



# **CNCmakers** INSTRUCTION MANUAL

S350 Series

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**Inverter**

- Upon receipt of the product and prior to initial operation, read these instructions thoroughly, and retain for future reference.

B-350.02



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## PRECAUTION

Never modify the products. Failure to observe this warning can result in electrical shock or personal injury. **CNC** is not responsible for any modification of the frequency products made by the user, since that will void your guarantee.

## NOTES FOR SAFE OPERATION


Read this instruction manual thoroughly before installation, operation, maintenance or inspection of the frequency inverters. In this manual, safe operation are classified as "WARNING" or "CAUTION".



Indicate a potentially dangerous situation which, if not avoided, could result in death or serious injury to personnel.



Indicate a potentially dangerous situation which, if not avoided, could result in minor or moderate injury and damage to equipment. It may also be used for warning against unsafe practices.

Even items described as  may result in a vital accident in some situations. Please follow these important notes:



**These are steps to be taken to ensure proper operation.**

# 1. INTRODUCTION

## 1.1 Technology Features

### I/O characteristics

- ◆ Rated Input Voltage Range: 380V/220V  $\pm$  15%
- ◆ Rated Input Frequency Range: 47~63Hz
- ◆ Rated Output Voltage Range: 0~Rated Input Voltage
- ◆ Rated Output Frequency: 0~650Hz

### Peripheral Interface Characteristics

- ◆ Programmable Digital Input: 6 input channels
- ◆ Programmable Analog Input: VI: 0~10V input CI: 4~20 mA input
- ◆ Open Collector Output: provide 1 output channel
- ◆ Relay Output: provide 2 output channels ( notice: 7.5KW and below provide 1 output channel )
- ◆ Analog Output: Provide 2 output channels:  
FM Terminal: 0/4~20mA or 0~10V  
AM Terminal: 0 ~10V  
( notice: 7.5KW and below only provide FM terminal )
- ◆ Programmable HM1 input ( high-speed pulse input ): provide 1 input channel: 0~50 KHz

### Control Characteristics


- ◆ Control Mode: provide 3 types of control mode: sensorless vector control (SVC) mode, V/F control mode, Torque control mode
- ◆ Overload Capacity: 150% of rated current for 60 seconds and 180% of rated current for 10 seconds.
- ◆ Start Torque: 0.5Hz/150% (SVC)
- ◆ Rotation Speed Ratio: 1:100 (SVC)
- ◆ Speed Control Accuracy:  $\pm$  0.5% of maximum speed
- ◆ Carrier Frequency: 1.0~15.0 KHz

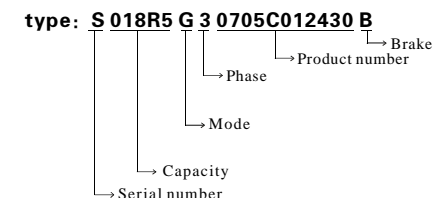
### Function Characteristics

- ◆ Frequency Setting Method: digital setting, analog setting, serial communication setting, PID setting, etc.
- ◆ PID control function
- ◆ Multi-speed control function: 16 steps speed control
- ◆ Oscillating frequency control function
- ◆ Non-stop function when instantaneous outage happens
- ◆ Automatic voltage adjustment function: automatically keep the output voltage constant when power supply is not stable.

- ◆ Provide up to 25 kinds of faults protection function: over-current, overvoltage, under-voltage, over temperature, lack of phase, overload and other protection function.

## 1.2 Description of Nameplate

TYPE	S350G S018R5G3
SOURCE	3Φ AC380V 50~60Hz
OUTPUT	18.5KW 39A 0.5~600Hz
	
IP20 S018R5G30705C012430B	

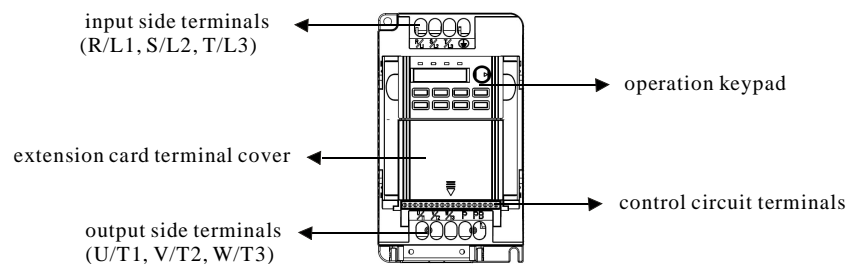
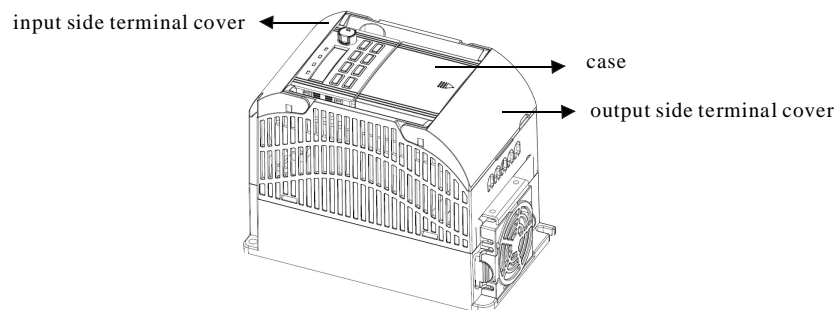


## 1.3 Series Selection Table

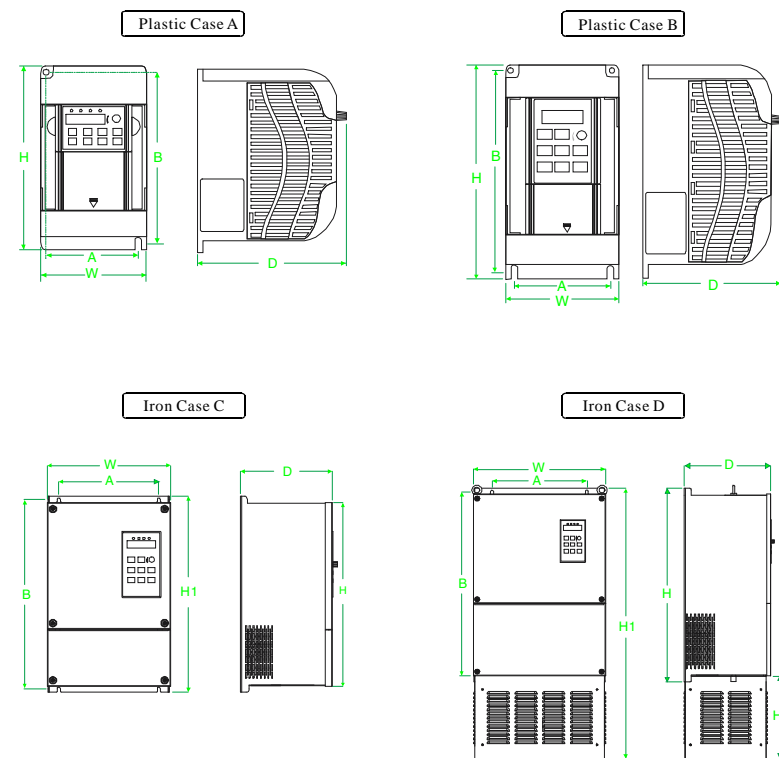
Model Number	Input Voltage	Rated Output Power (KW)	Rated Input Current (A)	Rated Output Current (A)	Motor Capacity (KW)
SR40G1	Single phase, 220V $\pm$ 15%	0.4	5.4	2.3	0.4
SR75G1		0.75	8.2	4.5	0.75
S1R5G1		1.5	14.2	7.0	1.5
S2R2G1		2.2	23.0	10	2.2
SR75G3	3-phase, 380V $\pm$ 15%	0.75	3.4	2.5	0.75
S1R5G3		1.5	5.0	3.7	1.5
S2R2G3		2.2	5.8	5	2.2
S004G3/5R5P3		4.0/5.5	10/15	9/13	4.0/5.5
S5R5G3/7R5P3		5.5/7.5	15/20	13/17	5.5/7.5
S7R5G3/011P3		7.5/11.0	20/26	17/25	7.5/11.0
S011G3/015P3		11.0/15.0	26/35	25/32	11.0/15.0
S015G3/018R5P3		15.0/18.5	35/38	32/37	15.0/18.5
S018R5G3/022P3		18.5/22.0	38/46	37/45	18.5/22.0
S022G3/030P3		22.0/30.0	46/62	45/60	22.0/30.0
S030G3/037P3		30.0/37.0	62/76	60/75	30.0/37.0
S037G3/045P3		37.0/45.0	76/90	75/90	37.0/45.0
S045G3/055P3		45.0/55.0	90/105	90/110	45.0/55.0
S055G3/075P3		55.0/75.0	105/140	110/150	55.0/75.0
S075G3/093P3		75.0/90.0	140/160	150/176	75.0/90.0
S093G3/110P3		90.0/110.0	160/210	176/210	90.0/110.0
S110G3/132P3		110.0/132.0	210/240	210/250	110.0/132.0

Model Number	Input Voltage	Rated Output Power (KW)	Rated Input Current (A)	Rated Output Current (A)	Motor Capacity (KW)
S132G3/160P3	3-phase, 380V 15%	132.0/160.0	240/290	250/300	132.0/160.0
S160G3/185P3		160.0/185.0	290/330	300/340	160.0/185.0
S185G3/200P3		185.0/200.0	330/370	340/380	185.0/200.0
S200G3/220P3		200.0/220.0	370/410	380/415	200.0/220.0
S200G3/250P3		220.0/250.0	410/460	415/470	220.0/250.0
S250G3/280P3		250.0/280.0	460/500	470/520	250.0/280.0
S280G3/315P3		280.0/315.0	500/580	520/600	280.0/315.0
S315G3/350P3		315.0/350.0	580/620	600/640	315.0/350.0
S350G3		350.0	620	640	350.0
S400G3		400.0	670	690	400.0

## 1.4 Outline Drawing

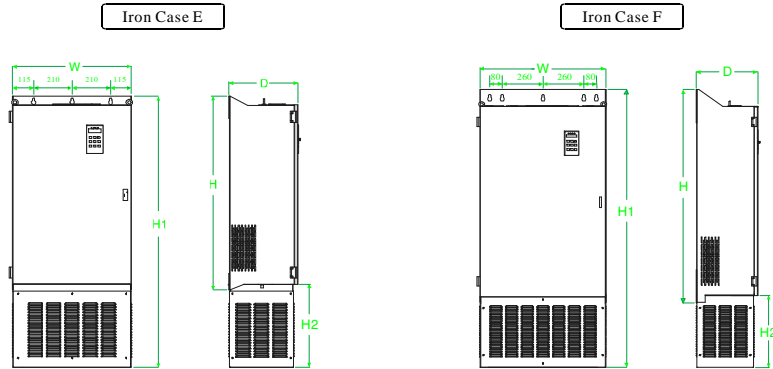


## 1.5 Dimensions Table



Dimensions table of 7.5KW and below

Voltage (V)	Power (KW)	Installation Dimension		Appearance Dimension			Installation Aperture(mm)	Case Type
		A(mm)	B(mm)	H(mm)	W(mm)	D(mm)		
220V	0.4~2.2	88.2	162.5	176.6	101.8	137.9	Φ5.5	A
380V	0.75~3.7	88.2	162.5	176.6	101.8	137.9	Φ5.5	
	4~7.5	115.8	245.5	266.1	132	163	Φ5.5	B



**Dimensions table of 11KW and above**

Power (KW)	Installation Dimension		Appearance Dimension					Installation Aperture (mm)	Case Type
	A(mm)	B(mm)	H(mm)	H1(mm)	H2(mm)	W(mm)	D(mm)		
11~18.5	156.6	378.3	355.4	392	—	212	190.6	Φ6.2	C
22~37	235	447	435.5	463	—	290	214.7	Φ7	
45~55	260	580	552.5	600	—	390.4	266.5	Φ10	
75~93	343	678	657.6	978.5	302	478	311.2	Φ10	D
110~160	449	902.5	927	1357	452	579	381	Φ10	
185~280	—	—	1060	1481.5	453	650	380.5	Φ12	E
315~400	—	—	1358.5	1767	457	800	392.5	Φ14	F

# 1.6 Selection Instruction of Brake Resistor and Brake Unit

## 1.6.1 Reference

When the machine driven by inverter controlling system needs rapid brake, the feedback energy which is generated by motor braking on DC bus should be removed by brake unit. S350 series inverter of 18.5KW and below have brake unit inside. The capacity of 22KW and above should use external brake unit according to the application requirement. Select the matching type of brake resistor or brake unit according to the capacity of inverter. The general matching table is as section 1.6.1.1 and 1.6.1.2 show.

