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Attached Table 1. Attached table 1. On-off state of multi-step speed for first, second or third, and the correspondence between the frequency table

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Chapter 1 Summarize

1. 1. Foreword

FC300 series inverter is for a variety of special occasions and designed a multi-functional high-performance products. Debugging parameters simple and practical, only one key settings can be changed to your needs special models, plus parameter copy function, so you use the inverter becomes extremely simple. Make sure you read before using this manual so that you can better use this drive, after reading Keep on future maintenance, maintenance and other occasions to use a very good help.

If have problem can't be solved when you use, please feel free to contact our company at any time. For your safety, please be sure to be qualified professional mechanical and electrical engineering installation and debugging and modification of parameters. This manual have Danger, Notice and other symbols to remind you when handling, installation, operation and check the inverter's safety, please cooperate so that the inverter using the more secure.

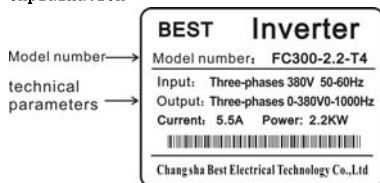
1.2. Inspection and safety precautions

FC300 series inverter has been rigorously tested and quality inspection before delivery. After the purchase, pls check the product package before unpacking it for careless transportation losses. Product specifications and models is the right that your ordered. If in doubt please contact our company.

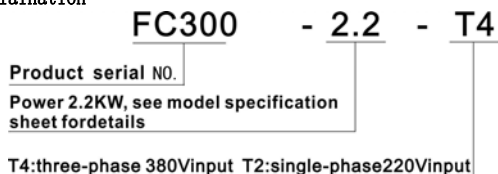
1.2.1 After unpacking inspection

- ①Includes a manual, a warranty card and a certificate.
- ②Check the nameplate on the side of the inverter to make sure the product in your hands is the right that you ordered.


Inverter nameplate explanation




Inverter model explanation



1. 2. 2. Safety precautions

 **DANGER** Incorrect use may result in casualties.

 **NOTICE** Incorrect use may result in damage to the inverter or the mechanical system.

Notice: Depending on the circumstances, “notice” level issues may also cause serious consequence, please follow the precautions of both levels, they are very important to our personal safety.

DANGER

- Be sure to turn off the power when wiring.
- Off AC power in ten minutes, is still very dangerous for inverter internal pressure, do not touch the internal circuit and spare parts.
- On working, please do not check and touch parts on circuit boards and signal lines.
- Do not disassemble or change the inverter internal connection lines and spare parts.
- Do not switch button with wet hands to prevent electric shock.
- Inverter ground terminals must be correctly grounded.
- Prohibited unauthorized alterations, replacement panels and parts, otherwise will have electric shock, explosion or other dangerous.

NOTICE

- In case of power inverter, do not open the drive cover, but do not touch circuit board components, these components are presented with hypertension, beware died of electric shock! ! !
- Do not perform a withstand voltage parts inside the inverter testing, these semiconductor parts susceptible to pressure damage.
 - Never connect the inverter output terminals UVW connected to AC power.
 - Being energized or power-off, the inverter and braking resistor is hot, do not touch them in order to avoid burns.
 - Applied to each terminal voltage can only be added by using them on annual to prevent burst and damage etc.
 - CMOS, IC on inverter main circuit board are susceptible to static electricity and damage, do not touch the main circuit board.
 - There can only be a qualified professional installation, debugging and maintenance of the inverter.
- The inverter scrap pls click industrial waste disposal, incineration is

strictly prohibited.

- Long-term storage, inverter shall be inspected and test run before use.
- Inverter easily be run at high speed setting, before change the setting, check the motor and mechanical characteristics whether there is sufficient capacity to adapt to high-speed operation.

1.2.3 Handling and placing precautions



NOTICE

- When carrying the inverter, do not pull the front cover, should move the inverter base to prevent the front cover off, fall on the ground, causing personal injury or damage.
- Install the inverter on fire-retardant materials as metal to prevent fires.
- Pls select a safe area to install the inverter to prevent high temperature and direct sunlight, avoid moisture and water droplets.
- Pls prevent children or unrelated person close to the inverter.
- The inverter can only be used in places approved by the company, use in unauthorized environment may result in fire, explosion, electric shock or other accidents.
- If several inverters are installed in the same control cabinet, pls provide cooling fan in additional, keep the temperature below 40 °C, to prevent overheating or fire and so on.
- Pls make sure the power is off, then remove or install the keyboard and hold the front cover to avoid poor contact, cause operator or display failure.
- Do not install the inverter in an environment containing explosive gas, otherwise there is danger of explosion.
- The area which altitude over 1000 meters, the inverter effect of heat dissipation become worse, pls downshift.
- Please do not install air switch and contactors and others switching element at the output side. If due to process and other aspects need to install, you must ensure that the inverter has no output switching. In addition, do not install the output side of the power factor improvement capacitors or lightning with varistor. Otherwise, the will cause the inverter failures, such as jump protection or components damaged.
- Please use a separate power, absolutely avoid together with a power supply with welding machines, etc., otherwise it will lead the inverter to protection or damage.



NOTICE

Before power on

● Power supply voltage must be chosen with the same specifications as the inverter input voltage.

PE symbol is ground terminal, make sure the motor and the inverter are properly grounded to ensure safety.

● When the contactor is installed between the power supply and the inverter, please do not use contactor to control the start or stop, otherwise, it will affect the service life of the inverter.

● Main circuit connections must be correct, **R. S. T (L. N)** is power input terminals, never connect on the U. V. W, otherwise when power on, it will cause the inverter damage.

Power on

● It is prohibited to insert or extract the inverter connector when power on, this is avoid control board surge arising due to plug into, damage the inverter. Cover up the cover before power on to prevent electric shock causing personal injury.

In operation

● The motor unit is prohibited to input or separate when inverter operation, otherwise it will cause inverter over-current trip, or even burn the inverter main circuit.

● Do not remove the front cover when power transmit in order to prevent electric shock causing casualties.

● When fault restart function is turned on, the motor is running will automatically restart after stop, do not close to the machine to avoid accidents.

● Stop switch function must be set to be valid, the use of it is difficult from the emergency stop switch, pls use carefully.

1.3. Specification sheet

Three-phase 440V level

Power KW	0.75	1.5	2.2	3.0	3.7	5.5	7.5	11	15	18.5	
Adaptive motor voltage KW	0.75	1.5	2.2	3.0	3.7	5.5	7.5	11	15	18.5	
In n p	Rated curre nt A	4.0	6.3	8.2	12	14.5	19	25	33	46	52

u t	Volta ge V	Three-phase 380V±15%									
	Rate HZ	50/60Hz									
O u t p u t	Rated curre nt A	2.7	4.2	5.5	8.0	9.5	13	18	24	32	38
	Volta ge V	Three-phase 0-380V									
	Rate HZ	0-1000Hz									
	Overl oad prote ction	200% Overcurrent Immediately 150% One minute									

Single-phase 230V level

Power KW	0.75	1.5	2.2	3.0	3.7	5.5	7.5	11	15	18.5	
Adaptive motor voltage KW	0.75	1.5	2.2	3.0	3.7	5.5	7.5	11	15	18.5	
I n p u t	Rated curre nt A	7.5	11	16	22	27	36	49	73	96	111
	Volta ge V	Single-phase 220V±15%									
	Rate HZ	50/60Hz									
O u t p u t	Rated curre nt A	5.0	7.0	11	15	18	25	33	49	65	75
	Volta ge V	Three-phase 0-220V									
	Rate HZ	0-1000Hz									
	Overl oad prote ction	200% Overcurrent Immediately 150% One minute									

(Remark)

1) Maximum applicable motor refers to the Maximum power light load motor which the inverter can drive, and 4-pole motor is standard.

2) Rated output current refers to the output current when the output voltage is 380V (or 220V).

3) Overload capacity is represented by over-current to the inverter rated current ratio of the percentage (%), when used repeatedly must wait temperature below when inverter and motor down to 100%.

4) The max output voltage can not exceed the supply voltage, under the power supply voltage can be arbitrarily set the output voltage (The peak value of the inverter output voltage is DC voltage).

5) Power capacity change according to the value of impedance(including the input reactor and wire)aside the power.

