PART NO.1

DETAILED SPECIFICATIONS

KENYA POWER

PROPOSED PURCHASE OF AIR CONDITIONING UNITS & CEILING FANS

DOCUMENT NO.: KP1/13D/4/1/TSP/16/006

Kenya Power

AIR CONDITIONERS FOR SUBSTATION CONTROL BUILDINGS — SPECIFICATION

A Document of the Kenya Power & Lighting Company Plc

October 2026

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0.1 CIRCULATION LIST

COPY NO.	COPY HOLDER
1	Manager, Standards
2	Electronic copy (pdf) on Kenya Power server (http://172.16.1.40/dms/browse.php?fFolderId=23)

REVISION OF KPLC STANDARDS

In order to keep abreast of progress in the industry, KPLC standards shall be regularly reviewed. Suggestions for improvements to approved standards, addressed to the Manager, Standards Department, are welcome.

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0.2 AMENDMENT RECORD

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
0	2026-10-12	New issue	Rotich Benard	Eng. Faith Gicugu

MEPS: Minimum Energy Performance Standards.

4. REQUIREMENTS

4.1. SERVICE CONDITIONS

The air conditioning units shall be suitable for use outdoors and indoors in tropical areas and harsh climatic conditions, including areas exposed to:

a) Altitude of between 0 to 2200m above sea level

b) Relative Humidity of up to 95%; non-condensing.

c) Average outdoor ambient temperature of +30°C with a minimum of -1°C and a maximum of +52°C;

d) Average indoor temperatures of a minimum of 18°C and a maximum of 40°C;

e) Sea spray (along the coast)

4.2. TECHNICAL REQUIREMENTS

4.2.1. General Requirements

4.2.1.1. The air conditioning equipment shall be suitable for installation and continuous operation in indoor and outdoor environments associated with electrical substations, switchgear rooms and office buildings. For substations and switchgear rooms, the equipment shall maintain the specified indoor environmental conditions such that condensation does not occur on electrical equipment, switchgear, walls, ceilings or other internal surfaces under normal operating conditions.

4.2.1.2. The air conditioning units shall supply cooled and dehumidified air to the conditioned rooms and shall be designed and operated to maintain the indoor temperature and relative humidity within specified limits so as to prevent condensation on electrical equipment and internal surfaces. This requirement is particularly critical for indoor switchgear rooms housing Air-Insulated Switchgear (AIS) or Gas-Insulated Switchgear (GIS), where excessive humidity and condensation adversely affect insulation performance, equipment reliability and electrical safety.

4.2.1.3. The air conditioning equipment shall be suitable for operation on a 230 V AC ±10%, 50 Hz ±2%, single-phase supply or a 400 V AC ±10%, 50 Hz ±2%, three-phase supply, as applicable.

4.2.1.4. The equipment shall be designed for continuous operation under Tropical Climate Class T3 conditions and shall operate satisfactorily at ambient temperatures of up to 52°C without derating.

4.2.1.5. The outdoor units and exposed components shall be suitable for operation in coastal environments characterized by saline atmospheres and sea spray. Metallic components, including heat exchangers, casings, fasteners and mounting brackets, shall be provided with suitable corrosion-resistant materials or protective coatings. The corrosion resistance of the protective coatings shall be verified by salt spray testing in accordance with ASTM B117.

4.2.1.6. The equipment shall be designed to provide reliable and continuous operation with minimum maintenance throughout its service life.

4.2.1.7. The air conditioning equipment shall comprise separate indoor and outdoor units complete with all accessories necessary for installation, testing and commissioning.

4.2.1.8. The enclosures of the indoor air-conditioning units shall have a minimum degree of protection of IP20, while the outdoor units shall have a minimum degree of protection of IP55, in accordance with IEC 60529.

4.2.1.9. Split-type air conditioners or Variable Refrigerant Flow (VRF) air conditioning systems incorporating inverter-driven compressors shall be used in substation control rooms and telecommunication rooms.

4.2.1.10. Mid-wall split-type air conditioners incorporating inverter-driven compressors shall be used in operator workstations.

4.2.1.11. Air conditioning units serving control rooms and telecommunication rooms shall be arranged in a duty/standby configuration.

