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

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

ARD product

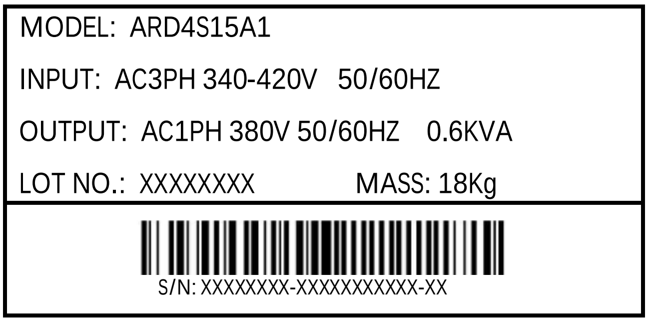
Rescue output voltage level
4: 380V
2: 220V
Voltage type
T: 3-phase AC output (3-ph 380V network input)
S: 1-Phase AC output (3-ph 380V network input)
D: 1-Phase AC output (3-ph 220V network input)
E: 1-Phase AC output (1-ph 220V network input)

G: isolation type
Null: Electrical type
Z: Special electrical wiring type
Product type
A1/B1: with battery
N1: No battery type (Self-prepare)

Maximum adaptive machine power
05kw -37kW

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.



MODEL: ARD4S15A1

