

SPECIFICATIONS FOR TOOLS AND INSTRUMENTS

1. JEMBE

- 47 inch timber handle.
- The head is a three pronged fork that is ideal for breaking hard ground, it forms a right angle with the included strong timber handle.
- Material: hot forged carbon steel
- Blade size: 24cm Long x 17.5cm wide
- Weight: 1620 grams (3.5 LBS)

2. PANGA

- Overall Length: 21.5 inch
- Blade Length: 15.5 inch
- Blade: Carbon Steel, Upturned Point
- Thickness: 2.00 mm/ Handle Length: 6 Inches
- Handle: Full Tang, Wooden Slabs with Rivets

3. SLASHER

- Made from hardened and tempered steel, this tool is light and easy to use and sharpened on both sides which makes it ideal for clearing long grass and weeds.
- Approx. Weight: 586 grms.
- Blade Length: 750mm (29½”)
- Width at widest end 50MM

4. WHEELBARROW

- Lightweight galvanized steel wheelbarrow ideal for a wide range of construction applications, as well as general use.
- Constructed with strong tubular steel frame and rubber gripped handles.
- Fitted with 340mm pneumatic tyre.

5. **RAKE**

- High quality stainless steel eliminates the risk of corrosion.
- Hardened, tempered, mirror polished 12-tooth head and socket.
- Sanded, solid ash shaft with traditional stained finish.
- Head width - 305*1430mm

6. **CHAINSAW/ POWERSAW**

- 40cm Oregon Bar and Chain
- High Efficiency Brushless Motor - Delivers up to (130) 4x4” cuts per charge (3.0 Ah)
- Automatic Oiling - Reduced Maintenance
- Tool Free Bar fitment & Chain Tensioning - Fast Chain Adjustments
- Variable Speed Trigger - No pull starting and improved control during cutting
- Chain Speed - 15 m/s
- Extensive over-mold, for extra grip and comfort in prolonged use
- Supplier with 1 x 54V, 3.0Ah Battery + 8A Charger
- 40CM Oregon Bar & Chain 3/8 Low Profile (90px) 1.1mm Gauge

7. **HACKSAW**

- Die-cast handle and stock with lightweight aluminium frame
- Twin (90° and 45°) blade positions for comfortable and accurate cutting
- Carbon steel blade suitable for cutting a variety of materials.
- Length 300mm

8. **FLAT FILE/ ROUND FILE**

- Soft grip handles for comfort and control
- Double cut for faster removal of material from work piece.
- Length 200mm

9. **PLIERS**

- Fully chromed and polished jaw head for corrosion resistance.

- Fitted with oversized grips for extra comfort.
- Comfort Grip

10. **COMBINATION SPANNER 6mm – 32mm**

- Cold stamped slim style chrome vanadium steel spanner
- Satin polished finish for corrosion resistance
- Open end and twelve-point wall-drive ring combination
- Hanging pouch
- 6mm-32mm

11. **ADJUSTABLE SPANNER 150, 200, 250, mm**

- Drop-forged Chrome Vanadium steel.
- Hardened and heat treated with fully polished head.
- Extra wide jaw capacity with Metric calibration and reversible feature allows use as a pipe wrench.
- Anti-slip comfort grip with hanging hole.
- Jaw Capacity: 150,200,250,mm
- Length: 200mm

12. **DIGITAL CLAMP METER**

- 200 A ac and dc current measurement with detachable jaw
- 600 V ac and dc voltage measurement
- True-rms ac voltage and current for accurate measurements on non-linear signals
- 6000 Ω resistance measurement with continuity detection

Features

- Detachable jaw makes accessing wires and viewing the display easier
- Built in flashlight/torch allows for easy illumination and identification of wires
- CAT III 600 V safety rating
- Compact design fits in your hand and can be used while wearing personal protective

equipment

- State of the art signal processing allows for use in noisy electrical environments while providing stable readings
- Large, easy to read backlight display automatically sets the correct measurement range so you do not need to change switch positions while taking a measurement
- Three-year warranty
- Soft case

	Range	Resolution	Accuracy
AC current	200 A	0.1 A	2 % ± 5 digits
DC current	200 A	0.1 A	2 % ± 5 digits
AC voltage	600 V	0.1 V	2 % ± 5 digits
DC voltage	600 V	0.1 V	2 % ± 5 digits
Resistance	6000	0.1	1 % ± 5 digits
Wire capacity	17 mm		
Safety rating	CAT III 600 V		

13. ALLEN KEYS METRIC 3-17mm

- For Hexagon socket head bolts.
- CHROME VANADIUM steel - 59CrV4 Gun metal finish Short series
- Contents:3-17mm

14. DOUBLE RING SPANNER 6-32mm

- Contents: 6 x 7, 8 x 9, 10 x 11, 12 x 13, 14 x 15, 16 x 17, 18 x 19, 20 x 22, 21 x 23, 24 x 27, 25 x 28, 30 x 32mm
- Chrome Vanadium steel spanners with deep offset Wall Drive rings.
- Hardened, tempered and nickel chrome plated for corrosion resistance.
- Fully polished mirror finish.
- Supplied in storage/carry rack.

15. SCREW DRIVERS.

- High quality Chrome Vanadium polished shafts with shot blasted and magnetized tips
- Textured handles with round profile design offer maximum power transfer from hand to fixing
- Colour - Coding for fast identification and hanging hole for alternative storage
- Deep knurling on shafts allows extra grip for oily fingers when spinning off fixings.
- Slotted;3x75,5x100,6x150,8x150mm,
- Philips;#1x75,#2x100mm,
- Pozi;#1x75,#2x100mm

16. RATCHET CRIMPING TOOL 220mm [HYDRAULIC]

- All steel construction with large soft grip handles.
- Quick change hardened and tempered jaws to suit insulated and non-insulated terminals.
- Ratchet action ensures consistent crimping.
- Insulated terminal suitability:0.5-1mm²,1.5-2.5mm²,4-6mm²
- None insulated terminal suitability:1.5,2.5,6,10mm²
- Length:220mm

17. PLIERS LONG NOSE, SIDE CUTTER & COMBINATION PLIERS

- Drop-forged Chrome Vanadium steel long nose pliers
- Finely ground heads with a fully polished finish
- Serrated jaws and precision ground cutting edges, induction hardened 55-60 HRC for cutting hard and soft wires
- Length 200mm
- Vinyl dipped handles for comfort and control.

