Preface

Thank you for purchasing solar inverter developed by our company.

Features:

- MPPT algorithm of fast tracking of maximum power point of PV cells, efficiency >99%.
- Solar battery working point voltage can be manually or automatically MPPT tracking.
- All weather automatic operation,can also be manually or automatically,
- Realize"sunrise work and sunset sleep".
- 35 kinds protection function. including auto detecting short circuit after power on.
- Auto sleep function/pump dry protect/low frequency protection/over load protection and etc.
- Full protections:overload,over current, overvoltage,under voltage,short circuit, dry pumping etc.
- Output frequency range: V/F(0~3000hz); vector control(0~300HZ).
- Overload capacity:60s with 150% of rated current,3s with 180% of rated current.
- Speed accuracy:±0.5%(SVC);±0.02%(VC).
- Pulse setting input:0Khz~100Khz.
- Remote control, support RS232/RS485 protocol, terminal control, analog control.

Before unpacking, please check carefully:

1. Whether the nameplate model of solar inverter are consistent with your order ratings. The box contains the solar inverter, user manual.
2. Whether the solar inverter is damaged during transportation. If you find any omission or damage, please contact us or your local supplier immediately.

First-time Use

For the users who use this product for the first time, read the manual carefully. If in doubt concerning some functions or performances, contact the technical support personnel to ensure correct use.

Due to the continuous improvement of solar inverter, this document will be updated without prior notice.

Solar inverter complies with the following international standards. All products have passed the CE certification.

IEC/EN61800-5-1: 2003 Variable speed electric drive system safety requirements;

IEC/EN61800-3: 2004 Variable speed electric drive system, Part 3: The Electro Magnetic Compatibility (EMC) Standards of Product and its specific testing methods.

Contents

1. Safety Information and Precautions

In this manual, the notices are graded based on the degree of danger:

Danger: Indicates that failure to comply with the notice will result in severe personal injury or even death.

Warning: Indicates that failure to comply with the notice will result in personal injury or property damage.

Read this manual carefully so that you have a thorough understanding. Installation, commissioning or maintenance may be performed in conjunction with this chapter. Our company will assume no liability or responsibility for any injury or loss caused by improper operation.

1.1 Safety Information

Danger

- Do not use damaged or missing components solar inverter. Failure to comply will result in personal injury.
- Please use the electric motor with upper B insulation class. Failure to comply will result in personal injury.
- Install the solar inverter on incombustible objects such as metal, and keep it away from combustible materials. Failure to comply may result in a fire.
- Wiring must be performed only by qualified personnel under instructions described in this manual. Failure to comply may result in unexpected accidents.
- A circuit breaker must be used to isolate the power supply and the solar inverter. Failure to comply may result in a fire.
- Ensure that the power supply is cut off before wiring. Failure to comply may result in electric shock.
- Connect the solar inverter to ground properly by standard. Failure to comply may result in electric shock.
- Cover the solar inverter properly before power-on to prevent electric shock.
- Do not open the solar inverter's cover after power-on to prevent from electric shock.
- Do not touch the solar inverter with wet hand and its peripheral circuit to prevent from electric shock.
- Do not touch the terminals of the solar inverter (including the control terminals). Failure to comply may result in electric shock.
- Do not touch the U, V, W terminal or motor connecting terminals when solar inverter automatically does safety testing for the external high-voltage electrical circuit. Failure to comply may result in electric shock.
- Do not go close to the equipment when selected the restart function. Failure to comply may result in personal injury.
- Do not touch the fan or the discharging resistor to check the temperature. Failure to comply will result in personal injury.
- Signal detection must be performed only by qualified personal during operation

⚠️**Warning:**

- When two solar inverters are laid in the same cabinet, arrange the installation positions properly to ensure the enough cooling effect.

- Do not drop wire residue or screw into the solar inverter. Failure to comply will result in damage to the solar inverter.

- Never connect the power supply cables to the output terminals (U, V, W) of the solar inverter. Failure to comply will result in damage to the solar inverter.

- Make sure that all the connecting wires comply with the requirement of EMC and the safety standard in the region. Use wire sizes recommended in the manual. Failure to comply may result in accidents.

- Never connect the braking resistor between the DC bus terminals (P+) and (P-). Failure to comply may result in a fire.

- Do not perform the voltage resistance test on any part of the solar inverter because such test has been done in the factory. Failure to comply will result in accidents.

- All peripheral devices must be connected properly under the instructions described in this manual. Failure to comply will result in accidents.

- Note the danger during the rotary running of motor when check the parameters. Failure to comply will result in accidents.

- Do not change the factory default settings of the solar inverter. Failure to comply will result in damage to the solar inverter.

- Avoid objects falling into the solar inverter when it is running. Failure to comply will result in damage to solar inverter.

- Do not start/stop the solar inverter by turning the contactor ON/OFF. Failure to comply will result in damage to the solar inverter.

2. Product Information

2.1 Model and Technical Specifications

Model	EM15-SP1-XXX					EM15-SP1S-XXX				
	d75	1d5	2d2	004	5d5	d75	1d5	2d2	004	5d5
Rated power/KW	0.75	1.5	2.2	4	5.5	0.75	1.5	2.2	4	5.5
Min. DC voltage/V	120									
Max.DC voltage/V	400									
Recommended MPPT range /V	250~400									
AC output	AC 3 phase 220V					AC 1 phase 220V (U,V)				
Output current/A	3.8	5.1	9	13	25	3.8	5.1	9	13	25
Output frequency	0~50/60Hz									
Power factor	>0.99									
Communication mode	RS485 communication									
Protection class	IP20									
Ambient temperature	-10℃~ +40℃(ambient temperation at 40℃~50℃，please keep derated use)									
Storage temperature	-20℃~ +60℃									
Humidity	Smaller than 95%RH, non-condensation									
Cooling	Forced Air cooling									
Altitude	Lower than 1000 m									
Humidity	Less than 95%RH, without condensing									
Vibration	Less than 5.9 m/s2 (0.6 g)									

Model [EM15-SP3-XXX]	d75	1d5	2d2	004	5d5	7d5	011	015	018	022	030	037	045
	055	075	090	110	132	160	200	220	250	280	315	355	400
Rated power/KW	0.75	1.5	2.2	4	5.5	7.5	11	15	18.5	22	30	37	45
	55	75	90	110	132	160	200	220	250	280	315	355	400
Min. DC voltage/V	280												
Max.DC voltage/V	750												
Recommended MPPT range /V	350~750												
AC output	AC 3 phase 380V												
Output current	2.1	3.8	5.1	9	13	17	25	32	37	45	60	75	91
	112	150	176	210	253	304	377	426	465	520	585	650	725
Output frequency	0~50/60Hz												
Power factor	>0.99												
Communication mode	RS485 communication												
Protection class	IP20												
Ambient temperature	-10℃~ +40℃(ambient temperation at 40℃~50℃，please keep derated use)												
Storage temperature	-20℃~ +60℃												
Humidity	Smaller than 95%RH, non-condensation												
Cooling	Forced Air cooling												
Altitude	Lower than 1000 m												
Humidity	Less than 95%RH, without condensing												
Vibration	Less than 5.9 m/s2 (0.6 g)												

2.2 Installation dimension

2.2.1 Solar inverter appearance and installing dimension(mm)
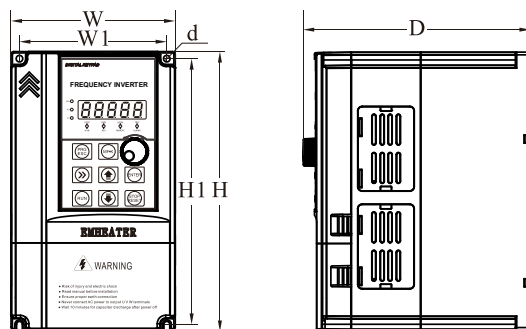
Diagram 2-2 Appearance and installation dimension (Plastic housing structure)

Matching inverter		Appearance and installing dimension (Unit: mm)					
EM15-SP1/SP1S	**EM15-SP3**	**W**	**W1**	**H**	**H1**	**D**	**d**
0.75~2.2kW	0.75~5.5kW	120	108	205	195	166	Φ4.5
4~5.5kW	7.5~11kW	162	148	250	238	191	Φ5.5
-	15~22kW	223	207	323	307	207	Φ5.5
-	30~37kW	300	220	540	500	240	Φ7
-	45~55kW	340	260	580	540	270	Φ10
-	75~90kW	410	260	610	575	280	Φ12
-	110~132kW	460	320	710	690	335	Φ12
-	160~220kW	535	360	885	830	370	Φ12
-	250~315kW	650	360	1040	985	415	Φ12
-	355~400kW	815	600	1350	1250	445	Φ12

2.2.2 Appearance and installation dimension of external keypad (keypad tray)
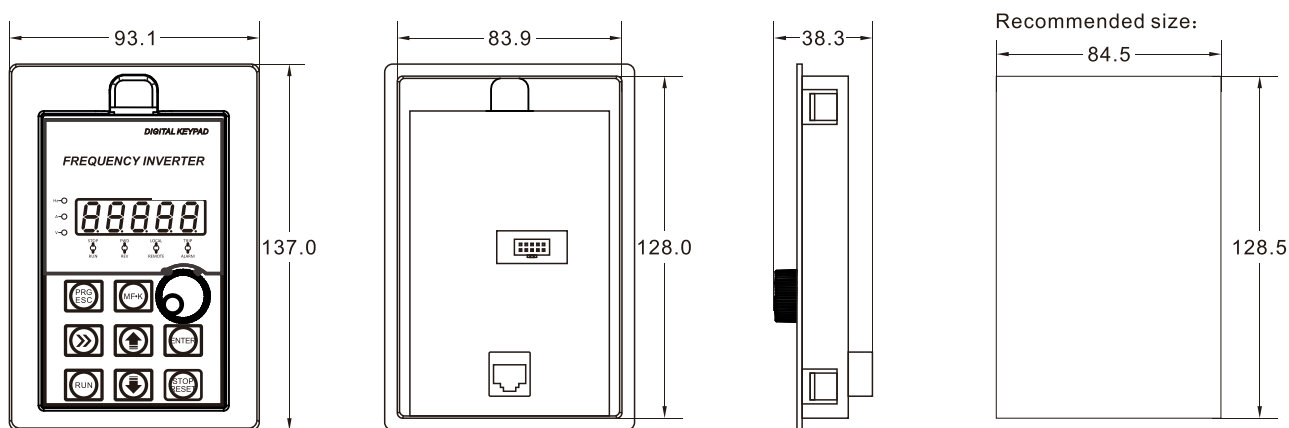
Diagram 2-3 Appearance and installation dimension of external keypad (keypad tray)

3.Installation of Frequency Inverter

3.1 Installation environment

1. The place with indoor vents or ventilation devices.
2. The environment temperature shall be -10℃~40℃. If the temperature is over 40℃ but less than 50℃, better to take down the cover of frequency inverter or open the front door of cabinet to facilitate heat dissipation.
3. Try to avoid high temperature and wet place; the humidity shall be less than 90% without frost deposit.
4. Avoid direct sunlight.
5. Keep away from flammable, explosive and corrosive gas and liquid.
6. No dust, floating fiber and metal particles.
7. Install on the place without strongly vibration. And the vibration should be not over 0.6G, Especially pay attention to far away from the punching machine, etc.
8. Keep away from electromagnetic interference source.

3.2 Installation direction and space

In order to not affect the service life of frequency inverter and reduce its performance, note for its installation direction and space and correctly fasten it.
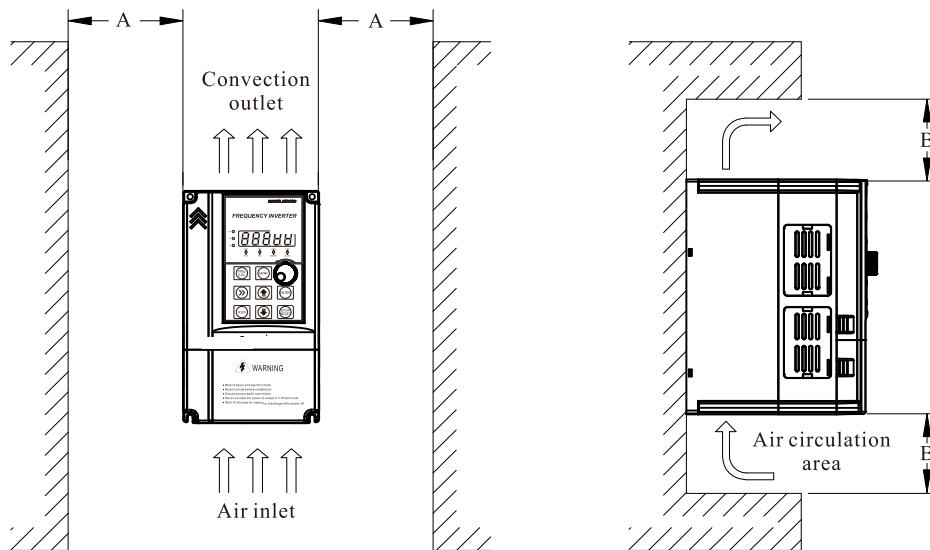
Diagram3-1　Ventilating duct installation dimension diagram of frequency inverter

Power class	Installation dimension	
	A	B
≤7.5kW	≥ 20mm	≥ 100mm
11kW - 30kW	≥ 50mm	≥ 200mm
≥ 37kW	≥ 50mm	≥ 300mm

Please install the frequency inverter vertically, to send out the heat upward, and pay attention to direction of frequency inverter to avoid inversion.

If there are several units of frequency inverter installed, please install them side by side, do not to install up and down.

3.3 Sketch and Description of Main Circuit Terminals

3.3.1 Function and description of Main Circuit Terminals

Power range: 0.75kW~22kW
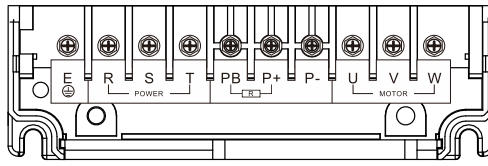
Power range: 30kW~400kW
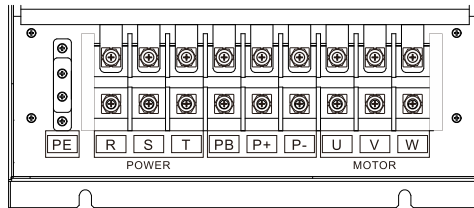
Terminal symbol	Function description
R, S, T	AC power input terminals
P+, P-	DC power input terminals；
P+, PB	Braking resistor connectin
⏚ or E/PE	Grounding terminal
U, V, W	Three-phase AC power output terminals

3.4 Control Circuit and Main Circuit Terminals Description

3.4.1 Control Circuit and Main Circuit Wiring

Diagram3-2   control circuit and main circuit wiring

3.4.2 Control Circuit Terminal Layout
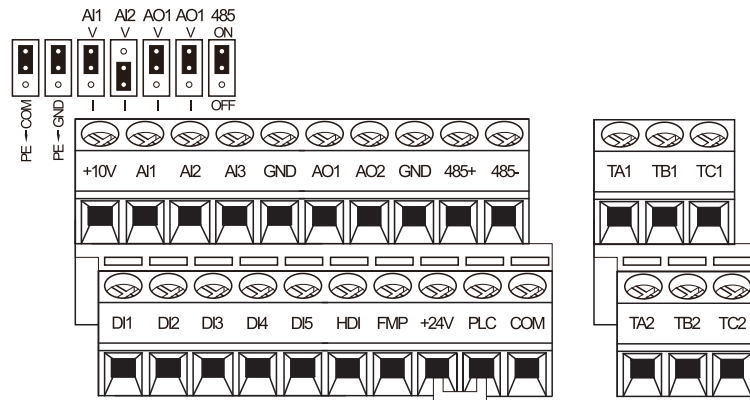
Diagram3-3   Control circuit terminal sketch diagram

3.4.3 Description of control circuit terminals

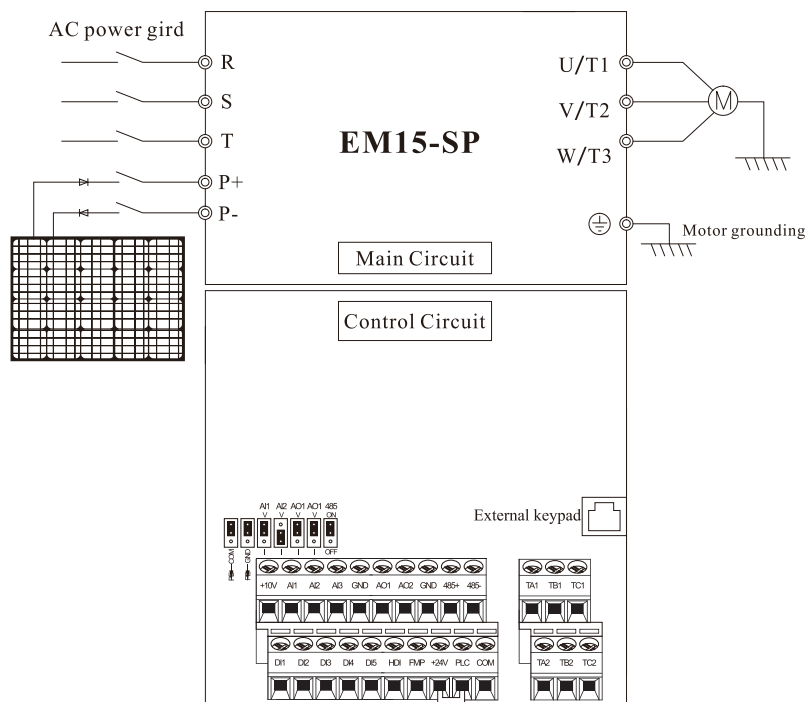| Type	Symbol	Name	Terminal function description
Power Supply	+10V-GND	External +10V power supply	Provide +10V power supply to external unit. Maximum output current:10Ma Generally, it provides power supply to external potentiometer with resistance range of 1 kΩ~5kΩ
	+24V-COM	External +24V power supply	Provide +24 V power supply to external unit. Generally, it provides power supply to DI/DO terminals and external sensors.Maximum output current: 200 mA
	PLC	External power supply input terminals	It connect with +24V default
Analog input	AI1-GND	Analog input 1	1. Input range: DC 0V~10V/ 0mA~20mA(decided by jumper AI1/AI2 on the control board); 2. Impedance: 22 kΩ (voltage input), 500 Ω (current input)
	AI2-GND	Analog input 2	
Digital input	DI1-COM	Digital input 1	1. Optical coupling isolation, compatible with dual polarity input 2.Input Impedance: 2.4 kΩ 3. Voltage range for level input: 9V~30 V
	DI2-COM	Digital input 2	
	DI3-COM	Digital input 3	
	DI4-COM	Digital input 4	
	DI5-COM	Digital input 5	
	HDI-COM	High Speed Pulse Input	Maximum input frequency: 100 kHz
Analog output	AO1-GND	Analog output 1	Voltage or current output is decided by jumper AO1/AO2. Output voltage range: 0V~10 V Output current range: 0mA~20 mA
	AO2-GND	Analog output 2	
	FMP- COM	High Speed Pulse Output	Constrained by function code b4-00 "FMP terminal output mode selection" as the high-speed pulse output, the highest frequency is 100kHz; when use as an open collector output, specifications is the same as DO.
Relay output	TA1-TB1	NC terminal	Contact driving capacity: 250 VAC, 3 A, COSø = 0.4 DC 30 V, 1 A
	TA2-TB2		
	TA1-TC1	NO terminal	
	TA2-TC2		
Interface	External keypad interface		Connected to an external keypad
Jumper	AI1/AI2		AI1/AI2 output selection, Voltage or Current output. AI1: voltage output by default. AI2: current output by default.
	AO1/AO2		AO1/AO2 output selection, Voltage or Current output. AI1/AI2: voltage output by default.

3.5 Collection Diagram For Different Motor

Note: For the EM15-SP1S series, U and V as single phase 220V output terminal
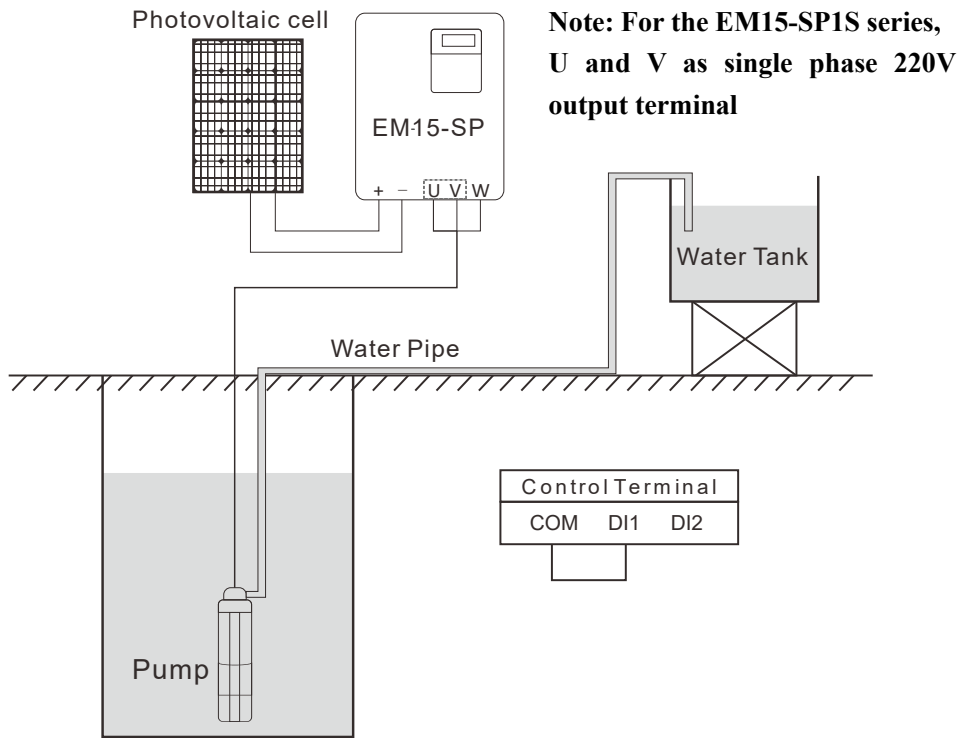
Diagram3-5   220V three phase installed without water level sensor (PV Input)
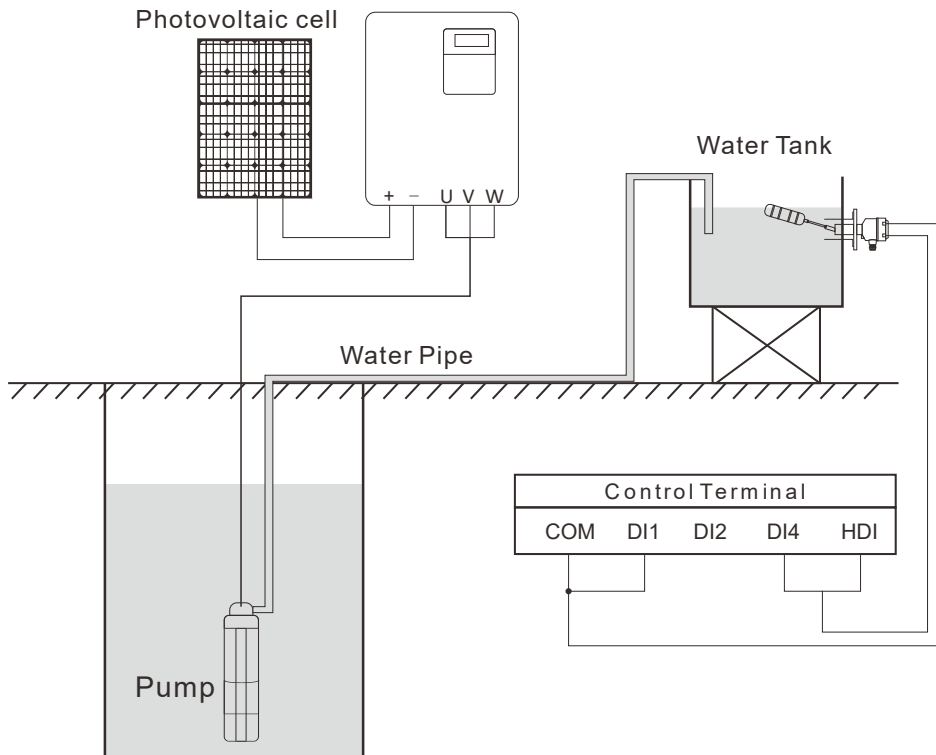
Diagram3-6   Diagram of 3phsae inverter connection method (PV Input)

3.5.1 The wiring of water-level automatic control

The wiring for floater water-level switch connected by cable

The common port, which using floate water-level switch connected by cable, is fed to the terminal "COM" of . And then, connected to DI1.
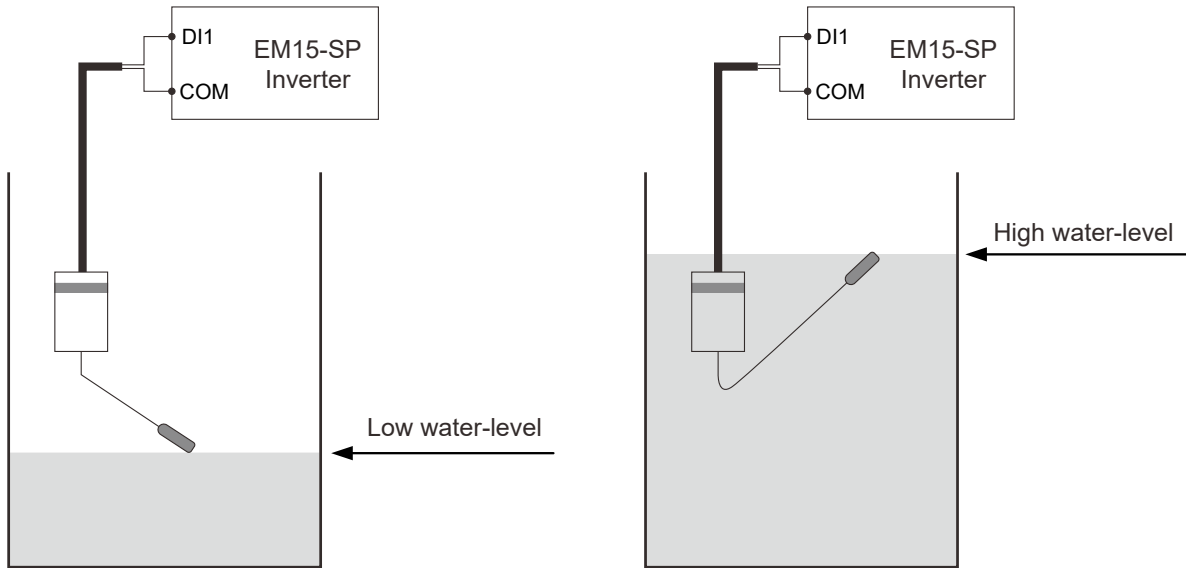
Diagram3-7 Diagram of Low water level and high water level

Remarks: When the actual water-level in the wells is higher than the horizontal line of high water-level, DI1 will be connected to the "COM" as well as controller automatically will start the pump. On the contrary, if the actual water-level is lower than the horizontal line of low water-level, DI1 will be disconnected from "COM" as well as controller automatically stop the pump to prevent anhydrous idling.

The wiring for floater water-level switch mounted on a side

The floater water-level switch mounted on a side is the normally open contact to output and its common wire is connected to the terminal COM of inverter. At the same time, the low level-water wire is connected to terminal DI4 and the high water-level wire is connected the terminal DI5.
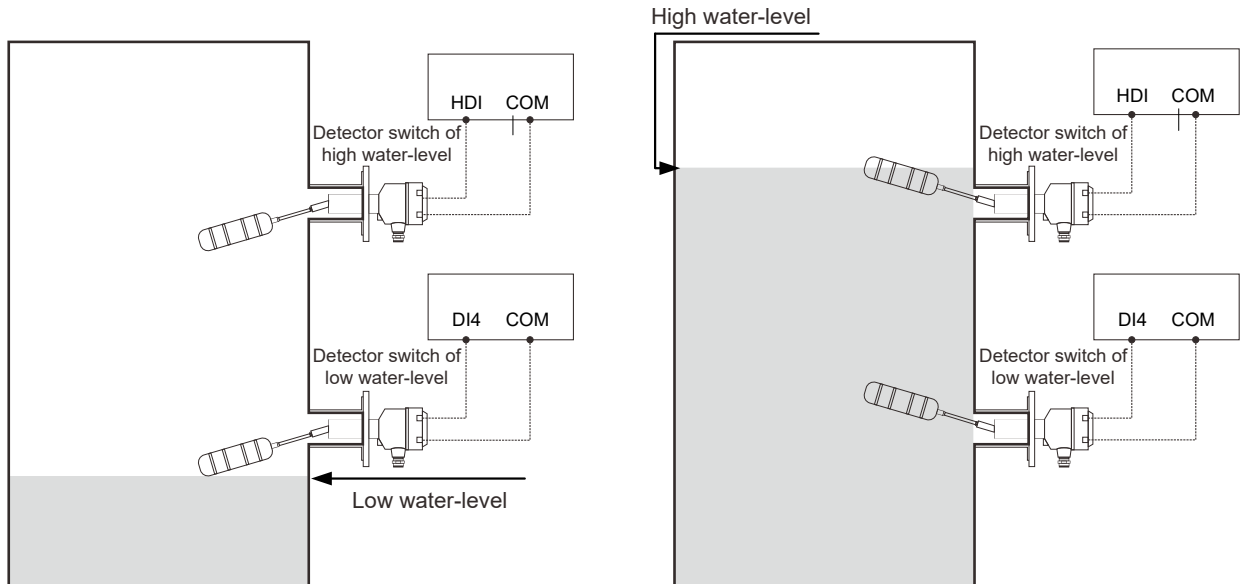
Diagram3-8 Diagram of Low water level and high water level

Remarks: When the actual water-level in the reservoir is lower than horizontal line of low water-level, DI4 and DI5 will be disconnected from the COM as well as controller automatically strat the pum. On the contrary, if the actual water-level is higher than the horizontal line of high water-level, DI4 and DI5 will be connected to COM as well as controller automatically stop the pump to prevent water overflow.

Notice: If only use one detection signal of water-level in the reservoir, DI4 and DI5 must be connected together by conductor.

4 Operation and display

4.1 Instruction of operation and display
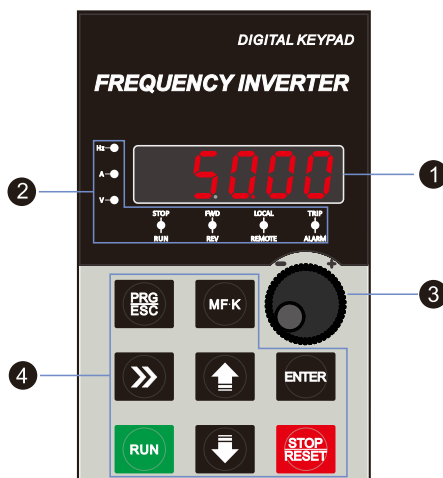
Diagram 4-1　Operating panel

No.	Name		Function
❶	LED display area		The 5-digit LED display is able to display the set frequency, output frequency, monitoring data and fault codes.
❷	Unit / Status Indicator area	Hz	Frequency unit
		A	Current unit
		V	Voltage unit
		STOP/ RUN	OFF indicates that the frequency inverter is in the stop state and ON indicates that the frequency inverter is in the running state.
		FWD/REV	It is Forward/Reversal indicator, ON indicates Reverse rotation.
		LOCAL /REMOTE	It indicates whether the frequency inverter is operated by operation keypad, terminals or remoter (communication). OFF indicates keypad operation control state; ON indicates terminals operation control state; Blinking indicates remote operation control state.
		TRIP /ALARM	Tunning/ Torque Control/Fault indicator When the indicator is ON, it indicates torque control mode. When the indicator is blinking slowly, it indicates the auto-tuning state. When the indicator is blinking quickly, it indicates the fault state.
❸	Encoder knob		Frequency, data or function code increase or decrease; the encoder knob has the confirmation key function
❹	Operation key area	PRG ESC	Programming key: Enter or exit menu level I.
		ENTER	Confirmation key: Enter the menu interfaces level by level, and confirm the parameter setting.
		MF·K	Multi-function key: Perform function switchover according to the setting of b9-01
		≫	Shift key: Select the displayed parameters in turn in the stop or running state, and select the digit to be modified when modifying parameters.
		↑	Increment key: Increase data or function code.
		↓	Decrement key: Decrease data or function code.
		RUN	Running key: Start the frequency inverter in the keypad control mode.
		STOP RESET	Stop/Reset key: Stop the frequency inverter when it is in the running state and perform the reset operation when it is in the fault state. The functions of this key are restricted by b9-00.

