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TECHNICAL SPECIFICATIONS FOR SPECIALIZED TRANSMISSION TOOLS AND EQUIPMENT

A Document of the Kenya Power & Lighting Co. Plc

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CIRCULATION LIST

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1	Chief Engineer, Transmission Network Maintenance
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AMENDMENT RECORD

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
0	2023-04-20	New Issue	Eng. Dedan Njoroge	Eng. George Korir
1	2023-10-27	Rev 1 Included	Eng. Dedan Njoroge	Eng. George Korir

FOREWORD

This Specification has been prepared by the Transmission Network Maintenance Department of The Kenya Power and Lighting Company PLC. (KPLC) and it lays down requirements for Specialized Transmission Tools and Equipment.

Specialized Transmission Tools and Equipment are a set of tools used for maintenance on the 132kV & 220kV network. They constitute of the transmission portable earthing harness, crimping tool complete with generator, lineman's headlamp gear, electric hoisting winch, height rescue stretcher, pipe bender, 2-way communication radio, mobile emergency LED flood lights, carbide bit holes saw and step drill bits complete with heavy duty hand-drill.

There are no other specifications in this series.

This specification stipulates the minimum requirements for Specialized Transmission Tools and Equipment acceptable for use in the company and it shall be the responsibility of the suppliers and manufacturer to ensure that the offered design is of the highest quality and guarantees excellent service to KPLC, good workmanship and good engineering practice in the manufacture for KPLC.
Users of KPLC specifications are responsible for their correct interpretation and application.

1. SCOPE

This specification specifies the materials, design, size, test methods, marking and packaging of the following Specialized Transmission Tools and Equipment:

a) Specialized tools, instruments and body harnesses: -
   i) Crimping tool complete with hydraulic power unit
   ii) Transmission portable earthing harnesses
   iii) Lineman's headlamp gear
b) Electric Hoisting Winch, Hook & Chain
c) Height Rescue Stretcher complete with Securing Harness and Hook Assembly
d) Two-way Communication Radio
e) Mobile Emergency LED Flood Lights
f) Carbide Bit Holes Saw and Step Drill Bits complete with Heavy duty Hand Drill

2. NORMATIVE REFERENCE

The following standard and guidelines contain provision, which, through reference in this text, constitute provisions of this specification. For dated editions, the cited edition will apply; for undated editions, the latest edition of the referenced document shall apply.

ISO 9461:	Hydraulic fluid power -- Identification of valve ports, sub-plates, control devices and solenoids
ISO 10763:	Hydraulic fluid power—Plain-end, seamless and welded precision steel tubes—Dimensions and nominal working pressures
ISO 4957:	Tool steels
IEC 61230	Live working – Portable equipment for earthing or earthing and short circuiting

IEC 61138	Cables for portable earthing and short circuiting equipment.
BS 7454	Method of calculation of thermally permissible short circuit currents, taking into account non-adiabatic heating effects

3. DEFINITIONS AND ABBREVIATIONS

For the purpose of this specification, the definitions and abbreviations given in the reference standards shall apply together with the following:

KPLC:	Kenya Power and Lighting Company Public Limited Company
STT&E:	Specialized Transmission Tools and Equipment
NM:	Network Maintenance
ltr:	Litre
LED:	Light Emitting Diode
Ppm:	Pulses Position Modulation
KHz:	Kilohertz
mAh:	Milliampere hours
dB:	Decibels
bpm:	Beats/blows per minute
rpm:	Revolutions per minute
QAP:	Quality Assurance Plan
ISO:	International Standards Association
IEC:	International Electrotechnical Commission
GTP:	Guaranteed Technical Particulars
kN:	kilonewtons
m:	Meters

mm: Millimeters

C: Centigrade

m/s: Meters per Second

g: Grams

Kg: Kilogrammes

W; Watts

kW: Kilowatts

A: Amps

kA: Kiloamps

Nm: Newton-meter

V: Voltage

4. REQUIREMENTS

4.1 Service conditions

4.1.1 The STT&E shall be suitable for use in tropical climatic conditions including areas exposed to:

a) Altitudes of up to 2200m above sea level;

b) Humidity of up to 95% without condensing;

c) Average ambient temperature of +30^{0}C with a minimum of -1^{0}C and a maximum of +40^{0}C;

d) Heavy Saline conditions along the coast.

e) Designed to withstand wind speeds of up to 40m/s

4.2 Specialized tools, instruments and body harnesses

4.2.1 Crimping tool complete with generator

4.2.1.1 The hydraulic crimping tool shall be ideal for installing crimp connectors to overhead line applications and accepts most hexagonal die models common to 1200kN tools.

4.2.1.2 The die sets to range from 16mm^2 - 630mm^2.

4.2.1.3 The tool shall have a die release system, protected from accidental operation and a pressure release trigger, which can be operated at any stage of the compression.

4.2.1.4 The hydraulic crimping tool design shall feature built-in safety valves which by-pass the oil supply when the maximum pressure is reached.

4.2.1.5 The hydraulic crimping tool shall have the following features as illustrated in Table 1 and shall be as per Fig. 1 (typical);

Table 1: Compression Tool Capabilities

PISTON RETURN	MAX COMPRESSION FORCE	MAX PRESSURE	MAX STROKE	PRESS WEIGHT	GROSS WEIGHT
Hydraulic	1200kN	700 bars	30 – 35mm	50 – 60 kg	20 – 30 kg

Figure 1: Hydraulic Compression Head

4.2.1.6 The hydraulic compression head shall be made from press forged steel.

4.2.1.7 The hydraulic compression head shall be supplied complete with a hydraulic power unit module of parameters detailed in Table 2.

ENGINE TYPE	POWER	MAX PRESSURE	TANK CAPACITY	GROSS WEIGHT
Petrol	2.5 – 3.5 kW	700 bars	10 – 15 ltr	50 – 60 kg

4.2.1.8 The hydraulic compression head shall be supplied complete with a kit of connecting hoses of 10m length.

4.2.2 Transmission portable earthing harnesses

4.2.2.1 The portable earthing equipment shall be designed and manufactured in accordance with IEC 61230 and IEC 61138 and shall permit safe earthing of electrical installations.

