



K-DRIVE

Elevator/lift Purpose inverter

KD600E Series

Debugging guide



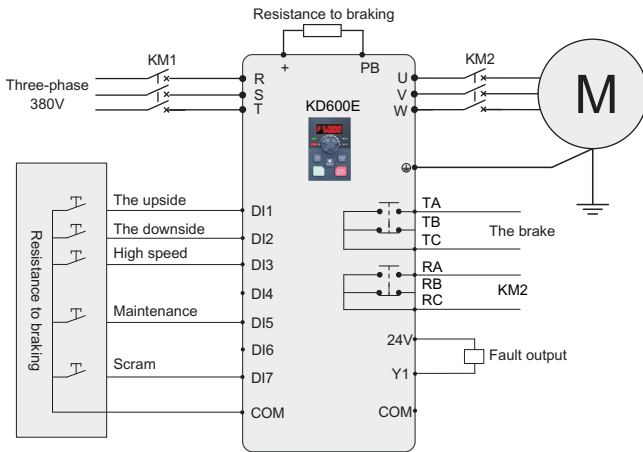
<http://www.keasyautomation.com>

1. DEBUGGING GUIDE

KD600E series elevator inverter is specially developed for elevator industry. It can be used with different elevator controllers to realize open loop elevator and closed loop elevator control.

1.1 Single multi-speed terminal elevator controller

For the elevator controller with only one multi-segment speed changing terminal, the high-speed segment and the layer speed segment are controlled by the on-off of the high-speed terminal. The wiring diagram of such elevator controller and frequency converter is as follows:



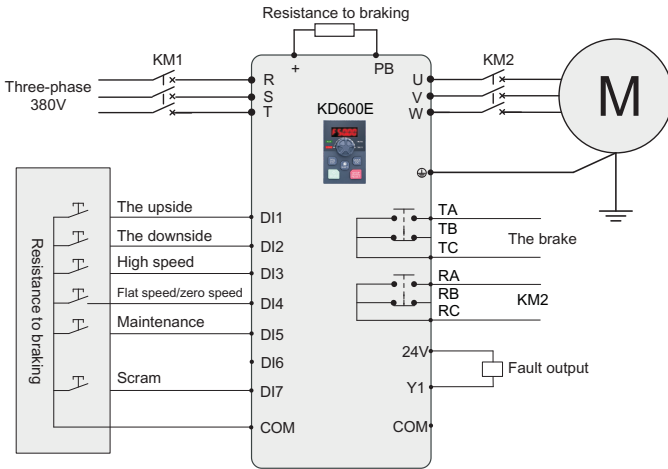
Single multi - speed terminal elevator controller and inverter wiring diagram

According to the connection between the controller, frequency converter and motor on site, for the elevator without running contactor (KM2), the connection of R2 can not be connected, similarly, for the elevator controller without fault signal reception, the connection of Y1 can not be connected. Complete the debugging by following the steps below:

- Set the high speed and flat speed, the elevator controller uses a high-speed terminal to switch between high speed and flat speed, the corresponding set of multi-section speed parameters are: PC-00=flat speed, PC-01=high speed;
- Maintenance speed setting, some elevator controller maintenance speed and flat speed shared, no maintenance signal output, here can not be connected to the maintenance signal line, skip this step; If the maintenance signal is output, the maintenance speed can be set through the function code. The corresponding parameters for setting the maintenance speed are:C1-14=repair speed;
- Emergency stop signal, some elevator controllers do not have emergency stop signal, the emergency stop signal line can not be connected, skip this step; If there is an emergency stop signal, set DI7 as an emergency stop signal P5-06=54;
- For maintenance and operation test, switch the elevator controller to the maintenance and operation mode, and test upward or downward to check whether the running direction is consistent. If not, switch the uplink signal and the downstream signal line, that is, switch the DI1 and DI2 signal lines, or switch any two of the motor output line UVW to each other.
- Normal mode test run, switch the elevator controller to the normal operation mode for test, adjust the acceleration and deceleration time according to the site.