### 1.6.1.1 Selection Instruction Table of Brake Resistor and Brake Unit for 220V Level

Inverter Capacity KW (HP)	Brake Unit		Brake Resistor (100% braking torque and 10% usage of brake unit)		
	Configuration Method	Quantity (unit)	Equivalent Value of Brake Resistor	Equivalent Brake Capacity	Quantity (unit)
0.4 ( 0.5 )	Standard Accessory Inside	1	400Ω	80W	1
0.75 ( 1 )		1	200Ω	80W	1
1.5 ( 2 )		1	130Ω	260W	1
2.2 ( 3 )		1	80Ω	260W	1
4 ( 5 )		1	48Ω	400W	1
5.5 ( 7.5 )		1	35Ω	550W	1

### 1.6.1.2 Selection Instruction Table of Brake Resistor and Brake Unit for 380V Level

Inverter Capacity KW (HP)	Brake Unit		Brake Resistor (100% braking torque and 10% usage of brake unit)		
	Configuration Method	Quantity (unit)	Equivalent Value of Brake Resistor	Equivalent Brake Capacity	Quantity (unit)
0.75 ( 1 )	Standard Accessory Inside	1	750Ω	80W	1
1.5 ( 2 )		1	400Ω	260W	1
2.2 ( 3 )		1	150Ω	390W	1
4 ( 5 )		1	150Ω	390W	1
5.5 ( 7.5 )		1	100Ω	520W	1
7.5 ( 11 )		1	50Ω	1040W	1
11 ( 15 )		1	50Ω	1040W	1
15 ( 20 )		1	40Ω	1560W	1

Inverter Capacity KW (HP)	Brake Unit		Brake Resistor (100% braking torque and 10% usage of brake unit)		
	Configuration Method	Quantity (unit)	Equivalent Value of Brake Resistor	Equivalent Brake Capacity	Quantity (unit)
18.5(25)	Additional Accessory (external)	1	20Ω	6000W	1
22(30)		1	20Ω	6000W	1
30 (40)		1	20Ω	6000W	1
37 (50)		1	13.6Ω	9600W	1
45 (60)		1	13.6Ω	9600W	1
55 (75)		1	13.6Ω	9600W	1
75 (100)		2	13.6Ω	9600W	2
90 (120)		2	13.6Ω	9600W	2
110 (150)		2	13.6Ω	9600W	2
132 (180)		1	4Ω	30000W	1
160 (215)		1	4Ω	30000W	1
185 (250)		1	3Ω	40000W	1
200 (270)		1	3Ω	40000W	1
220 (300)		1	3Ω	40000W	1
250 (340)		1	2Ω	60000W	1
280 (380)		1	2Ω	60000W	1
315 (430)		1	2Ω	60000W	1
350 (470)		2	3Ω	40000W	2
400 (540)		2	3Ω	40000W	2

### 1.6.1.3 Selection Instruction of Brake Resistor under the Situation of Long-time Braking Frequently

The formula is as following:

$$P = \left( \frac{F8.15 \times \text{standard DC bus voltage value}}{R} \right)^2 \times R$$

P – the capacity of brake resistor

F8.15 – threshold voltage of braking, reference to Function Code of F8 Group on Page 47.

R – the resistivity of brake resistor

#### Notice

- Select the matching brake resistor and brake unit according to the above instructions.
- The brake torque of inverter is changeable with the specifications of brake

resistor. The type of brake resistor on the above tables of 1.6.1.1 and 1.6.1.2 is designed under 100% braking torque and 10% usage of brake unit. Select the type of less resistivity of brake resistor (larger capacity) if need larger braking torque.

- Select the type of larger capacity of brake resistor if need frequent braking (braking usage is over 10%).
- When use the external brake unit, please refer to the relative manual book to set the voltage level of brake unit properly. If not, it may cause the malfunction of inverter.

## 1.6.2 Connection Methods

### 1.6.2.1 Connection Method of Brake Resistor

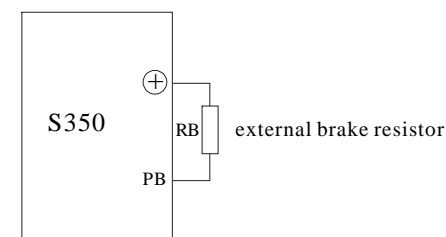


Figure 1.2 connection of brake resistor

### 1.6.2.2 Connection Method of Brake Unit

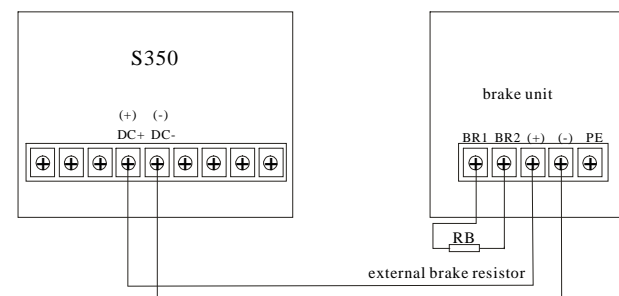


Figure 1.3 connection of brake unit

### 1.6.2.3 Parallel Connection Method of Brake Unit

Sometimes the parallel connection of brake unit is necessary because the capacity of brake unit is limited.

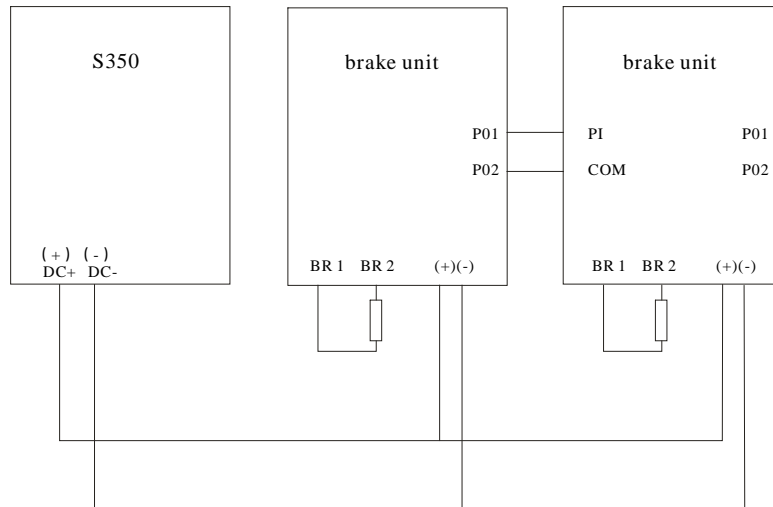


Figure 1.4 parallel connection of brake unit

## 2. INSTALLATION

### Storage



#### CAUTION

- If not in use, do not open the outside package and put it on the goods shelf.
- Store the inverter in dry place without dust, corrosive gas and liquid.
- Storage temperature range: -20°C to 65°C.
- Humidity: 90%RH or less without dew condensation.
- If the unused time is too long, make sure the inverter power on for at least one time within half of year. The time of power on must be over 5 hours. The input voltage of power supply must coast to rated voltage by boosting transformer.

### Before Installation



#### WARNING

- Do not install or operate any frequency inverter that is damaged or has missing parts.
- Choose the motor of insulation class B or above. Otherwise it may cause an electrical shock.

### Installation



#### WARNING

Install the frequency inverter on nonflammable material like metal. Otherwise it may cause a fire.



#### WARNING

Make sure that the mounting environment away from metal dust. Otherwise it may cause damage to the frequency inverter.



#### CAUTION

- When mount over two inverters in the same cabinet or enclosure, install a fan or other cooling device to keep the temperature inside below 40 °C.
- Do not let the conductor head or screws fall into the inside of the inverter. Otherwise it may cause damage to the inverter.
- Do not touch the front cover when remove inverter, otherwise it may cause damage to the inverter.



### Installation Environment Requirements



#### CAUTION

- Ambient temperature:  $-10^{\circ}\text{C}$  to  $40^{\circ}\text{C}$ , well ventilated.
- No water dripping. Avoid direct sunlight and low air pressure.
- No corrosive gas or liquid. No oil gas or metal dust.
- Installed indoors without vibration. Easy to maintain and inspect.
- Avoid electromagnetic interference.
- At an altitude of 1000m or above, it could be better that use the motor with lower rated capacity. Otherwise the inverter may become overheated because of rare air. For example, in order to control the motor of 4KW rated capacity, it could be better to use 5.5KW inverter.

## 2.1 Installation Space and Situation

In order to maintain conveniently, make sure there is plenty of space for inverter.

In order to keep good cooling effect, install the inverter uprightly and keep well ventilated.

If it is difficult to fasten the inverter, put a plat plate under the bottom of it. Otherwise the stress caused by getting-loose may cause damage to the main circuit components.

Use nonflammable material like iron plate on the side wall of installation. If there are multiple inverters installed in the same cabinet, keep the distance between them and add air deflector to ventilate the space.

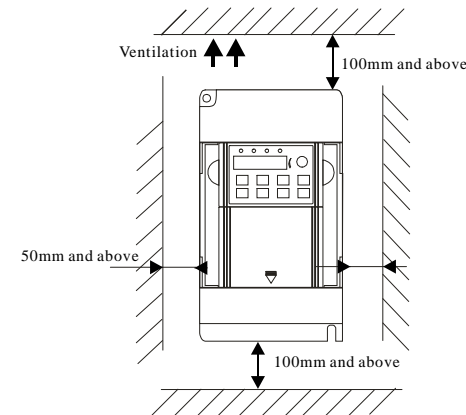


Figure 2.1 Safety Space for Single Inverter Installation

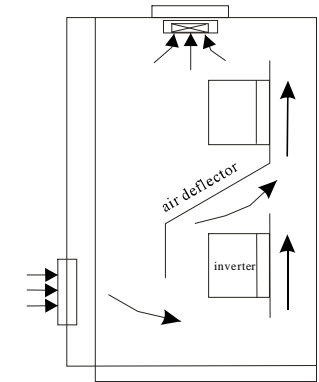


Figure 2.2 Up-down Installation

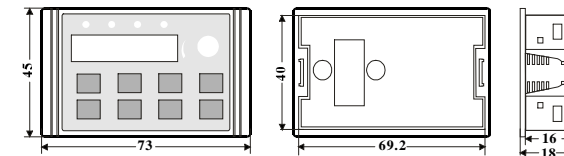
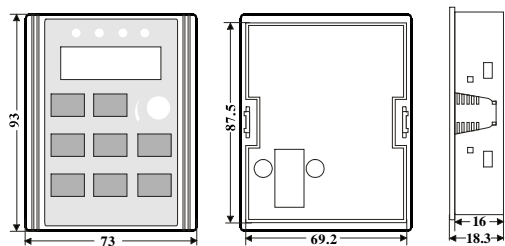
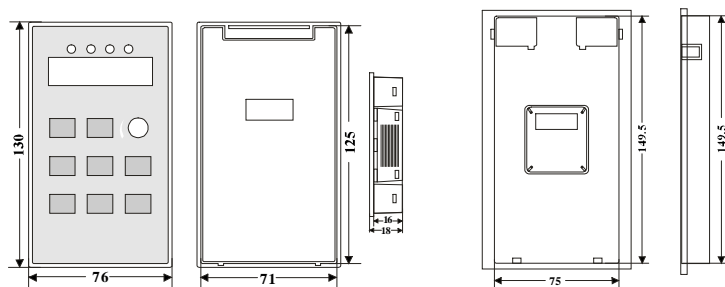


Figure 2.3 Dimensions of Extension Keypad (small size)  
unit: mm



**Figure 2.4 Dimensions of Extension Keypad (middle size)**  
unit: mm



**Figure 2.5 Dimensions of Extension Keypad (large size)**  
unit: mm

## 3. WIRING



### WARNING

Ensure only qualified personnel to operate. Otherwise it may cause an electrical shock. Make sure the inverter is isolated from power supply by the circuit breaker. Otherwise it may cause a fire.

Verify that the power supply is turned OFF before start wiring. Otherwise it may cause an electrical shock or fire.

Make sure that the ground terminal is grounded correctly. Otherwise it may cause an electrical shock.

Make sure that the voltage of inverter conforms to the local power supply voltage.

Verify that the wiring of input and output is correct and there is no short-circuit in peripheral circuit. Tighten the terminal screws. Otherwise these may cause damage to the inverter.



### CAUTION

Never connect the AC power supply to output terminals U, V and W. Otherwise the inverter will be damaged and the guarantee is invalid.

Make sure that wiring conform to EMC requirements and local power safe standard.

Make sure to use right wire according to this instruction manual. Otherwise it may cause an accident.

Braking resistor or braking unit cannot be directly connected to DC bus terminals (P+) and (N-). Otherwise it may cause a fire.

Never touch the inverter by wet hands. Otherwise it may cause electrical shock.