4.2 Function Code Table

If FP-00 set to a non-zero number, parameter protection is enabled. You must write in correct user password to enter the menu.

To cancel the password protection function, enter with password and set FP-00 to 0。

The parameter menu under the user-defined parameter mode can directly enter without password.

A is frequency inverter system parameter. Group "F" is basic function parameters .Group "U" is monitoring function parameters.

Code	Name	Setting range	Default
Group F0: Basic function parameters			
F0-00	G/P type selection	1: G type(Constant torque load models) 2: P type(Fan, water pump load models)	Model dependent
F0-01	Motor control mode	0: Sensorless vector control 1: Closed-loop vector control 2: VF control	2
F0-02	Command source selection	0: Keypad (LED OFF) 1: Terminal command (LED ON) 2: RS485 communication (LED flash)	0
F0-03	Main frequency source X selection	0: Digital setting(Preset frequency F0-08, UP/DOWN modifiable, no-record after power off) 1: Digital setting (Preset frequencyF0-08, UP/DOWN modifiable, record after power off) 2: AI1 3: AI2 4: Keypad potentiometer 5: PULSE setting 6: Multi-function 7: Built-in PLC 8: PID 9: Communication setting	4
F0-04	Auxiliary frequency source Y selection	As same as F0-03 (Main frequency source X selection)	0
F0-05	Auxiliary frequency Y range selection	0: Relative to maximum frequency 1: Relative to main frequency source X	0
F0-06	Auxiliary frequency source Y range	0%~150%	100%
F0-07	Frequency source selection when superposition	Unit's digit:frequency source selection 0: Main frequency source X 1: X and Y calculation (Calculation result determined by ten's digit) 2: Switchover between main frequency X source and auxiliary source Y 3: Switchover between main source X and arithmetic operation between of main source X and auxiliary source Y. 4: Switchover between auxiliary source Y and arithmetic operation between of main source X and auxiliary source Y Ten's digit : The arithmetic operation relationship between main and auxiliary. 0: Main + auxiliary 1: Main – auxiliary 2: Maximumof X and Y	00

Code	Name	Setting range	Default
		3: Minimum of X and Y	
F0-08	Preset frequency	0.00Hz~Maximum(F0-10)	50.00Hz
F0-09	Rotation direction	0: Forward direction 1: Reverse direction	0
F0-10	Maximum frequency	50.00Hz~320.00Hz	50.00Hz
F0-11	Frequency upper limit source	0: F0-12 1:AI1 2:AI2 3: Reserved 4: PULSE setting 5: Communication setting	0
F0-12	Frequency upper limit	Frequency lower limit(F0-14)~Maximum frequency(F0-10)	50.00Hz
F0-13	Frequency upper limit offset	0.00Hz~Maximum frequency F0-10	0.00Hz
F0-14	Frequency lower limit	0.00Hz~Maximum frequency F0-12	0.00Hz
F0-15	Carrier frequency	0.5kHz~16.0kHz	Model dependent
F0-16	Carrier frequency auto adjustment with temperature	0: No 1: Yes	1
F0-17	Acceleration time 1	0.00s~650.00s(F0-19=2) 0.0s~6500.0s(F0-19=1) 0s~65000s(F0-19=0)	Model dependent
F0-18	Deceleration time 1	0.00s~650.00s(F0-19=2) 0.0s~6500.0s(F0-19=1) 0s~65000s(F0-19=0)	Model dependent
F0-19	Acceleration/Deceleration time unit	0:1s 1:0.1s 2:0.01s	1
F0-21	The offset of auxiliary frequency source when perform superposition	0.00Hz~Maximum frequency F0-10	0.00Hz
F0-22	Frequency resolution	1:0.1Hz 2:0.01Hz	2
F0-23	Record of digital setting frequency of power failure	0: Not record 1: Record	0
F0-25	Acceleration/ deceleration time base frequency	0: Maximum frequency (F0-10) 1: Setting frequency 2: 100Hz	0
F0-26	Base frequency for UP/ DOWN modification during running	0: Running frequency 1: Setting frequency	0
F0-27	Binding command source to frequency source	Unit digit: Frequency source is bound by keypad command 0: No binding 1: Frequency source by digital setting 2: AI1 3: AI2 5: Pulse setting 6: Multi-function	0000

Code	Name	Setting range	Default
		7: Built-in PLC 8: PID 9: Communication setting Ten digit: Frequency source is bound by terminals Hundreds digit: Frequency source is bound by communication Thousands of digit: Automatic run Binding frequency source selection	
F0-28	Serial communication protocol	0: Protocol MODBUS-RTU	0
Group F1: Motor parameters			
F1-00	Motor type selection	0: General asynchronous motor 1: Variable frequency asynchronous motor	0
F1-01	Rated motor power	0.1KW~1000.0KW	Model dependent
F1-02	Rated motor voltage	1V~2000V	Model dependent
F1-03	Rated motor current	Inverter power <= 55KW:0.01A~655.35A Inverter power> 55KW:0.1A~6553.5A	Model dependent
F1-04	Rated motor frequency	0.01Hz~Maximum frequency	Model dependent
F1-05	Rated motor speed	1rpm~65535rpm	Model dependent
F1-06	Stator resistance (Asynchronous motor)	Inverter power<= 55KW:0.001Ω~65.535Ω Inverter power> 55KW: 0.0001Ω~6.5535Ω	Auto tuning
F1-07	Rotor resistance (Asynchronous motor)	Inverter power<= 55KW:0.001Ω~65.535Ω Inverter power> 55KW : 0.0001Ω~6.5535Ω	Auto tuning
F1-08	Leakage inductive reactance (Asynchronous motor)	Inverter power<= 55KW:0.01mH~655.35mH Inverter power> 55KW:0.001mH~65.535mH	Auto tuning
F1-09	Mutual inductive reactance (Asynchronous motor)	Inverter power<= 55KW:0.1mH~6553.5mH Inverter power> 55KW:0.01mH~655.35mH	Auto tuning
F1-10	No-load current (Asynchronous motor)	Inverter power<= 55KW: 0.01A~F1-03 Inverter power> 55KW:0.1A~F1-03	Auto tuning
F1-37	Auto tuning mode selection	0: No auto-tuning 1: Asynchronous motor static auto-tuning 2: Asynchronous motor complete auto-tuning	0
Group F2: Motor vector control parameters			
F2-00	Speed loop proportional gain 1	1~100	10
F2-01	Speed loop integral time 1	0.01s~10.00s	0.20s
F2-02	Switchover frequency 1	0.00~F2-05	5.00Hz
F2-03	Speed loop proportional gain 2	1~100	10
F2-04	Speed loop integral time 2	0.01s~10.00s	0.20s
F2-05	Switchover frequency 2	F2-02~Maximum frequency	10.00Hz
F2-06	Vector control slip gain	50%~200%	100%
F2-07	Speed loop filter time	0.000s~0.100s	0.003s

Code	Name	Setting range	Default
	constant		
F2-08	Vector control over excitation gain	0~200	0
F2-09	Torque upper limit source selection in speed control mode	0:set by F2-10 1:AI1 2:AI2 4:PULSE setting 5:Communication 6:MIN(AI1,AI2) 7:MAX(AI1,AI2) The full range of 1-7 option is correspond to F2-10	0
F2-10	Torque upper limit digital setting in speed control mode	0.0%~200.0%	150.0%
F2-13	Excitation adjustment proportional gain	0~60000	1000
F2-14	Excitation adjustment integral gain	0~60000	1000
F2-15	Torque adjustment proportional gain	0~60000	1000
F2-16	Torque adjustment integral gain	0~60000	1000
Group F3: V/F control parameters			
F3-00	VF curve setting	0: Linear V / F curve 1: Multi-point V / F curve 2: Square V / F curve 3: 1.2 power V / F 4: 1.4 power V / F 6: 1.6 power V/F 8: 1.8 power V/f 10: VF completely separation 11: VF half separation	0
F3-01	Torque booster	0.0%:(Automatic torque boost) 0.1%~30.0%	Model dependent
F3-02	Cut-off frequency of torque boost	0.00Hz~Maximum frequency	50.00Hz
F3-03	Multi-point VF frequency point 1	0.00Hz~F3-05	0.00Hz
F3-04	Multi-point VF voltage point 1	0.0%~100.0%	0.0%
F3-05	Multi-point VF frequency point 2	F3-03~F3-07	0.00Hz
F3-06	Multi-point VF voltage point 2	0.0%~100.0%	0.0%
F3-07	Multipoint VF frequency point 3	F3-05~Motor rated frequency(F1-04)	0.00Hz
F3-08	Multi-point VF voltage point 3	0.0%~100.0%	0.0%
F3-09	VF Slip compensation gain coefficient	0.0%~200.0%	100.0%

Code	Name	Setting range	Default
F3-10	VF over excitation gain	0~500	0
F3-11	VF oscillation suppression gain	0~100	Model dependent
F3-13	VF separate voltage source	0: Set by digital(F3-14) 1: AI1 2: AI2 4: PULSE setting 5: Multi-function 6: Built-in PLC 7: PID 8: Communication Note: 100.0% corresponds to the motor rated voltage	0
F3-14	VF separate voltage digital setting	0V~Rated motor voltage	0V
F3-15	VF separate acceleration time	0.0s~1000.0s Note: Indicates the deceleration time when 0V changes to the motor rated voltage	0.0s
Group F4: Input terminals			
F4-00	DI1 function selection	0: No function	1
F4-01	DI2 function selection	1: Forward running FWD 2: Reverse running REV	9
F4-02	DI3 function selection	3: 3 line control mode	53
F4-03	DI4 function selection	4: Forward Jog(FJOG) 5: Reverse Jog(RJOG)	51
F4-04	HDI function selection	6: Terminal UP	52
F4-05	DI5 function selection	7: Terminal DOWN 8: Free stop	2
F4-06	Reserve	9: Fault reset(RESET)	0
F4-07	Reserve	10: Run pause 11: Normally open (NO) input of external fault	0
F4-08	Reserve	12: Multiple step terminals 1	0
F4-09	Reserve	13: Multiple step terminals 2 14: Multiple step terminals 3 15: Multiple step terminals 4 16: Acceleration/ deceleration selection terminals 1 17: Acceleration/ deceleration selection terminals 2 18: Frequency source switch 19: UP/DOWN setting reset (terminals or keypad) 20: Running command terminals switch 21: Acceleration/deceleration forbidden 22: PID pause 23:PLC status reset 29: Torque control forbidden 32: Starting DC braking 33: Normally closed (NC) input of external fault 34: Frequency change enable 35: Change PID direction 36: External stop terminal 1 37: Control commands switchover terminal 2 38: PID integral pause 39: Switcover between frequency source X and preset frequency 40: Switcover between frequency source Y and preset	

Code	Name	Setting range	Default
		frequency 43: PID paramater switchover 44: User define fault 1 45: User define fault 2 46: Speed control /Torque control swithover 47: Emergency stop 48:External stop terminal 2 49: DC braking in deceleration 50: Clear the current running time 51: Full-water detection 1 52: Full-water detection 2 53: MPPT stop/ Photovoltaic control stop	
F4-10	DI filter time	0.000s~1.000s	0.010s
F4-11	Terminals command mode	0: Two line control 1 1: Two line control 2 2: Three line control 1 3: Three line control 2	0
F4-12	Terminals UP/DOWN Change ratio	0.001Hz/s~65.535Hz/s	1.00Hz/s
F4-13	AI curve 1 minimum input	0.00V~F4-15	0.00V
F4-14	AI curve 1 minimum input corresponding setting	-100.0%~+100.0%	0.0%
F4-15	AI curve 1 Max. input	F4-13~+10.00V	10.00V
F4-16	AI curve 1 Max input corresponding setting	-100.0%~+100.0%	100.0%
F4-17	AI1 filter time	0.00s~10.00s	0.10s
F4-18	AI curve 2 minimum input	0.00V~F4-20	0.00V
F4-19	AI curve 2 minimum input corresponding setting	-100.0%~+100.0%	0.0%
F4-20	AI curve 2 maximum input	F4-18~+10.00V	10.00V
F4-21	AI curve 2 maximum input corresponding setting	-100.0%~+100.0%	100.0%
F4-22	AI2 filter time	0.00s~10.00s	0.10s
F4-28	PULSE minimum input	0.00kHz~F4-30	0.00kHz
F4-29	PULSE minimum input corresponding setting	-100.0%~100.0%	0.0%
F4-30	PULSE maximum input	F4-28~100.00kHz	50.00kHz
F4-31	PULSE maximum input corresponding setting	-100.0%~100.0%	100.0%
F4-32	PULSE filter time	0.00s~10.00s	0.10s
F4-33	AI Curve selection	Units' digit:AI1 curve selection 1: Curve 1(2 point, see F4-13~F4-16) 2: Curve 2(2 point, see F4-18~F4-21) 3: Curve 3 (2 point, see F4-23~F4-26) 4: Curve 4(4 point, seeA6-00~A6-07) 5: Curve 5(4 point, see A6-08~A6-15) Ten's digit:AI2 curve selection，as above Hundred's digit: Curve set by potentiometer of keypad, as	321

Code	Name	Setting range	Default
		above	
F4-34	AI less than minimum input selection	Units' digit: AI 1 is less than minimum input Set selection 0:Corresponds to the minimum input setting 1:0.0% Ten's digit: A2 is less than minimum input Set selection, as above Hundred's digit: Potentiometer less than Min. Input selection, as above	000
F4-35	DI1 delay time	0.0s~3600.0s	0.0s
F4-36	DI2 delay time	0.0s~3600.0s	0.0s
F4-37	DI3 delay time	0.0s~3600.0s	0.0s
F4-38	DI valid mode selection 1	0: High level valid 1: Low level valid Digits: DI1 Ten's: DI2 Hundred's: DI3 Thousand's: DI4 Ten thousand's: DI5	00000
F4-39	DI valid mode selection 2	0: High level valid 1: Low level valid Digits: DI6 Ten's: DI7 Hundred's: DI8 Thousand's: DI9 Ten thousand's: DI10	00000
Group F5: Output terminals			
F5-00	FMP terminals output mode selection	0: High speed pulse output 1: Digital output	0
F5-01	FMR output function selection	0: No output 1: Frequency inverter running	0
F5-02	Relay 2 function selection	2: Fault output (Free stop fault) 3: FDT1 Frequency level detection output	2
F5-04	Relay 1 function selection	4: Frequency reached 5: Zero speed running (No output when stop) 6: Motor overload pre-alarm 7: Inverter overload pre-alarm 11: PLC cycle complete 12: Cumulative run time reached 13: Frequency limit 14: Torque limit 15: Ready to run 16: AI1>AI2 17: Frequency upper limit reached 18: Frequency lower limit reached (No output at stop) 19: Under voltage status output 20: Communication setting 23: Zero speed running 2(Having output at stop) 24: Accumulated power up time reached 25: Frequency level detection FDT2 output 26: Frequency 1 reached 27: Frequency 2 reached	1

Code	Name	Setting range	Default
		28: Current 1 reached 29: Current 2 reached 30: Timing reached 31: AI1 input limit exceeded 32: Load becoming 0 33: Reverse running 34: Zero current state 35: IGBT temperature reached 36: Output current is exceeded 37: Lower frequency reached(Having output at stop) 38: Alarm output (all faults) 39: Motor overtemperature warning 40: Current running time reached	
F5-06	FMP output function selection	0: Running frequency 1: Set frequency	0
F5-07	AO1 output function selection	2: Output current 3: Output torque (Absolute value)	0
F5-08	AO2 output function selection	4: Output power 5: Output voltage 6: Pulse input (100% corresponds to 100.0Hz) 7: AI1 8: AI2 12: Communication settings 13: Motor rotational speed 14: Output current (100.0% corresponds to 1000.0A) 15: Output voltage (100.0% corresponds to 1000.0V) 16: Output torque (Actual value)	1
F5-09	Maximum FMP output frequency	0.01kHz~100.00kHz	50.00kHz
F5-10	AO1 offset coefficient	-100.0%~+100.0%	0.0%
F5-11	AO1 gain	-10.00~+10.00	1.00
F5-12	AO2 offset coefficient	-100.0%~+100.0%	0.0%
F5-13	AO2 gain	-10.00~+10.00	1.00
F5-17	FMR output relay time	0.0s~3600.0s	0.0s
F5-18	Relay 1 output relay time	0.0s~3600.0s	0.0s
F5-19	Relay 2 output relay time	0.0s~3600.0s	0.0s
F5-20	DO1 output relay time	0.0s~3600.0s	0.0s
F5-22	DO logic selection	0: Positive logic 1: Negative logic Bits: FMR Ten's bit: Relay 1 Hundreds's bit: Relay 2 Thousands's bits: DO1 Ten thousands's bits: Reserved	00000
Group F6: Start and stop control			
F6-00	Start mode	0: Directly start 1: Rotational speed tracking restart 2: Pre-excitation start (Asynchronous machine)-	0
F6-01	Rotational speed tracking mode	0: Starts from stop frequency 1: Starts from zero speed	0

Code	Name	Setting range	Default
		2: Starting from maximum frequency	
F6-02	Rotational speed tracking ratio	1~100	20
F6-03	Startup speed	0.00Hz~10.00Hz	0.00Hz
F6-04	Startup speed holding time	0.0s~100.0s	0.0s
F6-05	Startup DC braking current / pre-excited current	0%~100%	0%
F6-06	Startup DC braking time / pre-excited time	0.0s~100.0s	0.0s
F6-07	Acceleration and deceleration mode	0: Linear acceleration / deceleration 1: S curve acceleration / deceleration A 2: S curve acceleration and deceleration B	0
F6-08	Time proportion of S-curve start segment	0.0%~(100.0%-F6-09)	30.0%
F6-09	Time proportion of S-curve end segment	0.0%~(100.0%-F6-08)	30.0%
F6-10	Stop mode	0: Deceleration stop 1: Free stop	0
F6-11	Initial frequency of stop DC braking	0.00Hz~Maximum frequency	0.00Hz
F6-12	Waiting time of stop DC braking	0.0s~100.0s	0.0s
F6-13	Stop DC braking current	0%~100%	0%
F6-14	Stop DC braking time	0.0s~100.0s	0.0s
F6-15	Brake usage ratio	0%~100%	100%
Group F7: Keyboard and display			
F7-01	MF.K key function selection	0: MF.K is invalid 1: Switchover between Operation panel command channel and remote command channel (terminal command channel or communication command channel) 2: Forward and reverse switching 3: Forward JOG 4: Reverse JOG	**0**
F7-02	STOP/RESET key function	0: STOP/RES button enable only in operation panel control mode 1: STOP/RES button enable in any control mode	**1**
F7-03	LED display running parameters 1	0000~FFFF Bit00: Running frequency 1(Hz) Bit01: Setting frequency (Hz) Bit02: Bus voltage (V) Bit03: Output voltage (V) Bit04: Output current (A) Bit05: Output power (KW) Bit06: Output torque (%) Bit07: DI input status Bit08: DO output status Bit09: AI1 voltage (V) Bit10: AI2 voltage (V) Bit11: Reserved	1F

Code	Name	Setting range	Default
		Bit12: Reserved Bit13: Reserved Bit14: Load speed display Bit15: PID setting	
F7-04	LED display running parameters 2	0000~FFFF Bit00: PID feedback Bit01: PLC stage Bit02: PULSE input pulse train frequency(kHz) Bit03: Running frequency 2(Hz) Bit04: Rest running time Bit05: AI1 before correction voltage (V) Bit06: AI2 before correction voltage (V) Bit07: Reserved Bit08: Line speed Bit09: Current power-on time (Hour) Bit10: Current running time (Min) Bit11: PULSE setting frequency (Hz) Bit12: Communication setting value Bit13: Reserved Bit14: Main frequency X display (Hz) Bit15: Auxiliary Frequency Y Display (Hz)	0
F7-05	LED display stop parameters	0000 ~ FFFF Bit00: Set frequency (Hz) Bit01: Bus voltage (V) Bit02: DI input status Bit03: DO output status Bit04: AI1 voltage (V) Bit05: AI2 voltage (V) Bit06: Reserved Bit07: Reserved Bit08: Reserved Bit09: PLC stage Bit10: Load speed Bit11: PID setting Bit12: PULSE setting frequency (kHz) Bit13: Reserved Bit14: Reserved Bit15: Reserved	33
F7-06	Load speed display coefficient	0.0001~6.5000	1.0000
F7-07	Heat sink temperature of IGBT	0.0℃~100.0℃	-
F7-08	Heat sink temperature of Rectifier	0.0℃~100.0℃	-
F7-09	Cumulative running time	0h~65535h	-
F7-10	Products number	-	-
F7-11	Software version	-	-
F7-12	Number of decimal places of load speed display	0: 0 decimal place 1: 1 decimal place 2: 2 decimal places 3: 3 decimal places	1
F7-13	Cumulative power-on time	0~65535 hour	-

Code	Name	Setting range	Default
F7-14	Cumulative power consumption	0~65535 KWh	-
Group F8: Auxiliary function			
F8-00	JOG running frequency	0.00Hz~Maximum frequency	2.00Hz
F8-01	JOG acceleration	0.0s~6500.0s	20.0s
F8-02	JOG deceleration	0.0s~6500.0s	20.0s
F8-03	Acceleration time 2	0.0s~6500.0s	Model dependent
F8-04	Deceleration time 2	0.0s~6500.0s	Model dependent
F8-05	Acceleration time 3	0.0s~6500.0s	Model dependent
F8-06	Deceleration time 3	0.0s~6500.0s	Model dependent
F8-07	Acceleration time 4	0.0s~6500.0s	Model dependent
F8-08	Deceleration time 4	0.0s~6500.0s	Model dependent
F8-09	Jump frequency 1	0.00Hz~Maximum frequency	0.00Hz
F8-10	Jump frequency 2	0.00Hz~Maximum frequency	0.00Hz
F8-11	Frequency jump amplitude	0.00Hz~Maximum frequency	0.00Hz
F8-12	Forward/Reverse rotation dead zone time	0.0s~3000.0s	0.0s
F8-13	Reverse running enabled	0: Enabled 1: Disabled	0
F8-14	Running mode when set frequency lower than lower limit	0: Run at lower limit frequency 1: Stop 2: Run at zero speed	0
F8-15	Drop control	0.00Hz~10.00Hz	0.00Hz
F8-16	Cumulative power-on time threshold	0h~65000h	0h
F8-17	Cumulative running time threshold	0h~65000h	0h
F8-18	Startup protection	0: No 1: Yes	0
F8-19	Frequency detection value (FDT1)	0.00Hz~Maximum frequency	50.00Hz
F8-20	Frequency detection hysteresis (FDT1)	0.0%~100.0%(FDT1 voltage level)	5.0%
F8-21	Frequency reached detection amplitude	0.0%~100.0%(Maximum frequency)	0.0%
F8-22	Jump frequency during acceleration/deceleration	0: Disabled 1: Enabled	0
F8-25	Frquency swtichover point between acceleration time 1 to acceleration time 2	0.00Hz~Maximum frequency	0.00Hz
F8-26	Frquency swtichover point	0.00Hz~Maximum frequency	0.00Hz

Code	Name	Setting range	Default
	between deceleration time 1 to deceleration time 2		
F8-27	Terminal JOG preferred	0: Disabled 1: Enabled	0
F8-28	Frequency detection value (FDT2)	0.00Hz~Maximum frequency	50.00Hz
F8-29	Frequency detection hysteresis (FDT2)	0.0%~100.0%(FDT2 voltage level)	5.0%
F8-30	Any frequency reaching detection value 1	0.00Hz~Maximum frequency	50.00Hz
F8-31	Any frequency reaching detection amplitude 1	0.0%~100.0%(Maximum frequency)	0.0%
F8-32	Any frequency reaching detection value 2	0.00Hz~Maximum frequency	50.00Hz
F8-33	Any frequency reaching detection amplitude 2	0.0%~100.0%(Maximum frequency)	0.0%
F8-34	Zero current detection level	0.0%~300.0% 100.0% corresponds to the motor rated current	5.0%
F8-35	Zero current detection delay time	0.01s~600.00s	0.10s
F8-36	Output overcurrent threshold	0.0%(No detect) 0.1%~300.0%(Rated current)	200.0%
F8-37	Output overcurrent detection delay time	0.00s~600.00s	0.00s
F8-38	Any current reaching 1	0.0%~300.0%(Motor rated current)	100.0%
F8-39	Any current reaching 1 amplitude	0.0%~300.0%(Motor rated current)	0.0%
F8-40	Any current reaching 2	0.0%~300.0%(Motor rated current)	100.0%
F8-41	Any current reaching 2 amplitude	0.0%~300.0%(Motor rated current)	0.0%
F8-42	Timing function	0: Disabled 1: Enabled	0
F8-43	Timing duration source	0: Set by F8-44 1: AI1 2: AI2 3: Potentiometer of operation panel The range of analog input corresponds to F8-44	0
F8-44	Timing duration	0.0Min~6500.0Min	0.0Min
F8-45	AI1 input voltage lower limit	0.00V~F8-46	3.10V
F8-46	AI1 input voltage upper limit	F8-45~10.00V	6.80V
F8-47	IGBT temperature threshold	0°C~100°C	75°C
F8-48	Cooling fan control	0: Working during running 1: Working after power up	0
F8-49	Wakeup frequency	Sleep frequency (F8-51)~Maximum(F0-10)	0.00Hz
F8-50	Wakeup delay time	0.0s~6500.0s	0.0s

Code	Name	Setting range	Default
F8-51	Dormant frequency	0.00Hz~Wake up frequency (F8-49)	0.00Hz
F8-52	Dormant delay time	0.0s~6500.0s	0.0s
F8-53	Current running time reached	0.0~6500.0 mins	0.0Min
Group F9: Fault and protection			
F9-00	Motor overload protection selection	0: Disabled 1: Enabled	1
F9-01	Motor overload protection gain	0.20~10.00	1.00
F9-02	Motor overload pre-warning coefficient	50%~100%	80%
F9-03	Overvoltage stall gain	0~1000	0
F9-04	Overvoltage stall protection voltage	120%~150%	135%
F9-05	Overcurrent stall gain	0~100	0
F9-06	Overcurrent stall protection current	100%~200%	150%
F9-07	Short-circuit to ground upon poweron	0: Disabled 1: Enabled	0
F9-09	Fault auto reset times	0~20	20
F9-10	DO action during fault auto reset	0: No act 1: Act	0
F9-11	Time interval of fault auto reset	0.1s~100.0s	5.0s
F9-12	Input phase loss protection/contactor energizing protection selection	Bit: Input phase loss protection selection Ten: Contactor pull protection options 0: Disabled 1: Enabled	00
F9-13	Output phase loss protection	0: Disabled 1: Enabled	0
F9-14	Fault type (1st)	0: No fault 1: Reserved	—
F9-15	Fault type (2nd)	2: Overcurrent in acceleration	—
F9-16	Fault type (3rd)(Latest)	3: Over current in deceleration 4: Over current in constant speed during 5: Over voltage in acceleration 6: Over voltage in deceleration 7: Over voltage in constant speed during 8: Buffer resistance overload 9: Undervoltage 10: Inverter overload 11: Motor overload 12: Input phase loss 13: Output phase loss 14: Igbt Module overheating 15: External fault 16: Communication error 17: Contactor is abnormal 18: Current detection is abnormal	—

Code	Name	Setting range	Default
		19: Motor tuning abnormal 20: Encoder / PG card is abnormal 21: Parameter read and write exception 22: Inverter hardware abnormality 23: Motor to ground short circuit 24: Reserved 25: Reserved 26: Running time arrives 27: User defined fault 1 28: user defined fault 2 29: Power-up time arrives 30: Under load 31: PID feedback is missing in running 40: Fast current limit timeout 41:Motor switch in running 42: The speed deviation is too big 43: Motor over speed 45: Motor overtemperature 51: Initial position error		
F9-17	Frequency of latest fault	—	—
F9-18	Current of latest fault	—	—
F9-19	DC bus voltage of latest fault	—	—
F9-20	Input terminals status of latest fault	—	—
F9-21	Output terminals status of latest fault	—	—
F9-22	Inverter status of latest fault	—	—
F9-23	Power up time of latest fault	—	—
F9-24	Running time of latest fault	—	—
F9-27	Frequency of 2nd fault	—	—
F9-28	Current of 2nd fault	—	—
F9-29	DC bus voltage of 2nd fault	—	—
F9-30	Input terminals status of 2nd fault	—	—
F9-31	Output terminals status of 2nd fault	—	—
F9-32	Inverter status of 2nd fault	—	—
F9-33	Power up time of 2nd fault	—	—
F9-34	Running time of 2nd fault	—	—
F9-37	Frequency of 1st fault	—	—
F9-38	Current of 1st fault	—	—
F9-39	DC Bus voltage of 1st fault	—	—
F9-40	Input terminals status of 1st fault	—	—

Code	Name	Setting range	Default
F9-41	Output terminal status of 1st fault	—	—
F9-42	Inverter status of 1st fault	—	—
F9-43	Power-on time of 1st fault	—	—
F9-44	Running time of 1st fault	—	—
F9-47	Fault protection action selection 1	Bit: Motor overload (Err11) 0: Free stop 1: Stop by stop mode setting 2: Continue to run Ten: Input missing (Err12) Hundreds: Output phase loss (Err13) Thousands of bits: external failure (Err15) Million: communication anomaly (Err16)	00000
F9-48	Fault protection action selection 2	Bit: Encoder / PG card exception (Err20) 0: Free stop Ten: Function code read and write exception (Err21) 0: Free stop 1: Stop by stop mode setting Hundred places: reserved Thousands: Motor overheating (Err25) Million: run time arrival (Err26)	00000
F9-49	Fault protection action selection 3	Bit: User defined fault 1 (Err27) 0: Free stop 1: Stop by stop mode 2: Continue to run Ten: User Defined Fault 2 (Err28) 0: Free Stop 1: Stop by stop mode 2: Continue to run Hundreds: Power-up time arrives (Err29) 0: Free stop 1: Stop by stop mode 2: Continue to run Thousands of bits: (Err30) 0: Free stop 1: Deceleration stop 2:Skip to 7% of the rated motor frequency to continue running, restore to run with setting frequency after no missing load Million: PID feedback lost in running (Err31) 0: Free parking 1: Stop by stop mode 2: Continue to run	00000
F9-50	Fault protection action selection 4	Bit: the speed deviation is too large (Err42) 0: Free stop 1: Stop by stop mode 2: Continue to run Ten: Motor over speed (Err43) Hundred places: initial position error (Err51)	00000
F9-54	Frequency selection for continuing to run upon fault	0: Current running frequency 1: Set frequency 2: Frequency upper limit 3: Frequency lower limit	0

Code	Name	Setting range	Default
		4: Backup frequency upon abnormality	
F9-55	Backup frequency upon abnormality	0.0%~100.0% (100.0% corresponds to the maximum frequency F0-10)	100.0%
F9-57	Motor overheat protection threshold	0°C~200°C	110°C
F9-58	Motor overheat warning threshold	0°C~200°C	90°C
F9-59	Action selection at instantaneous power failure	0: Invalid 1: Deceleration 2: Deceleration stop	0
F9-60	Action pause judging voltage at instantaneous power failure	80.0%~100.0%	90.0%
F9-61	Voltage rally judging time at instantaneous power failure	0.00s~100.00s	0.50s
F9-62	Action judging voltage at instantaneous power failure	60.0%~100.0%(Standard bus voltage)	80.0%
F9-63	Protection upon load becoming 0	0: Disabled 1: Enabled	0
F9-64	Load becoming 0 detection level	0.0~100.0%	10.0%
F9-65	Load becoming 0 detection time	0.0~60.0s	1.0s
F9-67	Over speed detection value	0.0%~50.0%(Max frequency)	20.0%
F9-68	Over speed detection time	0.0s: No detect 0.1~60.0s	1.0s
F9-69	Detection value of too large speed deviation	0.0%~50.0%(Max frequency)	20.0%
F9-70	Detection time of too large speed deviation	0.0s: No detect 0.1~60.0s	0.0s
Group FA: PID function			
FA-00	PID reference source	0: FA-01 1: AI1 2: AI2 3: Reserved 4: PULSE setting 5: Communication setting 6: Multi-function	0
FA-01	PID digital setting	0.0%~100.0%	50.0%
FA-02	PID feedback source	0: AI1 1: AI2 2: Reserved 3: AI1-AI2 4: PULSE setting 5: Communication setting 6: AI1 + AI2 7: MAX (| AI1 |, | AI2 |) 8: MIN (| AI1 |, | AI2 |)	0
FA-03	PID action direction	0: Forward action 1: Reverse action	0

