



Specification and Manual

Customer: _____
Description: Air Conditioner for Equipment (Through Wall Mounting)
Customer Part No.: _____ Rev.: _____
Delta Model No.: HEC2000XA Rev.: 03
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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Part no.:

Delta model no.: HEC2000XA

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Description

This document is an installation and the characteristics of Delta HECX1P 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 kept in upward position, “**NOT**” inverted, flat, or subject to excessive tilt and collision. The air conditioner is a precision instrument; it should be handled and transported with care. Do not stand on the box, or place heavy objects on top of the box. Pay attention to the below icons on the package.

If air conditioner is toppled, slanted or dropped, follow these steps: a. stand unit up for 12 hours to ensure refrigerant pressure stability, b. power on the unit and execute self-test to make sure no alarm condition, c. keep the air conditioner running for 1 hour to make sure there is no abnormal acoustic noise.



Safety Notes

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

Meaning of WARNING and CAUTION notices:

 **Warning:**

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

 **Caution:**

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

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 **Warning:**

1. Installation work and electrical wiring should be done only by qualified personnel 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 shock or fire.
4. Make sure that all wiring is secured, that 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 to complete installation.
9. Protective grounding connection: The enclosure must be grounded at the protective ground terminal. Use 6 mm² (10 AWG) wire and use spring washer to avoid loosening.
10. The air conditioner should not be 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 for use only by qualified personnel.

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 **Caution :**

1. Install the air conditioner on a wall or door strong enough to withstand the weight of the unit.
2. Do not block the 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 the unit.
6. Watch your step at the time of fin cleaning or air conditioner inspection.
7. Do not topple the air conditioner while moving or in storage.
8. The hole in the bottom of the air conditioner should be connected to a sealed container through a drain pipe.
9. This appliance is not to be used by any persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given proper supervision or instruction.
10. Children should be prevented from playing with the appliance.

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Specification for Approval

Customer :

Description : Air conditioner for Equipment with 2000 W Rated Cooling Capacity (Through Wall Mounting)

Customer P/N :

Rev. :

Delta model no. : HEC2000XA

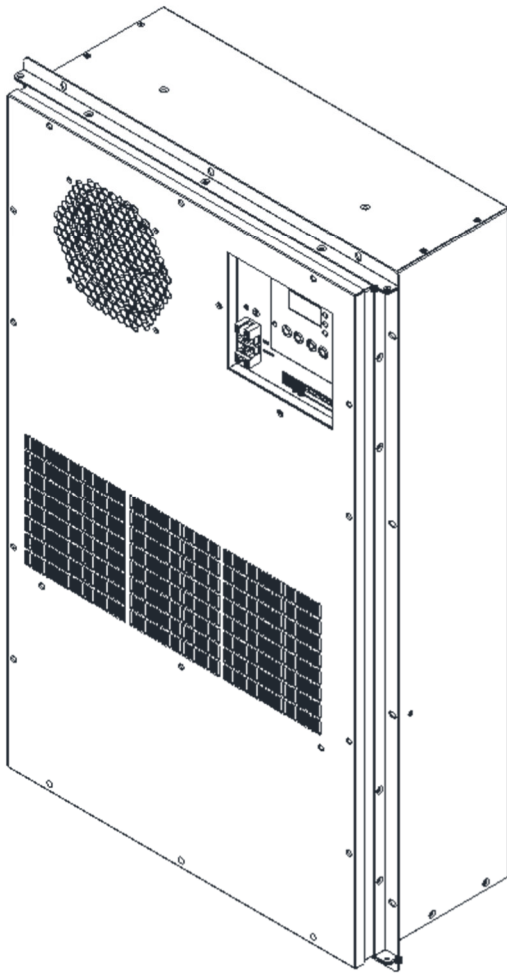
Rev. : 03

Sample revision. :

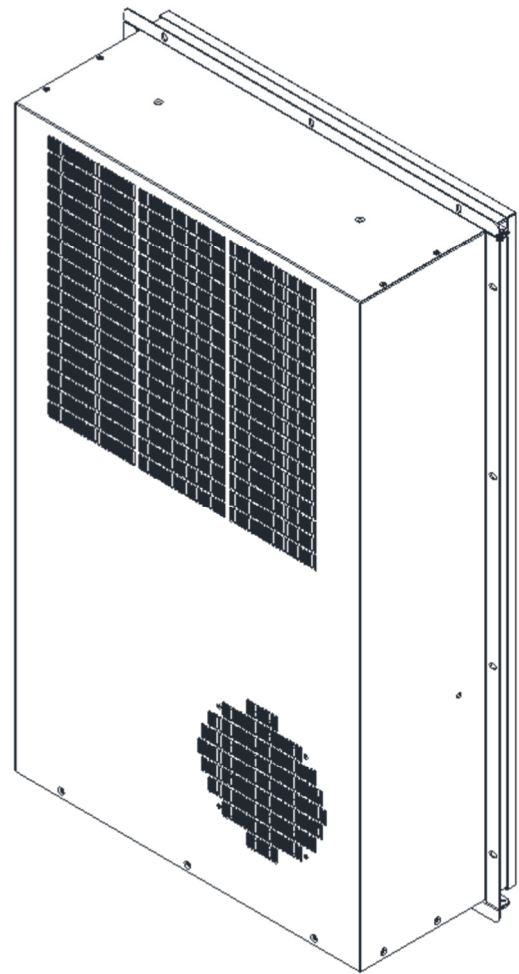
Date Code :

