4-in-1 Universal High Voltage Test Instruments

HVA SERIES

- VLF
- DC
- Jacket / Sheath
- Fault Conditioning

Find Weak Cables Without Making Cables Weak

HV Diagnostics INC.

BACKGROUND/APPLICATION

The HVA series of universal high voltage test instruments offer unrivalled **power, performance and reliability** for the majority of your AC VLF and DC high voltage testing applications.

While many testing standards around the world have evolved to recommend the use of AC VLF (Very Low Frequency) rather than DC for many high voltage testing applications, particularly those involving MV cables and rotating machines. The HVA Series of instruments include both high voltage AC and DC outputs to provide the operator with a single, complete testing package.

On Medium Voltage Extruded (XLPE, PE, EPR) cables, DC is no longer recommended by most international standards. DC has been found to be both destructive, causing premature failure of aged MV cables, and / or ineffective in detecting many types of serious pending insulation defects in new and old cable installations. Conversely, VLF detects many of these pending insulation defects that pose an imminent danger to the operational reliability without causing premature damage to the insulation. Insulation defects can be "weeded out" in a controlled testing environment without having them fail during service. This improves operational reliability and limits possible collateral damage.

VLF testing is the recommended method of testing MV extruded cables by most international testing standards and all HVA instruments comply in full with international standards, and guides like IEEE, CENELEC, VDE, IEC etc.

DESIGN/FEATURES

SINGLE PIECE DESIGN

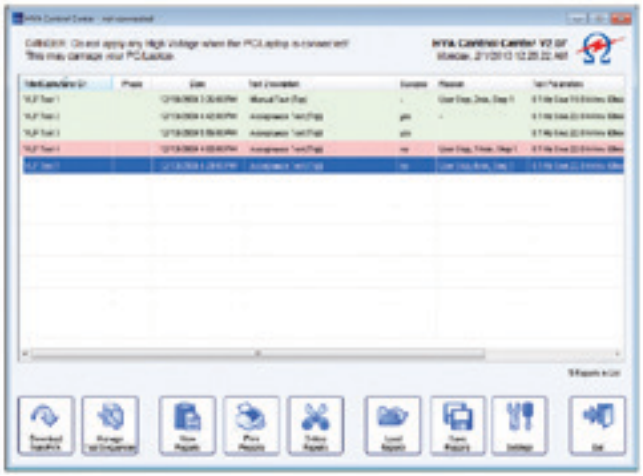
This eliminates the necessity and complexity of grounding and interconnecting multiple pieces of test equipment.

POWER OUTPUT AND PORTABILITY

The HVA Series have the **highest power to weight ratio** of any similar instruments on the market, making them highly portable, rugged and versatile in the field.

EASY TO USE OPERATOR INTERFACE

All operator displays are menu driven in a logical, ergonomic and easy to use format that intuitively takes the operator through the testing sequence. The backlit LCD display is visible in both nighttime and bright daytime environments. The HVAs use the "set and forget" method of first setting and then automatically outputting the desired test voltage — there is no variac to slowly nudge up or down to try to achieve the correct output voltage.



MAINTENANCE FREE DESIGN

There is no oil used in our instruments — which means there is no warm up time, filtering or maintenance required. There is also no need to keep the instruments upright, particularly during transportation. The HVAs have a solidstate, air cooled design which offer unmatched reliability and maintainability.

AC VLF AND DC VERSATILITY

The complete series of HVA instruments include both AC VLF and DC high voltage outputs. There is no need to carry both a DC hipot and an AC VLF hipot to the field.

INSULATION RESISTANCE AND CAPACITANCE MEASUREMENT

The real Insulation Resistance (mega-ohms) and Capacitance is measured during every test cycle during both AC & DC operation. No additional test hookups or procedures are required to measure these diagnostic insulation parameters.

LOAD INDEPENDENT, SYMMETRICAL OUTPUT WAVEFORM

A number of the VLF units on the market have voltage waveform abnormalities like spikes, surges, non-sinusoidal, non-symmetrical positive and negative half waveforms with peak amplitudes and frequency that vary from one load profile to another. The HVAs utilize high speed electronics that efficiently and precisely regulates the output voltage to produce a voltage waveform that is completely symmetrical and load independent.