4.2.2.2 The portable earthing equipment shall be supplied as a complete kit comprising earth-end clamp, line-end clamp and flexible leads complete with terminations.

4.2.2.3 The leads shall be made from aluminium.

4.2.2.4 After application of the earth-end clamp to the appropriate earth connection, the equipment shall be suitable for application of the line-end clamps in turn by means of non-conducting operating rod to the overhead line conductors.

4.2.2.5 A set shall comprise of three detached/independent flexible leads each with an earth-end clamp and line-end clamp.

4.2.2.6 The method of coupling the operating rod to the line end clamps shall permit the application of the clamp to the line conductor from an angle of between 45^0 – 90^0 to the axis of the conductor.

4.2.2.7 The complete equipment shall withstand the maximum expected short circuit fault current of 20kA/1 sec.

4.2.2.8 The equipment shall be able to withstand all stresses from the fault current without causing electrical, mechanical, chemical or thermal danger to persons.

4.2.2.9 All components shall be resistant to the levels of corrosion and physical handling stresses expected in service.

4.2.2.10 **Line-end clamp for the Transmission Portable Earthing Harnesses**

4.2.2.10.1 The line-end clamp shall comprise:

a) A device for making electrical contact with the overhead conductor.

b) Operating screw for tightening the device on the conductor. The operating screw shall be tightened by means of operating socket fitted to the fibre glass operating pole.

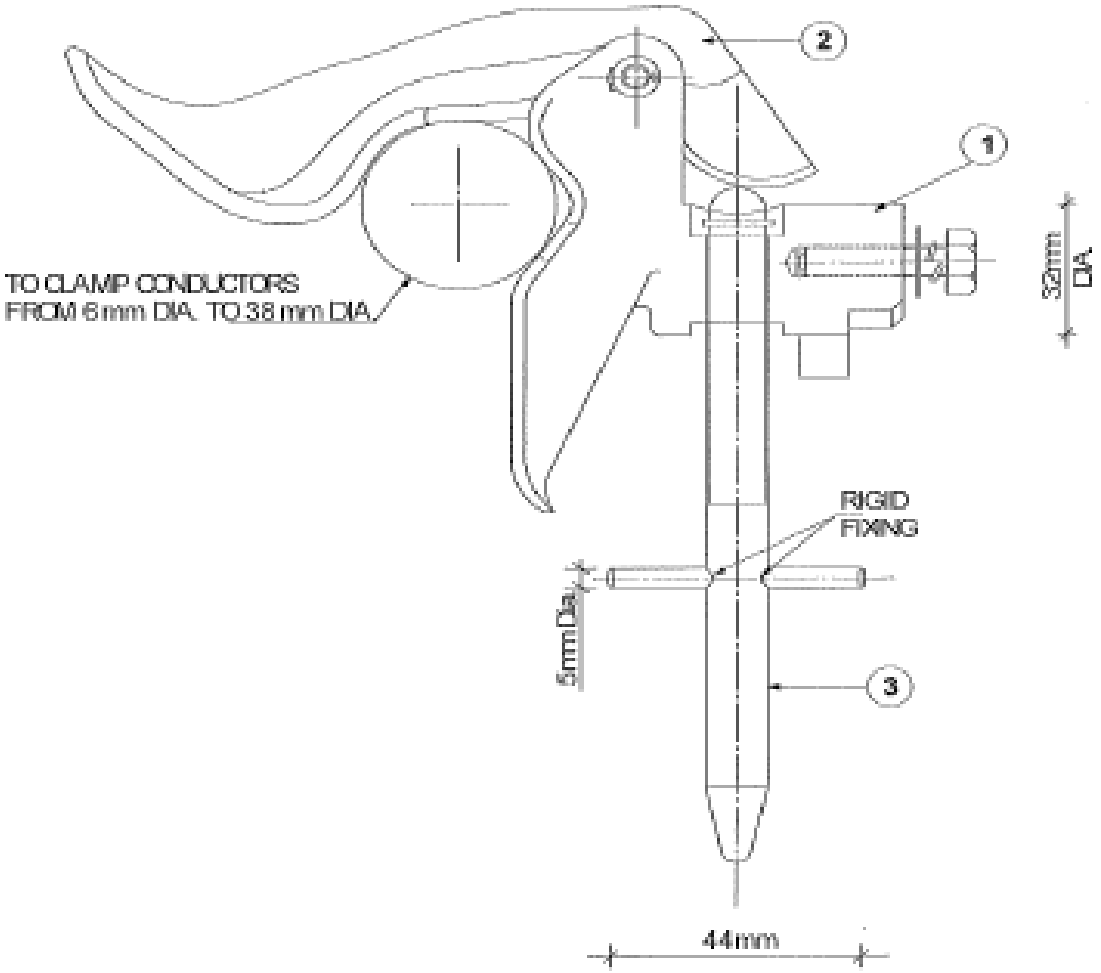
c) Once hooked over the conductor, the clamp shall become self-supporting whilst the operating screw is tightened or loosened.

4.2.2.10.2 Each line-end clamp shall be suitable for connection to aluminium multi-stranded line conductor in both new and oxidized conditions of diameters 6 – 30mm and copper busbar tubes of 38mm diameter. The clamps shall be suitable for connection to both tension and non-tension conductors.

4.2.2.10.3 The design of the clamp shall be such that its attachment to the conductor does not result in the inevitable deformation of the latter. It shall slide smoothly onto the overhead conductor.

4.2.2.10.4 The torque necessary to complete the connection shall not exceed 22Nm and the clamp shall be capable of withstanding over-tightening up to a maximum torque of 45Nm without damage to the clamp or conductor.

