	1
YD280T2S-1P5GB	1
YD280T2S-2P2GB	1

第九章 规格与选型

9.1 YD280 变频器技术规格与尺寸

9.1.1 技术规格

表 9-1 YD280 变频器型号与技术数据（三相 380V~480V）

项目		规格										
YD280T4-□G/□PB		0P7/1P5	1P5/2P2	2P2/3P0	3P0/3P7	3P7/5P5	5P5/7P5	7P5	11/15	15/18P5	18P5/22	22
适用电机容量 (kW)		0.75/1.5	1.5/2.2	2.2/3.0	3.0/3.7	3.7/5.5	5.5/7.5	7.5	11/15	15/18.5	18.5/22	22
适用电机容量 (HP)		1/2	2/3	3/4	4/5	5/7.5	7.5/10	10	15/20	20/25	25/30	30
输入	额定输入电流 (A)	2.4/4.6	4.6/6.3	6.3/9.0	9.0/11.4	11.4/16.7	16.7/21.9	21.9	32.2/41.3	41.3/49.5	49.5/59.0	59.0
输出	额定输出电流 (A)	2.1/3.8	3.8/5.1	5.1/7.2	7.2/9.0	9.0/13.0	13.0/17.0	17.0	25.0/32.0	32.0/37.0	37.0/45.0	45.0
	输出电压	三相 380~480V（跟随输入电压）										
	最高输出频率	500Hz（可通过参数更改）										
	载波频率	0.8kHz~8.0kHz（可根据负载特性，自动调整载波频率）										
	过载能力	G型 150% 额定电流 60s P型 120% 额定电流 60s										
电源	额定电压 额定频率	AC：三相 380~480V，50/60Hz										
	电压允许波动范围	-15~+10%，实际允许范围：AC 323~528V										
	频率允许波动范围	±5%										
	电源容量 (kVA)	2.8/5.0	5.0/6.7	6.7/9.5	9.5/12.0	12.0/17.5	17.5/22.8	22.8	33.4/42.8	42.8/45.0	45.0/54.0	54.0
散热设计	发热功耗 (kW)	0.046	0.068	0.081	1.009	0.138	0.201	0.24	0.355	0.454	0.478	0.551
	排风量 (CFM)	9	9	9	9	20	24	30	40	42	51.9	57.4
过电压等级		OVCIII										
污染等级		PD2										
防护等级		IP20										

表 9-2 YD280 变频器型号与技术数据（单相 200V~240V）

项目		规格				
YD280T2S-□GB		0P4	0P7	1P5	2P2	
输出	适配电机 (kW)	0.4	0.75	1.5	2.2	
输出	适配电机 (HP)	1/2	1	2	3	
输出	额定输出电流 (A)	2.3	3.8	7.2	9.0	
输出	输出电压	0~ 输入电压				
输出	最高输出频率	500Hz（可通过参数更改）				
输出	载波频率	0.8kHz~8.0kHz（可根据负载特性，自动调整载波频率）				
输出	过载能力	G型 150% 额定电流 60s　P型 120% 额定电流 60s				
输入	额定输入电流 (A)	5.4	8.0	15.0	22.0	
输入	额定电压额定频率	AC：单相 200~240V，50/60Hz				
输入	电压允许波动范围	-15~+10%，实际允许范围：AC170~264V				
输入	频率允许波动范围	±5%				
输入	电源容量 (kVA)	1.4	2.2	3.7	6.0	
散热设计	发热功耗 (kW)	0.043	0.065	0.097	0.121	
散热设计	排风量 (CFM)	9	9	9	20	
过电压等级		OVCIII				
污染等级		PD2				
防护等级		IP20				

NOTE

表 9-3　YD280 系列变频器技术规格

项 目		技术规格
基本功能	输入频率分辨率	数字设定：0.01Hz 模拟设定：最高频率 ×0.025%
	控制方式	开环矢量控制（SVC） V/F 控制　　注：200V机种仅支持V/F
	启动转矩	0.25Hz/150%（SVC）
	调速范围	1：200 （SVC）
	稳速精度	±0.5%（SVC）
	转矩控制精度	±5% 5Hz以上（SVC）
	转矩提升	自动转矩提升；手动转矩提升 0.1%~30.0%。
	V/F 曲线	五种方式：直线型；多点型；平方；完全V/F 分离；不完全V/F 分离。
	加减速曲线	直线或 S 曲线加减速方式； 四种加减速时间，加减速时间范围 0.0~6500.0s。
	直流制动	直流制动起始频率：0.00Hz~ 最大频率； 制动时间：0.0s~36.0s； 制动动作电流值：0.0%~100.0%。
	点动控制	点动频率范围：0.00Hz~50.00Hz； 点动加减速时间 0.0s~6500.0s。
	简易 PLC、多段速运行	通过内置 PLC 或控制端子实现最多 16 段速运行。
	内置 PID	可方便实现过程控制闭环控制系统。
	自动电压调整（AVR）	当电网电压变化时，能自动保持输出电压恒定。
	过压过流失速控制	对运行期间电流电压自动限制，防止频繁过流过压跳闸。
	快速限流功能	最大限度减小过流故障，保护变频器正常运行。
	转矩限定与控制	“挖土机”特性，对运行期间转矩自动限制，防止频繁过流跳闸； 矢量控制模式可实现转矩控制。
个性化功能	瞬停不停	瞬时停电时通过负载回馈能量补偿电压的降低， 维持变频器短时间内继续运行。
	快速限流	避免变频器频繁的出现过流故障。
	虚拟 IO	五组虚拟 DIDO，可实现简易逻辑控制。
	定时控制	定时控制功能：设定时间范围 0.0Min ～ 6500.0Min。
	多电机切换	两组电机参数，可实现两个电机切换控制。
	多线程总线支持	支持总线：RS485 Modbus-RTU

项 目		技术规格
运行	运行指令	操作面板给定、控制端子给定、串行通讯口给定。可通过多种方式切换
	频率指令	10 种频率指令：数字给定、模拟电压给定、模拟电流给定、脉冲给定、串行口给定。可通过多种方式切换
	辅助频率指令	10 种辅助频率指令。可灵活实现辅助频率微调、频率合成
	输入端子	标准： ● 5 个 DI 端子 ● 2 个 AI 端子，1 个仅支持 0 ~ 10V电压输入， 1个支持 0 ~ 10V 电压输入或 0 ~ 20mA 电流输入
	输出端子	标准： ● 1 个高速脉冲输出端子（可选为开路集电极式）， ● 支持 0~100kHz 的方波信号输出 ● 1 个 DO 端子 ● 1 个继电器输出端子 ● 1 个 AO 端子，支持 0 ~ 20mA 电流输出或 0 ~ 10V 电压输出
显示与键盘操作	输出与输入	5个LED数码管显示，8个按键，7个指示灯，1个电位器。 按键可调试参数、监控变频器与负载，包含电流、电压、频率等。 显示面板可提供1-3米外拉。(1米以上需满足电磁兼容措施）。
	按键锁定和功能选择	实现按键的部分或全部锁定，定义部分按键的作用范围，以防止误操作
保护功能	缺相保护	输入缺相保护，输出缺相保护
	瞬间过电流保护	在额定输出电流的 250% 以上时停机
	过压保护	主回路直流电压在 420V/820V 以上时停机
	欠压保护	主回路直流电压在 170V/350V 以下时停机
	过热保护	逆变桥过热时会触发保护
	过载保护	G 型150%，额定电流运行 60s 停机 P 型120%，额定电流运行 60s 停机
	过流保护	超过变频器 2.0 倍额定电流停机保护
	制动保护	制动单元过载保护，制动电阻短路保护
	短路保护	输出相间短路保护，输出对地短路保护
环境	使用场所	室内，不受阳光直晒，无尘埃、腐蚀性气体、可燃性气体、油雾、水蒸汽、滴水或盐份等
	海拔高度	1000m 以下使用无需降额，1000m 以上每升高 100m 降额 1% 超过 3000m 请联系厂家
	环境温度	－ 10°C ~ ＋ 40°C，温度超过 40°C时需要降额使用 环境温度每升高 1°C降额 1.5%，最高使用环境温度为 50°C
	湿度	小于 95%RH，无凝露
	振动	小于 5.9m/s^2（0.6g)
	存储温度	－ 20°C ~ ＋ 60°C

