Preface

Thank you for purchasing the GT20 series inverter developed and produced by Shenzhen Easydrive Electric Co., Ltd.!

The GT20 series inverter is a universal high-performance inverter with advanced control performance such as large low-frequency torque, self-identification of motor parameters, and optimal acceleration and deceleration control; it has functions to meet different process requirements, such as multi-step control and simple PLC control , PI control, fixed-length control, droop control, automatic energy-saving operation, flexible frequency setting method, diversified frequency combination methods and combination algorithms, and other practical functions. It can be used to drive machine tools, cables, textiles, papermaking, food, packaging, chemicals, municipal engineering and other automated production equipment to meet the performance and function requirements of different industrial equipment.

Before using this inverter, the users and relevant technicians shall read this manual carefully to ensure that the inverter can be properly installed and operated, so that the inverter can perform its best performance.

If there is any change to this user manual, please refer to the new version without notice.

High-performance Inverter
User Manual

Version: V1.2

This product implements standards:

The design and production of this product refer to the latest national standards (GB or GB/T), International Electrotechnical Commission Standards (IEC) and International System of Units (SI). The technical parameters of the relevant parts can meet the requirements of national standards (GB or GB/T) and International Electrotechnical Commission Standards (IEC). Main standards:

GB/T 12668.2-2002 Adjustable Speed Electrical Power Drive Systems - Part 2: General Requirements - Rating Specifications for Low Voltage Adjustable Frequency AC Power Drive Systems

GB 12668.3-2012 Adjustable Speed Electrical Power Drive Systems - Part 3: EMC Requirements and Specific Test Methods

GB 12668.501-2013 Adjustable Speed Electrical Power Drive Systems - Part 5: Safety Requirements - Electrical, Thermal and Energy

GB/T 2423.1-2008 Environmental Testing for Electric and Electronic Products - Part 1: Test Methods Tests A: Cold

GB/T 2423.2-2008 Environmental Testing for Electric and Electronic Products - Part 2: Test Methods Tests B: Dry Heat

GB/T 2423.3-2016 Environmental Testing - Part 2: Testing Method - Test Cab: Damp Test, Steady State

GB/T 2423.4-2008 Environmental Testing for Electric and Electronic Products - Part 2: Test method - Test Db: Damp heat, cyclic (12h+12h Cycle)

GB/T 2423.22-2012 Environmental Testing - Part 2: Test Methods - Test N: Change of Temperature

GB/T 2423.7-2018 Environmental Testing - Part 2: Test Methods - Test Ec: Rough Handling Shocks, Primarily for Equipment-type Specimens

GB/T4798.1-2005 Environmental Conditions Existing in the Application of Electric and Electronic Products Section 1: Storage

GB/T4798.2-2008 Environmental Conditions Existing in the Application of Electric and Electronic Products - Part 2: Transportation

GB/T4798.3-2007 Environmental Conditions Existing in the Application of Electric and Electronic Products - Part 3: Stationary Use at Weather-protected Locations

Danger

The inverter must be reliably grounded. If the inverter is not reliably grounded, there may be a potential danger of personal injury in the device.

Readers

This user manual is suitable for the following readers.

Inverter installers, engineering technicians (electrical engineers, electrical operators, etc.), designers, etc. Please ensure that this user manual reaches the end users.

Notational conventions in this manual

Caution: Moderate or minor injuries may occur due to failure to operate as required.

Danger: Deaths or serious injuries may occur due to failure to operate as required.

Chapter I Product Specification and Ordering Instructions

1.1 Inverter series models

This inverter has two voltage levels of 220V and 380V. The applicable motor power range is: 380V: 0.4kW-15kW; 220V: 0.4kW-2.2kW. The models of this series inverters are shown in Table 1-1.

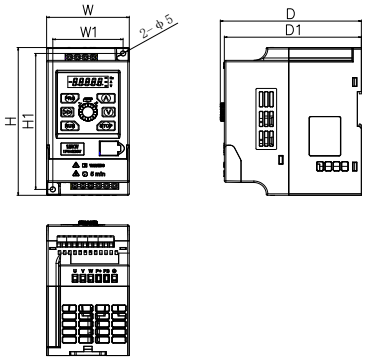
Table 1-1 Inverter Models

Inverter model (G: Constant torque load)		Rated capacity (kVA)	Rated output current (A)	Adaptable motor (kW)
220V single phase	GT20-2S0004G	0.75	2.4	0.4
	GT20-2S0007G	1.5	4.5	0.75
	GT20-2S0015G	2.7	7.1	1.5
	GT20-2S0022G	3.7	9.8	2.2
220V three-phase	GT20-2T0022G	3.7	9.8	2.2
380V three-phase	GT20-4T0004G	0.75	1.5	0.4
	GT20-4T0007G	1.5	2.3	0.75
	GT20-4T0015G	2.7	3.7	1.5
	GT20-4T0022G	3.7	5.0	2.2
	GT20-4T0040G	7.5	8.8	4.0
	GT20-4T0055G	9.0	13.0	5.5
	GT20-4T0075G	11	17.0	7.5

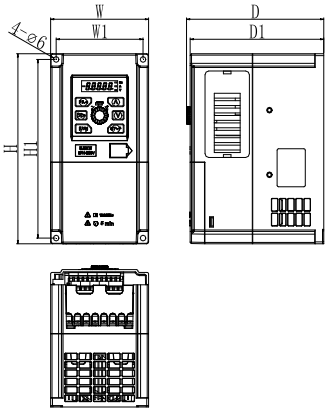
	GT20-4T0110G	17	25.0	11
	GT20-4T0150G	21	32.0	15

Note: For other power stage models of 220V voltage level, please consult the manufacturer before ordering.

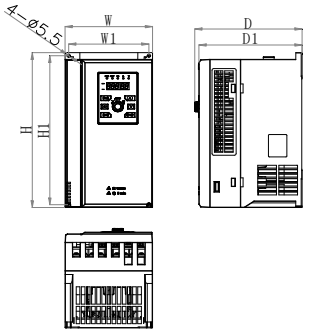
1.2 Product appearance and installation dimensions



(a) Specifications



(b) Specifications



(c) Specifications

Table 1-2 Inverter Appearance and Installation Series Dimensions (Unit: mm)

Specification	W	W1	H	H1	D	D1	Mounting hole diameter (Φ)	Reference diagram
GT20-4T0004G	80	68	150	138	136.5	133	5	(a)
GT20-2S0004G								
GT20-4T0007G								
GT20-2S0007G								
GT20-4T0015G								
GT20-2S0015G								
GT20-4T0022G								
GT20-4T0055G	106	94	200	188	148.5	144.6	6	(b)
GT20-4T0040G								
GT20-2S0022G								
GT20-2T0022G								
GT20-4T0075G	108	96	217	205	167	163	5.5	(b)
GT20-4T0110G	145	133	277	267	178	171	5.5	(c)
GT20-4T0150G								

1.3 Optional parts

1.3.1 Remote control keyboard

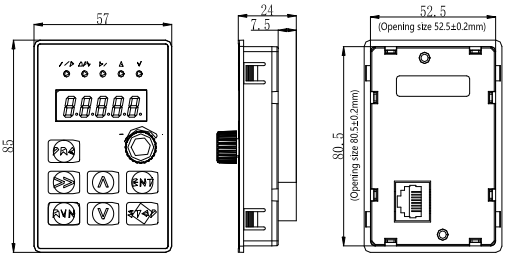


Figure 1-1 Remote Control Keyboard 1 (GT20-LKD)

Note: The standard keyboard network cables are 2m and 5m optional. If you need network cables of other specifications, please order separately.

1.3.2 Dustproof sticker (cover plate)

Figure 1-2 Dustproof Sticker

Table 1-3 Dustproof Sticker Optional Table

Dustproof sticker model	Adaptable models
GT20-4T0022	GT20-4T0004G, GT20-2S0004G, GT20-4T0007G, GT20-2S0007G, GT20-4T0015G, GT20-2S0015G, GT20-4T0022G
GT20-4T0075	GT20-4T0075G
GT20-4T0150	GT20-4T0110G，GT20-4T0150G

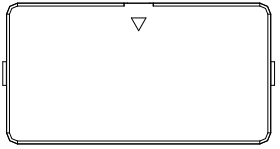


Figure 1-3 Dustproof Cover Plate

Table 1-4 Dustproof Cover Plate Optional Table

Dustproof cover plate model	Adaptable models
GT200-4T0040 (black)	GT20-4T0055G, GT20-4T0040G, GT20-2S0022G, GT20-2T0022G

1.4 Braking resistors

Please select energy consumption braking resistors according to Table 1-5 and Table 1-6. The wiring of the braking resistors is shown in Figure 1-4.

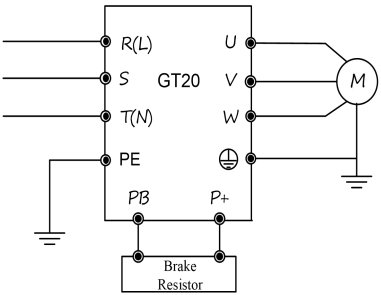


Figure 1-4 Inverter and Braking Assembly Wiring Diagram

Note:

1. The power derating of the braking resistor shall not exceed 30%, otherwise there is a risk of fire;
2. The wiring length of the braking resistor shall be less than 5m. During the energy consumption braking process, the braking resistor will cause temperature rise due to energy consumption. During installation, pay attention to safety protection and sound ventilation.

The braking resistor resistance and the power are selected according to the actual situation. The greater the system inertia, the shorter the deceleration time required, the more frequent the braking, the greater the power required by the braking resistor and the smaller the resistance required. Table 1-5 and Table 1-6 are recommended based on general applications (braking usage rate is 10%).

Table 1-5 Braking Resistor Selection Table (380V Voltage Level)

Specification	Suitable motor power (kW)	Braking resistor recommendation Resistance (Ω)	Braking resistor recommendation Power (W)
GT20-4T0004G	0.4	≥750	75
GT20-4T0007G	0.75	≥500	100
GT20-4T0015G	1.5	≥300	200
GT20-4T0022G	2.2	≥200	200
GT20-4T0040G	4.0	≥200	300
GT20-4T0055G	5.5	≥80	750
GT20-4T0075G	7.5	≥50	1100
GT20-4T0110G	11	≥50	1500

GT20-4T0150G	15	≥45	1800

Table 1-6 Braking Resistor Selection Table (220V Voltage Level)

Specification	Suitable motor power (kW)	Braking resistor recommendation Resistance (Ω)	Braking resistor recommendation Power (W)
GT20-2S0004G	0.4	≥200	75
GT20-2S0007G	0.75	≥150	100
GT20-2S0015G	1.5	≥100	200
GT20-2S0022G	2.2	≥75	300
GT20-2T0022G	2.2	≥75	300

Chapter II Installation and Wiring of Inverter

2.1 Inverter installation environment

2.1.1 Installation environment requirements

(1) Install in a well-ventilated indoor place. The ambient temperature is required to be within the range of -10ºC-40ºC. If the temperature exceeds 40 ºC, the drive needs to be derated. Derating by 3% for every 1º C incre ased in temperature，the maximum temperature is 50º C.

(2) Avoid installing in places with direct sunlight, dusty, floating fibers and metal powder.

(3) Do not install in places with corrosive or explosive gases.

(4) The humidity is required to be lower than 90%RH, without condensation of water droplets.

(5) Install in places where the plane fixed vibration is less than 5.9 m/s^2.

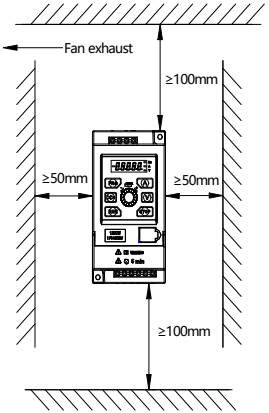
(6) Try to keep away from electromagnetic interference sources and other electronic instruments and equipment that are sensitive to electromagnetic interference.

2.1.2 Installation direction and space

(1) Generally, vertical installation shall be adopted.

(2) Minimum installation intervals and distances are shown in Figure 2-1.

(3) When multiple inverters are installed up and down, the baffle applied in the middle is shown in Figure 2-2.



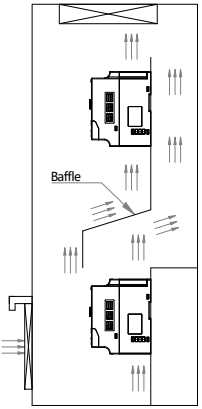


Figure 2-1 Installation Interval Diagram Figure 2-2 Installation Diagram of Multiple Inverters

2.1.3 Mechanical installation methods and steps (wall-mounted installation and guide rail installation are supported)

1. Wall-mounted screw installation

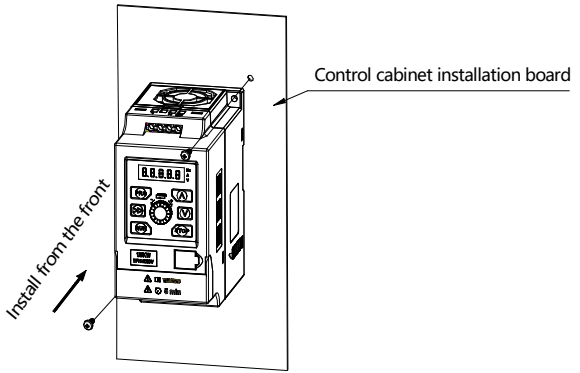


Figure 2-3 Wall-mounted Installation Diagram

2. Guide rail installation

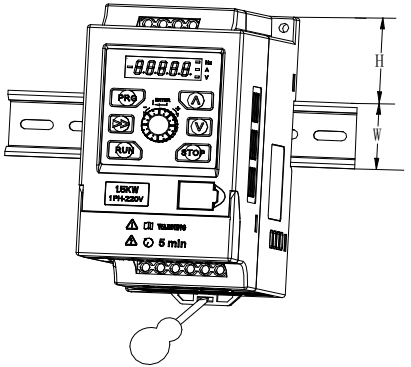


Figure 2-4 Guide Rail Installation Diagram

(1) Use a slotted screwdriver to insert into the slide block groove at the

bottom, to move the slide block out;

(2) Install the machine onto the guide rail support, push the guide rail slide block up to the original place and clamp.

Note: H is 45mm, W is 35mm

Table 2-1 Guide Rail Installation Table

Installation	Support model
Guide Rail Installation	GT20-4T0004G、GT20-2S0004G、GT20-4T0007G、GT20-2S0007G、GT20-4T0015G、GT20-2S0015G、GT20-4T0022G

2.2. Removal and installation of inverter panel

1. RJ45 flip shell

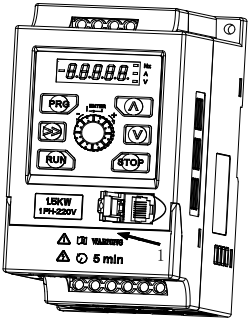


Figure 2-5 RJ45 Flip Shell's Open-Connect External Keyboard

2. Wiring flip shell

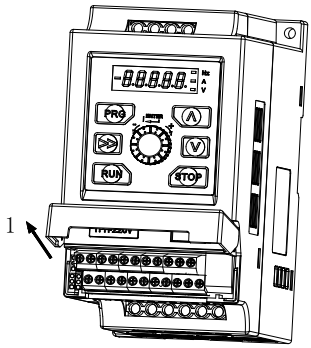


Figure 2-6 Wiring Flip Shell's Open-Control Terminal Wiring

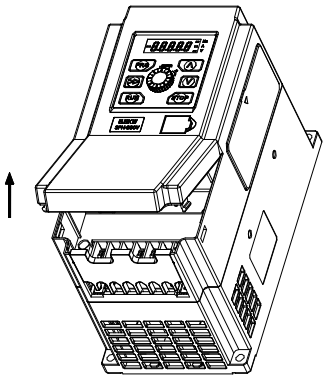
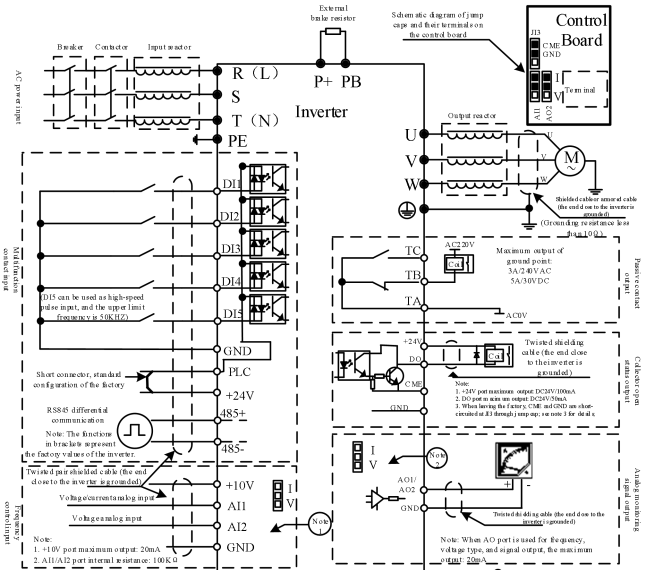


Figure 2-7 Wiring Flip Shell's Open-Control Terminal Wiring

2.3 Standard wiring diagram



Application model：GT20-4T0055G and below

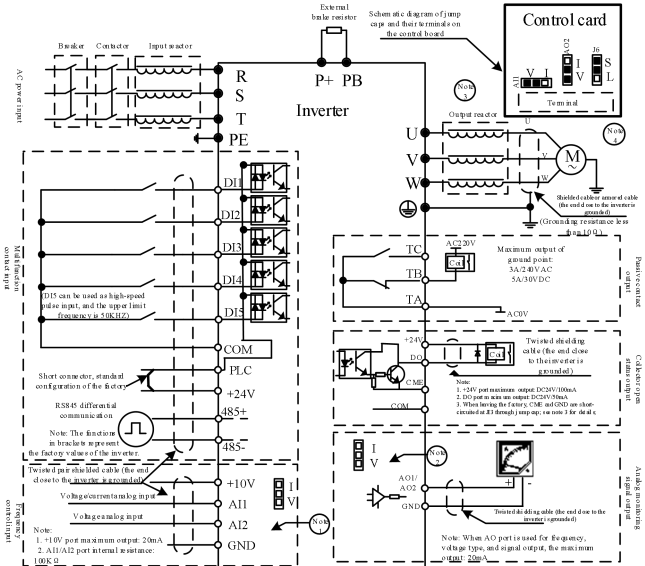
Note 1: The AI1 port can receive both voltage signals and current signals; AI1 (three-PIN needle on corresponding control board, the silk screen of which is AI1) in the corresponding wiring diagram (as shown in the upper right corner of the above figure); the middle of jump cap short connection and the upper pin are of current signal input; the middle pin and lower pin of short connection are of voltage signal input; the AI2 port can only receive voltage signals.

Note 2: The AO2 port can output both voltage signals and current signals; AO2 (three-PIN needle on corresponding control board, the silk screen of which is AO2) in the corresponding wiring diagram (as shown in the upper right corner of the above figure); the middle of jump cap short connection and the upper pin are of current signal output; the middle pin and lower pin of short connection are of voltage signal output; the AO1 port can only output voltage signals.

Note 3: The standard factory configuration of CME and GND is that the middle pin of JI3 is short-circuited to its upper pin (under standard factory configuration, DO port uses the internal +24V as the pull-up power supply, and its ground system is inverter GND), that is, CME is short circuited to GND; when GND interfaces are insufficient, the CME interfaces can be used as GND interfaces;

When DO port uses the external +24V power supply as pull-up (DO port is pulled up to +24V through 4.7K resistance), just remove the jump cap of JI3 port (just place the short-circuited cap to the JI3 middle pin and the lower pin, to avoid jump cap missing), in this case, CME is short-circuited to the ground system of external +24V power supply.

Note 4:When the connection between the drive and the motor is greater than 50 meters, it is recommended to install an AC output reactor, which can reduce the leakage current and increase the service life of the motor



Application model：GT20-4T0075G and above

Note 1: The AI1 port can receive both voltage signals and current signals; AI1 (three-PIN needle on corresponding control board, the silk screen of which is AI1) in the corresponding wiring diagram (as shown in the upper right corner of the above figure); the middle of jump cap short connection and the upper pin are of current signal input; the middle pin and lower pin of short connection are of voltage signal input; the AI2 port can only receive voltage signals.

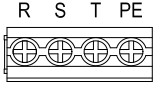
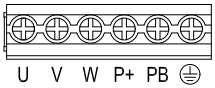
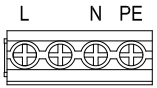
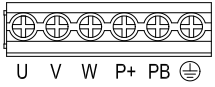
Note 2: The AO2 port can output both voltage signals and current signals; AO2 (three-PIN needle on corresponding control board, the silk screen of which is AO2) in the corresponding wiring diagram (as shown in the upper

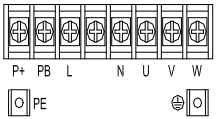
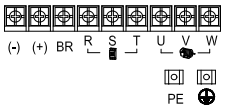
right corner of the above figure); the middle of jump cap short connection and the upper pin are of current signal output; the middle pin and lower pin of short connection are of voltage signal output; the AO1 port can only output voltage signals.

Note 3: When the connection between the drive and the motor is greater than 50 meters, it is recommended to install an AC output reactor, which can reduce the leakage current and increase the service life of the motor

2.3.1 Wiring of main circuit terminals

(1)The main circuit input and output terminals are shown in Table 2-2.

Applicable models	Main circuit terminals	Terminal name	Function description
GT20-4T0004G GT20-4T0007G GT20-4T0015G GT20-4T0022G		R, S, T	Three-phase AC 380V input terminal
		PE	Protective ground terminal
		U, V, W	Three-phase AC output terminal
		P+, PB	Braking resistor wiring terminal
		⏚	Motor ground terminal
GT20-2S0004G GT20-2S0007G GT20-2S0015G		L, N	Single-phase AC input terminal
		PE	Protective ground terminal
		U, V, W	Three-phase AC output terminal
		P+, PB	Braking resistor wiring terminal
		⏚	Motor ground terminal

Applicable models	Main circuit terminals	Terminal name	Function description
GT20-4T0040G GT20-4T0055G GT20-4T0075G GT20-2T0022G		R, S, T	Three-phase AC 380V input terminal
		U, V, W	Three-phase AC output terminal
		P+, PB	Braking resistor wiring terminal
		PE	Protective ground terminal
		⏚	Motor ground terminal
GT20-2S0022G		L, N	Single-phase AC input terminal
		U, V, W	Three-phase AC output terminal
		P+, PB	Braking resistor wiring terminal
		PE	Protective ground terminal
		⏚	Motor ground terminal
GT20-4T0110G GT20-4T0150G		R、S、T	Three-phase AC input terminal
		U、V、W	Three-phase AC output terminal

		(+)、BR	Braking resistor wiring terminal
		⏚	Motor ground terminal
		(+)、(-)	DC positive and negative bus output
		PE	Protective ground terminal

(2) The type selection of main circuit cable diameter, inlet protection circuit breaker QF or fuse in Table 2-3 is as follows:

Specification	Circuit breaker (A)	Recommended contactor(A)	Recommended input and output power wires (mm^2)	Control wire (mm^2)
GT20-4T0004G	10	10	1.5	1
GT20-2S0004G	10	10	1.5	1
GT20-4T0007G	10	10	1.5	1
GT20-2S0007G	10	10	1.5	1
GT20-4T0015G	10	10	1.5	1
GT20-2S0015G	20	16	2.5	1
GT20-2T0022G	32	20	2.5	1
GT20-4T0022G	16	10	2.5	1
GT20-4T0040G	20	16	2.5	1

GT20-4T0055G	25	25	4.0	1
GT20-4T0075G	40	32	6.0	1
GT20-4T0110G	63	38	10.0	1
GT20-4T0150G	63	40	10.0	1

2.4 Control circuit configuration and wiring

2.4.1 Control circuit terminal arrangement is as follows

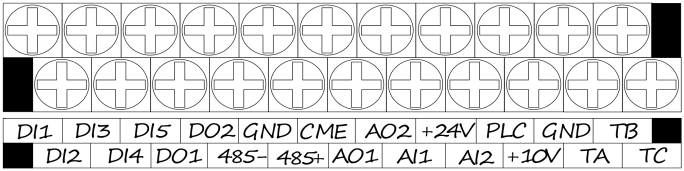


Figure 2-8 Arrangement Sequence of Control Plate Terminals for GT20-4T0055G and below

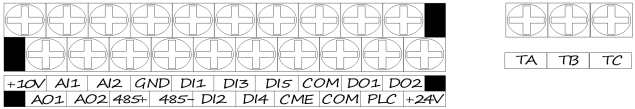


Figure 2-9 Arrangement Sequence of Control Plate Terminals for GT20-4T0075G and above

2.4.2 CN3 terminal function description is shown in Table 2-4.

Table 2-4 Control Terminal Function Table

Category	Terminal Label	Name	Terminal function description	Specification
Communication	485+	RS485 communication interface	RS485 differential signal positive terminal	For standard RS485 communication interface, please use twisted pair or shielded wire.
	485-		RS485 differential signal negative terminal	
Multifunctional output terminal	DO1	Open collector output terminal	It can be programmed and defined as switch output terminal with multiple functions, see terminal function parameter F6.11 for details, output terminal function introduction (common port CME)	Optocoupler isolated output; Working voltage range 9-30V; Maximum output current: 50mA
Multifunctional output terminal	DO2	Open collector output terminal	It can be programmed and defined as switch output terminal with multiple functions, see terminal function parameter F6.12 for details, output terminal function introduction (common port CME)	Optocoupler isolated output; Working voltage range 9-30V; Maximum output current: 50mA; Maximum output frequency: 50KHZ;

Analog Input	AI1	Analog input AI1	AI1 terminal receiving analog current, and voltage input (selected and switched through jump cap)	Input voltage range: 0～10V (input impedance: 100kΩ) Resolution: 1/1000 Input current range: 0～20mA (input impedance: 500Ω) Resolution: 1/1000
	AI2	Analog input AI2	Receives analog voltage input	
Analog output	AO1	Analog output	Provides analog voltage output, which can correspond to 12 physical quantities (see F5.25 for details)	Voltage output range: 0~10V
	AO2	Analog output	Provides analog voltage output, and current output (AO2 terminal can be realized by jump cap) can correspond to 12 physical quantities (see F5.26 for details)	Voltage output range: 0~10V Current output range: 0~20mA
Multifunctional input terminal	DI1	Multifunctional input terminal 1	It can be programmed and defined as switch input terminal with multiple functions, see Chapter VI terminal function parameters (switch input and output) input terminal function introduction. (See F6.00-6.04 for details)	The forward and reverse functions can be configured for the terminal; DI5 can be used as a high-speed pulse input terminal, and the upper limit of the input frequency is 50KHZ;
	DI2	Multifunctional input terminal 2		
	DI3	Multifunctional input terminal 3		

	DI4	Multifunctional input terminal 4		
	DI5	Multifunctional input terminal 5		
Power supply	+10V	+10V power supply	Provides +10V power supply for external	Maximum output current: 20mA
	+24V	+24V power supply	Digital signal power supply	Maximum output current: 100mA
	GND	Power supply common terminal	5.5kW and below :Power reference ground (including +10V and +24V) 7.5kW and above:reference ground for +10V	
	COM	+24V Power supply common terminal	5.5kW and below :doesn't have 7.5kW and above: Digital signal input common terminal	7.5kW and above:COM and GND are internally isolated from each other
	PLC	Multifunctional input	Common terminal of DI1-DI5	Shot-circuited to +24V when leaving the factory
	CME	Digital output common terminal	Common terminal of multifunctional DO1 and DO2.	CME and GND have been short-circuited in the factory

Relay output terminal	TA TB TC	Programmable relay output	Usually, TA-TC is normally open, and TA-TB is normally close; during operating, TA-TC is normally close, and TA-TB is normally open.	Electric shock rating: NO: 5A 250VAC NC: 3A 250VAC

2.4.3 Wiring of communication terminal

PLC or PC is used for master control, with the inverter as the slave, which are connected through RS485. It can realize single master and single slave communication or single master and multiple slaves communication. With the increasing connection units, the communication system becomes more easily to be interfered, so it is suggested to connect wires as follows (see Annex for communication protocol):

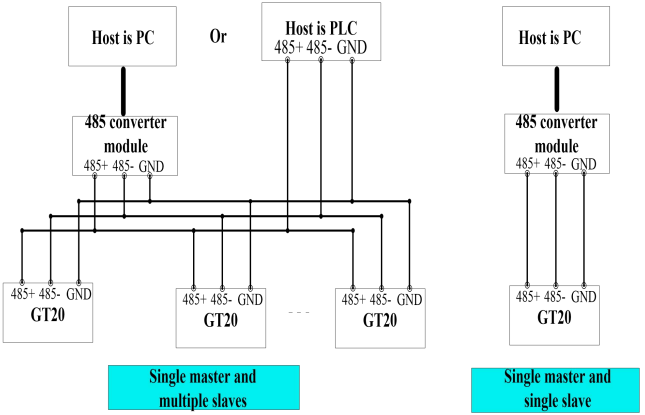
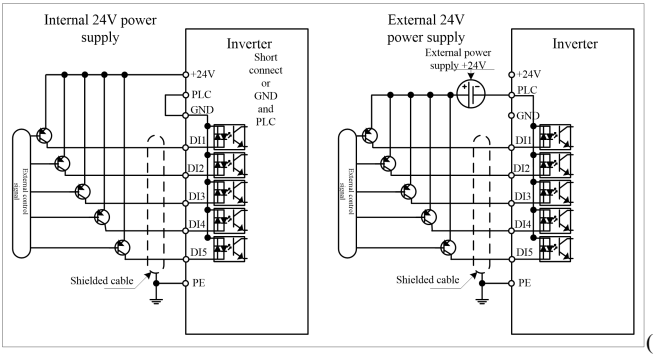


Figure 2-10 Wiring of Communication Terminal

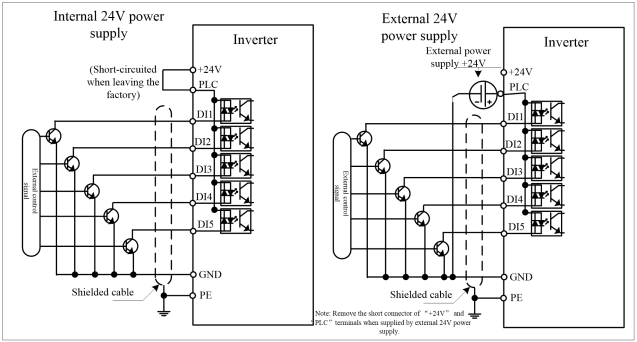
2.4.4 Multifunctional contact input wiring

(1) Wiring method of PNP characteristic transistor



(

2) Wiring method of NPN characteristic transistor



Note:5.5kW and below :the common end of the digital input signal is GND
7.5kW and above:the common end of the digital input signal is COM

Chapter III Operation Instructions of Inverter

3.1 Key function description

The inverter operation panel is provided with 7 keys and 1 rotary encoder. The functions are defined in Table 3-1.

