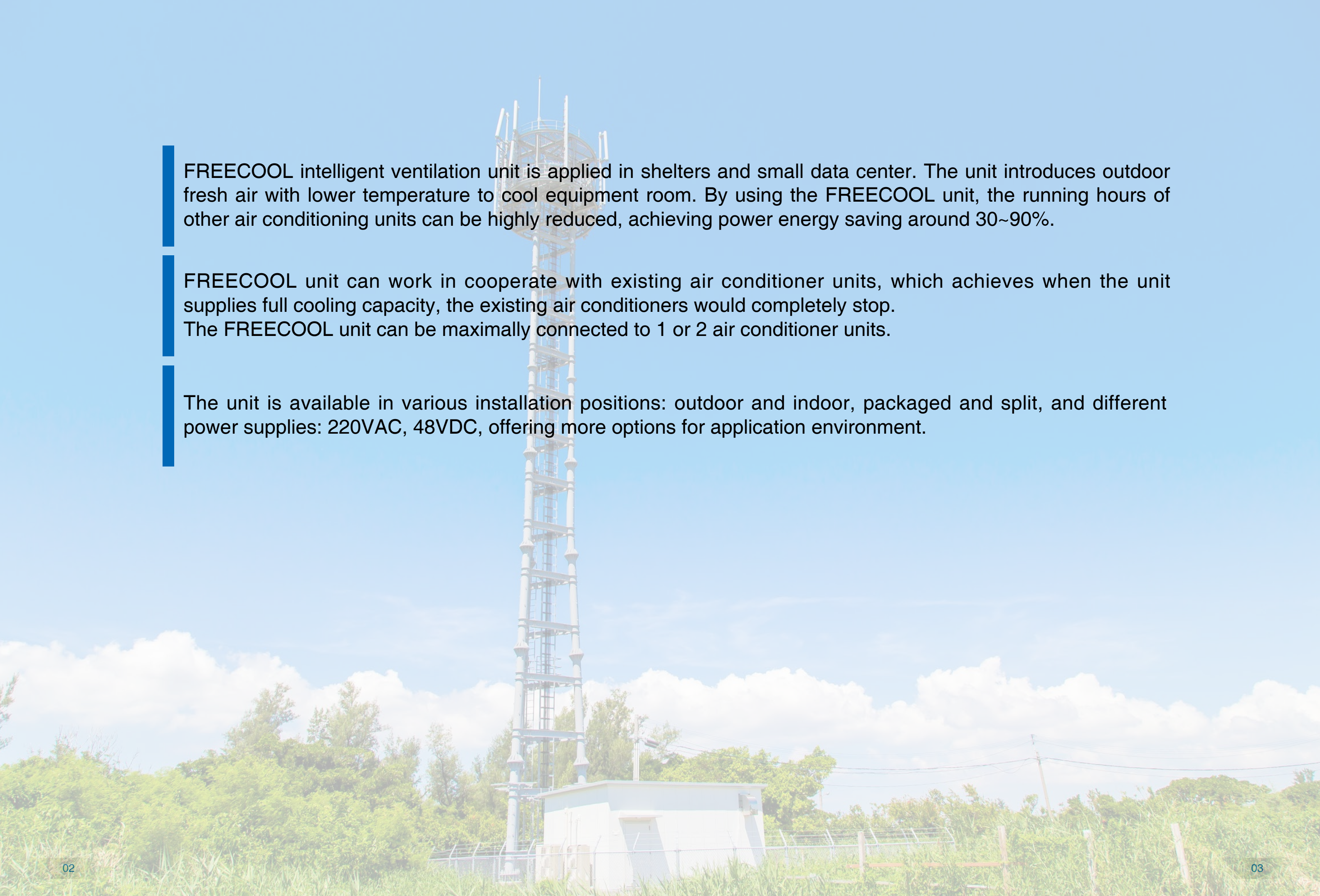


# FREECOOL

Intelligent Control Free Cooling Box

Air Volume: 1000~3450m<sup>3</sup>/h



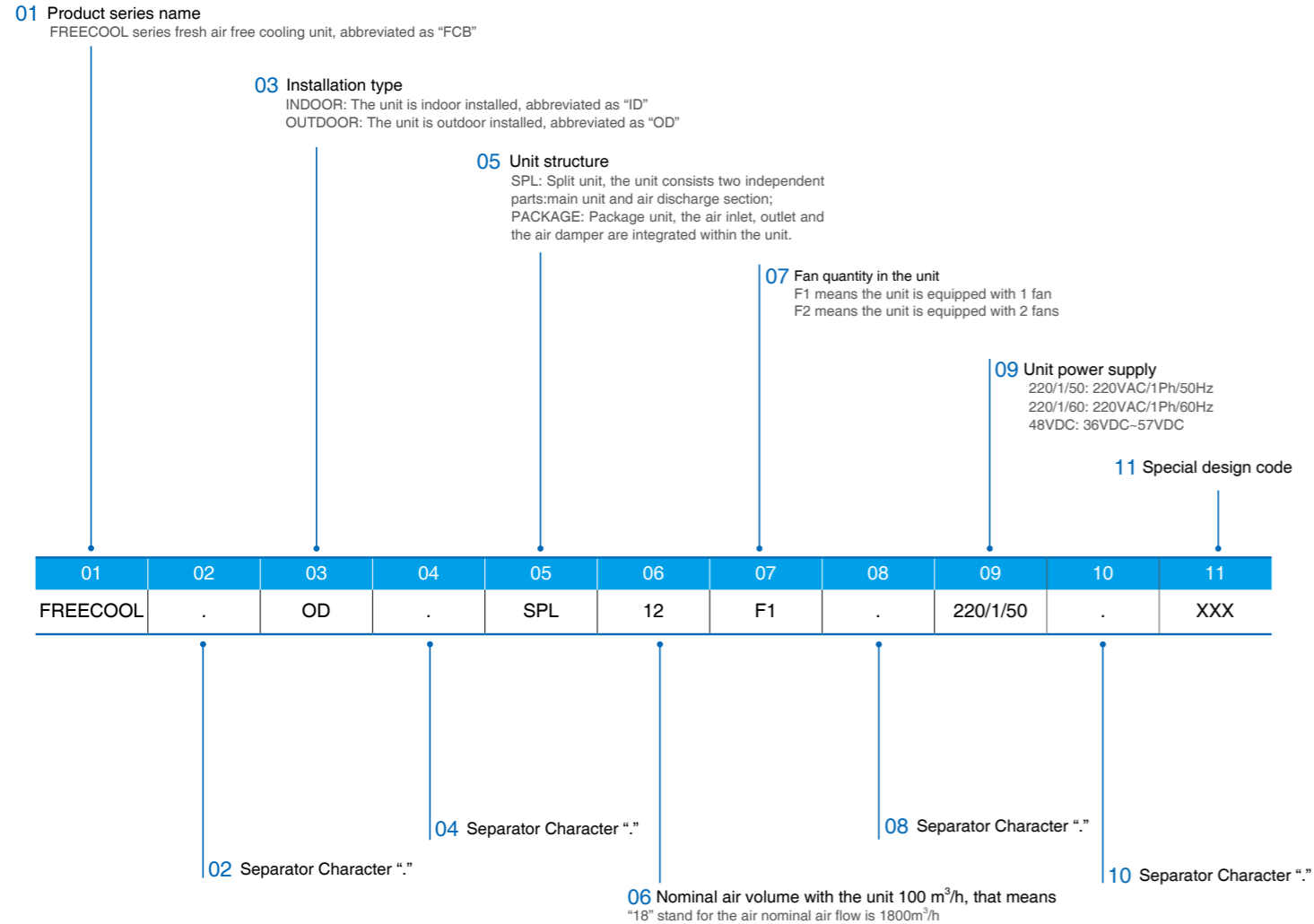


FREECOOL intelligent ventilation unit is applied in shelters and small data center. The unit introduces outdoor fresh air with lower temperature to cool equipment room. By using the FREECOOL unit, the running hours of other air conditioning units can be highly reduced, achieving power energy saving around 30~90%.

FREECOOL unit can work in cooperate with existing air conditioner units, which achieves when the unit supplies full cooling capacity, the existing air conditioners would completely stop. The FREECOOL unit can be maximally connected to 1 or 2 air conditioner units.

The unit is available in various installation positions: outdoor and indoor, packaged and split, and different power supplies: 220VAC, 48VDC, offering more options for application environment.

