Preface

Thanks for choosing the DL300 series universal low-power inverter produced by Shenzhen Sunfar Electric Technologies Co., Ltd.

This Manual is the operating manual for DL300 series universal low-power inverters. It provides all relevant instructions and precautions for installation, wiring, functional parameters, daily care and maintenance, fault diagnosis and troubleshooting of DL300 series inverters.

In order to use this series of inverters correctly, guarantee product's best performance and ensure safety of users and equipment, be sure to read this manual carefully before using DL300 series inverters. Improper use may cause abnormity and malfunction of the inverter, reduce its service life and even damage equipments and lead to personal injury and death etc.

This user manual is delivered with the device. Please keep it properly for future overhaul and maintenance.Owing to constant improvement of products, all data may be changed without further notice.

Simphoenix

User Manual of DL300 Series Universal Low-Power Inverter

Version V1.0

Revision Date: Feb 2023

目　录

Precautions

DL300 series universal low-power inverters are applicable to general industrial single-phase and three-phase AC asynchronous motors. If this inverter is used for equipment which is failed and may cause personal injury (e.g. nuclear control system, aviation system, safety equipment and instruments), please take care and consult with the manufacturer; if it is used for dangerous equipment, that equipment should be provided with safety protecting measures to prevent accident expansion in the case of inverter failure. The inverter is produced under strict quality assurance system. However, in order to protect your personal safety and equipment and property safety, before using this inverter, please read this chapter carefully and conduct transportation, installation, operation, commissioning and inspection according to relevant requirements.

1. Precautions of unpacking inspection

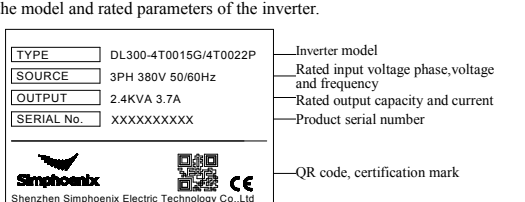
When unpacking, please confirm if

(1) There is any damage during transportation and any components are damaged or dropped.

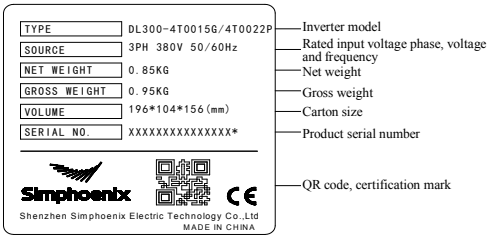
(2) The model and specifications stated on the inverter nameplate is consistent with your order. If there is any omission or damage, please contact your supplier promptly.

Nameplate of the inverter

On the left side of the inverter body, there is a nameplate marked with the model and rated parameters of the inverter.



Label on the outer box



Weight and dimension

Model		Net weight (KG)	Gross weight (KG)	Outer box dimension(mm)
DL300-4T0011GQ/4T0015PQ	DL300-2S0007Q	0.85	0.95	196×104×156
DL300-4T0015GQ/4T0022PQ	DL300-2S0015Q			
DL300-4T0022GQ/4T0040PQ	DL300-2S0022Q			
DL300-4T0040GQ/4T0055PQ	DL300-2S0030Q	1.2	1.35	211×124×161
DL300-4T0055GQ/4T0075PQ	DL300-2S0040Q			
DL300-4T0075GQ/4T0110PQ	——	1.9	2.15	266×166×181
DL300-4T0110GQ/4T0150PQ	——			
DL300-4T0150GQ/4T0185PQ	——	3.6	4.5	331×218×230

We have strict quality assurance system for the products in terms of manufacturing, packing and transportation. In case of any careless omission, please contact us or local agent immediately. We will address the problem at first time.

2. Safety precautions

In this manual, the wordings of "Danger" and "Caution" are defined as below.

Danger: Serious damage to the equipment or personal injuries may be caused if operating without following requirements.

Caution: Moderate injuries or minor injuries of personnel and material loss may be caused if operating without following

2.1 Installation

1. The inverter shall not be installed on combustibles.
2. The frequency inverter shall not be installed at places with direct sunlight.
3. The frequency inverter of this series shall not be installed in the environment of explosive gases, for fear of the danger of explosion.
4. No foreign matter is allowed to be dropped into the frequency inverter, for fear of causing fires or injury.
5. During installation, the frequency inverter shall be installed at the place able to bear its weight; otherwise, it may fall down or damage properties.

The inverter shall not be dismantled or modified without authorization.requirements.

2.2 Wiring

1. Wire diameter shall be selected according to applicable electric code, and wiring shall be done by qualified technicians.
2. Wiring shall not be started unless the power supply of the inverter is completely disconnected.
3. The grounding terminal of the inverter must be reliably grounded; otherwise, there can be a danger of electric shock.
4. Before wiring, make sure the power supply has been disconnected for over 10minutes; otherwise, there may be a danger of electric shock.
5. The electronic elements in the inverter is quite sensitive to static electricity, hence no foreign articles shall be placed into the inverter or contact the main board.

No alternating current power supply is allowed to be connected onto the U、V. and W of the inverter.

2.3 Maintenance

Wiring, inspection and other maintenance work shall not be done until the power supply is disconnected for 10 minutes.

3. Precautions of use

In this manual, the wordings of "Tip" and "Attention" are defined as below:

Tip: To give some useful information.

Attention: To indicate any precautions during operation.

1. The inverter shall be installed in the place with good ventilation.
2. The motor's temperature can be a little higher than that of industrial frequency power during operation of the inverter, which is abnormal.
3. With long-term operation at low speed, the operation life of motor can be affected due to the poorer heat dissipation effect. In this case,special frequency converter shall be selected or the motor's load shall be decreased.
4. When the altitude is over 1000m, the inverter shall be derated. Increase of altitude for every 1500 m shall be ground for derating by 10%.
5. If the operating environment is beyond the allowed conditions of the inverter, please consult the manufacturer.

The inverter's output terminal shall not be connected to any filter capacitor or other RC absorption equipment.

4. Scrapping precautions

Following attentions shall be paid when the inverter and its components are abandoned:

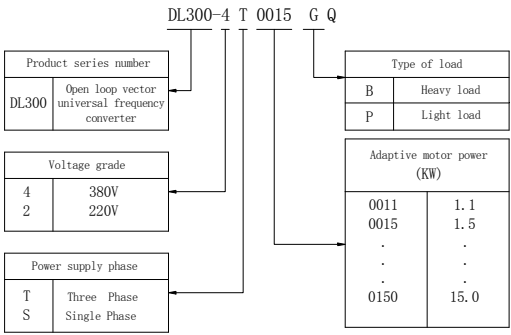
Explosion of the electrolytic capacitor: electrolytic capacitor in the frequency converter may cause explosion while burning.

Waste gas from plastic burning: harmful and toxic gas may be produced during combustion of plastic and rubber products of the converter.

Disposal: please dispose of inverters as industrial wastes.

Chapter 1 Product Introduction

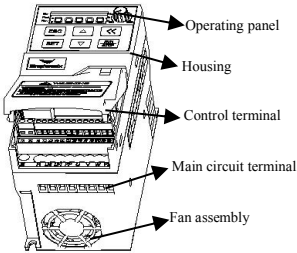
1.1 Description of inverter model



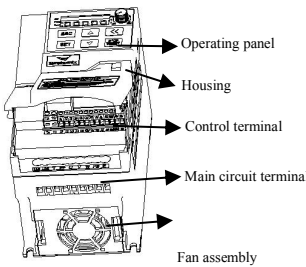
1.2 Model of inverter series

Inverter model	General load mode			Steady and light load mode		
	Rated capacity (KVA)	Rated current(A)	Adaptive motor power (KW)	Rated capacity (KVA)	Rated current(A)	Adaptive motor power (KW)
DL300-2S0007Q	1.9	5.0	0.75	——	——	——
DL300-2S0015Q	2.9	7.5	1.5	——	——	——
DL300-2S0022Q	3.8	10.0	2.2	——	——	——
DL300-2S0030Q	5.3	14.0	3.0	——	——	——
DL300-2S0040Q	6.3	16.5	4.0	——	——	——
DL300-4T0011GQ/4T0015PQ	2.0	3.0	1.1	2.4	3.7	1.5
DL300-4T0015GQ/4T0022PQ	2.4	3.7	1.5	3.6	5.5	2.2
DL300-4T0022GQ/4T0040PQ	3.6	5.5	2.2	6.3	9.5	4.0
DL300-4T0040GQ/4T0055PQ	6.3	9.5	4.0	8.6	13.0	5.5
DL300-4T0055GQ/4T0075PQ	8.6	13.0	5.5	11.2	17.0	7.5
DL300-4T0075GQ/4T0110PQ	11.2	17.0	7.5	16.5	25	11
DL300-4T0110GQ/4T0150PQ	16.5	25	11	21.7	33	15
DL300-4T0150GQ/4T0185PQ	21.7	33	15	25.7	37	18.5

1.3 Product appearance and name of components



Name of Category I Inverters
Applicable models:
DL300-2S0007Q～DL300-2S0015Q
DL300-4T0011GQ/4T0015PQ～DL300-4T0015GQ/4T0022PQ



Name of Category II, III ,IV Inverters
Applicable models:
DL300-2S0022Q～DL300-2S0040Q
DL300-4T0022GQ/4T0040PQ～DL300-4T0150GQ/4T0185PQ

1.4 Product technical indicators and specifications

Input	Rated voltage, frequency		Three phase (4T# series) 380V50/60Hz	Single phase (2S# series) 220V50/60Hz
	Allowed variation range of voltage		380 ~ 415V ± 10%	220V ± 10%
Output	Voltage		0 ~ input voltage	0 ~ input voltage
	Frequency		0.00~400Hz	
	Overload capacity		110%--long term; 150%--1 minute; 180%--2 second	
Control mode			V/F	
Control Characteristics	Frequency set resolution	Analog terminal input	0.1% of the maximum output frequency	
		Digital setting	Low frequency mode: 0.01Hz High frequency mode: 0.1Hz	
	Frequency precision	Analog input	Within 0.1% of the maximum output frequency	
		Digital input	Within 0.1% of the set output frequency	
	V/F curve (Voltage frequency characteristics)		Reference frequency can be set within 5~400Hz, and multi-node V/F curve can be randomly set.	
	Torque increase		Manual setting: 0.0¯20.0% of rated output.	
	Automatic current limiting and voltage limiting		Automatically detect motor's stator current and voltage and control it within allowable range according to special algorithm, regardless of any running process like acceleration, deceleration or static running.	
	Under voltage limiting during running		Especially for users of low-grid voltage and frequently fluctuating grid voltage. Even within the voltage range lower than allowable value, the system can maintain longest running time according to special algorithm and residual capacity distribution strategy.	
Typical functions	Multi-speed cont0rol		7-section programmable multi-speed control and 5 kinds of running modes available for selection.	
	Optional built-in PID controller		Internal integrated optimized PID controller, allowing for simple closed-loop control.	
	RS485 communication and linkage control		MODBUS protocol.	
	Frequency setting	Analog input	DC voltage 0-10V, and DC current 0-20mA (optional)	
		Digital input	Operating panel setting, potentiometer setting, RS485 port setting, UP/DW terminal control, and multiple combined setting with analog input.	

	Output signal	Relay and OC output	One channel OC output and One channel relay output (TA, TC), with up to 16 kinds of optional meanings.
		Analog output	One channel 0-10V voltage signal, and upper and lower limit can be set.
	Automatic voltage regulation running		Three kinds of voltage regulation modes including dynamic, static and none are available for selection according to different requirements, so as to achieve most stable running effect.
	Setting of acceleration and deceleration time		0.1¯600.0Sec continues setting.
	Running function		Setting of upper and lower limiting frequency, REV running limiting, RS485 communication, and control of progress increase and decrease of frequency, etc.
Display	Display of operation panel	Running status	Output frequency, output current, output voltage, motor revolution, set frequency, module temperature, analog input and output and so on.
		Alarm content	The nearest 6 times of fault records, five items of running parameter records at the time of latest fault trip including, the output frequency, output current, output voltage, DC voltage and modular temperature.
Protection/ alarm function	Over current, overvoltage, under voltage, overheat, short circuit, internal memory fault, etc		
Environment	Surrounding temperature	-10°C to +45°C (no freezing)	
	Surrounding humidity	90% below (no frosting)	
	Surrounding environment	Indoor (Free of direct sunlight, corrosion, flammable gas, oil mist and dusts)	
	Altitude	0~1000m, the load is derated by 10% for each kilometer increase.	
	Protecting grade	IP20	
	Cooling mode	Forced air cooling	
Installation mode	wall-mounted		
Vibration	$<6m/s^2$		

Chapter 2 Inverter Installation

2.1 Environmental requirements

This series of inverters are wall-mounted products and shall be vertically installed to facilitate air circulation and heat dissipation. Following attentions shall be paid for selecting installation environments.

1. The ambient temperature shall be within -10℃ – 45℃.
High-temperature and humid places shall be avoided, and the inverter shall be better placed in a place with humidity lower than 90% and without frosting.
2. Direct sunshine should be avoided.
3. The inverter should be away from flammable, explosive and corrosive gas and liquid.
4. The environment should be free of dust, floating fibers and metal particles.
5. The installation surface should be solid without ventilation.
6. The inverter should be away from electromagnetic
interference sources.
7. If there is too much dust in the environment, please close the cooling hole.(As show in figure 2-1-A)

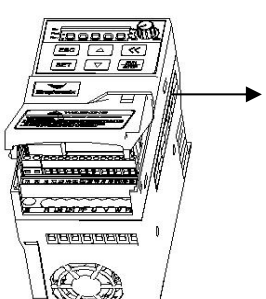


Figure 2-1-A

If you have any special installation requirements, please contact us in advance.

See Figure 2-1-B for installation spacing and distance requirement for single inverter. Enough space should be leaved around the inverter. For installation of multiple inverters, baffle plate should be applied between inverters to ensure good heat dissipation, as shown in Figure 2-1-C.

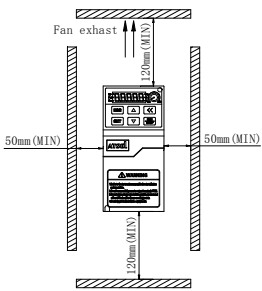


Figure 2-1-B Installation Spacing Distance

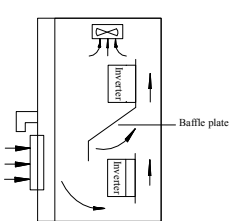
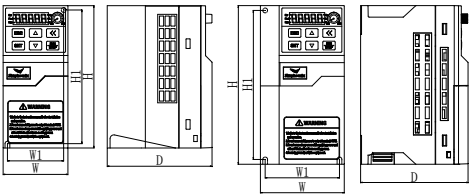


Figure 2-1-C Installation of Multiple Inverters

2.2 Installation dimension of inverters



Category I inverters
DL300-2S0007Q~DL300-2S0015Q
DL300-4T0011GQ/4T0015PQ~
DL300-4T0015GQ/4T0022PQ

Category II,III and IV inverters
DL300-2S0022Q~DL300-2S0040Q
DL300-4T0022GQ/4T0040PQ~
DL300-4T0150GQ/4T0185PQ

The specific installation dimensions of DL300 series inverters are shown in following table:

Inverter model (three-phase 380V)	Inverter model (single-phase 220V)	W1	W	H1	H	D	Screw specification
DL300-4T0011GQ/4T0015PQ	DL300-2S0007Q	59	68	139	148	110	M4
DL300-4T0015GQ/4T0022PQ	DL300-2S0015Q						
DL300-4T0022GQ/4T0040PQ	DL300-2S0022Q	78	88	155	165	113	M4
DL300-4T0040GQ/4T0055PQ	DL300-2S0030Q						
DL300-4T0055GQ/4T0075PQ	DL300-2S0040Q	99	109	199	209	135	M4
DL300-4T0075GQ/4T0110PQ	——						
DL300-4T0110GQ/4T0150PQ	——	134	146	235	249	155	M5
DL300-4T0150QG/4T0185PQ	——						

Chapter 3 Inverter Wiring

3.1 Wiring precautions

(1) Make sure intermediate circuit breaker is connected between the frequency inverter and power supply to avoid expanded accident when the frequency inverter is faulty.

(2) In order to reduce electromagnetic interference, please connect surge sorber on the coil of electromagnetic contactor, relay and etc. in the surrounding circuit of the frequency inverter.

