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-com munication, 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

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.

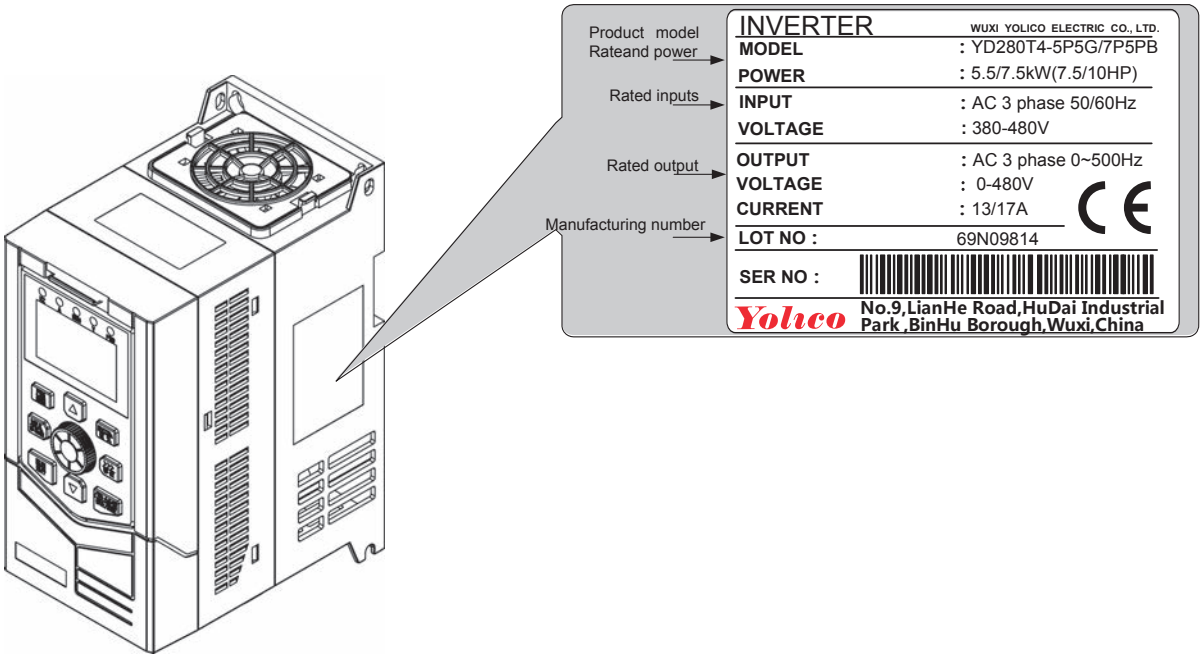
Chapter 1 Product Information

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:

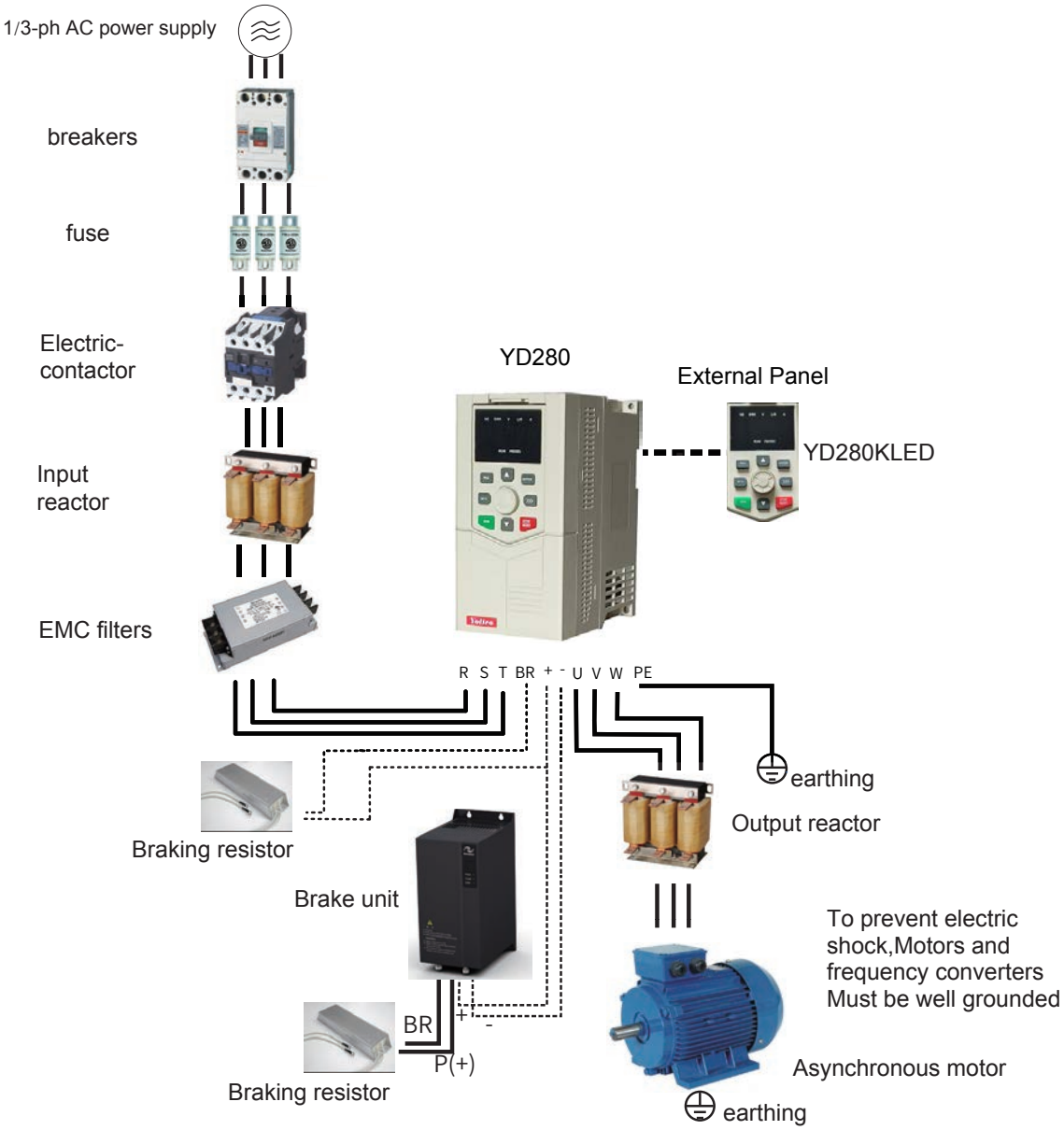


Figure 2-1 YD280 series system configuration

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.

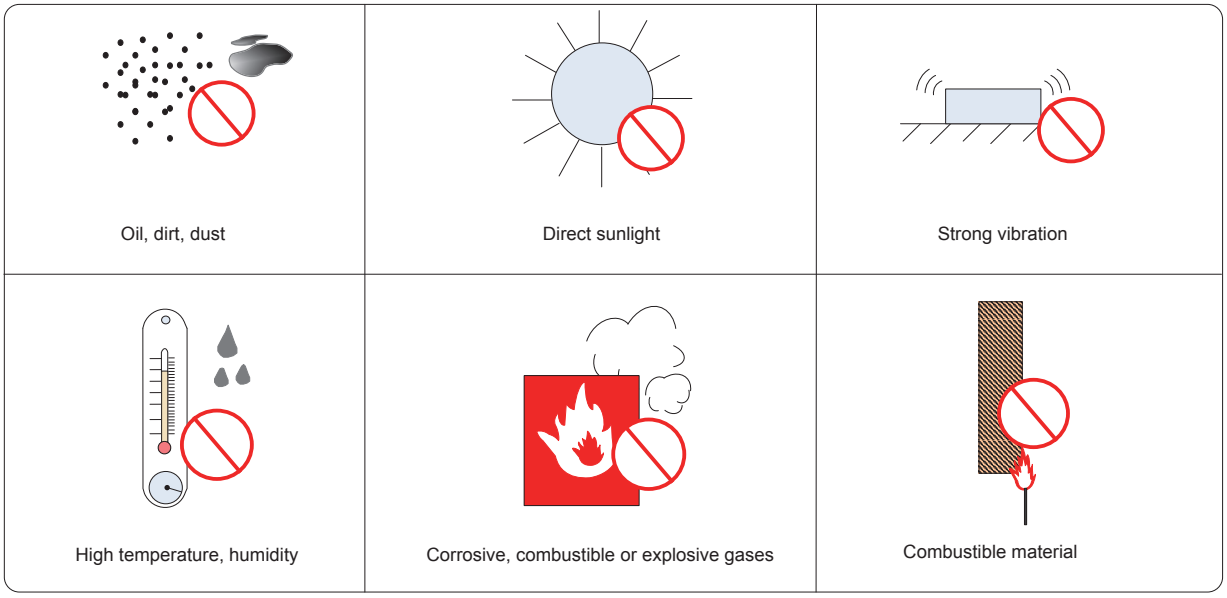
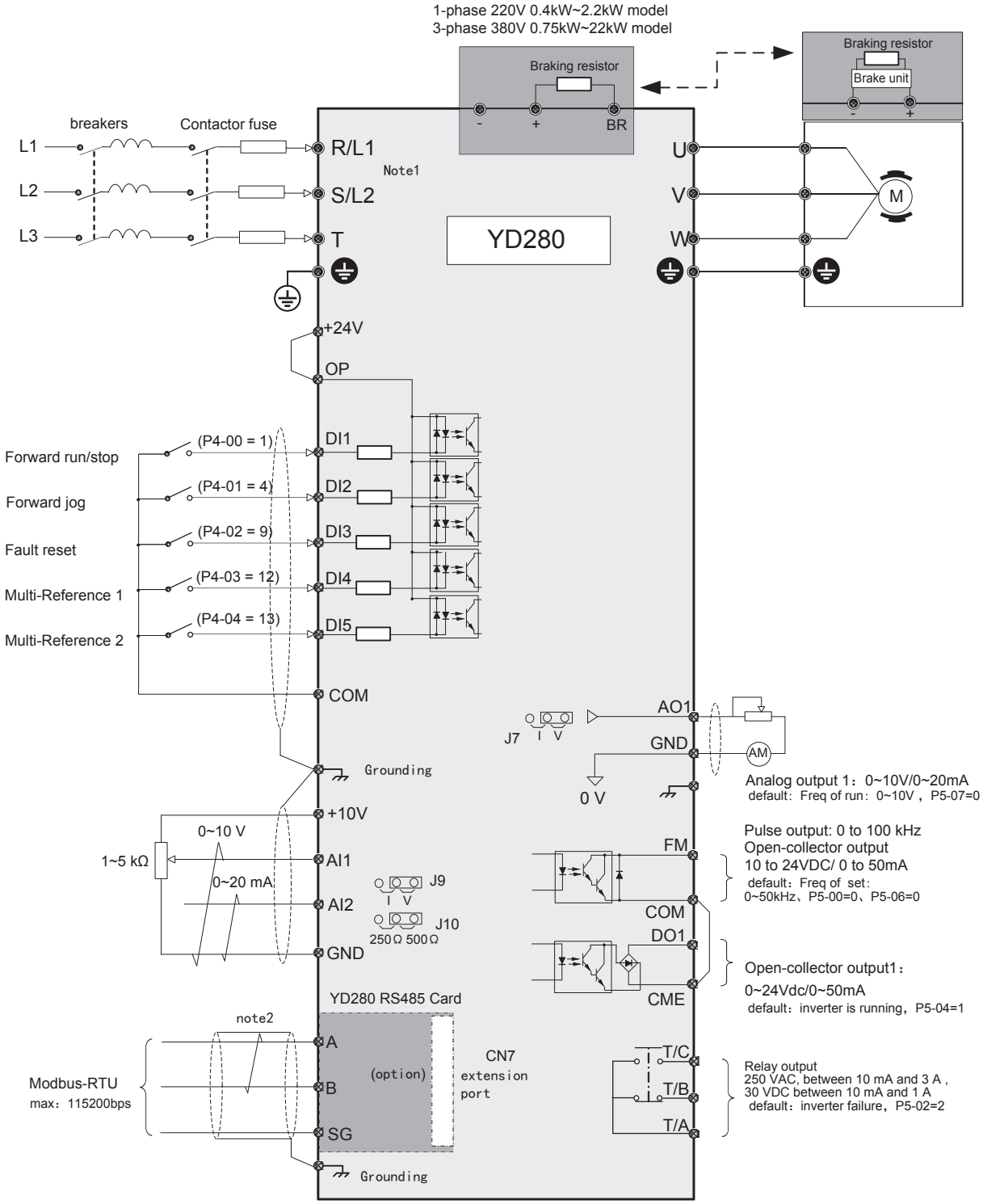


Figure 3-1 Requirements for the installation environment

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

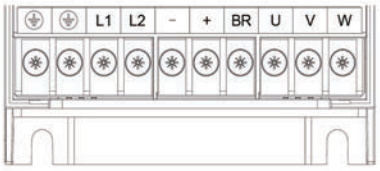


Figure 3-27 YD280T2S-0P4GB ~ YD280T2S-2P2GB main circuit terminal

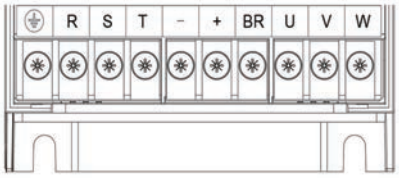


Figure 3-28 YD280T4-0P7G/1P5PB ~ YD280T4-3P7G/5P5PB main circuit terminal

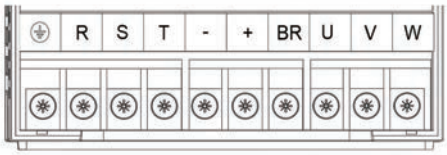


Figure 3-29 YD280T4-5P5G/7P5PB ~ YD280T4-7P5GB main circuit terminal

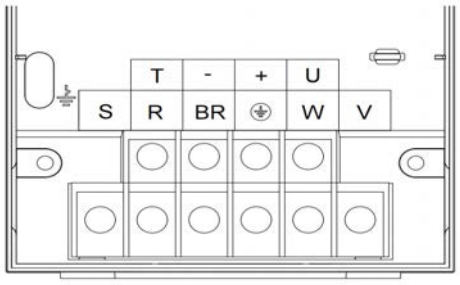


Figure 3-30 YD280T4-11G/15PB ~ YD280T4-15G/18P5PB and
YD280T4-18P5G/22PB ~ YD280T4-22GB main circuit terminal

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

◆ Control loop terminal arrangement

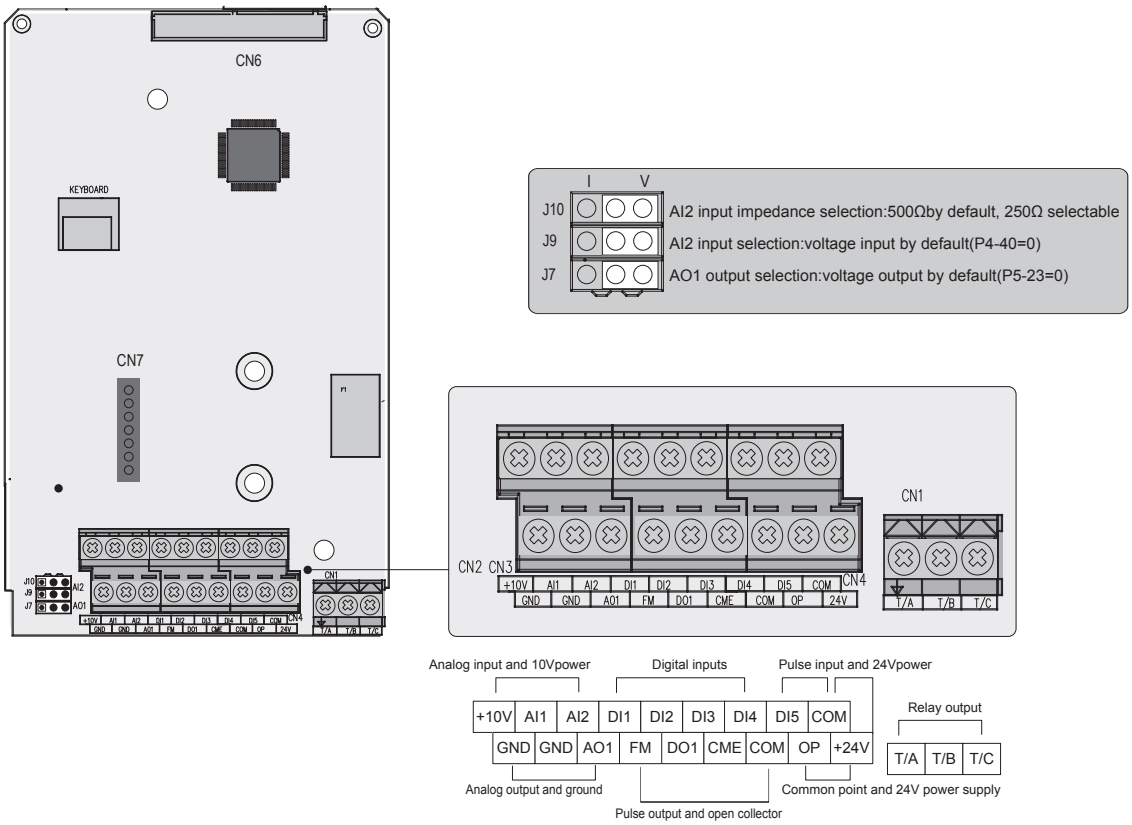


Figure 3-57 Terminal layout of the control circuit

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 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:

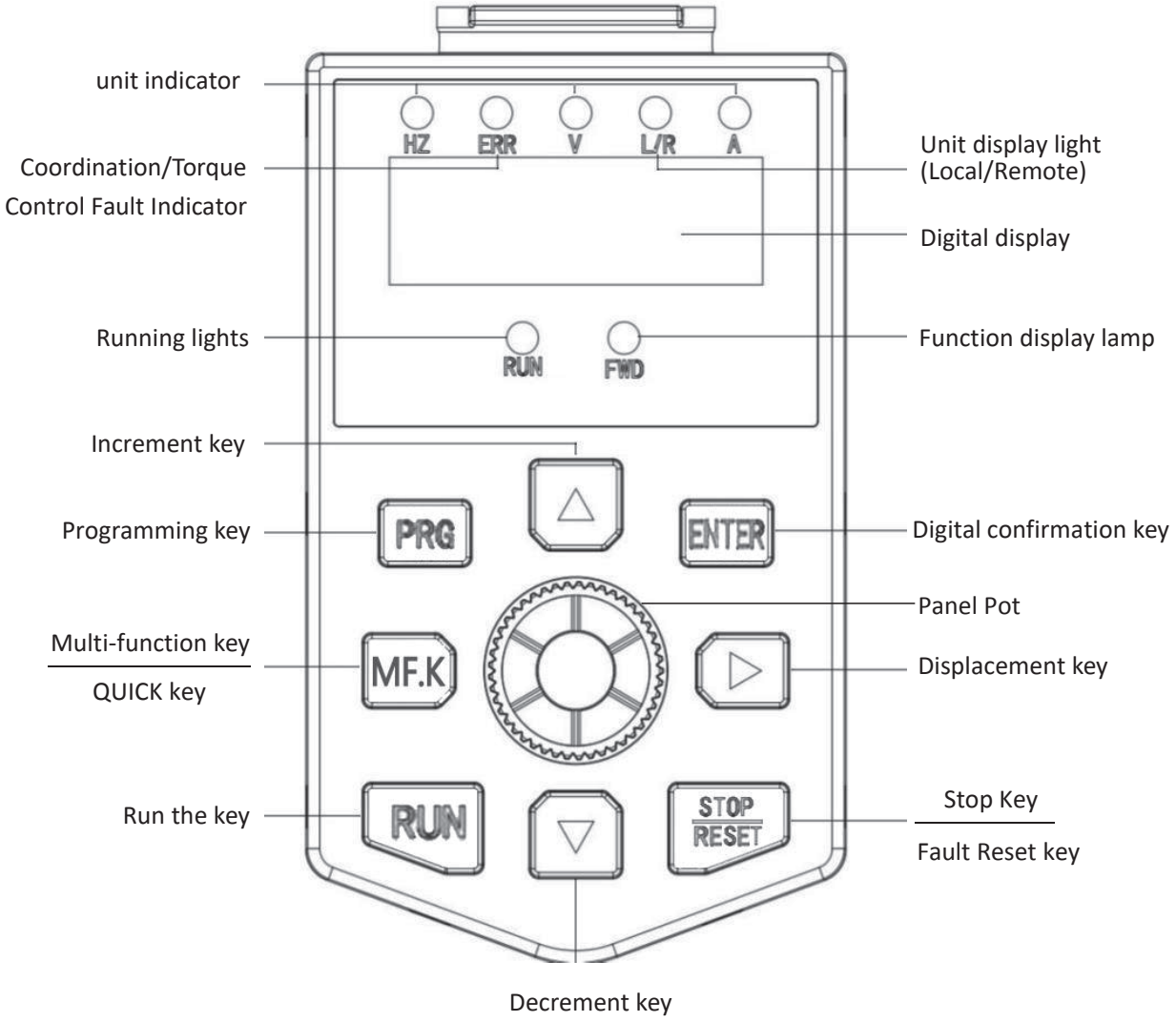


Figure 4-1 Details of the operating panel

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:

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.

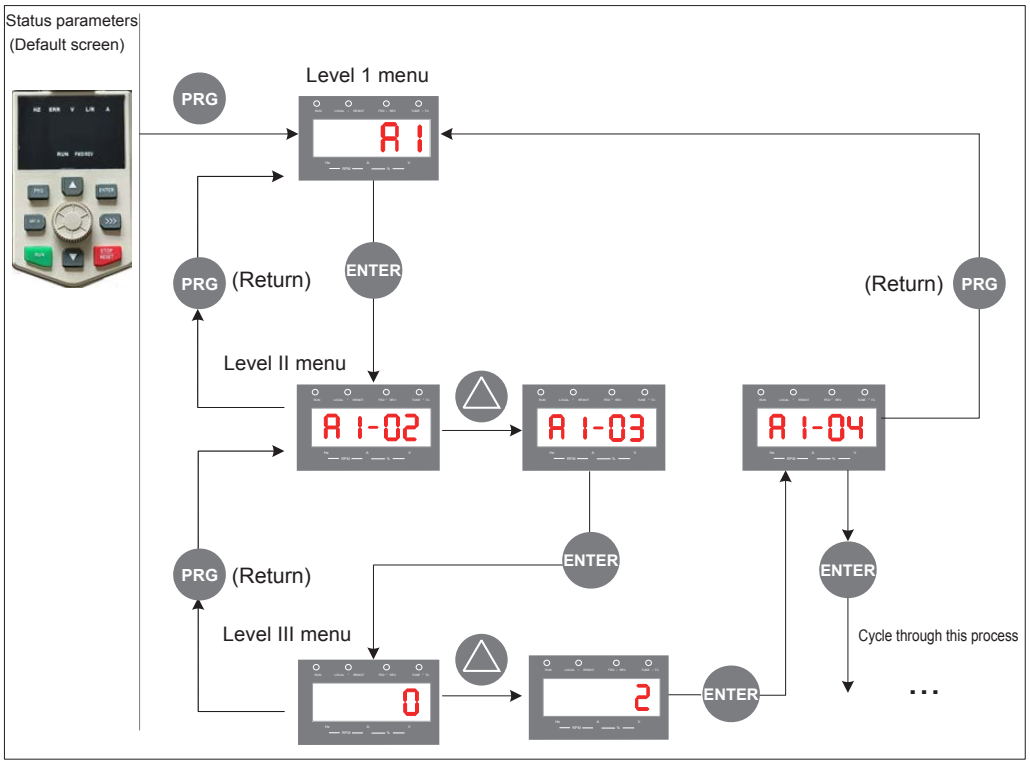


Figure 4-2 Flowchart of the three-level menu

Example

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

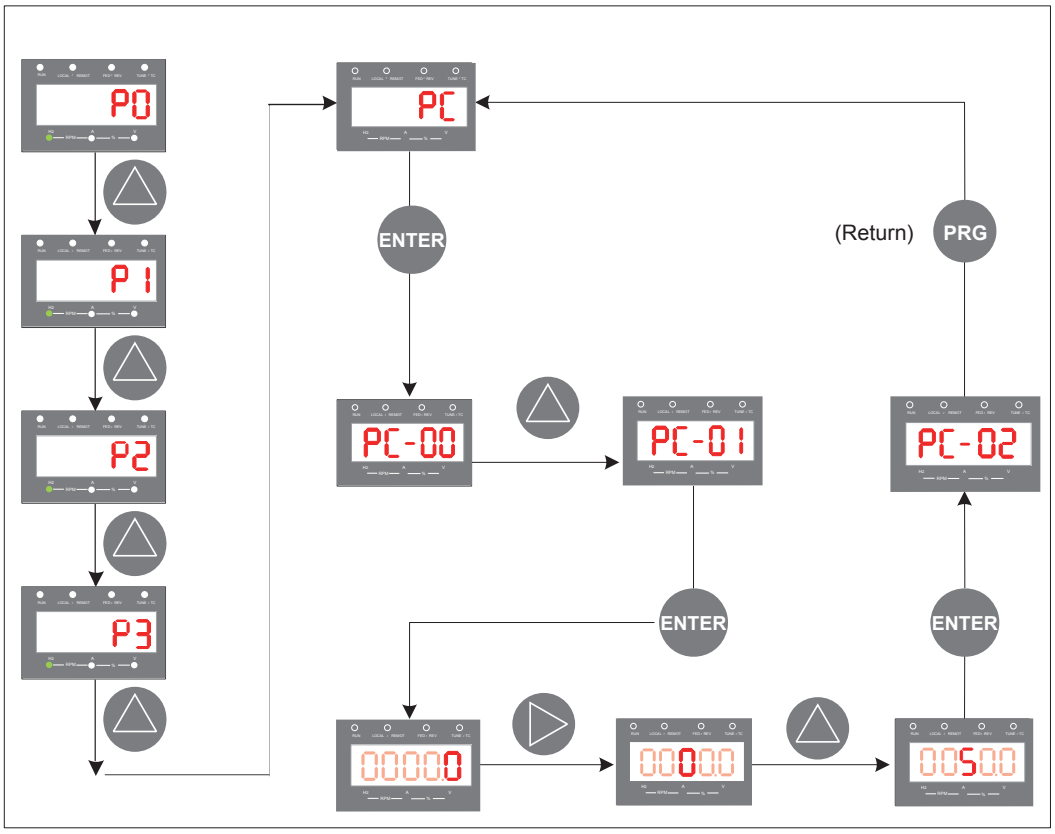


Figure 4-3 Parameter modification

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.

