Instructions for use

In order to ensure that the user is always in a safe operation state, there are [Danger] [Attention] and other symbols in this manual to remind you that you are carrying, installing and operating. Please check the safety precautions of the frequency converter so that you can cooperate to make it safer to use the frequency converter.

Danger	Improper operation may cause death.
Attention	Improper operation may cause damage to the frequency converter or mechanical system.

Danger

- Do not touch the PCB until the red LED on the board is off when the inverter is power-off.
- Do not connect or check the circuit when the inverter is working
- Do not refit or dismantle the frequency converter by yourself.
- Make sure the frequency converter terminal are connected correctly. Class 200V third type of ground, class 400V special ground.
- When the frequency converter is installed in a large power supply system with more than 600KW(including) or the power supply side is equipped with an input capacitor, it may cause a maximum peak current to flow through the power supply to the input end, resulting in its failure. To prevent this from happening; It is suggested to install an ac reactor to suppress the surge current and protect the frequency converter, so as to improve the power factor of the power supply.

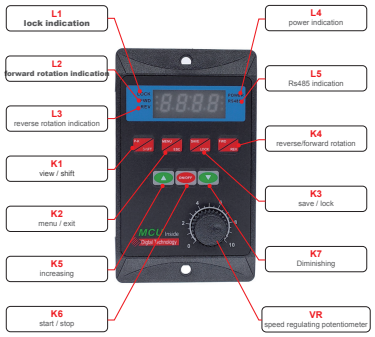
Attention

- Do not perform withstand voltage test on the components inside the inverter. Semiconductor parts are vulnerable to high voltage breakdown damage.
- Never connect frequency converter's output terminals T1 (U), T2 (V), T3 (W) to AC input power supply.
- Do not touch the circuit board to avoid damage to the circuit board CMOS system due to static electricity.

1. Display interface

1.1 display interface description

L1: Red LED flashing key is locked.
L2: the positive rotation turning indicator is green (FWD), which is always on during operation, it flashes when positive rotation stops.
L3: the reverse rotation indicator is blue (REV), which is always on during operation,it flashes when reverse rotation stops.
L4: POWER indicator, POWER indicator always on.
L5:RS485 communication indication.(No RS485 module default)



1.2 key function explanation

K1 P-K / SHIFT:
Function parameter display button. Press the P-K key to query the IPM module temperature, busbar current, busbar voltage, motor running speed and motor running frequency. SHIFT key can be used to set the shift selection.

K2 MENU / ESC:
Set the enter key. MENU key is the function entry key. The ECS key is the exit key.
K3 SAVE / LOCK:
Long press will lock or unlock K2, K3 and K4 keys. There is no operation on the interface running for 3 minutes, and it is locked automatically.
K4 FWD / REV:
Forward rotation and reverse rotation switch keys.
K5 increasing:
Adjust speed + / data setting + (↑).
K6 ON / OFF:
Start/stop key/ data setting confirmation key.
K7 decrease:
Adjust Speed - / data setting - (↓)
VR panel speed regulating potentiometer:
Rs485 operation is invalid when setting button speed regulation.

2. Function description

2.1 brief description of frequency converter

The frequency converter is a single-phase 220V voltage input and drives a three-phase motor (be sure to convert the connection method into a triangle type). The frequency output is 1.0-99.0HZ. In order to improve the output voltage, the product adopts SVPWM modulation mode and the carrier frequency is 8.0KHZ. It is suitable for motors under 750W and the maximum output power is 1100W. The frequency converter can arbitrarily change the V/F curve by setting the V/F compensation frequency and setting the voltage ratio under the frequency. By setting the maximum value of V/F curve, according to the load condition, the use efficiency of electric energy can be maximized, the heat of the motor can be reduced, and the service life of the motor and frequency converter can be extended.

2.2 internal parameter setting

2.2.1 Description of operation interface
The function parameters are shown as follows:

1. Items that can be queried by key K1
   A. t-xx: Display as radiator temperature value.
   B. Cx.xx: Display as current current value.
   C. xxx.x: Display as DC bus voltage value.
   D. xxxx: Displayed as the speed of the motor.
   E. Fxx.x: Displayed as the operating frequency value.
2. E-x.x: indicates a Error. Refer to the Error code to determine the cause of the fault.
3. When setting interface and boot up, the flashing power indicator indicates successful communication between the machine and the external Rs485.
4. When the button is not operated for 3 minutes, the power lamp flashes. At this time, K2, K3 and K4 are locked. Press the K3 key for 5 seconds to unlock.
5. Operation indicator FWD,REV, flashing means stop; normally on means running in this mode.