Sample issue date :

Quantity :



INTERNAL



EXTERNAL

Part no.:

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1. Product Instruction

1-1. General Description

HEC2000XA is a DC air conditioner with -48VDC 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 X A - XXX

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

No	Item	Digit	Specification
(1)	Product Message	HEC	Compressor Air Conditioner
(2)	Cooling Capacity	X1	X1=2000
(3)	Operation Voltage	X	DC 48 V for door with heater
(4)	Product Version	A	N/A
(5)	Customer ID	XXX	N/A

1-2. Main Feature & Model Number

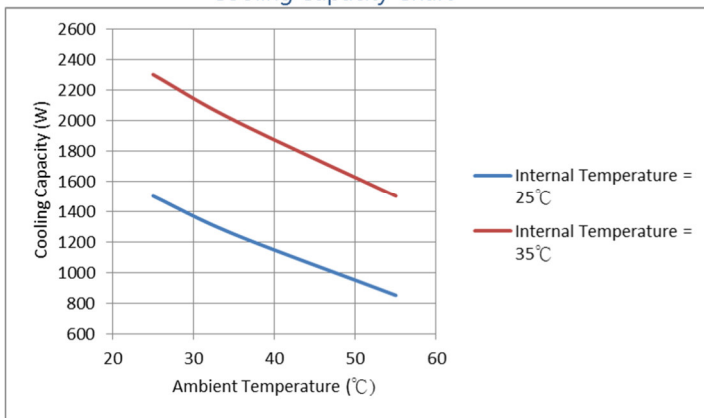
Dimensions, Weight & Mounting method		
Dimension (H x W x D) (without flange)	mm (inch)	746 x 446 x 200 (29.4 x 17.6 x 7.9)
Application		Outdoor
Weight	Kg (lbs)	37.0 (81.6)
Mounting Method		Door/Side
Color (optional)		RAL7035
Environmental Protection & Performance		
Operating Temperature Range	°C (°F)	-40 to +55 (-40 to +131)
Operating Humidity		External: 0~100% RH Internal: 0~80% RH
Storage Temperature	°C (°F)	-40 to +70 (-40 to +158)
Storage Relative Humidity	RH	5~95%
Refrigerant		R134a, 550 g ±10 g
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

Part no.:

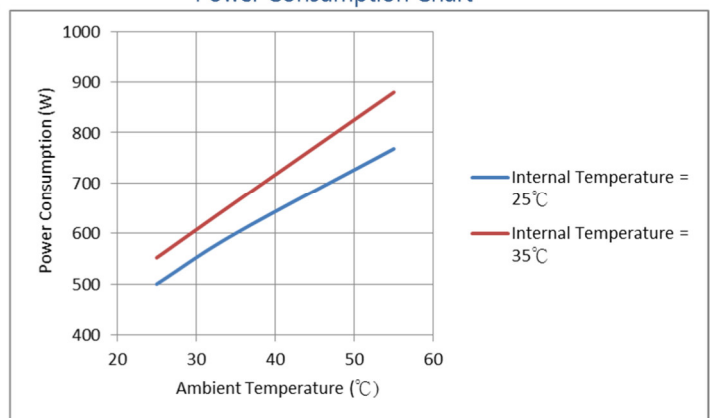
Delta model no.: HEC2000XA

Cooling Capacity & Operational Data		
Rated Cooling Capacity at L35/L35	W (Btu/hr)	2000 (6800)
Rated Cooling Current	A	13.8
Rated Internal Airflow (L35/L35)	m ³ /h (CFM)	470 (275)
Rated External Airflow (L35/L35)	m ³ /h (CFM)	420 (250)
Heating Capacity (Optional)	W	800
Power & Range		
Input Voltage	VDC	48
Max. Operating DC Current	A	23
Alarm	N/A	Dry Contact Output
Key Components		
Controller		Built-in Smart Controller
Communication port		RS485
Fans		Delta High Efficiency Blowers
Compressor		Rotary, DC

