SV800 Series
Intelligent vector inverter
Users' Manual

Ver:1.0-01

Shenzhen SCOV Electric Technologies Co., Ltd.

Foreword

Thank you for purchasing and using SCOV SV800 series intelligent vector frequency inverter. The SV800 series inverter is a kind of high-performance intelligent frequency inverter. We have made great breakthrough in dynamic response, speed-stabilizing precision, torque precision, intelligent start-up, weak magnetic control features and so on and made them reach international top technology level. After combined with the application characteristics of some new industries, the applicability and the industry design of the products are further strengthened, so it can better meet the requirements of all kinds of transmission applications.

After careful study, SCOV found that if we want to achieve a breakthrough in the core algorithm, we must systematically study the solution, especially perform algorithmically accurate calculations for the nuances of the theoretical model of the motor and the actual motor parameters, the nonlinear loss of the drive circuit and the loss of the connecting wire.

The practice has proved that the implementation of these methods has achieved a surprising result and has reached even surpassed the level of international first-class brands on a number of core indicators, which indicates that the era of truly cost-effective and high-performance frequency inverter has arrived.

No professional parameter adjustment required, a high-performance drive can be realized only after self-learning or auto-tuning , so we re-define SV800 series inverter as the intelligent vector frequency inverter.

Born for intelligence, SCOV will work with you to move forward!

Content

1 Safety information and precautions

1.1 Safety precautions

Users should familiar with the manual and other related technical materials and be sure to follow the safety precautions required in this chapter when installing, operating, and maintaining the product. At the same time, you should also know about the mechanical knowledge, safety information, precautions and so on.

In the manual, safety precautions are classified into <Danger> and <Warning> two categories:

DANGER**:** Failure to comply with the notice will result in fire, serious injury or even death.

WARNING**:** Failure to comply with the notice will result in personal injury or devices and property damage, even accidents.

Both marks which used in the manual indicate that there is an important content of safety. Failure to comply with those notices may lead to death, serious injury, damage to the products and related machines and systems. SCOV will assume no liability or responsibility for any injury, damage or loss caused by improper operation.

1.1.1 Safety precautions before installation

DANGER
● To avoid damage expanding and injury, please don't install the frequency inverter if you find water seepage, component missing or damaged. ● Do not install it if the packing list not conform to the product.

WARNING
● Do not touch the components with your hands. Electrostatic may cause damages. ● The withstand voltage test has been done before leaving the factory. The users do not need to perform the test on the inverter again. It may cause damage to the inverter insulation and internal components. ● Do not use the product when the rated value in the nameplate is inconsistent with the order requirements.

1.1.2 Safety precautions for transporting and installation

DANGER
● Install the equipment longitudinally on incombustible objects such as metal, and keep it away from combustible materials. Otherwise it may result in a fire. ● Install the equipment in the place that can bear the weight to avoid danger of injury due to falling. ● Do not install the equipment in an environment containing explosive gas. It may has danger of explosion.

WARNING
● Lift and handle the inverter gently when carrying, do not hold the front cover with one hand only. It may hurt your feet or damage the inverter if it falls off. ● Prevent conductive objects such as screws and metal shavings from falling into the inverter during installation. It may cause the inverter to malfunction or be damaged. ● Avoid places with harsh environments such as oil mist, dust suspension, vibration, etc. When installing in a cabinet, please ensure that the ambient temperature in the cabinet is within the allowed temperature range of the inverter. Otherwise it may cause the inverter to malfunction or be damaged.

1.1.3 Safety precautions for wiring

DANGER
● Do not perform wiring work expect for electrical construction professionals. Otherwise it has risk of electric shock and fire. ● Before wiring the inverter terminals, you must cut off all power connected to the inverter. The waiting time after the power is cut off is not shorter than the time marked on the inverter. Also ensure the DC voltage between +1 ~- or + 2 ~- is less than 30V. What's more, the inverter must properly regulate the ground wire. Otherwise it has a danger of electric shock. ● Please connect the input power cable and the motor cable correctly. Never connect the input power to the output terminals (U, V, W) of the inverter. Pay attention to the marks on the terminals and do not connect the wrong wires. Otherwise it has risk of damage to the inverter. ● Never connect the braking resistor directly between the DC bus positive terminal +1 or +2 and the negative terminal -. Otherwise it has risk of fire and damage to the inverter. ● The main circuit terminal wiring screws must be tightened well. For the wire diameter, please refer to the recommendations in this manual. Otherwise it has risk of fire and damage to the inverter. ● It is forbidden to connect AC220V voltage level signals to terminals except for the control terminals TA, TB, TC and MA, MB, and MG. Otherwise is has risk of damage to the inverter.
WARNING
● Ensure that the rated voltage of the inverter is consistent with the voltage of the AC power supply. Otherwise it may cause damage to the inverter. ● The encoder signal line should uses shielded wire, and the single end of the shield layer should reliably grounded. Otherwise it may cause the inverter to malfunction.

1.1.4 Safety precautions for debugging and operation

DANGER
● Ensure the front cover installed well before connect the input power supply. After power-on, do not open the cover and operate it as there is a high voltage inside. Otherwise it has a danger of electric shock. ● Please ensure the safety and reliability around the motor and mechanical load during motor electric parameters auto-tuning and the inverter operation. Otherwise it has risk of injury. ● Non-professional technicians are prohibited from testing signals during power-on. Otherwise it has risk of electric shock and damage to the inverter. ● Forbidden to repair the motor and mechanical equipment during power-on. Otherwise it has risk of electric shock and personal injury.

WARNING

- Do not touch the fan, radiator or braking resistor directly. May cause mechanical injury and burns.
- Do not use the input contactor on/off frequently to control the start and stop of the frequency inverter. May cause damage to the inverter.
- Check the allowable operating range of the motor and machine before operating as it is very easy for the inverter to drive the motor from low speed to high speed. Otherwise it may cause equipment damage.

1.1.5 Safety precautions for maintenance and rejection

DANGER

- Product maintenance, inspection and component replacement must be performed by qualified professional engineer. Otherwise it has danger of electric shock.
- Forbidden to carry out maintenance or repair on the inverter still with power on. Even if the power is cut off, the capacitor inside the inverter needs a certain discharge time and the waiting time is not shorter than the time marked on the inverter. Please confirm that the DC voltage between + 1 ~- or + 2 ~- is less than 30V. Otherwise it has danger of electric shock.

WARNING

- All pluggable devices must be plugged in and removed when the power supply is off. Otherwise it may cause damage to the inverter.
- Do not touch the component body by hand when maintaining, inspecting or replacing parts. Otherwise it may damage devices by electrostatic.
- The inverter must be treated as industrial waste after it is discarded.

1.1.6 Other safety precautions

WARNING

- Insulation inspection of motor
- When the motor is used for the first time or after being left for a long time and periodically inspected, the motor insulation inspection should be performed to prevent the inverter from alarming or damaging due to the insulation failure of the motor winding. The motor wiring must be separated from the inverter during the insulation check. 500V voltage megohmmeter is recommended and the insulation resistance of the motor wiring should be larger than 5MΩ.
- Low-frequency operation of motor
- Non-frequency variable standard motors will have poor cooling effect at low speed and the temperature of the motor will increase, so please reduce the load torque of the motor at low speed.
- Thermal protection of motor
  If the rated power of the inverter is greater than the rated power of the motor, please adjust the related parameters of motor protection in the inverter or install a thermal relay on the front of the motor to protect it.
- Surge protection
  This series of inverter is equipped with a surge suppressor inside which has a certain degree of protection against induced lightning. However, for lightning-prone areas, users need to place an

WARNING

external surge suppressor in front of the inverter power input.

- The using of contactors

  If a contactor is installed between the power supply and the inverter input terminal, do not frequently use the input contactor on/off mode to control the start and stop of the inverter. Charging and discharging frequently will affect the service life of its internal electrolytic capacitor.
- If a contactor is installed between the inverter output and the motor, make sure that the inverter is in the stop state before the contactor is turned on / off, otherwise the inverter may be damaged.
- Output filter

  The inverter output is a PWM high-frequency chopping voltage. Adding an output filter, output AC reactor or a magnetic ring between the inverter and the motor can effectively reduce electromagnetic noise.
- Please do not install capacitors to improve the power factor on the output side of the inverter which may cause over-current or even damage to the inverter.
- Input power supply

  This series of inverters are not suitable for exceeding the working voltage range specified in the manual. If necessary, adjust to the specified voltage range through a step-up or step-down device.
- All products of this series inverter support common DC bus input.
- De-rating using

  In areas with an altitude of more than 1000 meters, the thin air will cause the cooling effect of the inverter to deteriorate, so it should be de-rated. It is recommended that the rated output current be reduced by 1% for every 100m increase in altitude.

2 Product Introduction

2.1 Model and specifications

2.1.1 Nameplate explanation

When the products arrive:

- Please check the appearance to confirm whether there are any scratches or dirt on the inverter. Damage caused during product transportation is not covered by our warranty. In case of damage to the product during transportation, please contact the shipping company immediately.
- Please confirm whether the model of the inverter is consistent with the ordered product. You can refer to the "MODEL" column on the nameplate which on the side of the inverter

◆ Nameplate:

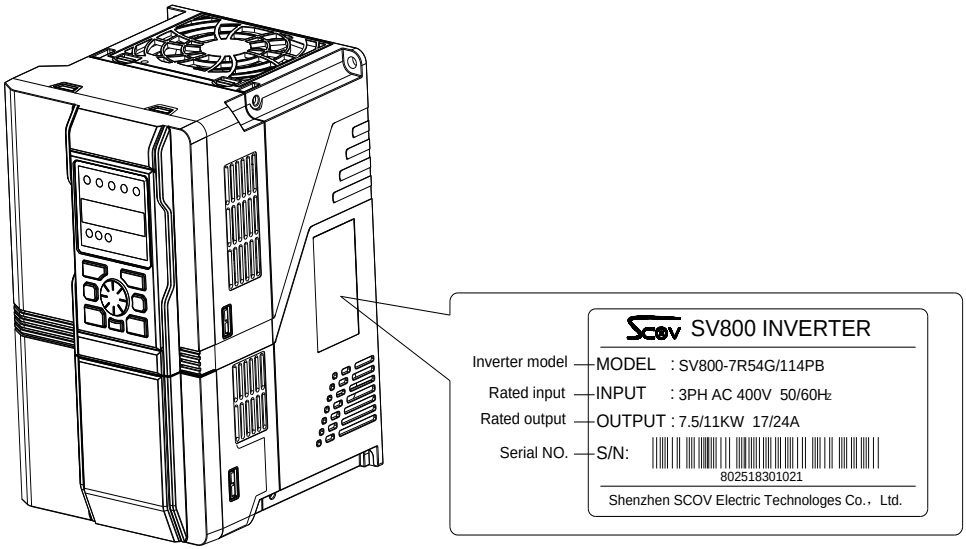


Fig. 2-1 Nameplate

2.1.2 Designation Rules of SV800/SV800A models

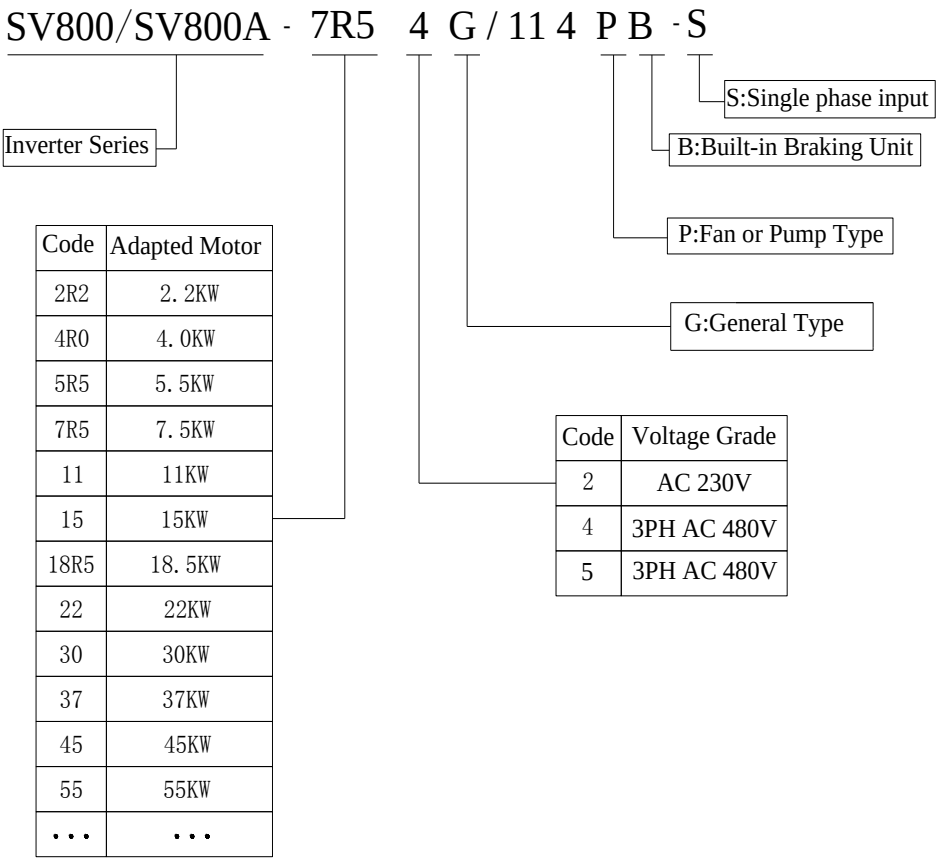


Fig. 2-2 Description of the model

2.1.3 Components name of the frequency inverter

This section describes the components names of the inverter.

◆ Plastic housing model

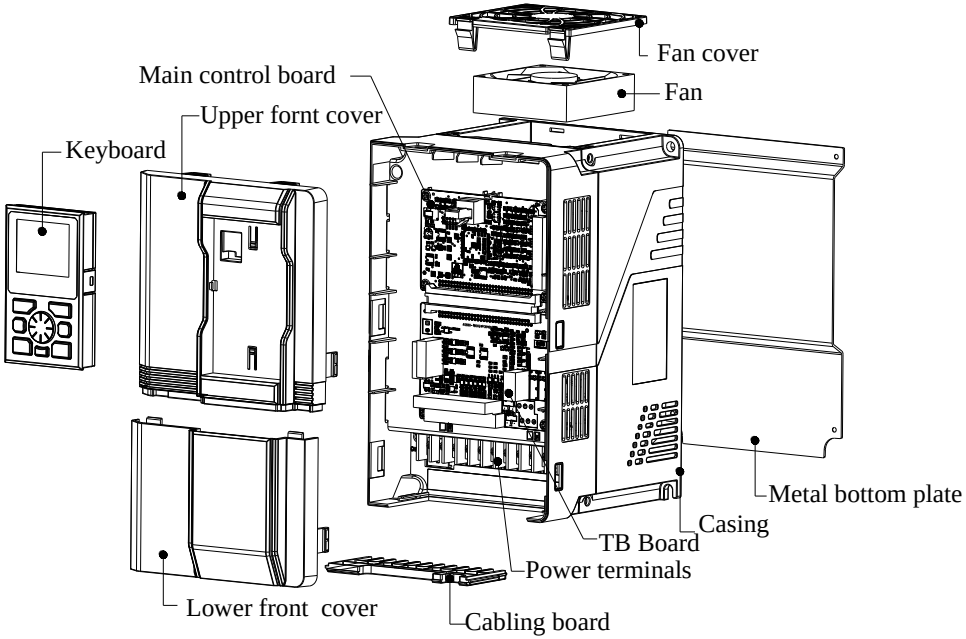


Fig. 2-3 Components names of the plastic housing model

◆ Sheet metal housing model

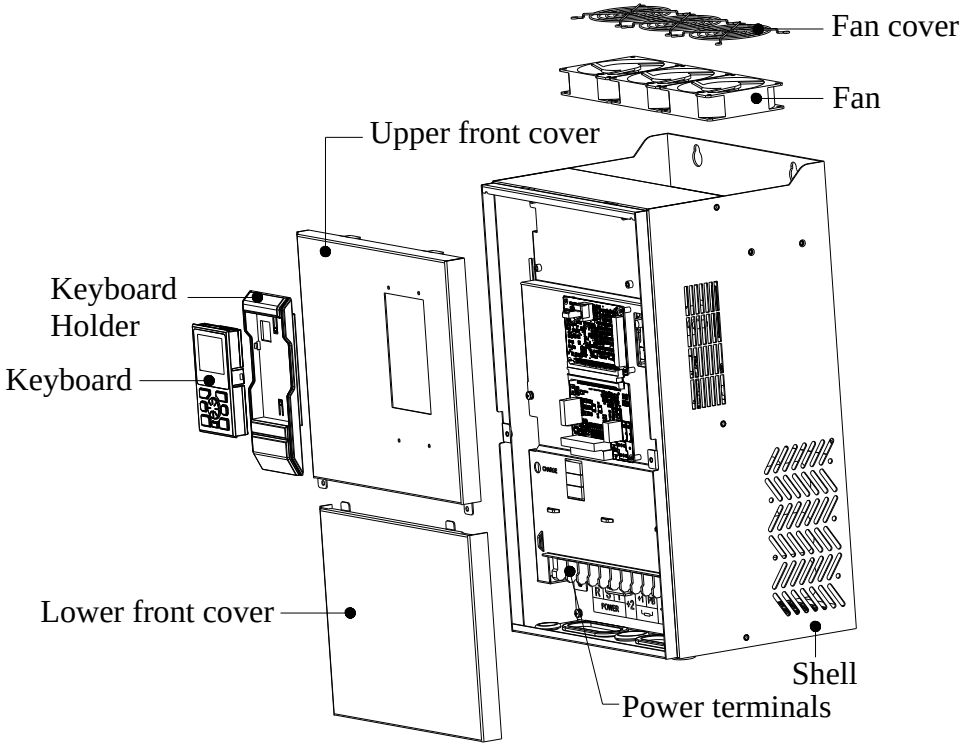


Fig. 2-4 Components names of the sheet metal housing model

2.1.4 Product models and specifications

The model and specifications of the SV800 series are shown in below Table 2-1. The input voltage is three-phase three-wire system (400V±15% 50/60Hz±5%), and the output voltage varies with the input voltage; the output power P_N is valid at the rated voltage U_N=380V.

Table 2-1 Models and Specifications

Code	Rated load			Heavy load		High heavy load		Carrier frequency range		Model name
	I_N A	I_{Max} A	P_N kW	I_{Hd} A	P_{Hd} kW	I_{HH} A	P_{HH} kW	Min kHz	Max kHz	
2R24	5.5	8.3	2.2	4.0	1.5	2.4	0.75	1.0	15.0	SV800-2R24GB
4R04	10	15	4.0	5.5	2.2	4.0	1.5	1.0	15.0	SV800-4R04G/5R54PB
5R54	13	19.5	5.5	10	4.0	5.5	2.2	1.0	15.0	SV800-5R54G/7R54PB
7R54	17	25	7.5	13	5.5	10	4.0	1.0	15.0	SV800-7R54G/114PB
114	24	35	11	17	7.5	13	5.5	1.0	15.0	SV800-114G/154PB
154	32.5	48	15	24	11	17	7.5	1.0	15.0	SV800-154G/18R54PB
18r54	38	57	18.5	32.5	15	24	11	1.0	15.0	SV800-18R54G/224PB
224	46	69	22	38	18.5	32.5	15	1.0	15.0	SV800-224G/304PB
304	62.5	93	30	46	22	38	18.5	1.0	15.0	SV800-304G/374P
374	75.5	113	37	62.5	30	46	22	1.0	15.0	SV800-374G/454P
454	92.5	138	45	75.5	37	62.5	30	1.0	15.0	SV800-454G/554P
554	111	166	55	92.5	45	75.5	37	1.0	15.0	SV800-554G/754P
754	146	219	75	111	55	92.5	45	1.0	15.0	SV800-754G/904P
904	169	253	90	146	75	111	55	1.0	15.0	SV800-904G/1104P
1104	210	315	110	169	90	146	75	1.0	15.0	SV800-1104G/1324P
1324	246	369	132	210	110	169	90	1.0	15.0	SV800-1324G/1604P
1604	300	450	160	246	132	210	110	1.0	15.0	SV800-1604G/1854P
1854	350	525	185	300	160	246	132	1.0	15.0	SV800-1854G/2004P
2004	370	555	200	300	160	246	132	1.0	15.0	SV800-2004G/2204P
2204	415	623	220	350	185	300	160	1.0	15.0	SV800-2204G/2504P
2504	460	690	250	370	200	300	160	1.0	15.0	SV800-2504G/2804P

Code	Rated load			Heavy load		High heavy load		Carrier frequency range		Model name
	I_N A	I_{Max} A	P_N kW	I_{Hd} A	P_{Hd} kW	I_{HH} A	P_{HH} kW	Min kHz	Max kHz	
2804	510	765	280	415	220	350	185	1.0	15.0	SV800-2804G/3154P
3154	600	900	315	460	250	370	200	1.0	15.0	SV800-3154G/3554P
3554	660	990	355	510	280	460	250	1.0	15.0	SV800-3554G/4004P
4004	740	1110	400	600	315	460	250	1.0	15.0	SV800-4004G/4504P
4504	820	1230	450	660	355	600	315	1.0	15.0	SV800-4504G/5004P
5004	920	1380	500	740	400	660	355	1.0	15.0	SV800-5004G/5604P
5604	990	1485	560	820	450	740	400	1.0	15.0	SV800-5604G/6304P
6304	1160	1665	600	920	500	740	400	1.0	15.0	SV800-6304G
7504	1380	2070	750	1160	630	920	500	1.0	15.0	SV800-7504G
10004	1840	2760	1000	1380	750	1160	630	1.0	15.0	SV800-10004G

Note: <1>Under vector control, the frequency inverter can drive motors with the power are three to four times smaller than the inverter power. Standard V/F control does not have this limitation.

<2> The carrier frequency range means that the control algorithm can operate stably under the maximum carrier frequency, but the motor needs to be de-rated when the carrier frequency is larger than the factory default value.

2.1.5 Heavy load application and de-rating use of frequency inverter

For rated load application:

The motor is allowed to output a maximum of 1.5 times of the rated torque; I_N in Table 2-1 is the rated current that can be used continuously when the inverter is not overloaded; P_N is the typical motor power adapted when there is no overload; I_{Max} is the maximum overload current allowed by the inverter, allowing continuous operation for 1 minute / 5 minutes at 40 ℃.

For heavy load application:

The inverter should be derating used by one grade and the motor is allowed to output more than 1.5 times of the rated torque; I_{Hd} in Table 2-1 is the rated current of the continuously running motor. The motor overload protection is set by P0-03 (motor overload protection setting) and P0-04～P0-06 (motor over-torque protection); The output current of the inverter is limited by I_{Max} and allowed to run continuously for 1 minute / 5 minutes at 40℃; P_{Hd} is the typical motor power adapted for heavy load applications.

For high heavy load applications:

The inverter should be de-rating used by two grades and the motor allows output greater than twice times of the rated torque; In table 2-1, I_{HH} is the rated current of the continuously running motor. The motor overload protection is set by P0-03 (motor overload protection setting) and

P0-04～P0-06 (motor over-torque protection); The output current of the inverter is also limited by I_{Max}, allowing continuous operation for 1 minute / 5 minutes at 40 ℃; P_{HH} is the typical motor power adapted for high heavy load applications.

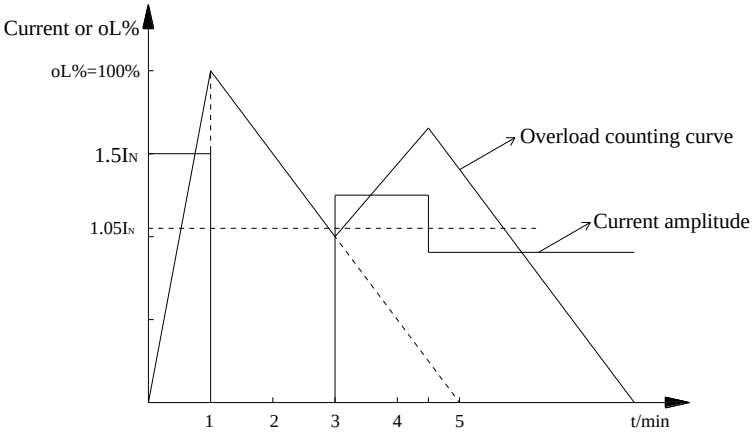


Fig.2-5 Overload protection diagram

Overload protection:

Both the inverter and the motor will perform overload protection and over-torque protection. The motor protection parameters can be set in the inverter. When the inverter output current is 1.5 times of the rated current (or I_{Max}), it is allowed to run for 1 minute / 5 minutes at 40 ℃, as shown in Figure 2-5.

The guidance of derating using:

When the user needs the motor to output more than 1.5 times of the rated torque, the inverter should be derated used as described above in the heavy load application. When the ambient temperature of the inverter, altitude and other factors changed or the carrier frequency of the inverter is greater than the factory default value, derating using (passive) is required; In addition, when the motor is required to run at a very low speed for a long time, the carrier frequency must be reduced or the inverter must be derated. Derating method as shown in Table 2-2 or you can consult the manufacturer.

Table 2-2 The guidance of inverter derating using

Derating factors	Derating guidance
Temperature	The rated value of the inverter is measured at 40 ℃. If the ambient temperature rises, the capacity should be reduced by 3%/1 ℃ and the maximum ambient temperature is 50 ℃.
Altitude	After the altitude is higher than 1000 meters, derating 1% for each 100 meters.
Carrier frequency	When the carrier frequency of the inverter is higher than the factory default value, in principle, the inverter should be derated used by one grade or consult the manufacturer directly.

Derating factors	Derating guidance
	When it needs to run at very low speed with rated output, please consult the manufacturer or derating use the inverter by one grade.

Note: The factors affecting the output capability of the inverter are not limited to the above factors, if any questions, please consult the manufacturer or supplier.

2.2 Description of control performance

SV800 series inverter is an intelligent high-performance frequency inverter, which can meet the wide range of applications of users. We have made significant improvement about targeted processing to improve control performance and simplify user operations.

When using SV800 series frequency inverter, variety of control modes can be chose that meet your requirements. Details are shown in **Table 2-3.**

Table 2-3 SV800 Technical Data

Control mode	Sensorless vector control (IM.SVC)	With sensor vector control (IM.VC)	V/F control (IM.VF)	Remarks
Motor type	Induction motor			Not limited to variable frequency motors
Setting parameters	A0-04=0	A0-04=1	A0-04=2	—
The main purpose	Can be used for all speed control motors and applications with sensorless high precision, high response requirements. Such as: applications that need high performance speed control ,high precision torque control ,high dynamic response and high stability	Applications with ultra-high precision with sensor and ultra-high response requirements. Such as: applications that need high performance speed control, high precision torque control, high dynamic response, high stability or high reliability	For all simple applications that need frequency inverter, especially for multi-motor applications. Such as: applications with general variable frequency speed control, general dynamic response and without self-learning function.	SVC can also support multi-motor control. For vector control, it is recommended to use a frequency inverter to drive one motor. If multiple motor control needed, please consult the manufacturer or agent.
Carrier frequency	1.0 ~15.0kHz Default : 6.0kHz	1.0~15.0kHz Default: 6.0kHz	1.0~ 10.0kHz Default: 6.0kHz	The inverter needs to be de-rated used when the carrier frequency raised.
Maximum speed (speed control)	Equivalent to 250Hz of motor	Equivalent to 250Hz of motor	Equivalent to 400Hz of motor	The frequency inverter needs to be de-rated used when the motor rotates at a frequency greater than 120 Hz.

Control mode		Sensorless vector control (IM.SVC)	With sensor vector control (IM.VC)	V/F control (IM.VF)	Remarks
Overload protection		Inverter overload Motor overload Motor over-torque	Inverter overload Motor overload Motor over-torque	Inverter overload Motor overload	The overload protection of frequency inverter is not adjustable and the overload protection of motor can be adjusted by parameters.
Basic performance parameter(speed control)	Static accuracy	<10% of motor slip speed	<0.01% of rated motor speed	<150% of motor slip speed	Depending on the mounting conditions of the motor and the type of motor, the speed control accuracy will vary slightly.
	Speed fluctuation	<0.05% of rated motor speed	<0.01% of rated motor speed	<0.1% of rated motor speed	—
	Dynamic accuracy	<0.3% s (100% motor rated torque step)	<0.1% s (100% motor rated torque step)	—	The V/F control is applied to applications that not require high dynamic response
	Constant power interval	Five times weak magnetic interval	Five times weak magnetic interval	—	V/F control operation with maximum frequency 400Hz
	Wide range debugging	12r/min~ rated motor speed	0r/min~ rated motor speed	—	The minimum speed of SVC control may vary slightly with motor characteristics.
	Start-up response time	0～200ms	0 to 100ms	—	Under vector control, the start-up response time varies slightly with motor power.
	Startup torque	>200% motor rated torque	>200% motor rated torque	150%	Under vector control, the start-up torque is 150% initially and also limited by the ratio of the frequency inverter to the motor rated current. The maximum start-up torque is 300% of the rated motor torque. For more details, please refer to “2.15 frequency inverter Heavy duty application and derating use"

Control mode			Sensorless vector control (IM.SVC)	With sensor vector control (IM.VC)	V/F control (IM.VF)	Remarks
Basic performance parameter (Torque control)	Ute precision		<3% motor rated torque	<3% motor rated torque	—	When performing torque control, motor parameters self-learning is required at the room temperature. If can't take self-learning and the motor parameters can only be manually input, the torque control index will decrease; In addition, the control index in the constant power interval will decrease slightly.
	Reentry accuracy		<0.5% rated motor torque	<0.5% rated motor torque	—	
	Fluctuation accuracy		<0.5% rated motor torque	<0.5% rated motor torque	—	
	Response time		<5ms (motor rated torque)	<5ms (motor rated torque)	—	
	Zero servo control		Not support	Support	—	Under VC control mode, when zero servo control is performed, the motor shaft would has no swing and no vibration.
Main control function	Self-learning	Motor self-learning	Full mode and static mode	Full mode and static mode	Static mode	For V/F control, the primary side resistance of the motor is learned only.
		Inverter self-learning	Support	Support	Support	Nonlinear parameters self-learning is performed under any mode of the frequency inverter.
		Parameter consistency	＜1%	＜1%	＜1%	There may be slight fluctuations in motor temperature as the self-learning process changes.
	Initial excitation of the terminal		Support	Support	—	Use it with vector control together, the start-up time can be reduced to 0ms.
	Terminal magnetic flux brake		Support	Support	Support	When the terminal brake is used, the motor rotational kinetic energy is completely consumed on the motor stator and rotor, so long-term using will adversely affect the motor.
	Speed/torque switching		Support	Support	—	It can be switched manually with the terminal or switched automatically by system or parameters setting.

Control mode		Sensorless vector control (IM.SVC)	With sensor vector control (IM.VC)	V/F control (IM.VF)	Remarks
	Speed gain switching	Support	Support	—	It can be switched manually with the terminals or switched automatically by parameter setting.
	Multi-motor switching	Support	Support	Support	Realizing one frequency inverter automatic switches and controls multiple motors.
	Terminal speed retention	Support	Support	Support	—
	The adjustment of rotational inertia	Support	Support	—	—
	Automatic compensation of motor temperature	Support	Support	—	Temperature adaptive control makes no practical significance under V/F control
	Anti-regenerative overvoltage stall	Support	Support	Support	The use of anti-regeneration stalls basically prevents overvoltage faults from occurring, but cannot be used when it needs braking resistors or active inverters to consume or regenerate regenerative energy.
	Start magnetic field enhancement	Support	Support	—	—
	High efficiency control	Support	Support	Support	Under vector control, when enabled high efficiency control, it will affect dynamic control performance.
	Speed observer	Support	Support	—	Please turn off the function if the transmission mechanism does not support high dynamic response
	Torque observer	Support	Support	—	Please turn off the function if the transmission mechanism does not support high dynamic response

Control mode		Sensorless vector control (IM.SVC)	With sensor vector control (IM.VC)	V/F control (IM.VF)	Remarks
	Speed variable structure control	Support	Support	—	—
Main control function	Speed dynamic deviation control	Support	Support	—	—
	Four quadrant torque control	Support	Support	Support	Under V/F control, only positive and negative torque limits are supported.
	Torque command mode selection	Support	Support	—	The torque mode selection is effective in the constant power interval and the constant torque interval is the same.
	Motor anti-reverse control	Support	Support	Support	When the motor anti-reverse function is enabled, it will affect the motor response performance at low speed range.
	Droop control	Support	Support	Support	Both vector control and V/F control support droop control.
	Output power observer	Support	Support	Support	Under V/F control, the motor output torque is an estimated calculation value, so the power observer accuracy and the determination of over-torque and under-torque will be worse than value under the vector control.
	Over torque detection	Support	Support	Support	Under V/F control, it's over-frequency protection.
	Under torque detection	Support	Support	Support	
	Over-speed protection	Support	Support	Support	
	Speed control error protection	Support	Support	—	When the function is enabled, the output will become blocked if control error occurs.

Control mode		Sensorless vector control (IM.SVC)	With sensor vector control (IM.VC)	V/F control (IM.VF)	Remarks
	Speed jump	Support	Support	Support	When the function is enabled, the acceleration/deceleration interval will be traversed according to the Acc./Dec. time; Under V/F control, it has t over-frequency protection.
	VF torque limit	—	—	Support	Under V/F control, the torque limit function is turned off by factory default. If the function is needed, please set parameters to enable it.
	VF automatic torque boost	—	—	Support	Under V/F control, when the function is valid, the torque boost value will become invalid.
	VF oscillation suppression	—	—	Support	Vector control not require oscillation suppression.

3 Mechanical Installation

3.1 Mechanical Installation

3.1.1 Installation Environment

Please install the inverter according to the below **Table 3-1**.

Table 3-1 Installation Environment

Item	Requirements
Installation place	Indoor
Ambient temperature	-10 to +40 ℃ ● Please use it in the place where the temperature does not change drastically. ● When using it in a closed space such as a control cabinet, please use cooling fan or cooling air conditioner to cool it and prevent the internal temperature from exceeding the condition temperature. ● Please avoid the inverter freezing.
Humidity	95% RH or below Please avoid condensation on the inverter.
Storage temperature	-20 ～ +60 ℃
Environment	● Locations free from oil mist, corrosive gases, flammable gases, dust, etc. ● Locations that metal powder, oil, water and other external objects can not enter the inverter.(Do not install the inverter on flammable materials such as wood.) ● Location without radioactive materials and flammable materials ● Place without harmful gases and liquids ● Place with less salt erosion ● Place without direct sunlight
Altitude	Less than 1000m, derating 1% for each 100 meters when higher than 1000m. <1>

Note 1: Please do not install transformers or other equipments around the inverter which generate electromagnetic waves or interference, otherwise it will cause the inverter to malfunction. If you need to install such equipment, you should install shield plate before the inverter.

Note 2: Please use cloth or paper to cover the upper portion of the frequency inverter to prevent metal debris, oil and water from entering into the frequency inverter during installation. After finish the job, be sure to remove the cloth or paper, and if it still covered, the ventilation will become poor and causes the frequency inverter to abnormally heat.

3.2 Installation direction and space

3.2.1 Installation space

The surrounding installation space and clearance should be reserved varies with the power levels of the SV800 series inverter.

◆ Single inverter installation

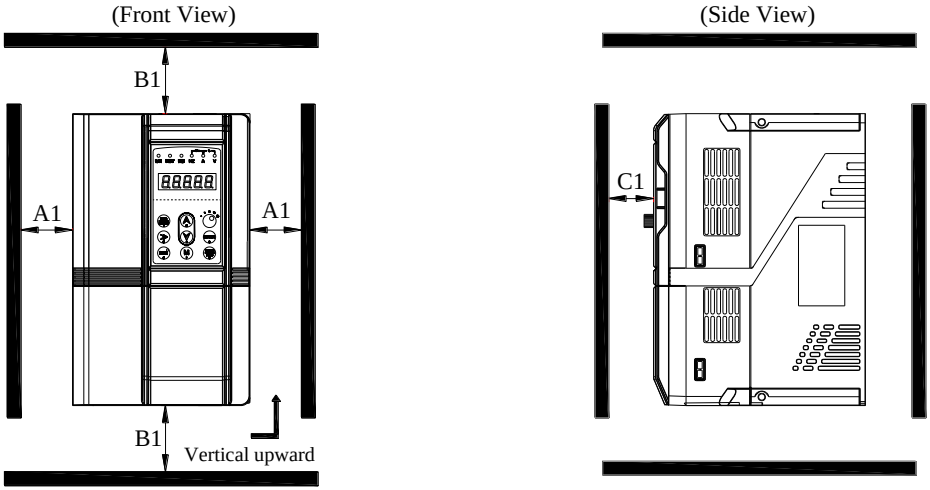


Fig.3-1 Single inverter installation

Table 3-2 Installation clearance requirements

Power level	Dimensional requirements (unit: mm)		
2.2KW~22KW	A1≥10	B1≥200	C1≥40
30~37KW	A1≥50	B1≥200	C1≥40
≥45KW	A1≥50	B1≥300	C1≥40

◆ Multi-inverter installation

The SV800 series inverter dissipates heat from the bottom to the top. When multiple inverters work together, please install them side by side and the upper of the inverter should be aligned. Clearance should be reserved between each inverter as shown in **Fig.3-2**:

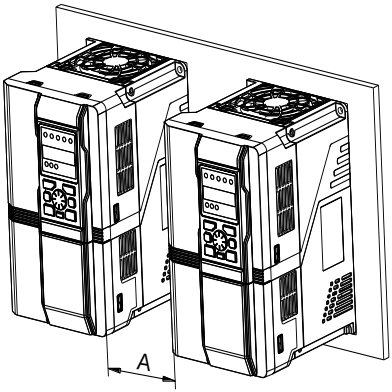


Table 3-3 Installation clearance requirements for each power class of the SV800

Power level	Space requirement (mm)
2.2KW~22KW	A≥10
30~37KW	A≥50
≥45KW	A≥50

Fig. 3-2 Installation clearance of multiple inverters

◆ Different rows installation

If one row of inverters need to be installed above another row, please install insulation guide plate to prevent the heat from the lower row inverters which will cause the temperature of the upper row inverters to raise, even over-heat and overload fault occurs. Measures as shown in **Fig.3-3**:

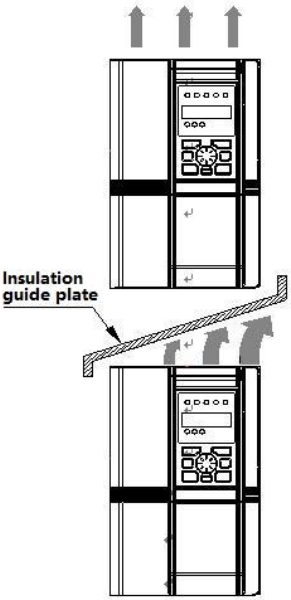


Fig.3-3 Up and down row installation requirements

3.2.2 Installation direction

When installing the inverter, please install it in a vertical upward direction. Other directions such as lying down, lying on its side and upside down are forbidden.

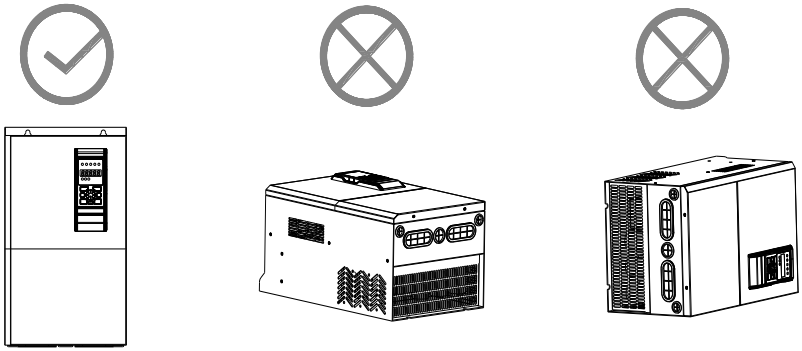


Fig.3-4 Installation Direction

3.3 Installation Guidance

The SV800 series inverter supports wall-mounted installation. You can follow below installation instructions and in conjunction with specific model and application requirements of the installation occasion to install the inverter.

- As shown in **Fig.3-1**, the installation space needs to ensure that the frequency inverter has sufficient heat sink space. Please consider the heat dissipation of other devices in the cabinet when reserve the space.
- Please mount the frequency inverter vertically to facilitate the upward emission of heat. If there are multiple frequency inverters in the cabinet, please install them side by side. Please refer to **Fig.3-3** and install a heat insulation flow guide plate in the case where the upper and lower mounting is required.
- When a mounting bracket is required, the material of the mounting bracket must be flame-retardant
- For applications with metal dust, it is recommended to use a mounting cabinet that can completely close the inverter to completely isolate the inverter from metal dust. At this time, the space in the fully sealed cabinet should be as large as possible. Installing the heatsink outside the cabinet is also recommended.

3.3.1 Wall-mounted Installation

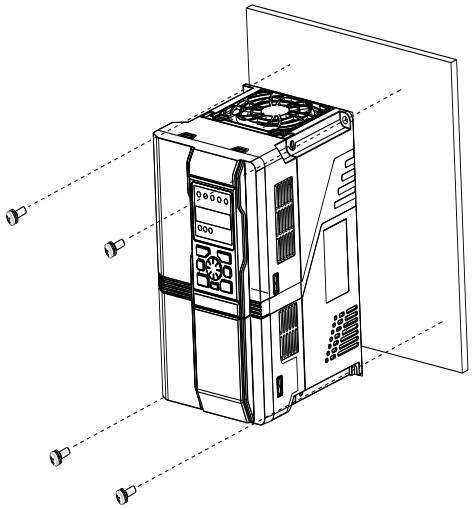


Fig. 3-5 Wall-mounted Installation

3.4 Disassembly and installation of keyboard

3.4.1 Disassembly of the keyboard

Please press the holders on both sides of the keyboard firmly according to the directions 1 and 2 in **Fig.3-6** and lift the keyboard body in the direction 3.

3.4.2 Installation of the keyboard

Install and press the keyboard in the direction 1 as shown in Fig.3-7 until you hear a "click". Do not install the keyboard from any other direction, otherwise it will cause poor contact of the keyboard.

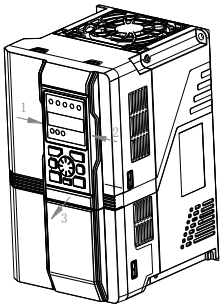


Fig. 3-6 Keyboard Disassembly

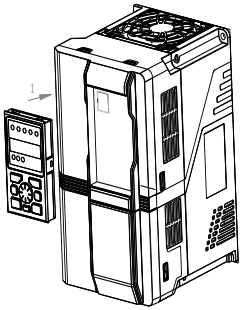


Fig.3-7 Keyboard Installation

3.5 Disassembly and installation of SV800 cover

3.5.1 Disassembly and installation of SV800 cover (plastic housing)

Step 1: Please refer to the disassembly and installation of the keyboard in 3.1.3and remove the keyboard firstly.

Step 2: Press the hook in both sides of the lower front cover in the direction of 1 as shown in Fig.3-8 and lift it up in the direction 2 to remove the lower front cover.

Step 3: Press the hook in both sides of the upper front cover in the direction of 1 as shown in Fig.3-9 and lift in the direction 2 to remove the upper front cover.

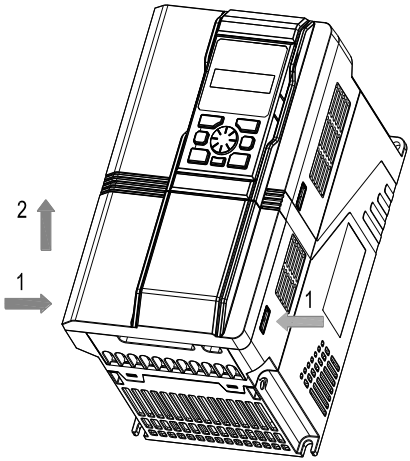


Fig. 3-8 Remove the lower front cover

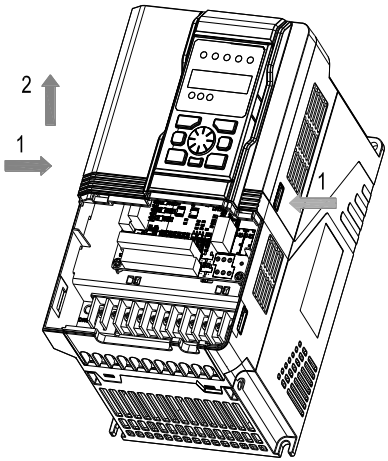


Fig.3-9 Remove the upper front cover

3.5.2 Disassembly and installation of SV800 cover (sheet metal housing)

3.5.2.1 Cover disassembly

Remove the two screws at the bottom of the cover firstly. Then tilt the cover 15 degrees and pull it out in the direction as shown in the figure.

3.5.2.2 Cover installation

After the wiring of the main circuit terminal and the control circuit terminal is completed, insert the buckle of the cover plate into the slot of the housing and tighten the two screws at the bottom of the cover plate, then the cover plate is installed. As shown in **Fig.3-10.**

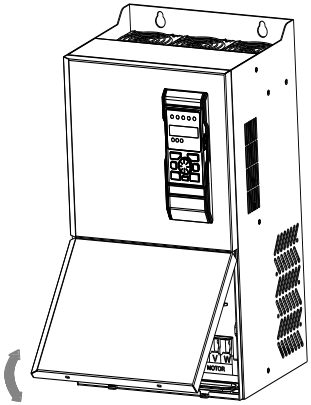


Fig. 3-10 Install the cover

3.6 SV800 appearance and installation dimensions

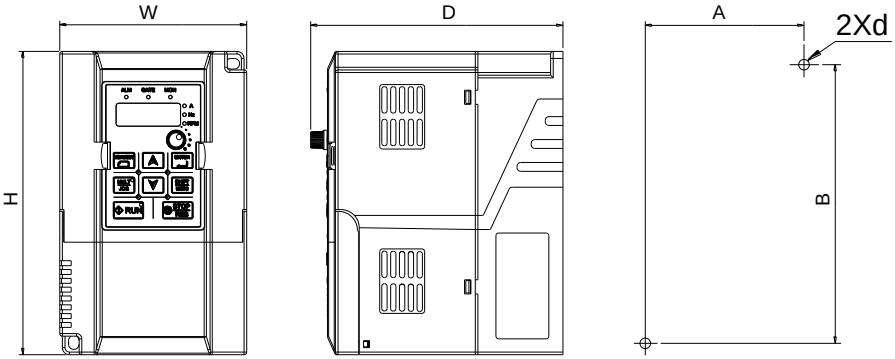


Fig. a

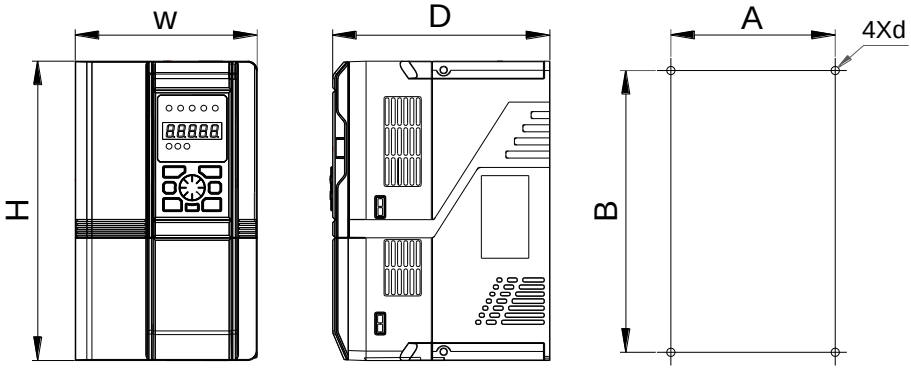


Fig. b

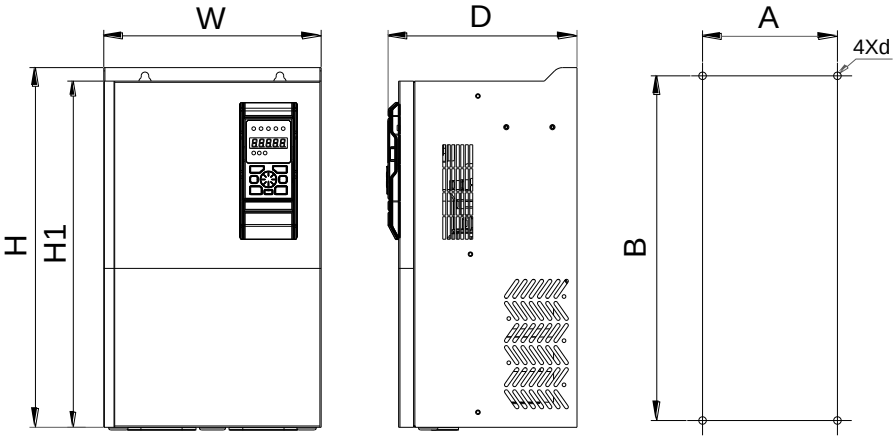


Fig. c

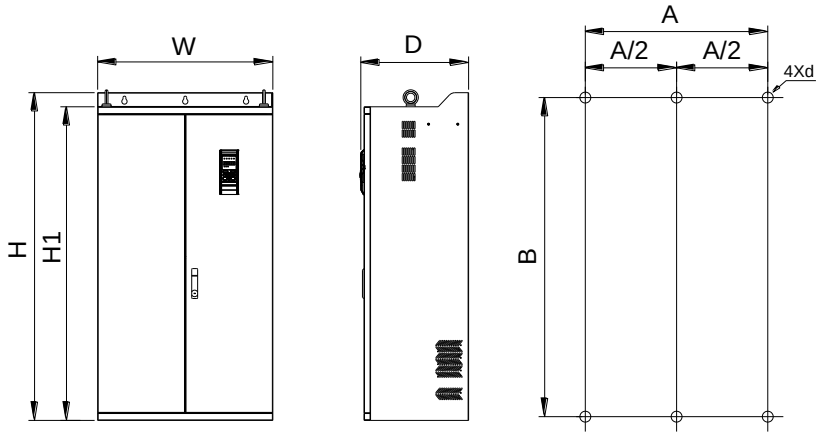


Fig. d

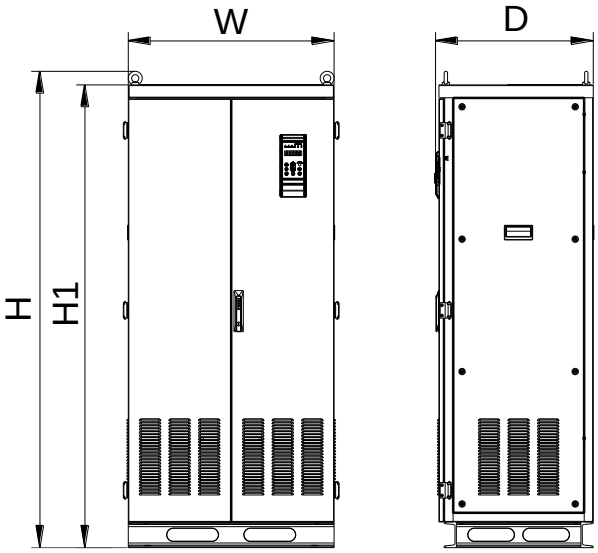


Fig. e

Table 3-4 Inverter Appearance and installation dimension (unit: mm)

Inverter Model	A	B	H1	H	W	D	Mounting hole	Fig. No.
SV800A-0R752GB	90	158	/	172	106	143	5.2	Fig. a
SV800A-1R52GB								
SV800A-2R22GB								
SV800A-0R754G/1R54PB								
SV800A-1R54G/2R24PB								
SV800A-2R24G/4R04PB								
SV800-2R24GB	115	205	/	215	125	177	5.2	Fig. b
SV800-4R04G/5R54PB								
SV800-5R54G/7R54PB	140	240	/	255	155	187	7	
SV800-7R54G/114PB								
SV800-114G/154PB	190	315	/	335	210	202	7	
SV800-154G/18R54PB								
SV800-18R54G/224PB	160	415	412	430	260	230	9	Fig. c
SV800-224G/304PB								
SV800-304G/374P	180	465	462	480	290	253	10	

Inverter Model	A	B	H1	H	W	D	Mounting hole	Fig. No.
SV800-374G/454P								
SV800-454G/554P	200	500	497	515	300	280	10	
SV800-554G/754P								
SV800-754G/904P	200	535	530	550	340	302	10	
SV800-904G/1104P	300	680	660	705	420	343	11	
SV800-1104G/1324P								
SV800-1324G/1604P								
SV800-1604G/1854P	300	950	930	975	470	395	11	
SV800-1854G/2004P	350	1040	1020	1070	580	425	12	
SV800-2004G/2204P								
SV800-2204G/2504P								
SV800-2504G/2804P	500	1315	1290	1350	720	445	12	Fig. d
SV800-2804G/3154P								
SV800-3154G/3554P								
SV800-3554G/4004P								
SV800-4004G/4504P								
SV800-4504G/5004P	/	/	1800	1855	840	615	/	Fig. e
SV800-5004G/5604P								
SV800-5604G/6304P								

3.7 Keyboard appearance and installation dimensions

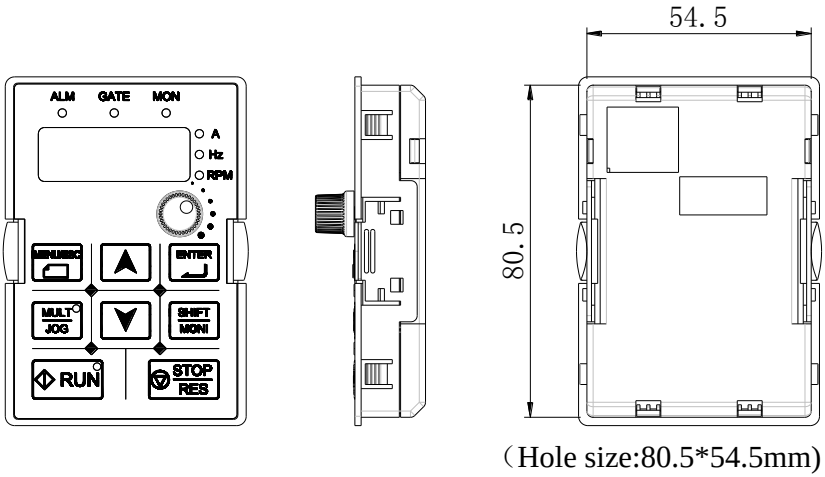


Fig.3-11 SV800A keyboard appearance and installation dimensions

The SV800A series inverter keyboard can be installed on the electric control cabinet directly. The mounting hole size is as shown in **Fig.3-11**.

