High Performance Vector Inverter

User Manual

(320 series)

Please carefully read this manual before installing/debugging/using this product!

(V 1.0)

Preface

Thank you for choosing 320 Series inverter (hereinafter referred to as inverter). This product is a full-featured and high-performed vector inverter of a new generation, which is researched, developed and produced independently by our company. It integrates various specialized needs for industry and individual needs for clients. It will try best to meet your needs in various occasions.

This product meets national standard of GB/T12668-2002 and has passed detection test made by National Center for Quality Supervision and Test of Electrical Control and Distribution Equipment as well as certification of ISO9001: 2008 international quality system.

This manual has illustrated relevant matters as users' installation and wiring, parameter setting, operation and running, fault diagnosis, trouble shooting and daily maintenance, etc. In order to ensure the right operation of the inverter in this series and make good use of its excellent performances, please carefully read this manual before installing this converter and keep it at hand or give it to the user of this converter.

If you have any questions or special requirements on the application of this inverter, please contact offices or agencies of our company, and after-sale service center of headquarter at any time. We will serve you with all sincerity.

Please carefully ensure the following matters while opening the box:

1. If this product has been damaged or bumped and whether the components are damaged or fell off;

2. If the rated values on nameplate are consistent with your requirements when you place this order;

3. If packing list is not consistent with your ordering data or there is any problem on this product, please contact offices or agencies of our company at any time. And please explain product model, specification, product code, purchasing date and degree of damage, etc. to help us solve your problems as soon as possible.

Contents

1. Matters Need Attention

In order to keep you, your equipment and properties safe, please carefully read the matters illustrated in this chapter before using this inverter and comply with them in transportation, installation, running, debugging and troubleshooting.

1.1 Definition of safety marks

Dangerous: This signal indicates that if do not operate accordingly, it may lead to death, serious injury or heavy losses of property.

Attention: This signal indicates that if do not operate accordingly, it may lead to personal injury or equipment damage.

Tips: This signal indicates some matters needed attention and some useful information.

1.2 Matters need attention for installation

1.2.1 Dangerous

1.2.1.1 Wiring shall be conducted by technicians with professional qualification to avoid electric shock.

1.2.1.2 Dismount and retrofit inverter privately is prohibited, otherwise it may lead to serious consequences.

1.2.1.3 Please fix the inverter on incombustible objects like metal to avoid catching fire.

1.2.1.4 Please do not fix inverter in inflammable and explosive environment, or else it may have danger of explosion.

Please correctly access AC power supply to input terminals R, S and T. Access output terminals U, V and W to AC power supply is prohibited, or else inverter will be damaged.

1.2.1.5 Before powering on, please cover the plate of inverter. With power on, please don't open the plate or wire, or else it has dangers of electric shock and explosion.

1.2.1.6 It is strictly prohibited to leave metals like wires or screws in the machine, or else it has dangers of explosion and fire.

1.2.1.7 With power on, please do not touch terminals with hands or operate inverter with wet hands, or else it has danger of electric shock.

1.2.1.8 With frequency powers on, wiring operation can be conducted only ten minutes after cutting off power supply and all the indicator lights on panel are off, or else it has danger of electric shock.

1.2.1.9 Please do not fix this inverter at the place with water, or else it might be damaged.

1.2.1.10 Please don't short out at P+ (+)/PB/N (-), or else it has dangers of fire and property damage.

1.2.1.11 For the inverter stored for a long time, voltage shall be boosted constantly by voltage regulator, or else it has dangers of electric shock or explosion.

1.2.2 Attention

1.2.2.1 Please avoid operation panel and cover plate being stressed, or else part of inverter will fall off and it has danger of being injured or damaged.

1.2.2.2 Installation shall be conducted at the place where it can bear the weight of inverter.

1.2.2.3 Please do not install the converter at the place under direct sunlight, or else it has danger of property damage.

1.2.2.4 Terminals of inverter shall be well-grounded.

1.2.2.5 Touch radiator with hands while power on or within ten minutes after power off is strictly prohibited to avoid being burnt.

1.2.2.6 If inverter is damaged or parts of it do not match, please do not install and run, or else it has dangers of being hurt or property damage.

1.2.2.7 Major loop terminals must be fasten to wires, or else it has dangers of property damage and reducing the nature life of converter.

1.2.2.8 For the occasion that starts and stops frequently, please control its start and stop with external terminals or panel. Please do not use contactor or other switching devices at the output end to directly control the start and stop very often, or else it may damage the converter.

1.3 Matters need attention for application

1.3.1 This inverter can be used only under the conditions stipulated in this manual. Unauthorized running environment may lead to dangers of fire, explosion and electric shock, etc.

1.3.2 When this inverter drives common motor to run slowly with constant torque for a longtime, increase of heat will make insulating property of the motor bad, because of heat dissipation of the motor becomes bad, which reduce natural life of the motor. Therefore, we suggest to use variable frequency motor or derate it.

1.3.3 When output frequency of motor driven by inverter is low, please derate it.

1.3.3 When output frequency of motor driven by inverter exceeds 50Hz, please take vibration of motor and increase of noises into consideration, and ensure that all are limited in acceptable degree like motor bearing, etc.

1.3.4 For the conditions like high inertia load, negative torque often happens, so that frequency will trip out because of over-current and over-voltage. At this time, braking resistor or braking unit or extending acceleration or deceleration time shall be adopted.

1.3.5 As this inverter has mechanical devices like reduction gearbox and gears that need lubricant, when it runs at a low speed for a long time, the lubricant quantity will becomes worse, so that it will be damaged. Thus, we suggest to check up before hand and maintain the device often.

1.3.6 Within a certain output frequency, inverter may come across mechanical resonance point of load devices, which can be avoided through setting hopping frequency.

1.3.7 When the wire between inverter and motor is over 30 meters, a high dv/dt will be generated in the coil of motor, which will damage layer insulation of the motor. Then please add output AC reactor at output end.

1.3.8 Before the first use or reuse after being placed for a longtime, please make insulation inspection on motor (make sure that insulation resistance measured is not less than 5MΩ) to avoid damaging inverter because of insulation failure.

1.3.9 As output U, V, W voltage waveform of inverter is PMW Wave, if capacitance for improving power factor or voltage dependent resistor for lightning protection is installed at the output end, inverter will fail or parts of it will be damaged. Then it must be removed. Diagram of capacitor prohibited at output end of inverter is as the following Diagram 1-2:

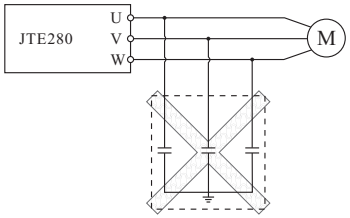


Diagram 1-2 Diagram of capacitor prohibited at output end of inverter

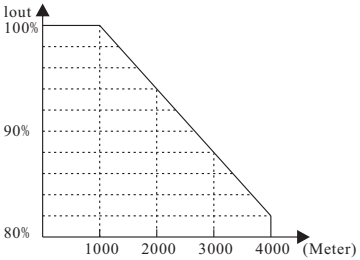


Diagram 1-3 Application relationship between rated output current of frequency converter and derating of altitude

1.3.10 If switching devices as contactor are needed to be fixed between output of inverter and motor, please make sure that make-break operation is conducted when inverter is of no output, or else the inverter may be damaged.

1.3.11 This inverter is not suitable to be used beyond working voltage. If it is needed, relevant voltage boosting device and voltage dropping device shall be used to transform voltage.

1.3.12 In the region higher than 1,000 meters above sea level, for the low cooling efficiency of inverter caused by rarefied air, it shall be used through derating. Application relationship between rated output current of inverter and derating of altitude is showed in following Diagram 1-3.

1.3.13 When adaption motor is selected, thermal protection can be carried out by inverter. If rated capacities of motor and inverter do not match, protection value must be adjusted or other protection measures shall be adopted, so as to keep the motor running safely through protection.

1.4 Matters need attention for abandonment

When deal with obsolete inverter and its components, please pay attention to the following matters.

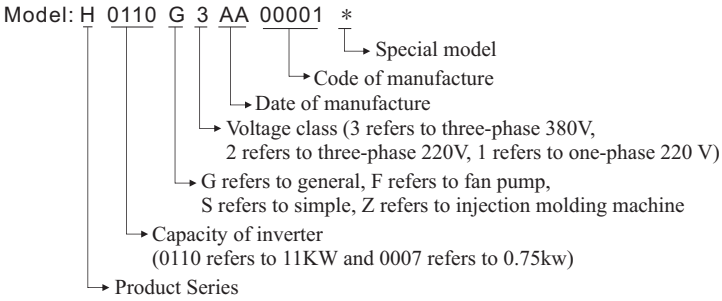
Electrolytic capacitor: electrolytic capacitor in inverter may cause explosion when burn it.

Plastics: plastics on electrolytic capacitor and rubber products may give off hazardous gas when it is burnt. Please do not burn it freely.

Clearance: please treat obsolete inverter as industrial waste.

2.Technical Parameters and Index

2.1 Model and its signification



2.2 Rated current output meter

Voltage	One-phase	Three-phase		
	220V	220V(240V)	380V（415V）	460V（440V）
Power (KW)	Current (A)	Current (A)	Current (A)	Current (A)
0. 4	2. 5	2. 5	-	-
0. 75	4	4	2. 5	2. 5
1. 5	7	7	3. 7	3. 7
2. 2	10	10	5	5
4	16	16	9	8
5. 5	20	20	13	11
7. 5	30	30	16	15
11	42	42	25	22
15	55	55	32	27
18. 5	–	70	38	34

Voltage	One-phase	Three-phase		
	220V	220V(240V)	380V（415V）	460V（440V）
Power (KW)	Current (A)	Current (A)	Current (A)	Current (A)
22	–	80	45	40
30	–	110	60	55
37	–	130	75	65
45	–	160	90	80
55	–	200	110	100
75	–	260	150	130
93	–	320	170	147
110	–	380	210	180
132	–	420	250	216
160	–	550	300	259
185	–	600	340	300
200	–	660	380	328
220	-	720	415	358
250	–	–	470	400
280	–	–	520	449
315	–	–	600	516
355	–	–	640	570
400	–	–	750	650
500	–	–	920	800

2.3 Instructions on technical index

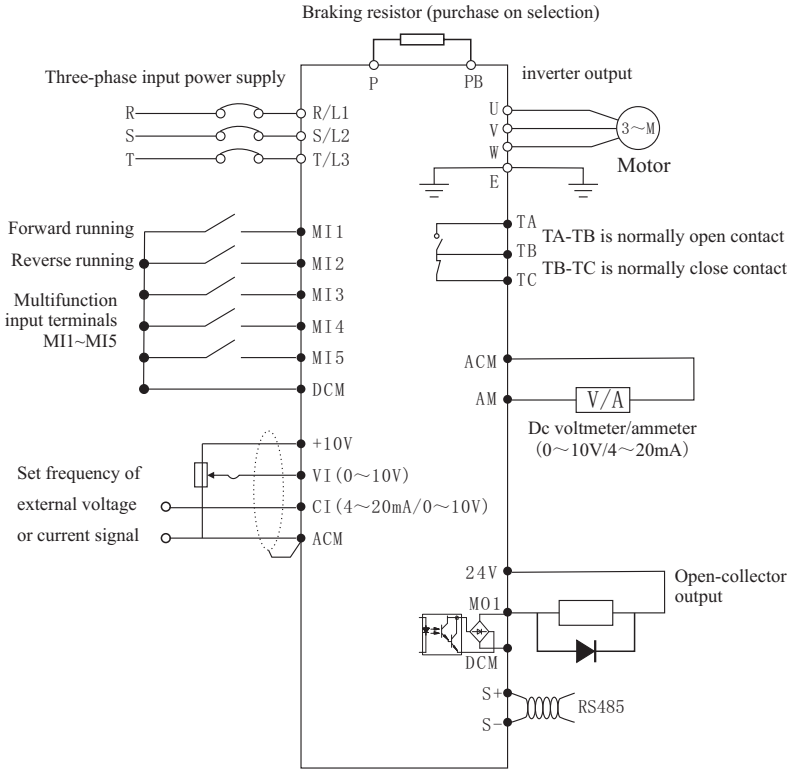
Input	Rated voltage and frequency		One-phase 220V, three-phase 380 V; 50/60Hz
	Change allowed range of voltage		One-phase 175V~280V; three-phase 305V~480V; voltage unbalance rate<3%;
Output	Voltage		Three-phase 0~220V, 0~380V
	Frequency		0Hz~600Hz
	Overload capacity		Series G: rated current ×150% / 1minute, ×180% / 2seconds; Series P: rated current ×120% / 1minute, ×150% / 2seconds; Heavy duty Z: rated current ×110% longtime, ×180% / 3minutes;
Controlling characteristics	Control method		V/F control (optimized SVPWM with the characteristic of optimized low-frequency dead-time compensation)
	Resolution of frequency setting	Simulation setting	0.1% of maximum output frequency
		Digital setting	0.01Hz
		Panel simulation setting	0.4% of maximum frequency
		External pulse	0.1% of maximum frequency
	Channel of frequency setting		Setting of penal potentiometer; setting of [▲] and [▼] on panel; setting of digitals on panel; setting of Port RS485; increasing and decreasing setting of terminal UP/DOWN; setting of analog voltage (DC/0～10V); setting of analog current (CI/4~20mA); setting of pulse (0~20KHz); combination setting; it allows switching between these setting methods at any time.
	Frequency accuracy	Simulation setting	±0.2% of maximum output frequency
		Digital setting	±0.01% of given output frequency
		External pulse setting	±0.1% of maximum output frequency
	V/F Curve (frequency characteristics of voltage)		Reference frequency can be set freely 5~500Hz and five curves can be chosen from: 1. Characteristic curve with constant torque 2. Characteristic curve with three reduced torques (2.0power, 1.7power and 1.2power) 3. Multistage V/F Curve defined by user
	Torque boost	Manual setting	0.1%~ 30% of rated output
		Auto-raise	Raising torque is confirmed automatically with output current

Controlling characteristics	Setting of accelerating and decelerating	Two methods: accelerate and decelerate as straight line, accelerate and decelerate as curve; seven types of time for accelerating and decelerating with unit of time can be chosen from (minute/second); it can be set successively 0.1s~6,000m.
	DC braking	It can be chosen when start or stop respectively, motion frequency 0~15Hz, braking current X (0~80%), with starting time of 0~60s or durative actions.
	Startup signal	It can be chosen from signals of forward signal, reversal signal and startup signal (triliner control)
	Operation with automatic energy-saving	Optimize V/F Curve automatically according to condition of loading so as to realize energy-saving operation.
	Automatic current limiting function	It is equipped with the ability of current self-restraint to avoid breakdown frequent over-current in the process of accelerating and decelerating as well as under impacting load
	Automatic voltage regulation (AVR)	When network voltage changes, it can be adjusted and maintained automatically to keep output voltage constant
	Prevention of voltage stall	Guarantee that overvoltage will not happen in the process of decelerating.
	Carrier adjustment of motor noise	Carrier frequency 1.0KHz~ 15.0KHz is successive and adjustable, which will reduce motor noises the most.
	Timer and counter	It build-in a timer and a counter, which helps to integrate system
	Function of multi-velocity control	It has seven stages of programmable multi-velocity control with running direction and running time of each stage can be set. When it is controlled by external terminals, speed can reach 15, which involves 6 operation modes including pendulous frequency operation.
	Pendulous frequency operation	It is of abundant pendulous frequency parameters, which helps to measure and set online data like center frequency, pendulous frequency amplitude and length, etc, so as to realize multi-machine interaction operation.
	Built-in PID control	It helps to make a simple closed-loop control system with no PID controller.