Table 3-1 Operation Panel Function Table

Key	Name	Label in the manual	Function description
PRG	Program/Exit key	PRG	Enter or exit programming state
RUN	Run key	RUN	In the operation panel mode, press this key to run the inverter.
STOP	Stop key	STOP	When the inverter is in the normal running state, if the inverter's running instruction channel is set to the keyboard stop effective mode, press this key and the inverter will stop according to the set mode. When the inverter is in the fault state, press this key to reset the inverter and return to the normal stop state.
▲	Increase key	▲	Increase data or function code
▼	Decrease key	▼	Decrease data or function code
▶▶	Shift key	▶▶	In the edit state, you can select the modification bit of the set data
ENTER	Rotary encoder	ENT	When pressed down, it is the ENT key, you can enter the drop-down menu or data confirmation.

			When the frequency channel is given by the operation panel, the rotary encoder can modify the set frequency of the inverter.

3.2 Keyboard operation methods

You can perform various operations on the inverter by operating the keyboard, as follows:

3.2.1 Shortcut monitoring parameter view

6 shortcut parameters are fixedly displayed in the shortcut monitoring interface, and the order can be switched by the Up or Down key. When the ENT key is pressed down in this interface, it will immediately return to the first shortcut parameter, and the 6 shortcut parameter sequence list is as follows.

Shortcut parameter 1	Determined by function code FC.17
Shortcut parameter 2	Output current
Shortcut parameter 3	Bus voltage
Shortcut parameter 4	Set frequency
Shortcut parameter 5	AI1
Shortcut parameter 6	Terminal state 1

The above is the shortcut display in the general mode, which will vary with different industry characteristics in other industries.

3.2.2 Settings of function code parameters

The function parameter system of this inverter includes function code F0 ～ FF group, monitoring parameter U0 group, and fault record parameter U1 group. Each function group includes several function codes. The function code is identified by (function code group number + function code number). For example, "F5.08" indicates the 8th function code of the 5th function group.

Function code setting example:

Example 1: Change the forward jog frequency setting from 5Hz to 10Hz (F2.20 changed from 5.00Hz to 10.00Hz)

1) Press the PRG key to enter the programming state, the digital tube displays function parameter "-**F0**-", and press the ▲ key to make the LED digital tube display "-**F2**-".

2) Press ENT, you can see the digital tube displays function parameter "**F2.00".**

3) Press the ▲ key to make the digital tube display function parameter "**F2.20**".

4) Press the ENT key, you will see the data(**5.00**) corresponding to F2.20, meanwhile, the LED (Hz) corresponding to its unit frequency lights up.

5) Press the ▶▶ key, if flashes, shift to the highest bit "5", and press the ▲ key five times, to change to **10.00**.

6) Press the ENT key, if the parameter does not flash, it indicates the modification is successful.

7) Press the PRG key, to exit the programming state.

Note: In P.off state, it is forbidden to modify the function code parameter.

3.2.3 Jog function operation

Use the operation panel to perform the jog operation of the inverter:

1) Press the PRG key three times to enter the jog operation state, and the digital tube displays function parameter "**JOG-".**

2) Press and hold the Up key to forward and jog.

3) Press and hold the Down key to reverse and jog.

3.2.4 Parameter upload and download operations

The external keyboard has the function of uploading and downloading the function code.

1) On the external keyboard, press the ▶▶key + the ▲ key, to execute the function code uploading function. The external keyboard reads all the function code values from the control board, and then writes into the keyboard memory chip.

2) On the external keyboard, press the ▶▶ key + the ▼ key, to execute the function code downloading function. The external keyboard reads all the function code values from the memory chip, and then writes into the inverter control board chip. However, when downloading, the keyboard will automatically distinguish the software version, inverter voltage level, and inverter power level. The specific conditions are as follows:

a. If the downloaded function code is inconsistent with the inverter software version of the parameter to be downloaded, it will not be downloaded and an E028 fault will be reported.

b. If the downloaded function code is inconsistent with the inverter voltage level of the parameter to be downloaded (e.g. The downloaded function code is of 2S model, but the inverter is of 4T model), it will not be downloaded and an E028 fault will be reported.

c. If the downloaded function code is consistent with the inverter voltage level of the parameter to be downloaded but the power level is inconsistent, the F3 group motor related parameters will not be downloaded, and other parameters will be downloaded normally.

d. If the downloaded function code is consistent with the inverter software version, voltage level, and power level of the parameter to be downloaded, all parameters will be downloaded.

Remarks:

1. The machine's standard external keyboard is a short-line keyboard (the length of the keyboard line is 15m or less). The keyboard does not support online update software (GT20-LKD);

2. The long-line keyboard (the length of the keyboard line is 80m or less) is an optional accessory. The long-line keyboard with LCD screen supports online software update. If the customer needs a long-line keyboard, special instructions are needed for special treatment of the whole machine.

Chapter IV Function Parameter Table

4.1 Function parameter table

Description of symbols in the table:

× - Indicates this parameter cannot be changed during the operation. ○ - Indicates this parameter can be changed during the operation.

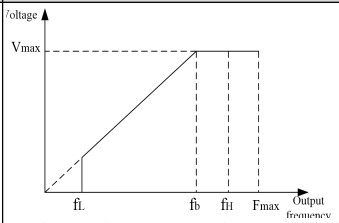
● - Indicates the actual test parameter, which cannot be changed. *****- Indicates this parameter is the reserved parameter of the manufacturer, which is prohibited to be changed.

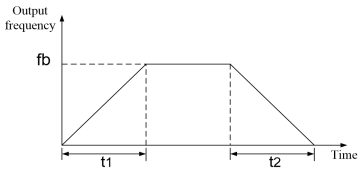
<table>
<tr><th>aramete
Code</th><th>Parameter name</th><th>Parameter detailed description</th><th>Minimum
Unit</th><th>Factory
value</th><th>Chang</th></tr>
<tr><td colspan="6">F0 group system management parameter</td></tr>
<tr><td>F0.00</td><td>Parameter operation protection</td><td>0: Password operation. You can view the function code value without entering a password, but you cannot change it. You need to enter the correct password in F0.05 before changing the function code.
1: Password operation. You cannot view the function code value when no password is entered, and the function code will display “-----”. You need to enter the correct password in F0.05 before viewing and changing the function code.
Note: This function will take effect only after setting the function code operation password in F0.05.</td><td>1</td><td>0</td><td>○</td></tr>
<tr><td>F0.01</td><td>Reserved</td><td>-</td><td>-</td><td>-</td><td>*</td></tr>
<tr><td>F0.02</td><td>Inverter operation deadline</td><td>Set range: 0~Maximum timing 65535h
0 indicates unlimited</td><td>1h</td><td>0h</td><td>○</td></tr>
<tr><td>F0.03</td><td>Parameter initialization</td><td>0: No operation
1: Restore the factory settings (the inverter model, running time, and fault records will not be restored)
2: Clear the fault memory information (clear fault memory parameters of U1 group)</td><td>1</td><td>0</td><td>×</td></tr>
<tr><td>F0.04</td><td>Industry code</td><td>0: Universal inverter
1: Special inverter for water supply
Note: Changing the industry code will restore other function codes to their factory settings.
The factory value of part of function codes of the special inverter for water supply is restored according to the following list:<table><tr><th>Function code</th><th>Factory value</th></tr><tr><td>F1.01</td><td>1</td></tr><tr><td>F1.02</td><td>8</td></tr><tr><td>F8.14</td><td>4ms</td></tr><tr><td>F8.15</td><td>5.0%</td></tr><tr><td>FC.17</td><td>14</td></tr></table></td><td>1</td><td>0</td><td>×</td></tr>
<tr><td>F0.05</td><td>Function code</td><td>Set range: 0~65535</td><td>1</td><td>0</td><td>○</td></tr>
</table>

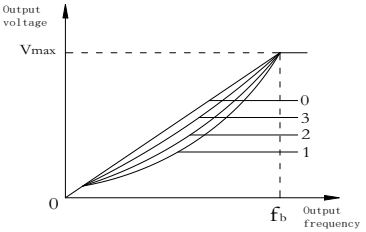
aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
	operation password	0 indicates no password, set any non-zero number, the password protection function will take effect immediately, please keep the set password in mind. After setting the password, if you want to clear the password, you must enter the correct password first, and then set the password value to 0. After setting the password, if you want to change the password, you must clear the password before you can set a new password. **Note: The password protection authority is set in F0.00, which is used to prohibit unauthorized personnel from viewing and changing the function code parameters.**			
Basic operating parameters of F1 group					
F1.00	Control method	0: Reserved 1: V/F control: Sound versatility, and stable operation, can effectively improve low-frequency torque and suppress current oscillation, with slip compensation and automatic voltage adjustment functions, further improving control accuracy.	1	1	×
F1.01	Run command channel selection	0: Operation panel run command channel: By the RUN key, and the STOP key, you can control the inverter to run and stop, press and hold the ▲ key and the ▼ key in the "**JOG-**" interface, you can perform forward jog and reverse jog. 1: Terminal run command channel: Control the running and stopping of the inverter through the multifunctional input terminal forward, reverse, forward jog, reverse jog, etc. (The corresponding multifunctional input terminal's function must be defined by the F6 and Fd parameter groups). 2: Serial port run command channel: Control the running and stopping of the inverter through communication.	1	0	○
F1.02	Main frequency x given channel selection	0: Operation panel digital potentiometer given. The frequency is set by adjusting the digital potentiometer on the panel. 1: Digital given 1, setting frequency by modifying function code F1.05 (corresponding to auxiliary frequency Y) or	1	0	○

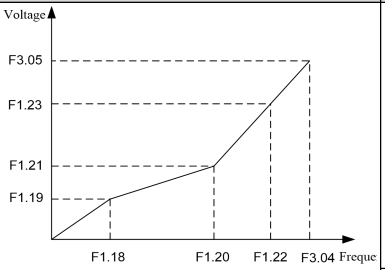
arameter Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
F1.03	Auxiliary frequency Y given channel selection	F1.07 (corresponding to main frequency X). 2: Digital given 2. The frequency is adjusted by setting the UP/DN function through the multifunctional input terminal. 3: Digital given 3, communication given. The frequency is set by the serial port frequency set command. 4: AI1 given, frequency setting is determined by AI1 terminal analog voltage/current, input range: DC 0～10V or DC 0～20mA (AI1 jumper selection), and the corresponding frequency curve is set in F5.00～F5.05 function code. 5: AI2 given, frequency setting is determined by AI2 terminal analog voltage, input range: DC 0～10V, and the corresponding frequency curve is set in F5.06～F5.11 function code. 6: Terminal pulse given, the frequency setting is determined by the terminal pulse frequency (input by DI5, and the function code F6.19 needs to be set to "high-frequency pulse input" function before use), the input pulse signal frequency range is 0~50.0kHz, and the corresponding frequency curve is set in F5.19～F5.23 function code. 7: Multistage instruction given, the inverter runs in multistage instruction mode, select simple PLC operation or multistage speed operation through function code F9.00. When multistage speed operation is selected, set the multistage speed terminal combination through group F6 and Fd to select the current running stage, and determine the current running frequency and acceleration/deceleration time through group F9 function code. When simple PLC operation is selected, determine the PLC operation mode, the number of operation stages, the phase operation frequency, the phase operation direction, and the phase operation time through group F9 function code. 8: PID given, the inverter operation mode is process PID control, and the operation frequency is the frequency value after PID action. In this case, you need to set PID	1	1	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
		related functions through group F8. 9: External operation panel analog potentiometer given. The frequency is set by adjusting the analog potentiometer on the external panel. 10: Reserved 11:keypad UP/DN input seatting 12-15: Reserved			
F1.04	Frequency source combination mode	0: X, the current frequency is set to the main frequency X. 1: Y, the current frequency is set to the auxiliary frequency Y. 2: X+Y, the current frequency is set to the main frequency X + the auxiliary frequency Y. 3: X-Y, the current frequency is set to the main frequency X + the auxiliary frequency Y. 4: Max (X,Y). The larger of the main frequency X and the auxiliary frequency Y is the set frequency. 5: Min (X,Y). The smaller of the main frequency X and the auxiliary frequency Y is the set frequency. **Note: If the X and Y directions are not the same, the frequency direction after the combination of 2 and 3 is based on the main frequency X, while 4 and 5 is based on the selected frequency direction. Besides the calculation during combination is based on the absolute value of the main and auxiliary frequencies, if the calculated value is less than 0, it will run at zero frequency. The combination mode can be switched through the multifunctional input terminal (group F6).**	1	0	○
F1.05	Digital setting of auxiliary frequency Y	Set range: Lower limit frequency~upper limit frequency When the auxiliary frequency Y given channel is selected to “digital setting 1”, this function code value is the frequency set value of the auxiliary frequency Y.	0.01Hz	50.00Hz	○
F1.06	Maximum output frequency	Set range: Upper limit frequency～650.00Hz	0.01Hz	50.00Hz	×

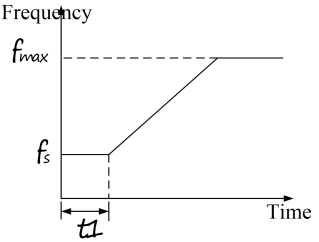
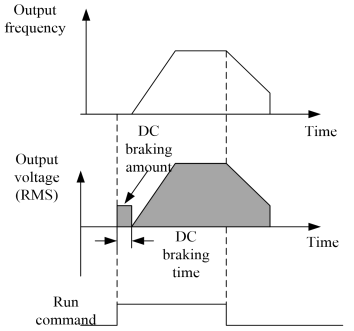
arameter Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
		 1. The maximum output frequency is the highest frequency allowed by the inverter, such as fmax shown in the figure. 2. The rated frequency of F3.04 is the corresponding minimum frequency when the inverter outputs the highest voltage, such as fb shown in the figure. 3. The maximum output voltage of F3.05 is the corresponding output voltage when the inverter outputs the rated frequency, such as Vmax shown in the figure. **Note: Be sure to set fmax, fb, and Vmax according to the motor parameters, otherwise the equipment may be damaged.**			
F1.07	Main frequency x digital setting	Set range: Lower limit frequency~upper limit frequency When the main frequency X given channel is selected to “digital setting 1”, this function code value is the frequency set value of the main frequency X.	0.01Hz	50.00Hz	○
F1.08	Reserved	-	-	-	*
F1.09	Upper limit frequency	Set range: Lower limit frequency~maximum output frequency The upper limit frequency is the upper limit value of the output frequency of the inverter. The value shall be less than or equal to the maximum output frequency. When the set frequency is higher than the upper limit frequency, it runs at the upper limit frequency.	0.01Hz	50.00Hz	○
F1.10	Lower limit frequency	Set range: 0.00~upper limit frequency The lower limit frequency is the lower limit value of the inverter output frequency. When the set frequency is lower than the lower limit frequency, it runs at the lower limit frequency. **Note: Maximum output frequency ≥ upper limit frequency ≥ lower limit frequency**	0.01Hz	0.00Hz	○

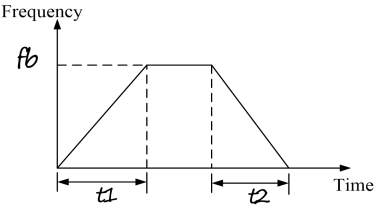
aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
F1.11	Acceleration time 1	Set range: 0.01～600.00  1. The acceleration time refers to the time required for the inverter to accelerate from zero frequency to the rated frequency of the motor, as shown in t1 in the figure. 2. The deceleration time refers to the time required for the inverter to decelerate from the rated frequency to zero frequency of the motor, as shown in t2 in the following figure. 3. There are four groups of acceleration and deceleration time parameters for this series of inverters. Other acceleration and deceleration time (2, 3, 4) are defined in parameters F2.14～F2.19. The factory default acceleration/deceleration time is acceleration/deceleration time 1. To select other acceleration and deceleration time groups, you must select them by terminal (see group F6 parameters). The acceleration and deceleration times during the motor parameter self-learning operation are set in F3.13 separately. The acceleration and deceleration times during jog operation are set in F2.22 and F2.23 separately. 4. The acceleration time is only valid for normal acceleration process, excluding start DC braking time and start frequency hold time. The deceleration time is only valid for normal deceleration process, excluding stop DC braking time. **Note: The default unit is s. For the selection of acceleration/deceleration time unit, see FC.07.**	0.01	6.00	○
F1.12	Deceleration time 1				○
F1.13	Acceleration/deceleration filtering time	Set range: 0～1000ms (0 indicates on filter) Acceleration/deceleration filter time constant. The longer the filter time is, the longer the actual acceleration/deceleration time that set.	1ms	0ms	○
F1.14	Reserved	-	-	-	*
F1.15	Reserved	-	-	-	*
F1.16	Reserved	-	-	-	*

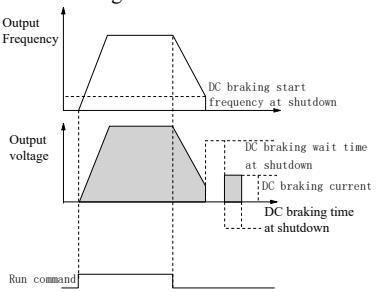
aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
F1.17	V/F curve setting	The V/F setting mode is defined in this function code, to meet the needs of different load characteristics. According to the definition, you can select 4 fixed curves and 1 custom curve. 0: Straight line VF, as shown in curve 0 in the figure. 1: User-set V/F curve, see F1.18~ F1.23 function code setting for details. 2: Reduced torque characteristic curve 1 (2.0 power), as shown in curve 1 in the figure. 3: Reduced torque characteristic curve 2 (1.7 power), as shown in curve 2 in the figure. 4: Reduced torque characteristic curve 3 (1.2 power), as shown in curve 3 in the figure.  **Note: Curves 1, 2, and 3 are suitable for variable torque loads of fans and pumps. Users can adjust according to the load characteristics to achieve the best energy saving effect.**	1	0	×
F1.18	V/F frequency value F1	F1.18 set range: 0.00～F1.20 F1.19 set range: 0～F1.21 F1.20 set range: F1.18～F1.22 F1.21 set range: F1.19～F1.23 F1.22 set range: F1.20～F3.04 F1.23 set range: F1.21～100.0%	0.01Hz	12.50Hz	×
F1.19	V/F voltage value V1		0.1%	25.0%	×
F1.20	V/F frequency value F2		0.01Hz	25.00Hz	×
F1.21	V/F voltage value V2		0.1%	50.0%	×

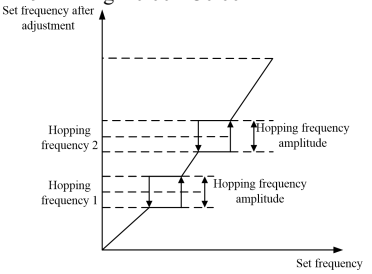
aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
F1.22	V/F frequency value F3		0.01Hz	37.50Hz	×
F1.23	V/F voltage value V3	1. When the F1.17V/F curve is set to 1, the user can customize the V/F curve through F1.18～F1.23, as shown in the figure. The V/F curve is defined by adding (V1, F1), (V2, F2), and (V3, F3) three-point broken line, to adapt to special load characteristics. 2. This function parameter group is used to flexibly set the V/F curve required by the user. **Note: V1<V2<V3, F1<F2<F3, setting the low-frequency voltage too high may cause the motor to overheat or even get burned, and the inverter may also have overcurrent stall or overcurrent protection. It shall be set according to the load characteristics of the motor.**	0.1%	75.0%	×
F1.24	Running direction setting	0: Forward 1: Reverse The direction of the motor can be changed by changing this function code. Its function is equivalent to changing the direction of rotation of the motor by adjusting any two lines of the motor lines U, V, and W. **Note: After the function code parameters are restored to the factory setting, the motor running direction will be restored to the factory value. Use with caution on the occasions that it is forbidden to change the motor steering after system debugging.**	1	0	○

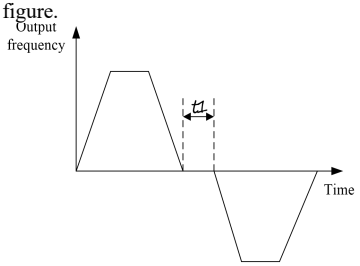
<table>
<tr><th>aramete Code</th><th>Parameter name</th><th>Parameter detailed description</th><th>Minimum Unit</th><th>Factory value</th><th>Chang</th></tr>
<tr><td>F1.25</td><td>Carrier frequency setting</td><td>Set range: 1～15kHz
<table><tr><td>Carrier frequency</td><td>Motor noise</td><td>Leakage current</td><td>Interference</td></tr><tr><td>Drop</td><td>↑</td><td>↓</td><td>↓</td></tr><tr><td>Rise</td><td>↓</td><td>↑</td><td>↑</td></tr></table>1. Advantages of high carrier frequency: Ideal current waveform, less current harmonics, and low motor noise.
2. Disadvantages of high carrier frequency: The switching loss increases, the inverter temperature rise increases, and the output ability of the inverter is affected. Under high carrier frequency, the inverter needs to be derated; at the same time, the leakage current of the inverter increases, and the external electromagnetic interference increases.
3. The use of low carrier frequency is contrary to the above situation. Too low carrier frequency will cause low frequency operation instability, torque decrease and even oscillation.
4. When the inverter leaves the factory, the manufacturer has set the carrier frequency reasonably. Generally, users do not need to change this parameter.</td><td>1kHz</td><td>4kHz</td><td>○</td></tr>
<tr><td colspan="6">F2 group start-stop control</td></tr>
<tr><td>F2.00</td><td>Start operation mode</td><td>LED single digit: Start mode
0: Start from the start frequency: Start at the start frequency set by F2.01, and accelerate to the set frequency after running the hold time set by F2.02 at this frequency.
1: Brake first and then start from the start frequency: First start with the DC braking current set in F2.03 and the DC braking time set in F2.04 for DC braking and then start from the start frequency.
2: Speed tracking and restart: Track the current speed and direction of the motor, and perform smooth start without impact on the motor that is still rotating.
LED tens digit: Speed tracking mode
0: Track down from the frequency of shutdown, usually this method is used.
1: Track down from the maximum frequency, suitable for power generation load.</td><td>11</td><td>00</td><td>×</td></tr>
</table>

Parameter Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
F2.01	Start frequency	F2.01 set range: 0.20～60.00Hz F2.02 set range: 0.0～10.0s  1. The start frequency refers to the initial frequency of the inverter at start. As shown in fs in the figure, setting a proper start frequency can increase the torque at start. 2. Within the hold time of the start frequency, as shown in t1 in the figure, the output frequency of the inverter is the start frequency, and then operate from the start frequency to the target frequency. 3. The start frequency value is not limited by the lower frequency limit.	0.01Hz	0.50Hz	○
F2.02	Start frequency hold time		0.1s	0.0s	○
F2.03	Start DC braking current	F2.03 set range: 0.0～150.0% inverter rated current F2.04 set range: 0.0～30.0S (0.0 indicates the DC braking does not act) 	0.1%	100.0%	○
F2.04	Start DC braking time	The process of braking first and then restarting from the start frequency, as shown in the figure: When the inverter is put into operation, first perform the DC braking before starting according to the DC braking current and the DC braking time set by F2.03 and F2.04; then start from this frequency and operate the set time according to the regulations of F2.01 and	0.1s	0.0s	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
		F2.02; then enter the normal acceleration phase according to parameters such as the set acceleration and deceleration times, the acceleration and deceleration time methods, etc. and accelerate to the set frequency.			
F2.05	Acceleration/deceleration mode selection	Frequency change mode selection during starting and running. 0: Linear acceleration/deceleration: The output frequency increases or decreases according to a constant slope.  1: Reserved	1	0	×
F2.06	Start protection selection (only valid for two-wire control)	This function realizes whether the inverter automatically starts running when the inverter is powered on, the fault is cleared, or the command channel is switched to the terminal two-wire mode. 0: If the run command is valid, the inverter does start, and the inverter is in the running protection state. The inverter will not run until the run command terminal is canceled and then the terminal is enabled. 1: If the run command is valid, the inverter speed tracking starts. **Note: For safety, be cautious when setting to 1.**	1	0	×
F2.07	Start protection wait time	Set range: 0.0～10.0s	0.1s	0.0s	○
F2.08	Stop mode	0: Deceleration stop: After receiving the stop command, the inverter will gradually reduce the output frequency according to the deceleration time, and stop when the frequency decreases to zero. 1: Free running stop: After receiving the stop command, the inverter immediately stops the output, and the load stops freely according to the mechanical inertia.	1	0	×