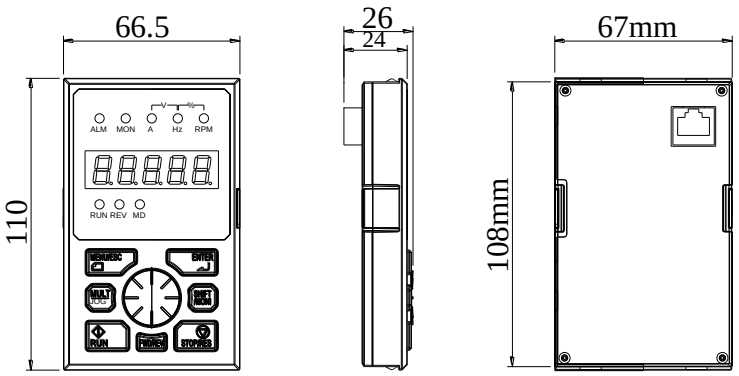


Figure 3-12 SV800 keyboard appearance and installation dimensions

The keyboard of SV800 series inverters can be directly installed on the electric control cabinet. The installation opening size is shown in **Fig.3-12**, but you need to pay attention to the accuracy of the opening. When the keyboard of the sheet metal model is externally used, the keyboard holder can also be directly installed on the electric control cabinet. What's more, we provide external keyboard holder that is convenient for opening installation. The appearance and installation dimension of those two keyboard holders are shown in **Fig.3-13**.

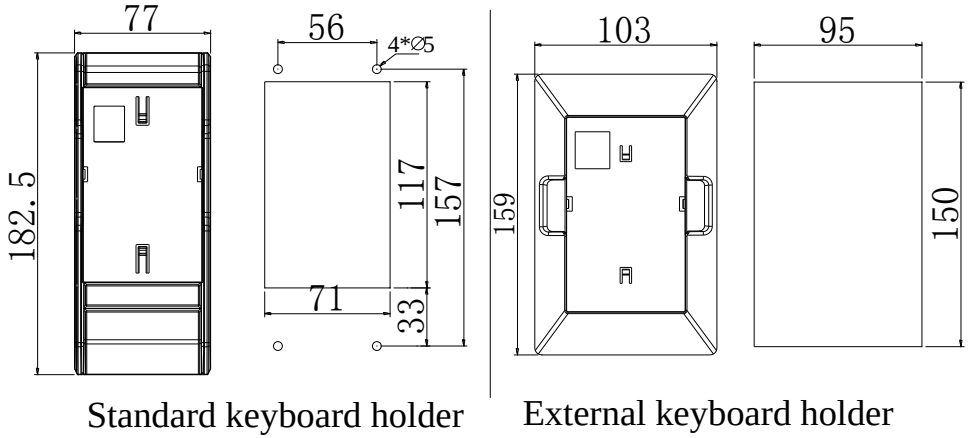


Fig. 3-13 SV800 keyboard holder outlook and installation dimensions

4 Electrical wiring and precautions

4.1 Main circuit electrical wiring

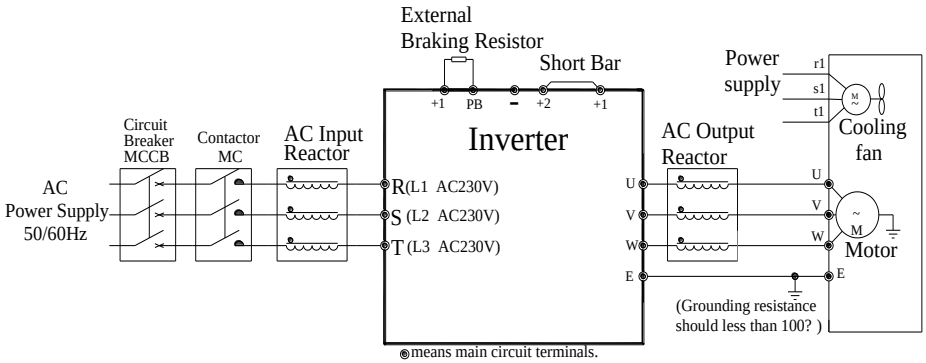


Fig. 4-1 Inverter main circuit wiring

Note: 1) Please be sure to remove the shorting link between the (+1) and (+2) terminals when install DC reactor.

4.1.1 Arrangement and definition of main circuit terminals

- SV800A single phase inverter 0.75kW-2.2kW main circuit terminals:

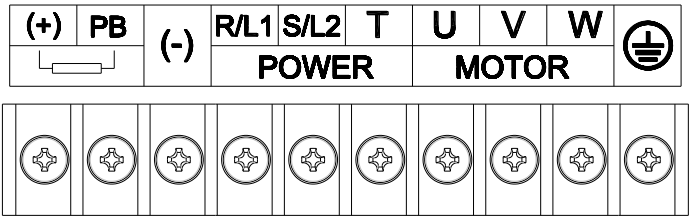


Fig.4-2 SV800A 1PH (0.75KW-2.2KW) Inverter Main circuit terminals

- SV800A three phase inverter 0.75kW-2.2kW main circuit terminals:

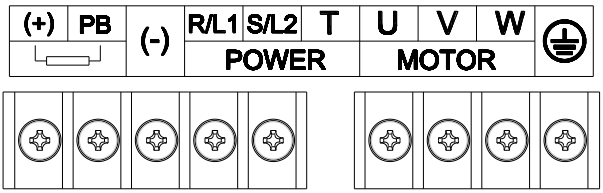


Fig.4-3 SV800A 3PH (0.75KW-2.2KW) Inverter Main circuit terminals

- SV800 three phase frequency inverter 2.2kW-22kW main circuit terminals:

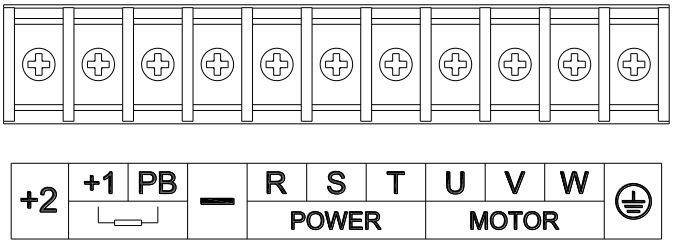


Fig. 4-4 SV800 (2.2KW-22KW) Inverter Main circuit terminals

- SV800 three phase frequency inverter 30kW-75kW main circuit terminals:

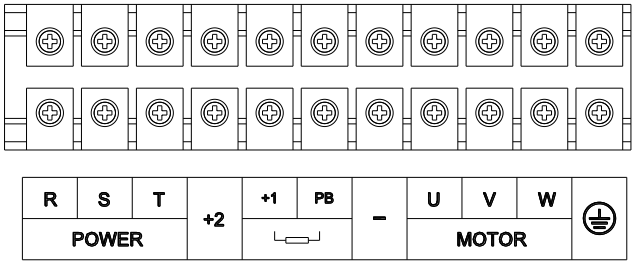


Fig. 4-5 SV800 (30KW-75KW) Inverter Main circuit terminals

- SV800 three phase frequency inverter90kW-160kW main circuit terminals:

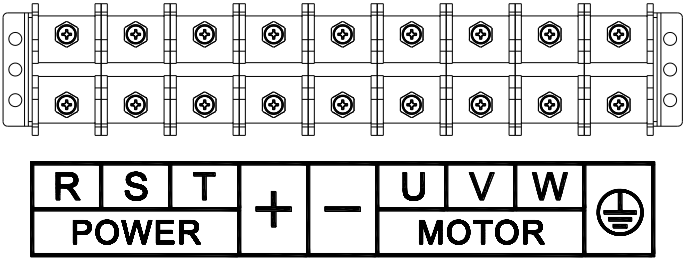


Figure 4-6 SV800 (90KW-160KW) Inverter Main circuit terminals

- SV800 three phase frequency inverter185kW-400kW main circuit terminals:

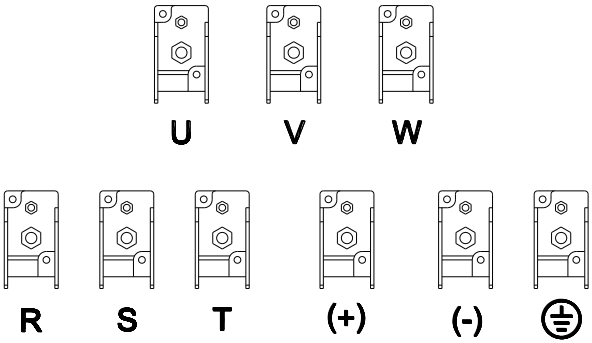


Fig. 4-7 SV800 (185KW-400KW) Inverter Main circuit terminals

- SV800 three phase frequency inverter450kW-630kW main circuit terminals:

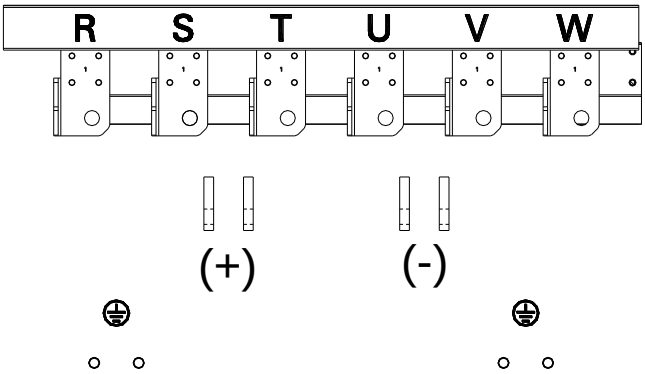


Fig.4-8 SV800 (450KW-630KW) Inverter Main circuit terminals

Table 4-1 Main circuit terminal function definition table

Terminal symbol	Terminal name	Terminal function definition
-	DC power terminals	DC power output, - is negative DC bus terminal, +1 or + is positive DC bus terminal, they can be used for external braking unit or common DC bus.
+1 or +		
+1	Brake resistor terminal	For installing external braking resistors and realize fast stopping.
PB		
+2	DC reactor terminals	Terminal +2 and +1 have been shorted by shorting link before leaving factory. Please remove the shorting link when need to install DC reactor. It can not be removed when installing braking resistor or common bus using. The inverter has built-in DC reactor as standard for power ≥90kW.
+1		
R	Inverter POWER input terminals	Connect three phase AC power supply
S		
T		
U	Inverter output terminals for MOTOR	Connect three phase AC motor
V		
W		
⏚	Grounding	Grounding terminal, the grounding resistance should <10 ohms.

4.1.2 Main circuit wiring precautions

1) Input power L1, L2, L3 or R, S, T:

- The wiring on the input side of the frequency inverter has no phase sequence requirements.
- The specifications and installation methods of external power wiring must comply with local regulations and related IEC standards.

2) DC bus terminals +1 and -:

- Please note that terminals +1 and – of DC bus have residual voltage after the inverter is switched off. Wait at least 10 minutes after the CHARGE indicator goes off before operating wiring, otherwise you may have a risk of electric shock.
- When using external brake component for inverter with power above 22kW, please pay attention to the polarity of terminal +1 and – that it can not be reversed, otherwise the frequency inverter will be damaged or even cause a fire.
- The wiring length of the brake unit should not exceed 10m. Twisted pair wire or tight two-wire parallel wiring should be used.
- Do not connect the braking resistor directly to the DC bus terminals. Otherwise it may cause the inverter damage or even a fire.

3) Braking resistor connection terminals +1, PB:

- For inverters with power 22KW or less, the braking resistor connection terminals is valid as the inverter with built-in braking unit.
- Please refer to the recommended value for braking resistor selection and the wiring distance should be less than 5m. Otherwise, it may damage the inverter.

4) External reactor connection terminals +2, +1:

- Please remove the shorting link between the +2 and +1 terminals when need to install external DC reactor and the reactor is connected between the two terminals.

5) Frequency inverter output terminals U, V, W:

- The specifications and installation methods of external power wiring must comply with local regulations and related IEC standards.
- The capacitors or surge absorbers can not be connected to the output side of the inverter. Otherwise it will cause frequency inverter protection or even damage.
- When the motor cable is too long, electrical resonance is easily generated due to the influence of distributed capacitance, causing motor insulation damage or large leakage current occurs, which will cause frequency inverter over-current protection. When the motor cable length is greater than 100m, an AC output reactor must be installed near the inverter.

6) Grounding terminal PE:

- The terminal must be reliably grounded. The resistance of the grounding wire must be less than 0.1Ω. Otherwise, the inverter may work abnormally or even be damaged.
- Do not connect the grounding terminal PE to the neutral N terminal of the power supply.
- The impedance of the PE conductor must be able to withstand the large short-circuit current that may occur when a fault occurs.
- Please select the size of the PE conductor according to the following table.

Cross-sectional area of a phase line (S)	Minimum cross-sectional area of protective conductors (Sp)
$S \leq 16mm^2$	S
$16mm^2 < S \leq 35mm^2$	$16mm^2$
$35mm^2 < S$	S/2

- Yellow-green cable must be used as PE conductor.

7) Requirements for the pre-protection device:

- Appropriate protection devices should be installed on the input distribution line to protect the device from over-current, short circuit and isolation protection.
- Factors such as power cable current capacity, system overload capability requirements and short-circuit capability of the pre-stage power distribution of the equipment should be considered when selecting protection

4.1.3 Installation size and wire selection of power terminals

Table 4-2 Recommended cable diameter

Inverter model	Power (kW)	Rated current (A)	Recommended cable for main circuit input and output /mm^2	Torque N•m
SV800A-0R752GB	0.75	4.04	0.75	0.87
SV800A-1R52GB	1.5	7.3	1.5	0.87
SV800A-2R22GB	2.2	9.6	1.5	0.87
SV800A-0R754G/1R54PB	0.75/1.5	2.5/4.04	0.75	0.87
SV800A-1R54G/2R24PB	1.5/2.2	4.04/5.5	0.75	0.87
SV800A-2R24G/4R04PB	2.2/4.0	5.5/10	1.5	0.87
SV800-2R24GB	2.2	5.5	0.75	0.87
SV800-4R04G/5R54PB	4.0/5.5	10/13	2.5	1.2
SV800-5R54G/7R54PB	5.5/7.5	13/17	4	1.2
SV800-7R54G/114PB	7.5/11	17/24	4	2.5
SV800-114G/154PB	11/15	24/32.5	6	2.5
SV800-154G/18R54PB	15/18.5	32.5/38	6	2.5
SV800-18R54G/224PB	18.5/22	38/46	10	4.0
SV800-224G/304PB	22/30	46/62.5	10	4.0
SV800-304G/374P	30/37	62.5/75.5	16	4.0
SV800-374G/454P	37/45	75.5/92.5	25	10.5
SV800-454G/554P	45/55	92.5/111	35	10.5
SV800-554G/754P	55/75	111/146	50	10.5
SV800-754G/904P	75/90	146/169	70	10.5
SV800-904G/1104P	90/110	169/210	95	20
SV800-1104G/1324P	110/132	210/246	120	20
SV800-1324G/1604P	132/160	246/300	120	20
SV800-1604G/1854P	160/185	300/350	150	20
SV800-1854G/2004P	185/200	350/370	185	85
SV800-2004G/2204P	200/220	370/415	185	85
SV800-2204G/2504P	220/250	415/460	240	85
SV800-2504G/2804P	250/280	460/510	120×2	85
SV800-2804G/3154P	280/315	510/600	120×2	85

Inverter model	Power (kW)	Rated current (A)	Recommended cable for main circuit input and output /mm^2	Torque N●m
SV800-3154G/3554P	315/355	600/660	150×2	85
SV800-3554G/4004P	355/400	660/740	185×2	85
SV800-4004G/4504P	400/450	740/820	240×2	85
SV800-4504G/5004P	450/500	820/920	270×2	200
SV800-5004G/5604P	500/560	920/990	270×2	200
SV800-5604G/6304P	560/630	990/1160	300×2	200

4.2 Description of control terminals

Control circuit terminal layout is shown in **Fig.4-9**:

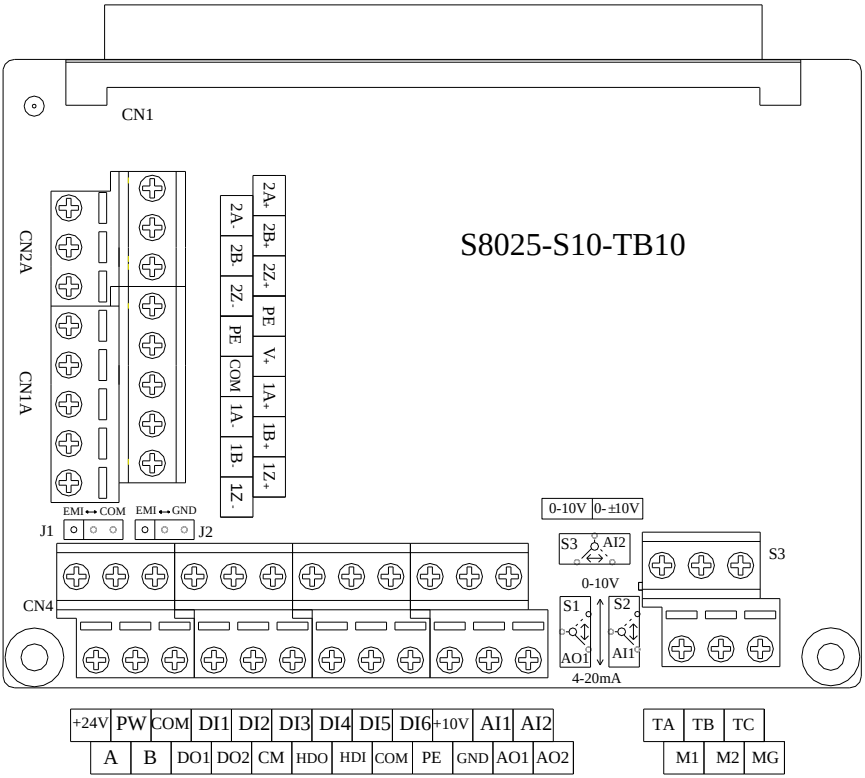


Fig. 4-9 TB board terminal layout

Table 4-3 Description of SV800 inverter control terminals

Type	Terminal symbol	Terminal name	Functional definition of the terminal
Power supply	+10V-GND	External +10V power supply	10V auxiliary power output, Maximum output is 50mA.
	+24V-COM	External +24V power supply	1. Provide +24V power supply to external device, the maximum output is 200mA 2. When driving DI1-DI6 with external signal, external +24V power supply can be connected.

Type	Terminal symbol	Terminal name	Functional definition of the terminal
	PW	External power terminal	Connect to +24V by factory default. When DI1-DI6 need to be driven by external signal, PW needs to be connected to external power supply. It also should be disconnected from the +24V.
Analog input	AI1-GND	Analog input 1	1. Input range: DC 0-10V/0-20mA, decided by toggle switch S2 on TB board: 0-10V or 0-20mA can be selected by the position of S2. 2. Input impedance: 20KΩ at voltage input and 250Ω at current input
Analog input	AI2-GND	Analog input 2	1. Input range: DC 0V-10V / -10V~+10V, decided by toggle switch S3 on TB board. 0-10V or -10V~+10V can be selected by S3 position. 2. Input impedance: 20KΩ for 0-10V or -10V~+10V input.
Digital input	DI1-PW	Digital input 1	Photoelectric converter is internal and functions of each DI can be programmed by parameters. Input conditions: maximum DC30V/8mA. Please refer to note 1.
	DI2-PW	Digital input 2	
	DI3-PW	Digital input 3	
	DI4-PW	Digital input 4	
	DI5-PW	Digital input 5	
	DI6-PW	Digital input 6	
	HDI-PW	High speed pulse input	Besides functions of DI1 ~ DI6, it can also be used for high-speed pulse input. Maximum input frequency: 100kHz
Analog output	AO1-GND	Analog output 1	Voltage or current output is decided by toggle switch S1 on the TB board. Output voltage range: 0~10V DC Output current range: 0 ~ 20mA
	AO2-GND	Analog output 2	Output voltage range: 0~10V DC
Digital output	DO1-CM	Digital output 1	Optical isolation, single polarity open-collector output Output voltage range: 0V-10V Output current range: 0-50mA Refer to note 2.
	DO2-CM	Digital output 2	

Type	Terminal symbol	Terminal name	Functional definition of the terminal
	HDO-COM	High speed pulse output	High-speed pulse output frequency range: 0~100KHz
Relay output	M1-MG	NO terminal (Normal open)	Functions can be programmed by parameters. Maximum contact capacity: 3A/240VAC 5A/30VDC
	M2-MG	NO terminal (Normal open)	
	TB-TC	NC terminal (Normal close)	
	TA-TC	NO terminal (Normal open)	
Commu-nication terminal	A-B	Communication terminal A-B	RS485 Communication port
	CN3	Keyboard interface	Connect to external keyboard (on the control board)
PG encoder terminal	V+~GND1	Encoder power supply	+ 24V, +12V, +5V optional output. + 24V sets by factory default..
	1A+~1A-	Encoder 1 output A signal	PG Closed Loop Encoder Interface (Non-standard)
	1B+~1B-	Encoder 1 output B signal	
	1Z+~1Z-	Encoder 1 outputs Z signal	
PG encoder terminal	2A+~2A-	Encoder 2 output A signal	Position Closed Loop Encoder Interface (Non-standard)
	2B+~2B-	Encoder 2 output B signal	
	2Z+~2Z-	Encoder 2 outputs Z signal	
	PE	Shield terminal	Encoder shield grounding

Note:

1.The default setting of the digital input port is common collector input. If you need to use common emitter input, please "PW" and "COM" together with shorting link.

2. The ground of digital output CM is internal isolated from the ground of digital input COM. When driving with external power supply, CM and COM terminals cannot be shorted externally. But when driving with internal + 24V, CM and COM should be short-connected in external.

The control circuit terminals mainly locate on the TB board which is connected to the control board through CN1. The control board as shown in Fig. 4-10:

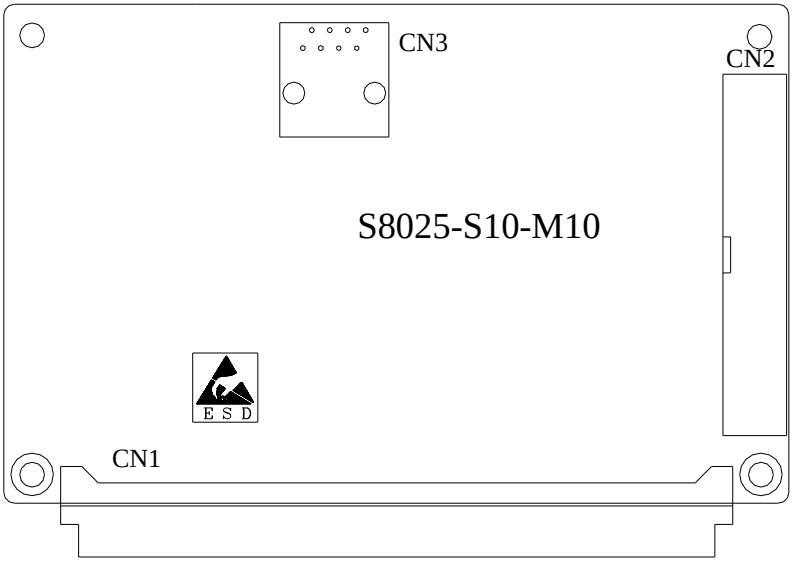
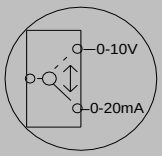
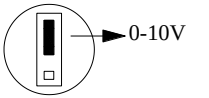
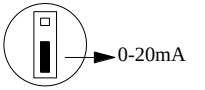
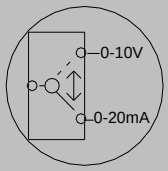
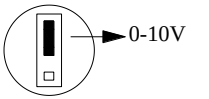
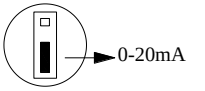
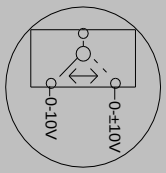
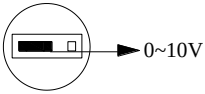
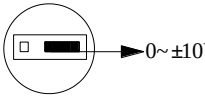
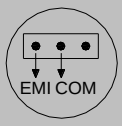
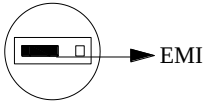
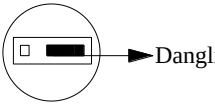
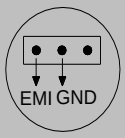
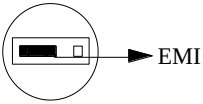
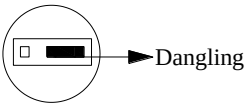


Fig. 4-10 control board terminals layout

4.2.1 Function descriptions of the switching terminals connection

Table 4-4 function descriptions of switching terminal connection

Switching terminals	Select position	Graphic symbol	Function descriptions
 （S1）	0-10V		(AO1) 0~10V voltage output
	0-20mA		(AO1) 0~20mA current output
 （S2）	0-10V		(AI1) 0~10V voltage input
	0-20mA		(AI1) 0~20mA current input
 （S3）	0-10V		(AI2) 0~10V voltage input
	0-±10V		(AI2) -10V ~ 10V voltage input
 （J1）	COM		COM network connects with PE and grounding well
	Dangling		COM network disconnected from PE

Switching terminals	Select position	Graphic symbol	Function descriptions
 （J2）	GND		GND connect with PE and grounding well
	Dangling		GND network disconnected from PE

4.2.2 Wiring method of frequency inverter electric control circuit

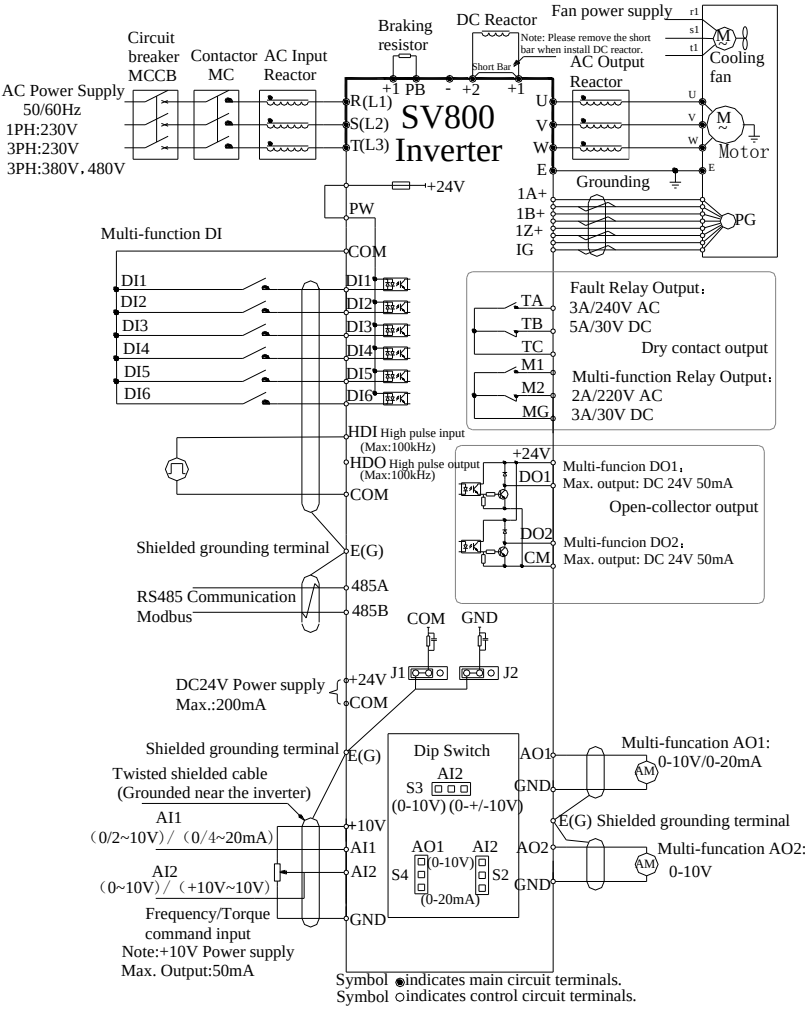


Fig. 4-11 Wiring method of frequency inverter control circuit

Note:

1) The multi-function input terminal (DI1-DI6) can choose NPN or PNP transistor signal as input. The internal power supply (+ 24V terminal) of frequency inverter or external power supply (24V) can be chose as bias voltage.

2) The analog monitor output can be used for the input signal of the ammeter, voltmeter, etc. It can't be used as feedback of control operation.

4.2.3 Wiring description of control signal terminals

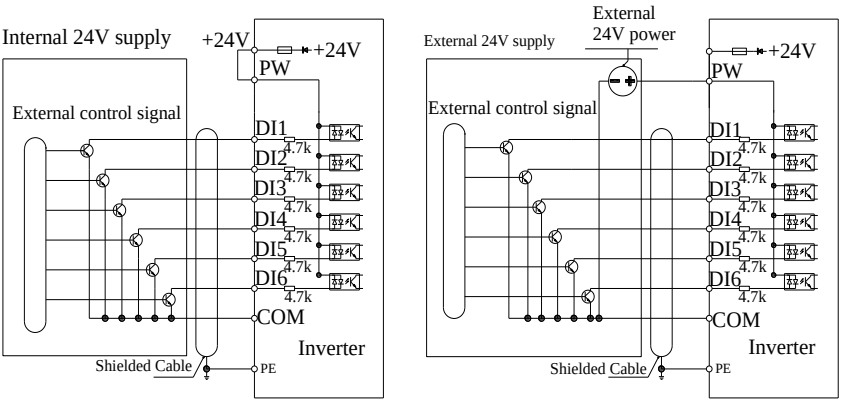


Fig.4-12 Digital input signal connection method of NPN characteristic transistor

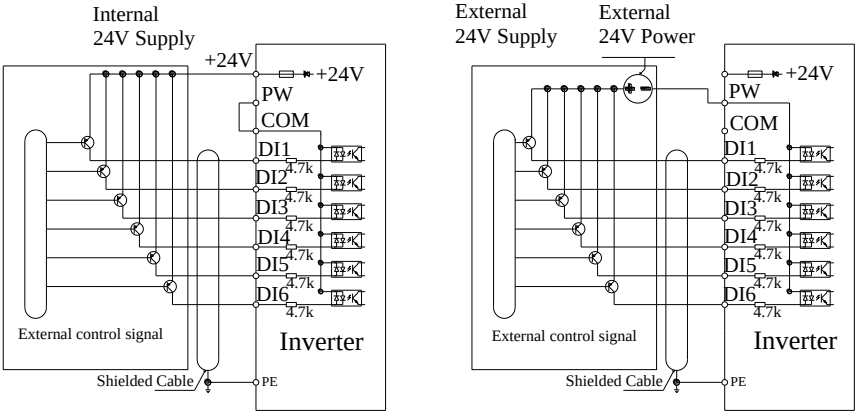


Fig.4-13 Digital input signal connection method of PNP characteristic transistor

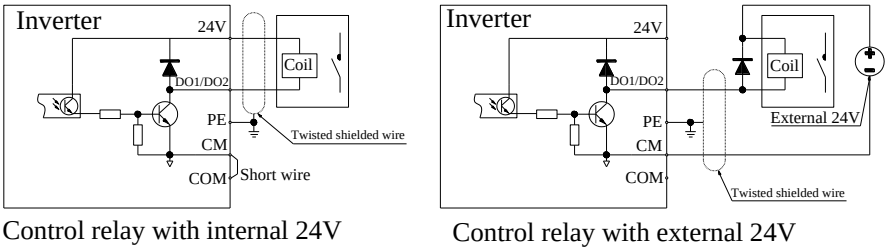


Fig. 4-14 Connection method of the digital output signals

Note: The default setting is 24V open-collector input and no need external 24. HDI supports open-collector signals which larger than 18V (default). For pulse signals need to larger than 9V input and the maximum pulse that HDI can receive is 100KHz.

4.3 EMC

4.3.1 Definitions of related terms

◆ EMC:

EMC (Electromagnetic Compatibility) is the ability of electrical and electronic equipment to work properly in an electromagnetic interference environment, also the ability not to release electromagnetic interference to other devices or systems and make influence on the stabilize working of other equipment.

Therefore, EMC includes two aspects:

Aspect 1: The electromagnetic interference caused by the device during normal operation cannot exceed certain limits;

Aspect 2: The device must have sufficient immunity to the electromagnetic interference in the environment, i.e. electromagnetic sensitivity.

- First class environment:

The first environment includes civilian facilities. It also includes low-voltage power grids facilities that are not directly connected through intermediate transformers and provide power to civil buildings.

- Second class environment:

The second environment includes all facilities other than those low-voltage supply networks that directly connected to civil buildings.

- C1 level Equipment:

The rated voltage of the electric drive system is less than 1000 V and used in the first environment.

- C2 level Equipment:

The rated voltage of the electric drive system is less than 1000 V and cannot be plug-in or movable equipment. It can only be installed and commissioned by a professional when used in the first environment.

- C3 level Equipment:

The rated voltage of the electric drive system is less than 1000 V and is suitable for the second environment and not for the first environment.

- C4 level Equipment:

The rated voltage of the electric drive system is equal to or above 1000 V or the rated current is equal to or above 400A, or use in a complex system of the second environment.

4.3.2 Introduction of EMC standards

◆ **EMC Standards**

The SV800 series frequency inverter meets the standard EN 61800-3:2004 C2 level requirements, and applicable to the first class environment and the second class environment.

◆ **EMC Requirements of Installation Environment**

The manufacturer of the system which installed with the inverter is responsible for the system's compliance with the requirements of the European EMC Directive. According to the system's application environment, please ensure that the system meets the requirements of standards EN61800-3: 2004 Class C2, C3 or C4.

The system (machinery or device) installed with the inverter must also be CE marked. The responsibility for the final assembly of the system is borne by the customer. Please confirm whether the system (machinery or device) complies with the European directives and meets the requirements of standard EN 61800-3: 2004 C2.

Note: In the first class environment, the frequency inverter may cause radio interference. Besides the CE compliance requirements mentioned in this chapter, users must take measures to prevent interference if necessary.

4.3.4 Installation of EMC input filter on Power supply input

EMC filter installed between the frequency inverter and the power supply can not only restrict the interference of electromagnetic noise in the surrounding environment on the inverter, but also prevents the interference from the inverter on the surrounding equipment.

The SV800 series inverter satisfies the requirements of category C2 only with an EMC filter installed on the power input side.

The installation precautions are as follows:

- When using the filter, please use it strictly according to the rated value. Since the filter is a Class I electrical appliance, the metal case ground of the filter should have a large area in good contact with the metal ground of the installation cabinet, and it must have good electrical continuity, otherwise there will be danger of electric shock and serious affects on the EMC effect.
- The filter ground must be connected to the common ground with the ground of the frequency inverter PE, otherwise the EMC effect will be seriously affected.
- The filter should be installed as close as possible to the power input of the frequency inverter.

4.3.5 Installation of AC input reactor on power supply input

AC input reactor is mainly used to reduce the harmonics in the input current. As optional device. when the application environment has high requirements about harmonic, an external reactor can be installed.

4.3.6 Installation of AC output reactor on frequency inverter output

Whether to install AC output reactor on the output side of the frequency inverter depends on the actual situation. The transmission line between the frequency inverter and the motor should not

be too long. Distributed capacitance is large when the cable is too long and it will generate high-harmonic current easily.

When the cable length is equal to or greater than or the value in the table below, AC output reactor installed near the output of the frequency inverter is needed:

Table 4-5 Output cable length when AC output reactor needed

Frequency inverter power (kW)	Rated voltage (V)	Cable length (m)
4	200 ～ 500	50
5.5	200 ～ 500	70
7.5	200 ～ 500	100
11	200 ～ 500	110
15	200 ～ 500	125
18.5	200 ～ 500	135
22	200 ～ 500	150
≧ 30	200 ～ 500	150

4.3.7 Installation of external DC reactor

The SV800 series frequency inverter (Power ≤ 75KW) uses a separate wooden case package when the external DC reactor is shipped. When the user installing it, the short-circuit copper bar between the terminal + 2 and + 1 of the frequency inverter main circuit should be removed firstly. Please install the DC reactor between + 2 and + 1, and the terminals have no polarity. After the DC reactor installed well, the short-circuit copper bar between + 2 and + 1 no needed.

Note: special requirements can be customized non-standard.

4.3.8 Shielded cable

◆ **Requirements for shielded cables**

In order to meet the EMC requirements of CE marking, shielded cables must be used. There are three phase conductor shielded cables and four phase conductor shielded cables. If the conductive properties of the shield cannot satisfy the requirements, a separate PE wire is needed. One wire of the four phase conductors shielded cable can be used as PE wire as shown in **Fig.4-15**:

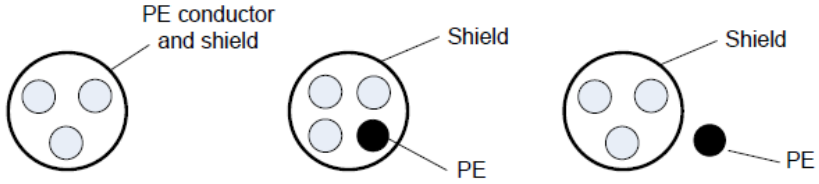


Fig. 4-15 Schematic diagram of the shielded cable

In order to effectively suppress the emission and conduction of radio frequency interference, the shielding layer of the shielded wire is composed of a coaxial copper braid. To enhance the shielding efficiency and electrical conductivity, the shielding layer should has a braided density greater than 90%. As shown in **Fig. 4-16**:

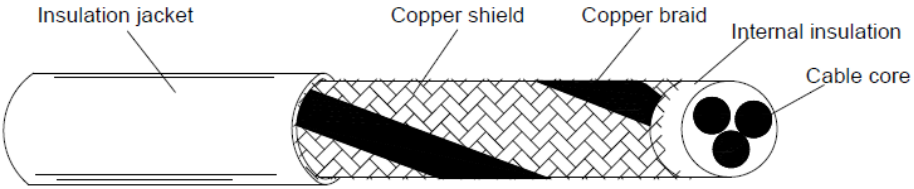


Fig. 4-16 Schematic diagram of shielded cable

1) Shielded symmetrical cables are recommended and four-core shielded cables can also be used as input cables.

2) The motor cable and PE shielded conductor (twisted shield) should be as short as possible to reduce electromagnetic radiation and external stray current and capacitive current of the cable. For motor cable lengths exceeding 100m, output filter or reactor is required.

3) All control cables are recommended to use shielded cables.

4) The output power line of frequency inverter is recommended to use shielded cable and the shielding layer should be grounded reliably. For the lead wire of the interfered device, it is recommended to use the twisted-pair shielded control line and ground the shield reliably.

◆ **Cable wiring requirements**

1) The motor cables must be laid far away from other cables. Several frequency inverter motor cables can be laid side by side.

2) The motor cables, the input power cables and the control cables are recommended be distributed in different ducts. To avoid electromagnetic interference caused by rapid variation of frequency inverter output voltage, the motor cables and other cables should be separated side by side for a long distance.

3) When the control cable must pass through the power cable, please ensure that the arranged angle between the two cables should be 90 degrees as much as possible. Don't pass other cables through the frequency inverter.

4) The power input and output lines of the inverter and weak current signal lines (e.g., control lines) should not be laid in parallel but as vertical as possible.

5) The cable ducts must be in good connection and well grounded. Aluminum ducts can be used to improve electric potential.

6) The filter, the frequency inverter, the motor should be well connected with the system (machinery or device) and the installed part is sprayed and protected, and the conductive metal is fully contacted.

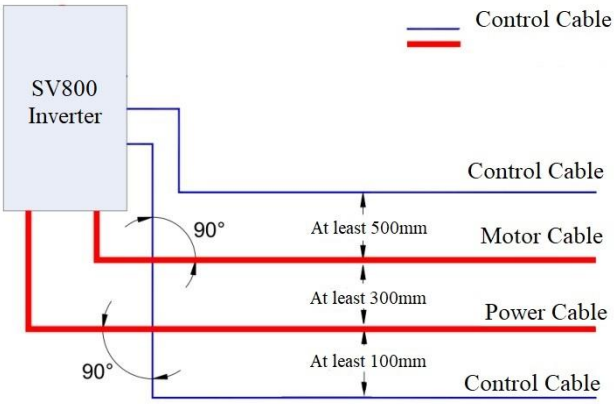


Fig. 4-17 Cable wiring

◆ **Requirements for leakage current**

1) Due to the output of the frequency inverter is high-speed pulse voltage, it will lead to high-frequency leakage current generates. In order to prevent electric shock and leakage fire, please install a leakage circuit breaker with the inverter.

2) The leakage current generated by each frequency inverter is about 100 mA, so the induced current of the selected leakage circuit breaker should be to larger than 100 mA.

3) High-frequency pulse interference may cause malfunction of the leakage circuit breaker after interference. Therefore, leakage circuit breaker with high frequency filtering should be selected. If several inverters need to be installed, each inverter should be provided with a leakage circuit breaker.

The factors that will affect the leakage current as follows:

- Frequency inverter capacity
- Carrier frequency
- The type and length of motor cable
- EMI filter

When the leakage current generated by the frequency inverter causes the leakage breaker to action, the following steps should to be done:

- Increasing the sensitivity current value of the leakage breaker
- Replace another leakage circuit breaker which has high-frequency inhibition effect.
- Decrease carrier frequency
- Shortening the length of the output cable
- Add leakage suppression devices

◆ **Advices and solutions to Common EMC Interference Problem**

The frequency inverter product belongs to strong interference device. Interference problem may still occurs due to improper wiring or grounding during using. When the inverter interferes with other devices, the following solutions can be adopted.

Table 4-6 Common EMC interference problems and solutions

Interference Type	Solutions
Leakage protection switch trip	● Connect the motor housing to the PE terminal of the inverter. ● Connect the PE terminal of the inverter to the PE of the power grid. ● Add safety capacitor box to the power input cable. ● Add magnetic rings to the inverter input cable.
Inverter causes interference during operation	● Connect the motor housing to the PE terminal of the inverter. ● Connect the PE terminal of the inverter to the PE of the power grid. ● Add safety capacitors box to the power input cables and wind the cables with magnetic rings. ● Add a safety capacitor to the interfered signal port or wind the signal cable with magnetic rings. ● Common ground connection between equipments;
Communication interference	● Connect the motor housing to the PE terminal of the inverter. ● Connect the PE terminal of the inverter to the PE of the power grid. ● Add safety capacitors box to the power input cables and wind the cables with magnetic rings. ● Add terminal resistor to the communication cable source and the load end.. ● Add communication common grounding line in the out side of communication cable; ● Use shielded cable as communication line and connect the shield of the cable to the common grounding point.
I/O interference	● Enlarge capacitive filter at the low-speed DI and the recommended maximum value is 0.1uF. ● Enlarge capacitive filter at the AI and the recommended maximum value is 0.22uF.

5 Introduction of operation and running

5.1 Confirmation before running

Before operation, the whole drive system needs to be checked, which mainly include the inspection of the wiring of the frequency inverter and the motor and the inspection of the inverter settings and debugging.

5.1.1 Wiring check of the frequency inverter

The inverter inspection mainly includes inverter and peripheral equipment, installation site and method, power supply voltage and output voltage, wiring of main circuit and control circuit etc.

☑	No.	Contents	Remarks
Inverter, peripheral accessories, optional cards			
☐	1	Whether the inverter model consistent with the ordered product?	
☐	2	Whether the selection and wiring of peripheral equipment (input filter, DC reactor, braking resistors) are correct?	
☐	3	Whether the optional cards model as same as the ordered product?	
Installation site and installation method			
☐	4	Is the inverter installation site correct?	
☐	5	Is the inverter installed mode correctly?	
Input Voltage and Output Voltage			
☐	6	Whether the power supply voltage within the input voltage specification of the inverter?	
☐	7	Whether the rated voltage of the motor consistent with the output specification of the inverter?	
☐	8	Whether the motor nameplate data in accordance with the inverter and application conditions?	
Main circuit wiring			
☐	9	Whether the power supply input connect to a breaker (MCCB)? Is the rated value correct?	
☐	10	Whether the power supply correctly connected to the frequency inverter input terminal (R, S, T)?	
☐	11	Whether connect the motor to the inverter output terminal (U, V, W) according to the phase sequence well?	
☐	12	Does the power supply and the motor cables	

☑	No.	Contents	Remarks
		comply with electrical specifications or related regulations?	
☐	13	Whether the setting method of the ground wire correct?	
☐	14	Whether the screws of the inverter main circuit terminals and the ground terminal are fastened firmly?	
☐	15	Whether overload protection of each motor is considered when multiple motors are driven by one frequency inverter?	
☐	16	When one frequency inverter drives several motors, whether the motor cables and the feedback signal can be switched in unison by contactor?	
☐	17	When using braking resistor and braking unit, whether an electromagnetic contactor is arranged on the power supply side of the inverter? Whether the resistance overload protection can cut off the power supply of the frequency inverter?	
☐	18	Whether the output side is connected with phase-feeding capacitor, whether the input side is connected with noise filter and leakage circuit breaker?	
Control circuit wiring			
☐	19	Whether used twisted shield wire for the wiring of the inverter control circuit?	
☐	20	Whether the shield of the shielded wire connects to the ground terminal well?	
☐	21	Whether the wiring of the optional accessories correct?	
☐	22	Is there any mistake about wiring?	
☐	23	Confirming whether the screw of the frequency inverter control circuit terminals fastened or not?	
☐	24	Are there any wire scraps, screws, etc. at the terminals?	
☐	25	Whether the cables of the terminal part in contact with the adjacent terminal?	
☐	26	Whether the wiring of the control circuit are separated in the casing or the control cabinet?	
☐	27	Whether the length of wiring less than 100 m?	

5.1.2 The setting and debugging check of the frequency inverter

The set of parameters is mainly used to check the setting and debugging of the inverter before running. Then run the inverter after checking correctly. If any omissions, please follow the instructions to complete the preparation.

☑	No.	Contents	Remarks
Basic check			
☐	1	Did you read the manual carefully during debugging or commissioning?	
☐	2	Whether confirm the information in the wiring checking table (5.1.1 Wiring check of the frequency inverter)?	
☐	3	Whether the frequency converter is power on?	
Nameplate check			
☐	4	Whether any conflict between the frequency inverter nameplate and the controlled motor nameplate?	
☐	5	Whether the parameters of the motor nameplate conflict with the input range of the motor parameter group?	
Motor parameters self-learning check			
☐	6	Whether the controlled motor has design manual? If so, please input electrical parameters according to the manual and perform static self-learning?	
☐	7	Whether the motor is separated from the load before self-learning?	
☐	8	Whether the setting of the motor nameplate parameters are correct? Are the self-learning preparations finished?	
☐	9	Whether select the control of the second motor control? Whether perform self-learning for the second motor according to the requirement?	
☐	10	After the motor self-learning finished, please check whether the motor parameters abnormal or not and whether any failure occurred about self-learning?	
Speed sensorless vector control mode check			
☐	11	Whether the running direction and speed interval of the motor correct?	

