

# HK-3ARD-22/37/55E-A User Manual

## ARD Overview

Elevator automatic rescue device, simply ARD for short, is specially developed by our company to improve elevator operation reliability and protect passengers from being trapped in an elevator due to power failure, further avoiding harm to passengers both physically and mentally.

ARD uses the back-up emergency power system beyond original elevator control and inverter system. ARD is characterized by simple installation wiring, convenient commissioning and high cost effectiveness. In case of failure of three-phase power network, ARD will automatically run within the set time to make elevator car slowly move to the near floor along the light-load direction, and then open the door to release passengers.

## Attentions before Installation

1. Please carefully read the use manual for correct installation, commissioning and use of elevator automatic rescue device (ARD for short).
2. To avoid personal and equipment accident, the following safety measures shall be taken for ARD installation, commissioning and maintenance:
  - (1) ARD installation, connection and commissioning shall only be made by the professional technician in elevator industry.
  - (2) Please make sure that ARD power switch and elevator main power have been turned off before ARD installation, connection and maintenance. Otherwise, there is electric shock risk.
  - (3) Please make sure that elevator equipment is grounded well.
  - (4) Please make operation according to hints or warnings in the use manual to prevent harm to installation or maintenance personnel, and damage to elevator equipment.
  - (5) Please confirm the correctness of the connection between ARD and elevator system again before turning on three-phase power for commissioning.
3. This manual shows ARD installation and connection steps, commissioning, usage, possible faults and troubleshooting methods, and in addition, introduces ARD external signal terminal in detail.
4. Do not keep or use the product in the following environment:
  - A. Availability of combustible gas, corrosive substance or heavy dust;
  - B. Abnormal high or low temperature (greater than 40°C or lower than -5°C), and high humidity (greater than 90%)
  - C. Direct exposure to sunlight or near to heating appliance;
  - D. Sharp vibration
  - Please use powder fire extinguisher in case of any fire around ARD, and do not use fluid extinguisher to avoid electric shock
  - Please make sure ARD is grounded reliably during installation

## Installation and Connection Description

### 1. Installation

The cabinet bottom of the product is equipped with bolt hole, which could make the product firmly mounted on structure by M8 bolt.

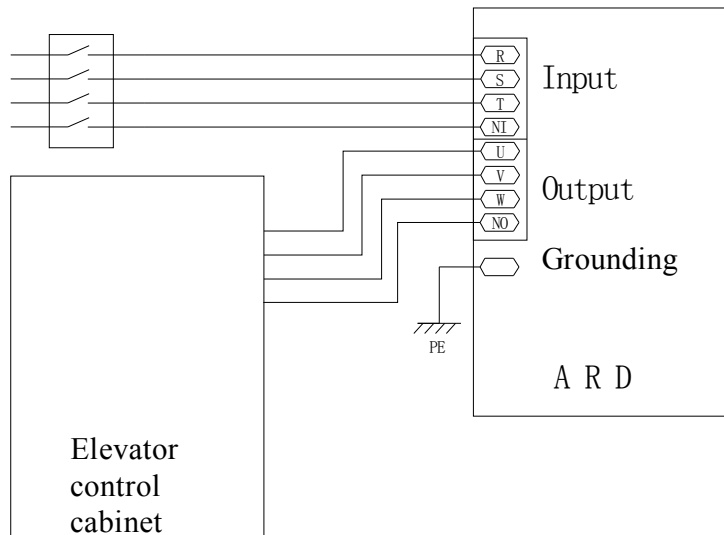
### 2. ZA01 Amp terminal external wiring

LINE NO.	Mark	Description
1~5	Reserved	Reserved
6	P14	Another set of contact of ARD power switch

7	KGL	
8	GL1	ARD remote switch ,for controlling inverter output
9	GL2	
10	P14A	ARD running signal output, which is output when in inversion.
11	EB-	
12	X5	Signal output, normally open .They are used to short out the phase sequence relay when ARD runs, which are output when in inversion.
13	X6	
14~16	Reserved	Reserved
17	-24V	DC24V/400mA power output when mains failure and last 1 hour
18	+24V	
19	BTY+	Battery voltage output
20	BTY-	
21	PE	Ground