3.1 Main Circuit Wiring Diagram

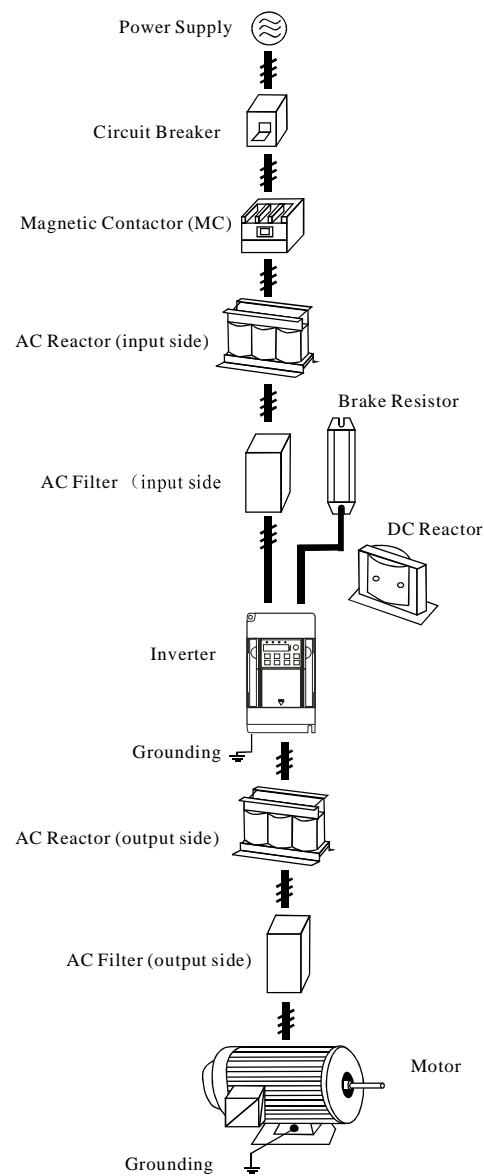


Figure 3.1 Main Circuit Wiring Diagram

3.2 Terminal Indication

3.2.1 Main Circuit Terminals

Terminal Symbol	Function Description
R、S、T	Terminals of 3-phase AC power input
(+)、(-)	Spare terminals for connecting external brake unit
(+)、PB	Spare terminals for connecting external brake resistor
P1、(+)	Spare terminals for connecting external DC reactor
(-)	Negative output terminal of DC bus
U、V、W	Terminals of 3- phase AC power output
	Grounding terminal

3.2.2 Terminals of Control Circuit

TC	TB	TA	S-	S+	10V	VI	ACM	CI	FM	MI5	MI4	MI3	MI2	MI1	MO1	DCM	24V
----	----	----	----	----	-----	----	-----	----	----	-----	-----	-----	-----	-----	-----	-----	-----

Figure 3.2 7.5KW and below

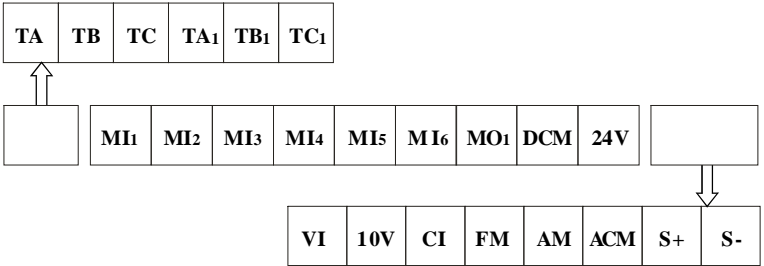


Figure 3.3 11KW and above

### 3.3 Standard Wiring Diagram

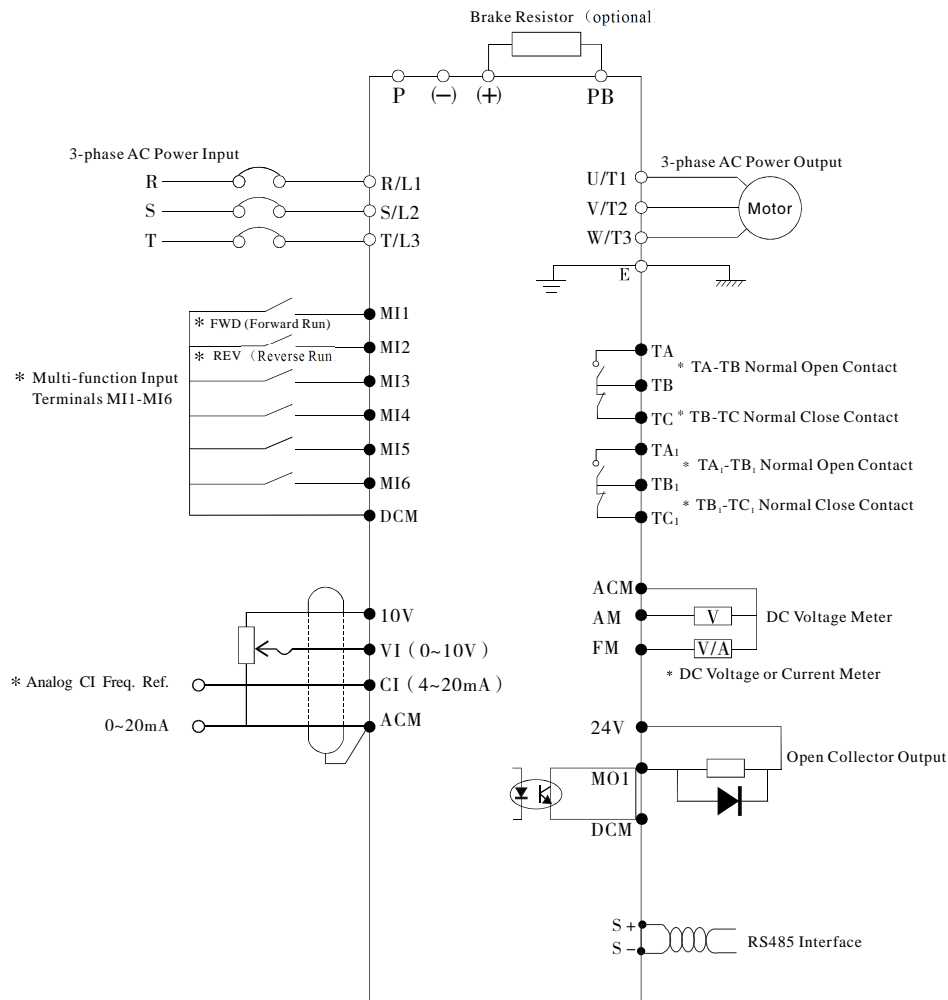


Figure 3.4 Standard Wiring Diagram

#### 3.3.1 Control Circuit Terminals Descriptions

Terminal Symbol	Description
MI1~MI6	Digital input terminals: make the photocoupler input together with +24V and DCM Input voltage range: 9~30V Input resistance:3.3 K
24V	+24V power supplied by inverter with max. output current: 150mA
DCM	Digital common terminal of +24V
VI	Analog input voltage: 0~10V Input resistance: 10K
CI	Analog input current: 4~20mA Input resistance: 250
10V	+10V power supplied by inverter with output current range: 0~10mA
ACM	Ref. zero potential of +10V
MO1	Open collector output terminal corresponding to DCM (common terminal). External voltage supply range: 0~24V with output current range: 0~50mA Upper resistance of 24V terminal :2~10 K
FM/AM	Analog output terminal. The function of FM can be selected by setting JP1. (output voltage or current) Analog output range: 0~10V/0~20mA AM only output voltage: 0~10V
TA、TB、TC / TA1、TB1、TC1	Multi-function Relay Output: TB/TB1: common contact TA/TA1: normal close TC/TC1: normal open Contact capacity: AC250V/3A, DC30V/1A
S+、S-	485 communication interface

#### 3.3.2 Descriptions of Jumper on Control Board

Jumper	Description
JP1	Connect 1 and 2: FM terminal outputs current: 0~20mA Connect 2 and 3: FM terminal outputs voltage: 0~10V

Notice: There is no JP1 for inverter of 7.5KW and below. If need the function of 0~20mA, function card is necessary.

### 3.4 Specifications Form of Circuit Breaker, Cable, Contactor and Reactor

#### 3.4.1 Specifications form of circuit breaker, cable and contactor

Model	Circuit Breaker (Amp.)	Input/Output Wire (mm <sup>2</sup> , copper-core wire)	Contactor Rated Current (Amp.)	Voltage
SR75G1	16	2.5	10	220V
S1R5G1	20	4	16	
S2R2G1	32	6	20	
S004G1	40	6	25	
S5R5G1	63	6	32	
S7R5G1	100	10	63	
S011G1	125	25	95	
S015G1	160	25	120	
S018R5G1	160	25	120	
S022G1	200	35	170	
S030G1	200	35	170	
S037G1	200	35	170	
S045G1	250	70	230	
SR75G3	16	2.5	10	380V
S1R5G3	16	2.5	10	
S2R2G3	16	2.5	10	
S004G3/5R5P3	25	4	16	
S5R5G3/7R5P3	25	4	16	
S7R5G3/011P3	40	6	25	
S011G3/015P3	63	6	32	
S015G3/018R5P3	63	6	50	
S018R5G3/022P3	100	10	63	
S022G3/030P3	100	16	80	
S030G3/037P3	125	25	95	
S037G3/045P3	160	25	120	
S045G3/055P3	200	35	135	
S055G3/075P3	200	35	170	
S075G3/093P3	250	70	230	
S093G3/110P3	315	70	280	
S110G3/132P3	400	95	315	

Model	Circuit Breaker (Amp.)	Input/Output Wire (mm <sup>2</sup> , copper-core wire)	Contactor Rated Current (Amp.)	Voltage
S132G3/160P3	400	150	380	380V
S160G3/185P3	630	185	450	
S185G3/200P3	630	185	500	
S200G/220P3	630	240	580	
S220G3/250P3	800	150x2	630	
S250G/280P3	800	150x2	700	
S280G/315P3	1000	185x2	780	
S315G/350P3	1200	240x2	900	
S350G3	1280	240x2	960	
S400G3	1380	185x3	1035	

#### 3.4.2 Specifications form of AC reactor and DC reactor

Inverter Capacity (KW)	Input AC reactor		Output AC reactor		DC reactor		Voltage
	Current (Amp.)	Inductance (mH)	Current (Amp.)	Inductance (mH)	Current (Amp.)	Inductance (mH)	
SR40G1	2	7	2	7	3	28	220V
SR75G1	2	7	2	7	3	28	
S1R5G1	5	3.8	5	3.8	6	11	
S2R2G1	7.5	2.5	7.5	2.5	6	11	
S1R5G3	5	3.8	5	1.5	6	11	
S2R2G3	7	2.5	7	1	6	11	380V
S004G3/5R5P3	10	1.5	10	0.6	12	6.3	
S5R5G3/7R5P3	15	1.0	15	0.25	23	3.6	
S7R5G3/011P3	20	0.75	20	0.13	23	3.6	
S011G3/015P3	30	0.60	30	0.087	33	2	
S015G3/018R5P3	40	0.42	40	0.066	33	2	
S018R5G3/022P3	50	0.35	50	0.052	40	1.3	
S022G3/030P3	60	0.28	60	0.045	50	1.08	
S030G3/037P3	80	0.19	80	0.032	65	0.80	
S037G3/045P3	90	0.16	90	0.030	78	0.70	
S045G3/055P3	120	0.13	120	0.023	95	0.54	
S055G3/075P3	150	0.10	150	0.019	115	0.45	

Inverter Capacity (KW)	Input AC reactor		Output AC reactor		DC reactor		Voltage
	Current (Amp.)	Inductance (mH)	Current (Amp.)	Inductance (mH)	Current (Amp.)	Inductance (mH)	
S075G3/093P3	200	0.12	200	0.014	160	0.36	380V
S093G3/110P3	250	0.06	250	0.011	180	0.33	
S110G3/132P3	250	0.06	250	0.011	250	0.26	
S132G3/160P3	290	0.04	290	0.008	250	0.26	
S160G3/185P3	330	0.04	330	0.008	340	0.18	
S185G3/200P3	400	0.04	400	0.005	460	0.12	
S200G/220P3	490	0.03	490	0.004	460	0.12	
S220G3/250P3	490	0.03	490	0.004	460	0.12	
S250G/280P3	530	0.03	530	0.003	650	0.11	
S280G/315P3	600	0.02	600	0.003	650	0.11	
S315G/350P3	660	0.02	660	0.002	800	0.06	
S350G3	400*2	0.04	400*2	0.005	460*2	0.12	
S400G3	490*2	0.03	490*2	0.004	460*2	0.12	

## 3.5 Wiring the Main Circuit

### 3.5.1 Wiring at Input Side of Main Circuit

#### 3.5.1.1 Circuit Breaker

Make sure a circuit breaker is installed between AC power supply and input terminals (R, S, T). Please refer to 3.4 Specifications Form of Circuit Breaker, Cable, Contactor and Reactor.