Cooling Capacity Chart



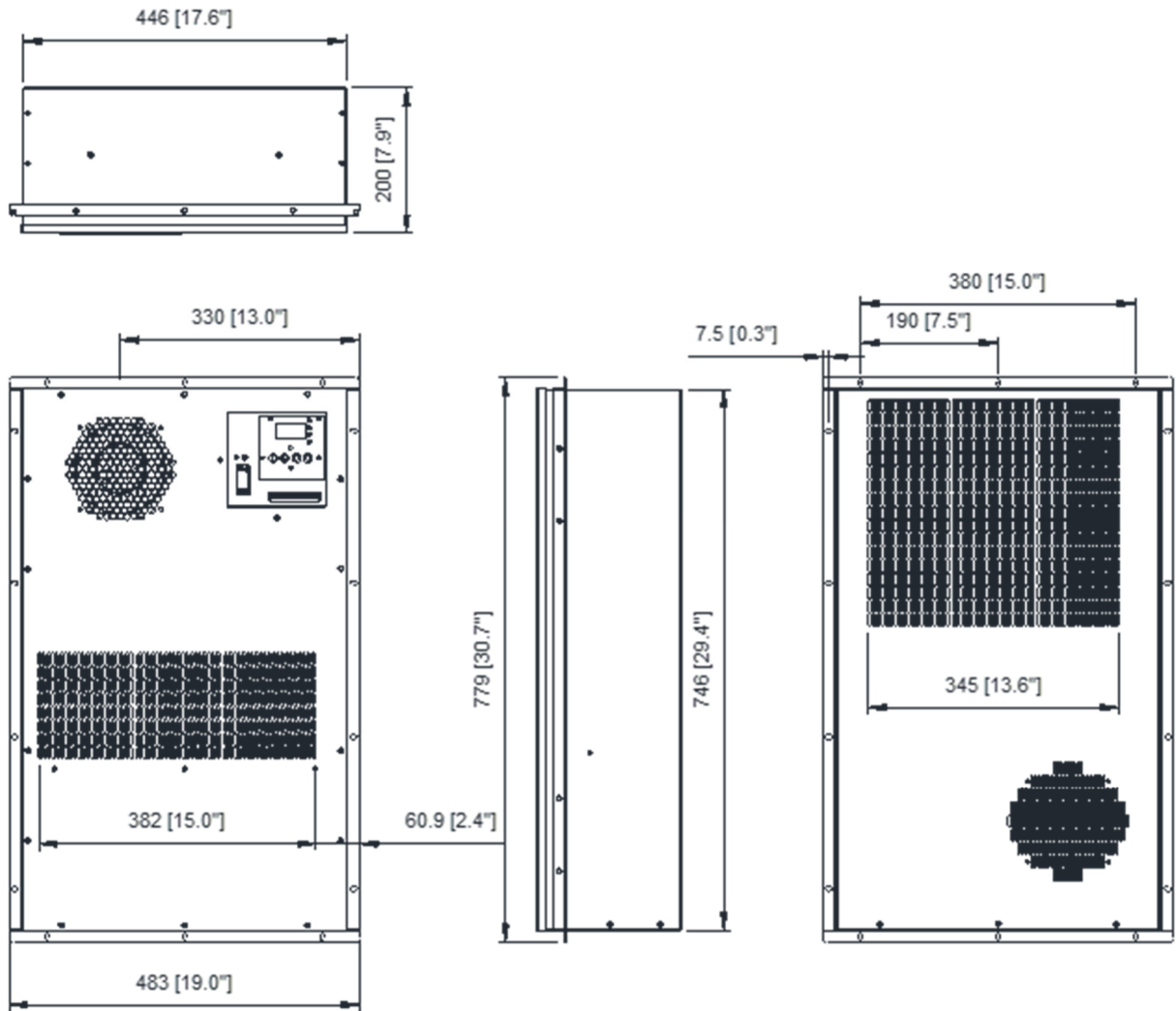
Power Consumption Chart



Part no.:

Delta model no.: HEC2000XA

1-3. Dimension



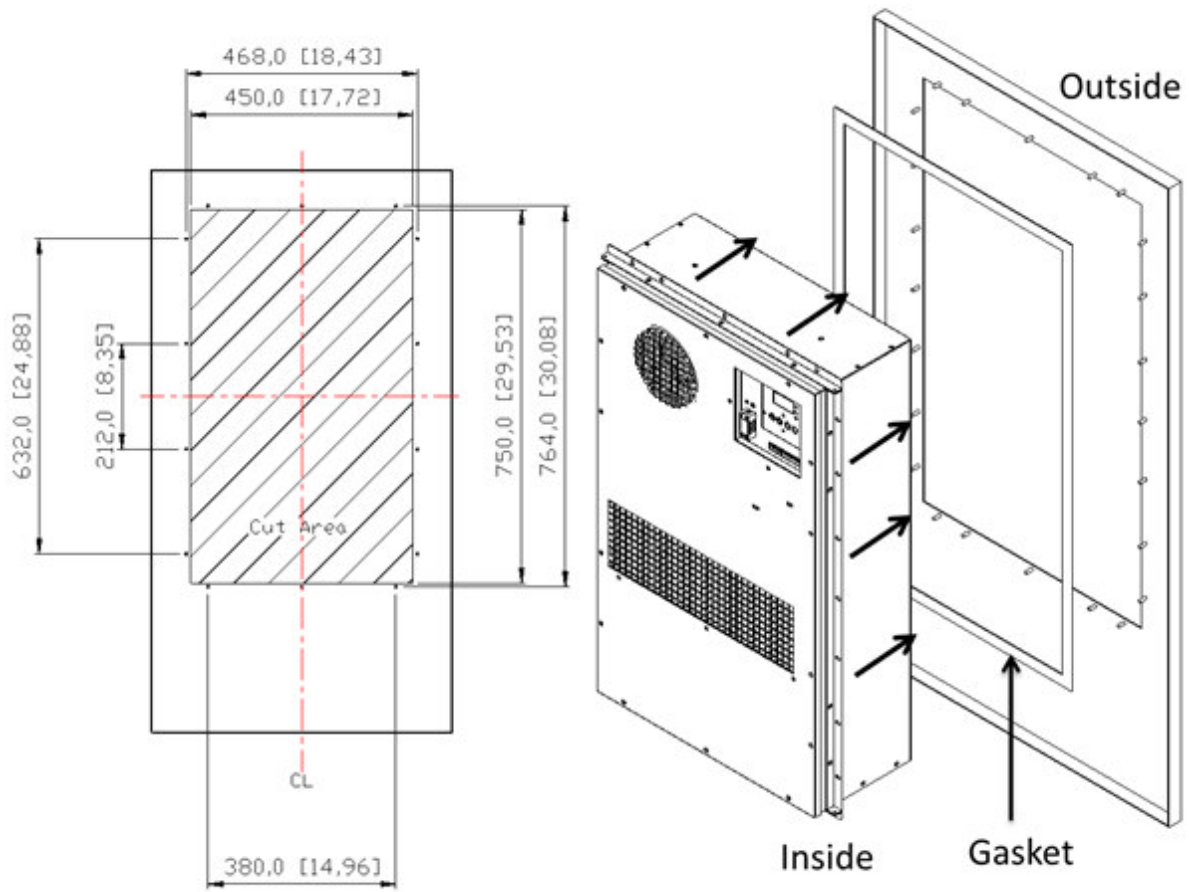
mm (inch)