☑	No.	Contents	Remarks
☐	12	Whether the motor self-learning completed?	
☐	13	Whether the settings of the protection parameters correct?	
☐	14	Does the carrier frequency of the inverter need to be modify? Whether the motor need to run at a state with low speed and large torque?	
☑	No.	Contents	Remarks
Close-loop vector control mode check			
☐	15	Whether the settings of the speed sensor parameters correct?	
☐	16	Whether running direction of the motor match to the sequence of the speed sensor signal wiring?	
☐	17	Whether the running direction and speed interval of the motor correct?	
☐	18	Whether the motor self-learning completed?	
☐	19	Whether the setting of the protection parameters correct?	
☐	20	Does the carrier frequency of the inverter need to be modify? Whether the motor need to run at a state with low speed and large torque?	
V/F control mode check			
☐	21	Whether the parameters setting of motor nameplate correct?	
☐	22	Whether the cable length between the motor and the frequency inverter more than 50M? Is it necessary to perform self-learning?	
☐	23	Does the carrier frequency of the inverter need to be modify? Whether it needs large torque when start up the motor?	

5.2 Instructions of the keyboard using

The contents of this section mainly describe the operation of the keyboard. It can control the inverter START/STOP, display various data, check the value of monitoring parameters display, set and modify function code parameters, clear fault information and so on.

5.2.1 Function and name of each part

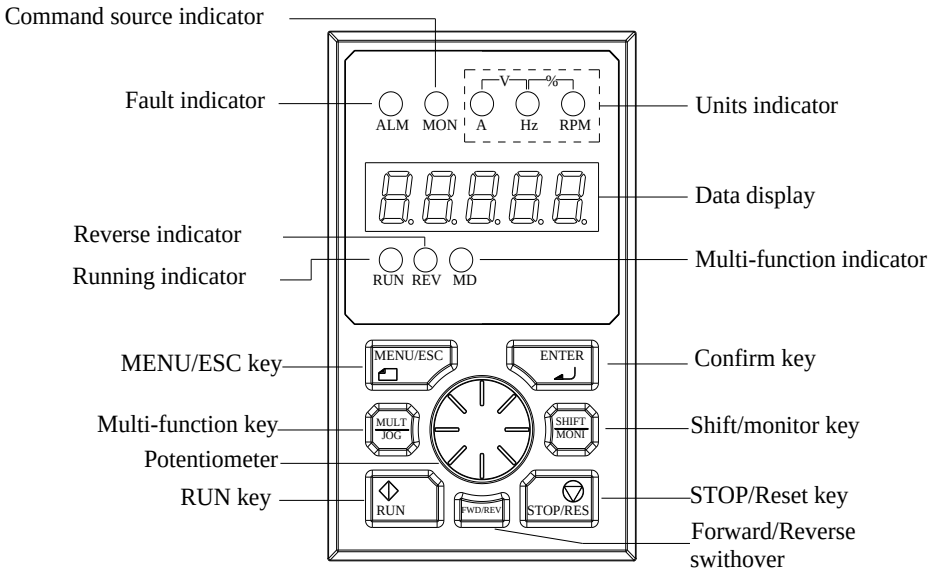


Fig.5-1 Keys of the keyboard

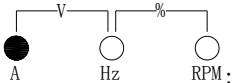
Keys	Name	Function Description
MENU	Menu	Enter or exit Level 1 menu
ENTER	Enter	Enter the menu level by level and confirm the parameter value
MULT	Multi-funct ion button	Depends on the selection of A0-11 and choose different functions
SHIFT	Shift key	In level 0 menu, it used to display parameters by cycle; During modifying parameters, it used to shift the bits to be modified.
RUN	Run key	In keyboard operation mode, it used to run the inverter

FWD/REV	FWD/REV switchover	Used to switch forward and reverse in keyboard control mode
STOP/RST	Stop/Reset button	Used in the keyboard operation mode for stop the inverter; When in fault display state, it used for fault reset
Shuttle key	Anticlockwise Rotation (decrease)	Decrease in data or function code
	Clockwise Rotation (increase)	Increase data or function code

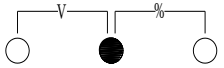
Characters meaning	Displayed characters	Characters meaning	Displayed characters	Characters meaning	Displayed characters	Characters meaning	Displayed characters
0	0	8	8	G	G	q	Q
1	1	9	9	H	H	r	r
2	2	A	A	i	i	S	5
3	3	b	b	J	J	t	t
4	4	C	C	L	L	U	U
5	5	d	d	n	n	v	v
6	6	E	E	o	o	y	Y
7	7	F	F	P	P	-	-

5.2.2 Description of LED indicators

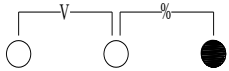
LED indicators include the unit indicator and status indicator.



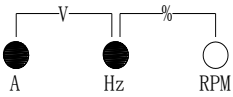
:A current unit



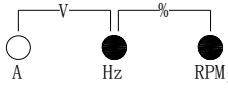
:Hz frequency unit



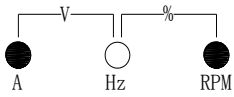
:RPM rotational speed unit



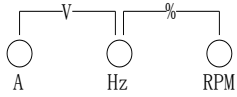
:V voltage unit



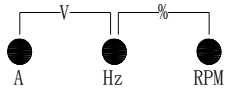
:% percentage unit



:kW power unit



:Dimensionless unit



:Time unit

ALM:Fault indicator

MON：:Keyboard operation command source indicator (Normal On)

MON： Terminal operation command source indicator (Normal Off)

MON: Communication operation command source indicator (Flashing)

RUN:Running indicator

RUN: Pre-excitation or DC braking indicator

MD : Multi-function indicator

REV: Reverse rotation command indicator

5.2.3 Level structure of the keyboard display functions

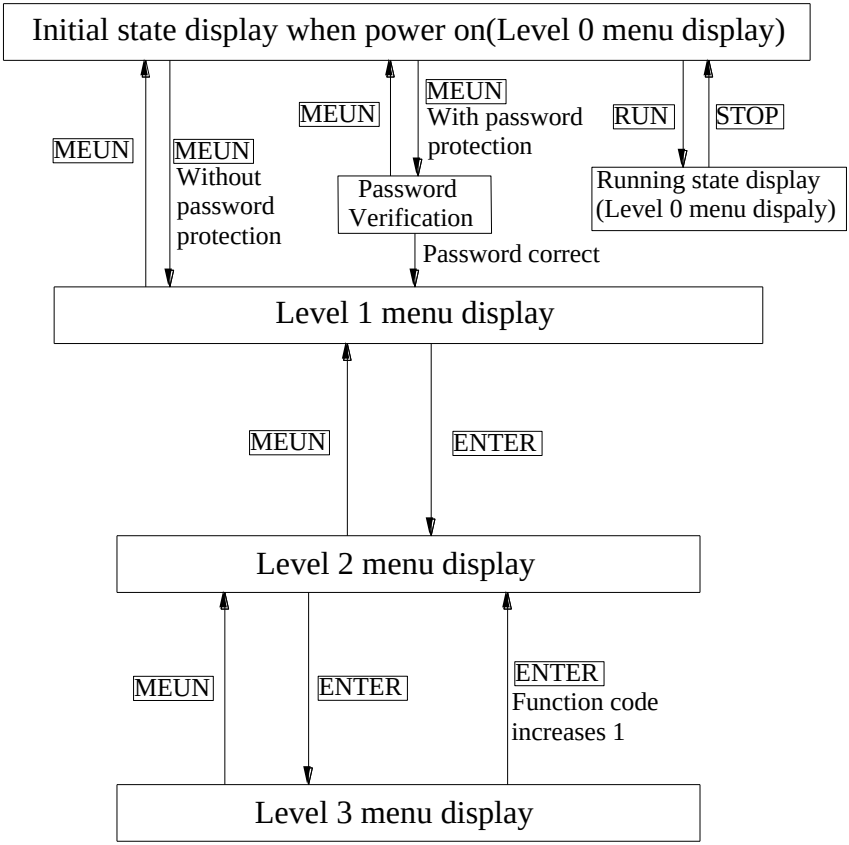


Fig.5-2 Menu structure

For example:

Level 0menu display: DC bus voltage in stop state or output frequency in operating state, etc.;

Level 1 menu display: A0, b0, etc.;

Level 2 menu display: A0-00, b0-01, etc.;

Level 3 menu display: A0-04 setting value 2, etc.;

5.2.4 Examples of the keyboard using

The introduction of the keyboard basic using:

Functional code parameter modification (modifying the set frequency from 0.40 Hz to 50.00 Hz):

1) Press the MENU key under the initial state (0-level menu) and it will display the current function group number A0;

2) Press SHIFT key and shift the flicker to the unit of A;

3) Rotate the knob clockwise and change A to E;

4) Press SHIFT key and shift the flicker to the unit of 0;

5) Rotate the knob clockwise and change 0 to 1;

6) Press ENTER key and it will display the current function code E1-00;

7) Press ENTER key to display the value of the current function code E1-00 0.40;

8) Press SHIFT three times and shift the flicker to the bit of the left first 0;

9) Rotate the knob clockwise and change 0 to 5;

10) Press ENTER key, it will save the modified parameter value and display the next function code E1-01 (If press MENU key, the modified parameter value would be gave up and it will display the function code E1-00);

11) Press MENU key, it will display E1 function code group number;

12) Press MENU key again, it will back to the 0-level menu;

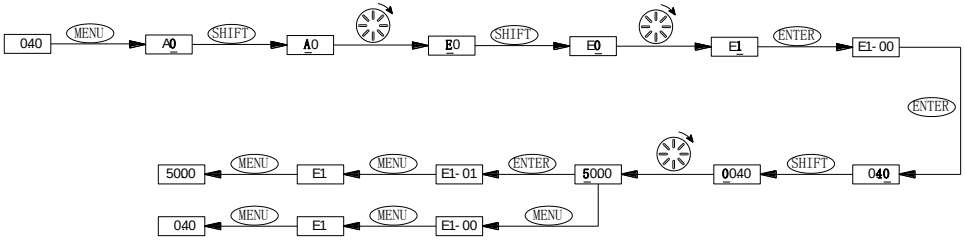


Fig. 5-3 Parameter setting procedure

The settings of user password:

1) Press MENU key under the initial state (0-level menu), it will display the current function group number A0;

2) Press ENTER key to display the current function code A0-00;

3) Rotate the knob clockwise to increase A0-00 to A0-01;

4) Press ENTER key to display----

5) Rotate the knob clockwise for 6 times to make the display become---6;

6) Press the ENTER key, it will save the modified parameter value and display the next function code A0-02;

7) Rotate the knob anticlockwise to reduce A0-02 to A0-01;

8) Repeat the steps of 4 to 6;

9) When frequency converter is powered down or without operation of the keyboard for 3 minutes, the set password will become effective.

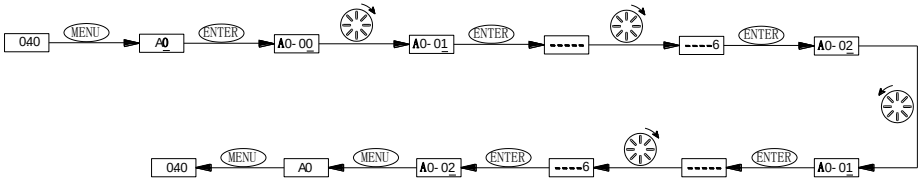


Fig. 5-4 Password setting

Parameter uploading:

1) Press the MENU key under the initial state (0-level menu) to display the current function group number A0;

2) Press the ENTER key to display the current function code A0-00;

3) Rotate the knob clockwise to increase A0-00 to A0-07;

4) Press ENTER key and it will display 0;

5) Turn the knob clockwise and change 0 to 1;

6) Press ENTER key, it will display "ULoAd" and start to upload characters;

7) After the uploading finished, the keyboard will display A0-08;

8) Press MENU key, it will display A0 function code group number;

9) Press MENU key again, it will back to the 0-level menu;

10)The uploading parameters finished;

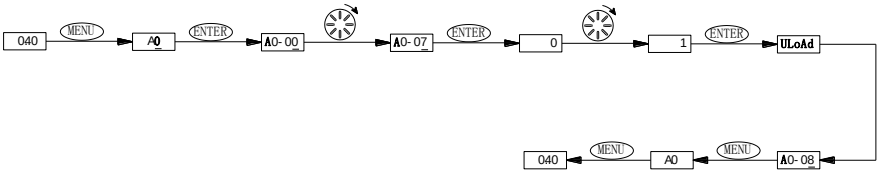


Fig. 5-5 Parameters upload procedure

Parameter download:

1) Press the MENU key under the initial state (0-level menu) to display the current function group number A0;

2) Press the ENTER key to display the current function code A0-00;

3) Rotate the knob clockwise to increase A0-00 to A0-07;

4) Press the ENTER key to display 0;

5) Rotate the knob clockwise for 2 or 3 times and make the display becomes 2 or 3 ("2" means motor parameters included and "3" means motor parameters not included);

6) Press ENTER key, it will display "dLoAd" and start to download characters;

7) After the downloading character finished, the keyboard displays A0-08;

8) Press MENU key, it will display A0 function code group number;

9) Press MENU key again, it will back to the 0-level menu;

10) The downloading parameter finished;

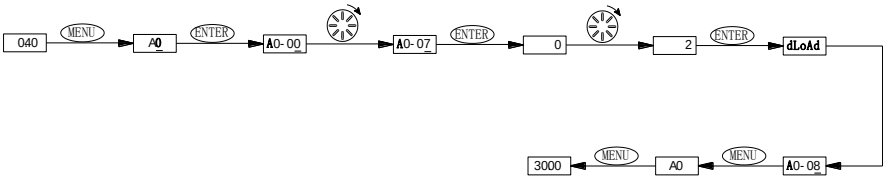


Fig. 5-6 Parameters download procedure

5.2.5 Operation of monitoring parameters

1) In the initial state (0 level menu), press the MENU button, it will display the current function group number A0;
2) Press SHIFT one times and shift the flasher to the bit of A;
3) Turn the knob clockwise and change A to U;
4) Press ENTER to display U0-00;
5) Press ENTER to display the value of the current function code U0-00, 0.40;
6) Press ENTER, it will display U0-01;
7) Press ENTER again, it will display the value of the current function code U0-01 0;
8) Press MENU button to display the U0-01 function code;
9) Press MENU button again, it will display the U0 function code group number;
10) Press the MENU button, it will back to the initial display state;

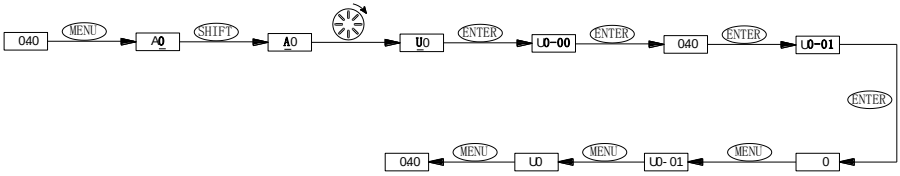


Fig.5-7 Monitoring Parameters viewing procedure

5.2.6 Connection mode of external keyboard

The keyboard can be directly connected to the inverter through crystal head and can also be externally connected to the inverter with a standard 8-line network wire.

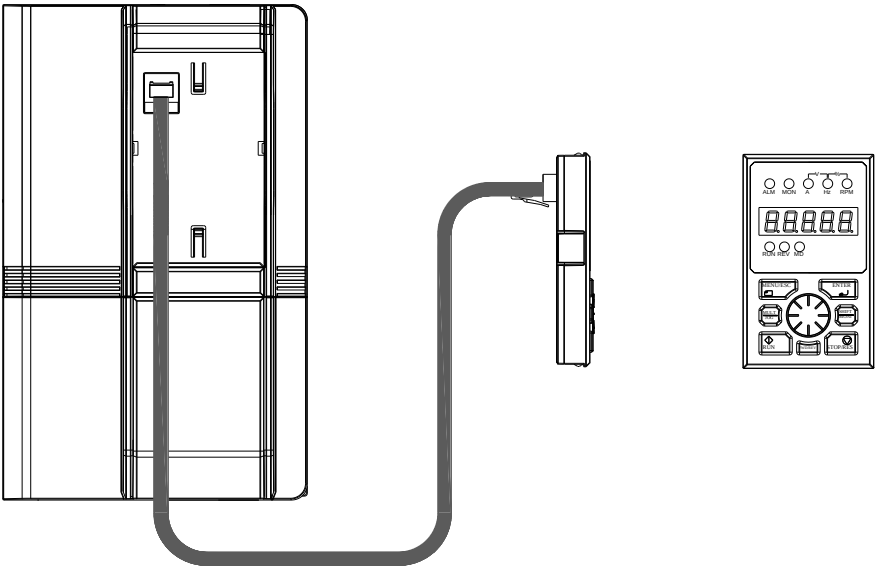


Fig. 5-8 Illustration of an external keyboard

5.3 Induction motors parameters self-learning

The mathematical model of the motor needs to be built when the induction motor is under vector control mode. The relevant parameters of the motor in the mathematical model can be automatically obtained by motor parameters self-learning .Thus it must perform motor parameters self-learning or input the motor parameters manually when vector control mode selected in the frequency inverter.

5.3.1 Induction motor parameters self-learning method and procedure

The self-learning of induction motor mainly includes full-mode self-learning and direct-current mode self-learning. Full-mode self-learning algorithm detects all electrical constants required for driving the motor. The direct-current mode self-learning algorithm just detects the primary side resistance of the motor and the frequency inverter nonlinear parameters, etc.

We tested all the frequency inverter well before send the frequency inverter to the customers. As the characteristic of the driven motor cannot be predicted after leaving the factory, the user needs to perform motor parameters self-learning after the frequency inverter is connected with the motor in the first time. The self-learning procedure as shown in Fig.5-9; When the motor types changes (including, but is not limited to power, voltage, current, rotational speed, frequency) during the use of the frequency inverter, the self-learning needs to be performed again as shown in Fig.5-9; If the carrier frequency changes during the controlling the debugging process, the static mode self-learning needs to be performed at least and the procedure as shown in **Fig.5-9.**

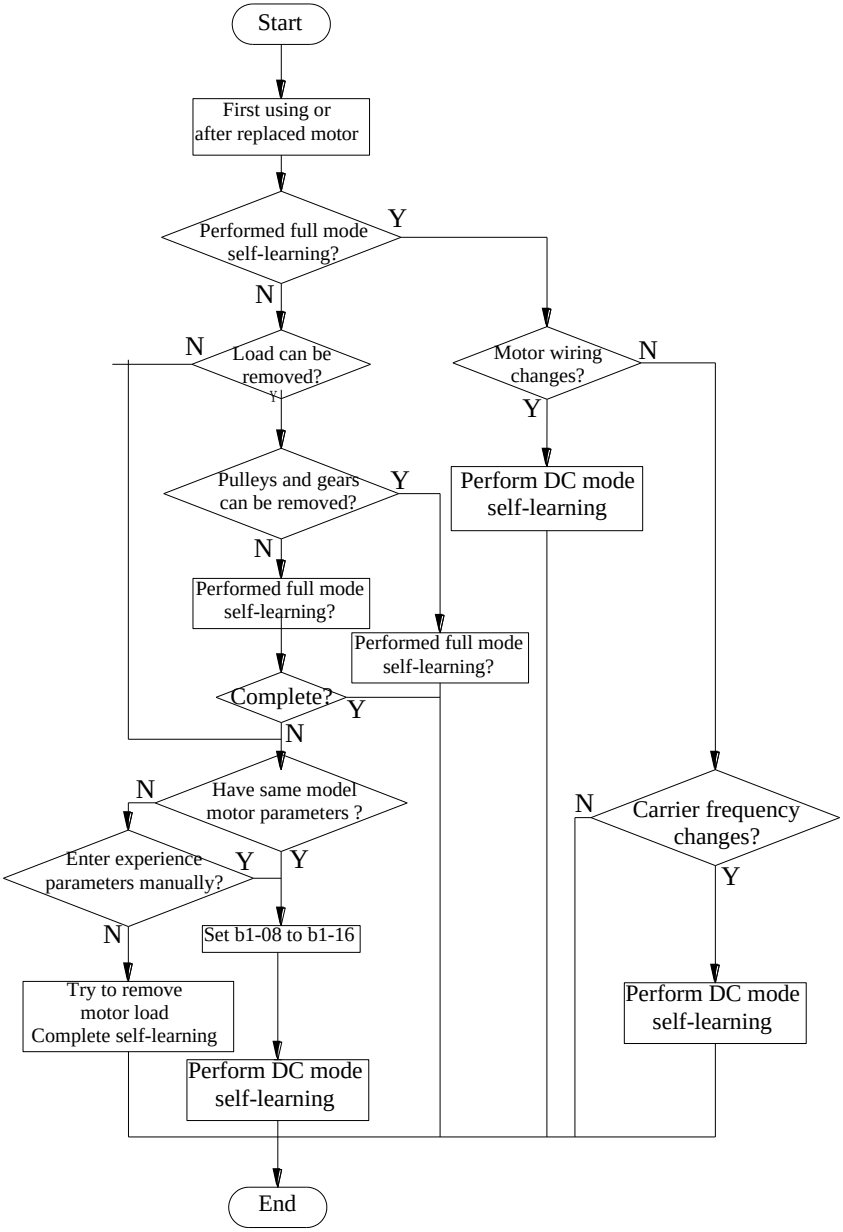


Fig.5-9 Flow chart 1 of self-learning

The nonlinear parameters of the inverter may change when the inverter or the main control board replaced, self-learning needs to be performed as shown in **Fig. 5-10**.

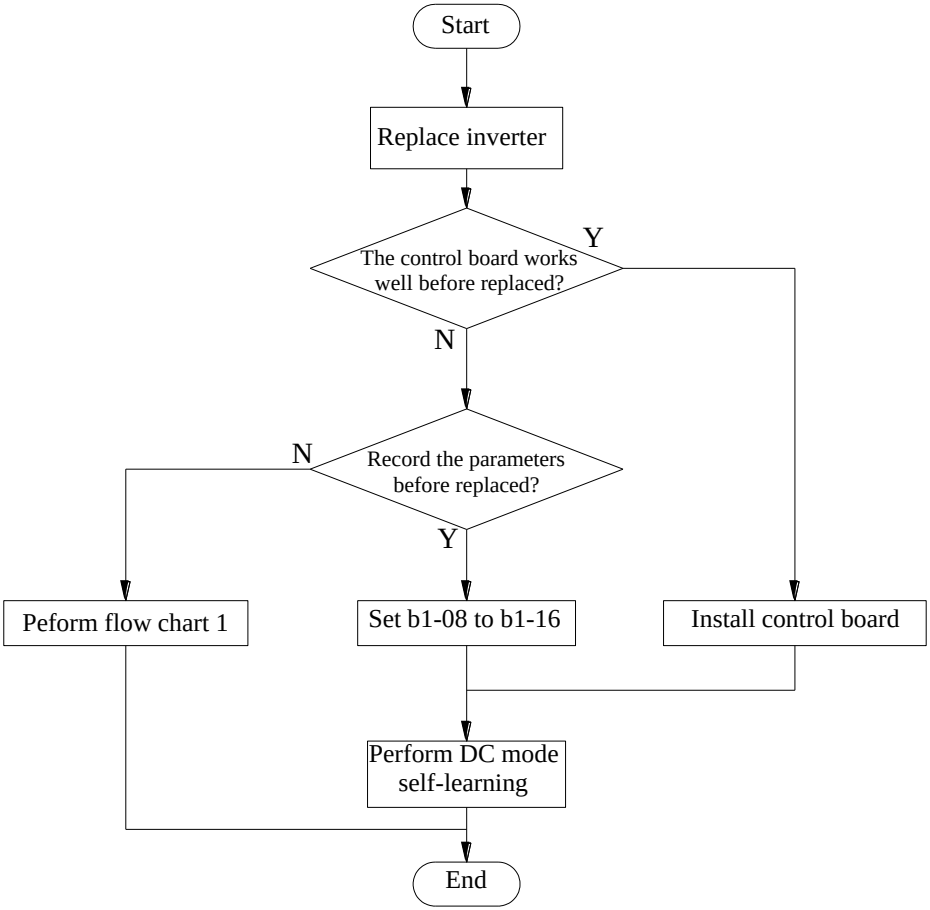


Fig. 5-10 Flow chart 2 of self-learning

Note: the self-learning flowchart 2 not include the situation of the frequency inverter types changed. Therefore, please replace the inverter or the main control board with same type, do not involve changes in the inverter type.

When perform parameters self-learning, the required implementation conditions, the detection parameters and the motor running state (4-pole variable frequency motor as example) are shown in **Table 5-1**:

Table 5-1 Summary Table for Self-Learning

	DC mode self-learning	Full mode self-learning
Self-learning implementation conditions	● Input the induction motor nameplate parameters correctly (b1-00 to b1-06, or b2-00 to b2-06) ● The pulse number of PG must be correctly input under close-loop vector control mode (b1-07 or b2-07) ● Motor and the transmission machinery not need to be separated	● Input the induction motor nameplate parameters correctly (b1-00 to b1-06, or b2-00 to b2-06) ● The pulse number of PG must be correctly input under close-loop vector control mode (b1-07 or b2-07) ● As far as possible, separate the motor is from the transmission machinery in a single state
Self-learning detection parameter	● Static time compensation constant (visible to manufacturers) ● Frequency inverter nonlinear parameters (visible to manufacturers) ● Motor primary side resistance and motor wiring resistance (b1-08 or b2-08) **Note**: In vector control mode, if you need to replace the main control board or the inverter, please ensure that the electrical parameters (b1-08 to b1-16, or b2-08 to b2-16) are correct after performing DC mode. You can choose the upload and download function of the keyboard. Use (A0-07) to upload the parameters before replacing and download the parameters to the replaced inverter. Thereafter perform DC mode self-learning. You can also enter electrical parameters manually after the DC mode self-learning finished.	● Static time compensation constant (manufacturer's visibility) ● Frequency inverter nonlinear parameters (visible to manufacturers) ● Motor primary side resistance and motor wiring resistance (b1-08 or b2-08) ● Motor secondary side resistance (b1-09 or b2-09) ● Motor leakage inductance (b1-10 or b2-10) ● Motor mutual inductance (b1-11 or b2-11) ● Motor inductance saturation compensation coefficient (b1-12, b1-13 or b2-12, b2-13) ● Motor iron loss conductance (b1-14 or b2-14) ● Motor mechanical loss coefficients (b1-15, b1-16 or b2-15, b2-16)
Self-learning motor state	● Due to the mechanical symmetry deviation of the three-phase winding, there will be slight jitters at the beginning of the self-learning. After rotate forward at low speed for a half cycle, and then rotate reverse at low speed for a half cycle, the self-learning finish. **Note:** Because DC mode self-learning does not require motor rotation, self-learning can be performed when the motor is loaded or has mechanical brake. At this time, the motor will neither shake nor reverse speed.	● Due to the mechanical symmetry deviation of the three-phase winding, there will be slight jitters at the beginning of the self-learning. Then the motor will become static. After a period of time, the motor will accelerate to 80% of the rated rotating speed of the motor and then decelerate to zero speed. After rotate forward at low speed for a half cycle, and then rotate reverse at low speed for a half cycle, the self-learning finish. **Note:** Please remove the load or mechanical brake from the motor when perform full-mode self-learning. If the motor can not rotate during the full-mode self-learning, the detected electrical parameters would be wrong, which may cause the motor to fail to run or even cause inestimable danger.

Note: It is recommended to perform the motor self-learning at ambient temperature (25 ℃). Do not perform self-learning after the motor runs out of heat, otherwise it will result in inaccurate parameters for constructing the motor mathematical model and lead to motor control accuracy decrease. Temperature

compensation function load in the motor control algorithm if the motor has temperature sensor built-in. The function can be selected by b-03. If motor without temperature sensor built-in, the motor control algorithm will compensate the motor parameters according to the motor temperature change, but the compensation accuracy is lower than the compensation with temperature sensor. If the change of the speed control accuracy which caused by the change of the motor temperature change exceeds the allowable range of the motor drive condition, it is necessary to consider the influence of other factors on the motor or consult the manufacturer for solution.

5.3.2 Preparation before induction motor self-learning

Before performing self-learning, please confirm U5-00 (frequency inverter voltage level and power) is consistent with the nameplate information of the inverter and confirm the motor type，control mode, the carrier frequency, motor speed range and the motor nameplate parameters inputted correctly.

Table 5-2 Self-learning Prepare Content List

☐	No.	Parameter Name	Content or Set range	Remarks
Frequency inverter model confirmation				
☐	**U5-00**	Inverter model	Indicates inverter voltage level and power, for example 380V 7.5kw, it will display 7R54	
Motor type and control mode confirmation				
☐	**A0-04**	Control mode setting	The self-learning algorithm varies with the control mode.	
Inverter carrier frequency selection				
☐	**A0-05**	Carrier frequency setting	Set range is 1.0 ~ 15.0kHz, with different carrier frequency, the detected self-learning parameters will change.	
Motor operating range and nameplate parameter confirmation (vector control)				
☐	**E0-02**	Maximum frequency	The unit associated with the A0-13 parameter selection	
☐	**E0-03**	Minimum frequency	Associated with the unit selected by the A0-13 parameter	
☐	**b1-00**	First motor rated power	3 level lower power of frequency inverter ~ rated power of frequency inverter	
☐	**b1-01**	First motor rated voltage	380V：280V ～ 460V	
☐	**b1-02**	First motor rated current	40% ~ 150% of inverter rated current	
☐	**b1-03**	First motor rated speed	25%-100% of the upper limit rotation speed	
☐	**b1-04**	First motor pole number	2~12 pole	
☐	**b1-05**	First motor rated frequency	b1-03*b1-04/120 ～ 7.0+b1-03*b1-04/12	
☐	**b1-06**	First motor cooling method	Self-cooling or forced cooling	
☐	**b1-07**	First motor PG pulse number	60 ~ 3600 (Speed sensor vector control mode only)	

☐	No.	Parameter Name	Content or Set range	Remarks
Motor operating range and nameplate parameter confirmation (V/F control)				
☐	**E0-02**	Maximum frequency	The unit associated with the selection of A0-13	
☐	**E0-03**	Minimum frequency	The unit associated with the selection of A0-13	
☐	**b1-00**	First motor rated power	0 ~ Inverter rated power	
☐	**b1-01**	First motor rated voltage	380V：280V ～ 460V	
☐	**b1-02**	First motor rated current	0% ~ 150% of inverter rated current	
☐	**b1-03**	First motor rated speed	400r/min～24000r/min	
☐	**b1-04**	First motor pole number	2 ~ 12 Poles	
☐	**b1-05**	First motor rated frequency	15.0HZ ~ Maximum frequency	

Please prepare it according to the parameters listed in above table. Motor parameters self-learning can be performed by setting the parameter b0-02 (the motor self-learning mode) after the preparation work is completed.

5.3.3 Instructions of induction motor DC self-learning mode

The direct current mode self-learning of the induction motor does not need to separate the motor from the load or the mechanical brake. It mainly detects the primary side resistance of the motor, the motor wiring resistance (b1-08 or b2-08), the nonlinear parameters of the frequency inverter, etc. Just the primary side resistance of the motor can be observed and debugged, the observations of other parameters require authorization.

The operational procedure of the DC mode self-learning as shown in **Table 5-3**:

Table 5-3 DC mode self-learning procedure

Steps	Operational content
1	Connect the motor terminals to the inverter output terminals U, V, W.
2	Connect the inverter power terminals R, S, T to the three-phase power supply. Refer to "5.3.2 Preparation of the induction motor before self-learning" and set the motor type, control mode, carrier frequency, operating speed range, motor nameplate, etc.
3	Set parameter b0-02 (motor self-learning mode) to 1, select DC mode self-learning and the keyboard will display tUnd.
4	Press the MULT button on the keyboard to start the DC mode self-learning and the keyboard will display tUn--.
5	The self-learning will complete after a period of time which depends on the capacity of the inverter. Thereafter the keyboard will display tUnEd and blinks for 5 seconds.
6	Check the parameter b1-08 or b2-08 to confirm whether the data is updated.

The detected data in DC mode self-learning as shown in **Table 5-4**:

Table 5-4 DC mode self-learning detected data

No.	Parameter name	Content and monitoring authority	Unit
b1-08	Primary side resistance of first motor	Depends on motor type	m Ω
	Static time compensation constant	Visible after authorized (usually no need to monitor)	
	Nonlinear parameters of frequency inverter	Visible after authorized (usually no need to monitor)	

Under vector control mode, since full-mode self-learning cannot be performed, it is also necessary to confirm the motor electrical parameters. In general, the motor parameters can be entered to b1-08 to b1-14 manually according to motor design manual or selected same type motor parameters and upload and download to the main control board For more details, please refer to the chapter "**5.1. 3.1 Induction Motor Self-Learning Mode and procedure**".

Note: During DC self-learning , there is voltage in the motor, especially when the cable between the motor and the frequency inverter is long. So please deal with the grounding and insulation of the motor well and don't touch the motor to avoid electric shock. What's more, when the motor is connected with heavy load or mechanical brake, the motor would not shake or rotate at low speed forward and reverse. It may shake or rotate at low speed forward and reverse when the load is light but it would not influence the correctness of the detected self-learning data.

5.3.4 Instructions of induction motor Full-mode self-learning

Induction motor full-mode self-learning includes motor rotation self-learning, so please remove the load or mechanical brake before start self-learning. If the motor connected with light load or gearbox and the like, the full-mode self-learning can not be finished normally. Even the self-learning finished normally, the detected motor parameters may be inaccurate and it will affect the accuracy of motor speed control and torque control accuracy. Therefore, please remove the load or reduction gear as far as possible when perform full-mode self-learning.

Please inquiry to manufacturer for supporting and solution if the working condition of the motor site is not allowed to remove the load or the mechanical brake. If the light load or the reduction gear can not be removed during the full-mode self-learning process, it is necessary to consider whether the reduction of the control accuracy fulfill the requirements of the motor driving working condition. For more details, please refer to the chapter "**5.3.1 Introduction of induction motor self-learning mode and procedure**".

If select V/F control in the self-learning preparation, the direct current mode self-learning will be performed even full-mode self-learning selected. For more details, please refer to the chapter "**5.3.3 Introduction of induction motor DC mode self-learning**".

Full-mode self-learning mainly detects all parameters of motor control from b1-08 to b1-16, frequency inverter non-linear parameters, etc. The procedure of full-mode self-learning as shown in **table 5-5**:

Table 5-5 Full-mode self-learning operation procedure

Steps	Operational content
1	Remove the mechanical load from the motor and connect the motor wiring terminals to the output terminals U, V and W of the frequency inverter correctly. Wiring PG if required according to the control mode.
2	Connect the inverter power terminals R, S, T to the three-phase power supply. Refer to "5.3.2 Preparation of the induction motor before self-learning" and set the motor type, control mode, carrier frequency, operating speed range, motor nameplate, etc.
3	Set parameter b0-02 (the motor self-learning mode) to 2 and select full-mode self-learning. The keyboard will display tUn.
4	Press MULT key on the keyboard to start full-mode self-learning and the keyboard will display tUn--.
5	The self-learning will complete after a period of time which depends on the capacity of the inverter. Thereafter the keyboard will display tUnEd and blinks for 5s.
6	Check the parameters b1-08 to b1-16 and confirm whether the data is updated.

The detected data in full-mode self-learning are shown in **Tables 5-6**:

Table 5-6 full-mode self-learning detected data

No.	Parameter name	Content and monitoring authority	Unit
b1-08	First motor primary side resistance	Depends on motor type	m Ω
b1-09	First motor secondary side resistance	Depends on motor type	m Ω
b1-10	First motor leakage inductance	Depends on motor type	m H
b1-11	First motor mutual inductance	Depends on motor type	m H
b1-12	First motor inductance saturation compensation coefficient 1	Depends on motor type	%
b1-13	First motor inductance saturation compensation coefficient 2	Depends on motor type	%
b1-14	First motor iron loss conductance	0.0mho ～ 600.0mho	mho
b1-15	First motor loss factor 1	0.0% to 200.0%	%
b1-16	First motor loss factor 2	0.0% to 200.0%	%
	Static time compensation constant	Visible after authorized (usually no need to monitor)	
	Inverter nonlinear parameters	Visible after authorized (usually no need to monitor)	

Note: During full-mode self-learning, there is voltage in the motor, especially when the cable between the motor and the frequency inverter is long. So please deal with the grounding and insulation of the motor well and don't touch the motor to avoid electric shock. Mechanical load removed is recommended before perform full-mode self-learning. The rotation speed can reach 80% of the rated speed during self-learning, please be careful when the motor rotates. When the motor connect with load, the full-load self-learning may can not complete.

5.3.5 Instructions of the second induction motor self-learning

SV800 series inverter can drive two motors with one inverter, it has two groups motor parameters. When use the second motor, please switch all cables (including 3PH UVW and PG signal cables) between the inverter and the motor by contactor or relay. By using of the multi-function input terminal (H0-XX = 31), the pre-set second motor parameters can be switched to the inside control parameters of the frequency inverter. Before switching by the terminal, the second motor selection parameter b0-00 (induction motor selection) must be selected as the second motor and the related motor parameters and control parameters should be set correctly. The second motor function will not be activated and the first motor still keep used if any one of the selection parameters b0-00 and the multi-function terminal second motor switching signal not meet the requirements.

Before perform the second motor self-learning, please switch the second motor correctly. The steps as below:

Step 1: Complete parameters self-learning of the first motor correctly. For more details please refer to the above instructions of the first motor self-learning

Step 2: Complete the switching of the second motor correctly as shown in **Tables 5-7**:

Table 5-7 Second Motor Switching

☑	No.	Parameter name	Content and monitoring authority	Remark
□	**b0-00**	Induction motor selection	Set to 1 to select the second motor	
□	**H0-xx**	Multi-function input terminal xx function selection	Set to 31 to select the second motor switching function	

Step 3: Complete the preparation work before the self-learning of the second motor, as shown in the following table:

Table 5-8 second motor self-learning preparation

☑	No.	Parameter name	Content and monitoring authority	Remark
Motor nameplate parameter confirmation (vector control)				
□	**b2-00**	Second motor rated power	3 level lower power of frequency inverter ~ rated power of frequency inverter	
□	**b2-01**	Second motor rated voltage	380V：280V ～ 460V	
□	**b2-02**	Second motor rated current	40% ~ 150% of inverter rated current	
□	**b2-03**	Second motor rated speed	25%-100% of the upper limit rotation speed	
□	**b2-04**	Second motor pole number	2~12 pole	
□	**b2-05**	Second motor rated frequency	b2-03*b2-04/120 ～ 7.0+b2-03*b2-04/12	

☑	No.	Parameter name	Content and monitoring authority	Remark
□	**b2-06**	Second motor cooling method	Self-cooling or forced cooling	
□	**b2-07**	Second motor PG pulses number	60 to 3600 (with speed sensor vector control mode only)	
Motor nameplate parameter confirmation (V/F control)				
□	**b2-00**	Second motor rated capacity	0 ~ rated capacity of the inverter	
□	**b2-01**	Second motor rated voltage	380V: 280V ~ 460V	
□	**b2-02**	Second motor rated current	0% to 150% of the rated current of the inverter	
□	**b2-03**	Second motor rated speed	400r/min~24000r/min	
□	**b2-04**	Second motor pole number selection	2 to 12 poles	
□	**b2-05**	Second motor rated frequency	15.0Hz ~ Maximum frequency	

Step 4: Select the second motor self-learning mode to perform it. The second motor self-learning mode is basically the same as the first motor self-learning mode. For more details, please refer to the above introductions of the first motor self-learning. The steps are shown in **Table 5-9**:

Table 5-9 Second motor self-learning procedure

Steps	Operational content
DC mode self-learning	
1	Set b0-00 and H0-xx correctly.
2	Switch the terminals of the second motor to the output U, V and W of the frequency inverter through contactor or relay.
3	Connect the inverter power terminals R, S, T to the 3 PH power supply, set the second motor nameplate, etc.
4	Set parameter b0-02 (motor self-learning mode) to 1, select DC mode self-learning and the keyboard will display **tUnd2**.
5	Press the MULT key on the keyboard to start the DC mode self-learning and the keyboard will display **tUn--**.
6	The self-learning will complete after a period of time which depends on the capacity of the inverter. Thereafter the keyboard will display **tUnEd** and blinks for 5 seconds.
7	Check the parameter b2-08 to confirm whether the data is updated.
Full-mode self-learning	
1	Set b0-00 and h0-xx correctly.
2	Remove the mechanical load from the second motor and switch the second motor wiring terminals to the output terminals U, V and W of the frequency inverter by contactor or relay. Wiring PG if required according to the

Steps	Operational content
	control mode.
3	Connect the inverter power terminal R, S and T to 3PH power supply, set the second motor nameplate, etc.
4	Set parameter b0-02 (the motor self-learning mode) to 2 and select full-mode self-learning. The keyboard will display tUn2.
5	Press MULT key on the keyboard to start full-mode self-learning and the keyboard will display tUn--.
6	The self-learning will complete after a period of time which depends on the capacity of the inverter. Thereafter the keyboard will display tUnEd and blinks for 5s.
7	Check the parameters b2-08 to b2-16 and confirm whether the data is updated.

Step 5: The detected data in different self-learning modes of the second motor are shown in **Tables 5-10**:

Table 5-10 second motor self-learning detected data

No.	Parameter name	Content and monitoring authority	Unit
DC mode self-learning			
b2-08	Second motor primary side resistance	Depends on motor type	m Ω
Full mode self-learning			
b2-08	Second motor primary side resistance	Depends on motor type	m Ω
b2-09	Second motor secondary side resistance	Depends on motor type	m Ω
b2-10	Second motor leakage inductance	Depends on motor type	m H
b2-11	Second motor mutual inductance	Depends on motor type	m H
b2-12	Second motor inductance saturation compensation coefficient 1	Depends on motor type	%
b2-13	Second motor inductance saturation compensation coefficient 2	Depends on motor type	%
b2-14	Second motor iron loss conductance	0.0mho ～ 600.0mho	mho
b2-15	Second motor loss factor 1	0.0% ～ 200.0%	%
b2-16	Second motor loss factor 2	0.0% ～ 200.0%	%

5.3.6 Status display and fault description of induction motor self-learning

A number of states in the self-learning process of the induction motor and the description as shown in following table:

Table 5-11 Self-Learning Status Description

LED Display Status	LCD Display Status	Meaning explanation
tUnd	**tUnd**	The first motor DC mode self-learning preparation is completed (**tUnd**)
tUn	**tUn**	The first motor full-mode self-learning preparation is completed (**tUn**)
tUnd2	**tUnd2**	The second motor DC mode self-learning preparation is completed (**tUnd2**)
tUn2	**tUn 2**	The second motor full-mode self-learning preparation is complete (**tUn 2**)
tUn--	**tUn--**	During Self-Learning process (**tUn--**)
tUnEd	**tUnEd**	Self-learning Completed (**tUnEd**)
tUnEr	**tUnEr**	Self-learning data abnormal, self-learning result abnormal, the self-learning cannot be completed normally, stop the self-learning process actively (**tUnEr**),
T5EtE	**SEtE**	Parameter setting abnormal during self-learning preparation (**SEtE**)

When abnormality occurs in the self-learning process of the induction motor, the processing methods are shown in **Tables 5-12**:

Table 5-12 Self-Learning Troubleshooting

LED Display Status	LCD Display Status	Treatment method
5EtE	**SEtE**	Indicates that parameter setting abnormal, generally caused by incorrect setting of motor nameplate parameter and motor running speed range parameter or the switching parameters setting of the first motor and second motor parameter. It may also caused by without second motor nameplate parameters but switch to second motor for self-learning. Therefore, please refer to "5.3.2 Preparation of the induction motor before self-learning" and "5.3.5 Second induction motor self-learning instructions" and reset the parameters b1-00 to b1-07, b2-00 to b2-07, E0-02, E0-03;
tUnEr	**tUnEr**	Indicates that self-learning data abnormal, self-learning result abnormal, the self-learning cannot be completed normally and the self-learning process is actively stopped. At this time, it is necessary to analyze the cause of the self-learning abnormality. Check whether the inverter model and motor nameplate parameters set correctly or not, whether the wiring between the inverter and the motor is abnormal, deal with the motor grounding and insulation well or not, whether the motor mechanical brake is released and the motor load is too large, whether the motor stator winding resistance is balanced and the motor rotor conduct bar is abnormal, etc.; Please refer to the chapter “5.3.2 The induction motor performs the pre-study preparation and the ” and "5.3.5 second induction motor self-learning instructions" and reset related parameters. If it cannot be solved, please replace the motor, the inverter or consult the manufacturer.

Note: When failure occurs during self-learning, it cannot be reset by the keyboard. It must be reset by turning power off and restart whole self-learning process again.

5.4 Inverter model, carrier frequency and control mode settings

The frequency inverter type, carrier frequency and control mode have important position in the using of frequency inverter. This chapter mainly introduce those aspects of SV800 series inverter.

5.4.1 The model setting and modification

Model parameters have been set correctly when the inverter is delivered from the factory. The user can check and confirm from **U5-00** (inverter voltage level and power) with the inverter nameplate. The model parameters can be set from the manufacturer's parameters after obtaining authorization. Do not modify the manufacturer's parameters without authorization. The manufacturer is not responsible for all problems caused by modifying the manufacturer's parameters.

If the inverter needs to replace the main control board, it may be necessary to reset the inverter model, perform bus voltage correction, motor selection, control mode confirmation and carrier frequency setting. It may just need bus voltage correction and other parameters can be restored to factory setting. If the debugging and application parameters have been set on the replaced main control board, you need to use the upload and download function of the keyboard to copy the relevant setting parameters to the new main control board. Detailed setting steps for model settings can also be consulted from the inverter manufacturer.

Note: After modify the frequency inverter model, even though the set parameters are updated by the upload download function, you must also perform self-learning and update the related feature parameters of the motor and the inverter.

5.4.2 Carrier frequency setting and modification

Frequency inverter carrier frequency is the modulation carrier frequency of the PWM signal which is the core parameter of the inverter output voltage. The SV800 series inverter algorithm supports range from 1.0 kHz to 15.0 kHz of the carrier frequency. It has factory default carrier frequency for each inverter with different power. If you need to increase the carrier frequency according to the application requirements of the inverter, the actual carrier frequency of the output voltage waveform is the set carrier frequency. As the carrier frequency increases, the heat generation increases, so the inverter must be derated, otherwise it will overheat frequently and alarm, may even damage the inverter.

In vector control, since the cycle of torque control must be synchronized with the carrier frequency, the characteristics of torque control will also change slightly after the carrier frequency changes, especially when the carrier frequency is set to less than 2.0kHz, the torque control cycle will change to Long and result in poor torque control characteristics. So if torque control is required, it is recommended that the carrier frequency be set to 6.0kHz.

Other carrier changes appropriately adjust the rated capacity of the inverter according to the loss considerations. For the derating guidelines when carrier frequency changes, please refer to "**2.1.5 Inverter heavy-load application and derating use**".

Note: When the carrier frequency of the inverter changes, the inverter parameters obtained by self-learning need to be modified, so self-learning must be performed to complete the automatic

update. Only DC mode self-learning needed.

5.4.3 The control mode setting and modification

Inverter control mode selection changes with the inverter's control object (different motor types). Please select the corresponding control mode through A0-04 (control mode setting). At present, for induction motors, there are mainly speed sensorless vector control, speed sensor vector control and V/F control.

The frequency inverter control mode selects the corresponding control mode by A0-04 (control mode setting) depending on the variation of the frequency inverter control object (different type of motor). At present, the speed sensor vector control, the belt speed sensor vector control, the V/F control and the like are mainly provided for the induction motor.

In vector control, all motor related electrical parameters in the inverter are 0. So after setting the motor nameplate parameters, please perform self-learning to obtain the relevant parameters of the mathematical model during motor control. For details, please refer to "5.3 Self-learning of induction motors". For V/F control, it can run directly without performing self-learning. In order to improve the accuracy of the motor terminal voltage, it is recommended to perform DC mode self-learning to complete the detection of the inverter's nonlinear parameters.

The related technical indexes of different control modes, please refer to the chapters "**2.1.4 Product model and specifications**" and "**2.2 Control Performance Description**".

Note: If the inverter performs full-mode self-learning and the motor has not changed, you can switch arbitrarily between different control modes; If you do not perform full-mode self-learning or only perform DC mode self-learning and run in V/F control mode, when need to switch to vector control, full-mode self-learning or the motor electrical parameters correctly enter needed before drive the motor.

5.5 Speed control and regulator parameter debugging

Speed control is one of the main control methods for inverter-driven motors. In the vector control mode, the motor rotation speed command is set value and the detected or estimated motor rotation speed is feedback value. The output torque command is adjusted by the speed loop regulator, so that the feedback speed changes with the command speed.

In speed control, as the mechanical time constant of the motor drive system is different and the speed of the drive system is different, the parameters of the speed loop regulator need to be adjusted to meet the requirements of motor speed control.

Speed control of the motor can be performed by setting d2-00 (motor drive mode selection) to 0 (speed control mode). The parameters of the speed loop regulator of the controlled motor can be modified by modifying the d0 (speed control commissioning parameter) group parameters to meet speed control requirements under different conditions.

5.5.1 Speed control indicator description

The speed control mainly include speed sensor vector control mode (VC) and speed sensorless vector control mode (SVC). The VC feedback speed used for speed control is detected by the position or speed sensor and the SVC feedback speed used for speed control is estimated by the speed estimation algorithm loaded in the inverter. Therefore, the speed control performance indicators under different control modes also is different.

5.5.2 Setting of motor rotation inertia

In the speed control of SV800 series products, a speed observer and a torque observer are added to the control algorithm. The speed control performance can be improved by setting the motor rotation inertia. When the inertia is not learned or the inertia of the motor and transmission system is not determined, the general inertia value of the transmission system can be quickly determined by manually adjusting the inertia. The specific method is as follows:

Set 20% to 100% of the sum of the motor inertia of the motor rotor and the mechanical inertia of the load in parameter d0-02 / d0-05 (the first and second motor speed control inertia). If you don't know the exact inertia of the motor, you can enter low inertia value firstly, and then gradually increase the set value. If the motor vibration or the current envelope is not smooth, return to the set value of the previous step. In different transmission conditions, the inertia of the belt drive system does not include the load mechanical part, only the inertia of the rotor portion of the motor and the pulley portion connected to the motor shaft is calculated. For gear driven system, when increasing the inertia parameter, if the gear meshing is caused by tooth backlash due to excessive backlash, reduce the setting parameters or increase the gear meshing degree. Because the intelligent control algorithm is used, the general inertia parameter of the operating conditions does not need to be adjusted to ensure system stability and speed. Responsiveness is taken into account. If the speed observer or torque observer is eliminated, the speed control is a typical PI control mode.

Note: The setting unit **of d0-02/ d0-05 is gm^2. You can multiply the obtained value kgm2 by 1000 as the setting value of this parameter. In addition, the parameter setting is inertia, not GD2, so GD2 needs to be divided by 4.**

5.5.3 Speed control proportional coefficient and integral time constant setting

When the vector control mode is used for speed control, it runs in the state connected with the mechanical transmission system. By adjusting d0-00 / d0-03 (the first / second motor speed control proportional gain) and d0-01 / d0-04 (the first / Second motor speed control integral time constant) for speed control debugging.