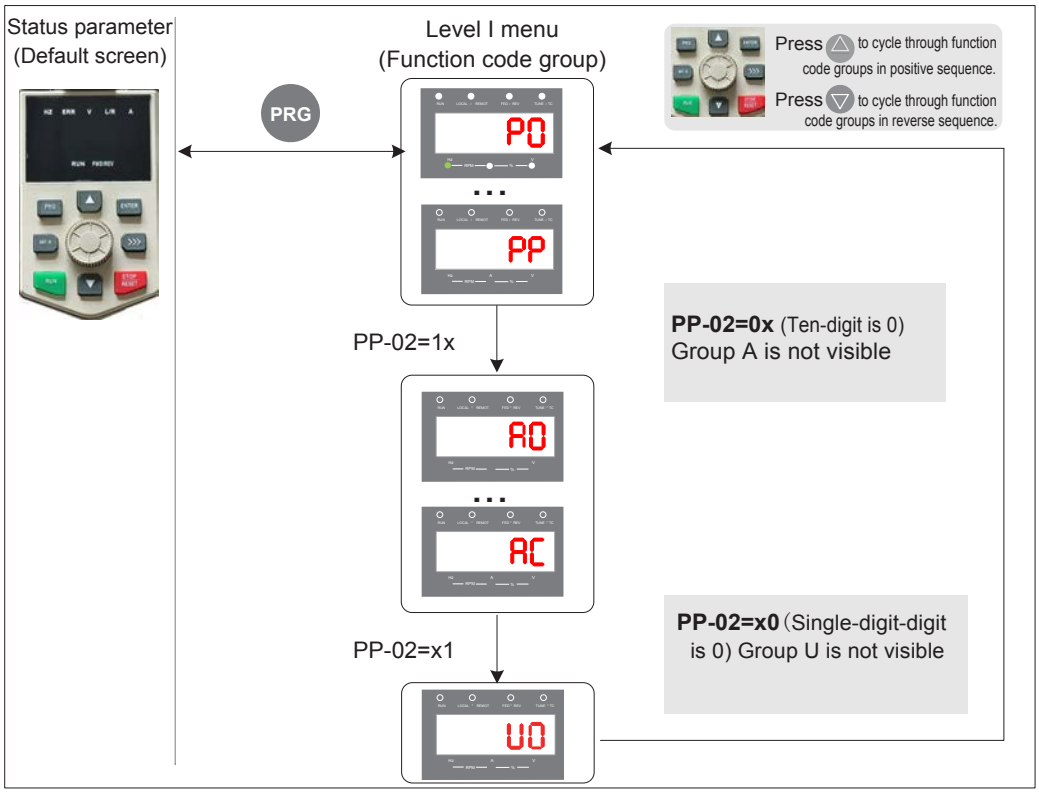


Figure 4-4 Viewing the parameter group number

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.

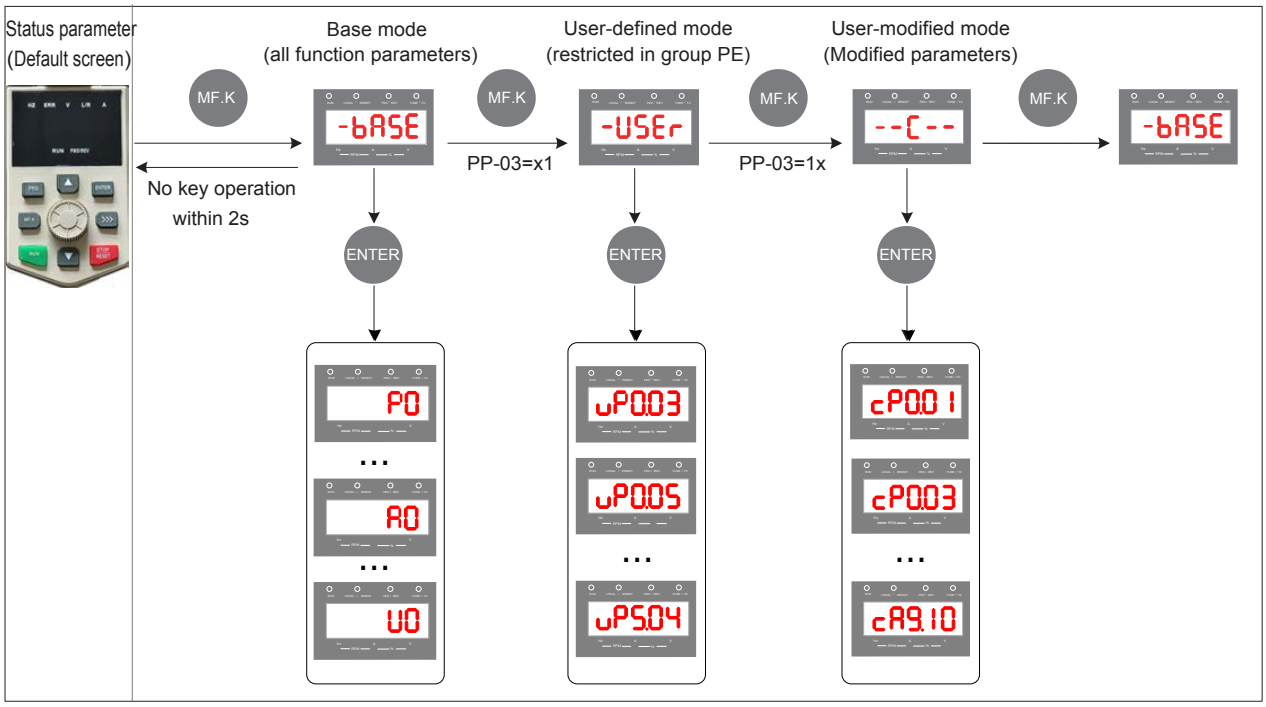
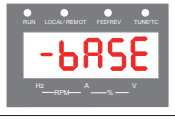


Figure 4-5 Schematic diagram of how to view parameters and parameters

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 Sen-digit: --C-- display-sel 0: Not displayed; 1: Visible	Decide on user custom groups, user changes Change whether the parameter group is displayed.

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.

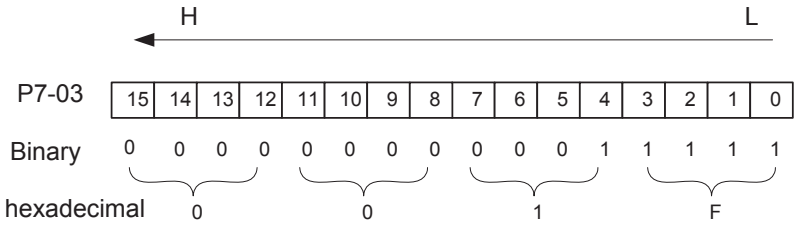
3） Status parameter

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.

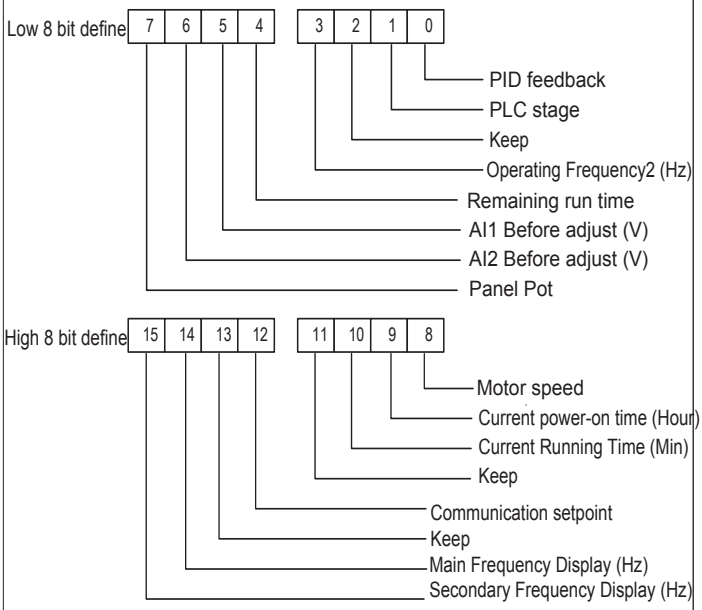
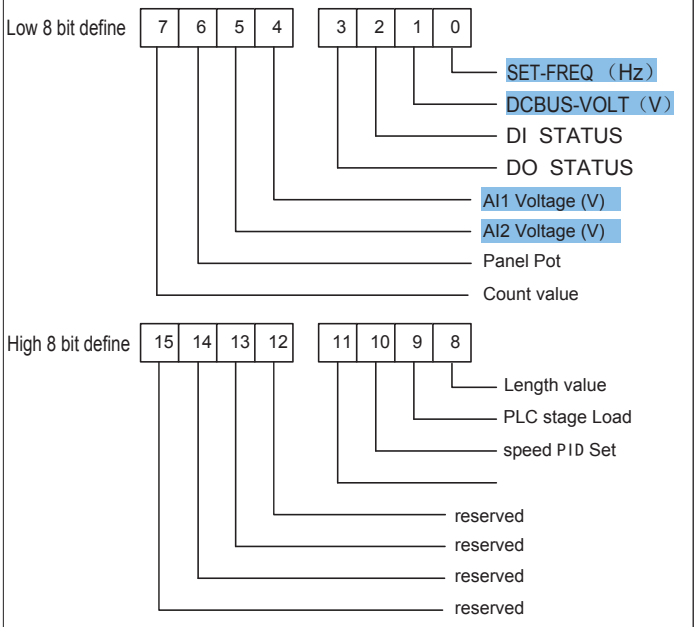
In the shutdown or running state, use the keys on the operation panel to switch each byte of the parameters P7-03、P7-04、P7-05.Multiple status parameters can be displayed.

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:

parameter	define	default	range of set	Parameter description
P7-03	Run display parameter 1	1F	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 P7-03. Low 8 bit define 7 6 5 4 3 2 1 0 RUN-FREQ（Hz） SET-FREQ （Hz） DCBUS-VOLT（V） OUT-VOLT（V） OUT-CURR（A） OUT-POWER（kW） OUT-TORQU（%） DI STATUS High 8 bit define 15 14 13 12 11 10 9 8 DO STATUS AI1 VOLT（V） AI2 VOLT（V） Panel Pot Count value Length value Load speed display PID setting Note: The shaded part is the default factory display.

<table>
<tr><th>parameter</th><th>define</th><th>default</th><th>range of set</th><th>Parameter description</th></tr>
<tr><td>P7-04</td><td>Run display parameter 2</td><td>33</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 P7-04.
 
</td></tr>
<tr><td>P7-05</td><td>Stop display parameter</td><td>0</td><td>0000 ～ FFFF</td><td>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.
 

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

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

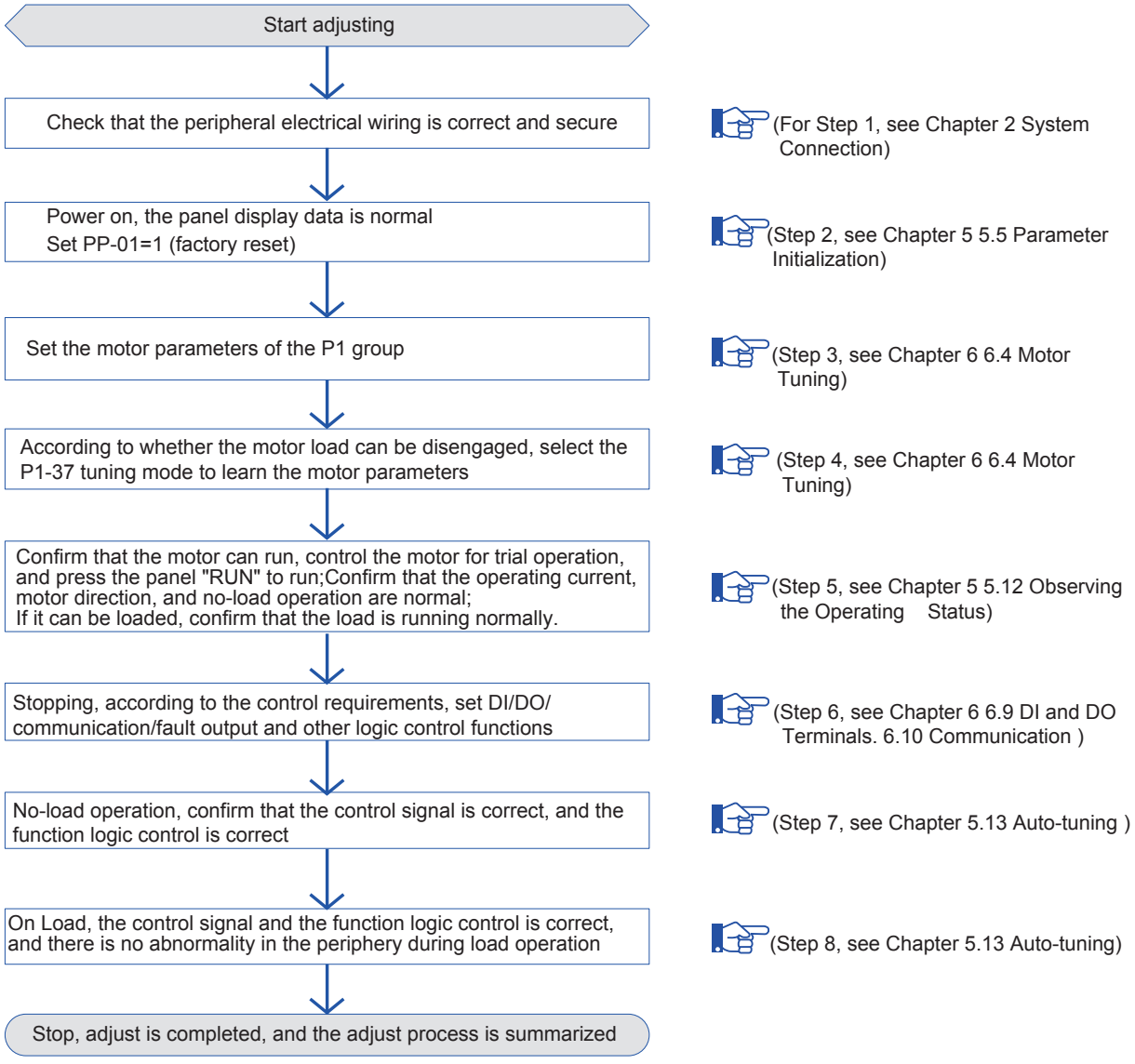


Figure 5-1 Quick adjusting steps

5.2 Flow chart of inverter commissioning

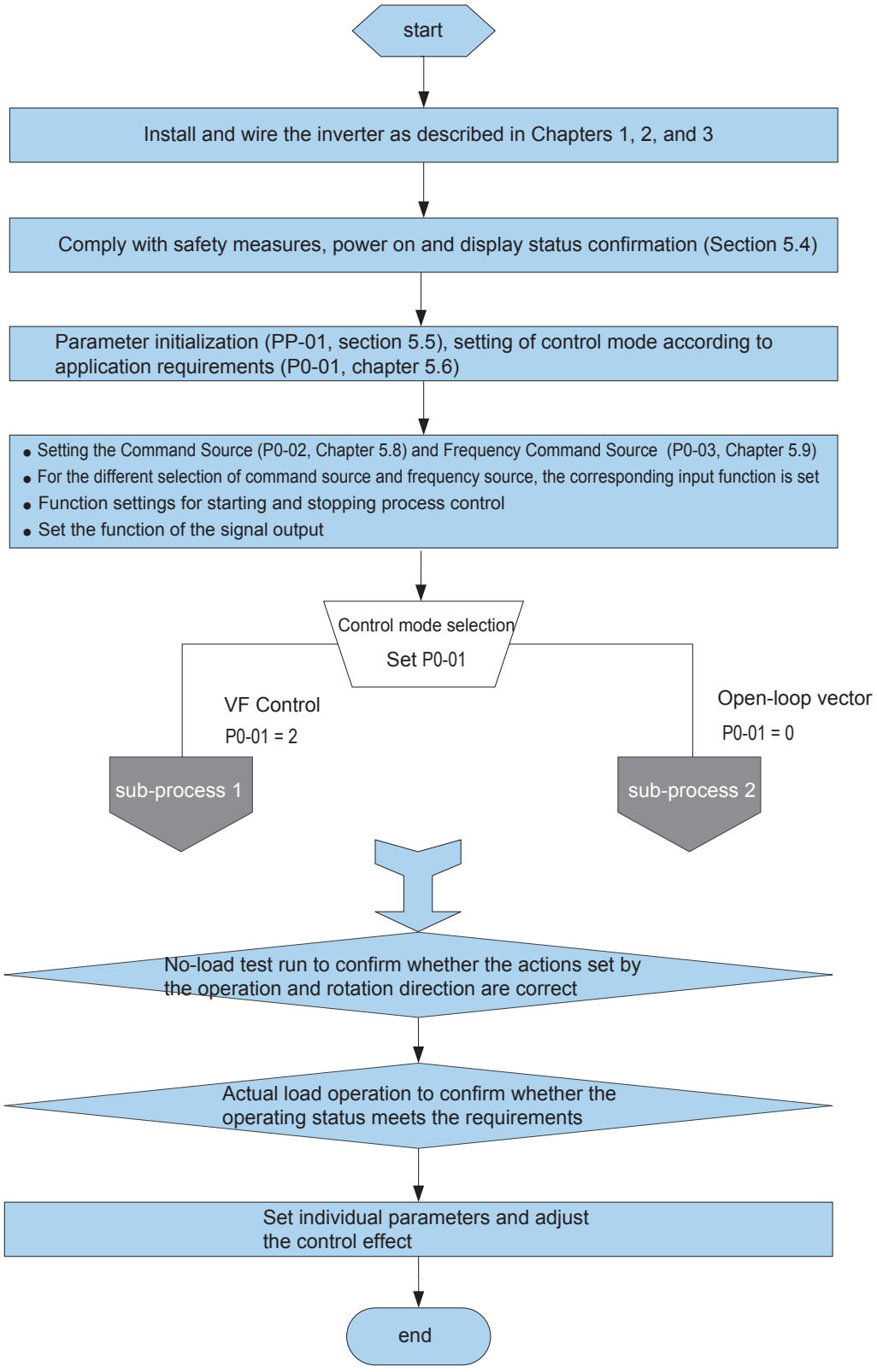


Figure 5-2 Flow chart of inverter commissioning

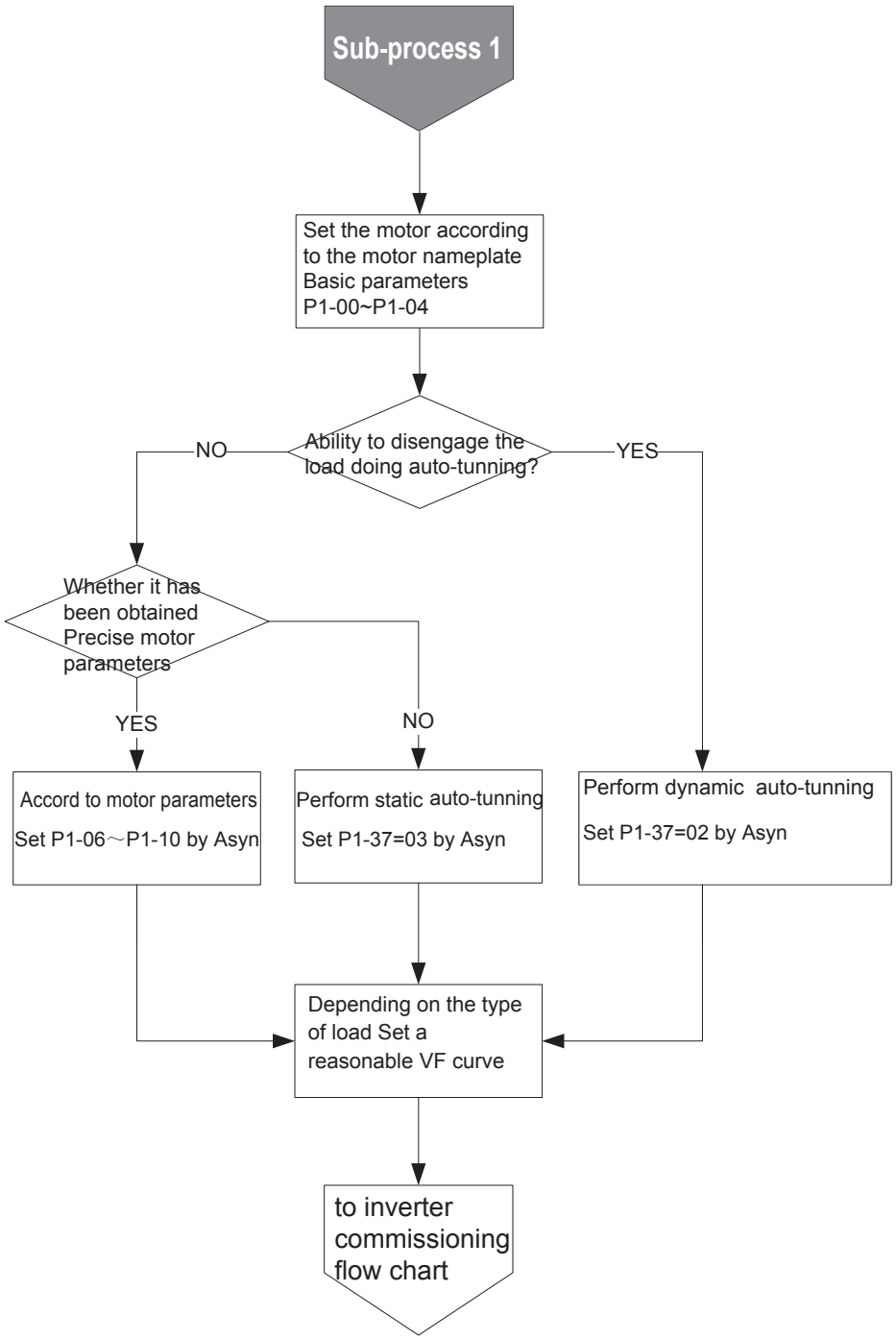


Figure 5-3 Inverter debugging Sub-process 1 (V/F control)

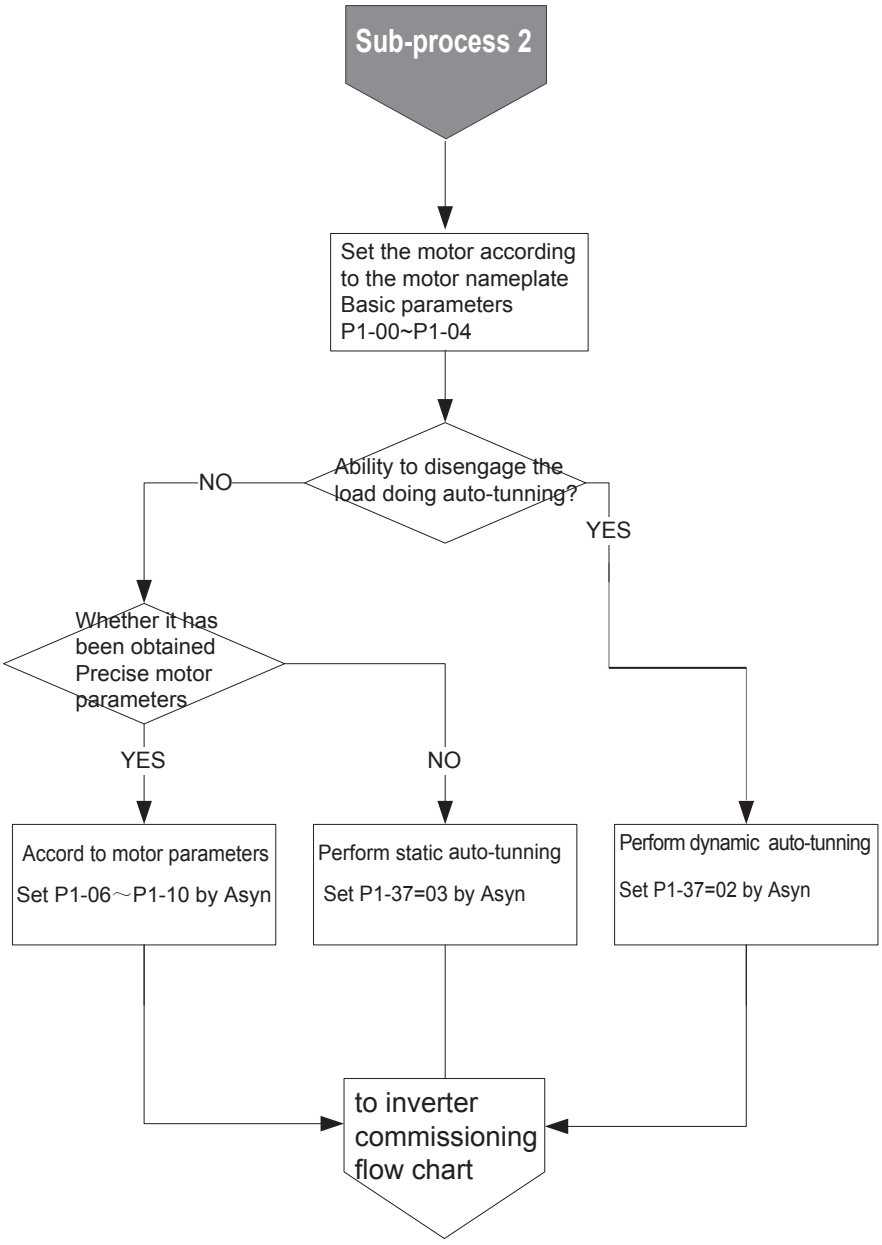


Figure 5-4 Inverter debugging Sub-process 2 (vector control)

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		The factory default display is a digital setting of 50.00Hz
fault		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
		Voltage【2】	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.