Code	Name	Setting range	Default
FA-04	PID setting feedback range	0~65535	1000
FA-05	Proportional gain Kp1	0.0~100.0	20.0
FA-06	Integral time Ti1	0.01s~10.00s	2.00s
FA-07	Differential time Td1	0.000s~10.000s	0.000s
FA-08	PID reverse rotation cut-off frequency	0.00~Maximum frequency	2.00Hz
FA-09	PID deviation limit	0.0%~100.0%	0.0%
FA-10	PID differential limiting	0.00%~100.00%	0.10%
FA-11	PID setting change time	0.00~650.00s	0.00s
FA-12	PID feedback filter time	0.00~60.00s	0.00s
FA-13	PID output filter time	0.00~60.00s	0.00s
FA-15	Proportional gain Kp2	0.0~100.0	20.0
FA-16	Integral time Ti2	0.01s~10.00s	2.00s
FA-17	Derivative time Td2	0.000s~10.000s	0.000s
FA-18	PID parameter switchover condition	0: NO switchover 1: Switchover via DI terminal 2: Auto switchover based on deviation	0
FA-19	PID parameter switchover deviation 1	0.0%~FA-20	20.0%
FA-20	PID parameter switchover deviation 2	FA-19~100.0%	80.0%
FA-21	PID initial value	0.0%~100.0%	0.0%
FA-22	PID initial value holding time	0.00~650.00s	0.00s
FA-23	Maximum deviation between two PID outputs in forward direction	0.00%~100.00%	1.00%
FA-24	Maximum deviation between two PID outputs in reverse direction	0.00%~100.00%	1.00%
FA-25	PID integral property	Bit: Integral separation 0: Invalid 1: Valid Ten:Whether to stop the integral working after outputting to the limit 0: Continue integral working 1: Stop integral working	00
FA-26	PID feedback loss detection value	0.0%:Do not judge feedback loss 0.1%~100.0%	0.0%
FA-27	PID feedback loss detection time	0.0s~20.0s	0.0s
FA-28	PID operation at stop	0: No PID operation at stop 1: PID operation at stop	0
Group FC: multi-step instructions, simple PLC			
FC-00	Multi-funtion 0	-100.0%~100.0%	0.0%

Code	Name	Setting range	Default
FC-01	Multi-funtion 1	-100.0%~100.0%	0.0%
FC-02	Multi-funtion 2	-100.0%~100.0%	0.0%
FC-03	Multi-funtion 3	-100.0%~100.0%	0.0%
FC-04	Multi-funtion 4	-100.0%~100.0%	0.0%
FC-05	Multi-funtion 5	-100.0%~100.0%	0.0%
FC-06	Multi-funtion 6	-100.0%~100.0%	0.0%
FC-07	Multi-funtion 7	-100.0%~100.0%	0.0%
FC-08	Multi-funtion 8	-100.0%~100.0%	0.0%
FC-09	Multi-funtion 9	-100.0%~100.0%	0.0%
FC-10	Multi-funtion 10	-100.0%~100.0%	0.0%
FC-11	Multi-funtion 11	-100.0%~100.0%	0.0%
FC-12	Multi-funtion 12	-100.0%~100.0%	0.0%
FC-13	Multi-funtion 13	-100.0%~100.0%	0.0%
FC-14	Multi-funtion 14	-100.0%~100.0%	0.0%
FC-15	Multi-funtion 15	-100.0%~100.0%	0.0%
FC-16	Simple PLC running mode	0: Stop after the Inverter runs one cycle 1: Keep final values after the Inverter runs one cycle 2: Repeat after the Inverter runs one cycle	0
FC-17	Simple PLC retentive selection	Bit: Power off memory options 0: No memory power-off 1: Power off memory Ten: Stop memory selection 0: Stop no memory 1: Stop memory	00
FC-18	Simple PLC segment 0 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-19	Simple PLC segment 0 acceleration/deceleration time selection	0~3	0
FC-20	Simple PLC segment 1 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-21	Simple PLC segment 1 acceleration/deceleration time selection	0~3	0
FC-22	Simple PLC segment 2 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-23	Simple PLC segment 2 acceleration/deceleration time selection	0~3	0
FC-24	Simple PLC segment 3 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-25	Simple PLC segment 3 acceleration/deceleration time selection	0~3	0
FC-26	Simple PLC segment 4 running time	0.0s(h)~6553.5s(h)	0.0s/h

Code	Name	Setting range	Default
FC-27	Simple PLC segment 4 acceleration/deceleration time selection	0~3	0
FC-28	Simple PLC segment 5 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-29	Simple PLC segment 5 acceleration/deceleration time selection	0~3	0
FC-30	Simple PLC segment 6 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-31	Simple PLC segment 6 acceleration/deceleration time selection	0~3	0
FC-32	Simple PLC segment 7 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-33	Simple PLC segment 7 acceleration/deceleration time selection	0~3	0
FC-34	Simple PLC segment 8 running time	0.0s(h)~6553.5s(h)	0.0s(h)
FC-35	Simple PLC segment 8 acceleration/deceleration time selection	0~3	0
FC-36	Simple PLC segment 9 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-37	Simple PLC segment 9 acceleration/deceleration time selection	0~3	0
FC-38	Simple PLC segment 10 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-39	Simple PLC segment 10 acceleration/deceleration time selection	0~3	0
FC-40	Simple PLC segment 11 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-41	Simple PLC segment 11 acceleration/deceleration time selection	0~3	0
FC-42	Simple PLC segment 12 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-43	Simple PLC segment 12 acceleration/deceleration time selection	0~3	0
FC-44	Simple PLC segment 13 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-45	Simple PLC segment 13 acceleration/deceleration time selection	0~3	0
FC-46	Simple PLC segment 14 running time	0.0s(h)~6553.5s(h)	0.0s/h

Code	Name	Setting range	Default
FC-47	Simple PLC segment 14 acceleration/deceleration time selection	0~3	0
FC-48	Simple PLC segment 15 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-49	Simple PLC segment 15 acceleration/deceleration time selection	0~3	0
FC-50	Simple PLC run time unit	0:s(2) 1:h(hour)	0
FC-51	Multi-function 0 given mode	0: Set by FC-00 1:AI1 2:AI2 4: PULSE setting 5: PID 6: Set by Preset frequency (F0-08), modified via terminal UP/DOWN	0
Group Fd: Communication			
Fd-00	Communication baud rate	Bit:MODBUS 0:300BPS 1:600BPS 2:1200BPS 3:2400BPS 4:4800BPS 5:9600BPS 6:19200BPS 7:38400BPS 8:57600BPS 9:115200BPS Ten: Reserved Hundred: Reserved	6005
Fd-01	MODBUS data format	0: No parity (8-N-2) 1: Even check (8-E-1) 2: Odd parity (8-O-1) 3: No parity (8-N-1) (MODBUS active)	0
Fd-02	Local address	0:Broadcast address 1~249 (MODBUS)	1
Fd-03	MODBUS respond delay	0~20ms (MODBUS enable)	2
Fd-04	Serial communication timeout	0.0: Disabled 0.1~60.0s (MODBUS)	0.0
Fd-05	Modbus protocol selection	Unit's digit: Modbus protocol 0: Non-standard Modbus protocol 1: Standard Modbus protocol Ten's digit: Reserved	30
Fd-06	Communication reading current resolution	0: 0.01A 1: 0.1A	0
Group FE: PV function			
FE-00	PV inverter selection	0: Disabled 1: Enabled	1

Code	Name	Setting range	Default
FE-01	Vmpp voltage reference selection	0: Manual 1: MPPT Automatic algorithm tracking	1
FE-02	Vmpp voltage manual setting value	0 - 1000.0V	500.0V
FE-03	Motor Selection	0: General three phase ac motor 1: Single phase motor with capacitor 2: Single phase motor without capacitor	--
FE-04	CVT proportional gain 1	0.0% - 999.9%	100.0%
FE-05	CVT Integral gain1	0.0% - 999.9%	100.0%
FE-10	MPPT search upper limit voltage	0 - 1000.0V	750.0V
FE-11	MPPT search lower limit voltage	0 - 1000.0V	300.0V
FE-12	MPPT search gain	0% - 500%	100%
FE-13	MPPT search time interval	0.0 - 10.0sec	1.0sec
FE-16	Dormancy voltage thresholds	0.0-1000.0V	300.0V
FE-17	Wake-up voltage thresholds	0.0-1000.0V	350.0V
FE-18	Wake-up delay time	0-30000sec	60sec
FE-19	Detection frequency of low frequency protection	0.00Hz~300.00Hz	10.00Hz
FE-20	Detection time of low frequency protection	0-30000s	10sec
FE-21	Auto-recovery time of low frequency protection	0-30000s	60sec
FE-22	Detection current of dry pumping protection	0.0-999.9A	0.0A
FE-23	Detection time of dry pumping protection	0-30000s	10sec
FE-24	Auto-recovery time of dry pumping protection	0-30000s	60sec
FE-25	Detection current of overcurrent protection	0.0-999.9A	0.0A
FE-26	Detection time of overcurrent protection	0-30000s	10sec
FE-27	Auto-recovery time of over current protection	0 -30000s	60sec
FE-28	Minimum. power protection value	0.00kw - 650.00kw	0.00kw
FE-29	Detection time of minimum power protection	0 - 30000s	0sec
FE-30	Auto-recovery time of minimum. power protection	0 - 30000s	0sec
FE-31	Full-water detection mode	0: Terminal 1: AI1 2: AI2	0
FE-32	Analog full-water detection	0 - 100.0%	25.0%

Code	Name	Setting range	Default
	Thresholds		
FE-33	Detection time of full-water protection	0 - 30000sec	10sec
FE-34	Exit time of full-water protection	0 - 30000sec	60sec
FE-35	Analog sensor damaged Thresholds	0 - 100.0%	0.0%
FE-36	PV DC correction coefficient	0.0 - 200.0%	100.00%
FE-37	PV DC correction offset	-100.00A - 100.00A	0.00A
FE-38	power curve point 0	0.0kw - 999.9kw	0.5kw
FE-39	power curve point 1	0.0kw - 999.9kw	1.0kw
FE-40	power curve point 2	0.0kw - 999.9kw	1.5kw
FE-41	power curve point 3	0.0kw - 999.9kw	2.0kw
FE-42	power curve point 4	0.0kw - 999.9kw	2.5kw
FE-43	flow curve point 0	0.0 - 999.9m^3/h	0.0 m^3/h
FE-44	flow curve point 1	0.0 - 999.9m^3/h	5.0 m^3/h
FE-45	flow curve point 2	0.0 - 999.9m^3/h	10.0m^3/h
FE-46	flow curve point 3	0.0 - 999.9m^3/h	15.0m^3/h
FE-47	flow curve point 4	0.0 - 999.9m^3/h	20.0m^3/h
Group FP: Function code management			
FP-00	User password	0~65535	0
FP-01	Restore default settings	0: No operation 1: Restore parameters to factory setting except motor parameters 2: Clear record information	0
FP-02	Function parameter group display selection	Bit: U group monitoring parameters 0: Not displayed 1: Display Ten: Advanced parameters 0: Not displayed 1: display	01
FP-04	Parameter modification property	0: Modifiable 1: Not modifiable	0
Group U0: Monitor parameters			
U0-00	Running frequency		0.01Hz
U0-01	Setting frequency		0.01Hz
U0-02	DC Bus voltage		0.1V
U0-03	Output voltage		1V
U0-04	Output current		0.01A
U0-05	Output power		0.1KW
U0-06	Output torque		0.01A
U0-07	DI state		1

Code	Name	Setting range	Default
U0-08	DO state		1
U0-09	AI1 voltage		0.01V
U0-10	AI2 voltage		0.01V
U0-12	PVopen circuit voltage		0.1V
U0-13	Pump flow speed		0.1m^3/hr
U0-14	Daily flow		0.1m^3
U0-15	Cumulative flow(low water level)		0.1m^3
U0-16	Cumulative flow (high water level)		0.1Km^3
U0-17	Daily generated electricity		0.1kwh
U0-18	Cumulative electricity consumption(low water level)		0.1kwh
U0-19	Cumulative electricity consumption(high water level)		1Mwh
U0-20	Remaining running time		-
U0-21	AI1 voltage before correction		-
U0-22	AI2 voltage before correction		-
U0-26	Present running time		
U0-28	Communication setting value		-
U0-30	Main frequency X		-
U0-31	Auxiliary frequency Y		-
U0-32	Viewing any register address value		-
U0-34	Motor temperature		-
U0-35	Target torque		-
U0-37	Power factor angle		-
U0-39	Target voltage of V/F separation		-
U0-40	Output voltage of V/F separation		-
U0-41	DI input state visual display		-
U0-42	DO output state visual display		-
U0-43	DI function state visual display 1		
U0-44	DI function state visual display 2		-
U0-45	Fault information		-
U0-59	Present setting frequency (%)		-
U0-60	Present running frequency (%)		-
U0-61	Frequency inverter running state		-
U0-62	Current fault code		-
U0-63	Sent value of point-point communication		-
U0-64	Received value of point-point communication		-
U0-65	Torque upper limit		-
Ar: Parameters for Alarm			
Ar.01	Dormancy		-

Code	Name	Setting range	Default
Ar.02	Low frequency protection		-
Ar.03	Dry pumping rotection /underload		-
Ar.04	Overcurrent protection		-
A4.05	Min.power protection		-
A4.06	Full-water protection		-
A4.07	Analog sensor fault		

5. Description of Function Codes

Group F0: Basic function parameters

F0-00	G/P type selection	1: G type(Constant torque load models)	Model
		2: P type(Fan, water pump load models)	dependent

This parameter is used to display the delivered model and cannot be modified.

1: **Applicable to constant torque general load with rated parameters specified.**

2: **Applicable to variable torque load (fan and pump) with rated parameters specified.**

F0-01	Motor control mode	0: Sensorless vector control	2
		1: Closed-loop vector control	
		2: VF control	

0: Sensorless vector control

It indicates open-loop vector control, and is applicable to high-performance control applications such as machine tool, centrifuge, wire drawing machine and injection moulding machine. One Inverter can operate only one motor.

1: Closed-loop vector control

It is applicable to high-accuracy speed control or torque control applications such as high-speed paper making machine, crane and elevator. One Inverter can operate only one motor. An encoder must be installed at the motor side, and a PG card matching the encoder must be installed at the Inverter side.

2: Voltage/Frequency (V/F) control

It is applicable to applications with low load requirements or applications where one Inverter operates multiple motors, such as fan and pump.

F0-02	Command source selection	0: Keypad control (LED off)	0
		1: Terminal control (LED on)	
		2: Communication control (LED blinking)	

It is used to determine the input channel of the frequency inverter control commands, such as run, stop, forward rotation, reverse rotation and jog operation. You can input the commands in the following three channels:

0: Keypad control ("LOCAL/REMOT" indicator off)

Commands are given by pressing keys "RUN" and "STOP/RESET" on the operation panel.

1: Terminal control ("LOCAL/REMOT" indicator on)

Commands are given by means of multifunctional input terminals with functions such as FWD, REV, JOGF, and JOGR.

2: Communication control ("LOCAL/REMOT" indicator blinking)

Commands are given from host computer. For more details please refer to the appendix of communication protocol.

F0-03	Main frequency source X selection	0: Digital setting(Preset frequency F0-08, UP/DOWN modifiable, no-record after power off)	4
		1: Digital setting (Preset frequencyF0-08, UP/DOWN modifiable, record after power off)	
		2: AI1	
		3: AI2	
		4: Keypad potentiometer	
		5: PULSE setting	
		6: Multi-function	
		7: Built-in PLC	
		8: PID	

| | | 9: Communication setting | |

It is used to select the setting channel of the main frequency. You can set the main frequency in the following 10 channels:

0: Digital setting (not record at power off)

The initial value of the set frequency is the value of F0-08 (Preset frequency). You can change the set frequency by pressing ▲ and ▼ on the operation panel (or using the UP/DOWN function of input terminals).

When the Frequency inverter is powered on again after power failure,the set frequency reverts to the value of F0-08

(record digital setting frequency)

1: Digital setting (record at power off)

The initial value of the set frequency is the value of F0-08(Preset frequency). You can change the set frequency by pressing keys ▲ and ▼ on the operation panel (or using the UP/DOWN functions of input terminals).

When the frequency inverter is powered on again after power failure, the setting frequency is the value memorized at the moment of the last power failure.

Note that F0-23 (record digital setting frequency of power failure) F0-23 determines whether the set frequency is memorized or cleared when the frequency inverter stops.It is related to stopping rather than power failure.

2: AI1

3: AI2

The frequency is set by analog input. The control board provides two analog input (AI) terminals (AI1, AI2). Including:

AI1: 0V~10 V voltage input or 0mA ~ 20mA   current input, determined by jumper JP2 on the control card;

AI2: 0V~10 V voltage input or 0mA ~ 20mA   current input, determined by jumper JP3 on the control card;

The corresponding relationship curve between the input voltage of AI1, AI2 and the target frequency can be user-defined. provides 5 corresponding curves, 3 groups curves are linear relation (2 point correspondence), 2 curves are arbitrary curve of 4 points corresponding relationship,User can set   by F4-13 ~ F4-27 function code and A6 group function code. F4-33 is used to set the AI1~AI2 two analog input. When AI is used as the frequency setting source, the corresponding value 100% of the voltage/current input corresponds to the value of F0-10 (Maximum frequency).

4: Keypad potentiometer

5: Pulse setting

The frequency is set by DI5 (high-speed pulse). The signal specification of pulse setting is 9–30 V (voltage range) and 0–100 kHz (frequency range). The corresponding value 100% of pulse setting corresponds to the value of F0-10 (Maximum frequency).

6: Multi-function

In multi-reference mode, combinations of different DI terminal states correspond to different set frequencies. The inverter supports a maximum of 16 speeds implemented by 16 state combinations of four DI terminals (allocated with functions 12 to 15) in Group FC. The multiple references indicate percentages of the value of F0-10 (Maximum frequency).

If a DI terminal is used for the multi-reference function, you need to perform related setting in group F4.

7: Built-in PLC

When the simple programmable logic controller (PLC) mode is used as the frequency source, the running frequency of the Inverter can be switched over among the 16 frequency references. You can set the holding time and acceleration/deceleration time of the 16 frequency references. For details, refer to the descriptions of Group FC.

8: PID

The output of PID control is used as the running frequency. PID control is generally used in on-site closed-loop control, such as constant pressure closed-loop control and constant tension closed-loop control.

When applying PID as the frequency source, you need to set parameters of PID function in group FA.

9: Communication setting

The frequency is set by communication mode.

F0-03	Auxiliary frequency reference source Y	0: Digital setting(Preset frequency F0-08, UP/DOWN modifiable, no-record after power off) 1: Digital setting (Preset frequencyF0-08, UP/DOWN modifiable, record after power off) 2: AI1 3: AI2 4: Keypad potentiometer 5: PULSE setting 6: Multi-function 7: Built-in PLC 8: PID 9: Communication setting	4

When used as an independent frequency input channel (frequency source switched over from X to Y), the auxiliary frequency source Y is used in the same way as the main frequency source X (refer to F0-03).

When the auxiliary frequency source is used for operation (frequency source is "X and Y operation"), pay attention to the following aspects:

1) If the auxiliary frequency source Y is digital setting, the preset frequency (F0-08) does not take effect. You can directly adjust the set main frequency by pressing keys UP and DOWN on the operation panel (or using the UP/DOWN function of input terminals).

2) If the auxiliary frequency source is analog input (AI1, AI2) or pulse setting, 100% of the input corresponds to the range of the auxiliary frequency Y (set in F0-05 and F0-06).

3) If the auxiliary frequency source is pulse setting, it is similar to analog input.

F0-05	Auxiliary frequency Y range selection	0: Relative to the maximum frequency 1: Relative to frequency source X	0
F0-06	Auxiliary frequency source Y range	0%~150%	100%

If X and Y operation is used, F0-05 and F0-06 are used to set the adjustment range of the auxiliary frequency source.

You can set the auxiliary frequency to be relative to either maximum frequency or main frequency X. If relative to main frequency X, the setting range of the auxiliary frequency Y varies according to the main frequency X.

F0-07	Frequency source selection when superposition	Unit's digit:frequency source selection 0: main frequency source 1:Arithmetic result of main and auxiliary operation (arithmetic relationship operation depends on ten's digit) 2: Switchover between main frequency X source and auxiliary source Y 3: Switchover between main source X and arithmetic operation between of main source X and auxiliary source Y. 4: Switchover between auxiliary source Y and arithmetic operation between of main source X and auxiliary source Y Ten's digit : The arithmetic operation relationship between main and auxiliary. 0: main + auxiliary 1: main – auxiliary 2: Maximumof X and Y 3: Minimum of X and Y	00

It is used to select the frequency setting channel. If the frequency source involves X and Y operation, you can set

the frequency offset in F0-21 for superposition to the X and Y operation result, flexibly satisfying various requirements.
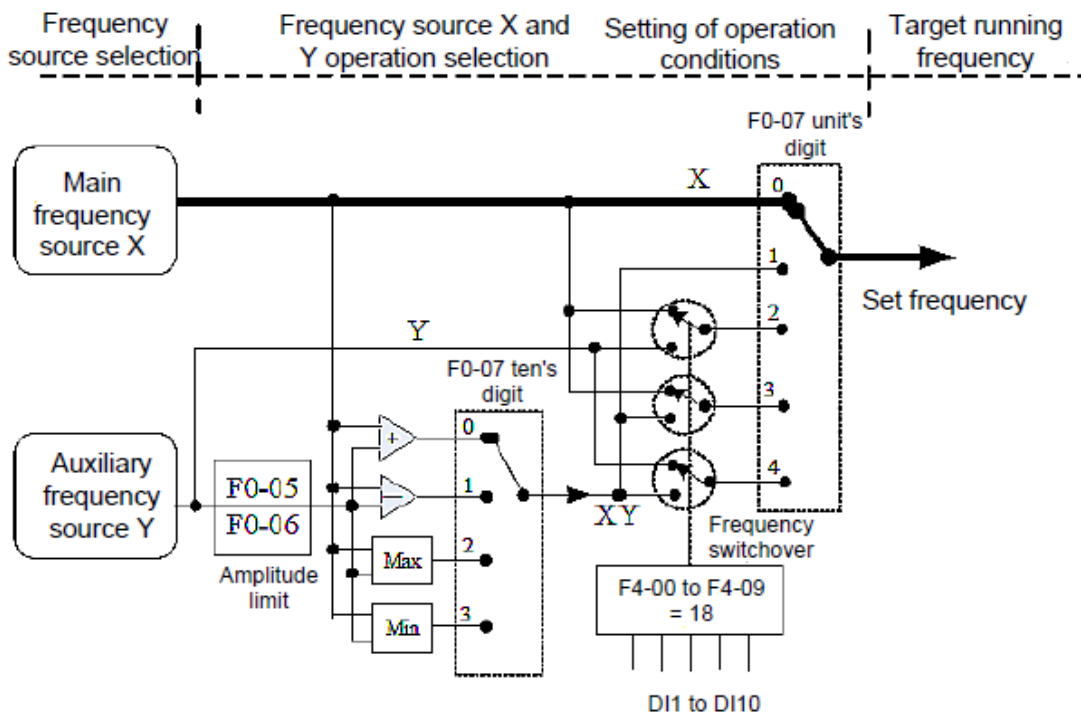
Diagram 5-1 Frequency setting based on main frequency source X and auxiliary frequency source Y

F0-08	Preset frequency	0.00Hz~ maximum frequency(F0-10)	50.00Hz

If the frequency source is digital setting he value of this parameter is the initial frequency of the frequency inverter (digital setting).

F0-09	Rotation direction	0: Forward direction 1: Reverse direction	0

You can change the rotation direction of the motor just by modifying this parameter without changing the motor wiring. Modifying this parameter is equivalent to exchanging any two phase of the motor's U, V, W wires.

Note:

The motor will restore original running direction after parameter initialization. Do not use this function in applications where changing the rotating direction of the motor is prohibited after system commissioning is complete.

F0-10	Maximum frequency	50.00Hz~500.00Hz	50.00Hz

When the frequency source is AI, pulse setting (HDI), or Multi-segment speed, the 100% of input corresponds to the value of this parameter.

F0-11	Frequency upper limit source	0: F0-12 1:AI1 2:AI2 3: Reserved 4: PULSE setting 5: Communication setting	0

It is used to set the source of the frequency upper limit, including digital setting(F0-12)，AI, pulse setting or communication setting.

F0-12	Frequency upper limit	Frequency lower limit(F0-14)~maximum frequency(F0-10)	50.00Hz

Setting Frequency upper limit.

F0-13	Frequency upper limit offset	0.00Hz~maximum frequency(F0-10)	0.00Hz

If the source of the frequency upper limit is analog input, set F0-13 as the offset value,the final frequency upper limit is obtained by adding the offset in this parameter to the frequency upper limit set in F0-11

F0-14	Frequency lower limit	0.00Hz~frequency upper limit (F0-12)	0.00Hz

If the frequency command is lower than the value of this parameter set by F0-14, the frequency inverter can stop, r run at the frequency lower limit, or run at zero speed.The result can be determined byF8-14(setting frequency lower than frequency lower limit running mode).

F0-15	Carrier frequency	0.5kHz~16.0kHz	Model dependent

It is used to adjust the carrier frequency of the Inverter, helping to reduce the motor noise, avoiding the resonance of the mechanical system, and reducing the leakage current to the earth and interference generated by the Inverter.

If the carrier frequency is low, output current has high harmonics, and the power loss and temperature rise of the motor increase.

If the carrier frequency is high, power loss and temperature rise of the motor declines. However, the Inverter has an increase in power loss, temperature rise and interference.

Adjusting the carrier frequency will exert influences on the aspects listed in the following table.

Carrier frequency	Low	High
Motor noise	Large	Small
Output current waveform	Bad	Good
Motor temperature rise	High	Low
Inverter temperature rise	Low	High
Leakage current	Small	Large
External Radiation interference	Small	Large

The factory setting of carrier frequency varies with the Inverter power. If you need to modify the carrier frequency, note that if the set carrier frequency is higher than factory setting, it will lead to an increase in temperature rise of the Inverter's heatsink. In this case, you need to de-rate the Inverter. Otherwise, the Inverter may overheat and alarm.

F0-16	Carrier frequency auto adjusting with temperature	0: No 1: Yes	1

It is used to set whether the carrier frequency is adjusted based on the temperature. The Inverter automatically reduces the carrier frequency when detecting that the heatsink temperature is high. The Inverter resumes the carrier frequency to the set value when the heatsink temperature becomes normal. This function reduces the overheat alarms.

F0-17	Acceleration time 1	0.00s~650.00s(F0-19=2) 0.0s~6500.0s(F0-19=1) 0s~65000s(F0-19=0)	Model dependent
F0-18	Deceleration time 1	0.00s~650.00s(F0-19=2)	Model

| | | 0.0s~6500.0s(F0-19=1) | dependent |
| | | 0s~65000s(F0-19=0) | |

Acceleration time indicates the time required by the frequency inverter to accelerate from 0 Hz to "Acceleration / Deceleration base frequency"(F0-25) that is, t1 in Diagram 5-2.

Deceleration time indicates the time required by the frequency inverter to decelerate from "Acceleration / Deceleration base frequency" (F0-25)，to 0 Hz, that is, t2 in Diagram 5-2.
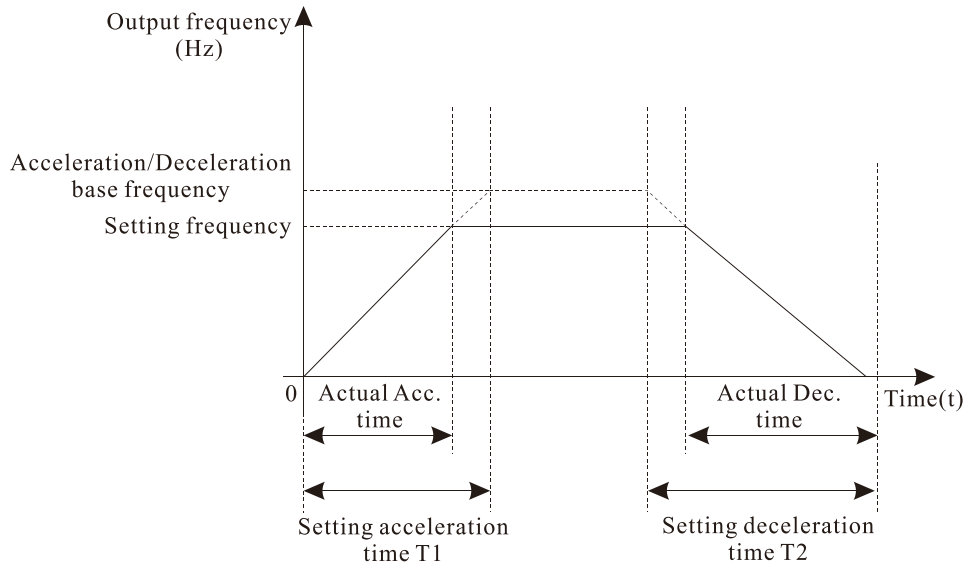

Diagram 5-2   Acceleration/Deceleration time

| F0-19 | Acceleration/Deceleration time unit | 0: 1s
1: 0.1s
2: 0.01s | 1 |

To satisfy requirements of different applications ，the inverter provides three acceleration/ deceleration time units, 1s, 0.1s and 0.01s.

Note: Modifying this parameter will make the decimal places of all frequency-related parameters change and corresponding frequency values change. Pay attention for this in on-site application.

| F0-21 | The offset of auxiliary frequency source when perform superposition | 0.00Hz~Maximum frequency F0-10 | 0.00Hz |

This parameter is valid only when the frequency source is set to "X and Y operation". The final frequency is obtained by adding the frequency offset set in this parameter to the X and Y operation result.

| F0-22 | Frequency resolution | 1:0.1Hz
2:0.01Hz | 2 |

It is used to set the resolution of all frequency-related parameters.

If the resolution is 0.1 Hz, the inverter can output up to 3200 Hz. If the resolution is 0.01 Hz, the inverter can output up to 600.00 Hz.

Note:

• Modifying this parameter will make the decimal places of all frequency-related parameters change and corresponding frequency values change.

• This parameter is not resumed when factory setting is resumed.

| F0-23 | Record of digital setting frequency of power failure | 0: Not record
1: Record | 0 |

This parameter is valid only when the frequency source is digital setting.

If F0-23 is set to 0, the digital setting frequency value restore to the value of F0-08(Preset frequency)after the frequency inverter stops. The modification by using keys ▲ and ▼ or the terminal UP/DOWN function is cleared to zero.

If F0-23 is set to 1, the digital setting frequency value "Reserved"is the set frequency at the moment when the frequency inverter stops. The modification by using keys ▲ and ▼ or the terminal UP/ DOWN function remains is record and valid.

| F0-25 | Acceleration/Deceleration time base frequency | 0: Maximum frequency(F0-10)
1: Set frequenc
2: 100Hz | 0 |

The acceleration/deceleration time indicates the time for the frequency inverter to increase from 0 Hz to the frequency set in F0-25，diagram 6-1 is the acceleration/deceleration time diagram.

If this parameter is set to 1, the acceleration/deceleration time is related to the set frequency. If the set frequency changes frequently, the motor's acceleration/deceleration also changes.

Pay attention for this in on-site application.

| F0-26 | Base frequency for UP/ DOWN modification during running | 0: Running frequency
1: Setting frequency | 0 |

This parameter is valid only when the frequency source is digital setting.

It is used to set the base frequency to be modified by using keys ▲ and ▼ or the terminal UP/DOWN function.If the running frequency and setting frequency are different, there will be a large difference between the frequency inverter's performance during the acceleration/ deceleration process.

| F0-27 | Binding command source to frequency source | Unit's digit: Binding keypad command to following frequency source.
    0: No binding
    1: Frequency source by digital settin
    2: AI1
    3: AI2
    5: Pulse setting
    6: Multi-function
    7: Built-in PLC
    8: PID
    9: Communication setting
Ten's digit: Binding terminal command to frequency source.
Hundred's digit: Binding communication command to frequency source. | 0000 |

It is used to bind the three running command sources with the nine frequency sources, facilitating to implement synchronous switchover.

For details on the frequency sources, see the description of F0-03 (Main frequency source X selection).Different running command sources can be bound to the same frequency source.

If a command source has bound to a frequency source, this frequency source set in ，F0-03~F0-07no longer takes effect when this command source is effective.

F0-28	Serial communication protocol	0: Protocol MODBUS-RTU	0

The use of serial port communication protocol MODBUS.