18. HAMMER

- Hammer head and shaft drop-forged from one piece of steel lightweight yet incredibly strong

- Manufactured and tested to BS 876
- Weight 450g(16oz)

19. TWO JACK DRILL

- The powerful and compact tool
- Powerful 600 W motor, ideal for drilling holes up to 10 mm in diameter in metal
- Drill spindle fixed in bearing for high precision
- Compact design and low weight for optimum handling in medium-duty drilling applications
- Control Electronic for precise drilling starts
- Metal keyless chuck for high precision and long lifetime
- Forward / reverse rotation
- Particularly suitable for drilling holes up to 10 mm in steel
- Rated power input: 600 W
- No-load speed: 0 - 2600 rpm
- Power output: 360 W
- Weight: 1.7 kg
- Rated speed: 0 - 1676 rpm
- Rated torque: 20.0 Nm
- Drill spindle connecting thread: 3/8"-24 UNF
- Chuck capacity, min./max.: 1 - 10 mm

20. DRILL BITS (MASON & STEEL)

- Comprehensive set of drill bits and accessories
- Includes masonry, wood and HSS drill bits plus an assortment of 1/4"hex power tool bits.
- DRILL BITS:HSS;2,3,4,5,6,8MM
- WOOD;4,5,6,8,10MM,
- MASONRY;4,5,6,7,8,10MM
- 1/4"HEX BITS;SLOTTED;3,4,5,6,7MM

21. TRIM KNIFE

- Disposable knife with safety cover

22. PVS GLOVES

- PVC coating on a cotton liner
- 355mm Cuffed gloves give extra protection to the user.
- Ideal for industrial and agricultural applications.
- CE Marked and conforms to BS EN 388 CAT 2.

23. LEATHER GLOVES

- A good quality durable leather recovery glove
- Tough enough to withstand heavy rope handling, ideal for handling hardware such as shackles, pulley blocks and ground anchors
- A must to have stowed with your tow rope.

24. SAFETY GLASSES

- Conforms to CE standards - BS EN 166/F
- Comfortable dual material temples for improved fit around the nose
- Modern wraparound design gives increased protection.
- Polycarbonate anti-scratch anti-glare lens

25. FLAME RETARDANT CLOTHING

Type: Nomex coverall
Material: Nomex® IIIA fabric, 150g/m² (4.5oz) / 200g/m² (6oz)
APTV: 5.0cal/cm² (150g/m²) or 6.0cal/cm² (200g/m²)
Feature: Inherently flame retardant

Color: Navy blue, royal blue, orange, yellow, red, grey, khaki, sage green or customized colors

Size: Customized

Standards: CE, ISO11612, EN1149, NFPA2112

Application: Oil and Gas, Petroleum, Chemical industrial, Paint and other Environments where flash fire may occur.

26. EXTENSION CORDS

- Tough impact resistant drum with recessed panel sockets.
- Thermal overload protection and power on indicator light. 4 x 230V Power sockets
- Frame incorporates a carrying handle
- Cable clip to secure plug whilst not in use and brake to stop drum spinning
- Fitted with BS approved non – rewirable 3-pin plug.
- Cable length :25m
- Cable type :PVC
- Drum size Medium
- Capacity wound:720W
- Capacity unwound:3120W
- Voltage :230V

27. COTTON GLOVES

- Cotton glove liners.
- STANDARD: EN 420 & EN 388.
- USE: May be efficiently used under Latex gloves.
- Excellent dexterity, sweat absorbent, lint-free.
- Material: cotton

28. TAPE MEASURE 10m

- Rubberized durable chrome body fitted with cushioned grip for comfort
- Fitted with 10m wide nylon coated blade maximizing strength Metric/Imperial rule with 16" and 19.2" stud Centre marking for framing work Class II accuracy.
- Features double edged end hook designed to grab on top or bottom for versatility.
- Fitted with powerful double magnets, lanyard and belt clip.

29. PIPE WRENCH 6, 8, 12 SIZE

- Gravity cast aluminium alloy handle has the strength of steel but at 2/3rds the weight.
- Drop-forged high carbon steel jaws with tool steel spring.

- Size 6, 8, 12

30. SOLDERING GUN

- Adjustable heating control ranging from 200-400°C (approximately).
- Removable solder tip transforms torch into flameless heat source.
- Suitable for heating and soldering.
- Includes safety cap for storage and acts as a stand for hands-free operation.

31. HAND TROLLEY

- Lightweight aluminium frame, weighs only 7kg yet has a carrying capacity of 90kg
- Folding steel foot plate and telescopic handle with spring release means that trolley can be packed away in seconds
- Fitted with Ø150mm wheels for easy-rolling over rough ground

32. INSULATION RESISTANCE TESTER

- Resistance measurement: 15 TΩ - 5 kV,
- 35 TΩ - 10 kV, 35 TΩ - 15 kV
- High current – 6 mA short circuit current
- High noise immunity – 8 mA of noise rejection
- Four software filters: 10s, 30s, 100s, 200s
- Li-ion battery – charges in 2 hours and gives up to 6hours continuous testing a 100 MΩ load ,battery meets IEC 62133
- CATIV 600 V safety rating up to 3000m
- CATIV 1000 V safety rating up to 4000m
- Remote operation via USB cable
- Download of memory via isolated USB cable Bluetooth®
- IR, timed IR, DAR, PI, DD, SV and ramp diagnostic tests
- Large LCD display with backlight

- Dedicated voltmeter function (30 V to 660 V) AC or DC
- Advanced memory, on screen recall and real time clock for date/ time stamped results
- Power DB Lite asset management software
- Option to record temperature and/or relative humidity with saved results (measured independently)
- Test types:- timed insulation resistance, polarization index, dielectric absorption index, step voltage, dielectric discharge, ramp

AC voltage (auto-Ranging): 90 - 264 V rms, 50/60 Hz, 100 A

Battery life: 11.1 V, 5.2Ah meets IEC 62133: 2003 6 hours (typical) continuous testing at 5 kV with a 100 MΩ load

Battery charge time: 2.5 hours deep discharge, 2 hours normal discharge

30 min quick charge: 1-hour operation at 5 kV with a 100 MΩ load

Test voltage: 250V, 500V, 1000 V, 2500 V, 5000 V, 10000 V, 15000V,

Lock test voltage: 40 V to 1 kV in 10 V steps, 1 kV to 5 kV in 25 V steps, 5 kV to 15 kV in 25 V steps