9.1.2 外型与安装尺寸

◆ YD280整机尺寸

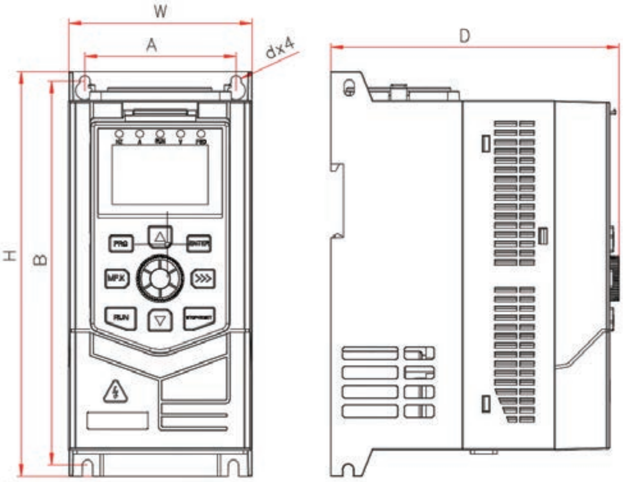


图 9-1 YD280T4-0P7G/1P5PB ~ 3P7G/5P5PB
YD280T2S-0P4GB ~ 2P2GB
外型尺寸及安装尺寸示意图

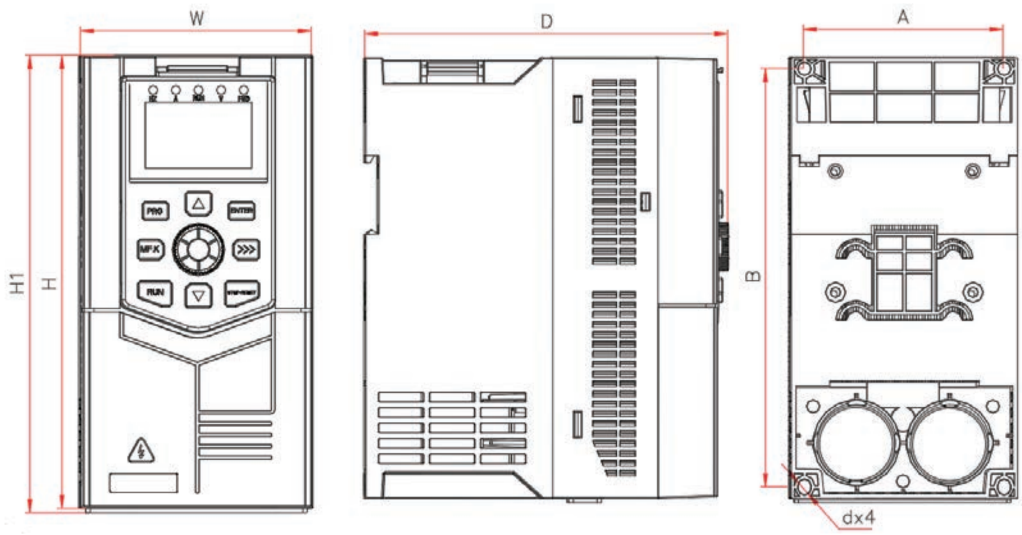


图 9-2 YD280T4-5P5G/7P5PB ~ YD280T4-7P5GB 外型尺寸及安装尺寸示意图

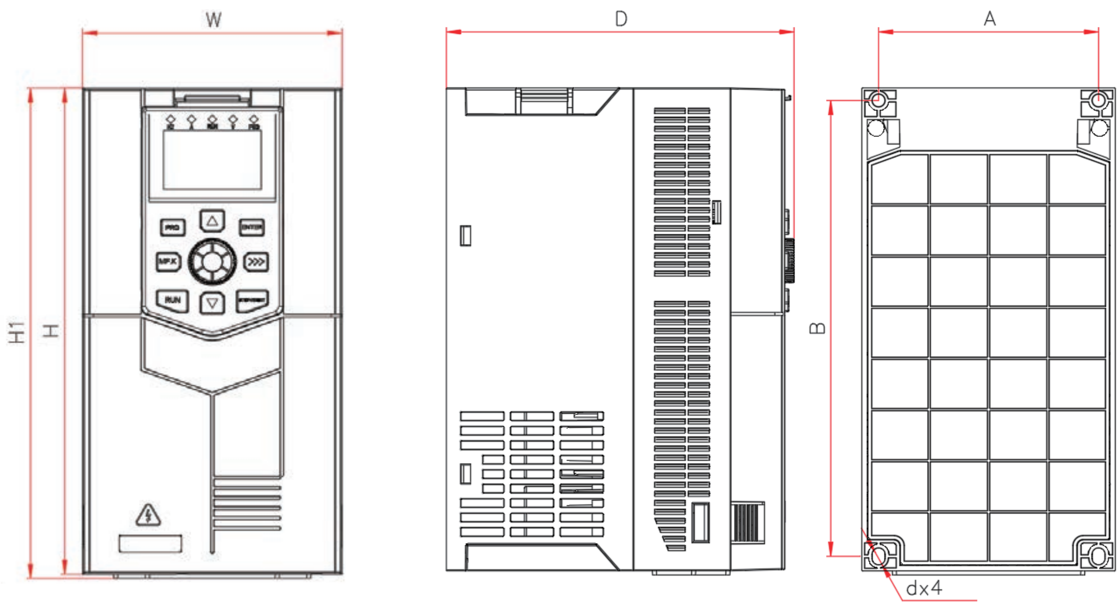


图 9-3 YD280T4-11G/15PB ~ YD280T4-15G/18P5PB 外型尺寸及安装尺寸示意图

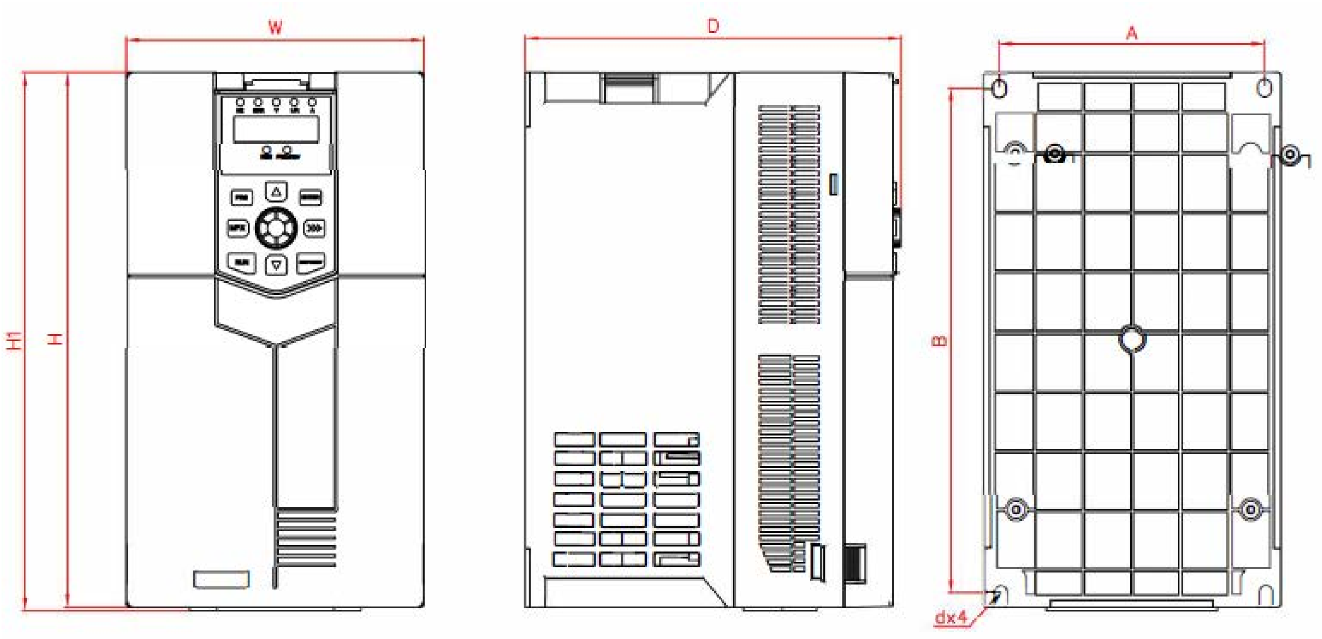


图 9-4 YD280T4-18P5G/22B ~ YD280T4-22GB 外型尺寸及安装尺寸示意图

表 9-4 YD280T4-0P7G/1P5PB~22GB 外型及安装孔位尺寸（三相 380V~480V）

框号	变频器型号	安装孔位 mm		外型尺寸 mm				安装孔径 mm	重 量 kg
		A	B	H	H1	W	D		
F1	YD280T4-0P7G/1P5PB YD280T4-1P5G/2P2PB YD280T4-2P2G/3P0PB YD280T4-3P0G/3P7PB YD280T4-3P7G/5P5PB	74	187	197.5	-	90	141	Ø5	1.6
F2	YD280T4-5P5G/7P5PB YD280T4-7P5GB	90	190	200	202	102	163.5	Ø6	1.8
F3	YD280T4-11G/15PB YD280T4-15G/18P5PB	108.5	227	240.5	242.5	125	173	Ø6.5	2.0
F4	YD280T4-18P5G/22PB YD280T4-22GB	147	278.5	295	297	165	208.3	Ø7.2	2.4

表 9-5 YD280T2S-0P4GB~2P2GB 外型及安装孔位尺寸（单相 200V~240V）

框号	变频器型号	安装孔位 mm		外型尺寸 mm				安装孔径 mm	重 量 kg
		A	B	H	H1	W	D		
F1	YD280T2S-0P4GB YD280T2S-0P7GB YD280T2S-1P5GB YD280T2S-2P2GB	74	187	197.5	-	90	141	Ø5	1.6

9.8.3 制动组件选型表

表 9-39 YD280 变频器制动组件选型表（三相 380~480V）

变频器型号	制动单元	125% 制动转矩 (10% ED, 最大 10 秒)		备 注	最小制动电阻值 Ω
		推荐制动电阻规格	制动电阻数量		
YD280T4-0P7G/1P5PB	内置标配	140W 800Ω	1	变频器型号后加“B”	96
YD280T4-1P5G/2P2PB		300W 380Ω	1		96
YD280T4-2P2G/3P0PB		440W 260Ω	1		96
YD280T4-3P0G/3P7PB		600W 190Ω	1		96
YD280T4-3P7G/5P5PB		740W 150Ω	1		64
YD280T4-5P5G/7P5PB		1100W 100Ω	1		32
YD280T4-7P5GB		1500W 75Ω	1		32
YD280T4-11G/15PB		2200W 50Ω	1		20
YD280T4-15G/18P5PB		3000W 38Ω	1		20
YD280T4-18P5G/22PB		4000W 32Ω	1		24
YD280T4-22GB		4500W 27Ω	1		24

表 9-40 YD280 变频器制动组件选型表（单相 200~240V）

变频器型号	制动单元	125% 制动转矩 (10% ED, 最大 10 秒)		备 注	最小制动电阻值 Ω
		推荐制动电阻规格	制动电阻数量		
YD280T2S-0P4GB	内置标配	80W 200Ω	1	变频器型号后加“B”	64
YD280T2S-0P7GB		80W 150Ω	1		64
YD280T2S-1P5GB		100W 100Ω	1		32
YD280T2S-2P2GB		100W 70Ω	1		32

NOTE

- 上表中的制动电阻值是基于制动使用率（ED）为 10%，且单次制动最长时间为 10 秒的工况。
- 对于 380~480V 机型，内置制动单元的默认起始制动电压为 760V；对于 200~240V 机型，内置制动单元的默认起始制动电压为 350V。
- 上述表中为指导数据，用户可根据实际情况选择不同的电阻阻值和功率（但阻值一定不能小于表中最小制动电阻值，功率可以大）。制动电阻的选择需要根据实际应用系统中电机发电的功率来确定，与系统惯性、减速时间、位能负载的能量等都有关系，需要用户根据实际情况选择。系统的惯量越大、需要的减速时间越短、制动得越频繁，则制动电阻需要选择功率越大、阻值越小。

第十一章 选配卡

YD280 系列变频器外接丰富的扩展卡可实现支持RS-485现场总线。

11.3.3 RS-485 扩展卡（YD280 RS485 Card）端子分布与功能说明

11.3.3.1 YD280 RS485 Card 端子分布与功能说明

YD280 RS485 通讯卡是为 YD280 系列变频器提供485通讯功能而专门研制，采用隔离方案，电气参数符合国际标准，用户可根据需要选用，以实现远程串口方式控制变频器运行及参数设定等功能。

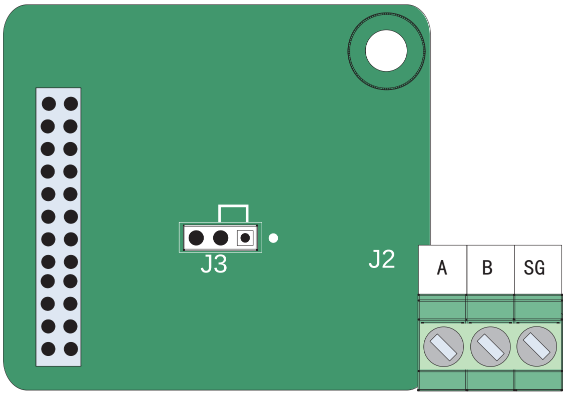


图 11-9 YD280 RS485 Card端子分布示意图

表 11-16 YD280 RS485 扩展卡端子功能说明

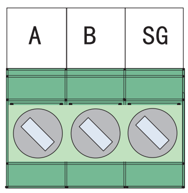
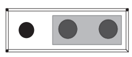
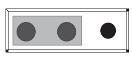
端子标识		端子名称	功能说明	端子分布
J2	A	485 通讯信号正	485 通讯输入端子，隔离输入	
	B	485 通讯信号负	485 通讯输入端子，隔离输入	
	SG	485 通讯信号参考地	电源为隔离电源	

表 11-17 YD280 RS485 扩展卡跳线说明

端子标识	端子名称	功能说明	跳线 / 拨码位置
J3	485 通讯终端电阻设置跳线	进行终端电阻匹配	
		不进行终端电阻匹配	

附录 A 异步电机专用功能参数表

PP-00 设为非 0 值，即设置了用户密码，在功能参数模式和用户更改参数模式下，参数菜单必须在正确输入密码后才能进入，取消密码，需将 PP-00 设为 0。

变频器用户密码只是用来锁定面板操作，在设置密码后，通过键盘操作参数读写时，每一次退出操作后，需再次进入时均需要进行密码验证；在通讯操作时可不通过密码直接进行读写操作（PP、PF 组除外）。

用户定制参数模式下的参数菜单不受密码保护。

P 组、A 组是基本功能参数，U 组是监视功能参数。参数表中符号说明如下：

“☆”：表示该参数的设定值在变频器处于停机、运行状态中，均可更改；

“★”：表示该参数的设定值在变频器处于运行状态时，不可更改；

“●”：表示该参数的数值是实际检测记录值，不能更改；

“*”：表示该参数是“厂家参数”，仅限于制造厂家设置，禁止用户进行操作；

"（T4）"：表示该设定或参数，仅限于380V机种，220V机种不适用。

A.1 基本功能参数简表

参数	名 称	设定范围	出厂值	更改	页码
P0 组 基本功能组					
P0-00	GP 类型显示	1：G 型（恒转矩负载机型） 2：P 型（风机、水泵类负载机型）	机型确定	●	-
P0-01	第 1 电机控制方式	0：无速度传感器矢量控制（SVC） （T4） 2：V/F 控制	0	★	-
P0-02	运行指令选择	0：操作面板 1：端子 2：通讯	0	☆	110/ 177/ 178
P0-03	主频率指令输入选择	0：数字设定（掉电不记忆） 1：数字设定（掉电记忆） 2：AI1 3：AI2 4：面板旋钮 5：保留 6：多段指令 7：简易 PLC 8：PID 9：通讯给定	0	★	116
P0-04	辅助频率指令输入选择	同 P0-03(主频率指令输入选择)	0	★	133
P0-05	叠加时辅助频率指令范围选择	0：相对于最大频率 1：相对于主频率指令	0	☆	135
P0-06	叠加时辅助频率指令范围	0%~150%	100%	☆	135

参数	名 称	设定范围	出厂值	更改	页码
P0-07	频率指令叠加选择	个位：频率指令选择 0：主频率指令 1：主辅运算结果（运算关系由十位确定） 2：主频率指令与辅助频率指令切换 3：主频率指令与主辅运算结果切换 4：辅助频率指令与主辅运算结果切换 十位：频率指令主辅运算关系 0：主 + 辅 1：主 - 辅 2：二者最大值 3：二者最小值	00	☆	135
P0-08	预置频率	0.00Hz~ 最大频率（P0-10）	50.00Hz	☆	117
P0-09	运行方向	0：默认方向运行 1：与默认方向相反方向运行	0	☆	202
P0-10	最大频率	50.00Hz~500.00Hz	50.00Hz	★	117/ 136/ 177/ 178
P0-11	上限频率指令选择	0：P0-12 设定 1：AI1 2：AI2 3：面板旋钮 4：保留 5：通讯给定	0	★	136
P0-12	上限频率	下限频率 P0-14~ 最大频率 P0-10	50.00Hz	☆	136
P0-13	上限频率偏置	0.00Hz~ 最大频率 P0-10	0.00Hz	☆	136
P0-14	下限频率	0.00Hz~ 上限频率 P0-12	0.00Hz	☆	136
P0-15	载波频率	机型确定	机型确定	☆	-
P0-16	载波频率随温度调整	0：否 1：是	1	☆	-
P0-17	加速时间 1	0.00s~650.00s(P0-19=2) 0.0s~6500.0s(P0-19=1) 0s~65000s(P0-19=0)	机型确定	☆	141/ 179
P0-18	减速时间 1	0.00s~650.00s(P0-19=2) 0.0s~6500.0s(P0-19=1) 0s~65000s(P0-19=0)	机型确定	☆	141/ 179
P0-19	加减速时间单位	0：1 秒 1：0.1 秒 2：0.01 秒	1	★	141
P0-21	叠加时辅助频率指令偏置频率	0.00Hz~ 最大频率 P0-10	0.00Hz	☆	-
P0-22	频率指令分辨率	2：0.01Hz	2	★	-
P0-23	数字设定频率停机记忆选择	0：不记忆 1：记忆	0	☆	117
P0-24	电机参数组选择	0：电机参数组 1 1：电机参数组 2	0	★	170
P0-25	加减速时间基准频率	0：最大频率 (P0-10) 1：设定频率 2：100Hz	0	★	141/ 199
P0-26	运行时频率指令 UP/DOWN 基准	0：运行频率 1：设定频率	0	★	-

参数	名 称	设定范围	出厂值	更改	页码
P0-27	运行指令捆绑主频率指令选择	个位：操作面板绑定频率源选择 0：无绑定 1：数字设定频率 2：AI1 3：AI2 4：面板旋钮 5：保留 6：多段速 7：简易 PLC 8：PID 9：通讯给定 十位：端子绑定频率源选择 百位：通讯绑定频率源选择	000	☆	136
P0-28	通讯协议选择	0：Modbus 协议	0	★	114/ 132/ 192
P1 组 第一电机参数					
P1-00	电机类型选择	0：普通异步电机 1：变频异步电机	0	★	143
P1-01	电机额定功率	0.1kW~1000.0kW	机型确定	★	143
P1-02	电机额定电压	1V~2000V	机型确定	★	143
P1-03	电机额定电流	0.01A~655.35A	机型确定	★	143
P1-04	电机额定频率	0.01Hz~ 最大频率	机型确定	★	143
P1-05	电机额定转速	1rpm~65535rpm	机型确定	★	143
P1-06	异步电机定子电阻	0.001Ω~65.535Ω	调谐参数	★	143
P1-07	异步电机转子电阻	0.001Ω~65.535Ω	调谐参数	★	143
P1-08	异步电机漏感抗	0.01mH~655.35mH	调谐参数	★	143
P1-09	异步电机互感抗	0.1mH~6553.5mH	调谐参数	★	143
P1-10	异步电机空载电流	0.01A~P1-03	调谐参数	★	143
P1-37	调谐选择	0：无操作 1：异步机静止部分参数调谐 2：异步机动态完整调谐 3：异步机静止完整调谐	0	★	141

参数	名 称	设定范围	出厂值	更改	页码
P2 组 第一电机矢量控制参数 T4：P2群仅380V机种适用					
P2-00	速度环比例增益 1	1~100	30	☆	149
P2-01	速度环积分时间 1	0.01s~10.00s	0.50s	☆	149
P2-02	切换频率 1	0.00~P2-05	5.00Hz	☆	149