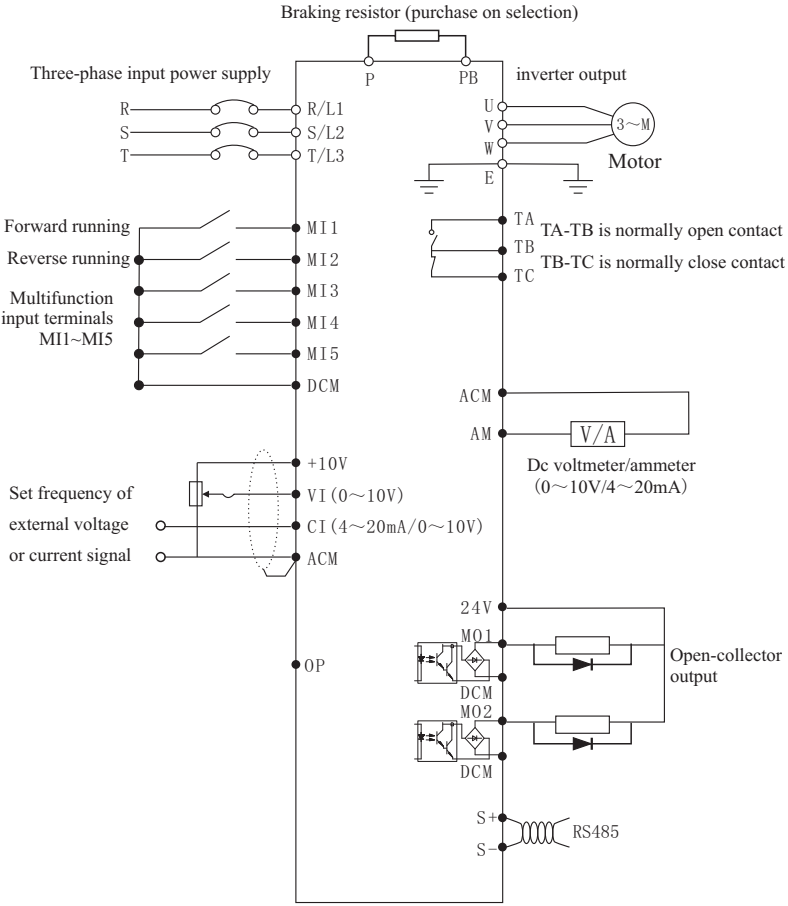
Controlling characteristics	Operation function		Setting of upper limiting frequency and lower limiting frequency, hopping motion of frequency, limit of reverse running, compensation of slip frequency, operation with stable voltage automatically, RS485 communications, control of frequency increasing and decreasing and self-recovery from fault.
	Output signal	Running status (M01 output)	inverter is running, arrival of frequency, level detection of frequency, alarm of overloading, stop running with external fault, reach upper-frequency limit, reach lower-frequency limit, stop with inadequate voltage, run with no speed, programmable multi-velocity status, reach internal counter, reach internal timer, upper and lower pressure limit alarm.
		Indicator	Output frequency, output current, output voltage, motor rotating speed, PID setting and feedback and be able to connect with voltmeter and frequency meter outside.
Display	Operation panel display	Running status	Output frequency, output current, output voltage, motor rotating speed, frequency setting, PID setting, PID feedback, module temperature, total of running time, analog input and output, and input status of terminals, etc.
		Warning contents	With failure logging of latest six times and operation parameters like output frequency, set frequency, output current, output voltage, DC bus voltage, module temperature of latest tripping operation.
Protection/warning function			Over-current, over-voltage, under-voltage, protection of electronic thermal relay, overheating, short circuit and over-loading.
Environment	Ambient temperature		From -10℃ to 50℃ (no freezing) (when the temperature is 40℃-50℃, we suggest to derate)
	Ambient humidity		Under 90% (no frosting)
	Surroundings		Indoor (with no direct sunlight, corrosion, inflammable gas, oil mist, vapor and water drops, etc)
	Elevation		Under 1000M
Structure	Level of protection		IP20
	Cooling method		Forced cooling
Installation methods			Wall-mounted type/ cabinet type

3. Installation and Wiring

3.1 Basic wiring diagram of major loop

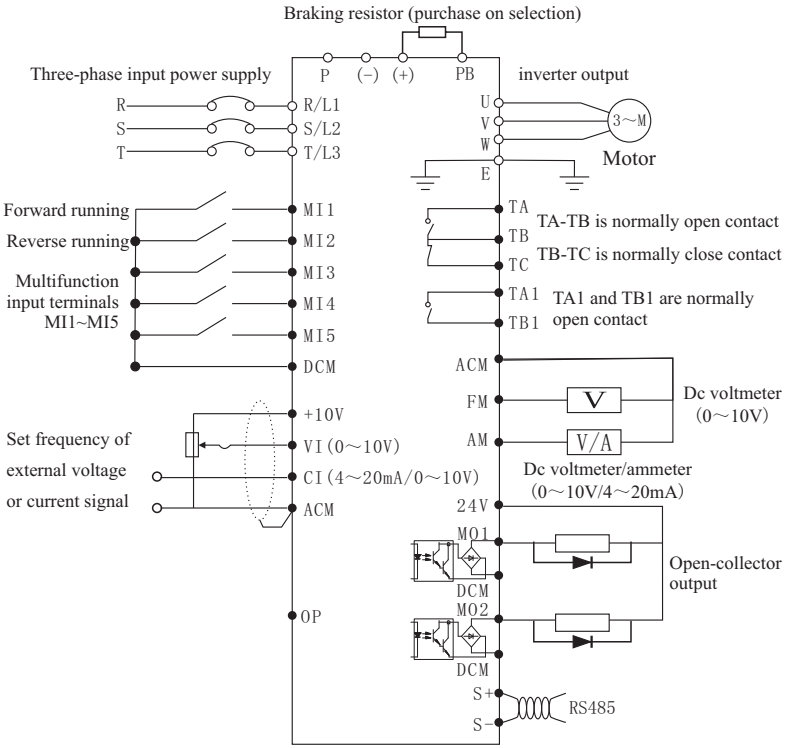


0.75-2.2KW Basic wiring diagram



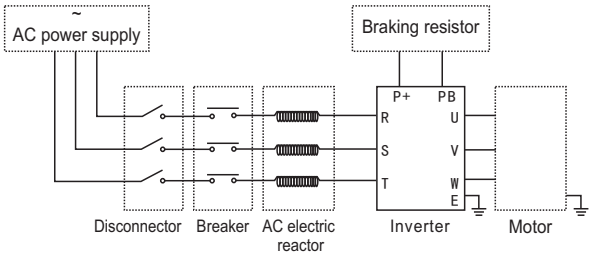
4-7.5KW Basic wiring diagram

Notation: 320S series (0.4-7.5KW) no AM Terminal.



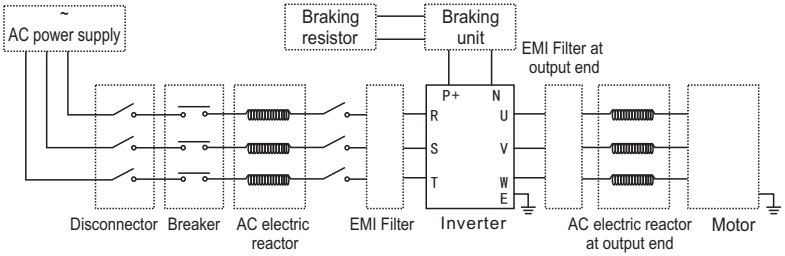
Above 11KW Basic wiring diagram

3.2 Recommendation of systematic wiring diagram



Simple systematic wiring diagram

Standard systematic wiring diagram refers to the following Diagram:



Standard systematic wiring diagram

Tips

1. Breaking devices like air-break switch must be fixed between power grid and inverter to endure personnel safety at equipment maintenance. When faults like short circuit or supply voltage is too low happen on the input end of inverter, air-break switch can protect it.

2. Breaker (QF) or fuse protector that can protect from over-current must be fixed in front of inverter to prevent expansion of fault coverage caused by fault of following devices.

3. Please do not control power on or off with contactor.

4. AC input electric reactor can be added when wave form of power grid distorts seriously, or after fixing DC electric reactor to inverter, interaction effect of ultra harmonics between power supply and inverter cannot meet the needs, or in order to improve power factor at input end of the inverter.

5. EMI filter at input end is able to prevent the high-frequency noise interference from power line of inverter.

6. In order to protect inverter and restrain ultra harmonics, as well as protect inverter from power supply, please fix DC electric reactor under the following circumstances.

a. When it has transient with no power caused by no switching with switch on the same power supply node that powers up inverter, which leads to gaps of harmonic and power grid caused by power grid voltage jump and phase-controlled load, it may damage bridge rectifier of inverter input.

b. When imbalance of three-phase power supply is more than 3% and inverter accesses to transformer with high-capacity, current flows over input power circuit of inverter may damage rectifying circuit. When capacity of power supply of inverter is larger than 550KVA, or power supply capacitance is larger than ten times of capacity of inverter, DC electric reactor needs to be fixed.

7. For output AC reactor, when the wire between inverter and motor is longer than 30 meters, output AC reactor that restrains high frequency oscillation is better to be fixed, to prevent insulation of motor from being damaged and when leakage current is very large, inverter will also jump to protect it.

8. EMI filter at output end: EMI filter can be selected to prevent interference noises and leakage current of wires at output end of inverter.

3.3 Selection of fittings

3.3.1 Braking resistor

inverters of 18.5W and under 18.5W have braking unit. Braking resistor can be fixed if dynamic braking is needed. If dynamic braking is needed in inverters above 22KW, braking unit and braking resistor shall be fixed. Commonly used braking resistor shall be selected and fixed according to the following chart:

Voltage (V)	Power (KW)	Specification of braking resistor		Braking torque 10%ED
		W	Ω	
One-phase 220 series	0.4	80	200	125
	0.75	100	200	125
	1.5	300	100	125
	2.2	300	70	125
	3.7	300	50	125
Three-phase 380 series	0.75	80	750	125
	1.5	300	400	125
	2.2	300	250	125
	4	400	150	125
	5.5	500	100	125
	7.5	1000	75	125
	11	1000	50	125
	15	1500	40	125
	18.5	4800	32	125
	22	4800	27.2	125
	30	6000	20	125
	37	9600	16	125
	45	9600	13.6	125
	55	12000	20/2	125
	75	18000	13.6/2	125
	93	18000	20/3	125
	110	18000	20/3	125
	132	24000	20/4	125
	160	36000	13.6/4	125

Remarks:

1. Please select the resistance value and operating frequency formulated by our company;

2. If the inverter and other devices are damaged because of using braking resistor that is not provided by out company, our company will not undertake any liabilities.

3. For the installation of braking resistor, safety and flammability of the environment must be taken into consideration, and the distance between braking resistor and inverter shall be not less than 100mm.

4. Parameters in this chart are only for reference, not as the standard.

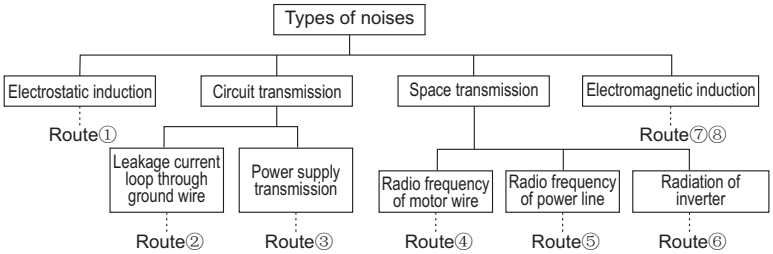
3.4 About interferences

Output of inverter is PWM wave, which will generate some noises while running. In order to reduce interferences that inverter brings to others, installation methods below can be referred.

3.4.1 Restraint of noise

(1) Type of noises

Degree of the influence on other devices made by the noises generated by inverter while working is related to various factors like controlling system of inverter, anti-interference ability and wiring condition of the device, safe distance and grounding method, etc. Types of noises include: electrostatic induction, circuit transmission, space transmission, electromagnetic induction and so on.



Noises types in multi-machine communication of inverter

(2) Basic countermeasures to prevent noises

Chart of Countermeasures to Prevent Interferences

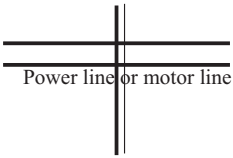
Noises transmission route	Countermeasures to reduce influence
②	When ground wire of peripheral equipment forms a closed loop with wirings of inverter, ground wire of inverter will leak current, which leads to malfunction of equipment. At this time, if the equipment is not grounding, malfunction will be added more.
③	When peripheral equipment shares the same system with power supply of inverter, the noises will transmit backward the power line, which interferes other devices of the same system. Preventing measures can be adopted as follows: install an electromagnetic noise filter at input end of inverter, in order to isolate it from other devices.
④⑤⑥	(1) Devices and signal lines that are easy to be interfered shall keep a distance from inverter. Adopt shielded line as signal line, with shielding layer grounded with single-end and try to keep a distance from inverter and its input line as well as output line. If signal line must be intersected with strong current cable, they should be orthogonal.

Noises transmission route	Countermeasures to reduce influence
④⑤⑥	(2) Install filter with high-frequency (ferrite common-mode choking coil) at input end and output end of inverter, which is effective to prevent radio-frequency interference of power line. (3) Cables of motor shall be put in rather thick barrier, such as put into pipes with large thickness (more than 2mm) or embed into cement tub. Then immerse power line into metal tube, and ground with shielded line (motor uses 4D cable, with one grounded at the side of inverter, and the other side connect to motor case).
①⑦⑧	Avoid strong current wires and weak current wires from being arranged in parallel or tied together; try to keep a distance from installation devices of inverter, and its wiring shall be away from inverter, input line and output line. Shielded line shall be used in signal line and power line. Pay attention to the relevant installation place of the devices with highfield and high magnetic field and be aware of getting away from it and being orthogonal.

3.4.2 Field wiring and grounding

(1) Cable (outgoing line of terminals U, V and W) from inverter to motor shall avoid being parallel with power line (input line of terminals R, S and T or R and T). If they must be paralleled, it must keep a distance of more than 30cm.

(2) Try to put three motor lines of output terminals U, V and W in metal tube or metal wiring groove.



Requirements on systematic wiring

(3) Control signal line shall adopt shielded cable, with shielding layer connecting to Port E of inverter and grounded with single end at the side near inverter.

(4) Ground cable at PE of inverter cannot connect with ground wire via other devices. It must be directly connected with earth plate.

(5) Control signal line cannot be arranged with strong current cable (R, S and T with U, V and W) in parallel within a short distance. They also cannot be tied together, which shall keep a distance of 20~60cm (related to intensity of strong current). If they should be intersected, they shall pass through each other vertically, just as Standard systematic wiring diagram.

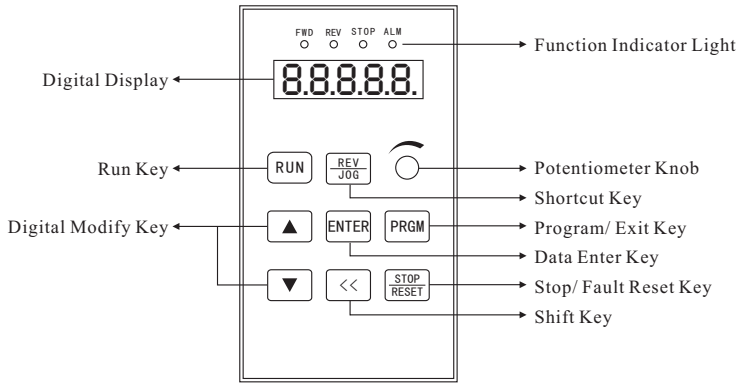
(6) Weak current ground wires like control signal line and sensor shall be grounded respectively and independently strong current ground wire.

(7) Connect with other devices at the power supply input end (R, S and T) of inverter is prohibited.