Test voltage accuracy: +4%, -0%, ±10 V nominal test voltage at 1GΩ load (0°C to 30°C)

Resistance range: 10 k to 15 TO @ 5 kV, 10 k to 35 TO@ 10 kV, 10 k to 35 TO @ 15 kV

Accuracy

	5000 V	2500 V	1000 V	500 V	250 V
±5% to	1 TΩ	500 GO	200 GΩ	100 GΩ	50 GΩ
±20% to	10 TΩ	5 TΩ	2 TΩ	1 TΩ	500 TΩ

Guard terminal: Guards out parallel leakage resistance

Performance: down to 250 k Ω with a maximum additional resistance error of 1% with a 100 M Ω load

Display

Display range analogue: 100 K Ω to 10 T Ω

Display range digital: 10 k Ω to 35 T Ω

Short circuit/charge: 6mA current

Insulation test Alarm: 100 k Ω to 10 G Ω

Capacitor charge (on battery): < 2.5 s/ μ F to 5 kV, <5 s/ μ F to 10 kV, < 6.3 s/ μ F to 15 kV

(With AC): < 1.5 s/ μ F to 5 kV, <2.7 s/ μ F to 10 kV, < 4 s/ μ F to 15 kV

Capacitor discharge: 5 kV to 50 V :< 120 ms/ μ F 10 kV to 50 V:< 250 ms/ μ F 15 kV to 50 V:< 3500 ms/ μ F

Capacitance range: with test voltage set above 500V 10 nF to 25 μ F

Capacitance: With test voltage set above 500 V

Measurement: 10 nF to 25 μ F

Capacitance: 10 nF to 10 μ F : $\pm 10\% \pm 5$ nF

Measurement accuracy

Current range 0.01 nA to 6 mA

Current accuracy $\pm 5\% \pm 0.2$ nA at all voltages (23 $^{\circ}$ C)

Interference 8 mA from 1200 V to 2500 V

Software 4 filter settings: 10 s, 30 s, 100 s, 200 s

Voltmeter range 30 V to 660 V ac or dc, 45Hz – 65Hz

Voltmeter accuracy $\pm 3\%$, $\pm 3V$

Timer range Up to 99 minutes 59 seconds, 15 second minimum setting

Memory capacity 11 hrs logging @ 5 sec intervals

33. PHASE OUT EQUIPMENT

Operating Voltage Range: 4kV to 230kV (phase-to-phase)

Power Supply: 9V lithium or alkaline battery in both transmitter and receiver units

Dimensions / Weight:

Receiver – 8.5”L x 3.3”D (22cm x 8cm) / 1.2 lb (0.54kg) Transmitter – 8.5”L x 3.3”D (22cm x 8cm) / 1.2 lb (0.54kg)

Radio Transmission Capability:

More than 33 feet through the air, over 1,000 feet along overhead conductors and underground cables with polyethylene insulation; range is substantially reduced in underground conductors with rubber insulation

Operating Temperature Range: -20°F to +120°F (-29°C to 49°C)

Operating Frequency & Phasing: For use on 50Hz Systems In phase indication for phase angle shift is $\leq 10^\circ$ No in phase indication for phase angle $\geq 30^\circ$

Hotstick Connection Method: A universal spline is built into the polycarbonate housing of both the transmitter and receiver units.

Set should be accompanied by a 6’ fiberglass hotstick and universal hotstick adaptor (shotgun)

Carrying Case: Metal carrying case is included with the units Dimensions: 15.3”L x 10.5”W x 4.8”D (39cm x 27cm x 12cm) Weight: 7.45 lb (3.4kg)

Probes Included:

Overhead Hook Probe (typically for transmitter) – 5.5”L x 2.5” opening (14cm x 6cm opening) Overhead Y Probe (typically for receiver) – 1.75”L x 1.5”W (4.4cm x 3.8cm)

-Underground bushing probe

-underground elbow probe

34. **HAND CRIMPING TOOLS**

- Steel construction with large comfort grip handles and plate stamped jaws.
- Ratchet action ensures consistent crimping.

35. **WIRE STRIPPERS**

- Heavy-duty, professional automatic wire stripper with alloy steel jaws.
- Fully automatic, single action, grips and strips all types of wire 0.2-6mm² with minimal pressure to handles and no damage to the inner core of the wire.
- Adjustable length stop is easily swiveled to allow longer stripping.
- Precision machined wire-cutting blades for long life.
- Features three crimping elements for insulated, non-insulated (1.5-6mm²) and auto-ignition terminals (7-8mm).

36. **VOLTAGE DETECTOR**

- For use on system voltages up to 800kV
- Large LED display indicates the line-to-ground voltage level
- Display is easy to read in bright or dark conditions
- Voltage readout allows user to distinguish between nominal and induced voltage levels
- Audible indication of voltage detected
- Built-in universal spline for standard hot stick attachment
- Auto shut-off with low battery function
- Voltage Detector Tester available as a power source to test before and after use
- Indicates Voltage up to 500 kV and includes:-
 - Overhead hook probe, 2“ diameter opening,
 - Overhead hook probe , 6“ diameter opening
 - Rugged Plastic Case
 - Should work with a link/hot stick

37. **SAFETY BELT**

- Pocket-friendly rates
- Full protection
- Temperature resistance
- Heavy load bearing capacity
- Width: 45mm
- Strength: $\geq 23\text{kN}$
- Safety Belts Material: Polyester

38. LADDERS

- Aluminium loft ladder manufactured to BS 14975:2006.
- Hand rail and all fixing components for quick and easy installation
- Three-section design enables ladder to fit in smaller areas

39. CIRCUIT BREAKER ANALYSER

The following characteristics of Circuit breaker Analyzer are to cover at least the following tests:

- Measure of Circuit breaker timing (for main and auxiliary contacts, up to 24 in total)
- Measure of Current profile in the coils (up to 6)
- Measure of Static and Dynamic contact resistance, in three phase mode
- MTC (Minimum Trip Coil), to verify which is the minimum voltage for that one the circuit breaker is operating
- Measure the PreInsertion Resistance (PIR) values
- Motion analysis (movement, speed), using 3 digital transducers
- First trip test, in three phase mode
- All the measures of timing and resistance should be possible to perform when the circuit breaker has Both Side Grounded, even for circuit breakers with two breaks for phase.