(3) Please use shielded wire of above 0.3mm² for the wiring of such analog signals as frequency setting terminal AI and instrument loop (AO), etc. The shielding layer shall be connected on the grounding terminal E of the frequency inverter with wiring length less than 30m.

(4) The stranded wire or shielded wire of above 0.75mm² shall be selected for the wiring of input and output loop (X1-X4) of relay; and the shielded layer shall be connected to the common port CM of control terminals, with wiring length less than 50 m.

(5) The control wire shall be separated from the power line of major loop;it shall be at a distance of above 10cm for parallel wiring and vertical for cross wiring.

(6) The connecting wire between the inverter and the motor shall be less than 30m; and when it is longer than 30m, the carrier frequency of the inverter shall be appropriately reduced.

(7) All leading wires shall be fully fastened with terminals to ensure good contact.

(8) The pressurization of all the leading wires shall be in compliance with the voltage class of the frequency inverter.

Absorption capacitor or other RC absorbers shall not be installed at U, V and W output end of the frequency inverter, as shown in figure 3-1.

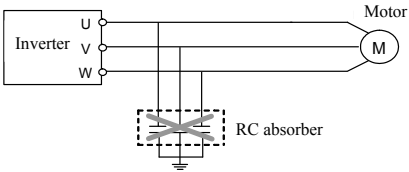


Figure 3-1 Forbidding connecting a RC absorber at the output terminal

3.2 Wiring of peripheral elements

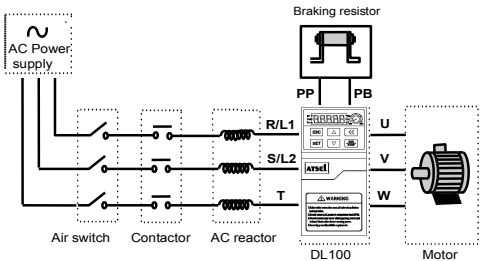


Figure 3-2 Inverter Wiring

- **Power supply**

  The inverter shall be provided with power in accordance with specification of input power supply designated by this operating manual.

- **Air switch**

  1) When the frequency inverter is maintained or not in use for a long time;
  2) the air switch will separate the frequency inverter from the power supply;
  3) When the input side of the frequency inverter has failures like short circuit, the air switch can provide protection.

- **Contactor**
  It can conveniently control power-supply and power disconnection of the inverter, and the power-on and power-off of the motor.
- **AC reactor**
  1) To promote power factor;
  2) To reduce harmonic input of the inverter against the grid;
  3) Weaken influenced caused by unbalanced voltage of three-phase power supply.
- **Brake resistance**
  When the motor is at the dynamic braking status, it can avoid producing over high pumping voltage in the DC loop.

Recommended specifications are shown in following table:

Inverter model	Adaptive motor (KW)	Wire specification (main loop) (mm^2)	Air circuit breaker (A)	Electromagnetic contactor (A)
DL300-2S0007Q	0.75	2.5	20	12
DL300-2S0015Q	1.5	2.5	32	18
DL300-2S0022Q	2.2	4.0	32	18
DL300-2S0030Q	3.0	6.0	40	32
DL300-2S0040Q	4.0	6.0	40	32
DL300-4T0011GQ/4T0015PQ	1.1	1.0	10	6
DL300-4T0015GQ/4T0022PQ	1.5	1.5	16	12
DL300-4T0022GQ/4T0040PQ	2.2	2.5	16	12
DL300-4T0040GQ/4T0055PQ	4.0	4.0	32	18
DL300-4T0055GQ/4T0075PQ	5.5	6	32	22
DL300-4T0075GQ/4T0110PQ	7.5	6	40	32
DL300-4T0110GQ/4T0150PQ	11.0	10	63	32
DL300-4T0150GQ/4T0185PQ	15.0	10	63	38

Main loop terminal

Inverter model	Screw specification	Tightening torque (N*m)	Recommended wire ear model
DL300-2S0007Q	M3.5	0.7~0.9	PTV1.25-9
DL300-2S0015Q	M3.5	0.7~0.9	PTV2-9
DL300-2S0022Q	M3.5	0.7~0.9	PTV5.5-13
DL300-2S0030Q	M3.5	0.7~0.9	PTV5.5-13
DL300-2S0040Q	M3.5	0.7~0.9	PTV5.5-13
DL300-4T0011GQ/4T0015PQ	M3.5	0.7~0.9	PTV1.25-9
DL300-4T0015GQ/4T0022PQ	M3.5	0.7~0.9	PTV1.25-9
DL300-4T0022GQ/4T0040PQ	M3.5	0.7~0.9	PTV2-9
DL300-4T0040GQ/4T0055PQ	M3.5	0.7~0.9	PTV5.5-13

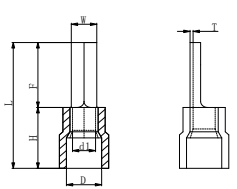
DL300-4T0055GQ/4T0075PQ	M4	1.2~1.5	RNY5.5-4S
DL300-4T0075GQ/4T0110PQ	M4	1.2~1.5	RNY5.5-4S
DL300-4T0110GQ/4T0150PQ	M5	2.0~2.5	RNY8-5S
DL300-4T0150GQ/4T0185PQ	M5	2.0~2.5	RNY8-5S

Universal control board and expansion card terminal

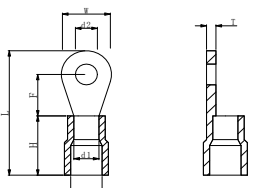
General control terminal	Screw specification	Tightening torque (N*m)	Recommended wire ear model
Control board/extension card terminal	M2	0.1~0.2	E0.5-6
Control board/extension card terminal	M3	0.3~0.4	E0.75-6

Wire ear model		W (mm)	F (mm)	L (mm)	H (mm)	d1 (mm)	D (mm)	T (mm)
PVT/E Series	PVT1.25-9	1.9	9	19	10	1.7	4.2	0.8
	PVT2-9	1.9	9	19	10	2.3	4.7	0.8
	PVT5.5-13	2.8	13	26	13	3.4	6.5	1
	E0.5-6	1.1	6	12	6	1	2.6	/
	E0.75-6	1.1	6	12.3	6.3	1.2	2.8	/

Wire ear model		d2 (mm)	W (mm)	F (mm)	L (mm)	H (mm)	d1 (mm)	D (mm)	T (mm)
RNY Series	RNY5.5-4S	4.3	7.2	5.9	22.5	13	3.4	6.7	1
	RNY8-5S	5.3	8.8	9.3	29.7	16	4.5	8	1.2



PVT/E series



PVT/E series

3.3 Basic wiring

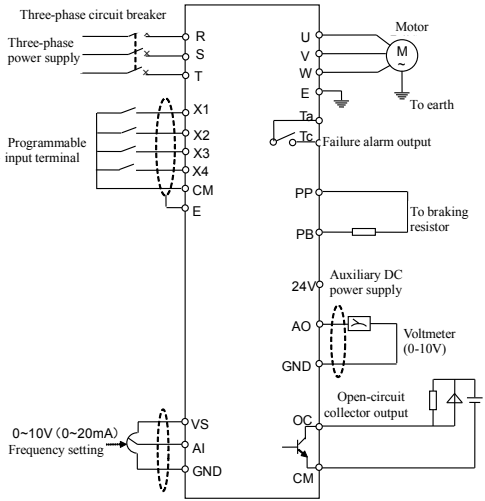
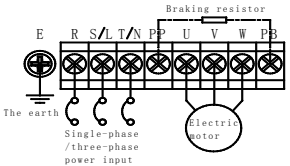


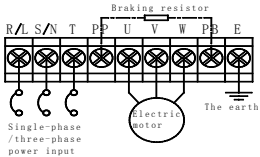
Figure 3-3 Basic Wiring of Inverter

3.4 Wiring of main loop terminal

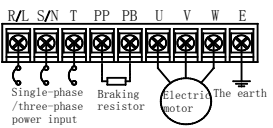
Symbol	Function	Symbol	Function
PP	DC side voltage positive terminal	PB	Braking resistor can be connected between PP and PB
R、S、T	Connect to the grid three-phase AC power supply	U、V、W	Connect to three-phase AC motor
E	Earthing terminal	L、N	Connect to the power grid single-phase AC power supply L:Live wire N:Zero wire



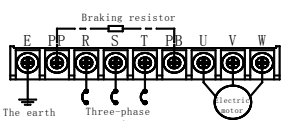
Applicable model:
category I main loop terminal
DL300-2S0007Q～2S0015Q
DL300-4T0011GQ/4T0015PQ～
DL300-4T0015GQ4T0022PQ



Applicable model:
category II main loop terminal
DL300-2S0022Q～2S0030Q
DL300-4T0022GQ/4T0040PQ～
DL300-4T0040GQ/4T0055PQ



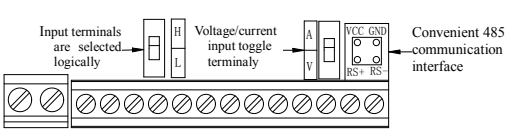
Applicable model:
category III main loop terminal
DL300-2S0004Q
DL300-4T0055GQ/4T0075PQ～
DL300-4T0075GQ/4T0110PQ



Applicable model:
category IV main loop terminal
DL300-4T0110GQ/4T0150PQ～
DL300-4T0150GQ/4T0185PQ

3.5 Wiring of control loop terminal

(1) Diagram of control loop terminal



(2) Function description of control loop terminal

Type	Terminal symbol	Terminal function	Remarks
Power supply	VS	Externally providing +10V (0~10mA) power supply	
	24V	External providing +24V (0~50mA) power supply (CM terminal is the power grand).	
Analog input	AI	Voltage signal input terminal (when the toggle switch is set to V)	The input range:0~10V
		Current signal input terminal (when the toggle switch is set to A)	The input range:0~20mA
	GND	Analog input signal common terminal (VS power ground)	
Control terminal	X1	Multifunctional input terminal 1	The function of the multi-function input terminal is set by the parameters [F3.01] ~ [F3.04], and it is effective when closed; in the logic selection of the input terminal, when the toggle switch is turned to L, the terminal and CM are closed and effective, and when the switch is to H, the terminal is connected to 24V End closure effective.
	X2	Multifunctional input terminal 2	
	X3	Multifunctional input terminal 3	
	X4	Multifunctional input terminal 4	
Analog output	AO	Programmable voltage signal output terminal (external voltage meter set by [F3.16])	Voltage signal output 0-10V.
OC output	OC	Programmable open-circuit collector output, set by parameter [F4.00]	Maximum load current 50mA and maximum withstanding voltage 24V.
Program-mable output	TA /TC	Normally open contact capacity: AC 250V, 1A resistive load ,TA-TC function is set by parameter [F4.01].	
Commu-nication	RS+/RS-	485 communication port	Convenient communication interface uses special cable (optional) to copy/download parameters conveniently through 485 communication.

Chapter 4 Operating Panel

4.1 Panel instructions

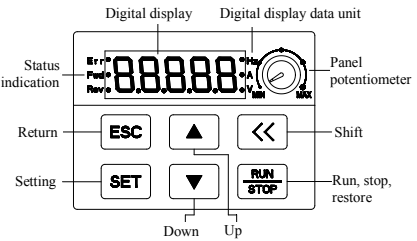


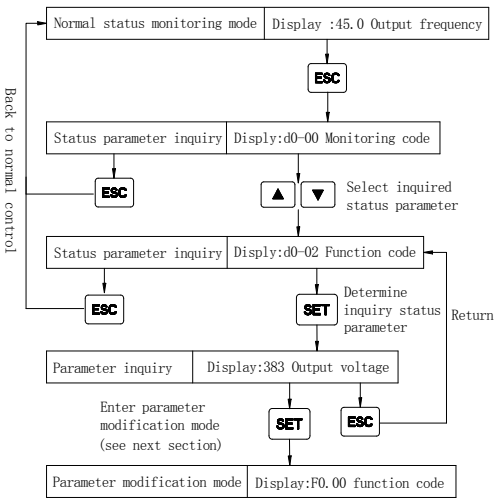
Figure 4-1 Operating Panel Sketch

Keys	Function Description
Digital display	Display the current operating status parameters and setting parameters of the frequency inverter.
A, Hz, V	Display the measurement unit corresponding to the main digital display data.
Fwd	The forward running indicator light indicates that the inverter is running forward and the output terminals U, V, W have output voltage.
Rev	Reverse running indicator light indicates that the inverter is running reversely and output terminals U, V, W have output voltage.
Err	Fault status indicator, indicating that the inverter is in fault status.
▲ ▼	**Data modification key.** It is used to modify functional code or parameters. At the status monitoring mode, if the frequency command channel is at the digital setting mode ([F0.00]=0), press this key to directly modify the frequency set value.
ESC	**Back key**. At the normal monitoring mode, press this key to enter the non-normal monitoring mode/monitoring parameter inquiry mode to see the operating status parameters of the inverter. At any other operating status, separately press this key to back to the previous status.
SET	**Set key**. Confirm the current status or parameter (parameters are stored in the internal memorizer) and enter the next function menu.

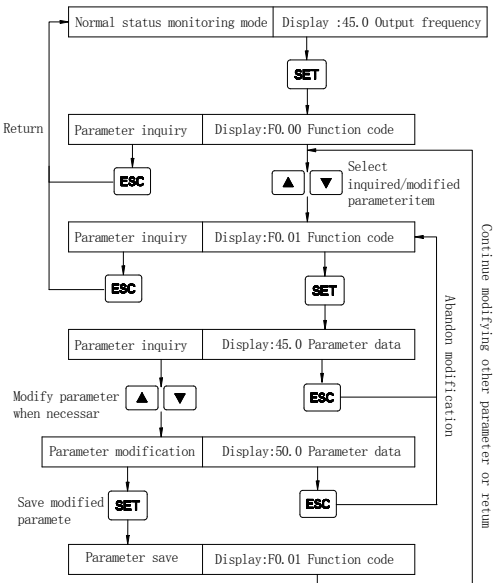
RUN STOP	**RUN/STOP command key.** When the command channel selects control panel ([F0.06] =###0), this key is effective. The key is a trigger key. When the inverter is at the stop status, press this key to input stop command to stop running. At the inverter fault status, this key is also used as the fault reset key.
<<	**Shift key.** When modifying data with any data modification key, press this key to select the data digit to be modified, and the selected digit will flash.
MIN MAX	**Panel potentiometer.** When the inverter's running frequency is set by the potentiometer on the operating meter (F0.00=3), rotate the potentiometer knob counterclockwise to decrease running frequency, and rotate it clockwise to increase running frequency.

4.2 Panel operating method

(1) Status parameter inquiry (example)



(2) Parameter inquiry and modification (example)



4.3 List of status monitoring parameters

Monitoring code	Content	Unit
d0-00	Inverter’s current output frequency	Hz
d0-01	Motor revolution	rpm
d0-02	Inverter’s current output current (effective value)	A
d0-03	Current output torque of the inverter(effective value)	%
d0-04	Inverter’s current output voltage (effective value)	V
d0-05	Current output power of the inverter(effective value)	kW
d0-06	Module temperature	℃
d0-07	Voltage at the DC terminal in the inverter	V
d0-08	Running time of the inverter **The unit:motor control mode** 0：VF control 1：Open-loop vector **Tens:Running state** 0：Stop 1：Velocity arrival 2：Acceleration 3：Deceleration **Hundreds:Reserve** **Thousands:Inhibitory action** 0：No action 1：Overcurrent suppression 2：Overvoltage suppression 3：Undervoltage suppression	
d0-09	Frequency channel instruction	Hz
d0-10	Stator frequency	Hz
d0-11	Input terminal status	
d0-12	Analog input AI	V
d0-13	Analog output AO	V
d0-14	Reserve	
d0-15	Reserve	
d0-16	Reserve	
d0-17	Field current	A
d0-18	Torque current	A
d0-19	Reserve	
d0-20	Main program version	
d0-21	Equipment capacity	kW
d0-22	U-phase current sampling zero bias	
d0-23	V-phase current sampling zero bias	
d0-24	Reserve	
d0-25	Reserve	
d0-26	Cumulative running time 1	H
d0-27	Cumulative running time 2	s
d0-28	Cumulative power-on time 1	H
d0-29	Cumulative power-on time 2	s

Monitoring code	Content	Unit
d0-30	Cumulative electricity consumption 1	Mw・h
d0-31	Cumulative electricity consumption 2	kW・h
d1-00	Last fault record	
d1-01	Historical fault record 1	
d1-02	Historical fault record 2	
d1-03	Historical fault record 3	
d1-04	Historical fault record 4	
d1-05	Historical fault record 5	
d1-06	Output frequency at the time of recent fault	Hz
d1-07	Output currency at the time of recent fault	A
d1-08	Output voltage at the time of recent fault	V
d1-09	DC voltage at the time of recent fault	V
d1-10	Module temperature at the time of recent fault	℃
d1-11	Set frequency at the time of recent fault	Hz
d1-12	Running status at the time of recent fault	
d1-13	Total startup time since the last fault	H
d1-14~d1-31	Reserve	

4.4 Simple operation of the inverter

4.4.1 Initial setting

(1) Channel selection for frequency input ([F0.00])

Inverter's initial setting varies from each other according to different models.

