Foreword

Thank you for choosing the SD100 series inverter.

Please read the Manual carefully before using the SD100 series inverter (the Product) and follow it strictly in use in order to use the Product correctly; otherwise, functioning error, fault, reduced life or even personal injury may occur! As a standard appendix, the Manual should be kept properly for further inspection and maintenance of the Product.

In addition to the operation instructions, the Manual also provides wiring diagrams for your reference. For any query or special requirements for the Product, please contact our local offices or dealers, or directly call our Headquarters customer service center to enjoy the best service. The Manual is subject to changes without a prior notice.

While doing unpacking inspection, check if:

1. The Product has damage during transport; its spare parts have damage or falling; the Product has damage due to collision.
2. The rated values marked in the Product's nameplate are consistent with your order requirements; the package box contains the Product, quality certificate, user's manual and warranty sheet.

The Product is manufactured, packaged and delivered in strict accordance with quality warranty system. For any omission of inspection, please contact us or supplier immediately for solutions.

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Chapter 1 Safety Running & Precautions

Make sure to read the Manual carefully prior to installation, running, maintenance and inspection of the Product.

Make sure to read this chapter carefully before using the Product in order to keep safety. The Manual's safety running and precautions are divided into "Warning" and "Precautions".

 Warning	: Potential hazards. Any violation may lead to major casualties or deaths.
 Caution	: Potential hazards. Any violation may lead to minor or moderate injuries or equipment damages. This is also alert for unsafe operation.

1.1 Acceptance

Inspection items are shown in table below:

Inspection Item	Introduction
1. Is the Product's model consistent with that on order?	Check the model on nameplate at lateral side of the Product.
2. Are the parts damaged?	Visually inspect the appearance and check if there's damage during transport.
3. Are the parts fastened correctly and safely?	Remove the Product's front cover. Inspect all visible parts with proper tools.
4. Is the specification received? Are quality certificate and warranty card received?	The Product's specification, quality certificate and warranty card

If any of the inspection items above fails, please feel free to contact us or agent.

1.2 Precautions of Safety Running

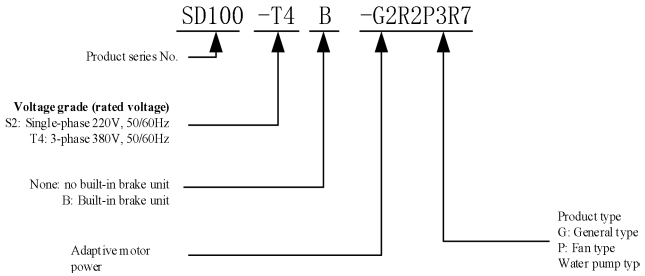
Warning	1. The Product should be installed and maintained by professional technicians only.
	2. The Product's rated voltage must be consistent with AC power voltage grade; otherwise, personal injury or fire hazard may occur.
	3. Do NOT connect the power supply of AC main circuit to Phase U, V and W of output terminal; otherwise, the Product will be damaged and the warranty will expire.
	4. Make sure to install the panel before connecting the input power supply. Do NOT remove the power supply while power is on; otherwise, electric shock may occur.
	5. Do NOT touch the Product's high-voltage terminals when power is on; otherwise, electric shock will occur.
	6. Make sure the power supply is cut off for at least 15min before conducting maintenance for the Product has large number of capacitors for storing electric energy. Make sure the charging indicator is off or confirm that positive/negative bus voltage is below 36V; otherwise, electric shock may occur.
Anti-static	7. Do NOT connect nor disconnect the conductor and connector when circuit is powered on; otherwise, personal injury may occur.
	8. Do NOT touch the electronic elements, for they can be damaged by static electricity easily.
	9. Do NOT apply voltage withstand test to the Product; otherwise, its internal semiconductor elements can be damaged.
	10. Make sure to close the cover plate before power-on; otherwise, electric shock and explosion may occur.
	11. Do NOT mix the input terminal; otherwise, explosion and property damage may occur.
	12. When inverter is stored for over half a year, make sure to increase its voltage gradually by using a voltage regulator prior to power supply; otherwise, electric shock and explosion may occur.
	13. Do NOT operate the Product with wet hands; otherwise, electric shock may occur.
	14. The spare parts MUST be replaced by professional technicians. Do NOT leave the thread residues or metals in the Product; otherwise, fire hazard may occur.
	15. Once the control panel is replaced, make sure to set the relevant parameters prior to running; otherwise, property damage may occur.
Caution	1. The motor should undergo insulation inspection when being used for the very first time or used after long-term idling and it is recommended to use 500V megger. The insulation resistance measured should not be lower than 5MΩ.

	2. Please consider the bearing capacity of mechanical devices before running the Product above 50Hz.
	3. When the Product's frequency output meets the resonance point of load device, such resonance point can be evaded by setting the hopping frequency of the Product.
	4. Do NOT use the 3-phase inverter as 2-phase inverter; otherwise, the Product may have a fault or damage.
	5. The Product should have derating operation when altitude is over 1,000m for the cooling effects are weakened due to thin air. In such case, please make technical consultancy to us.
	6. The quadrupole squirrel cage asynchronous motor is adopted as standard motor. When other motors are adopted, please select the inverter according to the rated current of motor.
	7. Do NOT control the Product's start/stop with contactor; otherwise, the Product can be damaged.
	8. Do NOT alter the Product's parameters at will; otherwise, the Product can be damaged.

Chapter 2 Product Information

2.1 Data and Naming Rules of Nameplate

Nameplate data: Taking Model SD100-T4B-G2R2P3R7 as example:



2.2 Technical Specification

Item		Specification	
Control	Control mode	V/F control Split ring vector control (SVC)	
	Frequency accuracy	Digital quantity: 0.02% Analog quantity: 0.1%	
	V/F curve	Linear, square, random V/F	
	Overload capability	Type G Machine: 150% rated current: 60s; 180% rated current: 3s	
		Type P Machine: 120% rated current: 60s; 150% rated current: 3s	
	Starting torque	Type G machine: 0.5Hz/150% (SVC); Type P Machine: 0.5Hz/120%	
	Speed regulation range	1:100 (SVC)	1:40 (V/F)
	Stable speed accuracy	±0.5% (SVC)	
	Torque control accuracy	Above 5HZ ±5% (SVC)	
	Torque compensation	Manual torque compensation (0.1%~30.0%), auto torque compensation	
Configuration	Control power supply +24V	Max. output current: 300mA	
	Input terminal	4-way digital input terminal (DI1~DI4); support expansion of 2 ways (DI5~DI6) by connecting IO expansion card. 1-way analog input terminal (VF1); support expansion of 1 way (VF2) by connecting IO expansion card; it can be used as digital input terminal through setting. **Note: VF1 can be used as voltage (0V~10V) or current (0/4mA~20mA) input, while VF2 can be used as voltage (0V~10V) input.**	
	Output terminal	1-way analog output terminal FM1, support expansion of 1 way (FM2) by connecting IO expansion card; it can output both voltage (0V~10V) and current (0mA~20mA) 1-way relay output T1, below DC30V/1A and below AC 250V/3A. 1-way collector open-circuit output (Y3), below DC 30V 50mA	
Running	Running mode	Keyboard, terminal, RS485 communication	
	Frequency source	14 primary frequency sources and 14 auxiliary frequency sources. Multiple combinations can be switched. Each frequency has diversified input modes: Keyboard	

Item		Specification
		potentiometer, external analog quantity, set figure, set pulse, multi-segment instruction, simplified PLC, communication, operation results, etc.
	Torque source	14 torque sources, including set figure, external analog quantity, set pulse, multi-segment instruction, communication, operation results.
	Acceleration/deceleration time	4 groups of straight lines (select and switch terminals by acceleration/deceleration time), S curve 1, S curve 2
	Emergency stop	Output of instantaneous interrupt inverter
	Multi-segment speed	Set 16-segment speed maximally; it can be switched through different combinations of multi-segment instruction terminals.
	Simplified PLC function	Support continuous run of 16-segment speed. The acceleration/deceleration and running period of each segment can be set independently
	Inching control	Inching frequency and inching acceleration/deceleration time can be set independently; besides, inching priority can be set under the running status
	Speed tracking	The Product can track the load speed for starting running
	Fixed-length and fixed-distance control	Realize fixed-length and fixed-length control function through the pulse input
Running	Counting control	Realize counting function through pulse input
	Swing frequency control	Applies to textile winding equipment
	Built-in PID	Realize closed-loop system of process control
	AVR function	Ensure constant output in case of grid voltage fluctuation
	DC braking	Realize fast and stable stop
	Slip compensation	Make compensation to the revolving speed due to load increase
	Hopping frequency	Avoid resonance with load
	Sag function	Balance the load of multiple motors which carry the same load
	Timing control	Realize auto shutdown of inverter when reaching the set time
	Built-in virtual delay relay	Realize simplified logic programming of multi-function output terminal function and digital input terminal signal;

Item		Specification
		the logic results can be equivalent to the digital input terminal functions, or be outputted through the multi-function output terminals.
	Built-in timer	2 built-in timers, to collect the timing input signals and realize output of timing signals. The built-in timer can be used independently or jointly.
	Built-in operation module	1 built-in 4-way operation module. It can realize simple add, subtract, multiply and divide, size judgment and integral operation
Communication		The control board has no RS485 communication interface. Standard MODBUS-TCP protocol is supported (connect EM60-485 expansion card externally)
Encoder		Connect 1-way pulse signal of encoder only (only DI6 of SD100-IO expansion card in appendix can be connected)
Motor type		Support asynchronous motor
Display	Running information	Set frequency, output current, output voltage, busbar voltage, input signal, feedback value, module temperature, output frequency, motor synchronous speed. Press >> button to have circular display of 32 items maximally
	Error information	Save the historical information of 3 faults under the running status of fault protection. Each piece of fault information includes the frequency, current, busbar voltage, input/output terminal status at faulty condition.
Protection	Inverter protection	Overcurrent, overvoltage, module fault protection, under-voltage, overheat, overload, external fault protection, EEPROM fault protection, grounding protection, missing phase, etc.
	Inverter alarm	Stall protection, overload alarm
	Instantaneous power-off	Below 15ms: Continuous running Above 15ms: Allow auto restart
Environment	Ambient temperature	-10°C~40°C
	Storage environment	-20°C~65°C
	Ambient humidity	90%RH maximally (no condensation)
	Height/vibration	Below 1,000m, below 5.9m/s^2 (=0.6g)
	Application location	No corrosive gas, inflammable gas, oil mist or dust and others
Cooling mode		Forced air cooling

2.3 Product List

Inverter Model	Rated Capacity (kVA)	Rated Input Current (A)	Rated Output Current (A)	Adaptive Motor (kW)
S2 (single-phase 220V,50/60Hz)				
SD100-S2-G0R4	0.8	5.0	3.0	0.4
SD100-S2B-G0R4	0.8	5.0	3.0	0.4
SD100-S2-G0R75	1.5	9	5.0	0.75
SD100-S2B-G0R75	1.5	9	5.0	0.75
SD100-S2-G1R5	2.7	15.7	7.0	1.5
SD100-S2B-G1R5	2.7	15.7	7.0	1.5
SD100-S2-G2R2	3.8	27	10.0	2.2
SD100-S2B-G2R2	3.8	27	10.0	2.2

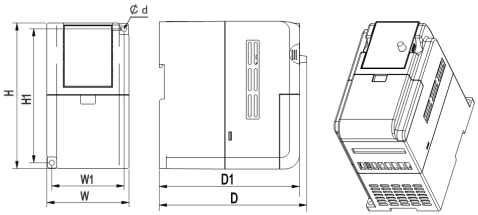
Inverter Model	Rated Capacity (kVA)	Rated Input Current (A)	Rated Output Current (A)	Adaptive Motor (kW)
T4 (3-phase 380V, 50/60Hz)				
SD100-T4B-G0R75P1R5	1.5	4.4	3.0	Type G Machine 0.75
	3.0	6.0	4.5	Type P Machine 1.5
SD100-T4B-G1R5P2R2	3.0	6.0	4.5	Type G Machine 1.5
	4.0	6.8	6.0	Type P Machine 2.2
SD100-T4B-G2R2P3R7	4.0	6.8	6.0	Type G Machine 2.2
	5.9	11	9.5	Type P Machine 3.7
SD100-T4B-G3R7P5R5	5.9	11	9.5	Type G Machine 3.7
	8.5	15.5	13	Type P Machine 5.5
SD100-T4B-G5R5P7R5	8.5	15.5	13	Type G Machine 5.5
	11	20.5	17	Type P Machine 7.5
SD100-T4B-G7R5P011	11	20.5	17	Type G Machine 7.5
	17	26	22	Type P Machine 11
SD100-T4B-G011P015	17	26	25	Type G Machine 11
	21	35	32	Type P Machine 15
SD100-T4B-G015P18R5	21	35	32	Type G Machine 15
	24	38.5	37	Type P Machine 18.5

Ordering instructions:

Please mark the product model and specification when placing an order. It is recommended to supplement other data, such as motor parameters and load. For any special requirements, please contact our Technology Department.

2.4 Appearance & Installation Dimensions

Model 1



Model	W	W1	H	H1	D	D1	Φ d
SD100-S2-G0R4	84	74	152	140	148. 4	141	5. 5
SD100-S2B-G0R4							
SD100-S2-G0R75							
SD100-S2B-G0R75							
SD100-T4B-G0R75P1R5	84	77	152	144	148. 4	141	4. 5
SD100-T4B-G1R5P2R2							

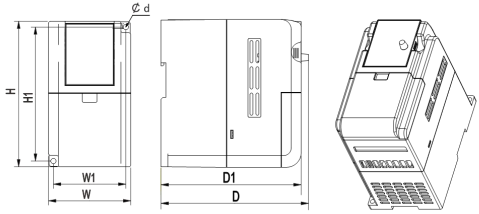
Note:
1. Plastic case model
2. The terminal arrangement is subject to the real product

Wiring diagram of main circuit:

U	V	W	PB	P+	⏚	L1	L2

⏚	P+	PB	R	S	T	U	V	W

Model 2



Model	W	W1	H	H1	D	D1	Φ d
SD100-S2-G1R5	105	95	165	153	161. 4	154	5. 5
SD100-S2B-G1R5							
SD100-S2-G2R2							
SD100-S2B-G2R2							
SD100-T4B-G2R2P3R7	105	95	165	155	161. 4	154	4. 5
SD100-T4B-G3R7P5R5							

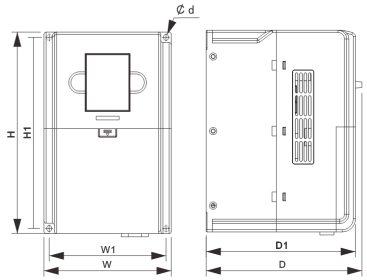
Note:
1. Plastic case model
2. The terminal arrangement is subject to the real product

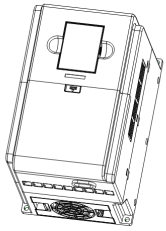
Wiring diagram of main circuit:

L1	L2	⏚	P+	PB	U	V	W

⏚	P+	PB	R	S	T	U	V	W

Model 3





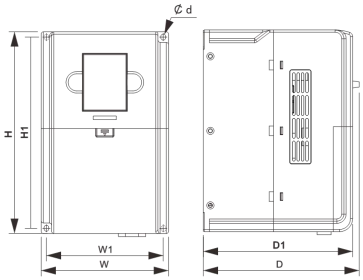
Wiring diagram of main circuit:

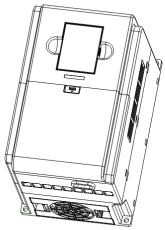
Note:
1. Plastic case model
2. The terminal arrangement is subject to the real product.

Model	W	W1	H	H1	D	D1	Ø d
SD100-T4B-G5R5P7R5	145	133	230	218	177.4	170	5.5
SD100-T4B-G7R5P011							

⏚	P+	PB	R	S	T	U	V	W

Model 4





Wiring diagram of main circuit:

Note:
1. Plastic case model
2. The terminal arrangement is subject to the real product.

Model	W	W1	H	H1	D	D1	Ø d
SD100-T4B-G011P015	180	168	285	273	167.4	160	5.5
SD100-T4B-G015P18R5							

⏚	P+	PB	R	S	T	U	V	W

2.5 Daily Maintenance

2.5.1 Daily Maintenance

The Product should undergo daily and regular maintenance to avoid potential failures or reduced life when the internal elements are aged due to the ambient temperature, humidity, dust and vibration.

Daily inspection items:

A. Whether motor running sound has abnormal changes.

B. Whether motor has vibration during running.

C. Whether the Product's installation environment is changed.

D. Whether the Product's cooling fan is running normally.

Daily cleaning:

A. Make sure the Product is clean.

B. Remove the surface dust on the Product. Prevent dust, or metal dust in particular, from entering the Product.

C. Remove the oil dirt on the Product's cooling fan effectively.

2.5.2 Regular Inspection

Please inspect the inaccessible parts regularly.

Regular inspection items:

A. Inspect and clean the air duct regularly.

B. Whether screws are loose.

C. Whether the Product is corroded.

D. Whether the terminal blocks have traces of arc drawing.

2.5.3 Replacement of Quick-wear Parts

The Product's quick-wear parts include cooling fans and filtering electrolytic capacitor, of which the service life is closely related to the application environment and maintenance conditions.

User can determine the replacement interval according to the running period.

A. Cooling fan

Possible cause: Bearing loss, blade aging.

Judgment criteria: Whether fan blades are cracked and there are abnormal vibration sounds during startup.

B. Filtering electrolytic capacitor

Possible cause: Poor quality of input power supply, high ambient temperature, frequency load jump and electrolyte aging. Judgment criteria: Whether there's liquid leakage, safety valve is bulged, measurement of electrostatic capacity and insulation resistance

2.5.4 Storage

Precautions for short-term and long-term storage:

A. Put the Product in the Company's package box for storage as much as possible.

B. Make sure to power on the Product for at least 5h in every half a year, and the input voltage must be slowly increased to the rated value by using a voltage regulator, for long-term storage may lead to aging of electrolytic capacitor.

2.5.5 Warranty

Free warranty applies to the Product only.

For any fault or damage in normal use condition, the Product may enjoy warranty service when used domestically (according to the Company's bar code), or enjoy the warranty service in the location of procurement within 6 months after

delivery.

The Company's products may enjoy life-long paid services regardless of its procurement time and location.

The Company's nationwide sales, production and agents can offer after-sales services for the product based on the following service conditions:

A. Carry out "3-stage" inspection service (including troubleshooting) in the location of this unit.

B. Follow the standard of after-sales service and responsibility specified in the contract signed by and between the Company and dealer.

C. Paid after-sales service can be provided by the Company's dealers (within warranty or not).

For any quality problem or accident, we bear the liability of repairing, exchange and return only. Users can purchase property insurance from the insurance company in order to acquire further compensation.

The Product enjoys 18-month warranty since the delivery date on bar code.

For any fault due to the following causes, the Product may enjoy paid maintenance even if it is within the warranty period:

A. Misoperation (as per the specification) or unauthorized repairing and transformation.

B. The Product has a fault due to violation against the specification.

C. Damage due to dropping or improper handling after procurement.

D. Aging or fault of parts due to poor environment.

E. Damages due to earthquake, fire hazard, wind-fire disaster, lightning stroke, abnormal voltage or other natural disasters and disaster-related factors.

F. Damages during transport. (Note: Transport mode is designated by customer and card transfer procedure is handled by us).

G. The brand, trademark, S/N and nameplate of manufacturer are damaged or fail to be identified.

H. Fail to make payment as agreed.

I. Fail to describe the installation, wiring, operation, maintenance or other use conditions to us objectively.

Make sure to return the Product to us to identify the attribution of liability in order to enjoy the repairing, exchange and return service.

Where the buyer fails to pay in full or pay off the balance as scheduled, the supplier still owns the Product without undertaking the liabilities above. The buyer shall have no objection.

The servicing fees should be calculated based on the manufacturer's unified standard or the contract (if any) should be prioritized.

Chapter 3 Installation & Wiring of Inverter

3.1 Selection of Installation Location & Space

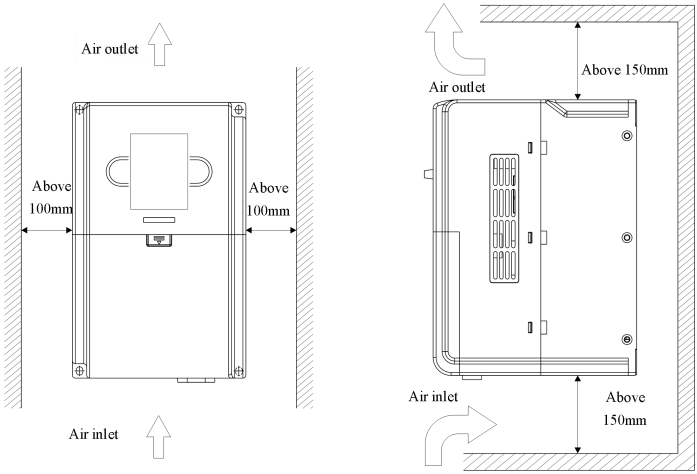
3.1.1 Selection of Installation Location:

 Caution	1. Avoid direct sunlight. Do NOT use the Product outdoors directly.
	2. Do NOT use the Product in places with corrosive gas and liquid.
	3. Do NOT use the Product in places with oil mist and splashed water.
	4. Do NOT use the Product in places with salt mist.
	5. Do NOT use the Product in places with rainfall and moisture.
	6. Make sure to install a filter when there's metal powder, silk, fiber or fabric in air.
	7. Do NOT use the Product in places with mechanical impacts and vibration.
	8. Make sure to take cooling measures when the ambient temperature exceeds 40°C. Type P Machine will reduce carrier wave automatically when the ambient temperature is high.
	9. Use the Product within the temperature range of -10°C + 40°C, for the Product can be fault when temperature is too high or too low.
	10. Keep the Product away from noise, for the Product can be affected by the electric welding machine and large-power electrical equipment.
	11. The radioactive materials may affect the Product's functioning.
	12. Keep the Product away from flammable materials, diluent and solvents.

The Product's installation environment should be selected according to the suggestions above to ensure good performance, long life and prevent damages.

3.1.2 Selection of Installation Space:

The Product should be reserved with an enough cooling space during vertical installation, to ensure effective cooling

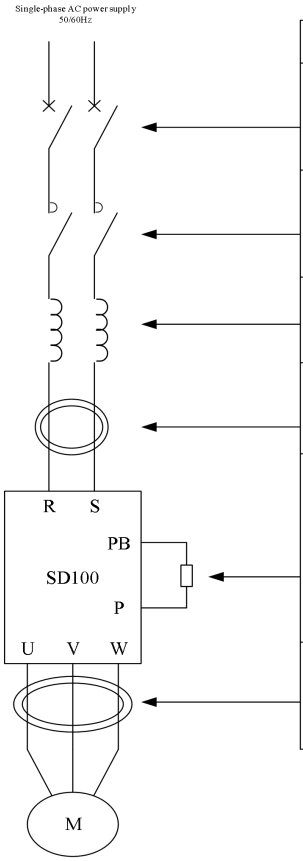


Installation Space of the Product

Caution	1. The product with open frame (IP00) and enclosed wall-mounting (IP20) should have the same clearance at the top/bottom and lateral sides.
	2. The Product's permissible temperature at air inlet should be: -10°C ~+40°C;
	3. The Product should be reserved with enough cooling space at the upper and lower space, to ensure smooth air feeding/discharging of the Product.
	4. Make sure foreign matters will not drop in air duct during installation, to avoid damaging the fan.
	5. The air inlet should be fitted with air filter when the Product is installed in places with much silk, fiber, fabric or dust in air.

3.2 Wiring of Peripheral Equipment and Optional Parts

Standard wiring method for peripheral equipment and optional parts of the Product:



Peripheral equipment and optional parts	Introduction
Non-fuse breaker MCCB	To cut off the Product's faulty current quickly and prevent power fault due to the fault of the Product and its circuit
Magnetic contactor MC	To cut off the main power supply when the Product has a fault, prevent power failure and restart after fault
AC reactor ACL	To improve the input power factor, reduce the upper harmonics and restrain the surge of power supply
Radio noise reducer NF	To reduce the radio jamming due to the Product
Regenerative braking resistance Rb	Applies when braking torque fails to meet the requirements; applies to the scenarios with large-inertia load, frequent braking or fast stop
Radio noise filter NF	To reduce the radio jamming due to the Product

3.3 Wiring of Main Circuit

3.3.1 Wiring Diagram and Precautions of Main Circuit

This section introduces the wiring of the Product's main circuit.

	1. Do NOT connect power supply of AC main circuit to Phase U, V and W of output terminal.
	2. Make sure to cut off power supply prior to wiring.

Danger	3. Make sure the Product's rated voltage is consistent with input power voltage.
	4. Do NOT carry out voltage withstand test to the Product.
	5. Make sure to fasten the terminal screws according to the specified fastening torque.

Caution	1. Make sure the grounding terminals are grounded before installing the main circuit. (Refer to 3.5)
	2. The terminal sequence is subject to the real product.
	3. Rated input voltage: AC single-phase 220V Frequency: 50/60Hz
	4. Permissible fluctuation voltage: ±10% (transient fluctuation ±15%) Permissible fluctuation frequency: ±2%

Wiring diagram of main circuit of Type SD100 machine 1:

U	V	W	PB	P+	⏚	L1	L2

⏚	P+	PB	R	S	T	U	V	W

Wiring diagram of main circuit of Type SD100 machine 2:

L1	L2	⏚	P+	PB	U	V	W

⏚	P+	PB	**R**	**S**	**T**	U	V	W

Wiring diagram of main circuit of Type SD100 machine 3:

	⏚	P+	PB	**R**	**S**	**T**	U	V	W

Wiring diagram of main circuit of Type SD100 machine 4:

	⏚	P+	PB	**R**	**S**	**T**	U	V	W

3.3.2 Precautions of Wiring at Main Circuit Input Side

1. Installation of circuit breaker (MCCB)

The MCCB or fuse must be connected between the AC main circuit power supply and input terminal R, S, T or between L1 and L2, in order to protect the

circuit.

2. Installation of residual current circuit breaker (RCCB)

When a RCCB is connected to the input terminal R, S, T, or L1 and L2, the input terminal that is not affected by high frequency should be selected, in order to prevent false action.

For example: NV series of Mitsubishi Electric (manufactured in or after 1988).

CDM1 series circuit breaker manufactured by Delixi Group.

3. Installation of magnetic contactor

It can also be installed when magnetic contactor (MC) is not installed at the power side of inverter. MC, which can substitute MCCB, can disconnect the power supply of main circuit by sequence. However, when MC is disconnected at the primary side, the regenerative braking will not take action and the motor will stop sliding.

The load can be running/stopped by closing/opening the MC at the primary side; however, frequent opening/closing may lead to a fault of the Product. Note: When braking resistor is used, it can realize sequential control through the tripping contact of overload relay when MC is disconnected.

4. Sequential connection of terminal

The phase line of input power supply can be connected to any terminal of R, S, T or L1, L2 on the terminal board regardless of the phase sequence.

5. AC reactor

High peak current may flow through the input power circuit and damage the rectifier converter when one inverter is connected to a large-capacity power transformer (600KVA or higher), or one phase lead capacitor (power-factor compensator) needs to be connected/disconnected; in such case, a DC reactor (optional) should be installed in the inverter, or an AC reactor (optional) can be installed in the input end, in order to effectively improve the power factor at the power side.

6. Surge absorber

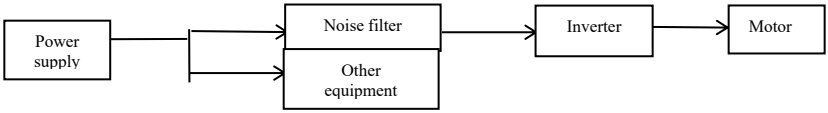
One surge suppressor should also be installed when inductive load (such as MC, relay, solenoid valve, solenoid coil and electromagnetic brake) is connected near the inverter.

7. Setting of noise filter at power side

The noise filter can be installed to reduce the high-frequency noise wave from the Product to the power supply.

Wiring example 1: Please use the specific noise filter of the Product.

Setting of noise filter at power side is as follows:



3.3.3 Precautions of Wiring at Main Circuit Output Side

1. Connection of output terminal and load

Connect Phase U, V and W of output terminal to Phase U, V and W of motor outgoing line, send forward running instruction to verify the forward rotation of this motor (CCW: Anticlockwise rotation when being observed from the load side of motor). When motor has wrong rotation direction, please exchange any two phases of U, V and W of output terminal.

2. It is forbidden to connect input power supply to Phase U, V and W of output terminal!!!

3. It is forbidden to carry out short-circuiting or grounding of output circuit

It is forbidden to touch the output circuit or have contact between output line and inverter shell; otherwise, electric shock or grounding fault may occur. Besides, it is forbidden to have short-circuiting of output line.

4. It is forbidden to connect the phase lead capacitor or LC/RC noise filter

Do NOT connect the phase lead capacitor or LC/RC noise filter to the output circuit.

5. Avoid installation of magnetic starter

When a magnetic starter or MC is connected to the output circuit, the Product may trigger the action of over-current protection circuit due to inrush current when loads are connected in the running period. The MC can have action only if the Product stops output.

6. Installation of thermal overload relay

One electronic overload protection function is included in the Product. Surely, one thermal overload relay should be connected when multiple motors are driven by one inverter, or one multi-pole motor is used. Besides, the thermal overload relay should be given the rated current that is the same with value marked on motor nameplate.

7. Setting of noise filter at output side

Specific noise filter should be arranged at the Product's output side, in order to reduce the radio noise and interference noise.

Interference noise: Due to electromagnetic interference, the noise modulation on signal line may lead to false action of controller.

Radio noise: The radio transceiver may generate noise due to the high-frequency wave emitted by the Product or cable.

8. Countermeasures for interference noise

In addition to the use of noise filter, the connecting line can be fully crossed into the metal pipe in order to restrain the interference noise that is generated at output end. The signal line should be separated for over 30cm to reduce the influence from interference noise.

9. Countermeasures for radio noise

The radio noise, which can be generated by the input/output line and the inverter, can be reduced by setting noise filter at both ends of input/output end and using shielded cable for connecting the iron box of inverter. Particularly, the connection line between inverter and motor should be as short as possible.

10. Wiring distance between inverter and motor

The harmonic leakage current from cable may bring unfavorable effects on the Product and peripheral equipment when the wiring distance between inverter and motor is too long or the Product's carrier frequency (frequency of main IGBT switch) is too high.

When wiring distance between the Product and motor is too long, the Product's carrier frequency can be reduced as follows. The carrier frequency can be given by function code F0.1.05.

The wiring distance between the Product and motor is shown in table below:

Distance between Inverter and motor	Carrier Frequency (F0.1.05)
50m maximally	10kHz or lower
100m maximally	5kHz or lower
Above 100m	3kHz or lower

The output reactor must be installed when line distance exceeds 50m; otherwise, the motor can be burnt easily!

The external thermal relay may have unnecessary action due to high frequency of current from the distributed capacitance between the output wiring of inverter.

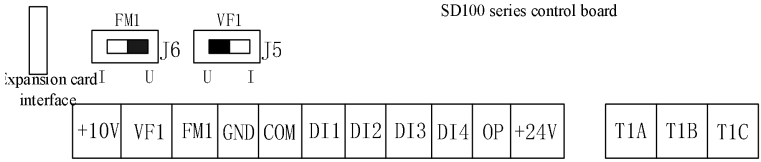
3.3.4 Wiring and Peripheral Equipment of Main Circuit

Inverter Model	Line Size of Main Circuit (mm^2)	Line Size of Control Circuit (mm^2)	MCCB (A)	MC (A)
S2 (single-phase 220V)				
SD100-S2-G0R4	2.5	1.0	16	10
SD100-S2B-G0R4	2.5	1.0	16	10
SD100-S2-G0R75	2.5	1.0	16	10
SD100-S2B-G0R75	2.5	1.0	16	10
SD100-S2-G1R5	2.5	1.0	20	16
SD100-S2B-G1R5	2.5	1.0	20	16
SD100-S2-G2R2	4.0	1.0	32	20
SD100-S2B-G2R2	4.0	1.0	32	20
T4 (3-phase 380V, 50/60Hz)				
SD100-T4B-G0R75P1R5	2.5	1.0	10	10
SD100-T4B-G1R5P2R2	2.5	1.0	16	10
SD100-T4B-G2R2P3R7	2.5	1.0	16	10
SD100-T4B-G3R7P5R5	4	1.0	25	16
SD100-T4B-G5R5P7R5	4	1.0	32	25
SD100-T4B-G7R5P011	4	1.0	40	32
SD100-T4B-G011P015	4	1.0	63	40
SD100-T4B-G015P18R5	6	1.0	63	40

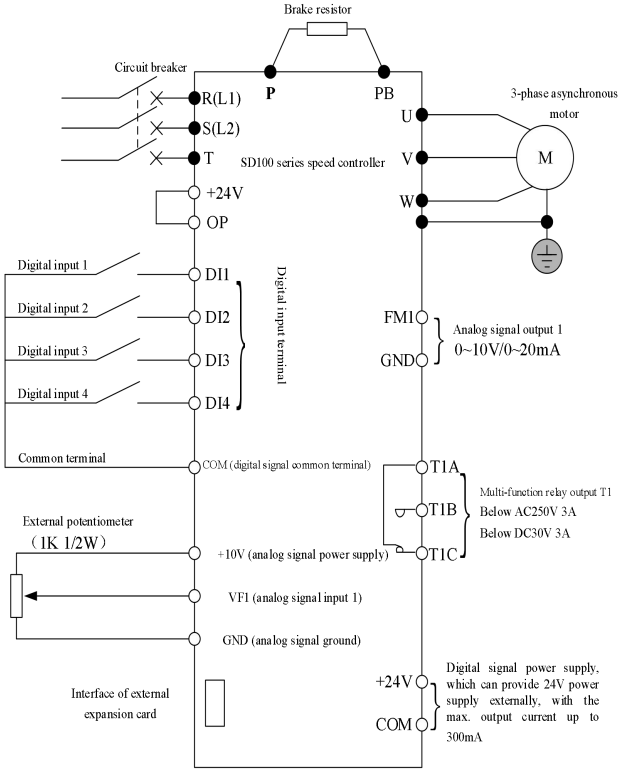
3.4 Wiring of Control Circuit

3.4.1 Terminal Arrangement and Wiring Diagram of Control Circuit

(The P24V terminal (if any) has the same functions with +24V terminal)



The wiring diagram for SD100 main circuit and control circuit is shown below (Connect L1/L2 for Type S2 Machine, or connect R/S/T for Type T4 Machine)



Note: (The P24V terminal (if any) has the same functions with +24V terminal)

3.4.2 Functions of Control Circuit Terminal

The functions of control circuit terminal are introduced in table below. Wiring is conducted according to the functions of each terminal.

Item	Terminal	Terminal Name	Function Description
Digital quantity input	DI1	Digital input 1	Standard terminal on control board. For details of functions, please refer to instructions of function code F3.0.01~F3.0.04
	DI2	Digital input 2	
	DI3	Digital input 3	
	DI4	Digital input 4	
	DI5	Digital input 5	Terminal of SD100 expansion card. For details of functions, please refer to instructions of function code F3.0.05, F3.0.06
	DI6	Digital input 6	
T1 relay	T1A	Multi-function relay output T1	TA-TB is normally on TA-TC is normally off Drive capability: AC250V Below 3A DC30V Below 3A
	T1B		
	T1C		
Analog quantity input	10V	10V power output	Supply DC 10V power voltage externally. Generally, it is used as working power supply of external potentiometer Drive capability: Below 50mA
	GND		
	VF1-GND	Analog input terminal 1	Standard terminal on control board. To receive the input of external analog signal, it can be 0V~10V voltage signal or 0/4mA~20mA current signal
	VF2-GND	Analog input terminal 2	Terminal of SD100 expansion card. To receive the input of external analog quantity signal. It can be 0V~10V voltage signal only.
Analog output	FM1-GND	Analog output terminal 1	Standard terminal of control board. Output 0~10V voltage or 0~20mA current
	FM2-GND	Analog output terminal 2	Terminal of SD100 expansion card. Output 0~10V voltage or 0~20mA current
+24V power supply	COM	24V power output	Provide DC 24V power voltage externally Drive capability: Max. output current up to 300mA
	+24		

Item	Terminal	Terminal Name	Function Description
Communication terminal	SG+	RS485 communication positive signal terminal	Terminal of SD100 expansion card. Communication wiring terminal of RS485
	SG-	RS485 communication negative signal terminal	

3.4.3 Wiring Instructions of Control Circuit

The control circuit, which must be arranged separately from the main circuit, strong-current circuit (relay contact 220V circuit), must be twisted shielded wire or twisted pair shielded wire. The shielded wire must be connected to Terminal PE of the Product, with wiring distance below 50m, in order to prevent false action due to interference.

1. Wiring instructions of analog input terminal circuit

J5 can control Channel VF1 and select the input of voltage/current signal. J5 switch should be located at I side when current signal input is selected, or be located at U side when voltage signal input is selected.

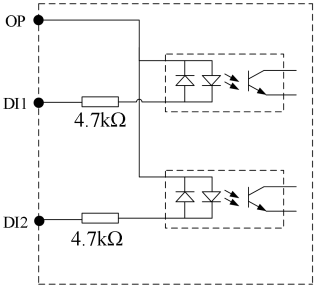
2. Wiring instructions of analog output terminal circuit

J6 can control Channel FM1 and select the output of voltage/current signal. J6 switch should be located at I side when current signal output is selected, or be located at U side when voltage signal output is selected.

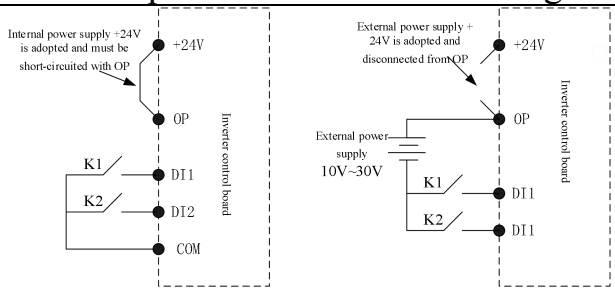
3. Wiring instructions of digital input terminal circuit

The shielded wire or twisted shielded wire should be used as much as possible for digital input, to prevent the interference of external signals, and the wiring distance should be less than 50m.

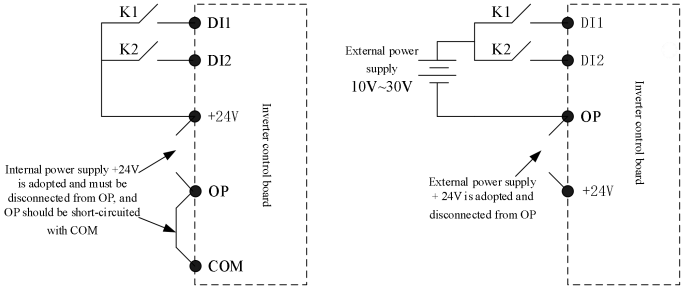
The circuit diagram of digital input loop control board is shown in picture below



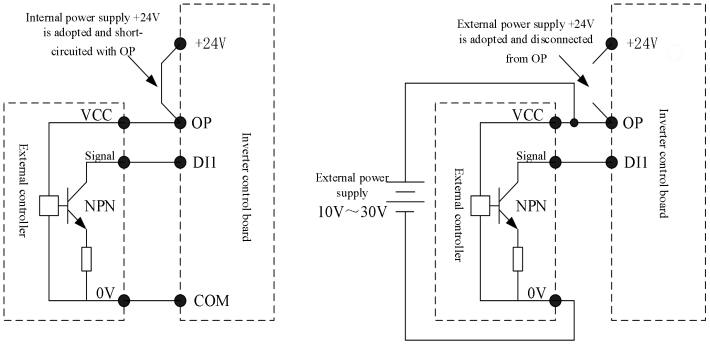
Wiring of common cathode of dry contact



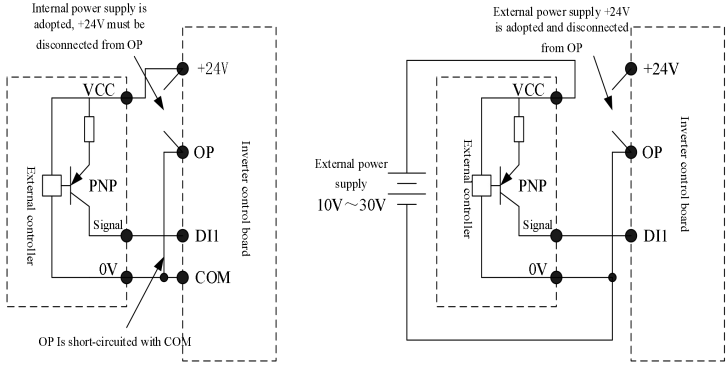
Wiring of common anode of dry contact



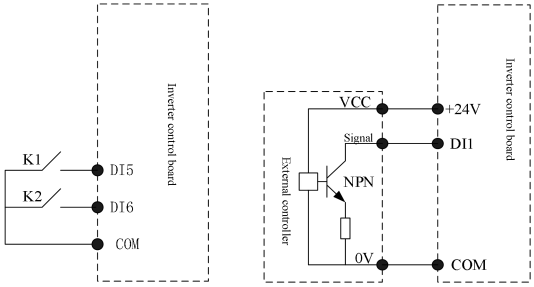
Sink type wiring



Source type wiring

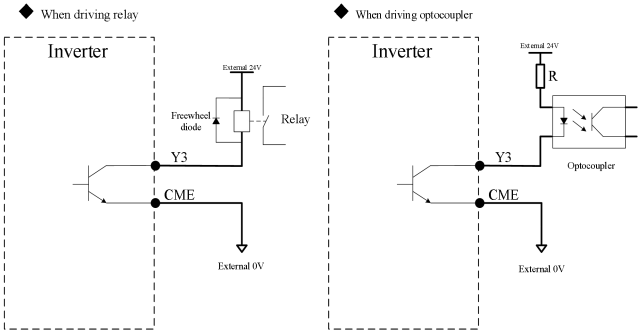


Only the following two wiring methods are supported by DI5 and DI6: The common cathode of dry contact of internal power supply is shown in the left picture below, while the NPN sink type wiring of internal power supply is shown in the right picture below:

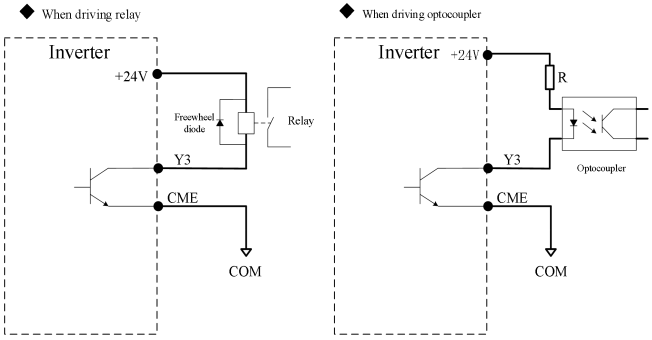


4. Wiring of output terminal of Y3 multi-function open collector

External power supply



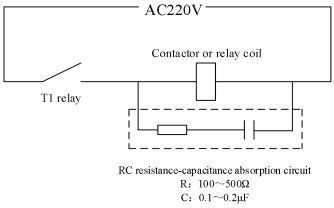
Internal power supply



5. Wiring instructions of T1 output terminal circuit

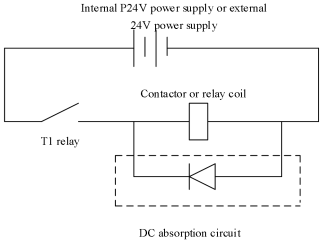
AC circuit

The surge voltage absorption circuit should be mounted when inductive load is being driven (such as electromagnetic relay and contactor), such as RC absorption circuit (the leakage current should be lower than the holding current of controlled contactor or relay), as shown in picture below:



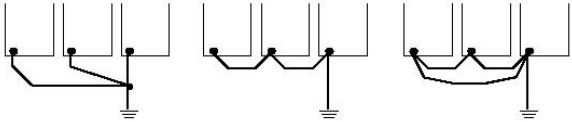
DC circuit

The freewheel diode should be mounted (pay attention to its polarity) when DC electromagnetic circuit is being driven, as shown in picture below:



3.5 Grounding

1. Grounding resistance:
Grade 200V: 100Ω or lower
Grade 400V: 10Ω or lower
2. The Product should not have shared grounding with electric welding machine, electric motor or other high-current electrical equipment. Make sure all grounding wires in conductor are paved separately with the conductors of high-current electrical equipment.
3. Use the standard grounding wire that should be as short as possible.
4. When multiple EP100 series inverters are used in parallel, the Product should be grounded as shown in Fig. (a), instead of forming the grounding circuit into a loop as shown in Fig. (c).
5. The Product and motor should be grounded as shown in Fig. (d).



(a) Correct (b) Wrong (c) Not recommended

(d) Correct Not recommended

6. Wiring inspection
Upon finishing installation and wiring, check if:
A. Wiring is correct.
B. Thread residues or screws are left in the Product.
C. Screws are fastened firmly.
D. The bare conductor on terminal has contact with other terminals.

Chapter 4 Keyboard Operation & Running

4.1 Selection of Operation Mode

The Product provides three control modes, including keyboard operation, terminal running and communication running, which can be selected by users according to the site environment and operation requirements. For details, please refer to 7.1.

4.2 Pilot Run and Inspection

4.2.1 Precautions and Inspection before Pilot Run

 Danger	1. Make sure to install the front cover before connecting the input power supply. Do NOT remove the outer cover when power is on; otherwise, electric shock may occur.
	2. Do NOT approach the Product or load when restart function is selected, for the Product will restart suddenly after shutdown. (The mechanical system should guarantee the personal safety, even if the Product will restart); otherwise personal injury may occur.
	3. An independent emergency stop button should be installed for the stop button can be disabled due to function setting; otherwise, personal injury may occur.
 Caution	1. Do NOT touch the cooler or resistor to avoid scald due to high temperature.
	2. Make sure to confirm the safety working range of motor and mechanical equipment to avoid personal injury and equipment damage, for it can be switched from low speed to high speed easily.
	3. A brake can be installed independently if necessary; otherwise, personal injury may occur.
	4. Do NOT alter the wiring during operation; otherwise, the equipment or inverter can be damaged.

Make sure to disconnect the mechanical coupler before the first running, in order to disconnect the motor and mechanical equipment and keep safety. When motor and mechanical equipment are connected before the first running, please operate with caution to avoid possible dangers. Before pilot run is started, check if:

A. Conductor and terminal are connected properly.

B. Short circuit is caused by thread residues.

C. Screw terminals are fastened firmly.

D. Motor is installed firmly.

4.2.2 Pilot Run

When system is ready, connect power supply and check if the Product is

normal.

The indicator of digital operation keyboard should be on when power supply is connected.

Cut off power supply immediately if any problem is found.

4.2.3 Inspection in Operation Process

In operation process, check if:

A. Motor is running stably.

B. Motor rotation direction is correct.

C. Motor has abnormal vibration or noise.

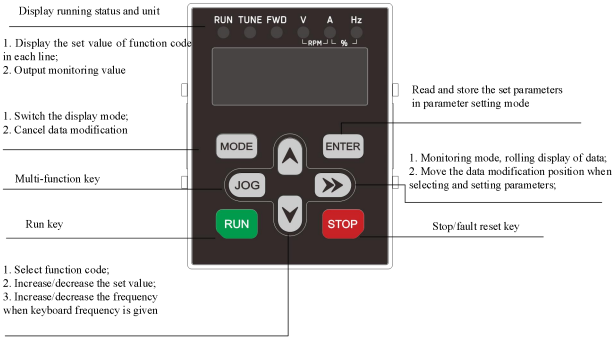
D. Acceleration/deceleration is stable.

E. Current is matched with load.

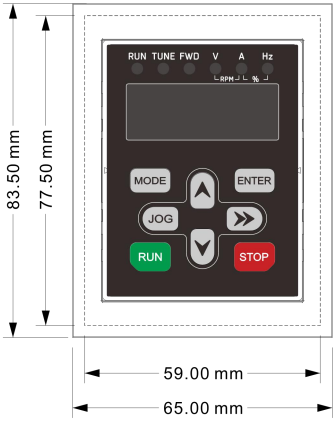
F. Status LED indicator and digital operation keyboard have correct display.

4.3 Operation Method of Keyboard

4.3.1 Keyboard Buttons and Functions



Keyboard Size



Indicator Functions

NO	Name	Function Description
1	FWD	The indicator will be on during forward rotation, or be off during reverse rotation
2	RUN	This indicator will be on when inverter is running
3	V	Voltage
4	A	Current
5	Hz	Frequency
6	V-%-A	Percentage
7	A-RPM-Hz	Revolving speed

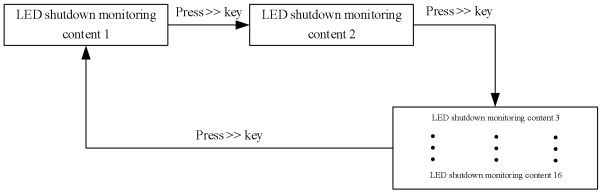
Hole Size of Pull-out Keyboard: 77.5mm*59mm

Dimensions of Pull-out Keyboard: 83.5mm*65mm

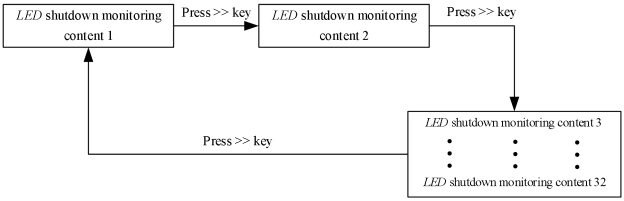
4.3.2 Data Monitoring Mode

1. Cycle monitoring mode

In monitoring mode, press >> button to change the display item, in order to check the current status of the Product.



16 contents of shutdown time can be displayed circularly at most in shutdown status. The specific contents of circular display are decided by function code F0.1.21. (For details, please refer to description of F0.1.21)



32 running monitoring contents can be cycled maximally in running status. The specific contents of cyclic display are decided by function code F0.1.18 and F0.1.19. (For details, please refer to description of F0.1.18 and F0.1.19)

2. Fault/alarm monitoring mode

A. When fault and alarm occur in running monitoring mode, the fault and warning information will be displayed automatically.

B. When fault is removed, press STOP/RESET button to reset.

C. For any major fault, cut off power supply to reset.

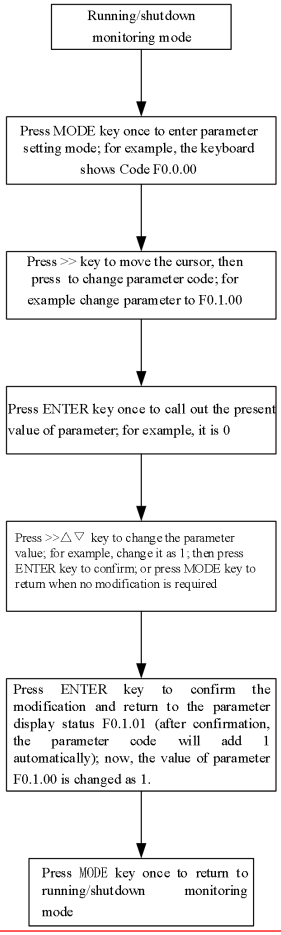
D. The keyboard will keep displaying the fault code (see Chapter 9) when fault is not removed or screen is not cleared.

4.3.3 Use of Multi-function Key JOG

The function code F0.1.03 can be set to define the functions of JOG key as demanded by user. The JOG key can be defined as invalid, forward inching, reverse inching, forward/backward switch, switch of panel control channel and reverse running, in which, forward inching, reverse inching and switch of panel control channel can be valid in any running control mode, while forward/backward switch

and reverse running are valid in keyboard control mode only.

4.3.4 Method of Viewing/setting Parameters (via Numeric Keyboard)



For example: The following example is to change the value of acceleration parameter F1.0.31 from 010.0 to 016.0

1	50.00	Display set frequency 50.00Hz, then press MODE key to enter parameter setting mode.
2	F0.0.00	Parameter F0.0.00 occurs; meanwhile, the last data bit "0" of pointer will flicker. Press △▽ to select the function code requiring setting, then press >> key to move the data bit
3	F1.0.31	Press >>, △▽ key to modify the display value as F1.0.31, then press ENTER key
4	010.0	The parameter default value is 010.0; meanwhile, the pointer stays at the last data bit "0"
5	016.0	Press >>,△▽ key to modify the display value as 016.0, then press ENTER key
6	F1.0.32	Save and write data in 016.0, it shows the data acceleration has been changed from 010.0 to 016.0; now, it is returned to parameter display of F1.0.32
7	F1.0.31	When MODE key is pressed directly without pressing ENTER key in Step 5, the keyboard will return to parameter display P0.0.11, the modified data will not be saved and the acceleration time is still 010.0
8	50.00	Press MODE key again to return to monitoring setting frequency

Note: Do NOT change the data in the following cases.

1. Parameters which are unalterable while the Product is running. (Refer to function parameter table)

2. Parameter protection function is enabled in F0.1.00 (parameter writing protection).

4.4 Display Mode of Function Code

The Product provides 3 function code display modes: Basic mode, user mode and verification mode.

Basic mode (F0.1.01=0)

The prefix of function code is 'F' in basic mode. The display of function code parameter is decided by function code F0.1.24 Its ones unit, tens place, hundreds place and thousands place correspond to each function code group. The specific meaning is shown in table below:

Function Code	Set Range		Description
Select F0.1.24 as parameter display of function code	Ones unit	0	Display Group F0 and Group F1 only
		1	Display all menus
	Tens place	0	Not display Group P7
		1	Display Group F7
	Hundreds place	0	Not display correction group F4.1
		1	Display correction group F4.1

User mode (F0.1.01=1)

Display the customized function code parameter of user function only. The display of function code parameter of Product is decided by function code of Group 7.0, and 30 function code parameters can be customized maximally. The prefix of function code is 'U' in user mode.