INPUT: AC3PH 340-420V 50/60HZ

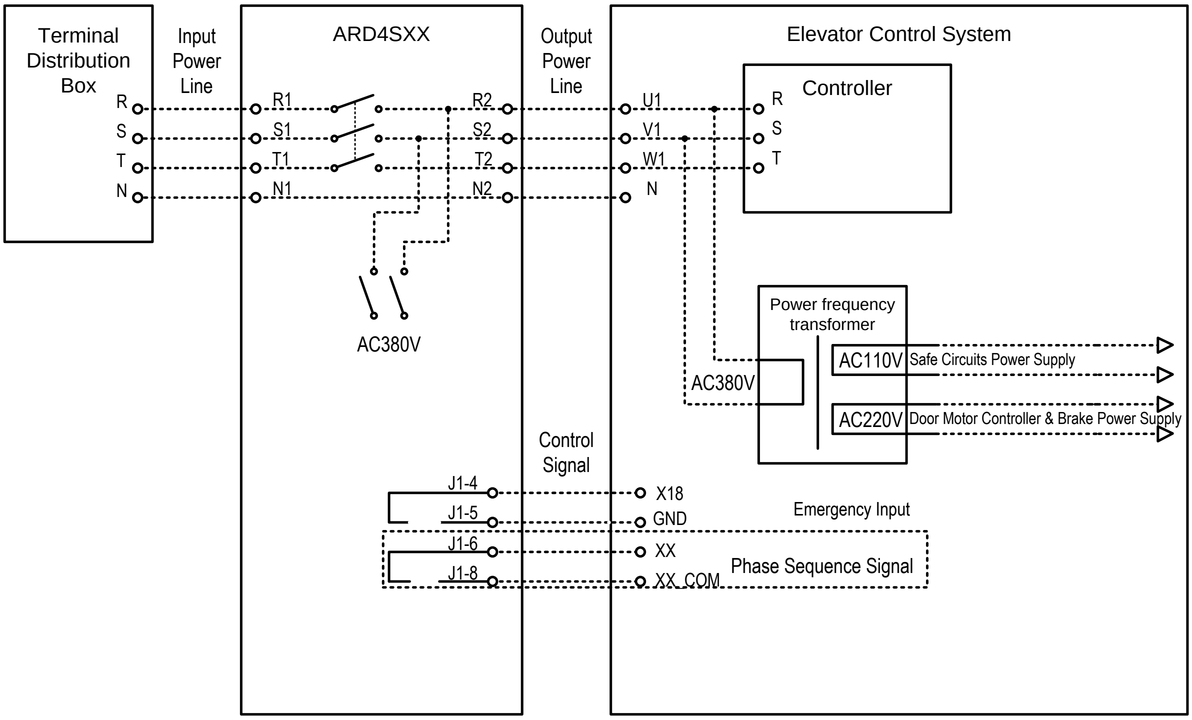
OUTPUT: AC1PH 380V 50/60HZ 0.6KVA

LOT NO.: XXXXXXXX MASS: 18Kg

S/N: XXXXXXXX-XXXXXXXXXXX-XX

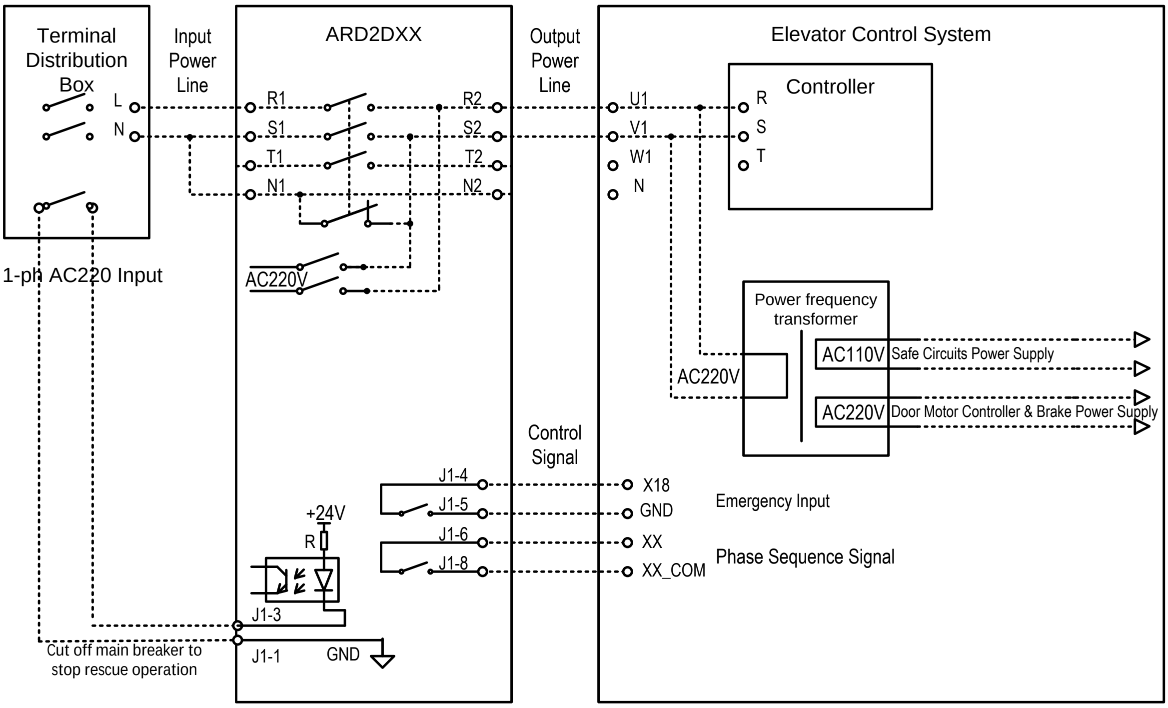
		Normal Type
		No Batteries Type (Self-prepare)
		1/12 Elevator rated running speed
		5min
		Sine Wave
		>90%
		Free cooling / Forced air-cooling
		IP20
		Ambient humidity below 90%RH (No dewing) -15~40 , well ventilated
		>1G below 20Hz

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.)

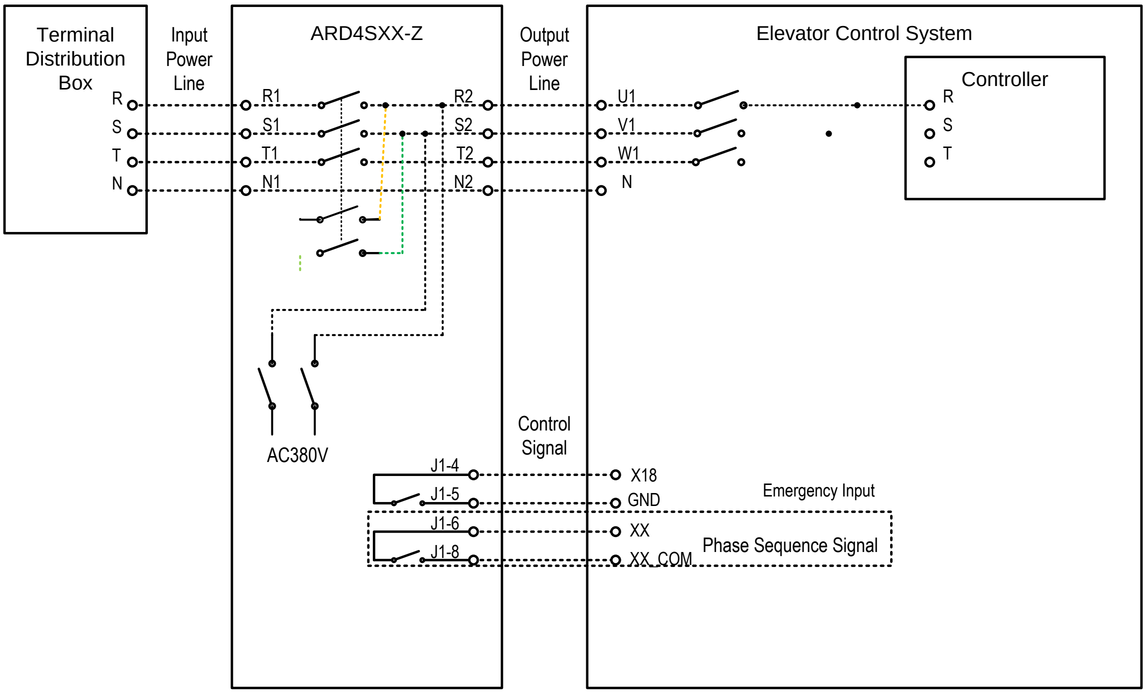


ARD2SXX Application Wirings (fit for the control system whose control power supply, brake power supply and safe circuit power supply are L and N.)