### 3. Power line input and output terminals R/S/T/NI/U/V/W/NO

- 1) Turn off ARD power switch and elevator main power
- 2) Connect three-phase power and neutral line to ARD input and output terminal R S T NI respectively
- 3) Connect elevator control cabinet and neutral line to ARD output terminal U V W NO
- 4) Neutral line NI and NO may not be connected, depending on site need, and may not be used for all devices. For details, please refer to attached wiring diagram
- 5) Please ground ARD grounding terminal reliably



## ARD Operating Instructions

- 1) In case of normal mains supply, the product is in charging state, and *STANDBY* indicator on panel flickers or is constantly on.
- 2) In case of abnormal mains supply, the product promptly uses internal battery power supply output DC24V, and upon setting time through F01 parameter (default 20S), starts 3phase AC380 for output. The constant output time of AC380 is set by F02 parameter (default 3Min), and AC380 output is closed after the constant time set is reached.

### Mains detection

- Test three-phase power through RST input terminal, and make operation in case of cut of any phase
- Recover mains power in case of ARD inversion, and at this time, switch into mains power after ARD delay of 3S.

## Emergency Power Output

- Immediately start up DC24V output and last for 1 hour after the abnormality in the main power is detected.
- Start up AC380 output after F01 parameter set time (default 20S) when the abnormality in the main power is detected. The duration is set by F02 parameter (default 3Min).
- Keep the main contactor disconnected until the main power goes back to normal when in phase loss.

## Main Contactor Exception Detection

- When the main power is normal but the main contactor is not closed, it will trigger breakdown with fault code as 5
- When the main power is abnormal and the main contactor fails to disconnect, it will trigger breakdown with fault code as 4
- It will stop all output when in a faulty state.

## ARD Operating Parameter Setting Instructions

- ARD operation panel consists of 1602LCD, 4 buttons and 3 indicator lights.

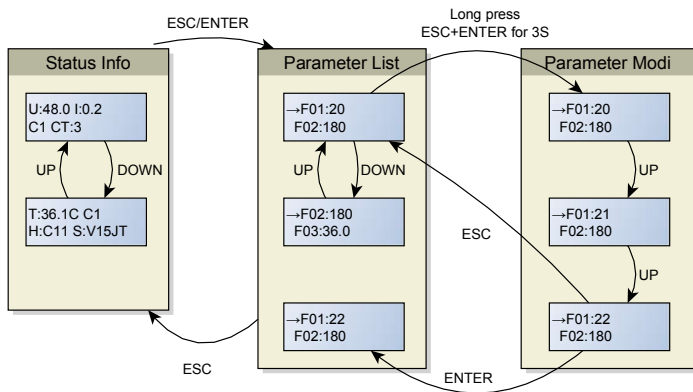
Type	Mark	Function
Key	ESC	Exit, return
Key	UP	Select the upper parameter or increase the parameter value
Key	DOWN	Select the lower parameter or decrease the parameter value
Key	ENTER	Enter the parameter or determine the modification
Indicator light	STANDBY	Flicker: Under charging Normally on: Charge complete
Indicator light	INVERTER	Flicker: Under inverter output Normally on: Inverter output stops
Indicator light	ERROR	When the red light is normally on, it refers to ARD error. Please shoot the trouble according to the fault code.

Notes: To modify parameter, please press ESC+ENTER key for 3s, and it is invalid in case of ARD in inversion state

- Parameter Settings

Parameter No.	Parameter Description	Default	Unit	Remark
F01	Waiting time for start the inversion	20	S	The time for ARD starting up the inverter output when in power failure.
F02	Time for inversion	180	S	Setting the working time of ARD inverter output
F03	Low-voltage cutoff threshold	9.0 per battery	V	Setting range 8.05~10.5V per battery
F04	Battery charging voltage at 25℃	13.6 per battery	V	Setting range 13.45~13.75 per battery
F05	Output line voltage regulation	400	V	Setting range 385~420, 5 unit per step
Err	Error records			Err parameter refers to the Error records, which can check the latest 10 faults through the interface. E0 refers to the latest fault record.