#### 3.5.1.2 Magnetic Contactor

Do not use magnetic contactor as the switch of the inverter. Otherwise frequent switching may cause the inverter to malfunction. Use it to cut off the input power supply when something is wrong in the system.

#### 3.5.1.3 Input AC Reactor (Optional)

Installation of a reactor is effective for improvement of power factor on the power supply side. Also, it can protect the inverter from harmonic wave and peak current caused by large capacity load or transformer.

#### 3.5.1.4 AC Filter

The surrounding device may be disturbed by the cables when the inverter is working. AC filter can minimize the interference.

### 3.5.2 Wiring at Inverter Side of Main Circuit

#### 3.5.2.1 DC Reactor

DC reactor almost has the same function of AC reactor.

#### 3.5.2.2 Brake Unit and Brake Resistor

- Inverter of 18.5KW and below has built-in brake unit. In order to dissipate the regenerative energy generated by dynamic braking, the brake resistor should be installed at (+) and PB terminals.
- The wire length of brake resistor should be less than 5m.
- The temperature of brake resistor will increase because the regenerative energy will be transformed to heat. Good ventilation and safe protection is necessary.

- Inverter of 22 KW and above need to connect external brake unit which should be installed at (+) and (-) terminals . The cable between inverter and brake unit should be less than 5m . The cable between brake unit and brake resistor should be less than 10m.

#### Notice

Make sure that the electric polarity of (+) (-) terminals are right. Do not connect (+) (-) terminals directly to brake resistor. Otherwise it may cause a fire.

### 3.5.3 Wiring at Motor Side of Main Circuit

#### 3.5.3.1 Output Reactor

When the distance between inverter and motor is more than 50m, inverter may be tripped by over-current protection frequently because of the large leakage current resulted from the parasitic capacitance with ground. Also, in order to avoid the damage of motor insulation, the output reactor should be installed.

#### 3.5.3.2 AC Filter at Output Side

AC filter should be installed to minimize the leakage current caused by the cable and minimize the radio noise caused by the cables between the inverter and cable.

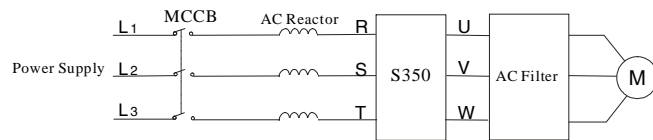


Figure 3.5 Wiring at Motor Side of Main Circuit

### 3.5.4 Wiring of Regenerative Unit

Regenerative unit is used for putting the electricity generated by braking of motor to the grid. Compared with traditional 3-phase inverse parallel bridge type rectifier unit, regenerative unit uses IGBT so that the total harmonic distortion is less than 4%. Regenerative unit is widely used for centrifugal and hoisting equipment.

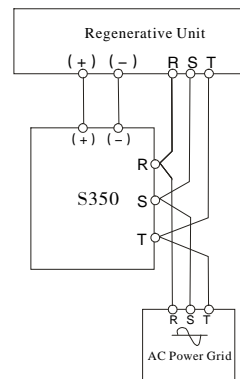


Figure 3.6 Wiring of Regenerative Unit

### 3.5.5 Wiring of Common DC Bus

Common DC bus method is widely used in paper industry and chemical fiber industry which need multi-motor to coordinate. In these applications, some motors are in driving status while some others are in regenerative braking (generating electricity) status. The regenerated energy is automatically balanced through the common DC bus, which means it can supply to motors in driving status. Thus the power consumption of whole system will be less compared with the traditional method (one inverter drives one motor). When two motors are running at the same time (i.e. winding application), one is in driving status and the other is in regenerative status. In this case the DC buses of these two inverters can be connected in parallel so that the regenerated energy can be supplied to motors in driving status whenever it needs. Its detailed wiring is shown in the following figure:

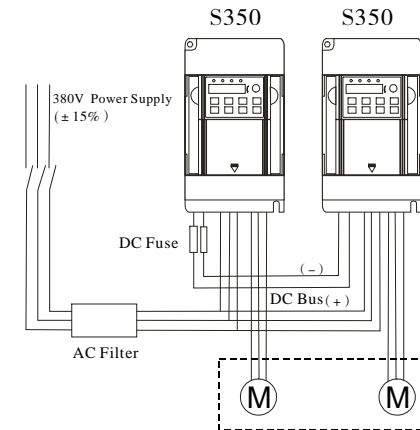


Figure 3.7 Wiring of Common DC Bus

#### Notice

Two inverters must be the same model when connected by common DC bus. Make sure they are powered on at the same time.

### 3.5.6 Grounding Wiring

Terminal E must be grounded correctly in order to prevent electrical shock and fire. The ground wire should be big and short. The ground resistance should be less than  $10\ \Omega$ . It is better to use copper wire ( $3.5\text{mm}^2$ ). When multiple inverters need to be grounded, do not loop the ground wire.

## 3.6 Wiring Control Circuit

### Precautions

Use shielded or twisted-pair cables to connect control terminals.

Connect the ground terminal (E) with shielded wire.

The cable connected to the control terminals should leave away from the main circuit and heavy current circuits (including power supply cable, motor cable, relay and contactor connecting cable) at least 20cm and parallel the wiring should be avoided. It is better to apply perpendicular wiring to prevent inverter malfunction caused by external interference.

## 3.7 Installation Guideline to EMC Compliance

### 3.7.1 General knowledge of EMC

EMC is the abbreviation of electromagnetic compatibility, which means the device or system has the ability to work normally in the electromagnetic environment and will not generate any electromagnetic interference to other equipments.

EMC includes two subjects: electromagnetic interference and electromagnetic anti-jamming. According to the transmission mode, electromagnetic interference can be divided into two categories: conducted interference and radiated interference.

Conducted interference is the interference transmitted by conductor. Therefore, any conductors (such as wire, transmission line, inductor, capacitor and so on) are the transmission channels of the interference.

Radiated interference is the interference transmitted in electromagnetic wave, and the energy is inverse proportional to the square of distance.

Three necessary conditions or essentials of electromagnetic interference are: interference source, transmission channel and sensitive receiver. For customers, the solution of EMC problem is mainly in transmission channel because of the device attribute of disturbance source and receiver can not be changed.

### 3.7.2 The EMC Characteristics of Inverter

Like other electric or electronic devices, inverter is not only an electromagnetic interference source but also an electromagnetic receiver. The operating principle of inverter determines that it can produce certain electromagnetic interference noise. At the same time inverter should be designed with certain anti-jamming ability to ensure the smooth working in certain electromagnetic environment. The EMC characteristics of inverter are as following.

#### 3.7.2.1

Input current is non-sine wave with large amount of harmonic wave. Harmonic wave may cause electromagnetic interference, decrease the grid power factor and increase the line loss.

#### 3.7.2.2

Output voltage is high frequency PWM wave, which can increase the temperature rise and shorten the life of motor. And the leakage current will also increase, which can lead to the leakage protection device malfunction and generate strong electromagnetic interference to influence the reliability of other electric devices.

#### 3.7.2.3

As the electromagnetic receiver, too strong interference will damage the inverter and influence the normal using of customers.

#### 3.7.2.4

In the system, EMA (electromagnetic anti-jamming) and EMI of inverter coexist. Decrease the EMI of inverter can increase its EMA ability.

### 3.7.3 EMC Installation Guideline

In order to ensure all electric devices in the same system to work smoothly, this section, based on EMC features of inverter, introduces EMC installation process in several aspects of application (noise control, site wiring, grounding, leakage current and power supply filter). The good effectiveness of EMC will depend on the good effectiveness of all of these five aspects.



### 3.7.3.1 Noise Suppression

All the connections to the control terminals must use shielded wire. And the shield layer of the wire must ground near the wire entrance of inverter. The ground mode is 360 degree annular connection formed by cable clips. It is strictly prohibitive to connect the twisted shielding layer to the ground of inverter, which greatly decreases or losses the shielding effect.

Connect inverter and motor with the shielded wire or the separated cable tray. One side of shield layer of shielded wire or metal cover of separated cable tray should connect to ground, and the other side should connect to the motor cover. Installing an EMC filter can reduce the electromagnetic noise greatly.

### 3.7.3.2 Site Wiring

Power supply wiring: the power should be separated supplied from electrical transformer. Normally it is 5 core wires, three of which are fire wires, one of which is the neutral wire, and one of which is the ground wire. It is strictly prohibitive to use the same line to be both the neutral wire and the ground wire.

Device classification: there are different electric devices contained in one control cabinet, such as inverter, filter, PLC and instrument etc, which have different ability of emitting and withstanding electromagnetic noise. Therefore, it needs to classify these devices as strong noise device and noise sensitive device. The same kinds of device should be placed in the same area, and the distance between devices of different category should be more than 20cm.

Wire arrangement inside the control cabinet: there are signal wire (light current) and power cable (strong current) in one cabinet. For the inverter, the power cables are categorized into input cable and output cable. Signal wires can be easily disturbed by power cables to make the equipment malfunction. Therefore, signal cables and power cables should be arranged in different areas. It is strictly prohibitive to arrange them in parallel or interlacement at a close distance (less than 20cm) or tie them together. If the signal wires have to cross the power cables, they should be arranged in 90 angles. Power input and output cables should not either be arranged in interlacement or tied together, especially when installed the EMC filter. Otherwise the distributed capacitances of its input and output power cable can be coupling each other to make the EMC filter out of function.

### 3.7.3.3 Grounding

Inverter must be grounded safely when in operation. Grounding occupies priority in all EMC methods because it does not only ensure the safety of equipment and persons, but also is the simplest, most effective and lowest cost solution for EMC problems.

Grounding has three categories: special pole grounding, common pole grounding and series-wound grounding. Different control system should use special pole grounding, and different devices in the same control system should use common pole grounding, and different devices connected by same power cable should use series-wound grounding.

### 3.7.3.4 Leakage Current

Leakage current includes line-to-line leakage current and over-ground leakage current. Its value depends on distributed capacitances and carrier frequency of inverter. The over-ground leakage current, which is the current passing through the common ground wire, can not only flow into inverter system but also into other devices. It also can make circuit breaker, relay or other devices malfunction. The value of line-to-line leakage current, which means the leakage current passing through distributed capacitors of input and output wire, depends on the carrier frequency of inverter, the length and section areas of motor cables. The higher carrier frequency of inverter, the longer of the motor cable or the bigger cable section area, the larger leakage current will occur.

#### Countermeasures:

Decreasing the carrier frequency can effectively decrease leakage current. When motor wire is relatively long (longer than 50m), it is necessary to install AC reactor or sine-wave filter at inverter output side. When motor wire is even longer, it is necessary to install one AC reactor at every certain distance.

### 3.7.3.5 Noise Filter

Noise filter has good function of electromagnetic decoupling. Thus it is better for users to install it. Two kinds of noise filter for inverter are as below:

Noise filter installed at the input side of inverter.

Install noise filter or isolation transformer at input side of other devices to isolate the inverter.

3.7.4 Other Standard Requirements

When install inverter and EMC filter, besides this manual guidelines, refer to the following standards:

- EN61800-3: electromagnetic radiation standard
- EN61000-6-3: electromagnetic radiation standard (living condition)
- EN61000-6-4: electromagnetic radiation standard (industrial condition).

4. OPERATION

4.1 Keypad Description

4.1.1 Keypad Schematic Diagram

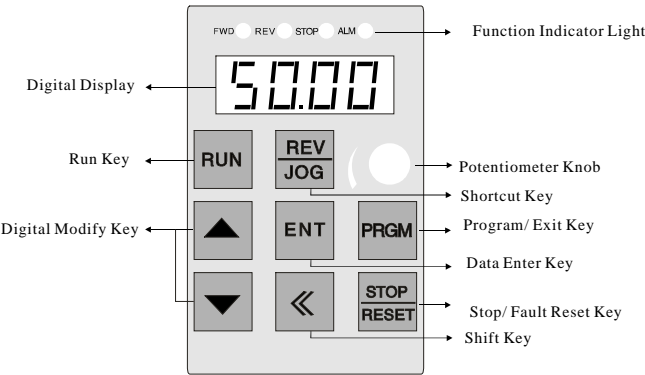


Figure 4.1 Keypad Schematic Diagram

4.1.2 Key Function Description

KeyName	Name	Function Description
PRGM	Programming key	Enter or exit of menu, parameter modification.
ENT	Data enter key	Progressively enter menu and confirm parameter.
▲	UP increase key	Progressively increase data or function codes.
▼	DOWN decrease key	Progressively decrease data or function codes.
⏮	Shift key	Use it to select displayed parameters cyclically in the stop or running status. In parameter setting mode, press this button to select the bit to be modified.
RUN	Run key	Start to run the inverter in keypad control mode.
STOP/RESET	Stop/reset key	In running status, restricted by function code F7.04, it can be used to stop the inverter. In malfunction alarm status, not restricted by function code F7.04, it can be used to reset the inverter.
REV/JOG	Shortcut key	Determined by function code F7.03.
RUN+ STOP/RESET	Combination key	Pressing the RUN and STOP/RESET at the same time can make inverter coast to stop.