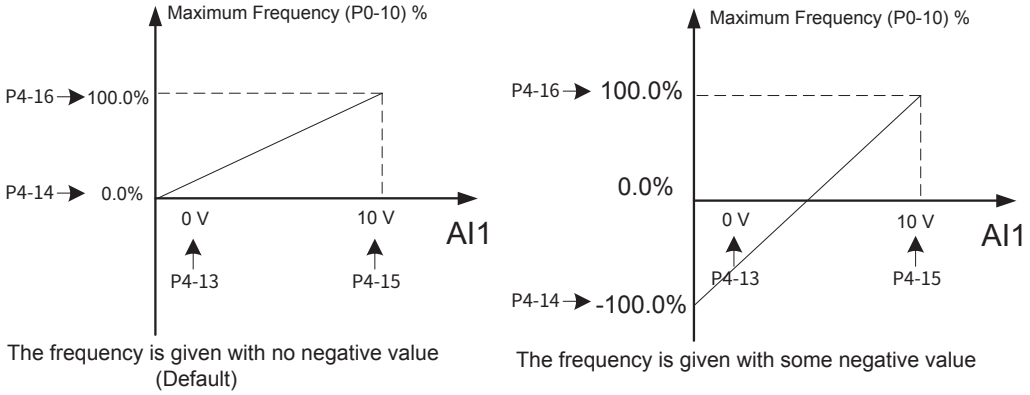


Figure 5-5 Typical setup curve for AI1

【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·

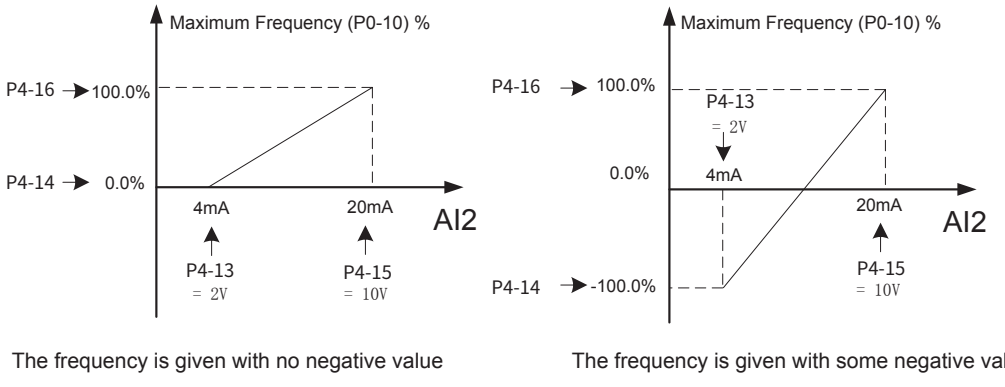


Figure 5-6 Typical setup curve for AI2

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

Setup steps	parameters	illustrate	
Multi-Speed as main frequency	P0-03	P0-03= 6	
Determine the number of segments that require multi-stage speeds	-----	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	
Set the DI terminal to a multi-speed function	P4-00 ～ P4-04	Multi-command terminal K1	Set 12
		Multi-command terminal K2	Set 13
		Multi-command terminal K3	Set 14
		Multi-command terminal K4	Set 15
Set the frequency corresponding to each multi-band speed 【note】	PC-00 ～ PC-15	The frequency setting corresponding to the speed is set as %, and 100% corresponds to the maximum frequency P0-10.	
	P0-10	When the frequency command is Multi-Speed, 100.0% of the parameter PC-00~PC-15 corresponds to max frequency P0-10.	

[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

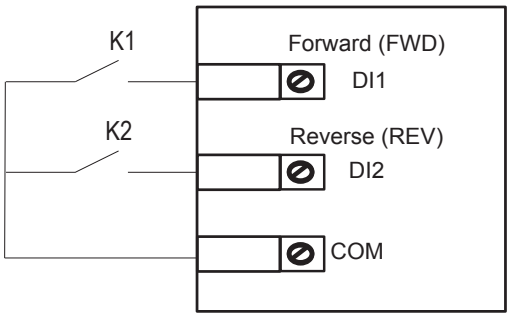


Figure 5-9 2-wire 1

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

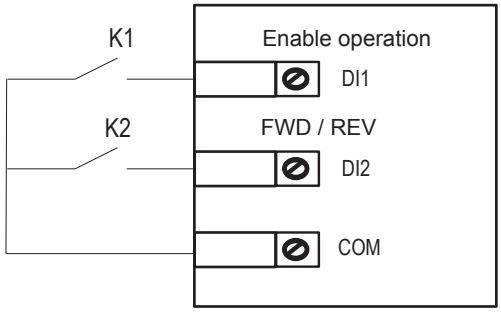


Figure 5-10 2-wire 2

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

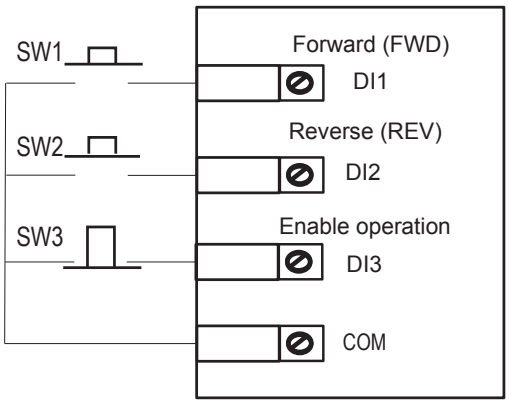


Figure 5-11 3-wire 1

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

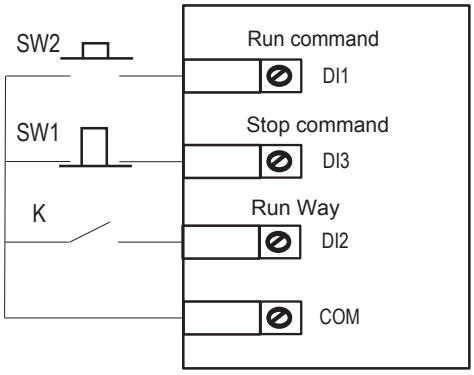


Figure 5-12 3-wire 2

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.。

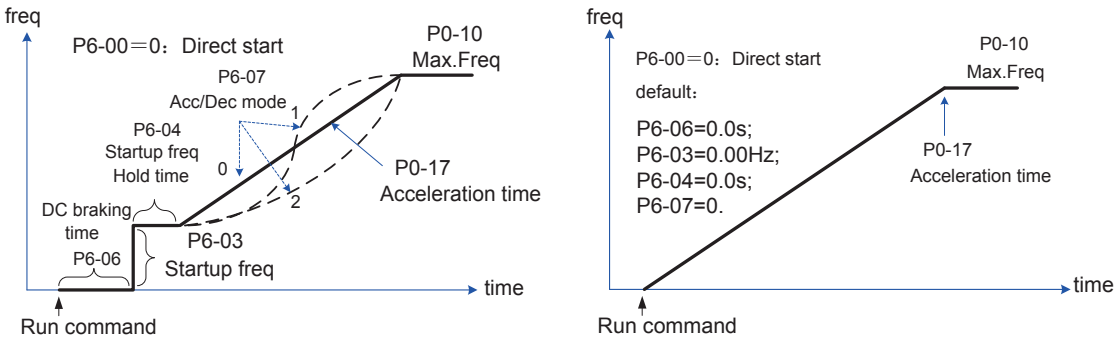


Figure 5-13 Direct startup mode

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.

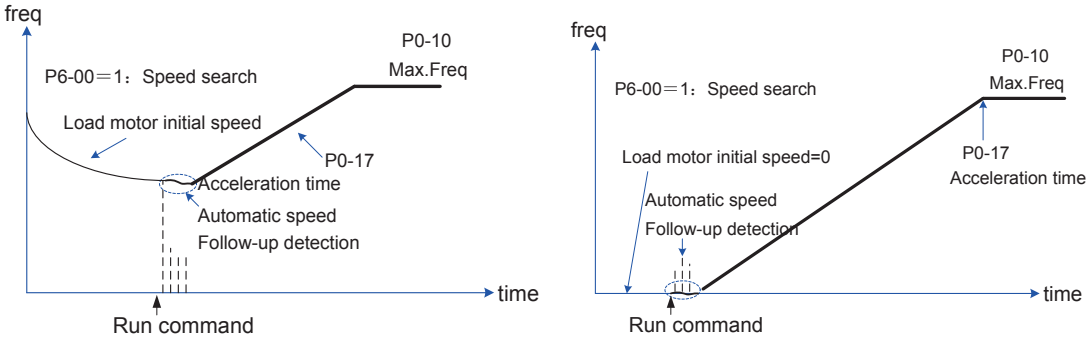


Figure 5-14 speed search mode

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:

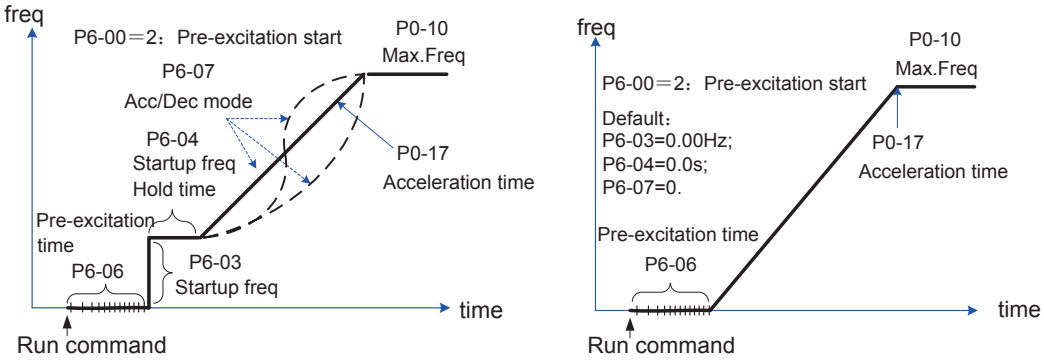


Figure 5-15 Pre-excitation start-up mode

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.

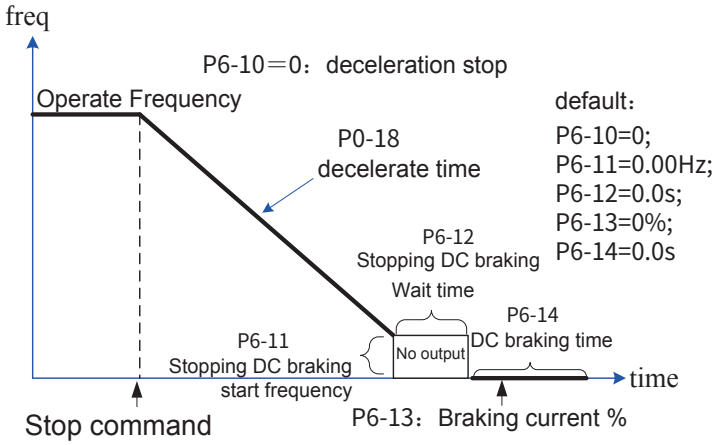


Figure 5-16 deceleration and stopping

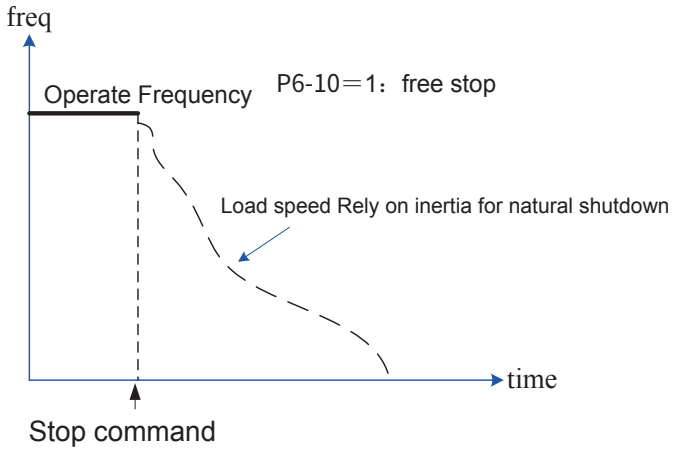


Figure 5-17 Free stop

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.

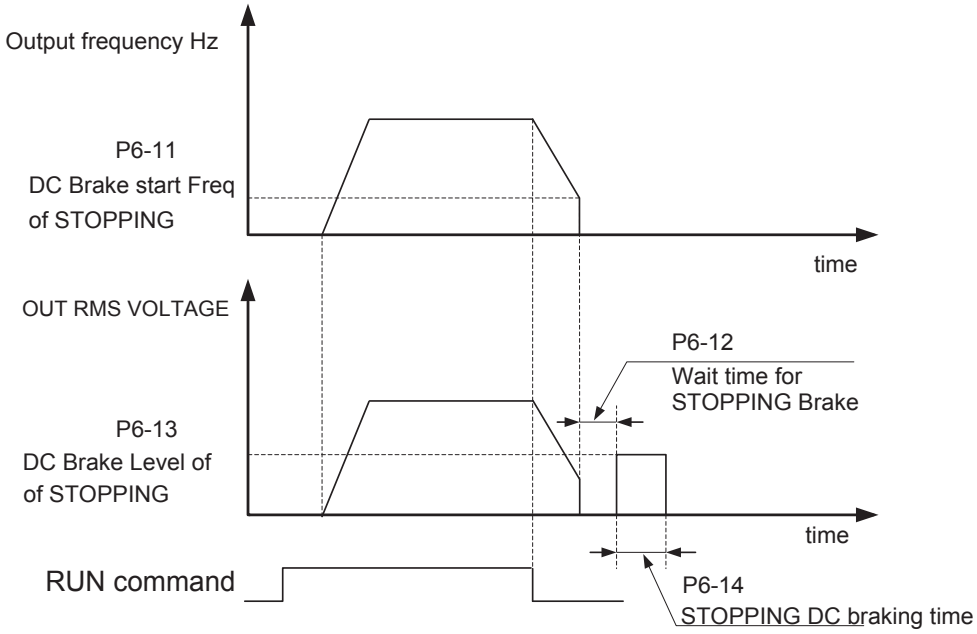


Figure 5-18 DC braking process of STOPPING

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.

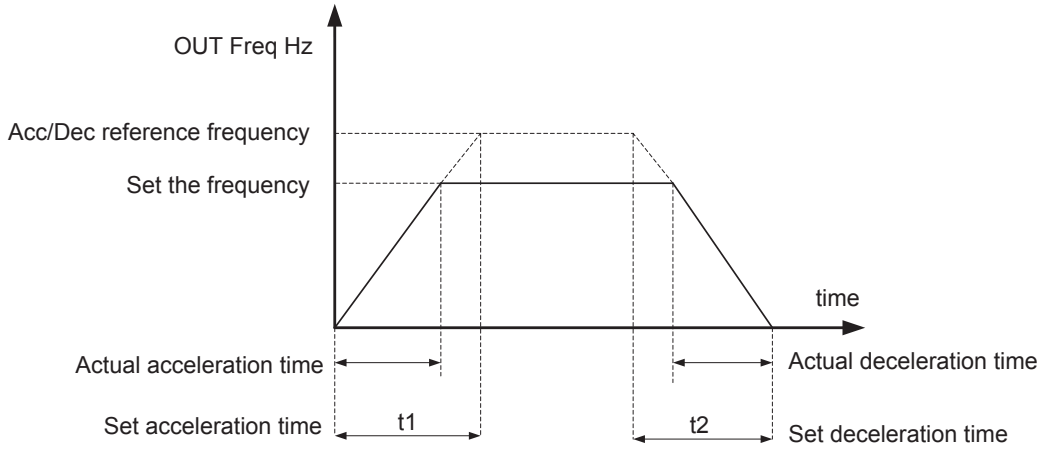


Figure 5-19 Acceleration and deceleration times

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。

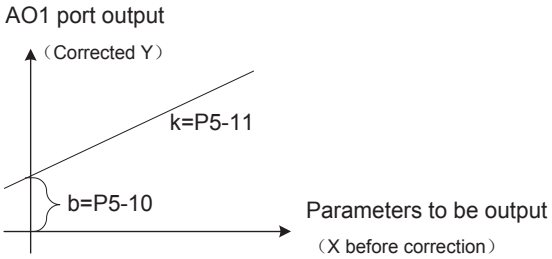


Figure 5-20 AO signal correction characteristic curve

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".

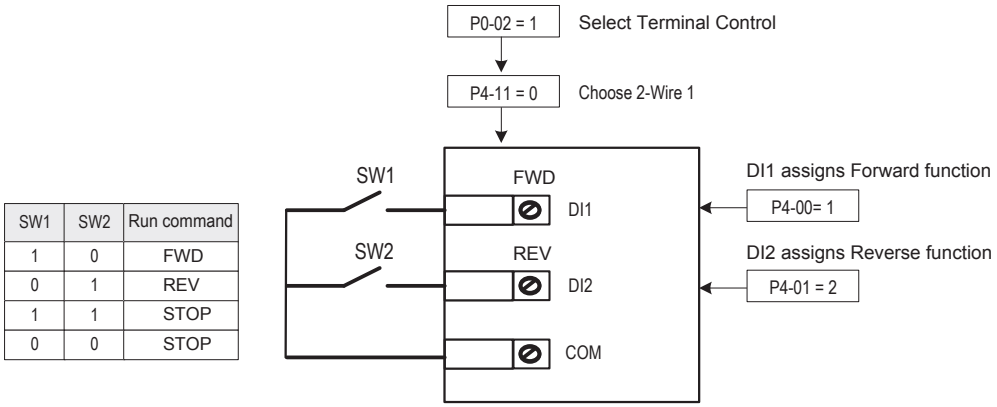
- 2-wire 1: P4-11=0 This is the most commonly used 2-wire pattern.

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

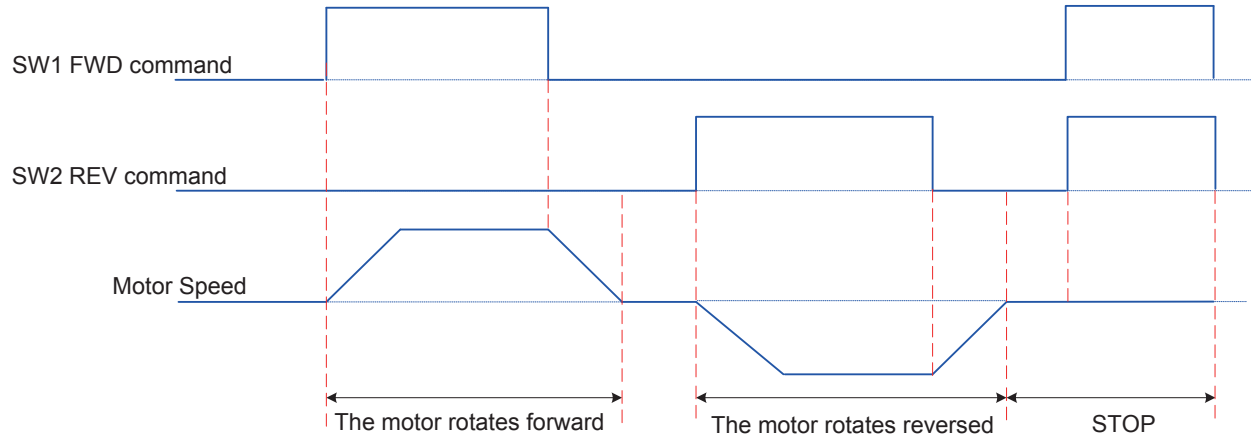


Figure 6-2 2-wire mode1 Timing diagram (normal)

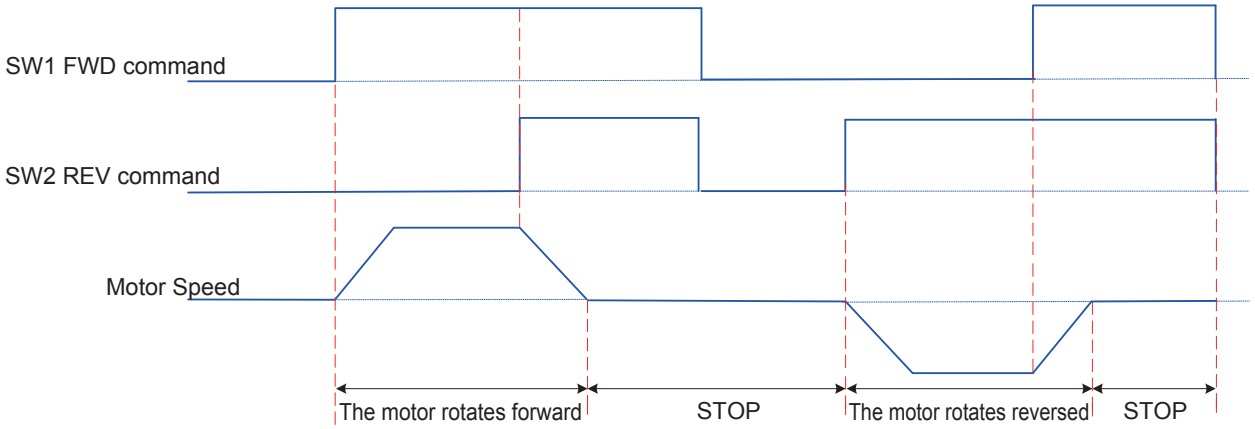


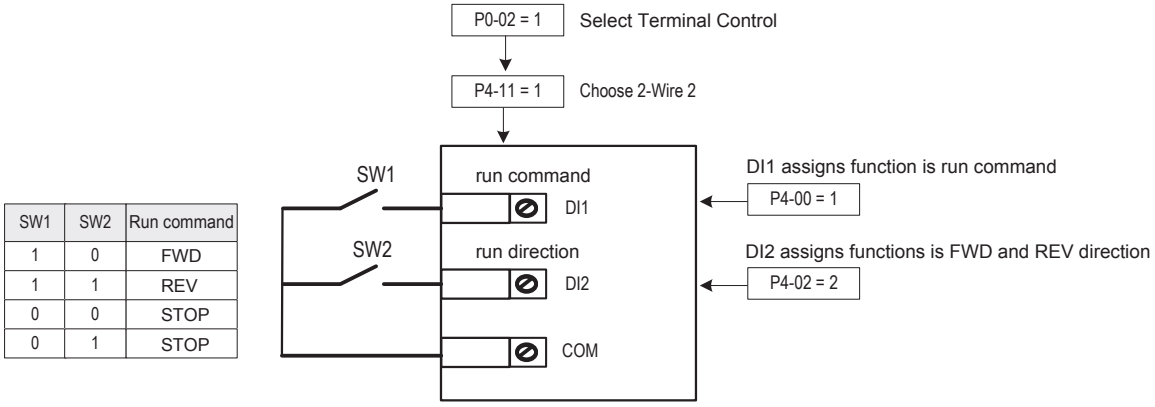
Figure 6-3 2-wire mode 1 Timing diagram (exception)

- 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

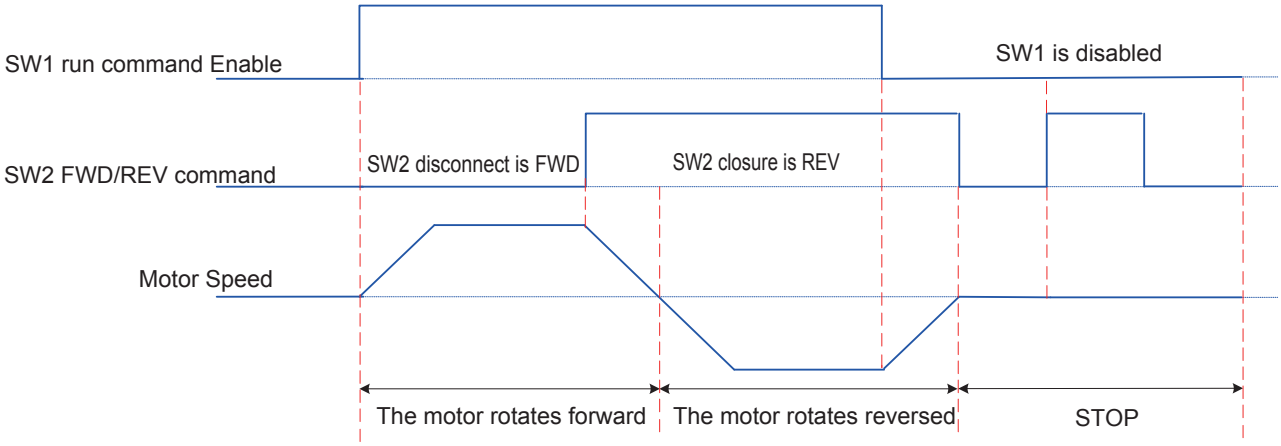


Figure 6-5 2-wire 2 Timing diagram

- 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.