4.2.2.10.5 The clamp shall be rated for 20kA/1 sec and shall be of the general shape and material given in Figure 2.



Item	Description	Material
1.	Clamp body	Aluminium alloy to BS 1490
2.	Trigger	Aluminium alloy to BS 1476
3.	Operating screw	Stainless steel to BS 970
–	Spindle, washers, split Pin, & bolt.	Stainless steel to BS 970

Figure 2: Line-end Clamp

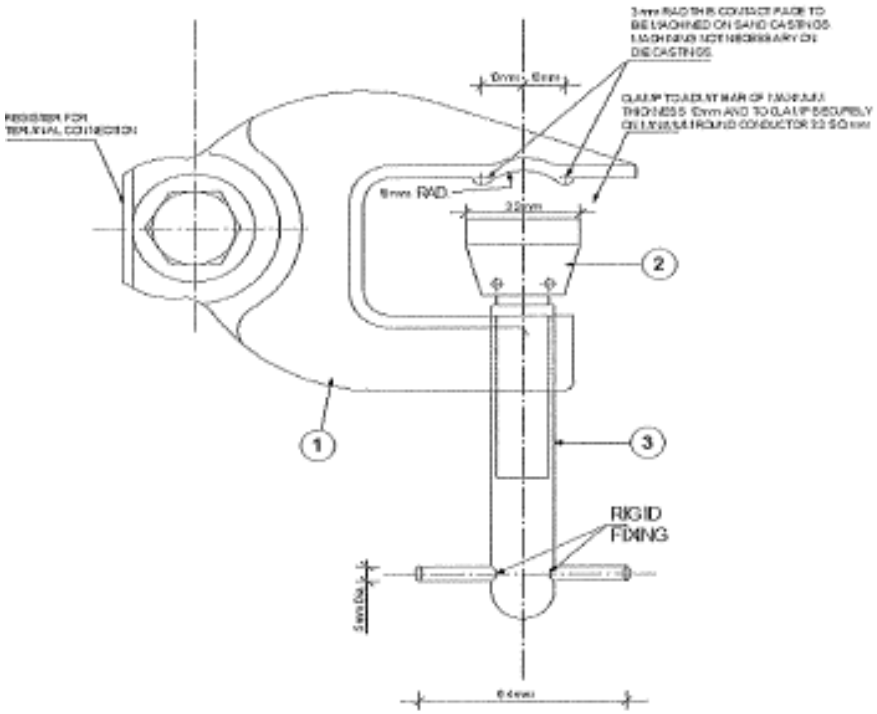
4.2.2.11 **Earth-end Clamp for the Transmission Portable Earthing Harnesses**

4.2.2.11.1 The earth-end clamp shall comprise:

a) A device for making electrical contact with the earth connection point i.e. earth rod assembly or steel work as appropriate.

b) Operating screw for tightening (by hand) the device to the earth connection point.

4.2.2.11.2 The clamp shall be rated for 20 kA/1 sec and shall be of the general shape and material details given in Figure 3.



Item	Description	Material
1.	Clamp body	Aluminium alloy to BS 1490
2.	Rocker body	Aluminium alloy to BS 1476
3.	Operating screw 12mm	Stainless steel to BS 970
–	Pin,bolt ,nuts & washers	Stainless steel to BS 970

Figure 3: Earth-end Clamp

4.2.2.12 **Flexible cable with termination for the Transmission Portable Earthing Harnesses**

4.2.2.12.1 The cable shall be of low weight and flexible over a wide range of temperature.

4.2.2.12.2 The insulating cover shall offer protection against mechanical and chemical damage.

4.2.2.12.3 The earthing and short circuiting cables shall withstand a fault current of 20kA/1 sec.

4.2.2.12.4 The cable shall be manufactured in accordance with IEC 61138.

4.2.2.12.5 The covering of the cable shall be based on a compound of thermoplastic polyvinyl chloride suitable for indoor and outdoor use within -5^{0}C and 70^{0}C in accordance with IEC 61138.

4.2.2.12.6 The mean value of the thickness of the covering shall be not less than 1.8mm.

4.2.2.12.7 The flexible lead shall be manufactured from fine stranded commercially pure aluminium sheathed with orange colour PVC.

4.2.2.12.8 The maximum diameter and electrical resistance (20^{0}C) of the conductor wires shall be 0.46mm and 0.326Ω/km respectively.

4.2.2.12.9 The cross sectional area for the aluminium cables for use in overhead Transmission lines portable earthing equipment shall be 120mm^2.

4.2.2.12.10 The cables shall be supplied complete with terminations ready for connection to line-end and earth-end clamps by use of single bolts.

4.2.2.12.11 Excellent fatigue resistance is required for the connections of cables to clamps.

4.2.2.12.12 The terminations shall obviate fraying of conductor strands and wear on protective PVC insulation an shall be fitted with a heat-shrink flexible sleeves to provide additional support as per design in Figure 4.

4.2.2.12.13 The connections shall ensure that the specified minimum characteristic of the cable are maintained.

4.2.2.12.14 Terminal lugs shall be supplied fully compressed on to the leads.

4.2.2.12.15 The flexible cable and termination shall be 12m from one termination end to the other termination end.

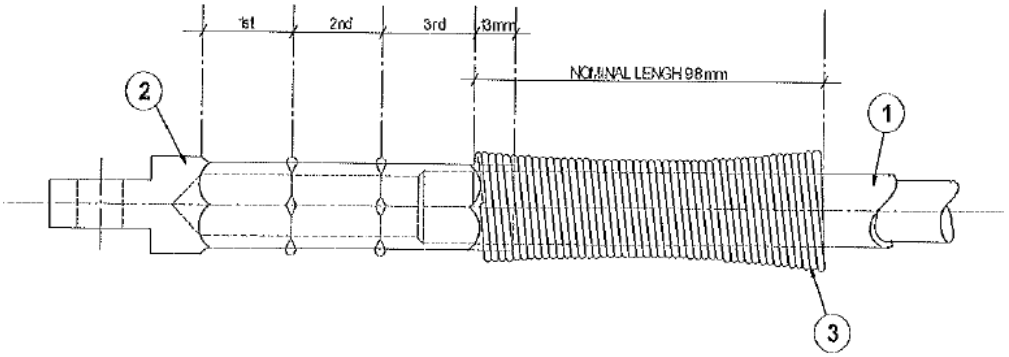


Figure 4: Cable Terminations

4.2.3 Lineman's Headlamp Gear

4.2.3.1 The headlamp shall have >50m beam distance.

4.2.3.2 The headlamp gear shall have mounting clips for securing to helmets and adjustable strap with rubber grip.

4.2.3.3 The headlamp shall be detachable from the straps and with a magnetic strip for affixing to metallic parts so as to be able to work hands free.

