

Single-phase ARD Series Elevator Automatic Rescue Device

User Manual

Rev.2.2

Shenyang Bluelight Automatic Technology Co., Ltd.

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1 Product Overview

This chapter introduces the model, specifications, and production functions of the elevator automatic rescue device (ARD for short).

1.1 Model Descriptions

Descriptions of ARD model is shown as Figure 1.1 (take AC380V 15kW for example)

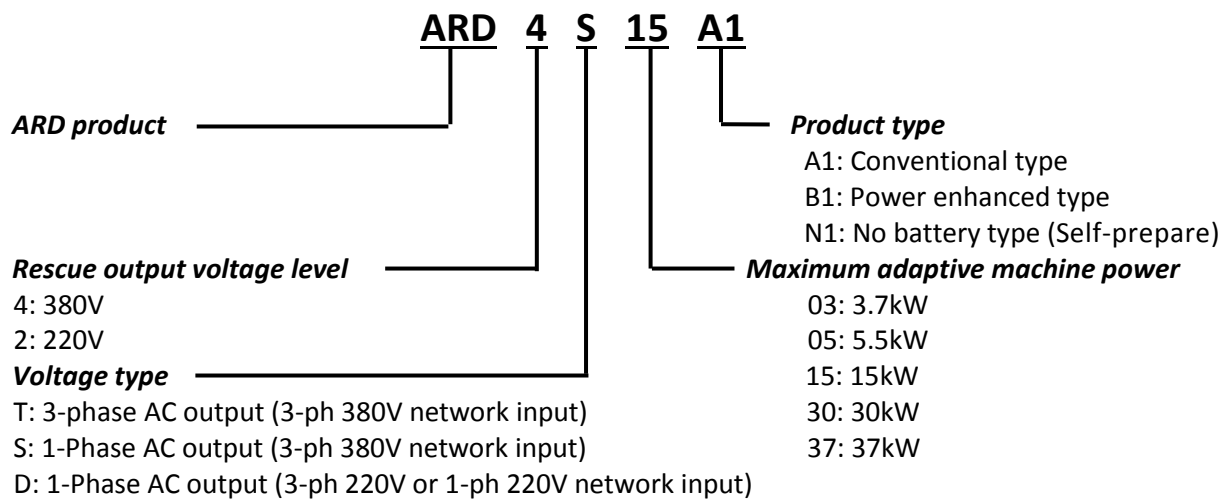


Figure 1.1 Model Descriptions of ARD

Note: For 3 types power network (3-ph 380V, 3-ph 220V and 1-ph 220V), two kinds of output voltage levels are available at present: single phase AC220V and single phase AC380V. Please select the voltage level of ARD according to the elevator control system.

Note: It is recommended to use ARD4SXXX1-Z series, a special model product for elevator cabinet equipped with main board and inverter. Refer to 2.4 ARD4SXX-Z Application Wirings.

1.2 Nameplate Descriptions

Nameplate of ARD is shown as Figure 1.2.

Model, power, input, output, lot number, serial number (the manufacturing number), and barcode of ARD are noted on the nameplate, which is pasted on the right side of the ARD.

