Specification and Manual

Customer :

Description : Air Conditioner for Equipment

Customer Part No. : Rev.:

Delta Model No. : HEC2500BFE Rev : 04

Sample Date Code:

Sample Issue Date : SEP.15 2020

Please send one copy of this specification back after you signed approval for production pre-arrangement

Approved by :

Date :

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Description

This document is an installation and the characteristics of Delta HECX1BF series. Before installing the unit, please read this manual thoroughly, and following the instructions contained in it. The document is the exclusive property of Delta Electronics, Inc. it should not be distributed, reproduced, or any other format without prior permission of Delta. Specifications are subject to change without notice.

Packing & Shipping

During handling or transport, air conditioner must be upward placed, **“NO”** inverted, flat, excessive tilt and collision. Air conditioner is a precision instrument, it should be handled or transported with care, do not stand on the box, or place heavy objects on it. Please pay attention to the following icons on the package.

If air conditioner is toppled, over slanted or dropped unfortunately, please follow below steps: a. stand for 12 hours to ensure refrigerant pressure stability, b. power on and execute self-test to make sure no alarm happened, c. air conditioner keeps 1 hour operating and make sure there is no abnormal acoustic noise.



Safety Notes

Please read the safety notes carefully before installing air conditioning unit and be sure to install it correctly. After completing the installation, make sure that the unit operates properly during the start-up operation.

Meaning of WARNING and CAUTION notices:

⚠ Warning:

Failure to follow these instructions properly may result in personal injure or loss life.

⚠ Caution:

Failure to observe these instructions properly may result in property damage or personal injury, which may be serious depending on the circumstance.

⚠ Warning:

1. Installation work and electrical wiring must be done by qualified person(s) in accordance with all applicable codes, standards and national wiring regulations.
2. Use this unit only in the manner intended by the manufacturer. If you have questions, please contact the manufacturer.
3. Install the air conditioner in accordance with the instructions in this installation manual. Improper installation may result in water leakage, electric shocks or fire.
4. Make sure that all wiring is secured, the specified wires are used, and there is no strain on the terminal connections or wires.
5. If refrigerant gas leaks during installation, ventilate the area immediately. Do not directly touch refrigerant that has leaked from refrigerant pipes or other areas, as there is a danger of frostbite.
6. Before serving or cleaning unit, switch power off and disconnect power supply.
7. When cutting or drilling into wall or ceiling, do not damage electrical wiring or hidden utilities.
8. Be sure to use only the specified accessories and parts for installation work.
9. Protective earth connection: The enclosure must be earthed at the protective earth terminal. Use 1.5 mm^2 (16 AWG) wire and use spring washer to avoid loosening.
10. The air conditioner shall be not accessible to the general public.
11. The installation must contain a device to disconnect all poles of the air conditioner from the power supply. The contact distance in all poles must be 3 mm minimum.
12. To reduce the risk of electrical shock. Means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.
13. This appliance is intended to be used by expert or trained users in shops, in light industry and on farms, or for commercial use by lay persons”**.**

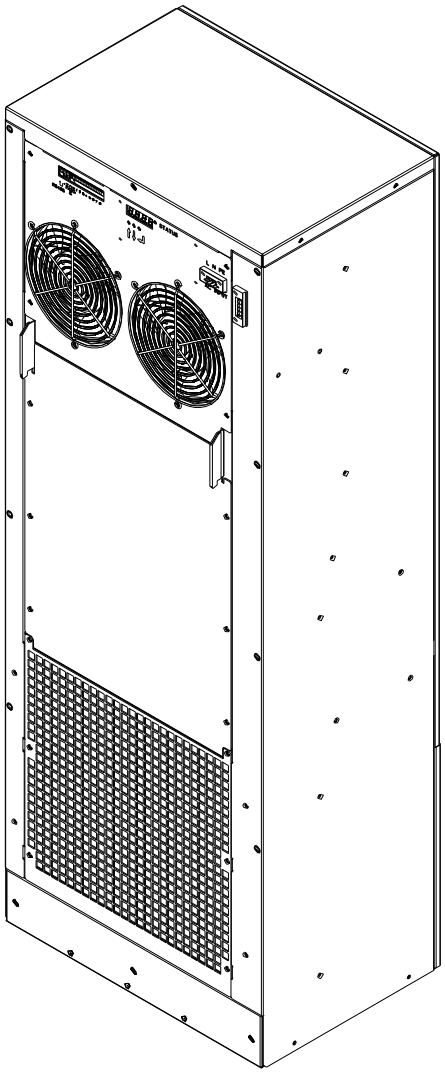
⚠ Caution :

1. Install the air conditioner on a wall/ door strong enough to withstand the weight of the unit.
2. Do not block air inlets or exits.
3. Do not install the air conditioner at any place where there is a danger or flammable gas leakage.
4. Arrange the drain to ensure complete drainage.

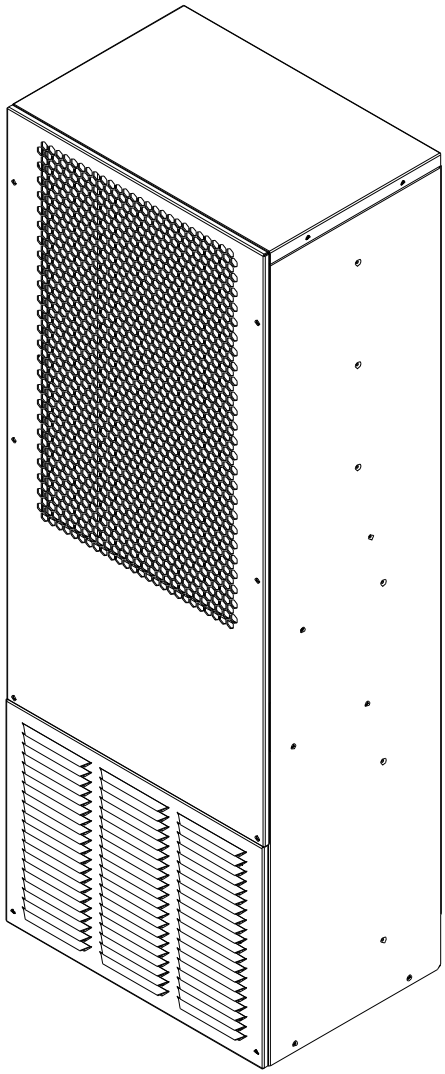
5. To avoid injury, do not touch the air inlet or aluminum fins of unit.
6. Watch your steps at the time of fin cleaning or air conditioner inspection.
7. Do not topple the air conditioner while moving or storage.
8. The hole in the bottom of the air conditioner should be connected to a sealed container through a drainpipe.
9. The appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.
10. Children being supervised not to play with the appliance.