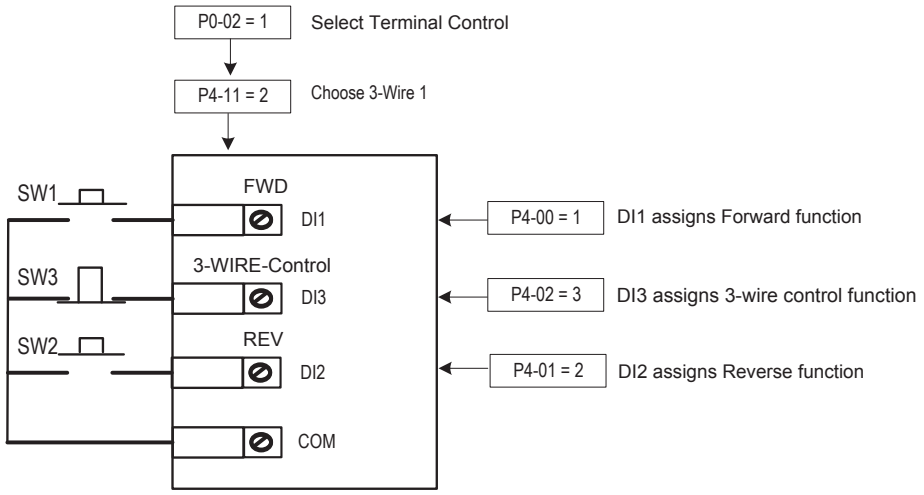


Figure 6-6 Wiring and parameter settings in 3-wire mode 1

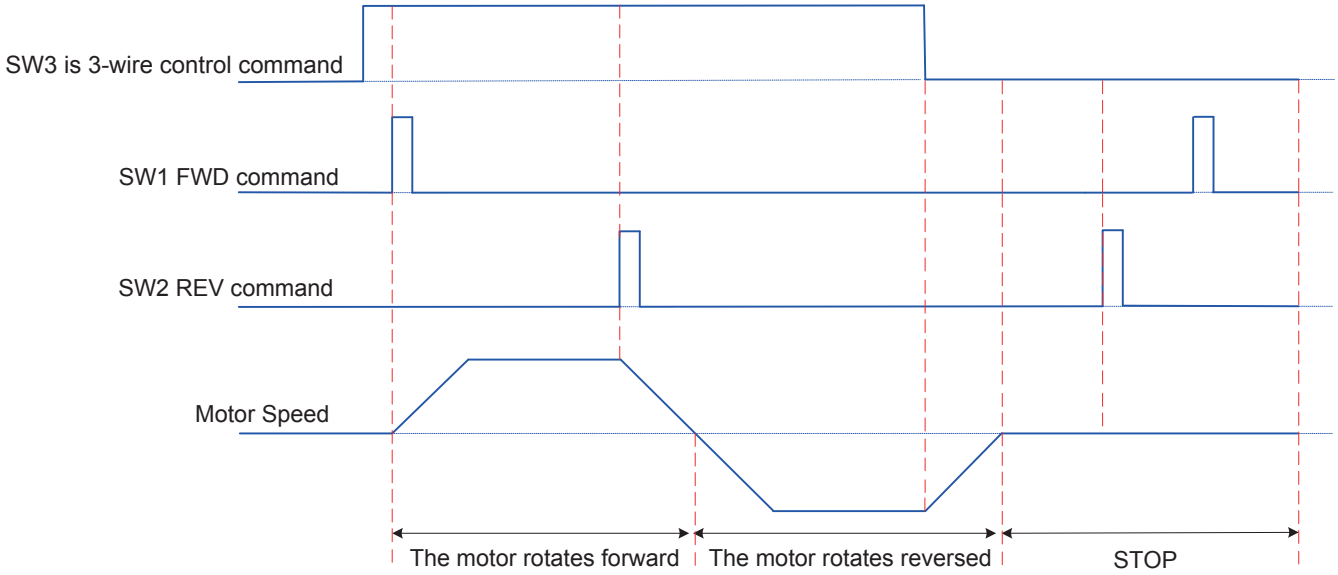


Figure 6-7 Timing diagram of 3-wire mode 1

- 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.

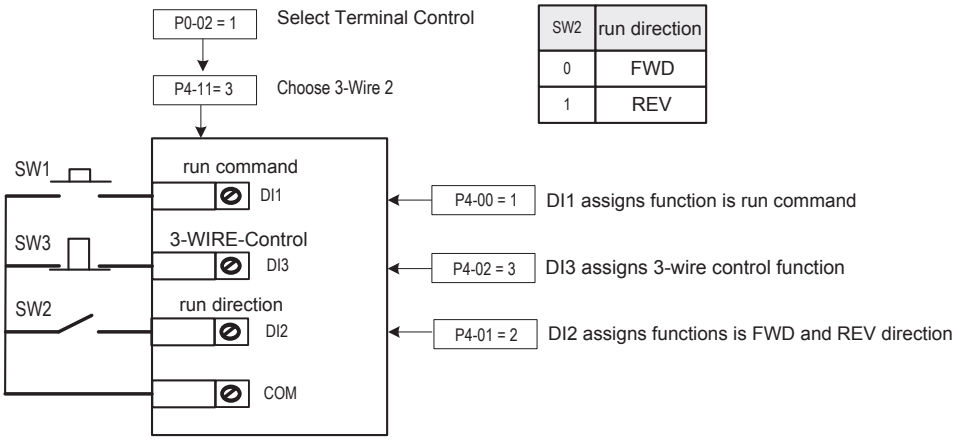


Figure 6-8 3-wire mode 2 Wiring and parameter settings

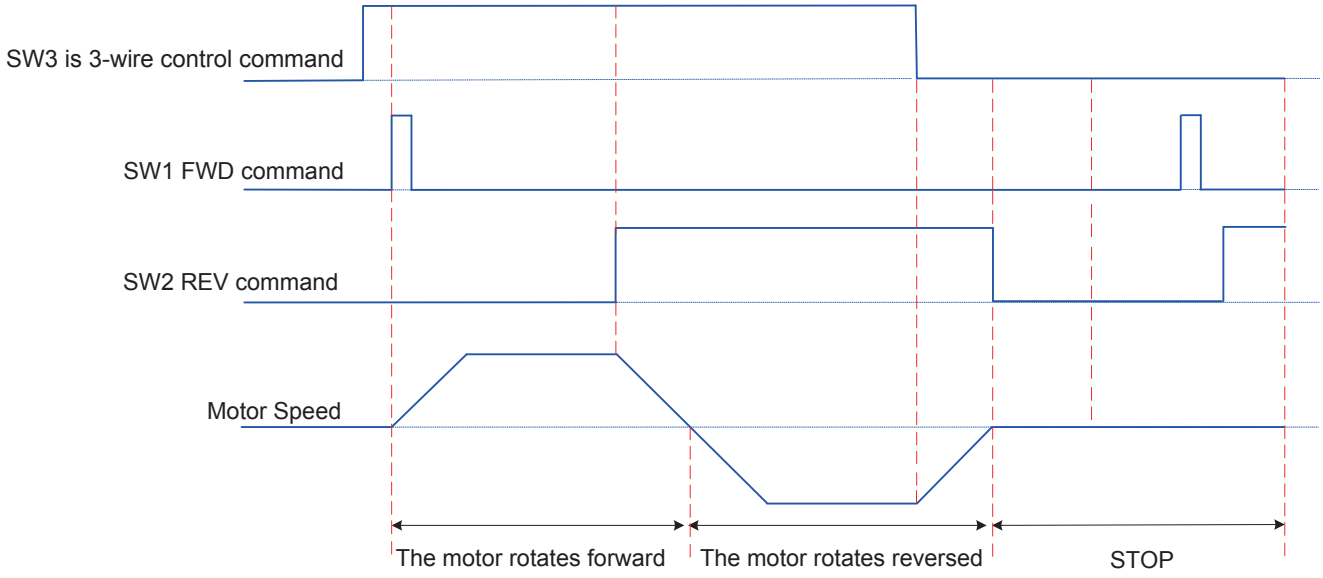


Figure 6-9 Timing diagram of 3-Wire mode 2

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

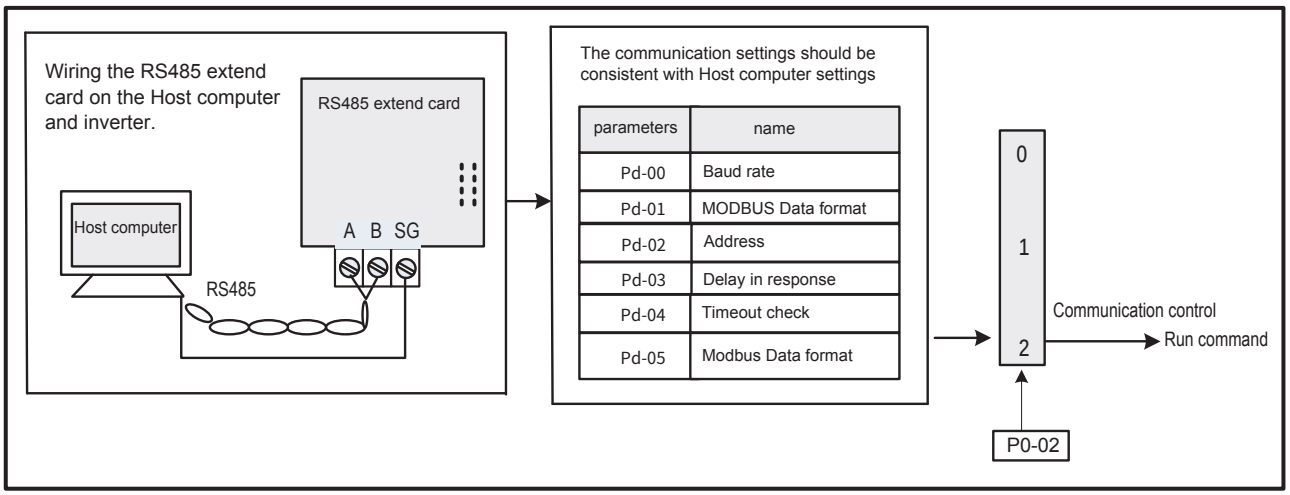


Figure 6-10 Schematic diagram of running commands using communication settings

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

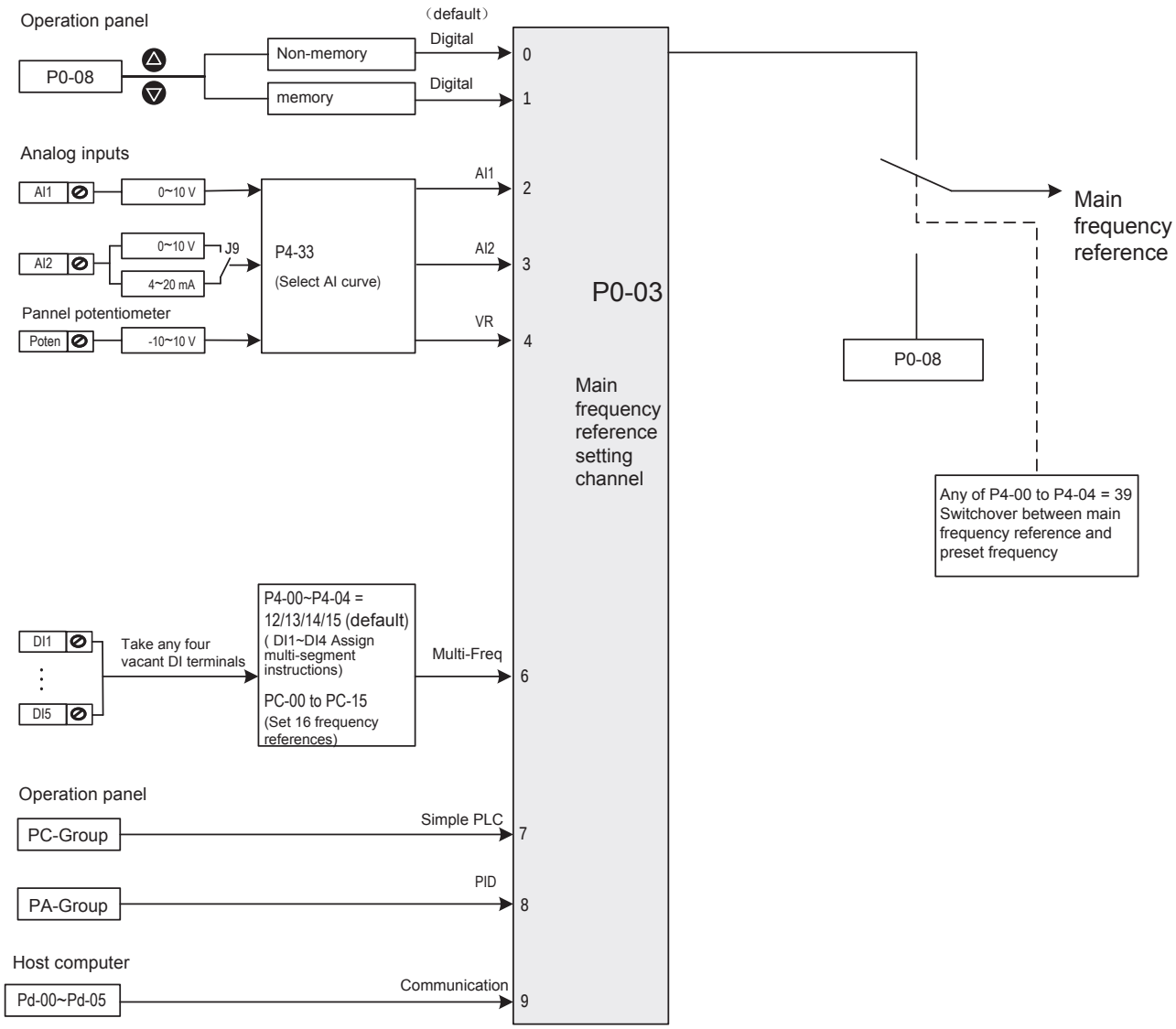


Figure 6-11 Main frequency command selection

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

- 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:

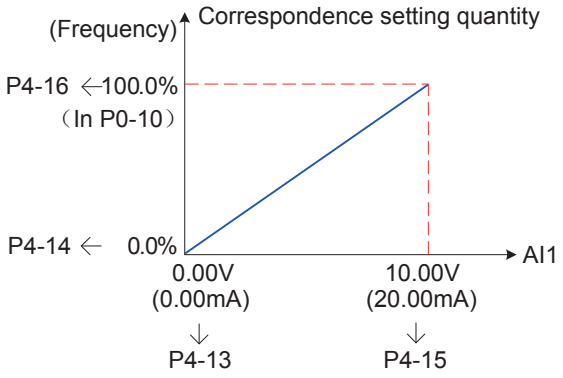


Figure 6-12 AI curve 1 is configured

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.

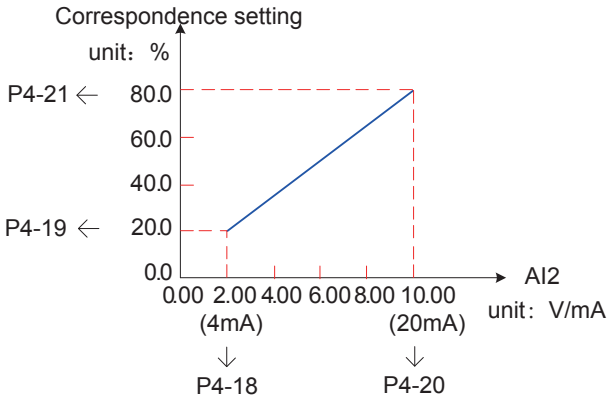


Figure 6-13 AI Curve 2 is configured

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.

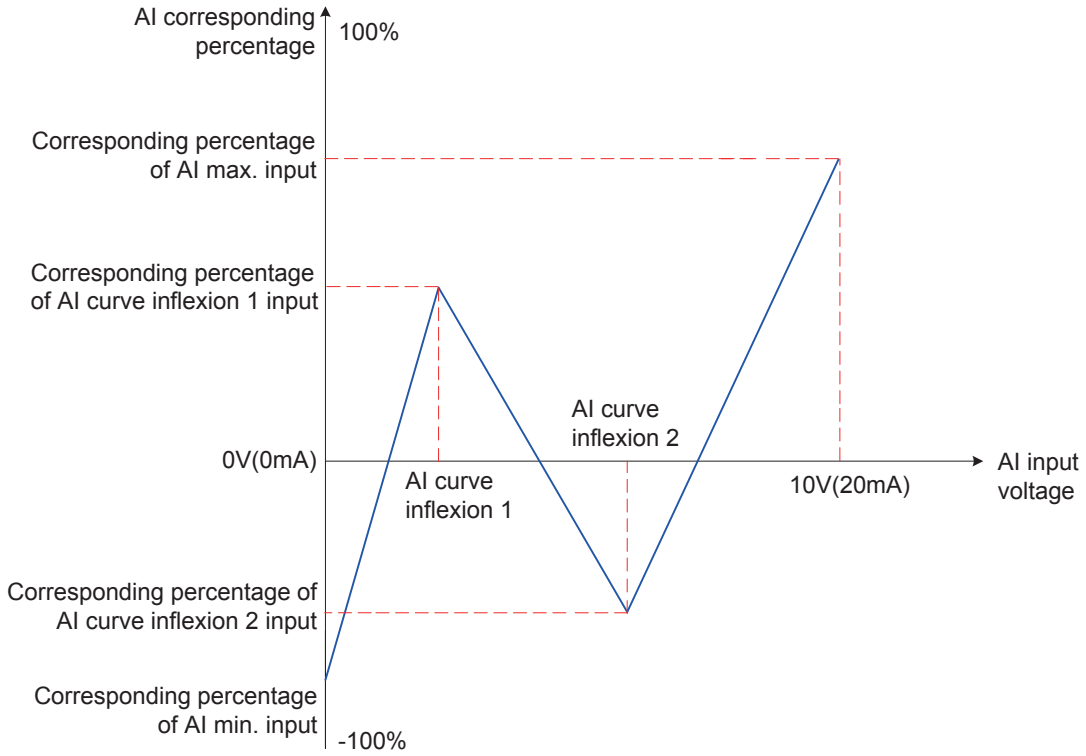


Figure 6-14 Curves 4 and 5 are schematic

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:

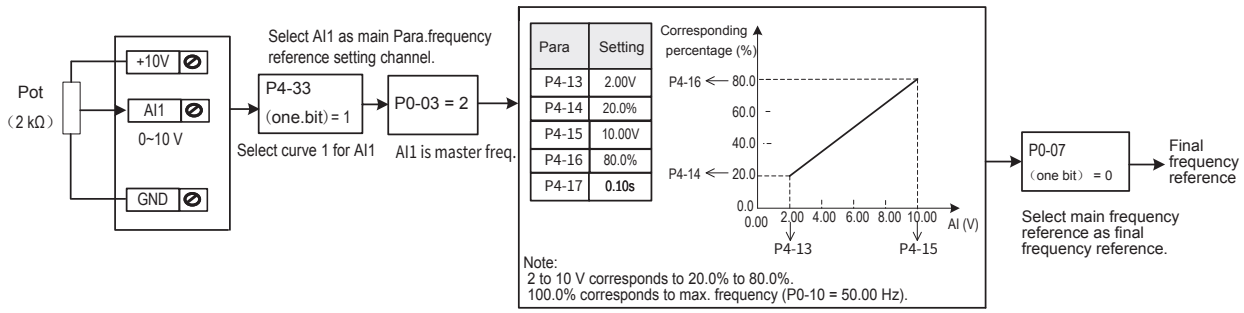


Figure 6-15 Voltage input at AI1 to control frequency reference

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:

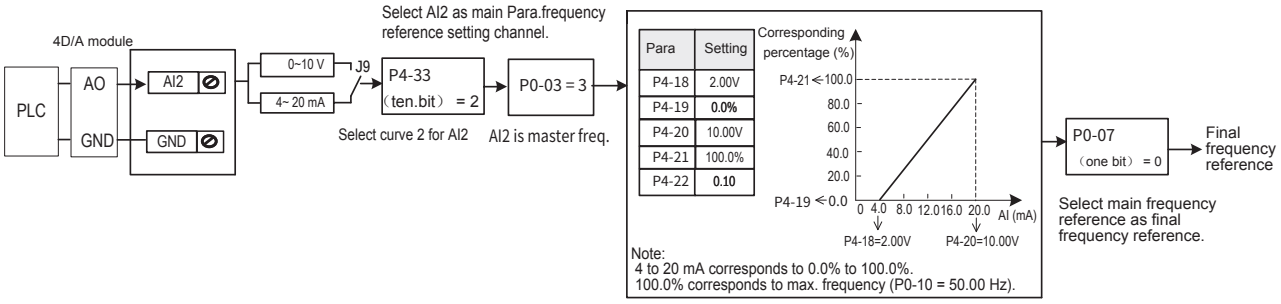


Figure 6-16 Current input at AI2 to control frequency reference

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:

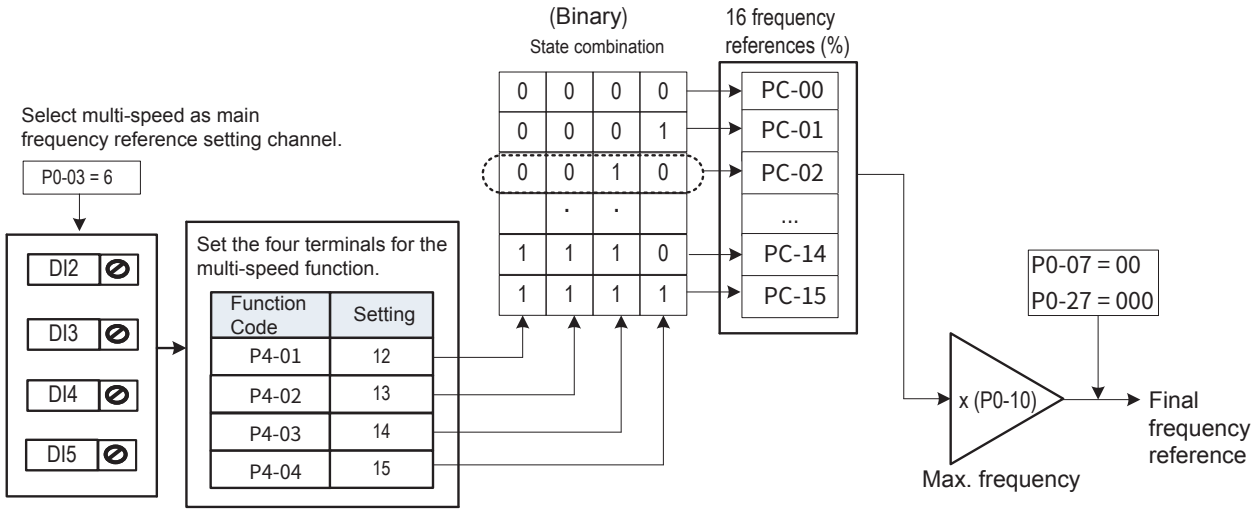


Figure 6-19 Using multi-speed to control frequency reference

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:

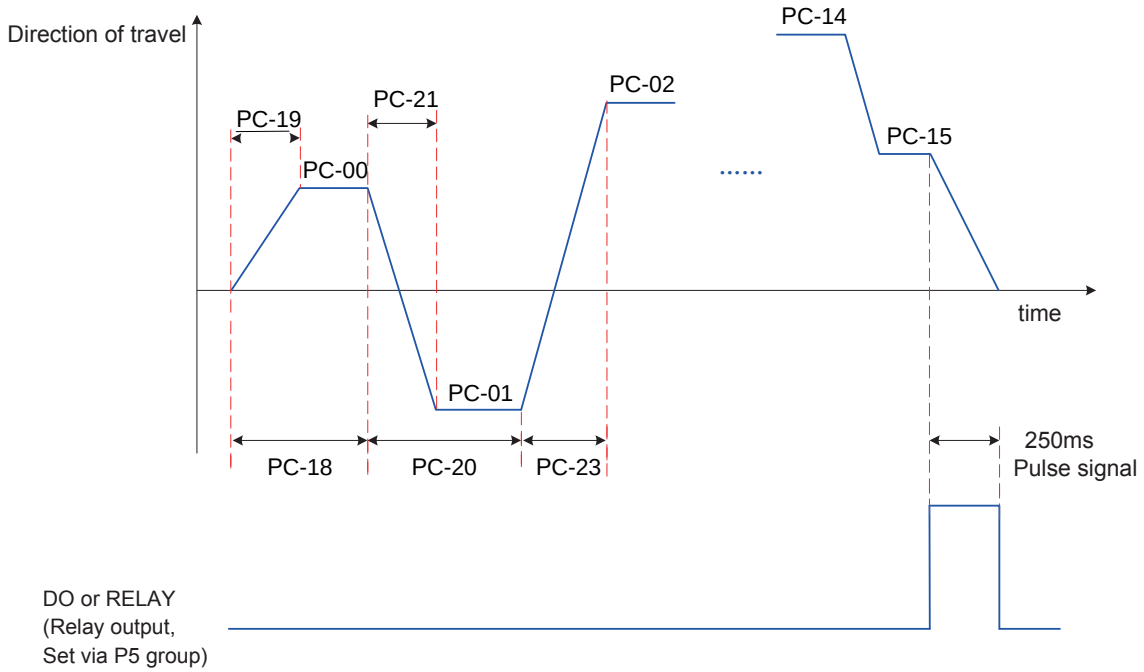


Figure 6-20 A simple PLC as a schematic diagram of the main frequency

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	Restart the PLC process every time you power up.
			0：no memory 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	The PLC process is restarted with each start-up.
			0：no memory 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)