External terminal control diagram

No.	Representative	Function
①	D1	X1 interface
②	D2	X2 interface
③	RS485+	Communication RS485 interface (to be determined)
④	RS485-	Communication RS485 interface (to be determined)
⑤	M2/D3	Reverse rotate output /X2 interface
⑥	M1	Forward rotation output interface
⑦	MO	Indicator light setting interface
⑧	COM	Common pole
⑨	VR	External potentiometer input terminal
⑩	+5V	External adjustment power output
Note: Don behalf of the period of speed		

2.2.2. Description of setting interface

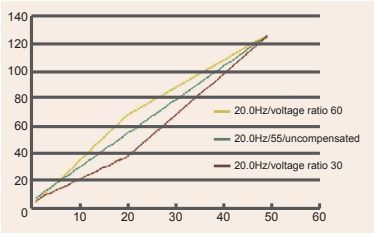
Press K2 (menu) ,display flashes "-0.0-", select(▲)and(▼)key adjust the code(See **FORM 1** for code). In the setting process, you can use the shift key (K1) and(▲)key(▼)key to adjust the code to set. then, press key (K6) comform to enter the sub item code selection. Finish the subitem code selecte, press (K6) key again return codeinterface, showing the flashing -x.x -, and then select the next parent code, and then press K6 key to enter the subcode selection. When all the setting options are completed, press the data setting save key K3, flashs "SAVE",again press K3 (save) to confirm the save,the interface stops flashing, save completely. Start the frequency converter,will run directly according to the set code, no need restart.press the exit key K2(MENU/ESC) to exit if you don't want to save data ,without affecting the parameters set before. Or after 20s without operation, it will return to the operation interface automatically.

2.2.3. Description of low-frequency V/F compensation

According to the load, the values in table 2 and the linear V/F curve values, the values can be set as -3 -, -0.4- and -0.5-. In order to improve the motor torque at low frequency, it is necessary to select the upper frequency of the torque. The voltage ratio of the highest compensation frequency is set at -0.3-0.4 -. The corresponding frequency or similar frequency can be found in table 2. Below this value will decrease the slope of the V/F curve and reduce the torque.

FORM 1 ON BACK

For example, set the value as 20.0 in -3 -, 60, 55, 30 in -0.4-, and 8 by default in -0.5-. The three V/F curves are as follows:



2.2.3. Maximum frequency limit voltage ratio

When the load is small and the motor is running at the highest speed, the optimal operation effect can be achieved by reducing the option data of - 0.6-setting.

FORM 2: Linear voltage ratio

Frequency HZ	Voltage Ratio	Frequency HZ	Voltage Ratio	Frequency HZ	Voltage Ratio	Frequency HZ	Voltage Ratio	Frequency HZ	Voltage Ratio
1	8	11	32	21	57	31	81	41	106
2	10	12	35	22	59	32	84	42	108
3	13	13	37	23	62	33	86	43	111
4	15	14	40	24	64	34	89	44	113
5	18	15	42	25	67	35	91	45	116
6	20	16	45	26	69	36	94	46	118
7	23	17	47	27	72	37	96	47	121
8	25	18	50	28	74	38	99	48	123
9	28	19	52	29	77	39	101	49	126
10	30	20	55	30	79	40	104	50	128

3. Set case

Case 1: set motor acceleration time

Turn on the power, press the (MENU/ESC) key, enter the main menu display - 0.0 -, press the (▲) key, display - 0.1 -, press the (RUN/STOP) key, display 01.01: represents the acceleration time of 5S; 02 represents the acceleration time of 2.5s; 03 represents the acceleration time of 1.6s. Select the acceleration time to be adjusted by the (▲) and (▼) keys.

Press the (RUN/STOP) key to return to the main menu - 0.1 - at this time, you can continue to set other options. If you do not set other options, press the (SAVE/LOCK) key to enter the save option, the nixie tube will display the flashing SAVE, and then press the (SAVE/LOCK) key to return to the frequency display interface. If you do not want to save and press the (MENU/ESC) key, the previously modified data will be invalid.