1.2 Double multi-speed terminal elevator controller

For the elevator controller with two multi-speed changing terminals, its high speed is controlled by the on-off of one terminal, and the other terminal is to control the flat speed or zero speed according to different controllers. The wiring diagram of the elevator controller and frequency converter with two multi-speed terminals is as follows:



Double multi - speed terminal elevator controller and inverter wiring diagram

According to the connection between the controller, frequency converter and motor on site, for the elevator without running contactor (KM2), the connection of R2 can not be connected, similarly, for the elevator controller without fault signal reception, the connection of Y1 can not be connected. Complete the debugging by following the steps below:

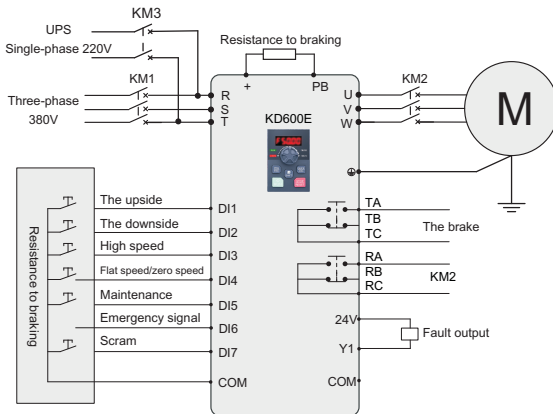
- Set high speed and flat speed. The elevator controller uses two terminals to switch between high speed and flat speed. For the controller whose two terminal signals are respectively high speed and flat speed signal, the corresponding parameters for setting multi-section speed are: PC-00=0, PC-00= flat speed, PC-01=high speed;
- Maintenance speed setting, some elevator controller maintenance speed and flat speed shared, no maintenance signal output, here can not be connected to the maintenance signal line, skip this step; If there is maintenance signal output, the maintenance speed can be set by function code. The corresponding parameters for setting maintenance speed are: C1-14=maintenance speed;

- Emergency stop signal, some elevator controllers do not have emergency stop signal, the emergency stop signal line can not be connected, skip this step; If there is an emergency stop signal, set DI7 as an emergency stop signal P5-06=54;
- For maintenance and operation test, switch the elevator controller to the maintenance and operation mode and test upward or downward to check whether the running direction is consistent. If not, switch the upstream signal and the downstream signal line, that is, switch the DI1 and DI2 signal lines, or switch any two of the motor output line UVW relative;
- Normal mode test run, switch the elevator controller to the normal operation mode for test, adjust the acceleration and deceleration time according to the site.

1.3 Emergency operation mode

When the elevator is in use, if the system's power supply suddenly fails, it may result in passengers being locked in the car.

KD600E series elevator inverter can support the emergency UPS power supply operation for emergency power outage operation, and the emergency signal can be received by the inverter terminal DI6. The wiring diagram is as follows:



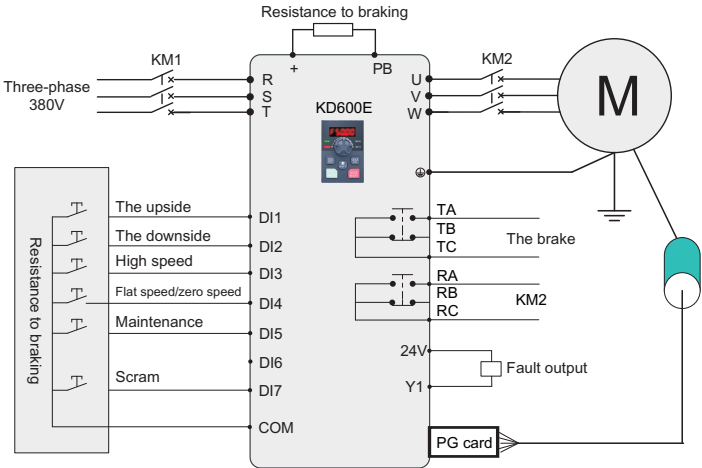
Emergency mode wiring diagram

When the power grid voltage is cut off, the elevator controller switches to the UPS and sends an emergency signal to the frequency converter. When the frequency converter receives the emergency signal, the frequency converter automatically switches to the emergency mode. The KD600E supports single-phase 220V and three-phase 380V UPS power supplies.