Specification for Approval

Customer :	
Description : Air conditioner for Equipment with 2500 W Rated Cooling Capacity	
Customer P/N :	Rev. :
Delta model no : HEC2500BFE	Rev. : 04
Sample revision. :	Date Code :
Sample issue date :	Quantity :



INTERNAL



EXTERNAL

Part no. :

Delta model no. : HEC2500BFE

1. Product Instruction

1-1. General Description

HEC2500BFE is an AC air conditioner with 230 VAC power input, it is designed for IP55 sealed outdoor telecom cabinet to provide stable and optimum internal conditions for equipment and avoid hotspot inside the cabinet.

HEC X1 BF E XXX

(1) (2) (3) (4) (5)

No	Item	Digit	Specification
(1)	Product Message	HEC	Compressor Air Conditioner
(2)	Cooling Capacity	X1	X1=2500
(3)	Operation Voltage	BF	AC230 V for door
(4)	Product Version	E	N/A
(5)	Customer ID	XXX	A01

1-2. Main Feature & Model Number

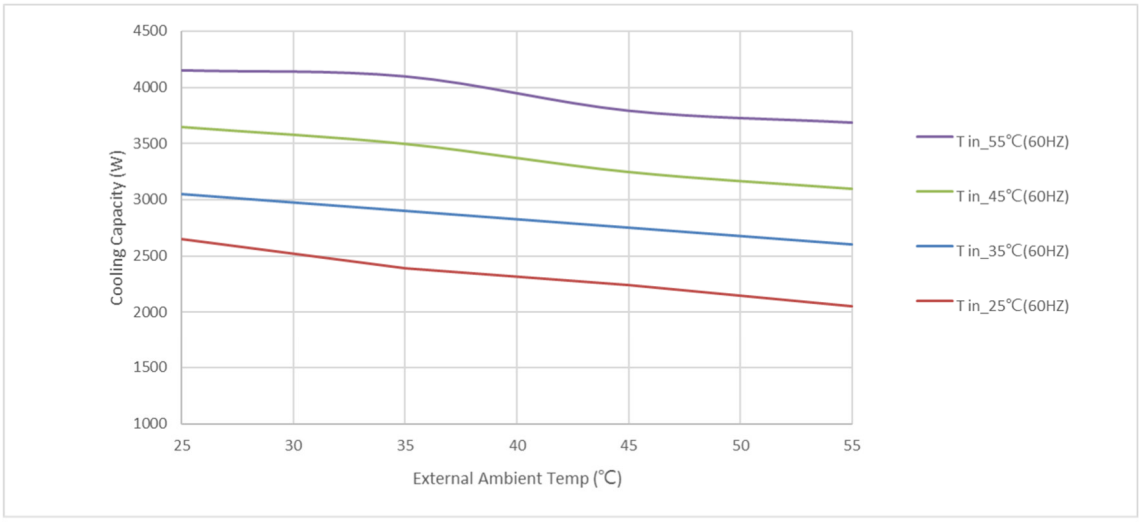
Dimensions, Weight & Mounting method		
Dimension (H x W x D) (without flange)	mm (inch)	1092 x 400 x 279 (43.0 x 15.8 x 10.9)
Application		Outdoor
Weight	Kg (lbs)	40 (88)
Mounting Method		Door/Side
Color (optional)		RAL7035
Environmental Protection & Performance		
Operating Temperature Range	°C (°F)	-10 ~ +55 (+14 ~ +131)
Operating Humidity		External : 0~100% RH Internal: 0~80% RH
Storage Temperature	°C (°F)	-40 ~ +70 (-40 ~ +158)
Storage Relative Humidity	RH	5~95%
Refrigerant		R134a
Protection for Dust ,Wind and Water (External)	IEC 60529 /GR487	IP55 / GR487
Noise (1.5m)	dB-A	65
Operating Status	N/A	LED Indicator / Display Board
Cooling Capacity & Operational Data		
Rated Cooling Capacity at L35/L35 (50/60Hz)	W (Btu/hr)	2500(8530)/2900(9895)
Rated Cooling Current at L35/L35 (50/60Hz)	A	3.8/4.4
Rated Cooling Power at L35/L35 (50/60Hz)	W	874/1012
Rated Internal Airflow (L35/L35)	m^3/h (CFM)	500 (290)
Rated External Airflow (L35/L35)	m^3/h (CFM)	530 (310)

Part no. :

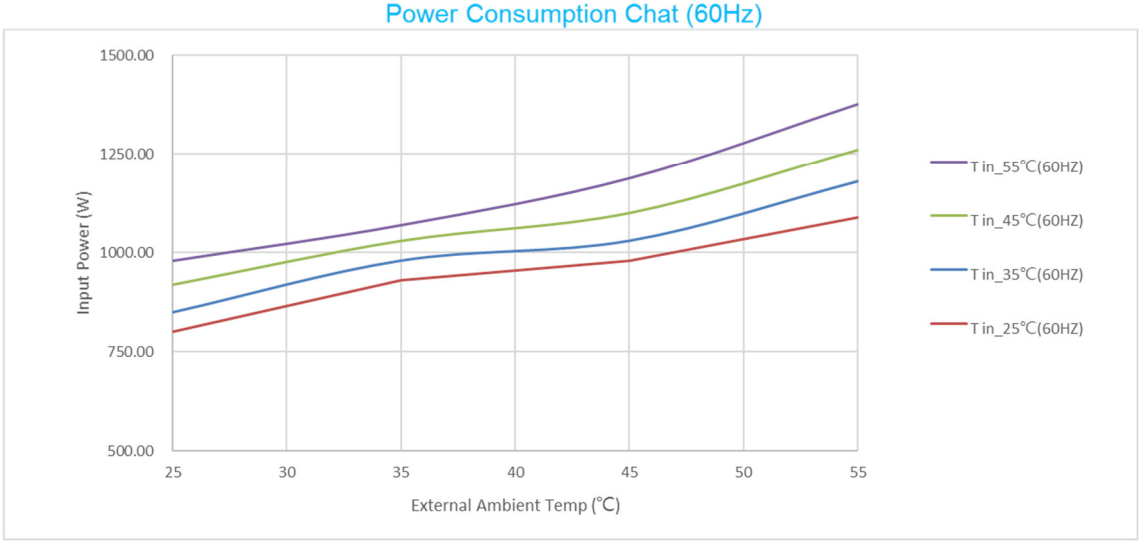
Delta model no. : HEC2500BFE

Power & Range		
Input Voltage	VAC / Phase / Frequency	230 / 1 / 50-60
Locked Rotor Current	A	23
Alarm	N/A	Dry Contact Output
Key Components		
Controller		Built-in Smart Controller
Fans		Delta High Efficiency Fan
Compressor		Rotary

