Preface

Thank you for purchasing the KOC680 series frequency inverter developed by KCLY.

The high-performance KOC680 series vector control frequency inverter has the following features:

1) Multiple voltage classes

It provides coverage of single-phase 220V, three-phase 220 V, three-phase 380 V, three-phase 480 V, three-phase 690 V、three-phase 560 V and three-phase 1140 V.

2) Support multiple motor types

It supports vector control of three-phase AC asynchronous motor and three-phase AC permanent magnet synchronous motor (PMSM).

3) Diversified control modes

It supports four control modes: sensor-less flux vector control (SFVC), closed- loop vector control (CLVC) and V/F control and V/F separately control.

4) Multiple communication protocols

It supports communication via Modbus-RTU, Profibus-DP and CANopen bus.

5) Multiple encoder types

It supports various encoders such as differential encoder, open-collector encoder, resolver and UVW encoders.

6) Super SFVC algorithm

It adopts high-speed response, enhanced low-frequency loading capacity and supports torque control of SFVC, which will bring you a new using experience.

KOC600 series frequency inverter is a continuable and vigorous product, and customized service is available!

Before unpacking, please check carefully:

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

First-time Use

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

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

CE

KOC600 series frequency inverter complies with the following international standards. All products have passed the CE certification.

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

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

Quick commissioning of constant pressure water supply

1 Water supply signal setting

Parameter setting b00.06=7 （PID control）

2 Startup method

2.1 Keypad startup method，RUN

2.2 External button startup method，parameter b00.01=1（Terminal control，connect wire to COM+DI1）

3 Set pressure signal

Set parameter of setting source b09.00=0 （Set pressure directly in b09.01）

b09.00=1 （Set pressure by keypad potentiometer）

b09.00=2 （Analog AI1 given，connect wire to AI1+10V+GND）

b09.00=3 （Analog AI2 given，connect wire to AI2+10V+GND）

4 Calculation method of pressure range

Set according to the range of pressure gauge，for example, the range of pressure gauge is 0~1MP.Calculate1MP=10Kg, if we want to keep pressure in 5Kg(0.5MP), set pressure b09.01=0.5*100=50.

5 Feedback pressure signal

Set parameter of feedback source b09.02=1（Analog AI1 feedback，connect wire to AI1+10V+GND）

b09.02=2（Analog AI2 feedback，connect wire to AI1+10V+GND）

Cautions：The feedback pressure signal cannot be connected to the same terminal as the set pressure signal, otherwise the PID is invalid。

6 Choose of analog AI1、analog AI2 signal

1 Voltage signal 0~10V (Default)

2 Current signal 0~20mA(Jumper J5 -AI2 and J12 -AI1)

7 Pressure monitor

At keypad display of 50.00 下，press ▷▷ 4 times（Set pressure）、 press ▷▷ 5 times（Feedback pressure）

Or enter Parameter monitor group b17.23（Set pressure）、b17.24（Feedback pressure）

Please refer to b24 parameter group for startup of water supply sleep or multi group motors

Please refer to user manual for more detailed parameters

Quick commissioning function parameters

Function Code	Parameter Name	Function description	Default	Property
Group b00 Basic Function Parameters				
b00.00	Speed control mode	1：Open-loop vector control mode（Suit for asynchronous motor） 2：V/F control mode（Suit for asynchronous motor） 3：Open-loop vector control mode（Suit for synchronous motor）	2	★
b00.01	Run command channel	0：Keypad running command channel（LED light off LOCAL） 1：Terminal running command channel（LED light on LOCAL） 2：Communication running command channel（LED flickering LOCAL）	0	☆
b00.03	Max. output frequency	b00.04~400.00Hz	50.00Hz	★
b00.04	Upper limit of the running frequency	b00.05~b00.03（Max. output frequency ）	50.00Hz	★
b00.05	Lower limit of the running frequency	0.00Hz~b00.04（Upper limit of the running frequency）	0.00Hz	★
b00.06	Main frequency source X selection	0：Keypad ▲ ▼ setting 1：Potentiometer of keypad 2：AI1 3：AI2 4：High pulse HDI 5：Simple PLC programme 6：Multi-function 7：PID 8：MODBUS communication protocol	0	☆
b00.11	Acceleration time 1	0.0~3600.0s	Model dependent	☆
b00.12	Deceleration time1	0.0~3600.0s	Model dependent	☆
b00.13	Running direction	0：Runs at default direction 1：Runs at the opposite direction 2：Forbid to run in reverse direction	0	☆
b00.15	Motor parameter autotuning	0：No operation 1：Rotation autotuning 2：Static autotuning 1 3：Static autotuning 2	0	★
b00.18	Function restore parameter	0：No operation 1：Restore the default value(Not include motor parameter） 2：Clear fault records	0	★

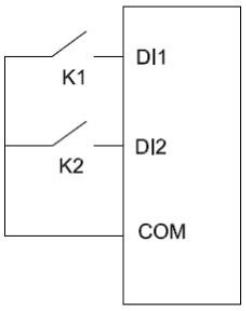
Function Code	Parameter Name	Function description	Default	Property
		3：Lock keypad		
Group b02 Motor 1 parameter				
b02.01	Motor rated power	0.1~3000.0kW	Model dependent	★
b02.02	Motor rated frequency	0.01Hz~b00.03（Max. output frequency）	50.00Hz	★
b02.03	Motor rated rotating speed	1rbm～65535rbm	Model dependent	★
b02.04	Motor rated voltage	1V～2000V	Model dependent	★
b02.05	Motor rated current	0.8A～6000.0A	Model dependent	★
B02.06	Stator resistance of asynchronous motor	0.001Ω～65.535Ω	Model dependent	☆
b02.07	Rotor resistance of asynchronous motor	0.001Ω～65.535Ω	Model dependent	☆
B02.15	Rated power of synchronous motor 1	0.1~3000.0kW	Model dependent	★
B02.16	Rated frequency of synchronous motor 1	0.01Hz~b00.03 (Maximum frequency)	Model dependent	☆
B02.17	Number of poles of synchronous motor	1~50	Model dependent	☆
B02.18	Rated voltage of synchronous motor 1	0~1200V	Model dependent	☆
B02.19	Rated current of synchronous motor 1	0.8~6000.0A	Model dependent	☆
B02.20	Stator resistance of synchronous motor 1	0.001~65.535Ω	Model dependent	☆
B02.21	Direct axis inductance of synchronous motor 1	0.01~655.35mH	Model dependent	★
Group b05 Input terminals				
b03.00	HDI Input	0：HDI is high pulse input；see b05.49~b05.54. 1：HDI is switch input	0	★
b03.01	DI1 terminal function selection	0： No function 1： Forward rotation（FWD） 2： Reverse rotation（REV） 3： 3-wire control 7： Fault reset 9： External fault input 10：Increasing frequency setting（UP） 11：Decreasing frequency setting（DOWN） 16：Multi-step speed terminal 1 17：Multi-step speed terminal 2 18：Multi-step speed terminal 3	1	★
b03.02	DI2 terminal function selection		4	★
b03.03	DI3 terminal function selection		7	★
b03.04	DI4 terminal function selection		0	★
b03.05	DI5 terminal function selection		0	★
b03.09	HDI terminal function		0	★

Function Code	Parameter Name	Function description	Default	Property
	selection	19：Multi-step speed terminal 4 **Remark： Please refer to detailed description for more functions**	0 0 0	★ ★ ★
b03.13	Terminals control running mode	0：2-wire control 1：2-wire control 2：3-wire control 3：3-wire control	0	★
Group b06 Output terminals				
b04.00	FM output	0：Open collector pole high speed pulse output 1：Open collector pole output	0	★
b04.01	DO1 output	0：Invalid 1：In operation 2：Forward rotation 3：Reverse rotation 4：Jogging 5：The inverter fault 12：Ready for operation 27：Auxiliary motor 1 starts 28：Auxiliary motor 2 starts **Remark： Please refer to detailed description for more functions**	0	☆
b04.02	FM output		0	☆
b04.03	Relay RY1 output		1	☆
			5	☆
b04.14	AO1 output	0：Running frequency 1：Setting frequency 4：Output current（relative to twice the inverter rated current） **Remark： Please refer to detailed description for more functions**	0	☆
b04.15	AO2 output		0	☆
b04.16	FM high-speed pulse output selection		0	☆

0：2-wire mode 1

This is 2- wire mode.Terminals DI1、DI2 control motor's FWD、REV.

Code	Name	Setting	Function description
b00.01	Run command channel	1	Terminal running
b03.13	Terminals control running mode	0	2-wire 1
b03.01	DI1 terminal function selection	1	Forward rotation（FWD）
b03.02	DI2 terminal function selection	2	Reverse rotation（REV）



K1	K2	Running direction
ON	OFF	FWD
OFF	ON	REV
OFF	OFF	Stop
ON	ON	Keep

0：2-wire mode 1

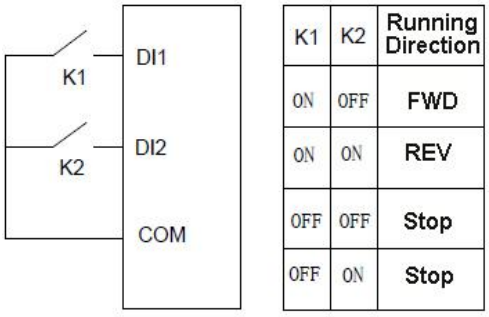
Refer to right figure，under this mode，K1 is closed，inverter is in forward rotation.

K2 is closed, inverter is in reverse rotation，K1、K2 are open at the same time，the inverter stops operation.

1：2-wire mode 2

This is 2- wire mode.Terminals DI1、DI2 control motor's FWD、REV.

Code	Name	Setting	Function description
b00.01	Run command channel	1	Terminal running
b03.13	Terminals control running mode	1	2-wire 2
b03.01	DI1 terminal function selection	1	Forward rotation（FWD）
b03.02	DI2 terminal function selection	2	Reverse rotation（REV）



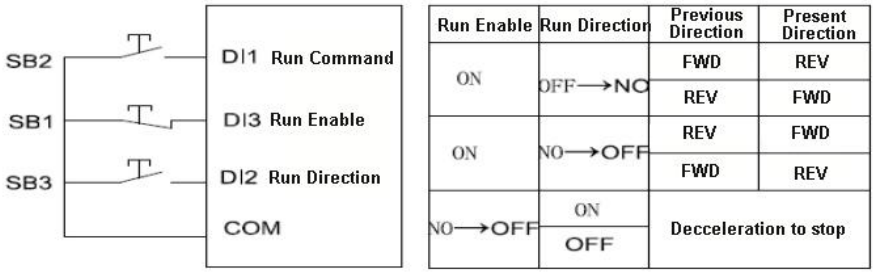
1：2-wire mode 2

Refer to right figure，under this mode，when K1 is closed，K2 is open, inverter is in FWD，K2 is closed, inverter is in REV；K1 is open，inverter stops operation.

2：3-wire mode 1

Under this mode, DI3 is enable terminal， operation command is connected to DI1, direction is controlled by DI2. Function code settings as below：

Code	Name	Setting	Function description
b00.01	Run command channel	1	Terminal running
b03.13	Terminals control running mode	2	3-wire 1
b03.01	DI1 terminal function selection	1	Enable operation
b03.02	DI2 terminal function selection	2	FWD or REV
b03.03	DI3 terminal function selection	3	3-wire operation control



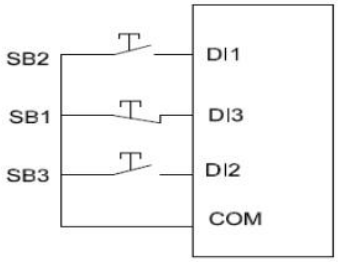
2：3-wire mode 1

As shown in the figure above, when the SB1 button is closed, the SB2 button is pressed to run the inverter in this control mode. SB3 disconnects the inverter to run forward and SB3 closes the inverter to run in reverse. When the SB1 button is disconnected, the inverter stops. During normal startup and operation, the SB1 button must be kept closed, and the command of the SB2 button will take effect at the edge of the closing action.

3：3-wire mode 2

Under this mode, DI3 is enable terminal， operation command is connected to DI1, direction is controlled by DI2. Function code settings as below：

Code	Name	Setting	Function description
b00.02	Run command channel	1	Terminal running
b03.13	Terminals control running mode	3	3-wire 2
b03.01	DI1 terminal function selection	1	Enable operation
b03.02	DI2 terminal function selection	2	FWD or REV
b03.03	DI3 terminal function selection	3	3-wire operation control



Run Enable	FWD Command	REV Command	Run Direction
ON	OFF→NO	ON	FWD
		OFF	FWD
ON	ON	OFF→NO	REV
	OFF		REV
NO→OFF	OFF	Decceleration to stop	

3：3-wire mode 2

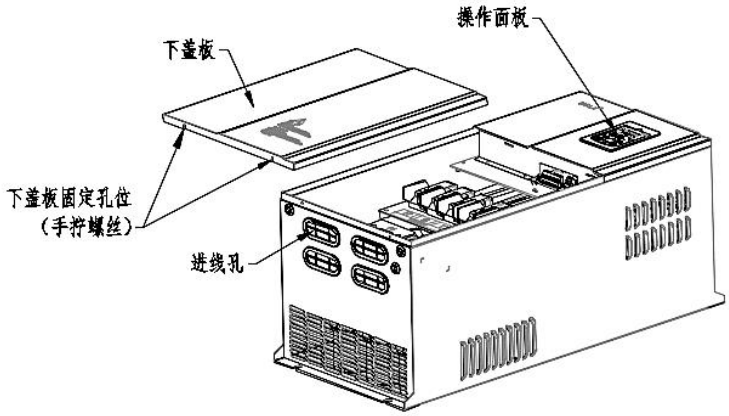
As shown in the figure above, when the SB1 button is closed, the inverter will run forward when the SB2 button is pressed, and the inverter will run in reverse when the SB3 button is pressed. The inverter will stop when the SB1 button is turned off. During normal startup and operation, the SB1 button must be kept closed, and the commands of the SB2 and SB3 buttons will take effect at the closing action edge. The running state of the inverter is subject to the last key action of the three buttons.

16-step number combination chart

Code	Name	Setting	Function description
b03.01	DI1	16	Multi-step speed terminal 1
b03.02	DI2	17	Multi-step speed terminal 2
b03.03	DI3	18	Multi-step speed terminal 3
b03.04	DI4	19	Multi-step speed terminal 4

DI4	DI3	DI2	DI1	Command setting	Code	Setting range
OFF	OFF	OFF	OFF	Multi-function 0	b10.02	-100.0~100.0%
OFF	OFF	OFF	ON	Multi-function 1	b10.04	-100.0~100.0%
OFF	OFF	ON	OFF	Multi-function 2	b10.06	-100.0~100.0%
OFF	OFF	ON	ON	Multi-function 3	b10.08	-100.0~100.0%
OFF	ON	OFF	OFF	Multi-function 4	b10.10	-100.0~100.0%
OFF	ON	OFF	ON	Multi-function 5	b10.12	-100.0~100.0%
OFF	ON	ON	OFF	Multi-function 6	b10.14	-100.0~100.0%
OFF	ON	ON	ON	Multi-function 7	b10.16	-100.0~100.0%
ON	OFF	OFF	OFF	Multi-function 8	b10.18	-100.0~100.0%
ON	OFF	OFF	ON	Multi-function 9	b10.20	-100.0~100.0%
ON	OFF	ON	OFF	Multi-function 10	b10.22	-100.0~100.0%
ON	OFF	ON	ON	Multi-function 11	b10.24	-100.0~100.0%
ON	ON	OFF	OFF	Multi-function 12	b10.26	-100.0~100.0%
ON	ON	OFF	ON	Multi-function 13	b10.28	-100.0~100.0%
ON	ON	ON	OFF	Multi-function 14	b10.30	-100.0~100.0%
ON	ON	ON	ON	Multi-function 15	b10.32	-100.0~100.0%

catalogue



Chapter 1 Safety Information and Precautions

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

- DANGER indicates that failure to comply with the notice will result in severe personal injury or even death.
- WARNING indicates that failure to comply with the notice will result in personal injury or property damage.

1.1 Safety Information

1.1.1 Before installation

DANGER

1. Do not use damaged or missing components frequency inverter. Failure to comply will result in personal injury.
2. Please use the electric motor with upper B insulation class. Failure to comply will result in personal injury.

1.1.2 During installation

DANGER

1. Install the frequency inverter on incombustible objects such as metal, and keep it away from combustible materials. Failure to comply may result in a fire.

WARNING

2. When two frequency inverters are laid in the same cabinet, arrange the installation positions properly to ensure the enough cooling effect.
3. Do not drop wire residue or screw into the frequency inverter. Failure to comply will result in damage to the frequency inverter.

1.1.3 Wiring

DANGER

1. Wiring must be performed only by qualified personnel under instructions described in this manual. Failure to comply may result in unexpected accidents.
2. A circuit breaker must be used to isolate the power supply and the frequency inverter. Failure to comply may result in a fire.
3. Ensure that the power supply is cut off before wiring. Failure to comply may result in electric shock.
4. Connect the frequency inverter to ground properly by standard. Failure to comply may result in electric shock.

WARNING

5. Never connect the power supply cables to the output terminals (U, V, W) of the Frequency inverter. Failure to comply will result in damage to the frequency inverter.
6. Make sure that all the connecting wires comply with the requirement of EMC and the safety standard in the region. Use wire sizes recommended in the manual. Failure to comply may result in accidents.
7. Never connect the braking resistor between the DC bus terminals (P+) and (P-). Failure to comply may result in a fire.

1.1.4 Before power-on

1. Check that the following requirements comply with:
The voltage class of the power supply is consistent with the rated voltage class of the frequency inverter.
The input terminals (R, S, T) and output terminals (U, V, W) are properly connected.
No short-circuit exists in the peripheral circuit.
The wiring is fastened.
Failure to comply will result in damage to frequency inverter.
2. Cover the frequency inverter properly before power-on to prevent electric shock.

3. Do not perform the voltage resistance test on any part of the frequency inverter because such test has been done in the factory. Failure to comply will result in accidents.
4. All peripheral devices must be connected properly under the instructions described in this manual. Failure to comply will result in accidents.

1.1.5 After power-on

1. Do not open the frequency inverter's cover after power-on to prevent from electric shock.
2. Do not touch the frequency inverter and its peripheral circuit to prevent from electric shock.
3. Do not touch the terminals of the frequency inverter (including the control terminals). Failure to comply may result in electric shock.
4. Do not touch the U, V, W terminal or motor connecting terminals when frequency inverter automatically does safety testing for the external high-voltage electrical circuit. Failure to comply may result in electric shock.

5. Note the danger during the rotary running of motor when check the parameters. Failure to comply will result in accidents.
6. Do not change the factory default settings of the frequency inverter. Failure to comply will result in damage to the frequency inverter.

1.1.6 During operation

DANGER

1. Do not go close to the equipment when selected the restart function. Failure to comply may result in personal injury.
2. Do not touch the fan or the discharging resistor to check the temperature. Failure to comply will result in personal injury.
3. Signal detection must be performed only by qualified personal during operation

WARNING

4. Avoid objects falling into the frequency inverter when it is running. Failure to comply will result in damage to frequency inverter.
5. Do not start/stop the frequency inverter by turning the contactor ON/OFF. Failure to comply will result in damage to the frequency inverter.

1.1.7 Maintenance

DANGER

1. Do not repair or maintain the frequency inverter at power-on. Failure to comply will result in electric shock.
2. Repair or maintain the frequency inverter only after the charge light on frequency inverter is powered off. This allows for the residual voltage in the capacitor to discharge to a safe value. Failure to comply will result in personal injury.
3. Repair or maintenance of the frequency inverter may be performed only by qualified personnel. Failure to comply will result in personal injury or damage to the frequency inverter.

1.2 General Precautions

1.2.1 Motor insulation test

Perform the insulation test when the motor is used for the first time, or when it is reused after being stored for a long time, or in a regular check-up, in order to prevent the poor insulation of motor windings from damaging the frequency inverter. The motor must be disconnected from the frequency inverter during the insulation test. A 500-V mega-Ohm meter is recommended for the test. The insulation resistance must not be less than 5 MΩ.

1.2.2 Thermal protection of motor

If the rated capacity of the motor selected does not match that of the frequency inverter, especially when the frequency inverter's rated power is greater than the motor's, adjust the motor protection parameters on the operation panel of the frequency inverter or install a thermal relay in the motor circuit for protection.

1.2.3 Running at over 50 Hz

The frequency inverter provides frequency output of 0 to 3000 Hz. If the frequency inverter is required to run at over 50 Hz, consider the bearable capacity of the machine.

1.2.4 Vibration of mechanical device

The frequency inverter may encounter the mechanical resonance point at some output frequencies, which can be avoided by setting the skip frequency.

1.2.5 Motor heat and noise

The output of the frequency inverter is pulse width modulation (PWM) wave with certain harmonic frequencies, and therefore, the motor temperature, noise, and vibration are slightly greater than those motor runs at grid power frequency (50 Hz).

1.2.6 Voltage-sensitive device or capacitor at output side of the Frequency inverter

Do not install the capacitor for improving power factor or lightning protection voltage-sensitive resistor at the output side of the frequency inverter because the output of the frequency inverter is PWM wave. Otherwise, the frequency inverter may suffer transient over current and even to be damaged.

1.2.7 Contactor at the Input/Output side of the frequency inverter

When a contactor is installed between the input side of the frequency inverter and the power supply, the frequency inverter must not be started or stopped by switching the contactor on or off. If the frequency inverter has to be operated by the contactor, ensure that the time interval between switching is at least one hour. Since frequently charge and discharge will shorten the service life of the capacitor inside of frequency inverter.

When a contactor is installed between the output side of the frequency inverter and the motor, do not turn off the contactor when the frequency inverter is active. Otherwise, IGBT modules inside of frequency inverter may be damaged.

1.2.8 When input voltage is over rated voltage range

The frequency inverter must not be used over the allowable voltage range specified in this manual. Otherwise, the frequency inverter's components may be damaged. If required, use a corresponding voltage transformer device.

1.2.9 Prohibition of three-phase input changed into two-phase input

Do not change the three-phase input of the frequency inverter to two-phase input. Otherwise, a fault will be result or the frequency inverter will be damaged.

1.2.10 Surge suppressor

The frequency inverter has a built-in voltage dependent resistor (VDR) for suppressing the surge voltage. For frequently surge place, please add extra surge voltage protection device at input side of frequency inverter.

1.2.11 Altitude and de-rating

In places where the altitude is above 1000 m and the cooling effect reduces due to thin air, it is necessary to de-rate the frequency inverter. Please contact our company for technical support.

1.2.12 Some special usages

If wiring that is not described in this manual such as common DC bus is applied, please contact the agent or our company for technical support.

1.2.13 Disposal

The electrolytic capacitors on the main circuits and PCB may explode when they are burnt. Poisonous gas is generated when the plastic parts are burnt. Please treat them as industrial waste.

1.2.14 Adaptable Motor

1) The standard adaptable motor is adaptable four-pole squirrel-cage asynchronous induction motor. For other types of motor, select a proper frequency inverter according to the rated motor current. If user uses inverter for permanent magnet synchronous motor, please contact my company for technical support.

2) The cooling fan and rotor shaft of non-variable-frequency motor are coaxial, which results in reduced cooling effect when the rotational speed decreasing. If variable speed is required, add a more powerful fan or replace it with variable-frequency motor in applications where the motor overheats easily.

3) The standard parameters of the adaptable motor have been configured inside the frequency inverter. It is still necessary to perform motor auto-tuning or modify the default values based on actual conditions. Otherwise, the running result and protection performance will be affected.

4) The frequency inverter may alarm or even be damaged when short-circuit exists on cables or inside the motor. Therefore, perform insulation short-circuit test when the motor and cables are newly installed or during routine maintenance. During the test, make sure that the frequency inverter is disconnected from the tested parts

Chapter 2 Product Information

2.1 Designation Rules

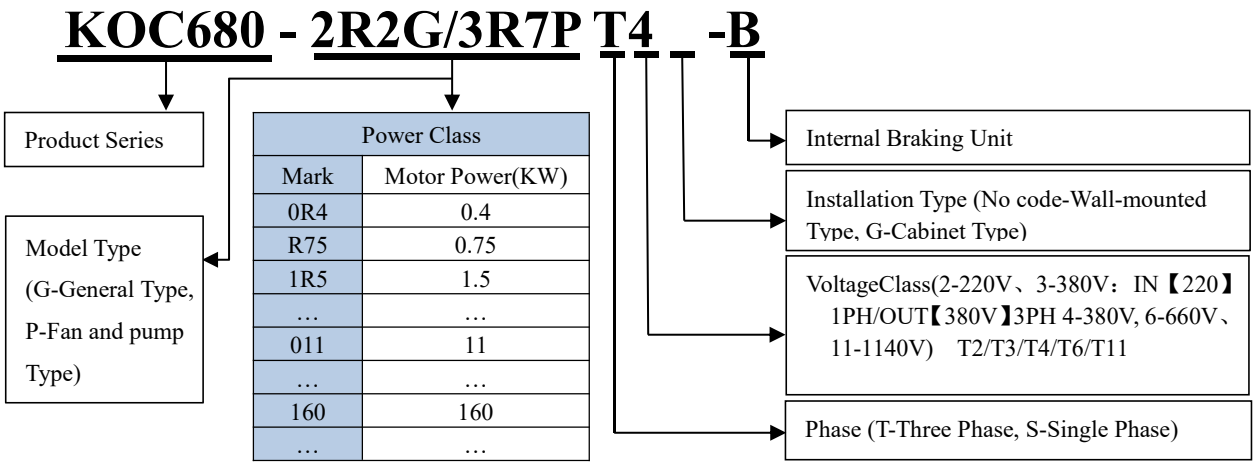


Figure 2-1 Designation Rules

2.2 Nameplate

MODEL: KOC680-2R2G/3R7PT4
POWER: 2.2KW/3.7KW
INPUT: 3PH AC 380V 50/60Hz 5.8/10.5A
OUTPUT: 3PH AC 0~380V 0~300Hz 5.1/9A
VERSION:
S/N: Barcode
Shenzhen KCLY Electric Co., Ltd.

MODEL: KOC680-2R2G/3R7PT4
POWER: 2.2KW/3.7KW
INPUT: 3PH AC 380V 50/60Hz 5.8/10.5A
OUTPUT: 3PH AC 0~380V 0~300Hz 5.1/9A
VERSION:
S/N: Barcode
BALDOR Technolgy(Dongguan)CO.,LTD

Figure 2-2 Nameplate

2.3 KOC680 Series Frequency Inverter

Table 2-1 Models and technical data of KOC680

Model	Power Capacity KVA	Input Current A	Output Current A	Adaptable Motor		Thermal Power Consumption KW
				KW	HP	
Three-phase：220V，50/60Hz						
KOC680-0R4GT2	1.5	3.4	2.1	0.4	0.5	0.016
KOC680-R75GT2	3	5	3.8	0.75	1	0.030
KOC680-1R5GT2	4	5.8	5.1	1.5	2	0.055
KOC680-2R2GT2	5.9	10.5	9	2.2	3	0.072
KOC680-3R7GT2	8.9	14.6	13	3.7	5	0.132
KOC680-5R5GT2	17	26	25	5.5	7.5	0.214
KOC680-7R5GT2	21	35	32	7.5	10	0.288
KOC680-011GT2	30	46.5	45	11	15	0.489
KOC680-015GT2	40	62	60	15	20	0.608

Model		Power Capacity KVA	Input Current A	Output Current A	Adaptable Motor		Thermal Power Consumption KW
					KW	HP	
KOC680-018GT2		57	76	75	18.5	25	0.716
KOC680-022GT2		69	92	91	22	30	0.887
KOC680-030GT2		85	113	112	30	40	1.11
KOC680-037GT2		114	157	150	37	50	1.32
KOC680-045GT2		134	180	176	45	60	1.66
KOC680-055GT2		160	214	210	55	75	1.98
KOC680-075GT2		231	307	304	75	100	2.02
Three-phase：380V，50/60Hz							
KOC680-R75GT4		1.5	3.4	2.1	0.75	1	0.027
KOC680-1R5GT4	KOC680-1R5PT4	3	5	3.8	1.5	2	0.050
KOC680-2R2GT4	KOC680-2R2PT4	4	5.8	5.1	2.2	3	0.066
KOC680-3R7GT4	KOC680-3R7PT4	5.9	10.5	9	3.7	5	0.120
KOC680-5R5GT4	KOC680-5R5PT4	8.9	14.6	13	5.5	7.5	0.195
KOC680-7R5GT4	KOC680-7R5PT4	11	20.5	17	7.5	10	0.262
KOC680-011GT4	KOC680-011PT4	17	26	25	11	15	0.445
KOC680-015GT4	KOC680-015PT4	21	35	32	15	20	0.553
KOC680-018GT4	KOC680-018PT4	24	38.5	37	18.5	25	0.651
KOC680-022GT4	KOC680-022PT4	30	46.5	45	22	30	0.807
KOC680-030GT4	KOC680-030PT4	40	62	60	30	40	1.01
KOC680-037GT4	KOC680-037PT4	57	76	75	37	50	1.20
KOC680-045GT4	KOC680-045PT4	69	92	91	45	60	1.51
KOC680-055GT4	KOC680-055PT4	85	113	112	55	75	1.80
KOC680-075GT4	KOC680-075PT4	114	157	150	75	100	1.84
KOC680-090GT4	KOC680-090PT4	134	180	176	90	125	2.08
KOC680-110GT4	KOC680-110PT4	160	214	210	110	150	2.55
KOC680-132GT4	KOC680-132PT4	192	256	253	132	200	3.06
KOC680-160GT4	KOC680-160PT4	231	307	304	160	250	3.61
KOC680-185GT4	KOC680-185PT4	241	350	340	185	280	4.01
KOC680-200GT4	KOC680-200PT4	250	385	377	200	300	4.42
KOC680-220GT4	KOC680-220PT4	280	430	426	220	300	4.87
KOC680-250GT4	KOC680-250PT4	355	468	465	250	400	5.51
KOC680-280GT4	KOC680-280PT4	396	525	520	280	370	6.21
KOC680-315GT4	KOC680-315PT4	445	590	585	315	500	7.03
KOC680-355GT4	KOC680-355PT4	500	665	650	355	420	7.81
KOC680-400GT4	KOC680-400PT4	565	785	725	400	530	8.51
KOC680-450GT4	KOC680-450PT4	630	883	820	450	600	9.23
	KOC680-500PT4	700	940	890	500	650	10.45

2.4 Technical Specifications

Function	Specification

Input	Input voltage (V)	AC 3PH 220V(-15%)~240V(+10%) Default 220V AC 3PH 380V(-15%)~440V(+10%) Default 380V AC 3PH 520V(-15%)~690V(+10%) Default 600V
	Input current (A)	Refer to the rated value
	Input frequency (Hz)	50Hz or 60Hz，allowed range 47~63Hz
Output	Output voltage (V)	0~Input voltage
	Output current (A)	Refer to the *rated value*
	Output power (kW)	Refer to the *rated value*
	Output frequency (Hz)	0~600Hz
Technical control feature	Control mode	V/F control mode，no PG vector control mode
	Motor type	Asynchronous motor
	Speed ratio	Asynchronous motor 1：100（SVC）
	Speed control accuracy	±0.2%（No PG vector control）
	Speed fluctuation	± 0.3%（No PG vector control）
	Torque response	<20ms（No PG vector control）
	Torque control accuracy	10%（No PG vector control）
	Starting torque	Asynchronous motor：0.5Hz/150%（No PG vector control）
	Overload capability	150% of rated current 1 minute，180% of rated current 10 seconds，200% of rated current 1 second（G type）； 120% of rated current 1 minute，150% of rated current 10 seconds，180% of rated current 1 second（P type）
Running control feature	Frequency setting	Digital setting, analog setting, pulse frequency setting, multi-step speed running setting, simple PLC setting, PID setting, MODBUS communication setting. Shift between the set combination and set channel.
	Auto voltage adjustment	Keep a stable voltage automatically when the grid voltage transients
	Fault protection	Provide over 30 fault protection functions: overcurrent, overvoltage, undervoltage, overheating, phase loss and overload, etc.
	Speed tracking at restarting	Restart the rotating motor smoothly Note：37kW（Include）and below built-in this function.
Peripheral interface	Terminal analog input resolution	≤ 20mV
	Terminal switch input resolution	≤ 2ms
	Analog input	1 channel（AI1）0~10V/0~20mA， 1 channel（AI2）-10~10V
	Analog output	2 channels（AO1、AO2）0~10V /0~20mA
	Digital input	6 channels common input, max. frequency 1kHz，internal impedance：3.3kΩ; 1 channel high speed input, max. frequency 50kHz
	Digital output	1 channel high speed pulse output, max. frequency 50kHz; 1 channel DO1 terminal open collector pole output

	Relay output	1 channel output RY1 P normally closed， RY1 C normally open，RY1 A common terminal Contactor capability：3A/AC250V，1A/DC30V

2.5 Product appearance and installation dimension【old product】/【New product】

2.5-1【old product】

2.5.1 **Product appearance**

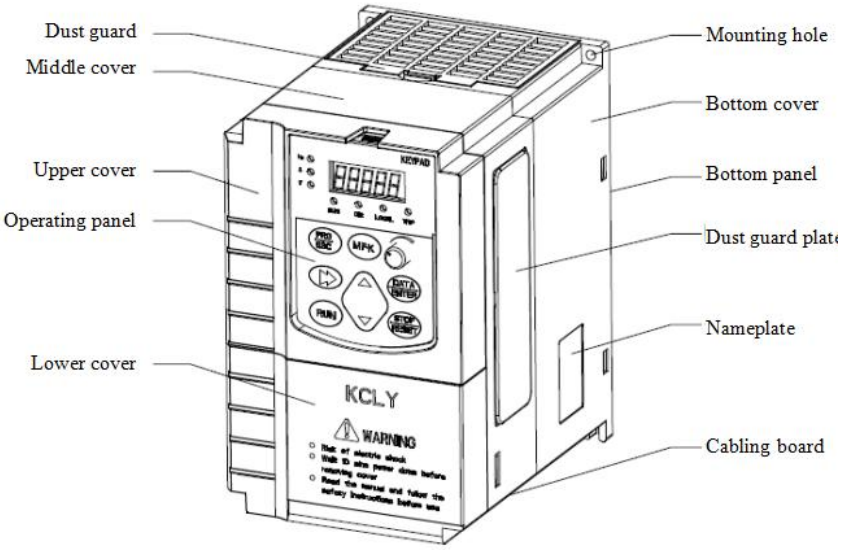


Figure 2-3 Product appearance(With potentiometer)

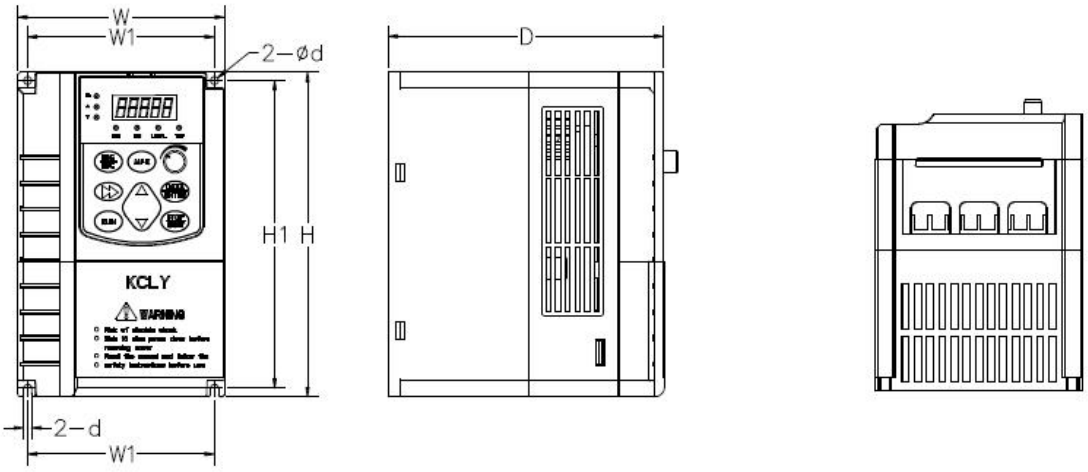


Figure 2-4 Appearance and installation dimension of KOC680 series【old product】 (Plastic housing structure)

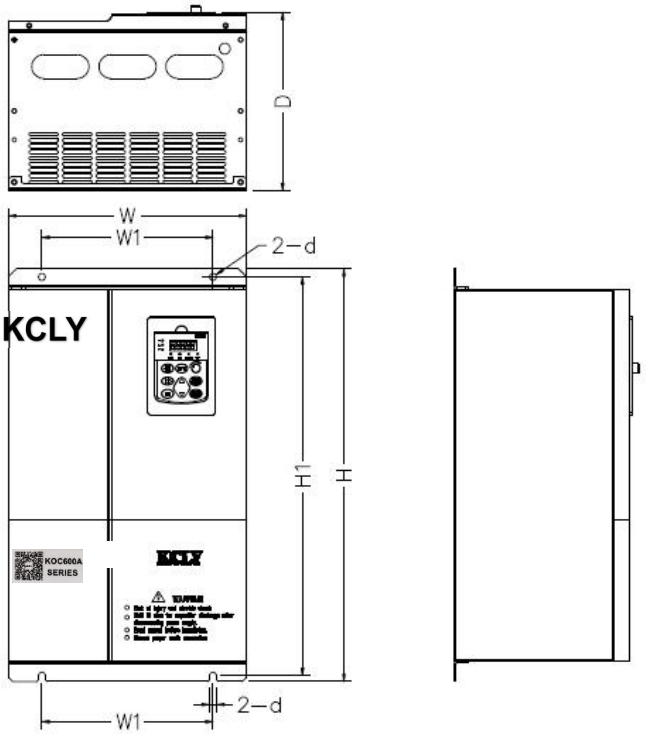


Figure 2-5 Appearance and installation dimension of KOC680 series【old product】 (Metal housing structure)

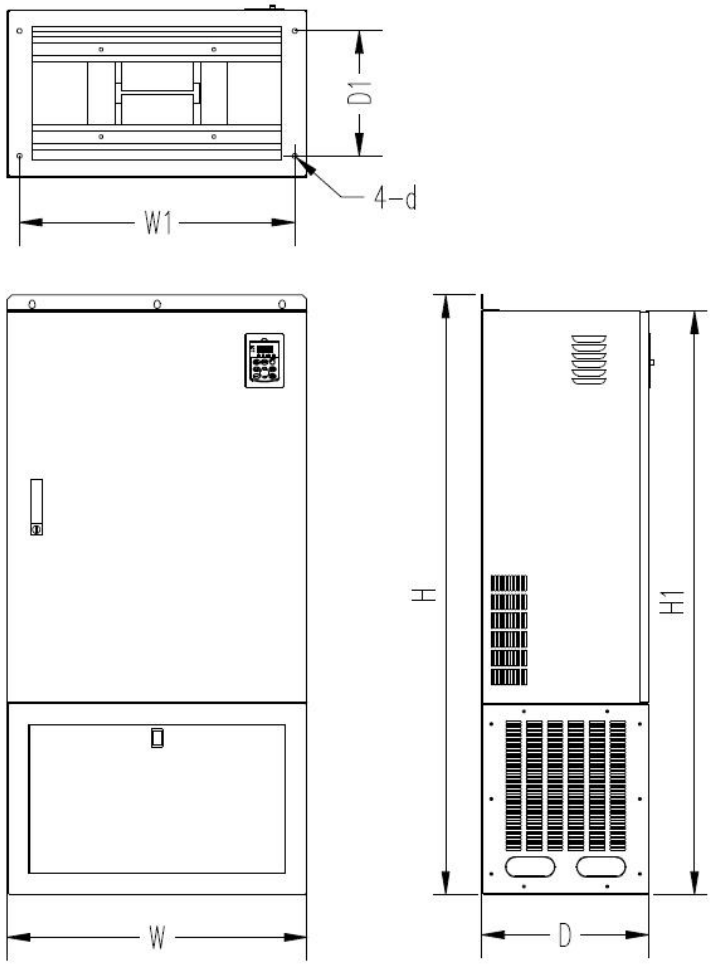


Figure 2-6 Appearance and installation dimension of KOC680 series 【old product】(Cabinet structure)

2.5.3 Appearance and installation dimension of external keypad【old product】 (keypad tray)

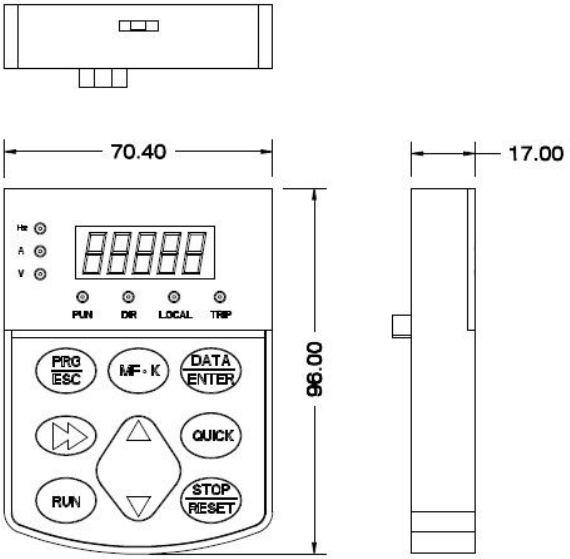


Figure 2-7 Appearance and installation dimension of keypad

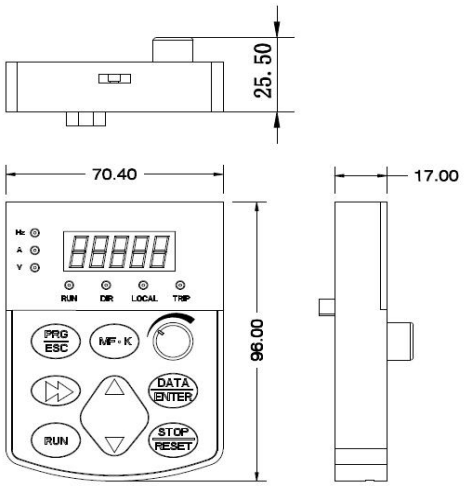


Figure 2-8 Appearance and installation dimension of keypad【old product】 (with potentiometer)

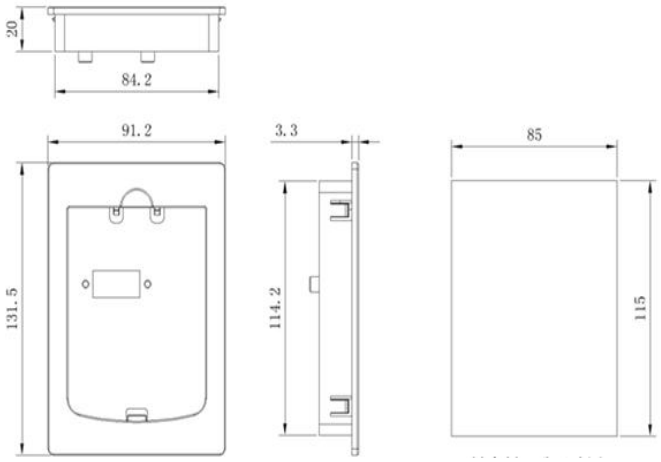


Figure 2-9 Appearance and installation dimension of external keypad【old product】 (keypad tray)

2.5.2 Appearance and Installation Hole Dimension (mm) of KOC680 【old product】Frequency Inverter

The housing types of the KOC680 models are listed in the following table：

Voltage & Power Class	Housing Type
Three-phase 220V	
0.4kW～5.5kW	Plastic housing
7.5kW～75kW	Sheet metal housing
Three-phase 380V	
0.75kW～11kW	Plastic housing
15kW～400kW	Sheet metal housing

Table 2-3 Appearance and installation hole dimension 【old product】(mm) of frequency inverter

Model	Appearance and installing dimension（mm）							Weight
	W	W1	H	H1	D	D1	Φd	（kg）±2%
Three-phase 220V								
KOC680-0R4GT2	118	106.5	185	175.5	157	—	Φ4.5	1.9
KOC680-R75GT2								
KOC680-1R5GT2								
KOC680-2R2GT2								2.1
KOC680-3R7GT2								
KOC680-5R5GT2	160	148	247	235	177	-	Φ5.5	3.9
KOC680-7R5GT2	180	100	356	341	176	—	Φ7	8.6
KOC680-011GT2								8.9
KOC680-015GT2	210	170	415	401	187	—	Φ7	11.25
KOC680-018GT2								
KOC680-022GT2	320	230	555	540	240	—	Φ10	
KOC680-030GT2								
KOC680-037GT2	290	232	638.5	612	270	-	Φ12	
KOC680-045GT2								
KOC680-055GT2	330	232	670	640	300	—	Φ12	
KOC680-075GT2	380	262	835	800	350	—	Φ12	
Three-phase 380V								
KOC680-R75G/1R5PT4	118	106.5	185	175.5	157	—	Φ4.5	1.9
KOC680-1R5G/2R2PT4								
KOC680-2R2G/3R7PT4								
KOC680-3R7G/5R5PT4								2.1
KOC680-5R5G/7R5PT4								
KOC680-7R5G/011PT4	160	148	247	235	177	-	Φ5.5	3.9
KOC680-011G/015PT4								
KOC680-015G/018PT4	180	100	356	341	176	—	Φ7	8.6
KOC680-018G/022PT4								
KOC680-022G/030PT4								8.9
KOC680-030G/037PT4	210	170	415	401	187	—	Φ7	11.25
KOC680-037G/045PT4								
KOC680-045G/055PT4	291	200	524	502	215	—	Φ10	20.9
KOC680-055G/075PT4								21.4
KOC680-075G/090PT4	290	232	638.5	612	270	-	Φ12	
KOC680-090G/110PT4								
KOC680-110G/132PT4	330	232	670	640	300	—	Φ12	
KOC680-132G/160PT4								

