涌现集团
YONGXIAN GROUP



MCTC-ARD-C Series

Elevator Auto Rescue Device User Manual

MON-CM-B04-2025-0011

Preface

Thank you for purchasing the MCTC-ARD-C series elevator auto rescue device (ARD).

The MCTC-ARD-C is developed and produced independently by Inovance Technology, and well matches Inovance NICE series elevator controllers, as well as non-Inovance integrated controllers. It is also applicable to the control system running in the light load direction.

Before using this product, read this manual carefully to fully understand features of the product and ensure safe use. This manual describes the specifications, mounting dimensions, terminals, installation and commissioning, and troubleshooting of the product.

☞ Product Features

- Good matching with NICE series elevator controllers
- Redundancy protection, reliable performance
- Intelligent management of battery, prolonging service life
- Accurate self-diagnostics, quicker fault location
- Modular design, easier maintenance

☞ Manual Obtaining

The user guide can be obtained from:

- Contact your provider.
- Log in to www.inovance.com and download the user manual.

1. Safety Precautions

WARNING	The device is exposed to high voltage which can cause severe electric shock or even death. Exert extreme caution when using or getting close to the energized device.
WARNING	The device provides the emergency running function in the case of sudden power failure or phase loss. System installation, commissioning and maintenance personnel must have prior trainings on safety and product use.
CAUTION	It is inhibited to ensure personal safety by using the startup, stop or input signals of the device during elevator maintenance as these signals cannot isolate dangerous voltage. Before electric wiring, use a reliable insulating component to disconnect power supply of the elevator.

2. Product Information

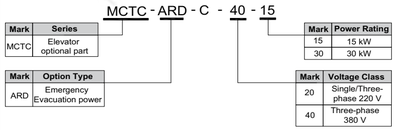
◆ Product Introduction

The ARD monitors the mains power state in normal state. When power failure or phase loss occurs in the elevator, the ARD automatically enters the emergency running state and outputs power to the elevator controller.

Then, the controller runs the elevator in the light load direction to the nearest floor at emergency evacuation speed, and opens the door to let passengers out. This improves safety of the elevator running.

◆ Designation Rules

Figure 1 Designation rules of ARD



◆ Technical Specifications

Table 1 Technical specifications of MCTC-ARD-C-4015

Item		Specifications
Basic parameters	Input voltage	Three phase 380 to 440 VAC, 50/60 Hz
	Output voltage	Single-phase 380 VAC, 50±5 Hz
	Battery pack	12 V x 3 x 7 Ah
	Elevator controller power	MCTC-ARD-C-4003, ⩽ 3.7 KW MCTC-ARD-C-4007, ⩽ 7.5 KW MCTC-ARD-C-4015, ⩽ 15 KW MCTC-ARD-C-4018, ⩽ 18.5 KW MCTC-ARD-C-4030, ⩽ 30 KW
Protection functions	Output short circuit, overcurrent, and battery protection functions	
Environment	Installation location	No conductive materials, corrosive gas, flammable gas, metal powder, oil mist or dust
	Altitude	< 1000 m (derated or consult Inovance if above 1000 m)
	Ambient temperature	-10°C to +40°C
	Humidity	< 95% RH, no condensation
	Vibration	< 5.9 m/s² (0.6 g)
	Storage temperature	-20°C to +60°C
	IP rating	IP20
	Ventilation method	Naturally ventilated

◆ Major Components

Table 2 Descriptions of major components

No.	Component	Specifications	
1	MCB	ARD3T153U2	
2	Drive board	ARD3T153M2	
3	Battery	MCTC-ARD-C-4003 with 12 V x 4.5 Ah x 3 MCTC-ARD-C-4007 with 12 V x 5.5 Ah x 3 MCTC-ARD-C-4015 with 12 V x 7 Ah x 3 MCTC-ARD-C-4018 with 12 V x 7 Ah x 3 MCTC-ARD-C-4030 with 12 V x 9 Ah x 3	
4	Contactor	3.7 kW–15 kW	Coil voltage 220 VAC-main contact 380 VAC/38 A-auxiliary contact 1NC+1NO
		18.5 kW 30 kW	Coil voltage 220VAC-main contact 380 VAC/50 A
			Auxiliary contact 1NC+1NO
5	Air switch	400 VAC/63 A	

3. Installation

◆ Installation Environment

The ARD is installed inside the elevator equipment room or shaft. A sufficient room for maintenance must be reserved when it is close to the elevator control cabinet.
The environment must satisfy the requirements in Table 1.

