

MOBILECOOL-OUTDOOR

Air Conditioner for Telecommunication Base Station
Cooling Capacity: 3.8kW-18.2kW





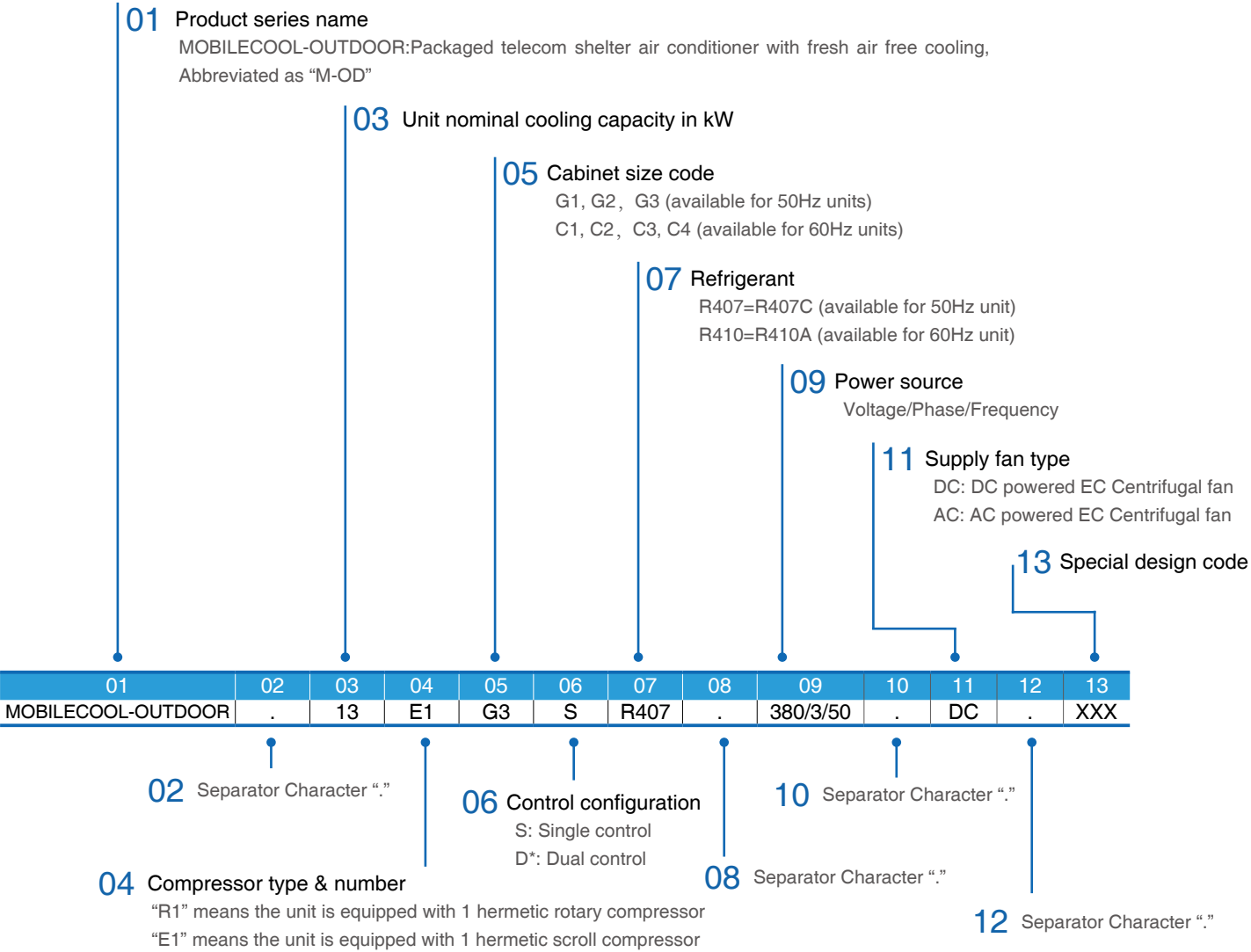
The MOBILECOOL-OUTDOOR product range is just one of many within the AIRSYS BTS air conditioner family. As with all AIRSYS products, the MOBILECOOL-OUTDOOR units have been designed to safely work across a range of operating conditions, with high efficiency, green refrigerant, and various power supply and installation arrangements.

Incorporating the latest technology and current design philosophies, the MOBILECOOL-OUTDOOR range offers outstanding performance and value.

The MOBILECOOL-OUTDOOR product is an outdoor packaged unit, complete with integrated refrigeration system, free cooling capability and controls.

All components and systems are assembled and fully tested prior to leaving the factory, including the default control parameters; once a unit has been installed on site, it may be used as soon as power is available.

