UVT – G6 /P6 Inverter User Manual

UV tech Variable Frequency Drive User Manual

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G6/P6 series inverter is a kind of high-performance vector control inverter. The product adopts speed sensorless vector control technology, the internationally leading technology, to offer excellent control performance of the internationally leading high-end inverters, and combines the application characteristics of China to further enhance the product reliability, environment adaptability and customized and industrialized design. It can better meet the demands of the various drive applications.

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Excellent performance

■Control mode

◆VVV/F control mode:

Startup torque: 1Hz 120% rated torque

Speed adjustment range: 1:120

Speed stabilization precision: ±0.5%

◆Vector control mode:

Precise speed sensorless vector control technology realizes AC motor decoupling, enabling the DC motorization of operation control.

Startup torque: 0.35Hz 150% rated torque

Speed adjustment range: 1:150

Speed stabilization precision: ±0.5%

■Excellent control performance under speed sensorless vector control mode

◆Realizing AC motor decoupling, enabling the DC motorization of operation control.

◆ Figure 1 indicates the four-quadrant operation of motor under speed sensorless vector control. Torque,current,rotating, speed and DC bus voltage have quick response,and motor has stable operation.

◆0.1s command acceleration/deceleration is realized with rated motor load.

◆Upon the zero-crossing switching of the motor (forward/reverse switching), the current has no phase mutation or oscillation, and the rotating speed has no pulsation.

◆The bus voltage is under stable control. Quick and reliable braking can be realized when decelerating under the condition of braking without power consumption.

It is especially suitable for: The reciprocating equipment, such as digital control machine tool, fountain control machine, weaving machine and jacquard.

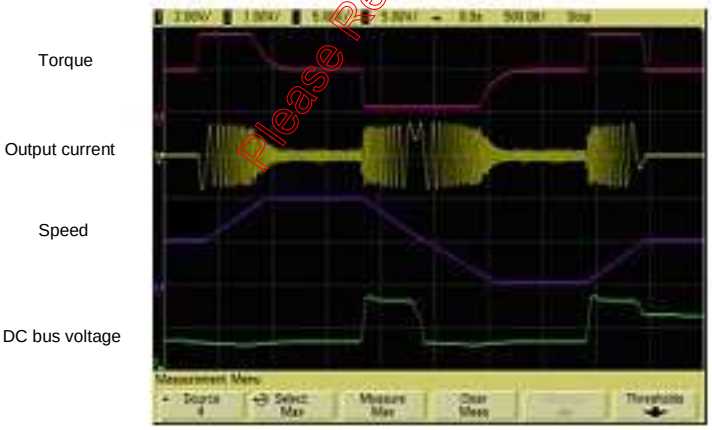


Fig. 1 Quick acceleration/deceleration four-quadrant running in the form of 0Hz→Forward running 50Hz→0Hz→Reverse running 50Hz→0Hz

■Realizing real tripless operation

◆With excellent current and voltage control technology, repetitive and alternate acceleration and deceleration is

performed through 0.2s command, and the inverter realizes stable and tripless operation.

◆ With extremely powerful loading capacity, the inverter can realize stable tripless operation in any acceleration/deceleration time and under any impact load condition.

◆With strong short-time overload capacity, the inverter can operate continuously for 0.5s under 200% rated load, and 1 minute under 150% rated load.

◆The intelligent module temperature control maximizes the loading capacity of the inverter.

It is especially suitable for:

The heavy-duty equipment, such as extrusion machine (for modification for energy saving), lifting equipment, digital control machine tool, rolling mill, furnace feeding equipment.

Fig. 2 The inverter realizes stable control of current and voltage and will not trigger tripping protection under any acceleration/deceleration condition as well as stable operation condition

■Unique instantaneous mains failure reaction

◆Upon the instantaneous mains failure, the energy of the motor feedback bus will keep the inverter running till the mains resumes normal.

◆When shutdown is caused by long-term power-failure during the operation of the inverter, the inverter will provide alarm message upon the power-up at the next time.

◆It supports the automatic operation of the inverter upon power-up after power failure.

It is especially suitable for: Chemical fiber and weaving equipment, multi-point synchronization linkage equipment, fan/pump, instantaneous power-failure startup equipment.

■Low frequency large torque stable operation under vector control

◆With precise speed identification and rotor magnetic flux orientation, the torque can respond quickly and realize stable operation in the case of 0.25Hz load mutation.

◆Startup torque: Open loop vector control 0.35Hz; 180% rated torque

◆Speed stabilization precision: Open loop vector control ±0.5%

It is especially suitable for: Medium and large wire-drawing machine, pipe and cable processing, lifting equipment, rolling mill.

Current

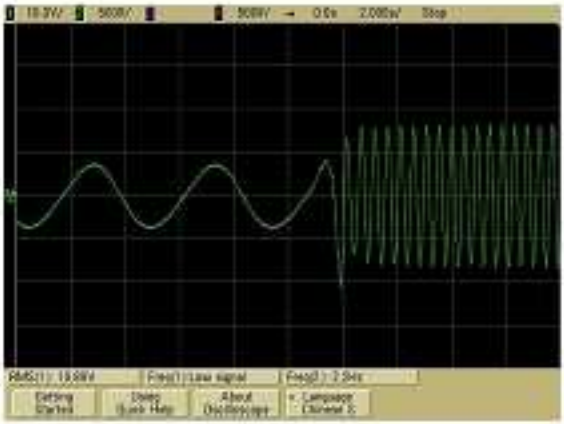


Fig.3 Abrupt increase to full load operation at 0.25Hz under speed sensorless vector control

■Unique quick DC braking

◆Within the range of 0 to 60Hz, the inverter can realize back electromotive force elimination and quick DC braking within 0.3s.

◆DC current is input in the most efficient way to improve the braking capacity.

◆There is no initial waiting time for the DC braking.

◆Special function code setting is provided to cancel the initial waiting time for DC braking.

It is especially suitable for: Lifting equipment, invertible roll table for rolling mill, weaving machine, paper making production line.

■Unique rotating speed tracing function

◆No special hardware detection circuit or special function code setting is needed. Within the range of 0 to 60Hz, the inverter can complete the identification of the motor rotating speed, rotating direction and phase angle within 0.2s, and start the smooth tracing on the freely rotating motor.

◆Tracing mode 1: Quick and smooth tracing on the free rotating speed of the motor without any impact.

It is especially suitable for: Fan/pump, the equipment whose operation shall be traced upon the power recovery after instantaneous power failure.

Current

Rotating speed

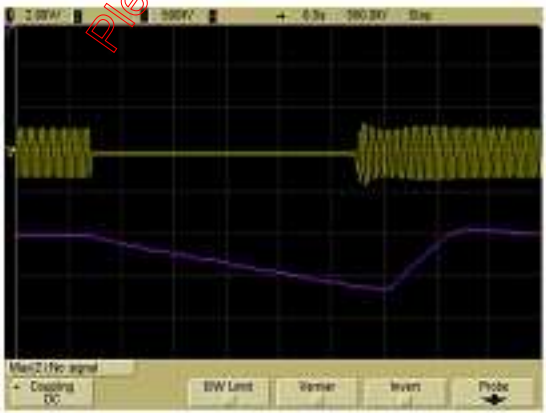


Fig. 4 Quick and impactless rotating speed tracing upon the free rotation of the motor

High reliability design

■Meeting the relevant international product standards

IEC61800-2	General requirements-Rating specifications for low voltage adjustable frequency a.c. power drive systems
IEC61800-3	EMC product standard including specific test methods
IEC61000-6	Electromagnetic compatibility (EMC) -Part6: Generic standards
IEC61800-5-1	Safety requirements -Electrical, thermal and energy
UL508C	UL Standard for Safety for Power Conversion Equipment

■Integrated design

◆Integrated design of hardware interface: The control board, button type operating panel are integrated to facilitate the operation and maintenance of the user.

◆Integrated design of software protocol: Terminal 485, universal expansion port SPI protocols are integrated
(Modbus protocol).

◆Integrated design of main circuit terminals: 0.75G .to 15G integrated, 18.5G to 75G integrated, to facilitate the operation and maintenance of the user.

◆Built-in braking unit design: 0.75G to 15G as standard, 18.5G to 75G as option, to reduce the cost and the installation space.

◆Integrated built-in expansion card design: Including extrusion machine interface card/water supply dedicated card/communication adapter card, meeting the industry application requirement.

◆Full series standard common DC bus design: The standard common DC bus scheme can be realized without modifying the product or adding peripheral circuit. It is applicable to such industry applications as paper making, chemical fiber, metallurgy and EPS.

■Adaptability design

◆Independent duct design: The full series supports the application demand of mounting heatsink out of the
cabinet, and is applicable to the applications of spinning machine, wire-drawing machine where there is too much cotton batting or dust.

◆Compact structure design: With complete thermal emulation and unique cold plate process, the product has compact structure, meeting the demand of OEM customers.

◆Complete system protection design: Based on the complete system design scheme, the PCB adopts protective coating, the copper bus adopts galvanization, the full series of product adopts sealed key components, the button type operating panel with potentiometer offers accessories meeting the IP54 requirement, which greatly improve the protection capacity of the system. It is applicable to the applications with dusty and corrosive environment, such as wire-drawing machine, printing and dyeing and ceramics.

◆Wide voltage range design: the DC operating voltage range is DC 360–720V, with mains voltage fluctuation recording function.

◆Precise current detection and protection: The full series adopts precise Hall sensor to detect the output current, meeting the quick real time control and protection requirement of software and hardware, ensuring the performance and reliability of the system.

◆Independent power supply for control: The system provides independent switching power DC input port. External UPS power supply can be realized through option card. It is applicable to the applications of oilfield, chemical industry and printing and dyeing industry.

◆Power-up self-detection function: It realizes the power-up detection on the peripheral circuit, such as motor
grounding, disconnection, greatly improving the reliability of the system.

◆Comprehensive system protection function: Software/hardware current limiting protection, overcurrent and

overvoltage protection, grounding short circuit protection, overload protection, IGBT short circuit protection, abnormal current detection protection, abnormal relay contact protection.

◆Perfect terminal protection function: short circuit and overload protection for the +24V and +10V power supply of the control terminals, operating panel cable reverse connection protection, input signal cable disconnection and abnormal analog input protection.

◆ Over-temperature prealarm protection function: Automatic adjustment will be made according to the temperature to ensure the reliable operation of the product, and maximum operating temperature will be recorded.

◆Comprehensive switching power protection function: Including switching power output short circuit protection, overload protection, power-up soft start function, open loop self-locking and voltage limiting protection function, ensuring the reliability of the system.

Rich and flexible functions

■Multiple frequency given modes, flexible and convenient for the operation

◆Operating panel setting (digital given). The operating panel can be used to conduct ∨/∧ adjustment on the frequency given.

◆Terminal reference

1) Analog AI1/AI2: 0~10V or 0~20mA;

2) Pulse frequency X8/DI: 0.2Hz~50kHz;

3) Xi terminal: Up/Dn mode independent, able to superpose with any other frequency reference mode.

◆Communication mode given: International standard Modbus protocol.

◆The above given modes can be switched online.

■Multiple channels for given input and feedback

◆Under the open loop or analog feedback close loop mode, the given input can define the main and auxiliary calculation relation:

1) Main given input + auxiliary given input;

2) Max (main given input, auxiliary giveninput)

3) Min (main given input, auxiliary given input)

◆Under the analog feedback close loop mode, the feedback value can also define the main auxiliary calculation relation before it enters the process PID for adjustment control.

It is especially suitable for: The continuous and automatic production lines, including paper making, printing and dyeing, packaging and printing, and the temperature difference and pressure difference applications, including the chilled water control of the central air conditioner, the water supply system.

■Digital operating panel

◆Button type standard TIP connection.

◆The button layout complies with the human engineering principle. One-button function code access and exit, making it easy for the operation.

◆With unique multifunctional button M, the following functions can be defined:

1) JOG;

2) FORWARD

3) REVERSE

■Upper computer communication

◆Terminals provide 485 ports, the communication protocol is Modbus, and upper computer monitoring software is provided.

◆Master slave communication control among several inverters can be realized.

◆Parameter upload and download can be realized.

Customized functions

■Multiple function code display modes

◆FU group menu can displays all the function codes.

◆Users can self-define the function codes for inquiry and modification

■Multiple function code encryption modes (to protect the intellectual property of the customers)

◆Users can set function parameter password protection.

■User self-defined parameter display function

◆Users can choose the common parameters displayed by the operating panel and use  keyto switch such parameters.

◆Users can define the parameters displayed upon running and stopping respectively.

◆Users can define such parameters as voltage,givenfrequency,current.

■Users can make secondary development

◆Universal expansion port is provided as standard.

◆Physical port SPI bus, software protocol Modbus.

◆The ports provide +24V/500mA power supply.

◆The CPU expansion scheme can realize PLC function.

◆It supports programming by user to realize process control.

■Enhanced function

◆The software filtering time for the AI1, AI2 analog input is settable to enhance the anti-interference capacity.

◆Independent multi-section modification can be made on the AI1, AI2 analog input curve.

◆Sulti-step speed setting is provided, with 15 speeds as standard.

◆Standard output frequency is 600Hz,with a maximum output frequency of 2000Hz, it is applicable to such equipment as vacuum pump, grinding machine, female thread extrusion machine.

◆With the acceleration/deceleration time up to 10 hours, it is applicable to the bobbiner and other equipment of the textile industry.

◆It supports the overload protection with motor temperature feedback.

◆Independent high-speed pulse input and output ports are provided to realize high-speed pulse cascade function.

Typical industry applications

■Digital control machine

◆Compact structure: The size is equal to 70% of the inverter of the same power.

◆Low speed precise processing: The excellent low-frequency torque performance can meet the processing demand of the machine main shaft in low speed condition (when it is operating in motoring state, it can realize a frequency as low as 0.35Hz and output 180% rated torque)

◆Torque and rotating speed index: It can meet the sudden loading and unloading requirement upon the cutting processing, with the dynamic torque response time <20ms and speed stabilization precision of ±0.3%.

■Special function for wire-drawing machine

◆Operation without swing link: It adopts open loop tension control to realize operation without swing link under speed sensorless control mode.

◆Operation with swing link: The user does not need to adjust the position of the swing link manually. When the system starts up, the swing link will get to the proper position automatically.

◆Powerful tensile capacity: It is suitable for the applications of large and medium wire-drawing machine. It features large torque upon low frequency operation and high speed stabilization precision.

◆Double conversion scheme: It can realize the inverter application of the same power class with precise current control and does not need to upgrade the level.

◆Environment adaptability: Independent duct design, protective coating treatment, high-temperature operation, and digital protection function.

■Special function for textile

◆Traverse operation function: It can effectively lead the yarn into the yarn carrier on the yarn and chemical fiber equipment to prevent the overlapping of the yarn and facilitate the unreeling.

◆Constant line speed mode: It can effectively prevent the uneven tightness of the yarns from the high speed cone winder to maintain the constant tension.

◆Fixed length calculation: It is convenient for the user to calculate the thread length. When the thread length reaches the preset value, the equipment will be shut down automatically.

■Extrusion machine energy saving

◆Extrusion machine interface board: It can realize best flow and pressure distribution relation in different processes by receiving the extrusion machine feedback signal to realize optimized energy saving control of motor.

◆Customized process curve: The user does not need to change the inverter parameter when replacing the moulds. The process curve memory can be easily realized.

◆Wide range torque output: Within the set range of pressure and flow, the motor torque output is stable to ensure the quality of the workpiece.

◆Tripless: With extremely powerful loading capacity, the inverter can realize stable tripless operation in any acceleration/deceleration time and under any impact load condition.

◆Green output: It adopts advanced power module drive mode to reduce the interference to the extrusion machine control circuit and sensor.

■Lifting control

◆Step torque response: It can quickly follow the equipment load change to prevent the runaway situation and ensure the safe production.

◆Four quadrant operation: It can smoothly and quickly switch the forward and reverse motoring and generating

state of the equipment.

◆Torque monitoring: It can adjust, limit, display and switch the torque output, so as to monitor the operating state of the equipment.

■Unpacking check

Check whether wearout was made to packingcase during transport.After unpacking, please check the following items:

◆Check whether the products coincide with the packing list or not.

◆Check if any damage was made to the inverter during transport (damage or gap on the body).

◆Review the inverter's nameplate and check if it is the right model you've ordered.

◆If you have ordered selected accessories, please also check the accessories.If any damage of the inverter or the accessories was found, please contact you supplier promptly or directly call 09327444043 / 09824692665.

■Inverter use announcements

◆Motor insulation check

Motor insulation check should be conducted first, before first long time laydown then reuse and periodic inspection, in order to prevent inverter from damage due to motor winding insulation failure. Make sure that motor cable is disconnected from inverter when do isulation check, 500V voltage type megohmmeter is recommended, and should guarantee the measured resistance is no less than 5 megohm.

◆Thermal protection of motor

If the capacity of the chosen motor does not match with rated capacity of inverter, especially if inverter's rated capacity is larger than motor's rated capacity,be sure to adjust motor protection parameters in inverter,or add thermal relay before the motor in order to protect motor.

◆Running above power frequency

The inverter's output frequency range is 0Hz～600Hz, If customers need to run inverter above 50 Hz, please consider the mechanical devices' bearing capacity.

◆Mechanical devices' vibration

At some output frequencies, inverter may reach the mechanical resonance point of the load device, then avoid by setting the parameters of the jump frequency.

◆Motor heat and noise

The inverter outputs PWM voltage wave, with a certain amount of harmonics, so that motor temperature rise, noise and vibration will increase slightly comparing with running under power frequency condition.

◆Voltage sensitive devices and capacitors to improve power factor are prohibited.

The innverter outputs PWM wave, if voltage sensitive devices and capacitors to improve power factor are connected to the output circuit, it will bring about instantaneous large current or even damage to inverter, please do not use.

◆Contactor installed between the inverter input and output is not allowed to be used to control start/stop of inverter. When it is necessary to be used to control start /stop of inverter, there should be an interval of no less than an hour. Frequently charge and discharge may reduce the life of the capacitors in inverter. If switching devices such as contactors are equipped between inverter output end and motor, should ensure that the inverter with no output when on/off operation is conducted, otherwise may easily lead to the inverter inner module damage.

◆Use beyond rated voltage

Our inverters are not suitable for usage beyond the allowable operating voltage range which is stipulated by the manual, otherwise the inverter inner components might be easy to damage.If it is necessary, please use the appropriate boost or buck units to achieve.

◆Three-phase input used as two-phase input

Do not allow to use three-phase inverter of this series as two-phase input, otherwise fualt may occur or the inverter might be damaged.

◆Lightning surge protection

The series inverters have built-in lightning over-current protection device, with a certain degree of self-protection capability for lightning. Customers in areas where lightning occurs frequently should install protection devices before inverter.

◆Altitude and derating use

For altitude above 1000m areas, the heat dissipation get worse due to the thin air, it is necessary to use by derating.Please consult our company if you encounter this kind of situation.

◆Some special use

If customers need to use wiring methods other than the recommended wiring diagram provided in this manual, such as the common DC bus, please consult our company.

◆Inverter scrap announcements

◐) Electrolytic capacitors in the inverter may explode when burn.

◐) Plastic, rubber and other matierals of inverter may give out harmful poisonous gases when burn, please take special care.

◐) Dispose inverter as industrial waste.

◆Adaptive motor

◐) Please choose four-pole squirrel cage induction motor as standard adaptive motor,otherwise please be sure to choose inverter according to motor's rated current. For occasions of driving permanent magnet synchronous motor, please consult us.

◐) Cooling fan of the non-inverter motor and rotor shaft are coaxially connected, so fan's cooling effect reduces as speed decreases,therefore, exhaust fan should be equipped when motor overheating occurs or replaces with variable-frequency motor.

◐) The inverter has already built in standard parameters of adaptive motor. According to actual situation, there is need of doing motor parameter recognization or personalization default values setting to line with the actual value, otherwise it will affect performance and protective properties.

◐ ） Cable or motor inner short circuit may lead to inverter alarm, even blow up. Therefore, insulation short-circuit test should be carried out on initial installation of the motor and cable, this test also need to be conducted in routine maintenance.Note: Be sure to cut off the connection between inverter and testing parts before test.

Please read this manual carefully before use the inverter, comprehend every item in order to use correctly.

This manual is a random accessory, be sure to appropriately preserve after use, for viewing at any time.

Safety precaution

Description of safety marks:

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

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

■Use

Danger:

●Do not use the damaged or uncompleted inverter, otherwise, injury may occur!

●Please use the motor above isolation class B, otherwise, electric shock may occur!

●This series of inverter is used to control the variable-speed operation of three-phase motor and cannot be used for single-phase motor or other applications. Otherwise, inverter failure or fire may be caused.

●This series of inverter cannot be simply used in the applications directly related to the human safety, such as the medical equipment.

●This series of inverter is produced under strict quality management system. If the inverter failure may cause severe accident or loss, safety measures, such as redundancy or bypass, shall be taken.

■Goods acceptance

Note:

●Check carefully whether damage or savage unloading was made to the goods,Ifsrews loose or lack parts is found, the inverter cannot be installed. Otherwise, even bigger lose or accident may be caused.

■Installation environment

Note:

●When inverter is installed in a control cabinet, the cabinet should equip with ventilation cooling fan meeting inverter requirement,to ensure the inner temperature of the cabinet below 50℃. Must make internal hot air smoothly discharge, and cold air inflow into the cabinet, so as to extend the service life and stable operation for users' use!

●Prevent cable cuts or screws entering the inverter, otherwise the inverter maybe damaged!

●Please install on apyrous material like metal, keep away from flammable materials, otherwise, fire may occur!

■Wiring

Danger:

●The wiring must be conducted by qualified electricians. Otherwise, electric shock mayoccur.

●Inverter must be disconnected with power supply be breaker, otherwise, fire alarm may occur.

●Please make sure the power supply is off before wiring, otherwise, electric shock may occur.

●The grounding terminal —El must be reliably grounded, otherwise, inverter shell may be electrified and exits the risk of electric shock.

●Main circuit terminals must be carefully checked. Wiring must be operated in accordance with the formal wiring standard.Shall not cheat on workmanship and materials or operate not according to the ruls. Avoid short circuit or terminal contact undesirable caused fever leads to fire or damage to the equipment.

■Wiring

Note:

●The three-phase power supply cannot connect to output terminals U/T1, V/T2 and W/T3, otherwise, the inverter may be damaged.

●It is forbidden to connect the output terminal of the inverter to the capacitor or LC/RC noise filter with phase lead, otherwise, the internal components of the inverter may be damaged.

●Please confirm that the power supply phases, rated voltage are consistent with that of the nameplate, otherwise, the inverter may be damaged.

●Do not perform dielectric strength test on the inverter, otherwise, the inverter may be damaged.

●The wires of the main circuit terminals and the wires of the control circuit terminals shall be laid separately or in a square-crossing mode, otherwise, the control signal may be interfered.

●The wires of the main circuit terminals shall adopt lugs with insulating sleeves.

●The inverter input and output cables with proper sectional area shall be selected according to the inverter power.

●When the length of the cables between the inverter and the motor is more than 100m, it is suggested to use output reactor to avoid the inverter failure caused by the overcurrent of the distribution capacitor.

● Inverter with standard configuration of DC reactor must connect DC reactor between ⊕1, ⊕2 terminals,otherwise inverter will do not disply after power on.