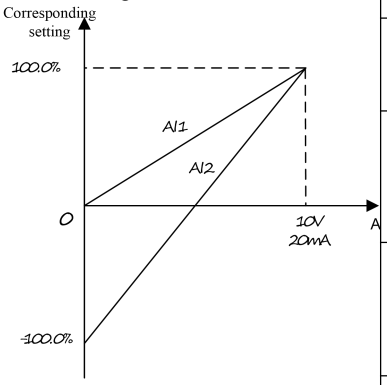
aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
		2: Deceleration stop + DC braking: After receiving the stop command, the inverter reduces the output frequency according to the deceleration time, and starts the DC braking when reaching the stop braking start frequency.			
F2.09	DC braking start frequency at shutdown	F2.09 set range: 0.00～60.00Hz F2.10 set range: 0.00～10.00s F2.11 set range: 0.0～150.0% inverter rated current F2.12 set range: 0.0～60.0S (0.0 indicates the DC braking does not act) F2.13 set range: 0～1	0.01Hz	0.00Hz	○
F2.10	DC braking wait time at shutdown		0.01s	0.10s	○
F2.11	DC braking current at shutdown		0.1%	100.0%	○
F2.12	DC braking time at shutdown	1. DC braking start frequency at stop: Means that the inverter starts stop DC braking when reaching this frequency during the deceleration stop. 2. DC braking wait time at stop: During decelerating and stopping, the time interval from the moment when the operation frequency reaches the start frequency of braking to the moment when the DC braking amount is applied. 3. DC braking current at stop: Refers to the DC braking amount that added. The larger the current, the stronger the DC braking effect. 4. DC braking time at stop: The duration of the DC braking amount. When the time is 0, there is no DC braking process. 5. Action selection during stop DC braking wait time: Refers to the operation status of the inverter during the braking wait time. When set to 0, it indicates no output, when set to 1, it indicates to run at the braking start frequency.	0.1s	0.0s	○
F2.13	Action selection within DC braking wait time at shutdown		1	1	○
F2.14	Acceleration time 2	Set range: 0.01～600.00 For specific definition, see F1.11 and F1.12. **Note: The default unit is s. For the**	0.01	6.00	○
F2.15	Deceleration time 2				○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
F2.16	Acceleration time 3	**selection of acceleration/deceleration time unit, see FC.07.**			○
F2.17	Deceleration time 3				○
F2.18	Acceleration time 4				○
F2.19	Deceleration time 4				○
F2.20	Jog run frequency	Set range: 0.10～50.00Hz Define the set frequency during jog operation.	0.01Hz	5.00Hz	○
F2.21	Jog interval time	Set range: 0.0～100.0s	0.1s	0.0s	○
F2.22	Jog acceleration time	Set range: 0.01～600.00s 1. The acceleration time refers to the time required for the inverter to accelerate from zero frequency to the rated frequency of the motor. 2. The jog deceleration time refers to the time required for the inverter to decelerate from the rated frequency to zero frequency of the motor.	0.01s	6.00s	○
F2.23	Jog deceleration time				○
F2.24	Jump frequency 1	F2.24 set range: 0.00～650.00Hz F2.25 set range: 0.00～30.00Hz F2.26 set range: 0.00～650.00Hz F2.27 set range: 0.00～30.00Hz F2.28 set range: 0.00～650.00Hz F2.29 set range: 0.00～30.00Hz  1. Setting the hopping frequency can make the inverter avoid the mechanical resonance point of the load. When the hopping frequency is set to 0, this function is invalid. Once these hopping points are set, the inverter will automatically avoid stable operation at these frequency points during operation. 2. During the acceleration and deceleration, the output frequency of the inverter can cross the hopping frequency zone normally.	0.01Hz	0.00Hz	×
F2.25	Jump frequency 1 range		0.01Hz	0.00Hz	×
F2.26	Jump frequency 2		0.01Hz	0.00Hz	×
F2.27	Jump frequency 2 range		0.01Hz	0.00Hz	×
F2.28	Jump frequency 3		0.01Hz	0.00Hz	×
F2.29	Jump frequency 3 range		0.01Hz	0.00Hz	×

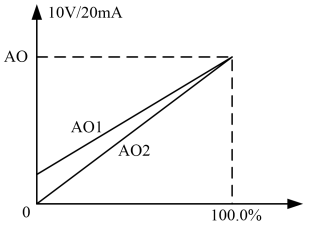
<table>
<tr><th>aramete
Code</th><th>Parameter name</th><th>Parameter detailed description</th><th>Minimum
Unit</th><th>Factory
value</th><th>Chang</th></tr>
<tr><td>F2.30</td><td>Forward and reverse dead zone time</td><td>Set range: 0.00～360.00s
The forward and reverse dead zone time refers to the transition interval during which the inverter waits at the output zero frequency during the transition from the current operating direction to the opposite operating direction after receiving the reverse run command, as shown in t1 in the figure.
 
</td><td>0.01s</td><td>0.01s</td><td>×</td></tr>
<tr><td colspan="6">F3 group motor and torque control parameters</td></tr>
<tr><td>F3.00</td><td>Motor model code</td><td>Set range: 1～13
The motor model code indicates the power code.
Partial codes are as follows:
<table><tr><th>Model code</th><th>Motor power</th></tr><tr><td>1</td><td>2T 0.4KW</td></tr><tr><td>2</td><td>2T 0.75KW</td></tr><tr><td>3</td><td>2T 1.5KW</td></tr><tr><td>4</td><td>2T 2.2KW</td></tr><tr><td>5</td><td>4T 0.4KW</td></tr><tr><td>6</td><td>4T 0.75KW</td></tr><tr><td>7</td><td>4T 1.5KW</td></tr><tr><td>8</td><td>4T 2.2KW</td></tr><tr><td>9</td><td>4T 4.0KW</td></tr><tr><td>10</td><td>4T 5.5KW</td></tr><tr><td>11</td><td>4T 7.5KW</td></tr><tr><td>12</td><td>4T 11KW</td></tr><tr><td>13</td><td>4T 15KW</td></tr></table>Note:
1. When the factory value is restored, this function code will be restored to the default parameters the same as the inverter power.
2. When this function code is reset, F3.01～F3.10 motor parameters can be initialized.</td><td>1</td><td>Model determination</td><td>×</td></tr>
<tr><td>F3.01</td><td>Rated power</td><td>F3.01 set range: 0.4～999.9KW
F3.02 set range: 0.01～655.35A
F3.03 set range: 1～65535rpm</td><td>0.1KW</td><td>Model determination</td><td>×</td></tr>
</table>

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
F3.02	Rated current	F3.04 set range: 1.00～650.00Hz F3.05 set range: 1～480V 1. Set the parameters of the controlled asynchronous motor. 2. In order to ensure the control performance, make sure to set the values of F3.01～F3.05 correctly according to the nameplate parameters of the asynchronous motor. 3. This inverter provides parameter self-learning function. The accurate parameter self-learning comes from the accurate settings of the motor nameplate parameters. 4. In order to ensure the control performance, please configure the motor according to the standard adapter motor of the inverter. If the gap between the motor power and the standard adapter motor is too large, the control performance of the inverter will decrease significantly.	0.01A		×
F3.03	Rated speed		1rpm		×
F3.04	Rated frequency		0.01Hz		×
F3.05	Rated power		1V		×
F3.06	No-load current I0	F3.06 set range: 0.01～655.35A F3.07 set range: 0.000～50.000Ω F3.-8 set range: 0.0～6553.5mH F3.09 set range: 0.000～50.000Ω F3.10 set range: 0.0～6553.5mH 1. After changing the motor model code F3.00, the inverter automatically sets the parameters of F3.06～F3.10 to the parameters of the corresponding motor. 2. If the parameters of the motor are known, please write the values in F3.06～F3.10 accordingly. If the motor parameter self-learning is performed, the set values of F3.06～F3.10 will be updated automatically after the learning is completed normally. 3. These parameters are the reference parameters for inverter control and have direct impact on control performance. **Note: Users shall not change this group of parameters at random.**	0.01A	Model determination	×
F3.07	Stator resistance R1		0.001Ω		○
F3.08	Leakage inductance X		0.1mH		○
F3.09	Rotor resistance R2		0.001Ω		○
F3.10	Mutual inductance Xm		0.1mH		○
F3.11	Motor poles	2~14	2	4	×
F3.12	Parameter self-learning	0: No action 1: Action (motor rotation): Perform comprehensive self-learning of motor parameters. It is recommended to use rotary self-learning for occasions with high control accuracy requirements. **Note: Before starting the self-learning,**	1	0	×

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
		make sure that the motor is stopped and remove the motor shaft from the load, otherwise the self-learning cannot be performed normally. Parameter self-learning steps: 1. According to the characteristics of the motor, set the function codes “F3.01 rated power” and “F3.02 rated current”, “F3.03 rated speed”, “F3.04 rated frequency”, “F3.05 rated voltage”, and “F3.11 motor poles” correctly. 2. Set F3.12 to 1, press the ENT key, and then press the RUN key to start parameter self-learning. In this case, the operation panel displays “STU--”. 3. When the operation panel no longer displays “STU--”, it indicates that the parameter self-learning is completed, and the set value of F3.12 will be set to 0 automatically.			
F3.13	Self-learning acceleration and deceleration speeds	0.01～600.00s Set acceleration/deceleration time during self-learning no-load test.	0.01s	6.00s	○
F3.14	Self-learning current	1～100% Set the current during self-learning DC test.	1%	25%	×
F5 group analog terminal parameters					
F5.00	AI1 minimum value	F5.00 set range: 0.00～F5.02 F5.01 set range: -100.0%～100.0% F5.02 set range: F5.00～10.00V F5.03 set range: -100.0%～100.0% F5.04 set range: 0.00～10.00V F5.05 set range: 0～1000ms F5.06 set range: 0.00～F5.08 F5.07 set range: -100.0%～100.0% F5.08 set range: F5.06～10.00V F5.09 set range: -100.0%～100.0% F5.10 set range: 0.00～10.00V F5.11 set range: 0～1000ms 1. The function code defines the relationship between the analog input voltage and the corresponding set value of the analog input. When the analog input voltage exceeds the set maximum or minimum input range, it will be calculated with the maximum or minimum input. 2. When analog input is current input, a current of 0～20mA corresponds to a voltage of 0～10V. 3. In different applications, The nominal values corresponding to the	0.01V	0.00V	○
F5.01	Set value corresponding to AI1 minimum value		0.1%	0.0%	○
F5.02	AI1 maximum value		0.01V	10.00V	○
F5.03	Set value corresponding to AI1 maximum value		0.1%	100.0%	○
F5.04	AI1 zero drift setting		0.01V	0.00V	○
F5.05	AI1 filter time		1ms	10ms	○
F5.06	AI2 minimum value		0.01V	0.00V	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
F5.07	Set value corresponding to AI2 minimum value	analog setting 100.0% are different, please refer to the instructions of applications for details. The following legend illustrates the different settings: 	0.1%	0.0%	○
F5.08	AI2 maximum value		0.01V	10.00V	○
F5.09	Set value corresponding to AI2 maximum value		0.1%	100.0%	○
F5.10	AI2 zero drift setting		0.01V	0.00V	○
F5.11	AI2 filter time	4. Filter time of analog input: Adjust the sensitivity of the analog input. Increasing this value appropriately can enhance the anti-interference of the analog quantity, but will weaken the sensitivity of the analog input. 5. Analog zero drift setting: Generally there will be some zero drift in the analog quantity. On some occasions with high accuracy requirements, the zero drift setting will achieve a better corresponding effect. **Note: Analog AI1 supports 0～10V/0～20mA input (AI1 jump cap selection), and analog AI2 only supports 0～10V input.**	1ms	10ms	○
F5.12	Reserved	-	-	-	*
F5.13	Reserved	-	-	-	*
F5.14	Reserved	-	-	-	*
F5.15	Reserved	-	-	-	*
F5.16	Reserved	-	-	-	*
F5.17	Reserved	-	-	-	*
F5.18	Analog automatic zero drift adjustment	Set range: 0～1 When set to 1, the automatic zero drift adjustment of the analog quantity must be performed. It must be ensured that there is no external analog input quantity input.	0	0	○
F5.19	PULSE minimum input	0.00～F5.21	0.01KHz	0.00KHz	○
F5.20	Correspondence setting of PULSE minimum input	-100.0%～100.0%	0.1%	0.0%	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
F5.21	PULSE maximum input	F5.19～50.00KHz	0.01KHz	50.00KHz	○
F5.22	Correspondence setting of PULSE maximum input	-100.0%～100.0%	0.1%	100.0%	○
F5.23	PULSE filter time	0～1000ms	1ms	10ms	○
F5.24	HDO function selection (DO2 terminal)	0: Running frequency (0～Maximum output frequency) 1: Set frequency (0～Maximum output frequency) 2: Output current (0～2 times rated current) 3: Output torque (0～2 times rated torque) 4: Output voltage (0～1.2 times rated voltage) 5: Bus voltage (0～1000V) 6: AI1 (0～10V/0～20mA) 7: AI2 (0～10V) 8: Reserved 9: Output power (0～2 times rated frequency) 10: Pulse input (0～50.00KHz) 11: Communication setting (0～1000)	1	5	○
F5.25	AO1 function selection		1	0	○
F5.26	AO2 function selection		1	1	○
F5.27	HDO (DO2 terminal) output lower limit	F5.27 set range: 0.0～F5.29 F5.28 set range: 0.00～50.00KHz F5.29 set range: F5.27～100.0% F5.30 set range: 0.00～50.00KHz F5.31 set range: 0.0～F5.33 F5.32 set range: 0.00～10.00V F5.33 set range: F5.31～100.0% F5.34 set range: 0.00～10.00V F5.35 set range: 0.0～F5.37 F5.36 set range: 0.00～10.00V F5.37 set range: F5.35～100.0% F5.38 set range: 0.00～10.00V 1. The function code defines the corresponding relationship between the output value and the analog output. When the output value exceeds the set maximum output or minimum output range, it will be calculated with the upper limit output or lower limit output. 2. When the analog output is current output, 1mA current is equivalent to 0.5V voltage. 3. In different applications, the analog output corresponding to 100% of the output	0.1%	0.0%	○
F5.28	Corresponding lower limit HDO (DO2 terminal) output frequency		0.01KHz	0.00KHz	○
F5.29	HDO (DO2 terminal) output upper limit		0.1%	100.0%	○
F5.30	Corresponding upper limit HDO (DO2 terminal) output frequency		0.01KHz	50.00KHz	○
F5.31	AO1 output lower limit		0.1%	0.0%	○
F5.32	Corresponding lower limit AO1 output voltage		0.01V	0.00V	○
F5.33	AO1 output upper limit		0.1%	100.0%	○

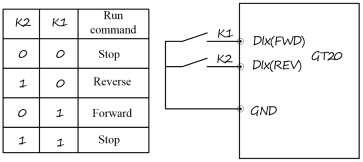
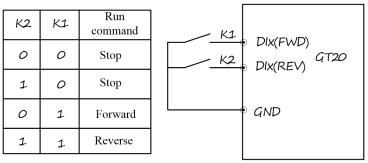
aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
F5.34	Corresponding upper limit AO1 output voltage	value is different. The following legend illustrates the different settings:  **Note: Analog AO1 only supports 0～10V output, and AO2 supports 0～10V/0～20mA output (AO2 jump cap selection).**	0.01V	10.00V	○
F5.35	AO2 output lower limit		0.1%	0.0%	○
F5.36	Corresponding lower limit AO2 output voltage		0.01V	0.00V	○
F5.37	AO2 output lower limit		0.1%	100.0%	○
F5.38	Corresponding upper limit AO2 output voltage		0.01V	10.00V	○
F5.39	External keyboard analog potentiometer zero drift setting	0.00～10.00V	0.01V	0.00V	○
F5.40	External keyboard analog potentiometer zero filter time	0～1000ms	1ms	10ms	○
F6 group digital terminal parameters					
F6.00	Multifunctional input terminal DI1 function selection	0: No function 1: Forward running FWD (level + edge) 2: Reverse running REV (level + edge) 3: Three-wire running control Sin (level) 4: Forward jog (level) 5: Reverse jog (level) 6: Free stop (level) 7: Fault reset (edge signal) 8: Run pause (level) 9: External fault input 10: Frequency setting increase (UP) 11: Frequency setting decreases (DOWN) 12: Multistage speed terminal 1 13: Multistage speed terminal 2 14: Multistage speed terminal 3 15: Multistage speed terminal 4 16: Acceleration/deceleration time selection 1 17: Acceleration/deceleration time selection 2 18: PLC pause	1	1	×

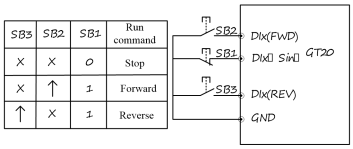
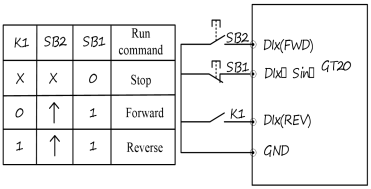
aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
F6.01	Multifunctional input terminal DI2 function selection	19: PLC operation stop and reset 20: PID control pause 21: PID parameter switching 22: Counter trigger 23: Counter reset 24: Length reset 25: Acceleration/deceleration prohibited (level) 26: Immediate DC braking 27: UP/DOWN setting cleared 28: Control command switched to keyboard 29: Control command switched to terminal 30: Control command switched to communication 31: Frequency source switched to the main frequency X 32: Frequency source switched to auxiliary frequency Y 33: High-frequency pulse count reset 34-50: Reserved **Note: The function of each terminal cannot be the same. If the functions of the two ports are set to the same, the DI ports ranked first will work first, and the latter ones will not work.** Detailed description of terminal functions: 1～3: Forward running FWD, reverse running REV, three-wire running control Sin: For terminal two-wire and three-wire control signals, see function code F6.09 description for details. 4～5: Forward jog and reverse jog: Used for jog running control under terminal run command mode, the jog running frequency, jog interval time and jog acceleration/deceleration time are defined in F2.20～F2.23. 6: Free stop: If the function of this terminal		2	
F6.02	Multifunctional input terminal DI3 function selection			7	

<table>
<tr><th>aramete Code</th><th>Parameter name</th><th>Parameter detailed description</th><th>Minimum Unit</th><th>Factory value</th><th>Chang</th></tr>
<tr><td>F6.03</td><td>Multifunctional input terminal DI4 function selection</td><td rowspan="3">is valid, the inverter immediately terminates the output, and the load stops freely according to the mechanical inertia.
7: Fault reset: When a fault alarm occurs in the inverter, the fault can be reset through this terminal. Its function is consistent with the STOP key function of the keyboard.
8: Running pause: If this terminal is valid during running, the terminal will decelerate to zero frequency running according to the deceleration time. This function is invalid during jog running.
9: External fault input: The fault signals of external devices can be input through this terminal, which is convenient for the inverter to monitor the faults of external devices. After receiving fault signals from external devices, the inverter displays “E015”, which is the fault alarm of external devices.
10~11: Frequency setting increase UP, and frequency setting decrease DOWN: The frequency increase or decrease is realized through the control terminal, to perform remote control replacing the operation panel. Effective when the main frequency F1.02 = 2 or the auxiliary frequency F1.03 = 2, the acceleration/deceleration rate is set by F6.10.
12~15: Multistage speed terminals 1~4: By selecting the terminal ON/OFF combination of these functions, you can define up to 16 stages of speed running curves, the frequency of multistage instructions, the selection of acceleration/deceleration time, and the rotating direction are set in group F9.
<table><tr><td>K4</td><td>K3</td><td>K2</td><td>K1</td><td>Frequency setting</td></tr><tr><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>Multistage instruction 1</td></tr><tr><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>Multistage instruction 2</td></tr><tr><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>Multistage instruction 3</td></tr><tr><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>Multistage instruction 4</td></tr><tr><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>Multistage</td></tr></table></td><td rowspan="3"></td><td>12</td><td rowspan="3"></td></tr>
<tr><td>F6.04</td><td>Multifunctional input terminal DI5 function selection</td><td>13</td></tr>
<tr><td>F6.05</td><td>Reserved</td><td>0</td></tr>
</table>

<table>
<tr><th>aramete Code</th><th>Parameter name</th><th>Parameter detailed description</th><th>Minimum Unit</th><th>Factory value</th><th>Chang</th></tr>
<tr><td>F6.06</td><td>Reserved</td><td rowspan="3">
<table>
<tr><td></td><td></td><td></td><td></td><td>instruction 5</td></tr>
<tr><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td><td>Multistage instruction 6</td></tr>
<tr><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td><td>Multistage instruction 7</td></tr>
<tr><td>OFF</td><td>ON</td><td>ON</td><td>ON</td><td>Multistage instruction 8</td></tr>
<tr><td>ON</td><td>OFF</td><td>OFF</td><td>OFF</td><td>Multistage instruction 9</td></tr>
<tr><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>Multistage instruction 10</td></tr>
<tr><td>ON</td><td>OFF</td><td>ON</td><td>OFF</td><td>Multistage instruction 11</td></tr>
<tr><td>ON</td><td>OFF</td><td>ON</td><td>ON</td><td>Multistage instruction 12</td></tr>
<tr><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>Multistage instruction 13</td></tr>
<tr><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>Multistage instruction 14</td></tr>
<tr><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>Multistage instruction 15</td></tr>
<tr><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>Multistage instruction 16</td></tr>
</table>
16~17: Acceleration/deceleration time selection 1~2: The ON/OFF combination of acceleration/deceleration time terminals 1 and 2 can realize the selection of acceleration/deceleration time 1~4.
<table>
<tr><td>K2</td><td>K1</td><td>Acceleration/deceleration time selection</td></tr>
<tr><td>OFF</td><td>OFF</td><td>Acceleration/deceleration time 1</td></tr>
<tr><td>OFF</td><td>ON</td><td>Acceleration/deceleration time 1</td></tr>
<tr><td>ON</td><td>OFF</td><td>Acceleration/deceleration time 3</td></tr>
<tr><td>ON</td><td>ON</td><td>Acceleration/deceleration time 4</td></tr>
</table>
18: PLC pause: Used to realize the pause control of the PLC running process. When this terminal is valid, it runs at zero frequency. The PLC running is not counted.
19: PLC running stop and reset: PLC is prohibited from starting when the terminal is valid, deceleration and stop control is implemented for the PLC running process, and the PLC is reset to the initial state.
20: PID control pause: PID is temporarily invalid, and the inverter maintains the current output frequency without performing PID adjustment.
21: PID parameter switching: When the PID parameter switching condition (F8.12) is set</td><td rowspan="3"></td><td>0</td><td rowspan="3"></td></tr>
<tr><td>F6.07</td><td>Reserved</td><td>0</td></tr>
<tr><td>F6.08</td><td>Reserved</td><td>0</td></tr>
</table>

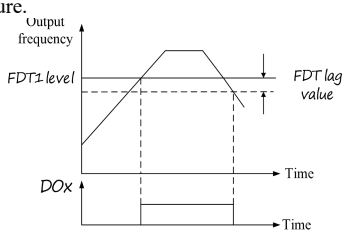
aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
		to 1 (via terminal switching), the F8.06~F8.08 are used for PID parameters when the terminal is invalid, and F8.09~F8.11 are used when the terminal is valid. 22: Counter trigger: Count pulse input port of the built-in counter, the highest pulse frequency: 50Hz, and the current count value can be stored and memorized when power is off. See function codes F6.22 and F6.23 for details. 23: Counter reset: Clear the built-in counter of the inverter and use it in conjunction with function 22 (counter trigger signal input). 24: Length reset: When the function terminal is valid, the actual length is cleared to zero. 25: Acceleration/deceleration prohibition: Keep the motor from being affected by any external signal (except stop command), maintain operating at the current speed. This function is invalid during jog running. 26: Immediate DC brake: When the stop mode is decelerate and stop + DC brake, it is switched to DC brake status when the terminal is valid during stop. 27: UP/DOWN setting is cleared: When the frequency given channel is set to terminal UP/DN, this function terminal can directly clear the frequency set by UP/DN. 28: Control command switched to keyboard 29: Control command switched to terminal 30: Control command switched to communication If the above three terminals or two of them are closed at the same time, the priority is keyboard> terminal> communication. **Note: When switching to terminal two-wire control, the running state changes are affected by the F2.06 parameter; when switching to other control modes, the current running state is maintained.** 31: Frequency source switched to the main frequency X 32: Frequency source switched to auxiliary frequency Y			

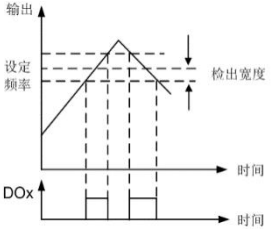
aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
		If the above two terminals are closed at the same time, the priority is switching to the main frequency X> switching to the auxiliary frequency Y. 33: High-frequency pulse count reset: The high-frequency pulse count value recorded by function code U0.16 is cleared.			
F6.09	Forward/reverse running mode setting	0: Two-wire control mode 1: This mode is the most commonly used two-wire mode. The forward and reverse of the motor are determined by the defined FWD and REV terminal commands.  1: Two-wire control mode 2: This mode uses the defined FWD as the running terminal and the direction is determined by the REV status that defined.  2: Three-wire operation control 1: This mode uses the defined Sin as the enable terminal, the run command is generated by FWD or REV, and both control the operation direction. When the inverter operates, the terminal Sin must be closed. The terminal FWD or REV generates a rising edge signal to control the operation and direction of the inverter. When the inverter stops, the terminal Sin must be disconnected to complete the stop.	1	0	×

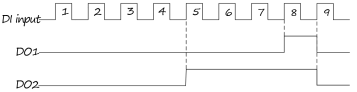
Parameter Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
		 3: Three-wire operation control 2: This mode uses the defined Sin as the enable terminal, the run command is generated by FWD, and the direction is controlled by REV. When the inverter operates, the terminal Sin must be closed. The terminal FWD generates a rising edge signal, and the inverter starts operating. The status of terminal REV determines the operation direction. When the inverter stops, the terminal Sin must be disconnected to complete the stop. 			
F6.10	UP/DN rate	0.01～99.99Hz/s This function code defines the change rate of the set frequency modified by the UP/DN terminal.	0.01Hz/s	1.00Hz/s	○
F6.11	Open collector output terminal DO1	0: No output 1: Inverter running signal (RUN) 2: Frequency arrival signal (FAR) 3: Frequency level detection signal (FDT1) 4: Frequency level detection signal (FDT2) 5: Reserved 6: Undervoltage lockout stopping (LU) 7: External fault stop (EXT) 8: Frequency upper limit (FHL) 9: Frequency lower limit (FLL)	1	0	×

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
F6.12	Open collector output terminal HDO (DO2 terminal)	10: Inverter running at zero frequency 11: PLC phase running completion 12: PLC cycle completion 13: Set count value arrival 14: Specified count value arrival 15: Set length arrival 16: Inverter ready to run (RDY) 17: Inverter fault 18: Reserved 19: Set cumulative running time arrival 20: Forward running 21: Reverse running 22: Reserved 23: Water supply sleep running indication 24: Water pipe overpressure indication 25: Water pipe underpressure indication 26: Water pipe shortage indication 27-30: Reserved	1	1	×
F6.13	Relay output function (TA/TB/TC)	Detailed description of terminal functions: 1: Inverter running signal (RUN): The inverter is running, and outputs an indication signal. 2: Frequency arrival signal (FAR): Refer to the function description of F6.18. 3: Frequency level detection signal (FDT1): Refer to the function description of F6.14～F6.15. 4: Frequency level detection signal (FDT2): Refer to the function description of F6.16～F6.17. 5: Reserved 6: Undervoltage lockout stopping (LU): When the DC bus voltage is lower than the undervoltage limit level, an indication signal is output, and the LED displays “P.oFF”. 7: External fault stop (EXT): When the inverter has an external fault trip alarm (E015), it outputs an indication signal. 8: Frequency upper limit (FHL): When the set frequency ≥ the upper limit frequency and the operation frequency reaches the upper limit, an indication signal is output. 9: Frequency lower limit (FLL): When the set frequency ≤ the lower limit frequency and the operation frequency reaches the lower limit, an indication signal is output. 10: Inverter running at zero frequency: Output frequency ≤ FC.10 zero frequency	1	17	×