Group F1: Motor parameters

F1-00	Motor type selection	0: General asynchronous motor 1: Variable frequency asynchronous motor	0
F1-01	Rated motor power	0.1kW~1000.0kW	Model dependent
F1-02	Rated motor voltage	1V~2000V	Model dependent
F1-03	Rated motor current	0.01A~655.35A(Frequency inverter power≤55kW) 0.1A~6553.5A(Frequency inverter power >55kW)	Model dependent
F1-04	Rated motor frequency	0.01Hz~maximum frequency	Model dependent
F1-05	Rated motor speed	1rpm~65535rpm	Model dependent

Set the parameters according to the motor nameplate no matter whether V/F control or vector control is adopted.

To achieve better V/F or vector control performance, motor auto-tuning is required. The motor auto-tuning accuracy depends on the correct setting of motor nameplate parameters.

F1-06	Stator resistance (Asynchronous motor)	Inverter power<= 55KW:0.001Ω~65.535Ω Inverter power> 55KW: 0.0001Ω~6.5535Ω	Auto tuning
F1-07	Rotor resistance (Asynchronous motor)	Inverter power<= 55KW:0.001Ω~65.535Ω Inverter power> 55KW : 0.0001Ω~6.5535Ω	Auto tuning
F1-08	Leakage inductive reactance (Asynchronous motor)	Inverter power<= 55KW:0.01mH~655.35mH Inverter power> 55KW:0.001mH~65.535mH	Auto tuning
F1-09	Mutual inductive reactance (Asynchronous motor)	Inverter power<= 55KW:0.1mH~6553.5mH Inverter power> 55KW:0.01mH~655.35mH	Auto tuning
F1-10	No-load current (Asynchronous motor)	Inverter power<= 55KW: 0.01A~F1-03 Inverter power> 55KW:0.1A~F1-03	Auto tuning

The parameters in F1-06 to F-10 are asynchronous motor parameters. These parameters are unavailable on the motor nameplate and are obtained by means of motor auto-tuning. Only F1-06 to F1-08 can be obtained through static motor auto-tuning. Through complete motor auto-tuning, encoder phase sequence and current loop PI can be obtained besides the parameters in F1-06 to F1-10.

Each time "Rated motor power" (F1-01) or "Rated motor voltage" (F1-02) is changed, the Inverter automatically restores values of F1-06 to F1-10 to the parameter setting for the common standard Y series asynchronous motor.

If it is impossible to perform motor auto-tuning onsite, manually input the values of these parameters according to data provided by the motor manufacturer.

F1-37	Auto tuning mode selection	0: No auto-tuning 1: Asynchronous motor static auto-tuning 2: Asynchronous motor complete auto-tuning	0

0: No auto-tuning

Auto-tuning is prohibited.

1: Asynchronous motor static auto-tuning

It is applicable to scenarios where complete auto-tuning cannot be performed because the asynchronous motor cannot be disconnected from the load.

Before performing static auto-tuning, properly set the motor type and motor nameplate parameters of F1-00 to F1-05 first. The Inverter will obtain parameters of F1-06 to F1-08 by static auto-tuning.

2: Asynchronous motor complete auto-tuning

Group F2: Motor vector control parameters

F2-00	Speed loop proportional gain 1	1~100	10
F2-01	Speed loop integral time 1	0.01s~10.00s	0.20s
F2-02	Switchover frequency 1	0.00~F2-05	5.00Hz
F2-03	Speed loop proportional gain 2	1~100	10
F2-04	Speed loop integral time 2	0.01s~10.00s	0.20s
F2-05	Switchover frequency 2	F2-02~Maximum frequency	10.00Hz

Speed loop PI parameters vary with running frequencies of the Inverter.

- If the running frequency is less than or equal to "Switchover frequency 1" (F2-02), the speed loop PI parameters are F2-00 and F2-01.
- If the running frequency is equal to or greater than "Switchover frequency 2" (F2-05), the speed loop PI parameters are F2-03 and F2-04.
- If the running frequency is between F2-02 and F2-05, the speed loop PI parameters are obtained from the linear switchover between the two groups of PI parameters, as shown in Diagram 5-3.
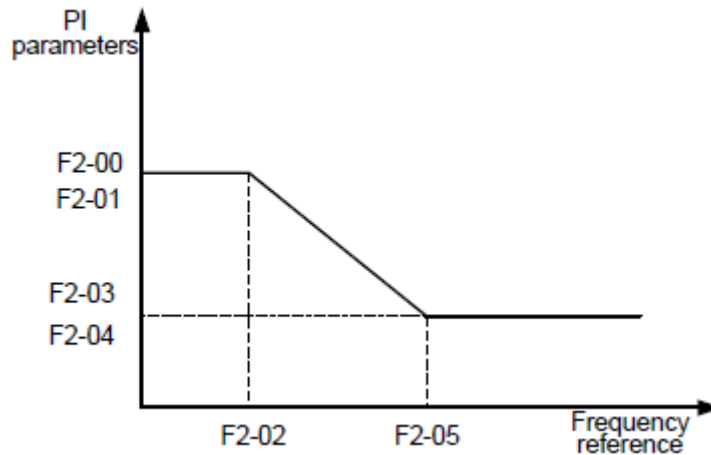
Diagram 5-3 Relationship between running frequencies and PI parameters

The speed dynamic response characteristics in vector control can be adjusted by setting the proportional gain and integral time of the speed regulator.

To achieve a faster system response, increase the proportional gain and reduce the integral time. Be aware that this may lead to system oscillation.

The recommended adjustment method is as follows:

If the factory setting cannot meet the requirements, make proper adjustment. Increase the proportional gain first to ensure that the system does not oscillate, and then reduce the integral time to ensure that the system has quick response and small overshoot.

Note: Improper PI parameter setting may cause too large speed overshoot, and overvoltage fault may even occur when the overshoot drops.

F2-06	Vector control slip gain	50%~200%	100%

For F0-01=1, it is used to adjust speed stability accuracy of the motor. When the motor with load runs at a very low speed, increase the value of this parameter; when the motor with load runs at a very large speed, decrease the value of this parameter.

For F0-01=2, it is used to adjust the output current of the Inverter with same load.

F2-07	Speed loop filter time constant	0.000s~0.100s		0.003s

In the vector control mode, the output of the speed loop regulator is torque current reference. This parameter is used to filter the torque references. It need not be adjusted generally and can be increased in the case of large speed fluctuation. In the case of motor oscillation, decrease the value of this parameter properly.

If the value of this parameter is small, the output torque of the Inverter may fluctuate greatly, but the response is quick.

F2-08	Vector control over excitation gain	0~200	0

During deceleration of the Inverter, over-excitation control can restrain rise of the bus voltage to avoid the overvoltage fault. The larger the over-excitation gain is, the better the restraining effect is.

Increase the over-excitation gain if the Inverter is liable to overvoltage error during deceleration. Too large over-excitation gain, however, may lead to an increase in output current. Therefore, set this parameter to a proper value in actual applications.

Set the over-excitation gain to 0 in applications of small inertia (the bus voltage will not rise during deceleration) or where there is a braking resistor.

F2-09	Torque upper limit source selection in speed control mode	0: Set by F2-10 1: AI1 2: AI2 4: PULSE setting 5: Communication 6: MIN(AI1,AI2) 7: MAX(AI1,AI2) The full range of 1-7 option is correspond to F2-10	0
F2-10	Torque upper limit digital setting in speed control mode	0.0%~200.0%	150.0%

In the speed control mode, the maximum output torque of the Inverter is restricted by F2-09. If the torque upper limit is analog, pulse or communication setting, 100% of the setting corresponds to the value of F2-10, and 100% of the value of F2-10 corresponds to the Inverter rated torque.

For details on the AI1 and AI2 setting, see the description of the AI curves in group F4.

For details on the pulse setting, see the description of F4-28 to F4-32.

When the Inverter is in communication with the master, if F2-09 is set to 5 "communication setting", F2-10 "Digital setting of torque upper limit in speed control mode" can be set via communication from the master.

F2-13	Excitation adjustment proportional gain	0~60000	1000
F2-14	Excitation adjustment integral gain	0~60000	1000
F2-15	Torque adjustment proportional gain	0~60000	1000
F2-16	Torque adjustment integral gain	0~60000	1000

These are current loop PI parameters for vector control. These parameters are automatically obtained through "Asynchronous motor complete auto-tuning" and need not be modified.

The dimension of the current loop integral regulator is integral gain rather than integral time.

Note that too large current loop PI gain may lead to oscillation of the entire control loop.

Therefore, when current oscillation or torque fluctuation is great, manually decrease the proportional gain or integral gain here.

Group F3: V/F control parameters

F3-00	VF curve setting	0: Linear V / F curve 1: Multi-point V / F curve 2: Square V / F curve 3: 1.2 power V / F 4: 1.4 power V / F 6: 1.6 power V/F 8: 1.8 power V/f 10: VF completely separation mode 1 11: VF Semi-separated separation mode 2	0

0: Linear V/F

It is applicable to common constant torque load.

1: Multi-point V/F

It is applicable to special load such as dehydrator and centrifuge. Any such V/F curve can be obtained by setting parameters of F3-03 to F3-08.

2: Square V/F

It is applicable to centrifugal loads such as fan and pump.

3 to 8: V/F curve between linear V/F and square V/F

10: VF completely separation mode 1

In this mode, the output frequency and output voltage of the Inverter are independent.

The output frequency is determined by the frequency source, and the output voltage is determined by "Voltage source for V/F separation" (F3-13).

It is applicable to induction heating, inverse power supply and torque motor control.

11: VF Semi-separated separation mode 2

In this mode, V and F are proportional and the proportional relationship can be set in F3-13. The relationship between V and F are also related to the rated motor voltage and rated motor frequency in Group F1.

Assume that the voltage source input is X (0 to 100%), the relationship between V and F is:

$$V/F = 2 \times X \times (\text{Rated motor voltage})/(\text{Rated motor frequency})$$

F3-01	Torque booster	0.0%:(Automatic torque boost) 0.1%~30.0%	Model dependent
F3-02	Cut-off frequency of torque boost	0.00Hz~Maximum frequency	50.00Hz

To compensate the low frequency torque characteristics of V/F control, you can boost the output voltage of the Inverter at low frequency by modifying F3-01.

If the torque boost is set to too large, the motor may overheat, and the Inverter may suffer overcurrent.

If the load is large and the motor startup torque is insufficient, increase the value of F3-01.

If the load is small, decrease the value of F3-01. If it is set to 0.0, the Inverter performs automatic torque boost. In this case, the Inverter automatically calculates the torque boost value based on motor parameters including the stator resistance.

F3-02 specifies the frequency under which torque boost is valid. Torque boost becomes invalid when this frequency is exceeded, as shown in the following diagram
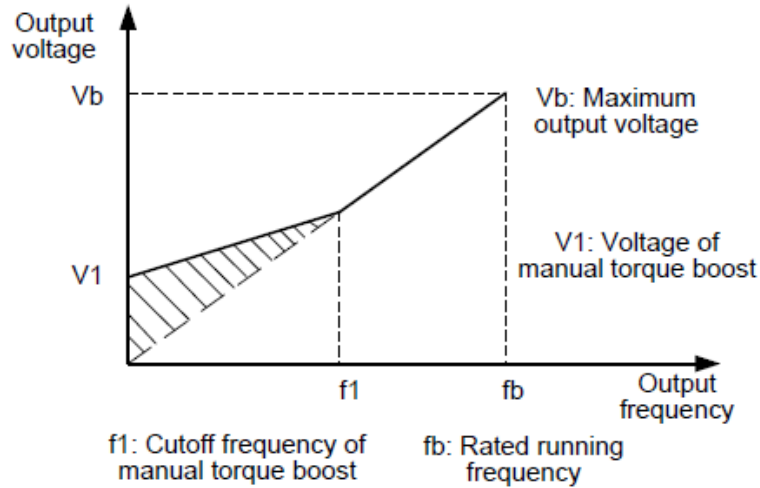
Diagram 5-4 Manual torque boost

F3-03	Multi-point VF frequency point 1	0.00Hz~F3-05	0.00Hz
F3-04	Multi-point VF voltage point 1	0.0%~100.0%	0.0%
F3-05	Multi-point VF frequency point 2	F3-03~F3-07	0.00Hz
F3-06	Multi-point VF voltage point 2	0.0%~100.0%	0.0%
F3-07	Multipoint VF frequency point 3	F3-05~Motor rated frequency(F1-04)	0.00Hz
F3-08	Multi-point VF voltage point 3	0.0%~100.0%	0.0%

These six parameters are used to define the multi-point V/F curve.

The multi-point V/F curve is set based on the motor's load characteristic. The relationship between voltages and frequencies is:

V1 < V2 < V3, F1 < F2 < F3

At low frequency, higher voltage may cause overheat or even burnt out of the motor and overcurrent stall or overcurrent protection of the Inverter.
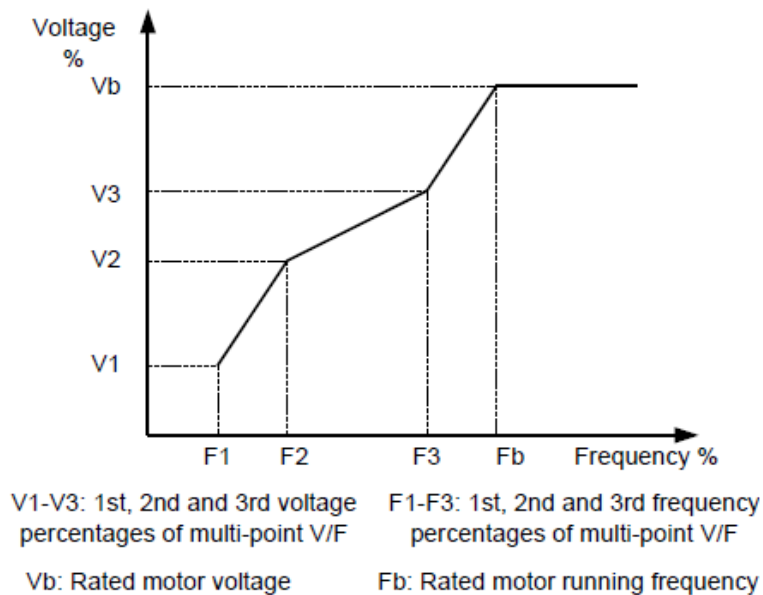
Diagram 6-5 Setting of multi-point V/F curve

F3-09	VF Slip compensation gain coefficient	0.0%~200.0%	100.0%

This parameter is valid only for the asynchronous motor.

It can compensate the rotational speed slip of the asynchronous motor when the load of the motor increases, stabilizing the motor speed in case of load change. If this parameter is set to 100%, it indicates that the compensation when the motor bears rated load is the rated motor slip. The rated motor slip is automatically obtained by the Inverter through calculation based on the rated motor frequency and rated motor rotational speed in group F1.

Generally, if the motor rotational speed is different from the target speed, slightly adjust this parameter.

F3-10	VF over excitation gain	0~500	0

During deceleration of the Inverter, over-excitation can restrain rise of the bus voltage, preventing the overvoltage fault. The larger the over-excitation is, the better the restraining result is.

Increase the over-excitation gain if the Inverter is liable to overvoltage error during deceleration. However, too large over-excitation gain may lead to an increase in the output current. Set F3-09 to a proper value in actual applications.

Set the over-excitation gain to 0 in the applications where the inertia is small and the bus voltage will not rise during motor deceleration or where there is a braking resistor.

F3-11	VF oscillation suppression gain	0~100	50

Set this parameter to a value as small as possible in the prerequisite of efficient oscillation suppression to avoid influence on V/F control.

Set this parameter to 0 if the motor has no oscillation. Increase the value properly only when the motor has obvious oscillation. The larger the value is, the better the oscillation suppression result will be.

When the oscillation suppression function is enabled, the rated motor current and noload current must be correct. Otherwise, the V/F oscillation suppression effect will not be satisfactory.

F3-13	VF separate voltage source	0: Set by digital(F3-14) 1: AI1 2: AI2 4: PULSE setting 5: Multi-function 6: Built-in PLC 7: PID 8: Communication Note: 100.0% corresponds to the motor rated voltage	0
F3-14	VF separate voltage digital setting	0V~Rated motor voltage	0V

V/F separation is generally applicable to scenarios such as induction heating, inverse power supply and motor torque control.

If V/F separated control is enabled, the output voltage can be set in F3-14 or by means of analog, multi-reference, simple PLC, PID or communication. If you set the output voltage by means of non-digital setting, 100% of the setting corresponds to the rated motor voltage. If a negative percentage is set, its absolute value is used as the effective value.

0: Digital setting (F3-14)

The output voltage is set directly in F3-14.

1: AI1

2: AI2

The output voltage is set by AI terminals.

4: Pulse setting

The output voltage is set by pulses of the terminal HDI.

Pulse setting specification: voltage range 9–30 V, frequency range 0–100 kHz

5: Multi-function

If the voltage source is multi-reference, parameters in group F4 and FC must be set to determine the corresponding relationship between setting signal and setting voltage. 100.0% of the multi-reference setting in group FC corresponds to the rated motorvoltage.

6: Built-in PLC

If the voltage source is simple PLC mode, parameters in group FC must be set to determine the setting output voltage.

7: PID

The output voltage is generated based on PID closed loop. For details, see the description of PID in group FA.

8: Communication setting

The output voltage is set by the host computer by means of communication.

The voltage source for V/F separation is set in the same way as the frequency source. For details, see F0-03. 100.0% of the setting in each mode corresponds to the rated motor voltage. If the corresponding value is negative, its absolute value is used.

Group F4: Input terminals

The inverter provides six digital input (DI) terminals (HDI can be used for high-speed pulse input) and two analog input (AI) terminals.

F4-00	DI1 function selection	1: Forward RUN (FWD)	Standard
F4-01	DI2 function selection	9	Standard
F4-02	DI3 function selection	53	Standard
F4-03	DI4 function selection	51	Standard
F4-04	HDI function selection	52	Standard
F4-05	DI5 function selection	2	Standard

The following table lists the functions available for the DI terminals.

Value	Function	Description
0	No function	Set 0 for reserved terminals to avoid malfunction.
1	Forward RUN (FWD) or running command	The terminal is used to control forward or reverse running of the frequency inverter.
2	Reverse RUN (REV) or the direction of FED/REV	
3	3 line control mode	The terminal determines three-line control of the Inverter. For details, see the description of F4-11.
4	Forward JOG (FJOG)	FJOG for the JOG forward running, RJOG for the JOG reverse running.
5	Reverse JOG (RJOG)	
6	Terminal UP	If the frequency is determined by external terminals, the terminals with the two functions are used as increment and decrement commands for frequency modification.
7	Terminal DOWN	

Value	Function	Description
		When the frequency source is digital setting, they are used to adjust the frequency.
8	Free stop	The Inverter blocks its output, the motor coasts to rest and is not controlled by the Inverter. It is the same as free stop described in F6-10.
9	Fault reset (RESET)	The terminal is used for fault reset function, the same as the function of RESET key on the operation panel. Remote fault reset is implemented by this function.
10	RUN pause	The Inverter decelerates to stop, but the running parameters are all memorized, such as PLC, swing frequency and PID parameters. After this function is disabled, the Inverter resumes its status before stop.
11	Normally open (NO) input of external fault	If this terminal becomes ON, the Inverter reports Err15 and performs the fault protection action. For more details, see the description of F9-47.
12	Multiple step terminals 1	The setting of 16 speeds or 16 other references can be implemented through combinations of 16 states of these four terminals.
13	Multiple step terminals 2	
14	Multiple step terminals 3	
15	Multiple step terminals 4	
16	Acceleration/ deceleration selection terminals 1	Totally four groups of acceleration/deceleration time can be selected through combinations of two states of these two terminals.
17	Acceleration/ deceleration selection terminals 2	
18	Frequency source switch	The terminal is used to perform switchover between two frequency sources according to the setting in F0-07.
19	UP/DOWN setting reset (terminals or keypad)	If the frequency source is digital setting, the terminal is used to clear the modification by using the UP/DOWN function or the increment/decrement key on the operation panel, returning the set frequency to the value of F0-08.
20	Running command terminals switch	If the command source is set to terminal control (F0-02= 1), this terminal is used to perform switchover between terminal control and operation panel control. If the command source is set to communication control (F0-02 = 2), this terminal is used to perform switchover between communication control and operation panel control.
21	Acceleration/deceleration forbidden	It enables the Inverter to maintain the current frequency output without being affected by external signals (except the STOP command).
22	PID pause	PID is invalid temporarily. The Inverter maintains the current frequency output without supporting PID adjustment of frequency source.
23	PLC status reset	The terminal is used to restore the original status of PLC control for the Inverter when PLC control is started again after a pause.
29	Torque control forbidden	The Inverter is prohibited from torque control and enters the speed control mode.
32	Starting DC braking	After this terminal becomes ON, the Inverter directly switches over to the DC braking state.
33	Normally closed (NC) input of external fault	After this terminal becomes ON, the Inverter reports Err15 and stops.
34	Frequency change enable	After this terminal becomes ON, the Inverter does not respond to any frequency modification.
35	Change PID direction	After this terminal becomes ON, the PID action direction is reversed to the direction set in FA-03.
36	External STOP terminal 1	In operation panel mode, this terminal can be used to stop the Inverter, equivalent to the function of the STOP key on the operation panel

Value	Function	Description
37	Control commands switchover terminal 2	It is used to perform switchover between terminal control and communication control. If the command source is terminal control, the system will switch over to communication control after this terminal becomes ON.
38	PID integral pause	After this terminal becomes ON, the integral adjustment function pauses. However, the proportional and differentiation adjustment functions are still valid.
39	Switcover between frequency source X and preset frequency	After this terminal becomes ON, the frequency source X is replaced by the preset frequency set in F0-08.
40	Switcover between frequency source Y and preset frequency	After this terminal is enabled, the frequency source Y is replaced by the preset frequency set in F0-08.
43	PID paramater switchover	If the PID parameters switchover performed by means of DI terminal (FA-18 = 1), the PID parameters are FA-05 to FA-07 when the terminal becomes OFF; the PID parameters are FA-15 to FA-17 when this terminal becomes ON.
44	User-defined fault 1	If these two terminals become ON, the Inverter reports Err27 and Err28 respectively, and performs fault protection actions based on the setting in F9-49.
45	User-defined fault 2	
46	Speed control /Torque control swithover	This terminal enables the Inverter to switch over between speed control and torque control. When this terminal becomes OFF, the Inverter runs in the mode set in A0-00. When this terminal becomes ON, the Inverter switches over to the other control mode.
47	Emergency stop	When this terminal becomes ON, the Inverter stops within the shortest time. During the stop process, the current remains at the set current upper limit. This function is used to satisfy the requirement of stopping the Inverter in emergency state.
48	External STOP terminal 2	In any control mode (operation panel, terminal or communication), it can be used to make the Inverter decelerate to stop. In this case, the deceleration time is deceleration time 4
49	DC braking in deceleration	When this terminal becomes ON, the Inverter decelerates to the initial frequency of stop DC braking and then switches over to DC braking state.
50	Clear the current running time	When this terminal becomes ON, the Inverter's current running time is cleared. This function must be supported by F8-42 and F8-53.
51	Full-water detection 1	Two probes any access, from the water-full position to maintain a certain height difference in the installation
52	Full-water detection 2	
53	MPPT stop/ Photovoltaic control stop	Into the common speed mode

The four multi-reference terminals have 16 state combinations, corresponding to 16 reference values, as listed in the following table:

K4	K3	K2	K1	Reference Setting	Corresponding Parameter
OFF	OFF	OFF	OFF	Reference 0	FC-00
OFF	OFF	OFF	ON	Reference 1	FC-01
OFF	OFF	ON	OFF	Reference 2	FC-02
OFF	OFF	ON	ON	Reference 3	FC-03
OFF	ON	OFF	OFF	Reference 4	FC-04
OFF	ON	OFF	ON	Reference 5	FC-05
OFF	ON	ON	OFF	Reference 6	FC-06
OFF	ON	ON	ON	Reference 7	FC-07
ON	OFF	OFF	OFF	Reference 8	FC-08
ON	OFF	OFF	ON	Reference 9	FC-09
ON	OFF	ON	OFF	Reference 10	FC-10
ON	OFF	ON	ON	Reference 11	FC-11
ON	ON	OFF	OFF	Reference 12	FC-12
ON	ON	OFF	ON	Reference 13	FC-13

K4	K3	K2	K1	Reference Setting	Corresponding Parameter
ON	ON	ON	OFF	Reference 14	FC-14
ON	ON	ON	ON	Reference 15	FC-15

If the frequency source is multi-reference, the value 100% of FC-00 to FC-15 corresponds to the value of F0-10 (Maximum frequency).

Besides the multi-speed function, the multi-reference can be also used as the PID setting source or the voltage source for V/F separation, satisfying the requirement on switchover of different setting values.

Two terminals for acceleration/deceleration time selection have four state combinations, as listed in the following table:

Terminal 2	Terminal 1	Acceleration/Deceleration Time	Corresponding
OFF	OFF	Acceleration/Deceleration time 1	F0-17, F0-18
OFF	ON	Acceleration/Deceleration time 2	F8-03, F8-04
ON	OFF	Acceleration/Deceleration time 3	F8-05, F8-06
ON	ON	Acceleration/Deceleration time 4	F8-07, F8-08

F4-10	DI filter time	0.000s~1.000s	0.010s

It is used to set the software filter time of DI terminal status. If DI terminals are liable to interference and may cause malfunction, increase the value of this parameter to enhance the anti-interference capability. However, increase of DI filter time will reduce the response of DI terminals.

F4-11	Terminals command mode	0: Two line control 1 1: Two line control 2 2: Three line control 1 3: Three line control 2	0

This parameter is used to set the mode in which the Inverter is controlled by external terminals. The following uses DI1, DI2 and DI3 among DI1 to DI6 as an example, with allocating functions of DI1, DI2 and DI3 by setting F4-00 to F4-02.

0: Two line control 1

It is the most commonly used two-line mode, in which the forward/reverse rotation of the motor is decided by DI1 and DI2. The parameters are set as below:

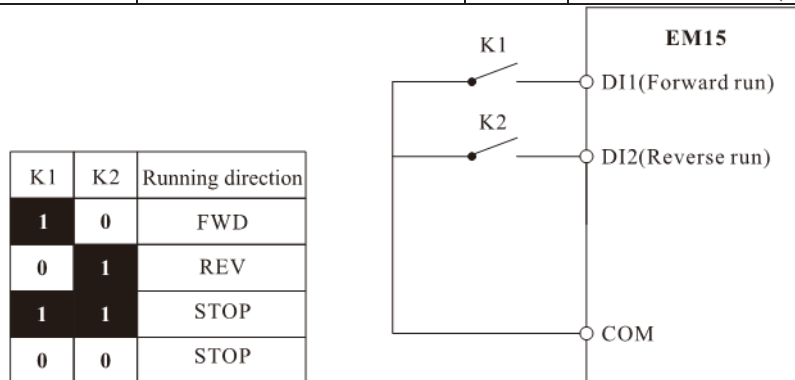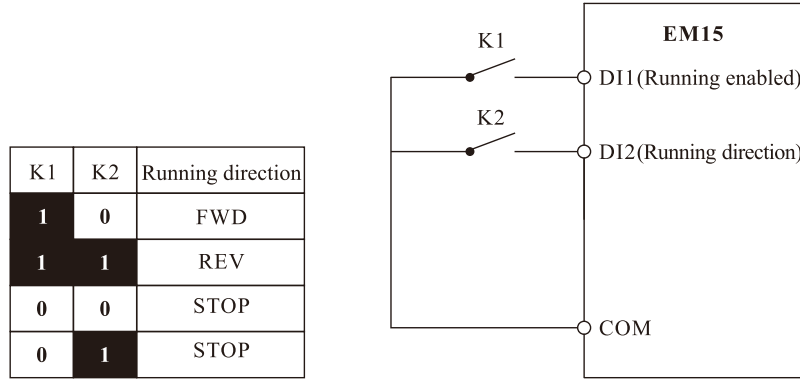| Code	Name	Value	Function Description
F4-11	Terminal command mode	0	Two-line 1
F4-00	DI1 function selection	1	Forward RUN (FWD)
F4-01	DI2 function selection	2	Reverse RUN (REV)

Diagram 5-6 Setting of two-line mode 1

As shown in the preceding diagram, when only K1 is ON, the Inverter instructs forward rotation. When only K2 is ON, the Inverter instructs reverse rotation. When K1 and K2 are ON or OFF simultaneously, the Inverter stops.

1: Two line control 2

In this mode, DI1 is RUN enabled terminal, and DI2 determines the running direction. The parameters are set as below:

Code	Name	Value	Function Description
b3-13	Terminal command mode	1	Two-line 2
b3-00	DI1 function selection	1	RUN enabled
b3-01	DI2 function selection	2	Forward or reverse

K1	K2	Running direction
1	**0**	FWD
1	**1**	REV
0	0	STOP
0	**1**	STOP

Diagram 5-7 Setting of two-line mode 2

As shown in the preceding diagram, if K1 is ON, the Inverter instructs forward rotation when K2 is OFF, and instructs reverse rotation when K2 is ON. If K1 is OFF, the Inverter stops.

2: Three line control 1

In this mode, DI3 is RUN enabled terminal, and the direction is decided by DI1 and DI2. The parameters are set as below:

Code	Name	Value	Function Description
F4-11	Terminal command mode	2	Three-line 1
F4-00	DI1 function selection	1	Forward RUN (FWD)
F4-01	DI2 function selection	2	Reverse RUN (REV)
F4-02	DI3 function selection	3	Three-line control
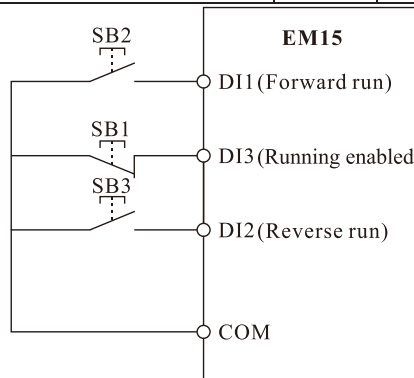
Diagram 5-8 Setting of 3 line mode 1

As shown in the preceding diagram, if SB1 is ON, the Inverter instructs forward rotation when SB2 is pressed to be ON and instructs reverse rotation when SB3 is pressed to be ON. The Inverter stops immediately after SB1 becomes OFF. During normal startup and running, SB1 must remain ON. The Inverter's running state is determined by the final actions on SB1, SB2 and SB3.

3: Three line control 2

In this mode, DI3 is RUN enabled terminal. The RUN command is given by DI1 and the direction is decided by DI2. The parameters are set as below:

Code	Name	Value	Function Description

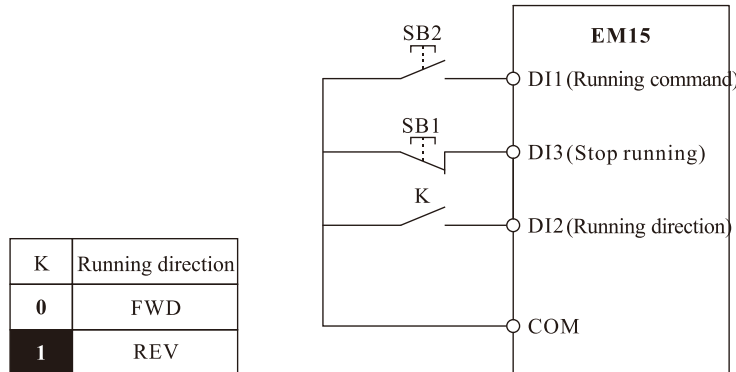| F4-11	Terminal command mode	3	Three-line 2
F4-00	DI1 function selection	1	RUN enabled
F4-01	DI2 function selection	2	Forward or reverse
F4-02	DI3 function selection	3	Three-line control

Diagram 5-9 Setting of 3 line mode 2

As shown in the preceding diagram, if SB1 is ON, the Inverter starts running when SB2 is pressed to be ON; the Inverter instructs forward rotation when K is OFF and instructs reverse rotation when K is ON. The Inverter stops immediately after SB1 becomes OFF. During normal startup and running, SB1 must remain ON. The Inverter's running state is determined by the final actions of SB1, SB2 and K.

F4-12	Terminals UP/DOWN Change ratio	0.001Hz/s~65.535Hz/s	1.00Hz/s

It is used to adjust the rate of change of frequency when the frequency is adjusted by means of terminal UP/DOWN.

If F0-22 (Frequency reference resolution) is 2, the setting range is 0.001–65.535 Hz/s.

If F0-22 (Frequency reference resolution) is 1, the setting range is 0.01–655.35 Hz/s.

F4-13	AI curve 1 minimum input	0.00V ~ F4-15	0.00V
F4-14	AI curve 1 minimum input corresponding setting	-100.00% ~ 100.0%	0.0%
F4-15	AI curve 1 Max. input	F4-13 ~ 10.00V	10.00V
F4-16	AI curve 1 Max input corresponding setting	-100.00% ~ 100.0%	100.0%
F4-17	AI1 filter time	0.00s ~ 10.00s	0.10s

These parameters are used to define the relationship between the analog input voltage and the corresponding setting value.

