Preface

Thank you for purchasing SINCR C500 Series frequency inverter made by Shenzhen SINCR Electrical Technology Co., Ltd.

This user manual describes how to use C500 series inverter properly. Please completely understand this user manual before installing, operating, maintaining and inspecting.

C500 is for general customer needs and individual customer needs, the industry demand for organic products. It is with built-in PID, multistage speed, PLC, input/output terminals, pulse frequency, power off and stopping parameter storage selection, the frequency given channels and run the command bingding, double frequency source given control, frequency control, etc. It can provide high integration solution to equipment manufacturing industry customers to reduce the system cost and improve the system reliability. Because we are committed to improve the frequency inverter technology, this specifications may be changed without notice. The product user manual shall be properly kept until inverter scrap.

If you have any questions or problems, please keep in touch with the agent or the company, you are welcome to put forward opinions or suggestions for improvement.

Contents

Chapter 1 Safety and Precautions

Please read this operation manual carefully before installing, operating, maintaining and inspecting

1.1 Logo and definition of safety information

In this manual, the safety precautions are sorted to “DANGER” ,“FORBID” and“CAUTION”.

DANGER	Indicate if you do not use it properly, it may cause danger such as death or series injury
FORBID	Indicate absolutely can not do.
CAUTION	Indicate if you do not use it properly, it may cause danger such as slight injury or equipment broken

1.2 Safety requirement

DANGER

- This series of inverter is used to control the three-phase motor, cannot be used for single-phase motor or for other purposes, otherwise may cause the inverter failure or fire.
- This series of inverter cannot be simply applied to medical device or other devices which directly are related to the personal safety.
- This series of inverter is produced under strict quality control system, if the inverter fault may cause a big accident or loss, you will need to set up security measures such as re dundant or bypass, just in case.

Receiving inspection

CAUTION

- Do not use the damaged inverter or inverter with missing parts.Otherwise, there may be risk of injury.
- Check the inverter nameplate rating is consistent with your order.If not, please contact the manufacturer in a timely manner.

Install

CAUTION

- Mount the inverter on incombustible surface like metal, and keep away from flammable substances and heat souces.
- Install environment No rain shower,water drop,steam,dust,Oily dirt;No corrosion, flammable gas, liquid;No metal particles or metal powder, etc.
- When installing, don't let the drilling debris drop into the inverter， Otherwise it may cause inverter fault.
- When the inverter installed in electric closet,Should ensure that ventilation fluency for electric closet and the outside world.
- Control circuit wiring should be separated from the power circuit wiring,， in order to avoid interference.

Wiring

DANGER

- Operation shall be performed by the professional engineering technician. Otherwise there will be danger of electric shock.
- Make sure the power is disconnected before connecting.Otherwise there will be danger of electric shock.
- The earth terminal PE shall be earthed reliably. Otherwise there may be danger of electric shock.
- Do not touch the inverter terminals (including control terminal).Otherwise there will be danger of electric shock.
- The brake resistor should be connected to the terminals (+) and PB. Otherwise it may cause fire.
- The primary loop connection cable to the exposed part of the interface, Should bind up with insulation tape, otherwise there is a risk of damage to property.

Wiring

CAUTION

- Never connect AC power to output UVW terminals,otherwise may cause inverter fault.
- It is forbidden to connect capacitor or phase advance LC/RC noise filter to output side of inverter,Otherwise may cause inverter fault.
- Confirm the power phase number, rated voltage is consistent with the product nameplate, otherwise it may cause inverter fault.
- Inverter main circuit wiring and control circuit wiring should be separate wiring or vertical cross, otherwise it will cause control signal interference.
- When the cable length between the inverter and motor exceeds 100 meters, it is recommended to use output reactor, in order to avoid too much of the distributed capacitance current resulting in failure of the inverter.

Running

DANGER

- Do not touch the inverter and its surrounding circuit with wet hand, otherwise there is risk of electric shock.
- Inverter wiring is complete and mount plate before electricity, charged conditions are strictly forbidden to remove the cover plate, otherwise there is risk of electric shock.
- When setting the function of fault automatic reset or power failure after restarting, dealing with machinery and equipment security isolation measures, otherwise it may cause injuries.
- After confirming the run command is cut off, you chould reset the fault and alarm signals, otherwise it may cause injuries.

CAUTION

- Do not control the inverter through turning on or turning off the power supply, otherwise it may cause damage of the inverter.
- Before operation, please confirm whether the motor and mechanical are within the using permissible range, otherwise it may damage the equipment.

- The radiator and brake resistance temperature is very high, do not touch, otherwise there is a risk of empyrosis.
- When it is used on lifting equipment, please install mechanical braking device at the same time.
- Please do not arbitrarily change the inverter parameter, the factory parameter setting can meet the most operation requirements, customers just need to set some necessary p arameters, modify parameters may cause the damage of the mechanical equipment.
- In occations of switching between power frequency to frequency conversion, the two contactors for controlling the power frequency and frequency conversion should interlock.

Repair and Inspection

DANGER

- Do not touch the inverter terminals while power-on.Otherwise there will be danger of electric shock.
- Do not open the cover of the inverter while power-on.
- Before opening the inverter for repairing, please cut off power supply of all related equipment. Please ensure main DC voltage is under 36V or the charger lamp is off. And please do operation after power off more than 10 mins.
- The inverter shall be repaired and maintained only by the qualified person who has received professional training.

CAUTION

- Human body electrostatic will damage inner sensitive components seriously. Before operation, please follow ESD measures. Otherwise, there is danger of inverter damage.

Repair and Inspection

FORBID

- While the inverter is running, switching the output side load is prohibited.
- Do not touch the high-pressure terminal of inverter,otherwise there is risk of electric shock.
- Ban live operation
- Prohibit non-professional personnel for maintenance, inspection and replacement parts.

Maintenance

CAUTION
● Regularly clean the cooling fan, and check whether it is normal; Regular clean dust accumulated in the machine. ● Regularly check the inverter input and output connection to see if there is any breakage or loose. ● Check whether terminals connection screws fasten. Check whether the wire is aging. ● The electrolytic capacitors on the main circuit and the PCB may explode when they are burning. Toxic gas may be generated when the plastic PCB boards are burning. So inverter should be recycled environmently by the relevant departments.

1.3 Precautions

Motor Insulation Inspection

When the motor is used for the first time, or when the motor is reused after being kept, or when periodical inspection is performed, it shall conduct motor insulation inspection so as to avoid damaging the inverter because of the insulation fault of the motor windings. The motor wires must be disconnected from the inverter during the insulation inspection. It is recommended to use the 500V megameter, and the insulating resistance measured shall be at least 5MΩ.

Thermal Protection of the Motor

If the capacity of the motor does not match the inverter, especially when the rated power of the inverter is higher than the rated power of the motor, the relevant motor protection parameters in the in the inverter shall be adjusted, or thermal relay shall be mounted to protect the motor.

Running with Frequency higher than Standard Frequency

This inverter can provide output frequency of 0Hz to 600Hz. If the user needs to run the inverter with frequency more than 50Hz, please take the resistant pressure of the mechanical devices into consideration.

Vibration of Mechanical Device

The inverter may encounter the mechanical resonance point at certain output frequencies, which can be avoided by setting the skip frequency parameters in the inverter.

Lubrication of mechanical device

Reducer and gear need lubrication mechanism in the long times running at low speed, due to t he lubrication effect may cause damage, customer should be sure to check in advance.

Motor Heating and Noise

Since the output voltage of inverter is PWM wave and contains certain harmonics, the temperature rise, noise and vibration of the motor will be higher than those which run at standard frequency.

Voltage-sensitive Device or Capacitor Improving Power Factor at the Output Side

Since the inverter output is PWM wave, if the capacitor for improving the power factor or voltage-sensitive resistor for lightning protection is mounted at the output side, it is easy to cause instantaneous over current in the inverter, which may damage the inverter. It is recommended that such devices should not be used.

Switching Devices like Contactors Used at the Input and Output terminal

If a contactor is installed between the power supply and the input terminal of the inverter, it is not allowed to use the contactor to control the startup/stop of the inverter. If using a contactor is unavoidable, it shall be used with interval of at least one hour. Frequent charge and discharge will reduce the service life of the capacitor inside the inverter. If switching devices like contactor are installed between the output end of the inverter and the motor, it shall ensure that the on/off operation is conducted when the inverter has no output. Otherwise the modules in the inverter may be damaged.

Using it outside rated voltage

If the C500 series inverter is used beyond the allowable working voltage range as specified in this manual, it is easy to damage the devices in the inverter. When necessary, use the corresponding step-up or step-down instruments to change the voltage.

Change Three-phase Input to Two-phase Input

It is not allowed to change the C500 series three-phase inverter into two-phase one. Otherwise, it may cause fault or damage to the inverter.

Lightning Impulse Protection

The series inverter has lightning over current protection device, and has certain self-protection ability against the lightning. In applications where lightning occurs frequently, the user shall install additional protection devices at the front-end of the inverter.

Altitude and Derating

In areas with altitude more than 1,000 meters, the heat sinking effect of the inverter may turn poorer due to rare air. Therefore, it needs to derate the inverter for use. Please contact our company for technical consulting in case of such condition.

Special Use

If the user needs to use the inverter beyond the recommended wiring diagram in this manual, such as shared DC bus, please consult our company.

Cautions of Inverter Disposal

The electrolytic capacitors on the main circuit and the PCB may explode when they are burning. .Toxic gas may be generated when the plastic parts are burning. Please dispose the inverter as industrial wastes.

Adaptable Motor

1) The cooling fan and the rotor shaft of the non-frequency-conversion motor adopt coaxial connection. When the rotating speed is reduced, the heat sinking effect will be poorer. Therefore, a powerful exhaust fan shall be installed, or the motor shall be replaced with frequency conversion motor to avoid the motor overheat

2) Since the inverter has been built-in standard parameters of the adaptable motors, it is necessary to perform motor parameter identification or modify the default values so as to comply with the actual values as much as possible, or it may affect the running effect and protection performance.

3) The short circuit of the cable or motor may cause alarm or explosion of the inverter. Therefore, please conduct insulation and short circuit testing with the newly installed motor and cable. Such testing shall also be conducted during routine maintenance. Please note that the inverter and the testing part shall be completely disconnected during the test.

Chapter2 Product Introduction

2.1 Inverter nameplate

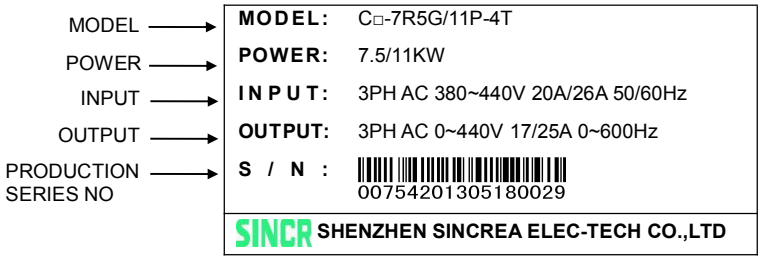

Fig.2-1:Product nameplate explanation

2.2 Naming rule

C500 - 7R5 G/ 011 P - 4 T B

inverter series
C100
C500
C6000
……

code	fit power of motor
0R7	0.75KW
7R5	7.5KW
011	11KW
110	110KW

inverter type	
G	general type
P	fans and water pump

brake unit	
B	including brake unit
Null	none

code	voltage class
S	single phase
T	three phase

code	voltage level
2	220V
4	380V
6	690V

Fig.2-2 Naming Rules

2.3 Selection Guide

Table 2-1 C500 series inverter models and Technical Data

Inverter model	Input Voltage (V)	Input Current (A)	Rated Output current(A)	Adaptable Motor (kW)	Brake Unit
C500-0R4G-2SB	Single Phase Range:220~240	5.4	2.3	0.4	Standard Built-in
C500-0R7G-2SB		8.2	4.5	0.75	
C500-1R5G-2SB		14.2	7.0	1.5	
C500-2R2G-2SB		23.0	10	2.2	
C500-0R7G-4TB	Three Phase Range:380~440	3.4	2.5	0.75	
C500-1R5G-4TB		5.0	3.7	1.5	
C500-2R2G-4TB		5.8	5	2.2	
C500-004G/5R5P-4TB		10/15	9/13	4.0/5.5	
C500-5R5G/7R5P-4TB		15/20	13/17	5.5/7.5	
C500-7R5G/011P-4TB		20/26	17/25	7.5/11.0	
C500-011G/015P-4TB		26/35	25/32	11.0/15.0	
C500-015G/018P-4TB		35/38	32/37	15.0/18.5	
C500-018G/022P-4TB		38/46	37/45	18.5/22.0	
C500-022G/030P-4T		46/62	45/60	22.0/30.0	Optional Built-in
C500-030G/037P-4T		62/76	60/75	30.0/37.0	
C500-037G/045P-4T		76/90	75/90	37.0/45.0	External
C500-045G/055P-4T		90/105	90/110	45.0/55.0	
C500-055G/075P-4T		105/140	110/150	55.0/75.0	
C500-075G/090P-4T		140/160	150/176	75.0/90.0	
C500-090G/110P-4T		160/210	176/210	90.0/110.0	
C500-110G/132P-4T		210/240	210/250	110.0/132.0	
C500-132G/160P-4T		240/290	250/300	132.0/160.0	
C500-160G/185P-4T		290/330	300/340	160.0/185.0	
C500-185G/200P-4T		330/370	340/380	185.0/200.0	
C500-200G/220P-4T		370/410	380/415	200.0/220.0	
C500-220G/250P-4T		410/460	415/470	220.0/250.0	
C500-250G/280P-4T		460/500	470/520	250.0/280.0	
C500-280G/315P-4T		500/580	520/600	280.0/315.0	
C500-315G/355P-4T		580/650	600/640	315.0/355.0	
C500-355G-4T		650	640	355.0	
C500-400G-4T		740	730	400.0	
C500-450G-4T		850	840	450.0	

2.4 General technical specifications of products

Table 2-2 C500 Inverter Technical Specifications

Item		Specifications
Power Input	Rated input voltage	Single Phase Range:220V±20%;Three-Phase Range:380V±20%Voltage imbalance: ＜3% as IEC61800-3 required
	Rated input current	Reference Table 2-1
	Rated input frequency	50Hz/60Hz，fluctuation range ±5%
Power Output	Adaptable Motor	Reference Table 2-1
	Rated output current	Reference Table 2-1
	Output voltage	0～input voltage,
Basic Function	Output frequency range	0~600Hz;0~3000Hz Can be customized according to custom er's requirements
	Carrier frequency	1.0kHz~16.0kHz
	Input frequency resolution	Digital setting: 0.01Hz;Analog setting: maximum frequency ×0.1%
	Control mode	sensorless vector control ;sensorless vector control 1;V/F control;Torque control
	Start torque	0.5Hz/150%
	Overload capacity	G type:150% rated current 1 min,180% rated current 10s; P type:120% rated current 1 min,150% rated current 10s;
	Torque boost	Auto torque boost;Manual torque boost: 0.1%~30.0%
	Accel/Decel curve	Linear Accel/Decel, S curve Accel/Decel; Four kinds of Accel/Decel time, ranges, range: 0.0s to 3600.0s
	V/F curve	Linear V/F;Square V/F;Multi-point V/F
	DC brake	DC brake frequency: 0.00Hz to maximum frequency; brake time: 0.0s to 50.0s, and brake current value: 0.0% to 120.0%.
	Jog control	Jog frequency range: 0.00Hz to 50.00Hz; jog Accel/Decel time: 0.0s to 3600.0s
	Simple PLC and multi-speed running	It can realize a maximum of 16 segments speed running via the built-in PLC or control terminals
	Built-in PID	It is easy to realize process-controlled close loop control system
	Auto voltage regulation（AVR）	It can keep constant output voltage automatically while grid voltage changes
	Current suppression	It can limit the current automatically while the V/F load is changing, prevent over current trip
	Quick current limit	Minimize the over-current fault, protect normal operation of the inverter
	Dynamic over-voltage suppression	When the running frequency is changed,it can automatically suppress feedback size of the energy,prevent bus over-voltage trip
	Oscillation suppression	optimize algorithm for V/F oscillation suppression,achieve V/F stable operation

Item		Specifications
Individualized function	Non-stop instantaneous power failure	The instantaneous power failure through the load feedback energy compensation voltage reduced,Maintain the inverter in a short period of time to continue running
	V/F individual control	Individually adjustable voltage and frequency preset
	Motor switch	Two groups of motor parameters,Two motor switching control can be achieved
	Support multithreading bus	Support for multiple field bus:Modbus,Profibus-DP,CANopen
	Fan control	To control fan operation,Increase the life of fan
Run	Running command channel	Three types of channels: operation panel reference, control terminal reference and serial communication port reference;These channels can be switched in various modes
	Frequency source	There are nine types of frequency sources, such as digital reference, analog voltage reference, analog current reference, pulse reference, PLC,MS speed, PID, and serial port reference, potentiometer reference
	auxiliary frequency source	There are nine types of auxiliary frequency sources，Flexible realization of auxiliary frequency tuning and frequency synthesis
	Input terminal	Standard: There are eight digital input terminals, one of which can be used as high-speed pulse input;There are two analog input terminals, with optional 0 ~ 10 V input voltage or 0/4 ~ 20 mA current input;
	Output terminal	Standard: Two analog output terminals,with optional 0 ~ 10 V input voltage or 0/4 ~ 20 mA current output;Two digital output terminals,one of which support 0 ~ 50 KHz square wave signal high-speed pulse output;Two relay output terminal
Display and Keyboard Operation	LED display	Display parameter
	Parameter copy	Can upload or download function code information of inverter to realize fast parameter copy.
	Key lock and selection function	Achieve some or all of the keys locked, scope definition part of the keys to prevent misuse
	Fault alarm	Over-voltage, under-voltage, over-current, short circuit, open phase, overload,overheat, over-voltage speed lost, current limit ,etc.
Environment	Using place	Indoor, and be free from direct sunlight, dust, corrosive gas,combustible gas, oil smoke, vapor, drip or salt.
	Altitude	1000m, derated when above 1000m
	Ambient temperature	-10 ℃ Celsius to +40 ℃ Celsius (Derated when used in the ambient temperature of 40 ℃ Celsius to 50 ℃ Celsius)
	Humidity	Less than 95%RH, without condensing
	Vibration	Less than 5.9m/s2（0.6g）
	Storage temperature	-20 Celsius to +60 Celsius

2.5 Product appearance size

2.5.1 Machine overall size

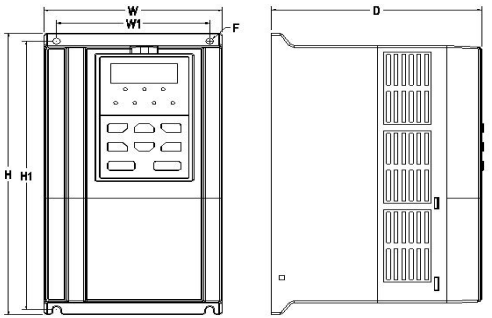

Fig.2-2 Standard dimension for C500 series inverter(0.75KW~110KW)

Table 2-3 Mounting Hole Dimensions of C500 Series Inverter（0.75~110KW model）

Apply to **0.75~110KW Model**						
Model	W (mm)	H (mm)	D (mm)	W1 (mm)	H1 (mm)	Installation Hole F(mm)
C500-0R7G-2SB	120	200	165	96	196	Φ5
C500-1R5G-2SB						
C500-2R2G-2SB						
C500-0R7G-4TB						
C500-1R5G-4TB						
C500-2R2G-4TB						
C500-004G/5R5P-4TB	140	268	164.7	120	258	Φ6
C500-5R5G/7R5P-4TB						
C500-7R5G/011P-4TB						
C500-011G/015P-4TB	180	340	207	120	331	Φ6
C500-015G/018P-4TB	225	365	211	147	353	Φ7
C500-018G/022P-4TB						
C500-022G/030P-4T	253	425	224	150	413	Φ7
C500-030G/037P-4T						
C500-037G/045P-4T	270	555	269	170	532	Φ7
C500-045G/055P-4T						
C500-055G/075P-4T						
C500-075G/090P-4T	325	680	375	190	660	Φ10
C500-090G/110P-4T						
C500-110G/132P-4T						

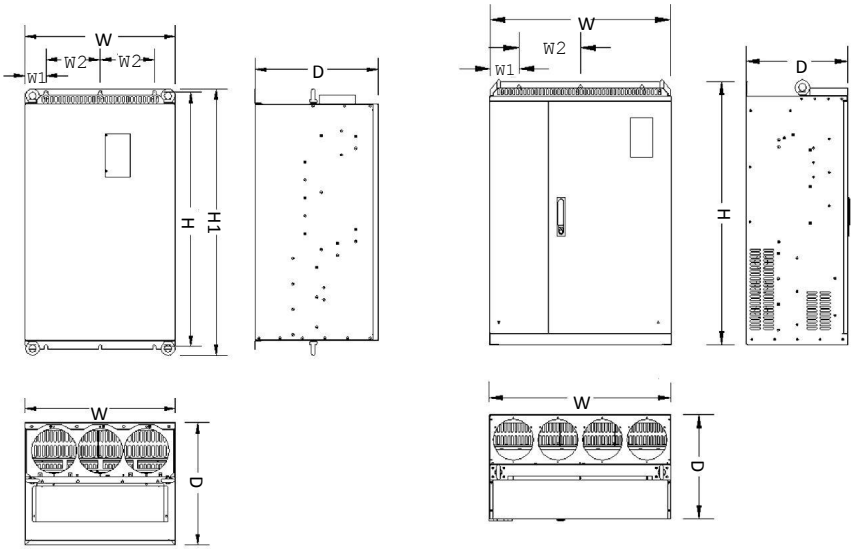

Fig.2-3 Standard dimension for C500 series inverter(0.75KW~110KW)

Table 2-4 Mounting Hole Dimensions of C500 Series Inverter（132~315KW model）

Apply to 132~315KW Model							
Model	W （mm）	W1 （mm）	W2 （mm）	H （mm）	H1 （mm）	D （mm）	Installation Hole F (mm)
C500-132G/160P-4T	500	70	180	890	850	408	Φ12
C500-160G/185P-4T							
C500-185G/200P-4T							
C500-200G/220P-4T							
C500-220G/250P-4T	680	110	230	960	931	380	Φ13
C500-250G/280P-4T							
C500-280G/315P-4T							
C500-315G/355P-4T							

2.5.2 The keyboard shape size

C500 series high-performance vector inverter has two kinds of specifications of the keyboard.

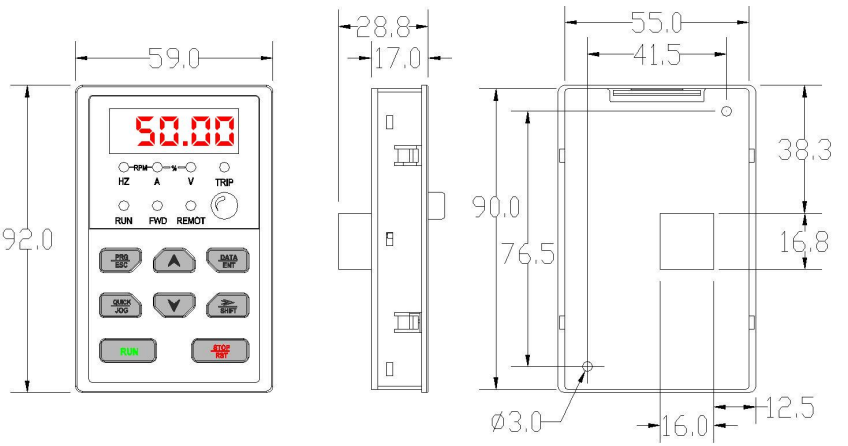

Fig.2-4 Little keyboard dimension(apply to 0.7~2.2KW)（mm）

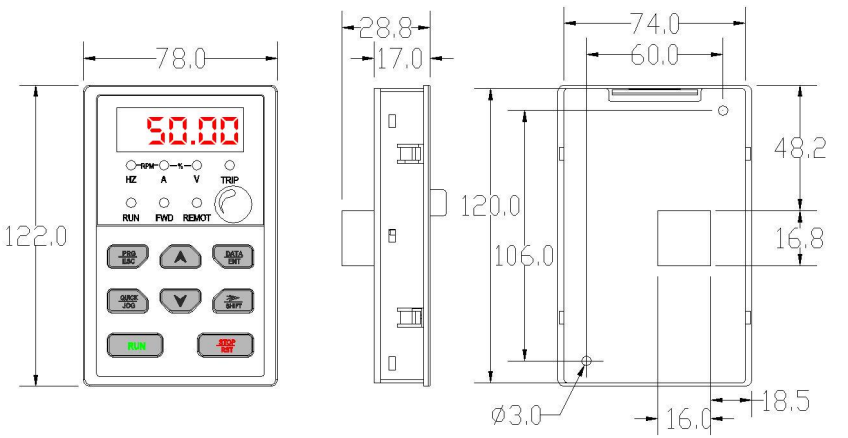

Fig.2-5 Large keyboard dimension(apply to 4~450KW)（mm）

Keyboard installed base dimension

According to the size of keyboard, the keyboard installed base has two kinds of specifications, It is convenient for customers install and fix while operating remote control.

