M200 Series High-performance General Inverter

User Manual (V1.0)

Shenzhen EasyDrive Electric Co., Ltd.

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Preface

Thank you for using the M200 Series General Sensorless Vector Control Inverter (“M200 inverter”) manufactured by Shenzhen EasyDrive Electric Co., Ltd.

As the latest general inverter based on the sensorless complete current vector control algorithm developed by Shenzhen EasyDrive Electric Co., Ltd., M200 Series General Sensorless Vector Control Inverter has a series of practical and advanced functions including self-identification of motor parameters, analog output, flexible frequency setting method and multiple frequency combination setting as well as RS485 communication, etc.

Before using the M200 inverter, the inverter user and the relevant technicians shall read the User Manual carefully to ensure the correct installation and operation of the inverter and its optimal performance.

The User Manual is subject to change without prior notice. The new edition shall prevail.

Intended Readers

The User Manual is intended for the following people to read:

Inverter installation personnel, engineers and technicians (electrical engineers and electrical operators), and designers, etc.

Please ensure the User Manual is to be received by end user.

Conventions

Sign Convention


Note The operation not in accordance with requirements may cause moderate injury or minor injury.


Danger The operation not in accordance with requirements may cause death or serious injury.

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Chapter 6 Detailed Description of Parameter Use

Chapter 7 Fault Diagnosis and Troubleshooting

Chapter 8 Maintenance and Care

Chapter 1 General

1.1 Product Confirmation

When opening the housing, please confirm carefully if any damage or scratch occurred in the transport or if the rated value of the machine on nameplate complies with your ordering requirement.

In case of any problem, please contact with your supplier or our company directly.

Description of Inverter Type:

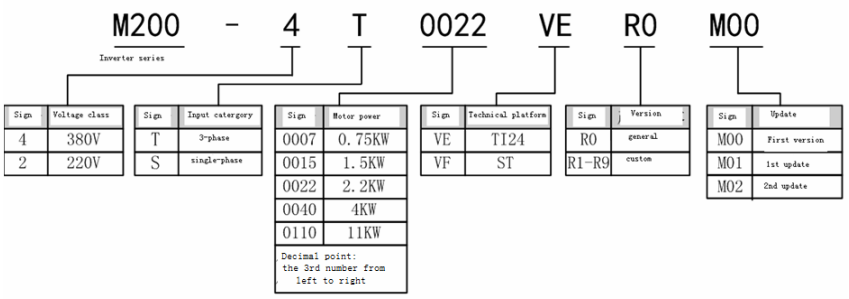


Figure 1-1Description of Inverter Type

The nameplate marked with inverter type and rated values is stamped at the lower part of the right side plate of the inverter case as shown below:

Figure 1-2 Inverter Nameplate

1.2 Precautions for Safety

- **Please confirm the product when receiving it.**

 Note
1. Do not install any damaged inverter or the inverter with any part or accessory missed to avoid personal injury.

- **Installation**

 Note
1. Please hold the bottom of inverter when transporting. If only holding the panel, the main inverter body may drop with the risk of hurting foot. 2. Please install the inverter on the nonflammable plate. Or else, it may cause fire. 3. If to install two or more inverters in the same control cabinet, please equip cooling fan and keep the air temperature of the air inlet under 40℃, because overheat may cause fire or other accidents.

- **Wiring**

 Danger
1. Please confirm that the input power has been cut off before wiring, or else it may cause electric shock or fire. 2. The wiring work shall be carried out by the professional electrical engineers, or else it may cause electric shock or fire. 3. The grounding terminal shall be earthed firmly and reliably to prevent electric shock. 4. When the emergency stop terminal is connected, do check its action is effective or not, or else it may cause injury (the wiring responsibility shall be taken by user). 5. Please do not touch output terminal directly. Do not connect the output terminal of inverter with the external housing and do not short-circuit output terminals, or else it may result in electric shock or short circuit.
 Note

1. Please confirm the power source of AC main circuit is in accordance with the rated voltage of inverter to avoid the risks of injury and fire.
2. Please do not carry out withstand voltage test to inverter, or else it may damage its components including semiconductor.
3. Please connect brake resistor or brake unit according to the wiring diagram, or else it may cause fire.
4. Please fasten terminals with screwdriver of the specified torque to avoid fire danger.
5. Please do not connect the input power line to the output terminals U, V and W. If the voltage connected to the output terminal, it may cause the internal damage of inverter.
6. Please do not connect phase-shifting capacitor and LC/RC noise filter to output circuit, or it may cause internal damage of inverter.
7. Please do not connect solenoid switch and electromagnectic contactor to the input circuit. When the inverter is running in idle, the surge current caused by the activation of solenoid switch and electromagnetic contactor may lead to the overcurrent protection action of inverter.

- **Care and Maintenance**

Danger

1. Please do not touch the wiring terminal of inverter for it has high voltage, or else it may cause electric shock.
2. Before powering on, please do install the panel well but cut off power when dismantling the panel, or else it may cause electric shock.
3. Non-professional technicians are not allowed to carry out maintenance and inspection work, or else it may cause electric shock.

Note

1. Special attention shall be paid when using CMOS integrated circuit for it is equipped with keyboard, control circuit board and drive circuit board. Do not touch circuit board directly by your finger, or else the resulted electrostatic induction may damage the integrated chip on circuit board.
2. When power on, do not change wiring and remove terminal wiring. When the inverter is running, do not check signal, or else it may damage the machine.

1.3 Precautions for Use

Attention shall be paid to the following aspects when using the M200 inverter:

1.3.1 Constant-torque Low-speed Run

If the inverter runs together with common motor at low speed for a long time, the work life of the

motor will be influenced for poor cooling effect. So, if the motor needs to run at low speed with constant torque for a long time, the special variable frequency motor shall be used.

1.3.2 Confirmation of Motor Insulation

When applying the M200 inverter to drive motor, please confirm the insulation situation of the motor used first to avoid damaging the machine. In addition, in case the motor environment is much poor, please check its insulation situation regularly to ensure the system works safely.

1.3.3 Negative Torque Load

As for the application situation with strict requirements on the deceleration time of motor, the inverter may trip for overcurrent or overvoltage due to too short deceleration time. In this case, the optional brake resistor shall be considered.

1.3.4 Mechanical Resonance Points of Load Device

In the certain range of output frequency, the inverter may come into with the mechanical resonance point of load device, which shall be avoided by setting hopping frequency.

1.3.5 Capacitor or Voltage-sensitive Component to Improve Power Factor

For the output voltage of inverter is pulse wave type, any capacitor or lightning-proof voltage-sensitive component that can improve power factor shall be removed from the output side because it may cause fault trip of the inverter or component damage. In addition, it is suggested not to equip any switch component including air switch or contactor to the output side, as shown in Figure 1-3. (if the switch component needs to be connected to the output side, do ensure the output current of the inverter is 0 in case of any switch action).

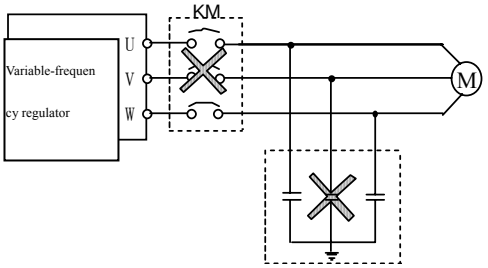


Figure 1-3 Capacitor Prohibited at the Output Terminal of Inverter

1.3.6 Run by the Frequency over 50Hz

If the running frequency exceeds 50Hz, the vibration and noise of motor will increase. Besides, the working speed range of the motor shaft and mechanical device shall be confirmed. Therefore, do make inquiry in advance.

1.3.7 Electric Heat Protection Value of Motor

When selecting the applicable motor, the inverter can carry out heat protection to motor. If the motor does not match with the rated capacity of inverter, the protection value shall be adjusted or other protection measures shall be taken to ensure the safe run of motor.

1.3.8 Altitude and Derated Application

In the area with its altitude over 1000m, the inverter shall be applied by derating, because the thin air will decrease the cooling effect of inverter. The Figure 1-4 shows the relation curve between the rated current of inverter and altitude.

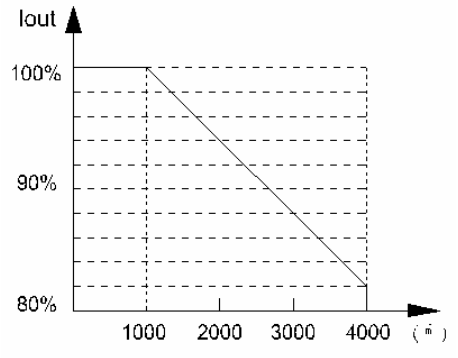


Figure 1-4 Relation Curve between the Rated Output Current of Inverter and Altitude

1.3.9 Protection Grade

The protection grade IP20 of the M200 inverter means the grade reached after installing keyboard.

1.4 Precautions for Abandonment

When abandoning the inverter, the attention shall be paid to the following aspects:

Explosion may happen when burning the electrolytic capacitor of the main circuit and that on the printed board. Toxic gas may generate after burning plastic pieces. So, please handle them as industrial refuse.

Chapter 2 Product Specifications and Ordering Instructions

2.1 Inverter Types

The M200 inverter has two voltages: 220V and 380V and its applicable motor power range is 0.75KW～22KW. The types of the M200 inverter is as shown by the Table 2-1.

Table 2-1 Types of M200 Inverter

Voltage class	Inverter type	Rated current (A)	Applicable motor (KW)
380V 3-phase	M200-4T0007VER0M00	2.5	0.75
	M200-4T0015VER0M00	3.7	1.5
	M200-4T0022VER0M00	5.0	2.2
	M200-4T0040VER0M00	9.0	4.0
	M200-4T0055VER0M00	13.0	5.5
	M200-4T0075VER0M00	17.0	7.5
	M200-4T0110VER0M00	25.0	11
	M200-4T0150VER0M00	32.0	15
	M200-4T0185VER0M00	37.0	18.5
	M200-4T0220VER0M00	45.0	22
220V single-phase	M200-2S0007VER0M00	4.5	0.75
	M200-2S0015VER0M00	7.0	1.5
	M200-2S0022VER0M00	10.0	2.2

Note: for any inverter of other power, please contact the manufacturer before ordering.

2.2 Technical Specifications

Table 2-2 Technical Specifications for the M200 Inverter

Item		**Standard specifications**
Input	Rated voltage and frequency	Single-phase 220V, 3-phase 220V, 3-phase 380V; 50Hz/60Hz
	Allowable variation	Voltage: -20% ～ +20% voltage unbalance rate: <3% frequency: ±5%Hz
Output	Rated voltage	0～220V/0～380V
	Frequency	0Hz～600Hz

Major control functions	Modulation mode	Optimizing space voltage vector PWM
	Control mode	Speed sensorless vector control
	Frequency accuracy	Digital setting: max. frequency ×±0.01%; Analog setting: max. frequency ×±0.2%
	Frequency	Digital setting: 0.01Hz；Analog setting: max. frequency×0.1%
Item		**Standard specifications**
Continued	Starting	0.0Hz～10.00Hz
	Torque lifting	Automatic torque lifting, manual torque lifting 1%～30.0% (only effective to V/F control mode)
	V/F curve	Linear V/F curve, square V/F curve, custom V/F curve
	ACC/DEC time	Max. 3600S (0.1～3600)
	DC brake	Start, respectively optional when stopping, action time setting: 0～50s
	Jog	Jog frequency range: 0.1Hz ～ max. frequency, jog acceleration/deceleration time: 0.1～3600s
	Built-in PID	To form closed-loop control system easily, and applicable to pressure and flow controls.
	Multi-speed	To realize 16-speed run by the combination of control terminals
	Spinning swing frequency	to realize the swing frequency functions such as fixed or variable amplitudes (retain)
	Automatic voltage	When the network voltage changes, adjust PWM output to keep the output voltage constant (AVR function)
	Automatic current limiting	Automatically limit current during running period to prevent frequent trips for overcurrent fault.
	Torque	Output 150% rated torque at 0.5HZ
	Self-identificatio	Auto-recognize motor parameter to obtain the optimal control effect.
Running function	Run command channel	Operation panel assignment; control terminal assignment; serial port assignment
	Frequency setting channel	Keys▲and ▼assignment; digital assignment of function code；serial port assignment; terminal UP/DOWN assignment; analog voltage assignment; analog current assignment; combination assignment
	Switching input channel	8 programmable switch inputs with max. 32 functions to set

	Analog input	2-way analog signal inputs and 1 optional 0～20mA/0～10V
	Analog output channel	2 analog signals can respectively output 0～10V and 0～20mA to realize the output of physical quantities including setting frequency and output frequency.
	On/off output	2 open collector outputs; 1 relay output signal; programmable physical outputs
Operation Panel	LED digital display	To display setting frequency, output voltage, output current and other parameters.
	External instrument	Physical displays of output frequency, output current and output voltage, etc.
Protective function		Overcurrent protection; overvoltage protection; undervoltage protection; overheat protection; and overload protection, etc.
Options		Brake package; remote operation panel; remote cable; keyboard holder, etc.
Environment	Applicable place	Indoor, no direct sunlight, no dust and corrosive gas, oil mist and water steam, etc.
	Altitude	＜1000m (to use by derating when more than 1000m)
	Environmental temperature	－10℃～＋40℃
	Humidity	＜90%RH, no condensation
	Vibration	＜5.9m/s^2
	Storage	－20℃～＋60℃
Structure	Protection	IP20 (in the working status or keyboard display status)
	Cooling type	Forced air cooling
Installation method		Wall-mounted in cabinet

2.3 Installation Dimension

Model	W	W1	H	H1	H2	D	D1	D2	D3	Diameter of mounting hole	Reference diagram
M200-4T0007VER0M00 M200-2S0007VER0M00	118	108	185	173		152	145	114	87	5.5	(a)
M200-4T0015VER0M00 M200-2S0015VER0M00											
M200-4T0022VER0M00 M200-2S0022VER0M00											
M200-4T0040VER0M00	118	108	185	173		173	166	135	108	5.5	(a)
M200-4T0055VER0M00	150	135	260	244		166	160	131	104	7.0	(b)
M200-4T0075VER0M00											
M200-4T0110VER0M00	232	152	378	352	330	226	216	160		7.0	(c)

M200-4T0150VER0M00											
M200-4T0185VER0M00	262	180	452	432	400	250	240	211	197	8.0	(d)
M200-4T0220VER0M00											

Table 2-3 Inverter Appearance and Installation Dimensions

2.3.1 Keyboard Holder

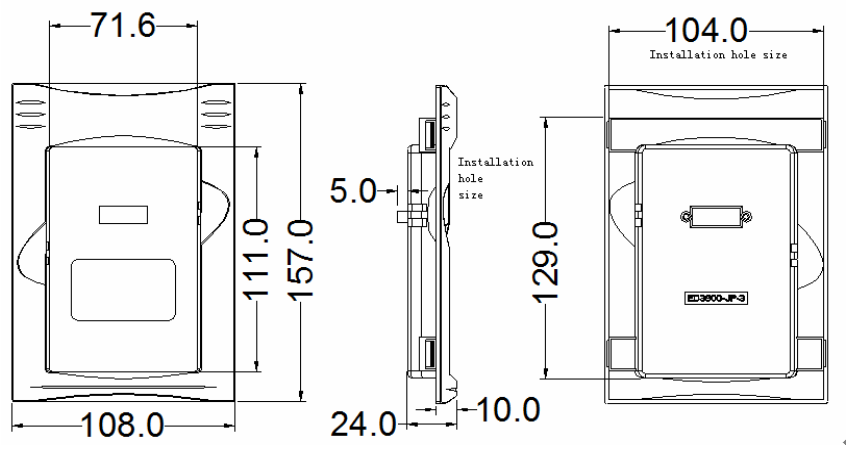


Figure 2-1 Size of M200-LKD Remote-control keyboard Holder (Optional)

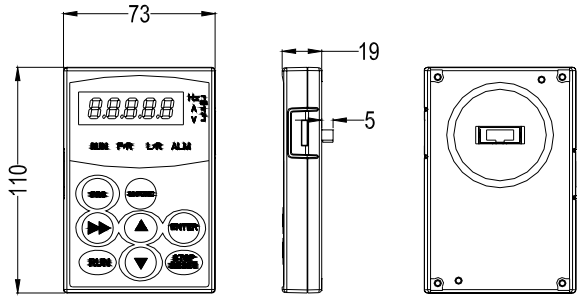
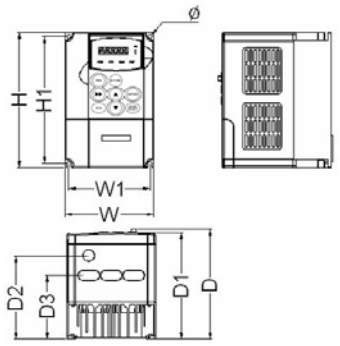


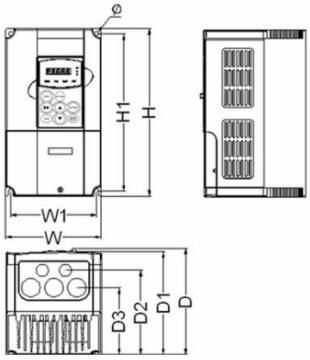
Figure 2-2 Size of M200-LKD Keyboard (Machine and Remote-control)

Tip: The manufacturer reserves the right to change the sizes mentioned above. The keyboard is subject to change without prior notice.

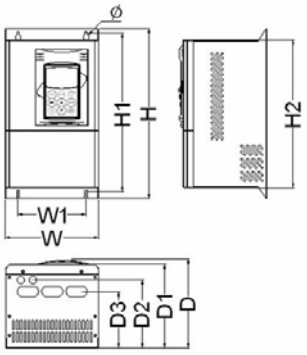
2.3.2 Product Appearance and Dimension



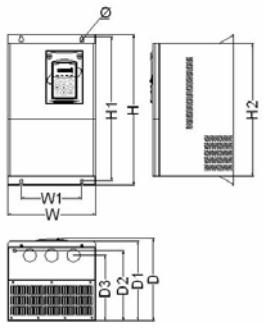
(a) 0.75-4KW Appearance



(b) 5.5-7.5KW Appearance



(c)11-15 KW Dimension



(d)18.5-22 KW Dimension

2.4 Brake Resistor

The brake unit of the M200 inverter is optional. If required, please point out when ordering. The dynamic braking resistor shall be equipped according to the Table 2-4. The wiring of brake resistor shall be carried out according to the Figure 2-3.

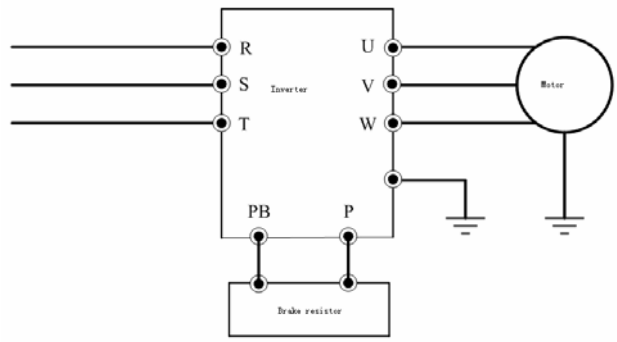


Figure 2-3 Wiring Diagram of Inverter and Brake Component

Table 2-4 Brake Resistor Table

Model	Applicable motor power (KW)	Resistance (Ω)	Resistance power (W)
M200-4T0007VER0M00	0.75	300	100
M200-4T0015VER0M00	1.5	300	200
M200-4T0022VER0M00	2.2	200	200
M200-4T0040VER0M00	4.0	150	400
M200-4T0055VER0M00	5.5	100	500
M200-4T0075VER0M00	7.5	75	800
M200-4T0110VER0M00	11	60	1000
M200-4T0150VER0M00	15	45	1500
M200-4T1850VER0M00	18.5	40	2000
M200-4T0220VER0M00	22	35	2500

1. The standard product is not equipped with built-in brake unit. If required, please specify when ordering.
2. The wiring length of brake resistor shall be less than 5m. The temperature of brake resistor will increase due to energy feed in the process of energy brake, and so attention shall be paid to safety protection and ventilation during installing.

Chapter 3 Inverter Installation and Wiring

3.1 Installation Environment

3.1.1 Requirements on Installation Environment

(1) Install indoor with good ventilation. Environmental temperature range: -10ºC～40ºC. If the temperature exceeds 40ºC, the forced external cooling shall be carried out or the inverter shall be derated for application.

(2) Avoid to install in the place with direct sunlight, dust, floating fiber and metal powder.

(3) It is strictly prohibited to install inverter in the place with corrosive or explosive gases.

(4) The humidity shall be lower than 90% without condensation.

(5) Install in the place with firm plane and vibration less than 5.9m/s^2.

(6) Keep away as possible from the electromagnetic interference source or other electronic instruments sensitive to electromagnetic interference.

3.1.2 Installation Direction and Space

(1) Install vertically in general condition.

(2) The installation spacing and the min. distance is as shown in Figure 3-1.

(3) If multiple inverters are installed up to down, baffle plate shall be applied between them as shown in Figure 3-2.

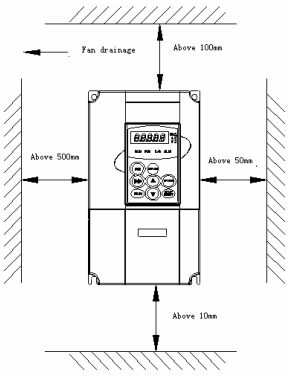


Figure 3-1 Installation Spacing Diagram

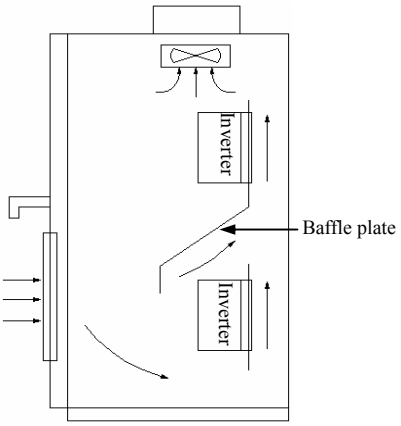


Figure 3-2 Installation Diagram of Multiple Inverters

3.1.3 Panel Removal and Installation

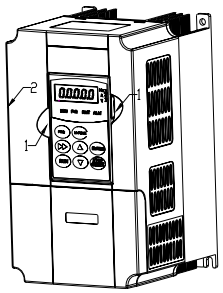


Figure 3-3 Removal of Operation Panel

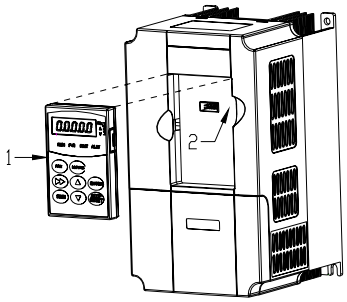


Figure 3-4 Installation of Operation Panel

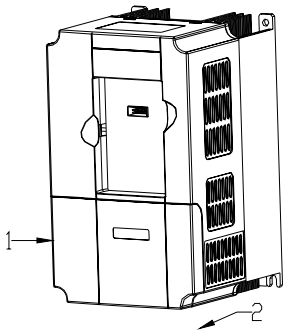
3.2.1Removal and Installation of Operation Panel and Lower Cover

◆ Removal of Operation Panel

Press the grab of operation panel by force to direction 1 as shown in the Figure 3-3 and lift the operation panel to direction 2.