◆ Mounting Method

The ARD can be mounted in the wall or on the floor.

Figure 2 Mounting dimensions

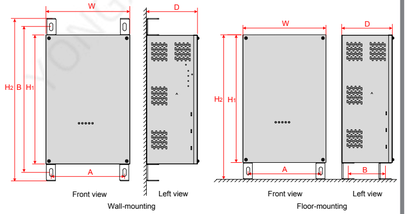
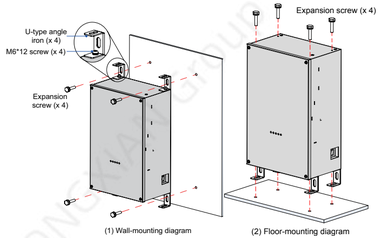


Table 3 ARD mounting dimensions

ARD Model	W (mm)	A (mm)	H1 (mm)	H2 (mm)	B (mm)	D (mm)	Gross Weight (kg)
Wall-mounting							
MCTC-ARD-C-4003	248.0	217.0	383.4	480.0	430.0	151.2	15
MCTC-ARD-C-2003							
MCTC-ARD-C-4007							
MCTC-ARD-C-2007							
MCTC-ARD-C-4015							
MCTC-ARD-C-2015							
MCTC-ARD-C-4018	303.0	272.0	383.4	480.0	430.0	151.2	17
MCTC-ARD-C-2018							
MCTC-ARD-C-4030							
MCTC-ARD-C-2030							
Floor-mounting							
MCTC-ARD-C-4003	248.0	217.0	383.4	431.7	99.0	151.2	15
MCTC-ARD-C-2003							
MCTC-ARD-C-4007							
MCTC-ARD-C-2007							
MCTC-ARD-C-4015							
MCTC-ARD-C-2015							
MCTC-ARD-C-4018	303.0	272.0	383.4	431.7	99.0	151.2	17
MCTC-ARD-C-2018							
MCTC-ARD-C-4030							
MCTC-ARD-C-2030							

Install the ARD according to the required dimensions in one of the following methods.

Figure 3 Mounting diagram of ARD

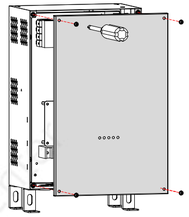


◆ Removing Front Cover

You need to remove the front cover before wiring the power cables and control circuit.

Loosen and remove the four screws on the front cover and remove the cover.