Function Code		Set Range	Description
Select Group F7.0 for displaying function code parameter	F7.0.00	U0.1.01	The function code parameter being set is selected as the customized function code of user. 30 function codes can be selected maximally
	……	U0.0.00~UX.X.XX (except for Group F7, F8)	
	F7.0.29	U0.0.00~UX.X.XX (except for Group F7, F8)	

Verification mode (F0.1.01=2)

Display the modified parameters only (the parameter is modified when parameter value in function code is different from the factory default value). The prefix of function code is 'C' in verification mode.

Chapter 5 Function Parameter Table

Introduction to function parameter table:

1. The Product's function code parameters can be divided into 9 groups by function and each group contains multiple small groups. Each group includes several function codes which can be set as different values.

2. The characters occurred in the function table and other contents in the Manual, such as F×.×.××, means the No. "××" function code in Group "×.×" of function table. For example, "F0.0.01" means the No. 01 function code of Group F0.0.

3. The contents in columns of function table are as follows:

"Function code" in the 1st column: Number of function code parameter; "Name" in the 2nd column: Complete name of function code parameter; "Set range" in the 3rd column: The range for valid set range of function code parameter; "Factory default value" in the 4th column: The factory default value of function code parameter; "Change restriction" in the 5th column: Change property of function code parameter (whether changes and condition change are allowed); "Reference page" in the 6th column: The reference page of function code parameter.

Introduction to change restrictions of function code parameters:

"☆": The set value of this parameter can be modified when the Product is under shutdown and running status

"★": The set value of this parameter is unalterable when the Product is under running status

"●": The value of this parameter is actual detection value and not alterable

"○": Modification is allowed only if this parameters is F0.1.00=2

Note:

User should read the Manual carefully before modifying the Product's parameters. For any query about the special functions, please contact our Technology Department to enjoy the technical support services safely and reliably. Do NOT alter the data randomly; otherwise, major fault and property loss may occur. Whoever violates the warning shall bear all the consequences arising therefrom!

5.1 Group F0 of Inverter Information and Fault Information

Group F0.0: Basic Information of Inverter

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F0.0: Basic Information of Inverter				
F0.0.00	Control mode display	0: V/F control 1: Open-loop vector control	Read only	●
F0.0.01	Inverter model	00000~65000	Read only	●
F0.0.02	Inverter rated power	00000~6500.0KW	Read only	●
F0.0.03	Inverter rated voltage	0000~9999V	Read only	●
F0.0.04	Inverter rated current	000.00~6500.0A	Read only	●
F0.0.05	Software version No.	00000~650.00	Read only	●
F0.0.06	Program off-standard No.	0000~9999	0	●
F0.0.07	Accumulated running period	00000h~65000h	0	●
F0.0.08	Accumulated power-on period	00000h~65000h	0	●
F0.0.09	Accumulated power consumption	00000 KWH ~65000 KWH	0	●
F0.0.10	Module temperature	000°C~100°C	Read only	●
F0.0.11	Running period at fire hazard mode	0.0min~6500.0min	0	●

Group F0.1: Basic Setting of Inverter

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F0.1: Basic Setting of Inverter				
F0.1.00	Function code protection	0: Modifiable 1: Non-modifiable 2: Special function code allows modification	0	☆
F0.1.01	Display mode	0: Basic mode (prefix is 'F') 1: User mode (prefix is 'U') 2: Verification mode (prefix is 'C') (Modification is allowed only if F0.1.00=2)	0	○
F0.1.02	Shutdown function of keyboard STOP key	0: Valid in keyboard operation mode only 1: Valid in any mode	1	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
F0.1.03	Set function of keyboard JOG key	0: Invalid 1: Forward inching 2: Reverse inching 3: Forward/reverse switch 4: Switch of keyboard control channel 5: Reverse running	1	★
F0.1.04	Reserved			
F0.1.05	Carrier frequency	00.5kHz~16.0kHz	Model	☆
F0.1.06	Whether carrier frequency is adjusted along with temperature	0: No 1: Yes	1	☆
F0.1.07	Undervoltage point setting	60.0%~140.0%	100.0	☆
F0.1.08	Sensitivity of overvoltage stall protection	0~100 (braking resistance should be set as 0)	5	☆
F0.1.09	Voltage point of overvoltage stall protection	120%~150%	130	☆
F0.1.10	Braking utilization rate	000%~100%	100	☆
F0.1.11	Fan control	0: Rotation during running 1: Constant rotation 2: Controlled by temperature	0	★
F0.1.12	Sag control	00.00Hz~10.00Hz	0.00	☆
F0.1.13	Dead zone compensation switch	0: Disable 1: Enable	1	☆
F0.1.14	PWM modulation mode	Ones place 0: Asynchronous modulation 1: Synchronous modulation Tens place: Under VF control 0: 3-phase modulation and 2-phase modulation coexist 1: 3-phase modulation completely Hundreds place: 0: Low-frequency carrier has limitation 1: Low-frequency carrier has no limitation Thousands place: Under vector control 0: 3-phase modulation and 2-phase modulation coexist 1: 3-phase modulation completely	1000	☆
F0.1.15	Upper limit frequency of 2-phase modulation switch	00.00Hz~15.00Hz	12.00	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
F0.1.16	Random PWM depth	00: Random PWM is invalid 01~10: Random depth of PWM carrier	0	☆
F0.1.17	AVR function	0: Valid 1: Invalid	0	☆
F0.1.18	Running display parameter 1 of LED	H.0001~H.FFFF Bit00: Running frequency (Hz) Bit01: Given frequency (Hz) Bit02: Output current (A) Bit03: Output voltage (V) Bit04: Busbar voltage (V) Bit05: Output torque (%) Bit06: Output power (kW) Bit07: Input terminal status Bit08: Output terminal status Bit09: VF1 voltage (V) Bit10: VF2 voltage (V) Bit11: Customized display value Bit12: Actual counting Bit13: Actual length Bit14: Set PID Bit15: PID feedback	H.001F	☆
F0.1.19	Running display parameter 2 of LED	H.0000~H.FFFF Bit00: PULSE frequency (0.01kHz) Bit01: Feedback speed (Hz) Bit02: PLC stage Bit03: Voltage (V) before VF1 correction Bit04: Voltage (V) before VF2 correction Bit05: Linear velocity Bit06: Current power-on time (min) Bit07: Current running time (min) Bit08: Remaining running time (min) Bit09: Frequency (Hz) of frequency source A Bit10: Frequency (Hz) of frequency source B Bit11: Set value of communication (Hz) Bit12: PULSE frequency (Hz) Bit13: Encoder feedback speed (r/min) Bit14: Actual distance Bit15: User standby monitoring value 1	H.0000	☆
F0.1.20	Auto switch time of LED running display	000.0: No switch 000.1s~100.0s	0.0	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
	parameter			
F0.1.21	LED shutdown display parameter	H.0001~H.FFFF Bit00: Set frequency (Hz) Bit01: Busbar voltage (V) Bit02: Input terminal status Bit03: Output terminal status Bit04: VF1 voltage (V) Bit05: VF2 voltage (V) Bit06: Actual counting Bit07: Actual length Bit08: PLC stage Bit09: Customize display value Bit10: Set PID Bit11: PID feedback Bit12: PULSE frequency (Hz) Bit13: User standby monitoring value 1 Bit14: Reserved Bit15: Reserved	H.0033	☆
F0.1.22	Customized display coefficient	0.0001~6.5000	1.0000	☆
F0.1.23	Customized display of control word	Ones place: Customized display of decimal points 0: 0 decimal point 1: 1 decimal point 2: 2 decimal points 3: 3 decimal points Tens place: Customized display of value source 0: Decided by hundreds place of customized display control word 1: Decided by set value of F0.1.22, 0.0000~0.0099 corresponds to P9.0.00~P9.0.99 of Group P9 Hundreds place: Selection of customized display coefficient 0: Customized display coefficient is P5.0.15 1: Customized display coefficient is calculation result 1 2: Customized display coefficient is calculation result 2 3: Customized display coefficient is calculation result 3 4: Customized display coefficient is calculation result 4	1	☆
F0.1.24	Selection of display of function parameter group	Ones place: 0: Display Group F0 and F1 1: Display all menus Tens place:	11	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
		0: Not display Group F7 1: Display Group F7 Hundreds place: 0: Not display correction parameter group F4.1 1: Display correction parameter group F4.1 Thousands place: Reserved Ten thousands place: Reserved		
F0.1.25	Parameter initialization	00: No operation 01: Clear record information 09: Restore default parameter, excluding electric parameter and correction group 19: Restore default parameters, excluding electric parameters 30: Backup current parameters of user 60: Restore user backup parameters 100~999: Restore default parameter and macro of user	00	★
F0.1.26	User password	00000~65535	0	☆
F0.1.27	Inverter type	1: Type G (general type) 2: Type P (light type)	Model	○

Group F0.2: Fault Records of Inverter

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F0.2 Fault Records of Inverter				
F0.2.00	Fault record 1 (the latest)	0: No fault		●

Function Code	Name	Set Range	Factory Default Value	Change Restriction
		1: Constant speed overcurrent 2: Acceleration overcurrent 3: Deceleration overcurrent 4: Constant speed overvoltage 5: Acceleration overvoltage 6: Deceleration overvoltage 7: Module fault 8: Under-voltage 9: Inverter overload 10: Motor overload 11: Input missing phase 12: Output missing phase 13: External fault 14: Communication error 15: Inverter overheat 16: Inverter hardware error 17: Motor-to-ground short circuit 18: Motor identification error 19: Motor load loss 20: PID feedback loss 21: Customized fault 1 22: Customized fault 2 23: Power-on time reached 24: Running period reached 25: Encoder fault 26: Parameter read/write error 27: Motor overheat 28: Speed major deviation 29: Motor overspeed 30: Initial position error 31: Current detection fault 32: Contactor 33: Current detection error 34: Fast current limiting timeout 35: Motor switching during running 36: 24V power failure 37: Drive power failure 38: Output short circuit 39: Reserved 40: Buffer resistance error		
F0.2.01	Fault record 2			●
F0.2.02	Fault record 3			●
F0.2.03	Fault frequency 1			●

Function Code	Name	Set Range	Factory Default Value	Change Restriction
F0.2.04	Fault current 1			●
F0.2.05	Busbar voltage 1 at faulty condition			●
F0.2.06	Input terminal status 1 at fault condition			●
F0.2.07	Output terminal status 1 at fault condition			●
F0.2.08	Inverter status 1 at fault condition			●
F0.2.09	Power-on period 1 at fault condition			●
F0.2.10	Running period 1 at fault condition			●
F0.2.11	Fault frequency 2			●
F0.2.12	Fault current 2			●
F0.2.13	Busbar voltage 2 at fault condition			●
F0.2.14	Input terminal status 2 at fault condition			●
F0.2.15	Output terminal status 2 at fault condition			●
F0.2.16	Inverter status 2 at fault condition			●
F0.2.17	Power-on period 2 at fault condition			●
F0.2.18	Running period 2 at fault condition			●
F0.2.19	Fault frequency 3			●
F0.2.20	Fault current 3			●
F0.2.21	Busbar voltage 3 at fault condition			●
F0.2.22	Input terminal status 3 at fault condition			●
F0.2.23	Output terminal status 3 at fault condition			●
F0.2.24	Inverter status 3 at fault condition			●
F0.2.25	Power-on period 3 at fault condition			●
F0.2.26	Running period 3 at fault condition			●

5.2 Group F1 of Motor Control Basic Parameters

Group F1.0: Setting of Motor Control Basic Parameters

Function Code	Name	Set Range	Factory Default Value	Change Restriction

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F1.0: Setting of Motor Control Basic Parameters				
F1.0.00	Control mode	0: V/F control 1: Open loop vector control 2: Reserved 3: Intelligent selection as 0 or 1 (see F0.0.00 for the actual control mode)	3	★
F1.0.01	Enable reversal control	0: Enable 1: Disable	0	☆
F1.0.02	Select power-on operation	0: Running 1: Not running	0	☆
F1.0.03	Running direction	0: Default direction 1: Reverse direction 2: Decided by multi-function input terminal	0	☆
F1.0.04	Selection of motion control mode	0: Keyboard control 1: Terminal control 2: Communication control	0	☆
F1.0.05	Selection of frequency source A	0: Given by keyboard (no power-off memory) 1: Given by keyboard (power-off memory) 2: Given by keyboard potentiometer 3: Given by external terminal VF1 4: Given by external terminal VF2 5: Given by PULSE (DI6) 6: Given by multi-segment instruction terminal 7: Given by simplified PLC 8: Given by PID control 9: Given by communication 10: Operation result 1 11: Operation result 2 12: Operation result 3 13: Operation result 4	2	★

Function Code	Name	Set Range	Factory Default Value	Change Restriction
F1.0.06	Selection of frequency source B	0: Given by keyboard (no power-off memory) 1: Given by keyboard (power-off memory) 2: Given by keyboard potentiometer 3: Given by external terminal VF1 4: Given by external terminal VF2 5: Given by PULSE (DI6) 6: Given by multi-segment instruction terminal 7: Given by simplified PLC 8: Given by PID control 9: Given by communication 10: Operation result 1 11: Operation result 2 12: Operation result 3 13: Operation result 4	0	★
F1.0.07	Select frequency source	0: Frequency source A 1: Frequency source B 2: Frequency A+B 3: Frequency A-B 4: Max. value of A, B 5: Min. value of A, B 6: Standby frequency source 1 7: Standby frequency source 2 8: Terminals are switched in 8 types above	0	☆
F1.0.08	Select frequency source B	0: Relative to the max. frequency 1: Relative to frequency source A	0	☆
F1.0.09	Regulating variable of frequency source B during superposition	000%~150%	100	☆
F1.0.10	Offset of Frequency B during superposition	000.00Hz~Max. frequency	0.00	☆
F1.0.11	Max. frequency	050.00Hz~299.00Hz	50.00	★
F1.0.12	Given by keyboard frequency	000.00~ Max. frequency	50.00	☆
F1.0.13	Upper limit frequency source	0: Given by figure (F1.0.14) 1: Given by external terminal VF1 2: Given by external terminal VF2 3: Given by multi-segment instruction terminal 4: Given by PULSE (DI6) 5: Given by communication 6: Operation result 1 7: Operation result 2 8: Operation result 3 9: Operation result 4	0	★

Function Code	Name	Set Range	Factory Default Value	Change Restriction
F1.0.14	Upper limit frequency	Lower frequency - Max. frequency	50.00	★
F1.0.15	Offset of upper limit frequency	000.00~Max. frequency	0.00	☆
F1.0.16	Lower limit frequency	000.00~Upper limit frequency	0.00	☆
F1.0.17	Min. output frequency	000.00~Upper limit frequency	0.50	☆
F1.0.18	Running mode of min. output frequency	0: Running at the min. frequency 1: Stop 2: Zero speed running 3: Standby	3	☆
F1.0.19	Starting frequency	00.00Hz~10.00Hz	0.00	☆
F1.0.20	Starting frequency hold time	000.0s~100.0s	0.0	★
F1.0.21	Hopping frequency 1	000.00Hz~Max. frequency	0.00	☆
F1.0.22	Hopping frequency 2	000.00Hz~Max. frequency	0.00	☆
F1.0.23	Range of hopping frequency	000.00Hz~Max. frequency	0	☆
F1.0.24	Select power-off memory of frequency Given by keyboard	0: No memory 1: Memory	0	☆
F1.0.25	Action benchmark of frequency given by keyboard during running	0: Running efficiency 1: Given frequency	0	★
F1.0.26	Acceleration/deceleration mode	0: Straight line 1: S curve 1 2: S curve 2	0	★
F1.0.27	Reference frequency of acceleration/deceleration	0: Max. frequency 1: Given frequency 2: 100Hz	0	★
F1.0.28	Acceleration/deceleration unit	0: 1s 1: 0.1s 2: 0.01s	1	★
F1.0.29	Proportion of Curve S starting segment	000.0%~100.0%	30.0	★
F1.0.30	Proportion of Curve S ending segment	000.0%~100.0%	30.0	★
F1.0.31	Acceleration period	0000.0~6500.0s	Model	☆
F1.0.32	Deceleration period	0000.0~6500.0s	Model	☆
F1.0.33	Acceleration period 2	0000.0s~6500.0s	Model	☆
F1.0.34	Deceleration period 2	0000.0s~6500.0s	Model	☆
F1.0.35	Acceleration period 3	0000.0s~6500.0s	Model	☆
F1.0.36	Deceleration period 3	0000.0s~6500.0s	Model	☆
F1.0.37	Acceleration period 4	0000.0s~6500.0s	Model	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
F1.0.38	Deceleration period 4	0000.0s~6500.0s	Model	☆
F1.0.39	Switching frequency point between acceleration 1 and 2	F1.0.41~Max. frequency	0	☆
F1.0.40	Switching frequency point between deceleration 1 and 2	F1.0.42~Max. frequency	0	☆
F1.0.41	Switching frequency point between acceleration 2 and 3	F1.0.43~Max. frequency	0	☆
F1.0.42	Switching frequency point between deceleration 2 and 3	F1.0.44~Max. frequency	0	☆
F1.0.43	Switching frequency point between acceleration 3 and 4	000.00Hz~Max. frequency	0	☆
F1.0.44	Switching frequency point between deceleration 3 and 4	00.00Hz~Max. frequency	0	☆
F1.0.45	Inching priority	0: Invalid 1: Valid	0	☆
F1.0.46	Frequency of inching running	000.00~Max. frequency	2.00	☆
F1.0.47	Inching acceleration	0000.0s~6500.0s	20.0	☆
F1.0.48	Inching deceleration	0000.0s~6500.0s	20.0	☆
F1.0.49	Set swing frequency	0: Relative to the set frequency 1: Relative to the max. frequency	0	☆
F1.0.50	Swing frequency amplitude	000.0%~100.0%	0.0	☆
F1.0.51	Jump amplitude	00.0%~50.0%	0.0	☆
F1.0.52	Swing frequency period	0000.1s~3000.0s	10.0	☆
F1.0.53	Rise time of swing frequency triangle wave	000.1%~100.0%	50.0	☆

Group F1.1: Motor Parameter Setting

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F1.1: Motor Parameter Setting				
F1.1.00	Motor type	0: Common motor 1: Variable frequency motor	0	★
F1.1.01	Motor rated power	0000.1kW~1000.0kW	Model	★
F1.1.02	Motor rated frequency	000.01Hz~Max. frequency	50.00	★
F1.1.03	Motor rated voltage	0001V~2000V	Model	★
F1.1.04	Motor rated current	000.01A~655.35A (inverter power	Model	★

Function Code	Name	Set Range	Factory Default Value	Change Restriction
		< 75kW) 0000.1A~6553.5A (inverter power ≥75kW)		
F1.1.05	Motor rated speed	00001rpm~65535rpm	Model	★
F1.1.06	Motor overload protection level	00.20~10.00	1.00	☆
F1.1.07	Parameter identification control	00: No action 01: Static identification 02: Complete identification	00	★
F1.1.08	Tuning KP coefficient	1~200	100	☆
F1.1.09	Tuning KIT coefficient	1~200	100	☆
F1.1.10	Stator resistor of asynchronous motor	00.001 ~65.535 (inverter power<75kW) 0.0001 ~6.5535 (inverter power ≥75kW)	Model	★
F1.1.11	Rotor resistor of asynchronous motor	00.001 ~65.535 (inverter power<75kW) 0.0001 ~6.5535 (inverter power≥75kW)	Model	★
F1.1.12	Leakage inductance of asynchronous motor	000.01mH~655.35mH (inverter power<75kW) 00.001mH~65.535mH (inverter power≥75kW)	Model	★
F1.1.13	Mutual inductance of asynchronous motor	0000.1mH~6553.5mH (inverter power<75kW)	Model	★
		000.01mH~655.35mH (inverter power≥75kW)		
F1.1.14	No-load current of asynchronous motor	000.01A~Motor rated current (inverter power<75kW) 0000.1A~Motor rated current (inverter power≥75kW)	Model	★

Group F1.2: VF control of Asynchronous Machine

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F1.2: VF Control of Asynchronous Machine				
F1.2.00	V/F curve mode	0: Straight line 1: Multi-point broken line 2: Square V/F curve 1 3: Square V/F curve 2 4: Square V/F curve 3	0	★
F1.2.01	Frequency of broken line V/F point 1	000.00Hz~F1.2.03	0.00	★
F1.2.02	Voltage of broken line V/F point 1	000.0%~100.0%	0.0	★
F1.2.03	Frequency of broken line	F1.2.01~F1.2.05	0.00	★

	V/F point 2			
F1.2.04	Voltage of broken line V/F point 2	000.0%~100.0%	0.0	★
F1.2.05	Frequency of broken line V/F point 3	F1.2.03~Motor rated frequency	0.00	★
F1.2.06	Voltage of broken line V/F point 3	000.0%~100.0%	0.0	★
F1.2.07	Torque boost	00.0% (auto torque boost) 00.1%~30.0%	Model	☆
F1.2.08	Cut-off frequency of torque boost	000.00Hz~Max. frequency	50.00	
F1.2.09	VF online torque compensation gain	0~200	150	★
F1.2.10	V/F over-excitation gain	000~200 (set as 0 when connecting braking resistor)	120	☆
F1.2.11	V/F slip compensation gain	000.0%~200.0%	0	☆
F1.2.12	VF slip compensation response time	0~10.0s	0.5	★
F1.2.13	VF oscillation suppression mode	1~4	1	★
F1.2.14	VF oscillation suppression	0~100	Model	☆
F1.2.15	Sensitivity of overcurrent stall protection	0~100	20	☆
F1.2.16	Overcurrent stall protection current	100%~200%	150	☆

Group F1.3: Basic Parameters of Vector Control

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F1.3 Basic Parameters of Vector Control				
F1.3.00	Velocity ring proportional gain 1	001~100	30	☆
F1.3.01	Velocity ring integral time 1	00.01~10.00	0.50	☆
F1.3.02	Switch frequency 1	000.00Hz~F1.3.05	5.00	☆
F1.3.03	Velocity ring proportional gain 2	001~100	20	☆
F1.3.04	Velocity ring integral time 2	00.01~10.00	1.00	☆
F1.3.05	Switch frequency 2	F1.3.02~Max. frequency	10.00	☆
F1.3.06	Velocity ring integral attribute	0: Invalid 1: Valid	0	☆
F1.3.07	Upper limit source of vector control torque	0: Given by figure (F1.3.08) 1: Given by external terminal VF1 2: Given by external terminal VF2 3: Given by multi-segment instruction terminal 4: Given by PULSE (DI6)	0	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
		5: Given by communication 6: MIN(VF1, VF2) 7: MAX(VF1, VF2) 8: Operation result 3 9: Operation result 4 10: Standby torque source 1 11: Standby torque source 2		
F1.3.08	Set upper limit of torque	000.0%~200.0%	150.0	☆
F1.3.09	Vector control slip gain	50%~200%	100	☆
F1.3.10	Excitation regulation ratio KP	00000~60000	2000	☆
F1.3.11	Excitation regulation integral KI	00000~60000	1300	☆
F1.3.12	Torque regulation ratio KP	00000~60000	2000	☆
F1.3.13	Torque regulation integral KI	00000~60000	1300	☆

5.4 Group F2 of Motor Control Parameter and Fault Protection

Group F2.0: Open Loop Vector of Asynchronous Machine SVC

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F2.0 Open Loop Vector of Asynchronous Machine SVC				
F2.0.00	Magnetic flux closed-loop bandwidth	0~5.00HZ	2.00	☆
F2.0.01	Reserved	0~1	0	★
F2.0.02	Reserved	0~1000	200	★
F2.0.03	Set value of min. magnetic flux	30~100	30	★
F2.0.04	Voltage margin	0~100	5	★
F2.0.05	Weak magnetic coefficient	50~100	80	★
F2.0.06	Velocity filtering	0~100ms	15	☆
F2.0.07	Over-modulation coefficient	100%~120%	105	☆
F2.0.08	Torque switch	0.0~50.0	20.0	★
F2.0.09	Response mode	0~2	1	★
F2.0.10	Max. output current of inverter	100.0~200.0	180.0	☆

Group F2.1: Torque Control

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F2.1 Torque Control				
F2.1.00	Select speed/torque control mode	0: Speed control 1: Torque control	0	★
F2.1.01	Set source of torque	0: Given by figure (F2.1.02) 1: Given by external terminal VF1 2: Given by external terminal VF2 3: Given by multi-segment instruction terminal 4: Given by PULSE (DI6) 5: Given by communication 6: MIN (VF1, VF2) 7: MAX (VF1, VF2) 8: Operation result 1 9: Operation result 2 10: Operation result 3 11: Operation result 4 12: Standby torque source 1 13: Standby torque source 2	0	★
F2.1.02	Set torque figure	-200.0%~200.0%	150.0	☆
F2.1.03	Forward frequency limit of torque control	000.00Hz~Max. frequency	50.00	☆
F2.1.04	Backward frequency limit of torque control	000.00Hz~Max. frequency	50.00	☆
F2.1.05	Torque acceleration	0000.0s~6500.0s	0.0	☆
F2.1.06	Torque deceleration	0000.0s~6500.0s	0.0	☆

Group F2.2: Motor Start/stop Control

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F2.2 Motor Start/stop Control				
F2.2.00	Starting mode	0: Direct startup 1: Speed tracking startup 2: Braking restart	0	☆
F2.2.01	Forward/reverse dead time	0000.0s~3000.0s	0	☆
F2.2.02	Speed tracking mode	0: Startup from shutdown frequency 1: Startup from 50 HZ 2: Startup from the max. frequency 3: Field orientation (parameters must be identified)	2	★
F2.2.03	Tracking speed	1~100	20	★
F2.2.04	Speed tracking current	0%~200%	Model	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
F2.2.05	Speed tracking KP	0~1000	500	★
F2.2.06	Speed tracking KI	0~1000	800	★
F2.2.07	Speed tracking demagnetization time	0.00s~10.00s	Model	☆
F2.2.08	Speed tracking min. frequency	000.00Hz~10.00Hz	1.50	☆
F2.2.09	DC braking current at startup	000%~100%	0	★
F2.2.10	DC braking time at startup	000.0s~100.0s	0.0	★
F2.2.11	Shutdown mode	0: Deceleration shutdown 1: Free stop	0	☆
F2.2.12	Starting frequency of DC braking at shutdown	000.00Hz~Max. frequency	0.00	☆
F2.2.13	Waiting time of DC braking at shutdown	000.0s~100.0s	0.0	☆
F2.2.14	DC braking current at shutdown	000%~100%	0	☆
F2.2.15	DC braking time at shutdown	000.0s~100.0s	0.0	☆

Group F2.3: Fault and Protection Setting

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F2.3 Fault and Protection Setting				
F2.3.00	Auto reset times of fault	0~20	0	☆
F2.3.01	Waiting interval of fault auto reset	0.1s~100.0s	1.0	☆
F2.3.02	Action selection of fault output terminal during auto reset period of fault	0: No action 1: Action	0	☆
F2.3.03	Selection 1 of fault protection action	0: Free shutdown 1: Stop by shutdown mode 2: Continue operation Ones place: Motor overload Tens place: Input missing phase Hundreds place: Output missing phase Thousands place: External fault Ten thousands place: Communication error	00000	☆
F2.3.04	Selection 2 of fault protection action	0: Free shutdown 1: Stop by shutdown mode 2: Continue operation Ones place: Motor load loss	00000	★

Function Code	Name	Set Range	Factory Default Value	Change Restriction
		Tens place: Feedback loss Hundreds place: Customized fault 1 Thousands place: Customized fault 2 Ten thousands place: Power-on time reached		
F2.3.05	Selection 3 of fault protection action	Ones place: Running period reached 0: Free shutdown 1: Stop by shutdown mode 2: Continue operation Tens place: Encoder error 0: Free shutdown Hundreds place: Parameter read/write error 0: Free shutdown 1: Stop by shutdown mode Thousands place: Motor overheat 0: Free shutdown 1: Stop by shutdown mode 2: Continue operation Ten thousands place: 24V power supply has fault 0: Free shutdown 1: Stop by shutdown mode	00000	☆
F2.3.06	Selection 4 of fault protection action	0: Free shutdown 1: Stop by shutdown mode 2: Continue operation Ones place: Speed major deviation Tens place: Motor overspeed Hundreds place: Initial position error Thousands place: Reserved Ten thousands place: Reserved	00000	☆
F2.3.07	Selection of continued running frequency at faulty condition	0: Run at current running frequency 1: Run at set frequency 2: Run at upper limit frequency 3: Run at lower limit frequency 4: Run at abnormal backup frequency	0	☆
F2.3.08	Standby frequency in case of error	000.0%~100.0%	100.0	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
F2.3.09	Missing phase protection of input	0: Disable 1: Enable	1	☆
F2.3.10	Sensitivity of input missing phase protection	01~10 (lower value, higher sensitivity)	05	☆
F2.3.11	Missing phase protection of output	0: Disable 1: Enable	1	☆
F2.3.12	Enable quick current limiting	0: Disable 1: Enable	1	☆
F2.3.13	Enable interphase short-circuit detection	0: Disable 1: Enable	1	
F2.3.14	Protection function of power-on short-circuit to ground	0: Disable 1: Enable	1	☆
F2.3.15	Motor overload protection	0: Disable 1: Curve 1 2: Curve 2 3: Curve 3	1	☆
F2.3.16	Coefficient of motor overload warning	050%~100%	80	☆
F2.3.17	Selection of load-drop protection	0: Invalid 1: Valid	0	☆
F2.3.18	Load-drop detection level	000.0%~100.0%	10.0	☆
F2.3.19	Load-drop detection period	00.0s~60.0s	1.0	☆
F2.3.20	Overspeed detection	00.0%~50.0%	20.0	☆
F2.3.21	Overspeed detection period	00.0: No detection 00.1s~60.0s	1.0	☆
F2.3.22	Detection of major speed deviation	00.0%~50.0%	20.0	☆
F2.3.23	Detection period of major speed deviation	00.0: No detection 00.1s~60.0s	5.0	☆
F2.3.24	Selection of instantaneous blackout action	0: Invalid	0	☆
		1: Deceleration 2: Deceleration shutdown		
F2.3.25	Judgment period of instantaneous blackout voltage rise	000.00s~100.00s	0.50	☆
F2.3.26	Judgment voltage of instantaneous blackout action	60.0%~100.0% (standard busbar voltage)	80.0	☆
F2.3.27	Judgment voltage of instantaneous action pausing	80.0%~100.0% (standard busbar voltage)	90.0	☆
F2.3.28	Selection of fire hazard mode	0: Fire hazard mode 0 1: Fire hazard mode 1 2: Fire hazard mode 2	0	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
F2.3.29	Running frequency of fire hazard	000.01Hz~Max. frequency	50.00	☆

5.4 Group F3 of External Terminal

Group F3.0: External Input Terminal DI

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F3.0 External Input Terminal DI				
F3.0.00	Running control mode of external terminal	0: Two-line type 1 1: Two-line type 2 2: Three-line type 1 3: Three-line type 2	0	★
F3.0.01	Terminal DI1 function	0: No function 1: Forward rotation (FWD) 2: Reverse rotation (REV) 3: Three-line running control 4: Forward inching 5: Reverse inching 6: Terminal UP 7: Terminal DOWN 8: Free stop 9: Multi-segment instruction terminal 1 10: Multi-segment instruction terminal 2 11: Multi-segment instruction terminal 3 12: Multi-segment instruction terminal 4 13: Fault reset (RESET) 14: Pause running 15: External fault input 16: Acceleration/deceleration selection terminal 1 17: Acceleration/deceleration selection terminal 2 18: Frequency source selection terminal 1 19: Frequency source selection terminal 2 20: Frequency source selection terminal 3 21: Running command selection terminal 1 22: Running command selection terminal 2 23: Clear UP/DOWN set value 24: Disable	1	△/★
F3.0.02	Terminal DI2 function		2	★
F3.0.03	Terminal DI3 function		9	★
F3.0.04	Terminal DI4 function		10	★
F3.0.05	Terminal DI5 function		11	★
F3.0.06	Terminal DI6 function		8	★
F3.0.07	Reserved		——	——
F3.0.08	Reserved		——	——
F3.0.09	Reserved		——	——
F3.0.10	Reserved		——	——

Function Code	Name	Set Range	Factory Default Value	Change Restriction
		acceleration/deceleration 25: PID pause 26: PLC status reset 27: Swing frequency pause 28: Counter input 29: Counter reset 30: Length counting input 31: Length reset 32: Disable torque control 33: PULSE input 34: Immediate DC braking 35: External fault normally-off input 36: Enable frequency modification 37: Reversal of PID function direction 38: External parking terminal 1 39: External parking terminal 2 40: Pause PID integral 41: Switch PID parameters 42: Switch speed control/torque control 43: Emergency stop 44: Deceleration DC braking 45: Customized fault 1 46: Customized fault 2 47: Clear running time 48: Timer input terminal 1 49: Timer input terminal 2 50: Timer clear terminal 1 51: Timer clear terminal 2 52: Encoder Phase A input 53: Encoder Phase B input 54: Distance reset 55: Clear integral counting 56: User function 1 57: User function 2 58: User function 3 59: User function 4 60: Disable rotation speed tracking startup 61: Fire hazard function		
F3.0.11	DI filtering time	0.000s~1.000s	0.010	☆
F3.0.12	Terminal change rate of UP/DOWN	00.001Hz/s~65.535Hz/s	1.000	☆
F3.0.13	Min. input of PULS	0.00kHz~ F3.0.15	0.00	☆
F3.0.14	Corresponding set value of PULS min. input	-100.0%~100.0%	0.0	☆
F3.0.15	Max. input of PULS	F3.0.13~100.00kHz	50.00	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
F3.0.16	Corresponding set value of PULS max. input	-100.0%~100.0%	100.0	☆
F3.0.17	PULS filtering time	00.00s~10.00s	0.10	☆
F3.0.18	Function of Terminal VF1 as digital input	00: Used as normal analogue quantity 01~59: Function of digital input terminal	00	★
F3.0.19	Function of Terminal VF2 as digital input	00: Used as normal analog quantity 01~59: Function of digital input terminal	0	★
F3.0.20	Select valid status of VF	0: High level valid 1: Low level valid Ones place: VF1 Tens place: VF2	0	★
F3.0.21	DI1 valid delay	0.0s~3600.0s	0.0	△/☆
F3.0.22	DI2 valid delay	0.0s~3600.0s	0.0	☆
F3.0.23	DI3 valid delay	0.0s~3600.0s	0.0	☆
F3.0.24	DI1 invalid delay	0.0s~3600.0s	0.0	△/☆
F3.0.25	DI2 invalid delay	0.0s~3600.0s	0.0	☆
F3.0.26	DI3 invalid delay	0.0s~3600.0s	0.0	☆
F3.0.27	DI terminal valid mode selection 1	0: High level valid 1: Low level valid Ones unit: DI1 Tens place: DI2 Hundreds place: DI3 Thousands place: DI4 Ten thousands place: DI5	0	★
F3.0.28	DI terminal valid mode selection 2	0: High level valid 1: Low level valid Ones unit: DI6 Tens place: Reserved Hundreds place: Reserved Thousands place: Reserved Ten thousands place: Reserved	0	★

Group F3.1: External Output Terminal DO

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F3.1: External Output Terminal DO				
F3.1.00	Select function of	0: No function	0	▲/☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
	expansion card Y01	1: Inverter running in progress 2: Fault shutdown output 3: Frequency level detection FDT1 output 4: Frequency reached 5: Zero-speed running in progress (no output after shutdown) 6: Motor overload pre-alarm 7: Inverter overload pre-alarm 8: Set counting reached 9: Designated counting reached 10: Length reached 11: PLC circle completed 12: Accumulated running period reached 13: Frequency restricted in progress 14: Torque restricted in progress 15: Running readiness 16: VF1>VF2 17: Upper limit frequency reached 18: Lower limit frequency reached (no output after shutdown) 19: Under-voltage status output 20: Set communication 21: VF1 input below lower limit 22: VF1 input above lower limit 23: Zero-speed running in progress 2 (output after shutdown) 24: Accumulated power-on period reached 25: Frequency level detection FDT2 output 26: Output of Frequency 1 arrival 27: Output of Frequency 2 arrival 28: Output of Current 1 reached 29: Output of Current 2 reached 30: Output of timing reached 31: VF1 input out of limit 32: Load drop in progress 33: Reverse running in progress 34: Zero current status 35: Module temperature reached 36: Output current out of limit 37: Lower limit frequency reached (output after shutdown) 38: Alarm output 39: PLC stage completed 40: Current running time reached 41: Fault output (no output of under-voltage)		
F3.1.01	Select T1 relay function		1	☆
F3.1.02	Select function of relay of expansion card T2/expansion card Y3		2	△/☆
F3.1.03	Select function of expansion card Y02		0	▲/☆
F3.1.04	Select YO function (Terminal YO/FMP is used as YO, i.e. F3.1.08=1)		0	△/☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
		42: Timing of Timer 1 reached 43: Timing of Timer 2 reached 44: Timing of Timer 1 reached 45: Fire hazard mode 46: Reserved 47: Reserved 48: Reserved 49: Reserved 50: Synchronize intermediate relay M1 51: Synchronize intermediate relay M2 52: Synchronize intermediate relay M3 53: Synchronize intermediate relay M4 54: Synchronize intermediate relay M5 55: Distance above zero 56: Distance set value 1 reached 57: Distance set value 2 reached 58: Operation result 2 above 0 59: Operation result 4 above 0		
F3.1.05	YO delay	0.0s~3600.0s	0	☆
F3.1.06	T1 delay	0.0s~3600.0s	0.0	☆
F3.1.07	T2/Y3 delay	0.0s~3600.0s	0.0	☆
F3.1.08	Function of Terminal YO/FMP	0: Pulse output (FMP) 1: Output of open collector (YO)	1	☆
F3.1.09	Max. frequency of FMP output	000.01KHz~100.00KHz	50	☆
F3.1.10	Valid status of multi-function output terminal	0: Positive logic 1: Reverse logic Ones place:YO Tens place: T1 Hundreds place: T2/Y3 Thousands place: Reserved Ten thousands place: Reserved	0	☆

F3.2: External Input Terminal AI

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F3.2 External Input Terminal AI				
F3.2.00	Min. input of Curve 1	00.00V~F3.2.02	0.00	☆
F3.2.01	Corresponding set value of Curve 1 min. input	-100.0%~100.0%	0.0	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
F3.2.02	Max. input of Curve 1	F3.2.00~10.00V	10.00	☆
F3.2.03	Corresponding set value of Curve 1 max. input	-100.0%~100.0%	100.0	☆
F3.2.04	VF1 filtering time	00.00s~10.00s	0.10	☆
F3.2.05	Min. input of Curve 2	00.00V~F3.2.07	0.00	☆
F3.2.06	Corresponding set value of Curve 2 min. input	-100.0%~100.0%	0.0	☆
F3.2.07	Max. input of Curve 2	F3.2.05~10.00V	10.00	☆
F3.2.08	Corresponding set value of Curve 2 max. input	-100.0%~100.0%	100.0	☆
F3.2.09	VF2 filtering time	0.00s~10.00s	0.1	☆
F3.2.10	Select analog input curve	Ones unit: Curve selected by VF1 Tens place: Curve selected by VF2 1: Curve 1 2: Curve 2 3: Curve 3 4: Curve 4 Hundreds place: VF1 input resolution Thousands place: VF2 input resolution Ten thousands place: Input resolution of keyboard potentiometer 0:00.01Hz 1:00.02Hz 2:00.05Hz 3:00.10Hz 4:00.20Hz 5:00.50Hz 6:01.00Hz (keyboard potentiometer is invalid)	22221	☆
F3.2.11	Curve is below the min. Set value	0: Corresponding set value of min. input 1: 0.0% Ones place: VF1 Tens place: VF2	H.00	☆
F3.2.12	Curve 3 min. input	00.00V~F3.2.14	0.00	☆
F3.2.13	Corresponding set value of Curve 3 min. input	-100.0%~100.0%	0.0	☆
F3.2.14	Input of Curve 3 deflection point 1	F3.2.12~F3.2.16	3.00	☆
F3.2.15	Corresponding set value of input of Curve 3 deflection point 1	-100.0%~100.0%	30.0	☆
F3.2.16	Input of Curve 3 deflection point 2	F3.2.14~F3.2.18	6.00	☆
F3.2.17	Corresponding set value of input of Curve 3 deflection point 2	-100.0%~100.0%	60.0	☆
F3.2.18	Max. input of Curve 3	F3.2.16~10.00V	10.00	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
F3.2.19	Corresponding set value of Curve 3 max. input	-100.0%~100.0%	100.0	☆
F3.2.20	Min. input of Curve 4	00.00V~F3.2.22	0.00	☆
F3.2.21	Corresponding set value of Curve 4 min. input	-100.0%~100.0%	-100.0	☆
F3.2.22	Input of Curve 4 deflection point 1	F3.2.20~F3.2.24	3.00	☆
F3.2.23	Corresponding set value of input of Curve 4 deflection point 1	-100.0%~100.0%	-30.0	☆
F3.2.24	Input of Curve 4 deflection point 2	F3.2.22~F3.2.26	6.00	☆
F3.2.25	Corresponding set value of input of Curve 4 deflection point 2	-100.0%~100.0%	30.0	☆
F3.2.26	Max. input of Curve 4	F3.2.24~10.00V	10.00	☆
F3.2.27	Corresponding set value of Curve 4 max. input	-100.0%~100.0%	100.0	☆

Group F3.3: External Output Terminal AO

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F3.3 External Output Terminal AO				
F3.3.00	Set analog output FM1	0: Running frequency 1: Given frequency 2: Output current 3: Output torque (torque absolute value) 4: Output power 5: Output voltage 6: PULSE input 7: VF1 voltage 8: VF2 voltage 9: Voltage of keyboard potentiometer 10: Actual length 11: Actual counting 12: Given by communication 13: Motor speed 14: Output current 15: Busbar voltage 16: Output torque 17: Operation result 1	0	☆
F3.3.01	Reserved		1	△/☆
F3.3.02	Reserved		0	△/☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
		18: Operation result 2 19: Operation result 3 20: Operation result 4		
F3.3.03	Analog FM1 output offset	-100.0%~100.0%	0.0	☆
F3.3.04	Analog FM1 output gain	-10.00~10.00	1.00	☆
F3.3.05	Analog FM2 output offset	-100.0%~100.0%	0	☆
F3.3.06	Analog FM2 output gain	-10.00~10.00	1.00	☆

5.5 Group F4 of Auxiliary Function and AIAO Curve Correction

Group F4.0: Auxiliary Function

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F4.0 Auxiliary Function				
F4.0.00	Accumulative power-on reaches set time	00000h~65000h	0	☆
F4.0.01	Accumulative running reaches set time	00000h~65000h	0	☆
F4.0.02	Set frequency reaches detection width	000.0%~100.0%	0	☆
F4.0.03	Frequency detection FDT1	000.00Hz~Max. frequency	50	☆
F4.0.04	FDT1 lag value	000.0%~100.0%	5	☆
F4.0.05	Frequency detection FDT2	000.00Hz~Max. frequency	50	☆
F4.0.06	FDT2 lag value	000.0%~100.0%	5	☆
F4.0.07	Randomly reached frequency detection value 1	000.00Hz~Max. frequency	50	☆
F4.0.08	Detection width of randomly reached frequency 1	000.0%~100.0%	0	☆
F4.0.09	Randomly reached frequency detection value 2	000.00Hz~Max. frequency	50	☆
F4.0.10	Detection width of randomly reached frequency 2	000.0%~100.0%	0	☆
F4.0.11	Detection level of zero current	000.0%~300.0% (100.0% corresponds to motor rated current)	5	☆
F4.0.12	Detection delay of zero	000.01s~600.00s	0.1	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
	current			
F4.0.13	Output current overrun	000.0%: No detection 000.1%~300.0%	200	☆
F4.0.14	Detection delay of current overrun	000.00s~600.00s	0	☆
F4.0.15	Current level detection 1	000.0%~300.0%	100	☆
F4.0.16	Detection width of current level 1	000.0%~300.0%	0	☆
F4.0.17	Current level detection 2	000.0%~300.0%	100	☆
F4.0.18	Detection width of current level 2	000.0%~300.0%	0	☆
F4.0.19	Lower limit of VF1 input	00.00V~F4.0.20	3.1	☆
F4.0.20	Upper limit of VF1 input	F4.0.19~11.00V	6.8	☆
F4.0.21	Module temperature reaches set value	000°C~100°C	75	☆
F4.0.22	Current running reaches set time	0000.0min~6500.0min	0	★
F4.0.23	Selection of timing function	0: Invalid 1: Valid (min) 2: Valid (hour)	0	★
F4.0.24	Selection of timing running period	0: Set figure (F4.0.25) 1: Given by external terminal VF1 2: Given by external terminal VF2 (Corresponding F4.0.25 of analog input range)	0	★
F4.0.25	Timing running period	0000.0min/h~6500.0min/h (unit depends on F4.0.23)	0	★
F4.0.26	Set length	00000m~65535m	1000	☆
F4.0.27	Actual length	00000m~65535m	0	☆
F4.0.28	Pulses per meter	0000.1~6553.5	100	☆
F4.0.29	Set counting	00001~65535	1000	☆
F4.0.30	Designated counting	00001~65535	1000	☆
F4.0.31	Set distance 1	-3200.0~3200.0	0	☆
F4.0.32	Set distance 2	-3200.0~3200.0	0	☆
F4.0.33	Pulses per distance	000.00~600.00	0	☆

Group F4.1: AIAO Curve Correction

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F4.1 AIAO Curve Correction Group				
F4.1.00	Voltage input of potentiometer correction	00.00V~F4.1.02	0.00	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
	point 1			
F4.1.01	Corresponding set value of potentiometer correction point 1	-100.0%~100.0%	0.0	☆
F4.1.02	Voltage input of potentiometer correction point 2	F4.1.00~10.00V	10.0	☆
F4.1.03	Corresponding set value of potentiometer correction point 2	-100.0%~100.0%	100.0	☆
F4.1.04	Potentiometer filtering time	00.00s~10.00s	0.1	☆
F4.1.05	VF1 measured voltage 1	0.500V~4.000V	2.000	☆
F4.1.06	VF1 display voltage 1	0.500V~4.000V	2.000	☆
F4.1.07	VF1 measured voltage 2	6.000V~9.999V	8.000	☆
F4.1.08	VF1 display voltage 2	6.000V~9.999V	8.000	☆
F4.1.09	VF2 measured voltage 1	0.500V~4.000V	2.000	☆
F4.1.10	VF2 display voltage 1	0.500V~4.000V	2.000	☆
F4.1.11	VF2 measured voltage 2	6.000V~9.999V	8.000	☆
F4.1.12	VF2 display voltage 2	6.000V~9.999V	8.000	☆
F4.1.13	FM1 target voltage 1	0.500V~4.000V	2.000	☆
F4.1.14	FM1 measured voltage 1	0.500V~4.000V	2.000	☆
F4.1.15	FM1 target voltage 2	6.000V~9.999V	8.000	☆
F4.1.16	FM1 measured voltage 2	6.000V~9.999V	8.000	☆
F4.1.17	FM2 target voltage 1	0.500V~4.000V	2.000	△/☆
F4.1.18	FM2 measured voltage 1	0.500V~4.000V	2.000	△/☆
F4.1.19	FM2 target voltage 2	6.000V~9.999V	8.000	△/☆
F4.1.20	FM2 measured voltage 2	6.000V~9.999V	8.000	△/☆

5.6 Group F5 of Simplified PLC and Virtual Relay

F5.0: Multi-speed and Simplified PLC

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F5.0 Multi-speed and Simplified PLC				
F5.0.00	Running mode of simplified PLC	0: Shutdown after finishing single running 1: Maintain final value after finishing single running	0	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
		2: Continuous cycle 3: Cycle for N times		
F5.0.01	Cycle number N	00000~65000	0	☆
F5.0.02	Selection of PLC power-off memory	Ones place: Selection of power-off memory 0: Power-off no memory 1: Power-off memory Tens place: Selection of non-fault shutdown memory 0: Non-fault shutdown no memory 1: Non-fault shutdown memory Hundreds place: Selection of fault shutdown memory 0: Fault shutdown no memory 1: Fault shutdown memory	0	☆
F5.0.03	Stage instruction 0	-100.0%~100.0%	0	☆
F5.0.04	Stage 0 running period	0000.0s~6500.0s	0	☆
F5.0.05	Stage instruction 1	-100.0%~100.0%	0	☆
F5.0.06	Stage 1 running period	0000.0s~6500.0s	0	☆
F5.0.07	Stage instruction 2	-100.0%~100.0%	0	☆
F5.0.08	Stage 2 running period	0000.0s~6500.0s	0	☆
F5.0.09	Stage instruction 3	-100.0%~100.0%	0	☆
F5.0.10	Stage 3 running period	0000.0s~6500.0s	0	☆
F5.0.11	Stage instruction 4	-100.0%~100.0%	0	☆
F5.0.12	Stage 4 running period	0000.0s~6500.0s	0	☆
F5.0.13	Stage instruction 5	-100.0%~100.0%	0	☆
F5.0.14	Stage 5 running period	0000.0s~6500.0s	0	☆
F5.0.15	Stage instruction 6	-100.0%~100.0%	0	☆
F5.0.16	Stage 6 running period	0000.0s~6500.0s	0	☆
F5.0.17	Stage instruction 7	-100.0%~100.0%	0	☆
F5.0.18	Stage 7 running period	0000.0s~6500.0s	0	☆
F5.0.19	Stage instruction 8	-100.0%~100.0%	0	☆
F5.0.20	Stage 8 running period	0000.0s~6500.0s	0	☆
F5.0.21	Stage instruction 9	-100.0%~100.0%	0	☆
F5.0.22	Stage 9 running period	0000.0s~6500.0s	0	☆
F5.0.23	Stage instruction 10	-100.0%~100.0%	0	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
F5.0.24	Stage 10 running period	0000.0s~6500.0s	0	☆
F5.0.25	Stage instruction 11	-100.0%~100.0%	0	☆
F5.0.26	Stage 11 running period	0000.0s~6500.0s	0	☆
F5.0.27	Stage instruction 12	-100.0%~100.0%	0	☆
F5.0.28	Stage 12 running period	0000.0s~6500.0s	0	☆
F5.0.29	Stage instruction 13	-100.0%~100.0%	0	☆
F5.0.30	Stage 13 running period	0000.0s~6500.0s	0	☆
F5.0.31	Stage instruction 14	-100.0%~100.0%	0	☆
F5.0.32	Stage 14 running period	0000.0s~6500.0s	0	☆
F5.0.33	Stage instruction 15	-100.0%~100.0%	0	☆
F5.0.34	Stage 15 running period	0000.0s~6500.0s	0	☆
F5.0.35	Stage 0 attribute	Ones place: Selection of acceleration/deceleration (multi-segment instruction is invalid) 0: Acceleration/deceleration 1 1: Acceleration/deceleration 2 2: Acceleration/deceleration 3 3: Acceleration/deceleration 4 Tens place: Selection of frequency source (multi-segment instruction is valid) 0: Current stage instruction 1: Keyboard potentiometer 2: Set keyboard frequency 3: VF1 input 4: VF2 input 5: Set PULSE (DI6) 6: Set PID 7: Operation result 1 8: Operation result 2 9: Operation result 3 A: Operation result 4 Hundreds place: Running direction 0: Default direction 1: Reverse direction	H.000	☆
F5.0.36	Stage 1 attribute		H.000	☆
F5.0.37	Stage 2 attribute		H.000	☆
F5.0.38	Stage 3 attribute		H.000	☆
F5.0.39	Stage 4 attribute		H.000	☆
F5.0.40	Stage 5 attribute		H.000	☆
F5.0.41	Stage 6 attribute		H.000	☆
F5.0.42	Stage 7 attribute		H.000	☆
F5.0.43	Stage 8 attribute		H.000	☆
F5.0.44	Stage 9 attribute		H.000	☆
F5.0.45	Stage 10 attribute		H.000	☆
F5.0.46	Stage 11 attribute		H.000	☆
F5.0.47	Stage 12 attribute		H.000	☆
F5.0.48	Stage 13 attribute		H.000	☆
F5.0.49	Stage 14 attribute		H.000	☆
F5.0.50	Stage 15 attribute		H.000	☆
F5.0.51	Unit of simplified PLC running period	0: Second 1: Hour 2: Minute	0	☆

Group F5.1: Virtual Relay and Built-in Logic

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F5.1 Virtual Relay and Built-in Logic				
F5.1.00	Control over intermediate delay relay	0: This relay's input is decided by its control word A	0	★
		1: This relay's input is decided by its control word B 2: This relay's input is decided by its control word C Ones place: Relay 1 (M1) Tens place: Relay 2 (M2) Hundreds place: Relay 3 (M3) Thousands place: Relay 4 (M4) Ten thousands place: Relay 5 (M5)		
F5.1.01	Control word A of intermediate relay	0: Set as 0 1: Set as 1 Ones place: M1 Tens place: M2 Hundreds place: M3 Thousands place: M4 Ten thousands place: M5	0	☆
F5.1.02	Control word B of intermediate delay relay M1	Ones place: Control logic 0: Input 1 1: NOT of Input 1 2: AND of Input 1 and 2 3: OR of Input 1 and 2 4: XOR of Input 1 and 2 5: Input 1 validness is set as valid Input 2 validness is set as invalid 6: Input 1 rising edge validness is set as valid Input 2 rising edge validness is set as invalid 7: Effective signal of Input 1 rising edge is taken as reverse 8: Input 1 rising edge is valid, outputs one pulse signal with width of 200ms 9: AND of Input 1 rising edge and Input 2 Hundreds place and tens place: Input 1 selection 0~5: DI1~DI6	0	★
F5.1.03	Control word B of intermediate delay relay M2		0	★
F5.1.04	Control word B of intermediate relay delay M3		0	★
F5.1.05	Control B of intermediate delay relay M4		0	★
F5.1.06	Control word B of intermediate delay relay M5		0	★