When the parameter is set to 0, the inverter's frequency setting will be set through the panel digit.

(2) Selection of running command input channel ([F0.06])

The inverter's initial setting varies according to different models. When this parameter is set to [F0.06] =###0, the inverter's start and stop control will be completed through RUN/STOP key on the operating panel.

4.4.2 Simple running

It is absolutely forbidden to connect the power cord to the output U, V, W of the frequency inverter.

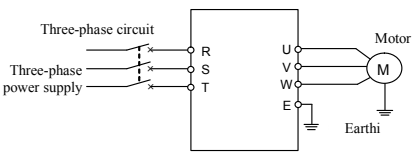


Figure 4-2 Simple Running Wiring Diagram

① Connect wires as per Figure 4-2;
② Switch on the power supply after confirming that the wires are connected correctly, and the inverter will firstly display "P-oN" and then "0".
③ Confirm that the frequency setting channel is at the digit setting model ([F0.00] = 0);
④ It is required to set parameter [F2.00] and [F2.01] according to the rated nameplate data on the inverter's dragging motor.
⑤ Press RUN/STOP key to start the inverter and the inverter will input 0 frequency, displaying "0.0".
⑥ Press Up of ▲ key to increase set frequency, and the output frequency of the inverter will increase and the motor revolution will also increase.
⑦ Check if the motor run normally. In case of any abnormity, stop running the motor immediately and disconnect power supply. Do not run the motor until fault cause is found.
⑧ Press Down on the ▼ key to decrease set frequency.
⑨ Press RUN/STOP key again to stop running and cut off the power supply.

The default value of the carrier frequency is fixed (2-8 kHz). If the motor is completely empty-load, slight oscillation may occur sometimes in the operation under high carrier frequency. At this time, please reduce the setting value of the carrier frequency. (Parameter [F0.08]).

Chapter 5 Function Parameter Table

Note :

' × ' : means that the set value of the parameter cannot be changed in the running state of the inverter;

'√' : indicates that the setting value of the parameter can be changed;

"☆": indicates that the set value of the parameter is related to the machine model.

Parameter Type	Function Code	Name	Setting Range and Description	Minimum unit	Default setting	Modification limit
Basic running parameter group	F0.00	Frequency input channel	0：Digital setting 1：External simulation quantity 2：External communication 3：Panel potentiometer 4：External terminal selection 5：Combination setting 6：Terminal UP / DW setting	1	3	√
	F0.01	Frequency number setting	0.00Hz ~ [F0.02]Hz	0.01	50.00	√
	F0.02	Upper limiting frequency	Low frequency mode:0.5~300.00Hz High frequency mode：5.0~1000.0Hz	0.01	50.00	×
	F0.03	Lower limit frequency	0.00~[F0.02] Hz	0.01	0.00	×
	F0.04	Parameter locking	0：All of the parameters are allowed to change 1：Only this parameter and F001 are allowed 2：Parameter lock only allows the modification of this parameter	1	0.00	√
	F0.05	Operation direction and Combination setting	**LED Units**：Run in reverse direction 0：Not valid 1：The direction is reversed **LED Tens**：Direction lock 0：Not valid 1：Reverse prevent 2：Positive rotation	1	0000	√

			prevention **LED Hundreds**：Lower limit frequency mode 0：Below the lower limit Keep the lower limit 1：Below the lower limit output 0 frequency **LED Thousands**：Frequency combination set 0 ~ B			
	F0.06	Run the command channel and the mode selection	**LED Units**： Run the command channel selection 0：Keyboard control 1：External terminal control 2：Serial communications port **LED Tens**： Run the command mode selection 0：Second-line mode1 1：Second-line mode2 2：Three line mode1 3：Three line mode2 **LED Hundreds**： Reserved **LED Thousands**： Start protection options 0：Not protect 1：Protect	1	0000	√
	F0.07	Parameter initialization	0：Not valid 1：Standard initialization 2：Clear the fault record 3：Full initialization	1	0	×
	F0.08	Carrier frequency	2.0~ 8.0 k	0.1	☆	√
	F0.09	The carrier characteristics	**LED Units**：Load association adjustment 0：Not valid 1：Valid **LED Tens**： Temperature association adjustment 0：Not valid 1：Valid **LED Hundreds**： Base frequency association adjustment	1	0011	√

			0：Not valid 1：Valid **LED Thousands：** Modulation mode 0：Asynchronous 1：Synchronization 2~5：Noise smooth			
	F0.10	Output and control settings	**LED Units：** Motor control mode 0：VF control 1：Open-loop vector control of the Asynchronous motor 2：Motor open ring vector control **LED Tens：**Reserved **LED Hundreds：** Reserved **LED Thousands：** Output mode 0：Low frequency mode(0~300.00Hz) 1：High frequency mode(0~1000.0Hz) 2：Stable stant load operation (P-type)	1	0	×
	F0.11	Permission password	0~65535	1	0	×
	F0.12	Monitoring parameter selection	0~31(D0.00~D0.31)	1	0	√
	F0.13	S curve ratio	0~50%	1	0	√
	F0.14	Acceleration time	0.01 ~ 600.00Sec	0.01	5.00	√
	F0.15	Deceleration time	0.01 ~ 600.00Sec	0.01	5.00	√
	F0.16	Point motion acceleration time	0.01 ~ 600.00Sec	0.01	5.00	√
	F0.17	Point motion deceleration time	0.01 ~ 600.00Sec	0.01	5.00	√
	F0.18	Positive turn point movement frequency	0.00~[F0.02]Hz	0.01	5.00	√
	F0.19	Reverse point motion frequency	0.00~[F0.02]Hz	0.01	5.00	√

Basic control parameter group	F1.00	Start the pre-excitation current	0.0~100.0%	0.1	30.0	√
	F1.01	Start the pre-excitation time	0.00~10.00Sec	0.01	0.0	√
	F1.02	Start frequency	0.0~min(F0.02,100.00) Hz	0.01	1.00	√
	F1.03	Start the frequency hold time	0.00~10.00Sec	0.01	0.0	√
	F1.04	Halt mode	**LED Units**：Starting mode 0：Regular start 1：Unidirectional speed tracking start 2：Bidirectional speed tracking starts **LED Tens**：Reserved **LED Hundreds**：Stop type 0：Slow down 1：Free shutdown **LED Thousands**：Emergency stop mode 0：Slow down 1：Free shutdown	1	0000	√
	F1.05	Shutdown DC brake frequency	0.0~min(F0.02,100.0) Hz	0.01	5.00	√
	F1.06	Shutdown DC brake current	0.0~100.0%	0.1	30.0	√
	F1.07	Shutdown the DC brake time	0.00~20.00Sec	0.01	0.00	√
	F1.08	Energy consumption braking level	340~400/650~800V	1	360/680	√
	F1.09	Energy consumption braking action selection	0：Action only when slowing down 1：Not limited by deceleration	1	0	√

	F1.10	Inhibition of action selection	**LED Units**: Underpressure suppression **LED Tens**: Overpressure inhibition **LED Hundreds**: Accelerated current limit **LED Thousands**: Run current limit 0:not valid 1:valid	1	1111	√
	F1.11	Under pressure suppression level	160~220/340~420V	1	190/380	√
	F1.12	The level of overpressure inhibition	350~400/650~800V	1	360/700	√
	F1.13	Accelerated current limit level	120~220%	1	180	√
	F1.14	Operating current limit level	120~220%	1	200	√
	F1.15	Magnetic flux braking level	0~100%	1	0	√
	F1.16	Motor overload protection level	10~131%	1	110	√
	F1.17	Protect action selection	**LED Units**:Output lack of phase **LED Tens**:Temperature sensor fault **LED Hundreds**:Motor short-circuit to the ground detection **LED Thousands**: Overload temperature correlation 0：Not valid 1：Valid	1	0111	√
	F1.18	Number of fault self-recovery times	0~5	1	0	√
	F1.19	Failure self-recovery time	0.00~600.00 Sec	0.01	1.00	√

Motor parameter group	F2.00	Basic frequency	5.00~1000.0Hz	0.01	50.00	×
	F2.01	Maximum output voltage	25 ~ 250V/50 ~ 500V	1	220/380	×
	F2.02	Recurrent ascension	0.0~20.0%	0.1	3.0	√
	F2.03	The V / F curve selection	0：Normalized form 1：Enhancement mode 2：Multiple spot 3：1.2 Times 4：1.4 Times 5：1.6 Times 6：1.8 Times 7：2.0 Times	1	0	√
	F2.04	V/F frequency1	0.00~[F2.00] Hz	0.01	0.00	√
	F2.05	V/F voltage1	0~[F2.01] V	1	0	√
	F2.06	V/F frequency2	0.00~[F2.00] Hz	0.01	0.00	√
	F2.07	V/F voltage2	0~[F2.01] V	1	0	√
	F2.08	V/F frequency3	0.00~[F2.00] Hz	0.01	0.00	√
	F2.09	V/F voltage3	0~[F2.01] V	1	0	√
	F2.10	Reserved				√
	F2.11	Zero frequency torque retention	0：Not valid 1：Valid	0	0	√
	F2.12	Automatic voltage	0：Not valid 1：Slow down invalid 2：Valid	1	0	√
	F2.13	Motor pole logarithm	1~16	1	2	√
	F2.14	The VF shock inhibition coefficient	0~100%	1	60	√
	F2.15	The SVC velocity filtering coefficient	100~900	1	650	√
	F2.16	Reserved				
	F2.17	Reserved				
	F2.18	Reserved				
	F2.19	Reserved				

Digital input and analog parameter group	F3.00	Input terminal attribute selection	**LED Units**: X1 Input Retro **LED Tens**: X2 Input Retro **LED Hundreds**: X3 Input Retro **LED Thousands**: X4Input Retro 0:Not valid 1:Valid	1	0000	√
	F3.01	Multifunction terminal X1	0~22	1	11	×
	F3.02	Multifunction terminal X2	0~22	1	0	×
	F3.03	Multifunction terminal X3	0~22	1	13	×
	F3.04	Multifunction terminal X4	0~22	1	0	×
	F3.05	UP/DW Terminal frequency power storage	0：Not valid 1：Valid	1	0	√
	F3.06	UP/DW Terminal integral time	0.01~50.0 Sec	0.01	1.00	√
	F3.07	Input the terminal filter time	1~50ms	1	10	√
	F3.08	Reserved				
	F3.09	AI input lower limit voltage	0.00~[F3.10] V	0.01	0.00	√
	F3.10	AI input upper limit voltage	[F3.19]~10.00 V	0.01	10.00	√
	F3.11	AI input filter time	0~200ms	1	10	√
	F3.12	AI minimum set frequency	0.00~[F3.13] Hz	0.01	0.00	√
	F3.13	AI maximum set frequency	[F3.12]~[F0.02] Hz	0.01	50.00	√
	F3.14	Reserved				
	F3.15	Reserved				
	F3.16	AO output selection	0：output frequency 1：output current 2：output voltage 3：Fixed value output	0	0	√

	F3.17	AO output lower limit voltage	0.00~[F3.18] V	0.01	0.00	√
	F3.18	AO output upper limit voltage	[F3.17]~10.00V	0.01	10.00	√
	F3.19	AO fixed-value output voltage	0~10.00V	0.01	0	√
Digital output and swing frequency operation parameter group	F4.00	Output feature selection	**LED Units**: OC output reversion **LED Tens**: RLY output inverse **LED Hundreds**: Reserved **LED Thousands**: Reserved 0:Not valid 1:Valid	1	0000	√
	F4.01	OC output selection	0~13	1	0	√
	F4.02	RLY output selection	0~13	1	8	√
	F4.03	RLY output time delay	0.00~30.00 Sec	0.01	0.00	√
	F4.04	monitor input variable	0~6	1	0	√
	F4.05	Lower limit of the monitor variable	0~100.0%	0.1	0	√
	F4.06	Upper limit of the monitor variable	0~100.0%	0.1	100.0	√
	F4.07	The frequency reaches the detection amplitude	0.0~min(F0.02,100.00) Hz	0.01	5.00	√
	F4.08	FDT setting	0.00~50.00 Hz	0.01	10.00	√
	F4.09	FDT action delay	0.00~20.00 Sec	0.01	0.00	√
	F4.10	Overload alarm level	10~200%	1	110	√
	F4.11	Overload alarm delay	0.00~600.00 Sec	0.01	5.00	√
	F4.12	Jump frequency	0.00~[F0.2] Hz	0.01	0	√

	F4.13	Jump frequency range	0~10.00Hz	0.01	0	√
	F4.14	Pressing frequency operation Settings	**LED Units**: Function setting 0: Function invalid 1: Effective function **LED Tens**: Center frequency selection 0: Frequency center frequency setting point 1: Frequency channel for the given value **LED Hundreds**: Place the choice 0: Fixed swing amplitude (relative maximum frequency) 1: Variable swing (relative center frequency) **LED Thousands**: Reserved	1	0000	√
	F4.15	Pressing frequency center frequency	0.00~[F0.02] Hz	0.01	25.00	√
	F4.16	The frequency amplitude	0.0~50.0%	0.1	20.0	√
	F4.17	The amplitude of the jump frequency	0~50.0%	0.1	0	√
	F4.18	The time of swing frequency rise	0.01~600.00Sec	0.01	1.00	√
	F4.19	The drop time of swing frequency	0.01~600.00Sec	0.01	1.00	√

Multi-stage speed and PLC operating parameter group	F5.00	Multi-speed operation mode	**LED Units**：Multiple speed selection 0：Not valid 1：Valid **LED Tens**：Mode selection 0：Monocycle 1：Keep the final value 2：Keep the set value 3：continuous loop **LED Hundreds**：Speed switching mode 0：Continuous switching 1：Zero frequency switch **LED Thousands**：Reserved	1	0000	√
	F5.01	Multi-speed frequency1	0.00Hz ~[F0.02]Hz	0.01	35.00	√
	F5.02	Multi-speed frequency2	0.00Hz ~ [F0.02]Hz	0.01	15.00	√
	F5.03	Multi-speed frequency3	0.00Hz ~ [F0.02]Hz	0.01	3.00	√
	F5.04	Multi-speed frequency4	0.00Hz ~ [F0.02]Hz	0.01	20.00	√
	F5.05	Multi-speed frequency5	0.00Hz ~ [F0.02]Hz	0.01	25.00	√
	F5.06	Multi-speed frequency6	0.00 Hz~ [F0.02]Hz	0.01	30.00	√
	F5.07	Multi-speed frequency7	0.00 Hz~ [F0.02]Hz	0.01	35.00	√
	F5.08	Phase 1 run time	0.0S~6500.0Sec	0.1	0.0	√
	F5.09	Phase 2 run time	0.0S~6500.0Sec	0.1	0.0	√
	F5.10	Phase 3 run time	0.0S~6500.0Sec	0.1	0.0	√
	F5.11	Phase 4 run time	0.0S~6500.0Sec	0.1	0.0	√
	F5.12	Phase 5 run time	0.0S~6500.0Sec	0.1	0.0	√
	F5.13	Phase 6 run time	0.0S~6500.0Sec	0.1	0.0	√
	F5.14	Phase 7 run time	0.0S~6500.0Sec	0.1	0.0	√