Should be also possible to measure the current and the voltage of the spring motors.

In add to the standard tests (Open, Close, Open-Close, Close-Open, Open-Close- Open) must be possible to set up Sequence of tests.

Must be available quick configuration of the circuit breaker analyzer taking in account the main characteristics of the circuit breaker under test, so to be easy for the operator configure the equipment.

The tests, configuration and analysis of the results must be done directly by front of the Circuit breaker Analyzer self.

Optionally, they can be done using an external PC.

Must be included the software to download the results in a PC, to analyze and storage. Upgrade of the software will be free of charge.

All accessories (cables, transducers, current clamps, PC, etc.) must be included in the scope of supply.

Must be included in the quotation even:

- 2 days training / FAT in the factory for maximum 3 people
- 3 training session of 3 days each / 8 hours a days in Kenya for maximum 10 people in each session, for theoretically and practical use of the circuit breaker analyzer. If will be available a circuit breaker in a substation, one day training (included in the above mentioned) will be used to perform practical tests on a real circuit breaker. Otherwise, the trainer must provide a circuit breaker simulator to perform practical test with the circuit breaker analyzer.

Coil Command Circuits

- . Number of circuits: **6** (three Open, three Close).
- . Type of driver: electronic; it ensures superior timing control.
- . Driver characteristic: up to 300 V DC; up to 60 A DC; up to 300 V AC; up to 42 A AC.
- . Operating time accuracy: 0.025% of delay \pm 20 us.
- . Coil current ranges: 3 ; 10; 60 A full scale, user selectable.
- . Coil current measurement accuracy: 0.1% of the reading \pm 0.1% of the selected range.
- Outputs are isolated between them and between grounds.

Timing Contact Inputs (Main/Pir Or Auxiliary)

- . Number of contact inputs: 24, divided in 12 groups of two each.
- . Each input group is isolated with respect to the others.
- . The contact inputs may be configured as main/PIR breaker contact or auxiliary contact.

- . The contacts status (closed or opened) are displayed on the screen Main/PIR breaker contact
- . Test of the main contact and of the pre-insertion resistor contact, selectable.
- . PIR resistance range : 30 Ohm to 10 kOhm
- . PIR resistance measurement value accuracy: $\pm 2\%$ of the reading $\pm 0.1\%$ of the range.
- The contact is closed when the contact resistance is less than 10 Ohm.
- Contact test voltage: 24 V; test current: 100 mA.

Auxiliary Contacts

- . Capability of testing dry contacts. Contact test voltage: 24 V; test current: 5 mA.
- . Capability of testing wet contacts. If wet, the input contact has these characteristics:
- .. Voltage threshold: 15V / 77V or programmable with steps of 5V (for PIR resistance measurement value option).
- .. Impedance : $>150\text{kOhm}$ or $> 500 \text{ kOhm}$ (for PIR resistance measurement value option)
- . Contact selection (dry or wet with thresholds) can be different on the groups.
- Maximum voltage: 300 V

Auxiliary Binary Output

- One relay auxiliary output.
- Characteristics of the contacts with a resistive load:
- AC: 300 V; 8 A; 2400 VA
- DC: 300 V; 8 A; 50 W
- The contact operation can be timed with respect to test start.

Inputs Time Measurement

- Sample rate: from 10 Hz up to 100 kHz
- Resolution: 0.01 ms to 100ms.
- Inputs timing accuracy: see the following table.

Ranges	Frequency Hz	Resolution ms	Accuracy % of the reading
1	100.000	0.01	$\pm 0.02 \text{ ms} \pm 0.01\%$

2	50.000	0.02	$\pm 0.02 \text{ ms} \pm 0.01\%$
4	20.000	0.05	$\pm 0.05 \text{ ms} \pm 0.01\%$
10	10.000	0.1	$\pm 0.1 \text{ ms} \pm 0.01\%$
20	5000	0.2	$\pm 0.2 \text{ ms} \pm 0.01\%$
40	2000	0.5	$0.5 \text{ ms} \pm 0.01\%$
100	1000	1	$1 \text{ ms} \pm 0.01\%$
200	500	2	$2 \text{ ms} \pm 0.01\%$
400	200	5	$5 \text{ ms} \pm 0.01\%$
1000	100	10	$10 \text{ ms} \pm 0.01\%$
2000	50	20	$20 \text{ ms} \pm 0.01\%$
5000	20	50	$50 \text{ ms} \pm 0.01\%$
10000	10	100	$100 \text{ ms} \pm 0.01\%$

Analog Inputs

- Number of analog inputs: 8, fully programmable.
- Common characteristics of analog inputs:
- Measurement resolution: 16 bit
- Number of ranges: three. 300Vac (420 Vdc peak) , 10Vdc, 1V DC
- Measurement accuracy:
- 1 V range : $\pm 0.2\%$ of the reading $\pm 0.2\%$ of the range
- 10 V range : $\pm 0.1\%$ of the reading $\pm 0.01\%$ of the range
- 420 V range : $\pm 0.5\%$ of the reading $\pm 0.1\%$ of the range
- . Input impedance: more than 600 kOhm.
- . Measurement sampling rate: 100 kHz max.
- . Number of insulated and independent neutrals: 4. Two groups of three channels each (to be used, for example, as transducer inputs for motion analysis and for voltage coming from microohmmeter) and two different neutrals for the remaining two channels (for monitoring motor current or DC coil supply).
- . Voltage value: + 5 V; maximum output current 30 mA; minimum transducer resistance 170 Ohm Insulation between different neutrals: 1 kV AC.

Minimum Trip Coil Tester

The function has the purpose of allowing to test the behaviour of the Minimum Trip Coil circuit and of Open or Close coils, when supplied at a reduced auxiliary voltage.

It must be able to manage auxiliary voltage up to 250 V.

Characteristics	PII37178
Absolute maximum voltage [V]	250
Maximum operating voltage [V]	240
Minimum operating voltage [V]	50
Maximum voltage drop [V]	120
Minimum voltage drop [V]	10
Adjustment step [V]	2
Adjustment Accuracy [V]	2
Maximum output current [A]	4 (dV < 60 V) 2 (dV < 60 V)
Maximum test duration [ms]	500
Pause duration [s]	20

The function is to be connected to the auxiliary DC supply of the plant; the function output voltage can be modified (stepped or ramped down), according to the test program.