Unit Identification



For example:
M-OD.13E1G3SR407.380/3/50: stands for M-OD unit with 13 kW nominal cooling capacity, equipped with 1 hermetic scroll compressor; cabinet size is G3. Single control; R407C refrigerant; The power supply is 380V/3Ph/50Hz.

Note: * If dual control units are ordered, one AIRSYS Lead-Lag Control box is required.

As an international supplier of ICT refrigeration solutions, AIRSYS takes into consideration global variations in power supplies. As shown in the table below, in addition to the standard power sources with blue backgrounds, a variety of alternative electrical supply options (grey background) are available to meet the needs of users in different regions.

50Hz(R407C)	Single Control	5R1G1	7E1G2	10E1G2	13E1G3	18E1G4
		220V/1PH/50Hz&48VDC		380V/3PH/50Hz&48VDC		
				220V/1PH/50Hz&48VDC		
				220V/1PH/50Hz		
	Dual Control			380V/3PH/50Hz		
		5E1G1				
		220V/1PH/50Hz&48VDC				
		220V/1PH/50Hz				
	Single Control	5R1G1	7E1G2	10E1G2	13E1G3	18E1G4
		220V/1PH/60Hz&48VDC		380V/3PH/50Hz&48VDC		
				220V/1PH/50Hz&48VDC		
				220V/1PH/50Hz		
	Dual Control			380V/3PH/50Hz		
		5E1G1				
		220V/1PH/50Hz&48VDC				
		220V/1PH/50Hz				

60Hz(R410A)	Single Control	3R1C1	5R1C1	7E1C2	10E1C2	13E1C3	18E1C4
				230V/1PH/60Hz&48VDC			230V/1PH/60Hz
				230V/1PH/60Hz			
				230V/3PH/60Hz&48VDC			
				230V/3PH/60Hz			
				380V/3PH/60Hz&48VDC			
	Dual Control			380V/3PH/60Hz			460V/3PH/60Hz
			5E1C1				
			230V/1PH/60Hz&48VDC				
			230V/1PH/60Hz				
		3R1C1	5R1C1	7E1C2	10E1C2	13E1C3	18E1C4
				230V/1PH/60Hz&48VDC			
				230V/1PH/60Hz			
				230V/3PH/60Hz&48VDC			
				230V/3PH/60Hz			
				380V/3PH/60Hz&48VDC			
				380V/3PH/60Hz			460V/3PH/60Hz
			5E1C1				
			230V/1PH/60Hz&48VDC				
			230V/1PH/60Hz				

Note: Power source with 48VDC means units configured with 48VDC powered EC supply fan.

When the user choose dual control units, they can refer to the following table for AIRSYS Lead Lag Control Box model to match the units:

Units	Dual Control Box Model
50Hz units with AC powered EC fan	ASLLC.2A.50
50Hz units with 48VDC powered EC fan	ASLLC.2A.48.50
60Hz units with AC powered EC fan	ASLLC.2A.60
60Hz units with 48VDC powered EC fan	ASLLC.2A.48.60

Working Range and Control Accuracy

Indoor side: Temperature range and accuracy: 5℃~32℃±1℃	Outdoor side: -30℃~53℃	Location: Temperature: -40℃~70℃ Humidity: 5~95%
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Applications

Various telecommunication base stations	Advanced technology electronic devices switching rooms
Power distribution stations	Industrial process control centers

Unit Main Components

Standard Components

Unit base and frame

Unit base is made of folded sheet steel coated with grey epoxy resin powder.
Unit frame is made of folded sheet steel and assembled with bolts or rivets. The surface of unit frame is coated with grey epoxy resin powder.

Unit panel

Unit panels are made of folded sheet steel and affixed to the unit frame with bolts or rivets. The surface of panels is coated grey epoxy resin powder.

Mechanical cooling system

Scroll compressor with crankcase electric heater (available for 7/10/13/18kW units) / Rotary compressor (only available for 3/5kW unit)
Filter dryer
Thermodynamic expansion valve
Evaporator: made of high efficiency heat exchanging copper tube with continuously enhanced aluminum finning.
Condenser: made of high efficiency heat exchanging copper tube with continuously enhanced louvered aluminum finning.
Auto reset type high/low pressure switch

Condenser fan

Axial propeller fan with directly coupled motor, internal thermal protection and external current protection.

Air Filter

G4 main air filter, 2"disposable pleated type.
G2 nylon filter, at outside air inlet.

Free cooling system

Motorized air damper:
Galvanized steel damper blade with jamb and head seals to prevent leakage when closed.
Damper blade is covered with insulating material to ensure good sealing performance.
Damper actuator:
24VAC power supply and maximum ~90 seconds open or close time, with spring return to close upon unit shutdown.