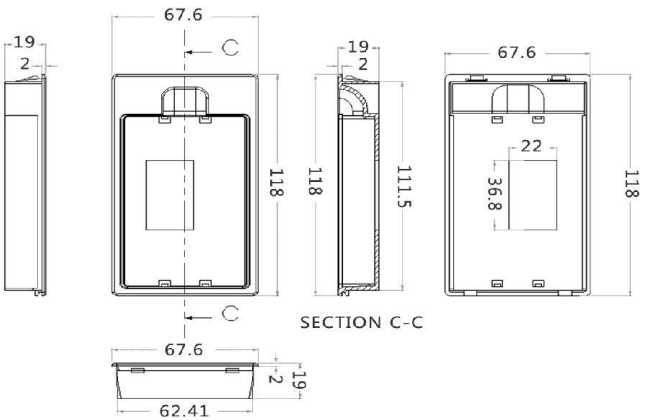

Fig.2-6 Little keyboard installed base dimension

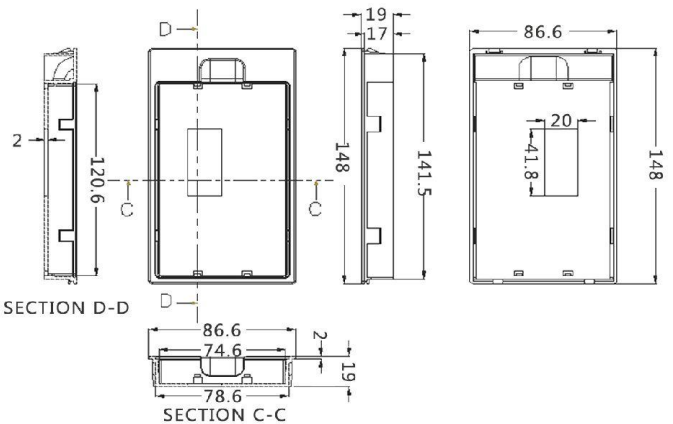

Fig.2-7 Large keyboard installed base dimension

2.6 Daily Maintenance for inverter

2.6.1 Daily Maintenance

In order to prevent the fault of inverter to make it operate smoothly in high-performance for a long time, user must inspect the inverter periodically (within half year).

☞CAUTION:

Before opening the inverter for repairing, please cut off power supply of all related equipments. Please ensure main DC voltage is under 36V or the charger lamp is off. And please do operation after power off more than 10 mins.

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Daily check items:

1） Check whether the noise of MOTOR is abnormal .

2） Check whether the vibration of MOTOR is abnormal .

3） Check whether the environment of inverter changes.

4） Check whether the fan of inverter is normal.

5） Check whether inverter is overheating.

Daily cleaning:

1）Always keep inverter in clean condition.

2）Effectively remove the surface dust of inverter, prevent dust to enter the inside of the invert er, especially the metal dust.

3）Effectively remove oil contamination of cooling fan.

2.6.2 Periodic Maintenance

Customer should check the drive every 3 months or 6 months according to the actual environment.

☞CAUTION:

1.Maintenance, inspection and replacement of parts must be performed only by authorized personnel.

2.Don't leave screw, gaskets and other metal objects in the machine, otherwise there is a risk of damage to the equipment

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Periodic Maintenance items:

1） Clean the dust on PCBs and air ducts with a vacuum cleaner.

2） Check whether the screws of control terminals are loose.

3） Check whether inverter is corrosion.

4） Check if there is a poor contact terminals.

5） Main circuit insulation test.

6） Check whether the insulating tapes around the cable lugs are stripped.

☞CAUTION:

1.It is not necessary to conduct the high voltage test (which has been completed upon delivery),In order to avoid damage due to improper testing device.

2.When using the megameter (DC 500V megameter recommended) to measure the insulating resistance, the main circuit shall be disconnected with the inverter. Do not use the insulating resistance meter to test the insulation of the control circuit.

2.6.3 Replacement of wearing Parts

Fans and electrolytic capacitors are wearing parts; please make periodic replacement to ensure long term, safety and failure-free operation. The replacement periods are as follows:

Device name	Lifetime
Fan	30,000 hours
Electrolytic Capacitor	40,000 hours
Relay	100,000 times

According to the running time, user can determine the replacement of fixed number of year.

1.cooling Fan

Possible causes for damage:bearing wear,leaf aging.

Discriminating standard:if there is a crack on fan blades,If there's any abnormal vibration sound when the inverter is power on.

2.Filter electrolytic capacitors

Possible causes for damage:The poor quality of the input power supply,high environmental temperature, frequent load jump,electrolyte aging.

Discriminating standard:liquid leakage,whether the safe valve has bulgy, measure the static capacitance,and measure the insulating resistance.

3.Relay

Possible causes for damage:corrosion,frequent action

Discriminating standard:open and close are failure.

2.6.4 Storage of Inverter

Attention shall be paid to the following points for the temporary and long-term storage for the inverter:

1) Place the inverter back into the packing box following the original package.

2) Long-term storage will degrade the electrolytic capacitor. The product shall be powered up once every 2 years, and the power-up time shall be no less than 5 hours. The input voltage shall be increased slowly to the rated value with the regulator.

2.7 Instructions on warranty of Inverter

Please refer to the warranty card in the warranty agreement for the specific warranty term

Chapter3 Installation and Wiring

3.1 Installation of inverter

3.1.1 Installation conditions

The inverter shall be mounted vertically on the base,and ventilated places:

（1）Ambient temperature: The ambient temperature is not allowed to exceed the allowable temperature range temperature range: -10°C ~ +40°C. Inverter will be derated if ambient temperature exceeds 40°C.

（2）The humidity of installation place should be less than 95% RH, without dewfall.

（3）Place without metal dust, oil mist, water and etc.

（4）Place without corrosive gases, flammable gases and etc.

（5）The maximum swing should less than 5.8m/S2 (0.6g).

（6）Place without direct sunshine.

（7）Don't install on flammable objects like wood.

If there are any special installation requirements, please consult with manufacturer in advance

3.1.2 Installation and space requirement

The installation of the inverter should ensure adequate ventilation,as shown in figure 3-1;Multiple inverter's parallel installation as shown in figure 3-2(a),When two inverters need to install up and down, please consider setting partition plate as shown in figure 3-2 (b).

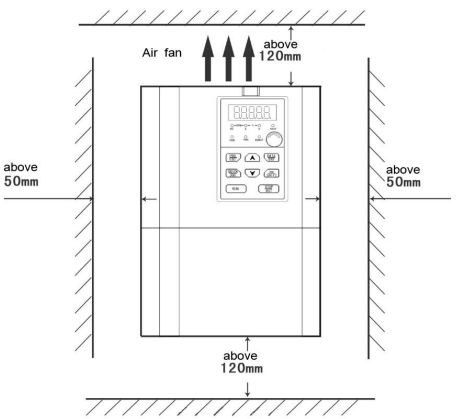


Fig.3-1 Spacing distance for installation

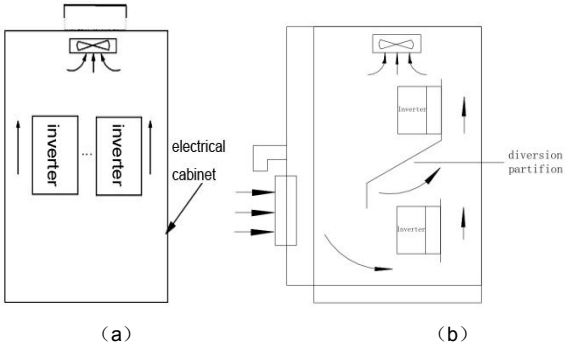


Fig.3-2 Installation dimensions of multiple inverters

3.1.3 Operation panel dismantlement and installation

A.Dismantlement

Put fingers on the slot at front part of the panel and then simply raise the panel,as shown in figure 3-3(a).

B.Installation

First the operation panel at the bottom of the fixed hook butt on the base installation groove at the bottom of the claw,Then slightly press the operation panel downward,as shown in figure 3-3(b).

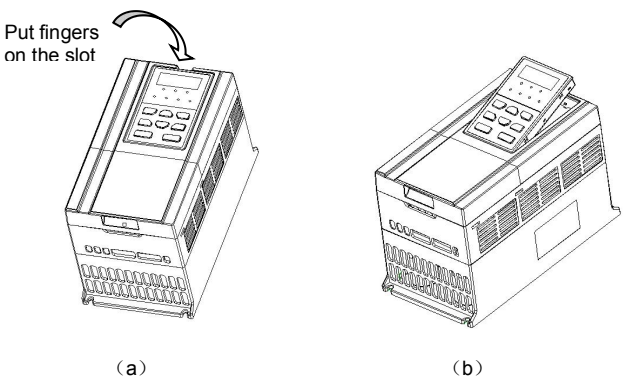


Fig.3-3 Operation panel dismantlement and installation

3.1.4 Cover plate dismantlement and installation

C500-4.0/5.5KW model is consisted of two plastic cover plates,Refer to Fig.3-4 for the dismantlement and installation of the cover plate.Before going dismantlement and installation of the cover plate,please remove the operation panel.

A.Cover plate dismantlement

First take the bottom cover plate,Then take the upper cover plate,The specific steps are as follows:

1）Inward press fixed hook for bottom cover plate,as shown in figure 3-4(a).

2）Open bottom cover plate,as shown in figure 3-4(b).

3）Remove bottom cover plate,as shown in figure 3-4(c).

4）Remove screw for upper cover plate,and inward press fixed hook,as shown in figure 3-4(d).

5）Open upper cover plate,as shown in figure 3-4(e).

6）Remove upper cover plate,as shown in figure 3-4(f).

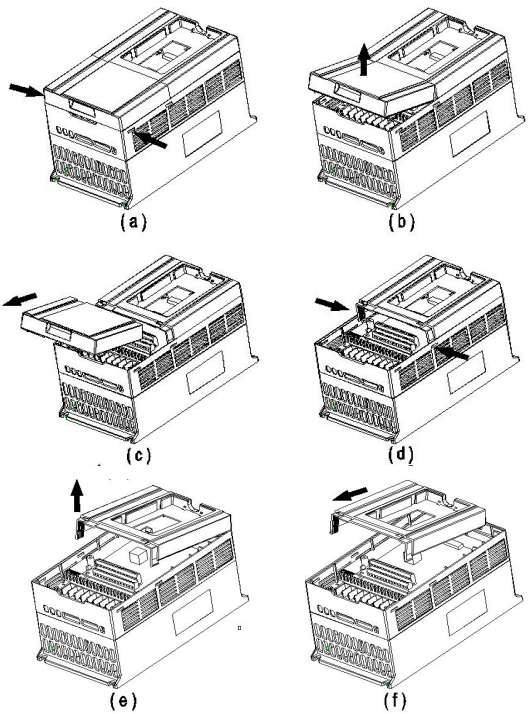


Fig.3-4 C500－4.0/5.5KW cover plate dismantlement and installation

B.Cover plate installation

First installation the upper cover plate,Then installation the bottom cover plate,The specific steps are as follows:

1）Insert the fixed hook at the upper cover plate into fixed hole on shell.

2）Press the upper cover plate down until heard a click, which means the cover plate has been in place.

3）Install the upper cover plate at the bottom of the screw hole aligning, fixed screw.

4）Insert the fixed hook at the bottom cover plate into fixed hole on upper cover plate.

5）Press the bottom cover plate down until heard a click, which means the cover plate has been in place.

3.2 Wiring inverter

3.2.1 Connected to the inverter and peripheral devices

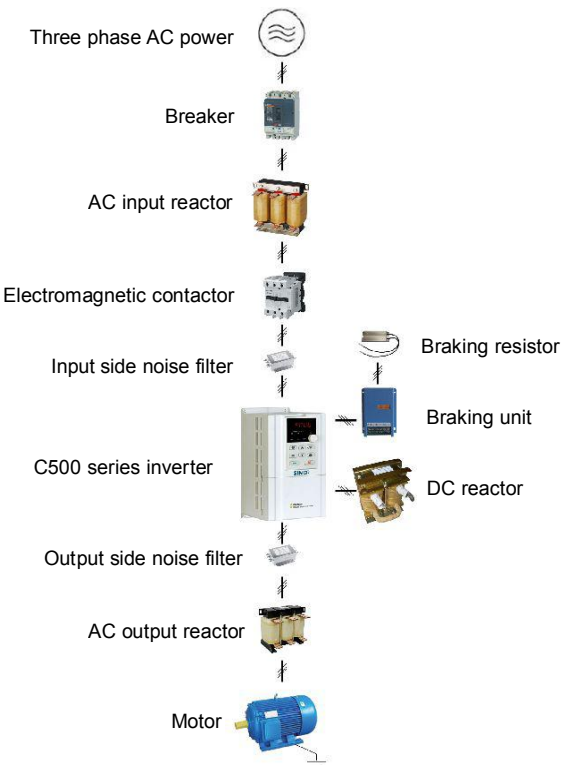


Fig.3-5 Connect the inverter to peripheral devices

3.2.2 Standard wiring diagram

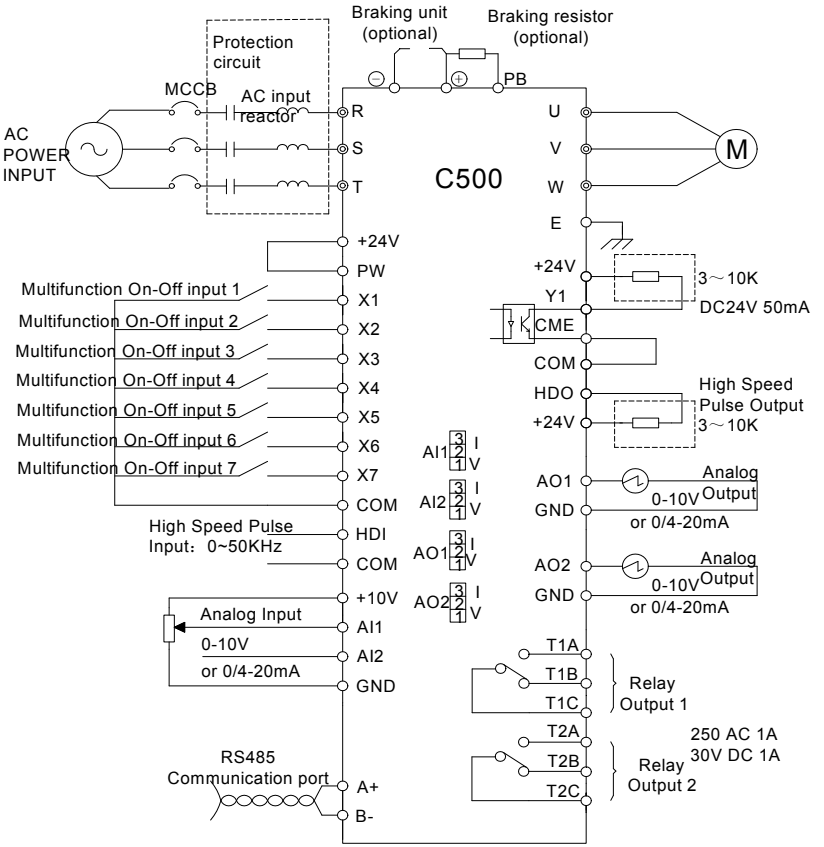


Fig.3-6 Standard wiring diagram

Note：

In the Figure, "◎" is Main circuit terminals,"○" is control terminals.

"AI1、AI2" is analog voltage and current input jumper selection.

"AO1、AO2" is analog voltage and current output jumper selection.

3.2.3 Terminal configuration

Before wiring terminals,users should remove cover plate of inverter（as show in chapter 3.1.4,Cover plate dismantlement and installation）, find the main circuit terminals and control terminals on the inverter,as shown in figure 3-7.

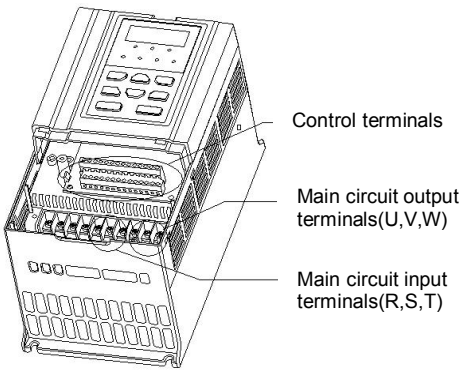
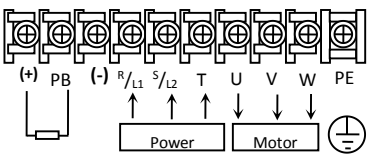
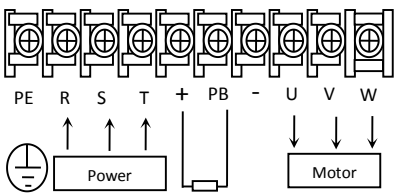


Fig.3-7 Schematic diagram for main circuit terminals

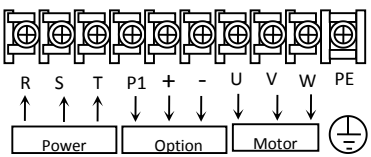
C500 series main circuit terminals



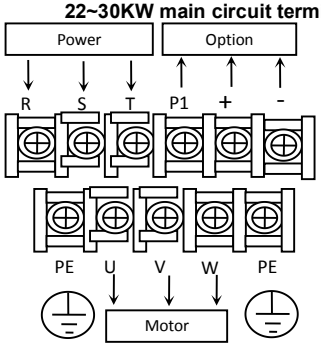
Under 18.5kW main circuit terminals array



22~30KW main circuit terminals array



37~55KW main circuit terminals array



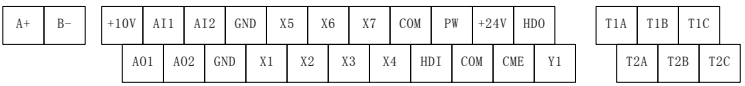
75~315KW main circuit terminals array

Main circuit function description:

Terminal	Name	Function description
R、S、T	Inverter input terminal	Used to connect 3-phase AC power supply
＋	DC power terminal	DC power output, (-) means DC bus cathode, (+) means DC bus anode, used for external braking unit
－		
＋、PB	Braking resistance terminal	Used for external braking resistance to realize quick stop
P1、＋	DC reactor terminal	Used for external DC reactor
U、V、W	Inverter output terminal	Used to connect the motor
⏚	Earth	Earth terminal, earth resistance<10 OHM

Control circuit terminals

1.Control circuit terminal diagram:



2.Control circuit terminals Function description:

Type	Terminal	Name	Function description
Analog input	+10V	+10V power supply	Provide +10V power supply for external units, with maximum output current of 10mA. It is generally used as the operating power supply for the external potentiometer.
	AI1	Analog input 1 (reference ground:GND)	Analog input, 0~10V/ 0~20mA, switched by J4(AI1) .
	AI2	Analog input 2 (reference ground:GND)	Analog input, 0~10V/ 0~20mA, switched by J5(AI2).
	GND	Common terminal of analog signal	Common terminal of analog input and output signal
Analog output	AO1	Analog output 1	Provide voltage or current output which can be switched by J1(AO1). Output range: 0~10V/ 0~20mA
	AO2	Analog output 2	Provide voltage or current output which can be switched by J7(AO2). Output range: 0~10V/ 0~20mA
	GND	Common terminal of analog signal	Common terminal of analog input and output signal
Digital input	X1	Multifunction input terminal	Digital signal input, The common terminal is
	X2		
	X3		

Type	Terminal	Name	Function description
	X4		COM. Customers could use parameter F5.01~F5.07 to set the function. While using these terminals, pls short + 24V and PW. Terminal valid state Xn and COM are interlinked, Xn low level effectively. Input voltage range: 9~30V Input impedance: 3.3kΩ
	X5		
	X6		
	X7		
	COM	Common ground terminal for digital signal	
	PW	External power supply	+24V terminal is connected to PW terminal as default setting. If user need external power supply, disconnect +24V terminal with PW terminal and connect PW terminal with external power supply.
	HDI	High speed pulse input	High speed pulse or Digital signal input, optical coupling with PW and COM. Pulse input frequency range: 0~50kHz Input voltage range: 9~30V Input impedance: 1.1kΩ
	COM	Common ground terminal for digital signal	
Digital output	HDO	High speed pulse output	High speed pulse output terminal. The corresponding common ground terminal is COM. Using internal + 24 v power supply, the CME and COM terminal must be connect. Pulse output frequency range: 0~50kHz
	CME	Common terminal of open collector output	
	COM	Common ground terminal for digital signal	
	Y1	Open collector output	The corresponding common ground terminal is CME. External voltage range: 0~24V Output current range: 0~50mA
Relay output	TxA	Relay1 and Relay2	Get by the function code F6.04 and F6.05 ,defined as a variety of functions for Relay TxA－TxC:Normally-open contact; TxB－TxC:Normally-closed contact; Max contact capacity:AC250V/2A , DC30V/1A
	TxB		
	TxC		
Communication	A+	RS485 anode	Standard 485 interface
	B-	RS485 cathode	

Chapter 4 Basic Operation and Run

4.1 Operation panel display

Operational control, parameters setting and display can be performed through the operation panel.Also the keyboard with potentiometer is optional,as show in Fig.4-1.

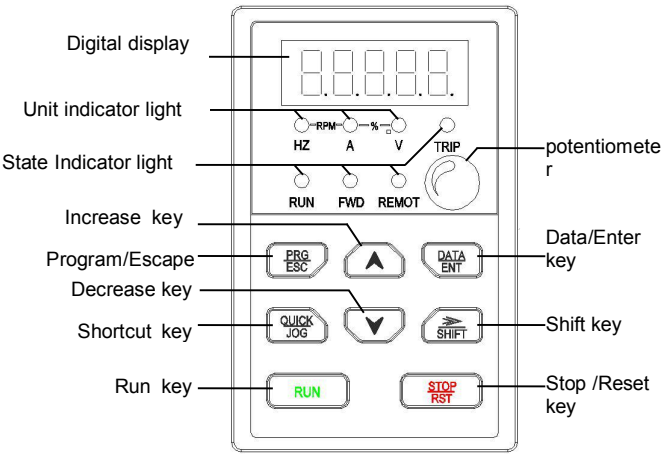


Fig.4-1 keyboard schematic diagram

4.2 Keyboard operation method

4.2.1 Keys function description

The keyboard has eight keys,Its function description as shown in table 4-1.

Table 4-1 Functions of keys

Keys	Name	Description	
PRG ESC	Programming Key	Entry or escape of first-level menu.	
DATA ENT	Enter Key	Progressively enter menu and confirm parameters.	
∧	Increase key	Progressively increase data or function codes.	
∨	Decrease key	Progressively decrease data or function codes.	
SHIFT	Shift Key	While modifying parameters, it is used to select the data bits. In stop and operate mode, it is used to cyclically display parameters	
RUN	Run Key	Start to run the inverter in keypad control mode.	Pressing the RUN and

Keys	Name	Description	
STOP RST	STOP / RESET Key	In running status,it can be used to stop the inverter. When fault alarm, it can be used to reset the inverter. This button is restricted by F7.04.	STOP/REST at the same time can achieve inverter free stop.
QUICK JOG	Shortcut Key	Determined by Function Code F7.03: 0: Jog operation 1: Switch between forward and reverse 2: Clear the UP/DOWN settings.	

