

## User Manual

# EM7 Series Frequency Inverter



## PREFACE

Thank you very much for choosing EM7 series of sensorless vector inverter

This manual provides guidance of using the inverter safely and carefully, containing introduction of installation, wiring, parameter list, routine maintenance, operating rules and cautions, etc.

In order to make good use of the inverter properly and safely, please read this manual thoroughly before using. It may lead to abnormal operation and failure, reduce using life, even damage the equipment and cause personal injury if you use it wrongly.

This manual is attachment together with the inverter. Please keep it well and it would be available to engineering and installation personnel, repairing and maintaining during the product functioning period

We has the right to modify and ameliorate products, data and dimensions without notice, so this manual is updated and all the contents in this manual are subject to change without any notice.

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## 1. PECAUTIONS

In order to use the inverter properly and safely, please read this manual carefully before using. And you should follow the requirements of this manual to move, install, run, operate and repair the inverter.

### 1.1 Opening

Please check any damage that may have occurred during transportation.

- 1) Please check whether the nameplate data of inverter is in accordance with your order, if anything wrong, please contact supplier immediately.
- 2) Our product is manufactured, packed and transported in the strict quality system. But in case there is any error, please contact with our company or local agent, we will solve the problem as quickly as possible.

Inverter's nameplate data

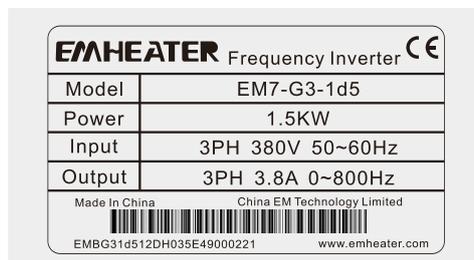


Fig 0-1 Nameplate

### 1.2 Safety regulations

There are two kinds of symbols being related with cautions as follows:

 <b>Danger</b>	If user does not operate according to requirements, it will lead to death, grievous bodily harm or severe property loss.
 <b>Warning</b>	If user does not operate according to requirements, it will lead to injury or damage of inverter.

### 1.3 Installing

- 1) Do not put the inverter on the combustible material.
- 2) EM7 series inverter can't install in the explosive ambient.
- 3) Do not drop other material into the inverter.



It is forbidden to disassemble and refit the inverter.

### 1.4 Wiring

- 1) It must be operated by professional worker when wiring.
- 2) Please be sure to turn off the power supply at least 10 min before wiring.
- 3) Inverter and motor must be grounded correctly.

- 4) Be sure to wire or inspect the inverter after power-off at least 10 minutes.
- 5) Electron components are sensitive about static electricity, so do not drop other material in inverter or touch the main circuit.



It is forbidden to connect an AC power supply with the U, V and W output terminals directly

### **1.5 Attention Notes:**

- 1) Be sure to install the inverter in a well-ventilated ambient.
- 2) The temperature at variable-frequency will be higher than at line-frequency, which is normal phenomenon.
- 3) The ordinary motor cannot run in the low speed for a long time, so user should select the special motor for inverter or reduce the motor load under the low speed.
- 4) When the altitude is over 1000m, the inverter will be valid to decrease the rated current, and the rated current will decrease 10% when the attitude is increased 1500m.

### **1.6 Dispose:**

When you dispose inverter and its parts, please pay attention to:

Capacitor: The capacitors in inverter may explode when they are burned.

Plastic: Poisonous gas may be generated when the front panel is burned, please pay attention to the waste gas when the plastic parts are burned.

Method: Please dispose inverter as industry rubbish.

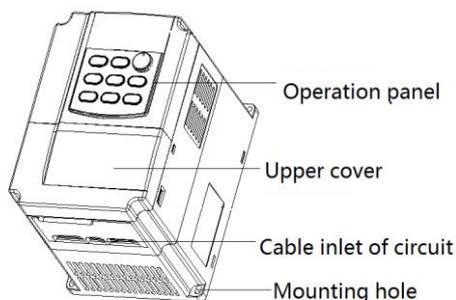
## 2. INTRODUCTION

### 2.1 Model explanation

EM7 - G 3 - 7d5  
 ① ② ③ ④

①	EM7 Series Mini Frequency Inverter
②	Products Type: G: General use
③	Voltage range: 1: Single phase 220V 3: Three phase 380V
④	Adaptable motor: 1d5: 1.5KW ;004: 4KW

### 2.2 Appearance description



### 2.3 Model of Inverter

Model	Voltage (V)	Rated Power (KVA)	Rated output current (A)	Applied motor Power (KW)
EM7-G1-1d5	220	2.9	7	1.5
EM7-G1-2d2		3.8	10	2.2
EM7-G3-1d5	380	2.4	4.5	1.5
EM7-G3-2d2		3.6	5.5	2.2
EM7-G3-004		6.3	9.0	4.0
EM7-G3-5d5		8.6	13	5.5
EM7-G3-7d5		11	17	7.5

### 2.4 Specifications

Input&Output	Rated Voltage and freq.	Three-phase (4T) 380V, 50/60Hz	Single-phase (2S) 220V; 50/60Hz
	Permissible voltage fluctuation	Three-phase (4T) 360V ~ 415V	Single-phase (2S) 200V ~ 240V
	Voltage	Three-phase (4T) 0 ~380V	Single-phase(2S) 0~220V
	Frequency	0~600Hz	