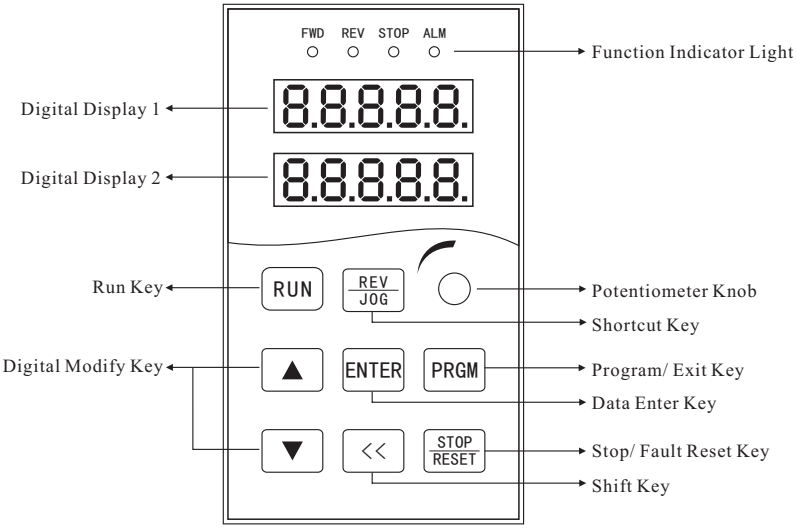
4. Operation and Display

4.1 Keypad Description

4.1.1 Keypad Schematic Diagram



Keypad Schematic Diagram (Single display)



Keypad Schematic Diagram (Double display)

4.1.2 Key Function Description

KeyName	Name	Function Description
PRGM	Programming key	Enter or exit of menu, parameter modification.
ENTER	Data enter key	Progressively enter menu and confirm parameter.
▲	UP increase key	Progressively increase data or function codes.
▼	DOWN decrease key	Progressively decrease data or function codes.
<<	Shift key	The selection of parameter modification and display content.
RUN	Run key	Start to run the inverter in keypad control mode.
STOP/RESET	Stop/reset key	To stop/reset operation, limited by function code F7-02.
REV/JOG	Shortcut key	Determined by function code F7-01.

4.1.3 Indicator Light Description

Indicator light name	Description
FWD	Forward operation status
REV	Reverse operation status
STOP	Stop status
ALM	Malfunction status

4.2 Operation Process

The monitoring operation of the first group LED digital display on the dual-display keyboard is same with the operation of the single display keyboard. The second group LED digital display mainly used to monitor the parameters of F7-08. With the factory default value of 04, it would mainly monitors the running current of the actuator. In case it is necessary to monitor other parameters, please modify the monitoring value of F7-08 directly and no need any other conversion.

4.2.1 Parameter Setting

Three levels of menu are:

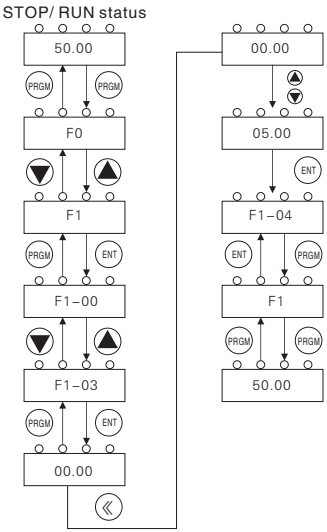
·Function code group (first-class)

·Function code (second-class)

·Function code setting value (third-class)

Remarks: Pressing PRGM or ENT can return to the second-class menu from the third-class menu. The difference is: Pressing ENT will save the setting parameters into the control panel, and return to the second-class menu with shifting to the next function code automatically. While pressing PRGM will directly return to the second-class menu without saving the parameters, and keep staying at the current function code.

For example: change the parameter 00.00Hz of function code F1-03 into 05.00 Hz as the following flow chart shows:



Flow Chart of Parameter Setting

Under the third-class menu, if the parameter has no flickering bit, it means the function code cannot be modified. The possible reasons include:

1) The parameter of this function code can't be modified, such as actual detected parameter, operation records and so on.

2) This function code can't be modified in running status, but can be modified in stop status.

4.2.2 Fault Reset

When inverter malfunction occurs, it will display the relative fault information. Use the STOP/RESET or terminals (determined by F5 Group) to reset the fault. After fault reset,inverter is at stand-by status. If not reset when inverter is at fault status, it will keep operation protection status and cannot run normally.

4.2.3 Motor Parameter Autotuning

When select SVC control mode (vector control without PG card), make sure that motor nameplate parameter is correctly input into the inverter. Inverter will match standard motor parameter according to nameplate parameter. In order to achieve precise control, autotuning is necessary. Refer to the following steps:

Firstly, set the parameter of F0-02 to 0. This means select the keypad to control stop or start.Then input the 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

If motor can be uncoupled with its load completely, set the parameter of F2-11 to 2 (complete tuning) and then push RUN , inverter can calculate the parameter of motor. During autotuning process, the panel of inverter will display RUN, When it displays END the autotuning process is finished.

If motor cannot be uncoupled with its load, set the parameter of F2-11 to 1 (static tuning) and then push RUN , inverter will auto-detect the parameters of motor stator resistor, rotator resistor and leakage inductance, while the parameters of motor mutual inductance and no-load current are not detected.

The parameters of motor mutual inductance and no-load current can be calculated by the following formula:

$$I0 = I \times \sqrt{1 - \eta^2}$$

$$Lm = \frac{U}{2\sqrt{3}\,\pi f \cdot Io} - L\delta$$

I 0 for no-load current, Lm for mutual inductance, L δ for leakage inductance.

4.2.4 Password Setting

When F7-00 is set to be non-zero, the parameter will be the user's password. After exit the function code editing status, the password will be effective after one minute. And then press the PRGM key again to try to access the function code editing mode, the inverter panel will display 0.0.0.0. The password must be input correctly to access it. If it is necessary to cancel the password function, set F7-00 to zero.

NOTE: When the inverter is powered on, system will execute initialization first and inverter panel displays J-320 with four lights on. After initialization, inverter accesses into stand-by status.

5. List of Functional Parameters

Here is the description for the symbols used in the functional parameter table:

"☆": It indicates that the setting value of the parameter can be modified when the inverter is in stop status or running status.

"★": It indicates that setting value of the parameter cannot be modified when the inverter is under the running status.

"●": It indicates that the numerical value of the parameter is actually measured value, which cannot be modified.

" * ": It indicates this parameter is "Factory Default Parameter" and can only be set by the manufacturer. The users are prohibited to adjust this parameter.

Function Code	Function Description	Setting Range	Factory Default Value	Change
F0 Group: Basic Functional Parameter Group				
F0-00	GP Model Display	1: G Model (constant torque load model) 2: P Model (fan and pump load model)	Model Dependent	●
F0-01	Control Model of Motor	0: Speed sensorless vector control (SVC) 1: Reserved 2. V/F control	2	★
F0-02	Command Source Selection	0: Operation Panel Running Command Channel 1: Terminal Command Channel 2: Communication Command Channel	0	☆
F0-03	Main Frequency X Selection	0: Digital Setup (The Pre-set Frequency is F0-08, Adjustable UP and DOWN, No Memory after Power Off) 1: Speed Control of Panel Potentiometer 2: VI 3: CI 4: Reserved 5: Reserved 6: MS Command 7: Simple PLC 8: PID 9: Communication	1	★
F0-04	Auxiliary Frequency Source Y Selection	Same with F0-03 (Main Frequency Source X Selection)	0	★
F0-05	Auxiliary Frequency Source Y Range Selection	0: Relative to Maximum Frequency 1: Relative to Frequency Source X	0	☆
F0-06	Auxiliary Frequency Source Y Range Selection	0%-150%	100%	☆

Function Code	Function Description	Setting Range	Factory Default Value	Change
F0-07	Frequency Source Overlapping Selection	Single-digit: selection of frequency source 0: Main frequency source X 1: Operation results of main and auxiliary frequency (the operation relationship is determined by tens digit) 2: Switching between main frequency source X and the auxiliary frequency source Y 3: Switching between main frequency source X and the operation results of main and auxiliary frequency 4. Switching between auxiliary frequency source Y and the operation results of main and auxiliary frequency Tens Digit: Operation relation between main frequency source and auxiliary frequency source 0: main plus auxiliary 1: main minus auxiliary 2: Maximum value between the main and the auxiliary 3: Minimum value between the main and the auxiliary	00	☆
F0-08	Pre-placing Frequency	0.00Hz-Maximum Frequency (F0-10)	50.00Hz	☆
F0-09	Running Direction	0: Direction is consistent 1: Direction is reverse	0	☆
F0-10	Maximum Frequency	50.00Hz-600.00Hz	50.00Hz	★
F0-11	Frequency Source Upper Limit	0: F0-12 Setting 1: VI 2: CI 3: Reserved 4: Reserved 5: Commuication Setup	0	★
F0-12	Frequency Upper Limit	Frequency Lower Limit F0-14-Maximum Frequency F0-10	50.00Hz	☆
F0-13	Frequency Upper Limit Offset	0.00Hz-Upper Limit Frequency F0-10	0.00Hz	☆
F0-14	Frequency Lower Limit	0.00Hz-Upper Limit FrequencyF0-12	0.00Hz	☆
F0-15	Carrier Frequency	0.5kHz-16.0kHz	Model Dependent	☆
F0-16	Carrier Frequency is Adjusted along with Temperature Changes	0: No 1: Yes	1	☆

Function Code	Function Description	Setting Range	Factory Default Value	Change
F0-17	Acceleration Time 1	0.00s-65000s	Model Dependent	☆
F0-18	Deceleration Time1	0.00s-65000s	Model Dependent	☆
F0-19	Time Unit of Acceleration and Deceleration	0: 1 second 1: 0.1 second 2: 0.01 second	1	★
F0-20	Reserved			
F0-21	Offset Frequency of Auxiliary Frequency Source During Overlapping	0.00Hz-Upper Limit Frequency F0-10	0.00Hz	☆
F0-22	Frequency Command Resolution	1: 0.1Hz 2: 0.01Hz	2	★
F0-23	Digital Setting Frequency Shutting Down Memory Selection	0: No Momory 1: With Memory	0	☆
F0-24	Benchmark Frequency of Acceleration Time	0: Maximum Frequency (F0-10) 1: Setting Frequency 2: 100Hz	0	★
F0-25	Frequency Command UP/DOWN Benchmark during Running	0: Running Frequency 1: Setting Frequency	0	★
F0-26	Command Source Bonding with Frequency SOurce	Single-digit: Operation Panel Command Binding with Frequency Source Selection 0: No binding 1: Panel Potentiometer Speed Adjustment 2: VI 3: CI 4: Reserved 5: Reserved 6: MS Speed 7: Simple PLC 8: PID 9: Communication Setting Tens Digital: Terminal Command binding with Frequency Source Selection Hundreds Digital: Communication Command binding with Frequency Source Selection Thousand Digital: Automatic Running binding with Frequency Source Selection	0000	☆
F0-27	Initialization of parameter	0: No Operation 01: Recover the Basic Parameter Group (F0 Group and F1 Group) 02: Clear Off Record Information 03: Complete Initialized Parameters	0	★

Function Code	Function Description	Setting Range	Factory Default Value	Change
F1 Group: Start-up and Shut-down Parameters				
F1-00	Start-up Method	0: Direct Start-up 1: Re-startup of rotate speed tracking 2: Pre-field Enable (alternate electrical asynchronous motor)	0	☆
F1-01	Rotate Speed Tracking Method	0: Starting from Shut-down Frequency 1: Starting from Zero 2: Starting from Maximum Frequency	0	★
F1-02	Speed of Rotate Speed Tracking	1-100	20	☆
F1-03	Start-up Frequency	0.00Hz-10.00Hz	0.00Hz	☆
F1-04	Retention Time of Start-up Frequency	0.0s-100.0s	0.0s	★
F1-05	Starting DC Braking Current /Prelimary Exciting Current	0%-100%	0%	★
F1-06	Starting DC Braking Time / Prelimary Exciting Time	0.0s-100.0s	0.0s	★
F1-07	Accelerating and Decelerating Method	0: Direct Line Acceleration and Deceleration 1: S Curve Acceleration and Deceleratio A 2: S Curve Acceleration and Deceleratio B	0	★
F1-08	Time Scale of the Starting Section of the S Curve	0.0%-(100.0%-F6-09)	30.0%	★
F1-09	Time Scale of the Ending Section of the S Curve	0.0%-(100.0%-F6-08)	30.0%	★
F1-10	Shut-down Method	0: Slowing Down Shut-down 1: Free Shut-down	0	☆
F1-11	Starting Frequency of the DC Braking for Shut-down	0.00Hz-Upper Limit Frequency	0.00Hz	☆
F1-12	Waiting Time of DC Braking for Shut-down	0.0s-100.0s	0.0s	☆
F1-13	DC Braking Current for Shut-down	0%-100%	0%	☆
F1-14	DC Braking Time for Shut-down	0.0s-100.0s	0.0s	☆
F1-15	Braking Utiliztion Rate	0%-100%	100%	☆

Function Code	Function Description	Setting Range	Factory Default Value	Change
F2 Group: Motor Parameter Group				
F2-00	Selection of Motor Type	0: 3-Phase Asynchronous Motor 1: Variable Frequency Motor	0	★
F2-01	Rated Power of Motor	0.1kW-1000.0kW	Model Dependent	★
F2-02	Rated Voltage of Motor	1V-2000V	Model Dependent	★
F2-03	Rated Current of Motor	0.01A-655.35A (Power of Frequency Converter<=55kW) 0.1A-6553.5A (Power of Frequency Converter >55kW)	Model Dependent	★
F2-04	Rated Frequency of Motor	0.01Hz-Upper Limit Frequency	Model Dependent	★
F2-05	Rated Rotation Speed of Motor	1rpm-65535rpm	Model Dependent	★
F2-06	Stator resistor of asynchronous motor	0.001Ω -65.535Ω (Power of Frequency Converter<=55kW) 0.0001Ω-6.5535Ω (Power of Frequency Converter>55kW)	Tuned Parameters	★
F2-07	Rotor resistor of asynchronous Motor	0.001Ω -65.535Ω (Power of Frequency Converter<=55kW) 0.0001Ω-6.5535Ω (Power of Frequency Converter>55kW)	Tuned Parameters	★
F2-08	Leak inductance of asynchronous motor	0.01mH-655.35mH (Power of Frequency Converter<=55kW) 0.001mH-65.535mH (Power of Frequency Converter>55kW)	Tuned Parameters	★
F2-09	Mutual inductance of asynchronous Motor	0.1mH-6553.5mH (Power of Frequency Converter<=55kW) 0.01mH-655.35mH (Power of Frequency Converter>55kW)	Tuned Parameters	★
F2-10	No-load current of asynchronous motor	0.01A-F2-03 (Power of Frequency Converter<=55kW) 0.1A-F2-03 (Power of Frequency Converter>55kW)	Tuned Parameters	★
F2-11	Tuning Selection	0: No Operation 1: Static tuning of asynchronous motor 2: Complete tuning of asynchronous motor	0	★

Function Code	Function Description	Setting Range	Factory Default Value	Change
F3 Group: Vector Control Parameter Group				
F3-00	Speed Loop Proportional Gain 1	1-100	30	☆
F3-01	Speed Loop Integration Time 1	0.01s-10.00s	0.50s	☆
F3-02	Switching Frequency 1	0.00-F3-05	5.00Hz	☆
F3-03	Speed Loop Proportional Gain 2	1-100	20	☆
F3-04	Speed Loop Integration Time 2	0.01s-10.00s	1.00s	☆
F3-05	Switching Frequency 2	F3-02-Maximum Frequency	10.00Hz	☆
F3-06	Slip Gain of Vector Control	50%-200%	100%	☆
F3-07	Filter time constant of Speed Loop	0.000s-0.100s	0.000s	☆
F3-08	Over-excitation Gains of Vector Control	0-200	64	☆
F3-09	Upper limit source of torque under the speed control mode	0: Function Code F2-10 Setting 1: VI 2: CI 3: Reserved 4: Reserved 5: Communication Setting 6: MIN(VI,CI) 7: MAX(VI,CI) The full span of the item 1-7 corrospond with F2-10	0	☆
F3-10	Digitial setting of the upper limit for torque under speed control mode	0.0%-200.0%	150.0%	☆
F3-11	Reserved			
F3-12	Reserved			
F3-13	Proportional gain of excitation adjustment	0-60000	2000	☆
F3-14	Integration gains of excitation adjustment	0-60000	1300	☆
F3-15	Proportional gains of torque adjustment	0-60000	2000	☆
F3-16	Integration gains of torque adjustment	0-60000	1300	☆
F3-17	Integration property of speed loop	Single-digit: Integration Separation 0: Inactive 1: Active	0	☆