- (1) Material: Case SGCC Sheet
- (2) Finish: Power paint 75 ~ 120 um
- (3) Color: RAL 7035
- (4) Dimension tolerance: $\pm 1.0\text{mm}$

Part no.:

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1-4. Mounting Panel Cutout



mm (inch)

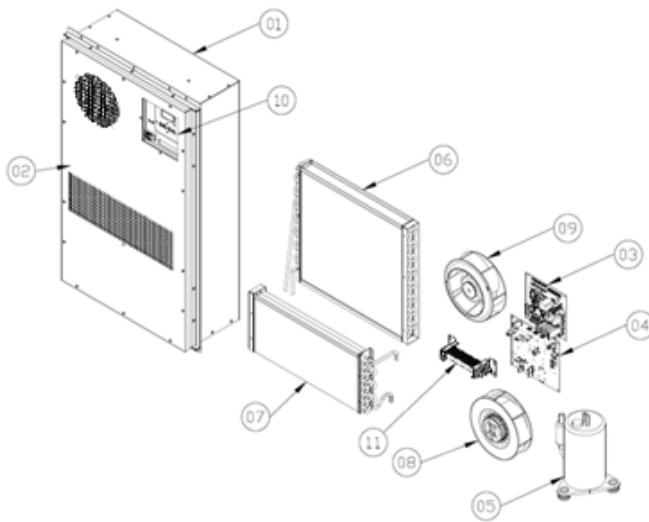
Part no.:

Delta model no.: HEC2000XA

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.



NO.	Q'TY	DESCRIPTION
1	1	Case Chassis
2	1	Case Cover
3	1	Driver Board
4	1	DC Power Board
5	1	Compressor
6	1	Condenser
7	1	Evaporator
8	1	External Fan
9	1	Internal Fan
10	1	Display Board
11	1	Heater

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.

Part no.:

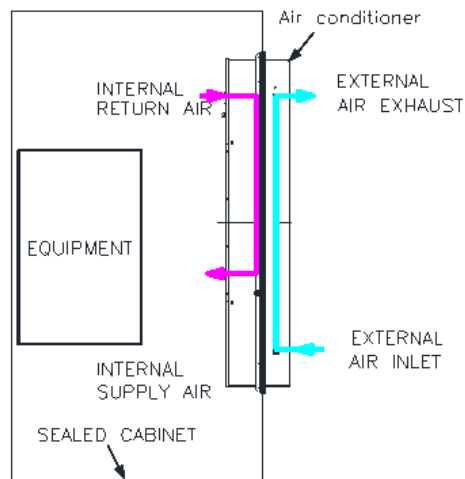
Delta model no.: HEC2000XA

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.

1-6. Thermal and Airflow

Internal and external air flow circulation is shown in below diagram. Counter flow design prevents mixing of internal and external air flows, but waste heat can still be dissipated from cabinet to the ambient outside air. An internal temperature sensor has been placed in the return air stream to provide reliable temperature measurement, and for safe operation.

The heated air inside the cabinet will be cooled by the evaporator. Waste heat absorbed by the refrigerant will be dissipated through the condenser at the external side.



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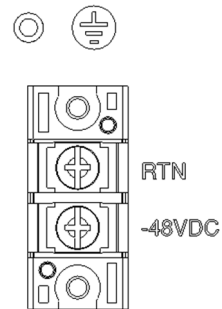
2 Electrical Specification

2-1. Indicator & Connector

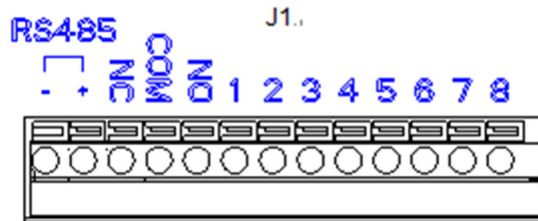
➤ Power Supply & Alarm Connector

(1) DC Power Connect :

Pin	Description	Cable wire size
1	RTN	10 AWG
2	-48 VDC	10 AWG
		10 AWG



(2) RS485 and J1 Connect :



※ RS485, Door Open and Emergency Fan are optional function. Now they are useless.