# Unit Identification



# Working range

**Working range of power supply:**  
35VDC ~ 57VDC ( Direct current units )  
220V±15% ( Alternate current units )

**Working range of power supply:**  
Temperature: -30°C~55°C  
Humidity: 5~95%

**Storage Environment:**  
Temperature: -40°C~70°C  
Humidity: 5~95%

# Applications

Various telecommunication base stations  
Power distribution stations

Advanced technology electronic devices switching rooms  
Industrial process control centers

# Product configuration

## Standard components

- Cabinet is made of folded steel plate painted with grey powder of epoxy resin.
- Backward curved, EC centrifugal fan directly coupled with 48V DC motor (Only available for FREECOOL.DC units)
- Backward curved, centrifugal fan directly coupled with 220V AC motor (Only available for FREECOOL.AC units)
- G4 washable main air filter  
G2 nylon pre-filter
- Control box, includes: contactor, relay and circuit breaker etc.
- Gravitational Pressure Relief Valve (air discharge) (Only available for SPLIT units)
- Electric motorized air damper with actuator (Only available for PACKAGE units)
- Rain hood at air inlet (Only for indoor installed units)
- Rain hood at air outlet (Only for SPLIT type units)
- Micro control system, include:
  - Micro-processor
  - Room temperature sensor
  - Outdoor temperature sensor

## Optional components

- G4 disposable filters
- Differential pressure switch for filter clogged
- Electric heater (Only available for packaged units with single fan)
- Supply air temperature
- Electric motorized air discharge valve
- Inverter for 24V to 48V
- RS232 communication interface card
- RS485 communication interface card
- PCOWEB internet communication card
- Clock card
- Contactor for existing air conditioners (with 1 or 2 existing air conditioners)
- Humidity sensor

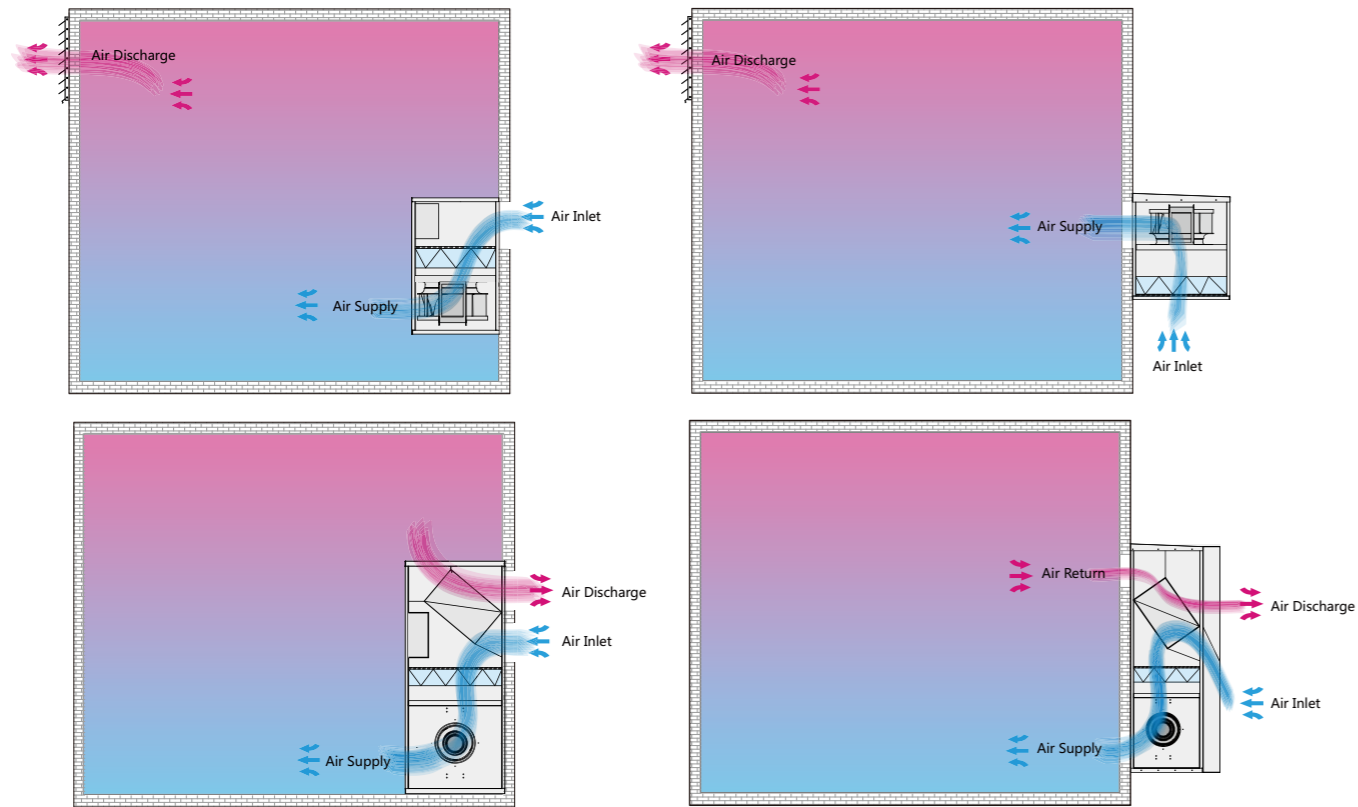
# Working Principle

When FCB is applied in shelters, FCB will be the main cooling provider which will control air conditioners to work in cooperate, supplying required cooling capacity.