Model	Appearance and installing dimension（mm）							Weight
	W	W1	H	H1	D	D1	Φd	（kg）±2%
KOC680-160G/185PT4	380	262	835	800	350	—	Φ12	
KOC680-185G/200PT4								
KOC680-200G/220PT4								
KOC680-220G/250PT4								
KOC680-250G/280PT4	720	660	1018	980	403	—	Φ14	
KOC680-280G/315PT4								
KOC680-315G/355PT4								
KOC680-355G/400PT4	840	720	1129	1100	423	—	Φ14	
KOC680-400G/450PT4								
KOC680-185G/200PT4G								
KOC680-200G/220PT4G								
KOC680-220G/250PT4G								
KOC680-250G/280PT4G	720	660	1438	1400	403	300	Φ14	
KOC680-280G/315PT4G								
KOC680-315G/355PT4G								
KOC680-355G/400PT4G	840	780	1544	1500	423	320	Φ14	
KOC680-400G/450PT4G								

2.5.1.2 【New product】

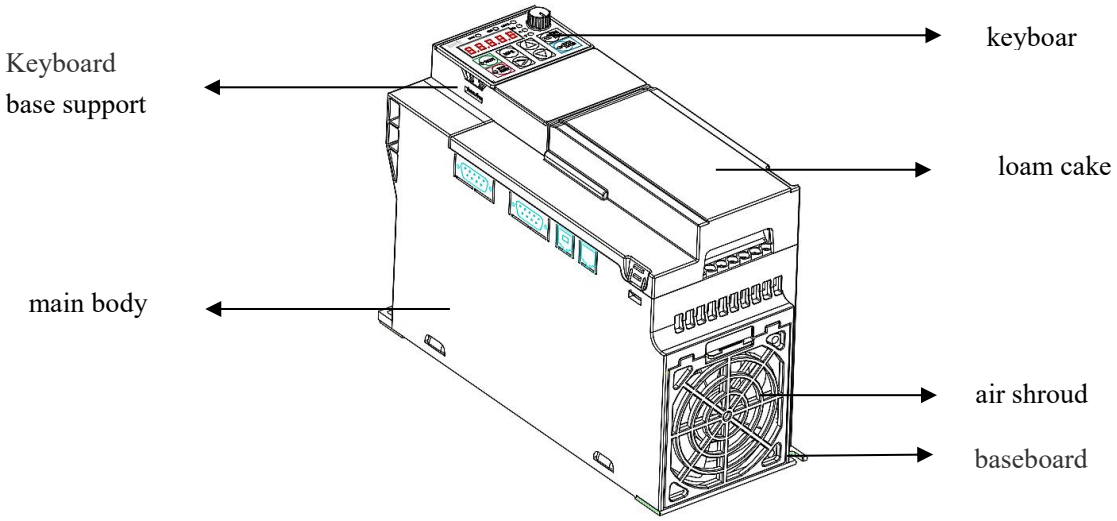


Figure 2-3-1 Product appearance【New product】(With potentiometer)

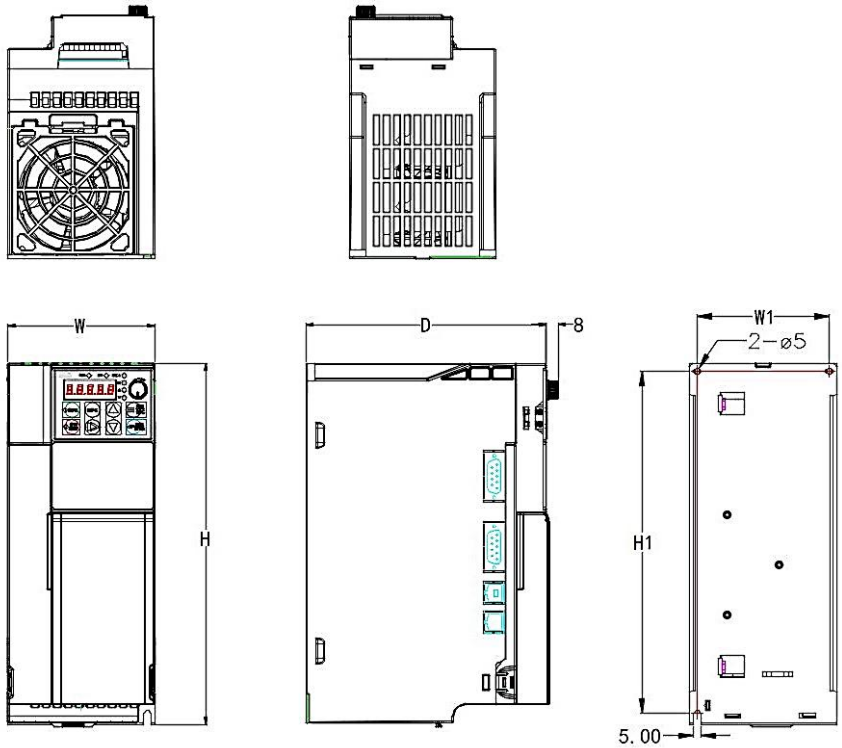


Figure 2-4-1 Appearance and installation dimension of KOC680 series【new product】 (Plastic housing structure)

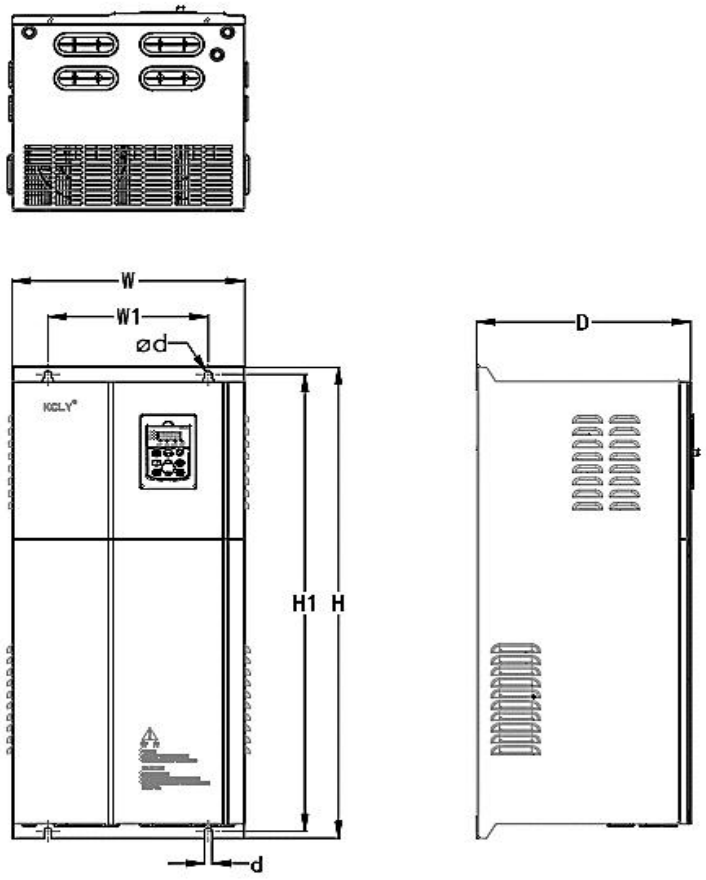


Figure 2-5-1 Appearance and installation dimension of KOC680 series【new product】 (Metal housing structure)

The housing types of the KOC680 models are listed in the following table：

Voltage & Power Class	Housing Type
Three-phase 220V	
0.4kW～5.5kW	Plastic housing
7.5kW～75kW	Sheet metal housing
Three-phase 380V	
0.75kW～11kW	Plastic housing
15kW～400kW	Sheet metal housing

2.5.2 Appearance and Installation Hole Dimension (mm) of KOC680 【New product】Frequency Inverter

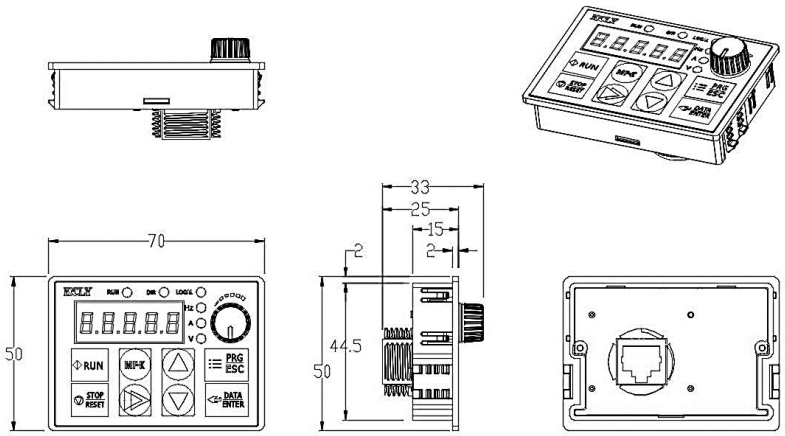
Table 2-3 Appearance and installation hole dimension【New product】 (mm) of frequency inverter

Model	Appearance and installing dimension（mm）							Weight（kg）±2%
	W	W1	H	H1	D	D1	ød	
Three-phase220V								
KOC680-0R4GT2	70	60	200	189	164		Ø4.5	
KOC680-R75GT2								
KOC680-1R5GT2								
KOC680-2R2GT2	100	90	245	234	164		Ø5	
KOC680-3R7GT2								
KOC680-5R5GT2	116	106	320	309	175		Ø5	
KOC680-7R5GT2								

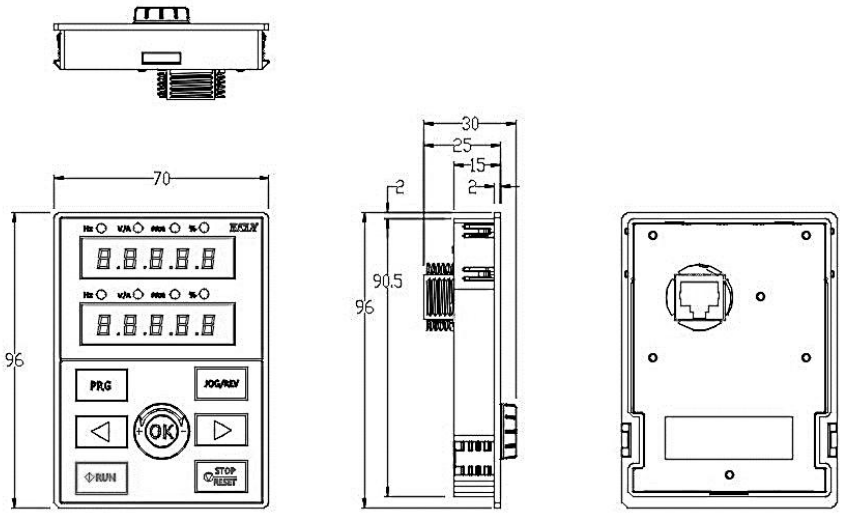
KOC680-011GT2	180	100	356	341	176		Ø7	
KOC680-015GT2								
KOC680-018GT2								
KOC680-022GT2	210	170	415	401	187		Ø7	
KOC680-030GT2								
KOC680-037GT2	290	200	524	502	215		Ø10	
KOC680-045GT2								
KOC680-055GT2	290	232	638	612	270		Ø12	
KOC680-075GT2								
Three-phase380V								
KOC680-R75G/1R5PT4	70	60	200	189	164		Ø4.5	
KOC680-1R5G/2R2PT4								
KOC680-2R2G/3R7PT4								
KOC680-3R7G/5R5PT4	100	90	245	234	164		Ø5	
KOC680-5R5G/7R5PT4								
KOC680-7R5G/011PT4	116	106	320	309	175		Ø5	
KOC680-011G/015PT4								
KOC680-015G/018PT4	180	100	356	341	176		Ø7	
KOC680-018G/022PT4								
KOC680-022G/030PT4								
KOC680-030G/037PT4	210	170	415	401	187		Ø7	
KOC680-037G/045PT4								
KOC680-045G/055PT4	290	200	524	502	215		Ø10	
KOC680-055G/075PT4								
KOC680-075G/090PT4	290	232	638	612	270		Ø12	
KOC680-090G/110PT4								
KOC680-110G/132PT4	330	232	670	640	300		Ø12	
KOC680-132G/160PT4								
KOC680-160G/185PT4	380	262	835	800	350		Ø12	
KOC680-185G/200PT4								
KOC680-200G/220PT4								
KOC680-220G/250PT4								
KOC680-250G/280PT4								
KOC680-280G/315PT4								
KOC680-315G/355PT4								
KOC680-355G/400PT4								
KOC680-400G/450PT4								
KOC680-160G/185PT4G								
KOC680-185G/200PT4G								
KOC680-200G/220PT4G								
KOC680-220G/250PT4G								

KOC680-250G/280PT4G								
KOC680-280G/315PT4G								
KOC680-315G/355PT4G								
KOC680-355G/400PT4G								
KOC680-400G/450PT4G								

2.5.3 Appearance and installation dimension of external keypad【New product】 (keypad tray)



2.5.4 Appearance and installation dimension of external keypad【New product】 (keypad tray)



2.5.4 Dimension figure of connecting terminals

Omitted

2.6 Options

Please indicate if the following options are needed when placing order.

Table 2-4 Options of KOC680 frequency inverter

Item	Model	Functions	Remarks
Internal braking unit	With"-B" after the product model	Three-phase: 0.75kw~37kw, Standard built-in brake unit	The internal braking unit is optional for 45kw~55kw.
External braking unit		External braking unit for above 75kw(including 75kw)	

Energy-regeneration unit		Energy saving product makes the electric energy of frequency inverter feedback to the AC power grid.	
Rectifying unit		To use the unit when many frequency inverters use the one DC bus, the way can save energy.	

2.7 Daily maintenance of frequency inverters

2.7.1 Daily maintenance

Due to the influence of temperature, humidity, dust and vibration, it will lead to poor heat dissipation and component aging of frequency inverter, and results in potential failure or reducing the service life of frequency inverter. Therefore, it is necessary to do daily and regular maintenance of the frequency inverter.

Daily check items:

1) Check if the sound is normal during the running of the motor;
2) Check if there is a vibration during the running of the motor;
3) Check whether the installation environment of frequency inverter has changed;
4) Check if the cooling fan of frequency inverter is working correctly, the cooling air duct is clear;
5) Check if the frequency inverter is overheating;
6) Make sure that the frequency inverter should always be kept in a clean state;
7) Clear up effectively the dust on the surface of the frequency inverter, prevent the dust from entering into the inside of the frequency inverter, especially for the metal dust;
8) Clear up effectively the oil and dust on the cooling fan of frequency inverter.

2.7.2 Regular inspection

Please regularly check frequency inverter, especially for the difficult checking place of running.

Regular inspection items:

1) Check the air duct and clear up regularly;
2) Check if there are any loose screws;
3) Check if the inverter has been corroded;
4) Check whether the wiring terminals show signs of arcing;
5) Main circuit insulation test.

Note:

When using the megger(please use the DC 500V meg ohm meter) to measure the insulation resistance, you shall disconnect the main circuit to the frequency inverter. Do not use the insulation resistance meter to test the control circuit. Do not to do the high voltage test (It has been done when the frequency inverter producing in factory.)

2.7.3 Wearing parts replacement

The vulnerable parts of frequency inverter include the cooling fan and filter electrolytic capacitor, its service life is closely related to the using environment and maintenance status. The general service life is shown as follows:

Part Name	Service Life
Fan	2 to 3 Years
Electrolytic capacitor	4 to 5 Years

The user can confirm the replace time according to the running time.

1) Possible reasons for the damage of cooling fan: bearing wear and blade aging. Distinguish standard: Any cracks in the fan blade, any abnormal vibration sound during the starting of frequency inverter.
2) Possible reasons for the damage of filter electrolytic capacitor: poor quality of the input power supply, the environment temperature is higher, the load change frequently and the electrolyte aging. Distinguish standard: Any leakage of its liquid, if

the safety valve is protruding, electrostatic capacitance and insulation resistance measurement.

2.7.4 Storage of the frequency inverter

After buying the frequency inverter, users shall pay attention to the temporary and long-term storage as following:

1) Store the frequency inverter in the original packaging;
2) Long-term storage can lead to the degradation of electrolytic capacitors, and must ensure to power on for once within 2 years. And the power-on time is at least 5 hours. The input voltage must slowly rise to the rating by using the voltage regulator.

2.8 Warranty Items

1) Warranty only refers to frequency inverter.
2) Under normal use, if there is any failure or damage, our company is responsible for the warranty within 12 months. (Leave factory date is subjected to the S/N on the frequency inverter nameplate or the contract). When over 12 months, reasonable maintenance fee will be charged;
3) During 12 months, if the following situation happens, certain maintenance fee will be charged;
   a, The users don't follow the manual stated makes the frequency inverter damaged;
   b, The damage caused by fire, flood and abnormal voltage;
   c. The damage caused by using the frequency inverter for abnormal functions;
   d. The relevant service fee is calculated according to the manufacturer's standard, if there is contract, then it carries out subject to the contract.

2.9 Selection Guide of braking component

Table 2-5 is the recommended value of braking resistor, users can select the different resistance value and power according to the actual situation,(but the resistance value must not be less than the recommended value in the table, and the power can be bigger.) The selection of braking resistance need to be confirmed according to the power that the motor generated in the practical application systems, and is relevant to the system inertia, deceleration time, the energy of the potential energy load, needs customers to choose according to actual situation. The greater the inertia the shorter deceleration time is needed and more frequently braking, so the braking resistor needs the one with bigger power but smaller resistance value.

2.9.1 Selection of braking resistance value

When braking, almost all the renewable energy of motor is consumed on the braking resistor.

According to the formula: U * U/R = PP

In the formula:

U --- The braking voltage when the system brake stably (different system is different, for the 380VAC system generally take 700V)

R - Braking resistor

PP – Power of braking

2.9.2 Selection power of braking resistor

In theory the power of braking resistor is consistent with the braking power, but it need to be taken into consideration that the braking resistor power will derate to 70%.

According to the formula: 0.7*Pr=PP*D

In this formula:

Pr----Power of resistor

D---- Braking proportion (the proportion that the regeneration process accounts for the whole process)

Elevator---- 20%~30%

Uncoiling and coiling machine---- 20%~30%

Centrifugal machine---- 50%~60%

Occasionally braking load---- 5%

Other machine generally-----10%

Model	Recommend power of braking resistor	Recommend resistance value of braking resistor	Braking unit	Remarks
Three-phase 220V				
KOC680-0R4GT2	150W	≥ 150Ω	Built-in as standard	No special instructions
KOC680-R75GT2	150W	≥ 110Ω		
KOC680-1R5GT2	250W	≥ 100Ω		
KOC680-2R2GT2	300W	≥ 65Ω		
KOC680-3R7GT2	400W	≥ 45Ω		
KOC680-5R5GT2	800W	≥ 22Ω		
KOC680-7R5GT2	1000W	≥ 16Ω		
KOC680-011GT2	1500W	≥ 11Ω		
KOC680-015GT2	2500W	≥ 8Ω		
KOC680-018GT2	3.7 kW	≥ 8.0Ω		
KOC680-022GT2	4.5 kW	≥ 8Ω	External	—
KOC680-030GT2	5.5 kW	≥ 4Ω		
KOC680-037GT2	7.5 kW	≥ 4Ω		
KOC680-045GT2	4.5 kW×2	≥ 4Ω×2		
KOC680-055GT2	5.5 kW×2	≥ 4Ω×2		
KOC680-075GT2	16k W	≥ 1.2Ω		
Three-phase 380V				
KOC680-R75G/1R5PT4	150W	≥ 300Ω	Built-in as standard	No special instructions
KOC680-1R5G/2R2PT4	150W	≥ 220Ω		
KOC680-2R2G/3R7PT4	250W	≥ 200Ω		
KOC680-3R7G/5R5PT4	300W	≥ 130Ω		
KOC680-5R5G/7R5PT4	400W	≥ 90Ω		
KOC680-7R5G/011PT4	500W	≥ 65Ω		
KOC680-011G/015PT4	800W	≥ 43Ω		
KOC680-015G/018PT4	1000W	≥ 32Ω		
KOC680-018G/022PT4	1300W	≥ 25Ω		
KOC680-022G/030PT4	1500W	≥ 22Ω		
KOC680-030G/037PT4	2500W	≥ 16Ω		
KOC680-037G/045PT4	3.7 kW	≥ 16.0Ω		
KOC680-045G/055PT4	4.5 kW	≥ 16Ω	External	-
KOC680-055G/075PT4	5.5 kW	≥ 8Ω		
KOC680-075G/090PT4	7.5 kW	≥ 8Ω		
KOC680-090G/110PT4	4.5 kW×2	≥ 8Ω×2		
KOC680-110G/132PT4	5.5 kW×2	≥ 8Ω×2		
KOC680-132G/160PT4	6.5 kW×2	≥ 8Ω×2		
KOC680-160G/185PT4	16kW	≥ 2.5Ω		
KOC680-185G/200PT4	18KW	≥ 2.5Ω		
KOC680-200G/220PT4	20 kW	≥ 2.5Ω		
KOC680-220G/250PT4	22 kW	≥ 2.5Ω		
KOC680-250G/280PT4	12.5 kW×2	≥ 2.5Ω×2		
KOC680-280G/315PT4	14 kW×2	≥ 2.5Ω×2		

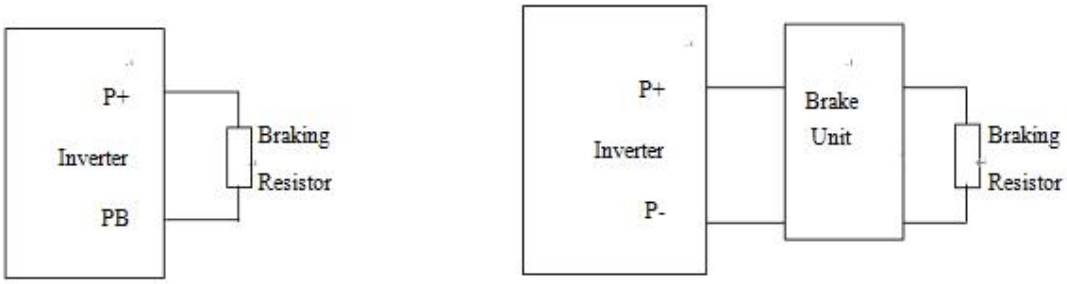
KOC680-315G/355PT4	16 kW×2	≥ 2.5Ω×2		
KOC680-355G/400PT4	17 kW×2	≥ 2.5Ω×2		
KOC680-400G/450PT4	14 kW×3	≥ 2.5Ω×3		

Table 2-5 KOC680 Inverter braking components selection table

2.9.3 Braking resistor connection description

The braking resistor connection of KOC680 series frequency inverter is showed as below:

Figure 2-10 Braking resistor connection scheme



Chapter 3 Installation of Frequency Inverter

3.1 Installation environment

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

3.2 Installation direction and space

In order to not affect the service life of frequency inverter and reduce its performance, note for its installation direction and space and correctly fasten it.

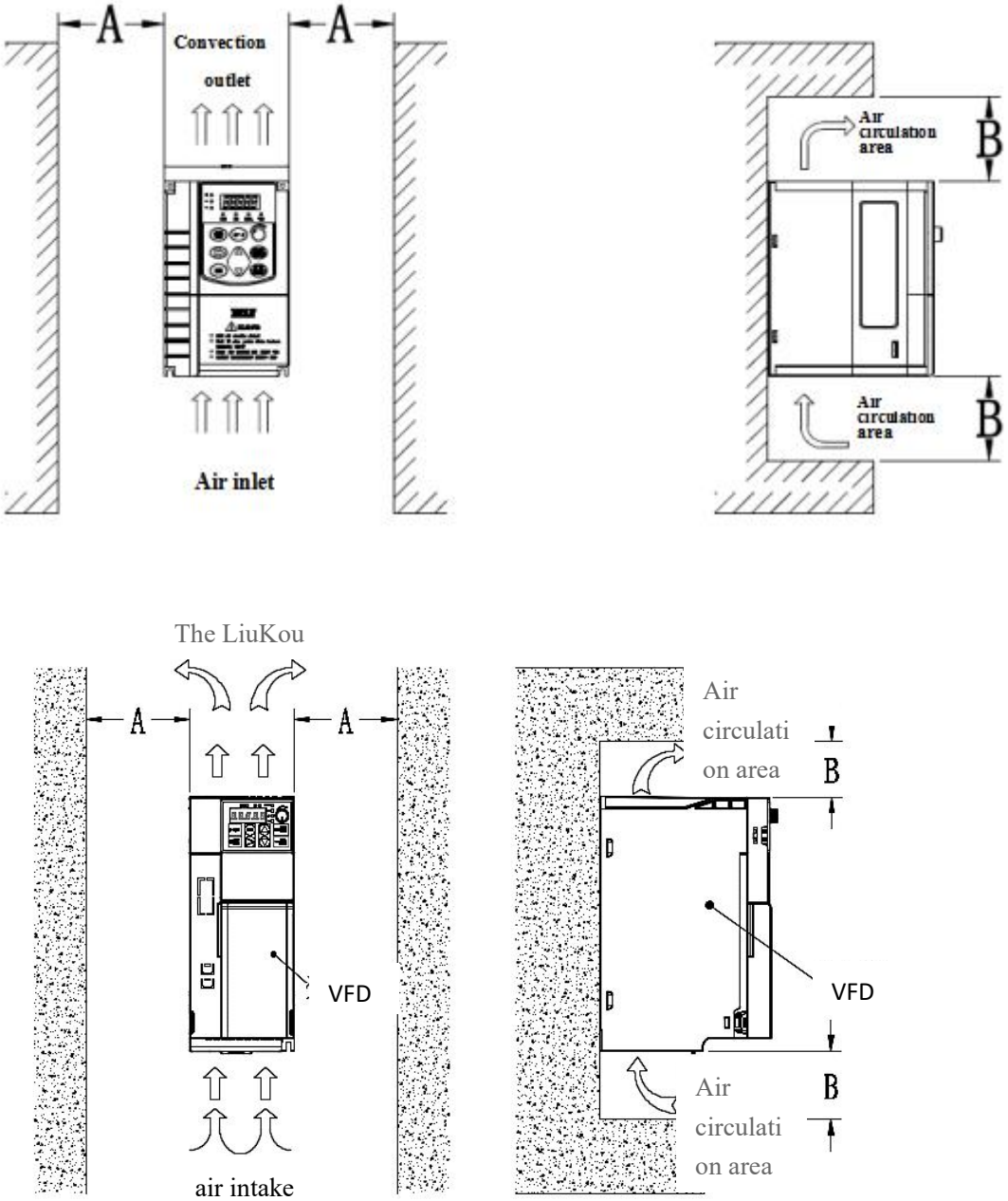


Figure 3-1 Ventilating duct installation dimension diagram of frequency inverter

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

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

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

3.3 Peripheral Devices Connection Diagram

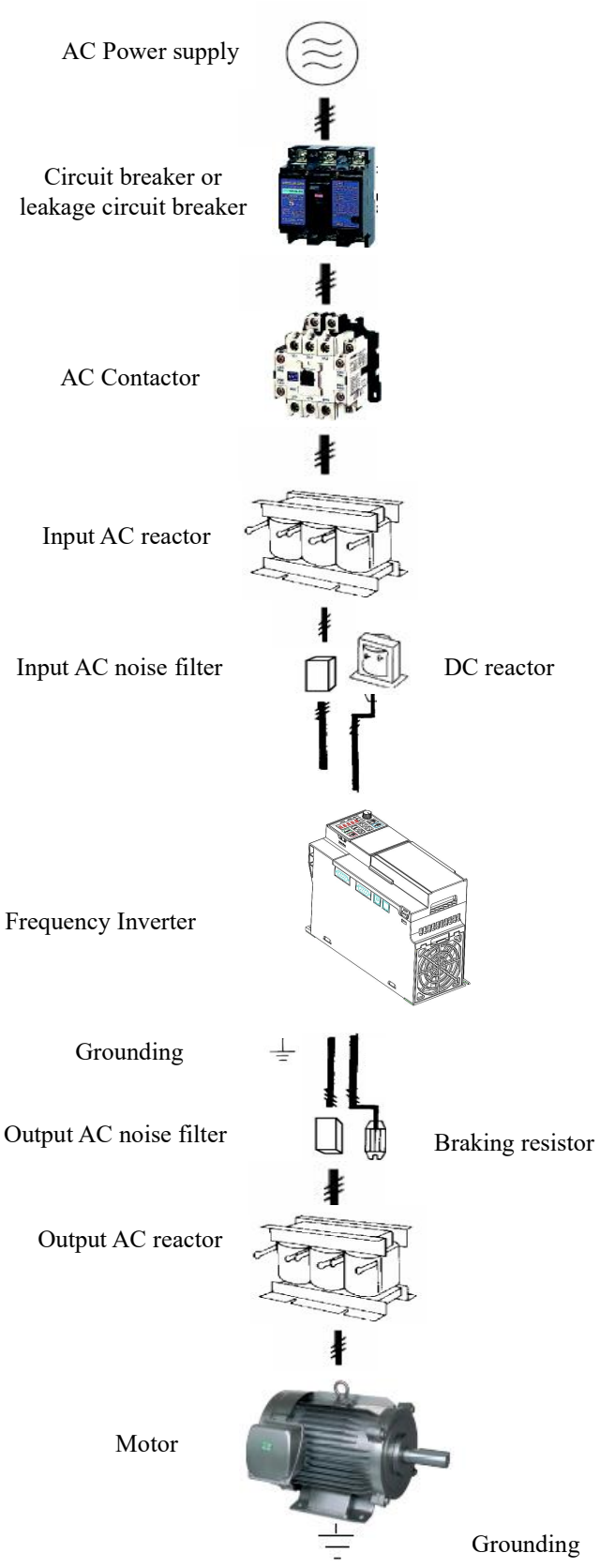


Figure 3-2 Peripheral Devices Connection

3.4 Instructions of Main Circuit Peripheral Devices

Table 3-1 Main circuit peripheral devices use instructions

Parts Name	Installation Location	Function Description
MCCB	Front of input circuit	The capacity of the circuit breaker shall be 1.5 to 2 times of the rated current of the inverter. The protect time of the circuit breaker shall fully consider the time features of the inverter overload protection.
Residual-current circuit breaker(RCCB)	Front of input circuit	As the inverter output is the high-frequency pulse output, there will be high-frequency leakage current. Special leakage circuit breaker shall be used when installing leakage circuit breaker at the input side of the inverter. It is suggested that B type leakage circuit breaker be used, and the leakage current value shall be set as 300mA.
Contactor	Between MCCB and frequency inverter input side	Frequently open and close of contactor will cause inverter failure, so the highest frequency for opening and closing of contactor shall be not exceeded than 10 times/min when braking resistor is used, to avoid the over-hot damage of the braking resistor, thermal protection relay with braking resistor over-hot detection shall be installed, by terminal of the thermal protection relay to disconnect the contactor.
Input AC reactor or DC reactor	Frequency inverter input side / near the Frequency inverter	1. The inverter power supply capacity is more than 600kVA or 10 times of the inverter capacity. 2. If there is switch type reactive-load compensation capacitor or load with silicon control at the same power node, there will be high peak current flowing into input power circuit, causing the damage of the rectifier components. 3. When the voltage unbalancedness of the three-phase power supply of the inverter exceeds 3%, the rectifier component will be damaged. 4. It is required that the input power factor of the inverter shall be higher than 90%. When the above situations occurred, install the AC reactor at the input side of the inverter or DC reactor to the DC reactor terminal.
Input noise filter	The frequency inverter input side	To reduce the noise input from the power to the inverter or output from the inverter to the power.
Thermal protection relay	The output side of frequency inverter	Although the inverter has motor overload protection function, when one inverter drives two or more motors or multi-pole motors, to prevent the motor over-temperature failure, thermal protection relay shall be installed between the inverter and each motor.
Output filter	The output side of frequency inverter	When the output side of the inverter is connected with output filter, the conduction and radiation interference can be reduced.
Output AC reactor	Between the output side of frequency inverter and motor, near the frequency inverter	When the cable connecting the inverter and the motor is longer than 100meters, it is suggested to install AC output reactor to suppress the high-frequency oscillation to avoid the damage to motor insulation, large leakage current and frequent inverter protective action.

3.5 Model Selection of Main Circuit Peripheral Devices

Table 3-2 Model Selection Diagram of Main Circuit Peripheral Devices (Recommended）

Model	MCCB (A)	Contactor (A)	Cable of Input Side Main Circuit	Cable of Output Side Main Circuit	Cable of Control Circuit (mm^2)
Three-phase 220V					
KOC680-0R4GT2	10	10	2.5	2.5	1.0
KOC680-R75GT2	16	10	2.5	2.5	1.0
KOC680-1R5GT2	16	10	2.5	2.5	1.0
KOC680-2R2GT2	25	16	4.0	4.0	1.0
KOC680-3R7GT2	32	25	4.0	4.0	1.0
KOC680-5R5GT2	63	40	4.0	4.0	1.0
KOC680-7R5GT2	63	40	6.0	6.0	1.0
KOC680-011GT2	100	63	10	10	1.0
KOC680-015GT2	125	100	16	10	1.0
KOC680-018GT2	160	100	16	16	1.0
KOC680-022GT2	200	125	25	25	1.0
KOC680-030GT2	200	125	35	25	1.0
KOC680-037GT2	250	160	50	35	1.0
KOC680-045GT2	250	160	70	35	1.0
KOC680-055GT2	350	350	120	120	1.0
KOC680-075GT2	500	400	185	185	1.0
Three-phase 380V					
KOC680-R75G/1R5PT4	10	10	2.5	2.5	1.0
KOC680-1R5G/2R2PT4	16	10	2.5	2.5	1.0
KOC680-2R2G/3R7PT4	16	10	2.5	2.5	1.0
KOC680-3R7G/5R5PT4	25	16	4.0	4.0	1.0
KOC680-5R5G/7R5PT4	32	25	4.0	4.0	1.0
KOC680-7R5G/011PT4	40	32	4.0	4.0	1.0
KOC680-011G/015PT4	63	40	4.0	4.0	1.0
KOC680-015G/018PT4	63	40	6.0	6.0	1.0
KOC680-018G/022PT4	100	63	6	6	1.0
KOC680-022G/030PT4	100	63	10	10	1.0
KOC680-030G/037PT4	125	100	16	10	1.0
KOC680-037G/045PT4	160	100	16	16	1.0
KOC680-045G/055PT4	200	125	25	25	1.0
KOC680-055G/075PT4	250	125	35	25	1.0
KOC680-075G/090PT4	250	160	50	35	1.0
KOC680-090G/110PT4	350	160	70	35	1.0
KOC680-110G/132PT4	350	350	120	120	1.0
KOC680-132G/160PT4	400	400	150	150	1.0
KOC680-160G/185PT4	500	400	185	185	1.0
KOC680-185G/200PT4	500	400	185	185	1.0
KOC680-200G/220PT4	630	600	150*2	150*2	1.0
KOC680-220G/250PT4	630	600	150*2	150*2	1.0
KOC680-250G/280PT4	800	600	185*2	185*2	1.0
KOC680-280G/315PT4	800	800	185*2	185*2	1.0

Model	MCCB (A)	Contactor (A)	Cable of Input Side Main Circuit	Cable of Output Side Main Circuit	Cable of Control Circuit (mm^2)
KOC680-315G/355PT4	1000	800	150*3	150*3	1.0
KOC680-355G/400PT4	1000	800	150*4	150*4	1.0
KOC680-400G/450PT4	1200	1000	150*4	150*4	1.0

3.6 Removal and mounting of operating panel and cover

3.6.1 Removal and mounting of operating panel (keypad)

The operating panel of KOC680 series Frequency inverter is a plug type, If you need to take it off when use or maintenance, please make sure the gentle actions, or it is easy to damage the plug type connection terminals on operating panel.

The removal and mounting of operating panel (keypad) is showed as Figure 3-3 and Figure 3-4:

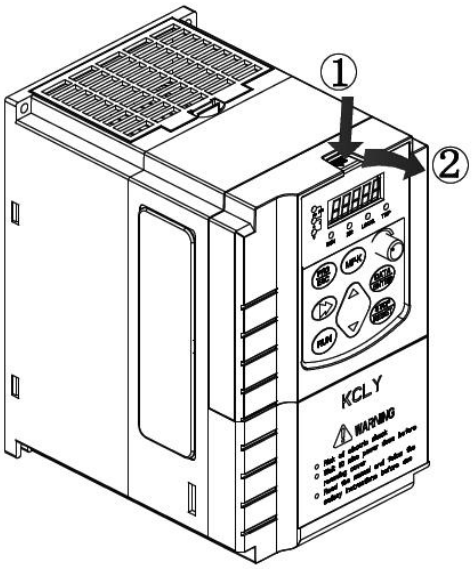


Figure 3-3 Removal of operating panel (keypad)

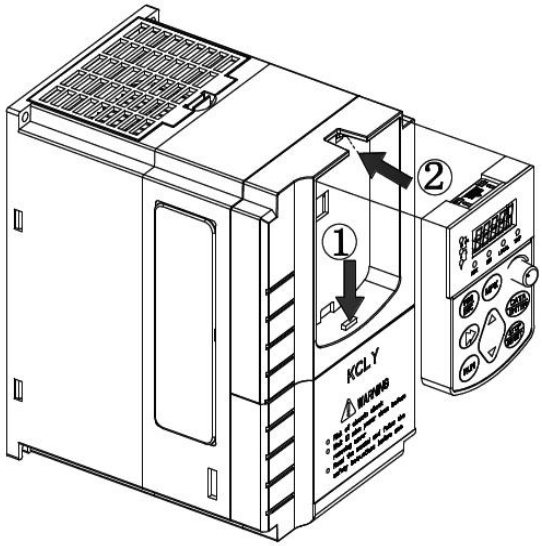


Figure 3-4 Mounting of operating panel (keypad)

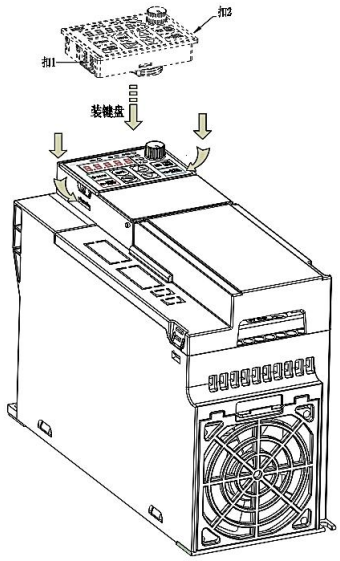


Figure 3-5 Removal of operating panel【New product】 (keypad)

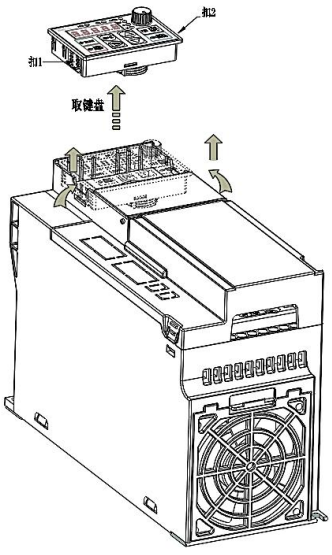


Figure 3-5 Removal of operating panel【New product】 (keypad)

3.6.2 Removal and Mounting of Frequency Inverter

The KOC680 series frequency inverter below 11kw (380V) uses plastic case. The removal and mounting of upper cover refers Figure3-5. Please use tool to push the hooks on both side of lower cover.

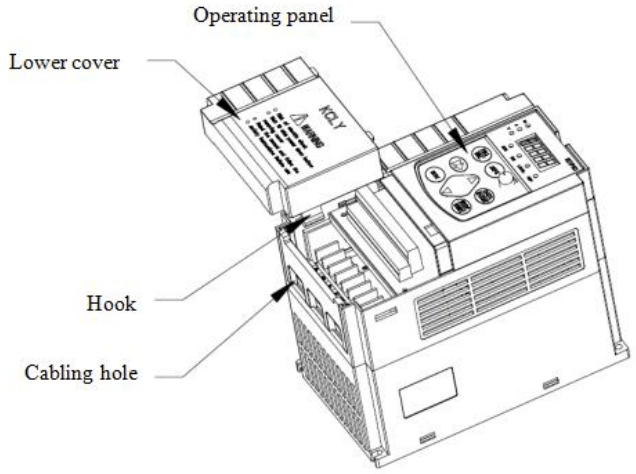


Figure 3-5 The cover removal of plastic case

The KOC680 series frequency inverter above 15kw (380V) uses metal case. The removal and mounting of lower cover refers figure3-6. Using thumb to unscrew and push lower cover and raise the cover.