Function Code	Function Description	Setting Range	Factory Default Value	Change
F4 Group: V/F Control Parameter Group				
F4-00	VF Curve Setting	0: Straight line V/F 1: Multi-point V/F 2: Square V/F 3: Power 1.2 V/F 4: Power 1.4 V/F 6: Power 1.6 V/F 8: Power 1.8 V/F 9: Reserved 10: VF complete separation mode 11: VF Semi-separation mode	0	★
F4-01	Torque Boost	0.0: (automatic) 0.1% to 30.0%	Model Dependent	☆
F4-02	Torque Boost Cut-off Frequency	0.00Hz-Maximum Frequency	50.00Hz	★
F4-03	Multi-point VF Frequency Point 1	0.00Hz-F3-05	0.00Hz	★
F4-04	Multi-point VF Voltage Point 1	0.0%-100.0%	0.0%	★
F4-05	Multi-point VF Frequency Point 2	F3-03-F3-07	0.00Hz	★
F4-06	Multi-point VF Voltage Point 2	0.0%-100.0%	0.0%	★
F4-07	Multi-point VF Frequency Point 3	F3-05-Rated Frequency of Motor (F1-04)	0.00Hz	★
F4-08	Multi-point VF Voltage Point 3	0.0%-100.0%	0.0%	★
F4-09	VF Slip Compensation Gain	0.0%-200.0%	0.0%	☆
F4-10	VF Over-excitation Gain	0-200	64	☆
F4-11	VF Oscillation Suppression Gain	0-100	Model Dependent	☆
F4-12	Reserved			
F4-13	Voltage Source Separated from the VF	0: Digitial Setting (F3-14) 1: VI 2: CI 3: Reserved 4: Reserved 5: MS Command 6: Simple PLC 7: PID 8: Communication Setting Note: 100.0% relative to the rated voltage	0	☆
F4-14	Digital Setting of the Voltage Separated from VF	0V-Rated Voltage of Motor	0V	☆
F4-15	Ascending Time of the Voltage Separated from VF	0.0s-1000.0s Note: indicate the time from 3V to rated voltage of the motor	0.0s	☆

Function Code	Function Description	Setting Range	Factory Default Value	Change
F5 Group: Input Terminal Parameter Group				
F5-00	MI1 Terminal Function Selection	0: No Function 1: Forward Running (FWD) 2: Reversed Running (REV) 3: Three-line Mode Running Control 4: Forward Rotation Jog (FJOG) 5: Reverse Rotation Jog (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Coast to stop 9: Fault Reset (RESET) 10: Pause 11: External Fault Normal Open Input 12: MS Command Terminal 1 13: MS Command Terminal 2 14: MS Command Terminal 3 15: MS Command Terminal 4 16: Speed-up and Speed-down Time Selection Terminal 1 17: Speed-up and Speed-down Time Selection Terminal 2 18: Switching of Frequency Sources 19: UP/DOWN Setup Clear (Terminal, Keyboard) 20: Running Command Switching Terminal 21: Acceleration/deceleration inactive 22: PID Pause 23: PLC Status Reset 24: Swing Frequency Pause 25: Counter Input 26: Counter Reset 27: Length Count Input 28: Length Reset 29: Torque Control Inactive 30~31: Reserved 32: Instant Direct Current Braking 33: Normal Cloed Input for External Fault 34: Frequency Change Enable 35: PID Function Direction Reversed Selection 36: External Shut-down Terminal 1 37: Controlling Command Switching Terminal 2 38: PID Integration Pause 39: Switching between Frequency Source X and Presetting Frequency 40: Switching between Frequency Source Y and Presetting Frequency 41~42: Reserved 43: PID Parameter Switching 44~45: Reserved 46: Speed Control /Torque Control Switching 47: Emergency Shut-down 48: External Shut-doiwn Terminal 2 49: Speed-down DC Braking 50: Current Running Time Clear 51~59:Reserved	1	★
F5-01	MI2 Terminal Function Selection		2	★
F5-02	MI3 Terminal Function Selection		9	★
F5-03	MI4 Terminal Function Selection		12	★
F5-04	MI5 Terminal Function Selection		13	★
F5-05	Reserved			
F5-06	Reserved			
F5-07	Reserved			
F5-08	Reserved			
F5-09	Reserved			

Function Code	Function Description	Setting Range	Factory Default Value	Change
F5-10	Min Filter Time	0.000s-1.000s	0.010s	☆
F5-11	Terminal Command Method	0. Two-line mode 1 1. Two-line mode 2 2. Three-line mode 1 3. Three-line mode 2	0	★
F5-12	Terminal UP/DOWN Change Rate	0.001Hz/s-65.535Hz/s	1.00Hz/s	☆
F5-13	VI Lower Limit	0.00V-10.00V	0.00V	☆
F5-14	Corrosponding Setting for VI Lower Limit	-100.0%-100.0%	0.0%	☆
F5-15	VI Upper Limit	0.00-10.00V	10.00V	☆
F5-16	Corrosponding Setting for VI Upper Limit	-100.0%-100.0%	100.0%	☆
F5-17	VI Wave Filter Time	0.00s-10.00s	0.10s	☆
F5-18	CI Lower Limit Value	0.00V-10.00V	0.00V	☆
F5-19	CI Lower Limit Relative Setting	-100.0%-100.0%	0.0%	☆
F5-20	CI Upper Limit	0.00-10.00V	10.00V	☆
F5-21	CI Upper Limit Relative Setting	-100.0%-100.0%	100.0%	☆
F5-22	CI Filter Time	0.00s-10.00s	0.10s	☆
F5-23 ~F5-56	Reserved			
F5-57	MI1 Delay Time	0.0s-3600.0s	0.0s	★
F5-58	MI2 Delay Time	0.0s-3600.0s	0.0s	★
F5-59	MI3 Delay Time	0.0s-3600.0s	0.0s	★
F5-60	Min Terminal Valid Mode Selection 1	0: High voltage level is active 1: Low voltage level is active Single-digit: MI1 Tens Digit: MI2 Hundreds Digit: MI3 Thousands Digit: MI4 Ten Thousands Digit: MI5	00000	★
F5-61	Reserved			

Function Code	Function Description	Setting Range	Factory Default Value	Change
F6 Group: Output Terminal Parameter Group				
F6-00	Reserved			
F6-01	MO1 Function Selection (Open Collector Output Terminal)	0: No output 1: Inverter Is Running 2: Fault Output (Fault Shut-down) 3: Frequency Level Detection FDT1 Output 4: Frequency Arrival 5: In Zero Speed Operation (No Output after Shut-down) 6: Motor Over-load Pre-warning 7: Inverter Overload Pre-warning 8: Setup Counting Value Arrival 9: Designated Counting Value Arrival 10: Length Arrival 11: PLC Circulation Completion 12: Accumulative Running Time Arrival 13: Frequency Limiting 14: Torque Limiting 15: Ready for Running 16: VI>CI 17: Frequency Upper Limit Arrival 18: Frequency Lower Limit Arrival (related with operation) 19: Under Voltage Status Output 20: Comunicaiton Setting 21: Positioning Completed (Reserved) 22: Positioning Completed(Reserved) 23: Zero Speed Running 2 (output during shut-down) 24: Accumulative Power On Time Arrival 25: Frequency Level Detection FDT2 Output 26: Frequency 1 Arrival Output 27: Frequency 2 Arrival Output 28: Current 1 Arrival Output 29: Current 2 Arrival Output 30: Timing Arrival Output 31: VI Input Beyond Limitation 32: Off-loading 33: Reverse runing 34: Zero Current Status 35: Module Temperature Arrival 36: Output current beyond limitation 37: Arrival of lower frequency (stop and output) 38: Alarming output (continue to run) 39: Pre-warning for overheat of motor 40: Current ruuning time arrival	0	☆
F6-02	Function Selection of Relay 1 (TA, TB, TC)		2	☆
F6-03	Reserved		0	☆
F6-04	MO2 Function Selection (Open Collector Output Terminal)		0	☆
F6-05	(TB1、TA1) Function Selection of Relay 2 (TB1, TA1)		0	☆

Function Code	Function Description	Setting Range	Factory Default Value	Change
F6-06	Reserved	0: Running frequency 1: Setting Frequency 2: Output Current 3: Output Torque 4: Output Power 5: Output Voltage 6: Reserved 7: VI 8: CI 9: Reserved 10: Length 11: Counter Value 12: Communication Setting 13: Rotation Speed of Motor 14: Output Current (100.0% corresponds with 1000.0A) 15: Output Voltage (100.0% corresponds with 1000.0V) 16: Reserved	0	☆
F6-07	AM Output Function Selection		0	☆
F6-08	FM Output Function Selection		1	☆
F6-09	Reserved			
F6-10	AM Zero Offset Coefficient	-100%-100.0%	0.0%	○
F6-11	AM Gain	-10.00V-10.00V	1.00V	○
F6-12	FM Zero Offset Coefficient	-100.0-100.0%	0.0%	○
F6-13	FM Gain	-10.00V-10.00V	1.00V	○
F6-14~ F6-17	Reserved			
F6-18	Relay 1 Output Delay Time	0.0s-3600.0s	0.0s	☆
F6-19	Relay 2 Output Delay Time	0.0s-3600.0s	0.0s	☆
F6-20	MO1 Output Delay Time	0.0s-3600.0s	0.0s	☆
F6-21	MO2 Output Delay Time	0.0s-3600.0s	0.0s	☆
F6-22	Selection for the Effective Status of MO Output Terminal	0: Positve logic 1: Negative logic Signal Digit: MO1 Tens Digit: Relay 1 Hundrds Digit: Relay 2 Thousands Digit: MO2 Ten Thousands Digit: Reserved	00000	☆

Function Code	Function Description	Setting Range	Factory Default Value	Change
F7 Group: Human-computer Interface Parameter Group				
F7-00	User Password	0-65535	0	☆
F7-01	JOG/REV Key Function Selection	0: Reverse running 1: Switching between the command channel of operation board and the remote command channel (terminal command channel or communication command channel) 2: Swtiching between forward and reverse rotation 3: Forward Jog 4: Reverse Jog	0	★
F7-02	STOP/RESET Button Function	0: The shut-down function of STOP/START is only valid under the operation mode of keyboard 1: The shut-down function of STOP/START is valid under all modes	1	☆
F7-03	LED Running Display Parameter 1	0000-FFFF Bit00: Running Frequency 1(Hz) Bit01: Setting Frequency (Hz) Bit02: Bus Voltage (V) Bit03: Output VOltage (V) Bit04: Output Current (A) Bit05: Output Power (kW) Bit06: Output Torque (%) Bit07: Min Input Status Bit08: MO Output Status Bit09: VI Voltage (V) Bit10: CI Voltage (V) Bit11: Reserved Bit12: Counter Value Bit13: Length Value Bit14: Load Speed Display Bit15: PID Setting	1F	☆
F7-04	LED Running Display Parameter 2	0000-FFFF Bit00: PID Feedback Bit01: PLC Stage Bit02: Reserved Bit03: Operating Frequency 2 (Hz) Bit04: Residual Running Time Bit05: VI Voltage before Check (V) Bit06: CI Voltage before Check (V) Bit07: Reserved Bit08: Linear Velocity Bit09: Curent Power On Time (Hour) Bit10: Current Running Time (Min) Bit11: Reserved Bit12: Communcaiton Setting Value Bit13: Reserved Bit14: Main Frequency X Display (Hz) Bit15: Auxiliary Frequency Y Display(Hz)	0	☆

Function Code	Function Description	Setting Range	Factory Default Value	Change
F7-05	LED Shut-down Display Parameter	0000-FFFF Bit00: Setting Frequency (Hz) Bit01: Bus Voltage (V) Bit02: Min Input Status Bit03: MO Output Status Bit04: VI Voltage (V) Bit05: CI Voltage (V) Bit06: Reserved Bit07: Counter Value Bit08: Length Value Bit09: PLC Stage Bit10: Load Speed Bit11: PID Setting Bit12: Reserved	33	☆
F7-06	Load Speed Display Coefficient	0.0001-6.5000	1.0000	☆
F7-07	Radiator Temperature of the module of inveter	0.0℃-100.0℃	–	●
F7-08	Monitoring Parameter of the Second Screen of Keyboard	0000-FFFF Bit00: Operating Frequency 1(Hz) Bit01: Setting Frequency (Hz) Bit02: Bus Voltage (V) Bit03: Output Voltage (V) Bit04: Output Current (A) Bit05: Output Power (kW) Bit06: Output Torque (%) Bit07: Min Input Status Bit08: MO Output Status Bit09: VI Voltage (V) Bit10: CI Voltage (V) Bit11: Temperature of inverter Bit12: Counter Value Bit13: Length Value Bit14: Load Speed Display Bit15: PID Setting Bit16: PID Feedback Bit17: PLC Stage Bit18: Communication Setting Frequency Bit19: Main Frequency X Display (Hz) Bit20: Auxiliary Frequency Y Display (Hz) Bit21: Current Power On Time (Hour) Bit22: Current Running Time (Min) Bit23: Accumulative Running Time Bit24: Residual Running Time	04	☆
F7-09	Accumulative Running Time	0h-65535h	–	●
F7-10	Product No.	–	–	●
F7-11	Software Version No.	–	–	●

Function Code	Function Description	Setting Range	Factory Default Value	Change
F7-12	Number of decimal places for the displaying of load speed	0: 0 Decimal Place 1: 1 Decimal Place 2: 2 Decimal Places 3: 3 Decimal Places	1	☆
F7-13	Accumulative Power On Time	0h-65535h	–	●
F7-14	Accumulative Power Consumption	0-65535°	–	●
F7-15	Modification Property of Function Code	0: Could be modified 1: Could not be modified	0	☆
F8 Group: Auxiliary Function Parameter Group				
F8-00	Jog Running Frequency	0.00Hz-Maximum Frequency	2.00Hz	☆
F8-01	Jog Speed-up Time	0.0s-6500.0s	20.0s	☆
F8-02	Jog Speed-down Time	0.0s-6500.0s	20.0s	☆
F8-03	Acceleration Time 2	0.0s-6500.0s	Model Dependent	☆
F8-04	Deceleration Time 2	0.0s-6500.0s	Model Dependent	☆
F8-05	Acceleration Time 3	0.0s-6500.0s	Model Dependent	☆
F8-06	Deceleration Time 3	0.0s-6500.0s	Model Dependent	☆
F8-07	Acceleration Time 4	0.0s-6500.0s	Model Dependent	☆
F8-08	Deceleration Time 4	0.0s-6500.0s	Model Dependent	☆
F8-09	Hoppying Frequency 1	0.00Hz-Maximum Frequency	0.00Hz	☆
F8-10	Hoppying Frequency 2	0.00Hz-Maximum Frequency	0.00Hz	☆
F8-11	Hoppying Frequency amplitude	0.00Hz-Maximum Frequency	0.01Hz	☆
F8-12	Forward and Reversed Dead Zone Time	0.0s-3000.0s	0.0s	☆
F8-13	Enable of the reverse rotation control	0: Active 1: Inactive	0	☆
F8-14	Running pattern when the setting frequency is lower than the lower frequency	0: Operation under Lower Limit Frequency 1: Shut-down 2: Zero Speed Running	0	☆
F8-15	Droop Control	0.00Hz-10.00Hz	0.00Hz	☆

Function Code	Function Description	Setting Range	Factory Default Value	Change
F8-16	Set Accumulative Power On Arriving Time	0h-65000h	0h	☆
F8-17	Set Accumulative Running Arrival Time	0h-65000h	0h	☆
F8-18	Start-up protection selection	0: No Protection 1: Protection	0	☆
F8-19	Frequency detection value (FDT1)	0.00Hz-Rated Current of Motor	50.00Hz	☆
F8-20	Frequency Detection Lagging Value (FDT1)	0.0%-100.0%(FDT1 Electric Level)	5.0%	☆
F8-21	Frequency Arrival Detection Width	0.0%-100.0%(Rated Current of Motor)	0.0%	☆
F8-22	Whether the jumping frequency during the acceleration or deceleration process is valid	0: Inactive 1: Active	0	☆
F8-23	Reserved			
F8-24	Reserved			
F8-25	Frequency Switching Point between acceleration time 1 and acceleration time 2	0.00Hz-Maximum Frequency	0.00Hz	☆
F8-26	Frequency Switching Point between acceleration time 1 and acceleration time 2	0.00Hz-Maximum Frequency	0.00Hz	☆
F8-27	Terminal Jog Optimization	0: Inactive 1: Active	0	☆
F8-28	Frequency Detection Value (FDT2)	0.00Hz-Maximum Frequency	50.00Hz	☆
F8-29	Frequency Detection Lagging Value (FDT2)	0.0%-100.0%(FDT2 Electric Level)	5.0%	☆
F8-30	Random Arrival Frequency Detection Value 1	0.00Hz-Maximum Frequency	50.00Hz	☆
F8-31	Random Arrival Frequency Detection Width 1	0.0%-100.0%(Rated Current of Motor)	0.0%	☆
F8-32	Random Arrival Frequency Detection Value 2	0.00Hz-Maximum Frequency	50.00Hz	☆
F8-33	Random Arrival Frequency Detection Width 2	0.0%-100.0%(Maximum Frequency)	0.0%	☆
F8-34	Zero Current Detection Level	0.0%-300.0% 100.0% Relative to Rated Current of Motor	5.0%	☆