	F5.15	PLC multi-speed Running direction1	**LED Units**: Phase 1 run direction **LED Tens**: Phase 2 run direction **LED Hundreds**: Phase 3 run direction **LED Thousands**: Phase 4 run direction 0:Forward direction 1:Opposite direction	1	0000	√
	F5.16	PLC multi-speed Running direction2	**LED Units**: Phase 5 run direction **LED Tens**: Phase 6 run direction **LED Hundreds**: Phase 7 run direction **LED Thousands**: Reserved 0:Forward direction 1:Opposite direction	1	0000	√
	F5.17	PLC runs is time shutdown	0~9999(min)	1	0	√
	F5.18	Reserved				√
	F5.19	Reserved				√
Communication setting parameter group	F6.00	Communicat-ion settings	**LED Units**: Porter rate selection 0：1200bps 1：2400bps 2：4800bps 3：9600bps 4：19200bps 5：38400bps **LED Hundreds**: Data format 0：1-8-1-N，RTU 1：1-8-1-E，RTU 2：1-8-1-O，RTU	0000	0003	×
	F6.01	This machine address	0~127	1	1	√
	F6.02	Response delay	0~1000 ms	1	2	√
	F6.03	Time out detection time	0.1~20.0 Sec	0.1s	2.0	√
	F6.04	Communicat-ion disconnection action selection	0：Halt 1：Run in the last state 2：Alarm shutdown	1	0	√
	F6.05	Linkage function	0000~0001	1	0000	×

	F6.06	Communication setting coefficient	0.100~10.000	0.001	1.000	√
	F6.10	Mapping application parameters1	F000~F919	1	F001	√
	F6.11	Mapping application parameters2	F000~F919	1	F001	√
	F6.12	Mapping application parameters3	F000~F919	1	F001	√
	F6.13	Mapping application parameters4	F000~F919	1	F001	√
	F6.14	Mapping application parameters5	F000~F919	1	F001	√
	F6.15	Mapping state parameters1	D000~D031	1	D000	√
	F6.16	Mapping state parameters2	D000~D031	1	D001	√
	F6.17	Mapping state parameters3	D000~D031	1	D002	√
	F6.18	Mapping state parameters4	D000~D031	1	D003	√
	F6.19	Mapping state parameters5	D000~D031	1	D004	√
PID parameter group	F7.00	PID function setting	**LED Units:** Function setting 0: PID function is closed 1: PID function to open **LED Tens:** The deviation polarity is reversed 0: Not valid 1: Polarity regurgitation **LED Hundreds:** Output polarity 0: Unipolarity 1: Bipolar **LED Thousands:** Frequency regulation benchmark 0: Upper limiting frequency 1: Frequency channel settings	1	0000	√

	F7.01	Digital setting	0.0~100.0%	0.1	50.0	√
	F7.02	Feedback gain correction	0.100~10.000	0.01	1.000	√
	F7.03	PID feedforward action coefficient	0~100%	1	0	√
	F7.04	Range of homeostatic bias	0 ~10.0%	0.1	0	√
	F7.05	Reserved				
	F7.06	Reserved				
	F7.07	proportional gain	0.01~5.00	0.01	1.00	√
	F7.08	integration time	0.00~3.00 Sec	0.01	1.00	√
	F7.09	differential gain	0.01~2.00	0.01	0	√
	F7.10	Reserved				
	F7.11	PID adjusts the frequency range	0.0~100.0%	0.1	100.0	√
	F7.12	Broken line detection	0.0~50.0%	0.1	5.0	√
	F7.13	Judgment of disconnection detection time	0.01~60.00Sec	0.01	5.00	√
	F7.14	Reserved				
	F7.15	PID dormancy function	0：Close 1：Open	1	0	√
	F7.16	The dormancy frequency	0~upper limiting frequency	0.01	0	√
	F7.17	Sleep delay	0~3600.0Sec	0.1	3.0	√
	F7.18	Sleep arousal bias	0~100%	0.1	5.0	√
	F7.19	Wake up delay	0~3600.0 Sec	0.1s	3.0	√

Asynchronous motor vector running parameter group	F8.00	Motor is rated power	0.1~100.0kw	0.1	☆	×
	F8.01	Motor is rated voltage	20 ~ 250V/30 ~ 450V	1	☆	×
	F8.02	Rated current of motor	0.1~1000.0A	0.1	☆	×
	F8.03	Rated frequency of motor	5~1000.0Hz	0.1	☆	×
	F8.04	Motor rated speed	300~60000rpm	1	☆	×
	F8.05	No-load current	0.01~300.00A	0.01	☆	×
	F8.06	Stator resistance	0.001~65.000Ω	0.001	☆	×
	F8.07	The stator inductance	0.1~6500.0mH	0.1	☆	×
	F8.08	Total leakage	0.1~650.00mH	0.01	☆	×
	F8.09	Rotor time constant	5.0~6500.0ms	0.1	☆	×
	F8.10	Transfer difference compensation coefficient	0.5~1.50	0.01	1.00	√
	F8.11	Motor parameter determination	**LED Units**：parameter identification 0：Close 1：Static identification 2：Dynamic identification **LED Tens**：Gain select 0：Single PID parameters 1：Dual PID parameters **LED Hundreds**：Speed identification mode 0：One-way mode 1：Two-way mode **LED Thousands**：Reserved	1	0000	×
	F8.12	Gain switch on the frequency	1.0~Rated frequency of motor Hz	0.1	5.0	√
	F8.13	Gain switch under frequency	0.5~ [F8.12]Hz	0.1	3.0	√
	F8.14	Proportional gain1	0.10~2.00	0.01	0.8	√

	F8.15	Integration time1	0~1.00Sec	0.01	0.3	√
	F8.16	Proportional gain2	0.10~2.00	0.01	0.8	√
	F8.17	Integration time2	0~1.00Sec	0.01	0.35	√
	F8.18	Speed regulator positive limit amplitude	0~250%	1	180	√
	F8.19	Speed regulator negative limit amplitude	0~250%	1	180	√
Synchronous motor operation parameter group	F9.00	Rated voltage of the synchronous motor	20 ~ 250V/30 ~ 450V	1	☆	×
	F9.01	Rated current of the synchronous motor	0.1~1000.0A	0.1	☆	×
	F9.02	Rated rotation speed of the synchronous motor	300~60000rpm	1	☆	×
	F9.03	Number of synchronous motor poles	1~50	1	☆	×
	F9.04	Reverse potential voltage (Valid value between the lines)	1.0~500.0V/krpm	0.1	☆	×
	F9.05	Stator resistance (between lines)	0.001~65.000Ω	0.001	☆	×
	F9.06	DD-axis inductance (between lines)	0.01~650.00mH	0.01	☆	×
	F9.07	Q-axis inductance (between lines)	0.01~650.00mH	0.01	☆	×
	F9.08	Chain Observer gain	0.1~2.5	0.1	1.0	√

	F9.09	Speed-filter bandwidth	10~500Hz	1	☆	√
	F9.10	Motor parameter determination and speed observation and selection	LED Units：Parameter identification 0：Close 1：Static identification LED Tens：Speed observation selection 0：Model reference adaptive 1：Flux observer LED Hundreds：Reserved LED Thousands：Reserved	1	0	×
	F9.11	The velocity-ring proportional gain	0.01~2.00	0.01	0.6	√
	F9.12	The velocity loop integral gain	0.01~2.00	0.01	0.8	√
	F9.13	Speed estimate proportional gain	0.1~5.00	0.01	1.00	√
	F9.14	Speed estimate for the integral gain	0.1~5.00	0.01	2.50	√
	F9.15	Excitation switching speed	0~ [F9.02]/2	0.01	[F9.02]/10	√
	F9.16	Low-speed excitation current limit amplitude	0~60%	0.01	30	√
	F9.17	High-speed weak magnetic current limit amplitude	0~50%	1	25	√
	F9.18	Positive torque limit	0~250%	1	180	√
	F9.19	Negative torque limit	0~250%	1	180	√

Chapter 6 Detailed Description of Functions

6.1 Basic operating parameter group

F0.00 Frequency input channel/mode selection Setting range: 0 ~ 6

It is used to select the setting channel/mode of the inverter's operating frequency.

0：Digital setting

The set frequency of the inverter is set by the parameter [F0.01].

1：External analog

The operating frequency is set by the external input voltage signal (0~10V) or current signal (0~20mA). For related characteristics, refer to the description of the parameters [F3.09] and [F3.10].

2：External communication

Receive the frequency setting command of the upper computer or the host computer through the serial RS485 interface.

3：Panel potentiometer

The operating frequency is set by the potentiometer on the operation panel.

4：External terminal selection

Determine the frequency input channel through the external multi-function terminal (the selection of the function terminal is determined by the parameters [F3.01] ~ [F3.04]).

Frequency setting Channel selection 2	Frequency setting Channel selection 1	Frequency setting channel
0	0	Digital setting
0	1	External input signal（0~10V/0~20mA）
1	0	RS485 interface
1	1	Panel potentiometer

Note: When the terminal and CM are closed, it is 1.

5 : Combination Settings

Selected by the [F0.05] group parameter LED thousand-bit frequency combination mode.

6：Terminal UP / DW setting

The frequency is set through the external multifunctional UP / DW terminal (the selection of the functional terminal is determined by the parameters [F3.01] ~ [F3.04]).

F0.01	Frequency digital setting Setting range: 0.00 Hz ~ 0.00 Hz ~[F0.02] Hz

When the frequency input channel selects the digital setting ([F0.00] = 0), the output frequency of the inverter is determined by this value. When the operation panel is in the normal monitoring mode, you can directly press the ▲ ▼ key to modify this parameter.

F0.02	Upper limiting frequency	Setting range:5.00~ 1000.0Hz

The maximum frequency limit is affected by the thousand frequency mode of [F0.10] group parameters, the maximum frequency 300.00Hz in low frequency mode and the maximum frequency 1000.0Hz in high frequency mode.

F0.03	Lower limit frequency	Setting range:0.00 Hz ~ [F0.02] Hz

This parameter is the lowest lower limit frequency of the allowable output of the inverter, and the reference parameter of action mode [F0.05] is set below the lower limit frequency.

F0.04	Parameter write protection	Setting range:0 ~ 2

This function is used to prevent accidental modification of data.

0：All parameters are allowed to be rewritten.

1： Only allow to modify function parameter [F0.01] and this parameter

2：Only allow to modify this parameter

When it is forbidden to modify the parameters, if you try to modify the data, it will display"- -".

Some parameters cannot be rewritten during operation. If you try to modify these parameters at this time, "- -" will be displayed. If you want to modify the parameters, please stop the inverter before modifying it.

F0.05	Operating direction and frequency combination setting Setting range: 0000~ B121H

LED Units：The running direction is reversed

0：not valid 1：valid

LED Units：Run direction lock

0：not valid　1：Reverse prevent　2：Positive rotation prevention

LED Hundreds：Lower limit frequency mode

0：Output lower limit frequency [F0.03] when falling below the lower limit frequency [F0.03]

1：Output zero frequency when below the lower limit frequency [F0.03]

LED Thousands：Frequency combination mode

This parameter is only valid when the frequency input channel selection combination is set ([F0.00]=5)

The set frequency of the inverter is determined by the linear combination of multiple frequency input channels. The set combination mode is shown in the table below. Through the combination setting, multiple channels can jointly control the frequency output of the inverter.

Set value	Combination method	Set value	Combination settings
0	External voltage setting + panel setting	1	External voltage setting + panel setting + digital setting
2	Communication setting + external voltage setting	3	Communication setting + external voltage setting + panel setting
4	Communication setting-panel setting + digital setting	5	Communication setting-external voltage setting
6	Serial port setting + external voltage setting-panel setting	7	External voltage setting-panel setting + digital setting
8	Panel Setting-Digital Setting	9	UP/DW frequency + external voltage setting
10	UP/DW frequency + panel setting + external voltage setting	11	Digital setting-external voltage setting

F0.06　Run command channel and mode selection

Predetermined area：0000 ~ 1022H

This function parameter is used to select the running command channel of the inverter, and the function of the RUN/STOP key (decimal setting).

LED units: run command channel selection

0：Keyboard control

The inverter running command is controlled by the RUN/STOP key on the keyboard.

In this mode, the state of the external control terminals X1~X4 (forward running function) can affect the output phase sequence of the inverter. When the external terminals X1~X4 (forward running function) are connected to CM, the inverter outputs the reverse sequence; When X1~X4

are disconnected from CM, the inverter outputs positive phase sequence.

1： External terminal control

The inverter running command is controlled by the on-off status of the multi-function terminals X1~X4 and the CM terminal, and the mode is determined by the LED tens.

2： Serial communication port

The running command of the inverter receives commands from the upper computer or host computer through the serial interface. This mode should also be selected when the machine is set as a slave in the linkage control.

LED ten digits: operation command mode selection

0：Two-line mode 1 (default mode)

Instruction	Shutdown order		Forward command	Reverse instruction
Terminal status				

In the two-wire mode, one input terminal X1~X4 must be selected as the forward control terminal FWD, and the other input terminal X1~X4 is the reverse control terminal REV (refer to the description of parameters [F3.01]～[F3.04])

1：Two-line mode 2

Instruction	Shutdown order		Forward command	Reverse instruction
Terminal status				

2：Three-line mode

For the three-wire control mode, one input terminal (X1~X4) must be selected as the forward control terminal FWD, one input terminal (X1~X4) is the three-wire operation control terminal SW1, and one input terminal (X1~X4) is the reverse control terminal REV (Refer to the description of parameters [F3.01]~[F3.04]), select any three of the input terminals X1-X4 by parameters [F3.01]~[F3.04].

The switch function description is as follows:

1. SW1(Three-wire operation control terminal) —— Inverter stop trigger switch

2. SW2(FWD) —— Forward trigger switch

3. SW3(REV) —— Reverse trigger switch

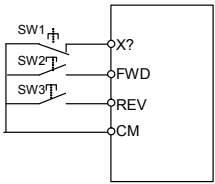


Figure 6-1 Wiring diagram of three-wire control mode

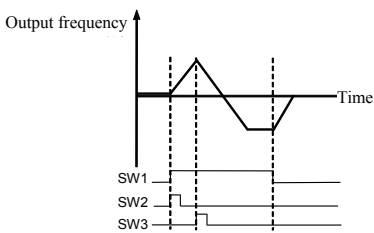


Figure 6-2 Frequency output diagram of three-wire control mode

3: Three wire mode 2

The switch functions are described as follows:

1. SW1 (three wire operation control terminal) - inverter operation enable switch

2. SW2 (FWD) - operation stop switch

3. SW3 (Rev) - direction control switch

Hundreds of LED: Reserved

Thousands of LED: Start protection options

0：Not protect 1：Protect

This parameter is used to select the protection in the effective state of the terminal start command when the inverter is powered on or the fault is reset. When the protection is effective, the start command must be invalid once before the frequency converter will respond to the start command.

F0.07	Parameter initialization	Predetermined area：0 ~ 3

Modify the parameters of the inverter to factory values.

0：No action

1： Standardized initialization（Restore all parameters to factory settings）

2：Clear fault record

3：Fully initialized(restore all parameters to factory settings and clear fault records)

F0.08	Carrier frequency	Setting range：2.0 ~ 8.0 KHz

This parameter determines the switching frequency of the internal power module of the inverter.

The carrier frequency mainly affects audio noise and thermal effects during operation. When silent operation is required, the carrier frequency can be slightly increased, but the maximum load that the inverter can carry will decrease, and the interference range of the inverter to the outside world will increase. For long motor cables, the leakage current between the motor cables and between the cable and the ground may also increase. When the ambient temperature is high, the motor load is heavy, or the inverter fails due to the above reasons, the carrier frequency should be appropriately reduced to improve the thermal characteristics of the inverter.

F0.09	Carrier characteristics	Predetermined area：0000 ~ 0010H

It is used to set some characteristics related to the carrier, generally without modification.

LED units：Load-associated adjustment

When this function is effective, when the load current is too large, the carrier wave will be automatically reduced in order to ensure the safe operation of the frequency converter.

Ten bits of LEDs:Load-related adjustment

When this function is valid, when the load current is too large, in order to ensure the safe operation of the inverter, the carrier will be automatically reduced.

Hundreds of LEDs: T fundamental frequency correlation adjustment

When this function is effective, the carrier wave will be automatically reduced when the frequency converter output frequency is lower than a certain value.

Thousands of LEDs:Modulation mode

0： Aynchronous modulation-for the vast majority of occasions below 300Hz.

1: Synchronous modulation-carrier frequency and base frequency to maintain a certain proportion, high frequency operation occasions should be sampled in this way to improve the stability.

2~5: Noise smoothing-When this function is effective, the frequency converter generates a random carrier to smooth the noise.