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
		arrival range, and outputs an indication signal under operation status. 11: PLC phase operation completed: After the simple PLC phase operation is completed, an indication signal (single pulse signal, width 250ms) is output. 12: PLC cycle completed: After the simple PLC completes one operation cycle, an indication signal (single pulse signal, width 250ms) is output. 13: Set count value arrival 14: Specified count value arrival For functions 13~14, refer to F6.22~F6.23 function description. 15: Set length arrival: When the actual length U0.15≥FC.11 set length, an indication signal is output. 16: Inverter operation ready (RDY): When this signal output is valid, it indicates that the inverter has no fault, the bus voltage is normal, and the inverter operation prohibition terminal is invalid. In this case, the start command can be accepted. 17: Inverter fault: If the inverter fails, an indication is output. 18: Reserved 19: Set the accumulated running time arrival: When the accumulated running time of the inverter (U0.27) reaches the running cutoff time (F0.02) of the inverter, an indication signal is output. 20: Forward running: The inverter is under the forward running status and outputs an indication signal. 21: Reverse running: The inverter is under the reserve running status and outputs an indication signal. 22: Reserved 23: Water supply sleep indication: During water supply application, the inverter is under the sleep status and outputs an indication signal. 24: Water pipe overpressure indication: During water supply application, the inverter judges that the water pipe is overpressure at the time and outputs an			

arameter Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
		indication signal. 25: Water pipe underpressure indication: During water supply application, the inverter judges that the water pipe is underpressure at the time and outputs an indication signal. 26: Water pipe shortage indication: During water supply application, the inverter judges that the water pipe is short of water at the time and outputs an indication signal.			
F6.14	FDT1 level	F6.14 set range: 0.00～650.00Hz F6.15 set range: 0.00～650.00Hz F6.16 set range: 0.00～650.00Hz F6.17 set range: 0.00～650.00Hz F6.14～F6.15 are supplementary definitions for No. 3 function FDT1 in the terminal output function, F6.16～F6.17 are supplementary definitions for No. 4 function FDT2 in the terminal output function. The usage of both is the same. In the following, F6.14～F6.15 are taken as an example: When the output frequency is greater than or equal to a certain set frequency (FDT1 level), an indication signal is output until the output frequency drops to a certain frequency (FDT1 level - FDT1 lag) lower than FDT1 level, as shown in the figure.  	0.01Hz	50.00Hz	○
F6.15	FDT1 lag		0.01Hz	1.00Hz	○
F6.16	FDT2 level		0.01Hz	25.00Hz	○
F6.17	FDT2 lag		0.01Hz	1.00Hz	○

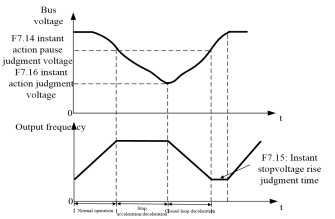
arameter Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
F6.18	Frequency arrival (FAR) detection width	0.00～650.00Hz This parameter is a supplementary definition for No. 2 function in the terminal output function. As shown in the figure, when the output frequency of the inverter is within the positive and negative detection widths of the set frequency, a pulse signal is output.  输出 Output 设定频率 Set frequency 检出宽度 Detection width 时间 Time 时间 Time	0.01Hz	2.50Hz	○
F6.19	HDI terminal input mode selection (DI5)	0: Switch input 1: High-frequency pulse input (see F5.19～F5.23)	1	0	×
F6.20	HDO terminal output mode selection (DO2)	0: Switch output 1: High-frequency pulse output (see F5.27～F5.30)	1	0	×
F6.21	Reserved	-	-	-	*
F6.22	Counter reset value setting (set count value arrival)	F6.22 set range: F6.23～9999 F6.23 set range: 0～F6.22 F6.22 and F6.23 are supplementary definitions for No. 13 and No. 14 functions in the terminal output function. 1. The set count value given refers to the number of input pulses from DIx (count trigger signal input function terminal), before the DOx (open collector output terminal) or the relay outputs an indication signal. As shown in the figure, when DIx	1	0	○

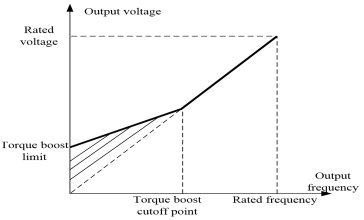
aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
F6.23	Counter detection value setting (specified count value arrival)	inputs the 8th pulse, DO1 outputs an indication signal, and F6.23 = 8 in this case. 2. The specified count value given refers to the number of input pulses from DIx, before the DOx or the relay outputs an indication signal, till the set count value is reached. As shown in the figure, when DIx inputs the 5th pulse, DO2 outputs an indication signal, till the set count value 8 is reached, in this case F6.23 = 5. 3. When the specified count value is greater than the set count value, the specified count value is invalid. 	1	0	○
F6.24	DI input switch polarity 1	00000~11111 LED single digit: DI1 positive/negative logic definition LED tens digit: DI2 positive/negative logic definition LED hundreds digit: DI3 positive/negative logic definition LED thousands digit: DI4 positive/negative logic definition LED 10 thousands digit: DI5 positive/negative logic definition This function code is used to set the polarity of the input switch. When the bit is set to 1, the input switch is positive logic (valid when connected to the common port, and invalid when disconnected); when the bit is set to 0, the input switch is negative logic (invalid when connected to the common port, and valid when disconnected).	11111	11111	○
F6.25	DI input switch polarity 2	00000~11111 LED single digit: Reserved LED tens digit: Reserved LED hundreds digit: Reserved LED thousands digit: Reserved LED 10 thousands digit: Reserved	11111	11111	○
F6.26	DO output switch polarity 1	00000~11111 LED single digit: DO1 positive/negative logic definition LED tens digit: DO2 positive/negative logic definition LED hundreds digit: Relay positive/negative logic definition LED thousands digit: Reserved LED 10 thousands digit: Reserved	11111	11111	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
		This function code is used to set the polarity of the output switch. When the bit is set to 1, the output switch is positive logic; when the bit is set to 0, the output switch is negative logic.			
F6.27	Reserved	-	-	-	*
F6.28	DI filter time	0～1000ms Set DI1～DI5 common terminal function input filter time. In the case of large interference, you shall increase the set value of this function code to prevent misoperation.	1ms	20ms	○
F6.29	DO1 output on delay	Set range: 0.0～600.0s This function code defines the delay from the status change of the switch output terminal and the relay to the output change.	0.1s	0.0s	○
F6.30	DO1 output off delay		0.1s	0.0s	○
F6.31	DO2 output on delay		0.1s	0.0s	○
F6.32	DO2 output off delay		0.1s	0.0s	○
F6.33	Relay output on delay		0.1s	0.0s	○
F6.34	Relay output off delay		0.1s	0.0s	○
F7 group advanced function parameters					
F7.00	Overpressure stall point	F7.00 set range: 100.0～160.0%Udc F7.01 set range: 0.000～10.000V F7.02 set range: 0～1000 F7.03 set range: 1～1000ms 1. The overvoltage stall protection function detects the bus voltage during the decelerating operation of the inverter and compares with the overvoltage stall point defined by F7.00 (relative to the standard bus voltage) and the overvoltage control voltage defined by F7.01 (relative to the bus voltage change rate), if the bus voltage exceeds the overvoltage stall point or the bus voltage change rate exceeds the overvoltage control voltage, the inverter will adjust the deceleration time to make the output frequency slow down. 2. Overvoltage stall gain, and overvoltage stall integration time: Used to adjust the inverter's ability to suppress overvoltage during deceleration. The larger the gain, and the longer the integration time, the stronger the ability to suppress overvoltage, and the inverter's deceleration time becomes longer	0.1% Udc	Model determination	○
F7.01	Overvoltage control voltage		0.001V	5.000V	○
F7.02	Overvoltage stall gain Kp		1	5	○
F7.03	Overvoltage stall integration time		1ms	200ms	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
		accordingly. So, under the premise of no overvoltage, the smaller the gain and the longer the integration time, the better the deceleration effect. **Note: When the set stall point is low, it is suggested that the user shall increase the deceleration time appropriately.**			
F7.04	Overcurrent stall level	F7.04 set range: 80.0～230.0% F7.05 set range: 0～1 F7.06 set range: 0～1000 F7.07 set range: 1～1000ms 1. The overcurrent stall function is to automatically limit the overcurrent stall level (F7.04) not exceeding the setting, through the real-time control of the load current, to prevent fault trips caused by current overshoot. For load occasions with large inertia or intense changes, this function is especially suitable. 2. The overcurrent stall level (F7.04) defines the current threshold of the overcurrent stall action, and its setting range is relative to the percentage of the inverter rated current. When this parameter value is exceeded, the inverter starts to implement the overcurrent stall protection function. 3. Overcurrent stall gain, and overcurrent stall integration time: Used to adjust the inverter's ability to suppress overcurrent during acceleration and deceleration. The larger the gain, and the longer the integration time, the stronger the ability to suppress overcurrent, and the inverter's acceleration/deceleration time becomes longer accordingly. So, under the premise of no overccurent, the smaller the gain and the longer the integration time, the better the effect. 4. The overcurrent stall function is always effective under the acceleration/deceleration status. Whether the overcurrent stall function is effective during constant speed operation is determined by the overcurrent stall action selection (F7.05). F7.05＝0 overcurrent stall is invalid during constant speed operation; F7.05＝1 overcurrent stall is valid during constant speed operation.	0.1%	180.0%	○
F7.05	Overcurrent stall action selection		1	1	○
F7.06	Overcurrent stall gain Kp		1	5	○
F7.07	Overcurrent stall integration time		1ms	200ms	○
F7.08	Speed tracking gain Kp	F7.08 set range: 0～100 F7.09 set range: 1～1000ms F7.10 set range: 0.1～600.0s	1	10	○
F7.09	Speed		1ms	50ms	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
	tracking integration time	F7.11 set range: 1～100% F7.12 set range: 1～100%			
F7.10	Speed tracking acceleration and deceleration	1. Speed tracking acceleration/deceleration: The faster the acceleration/deceleration, the faster the speed tracking, but too fast setting may cause the speed tracking result unreliable. 2. Speed tracking judgment threshold: When the torque current is smaller than the F7.11 judgment threshold (relative to the motor rated current) during speed tracking, the tracking is considered successful. 3. Judgment threshold for speed tracking switching completion: After speed tracking has successfully tracked the current frequency, the expected output voltage is calculated based on this frequency and the output voltage is gradually increased until the difference between the applied voltage and the expected output voltage is less than F7.12 judgment threshold, in this case, it will enter normal operation status.	0.1s	20.0s	○
F7.11	Speed tracking judgment threshold		1%	10%	○
F7.12	Speed tracking filter time		1%	3%	○
F7.13	Instant stop/nonstop function selection	F7.13 set range: 0～1 F7.14 set range: 80.0～100.0% F7.15 set range: 0.00～100.00s F7.16 set range: 70.0～100.0% F7.17 set range: 0～1000 F7.18 set range: 1～1000ms F7.19 set range: 0～300.0s The instant stop/nonstop function is used to determine whether the inverter will automatically perform low voltage compensation when the voltage drops or instant undervoltage. Reduce the output frequency appropriately and feed back the energy through the load to maintain the inverter operate without tripping. F7.13 is set to 0, no action. F7.13 is set to 1, action (deceleration). In case of a momentary outrage or a sudden drop in voltage, the inverter decelerates. When the bus voltage returns to normal, the inverter will normally accelerate to the set frequency.	1	0	○
F7.14	Instant stop action pause judgment voltage		0.1%	90.0%	○
F7.15	Instant stop voltage rise judgment time		0.01s	0.50s	○
F7.16	Instant stop action judgment voltage		0.1%	80.0%	○
F7.17	Instant stop gain Kp		1	5	○
F7.18	Instant stop integration time		1ms	100ms	○
F7.19	Instant stop deceleration time setting		0.1s	20.0s	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
					
F7.20	Overcurrent stall speed recovery time limit	Set range: 0.01～600.00s After the overcurrent stall is canceled, the inverter output frequency will resume to the set frequency, but the fastest acceleration / deceleration time for recovery is limited by this function code.	0.01s	0.20s	○
F7.21	Torque boost limit	F7.21 set range: 0.1～30.0% F7.22 set range: 0.00～F3.04 F7.23 set range: 0～500 (when set to 0, it is manual torque boost) F7.24 set range: 1～10000ms F7.25 set range: 0.00～F3.04 F7.26 set range: 0～500 F7.27 set range: 1～10000ms F7.28 set range: 0～100% 1. The torque boost is to compensate the output voltage of the inverter when the inverter is running at low frequency. The torque boost can improve the low frequency characteristics in V/F control mode. 2. The torque boost amount shall be set appropriately according to the load. The load can increase the boost amount, but the boost amount shall not be set too large. When the torque boost is too large, the motor will run over-excitation and the inverter output current will increase. The motor heats up and the efficiency decreases. 3. Torque boost cutoff point: At this frequency point, the torque boost is valid, and is invalid when the set frequency is exceeded. 4. Torque boost gain switching frequency point: Switching frequency point during high-speed and low-speed variable gains. 5. Setting of the torque boost gain and integration time: Increasing the gain can speed up the system's dynamic response, but if the gain is too large, the system is easy to generate oscillation; reducing the integration time can speed up the system's dynamic response, but if the integration is	0.1%	10.0%	○
F7.22	Torque boost cutoff point		0.01Hz	50.00Hz	○
F7.23	Torque boost gain 1		1	20	○
F7.24	Torque boost integration time 1		1ms	150ms	○
F7.25	Torque boost gain switching frequency point		0.01Hz	Model determination	○
F7.26	Torque boost gain 2		1	10	○

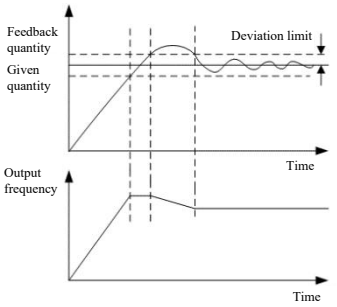
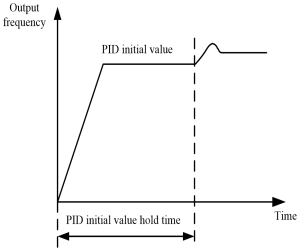
aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
F7.27	Torque boost integration time 2	too small, the system overshoot is large and is easy to generate oscillation. Usually, the proportional gain is adjusted first to maximize under the premise that the system is not oscillating; then the integration time is adjusted to make the system have a fast dynamic response and reduce the system overshoot.	1ms	500ms	○
F7.28	Automatic torque boost factor		1%	30%	○
F7.29	Motor oscillation suppression methods	F7.29 set range: 0～1 F7.30 set range: 0～1000 F7.31 set range: 0～10000ms In V/F control mode, it is easy to generate current oscillation at certain frequency. In minor cases, the motor cannot run stably, in serious cases, it will cause the inverter overcurrent. The oscillation suppression function is used to suppress the natural oscillation generated when the inverter cooperates with the motor. If the output current changes repeatedly during constant load operation, properly adjusting the oscillation suppression parameters based on the factory parameters can eliminate oscillation and make the motor operate stably. F7.29=0 Suppress oscillation by adjusting output frequency; F7.29=1 Suppress oscillation by adjusting output voltage.	1	0	○
F7.30	Motor oscillation suppression coefficient		1	3	○
F7.31	Motor oscillation suppression filter time		1ms	100ms	○
Group F8 PID control parameters					
F8.00	PID operation control selection	0: PID standby (not acting) 1: PID standby (acting)	1	0	×
F8.01	Given channel selection	When the frequency given channel is selected to 8, the inverter operation mode is process PID control. 0: F8.05 digital given 1: AI1 2: AI2 3: Reserved 4: PULSE setting 5: Communication setting 6: Multistage instruction setting	1	0	×

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
		7: Operation panel digital potentiometer given 8: Analog potentiometer given on external operation panel This function code determines the target given channel of PID. The set target of PID is a relative value, and the set 100% corresponds to 100% of the feedback signal of the controlled system. The system always performs calculation based on relative value (0 to 100.0%).			
F8.02	Feedback channel selection	This function code is used to select the PID feedback channel. 0: AI1 1: AI2 2: Reserved 3: Pulse 4: Communication setting **Note: The given channel and the feedback channel cannot be the same, otherwise, the PID cannot be controlled effectively.**	1	0	×
F8.03	Given channel filter	Set range: 0～1000ms The external given signal and feedback signal often overlap a certain interference.	1ms	10ms	○
F8.04	Feedback channel filter	The channel is filtered by setting the filter time. The longer the filter time, the stronger the anti-interference ability, but the response becomes slower; the faster the filter time, the faster the response, but the anti-interference ability weakens.	1ms	10ms	○
F8.05	Given quantity digital setting	Universal inverter mode setting range: 0.0～100.0% Water supply inverter mode setting range: 0.0～F8.23	0.1% Or 0.1bar	0.0% Or 0.0bar	○
F8.06	Proportional gain Kp1	Set range: 0～1000 Determine the adjustment intensity of the entire PID. The larger the proportional gain, the stronger the adjustment intensity. When there is a deviation between the feedback and the given, the output and the deviation are adjusted in proportion. If the deviation is constant, the adjustment amount is also constant. Proportional adjustment can quickly respond to changes in feedback, but just proportional adjustment cannot achieve non-differential control. The larger the proportional gain, the faster the adjustment speed of the system, but if it is too large, oscillation will occur. The adjustment method is to first set the	1	10	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
		integration time to be very long and the differential time to zero. Use only proportional adjustment to make the system run, change the given quantity, and observe the stable deviation (static difference) between the feedback signal and the given quantity. If the static difference is in the direction of given quantity changes (for example, increasing the given quantity, the feedback quantity is always less than the given quantity after the system is stable), continue to increase the proportional gain, otherwise decrease the proportional gain, and repeat the above process until the static difference is relatively small.			
F8.07	Integration time Ti1	Set range: 1～10000ms Determine how fast the PID regulator performs integral adjustment on the deviation between the PID feedback quantity and the given quantity. The shorter the integration time, the greater the adjustment intensity. When there is a deviation between the feedback and the given value, the output adjustment accumulates continuously. If the deviation persists, the adjustment increases constantly, until there is no deviation. The integral regulator can effectively eliminate static difference. If the integral regulator is too strong, there will be repeated overshoot, making the system unstable until oscillation occurs. The characteristics of the oscillation caused by excessive integration are as follows: The feedback signal swings up and down at a given quantity, and the swing gradually increases until it oscillates. The adjustment of the integration time parameter is generally from large to small, gradually adjust the integration time, and observe the effect of the system adjustment until the stable speed of the system reaches the requirements.	1ms	500ms	○
F8.08	Differential time Td1	Set range: 0～10000ms Determine how strong the PID regulator	1ms	0ms	○

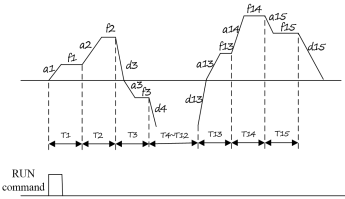
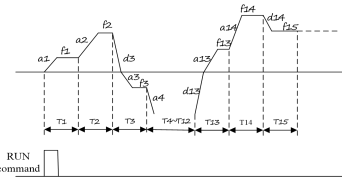
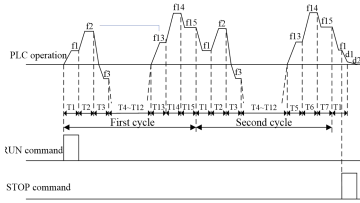
aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
		performs adjustment on the deviation change rate between the PID feedback quantity and the given quantity. The shorter the differential time, the greater the adjustment intensity. When the deviation between feedback and given changes, an adjustment proportional to the deviation change rate is output. The adjustment is only related to the direction and magnitude of the deviation change, and has nothing to do with the direction and magnitude of the deviation itself. The function of differential adjustment is to adjust according to the changing trend when the feedback signal changes, thus to suppress the change of the feedback signal. Please use the differential regulator with caution, because the differential regulation is easy to amplify the interference of the system, especially the interference with a higher change frequency.			
F8.09	Proportional gain Kp2	F8.09 set range: 0～1000 F8.10 set range: 1～10000ms F8.11 set range: 0～10000ms The parameter functions are the same as F8.06～F8.08, when used to switch the two groups of PID parameters, the switch method is shown in F8.12 setting.	1	5	○
F8.10	Integration time Ti2		1ms	2000ms	○
F8.11	Differential time Td2		1ms	0ms	○

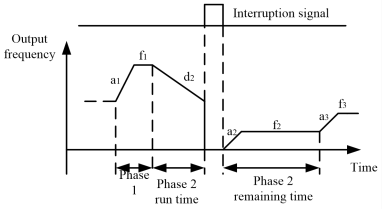
aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
F8.12	Gain switching conditions	0: Do not switch 1: Switch through the DI terminal: The function of the DI terminal is set to 21 (PID parameter switch). When the terminal is invalid, select parameter group 1 (F8.06～F8.08). When the terminal is valid, select parameter group 2 (F8.09～F8.11). 2: Automatic switch based on the deviation: Select the parameter group 1 (F8.06～F8.08) when the absolute value of the deviation between the given quantity and the feedback quantity is less than the switch threshold (F8.13), and select the parameter group 2 (F8.09 ~ F8.11) when greater than the switch threshold (F8.13) . 3: Switch automatically according to PID output: When the PID output (0～maximum output frequency corresponds to 0.0～100.0%) is less than the switch threshold (F8.13), select parameter group 1 (F8.06～F8.08), and select parameter group 2 (F8.09~F8.11) when greater than the switch threshold (F8 .13)	1	0	○
F8.13	Gain switching threshold	Set range: 0.0～100.0% The PID parameter switch threshold is valid when the gain switch condition (F8.12) is set to 2 or 3.	0.1%	0.0%	○
F8.14	PID sampling period	Set range: 1～60000ms The sampling period T is a sampling period of the feedback quantity, and the PID regulator operates once in each sampling period. The greater the sampling period, the slower the response.	1ms	1ms	○
F8.15	Deviation limit	Set range: 0.0～50.0% The deviation limit corresponds to a closed-loop given value. When the absolute value of the deviation between the given quantity and the feedback quantity is within this range, the PID stops adjusting, as shown in the figure. The proper setting of this function helps to consider the accuracy and stability of the system output.	0.1%	0.0%	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
					
F8.16	Closed-loop regulation features	0: Positive action. When the feedback signal is less than the given quantity, the output frequency of the inverter rises to make the PID reach balance. Such as rewinding tension PID control. 1: Negative action. When the feedback signal is less than the given quantity, the output frequency of the inverter drops to make the PID reach balance. Such as unwinding tension PID control.	1	0	○
F8.17	PID initial value	F8.17 set range: 0.0～100.0% F8.18 set range: 0.00～600.00s 1. After the inverter starts, accelerate to the initial PID value (F8.17) according to the acceleration time. After running for a period of time at this initial value (F8.18), the PID starts the closed-loop adjustment operation. 2. This function allows the closed-loop adjustment to quickly enter the stable phase.	0.1%	0.0%	×
F8.18	PID initial value hold time		0.01s	0.00s	×
F8.19	Closed-loop output polarity selection	0: Closed-loop output is negative, run at zero-frequency 1: Closed-loop output is negative, reverse	1	0	○
F8.20	PID reverse cutoff frequency	Set range: 0.00~upper limit frequency When the PID output frequency is negative (i.e. the inverter reverses), determine the upper limit of the reverse frequency.	0.01Hz	2.00Hz	×

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
F8.21	PID feedback loss detection value	F8.21 set range: 0.0～100.0% F8.22 set range: 0.0～200.0s (0.0s indicates no detection)	0.1%	10.0%	○
F8.22	PID feedback loss detection time	When the feedback value is less than the feedback disconnection detection value and the feedback disconnection detection time has passed, the inverter reports a PID feedback disconnection fault (E020).	0.1s	0.0s	○
F8.23	Maximum sensor range	Set range: 0.0～200.0bar The maximum range of the sensor corresponds to the maximum value of the closed-loop given value.	0.1bar	10.0bar	○
F8.24	Water supply sleep selection	0: Automatic sleep 1: Run at lower limit frequency	1	0	○
F8.25	Water supply sleep detection time	F8.25 set range: 0.0～3600.0s F8.26 set range: 0.01～600.00s Sleep detection pressure = (100.0%-F8.15) * set pressure value. When the inverter is running, it will detect whether the feedback pressure is higher than the sleep detection pressure. If the feedback pressure is higher than the sleep detection pressure, the inverter starts the sleep detection. After the water supply sleep detection delay time set by F8.25, if the feedback pressure is still greater than the sleep detection pressure, it enters the sleep status, and the inverter gradually reduces the output frequency according to the water supply sleep deceleration time defined by F8.26. If the feedback pressure becomes lower than the sleep detection pressure in the above process, the inverter determines that the sleep detection has failed, and the inverter returns to the PID adjustment status.	0.1s	10.0s	○
F8.26	Water supply sleep deceleration time		0.01s	10.00s	○
F8.27	Water supply wake pressure tolerance	F8.27 set range: 0.0～100.0% (100.0% is the set pressure value) F8.28 set range: 0.0～3600.0s 1. Water supply wake-up pressure = (100.0%-F8.27) * set pressure value. 2. When the inverter enters the sleep status, if the feedback pressure is lower than the	0.1%	10.0%	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
F8.28	Water supply wake detection time	water supply wake-up pressure, the inverter starts wake-up detection. After the water supply wake-up detection time set by F8.28, if the feedback pressure is still lower than the wake-up pressure, the wake-up is successful and the inverter returns to the PID adjustment status, otherwise the wake-up fails. Setting the wake-up pressure too high may cause the inverter to start and stop frequently. Setting it too low may cause insufficient water supply pressure.	0.1s	2.0s	○
F8.29	Water pressure overpressure alarm detection value	Set range: 0.0～100.0% (Do not test when set to 0, 100.0% is the maximum range of pressure sensor) When the feedback pressure is greater than or equal to this set value, and after the F8.31 pressure abnormal alarm detection time, a water pipe overpressure indication is output (the terminal outputs No. 24 function).	0.1%	90.0%	○
F8.30	Water pressure undervoltage alarm detection value	Set range: 0.0～100.0% (Do not test when set to 0, 100.0% is the maximum range of pressure sensor) When the feedback pressure is less than or equal to this set value, and after the F8.31 pressure abnormal alarm detection time, a water pipe underpressure indication is output (the terminal outputs No. 25 function).	0.1%	0.0%	○
F8.31	Water pressure abnormal alarm detection time	Set range: 0.0～3600.0s	0.1s	50.0s	○
F8.32	Water shortage alarm set value	F8.32 set range: 0.0～100.0% (100.0% is the set pressure value) F8.33 set range: 0.0～3600.0s F8.34 set range: 0～10000min (0min indicate there's no water shortage restart function) When the output frequency reaches the upper limit, the feedback pressure is still less than or equal to F8.32 water shortage set value and after F8.33 water shortage alarm detection time, a water pipe water shortage indication (the terminal outputs No. 26 function) will be output and the E023 water shortage fault will be reported. When the E023 water shortage fault occurs, without resetting the fault manually, it will	0.1%	20.0%	○
F8.33	Water shortage alarm detection time		0.1s	20.0s	○
F8.34	Water shortage restart wait time		1min	0min	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
		automatically reset and restart the operation after the F8.34 water shortage restart wait time.			
Group F9 multistage speed control parameters					
F9.00	Simple PLC run mode selection	LED single digit: PLC run mode 0: No action 1: Stop after a single cycle: The inverter will stop automatically after completing one cycle. You need to give a run command again to start.  2: Keep the final value after a single cycle: The inverter will automatically keep the operation frequency and direction of the last stage after completing one cycle.  3: Continuous cycle: The inverter will automatically start the next cycle after completing one cycle, till there's a stop command.  4: DI selection operation: Determine the current operation stage by selecting the ON/OFF combination of input terminal functions 12~15. For the combination method, please refer to No. 12~15 function description of group F6 multifunctional input terminals. LED tens digit: Start mode 0: Restart from the first stage: Stop	1111	0000	×

