Reg No 2003/011612/30

RE-ADVERT (2)
CD 10/2023

SUPPLY, INSTALL, MAINTAIN, REPAIR AND/OR REPLACE SPECIALIZED MOBILE HIGH VOLTAGE TEST EQUIPMENT

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1. STATEMENT OF INVITATION

CENTLEC (SOC) Ltd., (hereafter referred to as CENTLEC) a Municipal Entity distributing electricity in Mangaung and other Municipalities invites suitable service providers to supply, install, maintenance, replace and/or repair existing high voltage and new power cable diagnostics & fault location equipment installed inside the test units. This appointment will be valid for thirty-six (36) months.

2. MINIMUM REQUIREMENTS

2.1 Supply unique security personal identification number (PIN) and/or original Tax Clearance Certificate for Tax compliant status.

2.2 Supply municipal services (water, sanitation, rates and electricity) clearance certificate or Lease Agreement with a current Bill and rates clearances, or Current Bill of Account not owing more than 90 days. In a case where the services are paid by the Landlord, the signed lease agreement and statement of account must be submitted by the bidder.

2.3 The bidder must be registered on the National Treasury Centralized Suppliers Database.

2.4 The bidder must submit the Energy Sector Education and Training Authority (ESETA) Accreditation Certificate.

3. DEFINITIONS AND ABBREVIATIONS

3.1 Test Unit – Vehicle or a trailer equipped with high voltage specialized testing equipment.

4. SCOPE OF WORK

The service provider must supply, install, maintenance, replace and/or repair existing high voltage and new power cable diagnostics & fault location equipment installed inside the test units vehicles or a trailer of CENTLEC for the duration of the contract.

5. TECHNICAL SPECIFICATION

The specifications of the high voltage test equipment must be according to Table 1 below.

Table 1: Specifications

Unit Number	Technical data SPG 40	
1	Display	¼ VGA
	Insulation test	Voltages 1,000 V and 5,000 V ranges 1 kΩ, 1 MΩ, 100 MΩ
	DC testing	0 … 40 kV DC
	Leakage current	0 … 1/10/100 mA automatic measuring area setting
	Breakdown detection	0 … 40 kV
	Burning	0 … 8 kV; 0.7A; 0 … 20 kV ; 0.1A
	Upper surge voltages	0 … 12.5 / 25 kV or 0 … 16 / 32
	Lower surge voltages optional	0 … 4 kV or 0 … 8 kV
	Surge energy	0 … 3 kV or 0 … 6 kV 1,000 J in every range (optionally 2,000 J for vehicle installation)
	Surge sequence	3 … 10 sec. and single pulse
	Sheath fault location	0 … 5 kV and 0 … 10 kV
	Cycle intervals	DC; 1:3 ; 1:4 ; 1:6 (sec.)
	HV prelocation with optional TDR	ARM, ICE current decoupling Decay voltage coupling ICE Plus option (for 4 and 8 kV)
	Operating temperature	-10 °C … + 50 °C
	Power supply	230 V; 50 / 60 Hz (110 V optional)
	Power consumption	1.7 kVA max.
	Dimensions (L x W x H)	520 x 430 x 1,050 mm

	Connecting cable	25 m
	Weight	ca. 116 kg (incl. opt. surge level)
	Portable Time Domain Reflectometer	
2	Display	Industrial grade colour TFT panel
	LCD size	10.1"
	Aspect ratio	16:10
	Resolution	1,280 x 800 (WXGA)
	Backlight	LED
	Luminance	1000 cd/m² direct bonded Anti-glare capacitive touchscreen
	Measuring range	20 m ... 160 km at VOP = 80 m/µs
	Pulse width	20 ns ... 10 µs
	Pulse amplitude	10 ... 50 V
	Resolution	0.1 m at VOP = 80 m/µs
	Accuracy	0.001
	Timebase Accuracy	100 ppm
	Sampling rate	true 400 MHz
	Dynamic range	96 dB, with adjustable ProRange (Distance-dependent De-attenuation)
	Velocity of propagation	10 ... 149.9 m/µs (or ft/µs or nvp)
	Output impedance	50 Ω 10 Ω ... 500 Ω, adjustable
	ARM® trigger	ΔU trigger technology with automatic adjustment
	Proof voltage	< 400 V, only with separation filter
	Memory	4 GB for program and data
	Connections	USB, BNC, CAN
	Protection class	IP 65 enclosed, IP 54 open

	Battery	12 V Li-Ion rechargeable battery Overload protection Deep Discharge protection Smart charger 110 ... 240 V, 50/60 Hz 10 ... 17 V DC, 3.8 A 6 hrs of operating time on full charge 4 hrs recharge time
	Dimensions (W x H x D)	362 x 195 x 305 mm (14.2 in. x 7.6 in. x 12 in.)
	Weight	7.8 kg (17.1 lbs)
	Operating temperature	- 10 °C ... + 50 °C (14 °F ... +122 °F)
	Storage temperature	- 20 °C ... + 60 °C (-4 °F ... +140 °F)
	Technical data HV-Module SPG 32	
3	Testing	0 … 32 kV DC
	Surge	0 … 8 kV; 1750 J, 0 … 16 kV; 1750 J, 0 … 32 kV; 1750 J
	Surge rate	3 … 10 s, Single pulse
	Burning	0 … 32 kV; 160 mA
	Sheath fault locating	0 … 5 kV; 160 mA
	Connecting cable	25 m
	Mains supply	230 V; 50 / 60 Hz, 2 kVA (110 V
		optional)
	Dimensions (W x H x D)	800 x 1280 x 800 mm
	Weight	approx. 140 kg
	Technical data TDR Teleflex T30-E	
4	Range	TDR 10 m ... 50 km Transient 20 m ... 100 km
	Pulse width	35 ns to 4 µs

	Sampling rate	200 MHz
	Time Base Accuracy	± 0.01%
	Display	10.4“ VGA colour TFT display
	V/2	50 m/µs … 150 m/µs
	Modes	ARM-Mode, Quick Steps, Step-by-Step, ICE Impulse Current Method, Decay, Direct L1, Direct L2, Comparison L1/L2, Difference L1-L2.
	Memory	100 traces
	Interface	RS 232 for PC and printer
	Impedance matching	12 ... 150
	Operating temperature	-15 °C … 50 °C
	Mains supply	NiMh-Batterie, 230 V; 50 / 60 Hz (110 V optional), 12 V DC
	Dimensions (W x H x D)	360 x 160 x 270 mm
	Weight	6 kg
	Inverter System	
	Charger:	
5	Output Current:	40A
	Output Voltage:	14.4V
	Input Voltage:	100—240VAC
	Input Current:	3.4A
	Over Voltage Protection:	16—18V (Shut down with re-power on recovery)
	Over Temperature Protection:	Shutdown with auto recovery after voltage goes down
	Batteries:	

6	Type:	Sealed High Cycle Maintenance Free Battery
	Output Voltage:	12V
	Output Current:	102Ah
	Inverter: Technical Data	
7	Output Frequency:	50/60 Hz (Switch Selectable)
	Continuous Output	3000W
	Surge Rating:	6000W
	Input Voltage:	12/24/48 V DC
	Output Voltage:	220/230/240 VAC +- 3%
	Output Waveform:	Pure Sine Wave (THD < 3%)
	Protection:	Overload, Short Circuit, Reverse Polarity (Fuse) Over / Under Input Voltage, Over Temperature
	Operating Temperature Range:	0 to 40°C
	Storage Temperature Range:	-30°C to 70°C
	High Efficiency Full Load:	88%, 91%, 92%, 90%, 93%, 94%
	Tri-Colour Indicators:	Display Input Voltage, Output Load Level and Failure Status
	Advanced Microprocessor:	Internal
	Protections:	SC / OV / UV / OT / OL
	No Load Current Draw:	2.0A, 1.6A, 0.8A, 2.8A, 1.5A, 0.7A

	Input Level Indicator:	Red / Orange / Green LED
	Failure Indicator:	Red LED
	Cooling:	Loading Controlled Cooling Fan
	Remote Control Unit:	CR-6 / CR-7 / CR-8 Optional Safety Meet UL458 EN60950-1
	Input & Output Fully Isolation Design	
8	Spiking Gun, Karl Schermer	
9	Spiking Gun Cartriges Red Extra Strong (50)	
10	Installation Trailer (Full)	
11	Installation Vehicles (Full)	
	Portable reflectometer for fault location systems TECHNICAL DATA	
12	Distance range	20 m ... 160 km at v/2 = 80 m/µs
	Pulse width	20 ns ... 10 µs
	Pulse amplitude	10 ... 50 V
	Resolution	0.1 m at v/2 80 m/µs, 1.0 cm at v/2 < 40 m/µs
	Sampling rate	Up to 400 MHz (real sampling rate)
	Amplification	- 37 ... + 37 db
	De-attenuation	0 ... +22 dB for ProRange (adjustable from 0 to 100%)
	Transit time setting v/2	10 ... 149.9 m/µs, ft/µs or nvp

	Dynamic response range	> 80 dB
	Output impedance	50 Ω
	Adjustment	8 Ω ... 500 Ω, adjustable
	ARM trigger	Automatic adjustment with ΔU trigger
	Blind spot	No
	Withstand voltage	< 400 V, operation only with separation filter
	Display	10.4" colour TFT XGA 1,024 x 768, capacitive touchscreen, 600 cd/m2, LED backlight, dimmable
	Memory	4 GB mSATA for program and data
	Connections	Ethernet, USB, BNC, CAN (LON optional)
	Protection class	IP 65 enclosed, IP 54 open
	Supply	Battery operation, 110 ... 240 V, 50/60 Hz, 30 VA, 10 V ... 17 V DC, 3,8 A
	Dimensions (W x H x D)	362 x 195 x 195 mm (option 19" plug-in, 6 HE)
	Weight	10 kg
	Operating temperature	- 10 °C ... + 50 °C
	Storage temperature	- 20 °C ... + 60 °C
	<u>All round pinpointing receiver TECHNICAL DATA</u>	
		Display module
13	Display	TFT-color display, 320 x 240 pixels
	Protection	IP 54
	Dimensions (H x W x D)	65 x 225 x 100 mm (receiver)
	Weight	0.9 kg (including batteries
		Acoustic part/Sensor DDP-SU

	Safety	Volume limitation to 84 dB(A)
	Gain	>120 dB, automatic
	Dimensions	Diameter 230 mm
	Height	140 mm
	Handle length	450 ... 750 mm adjustable
	Weight	2.2 kg (including handle)
	Dynamic range	Acoustic channel > 110 dB
	Frequency operating range	100 ... 1500 Hz
	Filter stages	Off 100 ... 1500 HzLow pass 100 ... 400 HzBand pass 150 ... 600 HzHigh pass 200 ... 1500 Hz
	Protection	ratingIP 65
		Step voltage part
	Sensitivity	5 µV ... 200 V
	Suppression of disturbances	50/60 Hz, 16 2/3 Hz, KKS, DC
	Zero adjustment	Automatically
	Pulse recognition	Automatically
	Length – earth rods	1 m (dividable and isolated)
	Weight – earth rods	0.8 kg each
	Length – test leads	2 m
	Multi-purpose precision buried utility locator receiver and transmitter	
		Receiver Characteristics
14	Construction	High impact ABS injection molded housing
	Weight	4.6lbs (2.1kg)
	Dimensions	12.6in(L) x 4.9in(W) x 26.6in(H) (321mm x 124mm x 676mm)