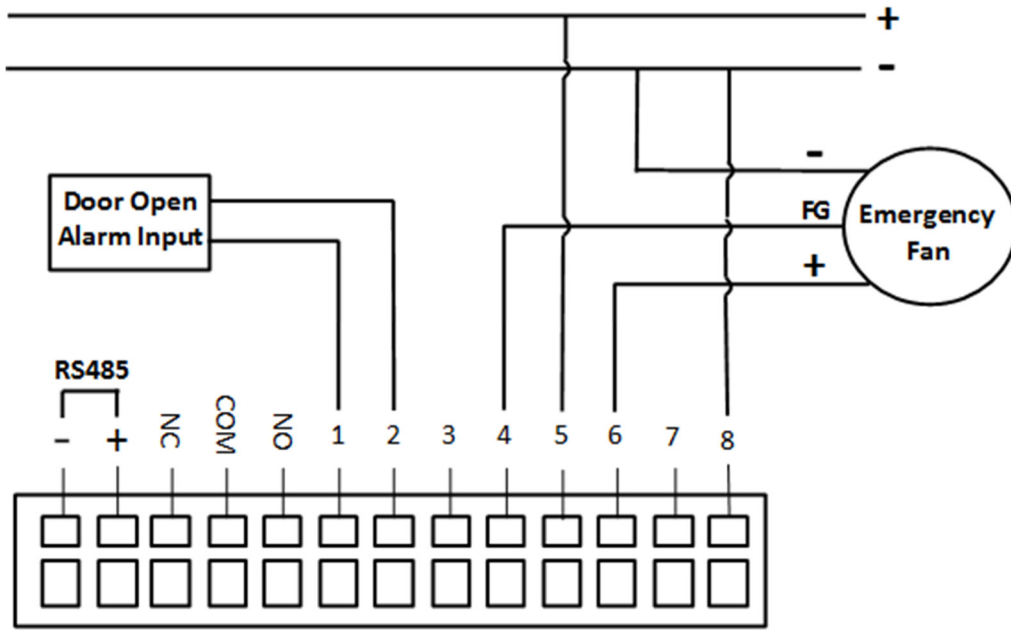
J1 Pin Name	Description
RS485 -	RS485 Communication
RS485 +	RS485 Communication
NC	Dry Output NC
COM	Dry Output COM
NO	Dry Output NO
1	Door open alarm input
2	Door open alarm input
4	Emergency Fan FG Input
5	Emergency Fan Dry Output COM
6	Emergency Fan Dry Output NO
8	Emergency Fan Ground

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➤ **Wiring Schematic Diagram : (Optional Function)**

Please connect the wires as shown in below diagram :



- (1) Door open function and emergency fan function are optional functions. Now they are useless.
- (2) The maximum current and rated voltage of emergency fan should 2 A and 48 VDC respectively.
- (3) Running at regular times :
If Emergency Fan Function is enable, operating time of emergency fan is 5 minutes daily.
- (4) Forced Run :
If Emergency Fan Function is enable, the emergency fan runs when the compressor does not have sufficient cooling capacity and cabinet temperature is higher than startup point (emergency point + 5). Emergency Fan stop when cabinet temperature is lower than emergency point.

➤ **System Alarm (Dry Contact)**

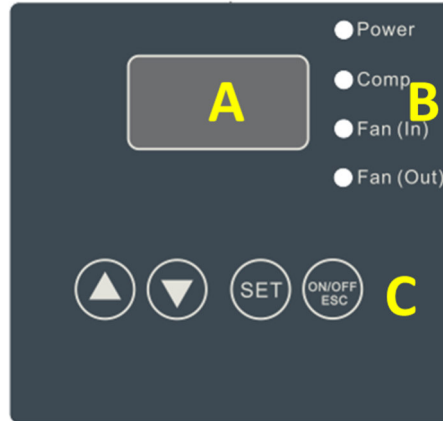
- (1) Specification: Contact rating: 2 A @ 30 VDC / 2 A @ 250 VAC
- (2) Normal: NC and COM dry contact output close (Default Setting)
- (3) Alarms happening: NC and COM dry contact output open. (Dry Contact will

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trigger when any of E2.1 , E2.5 , E2.8 , E3.1 , E4.1 , E4.2 , E4.3 ,E6.4 ,E6.5 happen.)

- **Panel** (Panel operation flowchart is drawn in 7-3.)



A: Display:

1. It will show the temperature inside the cabinet and system parametric setup.
2. If any alarm happens, alarm code and Cabinet Temperature are taken turns showing on 7-Segment Display.

B: LED Indicator:



1. Power:
 - ❖ When the system powers on, Power LED will be solid green.
 - ❖ If any alarm happens, Power LED flashes. Customer could check the root cause according to alarm code (listing in 7-5).
2. Comp.:
 - ❖ When the compressor is running, Comp. LED is solid green.
 - ❖ If the system goes into self-test mode, Comp. LED flashes.
3. Fan (In):
 - ❖ When the inner fan is running, Fan (In) LED is solid green.
4. Fan (Out):

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- ❖ When the outer fan is running, Fan (Out) LED is solid green.