When the speed is set to a certain speed for constant speed operation, if the speed fluctuation is caused by the load fluctuation on the load side, increase the speed control proportional gain. If the controlled speed of the motor also fluctuates during constant speed operation, please reduce the speed control integration time constant to increase the adjustment strength of the integration link. If the transmission mechanism such as belt oscillates or the gear box vibrates and roars, please reduce the speed control proportional gain and increase the integration time constant. As shown in **Fig. 5-11**:

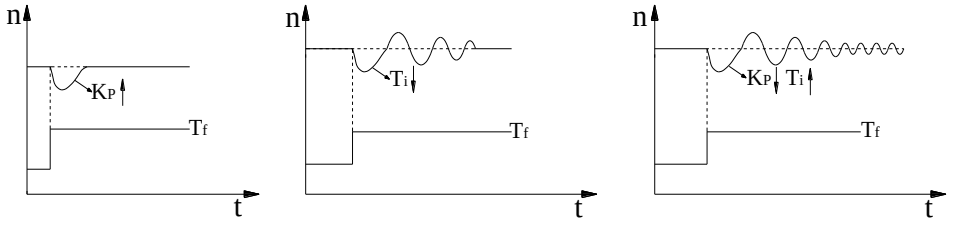


Fig. 5-11 Speed loop parameter debugging at constant speed

When the working condition requires speed step response, if the speed response is slow, increase the speed control proportional gain to improve the speed response performance. If the motor controlled speed has a large overshoot, reduce the speed control proportional gain or enable the regenerative stall function. If the motor oscillates during the step response, please reduce the speed control proportional gain and increase the speed control integral time constant or enable the speed loop variable structure parameters to ensure the stable operation of the motor. As shown in **Fig. 5-12**:

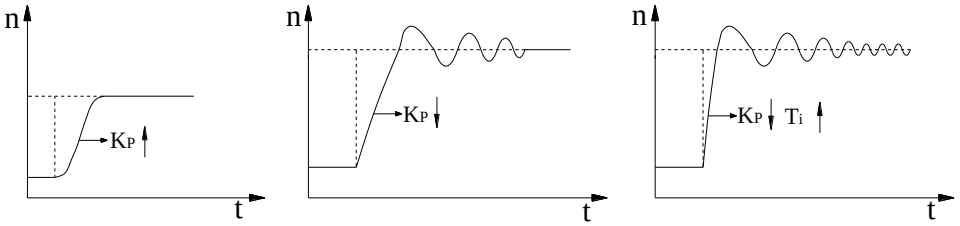


Fig. 5-12 Speed loop parameter debugging during speed step

The speed control in the vector control mode is based on the intelligent control algorithm and does not need to be adjusted in general application conditions. If you need to significantly improve the speed dynamic accuracy, you can refer to the above methods to adjust it.

Note: The speed loop speed control is different from the normal PI control. If you change the speed control proportional coefficient, the regulator integration time constant will also be adjusted. Therefore, you just need to adjust the speed control proportional coefficient during the debugging process. The speed control integral time constant remains unchanged and can only be adjusted if the proportional coefficient cannot be increased.

5.5.4 The setting of speed observer and torque observer

Because the speed loop adds intelligent modules such as speed observer and torque observer, it can significantly improve the speed control dynamic precision and effectively improve the dynamic response performance. When roar occurs if the transmission mechanism is gear transmission and the gear gap is too large or belt vibrates if it's belt driven, the speed observer and torque observer can be cancelled by d0-09 and d0-10. If both canceled, it is equivalent to

ordinary PI control.

The intelligent observer in the speed control has strong robust performance. Generally, it does not need to be cancelled and it is only required to keep the factory default value.

5.6.5 The setting of speed variable structure control parameters

By adjusting the values of d0-11 (variable structure control parameter automatic adjustment trigger threshold) and d0-12 (variable structure control parameter automatic adjustment minimum threshold) to meet the requirements of speed control for fast speed response and stability. d0-11 describes the deviation of speed control in percentages. When the deviation is greater than the trigger threshold, the speed response performance is improved. When the deviation decreases below the trigger threshold, the parameters are automatically modified to meet the smooth performance of the speed control. At the same time, it is limited by d0-12. The minimum value of the speed control parameter.

The variable structure control in the speed control has strong robust performance. Generally, no adjustment is needed, the factory value can be maintained.

5.5.6 Switching of speed control proportional coefficient

Parameter d0-13 (speed control proportional gain 2) is a spare speed control proportional gain, which can be selected through parameter d0-14 (speed control proportional gain selection), multi-function terminal or communication to switch the speed control proportional gain. Through parameter d0-14 (Speed control proportional gain selection), you can switch the proportional gain of the selected motor in the speed control and the spare gain d0-13 (speed control proportional gain 2). When it is selected as 2: special mode, it means the speed in the low speed range, the proportional gain of the loop regulator is the correction value of the currently set proportional gain. At this time, d0-13 (speed control proportional gain 2) is invalid. It is mainly used in situations where smooth start is required during startup and extremely high dynamic response characteristics are required during operation.

6 Function Parameters List

6.1 Reading method of function parameters list

You can understand all the parameters of the inverter simply and comprehensively through the parameter list. The parameters are briefly introduced in the parameter list. For detailed information about the function parameters, please refer to "**Chapter 7 Function Parameters Detailed Description**". This chapter mainly explains the related icons in the parameter list and the letter display comparison table in the LED keyboard.

6.1.1 Representation of icons in parameters list

In the parameters list, the following icons and terms are used to describe the effective range or modified attributes of each parameter in each control mode.

Table 6-1 Function parameters table icon description

Icon	Contents
ALL	Indicates the parameters valid for "all control modes"
IM.SVC	Indicates the parameters valid for " Induction Motor SVC mode"
IM.VC	Indicates the parameters valid for " Induction Motor VC mode"
IM.VF	Indicates the parameters valid for" Induction Motor V/F Control Mode "
	Indicates that the parameter can be modified during operation

6.1.2 Keyboard LED display character and letter correspondence table

In order to prevent the LED version of the keyboard from conflicting or ambiguous when displaying parameter numbers, faults, warnings and prompt symbols. The letter comparison table used in the keyboard display is as below.

Table 6-2 Keyboard Character Correspondence Table

Letter	A	b	C	d	E	F	H	i
LED character	**A**	**b**	**C**	**d**	**E**	**F**	**H**	**I**
Letter	J	L	n	o	P	r	t	U
LED character	**J**	**L**	**n**	**o**	**P**	**r**	**t**	**U**

6.2 The type of parameters

The SV800 series universal frequency inverter divides the function parameter group according to the application attribute, that is, the first-level menu in the parameter list, such as “A group” and “b group”, etc. In the first level menu, the second-level menu is divided according to the attributes in the group, such as "A0 Group", "A1 Group", etc. The detailed grouping is as follows.

6.2.1 Parameters Type Correspondence Table

The following is the list of all function parameter groups and the indexes of page number.

Table 6-3 Function Parameters Type Correspondence Table

Parameter group	Name	Remarks
A0	Basic parameters	
A1	Customer application parameters	
b0	Induction motor basic parameters	
b1	The first induction motor parameters	
b2	The second induction motor parameters	
d0	Speed control debugging parameters	
d1	Command input selection parameters	
d2	Run module control parameters	
d3	Torque control module parameters	
d4	V/F control parameters	
E0	Speed/frequency upper and lower limit parameters	
E1	Rotation speed / frequency command selection parameters	
E2	Acceleration/deceleration time selection parameters	
E3	Acc. and Dec. curve auxiliary function parameters	
E4	Simple PLC and multi-speed parameters	
F0	PID control parameters	
F1	Constant pressure water supply function parameters	
F2	Paper towel equipment function parameters	
F3	Lift equipment function parameters	
H0	Multi-function input terminals parameters	
H1	Multi-function output terminals parameters	

Parameter group	Name	Remarks
H2	Multifunction analog input parameters	
H3	Multi-function analog output parameters	
H4	Multi-function pulse input and output parameters	
L0	Basic communication parameters	
P0	Basic protection parameters	
U0	Status monitor parameters	
U1	Fault tracking parameters	
U2	Fault record parameters	
U3	Control monitor parameters	
U4	Application monitor parameters	
U5	Maintenance monitor parameters	

6.3 Function Parameters List

A0: Basic parameter group			
No.	**Name**	**Content**	**Set value**
A0-00 (0000H)	Keyboard language selection <1>	ALL 0: Chinese 1: English (reserved)	Factory default: 0 Range: 0~1
A0-01 (0001H)	User password setting	ALL	Factory default: 0 Range: 0~65535
A0-02 (0002H)	Parameters access level	ALL 0: Only for monitoring (A0-02 and monitoring group parameter UX-XX) 1: Common parameters (Customer application parameters A1-XX) 2: All parameters 3: Customer application mapped parameters	Factory default: 2 Range: 0~ 3
A0-04 (0004H)	Control mode setting	ALL Induction motor: 0: Sensorless vector control (IM.SVC) 1: Close-loop vector control (IM.VC) 2: V/F control (IM.VF) For more details, please refer to "5.5.3 Control Mode Settings and Modifications"	Factory default: 2 Range: 0~ 2
A0-05 (0005H)	Carrier frequency setting <2>	ALL The factory value determined by inverter type and generally not need to adjust. Note: In order to ensure the control accuracy, when changing the carrier frequency during vector control, static self-learning must be performed again. For details, refer to "5.3 Self-learning of Induction Motors".	Factory default: Depends on inverter type Range: 1.0~15.0
A0-06 (0006H)	Initialization	ALL 0: No parameters initialized 1:All parameters initialized 2: Application parameters initialized (excluding control mode, carrier frequency, motor parameters group b1/b2, A1-00)<3>	Factory default: 0 Range: 0~6
A0-07 (0007H)	Parameters upload and download	ALL 0: No action 1: Upload to keyboard 2: Download (Include motor parameters) 3: Download (Exclude motor parameters) If the uploaded version is inconsistent with the downloaded version of the control board program, CPy malfunction will be displayed when using keyboard to download. Please set the application parameters manually. The program version is checked in parameters U0-23, U0-24, U0-25.	Factory default: 0 Range: 0~3

A0: Basic parameter group			
No.	**Name**	**Content**	**Set value**
A0-08 (0008H)	Display parameter 1 when running	ALL Bit00: The set speed/frequency command Bit01: Motor speed Bit02: Inverter output frequency Bit03: Inverter output current Bit04: Control mode Bit05: Inverter output voltage Bit06: DC bus voltage Bit07: Motor shaft output power Bit08: Controll torque command Bit09: Input terminal status Bit10: Output terminal status Bit11: Running state Bit12: AI1(corresponds to the input voltage) Bit13: AI2(corresponds to the input voltage) Bit14: AI3(corresponds to the input voltage) Bit15: Input pulse frequency	Factory default: 0x016F Range: 0x0000~0xFFFF
A0-09 (0009H)	Display parameter 2 when running	ALL 0x0000～0xFFFF Bit00: Inverter temperature Bit01: Motor temperature Bit02: Set pressure(constant pressure water supply) Bit03: Feedback pressure(constant pressure water supply) Bit04: Inverter output frequency 1 (After acceleration and deceleration) Bit05: Set mechanical speed Bit06: Output mechanical speed Bit07: Set linear speed Bit08: Output line speed	Factory default: 0x0000 Range: 0x0000~0xFFFF
A0-10 (000AH)	Display parameters when Stop	ALL The content same as parameter A0-08	Factory default: 0x0041 Range: 0x0000~0xFFFF
A0-11 (000BH)	Multi-function key definition	ALL 0: Invalid 1:Jog run 2: Keyboard command channel and remote command channel switching	Factory default: 1 Range: 0~2
A0-12 (000CH)	G/P model selection	ALL 0:G type 1:P type	Factory default: 0 Range: 0~1
A0-13 (000DH)	Speed command unit selection	ALL 0：0.1Hz 1：0.01Hz 2：1r/min	Factory default: 1 Range: 0~2

<1>: The parameter just valid for LCD keyboard, it's invalid when the keyboard is LED type.

<2>: The carrier frequency initialization data and range change according to the inverter module. Here the carrier frequency range only the inverter can operates. If the carrier frequency is higher than the default value, the inverter should be derating used.

<3>: When A0-06 = 1, A1-00 and the mapped A1-01 ~ A1-49 set values will be restored to the factory default. When A0-06 = 2, the A1-00 set value remains unchanged, but the mapped A1- A1-49 set values will be restored to the factory default. At the same time, pay attention to the backup of the parameters b1-00 ~ b1-16 of the motor parameters group that has been obtained by full-mode self-learning when under vector control.

A1: Customer application parameters			
No.	**Name**	**Content**	**Set value**
A1-00 (0100H)	Application selection	ALL 0: User defined 1: General speed regulation 2: Air supply / exhaust fan 3: Constant pressure water supply (one inverter one pump, one inverter two pumps) 4~20: Reserved	Factory default: 1 Range:0~ 20 **<1>**
A1-01 (0101H)	Varies by application selection		**<2>**
A1-02 (0102H)	Varies by application selection		
A1-03 (0103H)	Varies by application selection		
...	Varies by application selection		
A1-49 (0131H)	Varies by application selection		

<1>: Group A1 parameters is convenient for user to set SV800 series inverter parameters. When the application has been selected in A1-00, the A1-01-A1-49 can automatically map a variety of function parameters and arrange them according to the application. The function parameters not need to be set can keep it as factory default and the unmapped parameters can also be set in the general function code group. For detailed mapping parameters of A1-01 ~ A1-49, please refer to Appendix D.

<2>: Initial values of A1-01-A1-49 parameters, Minimum and Maximum value vary with mapping parameters.

b0: Induction motor basic parameters			
No.	**Name**	**Content**	**Set value**
b0-00 (1000H)	Induction motor selection	IM.SVC IM.VC IM.VF 0: The first motor 1: The second motor selection	Factory default：0 Range:0~1
b0-02 (1002H)	Motor self-learning type	IM.SVC IM.VC IM.VF For induction motors, set the parameter and motor nameplate parameters firstly. Then press MULT to perform motor parameters self-learning. For IM.VF control mode, even it's set to 2, only DC mode self-learning is performed. 0: Do not perform self-learning 1: Perform DC mode self-learning 2: Perform full-mode self-learning	Factory default：0 Range:0~2
b0-03 (1003H)	Motor temperature compensation function selection	IM.SVC IM.VC If the motor has temperature sensor built-in, the stator coil temperature can be accurately detected, so as to the motor parameters can be compensated well, For IM.VF control mode, it does not require temperature compensation. 0：OFF 1：ON	Factory default：0 Range:0~1
b0-04 (1004H)	Motor temperature sensor type	IM.SVC IM.VC IM.VF 0：PT100 (Default) 1：PT1000	Factory default：0 Range:0~1
b0-05 (1005H)	Motor temperature detection input selection	IM.SVC IM.VC IM.VF 0: Without input 1:AI1 2:AI2 3:AI3 (Reserve)	Factory default：0 Range:0~3

b1: First induction motor parameters			
No.	**Name**	**Content**	**Set value**
b1-00 (1100H)	First motor rated power	IM.SVC IM.VC IM.VF Vector control: Three grades less power to the rated power of the inverter. V/F control: 0 ~ rated power of frequency inverter	Determined with the model (kW)
b1-01 (1101H)	First motor rated voltage	IM.SVC IM.VC IM.VF 220V：140～230 400V：280～460	Determined with the model (V)
b1-02 (1102H)	First motor rated current	IM.SVC IM.VC IM.VF Vector control: 40%-150% of inverter rated current V/F control: 0%-150% of inverter rated current	Determined with the model (A)
b1-03 (1103H)	First motor rated speed	IM.SVC IM.VC IM.VF Vector control: 25% to 100% of the maximum speed V/F control: 400 r/min to 24000 r/min	Determined with the model (r/min)
b1-04 (1104H)	First motor pole number selection	IM.SVC IM.VC IM.VF Select the number of poles of the motor	Factory default：4 poles Range: 2 poles ~12 poles

b1: First induction motor parameters			
No.	**Name**	**Content**	**Set value**
b1-05 (1105H)	First motor rated frequency	IM.SVC IM.VC IM.VF Vector control: rated speed * Poles No./ 120 ~ 7.0 + rated speed * Pole No. / 120 V/F control: 15.0 ~ maximum frequency	Factory default：50.0Hz Range：Determined with the model
b1-06 (1106H)	First motor cooling method	IM.SVC IM.VC IM.VF 0: Self-cooling fan 1: Forced cooling(fan or water cooling)	Factory default：0 Range：0~1
b1-07 (1107H)	First motor PG pulse number	IM.VC For speed sensors with orthogonal coding only, if other speed sensor signals are converted to orthogonal coding characteristics, it can be set to Enable	Factory default：1024 Range：60~3600
b1-08 (1108H)	First motor primary side resistance	IM.SVC IM.VC IM.VF The setting range is determined by the inverter model	Determined with the model (m Ω)
b1-09 (1109H)	First motor secondary side resistance	IM.SVC IM.VC The setting range is determined by the inverter model	Determined with the model (m Ω)
b1-10 (110AH)	First motor leakage inductance	IM.SVC IM.VC The setting range is determined by the inverter model	Determined with the model (m H)
b1-11 (110BH)	First motor mutual inductance	IM.SVC IM.VC The setting range is determined by the inverter model	Determined with the model (m H)
b1-12 (110CH)	First motor inductance saturation compensation coefficient 1	IM.SVC IM.VC The setting range is determined by the inverter model	Determined with the model (0.0%)
b1-13 (110DH)	First motor inductance saturation compensation coefficient 2	IM.SVC IM.VC The setting range is determined by the inverter model	Determined with the model (0.0%)
b1-14 (110EH)	First motor iron loss conductance	IM.SVC IM.VC	Factory default：Determined with the model Range: 0.0mho~600.0mho
b1-15 (110FH)	First motor loss factor 1	IM.SVC IM.VC	Factory default：Determined with the model Range： 0.0% ~200.0%
b1-16 (1110H)	First motor loss factor 2	IM.SVC IM.VC	Factory default：Determined with the model Range： 0.0% ~200.0%

b2: Second induction motor parameters			
No.	**Name**	**Content**	**Set value**
b2-00 (1200H)	Second motor rated power	IM.SVC IM.VC IM.VF Vector control: Three grades less power to the rated power of the inverter. V/F control: 0 ~ rated power of frequency inverter Same as b1-00	Determined with the model (kW)
b2-01 (1201H)	Second motor rated voltage	IM.SVC IM.VC IM.VF 220V：140～230 400V：280～460	Determined with the model (V)
b2-02 (1202H)	Second motor rated current	IM.SVC IM.VC IM.VF Vector control: 40%-150% of inverter rated current V/F control: 0%-150% of inverter rated current	Determined with the model (A)
b2-03 (1203H)	Second motor rated speed	IM.SVC IM.VC IM.VF Vector control: 25% to 100% of the maximum speed V/F control: 400 r/min to 24000 r/min	Determined with the model (r/min)
b2-04 (1204H)	Second motor pole number selection	IM.SVC IM.VC IM.VF Select the number of poles of the motor	Factory default：4 poles Range: 2 poles ~12 poles
b2-05 (1205H)	Second motor rated frequency	IM.SVC IM.VC IM.VF Vector control: rated speed * Poles No./ 120 ~ 7.0 + rated speed * Pole No. / 120 V/F control: 15.0 ~ maximum frequency	Factory default：50.0Hz Range：Determined with the model
b2-06 (1206H)	Second motor cooling method	IM.SVC IM.VC IM.VF 0: Self-cooling fan 1: Forced cooling(fan or water cooling)	Factory default：0 Range：0~1
b2-07 (1207H)	Second motor PG pulse number	IM.VC For speed sensors with orthogonal coding only, if other speed sensor signals are converted to orthogonal coding characteristics, it can be set to Enable	Factory default：1024 Range：60~3600
b2-08 (1208H)	Second motor primary side resistance	IM.SVC IM.VC IM.VF The setting range is determined by the inverter model	Determined with the model (m Ω)
b2-09 (1209H)	Second motor secondary side resistance	IM.SVC IM.VC The setting range is determined by the inverter capacity	Determined with the model (m Ω)
b2-10 (120AH)	Second motor leakage inductance	IM.SVC IM.VC The setting range is determined by the inverter capacity	Determined with the model (m H)
b2-11 (120BH)	Second motor mutual inductance	IM.SVC IM.VC The setting range is determined by the inverter capacity	Determined with the model (m H)
b2-12 (120CH)	Second motor inductance saturation compensation coefficient 1	IM.SVC IM.VC The setting range is determined by the inverter capacity	Determined with the model (0.0%)
b2-13 (120DH)	Second motor inductance saturation compensation coefficient 2	IM.SVC IM.VC The setting range is determined by the inverter capacity	Determined with the model (0.0%)

b2: Second induction motor parameters			
No.	**Name**	**Content**	**Set value**
b2-14 (120EH)	Second motor iron loss conductance	IM.SVC IM.VC	Factory default: Determined with the model Range: 0.0mho~600.0mho
b2-15 (120FH)	Second motor loss factor 1	IM.SVC IM.VC	Factory default: Determined with the model Range: 0.0% ~200.0%
b2-16 (1210H)	Second motor loss factor 2	IM.SVC IM.VC	Factory default: Determined with the model Range: 0.0% ~200.0%

d0 :Speed control debugging parameters			
No.	**Name**	**Content**	**Set value**
d0-00 (3000H)	First motor speed control proportional gain	IM.SVC IM.VC	Factory default：15 Range：3~100
d0-01 (3001H)	First motor speed control integral time constant	IM.SVC IM.VC	Factory default: 40ms Range: 20ms~10000ms
d0-02 (3002H)	First motor speed control rotation inertia	IM.SVC IM.VC	Factory default: 10 gm^2 Range: 0 gm^2~65535 gm^2
d0-03 (3003H)	Second motor speed control proportional gain	IM.SVC IM.VC	Factory default：15 Range：3~100
d0-04 (3004H)	Second motor speed control integral time constant	IM.SVC IM.VC	Factory default: 40ms Range: 20ms~10000ms
d0-05 (3005H)	Second motor speed control rotation inertia	IM.SVC IM.VC	Factory default: 10 gm^2 Range: 0 gm^2~65535 gm^2
d0-09 (3009H)	Torque observer selection	IM.SVC IM.VC 0：OFF 1：ON	Factory default：1 Range：0~1
d0-10 (300AH)	Speed observer selection	IM.SVC IM.VC 0：OFF 1：ON	Factory default：1 Range：0~1

d0 :Speed control debugging parameters			
No.	**Name**	**Content**	**Set value**
d0-11 (300BH)	The trigger threshold of variable structure control parameters automatically adjust	IM.SVC IM.VC	SVC control mode factory default: 5.00% Range: 0.01%~100.00% VC control mode factory default: 0.01% Range: 0.01%~100.00%
d0-12 (300CH)	The Min. threshold of variable structure control parameters automatically adjust	IM.SVC IM.VC	SVC control mode factory default: 20% Range: 0%~100% VC control mode factory default: 100% Range: 0% ~100%
d0-13 (300DH)	Speed control proportional gain 2	IM.SVC IM.VC	Factory default: 15 Range: 0~100
d0-14 (300EH)	Speed control proportional gain selection	IM.SVC IM.VC 0: The default speed control gain, depending on the selected motor 1: The speed control proportional gain 2; Valid immediately when Enabled 2: Special mode	Factory default: 0 Range: 0~2

d1:Command input selection			
No.	**Name**	**Content**	**Set value**
d1-00 (3100H)	Run command input selection	ALL 0: Keyboard control 1: Terminal control 2: Communication command control	Factory default：0 Range：0~2
d1-01 (3101H)	Main speed/ frequency command input selection	ALL 0: Keyboard digital setting by E1-00 (keyboard potentiometer valid) 1: Keyboard digital setting by E1-00 (keyboard potentiometer invalid) 2: AI1 3: AI2 4: Reserved 5: Pulse setting HDI 6: Multi-segment instructions 7: Simple PLC 8: PID 9: Communication setting 10: SPI communication setting	Factory default：0 Range：0~10
d1-02 (3102H)	Auxiliary frequency/speed command input selection	ALL 0: Auxiliary frequency invalid 1: Keyboard digital setting by E1-01 (Keyboard potentiometer valid) 2: Keyboard digital setting by E1-01 (Keyboard potentiometer invalid) 3: AI1 4: AI2 5: Reserved 6: Pulse setting HDI 7: Multi-segment instructions 8: Simple PLC 9: PID 10: Communication setting 11: SPI communication setting	Factory default：0 Range：0~11
d1-03 (3103H)	Auxiliary frequency/speed command coefficient	ALL	Factory default：100% Range：1%~100%
d1-04 (3104H)	Auxiliary frequency /speed coefficient reference	ALL 0: Relative to E0-02 1:Relative to the main setting frequency	Factory default：0 Range：0~1

d1:Command input selection			
No.	**Name**	**Content**	**Set value**
d1-05 (3105H)	Auxiliary frequency /speed overlay selection	ALL **Units digit:** frequency source selection 0: Main frequency source 1: Calculation value of main and auxiliary source 2: Switch between main frequency and auxiliary frequency source 3: Switch between the main frequency source and the calculation value of main and auxiliary source 4: Switch between the auxiliary frequency source and the calculation value of main and auxiliary source **Tens digits:** Calculation relationship between the main and auxiliary source 0: Main + auxiliary 1: Main-auxiliary 2: Max.(|Main|,|Auxiliary|) 3: Min.(|Main|,|Auxiliary|)	Factory default：0x00 Range：0x00~0x34
d1-06 (3106H)	Jog command input	ALL 0: Keyboard control 1: Terminal control 2: Communication command control	Factory default：0 Range：0~2
d1-07 (3107H)	Torque command selection	IM.SVC IM.VC 0: Keyboard parameter setting (d3-01) 1: AI1 2: AI2 3: Reserved 4: Pulse setting HDI 5: Communication setting	Factory default：0 Range：0~5
d1-08 (3108H)	Torque compensation command selection	ALL 0: No compensation 1: AI1 2: AI2 3: Reserved 4: Pulse setting HDI 5: Communication setting	Factory default：0 Range：0~5
d1-09 (3109H)	Shuttle speed control selection	ALL **Units digit:** Save after power off 0: Not save 1: Save **Tens digits:** positive/negative 0: No negative value during adjusting 1: Positive and negative value both valid	Factory default：0x01 Range：0x00~0x11
d1-10 (310AH)	FWD/REV key control selection	ALL 0: Invalid 1: Valid	Factory default：0 Range：0~1

d2: Operating module control parameters			
No.	**Name**	**Content**	**Set value**
d2-00 (3200H)	Selection of Motor Driving Mode	IM.SVC IM.VC 0: Speed Control Mode (ASR) 1: Torque command negative side priority mode 2: Torque command positive side priority mode 3: Torque Control Mode (ATR) 4: Speed / torque control switching mode Valid in vector control mode, set to 1 or 2 for automatic switching of speed/torque control.	Factory default：0 Range：0~4
d2-01 (3201H)	Torque Limit Value of Forward motoring	IM.SVC IM.VC	Factory default：180% Range：0%~300%
d2-02 (3202H)	Torque Limit Value of Forward regenerating	IM.SVC IM.VC	Factory default：-180% Range：-300%~0%
d2-03 (3203H)	Torque Limit Value of Reverse motoring	IM.SVC IM.VC	Factory default：-180% Range：-300%~0%
d2-04 (3204H)	Torque Limit Value of Forward regenerating	IM.SVC IM.VC	Factory default：180% Range：0%~300%
d2-05 (3205H)	High efficiency control selection	IM.SVC IM.VC 0：OFF 1：ON	Factory default：0 Range：0~1
d2-06 (3206H)	Stop mode selection	ALL 0: Free stop 1: Deceleration stop 2: Deceleration + DC Braking Stop In vector control, if the control mode is torque control, such as d2-00=1-4, the Stop mode is not restricted by d2-06. When the stop instruction input, it will free stop.	Factory default：1 Range：0~2
d2-07 (3207H)	Stop speed/frequency	ALL	Factory default：1.00Hz Range：0.00Hz~10.00Hz
d2-08 (3208H)	DC braking time	ALL	Factory default：0.0s Range：0.0s~30.0s
d2-09 (3209H)	DC braking current	IM.SVC IM.VC 100% relating to the motor rated current	Factory default：100% Range：20%~150%
d2-10 (320AH)	Low limit speed/Frequency Operation Mode	ALL 0: Run at the low. limit speed/ frequency 1: Stop by stop mode 2: Sleep	Factory default：2 Range：0~2

d2: Operating module control parameters			
No.	**Name**	**Content**	**Set value**
d2-11 (320BH)	Prohibit Reversal Mode Selection	ALL 0：OFF 1: Prohibit running at opposite direction of the starting command 2: Prohibit reverse direction running	Factory default：0 Range：0~2
d2-13 (320DH)	Anti-Regeneration stall function Selection	ALL It can prevent the motor from stopping stall due to overvoltage during deceleration and regeneration state. Mainly suitable for the deceleration state of all control mode and the regeneration state which occurs after deceleration when speed overshoot during vector control. 0: OFF (Automatic Effect within 10 seconds for SVC mode) 1:ON 2: OFF_1	Factory default：0 Range：0~2
d2-14 (320EH)	Pre-excitation mode selection	IM.SVC IM.VC 0: AC pre-excitation (with speed sensor) 1: DC pre-excitation	Factory default：1 Range：0~1
d2-18 (3212H)	Droop control selection	ALL 0：OFF 1：ON	Factory default：0 Range：0~1
d2-19 (3213H)	Droop start speed/frequency	ALL	Factory default：0.0% Range: 0.0%~100.0%
d2-20 (3214H)	Droop Rate Switching Speed/Frequency	ALL	Factory default：0.0% Range: 0.0%~100.0%
d2-21 (3215H)	Droop rate	ALL	Factory default：0.0% Range:0~50.0%
d2-22 (3216H)	Droop start torque	ALL	Factory default：0.0% Range：0.0%~90.0%
d2-23 (3217H)	Compensation function for mechanical loss	IM.SVC IM.VC 0:OFF 1:ON	Factory default：0 Range：0~1
d2-24 (3218H)	Mechanical loss offset	IM.SVC IM.VC	Factory default：0.0% Range：0.0%~100.0%
d2-25 (3219H)	Mechanical loss slope	IM.SVC IM.VC	Factory default：0.000% Range：0.000%~32.767%

d2: Operating module control parameters			
No.	**Name**	**Content**	**Set value**
d2-26 (321AH)	Timing function selection	ALL 0:Invalid 1: Valid	Factory default：0 Range：0~1
d2-27 (321BH)	Timing Runtime Selection	ALL 0: Set by d2-28 1: AI1 2: AI2 3: Reserved (The analog input range corresponds to d2-28)	Factory default：0 Range：0~3
d2-28 (321CH)	Timing of Run time	ALL 0.0~6500.0min	Factory default： 0.0min Range: 0.0min~6500.0min
d2-29 (321DH)	Arrival time setting for this operation	ALL 0.0-6500.0 min (0.0 means invalid)	Factory default： 0.0min Range: 0.0min~6500.0min
d2-30 (321EH)	Mechanical Speed Coefficient	ALL Set the mechanical speed U0-31 =120*U0-00*d2-30/ motor poles No. Output mechanical speed U0-32 = U0-01*d2-30	Factory default： 100.0% Range： 0.1%~999.9%
d2-31 (321FH)	Line speed coefficient	ALL Set the load line speed U0-33 =(120 *U0-00*d2-31/60)/ motor poles No. Output load line speed U0-34 = U0-01 * d2-31/60	Factory default： 100.0% Range: 0.1%~999.9%

d3: Torque control module parameters			
No.	**Name**	**Content**	**Set value**
d3-00 (3300H)	Torque command mode selection	IM.SVC IM.VC 0: % command mode 1: Absolute value command mode	Factory default：0 Range：0~1
d3-01 (3301H)	Torque command Settings	IM.SVC IM.VC Under vector control torque mode, when d1-07=0, the torque command is set by d3-01	Factory default：0% Range： -300%~300%

d4: V/F control mode parameters			
No.	**Name**	**Content**	**Set value**
d4-00 (3400H)	VF torque boost mode	IM.VF 0: Manual boost 1: Automatic boost	Factory default：0 Range：0~1
d4-01 (3401H)	Torque boost	IM.VF When Manual boost mode selected, the boost value should be properly adjusted according to the rated voltage of the motor	Factory default：Determined with the model Range：0.0%~20.0%
d4-02 (3402H)	DC braking voltage	IM.VF Under V/F control mode, please set the braking voltage properly according to the rated voltage of the motor	Factory default：0.0% Range：0.0%~20.0%
d4-03 (3403H)	Stable gain	IM.VF	Factory default：0.0% Range：0.0%~100.0%
d4-04 (3404H)	Start mode selection	IM.VF 0:Start by speed tracking 1: Start from Min. frequency (E0-03) 2: Start from low limit frequency (E0-01) It only valid for VF control. Start by speed tracking for vector control.	Factory default：1 Range：0~2
d4-05 (3405H)	Restart interval for V/F control	IM.VF	Factory default：0.100s Range：0.100s~10.000s
d4-06 (3406H)	Torque limit at motoring side	IM.VF When torque limit function used, since the torque is estimated in V/F control mode, so the accuracy is not high. Please use vector control when need accurate torque limit.	Factory default：150% Range：0%~200%
d4-07 (3407H)	Torque limit at regenerating side		Factory default：-150% Range：-200%~0%
d4-08 (3408H)	The motoring side torque limit selection	IM.VF 0：Invalid 1：Valid	Factory default：0 Range：0~1
d4-09 (3409H)	The regenerating side torque limit selection		Factory default：0 Range：0~1
d4-10 (340AH)	VF curve selection	IM.VF 0: Straight line 1:1.2 power curve 2:1.4 power curve 3:1.6 power curve 4:1.8 power curve 5:2.0 power curve 6: Polyline	Factory default：0 Range：0~6
d4-11 (340BH)	VF curve voltage 1<1>	IM.VF 220V：0～230V 400V：0～460V	Factory default：0V Range：0V~460V

d4: V/F control mode parameters			
No.	**Name**	**Content**	**Set value**
d4-12 (340CH)	VF curve frequency 1	IM.VF	Factory default: 0.00Hz Range: 0.00Hz~[d4-14]
d4-13 (340DH)	VF curve voltage 2	IM.VF	Factory default: 0V Range: 0V~460V
d4-14 (340EH)	VF curve frequency 2	IM.VF	Factory default: 0.00Hz Range: [d4-12]~[d4-16]
d4-15 (340FH)	VF curve voltage 3	IM.VF	Factory default: 0V Range: 0V~460V
d4-16 (3410H)	VF curve frequency 3	IM.VF	Factory default: 0.00Hz Range: [d4-14]~[d4-18]
d4-17 (3411H)	VF curve t voltage 4	IM.VF	Factory default: 0V Range: 0V~460V
d4-18 (3412H)	VF curve frequency 4	IM.VF Max. value b1-05(First motor rated frequency) or b2-05 (Second motor rated frequency)	Factory default: 0.00Hz Range: [d4-16] ~[b1-05]

Note: <1>220V voltage level: 0~230V,400V voltage level: 0~460V

E0 : The upper and low limit speed/ frequency			
No.	**Name**	**Content**	**Set value**
E0-00 (4000H)	Upper limit speed/frequency	ALL When A0-13=1 (0.01Hz resolution), the limit is 199.99Hz; When A0-13=0 (0.1Hz resolution), the limit is 400.0Hz; Set A0-13=2 (1r/Minimum resolution), the limit is 14700r/min. Set upper limit frequency according to the application conditions	Factory default: 50.00Hz Range: E0-01~199.99Hz
E0-01 (4001H)	Low limit speed/frequency	ALL Set the low limit frequency according to the application conditions	Factory default: 0.00Hz Range: E0-03~E0-00
E0-02 （4002H）	Max. speed/frequency	ALL The maximum speed/frequency of the motor that the inverter can drive. The Max. value under vector control is five times weak magnetic.	Factory default: 50.00Hz Range: 10.00Hz~400.0Hz
E0-03 （4003H）	Min. speed/frequency	ALL Frequency converter can drive the motor speed/frequency minimum value	Factory default: 0.00Hz Range: 0.00Hz~E0-02

E1:Speed/ frequency instructions			
No.	**Name**	**Content**	**Set value**
E1-00 (4100H)	Speed/frequency 1	ALL 1st speed for multi-speed command and the simple PLC command. It's digital frequency setting when frequency command input d1-01=0 or 1.	Factory default: 50.00Hz Range: [-E0-02]~[E0-02]
E1-01 (4101H)	Speed/frequency 2	ALL 2nd speed for multi-speed command and the simple PLC command	Factory default: 5.00Hz Range: [-E0-02]~[E0-02]
E1-02 (4102H)	Speed/frequency 3	ALL 3rd speed for multi-speed command and the simple PLC command	Factory default: 10.00Hz Range: [-E0-02]~[E0-02]
E1-03 (4103H)	Speed/frequency 4	ALL 4th speed for multi-speed command and the simple PLC command	Factory default: 20.00Hz Range: [-E0-02]~[E0-02]
E1-04 (4104H)	Speed/frequency 5	ALL 5th speed for multi-speed command and the simple PLC command	Factory default: 30.00Hz Range: [-E0-02]~[E0-02]
E1-05 (4105H)	Speed/frequency 6	ALL 6th speed for multi-speed command and the simple PLC command	Factory default: 40.00Hz Range: [-E0-02]~[E0-02]
E1-06 (4106H)	Speed/frequency 7	ALL 7th speed for multi-speed command and the simple PLC command	Factory default: 45.00Hz Range: [-E0-02]~[E0-02]
E1-07 (4107H)	Speed/frequency 8	ALL 8th speed for multi-speed command and the simple PLC command	Factory default: 50.00Hz Range: [-E0-02]~[E0-02]
E1-08 (4108H)	Speed/frequency 9	ALL 9th speed for multi-speed command and the simple PLC command	Factory default: 5.00Hz Range: [-E0-02]~[E0-02]
E1-09 (4109H)	Speed/frequency 10	ALL 10th speed for multi-speed command and the simple PLC command	Factory default: 10.00Hz Range: [-E0-02]~[E0-02]
E1-10 (410AH)	Speed/frequency 11	ALL 11th speed for multi-speed command and the simple PLC command	Factory default: 20.00Hz Range: [-E0-02]~[E0-02]

E1:Speed/ frequency instructions			
No.	**Name**	**Content**	**Set value**
E1-11 (410BH)	Speed/frequency 12	ALL 12th speed for multi-speed command and the simple PLC command	Factory default: 30.00Hz Range: [-E0-02]~[E0-02]
E1-12 (410CH)	Speed/frequency 13	ALL 13th speed for multi-speed command and the simple PLC command	Factory default: 40.00Hz Range: [-E0-02] ~[E0-02]
E1-13 (410DH)	Speed/frequency 14	ALL 14th speed for multi-speed command and the simple PLC command	Factory default: 45.00Hz Range: [-E0-02] ~[E0-02]
E1-14 (410EH)	Speed/frequency 15	ALL 15th speed for multi-speed command and the simple PLC command	Factory default: 50.00Hz Range: [-E0-02] ~[E0-02]
E1-15 (410FH)	Speed/frequency 16	ALL 16th speed for multi-speed command and the simple PLC command	Factory default: 50.00Hz Range: [-E0-02] ~[E0-02]
E1-16 (4110H)	Jog speed/frequency	ALL	Factory default: 0.80Hz Range: [-E0-02] ~[E0-02]

E2:Acc./Dec. time selection			
No.	**Name**	**Content**	**Set value**
E2-00 (4200H)	Acc./Dec. time selection during operation	ALL 0: Acc./Dec. time 1 1: Acc./Dec. time 2 2: Acc./Dec. time 3 3: Acc./Dec. time 4	Factory default: 0 Range: 0~3
E2-01 (4201H)	Acc./Dec. time selection for JOG operation	ALL 0: Acc./Dec. time 1 1: Acc./Dec. time 2 2: Acc./Dec. time 3 3: Acc./Dec. time 4	Factory default: 1 Range: 0~3
E2-02 (4202H)	Acc. time 1	ALL The Acc. Time to accelerate from 0.00Hz to E0-02. Acc. time of 1st speed in Multi-speed control.	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-03 (4203H)	Dec. time 1	ALL The Dec. Time to decelerate E0-02 to 0.00Hz. Dec. time of 1st speed in Multi-speed control.	Factory default: Determined with the model Range: 0.0s~3600.0s

E2:Acc./Dec. time selection			
No.	**Name**	**Content**	**Set value**
E2-04 (4204H)	Acc. time 2	ALL The Acc. Time to accelerate from 0.00Hz to E0-02. Acc. time of 2nd speed in Multi-speed control.	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-05 (4205H)	Dec. time 2	ALL The Dec. Time to decelerate E0-02 to 0.00Hz. Dec. time of 2nd speed in Multi-speed control.	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-06 (4206H)	Acc. time3	ALL Acc. time of 3rd speed in Multi-speed control.	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-07 (4207H)	Dec. time 3	ALL For Dec. time of 3rd speed in Multi-speed control.	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-08 (4208H)	Acc. time 4	ALL Acc. time of 4th speed in Multi-speed control and the UP frequency increase rate when UP/DOWN function valid	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-09 (4209H)	Dec. time 4	ALL Dec. time of 4th speed in Multi-speed control and the DOWN frequency decrease rate when UP/DOWN function valid	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-10 (420AH)	Acc. time 5	ALL Acc. time of 5th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-11 (420BH)	Dec. time 5	ALL Dec. time of 5th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-12 (420CH)	Acc. time 6	ALL Acc. time of 6th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s

E2:Acc./Dec. time selection			
No.	**Name**	**Content**	**Set value**
E2-13 (420DH)	Dec. time 6	ALL Dec. time of 6th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-14 (420EH)	Acc. time 7	ALL Acc. time of 7th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-15 (420FH)	Dec. time 7	ALL Dec. time of 7th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-16 (4210H)	Acc. time 8	ALL Acc. time of 8th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-17 (4211H)	Dec. time 8	ALL Dec. time of 8th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-18 (4212H)	Acc. time 9	ALL Acc. time of 9th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-19 (4213H)	Dec. time 9	ALL Dec. time of 9th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-20 (4214H)	Acc. time 10	ALL Acc. time of 10th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-21 (4215H)	Dec. time 10	ALL Dec. time of 10th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s

E2:Acc./Dec. time selection			
No.	**Name**	**Content**	**Set value**
E2-22 (4216H)	Acc. time 11	ALL Acc. time of 11th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-23 (4217H)	Dec. time 11	ALL Dec. time of 11th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-24 (4218H)	Acc. time 12	ALL Acc. time of 12th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-25 (4219H)	Dec. time 12	ALL Dec. time of 12th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-26 (421AH)	Acc. time 13	ALL Acc. time of 13th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s ~3600.0s
E2-27 (421BH)	Dec. time 13	ALL Dec. time of 13th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-28 (421CH)	Acc. time 14	ALL Acc. time of 14th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-29 (421DH)	Dec. time 14	ALL Dec. time of 14th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-30 (421EH)	Acc. time 15	ALL Acc. time of 15th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s

E2:Acc./Dec. time selection			
No.	**Name**	**Content**	**Set value**
E2-31 (421FH)	Dec. time 15	ALL Dec. time of 15th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-32 (4220H)	Acc. time 16	ALL Acc. time of 6th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-33 (4221H)	Dec. time 16	ALL Dec. time of 16th speed in Multi-speed control	Factory default: Determined with the model Range: 0.0s~3600.0s
E2-34 (4222H)	S curve Enable	ALL 0：OFF 1：ON	Factory default：0 Range：0~1
E2-35 (4223H)	S curve Acc. start time 1	ALL	Factory default: 0.1s Range：0.0s~60.0s
E2-36 (4224H)	S curve Acc. arrival time 1	ALL	Factory default: 0.1s Range：0.0s~60.0s
E2-37 (4225H)	S curve Dec. start time 1	ALL	Factory default: 0.1s Range：0.0s~60.0s
E2-38 (4226H)	S curve Dec. arrival time 1	ALL	Factory default: 0.1s Range：0.0s~60.0s
E2-39 (4227H)	S curve Acc. start time 2	ALL	Factory default: 0.1s Range：0.0s~60.0s
E2-40 (4228H)	S curve Acc. arrival time 2	ALL	Factory default: 0.1s Range：0.0s~60.0s
E2-41 (4229H)	S curve Dec. start time 2	ALL	Factory default: 0.1s Range：0.0s~60.0s
E2-42 (422AH)	S curve Dec. arrival time 2	ALL	Factory default: 0.1s Range：0.0s~60.0s

E3:Jump Speed and UP/DOWN			
No.	**Name**	**Content**	**Set value**
E3-00 (4300H)	Jump speed 1	ALL	Factory default: 0.00Hz Range: 0.00Hz~[E0-02]
E3-01 (4301H)	Jump speed 2		
E3-02 (4302H)	Jump speed 3		
E3-03 (4303H)	Jump speed 4		
E3-04 (4304H)	Jump speed amplitude	ALL	Factory default: 0.00Hz Range: 0.00Hz~10.00Hz
E3-05 (4305H)	UP/DOWN selection	ALL 0: OFF 1: ON	Factory default: 0 Range: 0~1
E3-06 (4306H)	UP/DOWN speed/frequency command memory selection	ALL 0: Normal mode 1: Save when Stop 2: Save when Power off	Factory default: 0 Range: 0~2
E3-07 (4307H)	UP/DOWN upper limit speed/frequency	ALL	Factory default: 10.00Hz Range: [E3-08]~[E0-02]
E3-08 (4308H)	UP/DOWN low limit speed/frequency	ALL	Factory default: 0.00Hz Range: [-E0-02]~[E3-07]
E3-09 (4309H)	Speed deviation limit function selection	ALL 0: OFF 1: ON	Factory default: 0 Range: 0~1
E3-10 (430AH)	Positive deviation speed	ALL	Factory default: 5.0% Range: 0.0%~100.0%
E3-11 (430BH)	Negative deviation speed	ALL	Factory default: -5.0% Range: -100.0%~0.0%

E4: Simple PLC and multi-speed			
No.	**Name**	**Content**	**Set value**
E4-00 (4400H)	Simple PLC operation mode	ALL 0: OFF 1: Stop after single cycle 2: Continuous cycle 3: Keep final value after single cycle	Factory default：0 Range：0~3
E4-01 (4401H)	Simple PLC memory selection when power off	ALL 0: Not save when power off 1: Save when power off	Factory default：0 Range：0~1
E4-02 (4402H)	Simple PLC running time unit setting	ALL 0: Second 1:Minute 2: Hours	Factory default：0 Range：0~2
E4-03 (4403H)	Simple PLC Step 1 Operation Time	ALL	Factory default：0.0 Range：0.0~3600.0
E4-04 (4404H)	Simple PLC Step 2 Operation Time	ALL	Factory default：0.0 Range：0.0~3600.0
E4-05 (4405H)	Simple PLC Step 3 Operation Time	ALL	Factory default：0.0 Range：0.0~3600.0
E4-06 (4406H)	Simple PLC Step 4 Operation Time	ALL	Factory default：0.0 Range：0.0~3600.0
E4-07 (4407H)	Simple PLC Step 5 Operation Time	ALL	Factory default：0.0 Range：0.0~3600.0
E4-08 (4408H)	Simple PLC Step 6 Operation Time	ALL	Factory default：0.0 Range：0.0~3600.0
E4-09 (4409H)	Simple PLC Step 7 Operation Time	ALL	Factory default：0.0 Range：0.0~3600.0
E4-10 (440AH)	Simple PLC Step 8 Operation Time	ALL	Factory default：0.0 Range：0.0~3600.0
E4-11 (440BH)	Simple PLC Step 9 Operation Time	ALL	Factory default：0.0 Range：0.0~3600.0
E4-12 (440CH)	Simple PLC Step 10 Operation Time	ALL	Factory default：0.0 Range：0.0~3600.0
E4-13 (440DH)	Simple PLC Step 11 Operation Time	ALL	Factory default：0.0 Range：0.0~3600.0
E4-14 (440EH)	Simple PLC Step 12 Operation Time	ALL	Factory default：0.0 Range：0.0~3600.0

E4: Simple PLC and multi-speed			
No.	**Name**	**Content**	**Set value**
E4-15 (440FH)	Simple PLC Step 13 Operation Time	ALL	Factory default: 0.0 Range: 0.0~3600.0
E4-16 (4410H)	Simple PLC Step 14 Operation Time	ALL	Factory default: 0.0 Range: 0.0~3600.0
E4-17 (4411H)	Simple PLC Step 15 Operation Time	ALL	Factory default: 0.0 Range: 0.0~3600.0
E4-18 (4412H)	Simple PLC Step 16 Operation Time	ALL	Factory default: 0.0 Range: 0.0~3600.0
E4-19 (4413H)	Simple PLC Acc./Dec. time selection Step 1~4	ALL **Units Digits:** Simple PLC Acc./Dec. time selection of Step 1 0: Acc./Dec. time 1 1: Acc./Dec. time 2 2: Acc./Dec. time 3 3: Acc./Dec. time 4 **Tens Digits:** Simple PLC Acc./Dec. time selection of Step 2 (Same as above) **Hundreds Digits:** Simple PLC Acc./Dec. time selection of Step 3 (Same as above) **Thousands Digits:** Simple PLC Acc./Dec. time selection of Step 4 (Same as above)	Factory default: 0x0000 Range: 0x0000~0x3333
E4-20 (4414H)	Simple PLC Acc./Dec. time selection Step 5~8	ALL **Units Digits:** Simple PLC Acc./Dec. time selection of Step 5 0: Acc./Dec. time 1 1: Acc./Dec. time 2 2: Acc./Dec. time 3 3: Acc./Dec. time 4 **Tens Digits:** Simple PLC Acc./Dec. time selection of Step 6 (Same as above) **Hundreds Digits:** Simple PLC Acc./Dec. time selection of Step 7 (Same as above) **Thousands Digit:** Simple PLC Acc./Dec. time selection of Step 8 (Same as above)	Factory default: 0x0000 Range: 0x0000~0x3333
E4-21 (4415H)	Simple PLC Acc./Dec. time selection Step 9~12	ALL **Units Digits:** Simple PLC Acc./Dec. time selection of Step 9 0: Acc./Dec. time 1 1: Acc./Dec. time 2 2: Acc./Dec. time 3 3: Acc./Dec. time 4 **Tens Digits:** Simple PLC Acc./Dec. time selection of Step 10 (Same as above) **Hundreds Digits:** Simple PLC Acc./Dec. time selection of Step 11 (Same as above) **Thousands Digit:** Simple PLC Acc./Dec. time selection of Step 12 (Same as above)	Factory default: 0x0000 Range: 0x0000~0x3333