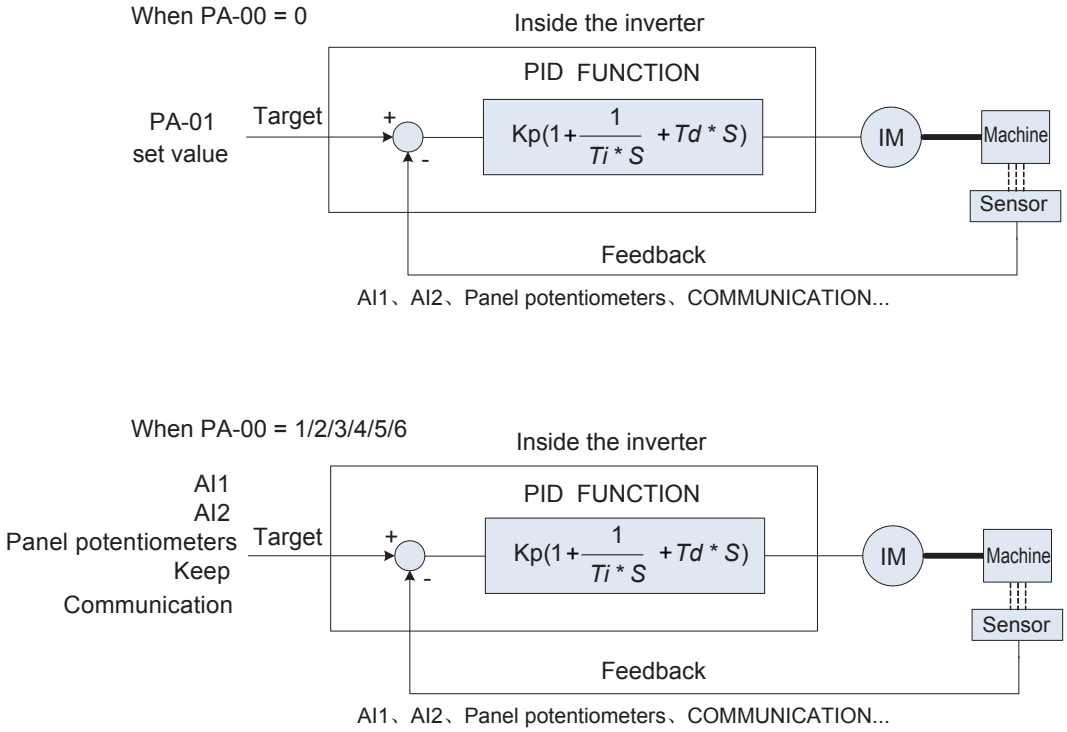


Figure 6-21 PID control function diagram

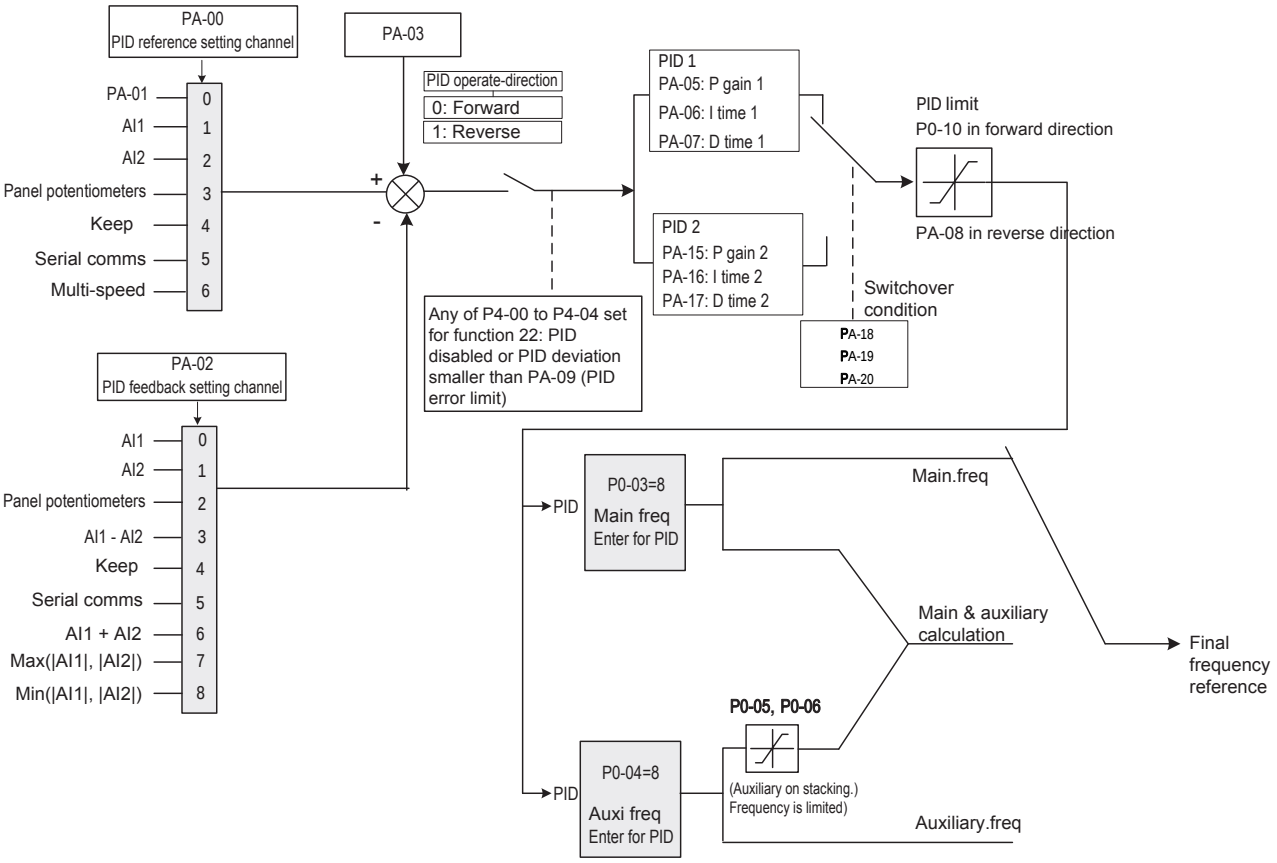


Figure 6-22 Block diagram of process PID control parameters

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.

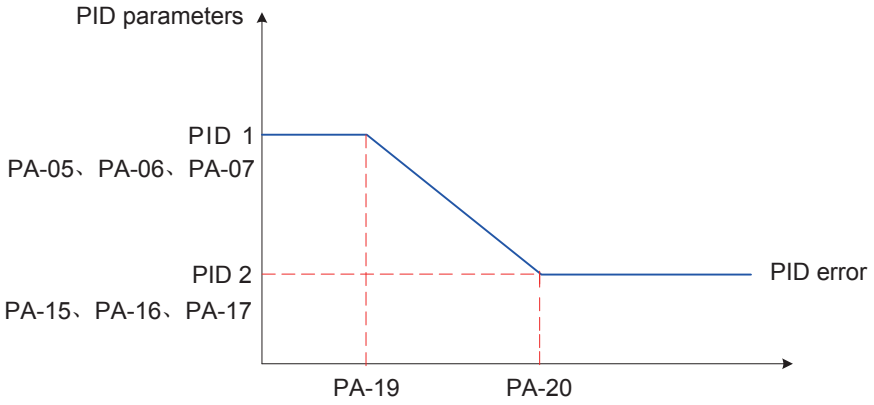


Figure 6-23 Switchover of two groups of PID parameters

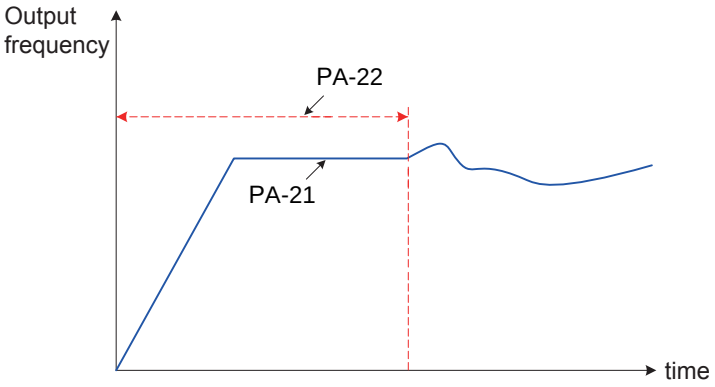


Figure 6-24 The PID initial value function

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

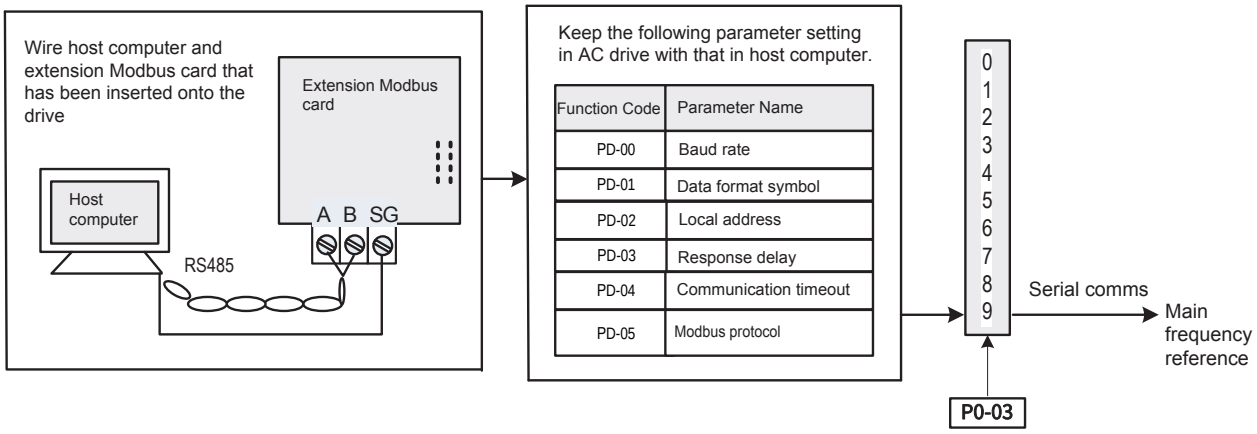


Figure 6-25 Communication is used as a parameter for the main frequency

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:

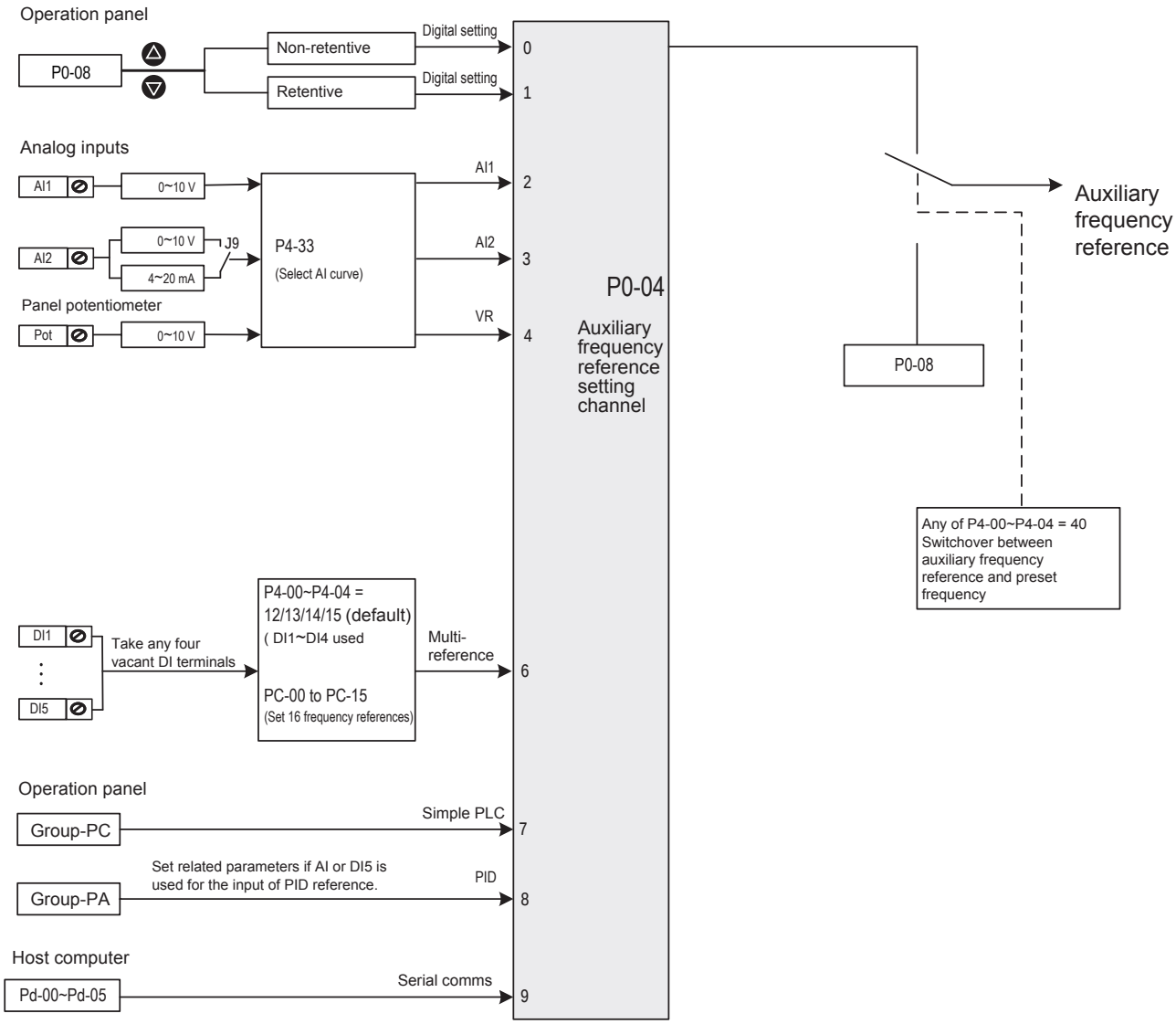


Figure 6-26 select a proper channel to set auxiliary frequency reference

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).

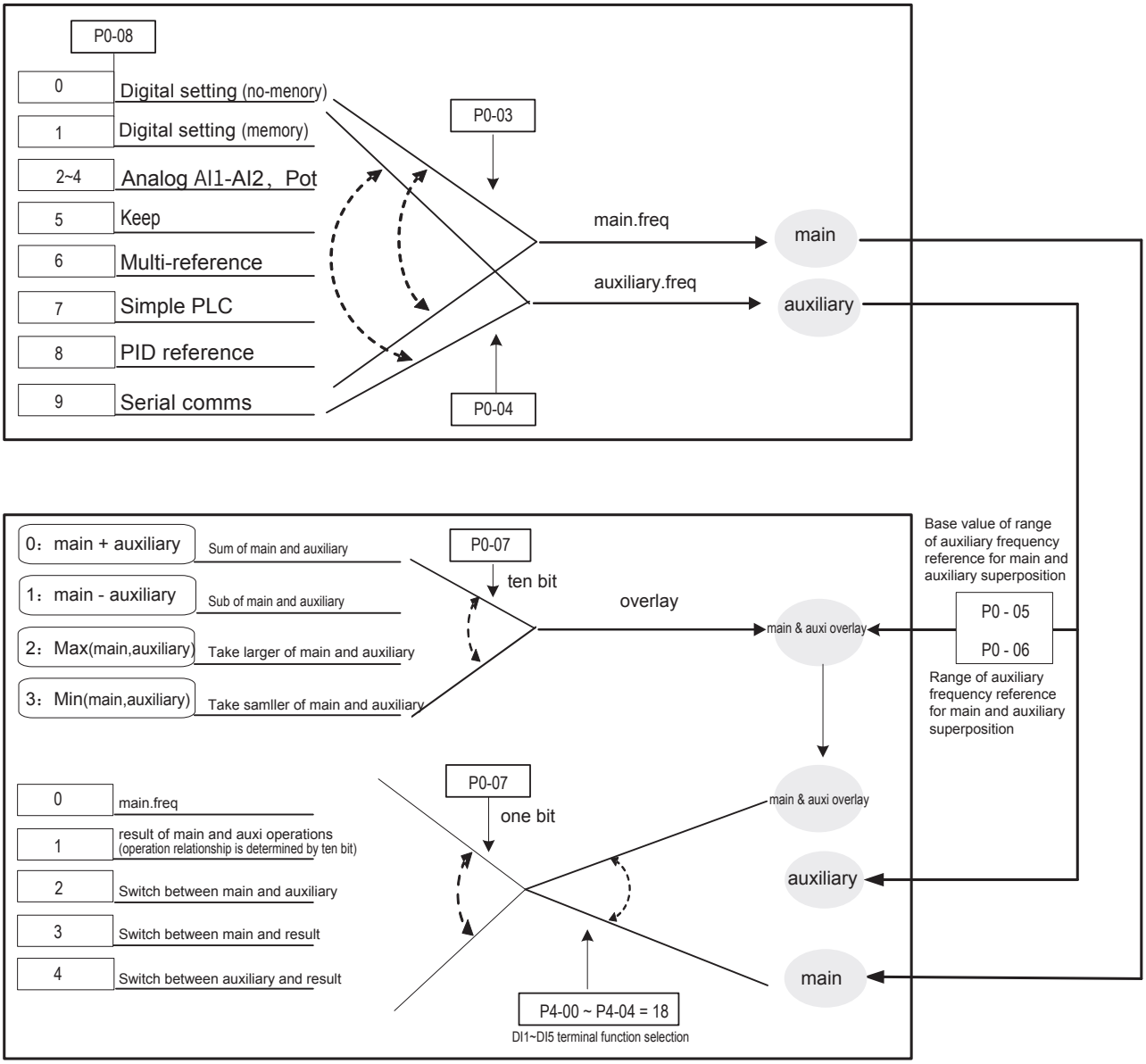


Figure 6-27 Frequency commands are overlay on the main and auxiliary frequency commands

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.

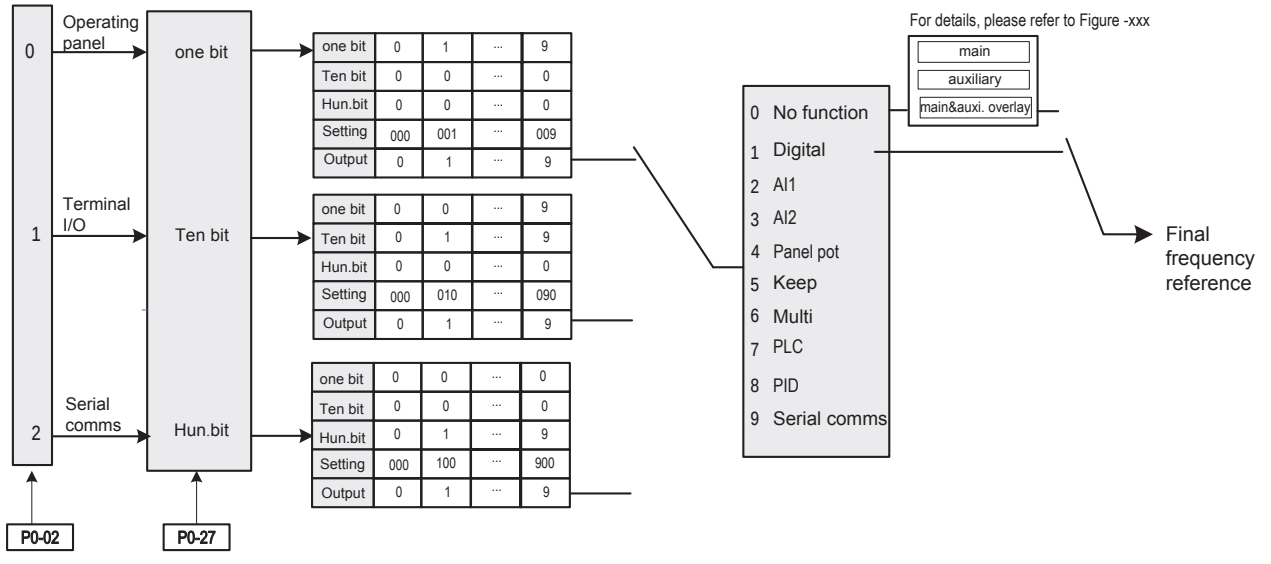


Figure 6-28 Running instructions are bound to the main frequency command

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.

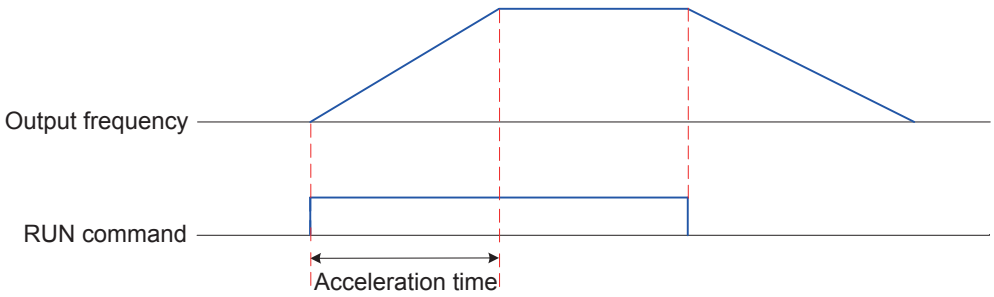


Figure 6-29 Sequence of direct start

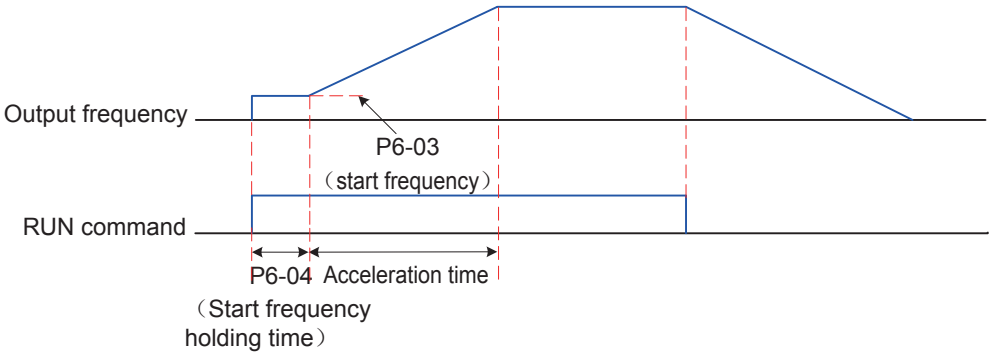


Figure 6-30 Sequence of start with start frequency

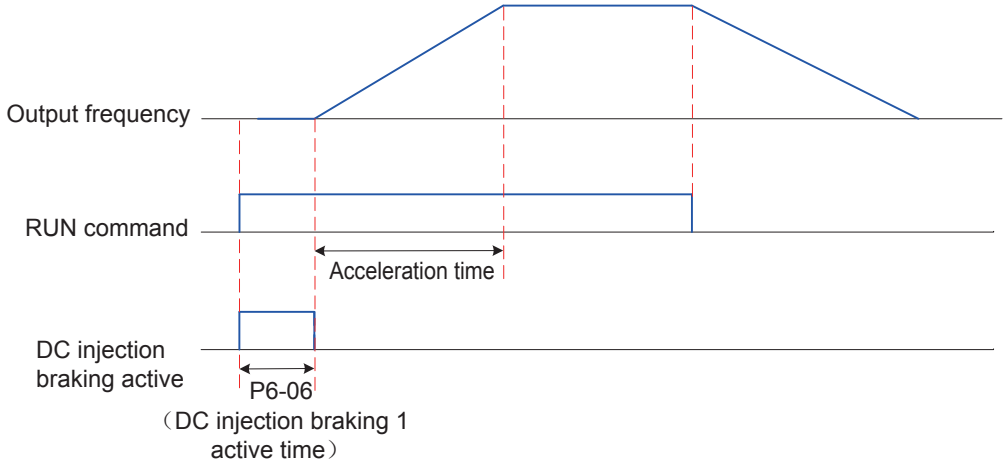


Figure 6-31 Sequence of start with DC injection braking

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:

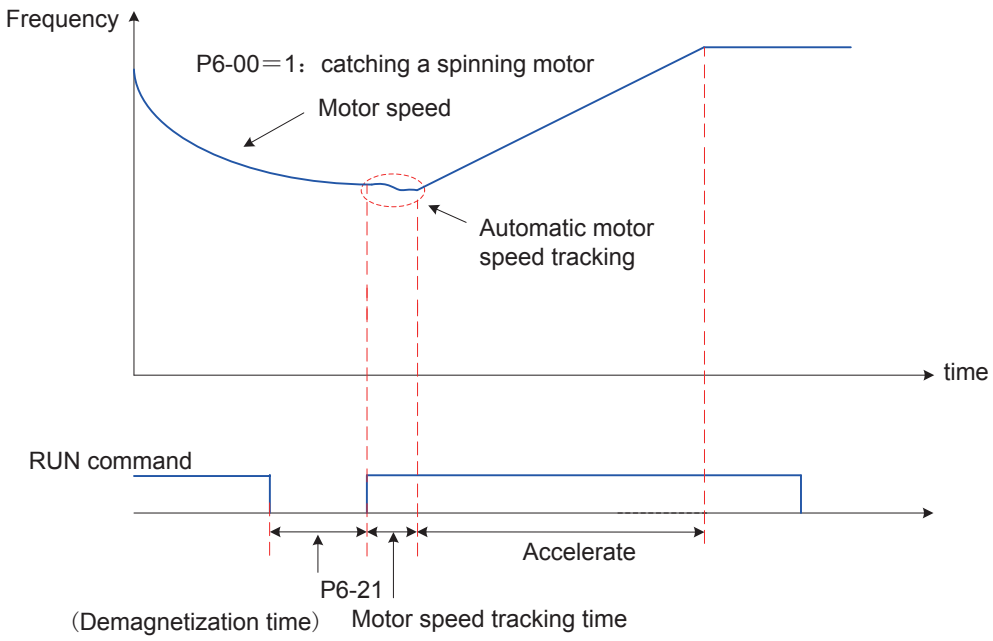


Figure 6-32 Catching a spinning motor

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.