4.2.2 LED Indicator light description

Have 5 digit LED ,3 units indicator lights, and 4 status indicator lights ,which can display all kinds of monitoring data and alarm codes such as reference frequency, output frequency and so on,as show in Fig.4-1.The 3 units indicator lights combination can display 5 unit instructions,function and unit indicator light description as show in Table 4-2.

Table 4-1 indicator light description

Indicate		Indicator light	Description
Function indicator	RUN	Running indicator	Light on: running status Extinguished: stop status
	FWD	Forward/reverse indicator	Light on: reverse running Extinguished: forward running
	REMOT	Terminal control indicator	Light on:terminal control Extinguished: keypad control Flickering:communication control
	TRIP	Fault indicator	Light on:Inverter fault
Unit indicator	Hz	Frequency unit indicator	Light on:running frequency value Flickering:setting frequency value
	A	Current unit indicator	Current unit indicator light
	V	Voltage unit indicator	Voltage unit indicator light
	RPM	Rotating speed unit indicator	Light on:running rotate speed Flickering:setting rotate speed
	%	Percentage indicator	Light on:running parameter value Flickering:setting parameter value

4.2.3 Switching methods for status display

C500 series inverter at stop or running state,can be used SHIFT key to circularly select the display parameters. When modifying the parameters, it can be used to select the bits of parameter for modification. For example, single-phase inverter without a motor running condition, introduce the parameter switch display method:

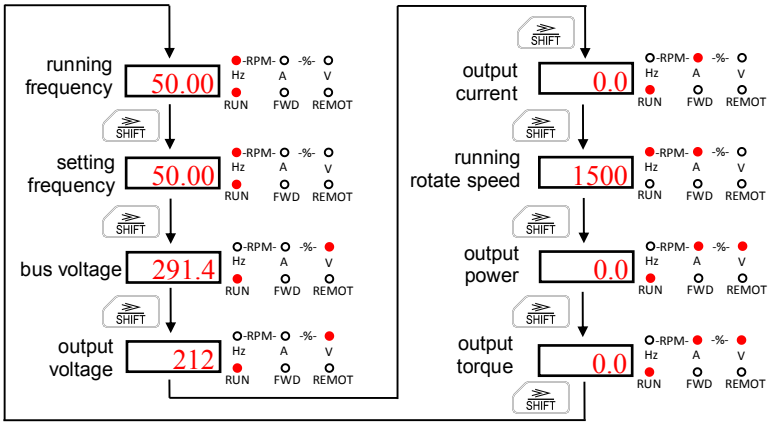


Fig.4-2 Under running condition, monitor parameters switching

4.2.4 Parameter setting method

Take changing the Relay 1, and set F6.04 = 6 as an example, describe how to modify C500 series inverter parameters:

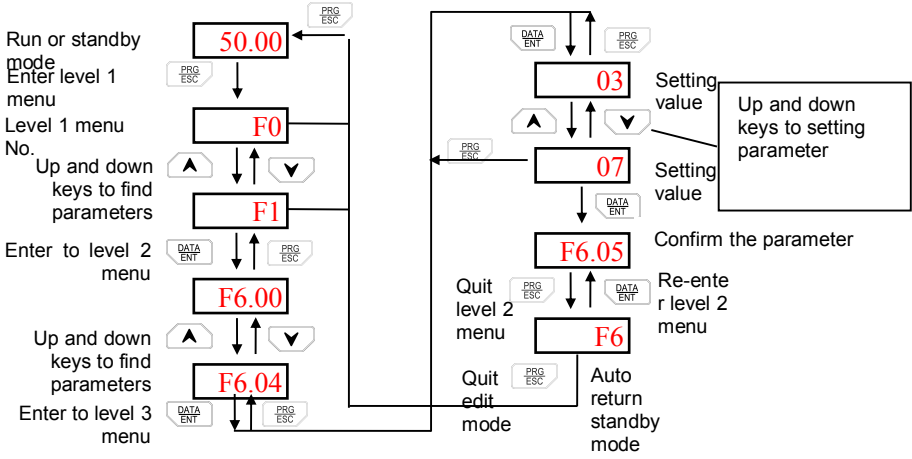


Fig.4-3 Function code parameter setting process

4.3 Motor Parameters self-adjustment

If “Sensorless Vector Control”mode is chosen（F0.00=1）, motor nameplate parameters must be input correctly as the self-adjustment is based on it.The performance of vector control depends on the parameters of motor strongly, so in order to achieve excellent performance, firstly customers must obtain the motor parameter exactly.The procedure of motor parameter self-adjustment is as follows:

1）Firstly, choose keypad command as the run command source (F0.01).

2）Then input following parameters according to the actual motor parameters:F2.01: motor rated power;F2.02: motor rated frequency;F2.03: motor rated speed;F2.04: motor rated voltage; F2.05: motor rated current.

3）Then setting F0.16＝1 or 2, make the inverter for dynamic or static self learning.

4）Press the RUN keys，motor will be self learning.

5）At last motor parameter self learning finish.

For detailed description, please refer to function code F0.16.

When the inverter is self learning,it will automatically calculate following parameter of the motor: F2.06: motor stator resistance;F2.07: motor rotor resistance;F2.08: motor stator and rotor inductance;F2.09: motor stator and rotor mutual inductance;F2.10: motor current without load.

CAUTION:

The motor should be uncoupled with its load while self learning; otherwise, the motor parameters obtained by self learning may be incorrect.

4.4 All kinds of status for inverter

4.4.1 Power-on initialization status

Firstly the system initializes during the inverter power-on, and LED displays “00000”. After the initialization is completed, the inverter is on stand-by status.

4.4.2 Motor parameter self-adjustment status

Please refer to the description of function code F0.16.

4.4.3 Stop status

In stop status,there are nine parameters which can be chosen to display or not.They are: setting frequency, DC bus voltage, input terminal status, PID setting value, PID feedback value, analog AI1, analog AI2, and current No. of multi-steps. Press SHIFT keys to switch display parameters.

4.4.4 Running status

In running status,there are fifteen parameters which can be chosen to display or not.They are:running frequency, setting frequency, DC bus voltage,output voltage,output current, rotate speed, output power, output torque,PID setting value, PID feedback value, HDI frequency,analog AI1, analog AI2, and current No. of multi-steps.Press SHIFT keys to switch display parameters.

4.4.5 Malfunction status

C500 Series inverter offers a variety of fault information,for details, please refer to Chapter 7 F ault Diagnosis and Countermeasures.

Chapter 5 Function Parameter Table

Symbol description:

"◇" indicates that this parameter can be modified all the time.

"◆" indicates that this parameter cannot be modified during the inverter is running.

"¤" indicates that this parameter is read only.

F0 Group: Basic Function

Function Code	Name	Setting Range	Factory Setting	Modify
F0.00	Speed control mode	0:Sensorless vector control 1: Sensorless vector control 1 2: V/F control 3:Torque control	0	◆
F0.01	Run command source	0: Keypad (LED extinguished) 1: Terminal (LED lights on) 2:Communication(LED flickering)	0	◆
F0.02	Frequency Source A selection	0:Keyboard 1: AI1 2. AI2 3: HDI 4: PLC 5: Multi-steps speed 6:PID 7: Communication setting 8:Keyboard potentiometer setup	8	◇
F0.03	Frequency Source B selection	0:Keyboard 1: AI1 2. AI2 3: HDI 4: PLC 5: Multi-steps speed 6:PID 7: Communication setup 8:Keyboard potentiometer setup	1	◇

Function Code	Name	Setting Range	Factory Setting	Modify
F0.04	Frequency Source B reference	0:Relative to Maximum frequency 1:Relative to Frequency Source A	0	◇
F0.05	Frequency source combination mode	0:Frequency source A 1: Frequency source B 2. A+B 3: A<=>B 4: A<=>A+B,depend on Xn terminal 5: B<=>A+B,depend on Xn terminal	0	◇
F0.06	Keypad reference frequency	0.00Hz~F0.07	50.00Hz	◇
F0.07	Maximum frequency	10.00~600.00Hz	50.00Hz	◆
F0.08	Frequency upper limit setup	0.00Hz~Maximum frequency	50.00Hz	◇
F0.09	Frequency lower limit setup	0.00Hz~F0.08	0.00Hz	◇
F0.10	Keypad and terminal UP/DOWN set	0: Valid，and Off electricity storage 1: Valid，and Off electricity does not storage 2:Invalid 3: Valid in running, clear zero at stop	0	◇
F0.11	Acceleration time 1	0.1～3600.0S	Depend on model	◇
F0.12	Deceleration time 1	0.1～3600.0S	Depend on model	◇
F0.13	Running direction selection	0: Forward 1: Reverse 2: Forbid reverse	0	◆
F0.14	Carrier frequency	1.0~15.0kHz	Depend on model	◇
F0.15	AVR function selection	0: Invalid 1: All valid 2: Valid in deceleration only	2	◇
F0.16	Motor parameters autotuning	0: No action 1: Rotation autotuning 2: Static autotuning	0	◆
F0.17	Restore parameters	0: No action 1: Restore factory setting	0	◆

Function Code	Name	Setting Range	Factory Setting	Modify
		2: Clear fault records		
F0.18	Parameters copy	0: No action 1:Parameters upload 2:Parameters download（all） 3:Parameters download（Except the motor parameters）	0	◆

F1 Group: Start and Stop Control

Function Code	Name	Setting Range	Factory Setting	Modify
F1.00	Start-up mode	0: Start directly 1: Braking first then start by start frequency 2: Speed tracking , judge direction then start	0	◆
F1.01	Start frequency	0.00～60.00Hz	0.50Hz	◇
F1.02	Start frequency hold time	0.0～50.0S	0.0S	◇
F1.03	Braking current before starting	0.0～120.0%	0.0%	◇
F1.04	Braking time before starting	0.0～50.0S	0.0S	◇
F1.05	Acceleration/Deceleration mode	0:Linear 1:S Curve	0	◆
F1.06	Stop mode	0: Deceleration to stop 1: Free stop	0	◇
F1.07	DC braking initial frequency	0.00～Maximum frequency	0.00Hz	◇
F1.08	DC braking waiting time	0.0～50.0S	0.0S	◇
F1.09	DC braking current	0.0～120.0%	0.0%	◇
F1.10	DC braking duration	0.0～50.0S	0.0S	◇
F1.11	FWD&REV dead time	0.0～3600.0S	0.0S	◇
F1.12	Action when running frequency is less than lower frequency limit	0:Running at the lower frequency limit 1:Stop	0	◆
F1.13	Terminal protection selection when power is on	0:Terminal running command is invalid when power is on 1:Terminal running command is valid when power is on	0	◇

F2 Group:Motor Parameters

Function Code	Name	Setting Range	Factory Setting	Modify
F2.00	Inverter mode	0:G mode 1:P mode	Depend on model	◆
F2.01	Motor rated power	0.4～900.0KW	Depend on model	◆
F2.02	Motor rated frequency	0.01Hz～Maximum frequency	50.00Hz	◆
F2.03	Motor rated speed	0～36000rpm	Depend on model	◆
F2.04	Motor rated voltage	0～460V	Depend on model	◆
F2.05	Motor rated current	0.1～2000.0A	Depend on model	◆
F2.06	Motor stator resistance	0.001～65.535Ω	Depend on model	◇
F2.07	Motor rotor resistance	0.001～65.535Ω	Depend on model	◇
F2.08	Motor stator & rotor inductance	0.1～6553.5mH	Depend on model	◇
F2.09	Motor stator & rotor mutual inductance	0.1～6553.5mH	Depend on model	◇
F2.10	Motor no-load current	0.01～655.35A	Depend on model	◇

F3 Group:Vector Control

Function Code	Name	Setting Range	Factory Setting	Modify
F3.00	Speed loop proportional gain 1	0～100	30	◇
F3.01	Speed loop integral time 1	0.01～10.00S	0.50S	◇
F3.02	Speed loop switching frequency 1	0.00Hz～F3.05	5.00Hz	◇
F3.03	Speed loop proportional gain 2	0～100	20	◇
F3.04	Speed loop integral time 2	0.01～10.00S	1.00S	◇
F3.05	Speed loop switching frequency 2	F3.02～Maximum frequency	10.00Hz	◇
F3.06	Slip compensation rate of VC	50～200%	100%	◇
F3.07	Speed loop filter time	0.000～0.100S	0.001S	◇
F3.08	Torque upper limit	0.0～200.0%	150.0%	◇
F3.09	Torque setting mode	0:Keypad setup 1: AI1 setup 2. AI2 setup 3: HDI setup	0	◇

Function Code	Name	Setting Range	Factory Setting	Modify
		4: Multi-steps speed setup 5:Communication setup		
F3.10	Keypad torque setting	-200.0%～200.0%	50.0%	◇
F3.11	Upper frequency setting source	0:Keypad setup 1: AI1 setup 2. AI2 setup 3: HDI setup 4: Multi-steps speed setup 5:Communication setup	0	◇
F3.12	Keypad setup upper frequency	0.00 Hz～Maximum frequency	50.00Hz	◇

F4 Group:V/F Control

Function Code	Name	Setting Range	Factory Setting	Modify
F4.00	V/F curve selection	0:Linear 1:square V/F curve 2: User-defined V/F curve	0	◆
F4.01	V/F frequency 1	0.00Hz～motor rated frequency	10.00Hz	◆
F4.02	V/F voltage 1	0.0%～100.0%	20.0%	◆
F4.03	V/F frequency 2	V/F frequency 1～motor rated frequency	25.00Hz	◆
F4.04	V/F voltage 2	0.0%～100.0%	50.0%	◆
F4.05	V/F frequency 3	V/F frequency 2～motor rated frequency	40.00Hz	◆
F4.06	V/F voltage 3	0.0%～100.0%	80.0%	◆
F4.07	Slip compensation rate of V/F	0.0%～200.0%	0.0%	◇
F4.08	Slip compensation time of V/F	0.00~10.00S	0.20S	◇
F4.09	Torque boost	0.0:（auto）,0.1～30.0	Depend on model	◇
F4.10	Torque boost cut-off	0.0～100.0%	50.0%	◆
F4.11	Auto energy-saving selection	0: no auto energy-saving 1: auto energy-saving	0	◆
F4.12	Oscillation suppression gain Kp	0～100	10	◇
F4.13	Oscillation suppression gain Ki	0～100	10	◇
F4.14	Voltage separation control	0:Invalid 1:Keypad setting torque 2:AI1 setting torque 3:AI2 setting torque 4:HDI setting torque 5:Multi-steps setting torque	0	

Function Code	Name	Setting Range	Factory Setting	Modify
		6:Communication setting torque		
F4.15	Keypad setting voltage	0~440V	0V	
F4.16	Voltage rising time	0.1～3600.0S	1.0S	
F4.17	Voltage falling time	0.1～3600.0S	1.0S	

F5 Group:Input Terminals

Function Code	Name	Setting Range	Factory Setting	Modify
F5.00	Terminal control mode	0: 2-line 1 1: 2-line 2 2: 3-line 1 3: 3-line 2	0	◆
F5.01	Multifunction input terminal 1(X1)	0: No function 1: FWD 2: REV 3: 3-line running control 4: FWD JOG 5: REV JOG 6: Free stop 7:Fault reset 8:running pause 9:Exterior fault input 10: Frequency UP 11: Frequency DW 12: UP/DW clear 13:Multi-steps terminal 1 14:Multi-steps terminal 2 15:Multi-steps terminal 3 16:Multi-steps terminal 4 17:ACC/DEC time choose 1 18:ACC/DEC time choose 2 19:PID control pause 20:Swing frequency pause 21: Swing frequency reset 22:ACC/DEC forbid 23:torque control forbid 24:Counter trigger 25:Counter clear 26:Frequency source switch 27:HDI input 28:Motor switch 29:PLC status reset 30:Running command switch to the terminals 31:DC braking 32～40:Reserved	1	◆
F5.02	Multifunction input terminal 2(X2)		2	◆
F5.03	Multifunction input terminal 3(X3)		7	◆
F5.04	Multifunction input terminal 4(X4)		0	◆
F5.05	Multifunction input terminal 5(X5)		0	◆
F5.06	Multifunction input terminal 6(X6)		0	◆
F5.07	Multifunction input terminal 7(X7)		0	
F5.08	HDI terminal function		0	

Function Code	Name	Setting Range	Factory Setting	Modify
F5.09	X terminal closed logic	0：On valid 1：Off valid Bits：X1，Ten：X2，Hundreds：X3，One thousand：X4， Ten thousand：X5	00000	◇
F5.10	UP/DOWN changing rate	0.01～50.00Hz/S	0.50Hz/S	◇
F5.11	AI1 lower limit	0.00～10.00V	0.00V	◇
F5.12	AI1 lower limit corresponding setting	-100.0～100.0%	0.0%	◇
F5.13	AI1 upper limit	0.00～10.00V	10.00V	◇
F5.14	AI1 upper limit corresponding setting	-100.0～100.0%	100.0%	◇
F5.15	AI1 input filter time	0.00～10.00S	0.10S	◇
F5.16	AI2 lower limit	0.00～10.00V	0.00V	◇
F5.17	AI2 lower limit corresponding setting	-100.0～100.0%	0.0%	◇
F5.18	AI2 upper limit	0.00～10.00V	10.00V	◇
F5.19	AI2 upper limit corresponding setting	-100.0～100.0%	100.0%	◇
F5.20	AI2 input filter time t	0.00～10.00S	0.10S	◇
F5.21	HDI lower limit	0.00～50.00 KHz	0.00KHz	◇
F5.22	HDI lower limit corresponding setting	-100.0～100.0%	0.0%	◇
F5.23	HDI upper limit	0.00～50.00 KHz	50.00KHz	◇
F5.24	HDI upper limit corresponding setting	-100.0～100.0%	100.0%	◇
F5.25	HDI input filter time	0.00～10.00S	0.10S	◇

F6 Group:Output Terminals

Function Code	Name	Setting Range	Factory Setting	Modify
F6.00	HDO selection	0:High-speed pulse output 1:ON-OFF output	0	◆
F6.01	HDO ON-OFF output selection	0:No output 1:Running 2:Run forward 3:Run reverse 4:Fault output 5:FDT1 output 6:Frequency reached	0	◇
F6.02	Y1 output selection		4	
F6.03	Reserved		0	◇
F6.04	Relay 1 output selection		0	◇
F6.05	Relay 2 output		0	

Function Code	Name	Setting Range	Factory Setting	Modify
	selection	7:Zero speed running 8:Preset count value reached 9:Specified count value reached 10:overload pre-alarm 11:Simple PLC step completed 12:PLC cycle completed 13:Running time reached 14:Upper frequency limit reached 15:Lower frequency limit reached 16:Ready 17:FDT2 reached 18～20:Reserved		
F6.06	HDO output selection	0: Running frequency 1: Setting frequency 2: Running RPM 3: Output current 4: Output voltage 5: Output power 6: Setting torque 7: Output torque 8: AI1 9: AI2 10: HDI	0	◇
F6.07	AO1 function selection		1	◇
F6.08	AO2 function selection		0	◇
F6.09	AO1 lower limit	0.0～100.0%	0.0%	◇
F6.10	AO1 lower limit corresponding output	0.00～10.00V	0.00V	◇
F6.11	AO1 upper limit	0.0～100.0%	100.0%	◇
F6.12	AO1 upper limit corresponding output	0.00～10.00V	10.00V	◇
F6.13	AO2 lower limit	0.0～100.0%	0.0%	◇
F6.14	AO2 lower limit corresponding output	0.00～10.00V	0.00V	◇
F6.15	AO2 upper limit	0.0～100.0%	100.0%	◇
F6.16	AO2 upper limit corresponding output	0.00～10.00V	10.00V	◇
F6.17	HDO lower limit	0.0～100.0%	0.0%	◇
F6.18	HDO lower limit corresponding output	0.00～50.00KHz	0.00KHz	◇
F6.19	HDO upper limit	0.0～100.0%	100.0%	◇
F6.20	HDO upper limit corresponding output	0.00～50.00KHz	50.00KHz	◇

F7 Group:Keypad and display parameters

Function Code	Name	Setting Range	Factory Setting	Modify
F7.00	User password	0～65535	0	◇
F7.01	Reserved			
F7.02	Change Parameter display	0:Display all parameter 1:Display amended parameter only		
F7.03	QUICK/JOG function selection	0: Jog 1: FWD/REV switching 2:Clean UP/DOWN setting 3:Running command source switching	0	◆
F7.04	STOP/RST function selection	0: Valid when keypad control 1: Valid when keypad or terminal control 2: Valid when keypad or communication control 3: Always valid	2	◇
F7.05	Running status display selection	0～0x7FFF BIT0:Running frequency BIT1: Given frequency BIT2:Bus voltage BIT3:Output voltage BIT4:Output current BIT5:Running speed BIT6:Output power BIT7:Output torque BIT8:PID given value BIT9:PID feedback value BIT10:Setting RPM BIT11:HDI frequency BIT12:AI1 value BIT13:AI2 value BIT14:Multi-speed number of current segment BIT15:Reserved	0x301F	◇
F7.06	Stop status display selection	0～0x7FFF BIT0:Running frequency BIT1: Given frequency BIT2:Bus voltage BIT3:Output voltage BIT4:Output current BIT5:Running RPM BIT6:Output power BIT7:Output torque BIT8:PID given value BIT9:PID feedback value BIT10:Setting RPM BIT11:HDI frequency	0x306	◇

Function Code	Name	Setting Range	Factory Setting	Modify
		BIT12:AI1 value BIT13:AI2 value BIT14:Multi-speed number of current segment BIT15:Reserved		
F7.07	RPM display coefficient	0.1～999.9% mechanical rotational speed =120*running frequency*F7.05/Number of poles motor	100.0%	◇
F7.08	Rectifier module temperature	0～100.0℃	——	¤
F7.09	IGBT module temperature	0～100.0℃	——	¤
F7.10	Software version 1	1.00～10.00	——	¤
F7.11	Software version 2			
F7.12	Inverter rated power		——	¤
F7.13	Accumulated running time	0～65535h	——	¤

F8 Group: auxiliary function

Function Code	Name	Setting Range	Factory Setting	Modify
F8.00	Acceleration time 2	0.1～3600.0S	20.00S	◇
F8.01	Deceleration time 2	0.1～3600.0S	20.00S	◇
F8.02	Acceleration time 3	0.1～3600.0S	20.00S	
F8.03	Deceleration time 3	0.1～3600.0S	20.00S	
F8.04	Acceleration time 4	0.1～3600.0S	20.00S	
F8.05	Deceleration time 4	0.1～3600.0S	20.00S	
F8.06	JOG operate frequency	0.00～Maximum frequency	5.00Hz	◇
F8.07	JOG acceleration time	0.1～3600.0S	Depend on model	◇
F8.08	JOG deceleration time	0.1～3600.0S	Depend on model	◇
F8.09	Skip frequency 1	0.00～Maximum frequency	0.00Hz	◇
F8.10	Skip frequency 2	0.00～Maximum frequency	0.00Hz	◇
F8.11	Skip frequency amplitude	0.00～Maximum frequency	0.00Hz	◇
F8.12	Swing frequency amplitude	0.0～100.0%	0.0%	◇
F8.13	Jitter frequency amplitude	0.0～50.0%	0.0%	◇
F8.14	Rise time of Swing frequency	0.1～3600.0S	5.0S	◇

Function Code	Name	Setting Range	Factory Setting	Modify
F8.15	Fall time of swing frequency	0.1～3600.0S	5.0S	◇
F8.16	FDT1 level	0.00～Maximum frequency	50.00Hz	◇
F8.17	FDT1 lag	0.00~10.00Hz	1.00Hz	◇
F8.18	FDT2 level	0.00～Maximum frequency	50.00Hz	◇
F8.19	FDT2 lag	0.00~10.00Hz	1.00Hz	◇
F8.20	Frequency arrive detecting amplitude	0.00~10.00Hz	2.00Hz	◇
F8.21	Specify the counter value	0～F8.22	0	◇
F8.22	Setting counter value	F8.20~65535	0	
F8.23	Overmodulation	0:Invalid 1:valid	1	◇
F8.24	Droop control	0.00～50.00Hz	0	◇
F8.25	Brake threshold voltage	380V:650～750V 220V:360～390V	380V：700V 220V：390V	◇
F8.26	ACC/DEC time unit	0:0.1S 1:0.01S	0	◇
F8.27	Fan control	0:Inverter control 1:Fan runs after electrifying	0	◇
F8.28	Over voltage rise frequency	0.00～10.00Hz	0	◆