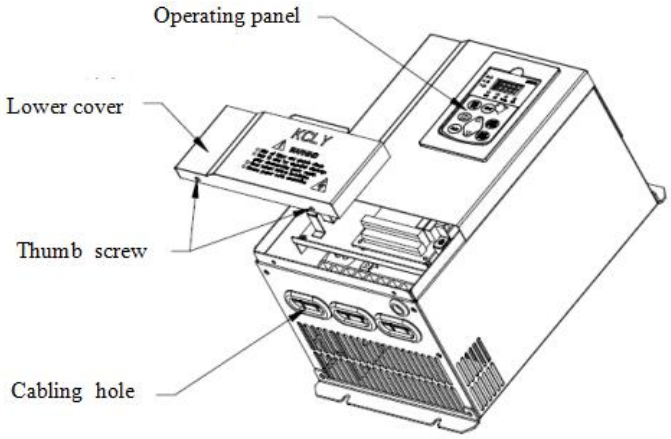
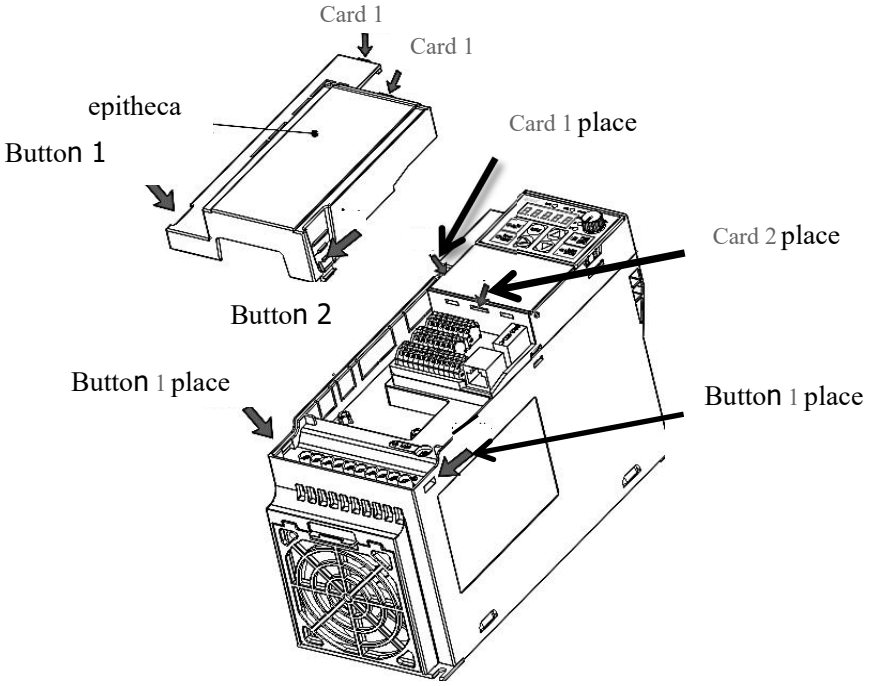


Figure 3-6 The removal and mounting of lower metal case cover



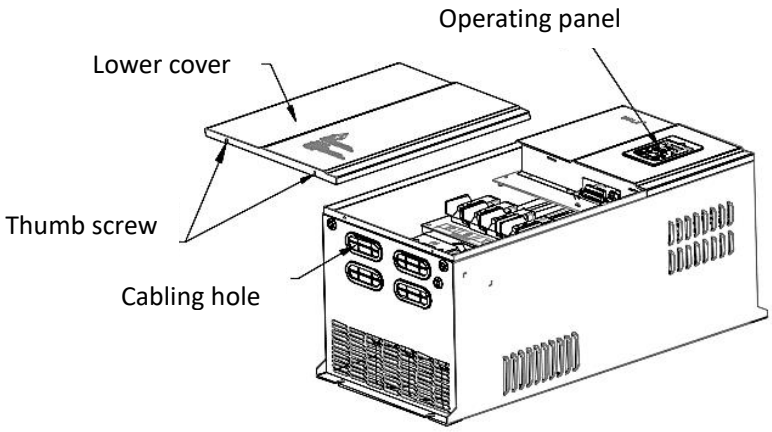


Figure 3-5-1 The cover removal of plastic case【New】

3.7 Connection Terminals Diagram Description

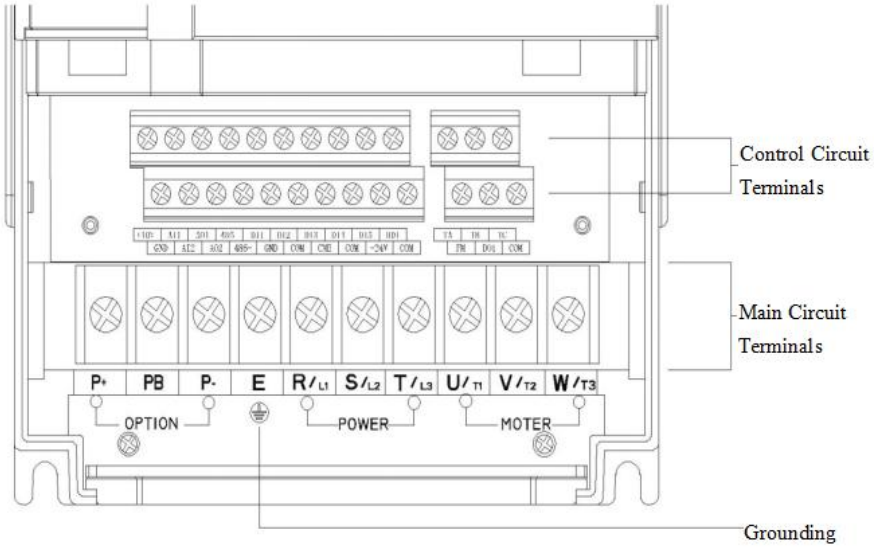
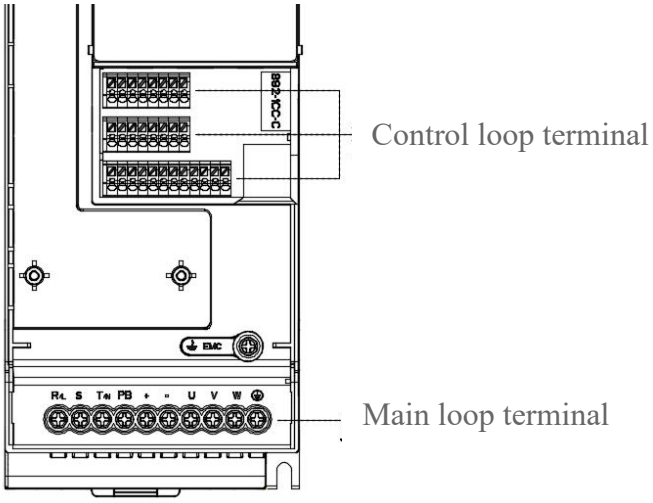


Figure 3-7 KOC680 Series Terminal Distribution Diagram



【New】

3.8 Sketch and Description of Main Circuit Terminals

3.8.1 Function and description of Main Circuit Terminals

3.8.1.1 Main Circuit Terminals Sketch of Three-phase 220V/380V Small Power Standard Models

Including model:

Three-phase 220V：KOC680-0R4GT2～KOC680-18GT2

Three-phase 380V：KOC680-R75G/1R5PT4～KOC680-037G/045PT4

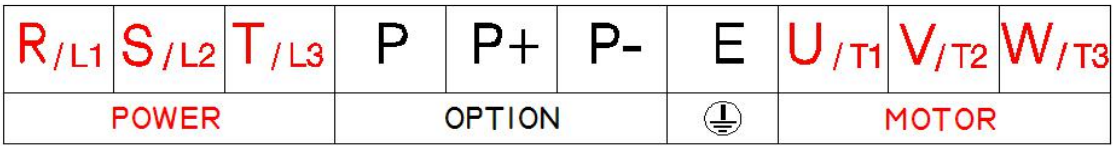
Terminal symbol	Terminal name and function description
P+、PB	Connecting terminals of braking resistor
P+、P-	Input terminals of DC power
⏚ or E	Grounding terminal
R/L1、S/L2、T/L3	Three-phase AC power input terminals
U/T1、V/T2、W/T3	Three-phase AC power output terminals

3.8.1.2 Main Circuit Terminals Sketch of Three-phase 220V/380V Medium and Big Power Standard Models

Including model:

Three-phase 220V：KOC680-022GT2～KOC680-075GT2

Three-phase 380V：KOC680-045G/055PT4～KOC680-400G/450PT4



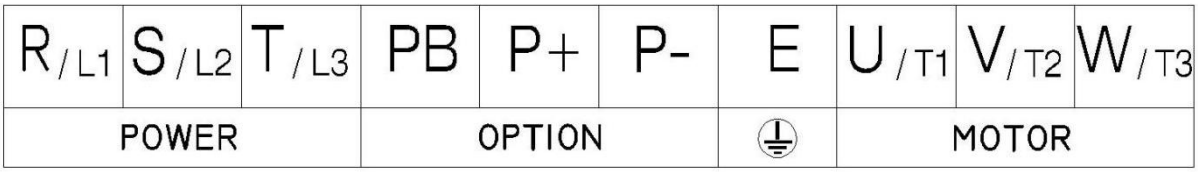
Terminal symbol	Terminal name and function description
R/L1、S/L2、T/L3	Three-phase AC power input terminals
P、P+	Connecting terminals of external DC reactor, Normally short circuited with copper bar.
P+、P-	DC power input terminals; DC output terminals of external braking unit
U/T1、V/T2、W/T3	Three-phase AC power output terminals
⏚ or E	Grounding terminal

3.8.1.3 Main Circuit Terminals Sketch of Model with optional internal braking units

Including model:

Three-phase 220V：KOC680-022GT2-B～KOC680-030GT2-B

Three-phase 380V：KOC680-045G/055PT4-B～KOC680-055G/075PT4-B



Terminal symbol	Terminal name and function description
R/L1、S/L2、T/L3	Three-phase AC power input terminals

P+ 、P-	DC power input terminals
P+、PB	Braking resistor connecting
U/T1、V/T2、W/T3	Three-phase AC power output terminals
⏚ or E	Grounding terminal

Note: Product with standard built-in unit can realize DC bus and braking function at the same time, if external DC reactor and braking function is needed, please contact the manufacturer.

3.9 Cautions for Main Circuit Wiring

3.9.1 Power Supply Wiring

◆It is forbidden to connect the power cable to the inverter output terminal, otherwise, the internal components of the inverter will be damaged.

◆To facilitate the input side over current protection and maintenance after power off, the inverter shall connect to the power supply through the circuit breaker or leakage circuit breaker and contactor.

◆Please confirm that the power supply phases, rated voltage are consistent with that of the nameplate, otherwise, the inverter may be damaged.

3.9.2 Motor Wiring

◆It is forbidden to short circuit or ground the inverter output terminal, otherwise the internal components of the inverter will be damaged.

◆Avoid short circuit the output cables or with the inverter enclosure, otherwise there exists the danger of electric shock.

◆It is forbidden to connect the output terminal of the inverter to the capacitor or LC/RC noise filter with phase lead, otherwise, the internal components of the inverter may be damaged.

◆When contactor is installed between the inverter and the motor, it is forbidden to switch on/off the contactor during the running of the inverter, otherwise, there will be large current flowing into the inverter, triggering the inverter protection action.

◆Length of cable between the inverter and motor

If the cable between the inverter and the motor is too long, the higher harmonic leakage current of the output end will produce by adverse impact on the inverter and the peripheral devices. It is suggested that when the motor cable is longer than 100m, output AC reactor be installed. Refer to the following table for the carrier frequency setting.

Table 3-3 Comparison table between the cable length and carrier frequency

Length of cable between the inverter and motor	Less than 50m	Less than 100 m	More than 100m
Carrier frequency（b00.14）	Less than 15kHz	Less than 10kHz	Less than 5kHz

3.9.3 Grounding Wiring

◆The inverter will produce leakage current. The higher the carrier frequency is, the larger the leakage current will be. The leakage current of the inverter system is more than 3.5mA, and the specific value of the leakage current is determined by the use conditions. To ensure the safety, the inverter and the motor must be grounded.

◆The grounding resistance shall be less than 10ohm. For the grounding wire diameter requirement, refer to 2.6 electrotype of main circuit peripheral devices.

◆Do not share grounding wire with the welding machine and other power equipment.

In the applications with more than 2 inverters, keep the grounding wire from forming a loop.

Figure 3-8 Grounding Wire Connection Sketch Map

3.9.4 Countermeasures for Conduction and Radiation Interference

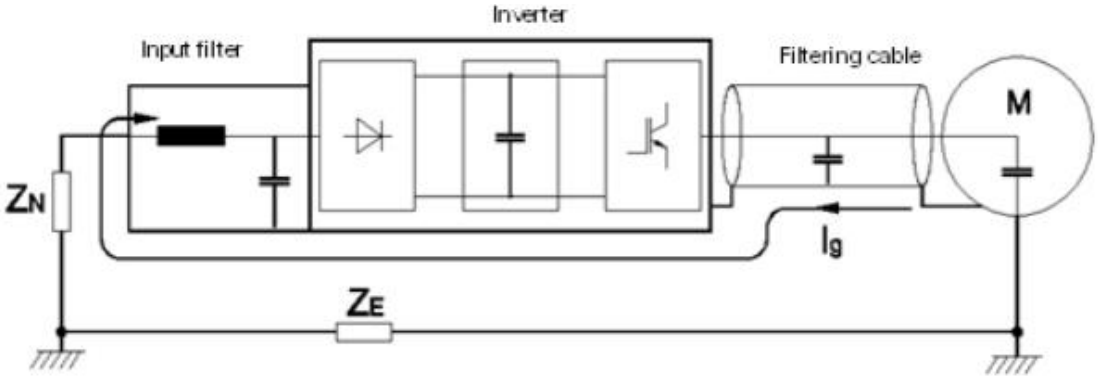


Figure 3-9 Connection of conduction and radiation interference solutions

◆When the noise filter is installed, the wire connecting the filter to the inverter input power end shall be as short as possible.

◆The filter enclosure and mounting cabinet shall be reliably grounded in large area to reduce the back flow impedance of the noise current Ig.

◆The wire connecting the inverter and the motor shall be as short as possible. The motor cable adopts 4-core cable, with the grounding end grounded at the inverter side, the other end connected to the motor enclosure. The motor cable shall be sleeved into the metal tube.

◆The input power wire and output motor wire shall be kept away from each other as far as possible.

◆The equipment and signal cables vulnerable to influence shall be kept far away from the inverter.

◆Key signal cables shall adopt shielding cable. It is suggested that the shielding layer shall be grounded with 360-degree grounding method and sleeved into the metal tube. The signal cable shall be kept far away from the inverter input wire and output motor wire. If the signal cable must cross the input wire and output motor wire, they shall be kept orthogonal.

◆When analog voltage and current signals are adopted for remote frequency setting, twinning shielding cable shall be used. The shielding layer shall be connected to the grounding terminal PE of the inverter, and the signal cable shall be no longer than 50m.

◆The wires of the control circuit terminals RA/RB/RC and other control circuit terminals shall be separately routed.

◆It is forbidden to short circuit the shielding layer and other signal cables and the equipment.

◆When the inverter is connected to the inductive load equipment (e.g. electromagnetic contactor, relay and solenoid valve), surge suppressor must be installed on the load equipment coil, as showed in Figure 3-10

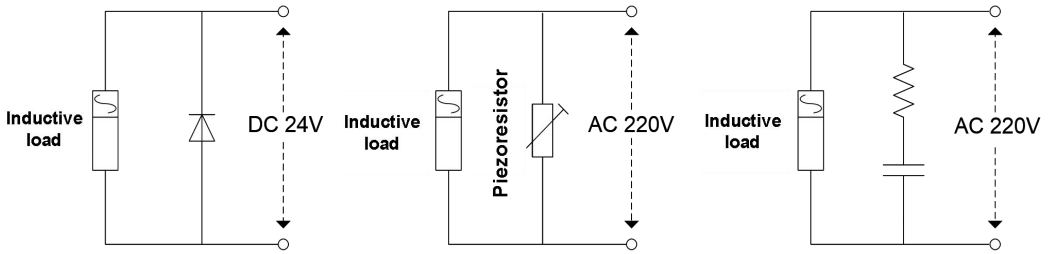


Figure 3-10 Application example of inductive load surge suppressor

3.10 Control Circuit and Main Circuit Terminals Description

3.10.1 Control Circuit and Main Circuit Wiring

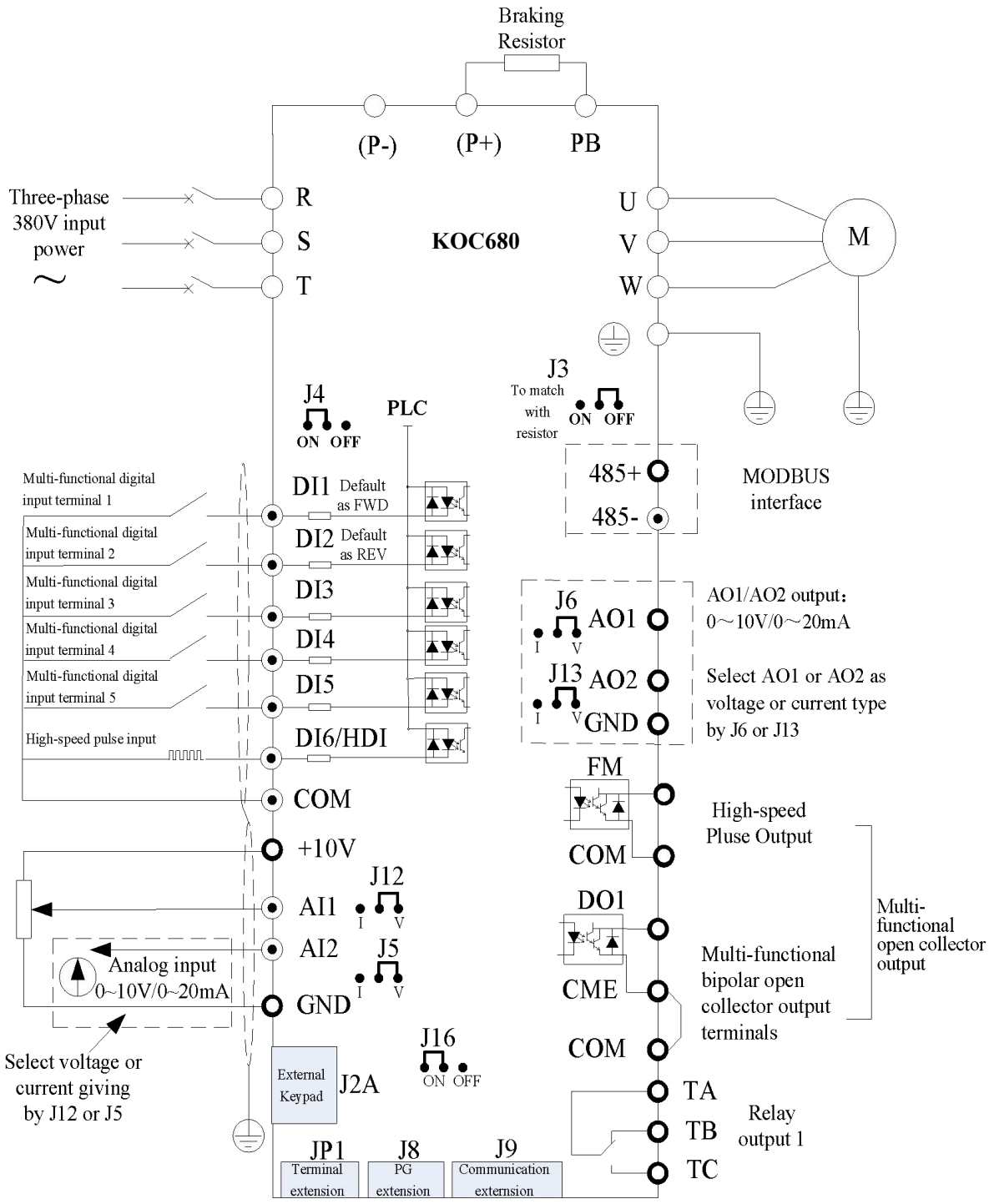
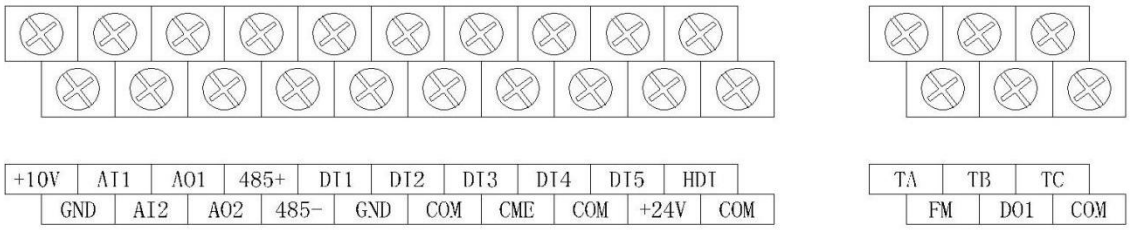


Figure 3-11 Control Circuit and Main Circuit Wiring

3.10.2 Control Circuit Terminal Layout

Figure 3-12 KOC600 series control circuit terminal sketch map



3.10.3 Description of control circuit terminals

Table 3-4 Description of control circuit terminals

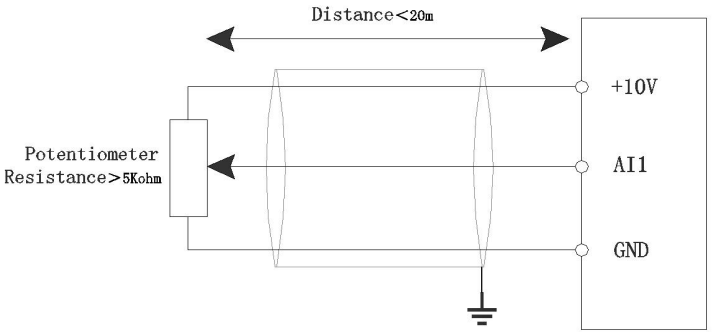
Type	Terminal Symbol	Terminal Name	Terminal function description
Power Supply	+10V-GND	External +10V power supply	Provide +10V power supply to external unit. Maximum output current:10mA Generally, it provides power supply to external potentiometer with resistance range of 1 kΩ~5kΩ
	+24V-COM	External +24V power supply	Provide +24 V power supply to external unit. Generally, it provides power supply to DI/DO terminals and external sensors. Maximum output current: 200 mA
	J4	Wiring mode selection of multi-functional digital input terminals	When the jumper is “ON”, this state is NPN mode. When the jumper is “OFF’, this state is PNP mode.
Analog input	AI1-GND	Analog input terminal 1	1. Input range: DC 0V~10V/ 0mA~20mA, decided by jumper J12 on the control board 2. Impedance: 22 kΩ (voltage input), 500 Ω (current input)
	AI2-GND	Analog input terminal 2	1. Input range: DC 0V~10V/ 0mA~20mA, decided by jumper J5 on the control board 2. Impedance: 22 kΩ (voltage input), 500 Ω (current input)
Digital input	DI1	Digital input 1	1. Optical coupling isolation, compatible with dual polarity input 2.Input Impedance: 2.4 kΩ 3. Voltage range for level input: 9V~30 V
	DI2	Digital input 2	
	DI3	Digital input 3	
	DI4	Digital input 4	
	DI5	Digital input 5	
	HDI	High Speed Pulse Input Terminal	Besides features of DI1~DI5 and it can be used for high-speed pulse input. Maximum input frequency: 50 kHz
Analog output	AO1-GND	Analog output terminal 1	Voltage or current output is decided by jumper J6. Output voltage range: 0V~10 V Output current range: 0mA~20 mA
	AO2-GND	Analog output terminal 2	Voltage or current output is decided by jumper J13. Output voltage range: 0V~10 V Output current range: 0mA~20 mA

Type	Terminal Symbol	Terminal Name	Terminal function description
Digital output	DO1-CME	Digital output 1	Optical coupling isolation, dual polarity open collector output Output voltage range: 0V~24 V Output current range: 0mA~50 mA Note that CME and COM are internally insulated, but they are shorted by jumper externally by factory default. In this case DO1 is driven by +24 V, If you want to drive DO1 by external power supply, please remove jumper between CME and COM.
	FM- COM	High Speed Pulse Output Terminal	It is set by b4-00 (FM terminal output mode selection) As high-speed pulse output, the maximum frequency hits 100 kHz. As open-collector output, its function is the same as that of DO1.
Relay output	TA-TB	NC terminal	Contact driving capacity: 250 VAC, 3 A, COSØ = 0.4 DC 30 V, 1 A
	TA-TC	NO terminal	
Auxiliary interface	JP1	Extension card interface	Connect to an optional card (I/O extension card, PLC card and various bus cards)
	J8	PG card interface	Support various types of PG cards: OC, differential, UVW ABZ and resolver.
	J9	External operation panel interface	Reversed
	J2A	External keypad interface	External keypad
	J16	Grounding interface	To connect the ground

3.10.4 Wiring of Analog Input Terminals

When the voltage signal is used as analog input, it is vulnerable from outside interference. Please use shielding cable, and ensure that the shielding cable reliably connect to the grounding. The cable should be as short as possible, and keep away from power lines. In serious interference occasions, you might consider to add a filter capacitor or ferrite core in signal cable.

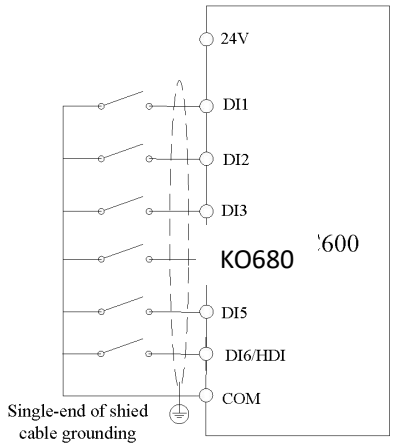
Figure 3-13 Wiring of analog input terminals



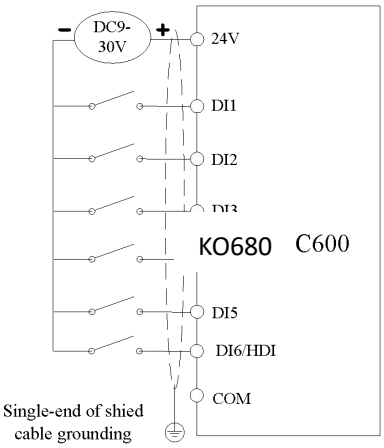
3.10.5 Wiring of Multi-functional Input Terminals

Figure 3-14 Wiring of digital input terminals in four different modes

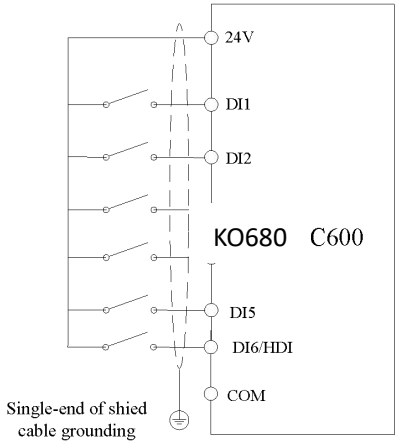
DI wiring mode 1(factory default wiring mode): the external power supply is not used when DI is set as NPN mode.



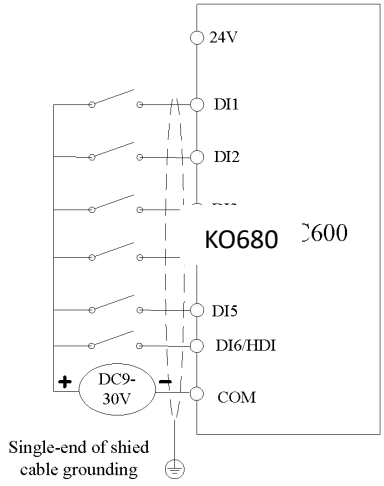
DI wiring mode 2: the external power supply is used when DI is set as NPN mode.



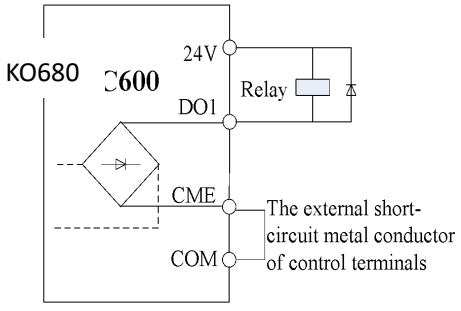
DI wiring mode 3: the external power supply is not used when DI is set as PNP mode.



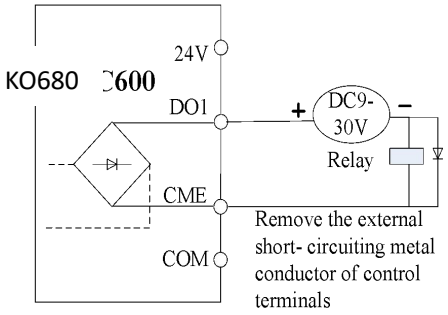
DI wiring mode 4: the external power supply is used when DI is set as PNP mode.



3.10.6 Wiring of digital output terminals when using internal and external power supply



Internal power supply wiring

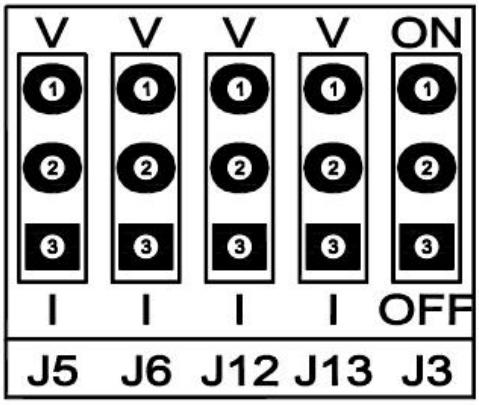


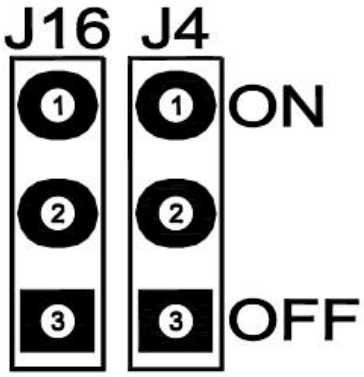
External power supply wiring

Note: When external power supply is adopted, please connect negative end of external power supply with terminal COM. The maximum current of open-collector output is 50mA. If the external load is a relay, please install a fly-wheel diode to the two sides of relay. Please correctly install the polarity of fly-wheel diode, otherwise control card and DSP can be damaged.

3.10.7 Description of Control Circuit Jumper

Figure 3-15 Control Circuit Jumper





Jumper Name	Function Description	Default Setting
J3	When the jumper is “ON”, it connects with 485 communication resistor. When the jumper is “OFF”, it disconnects with 485 communication resistor.	OFF
J4	When the jumper is “ON”, this state is NPN mode. When the jumper is “OFF’, this state is PNP mode.	ON
J5	When the jumper is “V”, AI2 is with voltage input (0~10V). When the jumper is “I”, AI2 is with current input (0~20mA).	V
J6	When the jumper is “V”, AO1 is with voltage output (0~10V). When the jumper is “I”, AO1 is with current output (0~20mA).	V
J12	When the jumper is “V”, AI1 is with voltage input (0~10V). When the jumper is “I”, AI1 is with current input (0~20mA).	V
J13	When the jumper is “V”, AO2 is with voltage output (0~10V). When the jumper is “I”, AO2 is with current output (0~20mA).	V
J16	When the jumper is “ON”, it connects with the ground. When the jumper is “OFF”, it disconnects with the ground.	ON

Chapter 4 Operation and display

4.1 Instruction of operation and display

Figure 4-1 Operating panel

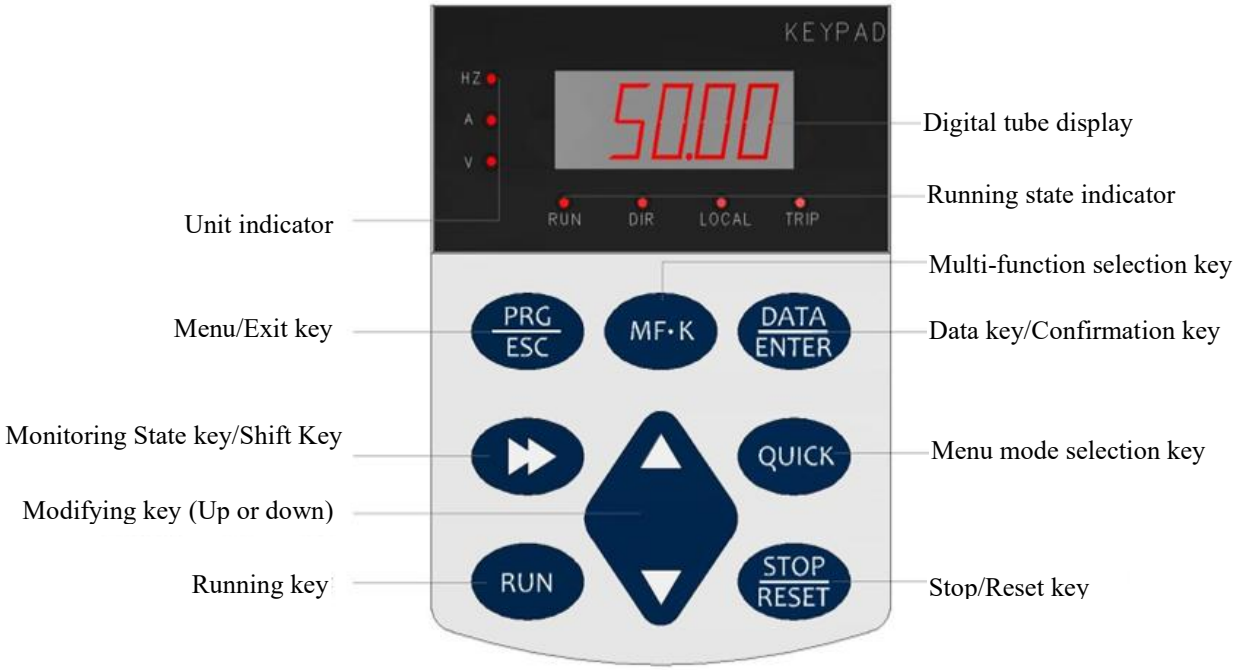
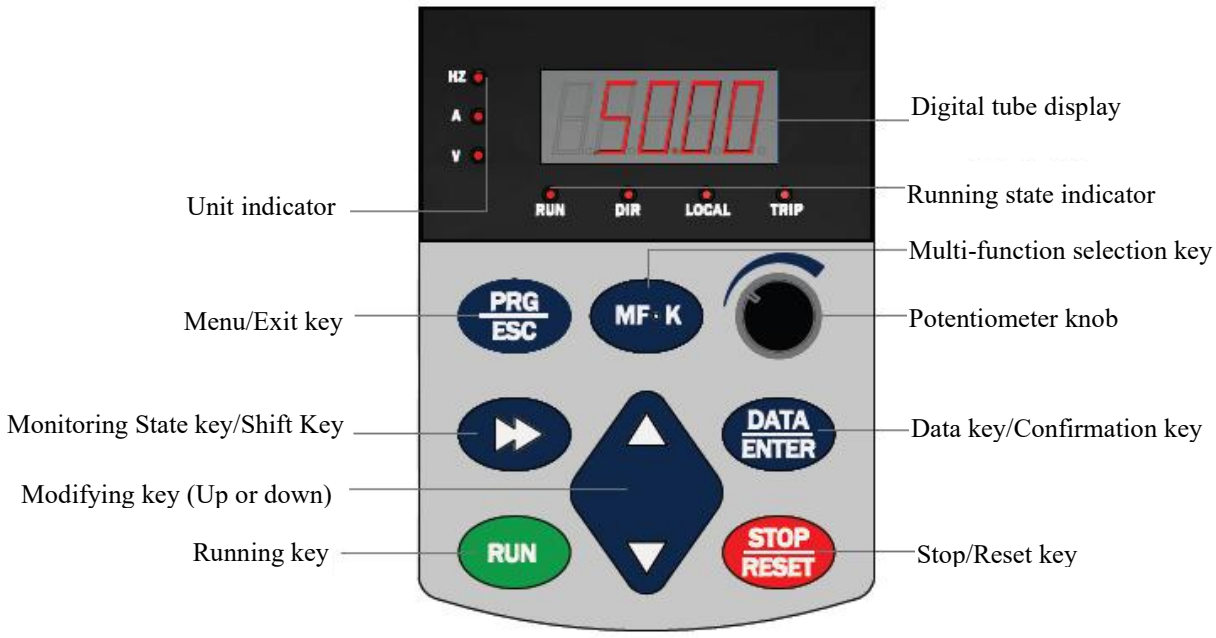


Figure 4-2 Operating panel 2 (With potentiometer)



1) Description of indicator

- RUN:

OFF indicates that the frequency inverter is in the stop state and ON indicates that the frequency inverter is in the running state.

- LOCAL:

It indicates whether the frequency inverter is operated by operation keypad, terminals or remoter (communication). OFF indicates keypad operation control state; ON indicates terminals operation control state; Blinking indicates remote operation control state.

- DIR: It is Forward/Reversal indicator, ON indicates forward rotation.
- TRIP: Tunning/ Torque Control/Fault indicator

When the indicator is ON, it indicates torque control mode. When the indicator is blinking slowly, it indicates the auto-tuning state. When the indicator is blinking quickly, it indicates the fault state.

2) Unit indicator

Hz: frequency unit;

A: Current unit;

V: Voltage unit

3) Digital display area

The 5-digit LED display is able to display the set frequency, output frequency, monitoring data and fault codes.

4) Description of Keys on the Operation panel (keypad)

Table 4-1 Keypad function table

Key	Name	Function
PRG/ESC	Programming	Enter or exit menu level I.
DATA/ENTER	Confirmation	Enter the menu interfaces level by level, and confirm the parameter setting.
△	Increment	Increase data or function code.
▽	Decrement	Decrease data or function code.
▷▷	Shift	Select the displayed parameters in turn in the stop or running state, and select the digit to be modified when modifying parameters.
RUN	RUN	Start the frequency inverter in the operation panel control mode.
STOP/RESET	Stop/Reset	Stop the frequency inverter when it is in the running state and perform the reset operation when it is in the fault state. The functions of this key are restricted by b9-00.
MF.K	Multi-function	Perform function switchover according to the setting of b9-01
QUICK (PRG+DATA)	Menu mode selection	Perform switchover between menu modes according to the setting of A0-08(The default is a menu mode). (There is no QUICK key in the potentiometer keypad. Press the PRG and DATA key meantime to realize the QUICK function.)

4.2 Viewing and Modifying Function Codes

The operation panel of the KOC680 adopts three-level menu.

The three-level menu consists of function code group (Level I), function code (Level II), and function code setting value (level III), as shown in the following figure.

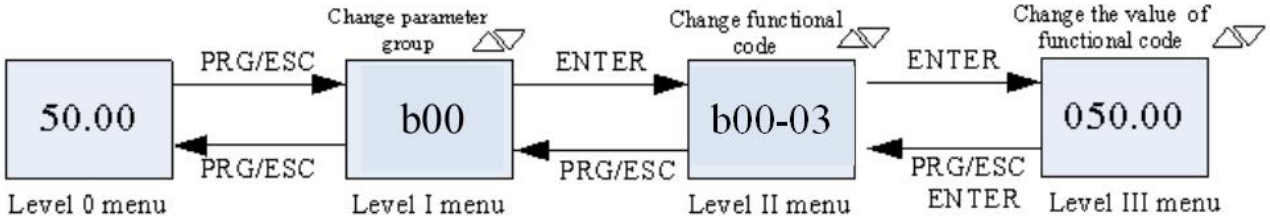


Figure 4-3 Operation procedure on the operation panel

Instruction: We can return to level II menu from Level III menu by pressing PRG or ENTER.

The difference between them is:

After you press ENTER, the system saves the parameter setting first, and then goes back to Level II menu and shifts to the next function code.

After you press PRG, the system does not save the parameter setting, but directly returns to Level II menu and remains at the present function code.

Under the Level III state, if there is no blinking digit of this parameter, then it indicates that the parameter can not to be modified. The possible reasons are:

1) This function code is a non-modifiable parameter, such as the actual testing parameters, operation records, etc.

2) This function code cannot be modified under the running state, but can modify after stopping.

Chapter 5 Function Code Table

If b07.00 is set to a non-zero number, parameter protection is enabled. You must enter correct user password to enter the menu.To cancel the password protection function, enter with password and set b07.00 to 0.

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

The symbols in the function code table are described as follows:

"☆": The parameter can be modified when the frequency inverter is in stop or running state.

"★": The parameter cannot be modified when the frequency inverter is in running state.

"●": The parameter is the actually measured value and cannot be modified.

"*": The parameter is factory parameter and can be modified only by the manufacturer.

Function code	Name	Detailed instruction of parameters	Default	Property
Group b00 Basic function group				
b00.00	Inverter type	0：G type 1：P type	0	★
b00.01	Speed control mode	1：Open loop vector control mode（Suit for asynchronous motor） 2：V/F control mode（Suit for asynchronous motor） 3：Open loop vector control mode （Suitable for: synchronous motor）	2	☆
b00.02	Run command channel	0：Keypad running command channel（LED light off LOCAL） 1： Terminal running command channel （ LED light on LOCAL） 2：Communication running command channel（LED flickering LOCAL）	0	☆
b00.03	Max. output frequency	b00.04~600.00Hz	50.00Hz	★
b00.04	Upper limit of the running frequency	b00.05~b00.03（Max. output frequency）	50.00Hz	★
b00.05	Lower limit of the running frequency	0.00Hz~b00.04（Upper limit of the running frequency）	0.00Hz	★
b00.06	Main frequency source X selection	0：Keypad number setting 1：Potentiometer of keypad 2：AI1 3：AI2 4：High pulse HDI 5：Simple PLC programme 6：Multi-functio0n 7：PID 8：MODBUS communication protocol	0	☆
b00.07	Main frequency source Y selection	0：Keypad number setting 1：Potentiometer of keypad 2：AI1 3：AI2	2	☆

Function code	Name	Detailed instruction of parameters	Default	Property
		4：High pulse HDI 5：Simple PLC programme 6：Multi-functio0n 7：PID 8：MODBUS communication protocol		
b00.08	Range of auxiliary frequency Y	0：Max output frequency 1：Relative to main frequency X	0	☆
b00.09	Combination of the setting source	0：X，the current frequency setting is X frequency command. 1：Y，the current frequency setting is Y frequency command. 2：X+Y，the current frequency setting is X+Y frequency command. 3：X-Y，the current frequency setting is X-Y frequency command. 4：Max（X，Y） 5：Min（X，Y）	0	☆
b00.10	Keypad set frequency	0.00 Hz~b00.03（Max output frequency）	50.00Hz	☆
b00.11	Acceleration time 1	0.0~3600.0s	Model Dependent	☆
b00.12	Deceleration time 1	0.0~3600.0s	Model Dependent	☆
b00.13	Running direction	0: Runs at the default direction 1: Runs at the opposite direction 2: Forbid to run in reverse direction	0	☆
b00.14	Carrier frequency setting	1.0-15.0KHz	Model Dependent	☆
b00.15	Motor parameter autotuning	0：No operation 1：Rotation autotuning 2：Static autotuning 1 3：Static autotuning 2	0	★
b00.16	AVR function selection	0：Invalid 1：Valid	1	☆
b00.17	Retain	Retain	0	★
b00.18	Function restore parameter	0：No operation 1：Restore the default value（Not include motor parameter） 2：Clear fault records 3：Lock keypad	0	★
b00.19	Carrier frequency automatic regulating selection	0: No automatic adjustment 1: Automatic adjustment	0	

Function code	Name	Detailed instruction of parameters	Default	Property
b00.20	Acceleration and deceleration mode selection	0: linear 1: S curve	0	
b00.21	S curve starting time	0.0 ~ 50.0S	0.1	
b00.22	S curve end time	0.0 ~ 50.0S	0.1	
Group b01 Start-up and stop control				
b01.00	Start mode	0：Start-up directly 1：Start-up after DC braking 2：Start-up after speed tracking	0	★
b01.01	Starting frequency of direct start	0.00~50.00Hz	0.50Hz	★
b01.02	Retention time of the starting frequency	0.0s-50s	0.0s	★
b01.03	The braking current before starting	0.0~100.0%	0.0%	★
b01.04	The braking time before starting	0.00~50.00s	0.00s	★
b01.05	Retain	Retain	0	★
b01.06	Speed tracking mode	0: start from stop frequency 1: Start with 0 speed 2: Start with maximum frequency	0	☆
b01.07	Speed tracking	0~100	20	☆
b01.08	Stop mode	0：Decelerate to stop； 1：Coast to stop；	0	☆
b01.09	Starting frequency of DC braking	0.00Hz~b00.03（Max output frequency）	0.00Hz	☆
b01.10	Waiting time before DC braking	0.00~50.00s	0.00s	☆
b01.11	DC braking current	0.0~100.0%	0.0%	☆
b01.12	DC braking time	0.00~50.00s	0.00s	☆
b01.13	Dead time of FWD/REVrotation	0.0~3600.0s	0.0s	☆
b01.14	Shiftingbetween FWD/REVrotation	0：Switch after 0 frequency 1：Switch after the starting frequency 2：Switch after the stopping speed	0	★
b01.15	Stopping speed	0.00~100.00Hz	0.50 Hz	★
b01.16	Detection of stopping speed	0： Detect according to speed setting (no stopping delay) 1：Detect according to speed feedback (only valid for vector control)	1	★
b01.17	Detection time of the feedback speed	0.00~100.00s （Only valid for b01.16=1）	0.50s	★
b01.18	Operation protection during powering on	0：The terminal running command is invalid when powering on. 1：The terminal running command is valid when powering on.	0	☆
b01.19	Action selection when running frequency is	0：Run at the lower limit frequency 1：Stop 2：Sleep and standby	0	★

Function code	Name	Detailed instruction of parameters	Default	Property
	lower than lower limit of frequency (valid when low limit of frequency is larger than 0)			
b01.20	Wake-up-from-sleep delay	0.0~3600.0s（Valid when b01.19=2）	0.0s	☆
b01.21	Restart after power off	0：Disable 1：Enable	0	☆
b01.22	The waiting time of restart after power off	0.0~3600.0s（Valid when b01.21=1）	1.0s	☆
b01.23	Start delay time	0.0~60.0s	0.0s	☆
b01.24	Delay time of the stop speed	0.0~100.0s	0.0s	☆
b01.25	0Hz output selection	0：Output without voltage 1：Output with voltage 2：Output at the DC braking current	0	☆
Group b02 Motor 1 parameter				
B02.00	Motor type	0：Asynchronous machine 1：Synchronous machine	Model dependent	★
b02.01	Rated power of motor	0.1~3000.0kW	Model dependent	★
b02.02	Rated frequency of motor	0.01Hz~b00.03（Max. output frequency）	50.00Hz	★
b02.03	Rated speed of motor	1rbm～65535rbm	Model dependent	★
b02.04	Rated voltage of motor	1V～2000V	Model dependent	★
b02.05	Rated current of motor	0.8A～6000.0A	Model dependent	★
b02.06	Stator resistor of asynchronous motor	0.001Ω～65.535Ω	Model dependent	☆
b02.07	Rotor resistor of asynchronous motor	0.001Ω～65.535Ω	Model dependent	☆
b02.08	Leakage inductance of	0.1mH～6553.5mH	Model	☆

Function code	Name	Detailed instruction of parameters	Default	Property
	asynchronous motor		dependent	
b02.09	Mutual inductance of asynchronous motor	0.1mH～6553.5 mH	Model dependent	☆
b02.10	Non-load current of asynchronous motor	0.1A～6553.5A	Model dependent	☆
b02.11	Magnetic saturation coefficient of core 1 of asynchronous motor 1	0.0~100.0%	Model dependent	★
b02.12	Magnetic saturation coefficient 2 of iron core of asynchronous motor 1	0.0~100.0%	50.00Hz	★
b02.13	Magnetic saturation coefficient of core 3 of asynchronous motor 1	0.0~100.0%	Model dependent	★
b02.14	Magnetic saturation coefficient of core 4 of asynchronous motor 1	0.0~100.0%	Model dependent	★
b02.15	Rated power of synchronous motor 1	0.1~3000.0kW	Model dependent	★
b02.16	Rated frequency of synchronous motor 1	0.01Hz~b00.03（Maximum frequency）	Model dependent	☆
b02.17	Number of poles of synchronous motor1	1~50	Model dependent	☆
b02.18	Rated voltage of synchronous motor 1	0~1200V	Model dependent	☆
b02.19	Rated current of synchronous motor 1	0.8~6000.0A	Model dependent	☆
b02.20	Stator resistance of synchronous motor 1	0.001~65.535Ω	Model dependent	☆
b02.21	Direct axis inductance of synchronous motor 1	0.01~655.35mH	Model dependent	★
b02.22	Synchronous motor 1 quadrature axis inductance	0.01~655.35mH	50.00Hz	★
b02.23	Back EMF constant of	0~10000	Model	★