	<b>Over-loading Endurance</b>	110% rated current for long-term; 150% rated current for 1min; 180% rated current for 2s	
<b>Control Characteristics</b>	<b>Control System</b>	V/F control	Sensorless current vector-control
	<b>Torque start</b>	the torque is 180% rated torque.	
	<b>Speed range</b>	1 : 100	1 : 200
	<b>The lasting accuracy</b>	±0.5%	±0.1%
	<b>response time</b>	≦ 20ms	≦ 5ms
	<b>V/F curve</b>	And V/F curve with multi-mode can be discretionally set. There are also three curves provided, Constant torque curve, Dec torque curve 1 and Dec torque curve 2.	
	<b>Torque boost</b>	Manual torque boost can be set between 0 and 20 percent; Automatic torque boost can be set according to output current.	
	<b>Current / voltage restraint</b>	Current close-circuit control can avoid the current attack.	
	<b>Freq. Resolution Analog Input</b>	0.1% of maximum output freq.	
	<b>Freq. Resolution Digital Input</b>	0.01Hz	
	<b>Freq. Precision Analog Input</b>	Within 0.2% of maximum output freq.	
	<b>Freq. Precision Digital Input</b>	Within 0.01% of setting freq.	
<b>Typical Functions</b>	<b>Multi-speed selection And Wobble freq. running</b>	Up to 8 stages of programmable multi-speed control, 6 kinds of running mode Wobble freq. function is composed of preset freq., center freq. adjusted and saving state and restart when inverter just had power off.	
	<b>PID control</b>	Embedded PID controller can preset freq.	
	<b>RS485 communication</b>	Standard positioning RS485 Manifold communication protocols can be selected(MODBUS), having synchronous linkage function.	
	<b>Automatic energy saving running</b>	Input voltage and compensation for speed drop is adjusted by real-time output current.	
	<b>Voltage stabilizing running Automatically</b>	To get the most stable running effect, user can select static stabilizing voltage, dynamics stabilizing voltage and non-stabilizing voltage.	
	<b>Determine speed and restart</b>	To use the function of Smooth restarting and stop restarting during motor works.	
	<b>Counter</b>	Embedded one counter, which will help the integration of system	
	<b>carrier frequency</b>	1.5~12.0KHz ;	
	<b>Analog input</b>	DC 0~10V, DC current 0~20mA	
	<b>Digital input</b>	It can be set by Operation panel, RS485, UP/DW terminal and combination setting.	
	<b>Analog output</b>	one output: 0~10V voltage, 0~20mA current, and upper/lower limit can be set by user	
	<b>Digital output</b>	Two OC output, 16 options can be selected, faults electric delay out can be selected .	
<b>Brake</b>	<b>Regenerative braking</b>	75% above	
	<b>DC braking</b>	Start and stop can be selected respectively, action freq. is form 0 to 50.0Hz, and action time is form 1 to 20.0s. Continuous action is also optional.	
	<b>Protection/Warning Functions</b>	Over current, over voltage, under current, under voltage, thermal relay, overheating, Short circuit, out voltage would be short of the phase, The parameters of motor is abnormal, Main contactor can't attract, Internal memory faults, etc.	

<b>Environmental Conditions</b>	<b>Ambient temperature</b>	-10°C~+50°C
	<b>Ambient humidity</b>	under 90%
	<b>Ambient atmosphere</b>	indoors (non-corrosive、 non-inflammable、 non-oil, non- fog etc.
	<b>Altitude</b>	lower than 1000m
	<b>Enclosure rating</b>	IP20
	<b>Cooling system</b>	the cooling mode
	<b>Vibration level</b>	< 20m/s

### 3. WIRING PROCEDURE

#### 3.1 Precautions:

- 1) Installing a middle breaker between inverter and power supply in order to avoid enlarging the accident.
- 2) Reducing the electromagnetic interference (EMI), please connect surge absorber to the coils of electromagnetic contactors, relays, etc.
- 3) Separating the main circuit wire from the signal/process circuit wiring, paralleled wiring should be at a distance of over 10cm and crossed wiring should be vertical with each other.
- 4) The wire must be less than 30m between motor and inverter. When the length of wire is over 30m, the carrier frequency of inverter should be reduced properly.
- 5) Compressive resistance of all the wire should match with the voltage grade of inverter.

It is not allowed that U、V、W of inverter connect with the surge absorber capacitor or other surge absorber equipment and shown as following Fig..

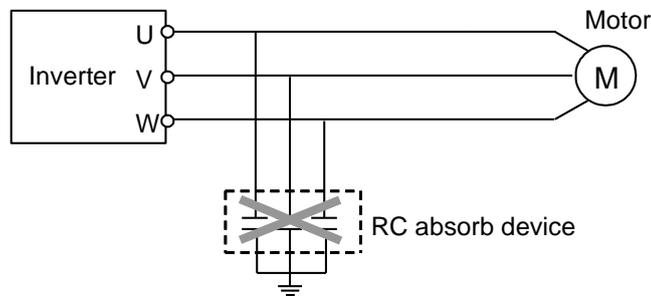


Fig.3-1 It is prohibited to connect RC absorb apparatus

#### 3.2 Wiring of External Components

##### 3.2.1 External Components

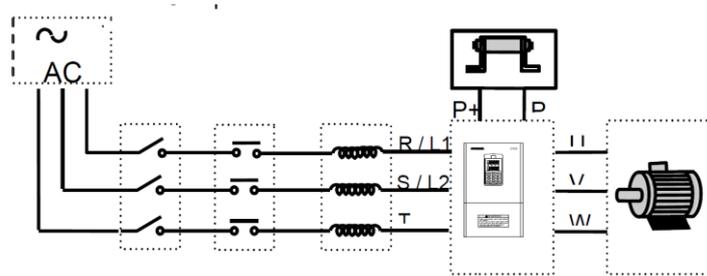


Fig.3-2 wiring

Power Supply	It is according to the rated input power specifications in manual.
Air-break switch	<ol style="list-style-type: none"> <li>1. When the inverter is in maintenance or leave-unused, the air-break switch should isolate the inverter with power supply.</li> <li>2. Input side of inverter takes place the fault of short-circuits or low-voltage, the air-break will take the protection.</li> </ol>
Contactor	Control the power-on or power-off of inverter expediently.
AC electric reactor	<ol style="list-style-type: none"> <li>1. Improve the power factor.</li> <li>2. Reduce the harmonic wave input for the electric network.</li> </ol>

	3. Weaken the imbalance effect on 3-phase power voltage.
Brake resistor	In the situation of regenerative braking, avoiding bringing voltage too highly.

3.2.3 Specification of commanded equipment is shown as following table.

Model	Applied Motor (KW)	Wire spec (Main circuit) (mm <sup>2</sup> )	Air-break (A)	Magnetic contactor (A)
EM7-G1-1d5	1.5	4	20	18
EM7-G1-2d2	2.2	6	32	18
EM7-G3-1d5	1.5	2.5	16	12
EM7-G3-2d2	2.2	4	16	12
EM7-G3-004	4.0	4	25	16
EM7-G3-5d5	5.5	6	32	22
EM7-G3-7d5	7.5	6	40	32