E4: Simple PLC and multi-speed			
No.	**Name**	**Content**	**Set value**
E4-22 (4416H)	Simple PLC Acc./Dec. time selection Step 13~16	ALL **Units Digits:** Simple PLC Acc./Dec. time selection of Step 13 0: Acc./Dec. time 1 1: Acc./Dec. time 2 2: Acc./Dec. time 3 3: Acc./Dec. time 4 **Tens Digits:** Simple PLC Acc./Dec. time selection of Step 14 (Same as above) **Hundreds Digits:** Simple PLC Acc./Dec. time selection of Step 15 (Same as above) **Thousands Digit:** Simple PLC Acc./Dec. time selection of Step 16 (Same as above)	Factory default: 0x0000 Range: 0x0000~0x3333

F0: PID control parameters			
No.	**Name**	**Content**	**Set value**
F0-00 (5000H)	Closed-loop operation control selection	ALL 0:Invalid 1:Universal PID control valid	Factory default：0 Range：0~1
F0-01 (5001H)	PID given channel selection	ALL 0: Parameter setting (F0-02) 1: AI1 analog input 2: AI2 analog input 3: Reserved 4: Pulse setting HDI 5: Communication setting (Communication address 0x6003) 6: Multiple instructions setting	Factory default：0 Range：0~6
F0-02 (5002H)	PID target value setting	ALL 0.0%~100.0%	Factory default: 50.0% Range：0~100.0%
F0-03 (5003H)	PID feedback channel selection	ALL 0: AI1 analog input 1: AI2 analog input 2: Reserved 3: AI1+AI2 4: AI1-AI2 5: Max.(|AI1|, |AI2|) 6:Min.(|AI1|, |AI2|) 7: Pulse setting HDI	Factory default：0 Range：0~7
F0-04 (5004H)	Closed-loop regulation characteristic	ALL 0: Positive 1: Negative	Factory default：0 Range：0~1
F0-05 (5005H)	PID target/feedback range	ALL	Factory default: 1000 Range：0~65535
F0-06 (5006H)	Proportional gain KP1	ALL	Factory default: 20.0 Range：0.0~100.0

F0: PID control parameters			
No.	**Name**	**Content**	**Set value**
F0-07 (5007H)	Integration time Ti1	ALL	Factory default: 2.00s Range: 0.01s~10.00s
F0-08 (5008H)	Differential time Td1	ALL	Factory default: 0.000s Range: 0.000s~10.000s
F0-09 (5009H)	PID differential limit	ALL	Factory default: 0.10% Range: 0.00%~100.00%
F0-10 (500AH)	PID deviation limit	ALL	Factory default: 0.0% Range: 0.0%~20.0%
F0-11 (500BH)	PID reverse cutoff speed / frequency	ALL	Factory default: 0.00Hz Range: 0.00Hz~[E0-02]
F0-12 (500CH)	PID setting filter time	ALL	Factory default: 0.00 Range: 0.00~600.00s
F0-13 (500DH)	PID feedback filter time	ALL	Factory default: 0.00s Range: 0.00s~60.00s
F0-14 (500EH)	PID output filter time	ALL	Factory default: 0.00s Range: 0.00s~60.00s
F0-15 (500FH)	Proportional gain KP2	ALL	Factory default: 20.0 Range: 0.0~100.0
F0-16 (5010H)	Integration time Ti2	ALL	Factory default: 2.00s Range: 0.01s~10.00s
F0-17 (5011H)	Differential time Ti2	ALL	Factory default: 0.000s Range: 0.000s~10.000s
F0-18 (5012H)	PID initial value	ALL	Factory default: 0.0% Range: 0.0%~100.0%

F0: PID control parameters			
No.	**Name**	**Content**	**Set value**
F0-19 (5013H)	PID initial value hold time	ALL	Factory default: 0.00s Range: 0.00s~600.00s
F0-20 (5014H)	PID parameter switching condition	ALL 0: Not switch 1: Switch by DI terminal 2: Automatic switching according to deviation 3: Reserved	Factory default: 0 Range: 0~3
F0-21 (5015H)	PID parameter switching deviation 1	ALL	Factory default: 20.00% Range: 0.00%~[F0-22]
F0-22 (5016H)	PID parameter switching deviation 2	ALL	Factory default: 80.00% Range: [F0-21]~100.00%
F0-23 (5017H)	Forward Max. of two output deviations	ALL	Factory default: 1.00% Range: 0.00%~100.00%
F0-24 (5018H)	Reverse Max. of two output deviations	ALL	Factory default: 1.00% Range: 0.00%~100.00%
F0-25 (5019H)	PID integral attribute	ALL **Units digits:** Integral separated 0: Invalid 1: Valid **Tens digits:** Stop the integration when the output reaches the limit 0: Continue 1: Stop	Factory default: 0x00 Range: 0x00~0x11
F0-26 (501AH)	PID feedback disconnection detection threshold	ALL 0.0% ～ 100.0% 0.0%: Means not detection	Factory default: 0.0% Range: 0.0%~100.0%
F0-27 (501BH)	PID feedback disconnection detection time	ALL	Factory default: 0.0S Range: 0.0S~20.0S
F0-28 (501CH)	PID Calculating at Stop state	ALL 0:Invalid 1: Valid	Factory default: 0 Range: 0~1
F0-29 (501DH)	PID upper limit frequency	ALL	Factory default: 50.00Hz Range: F0-30~E0-02

F0: PID control parameters			
No.	**Name**	**Content**	**Set value**
F0-30 (501EH)	PID low limit frequency	ALL	Factory default: 0.00Hz Range: E0-03~F0-29

F1: Constant pressure water supply			
No.	**Name**	**Content**	**Set value**
F1-00 (5100H)	Constant pressure water supply mode selection	ALL 0: Invalid 1: One Inverter one Pump 2: One Inverter two Pumps	Factory default: 0 Range: 0~2
F1-01 (5101H)	Target pressure setting	ALL	Factory default: 0.20MPa Range: 0.00MPa~F1-02
F1-02 (5102H)	Pressure range	ALL	Factory default: 1.00MPa Range: 0.00MPa~10.00MPa
F1-03 (5103H)	Sleep frequency	ALL	Factory default: 30.00Hz Range: 0.00Hz~E0-02
F1-04 (5104H)	Sleep delay time	ALL	Factory default: 0.0s Range: 0.0s~3600.0s
F1-05 (5105H)	Wake up pressure	ALL	Factory default: 0.00MPa Range: 0.00MPa~F1-01
F1-06 (5106H)	Wake delay time	ALL	Factory default: 0.0s Range: 0.0s~3600.0s
F1-07 (5107H)	Speed/frequency deviation when add or decrease pump	ALL	Factory default: 0.5% Range: 0.0%~100.0%
F1-08 (5108H)	Judgment frequency when adding pump	ALL	Factory default: 50.00Hz Range: F1-09~E0-02

F1: Constant pressure water supply			
No.	**Name**	**Content**	**Set value**
F1-09 (5109H)	Judgment frequency when decreasing pump	ALL	Factory default: 10.00Hz Range: E0-03~F1-08
F1-10 (510AH)	Add pump delay time	ALL	Factory default: 10.0s Range: 0.0s~999.9.0s
F1-11 (510BH)	Decrease pump delay time	ALL	Factory default: 5.0s Range: 0.0s~999.9s
F1-12 (510CH)	Contactor control delay time	ALL	Factory default: 0.5s Range: 0.1s~10.0s
F1-13 (510DH)	Automatic switching delay time	ALL	Factory default: 0Min Range: 0Min~65535Min
F1-14 (510EH)	Sleep pressure judgment range	ALL Set by the range of the pressure gauge or pressure sensor	Factory default: 0% Range: 0%~20.0%
F1-15 (510FH)	Water shortage protection	ALL 0: No protection 1: With sensor water shortage protection 2: Without sensor water shortage protection	Factory default: 0 Range: 0~2
F1-16 (5110H)	Water shortage protection current	ALL When F1-15=2, the output current threshold of judging water shortage	Factory default: 80% Range: 10%~150%
F1-17 (5111H)	Wake-up delay time after water shortage protection	ALL	Factory default: 60Min Range: 0Min~3000Min
F1-18 (5112H)	Water shortage protection judgment delay time	ALL	Factory default: 2.0s Range: 0.0s~10.0s

F2:Paper towel equipment parameters			
No.	**Name**	**Content**	**Set value**
F2-00 (5200H)	Enable Non-standard	ALL 0: Invalid 1:Valid	Factory default: 0 Range: 0~1
F2-01 (5201H)	Filter coefficient	ALL	Factory default: 0.300 Range: 0.000~2.000

F3:Lift and hoist equipment parameters			
No.	**Name**	**Content**	**Set value**
F3-00 (5300H)	Lift and hoist equipment function Enable	ALL 0: Invalid 1: Valid	Factory default：0 Range：0~1
F3-01 (5301H)	Release brake torque threshold	ALL	Factory default：100% Range：0%~300%
F3-02 (5302H)	Release brake delay time	ALL	Factory default：3.0s Range：0.0s~3600.0s
F3-03 (5303H)	Brake frequency value	ALL	Factory default：3.00Hz Range：0.00Hz~50.00Hz
F3-04 (5304H)	Brake delay time	ALL	Factory default：3.0s Range：0.0s~3600.0s
F3-05 (5305H)	Emergency brake Enable	ALL 0: Invalid 1: Valid	Factory default：0 Range：0~1
F3-06 (5306H)	Release brake frequency value	ALL	Factory default：3.00Hz Range：0.00Hz~50.00Hz
F3-07 (5307H)	Release brake time	ALL	Factory default：3.0s Range：0.0s~10.0s

H0: Multi-function input terminals			
No.	**Name**	**Content**	**Set value**
H0-00 (7000H)	Multi-function input terminal DI1	ALL Select the function of terminals DI1~DI6 0: No function 1: Forward Jog running 2: Reverse Jog running 3: Forward running 4: Reverse running 5: Three-wire operation control 6: Forward and reverse switching 7: Reserved 8: Reserved 9: Free Stop 10: Torque control selection 11: Multi-speed command 1 12: Multi-speed command 2 13: Multi-speed command 3 14: Multi-speed command 4 15: Acc./Dec. time Select 1 16: Acc./Dec. time select 2 17: S curve Acc./Dec. time 1 selection 18: S curve Acc./Dec. time 2 selection 19: Speed keeping 20: Fault reset 21: External fault input (Normal open) 22: External fault input (Normal closed) 23: Speed increase command UP 24: Speed decrease command DOWN 25: Clear the set of UP/DOWN 26: Prohibit Drooping function 27: DC braking command 28: Pre-excitation command 29: Reserved 30: Reserved 31: Select Second motor 32: Reserved 33: Reserved 34: Triggered into the next step in Simple PLC 35: Speed/frequency command switching 36: Main frequency command switches to digital setting 37: Auxiliary frequency command switches to digital setting	Factory default：3 Range：0~53
H0-01 (7001H)	Multi-function input terminal DI2		Factory default：4 Range：0~53
H0-02 (7002H)	Multi-function input terminal DI3		Factory default：1 Range：0~53
H0-03 (7003H)	Multi-function input terminal DI4		Factory default：20 Range：0~53
H0-04 (7004H)	Multi-function input terminal DI5		Factory default：0 Range：0~53

H0: Multi-function input terminals			
No.	**Name**	**Content**	**Set value**
H0-05 (7005H)	Multi-function input terminal DI6	38: Suspend PID operation 39: Reverse PID direction 40: Suspend PID integration 41: PID parameter switching 42: Simple PLC status reset 43: Suspend Simple PLC operation 44: External stop command(According to stop mode to stop) 45: Water shortage protection 46: Water enough signal input 50: Brake open confirmation 51: Switch Running command to the keyboard 52: Switch Running command to terminal 53: Switch Running command to communication	Factory default：0 Range：0~53
H0-12 (700CH)	Polarity selection	ALL Bit0 ~bit5: Relating DI1~DI6 Bitx =0: Positive logic Bitx =1: Negative logic	Factory default： 0x0000 Range： 0x0000~0x003F
H0-13 (700DH)	Multi-function input terminals filter time 1	ALL	Factory default： 0.010s Range： 0.000s~1.000s
H0-14 (700EH)	Multi-function input terminals filter time 2	ALL	Factory default： 0.010s Range： 0.000s~1.000s
H0-15 (700FH)	Terminal Start/Stop control mode	ALL 0: Two-wire mode 1 1: Two-wire mode 2 2: Three-line mode 1 3: Three-line mode 2	Factory default：0 Range：0~3

H1: Multi-function output terminals			
No.	**Name**	**Content**	**Set value**
H1-00 (7100H)	Multi-function output terminal DO1	ALL Select the function of terminals DO1~DO2, relays M1, M2 and TA-TB-TC 0: No function 1: End of Simple PLC multi-step operation 2: Detection speed 1 (detection speed =speed in H1-07, absolute value detection) 3: Detection speed 1 (detection speed ≥speed in H1-07, absolute value detection) 4: Detection speed 1 (detection speed ≤speed in H1-07, absolute value detection) 5: Detection speed 2 (detection speed = speed in H1-08) 6: Detection speed 2 (detection speed ≥speed in H1-08)	Factory default：0 Range：0~40
H1-01 (7101H)	Multi-function output terminal DO2	7: Detection speed 2 (detection speed ≤speed in H1-08) 8: Speed arrives 9: Torque detected 10: Absolute torque detected 11: Reserved 12: Overload pre-alarm 13: Reserved 14: During reverse running 15: Reserved 16: Inverter running 17: In failure 18: Speed limiting 19: Torque limiting	Factory default：0 Range：0~40
H1-03 (7103H)	Function selection of relay M1	20: Ready to run 21: Upper limit speed arrives 22: Low limit speed arrives 23: Under-voltage status output 24: Reserved 25: FCL activated 26: Reserved 27: Reserved 28: Reserved 29: The running time arrives 30: Motor overheat warning 31: Connect 1# pump to inverter 32: Connect 1# pump to power supply	Factory default：35 Range：0~40
H1-04 (7104H)	Function selection of relay M2	33: Connect 2# pump to inverter 34: Connect 2# pump to power supply 35: Running (including DC braking) 36:Set by communication 37: Water shortage protection 38~39: Reserved 40:Brake controloutput	Factory default：0 Range：0~40

H1: Multi-function output terminals			
No.	**Name**	**Content**	**Set value**
H1-05 (7105H)	Multi-function Relay output M1 Delay Time	ALL	Factory default: 0.0s Range: 0.0s~3600.0s
H1-06 (7106H)	Multi-function Relay output M2 Delay Time	ALL	Factory default: 0.0s Range: 0.0s~3600.0s
H1-07 (7107H)	Detection speed 1	ALL According to [E0-02] to set	Factory default: 0.0% Range: 0.0%~100.0%
H1-08 (7108H)	Detection speed 2	ALL According to [E0-02] to set	Factory default: 0.0% Range: -100.0%~100.0%
H1-09 (7109H)	Speed detection amplitude	ALL According to [E0-02] to set	Factory default: 0.0% Range: 0.0%~40.0%
H1-10 (710AH)	Torque detection instruction (Bipolarity)	ALL	Factory default：0 Range: -305%~305%
H1-11 (710BH)	Torque Detection Instruction (Absolute Value)	ALL	Factory default：0 Range：0~305%
H1-12 (710CH)	Overload pre-alarm setting	ALL	Factory default: 50% Range：0%~100%
H1-13 (710DH)	TA-TB-TC Relay Function Selection	ALL Refer to the functions definitions in H1-00	Factory default：17 Range：0~40

H2: Multi-function Analog input AI			
No.	**Name**	**Content**	**Set value**
H2-00 (7200H)	Analog input AI1 range selection	ALL 0:0 ~ 10V 1: Reserved 2: 4 ~ 20mA	Factory default：0 Range：0~2
H2-01 (7201H)	AI1 gain setting	ALL -300.0 ~ 300.0%(100% relating to10V of AI1)	Factory default： 100.0% Range： -300.0%~300.0%
H2-02 (7202H)	AI1 bias setting	ALL -300.0 ~ 300.0%(100% relating to10V of AI1)	Factory default： 0.0% Range： -300.0%~300.0%
H2-03 (7203H)	AI2 range selection	ALL 0：0~10V 1：-10~10V	Factory default：0 Range：0~1
H2-04 (7204H)	AI2 gain setting	ALL -300.0 ~ 300.0%(100% relating to10V of AI2)	Factory default： 100.0% Range： -300.0%~300.0%
H2-05 (7205H)	AI2 bias setting	ALL -300.0 ~ 300.0%(100% relating to10V of AI2)	Factory default： 0.0% Range： -300.0%~300.0%
H2-09 (7209H)	AI1 filter time	ALL	Factory default： 0.100s Range： 0.000s~10.000s
H2-10 (720AH)	AI2 filter time	ALL	Factory default： 0.100s Range： 0.000s~10.000s
H2-12 (720B)	The Min. detection of AI	ALL When the input analog signal is less than the set value, the input value of the analog signal is treated as 0.	Factory default： 0.040V Range： 0.000V~1.000V

H3: Multi-function analog output AO			
No.	**Name**	**Content**	**Set value**
H3-00 (7300H)	Multi-function AO1 function selection	ALL 0: No function 1: The set speed command 2: Motor speed 3: Inverter output frequency 4: Inverter output current 5: Inverter output voltage 6: DC bus voltage 7: Torque command 8: AI1 input signal(Converted to voltage) 9: AI2 input signal(Converted to voltage) 10: AI3 input signal(Converted to voltage) 11: Input pulse frequency 12: Motor output torque	Factory default：3 Range：0~12
H3-01 (7301H)	Multi-function AO1 range selection	ALL 0:0~10V 1:Reserved 2:4~20mA	Factory default：0 Range：0~2
H3-02 (7302H)	AO1 gain setting	ALL -300.0 ~ 300.0%(100% relating to 10V of AO1)	Factory default： 100.0% Range： -300.0%~300.0%
H3-03 (7303H)	AO1 bias setting	ALL 0.0 ~ 300.0%(100% relating to 10V of AO1)	Factory default： 0.0% Range： 0.0%~300.0%
H3-04 (7304H)	AO1 filter time	ALL 0.00～10.00	Factory default： 0.10s Range： 0.00s~10.00s
H3-05 (7305H)	Multi-function AO2 function selection	ALL Please refer to the functions in "**H3-00**"	Factory default：0 Range：0~12
H3-07 (7307H)	AO2 gain setting	ALL -300.0 ~ 300.0%(100% relating to 10V of AO2)	Factory default： 100.0% Range： -300.0%~300.0%
H3-08 (7308H)	AO2 bias setting	ALL 0.0 ~ 300.0%(100% relating to 10V of AO2)	Factory default： 0.0% Range： 0.0%~300.0%
H3-09 (7309H)	AO2 filter time	ALL 0.00～10.00	Factory default： 0.10s Range： 0.00s~10.00s

H4: Multi-function pulse input and output			
No.	**Name**	**Content**	**Set value**
H4-00 (7400H)	Pulse input HDI range setting	ALL 0.10～100.00kHz	Factory default：20.00 kHz Range：0.10 kHz~100.00 kHz
H4-01 (7401H)	HDI gain setting	ALL	Factory default：100.00% Range：0.00%~200.00%
H4-02 (7402H)	HDI bias setting	ALL	Factory default：0.0% Range：-100.0%~100.0%
H4-03 (7403H)	HDI filter time	ALL	Factory default：0.10s Range：0.00s~2.00s
H4-04 (7404H)	HDI Min. input frequency	ALL	Factory default：1Hz Range：1Hz~10kHz
H4-05 (7405H)	Multi-function pulse output HDO function	ALL 0: No function 1: The set speed command 2: Motor speed 3: Inverter output frequency 4: Inverter output current 5: Inverter output voltage 6: DC bus voltage 7: Torque command 8: Input pulse frequency 9: Motor output torque	Factory default：0 Range：0~9
H4-06 (7406H)	HDO output range setting	ALL	Factory default：20.00kHz Range：0.10KHz~100.00KHz

L0: Basic communication parameters			
No.	**Name**	**Content**	**Set value**
L0-00 (9000H)	Baud rate	ALL 0：4800bps 1：9600bps 2：19200bps 3：38400bps 4：57600bps 5：115200bps	Factory default：2 Range：0~5
L0-01 (9001H)	Data Format	ALL 0: No parity (8-N-1) 1: Even parity (8-E-1) 2: Odd parity (8-O-1)	Factory default：0 Range：0~2
L0-02 (9002H)	Local address	ALL 0：Broadcast address 1~247	Factory default：1 Range：0~247
L0-03 (9003H)	Response delay	ALL	Factory default：5ms Range：1ms~20ms
L0-04 (9004H)	Communication timeout	ALL 0.0: Invalid	Factory default：0.0s Range：0.0s~20.0s
L0-05 (9005H)	Communication mode selection	ALL 0：Modbus-RTU	Factory default：0 Range：0

P0: Basic protection parameters			
No.	**Name**	**Content**	**Set value**
P0-00 (C000H)	Braking voltage level of braking unit<1>	ALL 220V：320.0V～360.0V 380V：640.0V～720.0V	Factory default：680.0V Range：320.0V~720.0V
P0-01 (C001H)	Positive side over-speed setting	ALL The base value relating to [E-00]. Please set the speed protection threshold properly according to the requirements of the operating conditions.	Factory default：120% Range：0%~150%
P0-02 (C002H)	Negative side over-speed setting	ALL The base value relating to [E-00]. Please set the speed protection threshold properly according to the requirements of the operating conditions.	Factory default：-120% Range：-150%~0%
P0-03 (C003H)	Motor overload protection	ALL Motor overload protection is relative to the motor rated current to protect. Adjust the parameter to modify the degree of overload; The inverter overload protection is non-adjustable	Factory default：100% Range：20%~300%
P0-04 (C004H)	Over torque protection	IM.SVC IM.VC 0：OFF 1：ON	Factory default：0 Range：0~1
P0-05 (C005H)	Over torque protection action value	IM.SVC IM.VC	Factory default：150% Range：110%~305%
P0-06 (C006H)	Over torque protection reference torque	IM.SVC IM.VC	Factory default：105% Range：50%~105%
P0-07 (C007H)	Speed control error function selection	IM.SVC IM.VC 0：OFF 1：ON	Factory default：0 Range：0~1
P0-08 (C008H)	Speed control error positive side detection amplitude	IM.SVC IM.VC	Factory default：3.33Hz Range：1.67Hz~16.67Hz
P0-09 (C009H)	Speed control error negative side detection amplitude	ALL	Factory default：-3.33Hz Range：-16.67Hz~-1.67Hz
P0-10 (C00AH)	Motor overheat protection	ALL 0：OFF 1：ON	Factory default：0 Range：0~1
P0-11 (C00BH)	Motor overheat protection threshold	ALL	Factory default：110℃ Range：80℃~180℃
P0-12 (C00CH)	Motor overheat pre-alarm threshold	ALL	Factory default：90℃ Range：80℃~180℃

P0: Basic protection parameters			
No.	**Name**	**Content**	**Set value**
P0-13 (C00DH)	Fault self-recovery times	ALL 0~20(0 means no automatic reset fault)	Factory default：0 Range：0~20
P0-14 (C00EH)	Fault self-recovery interval	ALL 1.0s~100.0s	Factory default：10.0s Range：1.0s~100.0s
P0-15 (C00FH)	Relay action selection when automatic fault reset	ALL 0: Relay does not operate 1: Relay action	Factory default：0 Range：0~1
P0-16 (C010H)	Input loss phase detection filter time	ALL 0.0s~10.0s (0.0s means Not detect)	Factory default：5.0s Range：0.0s~10.0s
P0-17 (C011H)	Output loss phase detection Enable	ALL 0: Invalid 1: Valid	Factory default：0 Range：0~1
P0-18 (C012H)	Fan control selection	ALL 0: Fan runs when the inverter is in standby 1: Fan not run when the inverter is in standby	Factory default：1 Range：0~1
P0-19 (C013H)	Short circuit relay detection Enable	ALL 0: Valid 1: Invalid	Factory default：0 Range：0~1

Note: <1>: Factory default of 220V series inverter is 360.0V; Factory default of 380V series inverter is 680.0V

For 220V series inverter, the Max. is 360.0V and the Min. is 320.0V, for 380V series inverter, the Max. is 720.0V and the Min. is 640.0.V

U0: Status monitoring		
No.	**Name**	**Unit**
U0-00 (F000H)	The set speed	**Hz**
U0-01 (F001H)	Motor speed	**r/min**
U0-02 (F002H)	Inverter output frequency	**Hz**
U0-03 (F003H)	Inverter output current <5>	**A**
U0-04 (F004H)	Current control mode	—
U0-05 (F005H)	Inverter output voltage	**V**
U0-06 (F006H)	DC bus voltage	**V**
U0-07 (F007H)	Output Power	**kW**
U0-08 (F008H)	Control part torque command	**%**
U0-09 (F009H)	Input terminal status: bit0~bit11 corresponding to DI1~DI12 multi-function input terminal	—
U0-10 (F00AH)	Output terminal status: bit0~bit2 relating to DO1~DO3 multi-function output terminals bit3~bit4 relating to M1~M2 multi-function relay output terminals	—
U0-11 (F00BH)	Operation status	—
U0-12 (F00CH)	Fault status	—
U0-13 (F00DH)	Related input voltage of AI1	**V**
U0-14 (F00EH)	Related input voltage of AI2	**V**
U0-15 (F00FH)	Related input voltage of AI3	**V**
U0-16 (F010H)	Input pulse frequency	**KHz**
U0-17 (F011H)	Inverter module temperature	**℃**
U0-18 (F012H)	Motor temperature	**℃**
U0-19 (F013H)	Related input voltage of AI1 (before corrected)	**V**
U0-20 (F014H)	Related input voltage of AI2 (before corrected)	**V**

U0: Status monitoring		
No.	**Name**	**Unit**
U0-21 (F015H)	Related input voltage of AI3 (before corrected)	**V**
U0-22 (F016H)	Inverter cumulative power-on time	**Hour**
U0-23 (F017H)	Main program version	—
U0-24 (F018H)	Special inverter program version	—
U0-25 (F019H)	Driving module version	—
U0-26 (F01AH)	Constant pressure water supply target pressure	**MPa**
U0-27 (F01BH)	Constant pressure water supply feedback pressure	**MPa**
U0-28 (F01CH)	Inverter output frequency (After acceleration and deceleration)	**Hz**
U0-29 (F01DH)	Rectifier module temperature (≥160kW)	℃
U0-30 (F01EH)	Frequency adjustment factor	
U0-31 (F01FH)	The set mechanical speed	**r/min**
U0-32 (F020H)	Output mechanical speed	**r/min**
U0-33 (F021H)	The set line speed of load	**m/s**
U0-34 (F022H)	Output line speed of load	**m/s**

U1: Fault tracking		
No.	Name	**Unit**
U1-00 (F100H)	The last fault	—
U1-01 (F101H)	The last 1 fault	—
U1-02 (F102H)	The set speed/frequency when fault occurs	**r/min Hz**
U1-03 (F103H)	The speed/frequency command when fault occurs	**r/min Hz**
U1-04 (F104H)	Output current when fault occurs	**A**
U1-05 (F105H)	Motor speed when fault occurs	**r/min**
U1-06 (F106H)	Output voltage when fault occurs	**V**
U1-07 (F107H)	DC bus voltage when fault occurs	**V**
U1-08 (F108H)	Output frequency when fault occurs	**Hz**
U1-09 (F109H)	Torque command when fault occurs	**%**
U1-10 (F10AH)	Input terminal status when fault occurs: bit0 ~bit11 relating to DI1~DI12	—
U1-11 (F10BH)	Output terminal status when fault occurs: bit0~bit2 relating to DO1~DO3 and bit3~bit4 relating to M1 to M2	—
U1-12 (F10CH)	Operating state when fault occurs	—
U1-13 (F10DH)	Cumulative running time when fault occurs	**Hour**
U1-14 (F10EH)	Heat sink temperature when fault occurs	**℃**
U1-15 (F10FH)	Motor temperature when fault occurs	**℃**
U1-16 (F110H)	The set speed/frequency at the last 1st fault	**r/min Hz**
U1-17 (F111H)	The speed/frequency command at the last 1st fault	**r/min Hz**
U1-18 (F112H)	Output current at the last 1st fault	**A**
U1-19 (F113H)	Motor speed at the last 1st fault	**r/min**
U1-20 (F114H)	Output voltage at the last 1st fault	**V**
U1-21 (F115H)	DC bus voltage at the last 1st fault	**V**
U1-22 (F116H)	Output frequency at the last 1st fault	**Hz**
U1-23 (F117H)	Torque command at the last 1st fault	**%**

U1: Fault tracking		
No.	Name	**Unit**
U1-24 (F118H)	Input terminal status at the last 1st fault: bit0 ~bit11 relating to DI1~DI12	—
U1-25 (F119H)	Output terminal status at the last 1st fault: bit0~bit2 relating to DO1~DO3 and bit3~bit4 relating to M1 to M2	—
U1-26 (F11AH)	Operating status at the last 1st fault	—
U1-27 (F11BH)	Cumulative run time at the last 1st fault	**Hour**
U1-28 (F11CH)	Heat sink temperature at the last 1st fault	℃
U1-29 (F11DH)	Motor temperature at the last 1st fault	℃

U2: Fault Record		
No.	**Name**	**Unit**
U2-00 (F200H)	The 1st fault content	—
U2-01 (F201H)	The 2nd fault content	—
U2-02 (F202H)	The 3rd fault content	—
U2-03 (F203H)	The 4th fault content	—
U2-04 (F204H)	The 5th fault content	—
U2-05 (F205H)	The 6th fault content	—
U2-06 (F206H)	The 7th fault content	—
U2-07 (F207H)	The 8th fault content	—
U2-08 (F208H)	The 9th fault content	—
U2-09 (F209H)	The 10th fault content	—
U2-10 (F20AH)	Cumulative run time at the 1st fault	**Hour**
U2-11 (F20BH)	Cumulative run time at the 2nd fault	**Hour**
U2-12 (F20CH)	Cumulative run time at the 3rd fault	**Hour**
U2-13 (F20DH)	Cumulative run time at the 4th fault	**Hour**
U2-14 (F20EH)	Cumulative run time at the 5th fault	**Hour**
U2-15 (F20FH)	Cumulative run time at the 6th fault	**Hour**
U2-16 (F210H)	Cumulative run time at the 7th fault	**Hour**
U2-17 (F211H)	Cumulative run time at the 8th fault	**Hour**
U2-18 (F212H)	Cumulative run time at the 9th fault	**Hour**
U2-19 (F213H)	Cumulative run time at the 10th fault	**Hour**

U3: Controlling monitoring		
No.	**Name**	**Unit**
U3-00 (F300H)	Cumulative overload percentage	**0.01%**
U3-01 (F301H)	Speed control dynamic accuracy	**0.01%ms**
U3-02 (F302H)	U phase DC bias	—
U3-03 (F303H)	V-phase DC bias	—
U3-04 (F304H)	W phase DC bias	—
U3-05 (F305H)	Motor maximum output torque	**1%**
U3-06 (F306H)	Command word	—
U3-07 (F307H)	Status word	—

U5: Maintenance monitoring		
No.	Name	**Unit**
U5-00 (F500H)	Inverter voltage level and power (For 380V 7.5KW inverter, LED display 7R54)	—

7 Detailed function description

7.1 System parameters A group

The initial setting of the inverter is performed through the basic parameters of group A0. It includes interface, password, access level, initialization, upload and download, monitor display, multi-function key, motor control mode, carrier frequency, etc. Using the A1 group application parameters can also facilitate customer debugging or use the parameter mapping function when applying.

7.1.1 Basic parameter A0 group

The A0 group mainly used to set the operation interface, control mode, interface, password, access level, parameters initialization, upload/download, monitor display and the multi-function key.

No.	Name	Set range	Factory default
A0-00	Keyboard language selection	0～1	0

Select the LCD keyboard language.

0: Chinese

1: English (Reserved)

Note: Only valid for LCD keyboard

No.	Name	Set range	Factory default
A0-01	User password setting	0～65535	0

Used to set the user password. When the parameter setting value is not equal to 0, it means that the user has set the password. After the password setting is successful and takes effect, each time you enter the menu, you must enter the password correctly, otherwise you cannot enter the parameter modification and viewing, Setting the user password does not affect the monitoring parameters of the U0 group.

For the user password setting method, please refer to the operating instructions of the keyboard.

Note: Please remember the password you set.

No.	Name	Set range	Factory default
A0-02	Parameters access level	0～3	2

0: Only for monitoring

You can access A0-02 and the monitoring parameters in U0 group.

1: Common parameters

A0-02 and A1-XX group parameters can be accessed.

2: All parameters

All parameters can be accessed.

3: Customer application mapped parameters

A1-XX group parameters which mapped by customer application can be accessed.

No.	Name	Set range	Factory default
A0-04	Control mode setting	0～2	2

The parameter determines the control mode of the selected motor and the details refer to the "**5.5.1 Change of Control Mode**".

For vector control mode, the motor parameters self-learning must be performed (full-mode self-learning and DC mode self-learning) .

In the V/F control mode, after the self-learning performed, the precision of the output voltage to the motor is guaranteed and the motor operation oscillation, current distortion and etc. phenomena which caused by a series of nonlinear factors are obviously inhibited. The V/F control mode may also be run without perform self-learning. For V/F control, the self-learning mode only supports DC mode and just perform DC mode self-learning even set to the full-mode (b0-02 = 2) . But when switch to vector control ,it cannot drive the motor without self-learning. Please refer to the "5.3 Induction Motor Self-learning" for more details about self-learning and refer to "**2.2 Control Performance Description**" for the control performance indicators in different control modes.

0: Sensorless vector control (IM. SVC)

SVC control mode is open-loop vector control mode, it can be used for all varies speed control occasions. Please select SVC control mode when the motor operating conditions require high-precision and high-dynamic response for speed control or torque control. With accurate motor parameter self-learning and intelligent motor control algorithms, even if the motor without rotor position or speed feedback signals, it can also provide accurate and stable control effects. The speed range is from 12r / min to the rated speed of the motor.

1: Close-loop vector control (IM. VC)

VC control mode is the normal closed-loop vector control mode and can be used for variable speed control of motors with speed sensors. When the SVC control mode cannot meet the ultra-high standard speed control requirements determined by the motor operating conditions, if you need to improve the reliability of motor operation, please select VC control mode. The control mode can support ultra-high-precision speed control up to zero speed. The position or speed information of the motor needs to be feed back when in VC vector control mode, so the motor must be equipped with a position or speed sensor. At the same time, the motor sensor type must be match the position or speed signal interface on the inverter. The speed range is from 0r / min to the rated speed of the motor.

2: V/F Control (IM. VF)

IM. VF control mode is a normal V/ F control mode, mainly used for variable speed control occasions which do not require fast response and high-precision. The inverter can drive multiple motors together and self-learning not need for V/F control mode. The speed control range is generally 1:50.

Note:

1. During the vector control, any control mode can support five times weak magnetic operation.

2. IM.VC can support zero servo.

3. Vector control can also drive multiple motors to run, please inform the manufacturer when this special

demand is required, generally not recommended.

No.	Name	Set range	Factory default
A0-05	Carrier frequency setting	1.0KHz～15.0KHz	Depends on the model

Frequency inverter motor control algorithm can support 1.0KHz to 15.0KHz carrier frequency range.. For details of carrier frequency setting, please refer to "**5.5.2 carrier frequency setting and modification**". Each model has a corresponding initial value of carrier frequency. When need to increase the carrier frequency, the inverter must be re-rating used. Otherwise, overheat or overload protection will occurs and lead to power module damage in serious cases. You can also refer to "**2.1.5 Heavy load application and de-rating use of frequency inverter**" for the guidelines.

The relation between carrier frequency change and self-learning: In vector control mode, if the carrier changes after performed self-learning, DC mode self-learning must be performed at least when drive motor. In V/F control mode, the motor can also be driven without self-learning.

No.	Name	Set range	Factory default
A0-06	Initialization	0～6	0

0: No parameters initialized

1: All parameters initialized

All parameters except the A2 group manufacturer parameters are initialized. All parameters are restored to the factory defaults after initialization completed. Please note the backup of the motor group parameters b1-00~b1-16 and b2-00~b2-16 have been obtained by self-learning.

2: Application parameter initialization

All parameters initialized except for control mode A0-04, carrier frequency A0-05, application selection A1-00, A2 group manufacturer parameters and motor group parameters b1 group and b2 group.

3~6: Reserved

No.	Name	Set range	Factory default
A0-07	Parameters upload and download	0～3	0

0: No action

1: Upload to keyboard

Upload and save the function parameters to the keyboard which set in the main control board.

2: Download (Include motor group parameters)

Download the parameters which saved in the keyboard to the main control board, except for the A2 group manufacturer parameters.

3: Download (Exclude motor group parameters)

Download the parameters which saved in the keyboard to the main control board, except for the A2 group manufacturer parameters and motor group parameters.

Note: During the parameters uploading, the keyboard displays "ULoAd" and displays "dLoAd" during downloading. A0-07 will back to 0 after the parameters upload or download completed.

No.	Name	Set range	Factory default
A0-08	Display parameter 1 when running	0x0000～0xFFFF	0x016F
A0-09	Display parameter 2 when running	0x0000～0xFFFF	0x0000

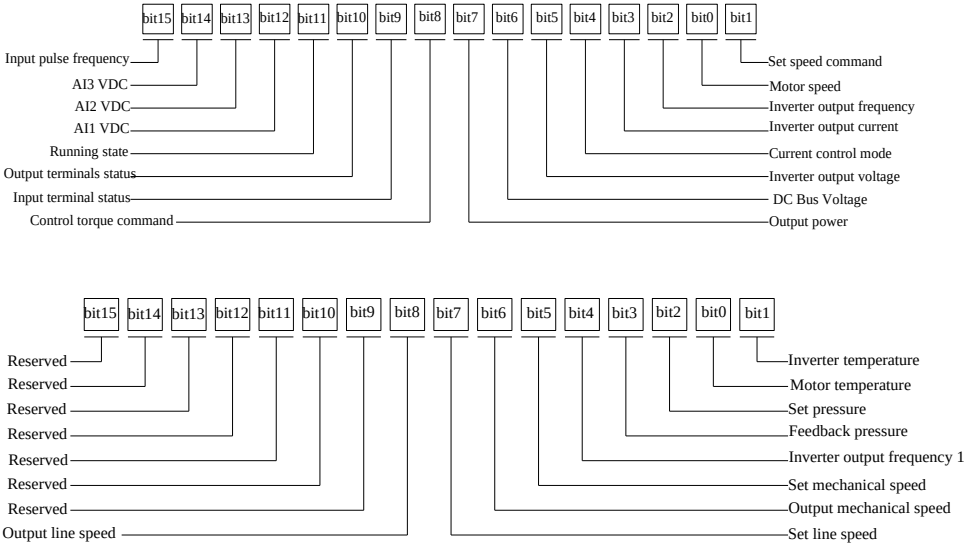


Fig.7-1 Level 0 menu display

No.	Name	Set range	Factory default
A0-10	Display parameters when Stop	0x0000～0xFFFF	0x0041

Refer to the setting of display parameters at running

No.	Name	Set range	Factory default
A0-11	Multi-function key definition	0～2	1

0: Invalid

1:Jog run

The jog function can be realized by the multi-function key on the keyboard.

2: Keyboard command channel and remote command channel switching

Through the keyboard multi-function key, you can complete the running command channel switching from “keyboard->Terminal->Communication”.

No.	Name	Set range	Factory default
A0-12	G/P model selection	0～1	0

0: G type

Generally drive load with constant torque or heavy load

1: P type

Generally drive light load like centrifugal fan or pump etc.

When select P type, the monitoring value U5-00 inverter power will change automatically and the carrier frequency A0-05 is automatically changed to 2KHz. In general, please do not increase the carrier frequency. Control mode A0-04 is generally set to V/F control, but vector control also supported.

No.	Name	Set range	Factory default
A0-13	Speed command unit selection	0～2	1

0: 0.1 Hz

The unit dimension of the relevant speed command is Hz, the Min. resolution is 0.1 and the Max. of E0-02 is 400.0 Hz.

1:0.01Hz

The unit dimension of the relevant speed command is Hz, the Min. resolution is 0.01 and the Max. of E0-02 is 199.99 Hz.

2:1r/min

The unit dimension of the relevant speed command is r/min, the Min. resolution is 0.1 and the Max. of E0-02 is 14700r/min.

7.1.2 A1:Customer application parameters

A1 group parameters are mainly used to set customer application parameters, which is convenient for viewing and modifying common parameters of the application site.

No.	Name	Set range	Factory default
A1-00	Application selection	0～20	1
A1-01～A1－49	Varies by application selection	Varies by application	Varies by application

Group A1 parameters is convenient for user to set SV800 series inverter parameters. When the application has been selected in A1-00, the A1-01-A1-49 can automatically map a variety of function parameters and arrange them according to the application. The function parameters not need to be set can keep it as factory default and the unmapped parameters can also be set in the general function code group.

0: User defined

By setting A0-02=3, the user can define the mapping function parameters of A1-01~A1-49.

1: General speed regulation

The user setting is for general speed control, and A1-01~A1-49 automatically correspond to the function parameters mapped by the manufacturer. For details, please refer to Appendix D.

2: Air supply / exhaust fan

The user sets the purpose for the air supply/exhaust fan. For details, refer to Appendix D for the manufacturer-mapped function parameters.

3: Constant pressure water supply (one inverter one pump, one inverter two pumps)

The user set the use for constant pressure water supply. For details, refer to Appendix D for the manufacturer's mapped function parameters.

4~20: Reserved

7.2 b:Induction motor parameters

Induction motor parameters mainly include basic parameter settings, nameplate parameter settings, electrical parameter settings and observations. In V/F control, one inverter can drive multiple motors. At this time, the nameplate parameters should be set to the sum of the parameters of the driven motors and a 10% margin is reserved. In vector control, one inverter drives one motor as much as possible. After set the relevant parameters well, the motor parameters self-learning must be performed. When it is necessary to use one inverter to drive multiple motors through the contactor, the parameters of multiple motors should be set correctly in this group of parameters and preparations must be made before operation.

7.2.1 b0: Induction motor basic parameters

No.	Name	Set range	Factory default
b0-00	Induction motor selection	0～1	0

The parameter used to select the second motor. When select the second motor, it is necessary to combine with the multi-function input terminal (H0-XX = 31), only the parameter is set to 1 and the multi-function input terminal with select the second motor function is ON, it will select the second motor, otherwise still the first motor parameters valid. Please refer to the "**5.4.4 Second Induction motor self-learning description**".

0: The first motor

The electric motor selected by default.

1: The second motor

The second motor is selected in combination with the multi-function terminal as the current drive motor, all the related parameters of the second motor are switched.

No.	Name	Set range	Factory default
b0-02	Motor self-learning type	0～2	0

The parameter is used to set the self-learning type of the selected induction motor. For induction motors, set the parameter and motor nameplate parameters firstly. Then press MULT to perform motor parameters self-learning. Refer to the "**5.3 Induction Motor Self-learning**" for details of the motor parameters self-learning. In vector control, it is necessary to perform full-mode self-learning in order to ensure that good control performance is obtained.

0: Do not perform self-learning

Without self-learning requirements, the parameter is 0.

1: Perform DC mode self-learning

DC mode self-learning selected.

Suitable for V/F control mode or carrier frequency changes in vector control mode or full-mode self-learning cannot be performed.

Note: Under vector control , if it cannot perform full-mode self-learning due to the restriction on the transmission working condition, please enter motor electric constant according to the motor design sheet or experience. Then perform DC mode self-learning again. For more details, please refer to "5.3 Induction Motor Self-learning".

2: Perform full-mode self-learning

Full-mode self-learning selected. Under V/F control mode ,only DC mode self-learning will be performed when full-mode self-learning selected; Please select full-mode self-learning for vector control if no special case restriction.

No.	Name	Set range	Factory default
b0-03	Motor temperature compensation function selection	0～1	0

The parameter can enable the temperature compensation function of the motor. If the motor is equipped with a temperature sensor, it can accurately detect the temperature of the stator coil to compensate the motor parameters. The V/F control does not require temperature compensation. In vector control, the motor control requires the electrical parameters of the motor equivalent circuit to establish a mathematical model for control. Based on the motor self-learning, the electrical parameters at room temperature of the motor have been obtained. Although the motor has a cooling system, the temperature will change with the change of operation time and output power, so the related parameters of the motor equivalent circuit have changed, which will cause the speed or torque control accuracy of the controlled motor to change and affect the control performance. Therefore, by detecting the temperature of the motor and setting the insulation level of the motor, the electrical parameter values of the motor can be determined as the temperature changes, which improves the stability of the motor control. In addition, because the motor temperature is known, the motor can be temperature protected. When the motor temperature or temperature rise exceeds the allowable temperature value, the motor will overheat and fail. Then the inverter will block the output and the motor will stop freely. At this time, it need to detect the motor cooling system or motor insulation resistance, etc. and check the cause of motor overheating.

0: OFF, **No temperature compensation**

The temperature compensation function of the temperature sensor is not enabled. Please keep this parameter at 0 when no temperature sensor is installed in the motor winding.

1: ON, with temperature compensation

When temperature sensor for detecting the temperature of the winding built-in, please select temperature compensation. Sensor with temperature-protected not included.

No.	Name	Set range	Factory default
b0-04	Motor temperature sensor types	0～1	0

0: PT100

1: PT1000

PT100 is default type. If NTC is used, the temperature calculation module needs to be modified. The customer needs to provide relevant NTC data. The divider resistance is fixed at 1000Ω, and

please select single polar type of the analog input interface.

No.	Name	Set range	Factory default
b0-05	Motor temperature detection input selection	0～3	0

0: Without input
1: AI1
2: AI2
3: AI3 (reserved)
When using the analog input interface as the motor temperature detection input, the analog input is not affected by the range, gain, and offset settings in the H2 group of parameters.

7.2.2 b1: The first induction motor parameters group

Under vector control, the first induction motor nameplate parameters , setting range and factory default are as follows:

No.	Name	Set range	Factory default
b1-00	First motor rated power	Three grades less power ~ Rated power	Determined with model (kW)
b1-01	First motor rated voltage	220V: 140V~230V 380V: 280V ~ 460V	Determined with model (V)
b1-02	First motor rated current	40% to 150% of the rated current of the inverter	Determined with model (A)
b1-03	First motor rated speed	E-00*25%～E-00	Determined with model (r/min)
b1-04	First motor pole number selection	2～12	4
b1-05	First motor rated frequency	b1-03*b1-04/120～ 7.0+b1-03*b1-04/120	50.0Hz
b1-06	First motor cooling method	0～1	0
b1-07	First motor PG pulse number	60～3600	1024

For V/F control, the first induction motor nameplate parameters, setting range are as follows:

No.	Name	Set range	Factory default
b1-00	First motor rated power	0~Rated power	Determined with model (kW)
b1-01	First motor rated voltage	220V: 140V~230V 380V: 280V ~ 460V	Determined with model (V)
b1-02	First motor rated current	0% to 150% of the inverter rated current	Determined with model (A)
b1-03	First motor rated speed	400r/min~24000r/min	Determined with model (r/min)
b1-04	First motor pole number selection	2~12	4
b1-05	First motor rated frequency	15.0 to the highest frequency	50.0Hz

This group of parameters is the motor nameplate parameters. When setting, it is set according to the rated value recorded on the nameplate or design sheet of the controlled motor. The motor

nameplate parameters are used during running and self-learning of the motor parameters, so they must be set before self-tuning. When the motor terminal has multiple wiring combinations, be sure to determine the motor rating under the current wiring mode. When setting the rated motor speed, it is combined with E0-00 (rotation speed / frequency upper limit).

In vector control mode (IM.SVC, IM.VC), the motor cooling mode needs to be set correctly. During vector control, the change of the motor parameters is compensated according to the temperature change of the motor (different from the compensation performed by detecting the temperature of the motor). B1-06 (forced cooling fan or water cooling) is set to 1 when the motor cooling fan is driven by another motor or the motor is water-cooled; when the fan directly connected to the motor shaft is cooled by the rotation of the motor itself, b1-06 (self-cooling fan) is set to 0.

The input range of this group of parameters is limited. The power range of the motor that can be driven by a certain power inverter is limited. Therefore, if the setting exceeds the limit when setting the nameplate, SEtE (parameter setting error) fault will be displayed. This fault cannot be reset. It disappears automatically when the setting is correct.

When the control mode is V/F control (IM.VF), the motor nameplate parameters are initialized to the nameplate of the same type of power motor, which may not match the nameplate of the motor being driven. The motor nameplate parameters are initialized to during vector control, regardless of vector or V/F control mode, please perform motor self-learning as much as possible.

No.	Name	Set range	Factory default
b1-08	First motor primary side resistance	Determined with the model	Change with the model (m Ω)
b1-09	First motor secondary side resistance	Determined with the model	Change with the model (m Ω)
b1-10	First motor leakage inductance	Determined with the model	Change with the model (m H)
b1-11	First motor mutual inductance	Determined with the model	Change with the model (m H)
b1-12	First motor inductance saturation compensation coefficient 1	Determined with the model	Change with the model (0.0%)
b1-13	First motor inductance saturation compensation coefficient 2	Determined with the model	Change with the model (0.0%)
b1-14	First motor iron loss conductance	0.0mho～600.0mho	Change with the model (0.0mho)
b1-15	First motor loss factor 1	0.0%～200.0%	Change with the model (0.0%)
b1-16	First motor loss factor 2	0.0%～200.0%	Change with the model (0.0%)

The set of parameters is the motor electrical constant necessary for vector control operations. When b0-02 (DC mode self-learning) is set to 1, b1-08 (first motor primary side resistance) is automatically set; When b0-02 (full-mode self-learning) is set to 2, all parameters are automatically set. Motor electrical constants are usually obtained by self-learning of motor parameters. If full-mode self-learning cannot be performed, manually enter this group of parameters and perform DC mode self-learning. If manually set according to the motor design

sheet, sometimes the desired characteristics cannot be obtained. , So you should do everything possible to perform a full-mode self-learning, and only need one full-mode self-learning. For details of motor parameter self-learning, refer to "5.3 Induction Motor Self-learning".

During vector control, if this set of parameters is all zero (no full-mode self-learning or correct electrical parameters have not been entered after performing DC-mode self-learning), a SEtE (operation preparation not completed) warning is displayed when the run command RUN key is input, The motor will not be allowed to drive. The motor can only be driven by performing full-mode self-learning or after entered the correct electrical parameters and perform DC mode self-learning. When the inverter model is changed, this group of parameters is all cleared, and other initializations refer to parameter A0-06 (Initialization).

The parameter b1-08 (The first motor primary side resistance) is the sum of the primary resistance of the motor (stator resistance) and the resistance of the cable between the inverter and the motor. In vector control, when the motor cable length changes greatly, DC mode self-learning needs to be performed again.