◆ Installation of Operation Panel

Press the both sides with force to direction 1 as shown in Figure 3-4, and press down the operation panel to direction 2 until the “crack” sound. Do not install the operation panel from other directions, or else it may result in the poor contact of operation panel.



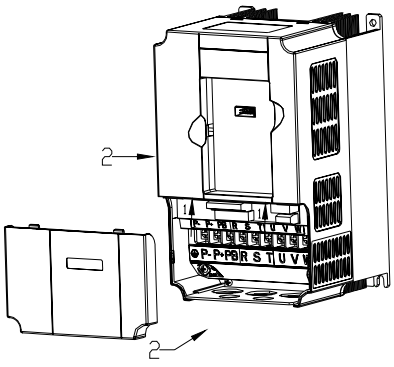


Figure 3-5 Removal of Cover board

Figure 3-6 Installation of Cover board

3.2.2 Removal and Installation of the Cover Board of Inverter with Plastic Housing

◆ Removal of Operation Panel

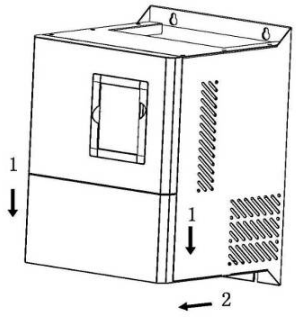
For the removal and installation of operation panel, please refer to Figure 3-3.

◆ Removal of Cover Board

Press both sides of cover board by force to direction 1 as shown in Figure 3-5, and meanwhile lift it up to direction 2.

◆ Installation of Cover Board

Insert the buckle on cover board into the groove of main body to direction 1 as shown in Figure 3-6, and press cover board to direction 2 until hearing the “crack” sound.



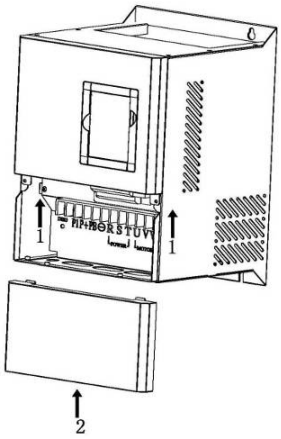


Figure 3-7 Removal of Lower Cover Board

Figure 3-8 Installation of Lower Cover Board

3.2.3 Removal and Installation of the Cover Board of Inverter with Sheet-metal Housing

◆ Removal of Operation Panel

For the removal and installation of operation panel, please refer to Figure 3-3.

◆ Removal of Lower Cover Board

Remove the installation screw of the lower cover board. Pull out it to direction 1 as shown in Figure 3-7 and lift up to direction 2.

◆ Installation of Lower Cover Board

Insert the grab on lower cover board into the groove of upper cover board to direction 1 as shown in Figure 3-8, install lower cover board to direction 2 and then fasten the screw of lower cover board.

◆ Removal of Upper Cover Board

Remove the installation screw of upper cover board to direction 1 as shown in Figure 3-9 and then pull out to direction 2.

◆ Installation of Upper Cover Board

Insert the grab on upper cover board into the groove of inerter body to direction 1 as shown in Figure 3-10, and then fasten the screw of upper cover board to direction 2.

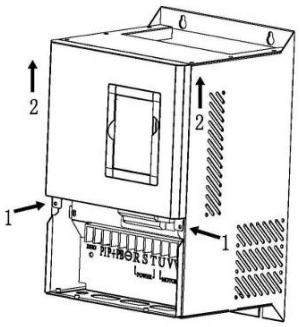


Figure 3-9 Removal of Upper Cover Board

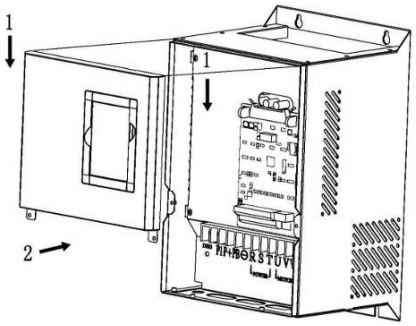


Figure 3-10 Installation of Upper Cover Board

Precautions for Inverter Wiring

Note

(1) Ensure that power source has been cut off for over 10min before wiring, or else it may cause electric-shock.

(2) It is strictly prohibited to connect power line with the output terminals U, V and W of the inverter.

(3) The inverter itself has leakage current. To ensure the safety, inverter and motor shall be earthed safely. The grounding line shall be 3.5mm² or above copper line with its grounding resistance less than 10Ω.

(4) The inverter has passed the withstand voltage test before leaving factory, and so user shall not carry out it to inverter.

(5) As shown in Figure 1-3, no electromagnetic contactor and absorption capacitor or other RC absorbing device shall be provided between inverter and motor.

(6) To provide overcurrent protection at input side and the convenience of power-off maintenance,

the inverter shall be connected to power source via intermediate breaker.

(7) Over 0.75mm² stranded wire or shielded wire shall be selected for DI and DO wiring. One end of the shielding layer shall hang in the air while the other end connected to the grounding terminal of inverter with wiring length less than 50m.

Danger

(1) Ensure the power supply of inverter has been cut off completely, and all LED indicators of operation keyboard are off. Then wait for over 10min before carry out wiring operation.

(2) The DC voltage between the main circuit terminals P+ and P- of inverter shall fall under DC36V before carrying out the internal wiring work.

(3) The wiring operation can only be carried out by the trained and qualified professionals with authorization.

(4) Check with care the voltage class of inverter complies with power supply voltage before powering on, or else it may result in personal injury and device damage.

Wiring of Main Circuit Terminal

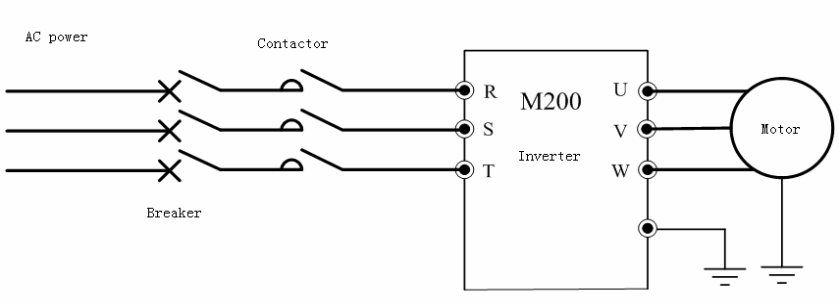


Figure 3-11 Simple Wiring of Main Circuit

3.4.1 Connection of Inverter and Optional Components

(1) Breaking device such as isolating switch shall be installed between supply network and inverter for personal safety and forced power off in maintenance.

(2) The power supply circuit of inverter shall be equipped with quick fuse or breaker for overcurrent protection so as to prevent the fault range enlarging.

(3) AC input reactor

If the power quality supplied by the network is not good, AC input reactor shall be provided. It can also increase the power factor at input side.

(4) The contactor is only used for power supply control.

(5) EMI filter at input side

EMI filter is optional to suppress the high-frequency Conducted interference and radio-frequency interference Sent out from the power line of inverter.

(6) EMI filter at output side

EMI filter is optional to suppress the radio-Frequency interference noise and wire leakage current generated from the output side of inverter.

(7) AC output reactor

If the connection wire between inverter and motor exceed 50m, it is suggested to install AC output reactor to reduce Leakage current and prolong the work life of motor. Pay attention to the voltage drop of AC output reactor during installation. Increase the input/output voltage of inverter or decrease the rated values of motor to avoid burning motor.

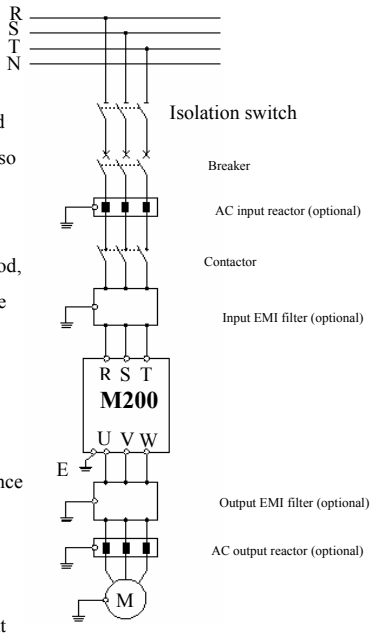


Figure 3－12 Connection of Inverter and Optional Parts

(8) Safe grounding line

The inverter has leakage current itself. To ensure safety, inverter and motor shall be earthed respectively with grounding resistance less than 10Ω. The grounding line shall be as short as possible with its diameter in accordance with the standard as shown in Table 3-1. (The values in the table are correct only when two conductors use the same metal. If not, the sectional area of the protective conductor shall be determined through Table 3-1 by the equivalent method of conductivity.)

Table 3-1 Sectional Area of Protective Conductor

Sectional area of conductor in installation S(mm^2)	The min. sectional area of the corresponding grounding conductor S(mm^2)
S ≤ 16	S
16 < S ≤ 35	16
35 < S	S/2

3.4.2 Wiring of Main Circuit Terminal

(1) The input/output terminals of the main circuit are as shown in Table 3-2 below.

Applicable model	Main circuit terminal	Terminal name	Function description
M200-4T0007VER0M00 M200-4T0015VER0M00 M200-4T0040VER0M00 M200-4T0022VER0M00 M200-4T0055VER0M00 M200-4T0075VER0M00	 P+ P− PB R S T U V W	R,S,T	3-phase AC 380V input terminal
		U,V,W	3-phase AC output terminal
		P+,PB	Wiring terminal of brake resistor
M200-4T0110VER0M00 M200-4T0150VER0M00 M200-4T0185VER0M00 M200-4T0220VER0M00	 P1 P PB ⊖ R S T U V W ⏚	R,S,T	3-phase AC 380V input terminal
		U,V,W	3-phase AC output terminal
		P,PB	Wiring terminal of brake resistor
		P1,P	Wiring terminal of DC input reactor
		P,⊖	Wiring terminal of external brake unit

Note： The sign ⏚ in the table above is grounding sign.

(2) Type selection of cable diameter, inlet-coil protection breaker QF or fuse is as shown in Table 3-3 below:

Model	breaker (A)	Fuse (A)	Input wire (mm^2)	Output wire (mm^2)	Control wire (mm^2)
M200-2S0007VER0M0	10	16	1.5	1.5	1
M200-2S0015VER0M0	20	16	1.5	1.5	1
M200-2S0022VER0M0	32	20	2.5	2.5	1

M200-4T0007VER0M0	10	10	1.5	1.5	1
M200-4T0015VER0M0	10	10	1.5	1.5	1
M200-4T0022VER0M0	16	10	2.5	2.5	1
M200-4T0040VER0M0	20	16	2.5	2.5	1
M200-4T0055VER0M0	32	20	4	4	1
M200-4T0075VER0M0	40	32	6	6	1
M200-4T0110VER0M0	63	35	10	10	1
M200-4T0150VER0M0	63	50	10	10	1
M200-4T0185VER0M0	100	63	16	16	1
M200-4T0220VER0M0	100	80	16	16	1

3.5 Wiring Diagram for Basic Running

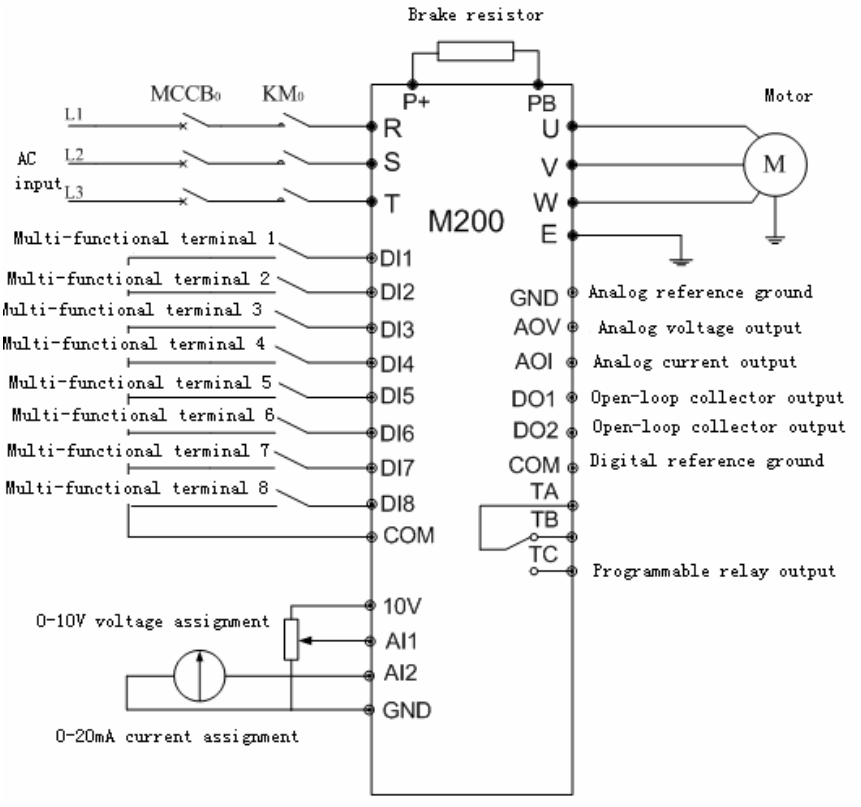


Figure 3－13 Wiring Diagram for Basic Running

3.6 Configuration and Wiring of Control Circuit

3.6.1 The control circuit terminal is arranged as shown below:

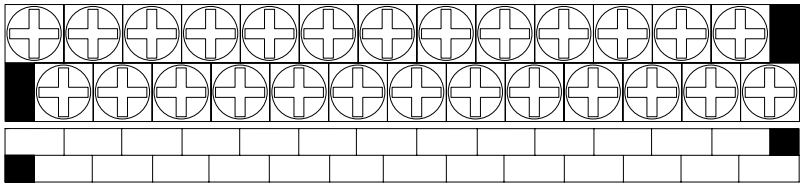


Figure 3－14 The Terminal Sequence Diagram of Control Panel (above 11KW)

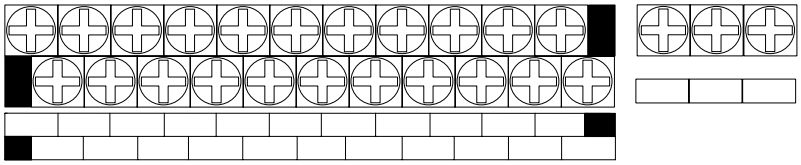


Figure 3－15 The Terminal Sequence Diagram of Small Control Panel (below 7.5KW)

3.6.2 The function description of CN3terinal is as shown in the Table 3-4

Category	Terminal No.	Name	Function description	Specification
Communication	485+	RS48 communication interface	Positive terminal of RS485 differential signal	Standard RS485 communication interface, shall use twisted wire or shielded wire.
	485-		Negative terminal of RS485 differential signal	
Multi-functional output terminal	DO1 DO2	Output terminal of open collector	The programmable terminal means the switch terminals of several functions. For detail, see the function introduction of output terminals F6.11 and F6.12 (public terminal: COM)	Optocoupler isolation output: Working voltage: 9～30V Max. output current: 50mA
Output terminal of relay	TA.TB.TC	Output terminal of programmable relay	Normal：TA-TB normally closed；TA-TC normally open When activated: TA-TB normally open；TA-TC normally closed (For detail, see F6.13 introduction)	Rated value of contactor NO：5A 250VAC NC：3A 250VAC
Analog input	AI1	Analog input AI1	To receive analog voltage input (reference ground: GND)	Input voltage： 0 ～ 10V (input impedance: 20KΩ) resolution ratio: 1/1000
	AI2	Analog input AI2	To receive analog current/voltage input (reference ground: GND) Select by jumper pin J6	Input current: 0～20mA (input impedance: 250Ω) resolution ratio: 1/1000
Analog output	AOI AOV	Analog output AO	To provide analog voltage output corresponding to 11 physical quantities with factory-default output frequency. (For detail, see F5.10 introduction)	Voltage output: 0～10V Current output: 0～20mA
Category	Terminal No.	Name	Function description	Specification
Multi-functional	DI1	Multi-functional input terminal 1	The programmable terminal means the switch terminals of several	

input terminal	DI2	Multi-functional input terminal 2	functions. For detail, see terminal function parameters of Chapter 6 (public terminal: COM). (for detail, see F6.00-6.07).	
	DI3	Multi-functional input terminal 3		
	DI4	Multi-functional input terminal 4		
	DI5	Multi-functional input terminal 5		
	DI6	Multi-functional input terminal 6		
	DI7	Multi-functional input terminal 7		
	DI8	Multi-functional input terminal 8		
Power source	10V	+10V power source	To provide +10V power source	Max. output current: 50mA
	GND	+10V public power terminal	Reference ground of analog signal and +10V power source	Mutual internal isolation between COM and GND
	COM	+24V public power terminal	Digital signal input, public output terminal	
	+24V	+24V power source	power source of digital signal	Max. output current: 50mA
	PLC	Public terminal of multi-functional input	DI1—DI8 public terminal	Short-circuit to 24V power when leaving factory

Table 3-4 Function List of Control Terminals

3.7 Installation Instructions Complying with EMC Requirements

3.7.1Basic Countermeasure for Noise Suppression

Table 3-5 Countermeasure Table of Interference Suppression

Noise transmission route	Countermeasures to reduce impact
②	If the grounding line of peripheral equipment forms close loop together with the wiring of inverter, the grounding line of inverter will leak current, which may cause malfunction of the equipment. In this case, if the equipment is not grounded, it may decrease malfunction.
③	If the power supply of peripheral equipment shares the same system with that of inverter, the noise of inverter will transmit reverse to power line, which may interfere with other equipments in the same system. For this reason, the following suppression measures can be adopted: install electromagnetic noise filter at input terminal of inverter and isolate other equipments by standby isolation transformer or power filter.

④⑤⑥	(1) The equipments and signal line easy to be interfered shall be installed away from inverter as possible. Shielded line shall be adopted for signal line with one end of shielded layer grounded, and it shall be kept away from inverter and its input/output line as possible. If the signal line shall be crossed with strong-current cable, they shall be orthogonal. (2) Install high-frequency noise filter (ferrite common-mode choke coil) respectively at the root parts of input and output sides of inverter to effectively suppress the radio-frequency interference of power line. (3) The cable line of motor shall be placed in the much thick shield such as thicker (above 2mm) pipe or buried in cement tank. The power line shall be pulled through metal pipe and the shielded line shall be grounded (motor cable shall be 4-core type cable with one grounded at inverter side and connected to motor case at the other end).
①⑦⑧	Avoid the parallel wiring or bundling of strong and weak current wires; install the equipment far away from inverter as possible and its wiring shall be away from the input/output wire of inverter. Signal line shall be shielded line. As for the equipment with strong electric field or strong magnetic field, attention shall be paid to its installation place relative to inverter and distance. They shall be orthogonal.

3.7.2 On-site Wiring and Grounding

(1) Wire from inverter to motor (outlet of terminal U, V and W) shall not be parallel to the power line (inlet of terminal R, S, T, or R, T) and shall be kept over 30cm away from the power line.

(2) 3 motor lines of the inverter output terminal U, V and W shall be kept in metal pipe or metal wireway.

(3) Control signal line shall be shielded type with the shielded layer connected to the GND terminal of inverter. The side close to inverter shall be single-end earthed.

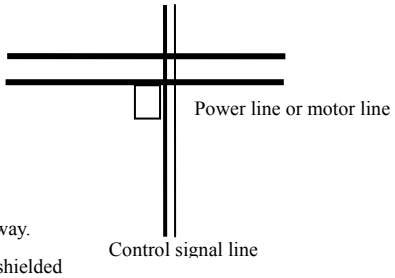


Figure 3-16 System Wiring Requirement

(4) PE grounding cable of inverter shall not grounded by using the grounding line of other equipment, and shall be grounded directly with the earth.

(5) Control signal line shall not be wired in parallel and close to strong-current wire (R, S, T or R, T and U, V, W), and shall not be bundled together but to kept 20-60cm (related to strong current) away from each other. If they need to be wired by crossing, they shall be vertical to each other as shown in Figure 3-16.

(6) Weak-current grounding line of control signal and sensor and strong grounding line shall be grounded respectively and separately.

(7) It is not allowed to connect other devices at the power input terminal (R, S, T or R, T).

Chapter 4 Inverter Running and Operation

4.1 Inverter Running

4.1.1 Working Status of Inverter

The M200 inverter has four working statuses: stop, run, programme and alarm.

Stop： When the inverter power is initialized, if no run command input or the stop command is sent during run, the inverter will enter idle mode.

Run： When the run command received, inverter will enter run status.

Programme： Keyboard operation panel can be used to change and set the function parameters of inverter.

Fault alarm： If any fault happens to peripheral equipment or inverter itself, or there is any operation error, the inverter will send out the corresponding fault code and lock out the output.

4.1.2 Run Mode of Inverter

The M200 inverter consists of five run modes that are jog run →common run according to priority.

0：jog run

In the stop status, the inverter will run by jog frequency (see functional code F2.20-2.22) after receiving jog run command (e.g., after pressing the M-FUNC of operation keyboard).

1：common run

The simple open-loop run mode of general inverter.

4.2 Keyboard Operation and Use

4.2.1 Keyboard Layout

Through operation panel and control terminals, the inverter can control the parameter setting including start, speed adjustment, stop, brake and run, and peripheral equipments. For operation panel, see Figure 4-1.