When air conditioner fails and the room temperature is higher than emergency setting temperature, FCB will switch on in emergency mode.

When the outdoor temperature is lower than room temperature, FCB turns on to bring fresh air outdoor to cool the room. When FCB cannot provide enough cooling capacity, FCB will turn on the air conditioner to supply cooling in assist.

Below drawings show the air flow of both package type and split type FCB.

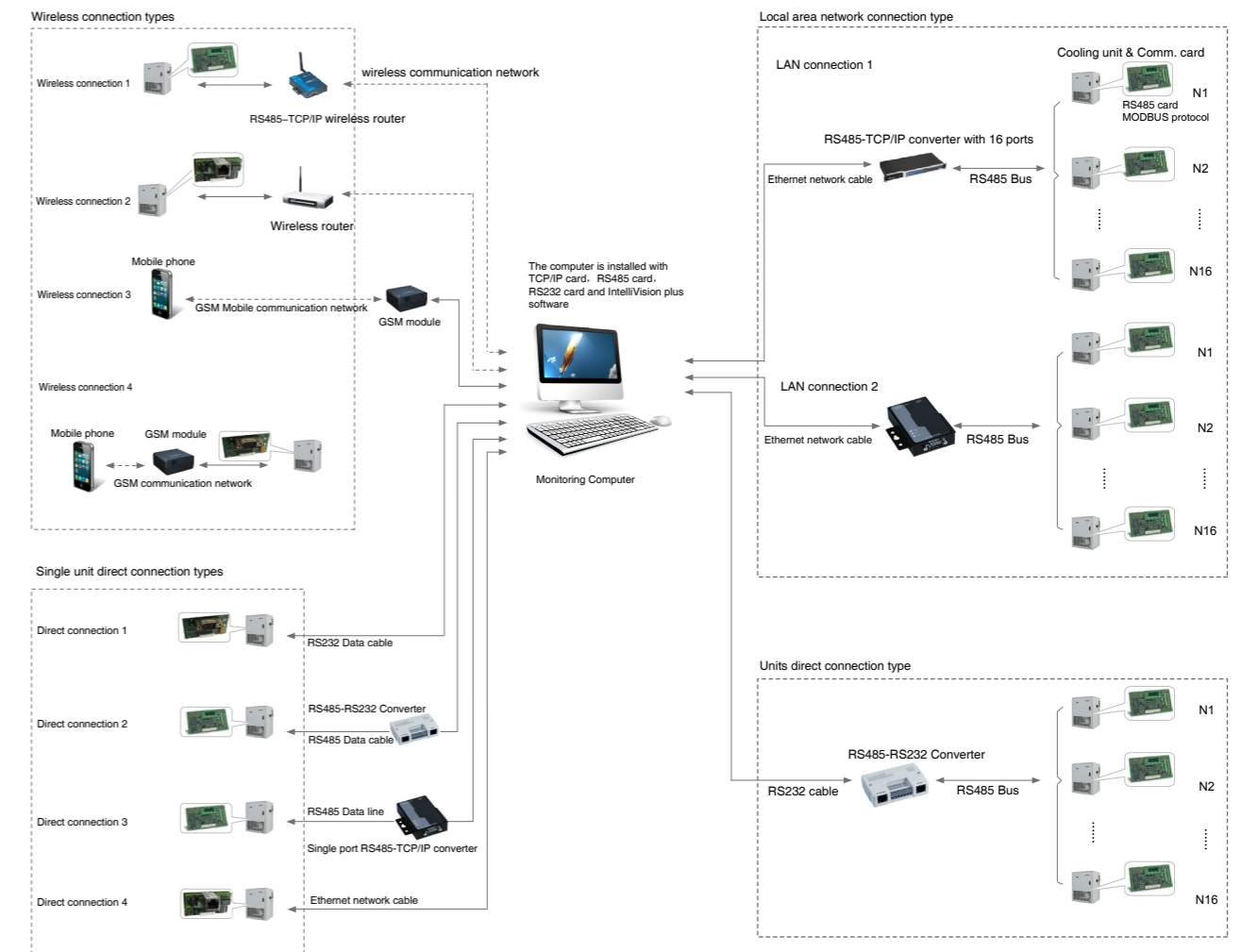


# Remote Control and Monitoring

The remote monitoring and control system can be easily connected with the units to realize remote real time monitoring and control and save the running data.