Cooling Capacity Chat (60Hz)



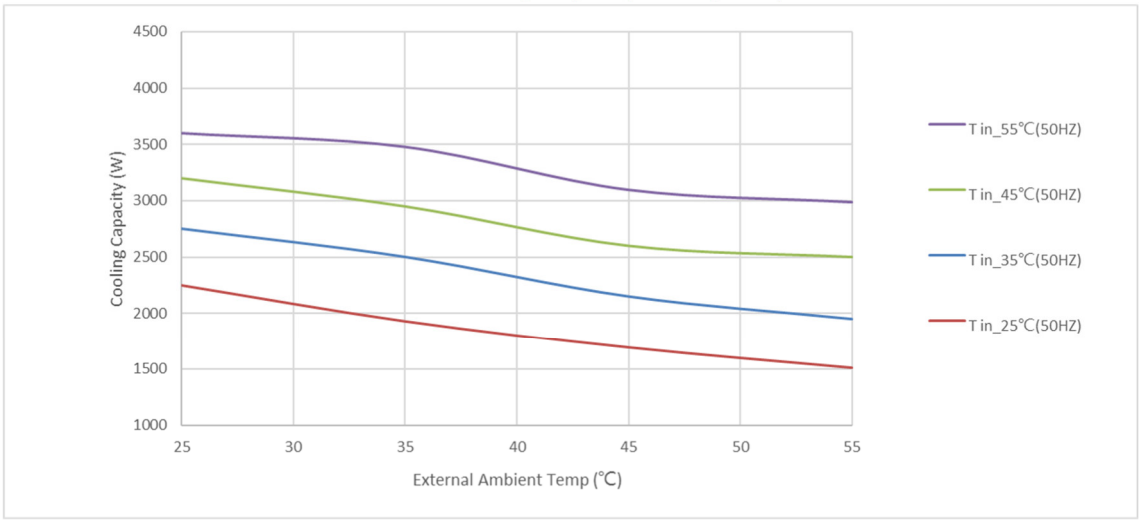
Power Consumption Chat (60Hz)



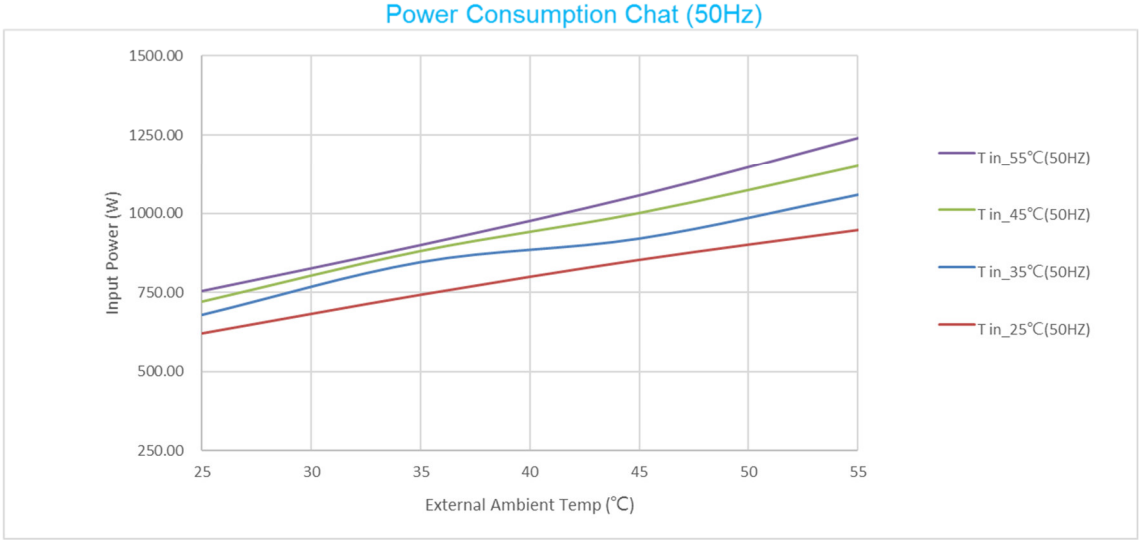
Part no. :

Delta model no. : HEC2500BFE

Cooling Capacity Chat (50Hz)



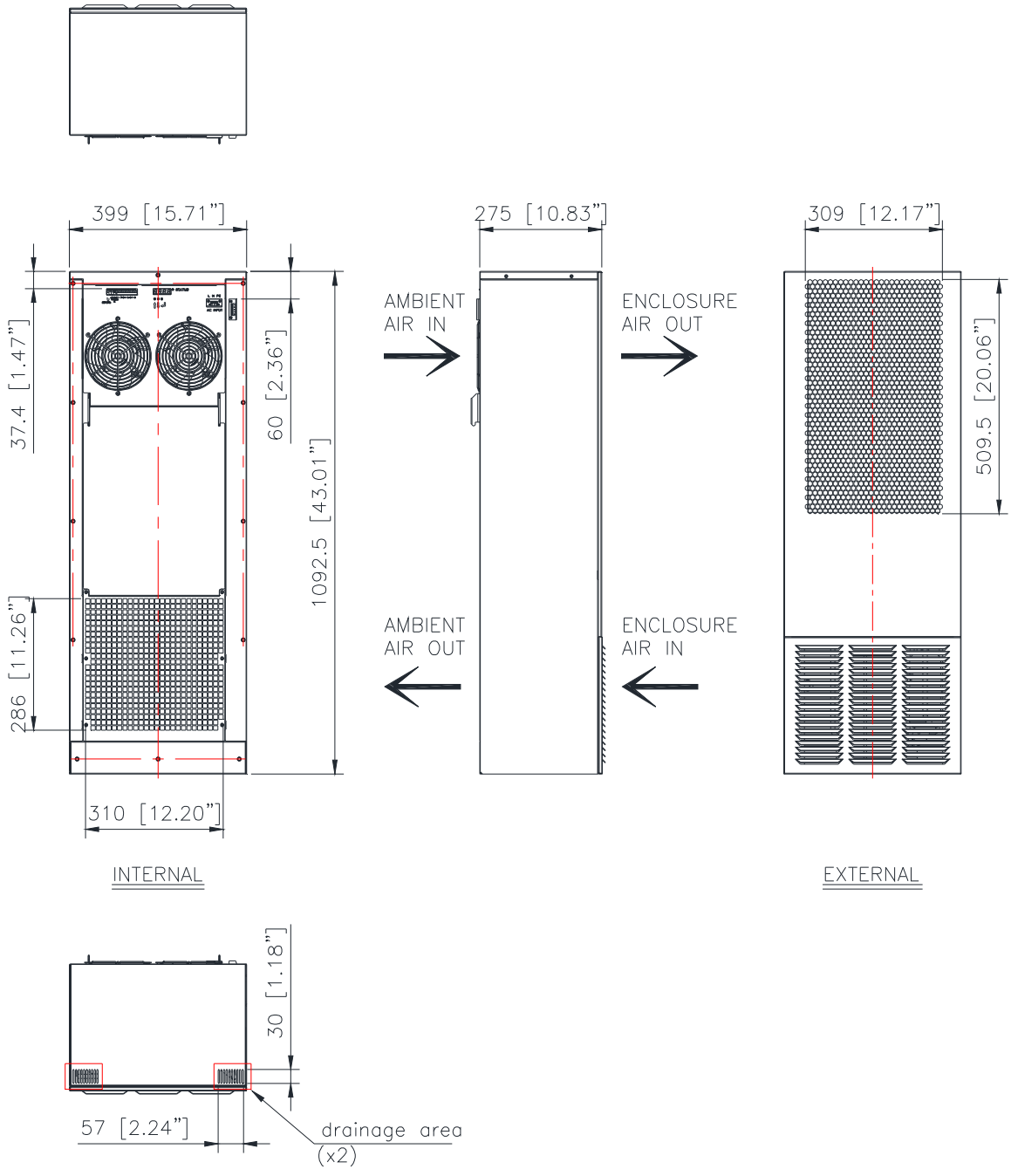
Power Consumption Chat (50Hz)