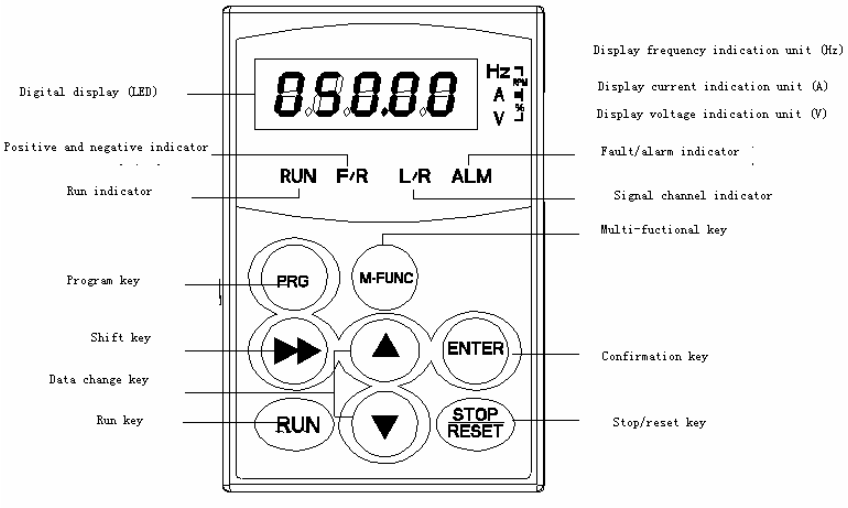


Figure 4-1 Schematic Diagram of Operation Panel

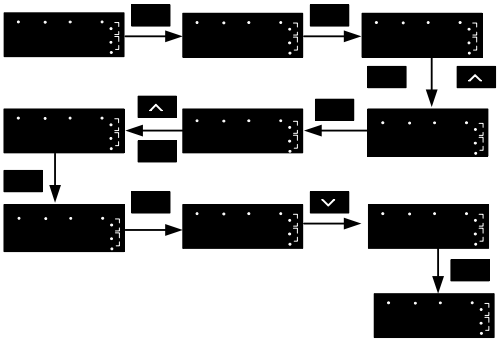
4.2.2 Function Description of Keyboard

The operation keyboard of inverter has 8 keys with their functions as shown in Table 4-1:

Item		Function Description
Indication function	**Hz**	When LED displays frequency data, the indicator turns on.
	A	When LED displays current data, the indicator turns on.
	V	When LED displays voltage data, the indicator turns on.
	ALM	When the inverter runs under limited current or voltage, or fault happens, the indicator is on.
	FOR/REV	When the inverter is running, the indicator is on.
Key function	**RUN**	**Run**：Run command channel of inverter (panel control mode is effective)
	M-FUNC	**Jog**：jog control. (it is a multi-functional key and can be defined through F0.02)
	STOP/RESET	**Stop/Reset**：When inverter is in normal run status, if the run command channel of inverter is effective to panel stop, press the key and then inverter will stop according to the set stop mode. When inverter in in fault, press the key to reset it to clear fault code.
	PRG	**Mode Switch**：To the work mode of operation panel.
	ENTER	**Enter**：To confirm the current status or parameter storage (parameter stored into internal memory).

	▲/▼	**Data change：** Used to change data function code or parameter. In the status monitor mode, if the specified frequency channel is set to be panel digital setting mode, the key can be pressed directly to change frequency command.
		Data bit change： In the status of data change, pres the key to select change bits, and then the changed bit will be flashing. In the status monitor status, press the key directly to enter parameter inquiry status. The parameters can be displayed in cycle.

For example: the max. output frequency of the parameterF1-08 can be changed from its factory default 50.0Hz to 60.00Hz according to the steps as shown below:



Chapter 5 Function Parameter List

5.1 Symbol Description:

×—mean the parameter cannot be changed in run process ○—mean the parameter can be changed in run process

5.2 Function Parameter List:

Parameter code	Parameter name	Setting range	Smallest unit	Factory default	Communication No.	Change
Parameter group F0 of system management						
F0-00	User password	0～65535	1	0	000	×
F0-01	Parameter initialization	0：no operation 1：reset to factory setting 2：clear fault record	1	0	001	×
F0-02	Function selection of M-FUNC key	0：M-FUNC (jog control) 1：switching of positive and negative rotation 2：clear the set frequency of UP/DOWN	1	0	002	×
F0-03	Function selection of STOP/RST key	0：only effective to keyboard control 1：Effective to both keyboard and terminal control 2：Effective to both keyboard and communication control 3：Effective to all control modes	1	0	003	×
F0-04	Software version number	0～9999	—	—	004	×
Parameter group F1 of basic run						
F1-00	Control mode	0: open-loop vector control (SVC) 1: V/F control 2: closed-loop vector control (VC) 3: constant-torque open-loop control 4: constant-torque closed-loop control	1	1	005	×
F1-01	Channel Selection of run command	0: run command channel of operation keyboard (LED off) 1: run command channel of terminal (LED flashing) 2: run command channel of communication (LED on)	1	0	006	×

F1-02	Selection of main frequency source	0：digital assignment(up/down key of keyboard or UP/DOWN terminal adjustment) 1：AI1 analog assignment(0～10V) 2: AI2 analog assignment(0～20mA) 3: simple PLC setting 4: multi-speed run setting 5: PID control setting 6: communication setting	1	0	007	○
Parameter code	**Parameter name**	**Setting range**	**Smallest unit**	**Factory default**	**Communication No.**	**Change**
F1-03	Selection of auxiliary frequency source B	0：digital assignment(up/down key of keyboard or UP/DOWN terminal adjustment) 1：AI1 analog assignment(0～10V) 2：AI2 analog assignment(0～20mA)	1	0	008	○
F1-04	Reference object selection of auxiliary frequency source B	0：relative to the max. frequency 1：relative to frequency source A	1	0	009	○
F1-05	Combination of frequency sources	0：main frequency source A 1：main frequency source A＋ auxiliary frequency source B 2：switching between main frequency source A and auxiliary frequency source B 3：switching between main frequency source A and (main frequency source A＋ auxiliary frequency source B)	1	0	010	○
F1-06	Digital frequency control	0：effective, and store when inverter powers down 1：effective, but not store when inverter powers down 2: the set frequency of keyboard or UP/DOWN is ineffective. 3：The setting is effective in run but clear when stops.	1	0	011	○
F1-07	Digital setting of run frequency	0.00Hz～【F1-08】	0.01Hz	50.00 Hz	012	○
F1-08	The max. output frequency	10.00～600.00Hz	0.01Hz	50.0Hz	013	×
F1-09	Upper limit frequency	【F1-10】～【F1-08】	0.01Hz	50.0Hz	014	○
F1-10	Lower limit frequency	0.00Hz～【F1-09】	0.01Hz	0.00Hz	015	○

F1-11	Acceleration time 1	0.1～3600.0S	0.1	Type setting	016	○
F1-12	Deceleration time 1	0.1～3600.0S	0.1	Type setting	017	○
F1-13	Torque lifting	0.0～30.0% Note: 0.0is automatic torque	0.1	0.0%	018	○
F1-14	Cutoff frequency of torque lifting	0.0～50.0%	0.1	20.0%	019	×
F1-15	Compensation of V/F slip frequency	0.0～200.0%	0.1	0.0	020	○
F1-16	V/F curve setting	0：linear curve 1：square curve 2：user to set V/F curve	1	0	021	×
F1-17	V/F frequency value F1	0.00～frequency value F2	0.01Hz	12.50Hz	022	×
F1-18	V/F voltage value V1	0.0～voltage value V2	0.1%	25.0%	023	×
F1-19	V/F frequency value F2	frequency value F1～F3	0.01Hz	25.00Hz	024	×
F1-20	V/F voltage value V2	voltage value V1～V3	0.1%	50.0%	025	×
F1-21	V/F frequency value F3	frequency value F2～【F2-02】	0.01Hz	37.50Hz	026	×
F1-22	V/F voltage value V3	voltage value V2～100.0%	0.1%	75.0%	027	×
Parameter code	**Parameter name**	**Setting range**	**Smallest unit**	**Factory default**	**Communication No.**	**Change**
F1-23	Retain	—	—	—	028	
F1-24	Direction setting	0：forward 1：reversal 2：reversal limiting	1	0	029	×
F1-25	Setting of carrier frequency	1.0～15.0 KHz	0.1Hz	Type setting	030	○
Parameter group F2 of start/stop control						
F2-00	Starting mode	0：start by starting frequency 1：Dc brake + start by starting frequency 2：start by speed track	1	0	031	×
F2-01	Starting frequency	0.00 Hz ～10.00Hz	0.01 Hz	0.00Hz	032	○
F2-02	Hold time of starting frequency	0.0～10.0S	0.1 S	0.0 S	033	○
F2-03	DC brake current for starting	0.0～150.0%	0.1%	0.0%	034	○
F2-04	DC brake current for starting	0.0～50.0S	0.1 s	0.0s	035	○
F2-05	ACC/DEC mode	0：linear acceleration/deceleration 1：S curve acceleration/deceleration	1	0	036	○
F2-06	Time scale of the initial segment of S	0.0～40.0%	0.1%	30.0%	037	×

F2-07	Time scale of the closing segment of S	0.0～40.0%	0.1%	30.0%	038	×
F2-08	Shut-down mode	0：slow down to stop 1：shut down freely	1	0	039	○
F2-09	Start frequency of shutdown brake	0.00 Hz ～【F1-08】	0.01Hz	0.00Hz	040	○
F2-10	Waiting time of shutdown brake	0.0～50.0S	0.1S	0.0S	041	○
F2-11	DC brake current for shutdown	0.0～150.0%	0.1%	0.0%	042	○
F2-12	DC brake time of shutdown	0.0：DC brake not activated (0.1～50.0s)	0.1S	0.0S	043	○
F2-13	Retain	—	—	—	044	
F2-14	Acceleration time 2	0.1～3600.0s	0.1S	Type setting	045	○
F2-15	Deceleration time 2	0.1～3600.0s	0.1S	Type setting	046	○
F2-16	Acceleration time 3	0.1～3600.0s	0.1S	Type setting	047	○
F2-17	Deceleration time 3	0.1～3600.0s	0.1S	Type setting	048	○
F2-18	Acceleration time 4	0.1～3600.0s	0.1S	Type setting	049	○
F2-19	Deceleration time 4	0.1～3600.0s	0.1S	Type setting	050	○
F2-20	Frequency setting of jog run	0.00～【F1-08】	0.01Hz	50.00Hz	051	○
F2-21	Frequency setting of jog acceleration	0.1～3600.0s	0.1S	Type setting	052	○
F2-22	Frequency setting of jog deceleration	0.1～3600.0s	0.1S	Type setting	053	○
Parameter code	**Parameter name**	**Setting range**	**Smallest unit**	**Factory default**	**Communication No.**	**Change**
F2-23	Hopping frequency 1	0.00 ～ upper limit frequency【F1-09】	0.01Hz	0.00Hz	054	○
F2-24	Hopping frequency 2	0.00 ～ upper limit frequency【F1-09】	0.01Hz	0.00Hz	055	○
F2-25	Hopping range	0.00 ～ upper limit frequency【F1-09】	0.01Hz	0.00Hz	056	○
F2-26	To activate when the set frequency less than the lower limit frequency	0：run by the lower limit frequency 1：shut down 2：0-speed run	1	0	057	×
F2-27	Dead time of positive/negative rotation	0.1～3600.0s	0.1S	0.0S	058	○
F2-28	Selection of terminal function test when power on	0: invalid terminal run command when power on 1：valid terminal run command	1	0	059	○

		when power on				
Motor parameter groupF3						
F3-00	Type selection	0： M-type (constant-torque load type) 1：FP-type (load type machine such as fan and water pump)	1	Type setting	060	×
F3-01	Rated power of motor	0.4～900.0KW	0.1KW	Type setting	061	×
F3-02	Rated frequency of motor	0.01 Hz ～【F1-08】	0.01 Hz	50.00Hz	062	×
F3-03	Rated speed of motor	0 ～36000RPM	1 RPM	Type setting	063	×
F3-04	Rated voltage of motor	0 ～460V	1 V	Type setting	064	×
F3-05	Rated current of motor	0.1 ～2000.0A	0.1A	Type setting	065	×
F3-06	Resistance of motor stator	0.001 ～65. 535Ω	0.001Ω	Type setting	066	○
F3-07	Resistance of motor rotor	0.001 ～65. 535Ω	0.001Ω	Type setting	067	○
F3-08	Inductance of stator and rotor	0.01 ～6553.5mH	0.1mH	Type setting	068	○
F3-09	Mutual inductance of stator and rotor	0.01 ～6553.5mH	0.1mH	Type setting	069	○
F3-10	No-load current of motor	0.1 ～655.35A	0.1A	Type setting	070	○
F3-11	Motor tuning selection	0：not activate 1：complete tuning (valid only when F1-00= 0) 2：quite tuning (valid only when F1-00=0)	1	0	071	×
Parameter group F4 of vector control						
F4-00	Proportional gain of speed ring (ASR) 1	0 ～100	1	20	072	○
F4-01	Integral time of speed ring (ASR) 1	0.01～10.00S	0.01S	0.20S	073	○
F4-02	Switch of low frequency	0.00 Hz ～【F4-05】	0.01Hz	5.00Hz	074	○
F4-03	Proportional gain of speed ring 2	0 ～100	1	15	075	○
Parameter code	**Parameter name**	**Setting range**	**Smallest unit**	**Factory default**	**Communication No.**	**Change**
F4-04	Circulation integral time of speed 2	0.01～10.00S	0.01S	0.50S	076	○
F4-05	Switch of high frequency	【F4-02】～【F1-08】	0.01Hz	10.00Hz	077	○

F4-06	Compensation factor of VC slip	50%～200%	1%	110%	078	○
F4-07	Upper-limit setting of VC torque	0.0%～200.0% (rated current of inverter)	0.1%	180.0%	079	○
F4-08	Retain	—	—	—	—	—
Parameter group F5 of analog terminal						
F5-00	Lower-limit voltage of AI1 input	0.00 ～10.00V	0.01 V	0.00 V	081	○
F5-01	Setting corresponding to AI1lower-limit voltage	-100.0～100.0%	0.1%	0.0%	082	○
F5-02	Upper-limit voltage of AI1 input	0.00 ～10.00V	0.01V	0.00V	083	○
F5-03	Setting corresponding to AI1upper-limit voltage	-100.0～100.0%	0.1%	100.0%	084	○
F5-04	Filtering time of AI1 input	0.00S～10.00S	0.01S	0.10S	085	○
F5-05	Lower current of AI2 input	0.00 ～20.00mA	0.01mA	0.00mA	086	○
F5-06	Setting corresponding to AI2 lower-limit current	-100.0～100.0%	0.1%	0.0%	087	○
F5-07	Upper-limit current of AI2 input	0.00 ～20.00mA	0.01mA	20.00mA	088	○
F5-08	Setting corresponding to AI2 upper-limit current	-100.0～100.0%	0.1%	100.0%	089	○
F5-09	AI2 input filtering time	0.00S～10.00S	0.01S	0.10S	090	○
F5-10	Function selection of AOV/AOI multi-functional analog output terminal	0：Output frequency 1：Set frequency 2：Running speed 3：Output current 4：Output voltage 5：Output power 6：Output torque 7：AI1 8：AI2 9：torque current 10：magnetic flux	1	0	091	○
F5-11	Lower limit of AOV/AOI output	0.0～100.0%	0.1%	0.0%	092	○
F5-12	AOV/AOI output corresponding to the lower limit	0.00～10.00V	0.01V	0.00V	093	○
F5-13	Upper limit of AOV/AOI output	0.0～100.0%	0.1%	100.0%	094	○

F5-14	AOV/AOI output corresponding to the upper limit	0.00～10.00V	0.01V	10.00V	095	○
Parameter code	**Parameter name**	**Setting range**	**Smallest unit**	**Factory default**	**Communication No.**	**Change**
Parameter group F6 of digital terminal						
F6-00	Function of input terminal DI1	0：control terminal in idle 1：forward rotating 2：reverse rotating 3：3-wire run control 4：forward jog 5：reverse jog 6：free stop control 7：Input of external reset signal (RST) 8：Fault input of external device 9：frequency increase command 10：frequency decrease command 11：UP/DOWN terminal frequency clear 12：multi-speed selection 1 13：multi-speed selection 2 14：multi-speed selection 3 15：multi-speed selection 4 16：ACC/DEC time selection 1 17：ACC/DEC time selection 2 18：PID control pause 19：pause of swing frequency control 20：reset of swing frequency status 21：ACC/DEC inhibit command 22：switch torque control to speed control 23：temporary clear of UP/DOWN terminal frequency 24：switch between frequency sources A and B 25: switch between frequency sources A and A＋B 26：PLC multi-speed pause 27：PLC multi-speed reset 28：clear signal input of counter 29：trigger signal input of counter 30-31: retain	1	0	096	×
F6-01	Function of input terminal DI2		1	0	097	×
F6-02	Function of input terminal DI3		1	0	098	×
F6-03	Function of input terminal DI4		1	0	099	×
F6-04	Function of input terminal DI5		1	0	100	×
F6-05	Function of input terminal DI6		1	0	101	×
F6-06	Function of input terminal DI7		1	0	102	×
F6-07	Function of input terminal DI8		1	0	103	×

F6-08	Switch filtering time	1～10	1	5	104	○
F6-09	FWD/REV terminal control mode	0：2-wire control mode 1 1：2-wire control mode 2 2：3-wire control mode 1 3: 3-wire control mode 2	1	0	105	×
F6-10	Frequency change rate of UP/DOWN terminal	0.01～50.00Hz/S	0.01Hz/S	0.50	106	○

Parameter code	**Parameter name**	**Setting range**	**Smallest unit**	**Factory default**	**Communication No.**	**Change**
F6-11	Setting of output terminal DO2 of open collector	0：no output 1：forward running of inverter 2：reverse running of inverter 3：fault output 4：detection signal of frequency/speed level (FDT) 5：frequency/speed reach signal (FAR) 6: 0-speed running indication of inverter 7: output frequency reaches upper limit 8: output frequency reaches lower limit 9: reach lower limit of given frequency when running 10:FDT reached 11: overload alarm of inverter 12: detection signal output of counter 13：reset signal output of counter 14: inverter ready for running 15: A programmable multi-speed run period finished 16：Programmable multi-speed stage finished 17：under voltage lock-out stop 18：forward RUN	1	0	107	○
F6-12	Setting of output terminal DO2 of open collector		1	0	108	○
F6-13	Output of programmable relay		1	1	109	○
F6-14	FDT level setting	0.00Hz～【F1-08】	0.01Hz	50.0Hz	110	○
F6-15	FDT lagged value	0.0～100.0%(FDT level)	0.1%	5.0%	111	○
F6-16	Detection amplitude when frequency up to FAR	0.0～100.0%(max. frequency)	0.1%	100.0%	112	○
F6-17	Reset value setting of counter	0～65535	1	1	113	×
F6-18	Detection value setting of counter	0～【F6-17】	1	1	114	×

Human-computer interface groupF7						
F7-00	Display factor of load speed	0.1～999.9%	0.1%	100.0%	115	○
F7-01	Monitoring parameter selection of run status	0～0XFFFF	1	0XFF	116	○
F7-02	Monitoring parameter selection of stop status	0～0X1FF	1	0XFF	117	○
Parameter group F8 of PID control						
F8-00	Setting of PID assignment channel	0：digital assignment 1：AI1 2：AI2 3：remote communication 4: multi-speed assignment	1	0	118	○
F8-01	Setting of digital assignment	0.0～100.0%	0.1%	0.0%	119	○
F8-02	Selection PID feedback channel	0：AI11：AI22：AI1+AI2 3：AI1-AI2 4：remote communication	1	0	120	○
F8-03	PID pole selection	0：positive 1：negative	1	0	121	○
F8-04	Proportional gain KP	0.01～100.00	0.01	1.00	122	○
Parameter code	**Parameter name**	**Setting range**	**Smallest unit**	**Factory default**	**Communication No.**	**Change**
F8-05	Integral time Ti	0.01～10.00s	0.01S	0.10S	123	○
F8-06	Derivative time Td	0.0：no derivation 0.01～10.00s	0.01S	0.00S	124	○
F8-07	Sampling period T	0.00：automatic 0.01～100.00s	0.01S	0.10S	125	○
F8-08	Deviation limit	0.0～100.0%	0.1%	0.0%	126	○
F8-09	Detection value of feedback break	0.0～100.0%	0.1%	0.0%	127	○
F8-10	Detection time of feedback disconnection	0.0～3600.0S	0.1S	10.0S	128	○
F8-11	Sleep threshold	0.00～10.00V	0.01V	10.00V	129	○
F8-12	Wakeup threshold	0.00～10.00V	0.01V	0.00V	130	○
F8-13	Sleep/wakeup time	0.1～100.0S	0.1S	100.0S	131	○
Parameter group F9 of multi-speed control						
F9-00	Mode selection of multi-speed run	0：Shun down after single cycle 1：Run by the final value after single cycle 2：continuous cycle	1	0	132	○
F9-01	Power-off memory of PLC run	0：not memorize 1：memorize	1	0	133	○
F9-02	Multi-speed frequency 0	-100.0～100.0%	0.1%	0.0%	134	○
F9-03	Multi-speed frequency 1	-100.0～100.0%	0.1%	0.0%	135	○

F9-04	Multi-speed frequency 2	-100.0～100.0%	0.1%	0.0%	136	○
F9-05	Multi-speed frequency 3	-100.0～100.0%	0.1%	0.0%	137	○
F9-06	Multi-speed frequency 4	-100.0～100.0%	0.1%	0.0%	138	○
F9-07	Multi-speed frequency 5	-100.0～100.0%	0.1%	0.0%	139	○
F9-08	Multi-speed frequency 6	-100.0～100.0%	0.1%	0.0%	140	○
F9-09	Multi-speed frequency 7	-100.0～100.0%	0.1%	0.0%	141	○
F9-10	Multi-speed frequency 8	-100.0～100.0%	0.1%	0.0%	142	○
F9-11	Multi-speed frequency 9	-100.0～100.0%	0.1%	0.0%	143	○
F9-12	Multi-speed frequency 10	-100.0～100.0%	0.1%	0.0%	144	○
F9-13	Multi-speed frequency 11	-100.0～100.0%	0.1%	0.0%	145	○
F9-14	Multi-speed frequency 12	-100.0～100.0%	0.1%	0.0%	146	○
F9-15	Multi-speed frequency 13	-100.0～100.0%	0.1%	0.0%	147	○
F9-16	Multi-speed frequency 14	-100.0～100.0%	0.1%	0.0%	148	○
F9-17	Multi-speed frequency 15	-100.0～100.0%	0.1%	0.0%	149	○
F9-18	Running time at stage 0	0.0～6553.5S(M)	0.1S(M)	0.0	150	○
Parameter code	**Parameter name**	**Setting range**	**Smallest unit**	**Factory default**	**Communication No.**	**Change**
F9-19	Running time at stage 1	0.0～6553.5S(M)	0.1S(M)	0.0	151	○
F9-20	Running time at stage 2	0.0～6553.5S(M)	0.1S(M)	0.0	152	○
F9-21	Running time at stage 3	0.0～6553.5S(M)	0.1S(M)	0.0	153	○
F9-22	Running time at stage 4	0.0～6553.5S(M)	0.1S(M)	0.0	154	○
F9-23	Running time at stage 5	0.0～6553.5S(M)	0.1S(M)	0.0	155	○
F9-24	Running time at stage 6	0.0～6553.5S(M)	0.1S(M)	0.0	156	○
F9-25	Running time at stage 7	0.0～6553.5S(M)	0.1S(M)	0.0	157	○
F9-26	Running time at stage 8	0.0～6553.5S(M)	0.1S(M)	0.0	158	○
F9-27	Running time at stage 9	0.0～6553.5S(M)	0.1S(M)	0.0	159	○
F9-28	Running time at stage 10	0.0～6553.5S(M)	0.1S(M)	0.0	160	○
F9-29	Running time at stage 11	0.0～6553.5S(M)	0.1S(M)	0.0	161	○
F9-30	Running time at stage 12	0.0～6553.5S(M)	0.1S(M)	0.0	162	○
F9-31	Running time at stage 13	0.0～6553.5S(M)	0.1S(M)	0.0	163	○
F9-32	Running time at stage 14	0.0～6553.5S(M)	0.1S(M)	0.0	164	○
F9-33	Running time at stage 15	0.0～6553.5S(M)	0.1S(M)	0.0	165	○