The unit can be remote controlled by many kinds of methods as follows:

- 4 kinds of wireless network connection with computer
- 3 kinds of local direct connection with computer
- 3 kinds of LAN network connection with computer



# Main Features

## High energy efficiency

Using the FREECOOL unit, the running hours of other air conditioning units can be highly reduced.

## Good structure design and easy maintenance

The main components such as: fan, motor, damper, controller and other related components can be accessed and maintained in front of the unit.

## Strong structure

The unit passed a transportation test to confirm the structure is strong enough to be able to transport on low grade ways.

## Smaller dimensions

The unit has a smaller dimension because of compact optimized structure design. Its volume is the smallest among the products with similar performance.

## Flexible installation

There are 4 types of installation structures for this series product, which includes: indoor installed packaged type, indoor installed split type, outdoor installed packaged type, and outdoor installed split type, which can meet all the installation demands of the most application.

## EC fan

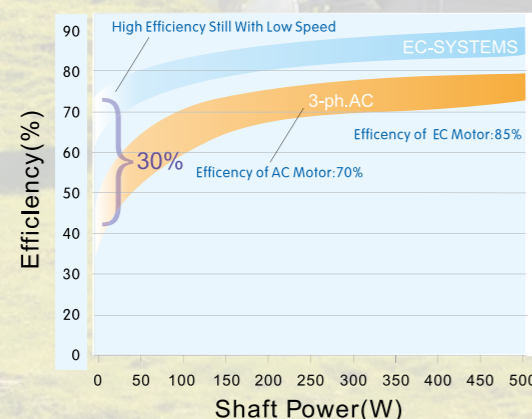
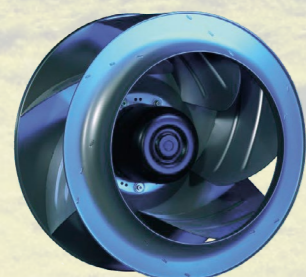
Fan is a core component in the unit. FREECOOL.DC unit is equipped with EC centrifugal fan with the following features:

High efficiency of motor

Fan rotation speed is adjustable; the energy consumption at low rotation speed is much lower than the high speed.

Emergency free cooling is available when the AC power fails.

Comparing with axial fan, it would not lose much air volume due to pressure drop.



## Intelligent Control

FREECOOL unit is controlled by microprocessor. All the components in the unit work fully automatically, realizing maximum energy saving without manual operation. All protections and alarms are automatically raised.

## Control to the other air conditioner

After a power failure, when the power is recovered, the unit will restarts. The FREECOOL unit is able to control other air conditioner.

When the FREECOOL unit can fully meet the cooling demand of base station, the controller can send a signal to stop the other air conditioner in the base station.

## Completely auto protection

The controller monitors the running status of all the components and will stop the running of relative component and raise an alarm if any failure.

## Emergency free cooling

When AC power fails, the unit can keep working as emergency free cooling by 48VDC supplied by battery in shelters (Only available for the FREECOOL.DC units).

## Data log

The controller has a bigger memory to log the running data of a year. All these data can also be sent to the remote control and monitoring system so that the customers can analyze the working performance and energy saving amount accordingly.

## Remote control and monitoring (Optional)

The unit can be installed with a RS232 or RS485 communication card to realize remote control and monitoring by the BMS system with open communication protocol.

## PCOWEB internet communication (Optional)

The unit can be equipped with a PCOWEB internet communication card with TCP/IP protocol and Ethernet work to realized remote control and monitoring. Each computer can be connected to the web server by Ethernet network and understand the working status and control the unit in time everywhere.

## Humidity control (Optional)

Humidity sensor (optional) can prevent from introducing high humidity inside. With humidity sensor, free cooling unit will turn off when the humidity of outdoor air is higher than humidity limitation to avoid the BTS equipment working at high humidity air environment, which may cause failures and damages of electronic devices.