In the emergency mode, when the elevator controller gives the frequency converter an operation signal, the frequency converter will run according to the emergency operation frequency set by C0-13, and its acceleration and deceleration time will increase and decelerate according to the time set by P7-07 and P7-08.

1.4 Closed loop elevator control

KD600E series elevator inverter can support closed-loop control, and provides a variety of PG cards for use with different encoders. Please refer to Chapter 5 of KD600 series User manual for PG card information. The wiring diagram of elevator controller and frequency converter for closed-loop elevator control is shown in the following figure:



Double multi - speed terminal elevator controller and inverter wiring diagram

Connect the connection between controller, frequency converter and motor, and connect the connection between PG card and encoder according to the site. For the elevator without running contactor (Km2), the connection of R2 can not be connected. Similarly, for the elevator controller without fault signal reception, the connection of Y1 can not be connected. Complete the debugging by following the steps below:

- Set high speed and flat speed. Set the parameters of multi-section speed according to the wiring mode in the figure: PC-00=0, PC-01= flat speed, PC-02= high speed;
- Maintenance speed setting, some elevator controller maintenance speed and flat speed shared, no maintenance signal output, here can not be connected to the maintenance signal line, skip this step; If there is maintenance signal output, the maintenance speed can be set by function code. The corresponding parameters for setting maintenance speed are: C1-14 maintenance speed;
- Emergency stop signal, some elevator controllers do not have emergency stop signal, the emergency stop signal line can not be connected, skip this step; If there is an emergency stop signal, set DI7 as an emergency stop signal P5-06=54;
- For maintenance and operation test, switch the elevator controller to the maintenance and operation mode and test upward or downward to check whether the running direction is consistent. If not, switch the upstream signal and the downstream signal line, that is, switch the DI1 and DI2 signal lines, or switch any two of the motor output line UVW relative;
- Check the direction of the encoder, switch the elevator controller to the maintenance operation mode, according to the uplink or downlink test, check the output frequency should be consistent with the positive or negative of the feedback speed of the U1-46 encoder, that is, if the output frequency is positive, the feedback speed of U1-46 also needs to be positive; If the output frequency is negative, the feedback speed of U 1-4 should also be negative. If the direction is inconsistent, P4-29 can be set to 1 or the A and B phase pulses of the encoder can be switched. After completion, check again whether the output frequency is consistent with the direction of U1-46 ;

- Run in closed-loop control mode, set the number of code lines P4-28 according to the encoder, set P0-03 to 3, turn it into closed-loop control mode, switch the elevator controller to the maintenance operation mode, and test upward or downward to check whether the elevator runs normally;
- Normal mode test run, switch the elevator controller to the normal mode for test, adjust the acceleration and deceleration time according to the site.

1.5 Multi-segment speed setting method

For different elevator controllers, the different combinations of signals output by the control multi-segment speed terminals will lead to different parameter positions for setting flat speed and high speed. The corresponding speed setting parameters of the combination are shown in the following table:

DI4(P5-03=13)	DI3(P5-04=12)	Speed setting parameters
0	0	PC-00
0	1	PC-01
1	0	PC-02
1	1	PC-03

The speed parameter of the PC group is set as a percentage. 100.0% corresponds to the maximum frequency (the value set by P0-14). Meanwhile, the corresponding acceleration and deceleration time can be set separately for each speed segment. The corresponding acceleration and deceleration time selection for each speed segment is shown in the following table:

Multiple segment velocity	Acceleration and deceleration time selection parameter
PC-00	PC-19
PC-01	PC-21
PC-02	PC-23
PC-03	PC-25