SOFTWARE / FIRMWARE

All HVA units are shipped with a free copy of the HVA Control Center. This software allows a standard PC to communicate with the HVA to configure and manage automatic test sequences and download test data from the instruments. All updates to the software are supplied free of charge.

POWER SUPPLY IMMUNITY AND INDEPENDENCE

All HVA's have universal power supply inputs offering a wide, flexible input range from 100V to 240AC, 50 or 60Hz. No special ordering or setting changes are required to use the instruments off different power supplies. Even poor quality power supplies, like poorly regulated power generators or cheap inverters with quasi-sinewave voltage outputs — as long as sufficient power is available, the output test voltage from the HVA is largely independent of the power supply being used. Whereas, most poor power supplies cause less advanced test equipment to malfunction or produce unstable and unreliable test results, the HVAs' output voltage and current remain constant and uninterrupted.

REAL TIME OSCILLOSCOPE DISPLAY

The actual output voltage waveform is displayed on the large LCD screen providing a very valuable diagnostic interface for the operator. Should an insulation breakdown occur during testing, the HVAs not only show the dielectric breakdown on the display, but they also record the instantaneous breakdown voltage and time.

OVERCURRENT / OVERLOADED OPERATION

Most instruments on the market will not differentiate between a large connected load and / or a faulted load — both generally cause the instruments to trip off. The HVAs intelligently analyze the load to determine whether it is faulted or merely too large for the output capability of the instrument; thus avoiding nuisance tripping.

FAULT CONDITIONING / "BURN" MODE AND TRIP MODE

Should a load fail under test, the operator can manually select to immediately "trip out" or further condition the fault. The default "trip" mode uses high speed electronics to quickly turn off the output test voltage if a fault occurs, resulting in almost no damage to the singular failure point.

SYSTEM VOLTAGE BACKFEED PROTECTION

An integrated power frequency/voltage monitoring protection system detects the presence of a potentially dangerous backfeed from the electrical power grid which could arise from a switching malfunction or system flashover. Both audible and visual alarms are produced, alerting the operator to take corrective action, thus avoiding a potentially dangerous situation for both people and equipment.

DISCHARGE LOAD CAPABILITY

The HVAs ensure that loads that they energize can also be safely de-energized / discharged! No load will be energized by the instrument if the discharging of that load exceeds the safe operation rating of the instrument.

TEST DATA MEASUREMENT AND STORAGE

At least 50 test records can be recorded by the test instrument allowing the user to later download the test results to a USB memory stick or a PC. There is no need to have an additional data storage or measurement interface or PC / laptop in the field.

FREQUENCY OPTIMIZATIOIN

Field and laboratory tests results have shown that the effectiveness of a VLF AC test diminishes as you drop frequency away from the nominal frequency of 0.1 Hz. Whereas, some suppliers of VLF instruments only have 1-3 user selectable frequencies to manually choose from — typically 0.1 / 0.05Hz / 0.02Hz. The HVA not only lowers frequency in small increments of 0.01 Hz, it also automatically optimizes the output frequency based on load. There is no need to try and figure out which frequency setting to use for a particular load or to unnecessarily drop frequency, thus minimizing the effectiveness of the test.

ACCURATE DIGITAL RMS METERING

AC Sinewave Voltages and Currents, as with the ratings of most electrical apparatus, almost always use RMS units. The ratings of cables, generators, switchgear etc. are all in RMS. Would anyone purchase or use a non RMS type multimeter nowadays? The HVAs measure the current and voltage by performing a RMS measurement calculation and displaying the RMS result. The RMS values are displayed in high resolution digital format that are easy to read and compare to the rating of the equipment or the test standards being applied. There are no low resolution, low accuracy analog meters that merely display instantaneous values.