C: Touchpad Control:

1.  (UP button) : UP or increase
2.  (DOWN button) : DOWN or decrease
3. **SET** (SET button) : Parametric setup
4. **ON/OFF ESC** (ESC button) : Back or Power on/off(Pressing it about 5 seconds.)

2-2 Protection

- Over Current Protection:
DC power board: 40 A
- Over Temperature Protection:
DC power board: 89 ± 4 °C
- Under Voltage Protection:
DC power board: 42 ± 1.0 VDC
- Over Voltage Protection:
DC power board: 59 ± 1.0 VDC
- Reverse Polarity:
Allow reverse voltage: 42 ~ 60 VDC
- Short Ckt:
If compressor UVW short for any both phase the compressor will not operate.
- Compressor H/T Protection:
 $T_{comp} \geq 105$ °C
- Eva L/T Protection:
 $TEVA < 0$ °C

3. Environmental Condition

- **Operating Temperature**
 -40 °C ~ $+55$ °C (-40 °F ~ $+131$ °F)

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- **Storage Temperature**
-40 °C ~ +75 °C (-40 °F ~ 167 °F)
- **Operation Humidity**
External air loop: 0 ~ 100 % RH
Internal air loop: 0 ~ 80 % RH, non-condensing
- **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

CE.TUV.UL




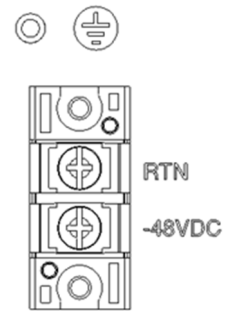
6. Accessory

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Power and Alarm Cable

Pin	Description	Cable wire size
1	RTN	10 AWG
2	-48 VDC	10 AWG
		10 AWG



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7. Parameters Table and Something Information

7-1. System Parameter Setup

Item	System Parameter	Default	Range
d1.01	Communication Address	N/A	N/A
d1.02	Communication Speed	N/A	N/A
d1.03	Target Temperature (Tt)	35 °C	25 °C - 50 °C
d1.04	Difference Temperature (Td)	3 °C	1 °C - 5 °C
d1.05	Cabinet Over Temperature	60 °C	40 °C - 60 °C
d1.06	DC Input Over Voltage	59 V	58 V - 60 V
d1.07	DC Input Under Voltage	42 V	42 V - 51.5 V
d1.08	Auto Self-Test Function	0	1:Execute ; 0: No Execute
d1.09	Door open Function	N/A	N/A
d1.10	Emergency Fan Function	N/A	N/A
d1.11	Dry Contact Normal Status Setup	1	1: Close ; 0: Open
d1.12	Recovery Default Value	0	1: Execute ; 0: No Execute
d1.13	Heating Startup Point	5 °C	-40 °C ~ 15 °C
d1.14	Heater Sensitivity	5 °C	5 °C ~ 15 °C
d1.15	Password Setup	0001	0000 ~ 9999
d1.16	System Re-Lock	N/A	N/A

- ※ d1.01, d1.02, d1.09 and d1.10 are option functions. Now they are useless.
- ※ Heating starts when cabinet temperature is lower than Heating Startup Point. Heating stops when cabinet temperature is higher than “Heating Startup Point + Heater Sensitivity”.
- ※ Cooling starts when cabinet temperature is higher than “Tt + Td”. Cooling stops when cabinet temperature is lower than “Tt - Td”.
- ※ The running speed of compressor depends on the temperature’s difference between cabinet temperature and Target temperature .The higher the difference is, the higher the speed is. the lower the difference is, the lower the speed is.