### 3.3 Basic wiring

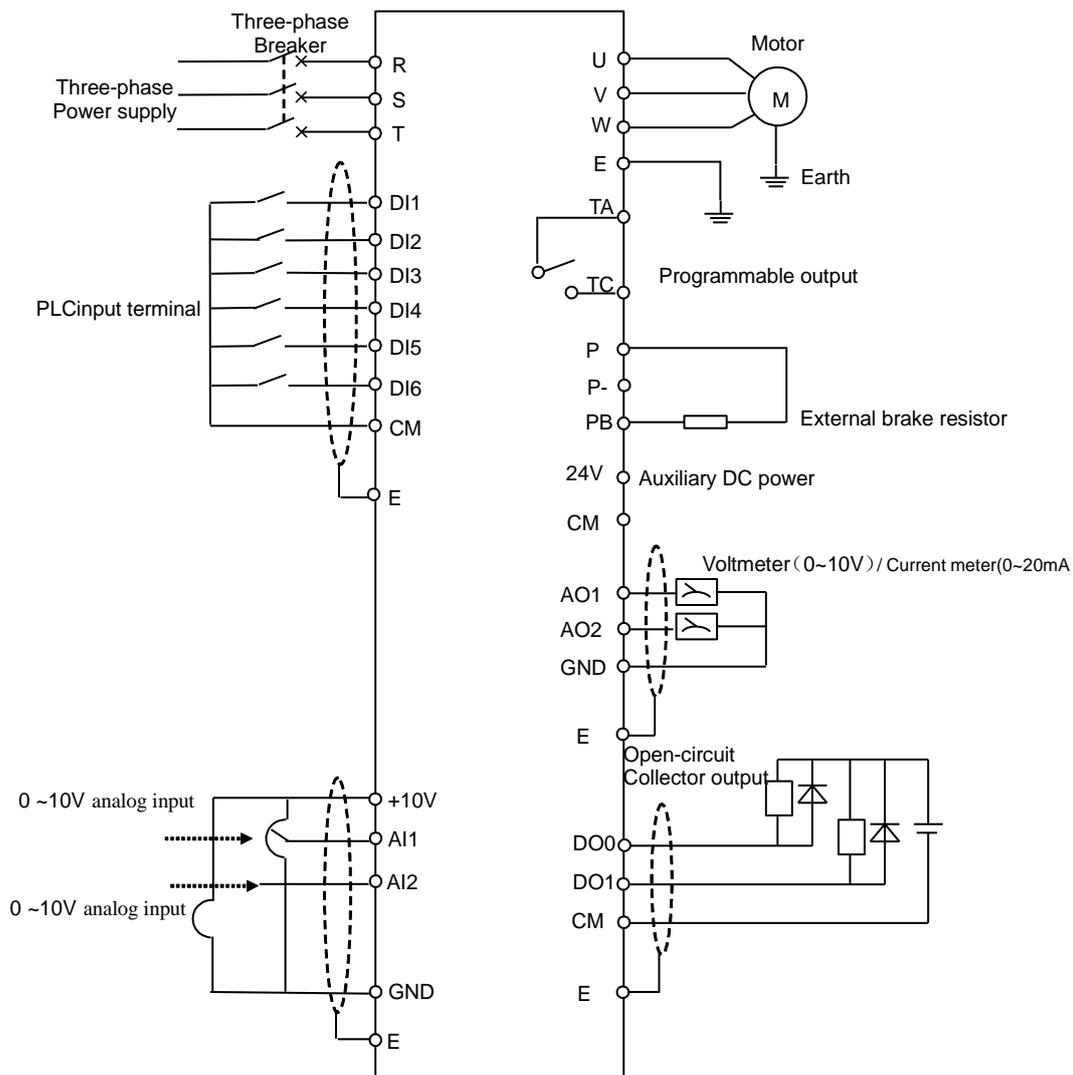
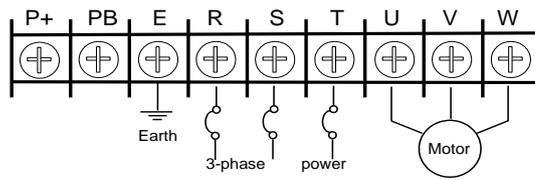


Fig.3-3 EM7 series inverter basic wiring

### 3.4 Terminal of main circuit



Description of terminal:

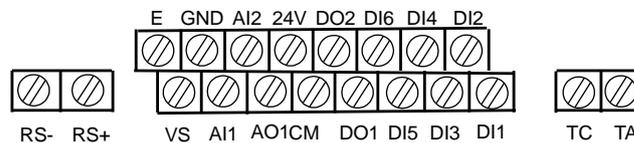
Terminal	Function
P	Positive Terminal of DC Negative
P-	Negative Terminal of DC / DC brake unite can be connected between P and P-.
P+	DC electric Reactor can be connected between P and P+.
PB	DC brake resistance can be connected between P and PB.
R、 S、 T	Connecting three-phase AC power supply
U、 V、 W	Connecting three-phase AC motor
E	Earth Terminal

### 3.5 Terminal of Control circuit

#### 3.5.1 I model



#### 3.5.2 II model



#### 3.5.3 Description of control-circuit terminal:

Type	Terminal	Function	Notes
Analog Input/ Output	AI1—GND	Frequency setting voltage signal input1 11terminal 1	0~10V/0-20mA (AI selection)
	A12—GND	Frequency setting voltage signal input2	0~10V
	AO1-GND	PLC voltage signal input terminal. It is set by P2.05	0~10V
Digital INPUT	DI1—CM	Multi-function input terminal 1	24Vdc / 5mA
	DI2—CM	Multi-function input terminal 2	
	DI3—CM	Multi-function input terminal 3	
	DI4—CM	Multi-function input terminal 4	
	DI5—CM	Multi-function input terminal 5	
	DI6—CM	Multi-function input terminal 6	
Digital Output	DO1—CM	PLC open-circuit collector output is set by P3.07	The maximum load-current is 50mA Capacity: AC 250V 1A
	DO2—CM	PLC open-circuit collector output is set by P3.08	
	TA—TC	General , TA-TC is unconnected when TA-TC is	

		connected, F3.8 is valid.	Resistive load
Power	10V	10V/10mA power and is grounded by GND	The maximum load-current is 50mA
	GND	Common terminal of analog input signal	
	24V	+24V/50mA power and is grounded by CM.	The maximum load-current is 50mA
	CM	Common terminal of control	
RS485	RS+	RS485 communication interface	MODBUS