Case 2: system restores factory default value

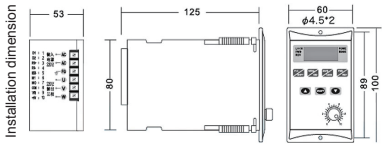
Press the (MENU/ESC) key to enter the main menu display - 0.0 -, press the (▲) key to display - 0.1 -, press the (P-K/SHIFT) shift key to adjust the main menu - x.1 - to - 9.1 -, press the (RUN/STOP) key, display the flashing CLE, press the (RUN/STOP) key to restore the factory default value, and return to the frequency display interface. If you do not want to operate, press the (MENU/ESC) key to return to the frequency display interface.

Be careful:

1. Press the (MENU/ESC) key in any setting interface to return to the frequency display interface.
2. During saving, displays flashing "SAVE", press the (MENU/ESC) key to exit, the previously modified data is invalid, and the parameters will automatically restore the previous parameters.
3. When adjusting the data, you can use the (P-K/SHFT) key to set the parameters quickly. All places where data needs to be saved need to press the (SAVE/LOCK) key twice to prevent misoperation.

Case 3: Braking with DC brake

When using DC braking, you need to set - 1.2 - item (parking mode select 2); - 3.2 - item (starting frequency when parking braking); - 3.3 - item (DC braking time, with 0.1s as the minimum setting time unit); - 3.4 - item to set DC braking voltage. The voltage value needs to increase slowly from small to large.



Segment velocity diagram

No.	D3	D2	D1
0	1	1	1
1	1	1	0
2	1	0	1
3	1	0	0
4	0	1	1
5	0	1	0
6	0	0	1
7	0	0	0

Note:
M1, M2, D1, D2, D3 are high-level when nothing is connected, so the low-level is valid. D1, D2, D3 are all high-level, indicating the lowest speed

5. Precautions

(1) When the fault code is displayed as E-0.2, the following points need to be noted:
①The load is too large, the acceleration time is too short,adjust the acceleration time and replace the frequency converter with higher power
②The rated power of the motor is too high. Replace the motor matched with the frequency converter
③The parameter settings in -0.3-, -0.4-, -0.5-, -0.6- are unreasonable. It is recommended to restore the factory values
(2)When the motor is running, there will be strong interference. At this time, the continuous plus function of manually adjusting the frequency may fail. However, the frequency can still be adjusted by pressing and holding the key. It is recommended to use a single key or stop the motor to modify the frequency.
(3)It is recommended to use the key to adjust the speed when adjusting the speed accurately. The potentiometer will produce a small deviation when the motor is running or the installation system vibrates, so as to affect the control accuracy.
(4)When the ambient temperature is too high, it is necessary to leave enough space for heat dissipation.

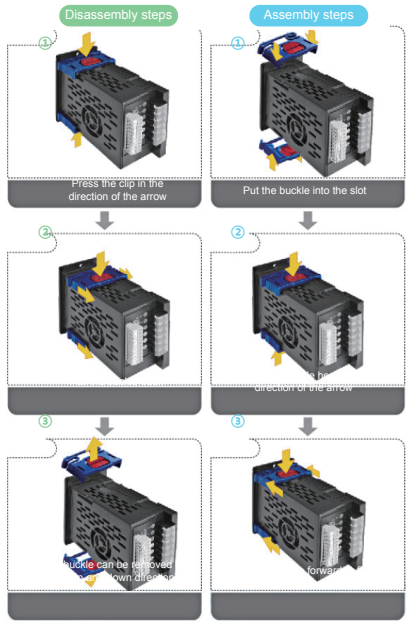
6. Use environment

Power supply: single-phase AC22OV±20%
Temperature: - 10℃~ 55℃
Humidity: 0% ~ 65%

7. Fault code

In case of converter failure, the four digit nixie tube will flash and display E-x.x.

No.	Erro Code	Content	Abnormal reason	Remark
1	E-0.1	overheating	1. Detect line faults	1. Frequency converter sent for repair
			2. The surrounding temperature is overheated or the ventilation is poor	2. Improve ventilation
2	E-0.2	Pulse overheating	1. Overload	1. Frequency converter sent for repair
			2. Improper setting of V/F mode	2. Set appropriate V/F curve
			3. Detect frequency converter fault	
3	E-0.3			
4	E-0.4	Frequency converter overload	1. Overload	1. Increase the capacity of frequency converter
			2. Improper setting of V/F mode	2. Set appropriate V/F curve
5	E-0.6	Temperature sensor failure	Temperature sensor is short circuited or damaged	1. Check the temperature sensor connection
				2. Frequency converter sent for repair
6	E-0.7	Temperature sensor failure	The temperature sensor wire is short circuited or damaged	1. Check the temperature sensor connection
				2. Frequency converter sent for repair
7	E-0.8	Frequency converter overload 100%	The output power of frequency converter is Over than 100% for more than 6 seconds	Replace higher power frequency converter
8	E-0.9	Frequency converter thermal protection	1. Detect line fault	1. Frequency converter sent for repair
			2. The surrounding temperature is overheated or the fan is damaged	2. Improve ventilation
9	E-1.0	Over voltage protection	Slow down and stop too fast	Set the acceleration and deceleration value low