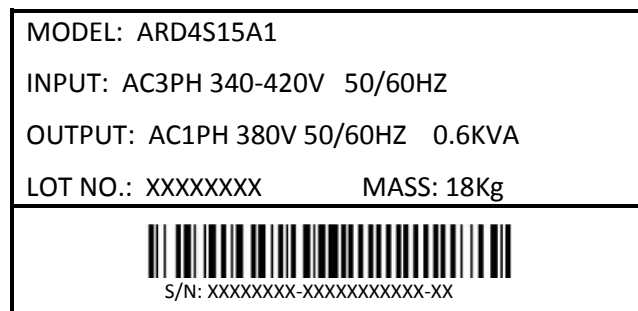


Figure 1.2 Nameplate of ARD

1.3 Technical Specifications

Table 1.1 Standard specification

Model	Voltage type	S	ARD2S03X	ARD2S05X	ARD2S15X	ARD2S30X	ARD2S37X
		D	ARD4S03X	ARD4S05X	ARD4S15X	ARD4S30X	ARD4S37X
	Product type	A1	Normal Type				
		B1	Enhanced Type				
N1		No Batteries Type (Self-prepare)					
Maximum Adaptable Machine Power(kW)			3.7	5.5	15	30	37
A1 Type Maximum Adaptable Elevator Load(kg)			450	1150	1150	1150	1600
B1 Type Maximum Adaptable Elevator Load(kg)			630	1350	1350	1350	2000
Output	Rescue Rated Output Voltage(V)		Voltage type S: AC220/380V, 50/60Hz Voltage type D: AC220V, 50/60Hz				
	A1 Type Rescue Rated Output Capacity(kVA)		0.3	0.6	0.6	0.6	1.3
	B1 Type Rescue Rated Output Capacity(kVA)		0.4	0.7	0.7	0.7	1.5
	Output Current (Non-Rescue State) (A)		18	18	32	60	80
Input	Net Voltage		Voltage type S: 3-ph AC 340~420V Voltage type D: 3-ph AC 185~240V or 1-ph AC 185~240V				
	Net Frequency		50/60Hz				
Battery Characteristics	Battery Type		Rechargeable Sealed Lead-Acid Battery				
	Rated Voltage		DC24V (12V×2)	DC36V (12V×3)	DC36V (12V×3)	DC36V (12V×3)	DC72V (12V×6)
	Rated Capacity (A1 Type)		7AH×2	7AH×3	7AH×3	7AH×3	7AH×6
	Rated Capacity (B1 Type)		9AH×2	9AH×3	9AH×3	9AH×3	9AH×6
Control Features	Recommended Elevator Rescue Speed		1/12 Elevator rated running speed				
	Single Running Duration		5min				
	Output Voltage Wave		Sine Wave				
	Efficiency		>90%				
Ambience	Cooling Mode		Free cooling / Forced air-cooling				
	Protection Class		IP20				
	Ambient Temperature & Humidity		Ambient humidity below 90%RH (No dewing) -15~40°C, well ventilated				
	Vibration Degree		>1G below 20Hz				

Note: X in the Model indicates product type: A1, B1 or N1.

1.4 Outline Dimension

Two types of installation are provided: horizontal and wall hanging.