Function Code	Name	Set Range	Factory Default Value	Change Restriction
		6~9: Reserved 10~14: M1~M5 15~16: VF1, VF2 17~19: Standby 20~79: Output function 00~59 of corresponding multi-function output terminal Ten thousands place and thousands place: Input 2 selection 0~5: DI1~DI6 6~9: Reserved 10~14: M1~M5 15~16: VF1, VF2 17~19: Standby 20~59: Output function 00~39 of corresponding multi-function output terminal		
F5.1.07	Control word C of intermediate delay relay M1	Tens place and ones place: 00~59 Set function 00~59 of corresponding digital input terminal Thousands place and hundreds place: 00~59 Output function 00~59 of corresponding multi-function output terminal	0	★
F5.1.08	Control word C of intermediate delay relay M2		0	★
F5.1.09	Control word C of intermediate delay relay M3		0	★
F5.1.10	Control word C of intermediate delay relay M4		0	★
F5.1.11	Control word C of intermediate delay relay M5		0	★
F5.1.12	M1 connection delay	0.0s~3600.0s	0	☆
F5.1.13	M2 connection delay	0.0s~3600.0s	0	☆
F5.1.14	M3 connection delay	0.0s~3600.0s	0	☆
F5.1.15	M4 connection delay	0.0s~3600.0s	0	☆
F5.1.16	M5 connection delay	0.0s~3600.0s	0	☆
F5.1.17	M1 disconnection delay	0.0s~3600.0s	0	☆
F5.1.18	M2 disconnection delay	0.0s~3600.0s	0	☆
F5.1.19	M3 disconnection delay	0.0s~3600.0s	0	☆
F5.1.20	M4 disconnection delay	0.0s~3600.0s	0	☆
F5.1.21	M5 disconnection delay	0.0s~3600.0s	0	☆
F5.1.22	Selection of intermediate relay valid status	0: No negation 1: Negation	0	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
		Ones place: M1 Tens place: M2 Hundreds place: M3 Thousands place: M4 Ten thousands place: M5		
F5.1.23	Control word of internal timer	Ones place: Timing control of Timer 1 Tens place: Timing control of Timer 2 0: Timer running 1: Controlled by timer input terminal 1 2: Negation control by timer input terminal 1 3: Controlled by timer input terminal 2 4: Negation control by timer input terminal 2 Hundreds place: Timer 1 clearing control Thousands place: Timer 2 clearing control 0: Controlled by timer clearing terminal 1 1: Controlled by timer clearing terminal 2 Ten thousands place: Timing unit 0: Second 1: Minute 2: Hour	0	☆
F5.1.24	Timing of Timer 1	0.0s~3600.0s	0	☆
F5.1.25	Timing of Timer 2	0.0s~3600.0s	0	☆
F5.1.26	Operation module control	0: No operation 1: Add 2: Subtraction 3: Multiplication 4: Division 5: Judgment of being greater than 6: Judgment of being equal to	H.0000	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
		7: Judgment of greater than and equal to 8: Integral 9~F: Reserved Ones place: Operation 1 Tens place: Operation 2 Hundreds place: Operation 3 Thousands place: Operation 4		
F5.1.27	Attribute of operation setting coefficient	0: Multiplication setting coefficient has no decimal 1: Multiplication setting coefficient has 1 decimal place 2: Multiplication setting coefficient has 2 decimal places 3: Multiplication setting coefficient has 3 decimal places 4: Multiplication setting coefficient has 4 decimal places 5: Division setting coefficient has no decimal place 6: Division setting coefficient has 1 decimal place 7: Division setting coefficient has 2 decimal places 8: Division setting coefficient has 3 decimal places 9: Division setting coefficient has 4 decimal places A: Division setting coefficient has no decimal place B: Division setting coefficient has 1 decimal place C: Division setting coefficient has 2 decimal places D: Division setting coefficient has 3 decimal places E: Division setting coefficient has 4 decimal places (The setting coefficient of A, B, C, D and E is address number of function code) Ones place: Operation 1	H.0000	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
		Tens place: Operation 2 Hundreds place: Operation 3 Thousands place: Operation 4		
F5.1.28	Operation 1 input A	Thousands place, hundreds place, tens place and ones place: Address of operation 1 input A Ten thousands place: Input operation mode 0: The input has operation via unsigned number 1: The input has operation via signed number	0	☆
F5.1.29	Operation 1 input B	Thousands place, hundreds place, tens place and ones place: Address of operation 1 input B Ten thousands place: Input operation mode 0: The input has operation via unsigned number 1: The input has operation via signed number	0	☆
F5.1.30	Operation 1 setting coefficient	00000~65535	1	☆
F5.1.31	Operation 2 input A	Thousands place, hundreds place, tens place and ones place: Address of operation 2 input A Ten thousands place: Input operation mode 0: The input has operation via unsigned number 1: The input has operation via signed number	0	☆
F5.1.32	Operation 2 input B	Thousands place, hundreds place, tens place and ones place: Address of operation 2 input B Ten thousands place: Input operation mode 0: The input has operation via unsigned number 1: The input has operation via signed number	0	☆
F5.1.33	Operation 2 setting coefficient	00000~65535	1	☆
F5.1.34	Operation 3 input A	Thousands place, hundreds place, tens place and ones place: Address of operation 3 input A Ten thousands place: Input operation mode	0	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
		0: The input has operation via unsigned number 1: The input has operation via signed number		
F5.1.35	Operation 3 input B	Thousands place, hundreds place, tens place and ones place: Address of operation 3 input B Ten thousands place: Input operation mode 0: The input has operation via unsigned number 1: The input has operation via signed number	0	☆
F5.1.36	Operation 3 setting coefficient	00000~65535	1	☆
F5.1.37	Operation 4 input A	Thousands place, hundreds place, tens place and ones place: Address of operation 4 input A Ten thousands place: Input operation mode 0: The input has operation via unsigned number 1: The input has operation via signed number	0	☆
F5.1.38	Operation 4 input B	Thousands place, hundreds place, tens place and ones place: Address of operation 4 input B Ten thousands place: Input operation mode 0: The input has operation via unsigned number 1: The input has operation via signed number	0	☆
F5.1.39	Operation 4 setting coefficient	00000~65535	1	☆

5.7 Group F6 of PID and Communication Control

Group F6.0: PID Control

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F6.0 PID Control				
F6.0.00	Set PID source	0: Given by figure (F6.0.01) 1: Given by keyboard potentiometer 2: Given by external terminal VF1 3: Given by external terminal VF2	0	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
		4: Given by PULSE (DI6) 5: Given by communication 6: Given by multi-segment instruction terminal 7: Given by simplified PLC 8: Operation result 1 9: Operation result 2 10: Operation result 3 11: Operation result 4		
F6.0.01	Set PID value	000.0%~100.0%	50	☆
F6.0.02	PID feedback source	0: Given by external terminal VF1 1: Given by external terminal VF2 2: VF1-VF2 3: VF1+VF2 4: Given by PULSE (DI6) 5: Given by communication 6: MAX[VF1, VF2] 7: MIN[VF1, VF2] 8: Multi-segment instruction terminals are switched 9: Operation result 1 10: Operation result 2 11: Operation result 3 12: Operation result 4	0	☆
F6.0.03	PID action direction	0: Forward action 1: Reverse action	0	☆
F6.0.04	PID set feedback range	00000~65535	1000	☆
F6.0.05	Proportional gain KP1	000.0~100.0	20	☆
F6.0.06	Integral time TI1	00.01s~10.00s	2	☆
F6.0.07	Differential time TD1	00.000s~10.000s	0	☆
F6.0.08	PID deviation limit	000.0%~100.0%	0	☆
F6.0.09	PID feedback filtering time	00.00s~60.00s	0	☆
F6.0.10	Proportional gain KP2	000.0~100.0	20	☆
F6.0.11	Integral time TI2	00.01s~10.00s	2	☆
F6.0.12	Differential time TD2	00.000s~10.000s	0	☆
F6.0.13	PID switch condition	0: No switch 1: Switch via terminal 2: Switch based on deviation	0	☆
F6.0.14	PID switch deviation 1	000.0%~F6.0.15	20	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
F6.0.15	PID switch deviation 2	F6.0.14~100.0%	80	☆
F6.0.16	PID initial value	000.0%~100.0%	0	☆
F6.0.17	PID initial value maintaining period	000.00~650.00s	0	☆
F6.0.18	PID feedback loss detection	000.0%: No judgment of feedback loss 000.1%~100.0%	0	☆
F6.0.19	PID feedback loss detection time	00.0s~20.0s	0	☆
F6.0.20	PID shutdown operation	0: No operation 1: Operation	0	☆
F6.0.21	PID reverse rotation cut-off frequency	0.00~Max. frequency	0	☆
F6.0.22	PID differential amplitude limit	0.00%~100.00%	0.1	☆
F6.0.23	PID set change period	0.00s~650.00s	0	☆
F6.0.24	PID feedback filtering time	0.00s~60.00s	0	☆
F6.0.25	PID output filtering time	0.00s~60.00s	0	☆
F6.0.26	Forward max. value of deviation between two outputs	0.00%~100.00%	1	☆
F6.0.27	Reverse max. value of deviation between two outputs	0.00%~100.00%	1	☆
F6.0.28	PID integral attribute	Ones place: Integral separation 0: Invalid 1: Valid Tens place: Whether stop integral after output reaches the limit 0: Continue integral 1: Stop integral	0	☆

Group F6.1: Communication Control

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F6.1 Communication Control				
F6.1.00	Baud rate	Ones place: MODBUS baud rate 0: 1200 1: 2400 2: 4800 3: 9600 4: 19200 5: 38400 6: 57600 Tens place: Reserved	3	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
F6.1.01	Data format	0: No check (8-N-2) 1: Even parity check (8-E-1) 2: Odd parity check (8-O-1) 3: No check (8-N-1)	0	☆
F6.1.02	Local machine address	000: Broadcasting address 001~249	1	☆
F6.1.03	Response delay	00~20ms	2	☆
F6.1.04	Communication timeout period	00.0 (invalid) 00.1s~60.0s	0	☆
F6.1.05	Data transmitting format	Ones place: MODBUS data format 0: Reserved 1: RTU mode Tens place: Reserved	1	☆
F6.1.06	Whether reply data in MODBUS communication	0: Reply 1: No reply	0	☆
F6.1.07	Treatment method of communication error	0: No treatment 1: Shutdown 2: Communication fault	0	☆

5.8 Group F7 of Customized Function

Group F7.0: Customized Parameters

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F7.0 Customized Parameters				
F7.0.00	User function 0	U0.1.01	U0.001	●
F7.0.01	User function 1	U0.0.00~UX.X.XX (except for Group F7 and F8)	U0.1.01	☆
F7.0.02	User function 2		U1.0.00	☆
F7.0.03	User function 3		U1.0.04	☆
F7.0.04	User function 4		U1.0.11	☆
F7.0.05	User function 5		U1.0.14	☆
F7.0.06	User function 6		U1.1.01	☆
F7.0.07	User function 7		U1.1.02	☆
F7.0.08	User function 8		U1.1.03	☆
F7.0.09	User function 9		U1.1.04	☆
F7.0.10	User function 10		U0.0.00	☆
F7.0.11	User function 11		U0.0.00	☆
F7.0.12	User function 12		U0.0.00	☆

Function Code	Name	Set Range	Factory Default Value	Change Restriction
F7.0.13	User function 13		U0.0.00	☆
F7.0.14	User function 14		U0.0.00	☆
F7.0.15	User function 15		U0.0.00	☆
F7.0.16	User function 16		U0.0.00	☆
F7.0.17	User function 17		U0.0.00	☆
F7.0.18	User function 18		U0.0.00	☆
F7.0.19	User function 19		U0.0.00	☆
F7.0.20	User function 20		U0.0.00	☆
F7.0.21	User function 21		U0.0.00	☆
F7.0.22	User function 22		U0.0.00	☆
F7.0.23	User function 23		U0.0.00	☆
F7.0.24	User function 24		U0.0.00	☆
F7.0.25	User function 25		U0.0.00	☆
F7.0.26	User function 26		U0.0.00	☆
F7.0.27	User function 27		U0.0.00	☆
F7.0.28	User function 28		U0.0.00	☆
F7.0.29	User function 29		U0.0.00	☆

5.9 Group F8 of Manufacturer Parameters

Group F8.0: Manufacturer Parameters

Function Code	Name	Set Range	Factory Default Value	Change Restriction
Group F8.0 Manufacturer Parameters				
F8.0.00	Manufacturer password	00000~65535	0	☆

5.10 Group F9 of Parameter Monitoring

Group F9.0: Monitoring Group

Function Code	Name	Description	Unit
Group F9.0 Monitoring Group			
F9.0.00	Running frequency	Output frequency while inverter is running	0.01Hz
F9.0.01	Set frequency	Set frequency of inverter	0.01Hz
F9.0.02	Output current	Output current while inverter is running	0.01A
F9.0.03	Output voltage	Output voltage while inverter is running	1V
F9.0.04	Busbar voltage	Voltage of inverter DC busbar	0.1V

Function Code	Name	Description	Unit
F9.0.05	Output torque	Output torque while inverter is running, percentage of motor rated torque	0.001
F9.0.06	Output power	Output power while inverter is running	0.1kW
F9.0.07	Input terminal status	Check if input terminal has signal input	
F9.0.08	Output terminal status	Check if output terminal has signal output	
F9.0.09	VF1 voltage	Check the voltage between VF1 and GND	0.01V
F9.0.10	VF2 voltage	Check the voltage between VF2 and GND	0.01V
F9.0.11	Customized display value	The value that is converted by customized display coefficient F0.1.22 and customized display decimal point F0.1.23	
F9.0.12	Actual counting	Check the inverter actual counting that is used for counting purpose	1
F9.0.13	Actual length	Check the inverter actual length that is used for fixed length purpose	1m
F9.0.14	PID set value	Product of PID set value and PID set feedback range	
F9.0.15	PID feedback	Product of PID feedback value and PID set feedback rang	
F9.0.16	PULSE frequency	Check PULSE input frequency	0.01kHz
F9.0.17	Feedback speed	Actual output frequency while inverter is running	0.1Hz
F9.0.18	PLC stage	Display the running stage of simplified PLC	1
F9.0.19	Voltage before VF1 correction	Voltage between VF1 and GND before VF1 correction	0.001V
F9.0.20	Voltage before VF2 correction	Voltage between VF2 and GND before VF2 correction	0.001V
F9.0.21	Linear velocity	Linear velocity of DI6 pulse sampling, equals to pulse number collected per minute/pulse number per meter	1m/min
F9.0.22	Current power-on period	The period of current power-on	1min
F9.0.23	Current running period	The period of current running	0.1min
F9.0.24	Remaining running period	Remaining running period of F4.0.23 timing function	0.1min
F9.0.25	Frequency of frequency source A	Check the frequency given by frequency source A	0.01Hz
F9.0.26	Frequency of frequency source B	Check the frequency given by frequency source B	0.01Hz
F9.0.27	Set value of communication	The set value of corresponding communication address A001, percentage of the max. frequency	%
F9.0.28	PULSE frequency	Check the frequency of PULSE input	1Hz
F9.0.29	Encoder feedback speed	The actual motor running frequency in encoder feedback	0.01Hz
F9.0.30	Actual distance	Check the actual distance of inverter distance control	
F9.0.31~	Reserved		

Function Code	Name	Description	Unit
F9.0.45			
F9.0.46	Operation result 1	Check the value of operation result 1	
F9.0.47	Operation result 2	Check the value of operation result 2	
F9.0.48	Operation result 3	Check the value of operation result 3	
F9.0.49	Operation result 4	Check the value of operation result 4	
F9.0.50	User standby monitoring value 1	Check the value of user specific function	
F9.0.51	User standby monitoring value 2	Check the value of user specific function	
F9.0.52	User standby monitoring value 3	Check the value of user specific function	
F9.0.53	User standby monitoring value 4	Check the value of user specific function	
F9.0.54	User standby monitoring value 5	Check the value of user specific function	
F9.0.63	Fire hazard mode	0: Not fire hazard mode 1: Fire hazard mode	

Chapter 6 Parameter Description

6.1 Group F0 of Inverter Parameters and Fault Information

Group F0.0 Basic Information of Inverter

Function Code	Name	Set Range	Factory Default Value
F0.0.00	Control mode display	0: V/F control 1: Open-loop vector control	Read only

This function code is read only and displays the actual control mode of inverter.
When F1.0.00 equals to 3 (intelligent selection of control mode), the actual control mode can be viewed through F0.0.00.
0: V/F control
Applies to the scenarios with low requirements for load or multiple motors are driven by one inverter.
1: Open loop vector control
No external encoder is connected for speed feedback. Generally, it applies to the scenarios of high-performance control and one motor is driven by inverter only.

Function Code	Name	Set Range	Factory Default Value
F0.0.01	Inverter model	00000~65000	Read only

This function code is used by manufacturer to check the factory model of inverter.

Function Code	Name	Set Range	Factory Default Value
F0.0.02	Inverter rated power	00000~6500.0KW	Read only

This function code is used by manufacturer and user to check the rated power of inverter.

Function Code	Name	Set Range	Factory Default Value
F0.0.03	Inverter rated voltage	0000~9999V	Read only

This function code is used by manufacturer and user to check the rated voltage of inverter.

Function Code	Name	Set Range	Factory Default Value
F0.0.04	Inverter rated current	000.00~6500.0A	Read only

This function code is used by manufacturer and user to check the rated current of inverter.

Function Code	Name	Set Range	Factory Default Value
F0.0.05	Software version No.	00000~650.00	Read only

This function code is used by manufacturer and user to check the software version number of inverter.

Function Code	Name	Set Range	Factory Default Value
F0.0.06	Program off-standard No.	0000~9999	Read only

This function code is used by manufacturer and user to check the program off-standard number of inverter.

Function Code	Name	Parameter Description	Range
F0.0.07	Accumulated running period	Display the Product's accumulated running period	0h~65000h
F0.0.08	Accumulated power-on period	Display the Product's accumulated power-on period since delivery	0h~65000h
F0.0.09	Accumulated power consumption	Display the Product's accumulated power consumption till now	0~65000 KWH
F0.0.10	Module temperature	Display the real-time temperature of module	000°C~100°C

The function codes above are used by manufacturer and user to check the accumulated running period, accumulated power-on period, accumulated power consumption and module real-time temperature.

F0.0.11	Running period in fire mode	Display the Product's running period in fire mode	0.0min~6500.0min

The function code above is used by manufacturer and user to check the accumulated running period in fire mode. For details, please refer to P2.3.29 (fire hazard mode) description.

Note: No warranty will be provided when F0.0.11 fire mode is enabled and run for over 5min

Group F0.1 Basic Setting of Inverter

Function Code	Name	Set Range	Factory Default Value
F0.1.00	Function code protection	0: Modifiable 1: Non-modifiable 2: Special function code allows modification	0

This function code is used for setting whether inverter parameters are modifiable.

When F0.1.00=0, all function code parameters can be modified;

When F0.1.00=1, all function code parameters can be checked but not modified, in order to prevent altering of function parameters by mistake.

When F0.1.00=2, only special function code allows modification.

Function Code	Name	Set Range	Factory Default Value
F0.1.01	Display mode	0: Basic mode (prefix is ‘F’) 1: User mode (prefix is ‘U’) 2: Verification mode (prefix is ‘C’)	0

This function code is used for determining the Product’s display mode. In basic mode, this function code can be modified only if F0.1.00 is set as 2. This function code can be modified directly in user mode and verification mode.

0: Basic mode (prefix is ‘F’)

The specific function code parameters displayed by inverter are decided by function code F0.1.24 (for details, please refer to description of function code F0.1.24)

1: User mode (prefix is ‘U’)

Display user’s customized parameters only. The specific function code parameters displayed by inverter are decided by function code of Group F7.0 (for details, please refer to description of Group F7.0). Presently, the prefix of function code is ‘U’.

2: Verification mode (prefix is ‘C’)

Display the modified parameters only (the parameter is modified when parameter value in function code is different from the factory default value). The prefix of function code is 'C' in verification mode.

Note: The relative parameters have the same meaning whether the prefix of function code is 'F' or 'U' or 'C' and they are used for distinguishing the display mode only. For example, the U0.0.01 in user mode equals to F0.0.01 in basic mode.

Function Code	Name	Set Range	Factory Default Value
F0.1.02	Shutdown function of keyboard STOP key	0: Valid in keyboard operation mode only 1: Valid in any mode	1

This function code is used for setting the shutdown function of STOP key

When F0.1.02=0, shutdown function is available under keyboard control mode only (i.e. F1.0.04=0)

When F0.1.02=1, shutdown function is available under any running control mode

Note: Fault reset function is always valid

Function Code	Name	Set Range	Factory Default Value
F0.1.03	Set function of keyboard JOG key	0: Invalid 1: Forward inching 2: Reverse inching 3: Forward/reverse switch 4: Switch with keyboard control channel 5: Reverse running	1

This function code is used for setting the functions of multi-function key JOG

When F0.1.03=0, the function of JOG key is invalid

When F0.1.03=1, the function of JOG key is forward inching

When F0.1.03=2, the function of JOG key is reverse inching

When F0.1.03=3, the function of JOG key is switch of forward/reverse switching

When F0.1.03=4, the function of JOG key is switch of operation panel channel. For example, JOG key can realize switch between terminal control ad keyboard control when F1.0.04 is set as 1 terminal control and F0.1.03 is set as 4.

When F0.1.03=5, the function of JOG key is reverse running. When F1.0.04 is set as

0, RUN key on board has forward running, while JOG key has reverse running.

Note: Forward inching and reverse inching function can be valid in any running control mode, while switch of forward/reverse control and reverse running function are valid in keyboard control mode only (i.e. F0.1.03=3).

Function Code	Name	Set Range	Factory Default Value
F0.1.05	Carrier frequency	0.50kHz~16.0kHz	Model

This function code is used for adjusting the Product's carrier frequency, in order to reduce the monitor noise and the leakage current of circuit to ground and the interference from the Product. When carrier frequency is low, the upper harmonic component of output current will increase, motor loss will increase and motor temperature rise will increase. When carrier frequency is high, the motor loss and temperature rise will decrease, but the Product's loss and temperature rise will increase, and the interference will also increase.

Influence from adjustment of carrier frequency:

Carrier frequency	Low →High
Motor noise	High →Low
Output current waveform	Bad →Good
Motor temperature rise	High →Low
Inverter temperature rise	Low →High
Leakage current	Low →High
Interference of external radiation	Low →High

Function Code	Name	Set Range	Factory Default Value
F0.1.06	Whether carrier frequency is adjusted along with temperature	0: No 1: Yes	1

When this function code is set as 1, the Product's carrier wave will be adjusted according to the temperature of F0.0.10. The adjustment function of carrier wave will be cancelled when it is set as 0.

Function Code	Name	Set Range	Factory Default Value
F0.1.07	Undervoltage point setting	60.0%~140.0%	100.0

This function code is used for setting the inverter busbar voltage that may trigger the undervoltage alarm. The set value of this function code is the percentage relative

to normal undervoltage point.

For Type T4 machine, the undervoltage point =350V*F0.1.07/100. So, the default value is 350V.

For Type S2 machine, the undervoltage point =200V*F0.1.07/100. So, the default value is 200V.

The Product's undervoltage point can be slightly adjusted by changing F0.1.07. Generally, no adjustment is required. It may affect the Product's safety protection if the undervoltage point is too low or too high.

Function Code	Name	Set Range	Factory Default Value
F0.1.08	Sensitivity of overvoltage stall protection	000: No overvoltage stall protection function 001~100 (Set as 0 when connecting brake resistor)	005
F0.1.09	Voltage point of overvoltage stall protection	120%~150%	130

When DC busbar voltage exceeds the overvoltage stall protection voltage during deceleration of the Product, the Product will stop deceleration and maintain the current running frequency; the Product will continue deceleration when the busbar voltage is reduced below the overvoltage stall protection voltage. The set value of function code F0.1.09 is the percentage of normal busbar voltage.

Sensitivity of overvoltage stall protection is used for adjusting the Product's capability of overvoltage suppression during deceleration. The overvoltage suppression capability will increase along with this value. This value should be as low as possible on the condition that there's no overvoltage.

F0.1.09 is the software overvoltage inhibition point and also the braking operation point when braking resistor is connected; so F0.1.08 must be set as 0 to cancel the software overvoltage inhibition function when a braking resistor is connected.

The calculation formula of overvoltage stall protection voltage is as follows:

For Type T4 machine, V=53*F0.1.09/10; so, the default value is 689V.

For Type S2 machine, V=29*F0.1.09/10; so, the default value is 377V.

Function Code	Name	Set Range	Factory Default Value
F0.1.10	Braking utilization rate	000%~100%	100

The function code is used for adjusting the duty cycle of braking unit. When braking utilization rate is high, the braking unit will have higher duty cycle, better braking effects, but the Product's busbar may have major voltage fluctuation during braking. No adjustment is required in general.

Function Code	Name	Set Range	Factory Default Value
F0.1.11	Fan control	0: Rotation during running 1: Constant rotation 2: Controlled by temperature	0

The function code is used for selecting the action mode of cooling fan.
When F0.1.11=0, the fan will rotate while the Product is running and stop rotation when the Product is stopped.
When F0.1.11=1, the fan will rotate constantly after power-on.
When F0.1.11=2, the fan will rotate when the Product's temperature is above 35°C, or stop rotation when the temperature is below 35°C.

Function Code	Name	Set Range	Factory Default Value
F0.1.12	Sag control	00.00Hz~10.00Hz	00.00

The load distribution can be uneven when one load is dragged by multiple motors. Based on sag control, the output frequency will decrease along with load increase, to realize load balancing of multiple motors. The set value of this function code is the decreased frequency at rated load.

Function Code	Name	Set Range	Factory Default Value
F0.1.13	Dead zone compensation switch	0: Disable 1: Enable	1

This function code is used for setting whether the Product has compensation to PWM dead zone. 0: No compensation; 1: Make compensation.

Function Code	Name	Set Range	Factory Default Value
F0.1.14	PWM modulation mode	Ones place 0: Asynchronous modulation 1: Synchronous modulation Tens place: Under VF control 0: 3-phase modulation and 2-phase modulation coexist 1: 3-phase modulation completely Hundreds place: 0: Low-frequency carrier has limitation 1: Low-frequency carrier has no limitation Thousands place: Under vector control 0: 3-phase modulation and 2-phase modulation coexist 1: 3-phase modulation completely	1000

This function code can change the PWM modulation mode in actual running process by changing the value of 0 and 1 above.

The preset modulation mode is low-frequency carrier limitation, complete 3-phase modulation and asynchronous modulation under VF control, which means, the hundreds place is 0, tens place is 1, ones place is 0 and the set value acquired is 0010.

Function Code	Name	Set Range	Factory Default Value
F0.1.15	Upper limit frequency of 2-phase modulation switch	00.00Hz~15.00Hz	12

Three-phase modulation, which is also called 7-section continuous modulation, will be entered when it is lower than this value; otherwise, it will be 2-phase modulation, which is also called 5-section interrupted modulation mode.

The Product has high switch loss but low current ripple under 7-section continuous modulation; low switch loss but high current ripple under 5-section interrupted modulation mode; however, it may lead to unstable motor running at high frequency. No modification is required in general.

Function Code	Name	Set Range	Factory Default Value
F0.1.16	Random PWM depth	00: Random PWM is invalid 01~10: Random depth of PWM carrier	0

This function code applies to VF control only. The monotonous and harsh motor sound can be soft and it can reduce the external electromagnetic interference by setting random PWM. Random PWM is invalid when random PWM depth is set as 0. Different effects can be acquired by adjusting the depth of random PWM.

Function Code	Name	Set Range	Factory Default Value
F0.1.17	AVR function	0: Valid 1: Invalid	0

When this function code is set as 0, the output voltage will be adjusted in real time based on busbar voltage change, to ensure stable voltage output. No adjustment will be made when it is set as 1. No modification is required in general.

Function Code	Name	Set Range	Factory Default Value

F0.1.18	Running display parameter 1 of LED	H.0001~H.FFFF Bit00: Running frequency (Hz) Bit01: Given frequency (Hz) Bit02: Output current (A) Bit03: Output voltage (V) Bit04: Busbar voltage (V) Bit05: Output torque (%) Bit06: Output power (kW) Bit07: Input terminal status Bit08: Output terminal status Bit09: VF1 voltage (V) Bit10: VF2 voltage (V) Bit11: Customized display value Bit12: Actual counting Bit13: Actual length Bit14: Set PID Bit15: PID feedback	H.001F
F0.1.19	Running display parameter 2 of LED	H.0000~H.FFFF Bit00: PULSE frequency (0.01kHz) Bit01: Feedback speed (Hz) Bit02: PLC stage	H.001F
		Bit03: Voltage (V) before VF1 correction Bit04: Voltage (V) before VF2 correction Bit05: Linear velocity Bit06: Current power-on time (min) Bit07: Current running time (min) Bit08: Remaining running time (min) Bit09: Frequency (Hz) of frequency source A Bit10: Frequency (Hz) of frequency source B Bit11: Set value of communication (Hz) Bit12: PULSE frequency (Hz) Bit13: Reserved Bit14: Actual distance Bit15: User standby monitoring value 1	

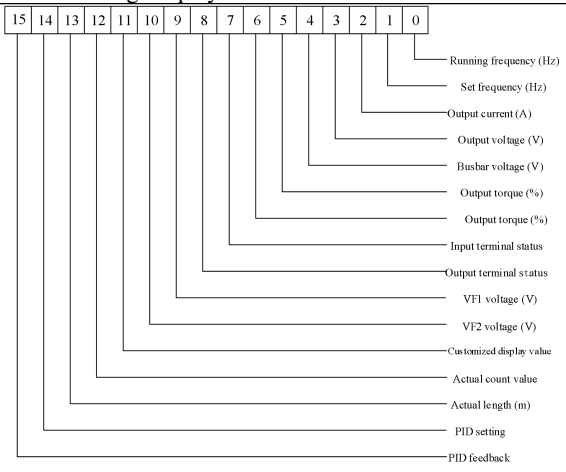
F0.1.20	Auto switch time of LED running display parameter	000.0: No switch 000.1s~100.0s	0

Function code F0.1.18 and F0.1.19 decide the LED display contents when the Product is under running status.

Function code F0.1.20 decides the display period of Parameter 1 and 2. When function code F0.1.20 is set as 0, it will display the set parameter of F0.1.18 only; otherwise, it will be switched within the set display parameter of 0.1.18 and F0.1.19 according to the given time of F0.1.20.

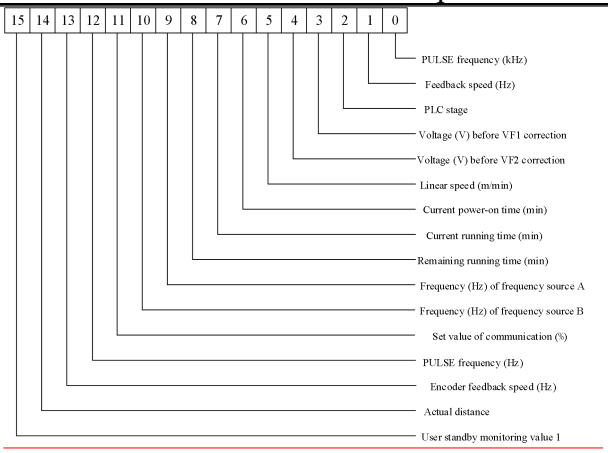
The format of specific display content is as follows:

LED Running Display Parameter 1



The corresponding position should be set 1, this binary number should be converted to hexadecimal and set in F0.1.18, in order to display the parameters above during running

LED Running Display Parameter 2



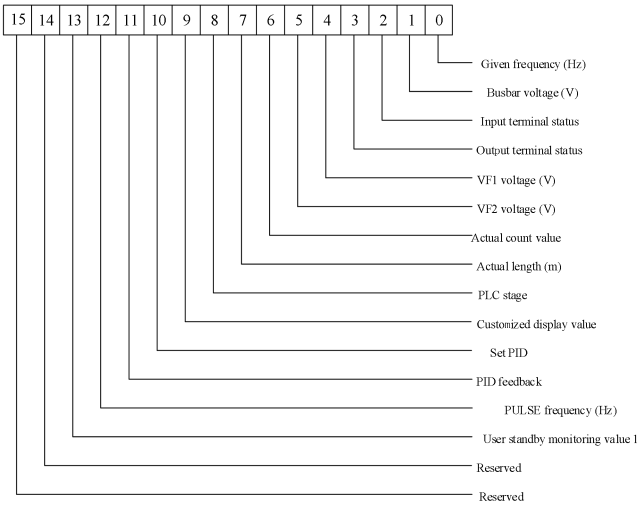
The corresponding position should be set 1, this binary number should be converted to hexadecimal and set in F0.1.19, in order to display the parameters above during running

Function Code	Name	Set Range	Factory Default Value
F0.1.21	LED shutdown display parameter	H.0001~H.FFFF Bit00: Set frequency (Hz) Bit01: Busbar voltage (V) Bit02: Input terminal status Bit03: Output terminal status Bit04: VF1 voltage (V) Bit05: VF2 voltage (V) Bit06: Actual counting Bit07: Actual length Bit08: PLC stage Bit09: Customize display value Bit10: Set PID Bit11: PID feedback Bit12: PULSE frequency (Hz) Bit13: User standby monitoring value 1 Bit14: Reserved Bit15: Reserved	H.0033

This function code decides the LED display contents when the Product is under shutdown status.

The format of specific display content is as follows:

LED Shutdown Display Parameters



The corresponding position should be set 1, this binary number should be converted to hexadecimal and set in F0.1.21, in order to display the parameters above in shutdown status

Function Code	Name	Set Range	Factory Default Value
F0.1.22	Customized display coefficient	0.0001~6.5000	1

F0.1.23	Customized display of control word	Ones place: Customized display of decimal points 0: 0 decimal point 1: 1 decimal point 2: 2 decimal points 3: 3 decimal points Tens place: Customized display of value source 0: Decided by hundreds place of customized display control word 1: Decided by set value of F0.1.22, 0.0000~0.0099 corresponds to F9.0.00~F9.0.99 of Group F9 Hundreds place: Selection of customized display coefficient 0: Customized display coefficient is F0.1.22 1: Customized display coefficient is calculation result 1 2: Customized display coefficient is calculation result 2 3: Customized display coefficient is calculation result 3 4: Customized display coefficient is calculation result 4	001

In some cases, the user can modify function code F0.1.22, F0.1.23 and adjust the corresponding relationship between inverter display value and frequency, in order to display the values which have linear relationship with frequency, instead of displaying the frequency. The display value can be called customized display value. Besides, the user can also modify the function code F0.1.22, F0.1.23, in order to display any of parameters in Group F9.

The ones place of F0.1.23 is used for setting the decimal places of customized display value.

The tens place of F0.1.23 is used for setting the source of customized display value. The display value is related to frequency if it is 0, or the display value is related to Group P9 if it is 1, as shown in table below:

Tens Place of F0.1.23	Display Control Word	Description

0	Hundreds place of F0.1.23	0	Display value = Frequency ×F0.1.22
		1	Display value = Frequency × Calculation result 1÷10000
		2	Display value = Frequency × Calculation result 2÷10000
		3	Display value = Frequency × Calculation result 3÷10000
		4	Display value = Frequency × Calculation result 4÷10000
1	F0.1.22	The set value 0.0000~0.0099 of F0.1.22 corresponds to F9.0.00~F9.0.99 of Group F9 For example, the display value is value P9.0.02 when F0.1.22=0.0002	
Note: The customized decimal places are not considered in the algorithm above.			

For example, the customized display value should be 2000×0.5000 = 1.000 (3 decimal points) when the customized display coefficient F0.1.22 is 0.5000, customized display control word F0.1.23 is 003 and frequency is 20.00Hz.

The customized display value should be 2000*500/10000=0.100 (3 decimal points) when the customized display control word F0.1.23 is 103, calculation result 1 is 500 and frequency is 20.00

The customized display value should be 1.000 (3 decimal points) when the customized display control word F0.1.23 is 013, F0.1.22 is 0.0002 and P9.0.02=1000.

Function Code	Name	Set Range	Factory Default Value
F0.1.24	Selection of display of function parameter group	Ones place: 0: Display basic group only 1: Display all menus Tens place: 0: Not display Group P7 1: Display Group P7 2: Reserved Hundreds place: 0: Not display correction parameter group 1: Display correction parameter group Thousands place: 0: Not display password group 1: Display password group Ten thousands place: Reserved	00011

This function code decides which function code parameters are displayed when

function code F0.1.01=0.

Function Code	Name	Set Range	Factory Default Value
F0.1.25	Parameter initialization	00: No operation 01: Clear record information 09: Restore default parameter, excluding electric parameter, correction group and password group 19: Restore default parameters, excluding electric parameters and password group 30: Backup current parameters of user 60: Restore user backup parameters 100~999: Restore default parameter of user	000

00: No operation

01: Clear record information

Clear the Product's fault records, accumulated running period, accumulated power-on period and accumulated power consumption

09: Restore default parameter, excluding motor parameter, correction group and password group

The Product's parameters are restored to default parameters, except for motor parameters, correction parameter group and password group

19: Restore default parameters, excluding motor parameters and password group

The Product's parameters are restored to default parameters, except for motor parameters and password group

30: Backup current parameters of user

Back up all function parameters of user to memory, so the user can restore all backup function parameters when parameters have error.

60: Restore user backup parameters

Restore the previous backup parameters of user, which means, restore the previous backup parameters by setting F0.1.25 as 30

100~999: Restore default parameter of user and macro. For details, please refer to 7.2.

Generally, this function is used for restoring the special customized default parameters and not operable to user in general.

Function Code	Name	Set Range	Factory Default Value
F0.1.26	User password	00000~65535	00000

F0.1.26 is given by user password. The password protection function is valid when any non-zero 5-digit figure is given. Please keep the set user password properly, for it will display "-----" when entering the menu in the next time, and the user needs to enter password correctly in order to view and modify the function parameters. The parameter F0.1.26 is provided with modification enabling control. F0.1.26 can be modified only if parameter F0.1.00=2.

The password protection can be canceled by entering password and changing F0.1.26 as 00000.

Function Code	Name	Set Range	Factory Default Value
F0.1.27	Inverter type	1: Type G (common type) 2: Type P (light load type)	Model

F0.1.27, which is inverter type, can be set only if F0.1.00=2. When this function code is set, the Product's rated current and overload curve will also change. When it is set as Type G machine, it will have 1min overload that is 150% of rated current of Type G machine. When it is set as Type P machine, it will have 1min overload that is 120% of rated current of Type P machine. Please refer to Section 2.3 for the rated current of Type G and P machine.

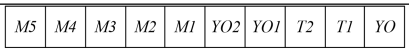
Group F0.2 Fault Records of Inverter

Function Code	Name	Set Range	Factory Default Value
F0.2.00	Fault record 1 (the latest)	0: No fault 1: Constant speed overcurrent 2: Acceleration overcurrent 3: Deceleration overcurrent 4: Constant speed overvoltage 5: Acceleration overvoltage 6: Deceleration overvoltage 7: Module fault 8: Under-voltage 9: Inverter overload 10: Motor overload 11: Input missing phase 12: Output missing phase 13: External fault 14: Communication error 15: Inverter overheat 16: Inverter hardware error 17: Motor-to-ground short circuit 18: Motor identification error 19: Motor load loss 20: PID feedback loss	00
F0.2.01	Fault record 2		00
F0.2.02	Fault record 3		00

Function Code	Name	Set Range	Factory Default Value
		21: Customized fault 1 22: Customized fault 2 23: Power-on time reached 24: Running period reached 25: Reserved 26: Parameter read/write error 27: Motor overheat 28: Speed major deviation 29: Motor overspeed 30: Initial position error 31: Current detection fault 32: Contactor 33: Current detection error 34: Fast current limiting timeout 35: Motor switching during running 36: 24V power failure 37: Drive power failure 38: Output short circuit 39: Reserved 40: Buffer resistance error	

The function code above records the type of the Product's latest 3 faults. 0 means no fault. For details of possible cause and solutions of each fault code, please refer to description of Chapter 9.

Function Code	Name	Parameter Description
F0.2.03	Fault frequency 1	Frequency of the latest fault
F0.2.04	Fault current 1	Current of the latest fault
F0.2.05	Busbar voltage 1 at faulty condition	Busbar voltage of the latest fault
F0.2.06	Input terminal status 1 at fault condition	Status of input terminal in the latest fault. Sequence is: VF2 | VF1 | DI10 | DI9 | DI8 | DI7 | DI6 | DI5 | DI4 | DI3 | DI2 | DI1 When input terminal is ON, the corresponding binary digit is 1 and OFF is 0. Then, the binary number is converted to decimal number for display.
F0.2.07	Output terminal status 1 at fault condition	Status of all output terminals in the latest fault. Sequence is:

Function Code	Name	Parameter Description
		 When output terminal is ON, the corresponding binary digit is 1 and OFF is 0. Then, the binary number is converted to decimal number for display.
F0.2.08	Inverter status 1 at fault condition	Used by manufacturer
F0.2.09	Power-on period 1 at fault condition	Current power-on period of the latest fault
F0.2.10	Running period 1 at fault condition	Current running period of the latest fault
F0.2.11	Fault frequency 2	Same with F0.2.03~F0.2.10
F0.2.12	Fault current 2	
F0.2.13	Busbar voltage 2 at fault condition	The same with F0.2.03~F0.2.10
F0.2.14	Input terminal status 2 at fault condition	
F0.2.15	Output terminal status 2 at fault condition	
F0.2.16	Inverter status 2 at fault condition	
F0.2.17	Power-on period 2 at fault condition	The same with F0.2.03~F0.2.10
F0.2.18	Running period 2 at fault condition	
F0.2.19	Fault frequency 3	
F0.2.20	Fault current 3	
F0.2.21	Busbar voltage 3 at fault condition	
F0.2.22	Input terminal status 3 at fault condition	
F0.2.23	Output terminal status 3 at fault condition	
F0.2.24	Inverter status 3 at fault condition	
F0.2.25	Power-on period 3 at fault condition	
F0.2.26	Running period 3 at fault condition	

6.2 Group F1 of Motor Basic Control Parameters

Group F1.0 Basic Parameter Setting of Motor Control

Function Code	Name	Set Range	Factory Default Value
F1.0.00	Control mode	0: V/F control 1: Open loop vector control 2: Reserved 3: Intelligent selection as 0 or 1 (see F0.0.00 for the actual control mode)	0

0: V/F control

Applies to the scenarios with low requirements for load or multiple motors are driven by one inverter.

1: Open loop vector control

No external encoder is connected for speed feedback. Generally, it applies to the scenarios of high-performance control and one motor is driven by inverter only

2: Reserved bit

3: Intelligent selection as 0 or 1 through the built-in algorithm. See value of F0.0.00 for the details.

The relationship between F1.0.00 and F0.0.00 is as follows:

(1) When F1.0.00=0, V/F control is entered and F0.0.00 will change to 0

(2) When F1.0.00=1, open-loop vector control is entered and F0.0.00 will change to 1

(3) When F1.0.00=3, it will have intelligent selection of VF or open-loop control, and its final control mode will be displayed in F0.0.00. The rules are as follows:

When parameter identification succeeds, F0.0.00 will change to 1, i.e. open-loop vector control.

When F1.1.10 (stator resistance of asynchronous machine) is modified, F0.0.00 will be changed to 1, i.e. open-loop vector.

When F1.1.11 (rotor resistance of asynchronous machine) is modified, F0.0.00 will be changed to 1, i.e. open-loop vector.

When F1.1.12 (leakage inductance of asynchronous machine) is modified, F0.0.00 will be changed to 1, i.e. open-loop vector.

When recovered parameter F0.1.25 is set as 9 or 19, F0.0.00 will be changed to 0, i.e. VF control.

When inverter model F8.0.01 is modified, F0.0.00 will change to 0, i.e. VF control

When F1.1.01 (rated power) is modified, F0.0.00 will change to 0, i.e. VF control

When F1.1.02 (rated frequency) is modified, F0.0.00 will change to 0, i.e. VF control

When F1.1.03 (rated voltage) is modified, F0.0.00 will change to 0, i.e. VF control

Note: The motor rated power (F1.1.01) must be set properly when open loop vector control mode is selected. Make sure to set the rated frequency (F1.1.02), rated voltage (F1.1.03), rated current (F1.1.04) and rated speed (F1.1.05) correctly and identify the motor parameters, for the merits of open loop vector control can be fully exerted only if motor parameters are correct.

Function Code	Name	Set Range	Factory Default Value
F1.0.01	Enable reversal control	0: Enable 1: Disable	0

This function code is used for setting whether the Product is allowed to run at reversal status

When F1.0.01=0, the Product is allowed to run at reversal status.

When F1.0.01=1, the Product is forbidden to run at reversal status, it mainly applies to the scenarios in which load reversal is not allowed.

Function Code	Name	Set Range	Factory Default Value
F1.0.02	Select power-on operation	0: Running 1: Not running	0

This function code is used for setting whether respond to running when running instruction is valid during power-on of the Product.

When F1.0.02=0, the Product has direct response to running.

When F1.0.02=1, the Product has no response to running. The running instruction must be withdrawn and be enabled again in order to have response.

Function Code	Name	Set Range	Factory Default Value
F1.0.03	Running direction	0: Default direction 1: Reverse direction 2: Decided by multi-function input terminal	0

This function code can be changed to change the motor rotation direction without changing the motor wiring; it equals to change of motor rotation direction by adjusting any two lines of motor U, V and W. This function code is valid in any

running control mode. When F1.0.03 is set as 2, the running direction will be decided by the multi-function input terminal. The terminal signal is valid and direction is reverse when multi-function input terminal function is 37.

Note: The motor running direction will be recovered to the original status when default factory parameters are recovered. This function should be used with caution when change of motor rotation direction is prohibited once system is debugged.

Function Code	Name	Set Range	Factory Default Value
F1.0.04	Selection of motion control mode	0: Keyboard control 1: Terminal control 2: Communication control	0

0: Keyboard control

Control the Product's startup, shutdown and forward/backward switch through RUN, STOP and JOG key on operation panel.

1: Terminal input

Control the Product's forward rotation, backward rotation and shutdown through the digital input terminal.

2: Communication control

Control the Product's forward rotation, backward rotation, shutdown, inching and reset through the upper computer by means of communication (for details, please refer to Chapter 8)

For details of three control modes above, please refer to 7.1.1

Function Code	Name	Set Range	Factory Default Value
F1.0.05	Selection of frequency source A	0: Given by keyboard (no power-off memory) 1: Given by keyboard (power-off memory) 2: Given by keyboard potentiometer 3: Given by external terminal VF1 4: Given by external terminal VF2 5: Given by PULSE (DI6) 6: Given by multi-segment instruction terminal 7: Given by simplified PLC 8: Given by PID control 9: Given by communication 10: Operation result 1 11: Operation result 2 12: Operation result 3 13: Operation result 4	02

0: Given by keyboard (no power-off memory)

The initial value of set frequency, which is given by function code F1.0.12, can be changed through ▲, ▼ of keyboard or UP/DOWN of terminal. When the Product is powered on again after power-off, the set frequency will be recovered to the set value of F1.0.12.

1: Given by keyboard (power-off memory)

The initial value of set frequency, which is given by function code F1.0.12, can be changed through ▲, ▼ of keyboard or UP/DOWN of terminal. When the Product is powered on again after power-off, the set frequency will become the set frequency at the moment of power-off, and the change value via ▲, ▼ of keyboard or UP/DOWN of terminal will be saved.

2: Given by keyboard potentiometer

The set frequency is given by potentiometer on operation panel.

3: Given by external terminal VF1

4: Given by external terminal VF2

The set frequency is given by analog input terminal. The Product provides 2-way analog input terminal (VF1, VF2). VF1 and VF2 can be 0V~10V voltage input, or 0/4mA~20mA current input. The VF1 and VF2 input and corresponding relationship curve of set frequency can be freely selected by user in 4 relationship curves through function code F3.2.10; in which, Curve 1 and 2 have straight line relationship and can be given by function code F3.2.00~F3.2.09. Curve 3 and 4, which have the broken line relationship with 2 deflection points, can be given by function code F3.2.12~F3.2.27. The deviation between actual voltage and sampling voltage of analog input terminal can be adjusted through the function code F4.1.05~F4.1.12.

5: Given by PULSE (DI6)

The set frequency is given by the high-speed pulse frequency of digital input terminal DI6 (terminal function can be undefined). The corresponding relationship between high-speed pulse frequency and set frequency can be given by function code F3.0.13~F3.0.16 and they have straight-line relationship.

6: Given by multi-segment instruction terminal

The set frequency is given by different combination status of multi-segment instruction terminal. 4 multi-segment instruction terminals (terminal function 9~12; for details, please refer to function description of F3.0.01~F3.0.10 multi-segment instruction terminal) can be set in the Product.

7: Given by simplified PLC

The set frequency is given by simplified PLC function; the Product's running frequency can be switched within any of 1~16 frequency instructions; the source of frequency instruction holding time of frequency instruction and acceleration/deceleration can be set through function code F5.0.03~F5.0.50.

8: Given by PID control

The set frequency is given by the calculated frequency of PID control. The relevant parameters (F6.0.00~F6.0.20) in "PID control group" should be set when the set frequency is given by the calculated frequency of PID control.

9: Given by communication

The set frequency is given by upper computer through communication. (For details, please refer to Chapter 8)

10: Operation result 1

11: Operation result 2

12: Operation result 3

13: Operation result 4

The set frequency is decided by the operation result that passes calculation and setting of internal operation module. For details of operation module, please refer to description of function code F5.1.26~F5.1.39. The operation results can be checked via function code F9.0.46~F9.0.49.

Function Code	Name	Set Range	Factory Default Value
F1.0.06	Selection of frequency source B	0: Given by keyboard (no power-off memory) 1: Given by keyboard (power-off memory) 2: Given by keyboard potentiometer 3: Given by external terminal VF1 4: Given by external terminal VF2 5: Given by PULSE (DI6) 6: Given by multi-segment instruction terminal 7: Given by simplified PLC 8: Given by PID control 9: Given by communication 10: Operation result 1 11: Operation result 2 12: Operation result 3 13: Operation result 4	00

This function code has the same function with "Selection of frequency source A" (F1.0.05). Please set it by referring to the setting method of function code F1.0.05 in order to use it.

Function Code	Name	Set Range	Factory Default Value
F1.0.07	Select frequency source	0: Frequency source A 1: Frequency source B 2: Frequency A+B 3: Frequency A-B 4: Max. value of A, B 5: Min. value of A, B 6: Standby frequency source 1 7: Standby frequency source 2 8: Terminals are switched in 8 types above	0

0: Frequency source A

The set frequency is given by frequency source A (F1.0.05).

1: Frequency source B

The set frequency is given by frequency source B (F1.0.06).

2: Frequency source A + B

The set frequency is given by frequency A + B.

3: Frequency source A-B

The set frequency is given by frequency A-B. The Product will run at reverse direction when frequency A-B is a negative value.

4: Max. value of A and B

The set frequency is decided by the max. value between frequency source A and B.

5: Min. value of A and B

The set frequency is decided by the min. value between frequency source A and B.

6: Standby frequency source 1

7: Standby frequency source 2

Standby frequency source 1 and 2 are reserved by manufacturer for the application in special scenarios and can be neglected by general users.

8: Terminals are switched in 8 types above

The set frequency is switched within the 8 frequency sources through different combinations of frequency source selection terminals.

Function Code	Name	Set Range	Factory Default Value
F1.0.08	Selection of frequency	0: Relative to the max.	0

	source B	frequency 1: Relative to frequency source A	
F1.0.09	Regulating variable of frequency source B during superposition	000%~150%	100

When the Product's set frequency is given by frequency A+B or frequency A-B, A is the primary given value while B is auxiliary given value by default. This function code F1.0.09, which decides the size for regulation degree of frequency source B, is the percentage relative to the range of frequency source B (set by function code F1.0.08).

When F1.0.08=0, the frequency of frequency source B is regulated relative to the max. frequency

When F1.0.08=1, the frequency of frequency source B is regulated relative to the frequency source A

Function Code	Name	Set Range	Factory Default Value
F1.0.10	Offset of Frequency B during superposition	000.00~Max. frequency	000.00

The set value of this function code is the offset of Frequency B. The set value of final Frequency B is acquired when this offset has superposition with Frequency B given by F1.0.12.

Function Code	Name	Set Range	Factory Default Value
F1.0.11	Max. frequency	050.00Hz~299.00Hz	050.00

Max. frequency: The max. output frequency allowed by the Product.

When analog input, PULSE input, multi-segment instruction input and simplified PLC are regarded as frequency source in the Product, the percentage of them is calibrated according to the set value of this function code.

Function Code	Name	Set Range	Factory Default Value
F1.0.12	Given by keyboard frequency	000.00~Max. frequency	050.00

The initial value of set frequency is given by this function code when function code F1.0.05 or F1.0.06 is set as 0 or 1.

Function Code	Name	Set Range	Factory Default Value

F1.0.13	Upper limit frequency source	0: Given by figure (F1.0.14) 1: Given by external terminal VF1 2: Given by external terminal VF2 3: Given by multi-segment instruction terminal 4: Given by PULSE (DI6) 5: Given by communication 6: Operation result 1 7: Operation result 2 8: Operation result 3 9: Operation result 4	0

This function code decides the source of the Product's upper frequency.