F9-34	Unit selection of PLC run time	0：S 1: M	1	0	166	○
F9-35	Retain	—	—	—	167	
F9-36	Retain	—	—	—	168	
F9-37	Retain	—	—	—	169	
F9-38	Retain	—	—	—	170	
F9-39	Retain	—	—	—	171	
Parameter group FA of protective function						
FA-00	Overload protection selection of motor	0：no protection 1：general motor	1	1	172	×
FA-01	Overload protection factor of motor	20.0%～120.0%	0.1%	100.0%	173	○
FA-02	Frequency reduction point of instant Power-off	70.0% ～ 110.0% (rated bus voltage)	0.1%	80.0%	174	○
FA-03	Reduction rate setting of instant Power-off frequency	0.00Hz～【F1-08】	0.01Hz	0.00	175	○
FA-04	Overvoltage stall protection	0：inhibit 1：allow	1	0	176	○
FA-05	Level of overvoltage limit	110～150%	1%	120	177	○
FA-06	Level of current amplitude limit	100%～200%	1%	160%	178	○
FA-07	Selection of current-limit action	0：valid in the whole process 1：invalid during constant speed running	1	0	179	×
Parameter code	**Parameter name**	**Setting range**	**Smallest unit**	**Factory default**	**Communication No.**	**Change**
FA-08	Current-limit frequency reduction rate	0.00～100.00Hz/S	0.01 Hz/S	10.0Hz/S	180	○
FA-09	Fault auto reset time	0～3	1	0	181	×
FA-10	Fault auto reset interval	0.1～100.0s	0.1	1.0s	182	×
FA-11	Overload pre-alarm level	20～120%	1%	100%	183	○
FA-12	Delay of overload pre-alarm	0.0～15.0s	0.1S	1.0S	184	×
FA-13	Input open-phase protection selection	0：inhibit 1：allow	1	1	185	×
FA-14	Output open-phase protection selection	0：inhibit 1：allow	1	1	186	×
Parameter group FB of serial communication						
FB-00	Communication address of local machine	0：master station 1～247：slave station	1	1	187	○

FB-01	Setting of communication baud rate	0：1200BPS 1：2400BPS 2：4800BPS 3：9600BPS 4：19200BPS 5：38400BPS	1	3	188	○
FB-02	Data format	0：no check (N，8，1) for RTU 1：even check (E，8，1) for RTU 2：odd check (0，8，1) for RTU 3：no parity (N，8，2) for RTU 4：even check (E，8，2) for RTU 5：odd check (0，8，2) for RTU 6：no parity (N，7，1) for ASCII 7：even check (E，7，1) for ASCII 8：odd check (0，7，1) for ASCII 9：no parity (N，7，2) for ASCII 10：even check (E，7，2) for ASCII 11：odd check (0，7，2) for ASCII 12：no parity (N，8，1) for ASCII 13：even check (E，8，1) for ASCII 14：odd check (0，8，1) for ASCII 15：no check (N，8，2) for ASCII 16：even check (E，8，2) for ASCII 17：odd check (0，8，2) for ASCII	1	0	189	○
FB-03	Reply delay in local machine	0～200mS	1mS	5mS	190	○
FB-04	Communication timeout detection	0.0～100.0S	0.1S	0.0S	191	○
FB-05	Transmission failure handling	0：alarm and free stop 1：Keep running 2：Not alarm but stop as set	1	1	192	○
Parameter code	**Parameter name**	**Setting range**	**Smallest unit**	**Factory default**	**Communication No.**	**Change**
FB-06	Transmission response handling	0：Response when writing operation 1: No response when writing operation	1	0	193	○
Parameter group FC of advanced function						
FC-00	Starting voltage of dynamic braking	115.0～140.0%	1V	130.0%	194	○
FC-01	Action rate of dynamic braking	10～100%	1%	50%	195	○
FC-02	AVR function	0：inhibit 1：full activation 2：activate when decelerating	1	2	196	○
FC-03	Auto energy-saving run	0：inhibit 1：allow	1	0	197	×

FC-04	Selection of oscillation suppression	0：Invalid 1：Valid	1	1	198	○
FC-05	Low-frequency threshold of oscillation suppression	0～500	1	5	199	○
FC-06	High-frequency threshold of oscillation suppression	0～500	1	100	200	○
FC-07	Amplitude limit of oscillation suppression	0～10000	1	5000	201	○
FC-08	High/low frequency separation point of oscillation suppression	0～10000	0.01Hz	12.5Hz	202	○
FC-09	Cooling fan control	0：auto control mode 1：keep running during power on	1	0	203	○
FC-10	PWM switching mode	0：mode 0 1：mode 1, high switch loss 2：mode 2, low switch loss	1	0	204	×
FC-11	Password of run limit function	0～65535	1	—	205	×
FC-12	Selection of run limit function	0：no limit 1：limit	1	0	206	×
FC-13	Limit time	0～65535H	1	0	207	×
Monitoring parameter group FD						
FD-00	Output frequency (Hz)	0.00 ～ max. output frequency【F1-08】	0.01	—	208	●
FD-01	Main setting frequency (Hz)	0.00 ～ max. output frequency【F1-08】	0.01	—	209	●
FD-02	Auxiliary setting frequency (Hz)	0.00 ～ max. output frequency【F1-08】	0.01	—	210	●
FD-03	Output current (A)	0.1-2000.0	0.1	—	211	●
FD-04	Output voltage (V)	0-460	1	—	212	●
FD-05	Output torque (%)	0-2000	—	—	213	●
FD-06	Motor speed (RPM/min)	0-36000	1	—	214	●
FD-07	Bus voltage (V)	0.0-1000.0V	—	—	215	●
FD-08	PID set value (%)	0.0-100.0	—	—	216	●
FD-09	PID feedback value (%)	0.0-100.0	—	—	217	●
Parameter code	**Parameter name**	**Setting range**	**Smallest unit**	**Factory default**	**Communication No.**	**Change**
FD-10	Analog input AI1(V)	0.0-10.0	—	—	218	●
FD-11	Analog input AI2(V)	0.0-10.0	—	—	219	●
FD-12	Status of input terminal	00-0XFF	—	—	220	●
FD-13	Status of output terminal	00-0XFF	—	—	221	●

FD-14	Current multi-speed segment number	0-15	—	—	222	●
FD-15	Current count value	0～65535	—	—	223	●
FD-16	Temperature of rectifier bridge	0～100.0℃	0.0℃	—	224	●
FD-17	IGBT temperature	0～100.0℃	0.0℃	—	225	●
FD-18	Accumulated run time of the machine	0～65535H	—	—	226	●
FD-19	Accumulated power-on time	0～65535H	—	—	227	●
FD-20	Type of the last fault	0～21	—	—	228	●
FD-21	Types of the past two faults	0～21	—	—	229	●
FD-22	Type of the current fault	0～21	—	—	230	●
FD-23	Run frequency in the current fault	0.00 ～ max. output frequency	0.01Hz	—	231	●
FD-24	Output current in the current fault	—	0.1A	—	232	●
FD-25	Bus voltage in the current fault	—	0.1V	—	233	●
FD-26	Input terminal status in the current fault	—	1	—	234	●
FD-27	Output terminal status in the current fault	—	1	—	235	●
Special parameter group FE						
FE-00	Selection of torque setting mode	0：digital assignment 1：AI1 analog assignment (0～10V) 2：AI2 analog assignment (0～20mA) 3：multi-speed run setting 4：communication setting	1	0	236	○
FE-01	Set torque of keyboard	-200.0～200.0%	0.1%	20.0%	237	○
FE-02	Setting source of upper limiting frequency	0：digital assignment 1：AI1 analog assignment(0～10V) 2：AI2 analog assignment (0～20mA) 3：multi-speed run setting 4：communication setting	1	0	238	○
FE-03--FE-60		Retain				
Factory parameter group FF (retain)						

Fault Code:

Fault Code	
Code	**Name**
E-01	Over-current in accelerated run
E-02	Over-current in decelerated run
E-03	Over-current in constant-speed run
E-04	Overvoltage in accelerated run
E-05	Overvoltage in decelerated run
E-06	Overvoltage in constant-speed run
E-07	Bus under-voltage
E-08	Motor overload
E-09	Inverter overload
E-10	Power module in fault
E-11	Open phase of input side
E-12	Open phase of output side
E-13	Radiator overheating of rectifier bridge
E-14	Overheating of IGBT radiator
E-15	External device in fault
E-16	RS485 communication fault
E-17	Current detection error
E-18	Motor tuning fault
E-19	EEPROM reading and writing fault
E-20	PID feedback break
E-21	Retain

Chapter 6 Detailed Description of Parameter Use

6.1 Parameter Group F0 of System Management

F0-00	User password	0 ～65535	—

The password protection function will go into effect by setting any number except 0. The password can be cleared by entering “00000”. Please remember clearly your password. When the password is set, user will not be able to enter the parameter menu without the correct password. The password protection function will take effect within 1min after exiting the programming status, and now press **PRG** to enter programming status. when the interface displays “0.0.0.0.”, the operator has to enter the correct password, or else he cannot enter it. The set password can be cleared by entering “ ” that can also disable the password protection function. Moreover, the password can also be cleared by resetting to factory default.

F0-01	Parameter initialization	0 ～ 2	0

0：No operation

The inverter is in the normal parameter reading and writing status.

The parameter change is related to the setting status of user password and the current status of inverter.

1：Reset to factory setting

All parameters (except parameter of group F3) can be reset to factory defaults according to the types.

2：Clear fault record

All historical fault records of FD-20～FD-27 can be cleared by setting the parameter to be 2.

When the operation is finished, the parameter will be set to be 0 automatically.

F0-02	Function selection of M-FUNC key	0 ～2	0

The M-FUNC key on the keyboard has 3 function options.

0：M-FUNC (jog control)

The key can be used to control the jog run of inverter.

1：Switch between positive and negative run

The key can be used to control the switch between positive and negative run of inverter, but it is only effective when F1-01=0.

2：Clear the UP/DOWN set frequency

To clear the UP/DOWN set frequency and restore the frequency to be that before using UP/DOWN.

F0-03	Function selection of STOP/RST key	0 ～3	0

The STOP key on the keyboard has 4 function options.

0：Only effective to keyboard control

Only when F1-01=0, the key can control the stop and fault reset functions of inverter.

1：Effective to both keyboard control and terminal control

Only when F1-01=0 or F1-01=1, the key can control the stop and fault reset functions of inverter.

2：Effective to both keyboard control and communication control

Only when F1-01=1 or F1-01=2, the key can control the stop and fault reset functions of inverter.

3：Effective to all control modes.

F0-04	Software version number	0～9999	0

The parameter indicates the software version used by the inverter.

6.2 Parameter Group F1 of Basic Run

F1-00	Control mode	0 ～4	1

0：Open-loop vector control (SVC)

It refers to the sensorless vector control mode that is applicable to the occasion of high-performance adjustable speed drive without encoder. The loads, including machine tools, centrifugal machines, drawing machines and injection molding machines, have high requirements on the torque output of inverter. In the vector control mode, an inverter can only drive 1 motor.

1：V/F control

It can be used for general load such as fan and water pump. In the V/F control mode, 1 inverter can drive multiple motors.

2：Closed-loop vector control (VC)

Retain

3：Constant-torque open-loop control

Retain

4：Constant-torque closed-loop control

Retain

Notes:

1. When selecting the vector control mode, the motor parameter tuning shall be carried out before the first run to obtain the accurate motor parameters. Once the tuning finished, the motor parameters obtained will be stored in the control panel for future use. In particular note that, ensure the motor nameplate is in accordance with the motor parameters of inverter before motor tuning, or else the tuning may be not able to be finished or lead to the wrong results. In case that no motor nameplate data is obtained, it is suggested to use V/F control mode.
2. When selecting vector control mode, the relevant parameters (group F4) of speed regulator shall be set correctly to ensure the good steady-state and dynamic performance.
3. When selecting vector control mode, 1 inverter can only drive 1 motor, and the inverter capacity cannot be higher or lower than motor by 2 classes, or else it may cause the decrease of control performance or abnormality.

F1-01	Selection of run command channel	0 ～2	0

0：Effective keyboard control

The run and stop functions of inverter can be controlled via run commands from operation keyboard including **RUN**, **STOP/RESET** and **M-FUNC**.

1：Effective terminal control

The run command of inverter can be control by the connection/disconnection status of the external multi-functional terminal (the functions corresponding to the multi-functional terminal shall be defined by the

parameter group F5).

2：Effective communication control

The run command shall be sent out by the upper computer through communication.

F1-02	main frequency	0 ～8	0

Main frequency source A is the main setting parameter of the run frequency of inverter. but as for the run frequency of inverter, F1-05 can also be set to realize the assignment of combination of the main frequency A and auxiliary frequency B.

0：digital assignment (up/down key on keyboard or UP/DOWN terminal adjustment)

The run frequency can be set through parameter F1-07, and adjusted through ▲/▼ keys on operation panel or UP/DOWN terminal. The UP/DOWN terminal is to adjust frequency by setting two terminals of F6-00～F6-07 respectively to be frequency increase command and decrease command.

1：AI1 analog assignment(0～10V)

The assigned external analog voltage can be used as set frequency. For the relevant parameters, see F5-00～F5-04.

2：AI2 analog assignment(0～20mA)

The assigned external analog current can be used as set frequency. For the relevant parameters, see F5-05～F5-09.

3：Simple PLC setting

The inverter runs in the way of simple programmable logic. For its run frequency setting, see F9-02～F9-17. For each run time setting, see F9-18～F9-33.

4：Multi-speed run setting

The inverter runs in multi-speed mode. For its run frequency setting, see F9-02～F9-17. Four terminals of F6-00～F6-07 can be set as multi-speed options respectively to match with the run frequencies of inverter.

5：PID control setting

The frequency is determined by the process PID. For the relevant setting, see the function parameters of group F8.

6：communication setting

The set frequency can be changed by setting RS485 serial port frequency.

F1-03	Selection of auxiliary frequency source B	0 ～2	0

The auxiliary frequency B can be set through F1-05 to form the run frequency of inverter in combination with the main frequency source A.

0：digital assignment (up/down key of keyboard or UP/DOWN terminal adjustment)

The run frequency can be set by parameter F1-07, and can be adjusted via ▲/▼ key on operation panel or UP/DOWN terminal. The UP/DOWN terminal is to adjust frequency by setting two terminals of F6-00～F6-07 respectively to be frequency increase command and decrease command.

1：AI1 analog assignment (0～10V)

The assigned external analog voltage shall be the set frequency. For relevant parameters, see

F5-00 ～F5-04.

2：AI2 analog assignment (0～20mA)

The assigned external analog current shall be the set frequency. For relevant parameters, see F5-05 ～ F5-09.

F1-04	Selection of reference object of auxiliary frequency source B	0 ～1	0

0：Relative to the max. frequency

The auxiliary frequency source B takes the max. output frequency as reference object.

1：Relative to frequency source A

The auxiliary frequency source B takes the set value of the main frequency source as reference object. The setting is effective only when F1-05=1or F1-5=3.

F1-05	Combination of frequency sources	0 ～3	0

The run frequency of inverter can be set by setting the combination of the main frequency source A and auxiliary frequency source B.

0：Main frequency source A

The run frequency is determined by the main frequency source A.

1：Main frequency source A＋ auxiliary frequency source B

The run frequency of inverter is formed by the combination of the set frequency of main frequency source A+ the set frequency of auxiliary frequency source B.

2：Switch between main frequency source A and auxiliary frequency source B

The run frequency of inverter set by the main frequency source A can be switched to be set by the auxiliary frequency source B. The setting function shall be utilized together with the switch function of the frequency sources A and B. When one parameter of F6-00～F6-07 is set to be 24, the run frequency set by the main frequency A can be changed to that set by the auxiliary frequency B by short-circuiting the parameter terminal and COM.

3：Switch between main frequency source A and (main frequency source A＋auxiliary frequency source B)

The run frequency of inverter set by the main frequency source A can be switched to be set by the main frequency source A + the auxiliary frequency source B. The setting function shall be utilized together with the switch function of the frequency sources A and A+B. When one parameter of F6-00～F6-07 is set to be 25, the run frequency set by the main frequency A can be changed to that set by the A+B by short-circuiting the parameter terminal and COM.

F1-06	Digital frequency control	0 ～3	0

The run frequency is set by parameter F1-07, and it can be adjusted by connecting/disconnecting the external control terminal UP/DOWN. When the UP-COM is closed, the frequency increases, and vice versa. When both UP/DOWN and COM are closed or disconnected, the frequency keeps the same.

0：Effective, and store when inverter powers down

UP / DOWN-assigned frequency value is stored when the inverter power down.

1：Effective, but not store when inverter powers down

UP / DOWN-assigned frequency value is not stored when the inverter power down.

2：Keyboard or UP/DOWN-set digital frequency is ineffective.

The frequency value set by keyboard or UP / DOWN will clear automatically.

3：effective in running but clear when stopping

When the inverter is running, the assigned frequency by ▲/▼ key and UP/DOWN is effective, but it will be cleared when the inverter stops.

F1-07	Digital setting of run frequency	0.00Hz～【F1-08】	50.00Hz

When the digital setting (F1-02=0) is selected as the frequency source, the inverter will directly set the set value of F1-07 as the current set frequency of inverter every time it is powered on.

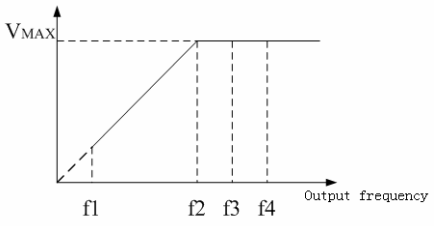
The run frequency value is limited in the range between upper limit and lower limit.

F1-08	The max. output frequency	10.00 Hz ～600.00Hz	50.00Hz

The max. output frequency means the highest frequency inverter can output.

F1-09	Upper limit of frequency	F1-10～F1-08	50.00Hz
F1-10	Lower limit of frequency	0.00 Hz ～F1-09	50.00Hz

The upper-limit frequency is used to set the upper limit of output frequency, as shown by f_3 in the figure. The basic run frequency f_2 is the min. output frequency corresponding to the max. output voltage, while f_4 is the max. frequency. The V_{max} in the figure below is the max. output voltage of inverter.



Schematic Diagram of Voltage and Frequency

Note：

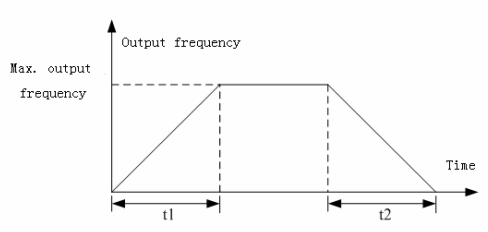
（1）The max. output frequency, upper-limit frequency and lower-limit frequency shall be set carefully according to the nameplate parameters and running situation of the actual controlled motor.

（2）Except the limit of upper-limit and lower-limit frequency, the output frequency is also limited by the set parameter values including start frequency, stop DC star frequency, hopping d=frequency, etc.

F1-11	Acceleration time 1	0.1～3600.0S	Type setting
F1-12	Deceleration time 1	0.1～3600.0S	Type setting

The acceleration (ACC) time means the time that the inverter accelerates from 0 to the max. output frequency as shown in Figure t1.

The deceleration (DEC) time means the time that the inverter decelerates from the max. output frequency to 0, as shown in Figure t2 below.



The parameters for ACC/DEC time of this series inverter consists of four groups, while the parameters for other ACC/DEC times (2, 3, 4) shall be defined in parameter F2-14～F2-19. The factory default time is ACC/DEC time 1. Other ACC/DEC time group shall be selected through terminal in group (please refer to the parameter group F6). The ACC/DEC time of the automatic tuning run shall be carried out according to the ACC/DEC time 1. The ACC/DEC time of M-FUNC run shall be separately set in F2-21-F2-22.

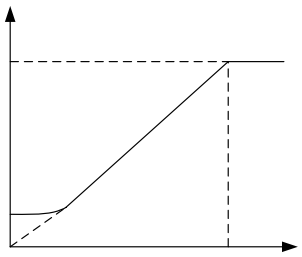
Note：

The ACC time is only effective to the normal speed increasing time, not including start DC brake time and start frequency hold time.

The DCE time is only effective to the normal speed decreasing time, not including stop DC brake time. 9i

F1-13	Torque lifting	0.0～30.0%(0.0 means automatic	0.0%
F1-14	Cutoff frequency of torque lifting	0.0 ～ 50.0% (relative rated frequency of motor)	20.0%

Torque lifting is to make lifting compensation to the output voltage of inverter when it runs by low frequency. The torque lifting can improve the low frequency property in V/F control mode. However, it shall not be set too big, or else the motor efficiency will decrease and the magnetizing current of motor will increase to make motor heating. The cutoff frequency of torque lifting: at this frequency, the torque lifting is effective, but it will lose effect when exceeding the set frequency.



Vmax

Schematic Diagram of Torque Lifting

F1-15	Compensation of V/F slip frequency	0.0～200.0%	0.0%

Slip frequency can make up the decreasing speed when motor is with load, namely the rated slip frequency of the corresponding motor.

Note：only when F1-00=1, the parameter is effective.

Vb

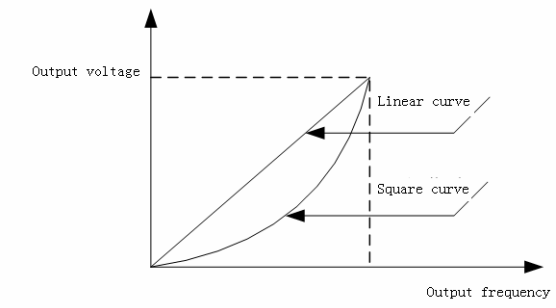
F1-16	V/F curve setting	0～2	0

0：Linear curve

The linear V/F curve is applicable to the general constant-torque load and its output voltage is in linear relation with the output frequency. See the linear curve as shown below.

1：Square curve

The square curve is applicable to the centrifugal load including fan and pump, and its output voltage is in square curve relation with the output frequency. See the square curve as shown below.



V/F Curve

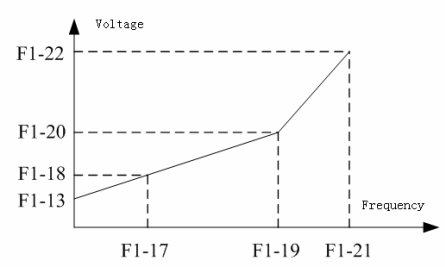
2： User-set V/F curve (determined by F1-17～F1-22)

Under this mode, V/F curve can be set by the parameters of F1-17～F1-22 as required by user.

Note：Only when F1-00=1, the parameter is effective.

F1-17	V/F frequency value F1	0.00～frequency value F2	12.50Hz
F1-18	V/F voltage value V1	0.0～voltage value V2	25.0%
F1-19	V/F frequency value F2	frequency value F1～F3	25.00Hz
F1-20	V/F voltage value V2	voltage value V1～V3	50.0%
F1-21	V/F frequency value F3	frequency value F2～【F2-02】	37.5Hz
F1-22	V/F voltage value V3	voltage value V2～100.0%	75.0%

The parameter group of the function can be used to flexibly set the V/F curve as required by user. For the custom curve, see the following figure:



V/F Custom Curve

Note: If F1-17 is much small, do not set F1-18 too high. That is to say, do not make the slope of the first segment of V/F curve too big, or else the current goes through IGBT will be too big, which will then burn motor out.