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
		during operation (caused by stop command, fault or power failure), and start from the first stage after restart. 1: Continue operation from the stage of interruption: Stop during operation (caused by stop command or fault), the inverter automatically records the run time of the current stage, and automatically enters this stage after restarting, and continues the operation in the remaining time at the frequency defined by this stage.  LED hundreds digit: Stage time unit selection 0: Second 1: Minute LED thousands digit: Store at power failure 0: Do not store at power failure 1: Stage at power failure storage interruption			
F9.01	Running stages	Set range: 1～16 Number of stages in a single PLC cycle.	1	16	○
F9.02	Multistage instruction 1	Lower limit frequency~upper limit frequency	0.01Hz	20.00Hz	○
F9.03	Stage 1 instruction setting	LED single digit: 0: Multistage instruction 1 (F9.02) 1: AI1 2: AI2 3: Pulse frequency 4: Communication 5: Operation panel digital potentiometer given 6: Analog potentiometer given on external operation panel LED tens digit: 0: Acceleration/deceleration time 1 1: Acceleration/deceleration time 2 2: Acceleration/deceleration time 3 3: Acceleration/deceleration time 4 LED hundreds digit: 0: Forward running 1: Reverse running	111	000	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
		Note: Only the LED single digit frequency source of stage 1 instruction can be set.			
F9.04	Stage 1 instruction running time	Set range: 0.1～6000.0 **Note: For the time unit selection, see F9.00 hundreds digit setting.**	0.1	10.0	○
F9.05	Multistage instruction 2	Stage X instruction (F9.05, F9.08, F9.11, F9.14, F9.17, F9.20, F9.23, F9.26, F9.29, F9.32, F9.35、F9.38, F9.41, F9.44, and F9.47) setting range: Lower limit frequency~upper limit frequency Stage X instruction (F9.06, F9.09, F9.12, F9.15, F9.18, F9.21, F9.24, F9.27, F9.30, F9.33, F9.36、F9.39, F9.42, F9.45, and F9.48) setting range: LED single digit: 0: Multistage instruction x 1: Reserved LED tens digit: 0: Acceleration/deceleration time 1 1: Acceleration/deceleration time 2 2: Acceleration/deceleration time 3 3: Acceleration/deceleration time 4 LED hundreds digit: 0: Forward running 1: Reverse running Stage X instruction running time (F9.07, F9.10, F9.13, F9.16, F9.19, F9.22, F9.25, F9.28, F9.31, F9.34, F9.37、F9.40, F9.43, F9.46, and F9.49) setting range: 0.1~6000.0 **Note: For the time unit selection, see F9.00 hundreds digit setting.**	0.01Hz	20.00Hz	○
F9.06	Stage 2 instruction setting		111	000	○
F9.07	Stage 2 instruction running time		0.1	10.0	○
F9.08	Multistage instruction 3		0.01Hz	20.00Hz	○
F9.09	Stage 3 instruction setting		111	000	○
F9.10	Stage 3 instruction running time		0.1	10.0	○
F9.11	Multistage instruction 4		0.01Hz	20.00Hz	○
F9.12	Stage 4 instruction setting		111	000	○
F9.13	Stage 4 instruction running time		0.1	10.0	○
F9.14	Multistage instruction 5		0.01Hz	20.00Hz	○
F9.15	Stage 5 instruction		111	000	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
	setting				
F9.16	Stage 5 instruction running time		0.1	10.0	○
F9.17	Multistage instruction 6		0.01Hz	20.00Hz	○
F9.18	Stage 6 instruction setting		111	000	○
F9.19	Stage 6 instruction running time		0.1	10.0	○
F9.20	Multistage instruction 7		0.01Hz	20.00Hz	○
F9.21	Stage 7 instruction setting		111	000	○
F9.22	Stage 7 instruction running time		0.1	10.0	○
F9.23	Multistage instruction 8		0.01Hz	20.00Hz	○
F9.24	Stage 8 instruction setting		111	000	○
F9.25	Stage 8 instruction running time		0.1	10.0	○
F9.26	Multistage instruction 9		0.01Hz	20.00Hz	○
F9.27	Stage 9 instruction setting		111	000	○
F9.28	Stage 9 instruction running time		0.1	10.0	○
F9.29	Multistage instruction 10		0.01Hz	20.00Hz	○
F9.30	Stage 10 instruction setting		111	000	○
F9.31	Stage 10 instruction running time		0.1	10.0	○
F9.32	Multistage instruction 11		0.01Hz	20.00Hz	○

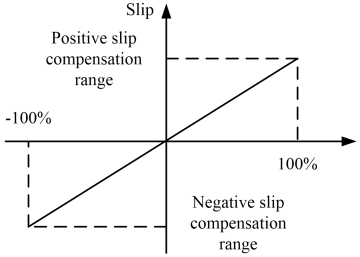
aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
F9.33	Stage 11 instruction setting		111	000	○
F9.34	Stage 11 instruction running time		0.1	10.0	○
F9.35	Multistage instruction 12		0.01Hz	20.00Hz	○
F9.36	Stage 12 instruction setting		111	000	○
F9.37	Stage 12 instruction running time		0.1	10.0	○
F9.38	Multistage instruction 13		0.01Hz	20.00Hz	○
F9.39	Stage 13 instruction setting		111	000	○
F9.40	Stage 13 instruction running time		0.1	10.0	○
F9.41	Multistage instruction 14		0.01Hz	20.00Hz	○
F9.42	Stage 14 instruction setting		111	000	○
F9.43	Stage 14 instruction running time		0.1	10.0	○
F9.44	Multistage instruction 15		0.01Hz	20.00Hz	○
F9.45	Stage 15 instruction setting		111	000	○
F9.46	Stage 15 instruction running time		0.1	10.0	○
F9.47	Multistage instruction 16		0.01Hz	20.00Hz	○

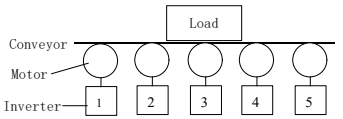
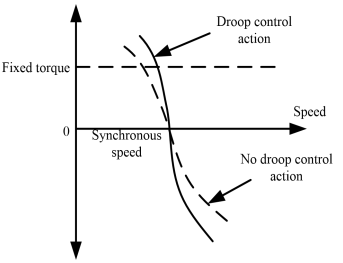
aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
F9.48	Stage 16 instruction setting		111	000	○
F9.49	Stage 16 instruction running time		0.1	10.0	○
Group FA protection function parameters					
FA.00	DC bus undervoltage protection point	Set range: 50～999V This function code specifies the allowed lower limit voltage of the DC bus when the inverter works normally. **Note: When the grid voltage is too low, the output torque of the motor will decrease. So, the inverter needs to be derated for long-term operation at low grid voltage.**	1V	Model determination	×
FA.01	Undervoltage fault action selection	0: During running, the voltage is lower than the undervoltage point, and an undervoltage fault E007 is reported. 1: During running, the voltage is lower than the undervoltage point, and P.oFF is reported.	1	0	×
FA.02	Motor overload protection action selection	0: No action 1: Action, E008 fault is reported when the motor is overloaded.	1	0	×
FA.03	Reserved	-	-	-	*
FA.04	Reserved	-	-	-	*
FA.05	Reserved	-	-	-	*
FA.06	Output phase loss protection delay time	Set range: 0.0～6000.0S (0.0s indicates no detection for output phase loss)	0.1s	0.0s	×
FA.07	485 communication fault protection action selection	0: No action 1: Action, E016 fault is reported when 485 communication is abnormal.	1	0	×
FA.08	Number of automatic resets	FA.08 set range: 0～100 (0 indicates no automatic reset function) FA.09 set range: 0.1～1000.0s 1. Number of automatic resets: When the inverter selects automatic reset for faults, it is used to set the number of automatic resets. When the number of continuous resets exceeds this value, the inverter will	1	0	×

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
FA.09	Automatic reset interval time	report a fault and stop and will not reset automatically. 2. Fault automatic reset interval time: Select the time interval from the fault occurrence to the automatic reset action. 3. Within 2 minutes after the inverter operates, if there is no fault, it will automatically clear the number of resets, and accumulate the number of resets from the beginning. 4. When the number of automatic resets is set to 0, it indicates that automatic reset is prohibited and fault protection is performed immediately. **Note: The inverter module protection (E010) and external equipment failure (E015) have no automatic reset function. After the automatic reset is completed, it will automatically start and run at the speed tracking. Use the automatic fault reset function with caution, otherwise, it may cause personal injuries and property losses.**	0.1s	5.0s	×
FA.10	Reserved	-	-	-	*
FA.11	Reserved	-	-	-	*
FA.12	Reserved	-	-	-	*
FA.13	Reserved	-	-	-	*
FA.14	Overload pre-alarm detection setting	LED Unit: Action Selection 0: Continuous Detection 1: Constant Speed Detection Only LED Ten-thousands Position: Alarm Selection 0: No Alarm, Continue Operation 1: Alarm, Stop Machine LED Hundreds Position: Detection Quantity Selection 0: Relative to Motor Rated Current (E008) 1: Relative to Inverter Rated Current (E009)	111	000	×
FA.15	Overload pre-alarm detection level	20.0~200.0%	0.1%	130.0%	×
FA.16	Overload pre-alarm detection time	0.0~60.0s	0.1s	5.0s	×
Group Fb serial communication parameters					
Fb.00	Local address	Set range: 0～247 The local address is unique in the communication network, which is the basis	1	1	×

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
		for the point-to-point communication between the host computer and the inverter. **Note: 0 is the broadcast address**			
Fb.01	Communication configuration	LED single digit: Baud rate selection 0: 1200BPS 1: 2400BPS 2: 4800BPS 3: 9600BPS 4: 19200BPS 5: 38400BPS LED tens digit: Data format 0: 1-8-2-N format, RTU 1: 1-8-1-E format, RTU 2: 1-8-1-O format, RTU 3: 1-7-2-N format, ASCII 4: 1-7-1-E format, ASCII 5: 1-7-1-O format, ASCII 6: 1-8-1-N format, RTU	11	03	×
Fb.02	Reserved	-	-	-	*
Fb.03	Local response delay	Set range: 0～1000ms The local response delay refers to the interval between the end of inverter data receiving and the sending of response data to the host computer. If the response delay is less than the system processing time, the response delay is based on the system processing time. If the response delay is greater than the system processing time, after the system has processed the data, it must wait until the response delay time is reached before sending data to the host computer.	1ms	5ms	×
Fb.04	Communication timeout detection time	Set range: 0.0～100.0s If the communication timeout fault time is set to 0, this function is invalid. If the time interval between two communications exceeds the communication timeout fault time, the system reports a communication fault E016, and the communication condition can be monitored. Usually, it is set to invalid. If this parameter is set in a continuous communication system, the communication condition can be monitored.	0.1s	0.0s	×
Fb.05	Host send selection	LED single digit: Current host running status	11	11	×

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
		0: Invalid 1: Valid LED tens digit: Current host running frequency 0: Invalid 1: Valid 1. When the inverter is set as the communication master (Fb.00 is set to 0), it can send data to the slave. In this case, the master inverter sends a broadcast command, and all slaves will receive the command sent by the master. 2. The master can send up to 2 frames of data in a polling manner. When set to invalid, no data is sent. **Note: Only RTU communication mode supports host sending.**			
Group FC auxiliary function parameters					
FC.00	Energy consumption braking threshold	FC.00 set range: 250～800V FC.01 set range: 0～100% 1. Energy consumption braking function. If the inverter bus voltage is higher than the energy consumption braking threshold, the built-in braking unit will act. In this case, if a braking resistor is connected, the pumping voltage energy at the inverter internal current side will be released through the braking resistor to make the bus voltage drop. 2. The energy consumption braking duty cycle is used to adjust the duty cycle of the braking unit. If the braking utilization rate is high, the braking unit action duty cycle is high and the braking effect is strong, but the inverter bus voltage fluctuates greatly during the braking process. **Note: The setting of this function shall consider the resistance and power of the braking resistor. Be sure to set the function parameters correctly according to the actual use.**	1V	Model determination	×
FC.01	Energy consumption braking duty cycle		1%	50%	×
FC.02	AVR function	0: No action 1: Act always 2: Do not act only during deceleration When the input voltage deviates from the rated value, this function can keep the output voltage constant, so generally the AVR shall operate, especially when the input voltage is higher than the rated value. **Note: When decelerating and stopping, the AVR does not act, the deceleration time is short, but the running current is**	1	2	×

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
		slightly larger; when the AVR acts all the time, the motor decelerates smoothly and the running current is small, but the deceleration time becomes longer.			
FC.03	Automatic energy-saving operation	0: No action 1: Action During the no-load or light-load operation, the motor detects the load current and adjusts the output voltage appropriately to achieve the purpose of energy saving.	1	0	○
FC.04	Slip compensation gain	FC.04 set range: 0～1000 (0 indicates no compensation) FC.05 set range: 0.1～20.0ms 1. The change of the motor load torque will affect the motor slip and cause the motor speed to change. Through slip compensation, the output frequency of the inverter is automatically adjusted according to the load torque of the motor, which can reduce the speed change of the motor caused by load changes, as shown in the figure.	1	0	○
FC.05	Slip compensation filter time	 2. Electric status: When the actual speed is lower than the given speed, gradually increase the compensation gain (FC.04). 3. Generation status: When the actual speed is higher than the given speed, gradually increase the compensation gain (FC.04). 4. The filter time constant of slip compensation. The shorter the filter time, the faster the response, but too short will easily cause oscillation and speed instability.	0.1ms	10.0ms	○
FC.06	Cooling fan control	0: Run in automatic mode Note: The fan is turned off at least 3 minutes after stop and when the temperature is lower than 40 degrees. 1: The fan keeps rotating during power-on	1	0	×
FC.07	Acceleration/de	0: Second	1	0	×

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
	celeration time unit	1: Minute			
FC.08	Droop control frequency	Set range: 0.00～10.00Hz 1. The droop control is suitable for the occasions where multiple inverters drive the same load. By setting this function, multiple inverters can reach a uniform distribution of power when driving the same load. Transmission gears are shown in the following figure (5 inverters drive the conveyors of 5 motors)  2. When the load of a certain inverter is heavy, the inverter will automatically reduce the output frequency appropriately according to the parameters set by this function to unload part of the load. This value can be adjusted gradually from small to large during debugging. The relationship between load and output frequency is shown in the following figure: 	0.01Hz	0.00Hz	○
FC.09	Deceleration factor	Set range: 50.0%～180.0% For the coefficient of voltage-frequency ratio during deceleration, increase the voltage-frequency ratio during deceleration, in this case, the output voltage increases and the deceleration will be faster, which is good for quick stop without reporting overvoltage.	0.1%	100.0%	○
FC.10	Zero frequency arrival range	Set range: 0.00～10.00Hz When the output frequency is less than or	0.01Hz	0.00Hz	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
		equal to the set value of this function code, an indication signal is output (the terminal outputs No. 10 function).			
FC.11	Set length	FC.11 set range: 0～65535m (0 indicates the fixed-length stop function is invalid) FC.12 set range: 0.001～10.000m FC.13 set range: 1～9999 1. This group of functions is used to realize the fixed-length stop function. 2. The inverter inputs counting pulses from DI5 (F6.19 needs to be set to 1), and obtains the actual length according to the number of pulses per revolution of the speed measuring shaft (FC.13) and the shaft circumference (FC.12). 3. Actual length = Number of counting pulses/number of pulses per revolution × circumference of the measuring shaft. 4. When the actual length (U0.15) ≥ the set length (FC.11), the inverter will automatically send a stop command to stop. You need to clear the actual length before running again, otherwise it will not start. **Note: The multifunctional input terminal can be used to clear the actual length (DIx is defined to No. 24 function), the normal counting and the actual length calculation can be performed only after the terminal is disconnected.** **The actual length is U0.15, and it is automatically stored during power failure.**	1m	0m	○
FC.12	Measuring shaft circumference		0.001m	0.100m	○
FC.13	Pulse per revolution		1	1	○
FC.14	Dead zone compensation coefficient	Set range: 0～20	1	Model determination	×
FC.15	STOP key stop function selection	0: Only valid for keyboard control 1: Valid for all control modes (invalid in two-wire control mode)	1	0	○
FC.16	Digital potentiometer power failure save selection	0: The digital potentiometer frequency is not saved during power failure, and will start from 0.00Hz after power-on. 1: The digital potentiometer frequency is saved during power failure, and will start from the power failure frequency after power-on.	1	1	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
FC.17	The first shortcut parameter display selection	Set range: 0～29 When set to 0～28, it corresponds to group U0 parameter number; when set to 29, it displays the operation frequency during fixed operation, and displays the instruction frequency during standby; when set to 4, it displays the operation speed during fixed operation, and displays the instruction speed during standby; when set to 5, it displays the operating linear speed during fixed operation, and displays the instruction linear speed during standby.	1	29	○
FC.18	Speed display factor	Set range: 0.01～100.00 This function code is used to correct the display error of the rotation speed and has no effect on the actual rotation speed. **Note: Speed = 120*frequency*FC.18/number of motor poles (F3.11)**	0.01	1.00	○
FC.19	Linear speed display factor	Set range: 0.01～100.00 This function code is used to correct the display error of the linear speed and has no effect on the actual linear speed. **Note: Linear speed = speed*FC.19**	0.01	1.00	○
FC.20	Frequency linkage selection	0: No linkage ratio 1: FC.21 is the coefficient linkage instruction frequency and acceleration/deceleration 1 2: FC.21 is used as the factor linkage instruction frequency 3: AI1 voltage value is the coefficient linkage instruction frequency and acceleration/deceleration 1 4: AI1 voltage value is used as the factor linkage instruction frequency	1	0	○
FC.21	Linkage ratio factor	Set range: 0.000～10.000	0.001	1.000	○
FC.22	Terminal JOG operation priority	0: Invalid 1: Valid	1	0	○
FC.23	Zero-frequency threshold (applied to the entire frequency range)	0.00~650.00Hz	0.01Hz	0.00Hz	○
FC.24	Display selection	LED Unit: Quick Parameter Display Selection 0: Display 6 quick parameters. See details in Chapter 3 Operation Instructions 1: Display 1 quick parameter, determined by			

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
		function code FC.17 LED Ten-thousandth Position: U Group Display Selection 0: Display U group 1: Do not display U group			
FC.25-FC.32	Reserved	-	-	-	*
FC.33	Quickly modify the frequency selection on the keypad	0: The initial frequency setting in the shortcut menu is 0.01Hz 1: The initial frequency setting in the shortcut menu is 0.10Hz 2: The initial frequency setting in the shortcut menu is 1.00Hz			
Group Fd virtual terminal parameter function					
Fd.00	VDI1 terminal function selection	Same as F6.00～F6.08 function code setting. Note: The VDI virtual terminal is an extension of the physical input terminal. The communication sends instructions to simulate the actual terminal. Each bit in the communication data represents a terminal, and the value of each bit represents the status of the corresponding terminal. For specific bit definition, please refer to the communication address 0x1206 description. **The function of each terminal cannot be the same. If the functions of the two terminals are set to the same, the physical terminal will act prior to the virtual terminal in order, the DI ports ranked first will work first, and the latter ones will not work.**	1	0	×
Fd.01	VDI2 terminal function selection		1	0	×
Fd.02	VDI3 terminal function selection		1	0	×
Fd.03	VDI4 terminal function selection		1	0	×
Fd.04	VDI5 terminal function selection		1	0	×
Fd.05	VDI6 terminal function selection		1	0	×
Fd.06	VDI7 terminal function selection		1	0	×
Fd.07	VDI8 terminal function selection		1	0	×
Fd.08	VDI9 terminal function selection		1	0	×
Fd.09	VDI10 terminal function		1	0	×

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Chang
	selection				
Fd.10	VDO1 terminal function selection	Same as F6.11～F6.13 function code setting. Note: The VDO virtual terminal is an extension of the physical output terminal. The virtual terminal status can be read only through communication. Each bit in the communication data represents a terminal, and the value of each bit represents the status of the corresponding terminal. For specific bit definition, please refer to the communication address 0x1207 description.	1	0	×
Fd.11	VDO2 terminal function selection		1	0	×
Fd.12	VDO3 terminal function selection		1	0	×
Fd.13	VDO4 terminal function selection		1	0	×
Fd.14	VDO5 terminal function selection		1	0	×
Fd.15	VDO1 output on delay	Same as F6.29～F6.34 function code setting.	0.1s	0.0s	○
Fd.16	VDO2 output on delay		0.1s	0.0s	○
Fd.17	VDO3 output on delay		0.1s	0.0s	○
Fd.18	VDO4 output on delay		0.1s	0.0s	○
Fd.19	VDO5 output on delay		0.1s	0.0s	○

4.2 Monitoring parameter group U0

aramete Code	Parameter name	Parameter detailed description
U0.00	Output frequency	Displays the output frequency of the current inverter
U0.01	Set frequency	Displays the set frequency of the current inverter
U0.02	Output current	Displays the output current of the current inverter
U0.03	Bus voltage	Displays the bus voltage of the current inverter
U0.04	Running speed	Displays the running speed of the current inverter **Note: Speed = 120*frequency*speed display factor (FC.18)/number of motor poles (F3.11)**
U0.05	Linear running speed	Displays the linear running speed of the current inverter **Note: Linear speed = speed*linear speed display factor (FC.19)**
U0.06	Output power	Displays the output power of the current inverter
U0.07	Output torque	Displays the output torque of the current inverter

aramete Code	Parameter name	Parameter detailed description
U0.08	Output voltage	Displays the output voltage of the current inverter
U0.09	AI1	Displays the actual input voltage/current of AI1 of the current inverter (when the input is of current type, 1mA current corresponds to 0.5V voltage display)
U0.10	AI2	Displays the actual input voltage of AI2 of the current inverter
U0.11	PID setting	Displays the PID set value of the current inverter
U0.12	PID feedback	Displays the PID feedback value of the current inverter
U0.13	Counter value	Displays the counter value of the current inverter
U0.14	Closed-loop pressure display	Displays the closed-loop pressure value of the current inverter **Note: Closed-loop pressure = PID feedback value*pressure sensor range (F8.23)**
U0.15	Actual length	Displays the actual length accumulated by the fixed length control function of the current inverter
U0.16	High-frequency pulse count value	Displays the accumulated pulse count value of the DI5 high-speed input signal of the current inverter (not saved after power failure)
U0.17	Pulse frequency display	Displays the pulse frequency of the DI5 high-speed input signal of the current inverter
U0.18	Inverter rated power	Displays the rated power of the inverter
U0.19	Inverter rated voltage	Displays the rated voltage of the inverter
U0.20	Inverter rated current	Displays the rated current of the inverter
U0.21	Reserved	-
U0.22	IGBT temperature	Displays the IGBT temperature of the current inverter
U0.23	DI terminal status 1	Displays current input terminal function status (defined by bit, 0 indicates that the current terminal input function is invalid, and 1 indicates that the current terminal input function is valid): LED single digit: DI1 input status LED tens digit: DI2 input status LED hundreds digit: DI3 input status LED thousands digit: DI4 input status LED ten thousands digit: DI5 input status
U0.24	Reserved	-
U0.25	DO terminal status	Displays current output terminal function status (defined by bit, 0 indicates that the current terminal output function is invalid, and 1 indicates that the current terminal output function is valid): LED single digit: DO1 output status LED tens digit: DO2 output status LED hundreds digit: Relay output status LED thousands digit: Reserved LED 10 thousands digit: Reserved
U0.26	Reserved	-

aramete Code	Parameter name	Parameter detailed description
U0.27	Running time accumulation	Displays the accumulated running time of the current inverter
U0.28	Software version number	Displays the software version number of the current inverter

4.3 Fault record parameter group U1

aramete Code	Parameter name	Parameter detailed description	Factory value	Chang
U1.00	Historical fault number	Set range: 0～9 According to the setting of this function code, you can view the fault record information of the last 10 times. By setting different values within U1.01～U1.06, the corresponding fault record will display.	0	○
U1.01	Fault code during fault	Fault record information at the xth fault (x is the set value of U1.00)	-	●
U1.02	Bus voltage during fault		-	●
U1.03	Output current during fault		-	●
U1.04	Running frequency during fault		-	●
U1.05	Running temperature during fault		-	●
U1.06	Fault occurrence time		-	●

4.4 Fault code table

Fault code	Fault type	Fault code	Fault type
E001	Inverter accelerated running overcurrent	E016	485 communication error alarm
E002	Inverter decelerated running overcurrent	E017	Current detection circuit fault alarm
E003	Inverter constant-speed running overcurrent	E018	Reserved
E004	Inverter accelerated running overvoltage	E019	Reserved
E005	Inverter decelerated running overvoltage	E020	Closed-loop feedback loss alarm
E006	Inverter constant-speed running overvoltage	E021	Water pressure overpressure alarm
E007	Undervoltage alarm during running	E022	Reserved

Fault code	Fault type	Fault code	Fault type
E008	Motor overload alarm	E023	Water shortage alarm
E009	Inverter overload alarm	E024	Reserved
E010	Reserved	E025	Reserved
E011	Reserved	E026	Reserved
E012	Phase loss alarm at output side	E027	Reserved
E013	Inverter module radiator overheat alarm	E028	Operation panel parameter copy error alarm
E014	Rectifier module radiator overheat alarm	E029	Reserved
E015	External fault alarm	E099	Reserved

Chapter V Basic Operation Instructions

5.1 Start operation mode

The GT20 series inverter's start operation control includes three different ways as follows:

1. Start when the inverter gives a run command normally;

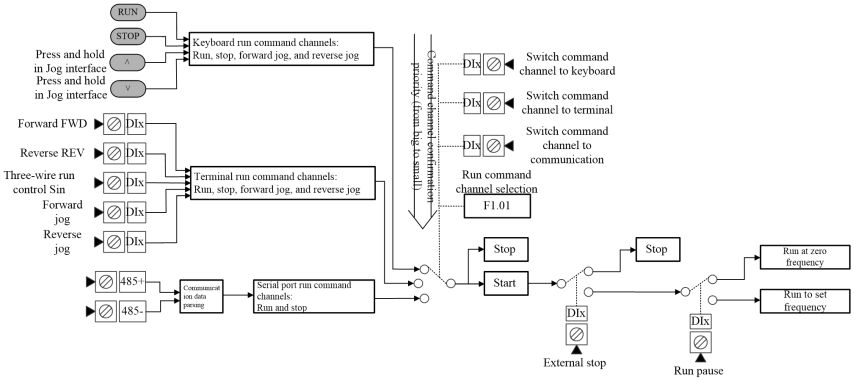
2. Start after the automatic fault reset of the inverter;

3. Start under the terminal two-wire start protection (the inverter starts automatically when the inverter is powered on, the fault is cleared or the command channel is switched to the terminal two-wire mode, which is only valid to terminal two-wire control).

The three different start-stop control statuses are described in the following.

5.1.1 Logic block diagram of start when the inverter gives a run command normally

The GT20 series inverter's run command input has three channels namely keyboard, terminal and communication, and can be switched freely by input terminal and function code settings.