■Check before operation

Danger:

●Please confirm whether power source voltage coincides with the inverter voltage, input andoutput wiring is correct, and check carefully whether there is short in the peripheral circuit, the circuit is fastened, otherwise inverter may be damaged!

●Inverter needs no withstand voltage test which has been done before delivery, otherwise electric shock may occur!

●Make sure that all the peripheral accessories are connected according to the circuit diagram provided by the manual, otherwise electric shock may occur!

■Charged commissioning

Danger:

●Close the cover board then power on, otherwise electric shock may occur!

●Power supply can only be connected after the wiring is completed and the cover is installed. It is forbidden to remove the cover in live condition, otherwise,electric shock may occur.

●When the inverter is powered on, even when it is in the stop state, the terminals of the inverter are still live. Do not touch the inverter terminals, otherwise electric shock may be caused.

●The failure and alarm signal can only be reset after the running command has been cut off. Otherwise, personal injury may be caused.

●Early on powering on, inverter carries out security detection to peripheral circuit automatically, at the moment, do not touch the U、V、W terminals or motor terminals, otherwise electric shock may occur!

Note:

●When auto failure reset or power failure restart function is set, isolation measures shall betaken for the mechanical equipment, otherwise, personal injury may be caused.

●When it is used on lifting equipment, mechanical contracting brake shall also be equipped.

●Do not control the inverter's start/stop by connect/disconnect the power supply, otherwise equipments might be damaged!

●Do not touch the inverter terminals (including the control terminals), otherwise electric shock may occur!

●If parameters recognition is needed, please note that the motor may hurt people during revolving, otherwise accident may occur!

●Do not chang factory parameters of the inverter at discretion, otherwise equipments might be damaged!

●If restart function was chosen, please keep away from the machines, otherwise human injury may occur!

●Do not touch the cooling fan or the discharge resistor, otherwise burn may occur!

●In the applications with industrial frequency and variable frequency switching, the two contactors for controlling the industrial frequency and variable frequency switching shall be interlocked.

■Maintenance, inspection

Danger:

●In the power-on state, please do not touch the inverter terminals, otherwise, there exists therisk of electric shock.

●If cover is to be removed, the power supply must be disconnected first.

●Wait for at least 10 minutes after power off or confirm that the CHARGE LED is off before the maintenance and inspection to prevent the harm caused by the residual voltage of the main circuit electrolytic capacitor to persons.

●The components shall be maintained, inspected or replaced by qualified electricians.

Note:

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

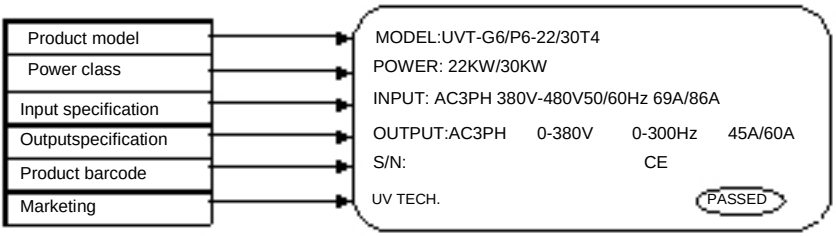
Danger:

●It is forbidden to modify the inverter unauthorizedly, otherwise, personal injury may becaused.

Contents

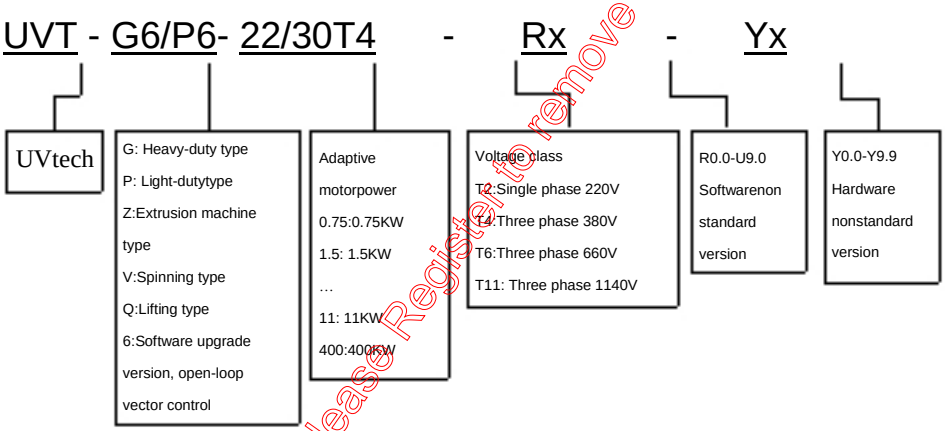
Chapter 1 Introduction to G6/P6 Series Inverter

1.1 Product nameplate description



1.2 Product model description

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



Software nonstandard version R0.0 ↓ R0.5 ↓ R1.0 ↓

Universal DSP version Extrusion machine version I/O expansion version

Hardware nonstandard version Y0.0 ↓ Y0.5 ↓ Y1.0 ↓

Universal DSP version Extrusion machine version I/O expansion version

1.3 Series model description

■G6/P6– □□□ /□□□ T2 Three phase/single phase220V constant torque/heavy-duty application

Power (KW)		0.4	0.75	1.5	2.2	3.7	5.5	7.5
Adaptive motor power (KW)		0.4	0.75	1.5	2.2	3.7	5.5	7.5
Output	Voltage (V)	Three phase 0 to rated input voltage						
	Rated current (A)	3	4.7	7.3	11	17	24	30
	Overload capacity	150% 1 minute; 180% 10seconds; 200% transient stop						
Input	Rated voltage/frequency	Three phase/single phase 210 to 230V; 50/60Hz						
	Allowable voltage range	DC 254-380V; Voltage unbalancedness ≤3%; allowable frequency fluctuation: “5%						
	Rated current (A)	2.9	3.8	5.7	8.25	13.5	19.5	25.5
Braking unit		Built-in as standard						
Protection class		IP20						
Cooling mode		Self-cooling			Forced air convection cooling			

■G6– □□□ T4 Three phase 400V constant torque/heavy-duty application

/□□□		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75
Adaptive motor power (KW)		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75
Power (KW)																
Output	Voltage (V)	Three phase 0 torated input voltage														
	Rated current (A)	2.5	3.8	5.5	9	13	17	25	34	40	45	60	75	90	110	150
Input	Rated voltage/frequency	Three phase 380V to 480V; 50/60Hz														
	Allowable voltage range	DC 460-780V; Voltage unbalancedness ≤3%; allowable frequency fluctuation: “5%														
	Rated current (A)	3.5	6.2	9.2	14	21	27	34	39	50	60	75	86	105	125	150
Braking unit		Built-in as standard										Built-in as option				
Protection class		IP20														
Cooling mode		Forced fan-ventilated														

Continuing:Three phase 400V constant torque/heavy-duty application (Note:for 132KW and above products, DC reactor,cabinet,220KW standard configuration are seletable)

Power (KW)		90	110	132	160	185	200	220	250	280	315	355	400	450	500
Adaptive motor power (KW)		90	110	132	160	185	200	220	250	280	315	355	400	450	500
Output	Voltage (V)	Three phase 0 to rated input voltage													
	Rated current (A)	180	210	253	310	350	380	430	480	530	600	680	750	800	900
Input	Rated voltage/frequency	Three phase 380V to 480V;50/60Hz													
	Allowable voltage range	DC 460 to 780V; Voltage unbalancedness≤3%; allowable frequency fluctuation: ±5%													
	Rated current (A)*coefficient	176	200	232	290	310	352	400	430	489	552	630	710	760	810

Braking unit	External DC braking
Protection class	IP20
Cooling mode	Forced fan-ventilated

■P6 – □□□ / □□□ T4 Three phase 400V constant torque/light-duty application

Power (KW)		5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160
Adaptive motor power (KW)		5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160
Output	Voltage (V)	Three phase 0 to rated input voltagte														
	Rated current (A)	13	17	24	30	39	45	60	75	90	110	130	180	210	253	310
Input	Rated voltage/frequency	Three phase 380V to 480V;50/60Hz														
	Allowable voltage range	DC 460 to 780V; Voltage unbalancedness ≤3%; allowable frequency fluctuation: “5%														
	Rated current (A)	19	23	35	45	54	62.1	77	94.5	112	135	180	261	180	208	261
Braking unit		Built-in as standard											Built-in as option			
Protection class		IP20														
Cooling mode		Forced fan-ventilated														

Continuing:Three phase 400V constant torque/light-duty application (Note:for 132KW and above products, DC reactor,cabinet,220KW standard configuration are seletable)

Power (KW)		185	200	220	250	280	315	355	400	450	500			
Adaptive motor power (KW)		185	200	220	250	280	315	355	400	450	500			
Output	Voltage (V)	Three phase 0 to rated input voltage												
	Rated current (A)	350	380	430	480	530	600	680	750	900	800			
Input	Rated voltage/frequency	Three phase 380V-480V; 50/60Hz												
	Allowable voltage range	DC 460-780V; Voltage unbalancedness ≤3%; allowable frequency fluctuation: “5%												
	Rated current (A)*coefficient	279	316	360	387	440.1	496	567	639	684	729			
Braking unit		External DC braking												
Protection class		IP20												
Cooling mode		Forced fan-ventilated												

1.4 Technical specifications of product

Item	Specification

Control features	Frequency control range	0～400Hz
	Output frequency precision	Digital directive ±0.01% （-10℃～+40℃）
	Set frequency resolution	Digital set:0.01Hz. Analog set:maximum frequency×0.1%．
	Speed adjustable range	1:100
	Overload capacity	G type:150% rated current 60s; 180% rated current 6s; 200% rated current transient stop. P type:120% rated current 60s;150% rated current 6s; 180% rated current transient stop. Z type:150% rated current 60s; 180% rated current 6s; 220% rated current transient stop.
	Control mode	Open-loop VVVF control; Open-loop vector control.
	Torque boost	Manual torque boost;auto output torque boost during acceleration.
	Startup torque	0.35Hz 150%rated torque
Functiondescription	Acc/deceleration curve	Linear or S curve acc/deceleration;4 kinds of acc/deceleration time; 0.1～3000.0s adjustable continuously
	JOG function	JOG frequency:0.00～50.00hz; JOG acc/deceleration:0.1～3000.0s adjustable continuously
	Standard function	Motor parameter auto detection function,simple vector control,multi-point VF curve,manualtorqueboost,auto torque boost,auto slip compensation(speed compensation),auto voltage regulation(AVR), speed tracking start function,DC braking when start,DC braking when stop,restart after instantaneous power failure,auto fault reset,overcurrent compression when accelerating,overcurrent descent frequency function at constant speed,overvoltage compression when decelerating,jump frequency function, carrier frequency automatic adjustment,automatic economic running,simple one drive two water supply function,16 steps multi-step speed running,simple PLC program running,traverse function for spinning,closed-loop PID adjustment control.
	Running command channel	3 kinds of control mode:keypadcontrol,analog terminal control,serial communication control
	Frequency source selection	Digital set,analog voltage set,analog current set,pulse input set,serial communication port set; through various method to combination switch.
	Input terminal	8 digital input terminals,up to 25 kinds of self-defined function,Compatible with active PNP input or NPN input,one can be used as a high speed pulse input; 2 analog analogterminals,can receive voltage signals (0~10V) or current signal (0~20mA);
	Output terminal	2 open-collector output terminals,up to 16 kinds of self-defined function; 2 relay output terminals,up to 20 kinds of self-defined function 2 analog output terminals,up to 10 kinds of self-defined function;can output voltage signals (0~10V) or current signal (0~20mA);

Efficiency	Under rated power, 7.5KW and below ≥93%; 45KW and below ≥95%; 55KW and above ≥98%	
Protection function	Power supply undervoltage, overcurrent protection, overvoltage protection, interference protection, abnormal comparison reference input, self-setting failure, module protection, heatsinkovertemperature protection, inverter overload protection, motor overload protection, abnormal current detection, output to ground short circuit,output missing phase, EEPROM abnormal, abnormal relay contact,hardware overload protection,input missing phase, input to ground short circuit.	
Operation environment	Operating site	Indoor,sea level below 1000m,no dust,corrosivegas,and direct sunlight
	Ambient temperature	-10℃～+40℃ (Ambient temperature is higher than 40℃,plea se use in derating)
	Humidity	20%～90%RH (no condensing)
	Vibration	<0.5g
	Storage temperature	-25℃～+65℃

1.5 Description of each part of the product

Fig. 1.5-1 Distributor of each part

1.6 Installation dimension figures of inverter

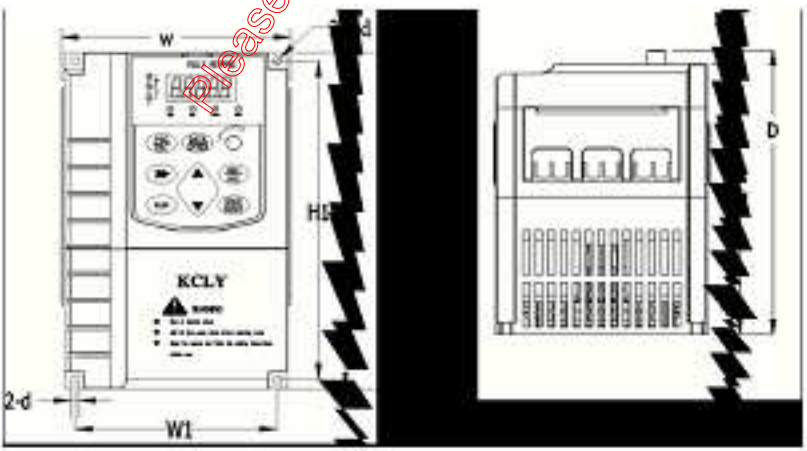
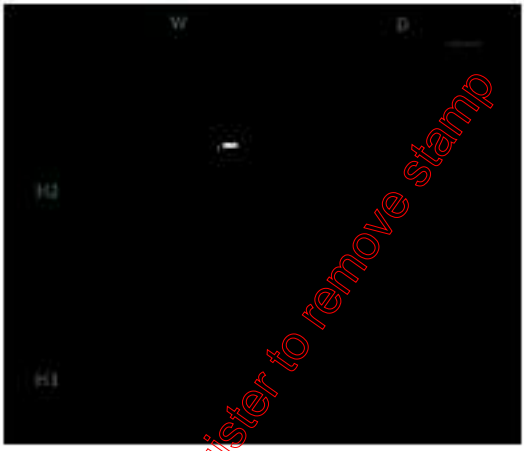


Fig. 1.6-1 Appearance and installation dimension scheme of 0.75~15KW inverter



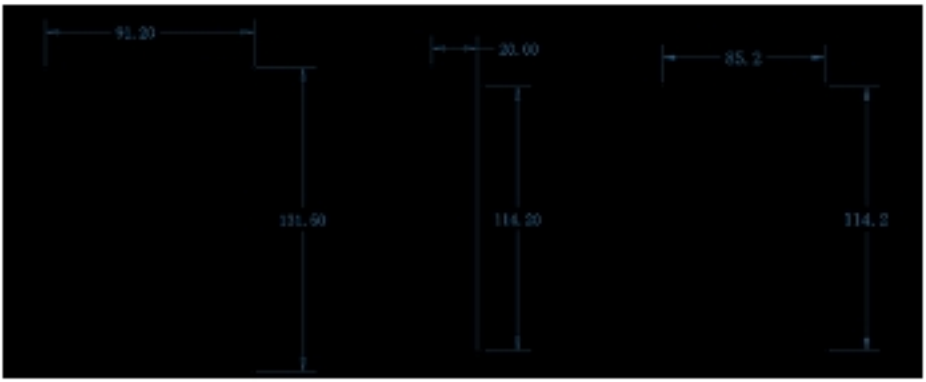


Fig. 1.6-6 Keypad pallet dimension and mounting hole

Keyboard installation method and dimension table:

Overall dimension			Case opening size		Installation method	Figure
Length (mm)	Width (mm)	Thickness (mm)	Height (mm)	Width (mm)		
131.5	91.2	20	114.2	85.2	Button type	Fig.1.5 Fig.1.6

Three phase/single phase 200V series installation dimension table:

220V product models	W(mm)	W(mm)	B(mm)	H(mm)	H1(mm)	D(mm)	D1(mm)	Mounting hole diameter (mm)	Net weight (Kg)
G6/P6-0.4T2									
G6/P6-0.7T2								ϕ5.0	..
G6/P6-1.5T2									
G6/P6-2.2T2									
G6/P6-3.7T2									

Note:Other models are not included in the above table, please determine dimensions when place order.

Three phase400V series installation dimension table:

380V product models	W(mm) H2(mm)	W1(mm)	H(mm)	H1(mm)		D(mm) D1(mm)		Mounting hole diameter (mm)	Net weight (Kg)
G6/P6-0.75T4	118	106.6	185	175.2		167.5	157.7	ϕ4.5	..
G6/P6-1.5T4									
G6/P6-2.2T4									
G6/P6-3.7/5.5T4	160	148	247	235		187.5	177.1	ϕ5.5	..
G6/P6-5.5/7.5T4									
G6/P6-7.5/11T4									
G6/P6-11/15T4	220	206	320	306		216	206.5	ϕ6	..
G6/P6-15/18T4									
G6/P6-18/22T4	290	230	455	441		236.5		ϕ10	..
G6/P6-22/30T4									
G6/P6-30/37T4									
G6/P6-37/45T4	320	230	555	536		236.6		ϕ10	..
G6/P6-45/55T4									
G6/P6-55/75T4	410	320	634	611		236.6			
G6/P6-75/90T4									
G6/P6-90/110T4									
G6/P6-110/132T4									
G6/P6-132/160T4								ϕ13	..
G6/P6-160/185T4									
G6/P6-200/220T4									
G6/P6-220/250T4									
G6/P6-250/280T4									
G6/P6-280/315T4									
G6/P6-315/350T4	..	750	..	1785	..		400	..	..
G6/P6-350/400T4									
G6/P6-400/450T4									
G6/P6-450/500T4									

Note: The final interpretation owes to production and design provider, If there are changes and update,we will notice when order is placed.

1.7 Description of optional accessories

1.7.1 Option description of DC reator

Some models of G6/P6 universal type can built-in DC reactor, details as follow:

Inverter models	DC reactor		Notes
	Built-in	extraposed	
G6/P6-0.75T4~G6/P6-5.5T4	×	×	No special instructions
G6/P6-7.5T4~G6/P6-55T4	√	×	Inverter models
G6/P6-75T4~G6/P6-200T4	×	√	Customers can add by their own
G6/P6-220T4~G6/P6-355T4	√	√	Inverter models

—√I said can, —×I said cannot.

1.7.2 Braking resistor selection guideline

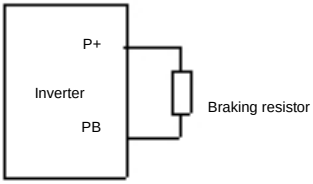
When the control device driven by inverter needs to brake quickly, braking unit should be used to release the power back to DC bus when motor braking.

Braking resistor selection of different voltage classes and different power classes inverters is shown as below （braking torque 100%）.

Inverter Models	Recommended power of braking resistor	Recommended resistance of braking resistor
G6/P6-0.75T4	150W	≧300Ω
G6/P6-1.5T4	150W	≧220Ω
G6/P6-2.2T4	250W	≧200Ω
G6/P6-3.7T4	300W	≧130Ω
G6/P6-5.5T4	400W	≧90Ω
G6/P6-7.5T4	500W	≧65Ω
G6/P6-11T4	800W	≧43Ω
G6/P6-15T4	1000W	≧32Ω
G6/P6-18T4	1300W	≧25Ω
G6/P6-22T4	1500W	≧22Ω
G6/P6-30T4	2500W	≧16Ω
G6/P6-37T4 G6/P6-45T4 G6/P6-55T4 G6/P6-75T4 G6/P6-90T4 G6/P6-110T4	Choose according to brake unit's requirement and recommended value	Choose according to brake unit's requirement and recommended value

1.7.3Braking resistor connection description

Brakingresistor connection of G6/P6 series inverters is shown as below.



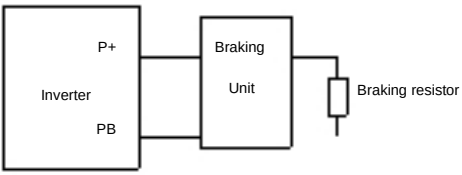


Fig. 1.7.3-1 Braking resistor installation[Below 30kW]Fig. 1.7.3-2 Braking resistor installation [Above 37kW]

1.8Connection description of extrusion machine's signal Board

UV TECH is anIO expansion optional component of extrusion machine promoted by our company, matingwith G6/P6 series inverters.It can directly inputs 0～1ADC current signals(through CI～COM terminals)or 0～24VDC voltage signals (through VI～COM terminals). After opto-couplersisolation processing, the signals can be converted into 0~10V voltage signal then internally connecting to inverterVCIinterface directly through row cable, users don't need to additionally connect analog signalcable.

Note: When extrusion machine signal board is used, external analog input of AI1, AI2can not be used.

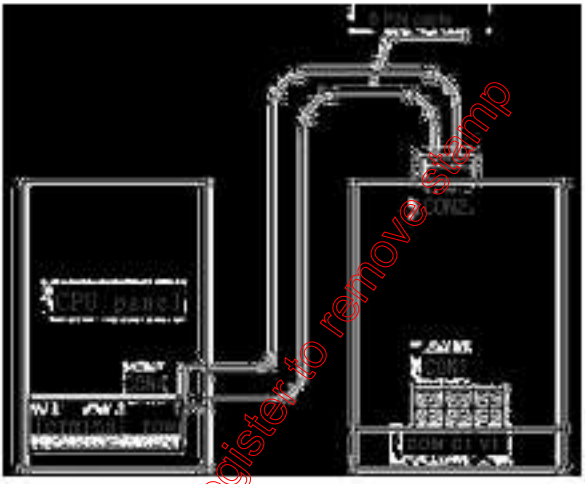


Fig. 1.8-1Connection of extrusion machine signal board

Wiringdescription of extrusionmachine:

One of the two connection mathods can be used,but cannot be used at the same time.

1. Control board of the extrusion machine outputs 0～24V voltage to injection molding signal board, VI connects positive voltage end, COM connects negative voltage end.

2. Control board of the extrusion machine outputs 0～1A current to injection molding signal board, CI connects current inflow end(Relative to signal board of extrusion machine), COM connects current outflow end(Relative to the signal board of extrusion machine).

Chapter 2 Inverter Installation

2.1 Installation environment

1. Indoor places with air-vents or ventilating devices.
2. Ambient temperature:-10℃~40℃. If the ambient temperature is greater than 40 ℃ but less than 50 ℃, remove inverter cover board or open the front door of the installation cabinet, to facilitate heat dissipation.
3. As far as possible to avoid installing at high temperature and high humidityplaces.Humidityshould be less than 90%, and frost-free.
4. Keep out of direct sunlight.
5. Keep away from flammable,explosive,corrosive gas and liquid.
6. No dust, floating fiber or fine metal powder.
7. The installation plane should be strong and no vibration.
8. Keep away from electromagnetic interference source.

2.2 Mountingdirection and space

In order not to affect the use life of inverter and reduce its performance, should pay attention to mounting direction and surrounding space, and correctly fixed it.