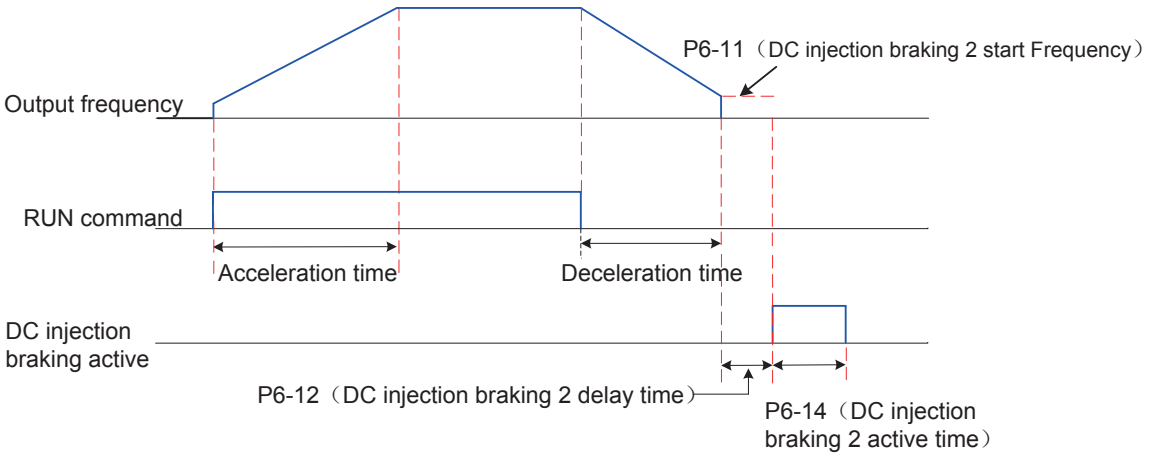


Figure 6-33 Decelerate to stop

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)

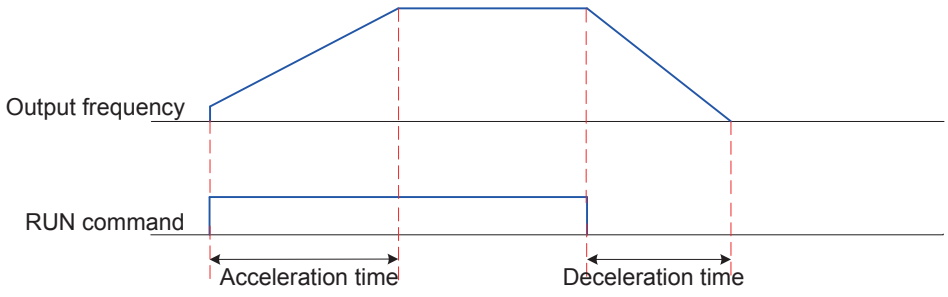


Figure 6-34 Decelerate to stop

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）

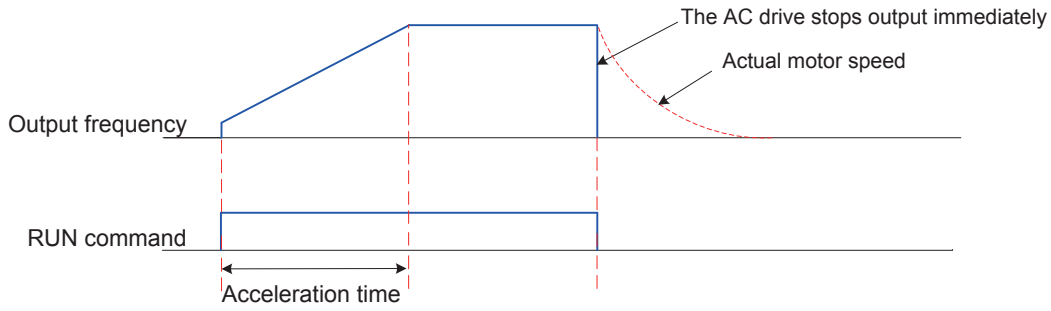


Figure 6-35 Free-parking sequence diagram

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.

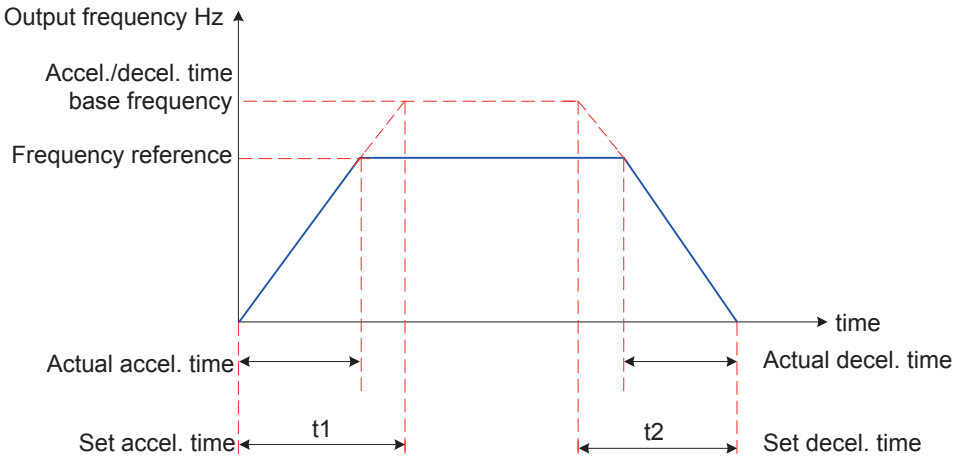


Figure 6-36 Acceleration/Deceleration time

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.

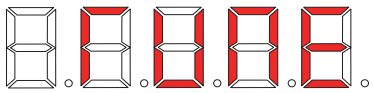
parameter	define	default	range	illustrate
P1-37	asyn- Motor auto- tuning method selection	0	0： No auto-tuning	does not work
			1： Static auto-tuning 1	Only Stator resistance, rotor resistance, leakage inductance
			2： Dynamic auto-tuning	Identify all motor parameters
			3： Static auto-tuning 2	All motor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

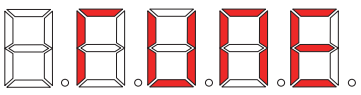
The following describes the method of motor tuning using the parameters of motor 1 (P0-24 set to 0, motor parameter group 1) as an example. If you want to tune the motor 2, first set P0-24 to 1 (motor parameter group 2), the tuning method of motor 2 is similar to that of motor 1, and the relevant parameters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

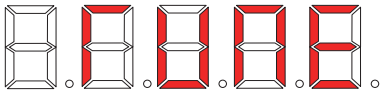
2) Dynamic complete tuning method of asynchronous motor

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

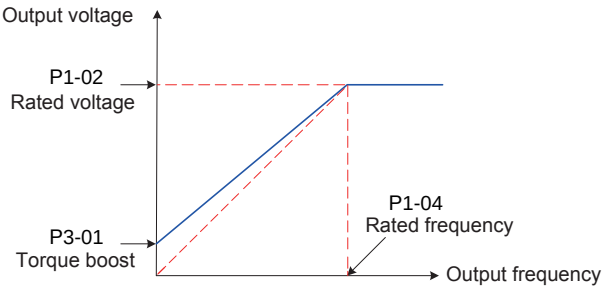


Figure 6-37 General constant-torque linear V/F curve

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

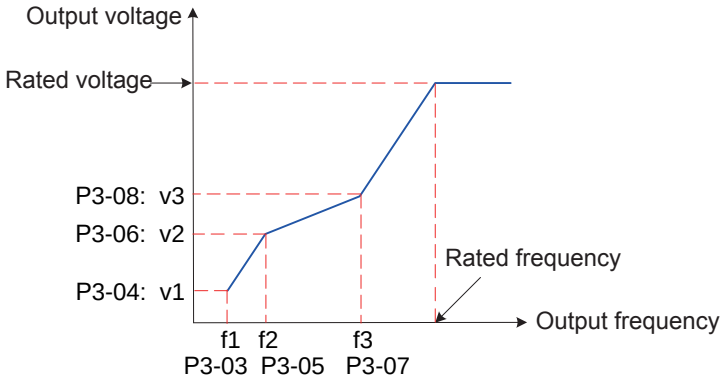


Figure 6-38 User-defined Multi-point V/F curve

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。

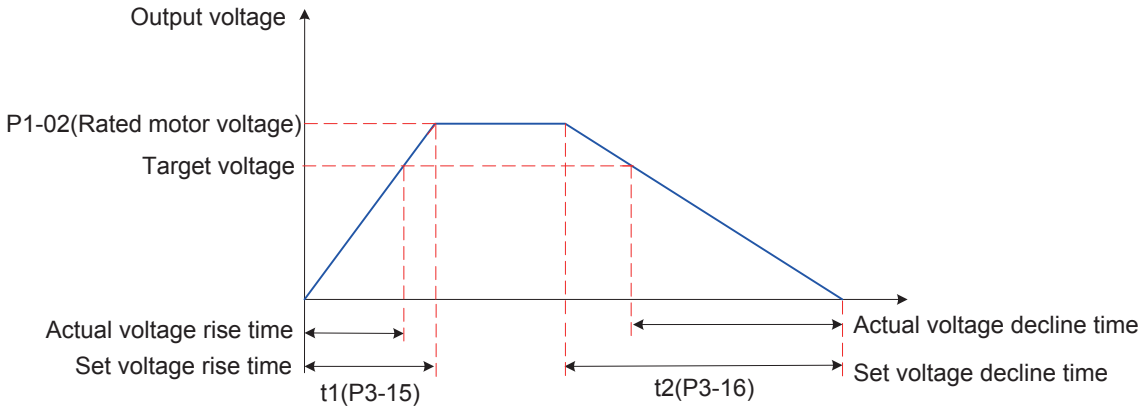


Figure 6-39 V/F separation

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".

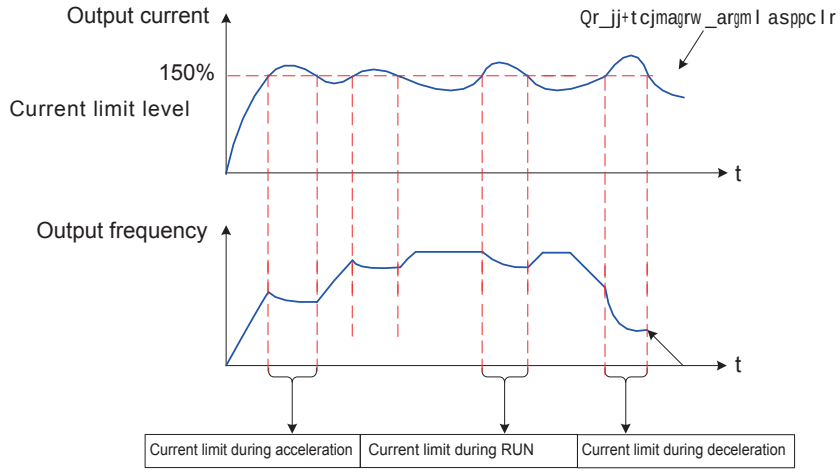


Figure 6-40 Current limit

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)

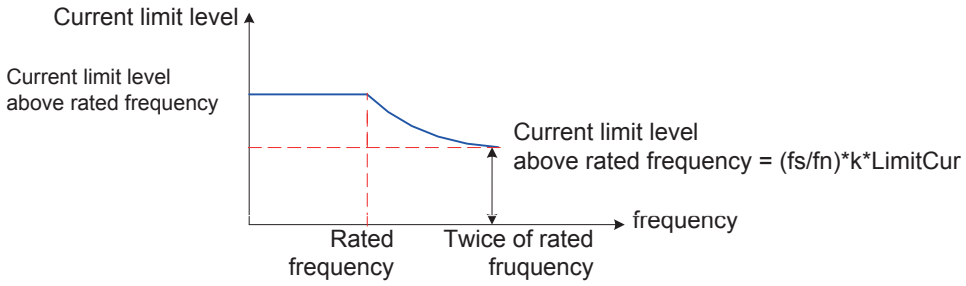


Figure 6-41 Current limit above rated frequency

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.

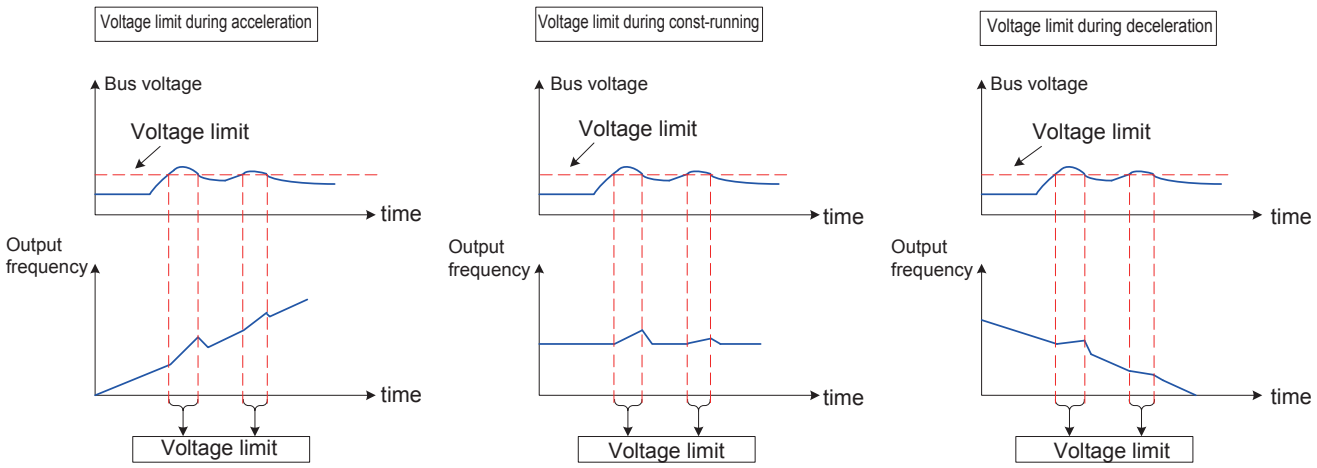


Figure 6-42 Voltage limit

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.

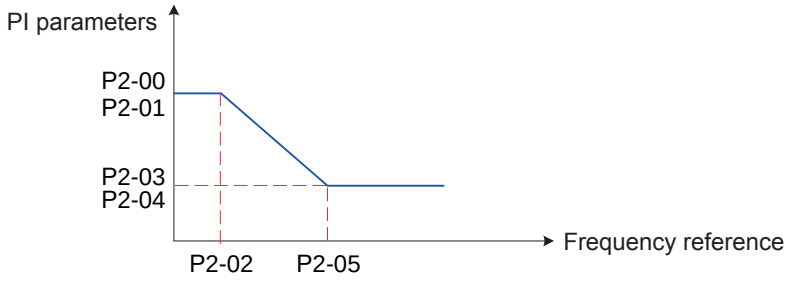


Figure 6-43 Speed loop PI parameters

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.

- 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) 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:

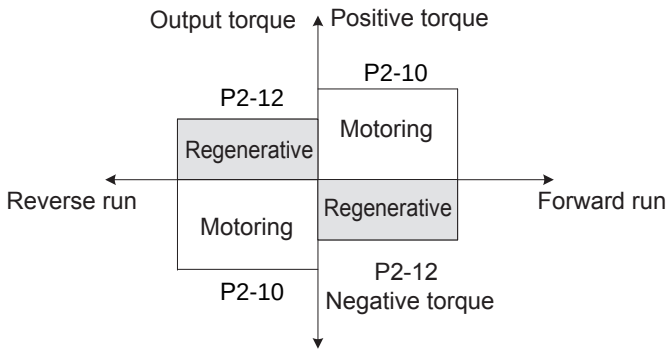


Figure 6-44 Torque limit in speed control

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:

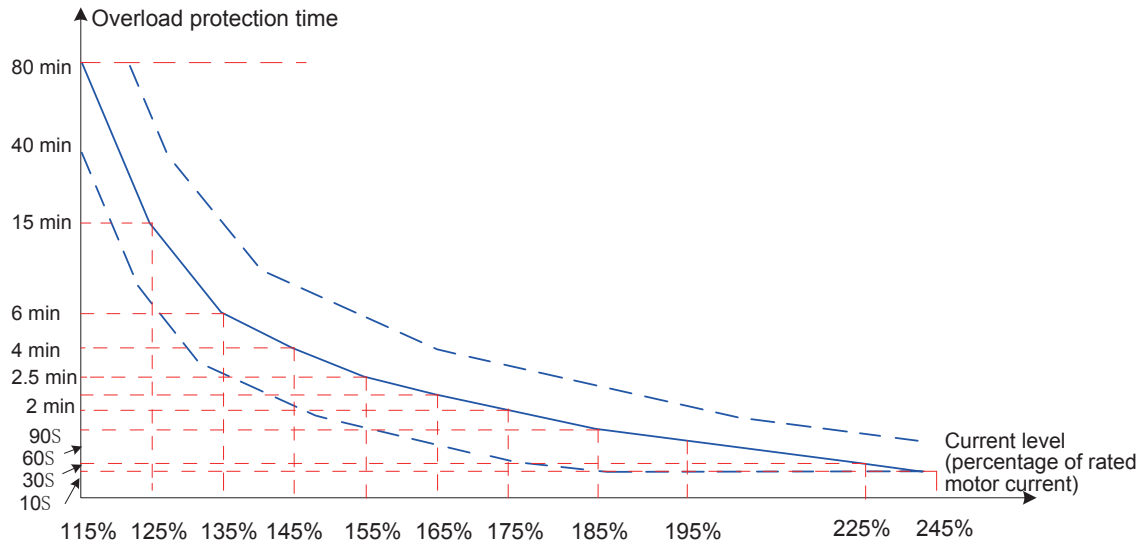


Figure 6-45 Inverse time-lag curve

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

- 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:

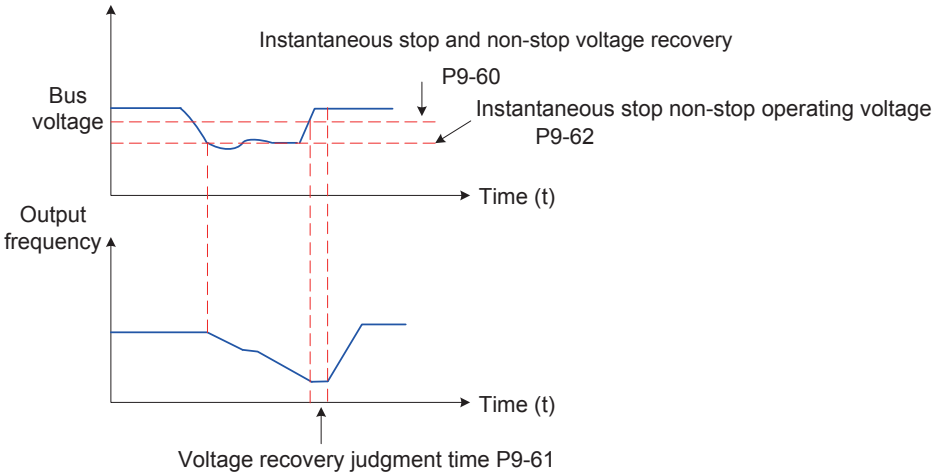


Figure 6-46 Power dip ride-through

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:

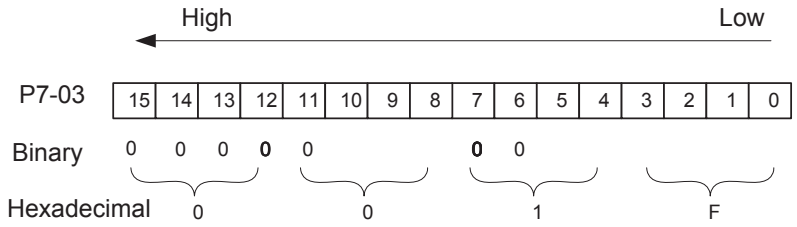
1) In the shutdown or running state, you can use the ▷ keys on the operation panel to switch each byte of the parameters P7-03, P7-04, and P7-05 to display multiple status parameters.

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:

parameter	define	default	range	illustrate
P7-03	LED display running parameters 1	1F	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 P7-03. low-8bit 7 6 5 4 3 2 1 0 Run frequency 1 (Hz) Set frequency (Hz) Bus voltage (V) Output voltage (V) Output current (A) Output power (kW) Output torque (%) DI state (V) high-8bit 15 14 13 12 11 10 9 8 DO state AI1 voltage (V) AI2 voltage (V) Pot voltage (V) Count value Length value Load speed display PID reference Note: The shaded part is the default factory display.
P7-04	LED display running parameters 2	00	0000~FFFF	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. low-8bit 7 6 5 4 3 2 1 0 PID feedback PLC stage Keep Run frequency 2 Remaining running time AI1 voltage before correction AI2 voltage before correction Pot voltage before correction high-8bit 15 14 13 12 11 10 9 8 Motor speed Current power-on time (H) Current running time (Min) Keep Communication reference Keep Main frequency display (Hz) Auxiliary frequency display (Hz)

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. low-8bit: 7 6 5 4 3 2 1 0 Set frequency (Hz) Bus voltage (V) DI state DO state AI1 voltage (V) AI2 voltage (V) Pot voltage (V) Count value high-8bit: 15 14 13 12 11 10 9 8 Length value PLC stage Load speed PID reference Keep Reserved Reserved Reserved 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

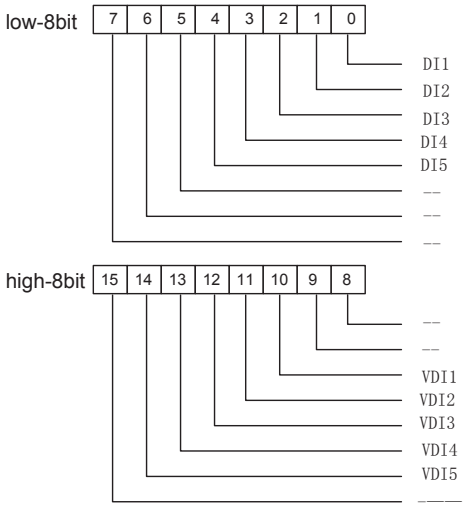
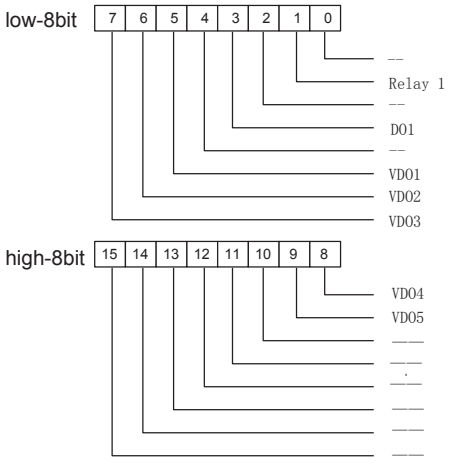
Binary to Hexadecimal Conversion Method:

· 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)

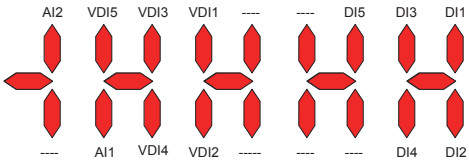
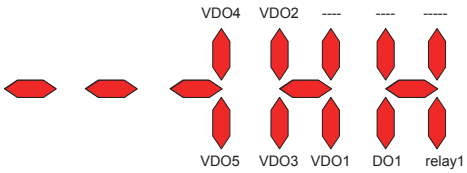
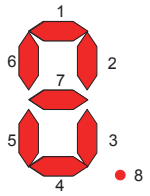
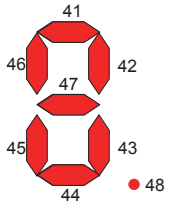
For example, 011 1101 1111 1001 can be divided into 0011 1101 1111 1001 and the hexadecimal number is obtained by looking up the following table 3DF9。