4.2.3.4 The headlamp shall have IP54 rating so as to protect the lamp from dust and water.

4.2.3.5 The headlamp shall have an internal battery that is rechargeable with micro-USB cable. It shall have an indicator to check the level of charge in the battery.

4.2.3.6 The parameters of the headlamp gear are as indicated in Table

Table 2: Parameters of the Lineman's Headlamp Gear

Maximum light output	>400 lumens
Minimum light output	>50 lumens
Maximum run time	>10 hours
Minimum run time	>2 hours

Weight with battery pack included	<0.5kg

4.3 Electric Hoisting Winch, Hook & Chain

4.3.1 The motor system shall be supplied with industrial series wound carbon brush motor, the enamelled wires in the motor with heat resistance of 150^0C - 180^0C.

4.3.2 The winch shall have a braking system that is activated during breakdown or failure in operation.

4.3.3 The winch shall be supplied with high strength steel plate to support the frame of hoist.

4.3.4 Motor and gear housings shall be made from aluminium alloy with high precision in assembly and low noise during operation.

4.3.5 The winch shall consist of upper and lower hook and shall be mad of alloy steel material by die-casting formation with high strength and four times safety factor. The lower hook shall have a safety latch to ensure safety of lifting operations.

4.3.6 The winch shall have a mechanical overload clutch that shall provide protection against overloading and overtight revolving.

4.3.7 The Electric Hoisting Winch, hook and wire is as illustrated in Figure 5:

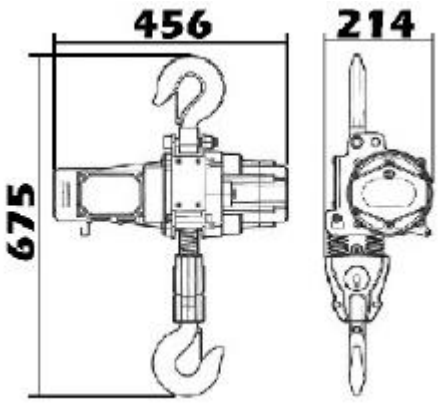


Figure 5: Electric Hoist Winch

4.3.8 The hoisting winch shall consist of a controller for purposes of its operation.

4.3.9 The hoisting winch shall be supplied with a high wear and tear resistance chain and stable corrosion resistance by continuous treatment.

4.3.10 The parameters of the Electric Hoisting Winch are as follows:

Table 3: Parameters of Electric Hoist Winch

NO	DESCRIPTION	UoM	VALUE
1	Capacity	kg	2000
2	Power	V	240
3	Phases	No.	Single (1-ph)
4	Lift	m	3
5	Speed (50Hz)	m/min	2
6	Motor	kW	1.6 – 2.2
7	Gross weight	kg	<40

4.4 Height Rescue Stretcher complete with Securing Harness and Hook Assembly

4.4.1 The stretcher shall have a rail of not less than 20mm diameter top rail to make it easier to handle when carried for extended periods.

4.4.2 The stretcher shall have rounded ends to provide greater manoeuvrability in tight locations as illustrated in Figure 6.

4.4.3 The stretcher shall have load attachment points for an easy and secure attachment of a lifting strap as detailed in Figure 7.

4.4.4 The stretcher shall have a polyethylene netting which is rust-proof and easy to clean.

4.4.5 The stretcher shall have a back support moulded from high density polyethylene for greater durability and ease of cleaning.

4.4.6 The stretcher shall be supplied complete with four patient restraint straps.

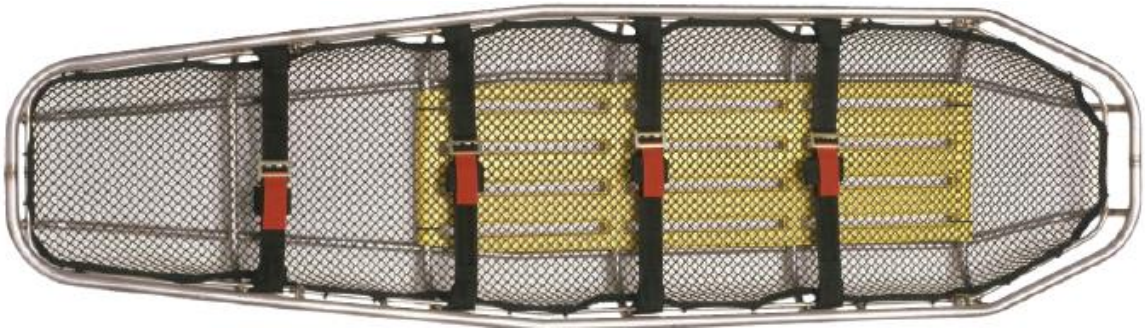


Figure 6: Rescue Stretcher

Figure 7: Rescue Stretcher attachment load points

4.4.7 The parameters of the rescue stretcher are as indicated in Table

LENGTH	WIDTH	HEIGHT	WEIGHT	LOAD RATING
2110mm	580mm	180mm	<7kg	11kN (1136kg)

4.4.8 The stretcher shall be supplied complete with hard-eyed straps as illustrated in Figure 8.

Figure 8: Hard-eyed straps

4.5 Two-way Communication Radio

4.5.1 The radio shall be licence free and portable.

4.5.2 The radio shall have voice recording feature, automatic roaming and high precision GPS.

4.5.3 The parameters of the two-way communication radio are as follows:

General	
Frequency Range	UHF: 446.0 - 446.2MHz
Channels	256
Zones	16
Water Proof	IP54
Channel Spacing	12.5KHz/ 25KHz
Working Voltage	DC 7V (±20%)
Frequency Stability	±1.5ppm