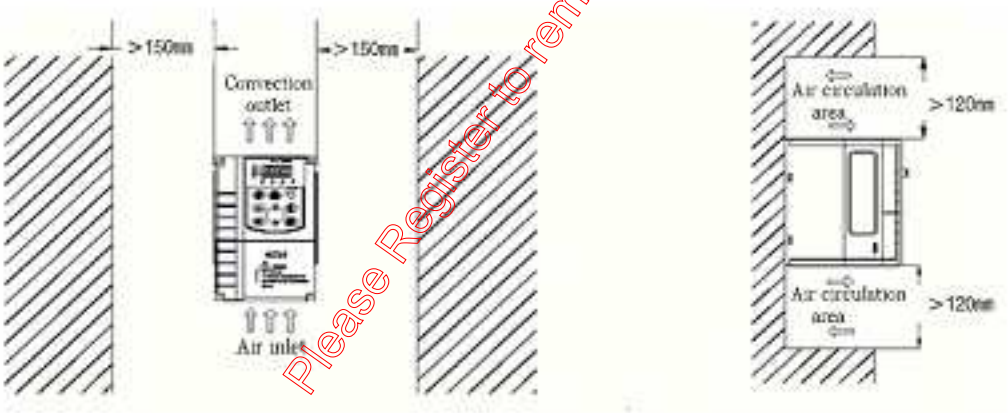


Fig. 2.2-1 Air duck ventilation

2.3Removal and mounting of operating panel and cover

2.3.1 Removal and mounting of operating panel

Fig. 2.3.1-1 Removal of operating panel

Fig.2.3.1-2 Mounting of operating panel

2.3.2 Removal and mounting of covers of inverter with plastic enclosure

Fig.2.3.2-1 Removal of lower cover

Fig.2.3.2-2 Removal of upper cover

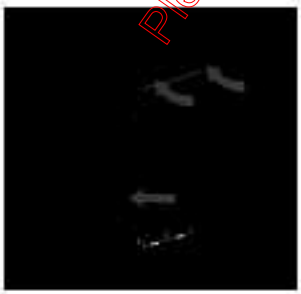
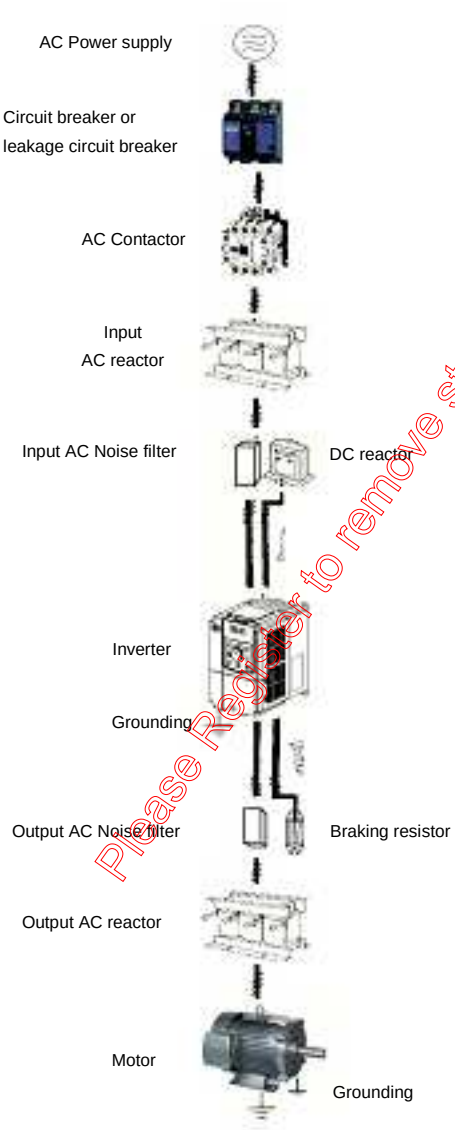


Fig.2.3.2-3 Mounting of upper cover

Fig.2.3.2-4 Mounting of lower cover

2.4 Connection peripheral devices



2.5 Description of peripheral devices for main circuit

Circuit breaker	The capacity of the circuit breaker shall be 1.5 to 2 time of the rated current of the inverter. The time features of the circuit breaker shall fully consider the time features of the inverter overload protection.
Leakage circuit breaker	Because the inverter output is the high-frequency pulse output, there will be high-frequency leakage current. Special leakage circuit breaker shall be used when installing leakage circuit breaker at the input end of the inverter. It is suggested that B type leakage circuit breaker be used, and the leakage current value shall be set as
Contactor	300mA. Frequent open and close of contactor will cause inverter failure, so the highest frequency for the open and close of contactor shall not exceed 10 times/min. When braking resistor is used, to void the overtemperature damage of the braking resistor, thermal
Input AC reactor or DC reactor	protection relay with braking resistor overtemperature detection shall be installed to disconnect the contactor at the contact control power side of the thermal protection relay. 1. The inverter power supply capacity is more than 600kVA or 10 times of the inverter capacity. 2. If there is switch type reactive-load compensation capacitor or load with silicon control at the same power node, there will be high peak current flowing into input power circuit, causing the damage of the rectifier components. 3. When the voltage unbalancedness of the three-phase power supply of the inverter exceeds 3%, the rectifier component will be damaged. 4. It is required that the input power factor of the inverter shall be higher than 90%. When the above situations occur, install the AC reactor at the input end of the inverter or DC reactor to the DC reactor terminal.
Input noise filter	The noise input from the power end to the inverter or output from the inverter to the power end can be reduced.
Thermal protection relay	Although the inverter has motor overload protection function, when one inverter drives two or more motors or multi-pole motors, to prevent the motor overtemperature failure, thermal protection relay shall be installed between the inverter and each motor, and the motor overload protection parameter P9.16 shall be set as —2I (motor protection disabled).
Output noise filter	When the output of the inverter is connected with noise filter, the conduction and radiation interference can be reduced.
Output AC reactor	When the cable connecting the inverter and the motor is longer than 100m, it is suggested to install AC output reactor to suppress the high-frequency oscillation to avoid the damage to motor insulation, large leakage current and frequent inverter protective action.

2.6 Lectotype of main circuit peripheral devices

Inverter model	Circuit breaker (A)	Contactor (A)	⊕1/B1, ⊕2/B2, OR/L1, S/L2, T/L3, U/T1, V/T2, W/T3			Grounding terminal E		
			Terminal screw	Tightening torque (N·m)	Wire specification (mm2)	Terminal screw	Tightening torque (N·m)	Wire specification (mm2)
G6/P6-0.4T2	16	10	M4	1.2~1.5	2.5	M4	1.2~1.5	2.5
G6/P6-0.75T4	25	16	M4	1.2~1.5	2.5	M4	1.2~1.5	2.5
G6/P6-1.5T4	32	25	M4	1.2~1.5	4	M4	1.2~1.5	2.5
G6/P6-2.2T4	40	32	M4	1.2~1.5	6	M4	1.2~1.5	4
G6/P6-0.75/1.5T4	10	10	M4	1.2~1.5	2.5	M4	1.2~1.5	2.5
G6/P6-1.5/2.2T4	16	10	M4	1.2~1.5	2.5	M4	1.2~1.5	2.5
G6/P6-2.2/3.7T4	16	10	M4	1.2~1.5	2.5	M4	1.2~1.5	2.5
G6/P6-3.7/5.5T4	25	16	M4	1.2~1.5	4	M4	1.2~1.5	4
G6/P6-5.5/7.5T4	32	25	M4	1.2~1.5	6	M4	1.2~1.5	6
G6/P6-7.5/11T4	40	32	M4	1.2~1.5	6	M4	1.2~1.5	6

G6/P6-11/15T4	63	40	M5	2.5~3.0	6	M5	2.5~3.0	6
G6/P6-15/18T4	63	63	M5	2.5~3.0	6	M5	2.5~3.0	6
G6/P6-18/22T4	100	63	M6	4.0~5.0	10	M6	4.0~5.0	10
G6/P6-22/30T4	100	100	M6	4.0~5.0	16	M6	4.0~5.0	16
G6/P6-30/37T4	125	100	M6	4.0~5.0	25	M6	4.0~5.0	16
G6/P6-37/45T4	160	100	M8	9.0~10.0	25	M8	9.0~10.0	16
Inverter model	Circuit breaker (A)	Contactor (A)	R/L1, S/L2, T/L3, ⊕ 1, 2/B1, B2, , U/T1, V/T2, W/T3			Grounding terminal PE		
			Terminal screw	Tightening torque (N·m)	Wire specification (mm2)	Terminal screw	Tightening torque (N·m)	Wire specification (mm2)
G6/P6-45/55T4	200	125	M8	9.0~10.0	35	M8	9.0~10.0	16
G6/P6-55/75T4	315	250	M10	17.6~22.5	50	M10	14.0~15.0	25
G6/P6-75/90T4	350	330	M10	17.6~22.5	60	M10	14.0~15.0	35
G6/P6-90/110T4	315	250	M10	17.6~22.5	70	M10	14.0~15.0	35
G6/P6-110/1 32T4	350	330	M10	17.6~22.5	100	M10	14.0~15.0	50
G6/P6-132/160T4	400	330	M12	31.4~39.2	150	M12	17.6~22.5	75
G6/P6-160/200T4	500	400	M12	31.4~39.2	185	M12	17.6~22.5	50×2
G6/P6-160/185T4	500	400	M12	31.4~39.2	185	M12	17.6~22.5	50×2
G6/P6-200/220T4	630	500	M12	48.6~59.4	240	M12	31.4~39.2	60×2
G6/P6-220/250T4	630	500	M12	48.6~59.4	240	M12	31.4~39.2	60×2
G6/P6-250/280T4	800	630	M12	48.6~59.4	150×2	M12	31.4~39.2	75×2
G6/P6-280/315T4	1000	630	M12	48.6~59.4	185×2	M12	31.4~39.2	100×2
G6/P6-315/355T4	1000	800	M14	48.6~59.4	250×2	M14	31.4~39.2	125×2
G6/P6-355/400T4	1200	800	M14	48.6~59.4	325×2	M14	31.4~39.2	150×2
G6/P6-400/450T4	1500	1000	M14	48.6~59.4	325×2	M14	31.4~39.2	150×2

2.7 Product terminal configuration

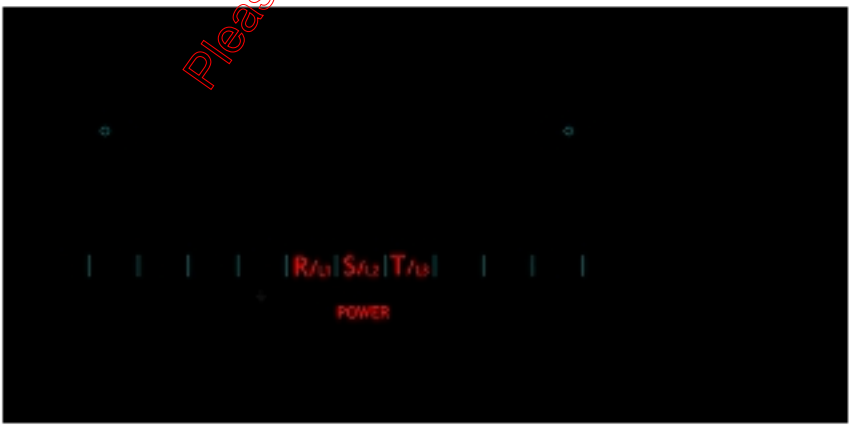


Fig. 2.7-1 Distribution of terminals

2.8 Function of main circuit terminals

G6/P6-0.4T2~G6/P6-2.2T2 andG6/P6-0.75/1.5T4~G6/P6-15/18.5T4

Fig. 2.8.1-1Wiring terminals distribution of models below 18.5KW

Terminal symbol	**Terminal name and function description**
⊕1/⊕2/B2	Connecting terminal of braking resistor
⊕1/B1, ⊖	DC power input terminal; DC input terminal of external braking unit
⏚	Grounding terminal E
R/L1, S/L2, T/L3	Three-phase AC input terminal
U/T1, V/T2, W/T3	Three-phase AC output terminal

G6/P6-18.5/22T4 ~G6/P6-75/90T4

R/L1	S/L2	T/L3	⊕1	⊕2	⊖	⏚	U/T1	V/T2	W/T3
POWER			OPTION			E	MOTOR		

Terminal symbol	**Terminal name and function description**
R/L1, S/L2, T/L3	Three-phase AC input terminal
⊕1, ⊕2	DC reactor connecting terminal, short circuited with copper bus upon delivery.
⊕2, ⊖	DC power input terminal; DC output terminal of external braking unit
U/T1, V/T2, W/T3	Three-phase AC output terminal
⏚	Grounding terminal PE

Internal braking unit option for G6/P6-18.5/22T4~G6/P6-75/90T4

R/L1	S/L2	T/L3	B1	B2	⊖	⏚	U/T1	V/T2	W/T3
POWER			OPTION			E	MOTOR		

Terminal symbol	**Terminal name and function description**
R/L1, S/L2, T/L3	Three-phase AC input terminal
B1, ⊖	DC power supply input terminal
B1, B2	Connecting terminal of braking resistor
U/T1, V/T2, W/T3	Three-phase AC output terminal
⏚	Grounding terminal PE

Note:Products with tandard built-in braking unit can realize DC bus and braking function at the same time, if DC reactor and braking function are needed to be realized at the same time,please contact the manufacturer.Meanwhile, main circuit terminals B1,B2,are correspondingly changed to ⊕1,⊕2/B1,B2.

G6-90T4~G6-400T4 and P6-110T4~P6-450T4

G6-90T4~G6-400T4 and P6-110T4~P6-450T4inverters employ top in bottom out wiring type

Terminal symbol	**Terminal name and function description**
R/L1, S/L2, T/L3	Three-phase AC input terminal
⊕1,⊕2	Connecting terminal of DC reactor;if don't connectreactor,inverter do not display after power on
⊕2, ⊖	DC power supply input terminal;DC output terminal of external braking unit
U/T1、V/T2、W/T3	Three-phase AC output terminal
⏚	Grounding terminal PE

2.9 Matters for attention for main circuit wiring

2.9.1 Power supply wiring

◆It is forbidden to connect the power cable to the inverter output terminal, otherwise, the internal components of the inverter will be damaged.

◆To facilitate the input side overcurrent protection and power failure maintenance, the inverter shall connect to the power supply through the circuit breaker or leakage circuit breaker and contactor.

◆Please confirm that the power supply phases, rated voltage are consistent with that of the nameplate, otherwise, the inverter may be damaged.

2.9.2 Motor wiring

◆It is forbidden to short circuit or ground the inverter output terminal, otherwise the internal components of the inverter will be damaged.

◆Avoid short circuit the output cable and the inverter enclosure, otherwise there exists the danger of electric shock.

◆It is forbidden to connect the output terminal of the inverter to the capacitor or LC/RC noisefilter with phase lead, otherwise, the internal components of the inverter may be damaged.

◆When contactor is installed between the inverter and the motor, it is forbidden to switch on/off the contactor during the running of the inverter, otherwise, there will be large current flowing into the inverter, triggering the inverter protection action.

◆Length of cable between the inverter and motor

If the cable between the inverter and the motor is too long, the higher harmonic leakage current of the output end will cause adverse impact on the inverter and the peripheral devices. It is suggested that when the motor cable is longer than 100m, output AC reactor be installed. Refer to the following table for the carrier frequency setting.

Length of cable between the inverter and motor	Less than 50m	Less than 100 m	More than 100m
Carrier frequency (PA.00)	Less than 15kHz	Less than 10kHz	Less than 5kHz

2.9.3 Grounding wiring

◆The inverter will produce leakage current. The higher the carrier frequency is, the larger the leakage current will be. The leakage current of the inverter system is more than 3.5mA, and the specific value of the leakage current is determined by the use conditions. To ensure the safety, the inverter and the motor must be grounded.

◆The grounding resistance shall be less than 10ohm. For the grounding wire diameter requirement, refer to 2.6lectotype of main circuit peripheral devices.

◆Do not share grounding wire with the welding machine and other power equipment.

In the applications with more than 2 inverters, keep the grounding wire from forming a loop.

Correct **Wrong**

Fig. 2.9.3-1 Correct and wrong connection of grounding wiring

2.9.4 Countermeasures for conduction and radiation interference

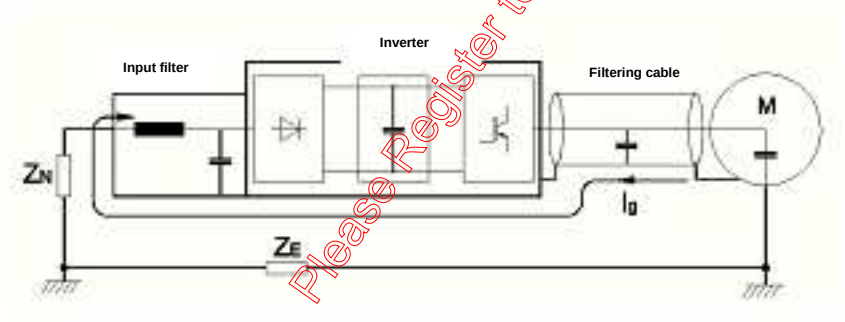


Fig. 2.9.4-1 Conection of onduction and radiation interference solutions

◆When the noise filter is installed, the wire connecting the filter to the inverter input power end shall be as short as possible.

◆The filter enclosure and mounting cabinet shall be reliably grounded in large area to reduce the back flow impedance of the noise current Ig.

◆The wire connecting the inverter and the motor shall be as short as possible. The motor cable adopts 4-core cable, with the grounding end grounded at the inverter side, the other end connected to the motor enclosure. The motor cable shall be sleeved into the metal tube.

◆The input power wire and output motor wire shall be kept away from each other as long as possible.

◆The equipment and signal cables vulnerable to influence shall be kept far away from the inverter.

◆Key signal cables shall adopt shielding cable. It is suggested that the shielding layer shall be grounded with 360-degree grounding method and sleeved into the metal tube. The signal cable shall be kept far away from the

inverter input wire and output motor wire. If the signal cable must cross the input wire and output motor wire, they shall be kept orthogonal.

◆When analog voltage and current signals are adopted for remote frequency setting, twinning shielding cable shall be used. The shielding layer shall be connected to the grounding terminal PE of the inverter, and the signal cable shall be no longer than 50m.

◆The wires of the control circuit terminals RA/RB/RC and other control circuit terminals shall be separately routed.

◆It is forbidden to short circuit the shielding layer and other signal cables and the equipment.

◆When the inverter is connected to the inductive load equipment (e.g. electromagnetic contactor, relay and solenoid valve), surge suppressor must be installed on the load equipment coil, as shown in Fig.3-5.

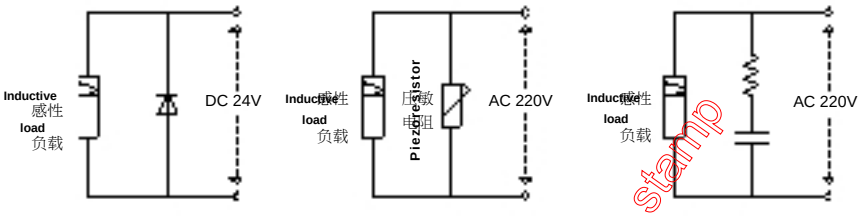
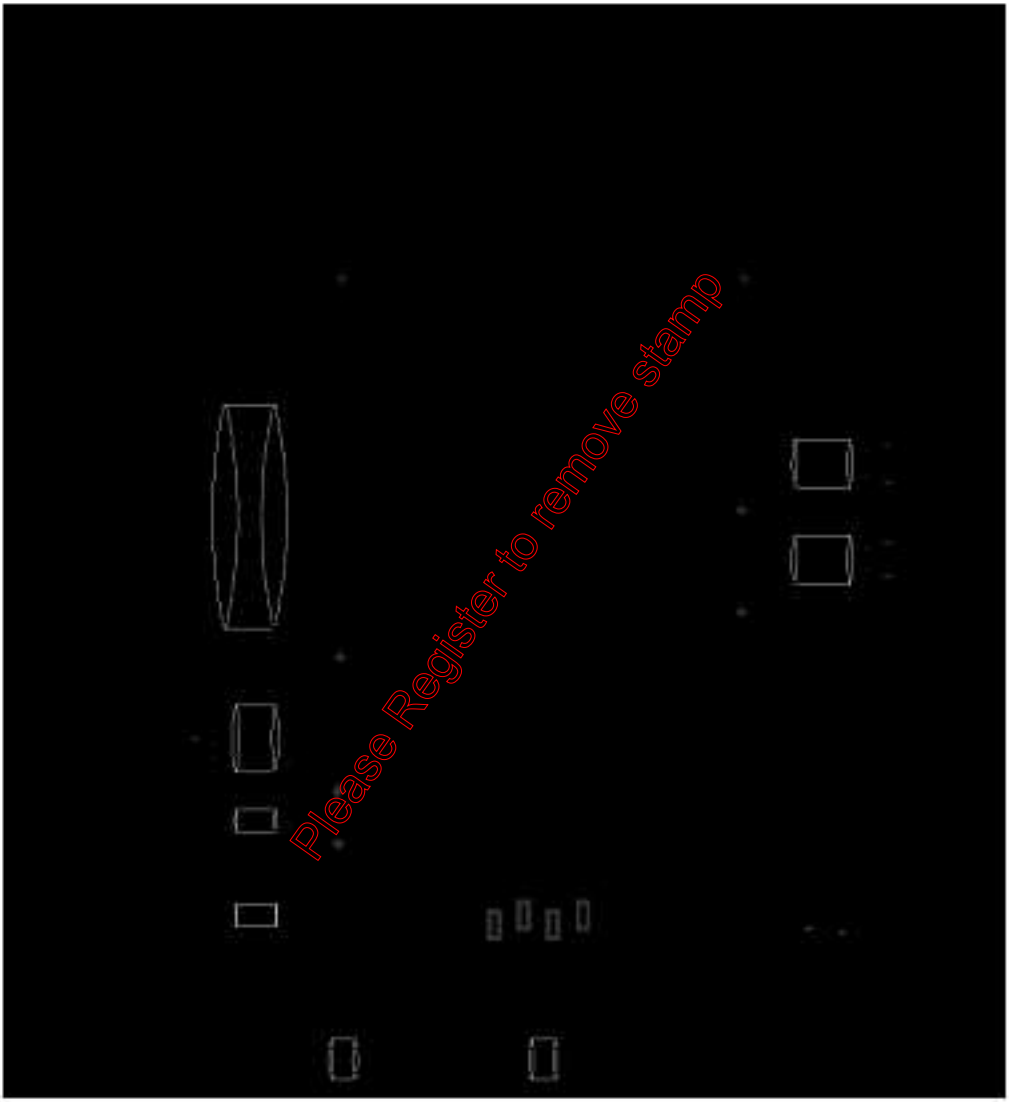


Fig. 2.9.4-2 Application of inductive load surge suppressor

2.10 Terminal wiring

2.10.1Control circuit and main circuit connection



2.10.2Arrangement sequence of the control circuit terminals

2.10.3 Description of control circuit terminals

Type		Terminal symbol	Terminal function description	Technical specification	Type
Input terminal	Analog input	+10V	Analog 10V power supply	Output capacity: below 50mA	
		AI1	Analog frequency setting 1	DC: 0~10V or 0.20 mA (resolution 1/1000)	
		AI2	Analog frequency setting 2	DC: 0~10V or 0~20mA(resolution 1/1000)	
		GND	Analog common port	0V	
	Digital input	X1/RUN	Multi-function input terminal X1/RUN	Leave factory setting: forward running	Photo coupler isolation: DC24V/8mA When external Power supply is used, voltage range: 9～30VX8 can be set as high speed pulse input terminal,maximum input is 50KHZ.
		X2/REV	Multi-function input terminal X2/REV	Leave factory setting: reverse running	
		X3	Multi-function input terminal X3	Leave factory setting: multi-step speed terminal 1	
		X4	Multi-function input terminal X4	Leave factory setting: multi-step speed terminal 2	
		X5	Multi-function input terminal X5	Leave factory setting: multi-step speed terminal 3	
		X6/JOG	Multi-function input terminal X6/JOG	Leave factory setting: forward JOG	
		X7/RST	Multi-function input terminal X7/RST	Leave factory setting: fault reset	
		X8/DI	Multi-function input terminal X8/DI	Leave factory setting:defaut pulse input	
		+24V	DC24V power supply positive end	Mating with —digital inputl,ldigital outputl to use	
		COM	DC24V power supply negtive end		
Output terminal	Analog output	AO1	Analog monitoring output 1	Voltage or current output; Leave factory setting:output frequency	Output capacity: Voltage: 0~10V, below 2mA; Current: 0~20mA, below 10V
		AO2	Analog monitoring output 2	Voltage or current output; Leave factory setting:output current	
		GND	Analog monitoring common port	0V	

	Digital output	Y1	Photo coupler output 1	Leave factory setting: inverter running	Open collector output; Photo coupler output capacity: DC36V,below 50mA .
		Y2	Photo coupler output 2	Leave factory setting: running frequency reaches set value	
		COM	Photo coupler output common port	0V	
	Relay output	RA1RA2	A node output	Leave factory setting: shutdown fault occur during running RA—RC: Normally closed RB—RC: Normally open	Node capacity: AC250V, below 2A ; DC30V,below 1A.
		RB1RB2	B node output		
		RC1RC2	Node point output common port		
Power supply		+24V	DC24V power supply positive end	Leave factory standard: +24V short circuit with PW by short circuit plate	Output capacity: below 500mA; +24V short circuit with PW by short circuit plate when leave factory.
		PW	Multi-function input common port		
Communication		+485	RS485 communication port +	RS485 interface for MODBUS communication use	MEMOBUS protocol Max38.4kBPS
		-485	RS485 communication port -		
		GND	485 common port		

2.10.4 Analog input terminals

Voltage signal of analog input is vulnerable to outside interference, Please use shielding cable, and ensure that the shielding cable reliably grounding.The cable should be as short as possible,and keep away from power lines. Serious interference occasions, you might consider to add a filter capacitor or ferrite core in signal cable.