## 4. OPERATIONS AND RUNNING

### 4.1 Operation panel

#### 4.1.1 Panel layout

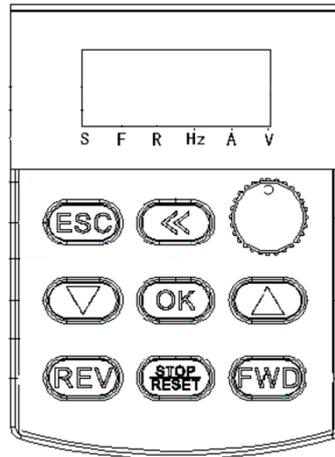


Fig.4-1-A Panel Layout

#### 4.1.2 Keypad functions

Item	Function
Main LED	It displays current state and setting parameter.
S Light	Operation indicator light. The inverter is STOP
F Light	Operation indicator light. The inverter is running forward
R Light	Operation indicator light. The inverter is running backward
A、Hz、 V Light	The corresponding unit of current display
	FWD key: The inverter will running forward to setting frequency according to appointed ACC or DEC curve.
	REV key: The inverter will be running backward to setting frequency according to appointed ACC or DEC curve.
	Stop and Reset key
	Return key: Press this key in normal monitor state to enter query mode of not normal monitor state /monitor parameters to check running state. In any state, press this key to return the upper state. This key is used together with  to perform Parameter read / backup.
	Set key
	Data modify key: It is used to modify the function code and parameter. In state monitor mode, if P1.00 is 0, press this key will modify the frequency instruction.
	Shift key.

## 4.2 List of state monitor parameter

Monitor Code	Content	Unit
d-0	Current output frequent	Hz
d -1	output current (Valid)	A
d -2	DC bus voltage	V
d -3	Temperature of module	°C
d -4	output voltage (Valid)	V
d -5	Rotate speed of motor	rpm
d -6	Input voltage of inverter	V
d -7	Setting freq.	Hz
d -8	Count value of Internal counter	
d -9	PID setting value	
d -10	PID feedback value	
d -11	Running linear speed	
d -12	Setting linear speed	
d -13	Analog input AI1 (voltage)	V
d -14	Analog input AI2 (voltage)	V
d -15	Analog input AI1 (current)	mA
d -16	Reserved	KHz
d -17	State of input terminal	
d -18	Analog output AO1	
d -19	Analog output AO2	
d -20	Magnetization current	A
d -21	Magnetization current setting	A
d -22	Torque current	A
d -23	Torque current setting	A
d -24	Reserved	Hz
d -25	Reserved	
d -26	First fault record	
d -27	Second fault record	
d -28	Third fault record	
d -29	Fourth fault record	
d -30	Fifth fault record	
d -31	Sixth fault record	
d -32	Output frequency of last fault	Hz
d -33	Setting frequency of last fault	Hz
d -34	Output current of last fault	A
d -35	Output voltage of last fault	V
d -36	DC voltage of last fault	V
d -37	Temperature of module of last fault	°C

## 5. PARAMETERS LIST

Symbol description:

★ means that this parameter can not be changed during operation.

▲ means that this parameter is related to the inverter's model.

Code	Name	Setting range	Manu- facture	Limit
P0.00	G/P selection	0: General-purpose lode 1: Fan and pump lode	0	★
P0.01	Parameter write-protoc	1: Forbid to modify All parameter except P1.01 and P0.01 2: Forbid to modify all parameter, except P0.01	0	
P0.02	Copy parameter function	0: Forbid 1: Allow	0	
P0.03	Parameter initialization	0: Parameter initialization is off. 1: Parameter initialization is on. 2: Clean fault records	0	★
P0.04	Manufactory password	0 ~ 9999	0	
P0.05	Monitor item selection	0~50	0	
P0.06	Reserved	-----	-----	
P0.07	The lower Limit frequency	0.0 Hz~ [P0.08]	0.0	
P0.08	The upper limit frequency	[P0.07] ~600.00Hz	50.00	
P0.09	Base running frequency	5.00~the upper limit frequency	50.00	
P0.10	Base running voltage	200~500V 100~250V	380 220	
P0.11	Carrier wave frequency	1.5~ 12.0 KHz	▲	
P0.12	Carrier wave characteristics	The second part of LED 0: The relation between out current and Carrier wave is off. 1: The relation between out current and Carrier wave is on. The third part of LED: 0: The relation between module temp and Carrier wave is off. 1: The relation between module temp and Carrier wave is on. The third part of LED 0: The relation between out frequent and Carrier wave is off. 1: The relation between out frequent and Carrier wave is on.	1110	
P1.00	Frequency input channel selection	0: Frequency setting by operation panel 1: UP/DW Acc and Dec control 2: RS485 interface 3: Panel potentiometer 4: External voltage signal AI1 (0V~10V) 5: External voltage signal A12 (0V~10V)	0	

Code	Name	Setting range	Manu- facture	Limit
		6: External current signal AI1 (0~20mA) 7: Reserved 8: Combination setting 9: External terminals		
P1.01	Frequency digital setting	0.00 ~ the upper limit frequency	0.0	
P1.02	Auxiliary control of frequency digital setting	The first part of LED: 0: Setting freq. will save after power down 1: Setting freq. will not save after power down The second part of LED: 0: Setting freq. is keep when stopping 1: Setting freq. will save in P1.01 whenstopping 2: Setting freq. is clear when stopping	0000	
P1.03	Modified rated of UP/DW terminals	0.01 ~ 100.0Hz/Sec	10.00	
P1.04	Reserved	-----	-----	
P1.05	Operation channel selection	0: Panel control 1: External terminals control 2: RS485 interface	0	
P1.06	Combination methods of instruction terminals	0: Two-line mode A 1: Two-line mode B 2: Three-line mode	0	★
P1.07	Acc time 1	0.1 ~ 6000 Sec	▲	
P1.08	Dec time 1	0.1 ~ 6000 Sec	▲	
P1.09	Acc time 2	0.1 ~ 6000 Sec	▲	
P1.10	Dec time 2	0.1 ~ 6000 Sec	▲	
P1.11	Acc time 3	0.1 ~ 6000 Sec	▲	
P1.12	Dec time 3	0.1 ~ 6000 Sec	▲	
P1.13	Acc time 4 /Jog Acc time	0.1 ~ 6000 Sec	▲	
P1.14	Dec time 1/ Jog Dec time	0.1 ~ 6000 Sec	▲	
P1.15	Jog frequency	0.0 ~ the upper limit freq.	5.00	
P1.16	Characteristics parameter of Acc and Dec	0: Beeline 1: S curve	0	
P1.17	Acc/Dec initial section proportion of S curve	10.0 ~ 50.0 (%)	20.0	★
P1.18	Acc/Dec ascending/ decline section proportion of S curve	10.0 ~ 80.0 (%)	60.0	★
P1.19	Start mode	0: Routine mode 1: Detect speed and restart	0	★
P1.20	Start frequency	0.0 ~ 10.00Hz	0.5	
P1.21	Start frequency duration	0.0 ~ 20.0 Sec	0.0	★
P1.22	DC braking current when starting	0.0 ~ 100.0 (%)	50.0	
P1.23	DC braking time when starting	0.0 ~ 20.0 Sec	0.0	★