F1-23	Retain	—	—
F1-24	Setting of run direction	0～2	0

0：Positive rotation

The actual run direction shall be in accordance with the set direction.

1：Negative rotation

Under this mode, the actual output phase sequence of inverter is reverse to the setting. For example, in case of terminal control, FWD-COM is closed and motor will rotate reversely. The function of **RUN** key on keyboard will be reverse.

2：Negative rotation prevention

Inverter can only run positively.

F1-25	Setting of carrier frequency	1.0 ～15.0KHz	Type setting

The parameter shall be used to set the carrier frequency of PWM wave output by inverter. The motor noise can be reduced by increasing the set value of carrier frequency, but the inverter temperature will increase for it. In case that carrier frequency exceeds the factory default value, the inverter shall be derated for application.

6.3 Start/stop Control Group F2

F2-00	Start mode	0 ～2	0

The start mode is effective when inverter enters run mode from stop mode. That is to say, the inverter will start again as the set mode after the following occasions: power on for the first time, instant power off and then on, reset in case of fault, free stop and normal stop.

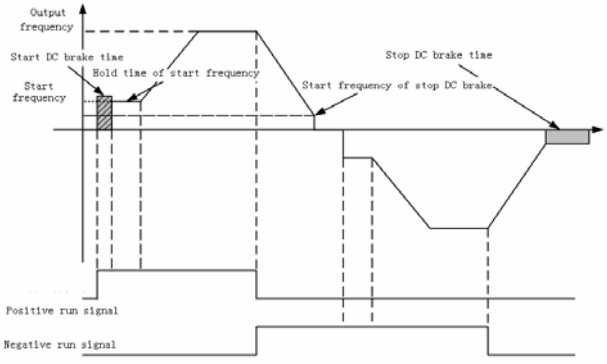
0：Start by start frequency

When the inverter starts to run, press the setting of F2-01 and F2-02 first to start the inverter from its start frequency (F2-01), and then it will run for the set time at this frequency (F2-02); then press the parameters of the set ACC/DEC time and mode to enter normal speed increasing stage to speed up to the set frequency.

1：DC brake + start by start frequency

When putting inverter into run, first press DC brake time set by F2-03 and F2-04 for the DC brake process before starting; then it will start from this frequency and run for the set time as set by F2-01 and F2-02, and; it will enter normal speed increasing stage as the set ACC/DCE time and mode to the set frequency.

The process to brake first and start by the start frequency is as shown by the following figure:



Schematic Diagram of Start Mode 1

2：Start by speed track

When putting inverter into use, first inspect the speed and direction of motor, and then track the current motor speed and direction according to the inspection result directly to start the rotating motor

in shock-free and smooth way.

When selecting this start mode, attention shall be paid to the rotary inertia of the system to increase the set value of parameter of ACC/DCE time properly.

Note：

(1) Start mode 0：Applicable to the occasion of big static friction torque but small load inertia, or the occasion with external mechanical brake equipment, namely the occasion that motor shaft can keep still when motor stops and start again.

(2) Start mode 1：Applicable to the occasion that motor runs positively or negatively when inverter is in stop status.

(3) Start mode 2：Especially applicable to the restart after fault reset or instant power-off in various working situations.

(4) Start mode 0 is applicable to the speed increase case where the inverter changes from forward running to reverse running, or the inverter increases speed by changing the set value.

F2-01	Start frequency	0.00 Hz ～10.00Hz	0.00 Hz
F2-02	Hold time of start frequency	0.0～50.0S	0.0 S

The start frequency refers to the initial frequency at the starting of inverter. To ensure the enough start torque, appropriate start frequency shall be set. The hold time of start frequency means the hold time of start frequency when inverter starts, as shown by the schematic diagram of start mode 1.

F2-03	Starting DC brake current	0.0～150.0%	0.0%
F2-04	Starting DC brake time	0.0～50.0S	0.0 S

F2-03 and F2-04 are effective only when inverter starts by the mode of DC brake + start frequency mode (F2-00=1). The setting of start DC brake current is the percentage relative to the rated current of inverter. If the start DC brake time set to be 0, there will be no DC start process.

Note：

(1) If the inverter capacity does not match with motor, do calculate the current and time parameters correctly and make setting carefully.

(2) As for the high-speed big-inertia load, it is not proper to adopt the mode of successive long-time big current DC brake and then start; it is suggested to adopt torque track mode and then start under start mode.

F2-05	Acceleration/deceleration mode	0～1	0

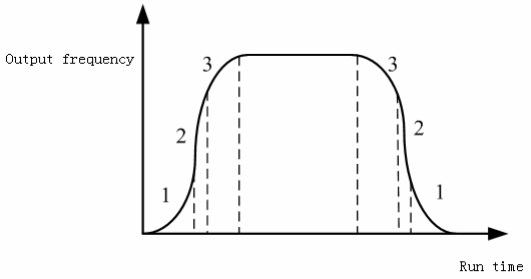
0：Linear acceleration/deceleration

The output frequency of inverter increases or decreases according to the fixed rate, and it is in linear relation with ACC/DCE time. Most loads adopt such mode.

1：S-curve acceleration/deceleration

In the ACC/DCE process of inverter, output frequency is in S-curve relation with ACC/DCE time that it increases or decreases as S curve. The function can be used to reduce the noise and vibration in the ACC/DCE process and reduce the load shock at start and stop. The parameters of S curve is set by the parameters F2-06 and F2-07.

F2-06	Time scale of S-curve start segment	0.0～40.0%	30.0%
F2-07	Time scale of S-curve stop segment	0.0～40.0%	30.0%



S-curve Acceleration/deceleration

The initial phase of S curve, as shown by ① in the diagram above, is the process that the slope of output frequency increases from 0;

The rise phase of S curve, as shown by ② in the diagram above, is the process that the slope of output frequency keeps constant;

The end phase of S curve, as shown by ③ in the diagram above, is the process that the slope of output frequency decreases to 0;

The parameters above are used in combination, and they are especially applicable to the start/stop of transport and transmission.

Note：

(1) Limit of set value: start time of S curve + end time of S curve ≤90% (ACC/DCE time).

(2) As for the ACC and DCE processes, the parameters for each phase of S curve shall be set in parallel.

F2-08	Shutdown mode	0～1	0

0：Stop by decelerating

When receiving the stop command, inverter will decrease the output frequency gradually according to the deceleration time until the frequency decreases to 0 and inverter stops.

1：Stop freely

When receiving the stop command, the inverter will stop outputting frequency immediately and the load machine will stop freely according to the mechanical inertia.

F2-09	Start frequency of stop DC brake	0.00 Hz ～【F1-08】	0.00Hz

The start frequency of start DC brake refers to the frequency of switch point that output frequency

decrease along the deceleration curve to be 0 suddenly in the process of deceleration and stop. In this process, if the set frequency is less than the start frequency of stop DC brake, the output frequency will be 0.

The start efficiency of stop DC brake is also effective in the deceleration process of positive and negative rotation switch.

If the working situation has no strict requirement on stop brake, the start frequency of stop DC brake shall be set as small as possible.

F2-10	Waiting time of stop DC brake	0.00 Hz ～50.0S	0.0 Sec
F2-11	Current of stop DC brake	0.00 ～150.0%	0.0%
F2-12	Stop DC brake time	0.00 Hz ～50.0S	0.0 Sec

F2-09 refers to the start frequency of DC brake in the deceleration and stop process. F2-10 refers to the time relay of inverter before DC brake to prevent overcurrent fault caused by brake at much high speed. F2-11 refers to the percentage of the output current of stop DC brake relative to the rated output current of inverter. F2-12 refers to the hold time of stop DC brake. When the stop DC brake time is set to be 0.0S, there is no DC brake.

Note：The stop DC brake function is ineffective for free stop.

Note：If the inverter capacity does not match with motor, do calculate the current and time parameters correctly and make setting carefully.

F2-13	Retain	—	—
F2-14	Acceleration time 2	0.1～3600.0S	Type setting
F2-15	Deceleration time 2	0.1～3600.0S	Type setting
F2-16	Acceleration time 3	0.1～3600.0S	Type setting
F2-17	Deceleration time 3	0.1～3600.0S	Type setting
F2-18	Acceleration time 4	0.1～3600.0S	Type setting
F2-19	Deceleration time 4	0.1～3600.0S	Type setting

The ACC/DCE times 2, 3 and 4 share the same definition with the ACC/DCE time 1 (F1-11 and F1-12). The factor default of ACC/DCE time for 5.5KW inverter or below it is 10.0S, while the factory default for 7.5KW inverter or above is 20.0S. The ACC/DCE time 1, 2, 3 and 4 can be selected through multi-functional terminal. (Refer to parameter group F6).

F2-20	Frequency of jog run	0.01 Hz ～【F1-08】	50.00Hz
F2-21	Jog acceleration time	0.1～3600.0S	Type setting
F2-22	Jog deceleration time	0.1～3600.0S	Type setting

This group of parameters define the relevant parameters for jog run. The definition of frequency and

ACC/DCE time is the same as the run definition of **RUN** key of inverter.

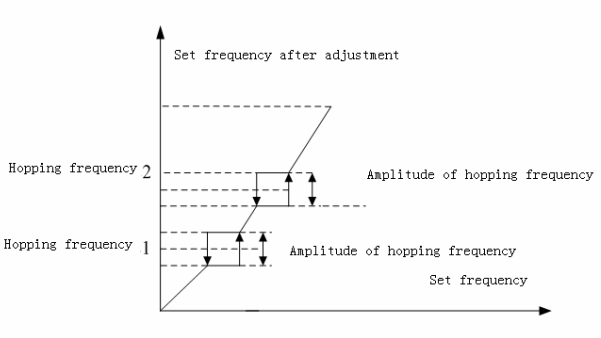
Note：

(1) The set value of jog run frequency is not subject to the lower-limit frequency, but subject to the upper-limit frequency.

(2) The jog run is not subject to the start frequency and the start frequency of stop DC brake.

F2-23	Hopping frequency 1	0.00～upper-limit frequency	0.00Hz
F2-24	Hopping frequency 2	0.00～upper-limit frequency	0.00Hz
F2-25	Amplitude of hopping frequency	0.00～upper-limit frequency	0.00Hz

The inverter can avoid the mechanical resonance point of load by setting hopping frequency. If the hopping frequency is set to be 0, the function will not take effect. Once the hopping points are set, the inverter will avoid these points automatically for steady run. See the following diagram.



Schematic Diagram of Hopping Frequency

Note：

Do not make two ranges of hopping frequency overlapped and nested.

In the ACC/DCE process, the output frequency of inverter can go through the hopping frequency area normally.

F2-26	Activate when the set frequency less than the lower-limit frequency	0 ～2	0

0： Run by the lower-limit frequency

When the set frequency is smaller than the lower-limit frequency (F1-10), the inverter will run by the lower-limit frequency.

1： Shut down

When the set frequency is smaller than the lower-limit frequency (F1-10), the inverter will stop.

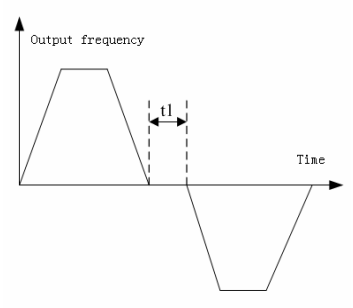
2： 0-speed run

When the set frequency is smaller than the lower-limit frequency (F1-10), the inverter will run by the

frequency 0.

F2-27	Dead time of positive and negative rotation	0.0～3600.0S	0.0S

The dead time means the transition time of waiting at frequency 0 when the inverter changes from the current direction to the reverse direction after receiving the negative rotation command. See t1 in the following diagram.



Dead Time of Positive and Negative Rotation

F2-28	Selection of terminal function detection when powering on	0～1	0

When selecting terminal to control the inverter start/stop,

0：Run command from the power-on terminal is ineffective.

During the power-on process, when the inverter detects the effective terminal run command (closed), it will not start until the terminal disconnects and the close.

1：Run command from the power-on terminal is effective.

During the power-on process, when the inverter detects the effective terminal run command (closed), it will start.

6.4 Motor Parameter Group F3

F3-00	Type selection	0～1	0

0：M-type motor: constant-torque load

1：FP-type motor: variable-torque load (e.g., fan and pump)

Motor shall be selected according to the load type.

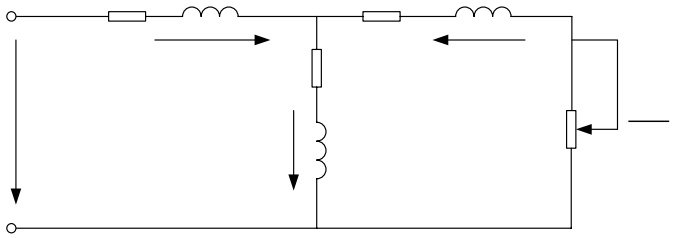
F3-01	Rated power of motor	0.4～22.0KW	Type setting

F3-02	Rated frequency of motor	0.01Hz ～F1-08	50.00Hz
F3-03	Rated speed of motor	0 ～36000RPM	Type setting
F3-04	Rated voltage of motor	0 ～460V	Type setting
F3-05	Rated current of motor	0.1 ～45.0A	Type setting

Note：These parameters shall be set according to those shown on the motor nameplate. The parameter self-recognition function of motor depends on the correct setting of these parameters. To ensure the performance of vector control, please select the applicable standard motor for inverter. If the distance between them is too long, the control performance will decrease.

F3-06	Resistance of motor stator	0.001 ～65. 535Ω	Type setting
F3-07	Resistance of motor rotor	0.001 ～65. 535Ω	Type setting
F3-08	Inductance of stator and rotor	0.1 ～6553.5mH	Type setting
F3-09	Mutual inductance of stator and rotor	0.1 ～6553.5mH	Type setting
F3-10	Idle current of motor	0.01 ～655.35A	Type setting

When the motor tuning finishes, the set values of F3-06 ～F3-10 will update automatically and they are the datum parameters of the high-performance vector control with direct influence on the control performance. The specific definitions of these parameters are as shown in the diagram below:



Steady-equivalent Circuit Diagram of Asynchronous Motor

R_1, L_1, R_2, L_2, L_M and I_0 in the diagram refer to the following aspects respectively:

Stator resistance, stator inductance, rotor resistance, rotor inductance and mutual inductance, as well as no-load magnetizing current.

R1 L1-Lm

I1 Rm

U1

I0 Lm

F3-11	Tuning selection of motor	0～1	0

0：not activate

1：Complete tuning (effective only when F1-00=0)

Please enter correct parameters (F3-00～F3-05) of motor nameplate correctly before tuning.

When the run command is sent after parameter setting, the inverter will learn the motor parameter by itself statically and then dynamically learn the motor parameter by itself.

2：Static tuning (effective only when F1-00= 0)

When the run command is sent after parameter setting, the inverter will learn the motor parameter by itself statically.

After tuning, the set value of F3-11 will be set to be 0 automatically.

Note：

(1) In case over-current or over-voltage fault occurs in the tuning process, the ACC/DCE time and torque lifting can be adjusted properly;

(2) The motor shaft shall have no load for complete tuning. It is prohibited to carry out complete tuning to the motor with load. In case that the load cannot be removed from the motor, the static tuning can be adopted;

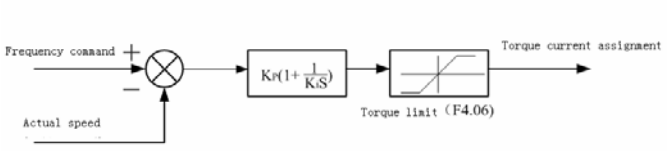
(3) Ensure that the motor is in stop status before start tuning, or else the tuning cannot be carried out normally;

(4) The tuning operation is effective only under panel control (F1-01=0).

6.5 Parameter Group F4 of Vector Control

F4-00	Proportional gain of speed ring (ASR) 1	0 ～100	20
F4-01	Integral time of speed ring (ASR) 1	0.01～10.00S	0.20 S
F4-02	Switch of low frequency	0.00 Hz～F1-08	5.00Hz
F4-03	Proportional gain of speed ring (ASR) 2	0～100	15
F4-04	Integral time of speed ring (ASR) 2	0.01～10.00S	0.50 S
F4-05	Switch of high frequency	【 F4-02 】 ～	10.00H

The group of parameters are effective only to vector control, but not effective to V/F control. The constitution of speed ring is shown as the figure below:

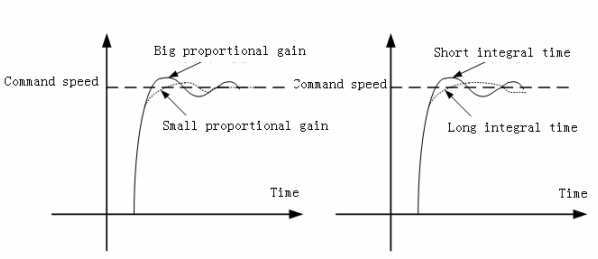


Simplified Block Diagram of Speed Ring

Whereas: K_P: proportional gain P, K_I: integral time I

If the integral time is set to be 0, the speed ring has not integral effect but pure proportion regulator.

The relation between proportional gain P and integral time I of speed ring (ASR) is as shown below:



Relationship between the Step Response of Speed Ring (ASR) and PI Parameter

The dynamic response of the system can be speeded up by increasing the proportional gain P. However, if P is too big, the system will shock easily.

The dynamic response of the system can be speeded up by reducing integral time I. However, if I is too small, the system will have big overshoot and easy to shock.

Generally, adjust and increase proportional gain P first under the premise of no shock to the system, and then adjust integral time I to enable the system to have quick response but small overshoot.

The parameters of speed ring PI are closely related to the inertia of load system, and so user shall adjust the parameters of speed ring PI according to the different applications.

Note：

If the PI parameter is not proper, the system may come into the overvoltage fault after starting quickly to the high speed (if no external brake resistor or brake unit) due to the regenerated brake energy of the system in the decreasing process after speed overshooting. It can be avoided by adjusting PI parameter.

F4-06	Compensation factor of VC slip	50 ～200%	110%

The slip compensation factor is used to calculate slip frequency. The 100% set value means that the

rated torque current is corresponding to the rated slip frequency. Slip compensation factor can be used to adjust accurately the offset of speed control and improve the sped precision of the system control. This function is effective to the open-loop vector run mode.

F4-07	Setting of the upper limit of VC torque	0.0%～200.0% (rated current of inverter)	180%

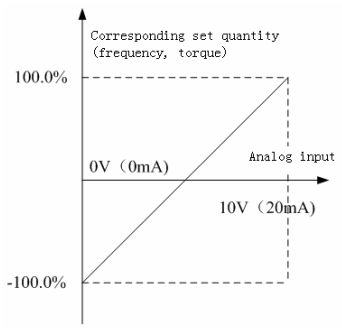
It is used to set the max. torque current of speed regulator. The 100% upper limit of torque is corresponding to the rated output current of inverter.

F4-08	Retain	—	—

6.6 Parameter Group F5 of Analog Terminal

F5-00	AI1 lower-limit value	0.00～10.00V	0.00 V
F5-01	Setting corresponding to AI1 lower limit	-100.0 ～	0.0%
F5-02	AI1 upper-limit value	0.00～10.00V	0.00 V
F5-03	Setting corresponding to AI1 upper limit	-100.0 ～	100.0%
F5-04	Filtering time of AI1 input	0.00～10.00S	0.10 S
F5-05	AI2 lower-limit value	0.00 ～	0.00mA
F5-06	Setting corresponding to AI2 lower limit	-100.0 ～	0.0%
F5-07	AI2 upper-limit value	0.00 ～	20.00mA
F5-08	Setting corresponding to AI2 upper limit	-100.0 ～	100.0%
F5-09	Filtering time of AI2 input	0.00～10.00S	0.10 S

It is to define the input range of analog input voltage channel and its corresponding set frequency percentage (relative to the max. output frequency) .



Linear Scale Diagram of Analog AI1/AI2

The system can carry out filter processing to the analog signals of external voltage input and external current input according to the set filter time to eliminate the influence of interference signal. The longer the time constant, the stronger the anti-interference capacity and the more stable the control is, but the slower the response is, and vice versa. If it is impossible to determine the optimal value in actual application, the parameter value shall be adjusted according to the control situation and response delay situation.

F5-10	Function selection of AOV/AOI multi-functional analog output terminal	01～10	0

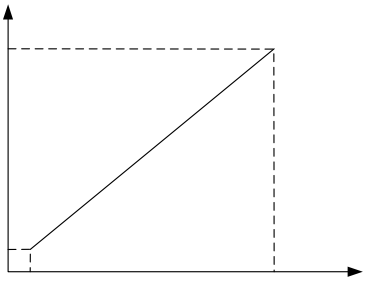
2-way programmable analog output terminal, AOV output voltage signal (0～10V), AOI output current signal (0～20mA). 1mA output current is equivalent to 0.5V voltage.

Set value	Function	Range
-	Run frequency	0～max. output frequency
1	Set frequency	0～max. output frequency
	Run speed	0～2 times of rated motor speed
	Output current	0～2 times of rated inverter current
	Output voltage	0～1.5 times of rated inverter voltage
	Output power	0～2 times of rated motor power
	Output torque	0～2 times of rated motor torque
	Input of analog AI1	0～10V
	Input of analog AI2	0～10V/0～20mA
	Torque current	

˜ı	Magnetic flux	

F5-11	Lower limit of AOV/AOI output	0.0～100.0%	0.0%
F5-12	AOV/AOI output corresponding to lower limit	0.00～10.00V	0.00 V
F5-13	Upper limit of AOV/AOI output	0.0～100.0%	0.0%
F5-14	AOV/AOI output corresponding to upper limit	0.00～10.00V	10.00 V

The functional code above defines the AOV/AOI linear output to overcome the influence of drift and the proportional relation with the corresponding output. If the analog output is current output, 1mA output current is equivalent to 0.5v voltage. The following diagram shows the linear proportional relation of output quantity.



Linear Scale Diagram of Analog AOV/AOI

10V/20mA
F5-14

F5-12

0.0% F5-11

6.7 Parameter Group F6 for Digital Terminal Function

F6-00	DI1 terminal function selection	0～31	0
F6-01	DI2 terminal function selection	0～31	0
F6-02	DI3 terminal function selection	0～31	0
F6-03	DI4 terminal function selection	0～31	0
F6-04	DI5 terminal function selection	0～31	0
F6-05	DI6 terminal function selection	0～31	0
F6-06	DI7 terminal function selection	0～31	0
F6-07	DI8 terminal function selection	0～31	0

0： Control terminal in idle

1： Forward rotating (FWD)

When terminal is short-circuited to COM, the inverter forward rotates and is valid only when F1-01=1.

2： Reverse rotating (REV)

When terminal is short-circuited to COM, the inverter reversely rotates and is valid only when F1-01=1.

3： Three-wire run control

This terminal is trigger switch of inverter stop and its principle refers to the detailed explanation of function in parameter F6-09.