When analog input voltage is larger than setting" Max. input" (F4-15), Analog voltage should be calculated as " Max. input". The same, When analog input voltage is smaller than setting" Min. input" (F4-13), Analog voltage should be calculated as " Min. input" F4-34.

When the analog input is current input, 1 mA current corresponds to 0.5 Volts.

 (AI1 filter time) is used to set the software filter time of AI1. If the analog input is liable to interference, increase the value of this parameter to stabilize the detected analog input. However, increase of the AI filter time will slow down the response of analog detection. Set this parameter properly based on actual conditions.

In different applications, 100% of analog input corresponds to different nominal values. For details, refer to the description of different applications.
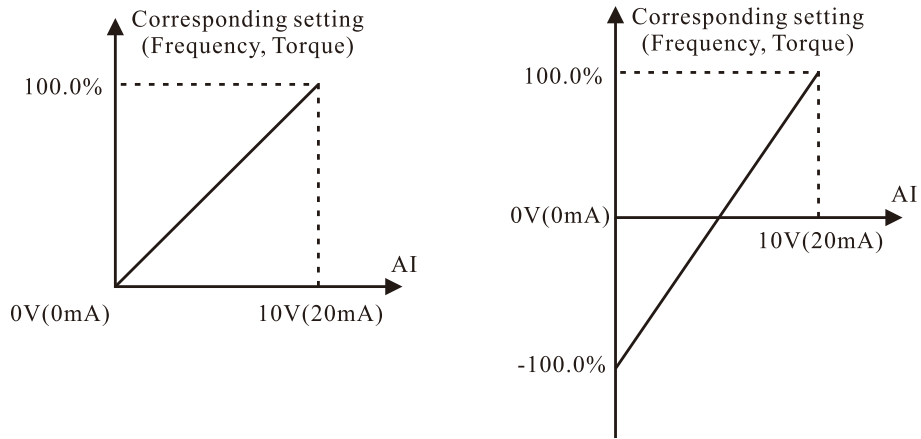
Following tables for reference:

Diagram 5-10 The relationship between analog given and setting value

F4-18	AI curve 2 minimum input	0.00V~F4-20	0.00V
F4-19	AI curve 2 minimum input corresponding setting	-100.0%~+100.0%	0.0%
F4-20	AI curve 2 maximum input	F4-18~+10.00V	10.00V
F4-21	AI curve 2 maximum input corresponding setting	-100.0%~+100.0%	100.0%
F4-22	AI2 filter time	0.00s~10.00s	0.10s

The method of setting AI2 functions is similar to that of setting AI1 function.

F4-28	PULSE minimum input	0.00kHz~F4-30	0.00kHz
F4-29	PULSE minimum input corresponding setting	-100.0%~100.0%	0.0%
F4-30	PULSE maximum input	F4-28~100.00kHz	50.00kHz
F4-31	PULSE maximum input corresponding setting	-100.0%~100.0%	100.0%
F4-32	PULSE filter time	0.00s~10.00s	0.10s

These parameters are used to set the relationship between HDI pulse input and corresponding settings. The pulses can only be input by HDI. The method of setting this function is similar to that of setting AI1 function.

F4-33	AI Curve selection	Units' digit:AI1 curve selection 1: Curve 1(2 point, see F4-13~F4-16) 2: Curve 2(2 point, see F4-18~F4-21) 3: Curve 3 (2 point, see F4-23~F4-26) 4: Curve 4(4 point, seeA6-00~A6-07) 5: Curve 5(4 point, see A6-08~A6-15) Ten's digit:AI2 curve selection，as above Hundred's digit: Curve set by potentiometer of keypad, as above	321

The unit's digit, ten's digit and hundred's digit of this parameter are respectively used to select the corresponding curve of AI1, AI2.

Any of the five curves can be selected for AI1, AI2.

Curve 1, curve 2 and curve 3 are all 2-point curves, set in group F4. Curve 4 and curve 5 are both 4-point curves, set in group A6.

F4-34	AI less than minimum input selection	Units' digit: AI1 is less than minimum input Set selection 0: Corresponds to the minimum input setting 1: 0.0% Ten's digit: AI2 is less than minimum input Set selection, as above Hundred's digit: Potentiometer less than Min. Input selection, as above	000

This parameter is used to determine the corresponding setting when the analog input voltage is less than the minimum value. The unit's digit, ten's digit and hundred's digit of this parameter respectively correspond to the setting for AI1 and AI2.

If the value of a certain digit is 0, when analog input voltage is less than the minimum input, the corresponding setting of the minimum input (F4-14, F4-19) is used.

If the value of a certain digit is 1, when analog input voltage is less than the minimum input, the corresponding value of this analog input is 0.0%.

F4-35	DI1 delay time	0.0s ~ 3600.0s	0.0s
F4-36	DI2 delay time	0.0s ~ 3600.0s	0.0s
F4-37	DI3 delay time	0.0s ~ 3600.0s	0.0s

For setting DI changing status, Inverter's delay for this actives.

Only DI1、DI2、DI3 has delay time functions

F4-38	DI valid mode selection 1	0: High level valid 1: Low level valid Digits: DI1 Ten's: DI2 Hundred's: DI3 Thousand's: DI4 Ten thousand's: DI5	00000
F4-39	DI valid mode selection 2	0: High level valid 1: Low level valid Digits: DI6 Ten's: DI7 Hundred's: DI8 Thousand's: DI9 Ten thousand's: DI10	00000

These parameters are used to set the valid mode of DI terminals.

0: High level valid

The DI terminal is valid when being connected with COM, and invalid when being disconnected from COM.

1: Low level valid

The DI terminal is invalid when being connected with COM, and invalid when being disconnected from COM.

Group F5: Output terminals

F5-00	FMP terminals output mode selection	0: High speed pulse output 1: Digital output	0

The FMP terminal is programmable multiplexing terminal. It can be used for high-speed pulse output, with maximum frequency of 50kHz. Refer to F5-06 for relevant functions of FMP. It can also be used as open collector switch signal output.

F5-01	FMR output function selection	No output	0
F5-02	Relay 2 function selection	Fault output (Free stop fault)	2
F5-04	Relay 1 function selection	Frequency inverter running	1

These five parameters are used to select the functions of the five digital output terminals.

T/A-T/B-T/C and P/A-P/B-P/C are respectively the relays on the control board.

Value	Function	Description
0	No output	The terminal has no function.
1	Frequency inverter running	When the Inverter is running and has output frequency (can be zero), the terminal becomes ON.
2	Fault output (Free stop fault)	When the Inverter stops due to a fault, the terminal becomes ON.
3	FDT1 Frequency level detect output	Refer to the descriptions of F8-19 and F8-20.
4	Frequency reach	Refer to the descriptions of F8-21.
5	Zero speed running (No output when stop)	If the Inverter runs with the output frequency of 0, the terminal becomes ON. If the Inverter is in the stop state, the terminal becomes OFF.
6	Motor overload pre-alarm	The Inverter judges whether the motor load exceeds the overload pre-warning threshold before performing the protection action. If the pre-warning threshold is exceeded, the terminal becomes ON. For motor overload parameters, see the descriptions of F9-00 to F9-02.
7	Inverter overload pre-alarm	The terminal becomes ON 10s before the Inverter overload protection action is performed.
11	PLC cycle complete	When simple PLC completes one cycle, the terminal outputs a pulse signal with width of 250 ms.
12	Cumulative run time reached	If the accumulative running time of the Inverter exceeds the time set in F8-17, the terminal becomes ON.
13	Frequency limit	If the set frequency exceeds the frequency upper limit or lower limit and the output frequency of the Inverter reaches the upper limit or lower limit, the terminal becomes ON.
14	Torque limit	In speed control mode, if the output torque reaches the torque limit, the Inverter enters the stall protection state and meanwhile the terminal becomes ON.
15	Ready to run	If the Inverter main circuit and control circuit become stable, and the Inverter detects no fault and is ready for RUN, the terminal becomes ON.
16	AI1>AI2	When the input of AI1 is larger than the input of AI2, the terminal becomes ON.
17	Frequency upper limit reached	If the running frequency reaches the upper limit, the terminal becomes ON.
18	Frequency lower limit reached (No output at stop)	If the running frequency reaches the lower limit, the terminal becomes ON. In the stop state, the terminal becomes OFF.
19	Under voltage status output	If the Inverter is in undervoltage state, the terminal becomes ON.
20	Communication setting	Refer to the communication protocol.
23	Zero speed running 2(Having output at stop)	If the output frequency of the Inverter is 0, the terminal becomes ON. In the state of stop, the signal is still ON.
24	Accumulated power up time reached	If the Inverter accumulative power-on time (F7-13) exceeds the value set in F8-16, the terminal becomes ON.
25	Frequency level detection FDT2 output	Refer to the descriptions of F8-28 and F8-29.
26	Frequency 1 reached	Refer to the descriptions of F8-30 and F8-31.
27	Frequency 2 reached	Refer to the descriptions of F8-32 and F8-33.
28	Current 1 reached	Refer to the descriptions of F8-38 and F8-39

Value	Function	Description
29	Current 2 reached	Refer to the descriptions of F8-40 and F8-41.
30	Timing reached	If the timing function (F8-42) is valid, the terminal becomes ON after the current running time of the Inverter reaches the set time.
31	AI1 input limit exceeded	If AI1 input is larger than the value of F8-46 (AI1 input voltage upper limit) or lower than the value of F8-45 (AI1 input voltage lower limit), the terminal becomes ON.
32	Load becoming 0	If the load becomes 0, the terminal becomes ON.
33	Reverse running	If the Inverter is in the reverse running state, the terminal becomes ON.
34	Zero current state	Refer to the descriptions of F8-28 and F8-29.
35	IGBT temperature reached	If the heatsink temperature of the Inverter IGBT (F7-07) reaches the set IGBT temperature threshold (F8-47), the terminal becomes ON.
36	Output current is exceeded	Refer to the descriptions of F8-36 and F8-37.
37	Lower frequency reached(Having output at stop)	If the running frequency reaches the lower limit, the terminal becomes ON. In the stop state, the signal is still ON.
38	Alarm output (all faults)	If a fault occurs on the Inverter and the Inverter continues to run, the terminal outputs the alarm signal.
39	Motor overtemperature warning	If the motor temperature reaches the temperature set in F9-58 (Motor overheat warning threshold), the terminal becomes ON. You can view the motor temperature by using U0-34.
40	Current running time reached	If the current running time of Inverter exceeds the value of F8-53, the terminal becomes ON.

F5-06	FMP output function selection	Running frequency	0
F5-07	AO1 output function selection	Running frequency	0
F5-08	AO2 output function selection	Setting frequency	1

Value	Function	Description
0	Running frequency	0 ~ maximum output frequency
1	Set frequency	0 ~ maximum output frequency
2	Output current	0 ~200% rated motor current
3	Output torque (Absolute value)	0 ~200% rated motor torque
4	Output power	0 ~200% rated power
5	Output voltage	0 ~ 120% rated voltage
6	Pulse input (100% corresponds to 100.0Hz)	0.01~100.00 kHz
7	AI1	0~10 V
8	AI2	0~10 V (or 0–20 mA)
9	Revered	-
10	Revered	-
11	Revered	-
12	Communication settings	0.0%~100.0%
13	Motor rotational speed	0 ~ rotational speed corresponding to maximum output frequency
14	Output current (100.0% corresponds to 1000.0A)	0.0~1000.0 A
15	Output voltage (100.0% corresponds to 1000.0V)	0.0~000.0 V
16	Output torque (Actual value)	-200% ~ 200% rated motor torque

F5-09	Maximum FMP output frequency	0.01kHz~100.00kHz	50.00k Hz
F5-10	AO1 zero bias coefficient	-100.0%~+100.0%	0.0%
F5-11	AO1 gain	-10.00~+10.00	1.00
F5-12	AO2 zero bias	-100.0%~+100.0%	0.0%
F5-13	AO2 gain	-10.00~+10.00	1.00

These parameters are used to correct the zero drift of analog output and the output amplitude deviation. They can also be used to define the desired AO curve.

If "b" represents zero offset, "k" represents gain, "Y" represents actual output, and "X" represents standard output, the actual output is: $Y = kX + b$.

The zero offset coefficient 100% of AO1 and AO2 corresponds to 10 V (or 20 mA). The standard output refers to the value corresponding to the analog output of 0 to 10 V (or 0 to 20 mA) with no zero offset or gain adjustment. For example, if the analog output is used as the running frequency, and it is expected that the output is 8 V when the frequency is 0 and 3 V at the maximum frequency, the gain shall be set to -0.50, and the zero offset shall be set to 80%.

F5-17	FMR output relay time	0.0s~3600.0s	0.0s
F5-18	Relay 1 output relay time	0.0s~3600.0s	0.0s
F5-19	Relay 2 output relay time	0.0s~3600.0s	0.0s
F5-20	DO1 output relay time	0.0s~3600.0s	0.0s

These parameters are used to set the delay time of output terminals FMR, relay 1, relay 2 and DO1 from status change to actual output.

F5-22	DO logic selection	0: Positive logic 1: Negative logic Bits: FMR Ten's bit: RELAY1 Hundreds's bit: RELAY2 Thousands's bits: DO1 Ten thousands's bit;s: Reserved	00000

It is used to set the logic of output terminals FMR, relay 1, relay 2, DO1 and DO2.

0: Positive logic

The output terminal is valid when being connected with COM, and invalid when being disconnected from COM.

1: Positive logic

The output terminal is invalid when being connected with COM, and valid when being disconnected from COM.

Group F6: Start and stop control

F6-00	Starting mode	0: Directly start 1: Rotational speed tracking restart 2: Pre-excitation start (Asynchronous machine)-	0

0: Direct start

If the DC braking time is set to 0, the Inverter starts to run at the startup frequency.

If the DC braking time is not 0, the Inverter performs DC braking first and then starts to run at the startup frequency. It is applicable to small-inertia load application where the motor is likely to rotate at startup.

1: Rotational speed tracking restart

The Inverter judges the rotational speed and direction of the motor first and then starts at the tracked frequency.

Such smooth start has no impact on the rotating motor. It is applicable to the restart upon instantaneous power failure of large-inertia load. To ensure the performance of rotational speed tracking restart, set the motor parameters in group F1 correctly.

2: Pre-excitation start (AC asynchronous machine)

It is valid only for asynchronous motor and used for building the magnetic field before the motor runs. For pre-excited current and pre-excited time, see parameters of F6-05 and F6-06.

If the pre-excited time is 0, the Inverter cancels pre-excitation and starts to run at startup frequency.

If the pre-excited time is not 0, the Inverter pre-excites first before startup, improving the dynamic response of the motor.

F6-01	Rotational speed tracking mode	0: Starts from stop frequency 1: Starts from zero speed 2: Starting from maximum frequency	0

To complete the rotational speed tracking process within the shortest time, select the proper mode in which the Inverter tracks the motor rotational speed.

0: Starts from stop frequency

It is the commonly selected mode.

1: Starts from zero speed

It is applicable to restart after a long time of power failure.

2: Starting from the maximum frequency

It is applicable to the power-generating load.

F6-02	Rotational speed tracking ratio	1~100	20

In the rotational speed tracking restart mode, select the rotational speed tracking speed. The larger the value is, the faster the tracking is. However, too large value may cause unreliable tracking.

F6-03	Startup speed	0.00Hz~10.00Hz	0.00Hz
F6-04	Startup speed holding time	0.0s~100.0s	0.0s

To ensure the motor torque at Inverter startup, set a proper startup frequency. In addition, to build excitation when the motor starts up, the startup frequency must be held for a certain period.

The startup frequency (F6-03) is not restricted by the frequency lower limit. If the set target frequency is lower than the startup frequency, the Inverter will not start and stays in the standby state.

During switchover between forward rotation and reverse rotation, the startup frequency holding time is disabled. The holding time is not included in the acceleration time but in the running time of simple PLC.

Example 1:

F0-03=0	The frequency source is digital setting.
F0-08=2.00Hz	The digital setting frequency is 2.00 Hz.
F6-03=5.00Hz	The startup frequency is 5.00 Hz.
F6-04=2.0s	The startup frequency holding time is 2.0s.

In this example, the Inverter stays in the standby state and the output frequency is 0.00 Hz.

Example 1:

F0-03=0	The frequency source is digital setting.
F0-08=10.00Hz	The digital setting frequency is 10.00 Hz.

| F6-03=5.00Hz | The startup frequency is 5.00 Hz. |
| F6-04=2.0s | The startup frequency holding time is 2.0s. |

In this example, the Inverter accelerates to 5.00 Hz, and then accelerates to the set frequency 10.00 Hz after 2s.

| F6-05 | Startup DC braking current / pre-excited current | 0%~100% | 0% |
| F6-06 | Startup DC braking time / pre-excited time | 0.0s~100.0s | 0.0s |

Startup DC braking is generally used during restart of the Inverter after the rotating motor stops. Pre-excitation is used to make the Inverter build magnetic field for the asynchronous motor before startup to improve the responsiveness.

Startup DC braking is valid only for direct start (F6-00 = 0). In this case, the Inverter performs DC braking at the set startup DC braking current. After the startup DC braking time, the Inverter starts to run. If the startup DC braking time is 0, the Inverter starts directly without DC braking. The larger the startup DC braking current is, the larger the braking force is.

If the startup mode is pre-excited start (F6-00 = 3), the Inverter builds magnetic field based on the set pre-excited current. After the pre-excited time, the Inverter starts to run. If the pre-excited time is 0, the Inverter starts directly without pre-excitation.

The startup DC braking current or pre-excited current is a percentage relative to the base value.

If the rated motor current is less than or equal to 80% of the rated Inverter current, the base value is the rated motor current.

If the rated motor current is greater than 80% of the rated Inverter current, the base value is 80% of the rated Inverter current.

| F6-07 | Acceleration and deceleration mode | 0: Linear acceleration / deceleration
1: S curve acceleration / deceleration A
2: S curve acceleration and deceleration B | 0 |

It is used to set the frequency change mode during the Inverter start and stop process.

0: Linear acceleration/deceleration

The output frequency increases or decreases in linear mode. The INVERTER provides four group of acceleration/deceleration time, which can be selected by using F4-00 to F4-08.

1: S-curve acceleration/deceleration A

The output frequency increases or decreases along the S curve. This mode is generally used in the applications where start and stop processes are relatively smooth, such as elevator and conveyor belt. F6-08 and F6-09 respectively define the time proportions of the start segment and the end segment.

2: S-curve acceleration/deceleration B

In this curve, the rated motor frequency f_b is always the inflexion point. This mode is usually used in applications where acceleration/deceleration is required at the speed higher than the rated frequency.

When the set frequency is higher than the rated frequency, the acceleration/deceleration time is:

$$t = (\frac{4}{9} \times \left(\frac{f}{f_b}\right)^2 + \frac{5}{9}) \times T$$

In the formula, f is the set frequency, f_b is the rated motor frequency and T is the acceleration time from 0 Hz to f_b.

| F6-08 | Time proportion of S-curve start segment | 0.0%~(100.0%-F6-09) | 30.0% |

F6-09	Time proportion of S-curve end segment	0.0%~(100.0%-F6-08)	30.0%

These two parameters respectively define the time proportions of the start segment and the end segment of S-curve acceleration/deceleration. They must satisfy the requirement: F6-08 + F6-09 ⩽ 100.0%.

In Diagram 5-11, t1 is the time defined in F6-08, within which the slope of the output frequency change increases gradually. t2 is the time defined in F6-09, within which the slope of the output frequency change gradually decreases to 0. Within the time between t1 and t2, the slope of the output frequency change remains unchanged, that is, linear acceleration/deceleration.
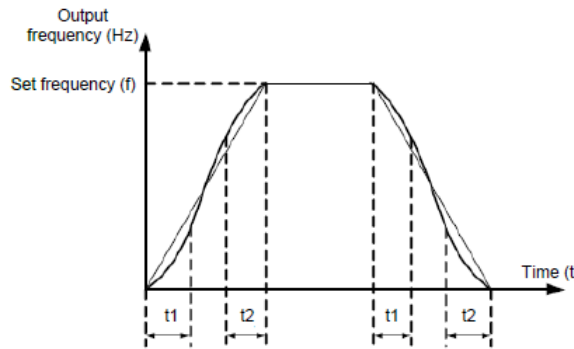
Diagram 5-11 S-curve acceleration/deceleration A
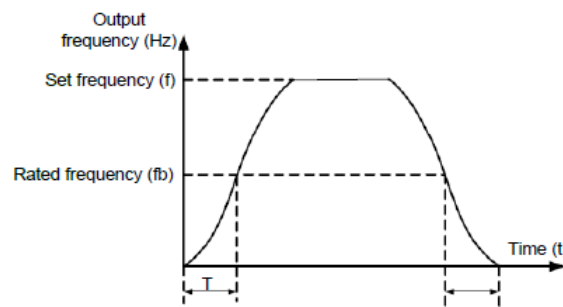
Diagram 5-12 S-curve acceleration/deceleration B

F6-10	Stop mode	0: Deceleration stop 1: Free stop	0

0: Deceleration stop

After the stop command is enabled, the Inverter decreases the output frequency according to the deceleration time and stops when the frequency decreases to zero.

1: Free stop

After the stop command is enabled, the Inverter immediately stops the output. The motor will coast to stop based on the mechanical inertia.

F6-11	Initial frequency of stop DC braking	0.00Hz~Maximum frequency	0.00Hz
F6-12	Waiting time of stop DC braking	0.0s~100.0s	0.0s
F6-13	Stop DC braking current	0%~100%	0%
F6-14	Stop DC braking time	0.0s~100.0s	0.0s

F6-11 (Initial frequency of stop DC braking)

During the process of decelerating to stop, the Inverter starts DC braking when the running frequency is lower

than the value set in F6-11.

F6-12 (Waiting time of stop DC braking)

When the running frequency decreases to the initial frequency of stop DC braking, the Inverter stops output for a certain period and then starts DC braking. This prevents faults such as overcurrent caused due to DC braking at high speed.

F6-13 (Stop DC braking current)

This parameter specifies the output current at DC braking and is a percentage relative to the base value.

● If the rated motor current is less than or equal to 80% of the rated Inverter current, the base value is the rated motor current.

● If the rated motor current is greater than 80% of the rated Inverter current, the base value is 80% of the rated Inverter current.

F6-14 (Stop DC braking time)

This parameter specifies the holding time of DC braking. If it is set to 0, DC braking is cancelled.

The stop DC braking process is shown in the following diagram.
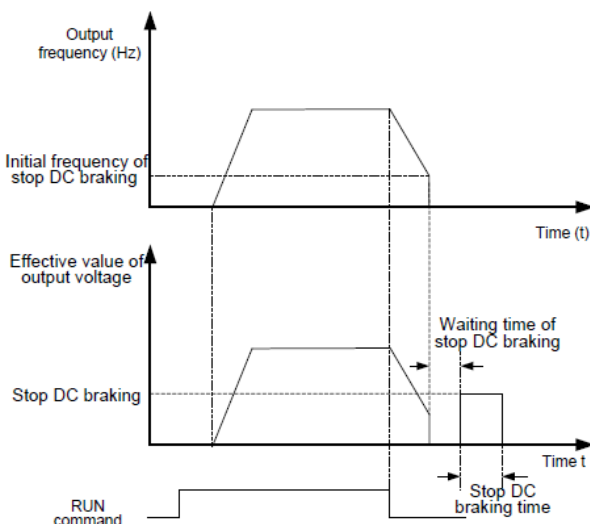
Diagram 5-13 Stop DC braking process

F6-15	Brake usage ratio	0%~100%	100%

It is valid only for the Inverter with internal braking unit and used to adjust the duty ratio of the braking unit. The larger the value of this parameter is, the better the braking result will be. However, too larger value causes great fluctuation of the Inverter bus voltage during the braking process.

Group F7: Keyboard and display

F7-01	MF.K key function selection	0: MF.K is invalid 1: Switchover between Operation panel command channel and remote command channel (terminal command channel or communication command channel) 2: Forward and reverse switching 3: Forward JOG 4: Reverse JOG	0

MF.K key refers to multifunctional key. You can set the function of the MF.K key by using this parameter. You can perform switchover by using this key both in stop or running state.

0: MF.K is invalid

This key is invalid.

1: Switchover between Operation panel command channel and remote command channel (terminal

command channel or communication command channel)

You can perform switchover from the current command source to the operation panel control (local operation). If the current command source is operation panel control, this key is invalid.

2: Forward and reverse switching

You can change the direction of the frequency reference by using the MF.K key. It is valid only when the current command source is operation panel control.

3: Forward JOG

You can perform forward JOG (FJOG) by using the MF.K key.

4: Reverse JOG

You can perform reverse JOG (FJOG) by using the MF.K key.

F7-02	STOP/RESET key function	0: STOP/RES button enable only in operation panel control mode 1: STOP/RES button enable in any control mode	1
F7-03	LED display running parameters 1	0000~FFFF Bit00: Running frequency 1(Hz) Bit01: Setting frequency (Hz) Bit02: Bus voltage (V) Bit03: Output voltage (V) Bit04: Output current (A) Bit05: Output power (KW) Bit06: Output torque (%) Bit07: DI input status Bit08: DO output status Bit09: AI1 voltage (V) Bit10: AI2 voltage (V) Bit11: Reserved Bit12: Reserved Bit13: Reserved Bit14: Load speed display Bit15: PID setting If a parameter needs to be displayed during the running, set the corresponding bit to 1, and set F7-03 to the hexadecimal equivalent of this binary number.	1F
F7-04	LED display running parameters 2	0000~FFFF Bit00: PID feedback Bit01: PLC stage Bit02: PULSE input pulse train frequency(kHz) Bit03: Running frequency 2(Hz) Bit04: Rest running time Bit05: AI1 before correction voltage (V) Bit06: AI2 before correction voltage (V) Bit07: Reserved Bit08: Line speed Bit09: Current power-on time (Hour) Bit10: Current running time (Min) Bit11: PULSE setting frequency (Hz) Bit12: Communication setting value Bit13: Reserved Bit14: Main frequency X display (Hz) Bit15: Auxiliary Frequency Y Display (Hz) If a parameter needs to be displayed during the running, set the corresponding bit to 1, and set F7-03 to the hexadecimal equivalent of this binary number.	0

These two parameters are used to set the parameters that can be viewed when the Inverter is in the running state. You can view a maximum of 32 running state parameters that are displayed from the lowest bit of F7-03.

F7-05	LED display stop parameters	0000 ~ FFFF Bit00: Set frequency (Hz) Bit01: Bus voltage (V) Bit02: DI input status Bit03: DO output status Bit04: AI1 voltage (V) Bit05: AI2 voltage (V) Bit06: Reserved Bit07: Reserved Bit08: Reserved Bit09: PLC stage Bit10: Load speed Bit11: PID setting Bit12: PULSE setting frequency (kHz) Bit13: Reserved Bit14: Reserved Bit15: Reserved If a parameter needs to be displayed during the running, set the corresponding bit to 1, and set F7-05 to the hexadecimal equivalent of this binary number.	33

F7-06	Load speed display coefficient	0.0001~6.5000	1.0000

This parameter is used to adjust the relationship between the output frequency of the Inverter and the load speed. For details, see the description of F7-12.

F7-07	Heat sink temperature of IGBT	0.0°C~100.0°C	-

It is used to display the insulated gate bipolar transistor (IGBT) temperature of the Inverter IGBT, and the IGBT overheat protection value of the Inverter IGBT depends on the model.

F7-08	Heat sink temperature of Rectifier	0.0°C~100.0°C	-

It is used to display the temporary software version of the control board.

F7-09	Cumulative running time	0h~65535h	-

It is used to display the accumulative running time of the Inverter. After the accumulative running time reaches the value set in F8-17, the terminal with the digital output function 12 becomes ON.

F7-10	Products number	-	-
F7-11	Software version	-	-
F7-12	The number of decimal places of load speed Displays	0: 0 decimal places 1: 1 decimal place 2: 2 decimal places 3: 3 decimal places	1

F7-12 is used to set the number of decimal places for load speed display. The following gives an example to

explain how to calculate the load speed:

Assume that F7-06 (Load speed display coefficient) is 2.000 and F7-12 is 2 (2 decimal places). When the running frequency of the Inverter is 40.00 Hz, the load speed is 40.00 x 2.000 = 80.00 (display of 2 decimal places).

If the Inverter is in the stop state, the load speed is the speed corresponding to the set frequency, namely, "set load speed". If the set frequency is 50.00 Hz, the load speed in the stop state is 50.00 x 2.000 = 100.00 (display of 2 decimal places).

F7-13	Cumulative power-on time	0~65535 hour	-

It is used to display the accumulated power-on time of the Inverter since the delivery. If the time reaches the set power-on time (F8-17), the terminal with the digital output function 24 becomes ON.

F7-14	Cumulative power consumption	0~65535 KWh	-

It is used to display the accumulative power consumption of the Inverter until now.

Group F8: Auxiliary function

F8-00	JOG running frequency	0.00Hz~Maximum frequency	2.00Hz
F8-01	JOG acceleration	0.0s~6500.0s	20.0s
F8-02	JOG deceleration	0.0s~6500.0s	20.0s

These parameters are used to define the set frequency and acceleration/deceleration time of the Inverter when jogging. The startup mode is "Direct start" (F6-00 = 0) and the stop mode is "Decelerate to stop" (F6-10 = 0) during jogging.

F8-03	Acceleration time 2	0.0s~6500.0s	Model dependent
F8-04	Deceleration time 2	0.0s~6500.0s	Model dependent
F8-05	Acceleration time 3	0.0s~6500.0s	Model dependent
F8-06	Deceleration time 3	0.0s~6500.0s	Model dependent
F8-07	Acceleration time 4	0.0s~6500.0s	Model dependent
F8-08	Deceleration time 4	0.0s~6500.0s	Model dependent

The inverter provides a total of four groups of acceleration/deceleration time, that is, the preceding three groups and the group defined by F0-17 and F0-18. Definitions of four groups are completely the same. You can switch over between the four groups of acceleration/deceleration time through different state combinations of DI terminals. For more details, see the descriptions of F4-01 to F4-05.

F8-09	Jumping frequency 1	0.00Hz~Maximum frequency	0.00Hz
F8-10	Jumping frequency 2	0.00Hz~Maximum frequency	0.00Hz
F8-11	Frequency jump amplitude	0.00Hz~Maximum frequency	0.00Hz

If the set frequency is within the frequency jump range, the actual running frequency is the jump frequency close to the set frequency. Setting the jump frequency helps to avoid the mechanical resonance point of the load.

The inverter supports two jump frequencies. If both are set to 0, the frequency jump function is disabled. The principle of the jump frequencies and jump amplitude is shown in the following diagram.
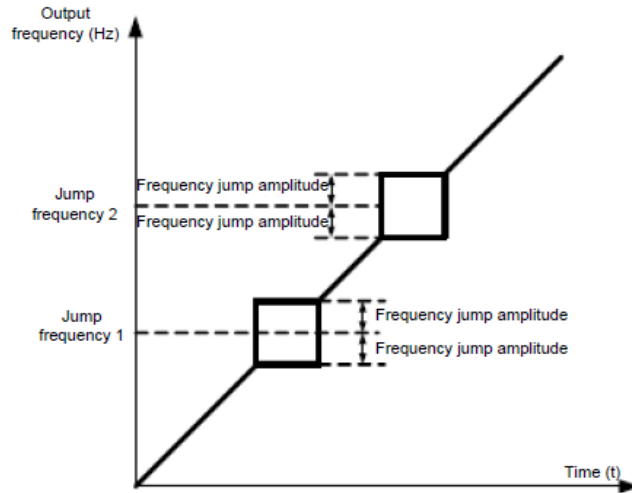
Diagram 5-14 Principle of the jump frequencies and jump amplitude

F8-12	Forward/Reverse rotation dead zone time	0.0s~3000.0s	0.0s

It is used to set the time when the output is 0 Hz at transition of the Inverter forward rotation and reverse rotation, as shown in the following diagram.
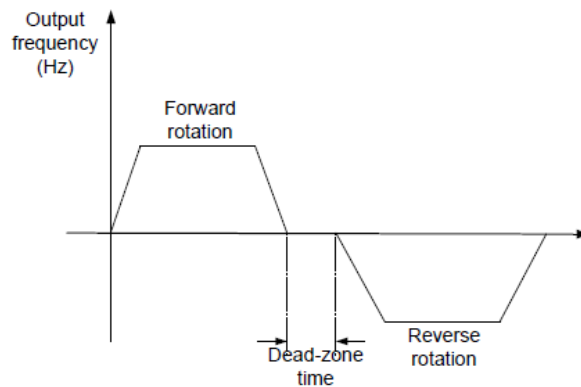

Diagram 5-15 Forward/Reverse rotation dead-zone time

F8-13	Reverse running enabled	0: Enabled 1: Disabled	0

It is used to set whether the Inverter allows reverse rotation. In the applications where reverse rotation is prohibited, set this parameter to 1.