Part no. :

Delta model no. : HEC2500BFE

1-3. Dimension



mm(inch)

(1) Material: Case AL5052 Sheet.

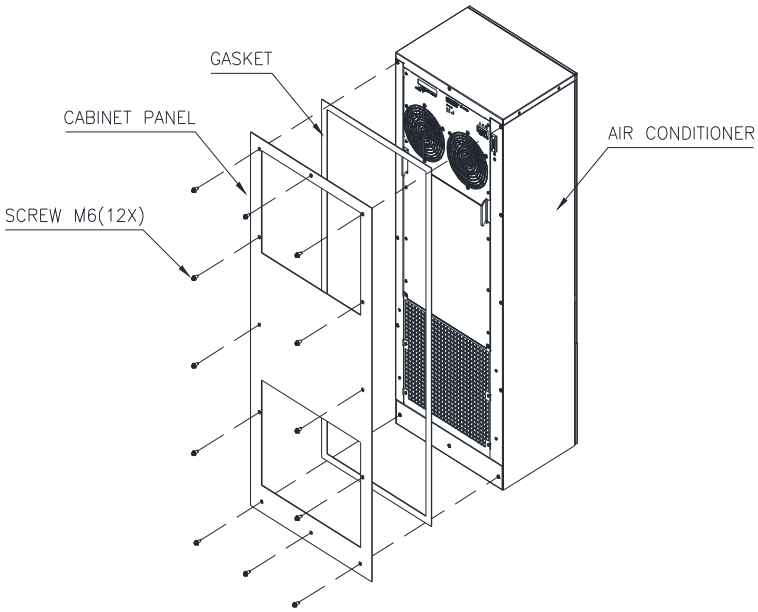
(2) Finish: Powder coating 75~120 μm, Color RAL 7035.

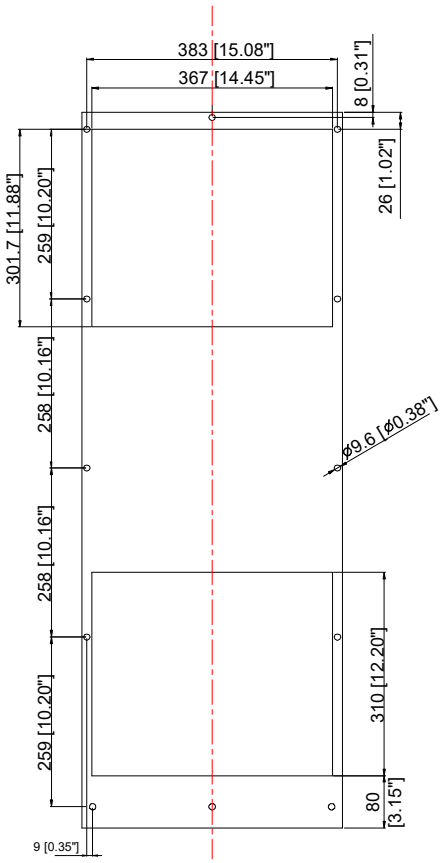
(3) Dimensional Tolerance: ±1 mm.

Part no. :

Delta model no. : HEC2500BFE

1-4. Mounting Panel Cutout





CUTOUT DIMENSIONS
EXTERNALLY MOUNTED

* Mounting screw : M6X15. [Externally mounted are 11pcs]

1-5. Configuration & Maintenance

Make sure the air conditioner surface sealed with mounting flange to avoid water penetrates into shelter through mounting interface. It is suggested to use gaskets sticking on the mounting flange and seal the gap between flange and cabinet with silicone gel during installation. There should be **NO** any gap surround gaskets to avoid water penetrates into enclosure.

The air conditioner is composed as the following key components: they are chassis, cover, controller, heat exchanger, blowers and compressor etc. It is "**not**" recommended that the user replace the compressor, evaporator, and the condenser by themselves; it may damage the system and getting injured.