0: Given by figure (F1.0.13)

The upper limit frequency is decided by the set value of function code F1.0.13

1: Given by external terminal VF1

2: Given by external terminal VF2

The upper limit frequency is decided by analog input terminal. The Product provides 2-way analog input terminal (VF1, VF2). VF1 and VF2 can be 0V~10V voltage input, or 0/4mA~20mA current input. The VF1 and VF2 input and corresponding relationship curve of set frequency can be freely selected by user in 4 relationship curves through function code F3.2.10; in which, Curve 1 and 2 have straight line relationship and can be given by function code F3.2.00~F3.2.09. Curve 3 and 4, which have the broken line relationship with 2 deflection points, can be given by function code F3.2.12~F3.2.27. The deviation between actual voltage and sampling voltage of analog input terminal can be adjusted through the function code F8.1.05~F8.1.12.

3: Given by multi-segment instruction terminal

The upper limit frequency is given by the different combinations of multi-segment instruction terminal. 4 multi-segment instruction terminals (terminal function 9~12; for details, please refer to function description of F3.0.01~F3.0.10 multi-segment instruction terminal) can be set in the Product.

4: Given by PULSE

The upper limit frequency is given by the high-speed pulse frequency of digital input terminal DI6 (terminal function can be undefined). The corresponding relationship between high-speed pulse frequency and upper limit frequency, which can be set through function code F3.0.13~F3.0.16, is a straight-line relationship.

5: Given by communication

The upper limit frequency is given through communication. (For details, please refer to Chapter 8)

6: Operation result 1

7: Operation result 2

8: Operation result 3

9: Operation result 4

The upper limit frequency is decided by the internal operation module after calculation and setting. For details of operation module, please refer to description of function code F5.1.26~F5.1.39. The operation results can be checked through function code F9.0.46~F9.0.49

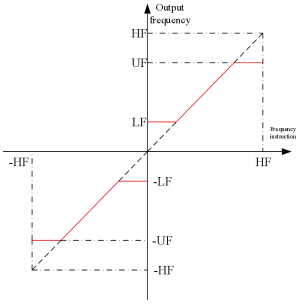
Note: The upper limit frequency should not be set as negative value; otherwise, it will be invalid.

Function Code	Name	Set Range	Factory Default Value
F1.0.14	Upper limit frequency	Lower limit frequency ~ Max. frequency	050.00
F1.0.15	Offset of upper limit frequency	000.00~Max. frequency	000.00
F1.0.16	Lower limit frequency	000.00~Upper limit frequency	000.00

Upper limit frequency: The max. allowed frequency that is given by user. When F1.0.13=0, the max. allowed frequency of the Product will be decided by the set value of function code F1.0.14. The set value of F1.0.15 is the offset of upper limit frequency. The set value of final upper limit frequency is obtained when this offset has superposition with the upper limit frequency given by function code F1.0.13.

Lower limit frequency: The min. allowed frequency set by user.

The relationship between the max. frequency, upper limit frequency and lower limit frequency is shown in diagram below



HF: Max. frequency UF: Upper limit frequency LF: Lower limit frequency

Function Code	Name	Set Range	Factory Default Value
F1.0.17	Min. output frequency	000.00~Upper limit frequency	0.5

Restriction of the Product's min. output frequency. The Product will enter

normal running when it is above the min. output frequency, or enter running based on the set mode of F1.0.18 when it is below the min. output frequency.

Function Code	Name	Set Range	Factory Default Value
F1.0.18	Running mode below the min. output frequency	0: Run at the min. frequency 1: Stop 2: Zero-speed running 3: Standby	3

0: Run at the min. frequency

When the given frequency is below the min. output frequency (set value of F1.0.17), the Product will run at the min. output frequency F1.0.17.

1: Stop

The Product will stop when the given frequency is below the min. output frequency (set value of F1.0.17).

2: Zero-speed running

The Product will enter zero-speed running when the given frequency is below the min. output frequency (set value of F1.0.17). This mode is not recommended when there's divergence during zero-speed running under open-loop vector control.

3: Standby

The Product will enter standby mode when the given frequency is below the min. output frequency (set value of F1.0.17), or start running when the given frequency is above the min. output frequency.

Note: Please use it with caution, for the Product may have certain voltage output when running at 0Hz.

Function Code	Name	Set Range	Factory Default Value
F1.0.19	Starting frequency	00.00Hz~10.00Hz	00.00
F1.0.20	Starting frequency hold time	000.0s~100.0s	000.0

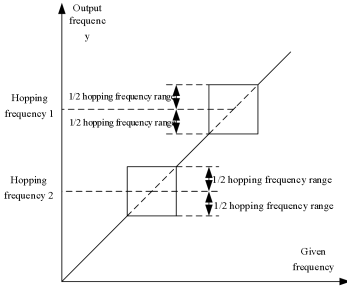
Starting frequency: Running frequency at the startup of the Product.

Proper starting frequency should be given, to make sure the motor has certain starting frequency. The Product may have overcurrent when this starting frequency is too high, or the Product may fail to start and enter standby status (not affected by starting frequency in inching mode) when the given frequency is lower than the starting frequency.

Starting frequency hold time: The running period at starting frequency during startup

Function Code	Name	Set Range	Factory Default Value
F1.0.21	Hopping frequency 1	000.00~Max. frequency	000.00
F1.0.22	Hopping frequency 2	000.00~Max. frequency	000.00
F1.0.23	Range of hopping frequency	000.00~Max. frequency	000.00

Hopping frequency is a function that can make the Product's hopping frequency evade the load resonance area of drive system. Two hopping frequency points can be set in the Product. Once the hopping frequency is set, the Product's output frequency will be automatically adjusted outside the load resonance area even if the given frequency is in the load resonance area, in order to avoid running at the resonance frequency. See description in diagram below:



Function Code	Name	Set Range	Factory Default Value
F1.0.24	Select power-off memory of frequency Given by keyboard	0: No memory 1: Memory	0

0: No memory

The given frequency will be recovered to the value set by function code F1.0.12 when the Product has shutdown. The frequency corrections made by keyboard ▲, ▼ key or terminal UP/DOWN will be cleared.

1: Memory

The given frequency before shutdown is kept when the Product has shutdown. The frequency corrections made by keyboard ▲, ▼ key or terminal UP/DOWN will be saved.

Note: This function code is valid only if frequency source is given by keyboard.

Function Code	Name	Set Range	Factory Default Value
F1.0.25	Action benchmark of frequency Given by keyboard during running	0: Running frequency 1: Given frequency	0

This function code determines the frequency correction method when keyboard ▲, ▼ key or terminal UP/DOWN has action, and whether has increase/decrease based on the running frequency or given frequency.

0: Running frequency

Make regulation based on the running frequency

1: Given frequency

Make regulation based on the given frequency

The two setting methods have obvious distinctions when the Product is in acceleration/deceleration process, which means, the parameter has great difference of selection when the Product's running frequency and given frequency are different

Note: This function code is valid only if frequency source is given by keyboard.

Function Code	Name	Set Range	Factory Default Value
F1.0.26	Acceleration/deceleration mode	0: Straight line 1: S curve 1 2: S curve 2	0

0: Straight line acceleration/deceleration

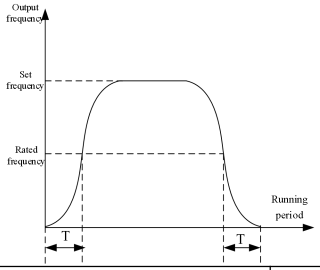
The output frequency has progressive increase or decrease according to straight line. The Product provides 4 groups of acceleration/deceleration periods, i.e. F1.0.31 and F1.0.32, F1.0.33 and F1.0.34, F1.0.35 and F1.0.36, F1.0.37 and F1.0.38, which can be switched according to different combinations of acceleration/deceleration selection terminals.

1: S curve 1

The output frequency has progressive increase or decrease by S curve 1. S curve 1 applies to the scenarios requiring smooth startup or shutdown; the time proportion for starting section and ending section of S curve 1 are respectively defined in Parameter F1.0.29 and F1.0.30.

2: S curve 2

In S curve 2, the motor rated frequency is always the deflection point of S curve, as shown in picture below. Generally, it applies to the scenarios of fast acceleration/deceleration in high-speed area above the rated frequency.



When the set frequency is above the rated frequency, the acceleration/deceleration period is:

$$t = \left(\frac{4}{9} \times \left(\frac{\text{Set frequency}}{\text{Rated frequency}}\right)^2 + \frac{5}{9}\right) \times T$$

Function Code	Name	Set Range	Factory Default Value
F1.0.27	Reference frequency of acceleration/deceleration period	0: Max. frequency 1: Given frequency 2: 100Hz	0
F1.0.28	Unit of acceleration/deceleration period	0: 1s 1: 0.1s 2: 0.01s	1

0: Max. frequency

The acceleration/deceleration period, which is between frequency 0 and the max. frequency, will change along with the max. frequency

1: Given frequency

The acceleration/deceleration period, which is between frequency 0 and the given frequency, will change along with the given frequency

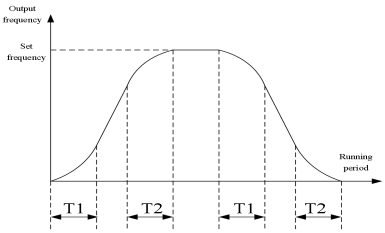
2: 100Hz

The acceleration/deceleration period, which is between frequency 0 and 100Hz, is a constant value

Note: The inching acceleration/deceleration is also controlled by it

Function Code	Name	Set Range	Factory Default Value
F1.0.29	Proportion of S curve starting section	000.0%~100.0%	030.0
F1.0.30	Proportion of S curve ending section	000.0%~100.0%	030.0

The time proportion for starting/ending section of S curve 1 is respectively defined by function code F1.0.29 and F1.0.30. The two parameters should be: F1.0.29+ F1.0.30≤100.0%. See description of diagram below:



T1 is the set value of function code F1.0.29. The slope of output frequency in this period will gradually increase from zero.

T2 is the set value of function code F1.0.30. The slope of output frequency in this period will gradually decrease to zero.

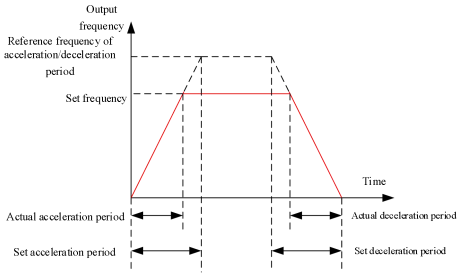
The slope of output frequency change maintains constant in the period between T1 and T2.

Function Code	Name	Set Range	Factory Default Value
F1.0.31	Acceleration period	0000.1s~6500.0s	Model
F1.0.32	Deceleration period	0000.1s~6500.0s	Model
F1.0.33	Acceleration period 2	0000.0s~6500.0s	Model
F1.0.34	Deceleration period 2	0000.0s~6500.0s	Model
F1.0.35	Acceleration period 3	0000.0s~6500.0s	Model
F1.0.36	Deceleration period 3	0000.0s~6500.0s	Model
F1.0.37	Acceleration period 4	0000.0s~6500.0s	Model
F1.0.38	Deceleration period 4	0000.0s~6500.0s	Model

Acceleration period: The period for the Product to increase to acceleration/deceleration reference frequency (given by function code F1.0.27) from zero frequency.

Deceleration period: The period for the Product to decrease to zero frequency from acceleration/deceleration reference frequency.

See introduction in diagram below:



Function Code	Name	Set Range	Factory Default Value
F1.0.39	Switching frequency point between acceleration 1 and 2	000.00Hz~Max. frequency	000.00
F1.0.40	Switching frequency point between deceleration 1 and 2	000.00Hz~Max. frequency	000.00
F1.0.41	Switching frequency point between acceleration 2 and 3	000.00Hz~Max. frequency	000.00
F1.0.42	Switching frequency point between deceleration 2 and 3	000.00Hz~Max. frequency	000.00
F1.0.43	Switching frequency point between acceleration 3 and 4	000.00Hz~Max. frequency	000.00
F1.0.44	Switching frequency point between deceleration 3 and 4	000.00Hz~Max. frequency	000.00

The function codes above are used for setting the acceleration/deceleration period and the frequency at switching point between acceleration/deceleration period. Acceleration/deceleration period 2 is adopted when the Product's running frequency is lower than the set value of the two function codes; otherwise, the acceleration/deceleration period 1 will be adopted. It also applies to acceleration/deceleration period 3 and 4.

Function Code	Name	Set Range	Factory Default Value
F1.0.45	Inching priority	0: Invalid 1: Valid	0

This function code is used for setting the top priority of inching function. The inching function includes keyboard inching function and terminal inching function.

When F1.0.45=1, the Product will be switched to inching running status if inching instruction occurs in the running process. The target frequency is inching frequency, while the acceleration/deceleration period is inching acceleration/deceleration period.

Function Code	Name	Set Range	Factory Default Value
F1.0.46	Inching running frequency	000.00~Max. frequency	002.00
F1.0.47	Inching acceleration period	0000.0s~6500.0s	0020.0
F1.0.48	Inching deceleration period	0000.0s~6500.0s	0020.0

The function code above defines the given frequency, acceleration/deceleration period when the Product is under inching running.

Function Code	Name	Set Range	Factory Default Value
F1.0.49	Set swing frequency	0: Relative to the set frequency	0

		1: Relative to the max. frequency	
F1.0.50	Swing frequency amplitude	000.0%~100.0%	000.0
F1.0.51	Jump amplitude	00.0%~50.0%	00.0
F1.0.52	Swing frequency period	0000.1s~3000.0s	0010.0
F1.0.53	Rise time of swing frequency triangle wave	000.1%~100.0%	050.0

The function codes above are used for swing frequency control.

Group F1.1 Motor Parameter Setting

Function Code	Name	Set Range	Factory Default Value
F1.1.00	Motor type	0: Common motor 1: Variable frequency motor	0

This function code is used for setting the type of the Product's load motor.

0: Common motor

The electric thermal protection value should be adjusted properly, for the cooling effects of common motor can be weakened during low-speed running; the low-speed compensation characteristic of motor protection mode means reduction of motor overload protection threshold when running frequency is lower than 30Hz.

1: Variable-frequency motor

No adjustment of protection threshold is required at low speed, for the variable-frequency motor is provided with forced air cooling and its cooling effects are not affected by revolving speed.

Function Code	Name	Set Range	Factory Default Value
F1.1.01	Motor rated power	0000.1kW~1000.0kW	Model
F1.1.02	Motor rated frequency	000.01Hz~Max. frequency	050.00
F1.1.03	Motor rated voltage	0001V~2000V	Model
F1.1.04	Motor rated current	000.01A~655.35A	Model
F1.1.05	Motor rated speed	00001rpm~65535rpm	Model

The customized motor parameter sets are shown in table above. User can configure the relevant parameter information based on the nameplate of motor used.

Function Code	Name	Set Range	Factory Default Value
F1.1.06	Motor overload protection level	00.20~10.00	01.00

User should set the value of F1.1.06 properly according to the actual overload capability and load condition of motor; otherwise, it may give out motor overload fault when the value is too low, or there may have risk of motor burning if the value

is too high, especially that the Product's rated current is higher than that of motor. When F1.1.06=01.00, the motor overload protection level is 100% motor rated current.

Function Code	Name	Set Range	Factory Default Value
F1.1.07	Control over parameter identification	0: No action 1: Static identification 2: Complete identification 11~12: Reserved	00

0: No action

No parameter identification is performed. The Product is under normal operation status

1: Static identification

This method can be adopted when the load and asynchronous motor cannot be separated completely. Make sure to set the parameter of F1.1.00~F1.1.05 correctly prior to identification. Once setting is done, press RUN key to carry out static identification of the Product, and only seven parameters of F1.1.10~F1.1.12 and F1.3.10~F1.3.13 can be acquired after completion of identification.

2: Complete identification

This method can be adopted when the load and asynchronous motor can be separated completely (this method is prioritized if possible, for it has better effects). Make sure to set the parameter of F1.1.00~F1.1.05 correctly prior to identification. Once setting is done, press RUN key to carry out complete identification of the Product, and nine parameters of F1.1.10~F1.1.14 and F1.3.10~F1.3.13 are acquired after identification.

Function Code	Name	Set Range	Factory Default Value
F1.1.08	Tuning KP coefficient	1~200	100
F1.1.09	Tuning KIT coefficient	1~200	100

The parameters above are the KP and KI parameters while identifying rotor resistance and leakage inductance. KP and KI can be reduced when oscillation occurs during motor identification (in static stage and non-rotating stage). However, the identification results can be inaccurate when KP and KI are too low.

Function Code	Name	Set Range	Factory Default Value
F1.1.10	Stator resistor of asynchronous motor	00.001Ω~65.535Ω	Model
F1.1.11	Rotor resistor of asynchronous motor	00.001Ω~65.535Ω	Model
F1.1.12	Leakage inductance of asynchronous motor	000.01mH~655.35mH	Model
F1.1.13	Mutual inductance of asynchronous motor	0000.1mH~6553.5mH	Model
F1.1.14	No-load current of asynchronous motor	000.01A~Motor rated current	Model

Function code F1.1.10~F1.1.14 is the intrinsic parameter of AC asynchronous motor. There are certain requirements for motor parameters, especially the vector control, regardless of VF/ control or vector control; the value of F1.1.10~F1.1.14 must be very close to the intrinsic parameter of motor and the vector control performance can be better when parameters are more accurate. Therefore, it is recommended to identify the motor through function code F1.1.07 when vector control is adopted. Where identification is unavailable at site, enter the parameters which are provided by motor manufacturer into the corresponding function codes above.

Group F1.2 VF Control of Asynchronous Machine

Function Code	Name	Set Range	Factory Default Value
F1.2.00	V/F curve mode	0: Straight line 1: Multi-point broken line 2: Square V/F curve 1 3: Square V/F curve 2 4: Square V/F curve 3	0

0: Straight line V/F

Applies to common constant-torque load

1: Multi-point broken line

The VF relationship curve of any broken line can be acquired by setting function code F1.2.01~F1.2.06.

2: Square V/F.

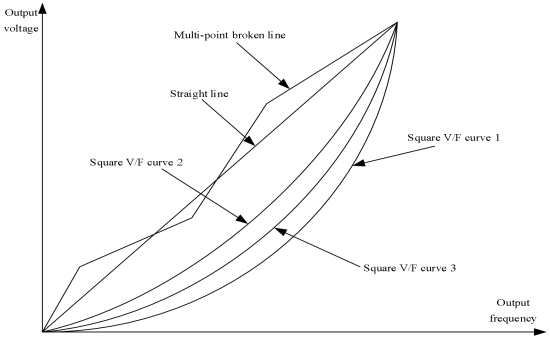
Applies to centrifugal loads such as fan and water pump

3: Square V/F curve 2

4: Square V/F curve 3

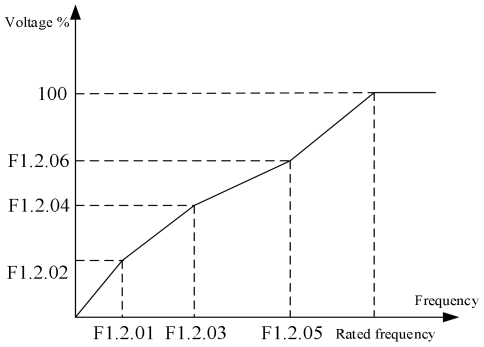
The relationship curve between straight line V/F and square V/F

The curves are as shown in diagram below:



Function Code	Name	Set Range	Factory Default Value
F1.2.01	Frequency of broken line V/F point 1	000.00Hz~F1.2.03	000.00
F1.2.02	Voltage of broken line V/F point 1	000.0%~100.0%	000.0
F1.2.03	Frequency of broken line V/F point 2	F1.2.01~F1.2.05	000.00
F1.2.04	Voltage of broken line V/F point 2	000.0%~100.0%	000.0
F1.2.05	Frequency of broken line V/F point 3	F1.2.03~Motor rated frequency	000.00
F1.2.06	Voltage of broken line V/F point 3	000.0%~100.0%	000.0

The function codes above define the V/F curve of multi-point broken line. The voltage of broken lines above is the percentage of motor rated voltage. The multi-point broken line V/F curve should be given according to motor load characteristics. Note: The relationship between three voltage points and frequency points must be: F1.2.01<F1.2.03<F1.2.05, F1.2.02<F1.2.04<F1.2.06. See description of diagram below:



Note: The voltage should not be too high at low frequency; otherwise, the Product may give out alarm of overcurrent fault or the motor can be burnt.

Function Code	Name	Set Range	Factory Default Value
F1.2.07	Torque boost	00.0% (auto torque boost) 00.1%~30.0%	Model
F1.2.08	Cut-off frequency of torque boost	000.00Hz~Max. frequency	050.00

Make compensation to the output voltage in low-frequency working area, in order to make compensation to the low-frequency torque characteristic of V/F control. Generally, the default factory value can meet the requirements; otherwise, overcurrent fault may occur when compensation is too high. It is recommended to increase this parameter when load is heavy while motor has insufficient low-frequency torque. This parameter can be reduced when load is light.

When torque boost is set as 00.0%, the Product will have auto torque boost and calculate the required torque boost automatically based on the parameters such as motor rotor resistance. It is recommended to identify the motor through function code F1.1.07, in order to acquire the best performance of auto torque boost. For details, please refer to description of function code F1.1.07.

Cut-off frequency of torque boost: The torque boost is valid when output frequency is under the set value; the torque boost will be invalid when this value is exceeded.

Function Code	Name	Set Range	Factory Default Value
F1.2.09	VF online torque compensation gain	0~200	150

When torque boost is set as 00.0%, the Product will have auto torque boost; F1.2.09 is the coefficient of auto torque boost. The optimal adjustment range is 100-150 after parameter identification. No adjustment is required in general.

Function Code	Name	Set Range	Factory Default Value
F1.2.10	V/F over-excitation gain	000~200	120

The over-excitation control can suppress the voltage rise of DC busbar due to pump voltage rise while the Product is decelerating, in order to avoid the fault of overvoltage. The suppression effects can increase along with the over-excitation gain. However, it may lead to increase of output current and even overcurrent fault when the over-excitation gain is too high. It is suggested to set over-excitation gain as 0 when DC busbar voltage rise is not high or the scenarios with braking resistance.

Function Code	Name	Set Range	Factory Default Value
F1.2.11	V/F slip compensation gain	000.0%~200.0%	000.0

As the percentage of motor rated slip, this function code applies to the asynchronous motor only. It is the compensation slip when motor has rated load. The motor rated slip can be calculated automatically according to the motor rated frequency and rated speed. The V/F slip compensation can make compensation to the motor speed deviation when asynchronous motor has load increase, in order to ensure basic stability of revolving speed.

Function Code	Name	Set Range	Factory Default Value
F1.2.12	VF slip compensation response time	0~10.0s	0.5

This function code is the response time when making slip compensation to VF control of asynchronous machine; the response will be slower when this function code increases, or be faster when this function code decreases; however, oscillation may occur easily when this function code is too low. The value of F1.2.12 can be increased when oscillation occurs due to slip compensation.

Function Code	Name	Set Range	Factory Default Value
F1.2.13	VF oscillation suppression mode	1~4	1

This function code applies to the inhibition mode of motor oscillation only. The effects may vary along with the inhibition modes.

Note: The Product will enter auto torque boost when torque boost is set as 00.0%. The software is fixed as oscillation inhibition mode 3.

F1.2.14	VF oscillation inhibition	0~100	Model

This function code is VF oscillation inhibition coefficient and the inhibition capability will improve along with the coefficient. However, it may lead to faults such as oscillation if the coefficient is too high. Generally, it is between 20 and 60.

Function Code	Name	Set Range	Factory Default Value
F1.2.15	Sensitivity of overcurrent stall protection	000: No overcurrent stall protection function 001~100	020
F1.2.16	Overcurrent stall protection current	100%~200%	150

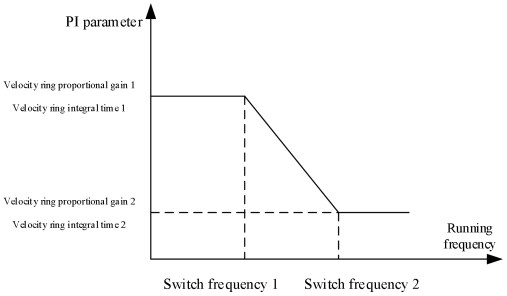
When output current exceeds the overcurrent stall protection current during deceleration of the Product, the Product will stop deceleration and maintain the current running frequency; the Product will continue deceleration when the output current is reduced. The set value of function code F1.2.16 is the percentage of motor rated current.

Overcurrent stall protection sensitivity is used for adjusting the Product's capability of overcurrent suppression during deceleration. The overcurrent suppression capability will increase along with this value. This value should be as low as possible on the condition that there's no overcurrent.

Group F1.3 Basic Parameters of Vector Control

Function Code	Name	Set Range	Factory Default Value
F1.3.00	Velocity ring proportional gain 1	001~100	030
F1.3.01	Velocity ring integral time 1	00.01~10.00	00.50
F1.3.02	Switch frequency 1	000.00Hz~F1.3.05	005.00
F1.3.03	Velocity ring proportional gain 2	001~100	020
F1.3.04	Velocity ring integral time 2	00.01~10.00	01.00
F1.3.05	Switch frequency 2	F1.3.02~Max. frequency	010.00

The function codes above can select different velocity ring PI parameters at different running frequencies of the Product. The velocity ring PI regulation parameter will be F1.3.00 and F1.3.01 when the running frequency is lower than switch frequency 1 (F1.3.02), or the speed ring parameter will be F1.3.03 and F1.3.04 when the running frequency is higher than switch frequency 2 (F1.3.05). The velocity ring PI parameter between switch frequency 1 and 2 is linear switch of two groups of PI parameters.



The system's dynamic response can be accelerated by increasing the proportional gain P, but the system may have oscillation easily when P is too high. The system's dynamic response can be accelerated when integral time I is reduced; but the system may have oscillation easily when I is too small. Generally, the proportional gain P should be adjusted firstly, and P should be increased on the premise that system has no oscillation; then adjust the integral time I to ensure fast response of system and avoid high overshoot.

Function Code	Name	Set Range	Factory Default Value
F1.3.06	Attribute of velocity loop integral	0: Invalid 1: Valid	0

This function code will be valid if it is set as 1, the integral coefficient of velocity loop will become 0 and only KP of velocity loop will take effects.

Function Code	Name	Set Range	Factory Default Value
F1.3.07	Upper limit source of vector control torque	0: Given by figure (F1.3.08) 1: Given by external terminal VF1 2: Given by external terminal VF2	0

		3: Given by multi-segment instruction terminal 4: Given by PULSE (DI6) 5: Given by communication 6: MIN (VF1, VF2) 7: MAX(VF1, VF2) 8: Operation result 1 9: Operation result 2 10: Operation result 3 11: Operation result 4	

0: Given by figure (F1.3.08)

The upper limit of vector control torque is given by the set value of function code F1.3.08

1: Given by external terminal VF1

2: Given by external terminal VF2

The upper limit of vector control torque is given by analog input terminal. The Product provides 2-way analog input terminal (VF1, VF2). VF1 and VF2 can be 0V~10V voltage input or 0/4mA~20mA current input. The VF1 and VF2 input and corresponding relationship curve of torque upper limit can be freely selected by user in 4 relationship curves through function code F3.2.10; in which, Curve 1 and 2 have straight line relationship and can be given by function code F3.2.00~ F3.2.09. Curve 3 and 4, which have the broken line relationship with 2 deflection points, can be given by function code F3.2.12~F3.2.27 The deviation between actual voltage and sampling voltage of analog input terminal can be adjusted through the function code F4.1.05~F4.1.12.

3: Given by multi-segment instruction terminal

The upper limit of vector control torque is given by different combination status of multi-segment instruction terminal. 4 multi-segment instruction terminals (terminal function 9~12; for details, please refer to function description of F3.0.01~F3.0.10 multi-segment instruction terminal) can be set in the Product.

4: Given by PULSE (DI6)

The upper limit of vector control torque is given by the high-speed pulse frequency of digital input terminal DI6. (Terminal function can be undefined). The corresponding relationship between high-speed pulse frequency and torque upper limit, which can be set through the function code F3.0.13~F3.0.16, is straight-line relationship.

5: Given by communication

The upper limit of vector control torque is given by upper computer through communication. (For details, please refer to Chapter 8)

6: MIN(VF1, VF2)

The upper limit of vector control torque is given by the lower input between VF1 and VF2.

7: MAX(VF1, VF2)

The upper limit of vector control torque is given by the higher input between VF1 and VF2.

8: Operation result 1

9: Operation result 2

10: Operation result 3

11: Operation result 4

The upper limit of vector control torque is decided by the operation result that passes calculation and setting of internal operation module. For details of operation module, please refer to description of function code F5.1.26~F5.1.39. The operation results can be checked via function code F9.0.46~F9.0.49.

Note: When the upper limit of vector control torque is given by VF1, VF2, multi-segment instruction, PULSE, communication and operation result, the corresponding range is the set value of F1.3.08.

Function Code	Name	Set Range	Factory Default Value
F1.3.08	Set upper limit of torque	000.0%~200%	150.0

When F1.3.07=0, the set value of this function code decides the upper limit of vector control torque. It is percentage of motor rated torque.

Function Code	Name	Set Range	Factory Default Value
F1.3.09	Vector control slip gain	50%~200%	100

As for speed sensor-less speed control, this function code is used for adjusting the stable speed accuracy of motor; increase this parameter when the charged dynamic load of motor has low speed and vice versa.

Function Code	Name	Set Range	Factory Default Value
F1.3.10	Excitation regulation ratio KP	00000~60000	2000
F1.3.11	Excitation regulation integral KI	00000~60000	1300
F1.3.12	Torque regulation ratio KP	00000~60000	2000
F1.3.13	Torque regulation integral KI	00000~60000	1300

Regulation parameter of vector control current loop PI. This parameter can be acquired automatically during motor tuning; no modification is required in general.

Note: For integral controller of velocity loop, the integral time is not taken as dimension, but the integral gain is set directly. The entire control loop may have oscillation when velocity loop PI gain is too high; the PI proportional gain or integral gain can be reduced manually in case of current oscillation or large torque ripple.

6.3 Group F2 of Motor Control Parameters and Fault Protection

Group F2.0 Open Loop Vector SVC of Asynchronous Machine

Function Code	Name	Set Range	Factory Default Value
F2.0.00	Magnetic flux closed-loop bandwidth	0~5.00HZ	2

This function code is the bandwidth of flux closed loop during open loop vector control; the flux bandwidth will increase along with the frequency, but oscillation may occur if the flux response is too high. No modification is required in general.

Function Code	Name	Set Range	Factory Default Value
F2.0.03	Min. flux given value	30~100	30

This function code is the min. set value of flux during open loop vector control. No modification is required in general.

Function Code	Name	Set Range	Factory Default Value
F2.0.04	Voltage margin	0~100	5

This function code is the set voltage margin during open loop vector control. The margin of weak magnetic area will increase and weak magnetism will be entered sooner when the set value increases. No modification is required in general.

Function Code	Name	Set Range	Factory Default Value
F2.0.05	Weak magnetism coefficient	50~100	80

This function code is the max. torque limitation of weak magnetism area. The limitation of weak magnetism area will increase along with the increase of this function code, but overcurrent may occur if this function code is too high. No modification is required in general.

Function Code	Name	Set Range	Factory Default Value
F2.0.06	Velocity filtering	0~100ms	15

This function code is the velocity filtering time under open loop vector control; the filtering will increase along with the set value. The response will be faster when the set value decreases, but oscillation may occur when the set value is too low.

Function Code	Name	Set Range	Factory Default Value
F2.0.07	Over-modulation coefficient	100%~120%	105

This function code is the overmodulation coefficient of output voltage in case of weak magnetism area. The voltage and current harmonic will increase along with the function code. No modification is required in general.

Function Code	Name	Set Range	Factory Default Value
F2.0.08	Torque switch	0.0~50.0	20

This function code is the parameter of torque reduction flux under open loop vector control. The flux and motor loss will be reduced when the upper limit of set torque is below F2.0.08.

Function Code	Name	Set Range	Factory Default Value
F2.0.09	Response mode	0~2	1

This function code is the response mode setting under open loop vector control. The response will be faster along with increase of set value.

Function Code	Name	Set Range	Factory Default Value
F2.0.10	Max. output current of inverter	100.0~200.0	180

This function code is the limitation of max. current output. No modification is required in general.

Group F2.1 Torque Control

Function Code	Name	Set Range	Factory Default Value
F2.1.00	Select speed/torque control mode	0: Speed control 1: Torque control	0

This function code is used for setting whether the Product is running at speed control mode or torque control mode.

When F2.1.00=0, speed control mode is entered

When F2.1.00=1, torque control mode is entered

Function Code	Name	Set Range	Factory Default Value
F2.1.01	Set source of torque	0: Given by figure (F2.1.02) 1: Given by external terminal VF1 2: Given by external terminal VF2 3: Given by multi-segment instruction terminal 4: Given by PULSE (DI6)	00

		5: Given by communication 6: MIN(VF1, VF2) 7: MAX(VF1, VF2) 8: Operation result 1 9: Operation result 2 10: Operation result 3 11: Operation result 4 12: Standby torque source 1 13: Standby torque source 2	

0: Given by figure (F2.1.02)

The torque is given by the set value of function code F2.1.02

1: Given by external terminal VF1

2: Given by external terminal VF2

The torque is given by analog input terminal. The Product provides 2-way analog input terminal (VF1, VF2). VF1 and VF2 can be 0V~10V voltage input, or 0/4mA~20mA current input. The VF1 and VF2 input and corresponding relationship curve of set torque can be freely selected by user in 4 relationship curves through function code F3.2.10; in which, Curve 1 and 2 have straight line relationship and can be given by function code F3.2.00~F3.2.0908. Curve 3 and 4, which have the broken line relationship with 2 deflection points, can be given by function code F3.2.12~F3.2.27. The deviation between actual voltage and sampling voltage of analog input terminal can be adjusted through the function code F4.1.05~F4.1.1208.

3: Given by multi-segment instruction terminal

The torque is given by the different combination status of multi-segment instruction terminal. 4 multi-segment instruction terminals (terminal function 9~12; for details, please refer to function description of F3.0.01~F3.0.10 multi-segment instruction terminal) can be set in the Product.

4: Given by PULSE (DI6)

The torque is given by the high-speed pulse frequency of digital input terminal DI6 (terminal function can be undefined). The corresponding relationship between high-speed pulse frequency and torque given value can be set through function code F3.0.13~F3.0.16, and it is straight-line relationship.

5: Given by communication

The torque is given by upper computer through communication. (For details, please refer to Chapter 8)

6: MIN(VF1, VF2)

The torque is given by the lower input between VF1 and VF2.

7: MAX(VF1, VF2)

The torque is given by the lower input between VF1 and VF2.

8: Operation result 1

9: Operation result 2

10: Operation result 3

11: Operation result 4

The set torque is decided by the operation result that passes calculation and setting of internal operation module. For details of operation module, please refer to description of function code F5.1.26~F5.1.39. The operation results can be checked via function code F9.0.46~F9.0.49.

12: Standby torque source 1

13: Standby torque source 2

Standby torque source 1 and 2 are reserved by manufacturer for the application in special scenarios and can be neglected by general users.

Note: When the torque is given by VF1, VF2, multi-segment instruction, PULSE, communication and operation result, the corresponding range is the set value of F2.1.02.

Function Code	Name	Set Range	Factory Default Value
F2.1.02	Set torque figure	-200.0%~200.0%	150.0

When F2.1.01=0, the set torque is decided by the set value of this function code. It is percentage of motor rated torque.

Function Code	Name	Set Range	Factory Default Value
F2.1.03	Forward frequency limit of torque control	000.00Hz~Max. frequency	050.00
F2.1.04	Backward frequency limit of torque control	000.00Hz~Max. frequency	050.00

The two function codes are used for setting the max. frequency of forward/reverse running when the Product is under torque control mode (i.e. F2.1.00=1).

Function Code	Name	Set Range	Factory Default Value
F2.1.05	Torque acceleration	0000.0s~6500.0s	0000.0
F2.1.06	Torque deceleration	0000.0s~6500.0s	0000.0

The two functions are used for setting the acceleration time of torque rise and deceleration time of torque drop when the Product is under torque control mode (i.e. F2.1.00=1). It can be set as 0 in the scenarios requiring fast response.

Group F2.2 Motor Start/stop Control

Function Code	Name	Set Range	Factory Default Value
F2.2.00	Starting mode	0: Direct startup 1: Speed tracking startup 2: Braking restart	0

0: Direct startup

The Product starts running from the starting frequency.

1: Speed tracking startup

The Product will firstly judge the motor speed and direction, then start at the tracked motor frequency and realize smooth and impact-free startup of revolving motor. This function code applies to the instantaneous power-failure restart with large-inertia load. The motor parameters should be set accurately, in order to guarantee the performance of speed tracking startup.

2: Braking restart

Implement DC braking firstly, then start running from the starting frequency.

Function Code	Name	Set Range	Factory Default Value
F2.2.01	Forward/reverse dead time	0000.0s~3000.0s	0000.0

This function code is used for setting the continuous output period of 0Hz when the Product is in the forward/reverse switch process.

Function Code	Name	Set Range	Factory Default Value
F2.2.02	Speed tracking mode	0: Start from shutdown frequency 1: Start from 50HZ 2: Start from the max. frequency 3: Magnetic field orientation (parameter identification required)	0

0: Start from shutdown frequency

Have downward tracking based on the frequency at the shutdown moment. This mode is adopted in general.

1: Start from 50HZ

Have upward tracking from 50HZ. It is adopted when the Product is restarted after long-term shutdown.

2: Start from the max. frequency

Have downward tracking from the max. frequency.

3: Magnetic field orientation

Have speed tracking through magnetic field orientation, to adapt to different

running directions; the velocity tracking has small current and high speed. However, parameter identification is required. Refer to function code F1.1.07 for the details of parameter identification.

Note: This function code applies only if startup mode is speed tracking startup (i.e. F2.2.00=1). SVC is internally controlled as magnetic field orientation by open loop vector control, to carry out speed tracking.

Function Code	Name	Set Range	Factory Default Value
F2.2.03	Velocity tracking speed	1~100	20

This function code is used for setting the velocity of VF velocity tracking, and it will take effects when startup mode is set as tracking startup (**i.e. F2.2.00=1**) and F2.2.02 is not 3; the tracking will be faster along with increase of the set value; however, it may have poor tracking effects when the set value is too high, and open loop vector control will be invalid.

Function Code	Name	Set Range	Factory Default Value
F2.2.04	Velocity tracking current	0%~200%	Model

This function code is used for setting the tracking current during VF velocity tracking. It will take effects when startup mode is set as tracking startup (i.e. **F2.2.00=1**) and F2.2.02 is not 3; it may have higher current and better effects when the set value increases, but the motor heating will be higher. Tracking may fail if the set value is too low. It must be ≥ motor no-load current. Open loop vector control will be invalid.

Function Code	Name	Set Range	Factory Default Value
F2.2.05	Velocity tracking KP	0~1000	500
F2.2.06	Velocity tracking KI	0~1000	800

This function code is used for setting KP and KI during VF velocity tracking; it will take effects when startup mode is set as tracking startup (i.e. **F2.2.00=1**) and F2.2.02 is not 3; the response will be faster when the set value increases. However, oscillation and overcurrent will occur when this value is too high. KP and KP can be reduced in case of oscillation. Open loop vector control will be invalid.

Function Code	Name	Set Range	Factory Default Value
F2.2.07	Velocity tracking demagnetization period	0.00s~10.00s	Model

This function code is the motor demagnetization waiting period of velocity tracking startup when the Product stops output. The waiting period will increase along with the set value. However, overcurrent may occur when the set value is too low. The demagnetization period will increase along with the motor power.

F2.2.08	Min. frequency of velocity tracking	000.00Hz~10.00Hz	1.5HZ

When the search frequency is below the value of F2.2.08, the motor is considered as static startup status and it will be switched to normal startup mode directly. This value should not be too low; otherwise, it may lead to tracking failure.

Function Code	Name	Set Range	Factory Default Value
F2.2.09	DC braking current at startup	000%~100%	000
F2.2.10	DC braking current at startup	000.0s~100.0s	000.0

DC braking current at startup: The Product's output current during DC braking, percentage of motor rated current; the braking force will increase along with the DC braking current at startup.

DC braking current at startup: The hold period of DC braking current at startup when the Product is being started. The DC braking function at startup is invalid when the braking period at startup is set as 000.0.

Function Code	Name	Set Range	Factory Default Value
F2.2.11	Shutdown mode	0: Deceleration shutdown 1: Free shutdown	0

0: Deceleration shutdown

When the shutdown instruction becomes valid, the Product will reduce the output frequency according to the deceleration period, and then shut down when the frequency is reduced to 0.

1: Free shutdown

When the shutdown instruction becomes valid, the Product will stop output immediately and have free shutdown according to the mechanical inertia.

Function Code	Name	Set Range	Factory Default Value
F2.2.12	Starting frequency of DC braking at shutdown	000.00Hz~Max. frequency	000.00
F2.2.13	Waiting time of DC braking at shutdown	000.0s~100.0s	000.0
F2.2.14	DC braking current at shutdown	000%~100%	000
F2.2.15	DC braking time at shutdown	000.0s~100.0s	000.0

When the output frequency is reduced to the set frequency of F2.2.12 in deceleration shutdown process, the Product will start output of braking current that is set in F2.2.14 after the waiting period set in F2.2.13; the Product will stop DC

braking when reaching the DC braking period that is set in F2.2.15 to complete the shutdown process.

Set the waiting time F2.2.13 of DC braking at shutdown properly to prevent the fault, such as overcurrent of DC braking at high speed. The DC braking current at shutdown F2.2.14 is the percentage of motor rated current; the braking force will increase along with the braking current at shutdown. The function of DC braking current at shutdown will be invalid when the DC braking time at shutdown is set as 000.0.

Note: F2.2.12 and F2.2.13 can also realize the climbing function of the Product: This function can reduce the Product's instability. When the Product is decelerated to the set frequency of F2.2.12 during shutdown, it will stop for a period set in F2.2.13 and then continue deceleration until it has shutdown. Generally, F2.2.12 is set as 0.05Hz, while F2.2.13 is set as 0.1s.

Group F2.3 Fault and Protection Setting

Function Code	Name	Set Range	Factory Default Value
F2.3.00	Auto reset times of fault	00: No auto reset of fault 01~20	00
F2.3.01	Waiting interval of fault auto reset	000.1s~100.0s	001.0

When F2.3.00=0, the Product has no auto reset function of fault and maintains the faulty status.

When F2.3.00>0, the Product will select the auto reset times of fault. The faulty status will be maintained after exceeding this number.

Function code F2.3.01 is the waiting time of auto fault reset after the Product gives out fault alarm.

Function Code	Name	Set Range	Factory Default Value
F2.3.02	Action selection of fault output terminal during auto reset period of fault	0: No action 1: Action	0

This function code is used for setting whether faulty output terminal has action during the period of fault auto reset.

When F2.3.02=0, the faulty output terminal has no action during the period of fault auto reset.

When F2.3.02=1, the faulty output terminal has action during the period of fault auto reset. When fault has auto reset, the faulty output terminal signal will reset as well.

Function Code	Name	Set Range	Factory Default Value
F2.3.03	Selection 1 of fault protection action	0: Free shutdown 1: Stop by shutdown mode 2: Continue operation Ones place: Motor overload Tens place: Input missing phase Hundreds place: Output missing phase Thousands place: External fault Ten thousands place: Communication error	00000
F2.3.04	Selection 2 of fault protection action	0: Free shutdown 1: Stop by shutdown mode 2: Continue operation Ones place: Motor load loss Tens place: Feedback loss Hundreds place: Customized fault 1 Thousands place: Customized fault 2 Ten thousands place: Power-on time reached	00000
F2.3.05	Selection 3 of fault protection action	Ones place: Running period reached 0: Free shutdown 1: Stop by shutdown mode 2: Continue operation Tens place: Reserved 0: Free shutdown Hundreds place: Parameter read/write error 0: Free shutdown 1: Stop by shutdown mode Thousands place: Motor overheat 0: Free shutdown 1: Stop by shutdown mode 2: Continue operation Ten thousands place: 24V power supply has fault 0: Free shutdown 1: Stop by shutdown mode	00000
F2.3.06	Selection 4 of fault protection action	0: Free shutdown 1: Stop by shutdown mode 2: Continue operation Ones place: Speed major deviation Tens place: Motor overspeed	00000

Function Code	Name	Set Range	Factory Default Value
		Hundreds place: Initial position error Thousands place: Reserved Ten thousands place: Reserved	

This function code F2.3.03~F2.3.06 is used for setting the action after the Product gives out alarm of fault. Each bit in selection of fault protection action corresponds to one fault protection. 0: Free shutdown after the Product gives alarm of fault; 1: Stop by shutdown mode after the Product gives out alarm of fault; 2: Continue running based on the frequency selected in function code F2.3.07 after the Product gives out alarm of fault.

Function Code	Name	Set Range	Factory Default Value
F2.3.07	Selection of continued running frequency at faulty condition	0: Run at current running frequency 1: Run at set frequency 2: Run at upper limit frequency 3: Run at lower limit frequency 4: Run at abnormal backup frequency	0

When a fault occurs while the Product is running and the fault treatment mode is continued running, the Product will display A** (** is fault code) and continue running based on the frequency selected by F2.3.07. When the fault treatment mode is deceleration shutdown, the Product will display A** during deceleration, or display Err** in shutdown status.

0: Run at current running frequency

Run at the current running frequency when the Product gives out alarm of fault

1: Run at set frequency

Run at the given frequency when the Product gives out alarm of fault

2: Run at upper limit frequency

Run at the lower limit frequency when the Product gives out alarm of fault

3: Run at lower limit frequency

Run at the lower limit frequency when the Product gives out alarm of fault

4: Run at abnormal backup frequency

Run at the set frequency of function code F2.3.08 when the Product gives out alarm of fault.

Function Code	Name	Set Range	Factory Default Value
F2.3.08	Standby frequency in case of error	000.0%~100.0%	100.0

When function code F2.3.07=4, the set value of this function code decides the

running frequency when the Product gives out alarm of fault. It is the percentage of the max. frequency.

Function Code	Name	Set Range	Factory Default Value
F2.3.09	Missing phase protection of input	0: Disable 1: Enable	1
F2.3.10	Sensitivity of input missing phase protection	01~10 (lower value, higher sensitivity)	5

This function code is used for setting whether the Product has protection of input missing phase.

When F2.3.09=0, the Product has no protection of input missing phase.

When F2.3.09=1, the Product will give out alarm of Err11 when input missing phase or input 3-phase unbalance is detected. The allowed degree of 3-phase unbalance is decided by function code F2.3.10; the response is slower and allowed 3-phase unbalance degree is higher when the set value increases. Note: No alarm will be given out when the Product is not running or motor load is light, even if F2.3.10 is small.

Function Code	Name	Set Range	Factory Default Value
F2.3.11	Missing phase protection of output	0: Disable 1: Enable	1

This function code is used for setting whether the Product has protection of output missing phase.

When F2.3.11=0, the Product has no protection of output missing phase.

When F2.3.11=1, the Product will give out alarm of Err12 when output missing phase or output 3-phase unbalance is detected.

Function Code	Name	Set Range	Factory Default Value
F2.3.12	Enable fast current limiting	0: Disable 1: Enable	1

Enable the fast current limiting to minimize the Product's overcurrent fault and ensure continuous operation of the Product. The Product may have damage due to overheat when it is under fast current limiting status continuously for long period; this case is not allowed, so the Product will report the fault of fast current limiting timeout (Err34) when the Product has fast current limiting for long period, which means the Product has overload and needs shutdown. Err34 fault protection will be disabled when the function code is set as 0.

Function Code	Name	Set Range	Factory Default Value
F2.3.13	Enable interphase short-circuit detection	0: Disable 1: Enable	1

Have short circuit detection to output before each running. The Product will report Err38 fault in case of output short circuit. Manual reset is not allowed when this fault occurs. The fault can be eliminated after powering on again.

When Err38 fault occurs, the user can remove the connection cable between the Product and motor, use VF to control running without connecting motor, to see if Err38 fault occurs; contact the manufacturer when the fault occurs. Output short circuit protection is not conducted when it is set as 0.

Function Code	Name	Set Range	Factory Default Value
F2.3.14	Protection function of power-on short-circuit protection to ground	0: Disable 1: Enable	1

This function code is used for enabling the protection function of power-on short-circuit protection to ground. Protection detection of short-circuit to ground will be conducted after each power-on, and the Product will report Err17 fault if there's short-circuit to ground; manual reset is not allowed when this fault occurs. The fault can be eliminated after powering on again. The detection protection of power-on short-circuit protection to ground will be cancelled when it is set as 0.

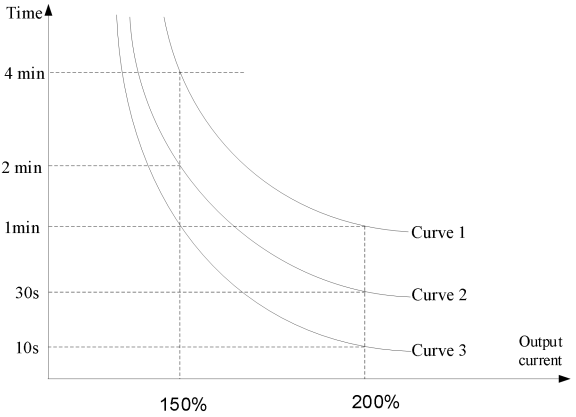
Function Code	Name	Set Range	Factory Default Value
F2.3.15	Motor overload protection	0: Prohibited 1: Curve 1 2: Curve 2 3: Curve 3	1
F2.3.16	Pre-alarm coefficient of motor overload	050%~100%	080

When F2.3.15=0: The Product has no overload protection function for motor. It is suggested to install a thermal relay between the Product and motor.

When F2.3.15=1, 2 or 3: The Product will judge whether motor has overload according to the inverse time characteristic curve of motor overload protection.

The function code F2.3.16 is used for determining the degree for pre-alarm before the motor has overload fault protection. The initial lead of pre-alarm will decrease along with the increase of this value. When the Product's output current accumulates and exceeds the product of inverse time limit of overload and F2.3.16, the Product's multi-function output terminal will output ON signal. The function of corresponding multi-function output terminal is motor overload pre-alarm (6).

The inverse time limit curve for overload protection of the Product is as shown in diagram below:



Inverse Time Curve of Overload Protection

Function Code	Name	Set Range	Factory Default Value
F2.3.17	Selection of load loss protection	0: Invalid 1: Valid	0
F2.3.18	Detection level of load loss	00.0%~100.0% (motor rated current)	010.0
F2.3.19	Detection time of load loss	0.0s~60.0s	01.0

The function code F2.3.17 is used for setting whether load drop function is valid. 0: Invalid. 1: Valid.

When load drop protection function is valid and the fault treatment mode is continuous running or deceleration shutdown, the Product's output frequency will be reduced to 7% of rated frequency when the Product's output current is lower than the corresponding current of load drop detection level F2.3.18 and the last period exceeds the load drop detection time F2.3.19; the Product will give out alarm of A19 in running or deceleration status, or give out alarm of Err19 in shutdown status, or have auto recovery to the given frequency for running when load is recovered.

Function Code	Name	Set Range	Factory Default Value
F2.3.20	Overspeed detection	00.0%~50.0%	20
F2.3.21	Overspeed detection period	00.0: No detection 00.1s~60.0s	1

This function will be valid only if the Product's running is under vector control of velocity sensor. The Product will report fault Err29 and have treatment according to the fault protection mode when the motor's actual velocity and set frequency are

detected by the Product, exceed the corresponding velocity of velocity detection value F2.3.20 and the last period exceeds velocity detection period F2.3.21.

Function Code	Name	Set Range	Factory Default Value
F2.3.22	Detection value of major velocity deviation	00.0%~50.0%	20
F2.3.23	Detection period of major velocity deviation	00.0: No detection 00.1s~60.0s	5

This function is valid only if the Product's running is under vector control of velocity sensor. The Product will report Err28 alarm and have treatment according to fault protection mode when the deviation between actual velocity and given frequency of motor is detected by the Product, the deviation exceeds the detection value F2.3.22 and the last period exceeds the deviation detection period F2.3.23. This function will be invalid when the velocity deviation detection period is set as 0.0s.

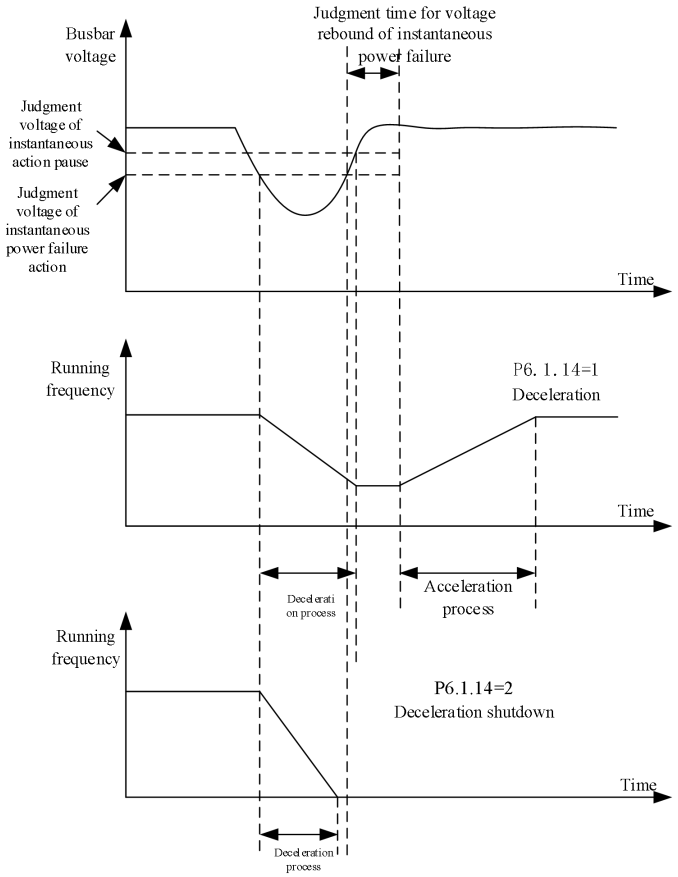
Function Code	Name	Set Range	Factory Default Value
F2.3.24	Selection of action in case of instantaneous power failure	0: Invalid 1: Deceleration 2: Deceleration shutdown	0
F2.3.25	Judgment time for voltage rebound of instantaneous power failure	0.00s~100.00s	000.50
F2.3.26	Judgment voltage of instantaneous power failure action	60.0%~100.0% (standard busbar voltage)	080.0
F2.3.27	Judgment voltage of instantaneous action pause	80.0%~100.0% (standard busbar voltage)	090.0

When F2.3.24=0, the Product will continue running at the current running frequency in case of instantaneous power failure or voltage drop.