### 4.1.3 Indicator Light Description

Indicator light name	Description
WFD	Light on: forward operation status
REV	Light on: reverse operation status
STOP	Stop status
ALM	Malfunction status

## 4.2 Operation Process

### 4.2.1 Parameter Setting

Three levels of menu are:

Function code group (first-class)

Function code (second-class)

Function code setting value (third-class)

#### Remarks:

Pressing PRGM or ENT can return to the second-class menu from the third-class menu. The difference is: Pressing ENT will save the setting parameters into the control panel, and return to the second-class menu with shifting to the next function code automatically. While pressing PRGM will directly return to the second-class menu without saving the parameters, and keep staying at the current function code. For example: change the parameter 00.50Hz of function code F1.01 into 05.00 Hz as the following flow chart shows:

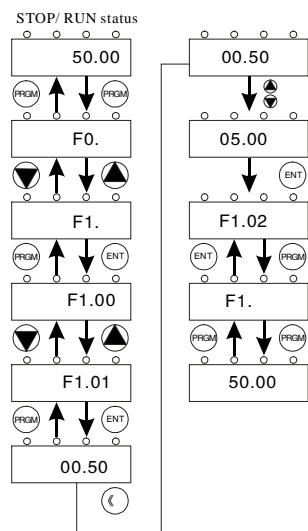


Figure 4.2 Flow Chart of Parameter Setting

Under the third-class menu, if the parameter has no flickering bit, it means the function code cannot be modified. The possible reasons include:

- The parameter of this function code can't be modified, such as actual detected parameter, operation records and so on.
- This function code can't be modified in running status, but can be modified in stop status.

### 4.2.2 Fault Reset

When inverter malfunction occurs, it will display the relative fault information.

Use the **STOP/RESET** or terminals (determined by F5 Group) to reset the fault.

After fault reset, inverter is at stand-by status. If not reset when inverter is at fault status, it will keep operation protection status and cannot run normally.

### 4.2.3 Motor Parameter Autotuning

When select SVC control mode (vector control without PG card), make sure that motor nameplate parameter is correctly input into the inverter. Inverter will match standard motor parameter according to nameplate parameter. In order to achieve precise control, autotuning is necessary. Refer to the following steps:

Firstly, set the parameter of F0.01 to 0. This means select the keypad to control stop or start. Then input the following parameters according to the actual motor Parameters:

F2.01: Motor rated power

F2.02: Motor rated frequency

F2.03: Motor rated speed

F2.04: Motor rated voltage

F2.05: Motor rated current

#### Notice

If motor can be uncoupled with its load completely, set the parameter of F2.11 to 1 (complete tuning) and then push **RUN**, inverter can calculate the parameter of motor. During autotuning process, the panel of inverter will display **-RUN-**, **RUN-0**, **RUN-1**. When it displays **-END-** the autotuning process is finished. If motor cannot be uncoupled with its load, set the parameter of F2.11 to 2 (static tuning) and then push **RUN**, inverter will auto-detect the parameters of motor stator resistor, rotor resistor and leakage

inductance, while the parameters of motor mutual inductance and no-load current are not detected. The parameters of motor mutual inductance and no-load current can be calculated by the following formula:

$$I_0 = I \times \sqrt{1 - \eta^2}$$

$$L_m = \frac{U}{2\sqrt{3}\pi f \cdot I_0} - L_\delta$$

$I_0$ : motor no-load current  
 $L_m$ : motor mutual inductance  
 $L_\delta$ : motor leakage inductance  
 $U$ : motor rated voltage  
 $I$ : motor rated current  
 $f$ : motor rated frequency  
 $\eta$ : motor power factor

#### 4.2.4 Password Setting

When F7.00 is set to be non-zero, the parameter will be the user's password. After exit the function code editing status, the password will be effective after one minute. And then press the **PRGM** key again to try to access the function code editing mode, the inverter panel will display **0.0.0.0.** The password must be input correctly to access it. If it is necessary to cancel the password function, set F7.00 to zero.

### 4.3 Operation Status

#### 4.3.1 Power-on Initialization

When the inverter is powered on, system will execute initialization first and inverter panel displays **-350-** with four lights on. After initialization, inverter accesses into stand-by status.

#### 4.3.2 Stand-by

Multi-status parameters will be displayed at stop or running status. Refer to function code F7.06 (running status parameters) and F7.07 (stop status Parameters).

There are ten parameters can be selected to display or not at stop status. They are: setting frequency, DC bus voltage, on-off input status, open collector output status, PID setting value, PID feedback value, analog input voltage VI, analog input current CI, multi-step speed value and torque value. These parameters can be displayed or not determined by F7.07 (corresponding to binary bit) and press shift key **▢** to select.

#### 4.3.3 Operation

There are sixteen parameters can be selected to display or not at running status. They are: running frequency, setting frequency, DC bus voltage, output voltage, output current, running speed, output power, output torque, PID setting value, PID feedback value, on-off input status, open collector output status, analog input voltage VI, analog input current CI, multi-step speed value and torque value. These parameters can be displayed or not determined by F7.06 (corresponding to binary bit) and press shift key **▢** to select.

#### 4.3.4 Fault

Refer to Section 6 Trouble shooting .

## 5. Function Code Table

### Notice

- “○” The parameters can be modified at stop or running status.  
 “●” The parameters cannot be modified at running status.  
 “◎” The parameters which are actual-detecting record value cannot be modified.

Function Code	Function	Settings Descriptions	Unit	Factory Settings	Modification Type
<b>F0 Group: Basic Parameters</b>					
<b>F0.00</b>	Control mode selection	0: Sensorless vector control 1: V/F control 2: Torque control		1	○
<b>F0.01</b>	Run command source	0: Keypad 1: Terminals 2: Communications		0	○
<b>F0.02</b>	Setting value valid or not of keypad /terminals	0: Valid and saved when power-off 1: Valid and not saved when power-off 2: Invalid 3: Valid at running status. Changed into the setting value of F0.08 when restart after stop.		0	○
<b>F0.03</b>	Master frequency setting source X	0: Up/down key 1: Potentiometer of panel 2: VI terminal 3: CI terminal 4: Reserved 5: Pulse setting (HM1) 6: Multi-function digital input terminals (MI1-MI6) 7: PLC 8: PID 9: Communication interface		1	○
<b>F0.04</b>	Auxiliary frequency setting source Y	0: Up/down key 1: Potentiometer of panel 2: VI terminal 3: CI terminal 4: Reserved 5: Pulse setting (HM1) 6: Multi-function digital input terminals (MI1-MI6) 7: PLC 8: PID 9: Communication interface		0	○
<b>F0.05</b>	Y setting value range	0: Relative to the maxi. frequency 1: Relative to X setting frequency value		0	○

Function Code	Function	Settings Descriptions	Unit	Factory Settings	Modification Type
<b>F0.06</b>	Y setting value range	0~100	%	100%	○
<b>F0.07</b>	Frequency setting source selection	0: X 1: X + Y 2: Shift between X and Y 3: Shift between X and X+Y 4: Shift between Y and X+Y		0	○
<b>F0.08</b>	Frequency setting source selection	0.00~setting value of F0.10	Hz	50.00Hz	○
<b>F0.09</b>	Running direction selection	0: Forward 1: Reverse 2: Reverse running prohibited		0	○
<b>F0.10</b>	Max. output frequency	10.00~650.00	Hz	50.00Hz	○
<b>F0.11</b>	Upper limit frequency setting source	0: Keypad 1: VI terminal 2: CI terminal 3: Multi-function digital input terminals (MI1-MI6) 4: Communication interface		0	○
<b>F0.12</b>	Upper limit running frequency	Lower limit frequency~ setting value of F0.10	Hz	50.00Hz	○
<b>F0.13</b>	Reserved				
<b>F0.14</b>	Lower limit running frequency	0.00~setting value of F0.12	Hz	0.00Hz	○
<b>F0.15</b>	The function of lower limit frequency	0: Running at lower limit frequency 1: Stop frequency point 2: Running at zero speed		0	○
<b>F0.16</b>	Carrier frequency	1.0~15.0	KHz	Different according to the inverter type	○
<b>F0.17</b>	PWM mode selection	0: PWM model 1 1: PWM model 2 2: PWM model 3		0	○
<b>F0.18</b>	Acceleration time 1	0.1~3600.0	second	10.0s	○
<b>F0.19</b>	Deceleration time 1	0.1~3600.0	second	10.0s	○
<b>F0.20</b>	Default setting	0: Not restore to default setting 1: Restore to factory setting 2: Fault record clearing		0	○

Function Code	Function	Settings Descriptions	Unit	Factory Settings	Modification Type
<b>F1 Group: Start and Stop Parameters</b>					
<b>F1.00</b>	Start mode	0:Start directly 1:DC braking and start 2:Speed tracing and start		0	●
<b>F1.01</b>	Start frequency	0.00~10.00Hz	Hz	0.50Hz	○
<b>F1.02</b>	Hold time of start frequency	0.0~50.0s	Second	0.0s	○
<b>F1.03</b>	DC braking current before start	0.0~150.0%	%	0.0%	○
<b>F1.04</b>	DC braking time before start	0.0~50.0s	Second	0.0s	○
<b>F1.05</b>	Stop mode	0: Deceleration to stop 1: Coast to stop		0	○
<b>F1.06</b>	Starting frequency of DC braking	0.00~setting value of F0.12	Hz	0.00Hz	○
<b>F1.07</b>	Waiting time before DC braking	0.0~50.0s	Second	0.0s	○
<b>F1.08</b>	DC braking current	0.0~150.0%	%	0.0%	○
<b>F1.09</b>	DC braking time	0.0~50.0s	Second	0.0s	○
<b>F1.10</b>	Dead time between FWD and REV	0.0~3600.0s	Second	0.0s	○
<b>F1.11</b>	FWD/REV enable option when power on	0: Disabled 1: Enabled		1	○
<b>F1.12-F1.15</b>	Reserved				
<b>F2 Group: Motor Parameters</b>					
<b>F2.00</b>	Inverter type	0:General type 1:Pump type		0	●
<b>F2.01</b>	Motor rated power	0.4~400.0kw	KW	Different according to inverter type	●

Function Code	Function	Settings Descriptions	Unit	Factory Settings	Modification Type
<b>F2.02</b>	Motor rated frequency	0.01~setting value of F0.10	Hz	50.00Hz	●
<b>F2.03</b>	Motor rated rotation speed	0~3600rpm	Rotation per minute	Different according to inverter type	●
<b>F2.04</b>	Motor rated voltage	0~480V	V	Different according to inverter type	●
<b>F2.05</b>	Motor rated current	0.1~2000.0A	A	Different according to inverter type	●
<b>F2.06</b>	Motor stator resistance	0.001~65.535Ω	Ω	Different according to inverter type	○
<b>F2.07</b>	Motor rotator resistance	0.001~65.535Ω	Ω	Different according to inverter type	○
<b>F2.08</b>	Motor stator inductance	0.1~6553.5mH	mH	Different according to inverter type	○
<b>F2.09</b>	Motor rotator mutual inductance	0.1~6553.5mH	mH	Different according to inverter type	○
<b>F2.10</b>	Motor no-load current	0.01~655.35A	A	Different according to inverter type	○
<b>F2.11</b>	Motor parameters autotuning	0:No autotuning 1: Autotuning completely 2:Static autotuning		0	●
<b>F2.12</b>	Reserved				
<b>F3 Group: Vector Control Parameters</b>					
<b>F3.00</b>	Proportional gain 1	0~100		20	●
<b>F3.01</b>	Integral time 1	0.01~10.00s	Second	0.50s	●
<b>F3.02</b>	Low frequency switch	0.00Hz~F3.05	Hz	5.00Hz	●