Code	Name	Setting range	Manu- facture	Limit
P1.24	Selection of starting pre-excitation	The first part of LED 0: Starting pre-excitation is Valid 1: Starting pre-excitation is Invalid The second part of LED: 0: Prepare pre-excitation is valid when zero frequency 1: Prepare pre-excitation is invalid when zero frequency	0001	
P1.25	Pre-excitation of starting time	0.10~2.00Sec	0.30	★
P1.26	Stop mode	0: Decelerate mode 1: Uncontrolled stop	0	
P1.27	Initial freq. of DC braking when stopping	0.0~50.00Hz	3.00	
P1.28	Waiting time of DC braking when stopping	0.0~5.0 Sec	0.1	
P1.29	Action time of DC braking when stopping	0.0~20.0 Sec	0.0	★
P1.30	DC braking current when stopping	0.0~100 (%)	50.0	
P1.31	Restart after power down setting	The first part of LED: 0: Invalid 1: Valid The second part of LED: 0: Routine mode 1: Detect speed and restart mode	0010	★
P1.32	Waiting time of restart after power down	0.0~10.0 Sec	0.5	★
P1.33	Dead time of FWD&REV	0.0~5.0 Sec	0.0	★
P1.34	Running threshold of zero freq.	0.0~100.0Hz	0.0	
P1.35	Return different of zero freq.	0.0~50.00Hz	1.00	
P1.36	Start voltage of dynamic braking	600~720V	700	
P1.37	Action ratio of dynamic braking	10~100 (%)	60	
P1.38	Torque Boost	0.0~30.0 (%)	▲	
P1.39	Torque boost pattern	0: Manual 1: Automatic	0	★
P1.40	Compensate for slip freq.	0.0~150.0 (%)	0	
P1.41	Automatic voltage regulation (AVR)	0: Invalid 1: Dynamic valid 2: Static valid	0	
P1.42	Energy-saving running	0: Invalid 1: Valid	0	★
P2.00	Input lower limit voltage AI1 (voltage)	0.0 ~ [P2.01]	0.0	
P2.01	Input upper limit voltage AI1 (voltage)	[P2.00] ~ 10.0V	5.0	

Code	Name	Setting range	Manu- facture	Limit
P2.02	Input lower limit voltage AI2 (voltage)	0.0V ~ [P2.03]	0.0	
P2.03	Input upper limit voltage AI2 (voltage)	[P2.02] ~ 10.0V	10.0	
P2.04	Characteristics selection of input channel	The first part of LED AI1channel:( voltage ) 0: positive characteristics 1: Negative characteristics The second part of LED AI2 channel: 0: positive characteristics 1: Negative characteristics The third part of LED: AI1channel:( current ) 0: positive characteristics 1: Negative characteristics	0000	★
P2.05	Analog output selection (AO1、AO2)	The first part of LED: AO1 output 0: Output freq. 1: Output current 2: Output voltage 3: Rotate speed of applied motor 4: PID setting 5: PID feedback The second part of LED: AO2 output 0: Output freq. 1: Output current 2: Output voltage 3: Rotate speed of applied motor 4: PID setting 5: PID feedback	0010	
P2.06	The lower limit of analog output ( AO1)	0.0~[P2.07]	0.0	
P2.07	The upper limit of analog output ( AO1)	[P2.06]~12.0	10.0	
P2.08	The lower limit of analog output ( AO2)	0.0~[P2.09]	2.0	
P2.09	The upper limit of analog output ( AO2)	[P2.08]~12.0	10.0	
P2.10	External freq. set time constant of filtering	0.01~1.00Sec	0.10	
P2.11	Input lower limit voltage AI1 (current)	0.0~[P2.12]	4.0	
P2.12	Input upper limit voltage AI1 (current)	[P2.11]~20MA	20.00	
P2.13	Frequency with the min setting	0.0~[P2.14]	0.00	
P2.14	Frequency with the max setting	[P2.13]~600.0HZ	50.00	
P3. 00	Function selection of Input terminal DI1	0: Control terminal is idle	0	

Code	Name	Setting range	Manu- facture	Limit
P3. 01	Function selection of Input terminal DI2	1: Multi-speed control terminal 1	0	
P3. 02	Function selection of Input terminal DI3	2: Multi-speed control terminal 2 3: Multi-speed control terminal 3	27	
P3. 03	Function selection of Input terminal DI4	4: Wobble freq. is valid 5: State of wobble freq. reset	0	
P3. 04	Function selection of Input terminal DI5	6: FWD jog control 7: REV jog control	0	
P3. 05	Function selection of Input terminal DI6	8: Acc& Dec time selection terminal 1 9: Acc& Dec time selection terminal 2 10: Freq. setting channel selection 1 11: Freq. setting channel selection 2 12: Freq. setting channel selection 3 13: Freq. is controlled gradually increase (UP) 14: Freq. is controlled gradually increase (DW) 15: UP-DW freq. clear 16: Uncontrolled stop control 17: Fault signal of peripheral equipment input 18: Three-line mode running control 19: DC braking control 20: Inner counter clear 21: Inner counter timer 22: PLC running valid 23: PID running valid 24: Reserved 25: PLC state reset after stopping 26: RESET 27: FWD 28: REV	0	
P3.06	Input terminals Function setting	The second part of LED: 0: It will valid when Input terminals are connected. 1: It will valid when Input terminals are disconnected.	0000	P3.06
P3. 07	Output terminal D01	0: In the running	0	
P3. 08	Output terminal D02	1: Frequency reaching	1	
P3. 09	TA,andTC of relay contacts	2: Freq. level detection signal (FDT) 3: Over-loading alarm 4: External fault halt 5: Output frequency reaches the upper-limit 6: Output frequency reaches the lower-limit 7: Running in zero speed 8: Inverter will stop when under voltage 9: PLC stage is end of run 10: PLC periodic is end of run 11: Reserved 12: Setting value of counter arrives 13: Designated value of counter arrives 14: Reserved 15: Reserved	16	