The parameter b1-09 (the first motor secondary side resistance) is the conversion value of the motor secondary resistance, i.e. the rotor resistance converted to the primary side. When the full-mode self-learning cannot be performed, it is necessary to set the conversion value of the motor at normal temperature (25℃) according to the motor design sheet. Motor self-learning should be performed at room temperature as much as possible. Especially when running in SVC control mode, it may cause the static accuracy of speed control to decrease. It is no longer necessary or recommended to repeat the self-learning after the motor self-learning is performed during debugging. The electrical parameters of the motor obtained in that way will cause the motor model to deviate from the electrical characteristics of the motor itself.

The parameter b1-10 (the first motor leakage inductance) is the leakage inductance of the motor. When the full-mode self-learning cannot be performed, it is necessary to manually set the average value of the primary side leakage inductance and the secondary side leakage inductance (primary side conversion value) according to the motor design sheet.

The parameter b1-11 (mutual inductance of the first motor) is the mutual inductance of the motor. It will change due to different magnetic fluxes. The inductance at the rated magnetic flux should be set in the parameter.

The parameters b1-12 (first motor inductance saturation compensation coefficient 1) and b1-13 (first motor inductance saturation compensation coefficient 2) are motor mutual inductance saturation compensation coefficients. When setting manually, the increase rate of 90% and 70% of the rated magnetic flux with respect to b1-11 should be set in percentages.

The parameter b1-14 (the first motor iron loss conductance) is the rated value of the conductance of the iron loss part of the motor.

The parameters b1-15 (first motor loss factor 1) and b1-16 (first motor loss factor 2) are the electrical and mechanical loss coefficients measured in full-mode self-learning which used for loss compensation in vector control.

7.2.3 b2:The second induction motor parameters group

Under vector control, the second induction motor nameplate parameters , setting range and factory default are as follows:

No.	Name	Set range	Factory default
b2-00	Second motor rated power	Three grades less power ~ Rated power	Determined with model (kW)
b2-01	Second motor rated voltage	220V: 140V~230V 380V: 280V ~ 460V	Determined with model (V)
b2-02	Second motor rated current	40% to 150% of the rated current of the inverter	Determined with model (A)
b2-03	Second motor rated speed	E-00*25%～E-00	Determined with model (r/min)
b2-04	Second motor pole number selection	2～12	4
b2-05	Second motor rated frequency	b2-03*b2-04/120～ 7.0+b2-03*b2-04/120	50.0Hz
b2-06	Second motor cooling method	0～1	0
b2-07	Second motor PG pulse number	60～3600	1024

For V/F control, the second induction motor nameplate parameters, setting range are as follows:

No.	Name	Set range	Factory default
b2-00	Second motor rated power	0~Rated power	Determined with model (kW)
b2-01	Second motor rated voltage	220V: 140V~230V 380V: 280V ~ 460V	Determined with model (V)
b2-02	Second motor rated current	0% to 150% of the inverter rated current	Determined with model (A)
b2-03	Second motor rated speed	400r/min~24000r/min	Determined with model (r/min)
b2-04	Second motor pole number selection	2~12	4
b2-05	Second motor rated frequency	15.0 to the highest frequency	50.0Hz

This group of parameters is the motor nameplate parameters. When setting, it is set according to the rated value recorded on the nameplate or design sheet of the controlled motor. Please refer to the first motor parameter description for details.

No.	Name	Set range	Factory default
b2-08	Second motor primary side resistance	Determined with the model	Change with the model (m Ω)
b2-09	Second motor secondary side resistance	Determined with the model	Change with the model (m Ω)
b2-10	Second motor leakage inductance	Determined with the model	Change with the model (m H)
b2-11	Second motor mutual inductance	Determined with the model	Change with the model (m H)

b2-12	Second motor inductance saturation compensation coefficient 1	Determined with the model	Change with the model (0.0%)
b2-13	Second motor inductance saturation compensation coefficient 2	Determined with the model	Change with the model (0.0%)
b2-14	Second motor iron loss conductance	0.0mho～600.0mho	Change with the model (0.0mho)
b2-15	Second motor loss factor 1	0.0%～200.0%	Change with the model (0.0%)
b2-16	Second motor loss factor 2	0.0%～200.0%	Change with the model (0.0%)

The set of parameters is the motor electrical constant necessary for vector control operations. For the details, please refer to the first motor parameter description.

7.3 d: debugging and controlling parameters

Through group d parameters, you can set the speed control, command input selection, speed loop auxiliary function module, torque control, V/F control. All debugging or control parameters related to speed and torque control in the motor control algorithm are classified in this group of parameters.

7.3.1 d0: speed control debugging parameters

This group of parameters mainly sets the parameters of the speed loop regulator in the speed control. The first motor and the second motor can be set separately. It also includes the selection and debugging of the speed observer, torque observer, variable structure control functions, selection and setting of spare speed loop proportional factor.

No.	Name	Set range	Factory default
d0-00	First motor speed control proportional gain	3～100	15
d0-01	First motor speed control integral time constant	20ms～10000ms	40 ms
d0-02	First motor speed control rotation inertia	0 gm²～65535 gm²	10 gm²

Set d0-00 to set the proportional gain of the first motor speed loop regulator.

Set d0-01 to set the integration time constant of the first motor speed loop regulator, also corresponds to the integral gain

Set d0-02 to set the rotational inertia of the first motor speed control. When setting the rotation inertia, it is set in the unit of gm2. For details, please refer to "**5.6.2 Setting of Motor rotation inertia**" and "**5.6.3 Setting of Speed Control Proportional Coefficient and Integration Time Constant**"

No.	Name	Set range	Factory default
d0-03	Second motor speed control proportional gain	3～100	15
d0-04	Second motor speed control integral time constant	20ms～10000ms	40 ms
d0-05	Second motor speed control moment of inertia	0 gm²～65535 gm²	10 gm²

The usage is the same as the first motor. For details, refer to "**5.6.2 Setting of Motor rotation inertia**" and "**5.6.3 Setting of Speed Control Proportional Coefficient and Integration Time Constant**".

No.	Name	Set range	Factory default
d0-09	Torque observer selection	0～1	1
d0-10	Speed observer selection	0～1	1

The speed observer and the torque observer in the speed control can be separately selected. If all canceled, the speed loop regulator is equivalent to the ordinary PI regulator. Refer to "**5.6.4 Speed Observer and Torque Observer Settings**" for details.

No.	Name	Set range	Factory default
d0-11	The trigger threshold of variable structure control parameters automatically adjust	0.01%～100.00%	SVC mode：5.00% VC mode：0.01%
d0-12	The Min. threshold of variable structure control parameters automatically adjust	0%～100%	SVC mode：20% VC mode：100%

This set of parameters is the variable structure control parameter in speed control. For details, refer to "**5.6.5 Setting of Speed Variable Structure Control Parameters**".

No.	Name	Set range	Factory default
d0-13	Speed control proportional gain 2	3～100	15
d0-14	Speed control proportional gain selection	0～2	0

The parameter d0-13 (speed control proportional gain 2) is a spare speed control proportional gain, which can be selected through parameter d0-14 (speed control proportional gain selection) or multi-function terminal or communication . For details, please refer to "**5.6. 6 Switching of speed control proportional coefficient**".

7.3.2 d1: Command input selection

This group of parameters is mainly used to set the start and stop command source of the inverter and the main speed and auxiliary speed source.

No.	Name	Set range	Factory default
d1-00	Run command input selection	0～2	0

0: Keyboard control

The operation command is controlled by the “RUN” and “STOP/RES” buttons on the keyboard. The MON light on the keyboard is ON.

1: Terminal control

The running command is controlled by the multi-function input terminal "Forward running" and "Reverse running". The MON light on the keyboard is OFF. Please refer to the multi-function input terminal for details.

2: Communication command control

The running command is controlled by the upper device through Modbus communication mode. The MON light on the keyboard flashes. Please refer to the Appendix Communication section for details.

No.	Name	Set range	Factory default
d1-01	Main speed/frequency command input selection	0～10	0

0: Keyboard digital setting by E1-00 (Keyboard potentiometer valid)

The set speed/ frequency initial value is determined by the value of E1-00 and can be modified by operating the potentiometer on the keyboard and setting of function code E1-00.

1: Keyboard digital setting by E1-00 (Keyboard potentiometer invalid)

The set frequency can only be modified by modifying the function code E1-00. The potentiometer on the keyboard is invalid.

2: AI1

3: AI2

4: Reserved

When the speed/ frequency commands are determined by analog input terminals, the analog input signal can be voltage signal 0~10 V, -10 V~+ 10 V or current signal 0~20mA and 4~20mA. For the relationship between the analog input and speed/ frequency, please refer to the **H2 group range selection and gain/ bias setting chapter content**.

5: Pulse setting HDI

The speed/ frequency commands are given by HDI high speed pulses. For the relationship between the high speed pulse input and the speed/ frequency, please refer to the **H4 group range selection and gain/ bias setting chapter content.**

The pulse signal specification: 0KHz-100KHz. The high-speed pulse signal can only be connected to the high-speed pulse terminal HDI.

6: Multi-segment instructions

When multi-speed commands is selected as the speed / frequency command source, different combinations of multi-function input terminals are required to correspond to different set speed / frequency values. The multi-function input terminal can be set with 4 multi-speed commands (11~14). The terminal function can have a maximum of 16 combinations, which can be used to select 16 speed / frequency commands in E1-00~E1-15. For details, please refer to the **multi-function input terminals and E1 group function parameters**.

7: Simple PLC

When the speed/ frequency command source is simple PLC, the operating frequency of the frequency inverter is switched between 1~16 speed/ frequency commands. The operation holding time of each speed/ frequency command and Acc./Dec. time can be set separately. Please refer to **E4 group function parameters** for details.

8: PID

When selecting the output of the process PID control as the speed / frequency command, it is generally used in situations where closed-loop control is required, such as constant pressure control.

When using PID as the speed / frequency source, you need to set the F0 group parameters. For the specific setting method, please refer to the **F0 group PID control parameters**.

9: Communications setting

The speed/ frequency command is set by the upper device communication control. For more details, please refer to the Appendix communication section.

10: SPI communication setting

The speed/ frequency command is set by the SPI communication control which just suitable for special inverter.

No.	Name	Set range	Factory default
d1-02	Auxiliary speed/frequency command input selection	0～11	0

0: Auxiliary frequency invalid

The auxiliary speed/frequency command is invalid and the speed/frequency command is only related to d1-01.

1: Keyboard digital setting by E1-01 (Keyboard potentiometer valid)

The set speed/ frequency initial value is determined by the value of E1-01 and can be modified by operating the potentiometer on the keyboard and setting of function code E1-01.

2: Keyboard digital setting by E1-01 (Keyboard potentiometer invalid)

The set frequency can only be modified by modifying the function code E1-01. The potentiometer on the keyboard is invalid.

3: AI1

4: AI2

5: Reserved

6: Pulse setting HDI

7: Multi-segment instructions

8: Simple PLC

9: PID

10: Communication setting

11: SPI communication setting

The setting method of 3~11 is the same as that of d1-01. Please refer to the description in **d1-01**.

No.	Name	Set range	Factory default
d1-03	Auxiliary speed / frequency command coefficient	1%～100%	100%

When auxiliary speed /frequency selected in d1-05 (speed/frequency superposition), this parameter is used to determine the adjustment range of the auxiliary speed/frequency command.

No.	Name	Set range	Factory default
d1-04	Auxiliary speed/frequency command coefficient reference	0～1	0

0: Relative to E0-02

Relating to E0-02 (Max. control speed/frequency).

1: Relative to the main setting frequency

Relating to the source selected in d1-01 (selected speed/frequency source).

No.	Name	Set range	Factory default
d1-05	Auxiliary velocity / frequency superposition selection	0x00～0x34	0x00

Units digits: Speed/ Frequency Source Selection

0: Main frequency source

Determined by the **d1-01**,please refer to the details in **d1-01**.

1: Calculation value of main and auxiliary source

The final speed/ frequency of the inverter is determined by the calculation value of main and auxiliary source and the calculation relationship is selected in tens digits of d1-05. The main speed/ frequency is set by d1-01 and the auxiliary speed/ frequency is set by **d1-02**.

2: **Switch between main frequency and auxiliary frequency source**

The multi-function terminal "speed/ frequency command switching" can be used to switch the main and auxiliary frequency. When it's valid, the frequency in d1-02 is selected, otherwise the frequency in d1-01 is selected.

3: Switch between the main frequency source and the calculation value of main and auxiliary source

The multi-function terminal "speed/ frequency command switching" can be used to switch the above frequency sources. When it's valid, the calculated valued would be selected. When it invalid, the frequency source in d1-01is selected.

4: Switch between the auxiliary frequency source and the calculation value of main and auxiliary source

The multi-function terminal "speed/ frequency command switching" can be used to switch the above frequency sources. When it's valid, the calculated valued would be selected. When it invalid, the frequency source in d1-02 is selected.

Tens digit: Calculation relationship between the main and auxiliary source

0: Main + auxiliary

1: Main-auxiliary

2:Max.(|Main|, |Auxiliary|)

3: Min.（|Main|, |Auxiliary|）

No.	Name	Set range	Factory default
d1-06	Jog command input	0～2	0

0: Keyboard control

Press the "**MULT/JOG**" key on the keyboard to **JOG RUN**; The "**MULT**" key definition is set in **A0-11**.

1: Terminal Control

Multi-function terminals "**FWD JOG RUN**" and "**REV JOG RUN**" can be used to J**OG RUN** control.

2: Communication Command Channel

Modbus communication controls **JOG RUN**.

No.	Name	Set range	Factory default
d1-07	Torque command selection	0～5	0

0: Keyboard parameter setting

The torque command value is set in d3-01.

1: AI1

2: AI2

The torque command value provided by AI. Voltage signal 0~10V, -10V~+10Vor current signal 0~20mA or 4~20mA can be selected. The Max. range corresponds to 300% rated torque.

3: Reserved

4: Pulse setting HDI

Pulse signal specification: 0KHz~100KHz, high-speed pulse signal can only be connected to high-speed pulse terminal HDI.

5: Communication setting

Modbus communication provides torque command value. For details, please refer to the Appendix Communication section.

No.	Name	Set range	Factory default
d1-08	Torque compensation command selection	0～5	0

0: No compensation

1: AI1

2: AI2

The torque command value provided by AI. Voltage signal 0~10V, -10V~+10Vor current signal 0~20mA or 4~20mA can be selected. The Max. range corresponds to 300% rated torque

3: Reserved

4: Pulse setting HDI

HDI high speed pulse provides the torque compensation.

Pulse signal specification: 0KHz~100KHz, it can only be connected to high-speed pulse terminal HDI.

5: Communication setting

Modbus communication controls the torque compensation. For details, please refer to the Appendix Communication section.

No.	Name	Set range	Factory default
d1-09	Shuttle speed control selection	00～11	01

Units digit: Save after power off

0: Not save

The shuttle speed not save when power off.

1: Save

Save shuttle speed when power off.

Tens digit: positive/negative

0: No negative value during adjusting

1: Positive and negative value both valid

No.	Name	Set range	Factory default
d1-10	FWD/REV key control selection	0～1	0

0: Invalid.

1: Valid.

7.3.3 d2: Operating module control parameters

Speed control related function module parameters group.

No.	Name	Set range	Factory default
d2-00	Selection of Motor Driving Mode	0～4	0

Under vector control, different control mode can be selected, speed control or torque control. The schematic diagram of the motor drive mode is shown in Fig.7-2:

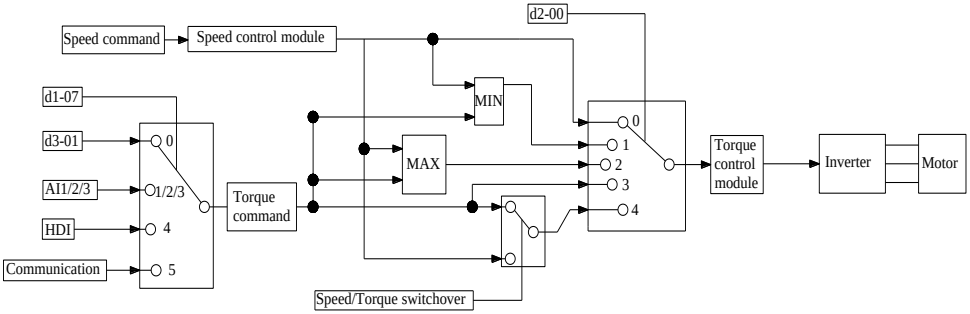


Fig.7-2 Driving mode selection

0: Speed Control Mode (ASR)

The motor speed is controlled.

1: Torque command negative side priority mode

It will select the smaller value as the actual torque command between the torque output of the speed loop adjuster the torque input command. Positive and negative symbol considered when judging.

2:Torque command positive priority mode

It will select the larger value as the actual torque command between the torque output of the speed loop adjuster the torque input command. Positive and negative symbol considered when judging.

3: Torque Control Mode (ATR)

The motor torque is controlled.

4: Speed/ torque control switching mode

The control mode can be switched by multi-function terminal (H0-XX = 10). When the terminal valid, torque control is selected. The switching is smoothly during operation and the motor speed not changed steeply.

When the priority mode is selected, it can limit the speed range under torque control mode. It means that even under torque control mode, speed can be controlled by the speed limit.

No.	Name	Set range	Factory default
d2-01	Torque Limit Value of Forward motoring	0%～300%	180%
d2-02	Torque Limit Value of Forward regenerating	-300%～0%	-180%
d2-03	Torque Limit Value of Reverse motoring	-300%～0%	-180%
d2-04	Torque Limit Value of Forward regenerating	0%～300%	180%

The motor output torque limit value can be set in four quadrants separately. During constant power interval, when absolute value instruction mode set in d3-00 (torque command mode selection), the output torque limit value decreases as the operation speed increases.

The four-quadrant torque limit value is set according to the percentage of the rated torque of the motor, the setting range can be set to be up to 300%. When the motor power is consistent with the frequency inverter power, the setting normally is not higher than 150%. The Max. value U3-05 (Max. output torque of the motor) can be calculated when the power of inverter and motor confirmed. When the four-quadrant torque limit value exceeds this effective value, the inside of the algorithm will be limited to the maximum effective value.

When the motor is switched through the multi-function terminal (H0-XX = 31), the Max. output torque effective value U3-05 of the activated motor will be recalculated. When the motor output torque limit value is set to be greater than 150%, P0-03 (motor overload protection setting) and P0-05 (over-torque protection action value setting) need to be adjusted, otherwise, oL2 (overload protection) or ot (over-torque protection) will be easily generated.

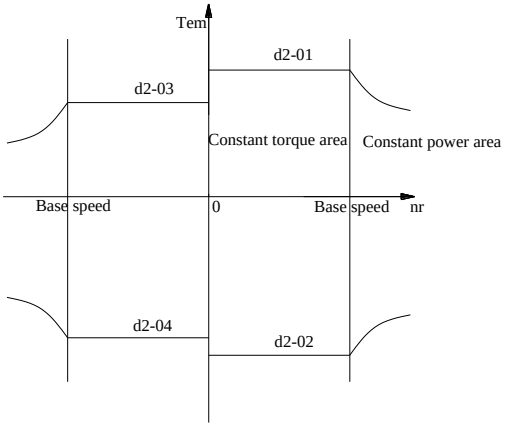


Fig.7-3 Four quadrant torque limit

No.	Name	Set range	Factory default
d2-05	High efficiency control option	0～1	0

When the load is light, you can enable the function. The magnetic field can be automatically adjusted to improve efficiency but the response performance of the speed control will reduce. Please turn off the function when require high dynamic response performance. What's more, the

function can not reduce the motor shaft output power required to drive the load as the motor shaft output power is determined by the external load.

0：OFF

1：ON

No.	Name	Set range	Factory default
d2-06	Stop mode selection	0～2	1
d2-07	Stop speed/frequency	0.00Hz～10.00Hz	1.00Hz
d2-08	DC braking time	0.0s～30.0s	0.0s
d2-09	DC braking current	20%～150%	100%

d2-06 (Stop mode selection).

0: Free stop

When the stop command input or the JOG command is canceled, the inverter blocks the output and the motor stops freely.

1: Deceleration stop

When the stop command input or the JOG command is canceled, the inverter will stop output voltage after decelerating to d2-07 (stop speed/frequency) according to the set deceleration time.

2: Deceleration + DC brake stop

When the stop command input or jog command is canceled, it will decelerate to d2-07 (stop speed/frequency) according to the set deceleration time and then enter the DC braking mode from AC mode. The braking time is set in d2-08 (DC braking time). In vector control, the braking current is set by d2-09 (DC braking current) (100% corresponds to the rated motor current). Under V/F control, the braking voltage set by d4-02 (DC braking voltage) (100.0% corresponds to the rated voltage).

The stop mode is shown in **Fig. 7-4**.

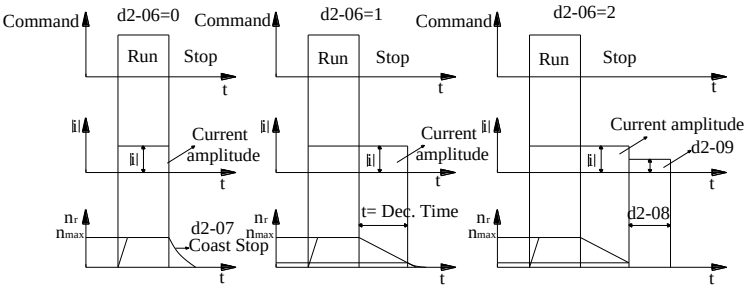


Fig. 7 - 4 Stop mode

Note: Except for speed control mode, for others mode selected in d2-00, regardless of the d2-06 setting, the stop mode is free stop.

No.	Name	Set range	Factory default
d2-10	Low limit speed / frequency operation mode	0～2	2

0:Run at the low limit speed/frequency

Keeps running at the low limit speed/frequency when the set frequency is lower than the low limit..

1: Stop by stop mode

Stop mode set in d2-06.

2: Sleep

SVC mode, when the inverter setting speed is lower than 12r/min, the motor stops and enter DC excitation operation. Under V/F control, it blocks the PWM wave.

No.	Name	Set range	Factory default
d2-11	Prohibit Reversal Mode Selection	0～2	0

0: OFF

No prohibit for the rotation direction.

1: **Prohibit running at opposite direction of the starting command**

The direction opposite to the operation command at the start of the motor is prohibited. Once the inverter is started, even if the forward/reverse run command is switched, the direction of the prohibition will not change if the inverter is not stopped. During forward rotation ,when reverse run command provided, the motor will decelerate to forward E0-01 and maintains the speed.

2: Prohibit reverse direction running

Regardless of the direction of the running command, the motor is prohibited from running in the opposite direction (the rotation direction with output voltage sequence U→V→W is forward direction). Under reverse command, the running speed/frequency is limited to forward E0-01 and maintains the speed.

Note: Under vector control, if d2-00 is set to other than 0 (speed control), the parameter must be set to 0. It means that anti-reverse function is not supported during torque control.

No.	Name	Set range	Factory default
d2-13	Anti-Regeneration stall function Selection	0～2	0

When the DC bus voltage is greater than **P0-00** + 10.0V, the activated function prevents the inverter from being tripped by overvoltage. As shown in **Fig.7-5**:

0:OFF

The function only valid within 10 seconds when start.

1:ON

2:OFF_1

Invalid all the time. Used to solve the problem that the hoisting equipment enters the overvoltage stall state when it starts.

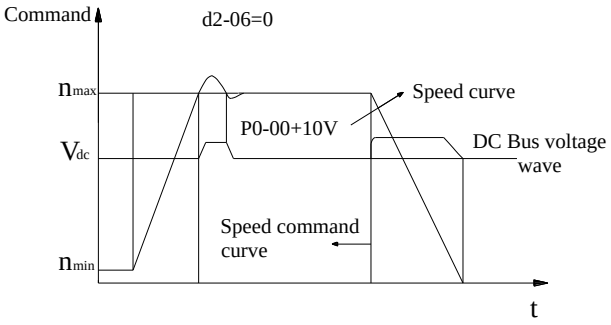


Fig.7-5 Anti-Regeneration stall Function

Note: In IM.SVC mode , the function is effective by default in 10S when start.

No.	Name	Set range	Factory default
d2-14	Pre-excitation mode selection	0～1	1

In IM.SVC mode, the AC pre-excitation mode cannot be supported because there is no speed sensor. The function used with the multi-function input terminal (H1-XX=28). For details, refer to the multi-function input terminal description.

0: AC pre-excitation

Speed sensor needed for this mode.

1: DC pre-excitation

The schematic diagram of the pre-excitation mode is shown in **Fig.7-6**:

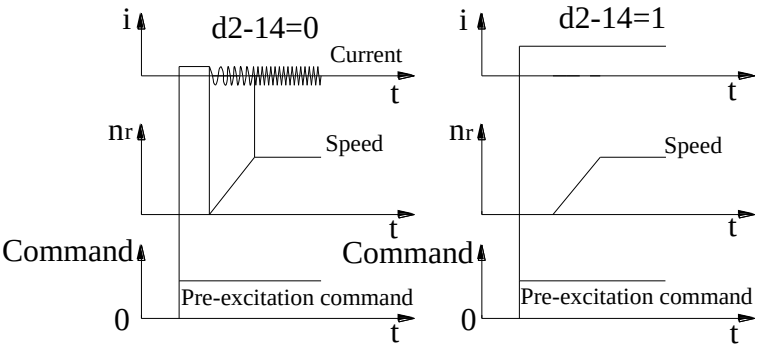


Fig. 7-6 Schematic diagram of pre-excitation mode

No.	Name	Set range	Factory default
d2-18	Droop control selection	0～1	0
d2-19	Droop start speed/frequency	0.0%～100.0%	0.0%
d2-20	Droop rate switching speed/ frequency	0.0%～100.0%	0.0%
d2-21	Droop rate	0.0%～50.0%	0.0%
d2-22	Droop start torque	0.0%～90.0%	0.0%

Various settings of droop control (no motor switching) may be used to balance multiply motor torques. It's effective in both vector control mode and V/F control mode. d2-19 and d2-20 are set according to the percentage of E0-00 (rotation speed/ frequency upper limit).

The function selected by d2-18. It is also can be prohibited by the multi-function terminal (H1-XX = 26) even if the droop function is selected by d2-18.

0:OFF

1:ON

The droop function takes effect when the speed is higher than the value in d2-19. It maintains at the setting value when the output frequency less than the set value.

d2-20: The switching speed/ frequency point of different droop rates. When the set frequency is higher than the switching frequency, it will calculate the droop amount according to the set frequency, otherwise it will calculate the droop amount according to the switching frequency. It will also calculate the droop amount according to the switching frequency when the current speed is less than the switching speed even the droop function take effect.

d2-22:It's the percentage value of the motor rated torque of the motor. There is no droop when the motor output torque is less than the set value.

The droop control setting and the illustration:

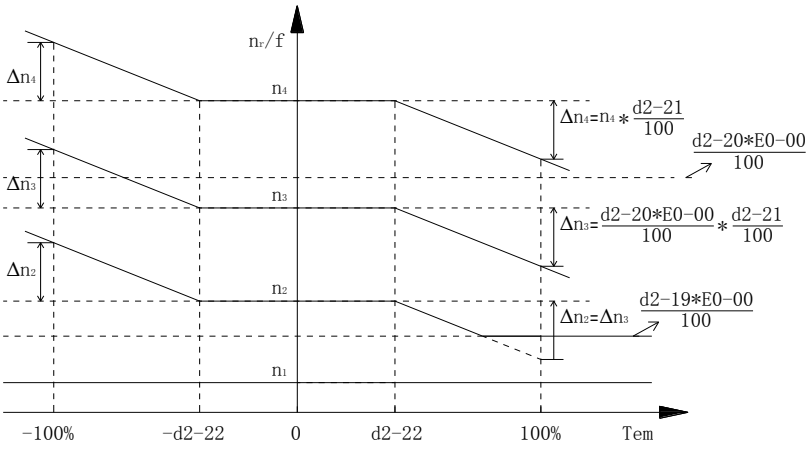


Fig. 7-7 Schematic diagram of droop control

No.	Name	Set range	Factory default
d2-23	Compensation function for mechanical loss	0～1	0
d2-24	Mechanical loss offset	0.0%～100.0%	0.0%
d2-25	Mechanical loss slope	0.000%～32.767%	0.000%

The mechanical loss compensation just used for the torque compensation of motor over-torque protection and droop control. It's not compensation for torque input command and torque monitor.

0:OFF

No compensation for mechanical loss.

1:ON

d2-24: It's the percentage value of the rated torque of the motor.

d2-25: The Max. loss at the Max. frequency E0-00, As shown in **Fig.7-8**:

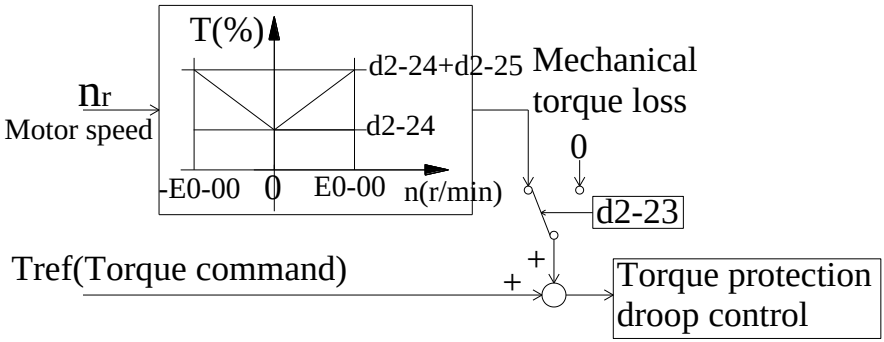


Fig. 7 - 8 Mechanical loss compensation

No.	Name	Set range	Factory default
d2-26	Timing function selection	0～1	0

When it's valid, the inverter starts timing when it starts. When it reaches the current running time set by d2-29, the output of the multi-function output terminal with the running time arrival function outputs "This runtime arrives" ON signal.

0: Invalid

1: Valid

No.	Name	Set range	Factory default
d2-27	Timing Runtime Selection	0～3	0

0: Set by d2-28

1: AI1

2: AI2

The time determined by AI. Voltage signal 0~10V, -10V~+10Vor current signal 0~20mA or 4~20mA can be selected. The Max. range corresponds to the set time in **d2-28**.

3: Reserved

No.	Name	Set range	Factory default
d2-28	Timing of Runtime	0.0～6500.0min	0.0min

Refer to **d2-27**.

No.	Name	Set range	Factory default
d2-29	Arrival time setting for this operation	0.0～6500.0min	0.0min

When the runtime arrives at the set value and the multi-function output terminal selected the run time arrival function, it outputs "the run time arrival" ON signal.

No.	Name	Set range	Factory default
d2-30	Mechanical speed coefficient	0.1%～999.9%	100.0%

The set mechanical speed and output mechanical speed can be monitored in parameters U0-31 and **U0-32**, the formula as follows:

The set mechanical speed **U0-31**=120 * **U0-00** ***d2-30** / Number of motor poles

The output mechanical speed **U0-32**=**U0-01***d2-30**

No.	Name	Set range	Factory default
d2-31	Line speed coefficient	0.1%～999.9%	100.0%

The set line speed and output line speed can be monitored in parameters U0-33 and U0-34, the formula as follows :

The set line speed **U0-33**=120 * **U0-00** × **d2-31** /60/ Number of motor poles

The output line speed **U0-32**=**U0-01**×**d2-31**/60

7.3.4 d3:Torque control module parameters

Torque control related function module parameters group.

No.	Name	Set range	Factory default
d3-00	Torque command mode selection	0～1	0

Used for determining the torque command characteristic in constant power interval or weak magnetic field of the motor. Invalid in the constant torque interval.

0:% command mode

1: Absolute value command mode

In constant power interval or weak magnetic field, even the set torque command is constant, the output torque will reduce with the speed increase.

Schematic diagram of torque command mode is shown in **Fig. 7-9**:

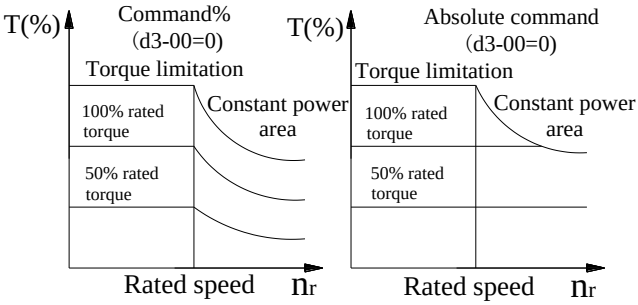


Fig. 7 - 9 Torque command mode

7.3.5 d4:V/F control mode parameters

V/F control related parameters group.

No.	Name	Set range	Factory default
d4-00	V/F torque boost mode	0～1	0
d4-01	Torque boost	0.0%～20.0%	Determined with the model

d4-00: V/F torque boost mode

0: Manual boost

The boost value set in d4-01. It suitable for one inverter drivers multiple motors mode.

1: Automatic boost

When automatic boost mode selected, the inverter automatically determines the torque boost amount according to the motor load characteristic.

Please perform motor parameters self-learning (DC mode self-learning) first, so that the boost amount at different frequencies can be accurately calculated. Also set the motor nameplate parameters in b1 and b2 groups correctly.

When manual boost mode selected, the value in d4-01 is the percentage of the motor rated voltage. When the start-up torque is insufficient, please increase the value to increase the start-up current, so as to increase the start-up torque. As shown in **Fig.7-10**:

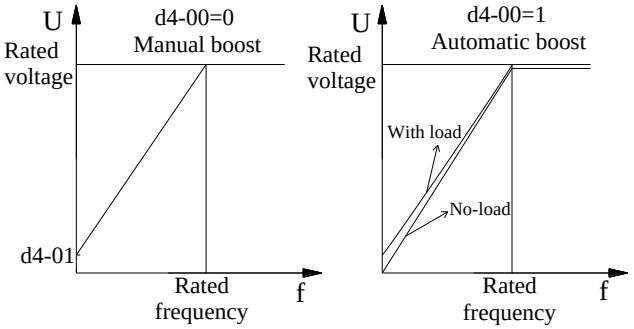


Fig. 7-10 Torque Boost

No.	Name	Set range	Factory default
d4-02	DC braking voltage	0.0%～20.0%	0.0%

It's percentage value of motor rated voltage. You can increase the value to obtain larger braking force in DC braking. But too large value will cause large current, even motor overload and other protection actions.

No.	Name	Set range	Factory default
d4-03	Stable gain	0.0%～100.0%	0.0%

Under the unstable frequency of motor rotation, increase the gain gradually until the motor rotation is stable. But too large gain may also cause instability of motor rotation.

No.	Name	Set range	Factory default
d4-04	Start mode selection	0～2	1
d4-05	Restart interval for V/F control	0.100s～10.000s	0.100s

Set the restart time after the inverter stops in d4-05. For the starting of large power motor, the free start mode may fail due to residual magnetic flux in the motor, so please increase the value in d4-05. For speed is less than 10% of Max. speed, it will restart from the Min. frequency even free start mode selected.

0: Start by speed tracking

The inverter will track the rotation speed of the motor and restart it when Running command valid.

1: Start from Min. frequency (E0-03)

2: Start from low limit frequency (E0-01)

Whether the motor rotates or not, it will restart from **E0-03** or **E0-01**.

No.	Name	Set range	Factory default
d4-06	Torque limit at motoring side	0%～200%	150%
d4-07	Torque limit at regenerating side	0%～200%	150%
d4-08	The motoring side torque limit selection	0～1	0
d4-09	The regenerating side torque limit selection	0～1	0

0:Invalid

1:Valid

In V/F control mode, torque control cannot be performed directly. The accuracy of torque limit is not high because it's indirect torque limit. When high accuracy needed, please choose vector control mode.

No.	Name	Set range	Factory default
d4-10	VF curve selection	0～6	0
d4-11	VF curve voltage 1	220V：0V～230V 380V：0V～460V	0V
d4-12	VF curve frequency 1	0.00Hz～d4-14	0.00Hz
d4-13	VF curve voltage 2	220V：0V～230V 380V：0V～460V	0V
d4-14	VF curve frequency 2	d4-12～d4-16	0.00Hz
d4-15	VF curve voltage 3	220V：0V～230V 380V：0V～460V	0V
d4-16	VF curve frequency 3	d4-14～d4-18	0.00Hz
d4-17	VF curve t voltage 4	220V：0V～230V 380V：0V～460V	0V
d4-18	VF curve frequency 4	d4-16～b1-05	0.00Hz

The V/F curve can be set with the above parameters. Straight line, quadratic curve or polyline can be selected according to the load characteristics. Straight line suitable for constant torque load, quadratic curve and decreased torque curve suitable for fan and pump load.

0: Straight line

1:1.2 power curve

2:1.4 power curve

3:1.6 power curve

4:1.8 power curve

5: 2.0 power curve

6: Polyline

When polyline selected, it can be defined by d4-11~d4-18. The relationship for each point as follow: **d4-11**<**d4-13**<**d4-15**<**d4-17**,**d4 -12**<**d4-14**<**d4-16**<**d4-18**. If set too high voltage at low frequencies, the motor may overheat or even burn out. The inverter may over-speed or over-current protection.

V/F curve as shown in **Fig. 7-11**:

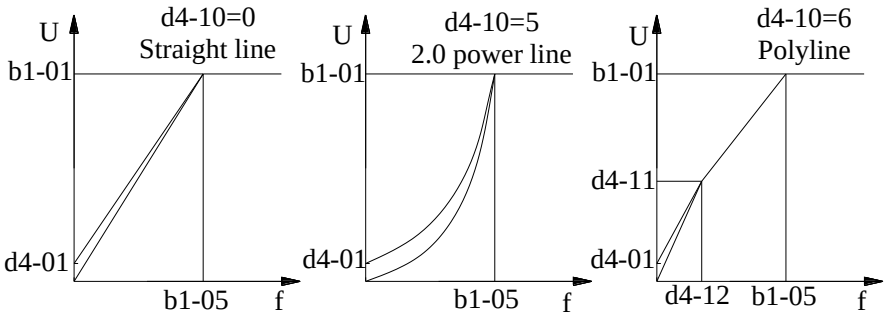


Fig. 7-11 VF curve

7.4 E: Acc./Dec. curve setting parameters

7.4.1 E0:The upper and low limit speed/ frequency

The setting of upper and low limit speed/frequency for speed control.

No.	Name	Set range	Factory default
E0-00	Upper limit speed/frequency	E0-01～E0-02	50.00Hz
E0-01	Low limit speed / frequency	E0-03~E0-00	0.00Hz
E0-02	Max. speed / frequency	10.00Hz~400.0Hz	50.00Hz
E0-03	Min. speed/frequency	0.00Hz~E0-02	0.00Hz

In vector control, the motor control algorithm supports five times weak magnetic operation, so the set range of **E0-02** is 1 to 5 times of the motor rated frequency. When the rated frequency is 50Hz, please not set it higher than 250 Hz under vector control.

Under SVC vector control, the motor control algorithm supports 12r/min lowest speed (Min. 0r/min for VC control). The motor will stop when the speed command is less than the lowest speed.

For V/F control, **E0-02** can be set as Max. 400.0Hz.

Note: When torque control mode selected in d2-00, the parameter setting is invalid.

7.4.2 E1:Speed/ frequency instructions

Multi-speed and simple PLC multi-step command and JOG speed command setting.

No.	Name	Set range	Factory default
E1-00	Speed/frequency 1	-E0-02～E0-02	50.00Hz
E1-01~ E1-15	Speed/frequency 2~16	-E0-02～E0-02	Refer to parameters list
E1-16	Jog Speed/frequency	-E0-02～E0-02	0.80Hz

For setting method, please refer to "Multi-speed Instructions 1-4" of multi-function terminal input.

7.4.3 E2: Acc./Dec. time selection

No.	Name	Set range	Factory default
E2-00	Acc./Dec. time selection during operation	0～3	0
E2-01	Acc./Dec. time selection for JOG operation	0～3	1

0: Acc./Dec. time 1

Set by **E2-02** and **E2-03**.

1: Acc./Dec. time 2

Set by **E2-04** and **E2-05**.

2: Acc./Dec. time 3

Set by **E2-06** and **E2-07**.

3: Acc./Dec. time 4

Set by **E2-08** and **E2-09**.

No.	Name	Set range	Factory default
E2-02~ E2-24	Acc./Dec. time 1 ~ Acc./Dec. time 16	0.0s～3600.0s	Determined with the model

Acc. time is defined as the time needed for increasing frequency from 0.00Hz to **E0-02**, Dec. time is defined as the time needed for decreasing frequency from **E0-02** to 0.00Hz. Factory default Acc./Dec. time set in **E2-02**, **E2-03**, Jog Acc./Dec. time set in **E2-04, E2 -05**. When multi-speed selected, each speed has its own independent Acc./Dec. time, like 1st speed corresponds to Acc./Dec. time 1. For UP/DOWN function, the change rate of the UP or DOWN frequency command determined by Acc./Dec. time 4 (**E2-08, E2-09**).

No.	Name	Set range	Factory default
E2-34	S curve Enable	0～1	0

0:OFF

1:ON

S curve is valid.

The specific time setting of S curve is determined by the multi-function input terminal "S curve Acc./Dec. time 1/2 selection".

No.	Name	Set range	Factory default
E2-35	S curve Acc. start time 1	0.0s～60.0s	0.1s
E2-36	S curve Acc. arrival time 1	0.0s～60.0s	0.1s
E2-37	S curve Dec. start time 1	0.0s～60.0s	0.1s
E2-38	S curve Dec. arrival time 1	0.0s～60.0s	0.1s
E2-39	S curve Acc. start time 2	0.0s～60.0s	0.1s
E2-40	S curve Acc. arrival time 2	0.0s～60.0s	0.1s
E2-41	S curve Dec. start time 2	0.0s～60.0s	0.1s
E2-42	S curve Dec. arrival time 2	0.0s～60.0s	0.1s

Acc./Dec. curve and S curve Acc./Dec. are shown in **Fig. 7-12**:

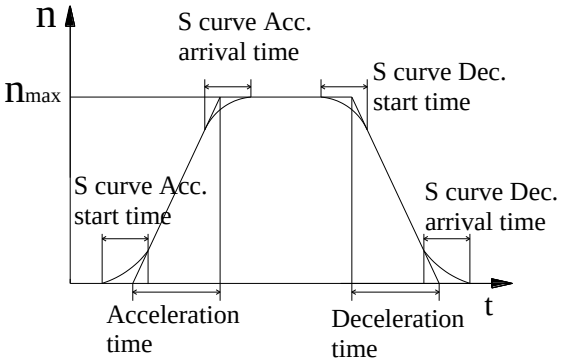


Fig. 7-12 Acc. and Dec. curve

7.4.4 E3: Jump Speed and UP/DOWN

Mainly auxiliary parameters of Acc. and Dec. curve, such as jump speed, UP/DOWN function, speed deviation limitation function and so on.

No.	Name	Set range	Factory default
E3-00	Jump speed 1	0.00Hz～E0-02	0.00Hz
E3-01	Jump speed 2		
E3-02	Jump speed 3		
E3-03	Jump speed 4		
E3-04	Jump speed amplitude	0.00Hz～10.00Hz	0.00Hz

The required jump speed is set by the parameter E3-00 to E3-03. It's invalid when the set value is 0. and the corresponding jump speed/ frequency does not enter into force when the parameter is set to zero. The jump function is mainly used for avoiding the mechanical resonance point or the non-safe speed interval during the operation of the motor. Details as shown in **Fig.7-13**:

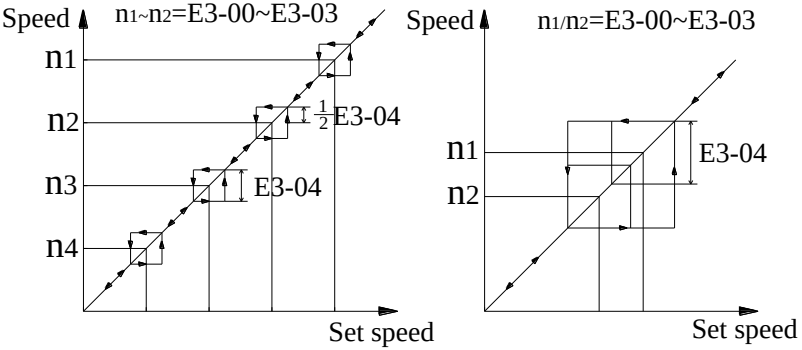


Fig.7-13 Jump speed

No.	Name	Set range	Factory default
E3-05	UP/DOWN selection	0～1	0
E3-06	UP/DOWN speed/frequency command memory selection	0～2	0
E3-07	UP/DOWN upper limit speed/frequency	E3-08～E0-02	10.00Hz
E3-08	UP/DOWN low limit speed/frequency	-E0-02～E3-07	0.00Hz

When UP/ DOWN function selected, the frequency command can be adjusted by multi-function input terminal (H0-XX = 23/24), communication, keyboard (Without shuttle key).

0:OFF

1:ON

E3-06 :UP/DOWN Speed/frequency save mode selection

0: Normal mode

Restart from the current given frequency which between the upper or low limit. If it exceeds the range, running at the limit frequency.

1: Save when Stop

Save the speed/frequency when the inverter stops. Restart from the saved speed/frequency.

2: Save when Power off

Save the speed/frequency when under-voltage fault occurs. Restart from the saved speed/frequency.

E3-07 and **E3-08** are the upper limit and low limit frequency for UP/ DOWN function. When negative value set in **E3-08**, forward and reverse operation can be switched by UP/ DOWN command.

No.	Name	Set range	Factory default
E3-09	Speed deviation limit function selection	0～1	0
E3-10	Positive deviation speed	0.0%～100.0%	5.0%
E3-11	Negative deviation speed	-100.0%～0.0%	-5.0%

0:OFF

1:ON

The function is used when the transmission mechanism does not allow the speed changes steeply. It used to set the speed deviation limit during acceleration or deceleration, just valid for vector control. The value in E3-10 and E3-11 are percentage value that relating to E0-00.

Note: When the speed deviation limit function is selected, d2-11 should be set as 0. Because the output torque is limited and processed when the anti-reverse function is enabled.

7.4.5 E4:Simple PLC and multi-speed

No.	Name	Set range	Factory default
E4-00	Simple PLC operation mode	0～3	0

0: OFF

1: Stop after single cycle

The inverter stop automatically after perform one cycle.

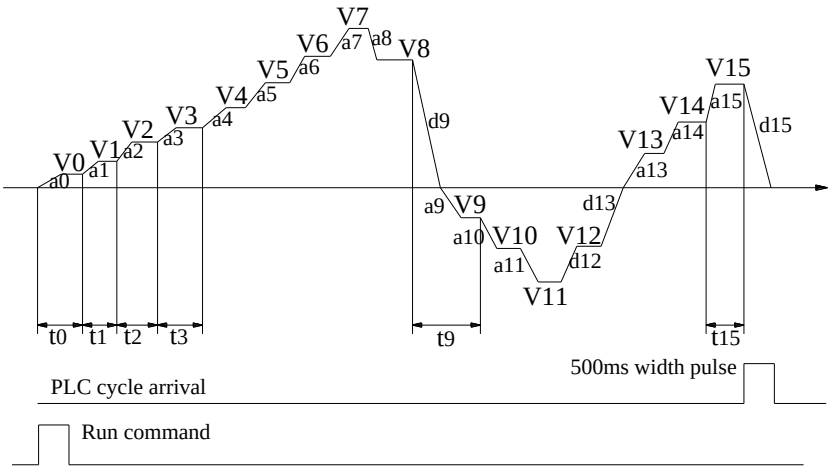


Fig. 7-14 Simple PLC stop after single cycle

2: Continuous cycle

Repeat the cycle until Stop command entered.

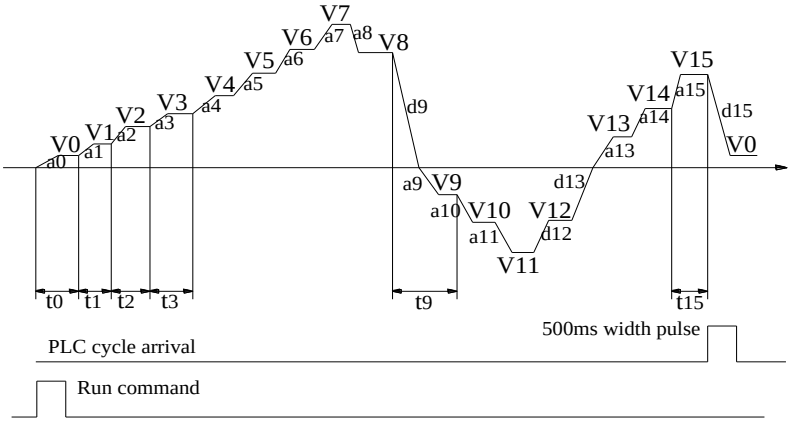


Fig.7-15 Simple PLC continuous cycle

3: Keep final value after single cycle

The inverter keeps running at the final speed after the single cycle completed until Stop command entered.

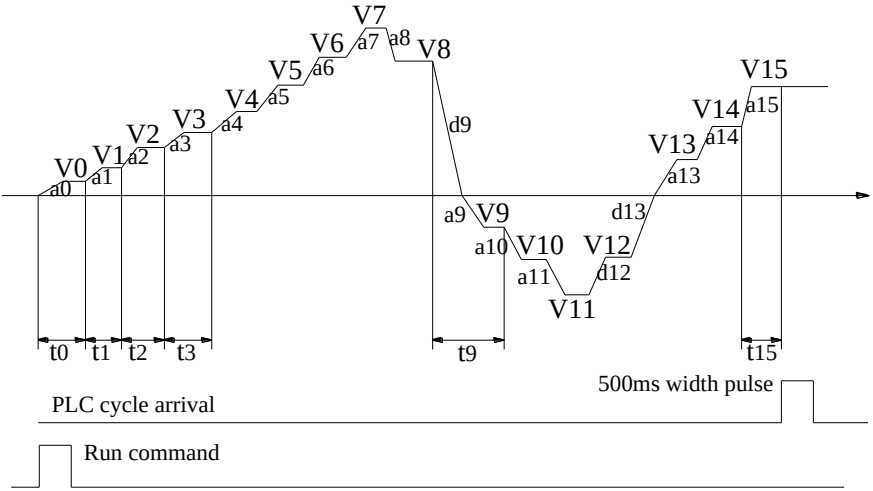


Fig. 7-16 Simple PLC keep final value after single cycle

t0 to t15: Operation time for each step.

a0 to a15: Acc. time for each step.

d0 to d15: Dec. time for each step.

V0-V15: Speed for each step.

No.	Name	Set range	Factory default
E4-01	Simple PLC memory selection when power off	0～1	0

0: Not save when power off

The simple PLC operation status not saved when power off. Restart from the first step when run again.

1: Save when power off

The simple PLC operation status saved when power off. It can be restarted from the saved status.