When F2.3.24=1, the Product will enter deceleration running in case of instantaneous power failure or voltage drop when the busbar voltage is reduced below the voltage corresponding to set value of F2.3.26; when the busbar voltage is recovered to the voltage corresponding to set value of F2.3.26 and the last period exceeds the set time of F2.3.25, the Product will have normal acceleration and run at the given frequency. When the busbar voltage is recovered above the voltage corresponding to set value of F2.3.27 during deceleration, the Product will stop deceleration and maintain running at the current frequency.

When F2.3.24=2, the Product will enter deceleration running in case of instantaneous power failure or voltage drop when the busbar voltage is reduced below the voltage corresponding to set value of F2.3.26; the Product will shut down when it is decelerated to 0Hz while the busbar voltage is not

recovered.



F2.3.28	Selection of fire hazard mode	0: Fire hazard mode 0 1: Fire hazard mode 1 2: Fire hazard mode 2	0
F2.3.29	Running frequency of fire hazard	000.01Hz~Max. frequency	50.00

When DI terminal is selected as function 61 (fire hazard function), it is recommended to set F2.3.01 (waiting interval of fault auto reset) above 10S, in order to improve the Product's service life.

1. When F2.3.28= 0, the electric level is valid, the run/stop instruction and running frequency are controlled by the function code of inverter normal running. The

Product will shut down after the faults of Err01, Err02, Err03, Err04, Err05, Err06, Err07, Err08, Err09, Err16, Err17, Err34 and Err38, the faults will reset automatically after waiting for the period of F2.3.01 but the Product will not have auto startup; the rest faults will be screened.

2. When F2.3.28= 1, the electric level is valid, the running frequency is set by F2.3.29 and the Product will have auto startup; the Product can realize shutdown through the emergency shutdown button (when external terminal is set with function 43) or free shutdown button (when external terminal is set with function 8) or fire function is invalid (cancelled through electric level triggering); the Product will shut down after the faults of Err01, Err02, Err03, Err04, Err05, Err06, Err07, Err08, Err09, Err16, Err17, Err34 and Err38, the faults will reset automatically after waiting for the period of F2.3.01 and the Product will have auto startup; the rest faults will be screened.

3. When F2.3.28= 2, both electric level and rising edge are valid, the Product will have auto startup and no shutdown, unless it is powered off. The Product will shut down after the faults of Err01, Err02, Err03, Err04, Err05, Err06, Err07, Err08, Err09, Err16, Err17, Err34 and Err38, the faults will reset automatically after waiting for the period of F2.3.01 and the Product will have auto startup; the rest faults will be screened.

6.4 Group F3 of External Terminal

Group F3.0 External Terminal Group DI

Function Code	Name	Set Range	Factory Default Value
F3.0.00	Running control mode of external terminal	0: Two-line type 1 1: Two-line type 2 2: Three-line type 1 3: Three-line type 2	0

The Product's four different running modes will be controlled when the current control running mode defined by this function code is terminal control (i.e. F1.0.04=1). For details, please refer to terminal control of 7.1.1.

Function Code	Name	Set Range	Factory Default Value
F3.0.01	DI1 terminal function selection	0~61	01 (forward running)
F3.0.02	DI2 terminal function selection	0~61	02 (reversal running)
F3.0.03	DI3 terminal function selection	0~61	09 (multi-segment instruction terminal 1)
F3.0.04	DI4 terminal function selection	0~61	10 (multi-segment instruction terminal 2)

F3.0.05	DI5 terminal function selection	0~61	11 (multi-segment instruction terminal 3)
F3.0.06	DI6 terminal function selection	0~61	08 (free shutdown)
F3.0.07~ F3.0.10	Reserved		

The function codes above can be used for setting the functions of digital input terminals. The available functions are as shown in table below:

Set Value	Function	Description
0	No function	The unused terminals can be defined as “no function”, in order to avoid false action
1	Forward running (FWD)	Control the forward and reverse rotation of inverter through the two terminals
2	Reverse running (REM60V)	
3	Control over three-line type running	This terminal is used for confirming that the Product’s running mode is 3-line control mode. For details, please refer to terminal control of 7.1.1.
4	Forward inching	Control the forward/reverse inching of the Product through the two terminals; valid in any running control mode. For details of inching running frequency, acceleration/deceleration, please refer to description of function code F1.0.46, F1.0.47 and F1.0.48.
5	Reverse inching	
6	Terminal UP	When given by keyboard, the given frequency can be increased or decreased through the two terminals.
7	Terminal DOWN	
8	Free shutdown	When this terminal is valid, the Product will block output and the motor’s shutdown process will not be controlled by the Product. This method has the same meaning with the free shutdown mentioned in F2.2.11.
9	Multi-segment instruction terminal 1	16 instructions can be given through the 16 states of the four terminals. For details, please refer to attached Table 1.

10	Multi-segment instruction terminal 2	
11	Multi-segment instruction terminal 3	
12	Multi-segment instruction terminal 4	
13	Fault reset (RESET)	Realize remote fault reset through this terminal. It has the same function with RESET key on keyboard.
14	Pause running	When this terminal is valid, the Product will enter deceleration shutdown, but all running parameters will be recorded. When this terminal is invalid, the Product will recover to the running status before shutdown.
15	Input of external fault normally-on	When this terminal is valid, the Product will give out alarm Err13 and realize fault treatment according to the fault protection action
16	Acceleration/deceleration selection terminal 1	Switch 4 groups of straight-line acceleration/deceleration through the 2 terminals. For details, please refer to attached Table 3.
17	Acceleration/deceleration selection terminal 2	
18	Frequency source selection terminal 1	These terminals are valid only if F1.0.07=8. Switch 8 frequency sources through the 8 states of the 3 terminals. For details, please refer to attached Table 2.
19	Frequency source selection terminal 2	
20	Frequency source selection terminal 3	
21	Running command selection terminal 1	Switch the running control modes by connecting/disconnecting the 2 terminals. For details, please refer to attached Table 4.
22	Running command selection terminal 2	
23	Clear UP/DOWN set value	
Set Value	Function	Description
		When the frequency is given by keyboard, this terminal can clear the frequency that is corrected via terminal UP/DOWN or keyboard ▲, ▼, in order to recover the given frequency to the given value of F1.0.12.

24	Disable acceleration/deceleration	When this terminal is valid, the Product's output frequency will not be affected by external signals (except for shutdown command)
25	Pause PID	PID control is invalid temporarily; the Product will keep running at the current output frequency without making PID adjustment of frequency source.
26	Reset PLC status	While PLC is being executed, this terminal can recover the Product to the initial status of simplified PLC.
27	Swing frequency pause	The Product has output at the center frequency and the swing function is paused.
28	Counter input	The input terminal for defining the counting pulse. Connect DI6 terminal in case of high-speed pulse.
29	Counter reset	Clear the counter.
30	Length counting input	The input terminal for defining the length counting pulse. Connect DI6 terminal in case of high-speed pulse.
31	Length reset	Clear the length
32	Disable torque control	The Product is allowed to run in speed control mode only and prohibited from running in torque control mode.
33	PULSE input	Define PULSE input terminal. Connect DI6 terminal.
34	Immediate DC braking	When this terminal is valid, the Product is directly switched to DC braking status
35	External fault normally-off input	When this terminal is invalid, the Product will give out alarm of Err13 and have fault treatment according to the fault protection mode
36	Enable frequency modification	When this terminal is invalid, the Product has no response to the frequency changes. When this terminal is valid, the Product has response to the frequency change.
37	Reversal of PID function direction	When this terminal is valid, the action direction of PID is opposite to the given direction of F6.0.03. When F1.0.03=2, this terminal is valid and the running direction is reverse.
38	External parking terminal 1	When running control mode is keyboard control (F1.0.04=0), the Product can be stopped through this terminal

39	External parking terminal 2	The Product can have deceleration shutdown according to deceleration time 4 through this terminal in any running control mode
40	Pause PID integral	When the ones place of F6.0.28 is 1 (i.e. integral separation is valid) and this terminal is valid, then integral adjustment function is paused, while the proportional adjustment and integral adjustment function of PID are still valid.
41	Switch PID parameters	PID parameter 1 will be adopted when switch condition of PID parameter is terminal (F6.0.13=1) and this terminal is invalid
Set Value	Function	Description
		PID parameter 2 will be adopted when this terminal is valid
42	Switch speed control/torque control	Switch the Product between torque control and speed control mode through this terminal. The Product will run at the given mode of F2.1.00 (speed/torque control mode) when this terminal is invalid, or switch to another mode when this terminal is valid.
43	Emergency stop	The Product will stop voltage output and the load will have free shutdown based on its inertia when this terminal is valid.
44	Deceleration DC braking	When this terminal is valid, the Product will firstly decelerate to the starting frequency of shutdown DC braking and then switch to shutdown DC braking status.
45	Customized fault 1	When customized fault 1 and 2 are valid, the Product will give out alarm Err21 and Err22 respectively, and have fault treatment according to the action mode of fault protection
46	Customized fault 2	
47	Clear running time	Clear the present running time in running process. The current running time can be checked through function code F9.0.23
48	Timer input terminal 1	When the timing of internal timer is controlled by this terminal, the terminal will control the timing start or stop of timer. Refer to description of function code F5.1.23

49	Timer input terminal 2	When the timing of internal timer is controlled by this terminal, the terminal will control the timing start or stop of timer. Refer to description of function code F5.1.23
50	Timer clear terminal 1	When clearing of internal timer is controlled by this terminal, this terminal will be valid and timer will be reset. Refer to description of function code F5.1.23
51	Timer clear terminal 2	When clearing of internal timer is controlled by this terminal, this terminal will be valid and timer will be reset. Refer to description of function code F5.1.23
52	Encoder Phase A input	Define the input terminal of Encoder A and B. The Product's DI6 terminal can be connected to encoder high-speed pulse; the encoder pulse frequency of other terminals should not exceed 200Hz.
53	Encoder Phase B input	
54	Distance reset	Clear the distance
55	Clear integral counting	Clear the integral counting of operation module
56~59	User function 1~4	Reserved
60	Disable rotation speed tracking startup	When rotation speed tracking startup (F2.2.00=1) is entered, this terminal will be valid and switched to direct startup
61	Fire hazard mode	The fire hazard mode can be entered through this terminal. Set fire hazard mode according to F2.3.28 and set the running frequency under fire hazard mode according to F2.3.29. Note: No warranty will be provided when the running period of fire hazard mode F0.0.11 exceeds 5min. When this function is enabled, it is recommended to set F2.3.01 (waiting interval of fault auto reset) above 10S, in order to improve the Product's service life.

Attached Table 1 Function Description of Multi-segment Instruction Terminal

Termina l 4	Terminal 3	Termina l 2	Termin al 1	Given Instruction	Corresponding Parameter
OFF	OFF	OFF	OFF	Multi-segment instruction 0	F5.0.03
OFF	OFF	OFF	ON	Multi-segment instruction 1	F5.0.05

OFF	OFF	ON	OFF	Multi-segment instruction 2	F5.0.07
OFF	OFF	ON	ON	Multi-segment instruction 3	F5.0.09
OFF	ON	OFF	OFF	Multi-segment instruction 4	F5.0.11
OFF	ON	OFF	ON	Multi-segment instruction 5	F5.0.13
OFF	ON	ON	OFF	Multi-segment instruction 6	F5.0.15
OFF	ON	ON	ON	Multi-segment instruction 7	F5.0.17
ON	OFF	OFF	OFF	Multi-segment instruction 8	F5.0.19
ON	OFF	OFF	ON	Multi-segment instruction 9	F5.0.21
ON	OFF	ON	OFF	Multi-segment instruction 10	F5.0.23
ON	OFF	ON	ON	Multi-segment instruction 11	F5.0.25
ON	ON	OFF	OFF	Multi-segment instruction 12	F5.0.27
ON	ON	OFF	ON	Multi-segment instruction 13	F5.0.29
ON	ON	ON	OFF	Multi-segment instruction 14	F5.0.31
ON	ON	ON	ON	Multi-segment instruction 15	F5.0.33

Note: When multi-segment instruction corresponds to the frequency, the corresponding parameter is the percentage of the max. frequency.

When multi-segment instruction corresponds to the torque, the corresponding parameter is the percentage of figure setting torque

When multi-segment instruction corresponds to PID, the corresponding parameter is the percentage of PID given feedback range

Attached Table 2 Function Description of Frequency Source Selection Terminal

Terminal 3	Terminal 2	Terminal 1	Frequency Source Selection
OFF	OFF	OFF	Frequency source A (equals to F1.0.07=0)
OFF	OFF	ON	Frequency source B (equals to F1.0.07=1)
OFF	ON	OFF	Frequency source A+B (equals to F1.0.07=2)
OFF	ON	ON	Frequency source A-B (equals to F1.0.07=3)
ON	OFF	OFF	Max. value of A, B (equals to F1.0.07=4)

ON	OFF	ON	Min. value of A, B (equals to F1.0.07=5)
ON	ON	OFF	Standby frequency source 1 (equals to F1.0.07=6)
ON	ON	ON	Standby frequency source 2 (equals to F1.0.07=7)

Attached Table 3 Function Description of Acceleration/deceleration Selection Terminal

Terminal 2	Terminal 2	Acceleration/deceleration Selection	Corresponding Parameters
OFF	OFF	Acceleration/deceleration 1	F1.0.31, F1.0.32
OFF	ON	Acceleration/deceleration 2	F1.0.33, F1.0.34
ON	OFF	Acceleration/deceleration 3	F1.0.35, F1.0.36
ON	ON	Acceleration/deceleration 4	F1.0.37, F1.0.38

Attached Table 4 Function Description of Running Command Selection Terminal

Current Running Control Mode	Terminal 2	Terminal 1	Running Control Mode
Keyboard control (F1.0.04=0)	OFF	ON	Terminal control
	ON	OFF	Communication control
	ON	ON	Communication control
Terminal control (F1.0.04=1)	OFF	ON	Keyboard control
	ON	OFF	Communication control
	ON	ON	Keyboard control
Communication control (F1.0.04=2)	OFF	ON	Keyboard control
	ON	OFF	Terminal control
	ON	ON	Keyboard control
Note: When both Terminal 1 and 2 are OFF, the running control mode set by function F1.0.04 will be entered			

Function Code	Name	Set Range	Factory Default Value
F3.0.11	DI filtering time	0.000s~1.000s	0.010

This function code is used for setting the software filtering time of DI terminal input status. This parameter can be increased in order to improve the

anti-interference capability when the DI input terminal can have false action easily due to interference. However, the response of DI terminal may slow down when this filtering time increases.

Function Code	Name	Set Range	Factory Default Value
F3.0.12	Terminal change rate of UP/DOWN	00.001Hz/s~65.535Hz/s	01.000

This function code defines the change rate of given frequency when the terminal UP/DOWN is used for adjusting the given frequency

Function Code	Name	Set Range	Factory Default Value
F3.0.13	PULSE min. input	0.00kHz~ F3.0.15	000.00
F3.0.14	Corresponding set value of PULSE min. input	-100.0%~100.0%	000.0
F3.0.15	PULSE max. input	F3.0.13~100.00kHz	050.00
F3.0.16	Corresponding set value of PULSE max. input	-100.0%~100.0%	100.0
F3.0.17	PULSE filtering time	00.00s~10.00s	00.10

The function codes above are used for setting the relationship between PULSE frequency and corresponding given value. It is straight-line relationship.

The pulse frequency should be calculated according to “PULSE max. input” when the input pulse frequency is higher than the given “PULSE given input” (F3.0.15); likewise, the pulse frequency should be calculated according to “PULSE min. input” when the input pulse frequency is lower than the given “PULSE min. input” (F3.0.13).

PULSE filtering time is used for setting the software filtering time of PULSE frequency; when the field pulse is likely to be interfered, please increase the filtering time to stabilize the pulse frequency under detection; however, the response speed of pulse frequency detection can slow down when filtering time is too high. So, the filtering time should be balanced according to the realities.

Note: When the PULSE frequency input corresponds to the frequency, the corresponding given value is the percentage of the max. frequency;

When the PULSE input corresponds to torque, the corresponding given value is the percentage of figure setting torque;

When the PULSE input corresponds to PID, the corresponding given value is the percentage of PID given feedback range

Function Code	Name	Set Range	Factory Default Value
F3.0.18	Function of Terminal VF1 as digital input	00: Inputted as normal analog quantity 01~61: Function of digital input terminal	00
F3.0.19	Function of Terminal VF2 as digital input	00: Inputted as normal analog quantity 01~61: Function of digital input terminal	00

This function code is used for setting the functions of analog input terminal VF when being used as digital input terminal DI. When VF is used as DI, VF terminal status is high level when VF and 10V are connected, or VF terminal status is low level when VF and 10V are disconnected. Please set it by referring to function description of function code F3.0.01~F3.0.10.

Function Code	Name	Set Range	Factory Default Value
F3.0.20	Select valid status of VF	0: High level valid 1: Low level valid Ones place: VF1 Tens place: VF2	00

This function code is used for determining whether VF terminal status is high level valid or low level valid when analog input terminal VF is being used as digital input terminal DI. Ones place and tens place represent VF1 and VF2 respectively.

High level valid: Valid when VF and 10V are connected, or invalid when disconnected

Low level valid: Invalid when VF and 10V are connected, or valid when disconnected

Function Code	Name	Set Range	Factory Default Value
F3.0.21	DI1 valid delay	0.0s~3600.0s	0000.0
F3.0.22	DI2 valid delay	0.0s~3600.0s	0000.0
F3.0.23	DI3 valid delay	0.0s~3600.0s	0000.0
F3.0.24	DI1 invalid delay	0.0s~3600.0s	0
F3.0.25	DI2 invalid delay	0.0s~3600.0s	0
F3.0.26	DI3 invalid delay	0.0s~3600.0s	0

The function above is used for setting the delay time when signal has action on

the Product when Signal DI1, DI2 and DI3 have changes. It is divided into valid delay and invalid delay.

Function Code	Name	Set Range	Factory Default Value
F3.0.27	DI terminal valid mode selection 1	0: High level valid 1: Low level valid Ones unit: DI1 Tens place: DI2 Hundreds place: DI3 Thousands place: DI4 Ten thousands place: DI5	00000
F3.0.28	DI terminal valid mode selection 2	0: High level valid 1: Low level valid Ones unit: DI6 Tens place ~ ten thousands place: (Invalid)	00000

The function code is used for setting the valid status mode of digital input terminal.

When high level valid is selected, it will be valid when corresponding DI terminals are connected or invalid when they are disconnected.

When low level valid is selected, it will be invalid when corresponding DI terminals are connected or valid when they are disconnected.

Note: DI5~D6 are terminals on the SD100 series IO expansion card.

Group F3.1 Group DO of External Output Terminal

Function Code	Name	Set Range	Factory Default Value
F3.1.00	Function selection of expansion card Y01	0: No function 1: Inverter running in progress 2: Fault shutdown output 3: Frequency level detection FDT1 output 4: Frequency reached 5: Zero-speed running in progress (no output after shutdown) 6: Motor overload pre-alarm 7: Inverter overload pre-alarm 8: Set counting reached 9: Designated counting reached 10: Length reached	0
F3.1.01	Select T1 relay function		1
F3.1.02	Relay of expansion card T2/Y3 function selection		2
F3.1.03	Function selection of expansion card Y02		0
F3.1.04	YO function selection (Terminal YO/FMP is used as YO, i.e. F3.1.08=1)		0

Function Code	Name	Set Range	Factory Default Value
		11: PLC circle completed 12: Accumulated running period reached 13: Frequency restricted in progress 14: Torque restricted in progress 15: Running readiness 16: VF1>VF2 17: Upper limit frequency reached 18: Lower limit frequency reached (no output after shutdown) 19: Under-voltage status output 20: Set communication 21: VF1 input below lower limit 22: VF1 input above lower limit 23: Zero-speed running in progress 2 (output after shutdown) 24: Accumulated power-on period reached 25: Frequency level detection FDT2 output 26: Output of Frequency 1 arrival 27: Output of Frequency 2 arrival 28: Output of Current 1 reached 29: Output of Current 2 reached 30: Output of timing reached 31: VF1 input out of limit 32: Load drop in progress 33: Reverse running in progress 34: Zero current status 35: Module temperature	

Function Code	Name	Set Range	Factory Default Value
		reached 36: Output current out of limit 37: Lower limit frequency reached (output after shutdown) 38: Alarm output 39: PLC stage completed 40: Current running time reached 41: Fault output (no output of under-voltage) 42: Timing of Timer 1 reached 43: Timing of Timer 2 reached 44: Timing of Timer 1 reached Timing of Timer 2 not reached 45: Fire hazard mode 46: Reserved 47: Reserved 48: Reserved 49: Reserved 50: Synchronize intermediate relay M1 51: Synchronize intermediate relay M2 52: Synchronize intermediate relay M3 53: Synchronize intermediate relay M4 54: Synchronize intermediate relay M5 55: Distance above zero 56: Distance set value 1 reached 57: Distance set value 2 reached 58: Operation result 2 above 0 59: Operation result 4 above 0	

The function description of multi-function output terminal is as follows:

Set Value	Function	Description

Set Value	Function	Description
0	No function	The multi-function output terminal has no function
1	Inverter running in progress	There's output frequency (can be zero) and output ON signal when the inverter is under running status
2	Fault shutdown output	Output ON signal when the Product has fault and shutdown
3	Frequency level detection FDT1 output	Please refer to description of function code F4.0.03, F4.0.04
4	Frequency reached	Please refer to description of function code F4.0.02
5	Zero-speed running in progress (no output after shutdown)	Output ON signal when the Product is under running status and output frequency is 0Hz.
6	Motor overload pre-alarm	Make judgment based on threshold of overload pre-alarm before motor has overload protection action; output ON signal when the pre-alarm threshold is exceeded. Please refer to description of function code F1.1.06, F2.3.16
7	Inverter overload pre-alarm	Output ON signal 10s before occurrence of inverter overload protection
8	Given count value reached	Output ON signal when the actual count value reaches the set value of function code F4.0.29
9	Designated count value reached	Output ON signal when the actual count value reaches the set value of function code F4.0.30
10	Length reached	Output ON signal when the actual length (F9.0.13) reaches the set length of function code F4.0.26
11	PLC circle completed	Output a pulse signal with width of 250ms when the simplified PLC completes one cycle
12	Accumulated running period reached	Output ON signal when the Product's accumulated running period reaches the set time of function code F4.0.01
13	Frequency restricted in progress	Output ON signal when the Product's output frequency reaches the upper or lower limit frequency
14	Torque restricted in progress	Output ON signal when the Product enters speed control mode and output torque

Set Value	Function	Description
		reaches the torque limit value
15	Running readiness	Output ON signal when the Product's main circuit and control circuit power supply are stabilized, no fault information is detected by the Product and the Product is under running status
16	VF1>VF2	Output ON signal when the input value of VF1 is higher than that of VF2
17	Upper limit frequency reached	Output ON signal when the output frequency reaches the upper limit frequency
18	Lower limit frequency reached (no output after shutdown)	Output ON signal when the output frequency reaches the lower limit frequency and the Product is under running status
19	Under-voltage status output	Output ON signal when the Product is in under-voltage status
20	Given by communication	Refer to description of Chapter 8
21	VF1 input below lower limit	Output ON signal when the value of analog VF1 input is lower than the set value (lower limit of VF1 input) of function code F4.0.19
22	VF1 input above lower limit	Output ON signal when the value of analog VF1 input is higher than the set value (upper limit of VF1 input) of function code F4.0.20
23	Zero-speed running in progress 2 (output after shutdown)	Output ON signal when the Product's output frequency is 0Hz. This signal is also ON in shutdown status.
24	Accumulated power-on period reached	Output ON signal when the Product's accumulated power-on period reaches the set time of function code F4.0.00.
25	Frequency level detection FDT2 output	Please refer to description of function code F4.0.05, F4.0.06
26	Output of Frequency 1 arrival	Please refer to description of function code F4.0.07, F4.0.08
27	Output of Frequency 2 arrival	Please refer to description of function code F4.0.09, F4.0.10
28	Output of Current 1 arrival	Please refer to description of function code F4.0.15, F4.0.16
29	Output of Current 2 arrival	Please refer to description of function code F4.0.17, F4.0.18
30	Output of timing arrival	The Product has auto shutdown and outputs ON signal during deceleration shutdown when the timing function is selected as valid (F4.0.23=1) and the current running period

Set Value	Function	Description
		reaches the set timing
31	VF1 input out of limit	Output ON signal when the value of analog VF1 input is higher than the set value (VF1 input upper limit) of function code F4.0.20 or lower than the set value (VF1 input lower limit) of function code F4.0.19
32	Load drop in progress	Output ON signal when the Product is under load drop status
33	Reverse running in progress	Output ON signal when the Product is under reverse running status
34	Zero current status	Please refer to description of function code F4.0.11, F4.0.12
35	Module temperature reached	Output ON signal when the temperature of the Product's module cooler reaches the set temperature of function code F4.0.21
36	Output current overrun	Please refer to description of function code F4.0.13, F4.0.14
37	Lower limit frequency reached (output after shutdown)	Output ON signal when the output frequency reaches the lower limit frequency or the given frequency is ≤ the lower limit frequency at shutdown status
38	Alarm output	Output ON signal when the Product has a fault and the fault treatment mode is continuous running or output ON signal during deceleration shutdown when the fault treatment mode is deceleration shutdown.
39	PLC stage completed	Output one pulse signal with width of 200ms when finishing each stage of simplified PLC
40	Current running time reached	The Product outputs ON signal and has no shutdown when the Product's current running period exceeds the set value of function code F4.0.22.
41	Fault output (no output of under-voltage)	Output ON signal when the Product has fault and shutdown. Output OFF signal in under-voltage status.
42	Timing of Timer 1 reached	Output ON signal when the timing of Timer 1 reaches the set time of function code F5.1.24.
43	Timing of Timer 2 reached	Output ON signal when the timing of Timer 2 reaches the set time of function code F5.1.25
44	Timing of Timer 1 reached while timing of Timer 2 not reached	Output ON signal when the timing of Timer 1 reaches the set time of function code F5.1.24, while the timing of Timer 2 has not reached

Set Value	Function	Description
		the set time of function code F5.1.25
45	Fire hazard mode	Reserved
46	Reserved	Reserved
47	Reserved	Reserved
48	Reserved	Reserved
49	Reserved	Reserved
50	Synchronize intermediate relay M1	The same with action of M1
51	Synchronize intermediate relay M2	The same with action of M2
52	Synchronize intermediate relay M3	The same with action of M3
53	Synchronize intermediate relay M4	The same with action of M4
54	Synchronize intermediate relay M5	The same with action of M5
55	Distance above zero	Output ON signal when the actual distance (F9.0.30) is above 0
56	Distance set value 1 reached	Output ON signal when the actual distance (F9.0.30) reaches the set distance of function code F4.0.31
57	Distance set value 2 reached	Output ON signal when the actual distance (F9.0.30) reaches the set distance of function code F4.0.32
58	Operation result 2 above 0	Output ON signal when the operation result 2 of operation module is above 0
59	Operation result 4 above 0	Output ON signal when operation result 4 of operation module is above 0

Function Code	Name	Set Range	Factory Default Value
F3.1.06	T1 delay	0.0s~3600.0s	0
F3.1.07	T2/Y3 delay	0.0s~3600.0s	0

The function code above is used for setting the delay of T1 and T2 signal generated by the Product and Y3 signal of open collector.

Function Code	Name	Set Range	Factory Default Value
F3.1.08	Function of YO/FMP terminal	0: Pulse output (FMP) 1: Output of open collector (YO)	1

This function code is used for defining whether using YO/FMP terminal as pulse output or open collector.

When it is used as pulse output (i.e. F3.1.08=0), please refer to description of function code F3.3.02 for the detailed functions, and the max. frequency of output pulse is decided by function code F3.1.09.

When it is used as output of open collector (i.e. F3.1.08=1), please refer to function code F3.1.04 for the specific functions.

Function Code	Name	Set Range	Factory Default Value
F3.1.09	Max. frequency of FMP output	000.01KHz~100.00KHz	50

This function code is used for setting the max. frequency of output pulse when YO/FMP terminal is used as pulse output (i.e. F3.1.08=0).

Function Code	Name	Set Range	Factory Default Value
F3.1.10	Valid status of multi-function output terminal	0: Positive logic 1: Reverse logic Ones place: YO Tens place: T1 Hundreds place: T2/Y3 Thousands place: Reserved Ten thousands place: Reserved	0

The ones place, tens place and hundreds place of this function code are respectively used for defining the output logic of Terminal YO, T1, T2/Y3.

0: Forward logic

The multi-function terminal is connected when output signal is valid, or disconnected when output signal is invalid.

1: Reverse logic

The multi-function terminal is connected when output signal is invalid, or disconnected when output signal is valid.

Group F3.2 Group AI of External Input Terminal

Function Code	Name	Set Range	Factory Default Value
F3.2.00	Min. input of Curve 1	00.00V~F3.2.02	00.00
F3.2.01	Corresponding set value of Curve 1 min. input	-100.0%~100.0%	000.0
F3.2.02	Max. input of Curve 1	F3.2.00~10.00V	10.00
F3.2.03	Corresponding set value of Curve 1 max. input	-100.0%~100.0%	100.0
F3.2.04	VF1 filtering time	00.00s~10.00s	00.10

The function codes above are used for setting the relationship between analog input and its corresponding value. It is straight-line relationship.

The analog quantity should be calculated according to “Max. input of Curve 1” when the analog input voltage is higher than the given “Max. input of Curve 1” (F3.2.02); likewise, the analog quantity should be calculated based on the min. input or 0.0% according to “Curve is lower than the min. input” (F3.2.11) when the analog input voltage is lower than the given “Min. input of Curve 1” (F3.2.00).

VF1 input filtering time is used for setting the software filtering time of VF1; when the field analog quantity is likely to be interfered, please increase the filtering time to stabilize the analog quantity under detection; however, the response speed of analog quantity detection can slow down when filtering time is too high. So, the filtering time should be balanced according to the realities.

Note: When the analog input corresponds to the frequency, the corresponding given value is the percentage of the max. frequency

When the analog input corresponds to torque, the corresponding given value is the percentage of figure setting torque

When the analog input corresponds to PID, the corresponding given value is the percentage of PID given feedback range

When the analog input corresponds to the corresponding timing, the corresponding value is the percentage of timing running period (F4.0.25)

Note: The Product’s analog input is based on 0V~10V by default. When input is 0mA~20mA, it should be equivalent to 0V~10V. When input is 4mA~20mA, it should be 2V~10V.

Function Code	Name	Set Range	Factory Default Value
F3.2.05	Min. input of Curve 2	00.00V~F3.2.07	00.00
F3.2.06	Corresponding set value of Curve 2 min. input	-100.0%~100.0%	000.0
F3.2.07	Max. input of Curve 2	F3.2.05~10.00V	10.00
F3.2.08	Corresponding set value of Curve 2 max. input	-100.0%~100.0%	100.0
F3.2.09	VF2 filtering time	0.00s~10.00s	00.10

Please refer to the description of Curve 1 for the functions and use methods of Curve 2.

Function Code	Name	Set Range	Factory Default Value
F3.2.10	Select analog input curve	Ones unit: Curve selected by VF1 Tens place: Curve selected by VF2 1: Curve 1 2: Curve 2 3: Curve 3 4: Curve 4 Hundreds place: VF1 input resolution Thousands place: VF2 input resolution	00021

		Ten thousands place: Input resolution of keyboard potentiometer 0:00.01Hz 1:00.02Hz 2:00.05Hz 3:00.10Hz 4:00.20Hz 5:00.50Hz 6:01.00Hz (keyboard potentiometer is invalid)	

The ones place and tens place of this function code are used for selecting the corresponding given curve of analog input VF1 and VF2 respectively. Any of 4 curves can be selected as the 2 analog inputs. Curve 1 and 2 have straight-line relationship; for details, please refer to setting of F3.2.00~F3.2.09; while Curve 3 and 4 have broken line relationship with deflection point; for details, please refer to setting of F3.2.12~F3.2.27. The hundreds place, thousands place and ten thousands place are respectively used for selecting the input frequency resolution of VF1, VF2 and keyboard potentiometer, i.e. the min. fluctuation value.

Function Code	Name	Set Range	Factory Default Value
F3.2.11	Curve is below the min. Set value	Ones place: VF1 below the min. input Tens place: VF2 below the min. input 0: Corresponding set value of min. input 1: 0.0%	H.00

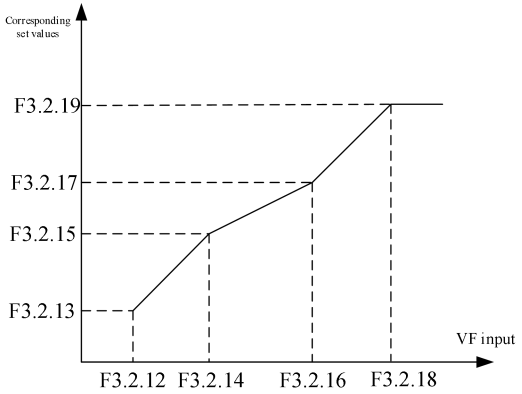
This function code is used for setting the determination method of given values corresponding to analog quantity when the analog input is lower than the given “min. input”.

The ones place and tens place of this function code correspond to analog input VF1 and VF2 respectively. When this function code is 0, the corresponding given value of this analog quantity is the “corresponding given value of min. input” (F3.2.01, F3.2.06, F3.2.13, F3.2.21) of selected curve when VF input is lower than “min. input”. When this function code is 1, the corresponding given value of this analog quantity is 0.0% when VF input is lower than “min. input”.

Function Code	Name	Set Range	Factory Default Value
F3.2.12	Curve 3 min. input	00.00V~F3.2.14	00.00
F3.2.13	Corresponding set value of Curve 3 min. input	-100.0%~100.0%	000.0
F3.2.14	Input of Curve 3 deflection point 1	F3.2.12~F3.2.16	03.00
F3.2.15	Corresponding set value of input of Curve 3 deflection point 1	-100.0%~100.0%	030.0
F3.2.16	Input of Curve 3 deflection point 2	F3.2.14~F3.2.18	06.00

F3.2.17	Corresponding set value of input of Curve 3 deflection point 2	-100.0%~100.0%	060.0
F3.2.18	Max. input of Curve 3	F3.2.16~10.00V	10.00
F3.2.19	Corresponding set value of Curve 3 max. input	-100.0%~100.0%	100.0

The functions and use methods of Curve 3 are roughly the same with those of Curve 1 and 2 (please refer to description of Curve 1). As the difference, Curve 1 and 2 have straight-line relationship and have no deflection point at the middle; while Curve 3 is broken line relationship and has two deflection points at the middle. See description of diagram below:



Function Code	Name	Set Range	Factory Default Value
F3.2.20	Min. input of Curve 4	00.00V~F3.2.22	00.00
F3.2.21	Corresponding set value of Curve 4 min. input	-100.0%~100.0%	-100.0
F3.2.22	Input of Curve 4 deflection point 1	F3.2.20~F3.2.24	03.00
F3.2.23	Corresponding set value of input of Curve 4 deflection point 1	-100.0%~100.0%	-030.0
F3.2.24	Input of Curve 4 deflection point 2	F3.2.22~F3.2.26	06.00
F3.2.25	Corresponding set value of input of Curve 4 deflection point 2	-100.0%~100.0%	030.0
F3.2.26	Max. input of Curve 4	F3.2.24~10.00V	10.00
F3.2.27	Corresponding set value of Curve 4 max. input	-100.0%~100.0%	100.0

For details of functions and use methods of Curve 4, please refer to description of Curve 3.

Group F3.3 Group AO of External Output Terminal

Function Code	Name	Set Range	Factory Default Value
F3.3.00	Set analog output FM1	0~20	00
F3.3.01	Set analog output FM2		01
F3.3.02	Given FMP output (Terminal YO/FMP is used as FMP, i.e. F3.1.08=0)		00

The function code F3.3.00 and F3.3.01 define the function of analog output FM1 and FM2 respectively.

Analog output FM1 and FM2 can output voltage signals ranged 0V~10V or current signals ranged 0mA~20mA. The deviation between the actual output voltage and target output voltage of analog output terminal can be adjusted through function code F4.1.13~F4.1.20.

The analog output range and scaling relationship of corresponding functions are as shown in table below:

Set Value	Function	Corresponding Functions of Analog Output 0.0%~100.0%
0	Running frequency	0~Max. output frequency
1	Given frequency	0~Max. output frequency
2	Output current	0~2 times of motor rated current
3	Output torque	0~2 times of motor rated torque
4	Output power	0~2 times of rated power
5	Output voltage	0~1.2 times of inverter rated voltage
6	PULSE input	0.01kHz~100.00kHz
7	VF1 voltage	0V~10V (or 0/4mA~20mA)
8	VF2 voltage	0V~10V (or 0/4mA~20mA)
9	Voltage of keyboard potentiometer	0V~10V
10	Actual length	0~Given length (set value of function code F4.0.26)
11	Actual count value	0~Designated count value (set value of function code F4.0.30)
12	Given by communication	Refer to description of Chapter 8
13	Motor speed	0~Corresponding revolving speed of max. output frequency
14	Output current	0.0A~1000.0A
15	Busbar voltage	0.0V~1000.0V
16	Output torque (actual value)	-2 times of motor rated torque ~ 2 times of motor rated torque

17	Operation result 1	-1000~1000
18	Operation result 2	0~1000
19	Operation result 3	-1000~1000
20	Operation result 4	0~1000

Function Code	Name	Set Range	Factory Default Value
F3.3.03	Analog FM1 output offset	-100.0%~100.0%	000.0
F3.3.04	Analog FM1 output gain	-10.00~10.00	01.00
F3.3.05	Analog FM2 output offset	-100.0%~100.0%	000.0
F3.3.06	Analog FM2 output gain	-10.00~10.00	01.00

Generally, the function codes above are used for correcting the deviation of null drift and output amplitude of analog output, or defining the analog output curve required.

Actual analog output = Standard analog output × Analog output gain + Analog output offset

Standard analog output refers to the output analog value when there's no offset and gain, i.e. voltage output is 0~10V, current output is 0~20mA.

Analog output offset is the percentage of output max. voltage 10V or current 20mA of standard analog output. For example, the analog output offset should be set as 20% and analog output gain should be set as 0.8, in order to output the 4~20mA current signal.

6.5 Group F4 of Auxiliary Function and AIAO Curve Correction

Group F4.0 Auxiliary Function

Function Code	Name	Set Range	Factory Default Value
F4.0.00	Accumulative power-on reaches set time	0h~65000h	00000

This function code is used for setting the accumulated power-on period since delivery of inverter. The Product's multi-function output terminal will output ON signals when the accumulated power-on period reaches the set value of function code F4.0.00. The corresponding function of multi-function output terminal is accumulated power-on period reached (24). The Product will give out alarm of Err23. The accumulated power-on period will be unlimited when this function code is set as 0. The actual accumulated power-on period can be checked through function code F0.0.08.

Note: The Product can enter normal running only if the accumulated power-on period (F0.0.08) is lower than the set value of function code F4.0.00. The accumulated power-on period is unlimited when this function code is set as 0.

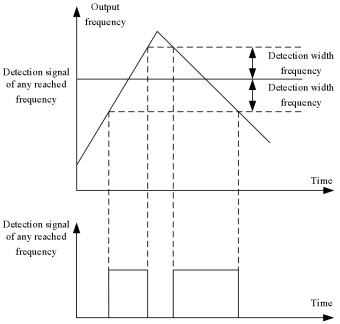
Function Code	Name	Set Range	Factory Default Value
F4.0.01	Accumulative running reaches set time	0h~65000h	00000

This function code is used for setting the Product's accumulated running period. The Product's multi-function output terminal will output ON signal when the actual accumulated running period reaches the set value of function code F4.0.01. The corresponding function of multi-function output terminal is accumulated running period reached (12). The Product will give out alarm of Err24. The actual accumulated running period can be checked through function code F0.0.07.

Note: The Product can enter normal running only if the actual accumulated running period (F0.0.07) is lower than the set value of function code F4.0.01; or the accumulated running period is unlimited when it is set as 0.

Function Code	Name	Set Range	Factory Default Value
F4.0.02	Set frequency reaches detection width	000.0%~100.0%	000.0

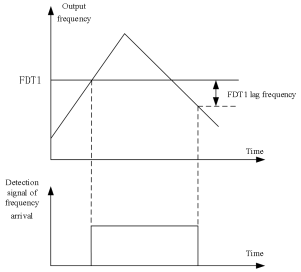
The Product's multi-function output terminal will output ON signal when the Product's running frequency is within the positive/negative detection width frequency of given frequency. The set value of this function code is percentage of the max. frequency. The corresponding function of multi-function output terminal is frequency reached (4). See description of diagram below:



Detection width frequency = Detection width of given frequency arrival (F4.0.02) × Max. frequency (F1.0.11)

Function Code	Name	Set Range	Factory Default Value
F4.0.03	Frequency detection FDT1	000.00Hz~Max. frequency	050.00
F4.0.04	FDT1 lag value	000.0%~100.0%	005.0

The Product's multi-function output terminal will output ON signal when the Product's output frequency exceeds certain value, and this value is called frequency detection FDT1. The Product's multi-function output terminal will output OFF signal when its output frequency is lower than certain value of frequency detection FDT1, and this value is called FDT1 lag frequency. The corresponding function of multi-function output terminal is output of frequency level detection FDT1 (3). See description of diagram below:



FDT1 lag frequency = Frequency detection FDT1 (F4.0.03) × FDT1 lag (F4.0.04)

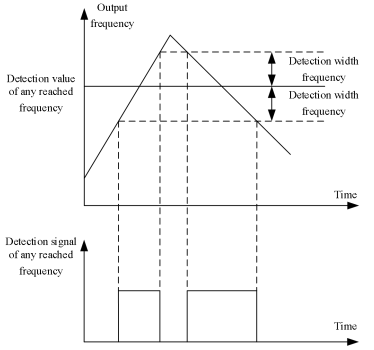
Function Code	Name	Set Range	Factory Default Value
F4.0.05	Frequency detection FDT2	000.00Hz~Max. frequency	050.00
F4.0.06	FDT2 lag value	000.0%~100.0%	005.0

FDT2 and FDT1 have the same function; for details, please refer to description of FDT1 (F4.0.03, F4.0.04). The corresponding function of multi-function output terminal is frequency level detection FDT2 (25).

Function Code	Name	Set Range	Factory Default Value
F4.0.07	Randomly reached frequency detection value 1	000.00Hz~Max. frequency	050.00
F4.0.08	Detection width of randomly reached frequency 1	000.0%~100.0%	000.0

The Product's multi-function output terminal will output ON signal when the Product's running frequency reaches the positive/negative detection width frequency of randomly reached frequency 1, or output OFF signal when the Product's running frequency is outside the positive/negative width frequency of randomly reached

frequency 1. The corresponding function of multi-function output terminal is output of Frequency 1 reached (26). See description of diagram below:



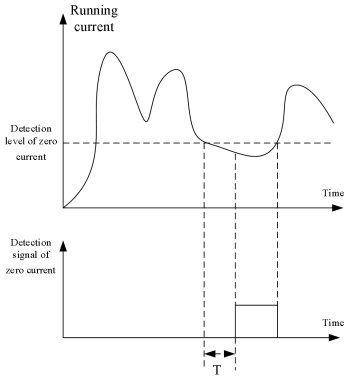
Detection width frequency = Detection width of randomly reached frequency 1 (F4.0.08) × Max. frequency (F1.0.11)

Function Code	Name	Set Range	Factory Default Value
F4.0.09	Randomly reached frequency detection value 2	000.00Hz~Max. frequency	050.00
F4.0.10	Detection width of randomly reached frequency 2	000.0%~100.0%	000.0

The function codes above have the same function with function code F4.0.07 and F4.0.08; for details, please refer to description of F4.0.07 and F4.0.08. The corresponding function of multi-function output terminal is output of Frequency 2 reached (27).

Function Code	Name	Set Range	Factory Default Value
F4.0.11	Detection level of zero current	000.0%~300.0% (100% correspondence to motor rated current)	005.0
F4.0.12	Detection delay of zero current	000.01s~600.00s	000.10

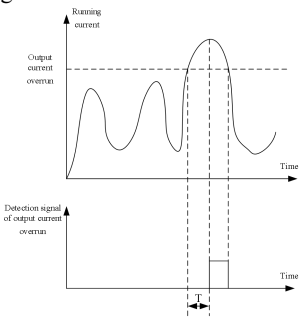
The Product's multi-function output terminal will output ON signal when the Product's running current is lower than or equals to zero current detection level and the last period exceeds the delay of zero current detection; or output OFF signal once the running current is recovered to the zero current detection level. The corresponding function of multi-function output terminal is zero current status (34). See description of diagram below:



T: Delay of zero current detection

Function Code	Name	Set Range	Factory Default Value
F4.0.13	Output current overrun	000.0%(no detection) 000.1%~300.0%	200.0
F4.0.14	Detection delay of current overrun	000.00s~600.00s	000.00

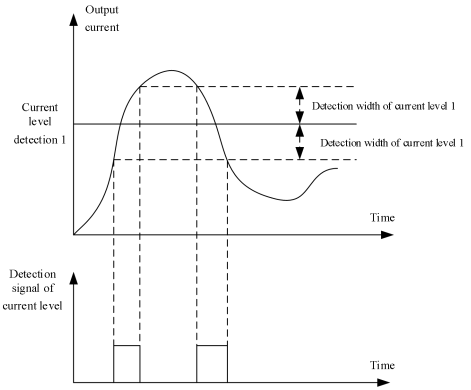
The Product's multi-function output terminal will output ON signal when the Product's running current is higher than the set value of function code F4.0.13 and the last period exceeds the set value of function code F4.0.14; or output OFF signal once the running current is recovered and ≤ the output current limit. The corresponding function of multi-function output terminal is output current overrun (36). See description of diagram below:



Output current overrun is the percentage of motor rated current. T: Detection delay of current overrun.

Function Code	Name	Set Range	Factory Default Value
F4.0.15	Current level detection 1	000.0%~300.0%	100.0
F4.0.16	Detection width of current level 1	000.0%~300.0%	000.0

The Product's multi-function output terminal will output ON signal when the Product's running current is within the positive/negative detection width of current level detection 1, or output OFF signal when the Product's running current is outside the positive/negative detection width of current level detection 1. The set values of function codes above are percentage of motor rated current. The corresponding function of multi-function output terminal is output of current 1 reached (28). See description of diagram below:



Current level detection 1 and detection width of current level 1 are percentage of motor rated current.

Function Code	Name	Set Range	Factory Default Value
F4.0.17	Current level detection 2	000.0%~300.0%	100.0
F4.0.18	Detection width of current level 2	000.0%~300.0%	000.0

The function codes above have the same function with function code F4.0.15, F4.0.16. For details, please refer to description of function code F4.0.15, F4.0.16. The corresponding function of multi-function output terminal is output of Current 2 arrival (29).

Function Code	Name	Set Range	Factory Default Value
F4.0.19	Lower limit of VF1 input	00.00V~F4.0.20	03.10
F4.0.20	Upper limit of VF1 input	F4.0.19~11.00V	06.80

The Product's multi-function output terminal will output ON signal when the input value of analog VF1 is lower than the set value of function code F4.0.19. The corresponding function of multi-function output terminal is VF1 input below lower limit (21) or VF1 input overrun (31).

The Product's multi-function output terminal will output ON signal when the input value of analog VF1 is higher than the set value of function code F4.0.20. The corresponding function of multi-function output terminal is VF1 input above upper limit (22) or VF1 input overrun (31).

Function Code	Name	Set Range	Factory Default Value
F4.0.21	Module temperature reaches set value	000°C~100°C	075

The Product's multi-function output terminal will output ON signal when the Product's module temperature reaches the set value of function code F4.0.21. The corresponding function of multi-function output terminal is module temperature reached (35). The actual module temperature can be checked through function code F0.0.10.

Function Code	Name	Set Range	Factory Default Value
F4.0.22	Current running reaches set time	0000.0~6500.0min	0000.0

The Product will restart counting after each startup. The Product will continue running and its multi-function output terminal will output ON signal when reaching the set value of function code F4.0.22. The current running period is unlimited when this function code is set as 0. The actual time of current running can be checked through function code F9.0.23 (the display value of F9.0.23 will be recovered to 0 automatically when the Product is stopped).

Function Code	Name	Set Range	Factory Default Value
F4.0.23	Selection of timing function	0: Invalid 1: Valid	0
F4.0.24	Selection of timing running period	0: Given by figure (F4.0.25) 1: Given by external terminal VF1 2: Given by external terminal VF2 (Corresponding F4.0.25 of analog input range)	0
F4.0.25	Timing running period	0000.0min~6500.0min	0000.0

The function codes above are used for completing the timing running function of the Product. For details, please refer to 7.1.8 (timing function).

Function Code	Name	Set Range	Factory Default Value
F4.0.26	Set length	00000m~65535m	01000
F4.0.27	Actual length	00000m~65535m	00000
F4.0.28	Pulses per meter	0000.1~6553.5	0100.0

The function codes above are used for fixed length control. For details, please refer to 7.1.9 (fixed length function)

Function Code	Name	Set Range	Factory Default Value
F4.0.29	Given count value	00001~65535	01000
F4.0.30	Designated count value	00001~65535	01000

The function codes above are used for counting control. For details, please refer to 7.1.10 (counting function)

Function Code	Name	Set Range	Factory Default Value
F4.0.31	Set distance 1	-3200.0~3200.0	0000.0
F4.0.32	Set distance 2	-3200.0~3200.0	0000.0
F4.0.33	Pulses per distance	000.00~600.00	000.00

The function codes above are used for distance control. For details, please refer to 7.1.11 (distance control function)

Group F4.1 AIAO Curve Correction

Function Code	Name	Set Range	Factory Default Value
F4.1.00	Voltage input of potentiometer correction point 1	00.00V~F4.1.02	00.00
F4.1.01	Corresponding set value of potentiometer correction point 1	-100.0%~100.0%	000.0
F4.1.02	Voltage input of potentiometer correction point 2	F4.1.00~10.00V	10.00
F4.1.03	Corresponding set value of potentiometer correction point 2	-100.0%~100.0%	100.0
F4.1.04	Potentiometer filtering time	00.00s~10.00s	00.10

This group of function code is used for correcting the potentiometer, in order to eliminate the zero offset due to ultra-long keyboard wire and influence from voltage attenuation. This group of function parameter has been corrected before delivery and they will be recovered to the corrected value when restoring the default factory parameters. Generally, no correction is required at the application site.

Note: The function codes above can be used for correcting VF3 when the potentiometer is replaced by VF3.

Function Code	Name	Set Range	Factory Default Value
F4.1.05	VF1 measured voltage 1	0.500V~4.000V	2.000
F4.1.06	VF1 display voltage 1	0.500V~4.000V	2.000
F4.1.07	VF1 measured voltage 2	6.000V~9.999V	8.000
F4.1.08	VF1 display voltage 2	6.000V~9.999V	8.000
F4.1.09	VF2 measured voltage 1	0.500V~4.000V	2.000
F4.1.10	VF2 display voltage 1	0.500V~4.000V	2.000
F4.1.11	VF2 measured voltage 2	6.000V~9.999V	8.000
F4.1.12	VF2 display voltage 2	6.000V~9.999V	8.000

This group of function code is used for correcting analog input VF, in order to eliminate the influence from VF input offset and gain. This group of function parameter has been corrected before delivery and they will be recovered to the corrected value when restoring the default factory parameters. Generally, no correction is required at the application site.

Measured voltage: Measure the voltage between VF terminal and GND terminal by using the meters such as multimeter.

Display voltage: The voltage display value sampled by inverter; see voltage display (F9.0.19, F9.0.20) before VF correction of Group F9.

Input two voltages to each VF input port, then input the measured voltage and display voltage to the corresponding function codes respectively to start auto correction of the Product.

Function Code	Name	Set Range	Factory Default Value
F4.1.13	FM1 target voltage 1	0.500V~4.000V	2.000
F4.1.14	FM1 measured voltage 1	0.500V~4.000V	2.000
F4.1.15	FM1 target voltage 2	6.000V~9.999V	8.000
F4.1.16	FM1 measured voltage 2	6.000V~9.999V	8.000
F4.1.17	FM2 target voltage 1	0.500V~4.000V	2.000
F4.1.18	FM2 measured voltage 1	0.500V~4.000V	2.000
F4.1.19	FM2 target voltage 2	6.000V~9.999V	8.000
F4.1.20	FM2 measured voltage 2	6.000V~9.999V	8.000

This group of function code is used for correcting the analog output FM. This group of function code has been corrected before delivery and they will be recovered to the corrected value when restoring the default factory parameters. Generally, no correction is required at the application site.

Measured voltage: Measure the voltage between FM terminal and GND terminal by using meters such as multimeter.

Target voltage: The theoretical voltage that is outputted by the Product according to the corresponding relationship of analog output.

Each FM port will output two voltages, input the measured voltage and target

voltage into the corresponding function codes above and the Product will carry out auto correction.

6.6 Group F5 of Simplified PLC and Virtual Relay

Group F5.0 Multi-speed and Simplified PLC

Function Code	Name	Set Range	Factory Default Value
F5.0.00	Running mode of simplified PLC	0: Shutdown after finishing single running 1: Maintain final value after finishing single running 2: Continuous cycle 3: Cycle for N times	0

0: Shutdown after finishing single running

The Product has auto shutdown after finishing one cycle.