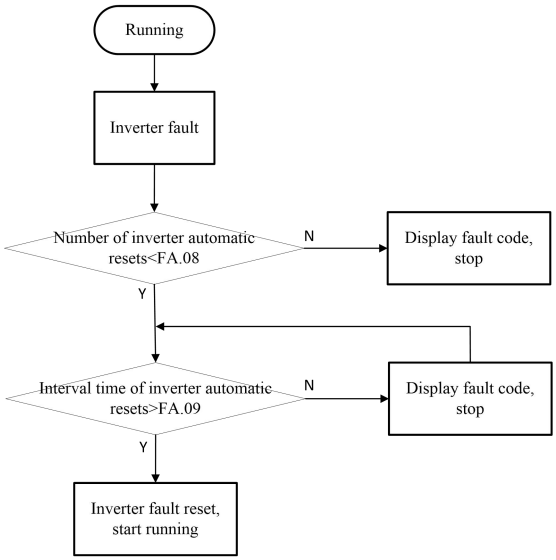


5.1. 2 Logic block diagram of start after the automatic fault reset of the inverter

The automatic reset function can automatically reset the running faults according to the set times and intervals. When the number of automatic resets is set to 0, it indicates that automatic reset is prohibited and fault protection is performed immediately. Within 2 minutes after the inverter operates, if there is no fault, it will automatically clear the number of resets, and accumulate the number of resets from the beginning.

The inverter module protection (E010) and external equipment failure (E015) have no automatic reset function. After the automatic reset is completed, it will automatically start and run at the speed tracking.

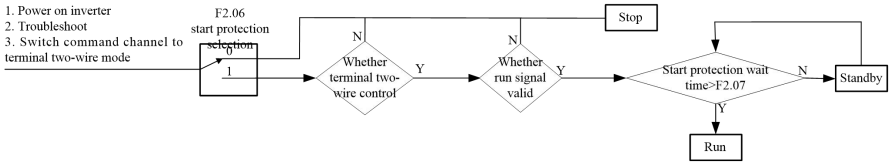
For safety's sake, use this function with caution, otherwise, it may cause personal injuries and property losses.



5.1.3 Terminal two-wire start protection and start logic block diagram

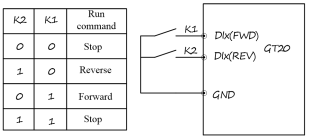
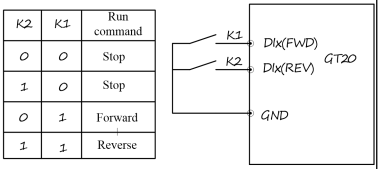
The terminal two-wire start protection start can realize that the inverter automatically starts when the inverter is powered on, the fault is cleared, or the command channel is switched to the terminal two-wire mode, if the terminal run command is valid.

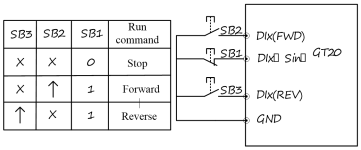
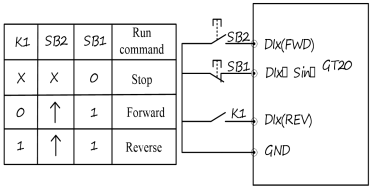
For safety's sake, use this function with caution, otherwise, it may cause personal injuries and property losses.



Related parameter table:

Parameter Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
F1.01	Run command channel selection	0: Operation panel run command channel 1: Terminal run command channel 2: Serial port run command channel	1	0	○
F1.24	Running direction setting	0: Forward 1: Reverse	1	0	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	actory val	Change
F2.06	Start protection selection (only valid for two-wire control)	This function realizes whether the inverter automatically starts running when the inverter is powered on, the fault is cleared, or the command channel is switched to the terminal two-wire mode. 0: If the run command is valid, the inverter does start, and the inverter is in the running protection state. The inverter will not run until the run command terminal is canceled and then the terminal is enabled. 1: If the run command is valid, the inverter speed tracking starts. **Note: For safety, be cautious when setting to 1.**	1	0	×
F2.07	Start protection wait time	Set range: 0.0～10.0s	0.1s	0.0s	○
F2.30	Forward and reverse dead zone time	Set range: 0.00～360.00s	0.01s	0.01s	×
F6.09	Forward/reverse running mode setting	0: Two-wire control mode 1: This mode is the most commonly used two-wire mode. The forward and reverse of the motor are determined by the defined FWD and REV terminal commands.  1: Two-wire control mode 2: This mode uses the defined FWD as the running terminal and the direction is determined by the REV status that defined.  2: Three-wire operation control 1: This mode uses the defined Sin as the enable terminal, the run command is generated by FWD or REV, and both control the operation direction. When the inverter operates, the terminal Sin must be closed. The terminal FWD or REV generates a rising edge signal to control the operation and direction of the inverter. When the	1	0	×

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	actory val	Change
		inverter stops, the terminal Sin must be disconnected to complete the stop.  3: Three-wire operation control 2: This mode uses the defined Sin as the enable terminal, the run command is generated by FWD, and the direction is controlled by REV. When the inverter operates, the terminal Sin must be closed. The terminal FWD generates a rising edge signal, and the inverter starts operating. The status of terminal REV determines the operation direction. When the inverter stops, the terminal Sin must be disconnected to complete the stop.  			
FA.08	Number of automatic resets	FA.08 set range: 0～100 (0 indicates no automatic reset function)	1	0	×
FA.09	Automatic reset interval time	FA.09 set range: 0.1～1000.0s	0.1s	5.0s	×

5.2 Start-stop control

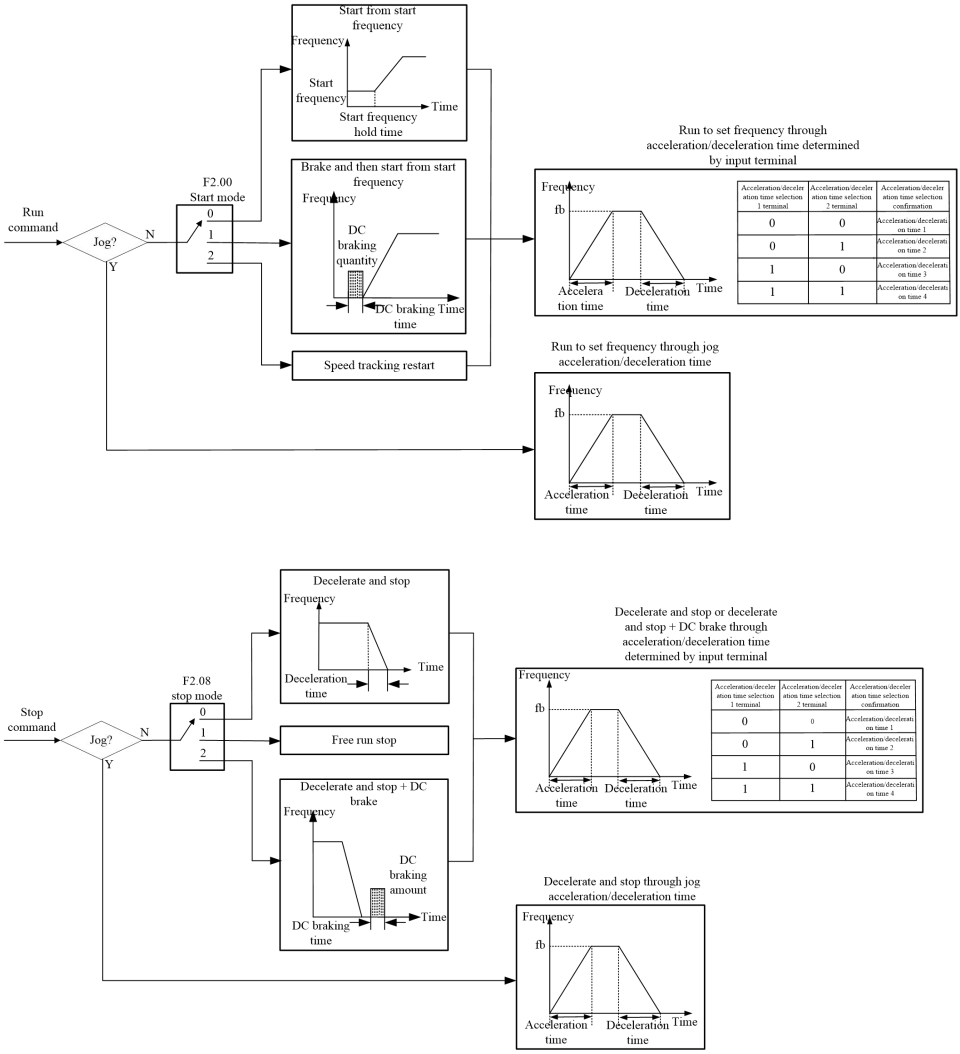
There are three ways to start the GT20 series inverter:

1. Start from the start frequency: Start at the start frequency set by F2.01, and accelerate to the set frequency after running the hold time set by F2.02 at this frequency.
2. Brake first and then start from the start frequency: First start with the DC braking current set in F2.03 and the DC braking time set in F2.04 for DC braking and then start from the start frequency.
3. Speed tracking and restart: Track the current speed and direction of the motor, and perform smooth start without impact on the motor that is still rotating.

There are three ways to stop the GT20 series inverter:

1. Deceleration stop: After receiving the stop command, the inverter will gradually reduce the output frequency according to the deceleration time, and stop when the frequency decreases to zero.

2. Free running stop: After receiving the stop command, the inverter immediately stops the output, and the load stops freely according to the mechanical inertia.
3. Deceleration stop + DC braking: After receiving the stop command, the inverter reduces the output frequency according to the deceleration time, and starts the DC braking when reaching the stop braking start frequency.



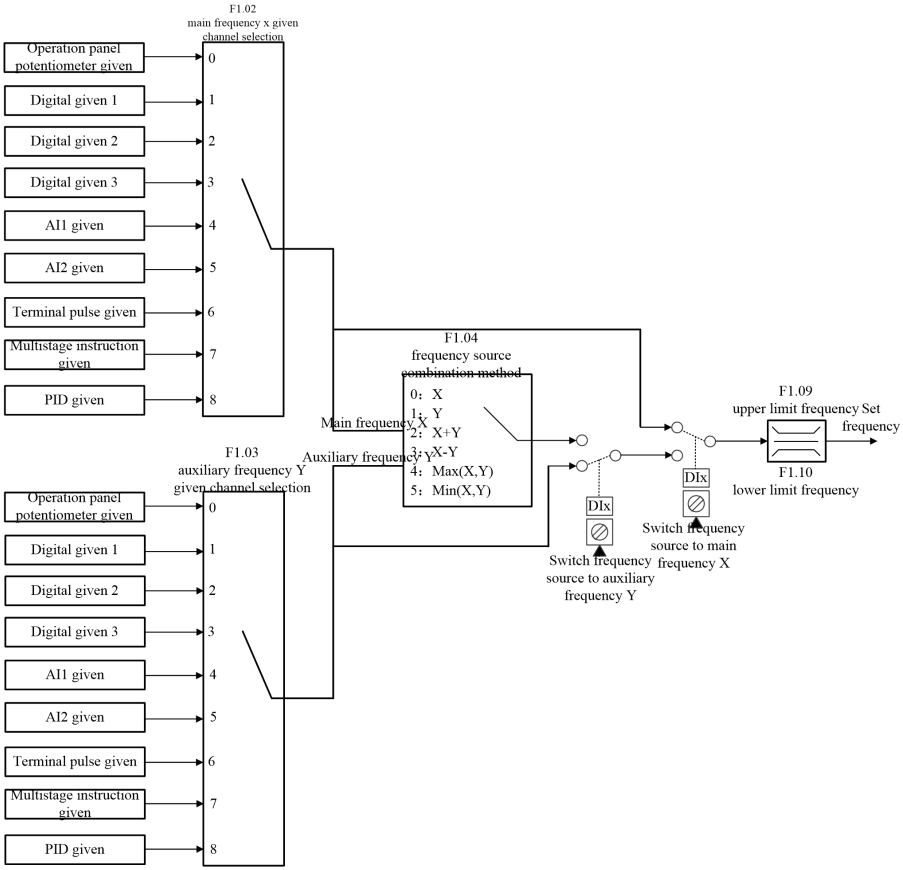
Related parameter table:

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	actory valu	Chang
F1.11	Acceleration time 1	Set range: 0.01～600.00	0.01	Model determination	○
F1.12	Deceleration time 1				○
F1.13	Acceleration/deceleration filtering time	Set range: 0～1000ms (0 indicates on filter)	1ms	0ms	○
F2.00	Start operation mode	LED single digit: Start mode 0: Start from start frequency. 1: Brake and then start from the start frequency. 2: Speed tracking restart. LED tens digit: Speed tracking mode 0: Track down from the frequency of shutdown, usually this method is used. 1: Track down from the maximum frequency, suitable for power generation load.	11	00	×
F2.01	Start frequency	F2.01 set range: 0.20～60.00Hz F2.02 set range: 0.0～10.0s	0.01Hz	0.50Hz	○
F2.02	Start frequency hold time		0.1s	0.0s	○
F2.03	Start DC braking current	F2.03 set range: 0.0～150.0% inverter rated current F2.04 set range: 0.0～30.0S (0.0 indicates the DC braking does not act)	0.1%	100.0%	○
F2.04	Start DC braking time		0.1s	0.0s	○
F2.05	Acceleration/deceleration mode selection	0: Linear acceleration/deceleration: The output frequency increases or decreases according to a constant slope. 1: Reserved	1	0	×
F2.08	Stop mode	0: Decelerate and stop 1: Run freely and stop 2: Decelerate and stop + DC brake	1	0	×
F2.09	DC braking start frequency at shutdown	F2.09 set range: 0.00～60.00Hz F2.10 set range: 0.00～10.00s F2.11 set range: 0.0～150.0% inverter rated current F2.12 set range: 0.0～60.0S (0.0 indicates the DC braking does not act) F2.13 set range: 0～1	0.01Hz	0.00Hz	○
F2.10	DC braking wait time at shutdown		0.01s	0.10s	○
F2.11	DC braking current at shutdown		0.1%	100.0%	○
F2.12	DC braking time at shutdown		0.1s	0.0s	○
F2.13	Action selection within DC braking wait time at shutdown		1	1	○
F2.14	Acceleration time 2	Set range: 0.01～600.00	0.01	Model determina	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	actory valu	Chang
F2.15	Deceleration time 2			tion	○
F2.16	Acceleration time 3				○
F2.17	Deceleration time 3				○
F2.18	Acceleration time 4				○
F2.19	Deceleration time 4				○
F2.20	Jog run frequency	Set range: 0.10～50.00Hz	0.01Hz	5.00Hz	○
F2.21	Jog interval time	Set range: 0.0～100.0s	0.1s	0.0s	○
F2.22	Jog acceleration time	Set range: 0.01～600.00s	0.01s	6.00s	○
F2.23	Jog deceleration time				○
F7.08	Speed tracking gain Kp	F7.08 set range: 0～100 F7.09 set range: 1～1000ms F7.10 set range: 0.1～600.0s F7.11 set range: 1～100% F7.12 set range: 1～100%	1	10	○
F7.09	Speed tracking integration time		1ms	50ms	○
F7.10	Speed tracking acceleration and deceleration		0.1s	20.0s	○
F7.11	Speed tracking judgment threshold		1%	10%	○
F7.12	Speed tracking switching completion judgment threshold		1%	3%	○

5.3 Frequency setting

There're many ways for the GT20 series inverter frequency given, and its given channels can be divided into three types namely the main frequency X, the auxiliary frequency Y, and the combination given. It can be switched freely by setting the terminal function.

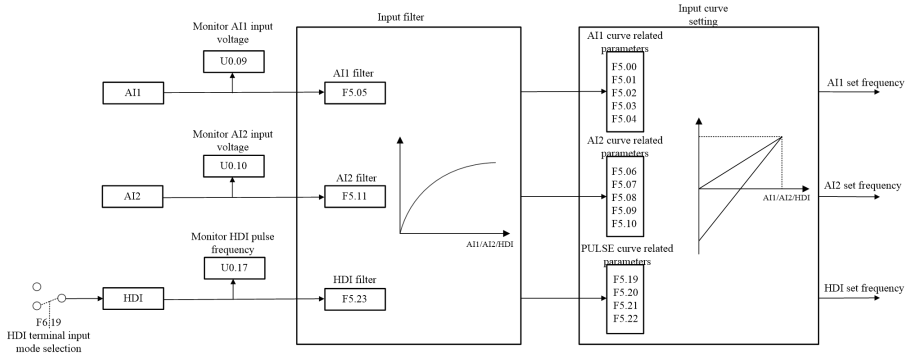


Related parameter table:

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	actory valu	Change
F1.02	Main frequency x given channel selection	0: Operation panel digital potentiometer given 1: Digital given 1 2: Digital given 2 3: Digital given 3 4: AI1 given 5: AI2 given 6: Terminal pulse given 7: Multistage instruction given 8: PID given 9-15: Reserved	1	0	○
F1.03	Auxiliary frequency Y given channel selection		1	1	○
F1.04	Frequency source combination mode	0: X 1: Y 2: X+Y 3: X-Y 4: Max(X,Y) 5: Min(X,Y)	1	0	○
F1.05	Digital setting of auxiliary frequency Y	Lower limit frequency~upper limit frequency	0.01Hz	50.00Hz	○
F1.06	Maximum output frequency	Upper limit frequency～650.00Hz	0.01Hz	50.00Hz	×
F1.07	Main frequency x digital setting	Lower limit frequency~upper limit frequency	0.01Hz	50.00Hz	○
F1.09	Upper limit frequency	Lower limit frequency~maximum output frequency	0.01Hz	50.00Hz	○
F1.10	Lower limit frequency	0.00~upper limit frequency	0.01Hz	0.00Hz	○

5.4 Analog input

The GT20 series is equipped with two analog input terminals (the analog AI1 supports 0～10V/0～20mA input and can be selected through the AI1 jump cap; the analog AI2 only supports 0～10V input) and one high-speed pulse input terminal. Each input can be filtered independently, and be adjusted. The corresponding given curve can be set by setting the given corresponding to the maximum and minimum values.



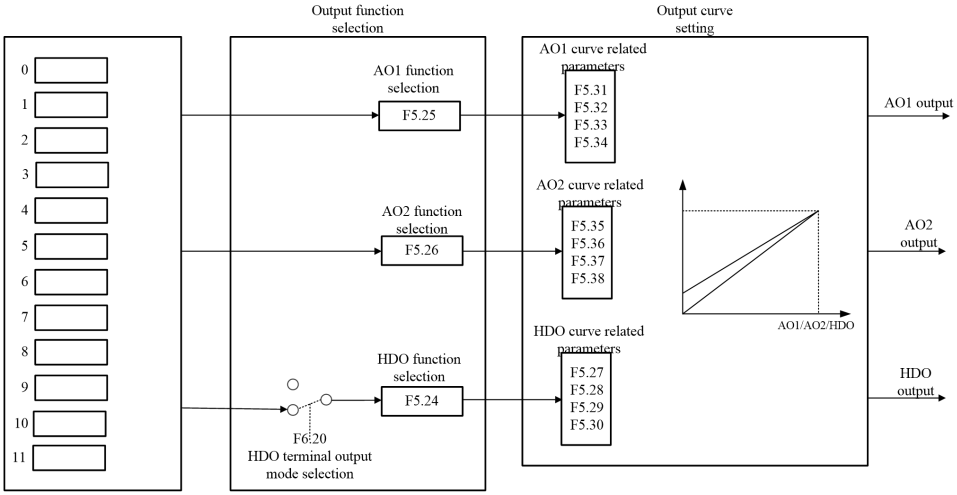
Related parameter table:

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	actory valu	Change
F5.00	AI1 minimum value	0.00～F5.02	0.01V	0.00V	○
F5.01	Set value corresponding to AI1 minimum value	-100.0%～100.0%	0.1%	0.0%	○
F5.02	AI1 maximum value	F5.00～10.00V	0.01V	10.00V	○
F5.03	Set value corresponding to AI1 maximum value	-100.0%～100.0%	0.1%	100.0%	○
F5.04	AI1 zero drift setting	0.00～10.00V	0.01V	0.00V	○
F5.05	AI1 filter time	0～1000ms	1ms	10ms	○
F5.06	AI2 minimum value	0.00～F5.08	0.01V	0.00V	○
F5.07	Set value corresponding to AI2 minimum value	-100.0%～100.0%	0.1%	0.0%	○
F5.08	AI2 maximum value	F5.06～10.00V	0.01V	10.00V	○
F5.09	Set value corresponding to AI2 maximum value	-100.0%～100.0%	0.1%	100.0%	○
F5.10	AI2 zero drift setting	0.00～10.00V	0.01V	0.00V	○
F5.11	AI2 filter time	0～1000ms	1ms	10ms	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	actory valu	Change
F5.18	Analog automatic zero drift adjustment	0~1	0	0	○
F5.19	PULSE minimum input	0.00～F5.21	0.01KHz	0.00KHz	○
F5.20	Correspondence setting of PULSE minimum input	-100.0%～100.0%	0.1%	0.0%	○
F5.21	PULSE maximum input	F5.19～50.00KHz	0.01KHz	50.00KHz	○
F5.22	Correspondence setting of PULSE maximum input	-100.0%～100.0%	0.1%	100.0%	○
F5.23	PULSE filter time	0～1000ms	1ms	10ms	○
F6.19	HDI terminal input mode selection (DI5)	0: Switch input 1: High-frequency pulse input (see F5.19～F5.23)	1	0	×

5.5 Analog output

The GT20 series is equipped with two analog output terminals (the analog AO1 supports 0～10V output; the analog AO2 supports 0～10V/0～20mA output, and is selected through AO2 jump cap) and one high-speed pulse output terminal. The proportional relationship can be adjusted by setting the maximum and minimum values and their corresponding output percentages. The analog output signal can output the operation frequency, output current, output torque, output voltage and output power in a certain proportion.



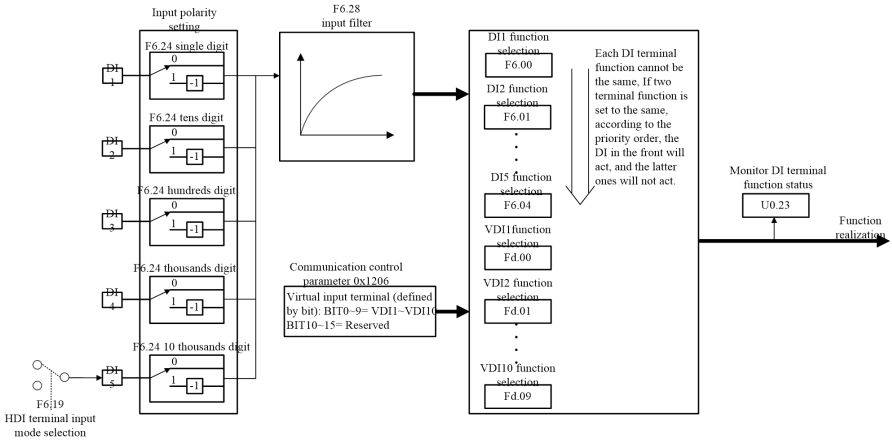
Related parameter table:

Parameter Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
F5.24	HDO function selection (DO2 terminal)	0: Running frequency (0～Maximum output frequency) 1: Set frequency (0～Maximum output frequency) 2: Output current (0～2 times rated current) 3: Output torque (0～2 times rated torque) 4: Output voltage (0～1.2 times rated voltage) 5: Bus voltage (0～1000V) 6: AI1 (0～10V/0～20mA) 7: AI2 (0～10V) 8: Reserved 9: Output power (0～2 times rated frequency) 10: Pulse input (0～50.00KHz) 11: Communication setting (0～1000)	1	5	○
F5.25	AO1 function selection		1	0	○
F5.26	AO2 function selection		1	1	○
F5.27	HDO output lower limit	0.0～F5.29	0.1%	0.0%	○
F5.28	HDO output frequency corresponding to lower limit	0.00～50.00KHz	0.01KHz	0.00KHz	○
F5.29	HDO output upper limit	F5.27～100.0%	0.1%	100.0%	○
F5.30	HDO output frequency corresponding to upper limit	0.00～50.00KHz	0.01KHz	50.00KHz	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	actory valu	hang
F5.31	AO1 output lower limit	0.0～F5.33	0.1%	0.0%	○
F5.32	Corresponding lower limit AO1 output voltage	0.00～10.00V	0.01V	0.00V	○
F5.33	AO1 output upper limit	F5.31～100.0%	0.1%	100.0%	○
F5.34	Corresponding upper limit AO1 output voltage	0.00～10.00V	0.01V	10.00V	○
F5.35	AO2 output lower limit	0.0～F5.37	0.1%	0.0%	○
F5.36	Corresponding lower limit AO2 output voltage	0.00～10.00V	0.01V	0.00V	○
F5.37	AO2 output lower limit	F5.35～100.0%	0.1%	100.0%	○
F5.38	Corresponding upper limit AO2 output voltage	0.00～10.00V	0.01V	10.00V	○
F6.20	HDO terminal output mode selection (DO2)	0: Switch output 1: High-frequency pulse output (see F5.27～F5.30)	1	0	×

5.6 Digital input

The GT20 series is equipped with 5 DI input terminals and 10 VDI virtual input terminals. All input terminal functions can be programmed through function codes. Among them, DI5 can be selected as a high-frequency pulse input terminal or an ordinary switch input terminal through function code; when it is selected as a high-speed pulse input terminal (HDI), the user can also use the HDI high-speed pulse input as frequency given, count input, or length pulse input.