	Display type	Transmissive 480 x 272 Pixel, 16-bit Color, High Visibility LCD, 4.3"/10cm
	Receiver antennas	Two sets of 3D antennas
	Battery	Six x AA Alkaline batteries - Rechargeable custom Lithium-ion batteries with 100-240V AC mains charger
	Battery life	Alkaline Li-ion (Rechargeable) 12 hours 27 hours - Intermittent use at 70ºF (21ºC) - With the full backlight turned on - Li-Ion batteries will withstand 500 charging life cycles - Battery life varies with temperature.
	Environmental	IP65 and NEMA 4
	External connectors	- Accessory Socket – to charge the internal batteries and attach accessories - Mini USB socket for data transfer and programming
	Temperature Range	- Operating: -4ºF to 122ºF (-20ºC to 50ºC) - Storage: -40ºF to 140ºF (-40ºC to 60ºC)
	Compliance and approvals	- Complies with European standard CE (Directive 99/5/EC) • EN 55011 • EN 61000-4-2: A1 & A2 • EN 61000-4-3 • EN 61000-4-8: A1ETSI EN 300 330-2 • ETSI EN 301 489-1 • ETSI EN 301 489-3 - Complies with FCC Rules Part 15 • CFR 47 part 2 • CFR 47 Part 15
	Manufacturing	- ISO 9001:2015
	Standard Accessories (comes with receiver)	- USB data transfer cable - Custom lithium-ion battery pack - 100-240V AC mains charger - Six x AA Alkaline battery holder - User handbook - Carry bag or hard case (decided at the time of ordering)
	Compatible Accessory Options	- MLA (Marker Locator Attachment) to locate buried EMS Markers - A-frame fault locator - Remote Antenna (Stethoscope) - Vehicle Charging DC Lead - Tx-Link - factory fitted radio link to remote control the

		Loc3 series transmitters - Range of Sondes (waterproof, self-contained transmitters for use in pipes & ducts)
		Receiver
	Information displayed	Status Bar Information: - Antenna configuration: Peak, Peak with arrows, Null, Broad, Delta Null, Omni Directional Peak, Omni Directional Broad - Line location - depth & current measurement - Battery condition - Speaker volume - Bluetooth and GNSS status (If fitted) - Cellular connection status - Radio link to transmitter status (if fitted)
	Locate screen (Classic display):	Signal strength - moving bar graph & numeric value - Bar graph color-coded indicating distortion level - Peak level indicator - Proportional left/right indication - Compass: full 360°-line direction indicator - Gain level (in dB) - Frequency selected - Product configuration menu & submenus including GNSS status and data logging transfer status. - Customer definable start-up screen - Depth and current - Warnings (if activated) - Plug and play automatic recognition of accessories - Accessory specific custom screens
	Information screen:	- GPS co-ordinates - Real-time horizontal accuracy in 2DRMS - Signal current and depth value - SiS Reset - Log number
	Alternative locate screens:	- Transverse Graph Screen - visual assessment of the locate quality and distortion - Sonde Locate Screen – directing arrow to move to the Sonde position along the polar axis - Vector Locate Screen – fully-automatic locate including offset, depth and locate uncertainty - Plan View Screen – fully-automatic graphical representation of the cable position independent of cable direction including depth/current and locate uncertainty.

	Configuration	The intuitive setup menu enables the user to configure: - Set up frequency selection to toggle by "f" pushbutton - Setup location mode selection to toggle by "m" pushbutton - Setup screen views selection to toggle by long press "m" pushbutton - Units of measure (feet/meter) - Sound (Pitch) – normal/modulated - Language - Continuous depth/current options - Loudspeaker level - Backlight - Bluetooth pairing - Transmitter Radio Link (if ordered)- Warnings (Excessive Tilt, Overhead Signal, Shallow Cable, Signal Overload - Auto shut down – configurable to power down at five minutes, ten minutes, or never
	Operating frequencies	- Configurable frequencies from 98Hz to 200 kHz • Power 50Hz and 60Hz • Radio 10kHz - 22.7kHz bandwidth - Signal Direction - enhanced product model giving the direction of outgoing current: • SD-USA: 256Hz/512Hz, SD-EUROPE: 320Hz/640Hz - Signal Select – a real-time measurement of signal bleed-over caused by capacitive o inductive coupling to other utilities: • SIS-491Hz, SIS-982 Hz, SIS-8440 Hz, SIS-9820 Hz, SIS-35kHz
	Operating modes	Classic Locate (2-section Bar graph) - Transverse Graph Mode - Plan View (Omni Directional) - Vector Locate (Lateral Position & Depth) - Sonde Locate
	Gain/scaling control	Manual gain using "+" or "-" with one touch to return to center (60% of FSD) "+" or "-" used to rescale the vector screen dependent on cable depth and offset
	Accuracy	Locate pinpointing accuracy: - Over 9ft (3m) – +/- 5% of depth - Up to 9ft (3m) – +/- 3% of depth Depth measurement accuracy: +/- 5% of depth Current measurement accuracy: - +/- 5% of actual current – over 9ft (3m) - +/- 3% of actual current – up to 9ft (3m) Depth range: Dependent on the strength of the signal radiating to the locator Performance rated using a single undistorted signal source
	Compatible transmitters	Loc-10SiSTx, and Loc3-10SiSTx
	Bluetooth	Internal Bluetooth for communicating with: External GPS or data logging devices Apple® devices Android™ devices
	GPS	GPS, GLONASS, Galileo 2.5m accuracy Internal GNSS module
	Transmitter Link	Optional Tx-Link (Remote transmitter control from the receiver)
	Data logging	- 50 million record internal storage - All parameters stored at each location including depth, current, date, time, mode, gain setting, frequency, locate uncertainty, longitude, latitude, and height above sealevel - GPS data coordinates, date, and time

	Data Transfer	The data can be saved in csv, klm, shp, xls, or xlsx formats - Via the free "MyLocator3" PC desktop app - Via cloud through the VMMap web portal
		Transmitter Characteristics
15	Construction	High-impact ABS plastic
	Weight	- With Alkaline battery tray: 9.9lbs (4.4kg) - With Rechargeable battery tray: 7.15lbs (3.24kg)
	Dimensions	13.1in(L) x 7.2in(W) x7.3in(H) (332mm x 182mm x 185mm
	Display Type	- Monochrome dot matrix graphic LCD with backlight - 2.4in x 1.3in (60mm x 32mm)
	Power Options	- 12 x Alkaline "D" cells - 12~22V external DC power - Optional Li-Ion rechargeable battery tray - 18V
	Battery Life	Output Power Alkaline Li-ion (Rechargeable) 1-watt 25 hours 50 hours 5-watt 6 hours 10 hours 10-watt 4-5 hours 6 hours At 70ºF (21ºC) - continuous use (based on the battery type and quality) Li-Ion batteries will withstand 500 charging life cycles
	Environmental	IP54 and NEMA 4
	External Connectors	1 x 3 pin connection socket (XLR) 1 x fuse (output protection) 1.6A/250V 1 x Mini-USB socket 1 x socket for battery charger & 12V DC power
	Temperature Range	- Operating: -4ºF to 122ºF (-20ºC to 50ºC) - Storage: -40ºF to 140ºF (-40ºC to 60ºC)
	Output Protection	Output protected against accidental momentary connection to up to 240V AC
	Compliance / Approvals	- Complies with European standard CE (Directive 99/5/EC) • EN 55011 • EN 61000-4-2: A1 & A2 • EN 61000-4-3 • EN 61000-4-8: A1 • ETSI EN 300 330-2 • ETSI EN 301 489-1 • ETSI EN 301 489-3 - Complies with FCC rules part 15 • CFR 47 part 2 • CFR 47 part 15
	Manufacturing	ISO 9001:2015
	Standard Accessories (Supplied with Transmitter)	- Direct Connection Leads (XLR plug with 10ft (3.5m) red/black leads) - Ground stake - Alkaline battery tray - 12 x D Cell alkaline batteries

	Compatible Accessories Options	- Optional Tx-Link (Remote transmitter control from the receiver) - 2-inch (50mm) signal clamp - 4-inch (100mm) signal clamp - 4-inch (100mm) SiS signal clamp - 5-inch (125mm) signal clamp - 18-inch (450mm) flexible signal clamp - Live Plug Connector - to connect and use the transmitter on lines carrying up to 240V AC - Live Cable Connector - to connect and use the transmitter on lines carrying up to 480V AC - Rechargeable battery tray – Custom Li-Ion battery tray and charger (input DC12V 3A, output DC18V-93.6 Wh) - 12V DC vehicle power lead for powering and charging the optional rechargeable battery from a vehicle
		Transmitter
16	Information Displayed	- Current (numeric) - Volts - Resistance - Frequency of output signal - High voltage warning if volts online exceed 30V AC - Beeper volume (three levels & off) - Battery condition icon - Bar graph showing the proportion of successfully applied signal - Animation icon confirming connection mode (Induction, Direct connection, Clamp) - Transmitter control connection status (if the Tx-Link feature is installed)
	Transmitting Modes	Induction mode – applies Signal inductively using the internal antenna - Direct Connection mode - applies Signal directly to the cable by clipping one output lead to the cable, the other to an independent ground - Clamp mode – applies the Signal using a Signal Clamp (also known as a toroid or coupler) placed around the target pipe or cable. * Modes are automatically selected when accessories are plugged in. the default mode (no accessories) is Induction.
		Transmitting Frequency by Mode
17	Induction Mode	Multiple induction frequencies between 8.19 kHz and 200 kHz
	Direct Connection Mode	Available frequencies between 98Hz and 200 kHz with default frequencies of 512Hz, 8.19 kHz, 33 kHz, 65 kHz, 200 kHz, Fault-find, SD, SiS
	Clamp Mode	Available frequencies between 8Hz and 200 kHz with default frequencies in 8.19 kHz, 33 kHz, 65 kHz SiS Clamp - Frequencies: 491Hz, 982Hz, 8.44 kHz, and 9.82 kHz.

	Transmitting Mode	Power Output Following FCC part 15: - Frequencies under 45 kHz - 10 watts - Frequencies over 45 kHz - 1 watt
	Maximum Output Voltage	50V RMS
	Maximum Output Current	1A RMS constant current
	Output Protection	Output protected against accidental momentary connection to up to 240V AC
	Audio indication	Connection quality – Increased beep rate indicates a better-applied signal - Beeps to confirm the selected action
	Controls	Use pushbuttons to select: • Power on/off • Frequency • Output level • Information (volts & resistance) / Setting (volume, frequency & multi-mode)
	Compatible Receivers	vLoc3 series, vLoc2 series, vLoc series, VM-510FFL+ Signal Select and Distortion Alert line ID features are available only with the vLoc-5000 and vLoc3-5000 receivers.
		Rechargeable Battery Tray
	Description	Optional Li-Ion rechargeable battery tray with charger for Loc3 series transmitters
	Input/output	- Input DC 12V 3A - Output DC 18V-93.6 Wh
	Battery Type	Li-Ion battery
	Temperature Range	- Operating: 14ºF to 140ºF (-10ºC to 60ºC) - Storage: -4ºF to 140ºF (-20ºC to 60ºC) - Charging: 32ºF to 113ºF (0ºC to 45ºC)
	Storage humidity	≤75% RH
	Weight	- Battery Tray: 3.31lbs. (1.5kg) - Transmitter with battery tray: 7.1lbs. (3.2kg)
	Dimension	13.1in(L) x 7.2in(W) x2.9in(H) (332mm x 182mm x 73mm)
	Warranty	12 Months
	Receiver in a SOFT KIT BAG.	Weight：16lbs. (7.3kg). Dimension：30in(L) x 11in(W) x 14in(H) (762mm x 279mm x 356mm)
	Receiver in a HARD CASE.	Weight：20lbs. (9.1kg). Dimension：34in(L) x 15in(W) x 20in(H) (864mm x 381mm x 508mm)

