



ABN 43 064 478 842

> 231 osborne avenue clayton south, vic 3169  
PO box 1548, clayton south, vic 3169  
t 03 9265 7400 f 03 9558 0875  
freecall 1800 680 680  
[www.tmgtestequipment.com.au](http://www.tmgtestequipment.com.au)

## Test & Measurement

- > sales
- > rentals
- > calibration
- > repair
- > disposal

## Complimentary Reference Material

This PDF has been made available as a complimentary service for you to assist in evaluating this model for your testing requirements.

TMG offers a wide range of test equipment solutions, from renting short to long term, buying refurbished and purchasing new. Financing options, such as Financial Rental, and Leasing are also available on application.

TMG will assist if you are unsure whether this model will suit your requirements.

Call TMG if you need to organise repair and/or calibrate your unit.

If you click on the "Click-to-Call" logo below, you can call us for FREE!

TMG Corporate Website

TMG Products Website



### Disclaimer:

All trademarks appearing within this PDF are trademarks of their respective owners.

## General Specifications:

<b>Input</b>	:	220 ± 5% Volts AC, 50 Hz, single phase.
<b>Output-Voltage AC</b>	:	30kV / 40kV / 50kV / 60kV
<b>Output frequency</b>	:	0.1Hz, 0.05Hz, 0.02Hz.
<b>Stability of frequency</b>	:	Fluctuation < 0.5%
<b>Measurement accuracy</b>	:	±3%.
<b>Positive and negative voltage peak errors</b>	:	≤3%.
<b>Voltage waveform distortion</b>	:	≤5%
<b>Test Settings</b>	:	1) Frequency : 0.1Hz, 0.05Hz, 0.02Hz 2) Timing: 0-99 minutes. 3) Test Voltage: Zero to rated kV. 4) Trip Current: Zero to rated mA.
<b>Protection</b>	:	1) Self-check. if condition is abnormal, tester shuts down & displays 'Load unconnected' 2) Mains fuse. 3) Over voltage protection. 4) Over current protection. 5) Protective HV resistor connected inside.
<b>Construction</b>	:	In two units: Controller and Booster..
<b>Ambient conditions of use</b>	:	Temperature Indoor and outdoor : -5 to + 45°C. Humidity: ≤85%
<b>Accessories</b>	:	1) One power supply cord. 2) One interconnecting Cable. 3) One low and high voltage cable. 4) One discharge rod. 5) One operating manual.

Model	Output	Load carrying capacity	Control Unit		Booster	
			Dim.(cm)	Wt(kg)	Dim.(cm)	Wt(kg)
VL-32	30kV/20mA	0.1Hz ≤ 1.1uF 0.05Hz ≤ 2.2uF 0.02Hz ≤ 5.5uF	28x37x22	5	33x18x34	25
VL-44	40kv/40mA	0.1Hz ≤ 1.1uF 0.05Hz ≤ 2.2uF 0.02Hz ≤ 5 uF	28x37x22	6	37x24x39	40
VL-53	50kV/30mA	0.1Hz ≤ 1.1uF 0.05Hz ≤ 2.2uF 0.02Hz ≤ 5.5uF	28x37x22	6	37x24x39	40

Specifications subject to change due to constant up gradation

## VLF AC HIPOT Tester

- Programmable micro-controller
- Advanced digital frequency technology
- Built-in printer
- Portable
- AC HIPOT testing of cables and electrical apparatus is now easier than before
- UDEY VLF testers are suitable for testing cables, transformers, switchgear, rotating machinery, & other electrical apparatus.



**According to the new IEEE 400.2 and international standards where the application of high voltage DC is no longer recommended**



## THE UDEY VLF ADVANTAGES:

- ! Easiest to use **Fully automatic programmable micro computer controller**
- ! **Built-in printer**
- ! True sine wave output
- ! Real-time display of actual output waveform
- ! Ergonomic, menu guided, large back lit LCD
- ! Storage of test results for later retrieval and print.
- ! Over voltage and current protected
- ! Variable frequency 0.1Hz, 0.05Hz, 0.02 Hz
- ! Data of current, voltage and waveform directly sampled at HV side.
- ! AC testing does not degrade good cable insulation
- ! Harmful space charges are not injected into the cable insulation
- ! No traveling waves are generated during testing
- ! Rugged and reliable design less prone to failure from transients

## Safety Features

- ! Short circuit protected.
- ! Status display of important functions.
- ! Zero start interlock.

## Applications Include

- ! Cables: XLPE, PE, EPR, PILC etc
- ! Capacitors
- ! Switchgear
- ! Transformers
- ! Rotating Machinery (IEEE 433)
- ! Insulators
- ! Bushings

## VLF Applications

### Cable

Monitoring the integrity of cable insulation has always been the top priority among electric utilities because it ensures continuity of supply. During routine maintenance, by detecting early insulation deterioration, remedial measures can be taken to repair economically and at convenience.

Cable runs can have high capacitance. An AC hipot test using VLF is the best reliable means to check cable integrity. Either the cable withstands the test voltage or fails. It is a PASS/ FAIL test. If there is failure, find the fault, repair it, and there you have a good cable.