参数	名 称	设定范围	出厂值	更改	页码
P2-03	速度环比例增益 2	1~100	20	☆	149
P2-04	速度环积分时间 2	0.01s~10.00s	1.00s	☆	149
P2-05	切换频率 2	P2-02~ 最大频率	10.00Hz	☆	149
P2-06	矢量控制转差增益	50%~200%	100%	☆	150
P2-07	SVC 速度反馈滤波时间	0.000s~0.100s	0.015s	☆	150
P2-09	速度控制方式下转矩上限指令选择	0：参数 P2-10 设定 1：AI1 2：AI2 3：面板旋钮 4：保留 5：通讯给定 6：MIN(AI1,AI2) 7：MAX(AI1,AI2) 1-7 选项的满量程对应 P2-10	0	☆	151
P2-10	速度控制方式下转矩上限数字设定	0.0%~200.0%	150.0%	☆	151/177
P2-11	速度控制方式下转矩上限指令选择（发电）	0：参数 P2-10 设定（不区分电动和发电） 1：AI1 2：AI2 3：面板旋钮 4：保留 5：通讯给定 6：MIN(AI1,AI2) 7：MAX(AI1,AI2) 8：参数 P2-12 设定 1-7 选项的满量程对应 P2-12	0	☆	151
P2-12	速度控制方式下转矩上限数字设定（发电）	0.0% ~ 200.0%	150.0%	☆	151
P2-13	励磁调节比例增益	0~60000	2000	☆	153
P2-14	励磁调节积分增益	0~60000	1300	☆	153
P2-15	转矩调节比例增益	0~60000	2000	☆	153
P2-16	转矩调节积分增益	0~60000	1300	☆	153
P2-17	速度环积分属性	个位：积分分离 0：无效 1：有效	0	☆	-
P2-21	弱磁区最大转矩系数	50~200%	100%	☆	154
P2-22	发电功率限制使能	0：无效 1：全程生效 2：恒速生效 3：减速生效	0	☆	151
P2-23	发电功率上限	0.0~200.0%	机型确定	☆	151
P3 组 V/F 控制参数					
P3-00	V/F 曲线设定	0：直线 V/F 1：多点 V/F 2~9：直线 V/F （仅T4) 2：平方 V/F （仅T2S) 3：1.2 次方 V/F（仅T2S) 4：1.4 次方 V/F （仅T2S) 6：1.6 次方 V/F （仅T2S) 8：1.8 次方 V/F （仅T2S) 9：保留 10：V/F 完全分离模式 11：V/F 半分离模式	0	★	144
P3-01	转矩提升	0.0%：（自动转矩提升） 0.1%~30.0%	机型确定	☆	144
P3-02	转矩提升截止频率	0.00Hz~ 最大频率	50.00Hz	★	144
P3-03	多点 V/F 频率点 1	0.00Hz~P3-05	0.00Hz	★	144
P3-04	多点 V/F 电压点 1	0.0%~100.0%	0.0%	★	144

参数	名 称	设定范围	出厂值	更改	页码
P3-05	多点 V/F 频率点 2	P3-03~P3-07	0.00Hz	★	144
P3-06	多点 V/F 电压点 2	0.0%~100.0%	0.0%	★	144
P3-07	多点 V/F 频率点 3	P3-05~ 电机额定频率 (P1-04)	0.00Hz	★	144
P3-08	多点 V/F 电压点 3	0.0%~100.0%	0.0%	★	144
P3-10	V/F 过励磁增益	0~200	64	☆	148
P3-11	V/F 振荡抑制增益	0~100	40	☆	148
P3-13	V/F 分离的电压源	0：数字设定（P3-14） 1：AI1 2：AI2 3：面板旋钮 4：保留 5：多段指令 6：简易 PLC 7：PID 8：通讯给定 注：100.0% 对应电机额定电压	0	☆	145
P3-14	V/F 分离的电压数字设定	0V~ 电机额定电压	0V	☆	145
P3-15	V/F 分离的电压加速时间	0.0s~1000.0s 注：表示 0V 变化到电机额定电压的时间	0.0s	☆	145
P3-16	V/F 分离的电压减速时间	0.0s~1000.0s 注：表示 0V 变化到电机额定电压的时间	0.0s	☆	146
P3-17	V/F 分离停机方式选择	0：频率 / 电压独立减至 0 1：电压减为 0 后频率再减	0	☆	146
P3-18	过流失速动作电流	50~200%	150%	★	147
P3-19	过流失速使能	0：无效 1：有效	1 (有效)	★	147
P3-20	过流失速抑制增益	0~100	20	☆	147
P3-21	倍速过流失速动作电流补偿系数	50~200%	50%	★	147
P3-22	过压失速动作电压	三相 380~480V 机型：650.0V ~ 800.0V 三相 200~240V 机型：330.0V ~ 400.0V	770.0V 370.0V	★	148
P3-23	过压失速使能	0：无效 1：有效	1 (有效)	★	148
P3-24	过压失速抑制频率增益	0~100	30	☆	148
P3-25	过压失速抑制电压增益	0~100	30	☆	148
P3-26	过压失速最大上升频率限制	0~50Hz	5Hz	★	148
P4 组 输入端子					

<table>
<tr><th>参数</th><th>名 称</th><th>设定范围</th><th>出厂值</th><th>更改</th><th>页码</th></tr>
<tr><td>P4-00</td><td>DI1 端子功能选择</td><td rowspan="10">0：无功能
1：正转运行 FWD 或运行命令
2：反转运行 REV 或正反运行方向
（注：设定为 1、2 时，需配合 P4-11 使用，详见参数参数说明）
3：三线式运行控制
4：正转点动（FJOG）
5：反转点动（RJOG）
6：端子 UP
7：端子 DOWN
8：自由停车
9：故障复位（RESET）
10：运行暂停
11：外部故障常开输入
12：多段指令端子 1
13：多段指令端子 2
14：多段指令端子 3
15：多段指令端子 4
16：加减速时间选择端子 1
17：加减速时间选择端子 2
18：频率指令切换
19：UP/DOWN 设定清零（端子、键盘）
20：控制命令切换端子 1
21：加减速禁止
22：PID 暂停
23：简易 PLC 状态复位
24：摆频暂停
25：计数器输入
26：计数器复位
27：长度计数输入
28：长度复位
29：转矩控制禁止
30：保留
31：保留
32：立即直流制动
33：外部故障常闭输入
34：频率修改使能
35：PID 作用方向取反
36：外部停车端子 1
37：控制命令切换端子 2
38：PID 积分暂停
39：主频率与预置频率切换
40：辅频率与预置频率切换
41：电机端子选择功能
42：保留
43：PID 参数切换
44：用户自定义故障 1
45：用户自定义故障 2
46：速度控制 / 转矩控制切换
47：紧急停车
48：外部停车端子 2
49：减速直流制动
50：本次运行时间清零
51：两线式 / 三线式切换
52：反向频率禁止
53-59：保留</td><td>1</td><td>★</td><td>181</td></tr>
<tr><td>P4-01</td><td>DI2 端子功能选择</td><td>4</td><td>★</td><td>181</td></tr>
<tr><td>P4-02</td><td>DI3 端子功能选择</td><td>9</td><td>★</td><td>181</td></tr>
<tr><td>P4-03</td><td>DI4 端子功能选择</td><td>12</td><td>★</td><td>181</td></tr>
<tr><td>P4-04</td><td>DI5 端子功能选择</td><td>13</td><td>★</td><td>181</td></tr>
<tr><td>P4-05</td><td>保留</td><td>0</td><td>-</td><td></td></tr>
<tr><td>P4-06</td><td>保留</td><td>0</td><td>-</td><td></td></tr>
<tr><td>P4-07</td><td>保留</td><td>0</td><td>-</td><td></td></tr>
<tr><td>P4-08</td><td>保留</td><td>0</td><td>-</td><td></td></tr>
<tr><td>P4-09</td><td>保留</td><td>0</td><td>-</td><td></td></tr>
<tr><td>P4-10</td><td>DI 滤波时间</td><td>0.000s~1.000s</td><td>0.010s</td><td>☆</td><td>-</td></tr>
</table>

参数	名 称	设定范围	出厂值	更改	页码
P4-11	端子命令方式	0：两线式 1 1：两线式 2 2：三线式 1 3：三线式 2	0	★	110
P4-12	端子 UP/DOWN 变化率	0.001Hz/s~65.535Hz/s	1.00Hz/s	☆	-
P4-13	AI 曲线 1 最小输入	0.00V~P4-15	0.00V	☆	118
P4-14	AI 曲线 1 最小输入对应设定	-100.0%~+100.0%	0.0%	☆	118
P4-15	AI 曲线 1 最大输入	P4-13~+10.00V	10.00V	☆	118
P4-16	AI 曲线 1 最大输入对应设定	-100.0%~+100.0%	100.0%	☆	118
P4-17	AI1 滤波时间	0.00s~10.00s	0.10s	☆	121
P4-18	AI 曲线 2 最小输入	0.00V~P4-20	0.00V	☆	119
P4-19	AI 曲线 2 最小输入对应设定	-100.0%~+100.0%	0.0%	☆	119
P4-20	AI 曲线 2 最大输入	P4-18~+10.00V	10.00V	☆	119
P4-21	AI 曲线 2 最大输入对应设定	-100.0%~+100.0%	100.0%	☆	119
P4-22	AI2 滤波时间	0.00s~10.00s	0.10s	☆	121
P4-23	面板旋钮最小输入	-10.00V~P4-25	-10.00V	☆	119
P4-24	面板旋钮最小输入对应设定	-100.0%~+100.0%	0.0%	☆	119
P4-25	面板旋钮最大输入	P4-23~+10.00V	10.00V	☆	119
P4-26	面板旋钮最大输入对应设定	-100.0%~+100.0%	100.0%	☆	119
P4-27	面板旋钮滤波时间	0.00s~10.00s	0.10s	☆	121
P4-28	保留	-	-	☆	-
P4-29	保留	-	-	☆	-
P4-30	保留	-	-	☆	-
P4-31	保留	-	-	☆	-
P4-32	保留	-	-	☆	-
P4-33	AI 曲线选择	个位：AI1 曲线选择 1：曲线 1（2 点，见 P4-13~P4-16） 2：曲线 2（2 点，见 P4-18~P4-21） 3：曲线 3（2 点，见 P4-23~P4-26） 4：曲线 4（4 点，见 A6-00~A6-07） 5：曲线 5（4 点，见 A6-08~A6-15） 十位：AI2 曲线选择，同上 百位：面板旋钮曲线选择，同上	321	☆	121
P4-34	AI 低于最小输入设定选择	个位：AI1 低于最小输入设定选择 0：对应最小输入设定 1：0.0% 十位：AI2 低于最小输入设定选择，同上 百位：面板旋钮低于最小输入设定选择，同上	000	☆	-
P4-35	DI1 延迟时间	0.0s~3600.0s	0.0s	★	181
P4-36	DI2 延迟时间	0.0s~3600.0s	0.0s	★	181
P4-37	DI3 延迟时间	0.0s~3600.0s	0.0s	★	181
P4-38	DI 端子有效模式选择 1	0：高电平有效 1：低电平有效 个位：DI1 十位：DI2 百位：DI3 千位：DI4 万位：DI5	00000	★	181

<table>
<tr><th>参数</th><th>名 称</th><th>设定范围</th><th>出厂值</th><th>更改</th><th>页码</th></tr>
<tr><td>P4-40</td><td>AI2 模拟量
电压、电流模式选择</td><td>0：电压0-10V输入
1：电流0-20mA输入</td><td>00000</td><td>★</td><td>182</td></tr>
<tr><td colspan="6">P5 组 输出端子</td></tr>
<tr><td>P5-00</td><td>FM 端子输出模式选择</td><td>0：脉冲输出 (FMP)
1：开关量输出 (FMR)</td><td>0</td><td>☆</td><td>184/
189</td></tr>
<tr><td>P5-01</td><td>FMR 功能选择（集电极开路输出端子）</td><td rowspan="3">0：无输出
1：变频器运行中
2：故障输出 (为自由停机的故障)
3：频率水平检测 1
4：频率到达
5：零速运行中（停机时不输出）
6：电机过载预报警
7：变频器过载预报警
8：设定记数值到达
9：指定记数值到达
10：长度到达
11：简易 PLC 循环完成
12：累计运行时间到达
13：频率限定中
14：转矩限定中
15：运行准备就绪
16：AI1>AI2
17：上限频率到达
18：下限频率到达 (停机时不输出)
19：欠压状态
20：通讯设定
21：保留
22：保留
23：零速运行中 2（停机时也输出）
24：累计上电时间到达
25：频率水平检测 2
26：频率1到达
27：频率2到达
28：电流1到达
29：电流2到达
30：定时到达
31：AI1 输入超限
32：掉载中
33：反向运行中
34：零电流状态
35：模块温度到达
36：输出电流超限
37：下限频率到达 (停机也输出)
38：告警 (所有故障)
39：电机过温
40：本次运行时间到达
41：故障 (为自由停机的故障且欠压不输出)</td><td>0</td><td>☆</td><td>184</td></tr>
<tr><td>P5-02</td><td>控制板继电器功能选择
(T/A-T/B-T/C)</td><td>2</td><td>☆</td><td>184</td></tr>
<tr><td>P5-04</td><td>DO1 输出功能选择</td><td>1</td><td>☆</td><td>184</td></tr>
</table>

参数	名 称	设定范围	出厂值	更改	页码
P5-06	FMP 输出功能选择	0：运行频率 1：设定频率 2：输出电流 3：电机输出转矩（绝对值，相对电机的百分比） 4：输出功率 5：输出电压 6：脉冲输入 (100.0% 对应 100.0kHz) 7：AI1 8：AI2 9：无 10：长度 11：记数值 12：通讯设定 13：电机转速 14：输出电流 (100.0% 对应 1000.0A) 15：输出电压 (100.0% 对应 1000.0V) 16：电机输出转矩（实际值，相对电机的百分比）	0	☆	189
P5-07	AO1 输出功能选择		0	☆	189
P5-09	FMP 输出最大频率	0.01kHz~100.00kHz	50.00kHz	☆	189
P5-10	AO1 零偏系数	-100.0%~+100.0%	0.0%	☆	189
P5-11	AO1 增益	-10.00~+10.00	1.00	☆	189
P5-17	FMR 输出延迟时间	0.0s~3600.0s	0.0s	☆	184
P5-18	RELAY1 输出延迟时间	0.0s~3600.0s	0.0s	☆	184
P5-20	DO1 输出延迟时间	0.0s~3600.0s	0.0s	☆	184
P5-22	DO 输出端子有效状态选择	0：正逻辑 1：反逻辑 个位：FMR 十位：RELAY1 百位：无 千位：DO1 万位：无	00000	☆	184
P5-23	AO1 输出选择	0：电压 1：电流	0	☆	184