	Transmitter with Alkaline battery tray	Weight：14lbs. (6.4kg). Dimension：16in(L) x 12in(W) x 9in(H) (406mm x 305mm x 229mm)
	Transmitter with Li-ion battery tray and charger	Weight：12lbs. (5.4kg). Dimension：16in(L) x 12in(W) x 9in(H) (406mm x 305mm x 229mm)
	Kit in a SOFT KIT BAG.	The receiver, transmitter with ALKALINE Battery, and 5" Clamp Weight：31lbs. (14.1kg). Dimension：32in(L) x 12in(W) x 16in(H) (813mm x 305mm x 406mm)
	Kit in a SOFT KIT BAG.	The receiver, transmitter with LI-ION Battery, and 5" Clamp Weight：31lbs. (14.1kg). Dimension：32in(L) x 12in(W) x 16in(H) (813mm x 305mm x 406mm)
	Kit in a HARD CASE.	The receiver, transmitter with ALKALINE Battery, and 5" Clamp Weight：34lbs. (15.4kg). Dimension：34in(L) x 15in(W) x 20in(H) (864mm x 381mm x 508mm)
	Kit in a HARD CASE.	The receiver, transmitter with LI-ION Battery, and 5" Clamp Weight：33lbs. (15kg). Dimension：34in(L) x 15in(W) x 20in(H) (864mm x 381mm x 508mm)
	Software	The receiver firmware can be upgraded using a PC with a USB port via the free MyLocator3 app.
		Cable Identifier Reliable cable selection for energized and de-energized cables
		Transmitter for identification on de-energized cables CI TX
18	Pulse voltage	55 VDC
	Pulse current	max. 100 A
	Pulse sequence	30 / min
	Pulse width	72 m's
	Power supply	100 ... 240 VAC 50 / 60 Hz 12 VDC rechargeable battery
	Operating time	4 h ion rechargeable battery
	Charging time	6 h
	Weight	1,6 kg
	Dimensions (W x H x D)	201 x 120 x 80 mm
	Protection class	IP 54

	Operating/storage temperature	- 10 °C ... + 60 °C
	Relative humidity	93 % at 30 °C (non-condensing)
		Transmitter for identification on energized cables LCI TX
19	Operating voltage	100 … 240 VAC 50 / 60 Hz
	Pulse current	80 A
	Pulse sequence	15 / min
	Pulse width	1,5 ms
	Weight	0,5 kg
	Dimensions (W x H x D)	151 x 101 x 60 mm
	Protection class	IP 54
	Operating/storage temperature	- 10 °C … + 60 °C CAT IV/300V
	Relative humidity	93% at 30 °C (non-condensing)
		Transmitter for phase-to-phase identification on energized cables LCI TX 440X
20	Operating voltage	100 … 440 VAC 50 / 60 Hz
	Pulse current	80 A
	Pulse sequence	15 / min
	Pulse width	1,5 m's
	Weight	0,5 kg
	Dimensions (W x H x D)	151 x 101 x 60 mm
	Protection class	IP 54
	Operating/storage temperature	- 10 °C … + 60 °C CAT IV / 600V

	Relative humidity	93% at 30 °C (non-condensing)
		Universal-receiver CI RX
21	Sensor	Flex-Coupler Ø ca. 150 mm (oder ca. 250 mm)
	Amplifier setting	10 steps 3 … 24 dB
	Power supply	2 x 1,5 V AA batteries
	Operating time	> 50 h
	Weight	0,4 kg
	Dimensions (W x H x D)	150 x 65 x 35 mm
	Protection class	IP 54
	Operating/storage temperature	- 10 °C … + 60 °C
	Relative humidity	93% at 30 °C (non-condensing)
		Insulation Resistance Tester
22	AC voltage (auto ranging)	90 - 264 V rms,50/60 Hz, 100 A; 90 - 264 V rms,50/60 Hz, 200 A
	Battery life	6 hours (typical) continuous testing at 5 kV with a 100 MΩ load; 4.5 hours (typical) continuous testing at 15 kV with a 100 MΩ
	30 min quick charge	1 hour operation at 5 kV with a 100 MΩ load
	Battery charge time	2.5 hours deep discharge,2 hours normal discharge
	Test voltage	250 V, 500 V, 1000 V, 2500 V, 5000 V, 10000 V, 15000 V, VL
	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 1 GΩ load (0°C to 30°C)
	Resistance range	10 k to 15 TΩ @ 5 kV, 10 k to 35 TΩ @ 10 kV, 10 k to 35 TΩ @ 15 kV

	Operating temperature range	-20 °C to 50 °C
	Storage temperature range	-25 °C to 65 °C
	Humidity	90% RH non-condensing at 40 °C
	IP rating	IP65 (lid closed), IP40 (lid open)
	Dimensions	305 mm x 194 mm x 360 mm
	Weight	6,5 kg
	Guard terminal performance	Guards out parallel leakage resistance down to 250 kΩ with a maximum additional resistance error of 1% with a 100 MΩ load
	Display range analogue	100 kΩ to 10 TΩ
	Display range digital:	10 kΩ to 35 TΩ
	Short circuit/charge current	6 mA
	Insulation test Alarm	100 kΩ to 10 GΩ
	Capacitor charge(on battery):	< 2.5 s/µF to 5 kV ,<5 s/µF to 10 kV,< 6.3 s/µF to 15 kV
	Capacitor charge(with AC):	< 1.5 s/µF to 5 kV ,<2.7 s/µF to 10 kV,< 4 s/µF to 15 kV
	Capacitor discharge	5 kV to 50 V :< 120 ms/µF10 kV to 50 V:< 250 ms/µF15 kV to 50 V:< 3500 ms/µF
	Capacitance range With test	10 nF to 50 µF

	voltage set above 500V	
	Capacitance measurement accuracy	10 nF to 10 µF : ±10% ±5 nF
	Current range	0.01 nA to 6 mA
	Current accuracy	±5% ±0.2 nA at all voltages (20 °C)
	Interference	8 mA from 2800 V to 15 kV
	Software 4 filter settings	0 s, 30 s, 100 s, 200 s
	Voltmeter range	30 V to 660 V ac or dc, 45Hz – 65Hz
	Voltmeter accuracy	±3%, ±3V
	Timer range	Up to 99 minutes 59 seconds,15 second minimum setting
	Memory capacity	11 hrs logging @ 5 sec intervals
	Test modes	IR, IR(t), DAR, PI, SV, DD, ramp test
	Interface	USB type B (device), Bluetooth® Class 2
	Real time output	(V, I, R) readings at a rate of 1 Hz
	Remote control	Remote control via USB cable only(requires RC dongle to be in position)
	TEST LEADS	15 kV leads supplied with a 3m lead-set, with large clips with insulation suited to 15 kV use.
		Industrial Label Printer
23	Display Type	16 chrs x 3 lines backlit graphic LCD with print preview
	Interfaces	USB 2.0, Wi-Fi, Wireless Direct
	Print Speed	30mm / sec (maximum)
	Maximum Tape Width	24mm
	Maximum Print Height	18mm

	Cutter Type	Automatic (Full & Half)
	Battery Type	BA-E001 Li-ion rechargeable battery (supplied) 6 x AA alkaline/rechargeable batteries - not supplied)
	Dedicated Labelling Functions	General, Faceplate, Patch panel, Punch Block, Cable wrap, Cable ag, Heat shrink tube Serialise (automatic number incrementation)
	Fonts	14 fonts, 10 styles, 6-48 point size
	Max. Lines per Label	7 (on 24mm width tape cassette)
	Max. text blocks	99
	Symbols	384
	Frames	7
	Barcodes	9 protocols (built into device)
	Automatic numbering	1-99
	Copy Printing	1-99
	Vertical Text Printing	Yes
	Rotated text printing	Rotate once, Rotate and repeat
	Supported Operating Systems	Windows Vista®, Windows® 7, Windows® 8, Mac OS X 10.6 or greater
	Cable Labelling Wizard	Yes
	Font Faces	All installed true-type fonts
	Font Styles	12
	Image Import	JPG, BMP, TIFF and other popular types
	Screen capture	Yes
	Frames	153

	Barcodes	21 protocols including 1D/2D barcodes
	Tape type; Tape widths	TZe tape cassettes; 6, 9, 12, 18, 24mm HSe tube cassettes; 5.8, 8.8, 11.7, 17.7, 23.6mm
	Supplies	USB cable, wrist strap and Carry case
		Surge wave receiver
24		**Receiver DPP-CU**
	Display	TFT-colour display, 320 x 240 Pixel
	Safety	Volume limitation to 84 dB (A)
	Gain	> 120 dB, automatic
	Supply	6 x LR6 Alkali-Mangan batteries
	Operation time	> 10 hrs.
	Protection rating	IP 54
	Dimensions (H x W x D)	65 x 225 x 100 mm
	Weight	0.9 kg (incl. batteries)
		Sensor DPP-SU
	Dimensions	Diameter 230 mm (outer rim)
	Height	140 mm
	Handle length	480 ... 750 mm adjustable
	Weight	2.2 kg (incl. batteries and handle)
	Dynamic range	Magnetic channel > 110 dB Acoustic channel > 110 dB
	Frequency range	100 ... 1500 Hz
		Single-pole Phase Comparators
25	Technical description:	Integrated TEST push-button.
		Orange LED = indication that frequency and voltage are in memory.
		Green LED = phasing indication.
		Voltage (kV) 10-30

		Length of antenna (m) 0.85
		Red LED = non-phasing indication.
		Powered by a LF 22 9 V battery. Delivered in carrying case.
VLF sine wave 34 kV		
26	Output voltage	VLF sine wave 0 … 24 kVRMS / 0 ... 34 kVpeak DC voltage ± 0 … 34 kV VFL rectangular voltage 0 … 34 kV Precision ± 1 % Resolution 0.1 kV
	Output current	Measuring range 0 … 14 mA Precision ± 1 % Resolution 1 µA
	General	Frequency range 0.01 Hz ... 0.1 Hz autom. frequency adjustment Output 0.6 µF @ 0,1 Hz at 24 kVRMS 5 µF @ 0,01 Hz at 21 kVRMS Input voltage 100 V … 260 V, 50/60 Hz, 400 VA Sheath testing 0 … 5 kV, 0 … 10 kV DC Sheath fault pinpointing 0 … 5 kV, 0 … 10 kV DC, Pulse rate 1:3 and 1:4 Safety Earth loop ground monitoring, autom.discharging of the test object Dimensions (W x H x D) 520 x 450 x 300 mm Weight 25 kg Protection class IP 20/IP 54 (operation/transportation) Operating temperature - 20 °C … + 55 °C Storage temperature - 25 °C … + 70 °C

The successful bidder must be able to provide a fully equipped Test Trailer or Build all relevant test equipment inside the vehicle (equivalent to SPG 40; Portable Time Domain Reflectometer; Inverter System; All round pinpointing receiver; Multi-purpose precision buried utility locator receiver and transmitter TX and RX; Cable Identifier Reliable cable selection for energized and de-energized cables; Transmitter for identification on energized cables; Universal-receiver CI Rx; Insulation Resistance Tester; Industrial Label Printer; Surge wave receiver; Single-pole Phase Comparators). This test Trailer or Vehicle pricing must be included in the bid pricing list.

6. HEALTH AND SAFETY REQUIREMENTS

Provide safe operation/instruction and maintenance manuals with each set of test unit equipment.

7. SPECIAL CONDITIONS

7.1 The successful bidder will train CENTLEC personnel for the period of the tender and must supply a detailed **training schedule**. This break-down must include the following topics. **Training schedules and training schedules modules.** Operate and setup of the following:

- 7.1.1 Signal generator (Thumper).
- 7.1.2 Portable Time Domain Reflectometer.
- 7.1.3 Portable reflectometer for fault location systems.
- 7.1.4 All round pinpointing receiver.
- 7.1.5 Multi-purpose precision buried utility locator receiver and transmitter.
- 7.1.6 Cable Identifier.
- 7.1.7 VLF sine wave.
- 7.1.8 Cable test and fault location fundamentals.