FORM 1

No.	Parent code	Content	Subitem code	Factory value
1	-0.1-	Set start time	Setting range: 1-15 (corresponding time 5s-0.1s)	7
2	-0.2-	Set stop time	Setting range: 1-15 (corresponding time 5s-0.1s)	7
3	-0.3-	Minimum frequency compensation	Setting range: 5-15	8
4	-0.4-	Set compensation maximum frequency	Setting range: 5.0-30.0Hz	20
5	-0.5-	Set the highest frequency voltage ratio of compensation	Setting range: 25-85	55
6	-0.6-	Maximum frequency limiting voltage ratio	Setting range: 80-128	128
7	-0.7-	Rs485 baud rate	0:48(4800) 2:192(19200) 1:96(9600) 3:384(38400)	96
8	-0.8-	Rs485 format, ASCII	1:8N1 3:8E1 2:8N2 4:801	8N1
9	-0.9-	Machine number	1~255	1
10	-1.0-	Source of working frequency	0: Panel keyboard control	1
			1: Panel potentiometer control	
			2: External analog signal input (output voltage is 0-5V) or external potentiometer	
			3: RS485 (RS485)	
			4: Segment speed input	
11	-1.1-	Start/stop source of control	0: Panel keyboard control	0
			1: RS485 (RS485)	
			2: Turn forward when power on	
			3: Turn reverse when power on	
			4: External port	
12	-1.2-	Parking method	0: Inertia stop	1
			1: Deceleration stop	
			2: Brake stop	
13	-1.3-	M * function selection	0: M1 forward rotation / stop, M2 reverse rotation / stop	0
			1: M1 operation / stop, M2 reverse rotation / forward rotation	
			2: M1 operation / stop, M2 section speed	
14	-1.4-	M0 function selection	0: Indication in operation	0
			1: Set arrival indication	
			2: Fault indication	
			3: Undefined (customizable)	
15	-1.5-	Overload protection selection	Undefined	
16	-1.6-	Over temperature protection selection	40℃~100℃	90℃
17	-1.7-	Maximum frequency setting	1.0~99.0Hz	50
18	-1.8-	Minimum operating frequency	1.0~30.0Hz	1
19	-1.9-	Working frequency	1.0~99.0Hz	50
20	-2.0-	Corresponding frequency of the highest output voltage	35.0~99.0Hz	50
21	-2.1-	Segment speed 1 setting	1.0~99.0Hz	5
22	-2.2-	Segment speed 2 setting	1.0~99.0Hz	10
23	-2.3-	Segment speed 3 setting	1.0~99.0Hz	20
24	-2.4-	Segment speed 4 setting	1.0~99.0Hz	25
25	-2.5-	Segment speed 5 setting	1.0~99.0Hz	35
26	-2.6-	Segment speed 6 setting	1.0~99.0Hz	40
27	-2.7-	Segment speed 7 setting	1.0~99.0Hz	45
28	-2.8-	Operating arrival frequency	1.0~99.0Hz	45
29	-2.9-	Undefined (customizable)	…	…
30	-3.0-	Current display selection	1: percentage	1
31	-3.1-	Undefined (customizable)	…	…
32	-3.2-	Braking frequency at stop	0.0-50.0Hz	0
33	-3.3-	Braking time	0.0-5.0S	0
34	-3.4-	Braking coefficient	0-30%	0
35	-3.5-	Polar logarithm	1~6	2
36	-3.6-	Motor slip	0.01~1.00	1
37	-3.7-	Rated speed of motor	1~9999	1500
38	-3.8-	Segment speed 0 setting	1.0~99.0Hz	1
39	-9.1-	Restore default value	Display flashing CLE, press start / stop key to restore	
40	-9.5-	Reset MCU	Display flashing - 8.88, press start / stop key to restore	-8.88
41	-9.6-			
42	-9.7-	Hardware version number		-X.xx
43	-9.8-	Software version number		-X.xx