1.4. Braking unit and braking resistor

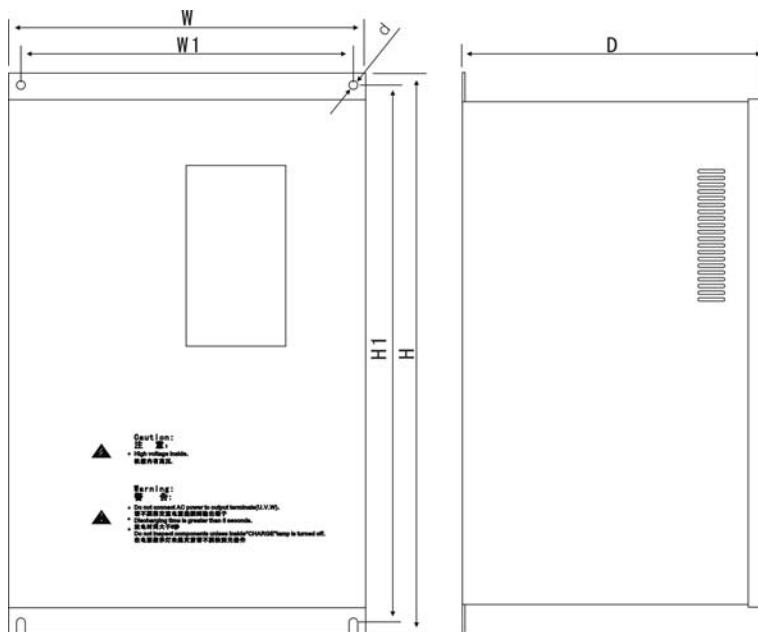
Inverter		Braking unit			Braking resistor		
Voltage	Power KW	Configuration	Specification	Amount	Configuration	Specification	Amount
Single-phase 220V	0.75	preset		1	outlay	80W /150 Ω	1
	1.5	preset		1	outlay	200W/100 Ω	1
	2.2	preset		1	outlay	200W/70 Ω	1
	3.0	preset		1	outlay	500W/90 Ω	1
	3.7	preset		1	outlay	600W/100 Ω	1
Three-phase 380V	0.75	preset		1	outlay	150W /400 Ω	1
	1.5	preset		1	outlay	200W/300 Ω	1
	2.2	preset		1	outlay	250W/200 Ω	1
	3.0	preset		1	outlay	260W/200 Ω	1
	3.7	preset		1	outlay	400W/150 Ω	1
	5.5	preset		1	outlay	500W/90 Ω	1
	7.5	preset		1	outlay	800W/60 Ω	1
	11	inlay		1	outlay	1000W/47 Ω	1
	15	inlay		1	outlay	1500W/36 Ω	1
18.5	inlay		1	outlay	2500W/47 Ω	1	

Chapter 2. Installation and wiring

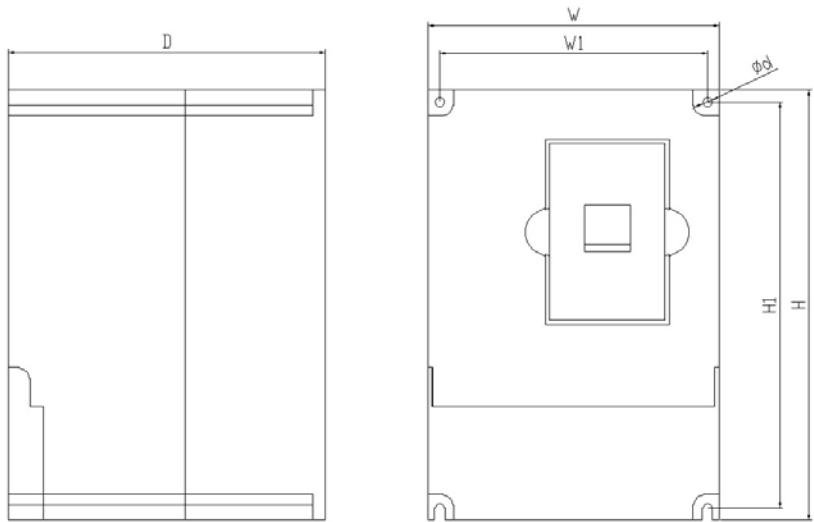
This chapter provides basic product “Installation and Wiring”, read precautions of this chapter carefully before use.

2.1. Case structure and size

FC300 case outline as below:



FC300 plastic case outline as below:



FC300 series dimensions of inverter as below:

Inverter model	Dimension			Installation dimension		
	W (mm)	H (mm)	D (mm)	W1 (mm)	H1 (mm)	d (mm)
FC300-0.75T2	108	152	130	94	139	4
FC300-1.5T2						
FC300-0.75T4						
FC300-1.5T4						
FC300-2.2T4						
FC300-2.2T2	140	205	156	125	191	5
FC300-3.0T2						
FC300-3.7T2						
FC300-3.0T4						
FC300-3.7T4						
FC300-5.5T4	170	280	184	110	266	6
FC300-7.5T4						
FC300-11T4						
FC300-15T4	210	338	200	192	319	7
FC300-18.5T4	248	375	228	160	356	8

2.2. Installation requirements

As the inverter is a precision power electronic products, good or bad of the installation environment will directly affect the normal work and life of the inverter, so demands as below:

2.2.1 Using environment

- Please install the inverter in the absence of water droplets, steam, dust or oily dust location.
- No corrosion, flammability of gaseous, liquid;
- No floating dust and metal particles;
- Rugged place without vibration;
- No electromagnetic noise interference place;
- The temperature of using environment is $-10^{\circ}\text{C}\sim+40^{\circ}\text{C}$;

2.2.2 The inverter uses plastic parts, pls do not use excessive force on the cover, careful installation to avoid damage.

2.2.3 Pls allow the back of the inverter or heatsink install outside the cabinet if possible, this can greatly reduce the temperature generated inside the cabinet.

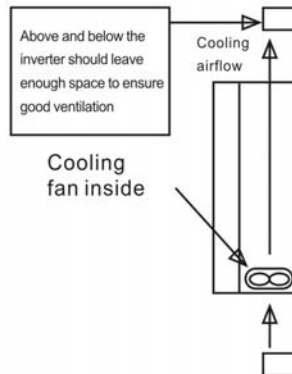
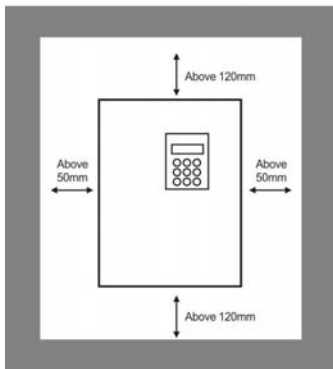
2.2.4 Install the inverter in a clean place as possible as you can, or install in a closed panel which can block any suspended matter.

2.2.5 Use screw install the inverter on the mounting plate vertically and firmly.

2.2.6 Pay attention to the cooling method when inverter installed in a control cabinet

When two or more inverters and fan are installed in a cabinet, should pay attention to the correct installation position to ensure that the inverter ambient temperature within the allowable value. If the installation location is incorrect, it will make the ambient temperature of inverter rises, reducing ventilation.

2.2.7 Pls install on a nonflammable objects. Inverter may reach very high temperatures (about 80°C). Meanwhile, in order to make heat easy to distribute should be sufficient space around it. (See attached picture)



2.3. Wiring requirements

- 2.3.1 Installation wiring should be separated from power cables and control cables, such as using separate trunking, etc. If the control circuit and the power cable line must cross, cross wiring should be 90 degrees.
- 2.3.2 Use shielded wires or twisted pair connection control circuits, to ensure the unshielded place as short as possible, should be used for cable sleeve if conditions permitted.
- 2.3.3 Avoid inverter gravity line (Output and input line) and signal lines parallel wiring and cluster wiring, should be disperse and cross wiring.
- 2.3.4 Inverter and control signal cables should be used shielded twisted pair cable, the skin of shielded cable connect to the COM terminal.
- 2.3.5 Ground wire of inverter, motor and others should grounded on the same point.
- 2.3.6 Add data line filters to the signal line.
- 2.3.7 Connecting line of the detector and the shield of control signal line should be ground with cable clamp metal.

2.4. Wiring instructions

2.4.1 Main circuit terminal explanation

Terminal mark	Terminal name	Explanation
L, N	AC power input	Connect to the frequency power supply Single-phase AC220V 50-60Hz
R, S, T		Three-phase AC230V or 380V50-60 Hz
U, V, W	Inverter output	Connect to three-phase Asynchronous motor
P+, PB	Connect to braking resistor	Between P+, PB, connect to braking resistor (under 15KW)
PE	Grounded	Inverter grounding, must be properly grounded.