7.2 Provide proof of capability to conduct preventative maintenance annually on each test unit as specified by the manufacturer for the duration of the contract. **Provide commitment letter.**

7.3 In the case of an equipment failure, the unit must be repaired as soon as possible to ensure CENTLEC service delivery will be maintained.

7.4 Warrantees and guarantees to be provided on all equipment supplied. **Warranty Certificates must be submitted on appointment.**

8. EVALUATION CRITERIA

All proposals submitted will be evaluated in accordance with the criteria set out in the policy of Supply Chain Management of the Entity.

The most suitable candidate will then be selected. Please take note that CENTLEC is not bound to select any of the bidders submitting proposals. CENTLEC furthermore reserves the right to select more than one bidder.

Furthermore, technical competence is the principal selection criteria, CENTLEC will evaluate the technical criteria first and will only look at the price and specific goals if it is satisfied with the technical evaluation. As a result of this, CENTLEC does not bind itself in any way to select the firm offering the lowest price.

The relative technical weighting of the criteria is as follows:

Table: 2. Evaluation Criteria

No.	**Criteria**	**Description**	**Points**
8.1.1	Capability	A minimum of two (2) signed reference letters on company's letterhead signed by the duly authorized person confirming track record and experience related to the scope of work. (a) Submit at least two (2) reference letters to demonstrate their capability to complete project as indicated in the scope of works **= 20 points** (b) Submit three (3) or more reference letters to demonstrate their capability to complete project as indicated in the scope of works. **= 30 points**	30
8.1.2.	Locality	Does the bidder have an existing and established local office (CENTLEC distribution area) = **20 points** If not (Within South Africa) = **10 points**	20
8.1.3.	Capacity	Does the bidder have the resources to complete project as indicated in the scope of works. Supply project organizational structure with CVs' and certified copies of qualifications of all personnel involved. (a) A Qualified Technician = **10 points** (b) Professional Engineer (ECSA registered) and a Qualified Technician **= 20 points**	20
8.1.4.	Quality Assurance	ISO 9001 Standard: Installation of high voltage test equipment = **30 points**	30
	TOTAL		**100**

A bidder who gets a minimum of 70 points and above will qualify to the next stage. Individual tenders would have to be evaluated according to the preferential point system. The bidder must score minimum points as follows:
Item 8.1.1 – 20 points
Item 8.1.2 – 10 points
Item 8.1.3 – 10 points
Item 8.1.4 – 30 points; in the Evaluation Criteria.

8.2 PRICE AND PREFERENTIAL POINTS SCORING – STAGE 2 (Price and Specific Goals requirement)

All Bidders that have passed the technical evaluation threshold of 70 points would also be scored based the 80/20 principle where 80 Points is for the Price and 20 points for specific goals as per the detail given below.

8.3 Points awarded for price

A maximum of 80 Points is allocated for price on the following basis:

Where $Ps = 80[1 - \frac{\text{Pt}-\text{P min}}{\text{P min}}]$
Ps = Points Scored for comparative price of bid under consideration
Pt = Comparative Price of bid under consideration
P min = Comparative Price of lowest acceptable bid

8.4 Points awarded for Specific Goals Requirement

In terms of Regulation 3.(1) An organ of state must, in the tender documents, stipulate— (a) the applicable preference point system as envisaged in regulations 4, 5, 6 or 7; (b) the specific goal in the invitation to submit the tender for which a point may be awarded, and the number of points that will be awarded to each goal, and proof of the claim for such goals in accordance with the table below;

Table 3: Specified Goals for Preferential Point System

Specified Goals	Points Allocation
50% Black owned	10
50% Women owned	5
50% Youth owned <35 years	5
Total Points	**20**

9. PRICING SCHEDULES

9.1 The bid price(s) adjustment shall be SEIFSA based priced.

9.2 Price(s) increase shall be subject to negotiation. The increase shall be negotiated after 12 months into the contract.

Table 4 Pricing Schedule

Unit Number	Technical data SPG 40		Quantity	Make and Model offered	Price
1	Display	¼ VGA	1		
	Insulation test	Voltages 1,000 V and 5,000 V ranges 1 kΩ, 1 MΩ, 100 MΩ			
	DC testing	0 … 40 kV DC			
	Leakage current	0 … 1/10/100 mA automatic measuring area setting			
	Breakdown detection	0 … 40 kV			
	Burning	0 … 8 kV; 0.7A; 0 … 20 kV ; 0.1A			
	Upper surge voltages	0 … 12.5 / 25 kV or 0 … 16 / 32			
	Lower surge voltages optional	0 … 4 kV or 0 … 8 kV			
	Surge energy	0 … 3 kV or 0 … 6 kV 1,000 J in every range (optionally 2,000 J for vehicle installation)			
	Surge sequence	3 … 10 sec. and single pulse			
	Sheath fault location	0 … 5 kV and 0 … 10 kV			
	Cycle intervals	DC; 1:3 ; 1:4 ; 1:6 (sec.)			

	HV prelocation with optional TDR	ARM, ICE current decoupling Decay voltage coupling ICE Plus option (for 4 and 8 kV)			
	Operating temperature	-10 °C … + 50 °C			
	Power supply	230 V; 50 / 60 Hz (110 V optional)			
	Power consumption	1.7 kVA max.			
	Dimensions (L x W x H)	520 x 430 x 1,050 mm			
	Connecting cable	25 m			
	Weight	ca. 116 kg (incl. opt. surge level)			
	Portable Time Domain Reflectometer		**Quantity**	**Make and Model offered**	**Price**
2	Display	Industrial grade colour TFT panel	**1**		
	LCD size	10.1"			
	Aspect ratio	16:10			
	Resolution	1,280 x 800 (WXGA)			
	Backlight	LED			
	Luminance	1000 cd/m² direct bonded Anti-glare capacitive touchscreen			
	Measuring range	20 m ... 160 km at VOP = 80 m/µs			
	Pulse width	20 ns ... 10 µs			
	Pulse amplitude	10 ... 50 V			
	Resolution	0.1 m at VOP = 80 m/µs			
	Accuracy	0.001			
	Timebase Accuracy	100 ppm			
	Sampling rate	true 400 MHz			
	Dynamic range	96 dB, with adjustable ProRange (Distance-dependent De-attenuation)			

	Velocity of propagation	10 ... 149.9 m/µs (or ft/µs or nvp)			
	Output impedance	50 Ω 10 Ω ... 500 Ω, adjustable			
	ARM® trigger	ΔU trigger technology with automatic adjustment			
	Proof voltage	< 400 V, only with separation filter			
	Memory	4 GB for program and data			
	Connections	USB, BNC, CAN			
	Protection class	IP 65 enclosed, IP 54 open			
	Battery	12 V Li-Ion rechargeable battery Overload protection Deep Discharge protection Smart charger 110 ... 240 V, 50/60 Hz 10 ... 17 V DC, 3.8 A 6 hrs of operating time on full charge 4 hrs recharge time			
	Dimensions (W x H x D)	362 x 195 x 305 mm (14.2 in. x 7.6 in. x 12 in.)			
	Weight	7.8 kg (17.1 lbs)			
	Operating temperature	- 10 °C ... + 50 °C (14 °F ... +122 °F)			
	Storage temperature	- 20 °C ... + 60 °C (-4 °F ... +140 °F)			
	Technical data HV-Module SPG 32		**Quantity**	**Make and Model offered**	**Price**
3	Testing	0 … 32 kV DC	**1**		
	Surge	0 … 8 kV; 1750 J, 0 … 16 kV; 1750 J, 0 … 32 kV; 1750 J			
	Surge rate	3 … 10 s, Single pulse			
	Burning	0 … 32 kV; 160 mA			
	Sheath fault locating	0 … 5 kV; 160 mA			
	Connecting cable	25 m			
	Mains supply	230 V; 50 / 60 Hz, 2 kVA (110 V			

		optional)			
	Dimensions (W x H x D)	800 x 1280 x 800 mm			
	Weight	approx. 140 kg			
	Technical data TDR Teleflex T30-E		**Quantity**	**Make and Model offered**	**Price**
4	Range	TDR 10 m ... 50 km Transient 20 m ... 100 km	**1**		
	Pulse width	35 ns to 4 µs			
	Sampling rate	200 MHz			
	Time Base Accuracy	± 0.01%			
	Display	10.4“ VGA colour TFT display			
	V/2	50 m/µs … 150 m/µs			
	Modes	ARM-Mode, Quick Steps, Step-by-Step, ICE Impulse Current Method, Decay, Direct L1, Direct L2, Comparison L1/L2, Difference L1-L2.			
	Memory	100 traces			
	Interface	RS 232 for PC and printer			
	Impedance matching	12 ... 150			
	Operating temperature	-15 °C … 50 °C			
	Mains supply	NiMh-Batterie, 230 V; 50 / 60 Hz (110 V optional), 12 V DC			
	Dimensions (W x H x D)	360 x 160 x 270 mm			
	Weight	6 kg			

	Inverter System		**Quantity**	**Make and Model offered**	**Price**
	Charger:				
5	Output Current:	40A	**1**		
	Output Voltage:	14.4V			
	Input Voltage:	100—240VAC			
	Input Current:	3.4A			
	Over Voltage Protection:	16—18V (Shut down with re-power on recovery)			
	Over Temperature Protection:	Shutdown with auto recovery			
		after voltage goes down			
	Batteries				
6	Type:	Sealed High Cycle Maintenance Free Battery	**1**		
	Output Voltage:	12V			
	Output Current:	102Ah			
	Inverter: Technical Data		**Quantity**	**Make and Model offered**	**Price**
7	Output Frequency:	50/60 Hz (Switch Selectable)	**1**		
	Continuous Output	3000W			
	Surge Rating:	6000W			
	Input Voltage:	12/24/48 V DC			
	Output Voltage:	220/230/240 VAC +- 3%			
	Output Waveform:	Pure Sine Wave (THD < 3%)			
	Protection:	Overload, Short Circuit, Reverse Polarity (Fuse) Over / Under Input Voltage, Over Temperature			

	Operating Temperature Range:	0 to 40°C			
	Storage Temperature Range:	-30°C to 70°C			
	High Efficiency Full Load:	88%, 91%, 92%, 90%, 93%, 94%			
	Tri-Colour Indicators:	Display Input Voltage, Output Load Level and Failure Status			
	Advanced Microprocessor:	Internal			
	Protections:	SC / OV / UV / OT / OL			
	No Load Current Draw:	2.0A, 1.6A, 0.8A, 2.8A, 1.5A, 0.7A			
	Input Level Indicator:	Red / Orange / Green LED			
	Failure Indicator:	Red LED			
	Cooling:	Loading Controlled Cooling Fan			
	Remote Control Unit:	CR-6 / CR-7 / CR-8 Optional Safety Meet UL458 EN60950-1			
	Input & Output Fully Isolation Design				
8	Spiking Gun firing with 9 mm blank cartridge		**1**		
9	Spiking Gun Cartridges Red Extra Strong (50)		**1**		

10	Installation Trailer (Full)		**1**		
11	Installation Vehicles (Full)		**1**		
	<u>Portable reflectometer for fault location systems TECHNICAL DATA</u>		**Quantity**	**Make and Model offered**	**Price**
12	Distance range	20 m ... 160 km at v/2 = 80 m/µs	**1**		
	Pulse width	20 ns ... 10 µs			
	Pulse amplitude	10 ... 50 V			
	Resolution	0.1 m at v/2 80 m/µs, 1.0 cm at v/2 < 40 m/µs			
	Sampling rate	Up to 400 MHz (real sampling rate)			
	Amplification	- 37 ... + 37 db			
	De-attenuation	0 ... +22 dB for ProRange (adjustable from 0 to 100%)			
	Transit time setting v/2	10 ... 149.9 m/µs, ft/µs or nvp			
	Dynamic response range	> 80 dB			
	Output impedance	50 Ω			
	Adjustment	8 Ω ... 500 Ω, adjustable			
	ARM trigger	Automatic adjustment with ΔU trigger			
	Blind spot	No			
	Withstand voltage	< 400 V, operation only with separation filter			
	Display	10.4" colour TFT XGA 1,024 x 768, capacitive touchscreen, 600 cd/m2, LED backlight, dimmable			
	Memory	4 GB mSATA for program and data			
	Connections	Ethernet, USB, BNC, CAN (LON optional)			
	Protection class	IP 65 enclosed, IP 54 open			

