Foreword

Thank you for choosing the products of Shenzhen V&T Technologies Co., Ltd.

FV20 - M series inverter is miniaturized vector inverter.The product adopts the current international leading control technology - no speed sensor vector control technology, with excellent control performance, high reliability and high overload;Complete function, compact size, easy installation, practical in different occasions of ac asynchronous motor and synchronous motor speed regulation, especially suitable for high efficiency requirements, installation space is limited, small power occasion, such as: small line, textile, printing and dyeing machinery, packaging machinery, woodworking machinery, etc

This manual introduces the performance, function, installation, debugging and maintenance of FV20 - M series small vector inverters.

Shenzhen V&T Technologies Co., Ltd.

Safety Precautions

Description of safety marks:

 Danger: The misuse may cause fire, severe injury, even death.

 Note: The misuse may cause medium or minor injury and equipment damage.

■ Use

 **Danger**
● This series of inverter is used to control the variable speed operation of three−phase motor and cannot be used for single−phase motor or other applications. Otherwise, inverter failure or fire may happen. ● This series of inverter cannot be simply used in the applications directly related to the human safety, such as the medical equipment. ● This series of inverter is produced under strict quality management system. If the inverter failure may cause severe accident or loss, safety measures, such as redundancy or bypass, shall be taken.

■ Goods Arrival Inspection

 **Note**
● If the inverter is found damaged or have missing parts, the inverter cannot be installed. Otherwise, accident may be caused.

■ Installatoion

 **Note**
● When handling and installing the product, please hold the product bottom. Do not hold the enclosure only. Otherwise, your feet may be injured and the inverter may be damaged because of dropping. ● The inverter shall be mounted on the fire retardant surface, such as metal, and kept far away from the inflammables and heat source. ● Keep the drilling scraps from falling into the inside of the inverter during the installation; otherwise, inverter failure may be caused.

- When the inverter is installed inside the cabinet, the electricity control cabinet shall be equipped with fan and ventilation port. And ducts for heat dissipation shall be constructed in the cabinet.

■ Wiring

Danger

- The wiring must be conducted by qualified electricians. Otherwise, electric shock may happen or inverter damage.
- Before wiring, confirm that the power supply is disconnected. Otherwise, electric shock may happen or fire.
- The PE terminal must be reliably grounded; otherwise, the inverter enclosure may become live.
- Please do not touch the main circuit terminals. The wires of the main circuit terminals must not contact the inverter enclosure. Otherwise, electric shock may happen.
- The connecting terminals for the braking resistor are ⊕2/B1 and B2. Please do not connect terminals other than these two. Otherwise, fire may be caused.
- The leakage current of the inverter system is more than 3.5mA, and the specific value of the leakage current is determined by the operation application conditions.Inverter and the motor must be grounded to ensure the safety.

■ Wiring

Note

- The three-phase power supply cannot connect to output terminals U/T1, V/T2 and W/T3; otherwise, the inverter will be damaged.
- It is forbidden to connect the inverter output terminals to the capacitor or LC/RC noise filter with phase lead, otherwise, the internal components of the inverter may be damaged.
- Please confirm that the power supply phases and rated voltage are consistent with those indicated by the nameplate, otherwise, the inverter may be damaged.
- Do not perform dielectric strength test on the inverter, otherwise, the inverter may be damaged.
- The wires of the main circuit terminals and the wires of the control circuit terminals shall be laid separately or in a square-crossing mode, otherwise, the control signal may be interfered.
- The wires of the main circuit terminals shall adopt lugs with insulating sleeves.
- The inverter input and output cables with proper sectional area shall be selected according to the inverter power.
- When the cables between the inverter and the motor are longer than 100m, it is suggested to use output reactor to avoid the inverter failure caused by the overcurrent of the distribution capacitor.
- The inverter which equipped with DC reactor must connect with DC reactor between the terminal of ⊕1、⊕2, otherwise the inverter will not display after power on.

■ Operation

Danger

- Power supply can only be connected after the wiring is completed and the cover is installed. It is forbidden to remove the cover in live condition; otherwise, electric shock may happen.
- When auto failure reset function or restart function is enabling, isolation measures shall be taken for the mechanical equipment, otherwise, personal injury may be caused.
- When the inverter is powered on, its terminals are still live even when it is in the stop state. Do not touch the inverter terminals; otherwise electric shock may happen.
- The failure and alarm signal can only be reset after the running command has been cut

off. Otherwise, personal injury may be caused.

Note

- Do not start or shut down the inverter by switching on or off the power supply, otherwise, the inverter may be damaged.
- Before operation, please confirm if the motor and equipment are in the allowable use range, otherwise, the equipment may be damaged.
- The heatsink and the braking resistor have high temperature. Please do not touch such device; otherwise, you may be burnt.
- When it is used on lifting equipment, mechanical contracting brake shall also be equipped.
- Please do not change the inverter parameter randomly. Most of the factory set parameters of the inverter can meet the operating requirement, and the user only needs to set some necessary parameters. Any random change of the parameter may cause the damage of the mechanical equipment.
- In the applications with industrial frequency and variable frequency switching, the two contactors for controlling the industrial frequency and variable frequency switching shall be interlocked.

■ Maintenance, Inspection

Danger

- In the power−on state, please do not touch the inverter terminals; otherwise, electric shock may happen.
- If cover is to be removed, the power supply must be disconnected first.
- Wait for at least 10 minutes after power off or confirm that the CHARGE LED is off before maintenance and inspection to prevent the human injury caused by the residual voltage of the electrolytic capacitor in main circuit.
- The components shall be maintained, inspected or replaced by qualified electricians.

Note

- The circuit boards have large scale CMOS IC. Please do not touch the board to avoid the circuit board damage caused by electro static.

■ Others

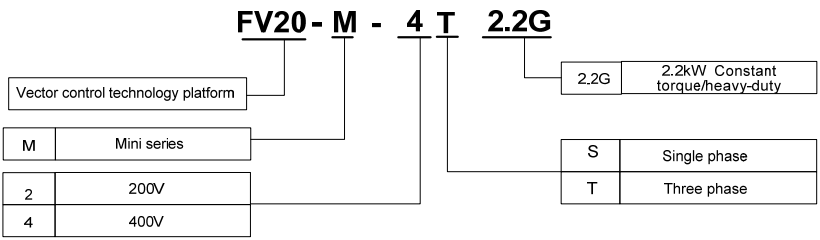
Danger
● It is forbidden to modify the inverter unauthorizedly; otherwise, human injury may be caused.

Contents

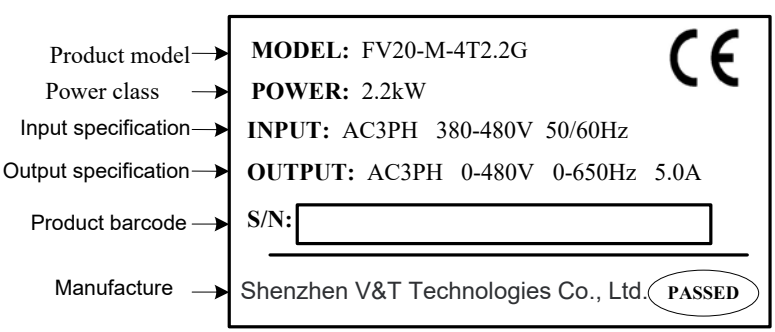
Chapter 1 Introduction to FV20-M Series Inverter

1.1 Product Model Description

The digits and letters in the inverter model field on the nameplate indicate such information as the inverter series, power supply class, power class, software versions and hardware versions.



1.2 Product Nameplate Description



1.3 Product Series

■ FV20−M−4T□□□G Three−phase 400V Constant torque/heavy−duty application

Power (kW)		0.75	1.5	2.2
Motor power (kW)		Motor power (kW)	1.5	2.2
Output	Voltage (V)	Three−phase 0 to rated input voltage		
	Rated current (A)	2.5	3.7	5.0
	Overload capacity	150% 1 minute, 180% 10 seconds, 200% 0.5 second, interval: 10 minutes (inverse time lag feature)		
Input	Rated voltage/frequency	Three−phase 380V/480V; 50Hz/60Hz		
	Allowable voltage range	323V～456V；Voltage imbalance ≤3%; allowable frequency fluctuation: ±5%		
Braking unit		Built−in as standard		
Protection class		IP20		
Cooling mode		Forced air convection cooling		

■ FV20−M−2S□□□G Single−phase 200V Constant torque/heavy−duty application

Power (kW)		0.75	1.5
Motor power (kW)		0.75	1.5
Output	Voltage (V)	Three−phase 0 to rated input voltage	
	Rated current (A)	4	7.5
	Overload capacity	150% 1 minute, 180% 10 seconds, 200% 0.5 second, interval: 10 minutes (inverse time lag feature)	
Input	Rated voltage/frequency	Single−phase 200V～240V；50Hz/60Hz	
	Allowable voltage range	180V～260V；Voltage imbalance ≤3%; allowable frequency fluctuation: ±5%	
Braking unit		Built−in as standard	
Protection class		IP20	
Cooling mode		Forced air convection cooling	

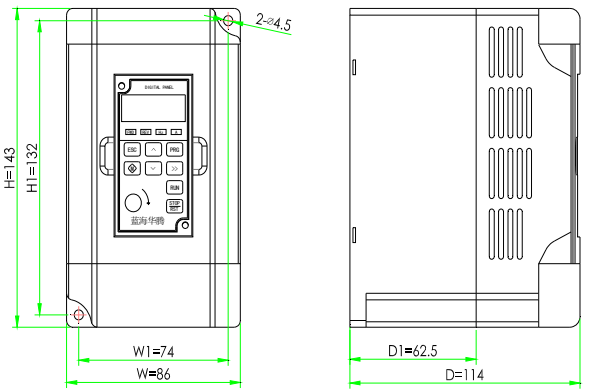
1.4 Technical Specifications of Product

Control features	Control mode	VF control	Vector VF control	Noninductive vector control 1	Noninductive vector control 2
	Starting torque	1.0Hz 150%	1.0Hz 150%	0.5Hz 150%	0.25Hz 150%
	Speed control range	1:50	1:50	1:100	1:200
	Speed accuracy	± 0.5%	± 0.5%	± 0.3%	± 0.3%
	Torque control	N	N	Y	Y
	Torque control accuracy	—	—	±5%	±5%
	Torque response time	—	—	<20ms	<20ms
Product functions	Key functions	Under-voltage adjustment, switching running command reference(operation panel, terminal and communication), speed tracing, multi− step frequency, Built-in simple PLC multi-segment speed function,auto tuning, S curve acceleration and deceleration, slip compensation, PID adjustment, Swing frequency function,drooping control, current limiting control, manual or auto torque boost. current limiting, multi−functional input and output terminal, Built-in timer/counter each			
	Frequency reference mode	Nine basic given: keyboard potentiometer to set, keyboard set UP/down keys, analog channel AI1 / AI2 setting, high-speed pulse DI setting, the PID function setting, multistage speed setting, Simple PLC to set, terminal set UP/DN, PC communication Settings, and can be mutual combination and switch.			
	Frequency	0.00～650.00Hz			
	Startup frequency	0.00～10.00Hz			
	Acceleration/ deceleration time	Linear acceleration and deceleration and S curve acceleration and deceleration, four acceleration and deceleration time, range:0.1～6000.0s			
	Dynamic braking	Braking start voltage:105.0～140.0%、braking termination voltage:105.0～150.0%			
	DC braking	DC braking initial frequency:0.00～50.00Hz；DC braking current:0.0～150.0%；DC braking time:0.0～60.0s；Without waiting time for start DC braking to realize quick braking			
	Jog control	Jog frequency range: 0.00 ~ 650.00 Hz, Jog acceleration and deceleration time 0.1 ~ 6000.0 S			

Unique functions	Multifunctional M key	The unique multifunctional key can be set as follows: 0: reverse, 1: Jog corotation, 2: Jog reversal, 3: running indication to be switched by given mode
	Parameter protection	Standard operating panel can implement all parameters that disables modification
	RS485 communication ports	RS485 communication ports support Modbus protocol (RTU). with a maximum distance of 500m.
	Independent duct	The full series adopts independent duct design and supports the installation of heatsink outside the cabinet
	Power on and auto−detection	Realizing the power on and auto−detection of internal and peripheral circuits, Such as communication abnormality, motor grounding, power undervoltage, etc
	Torque control	Torque control is supported in vector mode
	Synchro control	Support for permanent magnet synchronous motor with no speed sensor open loop control
Protection function	In the operation of the under-voltage protection, over-current protection with constant speed and acceleration and deceleration, overvoltage protection, over-voltage protection with constant speed, acceleration and deceleration, interference protection, frequency converter to overheating protection, overload protection, underload protection, motor overload protection, current to detect abnormal, short circuit protection on output, grounding protection on output, abnormal lack phase on input and output, abnormal memory, abnormal RS485 communication, inner abnormal upward/downward communication, abnormal PID feedback, abnormal open/closed terminal external equipment, timing protection	
Efficiency	Power class ≥93% at rated power	
Environment	Operating site	The product shall be mounted vertically in the control cabinet with good ventilation. Horizontal or other installation modes are not allowed. The cooling media is the air. The product shall be installed in the environment free from direct sunlight, dust, corrosive gas, combustible gas, oil mist, steam and drip.
	Ambient temperature	−10 ~ +40ºC, derated at 40 ~ 50ºC, the rated output current shall be decreased by 1% for every temperature rise of 1ºC
	Humidity	5 ~ 95%, no condensing
	Altitude	0 ~ 2000m, when derated above 1000m, the rated output current shall be decreased by 1% for every rise of 100m
	Vibration	3.5 m/s^2,2~9Hz; 10 m/s^2,9~200Hz; 15 m/s^2,200~500Hz
	Storage	−40~+70ºC

1.5 Product Outline and Mounting Dimension

Size of single-phase and three-phase mini converter (mm)



1.6 Braking Resistor Lectotype

Inverter model	Braking unit	Braking resistor unit				Braking torque%
		Power	Resistor	Minimum limit resistor	Qty.	
FV20−M−2S0.75G	Built−in as standard	70W	200Ω	200Ω	1	125
FV20−M−2S1.5G		260W	100Ω	100Ω	1	125
FV20−M−4T0.75G		110W	750Ω	125Ω	1	130
FV20−M−4T1.5G		260W	400Ω	100Ω	1	125
FV20−M−4T2.2G		320W	250Ω	100Ω	1	135

Note:

◆ The resistance must be greater than the minimum resistance value of the above table, otherwise the brake tube will be damaged;

◆ It is possible to avoid the use of corrugated resistance, which has a high parasitic inductance, it may

cause the brake tube to be damaged;

◆ The brake resistance power in the table is calculated with the braking duration within 30 seconds, and if the brake lasts longer, the brake resistance power should be larger. The more power of braking resistance, the more reliable the performance;

Chapter 2 Inverter Installation

2.1 Environment for Product Installation

- Do not install the inverter in the sites with oil mist, metal powder and dust.
- Do not install the inverter in the sites with hazardous gas and liquid, and corrosive, combustible and explosive gas.
- Do not install the inverters in salty sites.
- Do not install the inverter in the sites with direct sunlight.
- Do not mount the inverter on the combustible materials, such as wood.
- Keep the drilling scraps from falling into the inverter during the installation.
- Mount the inverter vertically in the electric control cabinet, mount the cooling fan or air conditioner to prevent the ambient temperature from rising to above 45 ºC.
- For the sites with adverse environment, it is recommended to mount the inverter heatsink outside the cabinet.

2.2 Mounting Direction and Space

This series of inverter is a wall-mounted inverter, which should be installed vertically to let air circulation and cooling, and the two sides of the converter should be kept more than 30mm in order to achieve optimal cooling effect.

For the installation of multiple wall-mounted inverters, if installed in the same vertical direction up and down, please pay attention to partition them by Baffle plate, and the upper and lower space of up to 120mm.