4.2.1.12. A minimum of two air conditioning units shall be installed in each control room to ensure continuity of cooling in the event of failure or maintenance of one unit.

4.2.1.13. Where a VRF system is used, a minimum of two outdoor units of equal capacity shall be provided to ensure redundancy.

4.2.1.14. Air conditioning units installed in telecommunication rooms shall be cooling-only type.

4.2.1.15. The equipment shall incorporate inverter-driven compressors for energy-efficient operation.

4.2.1.16. The equipment shall be provided with automatic restart, automatic defrost and anti-freeze protection functions.

4.2.1.17. The equipment shall be supplied complete with a wired wall-mounted controller.

4.2.1.18. The equipment shall be capable of maintaining the specified indoor environmental conditions under the design ambient conditions.

4.2.1.19. The equipment shall comply with the prevailing EPRA/KEBS Minimum Energy Performance Standards (MEPS) and shall bear the applicable Kenyan energy efficiency label.

4.2.1.20. The indoor and outdoor units shall be designed to operate at the specified noise levels without causing interference with personnel or adjacent equipment.

4.2.1.21. The outdoor units shall be weatherproof and suitable for installation in dusty, humid and corrosive environments.

4.2.1.22. The equipment shall be suitable for integration with the substation monitoring or Supervisory Control and Data Acquisition (SCADA) system.

4.2.1.23. The air conditioning equipment shall be supplied complete with all refrigerant piping, insulation, condensate drain piping, interconnecting cables, supports, mounting brackets, fasteners and accessories required for a complete installation unless otherwise specified.

4.2.1.24. All materials used in the manufacture of the equipment shall be resistant to corrosion, fungal growth, vermin attack and deterioration under tropical environmental conditions.

4.2.1.25. The equipment shall be covered by the Manufacturer's warranty against defects in materials and workmanship for a period of not less than twenty-four (24) months from the date of commissioning.

4.2.1.26. Spare parts and replacement components shall remain available for a minimum period of ten (10) years from the date of supply.

4.2.2. **Functional Requirements**

4.2.2.1. The air conditioning system shall be designed to provide adequate cooling for the rooms specified in the Schedule of Requirements.

4.2.2.2. The Tenderer shall visit the site and determine the cooling load for each room prior to selecting the air conditioning equipment.

4.2.2.3. The cooling load calculations shall take into account, as a minimum, the following:

(a) Room dimensions;
(b) Building orientation;
(c) Wall and roof construction;
(d) Solar heat gain;
(e) Occupancy;
(f) Lighting load;

(g) Heat dissipation from electrical and electronic equipment;
(h) Ventilation and infiltration loads; and
(i) Any other heat sources affecting the conditioned space.

4.2.2.4. The Tenderer shall submit detailed cooling load calculations together with the proposed equipment selection for evaluation.

4.2.2.5. The selected air conditioning equipment shall have sufficient cooling capacity to maintain the specified indoor environmental conditions under the prevailing site conditions.

4.2.2.6. The Tenderer shall demonstrate that the proposed equipment is adequately sized and shall provide manufacturers' selection data in support of the proposed equipment.

4.2.2.7. The proposed equipment shall not be oversized or undersized. Equipment selection shall be based on the calculated cooling load and the manufacturer's published performance data.

4.2.2.8. The equipment shall operate without producing excessive noise or vibration that may adversely affect personnel or adjacent equipment.

4.2.2.9. The air conditioning system shall be designed, installed and tested to prevent leakage of condensate water, refrigerant or any other fluid into the substation control room or onto electrical equipment. Condensate shall be positively collected and safely drained to a suitable discharge point outside the room.

4.2.2.10. Refrigerant piping, drain connections and associated fittings shall be securely installed and adequately sealed to minimize the risk of leakage. Any leakage that could result in moisture ingress, insulation deterioration, electrical faults, equipment damage or unsafe operating conditions shall not be permitted.

4.2.2.11. The air conditioning system shall be designed to maximize energy efficiency while maintaining the required indoor environmental conditions.

4.2.2.12. The complete installation shall be capable of safe, reliable and unattended operation with minimum attendance and maintenance.