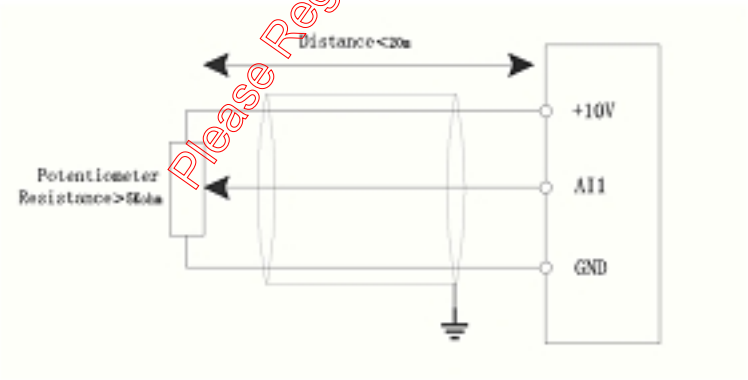


Fig. 2.10.4-1 Wiring of analog input terminals

2.10.5 Wiring mode of the multi-functional input/output terminals

■When the internal +24V power supply of the inverter is used

►The digital input adopts NPN sink current wiring mode. Terminal +24V short circuit with terminal PW; COM is common port.

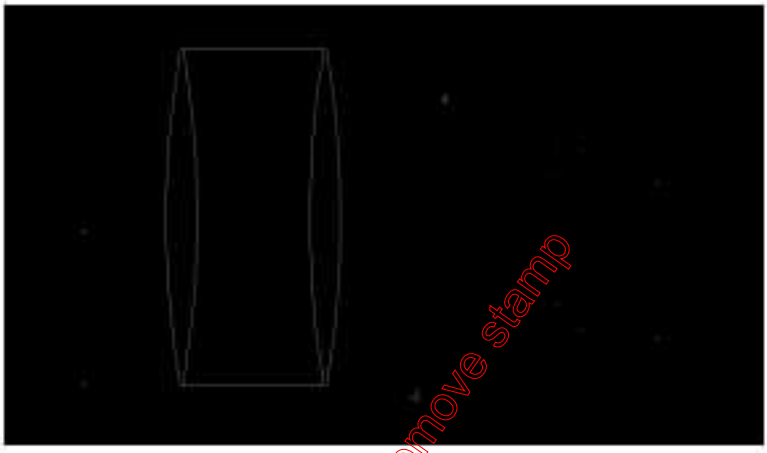


Fig. 2.10.5-1 Wiring of NPN transistor input (COM is common port)

►The digital input adopts PNP draw-off current wiring mode

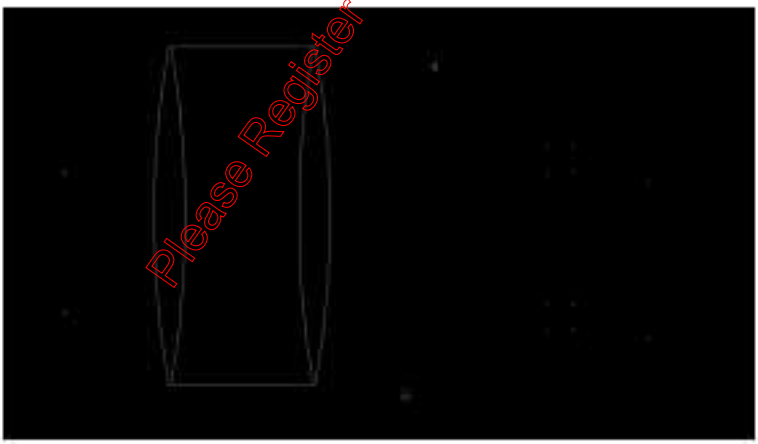


Fig. 2.10.5-2 Wiring of PNP transistor input

Note: The short circuit plate between terminal +24V and terminal PW must be removed.And connect the shot circuit plate between terminal PW and terminal COM.

■When the external power supply is used

►The digital input adopts NPN sink current wiring mode.External 24V power supply is used, terminal COM is common port.

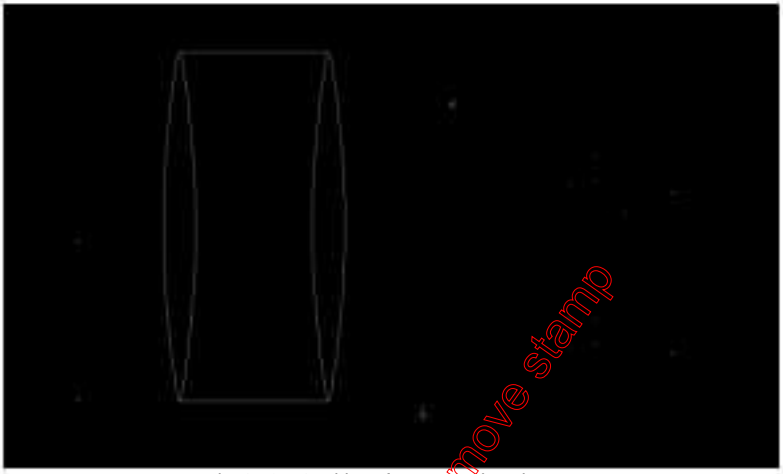


Fig. 2.10.5-3 Wiring of NPN transistor input

Note: The short circuit plate between terminal P24 and terminal PLC must be removed.

►When PNP draw-off current wiring mode is adopted,negative end of external power supply connects to terminal PW;Positive end of the external power supply is common port.Voltage range of external power supply is 9～30V.

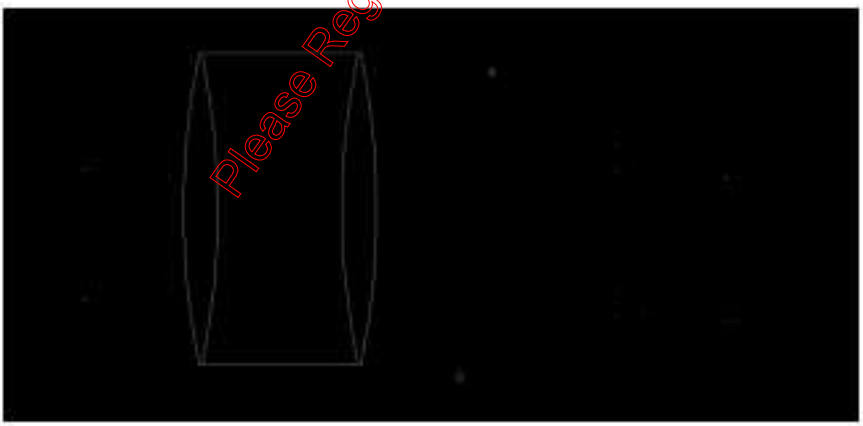


Fig. 2.10.5-4 Wiring of NPN transistor inputdraw-off current

2.10.6 Wiring mode of digital output terminal adopts internal and external power supply

►Wiring mode of digital output when open-collector output Y1,Y2 adopts internal +24V

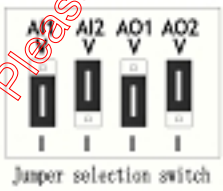
Fig.2.10.6-1Digital output adopts internal power supply

►Wiring mode of digital output when open-collector output Y1,Y2 adopts external power supply

Fig. 2.10.6-1 Digital output adopts external power supply

Note: When external power supply is adopted,please connect negative end of external power supply with terminal COM.Maximun current of open-collecter output is 50mA.If external load is relay, please parallel a fly-wheel diode with it. Please correctly install the fly-wheel diode, otherwise inverter internal panel and DSP can be damaged.

2.10.7 Description of control circuit jumper and other interfaces



Name	Function description	Leave factory setting
AI1 jumper	Select AI1 analog input quantity:V voltage 0~10V; I current 0~20mA	0-10V
AI2 jumper	Select AI2 analog inputquantity:V voltage 0~10V; I current 0~20mA	0-20mA
AO1 jumper	Select AO1 to output analog quantity:V voltage 0~10V; I current 0~20mA	0-10V
AO2 jumper	Select AO2 to output analog quantity:V voltage 0~10V; I current 0~20mA	0-20mA
CN5 interface	Keypad interface	
CN6 interface	Dedicated interface for extrusion	

Fig. 2.10.7-1Description of control circuit jumper and other interfaces

Chapter 3 Using Instructions of InverterOperation

3.1 Introduction to operation panel

3.2 Descriptions of indicators

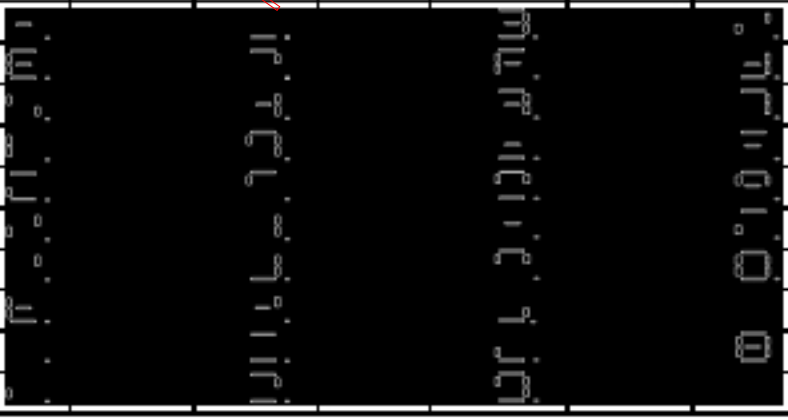
Symbol of indicator		Name	State description
Unit indicator	Hz	Frequency indicator	On: Current display parameter is set frequency Flash: Current display parameter is running frequency
	A	Current indicator	On: Current display parameter is current
	V	Voltage indicator	On: Current display parameter is voltage Flash: Current display parameter is DC bus voltage
	Hz+A	speed indicator	On: Current display parameter is speed
	Hz+V	PID mode indicator	On: Current given mode is PID closed-loop given Flash: Current feedback mode is PID closed-loop feedback
	Hz+A+V	Inverter temperature value indicator	On: Current detected temperature value of inverter inner
Status indicator	RUN	Running status indicator	On: Inverter is in running or JOG state Flash: Inverter is decelerating to stop Off: Inverter is in stop state
	DIR	Run reverse indicator	On: Inverter is in reverse state Flash: Inverter is forward & reverse switching Off:IInverter is in forward state
	LOCAL	Running command given mode indicator	On: Operation panel control mode (local control) Off: Terminals or serial communication control mode
	TRIP	Fault alarm indicator	On: Minor fault prealarm (overcurrent, overvoltage) Off: Outputcurrent of inverter and bus voltage are normal.

3.3 Descriptions of keys function

Key	Name	Function
	Monitoring key/Exit key	1.Used for switching system to monitoring state 2.Exit to the previous page 3.Clear alarm when the inverter is in alarm state
	Data key/Confirm key	1. Enter each level of menu 2. Confirm the modified data
	Shift key	1. Under quick monitoring mode,switch the monitoring parameter 2. When modify data, switch bit; 3. Add by decade when modify function code (only valid for P0 group.)
	UP key	Increase function code or data.
	DOWN key	Decrease function code or data.
	Multi-function key	According to function code (FU.114) to realize one of the following functions: 1.Unsed 2.Change inverter running direction 3. When inverter is in JOG state, loose the key, JOG stop.
	Run key	Under keypad control mode, the key start inverter running.
	Stop key/Reset key	1. When inverter is in normal running state, stop inverter running. 2. When inverter is in fault state, reset the fault. According function code can realiza emergency stop function.(Equal to external fault input)

3.4 Nixie tube Display and character recognition

It is comprised of 5 6-bit nixie tubes,to display set data value. The relationship between LED displayed symbols and characters are as follows:

LED display	Symbol meaning	LED display	Symbol meaning	LED display	Symbol meaning	LED display	Symbol meaning
							S
							T
							t
							U
							V
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							-
							8.
							.

3.5 Operation approch

Inverter has 5 kinds of operation state in all,as shown below:

Operation state	Main contents
M	Multi-function key, function state is set by FU.114.
Quick monitoring	Quick monitor 13 kinds of running state, including set frequency,output frequency,outputcurrent.
Function code setting	Modification of function code.FU function group of first level menu.
Information inquiry	Inquiry of inverter information,running state. FE function group of first level menu.
Fault alarm reset	Inverter fault alarm display and reset.
Quick modifying of keypad digital setting	When frequency setting source adopts keypad digital setting,quik modifying set frequency.(UP,DOWN function)

Chapter 4 List of Function code

◎ of modification item indicates cannot be modified during running; while○ indicates that can be modified during running. The address item is register address of MODBUS protocol.

Code	Function code name	Function code selection	Setting range	Factory setting	modifiable	Address
Basic function						
FU.000	Type setting	0:G 1:P	0~1	0	◎	00H
FU.001	Speed control mode	0:VVVF control 1:Open-loop vector control 2:Reserve 3:Reserve	0~3	0	◎	01H
FU.002	Running directive given mode	0:Keypad control 1:Analog terminal control 2:Serial 485 communication control	0~2	0	○	02H
FU.003	Frequency A directive selection	0:Keypad analog potentiometer 1:Digital given (keypad,terminal UP/DOWN) 2:AI1 3:AI2	0~8	0	○	03H
FU.004	Frequency directive B selection	4:Pulse input 5:Multi-step speed 6:RS485 setting 7:PLC running 8:PID	0~8	0	○	04H
FU.005	Combound mode of frequency source setting	0:A frequency directive 1:B frequency directive 2:A+B 3:MAX (A,B) 4:MIN (A,B)	0~4	0	○	05H
FU.006	Gain of frequency directive A	0.10~10.00	0.1~10	1.00	○	06H
FU.007	Gain of frequency directive B	0.10~10.00	0.1~10	1.00	○	07H
FU.008	Frequency setting of digital keypad	0.00~400.00Hz	0.00~600	50Hz	○	08H
FU.009	UP/DOWN digital given speed	0.01~100Hz/S	0.01~100	1.00Hz/S	○	09H
FU.010	Valid selection of UP/DOWN function key	0:Invalid 1:Valid,don't save after power off 2:Valid,save after power off	0~2	1	◎	0AH

FU.011	Upper limit of running frequency	0.00Hz~400.00Hz	0~400	50.00Hz	○	0BH
FU.012	Lower limit of running frequency	0.00Hz~400.00Hz	400~0	0.00Hz	○	0CH
FU.013	Running mode when upper limit frequency is lower than lower limit frequency	0:Running at lower limit frequency 1:Standby (0Hz output)	0~1	0	○	0DH
FU.014	Acceleration time 1	0.1~3000.0s	0.1~3000	Depends on type	○	0EH
FU.015	Deceleration time 1	0.1~3000.0s	0.1~3000	Depends on type	○	0FH
FU.016	Acceleration time 2	0.1~3000.0s	0.1~3000	20s	○	10H
FU.017	Deceleration time 2	0.1~3000.0s	0.1~3000	20s	○	11H
FU.018	Acceleration time 3	0.1~3000.0s	0.1~3000	20s	○	12H
FU.019	Deceleration time 3	0.1~3000.0s	0.1~3000	20s	○	13H
FU.020	Acceleration time 4	0.1~3000.0s	0.1~3000	20s	○	14H
FU.021	Deceleration time 4	0.1~3000.0s	0.1~3000	20s	○	15H
FU.022	Carrier frequency	1.0~10.0KHz	1~10	Depends on type	◎	16H
FU.023	Auto-adjustment selection of carrier frequency	0:Non auto-adjustment 1:Auto-adjustment	0~1	Depends on type	◎	17H
FU.024	Revolving direction control	0:Running in defaut direction 1:Running in opposite direction 2:Reverse prohibited	0~2	0	◎	18H
FU.025	Startup mode	0:Start from startup frequency 1:DC braking then start 2:Speed tracking is valid	0~2	0	◎	19H
FU.026	Startup frequency	0.00~10.00Hz	0.00~10.00	0Hz	○	1AH
FU.027	Startup frequency holding time	0.00~60.00s	0.00~60.00	0.00s	○	1BH
FU.028	DC braking current when start	0.0~100.0%	0.0~100.0	0.00%	○	1CH
FU.029	DC braking time when start	0.0~60.00s	0.0~60.00s	0.00s	○	1DH
FU.030	Acc/deceleration mode selection	0:Linear 1:S curve	0~1	0	◎	1EH
FU.031	S curve acceleration characteristic time	0.2~2.0s	0.2~2.0	0.5s	○	1FH
FU.032	S curve deceleration characteristic time	0.2~2.0s	0.2~2.0	0.5s	○	20H

FU.033	Motor stop mode	0:Decelerat to stop 1:Free stop	0~1	0	◎	21H
FU.034	Initial frequency of DC braking when stop	0.00~50.00Hz	0.00~50.00	0.00Hz	○	22H
FU.035	Waiting time of DC braking when stop	0.01~30.00s	0.01~30.00	0.10s	○	23H
FU.036	DC braking current when stop	0.0~100.0%	0.0~100.0	0.00%	○	24H
FU.037	DC braking time when stop	0.0~60.00s	0.0~60.00	0.00s	○	25H
FU.038	Dynamic braking selection	0:unuse 1:Use	0~1	0	◎	26H
FU.039	Initial voltage of dynamic braking	110.0%～140.0%	110～140.0	130.00%	○	27H
FU.040	Restart selection of instantaneous stop	0:Prohibited;1:Allowed	0~1	0	◎	28H
FU.041	Restart waiting time after instantaneous stop	0.01~60.00s	0.01~60.00	0.10s	○	29H
FU.042	JOG running frequency	0.00～50.00Hz	0.00~50.00	2.00Hz	○	2AH
FU.043	JOG acceleration time	0.1～3000.0s	0.1~3000.0	20.0s	○	2BH
FU.044	JOG deceleration time	0.1～3000.0s	0.1～3000.0	20.0s	○	2CH
FU.045	Prohibited setting frequency 1	0.00～400.00Hz	0.00～400.00	0.00Hz	○	2DH
FU.046	Prohibited setting frequency 2	0.00～400.00Hz	0.00~400.00	0.00Hz	○	2EH
FU.047	Width setting of prohibited frequency	0.00～50.00Hz	0.00~50.00	0.00Hz	○	2FH
FU.048	Dead zone betweenfarward and reverse	0.01~60.00s	0.01~60.00	0.00s	○	30H
FU.049	Detection width of frequency arrival	0.00～400.00Hz	0.00~400.00	1.00Hz	○	31H
FU.050	Detection value of frequency level	0.00～400.00Hz	0.00~400.00	50.00Hz	○	32H
FU.051	Lagged detection value of frequency level	0.00～50.00Hz	0.00~50.00	0.00Hz	○	33H
FU.052	Automatic voltage regulation output	0:Close 1:Open 2:Close when decelerating	0～2	2	◎	34H
FU.053	Motor rated power	0.4~1000.0KW	0.4~1000.0	Depends on type	◎	35H
FU.054	Motor rated frequency	1.00~400.00Hz	1.00~400.00	50.00Hz	◎	36H