- Operation and display description



**Example of modification of inverter output time F02 parameter:**

- Press *ENTER* or *ESC* key to enter the parameter modification interface in the power-on initial state
- Press *UP* or *DOWN* again to set F02 Parameter on the first row on the screen
- Meanwhile, long press *ESC + ENTER* for 3S to enter the parameter modification interface. At this moment, the first row on the screen flickers (only in non-inversion state can the parameter be modified)
- Press *UP* or *DOWN* to increase or decrease the parameter value
- Press *ENTER* to save or *ESC* to cancel after modification completion.

● Description of Display

System State	Example Displayed	Description
Waiting for inverter output	U:48.2 I:0.1 Sta:2 WT:4	U:48.2 The current battery voltage is 48.2V I:0.1 The average current of the battery is 0.1A. Sta:2 is a fixed value, indicating that the current state is waiting for inverter output. WT:4 Remaining waiting time. When the value is reduced to 0, the inverter output is started up.
Inverter output	U:48.2 I:1.1 WorkT:15	WorkT:15 The time that the inverter output has lasted, 15S
Charging	U:48.2 I0.1 C1 CT:12	CX: Indicates charging stage, wherein, X refers to 1-3. C1:Refers to the charging stage with high constant current C2:Refers to the charging stage with small current C3:Refers to the completion of charging. CT:12 Refers that the charging has lasted for 12 Min.
Fault	U:48.2 I:0.1 ERR:4	ERR:4 Fault code 4 (refer to the fault codes)
Inverter output shutdown	U:48.2 I:0.1 Shutdown	Shutdown: Inverter output shutdown
Others	U:48.2 I:0.1 Sta:X	Sta:X System state X 0: Initialization 1: Standby 2: Waiting for inverter output 3: Relay switch state 1 4: Relay switch state 2
(Irrelevant to the system state)	T:25C C0	T:25C The ambient temperature of the cabinet is 25°C. CX: Discharge or charge stage C0: Discharge C1: Charge Stage 1 C2: Charge Stage 2 C3: Charge completion

Unknown	COMM ERR	Error in communication between display board and mainboard
---------	----------	------------------------------------------------------------

● **Fault code and description**

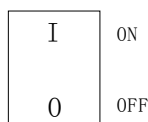
<b>Fault code</b>	<b>Fault description</b>
1	Battery overcurrent
2	Battery undervoltage
3	Battery overvoltage
4	The main contactor is not disconnected
5	The main contactor is not closed
6	The output voltage error, please check whether the input and output power lines reversed
7	Self-test failure

## ARD Commissioning

- The connection between ARD and elevator control cabinet must be conducted after the completion of elevator installation and commissioning and the elevator can be normally put into operation.
- Firstly, disconnect the main power of the elevator control cabinet, and then well connect the wire between ARD and elevator system according to the wiring instructions; check and confirm whether the wire connection is correct. Please ensure no error in the connection of RST and UVW of the three-phase power. Otherwise, it will cause irreparable and irreversible damage to ARD.
- Supply the normal three-phase power first, and then turn the control switch on ARD panel to On, then ARD is in a standby mode, and the battery charges automatically.
- After the mains failure, the yellow indicator light on ARD panel flicker and ARD is in an inversion mode and supplies power to the elevator system. ARD will stop running automatically according to the set time and enter to the standby mode after the three-phase power is restored.
- Internal commissioning is not required after the product is delivered. If an internal adjustment is required, please contact with the Company.
- ARD panel power switch instruction

UP: ON

DOWN: OFF



**Note: When the switch is turned OFF, the emergency rescue will no longer be implemented, and the batteries will not be charged .**

## Battery Maintenance and Replacement

The service life of the battery is shortened with the rise of the ambient temperature (25°C). Regular replacement of the battery (2-3 years) may ensure the normal operation of ARD and have sufficient time for discharge.

