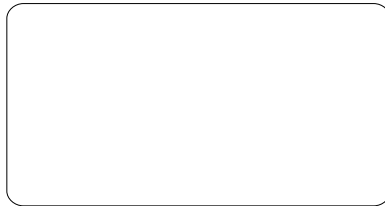




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King KINGAIR
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**Air Cooled Modular Close Control
 Air Conditioner for IT Room**

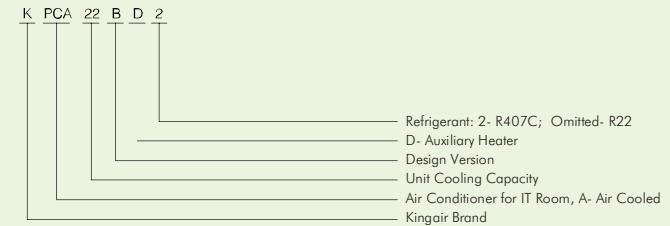
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Introduction

Air Cooled Modular Close Control Air Conditioner for IT Room is Kingair newly developed product based on years of design manufacturing and project experience of air conditioner for communication equipment. It aimed at features of communication equipment room such as high heat load, low humidity load, precise requirement on temperature and humidity, etc. It has high control accuracy, high sensible heat ratio, low noise, reliable performance for all-day operation, and is easy for installation and Unit is designed as module, and can be connected module by module into large capacity unit in order to meet different capacity required by computer room or data base. Unit can be widely used in communication, IT room, bank, internet center, financial securities, TV station, broadcasting station, test center and other isothermal and isohumidity occasion.

Nomenclature



Note: Front return and side supply unit is front return and top supply unit equipped with plenum chamber.

Product Features

- [1] Unit has 3 basic modules: 22, 27 and 37. User can choose and connect the 3 modules according to different capacity needs. Modules can be assembled, transported and installed together or separately, each module uses independent power source and water source, and connected with one another by communication cable.
- [2] Multiple modules unit can set main module and submodule; each module operate in turn so as to balance their running time.
- [3] Each module can be installed separately according to load distribution of the room, to avoid unbalance air flow of central air supply from integral unit and to balance temperature humidity deviation caused by uneven equipment heat radiation, so that indoor temperature and humidity distribution can be more even.
- [4] Different modules can be combined randomly, at most 8 modules can be connected together. Combination is flexible for future capacity adjustment.
- [5] Each unit is equipped with PLC and precise temperature and humidity sensor, and two system design. Temperature control accuracy is as high as $\pm 0.5^{\circ}\text{C}$, and humidity control accuracy $\pm 5\%$.
- [6] High sensible heat ratio, and energy-saving, to well fit in with thermal and humidity load of computer room.
- [7] Unit has applied world famous branded components for refrigeration system and electrical elements; all-day long stable and reliable operation during -15°C to 45°C ambient temperature.
- [8] Perfect self-diagnosis, alarm warning function, and auto startup after power-down.
- [9] Cooling and control system is independent so service work can be done while operating. Maintaining can be done at unit front.
- [10] RS485 and RS232 communication connection socket for network control is optional.
- [11] Applicable for Lonworks, Modbus and BACnet to connect with BMS.
- [12] R232 and GSM MODEM are optional so system can send alarm message to GSM cellphone and also accept its instruction.



Unit Components

1) Cooling System

- The unit is equipped with highly reliable USA Copeland hermetical scroll compressor with low noise, high efficiency and COP, long lifespan.
- The unit uses European/American imported component parts such as EMERSON, SPORLAN, DANFOSS, with reliable quality.
- Unit is using double independent circuits with high reliability and and larger adjusting range.

2) Evaporator Coil

- Manufactured from high pure seamless copper tube with aluminium split fin and is pressure bonded to the tubes through mechanical expansion to ensure the best optimum heat transfer capability.
- Aluminium fin has undergone hydrophilic and anti-rust treatment, thus it can effectively reduce the condensate water film thickness and decrease the film thermal resistance which thus enhancing the heat exchange rate of the coil.
- Huge air volume with large heat transfer area and high sensible heat ratio that enable it to match the condition room latent heat load.