Function code	Name	Detailed instruction of parameters	Default	Property
	synchronous motor 1		dependent	
b02.24	Initial pole position of synchronous motor 1 (reserved)	0x0000~0xFFFF	Model dependent	★
b02.25	Synchronous motor 1 Identification current (reserved)	0%~50%（Rated current of motor）	Model dependent	★
b02.26	Motor 1 overload protection	0：No protection 1：Common motor (with low speed compensation) 2：Variable frequency motor (without low speed compensation)	2	★
b02.27	Motor 1 over load protection coefficient	20.0%～120%	100.0%	☆
b02.28	Correction coefficient of motor 1 power	0.00~3.00	1.00	☆
b02.29	Retain	Retain	0	★
Group b03 Input terminal				
b03.00	HDI input type selection	0: HDI is high speed pulse input 1: HDI is switch input	0	☆
b03.01	DI1 terminal function selection	0: no function 1: Forward running 2: Reverse running 3: Three line operation control 4: Forward turning inching 5: Reverse turning inching 6: Free parking 7: Fault reset 8: Operation pause 9: External fault input 10: Frequency setting increment (UB) 11: Frequency setting decrease (down) 12: Frequency increase / decrease setting clear 13: Switch between setting a and setting B 14: Switch between combination setting and a setting 15: Switch between combination setting and B setting 16: Multi speed terminal 1 17: Multi speed terminal 2 18: Multi speed terminal 3 19: Multi speed terminal 4	1	☆
b03.02	DI2 terminal function selection		4	☆
b03.03	DI3 terminal function selection		7	☆
b03.04	DI4 terminal function selection		0	☆

Function code	Name	Detailed instruction of parameters	Default	Property
b03.05	HDI5 terminal function selection	20: Multi speed pause 21: acceleration and deceleration time selection 1 22: acceleration and deceleration time selection 2 23: simple BLC shutdown reset 24: simple BLC pause 25: bid control suspended 26: swing frequency pause (stop at current frequency) 27: swing frequency reset (return to center frequency) 28: counter reset 29: torque control inhibit 30: acceleration and deceleration forbidden 31: counter triggered 32: length reset 33: the frequency setting is temporarily cleared 34: stop DC brake 35: reserved 36: command switch to keyboard 37: command switch to terminal 38: command switch to communication 39: pre excitation command 40: clearing power consumption 41: power consumption maintenance 42-60: reserved 61: bid polarity switching 62-63: reserved	0	☆
b03.06	HDI6 terminal function selection		0	☆
b03.07	HDI7 terminal function selection		0	☆
b03.08	HDI8 terminal function selection		0	☆
b03.09	HDI terminal function selection		0	☆
b03.10	Input terminal polarity selection	0x000~0x1FF	0x000	☆
b03.11	Switching filter time	0.000~1.000s	0.010s	☆
b03.12	Virtual terminal setting	0x000 ~ 0x1ff (0: forbidden, 1: enabled) Bit0: HDI1 virtual terminal enable Bit1: HDI2 virtual terminal enable Bit2: HDI3 virtual terminal enable Bit3: S4 virtual terminal enable Bit4: S5 virtual terminal enable Bit5: S6 virtual terminal enable Bit6: S7 virtual terminal enable Bit7: S8 virtual terminal enable Bit8: HDI virtual terminal enable	0x000	☆
b03.13	Terminal control operation mode	0: two wire control 1 1: Two wire control 2 2: Three wire control 1 3: Three wire control 2	0	☆
b03.14	HD1 terminal closing delay time	0.000~50.000s	0.000s	☆
b03.15	HDI1 terminal turn off delay time	0.000~50.000s	0.000s	☆
b03.16	HDI2 terminal closing delay time	0.000~50.000s	0.000s	☆

Function code	Name	Detailed instruction of parameters	Default	Property
b03.17	HDI2 terminal turn off delay time	0.000~50.000s	0.000s	☆
b03.18	HDI3 terminal closing delay time	0.000~50.000s	0.000s	☆
b03.19	HDI3 terminal turn off delay time		0.000s	☆
b03.20	HDI4 terminal closing delay time	0.000~50.000s	0.000s	☆
b03.21	HDI4 terminal turn off delay time	0.000~50.000s	0.000s	☆
b03.22	HDI5 terminal closing delay time	0.000~50.000s	0.000s	☆
b03.23	HDI5 terminal turn off delay time	0.000~50.000s	0.000s	☆
b03.24	HDI6 terminal closing delay time	0.000~50.000s	0.000s	★
b03.25	HDI6 terminal turn off delay time	0.000~50.000s	0.000s	☆
b03.26	HDI7 terminal closing delay time	0.000~50.000s	0.000s	☆
b03.27	HDI7 terminal turn off delay time	0.000~50.000s	0.000s	☆
b03.28	HDI8 terminal closing delay time	0.000~50.000s	0.000s	☆
b03.29	HDI8 terminal turn off delay time	0.000~50.000s	0.000s	☆
B03.30	HDI terminal closing delay time	0.000~50.000s	0.000s	☆
B03.31	HDI terminal turn off delay time	0.000~50.000s	0.000s	☆
B03.32	AI1 lower limit	0.00V~B05.34	0.00V	☆
B03.33	AI1 lower limit corresponding setting	-100.0%~100.0%	0.0%	☆
B03.34	AI1 upper limit	B05.32~10.00V	10.00V	☆
B03.35	AI1 upper limit corresponding setting	-100.0%~100.0%	100.00%	☆
B03.36	AI1 input filtering time	0.000s~10.000s	0.100s	☆
B03.37	AI2 lower limit	0.00V~B05.39	0.00V	☆
B03.38	AI2 lower limit corresponding setting	-100.0%~100.0%	0.0%	☆
B03.39	AI2 upper limit	B05.37~10.00V	10.00V	☆
B03.40	AI2 upper limit corresponding setting	-100.0%~100.0%	100.00%	★
B03.41	AI2 input filtering time	0.000s~10.000s	0.100s	☆
B03.42	AI3 lower limit	-10.00V~B05.44	0.00V	☆
B03.43	AI3 lower limit corresponding setting	-100.0%~100.0%	-100.0%	☆
B03.44	AI3 median	B05.42~B05.46	0.00V	☆
B03.45	AI3 median corresponding setting	-100.0%~100.0%	0.0%	☆
B03.46	AI3 upper limit	B05.44~10.00V	10.00V	☆
B03.47	AI3 upper limit corresponding setting	-100.0%~100.0%	100.0%	☆
B03.48	AI3 input filtering time	0.000s~10.000s	0.100s	☆
B03.49	Retain	Retain	Retain	☆
B03.50	HDI lower limit frequency	0.000 KHz ~ B05.52	0.000KHz	☆
B03.51	HDIlower limit frequency	-100.0%~100.0%	0.0%	☆

Function code	Name	Detailed instruction of parameters	Default	Property
	corresponding setting			
B03.52	HDI upper limit frequency	B05.50 ~50.000KHz	50.000KHz	☆
B03.53	HDI upper limit frequency corresponding setting	-100.0%~100.0%	100.0%	☆
B03.54	HDI frequency input filtering time	0.000s~10.000s	0.010s	☆
Group b04 output terminal				☆
b04.00	FM output type selection	0: Open collector high speed pulse output 1: Open collector output	0	☆
b04.01	DO1 output selection	0: invalid 1: In operation 2: Forward running 3: Reverse operation 4: Inching operation 5: Inverter failure 6: Frequency level detection fdt1 7: Frequency level detection fdt2 8: Frequency arrival 9: Zero speed operation 10: Upper frequency reached 11: Lower frequency reached 12: Operational readiness 13: In pre excitation 14: Overload warning 15: Under load warning 16: Simple BLC phase completed 17: Simple BLC cycle completed 18: Set the count value to arrive 19: Designated count value arrival 20: External fault valid 21: length arrival 22: run time arrives 23: Modbus Communication virtual terminal output 24: reserved 25: reserved 26: DC bus voltage is established 27: auxiliary motor 1 starts 28: auxiliary motor 2 starts 26-30: reserved	0	☆
b04.02	FM output selection		20.0%	☆
b04.03	Relay RY1 output selection		0.00Hz	☆
b04.04	Relay RY2 output selection		00.0%	☆

Function code	Name	Detailed instruction of parameters	Default	Property
b04.05	Output terminal polarity selection	0 and positive 1and 00~0F BIT0: DO1 | BIT1: FM | BIT2: RELAY1 | BIT3: RELAY2	0	☆
b04.06	DO1 turn on delay time	0.000~50.000s	0.00s	☆
b04.07	DO1 off delay time	0.000~50.000s	0.00s	☆
b04.08	FM on delay time	0.000~50.000s（Only b06.00 = 1 is valid）	0.00s	☆
b04.09	FM off delay time	0.000~50.000s（Only b06.00 = 1 is valid）	0.00s	
b04.10	Delay time of relay RY1	0.000~50.000s	0.00s	☆
b04.11	Off delay time of relay RY1	0.000~50.000s	0.00s	☆
b04.12	Delay time of relay RY2	0.000~50.000s	0.00s	☆
b04.13	Off delay time of relay RY2	0.000~50.000s	0.00s	☆
b04.14	AO1 output selection	0: operating frequency 1: Set frequency 2: Given frequency of slope 3: Operating speed 4: Output current (relative to frequency converter) 5: Output current (relative to motor) 6: Output voltage 7: Output power 8: Set torque value 9: Output torque 10: Analog Ai1 input value 11: Analog AI2 input value 12: Analog ai3 input value 13: High speed pulse HDI input value 14: Modbus communication set point 1 15: Modbus communication set point 2 16: Reservation 17: Reservation 18: Reservation 19: Reservation 20: Reservation 21: reserved 22: torque current (relative to motor rated current) 23: slope given frequency (signed) 24-30: reserved	0	☆
b04.15	AO2 output selection		0	☆
b04.16	FM high speed pulse output selection		0	☆
b04.17	AO1 output lower limit	-100.0%~B04.19	0.00%	☆
b04.18	The lower limit corresponds to AO1 output	0.00V~10.00V	0.00V	★
b04.19	AO1 output upper limit	B04.17~100.0%	100.0%	★
b04.20	The upper limit corresponds to AO1 output	0.00V~10.00V	10.00V	☆

Function code	Name	Detailed instruction of parameters	Default	Property
B04.21	AO1 output filtering time	0.000s~10.000s	0.000s	
B04.22	AO2 output lower limit	-100.0%~B04.24	0.0%	
B04.23	The lower limit corresponds to AO2 output	0.00V~10.00V	0.00V	
B04.24	AO2 output upper limit	B06.22~100.0%	100.0%	
B04.25	The upper limit corresponds to AO2 output	0.00V~10.00V	10.00V	
B04.26	AO2 output filtering time	0.000s~10.000s	0.000s	
B04.27	FM output lower limit 3	-100.0%~B06.29	0.00%	
B04.28	The lower limit corresponds to FM output	0.00~50.00kHz	0.00kHz	
B04.29	FM output upper limit 3	B06.27~100.0%	100.0%	
B04.30	The upper limit corresponds to FM output	0.00~50.00kHz	50.00kHz	
B04.31	FM output filtering time	0.000s~10.000s	0.000s	
Group b05 vector control				
b05.00	Speed loop proportional gain 1	0~200.0	20.0	★
b05.01	Speed loop integral time 1	0.000~10.000s	0.200s	★
b05.02	Switching low frequency	0.00Hz~B03.05	5.00Hz	★
b05.03	Speed loop proportional gain 2	0~200.0	20.0	★
b05.04	Speed loop integral time 2	0.000~10.000s	0.200s	★
b05.05	Switching high point frequency	B03.02~B00.03（Maximum frequency）	10.00Hz	★
b05.06	Output filtering of velocity loop	0~8（corresponding0~2^8/10ms）	0	★
b05.07	Slip compensation coefficient of vector control (electric)	50%~200%	100%	★
b05.08	Slip compensation coefficient of vector control	50%~200%	100%	★
b05.09	Current loop scale factor B	0~65535	1000	★
b05.10	Current loop integral coefficient I	0~65535	1000	☆
b05.11	Selection of torque setting mode	0: torque control is invalid 1: Keyboard setting torque (b03.12) 2: Analog quantity Ai1 set torque (100% relative to 3 times of motor current) 3: Setting torque of analog quantity AI2 (same as above) 4: Setting torque of analog quantity ai3 (same as above) 5: Pulse frequency HDI set torque (same as above) 6: Multi stage torque setting (as above) 7: Modbus communication setting torque (as above) 8: Brohibus / canoben communication setting torque (same as above) 9: Ethernet communication setting torque (same as above) 10: Reservation	0	☆

Function code	Name	Detailed instruction of parameters	Default	Property
b05.12	Keyboard setting torque	-300.0%~300.0%（Rated current of motor）	50.0%	★
b05.13	Torque given filtering time	0.000~10.000s	0.010s	★
b05.14	Selection of upper limit frequency setting source for forward rotation of torque control	0: keyboard set upper limit frequency (b03.16) 1: Analog quantity Ai1 set upper limit frequency (100% corresponding to maximum frequency) 2: Set upper limit frequency of analog quantity AI2 (as above) 3: Set upper limit frequency of analog quantity ai3 (as above) 4: Pulse frequency HDI set upper limit frequency (as above) 5: Multi segment setting upper limit frequency (as above) 6: Modbus communication set upper limit frequency (as above) 7: Brohibus / canoben communication set upper limit frequency (same as above) 8: Set upper limit frequency for Ethernet communication (as above) 9: Reservation	0	☆
b05.15	Selection of torque control inversion upper limit frequency setting source	0: keyboard set upper limit frequency (b03.17) 1: Analog quantity Ai1 set upper limit frequency (100% corresponding to maximum frequency) 2: Set upper limit frequency of analog quantity AI2 (as above) 3: Set upper limit frequency of analog quantity ai3 (as above) 4: Pulse frequency HDI set upper limit frequency (as above) 5: Multi segment setting upper limit frequency (as above) 6: Modbus communication set upper limit frequency (as above) 7: Brohibus / canoben communication set upper limit frequency (same as above) 8: Set upper limit frequency for Ethernet communication (as above) 9: Reservation	0	☆
b05.16	Limit value of upper limit frequency keyboard for forward rotation of torque control	0.00Hz~B00.03	50.00 Hz	☆
b05.17	Torque control inversion upper limit frequency keyboard limit value	0.00 Hz~B00.03	50.00Hz	☆
b05.18	Selection of electric torque upper limit setting source	0: keyboard setting torque upper limit (b03.20) 1: Analog quantity Ai1 sets the upper limit of torque (100% relative to 3 times of motor current) 2: Set the upper limit of torque by analog AI2 (as above) 3: Set the upper limit of torque by analog quantity ai3 (as above) 4: Pulse frequency HDI set torque upper limit (as above) 5: Modbus communication setting torque upper limit (as	0	☆

Function code	Name	Detailed instruction of parameters	Default	Property
		above) 6: Brohibus / canoben communication set torque upper limit (same as above) 7: Ethernet communication set torque upper limit (same as above) 8: Reservation		
b05.19	Selection of braking torque upper limit setting source	0: keyboard setting torque upper limit (b03.21) 1: Analog quantity Ai1 set torque upper limit (100% relative to 3 times of motor rated current) 2: Set the upper limit of torque by analog AI2 (as above) 3: Set the upper limit of torque by analog quantity ai3 (as above) 4: Pulse frequency HDI set torque upper limit (as above) 5: Modbus communication setting torque upper limit (as above) 6: Brohibus / canoben communication set torque upper limit (same as above) 7: Ethernet communication set torque upper limit (same as above) 8: Reservation	0	☆
b05.20	Electric torque upper limit keyboard setting	0.0~300.0%（Rated current of motor）	0	☆
b05.21	Brake torque upper limit keyboard setting	0.0~300.0%（Rated current of motor）	0.000s	☆
b05.22	Flux weakening coefficient in constant power region	0.1~2.0	0.3	☆
b05.23	Minimum weak magnetic point in constant power area	10%~100%	20%	☆
b05.24	Maximum voltage limit	0.0~120.0%	100.0%	☆
b05.25	Pre excitation time	0.000~10.000s	0.300s	☆
b05.26	Flux weakening proportional gain	0~8000	1000	☆
b05.27	Vector control speed display selection	0: Display by actual value 1: Display by set value	0	☆
b05.28	Static friction compensation coefficient	0.0~100.0%	0.0%	☆
b05.29	Dynamic friction compensation coefficient	0.0~100.0%	0.0%	☆
Group b06 V / F control				
b06.00	Setting of motor 1V / F curve	0: straight V / F curve 1: Multipoint V / F curve 2: 1.3 power down torque V / F curve 3: 1.7 power down torque V / F curve 4: 2.0 power down torque V / F curve 5: Custom V / F (V / F separation)	0	★

Function code	Name	Detailed instruction of parameters	Default	Property
b06.01	Motor 1 torque increase	0.0%：（automatic）0.1%~10.0%	0.0%	☆
b06.02	Motor 1 torque lifting cut-off	0.0%~50.0%（Relative motor 1 rated frequency）	20.0%	☆
b06.03	Motor 1V / F frequency point 1	0.00Hz~b06.05	0.00Hz	☆
b06.04	Motor 1V / F voltage point 1	0.0%~110.0%（Rated voltage of motor 1）	00.0%	☆
b06.05	Motor 1V / F frequency point 2	B06.03~ B06.07	00.00Hz	☆
b06.06	Motor 1V / F voltage point 2	0.0%~110.0%（Rated voltage of motor 1）	00.0%	☆
b06.07	Motor 1V / F frequency point 3	B06.05~ B02.02（Relative motor 1 rated frequency） Or B04.05~ B02.16（Relative motor 1 rated frequency）	00.00Hz	☆
b06.08	Motor 1V / F voltage point 3	0.0%~110.0%（Rated voltage of motor 1）	00.0%	☆
b06.09	Motor 1V / F slip compensation gain	0.0~200.0%	100.0%	☆
b06.10	Low frequency suppression oscillation factor of motor 1 delay time	0~100	10	☆
b06.11	High frequency suppression oscillation factor of motor 1	0~100	10	☆
b06.12	Cut off point for motor 1 oscillation suppression	0.00Hz~B00.03（Maximum frequency）	30.00 Hz	☆
b06.13-b06.25		Retain	Retain	
b06.26	Energy saving operation selection	0: no action 1: Automatic energy saving operation	0	☆
b06.27	Voltage setting channel selection	0: keyboard set voltage (set by b04.28) 1: AI1 set voltage 2: AI2 set voltage 3: AI3 set voltage 4: HDI set voltage 5: Multi segment set voltage (the set value is determined by the multi segment speed of B10 group parameters) 6: Bid set voltage 7: Modbus communication setting voltage 8: Reservation 9: Reservation 10: Reservation	0	☆
b06.28	Keyboard set voltage value	0.0%~100.0%	100.0%	☆

Function code	Name	Detailed instruction of parameters	Default	Property
b06.29	Voltage increase time	0.0~3600.0s	5.0s	☆
b06.30	Voltage reduction time	0.0~3600.0s	5.0s	☆
b06.31	Maximum output voltage	B04.32~100.0%（Rated voltage of motor）	100.0%	☆
b06.32	Minimum output voltage	0.0%~ B04.31（Rated voltage of motor）	0.0%	☆
b06.33	Flux weakening coefficient in constant power region	1.00~1.30	1.00	☆
b06.34	Retain	Retain		
Group b07 Human-Machine Interface				
b07.00	User's password	0~65535	0	☆
b07.01	Parameter copy	0：No operation 1：Upload the local function parameter to the keypad 2：Download the keypad function parameter to local address(including the motor parameters) 3：Download the keypad function parameter to local address (excluding the motor parameter of b02 group) 4：Download the keypad function parameters to local address (only for the motor parameter of b02 group)	0	★
b07.02	FM.K function selection	0：No function 1：Jogging 2：Shift the display state by the shifting key 3：Shift between forward rotations and reverse rotations 4：Clear UP/DOWN setting 5：Coast to stop 6：Shift the running commands source 7：Quick commission mode(committee according to the non-factory parameter) Setting range：0x00~0x27	0X01	★
b07.03	Shifting sequence selection of FM.K commands	0：Keypad control→terminals control →communication control 1：Keypad control←→terminals control 2：Keypad control←→communication control 3：Terminals control←→communication control	0	☆

Function code	Name	Detailed instruction of parameters	Default	Property
b07.04	STOP/RESET stop function	0：Only valid for the keypad control 1：Both valid for keypad and terminals control 2：Both valid for keypad and communication control 3：Valid for all control modes	0	☆
b07.05	Parameters state 1	0x0000~0xFFFF BIT0：running frequency (Hz on) BIT1：set frequency (Hz flickering) BIT2：bus voltage（V on） BIT3：output voltage (V on) BIT4：output current (A on) BIT5：running rotation speed (rpm on) BIT6：output power (% on) BIT7：output torque (% on) BIT8：PID reference (% flickering) BIT9：PID feedback value (% on) BIT10：input terminals state BIT11：output terminals state BIT12：torque set value (% on) BIT13：pulse counter value BIT15：PLC and the current stage in multi-step speed	030XFF	☆
b07.06	Parameters state 2	0x0000~0xFFFF BIT0：Keypad potentiometer setting BIT1：AI1 (V on) BIT2：AI2 (V on) BIT3：HDI frequency BIT4：motor overload percentage (% on) BIT5：the inverter overload percentage (% on) BIT6：ramp frequency given value (Hz on) BIT7：linear speed BIT8：AC inlet current (A on) BIT9：upper limit frequency (Hz on)	0X0000	☆
b07.07	The parameter in the stop state	0x0000~0xFFFF BIT0： set frequency (Hz on, frequency flickering slowly) BIT1：bus voltage (V on) BIT2：input terminals state BIT3：output terminals state BIT4：PID reference (% flickering) BIT5：PID feedback value (% flickering) BIT7：Keypad potentiometer setting BIT8：analog AI1 value (V on) BIT9：analog AI2 value (V on) BIT10：high speed pulse HDI frequency BIT11：PLC and the current step in multi-step speed	0X00FF	☆

Function code	Name	Detailed instruction of parameters	Default	Property
		BIT12：pulse counters BIT14：upper limit frequency (Hz on)		
b07.08	Frequency coefficient	0.01~10.00	1.00	☆
b07.09	Rotation speed coefficient	0.1~999.9%	100.0%	☆
b07.10	Linear speed coefficient	0.1~999.9%	1.0%	☆
b07.11	Rectifier bridge module temperature	0~100.0℃	/	●
b07.12	IGBT module temperature	0~100.0℃	/	●
b07.13	Software version	1.00~655.35	/	●
b07.14	Local accumulative running time	0~65535h	/	●
b07.15	High bit of power consumption	0~65535 kWh（*1000）	/	●
b07.16	Low bit of power consumption	0.0~999.9 kWh	/	●
b07.17	Inverter type	0：G type 1：P type	/	●
b07.18	Rated power of the inverter	0.4~3000.0kW	/	●
b07.19	Rated voltage of the inverter	50~1200V	/	●
b07.20	Rated current of the inverter	0.1~6000.0A	/	●
b07.27	Type of present fault	0：No fault 1：IGBT U phase protection（OUt1） 2：IGBT V phase protection（OUt2） 3：IGBT W phase protection（OUt3） 4：OC1 5：OC2 6：OC3 7：OV1 8：OV2 9：OV3 10：UV 11：Motor overload（OL1） 12：The inverter overload（OL2） 13：Input side phase loss（SPI） 14：Output side phase loss（SPO） 15：Overheat of the rectifier module（OH1） 16：Overheat fault of the inverter module（OH2） 17：External fault（EF） 18：485 communication fault（CE）	/	●
b07.28	Type of the last fault		/	●
b07.29	Type of the last 2 faults		/	●
b07.30	Type of the last 3 faults		/	●
b07.31	Type of the last 4 faults		/	●
b07.32	Type of the last 5 faults		/	●

Function code	Name	Detailed instruction of parameters	Default	Property
		19：Current detection fault（ItE） 20：Motor autotune fault（tE） 21：EEbROM operation fault（EEb） 22：PID response offline fault（PIDE） 23：Braking unit fault（bCE） 24：Running time arrival（END） 25：Electrical overload（OL3） 26：Panel communication fault（PCE） 27：Parameter uploading fault（UPE） 28：Parameter downloading fault（DNE） 32：Grounding short circuit fault 1（ETH1） 33：Grounding short circuit fault 2（ETH2） 36：Undervoltage fault（LL）		
b07.33	Running frequency at present fault	0.00Hz	-	●
b07.34	Ramp reference frequency at present fault	0.00Hz	-	●
b07.35	Output voltage at the present fault	0V	-	●
b07.36	Output current at present fault	0.0A	-	●
b07.37	Bus voltage at present fault	0.0V	-	●
b07.38	The max. temperature at present fault	0.0℃	-	●
b07.39	Input terminals state at present fault	0	-	●
b07.40	Output terminals state at present fault	0	-	●
b07.41	Running frequency at the last fault	0.00Hz	-	●
b07.42	Ramp reference frequency at the last fault	0.00Hz	-	●
b07.43	Output voltage at the last fault	0V	-	●
b07.44	Output current at the last fault	0.0A	-	●
b07.45	Bus voltage at the last fault	0.0V	-	●
b07.46	The max. temperature at the last fault	0.0℃	-	●
b07.47	Input terminals state at the last fault	0	-	●
b07.48	Output terminals state at the last fault	0	-	●
b07.49	Running frequency at the last 2 faults	0.00Hz	-	●
b07.50	Ramp reference frequency at the last 2 faults	0.00Hz	-	●
b07.51	Output voltage at the last 2 faults	0V	-	●

Function code	Name	Detailed instruction of parameters	Default	Property
b07.52	Output current at the last 2 faults	0.0A	-	●
b07.53	Bus voltage at the last 2 faults	0.0V	-	●
b07.54	The max. temperature at the last 2 faults	0.0℃	-	●
b07.55	Input terminals state at the last 2 faults	0	-	●
b07.56	Output terminals state at the last 2 faults	0	-	●
Group b08 Enhanced function				
b08.00	ACC time 2	0.0~3600.0s	Model dependent	☆
b08.01	DEC time 2	0.0~3600.0s	Model dependent	☆
b08.02	ACC time 3	0.0~3600.0s	Model dependent	☆
b08.03	DEC time 3	0.0~3600.0	Model dependent	☆
b08.04	ACC time 4	0.0~3600.0s	Model dependent	☆
b08.05	DEC time 4	0.0~3600.0s	Model dependent	☆
b08.06	Jogging frequency	0.00Hz~b00.03（Max. output frequency）	5.00Hz	☆
b08.07	Jogging ACC time	0.0~3600.0s	Model dependent	☆
b08.08	Jogging DEC time	0.0~3600.0s	Model dependent	☆
b08.09	Jumping frequency 1	0.00Hz~b00.03（Max. output frequency）	0.00Hz	☆
b08.10	Jumping frequency range 1	0.00Hz~b00.03（Max. output frequency）	0.00Hz	☆
b08.11	Jumping frequency 2	0.00Hz~b00.03（Max. output frequency）	0.00Hz	☆
b08.12	Jumping frequency range 2	0.00Hz~b00.03（Max. output frequency）	0.00Hz	☆
b08.13	Jumping frequency 3	0.00Hz~b00.03（Max. output frequency）	0.00Hz	☆
b08.14	Jumping frequency range 3	0.00Hz~b00.03（Max. output frequency）	0.00Hz	☆
b08.15	Traverse range	0.0~100.0%（relative to the traverse range）	0.0%	☆

Function code	Name	Detailed instruction of parameters	Default	Property
b08.16	Sudden jumping frequency range	0.0~50.0%（relative to the traverse range）	0.0%	☆
b08.17	Traverse boost time	0.1~3600.0s	5.0s	☆
b08.18	Traverse declining time	0.1~3600.0s	5.0s	☆
B08.19-b08.24		Retain		
b08.25	Setting counting value	b08.26~65535	0	☆
b08.26	Reference counting value	0~b08.25	0	☆
b08.27	Set running time	0~65535min	0m	☆
b08.28	Fault auto reset times	0~10	0	☆
b08.29	Interval time of automatic fault reset	0.1~3600.0s	1.0s	☆
b08.30	Frequency decreasing ratio of the dropping control	0.00~10.00Hz	0.00Hz	☆
b08.32	FDT1 electrical level detection value	0.00Hz~b00.03（Max. output frequency）	50.00Hz	☆
b08.33	FDT1 retention detection value	0.0~100.0%（FDT1 electrical level）	5.0%	☆
b08.34	FDT2 electrical level detection value	0.00Hz~b00.03（Max. output frequency）	50.00Hz	☆
b08.35	FDT2 retention detection value	0.0~100.0%（FDT2 electrical level）	5.0%	☆
b08.36	Amplitude value for frequency arrival detection	0.00Hz~b00.03（Max. output frequency）	0.00Hz	☆
b08.37	Energy braking enable	0：Disable 1：Enable	0	☆
b08.38	Threshold voltage	200.0~2000.0V	220V voltage：380.0V	☆
			380V voltage: 700.0V	☆
			600V voltage：1120.0V	☆
b08.39	Cooling fan running mode	0：Normal mode 1：The fan keeps on running after power on	0	☆
b08.40	PWM selection	0x00~0x21 LED ones：PWM mode selection 0：PWM mode 1, three-phase modulation and	00	★

Function code	Name	Detailed instruction of parameters	Default	Property
		two-modulation 1：PWM mode 2, three-phase modulation LED tens: low-speed carrier frequency limit mode 0：Low-speed carrier frequency limit mode 1； 1：Low-speed carrier frequency limit mode 2； 2：No limit		
b08.41	Over modulation selection	0x00~0x11 LED ones 0：Invalid 1：Valid LED tens 0：Light overmodulation；overmodulation depth within area 1 range 1：Heavy overmodulation；overmodulation depth within area 2 range	0x01	★
b08.42	Keypad data control	0x000~0x1223 LED ones: frequency enable selection 0：Both ∧/∨ keys and digital potentiometer adjustments are valid 1：Only ∧/∨ keys adjustment is valid 2：Only digital potentiometer adjustments is valid 3：Neither ∧/∨ keys nor digital potentiometer adjustments are valid LED tens：frequency control selection 0：Only valid when b00.06=0 or b00.07=0 1：Valid for all frequency setting manner 2：Invalid for multi-step speed when multi-step speed has the priority LED hundreds：action selection during stopping 0：Setting is valid 1：Valid during running, cleared after stopping 2：Valid during running, cleared after receiving the stop command LED thousands: ∧/∨ keys and digital potentiometer integral function 0：The integral function is valid 1：The integral function is invalid	0x0000	☆
b08.43	Integral ratio of the keypad potentiometer	0.01~10.00s		☆
b08.44	UP/DOWN terminals control	0x00~0x221 LED ones：frequency control selection 0：UP/DOWN terminals setting valid 1：UP/DOWN terminals setting invalid LED tens：frequency control selection 0：Only valid when b00.06=0 or b00.07=0	0x000	☆

Function code	Name	Detailed instruction of parameters	Default	Property
		1：All frequency means are valid 2：When the multi-step are priority, it is invalid to the multi-step LED hundreds: action selection when stop 0：Setting valid 1：Valid in the running, clear after stop 2：Valid in the running, clear after receiving the stop commands		
b08.45	UP terminals frequency increasing integral ratio	0.01~50.00Hz/s	0.50Hz/s	☆
b08.46	DOWN terminals frequency integral ratio	0.01~50.00 Hz/s	0.50Hz/s	☆
b08.47	Action when the frequency setting is off	0x000~0x111 LED ones：Action selection when power off 0：Save when power off 1：Clear when power off LED tens：Action selection when MODBUS set frequency off 0：Save when power off 1：Clear when power off LED hundreds：The action selection when other frequency set frequency off 0：Save when power off 1：Clear when power off	0x000	☆
b08.48	High bit of initial power consumption	0~59999	0	☆
b08.49	Low bit of initial power consumption	0.0~999.9	0.0	☆
b08.50	Magnetic flux braking	0：Invalid Setting range：100~150	0	☆
b08.51	Inverter input power factor	0.00~1.00	0.56	☆
b08.52	Brake control selection	0：Invalid 1：Valid	0	
b08.53	Brake release frequency	0.00Hz-10.00Hz	2.50Hz	
b08.54	Brake release current	0.0%-200.0%	120．0%	
b08.55	Action time of brake release	0.0S-10.0S	1.0S	
b08.56	Brake closing frequency	0.00Hz-10.00Hz	2．00Hz	
b08.57	Wait time of brake closing	0.0S-10.0S	0.0S	
b08.58	Action time of brake closing	0.0S-10.0S	1.0S	
Group b09 PID control				
b09.00	PID reference source	0：Keypad digital reference（b09.01） 1：Keypad potentiometer setting 2：Analog channel AI1 reference 3：Analog channel AI2 reference	0	☆

Function code	Name	Detailed instruction of parameters	Default	Property
		4：High speed pulse HDI setting 5：Multi-step speed setting 6：MODBUS communication setting		
b09.01	Keypad PID preset	-100.0%~100.0%	0.0%	☆
b09.02	PID feedback source	0：Invalid 1：Analog channel AI1 feedback 2：Analog channel AI2 feedback 3：High speed HDI feedback 4：MODBUS communication feedback	0	☆
b09.03	PID output feature	0：PID output is positive： 1：PID output is negative：	0	☆
b09.04	Proportional gain（Kp）	0.00~100.00	1.00	☆
b09.05	Integral time（Ti）	0.01~10.00s	0.10s	☆
b09.06	Differential time（Td）	0.01~10.00s	0.0s	☆
b09.07	Sampling cycle（T）	0.00~10.000s	0.100s	☆
b09.08	PID control deviation limit	0.0~100.0%	0%	☆
b09.09	Output upper limit of PID	b09.10~100.0%	100%	☆
b09.10	Output lower limit of PID	-100.0%~b09.10	0.0%	☆
b09.11	Feedback offline detection value	0.0~100.0%	0.0%	☆
b09.12	Feedback offline detection time	0.0~3600.0s	1.0s	☆
b09.13	PID adjustment	LED ones： 0：Keep on integral adjustment when the frequency achieves the upper and low limit 1：Stop integral adjustment when the frequency achieves the upper and low limit LED tens： 0：The same with the setting direction； 1：Opposite to the setting direction LED hundreds： 0：Limit to the maximum frequency 1：Limit to frequency X LED thousands： 0：X+Y frequency，the buffer of X frequency is invalid 1：X+Y frequency, the buffer of X frequency is valid ACC/DEC is determined by ACC time 4 of b08.04	0x0001	☆
b09.14	Proportional gain at low frequency（Kp）	0.00~100.00	1.00	☆
b09.15	PID command of ACC/DEC time	0.0~1000.0s	0.0s	☆
b09.16	PID output filter time	0.000~10.000s	0.000s	☆
Group b10 Simple PLC and multi-step speed control				

<table>
<tr><th>Function code</th><th>Name</th><th>Detailed instruction of parameters</th><th>Default</th><th>Property</th></tr>
<tr><td>b10.00</td><td>Simple PLC</td><td>0：Stop after running once
1：Run at the final value after running once
2：Cycle running</td><td>0</td><td>☆</td></tr>
<tr><td>b10.01</td><td>Simple PLC memory</td><td>0：Power loss without memory
1：Power loss memory；</td><td>0</td><td>☆</td></tr>
<tr><td>b10.02</td><td>Multi-step speed 0</td><td>-100.0~100.0%</td><td>0.0%</td><td>☆</td></tr>
<tr><td>b10.03</td><td>Running time of step 0</td><td>0.0~6553.5s（min）</td><td>0.0s</td><td>☆</td></tr>
<tr><td>b10.04</td><td>Multi-step speed 1</td><td>-100.0~100.0%</td><td>0.0%</td><td>☆</td></tr>
<tr><td>b10.05</td><td>Running time of step 1</td><td>0.0~6553.5s（min）</td><td>0.0s</td><td>☆</td></tr>
<tr><td>b10.06</td><td>Multi-step speed 2</td><td>-100.0~100.0%</td><td>0.0%</td><td>☆</td></tr>
<tr><td>b10.07</td><td>Running time of step 2</td><td>0.0~6553.5s（min）</td><td>0.0s</td><td>☆</td></tr>
<tr><td>b10.08</td><td>Multi-step speed 3</td><td>-100.0~100.0%</td><td>0.0%</td><td>☆</td></tr>
<tr><td>b10.09</td><td>Running time of step 3</td><td>0.0~6553.5s（min）</td><td>0.0s</td><td>☆</td></tr>
<tr><td>b10.10</td><td>Multi-step speed 4</td><td>-100.0~100.0%</td><td>0.0%</td><td>☆</td></tr>
<tr><td>b10.11</td><td>Running time of step 4</td><td>0.0~6553.5s（min）</td><td>0.0s</td><td>☆</td></tr>
<tr><td>b10.12</td><td>Multi-step speed 5</td><td>-100.0~100.0%</td><td>0.0%</td><td>☆</td></tr>
<tr><td>b10.13</td><td>Running time of step 5</td><td>0.0~6553.5s（min）</td><td>0.0s</td><td>☆</td></tr>
<tr><td>b10.14</td><td>Multi-step speed 6</td><td>-100.0~100.0%</td><td>0.0%</td><td>☆</td></tr>
<tr><td>b10.15</td><td>Running time of step 6</td><td>0.0~6553.5s（min）</td><td>0.0s</td><td>☆</td></tr>
<tr><td>b10.16</td><td>Multi-step speed 7</td><td>-100.0~100.0%</td><td>0.0%</td><td>☆</td></tr>
<tr><td>b10.17</td><td>Running time of step 7</td><td>0.0~6553.5s（min）</td><td>0.0s</td><td>☆</td></tr>
<tr><td>b10.18</td><td>Multi-step speed 8</td><td>-100.0~100.0%</td><td>0.0%</td><td>☆</td></tr>
<tr><td>b10.19</td><td>Running time of step 8</td><td>0.0~6553.5s（min）</td><td>0.0s</td><td>☆</td></tr>
<tr><td>b10.20</td><td>Multi-step speed 9</td><td>-100.0~100.0%</td><td>0.0%</td><td>☆</td></tr>
<tr><td>b10.21</td><td>Running time of step 9</td><td>0.0~6553.5s（min）</td><td>0.0s</td><td>☆</td></tr>
<tr><td>b10.22</td><td>Multi-step speed 10</td><td>-100.0~100.0%</td><td>0.0%</td><td>☆</td></tr>
<tr><td>b10.23</td><td>Running time of step 10</td><td>0.0~6553.5s（min）</td><td>0.0s</td><td>☆</td></tr>
<tr><td>b10.24</td><td>Multi-step speed 11</td><td>-100.0~100.0%</td><td>0.0%</td><td>☆</td></tr>
<tr><td>b10.25</td><td>Running time of step 11</td><td>0.0~6553.5s（min）</td><td>0.0s</td><td>☆</td></tr>
<tr><td>b10.26</td><td>Multi-step speed 12</td><td>-100.0~100.0%</td><td>0.0%</td><td>☆</td></tr>
<tr><td>b10.27</td><td>Running time of step 12</td><td>0.0~6553.5s（min）</td><td>0.0s</td><td>☆</td></tr>
<tr><td>b10.28</td><td>Multi-step speed 13</td><td>-100.0~100.0%</td><td>0.0%</td><td>☆</td></tr>
<tr><td>b10.29</td><td>Running time of step 13</td><td>0.0~6553.5s（min）</td><td>0.0s</td><td>☆</td></tr>
<tr><td>b10.30</td><td>Multi-step speed 14</td><td>-100.0~100.0%</td><td>0.0%</td><td>☆</td></tr>
<tr><td>b10.31</td><td>Running time of step 14</td><td>0.0~6553.5s（min）</td><td>0.0s</td><td>☆</td></tr>
<tr><td>b10.32</td><td>Multi-step speed 15</td><td>-100.0~100.0%</td><td>0.0%</td><td>☆</td></tr>
<tr><td>b10.33</td><td>Running time of step 15</td><td>0.0~6553.5s（min）</td><td>0.0s</td><td>☆</td></tr>
<tr><td>b10.34</td><td>Simple PLC
0~7 step
ACC/DEC time</td><td>
<table>
<tr><th colspan="2">Binary bit</th><th>Step</th><th>ACC/DEC 1</th><th>ACC/DEC 2</th><th>ACC/DEC 3</th><th>ACC/DEC 4</th></tr>
<tr><td>BIT1</td><td>BIT0</td><td>0</td><td>00</td><td>01</td><td>10</td><td>11</td></tr>
<tr><td>BIT3</td><td>BIT2</td><td>1</td><td>00</td><td>01</td><td>10</td><td>11</td></tr>
<tr><td>BIT5</td><td>BIT4</td><td>2</td><td>00</td><td>01</td><td>10</td><td>11</td></tr>
</table>
</td><td>0x0000</td><td>☆</td></tr>
</table>

<table>
<tr><th>Function code</th><th>Name</th><th>Detailed instruction of parameters</th><th>Default</th><th>Property</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td>BIT7</td><td>BIT6</td><td>3</td><td>00</td><td>01</td><td>10</td><td>11</td></tr>
<tr><td>BIT9</td><td>BIT8</td><td>4</td><td>00</td><td>01</td><td>10</td><td>11</td></tr>
<tr><td>BIT11</td><td>BIT10</td><td>5</td><td>00</td><td>01</td><td>10</td><td>11</td></tr>
<tr><td>BIT13</td><td>BIT12</td><td>6</td><td>00</td><td>01</td><td>10</td><td>11</td></tr>
<tr><td>BIT15</td><td>BIT14</td><td>7</td><td>00</td><td>01</td><td>10</td><td>11</td></tr>
</table>
</td><td></td><td></td></tr>
<tr><td>b10.35</td><td>Simple PLC
8~15 step
ACC/DEC time</td><td>
<table>
<tr><th colspan="2">Binary bit</th><th>Step</th><th>ACC /DEC 1</th><th>ACC /DEC 2</th><th>ACC /DEC 3</th><th>ACC /DEC 4</th></tr>
<tr><td>BIT1</td><td>BIT0</td><td>0</td><td>00</td><td>01</td><td>10</td><td>11</td></tr>
<tr><td>BIT3</td><td>BIT2</td><td>1</td><td>00</td><td>01</td><td>10</td><td>11</td></tr>
<tr><td>BIT5</td><td>BIT4</td><td>2</td><td>00</td><td>01</td><td>10</td><td>11</td></tr>
<tr><td>BIT7</td><td>BIT6</td><td>3</td><td>00</td><td>01</td><td>10</td><td>11</td></tr>
<tr><td>BIT9</td><td>BIT8</td><td>4</td><td>00</td><td>01</td><td>10</td><td>11</td></tr>
<tr><td>BIT11</td><td>BIT10</td><td>5</td><td>00</td><td>01</td><td>10</td><td>11</td></tr>
<tr><td>BIT13</td><td>BIT12</td><td>6</td><td>00</td><td>01</td><td>10</td><td>11</td></tr>
<tr><td>BIT15</td><td>BIT14</td><td>7</td><td>00</td><td>01</td><td>10</td><td>11</td></tr>
</table>
</td><td>0x0000</td><td>☆</td></tr>
<tr><td>b10.36</td><td>PLC restart</td><td>0：Restart from the first step;
1：Continue to run from the stop frequency;</td><td>0</td><td>★</td></tr>
<tr><td>b10.37</td><td>Multi-step time unit</td><td>0：second; 1：minute;</td><td>0</td><td>★</td></tr>
<tr><td colspan="5">Group b11 Protective parameters</td></tr>
<tr><td>b11.00</td><td>Phase loss protection</td><td>0x000~0x111
LED ones:
0: Input phase loss protection disable
1: Input phase loss protection enable
LED tens:
0: Output phase loss protection disable
1: Output phase loss protection enable
LED hundreds:
0: Input phase loss hardware protection disable
1: Input phase loss hardware protection enable</td><td>111</td><td>☆</td></tr>
<tr><td>b11.01</td><td>Sudden power loss frequency decrease</td><td>0：Disable
1：Enable</td><td>0</td><td>☆</td></tr>
<tr><td>b11.02</td><td>Frequency decrease ratio of sudden power loss</td><td>0.00Hz/s~b00.03（Max. output frequency）
<table>
<tr><td>Voltage degree</td><td>220V</td><td>380V</td><td>600AV</td></tr>
<tr><td>Frequency decrease point at sudden power loss</td><td>260V</td><td>460V</td><td>800V</td></tr>
</table>
</td><td>10.00Hz/s</td><td>☆</td></tr>
<tr><td>b11.03</td><td>Overvoltage stall protection</td><td>0：Disable 1：Enable</td><td>1</td><td>☆</td></tr>
<tr><td rowspan="2">b11.04</td><td rowspan="2">Protection voltage at overvoltage stall</td><td>120~150%（standard bus voltage）（380V）</td><td>136%</td><td>☆</td></tr>
<tr><td>120~150%（standard bus voltage）（220V）</td><td>120%</td><td>☆</td></tr>
<tr><td>b11.05</td><td>Current limit selection</td><td>Ones: current limit action selection
0：Invalid</td><td>01</td><td>★</td></tr>
</table>

