

Specification and Manual

Customer:				
Description: A	Air Conditioner for Equipment			
Customer Part No.:		Rev.:		
Delta Model No.: HEC1000AFS		Rev.:	00	
Sample Date Co	ode:			
Sample Issue Da	ate: OCT.14 2020			

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

Approved by:

Date:

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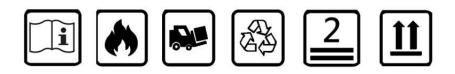
Description

This document is an installation and the characteristics of Delta HEC 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:

Marning:

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.

Marning:

- 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 1.5 mm² (16AWG) 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.

▲ Caution :

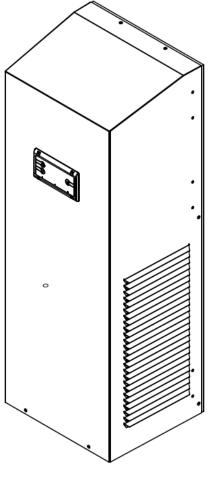
- 1. Install the air conditioner on a wall or door strong enough to withstand the weight of the unit.
- 2. Do not block the air inlets or exits.
- 3. Do not install the air conditioner at any place where there is a danger or flammable gas leakage.
- 4. Arrange the drain to ensure complete drainage.
-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

Part no.:

Delta model no.: HEC1000AFS

Specification for Approval

Customer :		
Description : Air conditioner for Equipment w	ith 1000 W Rated Cooling Capacity	
Customer P/N :	Rev. :	
Delta model no. : HEC1000AFS	Rev. : 00	
Sample revision. :	Date Code :	
Sample issue date :	Quantity :1 pc	



EXTERNAL

INTERNAL

1. Product Instruction

1-1. General Description

HEC1000AFR is a AC air conditioner with 115VAC power input, it is designed for UL TYPE 12 sealed outdoor telecom cabinet to provide stable and optimum internal conditions for equipment and avoid hotspot inside the cabinet.

 $\underline{\mathsf{HEC}}\,\underline{\mathsf{X1}}\,\,\underline{\mathsf{A}}\,\,\underline{\mathsf{F}}\,\,\underline{\mathsf{S}}$

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

No	Item	Digit	Specification
(1)	Product Message	HEC	Compressor Air Conditioner
(2)	Cooling Capacity	X1	X1=1000
(3)	Operation Voltage	А	AC 115V for door
(4)	Air condition type	F	F= Fix speed
(5)	Product Version	S	N/A

1-2. Main Feature & Model Number

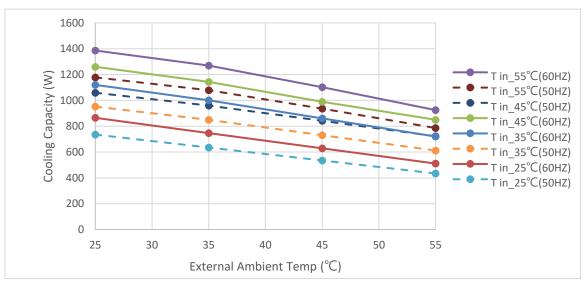
Dimensions, Weight & Mounting method				
Dimension (H x W x D) (Body only)	mm (inch)	810 x 299 x 240 (32" x 11.8" x 9.5")		
Application		Indoor / Outdoor		
Weight	Kg (lbs)	27.0(50.7)		
Mounting Method		Side mount		
Color (optional)		RAL7035		
Environmenta	Protection & Perfo	rmance		
Operating Temperature Range	°C (°F)	-10 to +55 (14 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, 280±10 g		
Protection for Dust ,Wind and Water (External)	IEC 60529 /NEMA	UL 50E TYPE 12		
Noise (1.5m)	dB-A	65		
Operating Status	N/A	LED Indicator / Display Board		
Cooling Capacity & Operational Data				
Cooling Capacity at L35/L35 (50/60HZ)	W (Btu/hr)	850(2672)/1000(3143)		
Cooling Current at L35/L35(50/60Hz)*	А	5.1/ 4.2		
Power & Range				
Input Voltage	VAC/Phase/Frequency	110/50/1,115/60/1		