1. The battery must be charged after it is used for the first time or placed for a long time.
2. At the ambient temperature <0°C, the chemical substances inside the battery will be affected by the temperature and the discharge time will drop sharply.
3. The battery has the phenomenon of self-discharge. Under the circumstance of no use for a short time, it should be charged once every three months, so as to ensure no damage to it.
4. If ARD is not used for a long time, please take off the battery and place the device in a dry environment.
5. The battery maintenance and replacement can only be conducted by professional technicians of battery.
6. There are risks of electric shock and short-circuit current when in battery replacement. To avoid personal injury due to electric shock, please conform to the following warnings when replacing the battery:

- Do not wear watch, ring or other metal object;
- Adopt insulated tools;
- Put on insulating gloves;
- Do not put any metal object on the battery;
- Do not short out the positive electrode and the cathode of the battery. Otherwise, it will cause electric shock or fire.

7. The steps of battery replacement are as follows:

- Remove the hexagonal screws on the fixed battery panel of the product;
- Take off the fixed panel;
- Disconnect the connection wires of the old battery;
- Replace the battery group;
- Connect wires of the new battery according to the original method;
- Install the fixed panel and screws;

**Warning: It is strictly forbidden to make opposite connection of battery positive and negative pole.**

## ARD Specifications

Model		HK-3ARD-22E-A	HK-3ARD-37E-A	HK-3ARD-55E-A
Capacity(KVA)		3	4.5	6
Mains input	Voltage	3 phase AC380V±10%		
	Frequency	50/60Hz		
Inverter output	Voltage	3 phase AC380V±10%		
	Waveform	Sine wave		
	Frequency	50Hz		
	Efficiency	≥0.8		
	Waveform distortion	Linear rated load≤5%		
Battery	Type	Plumbic acid charging-free and maintenance-free special battery		
	Rescue time	2-15Min (adjustable)		
	Charging time	≤8hours		
	Specifications and quantity	12V/24AH×4	12V/17AH×6	12V/24AH×6
Environment	Temperature	0℃～40℃		
	Humidity	30%～90% (non-condensable)		
	Noise	≤50dB		
Dimension L*W*H (mm)	Cabinet	452*180*536	505*217*536	505*217*536
	Battery box	410*330*220	535*395*206	535*395*206
Weight (KG) without battery		23.1	41	55

**Note: Since different brands of elevators have different door motor, brake, motor capacity and other equipment power consumption, the selection of ARD model should accord to the actual power demand of the field elevator.**

## After-sale Commitments

Dear Valued Customer, Good day!

Thank you very much for choosing our product. Our product is produced strictly in accordance with the product standards registered in the national authority. With the principle of honesty and trustworthiness and win-win cooperation, we will provide you with the best and fastest after-sale services. We hereby solemnly promise:

1. One-year warranty for the battery and two-year warranty for other components under the circumstance of proper installation and normal and standard use.
2. In case of technical problems in the course of installation and use, please call our After-sale Service Center at any time. We will provide you with perfect technical support.
3. For the product defect caused due to design and manufacturing, we will replace the product with the same type for you for free and undertake any expenses incurred.
4. The following circumstances should not belong to the range of free repair, replacement and return according to relevant national regulations:
  - (1) The product is damaged by accident or human factor. Such as input with an inapplicable voltage, high temperature, water inlet, mechanical damage, damage after falling, serious oxidation or rust in the product, etc.
  - (2) The product is damaged as it is installed or used not according to the requirements provided in the Operating Instructions.
  - (3) The product is damaged due to force majeure.
  - (4) The product is disassembled or repaired by the person who is not authorized by our company.
  - (5) Other damages caused not due to the quality of the product.