Function Code	Function	Settings Descriptions	Unit	Factory Settings	Modification Type
F3.03	Proportional gain 2	0~100		25	↑
F3.04	Integral time 2	0.01~10.00s	Second	1.00s	↑
F3.05	High frequency switch	F3.02~F0.10	Hz	10.00Hz	↑
F3.06	Coefficient of slip compensation	50~200%	%	100%	↑
F3.07	Upper limit torque	0.0~200% (inverter rated current)	%	150.0%	↑
F3.08	Torque setting method (100% relative to F3.07 upper limit torque)	0:Keypad setting 1:Analog VI setting 2:Analog CI setting 3:Analog VI+CI setting 4:Digital input terminal setting 5:Communication interface setting		0	↑
F3.09	Keypad setting torque	0.0%~100.0%		50.0	↑
F3.10-F3.12	Reserved				
<b>F4 Group: V/F Control Parameters</b>					
F4.00	V/F curve selection	0: Linear curve 1:Torque-stepdown curve 2:User-defined curve		0	↑
F4.01	Torque boost	0.0 % (auto) 0.1%~0.3%	%	0.0%	↑
F4.02	Torque boost cut-off	0.0~50.0% (relative to motor rated frequency)	%	20.0%	↑
F4.03	V/F frequency 1	0.00Hz~motor rated frequency	Hz	0.00Hz	↑
F4.04	V/F voltage 1	0.0%~100.0%	%	0.0%	↑
F4.05	V/F frequency 2	0.00Hz~motor rated frequency	Hz	0.00Hz	↑
F4.06	V/F voltage 2	0.0%~100%	%	0.0%	↑
F4.07	V/F frequency 3	0.00Hz~motor rated frequency	Hz	0.00Hz	↑
F4.08	V/F voltage 3	0.0%~100%	%	0.0%	↑
F4.09	Slip compensation limit	0.0%~200.0%	%	0.0%	↑

Function Code	Function	Settings Descriptions	Unit	Factory Settings	Modification Type
F4.10	Energy-saving selection	0:Disabled 1:Enabled automatically		0	↑
F4.11	Reserved				
F4.12	Low-frequency threshold of restraining oscillation	0~500		5	↑
F4.13	High-frequency threshold of restraining oscillation	0~500		100	↑
F4.14	Amplitude of restraining oscillation	0~10000		5000	↑
F4.15	Boundary of restraining oscillation	0.00~F0.10 (Maxi. frequency)	Hz	12.50Hz	↑
F4.16	Restraining oscillation	0: Valid 1: Invalid		1	↑
F4.17	AVR function selection	0:Invalid 1:Valid all the time 2:Invalid during deceleration		1	↑
F5 Group: Input Terminals Parameters					
F5.00	MI1 terminal function	0:Invalid 1:Forward run (FWD) 2:Reverse run (REV) 3:3-wire control 4:Forward jog run (FJOG) 5:Reverse jog run (RJOG) 6: UP Key command 7: DOWN Key command 8:Coast to stop 9:Fault reset (RESET) 10:Pause running 11: External fault input N. O. 12:Multi-step speed terminal 1 13:Multi-step speed terminal 2 14:Multi-step speed terminal 3 15:Multi-step speed terminal 4 16:Acceleration/deceleration selection terminal 1 17:Acceleration/deceleration selection terminal 2 18:Frequency setting source switch (refer to F0.07) 19: Clear UP/DOWN 20:Operation command method switch (refer to F0.01)		1	●
F5.01	MI2 terminal function			4	●
F5.02	MI3 terminal function			9	●
F5.03	MI4 terminal function			0	●
F5.04	MI5 terminal function			0	●
F5.05*	MI6 terminal function			0	●

Function Code	Function	Settings Descriptions	Unit	Factory Settings	Modification Type
F5.06	Reserved	21:Acceleration/deceleration prohibited			
F5.07	Reserved	22: Pause PID 23: Reset simple PLC after pause			
F5.08	Reserved	24: Pause traverse running 25: Counter input 26: Counter clear up			
F5.09	Reserved	27: Reserved 28: Reserved 29: Torque control prohibited 30: PULSE frequency input (only valid for HM1) 31: Reserved 32: DC braking command 33: External fault input N. C. 34. Terminal input delay			
F5.10	On/off filter times	1~10		5	○
F5.11	FWD/ REV control model	0:2-wire control mode 1 1:2-wire control mode 2 2:3-wire control mode 1 3:3-wire control mode 2		0	●
F5.12	UP/DOWN setting change rate	0.01~50.00Hz/s	Hz/s	0.50Hz/s	○
F5.13	VI lower limit	0.00V~10.00V	V	0.00V	○
F5.14	VI lower limit corresponding to setting value	0.0~100.0%	%	0.0%	○
F5.15	VI upper limit	0.00V~10.00V	V	10.00V	○
F5.16	VI upper limit corresponding to setting value	0.0~100.0%	%	100.0%	○
F5.17	VI input filter time constant	0.00s~10.00s	Second	0.10s	○
F5.18	CI lower limit	4mA~20mA	mA	4mA	○
F5.19	CI lower limit corresponding to setting value	0.0~100.0%	%	0.0%	○
F5.20	CI upper limit	4mA~20mA	mA	20mA	○
F5.21	CI upper limit corresponding to setting value	0.0~100.0%	%	100.0%	○
F5.22	CI input filter time constant	0.00s~10.00s	Second	0.10s	○

Function Code	Function	Settings Descriptions	Unit	Factory Settings	Modification Type
F5.23-F5.27	Reserved				
F5.28	Min. Pulse frequency	0.00kHz~50.00kHz	kHz	0.00kHz	○
F5.29	Min. Pulse frequency corresponding to setting value	0.0~100.0%	%	0.0%	○
F5.30	Maxi. Pulse frequency	0.00kHz~50.00kHz	kHz	50.00kHz	○
F5.31	Maxi. Pulse frequency corresponding to setting value	0.0~100.0%	%	100.0%	○
F5.32	Pulse input filter time constant	0.00s~10.00s	Second	0.10s	○
<b>F6 Group: Output Terminals Parameters</b>					
F6.00	MO1 output selection	0:No output 1:Motor forward run		1	○
F6.01	Reserved	2:Motor reverse run 3:Fault output		0	○
F6.02	Relay 1 output selection	4:FDT output 5:Frequency reached 6:Running at zero speed 7:Upper limit frequency reached 8:Lower limit frequency reached 9:Frequency setting value less than lower limit frequency		0	○
F6.03*	Relay 2 output selection	10:FDT reached 11:Running time reached 12:PLC cycle completed		3	○
F6.04	FM output selection	0:Running frequency 1:Setting frequency 2:Running torque 3:Output current 4:Output voltage 5:Output power 6:Output torque 7:Analog VI input value 8:Analog CI input value 9~10:Reserved		0	○
F6.05	FM output lower limit	0.0~100.0%	%	0.0%	○
F6.06	FM lower limit corresponding to output	0.00V~10.00V/0~20mA		0.00V	○
F6.07	FM output upper limit	0.0~100.0%	%	100.0%	○



Function Code	Function	Settings Descriptions	Unit	Factory Settings	Modifi - cation Type
<b>F6.08</b>	FM upper limit corresponding to output	0.00V~10.00V/0~20mA		10.00V	⌵
<b>F6.09*</b>	AM output selection	0:Running frequency 1:Setting frequency 2:Running speed 3:Output current 4:Output voltage 5:Output power 6:Output torque 7:Analog VI input 8:Analog CI input 9~10:Reserved		3	⌵
<b>F6.10</b>	AM output lower limit	0.0~100.0%	%	0.0%	⌵
<b>F6.11</b>	AM lower limit corresponding to output	0.00V~10.00V		0.00V	⌵
<b>F6.12</b>	AM output upper limit	0.0~100.0%	%	100.0%	⌵
<b>F6.13</b>	AM upper limit corresponding to output	0.00V~10.00V		10.00V	⌵
<b>F7 Group: Display Interface</b>					
<b>F7.00</b>	User password	0~65535		0	⌵
<b>F7.01</b>	Parameter copy	0: Invalid 1: Upload to LCD 2: Download from LCD 3: F2 Group		0	⌵
<b>F7.02</b>	LCD language selection	0: Chinese 1: English		0	⌵
<b>F7.03</b>	REV/JOG function selection	0:JOG invalid 1:Switch between keypad setting and communication interface setting 2: FWD/REV switch 3:Forward jog run		0	⌵
<b>F7.04</b>	STOP/RST function selection	0:Only valid for keypad setting 1:Valid for both keypad setting and terminals setting 2:Valid for both keypad setting and communication interface setting 3:Valid for all control mode		0	⌵
<b>F7.05</b>	Fixed parameter displayed	Unit's place: 0 E Ten's place: 0 8 Thousand's place: 0 1		0	⌵

Function Code	Function	Settings Descriptions	Unit	Factory Settings	Modifi - cation Type
<b>F7.06</b>	Running status display selection	0~0x7FFF BIT0:Running frequency BIT1:Setting frequency BIT2:DC bus voltage BIT3:Output voltage BIT4:Output current BIT5:Running speed BIT6:Output power BIT7:Output torque BIT8:PID setting value BIT9:PID feedback value BIT10:Input terminals status BIT11:Output terminals status BIT12:Analog VI value BIT13:Analog CI value BIT14: Step NO. of multi-step speed BIT15:Reserved		0035	⌵
<b>F7.07</b>	Stop status display selection	1~0x7FFF BIT0:Setting frequency BIT1: DC bus voltage BIT2:Input terminals status BIT3: Output terminals status BIT4: PID setting value BIT5:PID feedback value BIT6:Analog VI value BIT7:Analog CI value BIT8: Step NO. of multi-step speed BIT9~15:Reserved		003	○
<b>F7.08</b>	Reserved				
<b>F7.09</b>	Inverter modules temperature	0~80℃	℃		⊙
<b>F7.10</b>	Inverter software version			3.50	⊙
<b>F7.11</b>	Accumulative running time	0~65535h	Hour	0	⊙
<b>F8 Group: Enhanced Function Parameters</b>					
<b>F8.00</b>	Jog running frequency	0.00~F0.10	Hz	5.00Hz	○
<b>F8.01</b>	Jog running acceleration time	0.1~3600.0s	Second	20.00s	○
<b>F8.02</b>	Jog running deceleration time	0.1~3600.0s	Second	20.00s	○
<b>F8.03</b>	Acceleration time 2	0.1~3600.0s	Second	20.00s	○
<b>F8.04</b>	Deceleration time 2	0.1~3600.0s	Second	20.00s	○
<b>F8.05</b>	Acceleration time 3	0.1~3600.0s	Second	20.00s	○

Function Code	Function	Settings Descriptions	Unit	Factory Settings	Modification Type
F8.06	Deceleration time 3	0.1~3600.0s	Second	20.00s	○
F8.07	Acceleration time 4	0.1~3600.0s	Second	20.00s	○
F8.08	Deceleration time 4	0.1~3600.0s	Second	20.00s	○
F8.09	Skip frequency 1	0.00~F0.10	Hz	0.00Hz	○
F8.10	Skip frequency 2	0.00~F0.10	Hz	0.00Hz	○
F8.11	Skip frequency bandwidth	0.00~F0.10	Hz	0.00Hz	○
F8.12	FDT level	0.00~F0.10	Hz	50.00Hz	○
F8.13	FDT lag	0.0~100.0%	%	5.0%	○
F8.14	Frequency arrive detecting range	0.0~100.0% (Maxi. frequency)	%	0.0%	○
F8.15	Braking threshold voltage	115.0~140.0% (standard DC bus voltage)	%	125.0%	○
F8.16	Speed coefficient display	0.0~999.9% (Speed= 120* running frequency * F8.16/ polar of motor)	%	100.0%	○
F8.17	Running time selection	0h~65535h	Hour	65535h	◎
F8.18	START/STOP delay selection	0:Keep running 1:Stop		0	○
F8.19	Droop control	0.00Hz~10.00Hz	Hz	0.00Hz	◎
F8.20	Panel filter time selection	0.00~10.00	Second	0.10s	○
F8.21	Output delay time selection	0~60000	Second	0.00s	○
F8.22	Frequency detecting lower limit	0.00 ~ Maxi. frequency	Hz	20.00Hz	○
F8.23	Frequency detecting upper limit	0.00 ~ Maxi. frequency	Hz	40.00Hz	○
<b>F9 Group: PID parameters</b>					
F9.00	PID setting source	0:Keypad 1:Analog terminal VI 2:Analog terminal CI 3:Communication interface 4:Muli-function digital input terminals		0	┆
F9.01	Keypad PID preset	0.0%~100.0%	%	0.0%	┆
F9.02	PID feedback source selection	0:Analog terminal VI 1:Analog terminal CI 2:VI+CI 3:Communication interface		0	┆

Function Code	Function	Settings Descriptions	Unit	Factory Settings	Modification Type
F9.03	PID output characteristic	0: Positive 1: Negative		0	┆
F9.04	Proportional gain (Kp)	0.00~100.00		0.10	┆
F9.05	Integral time (Ti)	0.01~10.00s	Second	0.10s	┆
F9.06	Differential time (Td)	0.00~10.00s	Second	0.00s	┆
F9.07	Sampling cycle (T)	0.01~100.00s	Second	0.10s	┆
F9.08	Bias limit	0.0~100.0%	%	0.0%	┆
F9.09	Feedback lost detecting value	0.0~100.0%	%	0.0%	┆
F9.10	Feedback lost detecting time	0.0~3600.0s	Second	1.0s	┆
<b>FA Group: Protection and Malfunction Parameters</b>					
FA.00	Motor overload protection	0:Disabled 1:Normal motor 2:Variable frequency motor		2	┆
FA.01	Motor over current protection	20.0%~120.0% (motor rated current)	%	100.0%	┆
FA.02	Threshold of trip-free	70.0%~110.0% (standard bus voltage)	%	80.0%	┆
FA.03	Decrease rate of trip-free	0.00Hz~F0.10	Hz	0.00Hz	┆
FA.04	Over-voltage stall protection	0:Disabled 1:Enabled		0	┆
FA.05	Over-voltage stall protection point	110~150%	%	120%	┆
FA.06	Auto current limiting threshold	100~200%	%	160%	┆
FA.07	Frequency decrease rate when current limiting	0.00~100.00Hz/s	Hz/s	10.00Hz/s	┆
FA.08	Auto current limiting selection	0:Enabled 1: Disabled at constant speed		0	┆