4： Forward jog control

When terminal is short-circuited to COM, the inverter forward jogs and is valid only when F1-01=1.

5： Reverse jog control

When terminal is short-circuited to COM, the inverter reversely jogs and is valid only when F1-01=1.

6： Free stop control

When terminal is short-circuited to COM, the inverter freely shuts down.

7： External reset signal input (RST)

In case of failure in Inverter and terminal is short-circuited to COM, Inverter will reset.

8： External equipment failure input

External failure input. The failure signal of external equipment is input through this terminal and it allows the inverter to monitor the failure of external equipment.

9： Frequency increase command

When terminal is short-circuited to COM, the inverter increases frequency and is valid only when F1-02=0.

10：Frequency decrease command

When terminal is short-circuited to COM, the inverter decreases frequency and is valid only when F1-02=0.

11：UP/DOWN terminal frequency clear

When terminal is short-circuited to COM, the frequency set in UP/DOWN terminal will be cleared.

12：Multi-speed selection 1

13：Multi-speed selection 2

14：Multi-speed selection 3

15：Multi-speed selection 4

After selecting ON/OFF combination of above functional terminals, a 16 stage speed can be selected at maximum and valid only when F1-02=4, seen in the following table:

Multi-speed Selection 4	Multi-speed Selection 3	Multi-speed Selection 2	Multi-speed Selection 1	Speed
OFF	OFF	OFF	OFF	0
OFF	OFF	OFF	ON	1
OFF	OFF	ON	OFF	2
OFF	OFF	ON	ON	3
OFF	ON	OFF	OFF	4
OFF	ON	OFF	ON	5
OFF	ON	ON	OFF	6
OFF	ON	ON	ON	7
ON	OFF	OFF	OFF	8
ON	OFF	OFF	ON	9
ON	OFF	ON	OFF	10
ON	OFF	ON	ON	11
ON	ON	OFF	OFF	12
ON	ON	OFF	ON	13
ON	ON	ON	OFF	14
ON	ON	ON	ON	15

16：ACC/DEC time selection 1

17：ACC/DEC time selection 2

ON/OFF combination of ACC/DEC time selection can choose four ACC/DEC times seen in following table:

ACC/DEC Time 2	ACC/DEC Time 1	ACC/DEC Time
OFF	OFF	1
OFF	ON	2
ON	OFF	3
ON	ON	4

18： PID control pause

When terminal is short-circuited to COM, the inverter pauses PID.

19： Swing frequency control pause (retain)

When terminal is short-circuited to COM, the inverter pauses swing frequency and stably runs at current frequency. After it is disconnected, the Inverter will run swing frequency as its original state.

20： Swing frequency status reset (retain)

When terminal is short-circuited to COM, the inverter pauses swing frequency and stably runs at setting frequency (the center frequency of swing frequency). After it is disconnected, the Inverter will run swing frequency as its original state.

21：ACC/DEC inhibit command in inverter

When terminal is short-circuited to COM, it ensures the inverter is not affected by any external signal (except stop command) and maintains the running at current speed.

22：Switch torque control to speed control

When control mode is constant torque mode, this terminal is valid and switches into speed control. Or else, this terminal is invalid and switches into torque control.

23： UP/DOWN terminal frequency temporary clear

When terminal is short-circuited to COM, frequency value set at UP/DOWN terminal is temporarily cleared to zero. When terminal is disconnected, frequency restores to original value.

25: Switch between frequency sources A and B

When terminal is short-circuited to COM, the inverter runs at frequency given by auxiliary frequency source B instead of at frequency given by main frequency source A, which is valid only when F1-05=2.

25: Switch between frequency source A and A+B

When terminal is short-circuited to COM, the inverter runs at frequency given by main frequency source A+ auxiliary frequency source B instead of at frequency given by main frequency source A, which is valid only when F1-05=2.

26： PLC multi-speed pause

When terminal is short-circuited to COM, the inverter pauses PLC running mode and runs stably at frequency under current speed. After terminal is disconnected, the inverter continues PLC running mode.

27：PLC multi-speed reset

When terminal is short-circuited to COM, the inverter pauses PLC running mode and runs in ordinary mode. After terminal is disconnected, the inverter continues PLC running mode from zero speed.

28： Counter clear signal input

When terminal is short-circuited to COM, the counter is cleared to be zero.

29： Counter trigger signal input (only valid for DI6)

Receive pulse trigger signal from counter. When each signal is received, the counter will add 1.

30-31: Retain

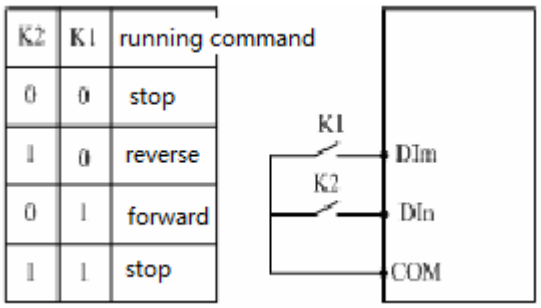
F6-08	Switching value filtering times	0～10	5

Confirm the times of DI1 to DI8 multi-functional terminal is closed validly. The less filtering times are, the shorter response time to switching value will be. The more filtering times are, the longer response time to switching value will be.

F6-09	FWD/REV terminal control mode	0～3	0

0： Two-wire control 1

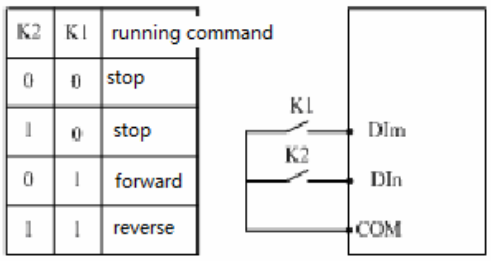
DIm forward command (FWD), DIn reverse command (REV). (DIm and Din mean any two terminals from DI1 to DI8.)



Two-wire Running Mode 1

1： Two-wire control 2

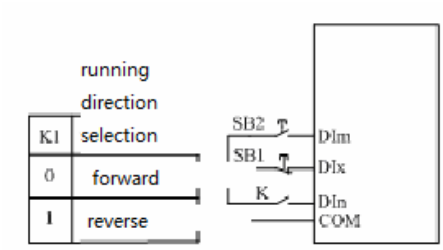
DIm forward command (FWD), DIn reverse command (REV). (DIm and Din mean any two terminals from DI1 to DI8.)



Two-wire Running Mode 2

2： Three-wire control 1

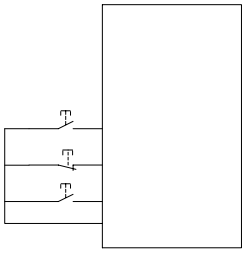
DIm forward command (FWD), DIn reverse command (REV) and DIx stop command (DIm, DIn and DIX mean any three terminals from DI1 to DI8.)



DIX is three-wire running control terminal, which is any terminal that has no defined function from DI1 to DI8 through parameter selection. Among them: SB2-running switch (normally open), SB1-stop switch (normally close) and K-direction selection switch

3：Three-wire control 2

DIm forward command (FWD), DIn reverse command (REV) and DIx stop command (DIm, Din and DIX mean any three terminals from DI1 to DI8.)



Including: SB2-forward switch SB1-stop switch SB3-reverse switch

DIx is three-wire running control terminal, which is any terminal from multi-function input terminal DI1 to DI8. Meanwhile, the corresponding terminal function selection is three-wire running control.

F6-10	UP/DOWN terminal frequency change rate	0.01～50.00Hz/S	0.50

This parameter is used to set up frequency change rate when frequency is set via UP/DOWN terminal which means the frequency change value within one second when UP/DOWN terminal is short-circuited to COM. This parameter only changes the change rate of given frequency without changing change rate of output frequency. So it suggests this parameter should make the UP/DOWN terminal frequency change rate less than and equal to change rate of output rate, if not so, a false phenomenon that frequency increases or decreases will appear after UP/DOWN terminal is disconnected.

F6-11	Open collector output terminal DO1 setting	0～17	0
F6-12	Open collector output terminal DO2 setting	0～17	0
F6-13	Programmable relay output	0～18	1

0： No output.

1： Inverter runs forward

When inverter runs forward, valid signal will be exported, or else invalid signal is exported.

2： Inverter runs reversely

When inverter runs reversely, valid signal will be output, or else invalid signal is output.

3： Failure output

In case of failure in inverter, valid signal will be output, or else invalid signal is output.

4： Frequency/speed level detection signal (FDT)

Refer to parameters F6-14.

5： Frequency/speed reach signal (FAR)

Refer to parameters F6-16.

6: 0-speed running indication in inverter

When inverter runs at zero speed, valid signal will be output, or else invalid signal is output.

7: Output frequency reaches upper limit

When output frequency of inverter reaches upper limit, valid signal will be output, or else invalid signal will be output.

8: Output frequency reaches lower limit

When output frequency of inverter reaches lower limit, valid signal will be output, or else invalid signal will be output.

9: Reach lower limit of given frequency when running

When inverter runs and lower limit of given frequency is reached, valid signal will be output, or else invalid signal will be output.

10: FDT reached Refer to parameters F6-14.

11: Inverter overload alarm signal

When inverter is overloaded, valid signal will be output, or else invalid signal will be output.

12：Counter detection signal output Refer to parameters F6-18.

13：Counter reset signal output Refer to parameters F6-17.

14: Inverter ready for running

When inverter is energized and ready for running, free from failure, bus is at normal voltage, inverter inhibited running terminal is invalid, the inverter will start up after directly receiving running command and this parameter outputs indication signal.

15: A programmable multi-speed run period finished

After a programmable multi-speed running (PLC) run period finishes, this terminal will output indication signal (single pulse signal, signal width 500mS).

16： Programmable multi-speed stage finished

After current stage of programmable multi-speed running (PLC) finishes, a valid pulse signal will be output and signal width is 500mS.

17：Under voltage lock-out stop

When DC bus is under voltage limitation level, indication signal will be output while LED displays “POFF”.

18： Forward RUN

When it runs forward, valid signal will be output, or else invalid signal will be output, excluding forward jog.

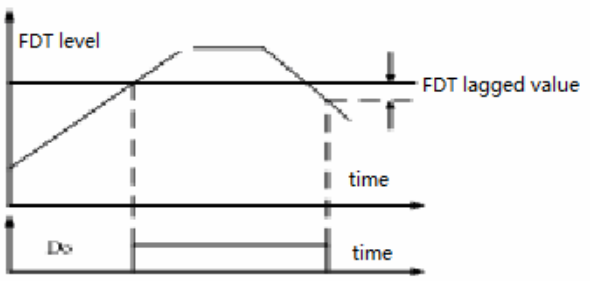
Note: DO1 and DO2 output low level valid signal (but the resistance must be 24 V power supply). When invalid signal is output, it will be high impedance signal. Relay outputs switch signal.

F6-14	FDT level setting	0.00Hz～【F1-08】	50.00Hz

F6-15	FDT lagged value	0.0～100.0%（FDT level）	5.0%

This parameter group is supplementary notes to function 4 in parameters F6-11 to F6-13, which are used to set up frequency detection level.

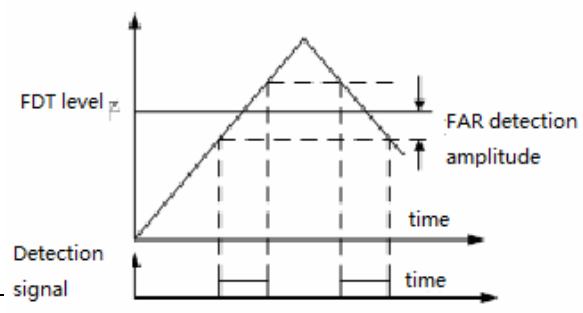
As shown below, when inverter output frequency increases above FDT electrical level setting value, the valid open collector signal will be output (low level). When output frequency decreases below FDT signal (lagged value), invalid signal will be output (high impedance). The difference between function 4 and function 10 in multi-functional output terminal is that, function 4 compares inverter output frequency with FDT given electrical level, while function 10 compares given frequency with FDT given electrical level.



Frequency Level Detection Diagram

F6-16	Detection amplitude when frequency up to FAR	0.0 ～ 100.0% （ maximal frequency）	100.0%

This parameter is supplementary note to function 5 in parameters F6-11 to F6-13, seen as below. When inverter output frequency is within positive and negative detection width of given frequency, the output terminal will output valid open collector signal (low level).



Frequency Reach Diagram

F6-17	Counter reset value setting	0～65535	1
F6-18	Counter detection value setting	0～【F6-17】	1

This parameter group defines how the counting works in the counter. Clock terminal in counter is external terminal DI6.

When the counter counts that the external clock reaches set value of parameter F6-17, the corresponding multi-functional output terminal (counter reset signal output) will output a synchronizing signal with its width equaling to external valid signal and the counter is cleared to zero. When the counter value reaches set value of parameter F6-18, the corresponding multi-functional output terminal (counter detection signal output) will output valid signal. If the counting value exceeds set value of parameter F-17, this output valid signal will be cancelled when the counter is cleared to zero. As shown below, set DO1 as reset signal output, DO2 as detection signal output, F6-17 as 8, F6-18 as 5. When it reaches detection value “5”, DO2 will output open collector signal and maintain. When it reaches reset value “8”, DO1 will output one open collector signal for one pulse cycle while DO1 and DO2 cancel output signals.

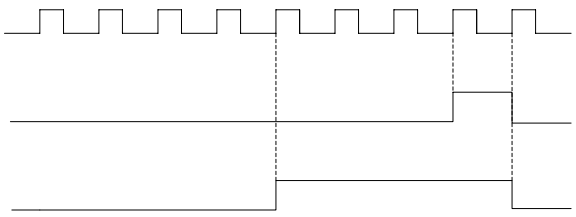


Diagram of Counter Reset Value Setting and Counter Detection Value Setting

6.8 Parameter Group F7 for Human-machine Interface

DI6 1 2 3 4

DO1

F7-00	Load speed display factor	0.1～999.9%	100.0%

Mechanical rotation speed: 120* running frequency *F7.00/pole number, which is used to correct speed scale display error, having no influence on actual speed.

F7-01	Monitoring parameter selection of run status	0～0FFFF	0XFF
F7-02	Monitoring parameter selection of stop status	0～0X1FF	0XFF

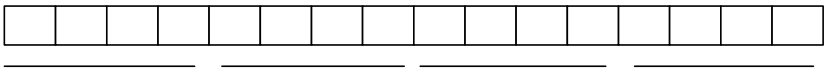
Stop and running display parameters are set as 16 digits. It is invalid if the bit is set as 0.Only 1 is valid. Press ⟫ key to display the parameter with valid bit, e.g. F7-07 is set as 0xF7. Press ⟫ key to switch display output terminal status.

16-digit code display list of running display

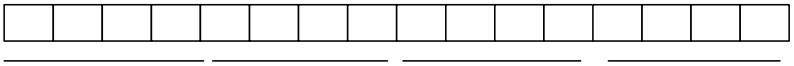
BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Output torque	Output power	Running speed	Output current	Output voltage	Bus voltage	Set frequency	Running frequency
BIT15	BIT14	BIT13	BIT12	BIT11	BIT10	BIT9	BIT8
Set count value	Current count value	Current stage in multi-speed	Analog input AI2(V)	Analog input AI1(V)	Output terminal status	PID feedback value	PID given value

For example:

1. If it plans to monitor 16 parameters, position from 0 to15 will be set as 1 and enter numbers into F7.01 like:



2. If it plans to monitor running frequency, bus voltage, output current, PID given value and PID feedback value, Bit0, 2, 4, 8 and 9 will be set as 1 and others are set as 0. Enter numbers into F7.01 like:



16-digit code display list of stop display parameter

Bit15 Bit14 Bit13 Bit12 Bit11 Bit10 Bit9 Bit8
0 0 0 0 0 0 1 1

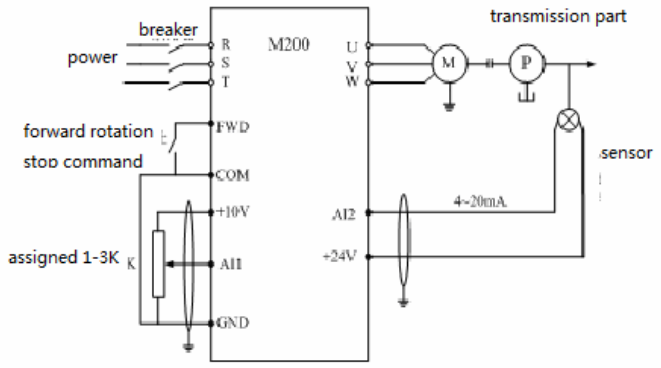
BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
AI2	AI1	Feedback closed loop value	Given closed loop value	Output terminal status	Input terminal status	Bus voltage	Set frequency
BIT15	BIT14	BIT13	BIT12	BIT11	BIT10	BIT9	BIT8
Retain	Retain	Retain	Retain	Retain	Retain	Retain	Multi-speed stage

0 3

The setting method of stop display parameter refers to parameter setting.

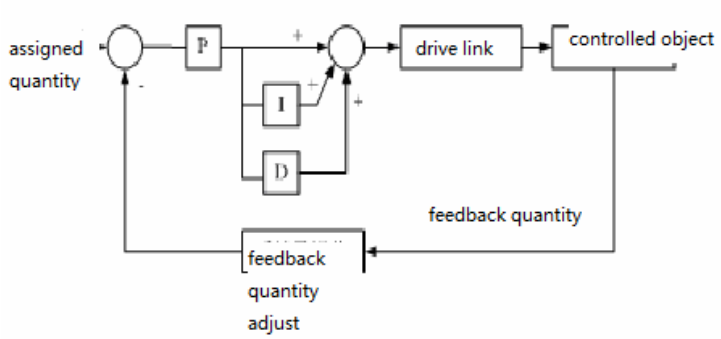
6.9 PID Parameter Group F8

Analog feedback control system: The assigned quantity is input from AI1 port. The index parameter of controlled object is switched into 4～20mA analog feedback quantity via sensor and then delivered into AI2 input port of inverter, after going through built-in PI regulator, an analog closed loop control system will be formed, seen as below:



（FWD terminal is user-defined）

Block diagram is:



F8-00	PID assignment channel selection	0 ～4	0

0：digit assignment PID assigned quantity is assigned by digit and set via parameter F8-01.

1：AI1 PID assigned quantity is assigned by external voltage signal AI1 (0-10V).

2：AI2 PID assigned quantity is assigned by external current signal AI2 (0～20mA/0～10V).

3：Remote communication PID assigned quantity is assigned by remote communication.

4: Multi-speed assignment PID assigned quantity is assigned by multi-speed.

F8-01	Setting of digital assignment	0.0～100.0%	0.0%

When analog quantity feedback is adopted, this parameter will set up the assigned quantity of closed loop control via operation panel. When the closed loop assigning channel selects digital assignment, this parameter will be valid.

F8-02	PID feedback channel selection	0 ～4	0

0：AI1 PID feedback quantity is assigned by external voltage signal AI1(0～10V).

1：AI2 PID feedback quantity is assigned by external current signal AI2 (0～20mA/0～10V）.

2：AI1+AI2 Take algebraic sum of AI1 and AI2.

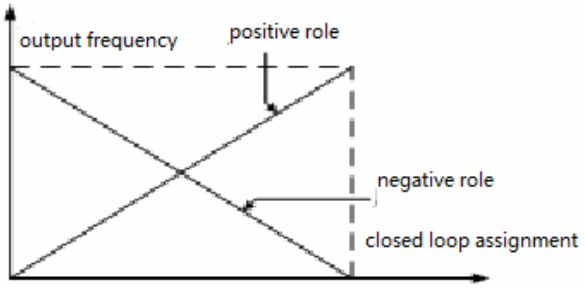
3：AI1-AI2 Difference between AI1 and AI2. If AI1is less than or equal to AI2, the result will be 0.

4：Remote communication PID feedback quantity is assigned by remote communication.

F8-03	PID pole selection	0 ～1	0

0：PID output is positive polarity.

1：PID output is negative polarity.



F8-04	Proportional gain Kp	0.01～100.00	1.00
F8-05	Integral time Ti	0.01～10.00S	0.10S
F8-06	Derivative time Td	0.0： no integral 0.01～10.00S	0.00S

Proportional gain （Kp）：

It decides adjustment strength of whole PID regulator. The bigger P is, the bigger adjustment strength will be. When this parameter is 100, it means when the deviation between PID feedback quantity and assigned quantity is 100%, the adjustment range of PID regulator acting on output frequency command will be maximum frequency (Integral role and derivative role are neglected.).

Integral time (Ti):

It decides the speed of PID regulator making integral control on the deviation between PID feedback quantity and assigned quantity. The integral time means when the deviation between PID feedback quantity and assigned quantity is 100%, the integral adjustor (Integral role and derivative role are neglected.), after continuously adjusted, is adjusted to reach maximum frequency [F1-08]. The shorter integral time is, the bigger adjustment strength will be.

Derivative time (Td):

It decides the strength of PID regulator adjusting change rate of deviation between PID feedback quantity and assigned quantity. Integral time means when the feedback quantity changes 100% within this time phase, the adjustment range of derivative adjustor will be maximal frequency [F1-08] (Integral role and derivative role are neglected.). The longer integral time is, the bigger adjustment strength will be.

PID is the most common control method in process control. Each part plays different role. The following is a brief introduction of working principles and adjustment methods:

Proportional control (P):

When the feedback quantity deviates from assigned quantity, an adjustment quantity in proportional to deviation will be output. If deviation is constant, the adjustment quantity will be constant. The proportional control can rapidly respond to the change of feedback. However, astatic control can not be realized by purely using proportional control. The bigger proportional gain is, the faster adjustment speed

in the system will be. However, if it is too big, oscillation will be caused. The adjustment method is, firstly, set integral time as long time, set derivative time as zero. Run the system by purely using proportional control. Change the assigned quantity, observe the deviation between feedback signal and assigned quantity (steady-state difference). If steady-state difference is in the direction of assigned quantity changing (e.g. after assigned quantity is added, the system becomes stable, and total feedback quantity will be less than assigned quantity.), it will continue to increase proportional control. If not so, decrease proportional control and repeat the above steps until steady-state deviation is very small (impossible to be zero).

Integral time (I):

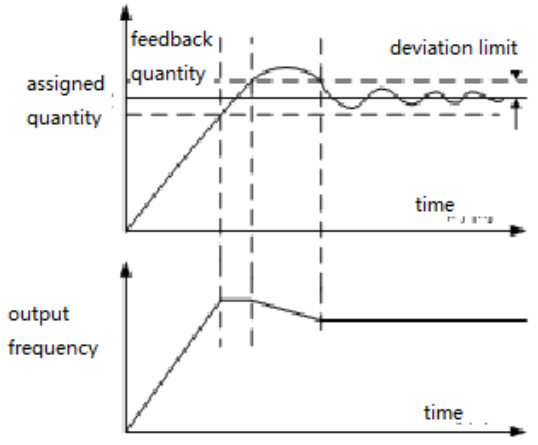
When feedback quantity deviates from assigned quantity, output adjustment quantity will be continuously accumulated. If deviation exists, adjustment quantity will continue to rise until there is no deviation. Integral adjustor is an effective tool to eliminate steady-state deviation. If integral controller acts too strongly, overshoot will repeat again and again, causing instability of system until oscillation is produced. Such oscillation caused by too strong integral role will feature feedback signal swinging up and down of assigned quantity, swing amplitude gradually increasing until oscillation caused. The integral time parameter is generally adjusted from big to small. Gradually adjust integral time, observe system adjustment effect until the stable speed of system meets the requirements.