Part no .:

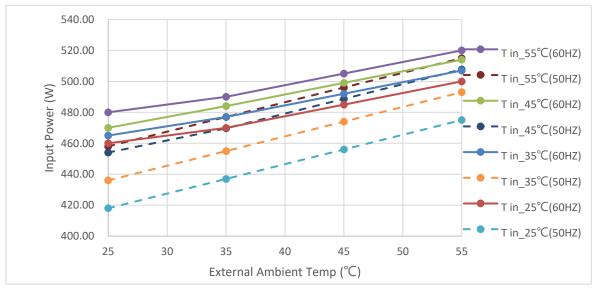
Delta model no.: HEC1000AFS

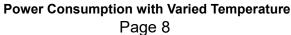
Input Voltage Range	VAC	103~121/50Hz,105~127/60Hz
Locked Rotor Current (60Hz)	A	15.9
Rated Current	A	6.4
Minimum circuit ampacity (MCA)	A	7.0
Maximum rating of overcurrent protective device (MOP)	A	15
Alarm	N/A	Dry Contact Output
К	ey Components	
Controller		Built-in Smart Controller
Fans		Delta High Efficiency Fans
Compressor		Rotary

*Followed thermal balancing test of DIN3168



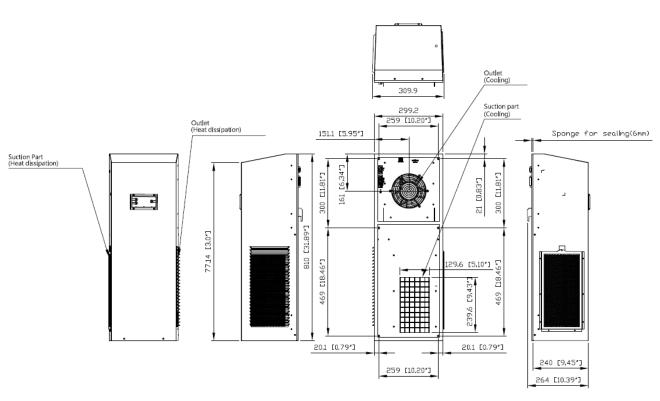
Cooling Capacity with Varied Temperature





Part no.: Delta model no.: HEC1000AFS

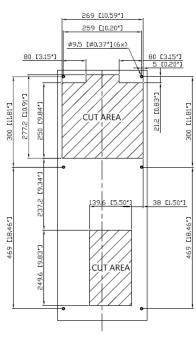
1-3. Dimension



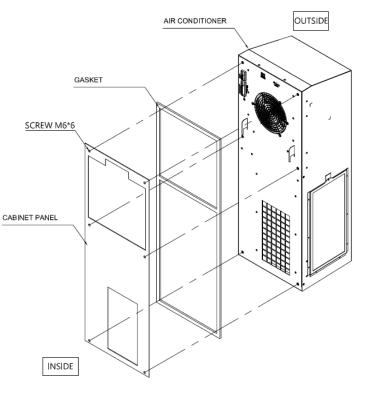
mm(inch)

- (1) Material: Case SGCC Sheet.
- (2) Finish: Powder coating 75 uM Min., Color RAL 7035.
- (3) Dimensional Tolerance: ±1 mm

1-4. Mounting plane Cutout



CABINET PANEL

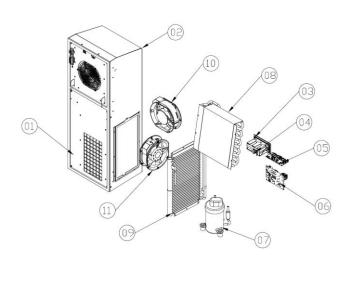


mm (inch)

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	Display Board
4	1	Driver Board
5	1	Remote Control Board
6	1	Power Board
7	1	Compressor
8	1	Condenser
9	1	Evaporator
10	1	Internal Fan
11	1	External Fan