P6 组 启停控制					
P6-00	启动方式 2,3选项 仅 T4	0：直接启动 1：转速跟踪再启动 2：预励磁启动 (交流异步机) 3：磁场定向转速追踪	0	☆	137
P6-01	转速跟踪方式	0：从停机频率开始 1：从工频开始 2：从最大频率开始	0	★	137
P6-02	转速跟踪快慢	20	20	☆	137
P6-03	启动频率	0.00Hz~10.00Hz	0.00Hz	☆	137
P6-04	启动频率保持时间	0.0s~100.0s	0.0s	★	137
P6-05	启动直流制动电流 / 预励磁电流	0%~100%	50%	★	137
P6-06	启动直流制动时间 / 预励磁时间	0.0s~100.0s	0.0s	★	137
P6-07	加减速方式	0：直线加减速 1、2：动态 S 曲线加减速	0	★	141
P6-08	S 曲线开始段时间比例	0.0%~(100.0%-P6-09)	30.0%	★	141

参数	名 称	设定范围	出厂值	更改	页码
P6-09	S 曲线结束段时间比例	0.0%~(100.0%-P6-08)	30.0%	★	141
P6-10	停机方式	0：减速停车　1：自由停车	0	☆	139
P6-11	停机直流制动起始频率	0.00Hz~ 最大频率	0.00Hz	☆	139
P6-12	停机直流制动等待时间	0.0s~100.0s	0.0s	☆	139
P6-13	停机直流制动电流	0%~100%	50%	☆	139
P6-14	停机直流制动时间	0.0s~100.0s	0.0s	☆	139
P6-15	制动使用率	0%~100%	100%	☆	-
P6-18	转速跟踪电流大小 T4	30%~200%	机型确定	★	-
P6-21	去磁时间 (SVC 有效) T4	0.00~5.00s	机型确定	☆	-
P6-23	过励磁选择 T4	0：不生效 1：仅减速生效 2：全程生效	0	☆	-
P6-24	过励磁抑制电流值 T4	0~150%	100%	☆	-
P6-25	过励磁增益 T4	1.00~2.50	1.25	☆	-
P7 组　键盘与显示					
P7-00	数码管缺画检验使能	0	0	☆	-
P7-01	MF.K 键功能选择	0：选择菜单种类，依据PP-03设定方式，MF.K 切换显示模式 1：操作面板命令通道与远程命令通道 (端子命令通道或通讯命令通道) 切换 2：正反转切换 3：正转点动 4：反转点动	0	★	84
P7-02	STOP/RESET 键功能	0：只在键盘操作方式下 ,STOP/RES 键停机功能有效 1：在任何操作方式下 ,STOP/RES 键停机功能均有效	1	☆	-
P7-03	运行显示参数 1	0000~FFFF Bit00: 运行频率 1(Hz) Bit01: 设定频率 (Hz) Bit02: 母线电压 (V) Bit03: 输出电压 (V) Bit04: 输出电流 (A) Bit05: 输出功率 (kW) Bit06: 输出转矩 (%) Bit07: DI 输入状态 Bit08: DO 输出状态 Bit09: AI1 电压 (V) Bit10: AI2 电压 (V) Bit11: 面板旋钮电压 (V) Bit12: 计数值 Bit13: 长度值 Bit14: 负载速度显示 Bit15: PID 设定	1F	☆	163

参数	名 称	设定范围	出厂值	更改	页码
P7-04	运行显示参数 2	0000~FFFF Bit00：PID 反馈 Bit01：PLC 阶段 Bit02：保留 Bit03：运行频率 2（Hz） Bit04：剩余运行时间 Bit05：AI1 校正前电压 (V) Bit06：AI2 校正前电压 (V) Bit07：面板旋钮校正前电压 (V) Bit08：电机转速 Bit09：当前上电时间 (Hour) Bit10：当前运行时间 (Min) Bit11：保留 Bit12：通讯设定值 Bit13：编码器反馈速度 (Hz) Bit14：主频率 X 显示 (Hz) Bit15：辅频率 Y 显示 (Hz)	00	☆	163
P7-05	停机显示参数	0000~FFFF Bit00：设定频率 (Hz) Bit01： 母线电压 (V) Bit02：DI 输入状态 Bit03：DO 输出状态 Bit04：AI1 电压 (V) Bit05：AI2 电压 (V) Bit06：面板旋钮电压 (V) Bit07：计数值 Bit08：长度值 Bit09：PLC 阶段 Bit10：负载速度 Bit11：PID 设定 Bit12：保留	33	☆	164
P7-06	负载传动比	0.001~65.000	1.000	☆	-
P7-07	逆变器模块散热器温度	-20°C ~120°C	-	●	-
P7-08	产品号	-	-	●	-
P7-09	累计运行时间	0h~65535h	-	●	-
P7-10	性能版本号	-	-	●	-
P7-11	功能版本号	-	-	●	-
P7-12	负载转速显示小数点位	个位：U0-14 的小数点个数 0：0 位小数位 1：1 位小数位 2：2 位小数位 十位：U0-19/U0-29 小数点个数 1：1 位小数位 2：2 位小数位	20	☆	-
P7-13	累计上电时间	0~65535 小时	-	●	-
P7-14	累计耗电量	0~65535 度	-	●	-
P8 组 辅助功能					
P8-00	点动运行频率	0.00Hz~ 最大频率	2.00Hz	☆	199
P8-01	点动加速时间	0.0s~6500.0s	20.0s	☆	199
P8-02	点动减速时间	0.0s~6500.0s	20.0s	☆	199
P8-03	加速时间 2	0.00s~650.00s（P0-19=2） 0.0s~6500.0s（P0-19=1） 0s~65000s（P0-19=0）	机型确定	☆	141

参数	名 称	设定范围	出厂值	更改	页码
P8-04	减速时间 2	0.00s~650.00s（P0-19=2） 0.0s~6500.0s（P0-19=1） 0s~65000s（P0-19=0）	机型确定	☆	141
P8-05	加速时间 3	0.00s~650.00s（P0-19=2） 0.0s~6500.0s（P0-19=1） 0s~65000s（P0-19=0）	机型确定	☆	141
P8-06	减速时间 3	0.00s~650.00s（P0-19=2） 0.0s~6500.0s（P0-19=1） 0s~65000s（P0-19=0）	机型确定	☆	141
P8-07	加速时间 4	0.00s~650.00s（P0-19=2） 0.0s~6500.0s（P0-19=1） 0s~65000s（P0-19=0）	0.0s	☆	141/ 177
P8-08	减速时间 4	0.00s~650.00s（P0-19=2） 0.0s~6500.0s（P0-19=1） 0s~65000s（P0-19=0）	0.0s	☆	141/ 177
P8-09	跳跃频率 1	0.00Hz~ 最大频率	0.00Hz	☆	201
P8-10	跳跃频率 2	0.00Hz~ 最大频率	0.00Hz	☆	201
P8-11	跳跃频率幅度	0.00Hz~ 最大频率	0.00Hz	☆	201
P8-12	正反转死区时间	0.0s~3000.0s	0.0s	☆	201
P8-13	反向频率禁止	0：无效 1：有效	0	☆	201
P8-14	设定频率低于下限频率运行模式	0：以下限频率运行 1：停机 2：零速运行	0	☆	136
P8-15	下垂率	0.00~10.00Hz	0.00Hz	☆	179
P8-16	设定累计上电到达时间	0h~65000h	0h	☆	206
P8-17	设定累计运行到达时间	0h~65000h	0h	☆	206
P8-18	启动保护选择	0：不保护 1：保护	0	☆	156
P8-19	频率检测值 1	0.00Hz~ 最大频率	50.00Hz	☆	202
P8-20	频率检测滞后率 1	0.0%~100.0%（FDT1 电平）	5.0%	☆	202
P8-21	频率到达检出幅度	0.0%~100.0%（最大频率）	0.0%	☆	203
P8-22	加减速过程中跳跃频率是否有效	0：无效 1：有效	0	☆	201
P8-25	加速时间 1 与加速时间 2 切换频率点	0.00Hz~ 最大频率	0.00Hz	☆	203
P8-26	减速时间 1 与减速时间 2 切换频率点	0.00Hz~ 最大频率	0.00Hz	☆	203
P8-27	端子点动优先	0：无效 1：有效	0	☆	199
P8-28	频率检测值 2	0.00Hz~ 最大频率	50.00Hz	☆	202
P8-29	频率检测滞后率 2	0.0%~100.0%（FDT2 电平）	5.0%	☆	202
P8-30	任意到达频率检测值 1	0.00Hz~ 最大频率	50.00Hz	☆	204
P8-31	任意到达频率检出幅度 1	0.0%~100.0%（最大频率）	0.0%	☆	204
P8-32	任意到达频率检测值 2	0.00Hz~ 最大频率	50.00Hz	☆	204
P8-33	任意到达频率检出幅度 2	0.0%~100.0%（最大频率）	0.0%	☆	204
P8-34	零电流检测水平	0.0%~300.0% 100.0% 对应电机额定电流	5.0%	☆	204
P8-35	零电流检测延迟时间	0.01s~600.00s	0.10s	☆	204
P8-36	输出电流超限值	0.0%（不检测） 0.1%~300.0%（电机额定电流）	200.0%	☆	205
P8-37	输出电流超限检测延迟时间	0.00s~600.00s	0.00s	☆	205
P8-38	任意到达电流 1	0.0%~300.0%(电机额定电流)	100.0%	☆	205

参数	名 称	设定范围	出厂值	更改	页码
P8-39	任意到达电流 1 幅度	0.0%~300.0%(电机额定电流)	0.0%	☆	205
P8-40	任意到达电流 2	0.0%~300.0%(电机额定电流)	100.0%	☆	205
P8-41	任意到达电流 2 幅度	0.0%~300.0%(电机额定电流)	0.0%	☆	205
P8-42	定时功能选择	0: 无效 1: 有效	0	★	206
P8-43	定时运行时间选择	0：P8-44 设定 1：AI1 2：AI2 3：面板旋钮 模拟输入量程对应 P8-44	0	★	206
P8-44	定时运行时间	0.0Min~6500.0Min	0.0Min	★	206
P8-45	AI1 输入电压保护值下限	0.00V~P8-46	3.10V	☆	206
P8-46	AI1 输入电压保护值上限	P8-45~11.00V	6.80V	☆	206
P8-47	模块温度到达	0°C ~100°C	75°C	☆	206
P8-48	散热风扇控制	0：运行时风扇运转 1：风扇一直运转	0	☆	206
P8-49	唤醒频率	休眠频率 (P8-51)~ 最大频率（P0-10)	0.00Hz	☆	207
P8-50	唤醒延迟时间	0.0s~6500.0s	0.0s	☆	207
P8-51	休眠频率	0.00Hz~ 唤醒频率（P8-49)	0.00Hz	☆	207
P8-52	休眠延迟时间	0.0s~6500.0s	0.0s	☆	207
P8-53	本次运行到达时间	0.0~6500.0 分钟	0.0Min	☆	207
P8-54	输出功率校正系数	0.00%~200.0%	100.0%	☆	207
P8-55	急停减速时间 仅T4	0~6553.5	机型确定	☆	207
P9 组 故障与保护					
P9-00	电机过载保护选择	0：禁止 1：允许	1	☆	157
P9-01	电机过载保护增益	0.20~10.00	1.00	☆	157
P9-02	电机过载预警系数	50%~100%	80%	☆	157
P9-03	过压失速增益	0~100	40/30	☆	148
P9-04	过压失速保护电压	650V~800V 330V~400V	770/370V	☆	148
P9-07	对地短路保护选择	个位：上电对地短路保护选择 0：无效 1：有效 十位：运行前对地短路保护选择（T4 only) 0：无效 1：有效	01	☆	-
P9-08	制动单元动作起始电压	三相 380~480V 机型：650.0V~800.0V 三相 200~240V 机型：330.0V~400.0V	760V 370V	★	148
P9-09	故障自动复位次数	0~20	0	☆	159
P9-10	故障自动复位期间故障 DO 动作选择	0：不动作 1：动作	0	☆	159
P9-11	故障自动复位等待时间	0.1s~100.0s	1.0s	☆	159
P9-12	输入缺相 \ 接触器吸合保护选择	个位：输入缺相保护选择 十位：接触器吸合保护选择 （T4 only) 0：禁止 1：允许	01/11	☆	158

<table>
<tr><th>参数</th><th>名 称</th><th>设定范围</th><th>出厂值</th><th>更改</th><th>页码</th></tr>
<tr><td>P9-13</td><td>输出缺相保护选择</td><td>个位：输出缺相保护选择
0：禁止
1：允许
十位：运行前输出缺相保护选择 （T4 only）
0：禁止
1：允许</td><td>01</td><td>☆</td><td>158</td></tr>
<tr><td>P9-14</td><td>第一次故障类型</td><td rowspan="3">0：无故障
1：保留
2：加速过电流
3：减速过电流
4：恒速过电流
5：加速过电压
6：减速过电压
7：恒速过电压
8：缓冲电阻过载
9：欠压
10：变频器过载
11：电机过载
12：输入缺相
13：输出缺相
14：模块过热
15：外部故障
16：通讯异常
17：接触器异常
18：电流检测异常
19：电机调谐异常
20：无
21：参数读写异常
22：变频器硬件异常
23：电机对地短路
24：保留
25：保留
26：运行时间到达
27：用户自定义故障 1
28：用户自定义故障 2
29：上电时间到达
30：掉载
31：运行时 PID 反馈丢失
40：快速限流超时
41：运行时切换电机
42：无
43：无
45：无
51：初始位置错误
55：主从控制时从机故障</td><td>—</td><td>●</td><td>-</td></tr>
<tr><td>P9-15</td><td>第二次故障类型</td><td>—</td><td>●</td><td>-</td></tr>
<tr><td>P9-16</td><td>第三次（最近一次）故障类型</td><td>—</td><td>●</td><td>-</td></tr>
<tr><td>P9-17</td><td>第三次（最近一次）故障时频率</td><td>0.00Hz~655.35Hz</td><td>0.00Hz</td><td>●</td><td>-</td></tr>
<tr><td>P9-18</td><td>第三次（最近一次）故障时电流</td><td>0.00Hz~655.35A</td><td>0.00A</td><td>●</td><td>-</td></tr>
<tr><td>P9-19</td><td>第三次（最近一次）故障时母线电压</td><td>0.0V~6553.5V</td><td>0.0V</td><td>●</td><td>-</td></tr>
</table>