4.2.3. Constructional Requirements

4.2.3.1. Compressors

4.2.3.1.1. Compressors shall be inverter-driven scroll or rotary type unless otherwise approved by the KPLC.

4.2.3.1.2. Compressors shall be hermetically sealed.

4.2.3.1.3. Compressors shall be designed for continuous operation.

4.2.3.3.7. Refrigerant piping insulation shall be closed-cell elastomeric insulation resistant to moisture absorption and ultraviolet degradation.

4.2.3.4. **Fans**

4.2.3.4.1. Indoor and outdoor fans shall be dynamically balanced.

4.2.3.4.2. Fan impellers shall be corrosion resistant.

4.2.3.4.3. Fan motors shall be permanently lubricated and suitable for continuous duty.

4.2.3.4.4. Fan motors shall be protected against overload.

4.2.3.4.5. Outdoor fan motors shall be weatherproof.

4.2.3.4.6. Fan assemblies shall be mounted to minimise transmission of vibration.

4.2.3.4.7. Fans shall deliver the airflow necessary to achieve the rated cooling performance.

4.2.3.5. **Filters**

4.2.3.5.1. Indoor units shall be provided with removable and washable air filters.

4.2.3.5.2. Air filters shall comply with ISO 16890.

4.2.3.5.3. Filters shall be readily accessible for inspection, cleaning and replacement without dismantling the equipment.

4.2.3.5.4. Filter media shall be resistant to moisture, fungal growth and deterioration.

4.2.3.5.5. The equipment shall provide an indication when filter cleaning or replacement is required, where such functionality is provided by the manufacturer.

4.2.3.5.6. Replacement filters shall be readily available for a minimum period of ten (10) years from the date of supply.

4.2.4. **Controls and Protection**

4.2.4.1. The air conditioning equipment shall automatically regulate its cooling capacity to match the prevailing room cooling load.

4.2.4.2. The air conditioning equipment shall automatically resume operation following restoration of the electrical supply after a power interruption.

4.2.4.3. The equipment shall continuously monitor its operating condition and initiate protective actions under abnormal operating conditions.

4.2.4.4. The equipment shall provide local fault indication and remote alarm signals where remote monitoring is specified.

4.2.5.8. Condensate drains shall be installed with adequate fall to ensure positive drainage.

4.2.5.9. Electrical wiring shall comply with IEC 60364 and all applicable Kenya Power requirements.

4.2.5.10. Control and power cables shall be adequately segregated.

4.2.5.11. Each air conditioning unit shall be supplied from an independent circuit protected by a suitably rated circuit breaker.

4.2.5.12. Metallic parts of the equipment shall be effectively bonded to the station earthing system.

4.2.5.13. The power supply shall be surge protected

4.2.5.14. The complete installation shall be tested and commissioned before acceptance.

4.2.5.15. The equipment shall be supplied with comprehensive Operation and Maintenance (O&M) Manuals, manufacturer-recommended preventive maintenance schedules, and relevant technical literature. The documentation shall clearly specify the requirements for unattended operation, routine inspection, preventive maintenance, troubleshooting, servicing intervals, and replacement of consumable or serviceable components, where applicable.

5. TEST REQUIREMENTS

The air conditioning units shall be inspected and tested in accordance with the methods, conditions and requirements of KS ISO 5149-2, KS ISO 5149-3, KS ISO 5149-4 and this specification, including:

a) Starting test.
b) Test at maximum operating conditions.
c) Freeze-up test.
d) Complete power supply failure test.
e) Condensate draining and enclosure sweat test.
f) Defrosting test.

6. MARKING AND PACKING

6.1. MARKING

6.1.1. Each indoor unit and outdoor unit shall be permanently and legibly marked with a corrosion-resistant nameplate securely fixed in position.

6.1.2. The nameplate shall be manufactured from stainless steel or anodised aluminium and shall be engraved, etched or otherwise permanently marked.

6.1.3. As a minimum, the nameplate shall contain the following information:

a) Manufacturer's name and trademark;

APPENDIX D: GUARANTEED TECHNICAL PARTICULARS (Normative)

To be filled and signed by the Bidder and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data, four customer reference letters, all in English Language.

Tender No. .....

Bidder's Name.....