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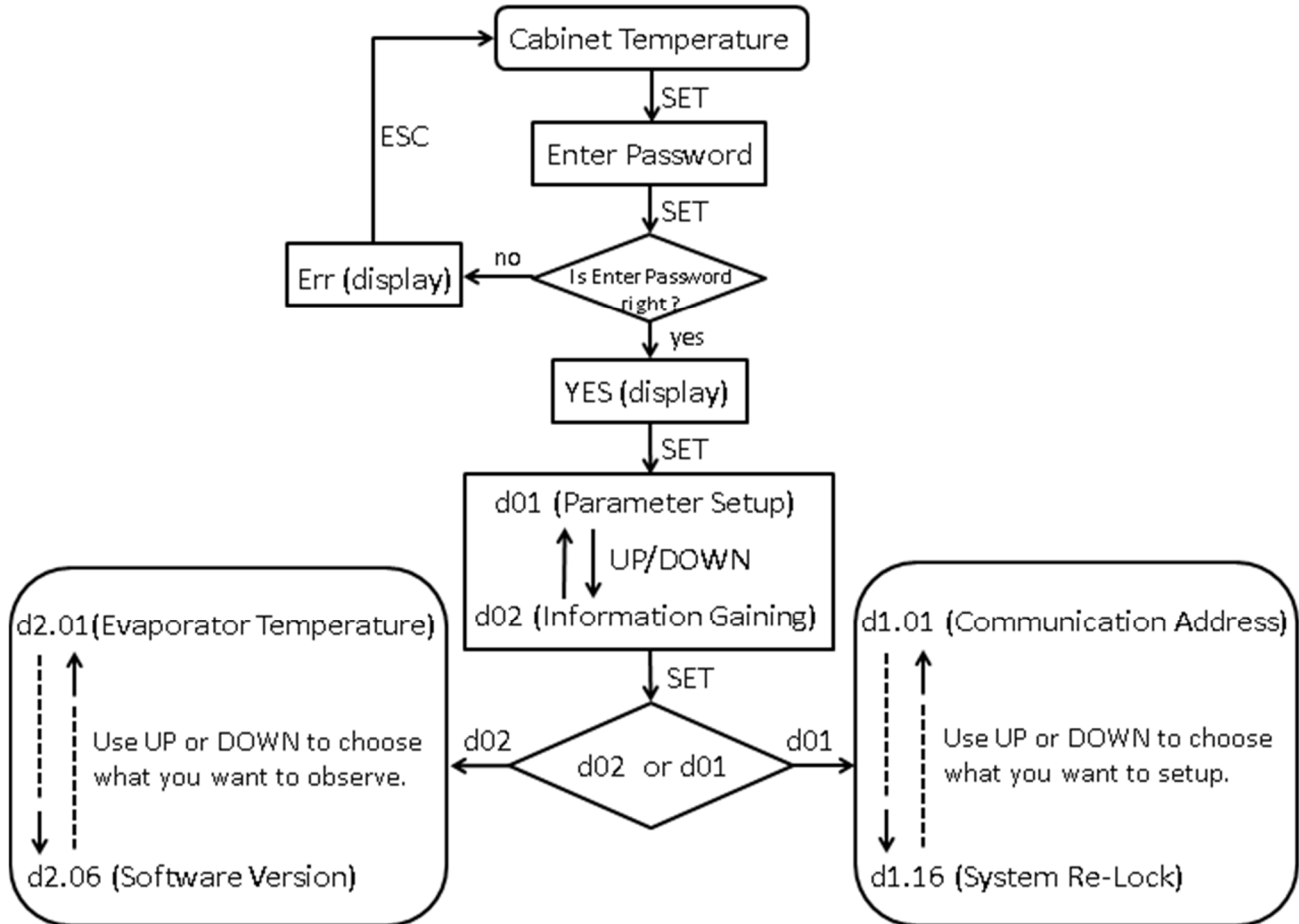
7-2. System Information Observation

Item	Description
d2.01	Evaporator Temperature (°C)
d2.02	Condenser Temperature (°C)
d2.03	Indoor Fan Speed (rpm)
d2.04	Outdoor Fan Speed (rpm)
d2.05	DC Input Voltage (V)
d2.06	Software Version

※ d2.01 ~ d2.06 are read-only functions.

7-3. Panel Operation Flowchart

We could operate the panel by following Panel Operation Flowchart below.



- ※ Pressing ESC button could back to the last step.
- ※ If the Password is right , you don't need to enter it again in 3 minutes.
- ※ After entering right Password , you can use d1.16 to re-lock your air conditioner.
- ※ The default value of Password is 0001.

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7-4. Self-Test (Operating Procedure)

1. Press SET button into the step of entering password.
2. Enter your password and press SET. (you don't need to enter it again in 3 minutes.)
3. If your password is right, the panel shows YES. Press SET button again to go to next step.
4. Press UP or DOWN to choose d01 and press SET.
5. Press UP or DOWN to choose d1.08 and press SET.
6. Press UP or DOWN to choose 1 (executing auto self-test) and press SET.

- ※ If the system gets into self-test mode, the Comp. LED flashes.
- ※ The period of self-test is about 5 minutes. (excluding compressors 3 minutes protection)
- ※ The testing items including EEPROM, NTC sensor, inner-fan, outer-fan, compressor, etc.
- ※ If any alarm happens, Power LED flashes. Alarm code and Cabinet Temperature are taken turns showing on 7-Segment Display.
- ※ When self-test ends, Comp. LED stops flashing. If there is no alarm, air conditioner runs according to the cabinet's temperature.

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7-5. Alarm Logs & Fault Processing

- (1) If any alarm happens, the Power LED flashes. Customer could check the root cause according to alarm code.
- (2) If any alarm happens, alarm code and Cabinet Temperature are taken turns showing on 7-Segment Display.

	Alarm Item	Alarm Code
Temperature Abnormal Alarm	Eva Temperature Protection	E 2.1
	Comp-out Temperature Protection	E 2.2
	PWB Temperature Protection	E 2.3
	IPM Temperature Protection	E 2.4
	Cabinet Over Temperature Protection	E 2.5
	Cabinet Under Temperature Protection	E 2.6
	High Pressure Protection	E 2.7
	Frequency High Pressure Protection	E 2.8
	Ambient Under Temperature Protection	E 2.9
Temperature Sensor Fault	Cabinet Temperature Sensor	E 3.1
	Eva Temperature Sensor	E 3.2
	Cond Temperature Sensor	E 3.3
	Comp-Out Temperature Sensor	E 3.4
	PWB Temperature Sensor	E 3.5
	IPM Temperature Sensor	E 3.6
Fan Fault	Indoor Fan	E 4.1
	Outdoor Fan	E 4.2
	Emergency Fan	E 4.3
Controller Fault	EEPROM (Display Board)	E 5.1
	EEPROM (Driver Board)	E 5.2
	Current Sensor	E 5.3
	DC Input Over Voltage	E 5.4
	DC Input Under Voltage	E 5.5
	Power Board	E 6.1