Other characteristics:

Connections: one input safety socket, to be connected to the auxiliary supply positive, and one output safety socket, to be connected to the minimum voltage input

Voltage adjustment in steps. Over-current protection

Static resistance measurement (microohmmeter characteristics)

- This three phase measurement is performed connecting CBA the equipment to the test sample and measuring its resistance. Test samples can be joints, main contacts and so on. Main contacts resistance is measured in the closed position.
- The static resistance measurement features are the following:

- Available nominal test currents: 200 A, 150 A, 100 A, 50 A, 25 A DC
- Resistance measurement ranges: 250 $\mu\Omega$, 1 m Ω , 10 m Ω , 50 m Ω
- Contact resistance accuracy: 0,2% of the reading } 0,2% of the range (for ranges 250 $\mu\Omega$ and 1 m Ω)
- Contact resistance accuracy: 0,3% of the reading } 0,3% of the range (for ranges 10 m Ω and 50 m Ω). Type of
- current source: electronic current generator, driven by a discharging capacitor
- Current generation duration: minimum 1 s, accordingly to the test current and the load
- Maximum test voltage: 5 V

Dynamic resistance measurement

With this measurement it is possible to record the main contact resistance during the CB close or open. The test current passes through the contact, and the equipment measures the contact resistance variations during the close or open movement.

Test current, resistance ranges and other characteristics: as for the static resistance measurement. Unlike the static resistance measurement, the test result is not a table of resistance measurements: it is the resistance profile during the test, along with voltage and current profiles.

Digital Transducer Inputs

- The circuit breaker analyzer allows monitoring up to three digital transducers at the meantime.
- . Maximum input frequency: 50 kHz
- . Interface: RS422
- . Accepted transducers: up to 5000 impulses per turn.
- . Connection: by three multi-pole connectors used also for the analog inputs.

AC current clamp

- The current clamp allows performing the first trip test: for three phase testing, three of them are necessary.
- The circuit breaker analyzer
- The maximum primary current is 10 A.

- The maximum cable diameter is 12 mm.

Hall Effect clip-on transformer for current measurements

- The Hall Effect clip-on transformer allows measuring the DC current of motors and of the auxiliary supply.
 - Main characteristics:
 - Metering AC and DC currents.
 - DC measurement null with a knob
 - Ranges: 10 mV/A, 80 A DC, 40 A AC maximum, and 1 V/A, 2 A DC, 1.5 A AC maximum
 - Low battery indicator
 - Measurement errors: 4% of reading +20 mA for the 80 A range; 2% of reading +5 mA for the 2 A range
 - Phase shift (up to 65 Hz): maximum 1°
 - Maximum working voltage: 600 Vrms
 - Power supply: alkaline 9 V battery, type 6 LR 61
 - Service life: 70 h typical
 - Maximum cable diameter: 10 mm
 - Weight: 330 g
- Dimensions: 65 mm wide (clamp closed); 36 mm thick; 230 mm long

Other Characteristics

- Mains supply:
- From 85 to 265 V AC; 47-63 Hz
- From 120 to 350 V DC.
- Maximum supply current: 3.6 A @ 100 V AC or 1.8 A @ 200 V
- AC; maximum power consumption: 360 VA.
- Housing: aluminium case, with hinged removable cover and handles.
- Dimensions: 407 x 450 x 230 mm. Weight: 15 kg.

The instrument should come complete with the following items:

- Mains cable
- User's manual
- Ethernet cable
- USB cable
- One cable, yellow/green, for the connection to ground. Cable length: 4 m; cross section 1 sq. mm, terminated with a crocodile
- Spare fuses
- Software TDMS.

Applicable Standards

- The test set conforms to the EEC directives regarding
- Electromagnetic Compatibility and Low-Voltage instruments.
- **Electromagnetic Compatibility:** Directive no. 2014/30/UE.
- Applicable Standard: EN61326-1:2013.
- **Low Voltage Directive:** Directive n. 2014/35/UE. Applicable standards: CEI EN61010-1:2010. In particular:
- Input/output protection: IP 2X - IEC69529.
- Operating temperature: -10° to 55 °C; storage: -20 °C to 70 °C.
- Relative humidity: 5-95% without condensing.
- **Vibration:** IEC 68-2-6 (20 m/s² at 10 – 150 Hz)
- **Shock:** IEC 68-2-27 (15 g; 11 ms; half-sine)

NB: Supplier should prove capability to offer training for the equipment to users.

40. DIGITAL MULTIMETER

Features include:

- **VoltAlert™** technology for non-contact voltage detection
- **AutoVolt** automatic ac/dc voltage selection
- LoZ: helps prevent false readings due to ghost voltage
- Large white LED backlight to work in poorly lit areas

- True-rms for accurate measurements on non-linear loads
- Measures 10 A (20 A overload for 30 seconds)
- Resistance, continuity, frequency and capacitance
- Min/Max/Average to record signal fluctuations
- Compatible with optional magnetic hanger (ToolPak™) for hands free operation
- CAT III 600 V safety rated

Measurement	Range	Resolution	Accuracy ± ([% of reading] + [counts])
DC millivolts	600.0 mV	0.1 mV	0.5 % + 2
DC volts	6.000 V	0.001 V	0.5 % + 2
	60.00 V	0.01 V	
	600.0 V	0.1 V	
Auto volts	600.0 V	0.1 V	2.0 % + 3 (dc, 45 Hz to 500 Hz) 4.0 % + 3 (500 Hz to 1 kHz)
AC millivolts ¹ true-rms	600.0 mV	0.1 mV	1.0 % + 3 (dc, 45 Hz to 500 Hz) 2.0 % + 3 (500 Hz to 1 kHz)
AC volts ¹ true-rms	6.000 V	0.001 V	1.0 % + 3 (45 Hz to 500 Hz) 2.0 % + 3 (500 Hz to 1 kHz)
	60.00 V	0.01 V	
	600.0 V	0.1 V	
Continuity	600 \bar{U}	1 \bar{U}	Beeper on < 20 \bar{U} off > 250 \bar{U} ; detects opens or shorts of 500 μ s or longer.
Ohms	600.0 Ω	0.1 Ω	0.9 % + 2
	6.000 k Ω	0.001 k Ω	0.9 % + 1
	60.00 k Ω	0.01 k Ω	
	600.0 k Ω	0.1 k Ω	
	6.000 M Ω	0.001 M Ω	1.5 % + 2
40.00 M Ω	0.01 M Ω		
Diode test	2.000 V	0.001 V	0.9 % + 2
Capacitance	1000 nF	1 nF	1.9 % + 2
	10.00 μ F	0.01 μ F	
	100.0 μ F	0.1 μ F	
	9999 μ F	1 μ F	1.9 % + 2
	100 μ F to 1000		
> 1000 μ F		5 % + 20	
Lo-Z capacitance	1 nF to 500 μ F		10 % + 2 typical
AC amps true-rms (45 Hz to 500 Hz)	6.000 A	0.001 A	1.5 % + 3
	10.00 A	0.01 A	
	20 A overload for 30 seconds max.		
	6.000 A	0.001 A	