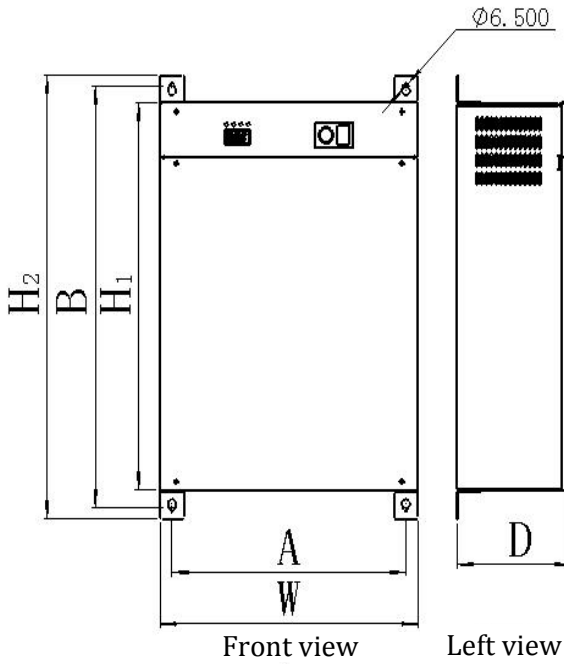


Figure 1.3 Hanging-type

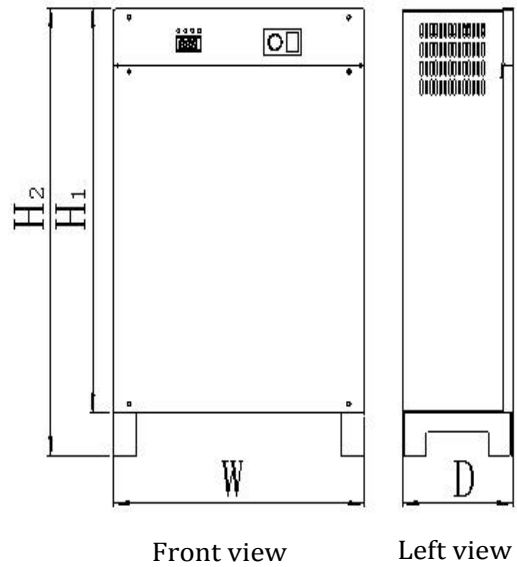


Figure 1.4 Horizontal-type

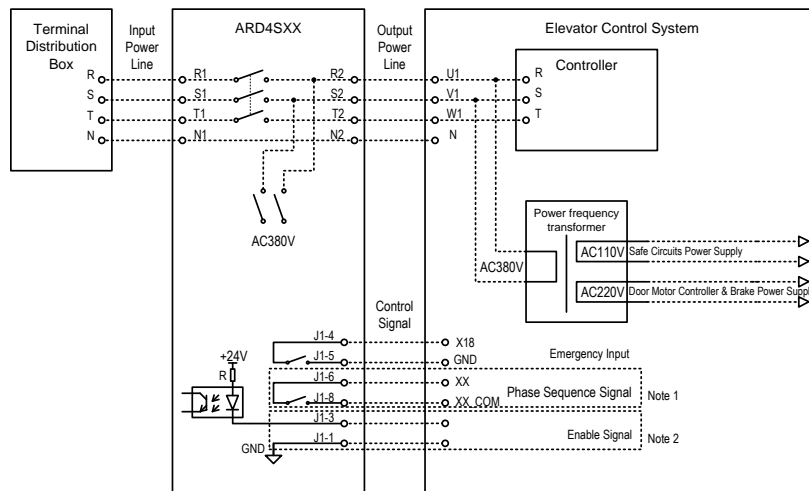
Table 1.2 Product size list (unit: mm; X indicates product type: A1, B1 or N1)

Model	W	D	H1	H2	A	B	Mounting type
ARD2S03X	320	140	425	488/470	290	463	Hanging/Horizontal
ARD4S03X							
ARD2D03X							
ARD2S05X							
ARD4S05X							
ARD2D05X							
ARD2S15X							
ARD4S15X							
ARD2D15X							
ARD2S30X							
ARD4S30X							
ARD2D30X							
ARD2S37X							
ARD4S37X							
ARD2D37X							

2 Electric Installation

2.1 ARD4SXX Application Wirings

ARD4SXX Application Wirings (fit for the control system whose control power supply, brake power supply and safe circuits power supply are produced by transformer from 380V power supply.)

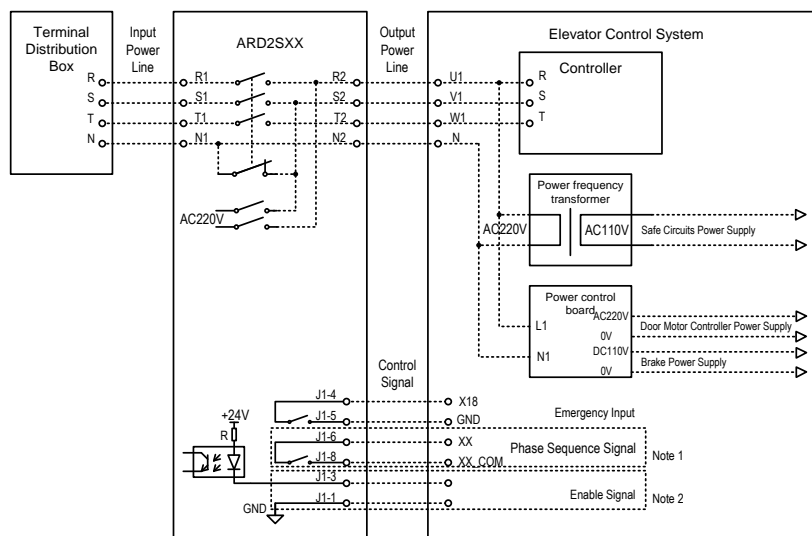


Note 1: If there is no phase sequence relay in the control cabinet, please ignore the phase sequence signal; If there is phase sequence relay in the control cabinet, please connect the phase sequence signal to the constant open contactor of the phase sequence relay.
 Note 2: Enable signal controls the ARD to stop or run, the ARD runs as the signals is connected, and the ARD stops as the signal is disconnected.
 If there is no enable signal, the J1-1 and J1-3 of ARD should be wired together (factory default condition).