2.4.2 The control loop terminals explanation

Terminal mark	Terminal name	Explanation
AVI	Frequency setting voltage input	Input 0-10V, PID given or feedback
ACI	Frequency setting voltage input	Input 4-20mA, PID given or feedback
AFM	0V-10V output	Used to indicate the frequency, current, speed, etc.
10V	Frequency setting auxiliary power	And AVI, COMD connected potentiometer (4.7K-10K)
X1	Multifunction input terminals 1	Function set by parameter P091, the factory defaults is "forward start"
X2	Multifunction input terminals 2	Function set by parameter P092, the factory defaults is "reverse start"
X3	Multifunction input terminals 3	Function set by parameter P093, the factory defaults is "stop"
X4	Multifunction input terminals 4	Function set by parameter P094, the factory defaults is "forward jog"
X5	Multifunction input terminals 5	Function set by parameter P095, the factory defaults is "muti-step speed No.1"
X6	Multifunction input terminals 6	Function set by parameter P096, the factory defaults is "muti-step speed No.2"
X7	Multifunction input terminals 7	Function set by parameter P097, the factory defaults is "muti-step speed No.3"
X8	Multifunction input terminals 8	Function set by parameter P098, the factory defaults is "external fault"
Y2A, Y2B	Relay contact output	Y2A, Y2B is normally open contact
Y1A, Y1B, Y1C	Relay contact output	Y1A, Y1B is normally open contact, Y1B, Y1C is normally closed contact
COM, 24V	Auxiliary power	COM, +24V ≤ 50mA, COM is analog input, output and

2.4.3 Main circuit wiring explanation

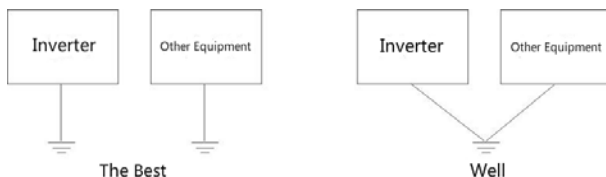
- 1) The power supply and screw terminals of electrical wiring, pls use the terminals with insulation tube.
- 2) Remember that the power must not be connected to the inverter output terminals(U, V, W), otherwise it will damage the inverter.
- 3) After wiring, cuts must be cleaned, wire offcuts may cause the inverter abnormalities, failure or damage, must always be kept clean. When drilling holes on the console, be careful not to make powder and other debris into the inverter.
- 4) To make the voltage pressure drop within 2%, please use the appropriate type of cable wiring. when the wiring distance between the inverter and motor is too long, especially in the case of low-frequency output, the main circuit cable voltage drop will cause the motor torque to decrease.
- 5) Cable distance up to 500 meters, especially long-distance wiring, because inrush current that generated by wiring parasitic capacitance can cause over-current protection ation. the device connected to the output may meet abnormal or failure operation. Therefore, the maximum wiring distance in the following table. (When the inverter is connected to two or more motors, the wiring length should not exceed 500 meters)

Inverter capacity	Under 0.75KW	2.2KW	Over 4.0KW
Non-low noise mode	300M	500M	500M
Low noise mode	300M	500M	500M

- 6) Between P+,B- terminal, is recommended to connect the braking resistor option.
- 7) Electromagnetic interference: inverter input and output circuit contains harmonic components, in high demand situations, please install radio noise filter at the input to minimize interference.
- 8) Do not install electric power capacitance, surge suppressors and radio noise filter at the output of the inverter, it will cause inverter failure or damage to the device.
- 9) After power on or runing, to change the wiring operation, first you must shut off the power after more than 10 minutes, using a multimeter check the voltage, after power-off in a period of time, the capacitor still has a dangerous high voltage.
- 10) Ground terminal must be grounded.

▲Since the inverter have leakage current, to prevent electric shock, the inverter and the motor must be properly grounded.

▲Grounding with separate ground terminal (Do not use screws in the shell, chassis, etc. Instead).



▲Try to use thick grounding cable wire, ground wire close to the inverter as short as possible.

▲Motor at inverter terminal ground, use one of four-core cable grounding in which specifications same as input cables.

2.4.4 Inverter main circuit terminal block:

0.75~1.5KW220V:		L	N	PE	U	V	W	PB	P+	
2.2~3.7KW220V:	L	N		PB	P+	U	V	W	PE	
5.5KW220V:	L	N		PB	P+	P-	U	V	W	PE
0.75~2.2KW380V:	R	S	T	PE	U	V	W	PB	P+	
3.0~5.5KW380V:	R	S	T	PB	P+	U	V	W	PE	
7.5KW380V:	P-	P+	PB	R	S	T	U	V	W	PE
11~15KW380V:	P-	P+	PB	R	S	T	U	V	W	PE
18.5KW380V:	R	S	T	P+	P-	U	V	W	PE	

Remark:

▲Different models may have difference, pls see the subject product.

▲When wiring, the inverter terminals(P +, P-) should marked same as braking unit, wrong connection may damage the inverter.

▲Cabling distance between Braking unit and braking resistor unit should be within 5 meters, even using twisted pair can not be more than 10 meters.

▲If the transistor in braking unit is damaged (shorted), the resistance will be very hot and cause a fire. Therefore, the input of the inverter install a magnetic contactor, cut off the power in case of failure.

1. The cable must be 75°C copper wire. 2. Tighten the screws at a certain intensity. No tightening can cause a short circuit or malfunction, tighten overdone will damage screws and terminal, also cause a short circuit or malfunction.

2.4.5 The control loop wiring

1) “COM” terminal is control signal common terminal, do not public grounded.

2) The wiring of control circuit terminals should use shielded or twisted pair, and must be

the wiring separately from main circuit and strong electrical circuit.

3) Since the frequency input signals of control circuit are micro current, in the occasion of contact input, in order to prevent poor contact, please use the two side contacts or twin contacts.

4) Control loop is recommended 0.75 mm² cable wiring.

5) High voltage can not enter into control loop , otherwise it will damage the inverter.

2.4. 6: Inverter control loop terminal block

10V	AVI	COM	ACI	AFM	Y2A	Y2B	Y1A	Y1B	Y1C
COM	X1	X2	X3	X4	X5	X6	X7	X8	+24V

Remark:

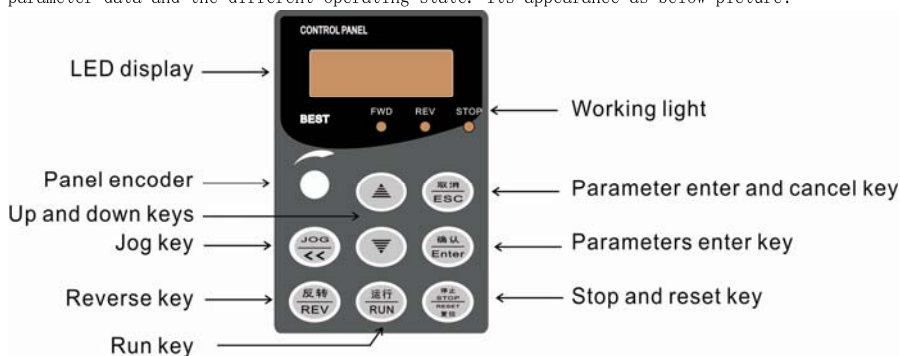
▲Different models may have difference, pls see the subject product.

Chaper 3 Running operation

This chapter provides basic product “running operation”, read details of this chapter carefully before use.





3. 1. Operation panel

Operator panel is the interface between people and machine, it consists of key section and display section, keys for the user to input control commands, the display section displays the parameter data and the different operating state. Its appearance as below picture:



3. 2. Keyboard instructions

Symbol	Key name	Functional explanation
	Run key	The inverter starts running when press this key, if set to an external terminal control, press this key is invalid.
	Reverse key	The inverter reversal running when press this key, if set to an external terminal control or "P067" is set to 0, the operation can not be reversed.
	stop/reset key	The inverter stops running when press this key, after fault alarm, press this key to reset system. Stop button is always active.
	Set key	Press this button to enter the function setting status, after modification, press this key to exit the function setting status.
	Enter key	In setting state press this key to confirm the function code, after modified parameters contents, press again to preserve the modified data; in standby

		or running state press to sequentially display DC voltage, output current, output voltage, speed, etc. see 3.3 display content description for details.
	Up key	The function code and parameter data values will increase when press this key. In the run or standby mode, press this key to increase the operating frequency.
	Down key	The function code and parameter data values will decrease when press this key. In the run or standby mode, press this key to reduce the operating frequency.
	Jog key	Modify parameters in setting state, it can be displaced. In standby mode (P025 = 1) press to perform jog operation.
	Panel encoder (Non-standard)	Equivalent to keyboard up, down key









3. 3. Display content instructions

Display content	Status	Instructions
FWD	Light	Motor forward during FWD operation
REV	Light	Motor reserve during FWD operation
STOP	Light	Motor stop during FWD operation

Display content code	Function
H	Given frequency
F	Output frequency
A	Output current
U	Busbar voltage
u	Output voltage
r	Motor speed
y	PID gived quantity
L	PID feedback quantity
J	The current count value
d	Factory test reserved

3. 4.Parameter modification method

If you need to modify the parameter, first enter into the function code which needs to be modified, and then re-set parameter values, specific steps are as follows:

No	Operation	Instruction
1	Press  Key	Enter the parameter setting mode, the inverter displays the current parameter number, example “P000”;
2	Press   Key	Adjust to the required parameters, example “P087”;
3	Press  Key	Inverter displays the current value of the parameter, example “0”;
4	Press   Key	Adjust to the required value, example “101”;
5	Press  Key	Confirm this action, storing data;
6	Press  Key	Exit setting mode and return to standby or running state

Remark:

- 1: Press “ESC” to enter the parameter setting mode, if you press “ESC” for 3seconds before being released into the special mode only can display and modify non-factory value parameter.
- 2: When setting the parameters, just press “ESC” key to exit the parameters setting mode can back to standby mode.