Chapter 3 Wiring of Inverter

3.1 Connection of the Product and Peripheral Devices

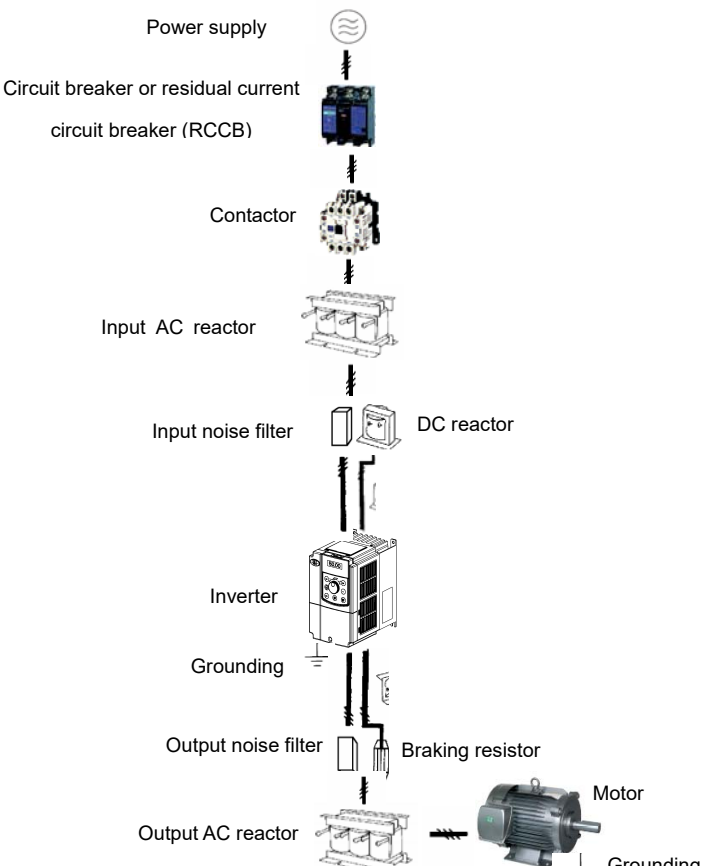


Figure3−1 Connection diagram of the product and peripheral devices

3.2 Description of Peripheral Devices for Main Circuit

Circuit breaker	The circuit breaker capacity o shall be 1.5 ~ 2 times of the inverter rated current. The time features of the circuit breaker shall fully consider the time features of the inverter overload protection.
RCCB (Residual current circuit breaker)	Because the inverter output is the high−frequency pulse, there will be high−frequency leakage current. Special RCCB shall be used when installing RCCB at the input end of the inverter. It is suggested that B type RCCB be used, and the leakage current value shall be set to 300mA.
Contactor	Frequent contactor tripping will cause inverter failure, so the highest frequency for the open and close of contactor shall not exceed 10 times/min. When braking resistor is used, to avoid the overtemperature damage of the braking resistor, a thermal protection relay with braking resistor overtemperature detection shall be installed to disconnect the contactor at the contact control power side of the thermal protection relay.
Input AC reactor or DC reactor	1. The inverter power supply capacity is more than 600kVA or 10 times of the inverter capacity. 2. If there is switch type reactive−load compensation capacitor or load with silicon control at the same power node, there will be high peak current flowing into input power circuit, which damage the rectifier components. 3. When the voltage imbalance of the three−phase power supply of the inverter exceeds 3%, the rectifier component will be damaged. 4. It is required that the input power factor of the inverter shall be higher than 90%. When the above situations occur, install the AC reactor at the inverter input side.
Input noise filter	The noise input and output from the power port between the inverter can be reduced.
Thermal protection relay	Although the inverter has motor overload protection function, when one inverter drives two or more motors or multi−pole motors, to prevent the motor overtemperature failure, thermal protection relay shall be installed between the inverter and each motor.
Output noise filter	When the output end of the inverter is connected with noise filter, the conduction and radiation interference can be reduced.
Output AC reactor	When the cable connecting the inverter and the motor is longer than 100m, it is suggested to install AC output reactor to suppress the high−frequency oscillation to avoid damaging motor insulation, large leakage current and frequent inverter protective action.

3.3 Functions of Main Circuit Terminal

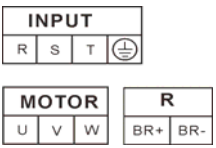


Figure 3-2 main loop terminal diagram

Terminal symbol	Terminal name and function description
R/L1、S/L2、T/L3	Three−phase AC input terminal
BR+、 BR−	Connecting terminal of braking resistor
U/T1、V/T2、W/T3	Three−phase AC output terminal
⏚	Grounding terminal PE

3.4 Attention for Main Circuit Wiring

3.4.1 Power Supply Wiring

- It is forbidden to connect the power supply cable to the inverter output terminals; otherwise, the internal components of the inverter will be damaged.
- The inverter shall connect to the power supply through a circuit breaker or RCCB and contactor to protect the inverter input against over current or disconnects the input power for maintenance.
- Please confirm that the power supply phases and rated voltage are consistent with that of the nameplate, otherwise, the inverter may be damaged.

3.4.2 Motor Wiring

- It is forbidden to short circuit or ground the inverter output terminal, otherwise the internal components of the inverter will be damaged.
- Do not short circuit the output cable and the inverter enclosure, otherwise electric shock may happen.
- It is forbidden to connect the output terminal of the inverter to the capacitor or LC/RC noise filter with phase lead, otherwise, the internal components of the inverter may be damaged.
- When contactor is installed between the inverter and motor, it is forbidden to switch on/off the contactor when the inverter is running; otherwise, large current will flow into the inverter, triggering the inverter protection action.
- Length of cable between the inverter and motor

If the cable between the inverter and the motor is too long, the high−order harmonic leakage current of the output end will cause adverse impact on the inverter and the peripheral devices. Output AC reactor should be installed if the motor cable is longer than 100m, Refer to the following table for the carrier frequency setting.

Length of cable between the inverter and motor	Less than 50m	Less than 100 m	More than 100m
Carrier frequency（P0-14）	Less than 15kHz	Less than 10kHz	Less than 5kHz

3.4.3 Grounding Wiring

- The inverter will produce leakage current. The higher the carrier frequency is, the larger the leakage current will be. The leakage current of the inverter system is more than 3.5mA, and the specific value of the leakage current is determined by the application conditions. To ensure the safety, the inverter and the motor must be grounded.
- The grounding resistance shall be less than 10 ohm. For the grounding wire diameter requirement.
- Do not share grounding wire with the welding machine and other power equipment.
- In the applications with more than 2 inverters, keep the grounding wire from forming a loop.

Figure 3−2 Grounding wiring

3.4.4 Countermeasures for Conduction and Radiation Interference

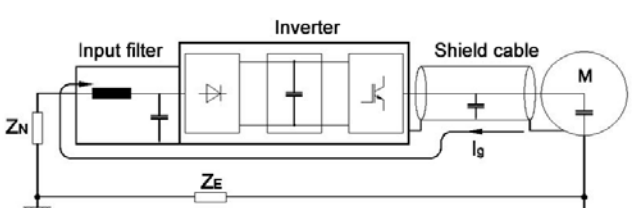


Figure3−4 Noise current illustration

- When the input noise filter is installed, the wire connecting the filter to the inverter

input power terminals shall be as short as possible.

- The filter enclosure and mounting cabinet shall be reliably connected in large area to reduce the back flow impedance of the noise current Ig.
- The wire connecting the inverter and the motor shall be as short as possible. The motor cable adopts 4−core cable, with the grounding end grounded at the inverter side, the other end connected to the motor enclosure. The motor cable shall be sleeved into the metal tube.
- The input power wire and output motor wire shall be kept away from each other as long as possible.
- The equipment and signal cables vulnerable to influence shall be kept far away from the inverter.
- Key signal cables shall adopt shielded cable. It is suggested that the shielded layer shall be grounded with 360−degree grounding method and sleeved into the metal tube. The signal cable shall be kept far away from the inverter input wire and output motor wire. If the signal cable must cross the input wire and output motor wire, they shall be kept orthogonal.
- When analog voltage and current signals are adopted for remote frequency setting, twisted pair shielded cable shall be used. The shielded layer shall be connected to the PE of the inverter, and the signal cable shall be no longer than 50m.
- The wires of the control circuit terminals TA/TB/TC and other control circuit terminals shall be separately routed.
- It is forbidden to short circuit the shielded layer and other signal cables or equipment.
- When the inverter is connected to the inductive load equipment (e.g. electromagnetic contactor, relay and solenoid valve), surge suppressor must be installed on the load equipment coil, as shown in Figure 3−4.

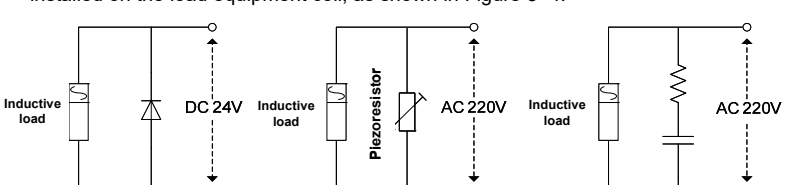


Figure 3−4 Application of inductive load surge suppressor

3.5 Terminal Wiring

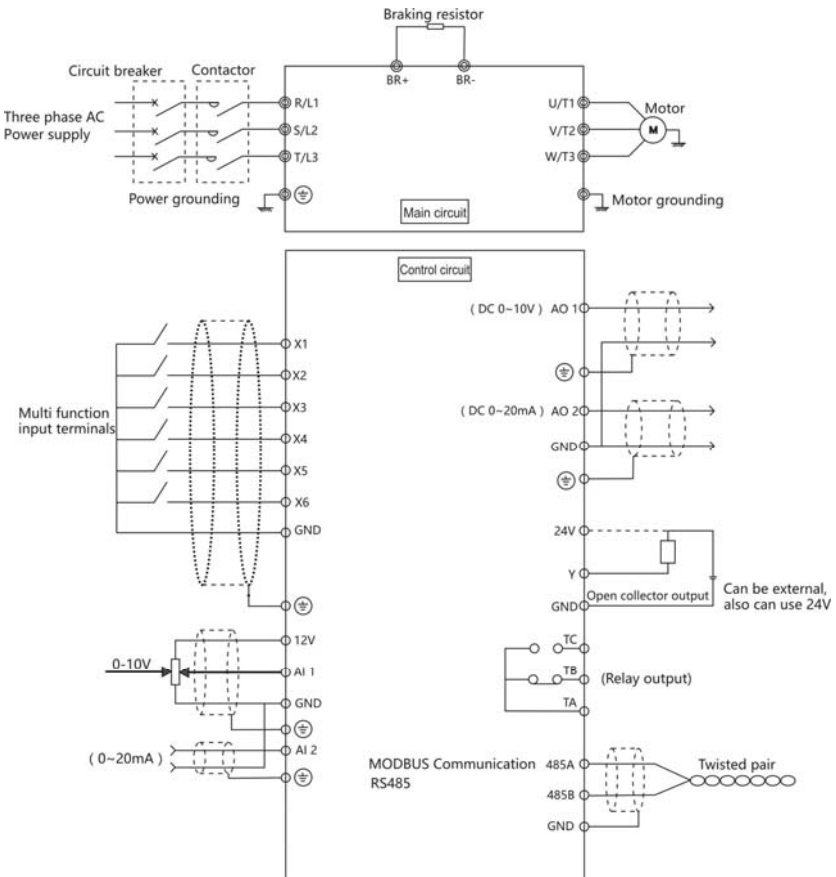


Figure3−5 Terminal wiring diagram

3.6 Functions of Control Circuit Terminals

Type	Terminal	Description	Note
Power output	12V	12V/10mA power	
	GND	The frequency sets the common end of the voltage signal (12V, power field), and the input negative side in analog current signal (the current inflow end)	
	24V	Provide 24V / 50mA power supply (GND terminal for this power supply)	
Analog input	AI1	Analog voltage signal input 1	DC 0～10V
	AI2	Analog current signal input 2	DC 0～20mA
On-off input	X1	Multi−functional input terminals 1	The function of multi-function input terminal is set by parameters（P5−16～P5−21）
	X2	Multi−functional input terminals 2	
	X3	Multi−functional input terminals 3	
	X4	Multi−functional input terminals 4	
	X5	Multi−functional input terminals 5	
	X6	Multi−functional input terminals 6, compatible with external input pulse signals:0.10～50.00 KHz	
Analog output	AO1	The programmable voltage output terminal (P5-34~P5-36 parameter confirmation).	DC 0～10V
	AO2	The programmable current output terminal (P5-39~P5-43 parameter confirmation).	DC 0～20mA
On-off output	Y	The output of programmable open collector is set by the parameter P5-27	Max Carry Current 50mA，Max withstand voltage 24V
Relay output	TA/TB/TC	The output of programmable relay is set by the parameter P5−28（TA/TB often closed , TA/TC often open）	Contact capacity: AC250V 1A resistivity load
RS485 communication	485A	Positive end of RS485	Modbus RTU format （Twisted shielding pair cable）
	485B	Negative end of RS485	

Note: The arrangement sequence of the control circuit terminals is as follows:

485A	485B	24V	Y	AO1	AO2	GND	AI1	AI2	12V	GND	X1	X2	X3	X4	X5	X6	TA	TB	TC

3.7 Lectotype of Control Circuit Peripheral Devices

Terminal number	Terminal screw	Tightening torque (N·m)	Wire specification mm^2	Wire type
12V、AI1、AI2、485A、485B、AO1、AO2、GND	M3	0.5～0.6	0.75	Twisted shielding pair cable
+24V、X1、X2、X3、X4、X5、X6、GND、Y、TA、TB、TC	M3	0.5～0.6	0.75	Shielding cable

3.8 Description of Jumper Function

CN1: the signal is valid when the multi-function input terminal (Xi) is connected with the power supply positive terminal 12V.The signal is valid when the multi-function input terminal (Xi) is connected with the power terminal GND.

Chapter 4 Running and operation instructions of inverter

4.1 Running instructions

In the following sections, you will use a number of nouns to describe the control, operation, and state of the inverter.Please read this chapter carefully to help understand and use the functions mentioned below.

4.1.1 A channel of operation instruction for inverter

It refers to the physical channel of the inverter to accept operation, stop, and Jog operation. It has three types:

Operation panel: control the key of RUN, STOP and M on the operation panel

External terminals: FWD, REV, COM, Xi (three-wire control) control

485 interface: start and stop control through the upper computer

Selection in run command channel can be decided by P0-02, when chosen by external terminal control, it is further determined by external terminal control mode (P5-15, including two line 1, line 2 and three line control 1, three line 2.

4.1.2 A channel of frequency given for inverter

FV20 - M has a variety of independent frequency given channels:

0：The keyboard potentiometer
1：The keyboard's up and down button determines the running frequency
2：AI1（0～10V）
3：AI2（0～20mA）
4：Reserve
5：PID closed-loop given frequency
6：Multi-step speed control
7：PLC given
8： UP/DN terminal given
9：Communication control
11：High speed pulse given

A given channel can also be given by a number of combinations as a final frequency (see P0-03 ~ P0-06 explanation).

4.2 Introduction to Operation Panel

4.2.1 Description of Keys on Operation Panel

Symbol	Name	Function
	Programming key PRG	1、 Enter each level of menu 2、 Confirm data storage 3、 Check function code in sequence 4、 Confirm the running command mode matching with M key
	Escape Key ESC	1、 Back to first level menu from second level menu; Back from first level menu to standby status, running status, and fault status 2、 Give up data storage after modifying data. 3、 After using >> key to switch from fault display to Stop / Run parameter display, press ESC to back to fault display status.
	Increase Key ∧	1、 In first level menu, increase function code PX-YZ according to edit bit. 2、 In second level menu, increase the function code data. 3、 In stop/run status, increase the given key frequency.（P0-03=1）
	Decrease Key ∨	1、 In first level menu, decrease function code PX-YZ according to edit bit. 2、 In second level menu, decrease the function code data. 3、 In stop/run status, decrease the given key frequency.（P0-03=1）
	Shift Key >>	1、 In first level menu, use >> key to move edit bit of PX-YZ menu 2、 In second level menu, use >> key to move the edit bit of data 3、 In fault status, change from fault display to stop/run display.
	Run Key RUN	1、 When running command is given via operation panel, the key is used to control the start of inverter. 2、 After setting the parameter auto tuning, start parameter auto tuning for inverter startup
	Stop/Reset Key STOP/RST	1、 When running command is given via operation panel, the key is used to control the stop of inverter. 2、 When the inverter has fault and has stopped, this key is used as RESET key to clear the fault alarm.
	Multi−function Key M	The multi-function key works by parameters P4−31
	Keyboard potentiometer	When P0-03 = 0, the given frequency is changed by adjusting the keyboard potentiometer

4. 2. 2 Descriptions of Indicators

Symbol of Indicator		Name	Meanings	Color
Unit indicator	Hz	Frequency indicator	On: Current displayed parameter is setting frequency	red
	A	Current indicator	On: Current displayed parameter is current	red
Status indicator	FWD	Run forward indicator	On: Inverter has run forward command; Off: Stop status	red
	REV	Run reverse indicator	On:Inverter has run reverse command; Off: Stop status	red

4.3 Menu Style

The menu style is 2−level menu.

4.3.1 Format of First Level Menu

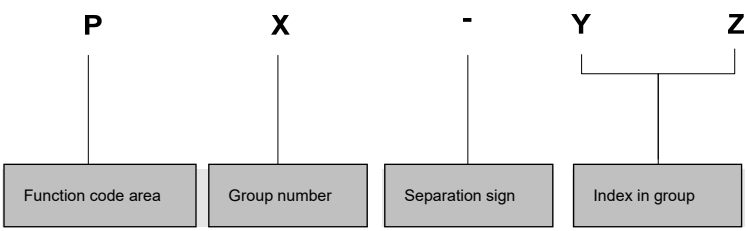


Figure 4−1 Format of first level menu

4.3.2 Format of Second Level Menu

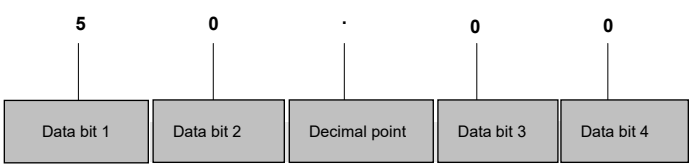


Figure 4−2 Format of second level menu

4.3.3 Identify Symbols Displayed Via LED

The relationship between characters displayed by LED and characters/numbers are as follows:

LED display	Meanings of characters	LED display	Meanings of characters	LED display	Meanings of characters	LED display	Meanings of character
	0		A		I		S
	1		b		J		T
	2		C		L		t
	3		c		N		U
	4		d		n		V
	5		E		O		y
	6		F		o		—
	7		G		P		8.
	8		H		q		.
	9		h		r		

4.4 Operation Example

For example, setting P0-02=1, Select the running command source as the external terminal control to startup and stop.