Function code	Name	Detailed instruction of parameters	Default	Property
		1：Always valid tens: overload alarm of hardware current limit 0：Valid 1：Invalid		
b11.06	Automatic current limit	50.0~200.0%	G type: 160.0%	★
			P type: 120.0%	★
b11.07	The decreasing ratio during current limit	0.00~50.00Hz/s	10.00Hz/s	★
b11.08	Overload pre-alarm of the motor/inverter	LED ones： 0：Overload pre-alarm of the motor, comply with the rated current of the motor 1：Overload pre-alarm of the inverter, comply with the rated current of the inverter LED tens： 0：The inverter continues to work after underload pre-alarm 1：The inverter continues to work after underload pre-alarm and the inverter stops running after overload fault 2：The inverter continues to work after overload pre-alarm and the inverter stops running after underload fault 3：The inverter stops when overload or underload LED hundreds： 0：Detection all the time 1：Detection in constant running LED thousands：Overload integral selection 0：Overload integral is invalid 1：Overload integral is valid	0x000	☆
b11.09	Overload pre-alarm test level	b11.11~200%	G type: 150%	☆
			P type: 120%	☆
b11.10	Overload pre-alarm detection time	0.1~3600.0s	1.0s	☆
b11.11	Detection level of underload pre-alarm	0~b11.09	50%	☆
b11.12	Detection time of underload pre-alarm	0.1~3600.0s	1.0s	☆

Function code	Name	Detailed instruction of parameters	Default	Property
b11.13	Output terminal action during fault	LED ones： 0：Action under fault undervoltage 1：No action under fault undervoltage LED tens： 0：Action during the automatic reset 1：No action during the automatic reset	0x00	☆
b11.16	Extension functions selection	LED ones: Voltage drop frequency-decreasing selection 0：Voltage drop frequency-decreasing selection disable 1：Voltage drop frequency-decreasing selection enable LED tens: Step 2 ACC/DEC time option 0：Step 2 ACC/DEC time option disable 1：Step 2 ACC/DEC time option enable,when running frequency more than b08.36, ACC/DEC time switch to step 2 ACC/DEC time.	00	☆
Group b13 Enhanced function group				
b13.00	Pull in current reduction factor	0.0~100.0%	0	☆
b13.01	Initial pole detection mode	0: no detection 1: High frequency stack 2: Pulse superposition	20%	☆
b13.02	Pull in current 1	0.0%~100.0% Rated current of motor	10.0%	☆
b13.03	Pull in current 2	0.0%~100.0% Rated current of motor	30.00 Hz	☆
b13.04	Pull in current switching frequency	0.00Hz~P00.03（Maximum frequency）	500Hz	☆
b13.05	retain			☆
b13.06	High frequency superimposed voltage	0.0~300.0% Rated voltage of motor	0	☆
b13.07	retain			☆
b13.08	retain			☆
b13.09	retain			☆
b13.10	retain			☆
b13.11	Detection time of maladjustment	0.0~10.0s	50.0%	☆
b13.12	High frequency compensation coefficient	0~100.0%	0	☆
b13.13	Braking current of short-circuit	0.0~150.0%	0.0%	☆
b13.14	Braking retention time before starting	0.00~50.00s	0.00s	☆
b13.15	Braking retention time when stopping	0.00~50.00s	0.00s	☆
Group b14 Serial communication				
b14.00	Local	1~247（0 is radio address）	1	☆

Function code	Name	Detailed instruction of parameters	Default	Property
	communication address			
b14.01	Communication baud ratio	0：1200bbS 1：2400bbS 2：4800bbS 3：9600bbS 4：19200bbS 5：38400bbS 6：57600bbS	4	☆
b14.02	Digital bit checkout	0:No check（N，8，1）for RTU 1:Even check（E，8，1）for RTU 2:Odd check（O，8，1）for RTU 3:No check（N，8，2）for RTU 4:Even check（E，8，2）for RTU 5:Odd check（O，8，2）for RTU 6: No check (n, 7, 1) for ASCII 7: Even check (E, 7, 1) for ASCII 8: Odd check (O, 7, 1) for ASCII 9: No check (n, 7, 2) for ASCII 10: Even check (E, 7, 2) for ASCII 11: Odd check (O, 7, 2) for ASCII 12: No check (n, 8, 1) for ASCII 13: Even check (E, 8, 1) for ASCII 14: Odd check (O, 8, 1) for ASCII 15: No check (n, 8, 2) for ASCII 16: Even check (E, 8, 2) for ASCII 17: Odd check (O, 8, 2) for ASCII	1	☆
b14.03	Response delay	0~200ms	5	☆
b14.04	Fault time of communication overtime	0.0（Invalid），0.1~60.0s	0.0s	☆
b14.05	Transmission fault processing	0：Alarm and stop freely 1：No alarm and continue to run 2：No alarm and stop according to the stop means (only under the communication control) 3：No alarm and stop according to the stop means (under all control modes)	0	☆
b14.06	Communication processing	LED ones： 0：Operation with response； 1：Operation without response； LED tens：Communication encryption processing 0：Communication encrypting invalid 1：Communication encrypting valid	0x00	☆
Group b17 Monitoring function				
b17.00	Setting frequency	0.00Hz~b00.03	-	●

Function code	Name	Detailed instruction of parameters	Default	Property
b17.01	Output frequency	0.00Hz~b00.03	-	●
b17.02	Ramp reference frequency	0.00Hz~b00.03	-	●
b17.03	Output voltage	0~1200V	-	●
b17.04	Output current	0.0~3000.0A	-	●
b17.05	Motor speed	0~65535RbM	-	●
b17.08	Motor power	-300.0~300.0%（corresponding to rated motor power）	-	●
b17.09	Output torque	-250.0~250.0%	-	●
b17.10	Evaluated motor frequency	0.00Hz~ b00.03	-	●
b17.11	DC bus voltage	0.0~2000.0V	-	●
b17.12	Switch input terminals state	0000~01FF	-	●
b17.13	Switch output terminals state	0000~000F	-	●
b17.14	Digital adjustment	0.00Hz~b00.03	-	●
b17.15	Torque reference	-300.0%~300.0%（rated motor current）	-	●
b17.16	Linear speed	0~65535	-	●
b17.18	Counting value	0~65535	-	●
b17.19	Input voltage set by keypad potentiometer	0.00~10.00V	-	●
b17.20	AI1 input voltage	0.00~10.00V	-	●
b17.21	AI2 input voltage	-10.00~10.00V	-	●
b17.22	HDI input frequency	0.000~50.000kHz	-	●
b17.23	PID reference value	-100.0~100.0%	-	●
b17.24	PID feedback value	-100.0~100.0%	-	●
b17.25	Power factor of the motor	-1.00~1.00	-	●
b17.26	Current running time	0~65535min	-	●
b17.27	Simple PLC and the current step of multi-step speed	0~15	-	●
b17.28	ASR controller output	-300.0%~300.0%（Rated current of motor）		●
b17.29	Synchronous machine pole angle	0.0~360.0		●
b17.30	Synchronous machine phase compensation	-180.0~180.0		●
b17.31	High frequency superimposed current of synchronous machine	0.0%~200.0%（Rated current of motor）		●
b17.32	flux linkage	0.0%~200.0%		●
b17.33	Excitation current setting	-3000.0~3000.0A		●
b17.34	Torque current setting	-3000.0~3000.0A		●
b17.35	AC input current	0.0~5000.0A	-	●
b17.36	Output torque	-3000.0Nm~3000.0Nm	-	●
b17.37	Counting of the motor overload	0~100（100 is OL1 fault）	-	●
b17.38	PID output	-100.00~100.00%	0.00%	●
b17.39	Wrong download of parameters	0.00~99.99	0.00	●

Function code	Name	Detailed instruction of parameters	Default	Property
Group b24 Constant pressure water supply				
b24.00	Water supply sleep selection	0：Invalid 1：Valid	0	★
b24.01	Press feedback source	0：Invalid 1：AI1 setting value 2：AI2 setting value 3：HDI setting value	0	☆
b24.02	Hibernation check	0：Hibernate as the setting frequency < b24.03 1：Hibernate as the feedback pressure > b24.04	0	★
b24.03	Starting frequency of hibernation	0.00~b00.03(Max. frequency)	10.00Hz	☆
b24.04	Starting pressure of hibernation	0.00~100.0%	50.0%	☆
b24.05	Hibernation delay time	0.0~3600.0s	5.0s	☆
b24.06	Hibernation awake	0：Awake as the setting frequency > b24.07 1：Awake as the feedback pressure < b24.08	0	★
b24.07	Awake frequency	0.00~b00.03(Max. frequency)	20.00Hz	☆
b24.08	Setting value of hibernation awake	0.00~100.0%	10.0%	☆
b24.09	Min. hibernation time	0.0~3600.0s	5.0s	☆
b24.10	Valid auxiliary motor	0：No auxiliary motor 1：Auxiliary motor 1 valid 2：Auxiliary motor 2 valid 3：Auxiliary motor 1 and 2 valid	0	☆
b24.11	Start/stop delay time of auxiliary motor 1	0.0~3600.0s	5.0s	☆
b24.12	Start/stop delay time of auxiliary motor 2	0.0~3600.0s	5.0s	☆

b24.10~b24.12can make three motors to form a simple system of water supply.：

One inverter pump，two normal umps can form constant pressure simple water supply system:

b24.10 is used to select the valid auxiliary motor.

0：No auxiliary motor

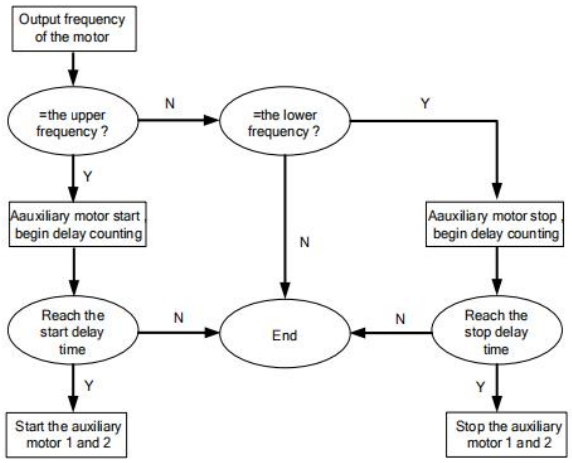
1：Auxiliary motor 1 valid

2：Auxiliary motor 2 valid

3：Auxiliary motor 1 and 2 valid

b24.11 Auxiliary motor 1 delay time of start/stop

b24.12 Auxiliary motor 2 delay time of start/stop



Chapter 6 Description of Function Codes

Group b00 Basic function group

b00.00	Speed control mode		Default	2
	Setting range	1	Open-loop vector control mode 1（Suit for asynchronous motor）	
		2	V/F control mode（Suit for asynchronous motor）	

1：No need to install encoders. It is suitable in cases with high speed control accuracy for accurate speed and torque control at all power ratings.

2：It is suitable in cases with no high speed control accuracy, such as fans、pumps. It can control many motors by one inverter.

Note：Before using vector control mode, the auto-tuning of motor parameters should be performed first.

b00.01	Run command channel		Default	0
	Setting range	0	Keypad running command channel（LED off）	
		1	Terminal running command channel（LED on）	
		2	Communication running command channel（LED flickering）	

Select the run command channel of the inverter.

The control command of the inverter includes: start-up, stop, forward, reverse, jogging and fault reset.

0：Keypad running command channel "**LOCAL/REMOT**" light off）

Carry out the command control by **RUN, STOP/ REMOT** on the keypad**.**

Set the multi-function key **FM.K** as **FWD/REV** shifting function（b07.02=3）to change the running direction； press **RUN** and **STOP/RESET** simultaneously in running state to make the inverter coast to stop.

1：Terminal running command channel "**LOCAL/REMOT"** flickering）

Carry out the running command control by the forward rotation, reverse rotation and forward jogging and reverse jogging of the multi-function terminals.

2：Communication running command channel "**LOCAL/REMOT**" on）

The running command is controlled by the upper monitor via communication.

b00.02	Communication selection	Default	0
	Setting range	Keypad command channel（LED off）	

Communication command channel 0

b00.03	Max. output frequency	Default	50.00Hz
	Setting range	b00.04-400.00Hz	

This parameter is used to set the Maximum output frequency of the inverter. Users should pay attention to this parameter because it is the foundation of the frequency setting and the speed of acceleration and deceleration.

b00.04	Upper limit of the running frequency	Default	50.00Hz
	Setting range	b00.05- b00.03（Max. output frequency）	

The upper limit of the running frequency is the upper limit of the output frequency of the inverter which is lower than or equal to the maximum frequency.When the set frequency is higher than the upper limit frequency, it runs

at the upper limit frequency.

b00.05	Lower limit of the running frequency	Default	0.00Hz
	Setting range	b00.05- b00.03（Max. output frequency）	

The lower limit of the running frequency is that of the output frequency of the inverter. The inverter runs at the lower limit frequency if the set frequency is lower than the lower limit one.

Note: Max. output frequency ≥ Upper limit frequency ≥ Lower limit frequency

b00.06	Main frequency source X selection	Default	0
	Setting range	Same as b00.09	

Note: Frequency X and frequency Y cannot use the same frequency setting mode. The frequency source can be set by b00.09.

b00.07	Selection of auxiliary frequency source Y		Default 2
	Setting range	0	Keypad data setting
		1	Potentiometer of keypad
		2	Analog AI1 setting
		3	Analog AI2 setting
		4	High-speed pulse HDI setting
		5	Simple PLC program setting
		6	Multi-step speed running setting
		7	PID control setting
		8	MODBUS communication setting

0：Keypad data setting

Modify the value of b00.10 (set the frequency by keypad) to modify the frequency by the keypad.

1：Potentiometer of keypad

2：Analog AI1 setting

3：Analog AI2 setting

Set the frequency by analog input terminals. KOC680 series inverters provide 3 channels analog input terminals as the standard configuration, among, potentiometer of keypad is adjusted by analog potentiometer, of which AI1 are the voltage/current option (0–10V/0–20mA) which can be shifted by jumpers; while AI2 is voltage input (-10V–+10V).

Note: when analog AI1 select 0~20mA input, the corresponding voltage of 20mA is 10V.

100.0% of the analog input setting corresponds to the maximum frequency (function code b00.03) in forward direction and -100.0% corresponds to the maximum frequency in reverse direction (function code b00.03).

4：High-speed pulse HDI setting

The frequency is set by high-speed pulse terminals. Goodrive200A series inverters provide 1 channel high speed pulse input as the standard configuration. The pulse frequency range is 0.00–50.00kHz.100.0% of the high speed pulse input setting corresponds to the maximum frequency in forward direction (b00.03) and -100.0% corresponds to the maximum frequency in reverse direction (b00.03).

Note: The pulse setting can only be input by multi-function terminals HDI. Set b05.00 (HDI input selection) to high speed pulse input, and set b05.49 (HDI high speed pulse input function selection) to

frequency setting input.

5：Simple PLC program setting

The inverter runs at simple PLC program mode when b00.06=5 or b00.07=5. Set b10 (simple PLC and multi-step speed control) to select the running frequency, running direction, ACC/DEC time and the keeping time of corresponding step. See the function description of b10 for detailed information.

6：Multi-step speed running setting

The inverter runs at multi-step speed mode when b00.06=6 or b00.07=6. Set b05 to select the current running step, and set b10 to select the current running frequency.

The multi-step speed has the priority when b00.06 or b00.07 does not equal to 6, but the setting stepcan only be the 1~15 steps. The setting step is 0~15 if b00.06 or b00.07 equals to 6.

7：PID control setting

The running mode of the inverter is process PID control when b00.06=7 or b00.07=7. It is necessary to set b09. The running frequency of the inverter is the value after PID effect. See b09 for the detailed information of the preset source, preset value, and feedback source of PID.

8：MODBUS communication setting

The frequency is set by MODBUS communication. See b14 for detailed information.

Note：X frequency、Y frequency cannot be set as one same frequency setting.

b00.08	Range of auxiliary frequency Y		Default	0
	Setting range	0	Maximum output frequency	
		1	Relative to main frequency X	

0：100% of Y frequency setting corresponds to the maximum output frequency.

1：100% of Y frequency setting corresponds to the maximum output frequency. Select this setting if it needs to adjust on the base of X frequency command.

b00.09	Combination of the setting source		Default	0
	Setting range	0	0：X, the current frequency setting is X frequency command.	
		1	1：Y, the current frequency setting is Y frequency command.	
		2	2：X+Y, the current frequency setting is X frequency command +Y frequency command.	
		3	3：X-Y, the current frequency setting is X frequency command - Y frequency command.	
		4	4：Max（X，Y）	
		5	5：Min（X，Y）	

0：The current frequency setting is X frequency command.

1：The current frequency setting is Y frequency command.

2：The current frequency setting is X frequency command +Y frequency command.

3：The current frequency setting is X frequency command - Y frequency command.

4：The bigger one between X frequency command and Y frequency is the set frequency.

5：The lower one between X frequency command and Y frequency is the set frequency.

Note: The combination manner can be shifted by terminal function(b05).

b00.10	Keypad set frequency	Default	50.00Hz
	Setting range	0.00 Hz~b00.03（Max. output frequency）	

When X and Y frequency commands are selected as“keypad setting”, this parameter will be the initial value of inverter

reference frequency.

b00.11	Acceleration time 1	Default	Model Dependent
	Setting range	0.0~3600.0s	
b00.12	Deceleration time 1	Default	Model Dependent
	Setting range	0.0~3600.0s	

ACC time means the time needed if the inverter speeds up from 0Hz to the max. one (b00.03).

DEC time means the time needed if the inverter speeds down from the max. output frequency to 0Hz (b00.03).

KOC680 series inverters define four groups of ACC/DEC time which can be selected by b05. The factory default ACC/DEC time of the inverter is the first group.

b00.13	Running direction		Default	0
	Setting range	0	Runs at the default direction	
		1	Runs at the opposite direction	
		2	Forbid to run in reverse direction	

0：The inverter runs in the forward direction,FWD/REV indicator is off.

1：The inverter runs in the reverse direction, FWD/REV indicator is on.

Modify the function code to shift the rotation direction of the motor. This effect equals to the shifting the rotation direction by adjusting either two of the motor lines (U, V and W). In keypad control, the motor rotation direction can be changed by **FM.K** on the keypad. Refer to parameter b07.02.

Note: When the function parameter comes back to the default value, the motor's running direction will come back to the factory default state, too. In some cases it should be used with caution after commissioning if the change of rotation direction is disabled.

2：Forbid to run in reverse direction: It can be used in some special cases if the reverse running is disabled.

b00.14	Carrier frequency setting	Default	Model Dependent
	Setting range	1.0-15.0KHz	

The advantage of high carrier frequency: ideal current waveform, little current harmonic wave and motor noise.

The disadvantage of high carrier frequency: increasing the switch loss, increasing inverter temperature and the impact to the output capacity. The inverter needs to derate on high carrier frequency. At the same time, the leakage and electrical magnetic interference will increase.

Applying low carrier frequency is contrary to the above, too low carrier frequency will cause unstable running, torque decreasing and surge. The manufacturer has set a reasonable carrier frequency when the inverter is in factory. In general, users do not need to change the parameter. When the frequency used exceeds the default carrier frequency, the inverter needs to derate 10% for each additional 1k carrier frequency.

b00.15	Motor parameter autotuning		Default	0
	Setting range	0	No operation	
		1	Rotation autotuning	
		2	Static autotuning 1	
		3	Static autotuning 2	

0：No operation

1：Comprehensive motor parameter autotune. It is recommended to use rotation autotuning when high control accuracy is needed.

2：It is suitable in the cases when the motor cannot de-couple from the load.

3：It is suitable in the cases when the motor cannot de-couple form the load. But only for parts of parameters.

b00.16	AVR function selection		Default	1
	Setting range	0	Invalid	
		1	Valid during the whole procedure	

0：Invalid

1：The auto-adjusting function of the inverter can cancel the impact on the output voltage of the inverter because of the bus voltage fluctuation.

b00.17	Inverter type		Default	0
	Setting range	0	G type；	
		1	P type；	

0：G type；for the constant torque load of rated parameters

1：P type； for the variable torque load of rated parameters (fans and water pumps)

KOC680 series inverters can use G/P type, the available motor power of G type is small one power file than that of P type.

b00.18	Function restore parameter		Default	0
	Setting range	0	No operation	
		1	Restore the default value	
		2	Clear fault records	
		3	Lock keypad	

Note: The function code will restore to 0 after finishing the operation of the selected function code.

Restoring to the default value will cancel the user password, please use this function with caution.

When b00.18=3, function codes except for b00.18 are only read cannot be written.

Group b01 Start-up and stop control

b01.00	Start mode		Default	0
	Setting range	0	Start-up directly: start from the starting frequency b01.01.	
		1	Start-up after DC braking	
		2	Start-up after speed tracking	

0: Start from the starting frequency b01.01.

1: Start the motor from the starting frequency after DC braking (set the parameter b01.03 and b01.04). It is suitable in the cases where reverse rotation may occur to the low inertia load during starting.

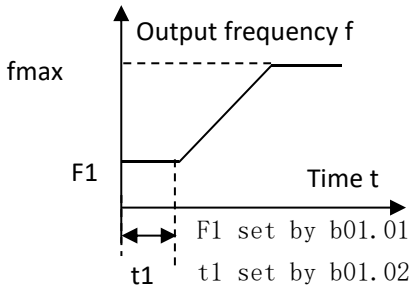
2: Start the rotating motor smoothly after tracking the rotation speed and direction automatically. It is suitable in the cases where reverse rotation may occur to the big inertia load during starting.

Note: This function is available for the inverters of 4kW and above.

b01.01	Starting frequency of direct start	Default	0.50Hz
	Setting range	0.00~50.00Hz	

Starting frequency of direct start-up means the original frequency during the inverter starting. See b01.02 for detailed information.

b01.02	Retention time of the starting frequency	Default	0.0s
	Setting range	0.0s-50s	



Set a proper starting frequency to increase the torque of the inverter during starting. During the retention time of the starting frequency, the output frequency of the inverter is the starting frequency. And then, the inverter will run from the starting frequency to the set frequency. If the set frequency is lower than the starting frequency, the inverter will stop running and keep in the stand-by state. The starting frequency is not limited in the lower limit frequency.

b01.03	The braking current before starting	Default	00.0%
	Setting range	0.0~100.0%	
b01.04	The braking time before starting	Default	0.00s
	Setting range	0.00~50.00s	

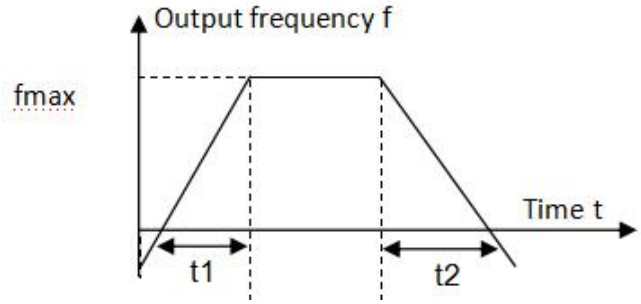
The inverter will carry out DC braking at the brakin current set before starting and it will speed up after the DC braking time. If the DC braking time is set to 0, the DC braking is invalid.

The stronger the braking current, the bigger the braking power. The DC braking current before starting means the percentage of the rated current of the inverter.

b01.05	ACC/DEC selection		Default	0
	Setting range	0	Linear type
		1	S curve

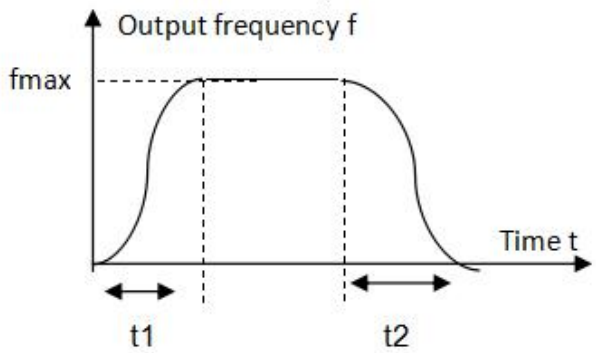
The changing mode of the frequency during start-up and running.

0：The output frequency increases or decreases linearly.



1: Output frequency increases/decreases gradually based on S curve.

S curve is used in cases where smooth start/stop is required eg elevator, conveyor belt, etc.



b01.06	ACC time of the starting step of S curve	Default	0.1s
	Setting range	0.0~50.0s	
b01.07	DEC time of the ending step of S curve	Default	0.1s
	Setting range	0.0~50.0s	

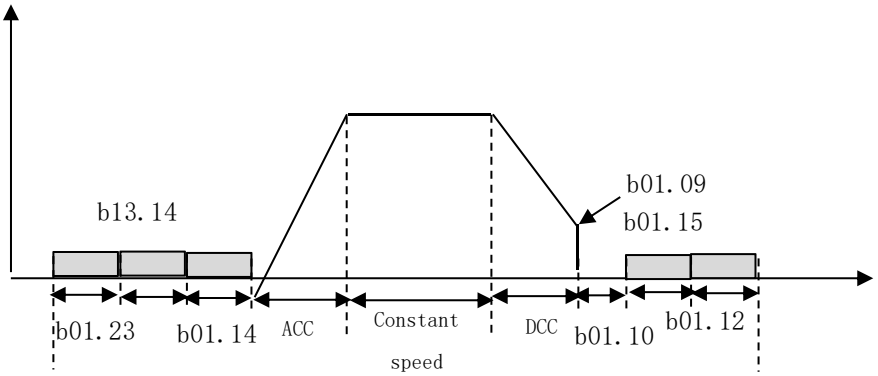
Note: Effective when b01.05 choose 1.

b01.08	Stop mode		Default	0
	Setting range	0	Decelerate to stop;	
		1	Coast to stop;	

0：After the stop command becomes valid, the inverter decelerates to reduce the output frequency during the set time. When the frequency decreases to 0Hz, the inverter stops.

1：After the stop command becomes valid, the inverter ceases the output immediately. And the load coasts to stop at the mechanical inertia.

b01.09	Starting frequency of DC braking	Default	0.00Hz
	Setting range	0.00Hz~b00.03（Max output frequency）	
b01.10	Waiting time before DC braking	Default	0.00s
	Setting range	0.00~50.00s	
b01.11	DC braking current	Default	0.0%
	Setting range	0.0~100.0%	
b01.12	DC braking time	Default	0.00s
	Setting range	0.00~50.00s	



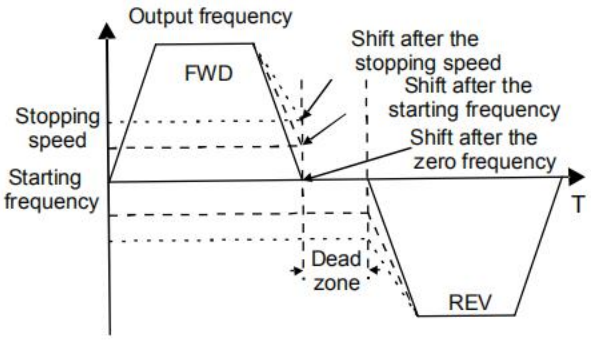
Starting frequency of DC braking: start the DC braking when running frequency reaches starting frequency determined by b1.09.

Waiting time before DC braking: Inverters block the output before starting the DC braking. After this waiting time, the DC braking will be started so as to revent over-current fault caused by DC braking at high speed.

DC braking current: The value of b01.11 is the percentage of rated current of inverter. The bigger the DC braking current is, the greater the braking torque is.

DC braking time: The retention time of DC brake. If the time is 0, the DC brake is invalid. The inverter will stop at the set deceleration time.

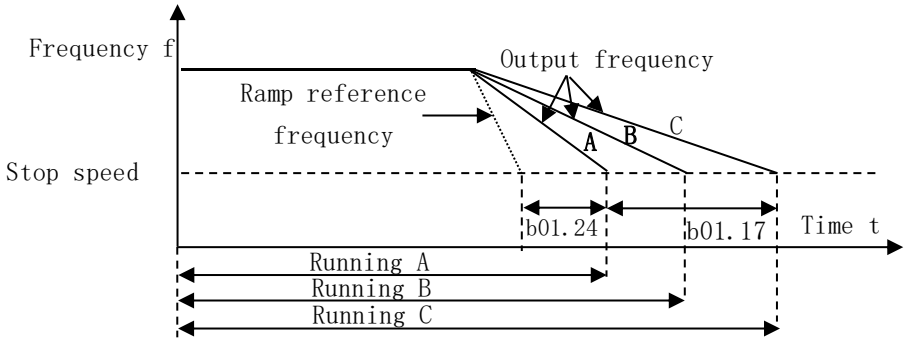
b01.13	Dead time of FWD/REV rotation	Default	0.0s
	Setting range	0.0~3600.0s	



During the procedure of switching FWD/RE rotation, set the threshold by b01.14.

b01.14	Shifting between FWD/REV rotation		Default	0
	Setting range	0	Switch after 0 frequency	
		1	Switch after the starting frequency	
		2	Switch after the stopping speed	
b01.15	Stopping speed		Default	0.50Hz
	Setting range		0.00~100.00Hz	
b01.16	Detection of stopping speed		Default	1
	Setting range	0	Detect according to speed setting (no stopping delay)	
		1	Detect according to speed feedback (only valid for vector control)	
b01.17	Detection time of the feedback speed		Default	0.5s
	Setting range		0.00~100.00s （only valid when b01.16=1）	

If set b01.16 to 1, the feedback frequency is less than or equal to b01.15 and detect in the set time of b01.17, the inverter will stop; otherwise the inverter will stop after the set time of b01.17



b01.18	Operation protection during powering on	Default	0
	Setting range	0	The terminal running command is invalid when powering on.
		1	The terminal running command is valid when powering on.

When the running command channel is the terminal control, the system will detect the state of the running terminal during powering on.

0：Even the running command is detected to be valid during powering on, the inverter won't run and the system keeps in the protection state until the running command is canceled and enabled again.

1：If the running command is detected to be valid during powering on, the system will start the inverter automatically after the initialization.

b01.19	Action selection when running frequency is lower than lower limit of frequency (valid when low limit of frequency is larger than 0)		Default	0
	Setting range	0	Run at the lower limit frequency	
		1	Stop	
		2	Hibernation	

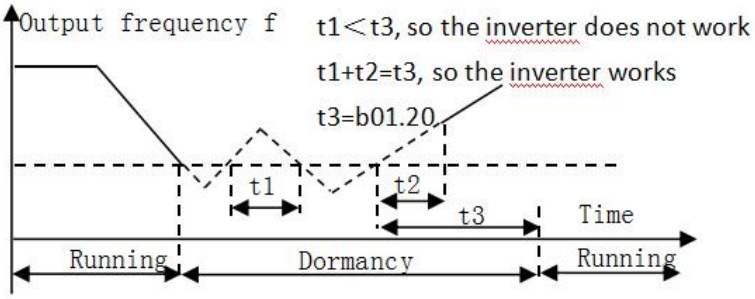
This function code determines the running state of the inverter when the set frequency is lower than the lower-limit one.

The inverter will coast to stop when the set frequency is lower than the lower-limit one. If the set frequency is above the lower limit one again and it lasts for the time set by b01.20, the inverter will come back to the running state automatically.

b01.20	Wake-up-from-sleep delay	Default	0.0s
	Setting range	0.0~3600.0s（valid when b01.19=2）	

This function code determines the wake-up-from-sleep delay. When the running frequency of the inverter is lower than the lower limit one, the inverter will pause to stand by.

When the set frequency is above the lower limit one again and it lasts for the time set by b01.20, the inverter will run automatically.



b01.21	Restart after power off	Default	0
	Setting range	0	Disable
		1	Enable

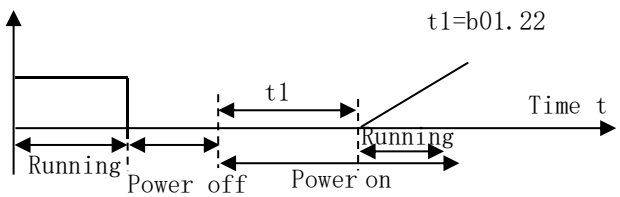
This function can enable the inverter start or not after the power off and then power on.

0：Disable

1：Enable, if the starting need is met, the inverter will run automatically after waiting for the time defined by b01.22.

b01.22	The waiting time of restart after power off	Default	1.0s
	Setting range	0.0~3600.0s（valid when b01.21=1）	

The function determines the waiting time before the automatic running of the inverter when powering off and then powering on.



b01.23	Start delay time		Default	0.0s
	Setting range		0.0~60.0s	
b01.24	Delay time of the stop speed		Default	0.0s
	Setting range		0.0~100.0s	
b01.25	0Hz output selection		Default	0
	Setting range	0	Output without voltage	
		1	Output with voltage	
		2	Output at the DC braking current	

Group b02 Motor 1

b02.01	Rated power of motor	Default	Model dependent
	Setting range	0.1~3000.0kW	
b02.02	Rated frequency of motor	Default	50.00Hz
	Setting range	0.01Hz~b00.03（Max output frequency）	
b02.03	Rated speed of motor	Default	Model dependent
	Setting range	1rpm～65535rpm	
b02.04	Rated voltage of motor	Default	Model dependent
	Setting range	1V～2000V	
b02.05	Rated current of motor	Default	Model dependent
	Setting range	0.8A～6000.0A	

Set the parameters of the controlled asynchronous motor.In order to ensure the control performance, please set the values of b02.01 ~ b02.05 correctly according to the nameplate parameters of the asynchronous motor.

KOC680 inverter has parameter autotuning function. The accurate autotuning parameter comes from the correct setting of the motor nameplate parameters.

In order to ensure the control performance, please configure the motor according to the standard adaptable motor of the inverter. If the difference between the motor power and the standard adaptable motor is too large, the control performance of the inverter will be significantly reduced.

b02.06	Stator resistor of asynchronous motor	Default	Model dependent
	Setting range	0.001Ω～65.535ΩV	
b02.07	Rotor resistor of asynchronous motor	Default	Model dependent
	Setting range	0.001Ω～65.535Ω	
b02.08	Leakage inductance of asynchronous motor	Default	Model dependent
	Setting range	0.1mH～6553.5mH	
b02.09	Mutual inductance of asynchronous motor	Default	Model dependent
	Setting range	0.1mH～6553.5mH	
b02.10	Non-load current of asynchronous motor	Default	Model dependent
	Setting range	0.1A～6553.5A	

After the motor parameter autotuning ends normally, the setting value (b02.06 ~ b02.10) can be automatically updated in the rotation autotuning and stationary autotuning 1 modes. In the static autotuning 2 mode, b02.06 ~ b02.10 set value can be updated automatically. These parameters are the reference parameters for inverter control and have a direct impact on control performance. Note: Users should not change this group of parameters at will.

b02.26	Motor 1 overload protection		Default	2
	Setting range	0	No protection	
		1	Common motor (with low speed compensation) ,reducing the threshold of the overload protection of the motor whose running frequency is below 30Hz.	
		2	Variable frequency motor (without low speed compensation)	

0：No protection

1： Common motor (with low speed compensation), because the heat-releasing effect of the common motors will be weakened, the corresponding electric heat protection will be adjusted properly. The low speed compensation characteristic mentioned here means reducing the threshold of the overload protection of the motor whose running frequency is below 30Hz.

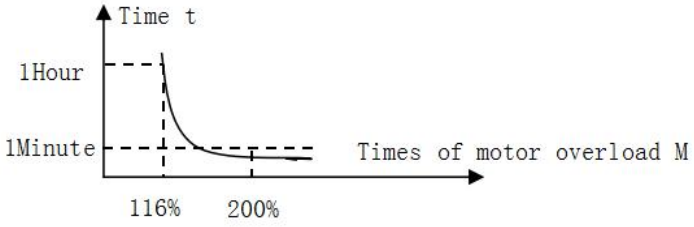
2： Variable frequency motor (without low speed compensation), because the heat-releasing effect of the specific motors won't be impacted by the rotation speed, it is not necessary to adjust the protection value during low-speed running.

b02.27	Motor 1 over load protection coefficient	Default	100%
	Setting range	20.0%～120%	
b02.28	Correction coefficient of motor 1 power	Default	1.0
	Setting range	0.00~3.00	

Motor 1 over load protection coefficient：Times of motor overload M = Iout/(In*K) In is the rated current of the motor, Iout is the output current of the inverter and K is the motor protection coefficient. So, the bigger the value of K is, the smaller the value of M is. When M =116%, the fault will be reported after 1 hour, when M =200%, the fault will be reported after 1 minute, when M>=400%, the fault will be reported instantly.

Correction coefficient of motor 1 power：Correct the power displaying of motor 1. Only impact the displaying value other than the control performance of the inverter.

Motor 1 over load protection coefficient

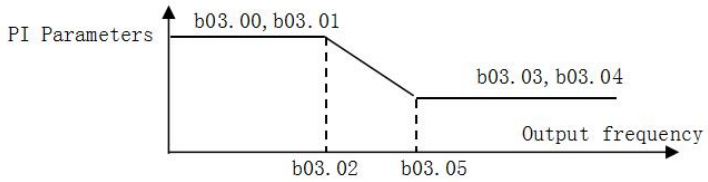


Group b03 Vector control

b03.00	Speed loop proportional gain1	Default	20.0
	Setting range	0~200.0	
b03.01	Speed loop integral time1	Default	0.200s
	Setting range	0.000~10.000s	
b03.02	Low switching frequency	Default	5.00Hz
	Setting range	0.00Hz~b03.05	
b03.03	Speed loop proportional gain 2	Default	20.0
	Setting range	0~200.0	
b03.04	Speed loop integral time 2	Default	0.200s
	Setting range	0.000~10.000s	
b03.05	High switching frequency	Default	10.00Hz
	Setting range	b03.02~b00.03（Max output frequency）	

The parameters b03.00~b03.05 only apply to vector control mode.Below the switching frequency 1(b03.02), the speed loop PI parameters are: b03.00 and b03.01.

Above the switching frequency 2(b03.05), the speed loop PI parameters are: b03.03 and b03.04. PI parameters are gained according to the linear change of two groups of parameters. It is shown as below:



Setting the proportional coefficient and integral time of the adjustor can change the dynamic response performance of vector control speed loop. Increasing the proportional gain and decreasing the integral time can speed up the dynamic response of the speed loop. But too high proportional gain and too low integral time may cause system vibration and overshoot. Too low proportional gain may cause system vibration and speed static deviation.

PI has a close relationship with the inertia of the system. Adjust on the base of PI according to different loads to meet various demands.

b03.06	Speed loop output filter	Default	0
	Setting range	0~8（corresponds to 0~28/10ms）	
b03.07	Compensation coefficient of electro motion slip	Default	100%
	Setting range	50~200%	
b03.08	Compensation coefficient of braking slip	Default	100%
	Setting range	50~200%	

Slip compensation coefficient is used to adjust the slip frequency of the vector control and improve the speed control accuracy of the system. Adjusting the parameter properly can control the speed steady-state error.

b03.09	Current loop percentage coefficient P	Default	1000
	Setting range	0~65535	
b03.10	Current loop integral Coefficient I	Default	1000
	Setting range	0~65535	

Note:

1 These two parameters adjust the PI adjustment parameter of the current loop which affects the dynamic response speed and control accuracy directly. Generally, users do not need to change the default value.

2 Only apply to SVC control mode 0 (b00.00=0).

b03.11	Torque setting method		Default 0
	Setting range	0	Torque control is invalid
		1	Keypad setting torque（b03.12）
		2	Potentiometer of keypad setting
		3	Analog AI1 setting torque
		4	Analog AI2 setting torque

		5	Pulse frequency HDI setting torque
		6	Multi-step torque setting
		7	MODBUS communication setting torque

This parameter is used to enable the torque control mode, and set the torque.

Note: Setting modes 2~10, 100% corresponds to three times of the rated current of the motor.

b03.12	Keypad setting torque		Default	50.0%
	Setting range		-300.0%~300.0%（rated current of the motor）	
b03.13	Torque reference filter time		Default	0.010s
	Setting range		0.000~10.000s	
b03.14	Upper frequency of forward rotation in vector control		Default	0
	Setting range	0	Keypad	
		1	Potentiometer of keypad	
		2	AI1	
		3	AI2	
		4	Pulse frequency HDI setting upper-limit frequency	
		5	Multi-step setting upper-limit frequency	
		6	MODBUS communication setting upper-limit	
b03.15	Upper frequency of reverse rotation in vector control		Default	0
	Setting range	0	Keypad	
		1	Potentiometer of keypad	
		2	AI1	
		3	AI2	
		4	Pulse frequency HDI setting upper-limit frequency	
		5	Multi-step setting upper-limit frequency	
		6	MODBUS communication setting upper-limit	

0: Keypad (b03.16 sets b03.14,b03.17 sets b03.15)

Note: Setting method 1~7，100% corresponds to the maximum frequency.

b03.16	Keypad setting for upper frequency of forward rotation	Default	50.00 Hz
	Setting range	0.00 Hz~b00.03（Max output frequency）	
b03.17	Keypad setting for upper frequency of reverse rotation	Default	50.00 Hz
	Setting range	0.00 Hz~b00.03（Max output frequency）	

b03.18	Upper electro motion torque source		Default	0
	Setting range	0	Keypad setting upper-limit torque	
		1	Potentiometer of keypad	
		2	AI1	

		3	AI2	
		4	HDI	
		5	MODBUS communication	
b03.19	Upper braking torque source		Default	0
	Setting range	0	Keypad setting upper-limit torque	
		1	Potentiometer of keypad	
		2	AI1	
		3	AI2	
		4	HDI	
		5	MODBUS communication	

This function code is used to select the electro motion and braking torque upper-limit setting source selection.

0: Keypad setting upper-limit frequency (b03.20 sets b03.18, b03.21 sets b03.19)

Note: setting mode 1~8，100% corresponds to three times of the motor current.

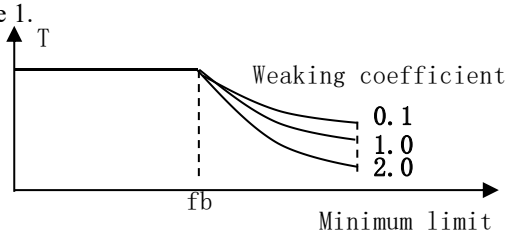
b03.20	Keypad setting of electromotion torque	Default	180%
	Setting range	0.0~300.0%（rated motor current）	
b03.21	Keypad setting of braking torque	Default	180%
	Setting range	0.0~300.0%（rated motor current）	

b03.22	Weakening coefficient in constant power zone	Default	0.3
	Setting range	0.1~2.0	
b03.23	Lowest weakening point in constant power zone	Default	20%
	Setting range	10%~100%	

The usage of motor in weakening control.

Function code P03.22 and P03.23 are effective at constant power. The motor will enter into the weakening state when the motor runs at rated speed. Change the weakening curve by modifying the weakening control coefficient. The bigger the weakening control coefficient is, the steeper theweak curve is.

b03.22 is only valid for vector mode 1.



b03.24	Max. voltage limit	Default	100%
	Setting range	0.0~120.0%	
b03.25	Pre-exciting time	Default	0.300s
	Setting range	0.000~10.000s	
b03.26	Weak magnetic proportional gain	Default	1000
	Setting range	0~8000	

b03.24 set the max. voltage of the inverter, which is dependent on the site situation.

b03.25 Reactivate the motor when the inverter starts up, build up a magnetic field inside the inverter to improve the torque performance during the starting process.

Note：b03.24~ b03.26 is only valid for vector mode 1.

b03.27	Vector control speed		Default	0
	Setting range	0	Display the actual value	
		1	Display the setting value	
b03.28	Compensation coefficient of static friction		Default	0
	Setting range		0.0~100.0%	
b03.29	Compensation coefficient of dynamic friction		Default	0
	Setting range		0.0~100.0%	

b03.28 adjusts to compensate the coefficient of static friction for compensating torque in running state. Only valid when setting in 1Hz.

b03.29Adjust P03.29 to compensate the coefficient of dynamic friction for compensating torque in running state. Only valid when setting in 1Hz.