F0.10 Motor control mode and frequency mode Setting range：0000 ~ 1001H

LED Units：motor control mode

0：VF control

1：Open-loop vector control of the Asynchronous motor

2：Motor open ring vector control

LED Tens：Reserved

LED Hundreds：Reserved

LED Thousands：Frequency mode

0：Low-frequency mode- -frequency range 0.5~300.00HZ

1：High-frequency mode- -frequency range 5.0~1000.0Hz

2： Stable load operation (P machine) -This function is suitable for constant load load (such as fan pump). In this mode, the load of the equipment can automatically increase a power level, and the initialization of motor parameters can also increase a power level.

F0.11 Permission password Setting range：0 ~ 65535

This parameter is the check code value to obtain the query and modification permission of some internal parameters.

F0.12 Monitoring parameter setting Setting range：0~ 31

This parameter is used to determine the display content of the operation panel in the state monitoring mode.

The monitoring parameters are selected to determine the display content of the LED, and the physical quantity corresponding to the display data can be referred to the state monitoring parameter table [0 to 31] corresponding to [D 0.00 to D 0.31].

F0.13 S Curve acceleration and deceleration ratio	Setting range：0~ 50%

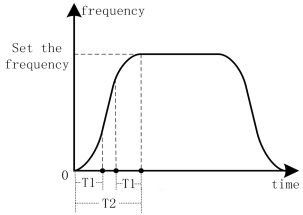


Figure 6-3 Schematic diagram of the S curve for acceleration and deceleration

The proportion of S curve segment in the whole period is set to 0%.

F0.14	Acceleration time	Predetermined area：0.01 ~ 600.00Sec
F0.15	Deceleration time	Predetermined area：0.01 ~ 600.00Sec

Define the rate at which the output frequency of the inverter changes up and down.

Acceleration time The time required for the output frequency to accelerate from 0.00Hz to the upper limit frequency [F0.03].

Deceleration time The time required for the output frequency to decelerate from the upper limit frequency [F0.03] to 0.00Hz.

F0.16	Jog acceleration time	Predetermined area：0.01 ~600.00Sec
F0.17	Jog deceleration time	Predetermined area：0.01 ~600.00Sec

The transition acceleration and deceleration time between the initial running frequency and the jog frequency.

F0.18	Forward jog frequency	Predetermined area：0.00Hz ~[F0.03]
F0.19	Reverse jog frequency	Predetermined area：0.00Hz~[F0.03]

6.2 Basic control parameter group

F1.00	***Start pre-excitation voltage***	***Predetermined area：0 .0~100.0%***
F1.01	***Start pre-excitation time***	***Predetermined area：0 ~10.00 Sec***

This parameter group is used to set the DC pre-excitation parameters at startup. The pre-excitation current refers to the percentage of the rated current of the frequency converter. The establishment of the air-gap flux of the motor takes a certain time. In order to obtain sufficient starting torque, the air-gap flux must be established in advance. Therefore, pre-excitation is required. When the parameter setting is 0, the pre-excitation is invalid. The excitation process is as follows :

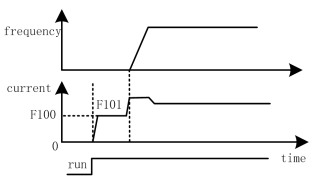


Figure 6-4 Schematic diagram of starting the pre-excitation field

F1.02	***Start frequency***
	Predetermined area：0.00 ~ min([F0.02],100.00Hz)
F1.03	***Start frequency duration***
	Predetermined area：0.00 ~ 10.00Sec

This function parameter group is used to define the characteristics related to the startup mode, see Figure 6-5.

Start frequency： For systems with large inertia, heavy load, and high starting torque requirements, the starting frequency can effectively overcome starting difficulties. Starting frequency duration (parameter code [F1.03]) refers to the duration of running at the starting frequency, which can be set according to actual needs. When set to 0, the starting frequency is invalid.

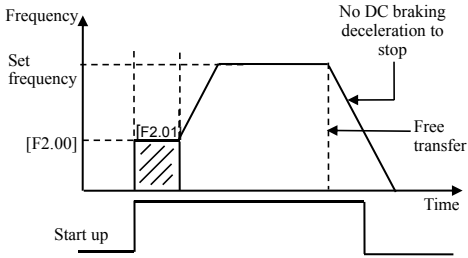


Figure 6-5 Start and stop frequency output curve

F1.04 Start and stop mode setting Predetermined area：0000 ~ 0101H

LED Units：starting mode

0: Regular start: Normal start at the acceleration time.

1: One-way speed tracking start

2: Bidirectional speed tracking start

The frequency converter shall detect the motor speed first, and then start at the detected speed. For some of the motor shaft is not stopped or rotating before starting, this function can smoothly start the motor, so as to prevent overvoltage or overcurrent fault of the frequency converter. Unidirectional speed tracking only detects to the target frequency direction, it can be applied to the inconsistency between the motor steering and the target steering during startup.

LED Tens：Reserved

LED Hundreds：Downtime method

LED Hundreds：Emergency shutdown

0： Decelerate to stop

When stopping, the inverter will gradually reduce its output frequency to zero according to the set deceleration time and then stop.

1： Free stop

When stopping, the inverter outputs zero frequency, blocks the output signal, and the motor runs freely and stops.

F1.05	***Start frequency of DC braking at stop***
	Predetermined area：0.00 ~ [F0.03]
F1.06	***DC braking current at stop***
	Predetermined area：0.0 ~ 100.0%
F1.07	***DC braking time at stop***
	Predetermined area：0 ~20.00 Sec.

This parameter group is used to set the DC braking parameters when stopping.The stop DC braking current refers to the percentage of the inverter's rated current.

The initial frequency of DC braking at stop ([F1.05]) is set. When the output frequency of the inverter is lower than this setting parameter when the inverter is stopped, the inverter will block the output, start the DC braking function, and stop the DC braking.

The action time is set by parameter [F1.07]. When the stop DC braking action time is set to 0, the stop DC braking function is invalid.

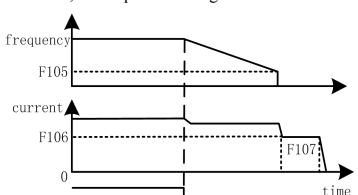


Figure 6-6 Schematic diagram of shutdown DC

F1.08	***Energy consumption braking initial voltage***
	Predetermined area：340~400V/650~800V

This parameter is valid for the inverter with built-in braking unit and is used to define the action parameters of the built-in braking unit of the inverter. When the internal DC side voltage of the inverter is higher than the initial voltage of dynamic braking, the built-in braking unit will act. If there is an external braking resistor, the internal DC side pumping voltage energy of the inverter will be released through the braking resistor to make the DC voltage drop. When the DC side voltage drops below a certain value ([F1.08]), the built-in braking unit of the inverter is turned off, as shown in Figure 6-7.

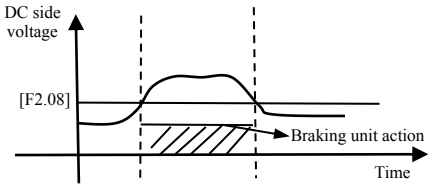


Figure 6-7 Dynamic braking

F1.09	Dynamic braking action selection

0：Action only when decelerating

1：Not limited by deceleration

F1.11	Undervoltage protection level Predetermined area：180 ~230V/360 ~460V

This parameter specifies the allowable lower limit voltage of the DC side when the inverter is working normally. For some occasions where the power grid is low, the undervoltage protection level can be appropriately reduced to ensure the normal operation of the inverter.

Note: When the grid voltage is too low, the output torque of the motor will decrease.

For the occasions of constant power load and constant torque load, too low grid voltage will increase the input current of the inverter, thereby reducing the reliability of the inverter operation.

F1.12	Overvoltage limit action level Predetermined area：350 ~400V/650 ~800V

This parameter specifies the threshold for voltage stall protection during motor deceleration. When the pumping voltage on the DC side of the inverter caused by deceleration exceeds the value specified in this parameter, the deceleration time will be automatically extended. As shown in Figure 6-8.

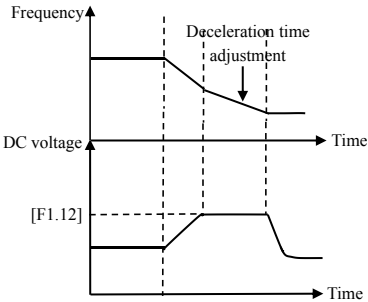


Figure 6-8 Voltage stall protection during deceleration

F1.13 Accelerating torque level Predetermined area：120 ~ 220(%)

This parameter is used to set the allowable output level of the torque current of the inverter during acceleration.

The torque limit level during the acceleration of the inverter is set by [F1.13], which is set as a percentage of the inverter's rated current. If it is set to 150%, it indicates that the output current during acceleration is 150% of the rated current at most.

When the output current of the inverter exceeds the level specified by this parameter, it will automatically extend the acceleration and deceleration time in order to limit the output current within this level, see Figure 6-9. Therefore, if the acceleration time requirement is short, the acceleration current limit level needs to be appropriately increased.

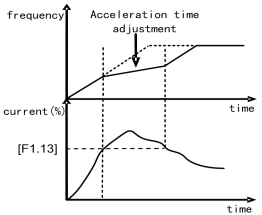


Figure 6-9 Schematic diagram of acceleration torque and braking torque

F1.14 Current limit level Predetermined area：120 ~ 220(%)

This parameter specifies the maximum allowable output current of the inverter, expressed as a percentage of the rated current of the inverter. Regardless of the working state (acceleration, deceleration, steady state operation), when the output current of the inverter exceeds the value specified in this parameter, the inverter will adjust the output frequency to limit the current within the specified range to avoid over-current tripping.

F1.15 Magnetic flux braking level Predetermined area：0~ 100%

This parameter is used to set the magnetic flux braking strength when the frequency converter is stopped. When it is set to 0, the magnetic flux braking is turned off. If the parameter is set too large, it is easy to cause the motor to heat up. It is recommended to use external braking resistance in case of frequent emergency stops.

F1.16 Motor overload protection factor
Predetermined area：10 ~ 131（%）

This parameter is used to set the sensitivity of the inverter's thermal relay protection to the load motor. When the rated current value of the load motor does not match the rated current of the inverter, the correct thermal protection of the motor can be achieved by setting this value. When it is set to 131%, the inverter closes the motor overload protection function.

The setting value of this parameter can be determined by the following formula:

[F1.16]= (Motor rated current / Inverter rated output current)×100%

When a frequency converter runs in parallel with multiple motors, the thermal relay protection function of the frequency converter will lose its effect. In order to effectively protect the motors, it is recommended to install a thermal protection relay at the inlet end of each motor.

F1.17	Protect action selection	Predetermined area：0000~0111H

LED Units：Output phase-deficiency protection

0：not valid 1：valid

LED Tens：Temperature sensor fault detection

0：not valid 1：valid

LED Hundreds：Short circuit to ground detection before operation

0：not valid 1：valid

When the function is effective, check whether the motor power line is short circuit to the ground before the first operation, or after the downtime exceeds 10S.

LED Thousands：Overload temperature correlation

0：not valid 1：valid

When the function is effective, the overload time of the converter is affected by the converter temperature.

F1.18	Failure self-recovery times	Predetermined area：0~5
F1.19	Fault self-recovery time	Predetermined area：0.00~600.00Sec

During the operation of the inverter, load fluctuations, grid fluctuations and other accidental factors may cause the inverter to stop due to failure. At this time, in order to ensure the continuity of the system, the inverter is allowed to automatically reset some types of faults and resume operation.

The self-recovery interval time refers to the interval time from the start of the inverter failure to the fault recovery action. If the inverter fails to return to normal within the set number of self-recovery times, the fault signal will be output. After the inverter is successfully restored, it is in the state of stopping and waiting to be started. If there is no fault for 24 hours, the self-recovery number count is reset to 0.

6.3 Motor parameter group

F2.00	***Basic operating frequency***
	Predetermined area：5.00Hz ~ upper limit frequency
F2.01	***Maximum output voltage***
	Predetermined area：25 ~ 250V/50 ~ 500V

The basic operating frequency is the minimum frequency corresponding to the maximum output voltage of the inverter, generally the rated frequency of the motor.

The maximum output voltage is the corresponding output voltage when the inverter outputs the basic operating frequency, generally the rated voltage of the motor.

These two function parameters need to be set according to the motor parameters. If there are no special circumstances, no modification is required.

F2.02	***Torque boost***	***Predetermined area：0.0 ~ 20.0（%）***

Used to improve the low-frequency torque characteristics of the inverter. When running in the low frequency range, the output voltage of the inverter is boosted and compensated, **Boost voltage= ([F2.01] * [F2.02]) / 100**, as shown in Figure 6-10.

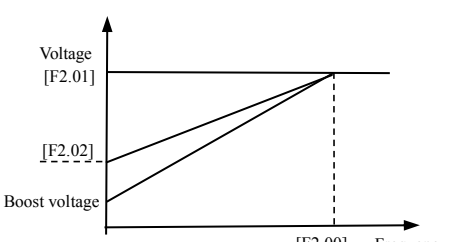


Figure 6-10 Schematic diagram of torque

F2.03	VF curve selection	Predetermined area：0~ 7

0: Standard type

1: Enhanced type: medium and low frequency increase

2: Multi-point VF is set by [F2.04~F2.09]

3~7: corresponding to 1.2,1.4,1.6,1.8,2 VF curves respectively

F2.04	V/F frequency 1	Predetermined area：0.00~[F2.00]
F2.05	V/F voltage 1	Predetermined area：0~[F2.01]
F2.06	V/F frequency 2	Predetermined area：0.00~[F2.00]
F2.07	V/F voltage 2	Predetermined area：0~[F2.01]
F2.08	V/F frequency 3	Predetermined area：0.00~[F2.00]
F2.09	V/F voltage 3	Predetermined area：0~[F2.01]

This function parameter group is used to flexibly set the V/F curve required by the user, see Figure 6-11.

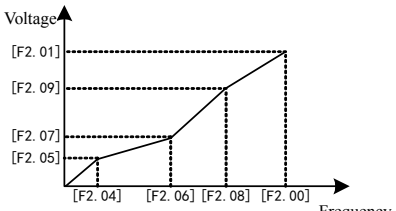


Figure 6-11 V / F custom curve setting

F2.11	Zero frequency torque hold	Predetermined area:0~1

0：The output voltage is 0 at zero frequency

1：Set the hold torque according to [F106] DC braking current at zero frequency

F2.12	Automatic voltage stabilization	Predetermined area:0~2

The automatic voltage stabilization function is to ensure that the voltage of the inverter does not fluctuate with the fluctuation of the input voltage. This function should be turned on when the grid voltage fluctuates greatly and the motor has a relatively stable stator voltage and current.

0:invalid 1:invalid deceleration 2:efficient

F2.13	Number of motor pole pairs	Predetermined area:1~16

This parameter is mainly used for the calculation of motor speed.

F2.13	VF shock inhibition coefficient	Predetermined area:0~100%

This parameter is used to suppress the motor light load shock in VF mode, the larger the value, the stronger the suppression.

F2.14	SVC velocity filtering coefficient	Predetermined area:100~900

This parameter is used for speed identification filtering in SVC mode, the larger the value, the smoother the speed but the slower the response.

6.4 Digital input and analog parameter group

F3.00	Input channel characteristics selection Predetermined area：0000~ 1111H

Used to select external digital input characteristics：

LED units： Define the characteristics of the X1 input channel

0：Positive characteristics 1：Inverse characteristics

LED ten digits:Define the characteristics of the X2 input channel

0：Positive characteristics 1：Inverse characteristics

Hundreds place of LED: Define the characteristics of X3 input channel

0：Positive characteristics 1：Inverse characteristics

LED Thousands: Define the characteristics of the X4 input channel

0：Positive characteristics 1：Inverse characteristics

The positive characteristic is valid when the terminal is closed and invalid when it is disconnected; the inverse characteristic is valid when the terminal is disconnected and invalid when the terminal is closed.

F3.01	Input terminal 1 function selection	Predetermined area：0 ~ 21
F3.02	Input terminal 2 function selection	Predetermined area：0 ~ 21
F3.03	Input terminal 3 function selection	Predetermined area：0 ~ 21
F3.04	Input terminal 4 function selection	Predetermined area：0 ~ 21

The function definitions of switch input terminals X1～X4 are described as follows:

0： without

1： Multi-speed control 1

2： Multi-speed control 2

3： Multi-speed control 3

The combination of the multi-speed control terminal is used to select the output frequency of the multi-speed, and the specific frequency setting of each stage is set by the multi-speed control parameter function code group ([F5.01] ~ [F5.07]).