The KD600E supports four sets of acceleration and deceleration times. The parameters for selecting the time range from 0 to 3. The parameters for setting the corresponding acceleration and deceleration times are shown in the following table:

Project	Group 0	Group 1	Group 2	Group 3
Time of acceleration	P0-23	P7-03	P7-05	P7-07
Time of deceleration	P0-24	P7-03	P7-06	P7-08

1.6 C1 Group function code Description

For different elevator controllers, the different combinations of signals output by the control multi-segment speed terminals will lead to different parameter positions for setting flat speed and high speed. The corresponding speed setting parameters of the combination are shown in the following table:

Function code	Name	Description (setting range)	Factory Default	Change
C1-01	Private machine control	0: invalid	1	×
		1: Effective		

0: invalid

No lock logic 1;

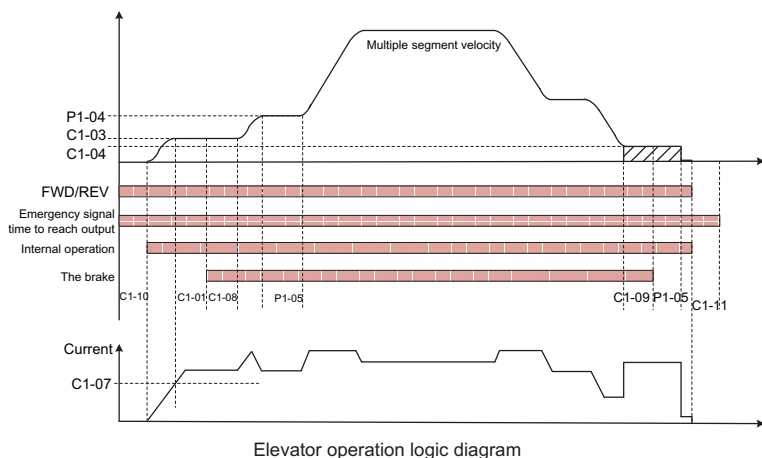
1: Effective

It is a special elevator model, and C1 group parameters are valid.

Function code	Name	Description (setting range)	Factory Default	Change
C1-01	Hold brake opening delay	0.0s ~ 10.00s	0.00s	×
P1-04	Start up frequency	0.00Hz ~ 10.00Hz	5.00Hz	×
P1-05	Start frequency hold time	0.0s ~ 10.00s	0.00s	×
C1-02	Holding brake closing frequency delay	0.0s ~ 10.00s	0.30s	×
C1-03	Opening frequency of lock brake (rising)	0.00Hz ~ 10.00Hz	1.00Hz	×
C1-04	Lock closing frequency (rising)	0.00Hz ~ 10.00Hz	0.20Hz	×
C1-05	Opening frequency of lock brake (decreasing)	0.00Hz ~ 10.00Hz	1.00Hz	×

Function code	Name	Description (setting range)	Factory Default	Change
C1-06	Lock closing frequency (decreasing)	0.00Hz ~ 10.00Hz	0.20Hz	×
C1-07	Hold the brake to turn on the current	0.0 ~ 100.0%	40.0%	△
C1-08	Holding time of opening frequency of lock brake	0.00 ~ 10.00s	0.30s	×
C1-09	Closing frequency holding time of lock brake	0.0s ~ 10.00s	0.20s	×
C1-10	Running contactor closing delay	0.0s ~ 10.00s	0.10s	×
C1-11	Run contactor open delay	0.0s ~ 10.00s	0.50s	×

By setting the function codes C1-00~C1-19, the starting comfort and stopping comfort of the elevator can be well adjusted. The exact meaning of each function code is as follows:



C1-03(lock gate opening frequency (up)) and C1-04(lock gate closing frequency (up)) have the same meaning as C1-05(lock gate opening frequency (down)) and C1-06(lock gate closing frequency (down)). The rising group is used for frequency judgment when the converter is in positive rotation, while the falling group is used for frequency judgment when the converter is in reverse rotation.