1: Maintain final value after finishing single running

The Product keeps running at the given frequency in the final stage after finishing one cycle

2: Continuous cycle

The Product keeps circling until the shutdown command is received

3: Cycle for N times

The Product has auto shutdown after cycling for N times. N is given by the set value of function code F5.0.01.

Function Code	Name	Set Range	Factory Default Value
F5.0.01	Cycle number N	00000~65000	00000

This function code is used for setting the cycle times when function code F5.0.00=3.

Function Code	Name	Set Range	Factory Default Value
F5.0.02	Selection of PLC power-off memory	Ones place: Selection of power-off memory 0: Power-off no memory 1: Power-off memory Tens place: Selection of non-fault shutdown memory 0: Non-fault shutdown no memory 1: Non-fault shutdown memory	00

		Hundreds place: Selection of fault shutdown memory 0: Fault shutdown no memory 1: Fault shutdown memory	

PLC power-off memory: Record the running stage and frequency of PLC before power-off and continue running from the memory stage in the next power-on. The PLC process will be restarted after each power-on when power-off no memory is selected.

PLC non-fault shutdown memory: Record the running stage and frequency of PLC before normal shutdown with memory and continue running from the normal shutdown memory stage in the next power-on. The PLC process of non-fault shutdown will not be recorded when no memory is selected.

PLC fault shutdown memory: Record the running stage and frequency of PLC before fault shutdown with memory and continue running from the fault shutdown memory stage in the next power-on. The PLC process of fault shutdown will not be recorded when no memory is selected.

Besides, the cycle times of PLC can be recorded by selecting this function.

Function Code	Name	Set Range	Factory Default Value
F5.0.03	Stage instruction 0	-100.0%~100.0%	000.0
F5.0.04	Stage 0 running period	0000.0s~6553.5s	0000.0
F5.0.05	Stage instruction 1	-100.0%~100.0%	000.0
F5.0.06	Stage 1 running period	0000.0s~6553.5s	0000.0
F5.0.07	Stage instruction 2	-100.0%~100.0%	000.0
F5.0.08	Stage 2 running period	0000.0s~6553.5s	0000.0
F5.0.09	Stage instruction 3	-100.0%~100.0%	000.0
F5.0.10	Stage 3 running period	0000.0s~6553.5s	0000.0
F5.0.11	Stage instruction 4	-100.0%~100.0%	000.0
F5.0.12	Stage 4 running period	0000.0s~6553.5s	0000.0
F5.0.13	Stage instruction 5	-100.0%~100.0%	000.0
F5.0.14	Stage 5 running period	0000.0s~6553.5s	0000.0
F5.0.15	Stage instruction 6	-100.0%~100.0%	000.0
F5.0.16	Stage 6 running period	0000.0s~6553.5s	0000.0
F5.0.17	Stage instruction 7	-100.0%~100.0%	000.0
F5.0.18	Stage 7 running period	0000.0s~6553.5s	0000.0
F5.0.19	Stage instruction 8	-100.0%~100.0%	000.0
Function Code	Name	Set Range	Factory Default Value
F5.0.20	Stage 8 running period	0000.0s~6553.5s	0000.0
F5.0.21	Stage instruction 9	-100.0%~100.0%	000.0
F5.0.22	Stage 9 running period	0000.0s~6553.5s	0000.0

F5.0.23	Stage instruction 10	-100.0%~100.0%	000.0
F5.0.24	Stage 10 running period	0000.0s~6553.5s	0000.0
F5.0.25	Stage instruction 11	-100.0%~100.0%	000.0
F5.0.26	Stage 11 running period	0000.0s~6553.5s	0000.0
F5.0.27	Stage instruction 12	-100.0%~100.0%	000.0
F5.0.28	Stage 12 running period	0000.0s~6553.5s	0000.0
F5.0.29	Stage instruction 13	-100.0%~100.0%	000.0
F5.0.30	Stage 13 running period	0000.0s~6553.5s	0000.0
F5.0.31	Stage instruction 14	-100.0%~100.0%	000.0
F5.0.32	Stage 14 running period	0000.0s~6553.5s	0000.0
F5.0.33	Stage instruction 15	-100.0%~100.0%	000.0
F5.0.34	Stage 15 running period	0000.0s~6553.5s	0000.0

When tens place of stage attribute is 0, the stage instruction is the corresponding given value of simplified PLC running and multi-segment instruction in all stages. It is the percentage of the max. frequency.

Stage running period is the continuous PLC running period in all stages (including acceleration/deceleration, forward/reverse dead zone time).

Function Code	Name	Set Range	Factory Default Value
F5.0.35	Stage 0 attribute	Ones place: Selection of acceleration/deceleration (multi-segment instruction is invalid) 0: Acceleration/deceleration 1 1: Acceleration/deceleration 2 2: Acceleration/deceleration 3 3: Acceleration/deceleration 4 Tens place: Selection of frequency source (multi-segment instruction is valid) 0: Current stage instruction 1: Keyboard potentiometer 2: Given by keyboard frequency 3: VF1 input 4: VF2 input 5: Given by PULSE (DI6) 6: Given by PID 7: Operation result 1 8: Operation result 2 9: Operation result 3 A: Operation result 4 Hundreds place: Running	H.000
F5.0.36	Stage 1 attribute		H.000
F5.0.37	Stage 2 attribute		H.000
F5.0.38	Stage 3 attribute		H.000
F5.0.39	Stage 4 attribute		H.000
F5.0.40	Stage 5 attribute		H.000
F5.0.41	Stage 6 attribute		H.000
F5.0.42	Stage 7 attribute		H.000
F5.0.43	Stage 8 attribute		H.000
F5.0.44	Stage 9 attribute		H.000
F5.0.45	Stage 10 attribute		H.000
F5.0.46	Stage 11 attribute		H.000
F5.0.47	Stage 12 attribute		H.000
F5.0.48	Stage 13 attribute		H.000
F5.0.49	Stage 14 attribute		H.000
F5.0.50	Stage 15 attribute		H.000

Function Code	Name	Set Range	Factory Default Value
		direction 0: Default direction 1: Reverse direction	

The ones place of stage attribute decides the acceleration/deceleration time of simplified PLC running in all stages. The tens place of stage attribute decides the frequency source of simplified PLC running or multi-segment instruction in all stages. The hundreds place of stage attribute decides the running direction of simplified PLC running in all stages.

Function Code	Name	Set Range	Factory Default Value
F5.0.51	Unit of simplified PLC running period	0: Second 1: Hour 2: Minute	0

Unit of stage running period when the Product is under simplified PLC running.

Group F5.1 Virtual Relay and Built-in Logic

Function Code	Name	Set Range	Factory Default Value
F5.1.00	Control over intermediate delay relay	0: This relay's input is decided by its control word A 1: This relay's input is decided by its control word B 2: This relay's input is decided by the thousands place and hundreds place of its control word C. Ones place: Relay 1(M1) Tens place: Relay 2(M2) Hundreds place: Relay 3(M3) Thousands place: Relay 4(M4) Ten thousands place: Relay 5(M5)	00000

This function is used for setting the control word that decides the intermediate delay relay.

When it is 0, the intermediate delay relay is decided by control word A. Please refer to description of function code F5.1.01

When it is 1, the intermediate delay relay is decided by control word B. Please refer to description of function code F5.1.02~F5.1.06

When it is 2, the intermediate delay relay is decided by the thousands place and

hundreds place of control word C. Please refer to description of function code F5.1.07~F5.1.11

For details, please refer to 7.1.12 (programming function of simplified internal relay)

Function Code	Name	Set Range	Factory Default Value
F5.1.01	Control word A of intermediate relay	0: Set as 0 1: Set as 1 Ones place: M1 Tens place: M2 Hundreds place: M3 Thousands place: M4 Ten thousands place: M5	00000

This function code is used for setting the relay which corresponds to this bit as 0 or 1 when this bit of function code F5.1.00 is 0. For details, please refer to 7.1.12 (programming function of simplified internal relay)

Function Code	Name	Set Range	Factory Default Value
F5.1.02	Control word B of intermediate delay relay M1	Ones place: Control logic 0: Input 1 1: NOT of Input 1 2: AND of Input 1 and 2 3: OR of Input 1 and 2 4: XOR of Input 1 and 2 5: Input 1 validness is set as valid Input 2 validness is set as invalid 6: Input 1 rising edge validness is set as valid Input 2 rising edge validness is set as invalid 7: Effective signal of Input 1 rising edge is taken as reverse 8: Input 1 rising edge is valid, outputs one pulse signal with width of 200ms 9: AND of Input 1 rising edge and Input 2 Hundreds place and tens place: Input 1 selection	00000
F5.1.03	Control word B of intermediate delay relay M2		00000
F5.1.04	Control word B of intermediate relay delay M3		00000
F5.1.05	Control B of intermediate delay relay M4		00000
F5.1.06	Control word B of intermediate delay relay M5		00000

Function Code	Name	Set Range	Factory Default Value
		00~09: DI1~DI10 10~14: M1~M5 15~16: VF1, VF2 17~19: Standby 20~79: Output function 00~59 of corresponding multi-function output terminal Ten thousands place and thousands place: Input 2 selection 00~09: DI1~DI10 10~14: M1~M5 15~16: VF1, VF2 17~19: Standby 20~59: Output function 00~39 of corresponding multi-function output terminal	

When the bit of function code F5.1.00 is 1, the relay at this bit is controlled by the corresponding function codes above. The ones place of function codes above is used for setting the logic operation function of Input 1 and 2. The hundreds place and tens place are used for setting selection of Input 1. The ten thousands place and thousands place are used for setting selection of Input 2. The intermediate delay relay M is the result of input 1 and 2 after simplified logic operation.

M=Logic operation (Input 1, 2)

For details, please refer to 7.1.12 (programming function of simplified internal relay)

Function Code	Name	Set Range	Factory Default Value
F5.1.07	Control word C of intermediate delay relay M1	Tens place and ones place: 00~59 Set function 00~59 of corresponding digital input terminal Thousands place and hundreds place: 00~59 Output function 00~59 of corresponding multi-function output terminal	0000
F5.1.08	Control word C of intermediate delay relay M2		0000
F5.1.09	Control word C of intermediate delay relay M3		0000
F5.1.10	Control word C of intermediate delay relay M4		0000
F5.1.11	Control word C of intermediate delay relay M5		0000

The tens place and ones place of function codes above are used for setting the action direction of intermediate relay after acquiring the logic operation result, i.e. the execution action (it can correspond to any of digital input function); while the thousands place and hundreds place are used for controlling the relay corresponding to bit that is 2 of F5.1.00 (it can correspond to any type of multi-function output terminal). For details, please refer to 7.1.12 (programming function of simplified internal relay).

Function Code	Name	Set Range	Factory Default Value
F5.1.12	M1 connection delay	0.0s~3600.0s	0000.0
F5.1.13	M2 connection delay	0.0s~3600.0s	0000.0
F5.1.14	M3 connection delay	0.0s~3600.0s	0000.0
F5.1.15	M4 connection delay	0.0s~3600.0s	0000.0
F5.1.16	M5 connection delay	0.0s~3600.0s	0000.0
F5.1.17	M1 disconnection delay	0.0s~3600.0s	0000.0
F5.1.18	M2 disconnection delay	0.0s~3600.0s	0000.0
F5.1.19	M3 disconnection delay	0.0s~3600.0s	0000.0
F5.1.20	M4 disconnection delay	0.0s~3600.0s	0000.0
F5.1.21	M5 disconnection delay	0.0s~3600.0s	0000.0

The function codes above are used for setting the connection or disconnection delay of intermediate delay relays.

Function Code	Name	Set Range	Factory Default Value
F5.1.22	Selection of intermediate relay valid status	0: No negation 1: Negation Ones place: M1 Tens place: M2 Hundreds place: M3 Thousands place: M4 One thousands place: M5	00000

This function code is used for setting the valid status of intermediate delay relay.

When certain bit is 0, the relay at this bit will output the acquired result signal

When certain bit is 1, the relay at this bit will have negation of acquired result signal and then output it

Function Code	Name	Set Range	Factory Default Value
F5.1.23	Control word of internal timer	Ones place: Timing control of Timer 1 Tens place: Timing control of Timer 2 0: Timer running 1: Controlled by timer input terminal 1	00000

		2: Negation control by timer input terminal 1 3: Controlled by timer input terminal 2 4: Negation control by timer input terminal 2 Hundreds place: Timer 1 clearing control Thousands place: Timer 2 clearing control 0: Controlled by timer clearing terminal 1 1: Controlled by timer clearing terminal 2 Ten thousands place: Timing unit 0: Second 1: Minute 2: Hour	

The ones place and tens place of this function code are used for setting timing control of Timer 1 and 2.

0: Timer is uncontrollable and under timing status constantly.

1: Controlled by timer input terminal 1. The timer will start counting when this terminal is valid; the timer will stop counting and maintain the current value when this terminal is invalid.

2: Negation control of timer input terminal 1. The timer will start counting when this terminal is invalid; the timer will stop counting and maintain the current value when this terminal is valid.

3~4: Refer to description of 1 and 2

The hundreds place and thousands place of this function code are used for setting clearing control of Timer 1 and 2.

0: Controlled by timer clearing terminal 1. The timing value of timer will be cleared and reset when this terminal is valid

1: Controlled by timer clearing terminal 2. The timing value of timer will be cleared and reset when this terminal is valid

The ten thousands place of this function code is used for setting the timing unit. 0: Second; 1: Minute; 2: Hour. For details, please refer to 7.1.13 (function of internal timer)

Function Code	Name	Set Range	Factory Default Value
F5.1.24	Timing of Timer 1	0.0s~3600.0s	00000
F5.1.25	Timing of Timer 2	0.0s~3600.0s	00000

The function code F5.1.24 and F5.1.25 are used for setting timing of Timer 1 and 2 respectively.

Function Code	Name	Set Range	Factory Default Value
F5.1.26	Operation module control	0: No operation 1: Add 2: Subtraction 3: Multiplication 4: Division 5: Judgment of being greater than 6: Judgment of being equal to 7: Judgment of greater than and equal to 8: Integral 9~F: Reserved Ones place: Operation 1 Tens place: Operation 2 Hundreds place: Operation 3 Thousands place: Operation 4	H.0000

The ones place, tens place, hundreds place and thousands place of this function code correspond to 1-way operation respectively. Different operation algorithms can be selected in each way operation. For details, please refer to 7.1.14 (internal operation function)

Function Code	Name	Set Range	Factory Default Value
F5.1.27	Attribute of operation setting coefficient	0: Multiplication setting coefficient has no decimal 1: Multiplication setting coefficient has 1 decimal place 2: Multiplication setting coefficient has 2 decimal places 3: Multiplication setting coefficient has 3 decimal places 4: Multiplication setting coefficient has 4 decimal places 5: Division setting coefficient has no decimal place 6: Division setting coefficient has 1 decimal place 7: Division setting coefficient has 2 decimal places 8: Division setting coefficient has 3 decimal places	H.0000

		9: Division setting coefficient has 4 decimal places A: Division setting coefficient has no decimal place B: Division setting coefficient has 1 decimal place C: Division setting coefficient has 2 decimal places D: Division setting coefficient has 3 decimal places E: Division setting coefficient has 4 decimal places (The setting coefficient of A, B, C, D and E is address number of function code) Ones place: Operation 1 Tens place: Operation 2 Hundreds place: Operation 3 Thousands place: Operation 4	

One setting coefficient is required for setting the operation result range into the given range of inverter function code, for the operation result range may not be equivalent to the given range of inerter function code. This function code is used for setting the function of setting coefficient. When the set value is 0~9, the operation setting coefficient is a numerical value and directly engaged in operation. When the set value is A~E, the operation setting coefficient is address number of function code, and the data in function code address are engaged in operation. The ones place, tens place, hundreds place and thousands place of function code correspond to 1-way operation respectively. For details, please refer to 7.1.14 (internal operation function).

Function Code	Name	Set Range	Factory Default Value
F5.1.28	Operation 1 input A	Thousands place, hundreds place, tens place and ones place: Address of operation 1 input A Ten thousands place: Input operation mode 0: The input has operation via unsigned number 1: The input has operation via signed number	00000
F5.1.29	Operation 1 input B	Thousands place, hundreds place, tens place and ones place: Address of operation 1 input B	00000

		Ten thousands place: Input operation mode 0: The input has operation via unsigned number 1: The input has operation via signed number	
F5.1.30	Operation 1 setting coefficient	00000~65535	00001

The function codes above are used for setting the input address and setting coefficient of operation 1. The thousands place, hundreds place, tens place and ones place of function code F5.1.28 represent the address of operation 1 input A respectively. The thousands place, hundreds place, tens place and ones place of function code F5.1.29 represent the address of operation 1 input B. The input address corresponds to all function codes. For example, address 1012 corresponds to function code F1.0.12. When input address has no corresponding function code, the default value in input address is 0. The ten thousands place of F5.1.28 and F5.1.29 represents the operation mode of value in input address. 0 means operation without unsigned number, while 1 means operation with unsigned number.

The function code F5.1.30 is used for setting the setting coefficient of operation 1. When the ones place of F5.1.27 is set as 0~9, the values in function code F5.1.30 will be directly engaged in operation; when the ones place of F5.1.27 is set as A~E, the values in function code F5.1.30 will be address number of function code, and the data in address number of function code will be engaged in operation, which is equivalent to indirect addressing.

Function Code	Name	Set Range	Factory Default Value
F5.1.31	Operation 2 input A	Thousands place, hundreds place, tens place and ones place: Address of operation 2 input A Ten thousands place: Input operation mode 0: The input has operation via unsigned number 1: The input has operation via signed number	00000
F5.1.32	Operation 2 input B	Thousands place, hundreds place, tens place and ones place: Address of operation 2 input B Ten thousands place: Input operation mode 0: The input has operation via	00000

		unsigned number 1: The input has operation via signed number	
F5.1.33	Operation 2 setting coefficient	00000~65535	00001
F5.1.34	Operation 3 input A	Thousands place, hundreds place, tens place and ones place: Address of operation 3 input A Ten thousands place: Input operation mode 0: The input has operation via unsigned number 1: The input has operation via signed number	00000
F5.1.35	Operation 3 input B	Thousands place, hundreds place, tens place and ones place: Address of operation 3 input B Ten thousands place: Input operation mode 0: The input has operation via unsigned number 1: The input has operation via signed number	00000
F5.1.36	Operation 3 setting coefficient	00000~65535	00001
F5.1.37	Operation 4 input A	Thousands place, hundreds place, tens place and ones place: Address of operation 4 input A Ten thousands place: Input operation mode 0: The input has operation via unsigned number 1: The input has operation via signed number	00000
F5.1.38	Operation 4 input B	Thousands place, hundreds place, tens place and ones place: Address of operation 4 input B Ten thousands place: Input operation mode 0: The input has operation via	00000

		unsigned number 1: The input has operation via signed number	
F5.1.39	Operation 4 setting coefficient	00000~65535	00001

The function codes above are used for setting the input address and setting coefficient of operation 2, 3, 4. For details, please refer to description of function code F5.1.28~F5.1.30.

6.7 Group F6 of PID Control and Communication Control

Group F6.0 PID Control

Function Code	Name	Set Range	Factory Default Value
F6.0.00	Set PID source	0: Given by figure (F6.0.01) 1: Given by keyboard potentiometer 2: Given by external terminal VF1 3: Given by external terminal VF2 4: Given by PULSE (DI6) 5: Given by communication 6: Given by multi-segment instruction terminal 7: Given by simplified PLC 8: Operation result 1 9: Operation result 2 10: Operation result 3 11: Operation result 4	00

0: Given by figure (F6.0.01)

The PID given value is decided by the set value of function code F6.0.01

1: Given by keyboard potentiometer

The PID given value is decided by keyboard potentiometer

2: Given by external terminal VF1

3: Given by external terminal VF2

The PID set frequency is given by analog input terminal. The Product provides 2-way analog input terminal (VF1, VF2). VF1 and VF2 can be 0V~10V voltage input, or 0/4mA~20mA current input. The VF1 and VF2 input and corresponding relationship curve of PID value can be freely selected by user in 4 relationship curves through function code F3.2.10; in which, Curve 1 and 2 have straight line relationship and can be given by function code F3.2.00~F3.2.09. Curve 3 and 4, which have the broken line relationship with 2 deflection points, can be given by function code F3.2.12~F3.2.27.

4: Given by PULSE (DI6)

The PID given value is given by the high-speed pulse frequency of digital input terminal DI6 (terminal function can be undefined). The corresponding relationship between high-speed pulse frequency and PID given value can be given by function code F3.0.13~F3.0.16 and they have straight-line relationship.

5: Given by communication

The PID given value is given by upper computer through communication. (For details, please refer to Chapter 8)

6: Given by multi-segment instruction terminal

The PID given value is given by the different combination status of multi-segment instruction terminal. 4 multi-segment instruction terminals (terminal function 9~12; for details, please refer to function description of F3.0.01~F3.0.10 multi-segment instruction terminal) can be set in the Product.

7: Given by simplified PLC

The PID given value is given by simplified PLC function; the Product's PID given value can be switched within any of 1~16 frequency instructions; the source of PID value instruction, holding time of PID value instruction and acceleration/deceleration can be set through function code F5.0.03~F5.0.50.

8: Operation result 1

9: Operation result 2

10: Operation result 3

11: Operation result 4

The PID given value is decided by the internal operation module after calculation and setting. For details of operation module, please refer to description of function code F5.1.26~F5.1.39. The operation results can be checked through function code F9.0.46~F9.0.49

Function Code	Name	Set Range	Factory Default Value
F6.0.01	Given by PID value	000.0%~100.0%	050.0%

When function code F6.0.00=0, the PID given value is decided by the set value of this function code

Function Code	Name	Set Range	Factory Default Value
F6.0.02	PID feedback source	0: Given by external terminal VF1 1: Given by external terminal VF2 2: VF1-VF2 3: VF1+VF2 4: Given by PULSE (DI6) 5: Given by communication	00

		6: MAX[VF1, VF2] 7: MIN[VF1, VF2] 8: Multi-segment instruction terminals are switched above 9: Operation result 1 10: Operation result 2 11: Operation result 3 12: Operation result 4	

0: Given by external terminal VF1

1: Given by external terminal VF2

The PID feedback value is given by analog input terminal

2: VF1-VF2

The PID feedback value is given by analog VF1-VF input

3: VF1+VF2

The analog quantity of PID feedback value is given by analog VF1+VF2 input

4: Given by PULSE

The PID feedback value is given by the high-speed pulse frequency of digital input terminal. Connect DI6 terminal (terminal function can be undefined). The relationship between high-speed pulse frequency and corresponding PID feedback value can be set through function code F3.0.13~F3.0.21 and it is straight-line relationship.

5: Given by communication

The PID feedback value is given by upper computer through communication. (For details, please refer to Chapter 8)

6: MAX[VF1, VF2]

The PID feedback source is given by the higher value between analog VF1 and VF2 input

7: MIN[VF1, VF2]

The PID feedback source is given by the smaller value between VF1 and VF2 input

8: Multi-segment instruction terminals are switched above.

The PID feedback source is switched within the 8 types above through different status combination of multi-segment instruction terminals. 4 multi-segment instruction terminals can be set in the Product. When it is used here, the details of 3 terminals (terminal function 9~11) are shown in table below:

Terminal 3	Terminal 2	Terminal 1	Feedback Channel
0	0	0	VF1 (equivalent to F6.0.02=0)
0	0	1	VF2 (equivalent to F6.0.02=1)
0	1	0	VF1-VF2 (equivalent to F6.0.02=2)

0	1	1	VF1+VF2 (equivalent to F6.0.02=3)
1	0	0	Given by PULSE (equivalent to F6.0.02=4)
1	0	1	Given by communication (equivalent to F6.0.02=5)
1	1	0	MAX[VF1,VF2] (equivalent to F6.0.02=6)
1	1	1	MIN[VF1,VF2] (equivalent to F6.0.02=7)

9: Operation result 1

10: Operation result 2

11: Operation result 3

12: Operation result 4

The PID feedback value is decided by the operation result that passes calculation and setting of internal operation module. For details of operation module, please refer to description of function code F5.1.26~F5.1.39. The operation results can be checked via function code F9.0.46~F9.0.49.

Function Code	Name	Set Range	Factory Default Value
F6.0.03	PID action direction	0: Forward action 1: Reverse action	0

This function code is used for setting the frequency changes along with feedback value

0: Forward action

The product's output frequency is directly proportional to the feedback value. When the feedback value is lower than the given value, the Product's output frequency and feedback value will also increase; the final feedback value is the same with given value.

1: Reverse action

The Product's output frequency is inversely proportional to the feedback value. When the feedback value is higher than the given value, the Product's output frequency will increase, while the feedback value will drop. The final feedback value is the same with given value.

Function Code	Name	Set Range	Factory Default Value
F6.0.04	PID set feedback range	00000~65535	01000

The PID set feedback range is a dimensionless unit. It is the range of PID set display F9.0.14 and PID feedback display F9.0.15. When F6.0.04 is set as 5000 and PID feedback value is 100.0%, the PID feedback display F9.0.15 is 5000. The given and feedback value of PID is calibrated based on this parameter.

Function Code	Name	Set Range	Factory Default Value
F6.0.05	Proportional gain KP1	000.0~100.0	020.0
F6.0.06	Integral time TI1	00.01s~10.00s	02.00
F6.0.07	Differential time TD1	00.000s~10.000s	00.000

The regulation volume and response speed will increase along with the increase of proportional gain KP1, but the system oscillation may occur if the value is too high. The system will have higher stability but lower response when KPI value is decreased.

When integral time TI1 increases, it may have slower response, higher output stability, weaker control over fluctuation of feedback value. When TI1 decreases, it may have faster response, higher output fluctuation, but oscillation may occur if the value is too low.

The gain provided by differentiator can be given limit by differential time TD1, to make sure a pure differential gain can be acquired at low frequency, while a constant differential gain can be acquired at high frequency. The regulation strength may increase along with the integral time.

Function Code	Name	Set Range	Factory Default Value
F6.0.08	PID deviation limit	000.0%~100.0%	000.0

This function code is used for determining whether regulating PID, to prevent unstable output frequency when there's small deviation between the given and feedback value.

PID will stop regulation and the Product will maintain stable output when the difference between PID given value and feedback value is lower than the given value of F6.0.08.

PID will have regulation when the difference between PID given value and feedback value is higher than the given value of F6.0.08.

Function Code	Name	Set Range	Factory Default Value
F6.0.09	PID feedback filtering time	00.00~60.00s	00.00

This function code is used for setting the software filtering time of feedback input. This filtering time can be increased in order to improve the feedback value under detection when the feedback value can have interference easily. However, the response of feedback value detection may slow down when this filtering time increases. So, the filtering time should be balanced according to the realities.

Function Code	Name	Set Range	Factory Default Value
F6.0.10	Proportional gain KP2	000.0~100.0	020.0

F6.0.11	Integral time TI2	00.01s~10.00s	02.00
F6.0.12	Differential time TD2	00.000s~10.000s	00.000

The function codes above have the same function with function code F6.0.05~F6.0.07. Please refer to the description of F6.0.05~F6.0.07

Function Code	Name	Set Range	Factory Default Value
F6.0.13	PID switch condition	0: No switch 1: Switch via terminal 2: Switch based on deviation	0

Better PID parameters should be used for control in some special application scenarios. This function code is used for switching PID parameters in any conditions.

0: No switch

The PID parameter of F6.0.05~F6.0.07 is adopted by default

1: Switch via terminal

Be switched through digital input terminal (this terminal function is set as 41: PID parameter switch). The PID parameter of F6.0.05~F6.0.07 is adopted when terminal signal is invalid, or the PID parameter of F6.0.10~F6.0.12 is adopted when terminal signal is valid.

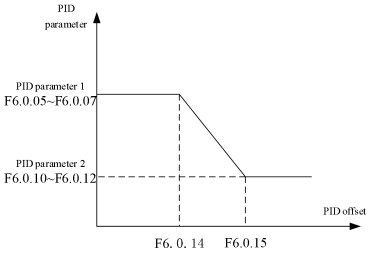
2: Switch based on deviation

Be switched according to the set value of function code F6.0.14 and F6.0.15. Please refer to the description of function code F6.0.14 and F6.0.15.

Function Code	Name	Set Range	Factory Default Value
F6.0.14	PID switch deviation 1	000.0%~F6.0.15	020.0
F6.0.15	PID switch deviatio2	F6.0.14~100.0%	080.0

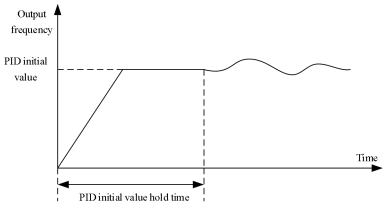
When F6.0.13=2, determine whether switch PID parameters through the two function codes. The set value of the two function codes is the percentage of function code F6.0.04 (PID set feedback range).

The PID parameter of F6.0.05~F6.0.07 will be adopted when the difference between the given and feedback value is lower than PID switch offset 1, or the PID parameter of F6.0.10~F6.0.12 will be adopted when the difference is higher than PID switch offset 2. The PID parameters will be linear interpolation value of two groups of PID parameter when the difference between given and feedback value is within the range of PID switch offset 1 and 2. See description of diagram below:



Function Code	Name	Set Range	Factory Default Value
F6.0.16	PID initial value	000.0%~100.0%	000.0
F6.0.17	PID initial value hold period	000.00~650.00s	000.00

When the Product is started, firstly accelerate to the PID initial value according to the normal acceleration, maintain running at the PID initial value status, then make PID regulation after passing the time given by F6.0.17. The PID initial value is the percentage of the max. frequency. See description of diagram below:



Function Code	Name	Set Range	Factory Default Value
F6.0.18	PID feedback loss detection	000.0%: No judgment of feedback loss 000.1%~100.0%	000.0
F6.0.19	PID feedback loss detection time	00.0s~20.0s	00.0

The two function codes are used for judging whether PID feedback signals are lost

When F6.0.18=0.0%, make no judgment whether PID feedback signals are lost

The Product will give out alarm of Err20 and PID feedback signal is considered to be lost when F6.0.18>0.0%, the actual PID feedback is lower than the set value of F6.0.18 and the continuous time exceeds the set time of F6.0.19.

Function Code	Name	Set Range	Factory Default Value
F6.0.20	PID shutdown operation	0: No operation 1: Operation	0

This function code is used for setting whether PID has operation when the Product is under shutdown status

0: No operation

PID operation is entered when the Product is running, or PID operation is not entered (this is selected in general) when the Product has shutdown

1: Operation

PID operation is entered whether the Product is under running or shutdown status

Function Code	Name	Set Range	Factory Default Value
F6.0.21	Cut-off frequency of PID reverse rotation	0.00~Max. frequency	0

In some PID control conditions, the PID regulation will convert the Product to reverse rotation from forward rotation, in order to reach the effects of PID regulation. The function code F6.0.21 is used for limiting the allowed max. frequency during reverse rotation of the Product.

Function Code	Name	Set Range	Factory Default Value
F6.0.22	PID differential limit amplitude	0.00%~100.00%	0.1

As the differential is sensitive in PID regulation and may lead to system oscillation easily, the user should set the parameter F6.0.22 reasonably according to the operation environment and control requirements, in order to keep PID differential valid within certain scope and improve the system stability.

Function Code	Name	Set Range	Factory Default Value
F6.0.23	PID set change time	0.00s~650.00s	0

This function code is used for setting the period from 0.00% linear change of PID set value to 100.00%. Set the parameter F6.0.23 reasonably according to the requirements of device and system, to avoid the adverse influence due to fast change or sudden change of PID set value.

Function Code	Name	Set Range	Factory Default Value
F6.0.24	PID feedback filtering time	0.00s~60.00s	0
F6.0.25	PID output filtering time	0.00s~60.00s	0

PID feedback filtering time: Set the time to improve the anti-interference ability

of feedback and stability of inverter frequency output, but the fast response of system can be reduced.

PID output filtering time: Set the time to reduce the sudden change of inverter frequency output, but the fast response of system can be reduced.

Function Code	Name	Set Range	Factory Default Value
F6.0.26	Forward max. value of deviation between two outputs	0.00%~100.00%	1

This function code is used for setting the allowed max. deviation of output at interval of 2ms when the Product has forward rotation due to PID regulation, in order to prevent fast output change of the Product during PID regulation.

Function Code	Name	Set Range	Factory Default Value
F6.0.27	Reverse max. value of deviation between two outputs	0.00%~100.00%	1

This function code is used for setting the max. allowed deviation at interval of 2ms when the Product has reverse rotation due to PID regulation, in order to prevent fast output change of the Product during PID regulation.

Function Code	Name	Set Range	Factory Default Value
F6.0.28	PID integral attribute	Ones place: Integral separation 0: Invalid 1: Valid Tens place: Whether stop integral after outputting to limit value 0: Continue integral 1: Stop integral	0

Integral separation: When integral separation is valid (i.e. ones place of F6.0.28 is 1), the integral adjustment function of PID will be paused when the terminal “Pause PID integral” is valid (the given function of digital input terminal is 40), but the ratio and differential regulation function of PID are still valid.

When integral separation is invalid (i.e. ones place of F6.0.28 is 0), the integral regulation function of PID will be engaged in regulation whether the terminal “Pause PID integral” (the given function of digital input terminal is 40) is valid.

Whether stop integral after outputting to limit value: Whether pause the integral regulation function of PID when the current PID operation output reaches the max. value or the min. value.

When “Stop integral” (i.e. ones place of F6.0.28 is 1), the integral regulation function of PID will be paused.

When "Continue integral" (i.e. tens place of F6.0.28 is 0), the integral regulation function of PID will be engaged in regulation.

Group F6.1 Communication Control

Function Code	Name	Set Range	Factory Default Value
F6.1.00	Baud rate	Ones place: MODBUS baud rate 0: 1200 1: 2400 2: 4800 3: 9600 4: 19200 5: 38400 6: 57600 Tens place: Invalid	3
F6.1.01	Data format	0: No check (8-N-2) 1: Even parity check (8-E-1) 2: Odd parity check (8-O-1) 3: No check (8-N-1)	0
F6.1.02	Local address	000: Broadcasting address 001~249	001
F6.1.03	Response delay	0ms~20ms	02
F6.1.04	Communication timeout period	00.0 (invalid) 00.1s~60.0s	00.0
F6.1.05	Data transmitting format	Ones place: MODBUS data format 0: Reserved 1: RTU mode Tens place: Invalid	1

The function codes above should be set when the Product realizes communication with other devices through RS-485 communication port. For details, please refer to RS-485 communication of the Product in Chapter 8.

Function Code	Name	Set Range	Factory Default Value
F6.1.06	Whether reply data in MODBUS communication	0: Reply 1: No reply	0

This function code is used for setting whether the machine returns information while reading parameters during MODBUS communication. Information is not replied when it is selected as 1.

Function Code	Name	Set Range	Factory Default Value	Change Restriction
F6.1.07	Treatment method of communication error	0: No treatment 1: Shutdown 2: Communication fault	0	

This function code is the treatment method in case of communication fault.

6.8 Customized Group F7 of User Parameters

Group F7.0 Basic Parameter Group

Function Code	Name	Set Range	Factory Default Value
F7.0.00	User function 0	U0.1.01	U0.1.01
F7.0.01	User function 1	U0.0.00~UX.X.XX (except for Group F7 and F8)	U1.0.00
F7.0.02	User function 2	U0.0.00~UX.X.XX (except for Group F7 and F8)	U1.0.04
F7.0.03	User function 3	U0.0.00~UX.X.XX (except for Group F7 and F8)	U1.0.11
F7.0.04	User function 4	U0.0.00~UX.X.XX (except for Group F7 and F8)	U1.0.14
F7.0.05	User function 5	U0.0.00~UX.X.XX (except for Group F7 and F8)	U1.1.01
F7.0.06	User function 6	U0.0.00~UX.X.XX (except for Group F7 and F8)	U1.1.02
F7.0.07	User function 7	U0.0.00~UX.X.XX (except for Group F7 and F8)	U1.1.03
F7.0.08	User function 8	U0.0.00~UX.X.XX (except for Group F7 and F8)	U1.1.04
F7.0.09	User function 9	U0.0.00~UX.X.XX (except for Group F7 and F8)	U1.1.05
F7.0.10	User function 10	U0.0.00~UX.X.XX (except for Group F7 and F8)	U0.0.00
F7.0.11	User function 11	U0.0.00~UX.X.XX (except for Group F7 and F8)	U0.0.00
F7.0.12	User function 12	U0.0.00~UX.X.XX (except for Group F7 and F8)	U0.0.00
F7.0.13	User function 13	U0.0.00~UX.X.XX (except for Group F7 and F8)	U0.0.00
F7.0.14	User function 14	U0.0.00~UX.X.XX (except for Group F7 and F8)	U0.0.00
F7.0.15	User function 15	U0.0.00~UX.X.XX (except for Group F7 and F8)	U0.0.00
F7.0.16	User function 16	U0.0.00~UX.X.XX (except for Group F7 and F8)	U0.0.00
F7.0.17	User function 17	U0.0.00~UX.X.XX (except for Group F7 and F8)	U0.0.00
F7.0.18	User function 18	U0.0.00~UX.X.XX (except for Group F7 and F8)	U0.0.00
F7.0.19	User function 19	U0.0.00~UX.X.XX (except for Group F7 and F8)	U0.0.00
F7.0.20	User function 20	U0.0.00~UX.X.XX (except for Group F7 and F8)	U0.0.00
F7.0.21	User function 21	U0.0.00~UX.X.XX (except for Group F7 and F8)	U0.0.00
F7.0.22	User function 22	U0.0.00~UX.X.XX (except for Group F7 and F8)	U0.0.00
F7.0.23	User function 23	U0.0.00~UX.X.XX (except for Group F7 and F8)	U0.0.00
F7.0.24	User function 24	U0.0.00~UX.X.XX (except for Group F7 and F8)	U0.0.00
F7.0.25	User function 25	U0.0.00~UX.X.XX (except for Group F7 and F8)	U0.0.00
F7.0.26	User function 26	U0.0.00~UX.X.XX (except for Group F7 and F8)	U0.0.00
F7.0.27	User function 27	U0.0.00~UX.X.XX (except for Group F7 and F8)	U0.0.00
F7.0.28	User function 28	U0.0.00~UX.X.XX (except for Group F7 and F8)	U0.0.00
F7.0.29	User function 29	U0.0.00~UX.X.XX (except for Group F7 and F8)	U0.0.00

This group of function code is group of user customized parameters. User can select the to-be-displayed function code parameters in function code (except for Group F7 and F8) and summarize them in Group F7.0 as the user customized parameters, to facilitate the operation such as check and change. 30 parameters can be customized at most.

6.9 Group F8 of Manufacturer Functions

Group F8.0 Manufacturer Parameters

Function Code	Name	Set Range	Factory Default Value
F8.0.00	Manufacturer password	00000~65535	00000

This function code is manufacturer password input and displays the specific function code of manufacturer. It should not be operated by user.

6.10 Group F9 of Monitoring Parameters

Group F9.0 Basic Monitoring Parameters

The parameter group F9 is used for monitoring the information of inverter running status. User can set the corresponding parameters as required and check parameters quickly through panel, to facilitate debugging and maintenance at site, or read the value of parameter group through communication in order to monitor them through upper computer.

Function Code	Name	Description	Unit
F9.0.00	Running frequency	Output frequency while inverter is running	0.01Hz
F9.0.01	Given frequency	Given frequency of inverter	0.01Hz
F9.0.02	Output current	Output current while inverter is running	0.01A
F9.0.03	Output voltage	Output voltage while inverter is running	1V
F9.0.04	Busbar voltage	Voltage of inverter DC busbar	0.1V
F9.0.05	Output torque	Output torque while inverter is running, percentage of motor rated torque	0.1%
F9.0.06	Output power	Output power while inverter is running	0.1kW
F9.0.07	Input terminal status	Check if input terminal has signal input	
F9.0.08	Output terminal status	Check if output terminal has signal output	
F9.0.09	VF1 voltage	Check the voltage between VF1 and GND	0.01V
F9.0.10	VF2 voltage	Check the voltage between VF2 and GND	0.01V
F9.0.11	Customized display value	The value that is converted by customized display coefficient F0.1.22 and customized display decimal point F0.1.23	
F9.0.12	Actual count value	Check the inverter actual count value that is used for counting purpose	1

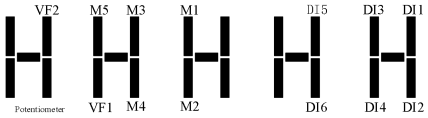
Function Code	Name	Description	Unit
F9.0.13	Actual length	Check the inverter actual length that is used for fixed length purpose	1m
F9.0.14	PID given value	Product of PID given value and PID set feedback range	
F9.0.15	PID feedback	Product of PID feedback value and PID set feedback range	
F9.0.16	PULSE frequency	Check PULSE input frequency	0.01kHz
F9.0.17	Feedback speed	Actual output frequency while inverter is running	0.1Hz
F9.0.18	PLC stage	Display the running stage of simplified PLC	1
F9.0.19	Voltage before VF1 correction	Voltage between VF1 and GND before VF1 correction	0.001V
F9.0.20	Voltage before VF2 correction	Voltage between VF2 and GND before VF2 correction	0.001V
F9.0.21	Linear velocity	Linear velocity of DI6 pulse sampling, equals to pulse number collected per minute/pulse number per meter	1m/min
F9.0.22	Current power-on period	The period of current power-on	1min
F9.0.23	Current running period	The period of current running	0.1min
F9.0.24	Remaining running period	Remaining running period of F4.0.23 timing function	0.1min
F9.0.25	Frequency of frequency source A	Check the frequency given by frequency source A	0.01Hz
F9.0.26	Frequency of frequency source B	Check the frequency given by frequency source B	0.01Hz
F9.0.27	Set value of communication	The set value of corresponding communication address A001, percentage of the max. frequency	%
F9.0.28	PULSE frequency	Check the frequency of PULSE input	1Hz
F9.0.29	Encoder feedback speed	The actual motor running frequency in encoder feedback	0.01Hz
F9.0.30	Actual distance	Check the actual distance of inverter distance control	
F9.0.31~ F9.0.45	Reserved		

Function Code	Name	Description	Unit
F9.0.46	Operation result 1	Check the value of operation result 1	
F9.0.47	Operation result 2	Check the value of operation result 2	
F9.0.48	Operation result 3	Check the value of operation result 3	
F9.0.49	Operation result 4	Check the value of operation result 4	
F9.0.50	User standby monitoring value 1	Check the value of user specific function	
F9.0.51	User standby monitoring value 2	Check the value of user specific function	
F9.0.52	User standby monitoring value 3	Check the value of user specific function	
F9.0.53	User standby monitoring value 4	Check the value of user specific function	
F9.0.54	User standby monitoring value 5	Check the value of user specific function	
F9.0.63	Fire hazard mode	0: Not fire hazard mode 1: Fire hazard mode	

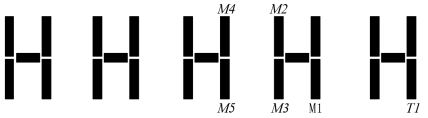
Corresponding Relationship between Input/output Terminal Status

The illuminance status of nixie tube vertical bar means whether input/output terminal has signal. When vertical bar is on, the corresponding input terminals of vertical bar have signal input or the output terminal has signal output.

The display rules of function code F9.0.07 are shown as follows:



The display rules of function code F9.0.08 are shown as follows:
(M is internal intermediate relay delay)



Chapter 7 Common Functions & Application Cases

7.1 Common Functions

7.1.1 Start/stop Control

The Product has 3 start/stop control modes: Keyboard control, terminal control and communication control.

1. Keyboard Control (Set F1.0.04=0)

Press “RUN” key on keyboard to start the Product, or press “STOP” key to stop the Product. The running direction can be controlled by function code F1.0.03. It will enter forward rotation when F1.0.03=0, or enter reverse rotation when F1.0.03=1.

2. Terminal Control (Set F1.0.04=1)

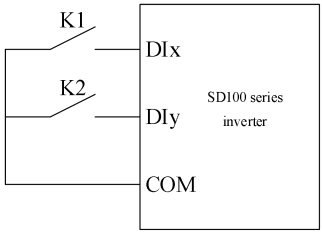
4 terminal start/stop modes are provided for users: Two-line type mode 1, two-line type mode 2, three-line type mode 1 and three-line type mode 2. The specific use method is as follows:

Two-line type mode 1 (Set F3.0.00=0)

The motor forward/reverse running is decided by any two DIx and DIy terminal of multi-function terminal, and the level is valid. The terminal functions are given as follows:

Terminal	Given Value	Description
DIx	1	Forward running (FWD)
DIy	2	Reverse running (REV)

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

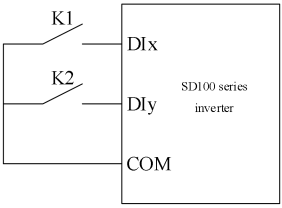


Two-line type mode 2 (Set F3.0.00=1)

The motor forward/reverse running is decided by any two DIx and DIy terminal of multi-function terminal, in which, DIx terminal is used as running enabling terminal, while DIy is terminal for confirming running direction, and their level is valid. The terminal functions are given as follows:

Terminal	Given Value	Description
DIx	1	Forward running(FWD)
DIy	2	Reverse running (REV)

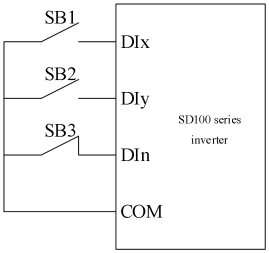
K1	K2	Run command
0	0	Stop
0	1	Stop
1	0	Forward rotation
1	1	Reverse rotation



Three-line type control mode 1 (Set F3.0.00=2)

The motor forward/reverse running is decided by any three DIx, DIy and DIn terminal of multi-function terminal, in which, DIn terminal is used as running enabling terminal; DIx and DIy are terminals for determining the running direction, and DIn level is valid; the rising edge pulse of DIx and DIy are valid. When running is required, firstly close DIn terminal, and the pulse rising edge of DIx or DIy will realize forward or reverse rotation control of motor. The motor can be stopped by disconnecting the signals of DIn terminal. The terminal functions are given as follows:

Terminal	Given Value	Description
DIx	1	Forward running (FWD)
DIy	2	Reverse running (REV)
DIn	3	Three-line type running control

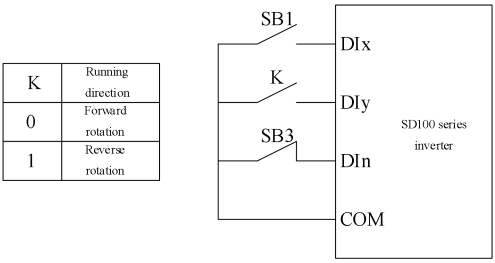


SB1: Normally-on forward running button; SB2: Normally-on reverse running button; SB3: Normally-off stop button.

●Three-line type control mode 2 (Set F3.0.00=3)

The motor forward/reverse running is decided by any three DIx, DIy and DIn terminal of multi-function terminal, in which, DIn terminal is used as running enabling terminal; DIx is running terminal and DIy is terminal for determining the running direction, and DIn and DIy level is valid; the rising edge pulse of DIx and DIy are valid. When running is required, firstly close DIn terminal, and the pulse rising edge of DIx will realize forward or reverse rotation control of motor, and DIy status will decide the running direction. The motor can be stopped by disconnecting the signals of DIn terminal. The terminal functions are given as follows:

Terminal	Given Value	Description
DIx	1	Forward running (FWD)
DIy	2	Reverse running (REV)
DIn	3	Three-line type running control



SB1: Normally-on forward running button; SB3: Normally-off stop button; K: Running direction selection button

3. Communication Control (Set F1.0.04=2)

The upper computer will realize the Product's start, stop, forward and reverse rotation through RS-485 communication. The Product supports standard MODBUS protocol. For details of description, please refer to RS-485 communication of Chapter 8.

7.1.2 Startup/Shutdown Mode

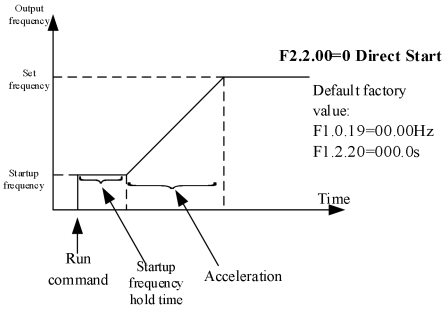
1. Startup Mode

The Product has 3 start modes: Direct startup, speed tracking startup and braking restart

●Direct startup (Set F2.2.00=0)

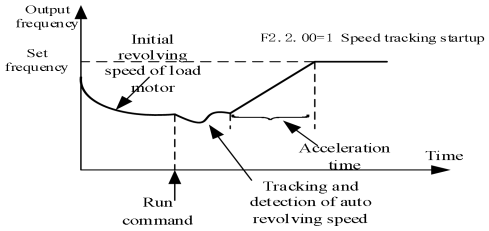
The Product starts according to the set startup frequency (F1.0.19) and startup

frequency hold time (F1.0.20), and then accelerates to the given frequency according to the selected acceleration.



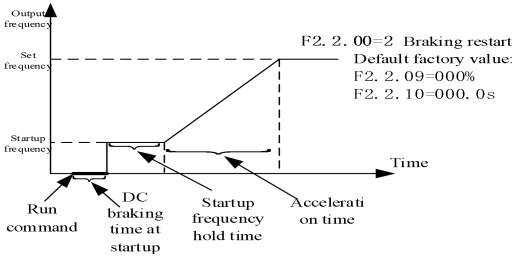
- Speed tracking startup (Set F2.2.00=1)

The Product starts speed tracking according to the speed tracking mode given in speed tracking mode F2.2.02. When the motor running speed is tracked, the Product will start at this speed, until it is accelerated or decelerated to the given frequency. This function should be used when the motor is not stopped stably or fails to be stopped.



- Braking restart (Set F2.2.00=2)

The Product will firstly have DC braking according to the data of DC braking current at startup (F2.2.09) and DC braking time at startup (F2.2.10) and then have normal startup. When motor has low-speed reverse rotation before startup, this function should be used during forward rotation.



2. Shutdown Mode

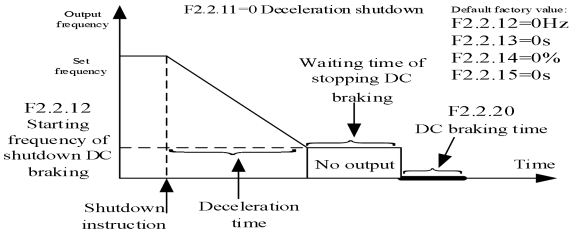
The Product has 2 shutdown modes: Deceleration shutdown and free shutdown

● Deceleration shutdown (Set F2.2.11=0)

When shutdown instruction is valid, the Product will reduce the output frequency according to the deceleration time selected, and realize shutdown when the output frequency is reduced to 0.

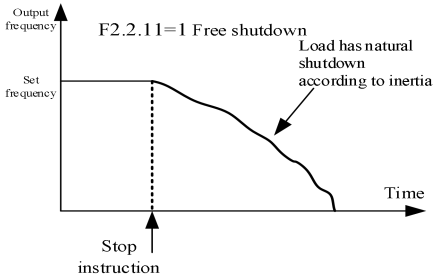
The DC braking time at shutdown can be used when the Product needs to realize fast shutdown at low speed or prevent sliding and vibration after shutdown; when the Product is decelerated to the given frequency of F2.2.12, it will start DC braking from the given current of F2.2.14 after waiting for the period given by F2.2.13, and it will stop DC braking after reaching the given time of F2.2.14.

Energy consumption braking should be used when the Product needs fast shutdown at high speed. All series of the Product can be provided with built-in brake unit, set the parameter of braking utilization rate F2.2.15 and connect the braking resistor to realize energy consumption braking; please check Appendix A2.5 for the external braking resistor



● Free shutdown (Set F2.2.11=1)

When shutdown instruction is valid, the Product will stop output immediately and the motor will have free shutdown according to the mechanical inertia. Free shutdown function should be selected when user has no shutdown requirements or the load supports braking function.



7.1.3 Acceleration/Deceleration Mode

The Product provides 3 acceleration/deceleration modes according to the load characteristics and requirements of acceleration/deceleration time: Straight line, S curve 1 and S curve 2, which can be selected through function code F1.0.26. Besides, the unit of acceleration/deceleration time can be adjusted and be set through function code F1.0.28.

● Straight line (Set F1.0.26=0)

Start straight-line acceleration to the given frequency from the startup frequency. The Product provides 4 straight-line acceleration/deceleration modes, which can be switched by selecting different combinations of terminal through acceleration/deceleration time.

● S Curve 1 (Set F1.0.26=1)

The output frequency has progressive increase or decrease according to Curve S. Curve S applies to the scenarios requiring smooth startup or shutdown; the Parameter F1.0.29 and F1.0.30 have defined the time proportion of starting and ending segment of S Curve 1 respectively.

● S Curve 2 (Set F1.0.26=2)

The motor rated frequency is always the deflection point of Curve S in acceleration/deceleration of this Curve S. Generally, it applies to the high-speed area which is above the rated frequency and needs fast acceleration/deceleration.

7.1.4 Inching Function

The Product provides 2 inching functions: Keyboard control, terminal control

● Keyboard control

Set the multi-function JOG key as forward inching or reverse inching (F0.1.03=1 or 2), and the Product can realize inching function through JOG key at shutdown. The inching running frequency, acceleration/deceleration time can be set through function code F1.0.46~F1.0.48.