Code	Name	Setting range	Manu- facture	Limit
		16: Inverter fault 17: Restrictions on wobble freq. of the upper and lower limit freq.		
P4.00	Type of V/F Curve	0: Constant torque curve 1: Low-freq. torque curve 1 2: Low-freq. torque curve 2 3: V/F user-defined curve	0	
P4.01	V/F freq. 3	[F1.7] ~ [F1.3]	0.0	★
P4.02	V/F voltage 3	[F1.8] ~ 100.0(%)	0.0	★
P4.03	V/F freq. 2	[F1.9] ~ [F1.5]	0.0	★
P4.04	V/F voltage 2	[F1.10] ~ [F1.6]	0.0	★
P4.05	V/F freq.1	0.0 ~ [F1.7]	0.0	★
P4.06	V/F voltage 1	[F1.1] ~ [F1.8]	0.0	★
P4.07	Characteristics selection of input channel V/F	The first part of LED Start Characteristics: 0: Soft characteristics 1: Hard characteristics The second part of LED Stop Characteristics: 0: Soft characteristics 1: Hard characteristics	0000	
P5.00	Control methods	0: V/F method 1: Vector control	0000	★
P5.01	Rated voltage of applied motor	200~500V 100~250V	380V 220V	★
P5.02	Rated freq. of applied motor	5.00~600.00Hz	50.00	★
P5.03	Rated current of applied motor	0.01~300.0A	▲	★
P5.04	Rated rev of applied motor	300~6000rpm	▲	★
P5.05	Exciting current of applied motor	[P5.03]/4~[P5.03]×3/4	▲	★
P5.06	Parameters self-determination	0: Invalid 1: Determine parameters when motor is stop 2: Determine parameters when motor is run	0	★
P5.07	Self-adapting rectify of motor parameters	The first part of LED 0: Self-adapting rectify of stator Resistance will invalid. 1: Self-adapting rectify of stator resistance will valid. The second part of LED 0: Self-adapting rectify of excitation current will invalid. 1: Self-adapting rectify of excitation current will valid.	0010	
P5.08	Stator resistance	0.000~20.000	▲	★
P5.09	Rotor resistance	0.000~20.000	▲	★
P5.10	Rotor inductance	0.00~600.00 (mH)	▲	★
P5.11	Inductance of excitation	0.00~600.00 (mH)	▲	★
P5.12	Leakage inductance (coefficient)	0.00~100.00 (mH)	▲	★

Code	Name	Setting range	Manu- facture	Limit
P5.13	Gain of compensation for speed drop	0.50~1.50	1.00	
P6.00	Multi-speed running mode	The first part of LED PLC setting 0: PLC is invalid. 1: PLC is valid. 2: PLC is conditional invalid. The second part of LED: Simple PLC running mode selection 0: Single loop mode 1: Single loop and stop mode 2: Continuous loop mode 3: Continuous loop and stop mode 4: Keep the end value 5: Keep the end value and stop mode	0000	★
P6.00	Multi-speed running mode	The third part of LED 0: Restart from the first stage freq. 1: Restart from running freq., which is saved before running is break 2: Restart from setting freq. when Running is break. The fourth part of LED: PLC save state 0: Non-save after power off 1: Save after power off	0000	★
P6.01	Multi-speed frequency 1	0.0 ~ the upper limit freq.	35.00	
P6.02	Multi-speed frequency 2	0.0 ~ the upper limit freq.	15.00	
P6.03	Multi-speed frequency 3	0.0 ~ the upper limit freq.	3.00	
P6.04	Multi-speed frequency 4	0.0 ~ the upper limit freq.	20.00	
P6.05	Multi-speed frequency 5	0.0 ~ the upper limit freq.	25.00	
P6.06	Multi-speed frequency 6	0.0 ~ the upper limit freq.	30.00	
P6.07	Multi-speed frequency 7	0.0 ~ the upper limit freq.	35.00	
P6.08	Multi-speed frequency 8	0.0 ~ the upper limit freq.	40.00	
P6.09	Running time of Multi-speed 1	0.0~6000 Sec	10.0	
P6.10	Running time of Multi-speed 2	0.0~6000 Sec	10.0	
P6.11	Running time of Multi-speed3	0.0~6000 Sec	10.0	
P6.12	Running time of Multi-speed 4	0.0~6000 Sec	10.0	
P6.13	Running time of Multi-speed 5	0.0~6000 Sec	10.0	
P6.14	Running time of Multi-speed 6	0.0~6000 Sec	10.0	
P6.15	Running time of Multi-speed 7	0.0~6000 Sec	10.0	
P6.16	Running time of Multi-speed 8	0.0~6000 Sec	10.0	
P6.17	Running direction of PLC multi-speed	The first part of LED 0: Stage 1 FWD	0000	

Code	Name	Setting range	Manu- facture	Limit
		1: Stage 1 REV The second part of LED : 0: Stage 2 FWD 1: Stage 2 REV The third part of LED : 0: Stage 3 FWD 1: Stage 3 REV The fourth part of LED : 0: Stage 4 FWD 1: Stage 4 REV		
P6.18	Running direction of PLC multi-speed	The first part of LED 0: Stage 5 FWD 1: Stage 5 REV The second part of LED : 0: Stage 6 FWD 1: Stage 6 REV The third part of LED : 0: Stage 7 FWD 1: Stage 7 REV The fourth part of LED : 0: Stage 8 FWD 1: Stage 8 REV	0000	
P7.00	Running direction control	The first part of LED 0: Running direction is consistent with setting direction 1: Running direction is in contradiction To setting direction The second part of LED: 0: Prevention REV is valid 1: Prevention REV is invalid	0000	
P7.01	Frequency reach the checkout amplitude	0.0~20.00Hz	5.00	
P7.02	FDT setting 1	0.0~ the upper limit freq.	10.00	
P7.03	FDT output delay time 1	0.1~200.0 Sec	2.0	★
P7.04	FDT setting 2	0.0~ the upper limit freq.	10.00	
P7.05	FDT output delay time 2	0.1~200.0 Sec	2.0	★
P7.06	Final value setup of internal counter	1~60000	1	★
P7.07	Internal timer setup	1~60000	1	★
P7.08	Skip freq. 1	0.0~the upper limit freq.	0.0	
P7.09	Amplitude accumulation Of Skip freq. 1	0.0~5.00Hz	0.0	
P7.10	Skip freq. 2	0.0~the upper limit freq.	0.0	
P7.11	Amplitude accumulation Of Skip freq. 2	0.0~5.00Hz	0.0	
P7.13	Close-loop analog coefficient setting	0.01~10.00	1.00	
P7.14	Rotator speed coefficient setting	0.01~10.00	1.00	
P7.15	Wobble freq. running mode	The first part of LED 0: Function of wobble freq. is invalid.	1000	★