Chapter 5 List of Parameters

5.1 List of Basic Menu Function Codes

Meanings of Each Item in Function Code Parameter Table

Item	Meanings
Function code No.	The number of function code, such as P0−00
Function code name	The name of function code, which explains the function code's meanings.
Factory setting	The value of factory setting (see P0−17)
Unit	V: Voltage; A: Current; ºC: Celsius degree; Ω: Ohm; mH: Milli−henry; rpm: Revolutions Per Minute; %:Percentage; bps: baud rate; Hz, kHz: Frequency; ms, s, min, h: Time; kW: Power; /: No unit
Property	○: This function code can be changed during operation; ×: This function code can only be changed during stopping status; * :The initial value of the function code is related to the inverter model
Function code options	Function code parameter setting list
User setting	Used for recording parameters by user

1. Basic operation parameters (P0 parameters)

Function code number	Function code name	Function code selection	mini unit	Factory setting	Property	User setting
P0−00	Load type	0: G type, constant torque/heavy load application 1: P type, variable torque/light load application	1	0	×	
P0−01	Control operation mode	0：VF control 1：Vector VF control 2：Sensorless vector control 1 3：Sensorless vector control 2	1	0	×	

Function code number	Function code name	Function code selection	mini unit	Factory setting	Property	User setting
P0−02	Running command given mode	0: Operation panel 1: External terminal 2：RS485 ports	1	0	○	
P0−03	Main frequency setting source option A	0：The keyboard potentiometer reference 1：The up/down keys on the keyboard are used to determine the operating frequency 2：AI1（0～10V） 3：AI2（0～20mA） 5：PID closed-loop reference frequency 6：Multi-speed control 7：PLC given 8： UP / DN terminal reference 9：Communication control 11：High-speed pulse reference	1	0	○	
P0−04	Auxiliary frequency setting source option B	0：Keyboard potentiometer 1：AI1（0～10V） 2：AI2（0～20mA） 3：P0−07 4：High-speed pulse reference 5：Multistage speed	1	1	○	
P0−05	Auxiliary frequency B reference object selection	0：Upper limit of frequency 1：Main frequency reference A	1	0	○	
P0−06	Set combination mode of frequency	0：A frequency reference 1：B frequency reference 2：A+B　　3：MAX（A，B） 4：MIN（A，B）　5：A−B	1	0	○	
P0−07	Panel digital frequency reference	0.00～650.00Hz	0.01	50.00	○	
P0−08	Upper limit frequency	5.00～650.00 Hz	0.01	50.00	×	
P0−09	Lower limit frequency	0.00Hz～650.00Hz	0.01	0.00	×	
P0−10	Lower limit frequency operation mode	0：Run at the lower limit frequency 1：Stop 2：Sleep standby	1	2	×	

Function code number	Function code name	Function code selection	mini unit	Factory setting	Property	User setting
P0−11	Wake up time	0.0～6000.0s	0.1	0.0	×	
P0−12	Acceleration time 1	0.1～6000.0s	0.1	*	○	
P0−13	Deceleration time 1	0.1～6000.0s	0.1	*	○	
P0−14	Carrier frequency	1～10KHz	1	*	○	
P0−15	Inverter operation direction	0：Same as setting direction 1：Opposite to setting direction 2：Reverse prevention	1	0	○	
P0−16	Standby status display parameters	0～39（corresponds to d parameters）	1	3	○	
P0−17	Parameter initialization	0：No action 11：Restore parameters to the initial value according to the model 22：Clear the failure record	1	0	×	
P0−18	Parameter protection	0：No protection 1：Parameters cannot be changed	1	0	×	
P0−19	The STOP button scope	0：Panel control is valid 1：All commands are valid	1	1	×	

2. **Start and stop parameters (P1 parameters)**

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
P1−00	Startup method	0：Starts at start frequency 1：Brake before start 2：Speed track before start	1	0	×	
P1−01	Startup frequency	0.00～10.00Hz	0.01	0.50	×	
P1−02	Startup frequency retention time	0.0～20.0s	0.1	0.0	×	
P1−03	Startup DC braking current	0～150.0%	1	50.0	×	
P1−04	Startup DC braking time	0.0～30.0s	0.1	0.0	×	
P1−05	Stop mode	0：Deceleration 1：Free stop	1	0	○	
P1−06	DC braking initial frequency at stop	0.00～50.00Hz	0.01	3.00	×	

P1−07	DC braking current at stop	0～150.0%	1	50.0	×	
P1−08	DC braking time at stop	0.0～60.0s	0.1	0.0	×	
P1−09	Algorithm selection on speed tracking	0：Minimum current method 1：Voltage frequency method	1	0	×	
P1−10	Wait time for speed tracking	0.0～10.0s	0.1	1.0	×	
P1−11	Search time for speed tracking	3.0～100.0s	0.1	6.0	×	
P1−12	Current condition for completion of speed tracking	1.00～50.00%	0.01	15.00	×	
P1−13	Initial voltage for braking	105.0～140.0%	0.1	123.0	○	
P1−14	Termination voltage for braking	105.0～150.0%	0.1	128.0	○	
P1−15	Power-on terminal operation command detection	0：Power on operation command is invalid 1：Power on operation command is valid	1	0	×	
P1−16	Stop speed	0.00～100.00%	0.01	1.00	○	
P1−17	Stop speed detection method	0：Detected as speed set value 1: Detected as actual speed (for vector control)	1	1	○	

3. **Motor Parameters**（P2 **Parameters**）

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
P2−00	Motor type	0：Asynchronous motor 1：Permanent magnet synchronous motor	1	0	×	
P2−01	Motor rated voltage	1～700V	1	*	×	
P2−02	Motor rated frequency	5.00～600.00Hz	0.01	50.00	×	
P2−03	Motor rated current	0.1～3000.0A	0.1	*	×	
P2−04	Rated slip frequency	0.00～5.00Hz	0.01	*	×	
P2−05	Number of motor poles	1～50	1	4	×	
P2−06	No-load current	10.0～ 80.0%	0.1	*	×	
P2−07	Stator resistance	0.00～50.00%	0.01	*	×	

P2−08	Rotor resistance	0.00～50.00%	0.01	*	×	
P2−09	Leakage inductive reactance	0.00～50.00%	0.01	*	×	
P2−10	Motor parameters self-tuning	0: No action 1: Static tuning 2: Complete tuning	1	0	×	
P2−11	Permanent magnet synchronous motor rated frequency	5.00～600.00Hz	0.01	50.00	×	
P2−12	Permanent magnet synchronous motor rated voltage	1～700V	1	*	×	
P2−13	Permanent magnet synchronous motor rated current	0.1～3000.0A	0.1	*	×	
P2−14	Permanent magnet synchronous motor rated counter potential	1～700V	1	*	×	
P2−15	Permanent magnet synchronous motor stator resistance	0.00～50.00%	0.01	*	×	
P2−16	Active damping detection time	2～100	1	10	×	
P2−17	Active damping coefficient 1	0～1000	1	100	×	
P2−18	Active damping coefficient 2	0～1000	1	100	×	
P2−19	Active damping switching frequency	0.00～100.00Hz	0.01	100.00	×	
P2−20	Active damping limit	0.00～3.00Hz	0.01	1.00	×	

4. Vector control and VF control (P3 parameters)

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
P3−00	Low speed ASR scale coefficient	0.01～30.00	0.01	0.60	○	
P3−01	Low speed ASR integral coefficient	0.01～10.00	0.01	1.00	○	
P3−02	ASR switching frequency 1	1.00～7.50Hz	0.01	5.00	○	
P3−03	High speed ASR scale coefficient	0.01～30.00	0.01	0.60	○	
P3−04	High speed ASR integral coefficient	0.01～10.00	0.01	1.00	○	
P3−05	ASR switching frequency 2	8.00～50.00Hz	0.01	10.00	○	

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
P3−06	Current loop scale coefficient	1～1000	1	20	×	
P3−07	Current loop integral coefficient	1～100	1	10	×	
P3−08	Vector control slip compensation coefficient	50～200%	1	100	×	
P3−09	Speed loop filter time constant	1～100ms	1	6	×	
P3−10	Torque limitation	0～200%	1	150	×	
P3−11	Cross compensation coefficient	0.00～0.50	0.01	0.00	×	
P3−12	Voltage closed-loop scale coefficient	0～1.00	0.01	0.20	×	
P3−13	Voltage closed-loop integral coefficient	0～1.00	0.01	0.20	×	
P3−14	Magnetic field control scale coefficient	10～1000	1	50	×	
P3−15	Magnetic field control integral coefficient	1～500	1	50	×	
P3−16	Current reference filter coefficient	1～100ms	1	10	×	
P3−17	Torque control selection	0：No torque control 1：Torque control	1	0	○	
P3−18	Torque given method	0：set the torque on the keyboard 1：AI1　2：AI2 3：Multi-stage torque 4：RS485 5：High-speed pulse	1	0	○	
P3−19	Keyboard torque reference	0.0～200.0%	0.1	50.0	○	
P3−20	Torque reference direction	0：Forward 1：Reverse	1	0	○	

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
P3−21	Upper limit frequency set source option	0：Upper limit frequency 1：AI1 2：AI2 3：Multi-stage speed 4：RS485 5：HDI 6：Reserve	1	0	○	
P3−22	V/F curve type option	0：Standard V/F curve, V/F=constant 1：Quadratic V/F curve 2：Custom curve	1	0	×	
P3−23	Custom curve F1	0.0～100.0%	0.1	0.0	×	
P3−24	Custom curve V1	0.0～100.0%	0.1	0.0	×	
P3−25	Custom curve F2	0.0～100.0%	0.1	0.0	×	
P3−26	Custom curve V2	0.0～100.0%	0.1	0.0	×	
P3−27	Custom curve F3	0.0～100.0%	0.1	0.0	×	
P3−28	Custom curve V3	0.0～100.0%	0.1	0.0	×	
P3−29	V/F torque boost	0.0～20.0%	0.1	2.0	×	
P3−30	Low frequency oscillation suppression strength	0～1000	1	100	×	
P3−31	High frequency oscillation suppression strength	0～1000	1	0	×	
P3−32	High and low speed frequency turning point	5.00～50.00 Hz	0.01	20.00	×	
P3−33	V/F control slip compensation coefficient	0.0～20.0%	1	0.1	×	

5. Auxiliary operation parameters (P4 parameters)

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
P4−00	Forward / reverse dead zone time	0.0～5.0s	0.1	0.1	○	
P4−01	Hopping frequency 1	0.00～50.00Hz	0.01	0.00	○	
P4−02	Hopping frequency 1 range	0.00～5.00Hz	0.01	0.00	○	
P4−03	Hopping frequency 2	0.00～50.00Hz	0.01	0.00	○	
P4−04	Hopping frequency 2 range	0.00～5.00Hz	0.01	0.00	○	
P4−05	Hopping frequency 3	0.00～50.00Hz	0.01	0.00	○	
P4−06	Hopping frequency 3 range	0.00～5.00Hz	0.01	0.00	○	
P4−07	Jog frequency	0.00～650.00Hz	0.01	5.00	○	
P4−08	Jog acceleration time	0.1～6000.0s	0.1	10.0	○	
P4−09	Jog deceleration time	0.1～6000.0s	0.1	10.0	○	
P4−10	Acceleration time 2	0.1～6000.0s	0.1	*	○	
P4−11	Deceleration time 2	0.1～6000.0s	0.1	*	○	
P4−12	Acceleration time 3	0.1～6000.0s	0.1	*	○	
P4−13	Deceleration time 3	0.1～6000.0s	0.1	*	○	
P4−14	Acceleration time 4	0.1～6000.0s	0.1	*	○	
P4−15	Deceleration time 4	0.1～6000.0s	0.1	*	○	
P4−16	Acceleration/ Deceleration mode	0：Direct line 1：S curve	1	0	×	
P4−17	UP / DN terminal acceleration and deceleration rate	0.01～100.00Hz/s	0.01	1.00	○	
P4−18	FDT1 (frequency level) setting	0.00～650.00Hz	0.01	50.00	○	
P4−19	FDT1 hysteresis detection value	0.0～100.0%	0.1	5.0	○	
P4−20	FDT2 (frequency level) setting	0.00～650.00Hz	0.01	50.00	○	

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
P4−21	FDT2 hysteresis detection value	0.0～100.0%	0.1	5.0	○	
P4−22	Frequency reached the detection rate	0.00～20.00Hz	0.01	1.00	○	
P4−23	PWM modulation method	The unit: over-modulation or not 0: No over-modulation 1: over-modulation Tens place: modulation mode 0: low-frequency three-phase modulation, high-frequency two-phase modulation 1: Three-phase modulation Hundreds place: low frequency processing 0: Carrier frequency greater than 3Khz, low-frequency carrier is limited to 3Khz 1: The carrier frequency is operated as set.	1	0	×	
P4−24	Automatic voltage regulator （AVR）	0：No action 1：Action 2：No action only when decelerating	1	0	×	
P4−25	Droop control	0.0～10.00Hz	0.01	0.0	×	
P4−26	Operation monitoring project option 1	0～3999：The upper two bits and the lower two bits of each parameter respectively represent a d parameter, and the three parameters can set six monitor parameters. During Inverter operation, press "Shift key" to circle show	1	0100	○	
P4−27	Operation monitoring project option 2		1	0302	○	
P4−28	Operation monitoring project option 3		1	0605	○	

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
P4−29	Speed display coefficient	0.1～999.9%	0.1	100.0	○	
P4−30	linear speed display coefficient	0.1～999.9	0.01	10.0	○	
P4−31	Multi-function key M function option	0：REV 1：Jog forward 2：Jog reverse 3:Command channel switch	1	0	×	

6. External I / O terminal definition (P5 parameters)

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
P5−00	AI1 minimum input	0.00～10.00V	0.01	0.00	○	
P5−01	AI1 minimum input corresponding setting	−100.00～100.0%	0.1	0.0	○	
P5−02	AI1 maximum input	0.00～10.00V	0.01	10.00	○	
P5−03	AI1 maximum input corresponding setting	−100.00～100.0%	0.1	100.0	○	
P5−04	AI1 filter time constant	0.01～50.00s	0.01	0.10	○	
P5−05	AI2 minimum input	0.00～10.00V	0.01	0.00	○	
P5−06	AI2 minimum input corresponding setting	−100.00～100.0%	0.1	0.0	○	
P5−07	AI2 maximum input	0.00～10.00V	0.01	10.00	○	
P5−08	AI2 maximum input corresponding setting	−100.00～100.0%	0.1	100.0	○	
P5−09	AI2 filter time constant	0.01～50.00s	0.01	0.10	○	
P5−10	PULSE minimum given	0.10～50.00KHz	0.01	0.10	○	
P5−11	PULSE minimum given corresponding setting	−100.00～100.0%	0.1	0.0	○	
P5−12	PULSE maximum given	0.10～50.00KHz	0.01	50.00	○	

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
P5−13	PULSE maximum given corresponding setting	−100.00～100.0%	0.1	100.0	○	
P5−14	PULSE filter time constant	0.01～50.00s	0.01	0.10	○	
P5−15	External operation command mode option	0：Two-wire control mode 1: 1：Two-wire control mode 2: 2：Three-wire control mode 1: 3：Three-wire control mode 2:	1	1	×	
P5−16	X1 terminal function selection	0：Non-function 1：Forward (FWD) 2：Reverse (REV) 3：External failure input (Normally open) 4：DC braking (enabled in stop) 5：Input at emergency stop 6：Input at failure reset 7：Multistage speed input 1 8：Multistage speed input 2 9：Multistage speed input 3 10：Multistage speed input 4 11：Three-wire control 12：Terminal UP 13：Terminal DOWN 14：Zero clearing of the terminal 15：Acceleration/deceleration option terminal 1 16：Acceleration/deceleration option terminal 2 17：PLC pause at work 18：PLC status reset (mode 1, 2) 19：Jog forward 20：Jog reverse 21：Swing frequency pause		1	×	
P5−17	X2 terminal function selection			2	×	
P5−18	X3 terminal function selection			7	×	
P5−19	X4 terminal function selection			8	×	

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
P5−20	X5 terminal function selection	at work 22：Reset at swing frequency 23：PID pause at work 24：Internal timer allows 25：Internal timer zero clearing 26：Counter trigger input 27：Counter reset 28：Frequency reference A and B switching 29：Frequency reference A and A + B switching 30：Frequency reference B and A + B switching 31：Acceleration and deceleration stop 32：Torque control is prohibited 33：Length counter input 34：Length counter is cleared 35：Command given source is forced to the LED keyboard 36: Command given source is forced to terminal 37：Command given source is forced to communication control 38：PID parameter selection 39：External failure is normally closed to input 40：Pulse input (enabled only for X6)		9	×	
P5−21	X6 terminal function selection			10	×	

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
P5−27	Y terminal output function selection	0：Non-function 1：Operating status 2：Failure output 3：Frequency arrival 4: Detection frequency FDT1 arrival 5: Detection frequency FDT2 arrival 6：Zero speed operation 7：Lower limit frequency arrival 8：Upper limit frequency arrival 9：Specified value of counter arrival (if greater than the specified value, it will output ON signal) 10：Final value of counter arrival (if equal to the final value, it will output ON signal of a count clock cycle) 11：Internal timer arrival (it will output ON signal of one timing unit) 12：Run-time reached (if greater than the set time, it will output on signal) 13：PLC phase operation completed (it will output 0.5S ON signal) 14：PLC operation cycle is completed (it will output 0.5S ON signal) 15：Over-torque pre-warning 16：Inverter standby 17：Length arrival 18：Sleep status 19：AI1 input overrun 20：Module temperature arrival	1	1	○	
P5−28	Relay TA/TB/TC terminal output function selection		1	2	○	