参数	名 称	设定范围	出厂值	更改	页码
P9-20	第三次(最近一次)故障时输入端子状态	0~9999	0	●	-
P9-21	第三次(最近一次)故障时输出端子状态	0~9999	0	●	-
P9-22	第三次(最近一次)故障时变频器状态	0~65535	0	●	-
P9-23	第三次(最近一次)故障时上电时间	0s~65535s	0s	●	-
P9-24	第三次(最近一次)故障时运行时间	0.0s~6553.5s	0.0s	●	-
P9-27	第二次故障时频率	0.00Hz~655.35Hz	0.00Hz	●	-
P9-28	第二次故障时电流	0.00A~655.35A	0.00A	●	-
P9-29	第二次故障时母线电压	0.0V~6553.5V	0.0V	●	-
P9-30	第二次故障时输入端子状态	0~9999	0	●	-
P9-31	第二次故障时输出端子状态	0~9999	0	●	-
P9-32	第二次故障时变频器状态	0~65535	0	●	-
P9-33	第二次故障时上电时间	0s~65535s	0s	●	-
P9-34	第二次故障时运行时间	0.0s~6553.5s	0.0s	●	-
P9-37	第一次故障时频率	0.00Hz~655.35Hz	0.00Hz	●	-
P9-38	第一次故障时电流	0.00A~655.35A	0.00A	●	-
P9-39	第一次故障时母线电压	0.0V~6553.5V	0.0V	●	-
P9-40	第一次故障时输入端子状态	0~9999	0	●	-
P9-41	第一次故障时输出端子状态	0~9999	0	●	-
P9-42	第一次故障时变频器状态	0~65535	0	●	-
P9-43	第一次故障时上电时间	0s~65535s	0s	●	-
P9-44	第一次故障时运行时间	0.0s~6553.5s	0.0s	●	-
P9-47	故障保护动作选择 1	个位：电机过载 (Err11) 0：自由停车 1：按停机方式停机 2：继续运行 十位：输入缺相 (Err12) 百位：输出缺相 (Err13) 千位：外部故障 (Err15) 万位：通讯异常 (Err16)	00000	☆	159
P9-48	故障保护动作选择 2	个位：保留 十位：参数读写异常 (Err21) 0：自由停车 1：按停机方式停机 百位：变频器过载故障动作选择（Err10） 0：自由停机 1：降额运行 千位：电机过热 (Err45) 万位：运行时间到达 (Err26)	00000	☆	159

参数	名 称	设定范围	出厂值	更改	页码
P9-49	故障保护动作选择 3	个位：用户自定义故障 1(27) 0：自由停车 1：按停机方式停机 2：继续运行 十位：用户自定义故障 2(28) 0：自由停车 1：按停机方式停机 2：继续运行 百位：上电时间到达 (29) 0：自由停车 1：按停机方式停机 2：继续运行 千位：掉载 (30) 0：自由停车 1：减速停车 2：直接跳至电机额定频率的 7% 继续运行，不掉载时自动恢复到设定频率运行 万位：运行时 PID 反馈丢失 (31) 0：自由停车 1：按停机方式停机 2：继续运行	00000	☆	160
P9-50	故障保护动作选择 4	个位：速度偏差过大 (42) 0：自由停车 1：按停机方式停机 2：继续运行 十位：电机超速度 (43) 百位：初始位置错误 (51)	00000	☆	160
P9-54	故障时继续运行频率选择	0：以当前的运行频率运行 1：以设定频率运行 2：以上限频率运行 3：以下限频率运行 4：以异常备用频率运行	0	☆	160
P9-55	异常备用频率	0.0%~100.0% (100.0% 对应最大频率 P0-10)	100.0%	☆	160
P9-56	保留	-	-	☆	-
P9-57	保留	-	-	☆	-
P9-58	保留	-	-	☆	-
P9-59	瞬停不停功能选择	0 无效 1 母线电压恒定控制 2 减速停机	0	★	161
P9-60	瞬停不停恢复电压	80%~100%	85%	★	161
P9-61	瞬停不停电压恢复判断时间	0.0~100.0s	0.5S	★	161
P9-62	瞬停不停动作电压	60%~100%	80%	★	161
P9-63	掉载保护选择	0：无效 1：有效	0	☆	161
P9-64	掉载检测水平	0.0~100.0%	10.0%	☆	161
P9-65	掉载检测时间	0.0~60.0s	1.0s	☆	161

参数	名 称	设定范围	出厂值	更改	页码
P9-71	瞬停不停增益 Kp	0~100	40	☆	161
P9-72	瞬停不停积分系数 Ki	0~100	30	☆	161
P9-73	瞬停不停动作减速时间	0~300.0s	20.0s	★	161
P9-74	晃电抑制时间 仅T4	0.1s~600.0s	0.5s	★	-

PA 组 PID 功能					
PA-00	PID 给定源	0：PA-01 设定 1：AI1 2：AI2 3：面板旋钮 4：保留 5：通讯给定 6：多段指令给定	0	☆	129
PA-01	PID 数值给定	0.0%~100.0%	50.0%	☆	129
PA-02	PID 反馈源	0：AI1 1：AI2 2：面板旋钮 3：AI1-AI2 4：保留 5：通讯给定 6：AI1+AI2 7：MAX(|AI1|, |AI2|) 8：MIN(|AI1|, |AI2|)	0	☆	129
PA-03	PID 作用方向	0：正作用 1：反作用	0	☆	129
PA-04	PID 给定反馈量程	0~65535	1000	☆	129
PA-05	比例增益 KP1	0.0~1000.0	20.0	☆	130
PA-06	积分时间 TI1	0.01s~10.00s	2.00s	☆	130
PA-07	微分时间 TD1	0.000s~10.000s	0.000s	☆	130
PA-08	PID 反转截止频率	0.00~ 最大频率	0.00Hz	☆	130
PA-09	PID 偏差极限	0.0%~100.0%	0.0%	☆	130
PA-10	PID 微分限幅	0.00%~100.00%	0.10%	☆	130
PA-11	PID 给定变化时间	0.00~650.00s	0.00s	☆	130
PA-12	PID 反馈滤波时间	0.00~60.00s	0.00s	☆	130
PA-13	PID 输出滤波时间	0.00~60.00s	0.00s	☆	130
PA-14	保留	-	-	☆	-
PA-15	比例增益 KP2	0~1000.0	20.0	☆	130
PA-16	积分时间 TI2	0.01s~10.00s	2.00s	☆	130
PA-17	微分时间 TD2	0.000s~10.000s	0.000s	☆	130
PA-18	PID 参数切换条件	0：不切换 1：通过 DI 端子切换 2：根据偏差自动切换 3：根据运行频率自动切换	0	☆	130
PA-19	PID 参数切换偏差 1	0.0%~PA-20	20.0%	☆	130
PA-20	PID 参数切换偏差 2	PA-19~100.0%	80.0%	☆	130
PA-21	PID 初值	0.0%~100.0%	0.0%	☆	130
PA-22	PID 初值保持时间	0.00~650.00s	0.00s	☆	130
PA-23	两次输出偏差最大值	0.00%~100.00%	1.00%	-	-
PA-24	两次输出偏差最小值	0.00%~100.00%	1.00%	-	-

参数	名 称	设定范围	出厂值	更改	页码
PA-25	PID 积分属性	个位：积分分离 0：无效 1：有效 十位：输出到限值后是否停止积分 0：继续积分 1：停止积分	00	☆	130
PA-26	PID 反馈丢失检测值	0.0%：不判断反馈丢失 0.1%~100.0%	0.0%	☆	131
PA-27	PID 反馈丢失检测时间	0.0s~20.0s	0.0s	☆	131
PA-28	PID 停机运算	0：停机不运算 1：停机时运算	0	☆	131
Pb 组 定长和计数					
Pb-05	设定长度	0m~65535m	1000m	☆	168
Pb-06	实际长度	0m~65535m	0m	☆	168
Pb-07	每米脉冲数	0.1~6553.5	100.0	☆	168
Pb-08	设定计数值	1~65535	1000	☆	169
Pb-09	指定计数值	1~65535	1000	☆	169
PC 组 多段指令、简易 PLC					
PC-00	多段指令 0	-100.0%~100.0%	0.0%	☆	124
PC-01	多段指令 1	-100.0%~100.0%	0.0%	☆	124
PC-02	多段指令 2	-100.0%~100.0%	0.0%	☆	124
PC-03	多段指令 3	-100.0%~100.0%	0.0%	☆	124
PC-04	多段指令 4	-100.0%~100.0%	0.0%	☆	124
PC-05	多段指令 5	-100.0%~100.0%	0.0%	☆	124
PC-06	多段指令 6	-100.0%~100.0%	0.0%	☆	124
PC-07	多段指令 7	-100.0%~100.0%	0.0%	☆	124
PC-08	多段指令 8	-100.0%~100.0%	0.0%	☆	124
PC-09	多段指令 9	-100.0%~100.0%	0.0%	☆	124
PC-10	多段指令 10	-100.0%~100.0%	0.0%	☆	124
PC-11	多段指令 11	-100.0%~100.0%	0.0%	☆	124
PC-12	多段指令 12	-100.0%~100.0%	0.0%	☆	124
PC-13	多段指令 13	-100.0%~100.0%	0.0%	☆	124
PC-14	多段指令 14	-100.0%~100.0%	0.0%	☆	124
PC-15	多段指令 15	-100.0%~100.0%	0.0%	☆	124
PC-16	简易 PLC 运行方式	0：单次运行结束停机 1：单次运行结束保持终值 2：一直循环	0	☆	127
PC-17	简易 PLC 掉电记忆选择	个位：掉电记忆选择 0：掉电不记忆 1：掉电记忆 十位：停机记忆选择 0：停机不记忆 1：停机记忆	00	☆	127
PC-18	简易 PLC 第 0 段运行时间	0.0s(h)~6500.0s(h)	0.0s(h)	☆	126
PC-19	简易 PLC 第 0 段加减速时间选择	0~3	0	☆	126
PC-20	简易 PLC 第 1 段运行时间	0.0s(h)~6500.0s(h)	0.0s(h)	☆	126
PC-21	简易 PLC 第 1 段加减速时间选择	0~3	0	☆	126
PC-22	简易 PLC 第 2 段运行时间	0.0s(h)~6500.0s(h)	0.0s(h)	☆	126

参数	名 称	设定范围	出厂值	更改	页码
PC-23	简易 PLC 第 2 段加减速时间选择	0~3	0	☆	126
PC-24	简易 PLC 第 3 段运行时间	0.0s(h)~6500.0s(h)	0.0s(h)	☆	126
PC-25	简易 PLC 第 3 段加减速时间选择	0~3	0	☆	126
PC-26	简易 PLC 第 4 段运行时间	0.0s(h)~6500.0s(h)	0.0s(h)	☆	126
PC-27	简易 PLC 第 4 段加减速时间选择	0~3	0	☆	126
PC-28	简易 PLC 第 5 段运行时间	0.0s(h)~6500.0s(h)	0.0s(h)	☆	126
PC-29	简易 PLC 第 5 段加减速时间选择	0~3	0	☆	126
PC-30	简易 PLC 第 6 段运行时间	0.0s(h)~6500.0s(h)	0.0s(h)	☆	126
PC-31	简易 PLC 第 6 段加减速时间选择	0~3	0	☆	126
PC-32	简易 PLC 第 7 段运行时间	0.0s(h)~6500.0s(h)	0.0s(h)	☆	126
PC-33	简易 PLC 第 7 段加减速时间选择	0~3	0	☆	126
PC-34	简易 PLC 第 8 段运行时间	0.0s(h)~6500.0s(h)	0.0s(h)	☆	126
PC-35	简易 PLC 第 8 段加减速时间选择	0~3	0	☆	126
PC-36	简易 PLC 第 9 段运行时间	0.0s(h)~6500.0s(h)	0.0s(h)	☆	127
PC-37	简易 PLC 第 9 段加减速时间选择	0~3	0	☆	127
PC-38	简易 PLC 第 10 段运行时间	0.0s(h)~6500.0s(h)	0.0s(h)	☆	127
PC-39	简易 PLC 第 10 段加减速时间选择	0~3	0	☆	127
PC-40	简易 PLC 第 11 段运行时间	0.0s(h)~6500.0s(h)	0.0s(h)	☆	127
PC-41	简易 PLC 第 11 段加减速时间选择	0~3	0	☆	127
PC-42	简易 PLC 第 12 段运行时间	0.0s(h)~6500.0s(h)	0.0s(h)	☆	127
PC-43	简易 PLC 第 12 段加减速时间选择	0~3	0	☆	127
PC-44	简易 PLC 第 13 段运行时间	0.0s(h)~6500.0s(h)	0.0s(h)	☆	127
PC-45	简易 PLC 第 13 段加减速时间选择	0~3	0	☆	127
PC-46	简易 PLC 第 14 段运行时间	0.0s(h)~6500.0s(h)	0.0s(h)	☆	127
PC-47	简易 PLC 第 14 段加减速时间选择	0~3	0	☆	127
PC-48	简易 PLC 第 15 段运行时间	0.0s(h)~6500.0s(h)	0.0s(h)	☆	127
PC-49	简易 PLC 第 15 段加减速时间选择	0~3	0	☆	127
PC-50	简易 PLC 运行时间单位	0：s（秒） 1：h（小时）	0	☆	127
PC-51	多段指令 0 给定方式	0：参数 PC-00 给定 1：AI1 2：AI2 3：面板旋钮 4：保留 5：PID 6：预置频率（P0-08）给定，UP/DOWN 可修改	0	☆	124/127

参数	名 称	设定范围	出厂值	更改	页码
Pd 组 通讯参数					
Pd-00	通讯波特率	个位：MODBUS 0：300BPS 1：600BPS 2：1200BPS 3：2400BPS 4：4800BPS 5：9600BPS 6：19200BPS 7：38400BPS 8：57600BPS 9：115200BPS 十位：保留 百位：保留 千位：保留	5005	☆	177/ 178/ 192
Pd-01	MODBUS 数据格式	0：无校验 (8-N-2) 1：偶校验 (8-E-1) 2：奇校验 (8-O-1) 3：无校验 (8-N-1) (MODBUS 有效)	0	☆	192
Pd-02	本机地址	1~247（MODBUS有效)	1	☆	192
Pd-03	MODBUS 应答延迟	0~20ms (MODBUS 有效)	2	☆	192
Pd-04	串口通讯超时时间	0.0：无效 0.1~60.0s (MODBUS 有效)	0.0	☆	192
Pd-05	MODBUS通讯数据格式	个位：MODBUS 0：非标准的 MODBUS 协议 1：标准的 MODBUS 协议 十位：保留	01	☆	193
Pd-06	通讯读取电流分辨率	0：0.01A	0	☆	193

