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PASSENGER RAIL AGENCY
OF SOUTH AFRICA

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**PROJECT SPECIFICATION AND BILL OF QUANTITY
FOR:
SUPPLY AND DELIVERY OF TEST LAB WESTERN CAPE PRASA REGION**

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1. INTRODUCTION

The purpose of this project is to provide a service to supply and deliver test lab equipment for Western Cape Region.

2. DESCRIPTION OF WORKS/SCOPE OF WORKS

The scope of work covers supply and deliver of the following equipment with their specifications:



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2.1 INSULATION RESISTANCE TEST(TIN8D 15kV) OR EQUIVALENT

2.1.1 Specification

- Resistance range:
 - 10 k to 15 TΩ @ 15 kV
 - Insulation test voltage up to 15 kV
 - Test insulation resistance up to 30 TΩ (30000 GΩ)
 - Short circuit current up to 5 mA
 - Auto hold function to freeze the reading
 - Overload protection
 - 30 insulation test voltages
 - Adjustment for testing time (duration) : 1~30 minutes
 - Auto off
 - Software included
 - USB to RS-232 data transmission.
 - 200 Measurement results can be saved and recalled on the display



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2.2 HIGH POWERD SURGE WAVE GENERATOR “WITH IT'S ACCESSORIES”(SWG 1750) OR EQUIVALENT

2.2.1 Specification

- AC Supply Voltage: 90-264 V rms
- Out put voltages in steps: 0, 8kV, 16kV, 32kV
- Voltage reflection: Analog
- Current(leakage) reflection: Analog
- Weight: 140kg



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2.3 digiPHONE+

- **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**



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- **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
- **Filter stages OFF:**
100 ... 1500 Hz
- **Low pass:**
100 ... 400 Hz
- **Band pass:**
150 ... 600 Hz
- **High pass:**
200 ... 1500 Hz
- **Protection rating:**
IP 65



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2.5 Multimeter

- Voltage measurements Both AC and DC:
 - up to 750 V and 1000 V respectively are possible with the AVO410, the AC reading being a true RMS value.
- Current measurements:
 - up to 10 A, a separate fused terminal is provided to protect both user and instrument from excess current.
- Continuity / diode testing
 - The continuity function features a buzzer and provides the user both optical and audio indication of identifying and confirming continuity between two points. This function also allows forward and reverse bias testing of diode and semiconductor junctions.
- Resistance, capacitance and frequency
 - Resistance can measured directly on the ohms range from 0 to 60 MΩ with capacitance measurements from 0 to 6.000 Mf.
 - In addition, frequency measurements from 0 to 60 MHz are possible.

2.6 RCL Multimeter

- **Technical specification**
 - 3½ Digit LCD Display
 - 2000 Counts



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- Large LCD Display
- Full Protection function, capacitor with the function of Self discharge
- Auto Power OFF

- Basic Functions :

- Resistance
- Capacitance
- Inductance

- Range :

- 200pF / 2nF / 20nF / 200nF / 2μF /
- 20μF / 200μF / 2000μF
- 200μH / 2mH / 20mH / 200mH /
- 20Ω/ 200Ω/ 2kΩ/ 20kΩ/ 200kΩ/ 20MΩ

2.7 Clamp Multimeter

- Display: 3 3/4 digit(4000 counts), 9999 counts(Frequency Mode), 42 segment Analog bar graph and function/units sign annunciators.

DC Voltage Ranges: 400mV,4V,40V,400V,1000V, $\pm(0.5\%+1\text{dgt})$

AC Voltage Ranges: 400mV,4V,40V,400V,750V, $\pm(1.5\%+4\text{dgts})$

AC Current Ranges: 200A,1500A, $\pm(1.5\sim5\%+5\text{dgts})$

DC Current Ranges: 200A,1000A, $\pm(1.5\sim5\%+5\text{dgts})$

Resistance Ranges: 400Ω,4kΩ,40kΩ,400kΩ,4000kΩ,40MΩ, $\pm(1.0\%+4\text{dgts})$

Continuity Test: Audible indication

Polarity: Automatic (-) negative polarity indication.

Overrange indication: MSD (Most Significant Digit) blinks.

Lower Batery indication: the ""battery sign"" is displayed when the battery voltage drops below accurate operating level.

Measurement rate: 2/sec. nominal 1/sec. Capacitanc and Frequency mode. 20/sec.

Analog display.

Operating Environment: 0 °C to 50 °C at < 70% RH

Storage Environment: -20 °C to 60 °C at 80% RH

Temperature Coefficient: 0.1 x (specified accuracy)/ °C (< 18 °C or > 28 °C)

Auto Power Off: 30 minutes after rotary switch or mode changes.

Altitude 6561.7 Feet (2000M)

Power : One standard 9-Volt battery, NEDA 1604, IEC 6f22, jis 006P



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Battery Life: 100 Hours typical with alkaline battery.