CUSTOMIZABLE AUTOMATIC TEST SEQUENCES

The HVAs include user programmable test sequences that allow the operator to easily and automatically perform testing in the field. All units are preconfigured in the factory to include the national standards such as IEEE, etc. This minimizes mistakes and avoids unnecessarily over or under stressing of the electrical apparatus being tested. It also ensures that the standards are correctly applied in the field without the need for the operator to remember or recall the correct testing parameters.

USB DOWNLOAD OPTION

The HVAs have the ability to download the test data to a computer using the widely available, portable and economical USB memory sticks or flash drives. An almost indefinite amount of test reports can simply and easily be downloaded to one of these small memory sticks to then be effortlessly uploaded to a network or PC.

HVA28, HVA34, HVA30-5, HVA60, HVA90 & HVA120

Technical Data

Model		HVA28	HVA34	HVA30-5	HVA60	HVA90	HVA120
Ordering Information		702 001	734 001	705 001	706 001	709 001	712 001
Power Supply/Input Voltage		110 to 240V AC ±10% (50/60Hz)					
Input Power Requirements		400VA	400VA	1.2kVA	1.2kVA	1.2kVA@120V (limited) 3kVA @240V	
Rated Max Output Voltage	Sinusoidal RMS/Peak Squarewave DC	20kV/28kV 28kV ±28kV	24kV/34kV 34kV ±34kV	23kV/33kV 30kV ±30kV	44kV/62kV 60kV ±60kV	64kV/90kV 90kV ±90kV	85kV/120kV 100kV ±100kV
Rate Max Output Current	Sinusoidal RMS DC/Squarewave	20mA 28mA	10mA 14.5mA	60mA 85mA	26mA 40mA	41mA 58mA	60mA 60mA
Output Frequency (default 0.1Hz)	Autoselectable	0.01Hz to 0.1Hz adjustable small increment of 0.01Hz (10 frequencies)					
Frequency Optimization		Yes					
Maximum Output Load Capability @ maximum voltage and frequency		0.5µF *5000ft *1.5km	0.5µF *5000ft *1.5km	3.8µF *38 000ft *11.5km	1µF *10 000ft *3km	1µF *10 000ft *3km	0.5µF *5 000ft *1.5km
Maximum Output Load Capability @ Reduced Frequency and / or voltage		10.0 µF *100 000ft *30km	12 µF *120 000ft *37km	15 µF *150 000ft *45km	5µF *50 000ft *15km	10µF *100 000ft *30km	5µF *50 000ft *15km
Metering	Voltage Current Capacitance Resistance Timing Fast Arc/Flashover Waveform	0.1kV Resolution ±1% Accuracy 1 µA Resolution ±1% Accuracy 0.1 nF to 20 µF Range 0.1MΩ to 20GΩ Range Included and integrated Detection Included and Integrated 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		Continous					
Computer Interface		USB Flash & BT	RS232 Standard, USB Flash Memory Download Module (optional)				
		HVA Contol Center Software included with every HVA instrument					
Memory / Test Record Storage	Built in Memory USB Flash Drive	50 Test Records Unlimited (see options)					
No. of programmable Automatic Test Sequences		40					
Standard HV Test Lead Cable Included		13ft/4m	13ft/4m	15ft/4.5m	15ft/4.5m	50ft/15m	20ft/6m
Weight		31lbs / 14kg	44lbs / 20kg	100 lbs / 45kg	126 lbs/57kg	280 lbs/127kg	400 lbs/181kg
Dimensions	Imperial (inches) Metric (mm)	16.9"x9.4"x13.4" 430x240x340	17"x14"x10" 430x360x250	18"x13.5"x20.5" 450x340x520	18"x13.5"x20.5" 450x340x520	26"x17.5"x24" 650x445x610	31"x17.5"x29" 790x445x740 Excluding Handle
Environmental	Storage Operating Humidity	-13°F to 158°F / -25 °C to 70°C 23°F to 113°F / -5°C to +45°C 85% RH non-condensing					

* Based on typical MV cable. 100pf/ft or 330 pF/m

Note: Due to continuous development, the information detailed in this document may change without notice.

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