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

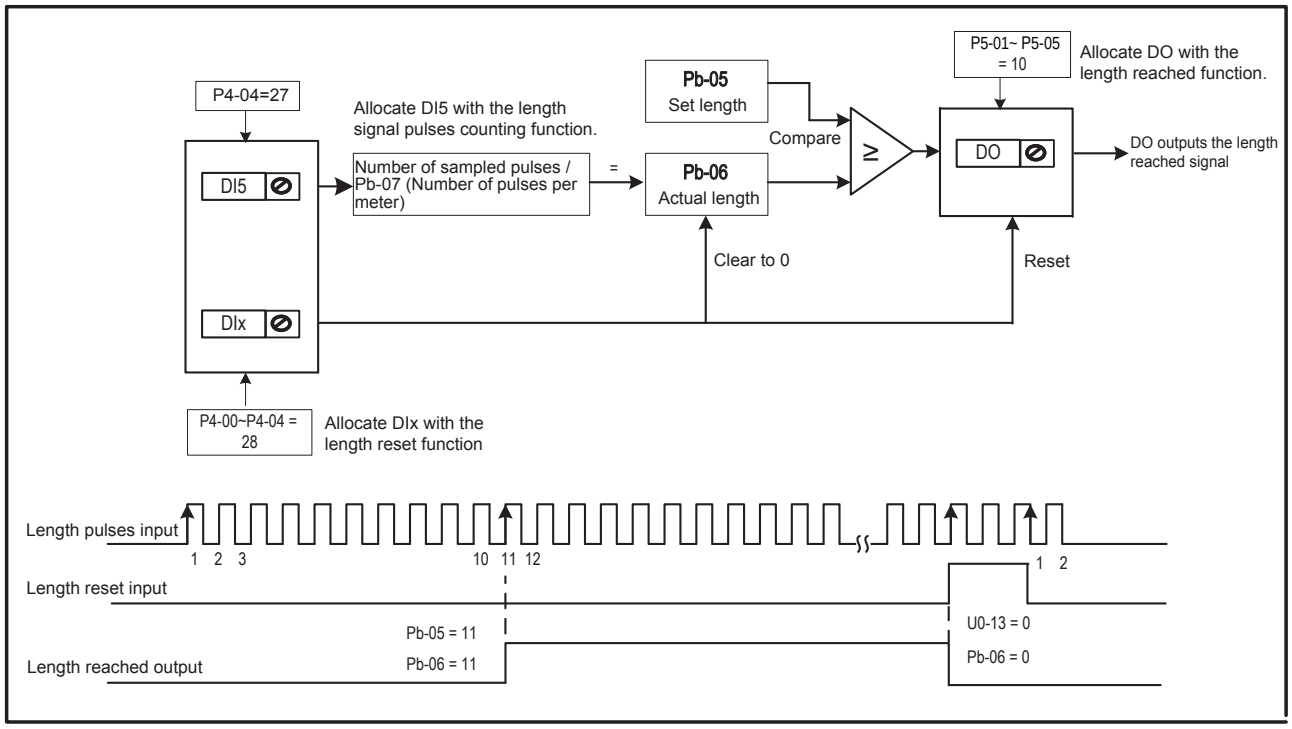


Figure 6-47 Fixed length control

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

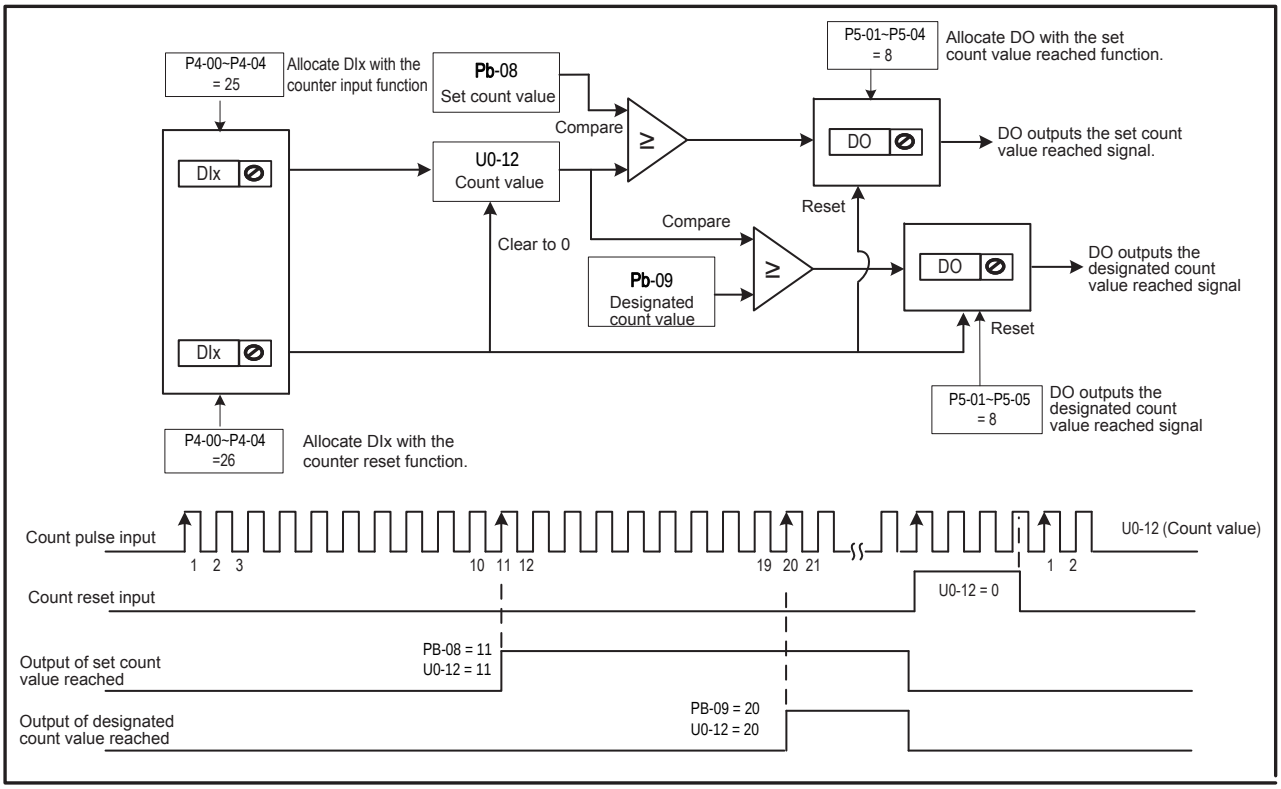


Figure 6-51 Counting function

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.)

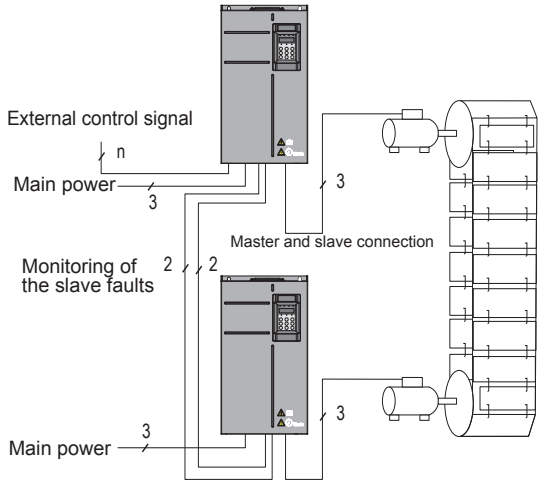
· When the motor shaft of the master and slave are flexibly connected, the slave should adopt the speed control mode, because small speed differences are allowed between the transmission units. When both the master and slave are speed controlled, the sag rate is generally used. (See Figure 6-52.)

❑ Rigid connection of the master and slave

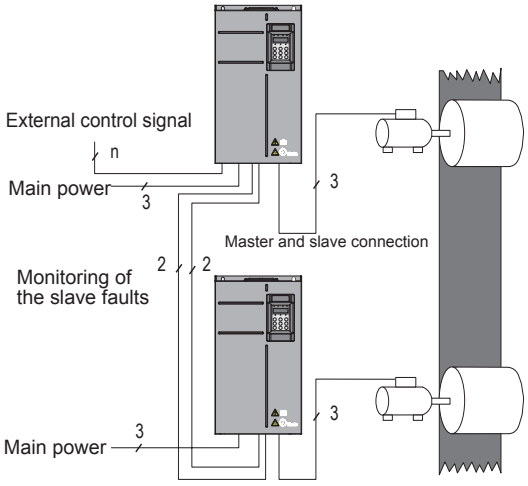
- The master is in speed control.
- The slave follows the torque reference of the master..

❑ 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

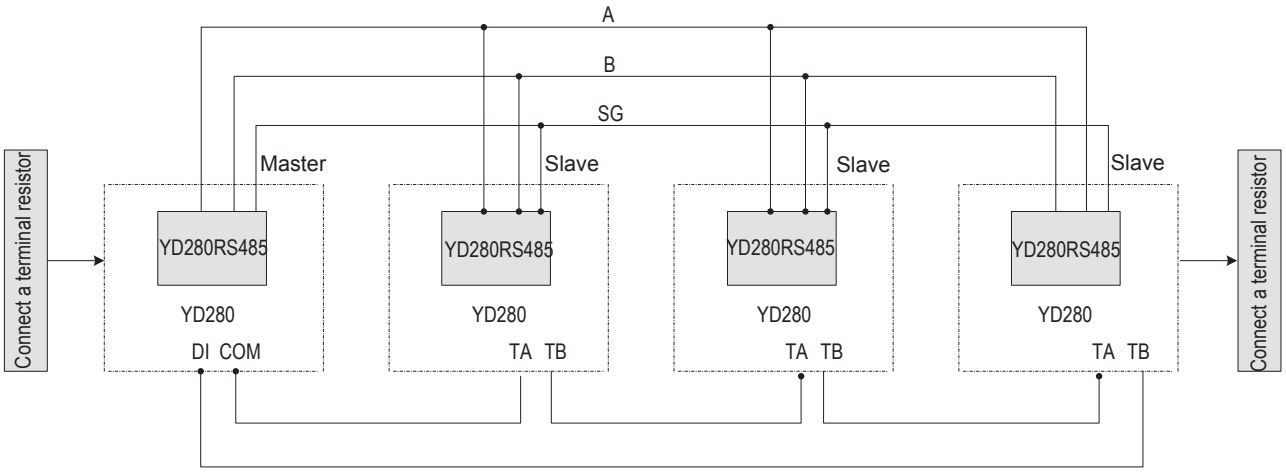


Figure 6-53 Connection of the master and slaves

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

- 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.

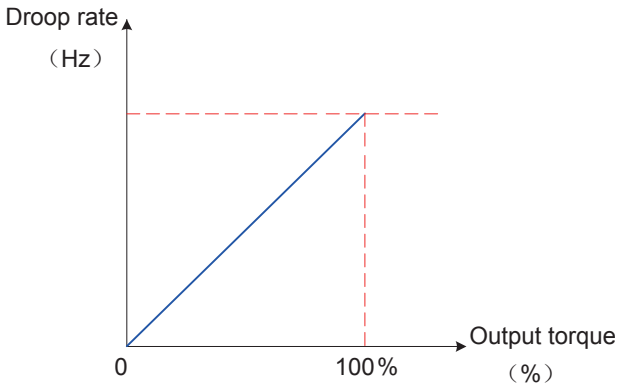


Figure 6-54 Relationship between droop rate and output torque

- 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.

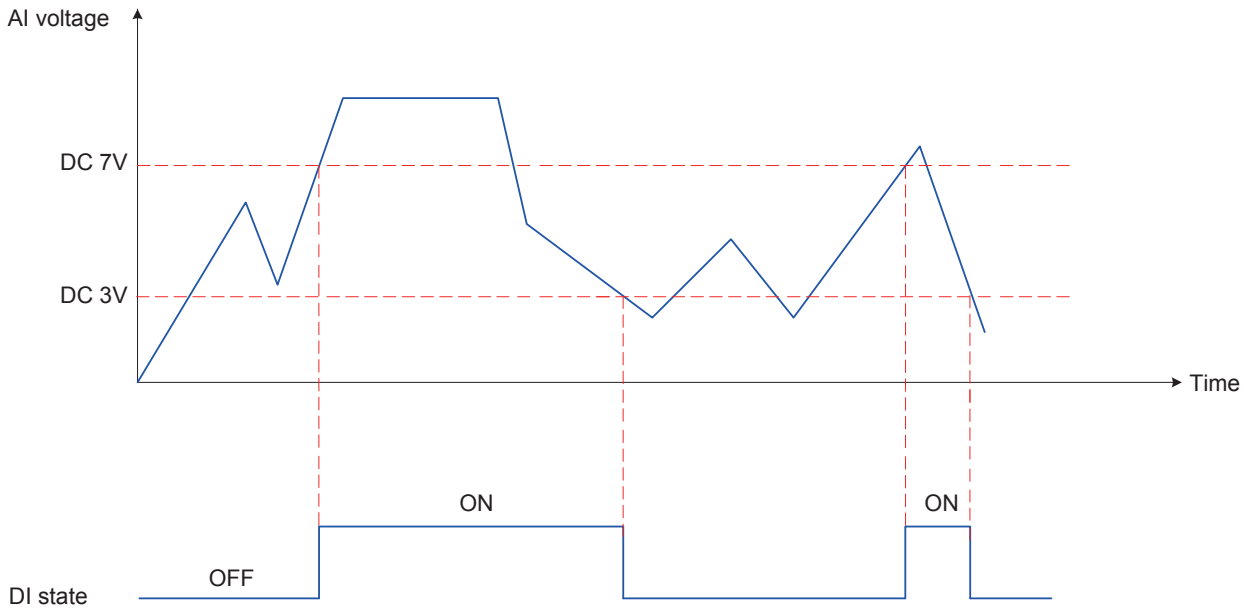


Figure 6-55 Relationship between AI input voltage and DI state

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:

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

The formula for calculating the bias coefficient is:

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

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.

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

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

● 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	

- 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.

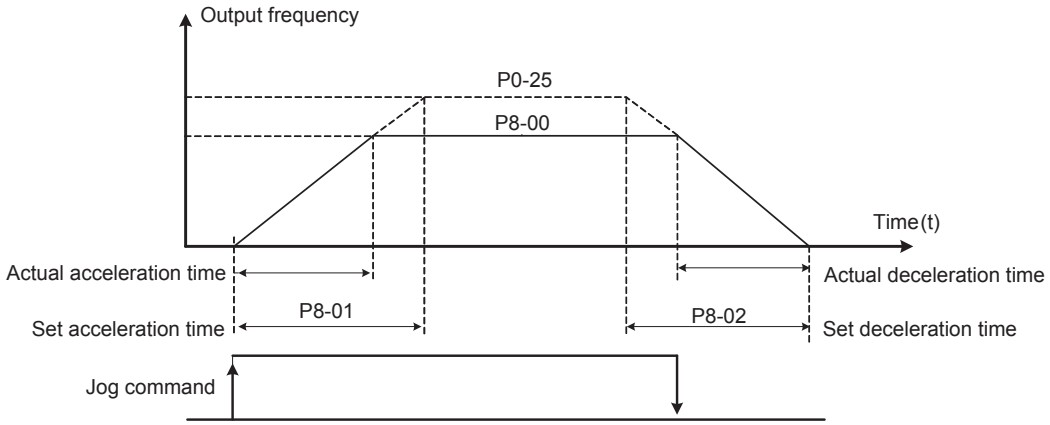


Figure 6-56 Schematic diagram of jog operation

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.

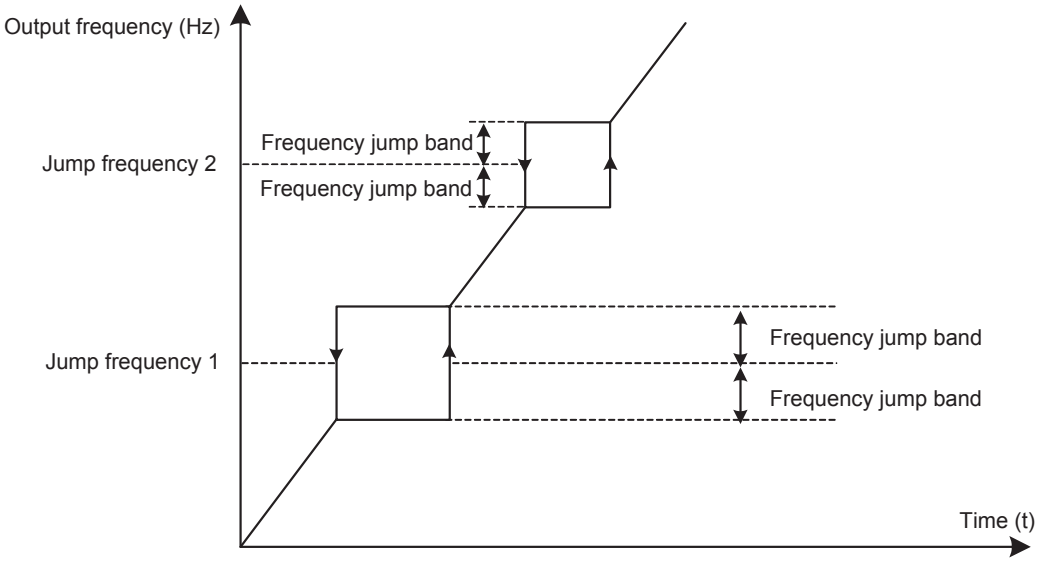


Figure 6-57 Jump frequency

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.

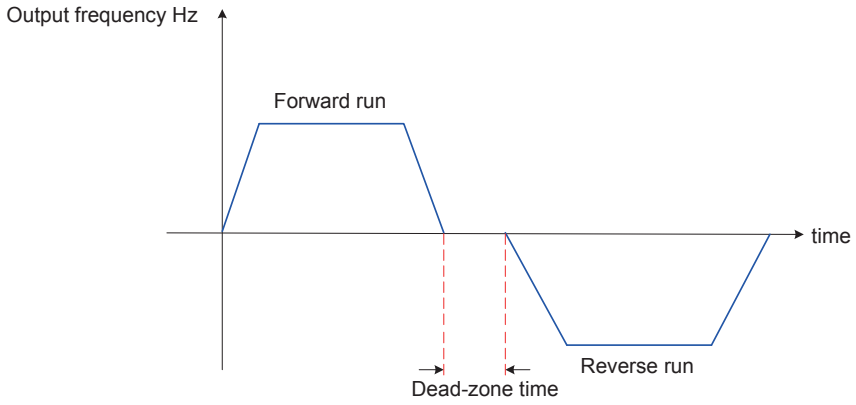


Figure 6-58 Forward/Reverse run switchover dead-zone time

3) Reverse Run Prohibited

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

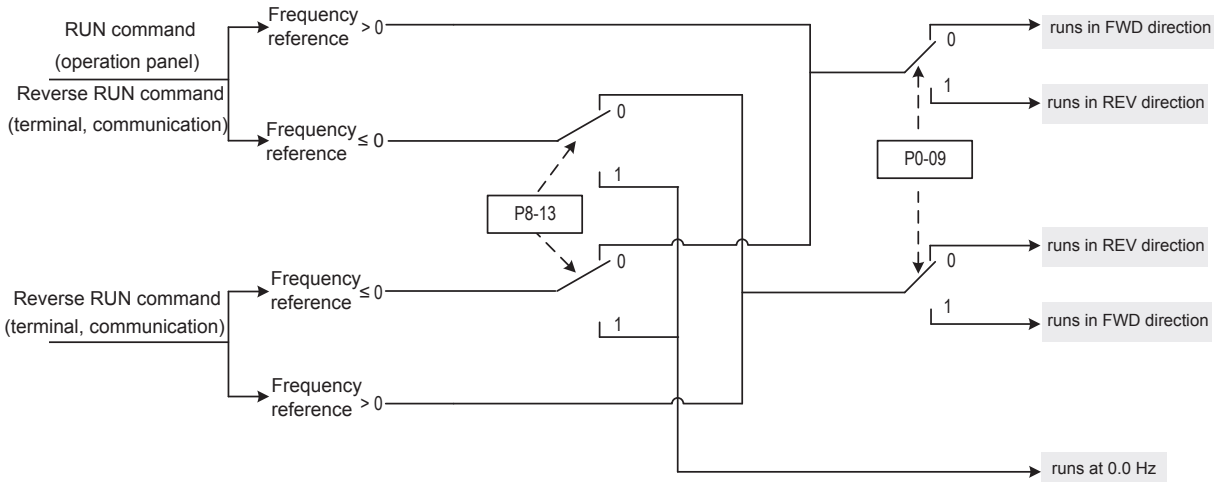


Figure 6-59 Control of reverse run

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.

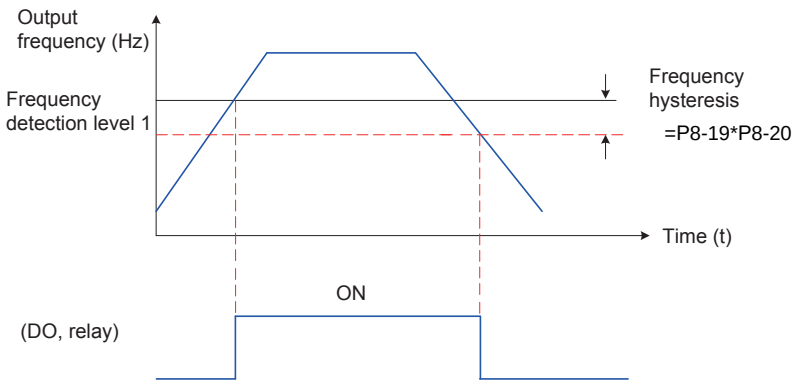


Figure 6-60 Frequency detection

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.

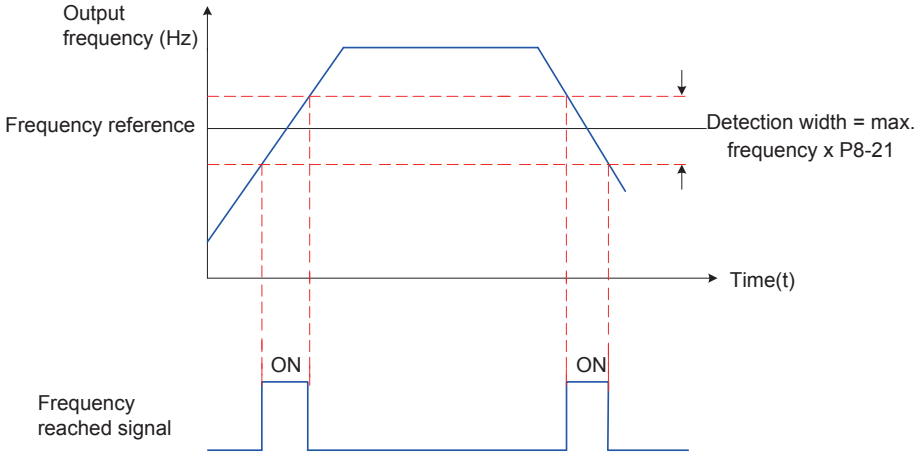


Figure 6-61 Frequency reached detection width

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	-

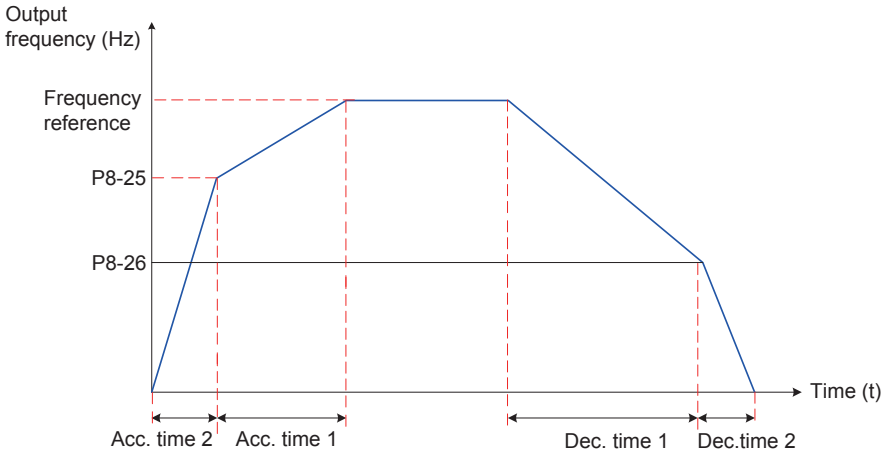


Figure 6-62 Acceleration and deceleration time switching

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)	-

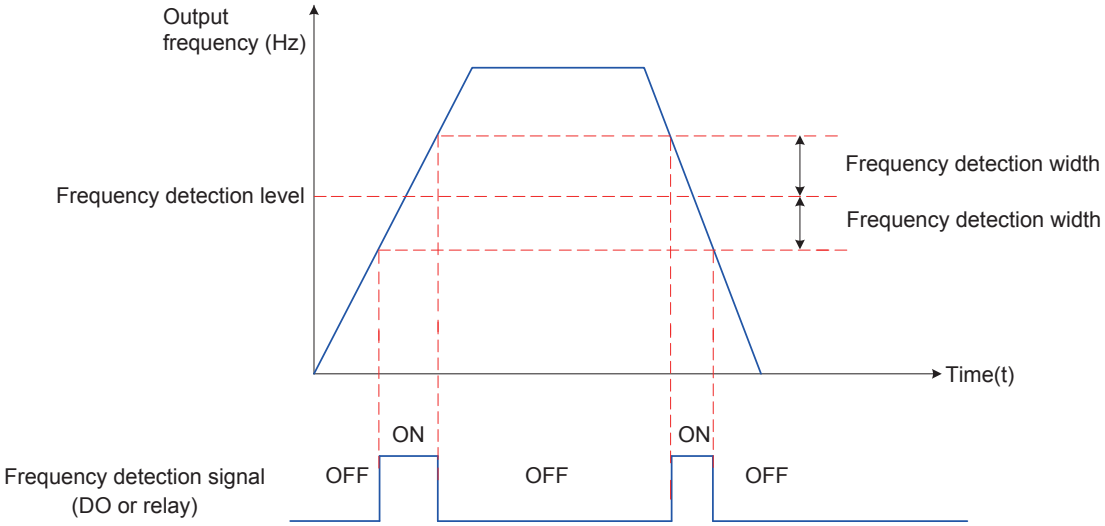


Figure 6-63 Arbitrary arrival frequency detection

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	

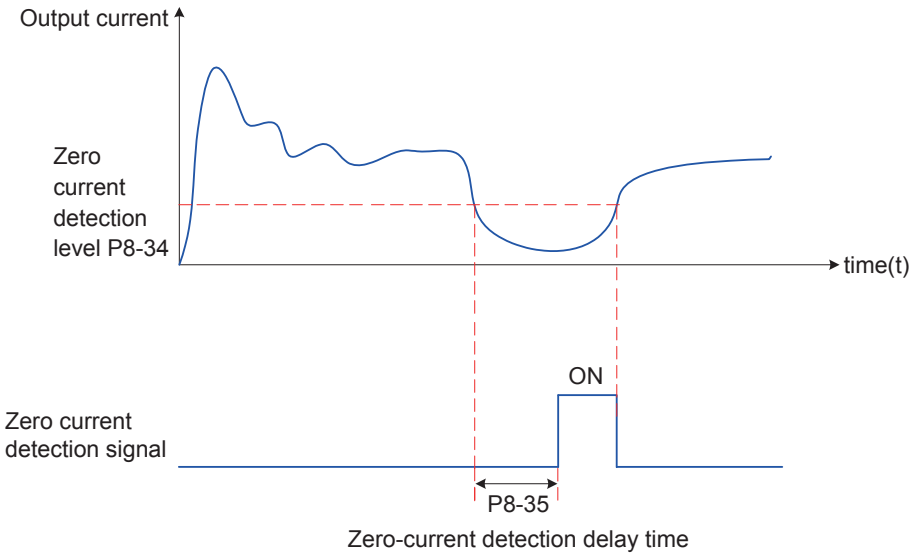


Figure 6-64 Zero current detection

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	-

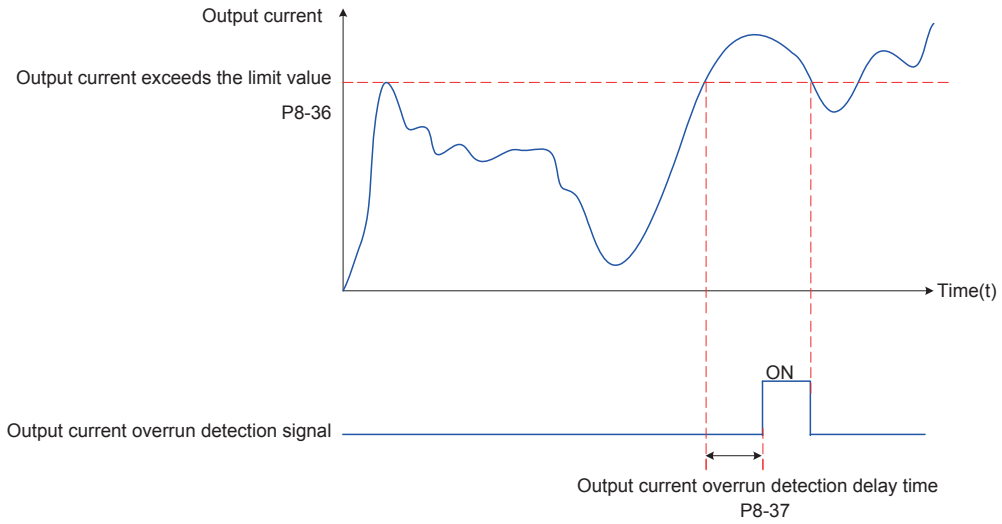


Figure 6-65 Detection of output current overrun

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.