DC hipot testing causes damage to insulation with some potential adverse charging effects. DC hipot testing causes a treeing effect, which is void in

insulation. Charges that built up within these voids using the DC test voltage method would want to dissipate to ground, thus causing a breakdown in cable's insulation, which would ultimately cause a failure. The UDEY VLF AC hipots enable users to AC field test cable. The main advantage of the VLF AC hipot tester over the previously used DC hipot testers, is that potential problems in cables can be discovered earlier.

### 1. Cable Installation And/Or Repair

### 2. Routine System Testing

Routine tests must be conducted by VLF on installed cable: feeders, substation cables, etc. If it is found that a cable can't hold 2 to 3 times normal voltage, at your convenience, VLF to breakdown the defect to locate the fault. Carry out the repairs and you have a good cable. It's simple, fast, economical, and conclusive.

### 3. Cable Fault Burning

To burn down cable faults using DC hipots or low current rated thumpers takes a long time. Burn down cable faults in short time with a VLF hipot. The VLF hipot's output is raised to the level of cable breakdown. and the cable arcs at the fault point, when all the stored energy in the cable along with the VLF current is discharged into the fault. The discharge energy can be thousands of joules, depending upon the charge built up. This energy rapidly reduces the cable fault impedance to near zero. The VLF reverses polarity every half cycle and this helps the process. This alternating negative and positive discharge causes rapid carbonization of the insulation.

### 4. Rotating machinery

Large motors and generators require several tests with AC voltage. The user has three choices: a) Line frequency units b) Series Resonant units or c) VLF. Line frequency units are very expensive, huge in size and need heavy input power. Compared to Line frequency units, Series resonant units are far smaller, yet are quite heavy, require a high input power and are not portable. Alternatively, use a UDEY VLF hipot. This needs 230V AC source, is portable weighing 35 kg approx. and meets the requirement of IEEE.

### 5. Others

Testing of transformers, bushings, full reel cable and other high capacitance loads.

## Introduction to VLF

### Background

It is well known that DC testing of aged extruded cable such as XLPE and EPR is potentially damaging to the cable insulation causing premature failure of the cable under service conditions.

In addition, DC "proof" or hipot testing has been found to be ineffective in detecting even serious defects in cables. Since this is the main objective of any hipot test, and due to the negative side effects of DC, VLF wave form testing is now recommended by almost all cable testing standards/guides such as IEEE, CENELEC, VDE, SABS etc.

Acceptance or maintenance hipot/proof testing using VLF high voltage sinusoidal AC allows the operator to efficiently detect serious cable insulation defects, before they result in an in-service failure, without affecting those healthy sections of the cable that still have remaining service life.

### What is VLF?

VLF means 'Very Low Frequency' and 0.1Hz to 0.02Hz is considered to be very low frequency. UDEY VLF AC Hipot's output is a true sinusoidal AC voltage at 0.1 Hz, 0.05Hz or 0.02Hz rather than at power line frequency of 50 or 60 Hz. The output test voltage is AC voltage but only at a lower frequency.

### Where are VLF hipots used?

VLF hipots are used to test high capacitance loads with AC voltage for proof testing. For site testing applications, use of huge and heavy line frequency/series resonant AC systems are not practical. Typical loads are cables, generators & motors, insulators, bushings, transformers, and any other high capacitance load requiring AC proof testing.

A large transformer or generator or long cable has a high capacitance. If these were to be proof tested at 50/60 Hz, it would take a very high power, huge, heavy and expensive testers and this is not practical for field use. UDEY VLF testers are AC (sine wave) hipots, only at lower frequency. It is now possible for utilities etc to test at site cable etc with AC voltage using a **small, lightweight, economical unit.**

- 500 times less power required for cable testing at 0.1 Hz than at 50 Hz, 2500 times less when 0.02 Hz is used.
- 600 times less power required for cable testing at 0.1 Hz than at 60 Hz, 3000 times less when 0.02 Hz is used.

It is undesirable to allow cable failures, hence a PASS/FAIL AC test is the best test. By their very nature, cables will fail in installation or in service. VLF them for timely repairs and to minimize costs. A cable which is unable to hold 2 to 3 times its working voltage is not going to last long. VLF it and repair it, if it is faulty. A cable which is designed to carry AC voltage and is factory tested with AC voltage therefore it must be field tested with AC voltage.

### How to use UDEY VLF?

UDEY VLF hipot is simple micro controller based tester. The load is connected to the HV output and ground return of the VLF unit. Set the test voltage, maximum current, time and start. The test voltage is applied for the set duration. A backlit LCD displays the status and wave form. Hipot automatically cuts off the test voltage once the test is over. The load under test either holds the voltage and passes or fails. It is a go/no go test. **Print the results on the in-built printer.**

### UDEY Design

The UDEY VLF range is the most advance VLF available. It combines modern programmable advanced variable digital frequency technology and micro computer control to perform full automatic voltage boost, step down, measurement and protection along with manual intervention in the process of automatic voltage boost. It is light in weight and a portable 2 unit system. The bid LCD screen ensures clear and bright visual display. The printer prints test reports.

The applied test voltage, frequency, current, wave form and time are displayed and recorded.

The load independent, symmetrical output wave form avoids the potentially destructive space charge effects caused by DC polarization that occurs in aged extruded cables causing them to fail prematurely when exposed to conventional high voltage DC.

Should a breakdown occur during testing, the actual voltage at which it occurred is displayed and recorded. Test results are stored in the Hipot's onboard memory allowing easy retrieval and print.

### LCD Display