Input function description:

Set value	Function	Description
0	No function	The inverter does not operate even if there is a signal input. Unused terminals can be set to having no function to prevent malfunction.
1	Forward running FWD (level + edge)	For terminal two-wire and three-wire control signals, see function code F6.09 description for details.
2	Reverse running REV (level + edge)	
3	Three-wire running control Sin (level)	
4	Forward jog (level)	Used for jog running control under terminal run command mode, the jog running frequency, jog interval time and jog acceleration/deceleration time are defined in F2.20～F2.23.
5	Reverse jog (level)	
6	Free stop (level)	If the function of this terminal is valid, the inverter immediately terminates the output, and the load stops freely according to the mechanical inertia.
7	Fault reset (edge signal)	When a fault alarm occurs in the inverter, the fault can be reset through this terminal. Its function is consistent with the STOP key function of the keyboard.
8	Run pause (level)	If this terminal is valid during running, the terminal will decelerate to zero frequency running according to the deceleration time. This function is invalid during jog running.
9	External fault input	The fault signals of external devices can be input through this terminal, which is convenient for the inverter to monitor the faults of external devices. After receiving fault signals from external devices, the inverter displays “E015”, which is the fault alarm of external devices.
10	Frequency setting increase (UP)	The frequency increase or decrease is realized through the control terminal, to perform remote control replacing the operation panel. Effective when the main frequency F1.02 = 2 or the auxiliary frequency F1.03 = 2, the
11	Frequency setting decreases (DOWN)	

<table>
<tr><th>Set value</th><th>Function</th><th>Description</th></tr>
<tr><td></td><td></td><td>acceleration/deceleration rate is set by F6.10.</td></tr>
<tr><td>12</td><td>Multistage speed terminal 1</td><td rowspan="4">By selecting the terminal ON/OFF combination of these functions, you can define up to 16 stages of speed running curves, the frequency of multistage instructions, the selection of acceleration/deceleration time, and the rotating direction are set in group F9.
<table>
<tr><th>K4</th><th>K3</th><th>K2</th><th>K1</th><th>Frequency setting</th></tr>
<tr><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>Multistage instruction 1</td></tr>
<tr><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>Multistage instruction 2</td></tr>
<tr><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>Multistage instruction 3</td></tr>
<tr><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>Multistage instruction 4</td></tr>
<tr><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>Multistage instruction 5</td></tr>
<tr><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td><td>Multistage instruction 6</td></tr>
<tr><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td><td>Multistage instruction 7</td></tr>
<tr><td>OFF</td><td>ON</td><td>ON</td><td>ON</td><td>Multistage instruction 8</td></tr>
<tr><td>ON</td><td>OFF</td><td>OFF</td><td>OFF</td><td>Multistage instruction 9</td></tr>
<tr><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>Multistage instruction 10</td></tr>
<tr><td>ON</td><td>OFF</td><td>ON</td><td>OFF</td><td>Multistage instruction 11</td></tr>
<tr><td>ON</td><td>OFF</td><td>ON</td><td>ON</td><td>Multistage instruction 12</td></tr>
<tr><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>Multistage instruction 13</td></tr>
<tr><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>Multistage instruction 14</td></tr>
<tr><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>Multistage instruction 15</td></tr>
<tr><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>Multistage instruction 16</td></tr>
</table></td></tr>
<tr><td>13</td><td>Multistage speed terminal 2</td></tr>
<tr><td>14</td><td>Multistage speed terminal 3</td></tr>
<tr><td>15</td><td>Multistage speed terminal 4</td></tr>
<tr><td>16</td><td>Acceleration/deceleration time selection 1</td><td rowspan="2">The ON/OFF combination of acceleration/deceleration time terminals 1 and 2 can realize the selection of acceleration/deceleration time 1~4.
<table>
<tr><th>K2</th><th>K1</th><th>Acceleration/deceleration time selection</th></tr>
<tr><td>OFF</td><td>OFF</td><td>Acceleration/deceleration time 1</td></tr>
<tr><td>OFF</td><td>ON</td><td>Acceleration/deceleration time 1</td></tr>
<tr><td>ON</td><td>OFF</td><td>Acceleration/deceleration time 3</td></tr>
<tr><td>ON</td><td>ON</td><td>Acceleration/deceleration time 4</td></tr>
</table></td></tr>
<tr><td>17</td><td>Acceleration/deceleration time selection 2</td></tr>
<tr><td>18</td><td>PLC pause</td><td>Used to realize the pause control of the PLC running process. When this terminal is valid, it runs at zero</td></tr>
</table>

Set value	Function	Description
		frequency. The PLC running is not counted.
19	PLC operation stop and reset	PLC is prohibited from starting when the terminal is valid, deceleration and stop control is implemented for the PLC running process, and the PLC is reset to the initial state.
20	PID control pause	PID is temporarily invalid, and the inverter maintains the current output frequency without performing PID adjustment.
21	PID parameter switching	When the PID parameter switching condition (F8.12) is set to 1 (via terminal switching), the F8.06~F8.08 are used for PID parameters when the terminal is invalid, and F8.09~F8.11 are used when the terminal is valid.
22	Counter trigger	Count pulse input port of the built-in counter, the highest pulse frequency: 50Hz, and the current count value can be stored and memorized when power is off. See function codes F6.22 and F6.23 for details.
23	Counter reset	Clear the built-in counter of the inverter and use it in conjunction with function 22 (counter trigger signal input).
24	Length reset	When the function terminal is valid, the actual length is cleared to zero.
25	Acceleration/deceleration prohibited (level)	Keep the motor from being affected by any external signal (except stop command), maintain operating at the current speed. This function is invalid during jog running.
26	Immediate DC braking	When the stop mode is decelerate and stop + DC brake, it is switched to DC brake status when the terminal is valid during stop.
27	UP/DOWN setting cleared	When the frequency given channel is set to terminal UP/DN, this function terminal can directly clear the frequency set by UP/DN.
28	Control command switched to keyboard	If the three terminals or two of them are closed at the same time, the priority is keyboard> terminal> communication. **Note: When switching to terminal two-wire control, the running state changes are affected by the F2.06 parameter; when switching to other control modes, the current running state is maintained.**
29	Control command switched to terminal	
30	Control command switched to communication	
31	Frequency source switched to the main frequency X	If the above two terminals are closed at the same time, the priority is switching to the main frequency X> switching to the auxiliary frequency Y
32	Frequency source switched to auxiliary frequency Y	
33	High-frequency pulse count reset	When the function terminal is valid, the high-frequency pulse count value recorded by function code U0.16 is cleared.
34~50	Reserved	Reserved function

Related parameter table:

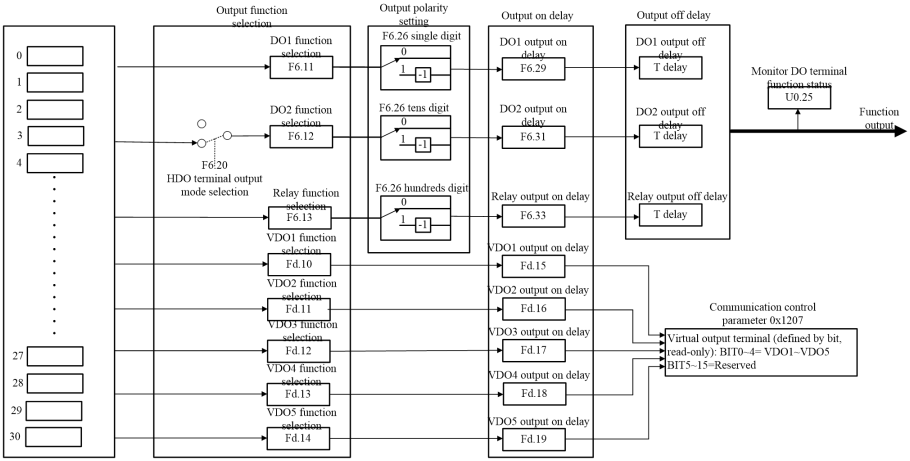
aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
F6.00	Multifunctional input terminal DI1 function selection	0: No function 1: Forward running FWD (level + edge) 2: Reverse running REV (level + edge) 3: Three-wire running control Sin (level) 4: Forward jog (level) 5: Reverse jog (level) 6: Free stop (level) 7: Fault reset (edge signal) 8: Run pause (level) 9: External fault input 10: Frequency setting increase (UP) 11: Frequency setting decreases (DOWN) 12: Multistage speed terminal 1 13: Multistage speed terminal 2 14: Multistage speed terminal 3 15: Multistage speed terminal 4 16: Acceleration/deceleration time selection 1 17: Acceleration/deceleration time selection 2 18: PLC pause 19: PLC operation stop and reset 20: PID control pause 21: PID parameter switching 22: Counter trigger 23: Counter reset 24: Length reset 25: Acceleration/deceleration prohibited (level) 26: Immediate DC braking 27: UP/DOWN setting cleared 28: Control command switched to keyboard 29: Control command switched to terminal 30: Control command switched to communication 31: Frequency source switched to the main frequency X 32: Frequency source switched to auxiliary frequency Y 33: High-frequency pulse count reset 34-50: Reserved	1	1	×
F6.01	Multifunctional input terminal DI2 function selection			2	
F6.02	Multifunctional input terminal DI3 function selection			7	
F6.03	Multifunctional input terminal DI4 function selection			12	
F6.04	Multifunctional input terminal DI5 function selection			13	
F6.19	HDI terminal input mode selection (DI5)	0: Switch input 1: High-frequency pulse input (see F5.19～F5.23)	1	0	×
F6.24	DI input switch polarity 1	00000~11111 LED single digit: DI1 positive/negative logic definition LED tens digit: DI2 positive/negative logic definition LED hundreds digit: DI3 positive/negative logic definition LED thousands digit: DI4 positive/negative logic definition LED 10 thousands digit: DI5	11111	11111	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
		positive/negative logic definition			
F6.28	DI filter time	0～1000ms	1ms	20ms	○
Fd.00	VDI1 terminal function selection	Same as F6.00～F6.08 function code setting.	1	0	×
Fd.01	VDI2 terminal function selection		1	0	×
Fd.02	VDI3 terminal function selection		1	0	×
Fd.03	VDI4 terminal function selection		1	0	×
Fd.04	VDI5 terminal function selection		1	0	×
Fd.05	VDI6 terminal function selection		1	0	×
Fd.06	VDI7 terminal function selection		1	0	×
Fd.07	VDI8 terminal function selection		1	0	×
Fd.08	VDI9 terminal function selection		1	0	×
Fd.09	VDI10 terminal function selection		1	0	×

5.7 Digital output

The GT20 series is equipped with two open collector output terminals, one relay output terminal, and five VDO virtual output terminals. All digital output terminal functions can be programmed through function codes. Among them, the high-speed pulse output terminal HDO can also be set to high-speed pulse output or switch output through function code selection.



Output function description:

Set value	Function	Description
0	No output	The output terminal has no function.
1	Inverter running signal (RUN)	The inverter is under the running status and outputs an indication signal.
2	Frequency arrival signal (FAR)	Refer to the function description of F6.18.
3	Frequency level detection signal (FDT1)	Refer to the function description of F6.14～F6.15.
4	Frequency level detection signal (FDT2)	Refer to the function description of F6.16～F6.17.
5	Reserved	Reserved function.
6	Undervoltage lockout stopping (LU)	When the DC bus voltage is lower than the undervoltage limit level, an indication signal is output, and the LED displays “P.oFF”.
7	External fault stop (EXT)	When the inverter has an external fault trip alarm (E015), it outputs an indication signal.
8	Frequency upper limit (FHL)	When the set frequency ≥ the upper limit frequency and the operation frequency reaches the upper limit, an indication signal is output.
9	Frequency lower limit (FLL)	When the set frequency ≤ the lower limit frequency and the operation frequency reaches the lower limit, an indication signal is output.
10	Inverter running at zero frequency	When the inverter output frequency is less than or equal to FC.10 zero frequency arrival range, and under the operation status, an indication signal is output.
11	PLC phase running completion	After the simple PLC phase operation is completed, an indication signal (single pulse signal, width 250ms) is output.
12	PLC cycle completion	After the simple PLC completes one operation cycle, an indication signal (single pulse signal, width 250ms) is output.

Set value	Function	Description
13	Set count value arrival	Refer to F6.22～F6.23 function description.
14	Specified count value arrival	
15	Set length arrival	When the actual length U0.15≥FC.11 set length, an indication signal is output.
16	Inverter ready to run	When this signal output is valid, it indicates that the inverter has no fault, the bus voltage is normal, and the inverter operation prohibition terminal is invalid. In this case, the start command can be accepted.
17	Inverter fault	If the inverter fails, an indication is output.
18	Reserved	Reserved function.
19	Set cumulative running time arrival	When the accumulated running time of the inverter (U0.27) reaches the running cutoff time (F0.02) of the inverter, an indication signal is output.
20	Forward running	The inverter is under the forward running status and outputs an indication signal.
21	Reverse running	The inverter is under the reserve running status and outputs an indication signal.
22	Reserved	Reserved function.
23	Water supply sleep running indication	During water supply application, the inverter is under the sleep status and outputs an indication signal.
24	Water pipe overpressure indication	During water supply application, the inverter judges that the water pipe is overpressure at the time and outputs an indication signal.
25	Water pipe underpressure indication	During water supply application, the inverter judges that the water pipe is underpressure at the time and outputs an indication signal.
26	Water pipe shortage indication	During water supply application, the inverter judges that the water pipe is short of water at the time and outputs an indication signal.
27~30	Reserved	Reserved function.

Related parameter table:

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
F6.11	Open collector output terminal DO1	0: No output 1: Inverter running signal (RUN) 2: Frequency arrival signal (FAR) 3: Frequency level detection signal (FDT1) 4: Frequency level detection signal (FDT2) 5: Reserved 6: Undervoltage lockout stopping (LU) 7: External fault stop (EXT) 8: Frequency upper limit (FHL) 9: Frequency lower limit (FLL) 10: Inverter running at zero frequency 11: PLC phase running completion 12: PLC cycle completion 13: Set count value arrival 14: Specified count value arrival 15: Set length arrival 16: Inverter ready to run (RDY)	1	0	×
F6.12	Open collector output terminal DO (HDO terminal)		1	1	×

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
		17: Inverter fault 18: Reserved 19: Set cumulative running time arrival			
F6.13	Relay output function (TA/TB/TC)	20: Forward running 21: Reverse running 22: Reserved 23: Water supply sleep running indication 24: Water pipe overpressure indication 25: Water pipe underpressure indication 26: Water pipe shortage indication 27-30: Reserved	1	17	×
F6.26	DO output switch polarity 1	00000~11111	11111	11111	○
F6.29	DO1 output on delay	Set range: 0.0～600.0s This function code defines the delay from the status change of the switch output terminal and the relay to the output change.	0.1s	0.0s	○
F6.30	DO1 output off delay		0.1s	0.0s	○
F6.31	DO2 output on delay		0.1s	0.0s	○
F6.32	DO2 output off delay		0.1s	0.0s	○
F6.33	Relay output on delay		0.1s	0.0s	○
F6.34	Relay output off delay		0.1s	0.0s	○
Fd.10	VDO1 terminal function	Same as F6.11～F6.13 function code setting.	1	0	×
Fd.11	VDO2 terminal function		1	0	×
Fd.12	VDO3 terminal function		1	0	×
Fd.13	VDO4 terminal function		1	0	×
Fd.14	VDO5 terminal function selection		1	0	×
Fd.15	VDO1 output on delay	Same as F6.29～F6.34 function code setting.	0.1s	0.0s	○

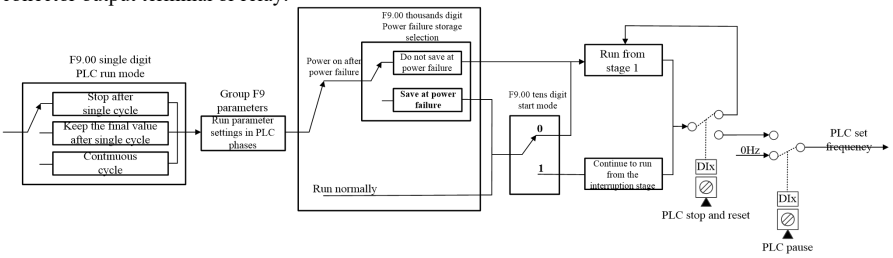
aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
Fd.16	VDO2 output on delay		0.1s	0.0s	○
Fd.17	VDO3 output on delay		0.1s	0.0s	○
Fd.18	VDO4 output on delay		0.1s	0.0s	○
Fd.19	VDO5 output on delay		0.1s	0.0s	○

5.8 Simple PLC

The simple PLC function is a multistage speed generator. The inverter can automatically change the operation frequency and direction according to the run time to meet the process requirements. This function used to be completed under the assistance of an external PLC. Now it can be realized by the inverter itself.

This series of inverters can realize 16-stage speed control, and there are 4 groups of acceleration/deceleration time for selection.

When the set PLC completes a cycle (or a stage), an ON signal can be output from the open collector output terminal or relay.



Related parameter table:

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
F9.00	Simple PLC run mode selection	LED single digit: PLC run mode 0: No action 1: Stop after a single cycle 2: Keep the final value after a single cycle 3: Continuous cycle 4: DI selective operation LED tens digit: Start mode 0: Start running from the first stage 1: Continue running from the stage of interruption LED hundreds digit: Stage time unit selection 0: Second	1111	0000	×

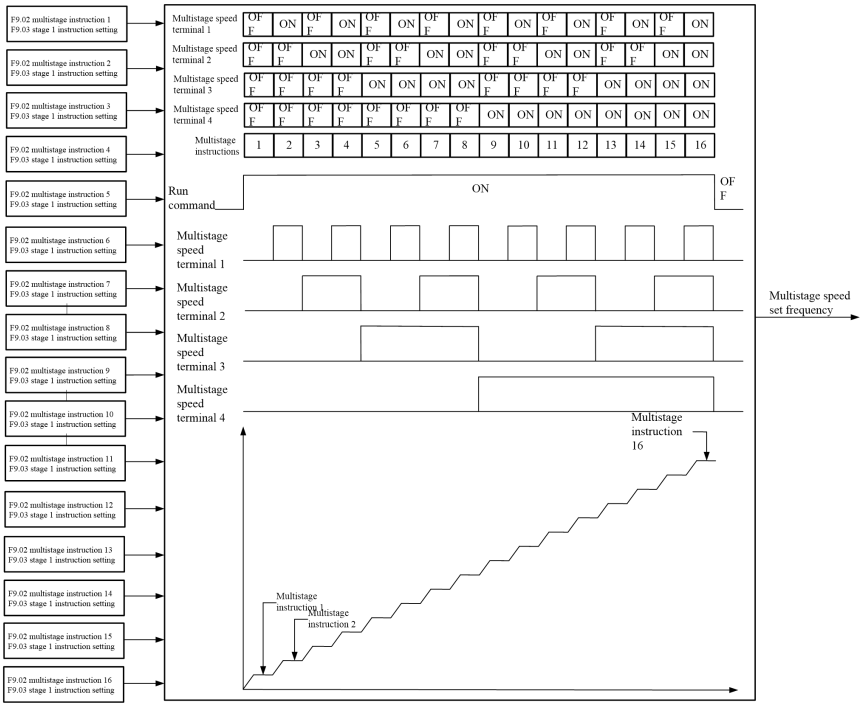
aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
		1: Minute LED thousands digit: Store at power failure 0: Do not store at power failure 1: Stage at power failure storage interruption			
F9.01	Running stages	1~16	1	16	○
F9.02	Multistage instruction 1	Lower limit frequency~upper limit frequency	0.01Hz	20.00Hz	○
F9.03	Stage 1 instruction setting	LED single digit: 0: Multistage instruction 1 (F9.02) 1: AI1 2: AI2 3: Pulse frequency 4: Communication 5: Operation panel digital potentiometer given 6: Analog potentiometer given on external operation panel LED tens digit: 0: Acceleration/deceleration time 1 1: Acceleration/deceleration time 2 2: Acceleration/deceleration time 3 3: Acceleration/deceleration time 4 LED hundreds digit: 0: Forward running 1: Reverse running **Note: Only the LED single digit frequency source of stage 1 instruction can be set.**	111	000	○
F9.04	Stage 1 instruction running time	Set range: 0.1～6000.0 **Note: For the time unit selection, see F9.00 hundreds digit setting.**	0.1	10.0	○
F9.05	Multistage instruction 2	Stage X instruction (F9.05, F9.08, F9.11, F9.14, F9.17, F9.20, F9.23, F9.26, F9.29, F9.32, F9.35、F9.38, F9.41, F9.44, and F9.47) setting range: Lower limit frequency~upper limit frequency	0.01Hz	20.00Hz	○
F9.06	Stage 2 instruction setting		111	000	○
F9.07	Stage 2 instruction running time	Stage X instruction (F9.06, F9.09, F9.12, F9.15, F9.18, F9.21, F9.24, F9.27, F9.30, F9.33, F9.36、F9.39, F9.42, F9.45, and F9.48) setting range: LED single digit: 0: Multistage instruction x 1: Reserved LED tens digit: 0: Acceleration/deceleration time 1 1: Acceleration/deceleration time 2 2: Acceleration/deceleration time 3 3: Acceleration/deceleration time 4 LED hundreds digit: 0: Forward running 1: Reverse running	0.1	10.0	○
F9.08	Multistage instruction 3		0.01Hz	20.00Hz	○
F9.09	Stage 3 instruction setting		111	000	○
F9.10	Stage 3 instruction running time		0.1	10.0	○
F9.11	Multistage instruction 4		0.01Hz	20.00Hz	○
F9.12	Stage 4 instruction setting		111	000	○

arameter Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
F9.13	Stage 4 instruction running time	Stage X instruction running time (F9.07, F9.10, F9.13, F9.16, F9.19, F9.22, F9.25, F9.28, F9.31, F9.34, F9.37、F9.40, F9.43, F9.46, and F9.49) setting range: 0.1~6000.0 **Note: For the time unit selection, see F9.00 hundreds digit setting.**	0.1	10.0	○
F9.14	Multistage instruction 5		0.01Hz	20.00Hz	○
F9.15	Stage 5 instruction setting		111	000	○
F9.16	Stage 5 instruction running time		0.1	10.0	○
F9.17	Multistage instruction 6		0.01Hz	20.00Hz	○
F9.18	Stage 6 instruction setting		111	000	○
F9.19	Stage 6 instruction running time		0.1	10.0	○
F9.20	Multistage instruction 7		0.01Hz	20.00Hz	○
F9.21	Stage 7 instruction setting		111	000	○
F9.22	Stage 7 instruction running time		0.1	10.0	○
F9.23	Multistage instruction 8		0.01Hz	20.00Hz	○
F9.24	Stage 8 instruction setting		111	000	○
F9.25	Stage 8 instruction running time		0.1	10.0	○
F9.26	Multistage instruction 9		0.01Hz	20.00Hz	○
F9.27	Stage 9 instruction setting		111	000	○
F9.28	Stage 9 instruction		0.1	10.0	○
F9.29	Multistage instruction 10		0.01Hz	20.00Hz	○
F9.30	Stage 10 instruction		111	000	○
F9.31	Stage 10 instruction		0.1	10.0	○
F9.32	Multistage instruction 11		0.01Hz	20.00Hz	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
F9.33	Stage 11 instruction		111	000	○
F9.34	Stage 11 instruction		0.1	10.0	○
F9.35	Multistage instruction 12		0.01Hz	20.00Hz	○
F9.36	Stage 12 instruction		111	000	○
F9.37	Stage 12 instruction		0.1	10.0	○
F9.38	Multistage instruction 13		0.01Hz	20.00Hz	○
F9.39	Stage 13 instruction		111	000	○
F9.40	Stage 13 instruction		0.1	10.0	○
F9.41	Multistage instruction 14		0.01Hz	20.00Hz	○
F9.42	Stage 14 instruction		111	000	○
F9.43	Stage 14 instruction		0.1	10.0	○
F9.44	Multistage instruction 15		0.01Hz	20.00Hz	○
F9.45	Stage 15 instruction		111	000	○
F9.46	Stage 15 instruction		0.1	10.0	○
F9.47	Multistage instruction 16		0.01Hz	20.00Hz	○
F9.48	Stage 16 instruction		111	000	○
F9.49	Stage 16 instruction		0.1	10.0	○

5.9 Multistage speed operation

Set the parameters when using the inverter for multistage speed operation. The GT20 inverter can set 16-stage speed, which is selected by the combination code of multistage speed terminals 1～4, corresponding to multistage speed 1 to multistage speed 16 respectively.



Related parameter table:

Parameter Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
F9.00	Simple PLC run mode selection	LED single digit: PLC run mode 0: No action 1: Stop after a single cycle 2: Keep the final value after a single cycle 3: Continuous cycle 4: DI selective operation LED tens digit: Start mode 0: Start running from the first stage 1: Continue running from the stage of interruption LED hundreds digit: Stage time unit selection 0: Second 1: Minute LED thousands digit: Store at power failure 0: Do not store at power failure 1: Stage at power failure storage interruption	1111	0000	×
F9.01	Running stages	1~16	1	16	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
F9.02	Multistage instruction 1	Lower limit frequency~upper limit frequency	0.01Hz	20.00Hz	○
F9.03	Stage 1 instruction setting	LED single digit: 0: Multistage instruction 1 (F9.02) 1: AI1 2: AI2 3: Pulse frequency 4: Communication 5: Operation panel digital potentiometer given 6: Analog potentiometer given on external operation panel LED tens digit: 0: Acceleration/deceleration time 1 1: Acceleration/deceleration time 2 2: Acceleration/deceleration time 3 3: Acceleration/deceleration time 4 LED hundreds digit: 0: Forward running 1: Reverse running **Note: Only the LED single digit frequency source of stage 1 instruction can be set.**	111	000	○
F9.04	Stage 1 instruction running time	Set range: 0.1～6000.0 **Note: For the time unit selection, see F9.00 hundreds digit setting.**	0.1	10.0	○
F9.05	Multistage instruction 2	Stage X instruction (F9.05, F9.08, F9.11, F9.14, F9.17, F9.20, F9.23, F9.26, F9.29, F9.32, F9.35、F9.38, F9.41, F9.44, and F9.47) setting range: Lower limit frequency~upper limit frequency Stage X instruction (F9.06, F9.09, F9.12, F9.15, F9.18, F9.21, F9.24, F9.27, F9.30, F9.33, F9.36、F9.39, F9.42, F9.45, and F9.48) setting range: LED single digit: 0: Multistage instruction x 1: Reserved LED tens digit: 0: Acceleration/deceleration time 1 1: Acceleration/deceleration time 2 2: Acceleration/deceleration time 3 3: Acceleration/deceleration time 4 LED hundreds digit: 0: Forward running 1: Reverse running Stage X instruction running time (F9.07, F9.10, F9.13, F9.16, F9.19, F9.22, F9.25,	0.01Hz	20.00Hz	○
F9.06	Stage 2 instruction setting		111	000	○
F9.07	Stage 2 instruction running time		0.1	10.0	○
F9.08	Multistage instruction 3		0.01Hz	20.00Hz	○
F9.09	Stage 3 instruction setting		111	000	○
F9.10	Stage 3 instruction running time		0.1	10.0	○
F9.11	Multistage instruction 4		0.01Hz	20.00Hz	○
F9.12	Stage 4 instruction setting		111	000	○
F9.13	Stage 4 instruction		0.1	10.0	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
	running time	F9.28, F9.31, F9.34, F9.37、F9.40, F9.43,			
F9.14	Multistage instruction 5	F9.46, and F9.49) setting range: 0.1~6000.0	0.01Hz	20.00Hz	○
F9.15	Stage 5 instruction setting	**Note: For the time unit selection, see F9.00 hundreds digit setting.**	111	000	○
F9.16	Stage 5 instruction running time		0.1	10.0	○
F9.17	Multistage instruction 6		0.01Hz	20.00Hz	○
F9.18	Stage 6 instruction setting		111	000	○
F9.19	Stage 6 instruction running time		0.1	10.0	○
F9.20	Multistage instruction 7		0.01Hz	20.00Hz	○
F9.21	Stage 7 instruction setting		111	000	○
F9.22	Stage 7 instruction running time		0.1	10.0	○
F9.23	Multistage instruction 8		0.01Hz	20.00Hz	○
F9.24	Stage 8 instruction setting		111	000	○
F9.25	Stage 8 instruction running time		0.1	10.0	○
F9.26	Multistage instruction 9		0.01Hz	20.00Hz	○
F9.27	Stage 9 instruction setting		111	000	○
F9.28	Stage 9 instruction running time		0.1	10.0	○
F9.29	Multistage instruction 10		0.01Hz	20.00Hz	○
F9.30	Stage 10 instruction setting		111	000	○
F9.31	Stage 10 instruction running time		0.1	10.0	○

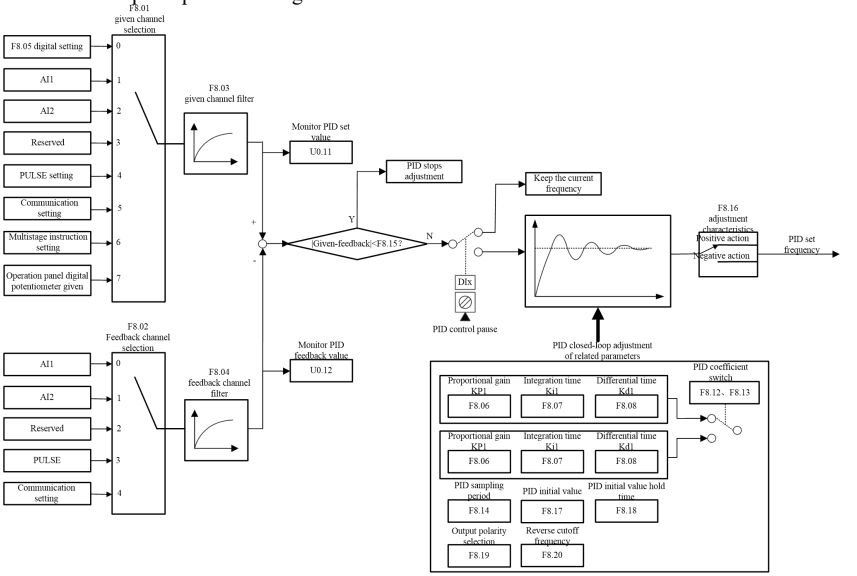
arameter Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
F9.32	Multistage instruction 11		0.01Hz	20.00Hz	○
F9.33	Stage 11 instruction setting		111	000	○
F9.34	Stage 11 instruction running time		0.1	10.0	○
F9.35	Multistage instruction 12		0.01Hz	20.00Hz	○
F9.36	Stage 12 instruction setting		111	000	○
F9.37	Stage 12 instruction running time		0.1	10.0	○
F9.38	Multistage instruction 13		0.01Hz	20.00Hz	○
F9.39	Stage 13 instruction setting		111	000	○
F9.40	Stage 13 instruction running time		0.1	10.0	○
F9.41	Multistage instruction 14		0.01Hz	20.00Hz	○
F9.42	Stage 14 instruction setting		111	000	○
F9.43	Stage 14 instruction running time		0.1	10.0	○
F9.44	Multistage instruction 15		0.01Hz	20.00Hz	○
F9.45	Stage 15 instruction setting		111	000	○
F9.46	Stage 15 instruction running time		0.1	10.0	○
F9.47	Multistage instruction 16		0.01Hz	20.00Hz	○
F9.48	Stage 16 instruction setting		111	000	○
F9.49	Stage 16 instruction running time		0.1	10.0	○

5.10 PID control

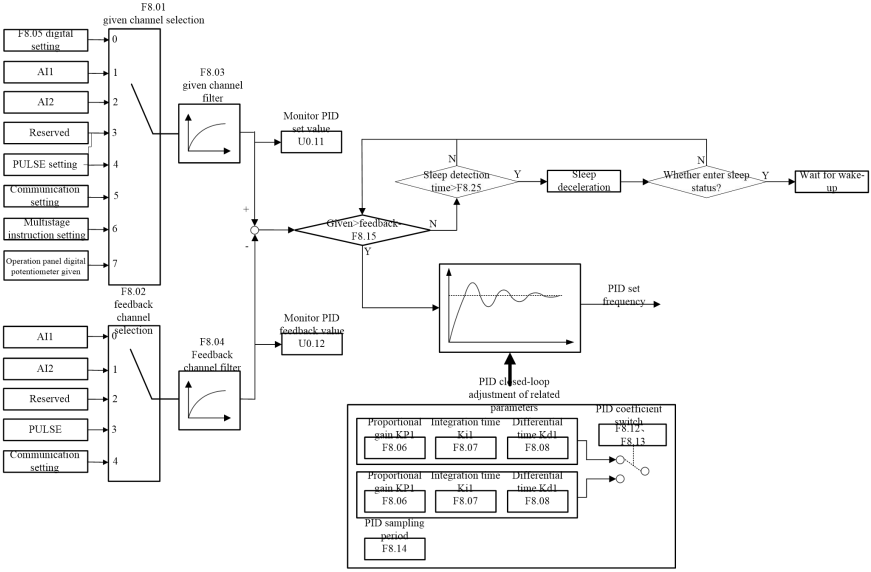
The PID control is a commonly used method for process control. By performing proportional,

integral, and differential operations on the feedback signal of the controlled quantity and the quantity of the target quantity signal, the output frequency of the inverter is adjusted to form a negative feedback system, so that the controlled quantity is stable on the target quantity. Suitable for process control such as flow control, pressure control and temperature control.