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Cooling System Fault	Startup Fail	E 6.2
	IPM Over Current	E 6.3
	Compressor Lack Phase	E 6.4
	Door open	E 6.5
	Internal Communication	E 6.6

※ Dry Contact will trigger when any of E2.1, E2.5, E2.8, E3.1, E4.1, E4.2, E4.3, E6.4, E6.5 happen.

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※Fault Analysis and Processing

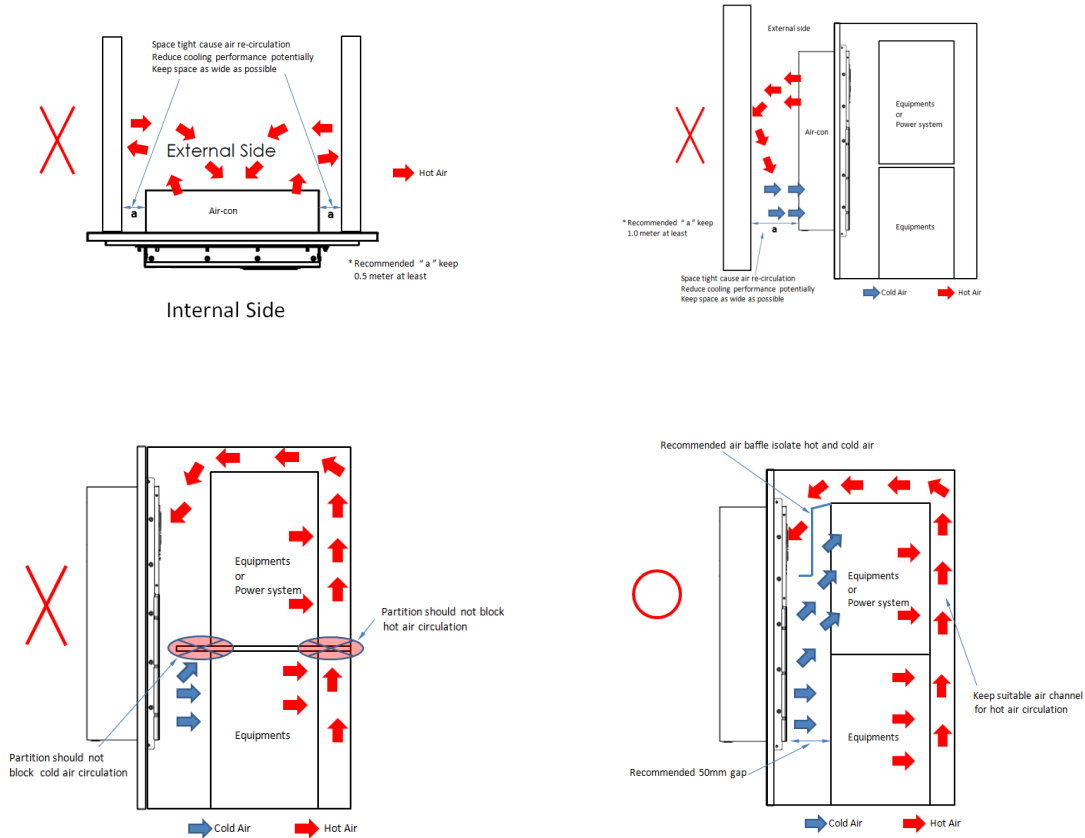
Fault State	Analysis of the Reasons	Solutions
Power on, and the cabinet temperature is too high but the air conditioner is not working	<ul style="list-style-type: none">• Power failure or no power.• The target temperature is higher than inside temperature.• System failure.	<ul style="list-style-type: none">• Check the power supply and the electric circuit.• Re-set the target temperature according to the system requirement.• Please contact Delta or authorized Delta service agent.
The air conditioner is running but the cabinet temperature is still high, no obvious cooling effect.	<ul style="list-style-type: none">• The air conditioner capacity is not match the load of the system.• The ambient temperature is too high.• Low efficiency of the condenser.• Other system failure	<ul style="list-style-type: none">• Check the heating load of the system.• Ensure the air conditioner is operating in correct temperature range.• Clean the condenser.• Please contact Delta or authorized Delta service agent.
The air conditioner stop operating, and there is no alarm signal.	<ul style="list-style-type: none">• The inside temperature is lower than the target temperature.• Other system failure.	<ul style="list-style-type: none">• Re-set the target temperature according to the system requirement.• Please contact Delta or authorized Delta service agent.

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8. Installation Notice

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



9. 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.

10. Versions

REV.	Description	Owner	Date
00	Issue SPEC	吳建樟	01/18'18
01	SHAPE CHANGE	吳建樟	08/23'18
02	Modify TUV.CE.UL ICON	呂紹任	08/13'20
03	Modify Caution	呂紹任	09/15'20