DC amps	10.00 A	0.01 A	1.0 % + 3
	20 A overload for 30 seconds max.		
Hz (V or A input) ²	99.99 Hz	0.01 Hz	0.1 % + 2
	999.9 Hz	0.1 Hz	
	9.999 kHz	0.001 kHz	
	50.00 kHz	0.01 kHz	

General specifications for Digital Multimeter

Accuracy is specified for 1 year after calibration, at operating temperatures of 18 °C to 28 °C, with relative humidity at 0 % to 90 %.

The accuracy specifications take the form of: $\pm (1\% \text{ of reading}) + [\text{counts}]$

Maximum voltage between any terminal and earth ground	600 V
Surge protection	6 kV peak per IEC 61010-1 600 V CAT III, Pollution Degree 2
Fuse for A input	11 A, 1000 V FAST Fuse (Fluke PN 803293)
Display	Digital: 6,000 counts, updates 4/sec
Bar graph	33 segments, updates 32/sec
Operating temperature	-10 °C to + 50 °C
Storage temperature	-40 °C to + 60 °C
Battery	9 volt Alkaline, NEDA 1604A/IEC 6LR61
Battery life	400 hours typical, without backlight

41. TOOL BOX 1'x2' Approved Type

- Heavy-duty stainless steel toolbox with integral composite tote tray.
- Soft grip carry handle for added comfort. Includes padlock eye for extra security.
- Size 1'x2'

42. TOOL BOX 2'x4' Approved Type

- Heavy-duty stainless steel toolbox with integral composite tote tray.
- Soft grip carry handle for added comfort. Includes padlock eye for extra security
- Size 2'x4'

43. LINK STICK FOR 220 & 400kV

- To support the hot-end trunnions or hooks, five stainless steel cross pins are located at 6" intervals on the 2"-diameter Epoxiglas® poles. To engage dead end and suspension yokes at the hot end also requires the adjustable pole clamp of heat-treated aluminum. This pole clamp can be unlocked and positioned by hot sticks.
- On the cold end, a high-strength steel strain-jack with bronze tongue provides take-up with a ratchet wrench and trunnions.
- Standard strain jack furnished with each strain pole provides 12" of adjustment. Longer strain jacks (for 24" or 36" of take-up) and extra pole clamps.

Specifications

- -7,500-lb. maximum load rating (2"-diameter Epoxiglas pole)
-2-ft. adjustment by Pole Clamp (furnished) in 6" increments on five stainless-steel pins
-12"-long Strain Jack E4011998 furnished as standard
-Optional 24" & 36" strain jacks and extra pole clamps
- Description: 18-ft. Strain Pole
- Maximum voltage: 765kv
- Insulated section: 180 inches (457.2)
- Overall length: 19ft – 8 inch
- Weight: 11.9 kg
- Should come with carrying bag and the sections detachable for portability.

44. INFRARED CAMERA

- IR Resolution- 464 x 348(161,472 pixels)
- Ultra Max® Resolution – 645,888 effective pixels
- Object Temperature Range - -20°C to 120°C(-4°F to 248°F),0°C to 650°C(32°F to 1202°F),300°C to 1500°C (572°F to 2732°F)
- Digital Zoom – 1-6X continuous
- Detector type & pitch – Uncooled microbolometer,17µm
- Thermal Sensitivity/NETD - <30Mk @ 30°C(42°lens)

- Spectral Range – 7.5 - 14 μ m
- Image frequency – 30Hz
- Lens Identification – Automatic
- F number – f/1.1(42°lens),f/1.3(24°lens),f/1.5(14°lens)
- Focus – Continuous with laser distance meter (LDM),one-shot LDM,one shot contrast, manual
- Minimum focus distance - 42°lens-0.15m; 24°lens-0.15m;optional macro mode;14°lens-1.0m
- Macro mode - 24° lens option / 103 μ m effective spotsize
- Programmable buttons – 2
- Display – 4” , 640 X 480 Pixel touchscreen LCD with auto rotation
- Digital Camera – 5MP,with built in LED photo/video lamp
- Color palettes – iron,gray,rainbow,arctic,Lava,Rainbow HC
- Image Modes – Infra red,Visual, MSX®,Picture in Picture
- Picture in Picture – resizable and movable
- UltraMax® - Quadruples pixel count; activated in menu and processed in Flir Tools
- Accuracy - $\pm 2^{\circ}\text{C}$ ($\pm 3.6^{\circ}\text{F}$) or $\pm 2\%$ of reading
- Spotmeter and Area – 3 ea. In live mode
- Measurement presets – No. Measurement, enter spot, hot spot, cold spot, user preset 1,User preset 2
- Laser pointer – available
- Laser distance meter – Yes, with dedicated button
- Voice - 60 sec. recording added to still images or video via built in mic(has speaker) or via Bluetooth
- Text - Predefined list or touchscreen, on infrared image inly
- Image sketch – From touch screen, on infrared image only
- Distance area measurement – Yes; calculates area inside measurement box in m^2 or ft^2
- GPS – automatic image tagging
- MeterLink® - yes
- Storage Media - Removable SD card