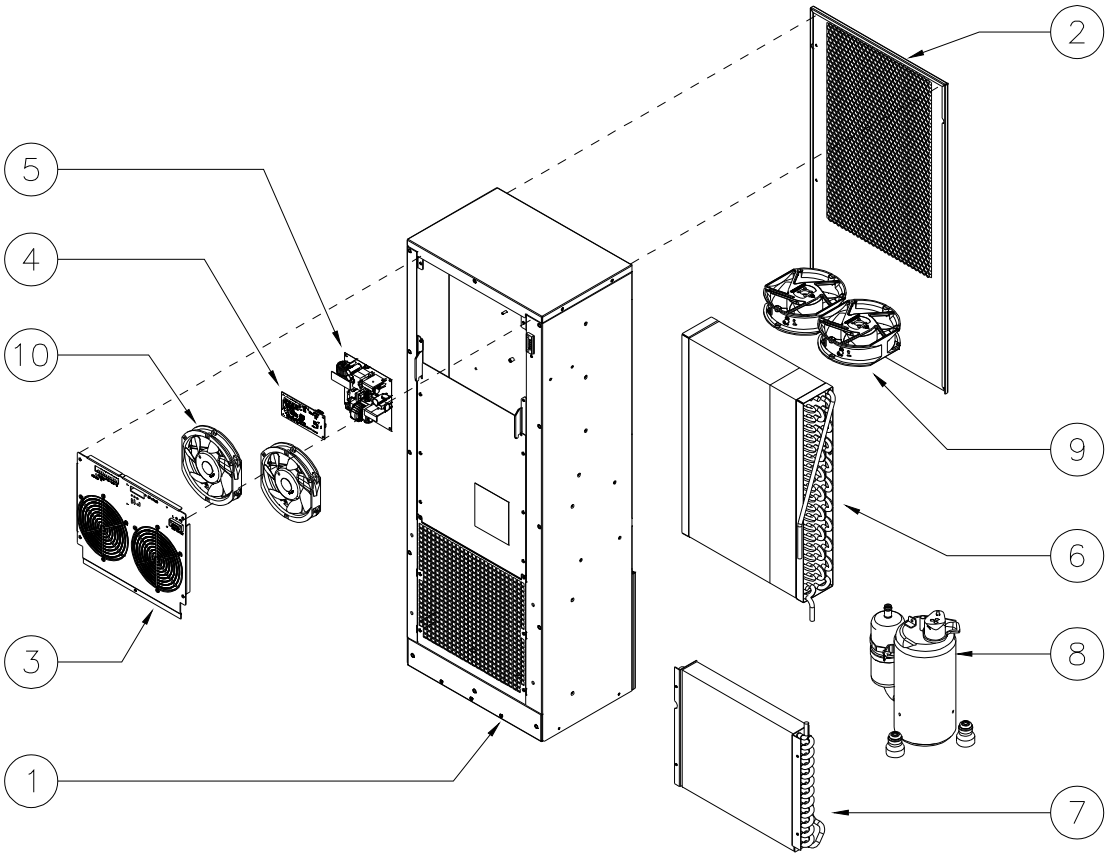
In order to assure the air conditioner running at optimal condition, the condenser should be cleaned once annually at least; user can clean the condenser with water directly. The external side fan blade can also be cleaned with normal pressure water if there is dust accumulation. Please do not use strong water jet to impact the center of fan and the surface of condenser.

The bottom hole of the air conditioner should be connected to a sealed container through a drainpipe, please clear drain holes when the maintenance. Please also notice that:

1. Check wires are connected correctly, and the insulation is not cracking or broken.
2. Use Self-test to check the unit running correctly or not. And the supplied air of internal side should be as cooled air.
3. Do not wipe the product with organic solvent, volatile substances like toluene or gasoline, it will destroy the powder-coated surface.
4. Turn off the power before maintaining.
5. Please turn off power and remove dry contact connector while non-operating for a long time.
6. If any abnormal acoustic noise from air conditioner happened, please turn off the product and contact with customer services.
7. The refrigerant is environmental friendly product of R134a. Little refrigerant leakage (< 5 g/ year) is allowed for application. If refrigerant leakage seriously, please turn off the power and wait for at least 2 hours to make sure the refrigerant fully exhaust. Please also contact the services to replace spare parts.
8. The compressor electrical protecting cover is sealed with silicon for IP55 requirement. Please do not dismantle the sealed cover or will lose the quality assurance of the compressor.

Part no. :

Delta model no. : HEC2500BFE

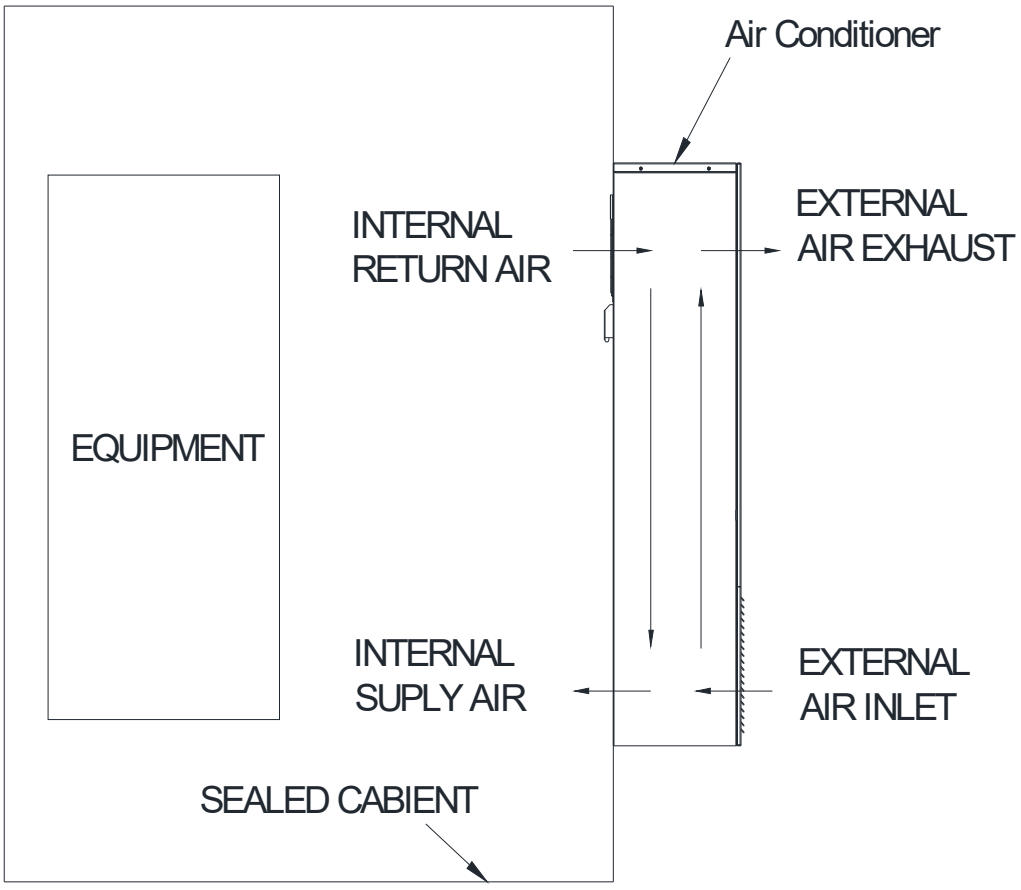


NO.	Q'TY	DESCRIPTION
1	1	Case Chassis
2	1	External Case Cover
3	1	Internal Case Cover
4	1	Control Board
5	1	DC Power Board
6	1	Evaporator
7	1	Condenser
8	1	Compressor
9	2	External Fan
10	2	Internal Fan