Function Code	Function	Settings Descriptions	Unit	Factory Settings	Modifi - cation Type
FA.09	Fault reset times	0~3		0	,
FA.10	Fault reset interval	0.1~100.0s	Second	1.0s	,
FA.11	Reserved				
FA.12	Reserved				
FA.13	Output phase lack protection	0: Disabled 1: Enabled		1	,
FA.14	Former twice faults type	0: No fault 1: Inverter unit protection (E0001) 2: Over-current when accelerate (E0002) 3: Over-current when decelerate (E0003) 4: Over-current at constant speed (E0004) 5: Over-voltage when accelerate (E0005)			,
FA.14	Former twice faults type	6: Over-voltage when decelerate (E0006) 7: Over-voltage at constant speed (E0007) 8: Reserved (E0008) 9: Under voltage (E0009) 10: Inverter overload (E0010) 11: Reserved (E0011) 12: Reserved (E0012) 13: Output phase lack (E0013) 14: Inverter overheating (E0014) 15: External fault (E0015) 16: Communication fault (E0016) 17: Reserved (E0017) 18: Current detection fault (E0018) 19: Motor autotuning fault (E0019) 20: Reserved (E0020) 21: Reserved (E0021) 22: EEPROM fault (E0022) 23: Reserved (E0023) 24: Reserved (E0024)			,
FA.15	Former once fault type				,
FA.16	Current fault type				,
FA.17	Running frequency when fault		Hz		,

Function Code	Function	Settings Descriptions	Unit	Factory Settings	Modifi - cation Type
FA.18	Output current when fault		A		,
FA.19	DC bus voltage when fault		V	0.0V	,
FA.20	Input terminal status when fault			0	,
FA.21	Output terminal status when fault			0	,
<b>FB Group: Oscillating Frequency Parameters</b>					
FB.00	Oscillating frequency bandwidth	0.0~100% (relative to setting frequency)	%	0.0%	,
FB.01	Skip frequency bandwidth	0.0~50.0% (relative to oscillating frequency bandwidth)	%	0.0%	,
FB.02	Rise time of oscillating frequency	0.1~3600.0s	Second	5.0s	,
FB.03	Drop time of oscillating frequency	0.1~3600.0s	Second	5.0s	,
FB.04- FB.06	Reserved				
FB.07	Counter value	0~65535	1	1000	,
FB.08	Reserved				
<b>FC Group: RS485 Communication Parameters</b>					
FC.00	Local address	1~247, 0 stands for the broadcast address		1	,
FC.01	Baud rate selection	0: 1200BPS 1: 2400BPS 2: 4800BPS 3: 9600BPS 4: 19200BPS 5: 38400BPS		3	,
FC.02	Data format	0: RTU, 1 start bit, 8 data bits, no parity check, 1 stop bit. 1: RTU, 1 start bit, 8 data bits, even parity check, 1 stop bit. 2: RTU, 1 start bit, 8 data bits, odd parity check, 1 stop bit. 3: RTU, 1 start bit, 8 data bits, no parity check, 2 stop bits. 4: RTU, 1 start bit, 8 data bits, even parity check, 2 stop bits. 5: RTU, 1 start bit, 8 data bits, odd parity check, 2 stop bits.		0	,

Function Code	Function	Settings Descriptions	Unit	Factory Settings	Modification Type
<b>FC.02</b>	Data format	6: ASCII, 1 start bit, 7 data bits, no parity check, 1 stop bit. 7: ASCII, 1 start bit, 7 data bits, even parity check, 1 stop bit. 8: ASCII, 1 start bit, 7 data bits, odd parity check, 1 stop bit. 9: ASCII, 1 start bit, 7 data bits, no parity check, 2 stop bits. 10: ASCII, 1 start bit, 7 data bits, even parity check, 2 stop bits. 11: ASCII, 1 start bit, 7 data bits, odd parity check, 2 stop bits. 12: ASCII, 1 start bit, 8 data bits, no parity check, 1 stop bit. 13: ASCII, 1 start bit, 8 data bits, even parity check, 1 stop bit. 14: ASCII, 1 start bit, 8 data bits, odd parity check, 1 stop bit. 15: ASCII, 1 start bit, 8 data bits, no parity check, 2 stop bits. 16: ASCII, 1 start bit, 8 data bits, even parity check, 2 stop bits. 17: ASCII, 1 start bit, 8 data bits, odd parity check, 2 stop bits.		0	,
<b>FC.03</b>	Communication delay time	0~200ms	ms	5ms	,
<b>FC.04</b>	Communication timeout delay	0.0 (invalid), 0.1~100.0s	Second	0.0s	,
<b>FC.05</b>	Communication error action	0:Alarm and coast to stop 1:No alarm and continue to run 2:No alarm but stop according to F1.05 (only when F0.01= 2) 3: No alarm but stop according to F1.05		1	,
<b>FC.06</b>	Transmission response action	0:Response to writing 1:No response to writing		0	,
<b>FD Group: Multi-step Speed and Simple PLC Parameters</b>					
<b>FD.00</b>	Multi-step 0	0.00Hz~Max. frequency	Hz	0.00Hz	
<b>FD.01</b>	Multi- step 1	0.00Hz~Max. frequency	Hz	0.00Hz	
<b>FD.02</b>	Multi- step 2	0.00Hz~Max. frequency	Hz	0.00Hz	
<b>FD.03</b>	Multi- step 3	0.00Hz~Max. frequency	Hz	0.00Hz	
<b>FD.04</b>	Multi- step 4	0.00Hz~Max. frequency	Hz	0.00Hz	
<b>FD.05</b>	Multi- step 5	0.00Hz~Max. frequency	Hz	0.00Hz	
<b>FD.06</b>	Multi- step 6	0.00Hz~Max. frequency	Hz	0.00Hz	
<b>FD.07</b>	Multi- step 7	0.00Hz~Max. frequency	Hz	0.00Hz	

Function Code	Function	Settings Descriptions	Unit	Factory Settings	Modification Type
<b>FD.08</b>	Multi- step 8	0.00Hz~Max. frequency	Hz	0.00Hz	
<b>FD.09</b>	Multi- step 9	0.00Hz~Max. frequency	Hz	0.00Hz	
<b>FD.10</b>	Multi- step 10	0.00Hz~Max. frequency	Hz	0.00Hz	
<b>FD.11</b>	Multi- step 11	0.00Hz~Max. frequency	Hz	0.00Hz	
<b>FD.12</b>	Multi- step 12	0.00Hz~Max. frequency	Hz	0.00Hz	
<b>FD.13</b>	Multi- step 13	0.00Hz~Max. frequency	Hz	0.00Hz	
<b>FD.14</b>	Multi- step 14	0.00Hz~Max. frequency	Hz	0.00Hz	
<b>FD.15</b>	Multi- step 15	0.00Hz~Max. frequency	Hz	0.00Hz	
<b>FD.16</b>	Simple PLC selection	0000~1113 Unit's place: method selection 0: Disabled 1:Stop after single cycle 2:Continuous cycle 3:Keep the final value after single cycle Ten's place: restart method selection 0:Restart from the first stage 1:Restart at the pause frequency Hundred's place: PLC status parameters saved selection when trip-off 0:Not saved 1:Save the stage number and frequency when trip-off Thousand's place: running time unit 0:Second 1:Minute		0000	,
<b>FD.17</b>	Reserved				
<b>FD.18</b>	0 <sup>th</sup> step running time	0.0s(m)~6000.0s(m)	Second	0.0s	,
<b>FD.19</b>	0 <sup>th</sup> step parameters selection	Unit's place: FWD/REV selection 0:Forward run 1:Reverse run Ten's place: 0: Accel. /decel. time 1 1: Accel. /decel. time 2 2: Accel. /decel. time 3 3: Accel. /decel. time 4		00	,
<b>FD.20</b>	1 <sup>th</sup> step running time	0.0s(m)~6000.0s(m)	Second	0.0s	,
<b>FD.21</b>	1 <sup>th</sup> step parameters selection	Unit's place: FWD/REV selection 0:Forward run		00	,

Function Code	Function	Settings Descriptions	Unit	Factory Settings	Modification Type
FD.21	1 <sup>st</sup> step parameters selection	1:Reverse run Ten's place: 0: Accel./decel. time 1 1: Accel./decel. time 2 2: Accel./decel. time 3 3: Accel./decel. time 4		00	○
FD.22	2 <sup>nd</sup> step running time	0.0s(m)~6000.0s(m)	Second	0.0s	○
FD.23	2 <sup>nd</sup> step parameters selection	Unit's place: FWD/REV selection 0:Forward run 1:Reverse run Ten's place: 0: Accel./decel. time 1 1: Accel./decel. time 2 2: Accel./decel. time 3 3: Accel./decel. time 4		00	○
FD.24	3 <sup>rd</sup> step running time	0.0s(m)~6000.0s(m)	Second	0.0s	○
FD.25	3 <sup>rd</sup> step parameters selection	Unit's place: FWD/REV selection 0:Forward run 1:Reverse run Ten's place: 0: Accel./decel. time 1 1: Accel./decel. time 2 2: Accel./decel. time 3 3: Accel./decel. time 4		00	○
FD.26	4 <sup>th</sup> step running time	0.0s(m)~6000.0s(m)	Second	0.0s	○
FD.27	4 <sup>th</sup> step parameters selection	Unit's place: FWD/REV selection 0:Forward run 1:Reverse run Ten's place: 0: Accel./decel. time 1 1: Accel./decel. time 2 2: Accel./decel. time 3 3: Accel./decel. time 4		00	○
FD.28	5 <sup>th</sup> step running time	0.0s(m)~6000.0s(m)	Second	0.0s	○
FD.29	5 <sup>th</sup> step parameters selection	Unit's place: FWD/REV selection 0:Forward run 1:Reverse run Ten's place: 0: Accel./decel. time 1 1: Accel./decel. time 2 2: Accel./decel. time 3 3: Accel./decel. time 4		00	○

Function Code	Function	Settings Descriptions	Unit	Factory Settings	Modification Type
FD.30	6 <sup>th</sup> step running time	0.0s(m)~6000.0s(m)	Second	0.0s	○
FD.31	6 <sup>th</sup> step parameters selection	Unit's place: FWD/REV selection 0:Forward run 1:Reverse run Ten's place: 0: Accel./decel. time 1 1: Accel./decel. time 2 2: Accel./decel. time 3 3: Accel./decel. time 4		00	○
FD.32	7 <sup>th</sup> step running time	0.0s(m)~6000.0s(m)	Second	0.0s	○
FD.33	7 <sup>th</sup> step parameters selection	Unit's place: FWD/REV selection 0:Forward run 1:Reverse run Ten's place: 0: Accel./decel. time 1 1: Accel./decel. time 2 2: Accel./decel. time 3 3: Accel./decel. time 4		00	○
FD.34	8 <sup>th</sup> step running time	0.0s(m)~6000.0s(m)	Second	0.0s	○
FD.35	8 <sup>th</sup> step parameters selection	Unit's place: FWD/REV selection 0:Forward run 1:Reverse run Ten's place: 0: Accel./decel. time 1 1: Accel./decel. time 2 2: Accel./decel. time 3 3: Accel./decel. time 4		00	○
FD.36	9 <sup>th</sup> step running time	0.0s(m)~6000.0s(m)	Second	0.0s	○
FD.37	9 <sup>th</sup> step parameters selection	Unit's place: FWD/REV selection 0:Forward run 1:Reverse run Ten's place: 0: Accel./decel. time 1 1: Accel./decel. time 2 2: Accel./decel. time 3 3: Accel./decel. time 4		00	○
FD.38	10 <sup>th</sup> step running time	0.0s(m)~6000.0s(m)	Second	0.0s	○
FD.39	10 <sup>th</sup> step parameters selection	Unit's place: FWD/REV selection 0:Forward run 1:Reverse run		00	○