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
P5−34	AO1 terminal output function selection	0：Setup frequency 1：Operation frequency 2：Output current 3：Bus voltage 4：Output voltage 5：Output power 6：Torque current 7：AI1 8：AI2 9：Reserved 10：High-speed pulse input 11：RS485 setting 12：Length 13：Count value 14～20：Reserved	1	0	○	
P5−35	AO1 represented variable 0% corresponds to analog output	0.0 ~ 100.0%, when the output is 0 ~ 10V, 100.0% corresponds to 10V;	0.1	0.0	○	
P5−36	AO1 represented variable 100% corresponds to analog output	0.0～100.0%	0.1	100.0	○	
P5−39	AO2 output mode selection	0：Analog output 1：Reserved	1	0	○	
P5−40	Reserved	/	/	/	/	
P5−41	AO2 output selection	Consistent with AO1 output selection.	1	1	○	
P5−42	AO2 represented variable 0% corresponds to analog output	0.0 ~ 100.0%, when the output is 0 ~ 20mA，100.0% corresponds to 20mA；	0.1	0.0	○	
P5−43	AO2 represented variable 100% corresponds to	0.0～100.0%	0.1	100.0	○	

7. PID Parameters（P6 Parameters）

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
P6−00	PID reference channel selection	0：Keyboard potentiometer reference 1：Pb−01 reference 2：P6−01 reference 3：AI1　4：AI2 5：RS485 reference 6：PLUSE reference 7：Multistage speed reference	1	2	○	
P6−01	PID reference	0～100.0%	0.1	50.0	○	
P6−02	PID feedback channel selection	0：AI1　1：AI2 2：HDI　3：RS485	1	0	○	
P6−03	Adjusting property	0：Positive property. 1：Negative property	1	0	○	
P6−04	Proportional gain	0.0～50.0	0.1	10.0	○	
P6−05	Integrating time constant	0.1～100.0s	0.1	3.0	○	
P6−06	Differential gain	0.0～5.0	0.1	0.0	○	
P6−08	Preset frequency	0.0～100.0% upper limiting frequency	0.1	50.0	○	
P6−09	Preset frequency hold time	0.0～3000.0s	0.1	0.0	○	
P6−10	Feedback break detection threshold	0.0～100.0%	0.1	5.0	○	
P6−11	Feedback disconnection judgment time	0.0～3000.0s，0.0 No judgment	0.1	0.0	○	
P6−12	PID negative output limit	0～100.0%	0.1	0.0	○	
P6−13	Maximum value of twice output	0.00～100.00%	0.01	1.00	○	

8. Multi-speed and PLC parameters（P7 parameters）

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
P7−00	Programmable multi-speed operation setting	The unit: 0：Stop after single run 1：Keep the final value after single run 2：Unlimited cycle operation Tens place : 0：The running time unit is seconds 1：The running time unit is minute Hundreds place: Reserved Thousands: restart mode selection 0：Each start from the first 0 segment 1：Each start from the interrupt start frequency	1	0002	×	
P7−01	Multi−speed frequency 0	0.0～100.0%	0.1	10.0	○	
P7−02	Multi−speed frequency 1	0.0～100.0%	0.1	20.0	○	
P7−03	Multi−speed frequency 2	0.0～100.0%	0.1	30.0	○	
P7−04	Multi−speed frequency 3	0.0～100.0%	0.1	40.0	○	
P7−05	Multi−speed frequency 4	0.0～100.0%	0.1	50.0	○	
P7−06	Multi−speed frequency 5	0.0～100.0%	0.1	70.0	○	
P7−07	Multi−speed frequency 6	0.0～100.0%	0.1	80.0	○	
P7−08	Multi−speed frequency 7	0.0～100.0%	0.1	100.0	○	
P7−09	Multi−speed frequency 8	0.0～100.0%	0.1	10.0	○	
P7−10	Multi−speed frequency 9	0.0～100.0%	0.1	20.0	○	
P7−11	Multi−speed frequency 10	0.0～100.0%	0.1	30.0	○	
P7−12	Multi−speed frequency 11	0.0～100.0%	0.1	40.0	○	
P7−13	Multi−speed frequency 12	0.0～100.0%	0.1	50.0	○	
P7−14	Multi−speed frequency 13	0.0～100.0%	0.1	70.0	○	
P7−15	Multi−speed frequency 14	0.0～100.0%	0.1	80.0	○	

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
P7−16	Multi−speed frequency 15	0.0～100.0%	0.1	100.0	○	
P7−17	Phase 0 runtime	0.0～3000.0s	0.1	10.0	○	
P7−18	Phase 0 running direction and acceleration and deceleration	The unit: 0: Run forward 1: Run reverse Tens place: 0： Acceleration and deceleration time 1 1： Acceleration and deceleration time 2 2： Acceleration and deceleration time 3 3： Acceleration and deceleration time 4	1	0	○	
P7−19	Phase 1 run time	0.0～3000.0s	0.1	10.0	○	
P7−20	Phase 1 running direction and acceleration and deceleration	Same stage 1 explanation	1	0	○	
P7−21	Phase 2 run time	0.0～3000.0s	0.1	10.0	○	
P7−22	Phase 2 running direction and acceleration and deceleration	Same stage 1 explanation	1	0	○	
P7−23	Phase 3 run time	0.0～3000.0s	0.1	10.0	○	
P7−24	Phase 3 running direction and acceleration and deceleration	Same stage 1 explanation	1	0	○	
P7−25	Phase 4 run time	0.0～3000.0s	0.1	10.0	○	
P7−26	Phase 4running direction and acceleration and deceleration	Same stage 1 explanation	1	0	○	
P7−27	Phase 5 run time	0.0～3000.0s	0.1	10.0	○	
P7−28	Phase 5 running direction and acceleration and deceleration	Same stage 1 explanation	1	0	○	
P7−29	Phase 6 run time	0.0～3000.0	0.1	10.0	○	

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
P7−30	Phase 6 running direction and acceleration and deceleration	Same stage 1 explanation	1	0	○	
P7−31	Phase 7 run time	0.0～3000.0s	0.1	10.0	○	
P7−32	Phase 7 running direction and acceleration and deceleration	Same stage 1 explanation	1	0	○	
P7−33	Phase 8 run time	0.0～3000.0s	0.1	10.0	○	
P7−34	Phase 8 running direction and acceleration and deceleration	Same stage 1 explanation	1	0	○	
P7−35	Phase 9 run time	0.0～3000.0s	0.1	10.0	○	
P7−36	Phase 9 running direction and acceleration and deceleration	Same stage 1 explanation	1	0	○	
P7−37	Phase 10 run time	0.0～3000.0s	0.1	10.0	○	
P7−38	Phase 10 running direction and acceleration and deceleration	Same stage 1 explanation	1	0	○	
P7−39	Phase 11 run time	0.0～3000.0s	0.1	10.0	○	
P7−40	Phase 11 running direction and acceleration and deceleration	Same stage 1 explanation	1	0	○	
P7−41	Phase 12 run time	0.0～3000.0s	0.1	10.0	○	
P7−42	Phase 12 running direction and acceleration and deceleration	Same stage 1 explanation	1	0	○	
P7−43	Phase 13 run time	0.0～3000.0s	0.1	10.0	○	
P7−44	Phase 13 running direction and acceleration and deceleration	Same stage 1 explanation	1	0	○	
P7−45	Phase 14 run time	0.0～3000.0s	0.1	10.0	○	

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
P7−46	Phase 14 running direction and acceleration and deceleration	Same stage 1 explanation	1	0	○	
P7−47	Phase 15 run time	0.0～3000.0s	0.1	10.0	○	
P7−48	Phase 15 running direction and acceleration and deceleration	Same stage 1 explanation	1	0	○	

9. Communication Parameters（P8 Parameters）

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
P8−00	Communication baud rate	0：300bps 1：600bps 2：1200bps 3：2400bps 4：4800bps 5：9600bps 6：19200bps 7：38400bps	1	5	○	
P8−01	Data format	0：No parity 1：Odd parity 2：Even parity	1	0	○	
P8−02	Local address	0～247 0: no data is returned for the broadcast address	1	1	○	
P8−03	Local response delay	0～100ms	1	5	○	
P8−04	Time out judgment	0.0～100.0s：0.0 the time out communication is invalid	0.1	0.0	○	
P8−05	Master/slave option	0：Slave station 1：Master station	1	0	○	
P8−06	RS485 set frequency proportional coefficient	0～999.9%	0.1	100.0	○	
P8−07	Write operation returns data or not	0：Return 1：Not return	1	0	○	
P8−08	Automatically reset time after disconnection	0.0：invalid 0.1～100.0：it will automatically reset after disconnection via value	0.1	0.0	○	

10. Advanced Parameters（P9 Parameters）

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
P9−00	Swing frequency amplitude	0.0～100.0%	0.1	0.0	○	
P9−01	Kick frequency range	0.0～50.0%	0.1	0.0	○	
P9−02	Triangle wave rise time	0.1～3600.0s	0.1	5.0	○	
P9−03	Triangle wave fall time	0.1～3600.0s	0.1	5.0	○	
P9−04	Counter specified value	0～65535	1	1000	○	
P9−05	Final value of counter	0～65535	1	2000	○	
P9−06	Set length	0～65535m	1	1000	○	
P9−07	Pulse per meter	0.1～6553.5	0.1	100.0	○	
P9−08	Internal timer timing unit	0.01～99.99s	0.01	1.00	○	
P9−09	Internal timer period	1～65535	1	10	○	
P9−10	Set operating time	0～65535H	1	65535	○	
P9−11	X1 opens delay time	0.0～3600.0s	0.1	0.0	○	
P9−12	X1 shut off delay time.	0.0～3600.0s	0.1	0.0	○	
P9−13	X2 opens delay time	0.0～3600.0s	0.1	0.0	○	
P9−14	X2 shut off delay time.	0.0～3600.0s	0.1	0.0	○	
P9−15	X3 opens delay time	0.0～3600.0s	0.1	0.0	○	
P9−16	X3 shut off delay time.	0.0～3600.0s	0.1	0.0	○	
P9−17	Y output delay time.	0.0～3600.0s	0.1	0.0	○	
P9−18	Relay output delay time	0.0～3600.0s	0.1	0.0	○	

11. Enhanced Control Parameters（PA Parameters）

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
PA−00	V / F separated or not	0：Not separate 1：Half separate 2：Completely separate	1	0	×	
PA−01	Voltage source option	0：PA−02 1： AI1 2：AI2 3：Keyboard potentiometer 4：PID 5： AI1+PID	1	0	○	
PA−02	Set voltage given on the keyboard	0～100.0%	0.1	0.0	○	
PA−03	Voltage acceleration and deceleration time	0.1～3600.0s	0.1	0.1	○	

12. Enhanced PID Function Parameters（Pb Parameters）

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
Pb−00	Remote pressure gauge range	0.001～60.000MPA	0.001	1.600	○	
Pb−01	Pressure setting on the keyboard	0.001～20.000MPA	0.001	0.500	○	
Pb−02	Modify whether to store keyboard settings automatically	0：Not save automatically 1：Save automatically	1	1	×	
Pb−03	Sleep frequency	0.00～600.00Hz	0.01	0.00	○	
Pb−04	Sleep delay time	0.0～3000.0s	0.1	60.0S	○	
Pb−05	Wake up pressure	0～100.0%	0.1	0.0	○	
Pb−06	Wake up delay time	0.0～60.0s	0.1	0.5	○	
Pb−07	Underload protection value	0.0～100.0% 0.0：no underload protection is performed	0.1	0.0	×	
Pb−08	Allow underload time	5.0～600.0s	0.1	20.0	×	
Pb−09	PID parameter option	0～3	1	0	×	
Pb−10	Proportional gain 2	0.0～50.0	0.1	5.0	○	

Pb−11	Integral time constant 2	0.1～100.0s	0.1	10.0	○	
Pb−12	Differential gain 2	0.0～5.0	0.1	0.0	○	
Pb−13	PID parameter switching deviation 1	0.0～100.0%	0.1	20.0	○	
Pb−14	PID parameter switching deviation 2	0.0～100.0%	0.1	80.0	○	
Pb−15	PID parameter switching frequency 1	0.0～100.0%	0.1	20.0	○	
Pb−16	PID parameter switching frequency 2	0.0～100.0%	0.1	80.0	○	

13. Protection parameters（Pd parameters）

Function code number	Function code name	Function code selection	Mini unit	Factory setting	Property	User setting
Pd−00	Current limit value	100.0～200.0%	0.1	*	○	
Pd−01	Over-Current and frequency down time	1.0～200.0s	0.1	5.0	○	
Pd−02	Overvoltage limit value	110.0～145.0%	1	130.0	○	
Pd−03	Overvoltage suppression gain	0～10	1	2	○	
Pd−04	Phase loss protection	The unit: input phase loss 0：No protection 1：Protection Tens place: output phase loss 0：No protection 1：Protection	1	11	○	
Pd−05	Motor overload protection	20.0～100.0%	0.1	100.0%	○	
Pd−06	Over torque pre-warning value	20.0～200.0%	0.1	*	○	
Pd−07	Over torque detection time	0.0～60.0s	0.1	0.1	○	
Pd−08	Fault automatic reset times	0～5	1	0	○	
Pd−09	Fault automatic reset interval time	0.1～600.0s	0.1	1.0	○	

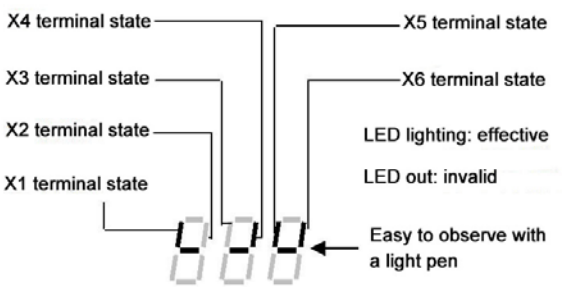
Pd−10	Relay fault output during reset.	0：No output 1：Output	1	0	○	
Pd−11	AI1 input voltage low limit	0.00～10.00V	0.01	2.00	○	
Pd−12	AI1 input voltage high limit	0.00～11.00V	0.01	8.00	○	
Pd−13	Arrive the temperature of module	25.0～90.0℃	0.1	70.0	○	
Pd−14	Fault type record 2	0～30	1	0	×	
Pd−15	Fault type record 1	0～30	1	0	×	
Pd−16	Fault type record 0 (Latest)	0～30	1	0	×	
Pd−17	Output frequency of latest fault	0～650.00Hz	0.01	0.00	×	
Pd−18	Output current of latest fault	0～3000.0A	0.1	0.0	×	
Pd−19	Bus voltage of latest fault	0～800V	1	0	×	

14. State monitoring parameters list

Monitor code	Content	Mini unit
d−00	Inverter output frequency at present	0.01Hz
d−01	Inverter output voltage at present	1V
d−02	Inverter output current at present	0.1A
d−03	Inverter setting frequency at present	0.01Hz
d−04	Inverter output frequency 2 at present	0.01Hz
d−05	DC bus voltage	1V
d−06	Temperature of module	0.1℃
d−07	PID Settings	0.1%
d−08	PID feedback value	0.1%
d−09	Speed	rmp
d−10	running linear speed	0.01*
d−11	External pulse input	0.01KHz
d−12	RS485 setting	
d−13	Reserve	
d−14	AI1	0.1V
d−15	AI2	0.1mA
d−16	DI terminal state	

d−17	DO terminal state	
d−18	Single continuous operation time	1H
d−19	Total operation time	1H
d−20	External pulse count value	
d−21	Internal timer number	
d−22	Actual length	m
d−23	Set pressure	MPa
d−24	Actual pressure	MPa
d−37	Interver rated voltage	1V
d−38	Interver rated current	0.1A
d−39	Product version number	

DI terminal state description: the last three of the five digital tubes display the digital tube input status



DO terminal state description: Y is the lowest level, the relay TA/TB/TC output is the binary number of the highest bits, transformed into decimal display.

Chapter VI Parameters Description

6.1 Basic function parameters (Group P0)

P0−00	Model selection	0～1（0）

0：G-type Inverter, suitable for constant torque load

1：P-type Inverter, suitable for variable torque load (fan, pump)

FV20-M series Inverter adopts a G / P integrated mode: constant torque load (G type) is lower one grade than fan, pump load(P type) .

P0−01	Control operation mode	0～3（0）

0：V / F control

It is suitable for most applications where a Inverter allows driving one or multiple motors (multiple motors have the same operating conditions), especially for the application which requires open-loop control exceeding the reference frequency a lot.

1：Vector VF control

The vectorization of VF control can improve the stability of the control and low-frequency torque and it is not sensitive to motor parameters.

2：Sensorless vector control 1

The unique vector control has relatively strong versatility and good steady-state performance, but worse dynamic index than the vector control 2,and it is not sensitive to motor parameters.

3：Sensorless vector control 2

The rotor field-orientation vector control has higher dynamic and static control performance and it is not sensitive to motor parameters.

The use of rotor magnetic field oriented vector control, with high dynamic and static control performance, motor

parameters sensitive.

P0−02	Run command reference mode	0～2（0）

0：Run command is controlled by LED keyboard

1：Run command is controlled by terminal

2：Operation command is controlled by communication

P0−03	Main frequency setting source option A	0～11（0）

0：Keyboard potentiometer reference

The operating frequency is set by the potentiometer on the operator panel

1：The up/down keys on the keyboard are used to determine the operating frequency

By operating the up and down keys on the keyboard, you can change the frequency value in P0-07 and set the operating frequency.