Jaw Opening Capacity: 57 mm conductor , 70 x 18 mm bus bar.

Weight: Approx. 18.9 OZ/ 540 g grms (including battery).

Dimensions: 10.9""x4.0""x1.9"" (277x102x49mm)

Accessories: Test leads; soft carrying case, battery, and owners manual

2.8 DC-AC Hipot-tester (HVA60) or Equivalent

- Power Supply/Input Voltage:**

110 to 240V AC ±10% (50/60Hz)

Input Power Requirements:

1.5kVA

Rated Max Output Voltage:

Sinusoidal RMS/Peak

44kV / 62kV

Squarewave

60kV

DC

±60kV

Rate Max Output Current:

Sinusoidal RMS

26mA

DC/Squarewave

40mA

Output Frequency (default 0.1Hz):

0.01Hz to 0.1Hz adjustable small increment of 0.01Hz (10 frequencies)

Frequency Optimization:

Yes

Maximum Output Load Capability @ MAXIMUM voltage and frequency:

1 µF

*10,000ft

*3km

Maximum Output Load Capability @ REDUCED voltage and/or frequency:



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10 μ F

*50,000ft

*15km

Metering:

Voltage

0.1kV Resolution $\pm 1\%$ Accuracy

Current

1 μ A Resolution $\pm 1\%$ Accuracy

Capacitance

0.1 nF to 20 μ F Range

Resistance

0.1M Ω to 20G Ω Range

Timing

Included and integrated

Fast Arc/Flashover

Detection included and integrated

Waveform

Real time oscilloscope display of actual output voltage waveform

Output Mode (all load independent & symmetrical):

VLF AC Sinewave

VLF AC Squarewave

DC (both Positive and Negative Polarity)

Fault Condition Mode / Fault Trip Mode

Vacuum Bottle Test Mode (DC) - optional

Cable Jacket / Sheath Test Mode

Output Duty:

Continuous

Computer Interface:

RS232 Standard, USB Flash Memory Download Module (optional)

HVA Control Center Software included with every HVA instrument

Memory / Test Record Storage:



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Built in Memory
50 Test Records
USB Flash Drive
Unlimited (see options)

No. of programmable Automatic Test Sequences:

40

Standard HV Test Lead Cable Included:

15ft / 4.5m

Weight:

126 lbs / 57 kg

Dimensions:

Imperial (inches)

18 x 13.5 x 20.5"

Metric (mm)

450 x 340 x 520 mm

Environmental:

Storage

-13°F to 158°F / -25°C to 70°C

Operating

23°F to 113°F / -5°C to +45°C

Humidity

85% RH non-condensing



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2.9 Millivolt injector

Key features

- Compact mA calibrator for measuring 0-20 mA or 4-20 mA signals
- High accuracy—0.01% and 1 μ A resolution
- Measures voltage output process signals from PLCs and transmitters
- Sources or simulates 4-20 mA loop current
- Sources voltage to 100 mV or 10 V With all required accessories

2.10 4kV DC voltage injector

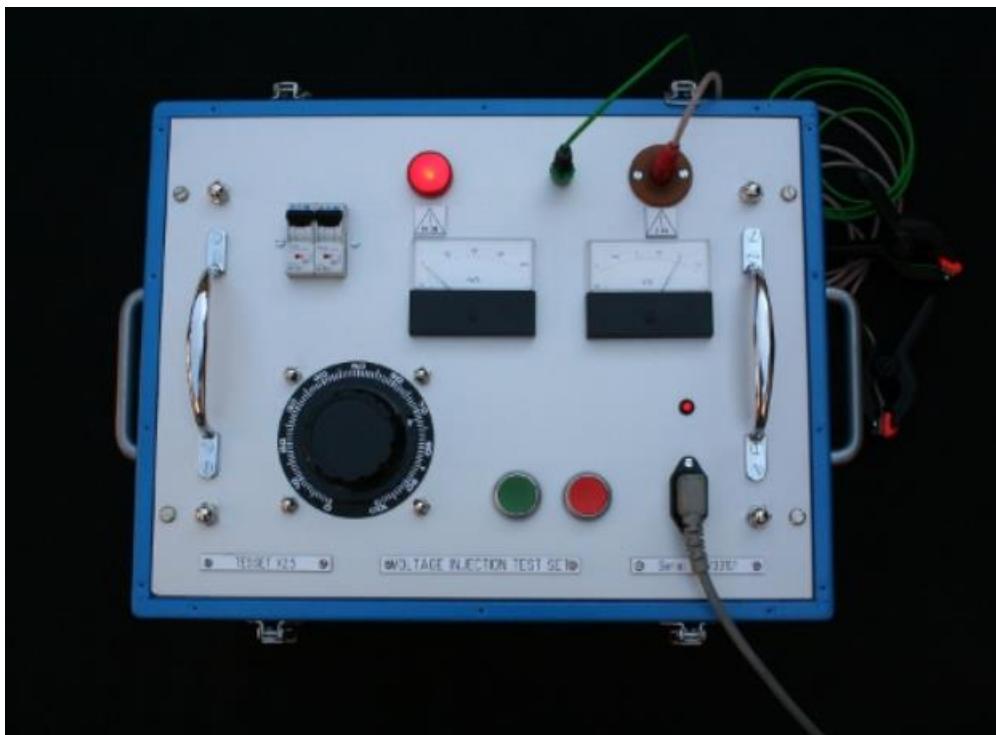
- DC output power: 0 – 4kV DC
- Measurement of voltage 0-4kV
- Class: 1,5
- Measurement of current: 1mA - 5mA
- Automatic trip on fault circuit and over loads