Function code	Name	Description (setting range)	Factory Default	Change
C1-12	Hold brake open type	0: Turns on according to the frequency	0	x
		1: Turn on according to frequency and current		

0: Turns on according to the frequency

The opening judgment condition of the lock brake is that the inverter outputs to the frequency set by C1-03(up) C1-05 (down), and then opens the lock brake after the time set by C1-01(lock brake opening delay).

1: Turn on according to frequency and current

In addition to the frequency set by C1-03 (up) and C1-05 (down), the current of the converter should also reach the value set by C1-07(open current of the lock gate).

Function code	Name	Description (setting range)	Factory Default	Change
C1-13	Emergency operating frequency	0.00~50.00Hz	20.00Hz	△

When the emergency signal is input, the inverter will enter the emergency running state, and the running frequency is the frequency set by the function code. In the emergency running state, the inverter will select acceleration and deceleration time 4 as the current acceleration and deceleration time.

Function code	Name	Description (setting range)	Factory Default	Change
C1-14	Maintenance operating frequency	0.00~50.00Hz	20.00Hz	△

When the maintenance signal is input, the operation frequency of the inverter will be operated according to the maintenance operation frequency.

Function code	Name	Description (setting range)	Factory Default	Change
C1-15	Emergency signal processing	0: The elevator is not running	1	×
		1: The UPS runs		

0: The elevator is not running

When there is an emergency signal input, the inverter will not output.

1: The UPS runs

When there is an emergency signal input, the inverter is powered by the UPS, and the inverter can run and output at the emergency frequency.

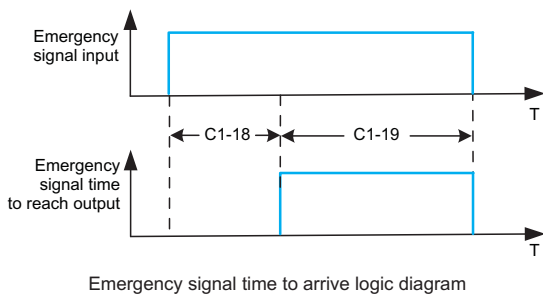
Function code	Name	Description (setting range)	Factory Default	Change
C1-16	Ascending correction frequency	0.00~3.00Hz	0.00Hz	×

This parameter is used to correct the flat accuracy of the elevator in the power generation mode. For example, when the elevator is just in the flat position when it is rising with half load, and exceeds the flat position when it is rising with no load, increasing this value can correct the flat accuracy.

Function code	Name	Description (setting range)	Factory Default	Change
C1-17	Drop correction frequency	0.00~3.00Hz	0.00Hz	×

This parameter is used to correct the flat accuracy of the elevator in electric mode. For example, when the elevator is just in the flat position when the half load drops, but cannot reach the flat position when the no load drops, increasing this value can correct the flat accuracy.

Function code	Name	Description (setting range)	Factory Default	Change
C1-18	Emergency signal validity time	0.0~500.0s	10.0s	×
C1-19	Emergency signal invalid time	0.0~1000.0s	180.0s	×



2. KD600E SERIES INVERTER STO FUNCTION

2.1 STO Function Overview

Reference standards: IEC 61508-1, IEC 61508-2, IEC 61508-3, IEC 61508-4, IEC 62061, ISO 13849-1, IEC 61800-5-2.

KD600E series inverter STO function, automatic stop when stopped. A stop signal is set inside the inverter, and when the signal is triggered, the inverter will automatically stop working. The inverter stops the output current by entering a specific control command or using an external sensor to trigger a stop signal. This function has high security and reliability, and can effectively avoid unnecessary equipment damage and personnel injury. When using the inverter, please set the parameters of the STO function reasonably to ensure its normal operation and achieve the best results.