Battery Capacity		≥2000mAh
Battery Average Working Time	Digital	22 hours
	Analog	16 hours
Antenna Impedance		50Ω
Weight		≤400g
Transmitter		
Power Output	High	5W
	Low	1W
Modulation Limitation		+/- 2.5KHz @ 12.5KHz; +/- 5KHz @ 25KHz
FM Noise		-40dB
Spurious Emission		-36 dBm≤1GHz; -30 dBm≥1GHz
Adjacent Channel Power		≤-60dB
Frequency Response		+1/-3dB
Vocoder		AMBE 3000
Audio Distortion		≤3%
Receiver		
Digital Sensitivity		5% BER: 0.25 uV
Analog Sensitivity		0.25 uV (12 dB SINAD)
Intermodulation		60dB
Adjacent Channel Selectivity		60dB
Spurious Suppression		60dB
FM Noise		-40dB
Frequency Response		+1/-3 dB

Audio Power	1.5W
Audio Distortion	3% (typical)
GPS Precision	Horizontal Accuracy ≤110m (with good signal)

4.6 Mobile Emergency LED Flood Lights

4.6.1 The LED flood light shall be rotatable in ≥90^0 angle to allow illumination in different directions when put in one particular position.

4.6.2 The flood light case shall be impact resistant and durable.

4.6.3 The flood light shall be powered from a ≥5Ah battery or 240V AC mains plug supply.

4.6.4 The flood light shall have a low battery indicator which flashes when battery power is low on charge.

4.6.5 The LED flood light shall be supplied complete with the following accessories:

a) Spare battery

b) Charger

c) Carry bag

4.6.6 The LED flood light parameters are as follows:

DESCRIPTION		**SPECIFICATION**
Bulb Type		LED
Maximum Light Output strobe	High	≥4000 lumens
	Medium	≥2000 lumens
	Low	≥1000 lumens
Maximum Battery Run Time	High	3 hours
	Medium	6 hours
	Low	12 hours

Weight with battery pack	≤5kg

4.7 Carbide Bit Holes Saw and Step Drill Bits complete with Heavy duty Hand Drill

4.7.1 The hand drill shall be corded for connection to 230V AC supply.

4.7.2 The hand drill shall have an automatic switch lock for continuous chiselling applications.

4.7.3 The drill bits shall be of solid carbide for an aggressive drilling rate and extended lifetime in tough applications.

4.7.4 The parameters of the heavy duty hand drill are as follows:

DESCRIPTION	**SPECIFICATION**
Impact Energy	19 Joules
Rated Power Input	>1600W
Impact Rate at Rated Speed	>2000bpm
Rated Speed	>210rpm
Weight	<15kg
Step drill bit Set (16mm – 51mm)	10pcs
Carbide bit hole saw set (16mm – 51mm)	10pcs

4.8 Heavy Duty Drill (Cordless)

4.8.1 The drill shall be cordless, ergonomic and comfortable.

4.8.2 The drill shall have a brushless motor for efficiency, endurance and compactness.

4.8.3 The drill shall be supplied with a battery charger, three (3) auger bits of 24mm, 26mm and 30mm each.

4.8.4 The parameters of the heavy duty drill are as follows:

DESCRIPTION	**SPECIFICATION**
Battery Voltage	18V

Impact Energy	>1.6 Joules
Impact Rate at Rated Speed	>4800bpm
Rated Speed	>1500rpm
Weight (excluding battery)	<4kg
Maximum drilling diameter in wood	>30mm
Total auger bit length	450mm
Flute length of the auger bit	360mm

4.9 Angle Grinder (Cordless)

4.9.1 The angle grinder shall have a balanced design and slim handle for optimized slim cutting.

4.9.2 The angle grinder shall be cordless, ergonomic and comfortable.

4.9.3 It shall consist of a high performance brushless motor.

4.9.4 The angle grinder shall consist of a keyless guard.

4.9.5 The dimensions shall be less than 500mm X 200mm (L X W).

4.9.6 The source of power shall be rechargeable battery of not less than 18V.

4.9.7 The no load speed shall not be less than 10000rpm.

4.9.8 The bore size diameter shall range between 18 – 30mm.

4.9.9 The disc diameter shall not be less than 120mm.

4.9.10 The weight of the angle grinder without the battery shall not be more than 3kg.

4.9.11 The grinder will be supplied complete with a battery charger.

4.10 Impact Wrench (Cordless)

4.10.1 The impact wrench shall be suitable for various bolting applications.

4.10.2 The tool shall be powerful enough to tighten M20 bolts (30mm nuts).

4.10.3 The tool shall have an Auto Bolt Release (ABR) feature, which makes disassembling easier by ensuring it automatically stops when the nuts loosen.

4.10.4 The dimensions shall not be more than 300 X 200 X 100mm (H X L X W).

4.10.5 The tool shall be powered from a rechargeable 18V battery.

4.10.6 The maximum torque shall not be less than 360Nm.

4.10.7 The maximum breakaway torque shall not be more than 720Nm.

4.10.8 The weight of the tool without the battery shall not be more than 3kg.

4.10.9 The tool shall be supplied complete with a battery charger.

4.10.10 The screw diameter shall range between M10 – M20.

4.11 Powered Cable Cutter (Cordless)

4.11.1 The tool shall be designed for cutting up to 1500 ACSR, 750 MCM copper or 1000MCM aluminium.

4.11.2 The tool shall have a guillotine cutter design that maintains cable profile for easy connector installation.

4.11.3 The tool shall have an LED light that helps illuminate the cutting area.

4.11.4 The tool shall be cordless and ergonomic.

4.11.5 The tool shall be powered from a rechargeable battery of at least 18V.

4.11.6 The guillotine blade shall be easily replaceable to maximize uptime.

4.11.7 The cutter shall be supplied complete with a charger, a hang hook, shoulder strap and a kit box.

4.12 Battery Operated Crimping Tool

4.12.1 The crimping tool shall comprise of standard spring and pin crimping dies.

4.12.2 The tool shall have short crimping cycles by optimized 2-step hydraulic system.

4.12.3 The tool shall have a compression force of at least 120kN.

4.12.4 It shall have a compression width of more than 12mm.

4.12.5 It shall have a crimping range of 10 – 400mm^2 as per DIN 48083.

4.12.6 The tool shall not weigh more than 5kg.

4.12.7 The dimensions shall not be more than 400 X 100 X 300mm.

4.12.8 The tool shall be powered by a rechargeable lithium ion battery of IPP-30.

4.12.9 It shall be supplied complete with a charger, carrying strap and transportation case.

4.13 Bee Suit

4.13.1 The suit shall be made from strong cotton material.

4.13.2 The suit shall be white in colour that is friendly to the bees and minimizes attacks.

4.13.3 The suit shall be supplied complete with veils/hoods/hats and gloves that are properly engineered to keep the face net at least 5cm from the face.

