

**ANNEX-B**

**COOLING SYSTEM (25KW)-----QTY 2**

- Manufacturer must be ISO 9001-, ISO 14001-, ISO 27001-, and OHSAS 18001-certified.
- Manufacturer must have CE certification for the PAC unit. This ensures electrical compatibility and safety design requirements. Please provide the CE certification.
- Manufacturer must comply with the RoHS, REACH, and WEEE statement for the standard PAC unit to ensure that the PACs do not contain compounds harmful to humans, animals, and to protect human health and environmental safety. Please provide the RoHS, REACH, and WEEE statement by the National Certified Institution of the Original Country
- The air conditioner should be air cooled in-row precision air conditioner scope includes supply, installation, commissioning, acceptance

Item	Specification
Air supply	Horizontal
Indoor unit type	EC fan
Total cooling capacity	≥ 25kW
Sensible cooling capacity	≥ 25kW at 35C outdoor temperate ≥ 25kW at at 45C outdoor temperate
SHR (Sensible heating ratio)	1
Air volume	6,000m <sup>3</sup> /h
Humidification capacity	1kg/h
Heating capacity	4kW

- PAC indoor unit should be configured with compressor, evaporator, EC fans, controller, electric expansion valve, oil separator, low-load dehumidifier kits, sight glass, dryer filter, humidifier and electrical heater
  - PAC unit should be equipped with high efficiency and 20%~100% stepless regulation DC inverter compressor. To save energy, the cooling capacity should adjust according to heat load. Compressor crankcase should be equipped with electrical heater to improve compressor reliability.
  - To ensure the reliability and accurate control, it is recommended to use the same brand of compressor driven, outdoor fan driven, electronic expansion valve, power module, control model and temperature-humidity module with the precision air-conditioner. The world top500 enterprise is recommended, such as HUAWEI, Emerson and Schneider
  - The unit could achieve stable & fast dehumidification at min 20% low IT load and larger than 95% relative humidity conditions, to avoid the condensation risk on IT equipment at extremely conditions.
  - The electronic expansion valve has its own power module and driven, which will close the valve as normal at sudden power down happening to avoid liquid flow back to compressor and ensure the system reliability
- PAC unit should use environment friendly refrigerant R410A.
- PAC unit should be equipped with PTC electrical heater, used for heating while low temperature conditions to improve reliability
    - PAC evaporator should be equipped with 3 row inner grooved copper pipe and blue hydraulic

aluminum fin to ease condensation water drainage and avoid water being carried out in the mean time improving heat exchanging capability.

- To reduce the impact to the upper grid caused by start-up of PAC unit, the PAC unit start-up current should be lower than rated current.
  - PAC unit should be configured with surge protection device to increase safety and reliability. No less than 6kV ability is recommended.
  - PAC indoor unit should use high efficiency energy saving variable speed EC fans to reduce fan power consumption.
  - The indoor unit should adopt pull type maintenance mode for power box and swapped type maintenance mode for control and power modules, to make the maintenance work easier.
  - The PAC should use an energy saving humidifier so that maximum humidification power consumption will be lower than 50W, with the third-party test report to prove that.
- The PAC should support Refrigerant Volume auto detection which can detect the refrigerant charge, leakage in real-time, and can provide Pre-alarm when the capacity of refrigerant is lower than 80%. This can effectively avoid Cooling capacity decrease due to leakage of refrigerant
- Each PAC unit should be equipped with advanced microprocessor controller, and should support group control function.
  - The PAC unit should be configured with 7 inch LCD true color touch screen to provide good human-computer interaction and a vivid interface. The controller should support interface switching by touching just one key. The controller should support to display max. 30 day's temperature & humidity color curves, and should also be able to graphically display the operation status of the unit components.
  - PAC unit should have the one-key touch function for display and collection of faulty message into a USB disk. PAC unit should have the fault alarm function and operating logs record function. The recorded history of alarms messages should not be less than 500., Operating logs should not be less than 200.
  - Each PAC unit should have independent controller, display panel, electrical heater, humidifier, independent temperature and humidity sensors to assure the unit's normal and precise operation.
  - PAC unit should generate power supply overvoltage alarm and undervoltage alarms. It should also support the following functions: fault diagnosis alarm recording, automatic protection, automatic recovery, and auto-restart function. It should display the detailed fault operation and maintenance advices on the control panel.
  - PAC unit should have linkage and group control function. Group control should use high speed and flexible CAN communication protocol. Controller should allow a unified control and management of 32 sets of units in the same area. Controller should have the following functions:
    1. Standby: Standby auto-switching function, when the unit in group fails, the standby unit is automatically put into operation, to improve the reliability of air conditioning systems;
    2. Rotation: Timely switching to standby unit;
    3. Cascading: automatically turn on or turn off corresponding AC unit according to actual cooling requirement to eliminate hot spots and save energy;
    4. Operation mode of avoiding competition: Avoid cooling and heating at the same time, or avoid humidifying and dehumidifying at the same time to save energy.
  - The operation status and faulty information of outdoor unit could be displayed on control panel and management system. The faulty could generate voice alarm and support managed by the management system.
- The operation status and faulty information of drain pump could be displayed on control panel and management system. The faulty could generate voice alarm and support managed by the management system to improve the draining reliability
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- PAC unit should be installed within row of racks. PAC unit should adopt horizontal air supply pattern. The width of the unit is 300mm, the depth of the unit should be optional 1100mm or 1200mm, and the height of the unit should be optional 2000mm or 2200mm, to maintain the same depth and height with IT cabinets.
- PAC unit should be accessible from both front and back sides of the unit, and can be maintained within 600mm distance from front or back doors to ease maintenance

**Note:-** The Precision cooling unit must be build in Dual input module. When the active power supply fails, the standby power supply takes over automatically. Power automatically switches back to the active power supply if it recovers. The System show monitoring of each power input separately.

- OEM must be present in Pakistan from last 7 year and have office in 3 Major cities minimum
  - OEM must have its own warehouse in Pakistan specially in Islamabad, Lahore and Karachi.
  - Third Party certifications are to be provided.
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