Function Code	Function Description	Setting Range	Factory Default Value	Change
F8-35	Zero Current Detection Delay Time	0.01s-600.00s	0.10s	☆
F8-36	Above Threshold Value of Output Current	0.0%(No inspection) 0.1%-300.0%(Rated Current of Motor)	200.0%	☆
F8-37	Output Current Above Threshold Detection Delay Time	0.00s-600.00s	0.00s	☆
F8-38	Random Arrival Current 1	0.0%-300.0%(Rated Current of Motor)	100.0%	☆
F8-39	Random Arrival Current 1 Width	0.0%-300.0%(Rated Current of Motor)	0.0%	☆
F8-40	Random Arrival Current 2	0.0%-300.0%(Rated Current of Motor)	100.0%	☆
F8-41	Random Arrival Current 2 Width	0.0%-300.0%(Rated Current of Motor)	0.0%	☆
F8-42	Timing Function Selection	0: Inivalid 1: Valid	0	☆
F8-43	Timing Operation Time Selection	0: F8-44 Setting 1: VI 2: CI 3: Reserved Analog inpout range cossosponds with F8-44	0	☆
F8-44	Timing Operaiton Time	0.0Min-6500.0Min	0.0Min	☆
F8-45	Lower Limit of VI Input Voltage Protection Value	0.00V-F8-46	3.10V	☆
F8-46	Upper Limit of VI Input Voltage Protection Value	F8-45-10.00V	6.80V	☆
F8-47	Arrival of Module Temperature	0℃-100℃	75℃	☆
F8-48	Reserved			
F8-49	Wake-up Frequency	Standby frequency (F8-51)- Maximum Frequency(F0-10)	0.00Hz	☆
F8-50	Wake-up Delay Time	0.0s-6500.0s	0.0s	☆
F8-51	Standby Frequency	0.00Hz- wake-up frequency(F8-49)	0.00Hz	☆
F8-52	Standby delay time	0.0s-6500.0s	0.0s	☆
F8-53	Setting for the current running time arrival	0.0Min-6500.0Min	0.0Min	☆

Function Code	Function Description	Setting Range	Factory Default Value	Change
F9 Group: PID Parameter				
F9-00	PID Reference Source	0: F9-01 Setting 1: VI 2: CI 3: Reserved 4: Reserved 5: Communication Setting 6: MS Command Setting	0	☆
F9-01	PID Number Setting	0.0%-100.0%	50.0%	☆
F9-02	PID Feedback Source	0: VI 1: CI 2: Reserved 3: Reserved 4: Reserved 5: Communication Setting 6: VI+CI 7: MAX(|VI|, |CI|) 8: MIN(|VI|, |CI|)	0	☆
F9-03	PID Function Direction	0: Forward Function 1: Reverse Function	0	☆
F9-04	PID Reference Feedback Range	0-65535	1000	☆
F9-05	Proportional Gain Kp1	0.0-100.0	20.0	☆
F9-06	Integration Time Ti1	0.01s-10.00s	2.00s	☆
F9-07	Derivatice Time Td1	0.000s-10.000s	0.000s	☆
F9-08	PID Reverse Ending Frequency	0.00-Maximum Frequency	2.00Hz	☆
F9-09	PID Deviration Limit	0.0%-100.0%	0.0%	☆
F9-10	PID Differentation Amplitude Limitation	0.00%-100.00%	0.10%	☆
F9-11	Changing Tiime for PID Reference	0.00-650.00s	0.00s	☆
F9-12	PID Feedback Filtering Time	0.00-60.00s	0.00s	☆
F9-13	PID Output Filtering Time	0.00-60.00s	0.00s	☆
F9-14	Reserved	–	–	☆

Function Code	Function Description	Setting Range	Factory Default Value	Change
F9-15	Proportional Gains Kp2	0.0-100.0	20.0	☆
F9-16	Integration Time Ti2	0.01s-10.00s	2.00s	☆
F9-17	Derivatice Time Td2	0.000s-10.000s	0.000s	☆
F9-18	PID Parameter Switching Condition	0: No Switching 1: Switching through Min Terminal 2: Automatic Switching according to Deviation	0	☆
F9-19	PID Parameter Switching Deviration 1	0.0%-FA-20	20.0%	☆
F9-20	PID Parameter Switching Deviration 2	FA-19-100.0%	80.0%	☆
F9-21	Initial Value of PID	0.0%-100.0%	0.0%	☆
F9-22	Maintainng Time of PID Initial Value	0.00-650.00s	0.00s	☆
F9-23	Maximum Value on Forward Direction of the Deviation of Two Ouput	0.00%-100.00%	1.00%	☆
F9-24	Maximum Value on Reverse Direction of the Deviation of Two Ouput	0.00%-100.00%	1.00%	☆
F9-25	PID Integration Property	Single Digit: Integration Separation 0: Inactive 1: Active Tens Digit: Whether stop the integration after the output has reached the limit value 0: Continued Integration 1: Stop Integration	00	☆
F9-26	Detection Value of PID Feedback Loss	0.0%: Not judged as feedback loss 0.1%-100.0%	0.0%	☆
F9-27	Detection Time of PID Feedback Loss	0.0s-20.0s	0.0s	☆
F9-28	PID Calculation after the Stop	0: No Calculation After the Stop 1: Calculation after the Stop	0	☆

Function Code	Function Description	Setting Range	Factory Default Value	Change
FA Group: Protection and Fault Parameter Group				
FA-00	Overload Protection Selection of Motor	0: Inactive 1: Active	1	☆
FA-01	Overload Protection Gains of Motor	0.20-10.00	1.00	☆
FA-02	Overload Warning Coefficient of Motor	50%-100%	80%	☆
FA-03	Over voltage speed loss gains	0-100	0	☆
FA-04	Over voltage speed loss protection voltage	120%-150%	130%	☆
FA-05	Over current speed loss gains	0-100	20	☆
FA-06	Over current speed loss protection current	100%-200%	170%	☆
FA-07	Protection selection for earth shortcuit upon power on	0: Invalid 1: Valid	1	☆
FA-08	Reserved			
FA-09	Times of automatic reset of faults	0-20	0	☆
FA-10	MO Action Selection of Automatic Reset Period	0: Inactive 1: Active	0	☆
FA-11	Internals for Automatic Reset during Fault	0.1s-100.0s	1.0s	☆
FA-12	Reserved			
FA-13	Protection Selection for the Output Phase Loss	0: Inactive 1: Active	1	☆

Function Code	Function Description	Setting Range	Factory Default Value	Change
FA-14	The First Fault Type	0: No Fault 1: Reserved 2: Speed-up Over Current 3: Speed-down Over Current 4: Constant Speed Over Current 5: Speed-up Over Voltage 6: Speed-down Over Voltage 7: Constant Speed Over Voltage 8: Overload of buffer resistance 9: Low Voltage 10: Over Load of inverter 11: Over Load of Motor 12: Input Phase Failure 13: Output Phase Failure 14: Module Over Heat 15: Externa. Fault 16: Communication Fault 17: Contactor Fault 18: Current Detection Fault 19: Motor tuning fault 20: Reserved 21: Parameter writing and reading fault 22: Hardware fault of inverter 23: Motor is short-cuirted to the earth 24: Reserved 25: Reserved 26: Running Time Arrival 27: Reserved 28: Reserved 29: Power-on Time Arrival 30: Off-load 31: PID feedback loss duing the running 40: Rapid current limitation delay 41: Motor switching during the running 42: Reserved 43: Reserved 45: Reserved 51: Reserved	–	●
FA-15	The Second Fault Type		–	●
FA-16	The Third (the Last) Fault Type		–	●
FA-21	Output Terminal Status during the Third (the latest time) Fault	–	–	●
FA-22	Frequency Converter Status during the Third (the latest time) Fault	–	–	●
FA-23	Power On Time during the Third (the latest time) Fault	–	–	●
FA-24	Running Time during the Third (the latest time) Fault	–	–	●

Function Code	Function Description	Setting Range	Factory Default Value	Change
FA-25	Reserved			
FA-26	Reserved			
FA-27	Second Fault Frequency	–	–	●
FA-28	Second Fault Current	–	–	●
FA-29	Second Fault Bus Voltage	–	–	●
FA-30	Input Terminal Status during Second Fault	–	–	●
FA-31	Output Terminal Status during Second Fault	–	–	●
FA-32	Frequency Converter Status during the Second Fault	–	–	●
FA-33	Power On Time during the Second Fault	–	–	●
FA-34	Running Time during the Second Fault	–	–	●
FA-35	Reserved			
FA-36	Reserved			
FA-37	First Fault Frequency	–	–	●
FA-38	First Fault Current	–	–	●
FA-39	First Fault Bus Voltage	–	–	●
FA-40	Input Terminal Status during the First Fault	–	–	●
FA-41	Output Terminal Status during the First Fault	–	–	●
FA-42	Frequency Converter Status during the First Fault	–	–	●
FA-43	Power On Time during the First Fault	–	–	●
FA-44	Running Time During the First Fault	–	–	●
FA-45-FA-58	Reserved			
FA-59	Instant Power Off Action Selection	0: Inactive 1: Speed-down 2: Speed-down Shut-down	0	☆

Function Code	Function Description	Setting Range	Factory Default Value	Change
FA-60	Reserved			
FA-61	Voiltage Raise Judgment time after instant power off	0.00s-100.00s	0.50s	☆
FA-62	Judgment Voltage of instant power off action	60.0%-100.0% (Standard Bus Voltage)	80.0%	☆
FA-63	Off-load Protection Selection	0: Inactive 1: Active	0	☆
FA-64	Off-load Protection Level	0.0-100.0%	10.0%	☆
FA-65	Off-load Protection Time	0.0-60.0s	1.0s	☆
FA-66	Reserved			
FA-67	Over-speed Detection Value	0.0% -50.0%(Mximum Frequency)	20.0%	☆
FA-68	Over-speed Detection Time	0.0s-60.0s	5.0s	☆
FA-69	The Speed deviation is higher than the detection value	0.0% -50.0%(Mximum Frequency)	20.0%	☆
FA-70	High speed deviation during the detection time	0.0s-60.0s	0.0s	☆
FB Group: Swing Frequency and Counting Meter Parameter Group				
FB-00	Swing Frequency Setting Method	0: Relative to Central Frequency 1: Relative to Maximum Frequency	0	☆
FB-01	Swing Frequency Amplitude	0.0%-100.0%	0.0%	☆
FB-02	Startup Frequency Amplitude	0.0%-50.0%	0.0%	☆
FB-03	Swing Frequency Cycle Time	0.1s-3000.0s	10.0s	☆
FB-04	Rising Time of the Triangle Wave of the Swing Wave	0.1%-100.0%	50.0%	☆
FB-05	Setting Length	0m-65535m	1000m	☆
FB-06	Actual Length	0m-65535m	0m	☆
FB-07	Pulse Number per Meter	0.0-6553.5	100	☆
FB-08	Setting Counter Value	1-65535	1000	☆
FB-09	Designated Counter Value	1-65535	1000	☆

Function Code	Function Description	Setting Range	Factory Default Value	Change
FC Group: 485 Communication Parameter Group				
FC-00	Baud Rate	Signal Digit: MODBUS 0: 300BPS 1: 600BPS 2: 1200BPS 3: 2400BPS 4: 4800BPS 5: 9600BPS 6: 19200BPS 7: 38400BPS 8: 57600BPS 9: 115200BPS Tens Digit: Profibus-DP 0: 115200BPs 1: 208300BPs 2: 256000BPs 3: 512000Bps Hundreds Digit: Reserved Thousand Digit: CANlink Baud Rate 0: 20 1: 50 2: 100 3: 125 4: 250 5: 500 6: 1M	6005	☆
FC-01	Data Format	0: No Check(8-N-2) 1: Odd Check(8-E-1) 2: Odd Parity Check (8-O-1) 3: No Check(8-N-1)	0	☆
FC-02	Address of the Machine	1-249, 0 is broadcasting address	1	☆
FC-03	Resoonse Delay	0ms-20ms	2	☆
FC-04	Communiction Timeout	0.0(Inactive), 0.1s-60.0s	0.0	☆
FC-05	Data Transfer Format Selection	Single Digit: MODBUS 0: Non-standard MODBUS Protocol 1: Standard MODBUS Protocol Tens Digit: Profibus-DP 0: PPO1 Format 1: PPO2 Format 2: PPO3 Format 3: PPO5 Format	31	☆
FC-06	Communication Reading Current Resolution	0: 0.01A 1: 0.1A	0	☆

Function Code	Function Description	Setting Range	Factory Default Value	Change
FD Group: Multi-segement Speed and Simple PLC Parameter Group				
FD-00	MS Command 0	-100.0%-100.0%	0.0%	☆
FD-01	MS Command 1	-100.0%-100.0%	0.0%	☆
FD-02	MS Command 2	-100.0%-100.0%	0.0%	☆
FD-03	MS Command 3	-100.0%-100.0%	0.0%	☆
FD-04	MS Command 4	-100.0%-100.0%	0.0%	☆
FD-05	MS Command 5	-100.0%-100.0%	0.0%	☆
FD-06	MS Command 6	-100.0%-100.0%	0.0%	☆
FD-07	MS Command 7	-100.0%-100.0%	0.0%	☆
FD-08	MS Command 8	-100.0%-100.0%	0.0%	☆
FD-09	MS Command 9	-100.0%-100.0%	0.0%	☆
FD-10	MS Command 10	-100.0%-100.0%	0.0%	☆
FD-11	MS Command 11	-100.0%-100.0%	0.0%	☆
FD-12	MS Command 12	-100.0%-100.0%	0.0%	☆
FD-13	MS Command 13	-100.0%-100.0%	0.0%	☆
FD-14	MS Command 14	-100.0%-100.0%	0.0%	☆
FD-15	MS Command 15	-100.0%-100.0%	0.0%	☆
FD-16	Running Method of Simple PLC	0: Shut-down after Single Operation 1: Maintain the the Final Value after Single Operation 2: Constant Circulation	0	☆
FD-17	Power Off Memory Selection of Simple PLC	Sigle Digit: Power Off Memory Selection 0: No Memory for Power Off 1: Power Off Memory Tens Digit: Shut-down Memory Selection 0: No Memory for Shut-down 1: Shut-down Memory	00	☆
FD-18	0 Segment Running Time of Simple PLC	0.0s(h)-6500.0s(h)	0.0s(h)	☆
FD-19	Speed-up and Speed-down Time Selection of Simple PLC	0-3	0	☆
FD-20	The First Segment Running Time of Simple PLC	0.0s(h)-6500.0s(h)	0.0s(h)	☆