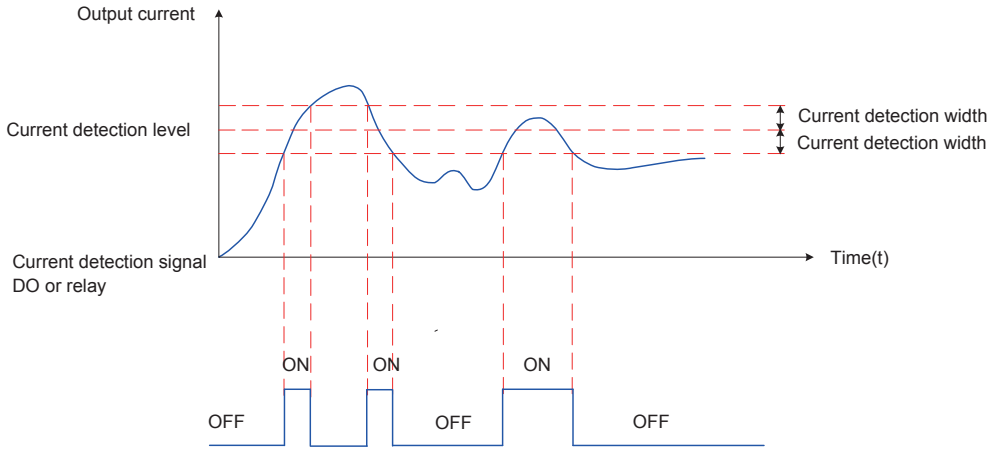


Figure 6-66 Current detection

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	

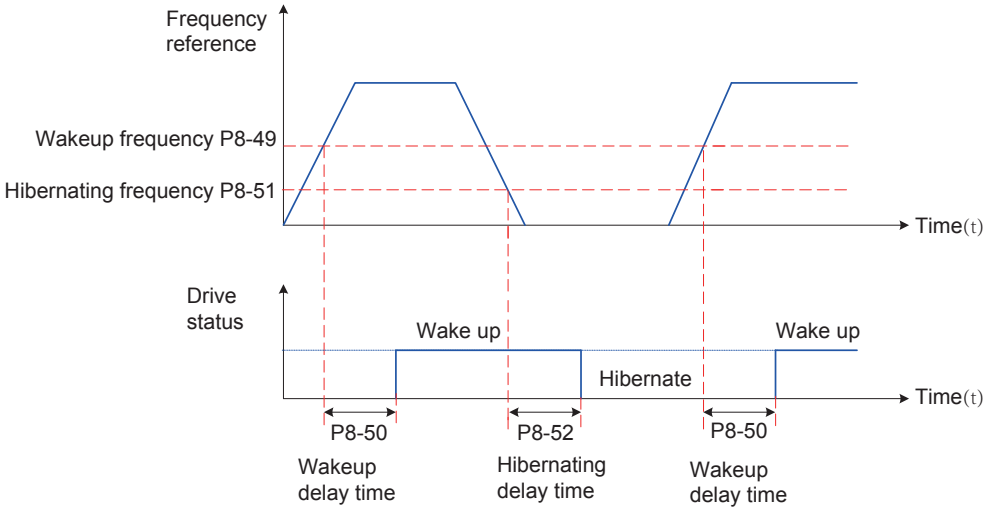


Figure 6-67 Sleep and wake-up settings

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		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		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		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		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		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		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		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		The hall is abnormal.	● Replace the hall .
		The drive board is abnormal	● Replace the drive board.
Motor auto-tuning fault		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		EEPROM chip is damaged	● Replace the main control board
Short circuit to ground		Motor is short circuited to the ground	● Replace cable or motor
Accumulative running time reached		Accumulative running time reaches the setting value	● Clear the record through parameter initialization
User-defined fault 1		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		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		Accumulative power-on time reaches the setting value	● Clear the record through parameter initialization
Load loss		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		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		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. 	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. 	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. 	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.

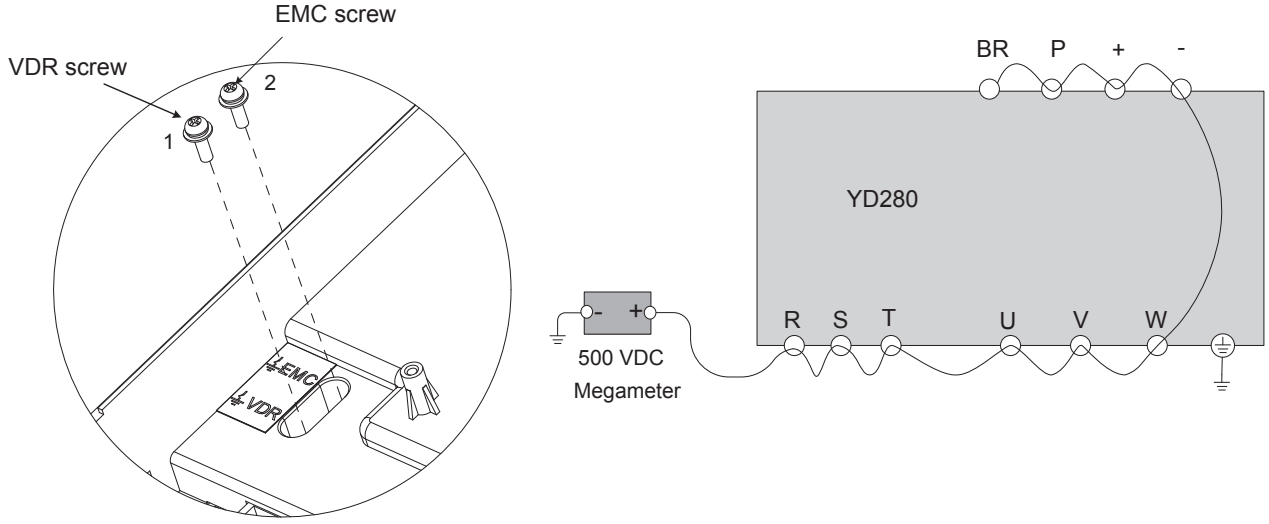
Inspection Item	Inspection Points	Solutions	Checked
General	Inspect for wastes, dirt and dust on the surface of the AC drive.	Use a vacuum cleaner to suck up wastes and dust to prevent direct touching. Wipe surface dirt gently with a soft cloth immersed in neutral detergent.	
Cables	Inspect power cables 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

◆ YD280 series size

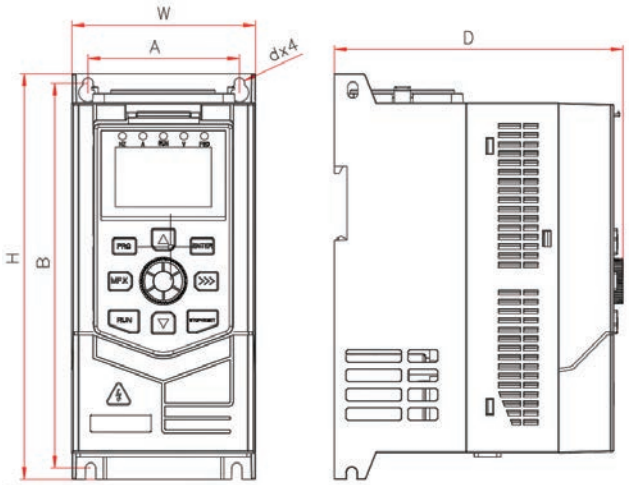


Figure 9-1 Schematic diagram of YD280T2S-0P4GB ~ YD280T2S-2P2GB /YD280T4-0P7G/1P5PB~YD280T4-3P7G/5P5PB exterior and installation dimensions

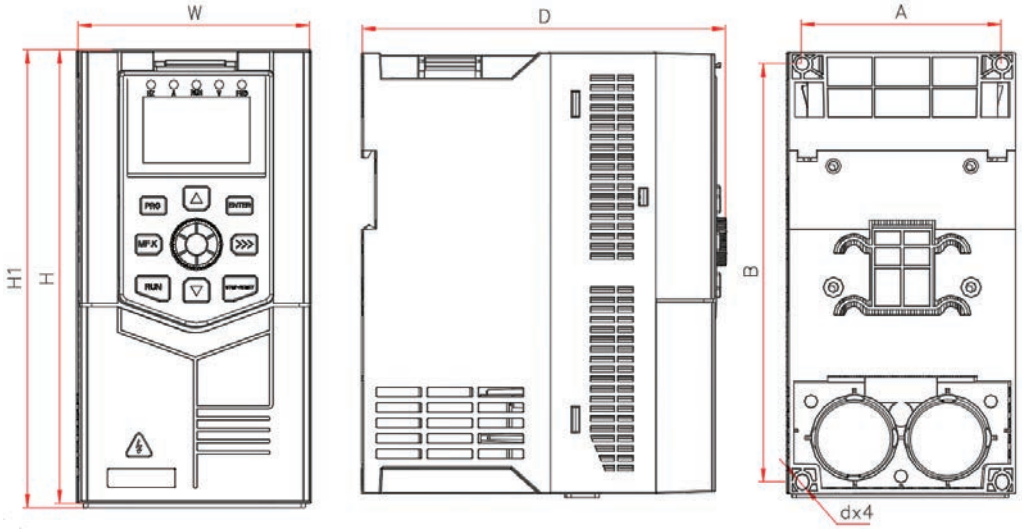


Figure 9-2 Schematic diagram of YD280T4-5P5G/7P5PB~YD280T4-7P5GB exterior and installation dimensions

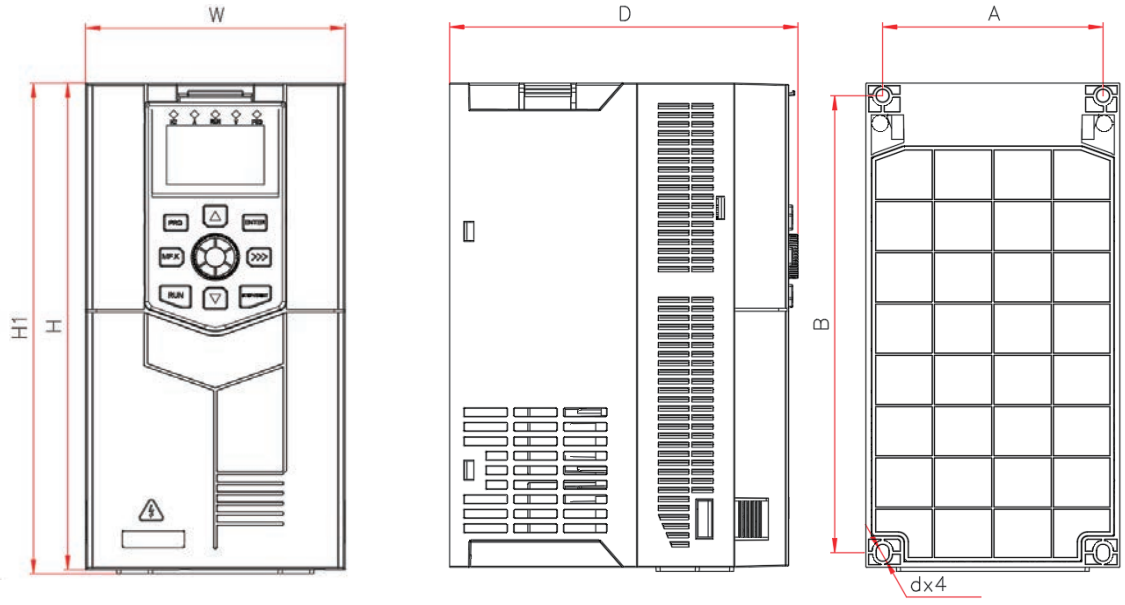


Figure 9-3 Schematic diagram of YD280T4-11G/15PB~YD280T4-15G/18P5PB Exterior and installation dimensions

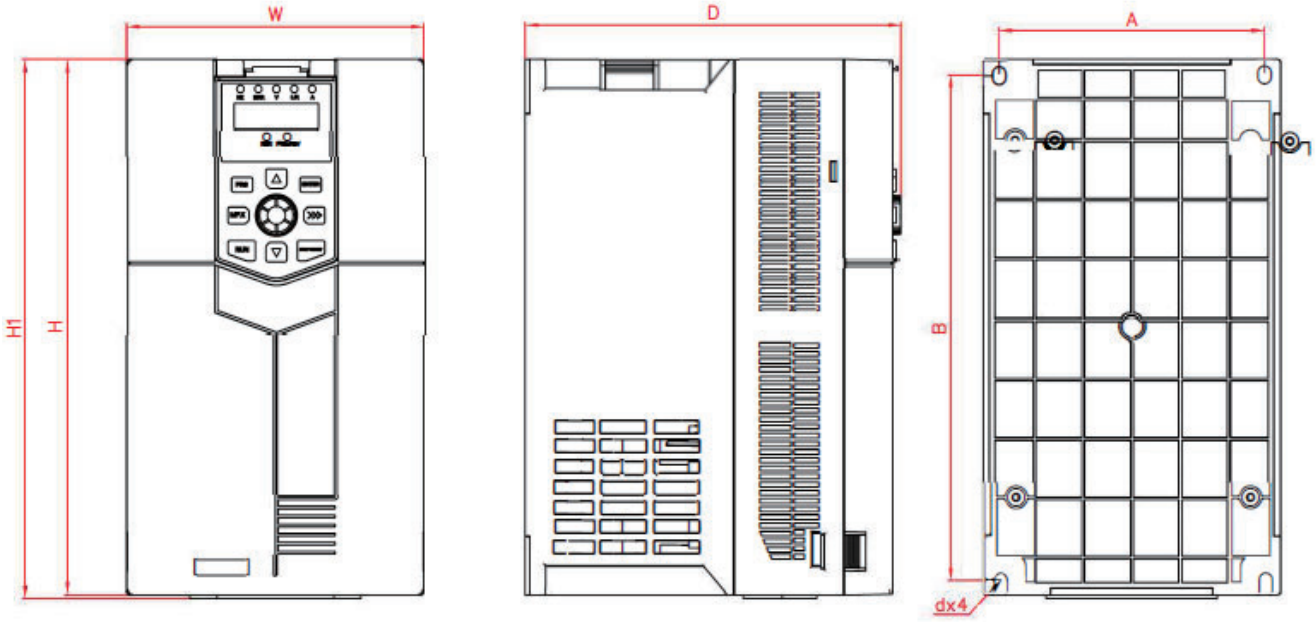


Figure 9-4 Schematic diagram of YD280T4-18P5G/22PB~YD280T4-22GB Exterior and installation dimensions

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	74	187	197.5	-	90	141	Ø5	1.6
	YD280T4-1P5G/2P2PB								
	YD280T4-2P2G/3P0PB								
	YD280T4-3P0G/3P7PB								
	YD280T4-3P7G/5P5PB								
F2	YD280T4-5P5G/7P5PB	90	190	200	202	102	163.5	Ø6	1.8
	YD280T4-7P5GB								
F3	YD280T4-11G/15PB	108.5	227	240.5	242.5	125	173	Ø6.5	2.0
	YD280T4-15G/18P5PB								
F4	YD280T4-18P5G/22PB	147	278.5	295	297	165	208.3	Ø7.2	2.4
	YD280T4-22GB								

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	74	187	197.5	-	90	141	Ø5	1.6
	YD280T2S-0P7GB								
	YD280T2S-1P5GB								
	YD280T2S-2P2GB								

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)		Note	Min brake resistance Ω
		Resistance	num		
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)		Note	Min brake resistance Ω
			Resistance	num		
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.

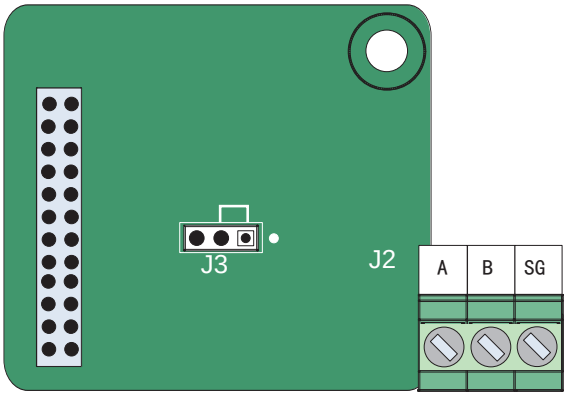


Figure 11-9 YD280 RS485 terminal distribution

Table 11-16 YD28RS485 Functions of expansion card terminals

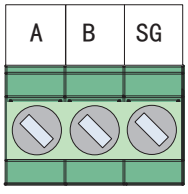
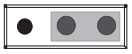
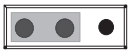
Type		Terminal Name	Function Description	Terminal
J2	A	RS485 positive input	RS485 communication terminal with isolation input	
	B	RS485 negative input	RS485 communication terminal with isolation input	
	SG	RS485 Power ground	Isolated power	

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	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%	000	☆	-
		Units position: AI1			
		Tens position: AI2			
		Hundreds position: Panel Pot			
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	P0.03	☆	-
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.

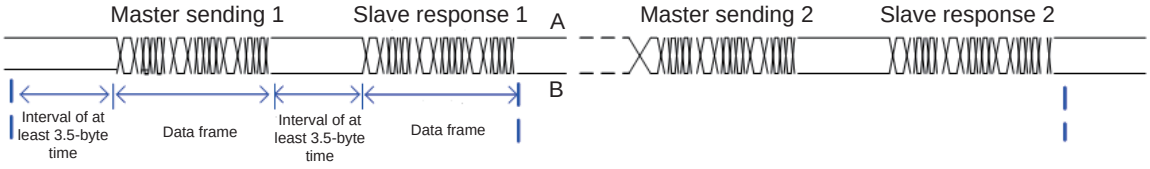
2. Topological structure

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.

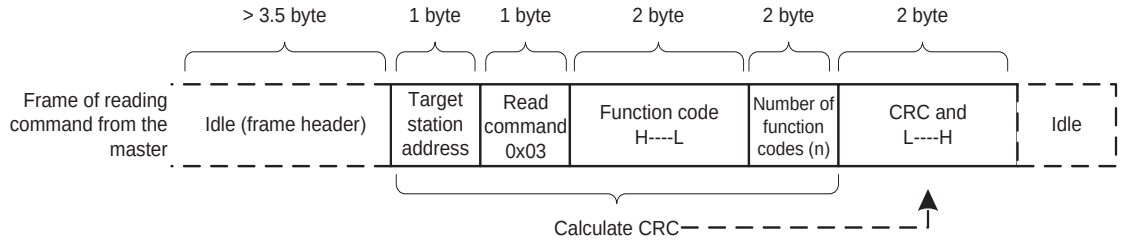


The communication protocol used by the drive is the Modbus-RTU slave communication protocol, which allows the drive to provide data to respond to "query/command" from the master or execute the action according to "query/command" from the master.

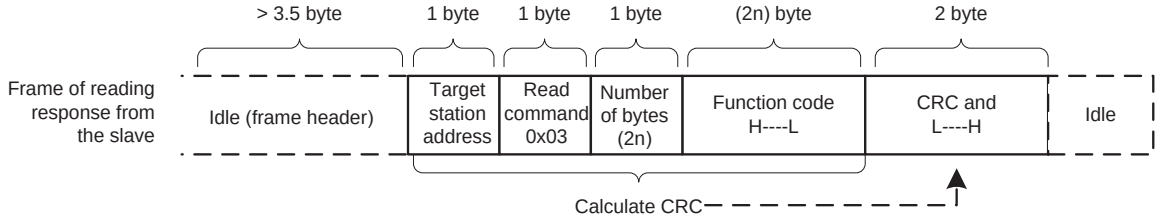
The master can be a PC, an industrial device, or a PLC. The master can communicate with a single slave or send broadcast messages to all slaves. When the master communicates with a single slave, the slave needs to return a message (response) to "query/command" from the master. For a broadcast message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

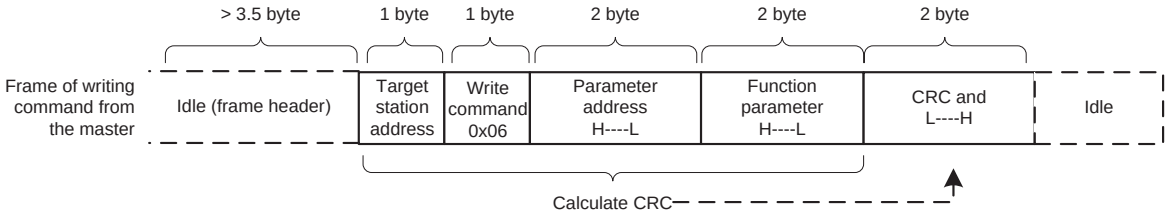
C.3 Data Format

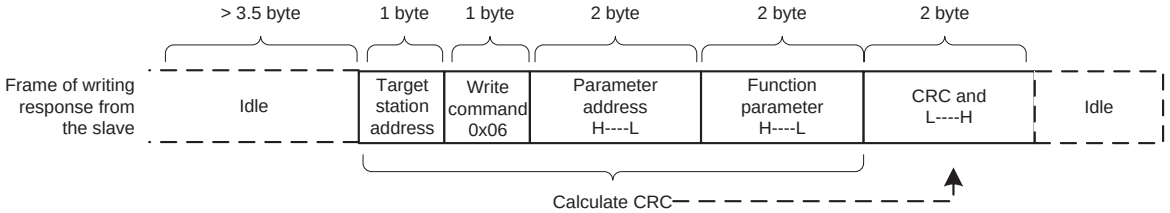
The Modbus-RTU protocol communication data format of the drive is as follows. The drive supports reading and writing of word-type parameters only. Reading command is 0x03 and writing command is 0x06. It does not support reading and writing of bytes or bits.



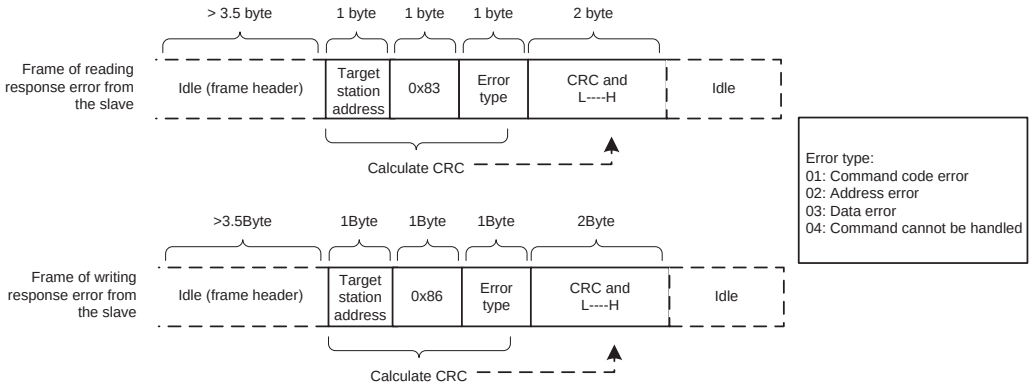
In theory, the host controller can read several consecutive parameters (n can reach up to 12) but the last parameter it reads must not jump to the next parameter group. Otherwise, an error occurs on response.







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	5: 9600 bps
		1: 600 bps	6: 19200 bps
		2: 1200bps	7: 38400 bps
		3: 2400 bps	8: 57600 bps
		4: 4800 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.

WUXI YOLICO ELECTRIC CO.,LTD

Add: NoNo.9, Lianhe Road, North District, Hudai Industrial Park, Binhu District,
Wuxi City, Jiangsu Province
PHONE: +086(0510)8516 1131
http://www.yolico.com