2：AI1（0～10V）

The external analog voltage input terminal AI1 (0 ~ 10V) is used to set the operating frequency.

3：AI2（0～20mA）

The external analog voltage input terminal AI2 (0 ~ 20mA) is used to set the operating frequency.

4：Reserved

5：PID closed-loop reference frequency

The output of the PID regulator is used to set the operating frequency.

6：Multi-speed control

External terminals X1 ~ X6 can be selected as per P5-16 ~ P5-21 as multi-speed terminals. the corresponding set frequency (P7-01 ~ P7-16) can be determined by the state of multi-speed terminals.

7：PLC reference

When the frequency source is simple PLC, it is required to set the "Multi-speed and PLC" parameters of Group P7 to determine the reference frequency of each operating stage. For details of PLC operation setting, please refer to Group P7 Function Code Description.

8：UP / DN terminal reference

The operating frequency is set by external control terminals UP / DN (UP and DN control terminals are selected by P5-16 ~ P5-21). When UP-COM is connected, the operating frequency will increase. When DN-COM is connected, the operating frequency

will decrease. When UP and DN are connected or disconnected at the same time with the COM terminal, the operating frequency remains unchanged. The increase and decrease of frequency should be set according to the acceleration / deceleration time in the P4-17.

9：Communication control

The host computer's frequency command is received by the RS485 interface. This method applies when the host computer is used to set the frequency or the Inverter in the linkage control is set to slave.

10：Reserved

11：High-speed pulse reference

The operating frequency is set by external pulse signal. The pulse input terminal is selected by parameter P5-21 (X6).

P0−04	Auxiliary frequency setting source option B	0～5（1）

0：Keyboard potentiometer reference 1：AI1（0～10V）

2：AI2（0～20mA）3：P0−07

4：High-speed pulse reference 5: Multi-speed

P0−05	Auxiliary frequency B reference object selection

0～1（0）

0：upper limit of frequency

1：Main frequency reference A

The setting value obtained from the auxiliary frequency setting source is 0 ~ 100.0%. Different reference values are selected, and the actual set frequency is also different.

P0−06	Set combination mode of frequency	0～5（0）

0：A frequency reference

When the frequency reference is A, the frequency reference can be switched between A and B through the function of terminal 28; the frequency can be switched between A and A + B through the function of terminal 29;

1：B frequency reference

When the frequency reference is B, the frequency reference can be switched from B to A + B through the function of terminal 30.

2：A+B　　3：MAX（A，B）

4：Min（A，B）　　5：A−B

P0−07	Panel digital frequency reference	0.00～650.00Hz（50.00Hz）

In the status monitoring mode, press UP/DOWN key on the operation panel to modify this parameter directly.

P0−08	Upper limit frequency	5.00～650.00Hz（50.00Hz）

P0−09	Lower limit frequency	0.00～600.00Hz（0.00Hz）

The upper limit frequency is the upper limit value of Inverter output frequency. All of the set frequency source including external analog reference, multi-speed and PLC are set in percentage. The reference value is the upper limit frequency.

P0−10	Lower limit frequency operation mode	0～2（2）

0：When the set frequency is less than the lower limit frequency, it runs according to the lower limit frequency.

1：When the set frequency is less than the lower limit frequency, the Inverter will shut down.

After shut down, if the start command is frequently available for the terminal switch control or RS485 control, user need to confirm the stop command before it can start again; for the keyboard control or terminal pulse control, it can only be started when the power-on trigger signal is obtained again. For the terminal command mode, it can be restarted when the terminal command turns from invalid status to enabled status.

2：Sleep standby

When the set frequency is less than the lower limit frequency, the output is locked out and the run command is not canceled. When the set frequency is greater than the lower

limit frequency, it is restarted.

P0−11	Wake up time	0.0～6000.0s（0.0s）

When Inverter is in the sleep mode, it will exit the sleep mode only when the set frequency is greater than the lower limit frequency for the time set by P0-11.

When Inverter is in hibernation mode, it will exit hibernation mode only when the set frequency is greater than the lower limit frequency for the time set by P0-11.

P0−12	Acceleration time 1	0.1～6000.0s（5.0s）
P0−13	Deceleration time 1	0.1～6000.0s（5.0s）

Acceleration time is the time it takes for the output frequency to accelerate from 0Hz to the rated frequency. Deceleration time is the time required for the output frequency to decelerate from the rated reference frequency to 0 Hz.

P0−14	Carrier frequency	1～10KHz（6KHz）

The carrier frequency mainly affects audio noise and thermal effects in operation.

When the ambient temperature is high and motor load is heavy, the carrier frequency should be reduced to improve the Inverter thermal property.

P0−15	Inverter operation direction	0～2（0）

This parameter is used to change the current output phase sequence of Inverter to change the running direction of the motor.

0：Same as setting direction

1：Opposite to setting direction

If selecting this method, the actual output phase sequence of Inverter will be opposite with the set one

2：Reverse prevention

The Inverter will ignore the turning command and only run in positive direction.

P0−17	Parameter initialization	0～9999（0）

Modify Inverter parameters to factory defaults.

0：No action

11：Restore parameters to the initial value according to the model

22：Clear the failure record

Note: Please set the model (P0-00) according to the actual situation before initialization.

This parameter is the key parameter. User is prohibited to change freely.

P0−18	Parameter protection	0～1（0）

0：No protection

1：Protection

All parameters cannot be changed. However, P0-07 can be changed in the monitoring status by the up / down key.

6.2 Starting and stopping parameters (Group P1)

P1−00	Startup method	0～2（0）

0：Start by the starting frequency

After receiving the operation command, the Inverter will run at the set starting frequency (P1-01). After the starting frequency duration (P1-02), it will run to the set frequency as per the acceleration and deceleration time.

1：Braking before start

The Inverter will firstly apply a certain DC braking current to the load motor (electromagnetic brake, defined in parameters P1-03 and P1-04), and then start it.This is suitable for small inertia load with forward or reverse rotation.

2：Speed tracking before restarting

The Inverter will firstly detect the motor speed, and then take the detected speed as a starting point to run to the set frequency as per the acceleration and deceleration time.

P1−01	Start frequency	0.00～10.00Hz（0.50Hz）
P1−02	Start frequency duration	0.0～20.00s（0.0s）

Set the starting frequency reasonably to improve the start torque property, but over-current failures sometimes occur if the set value is too large.

The start frequency duration is the duration of the operation based on start frequency. If the set frequency is lower than the starting frequency, it will run as per the starting. When the starting frequency duration reaches, it will run to the set frequency as per the deceleration time.

P1−03	Start DC braking current	0.0～150.0%（50.0%）
P1−04	Start DC braking current	0.0～30.0s（0.0s）

When the start mode is set as the “Braking before start” mode, the start DC braking function is enabled.

P1-03 is the DC braking current (percentage of rated current) at startup, P1-04 is the duration. When DC braking is performed, the Inverter will output DC current.

It is determined by the load and acceleration and deceleration time

Starting as per DC braking mode is as shown in Figure 1.

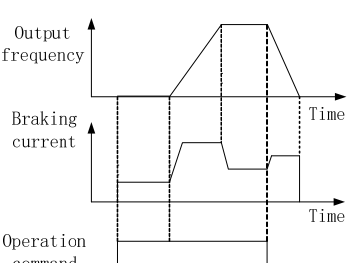


Figure 1 Start as per DC braking

P1-05	Stop mode	0～1（0）

0：Deceleration mode

After receiving the stop signal, it will decelerate and stop according to the set deceleration time.

1：Free stop

After receiving the stop signal, the output is locked out and the motor runs freely to a stop.

P1-06	Braking initial frequency of stop DC	0.00～50.00Hz（3.00Hz）
P1-07	Braking current of stop DC	0.0～150.0%（50.0%）
P1-08	Braking action time of stop DC	0.0～60.0s（0.0s）

These three parameters are used to define the DC braking function of Inverter during shutdown. During shutdown, the Inverter will activate DC braking when the output frequency of Inverter is lower than the DC braking initial frequency.

The DC braking action time refers to the duration of DC braking. When this parameter is set to 0, the DC braking function at shutdown is closed. When DC braking occurs, the Inverter outputs DC current. The DC braking function can provide zero speed torque which is usually used to improve the stop accuracy, but cannot be used for deceleration braking during normal operation.

P1-10	Wait time for speed tracking	0.0～10.0s（1.0s）
P1-11	Search time forspeed tracking	3.0～100.0s（6.0s）
P1-12	Current condition for completion of speed tracking	1.00～50.00%（15.00%）

As there is remanence inside the motor, if the speed tracking is immediately performed when the motor is just stopped, it may cause Inverter over-current. Appropriately increasing P1-10 will effectively reduce the probability of over-current.

According to the current determine the motor speed search time. The shorter it is set, the faster it searches. But probably reports overcurrent. So the factory value is better.

According to the current determine the motor speed.The motor current less than P1-12 is the condition for completion.The bigger the P1-12 are, the easier it can search the speed.But the speed deviation is also larger. So the factory value is better.

P1−13	Initial voltage for braking	105.0～140.0%（123.0%）
P1−14	Termination voltage for braking	105.0～150.0%（128.0%）

When the DC bus voltage reaches the initial voltage, the braking PWM signal starts to output. As the bus voltage increases, the duty ratio gradually increases from 0% and gets to 100% when the termination voltage is reached. If the set braking voltage setting is less than the initial voltage, there will be no braking and PWM output.

P1−15	Power-on terminal operation command detection	0～1（0）

0：Power on command is invalid

When the Inverter is powered on,if the operation command source is terminal reference, then even if the terminal operation command is enabled, the Inverter will not respond to prevent the Inverter from suddenly starting to hurt. To make the system run effectively, the terminal needs to be invalid and then enabled.

It prevents the immediate startup from damaging personnel or equipment.

1：Power on operation command is enabled

When the Inverter is powered on and the terminal operation command is enabled, the Inverter will run.

P1−16	Stop speed	0.00～100.0%（1.00%）

P1−17	Stop speed detection method	0～1（1）

When there is a stop command and the Inverter output frequency (speed) is lower than P1-16 set value, the Inverter will lock out the output and keep in a stop state.

Stop speed detection method:

0：Detected by speed set value

1：Detected by actual speed (for vector control)

6.3 Motor parameters (Group P2)

P2−00	Motor type	0～1（0）

0：Asynchronous motor

1：Permanent magnet synchronous motor

P2−01	Motor rated voltage	1～700V（380V）
P2−02	Motor rated frequency	5.00～600.00Hz（50.00Hz）
P2−03	Motor rated current	0.1～1000.0A（Supplier）
P2−04	Rated slip frequency	0.00～5.00Hz（Supplier）
P2−05	Number of motor poles	1～50（4）

P2-01 ~ P2-05 should be set according to the nameplate of the drive motor.

P2−06	No-load current	10.0～80.0%（Supplier）
P2−07	Stator resistance	0.00～50.00%（Supplier）

P2−08	Rotor resistance	0.00～50.00%（Supplier）
P2−09	Leakage inductive reactance	0.00～50.00%（Supplier）
P2−10	Motor parameters self-tuning	0～2（0）

After motor auto-tuning is normally completed, P2-06 ~ P2-09 set value will automatically update. The motor parameters are all relative to value of the given motor rated parameters:

P2-06 No-load current is the actual no-load current of the motor divided by the rated current of the motor and then multiplied by 100%.

P2-07 Stator resistance is the value obtained by multiplying the actual stator resistance by the rated stator current, divided by the motor nominal voltage and then multiplied by 1.732. P2-08 is in the similar way.

P2-09 Leakage reactance is the percentage of leakage inductance in mutual inductance

If the motor cannot be tuned on the spot, user can input manually by referring to the known parameters of the same type of motor.

Note: before tuning, the correct motor rating parameters (P2-01 ~ P2-05) must be set

0：No operation (i.e.tuning is disabled)

1：Static tuning

It is suitable for the occasion where the motor and load is not easy to disengage and fails to complete the rotation tuning.

2：Rotary tuning

6.4 Vector control and VF control parameters (Group P3)

P3−00	Low speed ASR scale coefficient	0.01～30.00（0.60）
P3−01	Low-speed ASR integration coefficient	0.01～10.00（1.00）

P3−02	ASR switching frequency 1	1.00～7.50Hz（5.00Hz）
P3−03	High-speed ASR scale coefficient	0.01～30.00（0.60）
P3−04	High-speed ASR integration coefficient	0.01～10.00（1.00）
P3−05	ASR switching frequency 2	8.00～50.00Hz（10.00Hz）

The parameters P3-00 and P3-01 are the PI tuning parameters when the operating frequency is less than the switching frequency 1 (P3-02). P3-03 and P3-04 parameters are the PI adjustment parameters when the operating frequency is higher than the switching frequency 2 (P3-05). The PI adjustment parameter between switching frequency 1 and switching frequency 2 is a linear switch between the two sets of PI parameters.

By setting the proportional coefficient and integral time of speed controller, user can adjust the dynamic speed response of vector control.

Increasing the proportional coefficient and the integral coefficient can speed up the corresponding dynamic response of speed ring. Oversized scaling coefficient and integration coefficient or undersized integration time may make cause the oscillation of the system.

Recommended adjustment method:

If the factory parameters cannot meet the requirements, slight adjustment should be made on the basis of the factory default parameters: firstly, increase the proportional gain to ensure that the system does not oscillate; then increase the integral coefficient so that the system has faster response property and smaller overshoot.

Note: If the PI parameter is set incorrectly, the speed overshoot may be too large, and to be worse, overvoltage failure may occur even when overshoot falls back.

P3−06	Current loop proportional coefficient	1～1000（20）

P3−07	Current loop integration coefficient	1～100（10）

The current loop dynamic response capability can be changed by adjusting the current loop coefficient, but generally the adjustment is not required.

P3−08	Vector control slip compensation coefficient	50～200%（100%）
P3−09	Speed loop filter time constant	1～100ms（6ms）

Usually the speed estimated by speed sensorless vector control algorithm has some fluctuations. In order to improve the stability of the system, a filter is required to be added. Generally the adjustment of this parameter is not required.

P3−10	Torque limit	0～200%（150%）

The given 100% corresponds to the rated output torque of Inverter matching motor.

P3−11	Cross-compensation coefficient	0.00～0.50（0.00）

In vector control, there is a coupling relationship between torque and magnetic field. Especially at high speed, this parameter can be adjusted to reduce the coupling and improve the control performance.

P3−12	Voltage closed-loop proportional coefficient	0.00～1.00（0.20）
P3−13	Voltage closed loop integration coefficient	0.00～1.00（0.20）

For the vector control, high speed need flux weakening, otherwise the speed does not go. In the process of flux weakening, the output is controlled to be the rated voltage. To adjust these two parameters can improve the voltage control performance.

P3−14	Magnetic field control proportional coefficient	10～1000（50）

P3−15	Magnetic field control integral coefficient	1～500（50）
P3−16	Current reference filter coefficient	1～100ms（10ms）
P3−17	Torque control selection	0～1（0）
P3−18	Torque reference method	0～5（0）
P3−19	Keyboard torque reference	0.0～200.0%（50.0%）
P3−20	Torque reference direction	0～1（0）
P3−21	Upper limit frequency set source option	0～6（0）

In vector control mode, P3-17 is torque control or not. When it is set as 0, the system will carry out speed control. When set to 1, the system will carry out torque control.

P3-18 torque reference:

0：Set torque on the keyboard

1：AI1

2：AI2

3：Multistage torque

4：RS485

5：High-speed pulse

P3-20 Torque reference direction: 0: Forward 1: Reverse

P3-21 Torque control upper limit frequency set source:

0：Set upper limit frequency on the keyboard

1：AI1

2：AI2

3：Multistage set upper limit frequency

4：RS485 setting

5：High-speed pulse 6：Reserved

P3−22	V / F curve type option	0～2（0）

0：Constant torque curve

The output voltage of Inverter is proportional to the output frequency, for most loads, this method is used.

1：Decrease torque curve

Inverter output voltage and output frequency showed a quadratic curve, suitable for fans, pumps and other constant power load.

2. Custom curve

The relationship between output voltage and output frequency is determined by parameters P3-23 to P3-28.

P3−23	Custom curve F1	0.0～100.0%（0.0%）
P3−24	Custom curve V1	0.0～100.0%（0.0%）
P3−25	Custom curve F2	0.0～100.0%（0.0%）
P3−26	Custom curve V2	0.0～100.0%（0.0%）
P3−27	Custom curve F3	0.0～100.0%（0.0%）
P3−28	Custom curve V3	0.0～100.0%（0.0%）

The Inverter automatically sorts F1, F2, F3 and V1, V2, V3 from small to large, such that the minimum frequency Fmin corresponds to the minimum voltage V min, the middle frequency Fmid to the middle voltage Vmid, and the maximum frequency Fmax to the

maximum voltage Vmax. V / F curve consists of five points: (0,0), (Fmin, Vmin), (Fmid, Vmid), (F max, Vmax), (rated frequency, rated voltage).

P3−29	V / F torque boost	0.0～20.0%（Supplier）

It is used to improve low frequency torque feature of Inverter. When operating in the low frequency range, the output voltage of Inverter is increased and compensated. This parameter has no effect when you select a custom curve.