Supply fan

DC powered EC centrifugal fan (except for 18kW unit)

Electric control

Standalone controls, with all the electric components enclosed in an independent housing.
Micro miniature breaker: every load is equipped with a separate micro miniature breaker.
Phase and over-current protector (only for 3 phases power source).
Control transformer
Power switch: change the voltage from AC to DC, used for 24VDC controller and damper actuator.
Controller
User terminal
Return air temperature sensor
Outdoor temperature sensor
Humidity sensor

Optional Components

AIRSYS Lead Lag Control

As for single control units, dual-control units contain all the electric components within an independent housing, while the Lead-Lag controller is a separate unit which is installed within the telecom shelter (like a head to control two units).

Hermetic Scroll Compressor (available for 5kW unit)

AC powered EC fan

If there is no stable DC power supply on site, the customer can choose M-OD units configured with AC powered EC fans.

Inverter Power (only available for 60Hz units)

An inverter power model must be chosen for M-OD unit configured with AC powered EC fan to make sure that the supply fan can still work in free cooling mode. On sites with only 24VDC, choose ASPCB.2.24, to transfer power supply from 24VDC to 220VAC/1Ph/60Hz; on site with only 48VDC, choose ASPCB.2.48, to transfer power supply from 48VDC to 220VAC/1Ph/60Hz.

Electric heating elements

2.25kW and 4.5kW options and related control components.

Air pressure switch for clogged filter

The clogged-filter alarm will be triggered if the optional air pressure differential switch is installed across the filter bank.

Air filter protection device

The AFPD is an AIRSYS-patented product, which has been developed to maximize the filter working life and enable free cooling to function in harsh environments such as sand storms, dust and other adverse weather conditions. This reduces both service costs and energy consumption.

Supply air temperature sensor

A supply air temperature sensor installed in the mixing box can be used to control the position of the air damper.

Anti-corrosion condenser

Condenser coil coated with PoluAl XT* anti-corrosion coating. Aluminum fin, copper tube.

* AIRSYS imported and incorporate BLYGOLD high quality and reliable anti-corrosion coating PoluAl XT for condenser coil protection.

Remote communication card (only available for 60Hz units)

RS485 or RS232 communication card with MODBUS communication protocol.
Network server: remote monitor and control after being equipped with IP address.

Clock card (only available for 60Hz units)

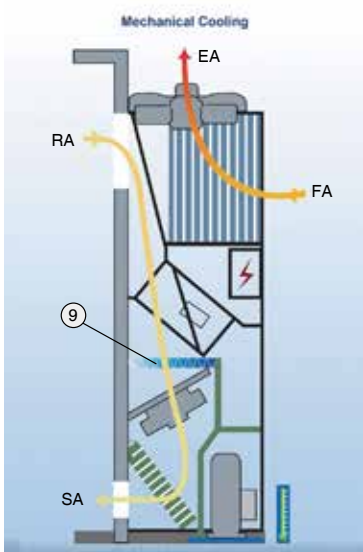
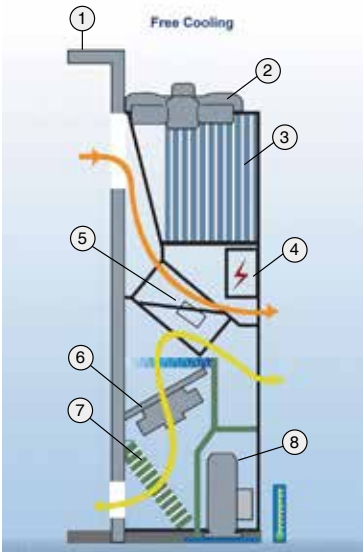
Enables calendar function for convenient operation and management.

PGD user terminal (only available for 60Hz units)

60Hz units are standard configured with simple three key user terminal which can only show three digits. The user can choose to configure PGD user terminal with text display function.