FU.055	Motor rated voltage	10.0~440.0V (Depends on type)	10.0~440.0 (Depends on type)	380V	◎	37H
FU.056	Motor rated current	1.0~2000.0A (Depends on type)	1.0~2000.0 (Depends on type)	Depends on type	◎	38H
FU.057	Motor rated speed	5~30000rpm	5~30000	1460rmp	◎	39H
FU.058	Motor primary resistor R1	0.001~65.000Ω	0.001~65	Depends on type	◎	3AH
FU.059	Motor no-load current	10.0~100.0%	10.0~100.0	35.00%	◎	3BH
FU.060	Motor parameter self-learning	0:Function is invalid 1:Static self-learning 2:Revolving self-learning	0~2	0	◎	3CH
FU.061	V/F curve setting	0:Linear 1:1.3 power 2:1.7 power 3:2.0 power 4: Multi-point user-defined	0~4	0	◎	3DH
FU.062	V/F voltage point 0	0.0~15.0%	0.0~15.0	1.00%	◎	3EH
FU.063	V/F frequency point 1	0.0~100.0%	0.0~100.0	0.00%	◎	3FH
FU.064	V/F voltage point 1	0.0~100.0%	0.0~100.0	0.00%	◎	40H
FU.065	V/F frequency point 2	0.0~100.0%	0.0~100.0	0.00%	◎	41H
FU.066	V/F voltage point 2	0.0~100.0%	0.0~100.0	0.00%	◎	42H
FU.067	Gain of automatic torque compensation	0.0~200.0%	0.0~200.0	100.00%	○	43H
FU.068	Filtering of automatic torque compensation	0.01~5.00s	0.01~5.00	0.10s	○	44H
FU.069	Gain of automatic slip compensation	0.0~200.0%	0.0~200.0	0.00%	○	45H
FU.070	Filtering of automatic slip compesation	0.01~5.00s	0.01~5.00	0.10s	○	46H
FU.071	Ecnomic running	0:Invalid;1;Valid	0~1	0	◎	47H
FU.072	Voltage limit of economic running	20.0~100.0%	20.0~100.0	80.00%	○	48H
FU.073	Speed-loop gain	50.0~200.0%	50.0~200.0	100.00%	○	49H
FU.074	Speed-loop filtering	0.01~1.00s	0.01~1.00s	0.10s	○	4AH
FU.075	Current-loop gain	50.0~200.0%	50.0~200.0	100.00%	○	4BH
FU.076	Current-loop filtering	0.01~1.00s	0.01~1.00	0.10s	○	4CH
FU.077	VC torque compensation	50.0~250.0%	50.0~250.0	100.00%	○	4DH

	gain					
FU.078	VC slip compensation gain	50.0~250.0%	50.0~250.0	100.00%	○	4EH
FU.079	Filtering coefficient of multi-function terminal	1~10	1~10	4	○	4FH
FU.080	Function selection of programmable terminal X1/RUN	0:No operation 1:Forward running 2:Reverse running 3: 3-wire mode running 4: Forward JOG 5: Reverse JOG 6: UP 7: DOWN 8:Free stop 9:Fault reset 10:External fault 11:Acc/deceleration time selection1 12: Acc/deceleration time selection 2 13: Multi-step speed selection 1 14: Multi-step speed selection 2 15: Multi-step speed selection 3 16: Acc/deceleration pause 17:PLC reset 18:PLC pause 19:Traverse reset 20:Traverse pause 21:PID pause 22:Internal counter clock input 23:Internal counter clear 24:Internal timer timing enables. 25:Internal timer clear. 26:retain 27:frequency source switched to A frequency order 28:frequency source switched to B frequency order 29:frequency source switched to A+B frequency order 30-31:retain Note: X8 is default for pulse input by software.If is programmed as other function,pulse input is	0~25	0	◎	50H
FU.081	Function selection of programmable terminal X2/REV			0	◎	51H
FU.082	Function selection of programmable terminal X3			0	◎	52H
FU.083	Function selection of programmable terminal X4			0	◎	53H
FU.084	Function selection of programmable terminal X5			0	◎	54H
FU.085	Function selection of programmable terminal X6/JOG			0	◎	55H
FU.086	Function selection of programmable terminal X7/RST			0	◎	56H
FU.087	Function selection of programmable terminal X8/DI			0	◎	57H

		invalid.				
FU.088	Running mode selection of terminal control start/stop	0:2-wire mode 1 1:2-wire mode 2 2:3-wire mode 1 3:3-wire mode 2	0~3	0	◎	58H
FU.089	AI1 min. input	0.00~10.00V	0.00~10.00	0.00V	○	59H
FU.090	Corresponding set frequency of AI1 min. input	0.00~400.00Hz	0.00~400.00	0.00Hz	○	5AH
FU.091	AI1 max. input	0.00~10.00V	0.00~10.00	10.00V	○	5BH
FU.092	Corresponding set frequency of VCI max. input	0.00~400.00Hz	0.00~400.00	50.00Hz	○	5CH
FU.093	AI1 input filtering time	0.01~5.00s	0.01~5.00	0.10s	○	5DH
FU.094	AI2 min. input	0.00~10.00V	0.00~10.00	0.00V	○	5EH
FU.095	Corresponding set frequency of AI2 min. input	0.00~400.00Hz	0.00~400.00	0.00Hz	○	5FH
FU.096	AI2 max. input	0.00~10.00V	0.00~10.00	10.00V	○	60H
FU.097	Corresponding set frequency of AI2 max. input	0.00~400.00Hz	0.00~400.00	50.00Hz	○	61H
FU.098	AI2 input filtering time	0.01~5.00s	0.01~5.00s	0.10s	○	62H
FU.099	PULSE min. input	0.00~50.00KHz	0.00~50.00	0.00KHz	○	63H
FU.100	Corresponding set frequency of PULSE min. input	0.00~400.00Hz	0.00~400.00	0.00Hz	○	64H
FU.101	PULSE max. input	0.00~50.00KHz	0.00~50.00	50.00KHz	○	65H
FU.102	Corresponding set frequency of PULSE max. input	0.00~400.00Hz	0.00~400.00	50.00Hz	○	66H
FU.103	PULSE input filtering time	0.01~5.00s	0.01~5.00	0.10s	○	67H
FU.104	Output function selection of relay 1 (RA1 RB1 RC1)	0:Invalid 1:Running 2:Frequency arrival 3: FDT frequency detection 4:External fault	0~20	9	◎	68H

FU.105	Output function selection of relay 2 (RA2 RB2 RC2)	5:Output frequency reaches to lower limit 6: Output frequency reaches to upper limit 7:Overlooad alarm 8:0 speed running 9:Inverter fault 10:Inverter running ready 11:Inverter stops due to undervoltage 12:Inverter forward running 13: Inverter reverse running 14: Designated value arrival of internal counter 15: Final value arrival of internal counter 16: Final value arrival of internal timer 17~20:Reserve		9	◎	69H
FU.106	Output function selection of terminal Y1			1	◎	6AH
FU.107	Output function selection of terminal Y2			2	◎	6BH
FU.108	Output function selection of terminal AO1	1:Running frequency 2:Setting frequency 3:Output current 4:Output voltage 5:PID given 6:PID feedback 7:AI1 input voltage 8:AI2 input voltage 9:PULSE frequency 10:Bus voltage 11~15:Reserve	1~15	1	○	6CH
FU.109	Output function selection of terminal AO2			2	○	6DH
FU.110	AO1 gain	0.10~10.00	0.10~10.00	1	○	6EH
FU.111	AO2 gain	0.10~10.00	0.10~10.00	1	○	6FH
FU.112	AO1 offset	0.00~10.00V	0.00~10.00	0.00V	○	70H
FU.113	AO2 offset	0.00~10.00V	0.00~10.00	0.00V	○	71H
FU.114	Definition of multi-function key **M**	0:Invalid 1:Forward and reverse switch 2:JOG running	0~2	0	○	72H
FU.115	Function setting of keypad **STOP** key	0:Valid only under keypad control 1:Valid under terminal and communication	0~1	0	○	73H
FU.116	Selection of display scenes when starting up	0:Set frequency 2:Output frequency 3:Outpuit current	0~9	9	○	74H

		4:DC bus voltage 5:Running speed 6:Inverter temperature 7:PID given 8:PID feedback 9:Display set frequency when stop;display output frequency during running				
FU.117	Protection coefficient of motor overload	50.0%~120.0%	50.0~120.0	100.00%	○	75H
FU.118	Prealarm value of motor overload	100.0%~180.0% (Motor rated current)	100.0~180.0	130.00%	○	76H
FU.119	Protection value of overcurrent stalling	110.0%~200.0%	110.0~200.0	Depends on type	○	77H
FU.120	Protection value of overcurrent descending frequency	110.0%~220.0%	110.0~220.0	Depends on type	○	78H
FU.121	Lagged time of overcurrent descending frequency	1~1000ms	1~1000	20ms	○	79H
FU.122	Coefficient of oscillation suppression	0~50	0~50	20	○	7AH
FU.123	Protection voltage coefficient of overvoltage stalling	120.0%~150.0%	120.0%~150.0%	130.00%	○	7BH
FU.124	reserve	-	-	-	○	7CH
FU.125	Times of fault automatic reset	0~3	0~3	0	○	7DH
FU.126	Interval time of fault automatic reset	0.01~60.00s	0.01~60.00	1.00s	○	7EH
FU.127	Alarm or not when fault automatic reset	0:No 1:Yes	0~1	0	◎	7FH
FU.128	Multi-step speed 0	0.00~400.00Hz	0.00~400.00	5.00Hz	○	80H
FU.129	Multi-step speed 1	0.00~400.00Hz	0.00~400.00	15.00Hz	○	81H
FU.130	Multi-step speed 2	0.00~400.00Hz	0.00~400.00	25.00Hz	○	82H
FU.131	Multi-step speed 3	0.00~400.00Hz	0.00~400.00	30.00Hz	○	83H
FU.132	Multi-step speed 4	0.00~400.00Hz	0.00~400.00	35.00Hz	○	84H
FU.133	Multi-step speed 5	0.00~400.00Hz	0.00~400.00	40.00Hz	○	85H

FU.134	Multi-step speed 6	0.00~400.00Hz	0.00~400.00	45.00Hz	○	86H
FU.135	Multi-step speed 7	0.00~400.00Hz	0.00~400.00	50.00Hz	○	87H
FU.136	PLC running mode	0:Single cycle 1:Keep final value after single cycle 2:Singuler cycle	0~2	0	◎	88H
FU.137	Time unit of PLC running	0:second 1:hour	0~1	0	◎	89H
FU.138	0th step running time of PLC	0.0~6553.5s(h)	0.0~6553.5	0.0s	○	8AH
FU.139	1st srteprunning time of PLC	0.0~6553.5s(h)	0.0~6553.5	0.0s	○	8BH
FU.140	2nd step running time of PLC	0.0v6553.5s (h)	0.0~6553.5	0.0s	○	8CH
FU.141	3rd step running tine of PLC	0.0~6553.5s (h)	0.0~6553.5	0.0s	○	8DH
FU.142	4th step running time of PLC	0.0~6553.5s (h)	0.0~6553.5	0.0s	○	8EH
FU.143	5th step running time of PLC	0.0~6553.5s (h)	0.0~6553.5	0.0s	○	8FH
FU.144	6th step running time of PLC	0.0~6553.5s (h)	0.0~6553.5	0.0s	○	90H
FU.145	7th step running time of PLC	0.0~6553.5s (h)	0.0~6553.5	0.0s	○	91H
FU.146	Acc/deceleration time setting of PLC	0~65535 (Binary conversion)	0~65535 (Binary conversion)	0	○	92H
FU.147	Running direction setting of PLC	0~255 (Binary conversion)	0~255 (Binary conversion)	0	○	93H
FU.148	PID given selection	0:Digital given 1:AI1 2:AI2 3:PULSE input 4:RS485 given 5:Keypad potentiometer	0~5	0	○	94H
FU.149	PIDdigital given	0.0~100.0%	0.0~100.0	50.00%	○	95H
FU.150	Reserve			150		96H
FU.151	Reserve			150		97H
FU.152	PID feedback selection	0:AI1 1:AI2 2:PULSE input 3:Keypad potentiometer (for test	0~3	0	○	98H

		use)				
FU.153	Gain of PID feedback	0.10~10.00	0.10~10.00	1	○	99H
FU.154	Reserve	-	-	-		9AH
FU.155	Characteristic selection of PID output	0: PID output is positive characteristic 1: PID output is negative characteristic	0~1	0	○	9BH
FU.156	Proportional gain KP	0.00~10.00	0.00~10.00	1	○	9CH
FU.157	Integral time TI	0.00~100.00s	0.00~100.00	2.00s	○	9DH
FU.158	Differential time TD	0.00～100.00s	0.00~100.00	0.00s	○	9EH
FU.159	Sampling periodT	0.01~10.00s	0.01~10.00	0.10s	○	9FH
FU.160	Deviation limit	0.0~100.0%	0.0~100.0	2.00%	○	A0H
FU.161	PID display proportion	0.01~10.00	0.01~10.00	1	○	A1H
FU.162	Traverse amplitude	0.0%~100.0% (Relative to set frequency)	0.0~100.0	0.00%	○	A2H
FU.163	Kick frequency amplitude	0.0%~50.0%	0.0~50.0	0.00%	○	A3H
FU.164	Traverse raising time	0.1~3200.0s	0.1~3200.0	15.0s	○	A4H
FU.165	Traverse descenting time	0.1~3200.0s	0.1~3200.0	15.0s	○	A5H
FU.166	Data transmission speed	0：2400bps 1：4800bps 2：9600bps 3：19200bps 4：38400bps	0~4	2	○	A6H
FU.167	Data format of communication (RTU)	0:1 start bit,8 data bits,1 stop bit,nocheck 1:1 start bit,8 data bits,1 stop bit,even parity check 2:1 start bit,8 data bits,1 stop bit,odd parity check	0~2	0	○	A7H
FU.168	RS485 communication address	1~247,0 are broadcast address,248 is main machine address	1~248	1	○	A8H
FU.169	Answer delay	1~150ms	1~150	10ms	○	A9H
FU.170	Slave receive proportioncoefficient	0.00~10.00	0.00~10.00	1	pending	AAH
FU.171	Fractional frequency of internal counter clock input	1~65535	1~65535	1	○	ABH
FU.172	Designated value of internal counter	1~65535	1~65535	100	○	ACH

FU.173	Final value of internal counter	1~65535	1~65535	200	○	ADH
FU.174	Timing unit of internal timer	0.01s~655.35s	0.01s~655.35s	1.00s	○	AEH
FU.175	Internal timer cycle	1~65535	1~65535	10	○	AFH
FU.176	Enable of input missing phase protection	0:Prohibit 1:Enable	0~1	0	pending	B0H
FU.177	Enable of output missing phase protection	0:Prohibit 1:Enable	0~1	0	pending	B1H
FU.178 ~ FU.198	Reserve	-	-	-	-	B2H~ C6H
FU.199	Initialization of function code	0:No operation 1: Initialized to factory default values 2:Clear fault record	0~2	0	◎	C7H
FU.200	Function code write protection	0:Invalid 1:Valid	0~1	0	pending	C8H

Chapter 5 Description of Function Code

This chapter introduces function code setting.FE,Fd function group is for inverter information inquiry.

5.1 Basic functional parameter

FU.000	Type seeting	Setting range :0~1	Factory value: 0

0: G Type Suitable for heavy-duty devices (Generally for plastic packaging machinery and drawing machine).

1: P Type Suitable for heavy-duty devices (Generally forfans and water pumps).

FU.001	Speed control mode	Setting range:0~1	Factory value: 0

0:Open-loop VVV/Fcontrol,VVV/Fcontrol is suitable for when high control precision is not required,as well as the occasion that one inverter drives multiple motors.

1:Open-loop vector control, indicates without encoder,isapplicapbale to universal occasion of high-performance without encoder,one inverter only drives one motor.such as CNC machine, centrifugal machine,lifting,extrusion machine and so on.Before this control mode is used,please carry out FU.060 motor parameter self-learning.

Note: Function group FU.061 V/F curve parameter is also valid under vector control.

FU.002	Running directive given mode	Setting range:0~2	Factory value: 0

There are up to 3 kinds of running directive given modes seletable.

0:Running directive given via operating keypad,via keys of RUN,STOP/RESET,multi-function M FU.114.

1:Running directive given via terminals, X1/RUN is for defaut forward running, X2/REV is fordefaut reverse running,X6/JOG is for JOG,X7/RST.

2: Running directive given via serial 485communication,to achieve inverter run,stop, forward/reverse runand other operation.Refer to Modbus communication protocol.

Note: Switch to local control (keypad control) through running directive given mode terminal.

State of running directive control terminal X1/RUN	FU.002software state setting	Running directive given mode in-sevice
Invalid	0	0
Invalid	0	0
Invalid	1	1
Invalid	2	2
Valid	0	0
Valid	1	0
Valid	2	0

Fig.5.1-1 Description of command resource switch

Running and JOG commands separately control set frequency, it will be in in running state when both of them are valid.

FU.003	Frequency A directive selection	Setting range:0~8	Factory value: 0
FU.004	Frequency directive B selection	Setting range:0~8	Factory value:0

0: Keypad potentiometer.Adjustment range is between the lower limit frequency and the upper limit frequency.

1: Digital directive given (Via keypad, multi-function terminals X1-X8 to realize UP and DOWN adjustment).Refering to parameter FU.080-FU.087. When inverter is in stop state, UP/DOWN adjustment is valid when monitoring given frequency under quick monitoring mode; while inverter is in running state, UP/DOWN adjustment is valid under quick monitoring mode.

2:AI1 analog input quantity.

3:AI2analog input quantity.

Frequency is set by analog input terminals.Inverter provides 2 input terminalS of analog quantity as standard,besides,optional multi-function I/O expansion cards can provide 2 input terminals of analog quantity(AI3,AI4). AI1, AI2 can supply 0-10V voltage or 0/4-20mA current.Voltage and current can switched via jumper AI1 AI2 of control board; AI3 is 0-5V, AI4is 0-5V/4-20mA.

4 ; High speed pulse input setting,frequency is given via high speed pulse input terminal.One high speed pulse (x8/di) as inverter standard configuration,set frequency is controlled via input pulse quantity of pulse input terminal.Signal specification of pulse setting:Pulse voltage range is 0-20V,pulse frequency range is 0.0-50.0kHz.Refer to FU.087 parameter description.

5:Multi-step speed running mode.When this mode is chose,inverter runs under multi-step speed mode.Current step is chose via terminal combination set by FU.080-FU.087 parameters,while choosing current running frequency via FU.128-FU.135 parameters.

6:Serial 485 communication setting.Frequency directive is given via upper computer in the way of communication.Details refer to chapter 7 Modbus communication protocol.

7:Simple PLC program setting

When this frequency set mode is chose,inverter will run according to simple PLC program. FU.137-FU.147 parameter groups are need be set to confirm corresponding running frequency,running direction,acc/deceleration time.Details refer to FU.137-FU.147 parameter description.

8:PID control setting.The parameter is chose,then inverter running mode is PID processing control,meanwhile, needing to set FU.148-FU.161.Inverter running frequency is the frequency value after PID operation.Meanings of PID given source,given quantity,feedback source refer to detailed description of FU.148-FU.161.

FU.005	Combound mode of frequency source setting	Setting range:0~4	Factory value : 0

0: Frequency directive A, current frequency given mode is A.

1: Frequency directive B, current frequency given mode is B.

2:A＋B, current frequency given mode is frequency directive A + frequency directive A.

3:Max (A,B), indicating if frequency directive A is larger than frequency directive B,then, frequency directive A is set frequency,otherwise, frequency directive B is set frequency.

4:MIN (A,B), indicating if frequency directive A is less than frequency directive B,then, frequency directive A is set frequency,otherwise, frequency directive B is set frequency.

Figure description of terminals:

Selection terminal AI1 of frequency directive A	Selection terminal AI2 of frequency directive B	Frequency source in-sevice	
Valid	Invalid	0	
Invalid	Valid	1	
Valid	Valid	A>B	2(A)
		B>A	2(B)
		A<B	3(A)
		B<A	3(B)

Fig. 5.1-2Description of selection terminal of frequency source

FU.006	Gain of frequency directive A	Setting range:0.10~10.00	Factory value:1.00
FU.008	Gain of frequency directive B	Setting range:0.10~10.00	Factory value:1.00

Set gain of frequency directive.0.10 means 0.1 times;10.00 means magnifying 10 times.

FU.008	Frequency setting of digital keypad	Setting range:0.00~400.00Hz	Factory value:50.00Hz

Set frequency value of keypad digital setting.

FU.009	UP/DOWN digital given speed	Setting range:0.01~100.00Hz/S	Factory value:1.00Hz/S

Set response speed of digital given value of keypad or multi-function terminal.

FU.010	Valid selection of UP/DOWN function key	Setting range:0~2	Factory value:1

0: Invalid.

1:Valid,do not store after power off. After set frequency FU.008 was modified via UP/DOWN, when power off,FU.008 will not be stored in EPP

2: Valid. After set frequency FU.008 was modified via UP/DOWN, when power off, FU.008 will be stored in EPP.

FU.011	Upper limit of running frequency	Setting range:0.00~400.00Hz	Factory value:50.00Hz
FU.012	Lower limit of running frequency	Setting range:0.00~400.00Hz	Factory value:0.00Hz

Set maximum output frequency value and minimum output frequency of inverter.

Note: Set upper and lower limit frequency is mainly to prevent misoperation of field personnel, and avoid probable heat due to motor running frequency too low, or machinery wear caused due to running frequency is too high.

FU.013	Running mode when upper limit frequency is lower than lower limit frequency	Setting range:0~1	Factory value:1

The function is for running state when set frequency is lower than lower limit frequency, validwhen the lower frequency is higher than 0.

0:Run at lower limit frequency.

1:Standby,when set frequency is lower than lower limit frequency,inverter free stop;Whensetfrequency is large or equal to upper limit frequency again,inverter will run automatically.

FU.014	Acceleration time 1	Setting range:0.1~3000.0s	Factory value:depends on power capacity
FU.015	Deceleration time 1	Setting range:0.1~3000.0s	Factory value: depends on power capacity
FU.016	Acceleration time 2	Setting range:0.1~3000.0s	Factory value:15.0s
FU.017	Deceleration time 2	Setting range:0.1~3000.0s	Factory value:15.0s
FU.018	Acceleration time 3	Setting range:0.1~3000.0s	Factory value:15.0s
FU.019	Deceleration time 3	Setting range:0.1~3000.0s	Factory value:15.0s
FU.020	Acceleration time 4	Setting range:0.1~3000.0s	Factory value:15.0s
FU.021	Deceleration time 4	Setting range:0.1~3000.0s	Factory value:15.0s

The 2nd,3rd,4th froupacc/deceleration time can be chose via multi-function terminal.And canalso be chose during PLC running.

Factory setting for models is shown as below:

Inverter models	Input power supply	Rated output power (KW)	Set value of FU.014,FU.015
G6/P6-0.4T4-15T4	3 phase AC380V	0.4-15	10.0s
G6/P6-18T4-37T4	3 phase AC380V	18-37	15.0s
G6/P6-45T4-75T4	3 phase AC380V	45-75	25.0s
G6/P6-90T4-132T4	3 phase AC380V	90-132	60.0s
G6/P6-160T4-200T4	3 phase AC380V	160-200	100.0s
G6/P6-200T4 以上	3 phase AC380V	200 以上	150.0s

Note:Factory setting will differ according to inverter power. According to users' field condition,the above factory setting can be adjusted to fit requirement most appropriately.

FU.014	Carrier frequency	Setting range:1.0~10.0KHz	Factory value:Depends on type

Set carrier frequency of PWM output.Carrier frequency has an impact on motor noise, inverter heat

dissipation,environment interference, thermal of inverter and motor.

When carrier frequency is higher than defaut factory value, inverter heat increases, please use inderating.

Carrier frequency	Electromagnetic noise	Noise, leakage current	Inverter thermal	Motor thermal	Motor noise	Output current wave
2KHZ	small	small	small	large	large	bad
5KHZ	↕	↕	↕	↕	↕	↕
10KHZ	large	large	large	small	small	good

Fig.5.1-3 Impact of carrier frequency on environment

Advantages of high carrier frequency:Ideal current wave,less current harmonics, low motor noise;

Disadvantage of high cattier frequency: Switch loss increases, inverter thermal rises, inverter output capacity will be affected.At high carrier frequency, inverter output capacity should be reduced to use;Meanwhile the leakage current of inverter as well as its electromagnetic interferencethe with external will increase.While at lower carrier frequency, the contrary is the case, Low carrier frequency will cause low-frequency operation untable, torque reduce even oscillation phenomena.

Before leave factory,the carrier frequency has been set properly. Generally, the user does not need to change to the parameter.when user adopts defaut carrier frequency,running the inverter by derating, the rated output shall be decreased by 20% for every carrier frequency rise of 1K.

FU.023	Auto-adjustment selection of carrier frequency	Setting range:0~1	Factory value: Depends on type

0: Non auto-adjustment.

1: Auto-adjustment.

FU.024	Revolving direction control	Setting range:0~2	Factory value: 0

0:Running in defaut direction.After power on,inverter runs according to the actual direction.

1:Running in opposite direction.Change motor running direction,its role is equal to change motor direction of rotation by adjusting any two motor cables.