P3−30	Low frequency oscillation suppression strength	0～1000（100）
P3−31	High frequency oscillation suppression strength	0～1000（0）
P3−32	High-low speed frequency turning point	5.00～50.00Hz（20.00Hz）

When the motor has no load or light load, the output current sometimes produces oscillation, which is easy to cause Inverter failure of over-current and over-voltage. Increasing the values of P3-30 and P3-31 can increase the suppression strength of current oscillation, but have a slight influence on the output frequency accuracy. Generally, the two parameters should be as small as possible to satisfy the operation. Its factory default under normal circumstances can meet user requirements.

P3−33	V / F control slip compensation coefficient	0.0～20.0%（0.0%）

6.5 Auxiliary operation parameters (Group P4)

P4−00	Forward & reverse dead time	0.0～5.0s（0.1s）

It is the holding time at zero frequency output when the Inverter changes the direction of rotation. The forward and reverse dead time mainly for the equipment that have large

inertia load and mechanical dead area when change the direction.

P4−01	Hopping frequency 1	0.00～50.00Hz（0.00Hz）
P4−02	Hopping frequency 1 range	0.00～5.00Hz（0.00Hz）
P4−03	Hopping frequency 2	0.00～50.00Hz（0.00Hz）
P4−04	Hopping frequency 2 range	0.00～5.00Hz（0.00Hz）
P4−05	Hopping frequency 3	0.00～50.00Hz（0.00Hz）
P4−06	Hopping frequency 3 range	0.00～5.00Hz（0.00Hz）

When the load carried by the Inverter produces mechanical resonance at a certain frequency point, it is better to use the skip frequency to avoid the resonance point.

A total of 3 Hopping frequency points are provided for choice. If the Hopping frequency range is set to 0, then the Hopping frequency is invalid.

P4−07	Jog frequency	0.00～650.00Hz（5.00Hz）
P4−08	Jog frequency acceleration time	0.1～6000.0s（10.0s）
P4−09	Jog frequency deceleration time	0.1～6000.0s（10.0s）

When inputting the jog command, the Inverter transits to jog frequency for operation as per the set jog acceleration and deceleration time

P4−10	Acceleration time 2	0.1～6000.0s（5.0s）

P4−11	Deceleration time 2	0.1～6000.0s（5.0s）
P4−12	Acceleration time 3	0.1～6000.0s（10.0s）
P4−13	Deceleration time 3	0.1～6000.0s（10.0s）
P4−14	Acceleration time 4	0.1～6000.0s（10.0s）
P4−15	Deceleration time 4	0.1～6000.0s（10.0s）
P4−16	Acceleration and deceleration methods	0～1（0）

They are the set value of the acceleration and deceleration time 2, 3 and 4. The actual acceleration / deceleration time of Inverter operation is selected by external terminal or simple PLC function parameter.

Acceleration and deceleration mode: 0: Linear. Linear acceleration and deceleration are used for most loads; 1: S curve. S curve acceleration and deceleration are mainly designed for the load that requires slowing down the noise and vibration and reducing the impact of the start and stop, as shown in picture 2.

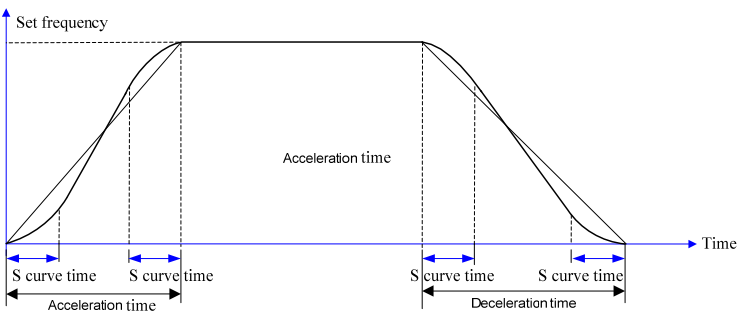


Figure 2 Inverter acceleration and deceleration curve

Acceleration and deceleration terminal 2	Acceleration and deceleration terminal 1	Acceleration and deceleration time option
OFF	OFF	Acceleration and deceleration time 1 (P0-12, P0-13)
OFF	ON	Acceleration and deceleration time 2 (P4-10, P4-11)
ON	OFF	Acceleration / deceleration time 3 (P4-12, P4-13)
ON	ON	Acceleration and deceleration time 4 (P4-14, P4-15)

P4−17	UP / DN terminal acceleration and deceleration speed rate	00.1～100.00Hz/s（1.00）
P4−18	FDT1 (frequency level) setting	0.00～650.00Hz（50.00Hz）
P4−19	FDT1 hysteresis detection value	0.0～100.0%（5.0%）
P4−20	FDT2 (frequency level) setting	0.00～650.00Hz（50.00Hz）
P4−21	FDT2 hysteresis detection value	0.0～100.0%（5.0%）

These four parameters are used to set the two-way frequency detection level. When the output frequency is higher than the FDT setting P4-18 (or P4-20), the selected output terminal (Y terminal or relay) outputs an enabled signal; When the output frequency is lower than a certain value P4-18-P4-18 × P4-19 (or P4-20-P4-20 × P4-21), the selected output terminal (Y terminal or relay) outputs invalid signal.

P4−22	Frequency reaches the detection rate	0.00～20.00Hz（1.00Hz）

This parameter is a supplementary definition of the function of the frequency arrival

signal. When the output frequency of Inverter is within the positive and negative detection range of the set frequency, the selected output terminal (Y terminal or relay) outputs an enabled signal.

P4−23	PWM modulation method	000～111（0）

The unit: over-modulation or not

0：No over-modulation

1：Over-modulation

Tens place: modulation mode

0：low-frequency three-phase modulation, high-frequency two-phase modulation

1：Three-phase modulation

Hundreds place: low frequency processing

0：Carrier frequency greater than 3Khz, low-frequency carrier limited to 3Khz

1：The carrier frequency is operated as set.

P4−24	Automatic voltage regulator (AVR)	0～2（0）

0：No action

1：Action

Automatic voltage regulator function is to ensure that the output voltage of Inverter does not fluctuate with the input voltage, but as the voltage in the grid has vast fluctuation range, it is expected that this function can be activated in the condition that the motor has a more stable stator voltage and current.

2：No action only when decelerating

When decelerating and stopping, if AVR no action is selected, the deceleration time is short, but the running current is relatively large. If AVR always action is selected, the motor will decelerate steadily with smaller running current, but the time will become longer.

P4−25	Droop control	0.00～10.00Hz（0.00Hz）

This function is suitable for multiple Inverters driving the same load. By setting this function, multiple Inverters can achieve even power distribution when driving the same

load. When a certain Inverter has heavy load, the Inverter will automatically reduce the output frequency as per the set parameters in order to remove part of the load. On the commissioning, this value can be gradually adjusted from small to large.

P4−26	Operation monitoring project option 1	0～3999（0100）
P4−27	Operation monitoring project option 2	0～3999（0302）
P4−28	Operation monitoring project option 3	0～3999（0605）

The upper two bits and the lower two bits of each parameter respectively represent a d parameter, and the three parameters can set a total of six d parameters. During Inverter operation, press "Shift key" in the monitoring status and then the keyboard will display the 6 status parameter values of P4-26, P4-27 and P4-28 in sequence.

P4−29	Speed display coefficient	0.1～999.9%（100.0%）

When P4-29 is set to 100.0%, the output frequency displayed by d-09 corresponds to the synchronous speed. Users can set different values according to the gear ratio to meet their needs.

P4−30	Line speed display coefficient	0.1～999.9（10.0）

Multiplied by P4-30 on the basis of the displayed value of d-09 can meet various needs.

P4−31	Multi-function key M function option	0～3（0）

0：Reverse

1：Forward jog

2：Reverse jog

3：Command channel switching

When the current command mode is the keyboard mode,this key is invalid.For other

modes, pressing this key can switch to the keyboard mode.

6.6 Multi-function I / O terminal definition (Group P5)

P5−00	AI1 minimum input	0.00～10.00V（0.00V）
P5−01	AI1 minimum input corresponding setting	-100.0～100.0%（0.0%）
P5−02	AI1 maximum input	0.00～10.00V（10.00V）
P5−03	AI1 maximum input corresponding setting	-100.0～100.0%（100.0%）
P5−04	AI1 filter time constant	0.01～50.00s（0.10s）

The two points (P5-00, P5-01) and (P5-02, P5-03) can be determined by inputting a straight line to obtain the set frequency corresponding to the analog input (when AI1 is used as PID reference or feedback, the percentage representing a real variable can be obtained). When the set frequency is negative, the inverter output is inverted. In order to reduce the impact of analog fluctuations on the Inverter control, the sampled analog is usually filtered by setting P5-04.

P5−05	AI2 minimum input	0.00～10.00V（0.00V）
P5−06	AI2 minimum input corresponding setting	-100.0～100.0%（0.0%）
P5−07	AI2 maximum input	0.00～10.00V（10.00V）
P5−08	AI2 maximum input corresponding setting	-100.0～100.0%（100.0%）

P5−09	AI2 filter time constant	0.01～50.00s（0.10s）

The two points (P5-05, P5-06) and (P5-07, P5-08) can be determined by inputting a straight line to obtain the set frequency corresponding to the analog input (when AI2 is PID reference or feedback, the percentage representing a real variable can be obtained). When the set frequency is negative, the inverter output is inverted. In order to reduce the impact of analog fluctuations on the Inverter control, the sampled analog is usually filtered by setting P5-09.

Analog AI2 is 0 ~ 20mA. 0 ~ 20mA is proportional to 0 ~ 10V.

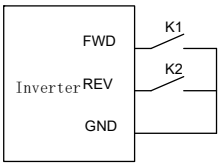
P5−10	PULSE minimum input	0.10～50.00KH（0.10KHz）
P5−11	PULSE minimum input corresponding setting	-100.0～100.0%（0.00%）
P5−12	PULSE maximum input	0.10～50.00KHz(50.00KH）
P5−13	PULSE maximum input corresponding setting	-100.0～100.0（100.00%）
P5−14	PULSE filter time constant	0.01～50.00s（0.10s）

The two points (P5-10, P5-11) and (P5-12, P5-13) can be determined by entering a straight line to get the high-speed pulse input corresponding to the set frequency (when the high-speed pulse is input as PID reference or feedback, the percentage representing a real variable can be obtained). When the set frequency is negative, the inverter output is inverted. In order to reduce the influence of detected high-speed pulse frequency fluctuation on Inverter control, it is usually filtered and set by P5-14.

P5−15	External operation command mode option	0～3（1）

This parameter is used to set the external terminal command control mode:
P5-15 is used to set how the FWD and REV terminals to control Inverter start and stop in terminal operation command reference mode.

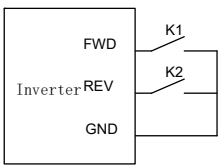
0: Two-wire type 1:



FWD	REV	Start &stop command
0	0	Shut down
0	1	Shut down
1	0	Forward running
1	1	Reverse running

Figure 3 Two-wire operation mode 1

1: two-wire type 2:



FWD	REV	Start &stop command
0	0	Shut down
0	1	Reverse running
1	0	Forward running
1	1	Shut down

Figure 4 Two-wire operation mode 2

2: three-wire type 1:

Xi (i = 1 ~ 6) terminal set "11: three-wire operation control" function.

When K3 is closed, FWD and REV control are enabled; when K3 is disconnected, FWD and REV control are invalid, Inverter is stopped;

The FWD terminal rising edge indicates the forward running command; the rising edge of the REV terminal indicates the reverse running command.

3: Three-wire type 2:

Xi (i = 1 ~ 6) terminal set "11: three-wire operation control" function.

When K3 is closed, FWD and REV control are enabled; when K3 is disconnected, FWD and REV control are invalid, Inverter is stopped;

FWD terminal rising edge indicates operating command; REV terminal open indicates forward direction command; REV terminal close indicates reverse direction command.

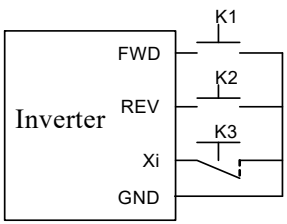


Figure 5 three-wire operation mode 1

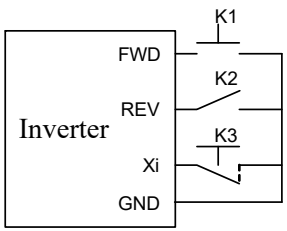


Figure 6 three-wire operation mode 2

P5−16	X1 function selection	0～50（1）
P5−17	X2 function selection	0～50（2）
P5−18	X3 function selection	0～50（7）
P5−19	X4 function selection	0～50（8）
P5−20	X5 function selection	0～50（9）
P5−21	X6 function selection	0～50（10）

0：No function

1：FWD forward command

2：REV reverse command
3：External failure input (normally open)
4：DC braking (enabled in stop)
5：Emergency stop input
6：Failure reset input
7：Multi-speed input 1
8：Multi-speed input 2
9：Multi-speed input 3
10：Multi-speed input 4
11：Three-wire control
12：Terminal UP
13：Terminal DOWN
14：Zero clearing of the terminal
15：Acceleration / deceleration option terminal 1
16：Acceleration / deceleration option terminal 2
17：PLC pause (stop at current frequency) at running
18：PLC status reset (mode 1, 2)
19：Jog forward
20：Jog reverse
21：Pause at swing frequency(stop at current frequency) at running
22：Reset at swing frequency (reset to center frequency) at running
23：PID pause (stop at current frequency) at running
24：Internal timer allowed
25：Internal timer zero clearing
26：Counter trigger input
27：Counter reset (reset to 0)
28：Frequency reference A and B switching
29：Frequency reference A and A + B switching
30：Frequency reference B and A + B switching

When frequency reference is A, function 28 can make A switch to function B; function 29 to switch to A + B; when frequency reference is B, it can be switched to A + B through function 30.

31：Acceleration and deceleration stop

The operating frequency of Inverter is not affected by the external frequency reference signal except for the stop command.

32：Torque control is prohibited

When torque control is selected, this function is enabled and switches to speed control.

33：Length counter input

34：Length counter is cleared

35：Command reference source is forced to the LED keyboard

36: Command reference source is forced to terminal

37：Command reference source is forced to communication control

If the function of 35 ~ 37 are enabled, then the function of large size is given priority, e.g. the function of number 35 is enabled,

38：PID control parameter selection. When Pb-09 = 1 and enabled terminal select this function, the second group is selected by PID proportional, integral and differential parameters; otherwise, the first group is selected.

39：External failure normally closed input

If no failure, the internal control board sampling is enabled; if failure presents,it would be invalid.

40：Pulse input (high speed, enabled only for X6)

P5−27	Y terminal output function selection	0～20（1）
P5−28	Relay TA / TB / TC terminal output function option	0～20（2）

0：No function

1：Operating status

2：Failure output

3：Frequency arrival

4：Detection frequency FDT1 arrival

5：Detection frequency FDT2 arrival

6：Zero speed operation

7：Lower limit frequency arrival

8：Upper limit frequency arrival

9：Specified value of counter arrival (if greater than the specified value, it will output ON signal)

10：Final value of counter arrival (if equal to the final value, it will output ON signal of a count clock cycle)

11：Internal timer arrival (it will output ON signal of one timing unit)

12：Run-time reached (if greater than the set time, it will output on signal)

13：PLC phase operation completed (it will output 0.5S ON signal)

14：PLC operation cycle is completed (it will output 0.5S ON signal)

15：Over-torque pre-warning

16：Inverter standby

17：Length arrival

18：In sleep

19：AI1 overrun

20：Module temperature arrival

P5−34	AO1 terminal output function selection	0～20（0）
P5−35	AO1 represented variable 0% corresponds to analog output	0.0～100.0%（0.0%）
P5−36	AO1 represented variable 100% corresponds to analog output	0.0～100.0%（100.0%）

Analog AO1 represents variable options:

0：Set frequency (100% corresponds to the upper limit frequency)

1：Operating frequency (100% corresponds to the upper limit frequency)

2：Output current (100% corresponds to 200% of rated current)

3：Bus voltage (100% corresponds to 150% of rated bus voltage)

4：Output voltage (100% corresponds to 100% of rated voltage)

5：Output power (100% corresponds to 200% of rated power)

6：Torque current (100% corresponds to 200% of rated current)

7： AI1

8： AI2

9：Expansion AI3

10：High-speed pulse input

11：RS485 setting

12：Length (100% corresponds to the length set by P9.06)

13：Count value (100% corresponds to the final count value set by P9.05)

14～20：Reserved

User terminal AO1, function code P5-35, P5-36 100.0%, corresponding to 10.00V.

P5−39	AO2 output mode selection	0～1（0）
P5−41	AO2 output selection	0～20（1）
P5−42	AO2 represented variable 0% corresponds to analog output	0.0～100.0%（0.0%）
P5−43	AO2 represented variable 100% corresponds to analog output	0.0～100.0%（100.0%）

AO2 output mode selection:

0：Analog output, 100.0% of P5-42, P5-43, corresponding to 20mA.

1：Reserved

6.7 Process PID Closed-loop Parameters (Group P6)

P6−00	PID reference channel selection	0～7（2）

This parameter is used to select input channel for the PID command:

0：Keyboard potentiometer reference 1：Reserved

2：P6.01 reference 3：AI1

4：AI2 5：RS485 reference

6：High-speed pulse reference 7：Multi-speed reference

In PID control mode, the setting value 100.0 corresponds to the set maximum value (corresponding to the maximum feedback amount).

P6-02	PID feedback channel selection	0～3（0）

This parameter is used to select the PID feedback channel:

0：AI1 1：AI2

2：High-speed pulse reference 3：RS485

P6-03	Adjusting property	0～1（0）

0：Positive property.