Function Code	Function Description	Setting Range	Factory Default Value	Change
FD-21	The first Segment Speed-up and Speed-down Time Selection of Simple PLC	0-3	0	☆
FD-22	Second Segment Running Time of Simple PLC	0.0s(h)-6500.0s(h)	0.0s(h)	☆
FD-23	Second Segment Speed-up/Speed-down Time Selection of Smiple PLC	0-3	0	☆
FD-24	Third Segment Running Time of Simple PLC	0.0s(h)-6500.0s(h)	0.0s(h)	☆
FD-25	Third Segment Speed-up/Speed-down Time Selection of Smiple PLC	0-3	0	☆
FD-26	Fourth Segment Running Time of Simple PLC	0.0s(h)-6500.0s(h)	0.0s(h)	☆
FD-27	Fourth Segment Speed-up/Speed-down Time Selection of Smiple PLC	0-3	0	☆
FD-28	Fifth Segment Running Time of Simple PLC	0.0s(h)-6500.0s(h)	0.0s(h)	☆
FD-29	Fifth Segment Speed-up/Speed-down Time Selection of Smiple PLC	0-3	0	☆
FD-30	Sixth Segment Running Time of Simple PLC	0.0s(h)-6500.0s(h)	0.0s(h)	☆
FD-31	Sixth Segment Speed-up/Speed-down Time Selection of Smiple PLC	0-3	0	☆
FD-32	Seventh Segment Running Time of Simple PLC	0.0s(h)-6500.0s(h)	0.0s(h)	☆
FD-33	Seventh Segment Speed-up/Speed-down Time Selection of Smiple PLC	0-3	0	☆
FD-34	Eighth Segment Running Time of Simple PLC	0.0s(h)-6500.0s(h)	0.0s(h)	☆
FD-35	Eighth Segment Speed-up/Speed-down Time Selection of Smiple PLC	0-3	0	☆
FD-36	Nineth Segment Running Time of Simple PLC	0.0s(h)-6500.0s(h)	0.0s(h)	☆
FD-37	Nineth Segment Speed-up/Speed-down Time Selection of Smiple PLC	0-3	0	☆

Function Code	Function Description	Setting Range	Factory Default Value	Change
FD-38	Tenth Segment Running Time of Simple PLC	0.0s(h)-6500.0s(h)	0.0s(h)	☆
FD-39	Tenth Segment Speed-up/Speed-down Time Selection of Smiple PLC	0-3	0	☆
FD-40	Eleventh Segment Running Time of Simple PLC	0.0s(h)-6500.0s(h)	0.0s(h)	☆
FD-41	Eleventh Segment Speed-up/Speed-down Time Selection of Smiple PLC	0-3	0	☆
FD-42	Twelfth Segment Running Time of Simple PLC	0.0s(h)-6500.0s(h)	0.0s(h)	☆
FD-43	Twelfth Segment Speed-up/Speed-down Time Selection of Smiple PLC	0-3	0	☆
FD-44	Thirteenth Segment Running Time of Simple PLC	0.0s(h)-6500.0s(h)	0.0s(h)	☆
FD-45	Thirteenth Segment Speed-up/Speed-down Time Selection of Smiple PLC	0-3	0	☆
FD-46	Forteenth Segment Running Time of Simple PLC	0.0s(h)-6500.0s(h)	0.0s(h)	☆
FD-47	Fourteenth Segment Speed-up/Speed-down Time Selection of Smiple PLC	0-3	0	☆
FD-48	Fifteenth Segment Running Time of Simple PLC	0.0s(h)-6500.0s(h)	0.0s(h)	☆
FD-49	Fifteenth Segment Speed-up/Speed-down Time Selection of Smiple PLC	0-3	0	☆
FD-50	Running time unit of simple PLC	0: s(second) 1: h(hours)	0	☆
FD-51	MS Command 0 Setting Method	0: Function Code FD-00 Setting 1: VI 2: CI 3: Reserved 4: Reserved 5: PID 6: Pre-set Frequency (F0-08) Setting, UP/DOWN Revisable	0	☆

Function Code	Function Description	Setting Range	Factory Default Value	Change
FE Group: Torque Control and Optimization Parameter Group				
FE-00	Speed/Torque Control Method Selection	0: Speed Control 1: Torque Control	0	★
FE-01	Setting Source Selection of Torque under Torque Control Mode	0: Reserved 1: VI 2: CI 3: Reserved 4: Reserved 5: Communication Setting 6: MIN(VI,CI) 7: MAX(VI,CI)	0	★
FE-02	Reserved			
FE-03	Digital Setting of Torque under Torque Control Mode	-200.0%-200.0%	150.0%	☆
FE-04	0Hz PWM Output Control Mode	0: Inactive 1: Active	0	☆
FE-05	Maximum Frequency in Forward Direction of Torque Control	0.00Hz-Mximum Frequency	50.00Hz	☆
FE-06	Maximum Frequency in Reverse Direction of Torque Control	0.00Hz-Mximum Frequency	50.00Hz	☆
FE-07	Speed-up Time of Torque Control	0.00s-65000s	0.00s	☆
FE-08	Speed-down Time of Torque Control	0.00s-65000s	0.00s	☆
FE-09	Switching of DPWM Upper Frequency	0.00Hz-15.00Hz	12.00Hz	☆
FE-10	PWM Modulation Method	0: Asynchronous Modulation 1: Synchronous Modulation	0	☆
FE-11	Dead-time Compensation Mode Selection	0: No Compensation 1: Compensation Mode 1 2: Compensation Mode 2	1	☆
FE-12	Random PWM Depth	0: Ranbdom PWM Inactive 1-10: PWM Carrier Frequency Random Depth	0	☆
FE-13	Enable Signal of Fast Current Limitation	0: Inactive 1: Active	1	☆
FE-14	Current Detection Compensation	0-100	5	☆
FE-15	SVC Optimization Mode Selection	0: No Optimization 1: Optimzed Mode 1 2: Optimized Mode 2	1	☆
FE-16	Setting of Under-voltage Point	60.0%-140.0%	100.0%	☆
FF Group: Factory Parameter Group				

Function Code	Name	Minimum Unit
U0 Group: Basic Monitoring Parameters		
U0-00	Operation Frequency (Hz)	0.01Hz
U0-01	Setting Frequency (Hz)	0.01Hz
U0-02	Busbar Volrage (V)	0.1V
U0-03	Output Voltage (V)	1V
U0-04	Output Current (A)	0.01A
U0-05	Output Power (kW)	0.1kW
U0-06	Output Torque (%)	0.10%
U0-07	Min Input Status	1
U0-08	MO Output Status	1
U0-09	VI Voltage (V)	0.01V
U0-10	CI Voltage (V)	0.01V
U0-11	Reserved	
U0-12	Count Value	1
U0-13	Length Value	1
U0-14	Load Speed Display	1
U0-15	PID Setting	1
U0-16	PID Feedback	1
U0-17	PLC Stage	1
U0-18	Reserved	
U0-19	Feedback Speed (Unit: 0. 1Hz)	0.1 Hz
U0-20	Residual Running Time	0.1 Min
U0-21	VI Voltage before Correction	0.001V
U0-22	CI Voltage before Correction	0.001V
U0-23	Reserved	
U0-24	Linear velocity	1m /Min
U0-25	Current Power On Time	1Min
U0-26	Current Running Time	0.1 Min
U0-27	Reserved	
U0-28	Communication setting value	0.01%
U0-29	Reserved	
U0-30	Main frequency X Display	0.01Hz
U0-31	Auxiliary frequency X Display	0.01Hz

6. EMC (Electromagnetic Compatibility)

6.1 Definition

Electromagnetic compatibility is the ability of the electric equipment to run in the electromagnetic interference environment and implement its function stably without interferences on the electromagnetic environment.

6.2 EMC Standard Description

In accordance with the requirements of the national standard GB/T 12668.3, the inverter needs to comply with electromagnetic interference and anti-electromagnetic interference requirements.

The existing products of our company apply the latest international standard –IEC/EN61800-3: 2004 (Adjustable speed electrical power drive system Part 3: EMC requirements and specific test methods), which is equivalent to the national standard GB/T 12668.3.

IEC/EN61800-3 assesses the inverter in terms of electromagnetic interference and anti-electronic interference. Electromagnetic interference mainly tests the radiation interference, conduction inference and harmonics interference on the inverter (required for the inverter for civil use. Anti-electromagnetic interferences mainly tests the conduction interference rejection, radiation interference rejection, surge interference rejection, fast and mutable pulse group interference rejection, ESD interference rejection and power low frequency end interference rejection (specific test items including: 1. Interference rejection tests of input voltage sag, interrupt and change; 2. Phase conversion interference rejection test; 3. Harmonic input interference rejection test; 4. Input frequency change test; 5. Input voltage unbalance test; 6. Input voltage fluctuation test).

6.3 EMC Guide

6.3.1 Harmonic Effect

Higher harmonics of power supply may damage the inverter. Thus, at some places where mains quality is rather poor, it is recommended to install AC input reactor.

6.3.2 Electromagnetic Interference and Installation Precautions

There are two kinds of electromagnetic interferences, one is interference of electromagnetic noise in the surrounding environment on the inverter, and the other is interference of inverter on the surrounding equipment.

Installation Precautions:

1. The earth wires of the inverter and other electric products shall be well grounded.

2. The power input and output power cables of the inverter and weak current signal cables (e.g. control line) shall not be arranged in parallel and vertical arrangement is preferable.

3. It is recommended that the output power cables of the inverter employ shield cables or steel pipe shielded cables and that the shielding layer be earthed reliably. The lead shielded control cables and the shielding layer shall be earthed reliably.

4. When the length of the motor cable is longer than 50m (220V) or 100m (380V), it needs to install output filter or reactor.

6.3.3 Handling Method for the Interference of the Surrounding Equipment on the Inverter:

The electromagnetic interference on the inverter is generated because of plenty of relays, contactors and electromagnetic brakes are installed near the inverter. When the inverter has error action due to the interferences, the following measures can be taken:

1. Install surge suppressor on the devices generating interference;

2. Install filter at the input end of the inverter.

3. The lead cables of the control signal cable of the inverter and the detection line employ shielded cable and the shielding layer shall be earthed reliably.

6.3.4 Handling Method for the Interferences of Inverter on the Surrounding Equipment:

These interferences include two types: one is radiation interference of the inverter, and the other is conduction interference of the inverter. These two types of interferences cause the surrounding electric equipment to suffer electromagnetic or electrostatic induction. The surrounding equipment hereby produces error action. For different interferences, it can be handled by referring to the following methods:

1. For the measuring meters, receivers and sensors, their signals are generally weak. If they are placed nearby the inverter or together with the inverter in the same control cabinet, they are easy to suffer interference and thus generate error actions. It is recommended to do not arrange the signal cables with the power cables in parallel and never bind them together; both the signal cables and power cables employ shielded cables and are well earthed; install ferrite magnetic ring (with suppressing frequency of 30 to 1000MHz) at the output side of the inverter and wind it 2 to 3 cycles; install EMC output filter in more severe conditions.

2. When the equipment suffering interferences and the inverter use the same power supply, it may cause conduction interference. If the above methods cannot remove the interference, it shall install EMC filter between the inverter and the power supply.

3. The surrounding equipment is separately earthed, which can avoid the interference caused by the leakage current of the inverter's earth wire when common earth mode is adopted.

6.3.5 Leakage Current and Handling

There are two forms of leakage current when using the inverter. One is the leakage current to the earth, and the other is leakage current between the cables.

1. Factors influencing the leakage current to the earth and the solutions:

There are distributed capacitance between the lead cables and the earth. The larger the distributed capacitance is, the larger the leakage current will be. The distributed capacitance can be reduced by effectively reducing the distance between the inverter and the motor. The higher the carrier frequency is, the larger the leakage current will be. The leakage current can be reduced by reducing the carrier frequency. However, reducing the carrier frequency may result in addition of motor noise. Note that additional installation of reactor is also an effective method to remove the leakage current.

The leakage current may increase following the addition of circuit current. Therefore, when the motor power is high, the corresponding leakage current will be high too.

2. Factors of producing leakage current between the cables and the solutions:

There is distributed capacitance between the output cables of the inverter. If the current passing the lines has higher harmonic, it may cause resonance and thus result in leakage current. If thermal relay is used, it may generate error action.

The solution is to reduce the carrier frequency or install output reactor. It is recommended that thermal relay not be installled before the motor when using the inverter, and that electronic over current protection function of the inverter be used instead.

6.3.6 Precauations for Installing EMC Input Filter at the Input End of Power Supply

1. When using the inverter, please follow its rated valukes strictly. Since the filter belongs to classification I electric applilcanes, the metal enclosure of filter shall be large and the metal ground of the installing cabinet shall be well earthed and have good conduction continuity. Otherwise there may be danger of electric shock and the EMC effect may be greatly affected.

2. Through the EMC test, it is found that the filter ground must be connected with the PE end of the inverter at the same public earth. Otherwise the EMC effect may be greatly affected.

3. The filter shall be installed at the place close to the input end of the power supply as much as possible.

7. Communications Protocol

7.1 Modbus Communication Protocol

This series inverter provides the RS485 communication interface and supports Modbus-RTU passive station communications protocol. The user could realize the centralized control through computer or PLC, set the operation commands of the inverters through this communications protocol, modify or read the function code parameter, and read the working status and error information of the inverter.

7.1.1 Content of the Protocol

The serial communication protocol defines the content and operating format of the information transmitted in the serial communications. The format includes the roll pulling (or broadcasting) format of the host machine and the coding method of the host machine. The content includes the function code for the required action, returned data, error checking and etc. The response of the host machine also adapts the same structure with the content including action confirmation, data returning, error checking and etc. In case the passive machine experiences any errors in receiving the information or the passive machine could not complete the required action of the host machine, it would organize error information as the feedback to the host machine.

7.1.2 Application Method

The inverter would connect with the “sing host machine with several passive machines” PC/PLC control network with RS485 bus line, which would be then taken as the passive machine for communications.

7.1.3 Structure of the Bus Line

(1) Interface Mode

RS485 Hardware Interface

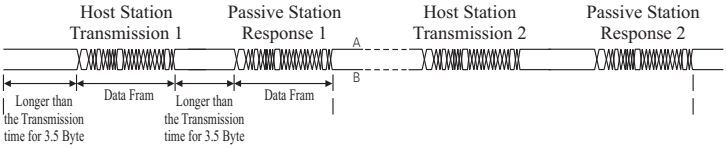
(2) Topological Structure

The system with one host machine and several passive machines. Each communication equipment in the network only has one sole passive address and only one equipment would be taken as the communication host machine (generally it is plane PC principal computer, PLC, HMI and etc). The communication host machine would actively initiate the communications to perform the reading and writing of the parameters of passive machines. The other equipment would be passive communication machine, which would response the inquiry and communication operation of the host machine. Only one machine could send data at the same moment and all the other machines shall be under the connection status.

The setting range of the address of the passive machine would be between 1 and 249. 0 is the address of the broadcasting communications. The address of the passive machine in the network shall be sole.

(3) Communication Transmission Method

The inverter adapts asynchronous serial and half-duplex transmission method. During the asynchronous serial communication process, the machine would send a frame of data per time in the format of message. According to the arrangement of the MODBUS-RTU protocol, a new communication frame is started when the idle time of the communication data line without any data transmission is larger than the transmission time for 3.5 Byte.



The in-built communications protocol of this series inverter is Modbus-RTU passive machine communications protocol, which could make response to the "Inquiry/command" of the host machine or take corresponding actions according to the "inquiry/command" of the host machine and make response to the communication data.

The host machine may be personal computer, industrial control equipment or programmable logic controller (PLC) and so forth. The host machine would not only be able to perform communications to one certain passive machine separately, but also be able to issue broadcasting information to all the passive machines. For the "inquiry/command" accessed by the host machine separately, the passive being accessed shall reply one response frame. For the broadcasting information transmitted by the host machine, the passive machines do not need to make any response.

7.1.4 Structure of Communications Data

The format of the communications data of the Modbus of this series inverter shall be as flowing. The inverter only supports the reading or writing of the parameters in Word format. The corresponding reading command of communications is Ox03 and the writing command is Ox06. The inverter does not support the reading or writing operation of byte or digit.

The host station reads the command frame:

>3.5 Byte	1 Byte	1 Byte	2 Byte	2 Byte	2 Byte	
Idle (Frame Header)	Address of Target Station	Reading Command 0x03	Address of Function Code H------L	Number of Function Code (n)	Total CRC Checking H------L	Idle

Calculate the CRC Checking

In theory, the principal computer could read several consecutive function codes per time (the maximum value of n could be as high as 12). However, please ensure the function code read would not exceed the last function code of the function code group. Otherwise, error would occur in the response.