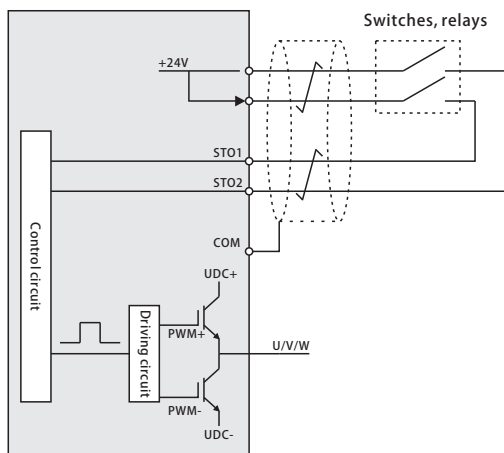


Figure 2-1 Schematic diagram of STO functions

Attention:

The opening and closing of the safety switch contact must be $\leq 250\text{ms}$;

The distance between the inverter and the safety switch is less than 25m;

2.2 STO function logic

STO function input status and corresponding faults:

STO input status	Corresponding STO fault
STO1 and STO2 are enabled simultaneously	The STO function is triggered, and the inverter cannot work properly
STO1 and STO2 shut down at the same time	The inverter can work normally without triggering the STO function
STO1, STO2 either is on	Err48 is triggered. You can identify the fault type by viewing the U1-35 value. 1: STO1 is disconnected. 2: STO2 is disconnected. 3: Both STO1 and STO2 are disconnected.

2.3 STO function installation checklist

Before installing an STO, perform a self-test according to the table below to ensure that the STO works.

Serial number	Item
1	Ensure that the inverter is free to run and stop during commissioning.
2	Stop the inverter (if it is running), cut off the input power and isolate the inverter from the power via the switch.
3	Connect the lines correctly according to the STO circuit diagram.
4	Check whether the STO input cable is connected to +24V and the shielding layer is connected to GND COM
5	Power-on self-test
6	When the motor is stopped, the STO method is tested: Issue a stop command to the inverter (if it is running) and wait until the motor shaft is stopped; Activate the STO function and issue a start command to the driver to ensure that the motor remains unchanged and at rest; Stops activating the STO circuit.
7	Restart the inverter and check whether the motor is running properly

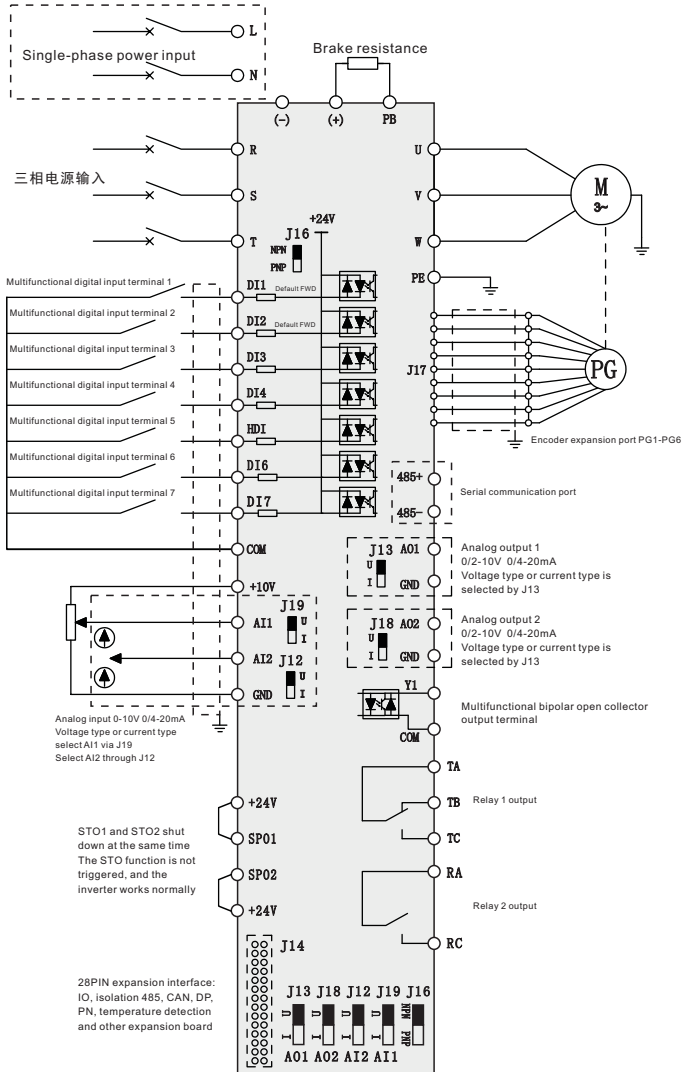
Serial number	Item
8	When the motor is running, the STO method is tested: Start the inverter to ensure the normal operation of the motor; Activate the STO circuit; The inverter triggers STO fault Err48 (U1-35 check the fault type and treatment) to ensure that the motor stops; Stops activating the STO circuit.
9	Restart the inverter and check whether the motor is running properly