Clause number	Item Description	Bidder's offer
4.2	**Technical Requirements**	
4.2.1	**General requirements**	
4.2.1.1	The air conditioning equipment shall be suitable for installation in indoor and outdoor environments within electrical substations and office buildings.	State suitability/application.
4.2.1.2	Condition of air being supplied to the conditioned room	specify
4.2.1.3	The equipment shall be suitable for operation on a 230 V AC ±10%, 50 Hz ±2%, single-phase supply or a 400 V AC ±10%, 50 Hz ±2%, three-phase supply, as applicable.	State rated voltage, frequency and phase.
4.2.1.4	The equipment shall be designed for continuous operation under Tropical Climate Class T3 conditions and shall operate satisfactorily at ambient temperatures of up to 52°C without derating.	State climatic class and maximum operating temperature.
4.2.1.5	Suitability for coastal environments exposed to saline atmospheres and sea spray	Specify
	Corrosion-resistant materials or protective coatings on outdoor units and exposed metallic components	Specify
	Salt spray test standard	Specify
	Salt spray test duration	Manufacturer to declare (hours)

Clause number	Item Description	Bidder's offer
	Salt spray test report	Provide
4.2.1.6	The equipment shall be designed to provide reliable and continuous operation with minimum maintenance throughout its service life.	State maintenance interval and design life.
4.2.1.7	The air conditioning equipment shall comprise separate indoor and outdoor units complete with all accessories necessary for installation, testing and commissioning.	State indoor and outdoor unit models and list accessories supplied.
4.2.1.8	Degree of protection of indoor air-conditioning units	Specify
	Degree of protection of the outdoor units	Specify
4.2.1.9	Split-type air conditioners or VRF systems incorporating inverter-driven compressors shall be used in substation control rooms and telecommunication rooms.	State proposed system type.
4.2.1.10	Mid-wall split-type air conditioners incorporating inverter-driven compressors shall be used in office accommodation.	State proposed office AC type.
4.2.1.11	Air conditioning units serving control rooms and telecommunication rooms shall be arranged in a duty/standby configuration.	Describe duty/standby arrangement.
4.2.1.12	A minimum of two air conditioning units shall be installed in each control room.	State number of units proposed.
4.2.1.13	Where a VRF system is used, a minimum of two outdoor units of equal capacity shall be provided.	State number and capacity of outdoor units.
4.2.1.14	Air conditioning units installed in telecommunication rooms shall be cooling-only type.	State equipment type.
4.2.1.15	The equipment shall incorporate inverter-driven compressors.	State compressor type and technology.
4.2.1.16	The equipment shall be provided with automatic restart, automatic defrost and anti-freeze protection functions.	Confirm each protection function.
4.2.1.17	The equipment shall be supplied complete with a wired wall-mounted controller.	State controller make and model.
4.2.1.18	The equipment shall be capable of maintaining the specified indoor environmental conditions under the design ambient conditions.	State design indoor temperature and humidity.
4.2.1.19	The equipment shall comply with the prevailing EPRA/KEBS MEPS and shall bear the applicable Kenyan energy efficiency label.	State efficiency rating and attach evidence.
4.2.1.20	The indoor and outdoor units shall be designed to operate at the specified noise levels.	State indoor and outdoor sound

Clause number	Item Description	Bidder's offer
		pressure levels (dB(A)).
4.2.1.21	The outdoor units shall be weatherproof and suitable for installation in dusty, humid and corrosive environments.	State IP rating and corrosion protection.
4.2.1.22	The equipment shall be suitable for integration with SCADA where specified.	State communication protocol and monitoring capability.
4.2.1.23	The air conditioning equipment shall be supplied complete with all refrigerant piping, insulation, condensate drain piping, interconnecting cables, supports, mounting brackets, fasteners and accessories.	List all accessories included.
4.2.1.24	All materials used in the manufacture of the equipment shall be resistant to corrosion, fungal growth, vermin attack and deterioration under tropical environmental conditions.	Describe materials and protective finishes.
4.2.1.25	The equipment warranty period	State period
4.2.1.26	Spare parts and replacement components shall remain available for a minimum period of ten (10) years from the date of supply.	State guaranteed spare parts availability period.
4.2.2	**Functional Requirements**	
4.2.2.1	Design provides adequate cooling.	Comply
4.2.2.2	Site visit and cooling load determination.	Confirm
4.2.2.3	Room dimensions considered.	Comply
	Building orientation considered.	Comply
	Wall and roof construction considered.	Comply
	Solar heat gain considered.	Comply
	Occupancy considered.	Comply
	Lighting load considered.	Comply
	Equipment heat gains considered.	Comply
	Ventilation/infiltration considered.	Comply
	Other heat sources considered.	Comply
4.2.2.4	Cooling load calculations submitted.	Submit
4.2.2.5	Adequate cooling capacity.	State kW
4.2.2.6	Manufacturer selection data.	Submit
4.2.2.7	Correct equipment sizing.	Confirm
4.2.2.8	Noise and vibration while in operation	Describe, State dB(A)
4.2.2.9	Leakages of condensate water, refrigerant or any other fluid into the substation control room or onto electrical equipment	Specify
	Collection and drainage of the condensate	Specify
4.2.2.10	Installation of refrigerant piping, drain connections and associated fittings	Describe