It means that the reference is greater than the feedback, so PID output increases.

1：Negative property

It means that the reference is less than the feedback, so PID output increases.

P6-04	Proportional gain	0.0～50.0（10.0）
P6-05	Integral time constant	0.1～100.0s（3.0s）
P6-06	Differential gain	0.0～5.0（0.0）

The parameters of the built-in PID controller should be adjusted according to the actual needs and system property.

P6-08	Preset frequency	0.0～100.0%（50.0%）
P6-09	Preset frequency hold time	0.0～3000.0s（0.0s）

When PID output is selected as frequency reference, in order to achieve the desired PID control effect quickly, it is sometimes necessary to run a certain period of time according to a preset frequency before starting PID, and then switch to PID control. This pre-set frequency is determined by P6-08 and the duration is determined by P6-09.

P6−10	Feedback break detection threshold	0.0～100.0%（5.0%）
P6−11	Feedback disconnection judgment time	0.0～3000.0s（0.0s）

When P6-11 is set to 0, the PID feedback disconnection detection has no effect. When the set value is greater than 0, the system reports a PID disconnection fault when the feedback signal is less than P6-10 and the time exceeds P6-11.

P6−12	PID negative output limit	0.0～100.0%（0.0%）
P6−13	Maximum value of twice output	0.00～100.00%（1.00%）

The maximum PID output is 100%, corresponding to the upper limit frequency. In some occasions, PID output is expected to control the forward and reverse of motor. Set P6-12 as a non-zero value and the Inverter can achieve automatic adjustment of forward and reverse speed based on the deviation of the reference and feedback signal. In order to reduce the impact of rapid changes in PID output on the load system, adjusting the P6-13 can achieve the perfect unity of speed and stability.

6.8 Multi-speed and PLC parameters (Group P7)

P7−00	Programmable multi-speed operation setting	0000～1112（0002）

This parameter determines the PLC operation mode by the place configuration of ones, tens, hundreds and thousands.

The unit:

0：Stop after single run　　1：Keep the final value after single run

2：Unlimited cycle operation

After a cycle, start again from the first speed stage in operating time that is not 0 and take turns.

Tens place:

0：The running time unit is seconds 1：The running time unit is minutes

Hundreds place: Reserved

Thousands place:

0：Each starts from the first 0 segment 1：Each start from the interrupt start frequency

P7−01	Multi-speed frequency 0	0.0～100.0%（10.0%）
P7−02	Multi-speed frequency 1	0.0～100.0%（20.0%）
P7−03	Multi-speed frequency 2	0.0～100.0%（30.0%）
P7−04	Multi-speed frequency 3	0.0～100.0%（40.0%）
P7−05	Multi-speed frequency 4	0.0～100.0%（50.0%）
P7−06	Multi-speed frequency 5	0.0～100.0%（70.0%）
P7−07	Multi-speed frequency 6	0.0～100.0%（80.0%）
P7−08	Multi-speed frequency 7	0.0～100.0%（100.0%）
P7−09	Multi-speed frequency 8	0.0～100.0%（10.0%）

P7−10	Multi-speed frequency 9	0.0～100.0%（20.0%）
P7−11	Multi-speed frequency 10	0.0～100.0%（30.0%）
P7−12	Multi-speed frequency 11	0.0～100.0%（40.0%）
P7−13	Multi-speed frequency 12	0.0～100.0%（50.0%）
P7−14	Multi-speed frequency 13	0.0～100.0%（70.0%）
P7−15	Multi-speed frequency 14	0.0～100.0%（80.0%）
P7−16	Multi-speed frequency 15	0.0～100.0%（100.0%）

These parameters are used to set the output frequency when the terminal controls multi-speed operation or programmable multi-speed (simple PLC) operation. The following table shows the corresponding multi- speed frequency after multi-speed terminal combine. Among them, the multi-speed control terminal corresponds to 1 that is enabled, while the corresponding 0 is invalid.

Multi-speed control terminal is selected by parameter P5-16 ~ P5-21.

Control terminal 1	Control terminal 2	Control terminal 3	Control terminal 4	Corresponds to multi-speed	Control terminal 1	Control terminal 2	Control terminal 3	Control terminal 4	Corresponds to multi-speed
0	0	0	0	0	0	0	0	1	8
1	0	0	0	1	1	0	0	1	9
0	1	0	0	2	0	1	0	1	10
1	1	0	0	3	1	1	0	1	11
0	0	1	0	4	0	0	1	1	12
1	0	1	0	5	1	0	1	1	13
0	1	1	0	6	0	1	1	1	14
1	1	1	0	7	1	1	1	1	15

When PLC is running, running direction and running time are set by parameters P7-17 ~ P7-48.

P7−17	Phase 0 run time	0.0～3000.0s（10.0s）
P7−18	Phase 0 running direction and acceleration and deceleration	0～31（0）
P7−19	Phase 1 run time	0.0～3000.0s（10.0s）
P7−20	Phase 1 running direction and acceleration and deceleration	0～31（0）
P7−21	Phase 2 run time	0.0～3000.0s（10.0s）
P7−22	Phase 2 running direction and acceleration and deceleration	0～31（0）

P7−23	Phase 3 run time	0.0～3000.0s（10.0s）
P7−24	Phase 3 running direction and acceleration and deceleration	0～31（0）
P7−25	Phase 4 run time	0.0～3000.0s（10.0s）
P7−26	Phase 4 running direction and acceleration and deceleration	0～31（0）
P7−27	Phase 5 run time	0.0～3000.0s（10.0s）
P7−28	Phase 5 running direction and acceleration and deceleration	0～31（0）
P7−29	Phase run time	0.0～3000.0s（10.0s）
P7−30	Phase 6 running direction and acceleration and deceleration	0～31（0）
P7−31	Phase 7 run time	0.0～3000.0s（10.0s）
P7−32	Phase 7 running direction and acceleration and deceleration	0～31（0）

P7−33	Phase 8 run time	0.0～3000.0s（10.0s）
P7−34	Phase 8 running direction and acceleration and deceleration	0～31（0）
P7−35	Stage 9 run time	0.0～3000.0s（10.0s）
P7−36	Phase 9 running direction and acceleration and deceleration	0～31（0）
P7−37	Phase 10 run time	0.0～3000.0s（10.0s）
P7−38	Phase 10 running direction and acceleration and deceleration	0～31（0）
P7−39	Phase 11 run time	0.0～3000.0s（10.0s）
P7−40	Step 11 running direction and acceleration and deceleration	0～31（0）
P7−41	Phase 12 run time	0.0～3000.0s（10.0s）
P7−42	Phase 12 running direction and acceleration and deceleration	0～31（0）

P7−43	Phase 13 run time	0.0～3000.0s（10.0s）
P7−44	Phase 13 running direction and acceleration and deceleration	0～31（0）
P7−45	Phase 14 run time	0.0～3000.0s（10.0s）
P7−46	Phase 14 running direction and acceleration and deceleration	0～31（0）
P7−47	Phase 15 run time	0.0～3000.0s（10.0s）
P7−48	Phase 15 running direction and acceleration and deceleration	0～31（0）

The running direction and acceleration / deceleration time of each phase are determined by setting of different ones and tens:

The unit:

0：Run forward

1：Run reverse

Tens:

0：Acceleration and deceleration time 1

1：Acceleration and deceleration time 2

2：Acceleration and deceleration time 3

3：Acceleration and deceleration time 4

6.9 Communication Parameters (Group P8)

P8−00	Communication baud rate	0～7（5）

It is used to specify the baud rate for RS485 communication.Communication parties must set the same baud rate.

0：300 bps
1：600 bps
2：1200 bps
3：2400 bps
4：4800 bps
5：9600 bps
6：19200 bps
7：38400 bps

P8−01	Data Format	0～2（0）

It is used to specify the data format for RS485 communication.All communication parties must adopt the same data format.

0：1 bit for start, 8 bits for data, 1 bit for stop, no parity.
1：1 bit for start, 8 bits for data, 1 bit for stop, odd parity.
2：1 bit for start, 8 bits for data, 1 bit for stop, even parity.

P8−02	Local address	0～247（1）

This parameter is used to set the Inverter site in RS485 communication. The Inverter only receives the host computer's data corresponding to the site of this place. Communication protocol uses the standard MODBUS RTU protocol, see Appendix 1 for details. When this parameter is set to 0, no data is returned for the broadcast address.

P8−03	Local response delay	0～100ms（5ms）

Response delay targets to the time when Inverter receives 485 instructions, processes it, and returns to host computer.

P8−04	Time out judgment	0.0～100.0s（0.0s）

When 485 communication is unsuccessful and its duration exceeds the set time of this parameter, the Inverter will recognize the communication fault. When this parameter is set to 0.0, the timeout judgment function is invalid.

P8−05	Master/slave option	0～1（0）

0：Slave station

1：Master station

When it is the main station, real-time broadcast is performed to send the Inverter's operating frequency and operating conditions for the slave station to follow it.

P8−06	RS485 set frequency proportional coefficient	0.0～999.9%（100.0%）

RS485 receives the host computer signal, multiplied by P8-06 as the actual reference frequency.

P8-07	Write operation returns data or not	0～1（0）

0：Return

1：Not return

P8−08	Automatically reset time after disconnection	0.0～100.0s（0.0s）

After the RS485 communication is disconnected, it will automatically reset after the set time. When this value is 0, the automatic resetting function is invalid.

6.10 Advanced Parameters (Group P9)

P9−00	Swing frequency amplitude	0.0～100.0%（0.0%）
P9−01	Kick frequency range	0.0～50.0%（0.0%）

P9−02	Triangle wave rise time	0.0～3600.0s（5.0s）
P9−03	Triangle wave fall time	0.0～3600.0s（5.0s）
P9−04	Counter specified value	0～65535（1000）
P9-05	Final value of counter	0～65535（2000）

External pulse is received through the multi-function input terminal and counted. When the count value reaches the specified value of P9-04, if function 9 (counter specified value arrival)is selected by the multi-function output terminal Y or relay output function, it will output an active electric level until the counter is cleared.

When the count value reaches the final value of P9-05 counter, if the multi-function output terminal Y or relay output function selects the function 10 (the counter final value reaches), a count cycle active level will output.

P9−06	Set length	0～65535m（1000m）
P9−07	Pulse number per meter	0.1～6553.5（100.0）

Set length and pulse per meter are mainly used for fixed-length control. The actual length is calculated by the pulse signal input from the switch input terminal:

Actual Length = Length count input pulse / Pulse number per meter.

P9−08	Internal timer timing unit	0.01～99.99s（1.00s）
P9−09	Internal timer period	1～65535（10）

The internal timer is enabled by the multi-function input terminal. When the timer is set to P9-08 × P9-09, and the multi-function output terminal Y or relay output select the

function No. 11 function (internal timer arrival), a timing unit of enabled signal is output.

P9−10	Set operating time	0～65535H（65535H）

When the operation time is longer than P9-10 and function No. 12 (operation time arrival) is selected by multi-function output terminal Y or relay output, an enabled signal is output.

6.11 Enhanced Control Parameters (Group PA)

PA−00	V / F separated or not	0～2（0）
PA−01	Voltage source option	0～5（0）
PA−02	Set voltage reference on the keyboard	0.0～100.0%（0.0%）
PA−03	Voltage acceleration and deceleration time	0.1～3600.0s（0.1s）

When VF control is selected, PA-00 is voltage separation parameters or not:

0: Not separate, i.e. normal VF control

1：Half separate. The Inverter output voltage has linear relationship with frequency. The ratio of both is controlled at the same time by the PA-01 selected voltage source.

2：Completely separate. The Inverter output voltage has nothing to do with the frequency, only controlled by the PA-01 selected voltage source.

PA-01 voltage source option:

0：PA−02 set value 1：AI1 2：AI2

3：Keyboard potentiometer 4：PID 5: AI1+PID

PA-02 is the set voltage reference

100.0% corresponds to the motor rated voltage

PA-03 voltage acceleration and deceleration time

It means the time required from zero to rated voltage.

6.12 Enhanced Function Parameters (Group Pb)

Pb−00	Remote pressure gauge range	0.001～60.000mpa（1.600）
Pb−01	Pressure setting on the keyboard	0.001～60.000mpa（0.500）
Pb−02	Modify whether to store keyboard settings automatically	0～1（1）
Pb−03	Sleep frequency	0.00～600.00Hz（0.00Hz）
Pb−04	Sleep delay time	0.0～3000.0s（60.00s）
Pb−05	Wake up pressure	0.0～100.0%（0.0%）
Pb−06	Wake up delay time	0.0～60.0s（0.5s）
Pb−07	Underload protection value	0.0～100.0%（0.0%）
Pb−08	Allow underload time	5.0～600.0s（20.0s）

Pb-00 Remote pressure gauge range refers to the actual pressure gauge range. The pressure gauge output 10V or 20mA corresponds to the pressure value.

Pb-01 Pressure setting on the keyboard. When the PID reference frequency is selected and PID reference is selected as Pb-01, the Pb-01 can be modified by the keyboard up and down keys in the monitoring status while running or stopped.

Pb-02 determines whether the modified set value is stored automatically. 0: Not save automatically unless SET is pressed to save. 1: Save automatically, It need 10s after modification finishes. This parameter also affects whether P0-07 and P6-01 parameters

are stored automatically.

The Inverter goes to sleep (output frequency is 0) when the PID output frequency is less than Pb-03 setting and duration is longer than Pb-04. When the feedback pressure is less than a certain value (Pb-05 multiplied by the set pressure), and When the duration exceeds Pb-06, the Inverter exits the sleep state and restart to work.

When Pb-07 is 0.0, no underload protection is performed. When Pb-07 is non-zero and the value of Inverter output current (% of rated current) is less than Pb-07 set value and duration is longer than Pb-08, it will report E.UL fault.

Pb−09	PID parameter option	0～3（0）
Pb−10	Proportional gain 2	0.0～50.0（5.0）
Pb−11	Integral time constant 2	0.0～100.0s（10.0s）
Pb−12	Differential gain 2	0.0～5.0（0.0）
Pb−13	PID parameter switching deviation 1	0.0～100.0%（20.0%）
Pb−14	PID parameter switching deviation 2	0.0～100.0%（80.0%）
Pb−15	PID parameter switching frequency 1	0.0～100.0%（20.0%）
Pb−16	PID parameter switching frequency 2	0.0～100.0%（80.0%）

Pb-09 PID parameter selection:

0: Select the first group (P6-04, P6-05, P6-06) for PID proportional coefficient, integral time constant and differential gain.

1: Select (function 38) as per the terminals for PID proportional coefficient, integral

time constant and differential gain. If this function is invalid, select the first group (P6-04, P6-05, P6-06). If the function is enabled, select the second group (Pb-10, Pb-11, Pb-12).

2: The actual PID proportional coefficient, integral time constant and differential gain are adjusted according to the deviation. When the deviation is less than Pb-13, run it as per the first group (P6-04, P6-05, P6-06) ; When it is greater than Pb-14, run it as per the second group (Pb-10, Pb-11, Pb-12); when the deviation is greater than Pb-13 and less than Pb-14, the actual parameters are obtained by linear interpolation.

3: The actual PID proportional coefficient, integral time constant and derivative gain are adjusted according to the output frequency. When the output frequency is less than Pb-15, run it as per the first group (P6-04, P6-05, P6-06); When it is greater than Pb-16, run it as per the second group (Pb-10, Pb-11, Pb-12); when the output frequency is greater than Pb-15 and less than Pb-16, then the actual parameters are obtained by linear interpolation.

6.13 Protection parameters (Group Pd)

Pd−00	Current limit value	100.0～200.0%（Supplier）
Pd−01	Over-current frequency down time	1.0～200.0s（5.0s）

In order to suppress frequent overcurrent failure, when Inverter current is too large, the Inverter quickly reduces frequency to suppress the oversized current.

Pd−02	Overvoltage limit value	110.0～145.0%（130.0%）
Pd−03	Overvoltage suppression gain	0～10（2）

During the deceleration of Inverter, the kinetic energy of motor feeds back to the bus voltage, which will raise the bus voltage. In order to restrain overvoltage fault, the Inverter automatically prolongs the deceleration time when bus voltage rises to a certain value.

Pd-02 is the percentage of the rated DC bus (311 V for a 220 V rated bus voltage and 537 V for a 380 V system).

Pd-03 the greater this value is set, the stronger ability the overpressure suppression .

Pd−04	Phase loss protection	00～11（11）

The unit: input phase loss. Low power input has no phase loss protection

0：No protection

1：Protection

Tens place: output phase loss

0：No protection

1：Protection

Pd−05	Motor overload protection	20.0～100.0%（100.0%）

This parameter is used to set the sensitivity for Inverter to thermal relay protection of the load motor. When the rated current of the load motor does not match the rated current of Inverter, the correct thermal protection of the motor can be achieved by setting this value. The smaller the setting, the easier it is to report motor overload protection.

Pd−06	Over torque pre-warning value	20.0～200.0%（150.0%）
Pd-07	Over torque detection time	0.0～60.0s（0.1s）

When the Inverter current is greater than Pd-06 and duration is longer than Pd-07, the active electric level will be output if Multi-function Output Terminal Y1 or Relay Output selects function 15 (Over Torque Pre-alarm)

Pd−08	Fault automatic reset times	0～5（0）
Pd−09	Fault automatic reset interval	0.1～600.0s（1.0s）

In the course of running, due to the fluctuation of the load, fault and stop of output may accidentally appear. In this case, user can use the fault self-recovery function to avoid the equipment stops. In the set number of times if Inverter cannot successfully

resume operation, the fault protection will be activated to stop the output. When the number of fault self-recovery times is set to zero, the self-recovery function is turned off. Self-recovery function is invalid to overload and overheating caused by fault protection.