The passive station reads the response frame:

>3.5 Byte	1 Byte	1 Byte	2 Byte	(2n) Byte	2 Byte	
Idle (Frame Header)	Address of Target Station	Reading Command 0x03	Number of Function Code (2n)	Address of Function Code H------L	Total CRC Checking H------L	Idle

Calculate the CRC Checking

The host station writes the command frame:

>3.5 Byte	1 Byte	1 Byte	2 Byte	2 Byte	2 Byte	
Idle (Frame Header)	Address of Target Station	Reading Command 0x06	Address of Function Code H------L	Parameter of Function Code H------L	Total CRC Checking H------L	Idle

Calculate the CRC Checking

The host station writes the response frame:

>3.5 Byte	1 Byte	1 Byte	2 Byte	2 Byte	2 Byte	
Idle	Address of Target Station	Write Command 0x06	Address of Function Code H------L	Parameter of Function Code H------L	Total CRC Checking H------L	Idle

Calculate the CRC Checking

In case a passive machine detects the error of the communication frame or fails in reading or writing the frame due to any other reasons, it would response to the frame in error.

Passive station reads the response frame with error

>3.5 Byte	1 Byte	1 Byte	1 Byte	2 Byte	
Idle (Frame Header)	Address of Target Station	0x83	Error Type	Total CRC Checking H------L	Idle

Calculate the CRC Checking

Passive station writes the response frame with error

>3.5 Byte	1 Byte	1 Byte	1 Byte	2 Byte	
Idle (Frame Header)	Address of Target Station	0x86	Error Type	Total CRC Checking H------L	Idle

Calculate the CRC Checking

Error Type:

01: Command Code Error

02: Address Error

03: Data Error

04: The Command Could Not Be Processed

Description for the Field of Data Frame:

Frame Header START	The idle time longer than the transmission time of 3.5 characters
Address of Passive Machine ADR	Communications Address: 0-249; 0= broadcasting address
Command Code CMD	03: Read the parameter of passive machine; 06= write the parameter of passive machine
Function Code Address H	The parameter address within the inverter, which shall be indicated with hexadecimal value system; it could be divided into function code type and non-function code type (like the running status parameter, running command and etc). Refer to the definition of the address. During the transmission, the high byte would be at the front and the low byte would be located at the later place.
Function Code Address L	
Number of Function Codes H	The number of function codes read by the current frame. The number 1 indicates the frame only reads one function code. During the transmission, the high byte would be in the front and the low byte would be at the later place. The protocol could only modify one function code and there is no such field.
Number of Function Code L	
Data H	The data replied, or the data to be written. During the transmission, the high byte would be transmitted before the low byte.
Data K	
CRC CHK Low Order	Detection value: the checking value of CRC16. During the transmission, the high byte would be transmitted before the low byte. Please refer to the description in CRC checking in this section for the detailed information about the calculation method.
CRCC CHK High order	
END	3.5 characters

CRC Checking Method:

CRC (Cyclical Redundancy Check) uses the RTU mode. In RTU mode, messages include an error-checking field that is based on a CRC method. The CRC field checks the contents of the entire message. The CRC field is two bytes, containing a 16-bit binary value. The CRC value is calculated by the transmitting device, which appends the CRC to the message. The receiving device recalculates a CRC during receipt of the message, and compares the calculated value to the actual value it received in the CRC field. If the two values are not equal with each other, an error would result.

The CRC is started by 0xFFFF. Then a process begins of applying successive eight-bit bytes of the message to the current contents of the register. Only the eight bits of data in each character are used for generating CRC. Start and stop bits, and the parity bit, do not apply to CRC.

During generation of the CRC, each eight-bit character is different or (XOR) with the register contents. Then the result is shifted in the direction of the least significant bit (LSB), with a zero filled into the most significant bit (MSB) position. The LSB is extracted and examined. If the LSB was 1, the register is then exclusive ORed with a preset value, fixed value. If the LSB was a 0, no exclusive OR takes places. This process is repeated until eight-bit byte is exclusive ORed with the register's current value, and the process repeats for eight more shifts as described above. The final contents of the register, after all the bytes of the message have been applied, is the CRC value.

When the CRC is appended to the message, the low-order byte is appended first, followed by the high-order byte. The simple function of CRC is shown as below:

```
unsigned int crc_chk_value (unsigned char *data_value, unsigned char length){
unsigned int crc_value=0xFFFF;
inti;
while (length--){
crc_value^=*data_value++;
for (i=0;i<8;i++){
if (crc_value&0X0001)
{
Crc_value=(crc_value>>1)
^0Xa001;
}
Else
{
Crc_value=crc_value>>1
}
}
}
return (crc_value);
}
```

Definition for the Address of Communications Parameters:

Read and write function-code parameters (some functional code is not changes, only for the usage or monitoring of the manufacturer).

7.1.5 The Mark Rules of Function Code Parameters Address

Indicating rules for the parameters address indicated by group number and mark of function code:

High order bytes: F0 –FF (F Group), 70 -7F (U Group)

Low order bytes: 00 –FF

Some parameters could not be changed when the inverter is under the running status. Some parameter could be adjusted no matter what status the inverter is under.

During the change of the parameters for function code, it is necessary to pay attention to the range, unit and related description of the parameters.

Group Number of the Function Code	Communication Access Address	Address of the function code in the Communication Modified RAM
F0 –FE Group	0XF0000 -0XFEFF	0X0000 -0X0EFF
U0 group	0X7000 -0X70FF	

Caution! Since EFPROM could be frequently stored, it will reduce the lifetime of EEPROM. In the communication mode, and some function code needn't be stored as long as change the RAM value.

To achieve this function, change high order F of the function code into zero of the parameter belongs to F Group.

For example:

Function code F3-12 cannot be stored into EEPROM, address indicates to be 030C.

The address can only act writing RAM, it cannot act reading. When act as reading, it is an invalid address.

For all the parameters, the command code o7H could be used to realize this function.

Stop/Start Parameters:

Parameter Address	Parameter Description	Parameter Address	Parameter Description
1000H	*Communication Setup Value (decimal system) -10000-10000	1010H	PID Setup
1001H	Running Frequency	1011H	PID Feedback
1002H	Bus Voltage	1012H	PLC Procedure
1003H	Output Voltage	1013H	Reserved
1004H	Output Current	1014H	Feedback Speed, Unit: 0.1Hz
1005H	Output Power	1015H	Residual Running Time
1006H	Output Torque	1016H	Voltage before VI Checking
1007H	Running Speed	1017H	Voltage before CI Checking
1008H	Min Input Flag	1018H	Reserved
1009H	AM, AM Output Flag	1019H	Linear Speed
100AH	Vi Voltage	101AH	Current Power On Time
100BH	CI Voltage	101BH	Current Running Time
100CH	Reserved	101CH	Reserved
100DH	Counting Value Input	101DH	Communication Setup Value
100EH	Length Value Input	101EH	Actual Feedback Speed
100FH	Load Speed	101FH	Main Frequency X Display
		1020H	Auxiliary Frequency Y Display

Caution:

Communication setting value is the percentage of relative value, and 10,000 correspond to 100.00%, -10000 correspond to -100.00%.

On the frequency dimension of the data, the percentage is the percentage of relative maximum frequency (F0-10). To the torque dimension data, the percentage is F2-10.

Control command input to inverter (write-only):

Command Word Address	Command Function
2000H	0001: Forward operation
	0002: Reverse operation
	0003: Forward jog
	0004: Reverse jog
	0005: Free stop
	0006: Speed-down stop
	0007: Fault reset

Read inverter status (read-only):

Status Word Address	Status Word Function
3000H	0001: Forward operation
	0002: Reverse operation
	0003: Stop

Parameters locking password checking: (If the return is the 8888H, it indicates the password pass the checking)

Password Address	Contents of Input password
1F00H	*****

Digital output terminal control: (write-only)

Command Address	Command Content
2001H	BIT0: MO1 output control BIT1: MO2 output control BIT2: RELAY1 output control BIT3: RELAY2 output control BIT4: FMR FMR output contro BIT5: Reserved BIT6: Reserved BIT7: Reserved BIT8: Reserved BIT9: Reserved

Analog output AM control: (write-only)

Command Address	Command Content
2002H	0-7FFF refers to 0% to 100.00%

Analog output FM control: (write-only)

Command Address	Command Content
2003H	0-7FFF refers to 0% to 100.00%

Pluse output control: (write-only)

Command Address	Command Content
2004H	0-7FFF refers to 0% to 100.00%

Inverter fault description:

Inverter Fault Address	Inverter fault information	
8000H	0000: No fault 0001: Reserved 0002: Speed-up over current 0003: Speed-down over current 0004: Constant over voltage 0005: Speed-up over voltage 0006: Speed-down over voltage 0007: Constant over voltage 0008: Buffer resistance overload fault 0009: Low voltage fault 000A: Inverter overload 000B: Motor overload 000C: Reserved 000D: Output phase failure 000E: Module overheat 000F: External fault 0010: Communication Fault 0011: Contactor fault 0012: Current detection fault 0013: Motor tuning fault 0014: Reserved	0015: Parameter reading and writing failure 0016: Hardware failure of inverter 0017: Grounding short-circuit fault of motor 0018: Reserved 0019: Reserved 001A: Running time arrival 001B: Customized Definition fault 1 001C: Customized Definition fault 2 001D: Power on time arrival 001E: Off-load 001F: PID feedback lost during running 0028: Time out fault of the fast current limiter 0029: Motor switching fault during running 002A: High speed deviation 002B: Over speed of motor 002D: Overheating of motor 005A: Setting fault of the number of lines of coder 005B: Not connected with coder 005C: Fault of initial position 005E: Speed feedback fault

7.2 Definition of the Communication Data Address

This series inverter supports four kinds of communication protocols including Modbus, CANopen, CaNlink and Profibus-DP. The programmable card and the point-to-point communication belong to the derivatives of CANlink protocol. Through these communication protocols, the upper-computer could achieve the control, monitoring and parameter modification or checking for the inverter.

The communication data could be divided into function code data and non-function code data. The non-function data consists of running command, running status, running parameters, warning information and etc.

7.2.1 Function Code Data

Function code data is the major setting parameters of the inverter. The function code data is shown as below:

Function Code Data	F Group (could read and write)	F0, F1, F2, F3, F4, F5, F6, F7, F8, F9, FA, FB, FC, FD, FE, FF

1. When communication reads the function code data:

For the function code data in F0-FF group, the high order 16-bit of communication address is the function group number directly, and the low order 16-bit communication address is the serial number of the function code in function group. Here are the examples:

F0-16 is function parameter and its communication address is F010H, where F0H indicates the function parameter in F0 group, and 10H indicates the hexadecimal system data format of serial number 16 in the function group.

2. When communication writes the function code data:

For the function code data in F0-FF Group, the communication address is high order 16-bit. Based on whether the data needs to be written into the EEPROM, the data could be divided into 00-0F or F0-FF. The low 16-bit is the serial number of the function code in the function group directly. Here is the example:

Write function parameter F0-16

No need to write into the EEPROM, the communication address is 0010H

Need to write into the EEPROM, the communication address is F010H

7.2.2 Non-function Code Data

Non-function Code Data	Status Data (Read Only)	U group monitoring parameter, fault description of inverter, running status of inverter
	Control Parameter (Write Only)	Control command, communication setting value, digital output terminal control, analog output AM control, analog output FM control, output control, parameter initialization

1. Status Data

The status data mainly consist of U group monitoring data, fault description of inverter and running status of inverter.

U Group Parameter Monitoring Parameter

The description of the U Group monitoring data is stated in the relative sections in chapter 5 and chapter 6. The definitions of the address are shown as below:

U0-U31, the high order 16-bit of the communication address is 70-7F, and the low 16-bit is the serial number of the monitoring parameter in the group. For example, the communication address for U0-11 is 700BH.

Description for the Inverter Fault

When the communication is reading the description of inverter fault, the communication address is fixed at 8000H. The upper-computer could acquire the current fault code of the inverter through the reading of this address data. The description of the fault code is stated in the running status of inverter in the definition of the function code of F9-14 in chapter 5.

When the communication is reading running status of inverter, the communication address is fixed at 3000H. The upper-computer could acquire the current running status of the inverter through the reading of this address data. The definition is shown as below:

Running Status Communication Address	Definition of the Reading Status Word
3000H	1. Forward operation
	2. Reverse operation
	3. Stop

2. Control Parameter

The control parameters consist of control command, digital output terminal control, analog output AM control and analog output FM control.

Control Command

When F0-02 (command source) is selected at 2: under the communication control, the upper-computer would realize the control of related commands like the stop or start of inverter through this communication address. The definitions of these commands are shown as below:

Control Command Communication Address	Command Function
2000H	1. Forward operation
	2. Reverse operation
	3. Forward jog
	4. Reverse jog
	5. Free stop
	6. Speed-down stop
	7. Fault reset

Communication Setting Value

The communication setting values are mainly used as the reference data when the frequency source, torque upper source, VF separation voltage source, PID reference source, PID feedback source and etc has been selected as the communication reference. The communication address is 1000H. When using the upper-computer to set the value of communication address, the data range of the communication address value is between -10000 and 10000, which correspond with the reference value from -100% to 100%.

Digital Output Terminal Control

When the function of the digital output terminal is selected at 20: under the communication control, the upper-computer could realize the control for the digital output terminal of the inverter through this communication address. Here is the definition of the command for reference:

Communication Address of the Digital Output Terminal Control	Command Name
2001H	BIT0: MO1 output control BIT1: MO2 output control BIT2: RELAY 1 Output control BIT3: RELAY 2 Output Control BIT4: Reserved BIT5: Reserved BIT6: Reserved BIT7: Reserved BIT8: Reserved BIT9: Reserved

Analog Quantity Output AM and FM

When the analog quantity output is AM and FM: under the communication setting, the upper-computer could realize the control of the analog quantity of the inverter through this communication address. Here is the definition of the parameters:

Output Control Communication Address		Command Content
AM	2002H	0-7FFF indicates 0% to 100%
FM	2003H	

8. Fault Diagnosis and Solution

8.1 Fault Information and Trouble-shooting

Fault Code	Fault Type	Checking for Potential Causes	Counter-measures
Err01	Inverter Unit Protection	1. Check if the inverter output loop is short circuited 2. If the cable connecting the motor with the inverter is too long 3. If the module is over heat 4. Check if the cable connections inside the inverter are loosen 5. Fault of the main control board 6. Fault of the drive board 7. Fault of the inverter module	1. Get rid of the peripheral fault 2. Install a Reactor or Output Filter 3. Check if the air duct is blocked and if the fan is in normal status, and resolve the existing problems 4. Insert all the connecting cables properly 5. Seek for technical support 6. Seek for technical support 7. Seek for technical support
Err02	Acceleration over current	1. Check if the output loop of the inverter is earthed or short circuited 2. The control method is vector control and there is no parameter identified 3. If the acceleration time is too short 4. If the manual boost torque or V/F curve is proper 5. If the voltage is too low 6. If start the motor under the forward running status 7. If load is added suddenly during the acceleration 8. The inverter model is rather small	1. Get rid of the peripheral fault 2. Identify the motor parameters 3. Prolong the acceleration time 4. Adjust the manual boost torque or V/F curve 5. Adjust the voltage to normal range 6. Select start upon rotational velocity follow-up or start upon motor shutdown 7. Remove the additional load 8. Select the inverter with higher power
Err03	Deceleration Over current	1. Check if the output loop of the Inverter is earthed or short circuited 2. The control method is vector control and there is no parameter identified 3. If the acceleration time is too short 4. If the voltage is too low 5. If load is added suddenly during the deceleration 6. If the brake unit and brake resistor are installed	1. Get rid of the peripheral fault 2. Identify the motor parameters 3. Prolong the deceleration time 4. Adjust the voltage to the normal range 5. Remove the additional load 6. Install the brake unit and the brake resistor
Err04	Constant Speed over Current	1. Check if the output loop of the Inverter is earthed or short circuited 2. The control method is vector control and there is no parameter identified 3. If the voltage is too low 4. f load is added suddenly during the running 5. The inverter model is rather small	1. Get rid of the peripheral fault 2. Identify the motor parameters 3. Adjust the voltage to the normal range 4. Remove the additional load 5. Select the inverter with higher power
Err05	Acceleration over Voltage	1. If the input voltage is too high 2. If there are external forces driving the motor to run during the acceleration process 3. If the acceleration time is too short 4. If the brake unit and brake resistor are installed	1. Adjust the voltage to normal range 2. Remove the external forces or install brake resistor 3. Prolong the acceleration time 4. Install brake unit and brake resistor