Function Code	Function	Settings Descriptions	Unit	Factory Settings	Modification Type
<b>FD.39</b>	10 <sup>th</sup> step parameters selection	Ten's place: 0: Accel. /decel. time 1 1: Accel. /decel. time 2 2: Accel. /decel. time 3 3: Accel. /decel. time 4		00	○
<b>FD.40</b>	11 <sup>th</sup> step running time	0.0s(m)~6000.0s(m)	Second	0.0s	○
<b>FD.41</b>	11 <sup>th</sup> step parameters selection	Unit's place: FWD/REV selection 0:Forward run 1:Reverse run Ten's place: 0: Accel. /decel. time 1 1: Accel. /decel. time 2 2: Accel. /decel. time 3 3: Accel. /decel. time 4		00	○
<b>FD.42</b>	12 <sup>th</sup> step running time	0.0s(m)~6000.0s(m)	Second	0.0s	○
<b>FD.43</b>	12 <sup>th</sup> step parameters selection	Unit's place: FWD/REV selection 0:Forward run 1:Reverse run Ten's place: 0: Accel. /decel. time 1 1: Accel. /decel. time 2 2: Accel. /decel. time 3 3: Accel. /decel. time 4		00	○
<b>FD.44</b>	13 <sup>th</sup> step running time	0.0s(m)~6000.0s(m)	Second	0.0s	○
<b>FD.45</b>	13 <sup>th</sup> step parameters selection	Unit's place: FWD/REV selection 0:Forward run 1:Reverse run Ten's place: 0: Accel. /decel. time 1 1: Accel. /decel. time 2 2: Accel. /decel. time 3 3: Accel. /decel. time 4		00	○
<b>FD.46</b>	14 <sup>th</sup> step running time	0.0s(m)~6000.0s(m)	Second	0.0s	○
<b>FD.47</b>	14 <sup>th</sup> step parameters selection	Unit's place: FWD/REV selection 0:Forward run 1:Reverse run Ten's place: 0: Accel. /decel. time 1 1: Accel. /decel. time 2 2: Accel. /decel. time 3 3: Accel. /decel. time 4		00	○

Function Code	Function	Settings Descriptions	Unit	Factory Settings	Modification Type
<b>FD.48</b>	15 <sup>th</sup> step running time	0.0s(m)~6000.0s(m)	Second	0.0s	○
<b>FD.49</b>	15 <sup>th</sup> step parameters selection	Unit's place: FWD/REV selection 0:Forward run 1:Reverse run Ten's place: 0: Accel. /decel. time 1 1: Accel. /decel. time 2 2: Accel. /decel. time 3 3: Accel. /decel. time 4		00	○
<b>FD.50</b>	Reserved				
<b>FD.51</b>	Reserved				
<b>FE.00 Group: Reserved</b>					

### Notice

MI6 terminal, relay 2 (TA1, TB1, TC1), AM terminal and HM1 terminal of inverters of 7.5KW and below will be disabled without SD card. For inverters of 11KW and above, only HM1 terminal needs to be enabled by adding SD card.

## 6. Trouble Shooting

### 6.1 Fault and Trouble Shooting

Fault Code	Fault Type	Reason	Solution
E0001	IGBT fault	1: Acceleration time is too short 2: IGBT module damaged 3: Malfunction caused by interference 4: Grounding is not properly	1: Increase acceleration time 2: Ask for support 3: Inspect external equipment and eliminate interference 4: Check grounding wire
E0002	Over-current when acceleration	1: Accelerate too fast 2: Input voltage is too low 3: Inverter capacity is too low	1: Increase acceleration time 2: Inspect the input power supply or wiring 3: Select larger capacity inverter
E0003	Over-current when deceleration	1: Decelerate too fast 2: Load is too heavy and has large inertia 3: Inverter capacity is too low	1: Increase deceleration time 2: Add suitable braking units 3: Select larger capacity inverter
E0004	Over-current at constant running speed	1: Sudden change of load 2: Input voltage is too low 3: Inverter capacity is too low	1: Check the load 2: Inspect the input power supply or wiring 3: Select larger capacity inverter
E0005	Over-voltage when acceleration	1: Input voltage abnormal 2: Restart the motor when instantaneous trip-off occurs	1: Inspect input power 2: Avoid prompt restart when trip-off
E0006	Over-voltage when deceleration	1: Decelerate too fast 2: Load is too heavy and has large inertia 3: Input voltage abnormal	1: Increase deceleration time 2: Add suitable braking units 3: Inspect input power
E0007	Over-voltage at constant running speed	1: Input voltage abnormal 2: Load inertia is too large	1: Install input AC reactor 2: Add suitable braking units
E0008	Reserved	Reserved	Reserved
E0009	Under voltage of DC bus	Input voltage is too low	Inspect power grid
E0010	Inverter overload	1: Accelerate too fast 2: Restart the motor when instantaneous trip-off occurs 3: Input voltage is too low 4: Load is too heavy	1: Increase acceleration time 2: Avoid prompt restart when trip-off 3: Inspect power grid 4: Select larger capacity inverter

Fault Code	Fault Type	Reason	Solution
E0011	Motor overload	1: Input voltage is too low 2: Improper setting of motor rated current 3: Improper motor's overload protection threshold 4: Inverter capacity is too low	1: Inspect voltage of power grid 2: Properly setting of motor rated current 3: Inspect load and boost the torque 4: Select larger capacity inverter
E0012	Reserved	Reserved	Reserved
E0013	Output phase failure	1: There is a broken wire in the output cable 2: There is a broken wire in the motor winding. 3: Output terminals are loose	Check the wiring and installation
E0014	Inverter overheat	1: Instantaneous over current of inverter 2: Output short circuit 3: Cooling fans of inverter stop or damaged. Obstruction of ventilation channel 4: Ambient temperature is too high 5: The cables or terminals are loose 6: Power circuit abnormal 7: Control PCB board abnormal	1: Refer to over current solutions 2: Use the good wire 3: Replace cooling fan and clear the ventilation channel 4: Decrease the ambient temperature 5: Inspect and tighten the wire and terminals 6: and 7: Ask for support
E0015	External fault	External fault input terminals take effect	Inspect external equipment
E0016	Communication fault	1: Improper baud rate setting 2: Receive wrong data 3: Communication is interrupted for long time	1: Set proper baud rate 2: Push STOP/RST to reset and ask for support 3: Check communication devices and cables
E0017	Reserved	Reserved	Reserved
E0018	Current detection fault	1: Wires or connectors of control board are loose 2: Amplifying circuit abnormal 3: Hall sensor is damaged 4: Power circuit abnormal	1: Check the wiring and connectors 2,3 and 4: Ask for support
E0019	Autotuning fault	1: Improper setting of motor rated parameters 2: Overtime of autotuning 3: Too much error	1: Set rated parameters according to motor nameplate 2: Check motor's wiring 3: Make motor uncoupled with load and autotune again

Fault Code	Fault Type	Reason	Solution
E0020 E0021	Reserved	Reserved	Reserved
E0022	EEPROM fault	1: Read/ Write fault of control parameters 2: EEPROM damaged	Push STOP/RST to reset and ask for support
E0023 E0024	Reserved	Reserved	Reserved

## 6.2 Common Faults and Solutions

Inverter may have following faults or malfunctions during operation , please refer to the following solutions.

### No display after power on:

Inspect whether the voltage of power supply is the same as the inverter rated voltage or not with multi-meter. If the power supply has problem, inspect and solve it.

Inspect whether the three-phase rectify bridge is in good condition or not. If the rectification bridge is burst out, ask for support.

### Power supply air switch trips off when power on:

Inspect whether the input power supply is grounded or short circuit. Solve this problem.

Inspect whether the rectify bridge has been burnt or not. If it is damaged , ask for support.

### Motor doesn't run after inverter works:

Inspect if there is balanced three-phase output among U, V, W. If yes, then motor could be damaged, or mechanically locked.

If the output is unbalanced or lost, the inverter drive board or the output module may be damaged, ask for support..

### Inverter displays normally when power on , but switch at the input side trips when running:

Inspect whether the output side of inverter is short circuit. If yes, ask for support.

Inspect whether ground fault exists. If yes, solve it.

If trip happens occasionally and the distance between motor and inverter is too far, it is recommended to install output AC reactor.

Inspect whether the output module is burnt or not. If yes, ask for support.

## 7 Data Address Table of Function Code

Function Code	Address
F0.00	0
F0.01	1
F0.02	2
F0.03	3
F0.04	4
F0.05	5
F0.06	6
F0.07	7
F0.08	8
F0.09	9
F0.10	10
F0.11	11
F0.12	12
F0.13	13
F0.14	14
F0.15	15
F0.16	16
F0.17	17
F0.18	18
F0.19	19
F0.20	20
F1.00	21
F1.01	22
F1.02	23
F1.03	24
F1.04	25
F1.05	26
F1.06	27
F1.07	28

Function Code	Address
F1.08	29
F1.09	30
F1.10	31
F1.11	32
F1.12	33
F1.13	34
F1.14	35
F1.15	36
F2.00	37
F2.01	38
F2.02	39
F2.03	40
F2.04	41
F2.05	42
F2.06	43
F2.07	44
F2.08	45
F2.09	46
F2.10	47
F2.11	48
F2.12	49
F3.00	50
F3.01	51
F3.02	52
F3.03	53
F3.04	54
F3.05	55
F3.06	56
F3.07	57

Function Code	Address
F3.08	58
F3.09	59
F3.10	60
F3.11	61
F3.12	62
F4.00	63
F4.01	64
F4.02	65
F4.03	66
F4.04	67
F4.05	68
F4.06	69
F4.07	70
F4.08	71
F4.09	72
F4.10	73
F4.11	74
F4.12	75
F4.13	76
F4.14	77
F4.15	78
F4.16	79
F4.17	80
F5.00	81
F5.01	82
F5.02	83
F5.03	84
F5.04	85
F5.05*	86



Function Code	Address
F5.06	87
F5.07	88
F5.08	89
F5.09	90
F5.10	91
F5.11	92
F5.12	93
F5.13	94
F5.14	95
F5.15	96
F5.16	97
F5.17	98
F5.18	99
F5.19	100
F5.20	101
F5.21	102
F5.22	103
F5.23	104
F5.24	105
F5.25	106
F5.26	107
F5.27	108
F5.28	109
F5.29	110
F5.30	111
F5.31	112
F5.32	113
F6.00	114
F6.01	115
F6.02	116
F6.03*	117

Function Code	Address
F6.04	118
F6.05	119
F6.06	120
F6.07	121
F6.08	122
F6.09*	123
F6.10	124
F6.11	125
F6.12	126
F6.13	127
F7.00	128
F7.01	129
F7.02	130
F7.03	131
F7.04	132
F7.05	133
F7.06	134
F7.07	135
F7.08	136
F7.09	137
F7.10	138
F7.11	139
F8.00	140
F8.01	141
F8.02	142
F8.03	143
F8.04	144
F8.05	145
F8.06	146
F8.07	147
F8.08	148

Function Code	Address
F8.09	149
F8.10	150
F8.11	151
F8.12	152
F8.13	153
F8.14	154
F8.15	155
F8.16	156
F8.17	157
F8.18	158
F8.19	159
F8.20	160
F8.21	161
F8.22	162
F8.23	163
F9.00	164
F9.01	165
F9.02	166
F9.03	167
F9.04	168
F9.05	169
F9.06	170
F9.07	171
F9.08	172
F9.09	173
F9.10	174
FA.00	175
FA.01	176
FA.02	177
FA.03	178
FA.04	179

Function Code	Address
FA.05	180
FA.06	181
FA.07	182
FA.08	183
FA.09	184
FA.10	185
FA.11	186
FA.12	187
FA.13	188
FA.14	189
FA.15	190
FA.16	191
FA.17	192
FA.18	193
FA.19	194
FA.20	195
FA.21	196
FB.00	197
FB.01	198
FB.02	199
FB.03	200
FB.04	201
FB.05	202
FB.06	203
FB.07	204
FB.08	205
FC.00	206
FC.01	207
FC.02	208
FC.03	209
FC.04	210

Function Code	Address
FC.05	211
FC.06	212
FD.00	213
FD.01	214
FD.02	215
FD.03	216
FD.04	217
FD.05	218
FD.06	219
FD.07	220
FD.08	221
FD.09	222
FD.10	223
FD.11	224
FD.12	225
FD.13	226
FD.14	227
FD.15	228
FD.16	229
FD.17	230
FD.18	231
FD.19	232
FD.20	233
FD.21	234
FD.22	235
FD.23	236
FD.24	237
FD.25	238
FD.26	239
FD.27	240
FD.28	241

Function Code	Address
FD.29	242
FD.30	243
FD.31	244
FD.32	245
FD.33	246
FD.34	247
FD.35	248
FD.36	249
FD.37	250
FD.38	251
FD.39	252
FD.40	253
FD.41	254
FD.42	255
FD.43	256
FD.44	257
FD.45	258
FD.46	259
FD.47	260
FD.48	261
FD.49	262
FD.50	263
FD.51	264