Figure 2.1 ARD4SXX application wirings diagram

2.2 ARD2SXX Application Wirings

ARD2SXX Application Wirings (fit for the control system whose control power supply, brake power supply and safe circuits power supply are L and N.)



Note 1: If there is no phase sequence relay in the control cabinet, please ignore the phase sequence signal; If there is phase sequence relay in the control cabinet, please connect the phase sequence signal to the constant open contactor of the phase sequence relay.
 Note 2: Enable signal controls the ARD to stop or run, the ARD runs as the signals is connected, and the ARD stops as the signal is disconnected.
 If there is no enable signal, the J1-1 and J1-3 of ARD should be wired together (factory default condition).

Figure 2.2 ARD2SXX application wirings diagram

2.3 ARD2DXX Application Wirings

ARD2DXX Application Wirings (fit for the control system whose control power supply, brake power supply and safe circuits power supply are produced by transformer from 220V power supply.)

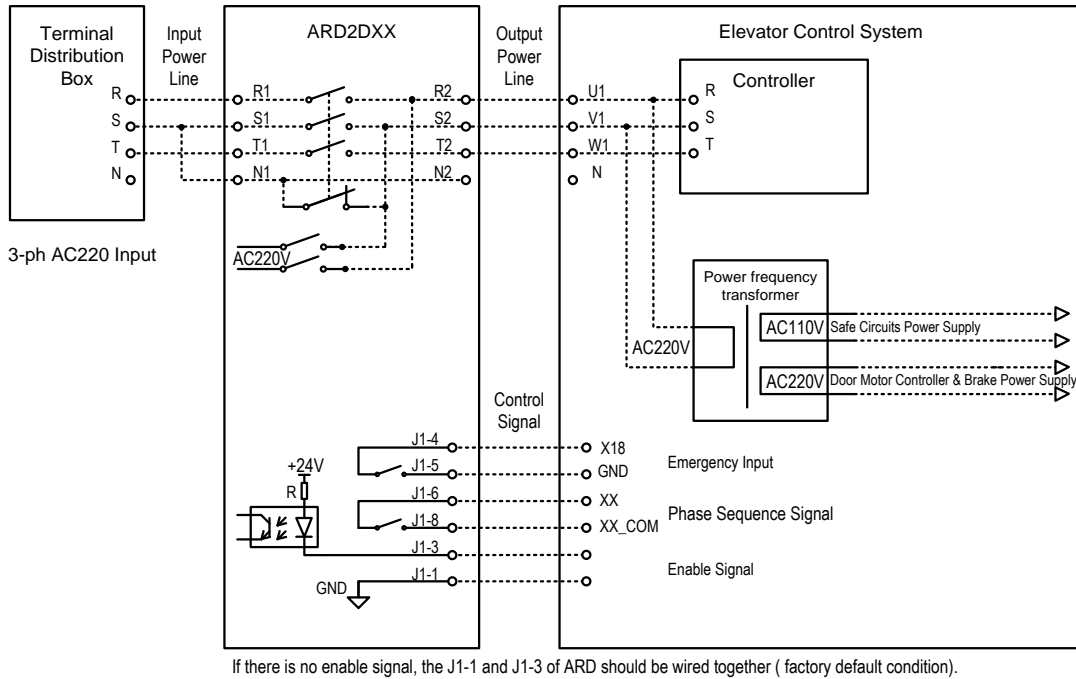


Figure 2.3 ARD2DXX application wirings diagram (for 3-phase AC220 input)