Group b04 V/F control

b04.00	Motor 1 V/F curve setting	Default	0
	Setting range	0	Straight line V/F curve; applying to the constant torque load
		1	Multi-dots V/F curve
		2	1.3th power low torque V/F curve
		3	1.7th power low torque V/F curve
		4	2.0th power low torque V/F curve
		5	Customized V/F(V/F separation)；
		6	Straight line V/F; applying to the constant torque load

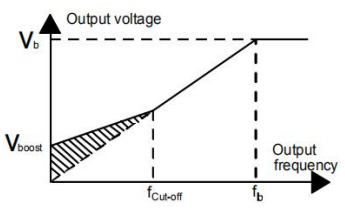
1 ： V/F curve，meet the need of different loads.

2~4 ： Apply to the torque loads such as fans and water pumps. Users can adjust according to the features of the loads to achieve a best energy-saving effect.

5： Customized V/F(V/F separation)； in this mode, V can be separated from f and f can be adjusted through the frequency reference channel set by b00.06 or the voltage reference channel set by b04.27 to change the feature of the curve.

b04.01	Motor 1 torque boost	Default	0.0%
	Setting range	0.0%：（Auto）0.1%~10.0%	
b04.02	Motor 1 torque boost close	Default	20%
	Setting range	0.0%~50.0%	

Torque boost is used for the compensation of low frequency torque. b04.01 is relative to the max. output voltage Vb.



b04.02 defines the percentage of closing frequency of manual torque to fb.

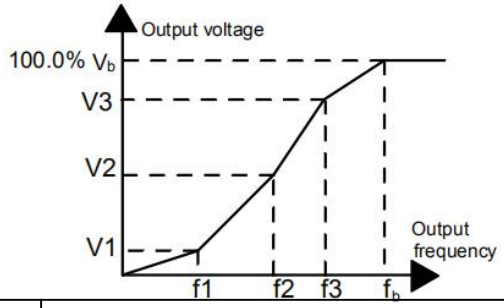
Torque boost should be selected according to the load. The bigger the load is, the bigger the torque is. Too big torque boost is inappropriate because the motor will run with over magnetic, and the current of the inverter will increase to add the temperature of the inverter and decrease the efficiency.

When the torque boost is set to 0.0%, the inverter is automatic torque boost threshold：below this frequency point, the torque boost is effective, but over this frequency point, the torque boost is invalid.

b04.03	V/F frequency 1 of motor 1	Default	0.00Hz
	Setting range	0.00Hz~b04.05	
b04.04	V/F voltage 1 of motor 1	Default	00.0%
	Setting range	0.0%~110.0%（Rated voltage of motor 1）	
b04.05	V/F frequency 2 of motor 1	Default	0.00Hz
	Setting range	b04.03~ b04.07	
b04.06	V/F voltage 2 of motor 1	Default	00.0%
	Setting range	0.0%~110.0%（Rated voltage of motor 1）	
b04.07	V/F frequency 3 of motor 1	Default	0.00Hz
	Setting range	b04.05~ b02.02（Rated frequency of motor 1）	
b04.08	V/F frequency 4 of motor 1	Default	00.0%
	Setting range	0.0%~110.0%（Rated voltage of motor 1）	

When b04.00 =1 (multi-dots V/F curve), the user can set V/F curve through b04.03~b04.08. V/F is generally set according to the load of the motor.

Note: V1＜V2＜V3, f1＜f2＜f3. Too high low frequency voltage will heat the motor excessively or damage. The inverter may occur the overcurrent speed or overcurrent protection.



b04.09	V/F slip compensation gain of motor 1	Default	100%
	Setting range	0.0~200.0%	

This function code is used to compensate the change of the rotation speed caused by load during compensation SVPWM control to improve the rigidity of the motor. It can be set to the rated slip frequency of the motor which is counted as below: △f=fb-n*p/60

Of which, fb is the rated frequency of the motor, its function code is b02.01; n is the rated rotating speed of the motor and its function code is b02.02; p is the pole pair of the motor. 100.0% corresponds to the rated slip frequency△f.

b04.10	Motor 1 low frequency vibration control factor	Default	10
	Setting range	0~100	
b04.11	Motor 1 high frequency vibration control factor	Default	10
	Setting range	0~100	

b04.12	Motor 1 vibration control threshold	Default	30%
	Setting range	0.00Hz~b00.03（Max output frequency）	

In the V/F control mode, current fluctuation may occur to the motor on some frequency, especially the motor with big power. The motor cannot run stably or overcurrent may occur. These phenomena can be canceled by adjusting this parameter.

b04.26	Energy-saving operation selection		Default	0
	Setting range	0	No action	
		1	Automatic energy-saving operation	

Energy-saving operation selection: Motor on the light load conditions, automatically adjusts the output voltage to save energy.

b04.27	Voltage setting channel		Default	0
	Setting range	0	Keypad setting voltage	
		1	Potentiometer of keypad	
		2	AI1 setting voltage	
		3	AI2 setting voltage	
		4	HDI setting voltage	
		5	Multi-step speed setting voltage	
		6	PID setting voltage	
		7	MODBUS communication setting voltage	

b04.28	Keypad setting voltage	Default	100%
	Setting range	0.0%~100.0%	

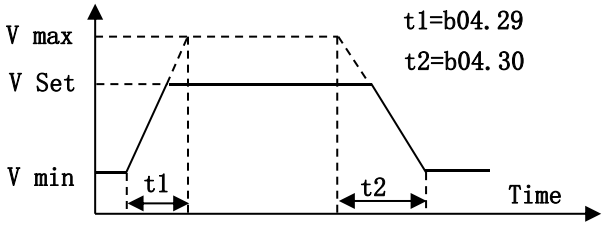
The function code is the voltage digital set value when the voltage setting channel is selected as“keypad selection”.

b04.29	Voltage increasing time	Default	5.0s
	Setting range	0.0~3600.0s	
b04.30	Voltage decreasing time	Default	5.0s
	Setting range	0.0~3600.0s	

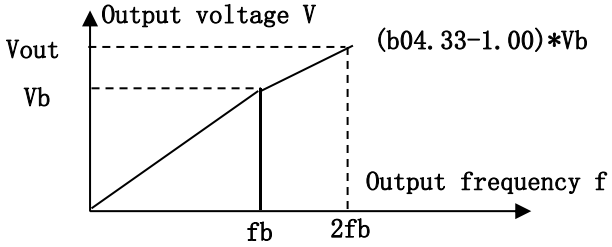
Voltage increasing time is the time when the inverter accelerates from the output minimum voltage to the output maximum voltage.

Voltage decreasing time is the time when the inverter decelerates from the output maximum voltage to the output minimum voltage.

b04.31	Maximum output voltage	Default	100%
	Setting range	b04.32~100.0%（Rated motor voltage）	
b04.32	Minimum output voltage	Default	0.0%
	Setting range	0.0%~b04.31（Rated motor voltage）	



b04.33	Flux weakening coefficient at constant power	Default	1．00
	Setting range	1.00~1.30	



Used to adjust the output voltage of inverter in SVPWM mode during flux weakening.

Group b05 Input terminals

b05.00	HDI input		Default	0
	Setting range	0	HDI is high pulse input; See b05.50~b05.54.	
		1	HDI is switch input	

HDI input：

0：HDI is high pulse input; See b05.50~b05.54.

1：HDI is switch input.

KOC680 series inverters are equipped with 6 multi-function digital input terminals (including HDI can be used as high-speed pulse input terminals), and 2 analog input terminals. If the system needs more input and output terminals, a multi-function input and output extension card can be selected.

Function code	Name	Default	Remark
b05.01	DI1 terminal function selection	1（FWD）	Standard
b05.02	DI2 terminal function selection	4（Forward jogging）	Standard
b05.03	DI3 terminal function selection	7（Fault reset）	Standard
b05.04	DI4 terminal function selection	0	Standard
b05.05	DI5 terminal function selection	0	Standard
b05.06	DI6 terminal function selection（Extended control terminal）	0	Extended
b05.07	DI7 terminal function selection（Extended control terminal）	0	Extended
b05.08	DI8 terminal function selection（Extended control terminal）	0	Extended
b05.09	DI9 terminal function selection	0	Standard

These parameters are used to set the functions of the digital multi-function input terminals. The functions that can be selected are shown in the following table:

Table 1 Multi-segment instruction function description

Code	Function	Description
0	No function	Unused terminals can be set to "No Function" to prevent malfunction.
1	Forward rotation（FWD）	Control the forward rotation and reverse rotation of the inverter through external terminals.
2	Reverse rotation（REV）	
3	3-wire control	Use this terminal to determine whether the inverter running mode is 3-wire control mode. For details, please refer to the description of function code b5-13 ("Terminals control running mode").
4	Forward jogging	MF.K is jog forward running, MF.K is jog reverse running. For the jog running frequency and jog acceleration / deceleration time, refer to the descriptions of function codes b08-07 and b08.08.
5	Reverse jogging	
6	Coast to stop	The inverter blocks the output. At this time, the stopping process of the motor is not controlled by the inverter. This method has the same meaning as “coast to stop” described in b01.08.
7	Fault reset	Using terminals’ function of resetting faults. It has the same function as the RESET key on the keyboard. With this function, remote fault reset can be realized.
8	Operation pause	The inverter decelerates to stop, but all operating parameters are memorized. Such as PLC parameters, swing frequency parameters, PID parameters. After this terminal signal disappears, the inverter returns to the running state before stopping.
9	External fault input	When this signal is sent to the inverter, the inverter reports fault EF, and performs fault handling according to the fault protection action mode (for details, see function code b11.13).
10	Increasing frequency setting（UP）	When the frequency is given by the external terminal, the frequency increasing and decreasing instructions are modified. When the frequency source is set to digital setting, the set frequency can be adjusted up and down.
11	Decreasing frequency setting（DOWN）	
12	Cancel the frequency change setting	When the frequency is given as digital frequency, this terminal can clear the frequency value changed by terminal UP / DOWN or keyboard UP / DOWN, and restore the given frequency to the value set by b00.10.
13	Shift between X setting and Y setting	Used to switch between different frequency sources. According to the setting of the frequency source selection function code (b00.09), when setting to switch between two types of frequency sources as the frequency source, this terminal is used to switch between the two types of frequency sources.
14	Shift between combination setting and X setting	If this terminal is valid, the frequency source X is replaced with the preset frequency (b00.08).

Code	Function	Description
15	Shift between combination setting and Y setting	If this terminal is valid, the frequency source X is replaced with the preset frequency (b00.08).
16	Multi-step speed terminal 1	The 16 states of these four terminals can be used to realize the setting of 16 steps speed or 16 other commands. For details, see Table 1.
17	Multi-step speed terminal 2	
18	Multi-step speed terminal 3	
19	Multi-step speed terminal 4	
20	Multi- step speed pause	Pause multi-speed action
21	ACC/DEC time option terminal 1	Through the 4 states of the 2 terminals, 4 kinds of acceleration / deceleration time selection can be realized. For details, see Table 2.
22	ACC/DEC time option terminal 2	
23	Simple PLC stop reset	The PLC pauses during execution, and when it runs again, this terminal can be used to restore the inverter to the initial state of the simple PLC.
24	Simple PLC pause	PLC pause
25	PID control pause	The PID is temporarily disabled, the inverter maintains the current output frequency and no longer performs PID adjustment of the frequency source.
26	Traverse Pause (stop at the current frequency)	The inverter outputs at the center frequency and the swing frequency function is paused.
27	Traverse reset (return to the center frequency)	Back to center frequency
28	Counter reset	Clear the counter status.
29	Torque control prohibition	The inverter is prohibited from torque control, and the inverter enters the speed control mode.
30	ACC/DEC prohibition	Ensure that the inverter is not affected by external signals (except the stop command) and maintain the current output frequency.
31	Counter trigger	Input terminal for counting pulses.
33	Cancel the frequency change setting temporarily	
34	DC brake	When this terminal is valid, the inverter directly switches to the DC braking state.
36	Shift the command to the keypad	When the command source is set to terminal control (b00.01 = 1), this terminal can switch between terminal control and keyboard control.
37	Shift the command to the terminals	When the command source is set to terminal control (b00.01 = 0), this terminal can switch between terminal control and keyboard control.

Code	Function	Description
38	Shift the command to the communication	When the command source is set to terminal control (b00.01 = 1), this terminal can switch between terminal control and keyboard control.
39	Pre-exciting command	Motor pre-excitation is performed when the inverter starts. Establishing a magnetic field inside the motor can effectively improve the torque characteristics during motor startup.
40	Clear the power consumption	Clear the current power consumption to 0.
41	Keep the power consumption	
61	PID pole switching	Switch PID positive and negative effects

Figure 6-1

Terminal 1（21）	Terminal 2（22）	ACC/DEC time selection	According parameters
OFF	OFF	ACC/DEC time 1	b00.11/b00.12
ON	OFF	ACC/DEC time 2	b08.00/b08.01
OFF	ON	ACC/DEC time 3	b08.02/b08.03
ON	ON	ACC/DEC time 4	b08.04/b08.05

<table>
<tr><td rowspan="2">b05.10</td><td>Polarity selection of the DI terminals</td><td>Default</td><td>0000</td></tr>
<tr><td>Setting range</td><td colspan="2">
<table>
<tr><td>BIT0</td><td>BIT1</td><td>BIT2</td><td>BIT3</td><td>BIT4</td></tr>
<tr><td>DI1</td><td>DI2</td><td>DI3</td><td>DI4</td><td>DI5</td></tr>
<tr><td>BIT5</td><td>BIT6</td><td>BIT7</td><td>BIT8</td><td></td></tr>
<tr><td>DI6</td><td>DI7</td><td>DI8</td><td>HDI</td><td></td></tr>
</table>
0.000s～1.000s</td></tr>
</table>

The function code is used to set the polarity of the input terminals.

When 0 is selected to be active high level, the corresponding DI terminal is valid when connected to COM, and disconnected is invalid.

When 1 is selected to be active low level, the corresponding DI terminal is invalid when connected to COM, and disconnected is valid.

b05.11	ON-OFF filter time	Default	0.010s
	Setting range	0.000s～1.000s	

Set the software filtering time of the DI terminal status. If the input terminals are susceptible to interference and cause malfunctions, you can increase this parameter to enhance anti-interference ability. However, increasing the filtering time will cause the response of the DI terminal to become slow.

b05.12	Virtual terminals setting	Default	0000
	Setting range	0x000~0x1FF（0：Disabled，1：Enabled） BIT0：DI1 virtual terminal BIT1：DI2 virtual terminal BIT2：DI3 virtual terminal	

		BIT3：DI4 virtual terminal BIT4：DI5 virtual terminal BIT5：DI6 virtual terminal BIT6：DI7 virtual terminal BIT7：DI8 virtual terminal BIT8：HDI virtual terminal

b05.13	Terminals control running mode		Default	0
	Setting range	0	2-wire control 1	
		1	2-wire control 2	
		2	3-wire control 1	
		3	3-wire control 2	

This parameter defines four different ways to control the inverter operation through external terminals.

Note：For the convenience of explanation, DI1, DI2, and DI3 among the multifunctional input terminals of DI1 to DI12 are arbitrarily selected as external terminals. That is, the functions of the three terminals DI1, DI2, and DI3 are selected by setting the values of b05.01 to b05.03. For detailed function definitions, see the setting range of b05.01 to b05.09.

b05.14	DI1 terminal switching-on delay time	Default	0.0s
	Setting range	0.0s～3000.0s	
b05.15	DI1 terminal switching-off delay time	Default	0.0s
	Setting range	0.0s～3000.0s	
b05.16	DI2 terminal switching-on delay time	Default	0.0s
	Setting range	0.0s～3000.0s	
b05.17	DI2 terminal switching-off delay time	Default	0.0s
	Setting range	0.0s～3000.0s	
b05.18	DI3 terminal switching-on delay time	Default	0.0s
	Setting range	0.0s～3000.0s	
b05.19	DI3 terminal switching-off delay time	Default	0.0s
	Setting range	0.0s～3000.0s	
b05.20	DI4 terminal switching-on delay time	Default	0.0s
	Setting range	0.0s～3000.0s	
b05.21	DI4 terminal switching-off delay time	Default	0.0s
	Setting range	0.0s～3000.0s	
b05.22	DI5 terminal switching-on delay time	Default	0.0s
	Setting range	0.0s～3000.0s	
b05.23	DI5 terminal switching-off delay time	Default	0.0s
	Setting range	0.0s～3000.0s	
b05.24	DI6 terminal switching-on delay time	Default	0.0s
	Setting range	0.0s～3000.0s	
b05.25	DI6 terminal switching-off delay time	Default	0.0s
	Setting range	0.0s～3000.0s	
b05.26	DI7 terminal switching-on delay time	Default	0.0s
	Setting range	0.0s～3000.0s	
b05.27	DI7 terminal switching-off delay time	Default	0.0s
	Setting range	0.0s～3000.0s	

b05.28	DI8 terminal switching-on delay time	Default	0.0s
	Setting range	0.0s～3000.0s	
b05.29	DI8 terminal switching-off delay time	Default	0.0s
	Setting range	0.0s～3000.0s	
b05.30	HDI terminal switching-on delay time	Default	0.0s
	Setting range	0.0s～3000.0s	
b05.31	HDI terminal switching-off delay time	Default	0.0s
	Setting range	0.0s～3000.0s	

It is used to set inverter for changing the delay time when the DI terminal status changes.

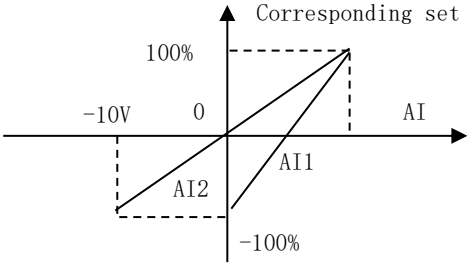
KOC680 supports the function of setting the delay time from DI1 to HDI.

b05.32	Lower limit of keypad potentiometer	Default	0.00V
	Setting range	0.00V~b05.34	
b05.33	Corresponding setting of the lower limit of keypad potentiometer	Default	0.0%
	Setting range	-100.0%~100.0%	
b05.34	Upper limit of keypad potentiometer	Default	10.00V
	Setting range	b05.32~10.00V	
b05.35	Corresponding setting of the upper limit of AI1	Default	100.0%
	Setting range	-100.0%~100.0%	
b05.36	AI1 input filter time	Default	0.100s
	Setting range	0.000s~10.000s	
b05.37	Lower limit of AI1	Default	0.00V
	Setting range	0.00V~b05.39	
b05.38	Corresponding setting of the lower limit of AI1	Default	0.0%
	Setting range	-100.0%~100.0%	
b05.39	Upper limit of AI1	Default	10.00V
	Setting range	b05.37~10.00V	
b05.40	Corresponding setting of the upper limit of AI1	Default	100.0%
	Setting range	-100.0%~100.0%	
b05.41	AI1 input filter time	Default	0.100s
	Setting range	0.000s~10.000s	
b05.42	Lower limit of AI2	Default	-10.00V
	Setting range	-10.00V~b05.44	
b05.43	Corresponding setting of the lower limit of AI2	Default	-100.0%
	Setting range	-100.0%~100.0%	
b05.44	Middle value of AI2	Default	0.00V
	Setting range	b05.42~ b05.46	
b05.45	Corresponding middle setting of AI2	Default	0.0%
	Setting range	-100.0%~100.0%	

b05.46	Upper limit of AI2	Default	10.00V
	Setting range	b05.44~10.00V	
b05.47	Corresponding setting ofthe upper limit of AI2	Default	100.0%
	Setting range	-100.0%~100.0%	
b05.48	AI2 input filter time	Default	0.100s
	Setting range	0.000s~10.000s	

Voltage, the nominal value corresponding to 100.0% of the analog setting is different in different applications. For details, please refer to the description of each application section.

The following illustration illustrates the settings：



Input filter time: this parameter is used to adjust the sensitivity of the analog input. Increasing the value properly can enhance the anti-interference of the analog, but weaken the sensitivity of the analog input.

Note：Analog AI1 can support 0~10V input；analog AI1 can support 0~10V/0~20mA input，when AI1 selects 0~20mA input，corresponding voltage of 20mA is 10V；AI2 supports -10~+10V input.

b05.50	Lower limit frequency of HDI	Default	0.000kHz
	Setting range	0.000kHz~b05.52	
b05.51	Corresponding setting of HDI low frequency setting	Default	0.00%
	Setting range	-100.0%~100.0%	
b05.52	Upper limit frequency of HDI	Default	50.000kHz
	Setting range	b05.50~50.000kHz	
b05.53	Corresponding setting of upper limit frequency of HDI	Default	100.0%
	Setting range	-100.0%~100.0%	
b05.54	HDI frequency input filter time	Default	0. 100s
	Setting range	0.000s~10.000s	

Group b06 Output terminals

KOC680 series inverters are standardly equipped with 1 multifunctional analog output terminal, 2 multifunctional digital output terminals, 1 multifunctional relay output terminal, 1 FM terminal（Can be selected as high-speed pulse output terminal, also can be selected as open-collector switch output).

If the above-mentioned output terminals cannot meet the field application, you need to install a multi-function input / output expansion card.

	FM terminal output mode	Default	0

b06.00	Setting range	0	Pulse output（FMP）
		1	Switch output（FMR）

The FM terminal is a programmable multiplexing terminal, which can be used as a high-speed pulse output terminal (FMP) or as an open-collector switch output (FMR).

When pulse output is FMP, the maximum frequency of the output pulse is 50.00kHz. For FMP related functions, refer to b06.16.

b06.01	DO1 function selection	Default	0
b06.02	FMR output function selection	Default	0
b06.03	Relay 1 function selection（T/A-T/B-T/C）	Default	1
b06.04	Relay 2 function selection（T/A-T/B-T/C）	Default	5

Multi-function output terminal function details

0	No output	Output terminal has no function
1	In operation	It means that the inverter is in the running state and has an output frequency (can be zero). At this time, the output is ON signal.
2	Forward rotation	It means that the inverter is running in the forward running state and has an output frequency (can be zero). At this time, the output is ON signal.
3	Reverse rotation	It means that the inverter is running in the reverse running state and has an output frequency (can be zero). At this time, the output is ON signal.
4	Jogging	It means that the inverter is running in the jog running state. At this time, the output is ON signal.
5	The inverter fault	When the inverter fails and stops due to fault, the output is ON signal.
6	Frequency degree test FDT1	Please refer to the description of function codes b08.32 and b08.33.
7	Frequency degree test FDT2	Please refer to the description of function codes b08.34 and b08.35.
8	Frequency arrival	Please refer to the description of function code b08.36.
9	Zero speed running	When the inverter is running and the output frequency is 0, the output is ON signal. When the inverter is stopped, this signal is OFF.
10	Upper limit frequency arrival	When the running frequency reaches the upper limit frequency, the output is ON signal.
11	Lower limit frequency arrival	When the running frequency reaches the lower limit frequency, the ON signal is put. This signal is OFF in the stop state.
12	Ready for operation	When the power of the main circuit and control circuit of the inverter is stable, and no fault information is detected by the inverter, and the inverter is in a running state, the output is ON signal.
13	Pre-magnetizing	During pre-excitation, the output is ON signal.

14	Overload pre-alarm	Before the motor overload protection works, based on the overload pre-alarm threshold, and output an ON signal after the pre-alarm threshold is exceeded.
15	Underload pre-alarm	When the inverter is in the off-load state, the output is ON signal.
16	Completion of simple PLC step	When the simple PLC runs one stage, it outputs a pulse signal with a width of 250ms.
17	Completion of simple PLC cycle	When the simple PLC runs a cycle, it outputs a pulse signal with a width of 250ms.
18	Setting count value arrival	When the count value reaches the value set by b08.25, the output is ON signal.
19	Defined count value arrival	When the count value reaches the value set by b08.25, the output is ON signal.
20	External fault valid	When a fault occurs in the inverter and the fault processing mode is to continue running, the inverter outputs an alarm.
22	Running time arrival	When the current running time of the inverter exceeds the time set by b08.27, it will output ON signal.
23	MODBUS communication virtual terminals output	
24	Brake control	Refer to details of b08.52-b08.58.
26	DC bus voltage establishment	
27	Auxiliary motor 1	Inverter 1, output ON signal.
28	Auxiliary motor 2	Inverter 2, output ON signal.

b06.05	Polarity selection of output terminals	Default	0
	Setting range	BIT0 BIT1 BIT2 BIT3 DO1 FM RELAY1 RELAY2 0-F	

It is used to set the effective state mode of the digital output terminal.

When 0 selected as high level is valid, 1 selected as low level is valid.

b06.06	DO1 switching-on delay time	Default	0.0s
	Setting range	0.0s～50.0s	
b06.7	DO1 switching-off delay time	Default	0.0s
	Setting range	0.0s～50.0s	
b06.08	FMR switching-on delay time	Default	0.0s
	Setting range	0.0s～50.0s	
b06.09	FMR switching-off delay time	Default	0.0s
	Setting range	0.0s～50.0s	
b06.10	RELAY1 switching-on delay time	Default	0.0s
	Setting range	0.0s～50.0s	
b06.11	RELAY1 switching-off delay time	Default	0.0s

	Setting range	0.0s～50.0s	
b06.12	RELAY2 switching-on delay time	Default	0.0s
	Setting range	0.0s～50.0s	
b06.13	RELAY2 switching-off delay time	Default	0.0s
	Setting range	0.0s～50.0s	

b06.14	FMP output function selection（Pulse output terminals）	Default	0
b06.15	AO1 output function selection	Default	0
b06.16	AO2 output function selection	Default	0

The range of the FMP terminal output pulse frequency is b06.27~b06.31 and it can be set between 0.01kHz and 50.00kHz.

The output range of analog output AO1 and AO2 is 0V ～ 10V, or 0mA ～ 20mA. The scaling relationship between the range of pulse output or analog output and the corresponding function is shown in the following table:

Setting code	Function	Function range (corresponds to pulse or analog output 0.0% ～ 100.0%)
0	Running frequency	0～Max frequency
1	Setting frequency	0～Max frequency
2	Ramp reference frequency	0～Max frequency
3	Running rotation speed	0～Speed corresponding to max frequency
4	Output current (relative to twice the inverter rated current)	2 times rated current of the inverter
5	Output current (relative to twice the motor rated current)	2 times rated current of the motor
6	Output voltage	0.0V～000.0V
7	Output power	0～2 times rated power 0～2
8	Setting torque	0～200% rated torque（Torque absolute value）
9	Output torque	-200% rated motor torque～+200% rated motor torque
10	Potentiometer of keypad set	0V～10V
11	Analog AI1 input value	0V～10V
12	Analog AI2 input value	0V～10V
13	High speed pulse HDI input value	0.01kHz～100.00kHz
14	MODBUS communication set value 1	0-32767
15	MODBUS communication set value 2	0-32767
22	Torque current (relative to triple the motor rated current)	3 times rated current of motor
23	Ramp reference frequency(with sign)	

AO1,AO2,HDI output set values

b06.17	Lower limit of AO1 output	Default	0.0%
	Setting range	-100.0%~b06.19	
b06.18	Corresponding AO1 output to the lower limit	Default	0.00V
	Setting range	0.00V~10.00V	
b06.19	Upper limit of AO1 output	Default	100.0%
	Setting range	b06.17~100.0%	
b06.20	Corresponding AO1 output to the upper limit	Default	10.00V
	Setting range	0.00V~10.00V	
b06.21	AO1 output filter time	Default	0.000s
	Setting range	0.000s~10.000s	
b06.22	Lower limit of AO2 output	Default	0.0%
	Setting range	-100.0%~b06.24	
b06.23	Corresponding AO2 output to the lower limit	Default	0.00V
	Setting range	0.00V~10.00V	
b06.24	Upper limit of AO2 output	Default	100.0%
	Setting range	b06.22~100.0%	
b06.25	Corresponding AO2 output to the upper limit	Default	10.00V
	Setting range	0.00V~10.00V	
b06.26	AO2 output filter time	Default	0.000s
	Setting range	0.000s~10.000s	
b06.27	Lower limit of HDI output	Default	0.00kHz
	Setting range	-100.0%~b06.29	
b06.28	Corresponding HDI output to the lower limit	Default	0.00V
	Setting range	0.00~50.00kHz	
b06.29	Upper limit of HDI output	Default	100.0%
	Setting range	b06.27~100.0%	
b06.30	Corresponding HDI output to the upper limit	Default	50.00kHz
	Setting range	0.00~50.00kHz	
b06.31	HDI output filter time	Default	0.000s
	Setting range	0.000s~10.000s	

The function code defines the corresponding relationship between the output value and the analog output. When the output value exceeds the set maximum output or minimum output range, it will be calculated with the upper limit output or lower limit output. When the analog output is a current output, 1mA current is equivalent to 0.5V voltage. In different applications, the analog output corresponding to 100% of the output value is different.

Group b07 Human-Machine Interface

b07.00	User's password	Default	0
	Setting range	0-65535	

Set any non-zero number, the password protection function will effect.

00000：Clear the previous user's password, and make the password protection invalid.

After the user's password becomes valid, if the password is incorrect, users cannot enter the parameter menu. Only correct password can make the user check or modify the parameters. Please remember all users' passwords.

Retreat editing state of the function codes and the password protection will become valid in 1 minute. If the password is available, press PRG/ESCto enter into the editing state of the function codes, and then "0.0.0.0.0" will be displayed. Unless input right password, the operator cannot enter into it.

Note: Restoring to the default value can clear the password, please use it with caution.

b07.01	Parameter copy		Default	0
	Setting range	0	No operation	
		1	Upload the local function parameter to the keypad	
		2	Download the keypad function parameter to local address(including the motor parameters)	
		3	Download the keypad function parameter to local address (excluding the motor parameter of b02 group)	
		4	Download the keypad function parameters to local address (only for the motor parameter of b02 group)	
b07.02	MF.K function selection		Default	1
	Setting range	0	No function	
		1	Jogging	
		2	Shift the display state by the shifting key.	
		3	Shift between forward rotations and reverse rotations.	
		4	Clear UP/DOWN settings.	
		5	Coast to stop.	
		6	Shift the running commands source.	
		7	Quick commission mode(committee according to the non-factory parameter)	

b07-02 multi-function

0：No function

1：Jogging，press MF.K to begin the jogging running.

2：Shift the display state by the shifting key. Press MF.K to shift the displayed function code from right to left.

3: Shift between forward rotations and reverse rotations. Press MF.K to shift the direction of the frequency commands. This function is only valid in the keypad commands channels.

4：Clear UP/DOWN settings. Press MF.K to clear the set value of UP/DOWN.

5：Coast to stop. Press MF.K to coast to stop.

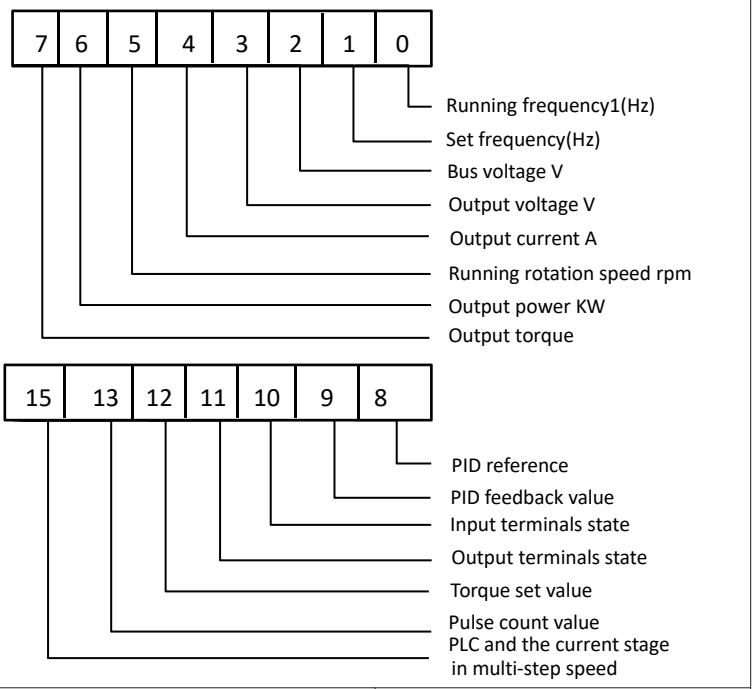
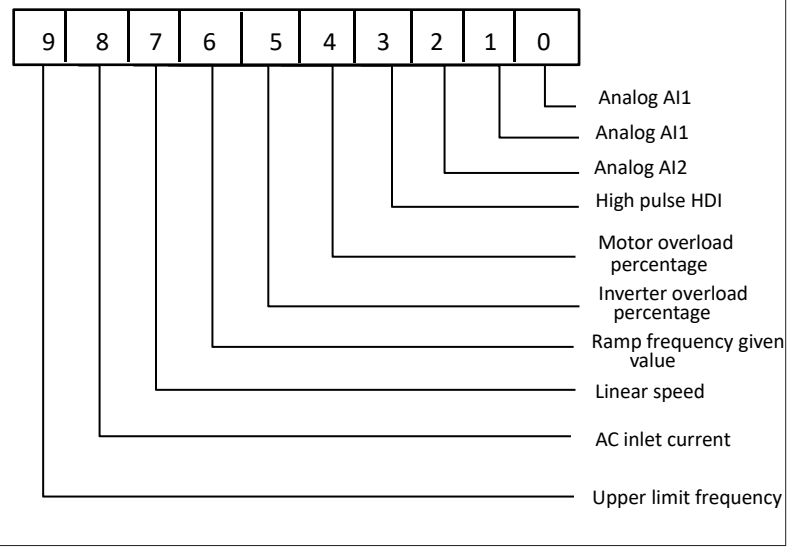
6：Shift the running commands source. Press MF.K to shift the running commands source.

7：Quick commission mode(committee according to the non-factory parameter).

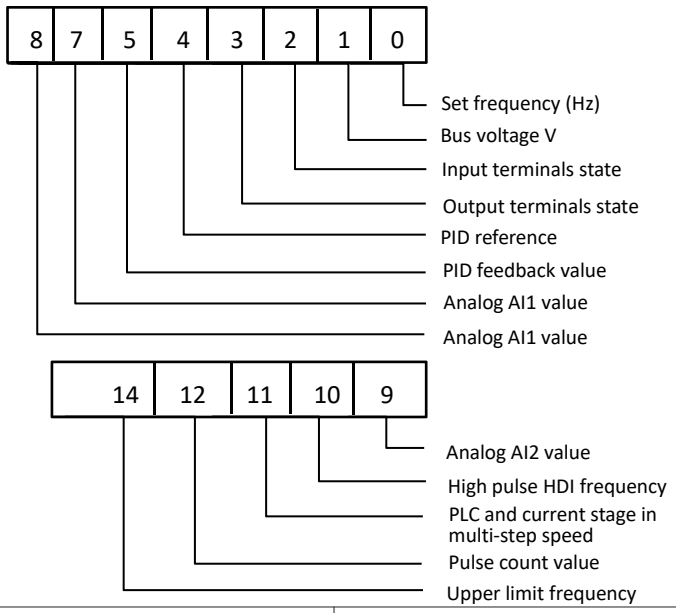
Note: Press MF.K to shift between forward rotation and reverse rotation, the inverter does not record the state after shifting during powering off. The inverter will run according to parameter b00.13 during next powering on.

b07.03	Shifting sequence selection of MF.K commands	Default	0

	Setting range	0	Keypad control→terminals control →communication control
		1	Keypad control←→terminals control
		2	Keypad control←→communication control
		3	Terminals control←→communication control
		When b07.02=6, set the shifting sequence of running command channels.	
b07.04	STOP/RESET stop function		Default 1
	Setting range	0	Only valid for the keypad control
		1	Both valid for keypad and terminals control
		2	Both valid for keypad and communication control
		3	Valid for all control modes

b07.05	Running state display LED 1	Default	03FF
	Setting range		
b07.06	Running state display LED 2	Default	0000
	Setting range		

b07.07	The parameter in the stop state	Default	00FF

	Setting range	
b07.08	Frequency coefficient	Default 1.00
	Setting range	0.01~10.00
b07.09	Rotation speed coefficient	Default 100.0%
	Setting range	0.1~999.9%
b07.10	Linear speed coefficient	Default 1.0%
	Setting range	0.1~999.9%

b07.08 Frequency coefficient：running frequency* b07.08

b07.09 Rotation speed coefficient：Mechanical rotation speed =120*displayed running frequency b07.09/motor pole pairs

b07.10 Linear speed coefficient：Linear speed= Mechanical rotation speed×b07.10

b07.11	Rectifier bridge module temperature	Default	-
	Setting range	0~100.0℃	
b07.12	IGBT module temperature	Default	-
	Setting range	0~100.0℃	
b07.13	Software version	Default	-
	Setting range	1.0-100	
b07.14	Local accumulative running time	Default	-
	Setting range	0-65535	
b07.15	High bit of power consumption	Default	-
	Setting range	0-65535KWh	
b07.16	Low bit of power consumption	Default	-
	Setting range	0-65535 KWh	
b07.17	Inverter type	Default	-
	Setting range	0: G type 1：P type	
b07.18	Rated power of the inverter	Default	-
	Setting range	0.4-3000.0KW	
b07.19	Rated voltage of the inverter	Default	-
	Setting range	50-1200V	
b07.20	Rated current of the inverter	Default	-

	Setting range	0.1-6000.0A	
b07.27	Type of present fault	Default	-
b07.28	Type of the last fault	0	No fault
b07.29	Type of the last 2 faults	1	IGBT U phase protection（OUt1）
b07.30	Type of the last 3 faults	2	IGBT V phase protection（OUt2）
b07.31	Type of the last 4 faults	3	IGBT W phase protection（OUt3）
b07.32	Type of the last 5 faults	4	OC1
		5	OC2
		6	OC3
		7	OV1
		8	OV2
		9	OV3
		10	UV
		11	Motor overload（OL1）
		12	The inverter overload（OL2）
		13	Input side phase loss（SPI）
		14	Output side phase loss（SPO）
		15	Overheat of the rectifier module（OH1）
		16	Overheat fault of the inverter module（OH2）
		17	External fault（EF）
		18	485 communication fault（CE）
		19	Current detection fault（ItE）
		20	Motor autotune fault（tE）
		21	EEPROM operation fault（EEP）
		22	PID response offline fault（PIDE）
		23	Braking unit fault（PCE）
		24	Running time arrival（END）
		25	Electrical overload（OL3）
		26	Panel communication fault（PCE）
		27	Parameter uploading fault（UPE）
		28	Parameter downloading fault（DNE）
		32	Grounding short circuit fault 1（ETH1）
		33	Grounding short circuit fault 2（ETH2）
		36	Undervoltage fault（LL）
b07.33	Running frequency at present fault	0.00Hz	-
b07.34	Ramp reference frequency at present fault	0.00Hz	-
b07.35	Output voltage at the present fault	0V	-
b07.36	Output current at present fault	0.0A	-
b07.37	Bus voltage at present fault	0.0V	-

b07.38	The max. temperature at present fault	0.0℃	-
b07.39	Input terminals state at present fault	0	-
b07.40	Output terminals state at present fault	0	-
b07.41	Running frequency at the last fault	0.00Hz	-
b07.42	Ramp reference frequency at the last fault	0.00Hz	-
b07.43	Output voltage at the last fault	0V	-
b07.44	Output current at the last fault	0.0A	-
b07.45	Bus voltage at the last fault	0.0V	-
b07.46	The max. temperature at the last fault	0.0℃	-
b07.47	Input terminals state at the last fault	0	-
b07.48	Output terminals state at the last fault	0	-
b07.49	Running frequency at the last 2 faults	0.00Hz	-
b07.50	Ramp reference frequency at the last 2 faults	0.00Hz	-
b07.51	Output voltage at the last 2 faults	0V	-
b07.52	Output current at the last 2 faults	0.0A	-
b07.53	Bus voltage at the last 2 faults	0.0V	-
b07.54	The max. temperature at the last 2 faults	0.0℃	-
b07.55	Input terminals state at the last 2 faults	0	-
b07.56	Output terminals state at the last 2 faults	0	-

Group b08 Enhanced function

b08.00	ACC time 2	Default	Model dependent
	Setting range	0.0~3600.0s	
b08.01	DEC time 2	Default	Model dependent
	Setting range	0.0~3600.0s	
b08.02	ACC time 3	Default	Model dependent
	Setting range	0.0~3600.0s	
b08.03	DEC time 3	Default	Model dependent
	Setting range	0.0~3600.0s	
b08.04	ACC time 4	Default	Model dependent
	Setting range	0.0~3600.0s	
b08.05	DEC time 4	Default	Model dependent
	Setting range	0.0~3600.0s	

KOC680 series defines a total of four groups of acceleration and deceleration time, which can be selected through the multifunctional digital input terminal (group b05). The factory default acceleration / deceleration time is the first group of acceleration / deceleration time.

b08.06	Jogging frequency	Default	5.00Hz
	Setting range	0.00Hz~b00.03（Max output frequency）	

b08.07	Jogging ACC time	Default	Model dependent
	Setting range	0.0~3600.0s	
b08.08	Jogging DEC time	Default	Model dependent
	Setting range	0.0~3600.0s	

Define the given frequency of the inverter during jogging operation. Setting range: 0.00Hz ~ b00.03 (max output frequency).

Jogging acceleration time refers to the time required for the inverter to accelerate from 0Hz to the maximum output frequency (b00.03).

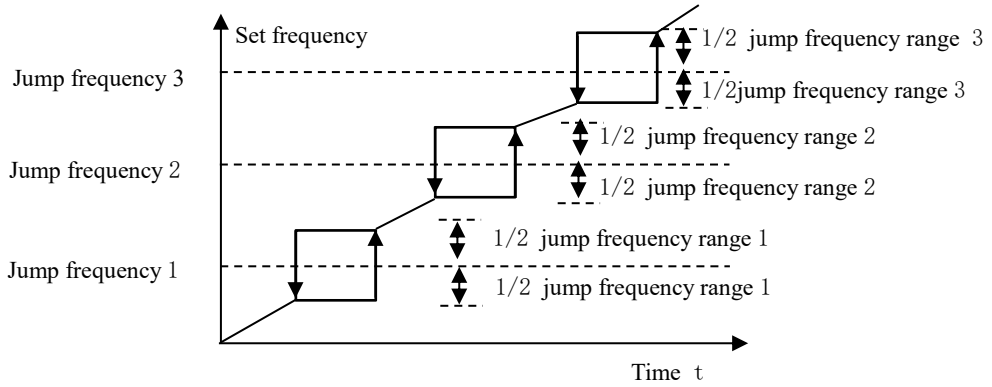
Jogging deceleration time refers to the time required for the inverter to decelerate from the maximum output frequency (b00.03) to 0Hz.

Setting range：0.0~3600.0s

b08.09	Jumping frequency 1	Default	0.00Hz
	Setting range	0.00Hz~b00.03（Max output frequency）	
b08.10	Jumping frequency range 1	Default	0.00Hz
	Setting range	0.00Hz~b00.03（Max output frequency）	
b08.11	Jumping frequency 2	Default	0.00Hz
	Setting range	0.00Hz~b00.03（Max output frequency）	
b08.12	Jumping frequency range 2	Default	0.00Hz
	Setting range	0.00Hz~b00.03（Max output frequency）	
b08.13	Jumping frequency 3	Default	0.00Hz
	Setting range	0.00Hz~b00.03（Max output frequency）	
b08.14	Jumping frequency range 3	Default	0.00Hz
	Setting range	0.00Hz~b00.03（Max output frequency）	

When the set frequency is within the jumping frequency range, the inverter will run at the jumping frequency boundary.

By setting the jumping frequency, the inverter avoids the mechanical resonance point of the load. This inverter can set three jumping frequency points. If the jump frequency points are all set to 0, this function will not work.

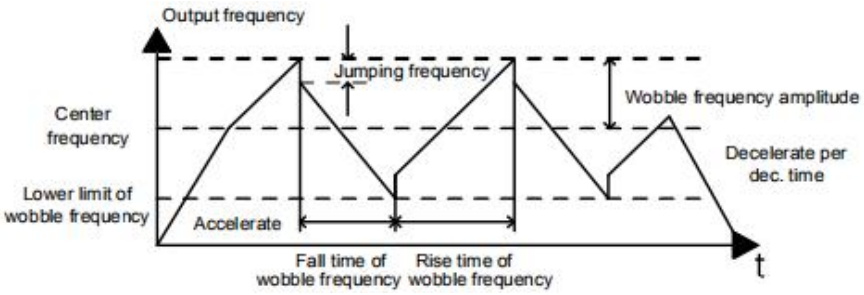


b08.15	Traverse range	Default	0.0%
	Setting range	0.0~100.0%（Relative set frequency）	
b08.16	Sudden jumping frequency range	Default	0.0%
	Setting range	0.0~50.0%（Relative traverse range）	

b08.17	Traverse boost time	Default	5.0s
	Setting range	0.1~3600.0s	
b08.18	Traverse declining time	Default	5.0s
	Setting range	0.1~3600.0s	

This function applies to the industries where traverse and convolution function are required such as textile、chemical fiber and winding.

The traverse function means that the output frequency of the inverter is fluctuated with the set frequency as its center. The route of the running frequency is illustrated as below, of which the traverse is set by b08.15 and when b08.15 is set as 0, the traverse is 0 with no function.