参数	名 称	设定范围	出厂值	更改	页码
PE 组 用户定制参数					
PE-00	用户参数 0	P0-00~PP-xx A0-00~Ax-xx U0-00~U0-xx U3-00~U3-xx	U3.17	☆	-
PE-01	用户参数 1		U3.16	☆	-
PE-02	用户参数 2		P0.00	☆	-
PE-03	用户参数 3		P0.00	☆	-
PE-04	用户参数 4		P0.00	☆	-
PE-05	用户参数 5		P0.00	☆	-
PE-06	用户参数 6		P0.00	☆	-
PE-07	用户参数 7		P0.00	☆	-
PE-08	用户参数 8		P0.00	☆	-
PE-09	用户参数 9		P0.00	☆	-
PE-10	用户参数 10		P0.00	☆	-
PE-11	用户参数 11		P0.00	☆	-
PE-12	用户参数 12		P0.00	☆	-
PE-13	用户参数 13		P0.00	☆	-
PE-14	用户参数 14		P0.00	☆	-
PE-15	用户参数 15		P0.00	☆	-
PE-16	用户参数 16		P0.00	☆	-
PE-17	用户参数 17		P0.00	☆	-
PE-18	用户参数 18		P0.00	☆	-
PE-19	用户参数 19		P0.00	☆	-
PE-20	用户参数 20		U0.68	☆	-
PE-21	用户参数 21		U0.69	☆	-
PE-22	用户参数 22		P0.00	☆	-
PE-23	用户参数 23		P0.00	☆	-
PE-24	用户参数 24		P0.00	☆	-
PE-25	用户参数 25		P0.00	☆	-
PE-26	用户参数 26		P0.00	☆	-
PE-27	用户参数 27		P0.00	☆	-
PE-28	用户参数 28		P0.00	☆	-
PE-29	用户参数 29		P0.00	☆	-
PE-30	用户参数 30		P0.00	☆	-
PE-31	用户参数 31		P0.00	☆	-
PP 组 参数管理					
PP-00	用户密码	0~65535	0	☆	-
PP-01	参数初始化	0：无操作 01：恢复出厂参数，不包括电机参数 02：清除记录信息 04：备份用户当前参数 501：恢复用户备份参数	0	★	-
PP-02	功能参数组显示选择	个位：U 组显示选择 0：不显示 1：显示 十位：A 组显示选择 0：不显示 1：显示	11	★	-
PP-03	个性参数组显示选择	个位：用户定制参数组显示选择 0：不显示 1：显示 十位：用户变更参数组显示选择 0：不显示 1：显示	00	☆	-

参数	名 称	设定范围	出厂值	更改	页码
PP-04	参数修改属性	0：可修改 1：不可修改	0	☆	-
A0 组 转矩控制参数		T4：A0群仅380V机种适用			
A0-00	速度 / 转矩控制方式选择	0：速度控制 1：转矩控制	0	★	152/ 178/ 179
A0-01	转矩控制方式下转矩设定选择	0：数字设定 1(A0-03) 1：AI1 2：AI2 3：面板旋钮 4：保留 5：通讯给定 6：MIN(AI1,AI2) 7：MAX(AI1,AI2) （1-7 选项的满量程，对应 A0-03 数字设定）	0	★	152/ 178
A0-03	转矩控制方式下转矩数字设定	-200.0%~200.0%	150.0%	☆	152/ 178
A0-05	转矩控制正向最大频率	0.00Hz~ 最大频率	50.00Hz	☆	152
A0-06	转矩控制反向最大频率	0.00Hz~ 最大频率	50.00Hz	☆	152
A0-07	转矩上升滤波时间	0.00s~650.00s	0.00s	☆	152/ 178
A0-08	转矩下降滤波时间	0.00s~650.00s	0.00s	☆	152/ 178
A1 组 虚拟 IO					
A1-00	虚拟 VDI1 端子 功能选择	0~59	0	★	187
A1-01	虚拟 VDI2 端子 功能选择	0~59	0	★	187
A1-02	虚拟 VDI3 端子 功能选择	0~59	0	★	187
A1-03	虚拟 VDI4 端子功能选择	0~59	0	★	187
A1-04	虚拟 VDI5 端子功能选择	0~59	0	★	187
A1-05	虚拟 VDI 端子有效状态设置模式	个位：虚拟 VDI1 十位：虚拟 VDI2 百位：虚拟 VDI3 千位：虚拟 VDI4 万位：虚拟 VDI5 0：由虚拟 VDOx 的状态决定 VDI 是否有效 1：由参数 A1-06 设定 VDI 是否有效	00000	★	187
A1-06	虚拟 VDI 端子状态设置	0：无效 1：有效 个位：虚拟 VDI1 十位：虚拟 VDI2 百位：虚拟 VDI3 千位：虚拟 VDI4 万位：虚拟 VDI5	00000	★	187
A1-07	AI1 端子作为 DI 时的功能选择	0~59	0	★	189
A1-08	AI2 端子作为 DI 时的功能选择	0~59	0	★	189

参数	名 称	设定范围	出厂值	更改	页码
A1-09	面板旋钮 作为 DI 时的功能选 择	0~59	0	★	189
A1-10	AI 端子作为 DI 时有效模式选择	0：高电平有效 1：低电平有效 个位：AI1 十位：AI2 百位：面板旋钮	000	★	189
A1-11	虚拟 VDO1 输出功能选择	0：与物理 DIx 内部短接 1~41：见 P5 组物理 DO 输出选择	0	☆	187
A1-12	虚拟 VDO2 输出功能选择	0：与物理 DIx 内部短接 1~41：见 P5 组物理 DO 输出选择	0	☆	187
A1-13	虚拟 VDO3 输出功能选择	0：与物理 DIx 内部短接 1~41：见 P5 组物理 DO 输出选择	0	☆	187
A1-14	虚拟 VDO4 输出功能选择	0：与物理 DIx 内部短接 1~41：见 P5 组物理 DO 输出选择	0	☆	187
A1-15	虚拟 VDO5 输出功能选择	0：与物理 DIx 内部短接 1~41：见 P5 组物理 DO 输出选择	0	☆	187
A1-16	VDO1 输出延迟时间	0.0s~3600.0s	0.0s	☆	187
A1-17	VDO2 输出延迟时间	0.0s~3600.0s	0.0s	☆	188
A1-18	VDO3 输出延迟时间	0.0s~3600.0s	0.0s	☆	188
A1-19	VDO4 输出延迟时间	0.0s~3600.0s	0.0s	☆	188
A1-20	VDO5 输出延迟时间	0.0s~3600.0s	0.0s	☆	188
A1-21	VDO 输出端子有效状态选择	0：正逻辑 1：反逻辑 个位：VDO1 十位：VDO2 百位：VDO3 千位：VDO4 万位：VDO5	00000	☆	188
A2 组 第二电机参数					
A2-00	电机类型选择	0：普通异步电机 1：变频异步电机	0	★	171
A2-01	电机额定功率	0.1kW~6553.5kW	机型确定	★	171
A2-02	电机额定电压	1V~2000V	机型确定	★	171
A2-03	电机额定电流	0.01A~655.35A	机型确定	★	171
A2-04	电机额定频率	0.01Hz~ 最大频率	机型确定	★	171
A2-05	电机额定转速	1rpm~65535rpm	机型确定	★	171
A2-06	异步电机定子电阻	0.001Ω~65.535Ω	机型确定	★	171
A2-07	异步电机转子电阻	0.001Ω~65.535Ω	机型确定	★	171
A2-08	异步电机漏感抗	0.01mH~655.35mH	机型确定	★	171
A2-09	异步电机互感抗	0.1mH~6553.5mH	机型确定	★	171
A2-10	异步电机空载电流	0.01A~A2-03	机型确定	★	171

参数	名 称	设定范围	出厂值	更改	页码
A2-37	调谐选择	0：无操作 1：异步机静止部分参数调谐 2：异步机动态完整调谐 3：异步机静止完整调谐	0	★	171
A2-38	速度环比例增益 1 仅 T4	1~100	30	☆	-
A2-39	速度环积分时间 1 仅 T4	0.01s~10.00s	0.50s	☆	-
A2-40	切换频率 1 仅 T4	0.00~A2-43	5.00Hz	☆	-
A2-41	速度环比例增益 2 仅 T4	1~100	20	☆	-
A2-42	速度环积分时间 2 仅 T4	0.01s~10.00s	1.00s	☆	-
A2-43	切换频率 2 仅 T4	A2-40~ 最大频率	10.00Hz	☆	-
A2-44	矢量控制转差增益 仅 T4	50%~200%	100%	☆	-
A2-45	SVC 转矩滤波常数 仅 T4	0.000s~0.100s	0.015s	☆	-
A2-47	速度控制方式下转矩上限源 仅 T4	0：A2-48 设定 1：AI1 2：AI2 3：面板旋钮 4：保留 5：通讯给定 6：MIN(AI1,AI2) 7：MAX(AI1,AI2) 1-7 选项的满量程，对应 A2-48 数字设定	0	☆	-
A2-48	速度控制方式下转矩上限数字设定 仅 T4	0.0%~200.0%	150.0%	☆	-
A2-49	速度控制方式下转矩上限指令选择（发电） 仅 T4	0：参数 A2-48 设定 1：AI1 2：AI2 3：面板旋钮 4：保留 5：通讯给定 6：MIN(AI1,AI2) 7：MAX(AI1,AI2) 8：参数 A2-50 设定 1-7 选项的满量程对应 A2-50	0	☆	-
A2-50	速度控制方式下转矩上限数字设定(发电) 仅 T4	0.0% ~ 200.0%	150.0%	☆	-
A2-51	励磁调节比例增益 仅 T4	0~60000	2000	☆	-
A2-52	励磁调节积分增益 仅 T4	0~60000	1300	☆	-
A2-53	转矩调节比例增益 仅 T4	0~60000	2000	☆	-
A2-54	转矩调节积分增益 仅 T4	0~60000	1300	☆	-
A2-55	速度环积分属性 仅 T4	个位：积分分离 0：无效 1：有效	0	☆	-
A2-59	弱磁区最大转矩系数 仅 T4	50~200%	100%	☆	-

参数	名 称	设定范围	出厂值	更改	页码
A2-60	发电功率限制使能 仅 T4	0：无效 1：全程生效 2：恒速生效 (T4 only) 3：减速生效 (T4 only)	0	☆	-
A2-61	发电功率上限 仅 T4	0.0~200.0% 100.0~120.0% (T2S)	机型确定	☆	-
A2-62	第 2 电机控制方式	0：无速度传感器矢量控制（SVC） (T4 only) 2：V/F 控制	0/2	★	-
A2-63	第 2 电机加减速时间选择	0：与第 1 电机相同 1：加减速时间 1 2：加减速时间 2 3：加减速时间 3 4：加减速时间 4	0	☆	-
A2-64	第 2 电机转矩提升	0.0%：自动转矩提升 0.1%~30.0%	机型确定	☆	-
A2-66	第 2 电机振荡抑制增益	0~100	40	☆	-
A5 组 控制优化参数					
A5-00	DPWM 切换上限频率	5.00Hz~ 最大频率	8.00Hz	☆	156
A5-01	PWM 调制方式	0：异步调制 1：同步调制	0	☆	156
A5-02	死区补偿模式选择	0：不补偿 1：补偿模式 1	1	☆	-
A5-03	随机 PWM 深度	0：随机 PWM 无效 1~10：PWM 载频随机深度	0	☆	156
A5-04	快速限流使能	0：不使能 1：使能	1	☆	161
A5-05	电压过调制系数	100~110	105	★	154
A5-06	欠压点设置	三相 380~480V 机型：210.0V~420.0V 单相 200~240V 机型：140.0V~230.0V	350.0V 200.0V	☆	162
A5-08	低速载频 仅T4	0 ~ 8 kHz	0	★	-
A5-09	过压点设置	三相 380~480V 机型：650.0V~820.0V 三相 200~240V 机型：200.0V~400.0V	820.0V 400.0V	★	162
A5-11	低速直流制动阈值 仅T4	01~20	5	☆	
A6 组 AI 曲线设定					
A6-00	AI 曲线 4 最小输入	-10.00V~A6-02	0.00V	☆	120
A6-01	AI 曲线 4 最小输入对应设定	-100.0%~+100.0%	0.0%	☆	120
A6-02	AI 曲线 4 拐点 1 输入	A6-00~A6-04	3.00V	☆	120
A6-03	AI 曲线 4 拐点 1 输入对应设定	-100.0%~+100.0%	30.0%	☆	120
A6-04	AI 曲线 4 拐点 2 输入	A6-02~A6-06	6.00V	☆	120
A6-05	AI 曲线 4 拐点 2 输入对应设定	-100.0%~+100.0%	60.0%	☆	120
A6-06	AI 曲线 4 最大输入	A6-04~+10.00V	10.00V	☆	120
A6-07	AI 曲线 4 最大输入对应设定	-100.0%~+100.0%	100.0%	☆	120
A6-08	AI 曲线 5 最小输入	-10.00V~A6-10	-10.00V	☆	120
A6-09	AI 曲线 5 最小输入对应设定	-100.0%~+100.0%	-100.0%	☆	120
A6-10	AI 曲线 5 拐点 1 输入	A6-08~A6-12	-3.00V	☆	120
A6-11	AI 曲线 5 拐点 1 输入对应设定	-100.0%~+100.0%	-30.0%	☆	120
A6-12	AI 曲线 5 拐点 2 输入	A6-10~A6-14	3.00V	☆	120

参数	名 称	设定范围	出厂值	更改	页码
A6-13	AI 曲线 5 拐点 2 输入对应设定	-100.0%~+100.0%	30.0%	☆	120
A6-14	AI 曲线 5 最大输入	A6-12~+10.00V	10.00V	☆	120
A6-15	AI 曲线 5 最大输入对应设定	-100.0%~+100.0%	100.0%	☆	120
A6-24	AI1 设定跳跃点	-100.0%~100.0%	0.0%	☆	-
A6-25	AI1 设定跳跃幅度	0.0%~100.0%	0.5%	☆	-
A6-26	AI2 设定跳跃点	-100.0%~100.0%	0.0%	☆	-
A6-27	AI2 设定跳跃幅度	0.0%~100.0%	0.5%	☆	-
A6-28	面板旋钮设定跳跃点	-100.0%~100.0%	0.0%	☆	-
A6-29	面板旋钮设定跳跃幅度	0.0%~100.0%	0.5%	☆	-