Working Principle

Cooling Mode

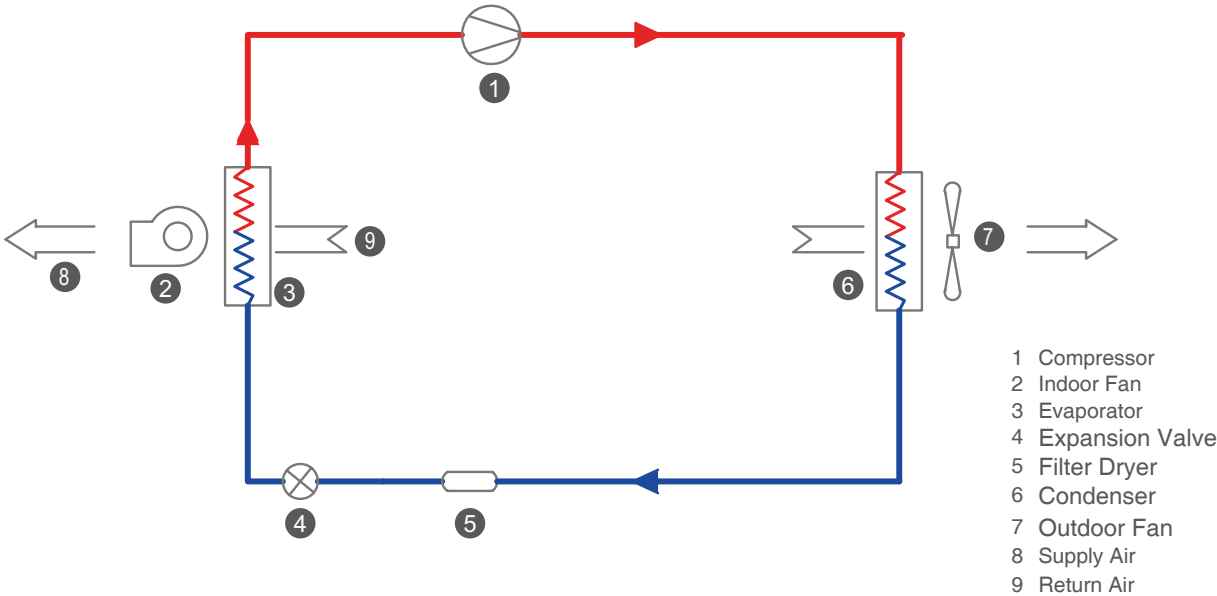


1. Shelter infrastructure
2. Condenser fan
3. Condenser
4. Electric control box
5. Air damper

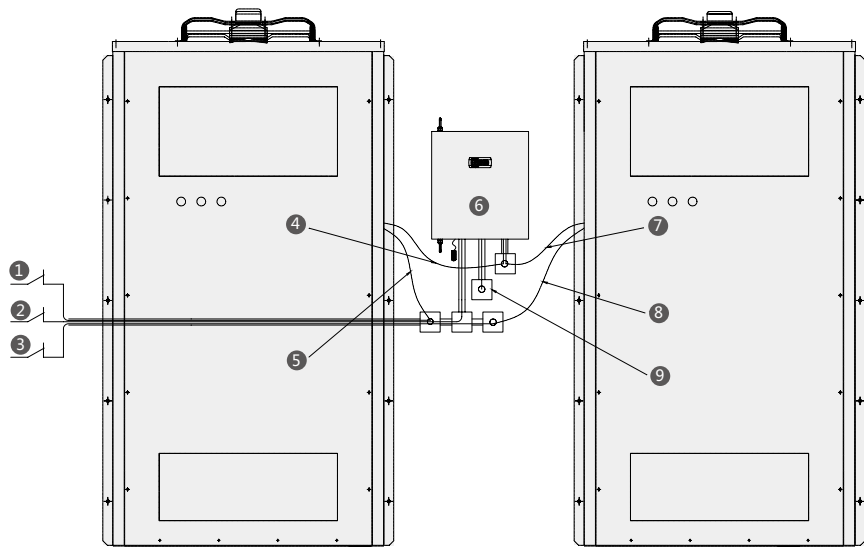
6. Supply fan
7. Evaporator
8. Compressor
9. Air filter