1-6. Thermal and Airflow

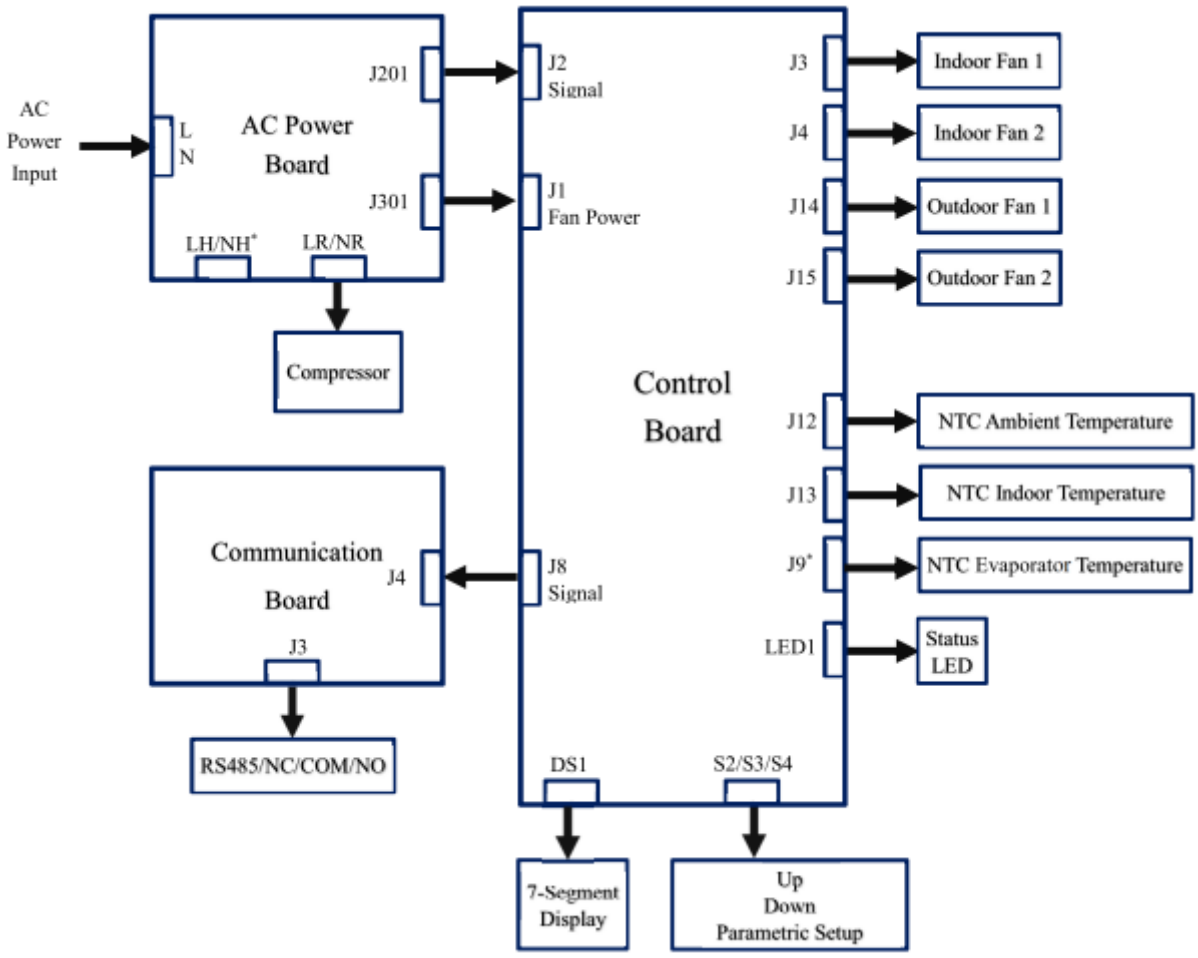
The internal and external air flow circulation is shown as the figure. Through separated mechanism design, internal and external air flow won't be mixed since the waste heat can be dissipated from the cabinet to the ambience. Internal temperature sensor is placed at return air stream to provide reliable temperature measurement and safety of operation.

The waste heat generated from the internal equipment will be absorbed by the refrigerant through the evaporator and dissipate to the ambience by the condenser of external side.



2 Electrical Specification

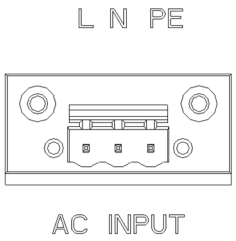
2-1. Indicator & Connector



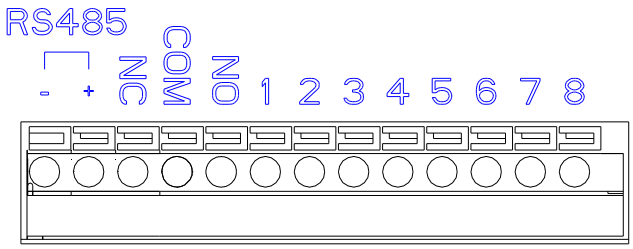
2-2. Indicator & Connector

- Power Connector

Pin	Description	Cable wire size
1	PE	1.5 mm^2 (16AWG)
2	N	1.5 mm^2 (16AWG)
3	L	1.5 mm^2 (16AWG)



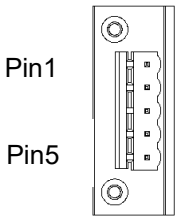
- Aircon Signal Connector



Pin	Description
1	Heater Control_P
2	Heater Control_N
3	N/A
4	Emergency Fan FG Input (Optional)
5	Emergency Fan Dry Output COM (Optional)
6	Emergency Fan Dry Output NC (Optional)
7	N/A
8	Emergency Fan Ground(Optional)