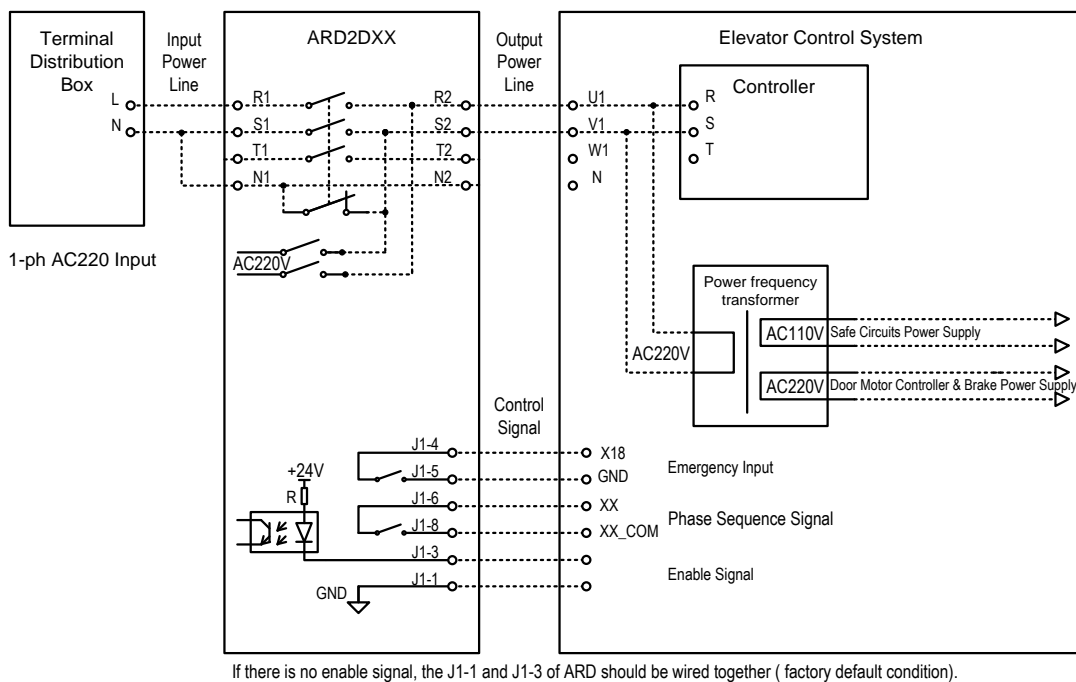
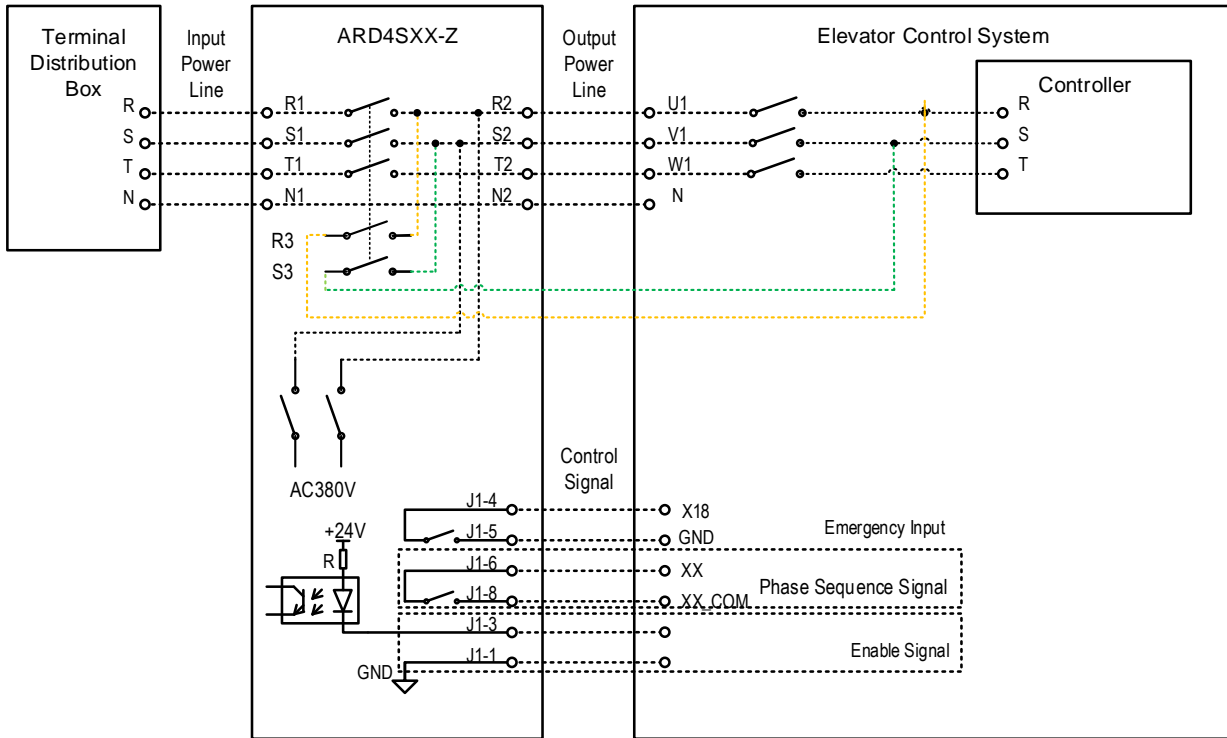