- EA:Exhaust air
RA:Return air
FA:Fresh air
SA:Supply air

Mechanical Refrigeration System Schematic



Dual Units Arrangement



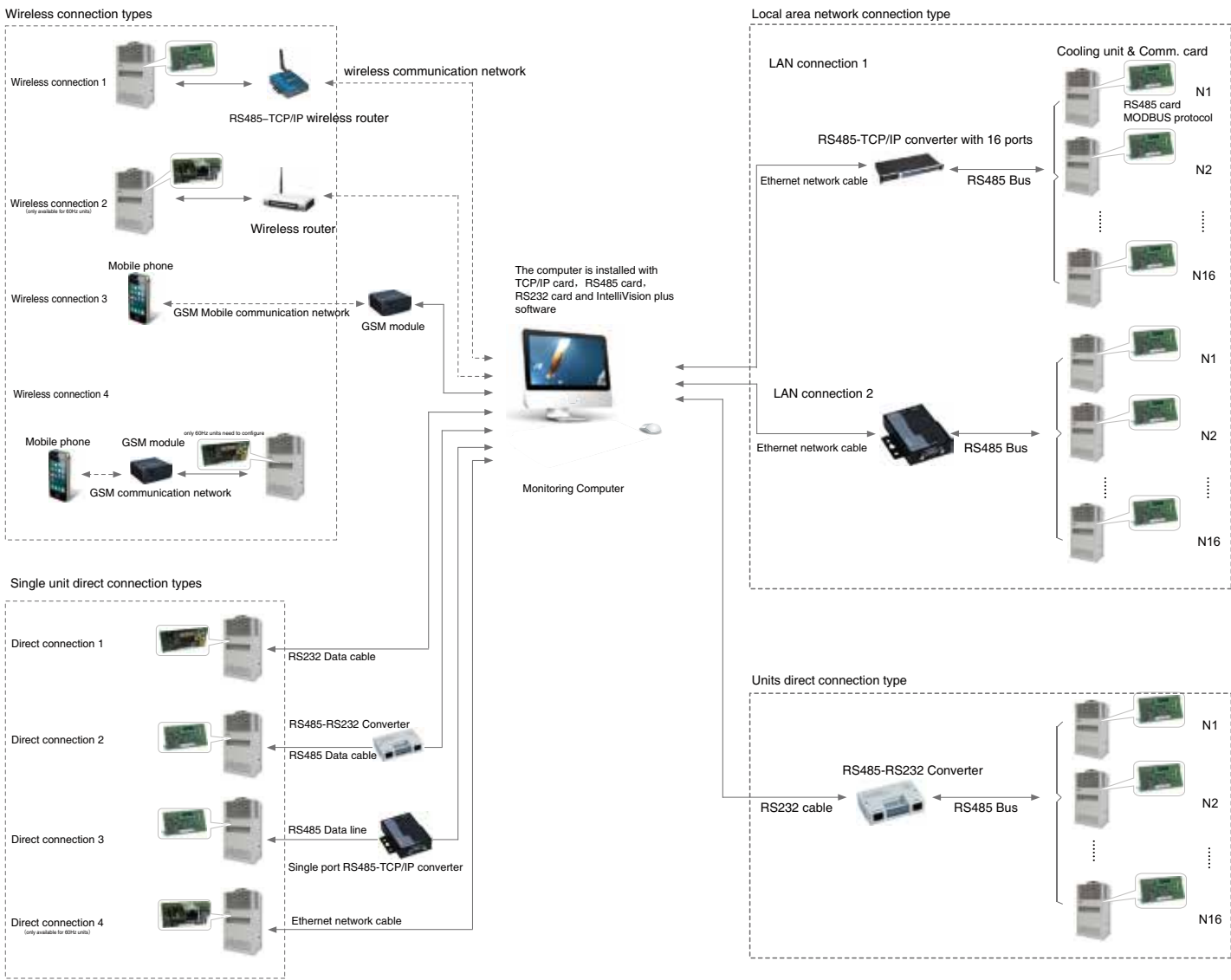
Free cooling operation conditions: When outdoor temperature is suitable, the two units will work simultaneously to minimize energy consumption through supplying maximum free-cooling capacity by using the EC fans.

Mechanical cooling operation conditions: When room temperature reaches mechanical cooling set point, the two units will work alternately with lead lag control logic.

Remote Control and Monitoring

The remote monitoring and control system can be easily connected with the units to enable remote real-time monitoring and control and save the logged data.

The various methods of remote control are as follows:



Main Features

Energy-saving operation

When the outdoor and indoor temperature difference meets the free cooling requirement (2°C default, adjustable), the free cooling system will automatically bring in outside air to the room and stop the mechanical cooling system, therefore reducing power consumption.

When the temperature difference between indoor and outdoor is higher than 10°C, the free cooling system can supply 100% of the cooling capacity, saving up to 90% of the energy requirements.

Good structural design for easy maintenance

The main components such as compressors, fans, motors, dampers and other related items are all easily accessible and maintained from the front of the unit.

The weight of each panel is less than 10kg for ease of removal and reinstatement.

Strong structure

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

Dual cooling source

Each unit is equipped with both mechanical cooling system and free cooling system as standard. The fresh air free cooling is designed to be the primary source of cooling.

Corrosion-proof (optional)

The standard unit framework is supplied with corrosion protection treatment. The treatment is sufficient to provide protection for 15 years life cycle for inland installation.

If necessary, the treatment for sea air environment can be supplied as an option.



Wide working range

The unit can work at minimum -30°C, maximum 53°C ambient temperature continuously and reliably.

High capacity air filter

When the pressure drop across the filter reaches 250Pa, the unit air flow will not be lower than 90% of design air flow at standard operating conditions.

High torque and low leakage air damper

The air filter is equipped with a high torque and low leakage air damper. The time for opening and closing the damper is less than 90 seconds.

The Air Leakage across the damper is less than 5% by volume of the air normally passing through the unit when a reverse pressure of 125 Pa is applied.

Compact dimensions

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

Fully automatic control

The unit is equipped with a full automatic control system; all control, protection, alarm functions are automatic with auto-restart.

Auto changeover of working mode

The unit automatically selects between mechanical cooling and free cooling modes. In the event of either electrical or mechanical failure affecting the refrigeration system, the unit will be capable of automatic reversion to the fresh air cooling mode.