2: Reverse prohibited.Is suitable for application in particular occasion motor reverse running isn't needed.don't need motor running the reversal of the occasion. In running or jog state, revolving direction control refers to the following logical chart:

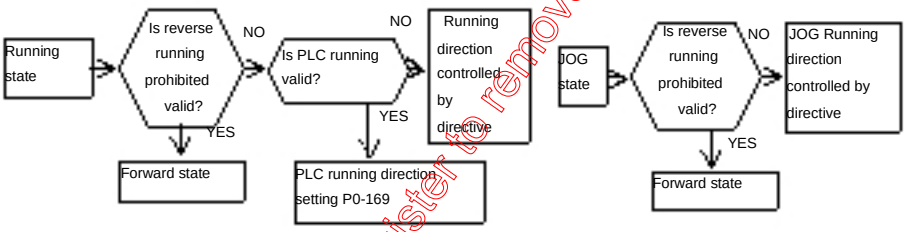

Fig. 5.1-4 Priority explanations of revolving direction control

FU.025	Startup mode	Setting range:0~2	Factory value: 0

0: Directly startup. The inverter begins to run from the startup frequency

1: DC braking then start.DC brake in according with the mode set by FU.028 and FU.029,then start from startup frequency. Applicable to occasion of small inertial load on startup may run reversely.

2: Speed tracing startup.Invertercalculate the speed and direction of motor,then start from the current speed,to realize motor start smoothly without impact,is suitable for large inertia load restart after instantaneous power off.

FU.026	Startup frequency	Setting range:0.00~10.00Hz	Factory value: 0.00Hz
FU.027	Startup frequency holding time	Setting range:0.00~60.00s	Factory value: 0.00s

Set startup frequency and startup frequency holding time when start running.

FU.028	DC braking current when start	Setting range:0.0~150.0%	Factory value: 0.0%
FU.029	DC braking time when start	Setting range:0.0~60.00s	Factory value: 0.00s

Set DC braking current and braking time when start.

FU.030	Acc/deceleration mode selection	Setting range:0~1	Factory value:0

0:Linear acc/deceleration.Change output frequency according to set acc/deceleration time.There 4 groups of acc/deceleration time seletablevia multi-function input terminal.See fig.5.1.1-5.

1:S curve acc/deceleration. Smooth the start and ending section during the acceleration and deceleration, and reduce the impact on mechanical devices.

Acc/deceleration selection1	Acc/deceleration selection2	Selecteacc/deceleration time
Off	Off	Acceleration1,deceleration1
Off	On	Acceleration 2,deceleration2
On	Off	Acceleration 3,deceleration 3
On	On	Acceleration 4,deceleration 4

Fig.5.1-1Acc/deceleration time select via terminals

FU.031	S curve acceleration characteristic time	Setting range:0.2~2.0s	Factory value: 0.5s
FU.032	S curve deceleration characteristic time	Setting range:0.2~2.0s	Factory value: 0.5s

S curve characteristic time means the time from 0 to set ac/deceleration time .Acceleration and deceleration set separately.

FU.033	Motor stop mode	Setting range:0~1	Factory value: 0

0: Decelerate to stop. Inverter reduces output frequency according to set deceleration time after received stop command,then motor gradually decelerates according to deceleration time until stop running.

1: Free stop.Inverter stop outputing frequency after received stop command,and will freely coast to stop.

FU.034	Setting range:	Setting range:	Factory value: 0.00Hz
FU.035	Waiting time of DC braking when stop	Setting range:0.01~60.00s	Factory value: 0.01s
FU.036	DC braking current when stop	Setting range:0.0~150.0%	Factory value: 0.0%
FU.037	DC braking time when stop	Setting range:0.0~60.00s	Factory value: 0.00s

During decelerating to stop,when output frequency reduces to DC braking starting frequency, inverter will stop outputing for some time (DC braking waiting time when stop), then, starts DC braking. Braking current and braking time of DC braking when stop can be set separately.

FU.036＝0, indicates that DC braking when stop is valid.

FU. 038	Dynamic braking selection	Setting range:0~1	Factory value: 0

0:Unuse

1: Use

FU. 039	Initial voltage of dynamic braking	Setting range:110.0~140.0%	Factory value: 130.0%

Set voltage value of dynamic braking,100.0% is relative to bus voltage 537V.

Dynamic braking means that by connecting inverter built-in braking resistor or external braking resistor to consume inverter bus electrical energy, this method can effectively avoid bus overvoltage fault.

FU.040	Restart selection of instantaneous stop	Setting range:0～1	Factory value: 0

0: Invalid.

1: Valid.Whenundervoltage fault occur due to bus voltage is too low, inverter will reset the fault automatically, and automatically run.

FU.041	Restart waiting time after instantaneous stop	Setting range:0.01~60.00s	Factory value: 0.10s

Set restart waiting time after instantaneous stop.Afterundervoltage fault occur, inverter will wait for a time set by the function code, then reset the fault,and automatically run.

FU.42	JOG running frequency	Setting range:0.00~400.00Hz	Factory value: 5.00Hz

After received JOG command, inverter will run at the frequency set be the function code.

FU.043	JOG acceleration time	Setting range:0.1~3200.0s	Factory value: 15.0s
FU.044	JOG deceleration time	Setting range:0.1~3200.0s	Factory value: 15.0s

FU.45	Prohibited setting frequency 1	Setting range:0.00~400.00Hz	Factory value: 0.00Hz

FU.46	Prohibited setting frequency 2	Setting range:0.00~400.00Hz	Factory value: 0.00Hz

FU.47	Width setting of prohibited frequency	Setting range:0.00~400.00Hz	Factory value: 1.00Hz

FU.048	Dead zone between farward and reverse	Setting range:0.01~60.00s	Factory value: 0.00s

It is the waiting time for the zero-crossing of rotation speed when the inverter switches from forward rotation to reverse rotation or from reverse rotation to forward rotation.

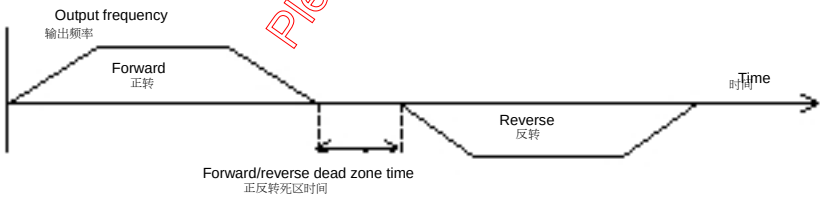

Fig.5.1-6Forward/reverse dead zone time

FU.049	Detection width of frequency arrival	Setting range:0.00~400.00Hz	Factory value: 1.00Hz

Mating with multi-function terminals to use.When the difference of running frequency and set frequency is less than the value set by this function code, output valid signal.

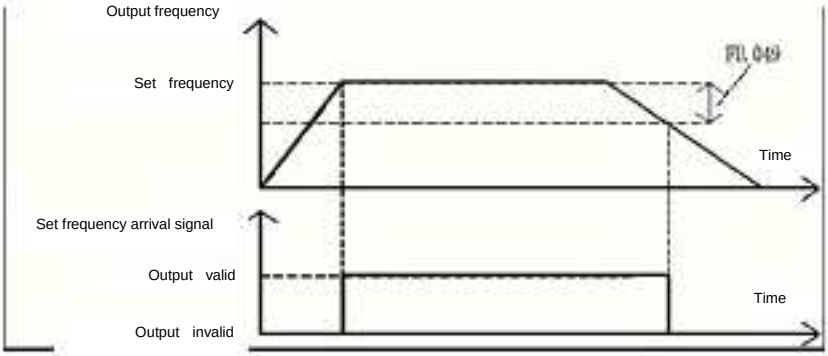

Fig. 5.1-7 Frequency arrival detective bandwidth description

FU.050	Detection value of frequency level	Setting range:0.00~400.00Hz	Factory value: 50.00Hz
FU.051	Lagged detection value of frequency level	Setting range:0.00~50.00Hz	Factory value: 0.00Hz

Combined with multi-function terminal to use. Output valid signal when running frequency is biger than set value of function code FU.050. Function code FU.051 set lagging-loop of inspection.

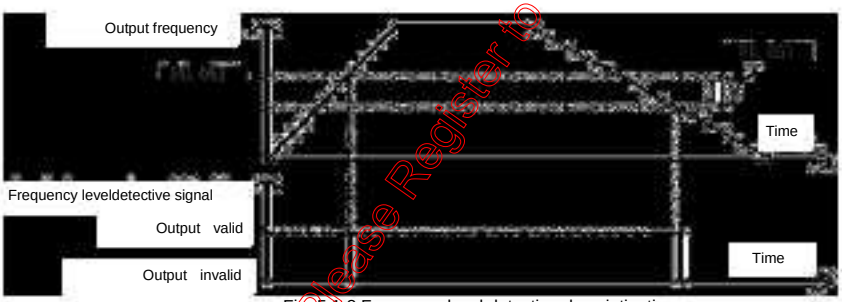

Fig. 5.1-8 Frequency level detection descriptiontion

FU.052	Automatic voltage regulation output	Setting range:0~2	Factory value: 2

0: Invalid.

1: Valid in whole course. Automatically regulates output voltage when output voltage fluctuates, prevents output voltage being affected by input voltage.

2: Invalid only under deceleration stop. Because braking torque will reduce when automatic voltage regulation function is used during decelerating stop, please close the function

5.2Motor parameters

FU.053	Motor rated power	Setting range:0.4~1000.0KW	Factory value:Depends on type
FU.054	Motor rated frequency	Setting range:1.00~400.00Hz	Factory value: 50.00Hz
FU.055	Motor rated voltage	Setting range:10.0~440.0V	Factory value: Depends on type
FU.056	Motor rated current	Setting range:1.0~2000.0A	Factory value: Depends on type
FU.057	Motor rated speed	Setting range:5~30000rpm	Factory value: 1460rmp

Note: Please set in accordance with motor nameplate.

Good control performance of vector control needs accurate motor parameters.Inverter provides motor parameter self-learning function. Accurate parameter self-learning is from accurate input of motor parameters.To ensure control performance,please make sure inverter and motor are matched in power.If the gap is too large, inverter control performance will be obviously reduced.

FU.058	Motor primary resistor R1	Setting range:0.001~65.000Ω	Factory value: Depends on type

The parameter has an impact on performance of vector control, please use motor parameter self-learning function to automatically detect.

Under VVVF control, the parameter also affects automatic torque compensation and automatic slip compensation.

FU.059	Motor no-load current	Setting range:10.0~100.0%	Factory value: 40.0%

The parameter has an impact on performance of vector control, please use motor parameter self-learning function to automatically detect.

FU.060	Motor parameter self-learning	Setting range:0~2	Factory value: 0

0: Invalid. After test finished successfully the code will be automatically set to 0.

1: Revolving test.Detect motor no-load currernt and stator resistor when motor revolves in no-load state

2: Static test. Detect a parameter of stator resistor when motor is connected with load and cannot run with no-load normally.

Detailed description please refer to 5.3 motor parameter self-learning.

5.3V/F curve setting and torque adjustment parameter

Note:4.1.3This function group is valid both under VVVF control and vector control.

FU.061	V/F curve setting	Setting range:0~4	Factory value: 0

0: Linear; 1:1.3 power; 2:1.7 power; 3:2.0 power;

4: Multi-point self-defined curve.

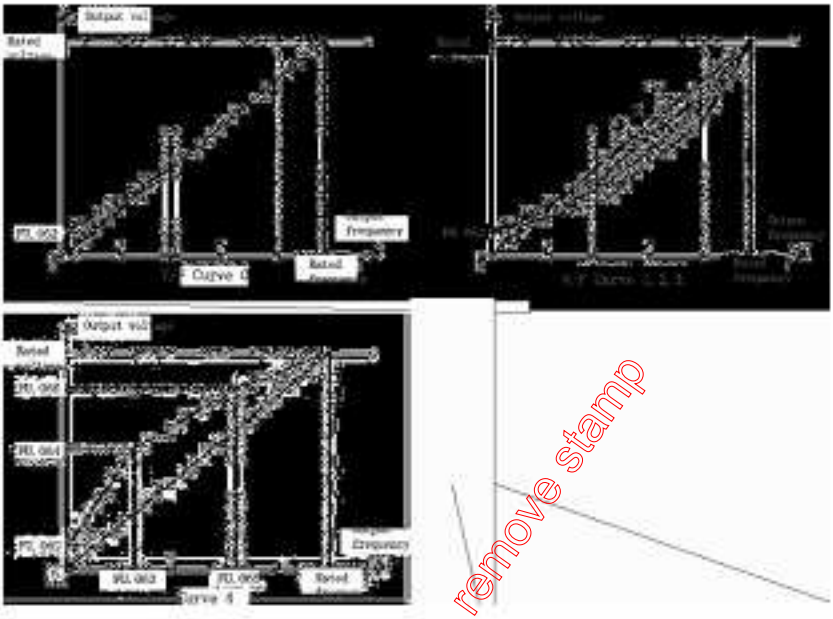

Fig.5.3-1 V/F curve

0: Linear V/F curve. Applicaple to constant torque load.

1~3: Many power V/F curve.Applicaple to variable torque load, such as: fan, water pumps. Many power V/F

curves shown an in fig. 5.3-1.

4: Multi-point V/F curve. V/F curve can be defined via set FU.062~FU.066.

FU.062	V/F voltage point 0	Setting range:0.0~15.0%	Factory value: 1.0%

Set output voltage corresponding to 0Hz.1.0% of the function code indicates 1.0%motor rated coltage (FU.018).For heavy-duty load increase the value by 1.0% each step.

FU.063	V/F frequency point 1	Setting range:0.0~100.0%	Factory value: 40.0%
FU.064	V/F voltage point 1	Setting range:0.0~100.0%	Factory value: 40.0%
FU.065	V/F frequency point 2	Setting range:0.0~100.0%	Factory value: 80.0%
FU.066	V/F voltage point 2	Setting range:0.0~100.0%	Factory value: 80.0%

Set frequency and voltage of the intermediate two points of the four-piont curve. 1.0% of the function code

indicates 1.0% motor rated frequency (FU.017) or 1.0% motor rated voltage (FU.018).

Note:V1<V2,f1<f2.If the voltage of low frequency is set too high,may cause motor overterheat or even burn,and

inverter will triggle overcurrent stalling or overcurrent protection.

FU.067	Gain of automatic torque compensation	Setting range: 0.0~250.0%	Factory value: 100.0%

The inverter will automatically adjust output voltage to keep motor torque constant, especially under low frequency running state to make up for stator resistor voltage drop, increase the function code when torque is not enough, decrease the function code when motor current is too large.

0.0 of the function code indicates that automatic torque compensation is prohibited.

FU.068	Filtering of automatic torque compensation	Setting range: 0.01~5.00s	Factory value: 0.10s

This function code is used to set response speed of automatic torque compensation.Increase the function code when motor shakes and speed fluctuates severely.

FU.069	Gain of automatic slip compensation	Setting range:0.0~250.0%	Factory value: 0.0%

The function code is used to improve motor speed change due to load change. if motor speed fluctuates significantly when load is stable, reduce the function code.

0.0 of the function code indicates that automatic slip compensation is prohibited.

FU.070	Filtering of automatic slip compesation	Setting range:0.01~5.00s	Factory value: 0.10s

The function code is used to set the response speed of automatic slip compensation. Increase the function code when motor shakes and speed fluctuates severely.

FU.071	Economic running	Setting range:0~1	Factory value: 0

0: Invalid.

1: Valid. Automatically decrease output voltage according to inverter's output power, in order to save energy.For heavy-duty load, the function should be prohibited.

FU.072	Voltage limit of economic running	Setting range:20.0~100.0%	Factory value: 80.0%

Set the minimum voltage of economic running.100.0% of the function code indicates that it is the standard voltage output according to V/F curve.

This function group is valid only under vector control.

FU.073	Speed-loop gain	Setting range:50.0~200.0%	Factory value: 100.0%
FU.074	Speed-loop filtering	Setting range:0.01~1.00s	Factory value: 0.10s

PI adjustment of speed-loop. Add speed-loop filtering when speed fluctuates.

FU.075	Current-loop gain	Setting range:50.0~200.0%	Factory value: 100.0%
FU.076	Current-loop filtering	Setting range:0.01~1.00s	Factory value: 0.10s

PI adjustment of current-loop. Add current-loop filtering when speed fluctuates.

FU.077	VC torque compensation gain	Setting range:50.0~250.0%	Factory value: 100.0%

Set the torque compensation value under vector control.

FU.078	VC slip compensation gain	Setting range:50.0~250.0%	Factory value: 100.0%

Set the slip compensation value under vector control.

5.4 Multi-function terminal parameter

FU.079	Filtering coefficient of multi-function terminal	Setting range:1~10	Factory value: 4

Set the filtering of the 8 X terminals,the larger the value is,the larger the filtering is.whenmisoperation of Xterminal is found,please increase the value.

FU.080	Function selection	of terminal X1/RUN	Setting range:0~26	Factory value: 1
FU.081	Function selection	of terminal X2/REV	Setting range:0~26	Factory value: 2
FU.082	Function selection	of terminal X3	Setting range:0~26	Factory value: 13
FU.083	Function selection	of terminal X4	Setting range:0~26	Factory value: 14
FU.084	Function selection	of terminal X5	Setting range:0~26	Factory value: 15
FU.085	Function selection	of terminal X6/JOG	Setting range:0~26	Factory value: 4
FU.086	Function selection	of terminal X7/RST	Setting range:0~26	Factory value: 9
FU.087	Function selection	of terminal X8/DI	Setting range:0~26	Factory value: 0

Note: When terminal X is used as internal timer input, please set FU.079 to 1.

0: No operation. Input termianls are in idle.

1:Forward running. Forward running directive input.

2:Reverse running. Reverse running directive input.

3: 3-wire mode running.

4: Forward JOG. Forward jog command input.

5: Reverse JOG. Reverse jog command input.

6: UP function. Frequency increase directive input.

7: DOWN function. Frequency decrease directive input.

8:Free stop. At receiving the directive, inverter stop outputting immediately,motor freely coast to stop.

9: Fault reset. Fault reset directive input, is equal to Resetlkey of keypad.

10:External fault input. As external mechanical fault signal connects to inverter.

11: Acc/deceleration time selection 1.See description of function code FU.014-FU.015.

12: Acc/deceleration time selection 2. See description of function code FU.016-FU.017.

13:Multi-step speed selection 1.

14: Multi-step speed selection 2.

15: Multi-step speed selection 3.

16: Acc/deceleration pause. The directive suspends ac/decelerating, output frequency keep constant.

17:PLC running reset. The directive resets PLC running, PLC will reatarts from 0th step.

18:PLC pause. The directive suspends PLC running, PLC internal timer stop timing.

19:Traverse running reset. The directive makes traverse running reset, after output frequency reached to set frequency, traverse running will restart.

20:Traverse pause. The directive suspends traverse running. Output frequency will keep constant.

21:PID operation pause.The directive suspends PID operation. Set frequency of PID operation will keep constant.

22:Internal counter clock input. Clock input of the counter. When this function is used, please set FU.054 to 1.

23:Internal counter clear.The counter will clear.

24:Internal timer timing enables. Timer starts timing when the signal is valid.

25:Internal timer clear. Timer will clear.

FU.088	Running mode selection of Terminal control start/stop	Setting range: 0~3	Factory value: 0

0: 2-wire mode 1; 1: 2-wire mode2.

2: 3-wire mode 1; 3: 3-wire mode 2.

2-wire running mode only needs to connect 2 signals: forward running and reverse running.

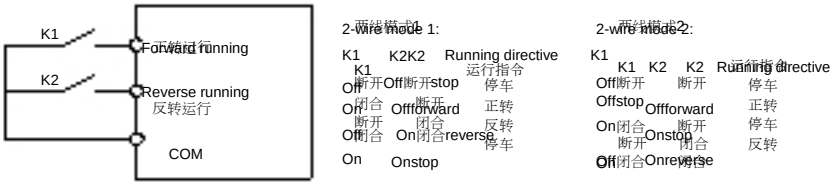

Fig. 5.4-12-wire mode running

3-wire mode needs to connect 3 signals: forward running, reverse running, and 3-wire mode running auxiliary.

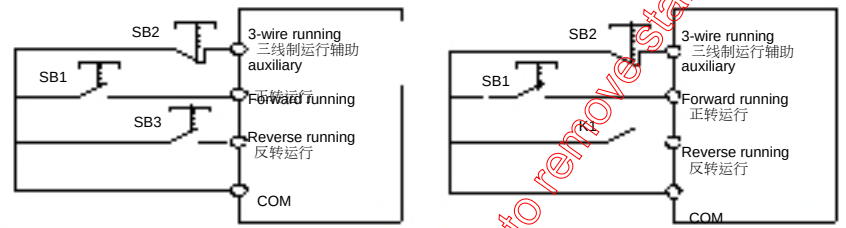

Fig. 5.4-2 3-wire mode running

FU.089	AI1 min. input	Setting range: 0.00~10.00V	Factory value: 0.00V
FU.090	Corresponding set frequency of AI1 min. input	Setting range: 0.00~400.00Hz	Factory value: 0.00Hz
FU.091	AI1 max. input	Setting range: 0.00~10.00V	Factory value: 10.00V
FU.092	Corresponding set frequency of VCI max. input	Setting range: 0.00~400.00Hz	Factory value: 50.00Hz

Input curve diagram shown as chart fig.5.4-3.

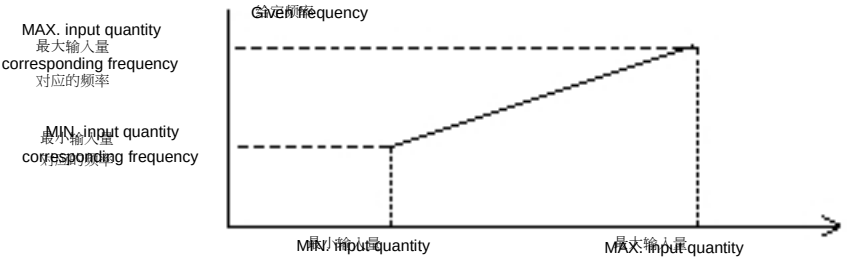

Fig. 5.4-3 Corresponding frequency setting curve of analog or pulse quantity

FU.093	AI1 input filtering time	Setting range: 0.01~5.00s	Factory value: 0.10s

Set filtering time of AI1 analog input.When analog quantity fluctuates severely,increase the value.

FU.094	AI2 min. input	Setting range: 0.00~10.00V	Factory value: 0.00V
FU.095	Corresponding set frequency of AI2 min. input	Setting range: 0.00~400.00Hz	Factory value: 0.00Hz
FU.096	AI2 max. input	Setting range: 0.00~10.00V	Factory value: 10.00V
FU.097	Corresponding set frequency of AI2 max. input	Setting range: 0.00~400.00Hz	Factory value: 50.00Hz

Input curve is an shown in figure 5.4-3.

FU.098	AI2 input filtering time	Setting range: 0.01～5.00s	Factory value: 0.10s

Set filtering time of AI2 analog input.When analog quantity fluctuates severely,increase the value.

FU.099	PULSE min. input	Setting range: 0.00~50.00KHz	Factory value: 0.00KHz
FU.100	Corresponding set frequency of PULSE min. input	Setting range: 0.00~400.00Hz	Factory value: 0.00Hz
FU.101	PULSE max. input	Setting range: 0.00~50.00KHz	Factory value: 50.00KHz
FU.102	Corresponding set frequency of PULSE max. input	Setting range: 0.00~400.00Hz	Factory value: 50.00Hz

Pulse inputs only via terminal X8. When X8 is used as high-peed pulse input, please set FU.087 to 0.