- Heater Signal Connector

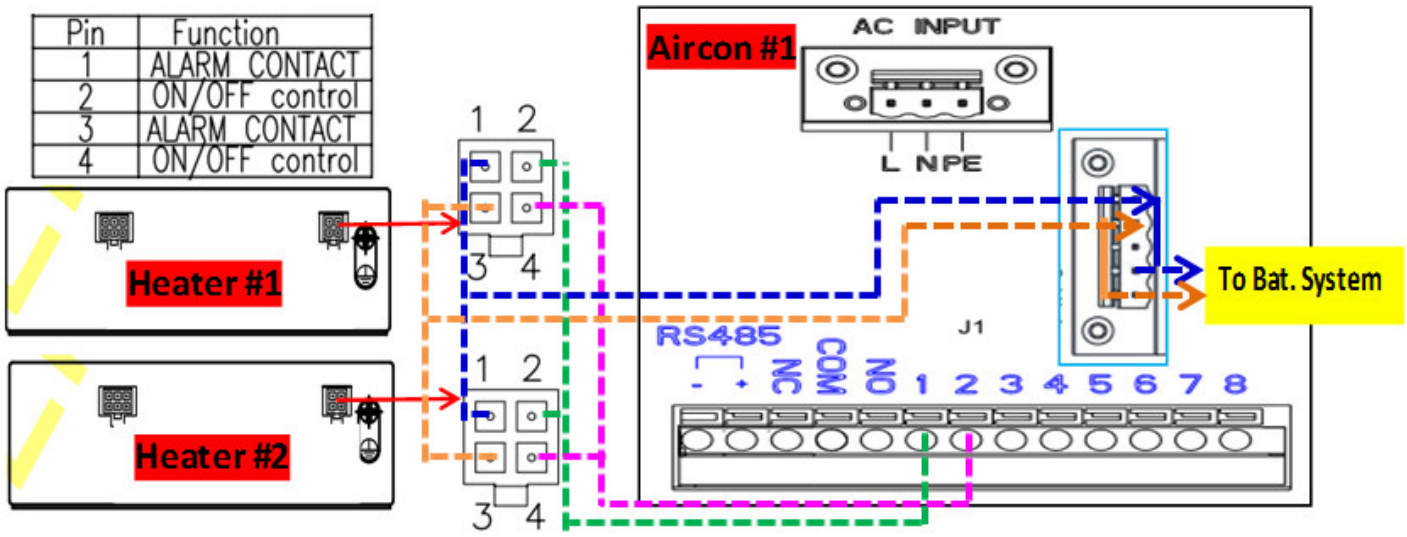
Pin	Description	Note
1	Heater Alarm In	Heater input
2	Heater Alarm In	Heater input
3	N/A	N/A
4	Heater Alarm Out	To customer's system
5	Heater Alarm Out	To customer's system



Part no. :

Delta model no. : HEC2500BFE

- Heater Signal Connection



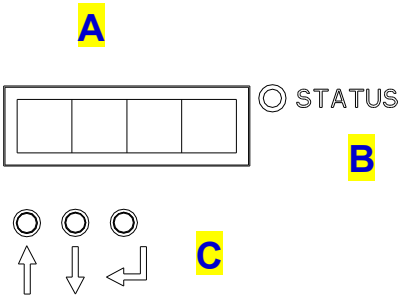
- System Alarm Default Setup
  - Specification: Contact rating: 30 VDC, 1A
  - Normal: NC and COM dry contact output close
  - Any alarms happening: NC and COM dry contact output open

- Panel Operation

- A: *Display*

  It will show the temperature inside the cabinet and system parametric setup.

	7-Segment Display
STATUS	Status LED
▲	Up
▼	Down
↵	Parametric Setup



- B: *LED indicator:*
    - Power
        - ❖ When the system power on and the LED will light in green.
        - ❖ If any alarm happens and the LED will flash in red. Customer could check the root cause according to alarm code.
        - ❖ If the system gets into self-test mode and the LED will flash in green.
- C: Button Controller 按钮
    - ❖ ↑: UP or increase
    - ❖ ↓: DOWN or decrease
    - ❖ SET: Parametric setup

2-2. Parametric Setup

Panel item	**Content**	**Range**	**Note**
d1.01	Aircon Address	1~128，Default :21	Optional
d1.02	Baud Rate Setup	0 : 9600 1 : 19200 (Default :0)	Optional
d1.03	Comp. Turn On Temp.	20~50，Default :26	
d1.04	Comp. Difference Comp.	1~10，Default :6	
d1.05	Cabinet Over Temperature	20~80，Default :65	
d1.06	Self-Test	0: Disable 1: Enable (Default :0)	
d1.07	Emergency Fan SetupSetup	0: Disable 1: Enable (Default :1)	Optional
d1.08	Alarm Default Setup	0: Normal Open 1:Normal Closed (Default :1)	
d1.09	Recovery Default Value	0: Disable 1: Enable (Default:0)	

d1.10	Heater Turn On Temp.	0~20，Default:16	
d1.11	Heater Difference Temp.	1~10，Default 6	
d1.12	Password setup	Default: 0001	
d2.01	Eva. Temp.		Display
d2.03	Tout Temp.		Display
d2.04	Fan-in Speed		Display
d2.05	Fan-out Speed		Display
d2.06	Firmware Ver.		Display

2.3. Self-Test

1. Press the SET button into parametric setup mode.
2. Press UP button to choose d1.06 and then press SET button to choose “1”executing auto self-test.
3. If the system gets into self-test mode and LED will flash in green.
4. Auto self-test running period about eighty seconds exclude compressors three minutes protection.
5. The test process including EEPROM, NTC sensor, inner-fan, outer-fan, compressor heater, emergency fan running correctly.
6. Recognizing that the implementation process without generating alarm or fault. If any alarm happens, according to alarm code to check the root cause.

2.4. Alarm Logs & Fault Processing

Alarm Items

	Alarm Item	Alarm Code
Temperature Abnormal Alarm	Eva Temperature Protection	E 2.1
	Cabinet Over Temperature Protection	E 2.2
	Cabinet Under Temperature Protection	E 2.6
Temperature Sensor Fault	Cabinet Temperature Sensor	E 3.1
	Eva Temperature Sensor	E 3.2
	Ambient Temperature Sensor	E 3.4
Fan Fault	Indoor Fan	E 4.1
	Outdoor Fan	E 4.2
Controller Fault	EEPROM	E 5.1
Cooling System Fault	Power Board	E 6.1
	Compressor Startup Fail	E 6.2

Fault Analysis and Processing

Fault State	Analysis of the Reasons	Solutions
Power on, and the cabinet temperature is too high but the air conditioner is not working	1. Power failure or no power. 2. The target temperature is higher than inside temperature. 3. System failure.	1. Check the power supply and the electric circuit. 2. Re-set the target temperature according to the system requirement. 3. Please contact the service department.
The air conditioner is running but the cabinet temperature is still high, no obvious cooling effect.	1. The air conditioner capacity is not match the load of the system. 2. The ambient temperature is too high. 3. Low efficiency of the condenser. 4. Other system failure	1. Check the heating load of the system. 2. Ensure the air conditioner operates in correct temperature range. 3. Clean the condenser. 4. Please contact the service department.
The air conditioner stop operating, and there is no alarm signal.	1. The inside temperature is lower than the target temperature. 2. Other system failure.	1. Re-set the target temperature according to the system requirement. 2. Please contact the service department.