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- Class: 1,5
- Automatic discharge circuit after use
- Buzz button
- Weight: max of 15 kg
- Power Supply 100 – 240 VAC 50/60HZ
- Operating Temperature -10°C/ +50°C



2.11 200A DC Current injector

- Voltage regulator (Variac), load transformer and rectifier must be incorporated on one test unit or two separate units.

Input Power Supply	AC: 220V· 25A, 50Hz.
Output Current	AC: 1000A·5V or 500A·10V.



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Output Current "DC"	200 A DC current
LCD Screen Digital Display	Simultaneous display of primary current and secondary current as well as the turn ratio;
The Range of Primary Current	0~1100A, Resolution: 0.1A;
The Range of Secondary Current	0~6A; Resolution: 0.001A.
Stopwatch	0.0001~999.99S precision ± 5 significant figures.
Precision	TRUE RMS $\pm 0.5\%$.
Duplicate Protection (electronic overload protection and software protection).	
Usage Environment	Temperature -10~40°C,
Relative humidity	<80%.
Volume	430×260×260mm ³ .
Weight	< 30kg.
Accessories	2x High current test leads, 1 earth lead, 1x power supply lead, double core sheathed wire, small clip: 2x black & 3x red

2.12 Three phase turn ratio test





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Rating	Variable Ratio - 0.9~10000 Angle - 0-360°
Angle measurement	0-360°
Accuracy	±0.1% (below500) 0.2%(501-2000) 0.5% (2001-10000)
Output voltage	Automatically adjusted according to load
Resolution	Minimum is 0.0001, Angle - 0.01°
Working power supply	AC 220V±10% 50Hz
Applied temperature	-10°C~40°C
Relative humidity	≤85%, non-condensing
Dimension tester	360*290*170(mm)
Wire box	360*290*170(mm)
Weight	Tester 5.9KG Wire box: 5.65KG
Accessories	1x black test line, 1x red test line, 1x power line, 1x earth lead, Print paper, and 2x fuses

3. DURATION

4. GUARANTEE

- 4.1. Prasa reserves the right to visually inspect the material during delivery for any defects or damages.
- 4.2. The material shall be subjected to a guarantee period of one year. The guarantee period shall commence the day it is formally handed over to and accepted by Metrorail.
- 4.3. Any defects that may become apparent during the guarantees period shall be rectified to the satisfaction of the client at a free cost.
- 4.4. Should the contractor fail to comply with the above, Prasa is entitled to take effective replacement of the defective material. The contractor must reimburse Prasa Metrorail the total cost for replacement of materials.



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5. PENALTY

Should the Contractor fail to complete delivery on/before the stipulated completion dates, a penalty fee of R5000 per week will be charged.

6. DELIVERY

All the material supplied must be delivered to Salt River Depot in Cape Town Western Cape PRASA Region

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7. BILL OF QUANTITIES

ITEM NO.	DESCRIPTION	QTY	RATE PER METER	UNIT PRICE (INCL. VAT)	TOTAL PRICE (INCL. VAT)
1	Supply and deliver THREE PHASE GENERATOR	1	EACH		
2	Supply and Deliver HIGH POWERD SURGE WAVE GENERATOR "WITH IT'S ACCESSORIES"	1	EACH		
3	Supply and deliver digiPHONE+	1	EACH		
4	Supply and deliver Multimeter	1	EACH		
5	Supply and deliver RCL Multimeter	1	EACH		
6	Supply and deliver Clamp Multimeter	1	EACH		
7	Supply and deliver DC-AC Hipot-tester	1	EACH		
8	Supply and deliver Millivolt injector	1	EACH		
9	Supply and deliver 4kV DC voltage injector	1	EACH		

Directors Acting Chairperson N. Nokwe-Macamo,
Adv. S. Sethene, Adv. M. Motlogelwa,
L. Joel, N. Makaapea, M. Mukhuba, DK. Mohuba,
S. Luthuli, TN. Mpye

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Company Secretary
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10	Supply and deliver 200A DC Current injector	1	EACH		
11	Supply and deliver Three phase turn ration test	1	EACH		
Total					
Vat					
Total Vat Inclusive					