Random restart when power recovered

Once power has been restored (following an outage), the unit will restart automatically with a random time delay between 1 to 60 seconds to avoid multiple items of equipment starting at the same time.

Automatic self-diagnosis

All the components connected to microprocessor are continuously tested. In case of malfunction, the failure is shown on the display with relevant information.

Comfort mode

When a service engineer is working in the base station,

HVAC comfort mode (72°F/22°C,adjustable) can be selected by pressing 2 buttons on the user terminal.

Emergency ventilation function

The emergency ventilation function can be enabled or disabled on site.

If it is enabled, the emergency ventilation function will be engaged once the room temperature exceeds the heat-protection setpoint for internal equipment. The emergency will be triggered at any time other than when fire/smoke alarm has been triggered.

Humidity limitation

This control function can be enabled or disabled on site.

If it is enabled, when the humidity is higher than the setpoint, free cooling will be turned off in order to stabilize the inside humidity within the base station.

Web server monitoring

The unit can be equipped with a Web Server card with TCP/IP protocol and Ethernet work to enable remote control and monitoring. Each computer can be connected to the web server by Ethernet network to view the working status and control the unit remotely.

Voltage protection

There is a voltage relay for protection. When the supply voltage is over the permitted range, the unit will be stopped.

For 3 phase units, if there is phase unbalance or phase absence, the unit will also be stopped for protection.

Auto-sequencing: equalize runtime of all units (Available for dual control system)

Where 2 units are installed on a site, the controller will automatically change the Lead unit according to its total runtime, in order to equalize runtime between units.controller can store at least 48 hours working data.



Data output

A facility for a connection RS485 of a computer lead to enable automatic downloading of logs and parameters into either a CSV file or Excel file.

Auto-changeover (Available for dual control system)

Upon failure of Lead unit, Lag unit operates

Web server monitoring

The unit can be equipped with a Web Server card with TCP/IP protocol and Ethernet work to enable remote control and monitoring. Each computer can be connected to the web server by Ethernet network to view the working status and control the unit remotely.

Automatic maintenance test

A maintenance test facility is provided to enable an engineer to press/select one button that will activate a self-test routine.

The self-test routine will check for the satisfactory operation of the fresh air damper and the compressor refrigerant circuits.

This is achieved by applying a dummy return air temperature signal, slowly ramping up from a point below the system set point to a high temperature level thereby testing the damper operation (via changes in the supply temperature).

The system stops the supply fan for a controlled period, to simulate the low pressure of refrigeration system and to check if the low pressure protection working normally.

The system stops the condenser fan for a controlled period, to simulate the high pressure of refrigeration system and to check if the high pressure protection working normally.

Running data logging

The controller has a memory of 1MB for data logging.

If the interval of data logging is less than 5 minutes, the controller can store at least 48 hours working data.

4 levels of password protection

There are 4 levels of password protection for the control system:

Read only: for regular operation access

Read/write: Suitable for maintenance personnel

Maintenance & commissioning: Suitable for commissioning engineers

OEM: Suitable for the engineer from manufacturer

Unit Specification

50Hz

Unit Model		5R1G1	7E1G2	10E1G2	13E1G3
Air flow scheme		DL			
Refrigerant		R407C			
Cooling Capacity					
Total cooling capacity(1)	kW	5.3	7.4	10.6	13.6
Sensible cooling capacity(1)	kW	4.5	6.5	9.1	11.7
Free cooling capacity (2)	kW	4.5	6.0	8.4	11.1
Compressor					
Type		Hermetic rotary	Hermetic scroll		
Power input(1)	kW	1.45	1.95	2.78	3.50
Current(1)	A	6.8	3.6	4.9	7.2
Supply fan					
Type		48VDC powered EC fan			
Qty	n.	1	1	1	2
Air volume	m³/h	1300	1800	2500	3300
Power input	kW	0.15	0.22	0.45	0.65
Current	A	3.1	4.6	9.4	13.5
Condenser fan					
Type		Axial fan			
Qty	n.	1	1	1	1
Air volume	m³/h	3000	4000	5800	7500
Power input	kW	0.27	0.40	0.56	0.90
Current	A	1.35	2	2.88	4.42
Electric heater (3)					
Type		Stainless steel			
Heating Capacity	kW	2.25	4.5	4.5	4.5
Current	A	9.8	19.6	19.6	19.6
Air filter					
Preliminary filter		G2 Nylon Net Pre-filter			
Main filter		disposable pleated type			
Power supply					
Power source		220VAC/1Ph/50Hz & 48VDC	380VAC/3Ph/50Hz & 48VDC		
Unit dimensions and weight					
Width	mm	620	929	929	1079
Depth	mm	620	694	694	694
Height	mm	1951	2151	2151	2151
Weight	kg	162	248	261	287

(1) The cooling capacity@Tindoor 26.7°C, Twb 19.4°Cand Toutdoor 35°C, compressor operating;
(2) The cooling capacity@indoor temperature and outdoor temperature difference (ΔT) is 10°C, compressor not operating;
(3) Optional.