A8 组　点对点通讯					
A8-00	点对点通讯功能选择	0：无效 1：有效	0	☆	177 / 178/ 179

参数	名 称	设定范围	出厂值	更改	页码
A8-01	主从选择	0：主机 1：从机	0	☆	177 / 179
A8-02	从机命令跟随主从信息交互	个位：从机命令跟随 0：从机不跟随主机运行命令运行 1：从机跟随主机运行命令运行 十位：从机故障信息传输 0：从机故障信息不传输 1：从机故障信息传输 百位：主机显示从机掉线 0：从机掉线主机不报故障 1：从机掉线主机报故障（Err16）	011	★	178/ 179
A8-03	从机接收数据作用选择	0：运行频率 1：目标频率	0	☆	178/ 180
A8-04	接收数据零偏	-100.00%~100.00%	0.00%	★	180
A8-05	接收数据增益	-10.00~10.00	1.00	★	180
A8-06	点对点通讯中断检测时间	0.0~10.0s	1.0s	☆	181
A8-07	点对点通讯主机数据发送周期	0.001~10.000s	0.001s	☆	181
A8-11	视窗	0.20~10.00Hz	0.50Hz	☆	178 / 181
AC 组 AIAO 校正					
AC-00	AI1 实测电压 1	-10.00V~10.000V	出厂校正	☆	-
AC-01	AI1 显示电压 1	-10.00V~10.000V	出厂校正	☆	-
AC-02	AI1 实测电压 2	-10.00V~10.000V	出厂校正	☆	-
AC-03	AI1 显示电压 2	-10.00V~10.000V	出厂校正	☆	-
AC-04	AI2 实测电压 1	-10.00V~10.000V	出厂校正	☆	-
AC-05	AI2 显示电压 1	-10.00V~10.000V	出厂校正	☆	-
AC-06	AI2 实测电压 2	-10.00V~10.000V	出厂校正	☆	-
AC-07	AI2 显示电压 2	-10.00V~10.000V	出厂校正	☆	-
AC-08	面板旋钮 实测电压 1	-10.00V~10.000V	出厂校正	☆	-
AC-09	面板旋钮 显示电压 1	-10.00V~10.000V	出厂校正	☆	-
AC-10	面板旋钮 实测电压 2	-10.00V~10.000V	出厂校正	☆	-
AC-11	面板旋钮 显示电压 2	-10.00V~10.000V	出厂校正	☆	-
AC-12	AO1 目标电压 1	-10.00V~10.000V	出厂校正	☆	-
AC-13	AO1 实测电压 1	-10.00V~10.000V	出厂校正	☆	-
AC-14	AO1 目标电压 2	-10.00V~10.000V	出厂校正	☆	-
AC-15	AO1 实测电压 2	-10.00V~10.000V	出厂校正	☆	-
AC-20	AI2 实测电流 1	0.00mA~20.000mA	出厂校正	☆	-
AC-21	AI2 显示电流 1	0.00mA~20.000mA	出厂校正	☆	-
AC-22	AI2 实测电流 2	0.00mA~20.000mA	出厂校正	☆	-
AC-23	AI2 显示电流 2	0.00mA~20.000mA	出厂校正	☆	-
AC-24	AO1 实测电流 1	0.00mA~20.000mA	出厂校正	☆	-
AC-25	AO1 显示电流 1	0.00mA~20.000mA	出厂校正	☆	-
AC-26	AO1 实测电流 2	0.00mA~20.000mA	出厂校正	☆	-
AC-27	AO1 显示电流 2	0.00mA~20.000mA	出厂校正	☆	-

A.2 监视参数简表

参数	名称	最小单位	通讯地址	页码
U0 组 基本监视参数				
U0-00	运行频率 (Hz)	0.01Hz	7000H	165
U0-01	设定频率 (Hz)	0.01Hz	7001H	165
U0-02	母线电压 (V)	0.1V	7002H	165
U0-03	输出电压 (V)	1V	7003H	165
U0-04	输出电流 (A)	0.01A	7004H	165
U0-05	输出功率 (kW)	0.1kW	7005H	165
U0-06	输出转矩 (%)	0.1%	7006H	165
U0-07	DI 输入状态	1	7007H	165
U0-08	DO 输出状态	1	7008H	165
U0-09	AI1 电压 (V)	0.01V	7009H	165
U0-10	AI2 电压（V）/ 电流（mA）	0.01V/0.01mA	700AH	165
U0-11	面板旋钮 电压 (V)	0.01V	700BH	165
U0-12	计数值	1	700CH	166
U0-13	长度值	1	700DH	166
U0-15	PID 设定	1	700FH	166
U0-16	PID 反馈	1	7010H	166
U0-17	PLC 阶段	1	7011H	166
U0-18	保留	0.01kHz	7012H	166
U0-20	剩余运行时间	0.1Min	7014H	166
U0-21	AI1 校正前电压	0.001V	7015H	166
U0-22	AI2 校正前电压（V）/ 电流（mA）	0.001V/0.01mA	7016H	166
U0-23	面板旋钮 校正前电压	0.001V	7017H	166
U0-24	电机转速	1RPM	7018H	166
U0-25	当前上电时间	1Min	7019H	166
U0-26	当前运行时间	0.1Min	701AH	166
U0-27	保留	1Hz	701BH	166
U0-28	通讯设定值	0.01%	701CH	166
U0-30	主频率显示	0.01Hz	701EH	166
U0-31	辅助频率显示	0.01Hz	701FH	166
U0-32	查看任意内存地址值	1	7020H	-
U0-35	目标转矩 (%)	0.1%	7023H	166
U0-37	功率因素角度	0.1°	7025H	166
U0-39	V/F 分离目标电压	1V	7027H	167
U0-40	V/F 分离输出电压	1V	7028H	167
U0-41	DI 输入状态直观显示	1	7029H	167
U0-42	DO 输出状态直观显示	1	702AH	167
U0-43	DI 功能状态直观显示 1(功能 01-40)	1	702BH	167

参数	名称	最小单位	通讯地址	页码
U0-44	DI 功能状态直观显示 2(功能 41-80)	1	702CH	167
U0-45	故障信息	1	702DH	167
U0-59	设定频率 (%)	0.01%	703BH	168
U0-60	运行频率 (%)	0.01%	703CH	168
U0-61	变频器状态	1	703DH	168
U0-62	当前故障编码	1	703EH	168
U0-63	点对点主机通讯发送转矩值	0.01%	703FH	168
U0-64	从站的个数	1	7040H	168
U0-65	转矩上限	0.1%	7041H	168
U0-73	电机序号	0：电机 1 1：电机 2	7046H	-
U0-74	变频器输出转矩	0.1%	7047H	-
U0-76	累计用电量低位 T4 only	0.1 度	704CH	168
U0-77	累计用电量高位 T4 only	1 度	704DH	168
U0-78	线速度 T4 only	1m/Min	704EH	-

附录 C 通 讯

C.1 通讯数据地址定义

YD280 系列变频器支持 Modbus-RTU通讯协议，用户选购RS485扩展卡实现功能。

上位机通过标准Modbus-RTU通讯协议能实现对变频器的 控制、监视及功能参数修改查看操作。

YD280 通讯数据可分为参数数据、非参数数据，后者包括运行命令、运行状态、运行参数、告警信息等。

C.1.1 YD280 参数数据

参数数据为变频器的重要设置参数，P 组 功能基础参数，A 组 进阶功能参数

如下：

YD280 参数数据	P 组（可读写）	P0、P1、P2、P3、P4、P5、P6、P7、P8、P9、PA、Pb、PC、Pd、PE、PF
	A 组（可读写）	A0、A1、A2、A3、A4、A5、A6、A7、A8、A9、AA、AB、AC、AD、AE、AF

参数数据通讯地址定义如下：

1） 当为通讯读取参数数据时

对于 P0~PF、A0~AF 组参数数据，其通讯地址高十六位直接为功能组编号，低十六位直接为参数在功能组中序号，举例如下：

P0-16 功能参数， 其通讯地址为 F010H，其中 F0H 代表 P0 组功能参数，10H 代表参数在功能组中序号 16 的十六进制数据格式

AC-08 功能参数，其通讯地址为 AC08，其中 ACH 代表 AC 组功能参数，08H 代表参数在功能组中序号 8 的十六进制数据格式

2） 当为通讯写入参数数据时

对于 P0~PF 组参数数据，其通讯地址高十六位，根据是否写入 EEPROM，区分为 00~0F 或 F0~FF，低十六位直接为参数在功能组中序号，举例如下：

---- 写功能参数 P0-16：

不需要写入 EEPROM 时，其通讯地址为 0010H

需要写入 EEPROM 时，其通讯地址为 F010H

对于 A0~AF 组参数数据，其通讯地址高十六位，根据是否需要写入 EEPROM，区分为 40~4F 或 A0~AF，低十六位直接为参数在功能组中序号，举例如下：

---- 写功能参数 AC-08：

不需要写入 EEPROM 时，其通讯地址为 4C08H

需要写入 EEPROM 时，其通讯地址为 AC08H

C.1.2 YD280 非参数数据

<table>
<tr><td rowspan="2">YD280
非参数数据</td><td>状态数据（只读）</td><td>U 组监视参数、变频器故障描述、变频器运行状态</td></tr>
<tr><td>控制参数 (只写)</td><td>控制命令、通讯设定值、数字输出端子控制、模拟输出 AO1控制、高速脉冲 (FMP) 输出控制、参数初始化</td></tr>
</table>

1） 状态数据

状态数据分为 U 组监视参数、变频器故障描述、变频器运行状态

U 组参数监视参数

U 组监视数据描述见“附录 C 功能参数表”、“第六章 参数说明”相关描述，其地址定义如下：

U0~UF，其通讯地址高十六位为 70~7F，低十六位为监视参数在组中的序号，举例如下：

U0-11，其通讯地址为 700BH

变频器故障描述

通讯读取变频器故障描述时，通讯地址固定为 8000H，上位机通过读取该地址数据，可以获取当前变频器故障代码，故障代码描述见“附录 A或B 功能参数表”P9-14 参数中定义

变频器运行状态

通讯读取变频器运行状态时，通讯地址固定为 3000H，上位机通过读取该地址数据，可以获取当前变频器运行状态信息，定义如下：

变频器运行状态通讯地址	读取状态字定义
3000H	1：正转运行
	2：反转运行
	3：停机

2） 控制参数

控制参数分为控制命令、数字输出端子控制、模拟输出 AO1 控制、高速脉冲 (FMP) 输出控制

- 控制命令

在 P0-02(命令源) 选择为 2：通讯控制时，上位机通过该通讯地址，可以实现对变频器的启停等相关命令控制，控制命令定义如下：

控制命令通讯地址	命令功能
2000H	1：正转运行
	2：反转运行
	3：正转点动
	4：反转点动
	5：自由停机
	6：减速停机
	7：故障复位

- 通讯设定值

通讯设定值主要用于 YD280 中频率源、转矩上限源、V/F 分离电压源、PID 给定源、PID 反馈源等选择为通讯给定时的给定数据。其通讯地址为 1000H，上位机设定该通讯地址值时，其数据范围为 -10000~10000，对应相对给定值 -100.00%~100.00%

- 数字输出端子控制

当数字输出端子功能选择为 20：通讯控制时，上位机通过该通讯地址，可以实现对变频器数字输出端子的控制，定义如下：

数字输出端子控制通讯地址	命令内容
2001H	BIT0：DO1 输出控制 BIT1：无 BIT2：RELAY1 输出控制 BIT3：无 BIT4：FMR 输出控制 BIT5：VDO1 BIT6：VDO2 BIT7：VDO3 BIT8：VDO4 BIT9：VDO5

- 模拟量输出 AO1，高速脉冲输出 FMP 控制

当模拟量输出 AO1，高速脉冲输出 FMP 输出功能选择为 12：通讯设定时，上位机通过该通讯地址，可以实现对变频器模拟量、高速脉冲输出的控制，定义如下：

输出控制通讯地址		命令内容
AO1	2002H	0 ～ 7FFF 表示 0%～ 100%
无	-	
FMP	2004H	

- 参数初始化

当需要通过上位机实现对变频器的参数初始化操作时，需要使用该功能。

如果 PP-00(用户密码) 不为 0，则首先需要通过通讯进行密码校验，校验通过后，在 30 秒内，上位机进行参数初始化操作。

通讯进行用户密码校验的通讯地址为 1F00H，直接将正确的用户密码写入该地址，则可以完成密码校验

通讯进行参数初始化的地址为 1F01H，其数据内容定义如下：

参数初始化通讯地址	命令功能
1F01H	1：恢复出厂参数
	2：清楚记录信息
	4：恢复用户备份参数
	501：备份用户当前参数

C.2 Modbus 通讯协议

YD280 系列变频器提供 RS485 通信接口，并支持 Modbus-RTU 从站通讯协议。用户可通过计算机或 PLC 实现集中控制，通过该通讯协议设定变频器运行命令，修改或读取参数参数，读取变频器的工作状态及故障信息等。

该串行通信协议定义了串行通信中传输的信息内容及使用格式。其中包括：主机轮询（或广播）格式；主机的编码方法，内容包括：要求动作的参数，传输数据和错误校验等。从机的响应也是采用相同的结构，内容包括：动作确认，返回数据和错误校验等。如果从机在接收信息时发生错误，或不能完成主机要求的动作，它将组织一个故障信息作为响应反馈给主机。

C.2.1 应用方式

变频器接入具备 RS485 总线的“单主多从”PC/PLC 控制网络，作为通讯从机。

C.2.2 总线结构

1） 硬件接口

需在变频器上插入 RS485 扩展卡 YD28TX1 硬件。

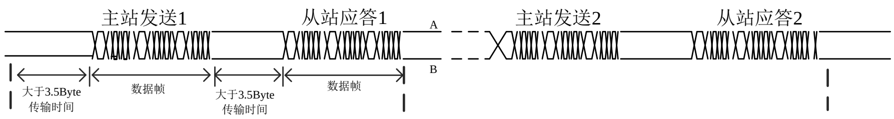
2） 拓扑结构

单主机多从机系统。网络中每一个通讯设备都有一个唯一的从站地址，其中有一个设备作为通讯主机（常为 PC 上位机、PLC、HMI 等），主动发起通讯，对从机进行参数读或写操作，其他设备在为通讯从机，响应主机对本机的询问或通讯操作。在同一时刻只能有一个设备发送数据，而其他设备处于接收状态。

从机地址的设定范围为 1~247。网络中的从机地址必须是唯一的。

3） 通讯传输方式

异步串行，半双工传输方式。数据在串行异步通信过程中，是以报文的形式，一次发送一帧数据，MODBUS-RTU 协议中约定，当通讯数据线上无数据的空闲时间大于 3.5Byte 的传输时间，表示新的一个通讯帧的起始。

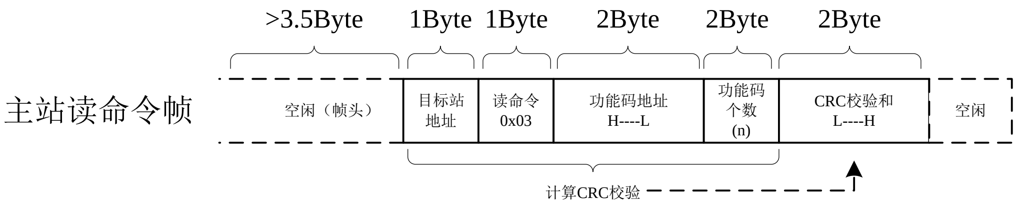


YD280 系列变频器内置的通信协议是 Modbus-RTU 从机通信协议，可响应主机的“查询 / 命令”，或根据主机的“查询 / 命令”做出相应的动作，并通讯数据应答。