	Supply	Battery operation, 110 ... 240 V, 50/60 Hz, 30 VA, 10 V ... 17 V DC, 3,8 A			
	Dimensions (W x H x D)	362 x 195 x 195 mm (option 19" plug-in, 6 HE)			
	Weight	10 kg			
	Operating temperature	- 10 °C ... + 50 °C			
	Storage temperature	- 20 °C ... + 60 °C			
All round pinpointing receiver TECHNICAL DATA					
		Display module	**Quantity**	**Make and Model offered**	**Price**
13	Display	TFT-color display, 320 x 240 pixels	**1**		
	Protection	IP 54			
	Dimensions (H x W x D)	65 x 225 x 100 mm (receiver)			
	Weight	0.9 kg (including batteries			
		Acoustic part/Sensor DDP-SU			
	Safety	Volume limitation to 84 dB(A)			
	Gain	>120 dB, automatic			
	Dimensions	Diameter 230 mm			
	Height	140 mm			
	Handle length	450 ... 750 mm adjustable			
	Weight	2.2 kg (including handle)			
	Dynamic range	Acoustic channel > 110 dB			
	Frequency operating range	100 ... 1500 Hz			
	Filter stages	Off 100 ... 1500 HzLow pass 100 ... 400 HzBand pass 150 ... 600 HzHigh pass 200 ... 1500 Hz			

	Protection	ratingIP 65			
		Step voltage part			
	Sensitivity	5 µV ... 200 V			
	Suppresion of disturbances	50/60 Hz, 16 2/3 Hz, KKS, DC			
	Zero adjustment	Automatically			
	Pulse recognition	Automatically			
	Length – earth rods	1 m (dividable and isolated)			
	Weight – earth rods	0.8 kg each			
	Length – test leads	2 m			
Multi-purpose precision buried utility locator receiver and transmitter					
		Receiver Characteristics	**Quantity**	**Make and Model offered**	**Price**
14	Construction	High impact ABS injection molded housing	**1**		
	Weight	4.6lbs (2.1kg)			
	Dimensions	12.6in(L) x 4.9in(W) x 26.6in(H) (321mm x 124mm x 676mm)			
	Display type	Transmissive 480 x 272 Pixel, 16-bit Color, High Visibility LCD, 4.3"/10cm			
	Receiver antennas	Two sets of 3D antennas			
	Battery	Six x AA Alkaline batteries - Rechargeable custom Lithium-ion batteries with 100-240V AC mains charger			
	Battery life	Alkaline Li-ion (Rechargeable) 12 hours 27 hours - Intermittent use at 70ºF (21ºC) - With the full backlight turned on - Li-Ion batteries will withstand 500 charging life cycles - Battery life varies with temperature.			
	Environmental	IP65 and NEMA 4			

	External connectors	- Accessory Socket – to charge the internal batteries and attach accessories - Mini USB socket for data transfer and programming			
	Temperature Range	- Operating: -4ºF to 122ºF (-20ºC to 50ºC) - Storage: -40ºF to 140ºF (-40ºC to 60ºC)			
	Compliance and approvals	- Complies with European standard CE (Directive 99/5/EC) • EN 55011 • EN 61000-4-2: A1 & A2 • EN 61000-4-3 • EN 61000-4-8: A1ETSI EN 300 330-2 • ETSI EN 301 489-1 • ETSI EN 301 489-3 - Complies with FCC Rules Part 15 • CFR 47 part 2 • CFR 47 Part 15			
	Manufacturing	- ISO 9001:2015			
	Standard Accessories (comes with receiver)	- USB data transfer cable - Custom lithium-ion battery pack - 100-240V AC mains charger - Six x AA Alkaline battery holder - User handbook - Carry bag or hard case (decided at the time of ordering)			
	Compatible Accessory Options	- MLA (Marker Locator Attachment) to locate buried EMS Markers - A-frame fault locator - Remote Antenna (Stethoscope) - Vehicle Charging DC Lead - Tx-Link - factory fitted radio link to remote control the Loc3 series transmitters - Range of Sondes (waterproof, self-contained transmitters for use in pipes & ducts)			
		Receiver	**Quantity**	**Make and Model offered**	**Price**
	Information displayed	Status Bar Information: - Antenna configuration: Peak, Peak with arrows, Null, Broad, Delta Null, Omni Directional Peak, Omni Directional Broad - Line location - depth & current measurement - Battery condition - Speaker volume - Bluetooth and GNSS status (If	**1**		

		fitted) - Cellular connection status - Radio link to transmitter status (if fitted)			
	Locate screen (Classic display):	Signal strength - moving bar graph & numeric value - Bar graph color-coded indicating distortion level - Peak level indicator - Proportional left/right indication - Compass: full 360°-line direction indicator - Gain level (in dB) - Frequency selected - Product configuration menu & submenus including GNSS status and data logging transfer status. - Customer definable start-up screen - Depth and current - Warnings (if activated) - Plug and play automatic recognition of accessories - Accessory specific custom screens			
	Information screen:	- GPS co-ordinates - Real-time horizontal accuracy in 2DRMS - Signal current and depth value - SiS Reset - Log number			
	Alternative locate screens:	- Transverse Graph Screen - visual assessment of the locate quality and distortion - Sonde Locate Screen – directing arrow to move to the Sonde position along the polar axis - Vector Locate Screen – fully-automatic locate including offset, depth and locate uncertainty - Plan View Screen – fully-automatic graphical representation of the cable position independent of cable direction including depth/current and locate uncertainty.			

	Configuration	The intuitive setup menu enables the user to configure: - Set up frequency selection to toggle by "f" pushbutton - Setup location mode selection to toggle by "m" pushbutton - Setup screen views selection to toggle by long press "m" pushbutton - Units of measure (feet/meter) - Sound (Pitch) – normal/modulated - Language - Continuous depth/current options - Loudspeaker level - Backlight - Bluetooth pairing - Transmitter Radio Link (if ordered)- Warnings (Excessive Tilt, Overhead Signal, Shallow Cable, Signal Overload - Auto shut down – configurable to power down at five minutes, ten minutes, or never			
	Operating frequencies	- Configurable frequencies from 98Hz to 200 kHz • Power 50Hz and 60Hz • Radio 10kHz - 22.7kHz bandwidth - Signal Direction - enhanced product model giving the direction of outgoing current: • SD-USA: 256Hz/512Hz, SD-EUROPE: 320Hz/640Hz - Signal Select – a real-time measurement of signal bleed-over caused by capacitive o inductive coupling to other utilities: • SIS-491Hz, SIS-982 Hz, SIS-8440 Hz, SIS-9820 Hz, SIS-35kHz			
	Operating modes	Classic Locate (2-section Bar graph) - Transverse Graph Mode - Plan View (Omni Directional) - Vector Locate (Lateral Position & Depth) - Sonde Locate			
	Gain/scaling control	Manual gain using "+" or "-" with one touch to return to center (60% of FSD) "+" or "-" used to rescale the vector screen dependent on cable depth and offset			
	Accuracy	Locate pinpointing accuracy: - Over 9ft (3m) – +/- 5% of depth - Up to 9ft (3m) – +/- 3% of depth Depth measurement accuracy: +/- 5% of depth Current measurement accuracy: - +/- 5% of actual current – over 9ft (3m) - +/- 3% of actual current – up to 9ft (3m) Depth range: Dependent on the strength of the signal radiating to the locator Performance rated using a single undistorted signal source			
	Compatible transmitters	Loc-10SiSTx, and Loc3-10SiSTx			

	Bluetooth	Internal Bluetooth for communicating with: External GPS or data logging devices Apple® devices Android™ devices			
	GPS	GPS, GLONASS, Galileo 2.5m accuracy Internal GNSS module			
	Transmitter Link	Optional Tx-Link (Remote transmitter control from the receiver)			
	Data logging	- 50 million record internal storage - All parameters stored at each location including depth, current, date, time, mode, gain setting, frequency, locate uncertainty, longitude, latitude, and height above sealevel - GPS data coordinates, date, and time			
	Data Transfer	The data can be saved in csv, klm, shp, xls, or xlsx formats - Via the free "MyLocator3" PC desktop app - Via cloud through the VMMap web portal			
		Transmitter Characteristics	**Quantity**	**Make and Model offered**	**Price**
15	Construction	High-impact ABS plastic	**1**		
	Weight	- With Alkaline battery tray: 9.9lbs (4.4kg) - With Rechargeable battery tray: 7.15lbs (3.24kg)			
	Dimensions	13.1in(L) x 7.2in(W) x7.3in(H) (332mm x 182mm x 185mm			
	Display Type	- Monochrome dot matrix graphic LCD with backlight - 2.4in x 1.3in (60mm x 32mm)			
	Power Options	- 12 x Alkaline "D" cells - 12~22V external DC power - Optional Li-Ion rechargeable battery tray - 18V			
	Battery Life	Output Power Alkaline Li-ion (Rechargeable) 1-watt 25 hours 50 hours 5-watt 6 hours 10 hours 10-watt 4-5 hours 6 hours At 70ºF (21ºC) - continuous use (based on the battery type and quality) Li-Ion batteries will withstand 500 charging life cycles			
	Environmental	IP54 and NEMA 4			
	External Connectors	1 x 3 pin connection socket (XLR) 1 x fuse (output protection) 1.6A/250V 1 x Mini-USB socket 1 x socket for battery charger & 12V DC power			

	Temperature Range	- Operating: -4ºF to 122ºF (-20ºC to 50ºC) - Storage: -40ºF to 140ºF (-40ºC to 60ºC)			
	Output Protection	Output protected against accidental momentary connection to up to 240V AC			
	Compliance / Approvals	- Complies with European standard CE (Directive 99/5/EC) • EN 55011 • EN 61000-4-2: A1 & A2 • EN 61000-4-3 • EN 61000-4-8: A1 • ETSI EN 300 330-2 • ETSI EN 301 489-1 • ETSI EN 301 489-3 - Complies with FCC rules part 15 • CFR 47 part 2 • CFR 47 part 15			
	Manufacturing	ISO 9001:2015			
	Standard Accessories (Supplied with Transmitter)	- Direct Connection Leads (XLR plug with 10ft (3.5m) red/black leads) - Ground stake - Alkaline battery tray - 12 x D Cell alkaline batteries			
	Compatible Accessories Options	- Optional Tx-Link (Remote transmitter control from the receiver) - 2-inch (50mm) signal clamp - 4-inch (100mm) signal clamp - 4-inch (100mm) SiS signal clamp - 5-inch (125mm) signal clamp - 18-inch (450mm) flexible signal clamp - Live Plug Connector - to connect and use the transmitter on lines carrying up to 240V AC - Live Cable Connector - to connect and use the transmitter on lines carrying up to 480V AC - Rechargeable battery tray – Custom Li-Ion battery tray and charger (input DC12V 3A, output DC18V-93.6 Wh) - 12V DC vehicle power lead for powering and charging the optional rechargeable battery from a vehicle			
		Transmitter	**Quantity**	**Make and Model offered**	**Price**
16	Information Displayed	- Current (numeric) - Volts - Resistance - Frequency of output signal - High voltage warning if volts online exceed 30V AC - Beeper volume (three levels & off) - Battery condition icon - Bar graph showing the proportion of successfully applied signal - Animation icon confirming connection mode (Induction, Direct connection, Clamp) - Transmitter control connection status (if the Tx-Link feature is installed)	**1**		