# Unit Specification

## *FREECOOL.OD/ID.PCK*

Unit Model		12F1	18F1	24F1	30F2	35F2
<b>Air flow</b>	m <sup>3</sup> /h	1000	1450	2050	2650	3000
<b>Cooling capacity</b>						
Δt=5°C	kW	1.7	2.4	3.4	4.5	5.0
Δt=10°C	kW	3.4	4.9	6.9	8.9	10.1
Δt=12°C	kW	4.0	5.9	8.3	10.7	12.1
<b>Power supply</b>						
48VDC						
Fan		Single inlet backward curved EC centrifugal fan				
Qty.	n.	1	1	1	2	2
Power input	kW	0.08	0.22	0.23	0.34	0.47
Current	A	1.70	4.50	4.70	7.00	9.80
<b>Power supply</b>						
220VAC(Only available for ID installation unit)						
Fan		Single inlet backward curved centrifugal fan				
Qty.	n.	1	1	1	2	2
Power input(1)	kW	0.13	0.18	0.39	0.36	0.50
Current(1)	A	0.55	0.76	2.10	1.52	2.20
Power input(2)	kW	0.10	0.16	0.23	0.30	0.33
Current(2)	A	0.85	1.30	1.10	2.45	2.70
<b>Noise (*)</b>	dB(A)	52	55	57	54	57
<b>Dimensions</b>						
W*D*H(ID)	mm*mm*mm	650*500*1100			750*600*1400	
Weight(ID)	kg	60	60	65	85	85
W*D*H(OD)	mm*mm*mm	650*550*1320			750*630*1620	
Weight(OD)	kg	65	65	68	115	115

- (1) Power supply is 220V/1Ph/50Hz;
- (2) Power supply is 220V/1Ph/60Hz;
- (3) The noise of 1 meter away from the unit.

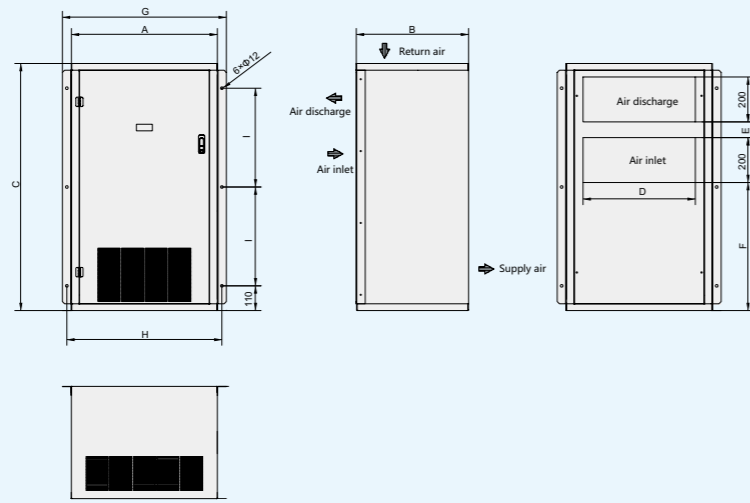
## *FREECOOL.OD/ID.SPL*

Unit Model		12F1	18F1	24F1	30F1	35F1
<b>Air flow</b>	m <sup>3</sup> /h	1000	1750	2050	3030	3450
<b>Cooling capacity</b>						
Δt=5°C	kW	1.7	2.9	3.4	5.1	5.8
Δt=10°C	kW	3.4	5.9	6.9	10.2	11.6
Δt=12°C	kW	4.0	7.1	8.3	12.2	13.9
<b>Power supply</b>						
48VDC						
Fan		Single inlet backward curved EC centrifugal fan				
Qty.	n.	1	1	1	1	1
Power input	kW	0.08	0.22	0.23	0.26	0.41
Current	A	1.70	4.50	4.70	5.50	8.60
<b>Power supply</b>						
220VAC (Only available for ID installation unit)						
Fan		Single inlet backward curved centrifugal fan				
Qty.	n.	1	1	1	1	1
Power input(1)	kW	0.13	0.18	0.39	0.38	0.57
Current(1)	A	0.55	0.76	2.10	1.70	2.70
Power input(2)	kW	0.10	0.16	0.23	0.25	0.45
Current(2)	A	0.85	1.30	1.10	1.30	2.20
<b>Noise (*)</b>	dB(A)	49	51	53	55	58
<b>Dimensions</b>						
W*D*H(ID)	mm*mm*mm	550*450*700		600*500*900		
Weight(ID)	kg	40	40	42	48	50
W*D*H(OD)	mm*mm*mm	550*550*600		610*610*630		
Weight(OD)	kg	38	38	40	45	45

- (1) Power supply is 220V/1Ph/50Hz;
- (2) Power supply is 220V/1Ph/60Hz;
- (3) The noise of 1 meter away from the unit.