Figure 4 Diagram of removing front cover



4. Wiring

Terminal Arrangement and Descriptions

Figure 5 Terminal arrangement diagram

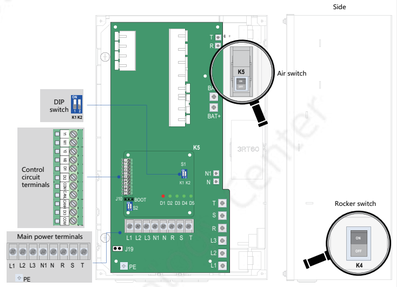


Table 4 Terminal descriptions of interface board

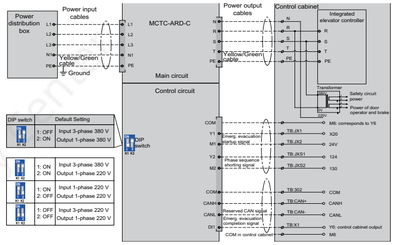
Type	Mark	Terminal Name	Function Description
Power terminals	PE	Three-phase AC power input terminals	The mains power is connected to terminals L1, L2, L3 and N1 of the ARD. Terminals R, S, T, and N of the ARD are connected to the elevator control cabinet. Note: Do not connect the power input cables to the output terminals R, S, T of the ARD. Otherwise, the ARD will be damaged. Note: The door operator is powered by 220 V mains supply and connected to R and N. K1 and K2 of the main board S1 are at ON position.
	N1		
	L1		
	L2		
	L3		
	R	Output terminals	
	S		
	T		
	N		
	Y1	Emergency running startup signal	ON when the ARD is in emergency running state; OFF when the ARD exits the emergency running state.
	M1		
	Y2	Phase sequence shorting signal	
	M2		
	DI1	Evacuation completion signal	Valid with low level (0 to 0.8 V) or when the passive switch is closed. After receiving this signal, the ARD considers that emergency running is completed. It stops output, exits the emergency running state and waits for system power-on. If the ARD does not receive this signal, it automatically stops output after running for 3 minutes.
	DI2	Forced evacuation signal	If J19 on the drive board is closed, when a low level signal (0-0.8 V) is input at DI2 or the passive switch is closed, ARD performs forced output. This is often used for electric brake release.
	COM	Signal GND	Common terminal of signals
	CANH	CAN communication	They are connected to CAN communication of the CN3 terminal on the main control board.
	CANL		
	DI3	Evacuation terminating signal	It connects to the auxiliary contact of the main air switch to turn off the main air switch and terminate the evacuation. Valid with low level (0 to 0.8 V) or when the passive switch is open.
	COM	Signal GND	Common terminal of signals
Switch	S1	K1: ON, K2: ON — Input three-phase 380 V Output single-phase 220 V K1: ON, K2: OFF — Input single-phase 220 V Output single-phase 220 V K1: OFF, K2: ON — Input three-phase 380 V Output single-phase 380 V K1: OFF, K2: OFF — Input three-phase 220 V Output single-phase 220 V	
	S2	CAN matched resistance jumper	It is in OFF position at delivery.
	K4	Rocker switch	It is used to cut off output of the battery and enable battery charging.
	K5	Air switch	Cut off charging to the ARD and power supply from the ARD batteries to the elevator system.
Jumper	J10	Program burning jumper	The jumper is in OFF position (pins 2 and 3 shorted) at delivery. Do not change it.

WARNING	The DIP switches K1 and K2 have been configured to match the three-phase 380 V model. Do not change them yourself. If a three-phase/single-phase 220 V model is required, contact

5. Commissioning

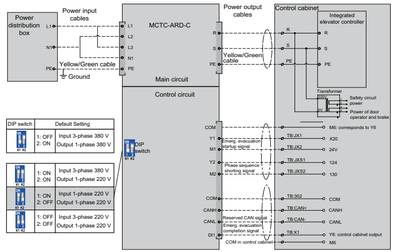
◆ Electric Wiring

Figure 6 Electric wiring diagram for three-phase 220 V/380 V



Note: For 380 V input and 220 V output (with the neutral line), boh K1 and K2 must be in ON position.

Figure 7 Electric wiring diagram for single-phase 220 V



Note: A control cable of 1.5 m length is provided at delivery.

Note: The power cables and other cables of the ARD are prepared by users.

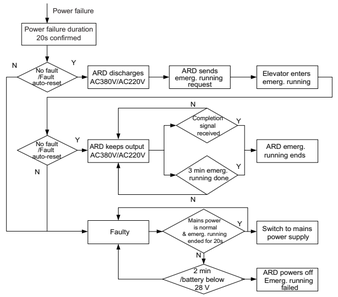
◆ Function Description

1. Normal evacuation

The following part takes MCTC-ARD-C-4015 as an example to describe how the ARD functions.

- When the mains power is normal, the ARD charges the battery.
- When the mains power is abnormal, the ARD operates in the emergency running state according to the following flowchart.