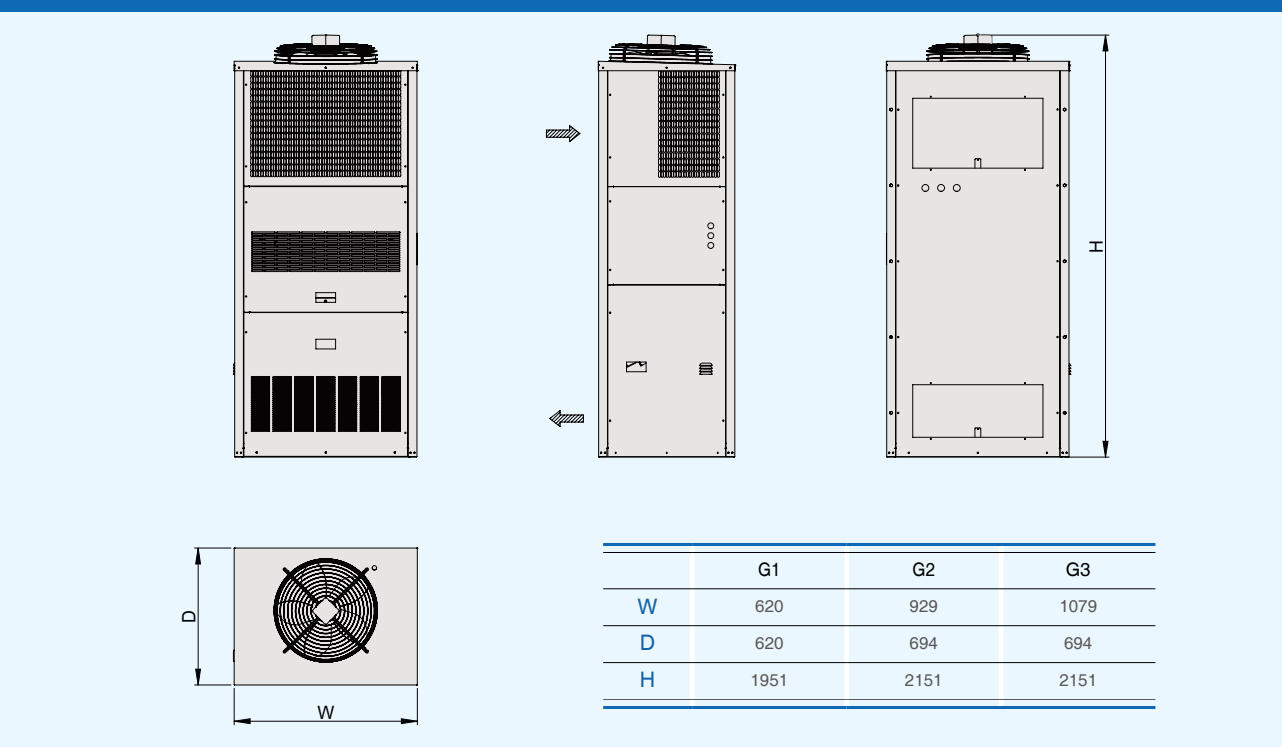
60Hz

Unit Model		3R1C1	5R1C1	7E1C2	10E1C2	13E1C3	18E1C4
Air flow scheme		DL					
Refrigerant		R410A					
Cooling Capacity							
Total cooling capacity(1)	kW	3.8	5.6	7.6	9.5	13.4	18.2
Sensible cooling capacity(1)	kW	3.1	4.5	6.6	8.2	11.0	15.8
Free cooling capacity (2)	kW	4.0	5.0	7.0	9.1	10.1	16.1
Compressor							
Type		Hermetic rotary		Hermetic scroll			
Power input(1)	kW	0.92	1.50	1.95	2.39	3.50	4.95
Current(1)	A	4.4	7.0	8.9	10.8	16.2	22.4
Supply fan							
Type		48VDC powered EC fan					
Qty	n.	1	1	1	1	2	2
Air volume	m³/h	830	1120	2060	2200	2800	3780
Power input	kW	0.10	0.15	0.22	0.25	0.40	0.55
Current	A	2.13	3.13	4.58	5.21	8.33	3.40
Condenser fan							
Type		Axial fan					
Qty	n.	1	1	1	1	1	1
Air volume	m³/h	3000	3000	3700	6200	6200	7560
Power input	kW	0.26	0.26	0.35	0.55	0.55	0.80
Current	A	1.20	1.20	1.60	2.60	2.60	3.55
Electric heater (3)							
Type		Electrode					
Heating Capacity	kW	2.25	2.25	4.5	4.5	4.5	4.5
Current	A	9.8	9.8	19.6	19.6	19.6	19.6
Air filter							
Preliminary filter		G2 Nylon Net Pre-filter					
Main filter		G4, 2" disposable pleated type					
Power supply							
Power source		230V/1Ph/60Hz & 48VDC					230V/1Ph/60Hz
Unit dimensions and weight							
Width	mm	700	700	1010	1010	1160	1360
Depth	mm	620	620	700	700	700	700
Height	mm	1930	1930	2130	2130	2130	2130
Weight	kg	157	162	234	240	287	323