3. 5.Start up

3.5.1 Focus on examination before running

- Whether pick the wrong line, in particular, should check the power supply if connected to UVW terminals incorrectly.
Pls note:power supply should input by R.S.T(L.N) terminal.
- Whether residual metal shaving or wire easily cause a short circuit on inverter substrate and wiring terminals.
- Check if screws are locking, connectors are loose.
- If output section occur short circuit or short circuit to ground.

3.5.2 Start up method

As control method of FC300 series inverter is set operator mode of operation at the factory, on test run, you can use the jog key on keyboard to move, generally test run can be used 5.0Hz.

Chapter 4 Function parameter instructions

No.	Function	Function description	Factory settings
P000	Inverter type code identification	Setting range: 0 , 0.75KW/220V ; 1 , 0.75KW/380V; 2 , 1.5KW/220V ; 3 , 1.5KW/380V; 4 , 2.2KW/220V ; 5 , 2.2KW/380V; 6 , 3.0KW/220V ; 7 , 3.0KW/380V; 8 , 3.7KW/220V ; 9 , 3.7KW/380V; 10 , 5.5KW/220V ; 11 , 5.5KW/380V; 12 , 7.5KW/220V ; 13 , 7.5KW/380V; 14 , 11KW/220V ; 15 , 11KW/380V; 16 , 15KW/220V ; 17 , 15KW/380V; 18 , 18.5KW/220V ; 19 , 18.5KW/380V;	Factory setting, only for read.
P001	Motor rated current	Setting range : 20—110% inverter rated current. Setting based on the actual	Depending on type

		motor rated current. Drive more than one motor, can not protect the motor, then please install protection relay for all motors.	
P002	Motor rated voltage	Setting range: 50-460V。 Setting based on the actual motor rated voltage.	220V (380V)
P003	Motor rated frequency	Setting range: 20.0—1000.0Hz Setting based on the actual motor rated frequency.	50.0Hz
P004	Motor load current	Setting range: 20%-50% Motor no-load current and the motor rated current ratio will affect the amount of slip compensation.	40
P005	Reserved		
P006	Reserved		
P007	Torque Upgrade	Setting range : 0-30%(Depending on type) This parameter sets minimum starting voltage value of V/F curve. set this parameter appropriately can improve the low starting torque.	Depending on type
P008	Reserved		
P009	Reserved		

P010	Reserved		
P011	Reserved		
P012	Starting frequency	<p>Setting range: 1.0Hz—Maximum operating frequency</p> <p>The frequency will accelerate to the target frequency when start inverter. If this value is set too large, it may result in over-current protection action.</p>	1.0
P013	Starting Delay	<p>Setting range: 0.0—600.0S</p> <p>Press the start frequency output when start inverter, to maintain this set time to the target frequency acceleration. This function is used to improve the motor starting characteristics, to ensure that the motor can be fully activated within a set time.</p>	0.0
P014	Stop mode	<p>Setting range:</p> <p>0, after deceleration, DC braking;</p> <p>1, freely stop</p> <p>This function is used to select the motor stop mode. When selecting the</p>	0

		deceleration stop, inverter receives a stop command, after the motor decelerates to a DC braking starting frequency P015, press P018 DC braking voltage and P017 stop braking time to brake stop; when choose freely stopping, after inverter receive stop command, cut off the output immediately, the motor freely inertial stop;	
P015	DC braking starting frequency	Setting range: 1.0-1000.0Hz When stop, slow down to this frequency, start DC braking.	3.0 Hz
P016	Prestart Braking time	Setting range : 0.0-600.0 seconds When the motor started, first for DC braking click according to this time, and then accelerated to the target frequency.	0.0second
P017	Stop braking time	Setting range : 0.0-600.0seconds	0.0second
P018	DC braking voltage	Setting range : 0-30%(Depending on type) Output voltage for DC	1

		barking, set this parameter, be sure to gradually increase until sufficient braking torque.	
P019	Reserved		
P020	Reserved		
P021	Maximum frequency	Setting range: minimum operating frequency—1000.0Hz Setting the maximum allowable frequency of the motor, all operational frequencies are affected by this frequency limit.	60.0Hz
P022	Minimum operating frequency	Setting range : 0.0 Hz—Maximum operating frequency, setting operable minimum frequency.	0.0Hz
P023	Minimum output frequency	Setting range : 0.0 Hz—Maximum operating frequency, Setting minimum output frequency that motor permissible . If the operating frequency setting under this frequency, the inverter stop output. applicable for Water Supply System.	1.0Hz

P024	Reserved		
P025	Keyboard jog control	Setting range: 0, Prohibit keyboard jog operation 1, Allow keyboard jog operation	1
P026	Jog frequency	Setting range : Minimum operating frequency—Maximum frequency, output frequency value when set the inverter receives jog command.	5.0Hz
P027	Jog relative parameters	This parameter is four hexadecimal number D3、D2、D1、D0, Represent different functions. D0 , Jog direction control: 0, forward; 1, reversal; 2(or others), can forward or reversal; D1 , Jog accelerate & deceleration time selection: 1-4, respectively corresponding to the first to fourth accelerate & deceleration time; 0 (or others), Selected by	0002

		an external control signal;	
P028	Reserve		
P029	Reserve		
P030	First frequency	Setting range : Minimum operating frequency—maximum frequency When the speed command (P064) is 0, this frequency as the first speed in operation. This parameter can be directly through the control panel ▲、▼keys to modify, recall automatically when power off.	50.0Hz
P031	Second frequency	Setting range : Minimum operating frequency—maximum frequency	2.0Hz
P032	Third frequency	Setting range : Minimum operating frequency—maximum frequency	3.0Hz
P033	Fourth frequency	Setting range : Minimum operating frequency—maximum frequency	4.0Hz
P034	Fifth frequency	Setting range : Minimum operating frequency—maximum frequency	5.0Hz
P035	Sixth frequency	Setting range : Minimum operating frequency—maximum	6.0Hz

		frequency	
P036	Seventh frequency	Setting range : Minimum operating frequency—maximum frequency	7.0Hz
P037	Eighth frequency	Setting range : Minimum operating frequency—maximum frequency	8.0Hz
P038	Acceleration time 1	Setting range: 0.1—3000.0 seconds This parameter is used to set time that inverter output frequency from 0 up to max frequency.	10.0
P039	Deceleration time 1	Setting range : 0.1—3000.0seconds This parameter is used to set time that inverter output frequency from max frequency down to 0.	10.0
P040	Acceleration time 2	Setting range : 0.1—3000.0 seconds	10.0
P041	Deceleration time 2	Setting range : 0.1—3000.0 seconds	10.0
P042	Acceleration time 3	Setting range : 0.1—3000.0 seconds	10.0
P043	Deceleration time 3	Setting range : 0.1—3000.0 seconds	10.0
P044	Acceleration	Setting range : 0.1—3000.0	10.0

	time 4	seconds	
P045	Deceleration time 4	Setting range : 0.1—3000.0 seconds	10.0
P046	Accel & decel frequency speed control of operation panel	Setting range: 1—100. When adjusting the frequency of the operation panel▲、▼ buttons, decrease this parameter can reduce the frequency growth rate.	100
P047	Accel & decel frequency time gap of external terminal	Setting range: 1—20000. When adjusting the frequency by external terminals, increase this parameter can reduce the frequency growth rate.	100
P048	Frequency memory	Setting range: 0, do not recall; 1, recall; 2, Memory frequency before start; After power off, setting first frequency(P030) whether memory or not.	1
P049	outages handling	Setting range: 0, Report lowvoltage fault, and lock; 1 , report lowvoltage fault, automatically reset	0

		<p>after power is restored, does not start;</p> <p>2, Slow down when close to the lowvoltage.</p> <p>3, Reserved</p> <p>4, Reserved</p> <p>Settings inverter operation when power off and power on again.</p>	
P050	Quick setting operation panel	<p>0, when the PID function effectively and quick setting PID target values(P122), or quick setting first frequency(P030)</p> <p>1, quick setting count preset(P127)</p>	
P051	Overheat protection A/D value	<p>Setting range:0-1023</p> <p>According to the NTC temperature sensor and overheating protection to calculate.</p> <p>Factory setting, for read only.</p>	130
P052	Fan start A/D value	<p>Setting range:0-1023</p> <p>According to the NTC temperature sensor and overheating protection to calculate.</p>	308