Derivative time (D):

When the deviation between feedback quantity and assigned quantity changes, an adjustment quantity in proportional to deviation change rate will be output. It is only relevant to deviation change direction and size rather than deviation direction and size itself. Derivation controller is used to adjust this deviation based on change trend when feedback signal changes so as to inhibit feedback signal change. Please take caution to use derivative controller, because it is easy to amplify system disturbance, particularly the disturbance with higher change frequency.

F8-07	Sampling period T	0.00：automatic 0.01～100.00S	0.10S
F8-08	Deviation limit	0.0～100.0%	0.0%

Sampling period refers to sampling period of feedback quantity. PI adjusts once within each sampling period. The longer sampling period is, the slower response will be. Deviation limit is the ratio between the absolute value of deviation between system feedback quantity and assigned quantity and assigned quantity. When feedback is within deviation limit, PI does not adjust, seen as below. The correct setting of this function is beneficial to increase the stability of system.



Deviation Limit Diagram

F8-09	Feedback disconnection detection value	0.0～100.0%	0.0%
F8-10	Feedback disconnection detection time	0.1～3600.0S	10.0 Sec

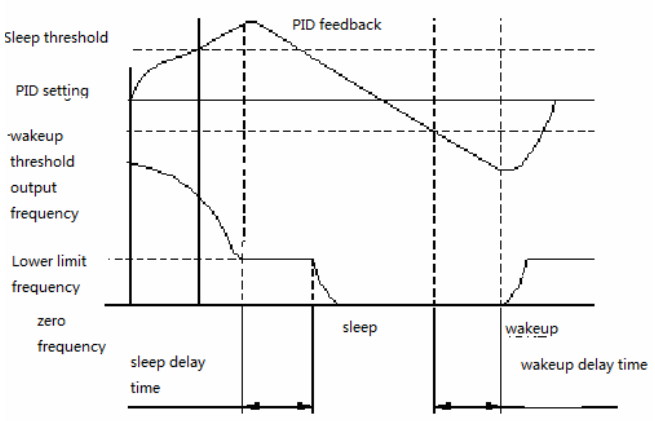
When feedback value is less than and equal to feedback disconnection detection value, and the feedback disconnection detection time elapses, the inverter will report PID feedback disconnection failure (E-20).

F8-11	Sleep threshold	0.00～10.00V	10.00V
F8-12	Wakeup threshold	0.00～10.00V	0.00V
F8-13	Sleep/Wakeup time	0.1～600.0S	100.0 Sec

F8-11 defines feedback limit value of inverter changing from work status into sleep status. When PID polarity is positive, if actual feedback value is higher than setting value (or when PID polarity is negative, if actual feedback value is lower than setting value), and the output frequency of inverter approaches lower limit frequency, the inverter will enter sleep status through delay waiting time defined by F8-13 (which means, inverter will rotate in zero speed.)

F8-11 defines feedback limit value of inverter changing from sleep status into work status. When PID polarity is positive, if actual feedback value is lower than setting value (or when PID polarity is negative, if actual feedback value is lower than setting value), the inverter will leave sleep status through delay waiting time defined by F8-13 and start working.

Thus, when PID is positive polarity, sleep threshold needs to be higher than Wakeup threshold. When PID is negative polarity, sleep threshold needs to be lower than wakeup threshold.



Sleep and Wakeup Function Diagram

6.10 Parameter Group F9 for Multi-speed Control

F9-00	Multi-speed running mode selection	0～2	0

0：Stop after single cycle

The inverter stops after one cycle of multi-speed running ends. At this moment, it restarts only when running command is given. If the running time is 0 in any phase, it will skip this phase when running and directly go to next phase.

Note:

Multi-speed running time must be higher than acceleration time. In this parameter group, it only defines running time. So it is necessary to understand how the multistage ACC/DEC time is converted.

Multistage ACC/DEC time=｛(current multistage frequency-starting multistage frequency)÷maximal frequency｝×ACC/DEC time (F1-11,F1-12)

For example, the maximal running frequency is 50Hz, acceleration 10S, deceleration 20S, so when it runs in multi-speed, the acceleration time of the system running from 20Hz to 30Hz will be:

T1=｛(30HZ-20HZ)÷50HZ｝×F1-11=2S

Deceleration time when system changes running from 30HZ to 10HZ:

T2=｛(30HZ-10HZ)÷50HZ｝×F1-12=8S

1：Keep running at final value after single cycle

After one cycle ends, the inverter will automatically keep running frequency and direction at final stage.

2： Continuous circulation

After one cycle ends, the inverter will automatically start next cycle until receive stop command.

F9-01	PLC running power-off memory	0～1	0

0：Not memorize

When it is power off, it will not memorize PLC running status. The inverter runs from stage 1 after being energized.

1：Memorize

When it is power off, it will memorize PLC running status, including power-off stage, running frequency and time already running. The inverter runs and automatically enters this stage after being energized and runs for residual time at frequency defined at this stage.

F9-02	Multi-speed frequency 0	-100.0～100.0%	0.0%
F9-03	Multi-speed frequency 1	-100.0～100.0%	0.0%
F9-04	Multi-speed frequency 2	-100.0～100.0%	0.0%
F9-05	Multi-speed frequency 3	-100.0～100.0%	0.0%
F9-06	Multi-speed frequency 4	-100.0～100.0%	0.0%
F9-07	Multi-speed frequency 5	-100.0～100.0%	0.0%
F9-08	Multi-speed frequency 6	-100.0～100.0%	0.0%
F9-09	Multi-speed frequency 7	-100.0～100.0%	0.0%
F9-10	Multi-speed frequency 8	-100.0～100.0%	0.0%
F9-11	Multi-speed frequency 9	-100.0～100.0%	0.0%
F9-12	Multi-speed frequency 10	-100.0～100.0%	0.0%
F9-13	Multi-speed frequency 11	-100.0～100.0%	0.0%
F ˜ ı	Multi-speed frequency 12	-100.0～100.0%	0.0%
F9-15	Multi-speed frequency 13	-100.0～100.0%	0.0%
F9-16	Multi-speed frequency 14	-100.0～100.0%	0.0%
F9-17	Multi-speed frequency 15	-100.0～100.0%	0.0%

Multi-speed symbol decides running direction. Negative means running in reverse direction. When

frequency is set as 100.0%, it will correspond to maximal frequency F1-08. Frequency input method is decided by F1-02. Start/stop command is set by F1-01.

F9-18	Running time at stage 0	0.0～6553.5S(M）	0.0
F9-19	Running time at stage 1	0.0～6553.5S(M）	0.0
F9-20	Running time at stage 2	0.0～6553.5S(M）	0.0
F9-21	Running time at stage 3	0.0～6553.5S(M）	0.0
F9-22	Running time at stage 4	0.0～6553.5S(M）	0.0
F9-23	Running time at stage 5	0.0～6553.5S(M）	0.0
F9-24	Running time at stage 6	0.0～6553.5S(M）	0.0
F9-25	Running time at stage 7	0.0～6553.5S(M）	0.0
F9-26	Running time at stage 8	0.0～6553.5S(M）	0.0
F9-27	Running time at stage 9	0.0～6553.5S(M）	0.0
F9-28	Running time at stage 10	0.0～6553.5S(M）	0.0
F9-29	Running time at stage 11	0.0～6553.5S(M）	0.0
F9-30	Running time at stage 12	0.0～6553.5S(M）	0.0
F9-31	Running time at stage 13	0.0～6553.5S(M）	0.0
F9-32	Running time at stage 14	0.0～6553.5S(M）	0.0
F9-33	Running time at stage 15	0.0～6553.5S(M）	0.0

This parameter group is used to set up programmable multi-speed running time. The time unit in this parameter group is decided by F9-34.

F9-34	PLC running time unit selection	0～1	0

0：S

PLC running time unit is second.

1: m

PLC running time unit is minute.

F9-35	Retain	—	—
F9-36	Retain	—	—
F9-37	Retain	—	—
F9-38	Retain	—	—
F9-39	Retain	—	—

6.11 Parameter Group FA for Protective Function

FA-00	Motor overload protection selection	0～2	2

0：No protection

Overload protection is not available for motor in this inverter. Please cautiously use this function.

1：General motor (with low speed compensation)

General motor has bad effect in heat dissipation when running at low speed. So we adjust corresponding electronic heat protection value. Low speed compensation features mentioned here is to decrease overload protection threshold when running frequency is lower than 30Hz.

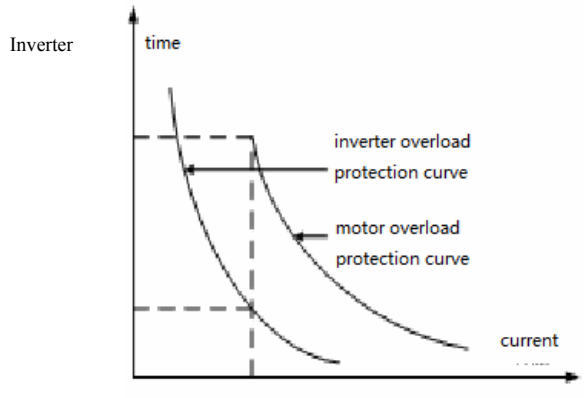
2： Variable frequency motor (without low speed compensation)

Because heat dissipation in variable frequency motor is not affected by rotation speed, there is no need to adjust low speed protection threshold.

FA-01	Motor overload factor	20.0～120.0%（Motor rated current）	100.0%

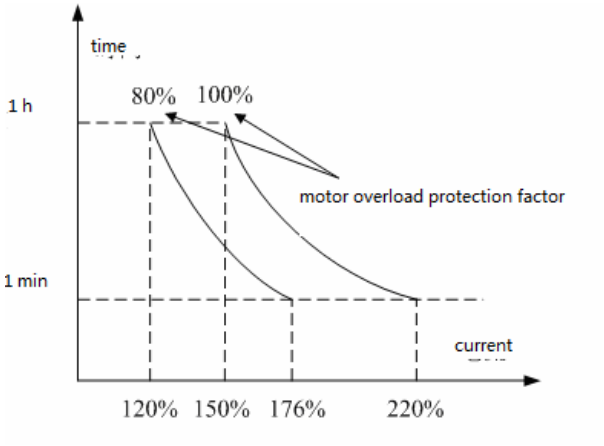
To apply effective overload protection to load motors of different specification, it needs to reasonably set overload protection factor of motor and limit the maximal current value allowed by the inverter. The motor thermal relay protection factor is the percentage between motor rated current and inverter rated output current.

If one motor matches with the drive power class of inverter, the motor overload protection factor can be set as 100%. At this moment, if output current is less than 150% of inverter rated current, motor overload protection will not act; When output current is 150% of inverter rated current, motor overload protection will not act because inverter overload protection acts firstly, seen as below:



Overload Protection and Motor Overload Protection Curve

When inverter capacity is higher than motor capacity, to apply effective overload protection to load motor of different specifications, it needs to reasonably set motor overload protection factor, seen as below:



Motor Overload Protection Factor Setting

FA-02	Instant power-off frequency reduction point	70.0～110.0%（rated bus voltage）	80.0%
FA-03	Instant power-off frequency reduction rate setting	0.00Hz～【F1-08】	0.00Hz

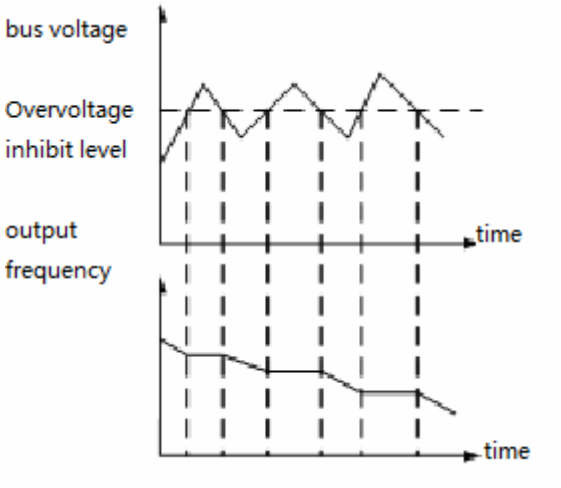
When instant power-off frequency reduction rate is set as 0, instant power-off restart function will be invalid.

Instant power-off frequency reduction point: When the inverter is power off, bus voltage reduces till instant power-off frequency reduction point, the inverter will decrease running frequency based on instant power-off frequency decrease rate and make motor energized, maintain bus voltage through feedback electric energy, ensures the inverter in normal operation until the inverter is power on again.

Instant power-off frequency parameter setting can realize switch between non-stop working grid and variable frequency power grid.

FA-04	Overvoltage stall protection	0：inhibit 1：allow	0
FA-05	Overvoltage limit level	110～150%(rated bus voltage)	120%

This parameter defines the threshold of voltage stall protection when the motor decelerates. If pump voltage on DC side of inverter exceeds the value set by this parameter, the inverter will adjust deceleration time, slowly reduce output frequency or stop reducing, decelerates until bus voltage is less than Overvoltage limit level. As shown below: Overvoltage limit level: means the percentage of rated bus voltage.



Description of Overvoltage Limit Level

FA-06	Current amplitude limit level	100～200%	160%/120%

Current amplitude limiting function is used to prevent fault trip caused by excessive current impact through real-time control of motor current. This function is specially suitable for the case where the load has bigger inertia or changes dramatically.

During acceleration, when the output current of inverter exceeds the value set by this parameter, the inverter will automatically adjust acceleration time until the current falls back beneath this level, then continue acceleration to target frequency value. During constant speed running, when output current exceeds the value set by this parameter, the inverter will adjust output frequency (frequency reduction unload), restrict the current within specified range and avoid overcurrent trip. The current amplitude limit level defines current threshold of auto-current-limit action. This level is the corresponding percent to inverter rated current.

FA-07	Current-limit action selection	0～1	0

0： Valid in the whole process

Current-limiting function is valid in whole process of inverter running.

1：Invalid during constant speed running

The current-limiting function is only valid when the inverter accelerates or decelerates.

FA-08	Current-limit frequency reduction rate	0.00 ～ 100.00Hz/s	10.00Hz/s

This parameter sets up the frequency reduction rate when the output current of inverter is higher than current amplitude limit level.

FA-09	Fault auto reset time	0～3	0
FA-10	Fault auto reset interval	0.1～100.0s	1.0s

In case of fault during operation, the inverter will stop output and display fault code. Through reset interval set by FA-10, the inverter will automatically reset and continue running. The times of fault auto reset is set by FA-09. When the time of fault reset time is set as 0, the auto reset function will not be available. Only manual reset function is available (through using the key STOP/RESET). For overheat and overload protection fault, the inverter is not allowed to conduct auto reset.

FA-11	Overload pre-alarm level	20～120%	100%
FA-12	Overload pre-alarm delay	0.0～15.0s	1.0s

Overload pre-alarm realizes monitoring on overload status before overload protection function acts. Overload pre-alarm level (FA-11) defines the current threshold of overload pre-alarm action. This level is the corresponding percent to rated current. Overload pre-alarm detection time (FA-12) defines the overload pre-alarm signal which is output after inverter output current is higher than overload detection level (FA-11) for a while. When inverter output current is higher than pre-alarm detection level, pre-alarm detection time will gradually increase. When inverter output current is less than detection level, pre-alarm detection time will gradually decrease. When overload pre-alarm status is valid, the inverter overload detection time will be higher than overload pre-alarm detection time.

FA-13	Input open-phase protection selection	0～1	1
FA-14	Output open-phase protection selection	0～1	1

0：Inhibit

Inhibit input/output open-phase protection function

1：Allow

Allow input/output open-phase protection function

6.12 Parameter Group FB for Serial Communication

FB-00	Communication address of local machine	0：master station 1～247：slave station	1

This parameter is used to set up the address of inverter when communicates by RS485. This address is exclusive.

0：Master station

It shows master station when inverter is in linkage control, which controls the running of inverters linked to this inverter.

1-31： Slave station

It shows the inverter acts as salve machine to receive data from upper computer or master station. The inverter only receives the data from upper computer or master station matching with the home address.

FB-01	Communication baud rate setting	0 ～5	3

0：1200 bps

1：2400 bps

2：4800 bps

3：9600 bps

4：19200 bps

5：38400 bps

This parameter is used to define the data transmission rate between upper computer and inverter. The baud rate in upper computer and inverter should be identical, or else the commutation fails. The bigger baud rate is, the faster data communication will be.

FB-02	Data format	0 ～17	0

The data format in upper computer and inverter must be identical, or else communication fails.

RTU format

0：No check（N,8,1） 1：Even check（E,8,1） 2：Odd check（O,8,1） 3：No check（N,8,2）

4：Even check（E,8,2） 5：Odd check（O,8,2）

ASCII format

6：No check（N,7,1） 7：Even check（E,7,1） 8：Odd check（O,7,1） 9：No check（N,7,2）
10：Even check（E,7,2） 11：Odd check（O,7,2） 12：No check（N,8,1） 13：Even check（E,8,1）
14：Odd check（O,8,1） 15：No check（N,8,2） 16：Even check（E,8,2） 17：Odd check（O,8,2）

FB-03	Reply delay in local machine	0 ～200mS	5mS

Reply delay in local machine: it means the interval of the inverter sending reply data to upper computer after the inverter receives data frame. If reply time is less than system handling time, it will be subject to system handling time.

FB-04	Communication timeout detection	0.0 ～100.0S	0.0S

Communication timeout fault time is set as 0, so this function is invalid. If the interval of two communications exceeds communication timeout fault time, the system will report communication fault error (E-15) and monitor communication status.

FB-05	Transmission failure handling	0 ～2	1

0： Alarm and free stop

Transmission fails, and the inverter will give alarm and free stop.

1： Keep running

Transmission fails, and the inverter will keep current status and keep running.

2： Not alarm but stop as set

Transmission fails, and the inverter will not give alarm but stop as stop method set by F2-08.

FB-06	Transmission response handling	0 ～1	0

0：Response when writing operation

1：No response when writing operation

This parameter is used to make response when upper computer writes parameter into the inverter.

6.13 Parameter Group FC for Advanced Function

FC-00	Starting voltage of dynamic braking	115.0 ～ 140.0 %（standard bus voltage）	130.0%
FC-01	Action rate of dynamic braking	10～100%	50%

This parameter group is used to define action parameter of break units built in the inverter. If the voltage on DC side inside inverter is higher than starting voltage of dynamic braking, this built-in break unit will act. At this moment, if braking resistance is connected, it will release pump voltage energy on

current side inside inverter through braking resistance and make DC voltage fall down. When the voltage on DC voltage reduces till one value, the built-in break unit will be closed. The action scale of dynamic braking is used to define the average voltage when the break unit applies voltage on braking resistance. The voltage applied in braking resistance is voltage pulse width modulating valve. Duty ratio is equal to this action rate of consumed braking action. The bigger action rate is, the faster energy will be released, the more obvious effect will be. Meanwhile, the power consumed in braking resistance will be bigger. The users can set up this parameter by comprehensively considering the braking resistance, power and braking effect required.

FC-02	AVR function	0 ～2	2

0：Inhibit

1：full activation

2：activate when decelerating

AVR refers to auto voltage regulator. When input voltage differs from rated value in inverter, this function will be used to keep stable output voltage in inverter. This function is invalid when the output command voltage is higher than input voltage.

When acceleration, if AVR does not act, deceleration will be short but running current is very big. If AVR acts, the motor decelerates stably and running current is small, but deceleration costs longer.

FC-03	Auto energy-saving run	0 ～1	0

0：Inhibit

1：Allow

If the inverter is in auto energy-saving run mode, it will automatically detect motor load and adjust output voltage to make the motor run in high-efficiency and energy-saving status. Auto energy-saving function shows very obvious effect in energy saving when there is low load change frequency and big change scope. Its working principles are to make the motor run in optimal high-efficiency status through adjusting the motor excitation status when motor is lightly loaded and reduce the energy consumption of motor to maximal extent and obtain additional effect in energy saving.

Tip: This function is used into fan and pump.

FC-04	Selection of oscillation suppression	0 ～1	1
FC-05	Low-frequency threshold of oscillation	0 ～500	5
FC-06	High-frequency threshold of oscillation	0 ～500	100
FC-07	Amplitude limit of oscillation suppression	0 ～10000	5000

FC-08	High/low frequency separation point of oscillation suppression	0 ～10000	12.50Hz

Oscillation suppression function is valid for V/F control mode. General motor often appears current oscillation when it is empty loaded or lightly loaded. This function can be used to weaken current oscillation. When FC-04=0, oscillation suppression function will be invalid. When FC-04=1, oscillation suppression function will be valid. When FC-05 and FC-06 are set as smaller value, oscillation suppression effect will be more obvious. Current increases obviously. If they are set as bigger value, the oscillation suppression effect will be weak. The voltage increase can be inhibited during oscillation suppression through setting FC-07. FC-08 value is the demarcation point between FC-05 and FC-06.

FC-09	Cooling fan control	0 ～1	0

0： auto control mode

Keep running during operation.

Inverter shuts down and the fan automatically stops when radiator is detected to be below 40 °C.

1：keep running during power on

This mode is suitable to some cases where fans can not stop.

FC-10	PWM switch mode	0～2	0

0：mode 0

1：mode 1，high switch loss.

2： mode 2, low switch loss.

FC-11	Password of run limit function	0～65535	
FC-12	Selection of run limit function	0～1	0
FC-13	Limit time	0～65535H	0

This parameter group is used to limit the operation of inverter.

When FC-12=1, the operation limit function will be valid. When FC-13 setting time is operated by inverter, the inverter will be locked and out of use. It restores normal use only when FC-12 and FC-13 are set again through entering FC-11 password into parameter setting.

6.14 Parameter Group FD for Monitoring

FD-00	Output frequency (Hz)	0.00～【F1.08】	—
FD-01	Main setting frequency (Hz)	0.00～【F1.08】	—
FD-02	Auxiliary setting frequency (Hz)	0.00～【F1.08】	—

FD-03	Output current (A)	0.1-2000.0	—
FD-04	Output voltage (V)	0-460	—
FD-05	Output torque（%）	0-2000	—
FD-06	Motor speed (RPM/min)	0-36000	—
FD-07	Bus voltage (V)	0.0-1000.0V	—

This parameter group is used to monitor each running parameter of inverter.

FD-08	PID set value (%)	0.0～100.0	—
FD-09	PID feedback value	0.0～100.0	—

This parameter group is used to monitor PID assigned value and feedback value.

FD-10	Analog input AI1(V)	0.0～10.0	—
FD-11	Analog input AI2(V)	0.0～10.0	—

This parameter group is used to monitor analog quantity value that is entered.