Figure 8 Emergency operation flowchart



●When the mains power to the elevator control cabinet, and the elevator restores to normal running state.

2. Forced evacuation

Forced evacuation is for the situation where there is power failure of the mains power and the ARD has terminated normal evacuation but you want to start ARD output again. When J19 on the drive board and DI2 are closed, ARD output is started. The jumper connected to J19 must be disconnected after evacuation.

3. The following features are available when the ARD and the controller are in CAN communication:

●After evacuation, the controller receives evacuation completion signal through CAN communication and terminates evacuation.

●When the controller reports errors that require power cutoff, neither normal or emergency power supply is allowed. When the controller reports errors, K1, K2, and K4 are disconnected, but not K3. The fault code gives indication.

●Fault reset; receiving reset mark; ARD function fault reset.

●Binding the manufacturer's code.

●Binding the contract number.

●The ARD version number is availabe on the main control board in the control cabinet.

4. 220 VAC power supply

When the mains power is normal, power supply is not controlled by software.

When the mains power is faulty:

If the DIP switch is set to 220 V, the ARD outputs 220 VAC (with the neutral line).

If the DIP switch is set to 380 V, the ARD doest not output 220 VAC (with the neutral line).

5. Disabling emergency evacuation by manually cut off the mains power

●Connect the NC contact of the main air switch to DI3.

●Open the main air switch to disable emergency evacuation.

6. Repair and Maintenance

Commissioning Description

1. Power-on

- Ensure that the air switch K5 and rocker switch K4 are on OFF position and carry out wiring according to Figure 5
- Turn on K5, attach the front cover, fasten the screws, and then turn on K4

2. Commissioning preparation

- Switch on the main power,and check that the elevator running and functions are normal
- Check the battery capacity, and ensure that 3 to 4 power indicators are on

3.First-time commissioning

- Do not carry out Commissioning at the bottom or top floor. Run the elevator to a middle floor, and then in the up or down direction.
- Cut off the main power when the elevator is in non-door zone area.

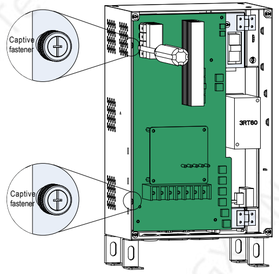
4.Emergency running

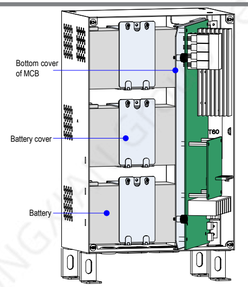
- When the elevator cannot run, turn K4 switch of the ARD to OFF position, and switch off the power supply of the elevator.
- Open the front over, and turn off switch K5 of the ARD, and check whether wiring is correct.

◆ Battery Replacement

Precautions	
⚠ CAUTION	Turn off the ARD and disconnect it from the mains power. Take off your metal objects such as ring and watch. Use a screwdriver with insulated handle, and do not lay tools or other metals on the battery. NEVER short or reverse the positive and negative poles of the battery. The battery needs to be replaced once every 2 years and charged and discharged once every 3 to 6 months.

Loosen the two captive fasteners on the bottom cover of the MCB; pull the fasteners to lift the cover along with the hinge to a proper position, and fix the cover by using the latch in the hinge.



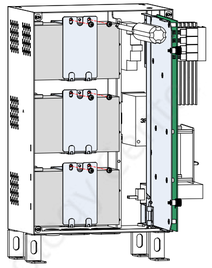


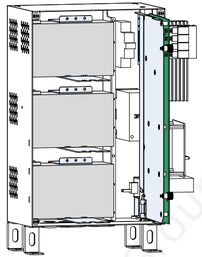
Take out the battery to be replaced as follows:

Remove the two screws on upper part of the battery cover.

Push downward the battery cover, and disconnect the cables on the battery.

Take out the battery from the battery box.





Install the new battery as follows:

Put a new battery into the battery box.