Pd−14	Fault type record 2	0～30（0）
Pd−15	Fault type record 1	0～30（0）
Pd−16	Fault type record 0 (Latest)	0～30（0）
Pd−17	Output frequency of latest fault	0～650.00Hz（0.00Hz）
Pd−18	Output current of latest fault	0～3000.0A（0.0A）
Pd−19	Bus voltage of latest fault	0～800V（0V）

Note: for details of failure, please check the fault table of chapter 7

Chapter 7 Fault Diagnosis

7.1 List of Fault and Alarm Information

FV20−M serial inverter is equipped with complete protection functions to provide efficient protection while utilizing its performance sufficiently. Some failure instructions may be displayed during operation. Compare the instructions with the following table and analyze,assess the causes and solve failures.

For damages on equipment or questions that can't be resolved, please contact with local distributors/agents, service centers or manufacturer for solutions.

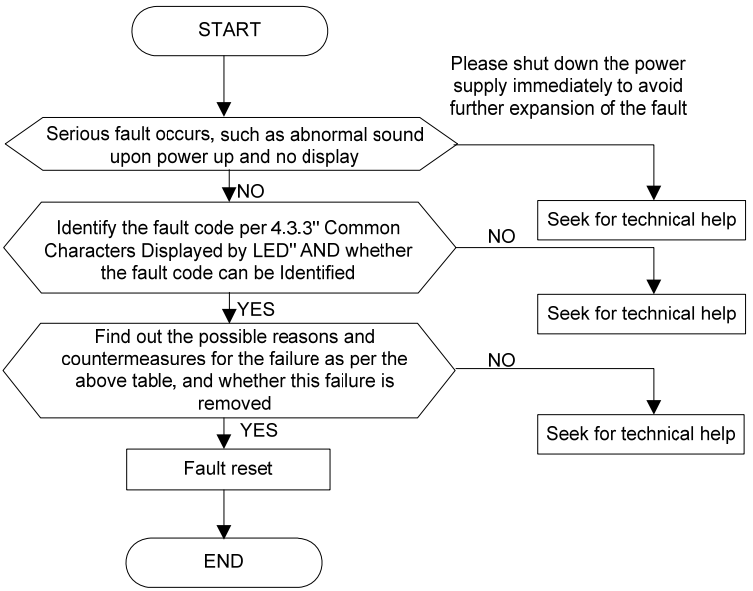
Failure No.	Failure code	Failure description	Potential causes	Solutions	Number
01	E. SC	Output short circuit fault	1. Output short circuit or grounding 2. Heavy load	1. Check the wiring 2. Seek for technical support	01H
02	E. OC1	Over current protection when acceleration operates	1. Acceleration time is too short 2. The torque is too high or the V/F curve doesn't fit	1. Prolong acceleration time 2.Reduce torque, boost voltage and Adjust V/F curve	02H
03	E. OC2	Over current protection when deceleration operates	Deceleration time is too short	Prolong deceleration time	03H
04	E.OC3	Over current protection when operating with constant speed	Sudden change of load during operation	Reduce load fluctuation	04H
05	E.OC4	Over current because of software	Same as E.OC1, E.OC2, E.OC3	Same as E.OC1, E.OC2, E.OC3	05H
06	E.232.	Internal downlink on communication failure	Hardware problem	Seek for technical support	06H
07	E.Gnd	Ground fault	1.Output grounding of motor or inverter 2.Inverter input and output for line contact	1. Check wiring 2. Check whether the motor is aging	07H
08	E.OU1	Over voltage protection when acceleration operates	1. High input voltage 2. The power supply frequently opens and closes	Check power supply voltage	08H

Failure No.	Failure code	Failure description	Potential causes	Solutions	Number
09	E. OU2	Over voltage protection when deceleration operates	1. Deceleration time is too short 2. Abnormal input voltage	1. Prolong deceleration time 2. Check power supply voltage 3. Install or reselect braking resistor	09H
10	E.OU3	Over voltage protection when operation with constant speed	1. Abnormal power supply voltage 2. There is an energy feedback with load	1.Check power supply voltage 2. Install or reselect braking resistor	0AH
14	E. UL	Underload	1. Inverter output line virtual connection 2. Inverter load disappears	1. Check wiring 2. Check the inverter load	0EH
15	E.OL1	inverter overload protection	1. The load is too large 2. Too short acceleration time 3. The torque is too high or the V/F curve doesn't fit 4. The grid voltage is too low	1. Reduce load or change to larger capacity inverter 2. Prolong the acceleration time 3. Reducing torque boost voltage, Adjust V/F curve 4. Check the grid voltage	0FH
16	E.OL2	Motor overload protection	1. The load is too large 2. Too short acceleration time 3. The protection factor is set too small 4. The torque is too high or the V/F curve doesn't fit	1. Reduce load 2. Prolong the acceleration time 3. Increase the motor overload protection coefficient 4. Reduce torque, boost voltage, Adjust V/F curve	10H
17	E.CUr	Current detection fault	1.Current detection device or circuit damage 2. There are problems with the auxiliary power supply	Seek for technical support	11H
18	E. LU	Running undervoltage	1. Abnormal power supply voltage 2. There is a large load starting in the power grid	1.Check power supply voltage 2. Separate the power supply	12H
19	E.EF1	Frequently opened terminal equipment failure	The external device of the inverter has a signal input	Check signal source and related equipment	13H
20	E.EF2	Frequently closed terminal equipment failure	The external device of the inverter has a signal input	Check signal source and related equipment	14H
21	E.OH	Inverter overheat	1. Blockage of air duct	1. Clean the dusts, wools and	15H

Failure No.	Failure code	Failure description	Potential causes	Solutions	Number
			2. Too high ambient temperature 3. Fan failure	other objects in the air duct. 2. Lower the ambient temperature and strengthen ventilation and heat dissipation. 3. Replace a new fan of the same model.	
22	E.SP1	Input phase loss	1. The input voltage loss phase 2. The input voltage is too low	1. Check the input connector 2. Check the power grid loss phase or not	16H
23	E.SP0	Output phase loss	The connection between inverter and motor is defective or disconnected	Check wiring	17H
24	E.EEP	Memory failure	Hardware failure	Seek for technical support	18H
25	E.End	Run time to	Internal Settings allow running time to arrive	Seek for technical support	19H
26	E. PID	PID feedback failure	1. The PID feedback signal line is disconnected 2. The sensor used to detect the feedback signal has failed 3. The feedback signal is inconsistent with the setting	1. Check the feedback channel 2. Check the sensor for failure 3. Verify that the feedback signal meets the setting requirements or not	1AH
27	E.485	RS485 communication failure	Error sending and receiving data during serial communication	1. Check wiring 2. Seek for technical support	1BH
28	E.doG	disturb	Misoperation caused by ambient electromagnetic interference	The disturbance source and absorption circuit around the inverter	1CH
29	E.232	Internal uplink communication failure	Hardware failure	Seek for technical support	1DH

This series of inverter records the failure code of the last three times and the output parameters of the inverter in the last one. The check can help to find out the cause of the failure.

7.2 Troubleshooting Procedures



Chapter 8 Routine Repair and Maintenance

The application environment (such as temperature, humidity, dust and powder, wool, smoke and oscillation), burning and wearing of internal devices and other factors may increase the possibilities of inverter failure. To reduce the failures and prolong the service life the inverter, it is necessary to conduct routine repair and periodic maintenance.

Note:

1. Only the personnel receiving professional training can dismantle and replace the inverter components.
2. Before inspection and maintenance, please make sure that the power supply to the inverter has been shut down for at least ten minutes ,or there may be risks of electric shock.
3. Do not leave metal components and parts in the inverter, or it may damage the inverter.

8.1 Routine Maintenance

The inverter shall be used under the allowable conditions as recommended in this manual and its routine maintenance shall be conducted as per the table below.

Item	Inspection Contents	Inspection Means	Criteria
Operation Environment	Temperature	Thermometer	−10 ~ +40ºC Derated at 40 to 50ºC, and the rated output current shall be decreased by 1% for every temperature rise of 1ºC.
	Humidity	Humidiometer	5 ~ 95%, no condensing
	Dust, oil, water and drop	Visual check	There are no dust, oil, water and drop.
	Vibration	Special test instrument	3.5mm, 2~ 9Hz; 10m/s^2,9~ 200Hz; 15m/s^2,200~ 500Hz
	Gas	Special test instrument, smell check and visual check	There are no abnormal smell and smoke.
Invert	Overheat	Special test instrument	Exhaust normal

er	Noise	Listen	There is no abnormal noise.
	Gas	Smell and visual check	There are no abnormal smell and smoke.
	Physical appearance	Visual check	The physical appearance is kept intact.
	Heatsink fan ventilation	Visual check	There are no fouling and wool that block the air duct.
	Input current	Amperemeter	In the allowable operating range. Refer to the nameplate.
	Input voltage	Voltmeter	In the allowable operating range. Refer to the nameplate.
	Output current	Amperemeter	In the rated value range. It can be overloaded for a short while.
	Output voltage	Voltmeter	In the rated value range.
Motor	Overheat	Special test instrument and smell.	There are no overheat fault and burning smell.
	Noise	Listen	There is no abnormal noise.
	Vibration	Special test instrument	There is no abnormal oscillation.

8.2 Periodic Maintenance

It needs to perform periodic inspection on the inverter once every three to six months according to the application environment and work conditions.

Item	Inspection Contents	Inspection Means	Criteria
Inverter	Main circuit terminal	Screwdriver/sleeve	The screws are tightened and the cables are kept well.
	PE terminal	Screwdriver/sleeve	The screws are tightened and the cables are kept well.
	Control circuit terminal	Screwdriver	The screws are tightened and the cables are kept well.
	Reliability of internal connections and connectors	Screwdriver and hands	Connection is firm and reliable.
	Expansion card connector	Screwdriver and hands	Connection is firm and reliable.
	Mounting screws	Screwdriver/sleeve	The screws are tightened.
	Cleaning the dusts and powders	Cleaner	There are no dusts and wools.
	Internal foreign objects	Visual check	There are no foreign objects.

Motor	Insulation test	500VDC megameter	Normal

8.3 Component Replacement

Different types of components have different service lives. The service lives of the components are subject to the environment and application conditions. Better working environment may prolong the service lives of the components. The cooling fan and electrolytic capacitor are vulnerable components and shall be conducted routine inspection as per the table below. If any fault occurs, please conduct immediate replacement.

Vulnerable Compone	Damage Causes	Solutions	Items for Routine Inspection
Fan	Bearing wear, blade aging	Change	The fan blade has no cracks and rotates normally. The screws are tightened.
Electrolytic capacitor	Ambient temperature is relatively high and electrolyte volatilizes.	Change	There are no electrolyte leakage, color change, crack and shell inflation. The safety valve is normal. Static capacity is equal to or higher than the initial value times 0.85.

Note:

When the inverter is stored for a long period of time, power connection test shall be conducted once within two years and test lasts at least five hours. It can use voltage regulator to gradually increase the value to the rated value when power connection is performed.

Appendix Modbus Communication Protocol

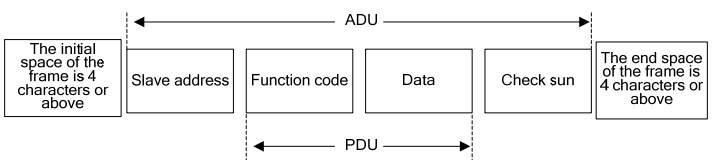
1 Support Protocol

Support Modbus protocol, RTU format, Broadcast address 0, slave address “1−247”, “248−255” for reservation.

2 Interface mode

RS485: Asynchronous, half duplex, LSB sending priority. Low byte is after the high byte. Inverter communication port (terminal RS485A/B) is default data format: 8−N−1, 9200 bps, see P8 function code specification.

3 Protocol Format



Attached Figure1 Protocol Format

ADU (Application Data Unit) check is the CRC16 check of the first three parts of ADU and obtained through exchange of high byte and low byte.

If the operation request is rejected, the feedback of PDU(Protocol Data Unit) will be error code or abnormal code. Error code equals to function code +0x80, abnormal code shows the error cause in detail.

Examples for abnormal codes:

Abnormal code	Definition	Abnormal code	Definition
0x01	Invalid command	0x02	Invalid address
0x03	Invalid data	0x04	CRC errors
0x05	Parameters are unchangeable.		

The exception code frame is as follows:

Address	Abnormal prompt	Abnormal code	Checksum
0x01	0x86	0x0004	0xE1F2

4 Function Interpretation

◆ Function 0x03 reads parameters and status words of multiple function code in inverter. (max for 5 consecutive reads)

PDU Part Contents	Data Length (Byte)	Range
Request:		
Function code	1	0x03
Initial address of register	2	0x0000 ~ 0xFFFF
Number of registers	2	0x0001 ~ 0x0010
Response:		
Function code	1	0x03
Read bytes	1	2*Number of registers
Read contents	2*Number of registers	

◆ Function 0x06 rewrites single function code or control parameter of the inverter

PDU Part Contents	Data Length (Byte)	Range
Request:		
Function code	1	0x06
Register address	2	0xF000～0xFFFF （0x0000～0x0FFF）
Register data	2	0xF000～0xFFFF （0x0000～0x0FFF）
Response:		
Function code	1	0x06
Register address	2	0xF000～0xFFFF （0x0000～0x0FFF）
Register data	2	0xF000～0xFFFF （0x0000～0x0FFF）

☞ **Note:**

1.0 xFFFF and 0x0FFF represent the same function code, write off the power with 0xFFFF, and write off the power with 0x0FFF. If you modify the function code frequently, it is recommended to use 0x0FFF format to write RAM instead of EEPROM.

2. The EEPROM life of the inverter is about 100,000 times, and the EEPROM can be damaged in a few days or weeks when a function code is frequently rewritten.By using

only the method of RAM, you can avoid EEPROM damage.

5 Inverter Register Address

Address Space	Meaning
0x0000～0x0FFF or 0xF000～0xFFFF	The corresponding register address calculation method in inverter function code : The bytes at higher refer to group number of function code. The bytes at low orders refer to sequence number in group and expressed with HEX adecimal. P0～Pd corresponds to the bytes at higher orders such as 0x00～0x0d 或 0xF0～0xFd. for example, the Modbus address of function code Pb-23 is (0x0b<<8)+23=0x0b17; If it needs to be saved for power down, the corresponding address is 0xFb17.
0x1000～0x1015	Monitor parameters, correspond to d0-00 ~ d0-21, read only
0x5000	Failure number, read only
0x8000～0x800D	The register for control word of the inverter. Refer to Attached Table 2 for details.

The bits for the control command word (0x8000) of the inverter are defined as follows

Bit	Meaning	Bit	Meaning
0	0: Stop command 1: Running command	3	0: Jog disabled 1: Jog command enabled
1	0: Run forward 1: Run reverse	14	0: Emergency stop disabled 1: Emergency stop enabled
2	0: Reset disabled 1: Reset enabled	15	0: Coast to stop disabled 1: Coast to stop enabled
Note: Bits 4 ~ 13 are reserved.			

6 CRC16 Function

```
unsigned int    crc16（unsigned char *data，unsigned char length）
{
    int i，crc_result=0xffff；
    while（length--）
    {
```

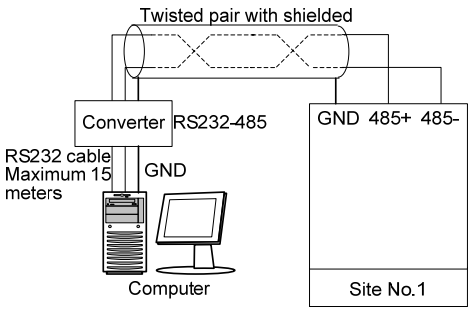
```
        crc_result^=*data++；
        for（i=0；i<8；i++）
        {
            if（crc_result&0x01）
                crc_result=（crc_result>>1）^0xa001；
            else
                crc_result=crc_result>>1；
        }
    }
    return （crc_result=（（crc_result&0xff）<<8）|（crc_result>>8））；//交换 CRC16 校验和高低字
}
```

7 Case Study of Modbus Communication Control

No.1 inverter stops in the default mode:					
	Address	Function code	Register Address	Register Contents	Check Sum
Request	0x01	0x06	0x8000	0x0000	0xA00A
Response	0x01	0x06	0x8000	0x0000	0xA00A

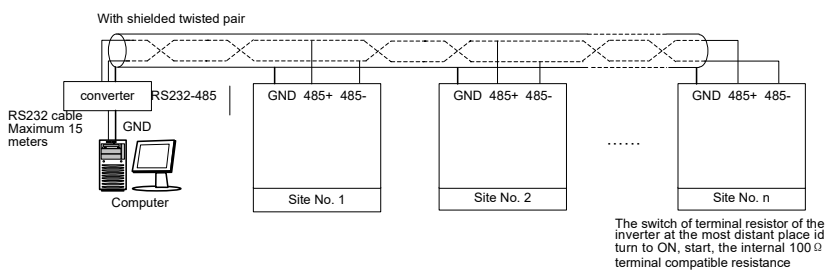
8 Communication Network Construction

◆ Connecting one inverter to the computer



Attached Figure2 Connecting One Inverter to the Computer

◆ Connecting multiple inverters to the computer



Attached Figure3 Connecting Multiple Inverters to the Computer