The basic principle block diagram of traditional PID control is as follows:



The basic principle block diagram of PID control for water supply application is as follows (used when F0.04 industry code is the special inverter for water supply):



The brief of PID control working principle and the introduction of adjustment method:

Proportional adjustment (Kp): When there is a deviation between the feedback and the given, the output and the deviation are adjusted in proportion. If the deviation is constant, the adjustment amount is also constant. Proportional adjustment can quickly respond to changes in feedback, but just proportional adjustment cannot achieve non-differential control. The larger the proportional gain, the faster the adjustment speed of the system, but if it is too large, oscillation will occur. The adjustment method is to first set the integration time to be very long and the differential time to zero. Use only proportional adjustment to make the system run, change the given quantity, and observe the stable deviation (static difference) between the feedback signal and the given quantity. If the static difference is in the direction of given quantity changes (for example, increasing the given quantity, the feedback quantity is always less than the given quantity after the system is stable), continue to increase the proportional gain, otherwise decrease the proportional gain, and repeat the above process until the static difference is relatively small.

Integration time (Ti): When there is a deviation between the feedback and the given value, the output adjustment accumulates continuously. If the deviation persists, the adjustment increases constantly, until there is no deviation. The integral regulator can effectively eliminate static difference. If the integral regulator is too strong, there will be repeated overshoot, making the system unstable until oscillation occurs. The characteristics of the oscillation caused by excessive integration are as follows: The feedback signal swings up and down at a given quantity, and the swing gradually increases until it oscillates. The adjustment of the integration time parameter is generally from large to small, gradually adjust the integration time, and observe the effect of the system adjustment until the stable speed of the system reaches the requirements.

Differential time (Td): When the deviation between feedback and given changes, an adjustment proportional to the deviation change rate is output. The adjustment is only related to the direction and magnitude of the deviation change, and has nothing to do with the direction and magnitude of the deviation itself. The function of differential adjustment is to adjust according to the changing trend when the feedback signal changes, thus to suppress the change of the feedback signal. Please use the differential regulator with caution, because the differential regulation is easy to amplify the interference of the system, especially the interference with a higher change frequency.

General steps for PID parameter setting

a. Determine the proportional gain Kp

When determining the proportional gain Kp, first remove the integral and differential items of PID. Generally, assumed Ti = 0 and Td = 0 (for details, see the description of PID parameter setting), so that the PID is of pure proportional adjustment. The input is set to 60%～70% of the maximum value allowed by the system. The proportional gain Kp is increased from 0 gradually until the system oscillates; in turn, the proportional gain Kp is gradually decreased from this time until the system oscillation disappears. In this case, the proportional gain Kp is recorded, and the proportional gain Kp of PID is set to 60%～70% of the current value. The proportional gain Kp debugging is completed.

b. Determine the integration time Ti

After the proportional gain Kp is determined, set a larger initial value of the integration time Ti, and then gradually decrease Ti until the system oscillates, and then in turn, increase Ti gradually until the system oscillation disappears. Record the Ti at this time and set the integration time constant Ti of PID to 150% ～ 180% of the current value. The integration time constant Ti debugging is completed.

c. Determine the differential time Td

Generally, the differential time Td needs not to be set (0). To set, the method is the same with that of determining Kp and Ti, taking 30% without oscillation.

d. The system is debugged with or without load, and then the PID parameters are fine-tuned until the requirements are met.

Related parameter table:

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
F8.00	PID operation control selection	0: PID standby (not acting) 1: PID standby (acting)	1	0	×
F8.01	Given channel selection	0: F8.05 digital given; 1: AI1 2: AI2 3: Reserved 4: PULSE setting; 5: Communication setting 6: Multistage instruction setting 7: Operation panel digital potentiometer given 8: Analog potentiometer given on external operation panel	1	0	×
F8.02	Feedback channel selection	0: AI1 1: AI2 2: Reserved 3: Pulse 4: Communication setting	1	0	×
F8.03	Given channel filter	Set range: 0～1000ms	1ms	10ms	○
F8.04	Feedback channel filter		1ms	10ms	○
F8.05	Given quantity digital setting	Universal inverter mode setting range: 0.0～100.0% Water supply inverter mode setting range:	0.1% Or 0.1bar	0.0% Or 0.0bar	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
		0.0～F8.23			
F8.06	Proportional gain Kp1	Set range: 0～1000	1	10	○
F8.07	Integration time Ti1	Set range: 1～10000ms	1ms	500ms	○
F8.08	Differential time Td1	Set range: 0～10000ms	1ms	0ms	○
F8.09	Proportional gain Kp2	F8.09 set range: 0～1000 F8.10 set range: 1～10000ms F8.11 set range: 0～10000ms	1	5	○
F8.10	Integration time Ti2		1ms	2000ms	○
F8.11	Differential time Td2		1ms	0ms	○
F8.12	Gain switching conditions	0: Do not switch 1: Switch through DI terminal 2: Switch automatically based on deviation 3: Switch automatically according to PID output	1	0	○
F8.13	Gain switching threshold	Set range: 0.0～100.0%	0.1%	0.0%	○
F8.14	PID sampling period	Set range: 1～60000ms	1ms	1ms	○
F8.15	Deviation limit	Set range: 0.0～50.0%	0.1%	0.0%	○
F8.16	Closed-loop regulation features	0: Positive action 1: Negative action	1	0	○
F8.17	PID initial value	F8.17 set range: 0.0～100.0% F8.18 set range: 0.00～600.00s	0.1%	0.0%	×
F8.18	PID initial value hold time		0.01s	0.00s	×
F8.19	Closed-loop output polarity selection	0: Closed-loop output is negative, run at zero-frequency 1: Closed-loop output is negative, reverse	1	0	○
F8.20	PID reverse cutoff frequency	Set range: 0.00~upper limit frequency	0.01Hz	2.00Hz	×
F8.21	PID feedback loss detection value	F8.21 set range: 0.0～100.0% F8.22 set range: 0.0～200.0s (0.0s indicates no detection)	0.1%	10.0%	○
F8.22	PID feedback loss detection time		0.1s	0.0s	○
F8.23	Maximum sensor range	Set range: 0.0～200.0bar	0.1bar	10.0bar	○
F8.24	Water supply sleep selection	0: Automatic sleep 1: Run at lower limit frequency	1	0	○

aramete Code	Parameter name	Parameter detailed description	Minimum Unit	Factory value	Change
F8.25	Water supply sleep detection time	F8.25 set range: 0.0～3600.0s F8.26 set range: 0.01～600.00s	0.1s	10.0s	○
F8.26	Water supply sleep deceleration time		0.01s	10.00s	○
F8.27	Water supply wake pressure tolerance	F8.27 set range: 0.0～100.0% (100.0% is the set pressure value) F8.28 set range: 0.0～3600.0s	0.1%	10.0%	○
F8.28	Water supply wake detection time		0.1s	2.0s	○
F8.29	Water pressure overpressure alarm detection value	Set range: 0.0～100.0% (Do not test when set to 0, 100.0% is the maximum range of pressure sensor)	0.1%	90.0%	○
F8.30	Water pressure undervoltage alarm detection value	Set range: 0.0～100.0% (Do not test when set to 0, 100.0% is the maximum range of pressure sensor)	0.1%	0.0%	○
F8.31	Water pressure abnormal alarm detection time	Set range: 0.0～3600.0s	0.1s	50.0s	○
F8.32	Water shortage alarm set value	F8.32 set range: 0.0～100.0% (100.0% is the set pressure value) F8.33 set range: 0.0～3600.0s F8.34 set range: 0～10000min (0min indicate there's no water shortage restart function)	0.1%	20.0%	○
F8.33	Water shortage alarm detection time		0.1s	20.0s	○
F8.34	Water shortage restart wait time		1min	0min	○

5.11 Troubleshooting

The GT20 series inverter provides rich fault handling information. When the inverter fails, the keyboard will display the fault code and stop output. The fault record parameter group U1 can record the last 10 fault information. After the fault occurs, the processing steps are as follows:

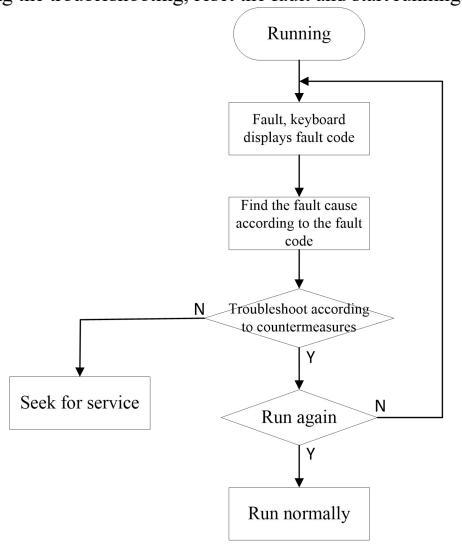
1. When the inverter fails, check whether the keyboard display is abnormal? If yes, seek for service.

2. If there is no abnormality, please check the group U1 function code, confirm the corresponding fault record parameters, and determine the actual status at occurrence of the current fault through all parameters;

2. Check the fault alarm content and countermeasure table, and check whether there is a

corresponding abnormal status according to the specific countermeasures?

3. Do troubleshooting or ask relevant personnel for help;
4. After confirming the troubleshooting, reset the fault and start running.



Related parameter table:

aramete Code	Parameter name	Parameter detailed description	Factory value	Change
U1.00	Historical fault number	Set range: 0～9 According to the setting of this function code, you can view the fault record information of the last 10 times. By setting different values within U1.01～U1.06, the corresponding fault record will display.	0	○
U1.01	Fault code during fault	Fault record information at the xth fault (x is the set value of U1.00)	-	*
U1.02	Bus voltage during fault		-	*
U1.03	Output current during fault		-	*
U1.04	Running frequency during fault		-	*
U1.05	Running temperature during fault		-	*
U1.06	Fault occurrence time		-	*

Fault alarm content and countermeasure table:

Fault code	Fault type	Possible cause of failure	Countermeasures

Fault code	Fault type	Possible cause of failure	Countermeasures
E001	Inverter accelerated running overcurrent	The acceleration time is too short.	Extend the acceleration time
		The V/F curve is improper.	Adjust the V/F curve setting, adjust the manual torque boost or set the motor parameters correctly to ensure that the automatic torque boost is normal.
		When an instant stop occurs, restart the motor in rotation.	Set the start mode F2.00 to speed tracking restart function.
		Low power grid voltage	Check the input power.
		The inverter power is too small.	Use an inverter with a large power level.
E002	Inverter decelerated running overcurrent	The deceleration time is too short.	Extend the deceleration time.
		Load with potential energy or large inertia torque	Externally add a proper energy consumption braking component.
		The inverter power is small.	Use an inverter with a large power level.
E003	Inverter constant-speed running overcurrent	Sudden change of load	Reduce the sudden change of load.
		The acceleration/deceleration time is set to short.	Extend the acceleration/deceleration time as appropriate.
		Abnormal load	Perform load check.
		Low power grid voltage	Check the input power.
		The inverter power is small.	Use an inverter with a large power level.
E004	Inverter accelerated running overvoltage	Abnormal input voltage	Check the input power.
		The acceleration time is set to short.	Extend the acceleration time as appropriate.
		When an instant stop occurs, restart the motor in rotation.	Set the start mode F2.00 to speed tracking restart function.
E005	Inverter decelerated running overvoltage	The deceleration time is too short (relative to regenerative energy).	Extend the deceleration time.
		Load with potential energy or large inertia torque	Select a proper energy consumption braking component.
E006	Inverter constant-speed running overvoltage	Abnormal input voltage	Check the input power.
		The acceleration/deceleration time is set to short.	Extend the acceleration/deceleration time as appropriate.
		Abnormal change of the input voltage	Install an input reactor.
		Large load inertia	Consider using an energy-saving brake component.
E007	Undervoltag	Abnormal input voltage	Check the power voltage.

Fault code	Fault type	Possible cause of failure	Countermeasures
	e during running		
E008	Motor overload alarm	The V/F curve is improper.	Set the V/F curve and the torque boost correctly.
		Extremely low power grid voltage	Check the power grid voltage.
		The general motor operates for a long time at a low speed with a large load.	Special motor can be selected for long-term and low-speed operation.
		Incorrect motor rated current	Set the motor rated current correctly.
		Motor stalled or a large sudden change of load	Check the load.
E009	Inverter overload alarm	The acceleration time is too short.	Extend the acceleration time
		Excessive DC braking amount	Reduce the DC braking current, and extend the braking time.
		The V/F curve is improper.	Adjust the V/F curve and the torque boost.
		When an instant stop occurs, restart the motor in rotation.	Set the start mode F2.00 to speed tracking restart function.
		Extremely low power grid voltage	Check the power grid voltage.
		Excessive load	Select an inverter with a larger power.
E010	Reserved	-	-
E011	Reserved	-	-
E012	Phase loss alarm at output side	Phase loss of output U, V, and W	Check the output wiring.
			Check the motor and the cable.
E013	Inverter module radiator overheat alarm	Too high ambient temperature	Reduce the ambient temperature.
		Blocked air duct	Clear the air duct.
		Damaged fan	Replace the fan.
		Abnormal inverter module	Seek for service.
E014	Rectifier module radiator overheat alarm	Too high ambient temperature	Reduce the ambient temperature.
		Blocked air duct	Clear the air duct.
		Damaged fan	Replace the fan.
E015	External fault alarm	External fault emergency stop terminal closed	Check the external equipment input.
E016	485 communication error	Improper baud rate setting	Set the baud rate properly.
		Serial port communication error	Press the STOP key to reset, and seek for service.

Fault code	Fault type	Possible cause of failure	Countermeasures
	alarm	Improper fault alarm parameter setting	Modify the settings of Fb.04, Fb.03 and FA.07.
		The host computer doesn't work.	Check whether the host computer works or not, and whether the wiring is correct.
E017	Current detection circuit fault alarm	Damaged auxiliary power supply	Seek for service.
		Damaged Hall device	Seek for service.
		Abnormal amplification circuit	Seek for service.
E018	Reserved	-	-
E019	Reserved	-	-
E020	Closed-loop feedback loss alarm	Feedback circuit disconnected	Check the feedback circuit.
E021	Water pressure overpressure alarm	Abnormal sensor feedback signal	Check the sensor wiring.
		Too low overvoltage alarm value	Modify the F8.29 setting.
		Too short alarm detection time	Modify the F8.31 setting.
E022	Reserved	-	-
E023	Water shortage alarm	Abnormal water pressure/water level	Check whether the water pressure at the pump inlet is abnormal.
		Broken line or poor contact of the sensor, system has no feedback signal.	Check the sensor installation and wiring.
		Too low water shortage alarm value.	Modify the F8.32 setting.
		Too short water shortage detection time	Modify the F8.33 setting.
E024	Reserved	-	-
E025	Reserved	-	-

Fault code	Fault type	Possible cause of failure	Countermeasures
E026	Reserved	-	-
E027	Reserved	-	-
E028	Operation panel parameter copy error alarm	The operation panel parameters are incomplete.	Re-upload the parameters in the backup operation panel.
		The operation panel parameters are inconsistent with the main control board parameter software version.	The parameter software version is inconsistent, and you cannot execute the parameter downloading, please re-upload the parameters in the backup operation panel.
		The operation panel parameters are of 2S model, but the main control board parameters are of 4T model.	The model corresponding to the parameter is inconsistent, and you cannot execute the parameter downloading, please re-upload the parameters in the backup operation panel.
E029	Reserved	-	-
E099	Reserved	-	-

Appendix I Communication Protocol

Networking mode

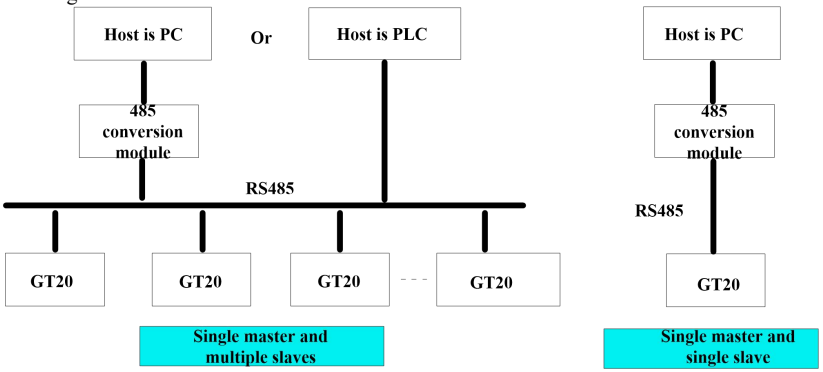


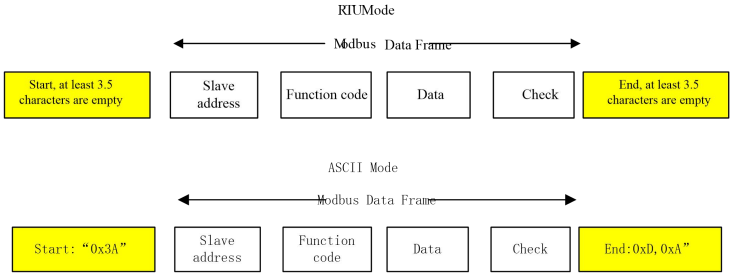
Figure 1 Schematic Diagram of Inverter Networking Mode

Interface mode

RS485: asynchronous, half-duplex. Default: 8-N-2, 9600BPS. For parameter setting, please refer to group Fb description.

Protocol format

The Modbus protocol supports both RTU mode and ASCII mode. The corresponding frame format is as follows:



Protocol function:

The main function of Modbus is to read and write parameters. Different function codes determine different operation requests. The inverter Modbus protocol supports the following function code operations:

Function code	Function code significance
0x03	Read inverter function code parameter and running status parameter
0x06	Rewrite function code or control parameter of single inverter
0x10	Rewrite function code or control parameter of multiple inverters

The function code parameter, control parameter and status parameter of the inverter are mapped as Modbus read-write registers. The read-write characteristics and range of the function code parameters follow the instructions in the inverter user manual. The group number of the inverter function code is mapped to the high byte address of the register, and the index in the group

is mapped to the low byte address of the register. The control parameter of the inverter is virtualized to the inverter function code group 18, and the status parameter of the inverter is virtualized to the inverter function code group 19. The correspondence between the function code group number and the high byte of its mapped register address is as follows:

Group F0: 0x00; group F1: 0x01; group F2: 0x02; group F3: 0x03; group F4: 0x04; group F5: 0x05; group F6: 0x06; group F7: 0x07; group F8: 0x08; group F9: 0x09; FA group: 0x0A; Fb group: 0x0B; FC group: 0x0C; Fd group: 0x0D; FE group: 0x0E; FF group: 0x0F; U0 group: 0x10; U1 group: 0x11; inverter control parameter group: 0x12; inverter status parameter group: 0x13.

For example, the register address of the inverter function code parameter F3.02 is 0x0302, and the register address of the inverter function code parameter FE.01 is 0x0E01.

If the operation request fails, the response is an error code and an exception code. The error code is equal to (function code + 0x80), and the exception code indicates the error reason. The exception code is listed as follows:

Exception code	Exception code significance
0x1	Illegal function code.
0x2	Illegal register address.
0x3	Data error, that is, the data exceeds the upper or lower limit.
0x4	Slave operation failed (including errors caused by invalid data, although the data is within the upper and lower limits).
0x18	Information frame error: Including information length error and check error.
0x20	Parameters cannot be modified.
0x21	Out of the range of function group.

The inverter control parameters can complete functions to start, stop, and set running frequency of the inverter. By searching inverter status parameters, parameters such as operating frequency, output current, and output torque of the inverter can be obtained. The specific inverter control parameters and status parameters are enumerated as follows (except 0x1207 virtual output terminal is read-only, other parameters are readable and writable):

GT20 inverter control parameter index

Register address	Parameter name	Whether save after power failure
0x1200	Control command word 1	No
0x1201	Main frequency setting	Yes
0x1202	Reserved	-
0x1203	PID given	Yes
0x1204	PID feedback	Yes
0x1205	Analog output AO, high-speed DO2 setting	No
0x1206	Virtual input terminal: Define by bit: BIT0~9 = VDI1~VDI10, BIT10~15 = Reserved	No
0x1207	Virtual output terminals (read-only): Define by bit: BIT0~4 = VDO1~VDO5, BIT5~15 = Reserved	No
0x2000	Control command word 2	No
0x2001	Main frequency setting	Yes

GT20 inverter status parameter index

Register address	Parameter name

Register address	Parameter name
0x1300	Running status word
0x1301	Inverter model

The inverter control word 1 (register address 0x1200) bit is defined as follows:

Control word (bit)	Value	Significance	Function description
Bit2, 1, 0	111B	Run command	Start the inverter
	110B	Stop command	Stop according to the way set by function code F2.08
	Remaining	No command	
Bit3	1	Reverse	Set the running direction when the run command is valid (invalid for jog command)
	0	Forward	
Bit8～Bit4	0	Reserved	-
Bit9	1	Fault reset valid	
	0	Fault reset invalid	
Bit15～Bit5	0	Reserved	-

The inverter control word 2 (register address 0x2000) bit is defined as follows:

Control word (bit)	Value	Significance	Function description
Bit1, 0	00B	No function	
	01B	Stop	Stop according to the way set by function code F2.08
	10B	Start	Start the inverter
	11B	No function	
Bit3, 2	0	Reserved	-
Bit5, 4	00B	No function	
	01B	Forward instruction	
	10B	Reverse instruction	
	11B	Fault reset	
Bit15～Bit5	0	Reserved	-

The inverter status word (register address 0x1300) bit is defined as follows:

Status word (bit)	Value	Significance	Remarks
Bit0	1	Inverter operation	
	0	Inverter stop	
Bit1	1	Inverter reverse	
	0	Inverter forward	
Bit2	1	Reach the main setting	

	0	Not reach the main setting	
Bit7～Bit3	0	Reserved	
Bit15～Bit8	00～0xFF	Fault code	0: Indicates the inverter is normal; Not 0: Indicates a fault, and refer to the user manual of the inverter of relevant type for detailed fault code significance. For example, the fault code for motor overload E008 is 0x08, and for undervoltage is 0x1F.

Application example

The command to start the 1# inverter to run in the forward direction and set the speed to 50.00HZ (internally indicated as 5000) is as follows:

	Address	Function code	Register address	Register number	Register content bytes	Register content	Verification code
Request	0x01	0x10	0x1200	0x0002	0x04	0x0007, 0x1388	0x9B98
Response	0x01	0x10	0x1200	0x0002	None	None	0x44B0

5# inverter fault reset:

Address	Function code	Register address	Register content	Verification code
0x05	0x06	0x1200	0x0200	0x8C56
0x05	0x06	0x1200	0x0200	0x8C56

Read the running frequency of the 4# inverter, and the inverter response running frequency is 50.00HZ:

Address	Function code	Register address	Register number or read bytes	Register content	Verification code
0x04	0x03	0x1000	0x0001	None	0x809F
0x04	0x03	None	0x02	0x1388	0x7912

Write the acceleration time 1 (i.e. function code F1.11) of 5# inverter to 1.00s, and do not save after power failure.

Address	Function code	Register address	Register content	Verification code
0x05	0x06	0x010B	0x0064	0xF99B
0x05	0x06	0x010B	0x0064	0XF99B

Read the output current of 5# inverter, and the inverter response output current is 3.00A.

Address	Function code	Register	Register number or	Register	Verification

		address	read bytes	content	code
0x05	0x03	0x1002	0x0001	None	0x208E
0x05	0x03	None	0x02	0x012C	0x49C9

Calibration relationship of the inverter

A) The calibration of the frequency is 1:100

To make the inverter run at 50Hz, the main setting shall be 0x1388 (5000).

B) The calibration of the time is 1:100

To make the inverter acceleration time be 3s, the function code setting shall be 0x012C (300).

C) The calibration of the current is 1:100

If the inverter feedback current is 0x012C (300), the current of the inverter is 3A.

Warranty Agreement

1. The warranty covers only the inverter itself.
2. During normal use, if the inverter fails or is damaged within 18 months, the company shall be responsible for repairing;

   If above 18 months, a reasonable maintenance fee will be charged.
3. The start of the warranty period is the date of manufacture of our company.
4. Within 18 months, a certain maintenance fee shall also be charged if:
   - Unable to follow the operation steps in the user manual causing damages to the inverter.
   - The inverter is damaged due to flood, fire, abnormal voltage, etc.
   - The inverter is damaged due to incorrect wiring, etc.
   - Damages caused by using the inverter for abnormal functions.
5. The related service fee is calculated based on actual cost. If there is a contract, the contract shall prevail during treatment.
6. Please keep this card and show it to the repair unit during warranty.

   If there are any questions, you can contact the supplier directly or contact our

Inverter warranty form

User unit:	
Detailed address:	
Zip code:	Contact person:
Telephone number:	Fax:
Machine number:	
Power:	Model:
Contract number:	Date of purchase:
Service unit:	
Contact person:	Telephone number:
Repairman:	Telephone number:
Date of repair:	
User comments and evaluation: □ Excellent □ Good □ Normal □ Poor Other comments: User signature: Day Month Year Company return visit records: Others:	

Certificate

Inspector:_____

This product is qualified via inspection and is allowed to leave the factory.