NO.	Q'TY	DESCRIPTION	Spare part P/N
1	1	Case Chassis	N/A
2	1	Case Cover	N/A
3	1	Display Board	HEC1000BFC-000C3
4	1	Control Board	HEC0600AA-000C2
5	1	Communication Board	HEC0600AFA-000C4
6	1	Power Board	HEC3000BFR-000C1
7	1	Compressor	N/A
8	1	Condenser	N/A
9	1	Evaporator	N/A
10	1	Internal Fan	HEC0600AFR-A00F2
11	1	External Fan	HEC0600AFR-A00F2

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:

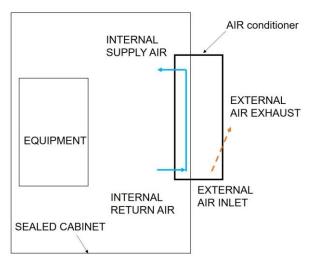
- 1. Check wires are connected correctly, and the insulation is not cracking or broken.
- 2. Use Self-test to check the unit running correctly or not. And the supplied air of internal side should be as cooled air.
- 3. Do not wipe the product with organic solvent, volatile substances like toluene or 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.</p>
- 8. The compressor electrical protecting cover is sealed with silicon for IP54 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.



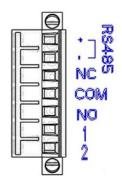
2. Electrical Specification

> Power Supply & Alarm Connector & Indicator

(1) AC Power Connect :

Pin	Description	Cable wire size	. © .	
1	PE	16 AWG	I I III	PE
2	N	16 AWG		N L
3	L	16 AWG	~ ⊚ °	

(2) RS485 and J1 Connect :



Part no.: Delta model no.: HEC1000AFS

J1 Pin Name	Description	
RS485 +	RS485 Communication	
RS485 -	RS485 Communication	
NC	Dry Output NC	
СОМ	Dry Output COM	
NO	Dry Output NO	
1	Door open alarm input	
2	Door open alarm input	

- System Alarm Default Setup
 - Specification: Contact rating: 2A@30 VDC / 2A@250 VAC
 - Normal: NC and COM dry contact output close
 - Alarms happening: NC and COM dry contact output open

(Dry Contact will trigger when alarm happen except E2.6 and E5.1) (3) Panel operation :

• A: Display:

8888	7-Segment Display	
© STATUS	Status LED	
†	Up	
+	Down	
4	Parametric Setup	

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

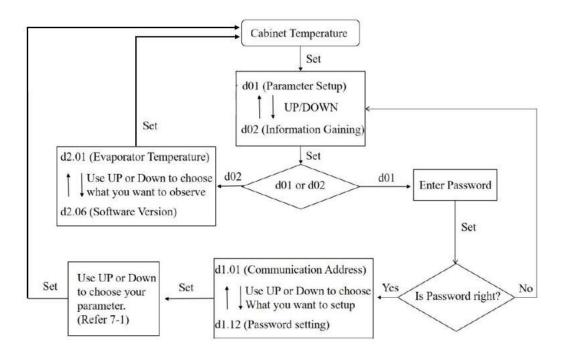
- B: LED indicator:
 - When the system power on and the LED will light in green.

If any alarm happens, according to flashing times of red led to check the root cause.

If the system gets into self-test mode and the LED will flash in green.

- C: Press Buttons:
 - ♦ ↑: UP or increase
 - ↓: DOWN or decrease
 - SET: Parametric setup

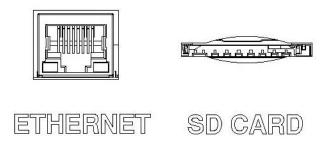
(4) Panel Operation Flowchart :



☆ If no button is pressed, after 20 seconds, the panel will return to the Cabinet Temperature screen.

* The default value of Password is 0001.

> SD card & Ethernet (Optional function):



The controller used communication technology to remotely control, monitor, SD card 8 GB for logging data and alarm the cooling function of the ACU. This can be done using a RJ45 or RS485 connected to an industrial network or a personal computer (PC) connected to an Internal local area network.