4.13.4 The veil/hood/hat shall be have a zip to run round the neck to avoid entry of bees into the suit.

4.13.5 The veil/hood shall have a universal fit and shall consist of wire veil, lined with cloth.

4.13.6 The suit shall have an expandable waist to fit different body sizes.

4.13.7 The bee suit shall be as illustrated in Figure 9.

Figure 9: Bee Suit

4.14 Power Saw

4.14.1 The power saw shall have high power and rapid acceleration.

4.14.2 The power saw shall have a smart start feature and an adjustable oil pump. That shall make it easy to set the chain lubrication as per the user needs.

4.14.3 The saw shall be equipped with a three-piece crankshaft for maximum durability for the toughest applications.

4.14.4 The saw shall have a sturdily built crankcase that shall withstand high revolutions per minute ensuring a long service life.

4.14.5 It shall have effective anti-vibration dampers for the user's comfort.

4.14.6 The technical parameters of the power saw shall be as follows;

DESCRIPTION	**SPECIFICATION**
Idling speed	<3000rpm
Maximum power speed	>9000rpm
Maximum torque	>3Nm
Gross weight	<12kg
Engine cylinder displacement	<100cm^3
Fuel tank volume	< 1ltr
Oil tank volume	<0.5ltrs
Oil pump type	Automatic

4.15 Petrol Driven Engine Drill

4.15.1 The drill shall be robust ergonomic and comfortable.

4.15.2 The drill shall have a two-stroke engine with a displacement of not less than 20cm^3.

4.15.3 The drill shall have a spark arresting muffler.

4.15.4 It shall have a throttle lockout button that shall prevent accidental drill bit rotation.

4.15.5 The drill shall comprise of a heavy duty keyed chuck that shall hold the drill shanks.

4.15.6 The drill output shall not be less than 0.8kW.

4.15.7 The fuel tank capacity shall not be less than 0.5 litres.

4.15.8 The engine drill shall have a dry weight of not more than 6kg.

4.15.9 It shall be supplied complete with a keyless chuck, 18cm gallon pot auger, 7.5x46cm heavy duty auger, 7.5x15cm auger, 6.0x15cm auger, hearing protection and a pair of size 12 heavy duty gloves.

4.16 Capstan Winch

4.16.1 The winch shall be portable.

4.16.2 The winch shall have a maximum rated capacity of not less than 1800kg.

4.16.3 The engine of the winch shall be two-stroke with a capacity of not less than 60cc.

4.16.4 The winch shall have a rope brake that ensure safety during operation by preventing unintentional sliding back of the load.

4.16.5 The winch shall have an automatic throttle that will be engaged as the rope is pulled.

4.16.6 The winch shall have an automatic brake system that is engaged when the pull on the rope is stopped.

4.16.7 The winch shall have a centrifugal clutch that ensures the capstan drum does not rotate on idle.

4.16.8 The winch shall not weigh more than 20kg.

4.16.9 It shall be supplied complete with a rope bag, a 2ton round sling hook and a D-shackle unilock.

Figure 10: 2Ton Round Sling Hook

Figure 11: D-Shackle Unilock

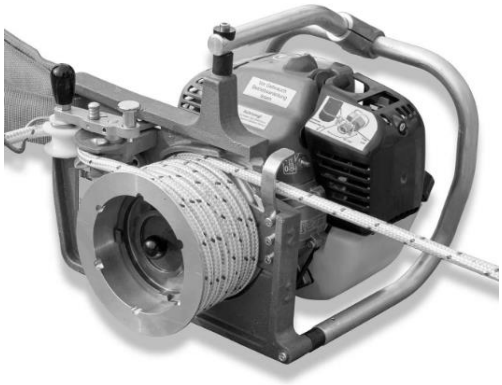


Figure 12: Capstan Winch

5. TESTS AND INSPECTION

5.1. The Specialized Transmission Tools & Equipment shall be tested in accordance with the relevant requirements and this specification. It shall be the responsibility of the manufacturer to perform or to have performed all the tests specified.

5.2. Copies of previous Test Certificates and Test Reports (for all applicable type tests) certified by the relevant International or National Testing/Standards Authority of the country of manufacture or ISO/IEC 17025 accredited testing laboratory shall be submitted with the tender (including certificate of accreditation for laboratory) for the purpose of technical evaluation, all in English language.

5.3. Copies of Test Reports to be submitted for tender evaluation shall include the results of the appropriate type tests for the Specialized Transmission Tools & Equipment, accessories and fittings identical in all essential details with those to be supplied.

5.4. Routine and sample test reports for the Specialized Transmission Tools & Equipment, accessories and fittings to be supplied shall be submitted to Kenya Power for approval before shipment/delivery of the goods. The Test reports shall include Verification of

Dimensions, Mechanical Type Tests and Electrical Type Tests. Kenya Power shall nominate three engineers to witness acceptance tests at the factory.

5.5. On receipt of the Specialized Transmission Tools & Equipment, accessories and fittings, Kenya Power will inspect them for acceptance at stores and may perform or have tests performed in order to verify compliance with this specification.

5.6. The supplier shall replace without charge to Kenya Power any tool, accessory or fitting which upon examination, test or use fail to meet any or all of the requirements in the specification.

6. MARKING AND PACKING

6.1. Instructions for installation and details on applicable tools shall be included in each package, all in English language.

6.2. The packaging shall protect the contents against any damage.

6.3. Every item should be marked with the following:

a) Manufacturer's Name
b) Part Number
c) Tower Type
d) Serial Number
e) Date of Manufacture
f) The words "PROPERTY OF KPLC"

6.4. In addition, each item should be marked with the applied proof test load. These markings should be permanently embossed on a nameplate in a protected location.