3) Air Cooled Condenser Coil

- High efficient inner screw copper tube and louvered aluminum fin increased the total heat transfer coefficient by 67% than normal coil.
- It uses high efficiency imported axial fan (propeller fan). The fan blade is press casting with aluminium sickle shaped die to meet fluids aerodynamic theory; external motor rotor is of maze hermetic type and with a protection level of IP54. Whole fan blade and motor assembly have undergone dynamic balancing test and correction. Furthermore the solid rigid structure confirms the fan blade perform with a low noise level.
- Fan speed can be adjusted with 10%-100% of the nominal speed. By pairing with the unique designed liquid receiver, the unit can operate under cooling cycle for whole year to suit the communication room special requirement.

4) Centrifugal Fan

- Unit is equipped with the forward curve centrifugal fan blower wheel that comes with a dynamically balancing inspection $\pm 0.3\mu\text{m}$ tolerance.
- Every fan is driven by its individual motor and is suitable for long period operation with low noise and vibration.

5) Humidifier

- Using electrode dry steam humidifier without bacteria, odour and also intelligent coil cleaning and drainage control also suitable for all type of water quality.
- The humidifier section is isolated from the air handling system section, in order to reduce the airflow resistance and easy for maintenance.

6) Dehumidifier

- Unique design dehumidifying function plus couples with reheat coil enabling it to increase the dehumidifying effect while maintaining the airflow and room temperature.

7) Filter

- Uses G4 folded type non-woven fabrics air filter with larger filtering area, high filtration efficiency, less air resistance and long lifespan, so as to ensure room cleaning.

8) PTC Electrical Heater

- PTC Heater applied ceramic heating element, with low thermal resistance, quick heating, and safe performance. Even when the fan failed and stopped, and PTC heater can't get enough heat dissipation, its power will decrease rapidly, without heating the surface to red like electric tube heater, more reliable.
- 3 steps control, with high precision, maintain the temperature in dehumidifying process.

9) Control and Electrical Wiring

- Uses famous electrical control components such as SIEMENS, OMRON, etc.
- Every power components come with switches and contactor, with high reliability.

10) External Structural

- The unit structure and panels are using embedded paneling assembling. The casing is constructed using electro-galvanized mild steel sheet. The finishing of the casing uses long lasting electrostatic epoxy polyester powder coating. It is rigid, solid and easily harmonizes with the room interior decoration. Cover panel is applied with a layer of noise absorption sponge (fire retardant) to reduce the unit noise level.
- Side Panel applied design of "metal sheet-PE Insulation-metal sheet" to ensure good air tightness, reduce noise level and heat loss.

11) Microprocessor Controller

- Utilization of European branded PLC, large screen display and specialized program designed for computer room air conditioner, to execute intelligent control onto computer room space. With high accuracy temperature/humidity sensor, controller can operate within $16^{\circ}\text{C} - 28^{\circ}\text{C}$, 35%-60% RH, and response to slight deviation as low as $\pm 1^{\circ}\text{C}$ and $\pm 5\%$ RH.
- Perfect alarm system/protection function. Alarm function included: Compressor-High pressure, low pressure, overheat, and overload; air pressure difference, blower overload, and filter block; high/low temperature and humidity; besides, fire/smoke/water leakage alarm are also optional and can be interlocked with other safety devices to ensure safe operation of communication equipment.

Unit Controller

1. Automatic start after powerdown

User can choose this function to automatically start unit after powerdown.

2. Multiple code protection

To ensure safe operation, parameter setting has 3 level code: user level, maintenance level and factory level.

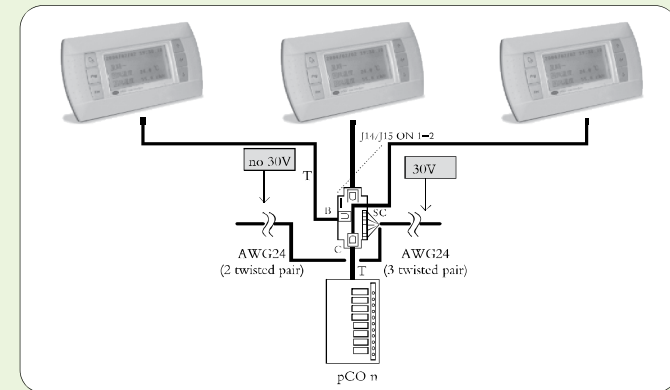
3. Standby unit automatic start

When any module unit linked in the network failed and stopped operation, standby module unit can automatically start.

4. Shared outside terminal

When units are linked under network control by communication cable, each module can be connected to separate remote controller and also to shared one, from which to set and check operation parameters of other module units.