4： Forward jog control

5： Reverse jog control

When the run command channel selection external terminal is valid, this parameter defines the input terminal of the external jog signal.

6： Frequency setting channel selection 1

7： Frequency setting channel selection 2

When the frequency input channel is the external terminal selection (F0.00=4), the frequency setting channel of the inverter is determined by the state of the two terminals. For the corresponding relationship, refer to the relevant description of the [F0.00] parameter.

8： Free stop control

Close the terminal corresponding to this parameter, the inverter will block the output.

9： Three-wire operation control

When the three-wire mode is selected as the running command terminal combination mode, the external terminal defined by this parameter is the inverter stop trigger switch. For the three-wire control mode, refer to the detailed description of the function code [F0.06].

10： DC brake control

When the inverter is stopped, if the terminal defined by this parameter is closed, when the output frequency is lower than the initial frequency of DC braking, the DC braking function will be activated until the terminal is disconnected. Refer to the description of [F1.05] ~[F1.07] for the relevant parameters of DC braking.

11：Forward control

12：Reverse control

13：Fault reset

When the inverter is in a fault state, closing the terminal set by this parameter can clear the inverter fault.

14：Reserve

15：Emergency stop

When this parameter setting terminal is valid, the frequency converter will immediately stop according to the emergency stop mode set in [F1.04]

thousands.

16：External fault input

When the terminal set by this parameter is closed, it indicates that the external equipment has a fault. At this time, for the safety of the equipment, the inverter will block the output and display the external fault signal Fu.16 at the same time.

17：Disconnection input

When the terminal set by this parameter is closed, it indicates that the external equipment has a disconnection fault. At this time, for the safety of the equipment, the inverter will block the output and display the external fault signal Fu.17 at the same time.

18：PLC investment

When the programmable PLC operation selection condition [F5.00] is valid, the external terminal defined by this parameter can realize the input and removal of PLC operation.

19：Swing frequency operation input

When the condition of selecting the swing frequency function is valid ([F4.14]=XXX2). The external terminal defined by this parameter can realize the input and removal of swing frequency operation.

20：UP

21：DW

The inverter can set the operating frequency through the external terminal and realize the remote frequency setting operation. When the terminal is valid, the set frequency increases or decreases according to the set rate; when the terminal is invalid, the set frequency remains. When both terminals are valid at the same time, the set frequency is maintained. The frequency increases when UP is valid, and decreases when DW is valid.

22：Acceleration and deceleration time switch

When the terminal is valid, it switches to the point movement acceleration and deceleration time ([F0.16], [F0.17]), and to the normal acceleration and deceleration time ([F0.14], [F0.15]).

F3.05 UP / DW terminal frequency power storage Setting range：0~1

This parameter is used to set whether the UP / DW terminal frequency failure is saved

0：not save 1：Power loss save power recovery

F3.06	UP / DW terminal integration time	Setting range：0.01 ~ 50.00Sec

This parameter is used to set the UP / DW terminal integration time, and the set value represents the time integrated to the upper limit frequency when the terminal is valid.

F3.07	Input the terminal filter time	Setting range：1~50ms

For the external input X 1 to X 4 input terminals, the short pulse signal below this set time will be filtered.

F3.09	AI input lower limit voltage Predetermined area：0.00V ~ [F3.10]
F3.10	AI input upper limit voltage Predetermined area：[F3.09] ~ 10.00 V

[F3.09], [F3.10] define the AI range of the analog input channel, which should be set according to the actual situation of the connected signal.

F3.11	AI input filter time	Predetermined area：1 ~ 200ms

The external analog input is filtered to effectively eliminate the interference signal. When the setting is too large, the anti-interference ability is strong but the response speed to the set signal will be delayed.

F3.12	Minimum set frequency	Predetermined area：0.00Hz ~ [F3.13]
F3.13	Maximum set frequency	Predetermined area：[F3.12] ~ [F0.03]

The corresponding relationship between the analog input AI and set frequency is shown in the figure 6-12.

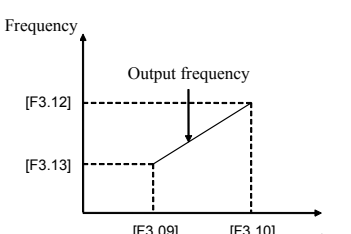


Figure 6-12 Diagram of the corresponding relationship between analog input and set frequency

F3.16	Analog output selection	Predetermined area：0 ~ 3

0： Output frequency

The amplitude of the analog output (AO) is proportional to the output frequency of the inverter. The set upper limit of analog output ([F3.18]) corresponds to the upper limit frequency.

1： Output current

The amplitude of the analog output (AO) is proportional to the output current of the inverter. The set upper limit of analog output ([F3.18]) corresponds to 2.5 times the rated current of the inverter.

2： The output voltage

The analog output (AO) amplitude is proportional to the output voltage of the frequency converter. The set upper limit of analog output ([F3.18]) corresponds to 1.5 times the nominal input voltage of the inverter (220V single-phase and 380V three-phase).

3：Fixed value output

The analog output (AO) output value is set by the [F319] parameter.

F3.17	AO output lower limit	Predetermined area：0.00 V ~ [F3.18]
F3.18	AO output upper limit	Predetermined area：[F3.17] ~ 10.00 V

Define the maximum and minimum values of the analog output AO output signal. As shown in Figure 6-13:

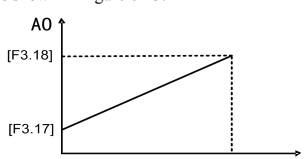


Figure 6-13 Analog output content of analog output

F3.19	AO fixed-value output voltage	Predetermined area：0 ~ 10.00V

This parameter is used to set the AO output voltage when the analog output is set to the constant value output.

6.5 Digital output and swing frequency operation parameter group

F4. 00 OC and relay output characteristics Setting range：0000 ~ 0011H		
LED Units：OC output polarity is reversed	0：not valid	1：valid
LED Tens：Relay output polarity is reversed	0：not valid	1：valid

F4.01	*Output terminal OC function selection*
	Predetermined area：0 ~ 13
F4.02	*Relay output TA/TC function selection*
	Predetermined area：0 ~ 13

It is used to define the content represented by the open collector output terminal OC and the relay output contact. The internal wiring diagram of the open-collector output terminal is shown in Figure 6-14. When the setting function is valid, the output is low, and when the function is invalid, the output is in a high-impedance state.

Relay contact output: When the set output function is valid, the normally open contact TA-TC is turned on.

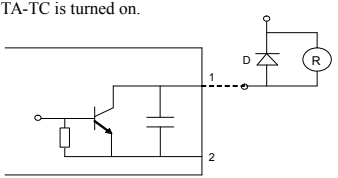


Figure 6-14 Internal wiring of OC output terminal

For When connecting inductive components (such as relay coils), freewheeling diode D must be connected in parallel.

0：Inverter is running

When the inverter is running, it outputs an effective signal, and when it is stopped, it outputs an invalid signal.

1： Frequency arrives

When the output frequency of the inverter is close to the set frequency to a certain range (the range is determined by parameter [F4.07]), it outputs a valid signal, otherwise it outputs an invalid signal.

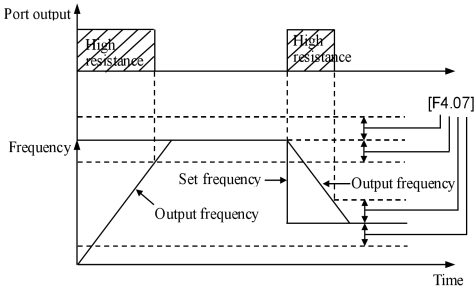


Figure 6-15 Frequency arrival signal

2： Frequency level detection (FDT)

When the output frequency of the inverter exceeds the FDT frequency level, the effective signal will be output after the set delay time. When the output frequency of the inverter is lower than the FDT frequency level, the invalid signal will be output after the same delay time.

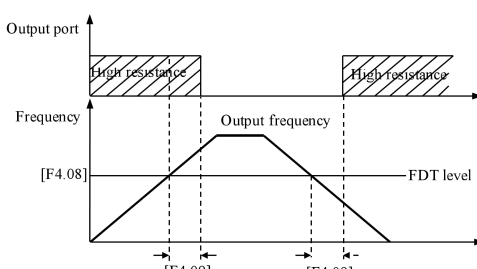


Figure 6-16 Frequency level detection signal

3： Overload detection

When the output current of the inverter exceeds the overload alarm level, the effective signal will be output after the set alarm delay time. When the output current of the inverter is lower than the overload alarm level, after the same delay time, an invalid signal is output.

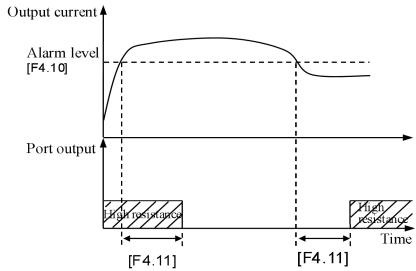


Figure 6-17 Overload alarm

4： Frequency reaches the upper limit

When the output frequency of the inverter reaches the upper limit frequency, this port outputs a valid signal, otherwise it outputs an invalid signal.

5： Frequency reaches the lower limit

When the output frequency of the inverter reaches the lower limit frequency, this port outputs a valid signal, otherwise it outputs an invalid signal.

6： Running at zero speed

When the inverter running command is valid and the output frequency is 0, this port outputs a valid signal; otherwise, it outputs an invalid signal.

7： Undervoltage shutdown

When the voltage on the DC side of the inverter is lower than the specified value, the inverter stops running, and this port outputs a valid signal, otherwise it outputs an invalid signal.

8：Inverter fault

When the inverter stops running due to a fault, it outputs an effective signal; when it is normal, it is in an invalid state.

9： Disconnection fault

When disconnection fault stops running, output valid signal; when normal, it is invalid state

10：PLC cycle completed

PLC cycles complete 250 ms pulse output

11：The monitor input variable is below the lower limits

12：The Monitor input variable is above the upper limits

13：The monitor input variable is within the upper and lower limits

F4. 03 Relay action delay Predetermined area：0.00 ~ 30.00Sec

This parameter is used to set the delay time when the state of the relay output signal changes.

F4.04 Monitor input variable selection Setting range：0~6
F4.05 Lower limit of the monitor variable Setting range：0.0 ~ 100.0%
F4.06 Upper limit of the monitor variable Setting range：0.0 ~ 100.0%

The parameters of this group are used to set the monitor function and can be used to monitor the status of relevant variables within frequency conversion. The monitor input variables are as follows:

No	Function	100% output	No	Function	100% output
0	frequency	upper limiting frequency	1	current	2.5 times the rated current of the frequency converter
2	output voltage	500V/1000V	3	busbar voltage	Single-phase 500V / three-phase 1000V
4	temperature	150℃	5	AI	10V
6	AO	10V			

F4. 07 Frequency reaches the detection range
Predetermined area：0.00 ~ [F0.03]

It is used to set the frequency defined by the output terminal to reach the detection range. When the output frequency of the inverter is within the positive or negative detection range of the set frequency, the output terminal will output a valid signal, see Figure 6-15.

F4.08 FDT (frequency level) setting
Predetermined area：0.00 ~ 20.00 Hz
F4.09 FDT output delay time
Predetermined area：0.00 ~ 20.00Sec

This parameter group is used to set the frequency detection level.

When the output frequency is higher than the FDT set value, after the set delay time, the output terminal will output a valid signal.

When the output frequency is lower than the FDT setting value, after the same delay time, the output terminal outputs an invalid signal.

F4.10	***Overload alarm level*** ***Predetermined area：10 ~ 200（%）***
F4.11	***Overload alarm delay time*** ***Predetermined area：0.00~ 600.00Sec***

This parameter group is used to set the overload alarm level and the alarm delay time. When the output current is higher than the set value of [F4.10], after the delay time set by the parameter [F4.11], the output terminal will output a valid signal (Low level), refer to Figure 6-17.

F4.12	***Jump frequency*** ***Setting range：0~ Upper limit frequency***
F4.13	***Jump frequency range*** ***Setting range：0.00~ 10.00Hz***

This parameter group is used to set the jump frequency function. When the set frequency is within the range of jump frequency, the actual running frequency will be the jump frequency near the set frequency. If the jump frequency is set to 0, the jump frequency function is canceled, and refer to Figure 6-18 for the jump frequency operation.

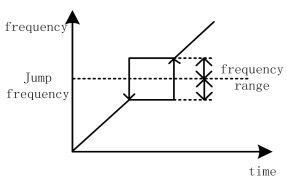


Figure 6-18 Schematic representation of the jump frequency

F4.14	***Swing frequency operation setting*** ***Predetermined area：0000~0012H***

This parameter is used to set the basic characteristics of swing frequency operation. (Minute decimal setting)

LED units: swing frequency function enable selection

0：Swing frequency function is off

1：Swing frequency function is effective

2：Swing frequency function condition is valid

When the external swing frequency input terminal is valid (the swing frequency input terminal is selected by the function parameters [F3.01] ~ [F3.04]), it runs in the swing frequency mode.

LED ten digits: center frequency setting

0：Digital setting, set by [F4.15]

1：Frequency channel selection, given by frequency channel

LED Hundreds：swing mode

0：Fixed swing: swing= [F4.16] * Upper frequency

1： Change swing (relative center frequency): swing = [F4.16] * center frequency

F4.15	*Swing frequency center frequency setting*
	Predetermined area：0.00~[F0.03]

The center frequency of swing frequency refers to the center value of the output frequency of the inverter during swing frequency operation.

Refer to Figure 6-19 for the detailed process of swing frequency operation.

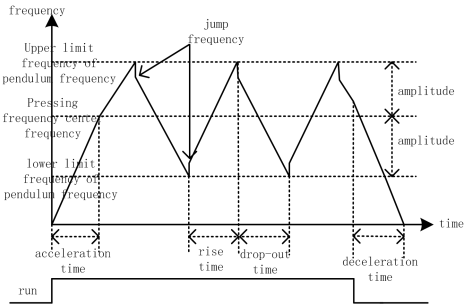


Figure 6-19 Schematic diagram of pendulum frequency operation

F4.16 Swing frequency amplitude Predetermined area：0.00~50.0%

The swing frequency amplitude is the ratio of the swing frequency amplitude

Swing frequency amplitude=[F4.16]×upper limit frequency

F4.18	*Triangle wave fall time*	*Predetermined area：0.01~600.00Sec*
F4.19	*Triangular wave rise time*	*Predetermined area：0.01~600.00Sec*

The triangular wave falling time is the running time from the upper limit frequency of the swing frequency to the lower limit frequency of the swing frequency during the swing frequency operation, that is, the deceleration time in

the swing frequency operation cycle.

The triangular wave rise time is the running time from the lower limit frequency of the swing frequency to the upper limit frequency of the swing frequency during swing frequency operation, that is, the acceleration time in the swing frequency operation cycle

6.6 Multi-speed section and PLC operating parameter group

F5.00 Multi-speed operation mode Predetermined area：0000~0042H

Basic characteristic setting of multi-speed operation (decimal setting).

LED units: simple PLC action selection

0： Simple PLC is invalid

1： Simple PLC effective

2： Simple PLC conditions are valid

When the LED ones place is 1 (PLC is valid), after the inverter is started, the inverter enters the simple PLC running state when the priority of the frequency channel is allowed.

When LED ones place selection 2 (PLC condition is valid), when the external PLC input terminal is valid (PLC input terminal is selected by parameter [F3.01] ~ [F3.04]), the inverter runs in simple PLC mode; external input terminal When it is invalid, the inverter automatically enters the frequency setting mode with lower priority.

LED ten digits: Simple PLC operation mode selection

0：Single loop mode

The inverter first runs at the set frequency of the first speed, and outputs the frequency step by step according to the set running time. If the set running time of a certain speed is 0, the speed will be skipped, and the inverter will stop output after running for one cycle. It is necessary to input a valid running command again to start the next cycle.

1： Keep final value mode

The basic operation mode is the same as that of mode 0, the inverter will not stop after running a single cycle, and run at a stage speed that is not zero at the last time. The other processes are the same as mode 1.

2： Keep set value mode

The basic operation mode is the same as that of mode 0, the inverter will not stop after running a single cycle, and run at a stage speed that is not zero at the last time. The other processes are the same as mode 1.