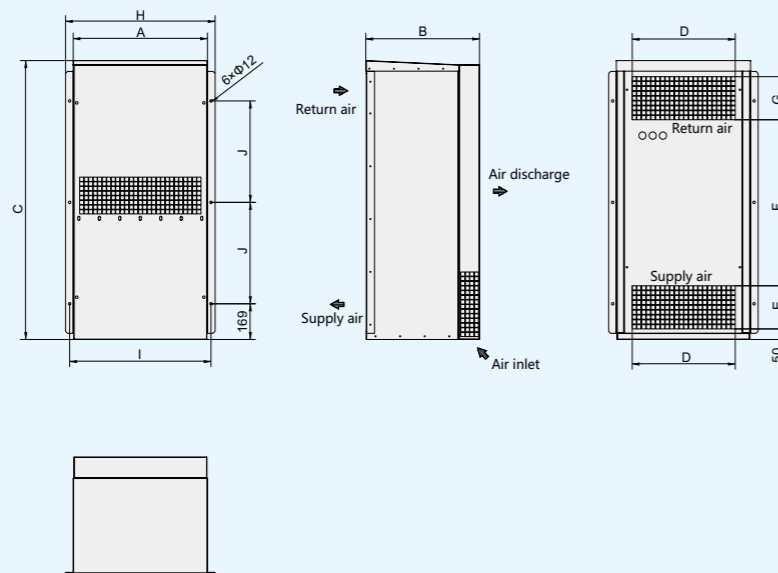
# Dimensioned drawings

## Indoor installed packaged units



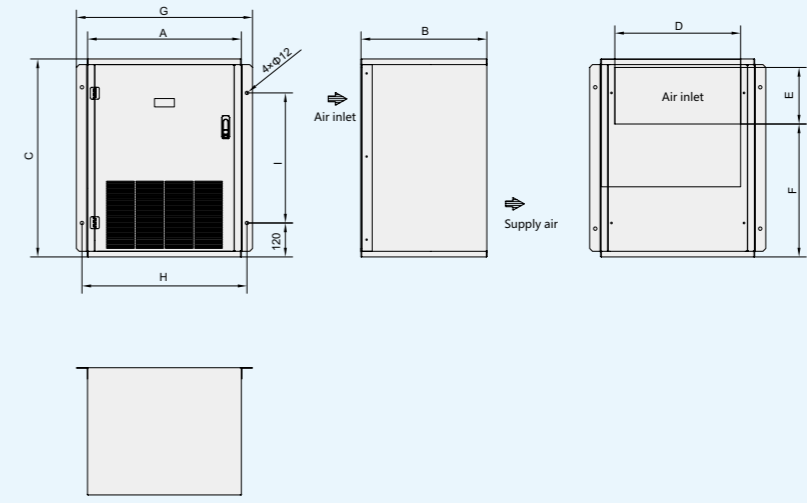
Model	A	B	C	D	E	F	G
FCB.ID.PCK.12F1	650	500	1100	500	70	570	730
FCB.ID.PCK.18F1	650	500	1100	500	70	570	730
FCB.ID.PCK.24F1	650	500	1100	500	70	570	730
FCB.ID.PCK.30F2	750	600	1400	560	120	820	830
FCB.ID.PCK.35F2	750	600	1400	560	120	820	830