Code	Name	Setting range	Manu- facture	Limit
		1: Function of wobble freq. is valid. 2: Function of wobble freq. is conditional valid. The second part of LED: restart mode 0: Restart according to parameters saved before stop 1: Restart The third part of LED: wobble freq characteristics 0: The wobble freq. is changeable. 1: The wobble freq. is fixed The fourth part of LED: Storage characteristics of wobble freq. 0: It will not save the running state of wobble freq. after power off 1: It will save the running state of wobblereq. after power off		
P7.16	Preset freq. of wobble freq.	0.0~the upper limit freq	10.00	
P7.17	Waiting time of preset freq.	0.0~6000.0Sec	0.0	★
P7.18	Amplitude of wobble freq.	0.0~50.0 (%)	10.0	
P7.19	Jumping freq.	0.0~80.0 (%)	10.0	
P7.20	Triangular rise time	0.1~1000.0Sec	10.0	
P7.21	Triangular fall time	0.1~1000.0Sec	10.0	
P7.22	Preset center freq. of wobble freq.	0.0~the upper limit freq	10.00	
P7. 23	Inverter stop when motor is cut off	0: Off 1: Inverter will run when motor is connected with it.	0	★
P8.00	Inner PID control	The first part of LED Inner PID control 0: Inner PID control is invalid 1: Inner PID control is valid 2: Inner PID control is conditional valid. The second part of LED: PID controller selection 0: proportion 1: Integral 2: Proportion and integral The third part of LED: 0: positive interaction 1: Reactor The fourth part of LED: 0: unidirectional control 1: two directions control	0020	★
P8.01	Inner PID setting and channel selection	The first part of LED 0: Digital setting. It is set by parameter 1: Serials interface setting 2: Panel potentiometer setting, it is on the operation panel. 3: External voltage signal AI1 (0~10V) 4: External voltage signal AI2 (0~10V) 5: External current signal AI1 (0~20MA) The second part of LED: Reserved. The third part of LED: It is used to set PID feedback channel. 0: Digital setting. It is set by parameter	0000	★

Code	Name	Setting range	Manu- facture	Limit
		1: Serials interface setting 2: Panel potentiometer setting, it is on the operation panel. 3: External voltage signal AI1 (0~10V) 4: External voltage signal AI2 (0~10V) 5: External current signal AI1 (0~20MA)		
P8.02	Inner PID close-loop digital setting	0.00~10.00V	0.0	
P8.03	Minimum fixed value	0.0~[P8.04]	0.0	
P8.04	Maximum fixed value	[P8.03]~10.00	10.00	
P8.05	Feedback of minimum fixed value	0.0~10.00	0.0	
P8.06	Feedback of maximum fixed value	0.0~10.00	10.00	
P8.07	Proportion gain	0.0~5.00	1.00	
P8.08	Integral time constant	1.0~500.0 Sec	10.0	
P8.09	Allowable deviation limit	0~20.0 (%)	0.0	
P8.10	Preset freq. for close-loop	0.0~the upper limit freq	0.0	
P8.11	Holding time of preset freq. for close-loop	0.0~6000.0Sec	0.0	★
P8.12	Sleeping threshold	0.0~10.00	10.00	
P8.13	Awakening threshold	0.0~10.00	0.0	
P9.00	Communication setting	The first part of LED: It is used to set baud rate of serials communication. 0: Reserved 1: 1200bps 2: 2400bps 3: 4800bps 4: 9600bps 5: 19200bps The second part of LED: To set data format of serials communication. 0: Close 1: Even 2: Odd	0015	★
P9.01	Local address	0~30	1	
P9.02	Response delay of local	0~1000ms	5ms	
P9.03	Function setting of communication Auxiliary function	The first part of LED 0: The inverter is guest 1: The inverter is host The second part of LED: Act selection after communication is lost 0: Stop 1: Keep	0010	
P9.04	Checkout time of communication overtime	0.0~100.0 Sec	10.0	
P9.05	Linkage setting proportion	0.01~10.00	1.00	
P9.06	Rectify channel of linkage	0: Close	0	

Code	Name	Setting range	Manu- facture	Limit
	setting proportion	1: Panel potentiometer Rectify channel 2: External voltage signal AI1 (0 ~ 10V) Rectify channel 3: External voltage signal AI2 (0 ~ 10V) Rectify channel 4: External current signal AI1 (0 ~ 20mA)		
PA.00	Under voltage protection level	320~480V	390	
PA.01	Over voltage limit level	660~760V	700	
PA.02	Current amplitude limiting level	150~200 (%)	180	
PA.03	Acc torque level	110~200 (%)	150	
PA.04	Braking torque lever	10~150 (%)	80	
PA.05	Motor over-lode protection coefficient	50~110 (%)	110	
PA.06	Over-loading alarm level	50~200 (%)	110	
PA.07	Over-loading alarm delay time	0.0~20.0 Sec	2.0	★
PA.08	Protection function in operation	The first part of LED Under voltage compensation intensity The second part of LED: Over voltage inhibit intensity The third part of LED: Over current inhibit intensity The fourth part of LED: Self-adapting braking torque adjust intensity	3333	
PA.09	Action function selection	the first part of LED Cooling fan control 0: Cooling fan run after inverter run. 1: Cooling fan will automatic run when inverter is power on. The second part of LED: Variable speed control of cooling fan 0: Invalid 1: Valid Cooling fan always keep the max speed. The third part of LED: Voltage over modulation 0: Invalid 1: Valid The fourth part of LED: Reserved.	0100	
PA.10	Reserved	-----	-----	
PA.11	Reserved	-----	-----	
PA.12	Rotate speed coefficient	0.10~5.00	1.00	
PA.13	Gain of closed loop of rotate speed	0.50~1.20	1.00	
PA.14	Integral time constants of closed loop of rotate speed	0.10~10.00	1.00	
PA.15	Compensation rectify of dead zone	0~25	0	

<b>Code</b>	<b>Name</b>	<b>Setting range</b>	<b>Manu- facture</b>	<b>Limit</b>
PA.16	Fault self-recovery time	0, 1, 2	0	★
PA.17	Interval time of fault self-recovery	0.2~20 Sec	2.0	★
PA.18	Program version	2100~2199	▲	