Traverse range: The traverse running is limited by upper and low frequency.

The traverse range relative to the center frequency (Set frequency): Traverse range AW＝center frequency X traverse range b08.15.

Sudden jumping frequency＝traverse range AW×sudden jumping frequency range b08.16. When run at the traverse frequency, the value which is relative to the sudden jumping frequency.

The raising time of the traverse frequency: The time from the lowest point to the highest one.

The declining time of the traverse frequency: The time from the highest point to the lowest one.

b08.25	Setting counting value	Default	0
	Setting range	b08.26~65535	
b08.26	Reference counting value	Default	0
	Setting range	0~b08.25	

The counter works by the input pulse signals of the HDI terminals.

When the counter achieves a fixed number, the multi-function output terminals will output the signal of“fixed counting number arrival” and the counter go on working; when the counter achieves a setting number, the multi-function output terminals will output the signal of “setting counting number arrival”, the counter will clear all numbers and stop to recount before the next pulse. The setting counting value b08.26 should be no more than the setting counting value b08.25.

b08.27	Set running time	Default	0m
	Setting range	0~65535min	
b08.28	Fault reset times	Default	0
	Setting range	0~10	
b08.29	Interval time of automatic fault reset	Default	1.0s
	Setting range	0.1~3600.0s	
b08.30	Frequency decreasing ratio of the dropping control	Default	0.00Hz

	Setting range	0.00~10.00Hz

b08.27: Pre-set running time of the inverter. When the accumulative running time achieves the set time, the multi-function digital output terminals will output the signal of "running time arrival".

b08.28: The time of the fault reset: set the fault reset time by selecting this function. If the reset time exceeds this set value, the inverter will stop for the fault and wait to be repaired.

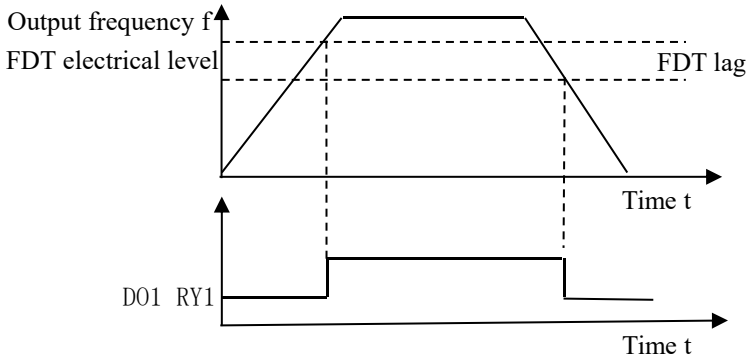
b08.29: The interval time of the fault reset: The interval between the time when the fault occurs and the time when the reset action occurs.

b08.30: The output frequency of the inverter changes as the load. And it is mainly used to balance the power when several inverters drive one load.

b08.32	FDT1 electrical level detection value	Default	50.00Hz
	Setting range	0.00Hz~b00.03（Max output frequency）	
b08.33	FDT1 retention detection value	Default	5.0%
	Setting range	0.0~100.0%（FDT1 electrical level）	
b08.34	FDT2 electrical level detection value	Default	50.00Hz
	Setting range	0.00Hz~b00.03（Max output frequency）	
b08.35	FDT2 retention detection value	Default	5.0%
	Setting range	0.0~100.0%（FDT2 electrical level）	

When the output frequency exceeds the corresponding frequency of FDT electrical level, the multi-function digital output terminals will output the signal of "frequency level detect FDT" until the output frequency decreases to a value lower than (FDT electrical level—FDT retention detection value) the corresponding frequency, the signal is invalid.

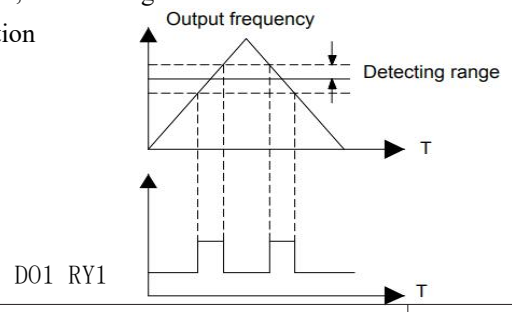
Below is the waveform diagram:



b08.36	Amplitude value for frequency arrival detection	Default	0.00Hz
	Setting range	0.00Hz~b00.03（Max output frequency）	

When the output frequency is among the below or above range of the set frequency, the multi-function digital output terminal will output the signal of "frequency arrival", see the diagram below for detailed information:

b08.36Amplitude value for frequency arrival detection



	Energy braking enable	Default	0

b08.37	Setting range	0	Disable
		1	Enable
b08.38	Threshold voltage		Default: 220Vvoltage380V 380Vvoltage700V 600V voltage1120V
	Setting range	200.0~2000.0V	

b08.37 This parameter is used to control the internal braking unit.

Note: Only applied to internal braking unit. After enabling, the overvoltage stall point will increase by 20V more than the energy braking point.

b08.38 After setting the original bus voltage, adjust this parameter to break the load appropriately. The factory value changes with voltage level.

b08.39	Cooling fan running mode		Default	0
	Setting range	0	Normal mode	
		1	The fan keeps on running after power on	

Set the operation mode of the cooling fan.

0: Normal mode, after the rectifier receives operation command or the detected temperature of module is above 45℃ or the module current is above 20% of the rated current, the fan rotates.

1: The fan keeps on running after power on(generally for the site with high temperature and humidity).

b08.40	PWM selection		Default	00
	Setting range	Ones	PWM mode selection	
		0	PWM mode 1, three-phase modulation and two-modulation	
		1	PWM mode 2, three-phase modulation	
		Tens	Low-speed carrier frequency limit mode	
		0	Low-speed carrier frequency limit mode 1, the carrier frequency will limit to 2k if it exceeds 2k at low speed	
		1	Low-speed carrier frequency limit mode 2, the carrier frequency will limit to 4k if it exceeds 4k at low speed	
		2	No limit	
b08.41	Over modulation selection		Default	01
	Setting range	Ones		
		0	Invalid	
		1	Valid	
		Tens		
		0	Light overmodulation；overmodulation depth within area 1 range	
		1	Heavy overmodulation; overmodulation depth within area 2 range	
b08.42	Keypad data control		Default	1
	Setting range	Ones	Frequency enable selection	
		0	Both ∧/∨ keys and digital potentiometer adjustments are valid	
		1	Only ∧/∨ keys adjustment is valid	
		2	Only digital potentiometer adjustments is valid	
		3	Neither ∧/∨ keys nor digital potentiometer adjustments are valid	
		Tens	Frequency control selection	

		0	Only valid when b00.06=0 or b00.07=0	
		1	Valid for all frequency setting manner	
		2	Invalid for multi-step speed when multi-step speed has the priority	
		Hundreds	Action selection during stopping	
		0	Setting is valid	
		1	Valid during running, cleared after stopping	
		2	Valid during running, cleared after receiving the stop command	
		Thousands	∧/∨keys and digital potentiometer integral function	
		0	The integral function is valid	
		1	The integral function is invalid	
b08.43	Integral ratio of the keypad potentiometer		Default	0.10s
	Setting range	0.01~10.00s		
b08.44	UP/DOWN terminals control		Default	000
	Setting range	Ones	Frequency enable selection	
		0	UP/DOWN terminals setting valid	
		1	UP/DOWN terminals setting invalid	
		Tens	Frequency control selection	
		0	Only valid when b00.06=0 or b00.07=0	
		1	All frequency means are valid	
		2	When the multi-step are priority, it is invalid to the multi-step	
		Hundreds	Action selection when stop	
		0	Setting valid	
		1	Valid in the running, clear after stop	
		2	Valid in the running, clear after receiving the stop commands	
b08.40	PWM selection		Default	00
	Setting range	Ones	PWM mode selection	
		0	PWM mode 1, three-phase modulation and two-modulation	
		1	PWM mode 2, three-phase modulation	
		Tens	Low-speed carrier frequency limit mode	
		0	Low-speed carrier frequency limit mode 1, the carrier frequency will limit to 2k if it exceeds 2k at low speed	
		1	Low-speed carrier frequency limit mode 2, the carrier frequency will limit to 4k if it exceeds 4k at low speed	
		2	No limit	
b08.41	Over modulation selection		Default	01
	Setting range	Ones		
		0	Invalid	
		1	Valid	
		Tens		
		0	Light overmodulation； overmodulation depth within area 1 range	
		1	Heavy overmodulation; overmodulation depth within area 2 range	

b08.42	Keypad data control		Default	1
	Setting range	Ones	Frequency enable selection	
		0	Both ∧/∨ keys and digital potentiometer adjustments are valid	
		1	Only ∧/∨ keys adjustment is valid	
		2	Only digital potentiometer adjustments is valid	
		3	Neither ∧/∨ keys nor digital potentiometer adjustments are valid	
		Tens	Frequency control selection	
		0	Only valid when b00.06=0 or b00.07=0	
		1	Valid for all frequency setting manner	
		2	Invalid for multi-step speed when multi-step speed has the priority	
		Hundreds	Action selection during stopping	
		0	Setting is valid	
		1	Valid during running, cleared after stopping	
		2	Valid during running, cleared after receiving the stop command	
		Thousands	∧/∨keys and digital potentiometer integral function	
		0	The integral function is valid	
		1	The integral function is invalid	
b08.43	Integral ratio of the keypad potentiometer		Default	0.10s
	Setting range	0.01~10.00s		
b08.44	UP/DOWN terminals control		Default	000
	Setting range	Ones	Frequency enable selection	
		0	UP/DOWN terminals setting valid	
		1	UP/DOWN terminals setting invalid	
		Tens	Frequency control selection	
		0	Only valid when b00.06=0 or b00.07=0	
		1	All frequency means are valid	
		2	When the multi-step are priority, it is invalid to the multi-step	
		Hundreds	Action selection when stop	
		0	Setting valid	
		1	Valid in the running, clear after stop	
		2	Valid in the running, clear after receiving the stop commands	
b08.45	UP terminals frequency increasing integral ratio		Default	0.50Hz/s
	Setting range	0.01~50.00Hz/s		
b08.46	DOWN terminals frequency integral ratio		Default	0.50Hz/s
	Setting range	0.01~50.00Hz/s		
b08.47	Action when the frequency setting is off		Default	000
	Setting range	0x000~0x111		
		Ones	Action selection when power off	
		0	Save when power off	

		1	Clear when power off	
		Tens	Action selection when MODBUS set frequency off	
		0	Save when power off	
		1	Clear when power off	
		Hundreds	The action selection when other frequency set frequency off	
		0	Save when power off	
		1	Clear when power off	
b08.48	High bit of initial power consumption		Default	0
	Setting range	0~59999		
b08.49	Low bit of initial power consumption		Default	0.0
	Setting range	0.0~999.9		
b08.50	Magnetic flux braking		Default	0
	Setting range	100~150		
b08.51	Inverter input power factor		Default	0.56
	Setting range	0.00~1.00 This function code is used to adjust the displayed current of the AC input side.		

b08.50 Magnetic flux braking

0：Invalid 100~150：The bigger the coefficient, the stronger the braking is.

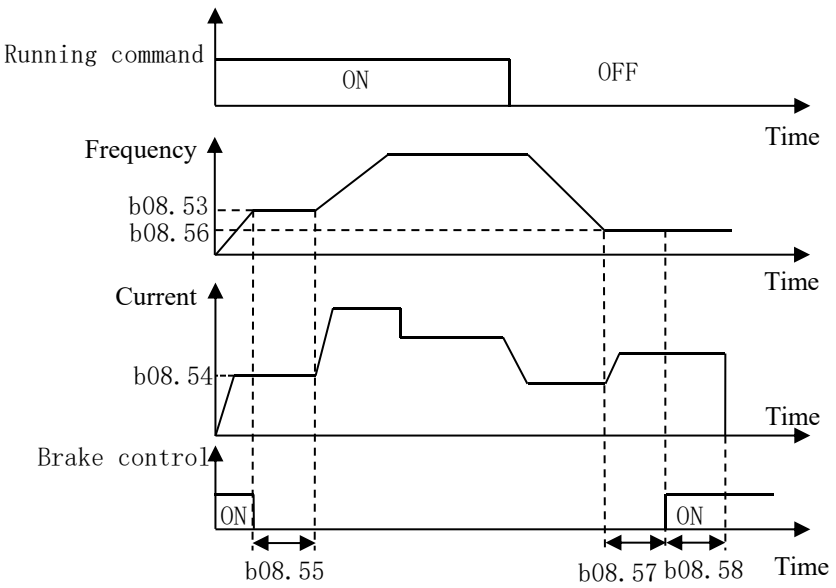
This inverter is used to increase the magnetic flux to decelerate the motor. The energy generated by the motor during braking can be converted into heat energy by increasing the magnetic flux.

The inverter monitors the state of the motor continuously even during the magnetic flux period.So the magnetic flux can be used in the motor stop, as well as to change the rotation speed of the motor. Its other advantages are:

Brake immediately after the stop command. It does not need to wait the magnetic flux weaken. Better cooling for motors. The current of the stator other than the rotor increases during magnetic flux braking, while the cooling of the stator is more effective than the rotor.

b08.52~ b08.58 Brake control function

Brake control process diagram



1、 The inverter receives the running command and accelerates to the brake release frequency set by b08.53.
2、 When the frequency reaches the set frequency of b08.53, the switching value output "brake control" terminal outputs an OFF signal to control the brake to release.
3、 Run at a constant speed with the brake release frequency. During this period, the inverter control output current does not exceed the current set by b08.54.
4、 The inverter reaches the set value of b08.55 at the holding brake release frequency, and starts to accelerate to the set frequency.
5、 After the inverter receives the stop command, it decelerates to the holding brake pull-in frequency set by b08.56 and runs at this frequency at a constant speed.
6、 After the running frequency reaches the setting value of b08.56, after the delay time of the holding time of the holding brake set in b08.57 is delayed, the digital output "holding brake control" terminal outputs a NO signal to control the holding of the holding brake.
7、 After the digital output "Brake Control" terminal outputs the NO signal time reaches the set value of b08.58, the inverter blocks the output and enters the stop state.

Group b09 PID control

b09.00	PID reference source	Default		0
	Setting range	0	Keypad digital reference（b09.01）	
		1	Keypad potentiometer setting	
		2	Analog channel AI1 reference	
		3	Analog channel AI2 reference	
		4	High speed pulse HDI setting	
		5	Multi-step speed setting	
		6	MODBUS communication setting	

When the frequency command selection (b00.06, b00. 07) is 7 or the voltage setting channel selection (b04.27) is 6, the running mode of the inverter is procedure PID controlled.

The parameter determines the target reference channel during the PID procures.

0：Keypad digital reference（b09.01）

1：Keypad potentiometer setting

2：Analog channel AI1 reference

3：Analog channel AI2 reference

4：High speed pulse HDI setting

5：Multi-step speed setting

6：MODBUS communication setting

The setting target of procedure PID is a relative one, 100% of the setting equals to 100% of the response of the controlled system.The system is calculated according to the relative value (0–100.0%).

Note: Multi-step speed reference, it is realized by setting b10 group parameters.

b09.01	Keypad PID preset		Default	0.0%
	Setting range		-100.0%~100.0%	
b09.02	PID feedback source	Default		0
	Setting range	0	Keypad potentiometer setting	
		1	Analog channel AI1 feedback	
		2	Analog channel AI2 feedback	

		3	High speed HDI feedback	
		4	MODBUS communication feedback	
b09.03	PID output feature	Default		0
	Setting range	0	PID output is positive：	
		1	PID output is negative：	

b09.03 PID output feature

0: PID output is positive: When the feedback signal exceeds the PID reference value, the output frequency of the inverter will decrease to balance the PID. For example, the strain PID control during wrap-up.

1: PID output is negative: When the feedback signal is stronger than the PID reference value, the output frequency of the inverter will increase to balance the PID. For example, the strain PID control during wrap-down.

b09.04	Proportional gain（Kp）	Default	1.0
	Setting range	0.00~100.00	
b09.05	Integral time（Ti）	Default	0.10s
	Setting range	0.01~10.00s	
b09.06	Differential time（Td）	Default	0.0s
	Setting range	0.01~10.00s	
b09.07	Sampling cycle（T）	Default	0.0s
	Setting range	0.01~10.00s	

b09.04 Proportional gain（Kp）

The function is applied to the proportional gain P of PID input. P determines the strength of the whole PID adjuster. The parameter of 100 means that when the offset of PID feedback and reference value is 100%, the adjusting range of PID adjustor is the max. requency (ignoring integral function and differential function).

b09.05 Integral time（Ti）

This parameter determines the speed of PID adjustor to carry out integral adjustment on the deviation of PID feedback and reference. When the deviation of PID feedback and reference is 100%, the integral adjustor works continuously after the time (ignoring the proportional effect and differential effect) to achieve the max. frequency (b00.03) or the max. voltage (b04.31). Shorter the integral time, stronger is the adjustment.

b09.06 Differential time（Td）

This parameter determines the strength of the change ratio when PID adjustor carries out integral adjustment on the deviation of PID feedback and reference. If the PID feedback changes 100% during the time, the adjustment of integral adjustor (ignoring the proportional effect and differential effect) is the max. frequency (b00.03) or the max. voltage (b04.31). Longer the integral time, stronger is the adjusting.

b09.07 Sampling cycle（T）

This parameter means the sampling cycle of the feedback. The modulator calculates in each sampling cycle. The longer the sapling cycle is, the slower the response is. When the sampling cycle is set 0.00s，the sampling cycle is 1ms.

b09.08	PID control deviation limit	Default	0%
	Setting range	0.0~100.0%	
b09.09	Output upper limit of PID	Default	0%
	Setting range	b09.10~100.0%	
b09.10	Output lower limit of PID	Default	0%
	Setting range	-100.0%~b09.10	
b09.11	Feedback offline detection value	Default	0.0%
	Setting range	0.0~100.0%	

b09.12	Feedback offline detection time	Default	1.0s
	Setting range	0.0~3600.0s	

b09.11 Feedback offline detection value

b09.12 Feedback offline detection time

Set the PID feedback offline detection value, when the detection value is smaller than or equal to the feedback offline detection value, and the lasting time exceeds the set value in P09.12, the inverter will report “PID feedback offline fault” and the keypad will display PIDE.

b09.13	PID adjustment	Default	000
	Setting range	0x000~0x111	
		Ones	
		0	Keep on integral adjustment when the frequency achieves the upper and low limit
		1	Stop integral adjustment when the frequency achieves the upper and low limit
		Tens	
		0	The same with the setting direction；
		1	Opposite to the setting direction
		Hundreds	
		0	Limit to the maximum frequency
		1	Limit to frequency X
		Thousands	
		0	X+Y frequency，the buffer of X frequency is invalid
		1	X+Y frequency, the buffer of X frequency is valid ACC/DEC is determined by ACC time 4 of b08.04
b09.14	Proportional gain at low frequency（Kp）	Default	1.00
	Setting range	0.00~100.00	
b09.15	PID command of ACC/DEC time	Default	0.0s
	Setting range	0.0~1000.0s	
b09.16	PID output filter time	Default	0.000s
	Setting range	0.000~10.000s	

Group b10 Simple PLC and multi-step speed control

b10.00	Simple PLC	Default	0
	Setting range	0	Stop after running once.
		1	Run at the final value after running once.
		2	Cycle running.
b10.01	Simple PLC memory	Default	0
	Setting range	0	Power loss without memory
		1	Power loss memory；

b10.00 Simple PLC

0：Stop after running once. The inverter has to be commanded again after finishing a cycle.

1： Run at the final value after running once. After finish a signal, the inverter will keep the running frequency and

direction of the last run.

2：Cycle running. The inverter will keep on running until receiving a stop command and then, the system will stop.

b10.01 Simple PLC memory

0：Power loss without memory

1：Power loss memory; PLC record the running step and frequency when power loss.

b10.02	Multi-step speed 0	Default	0%
	Setting range	-100.0~100.0%	
b10.03	Running time of step 0	Default	0.0s
	Setting range	0.0~6553.5s（min）	
b10.04	Multi-step speed 1	Default	0%
	Setting range	-100.0~100.0%	
b10.05	Running time of step 1	Default	0.0s
	Setting range	0.0~6553.5s（min）	
b10.06	Multi-step speed 2	Default	0%
	Setting range	-100.0~100.0%	
b10.07	Running time of step 2	Default	0.0s
	Setting range	0.0~6553.5s（min）	
b10.08	Multi-step speed 3	Default	0%
	Setting range	-100.0~100.0%	
b10.09	Running time of step 3	Default	0.0s
	Setting range	0.0~6553.5s（min）	
b10.10	Multi-step speed 4	Default	0%
	Setting range	-100.0~100.0%	
b10.11	Running time of step 4	Default	0.0s
	Setting range	0.0~6553.5s（min）	
b10.12	Multi-step speed 5	Default	0%
	Setting range	-100.0~100.0%	
b10.13	Running time of step 5	Default	0.0s
	Setting range	0.0~6553.5s（min）	
b10.14	Multi-step speed 6	Default	0%
	Setting range	-100.0~100.0%	
b10.15	Running time of step 6	Default	0.0s
	Setting range	0.0~6553.5s（min）	
b10.16	Multi-step speed 7	Default	0%
	Setting range	-100.0~100.0%	
b10.17	Running time of step 7	Default	0.0s
	Setting range	0.0~6553.5s（min）	
b10.18	Multi-step speed 8	Default	0%
	Setting range	-100.0~100.0%	
b10.19	Running time of step 8	Default	0.0s
	Setting range	0.0~6553.5s（min）	
b10.20	Multi-step speed 9	Default	0%
	Setting range	-100.0~100.0%	

b10.21	Running time of step 9	Default	0.0s
	Setting range	0.0~6553.5s（min）	
b10.22	Multi-step speed 10	Default	0%
	Setting range	-100.0~100.0%	
b10.23	Running time of step 10	Default	0.0s
	Setting range	0.0~6553.5s（min）	
b10.24	Multi-step speed 11	Default	0%
	Setting range	-100.0~100.0%	
b10.25	Running time of step 11	Default	0.0s
	Setting range	0.0~6553.5s（min）	
b10.26	Multi-step speed 12	Default	0%
	Setting range	-100.0~100.0%	
b10.27	Running time of step 12	Default	0.0s
	Setting range	0.0~6553.5s（min）	
b10.28	Multi-step speed 13	Default	0%
	Setting range	-100.0~100.0%	
b10.29	Running time of step 13	Default	0.0s
	Setting range	0.0~6553.5s（min）	
b10.30	Multi-step speed 14	Default	0%
	Setting range	-100.0~100.0%	
b10.31	Running time of step 14	Default	0.0s
	Setting range	0.0~6553.5s（min）	
b10.32	Multi-step speed 15	Default	0%
	Setting range	-100.0~100.0%	
b10.33	Running time of step 15	Default	0.0s
	Setting range	0.0~6553.5s（min）	

Multi-step commands can be used in three situations: as a frequency source and as a setting source for the process PID. In the application, the dimension of the multi-step command is a relative value, ranging from -100.0% to 100.0%. When used as a frequency source, it is a percentage of the relative maximum frequency;

But the PID reference is a relative value, multi-step commands as the PID setting source do not require dimensional conversion.

Multi-step commands need to be switched according to the different states of the multi-function digital DI，please refer to b05 group for detailed descriptions.

b10.34	Simple PLC 0~7 step ACC/DEC time	Default			0000		
	Setting range	Binary bit		Step	ACC/DEC time 1	ACC/DEC time 2	ACC/DEC time 3	ACC/DEC time 4
		BIT1	BIT0	0	00	01	10	11
		BIT3	BIT2	1	00	01	10	11
		BIT5	BIT4	2	00	01	10	11
		BIT7	BIT6	3	00	01	10	11
		BIT9	BIT8	4	00	01	10	11
		BIT11	BIT10	5	00	01	10	11
		BIT13	BIT12	6	00	01	10	11
		BIT15	BIT14	7	00	01	10	11

b10.35	Simple PLC 8~15 step ACC/DEC time	Default			0000		
	Setting range	Binary bit		Step	ACC/DEC time 1	ACC/DEC time 2	ACC/DEC time 3	ACC/DEC time 4
		BIT1	BIT0	0	00	01	10	11
		BIT3	BIT2	1	00	01	10	11
		BIT5	BIT4	2	00	01	10	11
		BIT7	BIT6	3	00	01	10	11
		BIT9	BIT8	4	00	01	10	11
		BIT11	BIT10	5	00	01	10	11
		BIT13	BIT12	6	00	01	10	11
		BIT15	BIT14	7	00	01	10	11

b10.36	PLC restart		Default	0
	Setting range	0	Restart from the first step;	
		1	Continue to run from the stop frequency;	
b10.37	Multi-step time unit		Default	0
	Setting range	0	second;	
		1	minute;	

b10.36 PLC restart

0：Restart from the first step; stop during running (cause by the stop command, fault or power loss), run from the first step after restart.

1：Continue to run from the stop frequency; stop during running (cause by stop command and fault), the inverter will record the running time automatically, enter into the step after restart and keep the remaining running at the setting frequency.

Group b11 Protective parameters

b11.00	Phase loss protection		Default	111
	Setting range	0x000~0x111		
		Ones		
		0	Input phase loss protection disable	
		1	Input phase loss protection enable	
		Tens		
		0	Output phase loss protection disable	
		1	Output phase loss protection enable	
		Hundreds		
		0	Input phase loss hardware protection disable	
		1	Input phase loss hardware protection enable	
b11.01	Sudden power loss frequency decrease		Default	0
	Setting range	0	Disable	
		1	Enable	
b11.02	Frequency decrease ratio of sudden		Default	10.00Hz/s

	power loss		
	Setting range	0.00Hz/s~b00.03（Max output frequency）	

After the power loss of the grid, the bus voltage drops to the sudden frequency-decreasing point, the inverter begin to decrease the running frequency at b11.02, to make the inverter generate power again. The returning power can maintain the bus voltage to ensure a rated running of the inverter until power recovery.

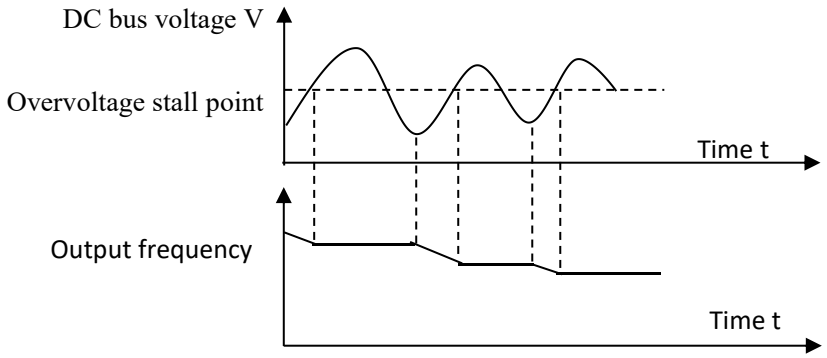
Voltage degree	220V	380V	660V
Frequency decrease point at sudden power loss	260V	460V	800V

Note:

1. Adjust the parameter properly to avoid the stopping caused by inverter protection during the switching of the grid.

2. Disable input phase loss protection to enable this function.

b11.03	Overvoltage stall protection		Default	0
	Setting range	0	Disable	
		1	Enable	



b11.04	Protection voltage at overvoltage stall		Default	380(136%) 220(120%)
	Setting range	380V	120~150%（standard bus voltage）	
		220V	120~150%（standard bus voltage）	
b11.05	Current limit selection		Default	01
	Setting range	0x00~0x11		
		Ones	current limit action selection	
		0	Invalid	
		1	Always valid	
		Tens	overload alarm of hardware current limit	
		0	Valid	
		1	Invalid	
b11.06	Automatic current limit		Default	-
	Setting range	50.0~200.0%		
		G	G type：160.0%	
		P	P type：120.0%	
b11.07	The decreasing ratio during current limit		Default	10.00Hz/s
	Setting range		0.00~50.00Hz/s	

The actual increasing ratio is less than the ratio of output frequency because of the big load during ACC running. It is necessary to take measures to avoid overcurrent fault and the inverter trips. During the running of the inverter, this function will detect the

output current and compare it with the limit defined in b11.06. If it exceeds the level, the inverter will run at stable frequency in ACC running, or the inverter will derate to run during the constant running. If it exceeds the level continuously, the output frequency will keep on decreasing to the lower limit. If the output current is detected to be lower than the limit level, the inverter will accelerate to run.

b11.08	Overload pre-alarm of the motor/inverter		Default	000
	Setting range	0x000~0x131		
		Ones		
		0	Overload pre-alarm of the motor, comply with the rated current of the motor	
		1	Overload pre-alarm of the inverter, comply with the rated current of the inverter	
		Tens		
		0	The inverter continues to work after underload pre-alarm	
		1	The inverter continues to work after underload pre-alarm and the inverter stops running after overload fault	
		2	The inverter continues to work after overload pre-alarm and the inverter stops running after underload fault	
		3	The inverter stops when overload or underload	
		Hundreds		
		0	Detection all the time	
		1	Detection in constant running	
b11.09	Overload pre-alarm test level		Default	-
	Setting range	b11.11~200%		
		G	G type：160.0%	
		P	P type：120.0%	
b11.10	Overload pre-alarm detection time		Default	1.0s
	Setting range		0.1~3600.0s	

Inverter or motor output current is greater than the overload pre-alarm detection level b11.09，and the duration exceeds the overload pre-alarm delay time b11.10，output overload pre-alarm signal.

b11.11	Detection level of underload pre-alarm	Default	50%
	Setting range	0~b11.09	
b11.12	Detection time of underload pre-alarm	Default	1.0s
	Setting range	0.1~3600.0s	

Inverter or motor output current is less than underload pre-alarm detection level b11.11，and the duration exceeds the underload pre-alarm delay time b11.12，output underload pre-alarm signal.

b11.13	Output terminal action during fault	Default	00
	Setting range	Ones	
		0	Action under fault undervoltage
		1	No action under fault undervoltage

		Tens	
		0	Action during the automatic reset
		1	No action during the automatic reset
b11.16	Extension functions selection	Default	000
	Setting range	0x00~0x11	
		Ones	Voltage drop frequency-decreasing selection
		0	Voltage drop frequency-decreasing selection disable
		1	Voltage drop frequency-decreasing selection enable
		Tens	Step 2 ACC/DEC time option
		0	Step 2 ACC/DEC time option disable
		1	Step 2 ACC/DEC time option enable,when running frequency more than b08.36, ACC/DEC time switch to step 2 ACC/DEC time.
b13.13	Braking current of short-circuit	Default	0.0%
	Setting range	0.0~150.0%	
b13.14	Braking retention time before starting	Default	0.00s
	Setting range	0.00~50.00s	
b13.15	Braking retention time when stopping	Default	0.00s
	Setting range	0.00~50.00s	

When the inverter is starting, the starting mode is direct frequency start.

When b01.00=0 during the starting of the inverter, set b13.14 to a non-zero value to enter the short circuit braking. When the running frequency is lower than b01.09during the stopping of the inverter, set b13.15 to a non-zero value to enter into stopping short circuited braking and then carry out the DC braking at the time set by b01.12 (refer to the instruction of b01.09~b01.12).

Group b14 Serial communication

b14.00	Local communication address	Default	1
	Setting range	Setting range：1~247	

When the master is writing the frame, the communication address of the slave is set to 0; the broadcast address is the communication address. All slaves on the MODBUS fieldbus can receive the frame, but the salve doesn't answer.

The communication address of the drive is unique in the communication net. This is the fundamental for the point to point communication between the upper monitor and the drive.。

Note: The address of the slave cannot set to 0.

b14.01	Communication baud ratio		Default 4
	Setting range	0	1200BPS
		1	2400BPS
		2	4800BPS
		3	9600BPS
		4	19200BPS
		5	38400BPS
		6	57600BPS
b14.02	Digital bit checkout		Default 1
	Setting range	0	No check（N，8，1）for RTU
		1	Even check（E，8，1）for RTU

		2	Odd check（O，8，1）for RTU
		3	No check（N，8，2）for RTU
		4	Even check（E，8，2）for RTU
		5	Odd check（O，8，2）for RTU
		6	No check（N，7，1）for ASCII
		7	Even check（E，7，1）for ASCII
		8	Odd check（O，7，1）for ASCII
		9	No check（N，7，2）for ASCII
		10	Even check（E，7，2）for ASCII
		11	Odd check（O，7，2）for ASCII
		12	No check（N，8，1）for ASCII
		13	Even check（E，8，1）for ASCII
		14	Odd check（O，8，1）for ASCII
		15	No check（N，8，2）for ASCII
		16	Even check（E，8，2）for ASCII
		17	Odd check（O，8，2）for ASCII
b14.03	Response delay	Default	5
	Setting range	0~200ms	

b14.03 Response delay

It means the interval time between the interval time when the drive receive the data and sent it to the upper monitor. If the answer delay is shorter than the system processing time, then the answer delay time is the system processing time, if the answer delay is longer than the system processing time, then after the system deal with the data, waits until achieving the answer delay time to send the data to the upper monitor.

b14.04	Fault time of communication overtime	Default	0.0s
	Setting range	0.1~60.0s	

When the function code is set as 0.0, the communication overtime parameter is invalid. When the function code is set as non-zero, if the interval time between two communications exceeds the communication overtime, the system will report “485 communication faults” (CE).

Generally, set it as invalid; set the parameter in the continuous communication to monitor the communication state.

b14.05	Transmission fault processing	Default	0
	Setting range	0	Alarm and stop freely
		1	No alarm and continue to run
		2	No alarm and stop according to the stop means (only under the communication control)
		3	No alarm and stop according to the stop means (under all control modes)
b14.06	Communication processing	Default	0
	Setting range	Ones	:
		0	Operation with response；
		1	Operation without response；
		Tens	Communication encryption processing
		0	Communication encrypting invalid
		1	Communication encrypting valid

b14.06 Communication processing

Ones：

0：Operation with response: the drive will respond to all reading and writing commands of the upper monitor.

1：Operation without response; The drive only responds to the reading command other than the writing command of the drive. The communication efficiency can be increased by this method.

Tens：Communication encryption processing

0：Communication encrypting invalid

1：Communication encrypting valid

Group b17 Monitoring function

<table>
<tr><td rowspan="2">b17.00</td><td>Setting frequency</td><td>Default</td><td>-</td></tr>
<tr><td>Setting range</td><td colspan="2">0.00Hz~b00.03</td></tr>
<tr><td rowspan="2">b17.01</td><td>Output frequency</td><td>Default</td><td>-</td></tr>
<tr><td>Setting range</td><td colspan="2">0.00Hz~b00.03</td></tr>
<tr><td rowspan="2">b17.02</td><td>Ramp reference frequency</td><td>Default</td><td>-</td></tr>
<tr><td>Setting range</td><td colspan="2">0.00Hz~b00.03</td></tr>
<tr><td rowspan="2">b17.03</td><td>Output voltage</td><td>Default</td><td>-</td></tr>
<tr><td>Setting range</td><td colspan="2">0~1200V</td></tr>
<tr><td rowspan="2">b17.04</td><td>Output current</td><td>Default</td><td>-</td></tr>
<tr><td>Setting range</td><td colspan="2">0.0~3000.0A</td></tr>
<tr><td rowspan="2">b17.05</td><td>Motor speed</td><td>Default</td><td>-</td></tr>
<tr><td>Setting range</td><td colspan="2">0~65535RPM</td></tr>
<tr><td rowspan="2">b17.08</td><td>Motor power</td><td>Default</td><td>-</td></tr>
<tr><td>Setting range</td><td colspan="2">Display the current power of the motor, 100.0% relative to the rated power of the motor, positive value is electric state, negative value is power generation state
-300.0~300.0%（corresponding to rated motor power）</td></tr>
<tr><td rowspan="2">b17.09</td><td>Output torque</td><td>Default</td><td>-</td></tr>
<tr><td>Setting range</td><td colspan="2">Display the current output torque of the inverter, 100.0% relative to the rated torque of the motor, positive value is electric state, negative value is power generation state
Setting range:-250.0~250.0%</td></tr>
<tr><td rowspan="2">b17.10</td><td>Evaluated motor frequency</td><td>Default</td><td>-</td></tr>
<tr><td>Setting range</td><td colspan="2">0.00Hz~ b00.03</td></tr>
<tr><td rowspan="2">b17.11</td><td>DC bus voltage</td><td>Default</td><td>-</td></tr>
<tr><td>Setting range</td><td colspan="2">0.0~2000.0V</td></tr>
<tr><td rowspan="2">b17.12</td><td>Switch input terminals state</td><td>Default</td><td>-</td></tr>
<tr><td>Setting range</td><td colspan="2">0000~01F
<table>
<tr><td></td><td>BIT8</td><td>BIT7</td><td>BIT6</td><td>BIT5</td></tr>
<tr><td></td><td>HDI</td><td>DI8</td><td>DI7</td><td>DI6</td></tr>
<tr><td>BIT4</td><td>BIT3</td><td>BIT2</td><td>BIT1</td><td>BIT0</td></tr>
<tr><td>DI5</td><td>DI4</td><td>DI3</td><td>DI2</td><td>DI1</td></tr>
</table></td></tr>
<tr><td rowspan="2">b17.13</td><td>Switch output terminals state</td><td>Default</td><td>-</td></tr>
<tr><td>Setting range</td><td colspan="2">0000~000F
<table>
<tr><td>BIT3</td><td>BIT2</td><td>BIT1</td><td>BIT0</td></tr>
</table></td></tr>
</table>

			DI4	DI3	DI2	DI1
b17.14	Digital adjustment	Default	-			
	Setting range	0.00Hz~ b00.03				
b17.15	Torque reference	Default	-			
	Setting range	-300.0%~300.0%（Rated motor current）				
b17.16	Linear speed	Default	-			
	Setting range	0~65535				
b17.18	Counting value	Default	-			
	Setting range	0~65535				
b17.19	Input voltage set by keypad potentiometer	Default	-			
	Setting range	0.00~10.00V				
b17.20	AI1 input voltage	Default	-			
	Setting range	0.00~10.00V				
b17.21	AI2 input voltage	Default	-			
	Setting range	-10.00~10.00V				
b17.22	HDI input frequency	Default	-			
	Setting range	0.000~50.000kHz				
b17.23	PID reference value	Default	-			
	Setting range	-100.0~100.0%				
b17.24	PID feedback value	Default	-			
	Setting range	-100.0~100.0%				
b17.25	Power factor of the motor	Default	-			
	Setting range	-1.00~1.00				
b17.26	Current running time	Default	-			
	Setting range	0~65535min				
b17.27	Simple PLC and the current step of multi-step speed	Default	-			
	Setting range	0~15				
b17.35	AC input current	Default	-			
	Setting range	0.0~5000.0A（Display the effective value of the incoming line current value on the AC input side）				
b17.36	Output torque	Default	-			
	Setting range	-3000.0Nm~3000.0Nm				
b17.37	Counting of the motor overload	Default	-			
	Setting range	0~100（100 jog OL1 fault）				
b17.38	PID output	Default	-			
	Setting range	-100.00~100.00%				
b17.39	Wrong download of parameters	Default	-			
	Setting range	0.00~99.99				

Group b24 Constant pressure water supply

b24.00	Water supply sleep selection		Default	0
	Setting range	0	Invalid	

		1	Valid	
b24.01	Press feedback source		Default	0
	Setting range	0	Invalid	
		1	AI1 setting value	
		2	AI2 setting value	
		3	HDI setting value	
b24.02	Hibernation check		Default	0
	Setting range	0	Hibernate as the setting frequency < b24.03	
		1	Hibernate as the feedback pressure > b24.04	
b24.03	Starting frequency of hibernation		Default	10.00Hz
	Setting range		0.00~b00.03(Max output frequency)	
b24.04	Starting pressure of hibernation		Default	50.0%
	Setting range		0.00~100.0%	
b24.05	Hibernation delay time		Default	5.0s
	Setting range		0.0~3600.0s	
b24.06	Hibernation awake		Default	0
	Setting range	0	Awake as the setting frequency > b24.07	
		1	Awake as the feedback pressure < b24.08	
b24.07	Awake frequency		Default	20.00Hz
	Setting range		0.00~b00.03(Max output frequency)	
b24.08	Setting value of hibernation awake		Default	10.0%
	Setting range		0.00~100.0%	
b24.09	Min. hibernation time		Default	5.0s
	Setting range		0.0~3600.0s	
b24.10	Valid auxiliary motor		Default	0
	Setting range	0	No auxiliary motor	
		1	Auxiliary motor 1 valid	
		2	Auxiliary motor 2 valid	
		3	Auxiliary motor 1 and 2 valid	
b24.11	Start/stop delay time of auxiliary motor 1		Default	5.0s
	Setting range		0.0~3600.0s	
b24.12	Start/stop delay time of auxiliary motor 2		Default	5.0s
	Setting range		0.0~3600.0s	

Chapter 7 EMC (Electromagnetic compatibility)

7.1 Definition

Electromagnetic compatibility is the ability of the electric equipment to run in the electromagnetic interference environment and implement its function stably without interferences on the electromagnetic environment.

7.2 EMC Standard Description

In accordance with the requirements of the national standard GB/T12668.3, the inverter needs to comply with electromagnetic interference and anti-electromagnetic interference requirements.

The existing products of our company apply the latest international standard—IEC/EN61800-3: 2004 (Adjustable speed electrical power drive systems part 3: EMC requirements and specific test methods), which is equivalent to the national standard GB/T12668.3. IEC/EN61800-3 assesses the inverter in terms of electromagnetic interference and anti-electronic interference. Electromagnetic interference mainly tests the radiation interference, conduction interference and harmonics interference on the inverter (required for the inverter for civil use)Anti-electromagnetic interference mainly tests the conduction interference rejection, radiation interference rejection, surge interference rejection, fast and mutable pulse group interference rejection, ESD interference rejection and power low frequency end interference rejection (specific test items including: 1. Interference rejection tests of input voltage sag, interrupt and change; 2. Phase conversion interference rejection test; 3. Harmonic input interference rejection test; 4. Input frequency change test; 5. Input voltage unbalance test; 6. input voltage fluctuation test). The tests shall be conducted strictly in accordance with the above requirements of IEC/ EN61800-3, and the products of our company are installed and used according to Section 7.3 and have good electromagnetic compatibility in general industry environment.

7.3 EMC Guide

7.3.1 Harmonic Effect

Higher harmonics of power supply may damage the inverter. Thus, at some places where mains quality is rather poor, it is recommended to install AC input reactor.

7.3.2 Electromagnetic Interference and Installation Precautions

There are two kinds of electromagnetic interferences, one is interference of electromagnetic noise in the surrounding environment on the inverter, and the other is interference of inverter on the surrounding equipment.

Installation precautions:

1) The earth wires of the frequency inverter and other electric products shall be well grounded;
2) The power input and output power cables of the inverter and weak current signal cables (e.g. control line) shall not be arranged in parallel and vertical arrangement is preferable.
3) It is recommended that the output power cables of the inverter employ shield cables or steel pipe shielded cables and that the shielding layer be earthed reliably. The lead cables of the equipment suffering interferences are recommended to employ twisted-pair shielded control cables, and the

shielding layer shall be earthed reliably.

4) When the length of motor cable is longer than 100 meters, it needs to install output filter or reactor.

7.3.3Handling method for the interferences of the surrounding equipment on the inverter:

The electromagnetic interference on the inverter is generated because plenty of relays, contactors and electromagnetic brakes are installed near the inverter. When the inverter has error action due to the interferences, the following measures can be taken:

1) Install surge suppressor on the devices generating interference;

2) Install filter at the input end of the inverter. Refer to Section 7.3.6 for the specific operations.

3) The lead cables of the control signal cable of the inverter and the detection line employ shielded cable and the shielding layer shall be earthed reliably.

7.3.4 Handling method for the interferences of frequency inverter on the surrounding equipment:

These interferences include two types: one is radiation interference of the inverter, and the other is conduction interference of the inverter. These two types of interferences cause the surrounding electric equipment to suffer electromagnetic or electrostatic induction. The surrounding equipment hereby produces error action. For different interferences, it can be handled by referring to the following methods:

1) For the measuring meters, receivers and sensors, their signals are generally weak. If they are placed nearby the inverter or together with the inverter in the same control cabinet, they are easy to suffer interference and thus generate error actions. It is recommended to handle with the following methods: Put in places far away from the interference source; do not arrange the signal cables with the power cables in parallel and never bind them together; both the signal cables and power cables employ shielded cables and are well earthed; install ferrite magnetic ring (with suppressing frequency of 30 to 1,000MHz) at the output side of the inverter and wind it 2 to 3 cycles; install EMC output filter in more severe conditions.

2) When the equipment suffering interferences and the inverter use the same power supply, it may cause conduction interference. If the above methods cannot remove the interference, it shall install EMC filter between the inverter and the power supply (refer to Section 7.3.6 for the prototyping operation); the surrounding equipment is separately earthed, which can avoid the interference caused by the leakage current of the inverter's earth wire when common earth mode is adopted.