		Factory setting, for read only.	
P053	Analog output select	<p>Setting range:</p> <p>0, output frequency of analog inverter , 0 — maximum frequency corresponds 0 — 10V;</p> <p>1, output current of analog inverter , 0—2times rated current corresponds to 0—10V;</p> <p>This function is used to connecting a DC voltmeter or other equipments between AFM and COM terminals. remote monitoring inverter output frequency, output current. AFM terminal maximum output voltage is 10V.</p> <p>2. Output voltage of analog inverter, 0-2 times the rated motor voltage corresponding to 0-10V.</p>	0
P054	the minimum analog corresponds to output	Setting range: 0.00—3.00V terminal signal size when setting minimum analog(0Hz or 0A) .	0.0
P055	the maximum	Setting range: 5.00—20.00V	10.00

	analog corresponds to output	terminal signal size when setting maximum analog(max frequency or 2 times inverter rated current). Notice: This parameter is used to revise the size of the analog output, AFM terminal actual maximum output voltage is 10V.	
P056	start display selection	Setting range: 0, frequency (H, F); 1, motor current (A); 2, bus voltage (U); 3, output voltage (u); 4, Approximate mechanical speed=output frequency*speed frequency ratio (r); 5, PID gived amount(y); 6, PID feedback amount (L); 7, count value(J); 8, Factory testing Reserved (d);	0
P057	speed frequency ratio	Setting range: 0.01—100.00 This function is used to set the speed display and operating frequency ratio. so that the speed display matches the actual speed.	30.00

P058	carrier frequency	Setting range : 0-5 corresponding to 3K, 5K, 7K, 9K, 11K, 13K The higher carrier frequency, the lower motor noise, the electrical interference greater, the greater heat inverter, the leakage current increases, the efficiency drops. The carrier frequency is lower, contrary to the above.	1
P059	Desired frequency attained	Setting range: 0.0—1000.0Hz When the inverter output frequency is greater or equal to this setting value, the inverter can be output signal through the multi-function output terminals.	0.0Hz
P060	Reserved		
P061	Hopping frequency starting point	Setting range: 3.0-100.0Hz Used to avoid mechanical resonance point.	20.0
P062	Jump frequency width	Setting range: 0.0-5.0Hz Used to avoid mechanical resonance point.	0.0
P063	Undervoltage protection	Setting range: 220V: 150-250VDC;	170 (320)

	voltage	380V: 300-450VDC。	
P064	Frequency Command source setting	Setting range: 0 . Control panel digital setting; 1. AVI terminal 0-10V setting; 2. ACI terminal 4-20mA setting; 3. Control panel digital setting, automatically switch to 4 if detected 0-10V signal from AVI terminal. 4. AVI terminal 0-10V setting, when AVI signal is 0 , automatically switched to 3 if detects panel ▲ 、 ▼ operation. 5. Panel potentiometer	3
P065	Run command source setting	Setting range: 0. Operation panel Controls (forward rotation start 、 Reverse rotation start 、 stop); 1. External terminal control (forward/stop 、 reversal/stop); 2. External terminal control (start/stop 、 reversal/forward);	5

		<p>3. External terminal control (Forward rotation start、 Reverse rotation start、stop (Normally closed));</p> <p>4. External terminal control (Forward rotation start、 Reverse rotation star、stop (Normally open));</p> <p>5. Above 0-3 automatically adapt;</p> <p>This function is used to select the inverter start and stop control mode 。 The following description assumes that X1 terminal is set to forward, X2 terminal is set to reversal, X3 terminal is set to stop.</p> <p>When you select the operation panel control (0), the external terminal control invalid.the motor start and stop controled by run key RUN, reversal key REV, stop key STOP on the control panel.</p> <p>When selecting an external terminal control (1), X1 (forward) and COM connected forward start,</p>	
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		<p>disconnect the stop; X2 (reversal) and COM connected reversal start, disconnect the stop.</p> <p>When selecting an external terminal control (2), X1 (forward) and COM connect to start, disconnect the stop; X2 (reversal) decide the run direction, X2 and COM connected reversal start, disconnect to forward.</p> <p>When selecting an external terminal control (3), X3 (stop) and COM connected to stop button normally closed contact, X1 (forward) and COM connected to forward button normally open contact, X2 (reversal) and COM connected to reversal button normally open contact.</p> <p>When selecting an external terminal control (4), X3 (stop) and COM connected to stop button normally open contact, X1 (forward) and COM connected to forward button normally</p>	
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		<p>open contact, X2(reversal) and COM connected to reversal button normally open contact.</p> <p>When you select 0-3 automatically adapt (5), the inverter can operate at 0-3. Note: X1, X2 are connected with COM, the motor reversal start.</p> <p>Special Note: In the case of may lead to personal safety, production loss or damage to the equipment, be sure to correctly set this parameter to prevent accidents.</p>	
P066	Steering Control	<p>Setting range:</p> <p>0, forward, whether running command is forward or reversal, the motor output is forward.</p> <p>1, reversal, whether running command is forward or reversal, the motor output is reversal;</p> <p>2, Can forward and reversal. if running command is forward, the motor output</p>	2

		<p>is forward; if running command is reversal, the motor output is reversal.</p> <p>Used to set the run direction of the motor, automatic memory after power failure.</p> <p>Forward and reversal trigger function will change this parameter.</p>	
P067	reversion control	<p>Setting range:</p> <p>0, Prohibit motor reversal;</p> <p>1, allow motor reversal;</p> <p>2, allow motor reversal, and allows keyboard inversion start;</p> <p>Used to limit the reverse, in some situations do not allow motor reversal, the parameter should be set to 0, to prevent accidents.</p>	1
P068	Reserved		
P069	Special function 1	<p>This parameter is four hexadecimal number D3、D2、D1、D0, represent different functions.</p> <p>D0、D1, reserved</p> <p>D2, Program runs reset mode</p> <p>0, Automatically reset at the</p>	

		<p>start of each, start run from the first speed.</p> <p>1, When start, continues to run the frequency when the last shutdown. reset by the external terminal, start run from the first speed.</p>	
P070	Special Function 2	<p>This parameter is four hexadecimal number D3、D2、D1、D0, represent different functions.</p> <p>D0, Two-wire DC braking: 0, invalid; 1, effective.</p> <p>D1, Multi-step speed command simultaneously with forward command: 0, Not included; 1, included.</p> <p>D2, AVI, ACI analog forward and reversal: 0, invalid; 1, effective. >50% is forward.</p> <p>D3, incremental of operation panel encoder accelerate control automatically: Set smaller, faster</p>	0x4000

		acceleration.	
P071	Fault record 1	0, No fault 1, Serious overcurrent (HoC) 2, Overcurrent (oC) 3, Overvoltage (oU) 4, lowvoltage (LU) 5, overload (oL) 6, Overheat (oH) 7, external fault (EF) 8, memory error (EEP) 9, data error (dEr) 10, CPU fault (CPU) 11, code error (CodE) 12, lack of input phase (LP) 13, lack of output phase (oP) 14, reserve	0 (Read only) Remark: fault record can not be modified, so may leave test records before factory.
P072	Fault history 2	(same as above)	0
P073	Fault history 3	(same as above)	0
P074	Accumulative boot time	(day)	(Read only)
P075	reserved		
P076	reserved		
P077	Torque motor voltage limit	This parameter is the relative proportion of the value of motor rated voltage, setting	

		range:10%-100%. Function:Limiting the minimum voltage which output to the torque motor. Example:P077=50, P002=380V, so P380*50%=190V, mean motor voltage can adjust between 190-380V.	
P078	Middle voltage	1/3 Motor rated frequency corresponding output voltage. 0-50%, 0 representatives of this power is invalid.	0
P079	reserved		
P080	reserved		
P081	reserved		
P082	reserved		
P083	reserved		
P084	reserved		
P085	reserved		0
P086	User password	Setting range: 0-65535. 0: Invalid; 65535: Invalid; When a password is not set, the P086 is set to a new password, and then the P087 is set to 2, the password becomes effective.	0

		When a password is set, you must enter the correct password in P086 before changing parameters, if P087 is set to 3, the password is cleared.	
P087	Special operation	Set this parameter, can perform some special operation sequence, the operation is completed automatically returns to 0, no memory. Setting range: 0, no operation; 1, restore factory settings; 2, remember user password; 3, clear user password; 4, upload parameters; 5, download parameters ; (notice: download from the same version of the software; the user required to consider the compatibility if copies between the different power specifications) others: reserve, Can not set arbitrarily;	0
P088	Braking	Setting range:	360V

	resistor discharge starting voltage	220V inverter: 350—400V 380V inverter: 650—720V	or 660V
P089	response points against overvoltage	Setting range: 220V inverter: 350—420V 380V inverter: 650—760V	380V or 730V
P090	response points against overcurrent	Setting range : 100—190% motor rated current	150
P091	X1 function selection	Setting range: 0, no effect; 1 , first multi-speed ; (attached table 1) 2 , second multi-speed ; (attached table 1) 3 , third multi-speed ; (attached table 1) 4, Frequency rises; 5, Frequency decreases; 6, forward jog; 7, reverse jog; 8, forward; 9, reversal; 10, forward trigger; 11, reverse trigger; 12, stop; 13, freely shutdown;	8