● Terminal control

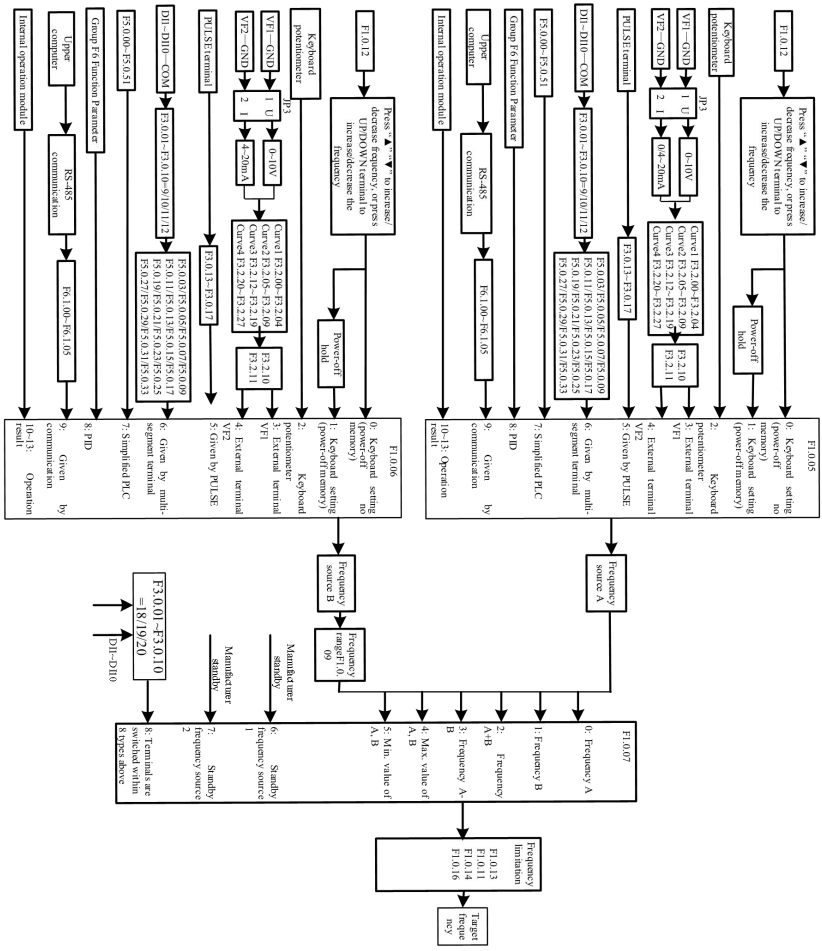
Set the multi-function terminal DIx and DIy as forward or reverse inching and the Product can realize inching through DIx and DIy at shutdown. The inching running frequency, acceleration/deceleration can be set through function code F1.0.46~F1.0.48.

Note: The inching functions of the given modes above are inching effects at shutdown status. To prioritize the inching function effects at the running status of inverter, the function code must be set as F1.0.45=1.

7.1.5 Running Frequency Control

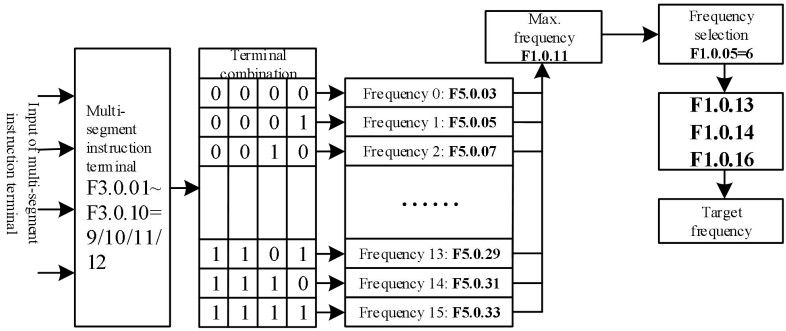
The Product provides two input channels of frequency sources, i.e. frequency source A and B, which can have independent running or be combined according to calculation. Each frequency source has 14 selections, in order to greatly satisfy the requirements for selecting different frequencies at site. Frequency source A is given by default when the Product is delivered. When two frequencies are combined, frequency source A is considered as the main channel by default, while frequency B is the auxiliary channel.

The following diagram has detailed introduction to realization process of frequency selection:



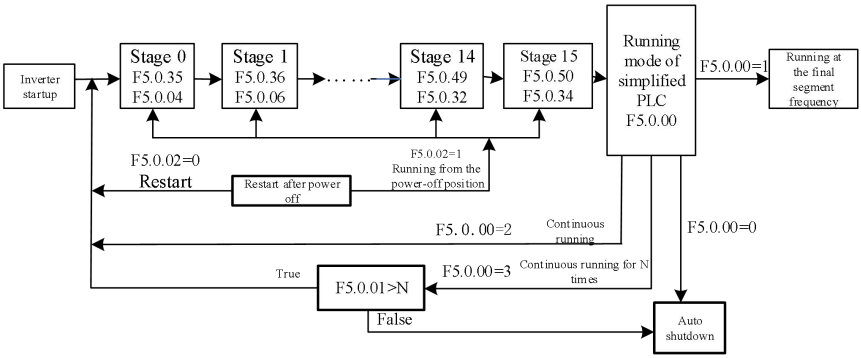
7.1.6 Multi-segment Speed Function

The Product can switch 16 segments of speeds through different combinations of multi-segment instruction terminals. The missing setting bit is calculated by status 0.



7.1.7 Simplified PLC

The Product can run 16 segments of speed maximally; the acceleration/deceleration time and running period of each segment can be set independently (refer to function code F5.0.03~F5.0.50). Besides, the cycle times can be set through function code F5.0.00, F5.0.01.



7.1.8 Timing Function

Function Code	Name	Set Range	Factory Default Value
F4.0.23	Selection of timing	0: Invalid 1: Valid	0

	function		
F4.0.24	Selection of timing running period	0: Given by figure (F4.0.25) 1: Given by external terminal VF1 2: Given by external terminal VF2 (Corresponding F4.0.25 of analog input range)	0
F4.0.25	Timing running period	0000.0 min~6500.0 min	0000.0

The Product is provided with built-in timing function to realize timing running.

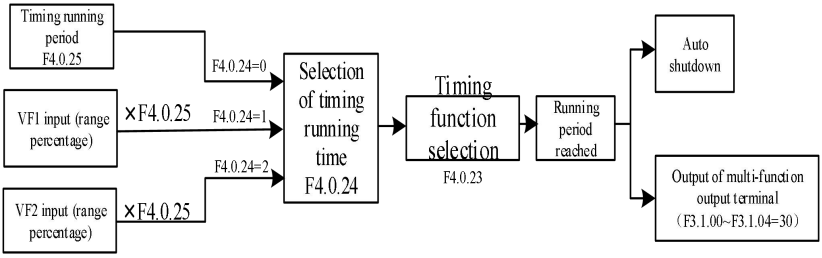
Function code F4.0.23 decides whether timing function is valid.

Function code F4.0.24 decides the source of timing running period.

When F4.0.24=0, the timing running period is given by the set value of function code F4.0.25;

When F4.0.24=1 or 2, the timing running period can be given by the external analog input terminal. The Product provides 2-way analog input terminal (VF1, VF2). VF1 can be 0V~10V voltage input, or 0/4mA~20mA current input. The VF1 and VF2 input and corresponding relationship curve of timing running period can be freely selected by user in 4 relationship curves through function code F3.2.10; in which, Curve 1 and 2 have straight line relationship and can be given by function code F3.2.00~F3.2.09. Curve 3 and 4, which have the broken line relationship with 2 deflection points, can be given by function code F3.2.12~F3.2.27. Now, the analog input range corresponds to the set value of function code F4.0.25.

When timing function is valid, the Product will restart counting after each startup. The Product will have auto shutdown when reaching the set timing, and its multi-function output terminal will output ON signal during shutdown. The corresponding function of multi-function output terminal is output of timing arrival (30). The timing period is unlimited when the given timing period is 0. The actual period of each running can be checked through function code F9.0.23 (the display value of F9.0.23 will be recovered to 0 automatically when the Product has shutdown).



7.1.9 Fixed Length Function

Function Code	Name	Set Range	Factory Default Value
F4.0.26	Given length	00000m~65535m	01000
F4.0.27	Actual length	00000m~65535m	00000
F4.0.28	Pulses per meter	0000.1~6553.5	0100.0

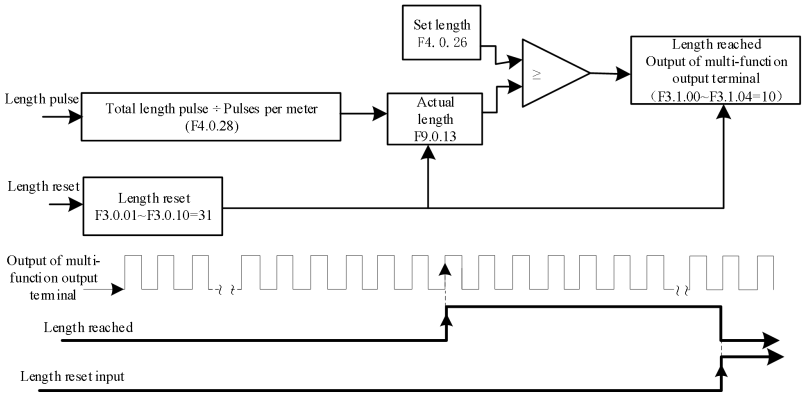
The Product is provided with built-in fixed length function to realize fixed length control. The function of corresponding digital input terminal should be set as "Length counting input" (Function 30) in the application. The DI6 terminal must be used when the input pulse frequency is high. The length calculation formula is as follows:

$$\text{Actual length} = \frac{\text{Total pulses collected by terminal}}{\text{Pulses per meter}}$$

The Product's multi-function output terminal will output ON signal when the actual length reaches the given length (set value of F4.0.26). The corresponding function of multi-function output terminal is length reached (10).

The actual length can be cleared through the digital input terminal during fixed length control. The corresponding function of digital input terminal is length reset (31).

The actual length can be checked through function code F4.0.27 or F9.0.13.



7.1.10 Counting Function

Function Code	Name	Set Range	Factory Default Value
F4.0.29	Given count value	00001~65535	01000
F4.0.30	Designated count value	00001~65535	01000

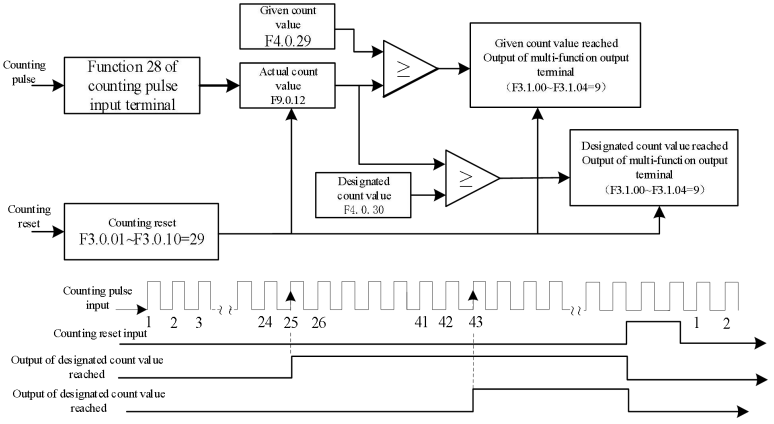
The Product's counting function has 2-stage signal output, i.e. given count value reached and designated counting reached. The function of digital input terminal should be set as "counter input" (Function 28) in application. The DI6 terminal must be used when pulse frequency is high.

The Product's multi-function output terminal will output ON signal when the actual count value reaches the given counting (set value of F4.0.29). The corresponding function of multi-function output terminal is given counting reached (8).

The Product's multi-function output terminal will output ON signal when the actual count value (set value of F4.0.30) reaches the designated count value. The corresponding function of multi-function output terminal is designated count value reached (9).

The actual count value can be cleared through digital input terminal during counting. The corresponding function of digital input terminal is counter reset (29).

The actual count value can be checked through function code F9.0.12.



7.1.11 Distance Control Function

Function Code	Name	Set Range	Factory Default Value
F4.0.31	Set distance 1	-3200.0~3200.0	0000.0
F4.0.32	Set distance 2	-3200.0~3200.0	0000.0
F4.0.33	Pulses per distance	000.00~600.00	000.00

The Product is provided with built-in distance control function. The corresponding function of digital input terminal should be set as “Encoder Phase A input” (Function 52) and “Encoder Phase B input” (53) in application. The encoder pulse frequency should not exceed 200Hz. The positive and negative of actual distance is decided by phase sequence of encoder. The distance calculation formula is as follows:

$$\text{Actual distance} = \pm\frac{\text{Total pulses collected by terminal}}{\text{Pulses per distance}}$$

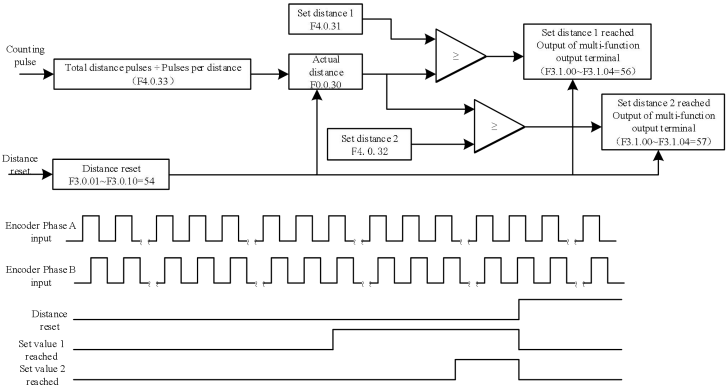
As the nixie tube has 5 bits only, all decimal points of nixie tube will display the negative value when the distance is less than -999.9. For example, “1.0.1.0.0” means -1010.0.

The Product’s multi-function output terminal will output ON signal when the actual distance reaches the set distance 1 (set value of F4.0.31). The corresponding function of multi-function output terminal is set distance 1 reached (56).

The Product’s multi-function output terminal will output ON signal when the actual distance reaches the set distance 2 (set value of F4.0.32). The corresponding function of multi-function output terminal is set distance 2 reached (57).

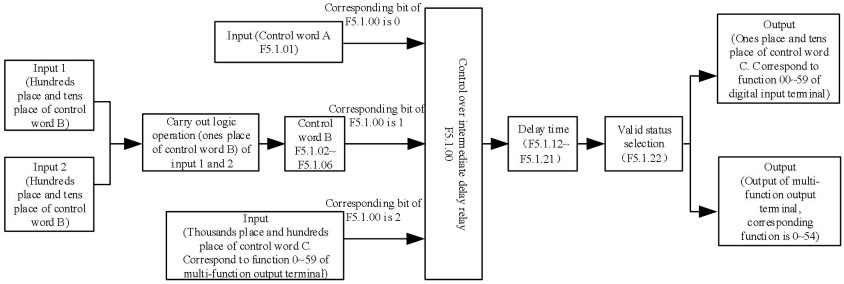
The actual distance can be cleared through the digital input terminal during distance control. The corresponding function of digital input terminal is distance reset (54).

The actual distance can be checked through function code F9.0.30.



7.1.12 Programming Function of Simplified Internal Relay

The Product is provided with 5 virtual intermediate delay relays to collect the physical signals from the Product's digital input terminals, as well as the virtual signals from multi-function output terminal (00~59); then carry out simplified logic running, to output the calculated results to the multi-function output terminal, or output the equivalents to the digital input terminals.

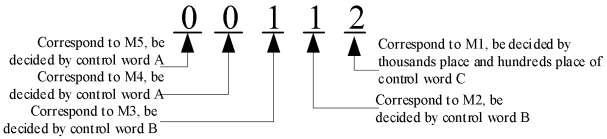


Introduction to control logic function of control word B of intermediate delay relay

Function Code	Set Value of Ones Place	Function	Description
F5.1.02 F5.1.03 F5.1.04 F5.1.05 F5.1.06	0	Input 1	When Input 1 is true, the logic result is true When Input 1 is false, the logic result is false
	1	NOT of Input 1	When Input 1 is true, the logic result is false When Input is false, the logic result is true
	2	AND of Input 1 and 2	When Input 1 and 2 are true at the same time, the logic result is true; otherwise, it is false
	3	OR of Input 1 and 2	When any of Input 1 and 2 is true, the logic result is true
	4	XOR of Input 1 and 2	When logic of Input 1 and 2 is opposite, the logic result is true. When logic of Input 1 and 2 is the same, the logic result is false
	5	Input 1 validness is set as valid Input 2 validness is set as invalid	When Input 1 is true, the logic result is true When Input 2 is true while Input 1 is false, the logic result is false

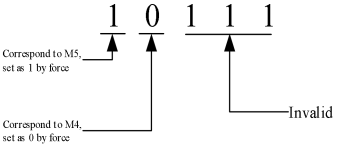
Function Code	Set Value of Ones Place	Function	Description
F5.1.02 F5.1.03 F5.1.04 F5.1.05 F5.1.06	6	Input 1 rising edge validness is set as valid Input 2 rising edge validness is set as invalid	When Input 1 rising edge is true, the logic result is true When Input 2 rising edge is true, the logic result is false
	7	Effective signal of Input 1 rising edge is taken as reverse	When Input 1 rising edge is true, the logic result is reverse
	8	Input 1 rising edge is valid, outputs one pulse signal with width of 200ms	When Input 1 rising edge is true, the logic result is true and lasts for 200ms, then becomes false
	9	AND of Input 1 rising edge and Input 2	When Input 1 rising edge and Input 2 are true at the same time, the logic result is true; otherwise, it is false

For example, set function code F5.1.00 (control over intermediate delay relay) =00112 and refer to description of function code F5.1.00: The Relay 5 (M5) and Relay 4 (M4) are decided by control word A, Relay 3 (M3) and Relay 2 (M2) are decided by control word B, while Relay 1 (M1) is decided by thousands place and hundreds place of control word C, as shown in diagram below:



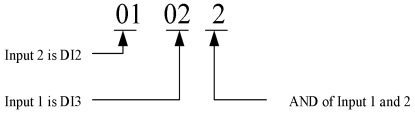
By combining the example above, set F5.1.01 (control word A of intermediate relay) =10111, then set M5=1, M4=0 by force.

As M3, M2 and M1 are not decided by control word A, F5.1.01 setting is invalid to M3, M2 and M1.

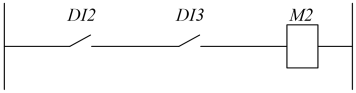


By combining the example above, set F5.1.03 (control word B of M2) =01022, refer to description of function code F5.1.03:

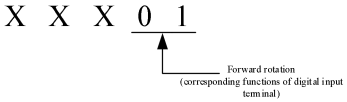
M2=DI2&&DI3, as shown in diagram below:



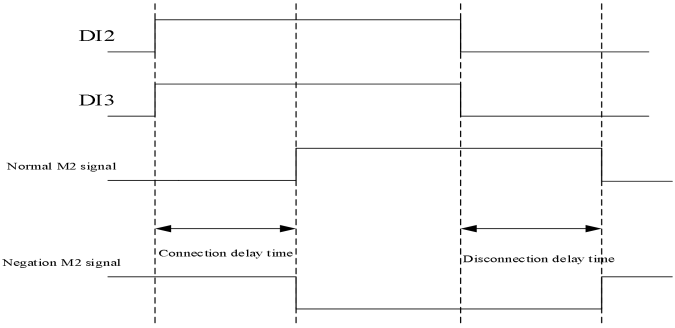
The equivalents are shown in diagram below:



Combining the examples above, set the tens place and ones place of F5.1.08 (correspond to control word C of M2) as 01 (corresponding function of digital input terminal), then M2 function is forward rotation. When 51 (synchronize intermediate relay M2) is set in F3.1.00~F3.1.04 at the same time, it corresponds to the output signal of multi-function output terminal.

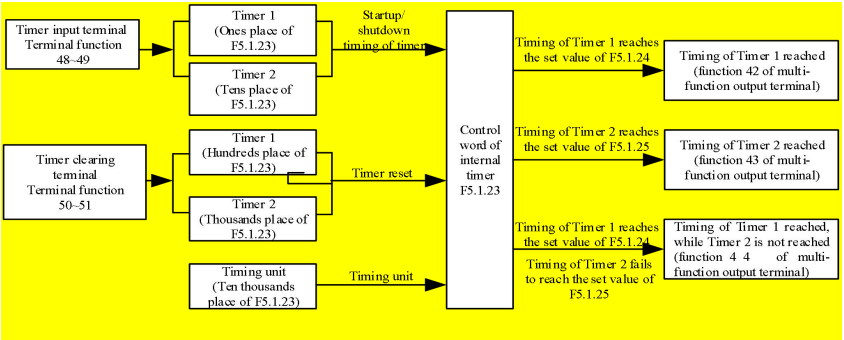


The connection delay of intermediate relay can be given by function code F5.1.12~F5.1.16, while its disconnection delay is given by function code F5.1.17~F5.1.21. Besides, the negation of output signal can be given by function code F5.1.22. Combining the examples above, set F5.1.13 (corresponding connection delay of M2) =10.0s, F5.1.18 (corresponding disconnection delay of M2) =5.0s. When both DI2 and DI3 are connected, M2 will be connected after delay of 10.0s, instead of being connected immediately; likewise, when DI2 or DI3 is disconnected, M2 will be disconnected after delay of 5.0s, instead of being disconnected immediately.



7.1.13 Functions of Internal Timer

The Product has 2 built-in timers to realize startup, shutdown timing and timer reset through the digital input terminal. Signals can be outputted through multi-function output terminal when timing is reached.



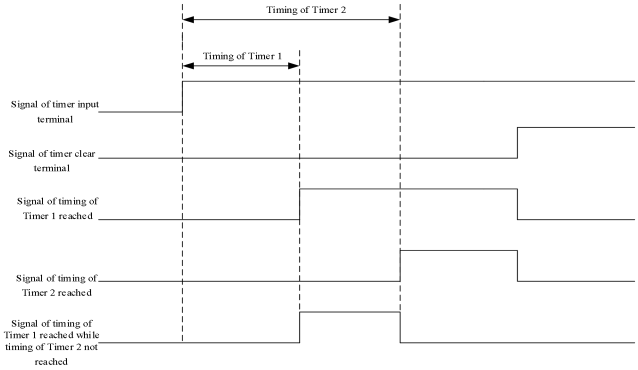
The timer will start counting when signal of timer input terminal (terminal function 48~49) is valid. When signal of timer input terminal is invalid, the timer will stop counting and maintain the current value.

The Product's multi-function output terminal will output ON signal when the actual count value of Timer 1 reaches the set value of F5.1.24. The corresponding function of multi-function output terminal is Timing of Timer 1 reached (42).

The Product's multi-function output terminal will output ON signal when the actual count value of Timer 2 reaches the set value of F5.1.25. The corresponding function of multi-function output terminal is Timing of Timer 2 reached (43).

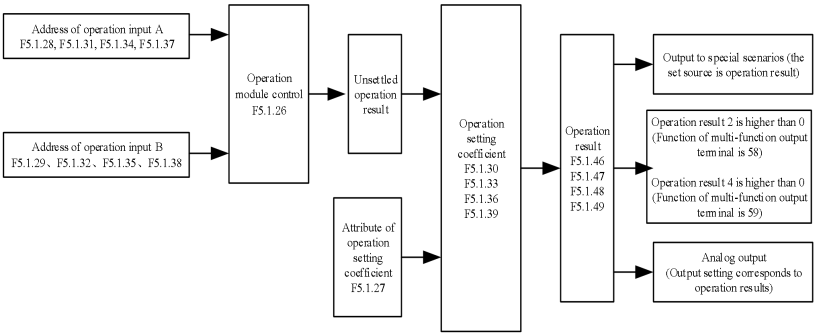
The Product's multi-function output terminal will output ON signal when the actual count value of Timer 1 reaches the set value of F5.1.24 while the actual count value of Timer 2 fails to reach the set value of F5.1.25. The multi-function output terminal will output ON signal when the actual count value of Timer 2 reaches the set value of F5.1.25. The corresponding function of multi-function output terminal is Timing of Timer 1 reached while timing of Timer 2 not reached (44).

The actual count value can be cleared through the digital input terminal during counting. The corresponding function of digital input terminal is timer clear terminal (50~51).



7.1.14 Functions of Internal Operation Module

The Product is provided with one built-in 4-way operation module that can collect the data (value after removing decimal point) from two function codes of the Product, to realize simple operation, and finally output the operation results to the special application scenarios. Surely, the operation results can realize the action of multi-function output terminal and output of analog signals.



Introduction to operation module control

Function Code	Corresponding Set value of Bit	Function	Description
F5.1.26	0	No operation	No operation
	1	Add	Address A data + Address B data
	2	Subtraction	Address A data - Address B data
	3	Multiplication	Address A data ×Address B data
	4	Division	Address A data ÷Address B data

Function Code	Corresponding Set value of Bit	Function	Description
	5	Judgment of being greater than	When Address A data >Address B data, the unsettled operation result is 1; otherwise, it is 0
	6	Judgment of being equal to	When Address A data = Address B data, the unsettled operation result is 1; otherwise, it is 0
	7	Judgment of greater than and equal to	When Address A data >= Address B data, the unsettled operation result is 1; otherwise, it is 0
	8	Integral	For time (taking ms as unit) per B address data, the unsettled operation result should add the data of Address A data. For example, the Address A data are 10, Address B data are 1000, then the unsettled operation result per 1000ms should add 10. The operation result range is -32767~32767. When the operation result is lower than -9999, all decimal points of nixie tube will display negative value. For example, “1.0.1.0.0” means -10100.
	9~F	Reserved	Reserved

Introduction to attribute of operation setting coefficient:

Function Code	Corresponding Set value of Bit	Function	Description
F5.1.27	0	Multiplication setting coefficient has no decimal	Unsettled operation result × operation setting coefficient
	1	Multiplication setting coefficient has 1 decimal place	Unsettled operation result × operation setting coefficient÷10
	2	Multiplication setting coefficient has 2 decimal places	Unsettled operation result × operation setting coefficient÷100
	3	Multiplication setting coefficient has 3 decimal	Unsettled operation result × operation setting coefficient÷1000

Function Code	Corresponding Set value of Bit	Function	Description
		places	
	4	Multiplication setting coefficient has 4 decimal places	Unsettled operation result × operation setting coefficient÷10000
	5	Division setting coefficient has no decimal place	Unsettled operation result ÷ operation setting coefficient
	6	Division setting coefficient has 1 decimal place	Unsettled operation result ÷ operation setting coefficient×10
	7	Division setting coefficient has 2 decimal places	Unsettled operation result ÷ operation setting coefficient×100
	8	Division setting coefficient has 3 decimal places	Unsettled operation result ÷ operation setting coefficient×1000
	9	Division setting coefficient has 4 decimal places	Unsettled operation result ÷ operation setting coefficient×10000
	A	Division setting coefficient has no decimal place	Unsettled operation result ÷ corresponding function code value of operation setting coefficient
	B	Division setting coefficient has 1 decimal place	Unsettled operation result ÷ corresponding function code value of operation setting coefficient×10
	C	Division setting coefficient has 2 decimal places	Unsettled operation result ÷ corresponding function code value of operation setting coefficient×100
	D	Division setting coefficient has 3 decimal places	Unsettled operation result ÷ corresponding function code value of operation setting coefficient×1000
	E	Division setting coefficient has 4 decimal places	Unsettled operation result ÷ corresponding function code value of operation setting coefficient×10000
Note: 5~9 means operation setting coefficient is directly engaged in operation; A~E: Operation setting coefficient is not directly engaged in operation; the operation setting coefficient indicates certain function code, and values in function code are engaged in operation.			

Introduction to scope of operation results

Operation Result Direction	Operation Result Range
Operation result indicates the given frequency	-Max. frequency ~ Max. frequency (remove decimal point)
Operation result indicates the given upper frequency	0~Max. frequency (remove decimal point)
Operation result indicates PID given value	-1000~1000 means -100.0%~100.0%
Operation result indicates PID feedback value	-1000~1000 means -100.0%~100.0%
Operation result indicates given torque	-1000~1000 means -100.0%~100.0%
Operation result indicates analog output	Operation result 1: -1000~1000
	Operation result 2: 0~1000
	Operation result 3: -1000~1000
	Operation result 4: 0~1000

Operation result 1 can be checked through function code F9.0.46.
Operation result 2 can be checked through function code F9.0.47.
Operation result 3 can be checked through function code F9.0.48.
Operation result 4 can be checked through function code F9.0.49.

For example, the sum of VF1 given value and VF2 given value is used for given torque through operation 2. The range of given torque is 0.0%~100.0%; so, the required operation result range is 0~1000. As the given voltage range of VF1 and VF2 is 00.00~10.00, the unsettled operation result of operation 2 is ranged 0~2000 and it is divided by 2 to acquire the required operation result range. The function code parameters requiring setting are as follows:

Function Code	Name	Set Value	Description
F2.1.01	Torque given source	9	The given torque is sourced from operation result 2
F5.1.26	Operation module control	H.0010	Select operation 2 as add operation
F5.1.27	Attribute of operation setting coefficient	H.0050	Division operation setting coefficient has no decimal point
F5.1.31	Operation 2 input A	09009	Correspond to function code F9.0.09, operate with unsigned number
F5.1.32	Operation 2 input B	09010	Correspond to function code F9.0.10, operate with unsigned number
F5.1.33	Operation 2 setting coefficient	2	Setting coefficient is 2

The description above equals to:

Operation result = (Value in F9.0.09 + Value in F9.0.10) ÷2

When F5.1.27= H.00A0, the description above equals to:

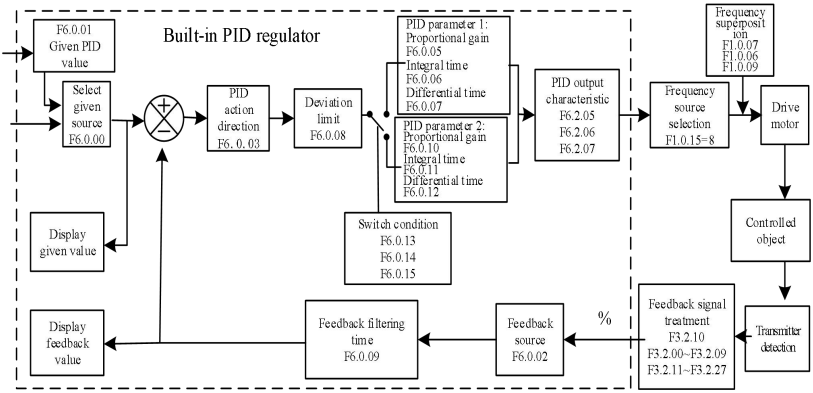
Operation result = (Value in F9.0.09 + Value in F9.0.10) ÷ Value in F0.0.02

When F1.0.00=1, then

Operation result = (Value in F9.0.09 + Value in F9.0.10) ÷ 1

7.1.15 PID Functions

The Product is provided with built-in PID regulator to configure the given signal channel and select the signal feedback channel, so the user can have auto regulation of process control easily, and realize control applications such as constant voltage, constant flow, constant temperature and tension. User should set the given mode of running frequency and select F1.0.05 as 8 (PID control), i.e. PID auto regulation of output frequency, in order to realize closed-loop control over PID frequency. The PID parameters are given in Group F6. The PID use method is as follows:



The Product is provided with 2 equivalent PID calculation units; so, the performance parameters can be given respectively, to realize optimization of regulation speed and accuracy. User can have free switch between multi-function terminal or given regulation deviation when different regulation performance is required at different stages.

7.1.16 Swing Frequency Control

Function Code	Name	Set Range	Factory Default Value
F1.0.49	Set swing frequency	0: Relative to the set frequency	0

		1: Relative to the max. frequency	
F1.0.50	Swing frequency amplitude	000.0%~100.0%	000.0
F1.0.51	Jump amplitude	00.0%~50.0%	00.0
F1.0.52	Swing frequency period	0000.1s~3000.0s	0010.0
F1.0.53	Rise time of swing frequency triangle wave	000.1%~100.0%	050.0

The swing frequency can improve the control performance of equipment in some scenarios, such as winding equipment of textile and chemical fiber, to improve the uniformity and evenness of spindle winding. The swing frequency performance, in which the given frequency is taken as center frequency, can be realized by setting the function code F1.0.49~F1.0.53.

Function code F1.0.49 is used for determining the datum quantity of swing amplitude, function code F1.0.50 is used for determining the size of swing amplitude, while function code F1.0.51 is used for determining the size of mutation frequency of swing frequency.

When F1.0.49=0, the swing amplitude is relative to the given frequency and it is variable swing amplitude system. It will change along with the given frequency.

Swing amplitude = Given frequency × Swing frequency amplitude

Mutation frequency = Given frequency × Swing frequency amplitude × Jump amplitude

When F1.0.49=1, the swing amplitude is relative to the max. frequency, it is fixed swing amplitude system, with fixed swing amplitude.

Swing amplitude = Max. frequency × Swing frequency amplitude

Mutation frequency = Given frequency × Swing frequency amplitude × Jump amplitude

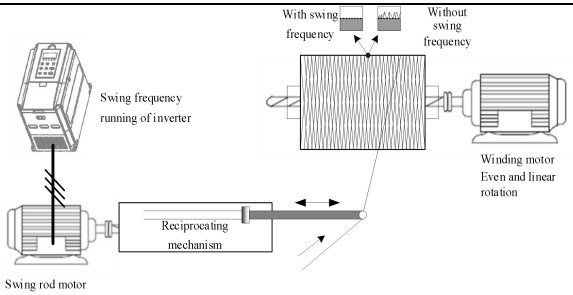
Swing frequency period: The period of one complete swing frequency period.

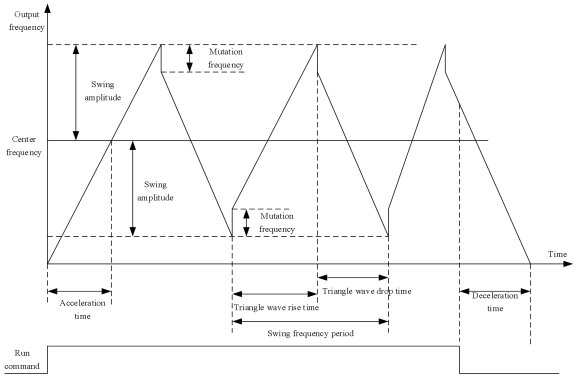
Rise time of swing frequency triangle wave: The percentage of triangle wave rise time to swing frequency period (F1.0.52).

Triangle wave rise time = Swing frequency period × Rise time of swing frequency triangle wave; unit: s.

Triangle wave drop time = Swing frequency period × (1- Rise time of swing frequency triangle wave); unit: s.

See description of diagram below:





Note: The swing frequency output frequency is restrained by the upper limit frequency and lower limit frequency.

7.1.17 Use of Analog Input/output

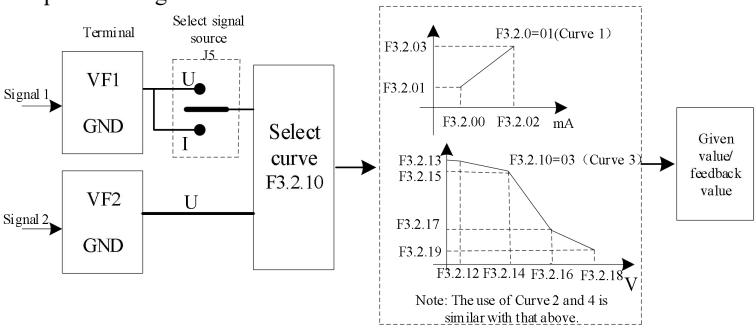
1. Analog Input

The Product supports 2-way analog input; in which, VF1 can be voltage signal or current signal, while VF2 can be voltage input signal only.

Input	VF1	Voltage source	Pull the dial switch J5 to “U” side. The 0V~10V DC signal is accepted
		Current source	Pull the dial switch J5 to “I” side. The 0/4mA~20mA signal is accepted

When the Product uses analog input as the given frequency source, given torque, given PID or feedback, the corresponding curve for relationship between voltage or current and given value or feedback value can be selected through function code F3.2.10, and the corresponding curve parameter can be set. The

sampling value of VF port can be checked in function code F9.0.09, F9.0.10. See description of diagram below:



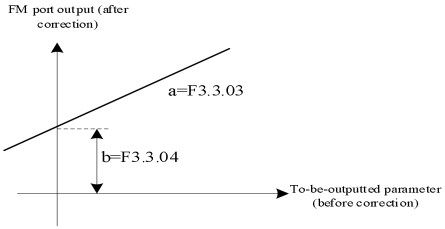
Note: The Product's analog input is based on 0V~10V by default. When input is 0mA~20mA, it can be equalized as 0V~10V. When input is 4mA~20mA, it can be equalized as 2V~10V.

2. Analog Output

The Product supports 2-way analog output, which can be voltage signal or current signal.

Output	FM1	Voltage source	Pull the dial switch J6 to "U" side to output 0V~10VDC signal
		Current source	Pull the dial switch J6 to "I" side to output 0mA~20mA signal
	FM2	Voltage source	Pull the dial switch J7 to "U" side to output 0V~10VDC signal
		Current source	Pull the dial switch J7 to "I" side to output 0mA~20mA signal

FM1 and FM2 can indicate the internal running parameters by outputting analog. The indicated parameter contents can be selected through function code F3.3.00, F3.3.01. Before being outputted, the analog output signals can be corrected through function code F3.3.03 and F3.3.04. The correction effects are as shown in diagram below:



Output Y=aX+b after correction (X: To-be-outputted running parameter; a: Output gain; b: Output offset)

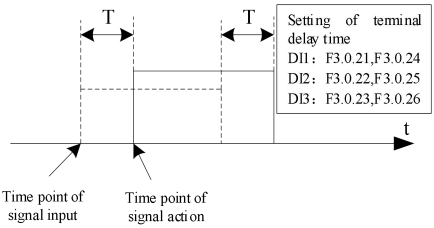
7.1.18 Use of Digital Input/output

1. Digital Input

The Product is fitted with 4 digital input ports by default and numbered DI1~DI4; besides, it can be added with 2 digital input terminals, which are numbered DI5~DI6, by connecting IO expansion card; in which, DI6 is high-speed input terminal. VF1 and VF2 can also be set as digital input through function code F3.0.18, F3.0.19.

The digital input port is powered by internal power supply; it is valid (represented by "1") when having short-circuiting with COM end, or invalid when disconnected (represented as "0"); the represented effects can be reverse by setting function code F3.0.27, F3.0.28. When VF is used as digital input, it is valid when 10V power terminal has short-circuiting with VF, or invalid when disconnected; the represented effects can be reverse by setting function code F3.0.20.

In which, the terminal DI1~DI3 can be used for setting the valid and invalid delay action time through function code F3.0.21~F3.0.26 and apply to the scenarios with delayed signal action.



T: Delay time

2. Digital Output

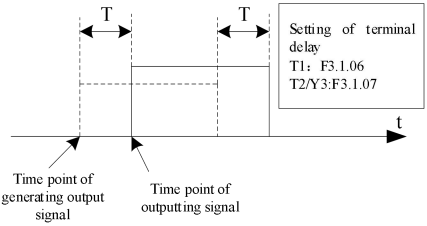
The Product is provided with 1 multi-function output port, which is Relay T1.

Terminal Name	Function Code	Output Description
Relay T1	F3.1.01	Relay; drive capability: 250VAC, 3A or below or 30VDC, below 1A

The T1 output port can set the delayed output time through function code F3.1.06. This can be applies in scenarios requiring delayed output of signals.

Terminal Name	Function Code	Output Description
Y3 multi-function output	F3.1.02	Open collector; drive capability: 30VDC, below 5OmA

The multi-function output port of Y3 open collector can also set the delay output time through function code F3.1.07, which applies to the scenarios of delayed signal output

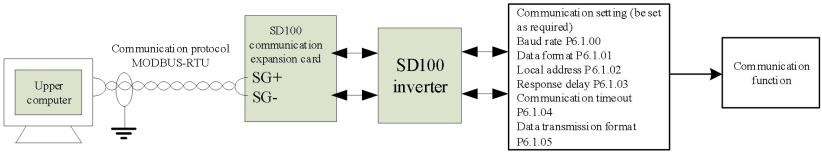


T: Delay time

7.1.19 Upper Computer Communication

The application of using upper computer for controlling inverter running via communication increases along with the wide application of auto control, and communication with SD100 series inverter can be established by using RS485 network. As the Product's control board has no communication interface, the external communication expansion card should be connected and be programmed on upper computer, in order to realize communication.

With MODBUS-RTU protocol being adopted, the Product can be used as slave station only, which means, it can receive the data from upper computer for treatment and replying only, instead of sending data actively. The parameters, such as function code F6.1.00~F6.1.05, should be set properly based on the realities during communication; otherwise, it may lead to failed or abnormal communication. The communication timeout (F6.1.04) should be set as non-zero data; so, the Product can have auto shutdown in case of communication timeout, to avoid uncontrolled running and poor consequences of the Product in case of communication fault or upper computer fault. Please refer to detailed description of Chapter 8 for the specific use of communication protocol. The schematic diagram for communication of SD100 is as shown in diagram below:



7.1.20 Parameter Identification

The accuracy of motor parameter F1.1.10~F1.1.1 may have direct influence on the Product's control performance when the Product is under vector control mode (F1.0.00=1 or 2); the Product must acquire the accurate parameters of controlled

motor, in order to realize good control performance and running efficiency. The known motor parameters can be manually inputted in F1.1.10~F1.1.14; otherwise, parameter identification and control should be carried out.

Parameter identification control includes static identification and complete identification. While implementing parameter identification of asynchronous motor, it is recommended to carry out complete identification at no load (F1.1.07=2).

Control Mode of Parameter Identification	Application Scenarios	Identification Effects
Static identification	Applies to asynchronous motor only and the scenarios in which motor and rotation system are not easily separated	Poor
Complete identification	Applies to asynchronous motor only and the scenarios in which motor and rotation can be separated completely	Optimal

For scenarios in which asynchronous motor and rotation system can be hardly separated, carry out complete identification by using motor of the same brand and model and then copy the motor characteristic parameters into corresponding parameters of F1.1.10~F1.1.14 of the Product.

Function Code	Name	Set Range	Factory Default Value
F1.1.07	Control over parameter identification	0: No action 1: Static identification 2: Complete identification 11~12: Reserved	00

0: No action

No parameter identification is performed. The Product is under normal operation status

1: Static identification

This method can be adopted when the load and asynchronous motor cannot be separated completely. Make sure to set the parameter of F1.1.00~F1.1.05 correctly prior to identification. Once setting is done, press RUN key to carry out static identification of the Product, and only three parameters of F1.1.10~F1.1.12 can be acquired after completion of identification.

2: Complete identification

This method can be adopted when the load and asynchronous motor can be separated completely (this method is prioritized if possible, for it has better effects). Make sure to set the parameter of F1.1.00~F1.1.05 correctly prior to identification. Once setting is done, press RUN key to carry out complete identification of the Product, and five parameters of F1.1.10~F1.1.14 are acquired after identification.

Steps of motor parameter identification:

1. Please confirm the status of motor when it can be separated from load completely, and make sure the motor will not affect other relevant equipment during rotation.

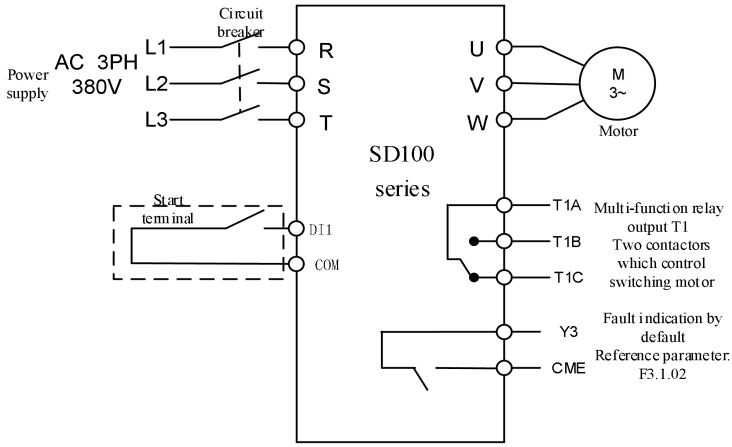
2. After power-on, please confirm that the Product's parameters F1.1.00~F1.1.05 are consistent with the corresponding parameters on nameplate.

3. Please confirm the Product's running control mode F1.0.04=0 and select panel control (which means, the identified running signal should be RUN key on panel only).

4. Set function code F1.1.07 and select parameter identification method. When complete identification is selected, then F1.1.07=2, press "ENTER" key and keyboard will show "TES"; then press "RUN" key, the "RUN" indicator will be on and "TUNE" indicator will flicker continuously. The parameter identification may last for about 30s~60s; when "TES" disappears, the "TUNE" indicator will become off, which means parameter identification is completed and the Product will store the identified motor characteristic parameters into the corresponding function codes automatically.

7.2 Application Cases

7.2.1 Dual Pump Switch Function (F0.1.25 =100)



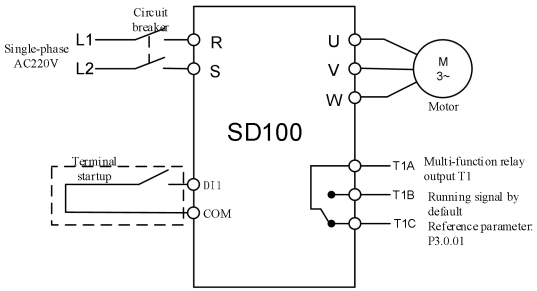
When 100 is inputted to F0.1.25, the following parameters are set automatically as follows:

When F0.1.25 is set as 100, the right parameters will be set automatically.	**F1.0.05=7**	**F5.1.03=100**	**F5.1.17=240**	**F3.1.01=52**
	F5.0.00=2	**F5.1.04=117**	**F5.0.51=2**	**F5.0.04=300**
	F5.0.02=11	**F5.1.07=3914**	**F5.0.35=16**	**F5.0.06=300**
	F5.1.00=112	**F5.1.13=220**	**F5.0.36=16**	

The following parameters are the common parameters of dual-pump function which should be set by customer (please firstly input 100 to F0.1.25 before user has debugging of dual-pump function)

Function Code	Name	Set Range	Description
F1.0.04	Selection of operation control mode	0	Start via RUN key on panel (default)
		1	Start via external terminal DI1 (F3.0.01=01)
F5.0.00	Running mode of simplified PLC	0	Shutdown after finishing single running
		1	Maintain final value after finishing single running
		2	Continuous cycle (default)
		3	Cycle for N times
F5.0.01	Cycle number N	0	Switching times of dual-pump circulation when F5.0.00=3
F5.0.02	Selection of PLC power-off memory	11	Shutdown/power off memory
F5.1.13	Pump switching time point	22.0s	This set value should be higher than the actual deceleration time of inverter
F5.1.17	Restart time point	24.0s	This set value is higher than the set value of F5.1.13
F5.0.04	Pump 1 running period	0	Running period of Pump 1
F5.0.06	Pump 2 running period	0	Running period of Pump 2
F5.0.35	Pump 1 frequency source	H.010	Decided by keyboard potentiometer (default)
		H.020	Given by keyboard frequency
		H.030	VF1 input
		H.040	Reserved
F5.0.36	Pump 2 frequency source	H.010	Decided by keyboard potentiometer (default)
		H.020	Given by keyboard frequency
		H.030	VF1 input
		H.040	Reserved
F5.0.51	Unit of pump running period	0	Second
		1	Hour
		2	Minute
F0.1.25	Recover factory default value	00	No operation
		30	Backup current parameters of user
		60	Recover backup parameters of user
		100	Recover default parameters of dual-pump function

7.2.2 Ball Mill

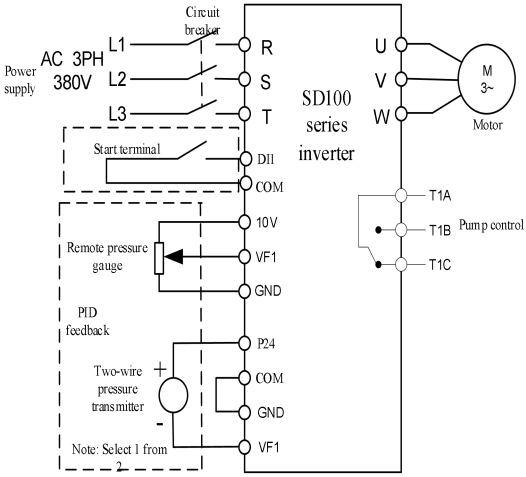


Common parameters of ball mill (please input 102 into F0.1.25 before debugging of ball mill)

Function Code	Name	Set Range	Factory Default Value
F0.1.01	Display mode	0: Basic mode (prefix is 'F') 1: User mode (prefix is 'U') 2: Verification mode (prefix is 'C')	1
F1.0.00	Control mode	0: V/F control 1: Open loop vector control 2: Closed loop vector control	0
F1.0.04	Select running control mode	0: Keyboard control 1: Terminal control 2: Communication control	0
F1.0.31	Acceleration time	0000.0~6500.0s	Model
F1.0.32	Deceleration time	0000.0~6500.0s	Model
F1.0.38	Timing reaches deceleration	0000.0~6500.0s	Model
F5.0.00	Circular running mode	0: Shutdown after finishing single running 1: Maintain constant value in single running 2: Continuous cycle 3: Cycle for N times	2
F5.0.01	Circulation times	00000~65000	00000
F5.0.02	Selection of PLC power-off memory	Ones place: Selection of power-off memory 0: Power-off no memory 1: Power-off memory Tens place: Selection of shutdown memory 0: Shutdown no memory 1: Shutdown memory	00

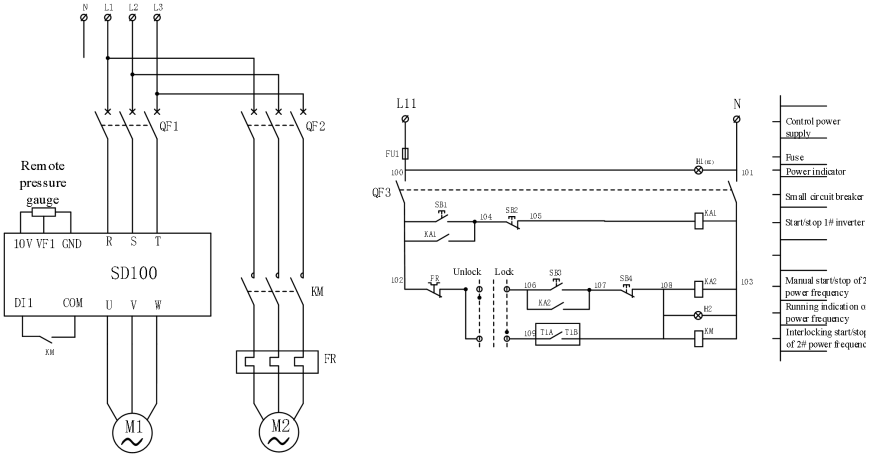
7.2.3 Constant-pressure Water Supply Control (F0.1.25 =101)

1. Common wiring diagram



Note: Pull J5-1 (VF1 dial switch) to U side for remote pressure gauge, or pull J5-1 to I side for pressure transmitter.

2. Control diagram of one-drag-two pump



When 101 is inputted in F0.1.25, the following parameters are set automatically

as follows:

When F0.1.25 is set as 101, the right parameters will be set automatically.	**F1.0.05=8**	**F0.1.18=H.C015**	**F0.1.21=H.0C02**	**F5.1.00=11111**
	F5.1.02=780	**F5.1.03=790**	**F5.1.04=11106**	**F5.1.05=38376**
	F5.1.06=21132	**F5.1.09=14**	**F5.1.24=900**	**F5.1.25=100**
	F5.1.26=H.7353	**F5.1.27=H.0505**	**F5.1.28=6004**	**F5.1.29=5124**
	F5.1.30=1000	**F1.0.16=1000**	**F5.1.34=6004**	**F5.1.35=5125**
	F5.1.36=1000	**F5.1.31=9015**	**F5.1.32=9046**	**F5.1.37=9048**
	F5.1.38=9015	**F5.1.12=50**	**F5.1.15=50**	**F5.1.20=50**

The following parameters are the common constant-pressure water supply parameters which are set by customer (please input 101 in F0.1.25 firstly before user has debugging of constant-pressure water supply)

Function Code	Name	Set Value	Description
F1.0.04	Selection of operation control method	0	Start via RUN key on panel (default)
		1	Start via external terminal DI1 (F3.0.01=01)
F1.0.16	Lower limit frequency	10.00	Set it as required
F1.0.31	Acceleration time	Model	Set it as required
F1.0.32	Deceleration time	Model	Set it as required
F6.0.00	PID set source	0	The set source is given by F6.0.01
F6.0.01	PID set value	50.0%	The set value should be given by user as required. It is percentage relative to F6.0.04.
F6.0.02	PID feedback source	0	Feedback source is inputted in Terminal VF1
F6.0.03	PID action direction	0	PID forward action. Frequency decreases along with feedback increase (default)
		1	PID reverse action. Frequency decreases along with feedback decrease
F6.0.04	PID set feedback range	1000	Set it according to actual feedback range (1000 means 1MPa)
F5.1.24	PID sleep threshold	90.0%	Be given by user as required. It is percentage relative to P4.0.04.
F5.1.25	PID wake-up threshold	10.0%	Be given by user as required. It is percentage relative to P4.0.04.
F5.1.12	Sleep delay time	5.0	Be set as required
F9.0.14	PID set value (display value)		Display PID set value

Function Code	Name	Set Value	Description
F9.0.15	PID feedback (display value)		Display PID feedback
F0.1.25	Recover factory default value	00	No operation
		30	Backup current parameters of user
		60	Recover backup parameters of user
		101	Recover factory default parameters of constant-pressure water supply function
Pump Control Parameters			
F3.1.01	Enable pump	00	Pump function invalid
		54	Pump function valid
F5.1.15	Pump connection delay	5.0	Pump is connected when delay of upper limit frequency reaches this set value
F5.1.20	Pump disconnection delay	5.0	Pump is disconnected when delay of lower limit frequency reaches this set value

The following parameters are constant-pressure water supply performance parameters which should be set by customer

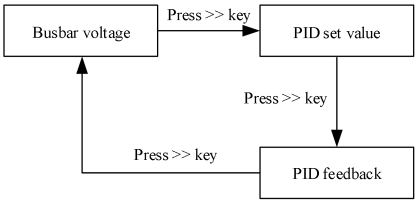
Function Code	Name	Set Range	Description
F3.2.10	Select analog input curve	H.21	Define VF1 selection curve 1
F3.2.00	Min. input of Curve 1	00.00V	Define curve of relationship between VF1 input and PID feedback. **Note: The Product's analog input is based on 0V~10V by default. When input is 0mA~20mA, it should be equivalent to 0V~10V. When input is 4mA~20mA, it should be 2V~10V.**
F3.2.01	Corresponding set value of Curve 1 min. input	000.0%	
F3.2.02	Max. input of Curve 1	10.00V	
F3.2.03	Corresponding set value of Curve 1 max. input	100.0%	
F3.2.04	VF1 filtering time	00.10s	When the field analog quantity is likely to be interfered, please increase the filtering time to stabilize the analog quantity under detection; however, the response speed of analog quantity detection can slow down when filtering time is too high.