F9 Group:PID control

Function Code	Name	Setting Range	Factory Setting	Modify
F9.00	PID given source selection	0:Keypad 1:AI1 2:AI2 3:HDI 4:Multi-steps 5:Remote communication 6:Keypad potentiometer setup	0	◇
F9.01	Keypad PID preset	0.0%～100.0%	0.0%	◆
F9.02	PID feedback source selection	0:AI1 1:AI2 2:AI1+ AI2 3:HDI 4:Communication	0	◇
F9.03	PID output characteristic	0:Positive 1:Negative	0	◇
F9.04	Proportional gain	0.00～10.00	0.10	◇

Function Code	Name	Setting Range	Factory Setting	Modify
	（Kp）			
F9.05	Integral time（Ti）	0.01～100.00S	8.00S	◇
F9.06	Differential time（Td）	0.00～10.00S	0.00S	◇
F9.07	PID output delay time	0.00~10.00S	0.00S	◇
F9.08	PID control deviation limitation	0.0～100.0%	0.0%	◇
F9.09	PID output upper limit	0.0~100.0%	100.0%	◇
F9.10	PID output lower limit	-100.0~100.0%	0.0%	◇
F9.11	Feedback lost detecting value	0.0～100.0%	0.0%	◇
F9.12	Feedback lost detecting time	0.0～3600.0S	2.0S	◇
F9.13	Action selections while feedback wire break	0:No action 1:Go on PID operation and output alarm signal 2:Stop and alarm malfunction	1	◇
F9.14	PID initial frequency	0.0~100.0%	0.0%	
F9.15	PID initial frequency keep time	0.0~3600S	0.0S	◇
F9.16	Dormancy frequency	0～Maximum frequency	0.00Hz	◇
F9.17	Dormancy detection time	0~2000S	10S	◇
F9.18	Start-up threshold	0.0%～100.0%	80.0%	◇

FA Group: Multi-steps speed

Function Code	Name	Setting Range	Factory Setting	Modify
FA.00	Multi-steps speed 0	-100.0～100.0%	0.0%	◇
FA.01	Multi-steps speed 1	-100.0～100.0%	0.0%	◇
FA.02	Multi-steps speed 2	-100.0～100.0%	0.0%	◇
FA.03	Multi-steps speed 3	-100.0～100.0%	0.0%	◇
FA.04	Multi-steps speed 4	-100.0～100.0%	0.0%	◇
FA.05	Multi-steps speed 5	-100.0～100.0%	0.0%	◇
FA.06	Multi-steps speed 6	-100.0～100.0%	0.0%	◇
FA.07	Multi-steps speed 7	-100.0～100.0%	0.0%	◇
FA.08	Multi-steps speed 8	-100.0～100.0%	0.0%	◇
FA.09	Multi-steps speed 9	-100.0～100.0%	0.0%	◇
FA.10	Multi-steps speed 10	-100.0～100.0%	0.0%	◇
FA.11	Multi-steps speed	-100.0～100.0%	0.0%	◇

Function Code	Name	Setting Range	Factory Setting	Modify
	11			
FA.12	Multi-steps speed 12	-100.0～100.0%	0.0%	◇
FA.13	Multi-steps speed 13	-100.0～100.0%	0.0%	◇
FA.14	Multi-steps speed 14	-100.0～100.0%	0.0%	◇
FA.15	Multi-steps speed 15	-100.0～100.0%	0.0%	◇
FA.16	0th step running time	0~65536	0	◇
FA.17	1st step running time	0~65536	0	◇
FA.18	2nd step running time	0~65536	0	◇
FA.19	3rd step running time	0~65536	0	◇
FA.20	4th step running time	0~65536	0	◇
FA.21	5th step running time	0~65536	0	◇
FA.22	6th step running time	0~65536	0	◇
FA.23	7th step running time	0~65536	0	◇
FA.24	8th step running time	0~65536	0	◇
FA.25	9th step running time	0~65536	0	◇
FA.26	10th step running time	0~65536	0	◇
FA.27	11th step running time	0~65536	0	◇
FA.28	12th step running time	0~65536	0	◇
FA.29	13th step running time	0~65536	0	◇
FA.30	14th step running time	0~65536	0	◇
FA.31	15th step running time	0~65536	0	◇
FA.32	ACC/DEC time selection for step 0~7	0~0xFFFF	0	
FA.33	ACC/DEC time selection for step 8~15	0~0xFFFF	0	
FA.34	Simple PLC mode	0:Stop after single cycle 1:Keep final value after single cycle 2:Continuous cycles	2	◇

Function Code	Name	Setting Range	Factory Setting	Modify
FA.35	Simple PLC status saving after power off	0:No saved 1:Saved	0	◇
FA.36	Simple PLC restart selection	0:Restart from step 0 1:Continue from paused step	0	
FA.37	Time unit	0:S 1:M	0	◇

Fb Group: Protection and Malfunction

Function Code	Name	Setting Range	Factory Setting	Modify
Fb.00	Motor overload protection	0:Disabled 1:Normal motor(with low speed compensation) 2:Variable frequency motor(without low speed compensation)	1	◆
Fb.01	Motor overload protection coefficient	20.0%～120.0%（rated current of the motor）	100.0%	◇
Fb.02	Non-stop instantaneous power failure	0:Disabled 1:Enabled	0	◇
Fb.03	Instantaneous frequency reduction point when power supply drop	210~600V	420V	◇
Fb.04	Instantaneous power off frequency dropping rate	0.00Hz～Maximum frequency	10.00Hz	◇
Fb.05	Input phase-failure protection	0:Disabled 1:Enabled	1	◇
Fb.06	Output phase-failure protection	0:Disabled 1:Enabled	0	◇
Fb.07	Over-voltage stall protection	0:Disabled 1:Enabled	1	◇
Fb.08	Over-voltage stall protection point	110～150%	140%	◇
Fb.09	Auto current limiting selection	0:Disabled 1:Enabled	1	◇
Fb.10	Auto current limiting threshold	100～200%	G：150% P：120%	◇
Fb.11	Inverter overload pre-alarm	0.00～200.0%	150.0%	◇
Fb.12	Inverter overload	0.0~100.0S	20.0S	◇

Function Code	Name	Setting Range	Factory Setting	Modify
	pre-alarm time			
Fb.13	Fault recovery times	0～3	0	◇
Fb.14	Fault auto-reset interval	0.1～100.0S	5.0S	◇
Fb.15	The first two fault types	0: No fault 1: IGBT U phase fault（Out1） 2: IGBT V phase fault（Out2） 3: IGBT W phase fault（Out3） 4: Over-current while ADD(OC1) 5: Over-current while DEC(OC2) 6: Over-current at constant speed (OC3) 7: Over-voltage while ADD（OU1） 8: Over-voltage while DEC（OU2） 9: Over-voltage at constant speed（OU3） 10: Bus under-voltage （UU） 11: Motor overload（OL1） 12: Frequency inverter overload（OL2） 13: Input side phase lack（SPI） 14: Output side phase lack（SPO） 15: Rectifier bridge overheat（OH1） 16: Inverter overheat（OH2） 17: Exterior fault（EF） 18: Rs485 communication fault（CE） 19: Current detection fault（ItE） 20: Motor detect malfunction circularly（tE） 21: Store malfunction（EEP） 22: PID feedback wire connection fault（PIDE） 23: Brake unit fault（bCE） 24: Operate time arrive fault（END） 25: Electronic overload（OL3） 26: Keyboard connection fault（PCE） 27: Parameter upload fault（UPE） 28: Parameter download fault（DNE） 29: Short circuitl（SC） 30: Current-limiting fault（LCE）		¤
Fb.16	The last fault types		——	¤
Fb.17	Fault types		——	¤
Fb.18	Malfunction running frequency	——	——	¤
Fb.19	Malfunction output current	——	——	¤
Fb.20	Malfunction bus voltage	——	——	¤
Fb.21	Malfunction input	－－	——	¤

Function Code	Name	Setting Range	Factory Setting	Modify
	terminal state			
Fb.22	Malfunction output terminal state	——	——	¤

FC Group:Serial Communication

Function Code	Name	Setting Range	Factory Setting	Modify
FC.00	Local address	1～247，0 stands of the broadcast address	1	◇
FC.01	Baud rate selection	0:1200BPS 1:2400BPS 2:4800BPS 3:9600BPS 4:19200BPS 5:38400BPS	3	◇
FC.02	Date bits checking set	0:No parity check（N，8，1）for RTU 1:Even parity check（E，8，1）for RTU 2:Odd parity check（O，8，1）for RTU 3:No parity check（N，8，2）for RTU 4:Even parity check（E，8，2）for RTU 5:Odd parity check（O，8，2）for RTU	0	◇
FC.03	Communication on delay time	0～200mS	5mS	◇
FC.04	Communication on timeout delay	0.0（Disable），0.1～100.0S	0.0S	◇
FC.05	Communication error action	0:Alarm and coast to stop 1:No alarm and continue to run 2:No alarm and stop according to F1.06(only Communication setup) 3:No alarm and stop according to F1.06	1	◇
FC.06	Response action(reserved)	0:Response to writing 1:No response to writing	0	◇

FD Group:The second Motor parameter

Function Code	Name	Setting Range	Factory Setting	Modify
Fd.00	Motor rated power	0.4～900.0KW	Depend on model	◆
Fd.01	Motor rated frequency	0.01Hz～Maximum frequency	50.00Hz	◆
Fd.02	Motor rated RPM	0～36000rpm	Depend on model	◆
Fd.03	Motor rated voltage	0～460V	Depend on model	◆
Fd.04	Motor rated current	0.1～2000.0A	Depend on model	◆
Fd.05	Motor stator resistance	0.001～65.535Ω	Depend on model	◇

Function Code	Name	Setting Range	Factory Setting	Modify
Fd.06	Motor rotor resistance	0.001～65.535Ω	Depend on model	◇
Fd.07	Motor stator rotor inductance	0.1～6553.5mH	Depend on model	◇
Fd.08	Motor stator rotor mutual inductance	0.1～6553.5mH	Depend on model	◇
Fd.09	Motor no-load current	0.01～655.35A	Depend on model	◇

FU Group:Monitor code

Function Code	Name	Setting Range	Factory Setting
FU.00	Setting frequency	——	——
FU.01	Operate frequency	——	——
FU.02	Bus voltage	——	——
FU.03	Output voltage	——	——
FU.04	Output current	——	——
FU.05	Output power	——	——
FU.06	Output torque	——	——
FU.07	Setting RPM	——	——
FU.08	Operate RPM	——	——
FU.09	PID given	——	——
FU.10	PID feedback	——	——
FU.11	AI1	——	——
FU.12	AI2	——	——
FU.13	HDI	——	——
FU.14	Multi-steps speed	——	——
FU.15	Multi-steps speed running time at present	——	——
FU.16	Digital input terminal status 1	——	——
FU.17	Digital input terminal status 2	——	——
FU.18	Counting value of counter	——	——

Chapter 6 Function Parameter Specification

6.1 F0 Group: Basic function

Function Code	Name	Setting Range
F0.00	Speed control mode	0～3【0】

0:Sensorless vector control

Being both the excellent property of the vector sensor and not sensitive to the motor para meters,suitable for most occasions.

1:Sensorless vector control 1

The precision of speed sensorless vector control technology really realize decoupling of ac motor,make operation control dc motor,suitable high-performance occasions,has advantages of high accuracy rotating speed, torque of high accuracy,without installing encoder.

2:V/F control

Suitable for the occasion of control accuracy is not high,such as fan and pump load.Can b e used in the occasion of one inverter drives multiple motor.

3:Torque control

Suitable for the occasion of counter rotating torque control accuracy is not high,such as wir e wound,wire drawing, etc.In torque control mode,the speed of the motor is determined by the motor load,the acceleration/deceleration speed no longer decided by the acceleration/deceleratio n time of the frequency inverter.

Note：Choosing a vector control method,must have motor parameter self learning.Onl y get the exact motor parameters can give a full play to the superiority of the vector co ntrol mode.

Function Code	Name	Setting Range
F0.01	Run command source	0～2【0】

Choosing the inverter control instruction.Inverter control command include:Start,stop,forward,i nversion and point movement,fault restoration,etc.

0:Keypad（“LOCAL/REMOT”LED extinguished）;

Both RUN and STOP/RST key are used for running command control.If multifunction key QUI CK/JOG is set as FWD/REV switching function（F7.03=1）, it will be used to change the rotatin g orientation.In running status,pressing RUN and STOP/RST at the same time will cause the invert er coast to stop.

1:Terminal（“LOCAL/REMOT” LED lights on）;

The operation,including forward run,reverse run,forward jog,reverse jog etc.can be controlled by multifunctional input terminals.

2:Communication（“LOCAL/REMOT” LED flickering）;

The operation of inverter can be controlled by host through communication.

Function Code	Name	Setting Range
F0.02	Frequency Source A selection	0～8【8】

Select frequency A command input channel and there are 8 main given frequency channels.

0：Keypad

Set the frequency by the keypad through modifying F0.06.To achieve the purpose of the keypad set frequency

1：AI1

2：AI2

Set the frequency through analog input terminals.Inverter provide 2 ways analog input terminal in its standard configuration,both AI1，AI2 are 0～10V/0（4）～20mA input，the current/voltage can be shifted by wire jumper AI1,AI2.Note：when AIx selects 0～20mA input,20mA corresponds to 10V.

100.0% of analog input corresponds to the max.Frequency（function code F0.07），-100.0% corresponds to the Max.Frequency in reverse（function code F0.07）。

3：HDI

The reference frequency is set by high speed pulse input.inverter provide 1 way HDI input in its standard configuration.

Pulse voltage range：15～30V

Pulse frequency range：0.0～50.0kHz。

100.0% of the setting impulse corresponds to maximal frequency,while -100.0% corresponds with minus maximal frequency.

Note：pulse can only be input through mutli-function terminal HDI.And set F5.08=27 to select the function of HDI as “setting input”.

4：Simple PLC

The inverter will run at simple PLC when selecting this frequency setting method.It is necessary to set the parameter of FA group to determine the given frequency,running direction and each ACC/DEC time.Please refer to the instruction of FA group carefully.

5：Multi-stage speed

The inverter will run at multi-stage speed when selecting this frequency setting method.The reference frequency is determined by F5 and FA group.If F0.02 is not multi-stage speed setting,then the multi-stage setting has the priority which is lower than the priority of jogging.Olny stage 1～15 can be set when multi-stage setting has the priority.So stage 0～15 can be set when F0.02 is multi-stage speed setting.

6：PID control

The running mode is procedure PID control when selecting this parameter.It is a necessary to set F9 group.The reference frequency is the result of PID adjustment.For details,please refer to description of F9 group.

7：Remote communication

The frequency command is given by the upper monitor through communication given.Please refer to MODBUS communication protocol.

8：Keyboard potentiometer

The frequency is given by the keyboard potentiometer.

Function Code	Name	Setting Range
F0.03	Frequency Source B selection	0～8【1】
F0.04	Frequency Source B reference	0～1【0】

F0.03:

Frequency Source B selection is same as F0.02,Please refer to the instruction of F0.02 carefully.

F0.04：

0:Maximum output frequency

100% of B frequency setting corresponds to the maximum output frequency.

1:A frequency command

100% of B frequency setting corresponds to the maximum output frequency.Select this setting if it needs to adjust on the base of a frequency command.

Function Code	Name	Setting Range
F0.05	Frequency command selection	0～5【0】

0:A

1:B

2:A+B

3:A<=>B

4:A<=>A+B,depend on Xn terminal

5:B<=>A+B,depend on Xn terminal

Function Code	Name	Setting Range
F0.06	Keypad reference frequency	0.00 Hz～F0.07【50.00 Hz】

When Frequency instruction selection is set to be keypad,this parameter is the initial value of inverter reference frequency.

Function Code	Name	Setting Range
F0.07	Maximum frequency	10.00～600.00 Hz【50.00 Hz】
F0.08	Frequency upper limit setup	F0.09～F0.07【50.00 Hz】
F0.09	Frequency lower limit setup	0.00Hz～F0.08【0.00 Hz】

F0.07:

This parameter is used to set the Max Output frequency of the inverter. It is the basic of frequency setting and ACC/DEC speed. Please pay attention to it.

F0.08:

This is the upper limit of the output frequency and it will be less than or equal to the Max Output frequency.

F0.09:

This is the lower limit of the output frequency of the inverter.

This parameter can be selected by function code F1.12. If the setting frequency is lower than the upper limit, the inverter will run, stop or hibernate at the lower limit frequency.

The Max. Output frequency? Upper limit of the frequency>_Lower limit of the frequency.

Function Code	Name	Setting Range
F0.10	Keypad and terminal UP/DOWN set	0～3【0】

The frequency can be set by "△" , "▽" and terminal UP/DOWN. This setting method have the highest and it can be combined with setting channel. It is used to adjust the output frequency during the commissioning of controlling system.

0:Valid,and the value can be saved when the inverter is powered off. The frequency command can be set and the value can be saved after the inverter is powered off and it will combination with the current frequency when it is repower on.

1:Valid,and the value can not be saved when the inverter is powered off. The frequency command can be set but the value can not be saved after the inverter is powered off.

2:Invalid,the function of "∧" , "∨" and terminal UP/DOWN is invalid, and the setting will be cleared automatically.

3:Valid during running. The function of "∧" , "∨" and terminal UP/DOWN is valid during running and the setting will be cleared automatically when the inverter stops.

Note:When the factory setting is restored, the value of keypad and UP/DOWN will be clear ed.

Function Code	Name	Setting Range
F0.11	Acceleration time 1	0.1～3600.0S【Depend on mode l】
F0.12	Deceleration time 1	0.1～3600.0S【Depend on mode l】

Acceleration time is the time of accelerating from 0Hz to maximum frequency (F0.07) Decel eration time is the time of decelerating from maximum frequency (F0.07) to 0Hz Please refer to following figure.

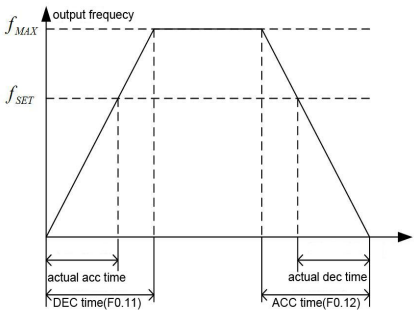


Fig.6-1 ACC and DEC time

When the reference frequency is equal to the maximum frequency,The actual acceleration a nd deceleration time will be equal to actual setting.

When the reference frequency is less than the maximum frequency,the actual acceleration and deceleration time will be less than actual setting.

The actual acceleration (deceleration) time=setting ACC/DEC time* reference frequency/ maxi mum frequency.

Inverter have 4 groups of ACC/DEC time

1st group:F0.11、F0.12；

2nd group:F8.00、F8.01；

3rd group:F8.02、F8.03；

4th group:F8.04、F8.05。

By multifunction digital input terminal of the ACC/DEC time choose terminal combination to choose ACC/DEC time.

Function Code	Name	Setting Range
F0.13	Running direction selection	0～2【0】

0:Runs at the default direction. the inverter runs in the forward direction.

1:Runs at the opposite direction, the inverter runs in the reverse direction. This effect equals to the shifting the rotation direction by adjusting either two of the motor wires.

Note: If the parameters are restored,the running direction will be back to its original status.It is careful to use to system debugging after is forbidden to change the motor to occasion.

2: Forbid to run in reverse direction. It can be used in some special cases if the reverse running is disabled.

Function Code	Name	Setting Range
F0.14	Carrier frequency	1.0～15.0KHz【Depend on model】

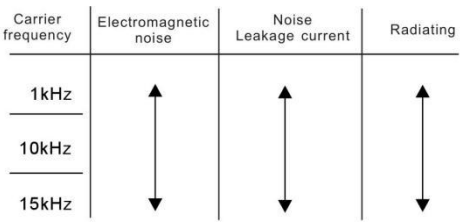


Fig.6-2 Effect of carrier frequency

The advantage of high carrier frequency:ideal current waveform,little current harmonic wave and motor noise.

The disadvantage of high carrier frequency:increasing the switch loss,increasing inverter tem perature and the impact to the output capacity. The inverter needs to derate

on high carrier frequency. At the same time, the leakage and electrical magnetic interferenc e will increase.

Applying low carrier frequency is contrary to the above,too low carrier frequency will cause unstable running,torque decreasing and surge.

The manufacturer has set a reasonable carrier frequency when the inverter is in factory. In general, users do not need to change the parameter.

When the frequency used exceeds the default carrier frequency,the inverter needs to derate 20% for each additional 1k carrier frequency.

Function Code	Name	Setting Range
F0.15	AVR function selection	0～2【2】

0:Invalid

1:All valid

2:Valid in deceleration only

When AVR is invalid,the output voltage will change with the input voltage (or DC bus voltage);when AVR is valid,the output voltage won't change with the input voltage (or DC bus voltage).The range of output voltage will keep constant.

Function Code	Name	Setting Range
F0.16	Motor parameters autotuning	0～2【0】

0:No action

1:Rotation autotuning

Input right parameters of the motor nameplate (F2.01-F2.05) and do not connect any load to the motor before performing autotuning and ensure the motor is in static and empty status.Otherwise the parameters detected by autotuning will be incorrect.

Set the proper acceleration and deceleration time (F0.11 and F0.12) according to the motor inertia before performing autotuning.Otherwise it may cause over-current and over-voltage fault during autotuning.

Set F0.16 to be then press the DATA/ENT, LED will display "TURN" and flicker.Press RUN to start the autotuning,and the LED will display "TURN" , "RUN" light will flicker,motor begin to run.When "RUN" lights off,that means the autotuning is finished and return to the stop status.

When flickers "TURN" flickers,pressing PRG/ESC can escape from the parameter autotune.

During the autotuning, press the STOP/RST will stop the autotune.

Note: Only keypad can control the autotuning. F0.16 will restore to 0 automatically when the autotuning is finished.

2: Static autotuning

When motor static parameter autotune, will not interrupt motor and load.Before the motor parameter self learning, it is necessary to correct the input parameters of motor nameplates.Since autotuning will detect the motor stator resistance and rotor resistance and leakage inductance of the motor.But the mutual inductance and the non-load current can not be measured.if needed user should input suitable value according to experience.

Function Code	Name	Setting Range
F0.17	Restore parameters	0～2【0】

0:No action

1:Restore factory setting

2:Clear fault records

This function code will restore to 0 automatically when complete the function operation.

Function Code	Name	Setting Range
F0.18	Parameters copy	0～3【0】

0:No action

1:Parameters upload

According to save the parameters of the type on the operation panel (with or without the motor parameters etc),automatically uploaded to the control panel.

2:Parameters download（all）

In addition to the historical record run (FU) parameters,other parameters downloaded to EEPROM on the operation panel.

3:Parameters download（Except the motor parameters）

In addition to the running record (FU) and motor parameters group (F2),other parameters downloaded to EEPROM on the operation panel.

6.2 F1 Group: Start and Stop Control

Function Code	Name	Setting Range
F1.00	Start mode	0～2【0】

0:Start directly: Start the motor at the starting frequency directly.

1:DC braking and start: Inverter will output DC current firstly and then start the motor at the starting frequency(Pay attention to set the parameters of F1.03 and F1.04).It is suitable for the motor which have small inertia load and may reverse rotation when start.

2: Speed tracking and start:Inverter detects the rotation speed and direction of motor,then s tart running to its reference frequency based on current speed.This can realize smooth start of rotating motor,suitable for large inertia load to start again when the instantaneous power failure. It only applies on the inverter of 7.5kW and above.