Main module unit can be connected by outside terminal to as much as 3 remote controllers in different location (as shown below), and alarm data as well as controller parameters can be printed out, easy to operate.



5. Wear balancing

When cooling load is low, each module unit can operate in turn, so as to balance running time.

User can also set quantity of standby module units, then they can operate in turn with submodule units to balance running of standby module units and submodule units, and increase lifespan of the whole system.

6. Timing ON OFF

Clock Card is optional to set unit on and off time at some specific time or weekly.

7. Intelligent control


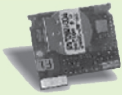


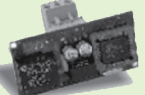

High precision temperature and humidity sensor is applied to allow controller respond to slight deviation as low as $\pm 0.1^{\circ}\text{C}$ and $\pm 0.1\%$ RH within the range of $15^{\circ}\text{C} - 30^{\circ}\text{C}$ and 35%RH-80%RH.

PLC applied Fuzzy Control Algorithm to control air cooling, heating, humidifying and dehumidifying, with high precision.

8. Complete failure check and protection

Unit alarm function included: compressor high pressure, low pressure, over heat, overload protection; air pressure difference protection, blower overload and filter block; high/low temperature and humidity; besides, fire /smoke /water leaking alarm are also optional and can be interlocked with other safety devices to ensure safe operation of communication equipment.

Optional Spare Parts

Name	Function	Photo
Black and White Touch Screen	Not only to display parameters as LCD, it can also display real-time curve of temperature and humidity.	
Colour Touch Screen	Colour Touch Screen has 1/4VGA resolution, with 5.7" screen and 32-bit CPU. It can display 256 color 320x240 photo, flash, Unicode unproportional font, temperature and humidity curve, and all parameters that can be displayed on LCD.	
Clock Card	To manage time and date, including related buffer RAM, and to record failure time.	
RS485 Serial Card	To connect with RS485 network, and workable for Modbus RTU Protocol, max baud rate is at 19200 bps to BMS.	
RS232 Serial Card	To connect with PTS or GSM modem, or connect one module to serial printer. After connecting GSM moden system can send failure message to GSM phone and accept on/off commend from GSM phone.	
Lonworks Serial Card	To connect with Lonworks network, contactor type: FIT10A78Kbs (TP/FT-10), baud rate is set at 4800, to connect with BMS.	
Ethernet™ Interface Card	To connect with BACnet™, Ethernet™, IP, SNMP V1,2,3, FTP and HTTP network, and to connect with BMS.	

Performance Parameter

Indoor Unit Model		KPCA22BD	KPCA27BD	KPCA37BD	
Capacity	Total/Sensible Capacity	kW 22.3/20.5	27.4/24.9	36.8/33.5	
	Sensible Heat Ratio	0.92	0.91	0.91	
Power Supply		380V/3 ~ /50Hz			
Nominal Power in Cooling		kW 8.42	11.12	13.5	
Max. Input Power		kW 20.4	24.2	31.1	
Indoor Air Supply	Air Volume	m³/h 7000	8400	10000	
	External Static Pressure (Pa) 3 modes air supply direction	Bottom	50	50	50
		Top	100	100	100
		Side	0	0	0
Fan Quantity		2	2	2	
Air Filter		G4, Washable Plate Filter			
Evaporator Coil	Type		Inner Screw Copper tube-Hydrophilic Aluminium Fin		
	Row		3	3	4
	Face Area	m² 0.87	1.1	1.1	
	On Coil Velocity	m/s 2.25	2.12	2.53	
Compressor	Type		Fully Hermetic Scroll Compressor		
	Regulation Range		0 ~ 50% ~ 100%		
	QTY		2	2	2
	Input Power	kW 3.1 x 2	4.1 x 2	4.7 x 2	
Ele. Heating	Type		PTC		
	Regulation Range		0 ~ 33% ~ 66% ~ 100%		
	Input Power	kW 9	9	12.5	
Humidifier	Type		Electrode Dry Steam Humidifier		
	Humidity Capacity	kg/h 4	4	9	
	Power	kW 3	3	6.75	
Dimension (L x W x H)	Bottom Supply	mm 1600 x 800 x 1950	1600x800x2060		
	Top Supply	mm 1600 x 800 x 1950	1600x800x2060		
	Side Supply	mm 1600 x 800 x 2250	1600x800x2360		
Gross Weight		kg 430	440	455	
Outdoor Unit	Type		Copper Tube/Aluminum Fin	Copper Tube/Aluminum Fin	Copper Tube/Aluminum Fin
	Model		KR18A	KR18A	KR24A
	QTY		2	2	2
Piping	Liquid Pipe Diameter		1/2"	1/2"	1/2"
	Gas Pipe Diameter		5/8"	5/8"	5/8"