F8-14	Running mode when set frequency lower than lower limit	0: Run at lower limit frequency 1: Stop 2: Run at zero speed	0

It is used to set the Inverter running mode when the set frequency is lower than the frequency lower limit. The inverter provides three running modes to satisfy requirements of various applications.

F8-15	Drop control	0.00Hz~10.00Hz	0.00Hz

This function is used for balancing the workload allocation when multiple motors are used to drive the same load. The output frequency of the Inverters decreases as the load increases. You can reduce the workload of the motor

under load by decreasing the output frequency for this motor, implementing workload balancing between multiple motors.

F8-16	Cumulative power-on time threshold	0h~65000h	0h

If the cumulative power-on time (F7-13) reaches the value set in this parameter, the corresponding DO terminal becomes ON.

For example, combining virtual DI/DO functions, to implement the function that the Inverter reports an alarm when the actual accumulative power-on time reaches the threshold of 100 hours, perform the setting as follows:

1) Set virtual DI1 to user-defined fault 1: A1-00 = 44.

2) Set that the valid state of virtual DI1 is from virtual DO1: A1-05 = 0000.

3) Set virtual DO1 to power-on time reached: A1-11= 24.

4) Set the accumulative power-on time threshold to 100 h: F8-16 = 100 h.

Then, the Inverter reports Err27 when the accumulative power-on time reaches 100 hours.

F8-17	Cumulative running time threshold	0h~65000h	0h

It is used to set the accumulative running time threshold of the Inverter. If the accumulative running time (F7-09) reaches the value set in this parameter, the corresponding DO terminal becomes ON.

F8-18	Startup protection	0: No 1: Yes	0

This parameter is used to set whether to enable the safety protection. If it is set to 1, the Inverter does not respond to the run command valid upon Inverter power-on (for example, an input terminal is ON before power-on). The Inverter responds only after the run command is cancelled and becomes valid again.

In addition, the Inverter does not respond to the run command valid upon fault reset of the Inverter. The run protection can be disabled only after the run command is cancelled.

In this way, the motor can be protected from responding to run commands upon power-on or fault reset in unexpected conditions.

F8-19	Frequency detection value (FDT1)	0.00Hz~Maximum frequency	50.00Hz
F8-20	Frequency detection hysteresis (FDT1)	0.0%~100.0%(FDT1 voltage level)	5.0%

If the running frequency is higher than the value of F8-19, the corresponding DO terminal becomes ON. If the running frequency is lower than value of F8-19, the DO terminal goes OFF

These two parameters are respectively used to set the detection value of output frequency and hysteresis value upon cancellation of the output. The value of F8-20 is a percentage of the hysteresis frequency to the frequency detection value (F8-19). The FDT function is shown in the following diagram.
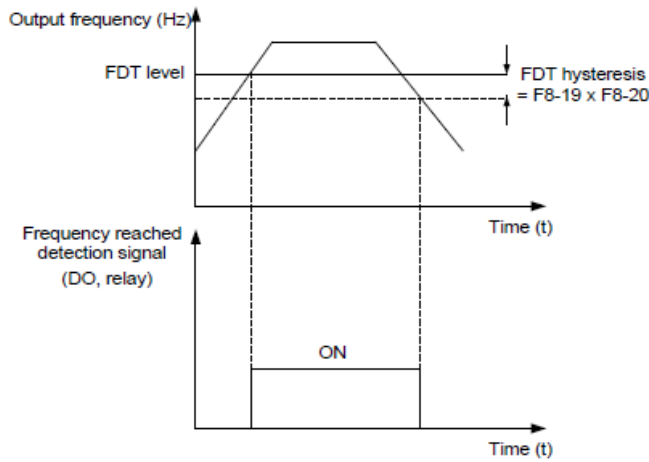
Diagram 5-16 FDT level

F8-21	Frequency arrival detection amplitude	0.0%~100.0%(Maximum frequency)	0.0%

If the Inverter running frequency is within the certain range of the set frequency, the corresponding DO terminal becomes ON.

This parameter is used to set the range within which the output frequency is detected to reach the set frequency. The value of this parameter is a percentage relative to the maximum frequency. The detection range of frequency reached is shown in the following figure.
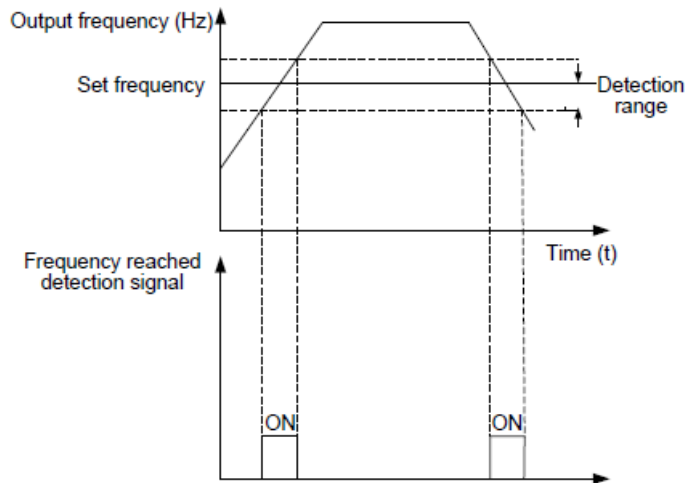
Diagram 5-17 Detection range of frequency reached

F8-22	Jump frequency during acceleration/deceleration	0: Disabled 1: Enabled	0

It is used to set whether the jump frequencies are valid during acceleration/deceleration.

When the jump frequencies are valid during acceleration/deceleration, and the running frequency is within the frequency jump range, the actual running frequency will jump over the set frequency jump amplitude (rise directly from the lowest jump frequency to the highest jump frequency). The following figure shows the diagram when the jump frequencies are valid during acceleration/deceleration.
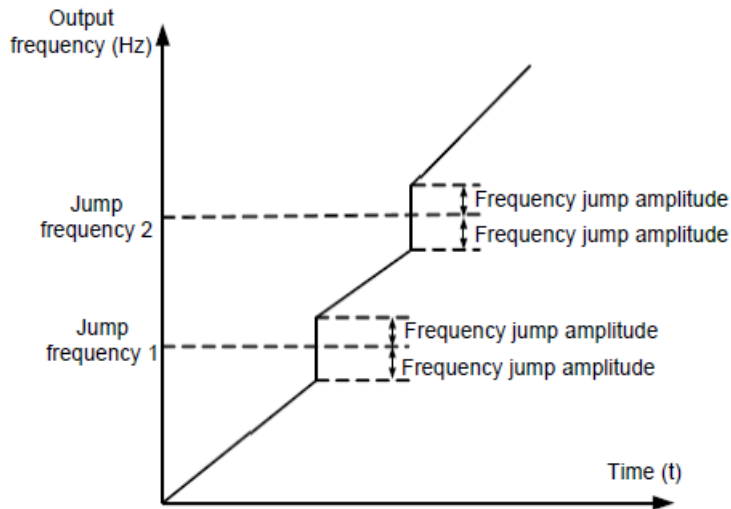
Diagram 5-18 Diagram when the jump frequencies are valid during acceleration/deceleration

F8-25	Frquency swtichover point between acceleration time 1 to acceleration time 2	0.00Hz~Maximum frequency	0.00Hz
F8-26	Frquency swtichover point between deceleration time 1 to deceleration time 2	0.00Hz~Maximum frequency	0.00Hz

This function is valid when motor 1 is selected and acceleration/deceleration time switchover is not performed by means of DI terminal. It is used to select different groups of acceleration/deceleration time based on the running frequency range rather than DI terminal during the running process of the Inverter.
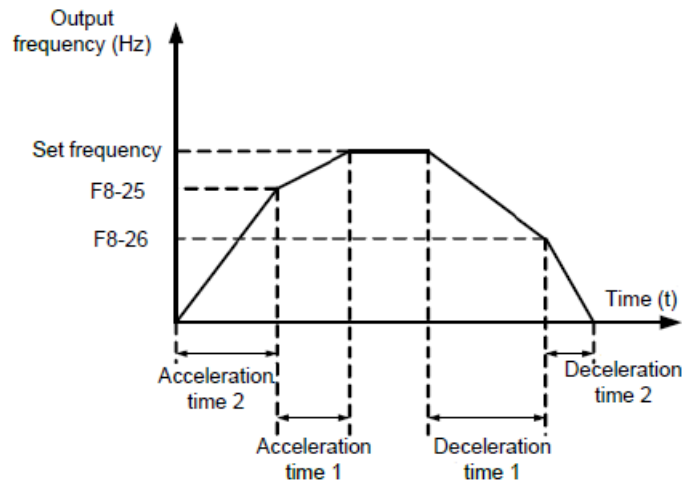
Diagram 5-19 Acceleration/deceleration time switchover

During acceleration, if the running frequency is smaller than the value of F8-25, acceleration time 2 is selected. If the running frequency is larger than the value of F8-25, acceleration time 1 is selected.

During deceleration, if the running frequency is larger than the value of F8-26, deceleration time 1 is selected. If the running frequency is smaller than the value of F8-26, deceleration time 2 is selected.

F8-27	Terminal JOG preferred	0: Disabled	0

		1: Enabled	

It is used to set whether terminal JOG is preferred.

If terminal JOG is preferred, the Inverter switches to terminal JOG running state when there is a terminal JOG command during the running process of the Inverter.

F8-28	Frequency detection value (FDT2)	0.00Hz~Maximum frequency	50.00Hz
F8-29	Frequency detection hysteresis (FDT2)	0.0%~100.0%(FDT2 voltage level)	5.0%

The frequency detection function is the same as FDT1 function. For details, refer to the descriptions of F8-19 and F8-20.

F8-30	Any frequency reaching detection value 1	0.00Hz~Maximum frequency	50.00Hz
F8-31	Any frequency reaching detection amplitude 1	0.0%~100.0%(Maximum frequency)	0.0%
F8-32	Any frequency reaching detection value 2	0.00Hz~Maximum frequency	50.00Hz
F8-33	Any frequency reaching detection amplitude 2	0.0%~100.0%(Maximum frequency)	0.0%

If the output frequency of the Inverter is within the positive and negative amplitudes of the any frequency reaching detection value, the corresponding DO becomes ON.

The INVERTER provides two groups of any frequency reaching detection parameters, including frequency detection value and detection amplitude, as shown in the following figure.
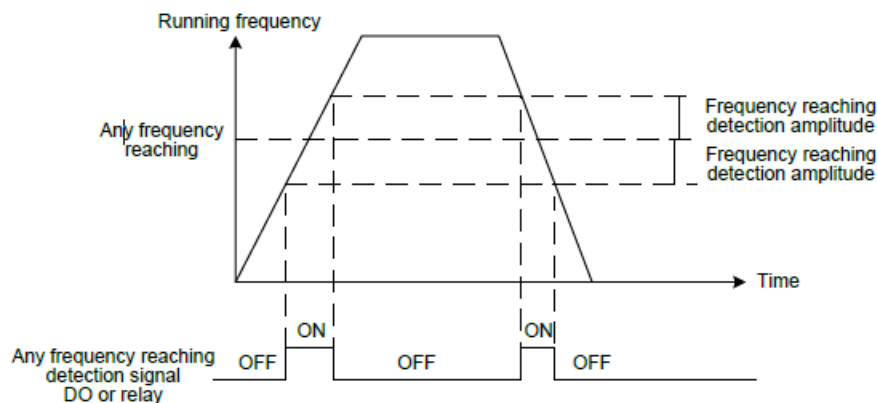

Diagram 5-20 Any frequency reaching detection

F8-34	Zero current detection level	0.0%~300.0% 100.0% corresponds to the motor rated current	5.0%
F8-35	Zero current detection delay time	0.01s~600.00s	0.10s

If the output current of the Inverter is equal to or less than the zero current detection level and the duration exceeds the zero current detection delay time, the corresponding DO becomes ON. The zero current detection is shown in the following figure.
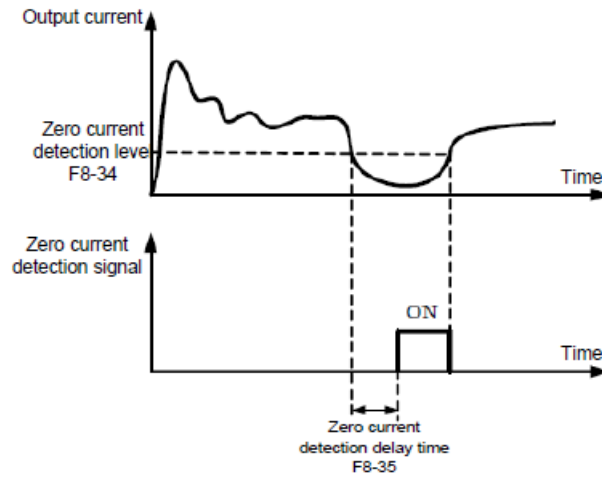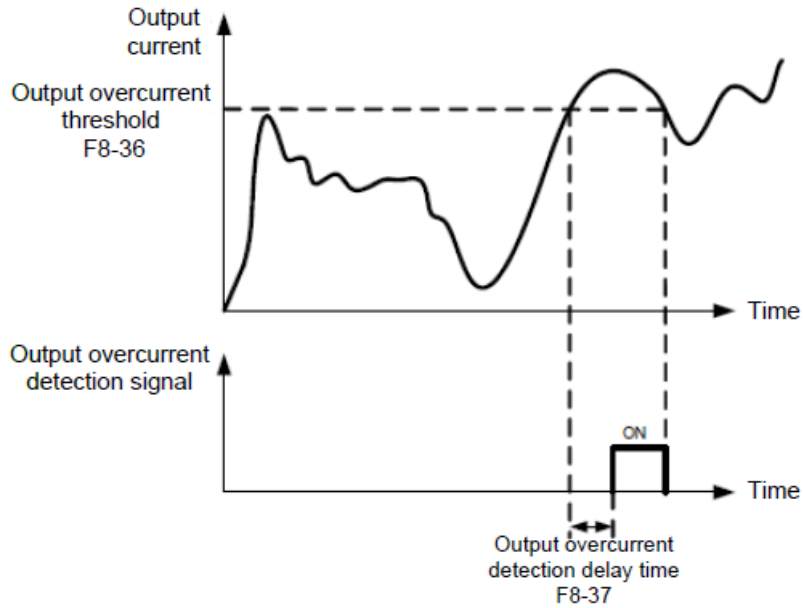
Diagram 5-21 Zero current detection

F8-36	Output overcurrent threshold	0.0%(No detect) 0.1%~300.0%(Rated current)	200.0%
F8-37	Output overcurrent detection delay time	0.00s~600.00s	0.00s

If the output current of the Inverter is equal to or higher than the overcurrent threshold and the duration exceeds the detection delay time, the corresponding DO becomes ON. The output overcurrent detection function is shown in the following figure.

Diagram 5-22 Output overcurrent detection

F8-38	Any current reaching 1	0.0%~300.0%(Motor rated current)	100.0%
F8-39	Any current reaching 1 amplitude	0.0%~300.0%(Motor rated current)	0.0%
F8-40	Any current reaching 2	0.0%~300.0%(Motor rated current)	100.0%
F8-41	Any current reaching 2 amplitude	0.0%~300.0%(Motor rated current)	0.0%

If the output current of the Inverter is within the positive and negative amplitudes of any current reaching detection value, the corresponding DO becomes ON.

The inverter provides two groups of any current reaching detection parameters, including current detection value and detection amplitudes, as shown in the following figure.
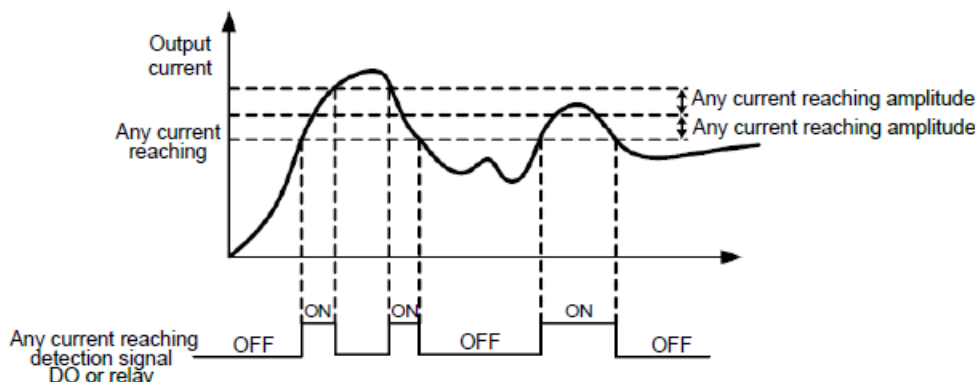

Diagram 5-23 Any current reaching detection

F8-42	Timing function	0: Disabled 1: Enabled	0
F8-43	Timing duration source	0: Set by F8-44 1: AI1 2: AI2 3: Potentiometer of operation panel The range of analog input corresponds to F8-44	0
F8-44	Timing duration	0.0Min~6500.0Min	0.0Min

These parameters are used to implement the Inverter timing function.

If F8-42 is set to 1, the Inverter starts to time at startup. When the set timing duration is reached, the Inverter stops automatically and meanwhile the corresponding DO becomes ON.

The Inverter starts timing from 0 each time it starts up and the remaining timing duration can be queried by U0-20.

The timing duration is set in F8-43 and F8-44, in unit of minute.

F8-45	AI1 input voltage lower limit	0.00V~F8-46	3.10V
F8-46	AI1 input voltage upper limit	F8-45~10.00V	6.80V

These two parameters are used to set the limits of the input voltage to provide protection on the Inverter. When the AI1 input is larger than the value of F8-46 or smaller than the value of F8-45, the corresponding DO becomes ON, indicating that AI1 input exceeds the limit.

F8-47	IGBT temperature threshold	0℃~100℃	75℃

When the heatsink temperature of the Inverter reaches the value of this parameter, the corresponding DO becomes ON, indicating that the IGBT temperature reaches the threshold.

F8-48	Cooling fan control	0: Working during running 1: Working after power up	0

It is used to set the working mode of the cooling fan. If this parameter is set to 0, the fan works when the Inverter is in running state. When the Inverter stops, the cooling fan works if the heatsink temperature is higher than 40℃, and stops working if the heatsink temperature is lower than 40℃.

If this parameter is set to 1, the cooling fan keeps working after power-on.

F8-49	Wakeup frequency	Sleep frequency (F8-51)~Maximum(F0-10)	0.00Hz
F8-50	Wakeup delay time	0.0s~6500.0s	0.0s
F8-51	Dormant frequency	0.00Hz~Wake up frequency (F8-49)	0.00Hz
F8-52	Dormant delay time	0.0s~6500.0s	0.0s

These parameters are used to implement the dormant and wakeup functions in the water supply application.

When the Inverter is in running state, the Inverter enters the dormant state and stops automatically after the dormant delay time (F8-52) if the set frequency is lower than or equal to the dormant frequency (F8-51).

When the Inverter is in dormant state and the current running command is effective, the Inverters starts up after the wakeup delay time (F8-50) if the set frequency is higher than or equal to the wakeup frequency (F8-49).

Generally, set the wakeup frequency equal to or higher than the dormant frequency. If the wakeup frequency and dormant frequency are set to 0, the dormant and wakeup functions are disabled.

When the dormant function is enabled, if the frequency source is PID, whether PID operation is performed in the dormant state is determined by FA-28. In this case, select PID operation enabled in the stop state (FA-28 = 1).

F8-53	Current running time reached	0.0~6500.0 mins	0.0Min

If the current running time reaches the value set in this parameter, the corresponding DO becomes ON, indicating that the current running time is reached.

Group F9: Faults and protection parameters

F9-00	Motor overload protection selection	0: Disabled 1: Enabled	1

The motor overload protective function is disabled. The motor is exposed to potential damage due to overheating. A thermal relay is suggested to be installed between the Inverter and the motor.

F9-01	Motor overload protection gain	0.20~10.00	1.00

The Inverter judges whether the motor is overloaded according to the inverse time-lag curve of the motor overload protection.

The inverse time-lag curve of the motor overload protection is:

220% x F9-01 x rated motor current (if the load remains at this value for one minute, the Inverter reports motor overload fault), or 150% x F9-01 x rated motor current (if the load remains at this value for 60 minutes, the Inverter reports motor overload fault)

Set F9-01 properly based on the actual overload capacity. If the value of F9-01 is set too large, damage to the motor may result because the motor overheats but the Inverter does not report the alarm.

F9-02	Motor overload pre- warning coefficient	50%~100%	80%

This function is used to give a warning signal to the control system via DO before motor overload protection. This parameter is used to determine the percentage, at which prewarning is performed before motor overload. The larger the value is, the less advanced the pre-warning will be.

When the accumulative output current of the Inverter is greater than the value of the overload inverse time-lag

curve multiplied by F9-02, the DO terminal on the Inverter allocated with function 6 (Motor overload pre-warning) becomes ON.

F9-03	Overvoltage stall gain	0~1000	0
F9-04	Overvoltage stall protection voltage	120%~150%	135%

When the DC bus voltage exceeds the value of F9-04 (Overvoltage stall protective voltage) during deceleration of the Inverter, the Inverter stops deceleration and keeps the present running frequency. After the bus voltage declines, the Inverter continues to decelerate.

F9-03 (Overvoltage stall gain) is used to adjust the overvoltage suppression capacity of the Inverter. The larger the value is, the greater the overvoltage suppression capacity will be.

In the prerequisite of no overvoltage occurrence, set F9-03 to a small value.

For small-inertia load, the value should be small. Otherwise, the system dynamic response will be slow. For large-inertia load, the value should be large. Otherwise, the suppression result will be poor and an overvoltage fault may occur.

If the overvoltage stall gain is set to 0, the overvoltage stall function is disabled. The overvoltage stall protective voltage setting 100% corresponds to the base values in the following table:

Three-phase 220 V 290 V	Three-phase 220 V 290 V
Three-phase 380 V 530 V	Three-phase 380 V 530 V

F9-05	Over-current stall gain	0~100	0
F9-06	Overcurrent stall protection current	100%~200%	150%

When the output current exceeds the overcurrent stall protective current during acceleration/deceleration of the Inverter, the Inverter stops acceleration/deceleration and keeps the present running frequency. After the output current declines, the Inverter continues to accelerate/decelerate.

F9-05 (Overcurrent stall gain) is used to adjust the overcurrent suppression capacity of the Inverter. The larger the value is, the greater the overcurrent suppression capacity will be. In the prerequisite of no overcurrent occurrence, set tF9-05 to a small value.

For small-inertia load, the value should be small. Otherwise, the system dynamic response will be slow. For large-inertia load, the value should be large. Otherwise, the suppression result will be poor and overcurrent fault may occur.

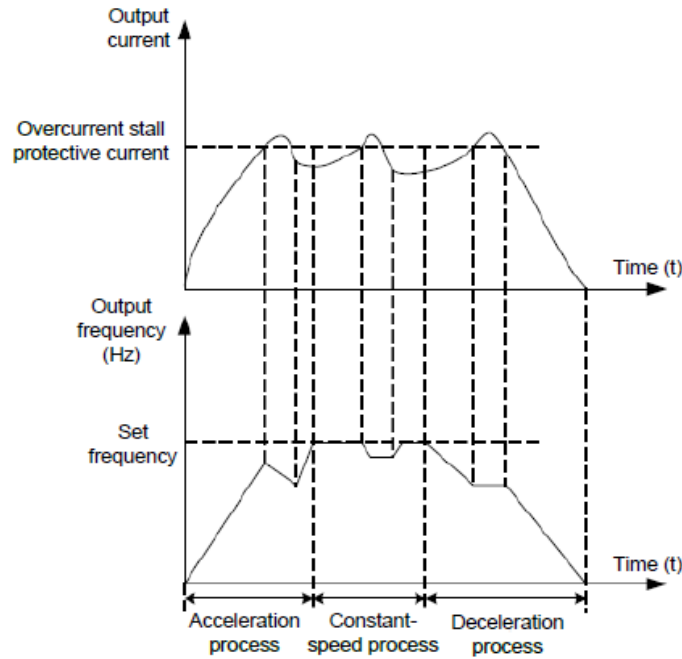If the overcurrent stall gain is set to 0, the overcurrent stall function is disabled.

Diagram 5-24 Diagram of the overcurrent stall protection function

F9-07	Short-circuit to ground upon poweron	0: Disabled 1: Enabled	0

It is used to determine whether to check the motor is short-circuited to ground at power-on of the Inverter. If this function is enabled, the Inverter's UVW will have voltage output a while after power-on.

F9-09	Fault auto reset times	0~20	20

It is used to set the times of fault auto resets if this function is used. After the value is exceeded, the frequency inverter will remain in the fault state.

F9-10	DO action during fault auto reset	0: Not act 1: Act	0

It is used to decide whether DO acts during the fault auto reset if the fault auto reset function is used.

F9-11	Time interval of fault auto reset	0.1s ~ 100.0s	5.0s

is used to set the waiting time from the frequency inverter alarm to fault auto reset.

F9-12	Input phase loss protection/contactor energizing protection selection	Unit's digit: Input phase loss protection Ten's digit: Contactor energizing protection 0: Disabled 1: Enabled	00

It is used to determine whether to perform input phase loss or contactor energizing protection.

F9-13	Output phase loss protection	0: Disabled 1: Enabled	0

It is used to determine whether to perform output phase loss protection.

F9-14	Fault type (1st)	0 ~ 99	00
F9-15	Fault type (2nd)	0 ~ 99	-
F9-16	Fault type (3rd)(Latest)	0 ~ 99	-

It is used to record the types of the most recent three faults of the frequency inverter. 0 indicates no fault.

F9-17	Frequency of latest fault	It displays the frequency when the latest fault occurs.
F9-18	Current of latest fault	It displays the current when the latest fault occurs.
F9-19	DC bus voltage of latest fault	It displays the DC bus voltage when the latest fault occurs.
F9-20	Input terminals status of latest fault	It displays the status of all DI terminals when the latest fault occurs. The sequence is as follows: BIT9 BIT8 BIT7 BIT6 BIT5 BIT4 BIT3 BIT2 BIT1 BIT0 DI0 DI9 DI8 DI7 HDI DI5 DI4 DI3 DI2 DI1 If a DI is ON, the setting is 1. If the DI is OFF, the setting is 0. The value is the equivalent decimal number converted from the DI status.
F9-21	Output terminals status of latest fault	It displays the status of all output terminals when the latest fault occurs. The sequence is as follows: BIT4 BIT3 BIT2 BIT1 BIT0 DO2 DO1 REL2 REL1 FMP If an output terminal is ON, the setting is 1. If the output terminal is OFF, the setting is 0. The value is the equivalent decimal number converted from the DI statuses.
F9-22	Inverter status of latest fault	Reserved
F9-23	Power up time of latest fault	It displays the present power-on time when the latest fault occurs.
F9-24	Running time of latest fault	It displays the present running time when the latest fault occurs.
F9-27	Frequency of 2nd fault	Same as F9-17–F9-24.
F9-28	Current of 2nd fault	
F9-29	DC bus voltage of 2nd fault	
F9-30	Input terminals status of 2nd fault	
F9-31	Output terminals status of 2nd fault	
F9-32	Inverter status of 2nd fault	
F9-33	Power up time of 2nd fault	
F9-34	Running time of 2nd fault	
F9-37	Frequency of 1st fault	Same as F9-17–F9-24.
F9-38	Current of 1st fault	
F9-39	DC Bus voltage of 1st fault	
F9-40	Input terminals status of 1st fault	
F9-41	Output terminal status of 1st fault	
F9-42	Inverter status of 1st fault	

F9-43	Power-on time of 1st fault		
F9-44	Running time of 1st fault		

F9-47	Fault protection action selection 1	Bit: Motor overload (Err11) 0: Free stop 1: Stop by stop mode setting 2: Continue to run Ten: Input missing (Err12) Hundreds: Output phase loss (Err13) Thousands of bits: external failure (Err15) Million: communication anomaly (Err16)	00000
F9-48	Fault protection action selection 2	Bit: Encoder / PG card exception (Err20) 0: Free stop Ten: Function code read and write exception (Err21) 0: Free stop 1: Stop by stop mode setting Hundred places: reserved Thousands: Motor overheating (Err25) Million: run time arrival (Err26)	00000
F9-49	Fault protection action selection 3	Bit: User defined fault 1 (Err27) 0: Free stop 1: Stop by stop mode 2: Continue to run Ten: User Defined Fault 2 (Err28) 0: Free Stop 1: Stop by stop mode 2: Continue to run Hundreds: Power-up time arrives (Err29) 0: Free stop 1: Stop by stop mode 2: Continue to run Thousands of bits: (Err30) 0: Free stop 1: Deceleration stop 2:Skip to 7% of the rated motor frequency to continue running, restore to run with setting frequency after no missing load Million: PID feedback lost in running (Err31) 0: Free parking 1: Stop by stop mode 2: Continue to run	00000
F9-50	Fault protection action selection 4	Bit: the speed deviation is too large (Err42) 0: Free stop 1: Stop by stop mode 2: Continue to run Ten: Motor over speed (Err43) Hundred places: initial position error (Err51)	00000

If "Free stop" is selected, the Inverter displays Err** and directly stops.

If "Stop according to the stop mode" is selected, the Inverter displays A** and stops according to the stop mode. After stop, the Inverter displays Err**.

If "Continue to run" is selected, the Inverter continues to run and displays A**. The running frequency is set in F9-54.

F9-54	Frequency selection for continuing to run upon fault	0: Current running frequency 1: Set frequency 2: Frequency upper limit 3: Frequency lower limit 4: Backup frequency upon abnormality	0
F9-55	Backup frequency upon abnormality	0.0%~100.0% (100.0% corresponds to the maximum frequency F0-10)	100.0%

If a fault occurs during the running of the Inverter and the handling of fault is set to "Continue to run", the Inverter displays A** and continues to run at the frequency set in F9-54.

The setting of F9-55 is a percentage relative to the maximum frequency.

F9-57	Motor overheat protection threshold	0°C~200°C	110°C
F9-58	Motor overheat pre-warning threshold	0°C~200°C	90°C

The signal of the motor temperature sensor needs to be connected to the optional I/O extension card.

Set the sensor type correctly during the use. You can view the motor temperature via U0-34.

If the motor temperature exceeds the value set in F9-57, the Inverter reports an alarm and acts according to the selected fault protection action.

If the motor temperature exceeds the value set in F9-58, the DO terminal on the Inverter allocated with function 39 (Motor overheat warning) becomes ON.

F9-59	Action selection at instantaneous power failure	0: Invalid 1: Deceleration 2: Deceleration stop	0
F9-60	Action pause judging voltage at instantaneous power failure	80.0%~100.0%	90.0%
F9-61	Voltage rally judging time at instantaneous power failure	0.00s~100.00s	0.50s
F9-62	Action judging voltage at instantaneous power failure	60.0%~100.0%(Standard bus voltage)	80.0%

Upon instantaneous power failure or sudden voltage dip, the DC bus voltage of the Inverter reduces. This function enables the Inverter to compensate the DC bus voltage reduction with the load feedback energy by reducing the output frequency so as to keep the Inverter running continuously.

If F9-59 = 1, upon instantaneous power failure or sudden voltage dip, the Inverter decelerates. Once the bus voltage resumes to normal, the Inverter accelerates to the set frequency. If the bus voltage remains normal for the time exceeding the value set in F9-61, it is considered that the bus voltage resumes to normal.