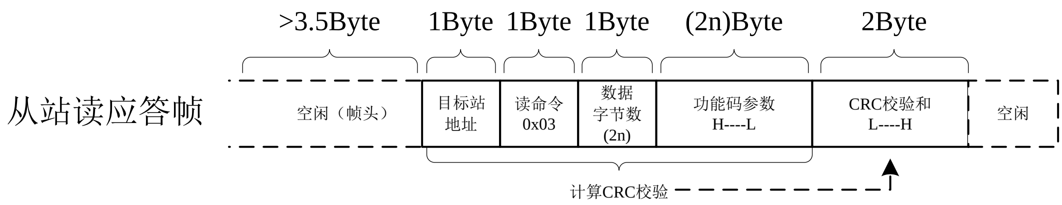
主机可以是指个人计算机（PC），工业控制设备或可编程逻辑控制器（PLC）等，主机既能对某个从机单独进行通信，也能对所有下位从机发布广播信息。对于主机的单独访问“查询 / 命令”，被访问从机要返回一个应答帧；对于主机发出的广播信息，从机无需反馈响应给主机。

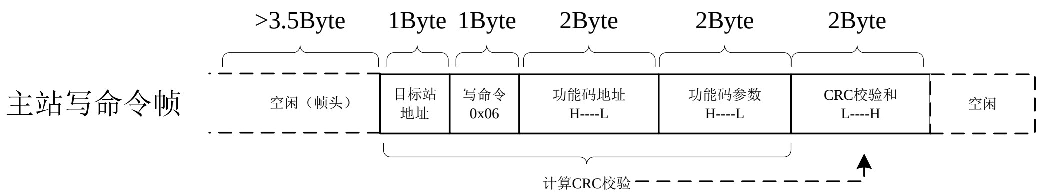
C.3 通讯资料结构

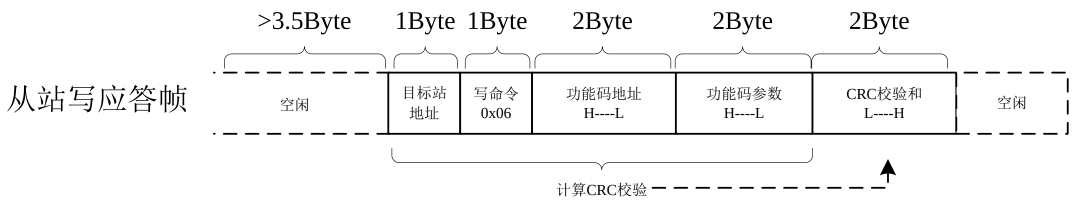
YD280 系列变频器的 Modbus-RTU 协议通讯数据格式如下，变频器只支持 Word 型参数的读或写，对应的通讯读操作命令为 0x03；写操作命令为 0x06，不支持字节或位的读写操作：



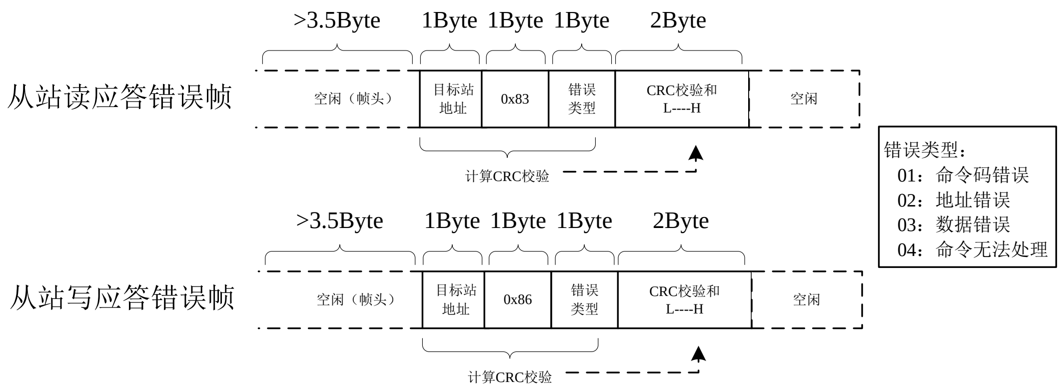
理论上，上位机可以一次读取连续的几个参数（即其中 n 最大可达 12 个），但要注意不能跨过本参数组的最后一个参数，否则会答复出错。







若从机检测到通讯帧错误，或其他原因导致的读写不成功，会答复错误帧。



数据帧字段说明：

帧头 START	大于 3.5 个字符传输时间的空闲
从机地址 ADR	通讯地址范围：1 ～ 247；
命令码 CMD	03：读从机参数；06：写从机参数
参数地址 H	变频器内部的参数地址，16 进制表示；分为参数型和非参数型（如运行状态参数、运行命令等）参数等，详见地址定义。 传送时，高字节在前，低字节在后。
参数地址 L	
参数个数 H	本帧读取的参数个数，若为 1 表示读取 1 个参数。传送时，高字节在前，低字节在后。 本协议一次只能改写 1 个参数，没有该字段。
参数个数 L	
数据 H	应答的数据，或待写入的数据，传送时，高字节在前，低字节在后。
数据 L	
CRC CHK 低位	检测值： CRC16 校验值。传送时，低字节在前，高字节在后。 计算方法详见本节 CRC 校验的说明。
CRC CHK 高位	
END	3.5 个字符时

CRC 校验方式：

CRC（Cyclical Redundancy Check）使用 RTU 帧格式，消息包括了基于 CRC 方法的错误检测域。CRC 域检测了整个消息的内容。CRC 域是两个字节，包含 16 位的二进制值。它由传输设备计算后加入到消息中。接收设备重新计算收到消息的 CRC，并与接收到的 CRC 域中的值比较，如果两个 CRC 值不相等，则说明传输有错误。

CRC 是先存入 0xFFFF，然后调用一个过程将消息中连续的 8 位字节与当前寄存器中的值进行处理。仅每个字符中的 8Bit 数据对 CRC 有效，起始位和停止位以及奇偶校验位均无效。

CRC 产生过程中，每个 8 位字符都单独和寄存器内容相异或（XOR），结果向最低有效位方向移动，最高有效位以 0 填充。LSB 被提取出来检测，如果 LSB 为 1，寄存器单独和预置的值相异或，如果 LSB 为 0，则不进行。整个过程要重复 8 次。在最后一位（第 8 位）完成后，下一个 8 位字节又单独和寄存器的当前值相异或。最终寄存器中的值，是消息中所有的字节都执行之后的 CRC 值。

CRC 添加到消息中时，低字节先加入，然后高字节。 CRC 简单函数如下：

```
unsigned int crc_chk_value（unsigned char *data_value,unsigned char length）
{
        unsigned int crc_value=0xFFFF;
        int i;
        while（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）;
}
```

通信参数的地址定义

读写参数（有些参数不能更改，只供厂家使用或监视使用）

C.4 参数参数地址标示规则

以参数组号和标号为参数地址表示规则：

高位字节： P0~PF(P 组)、A0~AF(A 组)、70~7F(U 组)

低位字节：00~FF

例如：若要访问参数 P3-12，则参数的访问地址表示为 0xF30C；

注意：

PF 组：既不可读取参数，也不可更改参数；

U 组：只可读取，不可更改参数。

有些参数在变频器处于运行状态时，不可更改；有些参数不论变频器处于何种状态，均不可更改；更改参数参数，还要注意参数的范围、单位及相关说明。

参数组号	通讯访问地址	通讯修改 RAM 中参数地址
P0 ～ PE 组	0xF000 ～ 0xFEFF	0x0000 ～ 0x0EFF
A0 ～ AC 组	0xA000 ～ 0xACFF	0x4000 ～ 0x4CFF
U0 组	0x7000 ～ 0x70FF	

注意 : 由于 EEPROM 频繁被存储，会减少 EEPROM 的使用寿命，所以，有些参数在通讯的模式下，无须存储，只要更改 RAM 中的值就可以了。

如果为 P 组参数，要实现该功能，只要把该参数地址的高位 P 变成 0 就可以实现。

如果为 A 组参数，要实现该功能，只要把该参数地址的高位 A 变成 4 就可以实现。

相应参数地址表示如下：

高位字节：00~0F(P 组)、40~4F(A 组)

低位字节：00~FF

如：

参数 P3-12 不存储到 EEPROM 中，地址表示为 030C；

参数 A0-05 不存储到 EEPROM 中，地址表示为 4005；

该地址表示只能做写 RAM，不能做读的动作，读时，为无效地址。

停机 / 运行参数部分：

参数地址	参数描述	参数地址	参数描述
1000H	* 通信设定值（十进制） –10000 ～ 10000	1010H	PID 设置
1001H	运行频率	1011H	PID 反馈
1002H	母线电压	1012H	PLC 步骤
1003H	输出电压	1013H	保留
1004H	输出电流	1014H	反馈速度，单位 0.1Hz
1005H	输出功率	1015H	剩余运行时间

参数地址	参数描述	参数地址	参数描述
1006H	输出转矩	1016H	AI1 校正前电压
1007H	运行速度	1017H	AI2 校正前电压
1008H	DI 输入标志	1018H	面板旋钮校正前电压
1009H	DO 输出标志	1019H	线速度
100AH	AI1 电压	101AH	当前上电时间
100BH	AI2 电压	101BH	当前运行时间
100CH	面板旋钮电压	101CH	保留
100DH	计数值输入	101DH	通讯设定值
100EH	长度值输入	101EH	保留
100FH	保留	101FH	主频率 X 显示
–	–	1020H	辅频率 Y 显示

NOTE

- 通信设定值是相对值的百分数，10000 对应 100.00%，-10000 对应 -100.00%；
- 对频率量纲的数据，该百分比是相对最大频率（P0-10）的百分数；对转矩量纲的数据，该百分比是 P2-10、A2-48（转矩上限数字设定，分别对应第一、二电机）。

控制命令输入到变频器：（只写）

命令字地址	命令功能
2000H	0001：正转运行
	0002：反转运行
	0003：正转点动
	0004：反转点动
	0005：自由停机
	0006：减速停机
	0007：故障复位

读取变频器状态：（只读）

状态字地址	状态字功能
3000H	0001：正转运行
	0002：反转运行
	0003：停机

参数锁定密码校验：如果返回实际密码值，即表示密码校验通过。（如果没有密码，即密码为 0，校验返回 0000H）

密码地址	输入密码的内容
1F00H	*****

数字输出端子控制：（只写）

命令地址	命令内容
2001H	BIT0：DO1 输出控制 BIT1：无 BIT2：RELAY1 输出控制 BIT3：无 BIT4：FMR 输出控制 BIT5：VDO1 BIT6：VDO2 BIT7：VDO3 BIT8：VDO4 BIT9：VDO5

模拟输出 AO1 控制：（只写）

命令地址	命令内容
2002H	0 ～ 7FFF 表示 0%～ 100%

变频器故障描述：

变频器故障地址	变频器故障信息	
8000H	0000：无故障 0001：保留 0002：加速过电流 0003：减速过电流 0004：恒速过电流 0005：加速过电压 0006：减速过电压 0007：恒速过电压 0008：缓冲电阻过载故障 0009：欠压故障 000A：变频器过载 000B：电机过载 000C：输入缺相 000D：输出缺相 000E：模块过热 000F：外部故障 0010：通讯异常 0011：接触器异常 0012：电流检测故障 0013：电机调谐故障 0014：保留	0015：参数读写异常 0016：变频器硬件故障 0017：电机对地短路故障 0018：保留 0019：保留 001A：运行时间到达 001B：用户自定义故障 1 001C：用户自定义故障 2 001D：上电时间到达 001E：掉载 001F：运行时 PID 反馈丢失 0028：快速限流超时故障 0029：运行时切换电机故障 002A：保留 002B：保留 002D：保留 005A：保留 005B：保留 005C：保留 005E：保留

C.5 PD 组通讯参数说明

Pd-00	波特率	出厂值	5005
	设定范围	个位：Modbus 波特率	
		0：300bps	5：9600bps
		1：600bps	6：19200bps
		2：1200bps	7：38400bps
		3：2400bps	8：57600bps
		4：4800bps	9：115200bps

此参数用来设定上位机与变频器之间的数据传输速率。注意，上位机与变频器设定的波特率必须一致，否则，通讯无法进行。波特率越大，通讯速度越快。

Pd-01	数据格式	出厂值	0
	设定范围	0：无校验：数据格式 <8,N,2> 1：偶检验：数据格式 <8,E,1> 2：奇校验：数据格式 <8,O,1> 3：无校验：数据格式 <8,N,1>	

上位机与变频器设定的数据格式必须一致，否则，通讯无法进行。

Pd-02	本机地址	出厂值	1
	设定范围	1~247	

当本机地址设定为 0 时，即为广播地址，实现上位机广播功能。

本机地址具有唯一性（除广播地址外），这是实现上位机与变频器点对点通讯的基础。

Pd-03	应答延时	出厂值	2ms
	设定范围	0~20ms	

应答延时：是指变频器数据接受结束到向上位机发送数据的中间间隔时间。如果应答延时小于系统处理时间，则应答延时以系统处理时间为准，如应答延时长于系统处理时间，则系统处理完数据后，要延迟等待，直到应答延迟时间到，才往上位机发送数据。

Pd-04	通讯超时时间	出厂值	0.0s
	设定范围	0.0s（无效）；0.1~60.0s	

当该参数设置为 0.0s 时，通讯超时时间参数无效。

当该参数设置成有效值时，如果一次通讯与下一次通讯的间隔时间超出通讯超时时间，系统将报通讯故障错误（Err16）。通常情况下，都将其设置成无效。如果在连续通讯的系统中，设置此参数，可以监视通讯状况。

Pd-05	通讯协议选择	出厂值	1
	设定范围	0：非标准的 Modbus-RTU 协议；1：标准的 Modbus-RTU 协议	

Pd-05=1：选择标准的 Modbus 协议，具体参见本协议“C.3 通讯资料结构”部分。

Pd-05=0：读命令时，从机返回字节数比标准的 Modbus 协议多一个字节，其他读写操作与标准 Modbus 协议操作一致。

Pd-06	通讯读取电流分辨率	出厂值	0
	设定范围	0：0.01A；	

用来确定通讯读取输出电流时，电流值的输出单位。

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