Clause number	Item Description	Bidder's offer
4.2.4.3	The equipment shall continuously monitor its operating condition and initiate protective actions under abnormal operating conditions.	Specify
4.2.4.4	The equipment shall provide local fault indication and remote alarm signals where remote monitoring is specified.	State
4.2.4.5	Each unit shall incorporate a microprocessor-based controller.	Specify
4.2.4.6	The controller shall continuously monitor system operating conditions.	State
4.2.4.7	The controller shall provide temperature sensing and automatic capacity control.	Specify
4.2.4.8	The controller shall provide self-diagnostic capability.	State
4.2.4.9	protective functions provided.	Specify
4.2.4.10	Alarms functions	State
4.2.4.11	Alarm signals shall be available through volt-free contacts for remote monitoring.	Specify
4.2.5	**Installation Requirements**	
4.2.5.1	Mounting brackets, supports, anchors, fasteners and fixing accessories included in the supply.	Provide a complete list
4.2.5.2	Mounting arrangement, support frame material, corrosion protection and structural design details.	Specify
4.2.5.3	Anti-vibration pad material, type, dimensions and load rating.	State
4.2.5.4	Pipe support arrangement, maximum support spacing and support material	Specify
4.2.5.5	Support material, corrosion protection method and coating specification.	State
4.2.5.6	Sleeve material, dimensions and sealing arrangement for pipes passing through walls	Specify
4.2.5.7	Sealing material and method used to prevent ingress for wall penetration	State
4.2.5.8	Condensate drain pipe material, diameter, minimum gradient and discharge arrangement.	Specify
4.2.5.9	Compliance with IEC 60364 and Kenya Power requirements. State cable types, insulation rating and wiring method.	State
4.2.5.10	Cable routing arrangement, segregation method and minimum separation distance.	Specify
4.2.5.11	Circuit breaker manufacturer, type, rated current, breaking capacity and protective characteristics for each unit.	State
4.2.5.12	Earthing arrangement for metallic parts including conductor size, conductor material and method of bonding to the station earth grid.	Specify

Clause number	Item Description	Bidder's offer
4.2.5.13	Surge protection	Specify
4.2.5.14	Proposed inspection, testing and commissioning procedure together with the schedule of tests and acceptance criteria.	Submit
4.2.5.15	Documents to be supplied with the equipment	List
5	Test Requirements	State
6	**Marking and packing**	
6.1	Marking	Specify
6.2	Packing	Specify
	APPENDICES	
A	**Test and inspection**	
A.1	Test standards and responsibility of carrying out tests	State
A.2	Copies of previous test certificates	Provide
A.3	Quality Certificates for the Air conditioning units to be supplied shall be submitted to KPLC for approval before shipment/delivery of the goods	State compliance
A.4	Replacement of Air conditioning units	Specify
B	**Quality Management System**	
	Quality Assurance Plan	Provide
	Copy of valid and relevant ISO 9001:2015	Provide
	Manufacturer's declaration of conformity	Provide
	Delivery time	State
	Manufacturer's experience	State
	Manufacturer's Capacity	State
C	**Documentation**	
C.1	Documents submitted with tender	Provide
C.2	Documents to be submitted by supplier to KPLC for approval before manufacture	List
	Statement of compliance to specification (indicate deviations if any & supporting documents)	State compliance

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Bidder's Name, Signature, Stamp and Date