		14, Forced shutdown; 15, Forced inversal; 16, Counter is cleared; 17, Counter input; 18, Program run reset; 19, External fault; 20, External reset; 21, Accelerate & decelerate time choosing first ; (attached table 2) 22, accelerate & decelerate time choosing second ; (attached table 2) 23, accelerate and decelerate pause; 24, Forced ACI passage effective.	
P092	X2 Function selection	(Same as above)	9
P093	X3 Function selection	(Same as above)	12
P094	X4 Function selection	(Same as above)	6
P095	X5 Function selection	(Same as above)	1
P096	X6 Function selection	(Same as above)	2
P097	X7 Function	(Same as above)	3

	selection		
P098	X8 Function selection	(Same as above)	19
P099	reserved		
P100	reserved		
P101	Y1 Function selection	Setting range: 0, no effect; 1, running; 2, target frequency reach; 3, random frequency reach; 4, fault; 5, lack of voltage; 6, count to; 7, count to warning; 8, stoping; 9, motor commutation delay;	4
P102	Y2 Function selection	(Same as above)	4
P103	Y3 Function selection	(Same as above)	4
P104	reserved		
P105	reserved		
P106	AVI Analog input filter	Setting range: 0.01-2.00	0.30
P107	ACI Analog input filter	Setting range: 0.01-2.00	0.30
P108	Analog input	Setting range: 0—100%	98

	corresponding to Maximum frequency (PID maximum target value)	For setting corresponding relationship between analog quantity and target frequency (PID target value) . For example, when AVI terminal input $10V*98%=9.8V$, frequency value reaches the maximum frequency (P021) .	
P109	Analog input corresponding to Minimum frequency (PID minimum target value)	Setting range: 0—100% For setting corresponding relationship between analog quantity and target frequency (PID target value) For example, when AVI terminal input $10V*2%=0.2V$, frequency value reaches the minimum frequency (P022) .	2
P110	reserved		
P111	reserved		
P112	Run Mode	Setting range: 0, Normal operation; 1, PID mode, control panel▲、▼set the target value, AVI terminal input the amount of feedback; 2, PID mode, control panel▲、▼set the target value, ACI terminal input the amount of	0

		<p>feedback;</p> <p>3, AVI terminal set the target value, ACI terminal input the amount of feedback;</p> <p>4, ACI terminal set the target value, AVI terminal input the amount of feedback;</p> <p>5-9, reserve;</p> <p>10, Program run, shut down after a single cycle;</p> <p>11, Program run, run for last frequency after a single cycle</p> <p>12, Program run, reciprocating cycle run;</p> <p>This parameter selects the run mode of the inverter.</p>	
P113	PID Max target value	<p>Setting range : Min target—10000</p> <p>This function is used to set the maximum target value when PID run.the decimal point position that displays on operator panel is set by P121.</p>	10000
P114	PID Min target value	<p>0—Max target</p> <p>This function is used to set the minimum target value when PID run.</p>	0

P115	PID Maximum target value corresponds to the amount of feedback	Setting range: 0—100% Used for setting maximum target value corresponds to the sensor feedback quantity.	100
P116	PID Minimum target value corresponds to the amount of feedback	Setting range: 0—100% Used for setting minimum target value corresponds to the sensor feedback quantity.	0
P117	ratio coefficient	Setting range: 0.01—10.00 The greater ratio coefficient, the fast response, but too much prone to oscillation. The smaller ratio coefficient, the slow response.	1.00
P118	Integral coefficient	Setting range: 0.01—10.00 The greater integral coefficient, the fast response	0.50
P119	differential coefficient	Setting range: 0.01—10.00 The greater differential coefficient, the fast response, but too much prone to oscillation. The smaller differential coefficient, the slow response.	0.50

P120	Feedback sampling period	Setting range : 0.1—20.0 seconds This parameter set time interval for next respond of PID controller.	0.3
P121	PID reference parameters	This parameter is four hexadecimal number D3、D2、D1、D0, represent different functions.。 D0, decimal place setting of PID display value: Setting range: 0-3。 D1, the relationship between motor speed and the amount of feedback: 0, Motor speed increase, the amount of feedback increase; 1, Motor speed increase, the amount of feedback decrease;	0x0002
P122	PID target value	Setting range: PID Min target value—PID Max target value automatically memory when power off.	5000
P123	reserved		
P124	reserved		
P125	reserved		

P126	Current count	Setting range: 0—65000 This parameter sets the count value of the counter current, an external pulse signal cause the parameter count increments up.	0
P127	count to preset	Setting range: 0—65000 This function is used to set the counter preset value, when the count value is equal to the count preset value, the system according to P129.	100
P128	Count to warning	Setting range: 1—65000 This function is used to set the counter preset value, in order to do well preparations of next step before counting arrive. when counter to the warning value, the system can output the signal through the terminal.	90
P129	Count to action selection	Setting range: 0, close output; 1, Continues to output;	0
P130	program run time unit	0: second; 1: second; 2: hour	0

P131	First speed run-time	0-6553.0	0
P132	Second speed run-time	0-6553.0	0
P133	Third speed run-time	0-6553.0	0
P134	Fourth speed run-time	0-6553.0	0
P135	Fifth speed run-time	0-6553.0	0
P136	Sixth speed run-time	0-6553.0	0
P137	Seventh speed run-time	0-6553.0	0
P138	Eighth speed run-time	0-6553.0	0
P139	First speed-related parameters	This parameter is four hexadecimal number D3、D2、 D1、D0, represent different functions: 0, forward; 1, reversal; 2 (others), can forward and reversal; D1, accelerate & deceleration time selection: 1-4 , respectively corresponding to the first to	0x0002

		fourth accelerate & deceleration time; 0 (or others), Selected by an external control signal;	
P140	Second speed-related parameters	(Same as above)	0x0002
P141	Third speed-related parameters	(Same as above)	0x0002
P142	Fourth speed-related parameters	(Same as above)	0x0002
P143	Fifth speed-related parameters	(Same as above)	0x0002
P144	Sixth speed-related parameters	(Same as above)	0x0002
P145	Seventh speed-related parameters	(Same as above)	0x0002
P146	Eighth speed-related parameters	(Same as above)	0x0002
P147	reserved		
P148	reserved		
P149	reserved		

P150	Communication Settings	<p>This parameter is four hexadecimal number D3、D2、D1、D0, specific functions as follows:</p> <p>D1 D0 the local address: Two hexadecimal means local address, Range 01-FF, is decimal 1-255</p> <p>D2:baud rate</p> <p>0:4800 1:9600 2:19200 3:38400</p> <p>D3:Data format</p> <p>0:1-8-2 mode, no parity 1:1-8-1 mode, even parity 2:1-8-1 mode, odd parity</p>	0x0301
P151	reserved		
P152	reserved		
P153	reserved		
P154	reserved		
P155	reserved		
P156	reserved		
P157	reserved		
P158	reserved		
P159	reserved		

Remark 1: Some models do not have the X5-X8, Y1-Y3, AVI, ACI, AFM etc. terminals

and functions, please refer to the specific model or consulting firm.

Remark 2: Some parameters can not be modified when the motor is running;

Attached table 1. Attached table 1. On-off state of multi-step speed for first, second, third, and the correspondence between the frequency table

Third multi-step speed	Second multi-step speed	First multi-step speed	Target frequency
OFF	OFF	OFF	First frequency
OFF	OFF	ON	Second frequency
OFF	ON	OFF	Third frequency
OFF	ON	ON	Fourth frequency
ON	OFF	OFF	Fifth frequency
ON	OFF	ON	Sixth frequency
ON	ON	OFF	Seventh frequency
ON	ON	ON	Eighth frequency

Attached table 2. On-off state of acceleration & deceleration time choose first or second and the correspondence between the acceleration & deceleration time table

accel & decel time setting choose second	accel & decel time setting choose first	target accel on & decel time
OFF	OFF	first accel & decel time
OFF	ON	second accel & decel time
ON	OFF	third accel & decel time
ON	ON	fourth accel & decel time

Chapter 5 troubleshooting easures

Maintenance and inspection in regularly to make your inverter keep in normal state for a long time.