APPENDICIES

A: TESTS (Normative)

A.1 It shall be the responsibility of the supplier to test or to have all the relevant tests performed.

B: QUALITY MANAGEMENT SYSTEM (Normative)

B.1 The supplier shall submit a Quality Assurance Plan (QAP) that will be used to ensure that the Specialized Transmission Tools & Equipment physical properties, tests and documentation, will fulfil the requirements stated in the contract documents, standards, specifications and regulations. The QAP shall be based on and include relevant parts to fulfil the requirements of ISO 9001: 2015.

B.2 The Manufacturer's Declaration of Conformity to applicable standards and copies of quality management certifications including copy of valid and relevant ISO 9001: 2015 certificate shall be submitted with the tender for evaluation.

B.3 The bidder shall indicate the delivery time of the Specialized Transmission Tools & Equipment, manufacturer's monthly & annual production capacity and experience in the production of the type and size of items being offered. A detailed list & contact addresses (including e-mail) of the manufacturer's previous customers for similar type of goods in the last five years as well as reference letters from at least four of the customers shall be submitted with the tender for evaluation.

C: DOCUMENTATION (Normative)

C.1 The bidder shall submit its tender complete with technical documents for tender evaluation. The technical documents to be submitted (all in English language) for tender evaluation shall include the following:

a) Fully filled clause by clause Guaranteed Technical Particulars (GTP) signed by the manufacturer, specific values shall be filled in, terms like "yes", "Agree" , "complied" shall not be acceptable;
b) Copies of the Manufacturer's catalogues, brochures, drawings and technical data;
c) Sales records for the last five years and at least four customer reference letters;
d) Details of manufacturing capacity and the manufacturer's experience;
e) Copies of required Type Test Reports by a Third Party Testing Laboratory accredited to ISO/IEC 17025;
f) Copy of Accreditation Certificate to ISO/IEC 17025 for the Third Party Testing Laboratory;
g) Manufacturers Letter of Authorization, ISO 9001:2015 Certificate and other technical documents required in the tender.
h) Manufacturer's warranty and guarantee; subject to at least 12 months from date of delivery to KPLC stores

C.2 The successful bidder (supplier) shall submit the following documents/details to KPLC for approval before manufacture:

a) Fully filled clause by clause Guaranteed Technical Particulars (GTP) stamped and signed by the manufacturer, specific values shall be filled in, terms like "yes", "Agree" , "complied" shall not be acceptable;
b) Design Drawings with details of the Specialized Transmission Tools & Equipment to be manufactured for KPLC.
c) Quality Assurance Plan (QAP) that will be used to ensure that the design, material, workmanship, tests, service capability, maintenance and documentation will fulfil the requirements stated in the contract documents,

standards, specifications and regulations. The QAP shall be based on and include relevant parts to fulfil the requirements of ISO 9001:2015.

d) Detailed test program to be used during factory testing;

e) Marking details and method to be used in marking the Insulated Platform Tools for Airmobile;

f) Packaging details (including packaging materials).

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D: GUARANTEED TECHNICAL PARTICULARS (Normative)

(To be filled and signed by the Manufacturer and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data, sales records for previous five years, four customer reference letters, details of suppliers' capacity and experience; and copies of complete type test certificates and test reports for tender evaluation, all in English Language)

Tender No. ……

Clause number	**KPLC requirement**	**Bidder's offer (indicate full details)**
Manufacturer's Name and address		*Specify*
Country of Manufacture		*Specify*
Bidder's Name and address		*Specify*
1.	Scope	*Specify*
2.	References	*Specify*
4.	**Requirements**	
4.1	**Service Conditions**	
4.1.1a)	Altitude	*State*
4.1.1b)	Humidity	*State*
4.1.1c)	Average Ambient Temperature	*State*
4.1.1d)	Saline Condition	*State*
4.1.1e)	Wind Speed	*State*
4.2	**SPECIALIZED TOOLS, INSTRUMENTS AND BODY HARNESSES**	
4.2.1	**CRIMPING TOOL COMPLETE WITH GENERATOR**	
4.2.1.1	Ideal use	*Specify*
4.2.1.2	Range of dies	*Specify*

Clause number	KPLC requirement	Bidder's offer (indicate full details)
4.2.1.3	Die release system	*Specify*
4.2.1.4	Built-in safety valve	*Specify*
4.2.1.5	Technical parameters of the Hydraulic Crimping Tool	*Specify*
4.2.1.6	Material of manufacture of the Hydraulic Compression Head	*Specify*
4.2.1.7	Parameters of the Hydraulic Power Unit module	*Specify*
4.2.1.8	Accessories and length of connecting hoses	*Specify*
4.2.2	**TRANSMISSION PORTABLE EARTHING HARNESSES**	
4.2.2.1	Design and manufacture	*Specify*
4.2.2.2	Complete kit	*Specify*
4.2.2.3	Material of manufacture of the leads	*Specify*
4.2.2.4	Application of the equipment	*Specify*
4.2.2.5	Components of a set	*Specify*
4.2.2.6	Method of coupling	*Specify*
4.2.2.7	Maximum short circuit fault current	*Specify*
4.2.2.8	Safety to persons handling the equipment	*Specify*
4.2.2.9	Levels of corrosion and physical handling stresses	*Specify*
4.2.2.10	**LINE-END CLAMP**	
4.2.2.10.1	Components of the line end clamp	*Specify*
4.2.2.10.2	Connection	*Specify*
4.2.2.10.3	Design of the clamp	*Specify*
4.2.2.10.4	Torque	*Specify*
4.2.2.10.5	Rating and material	*Specify*