Function Code	Name	Setting Range
F1.01	Start frequency	0.00～10.00Hz【0.50Hz】
F1.02	Start frequency hold time	0.0～50.0S【0.0S】

Set proper starting frequency can increase the starting torque.The inverter runs from the st arting frequency and after the keeping time of the starting frequency,the inverter will accelerate to the aimed frequency during the ACC time.If the reference frequency is less than starting fre quency,the inverter will be at stand-by status.The starting frequency could be less than the lowe r frequency limits.The starting frequency takes no effect during FWD/REV switching.

Function Code	Name	Setting Range
F1.03	Braking current before starting	0.0～120.0%【0.0%】
F1.04	Braking time before starting	0.0～50.0S【0.0S】

During the DC braking before F1.03,the increased current is the percentage to the rated cu rrent of the inverter.

DC braking is invalid when F1.04 is set to be 0.

The bigger the DC braking current,the greater the braking torques.

Function Code	Name	Setting Range
F1.05	Acceleration/Deceleration mode	0～1【0】

The frequency changing method during the running and starting of the inverter.

0:Linear

Output frequency according to the linear increasing or decreasing

1:S Curve

Output frequency according to the S Curve increasing or decreasing.S curve commonly use d in the up,stop process requires quite gentle,such as The elevator,conveyor belt.

Function Code	Name	Setting Range
F1.06	Stop mode	0～1【0】

0:Deceleration to stop

When the stop command takes effect,frequency converter according to the definition of dec eleration mode and the deceleration time to reduce the output frequency,frequency drop to 0 aft er downtime

1:Coast to stop

When the stop command takes effect, the inverter blocks the output immediately.The motor coasts to stop by its mechanical inertia.

Function Code	Name	Setting Range
F1.07	DC braking initial frequency	0.00～F0.07【0.00Hz】
F1.08	DC braking waiting time	0.0～50.0S【0.0S】
F1.09	DC braking current	0.0～120.0%【0.0%】
F1.10	DC braking duration	0.0～50.0S【0.0S】

DC braking initial frequency:Start the DC braking when running frequency reaches starting frequency determined.Starting frequency of DC braking is 0 and the DC braking is invalid.The inverter will stop in the defined DEC time.

DC braking waiting time:Before the start of the outage dc braking,inverter blockade output, after the delay a restart dc braking.Used to prevent the high speed start over current fault caus ed by dc braking.

DC braking current:Refers to add the amount of dc braking. The bigger braking current is, the greater the braking torque is.

DC braking duration:Refers to the amount of dc braking sustain time.

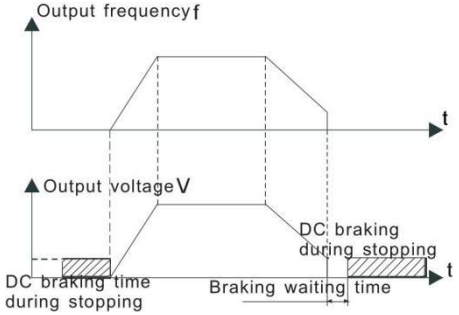


Fig.6-3 DC braking diagram

Function Code	Name	Setting Range
F1.11	FWD&REV dead time	0.0～3600.0S【0.0S】

Set the hold time at zero frequency in the transition between forward and reverse running.It is shown as following figure：

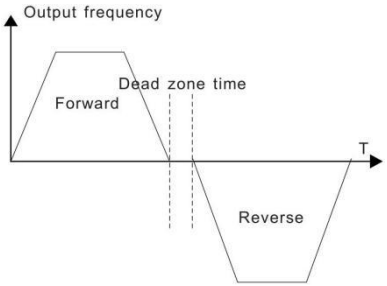


Fig.6-4 FWD/REV dead time diagram

Function Code	Name	Setting Range
F1.12	Action when running frequency is less than lower frequency limit	0～1【0】

This function code is used to determine the running state when the setting frequency is lower than the lower frequency limit.

0:Running at the lower frequency limit

1:Running at zero frequency.Inverter will Running at zero frequency when the running frequency is less than the lower frequency limit.When the reference frequency is higher than or equal to the lower frequency limit again,the Inverter will automatic increase frequency to run.

Function Code	Name	Setting Range
F1.13	Terminal detection selection when power is on	0～1【0】

This function only takes effect if run command source is terminal control.

0:Terminal running command is invalid,when power is on,inverter will not start even if FWD/REV terminal is active,until FWD/REV terminal disabled and enabled again.

1:Terminal running command is valid,when power on and FWD/REV terminal is active,inverter will start automatically.

Note:This function may cause the inverter restart automatically,please use it with cautious.

6.3 F2 Group: Motor Parameters

Function Code	Name	Setting Range
F2.00	Inverter mode	0～1【Depend on model】

0:G model:Applicable to constant torque load.

1:P model:Applicable to constant power load.

Inverters apply the manner of G/P unification,which means the power of the motor used in G type is lower than the power of the motor used in P type for one gear.

The factory setting of the inverter is G model.If P model is selected,it is necessary to set the function code to 1 and reset the motor parameters of F2.

Function Code	Name	Setting Range
F2.01	Motor rated power	0.4～900.0KW【Depend on model】
F2.02	Motor rated frequency	0.01Hz～F0.07【50.00Hz】
F2.03	Motor rated speed	0～36000rpm【Depend on model】
F2.04	Motor rated voltage	0～460V【Depend on model】
F2.05	Motor rated current	0.1～2000.0A【Depend on model】

Note: In order to achieve superior performance, please set these parameters according to motor nameplate, and then perform autotuning.

The inverter provides parameters autotune.Correct parameters autotune is from the right setting of parameter of motor.

The power rating of inverter should match the motor.If the bias is too big,the control performances of inverter will be deteriorated distinctly.

Note:Reset F2.01 can initialize F2.06-F2.10 automatically.

Function Code	Name	Setting Range
F2.06	Motor stator resistance	0.001～65.535Ω【Depend on model】
F2.07	Motor rotor resistance	0.001～65.535Ω【Depend on model】
F2.08	Motor stator & rotor inductance	0.1～6553.5mH【Depend on model】
F2.09	Motor stator & rotor mutual inductance	0.1～6553.5mH【Depend on model】
F2.10	Motor no-load current	0.01～655.35A【Depend on model】

After autotuning,the value of F2.06 — F2.10 will be automatically updated.These parameters are the basic parameters for high performance V/F control which have direct impact to the control performance.

Note:Do not change these parameters.

6.4 F3 Group: Vector Control

Function Code	Name	Setting Range
F3.00	ASR proportional gain 1	0～100【30】
F3.01	ASR integral time 1	0.01～10.00S【0.50S】
F3.02	ASR switching point 1	0.00Hz～F3.05【5.00Hz】
F3.03	ASR proportional gain 2	0～100【20】
F3.04	ASR integral time 2	0.01～10.00S【1.00S】
F3.05	ASR switching point 2	F3.02～F0.07【10.00Hz】

The above parameters are only valid for vector control.ASR PI parameters is decided by F3.00 and F3.01 when output frequency is less than F3.02.ASR PI parameters is decided by F3.03 and F3.04 when output frequency is greater than F3.05.When output frequency is between F3.02 and F3.05,ASR PI parameters obtained by two groups of parameters of the linear change,please refer to following figure.

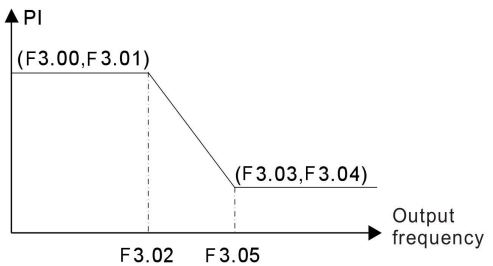


Fig.6-5 PI parameter diagram

By setting the speed regulator's the proportion gain and the integral time Can adjust the ASR of the vector control dynamic response.if the proportion gain is increased or the integral time is decreased,The system dynamic response will be faster.However,if the proportion gain is too large,the system tends to oscillate.If the integral time is too small,the system tends to oscillate And there may be speed difference.Please adjust these parameter according to actual situation.

ASR PI parameters is close to the system of inertia,according to different load characteristic s need to be in default on the basis of PI parameters to adjust to meet the needs of various occasions.

Function Code	Name	Setting Range
F3.06	Slip compensation rate of VC	50～200%【100%】

The parameter is used to adjust the slip frequency of vector control and improve the precis ion of speed control. Properly adjust this parameter can effectively restrain the static speed bia s.

Function Code	Name	Setting Range
F3.07	ASR filter time	0.000～0.100S【0.001S】

Velocity loop filter:ASR output after a first order filter go into current controller.Filter time co nstant is determined by F03.07.Increase the filter can reduce the output current ripple,but will al so slow dynamic response.

Function Code	Name	Setting Range
F3.08	Torque upper limit	0.0～200.0%【150%】

When vector speed control, the above parameter will set up the size of the torque upper li mit.Torque upper limit is determined by F3.08,also be determined by the analog, pulse frequenc y, or communications Settings.torque upper limit is given in the form of percentage.100% will be Equivalent to Torque when The inverter rated current.

note：Torque upper limit does not include the direction,No matter foreward or reverse, power-riven or generate electricity，The absolute value of the output torque is not excee d torque upper limit.

Function Code	Name	Setting Range
F3.09	Torque setting mode	0～5【0】

0:Keypad setup
Using the keyboard setting torque，this parameter is setting by F3.10.
1:AI1 setup
Using AI1 setting torque,0～10V/0～20m is a corresponding to 0～F3.08.
2:AI2 setup
Using AI2 setting torque,0～10V/0～20m is a corresponding to 0～F3.08.
3:HDI setup
Using HDI setting torque,0～F5.23 is a corresponding to 0～F3.08。
4:Multi-steps speed
Using Multi-steps speed setting torque,100% is a corresponding to 0～F3.08。
5:Communication setup
Using Communication by MODBUS setting torque.

Function Code	Name	Setting Range

F3.10	Keypad torque setting	-200.0%～200.0%【50.0%】

When F3.09 set to 0, this parameter will be setting torque.

Function Code	Name	Setting Range
F3.11	Upper frequency setting source	0～5【0】

When torque control,this parameter will be used for upper limit the choice of frequency source.Please refer to F3.09

Function Code	Name	Setting Range
F3.12	Keypad setup upper frequency	0.00 Hz～F0.07【50.00Hz】

When F3.11 set to 0 and set torque control,upper limiting frequency will be setting by this parameter.

6.5 F4 Group: V/F Control

Function Code	Name	Setting Range
F4.00	V/F curve selection	0～2【0】

0:Linear V/F curve.It is applicable for normal constant torque load.

1:Square V/F curve.It is suitable for centrifugal load，Such as fans and pumps.

2:User-defined V/F curve.It can be defined through setting (F4.03-F4.08).

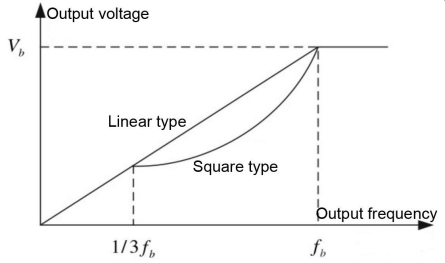


Fig.6-6 V/F curve

Function Code	Name	Setting Range
F4.01	V/F frequency 1	0.00Hz～F2.02【0】
F4.02	V/F voltage 1	0.0%～100.0%（【0】
F4.03	V/F frequency 2	F4.01～F2.02【0】
F4.04	V/F voltage 2	0.0%～100.0%（【0】
F4.05	V/F frequency 3	F4.03～F2.02【0】
F4.06	V/F voltage 3	0.0%～100.0%（【0】

F4.01-F4.06 are used to set the user-defined V/F curve.The value of V/F curve should be set according to the load characteristic of motor.

Note：V1＜V2＜V3,f1＜f2＜f3. The voltage corresponding to low frequency should not be set too high otherwise it may cause motor overheat or inverter fault.

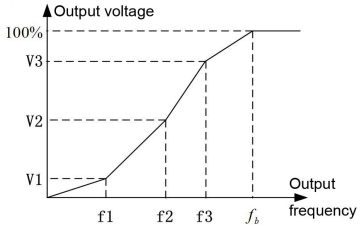


Fig.6-7 V/F curve setting diagram

Function Code	Name	Setting Range
F4.07	Slip compensation rate of V/F	0.0%～200.0%【0】
F4.08	Slip compensation time of V/F	0.00~10.00S【0】

This parameter can be compensated for on load application of V/F control motor speed cha nge,In order to improve the hardness of motor mechanical properties,100.0% is corresponding t o slip frequency rating of the motor.

Function Code	Name	Setting Range
F4.09	Torque boost	0.0:（auto）0.1～30.0【Depend on model】
F4.10	Torque boost cut-off	0.0～100.0%【50.0%】

Torque boost will take effect when output frequency is less than cut-off frequency of torque boost (F4.10).Torque boost can improve the torque performance of V/F control at low speed.

The value of torque boost should be determined by the load.The heavier the load,the large r the value is.If the boost is too large,the motor will run in exciting.The efficiency of the motor decreases as the current of the inverter increases and the motor increase the heat-releasing.

When the torque boost is set to 0.0%,the inverter is in the automatic torque boost state.

Cut-off point of torque boost:The torque boost is valid under this point,and the torque boost is invalid when exceeding this set frequency.

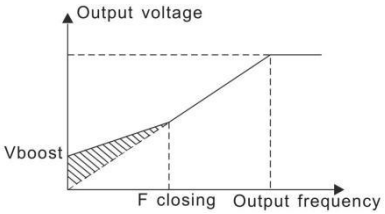


Fig.6-8 Torque boost by hand diagram

Function Code	Name	Setting Range
F4.11	Auto energy-saving selection	0～1【0】

0: no auto energy-saving

1: auto energy-saving

When motor In no load or light load run at constant speed,it will adjust the inverter output voltage and save energy through detecting the load current.

Note:This function is especially effective for fan and pump load

Function Code	Name	Setting Range
F4.12	Oscillation suppression gain Kp	0～100【0】
F4.13	Oscillation suppression gain Ki	0～100【0】

When V/F is running and the motor light load and low frequency (average 5.00 Hz ~ 20.0 0 Hz),it may appear Mechanical and electrical parameters of resonance.At the moment,Motor sp eed fluctuate, the inverter output current, bus voltage fluctuate.Serious when may damage the l oad equipment downtime or frequency inverter.At the moment,it can improve the system dampin g and eliminate oscillations through adjusting F4.12 F4.13.Generally do not need to adjust.

Function Code	Name	Setting Range
F4.14	Voltage separation control	0～6【0】
F4.15	Keypad setting voltage	0~440V【0V】

When separating V/F operates，the output voltage will set by the user.If F4.14 set to 1(key board set),setting the size of the output voltage instruction by F4.15,no more than motor rated voltage and output voltage of bus bar can provide|(The maximum output voltage of the bus can provide is $V_{bus}/\sqrt{2}$).Voltage command also set by the way,such as Analog value, input pulse, communication.100% is Corresponding to the motor rated voltage value.

Function Code	Name	Setting Range
F4.16	Voltage rising time	0.1～3600.0S【1.0S】
F4.17	Voltage falling time	0.1～3600.0S【1.0S】

Separating V/F output voltage generated by the voltage instruction through the up (down) slope.F4.16 set the up and speed of the slope,F4.17 set the down and speed of the slope.Volt age rising (falling) time is equal to the output voltage from 0 up (down) to the time required to 100.0%.

6.6 F5 Group: Input Terminals

Function Code	Name	Setting Range
F5.00	Terminal control mode	0～3【0】

This parameter defines four different control modes that control the inverter operation throu gh external terminals.

0: 2-wire control mode 1,The defined FWD and REV terminal (X1~X7) command determine s the direction

When (X1~X7) terminal of the definition of "FWD" is ON and (X1~X7) terminal of the defini tion of "FWD" is OFF,motor will forwardly run.

When (X1~X7) terminal of the definition of "FWD" is OFF and (X1~X7) terminal of the defi nition of "FWD" is ON,motor will reversely run.

When (X1~X7) terminal of the definition of "FWD" And (X1~X7) terminal of the definition of "FWD" State is consistent,motor stop running.

K1	K2	Run command
OFF	OFF	Stop
ON	OFF	FWD
OFF	ON	REV
ON	ON	Stop

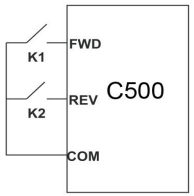


Fig.6-9 2-wire control mode1

1:2-wire control mode 2: START command is determined by FWD terminal.Run direction is determined by REV terminal.

When (X1~X7) terminal of the definition of "FWD" is ON and (X1~X7) terminal of the defini tion of "FWD" is OFF,motor will forwardly run.

When (X1~X7) terminal of the definition of "FWD" is OFF and (X1~X7) terminal of the defi nition of "FWD" is ON,motor will reversely run.

When (X1~X7) terminal of the definition of "FWD" And (X1~X7) terminal of the definition of "FWD" State is consistent,motor stop running.

K1	K2	Run command
OFF	OFF	Stop
ON	OFF	FWD
OFF	ON	Stop
ON	ON	REV

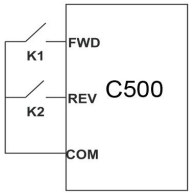


Fig.6-10 2-wire control mode2

2:3-wire control mode 1: START command is determined by FWD terminal.Run direction is determined by REV terminal.STOP command is determined by 3-wire control.

When (X1~X7) terminal of the definition of "FWD" trigger once,If (X1~X7) terminal of the definition of "REV" is OFF,motor will forwardly run;If (X1~X7) terminal of the definition of "REV" is ON,motor will reversely run.

Xi is Terminal control functions of (X1~X7) terminal of the definition of 3-wire control,if state is OFF,inverter stop running.

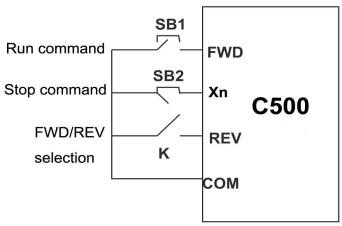


Fig.6-11 3-wire control mode1

3:3-wire control mode 2: START command is determined by FWD terminal.Run direction is determined by REV terminal.STOP command is determined by 3-wire control.

When (X1~X7) terminal of the definition of "FWD" trigger once,motor will forwardly run. When (X1~X7) terminal of the definition of "REV" trigger once,motor will reversely run.

Xi is Terminal control functions of (X1~X7) terminal of the definition of 3-wire control,if state is OFF,inverter stop running.

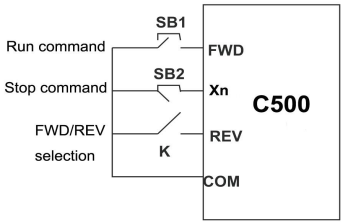


Fig.6-12 3-wire control mode2

Note: In 2-wire control mode,When produced by other sources halt instruction and make th e inverter stopping,the inverter will not run in following situation even if FWD/REV terminal is e nabled.Inverter will not run after the stop order to disappear.If you want to make the inverter ru nning, terminal of the definition of "FWD" or "REV" need trigger again.

Function Code	Name	Setting Range
F5.01	Multifunction input terminal 1(X1)	0～30【0】
F5.02	Multifunction input terminal 2(X2)	0～30【1】
F5.03	Multifunction input terminal 3(X3)	0～30【2】
F5.04	Multifunction input terminal 4(X4)	0～30【7】
F5.05	Multifunction input terminal 5(X5)	0～30【0】
F5.06	Multifunction input terminal 6(X6)	0～30【0】
F5.07	Multifunction input terminal 7(X7)	0～30【0】
F5.08	HDI terminal function	0～30【27】

This group parameters are used to set digital multifunction input terminals corresponding fu nction

0:No function
1:FWD
2:REV

When operation instruction channels is the terminal control, frequency converter running co mmands given by the terminal function.

3:3-line running control

Please refer to description of F5.00.

4:FWD JOG

5:REV JOG

Please refer to description of F8.06-F8.08.

6:Free stop

When the Command is effective,motor will immediately blockade output and coasts to stop by its mechanical inertia.It should use this way when large inertia load and no demands to sto p time.This way has the same meaning as free stop which F1.08 mention.

7:Malfunction reset

Resets faults that have occurred.It has the same function as STOP/RST .

8:running pause

When this terminal takes effect,inverter decelerates to stop and save current status, such a s PLC,traverse frequency and PID.When this terminal takes no effect,inverter restores the statu s.

9:Exterior fault input

Stop the inverter and output an alarm when a fault occurs in a peripheral device.

10:Frequency UP

11:Frequency DW

12:UP/DW clear

The reference frequency of inverter can be adjusted by UP command and DOWN comman d.These three functions are used to modify the reference frequency through external terminals. UP is the increasing command, DOWN is the decreasing command, and the Clear UP/DOWN is used to restore to the reference frequency given by the frequency command channel.

13,14,15,16:Multi-steps terminal 1～4

16 steps speed control can be realized by the combination of these four terminals.

Note:Multi-steps terminal 1 is the low,Multi-steps terminal 4 is the high.

Multi-steps terminal 4	Multi-steps terminal 3	Multi-steps terminal 2	Multi-steps terminal 1
BIT3	BIT2	BIT1	BIT0

17,18:ACC/DEC time choose terminal 1,2

4 groups of ACC/DEC time can be selected by the combination of these two terminals.

Terminal 2	Terminal 1	ACC/DEC time choose	Corresponding parameters
OFF	OFF	ACC/DEC time 0	F0.11 F0.12
OFF	ON	ACC/DEC time 1	F8.00 F8.01
ON	OFF	ACC/DEC time 2	F8.02 F8.03
ON	ON	ACC/DEC time 3	F8.04 F8.05

19:PID control pause

PID adjustment will be paused and inverter keeps output frequency unchanged.

20:Swing frequency pause

Inverter keeps output frequency unchanged.If this terminal is disabled, inverter will continue traverse operation with current frequency.

21:Swing frequency reset

Reference frequency of inverter will be forced as center frequency of traverse operation.

22:ACC/DEC forbid

ACC/DEC is invalid and maintains output frequency if it is enabled.

23:torque control forbid

Torque control is forbidden and switch inverter to run in speed control mode.

24:Counter trigger

The pulse input terminal of internal counter.Maximum pulse frequency:200Hz.

25:Counter clear zero

Clear the value of counter.

26:Frequency source switch

The power terminal is valid,frequency source combinations are forced to switch,frequency source refer to function code F0.05.

27:HDI input

The terminal will be set to high speed pulse input(Only the HDI port effectively).

28:Motor switch

Using to switch the first motor and the second motor.

29:PLC status reset

Restart the process of simple PLC,removing previous state of PLC memory information.

30:Running command switch to the terminals

This terminal is valid,running command is controlled by the terminal.

31:DC braking

This terminal is valid,inverter switch to Dc braking state,braking current is determined by F1.09.

32～40:Reserved

Function Code	Name	Setting Range
F5.09	X terminal trait selection	0～1【0】

Setting the working logic of X terminal.

0:On valid

1: Off valid

Function Code	Name	Setting Range
F5.10	UP/DOWN setting change rate	0.01～50.00Hz/S【0】

This parameter is used to determine how fast UP/DOWN setting changes.

Function Code	Name	Setting Range

F5.11	AI1 lower limit	0.00～10.00V【0.00V】
F5.12	AI1 lower limit corresponding setting	-100.0～100.0%【0.0%】
F5.13	AI1 upper limit	0.00～10.00V【10.00V】
F5.14	AI1 upper limit corresponding setting	-100.0～100.0%【100.0%】
F5.15	AI1 filter time constant	0.00～10.00S【0.10S】

These parameters determine the relationship between analog input voltage and the corresponding setting value.When the analog input voltage exceeds the range between lower limit and upper limit,it will be regarded as the upper limit or lower limit.

The analog input AII can only provide voltage input,and the range is 0V～10V.

For different applications,the corresponding value of 100.0% analog setting is different.For details,please refer to description of each application.

The following illustration shows several set of conditions.

Note: AI1 lower limit must be less or equal to AI1 upper limit.