If F9-59 = 2, upon instantaneous power failure or sudden voltage dip, the Inverter decelerates to stop.
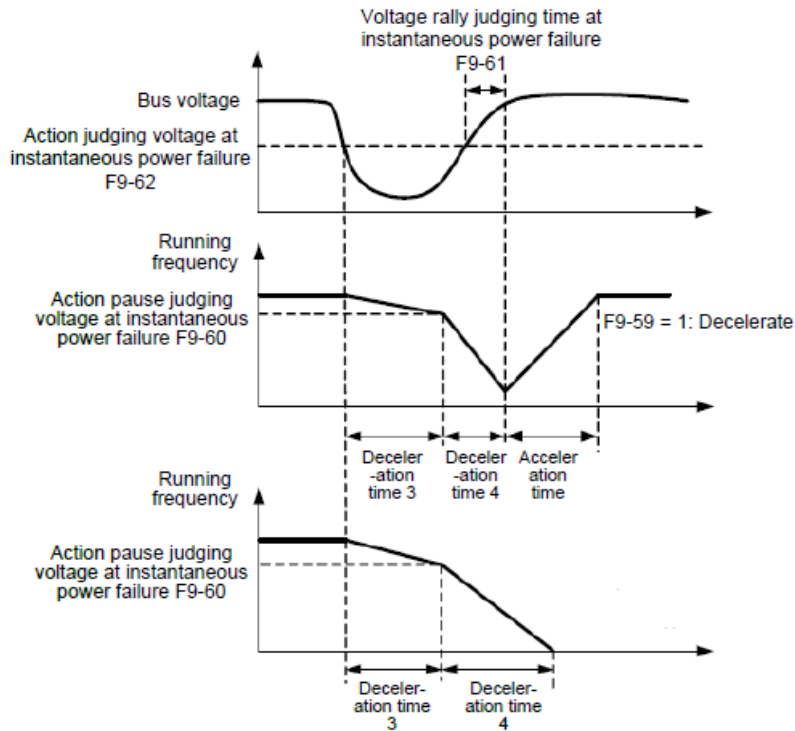
Diagram 5-25 Inverter action diagram upon instantaneous power failure

F9-63	Protection upon load becoming 0	0: Disabled 1: Enabled	0
F9-64	Load becoming 0 detection level	0.0~100.0%	10.0%
F9-65	Load becoming 0 detection time	0.0~60.0s	1.0s

If protection upon load becoming 0 is enabled, when the output current of the Inverter is lower than the detection level (F9-64) and the lasting time exceeds the detection time (F9-65), the output frequency of the Inverter automatically declines to 7% of the rated frequency. During the protection, the Inverter automatically accelerates to the set frequency if the load resumes to normal.

F9-67	Over speed detection value	0.0%~50.0%(Max frequency)	20.0%
F9-68	Over speed detection time	0.0s: No detect 0.1~60.0s	1.0s

This function is valid only when the Inverter runs in the FVC mode.

If the actual motor rotational speed detected by the Inverter exceeds the maximum frequency and the excessive value is greater than the value of F9-67 and the lasting time exceeds the value of F9-68, the Inverter reports Err43 and acts according to the selected fault protection action.

If the over-speed detection time is 0.0s, the over-speed detection function is disabled.

F9-69	Detection value of too large speed deviation	0.0%~50.0%(Max frequency)	20.0%
F9-70	Detection time of too large speed deviation	0.0s: No detect 0.1~60.0s	0.0s

This function is valid only when the Inverter runs in the FVC mode.

If the Inverter detects the deviation between the actual motor rotational speed detected by the Inverter and the set frequency is greater than the value of F9-69 and the lasting time exceeds the value of F9-70, the Inverter reports Err42 and according to the selected fault protection action.

If F9-70 (Detection time of too large speed deviation) is 0.0s, this function is disabled.

Group FA: PID function

PID control is a general process control method. By performing proportional, integral and differential operations on the difference between the feedback signal and the target signal, it adjusts the output frequency and constitutes a feedback system to stabilize the controlled counter around the target value.

It is applied to process control such as flow control, pressure control and temperature control. The following figure shows the principle block diagram of PID control.
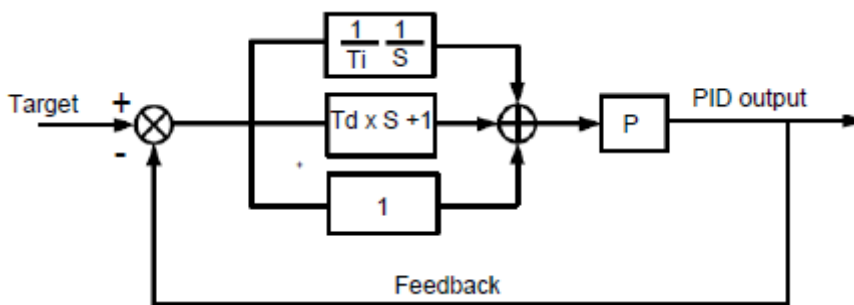

Diagram 5-26 Principle block diagram of PID control

FA-00	PID reference source	0: FA-01 1: AI1 2: AI2 3: Reserved 4: PULSE setting 5: Communication setting 6: Multi-function	0
FA-01	PID value setting	0.0%~100.0%	50.0%

FA-00 is used to select the channel of target process PID setting. The PID setting is a relative value and ranges from 0.0% to 100.0%. The PID feedback is also a relative value.

The purpose of PID control is to make the PID setting and PID feedback equal.

FA-02	PID feedback source	0: AI1 1: AI2 2: Reserved 3: AI1-AI2 4: PULSE setting 5: Communication setting 6: AI1 + AI2 7: MAX (| AI1 |, | AI2 |) 8: MIN (| AI1 |, | AI2 |)	0

This parameter is used to select the feedback signal channel of process PID.

The PID feedback is a relative value and ranges from 0.0% to 100.0%.

FA-03	PID action direction	0: Forward action 1: Reverse action	0

0: Forward action

When the feedback value is smaller than the PID setting, the Inverter's output frequency rises. For example, the winding tension control requires forward PID action.

1: Reverse action

When the feedback value is smaller than the PID setting, the Inverter's output frequency reduces. For example, the unwinding tension control requires reverse PID action.

Note that this function is influenced by the DI function 35 "Reverse PID action direction".

FA-04	PID reference feedback range	0~65535	1000

This parameter is a non-dimensional unit. It is used for PID setting display (U0-15) and PID feedback display (U0-16).

Relative value 100% of PID setting feedback corresponds to the value of FA-04. If FA-04 is set to 2000 and PID setting is 100.0%, the PID setting display (U0-15) is 2000.

FA-05	Proportional gain Kp1	0.0~100.0	20.0

It decides the regulating intensity of the PID regulator. The higher the Kp1 is, the larger the regulating intensity is. The value 100.0 indicates when the deviation between PID feedback and PID setting is 100.0%, the adjustment amplitude of the PID regulator on the output frequency reference is the maximum frequency.

FA-06	Integral time Ti1	0.01s~10.00s	2.00s

It decides the integral regulating intensity. The shorter the integral time is, the larger the regulating intensity is. When the deviation between PID feedback and PID setting is 100.0%, the integral regulator performs continuous adjustment for the time set in FA-06. Then the adjustment amplitude reaches the maximum frequency.

FA-07	Differential time Td1	0.000s~10.000s	0.000s

It decides the regulating intensity of the PID regulator on the deviation change. The longer the differential time is, the larger the regulating intensity is. Differential time is the time within which the feedback value change reaches 100.0%, and then the adjustment amplitude reaches the maximum frequency.

FA-08	PID reverse rotation cut-off frequency	0.00~Maximum frequency	2.00Hz

In some situations, only when the PID output frequency is a negative value (Inverter reverse rotation), PID setting and PID feedback can be equal. However, too high reverse rotation frequency is prohibited in some applications, and FA-08 is used to determine the reverse rotation frequency upper limit.

FA-09	PID deviation limit	0.0%~100.0%	0.0%

If the deviation between PID feedback and PID setting is smaller than the value of FA-09, PID control stops. The small deviation between PID feedback and PID setting will make the output frequency stabilize, effective for some closed-loop control applications.

FA-10	PID differential limiting	0.00%~100.00%	0.10%

It is used to set the PID differential output range. In PID control, the differential operation may easily cause system oscillation. Thus, the PID differential regulation is restricted to a small range.

FA-11	PID setting change time	0.00~650.00s	0.00s

The PID setting change time indicates the time required for PID setting changing from 0.0% to 100.0%. The PID setting changes linearly according to the change time, reducing the impact caused by sudden setting change on the system.

FA-12	PID feedback filter time	0.00~60.00s	0.00s
FA-13	PID output filter time	0.00~60.00s	0.00s

FA-12 is used to filter the PID feedback, helping to reduce interference on the feedback but slowing the response of the process closed-loop system.

FA-13 is used to filter the PID output frequency, helping to weaken sudden change of the Inverter output frequency but slowing the response of the process closed-loop system.

FA-15	Proportional gain Kp2	0.0~100.0	20.0
FA-16	Integral time Ti2	0.01s~10.00s	2.00s
FA-17	Derivative time Td2	0.000s~10.000s	0.000s
FA-18	PID parameter switchover condition	0: NO switchover 1: Switchover via DI terminal 2: Auto switchover based on deviation	0
FA-19	PID parameter switchover deviation 1	0.0%~FA-20	20.0%
FA-20	PID parameter switchover deviation 2	FA-19~100.0%	80.0%

In some applications, PID parameters switchover is required when one group of PID parameters cannot satisfy the requirement of the whole running process.

These parameters are used for switchover between two groups of PID parameters.

Regulator parameters FA-15 to FA-17 are set in the same way as FA-05 to FA-07.

The switchover can be implemented either via a DI terminal or automatically implemented based on the deviation.

If you select switchover via a DI terminal, the DI must be allocated with function 43 "PID parameter switchover". If the DI is OFF, group 1 (FA-05 to FA-07) is selected. If the DI is ON, group 2 (FA-15 to FA-17) is selected.

If you select automatic switchover, when the absolute value of the deviation between PID feedback and PID setting is smaller than the value of FA-19, group 1 is selected. When the absolute value of the deviation between PID feedback and PID setting is higher than the value of FA-20, group 2 is selected. When the deviation is between FA-19 and FA-20, the PID parameters are the linear interpolated value of the two groups of parameter values.
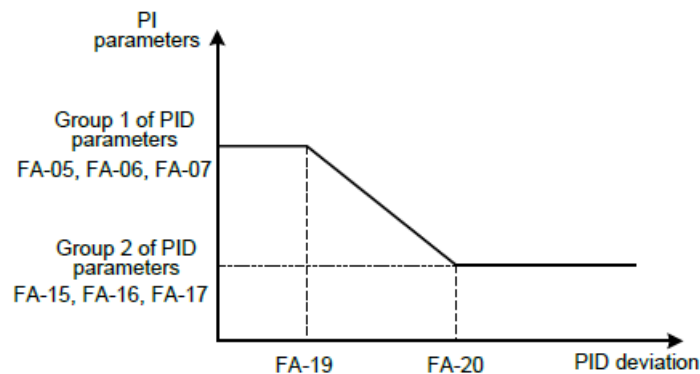
Diagram 5-27 PID parameters switchover

FA-21	PID initial value	0.0%~100.0%	0.0%
FA-22	PID initial value holding time	0.00~650.00s	0.00s

When the Inverter starts up, the PID starts closed-loop algorithm only after the PID output is fixed to the PID initial value (FA-21) and lasts the time set in FA-22.
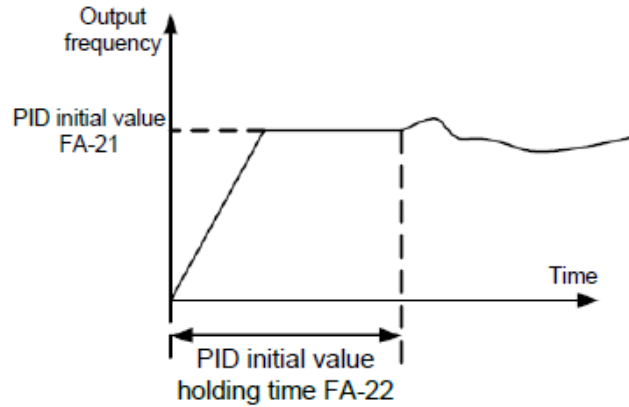

Diagram 5-28 PID initial value function

FA-23	Maximum deviation between two PID outputs in forward direction	0.00%~100.00%	1.00%
FA-24	Maximum deviation between two PID outputs in reverse direction	0.00%~100.00%	1.00%

This function is used to limit the deviation between two PID outputs (2 ms per PID output) to suppress the rapid change of PID output and stabilize the running of the Inverter.

FA-23 and FA-24 respectively correspond to the maximum absolute value of the output deviation in forward direction and in reverse direction

FA-25	PID integral property	Bit: Integral separation 0: Invalid 1: Valid Ten:Whether to stop the integral working after outputting to the limit 0: Continue integral working 1: Stop integral working	00

Integral separated

If it is set to valid, , the PID integral operation stops when the DI allocated with function 38 "PID integral pause" is ON In this case, only proportional and differential operations take effect.

If it is set to invalid, integral separated remains invalid no matter whether the DI allocated with function 38 "PID integral pause" is ON or not.

Whether to stop integral operation when the output reaches the limit

If "Stop integral operation" is selected, the PID integral operation stops, which may help to reduce the PID overshoot.

FA-26	PID feedback loss detection value	0.0%:Do not judge feedback loss 0.1%~100.0%	0.0%
FA-27	PID feedback loss detection time	0.0s~20.0s	0.0s

These parameters are used to judge whether PID feedback is lost.

If the PID feedback is smaller than the value of FA-26 and the lasting time exceeds the value of FA-27, the Inverter reports Err31 and acts according to the selected fault protection action.

FA-28	PID operation at stop	0: No PID operation at stop 1: PID operation at stop	0

It is used to select whether to continue PID operation in the state of stop. Generally, the PID operation stops when the Inverter stops.

Group FC: multi-step instructions, simple PLC

The inverter multi-reference has many functions. Besides multi-speed, it can be used as the setting source of the V/F separated voltage source and setting source of process PID. In addition, the multi-reference is relative value.

The simple PLC function is different from the inverter user programmable function. Simple PLC can only complete simple combination of multi-reference, while the user programmable function is more practical. For details, see the descriptions of group A7.

FC-00	Multi-funtion 1	-100.0%~100.0%	0.0%
FC-01	Multi-funtion 2	-100.0%~100.0%	0.0%
FC-02	Multi-funtion 3	-100.0%~100.0%	0.0%
FC-03	Multi-funtion 4	-100.0%~100.0%	0.0%
FC-04	Multi-funtion 5	-100.0%~100.0%	0.0%
FC-05	Multi-funtion 6	-100.0%~100.0%	0.0%
FC-06	Multi-funtion 7	-100.0%~100.0%	0.0%
FC-07	Multi-funtion 8	-100.0%~100.0%	0.0%
FC-08	Multi-funtion 9	-100.0%~100.0%	0.0%
FC-09	Multi-funtion 10	-100.0%~100.0%	0.0%
FC-10	Multi-funtion 11	-100.0%~100.0%	0.0%
FC-11	Multi-funtion 12	-100.0%~100.0%	0.0%
FC-12	Multi-funtion 13	-100.0%~100.0%	0.0%
FC-13	Multi-funtion 14	-100.0%~100.0%	0.0%
FC-14	Multi-funtion 15	-100.0%~100.0%	0.0%
FC-15	Multi-funtion 1	-100.0%~100.0%	0.0%

Multi-step can be the setting source of frequency, V/F separated voltage and process PID. The multi-reference is relative value and ranges from -100.0% to 100.0%.

As frequency source, it is a percentage relative to the maximum frequency. As V/F separated voltage source, it is a percentage relative to the rated motor voltage. As process PID setting source, it does not require conversion.

Multi-step can be switched over based on different states of DI terminals. For details, see the descriptions of group F4.

FC-16	Simple PLC running mode	0: Stop after the Inverter runs one cycle 1: Keep final values after the Inverter runs one cycle	FC-16

		2: Repeat after the Inverter runs one cycle	

0: Stop after the Inverter runs one cycle

The Inverter stops after running one cycle, and will not start up until receiving another command.

1: Keep final values after the Inverter runs one cycle

The Inverter keeps the final running frequency and direction after running one cycle.

2: Repeat after the Inverter runs one cycle

The Inverter automatically starts another cycle after running one cycle, and will not stop until receiving the stop command.

Simple PLC can be either the frequency source or V/F separated voltage source.

When simple PLC is used as the frequency source, whether parameter values of FC-00 to FC-15 are positive or negative determines the running direction. If the parameter values are negative, it indicates that the Inverter runs in reverse direction.
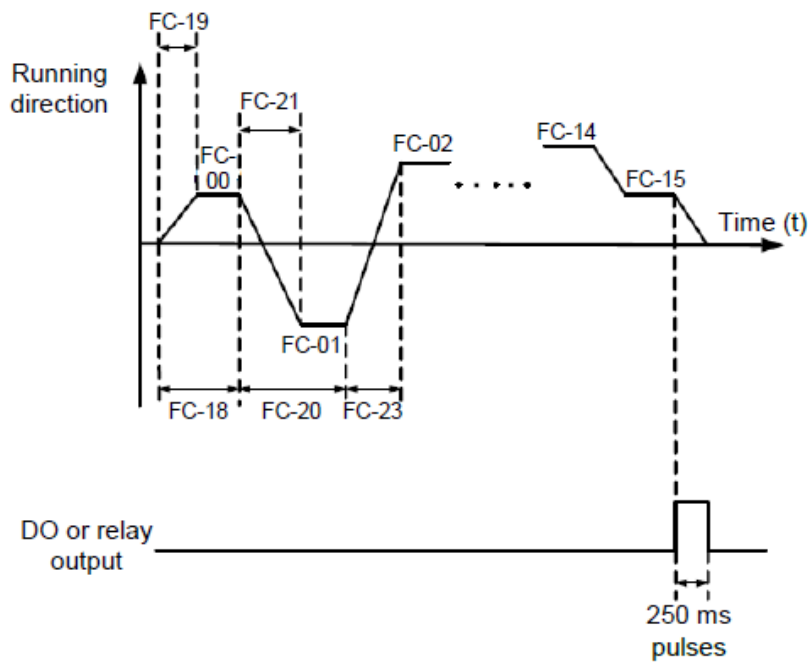

Diagram 5-29 Simple PLC when used as frequency source

FC-17	Simple PLC retentive selection	Bit: Power off memory options 0: No memory power-off 1: Power off memory Ten: Stop memory selection 0: Stop no memory 1: Stop memory	00

PLC retentive upon power failure indicates that the Inverter memorizes the PLC running moment and running frequency before power failure and will continue to run from the memorized moment after it is powered on again. If the unit's digit is set to 0, the Inverter restarts the PLC process after it is powered on again.

PLC retentive upon stop indicates that the Inverter records the PLC running moment and running frequency upon stop and will continue to run from the recorded moment after it starts up again. If the ten's digit is set to 0, the Inverter restarts the PLC process after it starts up again.

FC-18	Simple PLC segment 0 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-19	Simple PLC segment 0	0~3	0

	acceleration/deceleration time selection		
FC-20	Simple PLC segment 1 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-21	Simple PLC segment 1 acceleration/deceleration time selection	0~3	0
FC-22	Simple PLC segment 2 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-23	Simple PLC segment 2 acceleration/deceleration time selection	0~3	0
FC-24	Simple PLC segment 3 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-25	Simple PLC segment 3 acceleration/deceleration time selection	0~3	0
FC-26	Simple PLC segment 4 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-27	Simple PLC segment 4 acceleration/deceleration time selection	0~3	0
FC-28	Simple PLC segment 5 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-29	Simple PLC segment 5 acceleration/deceleration time selection	0~3	0
FC-30	Simple PLC segment 6 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-31	Simple PLC segment 6 acceleration/deceleration time selection	0~3	0
FC-32	Simple PLC segment 7 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-33	Simple PLC segment 7 acceleration/deceleration time selection	0~3	0
FC-34	Simple PLC segment 8 running time	0.0s(h)~6553.5s(h)	0.0s(h)
FC-35	Simple PLC segment 8 acceleration/deceleration time selection	0~3	0
FC-36	Simple PLC segment 9	0.0s(h)~6553.5s(h)	0.0s/h

	running time		
FC-37	Simple PLC segment 9 acceleration/deceleration time selection	0~3	0
FC-38	Simple PLC segment 10 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-39	Simple PLC segment 10 acceleration/deceleration time selection	0~3	0
FC-40	Simple PLC segment 11 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-41	Simple PLC segment 11 acceleration/deceleration time selection	0~3	0
FC-42	Simple PLC segment 12 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-43	Simple PLC segment 12 acceleration/deceleration time selection	0~3	0
FC-44	Simple PLC segment 13 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-45	Simple PLC segment 13 acceleration/deceleration time selection	0~3	0
FC-46	Simple PLC segment 14 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-47	Simple PLC segment 14 acceleration/deceleration time selection	0~3	0
FC-48	Simple PLC segment 15 running time	0.0s(h)~6553.5s(h)	0.0s/h
FC-49	Simple PLC segment 15 acceleration/deceleration time selection	0~3	0
FC-50	Simple PLC run time unit	0:s(2) 1:h(hour)	0
FC-51	Multi-function 0 given mode	0: Set by FC-00 1:AI1 2:AI2 4: PULSE setting 5: PID 6: Set by Preset frequency (F0-08), modified via terminal UP/DOWN	0

It determines the setting channel of reference 0. You can perform convenient switchover between the setting channels. When multi-reference or simple PLC is used as frequency source, the switchover between two

frequency sources can be realized easily.

Group Fd: Communication

Fd-00	Communication baud rate	Bit:MODBUS 0:300BPS 1:600BPS 2:1200BPS 3:2400BPS 4:4800BPS 5:9600BPS 6:19200BPS 7:38400BPS 8:57600BPS 9:115200BPS Ten: Reserved Hundred: Reserved	6005

This parameter is used to set the data transfer baud rate from host computer to frequency inverter. Please note that baud rate of the host computer and the inverter should be consistent. Otherwise, the communication is impossible. The higher the baud rate is, the faster the communication is.

Fd-01	MODBUS data format	0: No parity (8-N-2) 1: Even check (8-E-1) 2: Odd parity (8-O-1) 3: No parity (8-N-1) (MODBUS active)	0

The host computer and inverter setup data format must be consistent, otherwise, communication is impossible.

Fd-02	Local address	0: Broadcast address 1~249	1

When the local address is set to 0, that is, broadcast address, it can realize the broadcast function of host computer. The address is unique; it is base of point to point communication between host computer and frequency inverter.

Fd-03	MODBUS respond delay	0~20ms (MODBUS enable)	2

Response delay: it refers to the interval time from the inverter finishes receiving data to response data back to the host machine. If the response delay is less than the system processing time, then the response time is based on the time of the system processing. If the response delaying time is more than the system processing time, after the system processes the data, it should be delayed to wait until the response delay time is reached, and then sending back data to host machine

Fd-04	Serial communication timeout	0.0: Disabled 0.1~60.0s (MODBUS)	0.0

When this parameter is set to 0.0s, the communication interface timeout function is invalid.

When the function code is set to a value, if the interval time between this communication and the next communication is beyond the communication timeout, the system will report communication failure error (Err16). At normal application, it will be set as invalid. If in the continuous communication system, setting this parameter, you can monitor the communication status.

Fd-05	Modbus protocol selection	Unit's digit: Modbus protocol 0: Non-standard Modbus protocol	30

		1: Standard Modbus protocol Ten's digit: Reserved	

Fd-05=31: Select standard Modbus protocol.

Fd-05=30: When reading the command, the slave machine return is one byte more than the standard Modbus protocols.

Fd-06	Communication reading current resolution	0: 0.01A 1: 0.1A	0

It is used to confirm the unit of current value when the communication reads the output current.

Group FE: PV function

FE-00	PV inverter selection	0: Disabled 1: Enabled	1

If set to 0, inverter will be working as normal frequency inverter.

FE-01	Vmpp voltage reference selection	0: Manual 1: MPPT Automatic algorithm tracking	1
FE-02	Vmpp voltage manual setting value	0 - 1000.0V	500.0V

It is for setting solar panels working point voltage Vmpp. Solar water pump's working theory as below: Vmpp is selected between FE-01 MPPT running result and FE-02, then output running frequency by CVT controller.

FE-03	Motor Selection	0: General three phase ac motor 1: Single phase motor with capacitor 2: Single phase motor without capacitor	--

0: General three phase ac motor
1: Single phase motor with capacitor
2: Single phase motor without capacitor

FE-04	CVT proportional gain 1	0.0% - 999.9%	100.0%
FE-05	CVT Integral gain1	0.0% - 999.9%	100.0%

CVT controller is the core parts for solar water pump control, if any unbalance output frequency, please close MPPT(select manual reference Vmpp), then adjust proportional gain or Integral gain till frequency is stable; after that, open MPPT search again;
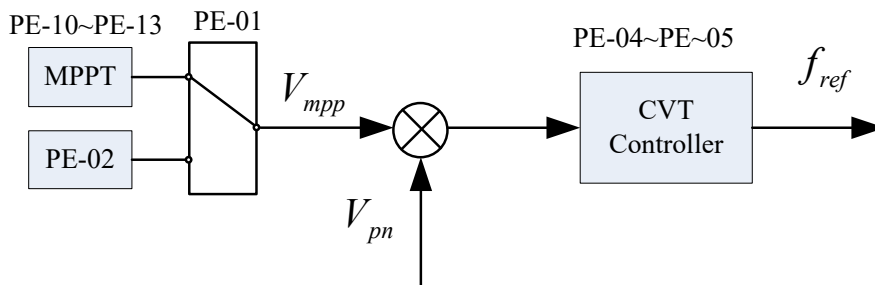

Diagram 5-30 Photovoltaic water pump control schematic

FE-10	Mppt search upper limit voltage	0 - 1000.0V	750.0V
FE-11	Mppt search lower limit voltage	0 - 1000.0V	300.0V
FE-12	MPPT search gain	0% - 500%	100%
FE-13	MPPT search time interval	0.0 - 10.0sec	1.0sec

FE-10/FE-11set MPPT search Vmpp's upper or limit value,FE-12 set search gain, FE-13 set search time interval，
If open MPPT, frequency fluctuation is very large, decrease search gain and increase search time interval to improve its stability.

FE-16	Dormancy voltage thresholds	0.0-1000.0V	300.0V
FE-17	Wake-up voltage thresholds	0.0-1000.0V	350.0V
FE-18	Wake-up delay time	0-30000sec	60sec

This group of parameters sets the dormancy function.

FE-19	Detection frequency of low frequency protection	0.00Hz~300.00Hz	10.00Hz
FE-20	Detection time of low frequency protection	0-30000s	10sec
FE-21	Auto-recovery time of low frequency protection	0-30000s	60sec

This group of parameters sets the low frequency protection function.

FE-22	Detection current of dry pumping protection	0.0-999.9A	0.0A
FE-23	Detection time of dry pumping protection	0-30000s	10sec
FE-24	Auto-recovery time of dry pumping protection	0-30000s	60sec

This group of parameters sets the dry pumping protection function.

FE-25	Detection current of overcurrent protection	0.0-999.9A	0.0A
FE-26	Detection time of overcurrent protection	0-30000s	10sec
FE-27	Auto-recovery time of over current protection	0 -30000s	60sec

This group of parameters sets the overcurrent protection function.

FE-28	Minimum. power protection value	0.00kw - 650.00kw	0.00kw
FE-29	Detection time of minimum power protection	0 - 30000s	0sec
FE-30	Auto-recovery time of minimum. power protection	0 - 30000s	0sec

This group of parameters sets the Min. power protection function.

FE-31	Full-water detection mode	0: Terminal 1: AI1 2: AI2	0
FE-32	Analog full-water detection Thresholds	0 - 100.0%	25.0%
FE-33	Detection time of full-water protection	0 - 30000sec	10sec
FE-34	Exit time of full-water protection	0 - 30000sec	60sec
FE-35	Analog sensor damaged Thresholds	0 - 100.0%	0.0%

FE-31 is for Full-water detection mode.

If set to 0, set any terminals(default DI4/DI5)function code to 51/52，two terminals enabled in same time could activate Full-water protection and two terminals disabled in same time could activate exit Full-water protection. One of the terminals enabled, remains its status without any change.

FE-33/FE-34 for detection time of full-water protection and exit time of full-water protection;

FE-35 for analog sensor damaged Thresholds，if FE-31 set to analog detection, and analog feedback is larger than the setting detectionThreshold value of FE-35. Judge it as analog sensor faults. Display A.Prb, and stop running; FE-31 set to 0, close sensor faults detection.

FE-36	PV DC correction coefficient	0.0 - 200.0%	100.00%
FE-37	PV DC correction offset	-100.00A - 100.00A	0.00A

As software estimating solar cells' DC current value, this parameters will correction this estimation value, U0-06 displays correction current, correction formula is U0-06 =(estimation value * FE-36)+ FE-37 ；

FE-38	Power curve point 0	0.0kw - 999.9kw	0.5kw
FE-39	Power curve point 1	0.0kw - 999.9kw	1.0kw
FE-40	Power curve point 2	0.0kw - 999.9kw	1.5kw
FE-41	Power curve point 3	0.0kw - 999.9kw	2.0kw
FE-42	Power curve point 4	0.0kw - 999.9kw	2.5kw
FE-43	Flow curve point 0	0.0 - 999.9m^3/h	0.0 m^3/h
FE-44	Flow curve point 1	0.0 - 999.9m^3/h	5.0 m^3/h
FE-45	Flow curve point 2	0.0 - 999.9m^3/h	10.0m^3/h
FE-46	Flow curve point 3	0.0 - 999.9m^3/h	15.0m^3/h
FE-47	Flow curve point 4	0.0 - 999.9m^3/h	20.0m^3/h

According output power(U0-05) calculate output flow speed(U0-13), User reference(P-Q curve), input to FE-38~FE-47, software automatically calculate U0-13；Generally, P-Q curve as below:
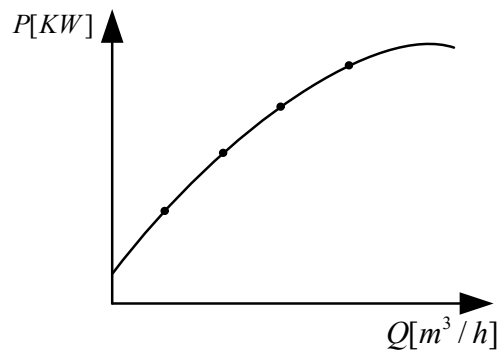
Diagram 5-31 P-Q curve

FP User password parameters

FP-00	User password	0 ~ 65535	0

If it is set to any non-zero number, the password protection function is enabled. After a password has been set and taken effect, you must enter the correct password in order to enter the menu. If the entered password is incorrect you cannot view or modify parameters.

If FP-00 is set to 00000, the previously set user password is cleared, and the password protection function is disabled.

FP-01	Restore default settings	0: No operation 1: Restore default settings except motor parameters and accumulation record. 2: Clear records	0

1. **Restore default settings except motor parameters**

If FP-01 is set to 1, most function codes are restored to the default settings **except** motor parameters, frequency command resolution (F0-22, fault records, accumulative running time (F7-09), accumulative power-on time (F7-13) and accumulative power consumption (F7-14).

2. **Clear records**

If FP-01 is set to 2, the fault records, accumulative power-on time (F7-13), accumulative running time (F7-09), and accumulative power consumption (F7-14) are cleared.

FP-04	Parameter modification property	0: Modifiable	0
		1: Not modifiable	

It is used to set whether the parameters are modifiable to avoid mal-function. If it is set to 0, all parameters are modifiable. If it is set to 1, all parameters can only be viewed.

Group U0: Monitor parameters

Group U0 is used to monitor the Inverter's running state. You can view the parameter values by using operation panel, convenient for on-site commissioning, or from the host computer by means of communication (address: 0x7000-0x7044).

U0-00	Running frequency	0.00~320.00 Hz (F0-22 = 2)
U0-01	Setting frequency	0.00~3200.0 Hz (F0-22 = 1)

These two parameters display the absolute value of theoretical running frequency and set frequency. For the actual output frequency of the Inverter, see U0-19.

U0-02	DC Bus voltage	0.0–3000.0 V

It displays the Inverter's bus voltage

U0-03	Output voltage	0–1140V

It displays the Inverter's output voltage in the running state.

U0-04	Output current	0.00–655.35 A (Inverter power ≤ 55 kW) 0.0–6553.5 A (Inverter power > 55 kW)

It displays the Inverter's output current in the running state.

U0-05	Output power	0~32767

It displays the Inverter's output power in the running state.

U0-06	Output torque	-200.0%–200.0%

It displays the Inverter's output torque in the running state.

U0-07	DI state	0~32767

It displays the current state of DI terminals. After the value is converted into a binary number, each bit corresponds to a DI. "1" indicates high level signal, and "0" indicates low level signal.

The corresponding relationship between bits and DIs is described in the following table.

Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7
DI1	DI2	DI3	DI4	DI5	HDI	DI7	DI8
Bit8	**Bit9**	**Bit10**	**Bit11**	**Bit12**	**Bit13**	**Bit14**	**Bit15**
DI9	DI10	VDI1	VDI2	VDI3	VDI4	VDI5	

U0-08	DO state	0~1023

It indicates the current state of DO terminals. After the value is converted into a binary number, each bit corresponds to a DO. "1" indicates high level signal, and "0" indicates low level signal. The corresponding relationship between bits and DOs is described in the following table.

Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7
DO3	Relay	Relay	DO1	DO2	VDO1	VDO2	VDO3
Bit8	**Bit9**	**Bit10**	**Bit11**	**Bit12**	**Bit13**	**Bit14**	**Bit15**
VDO4	VDO4						

U0-09	AI1 voltage	0.00–10.57 V
U0-10	AI2 voltage	0.00–20.00 mA

When F4-40 is set to 0, AI2 sampling data is displayed in the unit of V.

When F4-40 is set to 1, AI2 sampling data is displayed in the unit of mA.

U0-12	PV open circuit voltage	

It displays the inverter's PV open circuit voltage.

U0-13	Pump flow speed	

It displays the inverter's pump flow speed.

U0-14	Daily flow	

It displays the inverter's daily flow.

U0-15	Cumulative flow(low water level)	

It displays the inverter's cumulative flow(low water level)

U0-16	Cumulative flow (high water level)	

It displays the inverter's cumulative flow(high water level)

U0-17	Daily generated electricity	

It displays the inverter's daily generated electricity

U0-18	Cumulative electricity consumption(low water level)	

It displays the inverter's cumulative electricity consumption(low water level).

U0-19	Cumulative electricity consumption(high water level)	

It displays the inverter's cumulative electricity consumption(high water level)

U0-20	Remaining running time	0.0–6500.0 min

It displays the remaining running time when the timing operation is enabled. For details on timing operation, refer to F8-42 to F8-44.

U0-21	AI1 voltage before correction	0.00–10.57V
U0-22	AI2 voltage before correction	0.00–10.57 V 0.00–20.00 mA

They display the AI sampleding voltage/current value of AI. The actually used voltage/current is obtained after linear correction to reduce the deviation between the sampled voltage/current and the actual input voltage/current. For actual corrected voltage, see U0-09, U0-10 and U0-11. Refer to group AC for the correction mode.

U0-28	Communication setting value	-100.00%~100.00%

It displays the data written by means of the communication address 0x1000.

U0-30	Main frequency X	0.00–320.00 Hz 0.0–3200.0 Hz

It displays the setting of main frequency X.

If F0-22 (Frequency reference resolution) is 1, the display range is -3200.0–3200.0 Hz.

If F0-22 (Frequency reference resolution) is 2, the display range is -320.00–320.00 Hz.

U0-31	Auxiliary frequency Y	0.00–320.00 Hz 0.0–3200.0 Hz

It displays the setting of auxiliary frequency Y.

If F0-22 (frequency reference resolution) is 1, the display range is -3200.0–3200.0 Hz.

If F0-22 (frequency reference resolution) is 2, the display range is -320.00–320.00 Hz.

U0-35	Target torque	-200.0%–200.0%

It displays the current torque upper limit.

U0-37	Power factor angle	-

It displays the current power factor angle.

| U0-39	Target voltage of V/F separation	0 V to rated motor voltage
U0-40	Output voltage of V/F separation	0 V to rated motor voltage

They display the target output voltage and current actual output voltage in the V/F separation state. For V/F separation, see the descriptions of group F3.

U0-41	DI input state visual display	-

It displays the DI state visually and the display format is shown in the following diagram.
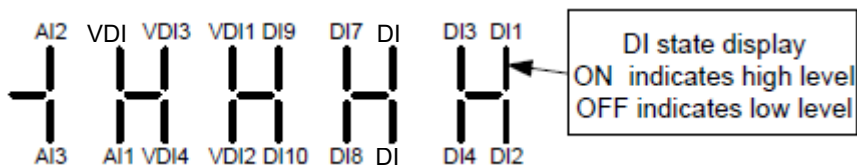
U0-42	DO output state visual display	-

It displays the DO state visually and the display format is shown in the following diagram.
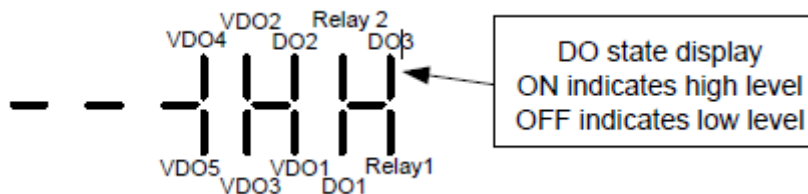
U0-43	DI function state visual display 1	-

It displays whether the DI functions 1-40 are valid. The operation panel has five 7-segment LEDs and each 7-segment LED displays the selection of eight functions. The 7-segment LED is defined in the following diagram.
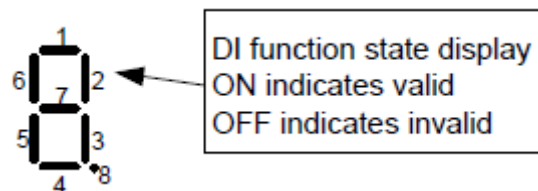
The 7-segment LED display functions 1-8, 9-16, 17-24, 25-32 and 33-40 respectively from right to left.

U0-44	DI function state visual display 2	-

It displays whether the DI functions 41–59 are valid. The display format is similar to U0-43.

The 7-segment LEDs display functions 41–48, 49–56 and 57–59, respectively from right to left.

U0-59	Present setting frequency (%)	-100.00%–100.00%
U0-60	Present running frequency (%)	-100.00%–100.00%

It displays the current set frequency and running frequency. 100.00% corresponds to the Inverter's maximum frequency (F0-10).

U0-61	Frequency inverter running state	0–65535

It displays the running state of the Inverter. The data format is listed in the following table:

U0-61	Bit0 Bit1	0: Stop 1: Forwarder running 2: Reverse running
	Bit 2 Bit3	0: Constant speed 1: Acceleration 2: Deceleration
	Bit 4	0:Normal DC bus voltage 1:Low DC bus voltage

U0-62	Current fault code	0~99

It displays the current fault code.

U0-63	Sent value of point-point communication	-100.00%–100.00%
U0-64	Received value of point-point communication	-100.00%–100.00%

It displays the data at point-point communication. U0-63 is the data sent by the master, and U0-64 is the data received by the slave.

U0-65	Torque upper limit	

It displays the current setting torque upper limit.

6. Fault Diagnosis and Solution

6.1 Fault Alarm and Countermeasures

 inverter has 35 types of warning information and protection function. In case of abnormal fault, the protection function will be invoked, the inverter will stop output, and the faulty relay contact of the inverter will start, and the fault code will be displayed on the display panel of the inverter. Before consulting the service department, the user can perform self-check according to the prompts of this chapter, analyze the fault cause and find out t solution. If the fault is caused by the reasons as described in the dotted frame, please consult the agents of inverter or our company directly. Among the 35 types of warning information, Err22 is hardware over current or over voltage signal. In most cases, the hardware over voltage fault will cause Err22 alarm.

Table 7-1 Common faults and solution of the frequency inverter

Fault Code	Err01	Fault Type	Inverter unit protection
1: The output circuit is grounded or short circuited. 2: The connecting cable of the motor is too long. 3: The IGBT overheat. 4: The internal connections become loose. 5: The main control board is faulty. 6: The drive board is faulty. 7: The inverter IGBT is faulty.			1: Eliminate external faults. 2: Install a reactor or an output filter. 3: Check the air filter and the cooling fan. 4: Connect all cables properly. 5: Ask for technical support 6: Ask for technical support 7: Ask for technical support
Fault Code	Err02/Err04	Fault Type	Over current during acceleration/ at constant speed
1: The output circuit is grounded or short circuited. 2: Motor auto-tuning is not performed. 3: The acceleration time is too short. 4: Manual torque boost or V/F curve is not appropriate. 5: The voltage is too low. 6: The startup operation is performed on the rotating motor. 7: A sudden load is added during acceleration. 8: The frequency inverter model is of too small power class.			1: Eliminate external faults. 2: Perform the motor auto- tuning. 3: Increase the acceleration time. 4: Adjust the manual torque boost or V/F curve. 5: Adjust the voltage to normal range. 6: Select rotational speed tracking restart or start the motor after it stops. 7: Remove the added load. 8: Select a frequency inverter of higher power class.
Fault Code	Err03	Fault Type	Over current during deceleration
1: The output circuit is grounded or short circuited. 2: Motor auto-tuning is not performed. 3: The deceleration time is too short. 4: The voltage is too low. 5: A sudden load is added during deceleration. 6: The braking unit and braking resistor are not installed.			1: Eliminate external faults. 2: Perform the motor auto-tuning. 3: Increase the deceleration time. 4: Adjust the voltage to normal range. 5: Remove the added load. 6: Install the braking unit and braking resistor.
Fault Code	Err05/ Err06	Fault Type	Overvoltage during acceleration/deceleration
1: The input voltage is too high. 2: An external force drives the motor during acceleration. 3: The acceleration/deceleration time is too short. 4: The braking unit and braking resistor are not installed.			1: Adjust the voltage to normal range. 2: Cancel the external force or install a braking resistor. 3: Increase the acceleration/deceleration time. 4: Install the braking unit and braking resistor.
Fault Code	Err07	Fault Type	Overvoltage at constant speed
1: The input voltage is too high. 2: An external force drives the motor during deceleration.			1: Adjust the voltage to normal range. 2: Cancel the external force or install the braking resistor.

Fault Code	Err08	**Fault Type**	Control power supply fault
The input voltage is not within the allowable range.			Adjust the input voltage to the allowable range.
Fault Code	Err09	**Fault Type**	Low voltage
1: Instantaneous power failure occurs on the input power supply. 2: The frequency inverter's input voltage is not within the allowable range. 3: The DC bus voltage is abnormal. 4: The rectifier bridge and buffer resistor are faulty. 5: The drive board is faulty. 6: The main control board is faulty.			1: Reset the fault. 2: Adjust the voltage to normal range. 3: Ask for technical support 4: Ask for technical support 5: Ask for technical support 6: Ask for technical support
Fault Code	Err10	**Fault Type**	Frequency inverter overload
1: The load is too heavy or locked- rotor occurs on the motor. 2: The frequency inverter model is of too small power class.			1: Reduce the load and check the motor and mechanical condition. 2: Select a frequency inverter of higher power class.
Fault Code	Err12	**Fault Type**	Power input phase loss
1: The three-phase power input is abnormal. 2: The drive board is faulty. 3: The lightningproof board is faulty. 4: The main control board is faulty.			1: Eliminate external faults. 2: Ask for technical support. 3: Ask for technical support. 4: Ask for technical support.
Fault Code	Err13	**Fault Type**	Power output phase loss
1: The cable connecting the frequency inverter and the motor is faulty. 2: The frequency inverter's three-phase outputs are unbalanced when the motor is running. 3: The drive board is faulty. 4: The IGBT module is faulty.			1: Eliminate external faults. 2: Check whether the motor three phase winding is normal. 3: Ask for technical support. 4: Ask for technical support.
Fault Code	Err14	**Fault Type**	IGBT Module overheat
1: The ambient temperature is too high. 2: The air filter is blocked. 3: The fan is damaged. 4: The thermally sensitive resistor of the IGBT module is damaged. 5: The inverter IGBT module is damaged.			1: Lower the ambient temperature. 2: Clean the air filter. 3: Replace the damaged fan. 4: Replace the damaged thermally sensitive resistor. 5: Replace the inverter module.
Fault Code	Err15	**Fault Type**	External equipment fault
1: External fault signal is input via DI. 2: External fault signal is input via virtual I/O.			1: Reset the operation. 2: Reset the operation.
Fault Code	Err16	**Fault Type**	Communication fault
1: The host computer is in abnormal state. 2: The communication cable is faulty. 3: The communication extension card is set improperly. 4: The communication parameters in group bA are set improperly.			1: Check the cabling of host computer. 2: Check the communication cabling. 3: Set the communication extension card correctly. 4: Set the communication parameters properly.
Fault Code	Err18	**Fault Type**	Current detection fault
1: The HALL device is faulty. 2: The drive board is faulty.			1: Replace the faulty HALL device. 2: Replace the faulty drive board.
Fault Code	Err22	**Fault Type**	Frequency inverter hardware fault
1: Overvoltage exists. 2: Over current exists.			1: Handle based on over voltage. 2: Handle based on over current.

Ar: Parameters for Alarm

Fault Code	Ar.01	Fault Type	Dormancy protection
When the voltage is lower than value of FE-16, the inverter will give dormancy alarm.			
Fault Code	Ar.02	Fault Type	Low frequency protection
When the frequency is lower than value of FE-19, the inverter will give low frequency protection alarm.			
Fault Code	Ar.03	Fault Type	Dry pumping rotection /underload
When the current is lower than value of FE-22, the inverter will give dry pumping protection(underload) alarm.			
Fault Code	Ar.04	Fault Type	Overcurrent protection
When the current is lower than value of FE-25, the inverter will give overcurrent rotection alarm.			
Fault Code	Ar.05	Fault Type	Minimum power protection
When the power is lower than value of FE-28, the inverter will give minimum power protection alarm.			
Fault Code	Ar.06	Fault Type	Full-water protection
Define DI terminal to 51/52, enable ON, and both are enabled ON will give full-water protection alarm.			
Fault Code	Ar.07	Fault Type	Analog sensor fault
When FE-31 = 1 or 2, and the analog feedback value is bigger than value of FE-35, the inverter will give analog sensor fault alarm.			

Appendix I. Modbus communication protocol

Our inverter provides RS485 communication interface, and adopts MODBUS communication protocol. User can carry out centralized monitoring through PC/PLC to get operating requirements. And user can set the running command, modify or read the function codes, the working state or fault information of frequency inverter by Modbus communication protocol.

I. About Protocol

This serial communication protocol defines the transmission information and use format in the series communication and it includes master-polling (or broadcasting) format, master coding method and the content includes function code of action, transferring data and error checking. The response of slave is the same structure, and it includes action confirmation, returning the data and error checking etc. If slave takes place the error while it is receiving the information or cannot finish the action demanded by master, it will send one fault signal to master as a response.

II. Application Methods

The frequency inverter will be connected into a "Single-master Multi-slave" PC/PLC control net with RS485 bus as the communication slave.

III. Bus structure

1) Hardware interface.

The "485+" and "485-"terminals on frequency inverter are the communication interfaces of Modbus

2) Topological mode

It is a "Single-master Multi-slave" system. In this network, every communication machine has a unique slave address. One of them is as "master" (usually PC host machine, PLC and HMI, etc.), actively sends out the communication, to read or write the parameters of slave. Other machines will be used as slave and response to the inquiry/command from master. At one time only one machine can send the data and other machines are in the receiving status. The setup range of slave address is 0 to 247. Zero refers to broadcast communication address. The address of slave must is exclusive in the network.

3) Transmission mode

There provide asynchronous series and half-duplex transmission mode. In the series asynchronous communication, the data is sent out frame by frame in the form of message. According to the Modbus-RTU protocol, when the free time of no transmission in communication data lines is more than the transmission time of 3.5byte, it indicates that a new start of communication frame.
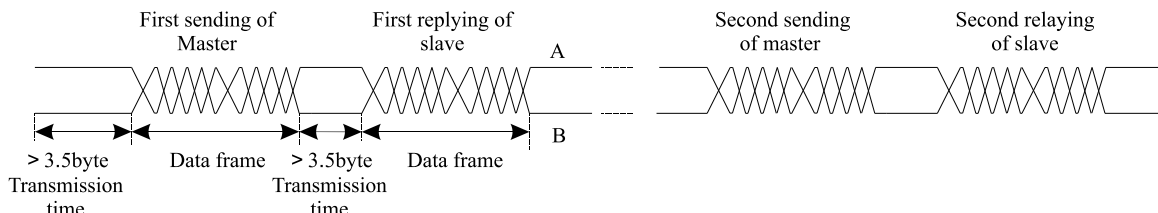
Our inverter has built-in the Modbus-RTU communication protocol, and is applicable to response the slave "Inquiry/command" or doing the action according to the master's "Inquiry / Command" and response to the data.

Here, master is personnel computer (PC), industrial machine or programmable logical controller (PLC), and the slave is inverter. Master not only visits some slave, but also sends the broadcast information to all the slaves. For
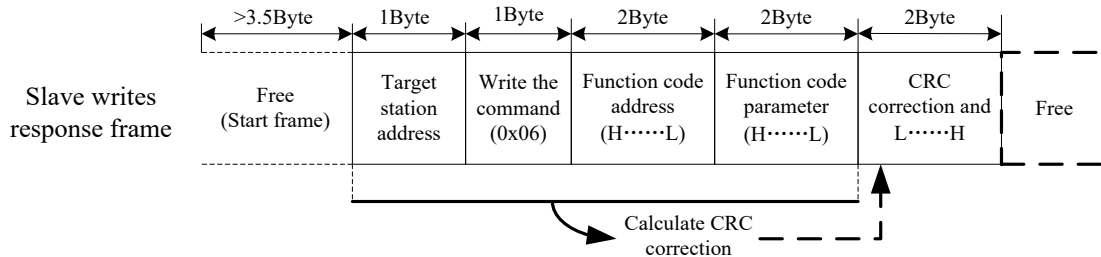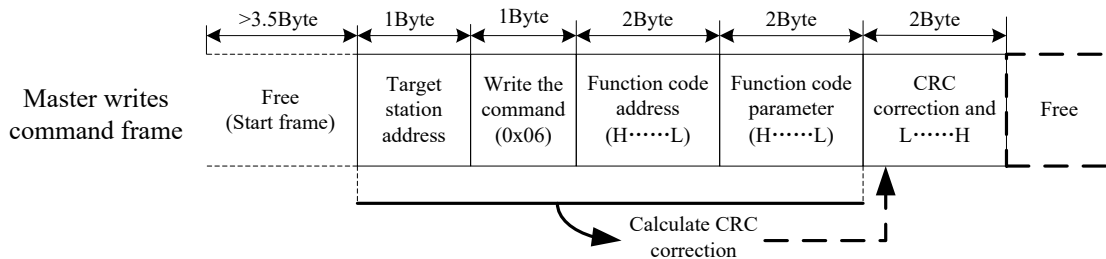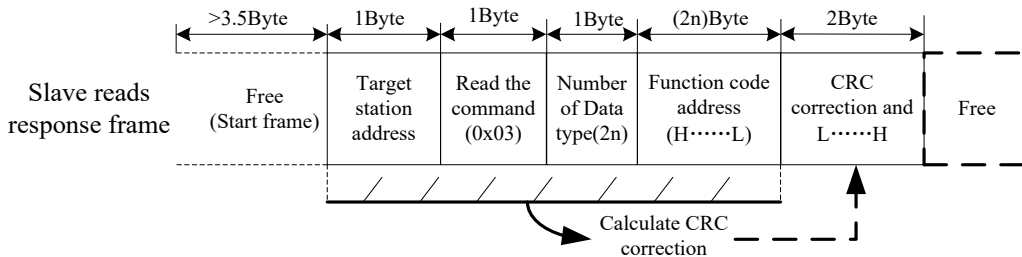
the single master "Inquiry/Command", all of slaves will return a signal that is a response; for the broadcast information provided by master, slave needs not feedback a response to master machine.

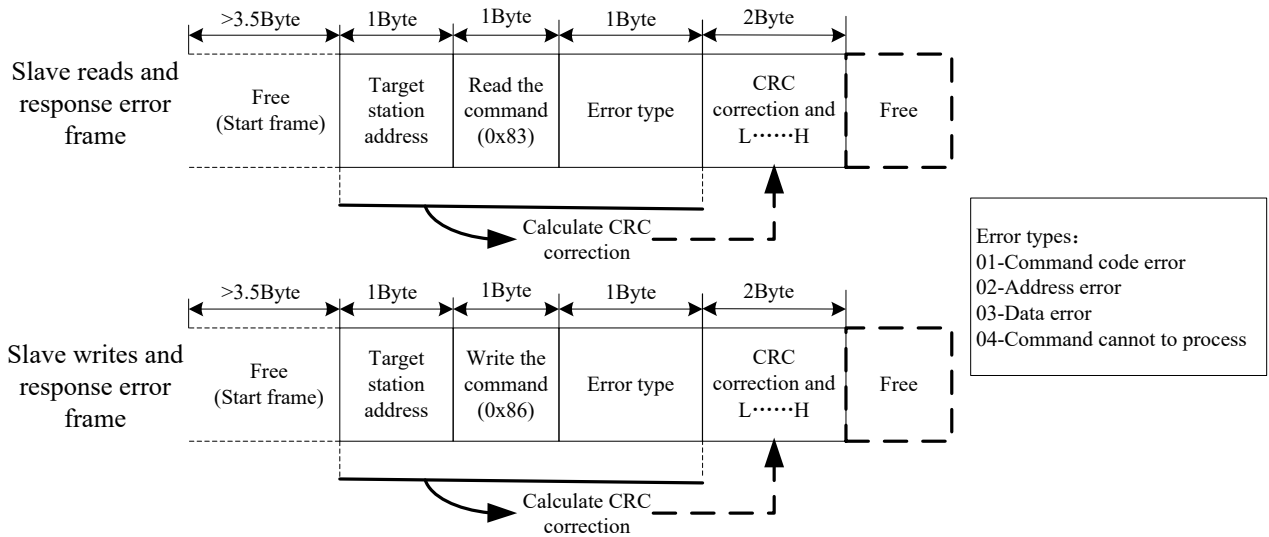**Communication data structure**

Modbus protocol communication data format of Our inverter is shown as following. The inverter only support the reading and writing of Word type parameters, the corresponding reading operation command is "0x03", the writing operation command is "0x06". The writing and reading operation of byte or bit is not supported.

Master reads command frame

>3.5Byte	1Byte	1Byte	2Byte	2Byte	2Byte	
Free (Start frame)	Target station address	Read the command (0x03)	Function code address (H······L)	Number of function code(n)	CRC correction and L······H	Free

Calculate CRC correction
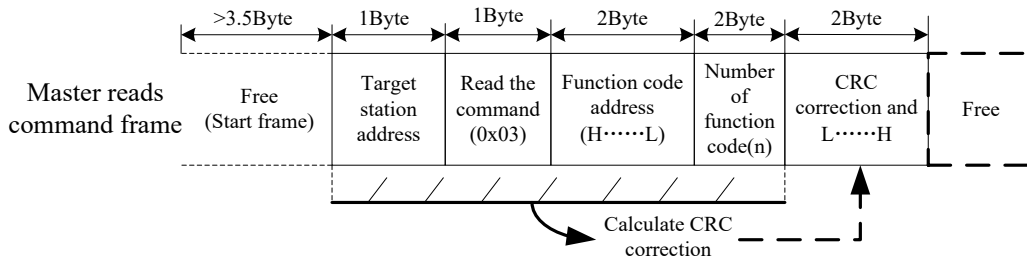
In theory, the host computer can continuously read several function codes once (that is, the maximum value of "n" is 12), but note that not to jump across the last function code in this function group to avoid the wrong reply.

Slave reads response frame

>3.5Byte	1Byte	1Byte	1Byte	(2n)Byte	2Byte	
Free (Start frame)	Target station address	Read the command (0x03)	Number of Data type(2n)	Function code address (H······L)	CRC correction and L······H	Free

Calculate CRC correction

Master writes command frame

>3.5Byte	1Byte	1Byte	2Byte	2Byte	2Byte	
Free (Start frame)	Target station address	Write the command (0x06)	Function code address (H······L)	Function code parameter (H······L)	CRC correction and L······H	Free

Calculate CRC correction

Slave writes response frame

>3.5Byte	1Byte	1Byte	2Byte	2Byte	2Byte	
Free (Start frame)	Target station address	Write the command (0x06)	Function code address (H······L)	Function code parameter (H······L)	CRC correction and L······H	Free

Calculate CRC correction

If the wrong communication frame was detected by the salve or other reasons caused the failure of reading and writing, the wrong frame will be replied.

RTU frame format

Frame start (START)	More than the 3.5- character time
Slave address(ADR)	Communication address:1 to 247(0: broadcast address)
Command code(CMD)	03: Read slave parameters 06: Write slave parameters
Function code address(H)	It indicates the external parameter address of frequency inverter in hexadecimal format; There are functional code or non-functional code (such as running state
Function code address(L)	parameter/ running command parameters) type parameters, for details see the address definition. During the transmission, high bit is put in the front, and low bit is at the back.
Number of function code(H)	It indicates the number of function code ready by the frame. If it is "1", then it indicates that it reads one function code. During the transmission, high bit is
Number of function code(L)	put in the front, and low bit is at the back. Only one function code can be modified at one time without the field.
Data(L)	It indicates the replying data or the data waiting to write-in. During the
Data(H)	transmission, high bit is put in the front, and low bit is at the back.
END	3.5- character time

CRC Checking

In RTU mode, messages include an error-checking field that is based on a CRC method. The CRC field checks the contents of the entire message. The CRC field is two bytes, containing a16-bit binary value. The CRC value is calculated by the transmitting device, which appends the CRC to the message. The receiving device recalculates a CRC during receipt of the message, and compares the calculated value to the actual value it received in the CRC field.

If the two values are not equal, that means transmission is error

The CRC is started by 0xFFFF.Then a process begins of applying successive eight-bit bytes of the message to the current contents of the register. Only the eight bits of data in each character are used for generating the CRC. Start and stop bits, and the parity bit, do not apply to the CRC. During generation of the CRC, each eight-bit character is exclusive ORed with the register contents. Then the result is shifted in the direction of the least significant bit (LSB), with a zero filled into the most significant bit (MSB) position. The LSB is extracted and examined. If the LSB was a 1, the register is then exclusive ORed with a preset, fixed value. If the LSB was a 0, no exclusive OR takes place. This process is repeated until eight shifts have been performed. After the last (eighth) shift, the next eight-bit byte is exclusive ORed with the register's current value, and the process repeats for eight more shifts as

described above. The final contents of the register, after all the bytes of the message have been applied, is the CRC value.

When the CRC is appended to the message, the low-order byte is appended first, followed by the high-order byte.

unsigned int crc_chk_value(unsigned char *data_value,unsigned char length

```
{unsigned int crc_value=0xFFFF;
    int i;
    while(length--)
    {crc_value^=*data_value++;
        for(i=0;i<8;i++)
        {if(crc_value&0x0001)
            {crc_value=(crc_value>>1)^0xa001;
            }
            else
            {
                crc_value=crc_value>>1;
            }
        }
    }
    return(crc_value);
}
```

Definition of communication parameter address

Read and write function-code parameters (Some functional code is not changed, only for the manufacturer use.)

The group number and mark of function code is the parameter address for indicating the rules.

High level bytes: F0~FF(Group F), A0~AF(GroupA), 70-7F(Group U)

Low level bytes: 00 ~ FF

For example: F3-12, address indicates to 0xF30C.

Note: Group U0: Only for reading parameter, cannot be changed parameters.

Some parameters cannot be changed during operation, some parameters regardless of what kind of state the inverter in, the parameters cannot be changed. Change the function code parameters, pay attention to the scope of the parameters, units, and relative instructions.

Function code group	Communication inquiry address	Inquiry address When Communication modifies RAM
F0~FE	0xF000~ 0xFEFF	0x0000~ 0x0EFF
U0	0x7000~ 0x70FF	

Besides, due to EEPROM be frequently stored, it will reduce the lifetime of EEPROM. In the communication mode, and some function codes don't have to be stored as long as change the RAM value.

Stop/start parameter

Parameter address	Parameter description	Parameter address	Parameter description
1000H	Communication set value(-10000 ~ 10000)(Decimal)	1010H	PID setting
1001H	Running frequency	1011H	PID feedback
1002H	DC Bus voltage	1012H	PLC process
1003H	Output voltage	1013H	Pulse input frequency, unit: 0.01KHz
1004H	Output current	1014H	Feedback speed, unit:0.1Hz
1005H	Output power	1015H	Remaining running time
1006H	Output torque	1016H	Voltage before AI1correction
1007H	Running speed	1017H	Voltage before AI2correction

1008H	DI input terminal	1018H	Reserved
1009H	DO output terminal	1019H	Reserved
100AH	AI1 voltage	101AH	Present power-on time
100BH	AI2 voltage	101BH	Present running time
100CH	Reserved	101CH	Pulse input frequency, unit:1Hz
100DH	Counting value input	101DH	Communication setting value
100EH	Length value input	101EH	Actual feedback speed
100FH	Load speed	101FH	Main frequency X display
		1020H	Auxiliary frequency Y display

Note: Communication setting value is the percentage of relative value, 10000 corresponds to 100%, -10000 correspond to -100.00%.

Control command input frequency inverter: (write in only)

Command word address	Command function
2000H	0001: Forward running
	0002: Reverse running
	0003: Forward jog
	0004: Reverse jog
	0005: Free stop
	0006:Decelerating stop
	0007: Fault reset

Read inverter status: (read only)

Command word address	Command function
3000H	0001: Forward running
	0002: Reverse running
	0003: Stop

Parameter locking password collation: (If the feedback is the 8888H, it indicates the password collation passed)

Password address	Contents of input password
1F00H	*****

Digital output terminal control: (write in only)

Address Of locking password command	Contents of locking password command
2001H	BIT0: DO1 output control
	BIT1: DO2 output control
	BIT2: Relay 1 output control
	BIT3: Relay 2 output control
	BIT4: FMR output control
	BIT5: VDO1
	BIT6: VDO2
	BIT7: VDO3
	BIT8: VDO4
	BIT9: VDO5

Analog output AO1 control: (write in only)

Command word address	Command function
2002H	0~7FFF indicates 0%~100%

Analog output AO2 control: (write in only)

Command word address	Command function
2003H	0~7FFF indicates 0%~100%

Pulse output control: (write in only)

Command word address	Command function
2004H	0~7FFF indicates 0%~100%

Inverter fault description:

Inverter fault description	Inverter fault information	
8000H	0000: No fault 0001: Reserved 0002: acceleration over current 0003: deceleration over current 0004: Constant speed over current 0005: acceleration over voltage 0006: deceleration over voltage 0007:Constant speed over voltage 0008: Buffer resistor fault 0009: less voltage fault 000A:Frequency inverter overload 000B: Motor overload 000C: Input phase failure 000D: Output phase failure 000E: IGBT overheat 000F: External equipment fault 0010: Communication fault 0011: Contactor fault 0012: Current detection fault 0013: Motor auto-tuning fault 0014: Encoder/PG fault	0015: EEPROM read-write in fault 0016: Frequency inverter hardware fault 0017: Short circuit to ground fault 0018: Reversed 0019: Reversed 001A: Accumulative running time reached 001B: User-defined fault 1 001C: User-defined fault 2 001D: Accumulative power-on time reached 001E: Off load 001F: PID lost during running 0028: fast current limit fault 0029: Motor switchover fault during running 002A: Too large speed deviation 002B: Motor over-speed 002D: Motor overheat 005A: Encode lines setting fault 005B: Not connect to the encoder 005C: Initial location fault 005E: Speed feedback fault

Group Fd Communication parameters

		Bit:MODBUS		
Fd-00	Communication baud rate	0:300BPS 1:600BPS 2:1200BPS 3:2400BPS 4:4800BPS 5:9600BPS	6:19200BPS 7:38400BPS 8:57600BPS 9:115200BPS Ten: Reserved Hundred: Reserved	6005

This parameter is used to set the data transfer rate from host computer and the frequency inverter. Please note that baud ratio of the host computer and the inverter should be consistent. Otherwise, the communication is impossible. The higher the baud ratio is, the faster the communication is.

Fd-01	MODBUS data format	0: No parity (8-N-2) 1: Even check (8-E-1) 2: Odd parity (8-O-1) 3: No parity (8-N-1)	0

		(MODBUS active)	

The host computer and frequency inverter setup data format must be consistent, otherwise, communication is impossible.

Fd-02	Local address	0:Broadcast address 1~249	1

When the local address is set to 0, that is, broadcast address, it can realize the broadcast function of host computer.

Fd-03	MODBUS respond delay	0~20ms (MODBUS enable)	2

Response delay time: it refers to the interval time from the inverter finishes receiving data to sending data to the host machine. If the response time is less than the system processing time, then the response delay time is based on the time delay of the system processing time. If the response delay time is more than the system processing time, after the system processes the data, it should be delayed to wait until the response delay time is reached, then sending data back to host machine.

Fd-04	Serial communication timeout	0.0:Disable 0.1~60.0s (MODBUS)	0.0

When the function is set to 0.0s, the communication interface timeout parameter is invalid.

When the function code is set to time value, if the interval time between the communication and the next communication is beyond the communication timeout, the system will report communication failure error (Err16). At normal circumstances, it will be set as invalid. If in the continuous communication system, set this parameter, you can monitor the communication status.

Fd-05	Modbus protocol selection	Unit's digit: Modbus protocol 0: Non-standard Modbus protocol 1: Standard Modbus protocol Ten's digit: Reserved	30

Fd-05=1: Select standard Modbus protocol.

Fd-05=0: When reading the command, the slave machine return is one byte more than the standard Modbus protocols.

Fd-06	Communication reading current resolution	0: 0.01A 1: 0.1A	0

It is used to confirm the unit of current value when the communication reads the output current.