3. Environmental Condition

Operating Temperature

-10°C ~ +55 °C (14 °F ~ +131 °F)

Storage Temperature -40 °C ~ +70 °C (-40 °F ~ 158 °F)

> Operation Humidity

External air loop: 0 ~ 100 % RH Internal air loop: 0 ~ 80 % RH, non-condensing

Ingress Protection Rating

UL TYPE 12

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 IP54 / NEMA 4X
Salt fog test (external side)	IEC 60068-2-52, 6cycles
Package bump	IEC 60068-2-29

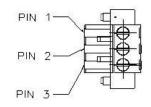
5. Safety Certification

TBD

6. Accessory

Power and Alarm Cable :

Pin	Description	Cable wire size
1	PE	16AWG
2	Ν	16AWG
3	L	16AWG



7. Parameters

7-1 Parametric Setup

Display	Description	Range			
d01					
d1.01	Communication Address	1~128, (Default=21)			
d1.02	Communication speed (Baud rate)	0 : 9600 1 : 19200 (Default=0)			
d1.03	Compressor turn on temperature setting	20~50, (Default=40)			
d1.04	Compressor hysteresis set point setting	1~10, (Default=5)			
d1.05	Cabinet over temperature point setting	20~80,(Default=65)			
d1.06	System self-test	0: off 1: on (Default=0)			
d1.07	Door open alarm function	0: Disable 1: Enable (Default=0)			
d1.08	Dry contact setting	0: normal Open 1: normal Closed (Default=1)			
d1.09	System parameters recovery	0: off 1: on (Default=0)			
d1.10	Heater turn on temperature setting	N/A			
d1.11	Heater hysteresis set point setting	N/A			
d1.12	Password setting	Default= 0001			
	d02				
d2.01	Evaporator temperature	Display			
d2.02	Condenser temperature	Display			

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d2.03	Ambient temperature Display	
d2.04	Internal fan speed	N/A
d2.05	External fan speed	N/A
d2.06	Firmware version	Display

% d1.10 and d1.11 are option functions. Default is closed.

% d2 layer is for system status information read only.

7.2 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.

Alarm Items	Type of alarm	Alarm code
	Evaporator low temperature alarm	E 2.1
	Cabinet high temperature alarm	E 2.2
Temperature protection alarm	System high pressure alarm	E 2.4
	System high pressure frequent alarm	E 2.5
	Cabinet low temperature alarm	E 2.6
Temperature sensor abnormality	Cabinet temperature sensor fault alarm	E 3.1

7.3 Alarm Logs & Fault Processing

Part no.:

Delta model no.: HEC1000AFS

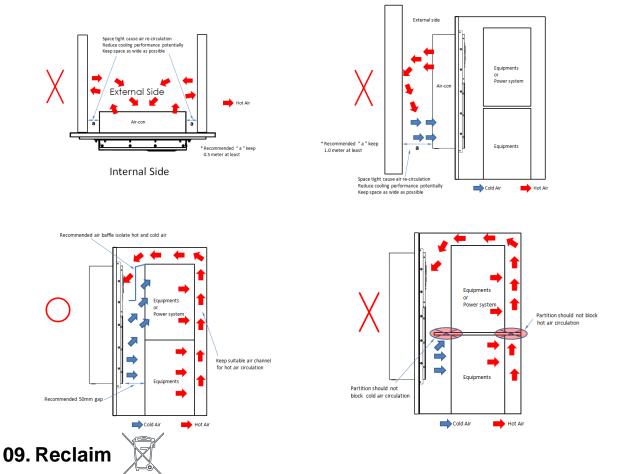
	Evaporator temperature sensor fault alarm	E 3.2
	Condenser temperature sensor fault alarm	E 3.3
	Ambient temperature sensor fault alarm	E 3.4
Control board exception	EEPROM abnormal alarm	E 5.1
System exception	Compressor failure alarm	E 6.2
	Door Open Alarm	E 6.3

Fault Analysis and Processing

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

8. Installation Notice

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



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	DESCRIPTION	RIPTION DRAWN	CHECKED			APPROVED	ISSUE
	DRAWN	ME	EE	CE	APPROVED	DATE	
00	ISSUE SPEC	Rex Lyu 10/14'20	Rex Lyu 10/14'20	Allen.Huang 10/14'20		MARS.WU 10/14'20	10/14'20