No.	Name	Set range	Factory default
E4-02	Simple PLC running time unit setting	0～2	0

0:Second

1:Minute

2:Hours

The unit of the running time for each step in simple PLC.

No.	Name	Set range	Factory default
E4-03~ E4-18	Simple PLC Operation Time for each step	0.0～3600.0	0.0

No.	Name	Set range	Factory default
E4-19~ E4-22	Simple PLC Acc./Dec. Time for each step	0x0000～0x3333	0x0000

Units Digits: Simple PLC Acc./Dec. time selection of Step 1

0: Acc./Dec. time 1

1: Acc./Dec. time 2

2: Acc./Dec. time 3

3: Acc./Dec. time 4

Tens Digits: Simple PLC Acc./Dec. time selection of Step 2 (Same as above)

Hundreds Digits: Simple PLC Acc./Dec. time selection of Step 3 (Same as above)

Thousands Digits: Simple PLC Acc./Dec. time selection of Step 4 (Same as above)

7.5 F:Application function parameters group

7.5.1 F0: PID control parameters

No.	Name	Set range	Factory default
F0-00	Closed-loop operation control selection	0～1	0

0: Invalid

1: Universal PID control valid

No.	Name	Set range	Factory default
F0-01	PID given Channel selection	0～6	0

0: Parameter setting (F0-02)

The PID target value set by **F0-02**.

1: AI1 analog input

2: AI2 analog input

The PID target value determined by AI. The AI signal can be 0~10V, -10V~+10V voltage signal or 0~20mA, 4~20mA current signal. The Max. range corresponds to 100.0%.

3: Reserved

4: Pulse setting HDI

The PID target value adjusted by HDI high speed pulse.
0KHz~100KHz available, high speed pulse signal can only be connected to HDI terminal.

5: Communication setting

The PID target value set by the upper devices through Modbus communication.

6: Multiple instructions setting

The PID target value set by E1-00~E1-15,it's percentage value of the multi-speed command relating to **E0-00**.

No.	Name	Set range	Factory default
F0-02	PID target value setting	0.0%～100.0%	50.0%

The PID target value set by F0-02 when F0-01= 0.

No.	Name	Set range	Factory default
F0-03	PID feedback channel selection	0～7	0

0: AI1 analog input

1: AI2 analog input

The PID feedback determined by AI. The AI signal can be 0~10V, -10V~+10V voltage signal or 0~20mA, 4~20mA current signal. The Max. range corresponds to 100.0%.

2: Reserved

3: AI1+AI2

4: AI1-AI2

5: Max.(|AI1|, |AI2|)

6:Min(|AI1|, |AI2|)

7: Pulse setting HDI

0KHz~100KHz high pulse available, the signal can only be connected to HDI terminal.

No.	Name	Set range	Factory default
F0-04	Closed-loop regulation characteristic	0～1	0

0: Positive

When the feedback value less than the target value, the output speed/frequency increases.

1: Negative

When the feedback value less than the target value, the output speed/frequency decreases. The multi-function input terminal with "PID direction reversal" function can also reverse the characteristic.

No.	Name	Set range	Factory default
F0-05	PID target/feedback range	0～65535	1000

The display range for target and feedback value when it's 100%.

No.	Name	Set range	Factory default
F0-06	Proportional gain Kp1	0.0～100.0	20.0
F0-07	Integration time Ti1	0.01s～10.00s	2.00s
F0-08	Differential time Td1	0.000s～10.000s	0.000s

Kp: Increasing the gain Kp can increase the dynamic response of the system. However, if too large Kp, the system is prone to oscillation. Steady-state error cannot be eliminated by proportional gain control alone.

Ti: Decreasing the integration time Ti can increase the system's dynamic response. However, if Ti is too small, the system has large overshoot and is prone to oscillation. The integral control can eliminate the steady-state error of the system, but cannot control the drastic changes.

Td: It can predict the variation trend of the deviation, so as to quickly respond to changes and improve dynamic performance, but it is easy to be disturbed, please use differential control with caution

No.	Name	Set range	Factory default
F0-09	PID differential limit	0.00%～100.00%	0.10%
F0-10	PID deviation limit	0.0%～20.0%	0.0%

If the deviation between the PID feedback and the target is greater than the set value, the PID regulator will start to adjust, otherwise the regulator stops and keep the output not change. The function can increase the stability of PID action.

No.	Name	Set range	Factory default
F0-11	PID reverse cutoff frequency	0.00Hz～E0-02	0.00Hz
F0-12	PID given filter time	0.00～600.00s	0.00s

It's the time for PID target value changes from 0.0% to 100.0%. Proper time can reduce the adverse effect on the system when a given amount of mutation occurs.

No.	Name	Set range	Factory default
F0-13	PID feedback filter time	0.00～60.00s	0.00s

The filter time of PID feedback, it's beneficial to reduce the influence of feedback amount being disturbed, but too large filter time will reduce the response performance of the system.

No.	Name	Set range	Factory default
F0-15	Proportional gain Kp2	0.0～100.0	20.0
F0-16	Integration time Ti2	0.01s～10.00s	2.00s
F0-17	Differential time Td2	0.000s～10.000s	0.000s

Refer to F0-06,F0-07,F0-08 for the details.

No.	Name	Set range	Factory default
F0-18	PID initial value	0.0%～100.0%	0.0%

The PID initial value valid lasts F0-19 time when the inverter starts.

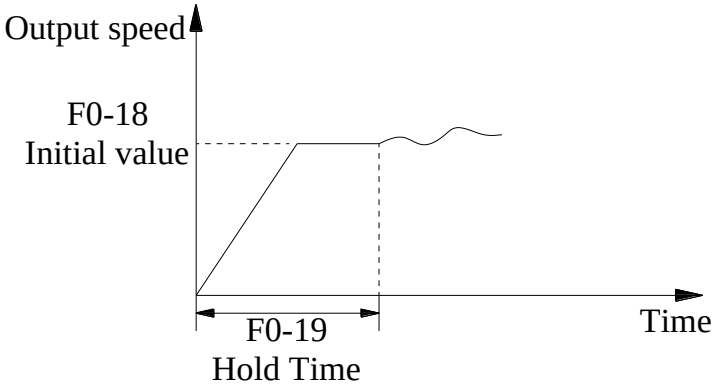


Fig.7-17 PID operates at initial value

No.	Name	Set range	Factory default
F0-19	PID initial value hold time	0.00～600.00s	0.00s

The hold time of PID initial value, when it's 0s, F0-18 invalid.

No.	Name	Set range	Factory default
F0-20	PID parameter switching condition	0～3	0
F0-21	PID parameter switching deviation 1	0.00%～F0-22	20.00%
F0-22	PID parameter switching deviation 2	F0-21～100.00%	80.00%

0: Not switch

Select the first group PID parameters,Kp1,Ti1 and Td1.

1: Switch by DI terminal

Switching by DI terminal when the multi-function terminal with "PID parameters switching" function valid.

2: Automatic switching according to deviation

When the absolute deviation is less than the value in F0-21, select the first group PID parameters. When it's larger than the value in **F0-22**, select the second group PID parameters. If the deviation value is between F0-21 and F0-22, the PID Parameters will linear transfer between two sets of PID parameters.

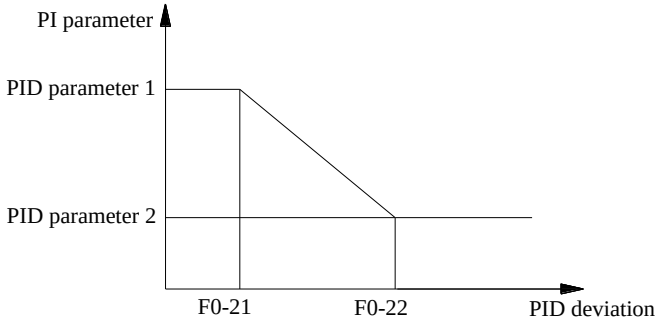


Fig. 7-18 PID parameter switching

3: Reserved

No.	Name	Set range	Factory default
F0-23	Forward Max. of two output deviations	0.00%～100.00%	1.00%
F0-24	Reverse Max. of two output deviations	0.00%～100.00%	1.00%

It's the forward and reverse maximum limit of the deviation of each PID output. To avoid the PID regulator output too large and cause the system not stable.

No.	Name	Set range	Factory default
F0-25	PID integral attribute	0x00～0x11	0x00

Units digits: Integral separated

0: Invalid

1: Valid

When integral separated function valid and the multi-function input terminal "PID integral pause" valid, the integral control of PID stops and the PID just has proportion and the

differential control.

Tens digits: Stop the integration when the output reaches the limit

0: Continue

1: Stop

Stop the integral control when the PID output reaches the Max. and Min. value. It may help to reduce the overshoot of PID.

No.	Name	Set range	Factory default
F0-26	PID feedback disconnection detection threshold	0.0%～100.0%	0.0%
F0-27	PID feedback disconnection detection time	0.0s～20.0s	0.0s

It used to judge whether the PID feedback signal is disconnection. When the feedback value less than **F0-26** and it lasts the time set in **F0- 27** setting value, the inverter gives "PID feedback loss" fault.

No.	Name	Set range	Factory default
F0-28	PID Calculating at Stop state	0～1	0

0: Invalid

No PID calculation at Stop state.

1: Valid

For PID general using, no need PID calculation when at stop state.

No.	Name	Set range	Factory default
F0-29	PID upper limit frequency	F0-30～E0-02	50.00Hz
F0-30	PID low limit frequency	E0-03～F0-29	0.00Hz

7.5.2 F1: Constant pressure water supply

This set of parameters is special for constant pressure water supply or similar system and is applied in combination with F0 group parameters.

No.	Name	Set range	Factory default
F1-00	Constant pressure water supply mode selection	0～2	0

0: Invalid

1: One Inverter one Pump

2: One Inverter two Pumps

When "**One Inverter two Pumps**" selected, please set multi-function output **H1-00**, **H1-01**, **H1-03**, **H1-04** to 31~34. They cannot be set as same value. Set as 0 when not be used.

No.	Name	Set range	Factory default
F1-01	Target pressure setting	0.00MPa～F1-02	0.20MPa

The target pressure set by **F1-01** when **F0-01**=0. The pressure setting and feedback channel are selected by **F0-01** and **F0-03**.

No.	Name	Set range	Factory default
F1-02	Pressure range	0.00MPa～10.00MPa	1.00MPa

It's the Max. pressure, which is the range of the remote pressure gauge or pressure sensor.

No.	Name	Set range	Factory default
F1-03	Sleep frequency	0.00Hz～E0-02	30.00Hz
F1-04	Sleep delay time	0.0s～3600.0s	0.0s
F1-05	Wake up pressure	0.00MPa～F1-01	0.00MPa
F1-06	Wake delay time	0.0s～3600.0s	0.0s

When the system feedback pressure is within the target pressure range and the inverter running frequency is below the value in **F1-03**, the inverter will enter sleep state after the sleep delay time of **F1-04**. After the feedback pressure is less than **F1-05** and lasts the wake up delay time set in **F1-06**, the inverter will wake up. The sleep function is invalid when the sleep delay time **F1-04**=0.

No.	Name	Set range	Factory default
F1-07	Speed/frequency deviation when add or decrease pump	0.0%～100.0%	0.5%
F1-08	Judgment frequency when adding pump	F1-09～E0-02	50.00Hz
F1-09	Judgment frequency when decreasing pump	E0-03～F1-08	10.00Hz
F1-10	Add pump delay time	0.0s～999.9s	10.0s
F1-11	Decrease pump delay time	0.0s～999.9s	5.0s

When the inverter output rises to F1-08 within the deviation range and the feedback pressure is

less than the target pressure, after delay time set in F1-10, it will add pump. When the inverter output drops to F1-09 within the deviation range and the feedback pressure is greater than the target, after the delay time set in F1-11, it will decrease pump.

No.	Name	Set range	Factory default
F1-12	Contactor control delay time	0.1s～10.0s	0.5s

It's the delay time between the varies frequency signal OFF and power supply signal ON. Electrical interlock needed for external circuit between varies frequency control and power supply control.

No.	Name	Set range	Factory default
F1-13	Automatic switching delay time	0Min～65535Min	0Min

It used to prevent one pump from rusting due to long-term non-operation or to better balance the life of two pumps. The function is invalid when the default value is 0.

No.	Name	Set range	Factory default
F1-14	Sleep pressure judgment range	0.0%～20.0%	0.0%

For single pump control, when the feedback pressure≥ target pressure-F0-10-F1-14 and meets the sleep condition, the inverter will enter sleep state. When F1-14=0, the inverter will enter sleep state when it meets the sleep condition.

No.	Name	Set range	Factory default
F1-15	Water shortage protection	0～2	0
F1-16	Water shortage protection current	10%～150%	80%
F1-17	Wake up delay time after water shortage protection	0min～3000min	60min
F1-18	Water shortage protection judgment delay time	2.0s～10.0s	2.0s

0:No protection

1: With sensor water shortage protection

Water shortage signal inputs by multi-function terminal DI. Function 45:Water shortage signal input, function 46:Enough water signal input.

2: Without sensor water shortage protection

When output frequency reaches the upper limit F0-29 and lasts the time in F1-18, if the output current is less than F1-16* motor rated current (b1-02), it will display water shortage warning code A.19 on the keyboard. Multi-function output terminal can also output ON signal when it defined as water shortage protection. After the time in F1-17 , it will reset automatically and judge again.

7.5.3 F2:Paper towel equipment parameters

No.	Name	Set range	Factory default
F2-00	Enable Non-standard	0～1	0
F2-01	Filter coefficient	0.300～2.000	0.300

7.5.4 F3:Lift and hoist equipment parameters

No.	Name	Set range	Factory default
F3-00	Lift and hoist equipment function Enable	0～1	0

0: Invalid

1: Valid

No.	Name	Set range	Factory default
F3-01	Release brake torque threshold	0%～300%	100%
F3-02	Release brake delay time	0.0s～3600.0s	3.0s

What the output torque is larger than the torque threshold and lasts the time in **F3-02**, it outputs the release brake signal.

No.	Name	Set range	Factory default
F3-03	Brake frequency value	0.00Hz～50.00Hz	3.00Hz
F3-04	Brake delay time	0.0s～3600.0s	3.0s

When the output frequency is less than or equal to the frequency set in F3-03 during shutdown, it will output brake signal after the time set in F3-04.

No.	Name	Set range	Factory default
F3-05	Emergency brake Enable	0～1	0

When the function is enabled, if the Stop command valid, it will output brake signal immediately.

No.	Name	Set range	Factory default
F3-06	Release brake frequency value	0.00Hz～50.00Hz	3.00Hz

When the output frequency is greater than or equal to the set value and the output torque meets the release condition, it outputs release brake signal.

No.	Name	Set range	Factory default
F3-07	Release brake time	0.0s～10.0s	3.0s

Release brake time for complete brake releasing smoothly.

7.6 H:Terminals function parameters

Inverter input and output terminals function setting.

7.6.1 H0: Multi-function input terminals

No.	Name	Set range	Factory default
H0-00	Multi-function input terminal DI1	0～53	3
H0-01	Multi-function input terminal DI2	0～53	4
H0-02	Multi-function input terminal DI3	0～53	1
H0-03	Multi-function input terminal DI4	0～53	20
H0-04	Multi-function input terminal DI5	0～53	0
H0-05	Multi-function input terminal DI6	0～53	0

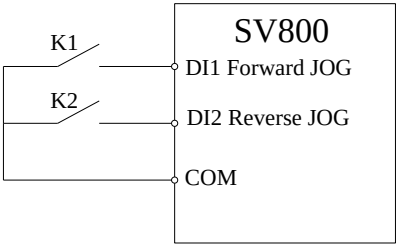
Note: The function of each terminal cannot be set to same value, otherwise the setting is unsuccessful.

0: No function

1: Forward Jog running

Forward Jog running controlled by DI. For the setting, please check **d1-06**,**E2-01**and **E1-16.**

2: Reverse Jog running



Run command	K1	K2
Forward JOG	1	0
Reverse JOG	0	1
Stop	1	1
Stop	0	0

Fig. 7-19 Jog running controlled by DI

3: Forward running

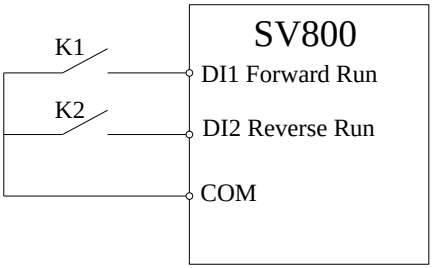
4: Reverse running

Forward or Reverse running controlled by DI. For related setting, please refer to d1-00, E2-00 and function "**Acc./Dec. time selection 1/2**".

5: Three-wire operation control

Terminal control has two control mode: two-wire control mode and three-wire control mode. When **H0-15 = 2/3**, "3-wire control mode" selected. For details about terminal control, please refer to below pictures and the setting of **H0-15.**

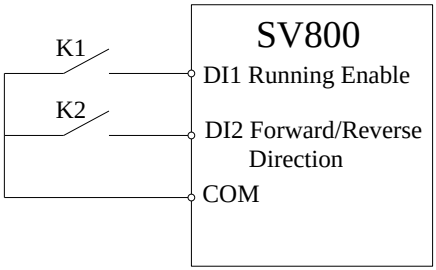
Two-wire control mode 1 (**H0-15=0**):



Run command	K1	K2
Forward Run	1	0
Reverse Run	0	1
Stop	1	1
Stop	0	0

Fig.7-20 Terminal Two-wire control mode 1

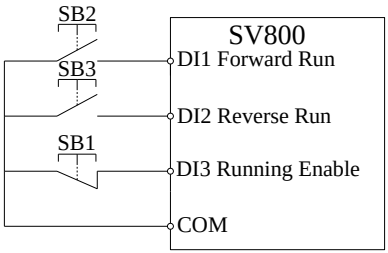
Two-wire control mode 2 (**H0-15=1**):



Run command	K1	K2
Forward Run	1	0
Reverse Run	1	1
Stop	0	1
Stop	0	0

Fig.7-21 Terminal Two-wire control mode 2

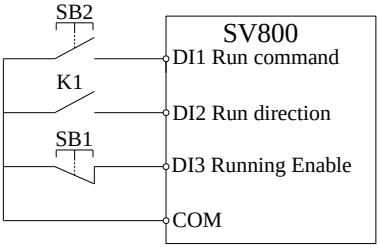
Three-wire control mode 1 (**H0-15=2**):



Run command	SB3	SB2	SB1
Forward Run	0	↑	1
Reverse Run	↑	0	1
Stop	0	↑	0
Stop	↑	0	0

Fig. 7-22 Terminals Three-wire control mode 1

Three-wire control mode 2 (**H0-15=3**):



Run command	K1	SB2	SB1
Forward Run	0	↑	1
Reverse Run	1	↑	1
Stop	0	↑	0
Stop	1	↑	0

Fig. 7-23 Terminal three-wire control mode 2

6: Forward and reverse switching

The running direction switched by DI.

7~8: Reserved

9: Free stop

When the terminal valid, the inverter blocks the output and the motor stops freely.

10: Torque control selection

When speed/torque control switching mode selected in **d2-00**, the DI used to switch between speed control and torque control.

11: Multi-speed command 1

12: Multi-speed command 2

13: Multi-speed command 3

14: Multi-speed command 4

Total 16 speeds can be selected by DI with multi-speed command 1~4 function. For details, please refer to **Table 7-1**.

Table 7-1 Multi-speed selection

Selected Speed	Multi-speed command 1	Multi-speed command 2	Multi-speed command 3	Multi-speed command 4
E1-00	OFF	OFF	OFF	OFF
E1-01	ON	OFF	OFF	OFF
E1-02	OFF	ON	OFF	OFF
E1-03	ON	ON	OFF	OFF
E1-04	OFF	OFF	ON	OFF
E1-05	ON	OFF	ON	OFF
E1-06	OFF	ON	ON	OFF
E1-07	ON	ON	ON	OFF

Selected Speed	Multi-speed command 1	Multi-speed command 2	Multi-speed command 3	Multi-speed command 4
E1-08	OFF	OFF	OFF	ON
E1-09	ON	OFF	OFF	ON
E1-10	OFF	ON	OFF	ON
E1-11	ON	ON	OFF	ON
E1-12	OFF	OFF	ON	ON
E1-13	ON	OFF	ON	ON
E1-14	OFF	ON	ON	ON
E1-15	ON	ON	ON	ON

15: Acc./Dec. time Select 1

16: Acc./Dec. time select 2

Total 4 Acc./Dec. time can be selected by DI with Acc./Dec. time select 1~2 function. For details, please refer to **Table 7-2**.

Table 7-2 Acc./Dec. Time selection

Acc./Dec. time setting	Acc./Dec. time Select 1	Acc./Dec. time Select 2
E2-02, E2-03 Acc./Dec. Time 1	OFF	OFF
E2-04, E2-05 Acc./Dec. Time 2	ON	OFF
E2-06, E2-07 Acc./Dec. Time 3	OFF	ON
E2-08, E2-09 Acc./Dec. Time 4	ON	ON

Note: It also has influence on the Acc./Dec. time of operation and Jog running.

17: S curve Acc./Dec. time 1 selection

18: S curve Acc./Dec. time 2 selection

The setting of S curve Acc./Dec. time, please refer to **Table 7-3.**

Table 7-3 S curve Acc./Dec. Time selection

Acc./Dec. time setting	S curve Acc./Dec. time Select 1	S curve Acc./Dec. time Select 2
S curve Acc./Dec. time 1	ON	OFF
S curve Acc./Dec. time 2	OFF	ON

Note: When S curve Acc./Dec. time Select 1 and S curve Acc./Dec. time Select 2 both ON or OFF, the Acc./Dec. time invalid.

19: Speed keeping

Keep running at the current frequency until the terminal invalid or decelerating when Stop command valid.

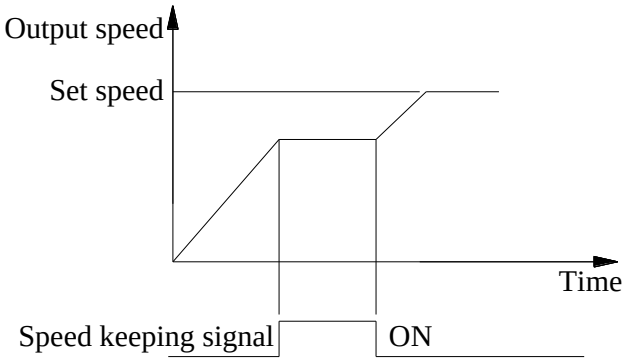


Fig. 7 - 24 Speed keeping by DI

20: Fault reset

21: External fault input (Normal open)

22: External fault input (Normal closed)

The inverter gives "External fault " when the terminal with function 21 and 22 valid, it locks the output immediately.

23: Speed increase command UP

24: Speed decrease command DOWN

When UP/DOWN function selected, DI with function 23 and 24 can be used to increase and decrease the frequency. The related parameters are **E3-05** to **E3-08**.

25: Clear the set of UP/DOWN

26: Prohibit Drooping function

The DI used to prohibit drooping function. For drooping function, please refer to parameters **d2-18** to **d2-22**.

27: DC braking command

When DC braking command provided by DI, it has some difference with the DC braking mode during deceleration. When the DI valid, the inverter outputs DC braking current and start the braking function. Under vector control, the DC braking current set in **d2-09**. For V/F control, the braking voltage set in **d4-02**. When the DI changes to invalid, after braking time set in **d2-08**, the inverter blocks the output.

28: Pre-excitation command

Pre-excitation command controlled by multi-function DI. Please select pre-excitation mode in **d2-14**. Only DC pre-excitation mode is supported for SVC control mode. The pre-excitation command priority is lower than the running, Jog and DC braking command.

29: Reserved

30: Reserved

31: Select Second motor

When second motor selected in b0-00 and the DI with the selected function is valid, the parameters in b2 group would be selected in the inverter.

For details, please refer to the "**7.2.3 Second Induction Motor Parameter b2 Group**".

Note: The connection of inverter UVW and the motor and the feedback signal (VC control mode) also need to be switched correctly when switching motor parameters.

32: Reserved

33: Reserved

34: Triggered into the next step in Simple PLC

When the DI with the function valid during simple PLC, it will skip to the next step from the current step.

35: Speed/ frequency command switching

The DI with the function used to switching different speed/ frequency source. For details, please refer to **d1-05**.

36: Main speed/ frequency command switches to digital setting

When the terminal valid, the frequency set in **E1-00** is selected as main frequency, otherwise it determined by **d1-01**.

37: Auxiliary speed/ frequency command switches to digital setting

When the terminal valid, the frequency set in **E1-01** is selected as auxiliary frequency, otherwise it determined by **d1-02**.

38: Suspend PID operation

When the terminal valid, the PID regulator stops adjusting and keeps the current output frequency unchanged until the terminal becomes invalid.

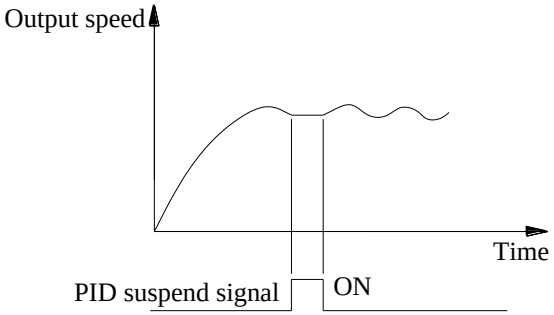


Fig. 7-25 PID operation suspended

39: Reverse PID direction

Reverse the PID direction by the DI. The PID adjustment characteristics set in F0-04. For details, please refer to **Table 7-4.**

Table 7-4 PID regulation positive and negative characteristics

PID regulation	F0-04	DI with Reverse direction
Positive	0	OFF
Negative	0	ON
Positive	1	ON
Negative	1	OFF

40: Suspend PID integration

PID integration can be suspended by the DI with the function. For details, please refer to **F0-25**.

41: PID parameters switching

PID parameters switched by the DI with the function. Please refer to **F0-20** for details.

42: Simple PLC status reset

The inverter starts simple PLC operation from the initial status after the status has been reset.

43: Suspend Simple PLC operation

Keeps running at the current frequency until the DI with the function becomes invalid, then back to run at simple PLC operation.

44: External stop command

When the DI is valid, the inverter will stops according to the stop mode set in **d2-06**.

45: Water shortage protection

When F1-15=1 and the DI is valid, the inverter will give water shortage A.19 alarm.

46: Water enough signal input

When F1-15=1 and the DI is valid, water shortage A.19 alarm would be reset.

47-49: Reserved

50: Brake open confirmation

During the controlling of mechanical brake in lift or hoist device, if the brake open confirmation signal not valid after Release brake signal provided, the inverter not enter the next step.

51: Switch Running command to the keyboard

Keyboard control is selected when the DI is valid.

52: Switch Running command to terminal

Terminal control is selected when the DI is valid.

53: Switch Running command to communication

Communication control is selected when the DI is valid.

No.	Name	Set range	Factory default
H0-12	Polarity selection	0x000～0x3F	0x000

0: Positive logic

The status of DI is valid when the DI connects to COM. Low

1: Negative logic

The status of DI is valid when the DI not connect to COM.
Bit0-bit 5 relating to DI~DI6.

No.	Name	Set range	Factory default
H0-13	Multi-function input terminals filtering time 1	0.000s～1.000s	0.010s
H0-14	Multi-function input terminals filter time 2	0.000s～1.000s	0.010s

H0-13 and **H0-14** are the filter time for DI1~DI12 terminals, **H0-13** for DI1 and DI2, **H0-14** for DI3~DI6. The anti-interference ability of the terminal can be effectively improved by setting proper filter time, but too large value will lead to slow response of DI.

No.	Name	Set range	Factory default
H0-15	Terminal Start/Stop control mode	0～3	0

0: Two-wire mode 1

1: Two-wire mode 2

2: Three-wire mode 1

3: Three-wire mode 2

For more details, please refer to the function "3-wire operation control " with function code 5 in multi-function terminal.

7.6.2 H1: Multi-function output terminals

No.	Name	Set range	Factory default
H1-00	Multi-function output terminal DO1	0～40	0
H1-01	Multi-function output terminal DO2	0～40	0
H1-03	Multi-function output terminal M1	0～40	35
H1-04	Multi-function output terminal M2	0～40	0

0: No function

1: End of Simple PLC multi-step operation

When one cycle of simple PLC completed, it outputs ON signal and lasts 500 ms.

2: Detection speed 1 (Detection speed = speed in H1-07)

When the output speed = the speed set in H1-07, it outputs ON signal.

3: Speed detection 1 (Detection speed ≥speed in H1-07)

When the output speed ≥the speed set in H1-07, it outputs ON signal.

4: Speed detection 1 (Detection speed ≤speed in H1-07)

When the output speed ≤ the speed set in H1-07, it outputs ON signal.

5: Speed detection 2 (Detection speed = speed in H1-08)

When the output speed = the speed set in H1-07, it outputs ON signal.

6: Speed detection 2 (Detection speed ≥speed in H1-08)

When the output speed ≥the speed set in H1-07, it outputs ON signal.

7: Speed detection 2 (Detection speed ≤speed in H1-08)

When the output speed ≤ the speed set in H1-07, it outputs ON signal.

8: Speed arrives

When the output speed reaches the set speed within the amplitude set in **H1-09**, it outputs ON signal.

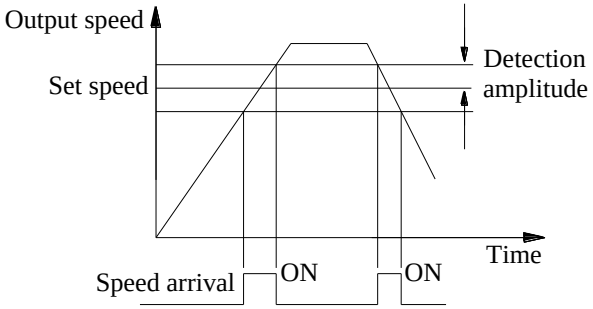


Fig.7-26 The speed arrives signal

9: Torque detected

When the output torque larger than the value in **H1-10**, it outputs ON signal.

10: Absolute torque detected

When the absolute value torque output larger than the value in **H1-11**, it outputs ON signal.

12: Overload pre-alarm

When the output current is larger than the value of **H1-12**, it outputs ON signal.

14: During reverse running

When the output speed is negative, it outputs ON signal.

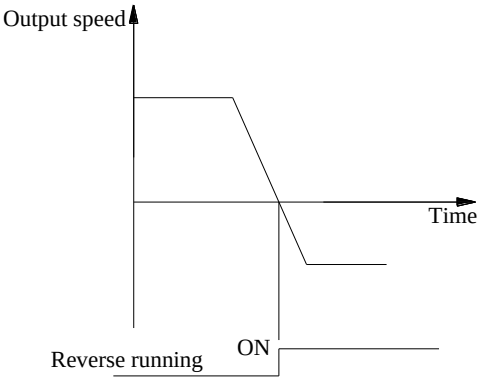


Fig.7-27 Reverse running signal

16: Inverter running (Not include DC braking)

During running status, it outputs ON signal. Become OFF when stopped.

17: In failure

During failure status, it outputs ON signal.

18: Speed limiting

When the output speed ≥ the speed set in **E0-00** or ≤ the speed set in **E0-01**, it outputs ON signal.

19: Torque limiting

When the output torque reaches the torque limit of motoring or braking, it outputs ON signal.

20:Ready to run

It outputs ON signal when the inverter without any fault after power on and the parameters set correctly.

21: Upper limit speed arrives

When the output speed reaches the limit set in **E0-00**, it outputs ON signal.

22: Low limit speed arrives

When the output speed reaches the limit set in **E0-01**, it outputs ON signal.

23: Under-voltage status output

When the inverter bus voltage less than the under-voltage level, it outputs ON signal and the keyboard displays "LU" alarm.

25: FCL activated

When the inverter is in the FCL protection, it outputs ON signal.

29: The running time arrives

When the timing function selected and the running time reaches the time set in d2-29, it outputs ON signal.

30: Motor overheat warning

When the detected motor temperature reaches the value set in **P0-12**, it outputs ON signal.

31: Connect 1# pump to inverter
32: Connect 1# pump to power supply
33: Connect 2# pump to inverter
34: Connect 2# pump to power supply

35: Running (including DC braking)

During running and DC braking status, it outputs ON signal.

36: Set by communication

The state of DO controlled by communication. The register address is 0x600B. When the set value is 1, it outputs ON signal. It's OFF when the set value is 0. For details, please refer to **Appendix B**.

37: Water shortage protection

During water shortage alarm, it outputs ON signal. It becomes OFF after the fault recovery.

38-39: Reserved

40: Brake control output

When the brake control signal is valid, it outputs ON signal.

No.	Name	Set range	Factory default
H1-05	Multi-function relay output M1 delay time	0.0s～3600.0s	0.0s
H1-06	Multi-function relay output M2 delay time	0.0s～3600.0s	0.0s

When delay time set in H1-05 and H1-06,the relay M1 and M2 will output ON signal after the delay time when the signal is valid.

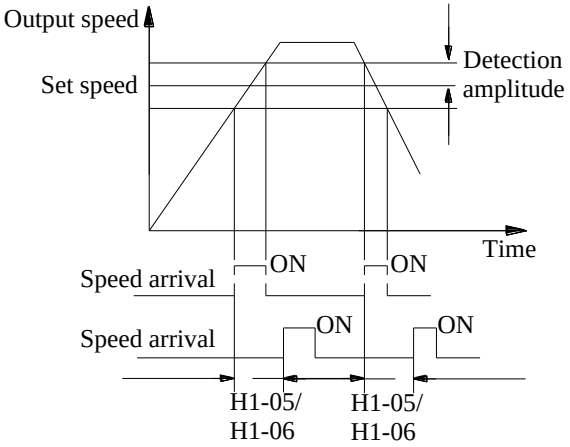


Fig.7-28 Delay output

No.	Name	Set range	Factory default
H1-07	Detection speed 1	0.0%～100.0%	0.0%
H1-08	Detection speed 2	-100.0%～100.0%	0.0%

Used to set the detection speed level, which is percentage value of **E0-02**.

No.	Name	Set range	Factory default
H1-09	Speed detection amplitude	0.0%～40.0%	0.0%

The amplitude used with multi-function DO “Speed arrives ” together, it’s percentage value of **E0-02**.

No.	Name	Set range	Factory default
H1-10	Torque detection instruction (Bipolarity)	-305%～305%	0%
H1-11	Torque Detection Instruction (Absolute Value)	0%～305 %	0%

H1-10 and **H1-11** used to set the torque detection level, which used with multi-function DO "Torque detection" and "Absolute torque detection" together. The DO outputs ON signal when

the detected torque reaches the set value.

No.	Name	Set range	Factory default
H1-12	Overload pre-alarm setting	0%～100%	50%

It used with multi-function DO "Overload pre-alarm setting" together. **H1-12** is a percentage value of the motor rated current.

No.	Name	Set range	Factory default
H1-13	TA-TB-TC Relay Function Selection	0～40	17

The Factory default is defined as inverter fault. Other functions as same as **H1-00**.

7.6.3 H2: Multi-function Analog input AI

No.	Name	Set range	Factory default
H2-00	Analog input AI1 range selection	0～2	0

0:0~10V

The negative input signal is limited to 0V.

1:Reserved

2:4~20mA

Please put the S2 dip switch on the right position when select voltage or current signal in **H2-00**. Factory default is voltage signal.

No.	Name	Set range	Factory default
H2-01	AI1 gain setting	-300.0%～300.0%	100.0%
H2-02	AI1 bias setting	-300.0%～300.0%	0.0%

Please refer to **Fig.7-29** for gain and bias settings:

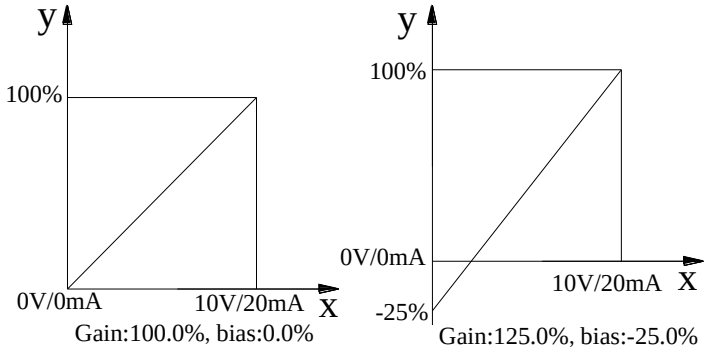


Fig. 7-29 AI input

No.	Name	Set range	Factory default
H2-03	AI2 range selection	0～1	0

0:0~10V

The negative input signal is limited to 0V.

1:-10V~10V

The gain and bias set in H2-04 and H2-05.

No.	Name	Set range	Factory default
H2-04	AI2 gain setting	-300.0%～300.0%	100.0%
H2-05	AI2 bias setting	-300.0%～300.0%	0.0%

100.0% relating to 10V signal.

No.	Name	Set range	Factory default
H2-09	AI1 filter time	0.000s～10.000s	0.100s
H2-10	AI2 filter time	0.000s～10.000s	0.100s

Increasing filter time of AI can increase the anti-interference ability, but the response will become slow.

No.	Name	Set range	Factory default
H2-12	The Min. detection of AI	0.000V～1.000V	0.040V

When the input AI value less than the value in **H2-12**, it will be regard as 0V.

7.6.4 H3: Multi-function analog output AO

No.	Name	Set range	Factory default
H3-00	Multi-function AO1 function selection	0～12	3

Please refer to information in Table 7 -5 for specific settings.

No.	Name	Set range	Factory default
H3-01	Multi-function AO1 range selection	0～2	0

0:0~10V

1:Reserved

2:4~20mA

The gain and bias of AO1 set in **H3-02** and **H3-03**.

Please put S1 DIP switch on the right position when voltage or current signal selected in **H3-01**.

No.	Name	Set range	Factory default
H3-02	AO1 gain setting	-300.0%～300.0%	100.0%
H3-03	AO1 bias setting	0.0%～300.0%	0.0%

For the setting method, please refer to **Fig. 7-30**:

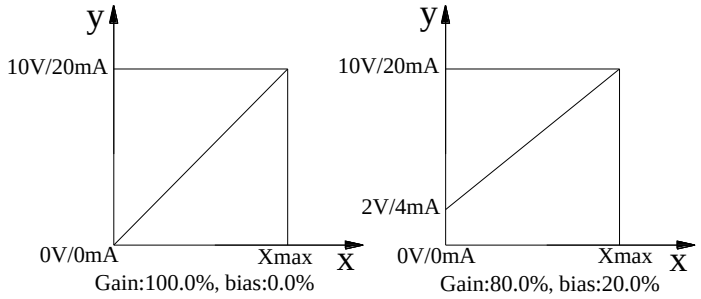


Fig. 7-30 AO analog output

Xmax: The required Max. output of AO.

No.	Name	Set range	Factory default
H3-04	AO1 filter time	0.00s～10.00s	0.10s
H3-05	Multi-function AO2 function selection	0～12	0

Please refer to information in Table 7 -5 for specific settings.

No.	Name	Set range	Factory default
H3-07	AO2 gain setting	-300.0%～300.0%	100.0%
H3-08	AO2 bias Setting	0.0%～300.0%	0.0%

For the setting method, please refer to the information in **H3-02** and **H3-03**.

No.	Name	Set range	Factory default
H3-09	AO2 filter time	0.00s～10.00s	0.10s

Table 7-5 Analog output function

Set value	Function	Range
0	No function	
1	The set speed command	0~ Upper limit speed/frequency
2	Motor speed	0~ Upper limit speed/frequency
3	Inverter output frequency	0~ Upper limit speed/frequency
4	Inverter output current	0~2 times motor rated current
5	Inverter output voltage	0~ motor rated voltage
6	DC bus voltage	0.0~1000.0V
7	Torque command	0%~300%
8	AI1 input signal (Converted to voltage)	0.00~10.00V
9	AI2 input signal (Converted to voltage)	0.00~10.00V
10	AI3 input signal (Converted to voltage)	0.00~10.00V
11	Input pulse frequency	0~H4-00
12	Motor output torque	0~Motor Max. output torque

7.6.5 H4: Multi-function pulse input and output

No.	Name	Set range	Factory default
H4-00	Pulse input HDI range setting	0.10KHz～100.00KHz	20.00KHz

Used to set the Max. range of high speed pulse input.

No.	Name	Set range	Factory default
H4-01	HDI gain setting	0.0%～200.0%	100.0%
H4-02	HDI bias setting	-100.0%～100.0%	0.0%

The setting method is same as AI. Please refer to the information in **H2-01** and **H2-02**.

No.	Name	Set range	Factory default
H4-03	HDI input filter time	0.00s～20.00s	0.10s
H4-04	HDI Min. input frequency	1Hz～10000Hz	1Hz

When the high pulse input frequency less than the set value in **H4-04**, it cannot be sampled effectively.

No.	Name	Set range	Factory default
H4-05	Multi-function Pulse output HDO function	0～9	0

Please refer to Table 7-6 for specific Settings.

No.	Name	Set range	Factory default
H4-06	HDO output range setting	0.10KHz～100.00KHz	20.00KHz

Used to set the Max. pulse frequency of the highs peed pulse output terminal.

Table 7-6 Pulse output function

Set value	Function	Range
0	No function	
1	The set speed command	0~ Upper limit speed/frequency
2	Motor speed	0~ Upper limit speed/frequency
3	Inverter output frequency	0~ Upper limit speed/frequency
4	Inverter output current	0~2 times motor rated current
5	Inverter output voltage	0~ motor rated voltage
6	DC bus voltage	0.0~1000.0V
7	Torque command	0%~300%
8	Input pulse frequency	0~H4-00
9	Motor output torque	0~Motor Max. output torque

7.7 L:Communication parameters

Modbus communication parameters set in L group.

7.7.1 L0:Basic communication parameters

No.	Name	Set range	Factory default
L0-00	Baud rate selection	0～5	2

0：4800bps
1：9600bps
2：19200bps
3：38400bps
4：57600bps
5：115200bps

No.	Name	Set range	Factory default
L0-01	Data format	0～2	0

0: No parity (8-N-1)
1: Even parity (8-E-1)
2: Odd parity (8-O-1)

No.	Name	Set range	Factory default
L0-02	Local address	0～247	1

0 is the broadcast address, available address 1~247.

No.	Name	Set range	Factory default
L0-03	Response delay	1ms～20ms	5ms

The response delay time of the inverter to the upper device.

No.	Name	Set range	Factory default
L0-04	Communication timeout	0.0s～20.0s	0.0s

The detection time of communication timeout. When it's 0, function is invalid.

No.	Name	Set range	Factory default
L0-05	Communication mode selection	0～1	0

0:Modbus RTU
1:Reserved

7.8 P:Protection parameters

7.8.1 P0:Basic protection parameters

Main protection parameters for the inverter and the motor.

No.	Name	Set range	Factory default
P0-00	Braking voltage level of braking unit	380V：640.0～720.0V	680.0V

Energy consumption brake trigger voltage level:
380 V grade type:680.0V, 220V grade type:340.0V.
Please refer to "**Appendix A:Braking**" about the wiring of braking resistor.
When the DC bus voltage is higher than the set voltage which caused by fast decreasing, the internal braking unit turn on. If the DC bus voltage falls below the brake voltage 5V, the braking unit closed. Please set the braking voltage level properly according to different grade inverter.

No.	Name	Set range	Factory default
P0-01	Positive side over-speed setting	0%～150%	120%
P0-02	Negative side over-speed setting	-150%～0%	120%

P0-01 and **P0-02** is a percentage value of **E0-00**. When the output frequency larger than the set value, the inverter will stop and display **oS** alarm and the motor stop freely.

No.	Name	Set range	Factory default
P0-03	Motor overload protection	20%～300%	100%

100% relates to the rated current of the driven motor. When P0-0 =100%, the protection level is 150% 1 minute. Then the inverter displays oL2 alarm and blocks output and the motor stops freely.
Motor overload protection time calculation:

Overload time (S) = 2700/ ((motor current/ motor overload protection current) * 100-105)

The overload alarm can be reset by STOP/ RST key on keyboard, multi-function terminal (**H0-XX** = 20) and communication are reset.
The overload protection count value of the motor can be monitored by **U3-00** (overload cumulative percentage) which is the Max. value of the motor overload or over-torque and the inverter overload or over-torque. The motor overload protection as shown in **Fig.7-31**:

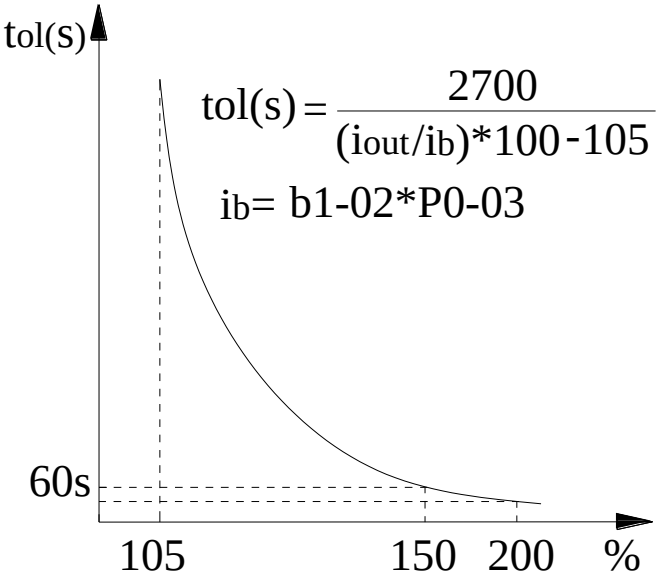


Fig. 7-31 Motor overload protection

Please also pay attention to the normal motor with self-cooling mode. When the motor runs at low speed, the cooling effect will decrease and may cause motor over-heat.

No.	Name	Set range	Factory default
P0-04	Over torque protection	0～1	0
P0-05	Over torque protection action value	110%～305%	150%
P0-06	Over torque protection reference torque	50%～105%	105%

Over torque protection is selected in **P0-04**. After compensated the mechanical loss, when the motor output torque exceeds **P0-06**, the over torque counter starts to count. When the output torque exceeds the value in P0-05, the inverter allowed to run for 1 minute. Then it will display **ot** blocks the output and the motor stops freely.

Motor over torque protection time calculation:

Over torque time (S) = 60 * (P0-05 - P0-06) / (torque command - P0-06)

The over-torque protection alarm can be reset by STOP/RST key on the keyboard, multi-function DI (**H0-XX**=20) and communication.

Motor over torque protection is shown in **Fig.7-32**:

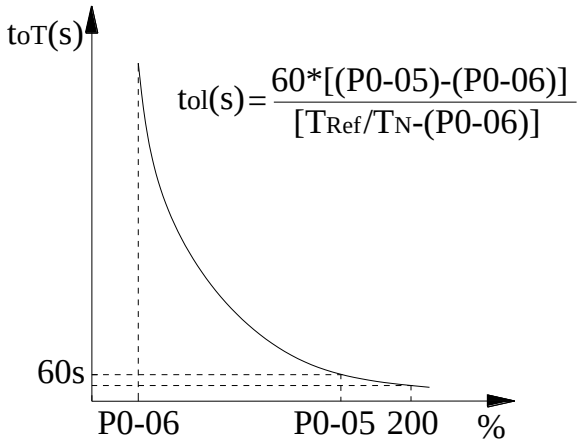


Fig. 7-32 Motor Over-Torque Protection

The over torque protection count value of the motor can be monitored by **U3-00** (overload cumulative percentage) which is the Max. value of the motor overload or over-torque. The overload or over-torque counter counts simultaneously with time under overload condition, when it reaches 100.00%, the inverter enters overload or over-torque protection.

No.	Name	Set range	Factory default
P0-07	Speed control error function selection	0～1	0
P0-08	Speed control error positive side detection amplitude	1.67Hz～16.67Hz	3.33Hz
P0-09	Speed control error negative side detection amplitude	-16.67Hz～-1.67Hz	-3.33Hz

The speed control error function selected by **P0-07**, it only effective for vector control. When the estimated speed or detected speed exceeds the speed command with the amplitude in **P0-08** or **P0-09**, the inverter will stop and display **SC** alarm and the motor stops freely. When the speed loop control or the speed sensor is abnormal and the load torque exceeds the torque limit value, the protection will also work.

No.	Name	Set range	Factory default
P0-11	Motor overheat protection threshold	80℃~180℃	110℃
P0-12	Motor overheat pre-alarm threshold	80℃~180℃	90℃

The multi-function DO with “Motor overheat pre-alarm” outputs ON signal when the motor temperature reaches the value in P0-12.

No.	Name	Set range	Factory default
P0-13	Fault self-recovery times	0～20	0
P0-14	Fault self-recovery interval	1.0s～100.0s	10.0s

When fault occurs, the inverter will reset fault automatically after delay time set in **P0-14** until the self-recovery times exceeds the value in **P0-13**. The function is invalid when it's 0.

Note: Inverter overheat, motor overheat, IGBT protection, motor self-learning fault cannot be self-recovery.

No.	Name	Set range	Factory default
P0-15	Relay action selection when automatic fault reset	0～1	0

When fault self-recovery function selected, the fault relay action can be set in **P0-15**.

0:Relay does not operate

1:Relay action

No.	Name	Set range	Factory default
P0-16	Input loss phase detection filter time	0.0s～10.0s	0.0s

It's the filter for input loss phase detection. The input loss phase detection is invalid when the value of **P0-16** is 0.

No.	Name	Set range	Factory default
P0-17	Output loss phase detection Enable	0～1	0

0:Invalid

1:Valid

V/F control, when not motor connect to U,V,W, it not detect loss phase detection.

No.	Name	Set range	Factory default
P0-18	Fan control selection	0～1	0

0: Fan runs when the inverter is in standby

1: Fan not run when the inverter is in standby

The fan control selection just suitable for the inverter with power or less than 37KW. For the inverter with power or above 45KW, the fan not run in standby status.

No.	Name	Set range	Factory default
P0-19	Short circuit relay detection Enable	0～1	0

0: Valid

1: Invalid

The detection function of bypass relay(Short circuit relay) in the charging circuit.

8 Fault and maintenance

8.1 Faults and warning list

When fault occurs, the keyboard displays the fault code, the ALM indicator lights, the inverter stops outputting, and the fault relay operates.