FD-12	Status of input terminal	00-0XFF	—
FD-13	Status of output terminal	00-0XFF	—

This parameter group is used to monitor input and output terminal status. Enter fault terminal and output status is 10-digit display.

Take input terminal as example:

BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
DI8	DI7	DI6	DI5	DI4	DI3	DI2	DI1

BIT is 1：means terminal is closed. When bit is 0, terminal is disconnected. 10-digit display “255” means input terminal is fully closed.

The display principle of output terminal status is the same as input terminal.

FD-14	Current multi-speed segment number	0～15	—

Monitor the current running stage when inverter runs in multi-speed mode.

FD-15	Current count value	0～15	—

Monitor current count value in counter.

FD-16	Temperature of rectifier bridge(rectifier)	0.0～100.0℃	—
FD-17	IGBT temperature	0.0～100.0℃	—

Monitor the current temperature of radiator.

FD-18	Accumulated run time of the machine	0～65535H	—

Monitor how many hours the inverter runs.

FD-19	Accumulated power-on time	0～65535H	—

Monitor how many hours the inverter is power on.

FD-20	Type of the last fault	1～21	—
FD-21	Types of the past two faults	1～21	—
FD-22	Type of the current fault	1～21	—

This parameter group is used to monitor fault types in latest three times and the fault type refers to detailed description of fault code.

FD-23	Run frequency in the current fault	0.00～【F1.08】	—
FD-24	Output current in the current fault	—	—
FD-25	Bus voltage in the current fault	—	—
FD-26	Input terminal status in the current fault	—	—
FD-27	Output terminal status in the current fault	—	—

This parameter group is used to monitor each parameter when inverter occurs fault.

6.15 Parameter Group FE for Special Function

FE-00	Selection of torque setting mode	0～4	0

This function code is used to set the torque assignment physical channel when torque control is applied.

0：digital assignment

Torque command is assigned by keyboard numbers. Setting value refers to FE-01.

1：AI1 analog assignment（0～10V）

Setting torque is assigned by external analog voltage. Relevant parameters refer to F5-00 to F5-04.

2：AI2 analog assignment（0～20mA）

Setting torque is assigned by external analog current. Relevant parameters refer to F5-05 to F5-09.

3：multi-speed run setting

Torque command is assigned by multi-speed mode. Running torque setting refers to F9-02 to F9-17, corresponding to F4-07. Set four terminals from F6-00 to F6-07 as multi-speed according to the torque at which the inverter runs.

4：communication setting

Torque command is assigned by RS485 communication.

FE-01	Set torque of keyboard	-100.0 ～	20.0%

This function code value corresponds to torque command, which is selected as torque setting value assigned by keyboard number.

FE-02	Setting source of upper limiting frequency	0～4	0

This function code sets up the assignment physical channel of upper limit frequency.

0：digital assignment

Upper limit frequency is assigned by keyboard numbers. Setting value refers to F1-09 setting.

1：AI1 analog assignment（0～10V）

Upper limit frequency is assigned by external analog voltage and relevant parameters refer to F5-00 to F5-04.

2：AI2 analog assignment（0～20mA）

Upper limit frequency is assigned by external analog current and relevant parameters refer to F5-05 to F5-09.

3：multi-speed run setting

Upper limit frequency is assigned by multi-speed.

4：communication setting

Upper limit frequency is assigned by RS485.

6.16 Factory Parameter Group FF

This parameter group is set by factory upon shipment. User can not modify this parameter group.

Chapter 7 Fault Diagnosis and Troubleshooting

7.1 Fault Symptoms and Solutions

In case of inverter abnormality, LED digital tube will display fault code and its content, the fault relay acts, inverter stops output. If motor keeps rotation when fault occurs, the motor will stop. Possible fault types in M200 inverter is seen in the Table 7-1. When the inverter fails, the users should check according to the description of this list and carefully record the fault. In need of technique service, please contact with after-sale service department of our company or our dealers in each area.

Fault Code	Name	Possible Reasons	Countermeasures
E-01	Over-current in accelerated run	①Too short acceleration ② Too big load inertia ③ Improper V/F curve ④ Too low voltage in grid ⑤ Too small power in inverter ⑥Restart motor that is rotating	① Extend acceleration time ② Lessen load inertia ③ Adjust torque lifting value or adjust V/F curve ④ Check input power supply ⑤ Select inverter with bigger power ⑥ Set as DC braking start
E-02	Over-current in decelerated run	① Too short deceleration ② Big load inertia ③ Small power in inverter	① Extend deceleration time ② Lessen load inertia ③ Select inverter with bigger power
E-03	Over-current in constant-speed run	① Input voltage is abnormal ② Load changes suddenly or is abnormal ③ Too small power in inverter	① Check input power supply ② Check the load or reduce load sudden change ③Select inverter with bigger power
E-04	Overvoltage in accelerated run	①Input voltage is abnormal ② Restart motor that is rotating	①Check input power supply ②Set as DC braking start
E-05	Overvoltage in decelerated run	①Too short deceleration ②There is load with energy feedback ③Input voltage is abnormal	① Extend deceleration time ②Replace by external energy-consuming braking component with bigger power ③ Check input power supply
E-06	Overvoltage in constant-speed run	①Abnormal input voltage ②Big load inertia	①Check input power supply ②Select energy-consuming braking component
E-07	Bus	①Abnormal input voltage	①Check voltage

	under-voltage		
E-08	Motor overload	①Torque lifts too highly or V/F curve is improper ②Too low voltage in grid ③Motor is locked or load sudden change is too excessively; ④Motor overload protection factor is set wrongly	①Reduce torque lifting value or adjust V/F curve ② Check voltage in grid ③ Check load ④Correctly set motor overload protection factor
E-09	Inverter overload	①Torque lifts too highly or V/F curve is improper ②Too short acceleration ③Too big load	①Reduce torque lifting voltage or adjust V/F curve ② Extend acceleration ③Reduce load or replace by inverter with bigger power
E-10	Power module in fault	①Inverter output is in short circuit or grounded ②Instant over-current in inverter ③Too high temperature ④Air duct is blocked or fan is damaged; ⑤DC auxiliary power fails ⑥ Control panel is abnormal	①Check wiring ②Refer to over-current countermeasures ③Clean air duct or replace fan ④ Seek for manufacturer or dealer's service
E-11	Open phase of input side	① Input power is in open phase or abnormal	① Check input power supply
E-12	Open phase of output side	①Output motor power is in open phase or abnormal	①Check motor wiring
E-13	Overheating of rectifier bridge (Radiator)	①Temperature is too high ② Fan is damaged ③Air duct is blocked	①Reduce temperature ②Replace fan ③ Clean air duct and improve ventilation
E-14	Overheating of IGBT radiator		
E-15	External device in fault	Fault input terminal of external equipment is closed	Disconnect fault input terminal of external equipment and remove fault
E-16	RS485 communication fault	①Baud rate is wrongly set ②Serial port communication error ③No communication signal from upper computer	①Properly set baud rate ②Check communication cable and seek for service ③Check whether upper computer works and wiring is correct

E-17	Current detection error	①Current detection apparatus is damaged or circuit fails ②DC auxiliary power is damaged	①Seek for manufacturer or dealer's service ②Seek for manufacturer or dealer's service
E-18	Motor tuning fault	① Motor is in bad wiring. ②Motor is damaged	① Check motor wiring. ②Replace into another motor and have try.
E-19	EEPROM reading and writing fault	①EEPROM core chip is abnormal.	①Seek for manufacturer or dealer's service
E-20	PID feedback disconnection	①PID feedback wire is in bad contact ②PID feedback wire breaks	①Check PID feedback wire wiring. ②Replace PID feedback wire
E-21	Running time limit	①Running limit time is reached	①Set up parameter FC-12 and FC-13 by using password set in FC-11.

Table 7-1 Fault Code and Countermeasure List

7.2 Fault Record Enquiry

This series of inverter makes record of fault codes in latest three times and the inverter operation parameter in last fault. The enquiry of these information is helpful to seek for fault reasons. Fault information is stored in FD-20 to FD-27. Please enter FD parameter group to find corresponding fault information.

Note：

(1) The fault reasons must be thoroughly investigated and solved before reset, if not so, the permanent damage will be caused to the inverter.

(2) If reset fails or fault occurs again after reset, reasons must be checked. Continuous reset will make inverter damaged.

(3) In case of overload and overheating protection, reset will be made after five minutes is delayed.

Chapter 8 Maintenance and Care

8.1 Daily Maintenance and Care

The changes of use environment of inverter, e.g. temperature, humidity and smoke, as well as aging components inside inverter will cause the inverter into faults of all kinds. Therefore, the inverter must be daily checked during storage and use, and periodically maintained and repaired.

8.1.1 Daily Maintenance

Please confirm the following items when inverter starts normally:

（1）Whether motor sounds abnormally and vibrates;

（2）Whether inverter and motor is heat abnormally;

（3）Whether temperature is too high;

（4）Whether load current value is the same as usual;

（5）Cooling fan in inverter runs normally.

8.2 Periodic Maintenance and Care

8.2.1 Periodic Maintenance

Power supply must be cut off when inverter is periodically maintained and checked. Check only when the monitor has no display and power indication lamp of main circuit turns off. Check contents are seen in Table 8-1.

Table 8-1 Periodic Check Contents

Check Items	Check Contents	Countermeasures
Screw in main circuit terminal and control circuit terminal	Whether it is loose	Screw tightly with screwdriver
Radiating piece	Whether air duct is blocked by dust and foreign material	Blow off the air duct with dry compressed air under pressure 4～6kgcm^2
PCB	Whether its surface has oil sludge and conductor debris or copper foil is corrosive.	Remove foreign material from surface of PCB.
Cooling fan	Whether it runs normally. Whether it sounds or vibrates abnormally. Cumulative running time reaches 20,000 hours above.	Replace cooling fan

Power component	Whether it has dust and oil sludge.	Remove foreign material
Electrolytic capacitor	Whether it leaks or bubbles appear. Anti-explosion valve is not extruded or not.	Replace electrolytic capacitor.

8.2.2 Periodic Care

To realize longer lifespan of inverter, the electronic components inside inverter must be periodically maintained and repaired according to their lifespan. The lifespan of electronic component inside inverter varies with the use environment and use condition. The maintenance period of inverter, as shown in Table 8-2 is only for reference to users when they are using.

Table 8-2 Replacement Time of Inverter Components

Component	Standard Replacement Year
Cooling fan	2～3 years
Electrolytic capacitor	4～5 years
Printed circuit board	5～8 years
Fuse protector	10 years

The use condition of inverter components to be replaced above are :

（1）Environmental temperature：averaged annual temperature is 30℃.

（2）Load factor：below 80%

（3）Running time：below 12 hours every day.

8.3 Guarantee for Inverter

Our company will offer warranty service to the inverter in following cases:

（1） Warranty scope only covers inverter body.

（2） Our company is responsible for repairing the inverter that is caused damage or failure within 18 months under normal use and charge reasonable maintenance expense if it exceeds 18 months.

（3）We will charge maintenance expense in following cases within 18 months:

■ The inverter is caused damage due to operation in violation of operation segments described in user manual;

■ The inverter is caused damage due to flood, fire and abnormal voltage, etc.

■ The inverter is caused damage due to wiring error, etc.

■ The inverter is caused damage due to its application into non-normal function.

(4) Service fee will be calculated according to actual expense. If contract is signed, the contract will prevail.

Appendix：

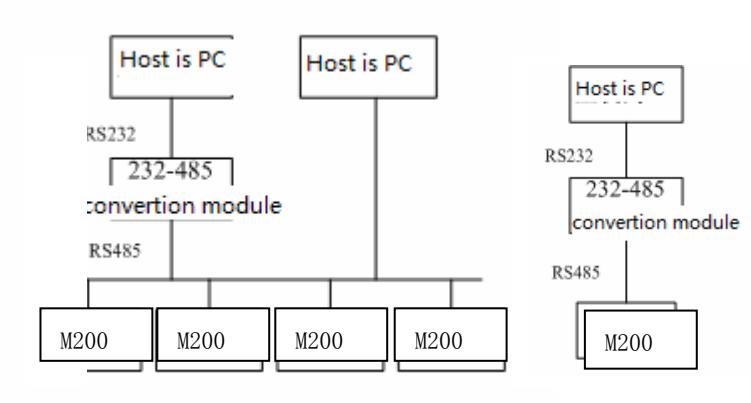
－Communication Protocol－

Communication protocol is MODBUS standard communication protocol, which offers RS485 communication interface that is generally used in industrial control to users. This inverter, acting as upper computer that has same communication interface with slave machine and adopts same communication protocol (e.g. PLC controller and PC computer), can realize collective monitor on inverter, besides, the user is allowed to use another inverter as host and connects many inverters of its company as salve machine through RS485 interface, so as to realize multi-machine linkage. This communication interface can be connected with remote keyboard to realize remote operation on inverter by users.

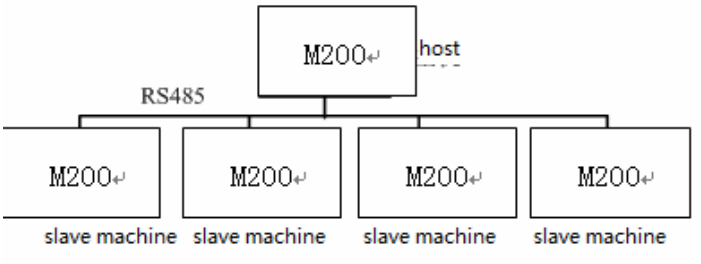
MODBUS communication protocol supports two transmission ways: RTU and ASCII. Users can select one of them based on their needs. The following is a detailed description of communication protocol in inverter.

Protocol contents contain: communication networking mode, communication interface mode, communication protocol format and communication protocol command list.

◆ Communication network mode



1 single host and many slave machines　　2　single host and single slave machine



3 Multi-machine linkage

◆Communication interface mode

Communication is RS485 hardware interface, asynchronous serial and half duplex transmission. Communication protocol defaults RTU as transmission mode.

Defaulted data format is : 1 start bit, 8 data bits and 2 stop bits.

Defaulted rate is 9600bps. Communication parameter setting refers to serial communication parameter group FC.

◆Communication RTU protocol format

1. Frame header: Frame header is the transmission time of delaying more than 3.5 characters. The whole information frame must be a continuous flow transmission.

2. Salve machine address: The address of inverter acting as salve machine is Pc00, one 16-digit byte.

3. Host command/slave machine response: The host sends a one 16-digit byte command and salve machine responds to the command.

4. Index area: It includes auxiliary and command index of 16-digit byte and realizes specific function.

5. Check area: frame check. Double-byte 16-digit number. It is calculated by sending port and added into information frame. RTU mode error check adopts CRC (Cyclic Redundancy Check) method. Error check field includes two check bytes. The bite check in Information frame byte can adopt odd/even check or no check.

CRC check method: Store 0xFFFF into CRC and then calculate more than 6 8-bit bytes in information frame by using CRC register. Calculation process: Each 8-bit character is individually different from the content in register or (XOR). Move the result to least significant bit and fill 0 as most significant bit. The final value in register is CRC value after all bytes in information frame are executed.

6. End mark: After the final transmission character, one pause of 3.5 characters at least marks the ending of information. A new information starts after this pause.

	Host Command Frame Format (16-digit Code)								
	1	2	3	4	5	6	7	8	
Pause of 3.5 characters above	Slave machine address	Host command	Fault index	Command index	Setting data	Setting data	Check	Check	Pause of 3.5 characters above
Starting bit	Address	Command	Index area		Data area		Check area		End mark
T1～T4	1	1	2		2		2		T1～T4

	Slave Machine Response Frame Format (16-digit Code)								
	1	2	3	4	5	6	7	8	
Pause of 3.5 characters above	Slave machine address	Slave machine response	Fault index	Command index	Response data	Response data	Check	Check	Pause of 3.5 characters above
Starting bit	Address	Response	Index area		Data area		Check area		End mark
T1～T4	1	1	2		2		2		T1～T4

RTU mode character transmission sequence

1. No parity bit transmission

Start bit	1	2	3	4	5	6	7	8	Stop bit	Stop bit

2. Have parity bit transmission

Start bit	1	2	3	4	5	6	7	8	Parity bit	Stop bit

◆ Communication ASCII protocol format

1. Frame header：Frame header is colon“：” and character ASCII code is “3AH”.

2. Salve machine address: The address of inverter acting as salve machine is Pc00, double-byte ASCII code, high byte first and low byte second.

3. Host command/slave machine response: The host sends a double-type ASCII code command, high

byte first and low byte second and salve machine responds to the command.

4. Index area: It includes auxiliary and command index of double-byte ASCII code realizes specific function.

5. Check area: frame check. Double-byte ASCII code. It is calculated by sending port and added into information frame. ASCII check mode is: check code is the sum of address and data value. For example, the check code written into slave machine parameter frame is 0x02+0x06+0x00+0x08+0x13+0x88

=0xAB, the complement code will be 0x55.

6. End mark: 16-digit 0DH,0AH，double-byte ASCII. 0DH is first and 0AH is second.

	Host Command Frame Format ASSCII Code)								
	1	2	3	4	5	6	7	8	
‘:’	Slave machine address	Host command	Fault index	Command index	Setting data	Setting data	Check	Check	CR LF
Starting bit	Address	Command	Index area		Data area		Check area		End mark
1	1	1	2		2		2		2

	Slave Machine Response Frame Format (ASCII Code)								
	1	2	3	4	5	6	7	8	
‘:’	Slave machine address	Slave machine response	Fault index	Command index	Response data	Response data	Check	Check	CR LF
Starting bit	Address	Response	Index area		Data area		Check area		End mark
1	1	1	2		2		2		2

ASCII code meaning

Character	‘0’	‘1’	‘2’	‘3’	‘4’	‘5’	‘6’	‘7’
ASCII CODE	0x30	0x31	0x32	0x33	0x34	0x35	0x36	0x37

Character	'8'	'9'	'A'	'B'	'C'	'D'	'E'	'F'
ASCII CODE	0x38	0x39	0x41	0x42	0x43	0x44	0x45	0x46

◆ Communication ASCII protocol command list

Communication Function	Sent by Host	Responded by Slave Machine	Note
Read RAM parameter inside salve machine	':'0''1''0''3''0''0''0''4''0''0''0''2''F'6'CR LF	':'0''1''0''3''0''0''0''4''0''0''0''2''0''0''0''F'6'CR LF	For the inverter, acting as slave machine, the address is 01H, read two continuous numbers from memory starting address 0004. The data in address 0004 is 1388H. The data in address 0005 is 07D0H.
Write parameter into salve machine	':'0''2''0''6''0''0''0''8''1''3''8''8''5''5'CR LF	':'0''2''0''6''0''0''0''8''1''3''8''8''5''5'CR LF	Write 5000 into address 008H of inverter, acting as slave machine, address is 02H. Do not frequently erase EEPROM parameters. EEPROM erasing lifespan is one million times.

◆ Communicating RTU protocol command list

Communication Function	Sent by Host	Responded by Slave Machine	Note
Read RAM parameter inside salve machine	01 03 00 04 00 02 85 CA	01 03 04 13 88 07 D0 43 07	For the inverter, acting as slave machine, the address is 01H, read two continuous numbers from

			memory starting address 0004. The data in address 0004 is 1388H. The data in address 0005 is 07D0H.
Write parameter into salve machine	02 06 00 08 13 88 05 6D	02 06 00 08 13 88 05 6D	Write 5000 into address 008H of inverter, acting as slave machine, address is 02H.

◆ Other communication protocol command

Protocol Command	Address Definition	Date	R/W Features
Control command	1000H	0001H：forward running 0002H：reverse running 0003H：forward jog 0004H：reverse jog 0005H：stop 0006H：free stop 0007H：fault reset 0008H：jogging stop	R/W
Status	1001H	0001H：forward running 0002H：reverse running 0003H：inverter stand-by 0004H：inverter fault	R
Communication setting address	2000H	Communication setting range（-10000 ～ 10000）	R/W
Description of operating shutdown parameter address	3000H	Running frequency	R
	3001H	Setting frequency	
	3002H	Bus voltage	
	3003H	Output voltage	
	3004H	Output current	

	3005H	Running speed	
	3006H	Output power	
	3007H	Output torque	
	3008H	PID assigned value	
	3009H	PID feedback value	
	300AH	Input terminal status	
	300BH	Output terminal status	
	300CH	Analog quantity AI1	
Continued	300DH	Analog quantity AI2	
	300EH	Retain	
	300FH	Retain	
	3010H	Retain	
	3011H	Retain	
	3012H	Current speed in multi-speed mode	
Inverter fault address	5000H		
Modbus Communication fault address	5001H	0000H：no fault	R
		0001H：password error	
		0002H：command code error	
		0003H：CRC check error	
		0004H：illegal address	
		0005H：illegal data	
		0006H：parameter modification invalid	
		0007H：system is locked	
		0008H：inverter busy（being saved）	

◆ Additional response upon wrong communication

RTU Fault Response of Slave Machine	ASCII Response Fault of Slave Machine	Note
01 06 50 01 00 05 09 09	‘:’‘0’‘1’‘0’‘6’‘5’ ‘0’‘0’‘1’‘0’‘0’‘0’ ‘5’‘A’‘3’CR LF	No matter communication command code is 03 or 06 in inverter, the fault reply command will be replied by 06 and data address is 0x5001 and error code is 0005H. Error code meaning: 1：error password；2：error command code；3：CRC check error；4：illegal address；5：illegal data；6：parameter modification invalid； 7：system is locked；8：inverter busy（being EEPROM saved）.

Warranty Agreement

1. Warranty scope only covers inverter body.
2. Our company is responsible for repairing the inverter that is caused damage or failure within 18 months under normal use and charge reasonable maintenance expense if it exceeds 18 months.
3. Warranty period will be valid since the shipment date from our company.
4. We will charge maintenance expense in following cases within 18 months:
   - The inverter is caused damage due to operation in violation of operation segments described in user manual;
   - The inverter is caused damage due to flood, fire and abnormal voltage, etc.
   - The inverter is caused damage due to wiring error, etc.
   - The inverter is caused damage due to its application into non-normal function.
5. Service fee will be calculated according to actual expense. If contract is signed, the contract will prevail.
6. Please keep this card in good condition and show it to maintenance unit upon warranty.
7. If there is any question, you can contact with the dealer and directly contact with our company.

Shenzhen Easydrive Electric Co., Ltd.

Address：Building 11, Jingxuan Industrial Park, Donghuan 2 Road, Longhua, Baoan District, Shenzhen

Postcode：518112 Fax：82447815

http://www.szeasydrive.com

Shenzhen Easydrive Electric Co., Ltd.

M200 Inverter Warranty Bill

User Company:	
Detailed Address:	
Postcode:	Contact Person:
Tel:	Fax:
Machine No.:	
Power:	Machine Model:
Contact No.:	Purchase Date:
Service Unit:	
Contact Person:	Tel:
Maintenance Personnel:	Tel:
Maintenance Date:	
User Opinions and Evaluation: □Very Good □ Good □Normal □ Bad Other Opinions: User Signature: Date: Return-visit Record of company: Others:	