Figure 2.4 ARD2DXX application wirings diagram (for 1-phase AC220 input)

2.4 ARD4SXX-Z Application Wirings

This method is for the control system configuration that the inverter has a contactor before its power input (emergency stop contactor or main power contactor).



If there is no enable signal, the J1-1 and J1-3 of ARD should be wired together.

Figure 2.5 ARD4SXX-Z application wirings diagram

3 Usage Description and Battery Maintenance

3.1 Working principle

When the power supply of the external network is normal, the main contactor in the emergency device is sucked in and power supply is provided to the elevator system through the external network. Meanwhile, the device will automatically charge the battery.

When the 3-phase power supply of the external network is cut off, the main contactor in the emergency device is disconnected, and the elevator system is disconnected from the external network. Emergency device will produce single AC220V or AC380V power for elevator system using, meanwhile, emergency running signal will be produced at the output port making the elevator run in self-rescue mode and complete the levelling process at self-rescue speed.

When the emergency power supply is put into use, it can run for up to 5 minutes at a time, and the power will be cut off automatically after 5 minutes.

3.2 Operation Panel

The operation panel consists of four LED indicator lamps and a 4-bit digital block and two operation switches. The appearance is shown in Figure 3.1.



Figure 3.1 Appearance diagram of operation panel

3.2.1 The definition of LED Indicator Lamps

The definitions and functions of the four LED indicator lamps on the operation panel are as shown in Table

Table 3.1 The definition and functions of the LED indicator lamps

Name	Function
D1	ARD fault indicator lamp. When fault of ARD occurs, this indicator lamp will be lit up, and extinguished when the fault is restored.
D2	The outer net status indicator lamp. When the power supply voltage of outer net is connected, the indicator is lit up, and when the power supply voltage of outer net is cut off, the indicator lamp is off.
D3	ARD charging indicator. When the ARD starts charging, the indicator is lit up, and when the ARD quits from charging state, the indicator is off.
D4	ARD running indicator. After power on, the ARD runs normally and the indicator lights flicker.

3.2.2 Operation button and switch

The definitions and functions of the button and switch on operation panel are as shown in Table 3.2.

Table 3.2 The definition and functions of the button and switch on operation panel

Name	Function
Circular vertical start button	In power off state, press this button to start the ARD until the digital display is normal, release the button and finish the start process.
Rocker Enable Switch	The rocker switch is inner enable switch. If the normal output state of ARD is required, the rocker switch should be allocated to the "ON". If the external enable switch is effective at the same time and there is no voltage on the net side, the system will delay for about 13 seconds and start working and output the corresponding voltage level.

3.2.3 Display Panel

Display Panel consists of 4-bit digital blocks, the first bit indicates work status, and the latter three bits indicate corresponding value.

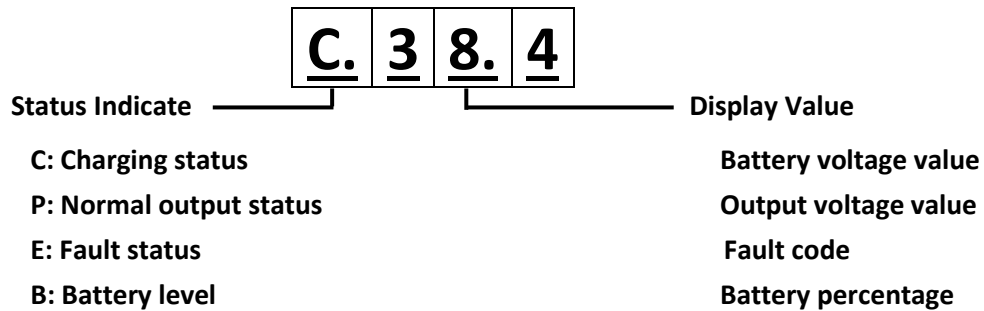


Figure 3.2 Schematic diagram of display panel

Example:

As the digital blocks show **C.38.4**, the first bit shows "C.", which means current status is charging; the latter 3-bit blocks mean the battery voltage value, and the current battery voltage is 38.4V.