- Image file format – Standard jpeg with measurement data included
- Time Lapse(Infrared) – 10sec to 24hrs
- Radiometric IR Video recording – real time radiometric recording (.csq)
- Non-radiometric IR or Visual Video – H.264 to memory card
- Radiometric IR video streaming – Yes, over UVC or WIFI
- Non-radiometric IR or Video Streaming – H.264 or MPEG-4 over WIFI,MJPEG over UVC or WIFI
- Communication interfaces – USB 2.0, Bluetooth, Wi-Fi
- Video out – Display Port over USB type C
- Battery type – Li-ion battery, charged in camera or on separate charger
- Battery operating time – Approx. 4 hours at 25°C (77°F) ambient temperature and typical use
- Operating temperature range - -15°C to 50°C (5°F to 122°F)
- Storage Temperature Range - -40°C to 70°C (-40°F to 158°F)
- Shock/Vibration/ Encapsulation; Safety - 25 g / IEC 60068-2-27, 2 g / IEC 60068-2-6 / IP 54; EN/UL/CSA/PSE 60950-1
- Weight/Dimensions w/o Lens – 1.3kg(2.9lbs),140x201x84mm(5.5x7.9x3.3in)
- Packaging – infrared camera with lens, 2 batteries, battery charger, hard transport case, lanyards, front lens cap, power supplies, printed documentation, SD Card(8 GB) Cables (USB 2.0A to USB Type-C, to HDMI,USB type - c to USB type –C)
- Software licences should be provided for minimum of 15 computers

NOTE

Bidder for Infrared Camera should provide proof of trained personnel with at least level 3 infrared thermography certification and licenced trainer from recognized infrared thermography institutions/firms. A qualified local trainer will be added advantage.

45. TOOL BAG

- Heavy-duty tool bag constructed of tough polyester with padded base for added durability.

- Adjustable shoulder strap can be hooked onto metal clasps for carrying heavier loads. Features twelve inner pockets and twelve outer pockets for optimum organization, cushioned carry handles and metal frame zip.

46. TOOLS CARRIER

- Craftsman 5-drawer rolling cabinet boasts 8,082 cu. in. of storage to hold your tools, and equipment conveniently in one place
- All steel construction with Craftsman exclusive I-Frame® design for long-lasting strength and durability
- Strong, steady smooth DynaGlide™ drawer performance
- Increased drawer load rating of 75 lbs.
- Large drawer trim for increased finger clearance
- Drawer dimensions:
 - 2 drawers measure 22-3/8" W x 16-1/2" D x 3-1/8"H
 - 1 drawer measures 22-3/8" W x 16-1/2" D x 4-1/8" H
 - 2 drawers measure 22-3/8" W x 16-1/2" D x 6-3/8" H
- Keyed internal locking system secures valuable tools
- 4-1/2" x 1-1/2" stylized casters combined with caster angles support up to 650 lbs.
- Tubular side handle for mobility
- Color: Red/Black
- Dimensions: 26-1/2" W x 18" D x 34" H
- Weight: 105 lbs.

47. RAISE REEL EASEL

- The drum elevators shall be made of galvanized welded steel, with a protective coating;
- The frame shall be completely detachable to reduce dimensions during transport. Each drum elevator shall have a support with fixed wedges for wooden drums of conductors and with one mechanical disk braking system to control the drum when unwinding the conductor.

- Base length of the drum elevator foot : 1650mm
- Minimum drum width : 600mm
- Maximum drum width : 1500mm
- Minimum fitting height: 500mm

(from centre of drum to ground)

- Maximum fitting height: 1100mm
- (from centre of drum to ground)
- Base width of the drum elevator foot 550mm
- Minimum drum diameter 1100mm
- Maximum drum diameter 2000mm
- Capacity 60KN
- Mass 284kg
- A manual disk brake shall be provided of maximum torque of 1KNM

48. **GROUNDING KITS FOR LINES**

For temporary grounding with jacket over concentric neutral. The set has two C-Type clamps on both ends in Chisel Sets to fits conductors. Each set includes 15m of copper clear-jacket ground cable and ferrules, a penetrator made from hardened-steel wide chisel and C-type grounding.

49. **GROUNDING ROD**

- Superior conductive material that improves the effectiveness of ground rods/plates.
- It permanently reduces resistance-to-ground, regardless of soil conditions.
- Ideal for use in dry conditions, rocky ground and sandy soils.
- 50 pound bags
- PowerSet™ hardens when wetted and can be used in any application.
- Paige part number 1820058.
- PowerFill™ is non-hardening and must be used in non-porous soils.
- Paige part number 1820059.

- Non-flammable. Safe to use while igniting CADWELDs and in storage

50. BRUSHCUTTER

- Includes Brush cutter Adapter kit & Brush Knife - Everything from simple grass trimming to heavy duty clearing work.
- Battery Voltage 54 V
- Battery Capacity 3 (not inc) Ah
- Charge Time 70 min
- Cutting width 38 cm
- Line cutting speed 0-5100 / 0-5600 rpm
- Line diameter 2 mm
- Line length supplied 7.5 m
- 2nd Handle Yes
- Telescopic shaft No
- A weighted sound power dB 94 A
- A weighted sound pressure dB 74 A
- Hand/arm weighted vibration 1.5 m/s²
- Weight 5.4 kg

51. OIL SAMPLING KIT

- Tests voltages up to 80kV.
- Suitable for mineral, ester and silicon oils.
- Direct output voltage or current breakdown detection.
- Automatic oil temperature measurement.
- Precision lockable electrode gap adjustment.
- Flat electrode gap gauges that will not damage electrodes.
- Intuitive user interface supports fully automatic operation.
- Pre-loaded international test standards.

- User configurable test sequences.
- Advanced result storage including USB stick.
- Safe operation with ultra-fast micro-switch HV cut-off.
- Easy-clean chamber with oil drain.
- Highly visible test chamber and vessel.
- Bright QVGA colour display with backlight.

52. MOORING (COME – ALONG CLAMP SELF TIGHTENING)

- 2 ton capacity, double-drive with pulley-block assembly
- 6 foot reach double line 3/16" aircraft cable with pulley-block assembly
- Handle length 20''
- Diameter of galvanized 7x9 aircraft cable 3/16"
- Working load limit 2,000 lbs.
- Capacity 4,000 lbs.
- Maximum pull 6 ft.
- Weight each 9 lbs.