Address for after-sale services: No.829, Fangshan East 2nd Road, Maxiang Shitou Industrial Zone, Xiang'an District, Xiamen City, Fujian Province, P.R. China

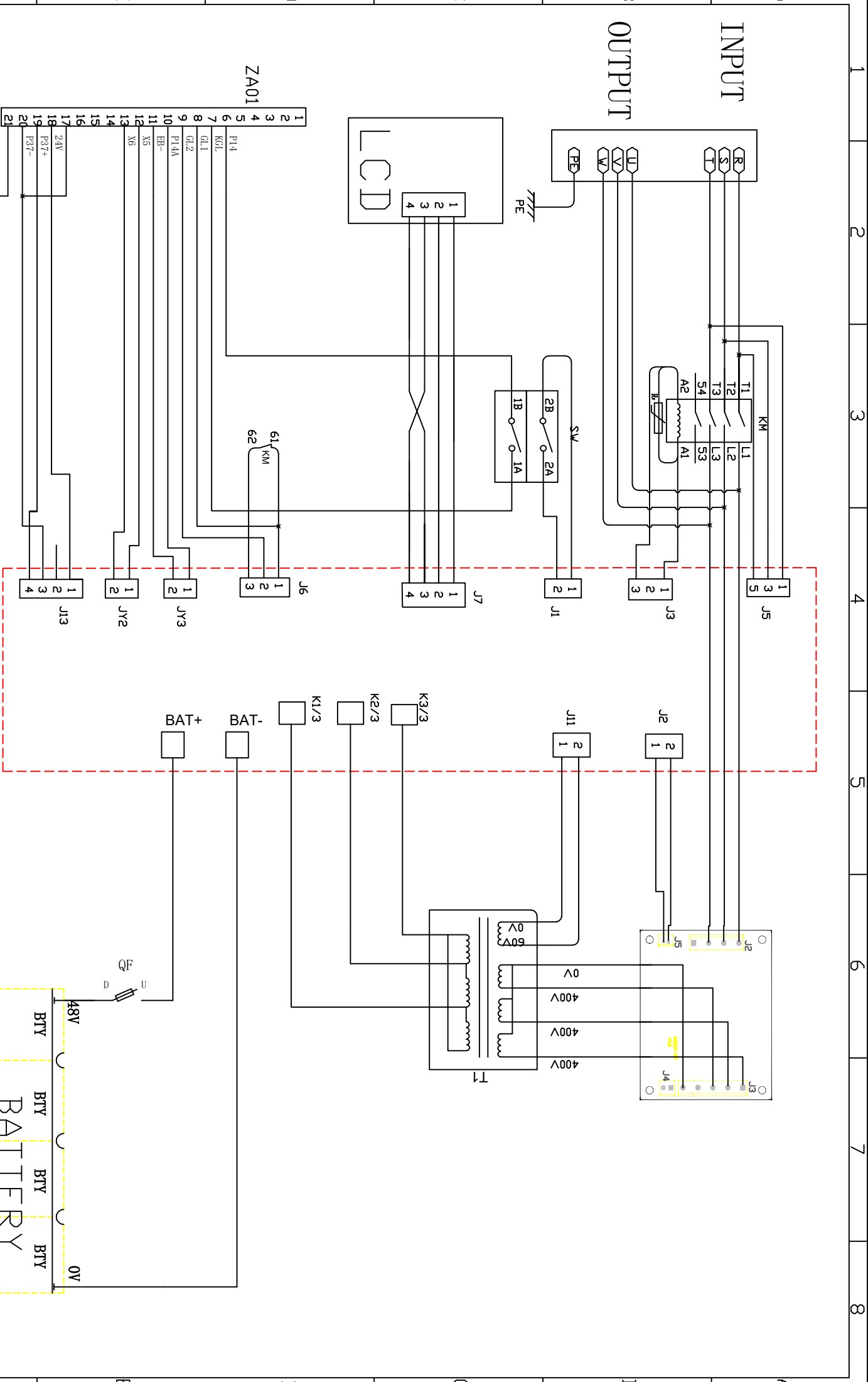
Postal Code: 361101

Tel: 0592—7622310

Fax: 0592—7622316

<http://www.xietongcn.com>