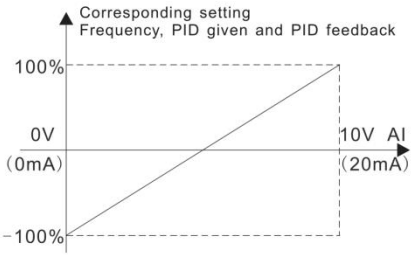


Fig.6-13 Relationship between AI and corresponding setting

AI1 filter time constant is effective when there are sudden changes or noise in the analog input signal.Responsiveness decreases as the setting increases.

Function Code	Name	Setting Range
F5.16	AI2 lower limit	0.00～10.00V【0.00V】
F5.17	AI2 lower limit corresponding setting	-100.0～100.0%【0.0%】
F5.18	AI2 upper limit	0.00～10.00V【10.00V】
F5.19	AI2 upper limit corresponding setting	-100.0～100.0%【100.0%】
F5.20	AI2 filter time constant	0.00～10.00S【0.10S】

Please refer to description of AI1.When AI2 is set as 0-20mA input,the corresponding voltage range is 0-10V.

Function Code	Name	Setting Range
F5.21	HDI lower limit	0.00～50.00 KHz【0.00KHz】
F5.22	HDI lower limit corresponding setting	-100.0～100.0%【0.0%】
F5.23	HDI upper limit	0.00～50.00 KHz【50.00KHz】
F5.24	HDI upper limit corresponding setting	-100.0～100.0%【100.0%】
F5.25	HDI filter time constant	0.00～10.00S【0.10S】

This group function code define corresponding relationship when using HDI pulse to set the input mode.

6.7 F6 Group: Output Terminals

Function Code	Name	Setting Range
F6.00	HDO selection	0～1【0】

HDO terminal is the reuse of programmable terminal.

0:High-speed pulse output:The maximum pulse frequency is 50.0 kHz.Please refer to description of F6.06.

1:ON-OFF output:Please refer to description of F6.01.

Function Code	Name	Setting Range
F6.01	HDO ON-OFF output selection	0～17【0】
F6.02	Open collector output Y1	0～17【4】
F6.03	Reserved	0～17【0】
F6.04	Relay 1output selection	0～17【0】
F6.05	Relay 1output selection	0～17【0】

ON-OFF output functions are indicated in the following table:

0:No output

1:Running.ON:Run command is ON or voltage is being output.

2:Run forward.ON: During forward run.

3:Run reverse.ON: During reverse run.

4:Fault output.ON: Inverter is in fault status.

5:FDT1 reached.Please refer to description of F8.16,F8.17.

6:Frequency reached.Please refer to description of F8.20.

7:Zero speed running.ON: The running frequency of inverter and setting frequency are zero.

8:Preset count value reached.Please refer to description of F8.22.

9:Specified count value reached.Please refer to description of F8.21.

10:overload pre-alarm.When the output current value detection reaches the setting of Fb.11 and the running time is more than the setting of Fb.12,inverter will output ON signal.

11:Simple PLC step completed.After simple PLC completes one step,inverter will output ON signal for 500ms.

12:PLC cycle completed.After simple PLC completes one cycle,inverter will output ON signal for 500ms.

13:Running time reached.ON:The accumulated running time of inverter is more than the set ting time.

14:Upper frequency limit reached.ON:Running frequency reaches the upper limiting frequency.

15:Lower frequency limit reached.ON:Running frequency reaches the lower limiting frequency.

16:Ready.ON:Inverter is ready (no fault, power is ON).

17:FDT2 reached.Please refer to description of F8.18,F8.19.

18～20:Reserved

Function Code	Name	Setting Range
F6.06	HDO function selection	0～10【0】
F6.07	AO1 function selection	0～10【1】
F6.08	AO2 function selection	0～10【0】

Standard of Analog output is either 0～20mA or 0～10V.It is able to select the voltage outp ut or current output through jumper AO1,AO2.The range of HDO ON-OFF output is 0khz～50.0k hz.

AO/HDO output functions are indicated in the following table:

Setting value	Function	Range
0	Running frequency	0～Maximum frequency
1	Reference frequency	0～Maximum frequency
2	Running speed	0～2*rated synchronous speed of motor
3	Output current	0～2*inverter rated current

4	Output voltage	0～1.5*inverter rated voltage
5	Output power	0～2*rated power
6	Setting torque	0～2*rated current of motor
7	Output torque	0～2*rated current of motor
8	AI1 input	0～10V/0～20mA
9	AI2 input	0～10V/0～20mA
10	HDI input	0.1Hz～50.000kHz

Function Code	Name	Setting Range
F6.09	AO1 lower limit	0.0～100.0%【0.0%】
F6.10	AO1 lower limit corresponding output	0.00～10.00V【0.00V】
F6.11	AO1 upper limit	0.0～100.0%【100.0%】
F6.12	AO1 upper limit corresponding output	0.00～10.00V【10.00V】

These parameters determine the relationship between analog output voltage/current and the corresponding output value. When the analog output value exceeds the range between lower limit and upper limit, it will output the upper limit or lower limit.

When A01 is current output, 1 mA is corresponding to 0.5V.

For different applications, the corresponding value of 100.0% analog output is different.For details, please refer to description of each application.

The following illustration shows several set of conditions:

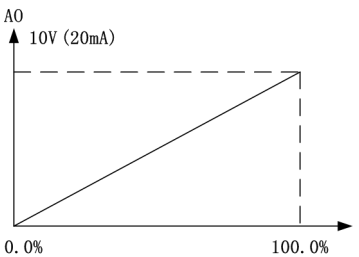


Fig.6-14 Relationship between AO and corresponding setting

Function Code	Name	Setting Range
F6.13	AO2 lower limit	0.0～100.0%【0.0%】

F6.14	AO2 lower limit corresponding output	0.00～10.00V【0.00V】
F6.15	AO2 upper limit	0.0～100.0%【100.0%】
F6.16	AO2 upper limit corresponding output	0.00～10.00V【10.00V】

Please refer to description of A01.Please refer to F6.09～F6.12.

Function Code	Name	Setting Range
F6.17	HDO lower limit	0.0～100.0%【0.0%】
F6.18	HDO lower limit corresponding output	0.00～50.00KHz【0.00KHz】
F6.19	HDO upper limit	0.0～100.0%【100.0%】
F6.20	HDO upper limit corresponding output	0.00～50.00KHz【50.00KHz】

The corresponding relationship of the output is similar to AO1.

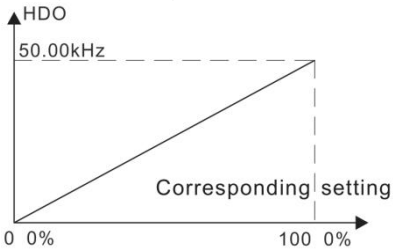


Fig.6-15 Relationship between HDO and corresponding setting

6.8 F7 Group Keypad and display parameters

Function Code	Name	Setting Range
F7.00	User password	0～65535【0】

The password protection function will be valid when P7.00 is set to be any nonzero data.

When P7.00 is set to be 00000,user's password set before will be cleared and the password protection function will be disabled.

After the password has been set and becomes valid,the user can not access menu if the user's password is not correct.Only when a correct user's password is input,the user can see and modify the parameters.Please keep user's password in mind.The password protection becomes valid in 1 minute after quitting from the function code editing state.Press PRG/ESC again to the function code editing state, "0.0.0.0.0." will be displayed.Unless using the correct password,the operators cannot enter it.

Function Code	Name	Setting Range

F7.02	Change Parameter display	0～1【0】

0:Display all parameter

1:Display amended parameter only

Unmodified Parameters will be hidden.

Function Code	Name	Setting Range
F7.03	QUICK/JOG function selection	0～3【0】

QUICK/JOG is a multifunctional key, whose function can be defined by the value.

0:Jog.Press QUICK/JOG ,the inverter will jog.

1: FWD/REV switching.Press QUICK/JOG , the running direction of inverter will reverse.It is only valid When the keyboard control.

2:Clear UP/DOWN setting.Press QUICK/JOG , the UP/DOWN setting will be cleared.

3:Run the command channel switching.

Function Code	Name	Setting Range
F7.04	STOP/RST function selection	0～3【0】

This function code defines the STOP/RST STOP function effective choice.

0:Valid when keypad control

1:Valid when keypad or terminal control

2:Valid when keypad or communication control

3:Always valid

The reset function of STOP/RST is always valid.

Function Code	Name	Setting Range
F7.05	Running status display selection	0x301F【0】
F7.06	Stop status display selection	0x306【0】

F7.05 and F7.06 define the parameters that can be displayed by LED in running status. Using a 16 bit binary number,if Bit is 0,the parameter will not be displayed;If Bit is 1,the parameter will be displayed.Press 》/SHIFT to look the corresponding parameters in right order.setting the function code should To convert binary into hexadecimal,than Enter the function code.

The display content corresponding to each bit of F7.05 is described in the following table:

BIT15	BIT14	BIT13	BIT12	BIT11	BIT10	BIT9	BIT8	BIT7	BIT6	BIT5	BIT4
Reserved	Step NO. Of Multi-steps speed	AI2 value	AI1 value	HDI frequency	Setting speed	PID feedback value	PID given value	Output torque	Output power	Running speed	Output current
								BIT3	BIT2	BIT1	BIT0
								Output	Bus	Given	Running

								voltage	voltage	frequen cy	frequen cy

The display content corresponding to each bit of F7.06 is described in the following table:

BIT15	BIT14	BIT13	BIT12	BIT11	BIT10	BIT9	BIT8	BIT7	BIT6	BIT5	BIT4
Reser ved	Step NO. Of Multi-s teps speed	AI2 value	AI1 value	HDI frequen cy	Setting speed	PID feedbac k value	PID given value	Output torque	Output power	Running speed	Output current
								BIT3	BIT2	BIT1	BIT0
								Output voltage	Bus voltage	Given frequen cy	Running frequen cy

setting the function code F7.05 and F7.06 should To convert binary into hexadecimal,than e nter the function code.

Function Code	Name	Setting Range
F7.07	Coefficient rotation speed	0.1～999.9%【100.0%】

Actual mechanical speed=120*output frequency*P7.09/Number of poles of motor.This parame ter is used to calibrate the bias between actual mechanical speed and rotation speed,Has no ef fect on the actual speed.

Function Code	Name	Setting Range
F7.08	Rectifier module temperature	0～100.0℃【0】
F7.09	IGBT module temperature	0～100.0℃【0】
F7.10	MCU software version 1	1.00～10.00【--】

Note: Above parameters are read only.

Rectify module temperature:Indicates the temperature of rectify module Overheat protection point of different model may be different.

IGBT module temperature:Indicates the temperature of IGBT module Overheat protection poi nt of different model may be different.

Software version:Indicates current software version of DSP.

Function Code	Name	Setting Range
F7.12	Inverter rated power	0.4～900.0KW【Depend on model】

Above Inverter rated power are read only.

Function Code	Name	Setting Range
F7.13	Accumulated running time	0～65535h【--】

Accumulated running time:Displays accumulated running time of inverter.

6.9 F8 Group auxiliary function

Function Code	Name	Setting Range
F8.00	Acceleration time 2	0.1～3600.0S【20.0S】
F8.01	Deceleration time 2	0.1～3600.0S【20.0S】
F8.02	Acceleration time 3	0.1～3600.0S【20.0S】

F8.03	Deceleration time 3	0.1～3600.0S【20.0S】
F8.04	Acceleration time 4	0.1～3600.0S【20.0S】
F8.05	Deceleration time 4	0.1～3600.0S【20.0S】

ACC/DEC time can be selected among F0.11，F0.12 and the above three groups.Their meanings are the same. Please refer to the relative instructions of F0.11 and F0.12.

Select the ACC/DEC time 0～3 through the different combination of the multifunction digital terminals when the inverter runs.

Function Code	Name	Setting Range
F8.06	JOG reference	0.00～F0.07【5.00Hz】
F8.07	JOG acceleration time	0.1～3600.0S【Depend on model】
F8.08	JOG deceleration time	0.1～3600.0S【Depend on model】

Defining JOG reference frequency,JOG acceleration time and JOG deceleration time.JOG running process operate according to the direct starting for start-stop operation way and slow down.

JOG acceleration time is the required time of inverter from 0Hz Accelerating to Maximum output frequency(F0.07).

JOG deceleration time is the required time of inverter from Maximum output frequency(F0.07) decelerating to 0Hz.

Function Code	Name	Setting Range
F8.09	Skip frequency 1	0.00～F0.07【0.00Hz】
F8.10	Skip frequency 2	0.00～F0.07【0.00Hz】
F8.11	Skip frequency amplitude	0.00～F0.07【0.00Hz】

By means of setting skip frequency, the inverter can keep away from the mechanical resonance with the load. F8.09 and F8.10 are center value of frequency to be skipped.

Note:

- If F8.11 is 0, the skip function is invalid.
- If both F8.09 and F8.10 are 0, the skip function is invalid no matter what F8.11 is.
- Operation is prohibited within the skip frequency bandwidth, but changes during acceleration and deceleration are smooth without skip.

The relation between output frequency and reference frequency is shown in following figure.

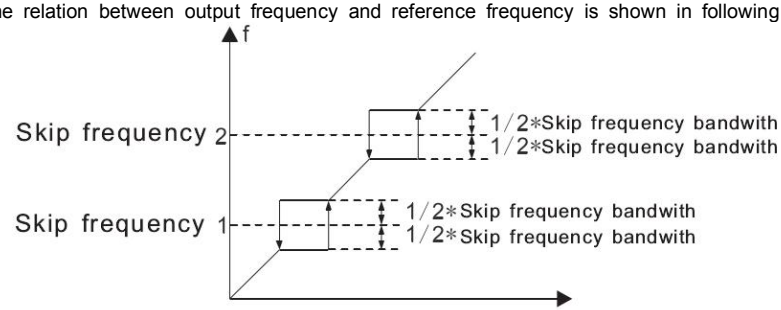


Fig.6-16 skip frequency diagram

Function Code	Name	Setting Range
F8.12	Traverse amplitude	0.0～100.0%【0.0%】
F8.13	Jitter frequency amplitude	0.0～50.0%【0.0%】
F8.14	Rise time of traverse	0.1～3600.0S【5.0S】

F8.15	Fall time of traverse	0.1～3600.0S【5.0S】

Traverse function applies to the industries where need the traverse and convolution function such as textile and chemical fiber industries.

The traverse function means that the output frequency of the inverter is fluctuated with the set frequency as its center.The route of the running frequency is illustrated as below,of which th e traverse is set by F08.12 and when F08.12 is set as 0,the traverse is 0 with no function.

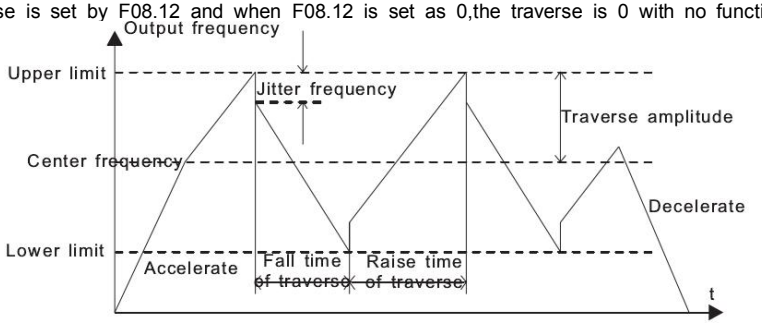


Fig.6-17 Traverse operation diagram

Traverse range:The traverse running is limited by upper and low frequency.

The traverse range relative to the center frequency: traverse range AW=center frequency*tra verse range F08.12.

Sudden jumping frequency=traverse range AW *sudden jumping frequency range F08.13.Wh en run at the traverse frequency, the value which is relative to the sudden jumping frequency.

The raising time of the traverse frequency:The time from the lowest point to the highest on e.

The declining time of the traverse frequency:The time from the highest point to the lowest one.

Function Code	Name	Setting Range
F8.16	FDT1 level	0.00 Hz～F0.07【50.00Hz】
F8.17	FDT1 lag	0.00~10.00Hz【1.00Hz】
F8.18	FDT2 level	0.00 Hz～F0.07【50.00Hz】
F8.19	FDT2 lag	0.00~10.00Hz【1.00Hz】

Setting the testing-value of the output frequency and the lag value of The output action re moving.as shown in following figure:

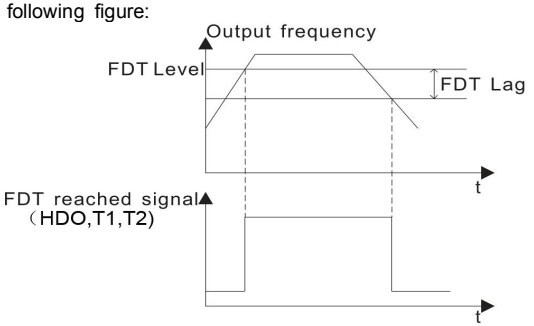


Fig.6-18 FDT level and lag diagram

Function Code	Name	Setting Range
F8.20	Frequency arrive detecting amplitude	0.00~10.00Hz【2.00Hz】

When output frequency is within the detecting range of reference frequency, an ON-OFF signal will be output.The function can adjust the detecting range.as shown in following figure:

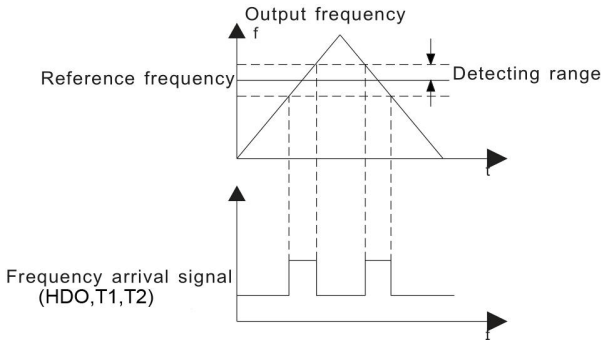


Fig.6-19 Frequency arriving detection diagram

Function Code	Name	Setting Range
F8.21	Specify the counter value	0～F8.22【0】
F8.22	Setting counter value	F8.20~65535【0】

If function of output terminal is set as preset count reached, when the count value reaches preset count value (F8.22), it will output an ON-OFF signal. Inverter will clear the counter and restart counting.

If function of output terminal is set as specified count reached,when the count value reaches specified count value (F8.21), it will output an ON-OFF signal until the count value reaches preset count value (F8.22). Inverter will clear the counter and restart counting.

Note:

- Specified count value (F8.21) should not be greater than preset count value (F8.22).
- Output terminal can be R01, R02 or HDO.

This function is shown as following figure:

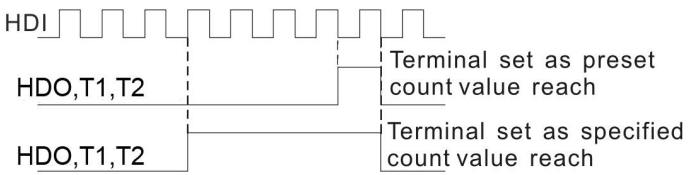


Fig.6-20 Preset and specified count value reached diagram

Function Code	Name	Setting Range
F8.23	Overmodulation	0～1【1】

0: the function is invalid

1:the function is valid

The function is applicable in the instance of low network voltage or heavy load for a long time,inverter raises the output voltage with rising utilization rate of bus voltage.

Function Code	Name	Setting Range
F8.24	Droop control	0.00～50.00Hz【0.00Hz】

When several motors drive the same load, each motor's load is different because of the dif ference of motor's rated speed. The load of different motors can be balanced through droop co ntrol function which makes the speed droop along with load increase.When the motor outputs r ated torque, actual frequency drop is equal to F8.24. User can adjust this parameter from small to big gradually during commissioning. The relation between load and output frequency is in th e following figure:

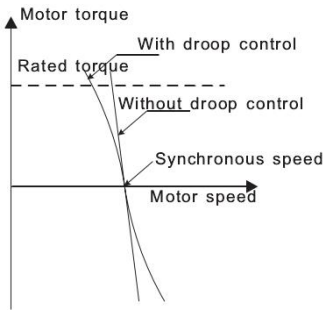


Fig.6-21 Droop control diagram

This parameter adjustment speed droop of the frequency change-value of the frequency inverter.

Function Code	Name	Setting Range
F8.25	Brake threshold voltage	380V：650～750V【700V】

Factory setting is 700V if rated voltage of inverter is 380V.

This function code can set The starting bus voltage of energy consumption braking.Properly adjust the value can be effective for braking load.

Function Code	Name	Setting Range
F8.26	ACC/DEC time unit	0～1【0】

This parameter is used to set ACC/DEC time units.

0:0.1s

1:0.01s

Function Code	Name	Setting Range
F8.27	Fan control	0～1【0】

0:Auto stop mode:The fan keeps working when the inverter is running.When the inverter st ops,whether the fan works or not depends on the module temperature of inverter.

1:The fan keeps working when powering on.

6.10 F9 Group: PID control

PID control is a common used method in process control,such as flow, pressure and temperature control.The principle is firstly to detect the bias between preset value and feedback value,then calculate output frequency of inverter according to proportional gain,integral and differential time. Please refer to following figure:

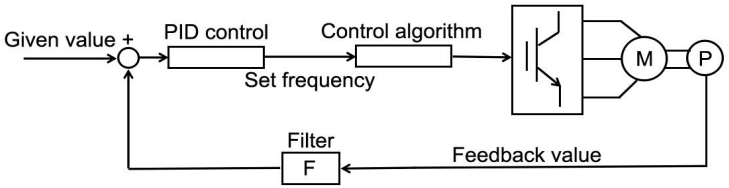


Fig.6-22 PID control diagram

Function Code	Name	Setting Range
F9.00	PID preset Source selection	0～6【0】

0:Keypad number setup

1:AI1

2:AI2

3:HDI

4:Multi-steps

5:Remote communication

6:Keypad potentiometer setup

When F0.02=6,this function is valid.The parameter determines the target given channel during the PID procures..

Goal-setting value of Process of PID is relative value,100% of preset value is corresponding to 100% of controlled system's feedback value.

System is always processing for operation according to the relative value (0 ~ 100%).Each given and feedback are 100.0% relative to 10.0 V

Function Code	Name	Setting Range
F9.01	Keypad PID preset	0.0%～100.0%【0.0%】

Set the parameter when P9.00=0.

The basic value of this parameter is the feedback value.

Function Code	Name	Setting Range
F9.02	PID feedback source selection	0～4【0】

0:AI1

1:AI2

2:AI1+ AI2

3:HDI

4:Communication

This parameter is used to select PID feedback source.

The given channel and the feedback channel can not coincide,otherwise,PID can not control effectively.

Function Code	Name	Setting Range
F9.03	PID output characteristic	0～1【0】

0:Positive.When the feedback value is greater than the preset value,output frequency will be decreased, such as tension control in winding application.

1:Negative.When the feedback value is greater than the preset value,output frequency will be increased,such as tension control in unwinding application.

Function Code	Name	Setting Range
F9.04	Proportional gain（Kp）	0.00～10.00【0.10】
F9.05	Integral time（Ti）	0.01～100.00S【8.00S】
F9.06	Differential time（Td）	0.00～10.00S【0.00S】

Optimize the responsiveness by adjusting these parameters while driving an actual load.

Adjusting PID control:

Use the following procedure to activate PID control and then adjust it while monitoring the response.

1.Enabled PID control (F0.02=6).

2.Increase the proportional gain (Kp) as far as possible without creating oscillation.

3.Reduce the integral time (Ti) as far as possible without creating oscillation.

4.Increase the differential time (Td) as far as possible without creating oscillation.

Making fine adjustments:

First set the individual PID control constants, and then make fine adjustments.

● Reducing overshooting

If overshooting occurs, shorten the differential time and lengthen the integral time.

● Rapidly stabilizing control status

To rapidly stabilize the control conditions even when overshooting occurs, shorten the integral time and lengthen the differential time.

● Reducing long-cycle oscillation

If oscillation occurs with a longer cycle than the integral time setting, it means that integral operation is strong.The oscillation will be reduced as the integral time is lengthened.

● Reducing short-cycle oscillation

If the oscillation cycle is short and oscillation occurs with a cycle approximately the same as the differential time setting, it means that the differential operation is strong. The oscillation will be reduced as the differential time is shortened.