3) The surrounding equipment is separately earthed, which can avoid the interference caused by the leakage current of the inverter's earth wire when common earth mode is adopted.

7.3.5 Leakage current and handling

There are two forms of leakage current when using the inverter. One is leakage current to the earth, and the other is leakage current between the cables.

1) Factors influencing the leakage current to the earth and the solutions:

There are distributed capacitance between the lead cables and the earth. The larger the distributed capacitance is, the larger the leakage current will be. The distributed capacitance can be reduced by effectively reducing the distance between the inverter and the motor. The higher the carrier frequency is, the larger the leakage current will be. The leakage current can be reduced by reducing the carrier frequency. However, reducing the carrier frequency may result in addition of motor noise. Note that additional installation of reactor is also an effective method to remove the leakage current.

The leakage current may increase following the addition of circuit current. Therefore, when the motor

power is high, the corresponding leakage current will be high too.

2) Factors of producing leakage current between the cables and solutions:

There is distributed capacitance between the output cables of the inverter. If the current passing the lines has higher harmonic, it may cause resonance and thus result in leakage current. If thermal relay is used, it may generate error action.

The solution is to reduce the carrier frequency or install output reactor. It is recommended that thermal relay not be installed before the motor when using the inverter, and that electronic over current protection function of the inverter be used instead.

7.3.6 Precautions for Installing EMC input filter at the input end of power supply

1) When using the inverter, please follow its rated values strictly. Since the filter belongs to Classification I electric appliances, the metal enclosure of the filter shall be large and the metal ground of the installing cabinet shall be well earthed and have good conduction continuity. Otherwise there may be danger of electric shock and the EMC effect may be greatly affected.
2) Through the EMC test, it is found that the filter ground must be connected with the PE end of the inverter at the same public earth. Otherwise the EMC effect may be greatly affected.
3) The filter shall be installed at a place close to the input end of the power supply as much as possible.
4) When the motor cable is too long, due to the influence of distributed capacitance, electrical resonance is easy to occur, which will cause damage to the motor insulation or generate a large leakage current to make the inverter overcurrent protection. When the length of the motor cable is longer than 100m, an AC output reactor must be installed near the inverter.

Chapter 8 Fault Diagnosis and Solution

8.1 Fault Alarm and Countermeasures

KOC680 inverter has 32 types of warning information and protection function. In case of abnormal fault, the protection function will be invoked, the inverter will stop output, and the faulty relay contact of the inverter will start, and the fault code will be displayed on the display panel of the inverter. Before consulting the service department, the user can perform self-check according to the prompts of this chapter, analyze the fault cause and find out t solution. If the fault is caused by the reasons as described in the dotted frame, please consult the agents of inverter or our company directly.

Common faults and solution of the frequency inverter

Fault code	Fault type	Possible Causes	Solutions
OUt1	IGBT Ph-U fault	1: The acceleration is too fast 2: IGBT module fault 3: Misacts caused by interference 4: The connection of the driving wires is not good 5: Grounding is not properly	1: Increase acceleration time 2: Change the power unit 3: Check the driving wires 4: Inspect external equipment and eliminate interference
OUt2	IGBT Ph-V fault		
OUt3	IGBT Ph-W fault		
OV1	Over-voltage when acceleration	1: The input voltage is abnormal 2: There is large energy feedback 3: No braking components 4: Braking energy is not open	1: Check the input power 2: Check if the DEC time of the load is too short or the inverter starts during the rotation of the motor or it needs to add the dynamic braking components 3: Install the braking components 4: Check the setting of relative function codes
OV2	Over-voltage when deceleration		
OV3	Over-voltage when constant speed running		
OC1	Over-current when acceleration	1: The acceleration or deceleration is too fast 2: The voltage of the grid is too low 3: The power of the inverter is too low 4: The load transients or is abnormal 5: The grounding is short circuited or the output is phase loss 6: There is strong external interference 7: The overvoltage stall protection is not open	1: Increase the ACC/DEC time 2: Check the input power 3: Select the inverter with a larger power 4: Check if the load is short circuited (the grounding short circuited or the wire short circuited) or the rotation is not smooth 5: Check the output configuration 6: Check if there is strong interference 7: Check the setting of relative function codes
OC2	Over-current when deceleration		
OC3	Over-current when constant speed running		
UV	DC bus Under-voltage	1: The voltage of the power supply is too low 2: The overvoltage stall protection is not open	1: Check the voltage of power grid 2: Check the setting of relative function codes
OL1	Motor overload	1: The voltage of the power supply is too low	1: Check the voltage of power grid 2: Reset the rated current of the motor

		2: The motor setting rated current is incorrect 3: The motor stall or load transients is too strong	3: Check the load and adjust the torque lift
OL2	Inverter overload	1: The acceleration is too fast 2: Restart the rotating motor 3: Voltage of power grid is too low 4: The load is too heavy	1: Increase the ACC time 2: Avoid the restarting after stopping 3: Check the voltage of power grid 4: Select an inverter with bigger power 5: Select a proper motor
SPI	Input phase loss	Phase loss or fluctuation of input R,S,T	1: Check input power 2: Check installation distribution
SPO	Output phase loss	U,V,W phase loss input(or serious asymmetrical three phase of the load)	1: Check the output distribution 2: Check the motor and cable
OH1	Rectify overheat	1: Air duct jam or fan damage 2: Ambient temperature is too high 3: The time of overload running is too long	1: Clean the air duct or the fan 2: Reduce the ambient temperature
OH2	IGBT overheat		
EF	External fault	DI external fault input terminals action	Check the external device input
CE	485 communication error	1: The baud rate setting is incorrect 2: Fault occurs to the communication wiring. 3: The communication address is wrong 4: There is strong interference to the communication	1. Set proper baud rate 2. Check the communication connection distribution 3. Set proper communication address 4. Chang or replace the connection distribution or improve the anti-interference capability
ItE	Current detection fault	1: The connection of the control board is not good 2: Hall components is broken 3: The modifying circuit is abnormal	1: Check the connector and re-plug 2: Change the hall 3: Change the main control panel
tE	Autotuning fault	1: The motor capacity does not comply with the inverter capability 2: The rated parameter of the motor does not set correctly 3: The offset between the parameters autotuning and the standard parameter is huge 4: Autotune overtime	1: Change the inverter mode 2: Set the motor type and rated parameter according to the motor nameplate correctly 3: Empty the motor load and re-identify 4: Check the motor connection and set the parameter 5: Check if the upper limit frequency is above 2/3 of the rated frequency
EEP	EEPROM operation fault	1: Error of controlling the write and read of the parameters 2: Damage to EEPROM	1: Press STOP/RES to reset 2: Change the main control panel
PIDE	PID feedback fault	1: PID feedback offline 2: PID feedback source disappear	1: Check the PID feedback signal 2: Check the PID feedback source

bCE	Braking unit fault	1: Braking circuit fault or damage to the braking pipes 2: The external braking resistor is not sufficient	1: Check the braking unit and change new braking pipe 2: Increase the braking resistor
END	Running time reach	The actual running time of the inverter is above the internal setting running time	Ask for the supplier and adjust the setting running time
OL3	Electrical overload	The inverter will report overload pre-alarm according to the set value	Check the load and the overload pre-alarm point
PCE	Keypad communication fault	1: The connection of the keypad wires is not good or broken 2: The keypad wire is too long and affected by strong interference 3: There is circuit fault on the communication of the keypad and main board	1: Check the keypad wires and ensure whether there is fault 2: Check the environment and avoid the interference source 3: Change the hardware and ask for service
UPE	Parameters uploading fault	1: The connection of the keypad wires is not good or broken 2: The keypad wire is too long and affected by strong interference 3: Partial circuit faults in keyboard or main board communication	1: Check the environment and eliminate sources of interference 2: Change the hardware and ask for service
DNE	Parameters downloading fault	1: The connection of the keypad wires is not good or broken 2: The keypad wire is too long and affected by strong interference 3: There is mistake on the data storage of the keypad	1: Check the environment and eliminate sources of interference 2: Change the hardware and ask for service 3: Repack-up the data in the keypad
ETH1	Grounding shortcut fault 1	1: The output of the inverter is short circuited with the ground 2: There is fault in the current detection circuit 3: The actual motor power sharply differs from the inverter power	1: Check if the connection of the motor is normal or not 2: Change the hall 3: Change the main control panel 4: Set motor parameters correctly
ETH2	Grounding shortcut fault 2		
LL	Electronic underload fault	The inverter will report the underload pre-alarm according to the set value	Check the load and the underload pre-alarm point
PoFF	System power off	System power off or the bus voltage is too low	Check power grid

Appendix A Modbus communication protocol

KOC680series inverter provides RS485 communication interface, and adopts MODBUS communication protocol. User can carry out centralized monitoring through PC/PLC to get operating requirements. And user can set the running command, modify or read the function codes, the working state or fault information of frequency inverter by Modbus communication protocol.

A.1 About Protocol

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

A.2 Application Methods

The MODBUS protocol communication data format used by this inverter is divided into RTU (Remote Terminal Unit) mode and ASCII RS485, the interface of 2-wire RS485 works on semiduplex and its data signal applies differential transmission which is called balance transmission, too. It uses twisted pairs, one of which is defined as A (+) and the other is defined as B (-). Generally, if the positive electrical level between sending drive A and B is among +2~+6V, it is logic“1”, if the electrical level is among -2V~-6V; it is logic“0”. 485+ on the terminal board corresponds to A and 485- to B. Communication baud rate (b14.01) means the binary bit number in one second. The unit is bit/s (bps). The higher the baud rate is, the quicker the transmission speed is and the weaker the anti-interference is. If the twisted pairs of 0.56mm（24AWG）is applied as the communication cables, the max. transmission distance is as below:

Baud rate	Max. transmission distance	Baud rate	Max. transmission distance
4800BPS	1200m	19200BPS	600m

It is recommended to use shield cables and make the shield layer as the grounding wires during RS485 remote communication.

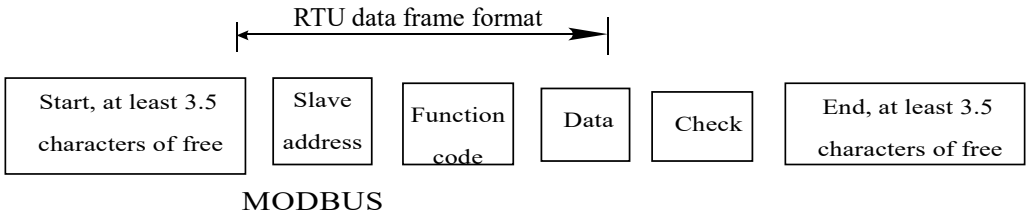
In the cases with less devices and shorter distance, it is recommended to use 120Ω terminal resistor as the performance will be weakened if the distance increase even though the network can perform well without load resistor.

A.3 .1 RTU mode

Name	Definition										
Code system	8-bit binary, each 8-bit frame field contains two hexadecimal characters, 0 ~ 9, A ~ F.										
Data Format	Start bit, 8 data bits, parity bit and stop bit. The data format is described in the following table: 11-bit character frame：										
	Start bit	BIT1	BIT2	BIT3	BIT4	BIT5	BIT6	BIT7	BIT8	Check bit	End bit

In RTU mode, a new frame always starts with a transmission time of at least 3.5 bytes. On a network that calculates the transmission rate at the baud rate, the transmission time of 3.5 bytes can be easily grasped. The data fields to be transmitted next are: slave address, operation command code, data, and CRC check word. Each field transfers bytes in hexadecimal 0 ... 9, A ... F. Network equipment is constantly monitoring the activity of the communication bus. When

the first field (address information) is received, each network device acknowledges the byte. With the completion of the transmission of the last byte, there is a similar 3.5-byte transmission time interval to indicate the end of the frame. After this, a new frame transmission will start.



The whole message frame in RTU mode is a continuous transmitting flow. If there is an interval time (more than 1.5 bytes) before the completion of the frame, the receiving device will renew the uncompleted message and suppose the next byte as the address field of the new message. As such, if the new message follows the previous one within the interval time of 3.5 bytes, the receiving device will deal with it as the same with the previous message. If these two phenomena all happen during the transmission, the CRC will generate a fault message to respond to the sending devices.

The standard structure of RTU frame：

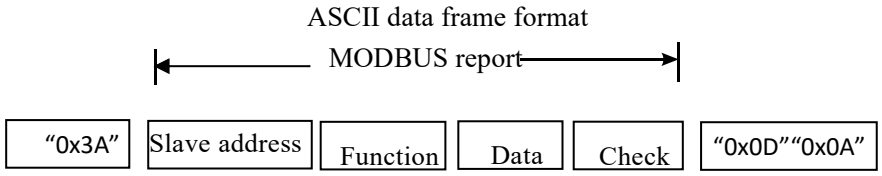
START	T1-T2-T3-T4（transmission time of 3.5 bytes）
ADDR	Communication address：0~247（decimal system）（0 is the broadcast address）
CMD	03H：read slave parameters 06H：write slave parameters
DATA（N-1） … DATA（0）	The data of 2*N bytes are the main content of the communication as well as the core of data exchanging
CRC CHK low bit	Detection value: CRC (16BIT）
CRC CHK high bit	
END	T1-T2-T3-T4（transmission time of 3.5 bytes）

A.3.2 ASCII mode

Name	Definition									
Code system	The communication protocol is hexadecimal, and the meaning of the ASCII information characters: "0" ... "9", "A" ... "F" Each hexadecimal is represented by the ASCII information of the corresponding character:									
	Character	‘0’	‘1’	‘2’	‘3’	‘4’	‘5’	‘6’	‘7’	
	ASCII CODE	0x30	0x31	0x32	0x33	0x34	0x35	0x36	0x37	
	Character	‘8’	‘9’	‘A’	‘B’	‘C’	‘D’	‘E’	‘F’	
	ASCII CODE	0x38	0x39	0x41	0x42	0x43	0x44	0x45	0x46	
Data Format	Start bit, 7/8 data bits, check bit and end bit. The data format is described in the following table: 11-bit character frame：									
	Start	BIT1	BIT2	BIT3	BIT4	BIT5	BIT6	BIT7	BIT8	Check	End

	10-bit character frame：									
	Start	BIT1	BIT2	BIT3	BIT4	BIT5	BIT6	BIT7	Check	E

In ASCII mode, the frame header is ":" ("0x3A"), and the end of frame defaults to "CRLF" ("0x0D" "0x0A"). In ASCII mode, except for the frame header and frame tail, the rest of the data bytes are sent in ASCII code. The upper 4 bytes are sent first, and then the lower 4 bytes are sent. Data in ASCII mode is 8 bits long. For 'A' ~ 'F', use the ASCII code of its uppercase letters. At this time, the data adopts LRC verification, and the verification covers the information part from the slave address to the data. The checksum is equal to the complement of all characters participating in the checksum (rounded up).



The standard structure of ASCII frame：

START	‘:’（0x3A）
Address Hi	Communication address: 8-bit address is composed of 2 ASCII codes
Address Lo	
Function Hi	Function code: 8-bit address is composed of 2 ASCII codes
Function Lo	
DATA（N-1） … DATA（0）	Data content: nx8-bit data content is composed of 2n ASCII codes n <= 16, maximum 32 ASCII codes
LRC CHK Hi	LRC check code: 8-bit checksum consists of 2 ASCII codes
LRC CHK Lo	
END Hi	Ende code: END Hi = CR (0x0D), END Lo = LF (0x0A)
END Lo	

A.3.3 RTU communication frame error checkout

The frame error check method mainly includes two parts of the check, namely the byte bit check (odd / even check) and the entire data check(CRC check or LRC check).

A.3.3.1 Bit checkout of the byte

The user can select different bit checkouts or non-checkout, which impacts the check bit setting of each byte.

The definition of even checkout: add an even check bit before the data transmission to illustrate the number of “1” in the data transmission is odd number or even number. When it is even, the check byte is “0”, otherwise, the check byte is”1”. This method is used to stabilize the parity of the data. The definition of odd checkout: add an odd check bit before the data transmission to illustrate the number of “1” in the data transmission is odd number or even number. When it is odd, the check byte is “0”, otherwise, the check byte is”1”. This method is used to stabilize the parity of the data.

For example, when transmitting “11001110”, there are five “1” in the data. If the even checkout is applied, the even check bit is “1”; if the odd checkout is applied; the odd check bit is “0”. The even and odd check bit is calculated on the check bit position of the frame. And the receiving devices also carry out even and odd checkout. If the parity of the

receiving data is different from the setting value, there is an error in the communication.

A.3.3.2 CRC check ---CRC(Cyclical Redundancy Check)

The checkout uses RTU frame format. The frame includes the frame error detection field which is based on the CRC calculation method. The CRC field is two bytes, including 16 figure binary values. It is added into the frame after calculated by transmitting device. The receiving device recalculates the CRC of the received frame and compares them with the value in the received CRC field. If the two CRC values are different, there is an error in the communication.

During CRC, 0*FFFF will be stored. And then, deal with the continuous 6-above bytes in the frame and the value in the register. Only the 8Bit data in every character is effective to CRC, while the start bit, the end and the odd and even check bit is ineffective.

The calculation of CRC applies the international standard CRC checkout principles. When the user is editing CRC calculation, he can refer to the relative standard CRC calculation to write the required CRC calculation program.

Here provided a simple function of CRC calculation for the reference (programmed with C language):

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

In ladder logic, CKSM calculated the CRC value according to the frame with the table inquiry. The method is advanced with easy program and quick calculation speed. But the ROM space the program occupied is huge. So use it with caution according to the program required space.

A.3.3.3 ASCII mode check（LRC Check）

The check value (LRC Check) added from the result of Address to Data Content. For example, the check code of 2.2.2 communication information above: 0x02 + 0x06 + 0x00 + 0x08 + 0x13 + 0x88 = 0xAB, then take the 2's complement = 0x55.

Here provided a simple function of LRC calculation for the reference (programmed with C language):

```
Static unsigned char
LRC(auchMsg,usDataLen) unsigned char
*auchMsg; unsigned short usDataLen;
```

```
{
unsigned char uchLRC=0;
while(usDataLen--)
uchLRC+=*auchMsg++;
return((unsigned char)(~((char)uchLRC)));
}
```

A.4 Command code and communication data illustration

A.4.1 RTU mode

A.4.1.1 Command code：03H，read N words (Can read up to 16 words consecutively)

Command code 03H means that if the master read data form the inverter, the reading number depends on the "data number" in the command code. Max. continuous reading number is 16 and the parameter address should be continuous. The byte length of every data is 2 (one word). The following command format is illustrated by hex (a number with "H" means hex) and one hex occupies one byte.

The command code is used to read the working step of the inverter.

For example, read continuous 2 data content from0004H from the inverter with the address of 01H (read the content of data address of 0004H and 0005H), the frame structure is as below:

RTU master command information (command sent from the master to the inverter)		**RTU slave response message (information sent from the inverter to the master)**	
START	T1-T2-T3-T4（transmission time of 3.5 bytes）	START	T1-T2-T3-T4（transmission time of 3.5 bytes）
ADDR（Address）	01H	ADDR	01H
CMD（Command code）	03H	CMD	03H
High bit of the start address	00H	Byte number	04H
Low bit of the start address	04H	High bit of data 0004H	13H
High bit of data number	00H	Low bit of data 0004H	88H
Low bit of data number	02H	High bit of data 0005H	00H
CRC low bit	85H	Low bit of data 0005H	00H
CRC high bit	CAH	Low bit of CRC	7EH
END	T1-T2-T3-T4（transmission time of 3.5 bytes）	High bit of CRC	9DH

A.4.1.2 Command code：06H，write one word

The command means that the master write data to the inverter and one command can write one data other than multiple dates. The effect is to change the working mode of the inverter.

For example, write 5000 (1388H) to 0004H from the inverter with the address of 02H, the frame structure is as below:

RTU master command information (command sent from the master to the inverter)	**RTU slave response message (information sent from the inverter to the master)**

START	T1-T2-T3-T4（transmission time of 3.5 bytes)	START	T1-T2-T3-T4（transmission time of 3.5 bytes)
ADDR	02H	ADDR	02H
CMD	10H	CMD	10H
High bit of writing data address	00H	High bit of writing data address	00H
Low bit of writing data address	04H	Low bit of writing data address	04H
High bit of data content	00H	High bit of data content	00H
Low bit of data content	02H	Low bit of data content	02H
CRC low bit	C5H	CRC low bit	C5H
CRC high bit	6EH	CRC high bit	6EH
END	T1-T2-T3-T4（transmission time of 3.5 bytes）	END	T1-T2-T3-T4（transmission time of 3.5 bytes）

A.4.1.3 Command code：08H，diagnosis function meaning of sub-function codes：

Sub-function Code	Description
0000	Return to inquire information data

For example: The inquiry information string is same as the response information string when the loop detection to address 01H of driver is carried out, the format is as below:

RTU master command information (command sent from the master to the inverter)		**RTU slave response message (information sent from the inverter to the master)**	
START	T1-T2-T3-T4（transmission time of 3.5 bytes）	START	T1-T2-T3-T4（transmission time of 3.5 bytes）
ADDR	01H	ADDR	01H
CMD	08H	CMD	08H
High bit of sub-function code	00H	High bit of sub-function code	00H
Low bit of sub-function code	00H	Low bit of sub-function code	00H
High bit of data content	12H	High bit of data content	12H
Low bit of data content	ABH	Low bit of data content	ABH
CRC CHK low bit	ADH	CRC CHK low bit	ADH
CRC CHK high bit	14H	CRC CHK high bit	14H
END	T1-T2-T3-T4（transmission time of 3.5 bytes）	END	T1-T2-T3-T4（transmission time of 3.5 bytes）

A.4.1.4 Command code：10H，continuous writing

Command code 10H means that if the master writes data to the inverter, the data number depends on the “data number” in the command code. The max. continuous reading number is 16.

For example, write 5000(1388H) to 0004H of the inverter whose slave address is 02H and 50(0032H) to 0005H, the frame structure is as below:

RTU master command information (command sent from the master to the inverter)		RTU slave response message (information sent from the inverter to the master)	
START	T1-T2-T3-T4(transmission time of 3.5 bytes)	START	T1-T2-T3-T4(transmission time of 3.5 bytes)
ADDR	02H	ADDR	02H
CMD	10H	CMD	10H
High bit of writing data address	00H	High bit of writing data address	00H
Low bit of writing data address	04H	Low bit of writing data address	04H
High bit of data number	00H	High bit of data number	00H
Low bit of data number	02H	Low bit of data number	02H
Byte number	04H	CRC low bit	C5H
High bit of data 0004H	13H	CRC high bit	6EH
Low bit of data 0004H	88H	END	T1-T2-T3-T4(transmission time of 3.5 bytes)
High bit of data 0005H	00H	/	/
Low bit of data 0005H	32H	/	/
CRC low bit	C5H	/	/
CRC high bit	6EH	/	/
END	T1-T2-T3-T4(transmission time of 3.5 bytes)	/	/

A.4.2 ASCII mode

A.4.2.1 Command code：03H（0000 0011），read N words（Word）(Can read up to 16 words consecutively)

For example: As for the inverter whose slave address is 01H, the starting address of internal storage is 0004, read two words continuously, the structure of this frame is listed as below:

ASCII master command information (command sent from the master to the inverter)		ASCII slave response message (information sent from the inverter to the master)	
START	':'	START	':'
ADDR	'0'	ADDR	'0'
	'1'		'1'
CMD	'0'	CMD	'0'
	'3'		'3'
High bit of starting address	'0'	Byte number	'0'
	'0'		'4'
Low bit of starting address	'0'	High bit of data address 0004H	'1'
	'4'		'3'
High bit of data number	'0'	Low bit of data address 0004H	'8'
	'0'		'8'

Low bit of data number	‘0’	High bit of data address 0005H	‘0’
	‘2’		‘0’
LRC CHK Hi	‘F’	Low bit of data address 0005H	‘0’
LRC CHK Lo	‘6’		‘0’
END Hi	CR	LRC CHK Hi	‘5’
END Lo	LF	LRC CHK Lo	‘D’
		END Hi	CR
		END Lo	LF

A.4.2.2 Command code：06H（0000 0110），write one word(Word)

For example: Write 5000 (1388H) to the 0004H address of the inverter whose slave address is 02H, then the structure of this frame is listed as below:

ASCII master command information (command sent from the master to the inverter)		**ASCII slave response message (information sent from the inverter to the master)**	
START	‘:’	START	‘:’
ADDR	‘0’	ADDR	‘0’
	‘2’		‘2’
CMD	‘0’	CMD	‘0’
	‘6’		‘6’
High bit of writing data address	‘0’	High bit of writing data address	‘0’
	‘0’		‘0’
Low bit of writing data address	‘0’	Low bit of writing data address	‘0’
	‘4’		‘4’
High bit of data content	‘1’	High bit of data content	‘1’
	‘3’		‘3’
Low bit of data content	‘8’	Low bit of data content	‘8’
	‘8’		‘8’
LRC CHK Hi	‘5’	LRC CHK Hi	‘5’
LRC CHK Lo	‘9’	LRC CHK Lo	‘9’
END Hi	CR	END Hi	CR
END Lo	LF	END Lo	LF

A.4.2.3 Command code：08H（0000 1000） diagnose function meaning of sub function code:

Sub function code	Description
0000	Return inquiry message data

For example: carry out circuit detection on drive address 01H, the content of inquiry message word string is the same with response message word string, its format is listed as below:

ASCII master command information (command sent from the master to the inverter)		ASCII slave response message (information sent from the inverter to the master)	
START	':'	START	':'
ADDR	'0'	ADDR	'0'
	'1'		'1'
CMD	'0'	CMD	'0'
	'8'		'8'
High bit of writing data address	'0'	High bit of writing data address	'0'
	'0'		'0'
Low bit of writing data address	'0'	Low bit of writing data address	'0'
	'0'		'0'
High bit of data content	'1'	High bit of data content	'1'
	'2'		'2'
Low bit of data content	'A'	Low bit of data content	'A'
	'B'		'B'
LRC CHK Hi	'3'	LRC CHK Hi	'3'
LRC CHK Lo	'A'	LRC CHK Lo	'A'
END Hi	CR	END Hi	CR
END Lo	LF	END Lo	LF

A.4.2.4 Command code：10H，continuous writing function

Command code 10H means the master write data to the inverter, the number of data being written is determined by the command "data number", the max. number of continuous writing is 16 words.

For instance: Write 5000 (1388H) to 0004H of the inverter whose slave address is 02H, write 50 (0032H) to 0005H of the inverter whose slave address is 02H, then the structure of this frame is listed as below:

ASCII master command information (command sent from the master to the inverter)		ASCII slave response message (information sent from the inverter to the master)	
START	':'	START	':'
ADDR	'0'	ADDR	'0'
	'2'		'2'
CMD	'1'	CMD	'1'
	'0'		'0'
High bit of starting address	'0'	High bit of starting address	'0'
	'0'		'0'
Low bit of starting address	'0'	Low bit of starting address	'0'
	'4'		'4'
High bit of data number	'0'	High bit of data number	'0'
	'0'		'0'
Low bit of data number	'0'	Low bit of data number	'0'

	‘2’		‘2’
Byte number	‘0’	LRC CHK Hi	‘E’
	‘4’	LRC CHK Lo	‘8’
High bit of data 0004H content	‘1’	END Hi	CR
	‘3’	END Lo	LF
Low bit of data 0004H content	‘8’	/	/
	‘8’	/	/
High bit of data 0005H content	‘0’	/	/
	‘0’	/	/
Low bit of data 0005H content	‘3’	/	/
	‘2’	/	/
LRC CHK Hi	‘1’	/	/
LRC CHK Lo	‘7’	/	/
END Hi	CR	/	/
END Lo	LF	/	/

A.5 The definition of data address

The address definition of the communication data in this part is to control the running of the inverter and get the state information and relative function parameters of the inverter.

A.5.1 The rules of parameter address of the function codes

The parameter address occupies 2 bytes with the fact that the high bit is in the front and the low bit is in the behind. The range of high and low byte are: high byte—00~ffH; low byte—00~ffH. The high byte is the group number before the radix point of the function code and the low byte is the number after the radix point. But both the high byte and the low byte should be changed into hex. For example P05.06, the group number before the radix point of the function code is 05, then the high bit of the parameter is 05, the number after the radix point 05, then the low bit of the parameter is 06, then the function code address is 0506H and the parameter address of b10.01 is 0A01H.

Function code	Name	Detailed description of parameter	Default
b10.00	Simple PLC means	0：Stop after running once 1：Run at the final value after running once 2：Cycle running	0
b10.01	Simple PLC memory selection	0：Power loss without memory 1：Power loss with memory	0

Note: b29 group is the factory parameter which cannot be read or changed. Some parameters cannot be changed when the inverter is in the running state and some parameters cannot be changed in any state. The setting range, unit and relative instructions should be paid attention to when modifying the function code parameters.

Besides, EEPROM is stocked frequently, which may shorten the usage time of EEPROM. For users, some functions are not necessary to be stocked on the communication mode. The needs can be met on by changing the value in RAM. Changing the high bit of the function code form 0 to 1 can also realize the function. For example, the function code b00.07 is not stocked into EEPROM. Only by changing the value in RAM can set the address to 8007H. This address can only be used in writing

RAM other than reading. If it is used to read, it is an invalid address.

A.5.2 The address instruction of other function in MODBUS

The master can operate on the parameters of the inverter as well as control the inverter, such as running or stopping and monitoring the working state of the inverter. Below is the parameter list of other functions

Function instruction	Address definition	Data meaning instruction	R/W characteristics
Communication control command	2000H	0001H：forward running	W/R
		0002H：reverse running	
		0003H：forward jogging	
		0004H：reverse jogging	
		0005H：stop	
		0006H：coast to stop (emergency stop)	
		0007H：fault reset	
		0008H：jogging stop	
The address of the communication setting value	2001H	Communication setting frequency（0~Fmax（unit：0.01Hz））	W/R
	2002H	PID reference, range（0~1000，1000 corresponds to 100.0%）	
	2003H	PID reference, range（0~1000，1000 corresponds to 100.0%）	W/R
	2004H	Torque setting value（-3000~3000，1000 corresponds to the 100.0% of the rated current of the motor）	W/R
	2005H	The upper limit frequency setting during forward rotation（0~Fmax（unit：0.01Hz））	W/R
	2006H	The upper limit frequency setting during reverse rotation（0~Fmax（unit：0.01Hz））	W/R
	2007H	The upper limit torque of electromotion torque （0~3000, 1000 corresponds to the 100.0% of the rated current of the motor）	W/R
	2008H	The upper limit torque of braking torque（0~3000, 1000 corresponds to the 100.0% of the rated current of the motor）	W/R
	2009H	Special control command word： Bit0~1：=00：motor1=01：motor2=10：motor3=11：motor4 Bit2：=1 torque control =0：speed control	W/R
	200AH	Virtual input terminal command , range：0x000~0x1FF	W/R
	200BH	Virtual output terminal command , range：0x00~0x0F	W/R
	200CH	Voltage setting value(special for V/Fseparation)（0–1000, 1000 corresponds to the 100.0% of the rated voltage of the motor）	W/R
	200DH	AO output setting 1（-1000~1000, 1000 corresponds to 100.0%）	W/R
	200EH	AO output setting 2（-1000~1000, 1000 corresponds to 100.0%）	W/R
SW 1 of the inverter	2100H	0001H：forward running	R
		0002H：forward running	
		0003H：stop	
		0004H：fault	
		0005H：POFF state	

SW 2 of the inverter	2101H	Bit0： =0：Not ready for operation =1：Ready for operation Bi1~2：=00：Motor1 =01：Motor2 =10：Motor3 =11：Motor4 Bit3： =0：asynchronous motor =1：synchronous motor Bit4：=0：pre-alarm without overload =1：overload pre-alarm Bit5~ Bit6：=00：keypad control=01：terminal control =10：communication control	R
Fault code of the inverter	2102H	See the fault type instruction	R
Identifying code of the inverter	2103H	KOC6800x0107	R
Operation frequency	3000H	Range：0.00Hz~b00.03	R
Setting frequency	3001H	Range：0.00Hz~b00.03	R
Bus voltage	3002H	Range：0~1200V	R
Output voltage	3003H	Range：0~1200V	R
Output current	3004H	Range：0.0~5000.0A	R
Operation speed	3005H	Range：0~65535RPM	R
Output power	3006H	Range：-300.0~300.0%	R
Output torque	3007H	Range：0~65535RPM	R
Close loop setting	3008H	Range：-100.0%~100.0%	R
Close loop feedback	3009H	Range：-100.0%~100.0%	R
Input IO state	300AH	Range：0000~00FF	R
Output IO state	300BH	Range：0000~00FF	R
AI 1	300CH	Range：0.00~10.00V	R
AI 2	300DH	Range：0.00~10.00V	R
AI 3	300EH	Range：0.00~10.00V	R
AI 4	300FH	Reserved	R
Read high speed pulse 1 input	3010H	Range：0.00~50.00kHz	R
Read high speed pulse 2 input	3011H	Reserved	R
Read current step of multi-step speed	3012H	Range：0~15	R
External length	3013H	Range：0~65535	R
External counting value	3014H	Range：0~65535	R
Torque setting	3015H	Range：0~65535	R
Inverter code	3016H	/	R
Fault code	5000H	/	R

R/W characteristics means the function is with read and write characteristics. For example, “communication control command” is writing chrematistics and control the inverter with writing command (06H). R characteristic can only read other than write and W characteristic can only write other than read.

Note: when operate on the inverter with the table above, it is necessary to enable some parameters. For example, the operation of running and stopping, it is necessary to set b00.01 to communication running command channel and set b00.02 to MODBUS communication channel.

And when operate on “PID reference”, it is necessary to set b09.00 to “MODBUS communication setting”.

The encoding rules for device codes (corresponds to identifying code 2103H of the inverter)

Code high 8 bit	Meaning	Code low 8 bit	Meaning
01	KOC	0x0c	KOC680 general inverters

Note: the code is consisted of 16 bit which is high 8 bits and low 8 bits. High 8 bits mean the motor type series and low 8 bits mean the derived motor types of the series.

A.5.3 Fieldbus ratio values

The communication data is expressed by hex in actual application and there is no radix point in hex. For example, 50.12Hz cannot be expressed by hex so 50.12 can be magnified by 100 times into 5012, so hex 1394H can be used to express 50.12. A non-integer can be timed by a multiple to get an integer and the integer can be called fieldbus ratio values.

The fieldbus ratio values are referred to the radix point of the setting range or default value in the function parameter list. If there are figures behind the radix point (n=1), then the fieldbus ratio value m is 10^n. Take the table as the example:

Function code	Name	Details	Default
b01.20	Wake-up from sleep delay time	Setting range: 0.0–3600.0s (valid when b01.19=2)	0.0s

If there is one figure behind the radix point in the setting range or the default value, then the fieldbus ratio value is 10. if the data received by the upper monitor is 50, then the “hibernation restore delay time” is 5.0 (5.0=50÷10).

If MODBUS communication is used to control the hibernation restore delay time as 5.0s. Firstly, 5.0 can be magnified by 10 times to integer 50 (32H) and then this data can be sent.

After the inverter receives the command, it will change 50 into 5 according to the fieldbus ratio value and then set the hibernation restore delay time as 5s.

Because the parameter data is 0032H (50) and 50 divided by 10 is 5, then the hibernation restore delay time is 5s.

A.5.4 Fault message response

There may be fault in the communication control. For example, some parameter can only be read. If a writing message is sent, the inverter will return a fault response message.

The fault message is from the inverter to the master, its code and meaning is as below:：

Code	Name	Meaning
01H	Illegal command	The command from master cannot be executed. The reason maybe: 1. This command is only for new version and this version cannot realize. 2. Slave is in fault state and cannot execute it.
02H	Illegal data address	Some of the operation addresses are invalid or not allowed to access. Especially the combination of the register and the transmitting bytes are invalid.
03H	Illegal value	When there are invalid data in the message framed received by slave. Note: This error code does not indicate the data value to write exceed the range, but indicate the message frame is an illegal frame.
04H	Operation failed	The parameter setting in parameter writing is invalid. For example, the function input terminal cannot be set repeatedly.
05H	Password error	The password written to the password check address is not same as the password set by b7.00.
06H	Data frame error	In the frame message sent by the upper monitor, the length of the digital frame is incorrect or the counting of CRC check bit in RTU is different from the lower monitor.
07H	Parameter is read-only	The parameters changed in the write operation of the host computer are read-only parameters
08H	The parameter cannot be changed during running	The modified parameter in the writing of the upper monitor cannot be modified during running.
09H	Password protection	When the upper monitor is writing or reading and the user password is set without password unlocking, it will report that the system is locked.

The slave uses functional code fields and fault addresses to indicate it is a normal response or some error occurs (named as objection response). For normal responses, the slave shows corresponding function codes, digital address or sub-function codes as the response. For objection responses, the slave returns a code which equals the normal code, but the first byte is logic 1.

For example: when the master sends a message to the slave, requiring it to read a group of address data of the inverter function codes, there will be following function codes:

0 0 0 0 0 0 1 1 （Hex 03H）

For normal responses, the slave responds the same codes, while for objection responses, it will return:

1 0 0 0 0 0 1 1 （Hex 83H）

Besides the function codes modification for the objection fault, the slave will respond a byte of abnormal code which defines the error reason.

When the master receives the response for the objection, in a typical processing, it will send the message again or modify the corresponding order.

For example, set the “running command channel” of the inverter (b00.01, parameter address is 0001H) with the address of 01H to 03, the command is as following:

01	06	00 01	00 03	98 0B
Inverter address	Read command	Parameters address	Parameters data	CRC check

But the setting range of "running command channel" is 0–2, if it is set to 3, because the number is beyond the range, the inverter will return fault response message as below:

01	86	04	43 A3
Inverter address	Abnormal response code	Fault code	CRC check

Abnormal response code 86H means the abnormal response to writing command 06H; the fault code is 04H. In the table above, its name is operation failed and its meaning is that the parameter setting in parameter writing is invalid.

A.6 Example of writing and reading

Refer to 11.4 for the command format.

A.6.1 Example of reading command 03H

Read the state word 1 of the inverter with the address of 01H (refer to table 1). From the table 1, the parameter address of the state word 1 of the inverter is 2100H.

RTU mode:

The command sent to the inverter:

01	03	21 00	00 01	8E 36
Inverter address	Read command	Parameters address	Data number	CRC check

If the response message is as below:

01	03	02	00 03	F8 45
Inverter address	Read command	Data address	Data content	CRC check

ASCII mode:

The command sent to the inverter:

:	01	03	21 00	00 01	DA	CR LF
START	Inverter address	Read command	Parameters address	Data number	LRC check	END

If the response message is as below:

:	01	03	21 00	00 01	DA	CR LF
START	Inverter address	Read command	Parameters address	Data number	LRC check	END

The data content is 0003H. From the table, the inverter stops.

A.6.2 Example of writing command 06H

Example 1: make the inverter with the address of 03H to run forward, the address of "communication control command" is 2000H and forward running is 0001. See the table below.。

Function instruction	Address definition	Data meaning instruction	R/W characteristics
Communication control command	2000H	0001H: forward running	W/R
		0002H: reverse running	
		0003H: forward jogging	

		0004H：reverse jogging	
		0005H：stop	
		0006H：coast to stop (emergency stop)	
		0007H：fault reset	
		0008H：jogging stop	

RTU mode：

The command sent by the master：

If the operation is successful, the response may be as below (the same with the command sent by the master):

ASCII mode：

The command sent to the inverter：

If the response message is as below (the same with the command sent by the master）：

Example 2: set the max. output frequency of the inverter with the address of 03H aHDI100Hz.

b00.03	Max output frequency	Setting range：b00.04~400.00Hz	50.00Hz

See the figures behind the radix point, the fieldbus ratio value of the max. output frequency (b00.03) is 100. 100Hz timed by 100 is 10000 and the corresponding hex is 2710H.

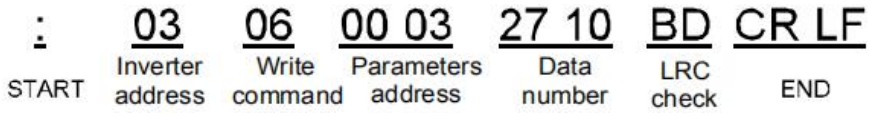
RTU mode：

The command sent by the master：

If the operation is successful, the response may be as below (the same with the command sent by the master):

ASCII mode：

The command sent to the inverter：



If the operation is successful, the response may be as below (the same with the command sent by the master):

:	03	06	00 03	27 10	BD	CR LF
START	Inverter address	Write command	Parameters address	Data number	LRC check	END

A.6.3 Example of continuous writing command 10H

Example 1: make the inverter whose address is 01H run forward at 10Hz. Refer to the instruction of 2000H and 0001. Set the address of "communication setting frequency" is 2001H and 10Hz corresponds to 03E8H. See the table below.

Function instruction	Address definition	Data meaning instruction	R/W characteristics
Communication control command	2000H	0001H：forward running	W/R
		0002H：reverse running	
		0003H：forward jogging	
		0004H：reverse jogging	
		0005H：stop	
		0006H：coast to stop (emergency stop)	
		0007H：fault reset	
		0008H：jogging stop	
The address of communication setting	2001H	Communication setting frequency(0–Fmax(unit: 0.01Hz))	W/R
	2002H	PID given, range(0–1000, 1000 corresponds to100.0%)	

The specific operation is to set b00.01 to 2 and b00.06 to 8.

RTU mode：

The command sent to the inverter:

01	10	20 00	00 02	04	00 01	03 E8	3B 10
Inverter address	Continuous writing command	Parameters address	Data number	Byte number	Forward running	10Hz	CRC check

If the response message is as below:

01	10	20 00	00 02	4A 08
Inverter address	Continuous writing command	Parameters address	Data number	CRC check

ASCII mode：

The command sent to the inverter:

:	01	10	20 00	00 02	04	00 01	03 E8	BD	CR LF
START	Inverter address	Continuous writing command	Parameters address	Data number	Byte number	Forward running	10Hz	LRC check	END

If the response message is as below:

:	01	10	20 00	00 02	CD	CR LF
START	Inverter address	Continuous writing command	Parameters address	Data number	LRC check	END

Example 2: set the ACC time of 01H inverter as 10s and the DEC time as 20s.

b00.11	Acceleration time 1	Setting range of b00.11 and b00.12：0.0~3600.0s	Model dependent
b00.12	Deceleration time 1		Model dependent

The parameter address corresponding to b00.11 is 000B, the hexadecimal corresponding to acceleration time 10s is 0064H, and the hexadecimal corresponding to deceleration time 20s is 00C8H.

RTU mode：

The command sent to the inverter:

01	10	00 0B	00 02	04	00 64	00 C8	F2 55
Inverter address	Continuous writing command	Parameters address	Data number	Byte number	10s	20s	CRC check

If the response message is as below:

01	10	00 0B	00 02	30 0A
Inverter address	Continuous writing command	Parameters address	Data number	CRC check

ASCII mode：

The command sent to the inverter：

:	01	10	00 0B	00 02	04	00 64	00 C8	B2	CR LF
START	Inverter address	Continuous writing command	Parameters address	Data number	10s	20s	LRC check		END

If the response message is as below：

:	01	10	00 0B	00 02	E2	CR LF
START	Inverter address	Continuous writing command	Parameters address	Data number	LRC check	END

Terms of warranty

1、The company solemnly promises that since the date when users purchase products from our company (hereinafter referred to as the manufacturer), users enjoy the following warranty services.

（1）From the date of purchase from the manufacturer, user enjoys the following three guarantee services

（2）Return, replacement and repair within 30 days after delivery;

（3）Replacement and repair within 90 days of delivery；

（4）Repair within 12 months of delivery；

（5）Except for export products

2、Disclaimer：Product failures caused by the following reasons are not under by the manufacturer's free warranty service：

（1）Failures caused by users not using or operating in accordance with the "User Manual"；

（2）Failures caused by the user not communicating with the manufacturer and repairing or modifying the product without the manufacturer's consent；

（3）Failure caused by abnormal aging of the product due to the harsh environment of the user (flying dust (conductive dust), water and corrosive gas, foreign objects blocking the cooling air duct)；

（4）Failures caused by natural disasters such as earthquakes, floods, fires, or disasters such as abnormal voltages；

（5）Damage to the product during transportation (the transportation method is specified by the customer, and the company assists in handling the cargo consignment procedures)；

3、For the service of return, replacement and repair, the goods must be returned to the company, and the return can be returned or repaired only after the responsibility is confirmed；

Warranty Card

User Name					
User Address					
Contact Person		Mobile		Facsimile	
Model			Series No.		
Supplier					
Contact Person		Mobile		Date of delivery	

SHENZHEN KCLY ELECTRIC CO.,LTD

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Email：KCLY@KCLY.ac.cn Website：www.KCLY.ac.cn
Technical Service：17722537583
Service Mobile：18028732656

✂

CERTIFICATE

This product has been strictly tested by our quality department.

Its performance complies with relevant technology and inspection markings, and is allowed to release.

Qc Check:_____