	Transmitting Modes	Induction mode – applies Signal inductively using the internal antenna - Direct Connection mode - applies Signal directly to the cable by clipping one output lead to the cable, the other to an independent ground - Clamp mode – applies the Signal using a Signal Clamp (also known as a toroid or coupler) placed around the target pipe or cable. * Modes are automatically selected when accessories are plugged in. the default mode (no accessories) is Induction.			
		Transmitting Frequency by Mode	**Quantity**	**Make and Model offered**	**Price**
17	Induction Mode	Multiple induction frequencies between 8.19 kHz and 200 kHz	**1**		
	Direct Connection Mode	Available frequencies between 98Hz and 200 kHz with default frequencies of 512Hz, 8.19 kHz, 33 kHz, 65 kHz, 200 kHz, Fault-find, SD, SiS			
	Clamp Mode	Available frequencies between 8Hz and 200 kHz with default frequencies in 8.19 kHz, 33 kHz, 65 kHz SiS Clamp - Frequencies: 491Hz, 982Hz, 8.44 kHz, and 9.82 kHz.			
	Transmitting Mode	Power Output Following FCC part 15: - Frequencies under 45 kHz - 10 watts - Frequencies over 45 kHz - 1 watt			
	Maximum Output Voltage	50V RMS			
	Maximum Output Current	1A RMS constant current			
	Output Protection	Output protected against accidental momentary connection to up to 240V AC			
	Audio indication	Connection quality – Increased beep rate indicates a better-applied signal - Beeps to confirm the selected action			
	Controls	Use pushbuttons to select: • Power on/off • Frequency • Output level • Information (volts & resistance) / Setting (volume, frequency & multi-mode)			

	Compatible Receivers	vLoc3 series, vLoc2 series, vLoc series, VM-510FFL+ Signal Select and Distortion Alert line ID features are available only with the vLoc-5000 and vLoc3-5000 receivers.			
		Rechargeable Battery Tray			
	Description	Optional Li-Ion rechargeable battery tray with charger for Loc3 series transmitters			
	Input/output	- Input DC 12V 3A - Output DC 18V-93.6 Wh			
	Battery Type	Li-Ion battery			
	Temperature Range	- Operating: 14ºF to 140ºF (-10ºC to 60ºC) - Storage: -4ºF to 140ºF (-20ºC to 60ºC) - Charging: 32ºF to 113ºF (0ºC to 45ºC)			
	Storage humidity	≤75% RH			
	Weight	- Battery Tray: 3.31lbs. (1.5kg) - Transmitter with battery tray: 7.1lbs. (3.2kg)			
	Dimension	13.1in(L) x 7.2in(W) x2.9in(H) (332mm x 182mm x 73mm)			
	Warranty	12 Months			
	Receiver in a SOFT KIT BAG.	Weight：16lbs. (7.3kg). Dimension：30in(L) x 11in(W) x 14in(H) (762mm x 279mm x 356mm)			
	Receiver in a HARD CASE.	Weight：20lbs. (9.1kg). Dimension：34in(L) x 15in(W) x 20in(H) (864mm x 381mm x 508mm)			
	Transmitter with Alkaline battery tray	Weight：14lbs. (6.4kg). Dimension：16in(L) x 12in(W) x 9in(H) (406mm x 305mm x 229mm)			
	Transmitter with Li-ion battery tray and charger	Weight：12lbs. (5.4kg). Dimension：16in(L) x 12in(W) x 9in(H) (406mm x 305mm x 229mm)			
	Kit in a SOFT KIT BAG.	The receiver, transmitter with ALKALINE Battery, and 5" Clamp Weight：31lbs. (14.1kg). Dimension：32in(L) x 12in(W) x 16in(H) (813mm x 305mm x 406mm)			

	Kit in a SOFT KIT BAG.	The receiver, transmitter with LI-ION Battery, and 5" Clamp Weight：31lbs. (14.1kg). Dimension：32in(L) x 12in(W) x 16in(H) (813mm x 305mm x 406mm)			
	Kit in a HARD CASE.	The receiver, transmitter with ALKALINE Battery, and 5" Clamp Weight：34lbs. (15.4kg). Dimension：34in(L) x 15in(W) x 20in(H) (864mm x 381mm x 508mm)			
	Kit in a HARD CASE.	The receiver, transmitter with LI-ION Battery, and 5" Clamp Weight：33lbs. (15kg). Dimension：34in(L) x 15in(W) x 20in(H) (864mm x 381mm x 508mm)			
	Software	The receiver firmware can be upgraded using a PC with a USB port via the free MyLocator3 app.			
Cable Identifier Reliable cable selection for energized and de-energized cables					
		Transmitter for identification on de-energized cables CI TX	**Quantity**	**Make and Model offered**	**Price**
18	Pulse voltage	55 VDC	**1**		
	Pulse current	max. 100 A			
	Pulse sequence	30 / min			
	Pulse width	72 m's			
	Power supply	100 ... 240 VAC 50 / 60 Hz 12 VDC rechargeable battery			
	Operating time	4 h ion rechargeable battery			
	Charging time	6 h			
	Weight	1,6 kg			
	Dimensions (W x H x D)	201 x 120 x 80 mm			
	Protection class	IP 54			
	Operating/storage temperature	- 10 °C ... + 60 °C			
	Relative humidity	93 % at 30 °C (non-condensing)			

		Transmitter for identification on energized cables LCI TX	**Quantity**	**Make and Model offered**	**Price**
19	Operating voltage	100 … 240 VAC 50 / 60 Hz	**1**		
	Pulse current	80 A			
	Pulse sequence	15 / min			
	Pulse width	1,5 ms			
	Weight	0,5 kg			
	Dimensions (W x H x D)	151 x 101 x 60 mm			
	Protection class	IP 54			
	Operating/storage temperature	- 10 °C … + 60 °C CAT IV/300V			
	Relative humidity	93% at 30 °C (non-condensing)			
		Transmitter for phase-to-phase identification on energized cables LCI TX 440X	**Quantity**	**Make and Model offered**	**Price**
20	Operating voltage	100 … 440 VAC 50 / 60 Hz	**1**		
	Pulse current	80 A			
	Pulse sequence	15 / min			
	Pulse width	1,5 m's			
	Weight	0,5 kg			
	Dimensions (W x H x D)	151 x 101 x 60 mm			
	Protection class	IP 54			
	Operating/storage temperature	- 10 °C … + 60 °C CAT IV / 600V			
	Relative humidity	93% at 30 °C (non-condensing)			

		Universal-receiver CI RX	**Quantity**	**Make and Model offered**	**Price**
21	Sensor	Flex-Coupler Ø ca. 150 mm (oder ca. 250 mm)	**1**		
	Amplifier setting	10 steps 3 … 24 dB			
	Power supply	2 x 1,5 V AA batteries			
	Operating time	> 50 h			
	Weight	0,4 kg			
	Dimensions (W x H x D)	150 x 65 x 35 mm			
	Protection class	IP 54			
	Operating/storage temperature	- 10 °C … + 60 °C			
	Relative humidity	93% at 30 °C (non-condensing)			
		Insulation Resistance Tester	**Quantity**	**Make and Model offered**	**Price**
22	AC voltage (auto ranging)	90 - 264 V rms,50/60 Hz, 100 A; 90 - 264 V rms,50/60 Hz, 200 A	**1**		
	Battery life	6 hours (typical) continuous testing at 5 kV with a 100 MΩ load; 4.5 hours (typical) continuous testing at 15 kV with a 100 MΩ			
	30 min quick charge	1 hour operation at 5 kV with a 100 MΩ load			
	Battery charge time	2.5 hours deep discharge,2 hours normal discharge			
	Test voltage	250 V, 500 V, 1000 V, 2500 V, 5000 V, 10000 V, 15000 V, VL			
	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 1 GΩ load (0°C to 30°C)			

	Resistance range	10 k to 15 TΩ @ 5 kV, 10 k to 35 TΩ @ 10 kV, 10 k to 35 TΩ @ 15 kV			
	Operating temperature range	-20 °C to 50 °C			
	Storage temperature range	-25 °C to 65 °C			
	Humidity	90% RH non-condensing at 40 °C			
	IP rating	IP65 (lid closed), IP40 (lid open)			
	Dimensions	305 mm x 194 mm x 360 mm			
	Weight	6,5 kg			
	Guard terminal performance	Guards out parallel leakage resistance down to 250 kΩ with a maximum additional resistance error of 1% with a 100 MΩ load			
	Display range analogue	100 kΩ to 10 TΩ			
	Display range digital:	10 kΩ to 35 TΩ			
	Short circuit/charge current	6 mA			
	Insulation test Alarm	100 kΩ to 10 GΩ			
	Capacitor charge(on battery):	< 2.5 s/µF to 5 kV ,<5 s/µF to 10 kV,< 6.3 s/µF to 15 kV			
	Capacitor charge(with AC):	< 1.5 s/µF to 5 kV ,<2.7 s/µF to 10 kV,< 4 s/µF to 15 kV			
	Capacitor discharge	5 kV to 50 V :< 120 ms/µF10 kV to 50 V:< 250 ms/µF15 kV to 50 V:< 3500 ms/µF			

	Capacitance range With test voltage set above 500V	10 nF to 50 µF			
	Capacitance measurement accuracy	10 nF to 10 µF : ±10% ±5 nF			
	Current range	0.01 nA to 6 mA			
	Current accuracy	±5% ±0.2 nA at all voltages (20 °C)			
	Interference	8 mA from 2800 V to 15 kV			
	Software 4 filter settings	0 s, 30 s, 100 s, 200 s			
	Voltmeter range	30 V to 660 V ac or dc, 45Hz – 65Hz			
	Voltmeter accuracy	±3%, ±3V			
	Timer range	Up to 99 minutes 59 seconds,15 second minimum setting			
	Memory capacity	11 hrs logging @ 5 sec intervals			
	Test modes	IR, IR(t), DAR, PI, SV, DD, ramp test			
	Interface	USB type B (device), Bluetooth® Class 2			
	Real time output	(V, I, R) readings at a rate of 1 Hz			
	Remote control	Remote control via USB cable only(requires RC dongle to be in position)			
	TEST LEADS	15 kV leads supplied with a 3m lead-set, with large clips with insulation suited to 15 kV use.			
		Industrial Label Printer	**Quantity**	**Make and Model offered**	**Price**
23	Display Type	16 chrs x 3 lines backlit graphic LCD with print preview	**1**		
	Interfaces	USB 2.0, Wi-Fi, Wireless Direct			
	Print Speed	30mm / sec (maximum)			

	Maximum Tape Width	24mm			
	Maximum Print Height	18mm			
	Cutter Type	Automatic (Full & Half)			
	Battery Type	BA-E001 Li-ion rechargeable battery (supplied) 6 x AA alkaline/rechargeable batteries - not supplied)			
	Dedicated Labelling Functions	General, Faceplate, Patch panel, Punch Block, Cable wrap, Cable - ag, Heat shrink tube Serialise (automatic number incrementation)			
	Fonts	14 fonts, 10 styles, 6-48 point size			
	Max. Lines per Label	7 (on 24mm width tape cassette)			
	Max. text blocks	99			
	Symbols	384			
	Frames	7			
	Barcodes	9 protocols (built into device)			
	Automatic numbering	1-99			
	Copy Printing	1-99			
	Vertical Text Printing	Yes			
	Rotated text printing	Rotate once, Rotate and repeat			
	Supported Operating Systems	Windows Vista®, Windows® 7, Windows® 8, Mac OS X 10.6 or greater			
	Cable Labelling Wizard	Yes			
	Font Faces	All installed true-type fonts			