FU.103	PULSE input filtering time	Setting range: 0.01~5.00s	Factory value: 0.10s

Set filtering time of pulse input.When pulse input fluctuates severely,increase the value.

FU.104	Output function selection of relay 1	Setting range: 0~19	Factory value: 2
FU.105	Output function selection of relay 2	Setting range: 0~19	Factory value: 3
FU.106	Y1 function definition	Setting range: 0~19	Factory value: 2
FU.107	Y2 function definition	Setting range: 0~19	Factory value: 3

0: No output function.Output terminal are in idle.

1: Shutdown fault occurs during running.Output valid signal when shutdown fault occurs.

2: During inverter running.Output valid signals during inverter running.

3: Running frequency reaches to set value.See description of function code FU.049.

4: FDT frequency inspection.see description of function code FU.050

5: External fault shutdown. Output valid signals when there is external fault signal.

6: Lower limit frequency running. Output valid signal when running frequency reaches to lower limit frequency.

7: Upper limit frequency running.Output valid signal when running frequency reaches to upper limit frequency.

8: Overload pre-alarm.When output current is bigger than or equal to overload pre-alarm value,outputs valid signals.

9: Minor fault occurs during running.Output valid signals when minor overcurrent or overvoltage fault occurs.

10:Inverter ready for running. When no fualt occurs and is waiting for running directive,inverter outputs valid signals.

11: Undervoltage shutdown during running.Output valid signal when undervoltage fault occurs during running.

12: Inverter forward running.Output valid signals during forward running.

13: Inverter reverse running.Output valid signals during reverse running.

14: Internal counter designated value arrival.See description of function code FU.171~FU.173.

15: Internal counter final value arrival.See description of function code FU.171~FU.173.

16: Internal counter cycle arrival. See description of function code FU.174~FU.175.

17-20: reserve.

FU.108	Output function selection of terminal AO1	Setting range: 0~7	Factory value: 0
FU.109	Output function selection of terminal AO2	Setting range: 0~7	Factory value: 1

Set the physical meaning of analog quantity output. Maximum output measuring range is 0-10V/0-20mA.

1: Inverter running frequency. Output frequency 50.00Hz corresponds to 10V/20mA output.

2: Setting frequency.Set frequency 50.00Hz corresponds to 10V20mA output.

3 : Output current. Output current is motor's rated current corresponding to 10V20mA output.

4: Output voltage.Output voltage 500.0V corresponds to 10V20mA output.

5: PIDgiven value.

6: PID feedback value.

7: AI1 input voltage.AI1 input voltage 10V/20mA corresponds to 10V/20mA output (When AI1 is for current input, 20mA corresponds to 10V/20mA)

8: AI2 input voltage.AI2 input voltage 10V/20mA corresponds to 10V/20mAoutput. (When AI2 is for current input, 20mA corresponds to 10V/20mA)

9: PULSEinput. Pulse input 50.00KHz correspond to 10V output.

10: DC bus voltage. DC bus voltage 500V corresponds to 10V output.

11-15: Reserve.

FU.110	AO1 gain	Setting range: 0.10~10.00	Factory value: 1.00
FU.111	AO2 gain	Setting range: 0.10~10.00	Factory value: 1.00

Set analog output gain.

The following figure takes AO1 as analog indicating function of —output frequencylanalog indicating, gives an example of output gain setting.

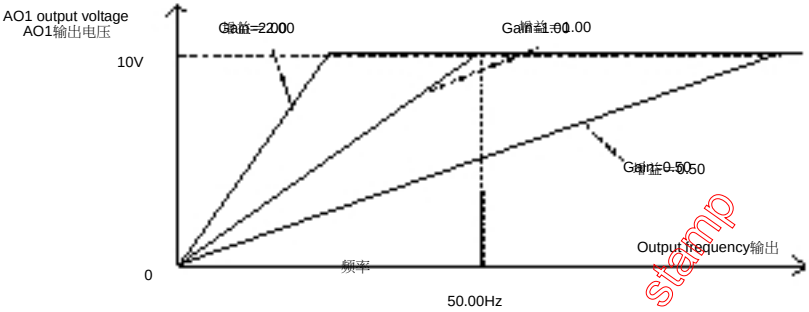

Fig. 5.4-4 Output gain of analog quantity

FU.112	AO1 offset	Setting range: 0.00~10.00V	Factory value: 0.00V
FU.113	AO2 offset	Setting range: 0.00~10.00V	Factory value: 0.00V

FU.114	Definition of multi-function key **M**	Setting range: 0~2	Factory value: 0

0: The key is invalid.

1: Running direction switch.The key is for running direction switch.

2: Jog command.The key is for JOG running.

FU.115	Function setting of keypad **STOP** key	Setting range: 0~1	Factory value: 0

0: Valid only under keypad control.

1:Valid both under terminal/serial communication control mode (Equal to external fault input).

FU.116	Selection of display scenes when starting up	Setting range: 0~9	Factory value: 0

The function code is for set of defaut monitoring parameter under quick monitoring state.

0: Set frequency;

1: Output frequency;

2: Output current;

3: Output voltage;

4: DC bus voltage;

5: Running speed;

6: Inverter temperature;

7: PID closed-loop given;

8: PID closed-loop feedback;

9: Display set frequency when stop; Display output frequency during running.

FU.117	Protection coefficient of motor overload	Setting range: 80.0%~110.0%	Factory value: 100.0%

Overload protection is based on rated current of motor.When the function mode 100.0% corresponds to overload capacity: G type overload capacity is 150% motor rated current for 1 minute;P type is 120% motor rated current for 1 minute, adopting inverse time limit curve control. 110.0% of this function code corresponds overload capacity:G type overload capacity is 165% motor rated current for 1 minute;P type is 132% motor rated current for 1 minute, adopting inverse time limit curve control.

FU.118	Prealarm value of motor overload	Setting range: 100.0~180.0%	Factory value: 130.0%

100.0% of this function code corresponds to motor rated current.Output overload precaution signal when output current is large than set value of the function code.The function needs to combine with multi-function terminal to use.

FU.119	Protection value of overcurrent stalling	Setting range: 110.0~200.0%	Factory value: Depends on type

100.0% of this function code corresponds to motor rated current.

Defaut value of G type (constant torque load) is 160.0%;For P type(fan,pump load) is 130.0%.

During accelerating running, current may rise rapidly due to that acceleration time does not match with motor inertia or the mutation of load inertia.By detecting output current of inverter and comoparing with set value of the function code, when actual current exceeds the value, inverter will pause accelerating until current reduced to 5.0% smaller than set value, and then continues to accelerate.

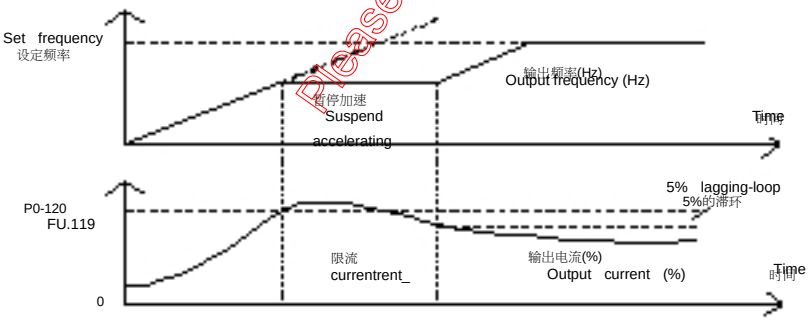

Fig. 5.4-5 overcurrent stalling protection diagram

FU.120	Protection value of overcurrent descending frequency	Setting range: 110.0%~220.0%	Factory value:Depends on type
FU.121	Lagged time of overcurrent descending frequency	Setting range: 1~1000ms	Factory value: 20ms

Function code FU.120 100.0% corresponds to motor rated current. Defaut value of G type (constant torque load) is 170.0%;for P type(fan,pump load) is 140.0%.

During constant speed (output frequency) running, current may rise rapidly due to the mutation of the load. By detecting output current of inverter and comparing with set value of FU.120, when actual current exceed the set value of FU.120 and holding on for the set time of FU.121, inverter will reduce output frequency to 5% smaller than set value, then increases to set output frequency.

Note: During traverse running,the parameter is invalid.

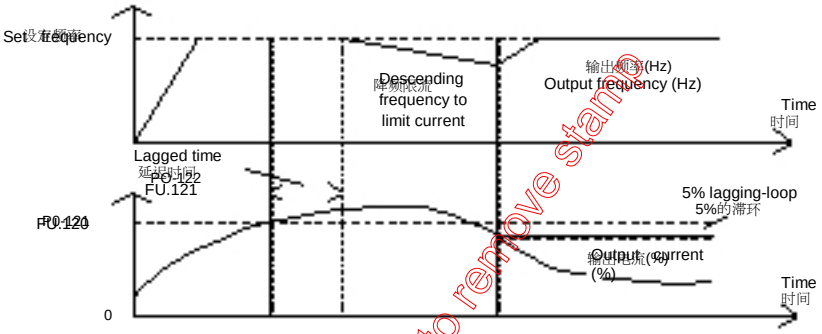

Fig. 5.4-6Descending frequency to limit current diagram

FU.122	Coefficient of oscillation suppression	Setting range: 0~50	Factory value: 20

FU.123	Protection voltage coefficient of overvoltage stalling	Setting range: 120.0%~150.0%	Factory value: 130.0%

During inveter decelerating running, due to setting deceleration time too short, not matched with motor in capacity,inverter bus voltage may raise rapidly.By detecting inverter bus voltage and comparing with set value of the function code,when the actual bus voltage exceeds the value,inverter will suspend decelerating untill the bus voltage down to 5.0% smaller than the set value, and then continues to decelerate.

FU.124	reserve	Setting range:	Factory value:

FU.125	Times of fault automatic reset	Setting range: 0~3 times	Factory value: 0 time
FU.126	Interval time of fault automatic reset	Setting range: 0.01~60.00s	Factory value: 1.00s

After inverter fault occured and delayed for a certain time(FU.126), will automatically clear the fault according to times of fault automatic reset times (FU.125),and sends out running command to inverter.

FU.125＝0 indicates that fault automatic reset function is invalid,and times of fault occurred in the past will be cleared.

Note: After normally running for 60s, times of fault occurred in the past will be cleared.

FU.127	Alarm or not when fault automatic reset	Setting range: 0~1	Factory value: 0

0: No action.Shutdown fault output is invalid with no alarm.

1: Action.Shutdown fault output is valid with alarm.

5.5 Multi-step speed and simple PLC

Multi-function terminal X set multi-step speed according to the following form,there are up to 16 steps of speed:

When frequency source is —AI1 mode 2ǀ or —AI2 mode 2ǀ, —multi-step speed 0ǀ will not be used.

Multi-step speed terminal1	Multi-step speed terminal2	Multi-step speed terminal3	Multi-step speed terminal4	Speed step under combination mode
Off	Off	Off	Off	Multi-step speed 0
Off	Off	Off	On	Multi-step speed 1
Off	Off	On	Off	Multi-step speed 2
Off	Off	On	On	Multi-step speed 3
Off	On	Off	Off	Multi-step speed 4
Off	On	Off	On	Multi-step speed 5
Off	On	On	Off	Multi-step speed 6
Off	On	On	On	Multi-step speed 7
On	Off	Off	Off	Multi-step speed 8
On	Off	Off	On	Multi-step speed 9
On	Off	On	Off	Multi-step speed 10
On	Off	On	On	Multi-step speed 11
On	On	Off	Off	Multi-step speed 12
On	On	Off	On	Multi-step speed 13
On	On	On	On	Multi-step speed 14
On	On	On	On	Multi-step speed 15

Set of corresponding frequency of multi-step speed:

FU.128	Multi-step speed 0	Setting range: 0.00~400.00Hz	Factory value: 5.00Hz
FU.129	Multi-step speed 1	Setting range: 0.00~400.00Hz	Factory value: 15.00Hz
FU.130	Multi-step speed 2	Setting range: 0.00~400.00Hz	Factory value: 25.00Hz
FU.131	Multi-step speed 3	Setting range: 0.00~400.00Hz	Factory value: 30.00Hz
FU.132	Multi-step speed 4	Setting range: 0.00~400.00Hz	Factory value: 35.00Hz
FU.133	Multi-step speed 5	Setting range: 0.00~400.00Hz	Factory value: 40.00Hz
FU.134	Multi-step speed 6	Setting range: 0.00~400.00Hz	Factory value: 45.00Hz
FU.135	Multi-step speed 7	Setting range: 0.00~400.00Hz	Factory value: 50.00Hz

	Multi-step speed 8	Setting range: 0.00~400.00Hz	Factory value: 8.00Hz
	Multi-step speed 9	Setting range: 0.00~400.00Hz	Factory value: 9.00Hz
	Multi-step speed 10	Setting range: 0.00~400.00Hz	Factory value: 10.00Hz
	Multi-step speed 11	Setting range: 0.00~400.00Hz	Factory value: 11.00Hz
	Multi-step speed 12	Setting range: 0.00~400.00Hz	Factory value: 12.00Hz
	Multi-step speed 13	Setting range: 0.00~400.00Hz	Factory value: 13.00Hz
	Multi-step speed 14	Setting range: 0.00~400.00Hz	Factory value: 14.00Hz
	Multi-step speed 15	Setting range: 0.00~400.00Hz	Factory value: 15.00Hz

Set frequency of 16 steps of multi-step speed.

FU.136	PLC running mode	Setting range: 0~2	Factory value: 0

0: Single cycle. PLC only circulates one time, after ran over 15 steps of speeds, will stop.

1: Single cycle then run at the 15th multi-step speed.After finished 15 steps of speed,keep running at the 15th multi-step speed.

2: Singular cycle. PLC circulates unceasingly, after finished 15 steps of speeds, will start the new circulation from 0th step speed.

FU.137	Time unit of PLC running	Setting range: 0~1	Factory value: 0

0: Second. PLC running time unit is second,set unit of FU.138～FU.145.

1:Hour. Unit of PLC running time unit is hour,set unit of FU.138～FU.145.

Set the frequency of 16 steps of multi-step speed.

FU.138	0th step running time of PLC	Setting range: 0.0~6553.5s（h）	Factory value: 0.0s
FU.139	1st srtep running time of PLC	Setting range: 0.0~6553.5s（h）	Factory value: 0.0s
FU.140	2nd step running time of PLC	Setting range: 0.0~6553.5s（h）	Factory value: 0.0s
FU.141	3rd step running tine of PLC	Setting range: 0.0~6553.5s（h）	Factory value: 0.0s
FU.142	4th step running time of PLC	Setting range: 0.0~6553.5s（h）	Factory value: 0.0s
FU.143	5th step running time of PLC	Setting range: 0.0~6553.5s（h）	Factory value: 0.0s
FU.144	6th step running time of PLC	Setting range: 0.0~6553.5s（h）	Factory value: 0.0s
FU.145	7th step running time of PLC	Setting range: 0.0~6553.5s（h）	Factory value: 0.0s
	8th step running time of PLC	Setting range: 0.0~6553.5s（h）	Factory value: 0.0s
	9th srtep running time of PLC	Setting range: 0.0~6553.5s（h）	Factory value: 0.0s
	10th step running time of PLC	Setting range: 0.0~6553.5s（h）	Factory value: 0.0s
	11th step running tine of PLC	Setting range: 0.0~6553.5s（h）	Factory value: 0.0s
	12th step running time of PLC	Setting range: 0.0~6553.5s（h）	Factory value: 0.0s
	13th step running time of PLC	Setting range: 0.0~6553.5s（h）	Factory value: 0.0s

	14th step running time of PLC	Setting range: 0.0~6553.5s（h）	Factory value: 0.0s
	15th step running time of PLC	Setting range: 0.0~6553.5s（h）	Factory value: 0.0s

Set the running time of each PLC step.

FU.146	Acc/deceleration time setting of PLC	Setting range: 0~65535 binary conversion	Factory value: 0

Set ac/deceleration time of each PLC step, need for binary conversion. For binary number of 16 bits, its lowest order is BIT0, highest order is BIT15.

FU.147	Running direction setting of PLC	Setting range: 0~255 binary conversion	Factory value: 0

Set running direction of each PLC step,need for binary conversion.For binary number of 16 bits, its lowest order is BIT0, highest order is BIT15.

BIT0 corresponds to running direction of the 0th step. BIT0＝0, the 0th step runnig direction is forward;BIT0＝1, the 0th step runnig direction is reverse.

……

BIT15 corresponds to running direction of the 15th step. BIT15＝0, the 15th step runnig direction is forward;BIT15 ＝ 1, the 15th step runnig direction is reverse.

After the combined 16-bit binary number is converted into decimal number, then set it to the function code.

Function code	Binary bits	PLC step	Acc/dec time 0	Acc/dec time 1	Acc/dec time 2	Acc/dec time 3
FU.146	BIT1 BIT0	0	00	01	10	11
FU.146	BIT3 BIT2	1	00	01	10	11
FU.146	BIT5 BIT4	2	00	01	10	11
FU.146	BIT7 BIT6	3	00	01	10	11
FU.146	BIT9 BIT8	4	00	01	10	11
FU.146	BIT11 BIT10	5	00	01	10	11
FU.146	BIT13 BIT12	6	00	01	10	11
FU.146	BIT15 BIT14	7	00	01	10	11
FU.146	BIT1 BIT0	8	00	01	10	11
FU.146	BIT3 BIT2	9	00	01	10	11
FU.146	BIT5 BIT4	10	00	01	10	11
FU.146	BIT7 BIT6	11	00	01	10	11
FU.146	BIT9 BIT8	12	00	01	10	11
FU.146	BIT11 BIT10	13	00	01	10	11
FU.146	BIT13 BIT12	14	00	01	10	11
FU.146	BIT15 BIT14	15	00	01	10	11

Select one group of acc/deceleration time via two binary bits. There is 4 groups of acc/deceleration time are

selectable in all. After the combined 16-bit binary number is converted into decimal number, then set it to the function code.

5.6PID control paranmeter

FU.148	PID given selection	Setting range: 0~5	Factory value: 0

0: Keypad digital setting.PID given is set by FU.148,given by PID.

1: AI1(0～10V/0-20mA).PID given is set by AI1 voltage or current of control terminal. When current inputs, is automatically converted into voltage, 20 mA corresponds to 10V.

2: AI2(0～10V/0-20mA). PID given is set by AI2 voltage or current of control terminal. When current inputs, is automatically converted into voltage, 20 mA corresponds to 10V.

3: PULSE input setting.Through internal conversion,pulse 10.00KHz is converted into 10.00 V.

4: Serial communication setting.Pleaserefer to serial communication protocol description.

5: Keypad potentiometer.Automatically converted into voltage 0-10V.

Note: Should select current input for input jumper of AI2.

FU.149	PID digital given	Setting range: 0.00~100%	Factory value: 50%

PIDdigital given set by keypad digital given, current input quantity is expressed by percentage,factory settingis50%.

FU.150	Reserve		
FU.151	Reserve		

FU.152	PID feedback selection	Setting range: 0~3	Factory value: 0

0: AI1(0～10V). PID given is set by AI1 voltage of control terminal. When current inputs, is automatically converted into voltage, 20 mA corresponds to 10V.

1: AI2(0～10V). PID given is set by AI2 voltage of control terminal. When current inputs, is automatically converted into voltage, 20 mA corresponds to 10V.

2: PULSE input setting.Through internal conversion,pulse 10.00KHz is converted into 10V.

3: Keypad potentiometer.(for testing use).

Note: Should select current input for input jumper of AI2.

FU.153	Gain of PID feedback	Setting range: 0.10~10.00	Factory value: 1.00

Set gain of PID feedback.

FU.154	Reserve		

FU.155	Characteristic selection of PID output	Setting range: 0~1	Factory value: 0

0: Positive characteristic.When feedback quantitye is larger than PID given quantity,inverter is required to reduce output frequency,to make PID balanced.

1: Inverse characteristic. When feedback quantity is larger than PID given quantity,inverter is required to raise output frequency,to make PID balanced.

FU.156	Proportional gain KP	Setting range: 0.00~10.00	Factory value: 1.00
FU.157	Integral time TI	Setting range: 0.00~100.00s	Factory value: 2.00s
FU.158	Differential time TD	Setting range: 0.00~100.00s	Factory value: 0.00s

Proportional, integral, and derivative in PID regulator is independent of each other, regulated through their respective function code.

Proportional gain KP: the larger the q is the stronger the proportional regulation. The function code 1.00 indicates when the deviation of PID feedback quantity and given quantity is 10.00V, the output frequency directive of PID regulator is 10.00Hz (ignore integral and differential effect).

Note: the function code 0 indicates prohibiting proportional regulation.

Integration time TI: the smaller the Value is the stronger the integration regulation. The function code 1.00s indicates when the deviation of PID feedback quantiyt and given quantity is 10.00V, after continuously regulating for 1s, output frequency directive of PID regulator is 10.00Hz (ignore proportional and differential effect)

Note: the function code 0 indicates prohibiting integration regulation.

Differential time TD: the larger the Value is the stronger the differential regulation. The function code 1.00s indicates when change rate of deviation of PID feedback quantity and given quantity is 10.00V during 1.00s, the output frequency directive of PID regulator is 10.00Hz (ignore the proportional and integral effect).

Note: the function code 0 indicates prohibiting differential regulation.

FU.159	Sampling period T	Setting range: 0.01~10.00s	Factory value: 0.10s

Setting refresh cycle of given quantity and feedback quantity of PID regulator.

FU.160	Deviation limit	Setting range: 0.00~100%	Factory value: 2.0%

When the d-value of given value and feedback value of PID is less than this value,PID stop operation,keeping output frequency.

FU.161	PID display proportion	Setting range: 0.01~10.00	Factory value: 1.00

5.7 Traverse control parameter

FU.162	Traverse amplitude	Setting range: 0.0~100.0%(relative to set frequency)	Factory value: 0.0%
FU.163	Kick frequency amplitude	Setting range: 0.0~50.0%(relative to traverse amplitude)	Factory value: 0.0%
FU.164	Traverse raising time	Setting range: 0.1~3200.0s	Factory value: 15.0s
FU.165	Traverse descenting time	Setting range: 0.1~3200.0s	Factory value: 15.0s

Traverse function is applicapable to textile, chemical fiber and other industries. During traverse running, inverter's output frequency takes set frequency as center to swing up and down. Traverse amplitude is set by FU.162, when FU.162 is set to 0, traverse running is invalid.

Note: When FU.162 is set too large,output frequency will be large than upper limit frequency during traverse running,then,traverse running will be invalid automatically.

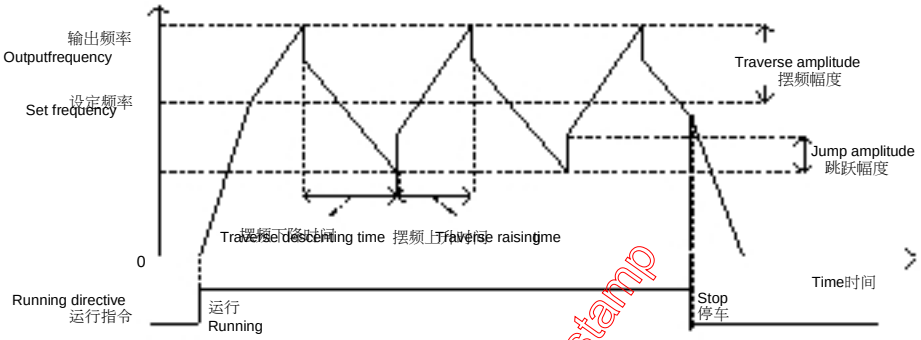

Fig. 5.7-1 Traverse running

5.8Serial communication 485 parameter

FU.166	Data transmission speed	Setting range: 0~4	Factory value: 2

Select data rate of serial communication.