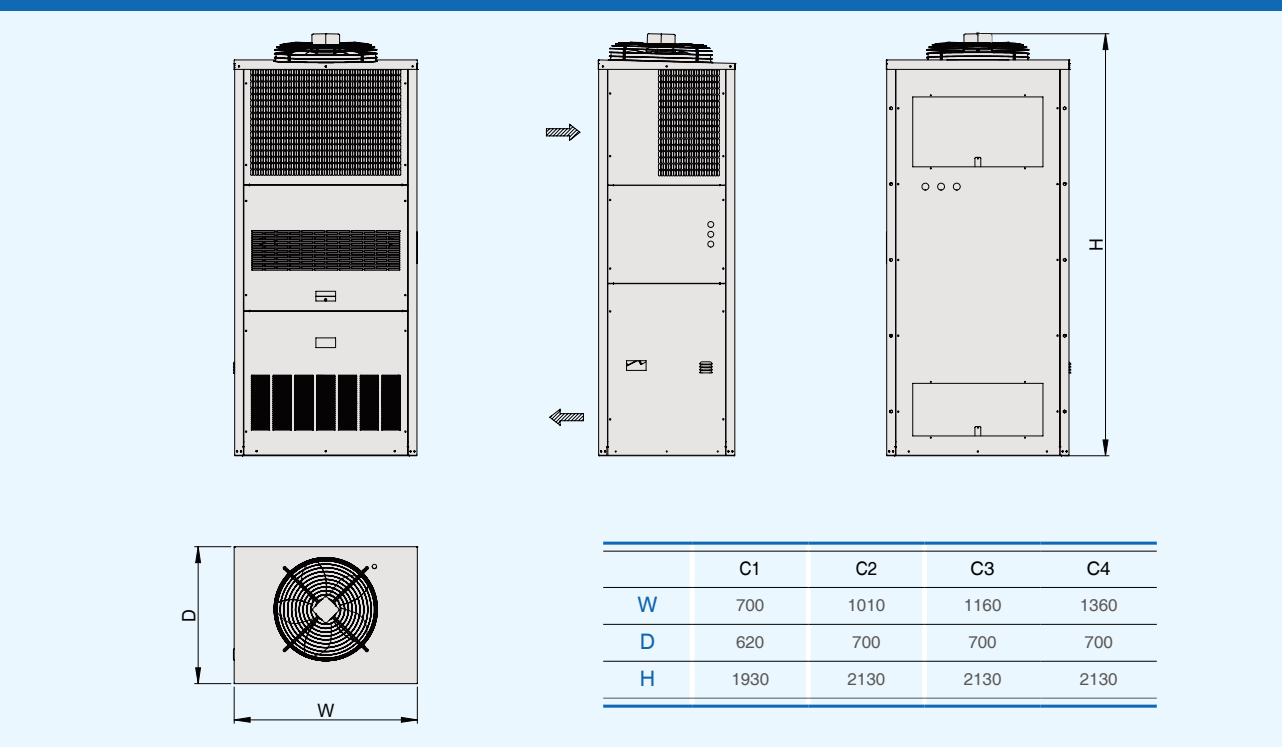
(1) The cooling capacity @ Tindoor 26.7°C, Twb 19.4°Cand Toutdoor 35°C, compressor operating;
(2) The cooling capacity @ indoor temperature and outdoor temperature difference (ΔT) is 10°C, compressor not operating;
(3) Optional.

Dimensioned drawings

50Hz



60Hz





AIRSYS



AIRSYS

Balance the Environment

AIRSYS is a cooling product and solution provider for ICT (Information & Communication Technology) industry.

The products include:

- Air conditioner and Chiller for IT room and large data center
- Intelligent Control system (BAS) for IT room and data center
- Air conditioning equipments for telecom shelters
- Intelligent control system for shelter cooling.
- Air conditioner and heat exchanger for telecom cabinets.

The solution include:

- Cooling system design
- System integration
- Installation and Commissioning
- Operation and Maintenance

AIRSYS is also a global leader in providing cooling solution for Medical Imaging System.



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