Clause number	KPLC requirement	Bidder's offer (indicate full details)
4.2.2.11	**EARTH-END CLAMP**	
4.2.2.11.1	Components of earth end clamp	*Specify*
4.2.2.11.2	Rating and material	*Specify*
4.2.2.12	**FLEXIBLE CABLE WITH TERMINATION**	
4.2.2.12.1	Weight and flexibility	*Specify*
4.2.2.12.2	Insulating cover	*Specify*
4.2.2.12.3	Short circuit rating	*Specify*
4.2.2.12.4	Standard of Manufacture	*Specify*
4.2.2.12.5	Covering Cable	*Specify*
4.2.2.12.6	Thickness	*Specify*
4.2.2.12.7	Material	*Specify*
4.2.2.12.8	Maximum diameter and electrical resistance	*Specify*
4.2.2.12.9	Cross sectional area	*Specify*
4.2.2.12.10	Termination	*Specify*
4.2.2.12.11	Fatigue resistance	*Specify*
4.2.2.12.12	Fraying of conductor strands and wear on protective PVC insulation	*Specify*
4.2.2.12.13	Connections	*Specify*
4.2.2.12.14	Terminal lugs	*Specify*
4.2.3	**LINEMAN'S HEADLAMP GEAR**	
4.2.3.1	Beam distance	*Specify*
4.2.3.2	Mounting clips	*Specify*
4.2.3.3	Detachable	*Specify*

Clause number	KPLC requirement	Bidder's offer (indicate full details)
4.2.3.4	IP rating	*Specify*
4.2.3.5	Power source	*Specify*
4.2.3.6	Parameters of the head lamp	*Specify*
4.3	**ELECTRIC HOISTING WINCH, HOOK & CHAIN**	
4.3.1	Motor system	*Specify*
4.3.2	Breaking system	*Specify*
4.3.3	Steel plate	*Specify*
4.3.4	Construction	*Specify*
4.3.5	Hooks	*Specify*
4.3.6	Mechanical overload clutch	*Specify*
4.3.8	Operation	*Specify*
4.3.9	Chain	*Specify*
4.3.10	Parameters of equipment	*Specify*
4.4	**HEIGHT RESCUE STRETCHER COMPLETE WITH SECURING HARNESS AND HOOK ASSEMBLY**	
4.4.1	Rail diameter	*Specify*
4.4.2	Design of rail ends	*Specify*
4.4.3	Load attachment points	*Specify*
4.4.4	Netting	*Specify*
4.4.5	Back support	*Specify*
4.4.6	Restraint straps	*Specify*
4.4.7	Parameters of the Rescue STretcher	*Specify*
4.4.8	Accessories	*Specify*

Clause number	KPLC requirement	Bidder's offer (indicate full details)
4.5	**TWO-WAY COMMUNICATION RADIO**	
4.5.1	License and portability	*Specify*
4.5.2	Radio features	*Specify*
4.5.3	Radio parameters	*Specify*
4.6	**MOBILE EMERGENCY LED FLOOD LIGHTS**	
4.6.1	Illumination in different directions	*Specify*
4.6.2	Casing	*Specify*
4.6.3	Power source	*Specify*
4.6.4	Battery indicator	*Specify*
4.6.5	Accessories	*Specify*
4.6.6	Parameters of the LED Flood Light	*Specify*
4.7	**CARBIDE BIT HOLES SAW AND STEP DRILL BITS COMPLETE WITH HEAVY DUTY HAND DRILL**	
4.7.1	Power supply	*Specify*
4.7.2	Automatic switch lock	*Specify*
4.7.3	Material of manufacture	*Specify*
4.7.4	Parameters of the heavy duty hand drill	*Specify*
4.8	**HEAVY DUTY DRILL (Cordless)**	
4.8.1 – 4.8.4	*KPLC Requirement*	*Specify*
4.9	**ANGLE GRINDER (Cordless)**	
4.9.1 - 4.9.11	*KPLC Requirement*	*Specify*
4.10	**IMPACT WRENCH (Cordless)**	
4.10.1 - 4.10.10	*KPLC Requirement*	*Specify*

Clause number	KPLC requirement	Bidder's offer (indicate full details)
4.11	**POWERED CABLE CUTTER (Cordless)**	
4.11.1 - 4.11.7	*KPLC Requirement*	*Specify*
4.12	**BATTERY OPERATED CRIMPING TOOL**	
4.12.1 - 4.12.9	*KPLC Requirement*	*Specify*
4.13	**BEE SUIT**	
4.13.1 - 4.13.7	*KPLC Requirement*	*Specify*
4.14	**POWER SAW**	
4.14.1 - 4.14.6	*KPLC Requirement*	*Specify*
4.15	**PETROL DRIVEN ENGINE DRILL**	
4.15.1 - 4.15.9	*KPLC Requirement*	*Specify*
4.16	**CAPSTAN WINCH**	
4.16.1 - 4.16.9	*KPLC Requirement*	*Specify*
5	**TEST REQUIREMENTS**	
5.1	Test standards and responsibility of testing	*Specify*
5.2	Relevant copies of test documentation	*Specify*
5.3	Type of tests to be done on the Insulated Platform Tools for Airmobile	*Specify*
5.4	Approval of routine and sample test reports	*Specify*
5.5	Local inspection and acceptance	*Specify*
5.6	Replacement of faulty Items	*Specify*
6	**MARKING AND PACKING**	
6.1	Instructions for installation	*Specify*
6.2	Packaging	*Specify*

Clause number	KPLC requirement	Bidder's offer (indicate full details)
6.3	Marking details	*Specify*
6.4	Marking of applied proof test load	*Specify*
A	**TEST**	
A.1	Responsibility of carrying out tests	*State*
B	**QUALITY MANAGEMENT SYSTEM**	
B.1	Quality Assurance Plan	*Provide*
B.2	Manufacturer's declaration of conformity to applicable standards	*Provide*
B.3	Manufacturer's experience and delivery time	*State*
	Manufacturer's delivery time	*State*
	Manufacturing Capacity (units per month)	*State*
	List of previous customers	*State*
	Customer reference letters	*State*
C	**DOCUMENTATION**	
C.1	Documents submitted with tender	*State compliance*
C.2	Documents to be submitted by supplier to KPLC for approval before manufacture	*State compliance*
	Statement of compliance to specification (indicate deviations if any & supporting documents)	*State compliance*

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Manufacturer's Name, Signature, Stamp and Date