The fault code list is shown in **Table 8-1**:

Table 8-1 Fault codes list

LED keyboard display	LCD keyboard display	Fault	Pages
CoEr	**CoEr**	Keyboard communication timeout failure	215
CPY	**CPy**	Parameter copy failure	213
CUr	**CUr**	Current detection fault	212
EF	**EF**	External terminal fault input	212
EPr	**EPr**	Parameter saving failure	212
Er.34	**Er.34**	Parameter calculation fault 1 (Special for manufacturer)	216
Er.35	**Er.35**	Parameter calculation fault 2 (Special for manufacturer)	216
FbL	**FbL**	PID feedback loss fault	214
FCLoL	**FCLoL**	FCL fast current limiting overload fault	214
GF	**GF**	Short circuit to ground	211
IGbt1	**iGbt1**	U phase module protection	210
iGbt2	**iGbt2**	V phase module protection	210
IGbt3	**iGbt3**	W phase module protection	210
LF	**LF**	Output loss phase	212
LU	**LU**	DC bus under-voltage	212
oC	**oC**	Inverter over-current	209
oH1	**oH1**	Inverter overheat	211
oH2	**oH2**	Motor overheat	211
oL1	**oL1**	Inverter overload	210

oL2	**oL2**	Motor overload	211
o5	**oS**	Over-speed fault	213
ot	**ot**	Over torque fault	213
oU	**oU**	DC bus overvoltage	209
PF	**PF**	Input loss phase	215
PtA	**PtA**	Power on time arrives	214
rF	**rF**	Bypass relay (contactor) failure	215
rtA	**rtA**	Running time arrives	215
rUn	**rUn**	Motor switching during operation fault	214
5C	**SC**	Speed control error	213
5Er	**SEr**	Speed tracking failure	214
5EtE	**SEtE**	Parameter setting error	215
tUnEr	**tUnEr**	Motor self-learning failure	212
U5Er	**USEr**	User setting fault	215

Warning code list is shown in **Table 8-2.**

Table 8-2 Warning code list

LED keyboard display	LCD keyboard display	Warning	Pages
A.12	**A.12**	Special for factory 1	218
A.13	**A.13**	Special for factory 2	219
A.14	**A.14**	Special for factory 3	219
A.19	**A.19**	Water shortage	219
A.20	**A.20**	Not perform motor self-learning	219
A.21	**A.21**	Weaken magnetic setting exceeds the upper limit	219
CErr	**CErr**	PWM module calculation abnormal	217
CErr0	**CErr0**	Class 0 parameter calculation	218

LED keyboard display	LCD keyboard display	Warning	Pages
		abnormal	
CErr1	**CErr1**	Class 1 parameter calculation abnormal	218
CErr2	**CErr2**	Class 2 parameter calculation abnormal	218
CErr3	**CErr3**	Class 3 parameter calculation abnormal	218
CErr4	**CErr4**	Class 4 parameter calculation abnormal	218
CErr5	**CErr5**	Category 5 parameter calculation abnormal	218
E2AA	**E2AA**	E2 interval (A area) read and write abnormal	217
iPoE	**iPoE**	Protection type not recognized in the power module	217
norUn	**norUn**	Unready	217
Pdr5t	**PdrSt**	Power off to reset needed	217

8.2 Faults and solutions

Faults and corresponding solutions as below.

LCD keyboard display	LED keyboard display	Fault Name	Communication code
oC	oC	Inverter over-current	1
Possible causes		**Countermeasures**	
Output cable short circuit or inverter and motor short circuit to ground		Check input and output wiring	
Acc./Dec. time too short (V/F control)		Increase Acc./Dec. time	
The load too heavy		Reduce the load or replace drive and motor with larger power	
Motor with phase-in capacitor		Remove the phase capacitor	

Improper current control gain setting	Adjust the current control gain (visible when allowed by manufacturer)
Fast current limiting threshold setting abnormal	Reset the fast current limiting threshold (visible when allowed by manufacturer)
Improper self-learning settings	Perform full mode self-learning again
The power of frequency inverter and motor not matched	Correctly configure the combination of frequency inverter and motor
Speed sensor detection incorrect	Correctly set the parameters related to the speed sensor, check the signal wiring and separate from the main circuit wiring.

LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
oU	oU	DC Bus Overvoltage	2
Possible causes		**Countermeasures**	
Output cable short circuit or short circuit to ground		Check output wiring	
Dec. time too short		Increase Dec. time; Use anti-regeneration stall function (**d2-13**); Select energy consume braking(**P0-00**) and use braking resistor or brake; Select energy feedback unit.	
Improper setting of braking voltage for braking resistor		Adjust braking voltage (**P0-00**)	
Braking resistor or braking unit abnormal		Replace the braking resistor or braking unit	
Input power supply voltage rises abnormally		Detect the voltage of power supply	
Load inertia too large		Refer to the countermeasures of “Dec. time too short”	

LCD keyboard display	LED keyboard display	Fault Name	Communication code
iGbt1	IGbt1	U phase module protection	3
Possible causes		**Countermeasures**	
IGBT or IPM module damage		Check the IGBT or IPM modules	
Output cable short circuit or short circuit to ground		Check output cable	
Motor damage		Check motor failure and replace motor	
Inverter ambient temperature too high		Check installation environment and temperature rise inside the inverter	
Improper installation method of inverter		Install the inverter correctly	
Unconnected DC reactor		Connect DC reactor	
Carrier frequency too large		Decrease carrier frequency or reduce load	
Continuous heavy load operation at low frequency(<5.0Hz)		Select inverter with larger power and re-rate using	
Power supply board or main control board abnormal		Replace power board or main control board	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
iGbt2	iGbt2	V phase module protection	4
Possible causes		**Countermeasures**	
Same as "**iGbt1**"		Same as "**iGbt1**"	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
iGbt3	IGbt3	W phase module protection	5
Possible causes		**Countermeasures**	
Same as "**iGbt1**"		Same as "**iGbt1**"	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
oL1	oL1	Inverter overload	6
Possible causes		**Countermeasures**	
Load too heavy		Decrease the load	
Improper selection of inverter or motor		Reduce the load or reselect the inverter and motor	
The overload protection parameter inverter not set properly		Reset the overload protection parameters (Authorized by manufacturer)	
Motor stall (V/F control)		Adjust the torque limit (**d4-06, d4-07**)	
Improper setting of torque limit value		Adjust the torque limit (**d2-01, d2-02, d2-03, d2-04**)	

Speed sensor parameter setting or wiring improper		Modify speed sensor parameters (**b1-07, b2-07**) or adjust wiring	
Motor nameplate parameters not set properly		Modify the motor nameplate parameters (**b1**, **b2**)	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
oL2	oL2	Motor overload	7
Possible causes		**Countermeasures**	
Load too heavy		Decrease the load	
Improper selection of inverter or motor		Reduce the load or reselect the inverter and motor	
Improper setting of motor overload and over-torque protection parameters		Reset motor overload and over-torque protection parameters (**P0-03~P0-06**)	
Motor stall (V/F control)		Adjust the torque limit (**d4-06, d4-07**)	
Improper setting of torque limit value		Adjust the torque limit (**d2-01, d2-02, d2-03, d2-04**)	
Speed sensor parameter setting or wiring improper		Modify speed sensor parameters (**b1-07, b2-07**) or adjust wiring	
Motor nameplate parameters not set properly		Modify the motor nameplate parameters (**b1**, **b2**)	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
oH1	oH1	Inverter overheat	8
Possible causes		**Countermeasures**	
The inverter ambient environment temperature too high		Reduce ambient temperature or inverter de-rating use	
Inverter cooling fan aging or damage		Replacement cooling fans	
Temperature detection circuit fault		Seeking technical support from manufacturer	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
oH2	oH2	Motor overheat	9
Possible causes		**Countermeasures**	
Load too heavy		Decrease the load	
Cooling fan loss or abnormal heat dissipation medium		Replace the cooling fan or cooling medium, or replace the motor	
Motor temperature detection signal abnormal		Make sure the temperature sensor and signal detection circuit are correct	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
GF	GF	Short circuit to ground	10
Possible causes		**Countermeasures**	

Motor burned or motor insulation aged		Check the motor insulation resistance abnormal or not	
Output cable broken or aged and causes short circuit		Check the cable between the inverter and the motor abnormal or not.	
The distributed capacitance between the motor and the inverter too large		Reduce distributed capacitance	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
LF	LF	Output loss phase	11
Possible causes		**Countermeasures**	
Inverter output loss phase		Make sure the output is connected correctly	
Motor stator winding abnormal		Make sure the motor is normal or replace motor	
Single phase motor connected		Single phase motor not supported	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
EPr	EPr	Parameter save failure	12
Possible causes		**Countermeasures**	
Parameters save failure		Seek technical support from manufacturer	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
LU	LU	DC bus under-voltage	14
Possible causes		**Countermeasures**	
Input power supply instantaneous power failure		Make sure the input supply power is normal	
Input power loss phase		Make sure the input supply power is normal	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
EF	EF	External terminal fault input	15
Possible causes		**Countermeasures**	
Multi-function terminal with external terminal fault input function is valid		Exclude the valid terminal signal	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
CUr	CUr	Current detection fault	16
Possible causes		**Countermeasures**	

Inverter current feedback circuit abnormal		Check the abnormal causes or replace the control board	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
tUnEr	tUnEr	Motor self-learning fault	17
Possible causes		**Countermeasures**	
Self-learning fault during operation		Power on again to reset the fault	
Data collection error during self-learning		Check if the motor nameplate parameters are set correctly Check if the inverter voltage detection is correct or replace the control board when cannot confirm. Check if the inverter current detection is correct or replace the control board when cannot confirm.	
Parameter calculation abnormal during self-learning		Same as above.	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
oS	o5	Over-speed fault	18
Possible causes		**Countermeasures**	
Over-speed setting not correct		Correct setting parameters (**P0-01~P0-02**)	
Improper setting of speed control gain and causes excessive overshoot		Adjust the speed control gain (**d0-00~d0-05**)	
Load torque is less than torque command in torque control mode		Correct set torque command	
Speed detection interference causes malfunction		Check speed sensor wiring	
Improper setting of speed sensor parameters		Reset speed sensor parameters	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
SC	SC	Speed control error	19
Possible causes		**Countermeasures**	
Improper detection amplitude setting		Correct set speed detection amplitude (**p0-07 ~ p0-09**)	
Load too heavy and the torque limit reached		Decrease load	
Acc./Dec. time too short and torque limit reached		Increase Acc./Dec. time	
Speed sensor abnormal		Make sure the speed sensor works correctly	
Speed sensor wiring abnormal		Make sure the speed sensor is connected correctly	

The wiring between inverter output terminal and motor wrong		Ensure the wiring between the inverter and the motor is correct	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
ot	ot	Over torque fault	20
Possible causes		**Countermeasures**	
Load too heavy		Decrease the load	
Improper selection of inverter or motor		Reduce the load or reselect the inverter and motor	
Improper setting of motor over torque protection parameters		Reset parameters in (**P0-04~P0-06**)	
Improper setting of torque limit value		Adjust the torque limit (**d2-01, d2-02, d2-03, d2-04**)	
Speed sensor parameter setting or wiring improper		Modify speed sensor parameters (**b1-07, b2-07**) or adjust wiring	
Improper set motor nameplate parameters		Modify the motor nameplate parameters (**b1**, **b2**)	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
CPy	CPY	Parameter copy failure	21
Possible causes		**Countermeasures**	
The version in the keyboard not match with the main control board.		Keep same version for parameters download	
Communication between the main control board and the keyboard abnormal		Check if the communication is interrupted	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
FbL	FbL	PID feedback loss failure	22
Possible causes		**Countermeasures**	
PID feedback voltage is less than the set loss value		Reset proper loss detection value	
Feedback signal is not connected		Check if the feedback signal is correctly connected.	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
rUn	rUn	Switching motor during operation	23
Possible causes		**Countermeasures**	
Switching motor during operation		Prohibit switching motor during operation	

LCD keyboard display	LED keyboard display	Fault Name	Communication code
FCLoL	FCLoL	FCL overload fault	24
Possible causes		**Countermeasures**	
Acc./Dec. time too short (V/F control)		Increase Acc./Dec. time	
The load too heavy		Reduce the load or replace drive and motor with larger power	
Fast current limiting threshold setting abnormal		Reset the fast current limiting threshold (visible when allowed by manufacturer)	
Improper selection of inverter or motor		Reduce the load or reselect the inverter and motor	
Continuous heavy load operation at low frequency(<5.0Hz)		Select inverter with larger power and re-rate using	
Fast current limit signal abnormal		Replace the control board	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
SEr	5Er	Speed tracking fault	25
Possible causes		**Countermeasures**	
Motor nameplate parameters setting abnormal		Correctly set the motor nameplate parameters	
Self-learning parameter input abnormal		Input motor parameters correctly and perform full mode self-learning	
Abnormal voltage detection signal		Check if the inverter voltage detection is correct or replace the control board when cannot confirm.	
Abnormal current detection signal		Check if the inverter current detection is correct or replace the control board when cannot confirm.	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
PtA	PtA	Power-on time arrives	27
Possible causes		**Countermeasures**	
Inverter power-on time arrives		Contact manufacturer or supplier	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
rtA	rtA	Run time arrives	28
Possible causes		**Countermeasures**	
Run time arrives		Contact manufacturer or supplier	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
CoEr	CoEr	Communication timeout fault	29

Possible causes		**Countermeasures**	
Communication cable wiring abnormal		Check communication wiring and eliminate short circuit and disconnection problem	
Communication cable disturbed		Use anti-interference measures to eliminate the impact of interference on communication	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
USEr	U5Er	User set failure	30
Possible causes		**Countermeasures**	
User setting parameter error		Correctly set the related parameters	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
PF	PF	Input loss phase	31
Possible causes		**Countermeasures**	
Input power supply loss phase		Make sure the input power supply normal	
Inverter rectifier or power module damage		Replace the inverter	
Input power supply voltage too low or voltage fluctuation too large		Make sure the input power supply normal	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
rF	rF	Bypass relay (contactor) fault	32
Possible causes		**Countermeasures**	
Relay (contactor) works abnormal		Check the abnormal causes and replace the relay when cannot confirm.	
Relay control signal is abnormal		Check the abnormal causes and replace the control board when cannot confirm.	
Bus voltage detection is abnormal		Check the abnormal causes and replace the control board when cannot confirm.	
Relay (contactor) detection signal is abnormal		Check the abnormal causes and replace the control board when cannot confirm.	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
SEtE	5EtE	Parameter setting error	33
Possible causes		**Countermeasures**	
Motor nameplate parameters setting error		Enter the motor nameplate parameters correctly	
Motor operating range conflicts with protection parameter settings		Set the operating parameters correctly	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**

Er.34	Er.34	Parameter calculation fault 1 (Special for manufacturer)	34
Possible causes		**Countermeasures**	
Motor nameplate parameters set error		Set motor nameplate parameters correctly	
No self-learning or self-learning error		Perform full-mode self-learning	
Motor operating range conflicts with protection parameter settings		Set the operating parameters correctly	
LCD keyboard display	**LED keyboard display**	**Fault Name**	**Communication code**
Er.35	Er.35	Parameter calculation fault 2 (Special for manufacturer)	35
Possible causes		**Countermeasures**	
Same as **Er.34**		Same as **Er.34**	

8.3 Warning and solutions

LCD keyboard display	**LED keyboard display**	**Warning Name**
norUn	norUn	Unready
Possible causes		**Countermeasures**
Motor nameplate parameters not set		Correctly set the motor nameplate parameters
Not perform self-learning		Perform full-mode self-learning
Self-learning is not complete		Perform full-mode self-learning
No DC mode self - learning is performed after carrier change		Perform DC mode self-learning
Motor nameplate, self-learning, operation and protection parameters are improperly set		Enter the motor nameplate parameters correctly Perform DC mode self-learning after input self-learning parameters correctly Set the operation parameters correctly Set the protection parameters correctly
LCD keyboard display	**LED keyboard display**	**Warning Name**
E2AA	E2AA	E2 (A area) read/write abnormal
Possible causes		**Countermeasures**
E2 area read/write anomaly		Recover to factory default and perform full mode self-learning after input related parameters correctly
LCD keyboard display	**LED keyboard display**	**Warning Name**
PdrSt	Pdr5t	Power off to reset needed

Possible causes		**Countermeasures**
Self-learning fault during operation		Power off and reset the fault
Self-learning errors		Power off and reset the fault after check possible causes
IGBT or IPM failures		Power off and reset the fault after check possible causes
LCD keyboard display	**LED keyboard display**	**Warning Name**
iPoE	iPoE	Protection type not recognized in the power module
Possible causes		**Countermeasures**
Power protection circuit abnormal		Check the abnormal causes or replace the control board when cannot confirm
LCD keyboard display	**LED keyboard display**	**Warning Name**
CErr	CErr	PWM module calculation abnormal
Possible causes		**Countermeasures**
Carrier frequency setting error		Correctly set carrier frequency
LCD keyboard display	**LED keyboard display**	**Warning Name**
CErr0	CErr0	Type 0 parameter calculation abnormal
Possible causes		**Countermeasures**
Motor nameplate parameters set error		Set motor nameplate parameters correctly
No self-learning or self-learning error		Perform full-mode self-learning
Motor operating range conflicts with protection parameter settings		Set the operating parameters correctly
Improper set motor protection parameters		Set protection parameters correctly
LCD keyboard display	**LED keyboard display**	**Warning Name**
CErr1	CErr1	Type 1 parameter calculation exception
Possible causes		**Countermeasures**
Same as "Type 0 parameter calculation abnormal"		Same as "Type 0 parameter calculation abnormal"
LCD keyboard display	**LED keyboard display**	**Warning Name**
CErr2	CErr2	Type 2 parameter calculation exception
Possible causes		**Countermeasures**
Same as "Type 0 parameter calculation abnormal"		Same as "Type 0 parameter calculation abnormal"
LCD keyboard display	**LED keyboard display**	**Warning Name**

CErr3	CErr3	Type 3 parameter calculation exception
Possible causes		**Countermeasures**
Same as "Type 0 parameter calculation abnormal"		Same as "Type 0 parameter calculation abnormal"
LCD keyboard display	**LED keyboard display**	**Warning Name**
CErr4	CErr4	Type 4parameter calculation exception
Possible causes		**Countermeasures**
Same as "Type 0 parameter calculation abnormal"		Same as "Type 0 parameter calculation abnormal"
LCD keyboard display	**LED keyboard display**	**Warning Name**
CErr5	CErr5	Type 5 parameter calculation exception
Possible causes		**Countermeasures**
Same as "Type 0 parameter calculation abnormal"		Same as "Type 0 parameter calculation abnormal"
LCD keyboard display	**LED keyboard display**	**Warning Name**
A.20	A.20	Not perform motor self-learning
Possible causes		**Countermeasures**
Not perform DC mode self-learning under vector control when the carrier frequency changes.		Perform DC mode motor self-learning
LCD keyboard display	**LED keyboard display**	**Warning Name**
A.21	A.21	Weaken magnetic setting exceeds the upper limit
Possible causes		**Countermeasures**
E0-02 larger than 250.0Hz in vector control mode		Set **E0- 02** value less than 250.0Hz

8.4 Maintenance

8.4.1 Daily and periodic inspection

The influence of the ambient temperature, humidity, dust and vibration will cause the aging of the devices in the inverter, which may cause potential faults or reduce the service life of the inverter. Therefore, it is necessary to carry out routine and periodic maintenance.

Table 8-3 Daily and Periodic Inspection Items of the Inverter

Frequency	Check contents
Daily inspection	● Check whether the inverter cooling fan abnormal or not and the air duct blocked or not. ● Confirm the installation environment of the inverter and the input voltage is within the allowable range. ● Check whether the motor temperature rising is normal.
Periodic inspection	● Make sure that there are garbage, dirt and dust deposits on the surface of the inverter ● Confirm whether the insulation layer of power cable and signal cable is aging or cracking. ● Confirm that the mechanical installation of the inverter and motor is firm. ● Confirm that the connection between the inverter and motor terminals is firm. ● Confirm that the insulation resistance of inverter and motor is up to standard.

8.4.2 Wearing parts replacement

The wearing parts of the inverter mainly include cooling fans and electrolytic capacitors for filtering. Its life is closely related to the environment and maintenance conditions. The general life time as follows:

Table 8-4 fans, electrolytic capacitor life tables

Device Name	Life time	Remarks
Fan	About 5 years	The fans vibrate and abnormal noise should be changed into account
Electrolytic capacitor	About 5 years	Leakage of electrolytic capacitor, protrusion of safety valve and change of capacitance value

8.4.3 Inverter storage

After the user purchases the inverter, the following points must be noted for temporary storage and long-term storage:

1) Store as much as possible in the original packaging with good ventilation.

2) The whole machine is not allowed to be placed in humid, high temperature or outdoor exposure places for a long time.

3) Long-term storage will cause the deterioration of electrolytic capacitors. It must be ensured that it is energized once within one year and the energized time is not less than 1 hour. The input voltage must be slowly increased to the rated value with a voltage regulator.

Appendix A: Braking

A.1 Selection of braking unit and braking resistor

A.1.1 Selection of braking resistor resistance

When braking, almost all of the motor regenerative energy is consumed by the braking resistor. According to the formula:

Pb=U*U/R

U: System braking voltage (U normally is 700V AC 380V grade inverter)
Pb: Braking power

A.1.2 Selection of braking resistor power

In theory, the braking resistor has the same power as the braking power, but considering the de-rating is 70%. According to the formula:

0.7*Pr=Pb*D

Pr: The power of the braking resistor;
D: Braking rate, which is the proportion of the regeneration process to the entire working process.

Common application occasions	Elevator	Unwinding and Rewinding	Centrifuge	Accidental brake load	General occasions
Braking rate	20% ~30%	20 ~30%	50%~60%	5%	10%

Table A-1 is the guidance data. Users can choose different resistance values and power according to the actual situation. (However, the resistance value must not be less than the recommended value in the table, and the power can be large.) The selection of the braking resistor needs to be based on the actual application system. The power generated by the motor is determined by the inertia of the system, the Dec. time and the energy of the potential energy load. The larger the system's inertia, the shorter the deceleration time and the more frequent braking, the greater the power and the smaller the resistance of the braking resistor needed.

Table A-1 SV800A/ SV800 Inverter Braking Group

Inverter model	Recommended power	Recommended resistance	Braking unit
Single phase 220V			
SV800A-0R752GB	80W	≥ 200Ω	Built-in
SV800A-1R52GB	100W	≥ 100Ω	
SV800A-2R22GB	100W	≥ 70Ω	
Three-phase 380 V			
SV800A-0R754G/1R54PB	150W	≥ 320Ω	Built-in
SV800A-1R54G/2R24PB	150W	≥ 220Ω	
SV800A-2R24G/4R04PB	250W	≥ 200Ω	
SV800-2R24GB	250W	≥200Ω	
SV800-4R04G/5R54PB	300W	≥130Ω	
SV800-5R54G/7R54PB	400W	≥90Ω	
SV800-7R54G/114PB	500W	≥65Ω	
SV800-114G/154PB	800W	≥43Ω	
SV800-154G/18R5PB	1000W	≥32Ω	
SV800-18R54G/224PB	1300W	≥25Ω	
SV800-224G/304PB	1500W	≥22Ω	
SV800-304G/374P	2500W	≥16Ω	Optional
SV800-374G/454P	3.7 kW	≥12.6Ω	
SV800-454G/554P	4.5 kW	≥9.4Ω	
SV800-554G/754P	5.5 kW	≥9.4Ω	
SV800-754G/904P	7.5 kW	≥6.3Ω	

A.1.3 Wiring of braking unit and braking resistor

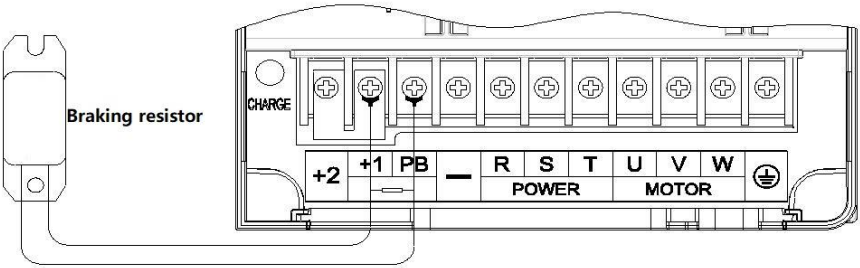


Fig.A-1 Applicable to the inverter with built-in braking unit

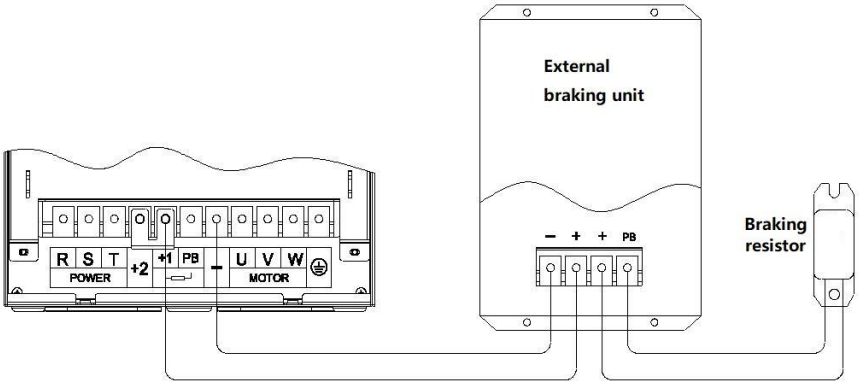


Fig.A-2 Applicable to inerter with external braking unit

Appendix B: Communication

B.1 Modbus communication

B.1.1 Support protocol

Support Modbus protocol, RTU format. Broadcast address 0, the slave address: 1~247.

B.1.2 Interface mode

RS485 interface: asynchronous, semiduplex, the high byte is first, and the low byte is after.
The default data format:8-N-1, 19200bps. For parameter settings, see the **L0** group parameters.

B.1.3 Format of protocol

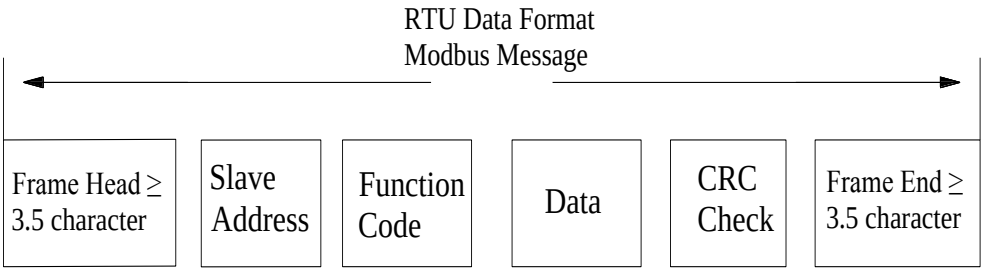


Fig.B-1 Modbus data format

B.1.4 Modbus Functions

The main function of Modbus is to read and write parameters. Different function codes determine different operation requests. The function code operation supported by the Modbus protocol of the frequency inverter is shown in table B-1**:**

Table B-1 Modbus function codes

Function code	Function code meaning
0x03	Read inverter function code parameters or status parameters
0x06	Write single parameter of the inverter, not save after power off
0x08	Line diagnosis
0x10	Write multiple parameters of the inverter, not save after power off
0x41	Write single parameter of the inverter, save after power off
0x43	Write multiple parameters of the inverter, save after power off

Note: If you use the 0x41 or 0x43 instruction to modify the function code parameters during communication, since the parameters are written to the EEPROM, frequent use will damage the EEPROM of the memory chip. When the function parameters need to be modified frequently, it is recommended to use 0x06 or 0x10 instructions

Register address of inverter function code parameter, control parameter and state parameter are

shown in below table:

Table B-2 Function code address

Function code group	Register address high byte	Function code group	Register address high byte
A0	0x00	**E3**	0x43
A1	0x01	**E4**	0x44
A2	0x02	**F0**	0x50
b0	0x10	**F1**	0x51
b1	0x11	**F2**	0x52
b2	0x12	**F3**	0x53
b3	0x13	**H0**	0x70
C0	0x20	**H1**	0x71
C1	0x21	**H2**	0x72
C2	0x22	**H3**	0x73
C3	0x23	**H4**	0x74
d0	0x30	**L0**	0x90
d1	0x31	**P0**	0xC0
d2	0x32	**U0**	0xF0
d3	0x33	**U1**	0xF1
d4	0x34	**U2**	0xF2
E0	0x40	**U3**	0xF3
E1	0x41	**Control parameter**	0x60
E2	0x42		

The application layer protocol data units of each function code are as follows:

Function code 0x03: Read register contents

The request format is as follows:

Application layer data unit	Data length (bytes)	Range
Local address	1	1~247
Function code	1	0x03
Register address	2	0x0000~0xFFFF
Number of registers	2	0x0001~0x000C
Check	CRC	0x0000~0xFFFF

The answer format is as follows:

Application layer data unit	Data length (bytes)	Range
Local address	1	1~247
Function code	1	0x03
Number of read bytes	1	2 * number of registers
Registers content	2 * number of registers	0x0000~0xFFFF
Check	CRC	0x0000~0xFFFF

Function code 0x06 or 0x41: Write single function code parameter or control parameter.

The request format is as follows:

Application layer data unit	Data length (bytes)	Range
Local address	1	1~247
Function code	1	0x06 OR 0x41
Register address	2	0x0000~0xFFFF
Registers content	2	0x0000~0xFFFF
Check	CRC	0x0000~0xFFFF

The answer format is as follows:

Application layer data unit	Data length (bytes)	Range
Local address	1	1~247
Function code	1	0x06 OR 0x41
Register address	2	0x0000~0xFFFF
Number of registers	2	0x0000~0xFFFF
Check	CRC	0x0000~0xFFFF

Function code 0x10 or 0x43: Write multiple function code parameters or control parameters

The request format is as follows:

Application layer data unit	Data length (bytes)	Range
Local address	1	1~247
Function code	1	0x10 OR 0x43
Register address	2	0x0000~0xFFFF
Number of registers	2	0x0001~0x000C
Register content bytes	1	2* number of registers
Register contents	2* number of registers	0x0000~0xFFFF
Check	CRC	0x0000~0xFFFF

The answer format is as follows:

Application layer data unit	Data length (bytes)	Range
Local address	1	1~247
Function code	1	0x10OR 0x43
Register address	2	0x0000~0xFFFF
Number of registers	2	0x0001~0x000C
Check	CRC	0x0000~0xFFFF

Function code 0x08: Line diagnosis

The request format is as follows:

Application layer data unit	Data length (bytes)	Range
Local address	1	1~247
Function code	1	0x08
Register address	2	0x0000~0x0030
Number of registers	2	0x0000~0xFFFF
Check	CRC	0x0000~0xFFFF

The answer format is as follows:

Application layer data unit	Data length (bytes)	Range
Local address	1	1~247
Function code	1	0x08
Register address	2	0x0000~0x0030
Number of registers	2	0x0000~0xFFFF
Check	CRC	0x0000~0xFFFF

The sub-function codes supported by line diagnostics are as follows:

Sub-function code	Data request	Data response	Sub-function code meaning
0x0001	0x0000	0x0000	Reinitialize the communication to disable the no - reply mode
	0xFF00	0xFF00	Reinitialize the communication to disable the no - reply mode
0x0003	New tail frame "00"	New tail frame "00"	Sets the ASCII end frame, which replaces the old newline symbol. (the new tail frame cannot be larger than 0x7F and equal to 0x3A)
0x0004	0x0000	No response	Set no response mode, and the slave only responds to the initial communication request. Mainly used to isolate fault slave
0x0030	0x0000	0x0000	Set slave not answering invalid commands and error commands
	0x0001	0x0001	Set slave response invalid command and error command

B.1.5 Register address of control parameters

Register address	Parameter Name	Remarks
0x6000	Control command word	
0x6001	Main speed/frequency	
0x6002	Auxiliary speed/frequency	
0x6003	PID communication given	
0x6004	PID communication feedback	
0x6005	Torque communication setting	
0x6006	Torque compensation communication setting	
0x6007	Motoring torque	
0x6008	Braking torque	
0x6009	Speed positive side limit	
0x600A	Speed negative side limit	
0x600B	DO terminal communication given	

The control command words definition is as follows

Control command word 0x6000	Value	Meaning	Function description
bit0	0	Running commands invalid	Invalid
	1	Running commands valid	Start inverter
bit1	0	Forward	Direction setting
	1	Reverse	
bit2	0	Invalid	
	1	Jog run	
bit3	0	Invalid	
	1	Reset command valid	
bit4	0	Invalid	
	1	Dec. Stop valid	
bit5	0	Invalid	
	1	Stop freely valid	
bit6~bit15		Reserved	

DO terminal communication is defined as follows:

Control command word 0x600B	Value	Meaning
bit0	0	DO1 OFF
	1	DO1 ON
bit1	0	DO2 OFF
	1	DO2 ON
bit2	Reserved	Reserved
bit3	0	Relay M1 OFF
	1	Relay M1 ON
bit4	0	Relay M2 OFF
	1	Relay M2 ON
bit5	0	Relay TA-TB-TC OFF
	1	Relay TA-TB-TC ON
bit6~bit15	Reserved	Reserved

B.1.6 Examples of Modbus communication

Function code parameters reading example:

Read 1 # Inverter Digital Setting Frequency, Inverter Response Setting Frequency 50.00Hz						
	Address	Function code	Register address	Number of registers	Register contents	Check
Request	0x01	0x03	0x4100	0x0001	No	0x9036
Answer	0x01	0x03	No	0x02	0x1388	0xB512

Write single function code parameter example:

Start 1# inverter running in the forward direction					
	Address	Function code	Register address	Number of registers	Check
Request	0x01	0x06	0x6000	0x0001	0x560A
Answer	0x01	0x06	0x6000	0x0001	0x560A

1# inverter default mode stop					
	Address	**Function code**	**Register address**	**Number of registers**	**Check**
Request	0x01	0x06	0x6000	0x0010	0x9606
Answer	0x01	0x06	0x6000	0x0010	0x9606

Write multiple function code parameter examples:

Start 1# inverter forward rotation, set the inverter frequency 50.00Hz							
	Address	**Function code**	**Register address**	**Number of registers**	**Content bytes**	**Register contents**	**Check**
Request	0x01	0x10	0x6000	0x0002	0x04	0x0001，0x1388	0x073B
Answer	0x01	0x10	0x6000	0x0004	No	No	0xDFCA

B.1.7 CRC16 function

CRC16 checkout value calculating function written by C language:

```
Uint16 CRC16(const Uint16 *data, Uint16 len)
{
Uint16 crcValue = 0xffff;
Uint16 i;
while (len--)
{
    crcValue ^= *data++;
    for (i = 0; i < 8; i++)
    {
        if (crcValue & 0x0001)
        {
            crcValue = (crcValue >> 1) ^ 0xa001;
        }
        else
        {
            crcValue = crcValue >> 1;
        }
    }
}
return (crcValue);
}
```

Appendix C: Control Block diagram

C.1 Control Block diagram

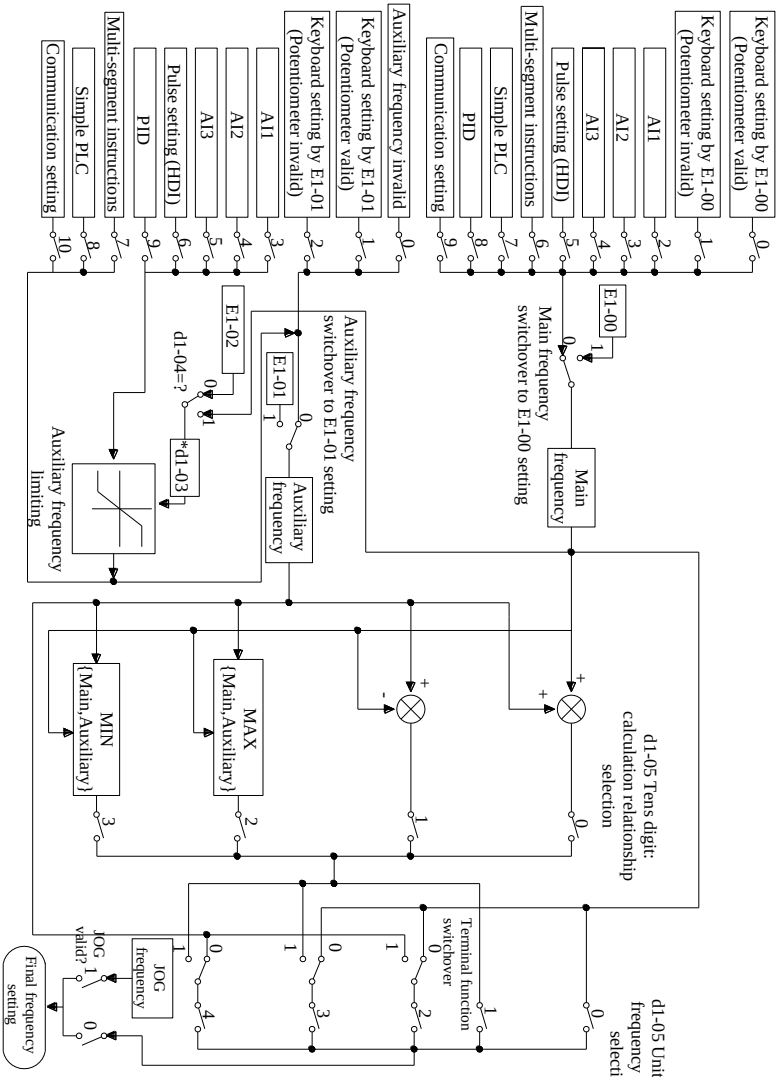


Fig.C-1 Frequency Given Logic Block Diagram

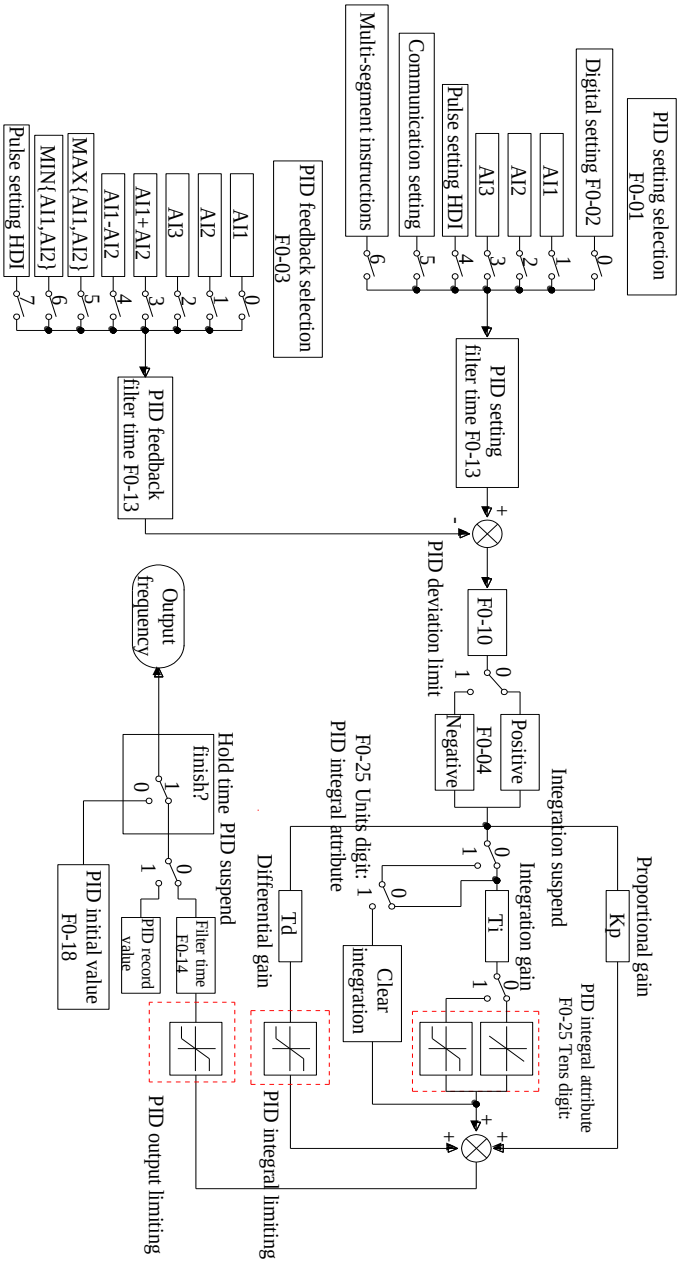


Fig.C-2 PID control block diagram

Appendix D: A1 application selection and parameter mapping

In order to facilitate the user to set the parameters using the SV800A/SV800 series, as long as the user selects the inverter application in A1-00, A1-01 ~ A1-49 will automatically correspond to the function parameters and arranged according to the application frequency.

A1: Customer application parameters			
No.	**Name**	**Contents**	**Set value**
A1-00 (0100H)	Application selection	ALL 0: User defined 1: General speed regulation 2: Air supply / exhaust fan 3: Constant pressure water supply (one inverter with one pump or one inverter two pumps) 4~20: Reserved	Factory default:1 Range:0~20

D.1 Application of general speed regulation (A1-00 = 1)

No.	Name	Factory default	Description	Mapping parameter
A1-01	Control mode setting	2: V/F control	0: SVC vector control <1>	A0-04
A1-02	Run command input selection	0: Keyboard control	1: Terminal control 2: Communication control	d1-00
A1-03	Main frequency command input selection	0: Keyboard parameter (E1-00) setting (Keyboard potentiometer valid)	1: Keyboard parameter (E1-00) setting (keyboard potentiometer invalid) 2: AI1 3~9: Refer to the detailed description	d1-01
A1-04	Frequency 1	50.00Hz		E1-00
A1-05	Acc. time 1	Determined with the model	Set according to requirements	E2-02
A1-06	Dec. time 1	Determined with the model	Set according to requirements	E2-03
A1-07	DI1 terminal function selection	3: Forward running	Other options look at the detailed description of Chapter 7.	H0-00
A1-08	DI2 terminal function selection	4: Reverse running	Other options look at the detailed description of Chapter 7.	H0-01
A1-09	M1 relay output function selection	35: Running (including DC braking)	Other options look at the detailed description of Chapter 7.	H1-03
A1-10	TA-TB-TC relay input	17: In failure	Other options look at the	H1-13

No.	Name	Factory default	Description	Mapping parameter
	Function selection		detailed description of Chapter 7.	
A1-11	Torque boost	Determined with the model	Only valid for VF control	d4-01
A1-12	Start mode selection	1: Start from Min. frequency start (E0-03)	0: Start by speed tracking <2>	d4-04
A1-13	Stop mode	1: Deceleration stop	0: Free stop	d2-06
A1-14	Upper limit frequency	**50.00Hz**	Set according to requirements	E0-00
A1-15	Low limit frequency	**0.00Hz**		E0-01
A1-16	Max. frequency	**50.00Hz**		E0-02
A1-17	Jog run command input	**0:**Keyboard control	1: Terminal control 2: Communication control	d1-06
A1-18	Jog frequency	**0.80Hz**		E1-16
A1-19	DI3 function	1: Forward jog operation	Refer to Chapter 7 for details.	H0-02
A1-20	DI4 function	20: Fault reset	Refer to Chapter 7 for details.	H0-03
A1-21	AI1 signal type	0:0~10V	1:4~20mA (S2 switch needs to be set to current side)	H2-00
A1-22	AO1 function	3: Inverter output frequency	Refer to Chapter 7 for details.	H3-00
A1-23	Prohibit Reversal Mode Selection	0: OFF	2: Prohibit reverse running	d2-11
A1-24	Anti-Regeneration stall function Selection	**0: OFF**	1: ON	d2-13
A1-25	Motor overload protection	**100%**	<3>	P0-03
A1-26~ A1-49				Retain

<1> V/F control can be used for general speed control applications. If high-performance speed control of asynchronous motors is required, it can be set to 0: SVC vector control.

<2> d4-04 is effective only for V/F control, and vector control is the speed tracking start.

<3> Factory default is 1.5 times the motor rated current (b1-02) for one minute.

D.2 Application of air supply/exhaust fan (A1-00=2)

No.	Name	Factory default	Description	Mapping parameter
A1-01	Control mode setting	2: V/F control	V/F control for generally using	A0-04
A1-02	G/P model selection	0: G type	1:P type	A0-12
A1-03	Run command input selection	0: Keyboard control	1: Terminal control 2: Communication control	d1-00
A1-04	Main frequency command input selection	0: Keyboard parameter (E1-00) setting (keyboard potentiometer valid)	1: Keyboard parameter (E1-00) setting (keyboard potentiometer is invalid) 2: AI1 3~9: Refer to the detailed description	d1-01
A1-05	Frequency 1	50.00Hz		E1-00
A1-06	Acc. time 1	Determined with the model	Set according to requirements	E2-02
A1-07	Dec. time 1	Determined with the model	Set according to requirements	E2-03
A1-08	DI1 function .	3: Forward running	Refer to Chapter 7 for details.	H0-00
A1-09	M1 relay function	35: Running (including DC braking)	Refer to Chapter 7 for details.	H1-03
A1-10	TA-TB-TC relay function	17: Inverter failure	Refer to Chapter 7 for details.	H1-13
A1-11	Upper limit frequency	50.00Hz	Set according to requirements	E0-00
A1-12	Low limit frequency	0.00Hz		E0-01
A1-13	Max. frequency	50.00Hz		E0-02
A1-14	Start mode selection	1: Start from Min. frequency (E0-03)	Generally set to 0: Start by speed tracking	d4-04
A1-15	Stop mode selection	1: deceleration stop	0: Free stop	d2-06
A1-16	Anti-Regeneration stall function Selection	0:OFF	Generally set to 1: ON	d2-13
A1-17	Torque boost	Determined with the model	Generally set to 0%	d4-01
A1-18	Prohibit Reversal Mode Selection	0: OFF	2: Prohibit reverse running	d2-11
A1-19	DI4 function	20: Fault reset	Refer to Chapter 7 for details.	H0-03
A1-20	AI1 input signal type	0:0~10V	1:4~20mA (S2 switch needs to be switched to current side)	H2-00

A1-21	AO1 output function	3: Inverter output frequency	Refer to Chapter 7 for details.	H3-00
A1-22	Motor overload protection setting	**100%**		P0-03
A1-23~ A1-49				Reserved

D.3 Application of constant pressure water supply (one inverter with one pump or one inverter two pumps) (A1-00=3)

No.	Name	Factory default	Description	Mapping parameter
A1-01	Control mode setting	2: VF control	V/F control for general using	A0-04
A1-02	G/P model selection	0: G type	1:P type	A0-12
A1-03	Run command input selection	0: Keyboard control	1: Terminal control 2: Communication control	d1-00
A1-04	Main frequency command input selection	0: Keyboard parameter (E1-00) setting (keyboard potentiometer valid)	8: PID Refer to Chapter 7 for details	d1-01
A1-05	Acc. time 1	Determined with the model	Set according to requirements	E2-02
A1-06	Dec. time 1	Determined with the model	Set according to requirements	E2-03
A1-07	DI1 function	3: Forward running	Refer to Chapter 7 for details	H0-00
A1-08	Closed-loop operation control selection	0: Invalid	Need to be set to 1: Universal PID control valid	F0-00
A1-09	PID given channel selection	0: Parameter setting given (F0-02)	Refer to Chapter 7 for details	F0-01
A1-10	PID feedback channel selection	0: AI1 analog input	Refer to Chapter 7 for details	F0-03
A1-11	Constant pressure water supply mode selection	**0: Invalid**	1: One Inverter one Pump 2: One Inverter two Pumps	F1-00
A1-12	Target pressure setting	**0.20MPa**	Set according to actual needs	F1-01
A1-13	Pressure range	**1.00MPa**	According to the actual remote pressure gauge or sensor settings	F1-02
A1-14	AI1 signal type	**0**：0~10V	1:4~20mA (S2 switch needs to be switched to current gear)	H2-00
A1-15	Start mode selection	1: Start from Min. frequency (E0-03)	Generally set to 0: Start by speed tracking	d4-04
A1-16	Stop mode selection	1: Deceleration stop	0: Free stop	d2-06
A1-17	Torque boost	Determined with the model	Generally set to 0%	d4-01
A1-18	Sleep frequency	30.00Hz	Factory default sleep, wake-up function is invalid, generally	F1-03
A1-19	Sleep delay time	0.0s		F1-04

No.	Name	Factory default	Description	Mapping parameter
A1-20	Wake up pressure	0.00MPa	set to sleep slower, wake up faster, wake up pressure is less than target pressure	F1-05
A1-21	Wake delay time	0.0s		F1-06
A1-22	DO1 function	0: No function	31: Connect 1# pump to inverter	H1-00
A1-23	DO2 function selection	0: No function	32: Connect 1# pump to power supply	H1-01
A1-24	M1 Relay function	35: Running (including DC braking)	33: Connect 2# pump to inverter	H1-03
A1-25	M2 Relay function	0: No function	34: Connect 2# pump to power supply <1>	H1-04
A1-26	Upper limit frequency	**50.00Hz**	Set according to requirements	E0-00
A1-27	Low limit frequency	**0.00Hz**		E0-01
A1-28	Max. frequency	**50.00Hz**		E0-02
A1-29	PID Proportional Gain KP1	**20.0**		F0-06
A1-30	PID integration time TI1	**2.00S**		F0-07
A1-31	Prohibit Reversal Mode Selection	0: OFF	2: Prohibit reverse running	d2-11
A1-32	DI4 function	20: Fault reset	Refer to Chapter 7 for details	H0-03
A1-33	TA-TB-TC relay	17: Inverter failure	Refer to Chapter 7 for details	H1-13
A1-34	AO1 function	3: Inverter output frequency	Refer to Chapter 7 for details	H3-00
A1-35	Motor overload protection setting	**100%**		P0-03
A1-36~ A1-49				Retain

<1> When the F1-00=2 (One inverter two Pumps), the inverter will add or remove the pumps automatically by four digital output control signals DO1, DO2, M1 and M2.

Shenzhen SCOV Electric Technologies Co., Ltd.

Warranty Card

Customer Information	Customer Name:	
	Detailed address:	
	Contact:	Tel.\Mobile:
Product information	Product model:	Serial No.:
	Date of purchase:	Application devices:
	Description of the fault:	
Fault details	(Maintenance time and content): Repair person: Y M D	

Note: Please send this card to our company together with the faulty product, thank !

Shenzhen SCOV Electric Technology Co., Ltd.

Certificate of conformity

Checker: _____

This product has been inspected by our quality control and quality assurance department. Its performance parameters conform to the "User Manual" standard attached and allowed to leave the factory.

Warranty agreement

SCOV promises that since the date of purchase from our company, users enjoy the following product warranty services.

1. Except for non-standard products, we provides 18 months warranty period from the purchase date for the failure or damage under normal use conditions.

2. Reasonable repair expenses will be charged for the damages due to the following causes:

2.1Improper operation without following the instructions in the User Manual.

2.2The user has repaired or altered the product without communication with our company and caused product failure.

2.3Broken due to force majeure such as earthquake, lightning, abnormal voltage, fire, flood or other natural disasters.

2.4Application in harsh environmental conditions beyond the manual, such as gas corrosion, salt erosion and metal dust pollution.

2.5 Damage caused by bad keeping, falling down from high place or other extrinsic factor after purchasing the inverter.

3. The right to interpret this agreement belongs to Shenzhen SCOV Electric Technology Co., Ltd.

Shenzhen SCOV Electric Technologies Co., Ltd.

Address: Room 301, Factory Building 3, No. 4 Fuye Road, Zhangkengjing Community, Guanhu Street, Longhua District, Shenzhen, China