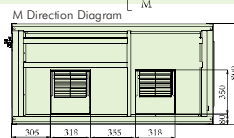
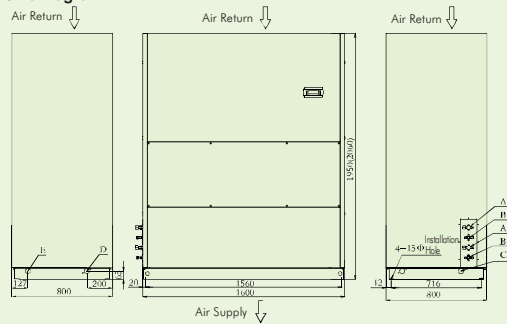
Note:
1) Indoor air return humidity: 23°C DB/17°C WB. Outdoor ambient temperature 35°C.

Module Combination

Nominal Cooling Capacity kW	Module Combination			Total Module Quantity
	KPCA22	KPCA27	KPCA37	
44.6	2	-	-	2
49.7	1	1	-	2
54.8	-	2	-	2
59.1	1	-	1	2
64.2	-	1	1	2
72	2	1	-	3
77.1	1	2	-	3
86.5	1	1	1	3
99.4	2	2	-	4
104.5	1	3	-	4
109.6	-	4	-	4
113.9	1	2	1	4
131.9	1	4	-	5
146.4	-	4	1	5
159.3	1	5	-	6
162.8	4	-	2	6
173.8	-	5	1	6
186.7	1	6	-	7
196.1	1	5	1	7
219.2	-	8	-	8
223.5	1	6	1	8
232.9	1	5	2	8
243.1	1	-	6	7
257.6	-	-	7	7
270.5	1	1	6	8
279.9	1	-	7	8
285	-	1	7	8
294.4	-	-	8	8

Unit Outlook Diagram

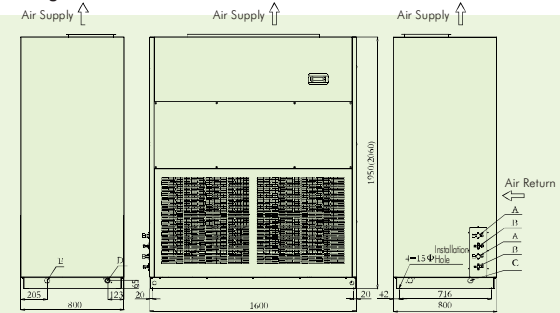
Bottom Supply Unit Diagram



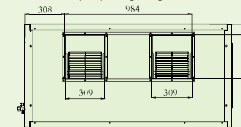
Note:
 A— ϕ 5/8" gas discharge pipe
 B— ϕ 1/2" liquid pipe
 C—supply power inlet
 D—DN32 water drainage pipe
 E—DN15 water inlet pipe

Unit Outlook Diagram

Top Supply Unit Diagram

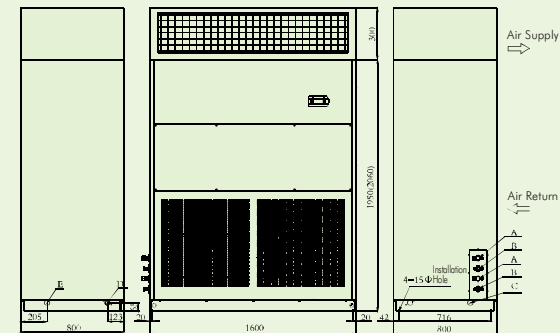


Top Opening Diagram



Note:
 A— ϕ 5/8" gas discharge pipe
 B— ϕ 1/2" liquid pipe
 C—supply power inlet
 D—DN32 water drainage pipe
 E—DN15 water inlet pipe