If oscillation cannot be reduced even by setting the differential time to 0, then either lower the proportional gain or raise the PID primary delay time constant.

Function Code	Name	Setting Range
F9.07	PID output delay time	0.00~10.00S【0.00S】

Frequency instruction output delay time setting of PID control.

Function Code	Name	Setting Range
F9.08	PID control deviation limitation	0.0～100.0%【0.0%】

Bias limit defines the maximum bias between the feedback and the preset.PID stops operation when the bias is within this range.Setting this parameter correctly is helpful to improve the system output accuracy and stability.

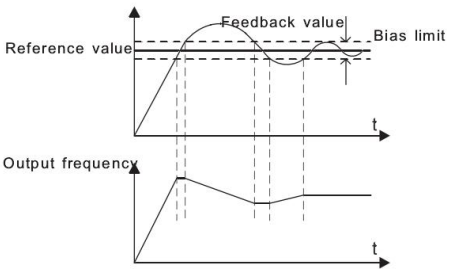


Fig.6-23 Relationship between bias limit and output frequency

Function Code	Name	Setting Range
F9.09	PID output upper limit	0.0~100.0%【100.0%】
F9.10	PID output lower limit	-100.0~100.0%【0.0%】

These two parameters are used to restrict the output range of the PID regulator.

Function Code	Name	Setting Range
F9.11	Feedback lost detecting value	0.0～100.0%【0.0%】
F9.12	Feedback lost detecting time	0.0～3600.0S【2.0S】
F9.13	Action selections while feedback wire break	0～2【1】

Feedback lost detecting value:the values of relative is full scale(100%),The system has bee n testing the PID feedback quantity.When the feedback value is less than the feedback break li ne readings,the system will start recording time.When the test time is beyond feedback bolt test ing time,the system will alarm feedback lost failure (PIDE).

Function Code	Name	Setting Range
F9.14	PID initial frequency	0.0~100.0%【0.0%】
F9.15	PID initial frequency keep time	0.0~3600S【0S】

Appropriate Settings PID,Preset frequency holding time or Preset output switching thresholds Can avoid the inverter start initial feedback and instruction deviation limits and make the PID regulator saturation,Can make the closed-loop regulating quickly into a stable stage and no obvious overshoot or oscillation.

After the PID operation,Frequency accelerates to PID preset frequency according to ACC/DEC time,and run continuously at the frequency point until the output can not meet the needs of F9.14 setting PID preset keep conditions, according to the PID output operation.As shown in the figure below:

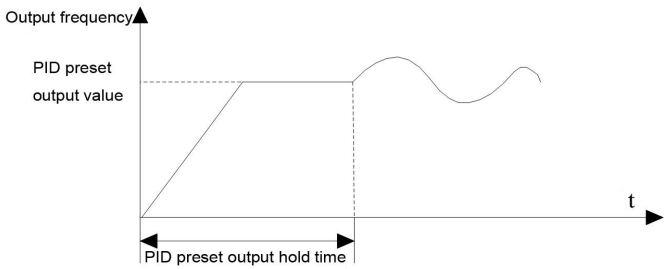


Fig.6-24 PID preset output diagram

Function Code	Name	Setting Range
F9.16	Dormancy frequency	0.00～F0.07【0.00Hz】
F9.17	Dormancy detection time	0~2000S【10S】
F9.18	Start-up threshold	0.0%～100.0%【80.0%】

PID dormancy:When the system detects the PID feedback value higher than that of PID frequency thresholds and maintain longer than PID after dormancy detection time,inverter will start deceleration according to the current set of deceleration time.Entering a dormant state after frequency reduced to 0.If PID feedback is less than PID frequency of dormancy,PID will be back to adjust status and Dormancy detection time will be Reseted.When this parameter is set to 100%,PID dormancy function will be invalid.

PID revival:When frequency converter in PID dormant state, PID feedback below the PID awaken and more than PID dormant waiting time after time, and frequency converter out of hibernation back to PID control mode.

This function is particularly used for the application such as constant pressure water supply.

6.11 FA Group: Multi-steps speed

Simple function of PLC is an inverter built-in programmable controller (PLC) to complete the logic of multistage frequency automatic control.Can set up running time, direction and operation frequency, in order to meet the process requirements.

This series of frequency inverter can achieve 16 segment speed change control, there are four kinds of ACC/DEC time for choice

When set by PLC after completion of a cycle can be made of multifunction digital output terminals or multifunction relay output ON a signal.

Function Code	Name	Setting Range
FA.00	Multi-steps speed 0	-100.0～100.0%【0.0%】
FA.01	Multi-steps speed 1	-100.0～100.0%【0.0%】
FA.02	Multi-steps speed 2	-100.0～100.0%【0.0%】
FA.03	Multi-steps speed 3	-100.0～100.0%【0.0%】
FA.04	Multi-steps speed 4	-100.0～100.0%【0.0%】
FA.05	Multi-steps speed 5	-100.0～100.0%【0.0%】
FA.06	Multi-steps speed 6	-100.0～100.0%【0.0%】
FA.07	Multi-steps speed 7	-100.0～100.0%【0.0%】
FA.08	Multi-steps speed 8	-100.0～100.0%【0.0%】
FA.09	Multi-steps speed 9	-100.0～100.0%【0.0%】
FA.10	Multi-steps speed 10	-100.0～100.0%【0.0%】
FA.11	Multi-steps speed 11	-100.0～100.0%【0.0%】
FA.12	Multi-steps speed 12	-100.0～100.0%【0.0%】
FA.13	Multi-steps speed 13	-100.0～100.0%【0.0%】
FA.14	Multi-steps speed 14	-100.0～100.0%【0.0%】
FA.15	Multi-steps speed 15	-100.0～100.0%【0.0%】
FA.16	0th step running time	0~65536【0】
FA.17	1st step running time	0~65536【0】
FA.18	2nd step running time	0~65536【0】
FA.19	3rd step running time	0~65536【0】
FA.20	4th step running time	0~65536【0】
FA.21	5th step running time	0~65536【0】
FA.22	6th step running time	0~65536【0】
FA.23	7th step running time	0~65536【0】
FA.24	8th step running time	0~65536【0】
FA.25	9th step running time	0~65536【0】
FA.26	10th step running time	0~65536【0】
FA.27	11th step running time	0~65536【0】
FA.28	12th step running time	0~65536【0】
FA.29	13th step running time	0~65536【0】
FA.30	14th step running time	0~65536【0】
FA.31	15th step running time	0~65536【0】

100.0% of the frequency setting corresponds to the Maximum Frequency(F0.07).

When selecting simple PLC running,set FA.00~FA.33 to define the running and direction of all stages.

Note:The symbol of Multi-steps determines the running direction of simple PLC.The negative value means reverse rotation.

Multi-steps speeds are in the range of -Fmax~Fmax and it can be set continuously.Inverter s can set 16 stages speed, selected by the combination of Multi-steps terminals X1,X2,,X3,,X4,c orresponding to the speed 0 to speed 15.

When X1=X2=X3=X4=OFF,the frequency input manner is selected via code F0.02.When all S1=S2=S3=S4 terminals aren't off,it runs at Multi-steps which takes precedence of keypad, analog value, high-speed pulse,PLC,communication frequency input.Select at most 16 stages speed via the combination code of X1,X2,X3,X4.

The start-up and stopping of Multi-steps running is determined by function code F0.01,the relationship between X1,X2,X3,X4 terminals and Multi-steps speed is as following:

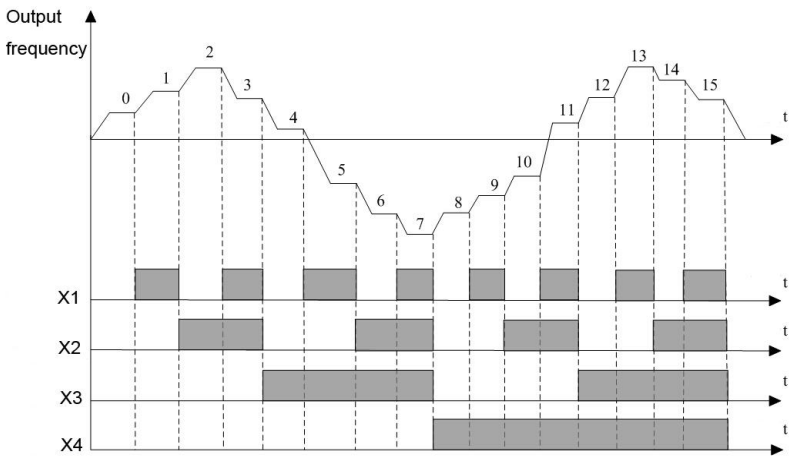


Fig.6-25 Multi-steps speed operation diagram

Function Code	Name	Setting Range
FA.32	ACC/DEC time selection for step 0~7	0~0xFFFF【0】
FA.33	ACC/DEC time selection for step 8~15	0~0xFFFF【0】

When F0.02 set to 4,FA.32 will be used to set ACC/DEC time selection for step 0~7 and FA.32 will be used to set ACC/DEC time selection for step 8~15.

Function Code	Name	Setting Range

FA.34	Simple PLC mode	0～2【0】

0: Stop after one cycle:Inverter stops automatically as soon as it completes one cycle,and it needs run command to start again.

1:Hold last frequency after one cycle:Inverter holds frequency and direction of last step after one cycle.

2: Circular run: Inverter continues to run cycle by cycle until receive a stop command.

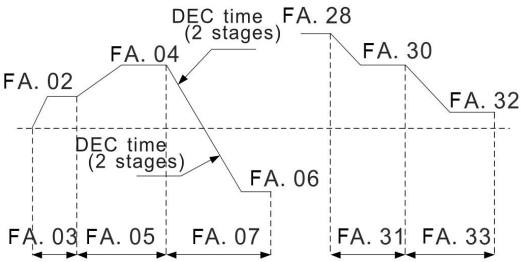


Fig.6-26 Simple PLC operation diagram

Function Code	Name	Setting Range
FA.35	Simple PLC status saving after power off	0～1【0】

0:Power loss without memory

1:Power loss memory

PLC record the running stage and frequency when power loss.

Function Code	Name	Setting Range
FA.36	Simple PLC restart selection	0～1【0】

0: Restart from step 0

If the inverter stops during running (due to stop command or fault),it will run from step 0 when it restarts.

1:Continue from interrupted step

If the inverter stops during running (due to stop command or fault), it will record the running time of current step. When inverter restarts,it will resume from interrupted time automatically.

Function Code	Name	Setting Range
FA.37	Time unit	0～1【0】

0:Seconds
1:Minutes
This parameter determines the unit of x step running time.

6.12 Fb Group: Protection and Malfunction

Function Code	Name	Setting Range
Fb.00	Motor overload protection	0～2【1】

0:Disabled.No motor overload protection characteristics(care of applications),at the moment,inverter is no overload protection to load motor.

1:Common motor (with low speed compensation).As the cooling effect of the common motor is weakened at low speed,the corresponding electronic heating protection is adjusted.The low speed compensation means decrease the motor overload protection threshold whose frequency is below 30Hz.

2: Variable frequency motor (without low speed compensation).As the cooling effect of variable frequency motor has nothing to do with running speed,it is not required to adjust the motor overload protection threshold.

Function Code	Name	Setting Range
Fb.01	Motor overload protection current	20.0%～120.0%【100.0%】

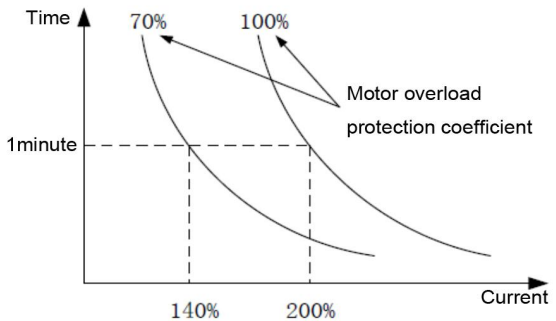


Fig.6-27 Motor overload protection coefficient

This value can be determined by the following formula:

Motor overload protection current=(allow the maximum load current/the rated current of the motor)*100%。

Mainly used in place of large frequency inverter drive small motor,it is necessary to Set the function to protect motor.

Function Code	Name	Setting Range
Fb.02	Non-stop instantaneous power failure	0～1【0】
Fb.03	Threshold of trip-free	210~600V【420V】
Fb.04	Decrease rate of trip-free	0.00Hz～F0.07【10.00Hz】

If Fb.02 is set to be 0,the trip-free function is invalid.If Fb.05 is set to be 1, the trip-free function is valid.

Fb.03 is the bus voltage of Threshold of trip-free.

Threshold of trip-free:Trip-free function enables the inverter to perform low-voltage compensation when DC bus voltage drops below Pb.04. The inverter can continue to run without tripping by reducing its output frequency and feedback energy via motor.When the grid power is down and bus voltage equal to the value of threshold of trip-free,the inverter will Reduce the operating frequency according to Fb.05,The motor will be in a mode of power generator,Feedback of electricity will be used to maintain the bus voltage and the inverter will run under the normal state until The inverter is on electricity again.

Note:properly adjusting the two parameters is a good way to realize the power switch,and not causing the inverter protection causing production stagnation.

Function Code	Name	Setting Range
Fb.05	Input phase-failure protection	0～1【1】
Fb.06	Output phase-failure protection	0～1【0】

0:Disable

1:Enable

Input phase loss protection: select whether to protect the input phase loss.

Output phase loss protection: select whether to protect the output phase loss.

Function Code	Name	Setting Range
Fb.07	Over-voltage stall protection	0～1【1】
Fb.08	Over-voltage stall protection point	110～150%【140%】

Fb.07:

0:Disabled

1:Enabled

Fb.08:Factory setting is 130% if rated voltage of inverter is 380V.

During deceleration,the motor's decelerating rate may be lower than that of inverter's output frequency due to the load inertia.At this time,the motor will feed the energy back to the inverter, resulting in rise of DC bus voltage rise.If no measures taken,the inverter will trip due to over voltage.

During deceleration,the inverter detects DC bus voltage and compares it with over-voltage s tall protection point.If DC bus voltage exceeds Fb.07,the inverter will stop reducing its output fre quency.When DC bus voltage become lower than Fb.07,the deceleration continues.as shown in following figure:

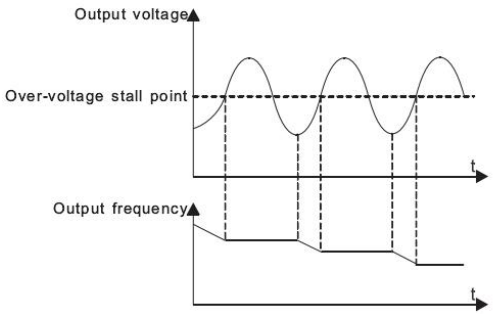


Fig.6-28 Over-voltage stall function

Function Code	Name	Setting Range
Fb.09	Auto current limiting selection	0～1【1】
Fb.10	Auto current limiting threshold	100～200%【120%】

Fb.09:

0:Disabled

1:Enabled

Fb.10:The automatic level of current limiting the factory values related to the model,among: G-type:160%;P-type:120%

When inverter is running in large load,the actual rate of climb motor speed will less than output frequency rate of climb.If measures are not taken,it will lead to accelerated flow of failure and cause the inverter tripping.

Automatic current limiting protection function in the process of inverter operation is comparing with the current limit levels is determined by Fb.10 through detecting the output current.When more than current limit levels,the inverter output frequency will be carried out in accordance with the flow frequency decrease rate of decline;When the level of output current is lower than the current limit point again,the inverter will recover to the normal operation.As shown in figure:

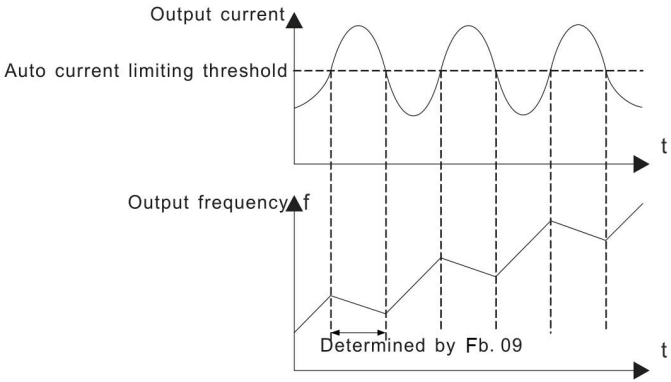


Fig.6-29 Current limiting protection function

During auto current limiting process, the inverter's output frequency may change; therefore, it is recommended not to enable the function when inverter needs to output stable frequency.

During auto current limiting process, if Fb.10 is too low, the overload capacity will be impacted.

Function Code	Name	Setting Range
Fb.11	Inverter overload pre-alarm	0.00～200.0%【150.0%】
Fb.12	Inverter overload pre-alarm time	0.0~100.0S【20.0S】
Fb.13	Malfunction recovery times	0～3【0】
Fb.14	Malfunction auto-reset interval	0.1～100.0S【5.0S】

Malfunction recovery times:When inverter selects malfunction recovery,this parameter will can be used to set malfunction recovery times.If more than the value of frequency converter fault standby,it will wait for restore.

Malfunction auto-reset interval:Choosing the time interval between failure occurrence and automatic reset action.

Function Code	Name	Setting Range
Fb.15	The first two malfunction types	0～30【--】
Fb.16	The last malfunction types	0～30【--】
Fb.17	Malfunction types	0～30【--】

Recording the inverter recently three failure types:
0:No fault
1～30:30 different kinds of faults,please refer to Chapter 7.

Function Code	Name	Setting Range
Fb.18	Malfunction running frequency	--【--】
Fb.19	Malfunction output current	--【--】
Fb.20	Malfunction bus voltage	--【--】
Fb.21	Malfunction input terminal state	--【--】
Fb.22	Malfunction output terminal state	--【--】

Recording The current fault state of the inverter.

6.13 FC Group: Communication Parameter

Function Code	Name	Setting Range
FC.00	Local address	0～247【1】

When the master is writing the frame,the communication address of the slave is set to 0,the address is the communication address.All slaves on the MODBUS fieldbus can receive the frame.but the salve doesn't answer.Note:The address of the slave cannot set to 0.

The communication of the drive is unique in the communication net.This is the fundamental for the point to point communication between the upper monitor and the drive.

Function Code	Name	Setting Range
FC.01	Baud rate selection	0～5【3】

0：1200bps

1：2400bps

2：4800bps

3：9600bps

4：19200bps

5：38400bps

This parameter can set the data transmission rate during serial communication.Note,The baud rate between the upper monitor and the inverter must be the same.Otherwise,the communication is not applied.The bigger the baud rate,the quicker the communication speed.

Function Code	Name	Setting Range
FC.02	Date format	0～5【0】

0:RTU,1 start bit,8 data bits,no parity check,1 stop bit.

1:RTU,1 start bit,8 data bits,even parity check,1 stop bit

2:RTU,1 start bit,8 data bits,odd parity check,1 stop bit

3:RTU,1 start bit,8 data bits,no parity check,2 stop bit.

4:RTU,1 start bit,8 data bits,even parity check,2 stop bit

5:RTU,1 start bit,8 data bits,odd parity check,2 stop bit

6:ASCII,1 start bit,7 data bits,no parity check,1 stop bit.

7:ASCII,1 start bit,7 data bits,even parity check,1 stop bit

8:ASCII,1 start bit,7 data bits,odd parity check,1 stop bit

9:ASCII,1 start bit,7 data bits,no parity check,2 stop bit.

10:ASCII,1 start bit,7 data bits,even parity check,2 stop bit

11:ASCII,1 start bit,7 data bits,odd parity check,2 stop bit

12:ASCII,1 start bit,8 data bits,no parity check,1 stop bit.

13:ASCII,1 start bit,8 data bits,even parity check,1 stop bit

14:ASCII,1 start bit,8 data bits,odd parity check,1 stop bit

15:ASCII,1 start bit,8 data bits,no parity check,2 stop bit.

16:ASCII,1 start bit,8 data bits,even parity check,2 stop bit

17:ASCII,1 start bit,8 data bits,odd parity check,2 stop bit

This parameter defines the data format used in serial communication protocol.

Function Code	Name	Setting Range
FC.03	Communication on delay time	0～200mS【5mS】

This parameter means the interval time when the drive receive the data and sent it to the upper monitor.If the answer delay is shorter than the system processing time,then the answer delay time is the system processing time,if the answer delay is longer than the system processing time,then after the system deal with the data,waits until achieving the answer delay time to send the data to the upper monitor.

Function Code	Name	Setting Range
FC.04	Communication on timeout delay	0.0(invalid)，0.1～100.0S【0.0S】

When the function code is set as 0.0, the communication overtime parameter is invalid.

When the function code is set to a valid value. if the interval time between two communications exceeds the communication overtime,the system will report“communication faults”(CE).

Generally, set it as invalid; set the parameter in the continuous communication to monitor the communication state.

Function Code	Name	Setting Range
FC.05	Communication on error action	0～3【1】

0:Alarm and coast to stop
1:No alarm and continue to run
2:No alarm and stop according to F1.06(only Communication setup)
3:No alarm and stop according to F1.06

Inverter in communication exception cases can be set by communication error handling acti on selection is shielding CE fault, stop or continue to run.

Function Code	Name	Setting Range
FC.06	Response action	0～1【0】

Unit's place of LED
0:Response to writing
1:No response to writing
Ten's place of LED
0:Reference not saved when power off
1:Reference saved when power off

6.14 FD Group: The second Motor parameter

Function Code	Name	Setting Range
Fd.00	Motor rated power	0.4～900.0KW【Depend on model】

Fd.01	Motor rated frequency	0.01Hz～F0.07【50.00Hz】
Fd.02	Motor rated speed	0～36000rpm【Depend on model】
Fd.03	Motor rated voltage	0～460V【Depend on model】
Fd.04	Motor rated current	0.1～2000.0A【Depend on model】
Fd.05	Motor stator resistance	0.001～65.535Ω【Depend on model】
Fd.06	Motor rotor resistance	0.001～65.535Ω【Depend on model】
Fd.07	Motor stator rotor inductance	0.1～6553.5mH【Depend on model】
Fd.08	Motor stator rotor mutual inductance	0.1～6553.5mH【Depend on model】
Fd.09	Motor no-load current	0.01～655.35A【Depend on model】

The second motor parameters have the same definition as the first group (F2) motor parameters.

Chapter 7 Fault Checking and Removing

7.1 Fault Alarm and Countermeasures

C500 inverter has a total of 30 warning informations and protection functions. In case of abnormal fault, the protection function will be invoked,the inverter will stop output, and the faulty relay contact of the inverter will start, and the fault code will be displayed on the display panel of the inverter. Before consulting the service department, the user can perform self-check according to the prompts of this chapter, analyze the fault reason and find out t solution. If you can't solve the fault, please consult the agents of inverter or our company directly.