Fault Code	Fault Type	Checking for Potential Causes	Counter-measures
Err06	Deceleration over voltage	1. If the input voltage is too high 2. If there are external forces driving the motor to run during the deceleration process 3. If the deceleration time is too short 4. If the brake unit and brake resistor are installed	1. Adjust the voltage to normal range 2. Remove the external forces or install brake resistor 3. Prolong the deceleration time 4. Install brake unit and brake resistor
Err07	Constant over voltage	1. If the input voltage is too high 2. If there are external forces driving the motor to run during the running process	1. Adjust the voltage to normal range 2. Remove the external forces or install brake resistor
Err08	Control power supply fault	1. If the input voltage is within the range as specified by the specifications	1. Adjust the voltage to the range as specified by the specifications
Err09	Under voltage fault	1. If there is transient power failure 2. Detect if the voltage at the input end of the inverter is within the range as specified by the specifications 3. Measure if the bus voltage is normal 4. Check if the rectifier bridge and buffer resistor are normal 5. Check if the drive board is normal 6. Check if the main control board is normal	1. Reset the fault 2. Adjust the voltage to normal range 3. Seek for technical support 4. Seek for technical support 5. Seek for technical support 6. Seek for technical support
Err10	Overload of the Inverter	1. If the load is too heavy or motor does not rotate 2. The inverter model is rather small	1. Reduce the load and check the motor and machinery 2. Select the inverter with higher power
Err11	Motor Overload	1. If the motor protection parameter is set properly 2. If the load is too heavy or motor does not rotate 3. The inverter model is rather small	1. Set this parameter properly 2. Reduce the load and check the motor and machinery 3. Select the inverter with higher power grade
Err12	Reserved		
Err13	Phase loss at the input side	1. If the wiring from the inverter to the motor is normal 2. If the output of the three phases is balance when the motor is running 3. Check if the drive board is normal 4. If the module is fault	1. Get rid of the peripheral fault 2. Check and resolve the problems in the external lines to ensure that the three-phase power input to the inverter is normal 3. Seek for technical support 4. Seek for technical support
Err14	Module over heat	1. If the ambient temperature is too high 2. If the air duct is blocked 3. If the fan is broken 4. If the thermal resistor of the module is broken 5. If the inverter module is broken	1. Reduce the ambient temperature 2. Clean the air duct 3. Replace the fan 4. Replace the thermal resistor 5. Replace the inverter module

Fault Code	Fault Type	Checking for Potential Causes	Counter-measures
Err15	External equipment fault	1. If it inputs external fault signal via the multifunctional terminal DI 2. If it inputs external fault signal via the multifunctional virtual IO	1. Reset to run 2. Reset to run
Err16	Communications fault	1. If the host computer is working 2. If the communication cable is work properly 3. The setting of the communication expansion card F0-28 is incorrect The communication parameter FD is not correctly set.	1. Check the host computer cable connection 2. Check the cable for communications 3. Correctly set the type of communication expansion card 4. Modify the communication parameters
Err17	Contactor Fault	1. Check if the drive board and power supply is normal 2. Check if the contactor is normal	1. Replace the control board or power supply 2. Replace the contactor
Err18	Current detection fault	1. Check if the hall device is normal 2. Detect if the drive board is normal	1. Replace the hall device 2. Replace the drive board
Err19	Motor tuning fault	1. If the motor parameters are set as per the motor nameplate 2. If the parameter identification process is delayed	1. Set the motor parameters correctly according to the nameplate 2. Check the cable connecting the inverter to the motor
Err20	Reserved		
Err21	EEPROM Reading and Writing Fault	Damage of the chip of EEPROM	1. Replace the main control board
Err22	Inverter hardware fault	1. If it is over voltage 2. If it is over current	1. Handle according to the countermeasures for over voltage fault 2. Handle according to the countermeasures for over current fault
Err23	Fault of Short Circuit to Earth	1. Detect if the motor is short circuited to earth	1. Replace the cable or motor
Err24	Reserved		
Err25	Reserved		
Err26	Accumulative Running Time Arrival Fault	1. If the accumulative running time has reached the setting value	1. Clear off the memory information through the parameter initialization
Err27	Reserved		
Err28	Reserved		
Err29	Accumulative Power On Time Arrival Fault	1. If the accumulative power on time has reached the setting value	1. Clear off the memory information through the parameter initialization

Fault Code	Fault Type	Checking for Potential Causes	Counter-measures
Err30	Off Load Fault	1. The running current of the inverter is lower than F9-64	1. Check if it is off load or the setting of F9-64 and F9-65 are matching with the actual working conditions
Err31	PID Feedback Loss Fault during the Running	1. The Feedback of PID is lower than the setting value of FA-26	1. Check the PID Feedback Signal or Set the FA-26 at an Appropriate Value
Err40	Wave and Current Limitation Protection Fault	1. If the load is too heavy or motor does not rotate 2. The inverter selected is too small	1. Reduce the load and check the machinery 2. Select the inverter with higher power grade
Err41	Motor Switching Fault During Running	1. Change the current motor selection during the running through the terminals	1. Perform the motor switching after the inverter has stopped
Err42	Reserved		
Err43	Reserved		
Err45	Reserved		
Err51	Reserved		

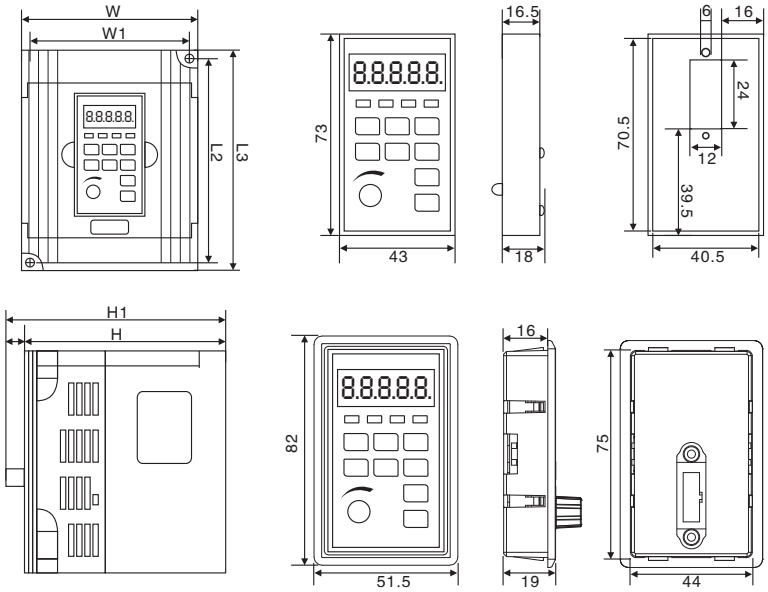
8.2 General Faults and Counter-measures

Fault Phenomenon	Possible Cause	Solution
No display upon power on	The power grid does not have any voltage or the voltage is too low' The fault of the switching power supply on the drive board of the inverter; Damage of the rectifier; Damage of the buffer resistor of the inverter; Fault of the control board and keyboard; Disconnection between the control board and the drive board or keyboard.	Check the input power supply. Check the voltage of bus line. Plug/unplug the 8-core and 28-core bus once again. Consult the manufacturer.
HC is displayed upon power-on	Poor contact of the connecting cable between the drive board and the control board; Damage of the relative device on the control board; Motor or the motor cable is short-circuit to the ground; Hall fault; The voltage in the power grid is too low.	Consult the manufacturer.

Fault Phenomenon	Possible Cause	Solution
"ERR23" alarm is displayed upon Power-on.	The motor or the output line is short circuited to the earth The inverter is damaged.	Measure the insulation of the motor and output line with magneto-ohmmeter; Consult the manufacturer.
The inverter displays normally upon power-on, but "HC" is displayed upon running and stops immediately	The fan is damaged or blocked; Short-circuit exist in the wiring of the periphery control terminals	Replace the fan; Correct the external short-circuit fault.
ERR14 (Module Overheat) Fault is frequently reported	The setting of load frequency is too high; Damage of fan or block of air duct; Damage of the internal devices of inverter (thermal coupler or others)	Reduce the load frequency (F0-15); Replace the fan or clear off the air duct; Consult the manufacturer.
The motor does not rotate upon Inverter Running	Motor and motor cable; Wrong setting of the parameter of inverter (motor parameters); Poor contact between the drive board and control board; Fault of drive board.	Check the connecting cable between the inverter and motor; Replace the motor or solve the motor fault; Check and reset the parameters of motor.
MIn terminal disabled	Wrong setting of parameters; Fault of external signals; Loosen of the connecting cable between OP and +24V Fault of control board	Check and reset the related parameter in F4 group; Reconnect the external single cable; Re-confirm the connecting cable between Op and +24V; Consult the manufacturer.
The inverter frequently reports over current fault and over voltage fault	The motor parameters are set wrongly. Acceleration/deceleration time is improper. Load fluctuates.	Reset the parameters of motor, or perform the tuning of the motor; Set appropriate acceleration or deceleration time; Consult the manufacturer.
Err17 alarming upon Power-on	The soft-starting contactor is not connected	Check if any loosen of the cable for contactor; Check if any fault of the contactor; Check if any fault in the 24V power supply of the contactor; Consult the manufacturer.
Display 88888 upon Power-on	Damage of the relative device on the control board	Change the control board

Appendix: Installation dimension

Simple type (0.4–2.2KW) 320S Series



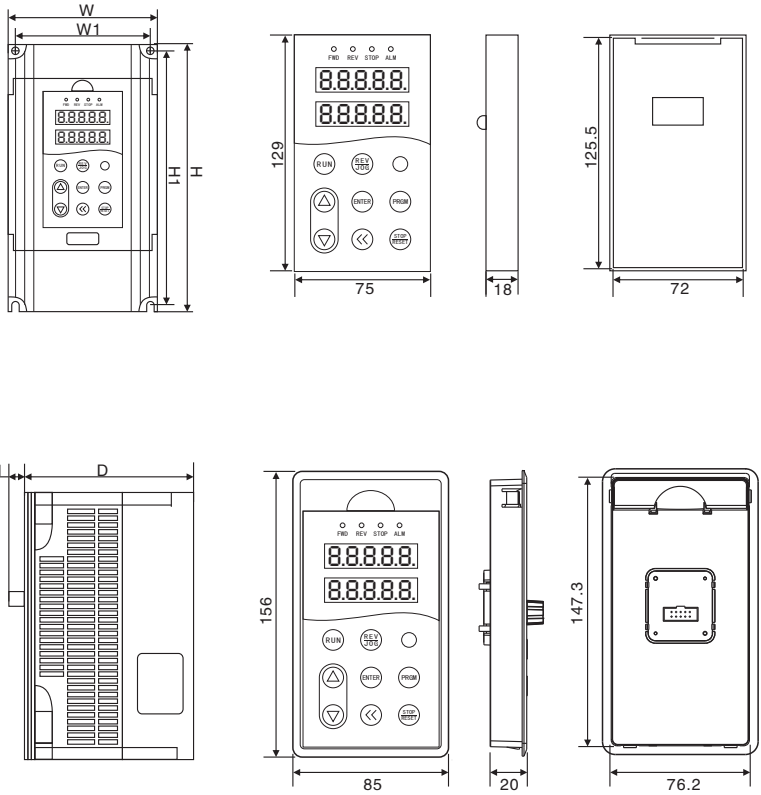
0.4-2.2KW series chassis type table

Unit：mm

Power	W	W1	H	H1	D	D1
0.4KW 220V 0.75KW 220V 1.5KW 220V	85.5	74	142	132	123	113
0.75KW 220V 1.5KW 220V 2.2KW 220V 0.75KW 380V 1.5KW 380V 2.2KW 380V	101	92	152	143	127	117

Reminding: for satisfy user requirement, have 2 installation sizes of 0.75KW/220V, 1.5KW/220V, for user choosing

Simple type (4–7.5KW) 320S Series

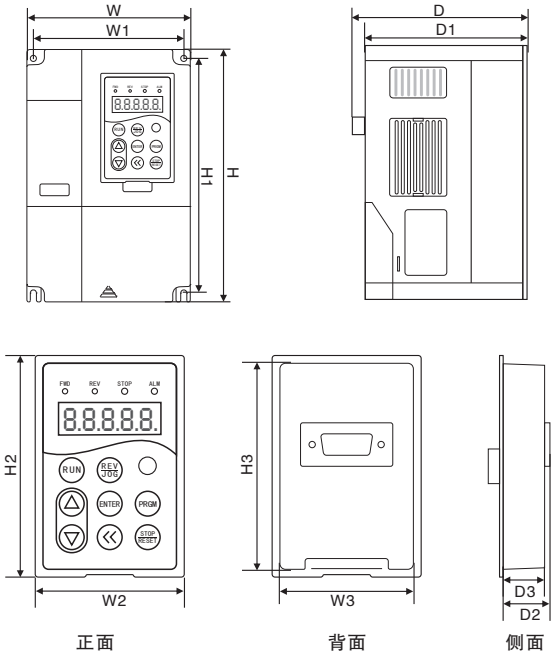


4-7.5KW series chassis type table

Unit：mm

Power	W	W1	H	H1	D	D1
4.0KW 380V 5.5KW 380V 7.5KW 380V	130.0	115.0	264.0	244.0	153.5	9.0

(0.4–7.5KW) Series

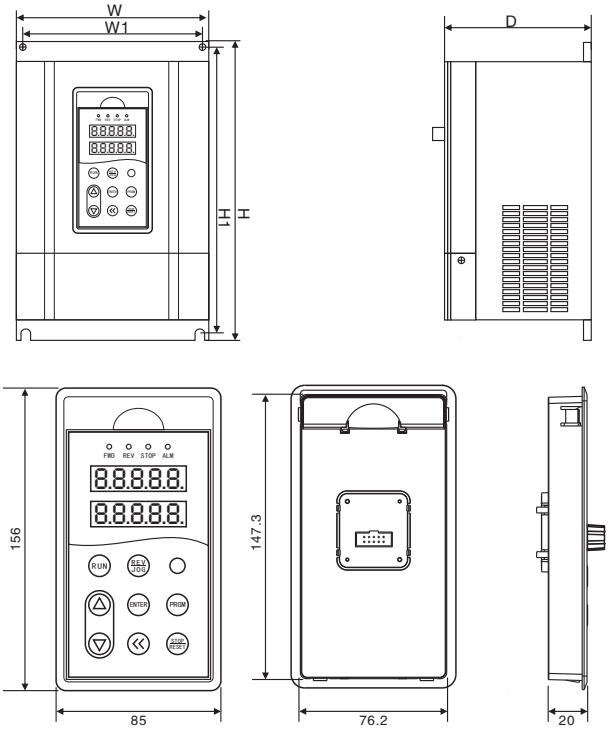


0.4-7.5KW series chassis type table

Unit：mm

Power	W	W1	H	H1	D	D1	W2	W3	H2	H3	D2	D3
0.75KW 220V 1.5KW 220V 2.2KW 220V 0.75KW 380V 1.5KW 380V 2.2KW 380V	113	100.5	174	162.8	140	132	51	46.8	75.8	71.5	19	16.5
4.0KW 380V 5.5KW 380V 7.5KW 380V	160.7	146.7	246	232	155.5	147.5	67	61.5	99.7	94	19	16.5

(11–450KW) Series



11-450KW series chassis type table

Unit：mm

Power	H	W	D	H1	W1	Aperture
11KW 15KW 18.5KW(塑壳)	375	210	196	362.5	160	7
22KW 30KW 37KW	440	285	206	424	238	8
45KW 55KW	600	385	267.7	580	260	10
75KW 93KW	659	413	327	635	293	12
110KW 132KW 160KW	849	480	389	822.5	369	12
200KW 220KW 250KW 280KW	1060	650	380.5	1030	420	12
315KW 355KW 400KW 450KW	1361.5	800	393	1300	520	16