	Font Styles	12			
	Image Import	JPG, BMP, TIFF and other popular types			
	Screen capture	Yes			
	Frames	153			
	Barcodes	21 protocols including 1D/2D barcodes			
	Tape type; Tape widths	TZe tape cassettes; 6, 9, 12, 18, 24mm HSe tube cassettes; 5.8, 8.8, 11.7, 17.7, 23.6mm			
	Supplies	USB cable, wrist strap and Carry case			
Surge wave receiver					
		Receiver DPP-CU	**Quantity**	**Make and Model offered**	**Price**
24	Display	TFT-colour display, 320 x 240 Pixel	**1**		
	Safety	Volume limitation to 84 dB (A)			
	Gain	> 120 dB, automatic			
	Supply	6 x LR6 Alkali-Mangan batteries			
	Operation time	> 10 hrs.			
	Protection rating	IP 54			
	Dimensions (H x W x D)	65 x 225 x 100 mm			
	Weight	0.9 kg (incl. batteries)			
		Sensor DPP-SU			
	Dimensions	Diameter 230 mm (outer rim)			
	Height	140 mm			
	Handle length	480 ... 750 mm adjustable			
	Weight	2.2 kg (incl. batteries and handle)			
	Dynamic range	Magnetic channel > 110 dB Acoustic channel > 110 dB			
	Frequency range	100 ... 1500 Hz			

		Single-pole Phase Comparators	**Quantity**	**Make and Model offered**	**Price**
25	Technical description:	Integrated TEST push-button. Orange LED = indication that frequency and voltage are in memory. Green LED = phasing indication. Voltage (kV) 10-30 Length of antenna (m) 0.85 Red LED = non-phasing indication. Powered by a LF 22 9 V battery. Delivered in carrying case.	**1**		
		VLF sine wave 34 kV	**Quantity**	**Make and Model offered**	**Price**
26	Output voltage	VLF sine wave 0 … 24 kVRMS / 0 ... 34 kVpeak DC voltage ± 0 … 34 kV VFL rectangular voltage 0 … 34 kV Precision ± 1 % Resolution 0.1 kV	**1**		
	Output current	Measuring range 0 … 14 mA Precision ± 1 % Resolution 1 µA			
	General	Frequency range 0.01 Hz ... 0.1 Hz autom. frequency adjustment Output 0.6 µF @ 0,1 Hz at 24 kVRMS 5 µF @ 0,01 Hz at 21 kVRMS Input voltage 100 V … 260 V, 50/60 Hz, 400 VA Sheath testing 0 … 5 kV, 0 … 10 kV DC Sheath fault pinpointing 0 … 5 kV, 0 … 10 kV DC, Pulse rate 1:3 and 1:4 Safety Earth loop ground monitoring, autom.discharging of the test object Dimensions (W x H x D) 520 x 450 x 300 mm Weight 25 kg			

		Protection class IP 20/IP 54 (operation/transportation) Operating temperature - 20 °C … + 55 °C Storage temperature - 25 °C … + 70 °C			

10. CONTACT DETAILS

10.1 For any further technical information regarding the document contents please contact Mr. I Smith e-mail: Isaac.smith@CENTLEC.co.za. Such queries must be done in writing, the email address provided serves this purpose.

10.2 For Supply Chain Related questions, Please contact Ms. Palesa Makhele at Palesa.Makhele@CENTLEC.co.za.

11. ANNEXURES

Health and safety guidelines to assist with the compiling of health and safety file.

Reg No 2003/011612/30

OCCUPATIONAL HEALTH

AND

SAFETY

SPECIFICATION GUIDELINES

FOR

SUPPLY, INSTALL, MAINTAIN, REPAIR AND/OR REPLACE SPECIALIZED MOBILE HIGH VOLTAGE TEST EQUIPMENT

OCCUPATIONAL HEALTH AND SAFETY SPECIFICATIONS

Definitions

"Health and Safety Specification" means a documented specification of all health and safety requirements pertaining to the associated Works on a construction site, so as to ensure the health and safety of person during construction process. This document is prepared by the Client or Client agency.

"Health and Safety Plan" means a documented plan which addresses hazards identified and includes safe work procedures to mitigate, reduce or control the hazards identified. This document is prepared by the Principal Contractor or the Subcontractor.

"**Employer"** Where used in contract documents and in this specification, means the employer as defined in the General Conditions of Contract and it shall be have the same meaning as "**Client"** as defined in the Construction Regulation 2003.
"**Employer"** and "**Client"** is therefore interchangeable and shall be read in context of the relevant document.

"**Contractor"** where used in the contract documents and in this specification shall have meaning as "contractor" as defined in the General Conditions of Contract.
In this specification the terms "**Principal Contractor"** and **"Contractor"** are replaced with **"Contractor"** and **"Sub Contractor"** respectively
For the purpose of this contract, the **Contractor** will, in terms of the OHS Act 1993, be the mandatory of the Employer, without derogating from his/her status as an employer in his/her own right.

"Engineer" where used in this specification, means the Engineer as defined in the General Conditions of Contract. In terms of the Construction Regulations the Engineer may act as agent of behalf of the Employer (the client as defined in the Construction Regulations)

"OHS Section" means Occupational Health and Safety Division within Centlec (SOC) LTD will oversees all Projects to ensure that Principal Contractor comply with Occupational Health & Safety Act 85 of 1993, Construction Regulation and all related codes of practice.

1. General Statement

It is a requirement of Centlec (SOC) Ltd that the Contractor shall provide a safe and healthy working environment and to direct all his activities in such a manner that his employees and any other persons, who may be directly affected by his activities, are not exposed to hazards to their health and safety. To this end the contractor shall take full responsibility to conform to all the provisions of the occupational health and safety Act (Act 85 0f 1993), and all relevant regulations as stated in section 44 of Occupational Health and Safety Act 85 of 1993.

For the purpose of this contract the Contractor is required to confirm his status as mandatory to Centlec (SOC) Ltd and employer representattives in his own right for the execution of the contract, and he shall enter into Section 37.2 agreement in respect of the Occupational Health and Safety Act 85of 1993.

2. Scope

This specification includes health and safety elements in terms of the Occupational Health and Safety Act 85 of 1993 and to satisfy the requirements of the Construction Regulation, which will be applicable to the Principal Contractor for the safe execution of work during the project.

3. Purpose

The purpose of this specification is to ensure that the Principal Contractor provides and maintains, as far as reasonably a safe working environment for all employees and the public at large during the construction work.

4. Project Description

The project includes all activities shown on the project drawings and provisional bills of quantities. Additional work or changes to the contract may result in a change to the scope of work. The principal contractor shall make allowance for this in their Health and Safety Plan.

5. The principle health and safety risks involved on this specific site will be that of:-

- Working at elevated position
- Along the road side
- Usage of lifting equipments
- Back age due handling material
- Ladder usage due cabling
- Bending when working at the same level
- Fire hazards that may emanate from explosive chemicals
- Smell that may come due chemicals

6. Details of Specifications

6.1 Appointment of Health and Safety Personnel

The Contractor shall ensure that all relevant appointments specified in the Occupational Health and Safety Act 85 of 1993 and Construction Regulations are made in writing prior to commencement of the Project.

The Principal contractor shall provide adequate levels of suitable trained, experienced and competent management and supervision to ensure that the works proceed and without risks to health or environment and that all operations and personnel for whom the contractor is responsible are adequately monitored and supervised.

The Principal Contractor shall ensure that the appointments listed below are made where applicable:

- Project Manager – section 16.2 OHS ACT
- Registered electrician
- Health and safety representative section 17 of OHS Act 85 of 1993
- Principal Contractor appointment
- Contractor – CR5(1)(k)
- Construction Supervisor – CR8.2
- Assistant construction supervisor – CR8.3
- Construction safety officer – CR8.6
- Risk assessor – CR9.1
- Fall protection planner – CR10.1(a)
- Excavation supervisor – CR13(a)
- Scaffolding supervisor – CR16(1)
- Material hoist inspector – CR19(8)(a)
- Construction vehicle and mobile plant inspector –CR23.1(k)
- Stacking and storage supervisor – CR28(a)
- Fire equipment inspector – CR29(h)
- First aiders GSR3
- Health and safety committee members – Section 19(1) OHS Act 85 of 1993

6.2 Notification to Department of Labour

1. The Principal Contractor shall before commencement of the Project, notify the Department of Labour in writing of the construction work to be undertaken after the appointment letter has been received by the contractor.

The notification must be done in Annexure 2 form for notification of construction work attached in this.

A copy of the notification must be kept on site, available for inspection by inspectors, occupational health and safety unit representatives, employer, engineer, employees and persons on site.

6.3 Establishment of Health and Safety Committee

The Principal Contractor shall establish a Health and Safety Committee in terms of Section 19 of the Occupational Health and Safety Act 85 of 1993.

The Principal Contractor shall hold meeting at least once a month with appointed supervisors, Health and Safety Reps and the chairperson of the Health and Safety Committee and copies of the safety meeting to be forwarded to the client and the client health and safety representative to be informed and invited to such meetings.

Matters that are to be discussed should include at least the following as minimum:

- Make recommendations to resolve health and safety matters (i.e. internally by representatives or externally by DOL inspector)
- Accident/safety incident and they must be recorded for audit and for reporting to CENTLEC safety representative
- Hazardous conditions
- Hazardous material/substances
- Work procedures
- PPE
- Housekeeping
- Work permits
- Non conformances
- Emergency preparedness
- Traffic control
- Access control
- Training
- Forthcoming high hazard activities
- Liquor and drugs
- Occupational health and hygiene issues
- General health and safety issues
- Matters arising from principal contractor safety meetings.

6.4 Health and Safety Hazards

The Principal Contractor shall take cognisance of the following hazards that are prevalent in the project:

<u>Hazardous Environment</u>

- Asbestos work
- Dust

- Fumes
- Noise
- Insufficient lighting
- Weather conditions – Heat/Rain/Wind/Cold
- Working at height and on elevated structures for work above 2 meter height (fall protection plans required)
- Working in and around deep excavations (shoring and bracing required)
- Working next to moving plant
- Working with chemical products

Hazardous Equipment

- Cranes
- Earth moving equipment
- Excavators
- Trucks
- Batch plant
- Ladders
- Lifting equipment
- Chains and slings
- Fall protection equipments

Hazardous Operations

- Crane lifts (sometimes in windy conditions)
- Excavations
- Welding if any
- Use of step ladder
- Usage of the carry picker by unauthorised personnel

Hazardous Tools

- Angle grinders
- Electric hand tools
- Circular saws
- Welding units – arc and gas
- Explosive power tool

Hazardous Substances

- Chemicals & solvents
- Liquid petroleum
- Diesel

6.5 Arrangements for controlling significant site risks

The following are some examples requiring arrangements for controlling the most significant site risks.

6.5.1 Safety Risks

- Preventing employees from falling into excavations, from trucks etc
- Control of lifting operations
- The maintenance of plant and equipment
- Poor ground conditions
- Traffic routes and segregation of vehicles and pedestrians
- Storage of hazardous materials
- Dealing with existing unstable structures/land
- Other significant safety risks as and when identified
- Usage of mobile plant

6.5.2 Health Risks

- Storage and use of hazardous chemical substances
- Manual handling
- Reducing noise and vibration
- Provision of adequate lighting
- Extreme heat and cold temperature considerations
- Dealing with HIV/Aids/COVID-19 and other illnesses
- Provision of maintaining ablution and eating facilities
- Other significant health risks as and when identified
- Distribution of condoms
- Allow employees to test when CENTLEC health and safety section arrange testing for HIV/AIDS
- Allow employees to donate blood when CENTLEC health and safety section arrange for blood donation.

All safe operating procedures, method statements or rules implemented mitigate the risk whilst performing hazardous tasks are to be effectively communicated to the contractor's staff performing the tasks.

It is to be noted that these are some of the hazards that may be prevalent in this Project.

Others may be identified during the Risk Assessment.