**When the product is improved, the features and relevant data of the product may be altered without prior notice.**

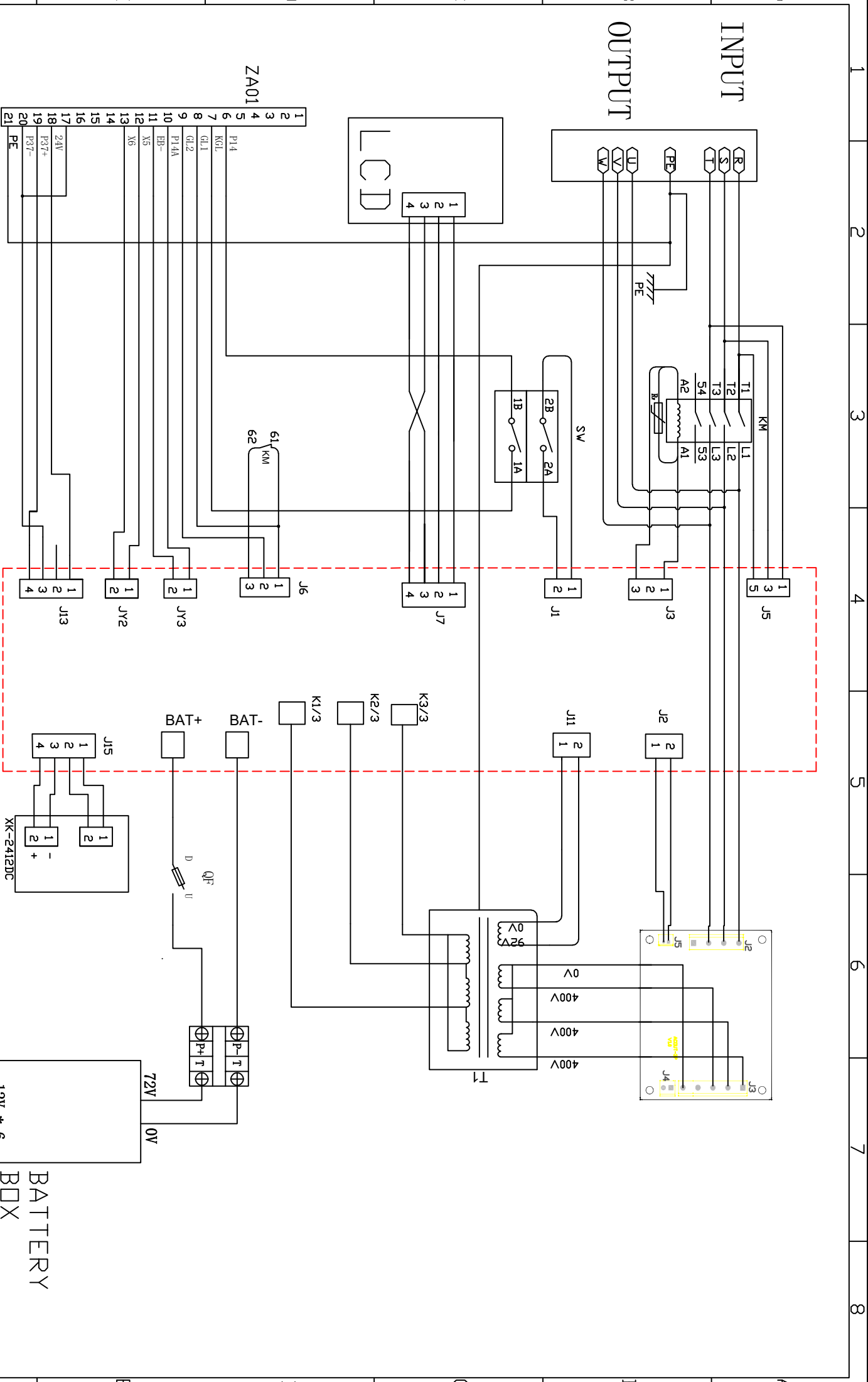


Designed by	ZhiHuang	Issued by		Model NO.	HK-3ARD-22E-A
Checked by	LZhenfan	Reviewed by		Revision	