As the digital blocks show **P.220**, the first bit shows "P.", which means normal output status; the latter 3-bit blocks mean output voltage value, and the current output voltage is 220V.

As the digital blocks show **E.01**, the first bit shows "E.", which means current status is fault; the latter 3-bit blocks mean Fault 01. The fault can be resolved according to the ARD Fault list.

As the digital blocks show **B.80**, the first bit shows "B.", which means current battery remaining capacity; the latter 3-bit blocks mean the percentage of battery remaining capacity, and the current remaining battery capacity is 80%.

Table 3.3 ARD fault list

Fault Code	Descriptions	Reasons and Solutions
E.01	Undervoltage battery	Battery charging time is not enough; battery life has reached the limit; charging circuit is abnormal.
E.02	Overvoltage battery	Abnormal battery charging circuit or abnormal battery voltage.
E.03	Overheat	Overheat status has been detected or cooling fan works abnormally.
E.04	IF error	Output current is detected up to limit; the rescue speed should be reduced.
E.05	Output overcurrent	Instantaneous value of output current is detected too large; the rescue speed should be reduced.
E.06	Abnormal charging power supply	Charging circuits work error, please contact the factory.

Table 3.3 ARD fault list (Cont'd)

Fault Code	Descriptions	Reasons and Solutions
E.07	Abnormal zero point of AC voltage or AC current	While working, the zero-point bias of AC voltage or AC current is too large.
E.08	Output overload	The output has been detected arrived at the limit and last for a long time, system should be power down, and rescue speed should be reduced.
E.09	Net-side contactor error: the feedback does not match to the net-side contactor act command	Check the net-side contactor and its output and feedback circuit.
E.10	Inner flash storage error	Internal resident parameters store abnormally, please contact the manufacturer.
E.11	Abnormal voltage sensor	Internal hardware error, please contact the manufacturer.
E.12	Error produced immediately as ARD was put into operation, and the number of retry times is up to 5.	Necessary to determine and dispose according to the error code before E.12
E.13	Undefined error	Inner error, please contact the manufacturer.

3.3 Battery Replacement Guidance

Take ARD2S15A1 as an example, introduce battery replacement and installation, and ARD2S15A1 contains 3 batteries.

Step 1: Loose 4 screws and remove the faceplate.

Step 2: Remove the wirings of batteries. Then remove the batteries in the order of A-B-C.

Step 3: When changing batteries or installing batteries, be sure to pay attention to connecting line numbers.

Connect the red outgoing line of the main control board (labelled DC+) with the red terminal of battery (labelled 1); connect the black outgoing line (labelled DC-) with the black terminal of battery (labelled 2).

Failure to connect in accordance with specified line sequence will cause damage to devices on the control board, and ARD will not work properly.

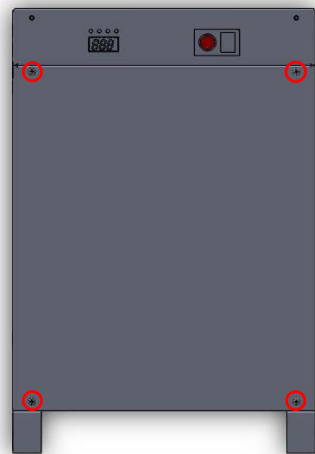


Figure 3.3 Remove Face Plate

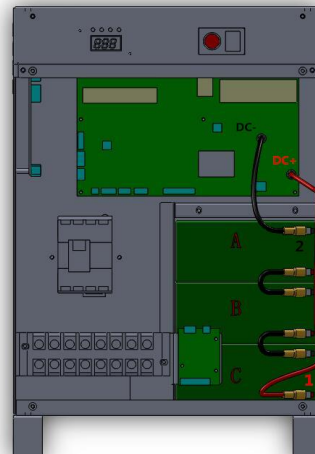


Figure 3.4 Battery Connection