F6.0.05	Proportional gain KP1	020.0	The regulation volume and response speed will increase along with the increase of proportional gain KP1, but the system oscillation may occur if the value is too high. The system will have higher stability but lower response when KPI value is decreased.
F6.0.06	Integral time TI1	02.00	When integral time TI1 increases, it may have slower response, higher output stability, weaker control over fluctuation of feedback value. When TI1 decreases, it may have faster response, higher output fluctuation, but oscillation may occur if the value is too low.
F6.0.07	Differential time TD1	00.000	The gain provided by differentiator can be given limit by differential time TD1, to make sure a pure differential gain can be acquired at low frequency, while a constant differential gain can be acquired at high frequency. The regulation strength may increase along with the integral time.

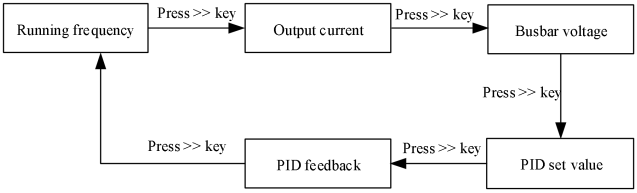
Constant-pressure water supply optimization parameters apply to general scenarios and no setting is required. Please refer to description of function code when setting the parameters.

Function Code	Name	Set Range	Description
F6.0.08	PID deviation limit	000.0	Set them by referring to the function code description.
F6.0.09	PID feedback filtering time	00.00	
F6.0.10	Proportional gain KP2	020.0	
F6.0.11	Integral time TI2	02.00	
F6.0.12	Differential time TD2	00.000	
F6.0.13	PID switch condition	0	
F6.0.14	PID switch deviation 1	020.0	
F6.0.15	PID switch deviation 2	080.0	
F6.0.16	PID initial value	000.0	
F6.0.17	PID initial value hold period	000.00	
F6.0.18	PID feedback loss detection	000.0	
F6.0.19	PID feedback loss detection time	00.0	
F6.0.20	PID shutdown operation	0	

Monitoring Contents of Shutdown Status



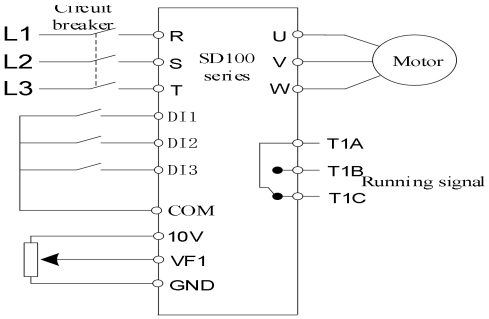
Monitoring Contents of Running Status:



7.2.4 Local/remote Control (F0.1.25 =104)

When 104 is inputted in F0.1.25, the following parameters are set as follows:

When F0.1.25 is set as 104, the right parameters will be set automatically.	**F1.0.04=1**	**F1.0.05=2**	**F1.0.06=4**	**F1.0.07=8**
	F3.0.01=0	**F3.0.02=0**	**F3.0.03=18**	**F5.1.00=1111**
	F5.1.02=21	**F5.1.03=102**	**F5.1.04=1022**	**F5.1.05=11123**
	F5.1.07=21	**F5.1.10=1**		



Note: 1. VF1 is local analog input

2. Set remote frequency source F1.0.06

3. DI1 is local start/stop button (connect to start, or disconnect to shut down)
4. DI2 is remote start/stop button (connect to start, or disconnect to shut down)
5. DI3 is local/remote switch button (connect to enter remote mode, disconnect to enter local mode)

The following parameters are common parameters which should be set by customer (please input 104 into F0.1.25 firstly before user has debugging of local/remote control)

Function Code	Description
F1.0.04	Control mode of running command: F1.0.04=1 and F5.1.07=0021: Local: Keyboard control; remote: Terminal DI2 control (default) F1.0.04=1 and F5.1.07=0000: Local: Terminal DI1 control; remote: Terminal DI2 control
	F1.0.04=2 and F5.1.07=0021: Local: Keyboard control; remote: Communication control F1.0.04=2 and F5.1.07=0022: Local: Terminal DI1 control; remote: Communication control
F1.0.05	Select 0~13 as local frequency source, 02: Keyboard potentiometer (default)
F1.0.06	Select remote frequency source as 0~13, 04: Reserved (default), it should be reset
F0.1.25	30: Backup current parameters of user
	60: Recover backup parameters of user
	104: Recover factory default parameters of local/remote function

Chapter 8 RS-485 Communication of SD100 Series Inverter

1. Introduction to RS-485 Communication Terminal of SD100 Series Inverter

The external communication expansion card must be connected to realize communication, for the Product's control board has no RS-485 communication terminal.

SG+: 485 signal positive end

SG-: 485 signal negative end

2. Introduction to Communication Parameters of the Product

Make sure to set the Product's "baud rate", "data format" and "communication address" through keyboard before using RS-485 communication.

Function Code	Name	Set Range	Factory Default Value
F6.1.00	Baud rate	Ones place: 0: 1200 1: 2400 2: 4800 3: 9600 4: 19200 5: 38400 6: 57600	03
F6.1.01	Data format	0: No check (8-N-2) 1: Even parity check (8-E-1) 2: Odd parity check (8-O-1) 3: No check (8-N-1)	0
F6.1.02	Local address	000: Broadcasting address 001~249	1
F6.1.03	Response delay	0ms~20ms	2
F6.1.04	Communication timeout	0.0 (invalid) 0.1s~60.0s	0.0
F6.1.05	Data transmission format	Ones place: 0: ASCII mode (reserved) 1: RTU mode	01

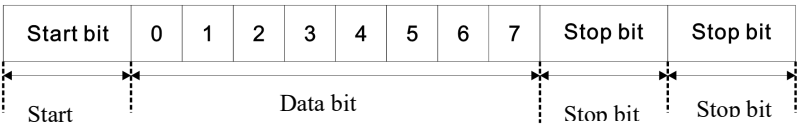
Response delay: When data are received, the Product will start restoring data after passing the set time of delay function code F6.1.03.

Communication timeout: When the interval time of data frames received by the Product exceeds the set value of function code F6.1.04, the Product will give out alarm Err14 and it is regarded as communication fault. Communication timeout will be invalid when it is set as 0.0.

3. Introduction to Standard MODBUS Communication Format

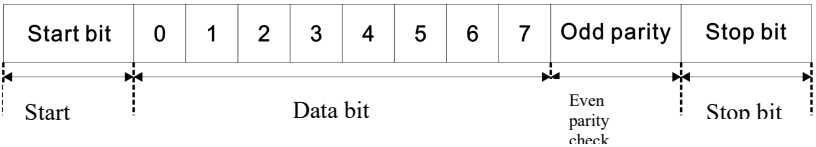
3.1 Character Structure

(8-N-2, F6.1.01=0)

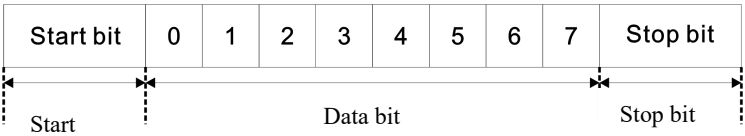


(8-E-1, F6.1.01=1)

(8-O-1, F6.1.01=2)



(8-N-1, F6.1.01=3)



3.2 Communication Data Structure

ADR	Slave (inverter) address Inverter address range (001~249), (8-bit hexadecimal number) **Note:** When ADR=000H, all slaves will take effects and will not send back information (broadcast mode)
CMD	Function code of data packet (06: Write one register content 03: Read contents of one or continuous registers) (8-bit hexadecimal number)
ADRESS	Master station sending: Data address in case of 06 function code (16-bit hexadecimal number), data start address in case of 03 function code (16-bit hexadecimal number)

	Master station reply: Data address in case of 06 function code (16-bit hexadecimal umber), data bit in case of 03 function code (8-bit hexadecimal number)
DATA	Master station sending: Data contents in case of 06 function code (16-bit hexadecimal number), data number in case of 03 function code (16-bit hexadecimal number) Master station reply: Data contents in case of 06 function code (16-bit hexadecimal umber), data contents in case of 03 function code (N 8-bit hexadecimal number)
CRC	Error detection value (16-bit hexadecimal number)

CRC error detection value, which is adopted in RTU, is calculated as follows:

Step 1: Load a 16-bit register (CRC register) with contents of FFFFH.

Step 2: Carry out XOR operation to the first byte of communication data and contents of CRC register, and save back the results in CRC register.

Step 3: move the contents of CRC register to the lowest valid bit by 1bit, fill the max. valid bit with 0 and detect the lowest valid bit of CRC register.

Step 4: When the lowest valid bit is 1, carry out XOR operation to the CRC register and preset value. It will have no action when the lowest valid bit is 0.

Step 5: Repeat Step 3 and 4 for 8 times and treatment of this byte is completed.

Step 6: Repeat Step 2-5 to the next byte of communication data, until all bytes are treated; the final contents of CRC register are CRC values. While transferring CRC values, firstly add the lower byte before the higher byte, which means, the lower bytes are transferred firstly.

When communication has error, the slave will reply ADRESS and DATA as follows:

ADRESS	DATA	Description	ADRESS	DATA	Description
FF01	0001	Invalid address	FF01	0005	Invalid parameter
FF01	0002	CRC check error	FF01	0006	Parameter change invalid
FF01	0003	Command read/write error	FF01	0007	System lock
FF01	0004	Password error	FF01	0008	Storing parameters

Format of command string written by master station:

Character Name	Slave Address	Write Command 06H	Function Code Address	Data Contents	CRC Check
Character	1Byte	1Byte	2Byte	2Byte	2Byte

length					
Example	01H	06H	0005H	1388H	949DH

Format of command string replied and written by slave station:

Character Name	Slave Address	Write Command 06H	Function Code Address	Data Contents	CRC Check
Character length	1Byte	1Byte	2Byte	2Byte	2Byte
Example	01H	06H	0005H	1388H	949DH

Format of command string read by master station:

Character Name	Slave Address	Write Command 03H	Start Address of Function Code	Data Quantity	CRC Check
Character length	1Byte	1Byte	2Byte	2Byte	2Byte
Example	01H	03H	9000H	0003H	28CBH

Format of command string replied and read by slave station:

Character Name	Slave Station Address	Write Command 03H	Data Quantity	Data Contents 1	Data Contents 2	Data Contents 3	CRC Check
Character length	1Byte	1Byte	1Byte	2Byte	2Byte	2Byte	2Byte
Example	01H	03H	06H	0000H	0000H	0000H	2175 H

Format of command wrong character replied and written by slave station:

Character Name	Slave station Address	Write Command 06H	Read/write Wrong Mark	Read/write Wrong Type	CRC Check
Character Length	1Byte	1Byte	2Byte	2Byte	2Byte
Example	01H	06H	FF01H	0005H	281DH

Format of command wrong character replied and read by slave station:

Character Name	Slave station Address	Write Command 03H	Read/write Wrong Mark	Read/write Wrong Type	CRC Check
Character Length	1Byte	1Byte	2Byte	2Byte	2Byte
Example	01H	03H	FF01H	0005H	E41DH

4. Definition of Parameter Address of Communication Protocol

The Product has many function codes and some non-function parameters, of which the specific read/write attribute is as follows

Function code parameter	F1~F8	Readable and writable
	F9	Read only
Non-function code parameter	A000H, A001H, A002H, A003H, A004H, A005H, A010H, A011H	Write only
	B000H, B001H	Read only

Introduction to read/write address of function code parameters:

The higher bit of parameter address is composed of group and level of function code parameter, while the lower bit of parameter address is composed of serial number.

Avoid repeated storage of EEPROM during communication, for the EEPROM has limited service life. Therefore, some function codes should not be stored in EEPROM and only the values in RAM need to be changed.

The higher bit address of parameter address should be taken as hexadecimal number, while the lower bit address, as decimal number, should be converted into hexadecimal number, in order to write parameters in EEPROM. Then combine the higher bit address and lower bit address into a 4-bit hexadecimal number.

For example, the address of writing F3.2.20 in EEPROM is

Higher bit address is hexadecimal 32. The lower bit address is decimal 20 and converted into hexadecimal 14. Therefore, the address is represented by 0x3214.

When parameters are not written in EEPROM, the higher bit address of parameter address should be taken as hexadecimal number plus 4, while the lower bit address, as decimal number, should be converted into hexadecimal number. Then combine the higher bit address and lower bit address into a 4-bit hexadecimal number.

For example, the address of not writing F3.2.20 into EEPROM is

The higher bit address is hexadecimal 16 plus 4, so it is 36. The lower bit address is decimal 20 and converted into hexadecimal 14. Therefore, the address is represented by 0x3614

Address Definition Table of Non-function Codes

Definition	Function Code	Parameter Address	Function Description	
Inverter command	06H	A000H	0001H	Forward running
			0002H	Reveres running

Definition	Function Code	Parameter Address	Function Description	
			0003H	Forward inching
			0004H	Reverse inching
			0005H	Free shutdown
			0006H	Deceleration shutdown
			0007H	Fault reset
		A001H	Frequency instruction or upper limit frequency source (percentage of the max. frequency, no memory) (00.00~100.00 means 00.00%~100.00%)	
		A002H	BIT2	Relay T1
			BIT3	Output Y3 of multi-function open collector
			When output terminal signal of Relay T1 is valid, the corresponding bit should be set as 1, then the binary number should be converted to decimal number and sent to address A002	
		A003H	FM1 output address (00.0~100.0 means 00.0%~100.0%)	
		A004H	FM2 output address (00.0~100.0 means 00.0%~100.0%)	
		A010H	PID given value	
		AO11H	PID feedback value	
Monitor inverter running status	03H	B000H	0001H	Forward running
			0002H	Reverse running
			0003H	Stop

Address Definition Table of Non-function Codes

Definition	Function Code	Parameter Address	Function Description	
Monitor inverter fault	03H	B001H	00	No fault
			01	Overcurrent at constant speed
			02	Overcurrent during acceleration
			03	Overcurrent during deceleration
			04	Overvoltage at constant speed
			05	Overvoltage during acceleration
			06	Overvoltage during deceleration
			07	Module fault
			08	Undervoltage
			09	Inverter overload
			10	Motor overload
			11	Input missing phase
			12	Output missing phase

Definition	Function Code	Parameter Address	Function Description	
			13	External fault
			14	Communication error
			15	Inverter overheat
			16	Inverter hardware error
			17	Motor-to-ground short circuit
			18	Motor identification error
			19	Motor load drop
			20	PID feedback loss
			21	Customized fault 1
			22	Customized fault 2
			23	Accumulated power-on period reached
			24	Accumulated running period reached
			25	Reserved
			26	Parameter read/write error
			27	Motor overheat
			28	Speed major deviation
			29	Motor overspeed
			30	Initial position error
			31	Current detection fault
			32	Contactor
			33	Current detection error
			34	Fast current limiting timeout
			35	Motor switching during running
			36	24V power failure
			40	Buffer resistance

5. Examples

Example 1: Forward rotation startup of 1# inverter

Data packet sent by master machine

ADR	01H
CMD	06H
ADRESS	A0H
	00H
DATA	00H
	01H
CRC	6AH
	0AH

Data packet replied by slave machine

ADR	01H
CMD	06H
ADRESS	A0H
	00H
DATA	00H
	01H
CRC	6AH
	0AH

Example 2: Given frequency of 1# inverter (no memory)

The given frequency of 1# inverter is 100.00% of the max. frequency

The method is as follows: Remove the decimal point of 100.00 and it will be 10000D=2710H

Data packet sent by master machine

ADR	01H
CMD	06H
ADRESS	A0H
	01H
DATA	27H
	10H
CRC	E0H
	36H

Replied data packet

ADR	01H
CMD	06H
ADRESS	A0H
	01H
DATA	27H
	10H
CRC	E0H
	36H

Example 3: Inquiry running frequency of 1#inverter

Inquiry the “output frequency” of 1# inverter at its running status

The method is as follows: The function code parameter of output frequency is F9.0.00 and converted to the address 9000H

If “output frequency” of 1# inverter is 50.00Hz, 5000D=1388H

Data packet sent by master machine

ADR	01H
CMD	03H
ADRESS	90H
	00H
DATA	00H
	01H
CRC	A9H
	0AH

Data packet replied by slave machine

ADR	01H
CMD	03H
ADRESS	02H
DATA	13H
	88H
CRC	B5H
	12H

Chapter 9 Troubleshooting

9.1 Faults & Troubleshooting of Inverter

Fault Display	Description	Details	Troubleshooting
Err00	No fault		
Err01	Overcurrent at constant speed	The output current exceeds the overcurrent during constant-speed running of the Product	● Check if the Product's output circuit has short circuit ●Check if input voltage is too low; ● Check if load has sudden changes; ● Carry out parameter identification or improve the high/low-frequency torque compensation ● Check if motor or the Product has enough rated power;
Err02	Overcurrent during acceleration	The output current exceeds the overcurrent during acceleration running of the Product	● Check if motor and line have short circuit, grounding or they are too long; ●Check if input voltage is too low ●Extend the acceleration time; ● Carry out parameter identification or improve the high/low-frequency torque compensation or adjust the V/F curve ● Check if load has sudden changes; ●Check if select speed tracking or restart when motor is stopped completely; ● Check if motor or the Product has enough rated power;

Err03	Overcurrent during deceleration	Output current exceeds the overcurrent value during deceleration running of the Product	● Check if motor and line have short circuit, grounding or they are too long; ● Carry out parameter identification; ●Extend the deceleration time; ●Check if input voltage is too low; ● Check if load has sudden changes; ● Install braking unit and braking resistor;
Err04	Overvoltage at constant speed	DC voltage of main circuit exceeds the given value during constant speed running of the Product. Inspect the DC overvoltage:	● Check if input voltage is too high; ● Check if busbar voltage display is normal; ● Check if motor is driven by external force during operation;

Fault Display	Description	Details	Troubleshooting
Err05	Overvoltage during acceleration	DC voltage of main circuit exceeds the given value during acceleration running of the Product. Inspect the overvoltage as mentioned above.	● Check if motor and circuit has short circuit to ground ● Check if input voltage is too high; ● Check if busbar voltage display is normal; ●Extend the acceleration time; ● Check if motor is driven by external force during acceleration; ● Install braking unit and braking resistor;
Err06	Overvoltage during deceleration	DC voltage of main circuit exceeds the given value during deceleration running of the Product.	● Check if input voltage is too high; ● Check if busbar voltage display is normal; ●Extend the deceleration period; ● Check if motor is driven by external force during deceleration; ● Install braking unit and braking resistor;

Err07	Module fault	Module auto protection is triggered by external fault of the Product	● Inspect the resistance of motor coil ●Inspect motor insulation ● Inverter module has breakdown damage
Err08	Undervoltage	DC main circuit has insufficient voltage during operation	● Check if power cable has good ntact; ●Check if incoming wire voltage is thin the specified range; ● Check if there's instantaneous wer-failure; ●Check if busbar voltage display is rrect; ● Check if rectifier bridge and arging resistance are normal;
Err09	Inverter overload	The Product's current exceeds the allowed overcurrent	● Check if motor is blocked or reduce the motor load ● Use an inverter with higher power;
Err10	Motor overload	Motor current exceeds the allowed overcurrent	● Check if the given value of motor protection parameter F1.1.06 is proper; ● Check if motor is blocked or reduce the motor load; ● Give the motor rated current properly; ●Use a motor with higher power;
Err11	Input missing phase	Input missing phase or 3-phase unbalance fault	●Check if input circuit voltage has issing phase or 3-phase unbalance ●Check if wiring terminal is loose ●Seek for technical supports

Fault Display	Description	Details	Troubleshooting
Err12	Output missing phase	Output missing phase or 3-phase unbalance	● Check if output circuit voltage has missing phase or 3-phase unbalance ●Check if wiring terminal is loose ●Seek for technical supports
Err13	External fault	Fault due to external control circuit	Check the input circuit of external fault signal Reset;

Err14	Communication error	Communication error of the Product or other device	● Inspect the external communication circuit ● Upper computer has operation error ● Communication parameter setting error ● Communication protocol is inconsistent;
Err15	Inverter overheat	Cooler temperature ≥oh detection value (approx. 80°C, from temperature switch)	● Inspect the running conditions and ventilation of fan; ●Check if the ambient temperature is too high and take cooling measures; ● Check if thermistor or temperature switch is damaged; ● Remove the dirt outside cooler and at air inlet;
Err16	Inverter hardware error	The Product has overcurrent or overvoltage fault and is judged as hardware fault	● Handle it according to overcurrent and overvoltage fault
Err17	Motor-to-ground short circuit	Motor-to-ground short circuit	● Check if the Product's output circuit or motor has short circuit to ground
Err18	Motor identification error	There's error in motor parameter identification	● Check if motor parameters are consistent with motor nameplate; ● Check if the Product is well connected to the main cable of motor;
Err19	Motor load drop	The Product's running current is lower than the value of load drop current F2.3.18 and lasts for the period of F2.3.19	●Check if the load is separated; ●Check if the set value of F2.3.18 and F2.3.19 are conforming to the realities
Err20	PID feedback loss	The PID feedback value is lower than the value of F6.0.18 and lasts for the period of F6.0.19	●Check if PID feedback signal is normal ●Check if the set value of F6.0.18, F6.0.19 are conforming to the realities

Fault Display	Description	Details	Troubleshooting
Err21	Customized fault 1	Fault 1 signal given by user through multi-function terminal or PLC programming function	● Check if customized fault 1 condition is eliminated, then reset it;
Err22	Customized fault 2	Fault 2 signal given by user through multi-function terminal or PLC programming function	● Check if customized fault 2 condition is eliminated, then reset it;
Err23	Accumulated power-on period reached	The Product's accumulated power-on period reaches the given time of F0.0.08	● Clear the record information through parameter initialization
Err24	Accumulated running period reached	The Product's accumulated running period reaches the given time of F0.0.07	● Clear the record information through parameter initialization
Err26	Parameter read/write error	EEPROM chip is damaged	●Replace the main control board
Err27	Motor overheat	Motor temperature is too high	● Check if motor temperature is too high; ● Check if temperature sensor is damaged or wiring is loose;
Err31	Current detection fault	Current detection circuit has fault	●Check if Hall device has a fault ● Check if detection circuit of drive board has a fault; ●Check if drive board has a fault
Err32	Contactor	Drive board power supply error due to contactor fault	●Check if contactor is normal ● Check if drive board power supply is normal
Err33	Current detection error	Current detection value error due to fault of current detection circuit	●Check if Hall device has a fault ● Check if detection circuit of drive board has a fault; ●Check if drive board has a fault

Err34	Fast current limiting timeout	The Product's running current is too high continuously and exceeds the allowed period of current limitation	● Check if motor has overload or blockage; ● Check if the Product has insufficient capacity
Err35	Motor switching during running	Motor is switched while the Product is running	● Make sure the Product is stopped before switching the motor
Err38	Output short circuit	Interphase short circuit of 3-phase output	● Inspect the insulation of motor cable and motor body
Err40	Buffer resistance	Busbar voltage has major fluctuation	●Check if contactor is normal ●Check the voltage fluctuation of incoming line

9.2 Diagnosis & Troubleshooting of Motor Faults

For any of the fault of motor, inspect the cause and take corresponding corrective measures. Where the fault remains after inspection and correction, please contact the agent immediately.

Motor faults & troubleshooting:

Fault	Inspection Signal	Corrective Measures
Motor rotation failure	Whether power voltage is applied to power terminal R and S?	Connect power supply; disconnect the power supply and then power on again; inspect the power voltage again; make sure terminal screws are fastened.
	Whether U, V and W voltage of output terminal is correct by using a rectifier type voltmeter?	Disconnect power supply and then connect it again
	Whether motor is blocked due to overload?	Reduce load and eliminate blockage
	Whether operator display displays fault?	Inspect the fault by fault sheet
	Whether forward/reverse running instruction is inputted?	Inspect the wiring
	Whether given frequency signal is inputted?	Change the wiring Inspect the given voltage of frequency
	Whether given running mode is	Input the given value

	correct?	properly
Motor has reverse rotation	Whether wiring of Terminal U, V and W is correct?	Connect the Phase U, V and W of motor lead to wire accordingly.
	Whether the running input signal of forward/reverse rotation is correct?	Change the wiring
Fail to change motor rotation speed	Whether the wiring of given frequency circuit is correct?	Change the wiring
	Whether the given running mode is correct?	Inspect the selection of running mode by using operator.
	Whether there's overload?	Reduce the load
Motor rotation (rpm) too fast or slow	Whether the motor rated value (pole number and voltage) is correct?	Inspect the technical data on motor nameplate
	Whether acceleration/deceleration speed change rate of gear is correct?	Inspect the shift gear (gear, etc.)
	Whether the give value of max. output frequency is correct?	Inspect the given value of max. output frequency
	Whether there's major voltage drop between motor terminals by using a rectifier voltmeter?	Inspect V/F characteristic value
Motor rotation (rpm) is unstable during operation	Whether there's overload?	Reduce the load
	Whether load has major changes?	Reduce load changes, increase the motor capacity of the Product
	Whether 3-phase or single-phase power supply is required? Whether 3-phase power supply has missing phase?	Check if the wiring of 3-phase power supply has missing phase

Appendix 1 Regular Maintenance & Inspection Method

Inspection Location	Item	Inspection	Frequency			Inspection Method	Standard	Measurement Instrument
			Yearly	1-year	2-year			
Exterior	Ambient environment	Whether there's dust? Whether the ambient temperature and humidity are proper?	√			Refer to precautions	Temperature: -10~+40° C, no dust. Humidity: No condensation below 90%	Thermometer Hygrometer Recorder
	Equipment	Whether there's abnormal vibration and noise?	√			Visual inspection and hearing	No fault	
	Input voltage	Whether the input voltage of main circuit is normal?	√			Measure the voltage between Terminal R and S		Digital multimeter/tester
Main circuit	All	Do inspection with megger (between main circuit and ground) Whether fixed parts are loose? Whether parts are overheated? Cleaning		√		Loosen the Product, apply short circuit to Terminal R, S, U, V and W and measure resistance between the terminals and ground Fasten the screws Visual inspection	There's no fault above 5MΩ	DC 500V megger

	Conductor wiring	Whether conductor is rusted? Whether wiring sheath is damaged?		√		Visual inspection	No fault	
	Terminal	Whether there's damage?		√		Visual inspection	No fault	
	IGBT module/diode	Inspect impedance between terminals			√	Loosen the Product and measure the resistance between R, S, <-> +, - and U, V, W <-> +, - with a meter.		Digital multimeter/analog meter
	Insulation resistance	Do inspection with megger (between output terminal and grounding terminal)			√	Loosen U, V and W and fasten the motor wiring	Above 5MΩ	500V megger

Inspection Location	Item	Inspection	Frequency			Inspection Method	Standard	Measurement Instrument
			Daily	1-year	2-year			
Main circuit	Filtering capacitor	Whether there's liquid penetration Whether safety holes are extruded? Whether capacitor expansion is detected	√	√		Visual inspection Measure it with capacitance measurement device	No fault Exceed 85% of rated capacity	Capacitance tester
	Relay	Whether there's vibration and noise during operation? Whether contact has damage		√		Hearing Visual inspection.	No fault	

	Resistor	Whether resistor insulation has damage Whether wiring of resistor has damage (open circuit)		√		Visual inspection Disconnect one resistor and measure it with meter	No fault The error must be within ±10% of display resistance	Digital multimeter/analog tester
Control circuit and protective circuit	Running inspection	Whether each phase of output voltage has unbalance The display circuit should have no error after executing sequential protection		√		Measure the voltage short circuit between output terminal U, V and W, open the Product's protective circuit output	For 200V (400V) inverter, the voltage difference per phase should not exceed 4V (8V)	Digital multimeter/correction voltmeter
Cooling system	Cooling fan	Whether there's abnormal vibration or noise? Whether the connection position is loose	√	√		Power off and rotate the fan manually Fasten the connection	Make sure to rotate it stably, no fault	
Display	Meter	Whether the display value is correct?	√	√		Inspect the reading on external meters of panel	Inspect the given value	Voltmeter/ meter, etc.
Motor	All	Whether there's abnormal vibration or noise? Whether there's abnormal odor?	√			Hearing, smelling and visual inspection Check if there's overheat or damage	No fault	

Note: The values in brackets apply to 400V inverter.

Appendix 2 Guidance for Selecting Optional Parts

This series of product can be mounted with peripheral equipment by user as required.

A2.1 AC reactor ACL

The AC reactor can suppress the higher harmonics of inverter input current and improve the power factor of the Product. It is suggested to use AC contactor in the following conditions:

1. The ratio between the Product's power capacity and inverter capacity is above 10:1.
2. The same power supply can be connected to controlled silicon load or the power factor compensation device controlled by switch.
3. The voltage unbalance of 3-phase power supply is high (≥3%).

ACL configuration table for common AC reactor:

Power kW	Current A	Inductance mH	Power kW	Current A	Inductance mH
0.4	2.0	4.6	1.5	7.0	1.6
0.75	4.0	2.4	2.2	10	1.0

A2.2 Radio Noise Filter

The radio noise filter is used for suppressing the conduction of electromagnetic interference noise generated by the Product, and suppressing the influence from external radio, instantaneous impact and surge on the Product.

Configuration table of common 3-phase 3-wire radio noise filter:

Voltage V	Motor Power kW	Filter Model	Main Parameters of Filter					
			Common Mode Input Loss dB			Differential Mode Input Loss dB		
			0.1MHz	1MHz	30MHz	0.1MHz	1MHz	30MHz
220	0.4~0.75	DL-5EBT1	75	85	55	55	80	60
	1.5~2.2	DL-10EBT1	70	85	55	45	80	60

The filter should be used when the application scenario has strict requirements for preventing radio interference and needs to reach CE, UL and CSA standard, or the equipment around the Product has poor resistance to radio interference. The wires should be short and the filter should be close to the Product during installation.

A2.3 Remote Operation Keyboard

The Product's panel is fitted with elaborate and convenient operation key. User may purchase the extended cable in order to move the keyboard to other places outside the Product and put forward the demand when placing an order. The distance between operation keyboard and the main engine should be within 10m, for serial communication is adopted between the operation keyboard and the main engine. To use the keyboard at a longer distance please purchase the long-distance operation keyboard from the supplier or us.

A2.4 Energy Consumption Braking Unit and Braking Resistance

The Product is fitted with built-in braking units. The braking resistor can be connected directly, in order to increase the braking torque.

The simplified calculation formula for braking resistance of braking unit is as follows:

The braking current IB should be selected properly according to the load inertia and shutdown period, for the braking torque generated is roughly equivalent to the motor rated torque when the braking current is 1/2 of motor rated current I. When load inertia increases, the shutdown period can be shorter and selected braking current IB will be higher.

$$IB=(1/2\sim3/2)*I$$

Select the resistance of braking unit and braking resistor based on the braking current

The peak current of braking unit (applies to the Company's braking unit of only) should be higher than IB.

Resistance of braking resistor

RB=U/IB (U should be 400V for S2 and T2 series, or 800V for T4 series)

Power of braking resistor

$$PB=K*U*U/RB$$

K, which is braking coefficient and ranged 0.1~0.5, should be selected according to the load inertia and shutdown period. When load inertia increases, the shutdown period will be shorter and selected braking coefficient K will be higher. General load can be selected as 0.1~0.2, while large-inertia load can be selected as 0.5.
The configuration table while IB is roughly 1/2I and K is 0.1~0.2 is as follows. When load inertia is high while shutdown period is short, proper adjustment should be made according to the formula above:

Appendix 2 Guidance for Selecting Optional Parts

Inverter Type	Braking Unit Model	Resistance of Braking Resistor (Ω)	Power of Braking Resistor (W)
S2 (single-phase 220V)			
SD100-S2-G0R4	Built-in, allowed max. current is 8A	400	80
SD100-S2B-G0R4	Built-in, allowed max. current is 8A	400	80
SD100-S2-G0R75	Built-in, allowed max. current is 8A	200	160
SD100-S2B-G0R75	Built-in, allowed max. current is 8A	200	160
SD100-S2-G1R5	Built-in, allowed max. current is 15A	120	250
SD100-S2B-G1R5	Built-in, allowed max. current is 15A	120	250
SD100-S2-G2R2	Built-in, allowed max. current is 15A	80	400
SD100-S2B-G2R2	Built-in, allowed max. current is 15A	80	400

Inverter Type	Braking Unit Model	Resistance of Braking Resistor (Ω)	Power of Braking Resistor (W)
T4(3-phase 380V)			
SD100-T4B-G0R75P1R5	Built-in, allowed max. current is 10A	600	160
SD100-T4B-G1R5P2R2	Built-in, allowed max. current is 10A	400	250
SD100-T4B-G2R2P3R7	Built-in, allowed max. current is 15A	250	400
SD100-T4B-G3R7P5R5	Built-in, allowed max. current is 25A	150	600
SD100-T4B-G5R5P7R5	Built-in, allowed max. current is 40A	100	1000
SD100-T4B-G7R5P011	Built-in, allowed max. current is 40A	75	1200
SD100-T4B-G011P015	Built-in, allowed max. current is 50A	50	2000
SD100-T4B-G015P18R5	Built-in, allowed max. current is 75A	40	2500

Appendix 3 EMC (Electro Magnetic Compatibility)

3.1 Definition of Terms

3.1.1 EMC (electro magnetic compatibility), which refers to the normal operation capability of electrical and electric equipment in environment with electromagnetic interference, no release of electromagnetic interference to other local equipment or system, in order to prevent the capability of other equipment to realize functions stably, includes two requirements: On one hand, the electromagnetic interference generated by equipment to the environment during normal running should not exceed certain limit; on the other hand, the equipment has certain immunity to electromagnetic interference in environment, i.e. electromagnetic susceptibility.

3.1.2 Class 1 environment: The Class 1 environment includes facilities for civil use, including the low-voltage grid facilities which are directly connected to civil buildings for power supply without using the intermediate transformer.

3.1.3 Class 2 environment: Class 2 environment includes the facilities except for low-voltage grid that is directly connected to civil buildings for power supply.

3.1.4 Class C1 device: The rated power supply of electric transmission system is below 1000V, applied in Class 1 environment.

3.1.5 Class C2 device: The rated voltage of electric transmission system is below 1000V, not plug-in device or movable device; such device should be installed and debugged by professional technicians when being used in Class 1 environment.

3.1.6 Class C3 device: The rated voltage of electric transmission system is below 1000V, applies to Class 2 environment, instead of Class 1 environment.

3.1.7 Class C4 device: The rated voltage of electric transmission system is not below 1000V, or rated current is not below 400A, or applies to complex system of Class 2 environment.

3.2 Introduction to EMC Standard

3.2.1 EMC Standard

3.2.1.1 The Product conforms to Class C3 requirements of EN 61800-3, applies to Class 1 and 2 environment.

3.2.2 EMC Requirements of Installation Environment

3.2.2.1 The system manufacturer that uses the Product should ensure that system conforms to the requirements of Europe EMC directive, and conforms to Class C2, C3 or C4 requirements of EN 61800-3 according to the application environment of system.

3.2.2.2 The system (machine or device) mounted with the Product should also be provided with mark EC and finally undertaken by the customer of system assembly. The customer should confirm whether the system (machine and device) conforms to Europe directive and requirements of EN 61800-3 C2.

Caution

The Product may bring radio interference when being used in Class 1 environment. Where necessary, the user should take measures to prevent interference.

3.3 Guidance for Installation & Selection of EMC Peripheral Accessories

3.3.1 Guidance for Installation & Guidance of EMC Peripheral Accessories

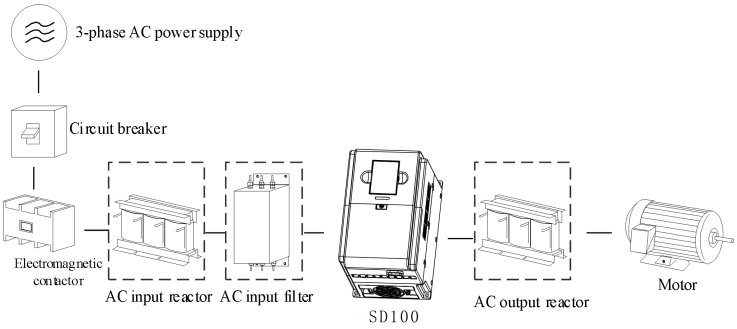


Fig. 1 Schematic Diagram for Installing EMC Peripheral Accessories (shown in dashed box)

3.3.2 Installation of EMC Input Filter at Power Input End

External EMC input filter can be installed between the Product and power supply, in order to restrain the interference from electromagnetic noise of ambient environment on the Product, and prevent the interference from the Product to the surrounding devices. The filter should be connected at the input end, so that the Product can reach Class 2 level in installation.

3.3.2.1 Notes of installing EMC input filter:

The filter should be used in strict accordance with the rated value: As the filter belongs to Class I electric appliance, its metal shell should have good contact with

metal ground of installation cabinet, have good conductive continuity; otherwise, it may have risk of electric shock and severely affect the EMC effects. The ground of filter and inverter PE end should be connected to the same public ground; otherwise, it may severely affect the EMC effects. The filter installation position should be close to the power input end of the Product.

3.3.2.2 Type Selection of EMC Filter (3-phase 380V~440V)

Inverter Model	Filter Model	Loss (W)	Appearance
SD100-T4B-G0R75P1R5	RFI4C5N6		C
SD100-T4B-G1R5P2R2	RFI4C5N6		C
SD100-T4B-G2R2P3R7	RFI4C10N6		C
SD100-T4B-G3R7P5R5	G:RFI4C10N6		C
	P:RFI4C20N6		C
SD100-T4B-G5R5P7R5	RFI4C20N6		C
SD100-T4B-G7R5P011	G:RFI4C20N6		C
	P:RFI4C40N10		C
SD100-T4B-G011P015	RFI4C40N10		C
SD100-T4B-G015P18R5	RFI4C40N10		C

Table 1 Type Selection of Filter

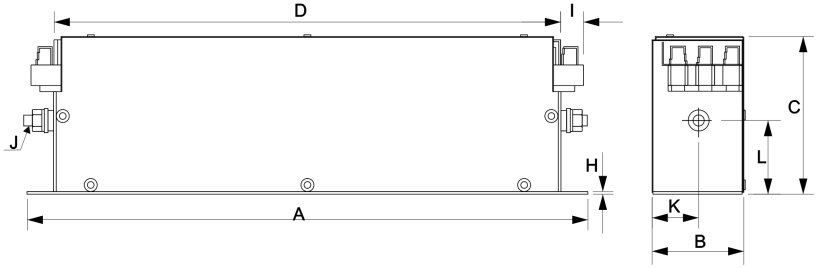


Fig. 2 Dimension Diagram of Filter

Filter Model	A	B	C	D	E	F	G	H	I	J	K	L
RFI4C5N6	190	40	70	168	183	20	4.5	1	7.25	M5	20	35
RFI4C10N6	190	40	70	168	183	20	4.5	1	7.25	M5	20	35
RFI4C20N6	250	45	70	220	235	25	5.5	1	8.2	M5	22.75	30
RFI4C40N10	270	50	85	240	255	30	5.5	1	10.6	M5	25	40

Table 2 Dimension Table of Filter (unit: mm)

3.3.2.3 Amorphous magnet ring (common mode suppressor/zero phase reactor)

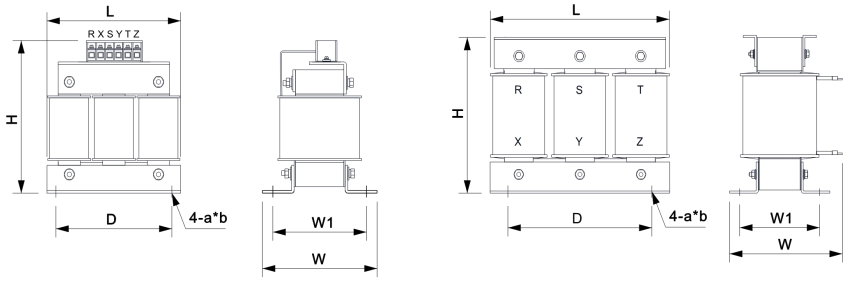
Wrap magnet ring on input line R/S/T or output line U/V/W of drive to improve the EMC performance.

3.3.2.4 Install AC input reactor on power input end

The AC input reactor, which is mainly used for reducing the harmonic in input current, is installed externally as the optional accessory. External reactor can be installed when the operation environment needs high harmonic. The recommended models of AC input reactor are as follows:

Inverter Model	Adapted Reactor	Inductance (mH)	Appearance
SD100-T4B-G0R75P1R5	ACR-0005-2M80-0.4SC	2.8	A
SD100-T4B-G1R5P2R2	G:ACR-0005-2M80-0.4SC	2.8	A
	P: ACR-0007-2M00-0.4SC	2.0	A
SD100-T4B-G2R2P3R7	G:ACR-0007-2M00-0.4SC	2.0	A
	P: ACR-0010-1M40-0.4S	1.4	A
SD100-T4B-G3R7P5R5	G:ACR-0010-1M40-0.4SC	1.4	A
	P: ACR-0015-0M94-0.4S	0.94	A
SD100-T4B-G5R5P7R5	G:ACR-0015-0M94-0.4SC	0.94	A
	P: ACR-0020-0M70-0.4SC	0.7	A
SD100-T4B-G7R5P011	G:ACR-0020-0M70-0.4SC	0.70	A
	P: ACR-0030-0M47-0.4SC	0.47	B
SD100-T4B-G011P015	G:ACR-0030-0M47-0.4SC	0.47	B
	P: ACR-0040-0M36-0.4SC	0.36	B
SD100-T4B-G015P18R5	G:ACR-0040-0M36-0.4SC	0.36	B
	P:ACR-0050-0M28-0.4S	0.28	B

Table 3 Type Selection of AC Input Reactor (3-phase 380V~440V)



Picture A Picture B

Fig. 3 Dimension Diagram of AC Input Reactor

Model of Output Reactor	L	H	W	D	W1	a*b	Diagram No.
ACR-0005-2M80-0.4SC	115	135	95	90	70	6*11	A
ACR-0007-2M00-0.4SC	115	135	95	90	70	6*11	A
ACR-0010-1M40-0.4SC	115	135	95	90	70	6*11	A
ACR-0015-0M94-0.4SC	115	135	95	90	70	6*11	A
ACR-0020-0M70-0.4SC	115	135	95	90	70	6*11	A
ACR-0030-0M47-0.4SC	155	135	130	95	63	6*15	B
ACR-0040-0M36-0.4SC	155	135	130	95	76	6*15	B

Table 4 Diagram Table of AC Input Reactor (unit: mm)
(Note: The reactor dimension table is for reference only. The actual installation dimension is subject to real product)

3.3.2.4 Install AC Output Reactor at Inverter Output Side

It depends on the realities whether installing AC output reactor at the Product's output side. The transmission line between the Product and motor should not be too long; otherwise, higher harmonic current may occur. The output reactor should be arranged when output cable is too long. AC output reactor should be installed near the Product when the cable length is higher than or equals to the value in table.

Inverter power (kW)	Rated Voltage (V)	Min. Cable Length (m) of Optional Output Reactor
0.4~4	200 ~ 500	50
5.5	200 ~ 500	70
7.5	200 ~ 500	100
11	200 ~ 500	110
15	200 ~ 500	125
18.5	200 ~ 500	135
22	200 ~ 500	150
≧ 30	280 ~ 690	150

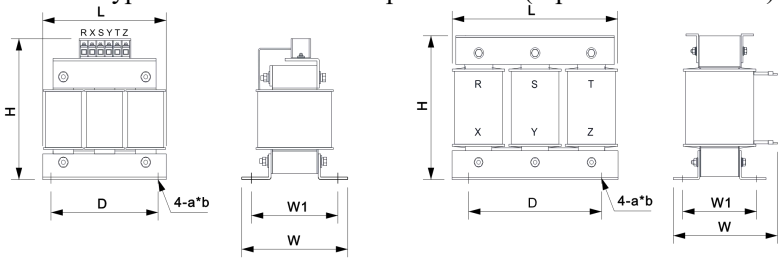
Table 5 Min. Length of Reactor Output Cable

The recommended models of AC output reactor are as follows:

Inverter Model	Adaptive Reactor	Inductance (mH)	Appearance
SD100-T4B-G0R75P1R5	OCR-0005-1M40-0.4SC	1.4	A
SD100-T4B-G1R5P2R2	G:OCR-0005-1M40-0.4SC	1.4	A

	P:OCR-0007-1M00-0.4SC	1.0	A
SD100-T4B-G2R2P3R7	G:OCR-0007-1M00-0.4SC	1.0	A
	P: OCR-0010-0M70-0.4SC	0.7	A
SD100-T4B-G3R7P5R5	G:OCR-0010-0M70-0.4SC	0.7	A
	P: OCR-0015-0M47-0.4SC	0.47	A
SD100-T4B-G5R5P7R5	G:OCR-0015-0M47-0.4SC	0.47	A
	P: OCR-0020-0M35-0.4SC	0.35	A
SD100-T4B-G7R5P011	G:OCR-0020-0M35-0.4SC	0.35	A
	P: OCR-0030-0M23-0.4SC	0.23	B
SD100-T4B-G011P015	G:OCR-0030-0M23-0.4SC	0.23	B
	P: OCR-0040-0M18-0.4SC	0.18	B
SD100-T4B-G015P18R5	G:OCR-0040-0M18-0.4SC	0.18	B
	G:OCR-0050-0M14-0.4SC	0.14	B

Table 6 Type Selection of AC Output Reactor (3-phase 380V~440V)



Picture A Picture B

Fig. 4 Dimension Diagram of AC Output Reactor

Model of Output Reactor	L	H	W	D	W1	a*b	Diagram No.
OCR-0005-1M40-0.4SC	115	135	89	90	70	6*11	A
OCR-0007-1M00-0.4SC	115	135	89	90	70	6*11	A
OCR-0010-0M70-0.4SC	115	135	89	90	70	6*11	A
OCR-0015-0M47-0.4SC	115	135	89	90	70	6*11	A
OCR-0020-0M35-0.4SC	155	135	130	95	61	6*15	A
OCR-0030-0M23-0.4SC	155	135	140	95	63	6*15	B
OCR-0040-0M18-0.4SC	155	135	140	95	63	6*15	B

Table 7 Dimension Table of AC Output Reactor (unit: mm)
(Note: The reactor dimension table is for reference only. The actual installation dimension is subject to real product)

Appendix 4 SD100-IO Expansion Card

1. Introduction

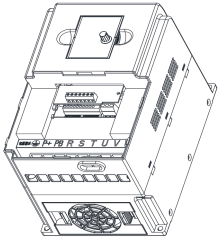
The SD100-IO expansion card is developed by Delixi Hangzhou Inverter Co., Ltd. for expanding the SD100 series IO ports.

Specification	Name	Description
SD100-IO	SD100-IO expansion card	2-way digital input (DI5~DI6) 1-way analog input (VF2) 1-way analog output (FM2) RS-485 communication port (SG+, SG-)

2. Mechanical Installation

Make sure the Product is powered off completely prior to installation.

Align the IO expansion card with the expansion card interface and locating holes on inverter control board and fix it with screws.



Installation Mode of IO Expansion Card

Appearance of SD100-IO

3. Function Description of Control Terminal

Item	Terminal	Terminal Name	Function Description
Digital input	DI5-COM	Digital input 7	For details of function, please refer to operation instruction of function code F3.0.05, F3.0.06
	DI6-COM	Digital input 8	
Analog quantity	VF2-GND	Analog input terminal	For receiving input of external analog signal, it can be 0V~10V voltage signal only
24V power supply	COM	24V power output	Provide 24V power voltage externally, generally used as working power supply for digital input terminal or low-voltage equipment Drive capability: Max. output current 300mA
	+24V		
Communication terminal	SG+	RS485+	Support standard MODBUS-RTU protocol
	SG-	RS485-	

Appendix 5 RS485 Communication Expansion Card

1. Introduction

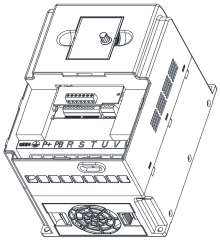
The communication expansion card should be installed to realize communication, for the Product has no communication function. The specific model is as follows:

Specification	Name	Description
SD100-485	SD100 communication expansion card	SG+: 485 communication positive signal terminal SG-: 485 communication negative signal terminal Support MODBUS-RTU protocol

2. Mechanical Installation

Make sure the Product is powered off completely prior to installation.

Align the RS485 communication expansion card with the expansion card interface and locating holes on inverter control board and fix it with screws.



Installation Mode of SD100-485

Appearance of SD100-485

Appendix 6 SD100-IO2-1 Expansion Card

1. Introduction

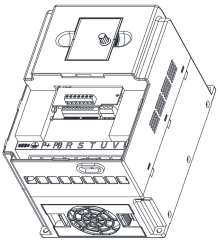
The SD100-IO2-1 expansion card is developed by Delixi Hangzhou Inverter Co., Ltd. for expanding the SD100 series IO ports.

Specification	Name	Description
SD100-IO2-1	SD100-IO2-1 expansion card	2-way digital input (DI5~DI6) 1-way open collector output (Y3) Transistor output T2 (T2A, T2B) SG+: 485 communication positive signal terminal SG-: 485 communication negative signal terminal Support standard MODBUS-RTU protocol

2. Mechanical Installation

Make sure the Product is powered off completely prior to installation.

Align the SD100-IO2-1expansion card with the expansion card interface and locating holes on inverter control board and fix it with screws.



Installation Mode of SD100-IO2-1

Appearance of SD100-IO2-1

Appendix 7 SD100-IO2-2 Expansion Card

1. Introduction

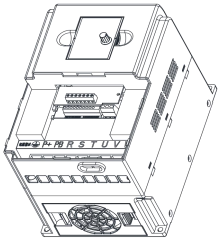
The SD100-IO2-2 expansion card is developed by Delixi Hangzhou Inverter Co., Ltd. for expanding the SD100 series IO ports.

Specification	Name	Description
SD100-IO2-2	SD100-IO2-2 expansion card	1-way open collector output (Y3)

2. Mechanical Installation

Make sure the Product is powered off completely prior to installation.

Align the SD100-IO2-2 expansion card with the expansion card interface and locating holes on inverter control board and fix it with screws.



Installation Mode of SD100-IO2-2

Appearance of SD100-IO2-2

Appendix 8 SD100-IO2-3 Expansion Card

1. Introduction

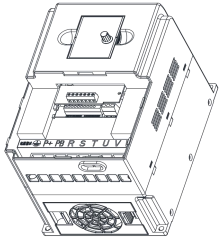
The SD100-IO2-3 expansion card is developed by Delixi Hangzhou Inverter Co., Ltd. for expanding the SD100 series IO ports.

Specification	Name	Description
SD100-IO2-3	SD100-IO2-3 expansion card	2-way digital input (DI5~DI6)

2. Mechanical Installation

Make sure the Product is powered off completely prior to installation.

Align the SD100-IO2-3 expansion card with the expansion card interface and locating holes on inverter control board and fix it with screws.



Installation Mode of SD100-IO2-3

Appearance of SD100-IO2-3

Appendix 9 SD100-IO3-1 Expansion Card

1. Introduction

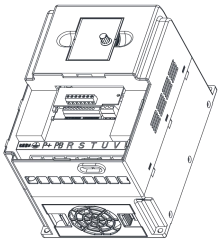
The SD100-IO3-1 expansion card is developed by Delixi Hangzhou Inverter Co., Ltd. for expanding the SD100 series IO ports.

Specification	Name	Description
SD100-IO3-1	SD100-IO3-1 expansion card	2-way digital input (DI5~DI6) Multi-function relay output T2 (T2A, T2B, T2C) SG+: 485 communication positive signal terminal SG-: 485 communication negative signal terminal Support standard MODBUS-RTU protocol

2. Mechanical Installation

Make sure the Product is powered off completely prior to installation.

Align the SD100-IO3-1 expansion card with the expansion card interface and locating holes on inverter control board and fix it with screws.



Installation Mode of SD100-IO3-1

Appearance of SD100-IO3-1

Appendix 10 SD100-IO3-2 Expansion Card

1. Introduction

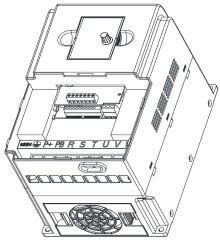
The SD100-IO3-2 expansion card is developed by Delixi Hangzhou Inverter Co., Ltd. for expanding the SD100 series IO ports.

Specification	Name	Description
SD100-IO3-2	SD100-IO3-2 expansion card	Multi-function relay output T2 (T2A, T2B, T2C)

2. Mechanical Installation

Make sure the Product is powered off completely prior to installation.

Align the SD100-IO3-2 expansion card with the expansion card interface and locating holes on inverter control board and fix it with screws.



Installation Mode of SD100-IO3-2

Appearance of SD100-IO3-2