5.1. Maintenance inspection precautions

- Maintenance inspection, be sure to cut off the input power to the inverter.
- Make sure the power is cut off, maintenance and inspection after the display disappears 10 minutes.
- During the inspection process, definitely not uproot and mismatches the internal power supply, wire and cable, otherwise will cause inverter does not work or damage it.
- Screws and other accessories can not be stay inside the inverter when installed to avoid circuit boards causing a short.
- To keep the inverter clean and avoid dust, oil mist, moisture intrusion after installation.

5.2. Periodic inspection items

- Confirm if supply voltage compliance with the required voltage of inverter;
(Particular attention if the power line and motor damaged)
- If wiring terminals and connectors become flexible;
(If power lines, terminal connection cable are broken strand)
- Whether there is dust, iron and corrosive liquids inside the inverter.
- Prohibit to measure insulation resistance of inverter.
- Check output voltage, output current, output frequency;
(Measurement gap is not too large)
- Check if the around temperature is between $-10^{\circ}\text{C}\sim 40^{\circ}\text{C}$, if installation environment is well ventilated;

- Humidity maintained at 90% or less;
(Can not have the phenomenon of water droplets)
- run without abnormal sound or abnormal vibration phenomena;
(Inverter can not be placed where have large vibration)
- You should regularly clean the vent.

5.3. Fault information and troubleshooting

FC300 series inverter with very perfect protection function, possess overload, phase short circuit, ground short circuit, lowvoltage, overheat, overcurrent etc. pls identify the cause according to the following table when inverter meet protection. Start running after these, if can not handle, please contact the company.

Fault display	Fault content and description	Handling method
HoC	serious overcurrent	1: Check if the motor for short circuit or partial short circuit, if output wire insulation is good; 2: extend the accelerate & decelerate time; 3 : inverter configuration unreasonable, increase the inverter capacity; 4: Reduce the torque boost setting; 5 : Check whether the motor stall, the mechanical load has sudden change; 6: Whether have a mutation of power system voltage; 7: DC braking is too big, reduce the amount of DC braking; 8: machine fault, send to factory for overhaul.

OU	Over-voltage	<p>1: Power system voltage is too high, Check if generate sudden voltage;</p> <p>2: if the input voltage is wrong;</p> <p>3: Load inertia is too large;</p> <p>4:Deceleration time is too short.</p>
LU	Low-voltage	<p>1:check if the input voltage is normal;</p> <p>2:check if the load have sudden change;</p> <p>3:Check the line is too far away or too small;</p> <p>4:if lack of phase.</p>
OH	overheat	<p>1:Check whether the fan stall and the heat sink have foreign matter;</p> <p>2:if surrounding temperature is normal;</p> <p>3:if have adequacy ventilation and air convection</p> <p>4:Temperature sensor is damaged or inverter fault, send to factory for overhaul.</p>
OL	Overload	<p>1:Check whether the inverter capacity match small, otherwise increase capacity;</p> <p>2:Check if the mechanical load has stuck phenomenon;</p> <p>3: V/F curve setting is poor, reset;</p> <p>4:DC braking time is too long when start or stop, reduce braking time</p>
oC	Over-current	<p>1: Acceleration time too fast, appropriate to increase the acceleration time;</p> <p>2: motor serious overload;</p> <p>3: control panel bad, send to factory for overhaul.</p>

CodE	Code error	Inverter fault, send to factory for overhaul.
LP	Lack of input phase	Check whether input terminal lack of phase or disconnection
oP	Lack of output phase	Inverter fault, send to factory for overhaul.
CPU	CPU fault	Inverter fault, send to factory for overhaul.
EEP	Memory error	send for repair
EF	External fault	External equipment failure
dEr	Parameter setting error	Set the parameters correctly Notice: It is possible because the causes of accidents lead to parameter error, please check the parameters strictly before running.

5.4. Fault and analysis

5.4.1 Press run button, the motor does not turn

1) Run mode setting wrong, that is to say if run mode under the control of external terminals, use panel to start; or run mode under the control of operator, use external terminal to start.

2) Frequency command is too low or not given.

3) External wiring errors, such as two-wire, three-wire connection and the parameter setting is incorrect.

4) Multi-function input terminal setting error (External control cases).

5) Inverter fault protection status

6) motor fault.

7) inverter fault.

5.4.2 Parameters can not be set

1) User password lock, pls reset after decryption.

2) inverter is running.

3) Connector connect abnormally, digital operator communication unusual, remove the operator after power off, reloading up and try again.

5.4.3 The motor can not reversal

See if P067 is equal to 1, if equal to 0 then reversal are prohibit.

5.4.4 Motor run in the opposite direction

Motor output line wiring error, set P066 steering control to the opposite direction or exchange any two wires of the U, V, W.

5.4.5 motor deceleration is too slow

1) Deceleration time is too long, reduce deceleration time

2) Installation of the braking resistor.

3) Plus DC braking.

5.4.6 Motor overheating

1) The load is too large, the actual torque already exceed the rated torque of the motor, we recommend increasing the motor capacity.

2) The temperature is too high, in the high temperature environment, the motor will burn pls lower the temperature around the motor.

3) Withstand voltage shortage between motor phase.

Inverter switching action will produce a shock wave between the motor windings, usually the maximum impulse voltage will reach three times with the inverter input power, use the motor which impulse withstand voltage between motor phase higher than maximum impulse voltage.

5.4.7 Inverter starts, interfering with other control devices.

1) Lower carrier frequency, reduce the number of switching operation

2) Set noise filter at the power input side of the inverter.

3) Set noise filter at the output side of the inverter.

4) Pls correct grounding the inverter and motor.

5) Put metal pipe on the outside of the cable, proceed shielding.

6) Main circuit wiring and control lines are wiring separately.

5.4.8 When fan start, the inverter has been found overcurrent and stall.

1) When start, the fan is in idle condition, pls set DC braking when start.

2) Already set DC braking when start, pls increase the value of the DC braking.

5.4.9 The machine has vibration or roar

1) Vibration frequency of mechanical systems occurs resonance with carrier, adjust the carrier to avoid resonance point.

2) Vibration frequency of mechanical systems occurs resonance with output frequency of the inverter.

3) a. Set skip frequency function, avoiding the resonance point; b. Set rubber vibration insulator on the motor baseboard.

5.5. Common anomalies and countermeasures

Common anomalies analysis and countermeasures reference to the following table

abnormal phenomena		Possible reason and countermeasures
Motor does not run	no display on keyboard	Check if power failure, if input power lack of phase, if input power connect in a wrong way
	no display on keyboard, but the inside fan still at work	Detection if have some problems with the wire and sockets which related to keyboard, measuring inside control supply and voltage, to confirm whether the output voltage of the switching power supply input to the control board
	Inside fan is not working	Switching power supply or rectifier circuit is broken, send to factory for overhaul.

	Motor has drone sound	Motor load is too heavy, try to reduce the load
	Found no anomalies	Confirm whether trip or not reset after trip, if in power-down and then start state, if keyboard re-set, whether enter into the program running status, multi-speed running status, set by operating status or non-operating status. Can try to restore the factory value.
		Confirm whether the run command is given
		Check if the running frequency is set to zero acceleration and deceleration time setting inappropriate Current limits set too small overvoltage protection when slow down Carrier frequency setting inappropriate, overloaded or oscillation
motor can not acceleration and deceleration smoothly		
The motor speed is too high or too low		

Chapter 6 RS485 Communication agreement

1 Support agreement

Support Modbus agreement, RTU mode. Broadcast address 0, slaves address can be set 1~255.

2 Interface mode

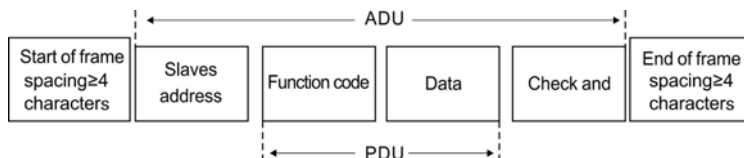
RS485: asynchronous, half duplex, the least significant bit sent priority. High byte in the front, low byte at the back.

The default data format: 1-8-N-2, 38400 bps.

Function parameters: P150, Communication configuration. Composed by the four hexadecimal【 D3 D2 D1 D0】, default 0x0301, the role of members as following table shows:

D3		D2		D1	D0
	Data format		Baud rate	Two hexadecimal mean address of the machine, range 01-FF, mean decimal 1-255.	
0	1-8-2 mode, No parity	0	4800		
1	1-8-1 mode, even parity	1	9600		
2	1-8-1 mode, odd parity	2	19200		
		3	38400		

3 Agreement format



ADU (Application Data Unit) check is the CRC16 check of the first three parts of ADU and obtain through exchange high and low byte. If the operation request fails, PDU (Protocol Data Unit) reply for error code and exception code. Error code is equal to the function code +0x80, Exception code indicates the specific cause of the error. Exception code listed as below:

Exception code	Significance shown
0x01	Illegal function code
0x02	Illegal Address
0x03	Illegal data
0x04	Slave operation failed
0x05	Framing error

4 Functional Explanation

◆ Function 0x03 read inverter multi-functions parameters and status word, at most 5.