0: 2400BPS;

1: 4800BPS;

2: 9600BPS;

3: 19200BPS;

4: 38400BPS.

FU.167	Data format of communication (RTU)	Setting range: 0~2	Factory value: 0

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

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

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

FU.168	RS485 communication address	Setting range:1~248	Factory value: 1

Inverter's identifying address of during serial communication.

1~247:Slave inverter address

248: Master inverter address (more than one inverters are used synchronously)

FU.169	Answer delay	Setting range:1~150ms	Factory value: 10ms

During serial communication,after received data,inverter will delay for the function code setting time,then sends answer data.

FU.170	Slave machine receive proportion coefficient	Setting range:0.00~10.00	Factory value: 1.00

When counting function is used, please set FU.079 filering times of terminal XI to 1.Clock cycle of counter clock input is required bigger than 4ms,minimum pulse width bigger than 1.5ms.

5.9Parameter of internal counter, timer

FU.171	Fractional frequency of internal counter clock input	Setting range:1~65535	Factory value: 1

After internal counter clock input received signal,should go through internal fractional frequency operation ,then is accumulated to internal counter.

For example: When the parameter is set to 100, after 100 pulses were received, the internal counter count accumulates 1.

FU.172	Designated value of internal counter	Setting range:1~65535	Factory value: 100
FU.173	Final value of internal counter	Setting range:1~65535	Factory value: 200

Combined with output terminals to use.When counting value is larger than designated value,output terminals will output internal counter designated value arrival signal. When counting value is equel to final value, output terminals will output internal counter final value arrival signal.

Note: Clear counter by using terminal function of —internal counter clear‖

For example: When FU.171 is set to 2, FU.172 is set to 5, FU.173 is set to 9,counting and signal diagram is shown below.

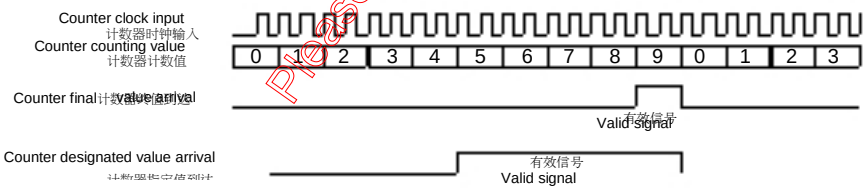

Fig. 5.9-1 Counter, timer

FU.174	Timing unit of internal timer	Setting range:0.01s~655.35s	Factory value: 1.00s
FU.175	Internal timer cycle	Setting range:1~65535	Factory value: 10

Combined with output terminals to use.When internal timer arrives to timing cycle,output terminals will output internal timer cycle arrival signal. The timer's time cycle is the product of parameter FU.174 and parameter FU.175.

Note: Internal timer starts timing only by using terminal function of —internal timer timing enable‖.Clear timer by using terminal function of —internal timer clear‖.Clear counter by using terminal function of —internal counter clear‖ .

For example: When FU.174 is set to 0.1s, FU.175 is set to 5,time cycle of timer is 0.1s ×5＝0.5s.Timing and signal diagram is shown below.

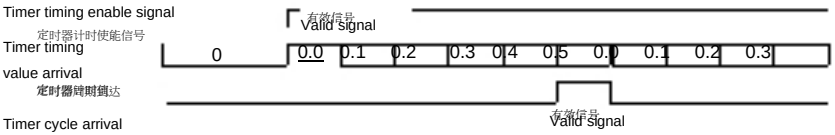

Fig. 5.9-2 Timing function diagram

5.10 Missing phase protectionof input and output

FU.176	Enable of input missing phase protection	Setting range:0~1	Factory value:

0: Prohibited

1: Enable

FU.176	Enable of output missing phase protection	Setting range:0~1	Factory value:

0: Prohibited

1: Enable

FU.176 FU.198	Reserve		

5.11Password protection and initialization parameter

FU.199	Initialization of function code	Setting range:0~2	Factory value: 0

0: No operation.

1:Initialized to factory defaut value. Function group restore to factory state.2: Clear fault record.

FU.200	Function code write protection	Setting range:0~1	Factory value: 0

0:Invalid.Function group FU can be changed.

1: Valid. Function group cannot be changed.

FE Fault factors

FE.OOO	current fault type	0(No Fault)～18	DDH
FE.OO1	current fault type output frequency	0.00～400.00Hz	DEH
FE.OO2	current fault type output current	0.00～2000.0A	DFH
FE.OO3	current fault type busbar voltage	0.00～1000V	EOH
FE.OO4	current fault type move direction		E1H
FE.OO5	last fault type	0(No Fault)～18	E2H
FE.OO6	last fault type output frequency	0.00～400.00Hz	E3H
FE.OO7	last fault type output current	0.00～2000.0A	E4H
FE.OO8	last fault type busbar voltage	0.00～1000V	E5H
FE.OO9	last fault type move direction		E6H
FE.O10	The first two fault type	0(No Fault)～18	E7H
FE.O11	The first two fault type output frequency	0.00～400.00Hz	E8H
FE.O12	The first two fault type output current	0.00～2000.0A	E9H
FE.O13	The first two fault type busbar voltage	0.00～1000V	EAH
FE.O14	The first two fault type move direction		EBH

FD human-computer interface display factor

Fd.000	frequency setting	0.00～400.00Hz	ECH
Fd.001	input frequency	0.00～400.00Hz	EDH
Fd.002	input current	0.1～2000.0A	EEH
Fd.003	input voltage	0.1～2000.0V	EFH
Fd.004	current voltage	100～1000V	FOH
Fd.005	operating speed	0～30000rmp	F1H
Fd.006	frequency inverter temperature	0～100 celsius degree	F2H
Fd.007	PID	0.00～10.00V	F3H
Fd.008	PID Feedback	0.00～10.00V	F4H
Fd.009	input pulse frequency	0.01～50.00KHz	F5H
Fd.010	VIC input voltage	0.00～10.00V	F6H
Fd.011	CCI input voltage	0.00～10.00V	F7H
Fd.012	input terminal status		F8H
Fd.013	AO1 output voltage	0.00～10.00V	F9H
Fd.014	AO2 output voltage	0.00～10.00V	FAH
Fd.015	output terminal status		FBH

Fd.016	accumulated running hours	0～65535h		FCH
Fd.017	software edition No.			FDH
Fd.018	Retain			FEH
Fd.019	Retain			FFH
Fd.020	Retain			100H

Chapter 6 Fault Alarm and Countermeasures

6.1 Fault and Alarm

Fault and alarm are both abnormal states. But there is obvious difference between them.

Inverter self-monitors during running. If fault occurs, inverter will display fault code, and cut off inverter output to make motor in free running state and stop revolving; while if alarm occurs,inverter will display alarm code, inverter do not cut off output under alarm state, motor is still controlled by inverter.

6.1.1 Fault indication and fault reset

1~15 are for fault indication.

There are a number of ways of inverter fault reset: keyboard "reset button", terminal reset function, or, if necessary, fault reset can also be achieved by turning off the main power supply for some time. If fault has disappeared, inverter will resume normal operations; otherwise inverter will trip again.

Note: If start command is valid, fault reset will start transmission equipment.

6.2 Fault alarm and contermeasures

Fault Code		Type	Fault causes	Countermeasures
No.	English Abbr.			
1	oc	Overcurrent fault	Ac/deceleration time is too short. Inverter power is too small. Grid voltage is too low	Prolong ac/deceleration time. Choose one level bigger inverter Check input voltage.
2	Sc	Power module fault	Ac/deceleration time is too short. Output side of inverter is short. Power module is damaged. External interference.	Prolong ac/deceleration time. Check motor insulation. Seek for support. Check whether peripherals are with strong interference source.
3	ou	Bus overvoltage fault	Deceleration time is too short, regeneration energy is too large. Grid voltage is too high.	Prolong deceleration time. Check input voltage. Choose one level bigger inverter.

			Load inertia is too large, regeneration energy is too large.	
4	Lu	Bus undervoltage fault	Grid voltage is too low.	Check input voltage.
5	oL	Motor overload fault	Grid voltage is too low. Load inertia is too large. Motor rated current setting wrong. Inverter power is too small.	Check input voltage. Check load, adjust torque boost quantity. Reset motor rated current. Choose one level bigger inverter.
6	oH	Inverter overheating fault	Ambient temperature is too high. Poor ventilation of inverter. Cooling fan fault. Temperature inspection circuit fault.	Check whether ambient temperature meets requirement. Improve ventilation. Check whether cooling fan run. Seek for support.
7	cno	Soft start fault	Soft start circuit or contactor is damaged.	Seek for support.
8	ILP	Input missing phase fault	3-phase AC input missing phase.	Check input power supply and the cable.
9	OLP	Output missing phase fault	Current of 3-phase input side is asymmetric.	Check output cable and motor insulation.
10	EF	External equipment fault	External fault signal input terminal acting. STOPI key of keypad is set to emergency stop.	Check external fault cause. Check keypad —stopl key setting.
11	tA	Lifetime arrival fault.	Lifetime set by manufacturer arrival.	Contact manufacturer
12	cdE	Current detecting circuit fault.	Current detecting component damaged.	Seek for support.
13	EEP	EEPROM read-write fault	Control panel component damaged. External interference.	Seek for support. Check if peripherals are with strong interference source.
14	AUE	Motor parameter inspection fault	Deviation between test results and theoretical value is too large. Motor parameter set wrong setting.	Confirm motor is under no load state. Check motor parameter

12	EIF	CPU disturbed fault	External interference.	Check if peripherals are with strong interference source.

6.3 Solutions of common fault

Inverter may encounter several of the following failure in use, please follow the steps as below to do simple fault analysis:

6.3.1 No display after power on

1. With a multimeter check whether the input power source of inverter is consistent with the rated voltage of inverter.
2. Check inverter bus voltage with a multimeter, determine whether three-phase rectifier is good.
3.Check if the —CHARGEI light is lit.
4. If the above are OK, fault may exist in switching power supply section. Please seek service.

6.3.2 Motor does not run after inverter ran

1. For motors with band-type brake, please make sure that the motor is not in band-type braking state.
2. Disconnecting inverter and motor, runninginverter at 50Hz, and with a multimeter, check whether there is balanced voltage among three-phase output u, v, w. Note that since that among u, v, w arehigh frequency pulses,analog voltage meter(range: AC 500V) should be used. If voltage is unbalanced or there is no voltage, the inverter module is damaged.Please seek service.
3. If the above are OK, please seek service 09327444043 / 09824692665.

Chapter 7 Serial 485 (MODBUS) Communication Protocol

The inverter supports Modbus protocol, RTU format, Broadcast address 0, master address 248, slave address —1-247l.

7.1 Composition of MODBUS communication

7.1.1 Interface mode

RS485: asynchronous, half duplex, LSB sending priority. Low byte is after the high byte.
Inverter communication port: terminal RS485+/-, default data format: 8-N-1, 9600 bps.

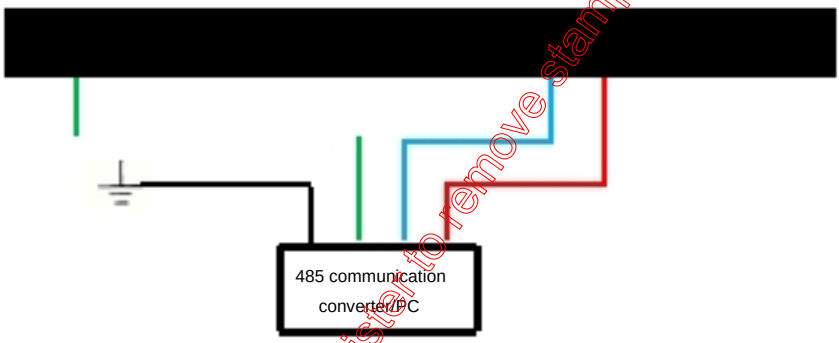

Fig.7.1.1-1 Wiring of 485 interface

7.1.2 Communication network mode

MODBUS communication is composed by 1 master station and up to 31 slave stations at most,andtakes the form of master station sending directives and slave station responding. Each time master station takes serial communication with one slave station. Therefore, assign address number in advance for each station, main station directives conduct signal communicates in accordance with the number. After Received instruction from main station, slave station performs assigned functions, to respond to the main station.

The following intervals must be kept between the messages:

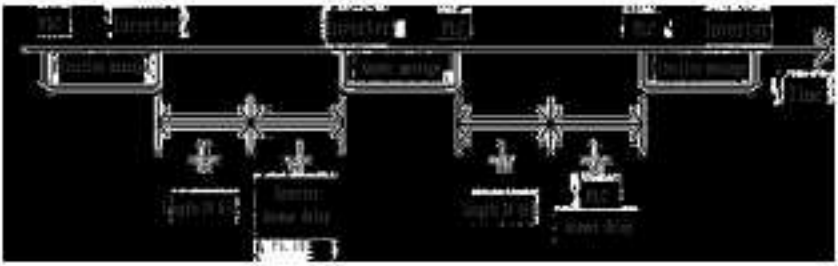

Fig. 7.1.2-1 Serial communication

7.2 Message Format

MODBUS communication takes the form of master station sending directives and slave station responding. Massage format of sending and receive is composed as shown in fig. 7.2-1,data length changes along with different directive (function) contents.

Slave station address
Function code
Data
Error inspection

Fig. 7.2-1 Serial communication message format

1. Slave station address

Inverter address range is (0～C7Hex).If it is set to 0, master station sends to all the slave stations, but slave stations do not respond.

2. Function code

Function (Hex)	Function	Directive message		Response message	
		Mini.(byte)	Max.(byte)	Mini.(byte)	Max.(byte)
03H	Read the contents of register	8	8	7	37
08H	Loopback test	8	8	8	8
10H	Multiple memory registers write in	11	41	8	8
80H	Slave register receive data error			5	5

Fig. 7.2-2serial communication function code explanation

3. Data

Memory register number (test code when number) and its datenverbund constitute a series of data. Data length changes according to the directive content.

4. Error detection

CRC-16 (CRC: Cyclic Redundancy Check, checksum method) is used to check out errors in communication.

Check and operation results are saved in a data (16 bits), the start value is FFFFH.

Put the data packet that is to be sent (slave station address, function code and data) and fixed value A001H together to conduct oxr and shift operation. After the operation is finished, checksum value is included in the data.

Check and operation proceed in accordance with the following methods:

1) Start value of the 16-bit data used for operation must be set to start: FFFFH.

2) Must conduct xor operation by using start value and slave station address.

3) Must right shift the result until the overflow bit turn out to be 1.

4) When the overflow bit turns out to be 1, must conduct oxr operation by the third step result and fixed value A001H.

5) After 8 times shift operations (whenever the overflow bit becomes 1, it must, as described in step 4 carry on oxr operation), carry on oxropereation with the last operation result and the next data packet (8-Bit function code). The result must execute 8 times shift operations again, when the overflow bit becomes 1, needs to carry out oxr operation with the fixed value A001H.

6) To process the data in the same procedure. The high byte is processed first, and then the low byte, until all of the data processing is completed.

7) The operation result is checksum, consisting of a high byte and a low byte.

Note: When add checksum into data frame, add low byte first, then add the high byte.

7.3 MODBUS massege example

7.3.1 Read register contents

At most 16 inverters'momery register contents can be read each time.

Firstly,the directive message must contain the start address of the first register to read and the quantity of the registers to read.Response message will contain the contents of the registers to read.The contents of memory register is divided into the high 8 bits and the low 8 bits,becoming data of response massege in numerical order.

Read message from 000H, 001H registers of slave inverter 2, which is shown as below.

Directive massage		
Slave station address		02H
Founction code		03H
Start address	High order	00H
	Low order	00H
quantity	High order	00H
	Low order	02H
CRC-16	High order	C4H
	Low order	38H

Response massege (normal state)		
Slave station address		02H
Function code		08H
Test code	High order	01H
	Low order	02H
Data	High order	03H
	Low order	04H
CRC-16	High order	41H
	Low order	37H

Response massege (fault state)		
Slave station address		02H
Function code		80H
Error code		F1H
CRC-16	High order	C1H
	Low order	03H

Fig. 7.3.1-1 Serial communicationread command example

7.3.2 Loop test

Directive message returned directly as a response message, using communication detection between master and slave stations. Any calue can be used for test code and data.

Loop test message of the slave inverter 2 is demonstrated as follows.

Directive massege		
Slave station address		02H
Function code		08H
Test code	High order	01H
	Low order	02H
Data	High order	03H
	Low order	04H
CRC-16	High order	41H
	Low order	37H
Response massege (normal state)		
Slave station address		02H
Function code		08H
Test code	High order	01H
	Low order	02H
Data	High order	03H
	Low order	04H
CRC-16	High order	41H
	Low order	37H

Response massege (fault state)		
Slave station address		02H
Function code		80H
Error code		03H
CRC-16	High order	F1H
	Low order	C1H

Fig. 7.3.2-1 Serial communication loop test example

7.3.3 Write in of multiple memory registers

At most 16 inverter memory registers can be writedin.Begin with the assigned number, write the assigned data into assigned quantity of memory registers.Write in data must conduct in accordance with numbered order of the Registers, respectively, in order of high 8 bits and low 8 bits aligned in directive message.

From PLC modify 000H, 001H registers' messages of slave inverter,which is shown as follows:

directive mesage		
Slave station address		02H
Function code		10H
Start address	High order	00H
	Low order	00H
quantity	High order	00H
	Low order	02H
The number of data		04H
Start data	High order	00H
	Low order	01H
The next data	High order	00H
	Low order	01H
CRC-16	High order	6CH
	Low order	EBH
Note：The number of data＝quantity×2		

Response massege (normal state)		
Slave station address		02H
Function code		10H
Start address	High order	00H
	Low order	00H
Quantity	High order	00H
	Low order	02H
CRC-16	High order	51H
	Low order	9FH

Response massege (fault state)		
Slave station address		02H
Function code		80H
Error code		01H
CRC-16	High order	31H
	Low order	C2H

Fig. 7.3.3-1 Example of serial communication write in

Read contents. MODBUS register address of each function code refers to function code list.

The data is transmitted as an integer, pay attention to the units of the function code.

7.3.4 Data save directive

When MODBUS communication is used, if write function code data in inverter from PLC,

function code data will be saved in inverter internal data fields temporarily.

The function code data of the RAM is written to inverter internal EEPROM (permanent storage) by the save directive.Write 1 in 0909H register,thenData save directive can be carried on by writing 1 into 0909H register.

7.3.5 Broadcast sending data

When send data by broadcast, one directive can be sent simultaneously to all slave stations. Slave station address of directive message must be set to 00H. All slave stations receive the information, without response.

7.4 Slave inverter

When inverter address is 1～31,the slave station will receive the following data.

7.4.1 Directive data

Directive data is shown as below.Write in only by function code 06H.

MODBUS Register address	contents	
900H	Bit0	Running directive 1: running, 0: stop
	Bit1	Direction directive 1: reverse, 0: forward
	Bit2	JOG directive 1: JOG, 0: stop
	Bit3	Reset directive 1: fault reset, 0:no
	Bit4～F	Retained
901H	Frequency directive	

902H	PID given value
903H～908H	Retained
909H	Save directive 1: save parameter to EEPROM
Note：Bit 0 is the lowest order bit	

Fig. 7.4.1-1 Data defination of serial communication directive

7.4.2 Monitoring data

Function code of function group d0、d1、d2、d3 can act as monitoring data by using function code 003H.

7.4.3 Setting data

Function code of function group P0 can be modified, writing in by function code 10H. MODBUS register address of each function group refers to function group list. The data is transmitted as an integer, pay attention to the units of each function code.

7.4.4 Testing data

Receive test data of function code 08H during loop test, and respond.

7.5 Master Inverter

When inverter address is 32, the inverter acts as a master inverter and sends the following broadcast data. At this time master inverter sends running and stop directive according to
current operating state, the set frequency is sent as a frequency directive. MODBUS register address is 900H and 901H.

Master inverter sends frequency directive 50.0Hz and set forward running message, which is shown as below:

MODBUS Register address	contents	
900H	Bit 0	Running directive 1:running,0:stop
	Bit 1	Direction directive 1:reverse running,0:forward running
	Bit 2	Retained
	Bit 3～F	Retained
901H	Frequency directive	
Note: Bit 0 is the lowest order bit		

Directive message		
Slave station address		00H
Function code		10H
Start addree	High order	09H
	Low order	00H
Quantity	High order	00H
	Low order	02H
The number of data		04H
Start data	High order	00H
	Low order	01H
The next data	High order	13H
	Low order	88H
CRC-16	High order	C1H
	Low order	95H

Fig. 7.5-1 Serial command example when inverter is master station

7.6 MODBUS communication error code

When slave inverter receives error data, will answer data fram of function code 80H, error code is shown as below:

Error code	Contents
01H	Do not allowed to write in the data during running
02H	Data overflow 1. MODBUS address out of range. 2. Number of data out of range. 3. When writing data, the data contents exceed the upper and lower limits.
03H	Function code overflow

Fig. 7.6-1 serial communication error code

7.7 No Response Fault Inspection of Slave Machine

Under the following condition, salve station ignore directive message of master station, does not sent response message.

1. Transmission error is checked out in directive message (over adjustment, framing, parity, CRC-16)

2. Slave address in directive message is not accordance with the slave address of inverter side.

3. When time interval between data and data that constitutes message exceeds 24 bits.

Chapter 8 Repair and Maintenance

8.1 Periodic Inspection

As a result of inverter use environment changes, such as temperature, humidity, smog and so on, as well as aging of inverter internal parts, kinds of faults may occur. Therefore, in the course of storage and use, daily inspection and periodic maintenance should be carried on.

Inspection Items	Inspection contents	Solutions
Terminal screws	Whether the screws are loosen	Screw up by screwdriver.
Heatsink	Whether there is dust	Blow the dust off with 4~6kg/cm ^{2}dried compressed air.
PCB(printed circuit board)	Whether there is dust	Blow the dust off with 4~6kg/cm ^{2}dried compressed air.
Cooling fan	Whether there is abnormal noise, abnormal vibration.	Replace the cooling fan.
Power component	Whether there is dust	Blow the dust off with 4~6kg/cm ^{2}driedcompressed air.
Bus aluminum electrolytic capacitor	Is there color change, strange smell, bubble or leak.	Replace aluminum electrolytic capacitor.

Fig. 8.1-1 Inverter periodic inspection

8.2 Components replacement agelimit

Fansand bus aluminum electrolytic capacitors are easy to damage parts of inverter, to ensure long-term security work of inverter, please replace periodically. Under condition of ambient temperature below 30℃, 80% rated load, running time of 12 hours/day, replacement time is as follows:

1. Fan: should be replaced after 3 years.

2. Aluminum electrolytic capacitor:should be replaced after 5 years.

8.3 Warranty Description

Calculating from the date of leaving factory, the warranty period is 18 months. Manufacturer is responsible only for quality issues due to improperdesign and productive process, not for the damage caused by transport or unpacking. Regarding incorrect installation and use, such as temperature, dust, corrosion, which do not comply with the prescribed working conditions, as well as damage caused by overload running, manufacturer is irresponsible.