7. Safety File

The contractor shall appoint a suitable qualified person to prepare the Health and Safety File and to keep it up to date for the duration of the contract. The Health and Safety File shall include the following information:

- Notification of construction Work (Construction Regulation 4) (Annexure 2)
- Copy of OHS Act (updated) (General Administrative Regulation 4) and relevant regulations as stated by section 44 of OHS Act 85 of 1993.
- Proof of Registration and good standing with a COID Insurer
- Copy Health and Safety plan (Construction Regulation 7(1)) that include the

followings:-

Applicable appointments
List of equipments and specialised equipments
List of PPE issued
Recent inspection lists
Training records
Medical surveillance
Hazards identification and risk assessment
Safe work procedure include fall protection plan, permits, locks-out procedures, method statements
Test records for equipments and work
Incident history
Notices issued
Health and safety expenses in respect of the project

- OHS programme agreed with client including the underpinning Risk Assessment and Method Statements (Construction Regulation 9(1))
- Design/ drawings (Construction Regulation 6)
- A list of Contractors (subcontractors) including copies of the agreements between the parties and the type of work being done by each Contractor (Construction Regulation 7)
- Appointment/Designation forms required by the ACT and Regulations
- Registers as follows:

8. Register required

- OHS Representatives Inspection Register (monthly)
- Excavation inspection (daily)
- Lifting equipment (before use and monthly)
- Designers Inspection of Structure record
- Arc and Gas welding and Flame Cutting Equipment Inspections (before use daily)
- Construction Vehicles and mobile plant Inspections (Daily)
- Fire equipment inspection and maintenance (monthly)
- First aid (monthly)
- Hazardous Chemical Substances (MSDS and listing of chemicals)
- Lifting Tackle and Equipment inspections (before use daily and monthly)
- Inspection of cranes (daily before use)
- Inspection of ladders (daily before use and monthly)
- Inspection of vessels and pressure (monthly and 3 yearly)
- Machinery inspections (before use and monthly)
- Drivers/Operators of mobile plant/construction vehicles daily inspections

The Health and Safety File shall be handed over to the client on completion of the contract. It must contain all the documentation handed to the contractor by any sub contractors together with a record of all drawings, designs, materials used and other similar information concerning the completed project

9. Written Safe Work Procedures and Risk Assessments

Written Safe Work Procedures are to be available in order to mitigate, reduce or control the hazards and risks identified in the Risk Assessment.

Initially a generic document can be produced, by the first three weeks of operation a tasked based document must be produced and be updated as per changes in tasks.

10. Personal Protective Equipment

The Principal Contractor shall ensure that the following minimum personal protective equipment and wear are issued to his employees:

- No person is allowed to be on site without the required PPE as prescribed by risk assessments. This must be discussed at the safety meeting and adhered to by all contractors on site.
- Principal Contractor must ensure that PPE is being used as a last resort upon trying all reasonable means to remove the hazard.
- All contractors are required to keep an updated register of all PPE issued.
- Strict compliance measures must be administered to ensure employees use PPE.
- Hard hats, safety shoes with steel toe caps and protective clothing shall be provided by the contractor free of charge for all his employees and shall be worn at all times. Employees working on site must not wear metallic helmets. Other protective equipment such as gloves, safety glasses, face shield, dust mask, ear plugs etc shall be issued and used when required as per tasks. The contractor shall ensure that his employees understand why the PPE is necessary and that they use them correctly.
- Only double lanyard safety harnesses are allowed and must be used when conducting work at elevated positions except on properly built scaffold platform.
- When handling corrosive liquids e.g. acids or caustic suitable eye protection, gloves, and special overalls shall be worn.
- Ear protection shall be worn in any designated noise zone and a signage needs to be placed in the conspicuous place.
- Suitable respirators shall be provided where gas or dust pose a hazard
- Any person refusing to wear protective clothing when instructed to do so by the responsible person shall be removed from the site.

11. Excavations

It is essential that the contractor shall follow the instructions and precautions in the standard specifications and Project Specifications as well as the provisions of the Construction Regulations to the letter as unsafe excavations can be a major hazard on any construction site. The contractor shall therefore ensure that all excavation

work is carried out under the supervision of a competent person that the inspections are carried out by a professional engineer or technologist on daily bases.

Supervision by competent person will not relieve the contractor from his duties and responsibilities under Regulation 11 of Construction Regulations.

12. Explosive powered tools

The contractor shall ensure that, wherever explosive-powered tools are required to be used, all safety provisions of Regulation 19 are complied with.

It is especially important that warning notices are displayed and that the issue and return of cartridges and spent cartridges be recorded in a register to be kept on site.

13. Cranes

Wherever the use of tower cranes becomes necessary, the provisions of Regulation 20 shall be complied with.

14. Construction Vehicles and mobile plant

The contractor shall ensure that all construction vehicles and plant are in good working condition and safe for use, and that they are used in accordance with their design and intended use. The vehicles and plant shall only be operated by workers, operators who have received appropriate training, all in accordance with all the requirements of regulation 21.

All vehicles and plant must be inspected on daily basis, prior to use, by a competent person and the findings must be recorded in a register to be kept on site.

15. Electrical installation and machinery on construction sites

The contractor shall comply with the electrical installation Regulations (Government Notice R2920 of 23 October 1992) and the electrical Machinery Regulations (Government Notice R1953 of 12 August 1993). Before commencement of construction, the Contractor shall take adequate steps to ascertain the presence of, and guard against dangers and hazards due to electrical cables and apparatus under, over on site. Temporary electrical connection arrangements will be made with respectetive project manager from Centlec site.

All temporary electrical installations on the site shall under the control of a competent person, without relieving the Contractor of his responsibility for the health and safety of all workers and persons on site in terms of Regulation 22.

16. Use of temporary storage of flammable liquids on construction sites.

The contractor shall comply with the provisions of the General Safety Regulations (Government Notice R1031 of May 1986) and all the provisions of Regulation 23 of Construction Regulations to ensure a safe and hazard-free environment to all workers and persons on site.

17. Water environments

Where construction work is done over or in close proximity to water, the provisions of Regulation 24 shall apply. Emergency procedure for hazardous spills in water will be followed as stated in the emergency preparedness procedures.

18. Stacking and storage on construction sites

The provisions of the stacking of articles contained in the General Safety Regulations (Government notice R1031 of 30 May 1986) as well as all the provisions of Regulation 26 of the Construction Regulations shall apply.

19. Fire precautions on construction sites

The provisions of the environmental Regulations for Workplaces (Government Notice R2281 of 16 October 1987) shall apply

In addition the necessary precautions shall be taken to prevent the incidence of fires, to provide adequate and sufficient fire protection equipment, sirens, escape routes etc. all in accordance with Regulation 27 of the Construction Regulations.

No open fire will be allowed on site, unless a proper arrangement with site manager and authority has been made.

20. Construction welfare facilities

The contractor shall comply with the construction site provisions as in the Facilities Regulations (Government Notice R1593 of 12 August 1988).

21. Fall protection plan

A comprehensive fall protection plan is to be established in order to prevent employees from falling from elevated positions

- The contractor shall stop all persons working with erection of steelwork during periods of inclement weather or if the possibility of lightning is present

- Safety harness as fall arrest devices will be worn when working at an elevation, unless working from a safe platform
- Working on elevated positions shall only be carried out under the supervision of a competent person.
- Provision must be made to prevent objects and material from falling from elevated areas and the protection of persons working below.
- All unprotected openings in floors, edges, slabs, hatchways and stairs will be adequately barricaded and suitable visible means will be used to demarcate such barricading
- Where necessary life lines will be installed for the purpose of fall protection

All personnel working at height exceeding 2metres will be declared medically and psychological fit.

22. Permit to work.

The contractor is to ensure that the proper permit is in hand and duly authorised by appointed person before commencing with the work in question, some of the activities that require a permit to work are:

- Hot works
- Excavation work more than 1.5m deep
- Work being done 3m of an overhead power line or above the transformers.
- Use of hazardous substances e.g., asbestos, lead

Contractor shall liaise with project manager from C for the issue of work permit.

23. Housekeeping on Site

The Principal Contractor shall ensure a high level of housekeeping on site. Adequate care must be taken by the contractor to ensure that storage and stacking is correctly and safely carried out. On completion the contractor is responsible for clearing the site of all material, scrap, temporary building to the satisfaction of the client.

24. First Aid Facilities

- Adequate first aid facilities are to be available on site.
- Individuals that are trained and certified competent to administer first aid is to be on site at all times, serving as First Aid Officer.
- The following welfare facilities must be provided for and kept in clean and suitable condition, shower facility, sanitary facility, changing facility, sheltered eating facility and drinking water at strategic locations on site.

25. Health and Safety Induction

- The Principal Contractor shall ensure that all employees undergo a health and safety induction.
- Proof of induction is to be included in the "Safety File".
- The contractor is expected to have a daily safety "tool box" meeting. Subject topics that are applicable to the job at hand e.g. near misses that have happened, accident and up and coming work will be discussed along suggestion and comments.
- These meetings can be used as a training meeting with the central idea of educating employees.

26. Accident/Incident Reporting and Investigations

- All accidents/incidents shall be recorded and investigated and reported to Occupational Health & Safety Section.
- Accidents/incidents are to be reported to Centlec (SOC) LTD Project Manager.
- All reportable incidents in terms of Section 24 of the OHS ACT shall be investigated and recorded by the contractor as required by the Act and also reported to Occupational Health & Safety Unit.
- The contractor shall compile an investigation report and ensure that all the preventative actions recommended are in place.

27. Health and Safety Inspections/Audits

- The Principal Contractor shall ensure that the work area, equipment, machinery, safety equipment and wear, etc are inspected on a regular basis.
- Proof of such inspections are to be maintained in the "Safety File"
- All non-conformances revealed during the inspections are to be noted and rectified as soon as possible. The client, health and safety unit will also conduct formal audits at least once a month and deviations that are revealed must be rectified within the required time frame.
- All portable tools shall be inspected daily by the user as well as weekly recorded inspections and testing to be done.

28. Medical Surveillance

- The Principal Contractor shall ensure that all his employees undergo the appropriate medical surveillance based on the risk and hazards expose to, particular to employees working with asbestos.
- The medical surveillance records is to be included in the "Safety File"

29. Site Security

The Principal Contractor shall ensure that access to site is controlled so that children or unauthorised persons are prevented from wandering onto site.

Suitable signage to be displayed in this respect, it is imperative that the principal contractor ensures the safety of all workers as well as property and material on site.

The Principal Contractor safety officer shall also in collaboration with the sub-contractor personnel develop traffic plan for the site to ensure the safe movement of all construction related mobile plant and employees at large and this plan is to be reviewed at monthly safety meeting to ensure its applicability.
The contractor shall demarcate the route along which their employees may proceed when coming or going off shift and all security requirements shall be highlighted at the induction given by the Principal Contractor.

30. Emergency Preparedness

The Principal Contractor shall develop and implement an emergency plan for site in collaboration with sub-contractors and the client representative. The plan would have to be revised due to the changing environment on construction site. Specific requirements for first aid and medical as well as fire and rescue will be addressed. The contractor is to ensure that the necessary firefighting equipment is in place in respective area.

31. Non-Compliance to Health and Safety Standards

The CENTLEC Representatives reserve the right to stop the operations of the Principal Contractor should it be found that the operations are being undertaken in non-compliance with the laid down health and safety plan based on this specification.

The client has the authority to issue a non-conformance report to any contractor not complying to the SHE requirements on site, with necessary required rectification action required within a specific time frame.

It is noted to the contractors that any expenses incurred due to non-conformances shall be for Contractor’s account in question.

Safety officers and other personnel have the authority to stop work if there is a life-threatening situation or danger of material loss/damage and direct immediate remedial action under the supervision of contractor’s manager is required.

Any “stop work order’ shall be followed up and the site manager shall present a written report including remedial actions to avoid the re-occurrence and disciplinary action for contravening safety regulation and if considered necessary to instruct the site manager to remove certain of his personnel from site.