53. CHAIN HOIST SUBSTATION

- Fitted with heat treated and ground, triple-spur geared shaft and pinion
- Mechanical load brake for extra safety.
- Chains are manufactured from hardened alloy material and load hooks feature safety latches.
- Compact gear housing allows use where headroom is limited.
- Safe working load:5000kg
- Test load:7500kg
- Standard lift:3mtr
- Load chain diameter:ø10mm
- Pulling effort:42.22kgf
- Headroom:588mm
- Overall width:186mm

- Overall depth:253mm
- Hook aperture:50mm
- Maximum hook capacity diameter:ø65mm
- Weight:43kgs

54. CHAIN HOIST T/ LINE 1.5 TONNE

- Rugged construction features drop-forged and heat treated pinion gear with totally enclosed mechanisms.
- Equipped with heavy-duty brake and high quality alloy steel chain for durable and safe operation.
- Free-chaining feature permits slack in the load chain to be taken up by hand before engaging the ratchet arm.
- Pull on lever to lift full load:24kgf
- Chain length:1.5mtr
- Load chain diameter:ø8mm
- Head room:295mm
- Operating clearance:104mm
- Hook aperture:30mm
- Weight:12kg

55. CHAIN HOIST T/ LINE 3.0 TONNE

- Rugged construction features drop-forged and heat treated pinion gear with totally enclosed mechanisms.
- Equipped with heavy-duty brake and high quality alloy steel chain for durable and safe operation.
- Free-chaining feature permits slack in the load chain to be taken up by hand before engaging the ratchet arm.
- Pull on lever to lift full load:33kgf
- Chain length:1.5mtr
- Load chain diameter:ø10mm

- Head room:400mm
- Operating clearance:108mm
- Hook aperture:40mm
- Weight:24kg

56. CHAIN HOIST T/ LINE 6.0 TONNE

- Fitted with heat treated and ground, triple-spur geared shaft and pinion.
- Also includes mechanical load brake for extra safety.
- All chains are manufactured from hardened alloy material and load hooks feature safety latches.
- Compact gear housing allows use where headroom is limited
- Test load:7500kg
- Standard lift:3mtr
- Load chain diameter:ø10mm
- Pulling effort:42.22kgf
- Head room:588mm
- Hook aperture:50mm
- Weight:43kgs
- Maximum hook capacity diameter:ø65mm

57. SELF TIGHTENING TACKLE(TIRFOR)

- 3.2 TON TIRFOR WINCH C/W HANDLE
- 16.3mm x 30m TIRFOR WIRE ROPE COMPLETE
- Working Load Limit(kg): 3200
- Machine weight (kg) : 27
- Wire rope weight (kg) : 26.6
- Special tirfor wire rope (mm): 16.3
- Wire rope breaking strain (kg): 16000
- Dimensions of the machines : 676X330X156
- Dimensions of the handle open/closed : 1190/680

59. SUBMERSIBLE WATER PUMP 18HP

PUMP

The submersible pumps are designed for pumping waste water containing particles and impurities in industrial and domestic applications. Material for impellers and pump bodies should be cast iron. They feature cast iron impellers and pump bodies, double mechanical seals, NBR oil seals and stainless steel strainers and are supplied with 10m of cable. Single phase pumps up to 1.5kW are supplied with level switches for automatic operation while 3 Phase Pumps require external switching control.

MOTOR

Pumps are supplied with dry-type 2-pole motors designed for continuous duty. Single phase motors have integral thermal protection and can be connected directly to the mains power through a 10A fuse or MCB. Three phase motors require a remote DOL starter.

Enclosure Class: IP68 **Insulation Class:** F **Speed:** 2900rpm

Operating Conditions

Pumped liquids: Thin, chemically non-aggressive liquids, containing some impurities and fibres

Max. Liquid temperature: +40°C

Max. Operating Depth: 10m

Min Immersion Depth: 132mm

Max. Particle Size: 6mm

PUMP DATA

Voltage 1 x 240v

Power 18hp

Maximum head 50m

60. MOBILE SCAFFOLD

- Provides elevated working platform for hot stick/bare hand work in substations or other applications.
- Manufactured using epoxiglas that meet or exceed IEC60855
- For use up to 400KV AC.
- Modular sections allow for quick assembly,disassembly and minimal space requirements for transport and storage.
- Maximum height of 12metres.
- 1m X 1m modules shall be 24 in number;crosspieces shall be 4 for sides and 12 for diagonal.
- Platform guard modules shall be 1m by 2m.
- The base shall have wheels with 6m rails and outriggers for locking.
- Swivel sticks /Guying poles and poly-dacron rope shall be provided for support.
- The platform board shall be made of fiberglass and shall have a 4 way diamond pattern for grip and traction with a maximum load of 300kg.
- The insulated scaffolding shall come with the following accessories:-
 - Fiberglass reinforced block and handline hook
 - Webbing sling for attaching hand line block to insulated scaffold
 - Vinyl laminated open weave nylon cloth tool buckets
 - Leakage current monitors

61. STEP LADDER 2M HIGH

- Class 1 approved professional industrial aluminium platform steps.
- Rigid box section aluminium with heavy-duty cross brace for extra strength and stability.
- Double riveted extra-large non-slip treads.
- Wide platform and high safety rail allow plenty of leg room for safe standing.

62. SUSPENSION LADDER

- Used in hanging position at the tower-cross arms for performing works, for instance at the insulator chains.
- Optional foldable conductor hook or tower- and conductor hook (SLA-00-02 OR SLA-00-03).
- Equipped with a guide rail for the optional available anti-fall system (SLA-00-01).
- Tower hook is made of galvanized steel and equipped with a safety chain to prevent accidental fall down of the ladder.
- The ladder itself is a welded structure of first grade extruded aluminum pipes.
- The rungs are corrugated for slip protection.
- The working load in hanging position is 3 KN.

63. PULLEY BLOCK

- Ideal for moving heavy objects.
- The wire rope (not included) is easily fitted via a hinged section of the side plate.
- Pulley sheave runs on maintenance-free bushes. Suitable for industrial and automotive applications.

65. CUTTING MACHINE

- | | |
|---------------------------------------|-----------------|
| • Cutting capacity at rectangle
0° | 85 x 180 mm |
| • Cutting capacity at square 0° | 120 x 120
mm |
| • Cutting capacity at L-profile
0° | 138 x 138
mm |
| • No-load speed | 3,500 rpm |
| • Cutting disc diameter | 355 mm |
| • Cutting disc bore | 25.4 mm |
| • Weight | 17 kg |
| • Rated power input | 2,000 W |

66. PORTABLE MOBILE GENERATOR 5KVA

- Frequency: 50Hz
- Rated AC Output (kVa): 5.0kVa
- Type: brush, self – excitation,
- 2-pole, single phase
- Engine model:gx390
- Fuel tank capacity:22ltrs
- Starting system: recoil starter
- Overall dimension LxWxH:760*550*610