3： Continuous loop mode

The basic operation mode is the same as that of mode 0. After one cycle

of operation, it starts to cycle from the first speed.

LED Hundreds： Frequency switching mode

0：Continuous switching

Continuous frequency switching during adjacent stages.

1：Zero frequency switch

The frequency drops to 0Hz and then switches to the next stage.

F5.01	***Multi-speed frequency 1***
	Predetermined area：0.00Hz ~ upper limit frequency
F5.02	***Multi-speed frequency 2***
	Predetermined area：0.00Hz ~ upper limit frequency
F5.03	***Multi-speed frequency 3***
	Predetermined area：0.00Hz ~ upper limit frequency
F5.04	***Multi-speed frequency 4***
	Predetermined area：0.00Hz ~ upper limit frequency
F5.05	***Multi-speed frequency 5***
	Predetermined area：0.00Hz ~ upper limit frequency
F5.06	***Multi-speed frequency 6***
	Predetermined area：0.00Hz ~ upper limit frequency
F5.07	***Multi-speed frequency 7***
	Predetermined area：0.00Hz ~ upper limit frequency

This group of parameter function codes is used to set the output frequency of the terminal to control multi-speed operation.

F5.08	***Phase 1 running time***	***Predetermined area：0.0 ~ 6000.0 Sec***
F5.09	***Phase 2 running time***	***Predetermined area：0.0 ~ 6000.0 Sec***
F5.10	***Phase 3 running time***	***Predetermined area：0.0 ~ 6000.0 Sec***
F5.11	***Phase 4 running time***	***Predetermined area：0.0 ~ 6000.0 Sec***
F5.12	***Phase 5 running time***	***Predetermined area：0.0 ~ 6000.0 Sec***
F5.13	***Phase 6 running time***	***Predetermined area：0.0 ~ 6000.0 Sec***
F5.14	***Stage 7 running time***	***Predetermined area：0.0 ~ 6000.0 Sec***

[F5.08]～[F5.14] Multi-speed frequency 1～7 running time

Note: The running time of each stage refers to the time from the end of the previous stage to the end of the current stage, including the acceleration or deceleration time from running to the frequency of the current stage.

F5.15	PLC multi-stage running direction 1 Predetermined area：0000 ~1111H

Define PLC multi-speed running direction (binary setting).

PLC running direction setting.

LED units: Phase 1 direction selection

0：Positive 1：Reverse

LED ten digits: Phase 2 direction selection

0：Positive 1：Reverse

Hundreds of LEDs: Phase 3 direction selection

0：Positive 1：Reverse

LED Thousands: Phase 4 direction selection

0：Positive 1：Reverse

F5.16	PLC Multi-stage running direction 2 Predetermined area：0000 ~0111H

Define PLC multi-speed running direction (binary setting)

PLC running direction setting.

LED units: stage 5 direction selection

0：Positive 1：Reverse

LED ten digits: stage 6 direction selection

0：Positive 1：Reverse

Hundreds of LEDs: Stage 7 direction selection

0：Positive 1：Reverse

F5.17	PLC running time	Predetermined area：0 ~9999Min

When the programmable multi-speed running function is selected, this parameter is used to set the programmable multi-speed running time. When the time is up, the machine will stop automatically. When the operation is resumed, the stop command should be given first, and then the start command should be given.

When this parameter is set to 0, the timer running stop function is invalid.

6.7 Communication setting parameter group

F6.00	Communication settings	Predetermined area：0000 ~ 0025

This parameter is used to set communication-related characteristics (decimal setting).

LED units: baud rate selection

0：1200bps　　1：2400bps　　2：4800bps

3：9600bps　　4：19200bps　　5：38400bps

When using serial communication, you must ensure that both parties have the same baud rate.

LED ten digits: data format selection

0：No verification　1：　Even parity　2：Odd parity

When using serial communication, you must ensure that both parties have the same data format.

Hundreds of LEDs: reserved

Thousands of LEDs: reserved

F6.01	Local address	Predetermined area：0 ~ 127

Set the local address of the inverter during communication, which is only valid when the local machine is a slave. In the communication process, the machine only sends back response frames to the data frames that match the address of the machine, and receives commands.

0 is the broadcast address. For broadcast data, the slave executes instructions but does not return corresponding data (see appendix communication protocol).

F6.02	Local answer delay	Predetermined area：0 ~ 1000 ms

After the machine correctly receives the information code of the upper computer, it is the waiting time before sending the response data frame.

F6.03	Communication timeout detection time Predetermined area：0.1 ~ 20.0 Sec

When the machine does not receive the correct data signal within the time interval defined by this parameter. Then the machine judges that the communication is malfunctioning. According to the working mode after communication failure set in [F6.05], choose to stop or continue running.

F6.04	Action setting after communication failure Predetermined area：0000 ~ 0001

0：Downtime

1：Maintain current state

2：Alarm shutdown

F6.05	Linkage settings	Predetermined area：0000 ~ 0011

When using the linkage function, the master is set to 0001 and the slave is set to 0000 to realize linkage communication.

F6.06	Communication setting scale factor Predetermined area：0.100 ~ 10.000

This parameter defines the ratio of the output frequency of the master and the slave during linkage control.

This group of parameters of the host inverter does not work. When the linkage synchronization control is realized through the RS485 interface, the running command of the slave machine is completely synchronized with the master machine, and the frequency command of the slave machine is calculated as follows:

Slave frequency command = Host frequency command × [F6.06]

F6.07 ~F6.09	Reserve

F6.10	Mapping application parameters1	Setting range：F000 ~ F919
F6.11	Mapping application parameters2	Setting range：F000 ~ F919
F6.12	Mapping application parameters3	Setting range：F000 ~ F919
F6.13	Mapping application parameters4	Setting range：F000 ~ F919
F6.14	Mapping application parameters5	Setting range：F000 ~ F919

Mapping parameter settings enable non-continuous parameter addresses by accessing the continuous mapping address, read and write the data,This group of parameters is used to set the application parameter mapping address. For detailed address, refer to the MODBUS Section 3.1.3 communication parameters.

Mapping application parameters	Mapping access address
Mapping application parameters1~5	0x1303~0x1307

F6.15	***Mapping state parameters1***	***Setting range：D000 ~ D031H***
F6.16	***Mapping state parameters2***	***Setting range：D000 ~ D031H***
F6.17	***Mapping state parameters3***	***Setting range：D000 ~ D031H***
F6.18	***Mapping state parameters4***	***Setting range：D000 ~ D031H***
F6.19	***Mapping state parameters5***	***Setting range：D000 ~ D031H***

Mapping state parameters	Mapping access address
Mapping state parameters1~5	0x1403~0x1407

6.8 PID parameter group

PID control adjusts the output frequency of the inverter by calculating the difference between the feedback value of the controlled system and the target value to adjust the output frequency of the inverter to stabilize the controlled system at the target signal. The schematic diagram is shown in Figure 6-20.

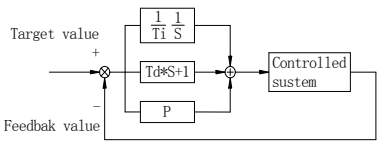


Figure 6-20 PID function diagram

F7.00	***PID feature selection***	***Predetermined area：0000 ~ 0011H***

Ones place: 0：PID function closed 1：PID function enable
Tens units：The deviation polarity is reversed
0：no avail 1：Polarity regurgitation
Hundreds units：Output polarity
0：unipolarity 1：bipolar
Thousands units：PID frequency regulation benchmark
0：upper limiting frequency 1：Frequency channel settings

F7.01	***PID values are given***	***Setting range：0.0~100.0%***

Percentage set for given PID.

F7.02	Feedback channel correction coefficient Setting range：0.100~10.000

This parameter allows for a linear correction of the feedback signal.

F7.03	PID feedforward action coefficien	Setting range：00~100.0%

0：Feedforward function turned off

1~100%：Feedforward action coefficient can increase the response speed during system startup.

F7.04	Range of static deviation	Setting range：0 ~10.0%

The PID does not adjust action when the error is within this range.

F7.07	proportional gain	Setting range：0~5.00
F7.08	integration time	Setting range：0~3.00Sec
F7.09	differential gain	Setting range：0~2.00

This parameter group is the built-in PID controller parameter.

F7.11	PID adjusts the frequency range	Setting range：0.0~100.0%

This parameter is set as the upper limit frequency of the PID adjustment, which is the percentage of the maximum PID output value corresponding to the reference base frequency.

F7.12	Lower limit of disconnection detection	Setting range：0.0 ~50.0%
F7.13	Disline detection delay time	Setting range：0.01 ~60.00Sec

If the feedback value of the system is lower than the lower limit of If the feedback value of the system is lower than the lower limit of break detection, it is considered to be in the break state and starts to detect the break state. If the system is still in the break state after delay time, the break fault is considered to occur.

0：Function is closed **1：Function to open**

F7.15	PID dormancy function	Setting range： 0~1

F7.16 PID dormancy frequency	***Setting range: 0~the upper limit frequency***
F7.17 PID dormancy latency	***Setting range： 1~3600.0Sec***
F7.18 PID arousal deviation	***Setting range： 0~100%***
F7.19 PID wake-up delay	***Setting range： 1~3600.0Sec***

The parameters of this group set the dormancy function. When the dormancy function is effective, the PID deviation is less than the static deviation of [F7.04], and the output frequency is less than the dormancy frequency. After the continuous dormancy delay time, the inverter enters the dormancy. After the feedback deviation during dormancy is greater than the static deviation and the continuous awakening delay time, the frequency converter wakes up and enters the PID adjustment state according to the feedback deviation.

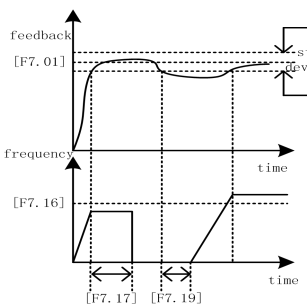


Figure 6-21 Figure of PID run

6.9 Vector run parameter group

F8.00~F8.04	***Rated parameters of motor***	***Setting range：☆***

Neplate parameters of Amotor, in order to ensure control performance, must:

1) Set the nameplate parameters correctly;

2) The power level of the motor and frequency converter should be matched, generally only the motor is two smaller or one smaller than the frequency converter.

After changing the rated power setting (F8.00), the parameters behind the setting will be automatically matched. Please modify the setting in

sequential order.

Change any one of the nameplate parameters of the motor, the frequency converter will automatically set the static identification of the primary motor parameters.

F8.05~F8.09	***parameter of electric machine***	***Setting range：☆***

After parameter identification, the group of parameters will be automatically updated, generally without setting.

F8.10	***Transfer difference compensation coefficient***
	Setting range：0.5~1.50

The rotation compensation coefficient is used to calculate the rotation frequency and is effective for the vector control mode. In the SVC operation mode, the speed control static difference **c**an be adjusted by modifying this parameter.

F8.11	***Motor parameter determination***	***Setting range：0.5~1.50***

The motor parameter setting function must be started when the vector control mode (F0.10 is set to 1).

After this function is turned on (F8.11 is set to 1~2), a parameter identification process will be conducted when starting the frequency converter. After the parameter identification, F8.11 will automatically clear, and the obtained motor parameters will be automatically stored in the internal memory of the frequency converter. The value of parameters F8.05 ~ F8.10 will be automatically updated, and the LED interface "tune" will be prompted during the identification process.

Before identification run, confirm confirm:

1） Motor nameplate parameters (F8.01~F8.04) have been correctly entered;

2）The motor is in a shutdown state.

LED Units：Identification of motor parameters

0：close

1：Static identification

In the parameter setting process, the motor always keeps the stop state, and there is no requirement for the connection relationship of the motor rotating shaft, but the setting accuracy is low.

2：Static + operation parameter identification

After the frequency converter performs static identification of the motor, the converter automatically starts the identification process. During the

operation identification process, the stop command can be entered to force terminate the identification process. At this time, the identification request is not cleared, and the identification process will be restarted again.

The maximum operating frequency of operation identification will reach 80% of the rated frequency of the motor. Before starting and identification, please confirm the safety of the equipment, and the operation will be automatically terminated after the identification.

In the process of operation identification of motor parameters, we must ensure that the whole process motor has no load, otherwise incorrect motor parameters will be obtained.

LED Tens：gain select

0：Dual PID parameters 1：Single PID parameters

LED Hundreds：Speed identification mode

0：One-way mode 1：Two-way mode

F8.12	***Gain switch on the frequency***	***Setting range：1.0~[F8.03]***
F8.13	***Gain switch under frequency***	***Setting range：0.5~[F8.12]***

The group of parameters are used to set the low speed and high speed gain switching points and the frequency range of lag ring switching. The first set of parameters of low speed and the second set of high speed parameters are valid.

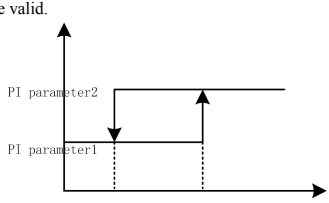


Figure 6-22 Schematic diagram of the gain switching

F8.14	***proportional gain1***	***Setting range：0.1~2.00***
F8.15	***integration time1***	***Setting range：0~1.00Sec***
F8.16	***proportional gain2***	***Setting range：0.1~2.00***
F8.17	***integration time2***	***Setting range：0~1.00Sec***

This set of parameters is used to adjust the proportional gain of the speed

regulator, integration time, each parameter is set according to the following principles:

1：Proportional gain P: the larger the value, the faster the response, the system stability, leading to speed oscillation.

2：Integration time Ti: The smaller the value, the faster the response, the greater the speed overshoot, the worse the stability, generally is proportional to the system inertia, when the inertia is large, this parameter should be also set with a large value.

F8.18	***Regulator output positive limit***
	Setting range：10~250 %
F8.19	***Regulator output has a negative limit amplitude***
	Setting range：10~250 %

This parameter is used to set the output range of the regulator to limit the transient positive and negative torque of the system, and the set value is the percentage relative to the rated torque.

6.10 Synchronous motor operation parameter group

F9.00	***Rated voltage of the synchronous motor***	***Setting range：☆***
F9.01	***Rated current of the synchronous motor***	***Setting range：☆***
F9.02	***Rated rotation speed of the synchronous motor***	
	Setting range：☆	
F9.03	***Synchronous motor pole-logarithm***	
	Setting range：☆	
F9.04	***Antipotential voltage (effective value between lines)***	
	Setting range：☆	
F9.05	***Stator resistance (between lines)***	***Setting range：☆***
F9.06	***D-axis inductance (between lines)***	***Setting range：☆***
F9.07	***Q-axis inductance (between lines)***	***Setting range：☆***

This set of parameters are used to set the parameters of the synchronous motor, in which the reverse potential voltage is the effective value of the voltage generated between the two lines when the motor rotates at 1000rpm (the reverse potential is equal to √3 times the opposite potential) (AC amplitude divided by √2). The stator resistance and the DQ axis inductance are also measured between the two lines.

F9.08	***Magnetic-chain observer gain***	***Setting range：0.01~2.50***
F9.09	***Speed-view filter bandwidth***	***Setting range：10~500HZ***

This parameter is used to set the magnetic chain observer gain, and the larger the gain, the faster the response, but the excessive gain may cause shock, and the speed filter bandwidth is used to set the cut-off frequency of the speed filter.

F9.10	***Motor parameter measurement and velocity observation***
	Setting range：0000~0011

LED Units： The synchronous motor parameter determination function must be started when the synchronous motor control mode is selected (F0.10 is set to 2). After the parameter identification, F9.10 will be automatically cleared, the obtained motor parameters will be automatically stored in the internal memory of the frequency converter, the value of parameters F9.05 ~ F9.07 will be automatically updated, and the LED interface prompts "tune" in the identification process.

LED Tens：Speed observation selection

0：model reference adaptive 1：Flux observer

Before identification run, confirm confirm:

1）Motor nameplate parameters (F9.00~F9.04) have been correctly input;

2）The motor is in a shutdown state with no external load.

In the process of operation identification of motor parameters, we must ensure that the whole process motor has no load, otherwise incorrect motor parameters will be obtained.

F9.11	***The velocity-ring proportional gain***	***Setting range：0.01~2.00***
F9.12	***The velocity loop integral gain***	***Setting range：0.01~2.00***
F9.13	***The velocity observer proportional gain***	***Setting range：0.1~5.00***
F9.14	***The velocity observer integration gain***	***Setting range：0.1~5.00***

This group of parameters is used to set the speed ring and the speed observer parameters, and the speed ring parameters are used to adjust the speed response to improve the speed and load response requirements.