2.4 Terminal connection diagram

The control loop terminal layout is shown as follows:

+10V	AI1	AI2	DI1	DI12	+24V	STO1	+24V	STO2
GND	AO1	AO2	DI3	DI4	HDI	Y1	R/A	R/C
485+	485-	DI6	DI7	+24V	COM	T/A	T/B	T/C

Connection mode:



WARRANTY

- ❶ The company solemnly promises that users will enjoy the following warranty services from the date of purchase of products from our company (hereinafter referred to as the manufacturer).
- ❷ Since the product was purchased by the user from the manufacturer, enjoy the following three guarantee services:
 - ⊘ Return, replacement and repair within 30 days of delivery:
 - ⊘ Replacement and repair within 90 days of delivery:
 - ⊘ Repair within 18 months of delivery:
 - ⊘ Except when exporting abroad.
- ❸ This product enjoys lifetime paid service from the date of purchase by the user from the manufacturer.
- ❹ Disclaimer: Product failure caused by the following reasons is not covered by the manufacturer's free warranty service:
 - ⊘ Failure caused by the user's use and operation in accordance with the requirements of the «Instruction Manual»:
 - ⊘ Failure caused by the user to repair or modify the product without communicating with the manufacturer:
 - ⊘ Failure caused by abnormal aging of the product due to poor user environment:
 - ⊘ Failures caused by natural disasters such as earthquakes, fires, floods or abnormal voltages:
 - ⊘ Damage to the product during transportation (the transportation method is specified by the customer, and the company assists in handling the cargo consignment procedures)
- ❺ Under the following conditions, manufacturers have the right not to provide warranty services:
 - ⊘ When the manufacturer's product logo, trademark, nameplate, etc. are damaged or unrecognizable:
 - ⊘ When the user fails to pay the purchase price in accordance with the signed contract:
 - ⊘ The user intentionally conceals the manufacturer's after-sales service unit when the product is installed, wired, operated, maintained or otherwise improperly used
- ❻ For the service of return, replacement and repair, the company must return or return to the company, and it can only be returned or repaired after confirming the responsibility vested.

WARRANTY CARD

User information			
User name			
User address			
Postal code		Contact person	
Tel		Fax	
Machine type		Machine code	
Agent / Reseller Information			
Supplier			
Contact			
Tel		Delivery date	

CERTIFICATE OF QUALITY

QC test: _____

This product has been tested by our company's quality department, and its performance meets the standards, passes the inspection, and is approved to leave the factory.

Energy efficient , beautiful environment



SHENZHEN K-EASY AUTOMATION CO.,LIMITED

📍 Add: Wisdom Lmgyu, baishixia community, Fuyong street, Bao 'an District, Shenzhen, China

☎ Tel: +86-0755-27850411

📞 Wechat/Whats App:+86-19924552818

✉ E-mail: Sales@keasyautomation.com

🌐 <http://www.keasyautomation.com>

Design date: December 04, 2023

Version
1.0