Content	Data length (bytes)	Range
Request:		
Function code	1	0x03
Register Start Address	2	0x0000~0xFFFF
Register data	2	0x0001~0x0010
Reply:		
Function code	1	0x03
Read the bytes	1	2* Number of registers
Read the contents	2* Number of registers	

◆ Function 0x06 rewrite inverter single function code and control parameters

Content	Data length (bytes)	Range
Request:		
Function code	1	0x06
Register address	2	0x0000~0xFFFF
Register data	2	0x0000~0xFFFF
Reply:		
Function code	1	0x06
Register address	2	0x0000~0xFFFF
Function data	2	0x0000~0xFFFF

5 Inverter register address distribution

0x0000-0x0fff	Inverter functional parameters
0x8000	Virtual Terminal Low 16
0x8001	Virtual Terminal high 16
0x8100	Inverter status word
0x8101	Setting frequency
0x8102	Output frequency
0x8103	Output current
0x8104	Bus voltage
0x8105	Output voltage
0x8106	Mechanical revolving speed
0x8107	PID given quantity
0x8108	PID feedback quantity
0x8109	Current count

The role of the Virtual Terminal

The inside of inverter has an 32-bit virtual terminal, and its low 16 (bit0-bit15)'s address is 0x8000, high 16 (bit16-bit31)'s address is 0x8001. This virtual terminals and X1-X8 (Specific functions specified by the parameter) have an effect in parallel.

32 virtual terminal functions corresponding to various specific input functions, such as function of bit8 is 8-Forward; function of bit9 is 9-reversal. Reference to X1-X8multi-function input.

inverter status word (0x8100) bits are defined as follows:

Position	Meaning	
1	0: normal input voltage	1: lowvoltage
3	0: non-jog run	1: jog run
4	0: non-reversal run	1: reversal run
5	0: non-forward run	1: forward run
11-15	fault status in current, reference to fault recording and code	

6 CRC16 Function

`unsigned int crc16(unsigned char *data, unsigned char length)`

```
{
    int i, crc_result=0xffff;
    while(length--)
    {
        crc_result^=*data++;
        for(i=0; i<8; i++)
        {
            if(crc_result&0x01)
                crc_result=(crc_result>>1)^0xa001;
            else
                crc_result=crc_result>>1;
        }
    }
}
```



```

}
return (crc_result=((crc_result&0xff)<<8)|(crc_result>>8));
//exchange CRC16 check and high & low byte
}

```

7 Modbus Communication Control Example

Start 1# inverter forward:

Request: 0x01 0x06 0x80 0x00 0x01 0x00 CRCH CRCL

Reply: 0x01 0x06 0x80 0x00 0x01 0x00 CRCH CRCL

Remark: 0x8000: virtual terminal low 16;

0x0100: Set the virtual terminal bit8=1, forward command is valid.

CRCH = A1; CRCL = 9A.

01 06 80 00 01 00 A1 9A

Start 1# inverter reversal:

Request: 0x01 0x06 0x80 0x00 0x02 0x00 CRCH CRCL

Reply: 0x01 0x06 0x80 0x00 0x02 0x00 CRCH CRCL

Remark: 0x0200: Set the virtual terminal bit9=1, reversal command is valid.

CRCH = A1; CRCL = 6A.

1# Inverter stopping:

Request: 0x01 0x06 0x80 0x00 0x00 0x00 CRCH CRCL

Reply: 0x01 0x06 0x80 0x00 0x00 0x00 CRCH CRCL

Remark: 0x0000: Set the virtual terminal bit8=bit9=0, forward and reversal command is invalid.

CRCH = A0; CRCL = 0A.

01 06 80 00 00 00 A0 0A

1# Inverter speed setting for 50.0Hz:

Request: 0x01 0x06 0x00 0x1e 0x01 0xf4 CRCH CRCL

Reply: 0x01 0x06 0x00 0x1e 0x01 0xf4 CRCH CRCL

Remark: 0x001e: decimal 30, represents P030(First frequency);

0x01f4: decimal 500, inverter inside unit is 0.1Hz, scilicet 50.0Hz.

CRCH = E9; CRCL = DB.

38HZ: 01 06 00 1E 01 7C E9 BD

Read 1# inverter output frequency, inverter reply output frequency is 50.0Hz:

Request: 0x01 0x03 0x81 0x02 0x00 0x01 0x0d 0xf6

Reply: 0x01 0x03 0x02 0x01 0xf4 0xb8 0x53

Remark: 0x8102: Output frequency;

0x0001: Read a word;

0x02: Return two bytes;

0x01f4: Decimal 500, inverter inside unit is 0.1Hz, scilicet 50.0Hz.

Read 1# inverter status, inverter reply on forward run, no fault:

Request: 0x01 0x03 0x81 0x00 0x00 0x01 0xac 0x36

Reply: 0x01 0x03 0x02 0x01 0xa0 0xb9 0xac

Remark: 0x8100: inverter status words;

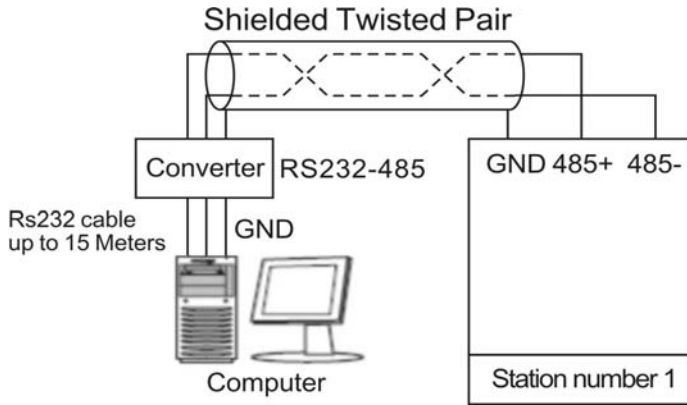
0x0001: read a word;

0x02: return two bytes;

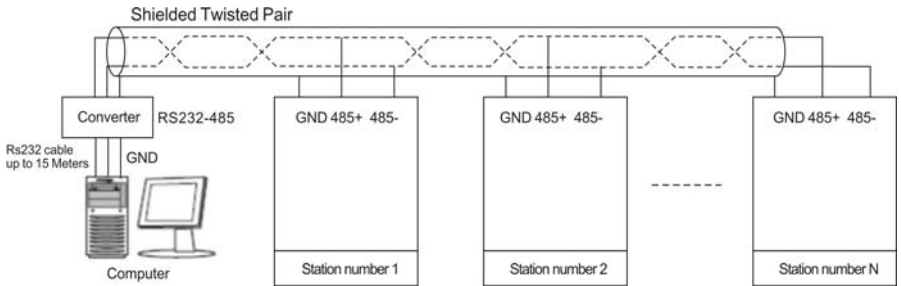
0x01a0: BIT5=1, inverter forward run

8 Communications network set up

- ◆ One inverter connected to the computer



◆ Multiple inverters connected to the computer



Notice: Only the most distant inverter require to connect to termination resistors. 240 OHM)

Chapter 7 Commitment to quality

This chapter provides the product “Commitment to quality” if have quality problem, we will handle according to follow regulations, pls read this chapter carefully before use.

Commitment to Quality Regulations of the product

7.1 Warranted range: Inverter itself

7.2 Warranted start time: On the day of user opening

7.3 Warranted commitment: The products implement three guarantees

1.1 Return within a week after purchase if have non-human quality problems

1.2 Replacement Within a month after purchase if have non-human quality problems

1.3 Guaranteed for a year

7.4 Subject to the following causes of failure, even within the warranty but needs maintenance fee:

1.1 Problems caused by incorrect operation or unauthorized repair and transform.

1.2 Problems caused by use inverter beyond the standard specifications requirement.

1.3 Damage cause by broken after purchase or improper placement (such as water, etc.).

1.4 Failure that due to use does not meet the requirements of this specification environment.

1.5 Inverter damage caused by wiring errors.

1.6 Failure that due to earthquake, fire, lightning, abnormal voltage or other caused by force majeure.

7.5 Sales in China and agencies of the company can provide service for this product.



Best Electrical Technology

Guarantee Card

Model :

Factory No. :

Buy day: _____

User name: _____ Company name: _____

Address: _____

Zip code: _____ E-mail: _____

Tel: _____ Fax: _____

If any quality problems occurred under appropriate operation, we provide 1 week replacement and 12 months free maintenance service when presenting this warranty card for the product purchased.

Changsha Best Electrical Technology Co.,Ltd

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of West Tongzipo Road, Gaoxin Area, Changsha, Hunan, China
Website: www.best-cn.cn
Mailbox: best_cs@126.com
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Please leave your comments and suggestions

Year Month Date