3. Environmental Condition

3-1. Operating Temperature

-10 °C ~ +55 °C (14 °F ~ 131 °F)

3-2. Storage Temperature

-40 °C ~ +70 °C (-4 °F ~ 158 °F)

3-3. Operation Humidity

External air loop: 0 ~ 100 % RH

Internal air loop: 0 ~ 80 % RH, non-condensing

3-4. Ingress Protection Rating

IP55 (IEC60529) on external side

GR487 on external side

4. Reliability Table

Test item	Condition
High temperature	IEC 60068-2-2
Low temperature	IEC 60068-2-1
High temp. / High humidity	IEC 60068-2-3
Temperature cycle	IEC 60068-2-14 test Nb
Vibration	ETSI 300 019-1-4 CLASS 4.1
Ingress protection (external side)	IEC 60529 IP55 / GR487
Salt fog test (external side)	IEC 60068-2-11 severity 4 , 6cycles
Package bump	IEC 60068-2-29

5. Safety Certification

UL

Part no. :

Delta model no. : HEC2500BFE

6. Accessory

➢ Power Connector

Pin	Description	Cable wire size
1	PE	1.5 mm^2 (16AWG)
2	N	1.5 mm^2 (16AWG)
3	L	1.5 mm^2 (16AWG)



PIN 1
PIN 2
PIN 3

➢ Alarm Connector

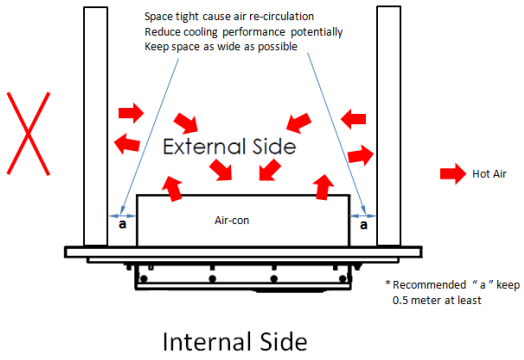
Pin	Description	Note
1	Heater Alarm In	Heater input
2	Heater Alarm In	Heater input
3	N/A	N/A
4	Heater Alarm Out	To customer's system
5	Heater Alarm Out	To customer's system



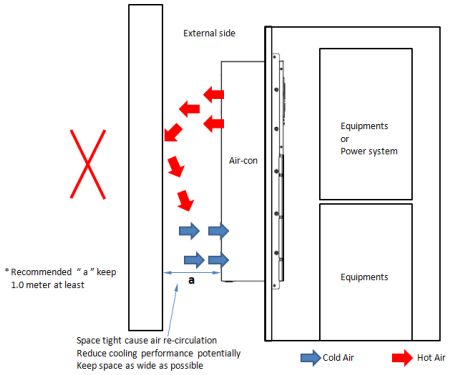
PIN 1
PIN 2
PIN 3
PIN 4
PIN 5

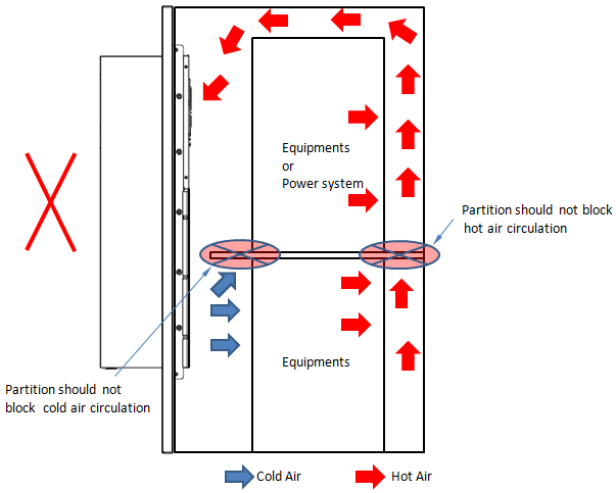
7. Installation Notice

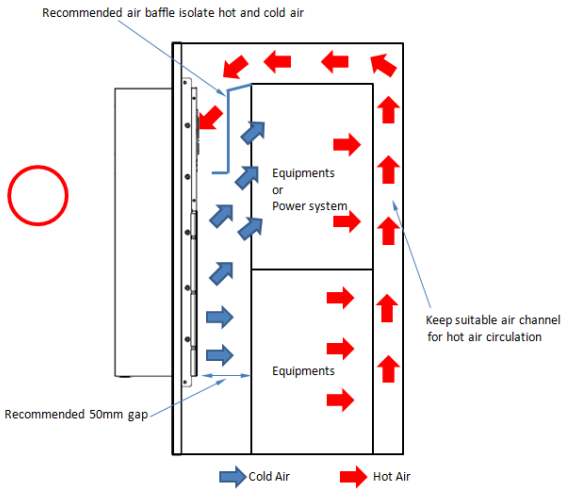
Check the surrounding obstacles to make sure the product get enough space for air circulate.



Internal Side







8. Reclaim



At the end of the unit working life, the produce must not be disposed of as urban waste. It must be taken to a special local authority differentiated waste collection center or to a dealer providing this service.

9. Versions

REV.	DESCRIPTION	DRAWN	CHECKED			APPROVED	ISSUE DATE
			ME	EE	CE		
00	ISSUE SPEC	MICHAEL.CHEN04/18'17	MICHAEL.CHEN 04/18'17	Allen.Huang 04/18'17	------	Diamond CHEN / CW.CHEN 04/18'17	04/18'17
01	CHANGE SPEC	Mars.Wu 09/26'18	Mars.Wu 09/26'18	Allen.Huang 09/26'18	------	Diamond CHEN / CW.CHEN 09/26'18	09/26'18
02	Update performance curve table	Mars.Wu 01/31'20	Mars.Wu 01/31'20	Allen.Huang 01/31'20	------	Diamond CHEN / CW.CHEN 01/31'20	01/31'20
03	Modify UL ICON	Rex.lyu 08/13'20	Rex.lyu 08/13'20	Allen.Huang 08/13'20	------	Diamond CHEN / Mars.Wu 08/13'20	08/13'20
04	Modify Caution	Rex.lyu 09/15'20	Rex.lyu 09/15'20	Allen.Huang 09/15'20	------	Diamond CHEN / Mars.Wu 09/15'20	09/15'20