L

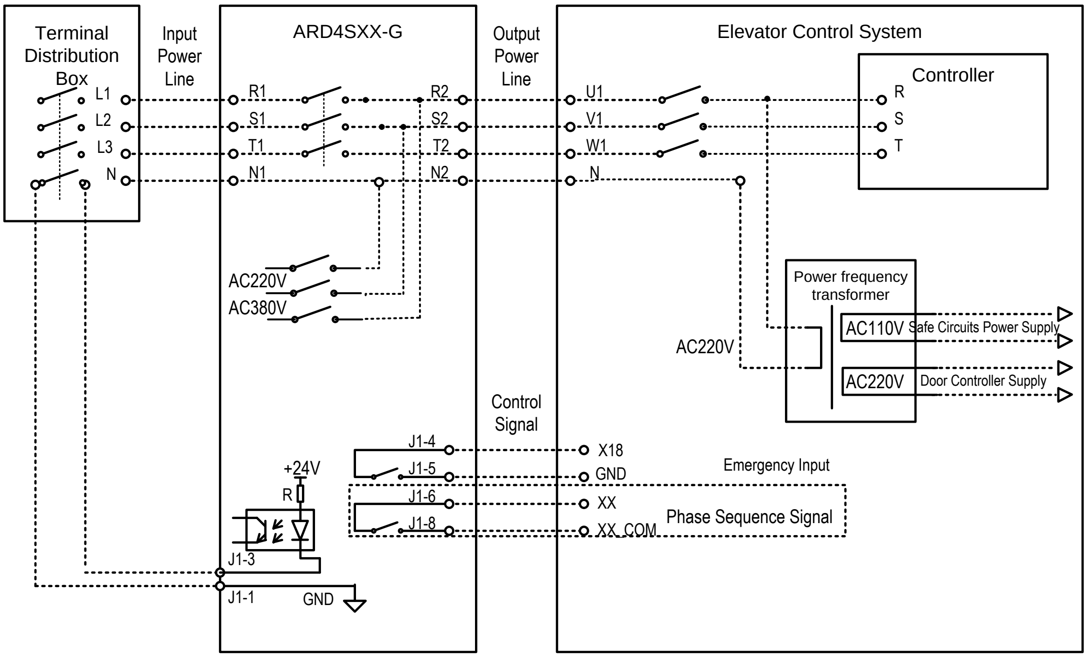

Terminal Distribution Box
L
N
1-ph AC220 Input
Input Power Line
ARD2DXX
R1
S1
T1
N1
R2
S2
T2
N2
AC220V
Output Power Line
Elevator Control System
U1
V1
W1
N
R
S
T
Controller
Power frequency transformer
AC220V
AC110V
Safe Circuits Power Supply
AC220V
Door Motor Controller & Brake Power Supply
Control Signal
J1-4
J1-5
J1-6
J1-8
X18
GND
XX
XX_COM
Emergency Input
Phase Sequence Signal
+24V
R
J1-3
J1-1
GND
Cut off main breaker to stop rescue operation

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).



The control power supply, brake power supply, and safety circuit power supply are generated by 380V power supply through a transformer in the control system. The wiring method of ARD4SXX-G is same as that of ARD4SXX in 2.1.

The wiring of ARD4SXX-G replacing ARD2SXX and being used for control power supply, bandgap power supply, and safety circuit power supply L and N in control system is as follows:

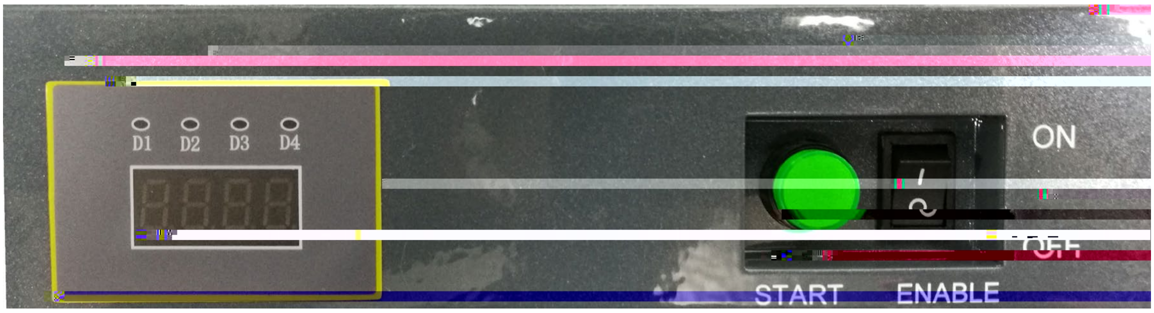


When the power supply of the external network is normal, the main contactor in the emergency device is sucked in and power supply is provided to the elevator system through the external network. Meanwhile, the device will automatically charge the battery.

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.

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.



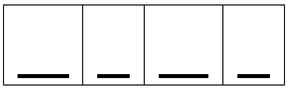
The definitions and functions of the four LED indicator lamps on the operation panel are as shown in

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.

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

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.

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



As the digital blocks show , 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 , 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 , 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 , 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%.

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	

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.

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.