Side Supply Unit Diagram

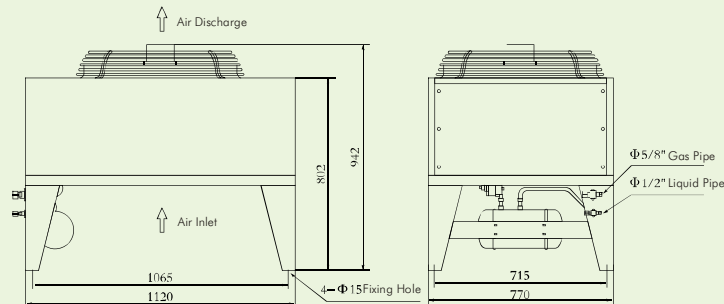


Note:
 A— ϕ 5/8" gas discharge pipe
 B— ϕ 1/2" liquid pipe
 C—supply power inlet
 D—DN32 water drainage pipe
 E—DN15 water inlet pipe

KR-Performance Parameter and Outlook Diagram

- Uses high efficiency inner groove copper tube and split aluminium to ensure high heat transfer rate.
- Unique designed liquid receiver and large condenser coil (subcool), to ensure the system refrigeration can be stably operated under all kinds of ambient temperature.
- Low adjustable speed axial fan and its internal overheat protector has high reliability, suitable for long duration running at Low operating noise
- Straight airflow design without being influenced by the monsoon wind

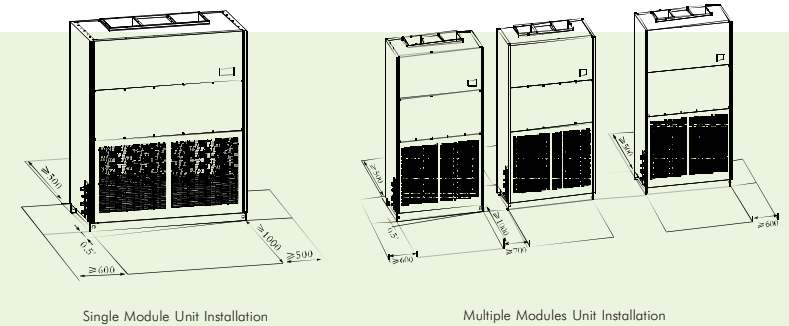
Model	KR18	KR24
Power Supply	220V/50Hz	220V/50Hz
Heat Load kW	18	24
Air Volume m ³ /h	5000	8000
Fan Quantity	1	1
Motor Power kW	0.36	0.55
Nominal Current A	1.65	2.5
Weight kg	80	85
Noise Level dB(A)	58	59
Piping	Liquid Pipe Diameter	1/2"
	Gas Pipe Diameter	5/8"



Unit Installation

1. Please save enough ventilation space around the unit to make sure of smooth air flow and easy service (as shown below).
2. Water discharge pipe is at right side, unit should be installed 0.5° leaning to water discharge side to better drain water. As condensing water and humidifier discharge water will be drained out together, the temperature will be as high as 100°C, so heat resist measures should be taken to the discharge pipe.
3. Unit should use independent water source, not use hot water for makeup water source in case fouling block forces water into solenoid valve. Inlet water quality has following requirement:
 - (1). DO NOT use 100% soft water.
 - (2). If use ordinary running water, the hardness must not access 500mgCaCO₃/L, charge passed must not access 800microS/cm.
 - (3). If soft water is applied, it should be mixed with running water until the hardness reduces to 1/3 of original value, or to 150mgCaCO₃.
 - (4). Mixed up soft water and running water should keep its PH value between 7.0 and 8.0.
4. When more than one module is installed, keep the side distance more than 700mm; avoid placing them back and front but if have to, keep the back and front distance more than 1000m.

Unit Installation



Wiring

1. The supply voltage must be maintained around ±10% and the frequency is ± 2%.
2. The current differential between 2 phase must not more than ± 2%. The supply current differential (highest and lowest) must be lower than 3% to avoid compressor from overloading.
3. The minimum starting voltage of the unit should be larger than 85% of the setting value.
4. All wiring connection must follow the electrical standard, and unit with terminal must use 500 resistance meter for checking the current leakage. The minimum resistance is 3MΩ.
5. For safety purposes, earthing protection installation must follow the electrical standard to avoid current leakage.

Model	Max Input Power kW	Single Module Wiring mm ²	Outdoor-Indoor Unit Wiring mm ²
		BVR (Polyfluoroethylene end cover)	BVR (Polyfluoroethylene end cover)
KPCA22BD	20.4	16	1.5
KPCA27BD	24.2	16	1.5
KPCA37BD	31.1	25	1.5

Note: Max Input Power = Compressor Max Power + Ele. Heater Power + Indoor Fan Motor Power + Outdoor Fan Motor Power