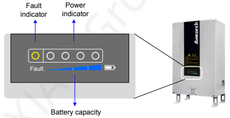
Attach the batter cover, and fasten the screws.

Remove the latch, place the bottom cover the MCB well, and fasten the captive screws.
Attach the front cover, and fasten the four screws.

7. Troubleshooting

◆ Status Indicators

Figure 8 Diagram of status indicators



Descriptions of power indicators

Power Indicator	Status Description
	Each indicator displays 25% of the battery capacity. The LED on the left blinks during charging. The LEDs becomes off from right to left during discharging.

◆ Faults and warnings with display

Table 5 Troubleshooting of common faults and warnings with display

Fault Display	Description	Troubleshooting
	Short circuit (overcurrent) on output side	It is a non-resettable hardware overcurrent fault. Eliminate the causes, and power on the ARD again.
	Over-temperature	When the NTC of the heatsink detects that the temperature reaches 90°C, the ARD automatically stops output, and restores to normal after the heatsink temperature falls below 82°C.
	Battery undervoltage	Judgment during discharging: When the battery voltage reduces to below 28 VDC, and the ARD implements undervotage protection and stops output. When the AC power input restores to normal, the ARD restores to normal power supply state and charges the battery.
	Battery overdischarge or switch not closed	Judgment at startup: When the fault indicator is ON, check whether the air switch K5 and rocker switch K4 are in closed state. If the fault persists when both the switches are closed, it indicates the battery is overdischarged (voltage lower than 27 V). To solve this, the forced charging circuit charges the battery for 4 hours and power-on and -off are performed again. If the fault is eliminated, the battery is still serviceable; if the fault persists after the procedure is repeated several times, you need to replace the battery.
	Battery voltage being low	The ARD cannot provide emergency running at power failure when there is a warning indicating the voltage is low. In case of mains power failure, the detected battery voltage is below 38 V. When the AC power input restores to normal, the ARD restores to normal power supply state and charges the battery, and this warning is reset. If there is still no input from the mains power within 3 minutes or the voltage is below 28 V, K3(relay) is opened and the ARD automatically stops the battery voltage indication.
	Output overload protection	Judgement druing discharging: In case of 1-minute 1 kW overload or 10-second 1.5 kW overload, when the AC power input restores to normal, the ARD restores to normal power supply state and charges the battery, and this warning is reset. Auto-resetting is allowed. If there is still no input from the mains power within 2 minutes, or ARD voltage is below 28 V, the ARD automatically stops the battery voltage indication by opening K3.

Fault Display	Description	Troubleshooting
	Busbar overvoltage	Fault is reported when the voltage of the busbar exceeds 780 V for 10 ms.
	Power cutoff fault reported by the controller	Normal and emergency power supply are prohibited. Apart from K3, K1, K2 and K4 are opened and the fault code gives indication.

◆ Common Symptoms

Table 6 Common symptoms and troubleshooting

No.	Fault Symptoms	Causes	Troubleshooting
1	There is no power input or phase loss exists.	1. The drive board or MCB is damaged. 2. The contactor is damaged due to incorrect wiring of output cables.	1. Power on the ARD again, replace the board or contactor. 2. Check that the wiring is correct.
2	The ARD has a relative low voltage and cannot support emergency running of the elevator.	1. The battery voltage is low. 2. The thyristor is overheated.	1. Check the battery voltage 2. Try again after the heatsink cools down and the battery voltage restores to normal.
3	The ARD circuit board is damaged.	Output abnormality or overcurrent exists.	1. Check the wiring and check that the elevator controller power matches the ARD power. 2. Replace the circuit board.
4	The ARD exits the emergency running state suddenly a short time after it enters this state or during operation.	Output abnormality or overcurrent exists.	Check the wiring and check that the elevator controller power matches the ARD power.
5	The ARD cannot enter the emergency running state.	1. The switch K5 or K4 is in OFF state or damaged. 2. The battery voltage is low.	1. Turn K5 or K4 to ON position, or replace the damaged one. 2. Charge the battery or replace it with a new one.