During the inverter using process, the following faults may occur. Please conduct simple fault analysis by referring to the methods below:

Fault code	Fault type	Possible Cause	Solution
0	No fault		
Out1	IGBT Phase-U fault	1. Acc/Dec time is too short. 2. IGBT module fault. 3. Fault caused by interference. 4. Grounding is not properly.	1. Increase Acc/Dec time. 2. Ask for support. 3. Inspect external equipment and eliminate interference.
Out 2	IGBT Phase-V fault		
Out 3	IGBT Phase-W fault		
OC1	Over-current when acceleration	1.Acc time is too Short. 2.Motor parameters are not accurate. 3.The voltage of the grid is too low. 4.The power of the inverter is too low. 5. V/F curve is not suitable.	1.Prolong Acc time. 2.The motor parameters self-adjusting 3.Check input power. 4.Select inverter with right capacity. 5.Reset V/F curve or torque boost value.
OC2	Over-current when deceleration	1.Dec time is too Short. 2.Load potential energy or inertia is too large. 3.The power of the inverter is too low.	1.Prolong Dec time. 2.Connect external braking resistance or braking unit. 3.Select inverter with right capacity.
OC3	Over-current when constant speed running	1.The load transients or is abnormal. 2.The voltage of the grid is too low. 3.The power of the inverter is	1. Check load's changing and eliminate it. 2.Check input power. 3.Select inverter with right capacity

Fault code	Fault type	Possible Cause	Solution
		too low.	
OU1	Over-voltage when acceleration	1. Input voltage is too high. 2. While power is off, restart motor which is running .	1.Check input power. 2.Avoid restart-up after stopping.
OU2	Over-voltage when deceleration	1 .Dec time is too short. 2.The inertia of the load is big. 3.The input voltage is abnormal.	1.Increase the Dec time. 2.Increase the energy-consuming components. 3. Check the input power.
OU3	Over-voltage when speed constant running	1 .The input voltage changes abnormally. 2. The inertia of the load is big.	1 .Install the input reactor. 2.Add proper energy-consuming components.
UU	DC bus Under-voltage	1.The voltage of the grid is low. 2.Momentary interruption.	1.Check input power. 2.RESET operation.
OL1	Motor overload	1 .The voltage of the power supply is too low. 2. The motor setting rated current is incorrect. 3. The motor stall or load transients is too strong. 4.The power of the motor is too big.	1 .Check the power grid voltage. 2. Reset the rated current of the motor. 3. Check the load and adjust the torque lift. 4. Select a proper motor.
OL2	Inverter overload	1 .The acceleration is too fast. 2. Restart the rotating motor. 3. The voltage of the power supply is too low. 4. The load is too heavy.	1.Increase the ACC time 2. Avoid restarting after stopping. 3. Check the power of the supply line. 4. Select an inverter with bigger power.
SPI	Input phase loss	Phase loss or fluctuation of input R, S and T	1.Check input power 2.Check input wiring.
SPO	Output phase loss	1.U, V and W phase loss output. 2. Three phase of the load are serious asymmetrical.	1 .Check output distribution. 2. Check the motor and cable.
OH1	Rectify overheat	1.Sudden over current of the inverter. 2.There is direct or indirect short circuit between output 3 phase. 3.Air duct jam or fan damage. 4.Ambient temperature is	1 .Refer to the over current solution. 2. Rewiring. 3. Dredge the wind channel or change the fan. 4. Reduce the ambient temperature. 5. Check and reconnect. 6. Ask for service.
OH2	IGBT overheat		

Fault code	Fault type	Possible Cause	Solution
		too high. 5.The wiring of the control panel or plug-ins are loose. 6.The auxiliary power supply is damage and the drive voltage is undervoltage. 7.The rectifier module is broken. 8.The control panel is abnormal.	
EF	External fault	Xn External fault input terminal take action.	Inspect external equipment.
CE	Communication fault	1.Improper baud rate setting. 2.Communication fault. 3.Communication is interrupted for Long time.	1. Set proper baud rate. 2. Ask for service. 3.Check the communication connection distribution.
ItE	Current detection fault	1. Wires or connectors of control board are loose. 2. Auxiliary power is damaged. 3.Hall sensor is damaged. 4. Amplifying circuit is abnormal.	1.Check the wiring. 2.Ask for service. 3.Ask for service. 4.Ask for service.
tE	Motor autotuning fault	1 .The motor capacity does not comply with the inverter capacity. 2.The rated parameter of the motor does not be set correctly. 3. There is a big difference between autotune.parameter and the standard parameter 4. Autotune overtime.	1.Change the inverter model. 2.Set the rating parameters according to the name plate of the motor. 3.Do not connect motor to the load and identify again. 4.Check the motor wiring and set the parameters.
EEP	EEPROM fault	1 .Error of controlling the write and read of the parameters 2. Damage to EEPROM.	1.Press STOP/RESET to reset. 2.Ask for service.
PIDE	PID feedback fault	1.PID feedback offline. 2. PID feedback source	1.Check the PID feedback signal wires.

Fault code	Fault type	Possible Cause	Solution
		disappear disappear.	2.Check PID feedback source.
bCE	Braking unit fault	1.Braking circuit fault or damage to the braking pipes. 2.The external braking resistor is a little low.	1.Check the braking unit and change new braking pipes. 2.Increase braking resistence.
END	Time reach of factory setting	Trial time arrival	Using parameter initialization function to remove record information.
OL3	Electronic thermal overload	1.The temperature sensor wiring is loose 2.The motor temperature is too high.	1.Check the temperature sensor wiring and troubleshooting. 2.Reduce carrier frequency or other cooling measures to cooling the motor.
PCE	Keyboard connect fault	Keyboard wire fault.	Replace keyboard wire.
UPE	Parameters upload error	1.The keyboard and control panel cable is too long，the parameter is disturbed while transmission 2.In the download process , keyboard save data does not match the data with inverter.	1.Shorten the keyboard and control panel wire to reduce EMI. 2. Before the download process , make sure whether the keyboard saved data are matching with inverter.
DNE	Parameters download error		
SC	Short circuit	1. Acc time is too short. 2.IGBT module is damaged. 3.Electromagnetic disturb. 4.Output line is short circuit to the earth. 5.Short circuit between inverter and output side.	1.Prolong Acc time properly. 2.Check periphery equipment and restart after fault eliminating. 3.Ask for service.
LCE	Current limiting fault	1.The motor stall or load transients is too strong. 2.The power of the inverter is too low.	1.Reduce the load,Check the motor and mechanical conditions. 2.Select an inverter with bigger power.

7.2 Common Faults and Solutions

7.2.1 No display after power on

Inspect whether the power supply voltage is the same as the inverter rated voltage. If the power supply has problem, inspect and solve it. Check whether the three-phase rectifier bridge is in good condition. If the rectifier bridge is broken, please, ask for service.

Check whether the “CHARGE” lamp is lighten,if not,the rectifier bridge or buffer resistance may be with fault;

If the lamp is lighten,maybe the switching power supply is fault, please ask for service.

7.2.2 Power supply air switch trips off when power on

Inspect whether the input power supply is grounded or short circuit. Please solve the problem.

Inspect whether the rectify bridge has been burnt or not. If it is damaged, ask for service.

7.2.3 Motor doesn’t move after inverter running

Inspect if there is balanced three-phase output among U, V, W. If yes, then motor could be damaged, or mechanically locked. Please solve it.If the output is unbalanced or lost, the inverter drive board or the output module may be damaged, ask for service.

7.2.4 Inverter displays normally when power on, but power supply air swith at the input side trips when running

①Inspect whether the output side of inverter is short circuit. If yes, ask for service.

②Inspect whether between the motor wires is short circuit or the motor wires is grounded. If yes,please solve the problem.

③If trip happens occasionally and the distance between motor and inverter is too far, it is recommended to install output AC reactor.

④After fault protection, remove faults, and press the STOP/RESET key to reset the fault , and then restart inverter.

⑤After removing fault,cut off the inverter power source,after all the LED lights on the inverter extinguish,turn on the inverter power source,then start inverter.

⑥When the above methods cannot make the inverter be used normally, please record the failure code on the keyboard, inverter model and series number,then contact our company technical engineer to solve .

Chapter 8 Communication Protocol

8.1 Protocol content

RS485: asynchronous, half-duplex.

Default: 8-E-1, 19200bps. Please refer to Group FC: parameter settings.

8.2 Communication Modes

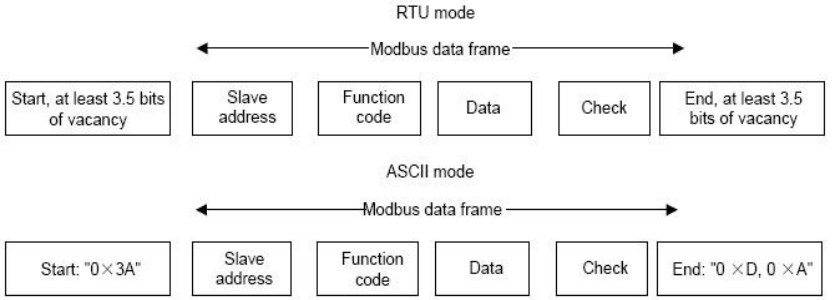
(1) The protocol is Modbus protocol. Besides the common register Read/Write operation, it is supplemented with commands of parameters management.

(2) The drive is a slave in the network. It communicates in 'point to point' master-slave mode. It will not respond to the command sent by the master via broadcast address.

(3) In the case of multi-drive communication or long-distance transmission, connecting a 100~120Ω resistor in parallel with the master signal line will help to enhance the immunity to interference.

8.3 Protocol Format

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



Modbus adopts "Big Endian" representation for data frame. This means that when a numerical quantity larger than a byte is transmitted, the most significant byte is sent first.

RTU mode

In RTU mode, the Modbus minimum idle time between frames should be no less than 3.5 bytes. The checksum adopts CRC-16 method. All data except checksum itself sent will be counted into the calculation. Please refer to section: CRC Check for more information. Note that at least 3.5 bytes of Modbus idle time should be kept and the start and end idle time need not be summed up to it.

The table below shows the data frame of reading parameter 002 from slave node address 1.

Node adds.	Command	Data adds.		Read No.		CRC	
0x01	0x03	0x00	0x02	0x00	0x01	0x25	0xCA

The table below shows the reply frame from slave node address 1.

Node adds.	Command	Bytes No.	Data		CRC	
0x01	0x03	0x02	0x00	0x00	0xB8	0x44

ASCII mode

In ASCII mode, the frame head is “0x3A”, and default frame tail is “0x0D” or “0x0A”. The frame tail can also be configured by users. Except frame head and tail, other bytes will be sent as two ASCII characters, first sending higher nibble and then lower nibble. The data have 7/8 bits. “A”~“F” corresponds to the ASCII code of respective capital letter. LRC check is used. LRC is calculated by adding all the successive bytes of the message except the head and tail, discarding any carriers, and then two’s complementing the result.

Example of Modbus data frame in ASCII mode:

The command frame of writing 0x0003 into address “0x1000” of slave node address 1 is shown in the table below:

LRC checksum = the complement of (01+06+10+00+0x00+0x03) = 0xE5.

	Frame head	Node adds.		Command		Data adds.			
Code		0	1	0	6	1	0	0	0
ASCII	3A	30	31	30	36	31	30	30	30

Data to write				LRC		Frame tail	
0	0	0	3	E	5	CR	LF
30	30	30	33	45	35	0D	0A

8.4 Protocol Instruction

Different respond delay can be set through drive’s parameters to adapt to different needs. For RTU mode, the respond delay should be no less than 3.5 bytes interval, and for ASCII mode, no less than 1ms.

The main function of Modbus is to read and write parameters. The Modbus protocol supports the following commands:

0x03	Read inverter’s function parameter and status parameters
0x06	Write single function parameter or command parameter to inverter

All drive's function parameters, control and status parameters are mapped to Modbus R/W data address.

The data address of control and status parameters please refer to the following table.

Parameter description	Address	Meaning of value	R/W feature
Control command	1000H	0001H: forward	W/R
		0002H: reverse	
		0003H: Reserved	
		0004H: Reserved	
		0005H: Coast to Stop	
		0006H: Dec to stop	
		0007H: Reset fault	
Inverter status	1001H	0001H: Forward running	R
		0002H: Reverse running	
		0003H: Standby	
		0004H: Fault	
Frequency source communication setting	2000H	Communication Setting Range (-10000~10000) Note: the communication setting is the percentage of the relative value (-100.00%~100.00%). If it is set as frequency source, the value is the percentage of the maximum frequency (F0.07). If it is set as PID (preset value or feedback value), the value is the percentage of the PID.	W/R
Status parameters	3000H	Running frequency	R
	3001H	Preset frequency	R
	3002H	DC Bus voltage	R
	3003H	Output voltage	R
	3004H	Output current	R
	3005H	Running speed	R

Parameter description	Address	Meaning of value	R/W feature
	3006H	Output power	R
	3007H	Output torque	R
	3008H	PID preset value	R
	3009H	PID feedback value	R
	300AH	Input terminal status	R
	300BH	Output terminal status	R
	300CH	Input of AI1	R
	300DH	Input of AI2	R
	300EH	Input of HDI	R
	300FH ~ 3011H	Reserved	R
	3012H	Step NO. of multi-steps speed	R
Parameter lock password command address	5000H	This address stores the fault type of inverter.	R
Fault info address	5001H	0000H:no fault 0001H:password error 0002H:command code error 0003H:CRC ECC Error 0004H:illegal address 0005H:illegal data 0006H:Parameter is invalid 0007H:System is locked 0008H:inverter is busy	R

8.5 Notice

Between frames, the span should not less than 3.5 bytes interval; otherwise, the message will be discarded.Be cautious to modify the parameters of PC group through communication, otherwise may cause the communication interrupted.In the same frame, if the spans between two .near bytes more than 1.5 bytes interval, the behind bytes will be assumed as the start of next message so that communication will failure.

8.6 CRC Check

For higher speed, CRC-16 uses tables. The following are C language source code for CRC-16.

```
unsigned int crc_cal_value(unsigned char *data_value,unsigned char data_length)
{
int i;
unsigned int crc_value=0xffff;
while(data_length--)
{
crc_value^=*data_value++;
        for(i=0;i<8;i++)
        {
if(crc_value&0x0001)crc_value=(crc_value>>1)^0xa001;
        else crc_value=crc_value>>1;
        }
    }
return(crc_value);
}
```

8.7 Example

8.7.1 RTU mode, read 2 data from 0004H

The request command is:

START	T1-T2-T3-T4 (transmission time of 3.5 bytes)
Node address	01H
Command	03H
High byte of start address	00H
Low byte of start address	04H
High byte of data number	00H
Low byte of data number	02H
Low byte of CRC	85H
High byte of CRC	CAH
END	T1-T2-T3-T4 (transmission time of 3.5 bytes)

The reply is :

START	T1-T2-T3-T4 (transmission time of 3.5 bytes)
Node address	01H
Command	03H
Returned byte number	04H
Higher byte of 0004H	13H
Low byte of 0004H	88H
High byte of 0005H	00H
Low byte of 0005H	00H
Low byte of CRC	7EH
High byte of CRC	9DH
END	T1-T2-T3-T4 (transmission time of 3.5 bytes)

8.7.2 ASCII mode, read 2 data from 0004H:

The request command is:

START	':'
Node address	'0'
	'1'
Command	'0'
	'3'
High byte of start address	'0'
	'0'
Low byte of start address	'0'
	'4'
High byte of data number	'0'
	'0'
Low byte of data number	'0'
	'2'
LRC CHK Hi	'F'
LRC CHK Lo	'6'
END Lo	CR
END Hi	LF

The reply is

START	':'
Node address	'0'
	'1'
Command	'0'
	'3'
Returned byte number	'0'
	'4'
Higher byte of 0004H	'1'
	'3'
Low byte of 0004H	'8'
	'8'
High byte of 0005H	'0'
	'0'
Low byte of 0005H	'0'
	'0'
LRC CHK Lo	5'
LRC CHK Hi	'D'
END Lo	CR
END Hi	LF

8.7.3 RTU mode, write 5000 (1388H) into address 0004H, slave node address 02.

The request command is:

START	T1-T2-T3-T4 (transmission time of 3.5 bytes)
Node address	02H
Command	06H
High byte of data address	00H
Low byte of data address	04H
High byte of write content	13H
Low byte of write content	88H
Low byte of CRC	C5H
High byte of CRC	6EH
END	T1-T2-T3-T4 (transmission time of 3.5 bytes)

The reply command is:

START	T1-T2-T3-T4 (transmission time of 3.5 bytes)
Node address	02H
Command	06H
High byte of data address	00H
Low byte of data address	04H
High byte of write content	13H
Low byte of write content	88H
Low byte of CRC	C5H
High byte of CRC	6EH
END	T1-T2-T3-T4 (transmission time of 3.5 bytes)

8.7.4 ASCII mode, write 5000 (1388H) into address 0008H, slave node address 02.

The request command is:

START	':'
Node address	'0'
	'2'
Command	'0'
	'6'
High byte of data address	'0'
	'0'
Low byte of data address	'0'
	'4'
High byte of write content	'1'
	'3'
Low byte of write content	'8'
	'8'
LRC CHK Hi	'5'
LRC CHK Lo	'9'
END Lo	CR
END Hi	LF

The reply command is:

START	':'
Node address	'0'

	‘2’
Command	‘0’
	‘6’
High byte of data address	‘0’
	‘0’
Low byte of data address	‘0’
	‘4’
High byte of write content	‘1’
	‘3’
Low byte of write content	‘8’
	‘8’
LRC CHK Hi	‘5’
LRC CHK Lo	‘9’
END Lo	CR
END Hi	LF

8.7.5 RTU mode, diagnose that the asked data bytes of address 01H should be the same as responds.

The request command is:

START	T1-T2-T3-T4
Node address	01H
Command	08H
High byte of data address	00H
Low byte of data address	00H
High byte of write content	12H
Low byte of write content	ABH
Low byte of CRC	ADH
High byte of CRC	14EH
END	T1-T2-T3-T4 (transmission time of 3.5 bytes)

The reply command is:

START	T1-T2-T3-T4 (transmission time of 3.5 bytes)
Node address	01H

Command	08H
High byte of data address	00H
Low byte of data address	00H
High byte of write content	12H
Low byte of write content	ABH
Low byte of CRC	ADH
High byte of CRC	14H
END	T1-T2-T3-T4 (transmission time of 3.5 bytes)

8.7.6 ASCII mode, diagnose that the asked data bytes of address 01H should be the same as responds.

The request command is:

START	':'
Node address	'0'
	'1'
Command	'0'
	'8'
High byte of data address	'0'
	'0'
Low byte of data address	'0'
	'0'
High byte of write content	'1'
	'2'
Low byte of write content	'A'
	'B'
LRC CHK Hi	'3'
LRC CHK Lo	'A'
END Lo	CR
END Hi	LF

The reply command is:

START	':'
Node address	'0'
	'1'

Command	‘0’
	‘8’
High byte of data address	‘0’
	‘0’
Low byte of data address	‘0’
	‘0’
High byte of write content	‘1’
	‘2’
Low byte of write content	‘A’
	‘B’
LRC CHK Hi	‘3’
LRC CHK Lo	‘A’
END Lo	CR
END Hi	LF

Chapter9 Peripheral Equipment and Options

9.1 AC reactor

AC reactor can improve power factor and suppress high-order harmonic from the power side. In the following cases, AC input reactor must be used:

■ The power supply capacity to the Inverter capacity is more than 10:1. Then tsilicon load is connected to the same power or power factor compensation device with switching control.

■ Three-phase power supply voltage unbalance degree is big（≥3%）。

Table 9-1 Specifications of the commonly used AC reactor

Voltage(V)	Power(kW)	Current(A)	Inductance (mH)	Voltage(V)	Power(kW)	Current(A)	Inductance (mH)
220	0.4	2.4	4.6	380	0.75	2.5	7.6
	0.75	4.5	2.4		1.5	4	4.8
	1.5	7	1.6		2.2	6	3.2
	2.2	11	1.0		4	9	2.0
	4	18	0.6		5.5	13	1.5
	5.5	22	0.5		7.5	17	1.2
	7.5	30	0.4		11	25	0.8
	11	42	0.27		15	32	0.6
	15	55	0.2		18.5	38	0.5
	18.5	70	0.16		22	45	0.42
	22	80	0.14		30	60	0.32
	30	110	0.1		37	75	0.26
	37	145	0.08		45	90	0.21
	45	180	0.06		55	110	0.18
	55	215	0.05		75	150	0.13
	75	285	0.04		93	170	0.11
	93	350	0.03		110	210	0.09
	110	415	0.03		132	250	0.08
	160	300	0.06		200	380	0.05
	220	415	0.05		250	480	0.04
	280	520	0.04				

9.2 DC reactor

■ While the power grid capacity is much bigger than the inverter, or the power supply capacity is more than 1000KVA, or the demand for mproving the power supply power factor is very high,DC reactor must be used.DC reactor can be used in conjunction with AC reactor, it is helpful to reduce input high-order harmonic.

Table 9-2 Specifications of the commonly used DC reactor

Voltage(V)	Power(kW)	Current(A)	Inductance (μH)	Voltage(V)	Power(kW)	Current(A)	Inductance (μH)
220	11~15	75	450	380	11~15	40	1500
	18.5~30	150	200		18.5~30	75	600
	37~55	300	100		37~55	150	300
	75~90	420	40		75~90	220	200
	110	560	25		110~132	280	140
					160~200	370	110
					220	560	70
					250~280	740	55

9.3 Remote Operation keyboard

This series of inverter is with exquisite design and easy to use keyboard. User wants to keyboard panel to extend to other place, you can buy extension line, simply put forward with orders. The user can remove the panel to place within 10 m away from the host.

9.4 Braking unit and braking resistance

Braking resistance value and power in the chart are decided according to common inertia load and intermittent braking mode. While used in large inertia occasion or long time frequent brake occasion, please adjust resistance value and power according to the inverter specification and the rated parameter of braking unit.

Under the situation of braking torque is 100% and the brake unit utilization rate is 10%, recom mend brake resistance as following table:

Table 9-3 Suggested braking resistance specification parameters

Voltage (V)	Motor power(KW)	Resistance value(Ω)	Resistance power(KW)	Voltage (V)	Motor power(KW)	Resistance value(Ω)	Resistance power(KW)
220	0.75	200	0.1	380			
	1.5	100	0.25		1.5	400	0.25
	2.2	75	0.25		2.2	250	0.25

Voltage (V)	Motor power(KW)	Resistance value(Ω)	Resistance power(KW)	Voltage (V)	Motor power(KW)	Resistance value(Ω)	Resistance power(KW)
	4	40	0.4		4	150	0.4
	5.5	30	0.5		5.5	100	0.5
	7.5	20	0.8		7.5	75	0.8
	11	13.6	2.25		11	50	1
	15	10	3		15	40	1.5
	18.5	8	4		18.5	30	4
	22	6.8	4.5		22	30	4
	30	5	6		30	20	6
	37	5	6		37	16	9
	45	6.8/2	9		45	13.6	9
	55	6.8/2	9		55	20/2	12
	75	6.8/3	13.5		75	13.6/2	18
	90	6.8/3	13.5		90	20/3	18
	110	6.8/4	18		110	20/3	18
					132	20/4	24
					160	13.6/4	36
					200	13.6/5	45
					220	13.6/5	45
					250	13.6/6	54
					280	13.6/6	54

Warranty Card

customer information	User name:	
	User address:	
	Postal Code:	
	Contact Person:	Tel.:
product information	Model:	
	Purchase date:	Series NO.:
	Use Device:	Match motor:
	Name of agent:	
fault information	（Maintenance time and content）:	
user Appraisal	Thank you for your evaluation in our service quality: □Good □Better □Ordinary □Bad Sign: Date:	
Maintenance person:		Maintenance data:

Warranty Card

customer information	User name:	
	User address:	
	Postal Code:	
	Contact Person:	Tel.:
product information	Model:	
	Purchase date:	Series NO.:
	Use Device:	Match motor:
	Name of agent:	
fault information	（Maintenance time and content）:	
user Appraisal	Thank you for your evaluation in our service quality: □Good □Better □Ordinary □Bad Sign: Date:	
Maintenance person:		Maintenance data:

Warranty Agreement

1.The warranty period of the product is 18 months （refer to the barcode on the equipment body）.During the warranty period, if the product fails or is damaged under the condition of normal use by following the instruction.Our company will be responsible for free maintenance.

2.Within the warranty period, maintenance will be charged for the following reasons:

A.The damage caused by improper use or repair/modification without prior permission.

B.The damage caused by fire, flood, abnormal voltage, other disasters and second disaster;

C.The hardware damage caused by dropping or transportation upon the procurement.

D.The damage caused by the improper operation;

E.The damage or fault caused by the trouble our of the equipment (e.g.external device).

3.If there is any fault or damage to the product, please correctly fill out the Product Warranty Card in detail.

4.The maintenance fee is charged according to the newly adjusted Maintenance Price List by our company.

5.In general, the warranty card will not be re-issued.Please keep the card and present it to the maintenance personnel when asking for maintenance.

6.If there is any problem during the service, please contact the agent of our company or our company directly.

7.This agreement shall be interpreted by Shenzhen Sincrea Electrical Technology Co., Ltd.

Shenzhen Sincrea Electrical Technology Co., Ltd.
Service Center
Address: 13th Floor, Building A, Qiaode Technical Park, High-tech Park West, Guangming New District, Shenzhen
Tel:（0755）29420485　P.C.: 518107
Website: http: //www.sincrea.com

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