## Outdoor installed packaged units



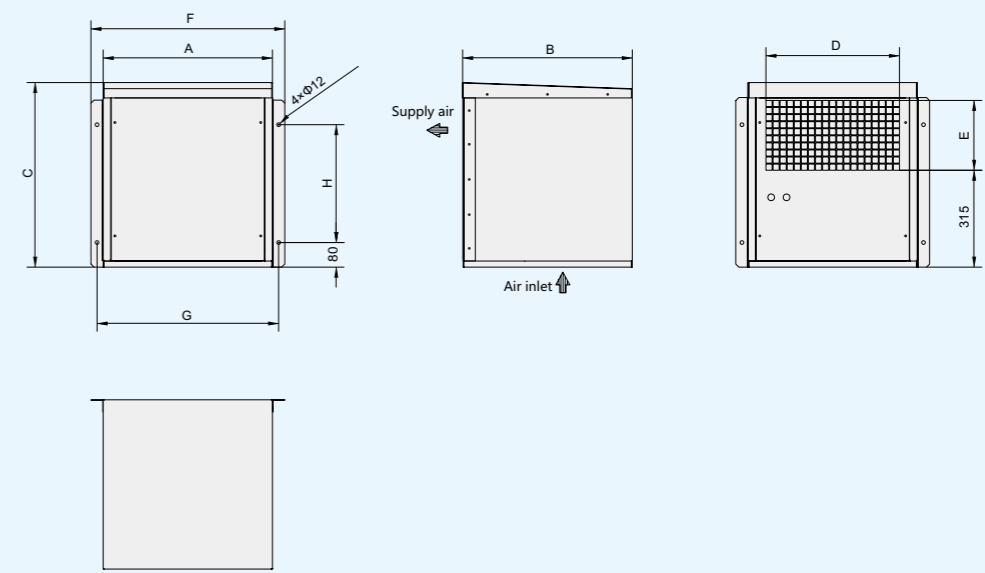
Model	A	B	C	D	E	F	G	H	I
FCB.OD.PCK.12F1	650	550	1320	500	785	200	55	500	730
FCB.OD.PCK.18F1	650	550	1320	500	785	200	55	500	730
FCB.OD.PCK.24F1	650	550	1320	500	785	200	55	500	730
FCB.OD.PCK.30F2	750	630	1620	600	820	470	50	340	830
FCB.OD.PCK.35F2	750	630	1620	600	820	470	50	340	830

## Indoor installed split units



Model	A	B	C	D	E	F	G
FCB.ID.SPL.12F1	550	450	700	450	200	470	630
FCB.ID.SPL.18F1	550	450	700	450	200	470	630
FCB.ID.SPL.24F1	600	500	900	500	310	560	680
FCB.ID.SPL.30F1	600	500	900	500	310	560	680
FCB.ID.SPL.35F1	600	500	900	500	310	560	680

## Outdoor installed split units



Model	A	B	C	D	E	F
FCB.OD.SPL.12F1	550	550	600	420	225	630
FCB.OD.SPL.18F1	550	550	600	420	225	630
FCB.OD.SPL.24F1	610	610	630	480	255	690
FCB.OD.SPL.30F1	610	610	630	480	255	690
FCB.OD.SPL.35F1	610	610	630	480	255	690



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**Airsys Refrigeration Engineering Technology (Beijing) Co., Ltd.**

Add: 10th floor, Hongkun Shengtong building, 19, Ping Guo Yuan Xi Xiao Jie, Shijingshan, Beijing, China 100043  
Tel: +86(0)10 68656161

**Gu'an Airsys Environment Technology Company Ltd.**

Add: 25, Dongfang Street, Gu'an Industry Park, Langfang City, Hebei Province, China  
Tel: +86(0)10 68656161

**Shanghai Aierserve HVAC System Service Co., Ltd.**

Add: #7-2, No.658, Daduhe Rd., Putuo District, Shanghai, China, 200333  
Tel: +86(0)21 62452626 Fax: +86 (0)21 62459622

**AIRSYS Australia Sales Office**

Add: PO BOX 1088, Flagstaff Hill, SA, 5159, Australia  
Tel: +61 479151080

**AIRSYS BRASIL LTDA.**

Add: Av. Moaci, 395 Conj 35/36 04083-000 – Planalto Paulista SAO PAULO – SP  
Tel: +55 (11) 25976817 / +55 (11) 21585560

**AIRSYS Deutschland GmbH**

Add: Dahlweg 120a, D-48153 Münster Germany  
Tel: +49 (0) 25197307478 Fax:+49 (0) 251-97307479

**AIRSYS Klima Sanayi ve Ticaret A.Ş.**

Add: Barbaros Mah. Evren Cad. Erzurumlular Sk. No:23 Ataşehir / Istanbul Turkey  
Tel: +90(216) 4706280 Fax: +90(216) 4706290

**AIRSYS North America, LLC**

**ICT Cooling:**

Add: 915 De La Vina St. Santa Barbara, CA 93101, USA  
Tel: +1 (805) 312 7563 Call Centre: +1 (855) 874 5380

**Medical Cooling:**

Add: 3127 Independence Dr Livermore, CA 94551, USA  
Tel: +1 800 7131543

**AIRSYS Singapore Pte. Ltd**

Add: 12 Lorong Bakar Batu #06-01 Singapore (348745)  
Tel: +65 62787188 Fax: +65 68416301

**AIRSYS (UK) Ltd.**

Add: 245 Europa Boulevard, Warrington, UK. WA5 7TN  
Tel: +44 (0) 1925 377 272 Call Centre: +44(0)8456099950

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