## 6. FAULT ALARM AND COUNTERMEASURES

### 6.1 Protective functions and Countermeasures

Code	Faults	Probably Cause	Solutions
Ec.1	Over-current during Acc	<ol style="list-style-type: none"> <li>1. Acceleration time is too short.</li> <li>2. V/F curve is not suitable.</li> <li>3. User start rotating motor, but doesn't set function of detect speed and restart.</li> <li>4. Value of torque boost set too high.</li> <li>5. Mains voltage is too low</li> </ol>	<ol style="list-style-type: none"> <li>1. Prolong the acceleration time</li> <li>2. Descend the torque boost or adjust the V/F curve</li> <li>3. To set function of detect speed and restart</li> <li>4. To decrease voltage of torque boost</li> <li>5. Check mains voltage</li> </ol>
Ec.2	Over-current during Dec	Deceleration time is too short.	Prolong the deceleration time
Ec.3	Over-current during running or stopping	<ol style="list-style-type: none"> <li>1. Load occurs mutation</li> <li>2. Mains voltage is too low</li> </ol>	Decrease load fluctuation
Ec.4	Over-voltage during Acc	<ol style="list-style-type: none"> <li>1. Input voltage is too high</li> <li>2. Power supply is switched on or off frequently.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check power supply</li> <li>2. Control the on-off of inverter by the control terminal</li> </ol>
Ec.5	Over-voltage during Dec	<ol style="list-style-type: none"> <li>1. Deceleration time is too short.</li> <li>2. Input-voltage is abnormal</li> </ol>	<ol style="list-style-type: none"> <li>1. Extend the deceleration time</li> <li>2. Check power supply voltage</li> <li>3. Install or select the brake resistance</li> </ol>
Ec.6	Over-voltage during running	<ol style="list-style-type: none"> <li>1. Power supply is abnormal</li> <li>2. There are energy feedback load</li> </ol>	<ol style="list-style-type: none"> <li>1. Check power supply</li> <li>2. Install or select brake resistor</li> </ol>
Ec.7	Over voltage at stop	Power supply is abnormal	Check power supply voltage
Ec.8	Under-voltage during running	<ol style="list-style-type: none"> <li>1. Power supply is abnormal</li> <li>2. There is great fluctuation of load in electric network.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check power supply voltage</li> <li>2. Provide the power supply separately</li> </ol>
Ec.9	Inverter protective action	<ol style="list-style-type: none"> <li>1. Output is short-circuit or ground</li> <li>2. Load is too heavy</li> </ol>	<ol style="list-style-type: none"> <li>1. Check wiring</li> <li>2. Reduce the load</li> <li>3. Check whether brake resistor is short-circuit</li> </ol>
Ec.10	Output ground	<ol style="list-style-type: none"> <li>1. The output terminal of inverter grounds</li> <li>2. The wire is too long between inverter and motor and the carrier frequency is too high.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the connecting wire</li> <li>2. Shorten the connection wire or reduce the carrier frequency.</li> </ol>
Ec.11	Interfere	Faultaction causing by electromagnetism	Add absorb circuit

		interfere	
Ec.12	Inverter over-loading	<ol style="list-style-type: none"> <li>1. Load is too heavy.</li> <li>2. Acceleration time is too short.</li> <li>3. Torque boost is too high or V/F curve is not suitable.</li> <li>4. Voltage of Power supply is too low</li> <li>5. User starts rotating motor, but doesn't set function of detect speed and restart.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce the load or replace with higher capacity inverter.</li> <li>2. Prolong Acc time.</li> <li>3. Decrease the torque boost or adjusting V/F curve.</li> <li>4. Check Voltage of Power supply</li> <li>5. To set function of detect speed and restart</li> </ol>
Ec.13	Motor over-loading	<ol style="list-style-type: none"> <li>1. Load is too heavy.</li> <li>2. Acceleration time is too short.</li> <li>3. The setting of protection factor is too small</li> <li>4. Torque boost is too high or V/F curve is not suitable.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce the load</li> <li>2. Prolong Acc time</li> <li>3. Increase the over-loading protection factor of motor</li> <li>4. Decrease torque boost voltage and adjust V/F curve.</li> </ol>
Ec.14	Inverter overheat	<ol style="list-style-type: none"> <li>1. Wind hole is blocked</li> <li>2. Environmental temperature is too high</li> <li>3. Fan is damaged</li> </ol>	<ol style="list-style-type: none"> <li>1. Clear air duct or improve the air condition.</li> </ol>
Ec.16	Peripheral equipment occur error	There is signal input on the peripheral. Equipment fault input terminal of Inverter	Check the signal source and the pertinent equipments
Ec.17	Inverter output lack	Inverter output lack phase	Check the wire of applied motor.
Ec.19	Main contactor of inverter is poor contact	<ol style="list-style-type: none"> <li>1. Power supply is too low</li> <li>2. Contactor is damaged.</li> <li>3. Starting resistance is damaged.</li> <li>4. Control circuit is damaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check power supply</li> <li>2. Replace contactor</li> <li>3. Replace starting resistance.</li> <li>4. Contact Us</li> </ol>
Ec.20	Current detecting error	<ol style="list-style-type: none"> <li>1. The current detecting equipment or circuit is damaged</li> <li>2. Auxiliary power supply has problem</li> </ol>	Contact Us
Ec.21	Temperature sensor occur faults	<ol style="list-style-type: none"> <li>1. Signal line of temperature is poor contact</li> <li>2. Temperature sensor is damage.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check jack</li> <li>2. Contact Us</li> </ol>

## 6.2 Fault record inquiry

EM7 series inverter records the last six fault codes and the output parameters of last fault. This information is aid in looking up the fault causes. Fault information and state monitor parameters are stored uniformly, so please refer to the operation way to look up the information.

Item	Contents	Item	Contents	Item	Contents
d-26	First fault record	d-30	Fifth fault record	d-34	Output current of last fault
d-27	Second fault record	d-31	Sixth fault record	d-35	Output voltage of last fault
d-28	Third fault record	d-32	Output frequency of last fault	d-36	DC voltage of last fault

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d-29	Fourth fault record	d-33	Setting frequency of last fault	d-37	Module temperature of last fault
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### 6.3 Reset

- 1) Be sure to check the fault cause and exclude it before reset, otherwise, which may lead to the inverter, the permanent damaged.
- 2) If the inverter can not be reset or occur the fault again after reset, please find out the reason. Continuous reset will damage the inverter
- 3) Over-load or over-heat protective action should delay 5 minutes to reset.

When the inverter happens to the fault, you can reset the inverter to resume the normal running by any way as follows:

- External reset input-terminal RST and CM terminal are closed, then off.
- While the fault code is displayed, press  key.
- Turn the power source off.
- It will send fault reset instrument by RS485 interface.