Xiamen Hanjing Elevator Control System Co.,Ltd

48V  
BTY  
BTY  
BTY  
BTY  
0V  
BATTERY



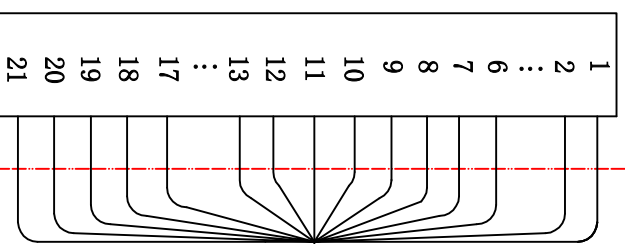
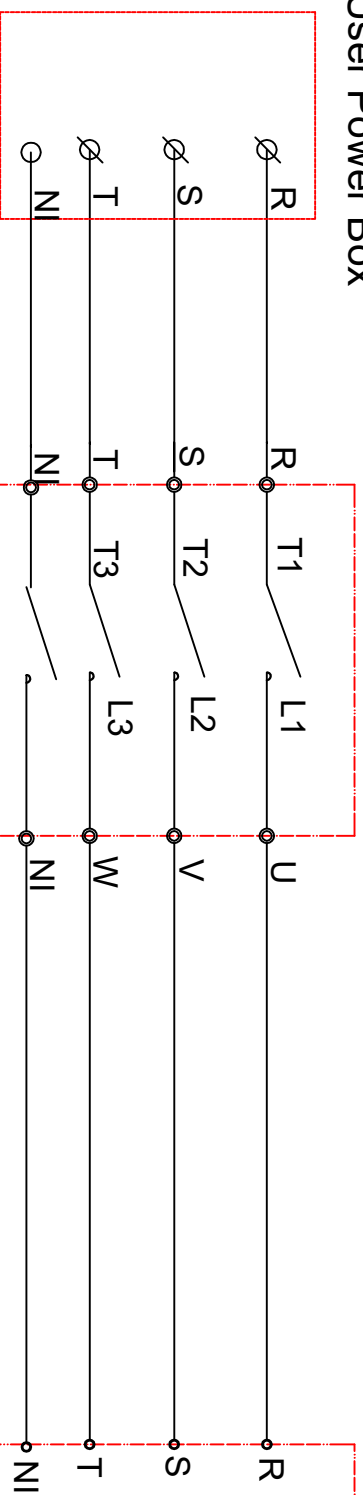


Designed by	ZhirHuang	Issued by		Model NO.	HK-3ARD-37/55E-A
Checked by	LZhenFan	Reviewed by		Revision	V11
Xiamen Hanjing Elevator Control System Co.,Ltd				BATTERY BOX	

User Power Box

HK-3ARD-37E/55E

Elevator control cabinet



SN/0	ACCOUNT FOR FUNCTION
1	L
2	N
3,4,5	SPARE
6	A SET OF CONTACT OF ISOLATOR SWITCH INSIDE ARD. TO DETECT MAIL CONTROL BOARD
7	TO TURN OFF ARD BY ISOLATOR SWITCH OF CONTROL CABINET IN LONG DISTANCE.
8	ARD RUN SIGNAL
9	ARD RUN SIGNAL
10	ARD RUN SIGNAL
11	ANOTHER SET OF CONTACT OF ARD. TO SHORT-CIRCUIT PHASE SEQUENCE RELAY WHEN ARD RUNNING.
12	SPARE
13	SPARE
14,15,16	DC24V - OUTPUT
17	DC24V + OUTPUT
18	BATT TEST +
19	BATT TEST -
20	PE
21	PE

(18\*0.75+1\*2.0), 3M

Design Check

Standard Auditing

Xiamen Hanjing Automation CO.,Ltd

HK-3ARD-55E/37E (The external wiring diagram)

Type Version  
HK-3ARD-55E/37E  
20151210-297-A02