For the motor body or the system with large load inertia is appropriately increased (but does not cause shock) proportional gain, reducing the integral gain can improve the overshoot.

The speed observer parameters are used to improve the speed observer response, so as to improve the stability of the speed ring, usually does not need to adjust, but if the system cannot simply adjust the speed ring after stability or cannot meet the requirements of parameters, the speed observer parameters can properly adjust the speed observer parameters.

F9.15	***Excitation switching speed***	***Setting range：☆***
F9.16	***Low-speed excitation current limit amplitude Setting range：0~60%***	

In order to improve the load capacity under speed, when the motor speed is lower than the excitation switching speed, the percentage is relative to the rated current of the motor.

F9.17	***High-speed weak magnetic current limit amplitude Setting range：0~50%***

This parameter is used to set the limit of the weak magnetic current after the drive enters the weak magnetic zone, whose percentage is relative to the rated current of the motor, so as to avoid working in the weak magnetic zone for a long time as far as possible, otherwise the motor may demagnetize risk.

F9.18	***Positive torque limit***	***Setting range：0~250%***
F9.19	***Negative torque limit***	***Setting range：0~250%***

This set of parameters is used to set the positive and negative torque limit of the speed ring, whose percentage is relative to the rated current of the motor.

Chapter 7 Fault Diagnosis And Countermeasures

7.1 Protection function and countermeasures

Fault Code	Fault Description	Possible Reasons	Solutions
Fu.01	Over current occurs in inverter acceleration running process	1. The acceleration time is too short. 2. Start the rotating motor directly. 3. The torque boost is preset as too large. 4. The network voltage is too low.	1. Extend acceleration time. 2. Restart the motor after stop 3. Reduce voltage of torque boost. 4. Check the network voltage and reduce power.
Fu.02	Over current occurs in inverter deceleration running process	The acceleration time is too short.	Increase the acceleration time
Fu.03	Over current occurs in inverter running or stop condition	1. Load changes suddenly 2. The network voltage is too low.	1. Reduce the load fluctuation. 2. Check the power voltage.
Fu.04	Overvoltage occurs in inverter acceleration running process	1. The input voltage is too high. 2. Put the power on and off frequently.	1. Check the power. 2. Lower the setting of acceleration torque level.
Fu.05	Overvoltage occurs in inverter deceleration running process	1. The acceleration time is too short. 2. The input voltage is abnormal.	1. Extend the acceleration time. 2. Check the power voltage. 3. Install braking resistor or reselect braking resistor.
Fu.06	Overvoltage occurs in inverter running process	1. The power voltage is abnormal. 2. There is energy feedback load.	1. Check the power voltage. 2. Install the braking unit and braking resistor or reselect braking resistor.
Fu.07	Overvoltage occurs in inverter stop condition	The power voltage is abnormal.	Check the power voltage.
Fu.08	Under-voltage occurs in inverter running process	1. The power voltage is abnormal. 2. There is starting operation of heavy load in network.	1. Check the power voltage. 2. Supply power separately.
Fu.09	Reserve		
Fu.10	Motor power line grounding	Motor power line short circuit to the ground	Check whether the wiring is reasonable.

Fault Code	Fault Description	Possible Reasons	Solutions
Fu.11	Electromagnetic interference	Jamming drive signal	1. Check whether the wiring is reasonable. 2. The strong and weak lines are separated.
Fu.12	Inverter overload	1. The load is too large. 2. The acceleration time is too short. 3.The torque boost is too high. 4. The network voltage is too low.	1. Reduce load or change a larger capacity inverter. 2. Extend the acceleration time. 3. Reduce the voltage of torque boost. 4. Check the network voltage.
Fu.13	Motor overload	1. The load is too large. 2. The acceleration time is too short. 3.The protection factor Setting is too small. 4. The torque boost is too high.	1. Reduce load. 2. Extend the acceleration time. 3. Increase the overload protection factor of motor. 4. Reduce torque boost.
Fu.14	Inverter overheat	1. Air duct obstruction 2. The environment temperature is too high. 3. The fan is damaged.	1. Clean air duct or improve ventilation condition. 2. Improve the ventilation condition and reduce the carrier frequency. 3. Change fan.
Fu.15	Reserve		
Fu.16	External equipment fault	The exterior fault input terminal is ineffective.	1. Check the exterior equipment. 2. Disconnect the external fault input terminal.
Fu.17	PID feedback off-line	1 The feedback signal is lost. 2. The setting of off-line detection threshold value is not appropriate.	1. Check line. 2. Reduce threshold value of off-line detection.
Fu.18	Communication interruption	Communication line interruption	Check communication connection
Fu.19	Reserve		
Fu.20	Current detection error	The current detection devices or circuit is damaged.	1. Check socket line. 2. Ask for manufacturers' assistance.
Fu.21	Temperature sensor fault	NTC short circuit	1.Check the NTC line 2.Change NTC
Fu.22	No motor is connected during parameter identification	Motor power line is disconnected.	Check motor wiring

Fu.23	parameter identification is wrong	Motor parameter identification is abnormal.	Check whether the motor line is in good contact.
Fu.24 ~ Fu.25	Reserve		
Fu.26	Output missing phase	The output line is out of phase.	Check the circuit between motor and inverter.
Fu.27 ~ Fu.34	Reserve		
Fu.35	Software overcurrent	1.The acceleration time is too short. 2.Overload	1.Increase acceleration time. 2.Lighten the load.
Fu.40	Internal data EEPROM error	The read-write errors of control parameters.	Ask for manufacturers' assistance.

7.2 Fault record query

The series of inverters recorded the recent fault code occurred in the last 6 times and the inverter output parameters of the last fault; query of these information will contribute to find fault causes.

Monitoring project	content	Monitoring project	content
d1-00	Last fault record	d1-07	The output current of the last fault recently
d1-01	Historical fault record 1	d1-08	The output voltage of the last fault recently
d1-02	Historical fault record 2	d1-09	The direct voltage of the last fault recently
d1-03	Historical fault record 3	d1-10	The module temperature of the last fault recently
d1-04	Historical fault record 4	d1-11	The set frequency of the last fault recently
d1-05	Historical fault record 5	d1-12	The running status of the last fault recently
d1-06	The output frequency of the last fault recently	d1-13	Total startup time since the last fault

The fault information and condition monitoring parameters are stored in a unified manner; please refer to the keyboard operation method to query information.

7.3 Fault reset

- The fault causes must be identified and removed completely prior to reset, otherwise it may cause permanent damage to the inverter.
- If the inverter can't be reset or fault occurs after reset, it's necessary to find out causes, otherwise continuous reset will damage the inverter.
- The protection actions of overload and overheat should be delayed for 5 minutes when reset.

To recover to the normal operation when the inverter fault occurs, it's optional to choose any of the following operations.

Method I: Press RUN/STOP key when displaying fault code.

Method II: Disconnect after closure of external multi-function terminals X1~X4 (fault reset) and CM.

Method III: Send the fault reset command via RS485 interface.

Method IV: Cut off power supply.

Appendix I: MODBUS Protocol Specification

1. Communication setting

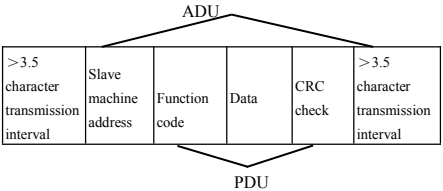
The protocol is MODBUS RTU.

2. Communication function

Complete communication between upper machine and inverter, including sending operation command to inverter, setting running frequency, rewriting function code parameter, reading running status of inverter, monitoring parameter, fault message and function code parameter.

3. Protocol format

MODBUS RTU format



3.1 Interpretation of protocol format

1. Slave address

0 is broadcast address and the slave address can be set as 1-127.

2. PDU part

(1) Function code 03: Read functional parameters, running status, monitoring parameter and fault message of multiple inverters,and 6 inverter parameters with continuous address at most in one time.

Sent by main machine:

PDU PART	03	Register initial address		Number of registers	
		High	Low	High	Low
Data length(Byte)	1	1	1	1	1

Slave machine response:

PDU PART	03	Number of reading bytes (2*Number of registers)	Reading content
Data length(Byte)	1	1	2*Number of registers

(2) Function code 06: Rewrite operation command, running frequency and functional parameter of single inverter.

Sent by main machine:

PDU PART	06	Register initial address		Register data	
		High	Low	High	Low
Data length(Byte)	1	1	1	1	1

Slave machine response:

PDU PART	06	Register initial address		Register data	
		High	Low	High	Low
Data length(Byte)	1	1	1	1	1

(3) Function code 10: Rewrite operation command, running frequency and functional parameter of multiple inverters.

Sent by main machine:

PDU PART	10	Register initial address		Number of registers		Content byte count	Register content
		High	Low	High	Low		
Data length(Byte)	1	1	1	1	1	1	2*Number of registers

Slave machine response:

PDU PART	10	Register initial address		Number of registers	
		High	Low	High	Low
Data length(Byte)	1	1	1	1	1

Notice: the inverter starts to store data from the register with lowest address to that with the highest address, and 6 function codes can be saved at most in one time; in case of identifying some error, the slave machine will make objection response.

Objection response:

PDU PART	0x80＋Function code	Objection code
Data length(Byte)	1	1

Objection code indicates error category:

Objection code	Corresponding error
01	Illegal function code
02	Illegal data address
03	Overhanging data D
04	Invalid operation of slave machine
05	Too much read-write parameters
06	Reserve read-write, implicit parameter
07	Slave machine running forbids modifying data
08	Data modification is protected by password

CRC CHECK:

CRC CHECK	CRC Low	CRC High
Data length(Byte)	1	1

CRC CHECK function is shown as below:

```
unsigned int crc_chk_value(unsigned char *data_value, unsigned char length)
{
    unsigned int crc_value=0xFFFF;
    int i;
    while(length--)
        {    crc_value^=*data_value++;
         for(i=0;i<8;i++)
            { if(crc_value&0x0001)
                    crc_value=( crc_value>>1)^0xA001;
              else
                    crc_value= crc_value>>1;
            }
        }
         return(crc_value);
}
```

3. Definition of communication parameter address

Distribution of inverter parameter address

Register implication	Register address space
Functional parameter(1)	High is the number of function code group, while low is mark number of function code, e.g. F1.11, the register address is F111.
Monitoring parameter	High is monitoring group number and low is monitoring mark number, e.g. d0-12, the register address is D012 .
Control command(2)	0x1300
Frequency setting	0x1301
Reserve	0x1302
Mapping application parameter 1~5	0x1303~0x1307
Reserve	0x1400
Inverter status(3)	0x1401
Fault message(4)	0x1402
Mapping state parameter 1~5	0x1403~0x1407

Note:

(1) The frequent writing of function code parameters in the EEPROM will reduce its service life. Some parameters in the communication mode don't need to store, but to modify the RAM value. When writing the functional parameter of EEPROM, just change "F" to "E" in the high address of the register, e.g. when writing the EEPROM value of F1.11, its register address should be E111.

(2) Operation command corresponding to operation command code:

Operation command code	Operation command
0x0000	Stop
0x0001	FWD running
0x0002	REV running
0x0003	FWD inching
0x0004	REV inching
0x0005	Free shutdown(Emergency shutdown)
0x0006	Fault reset

(3) Inverter status:

Inverter status code	Indication
0x0000	The direct voltage is not ready
0x0001	In FWD running
0x0002	In REV running
0x0003	Stops
0x0004	In fault condition

(4)The high fault message code is 0, while low is corresponding to the rear mark number of inverter fault code-Fu., e.g. if the fault message code is 0x000C, it represents that inverter fault code is Fu.12.

1.2 Example

(1). Start 1＃ inverter in FWD running condition

Main machine request:

Slave machine address	Function code	Register initial address		Register data		CRC CHECK	
		High	Low	High	Low	Low	High
01	06	13	00	00	01	4C	8E

Slave machine response: inverter in FWD running condition responds the same data with main machine request.

(2). Set inverter running frequency as 50.0Hz

Main machine request:

Slave machine address	Function code	Register initial address		Register data		CRC CHECK	
		High	Low	High	Low	Low	High
01	06	13	01	13	88	D1	D8

Slave machine response:inverter in 50.0Hz running condition responds the same data with main machine request.

(3). Read current running frequency, output current, inverter response frequency 50.0Hz and output current 1.1A of inverter.

Main machine request:

Slave machine address	Function code	Register initial address		Number of registers		CRC CHECK	
		High	Low	High	Low	Low	High
01	03	D0	00	00	02	FC	CB

Slave machine response:

Slave machine address	Function code	Number of reading bytes	1st register data		2nd register data		CRC CHECK	
			High	Low	High	Low	Low	High
01	03	04	13	88	05	DC	7C	54

(4). Start 1 # inverter in FWD running condition and set inverter running Frequency as 40. 0Hz.

Main machine request:

Slave machine address	Function code	Register initial address		Number of registers		Number of content bytes	1st register data		2nd register data		CRC CHECK	
		High	Low	High	Low		High	Low	High	Low	Low	High
01	10	13	00	00	02	04	00	01	0F	A0	7E	D7

Slave machine response:

Slave machine address	Function code	Register initial address		Number of registers		CRC CHECK	
		High	Low	High	Low	Low	High
01	10	13	00	00	02	45	4C

Appendix II: Brake resistor selection

In running process of inverter, in case that controlled motor speed falls too fast or motor load shakes too fast, the electromotive force will charge inverter internal capacitance through inverter in reverse direction, therefore, voltage at two ends of power module will be boosted to damage inverter possibly. The inverter internal control will be suppressed based on loading condition; in case of brake performance failing to meet customer requirements, it's necessary to connect with external brake resistor to realize immediate release of energy. The external brake resistor belongs to energy-consumption brake mode, which will consume all energy on power brake resistor. Therefore, selection of power and resistance value of brake resistor must be reasonable. The following content refers to introducing brake resistor power and resistance value recommended to be employed for SUNFAR inverter. Based on loading condition, user can modify value properly in line with the range specified by SUNFAR inverter.

Inverter model	Applicable motor (KW)	Brake resistor power (KW)	Brake resistance value (Ω)	Braking torque (%)
DL300-2S0007Q	0.75	0.1	≥100	100
DL300-2S0015Q	1.5	0.2	≥70	100
DL300-2S0022Q	2.2	0.2	≥50	100
DL300-2S0030Q	3.0	0.4	≥40	100
DL300-2S0040Q	4.0	0.4	≥35	100
DL300-4T0011GQ/4T0015PQ	1.1	0.3	≥400	100
DL300-4T0015GQ/4T0022PQ	1.5	0.5	≥300	100
DL300-4T0022GQ/4T0040PQ	2.2	0.75	≥200	100
DL300-4T0040GQ/4T0055PQ	4.0	1.0	≥125	100
DL300-4T0055GQ/4T0075PQ	5.5	1.5	≥85	100
DL300-4T0075GQ/4T0110PQ	7.5	2.0	≥65	100
DL300-4T0110GQ/4T0150PQ	11	2.5	≥50	100
DL300-4T0150GQ/4T0185PQ	15	3.6	≥35	100

The above configuration is to realize 100% braking torque, it's necessary to select value in actual use based on braking condition. In case of weak braking, please reduce brake resistance properly and increase brake resistance power class in proportion.

The brake resistance power is the estimated value in working condition of brake resistance interval; when continuous working time of brake resistance is longer (more than 5s), it's necessary to properly increase power class of brake resistance under the condition of same resistance value.

Simphoenix Warranty Card

Maintenance Company：_____ User：_____

Model No.：_____ Purchase Date：_____

Invoice No.：_____ Purchased From：_____

Add：Building A,Huichao Industrial Pack,Gushu 2nd Rd.,Xixiang,Bao'an District,Shenzhen,China.

Post Code：401336 Tel：0086-0755-26607756

Service：0086-0755-26910928 Fax：0086-0755-26919882

Note：

1. Please keep this card properly, please contact service center with this card and invoice when need maintenance.
2. The warranty period is 18 months.

Shenzhen Simphoenix Electric Technology Co.,Ltd

Cut along the dotted line

Certificate of Approval

This product is approved to delivery according to the standard

Inspector：_____

Simphoenix

Shenzhen Simphoenix Electric Technology Co.,Ltd