



HVNI[®]

HIGH VOLTAGE, INC.
BENCHTOP AC HIPOT TESTERS
ABT SERIES PRODUCT CATALOG

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BENCHTOP POWER FREQUENCY AC HIPOT TEST SETS

The ABT Series from HVI are benchtop power frequency AC hipot test sets designed around the industry leading PFT series of portable AC hipots, for a variety of factory, laboratory, and repair shop testing applications. With a variety of control options, the ABT series are custom built in the USA at our factory in upstate New York. Models range from 10kV to 50kV at 1.5kVA of output power. All are equipped with transit protected and anti-static glass faced meters, a guard circuit, and an adjustable overload as standard equipment.

Applications

The ABT series were designed for testing resistive or light capacitive loads in a shop or factory and are well suited for pass/fail, AC over-voltage withstand test on high voltage apparatus like vacuum bottles, interrupters, switchgear, circuit breakers, reclosers, hotline tools/safety products, short lengths of bus duct, small motors, small transformers, electrical components, and many other apparatus needing an AC test voltage.



Vacuum Bottles/Interrupters



Switchgear and Circuit Breakers



Substation Apparatus



Hotline Tools



Iso Phase Buss



Small Motors/Generators

How to Size an AC Dielectric Test Set

When AC testing, most loads appear capacitive. To apply high voltage AC at power frequency (50/60Hz) to a capacitive load requires higher power and current ratings from the test set when compared to DC. Unlike DC where the capacitance of the load only needs to be overcome once, as you slowly raise the output voltage, AC must overcome the capacitance 2 times per cycle. Once while reaching the peak voltage on the positive side of the sinewave and the second while reaching the peak voltage on the negative side of the sinewave after crossing the zero reference. The output power or kVA requirement may be very different depending on the load of the apparatus under test. The capacitance of the load must be known to calculate the required current at the specified test voltage. Don't undersize the set, select a test set with at least 25% extra power than needed.



Don't Undersize the Set

AC high voltage testing requires higher power and current ratings when compared to DC testing the same test object. There are several parameters that must be considered when selecting an AC hipot or dielectric test set, the most important one being the capacitance of the load. This capacitance dictates the amount of output power, or the relationship of the amount of current drawn by the device under test to the specified test voltage required from the test set. Following are several considerations when specifying a test set.



Voltage Output

Select a test set with 20 – 25% more voltage than your requirement for enough voltage headroom to compensate for any possible future changes in testing standards or the testing application. The output current of the test set is based on the kVA, or Power rating at full voltage. Any increase in the output voltage rating for the same kVA rated test set will proportionately decrease the current rating.

Power/Current Rating

Power rating, or kVA is calculated by multiplying the maximum output voltage by the maximum output current. When AC testing, most loads appear capacitive. To apply high voltage AC at power frequency, 50 or 60 Hz to a capacitive load requires higher power and current ratings from the test set than most portable AC hipots can typically supply. The capacitance of the load must be known in order to calculate the required current at the desired test voltage. Select a test set, with at least 20 - 25%



extra power than believed needed. To determine the current needed from the test set, the following formula should be used: Another way to determine the current needed at the required test voltage is to apply a lower voltage to the load and measure the current. The current draw of the device under test at the actual higher test voltage should be a linear increase. For example, if your test load draws 1mA @ 5 kV it will draw approximately 10 mA @ 50 kV. An AC test set is a constant current device, the maximum output current is the same at any output voltage. For higher current requirements please see our FPA Series, HPA series, and PAR series.

$$A = 2\pi fCV$$

A = Test current required in Amps (A)

f = Test frequency in Hertz (Hz)

C = Load capacitance in Farads (F)

V = Test voltage in volts (V)

Duty Cycle

Most AC dielectric strength testing is short duration testing performed for 60 seconds at a time, however, production testing may require consecutive tests over many hours. Most ABT AC test sets are rated for 50% duty. The full power rating can be delivered for one hour on followed by one hour off. Most ABT AC test sets are rated for continuous duty at approximately 80% of the full power rating.

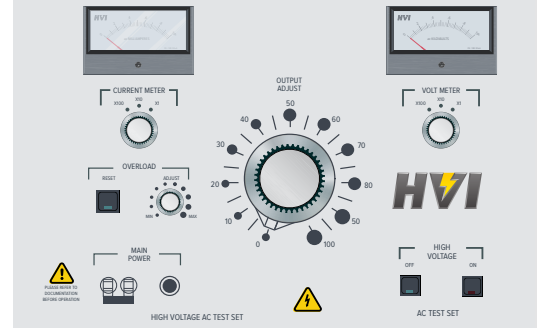
Partial Discharge Requirements

The ABT Series AC test sets are not PD rated.

Controls and Configurations

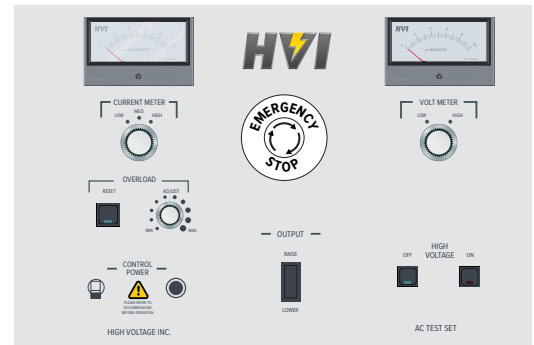
Standard Controls: Simplifies controls with manual output voltage

- Voltage meter: two range
- Current meter: three range
- Main Power breaker/indicating light
- HV On/Off
- Output Adjust control knob
- Variable Overload w/reset, 10-110% of rated output current
- External interlock provisions



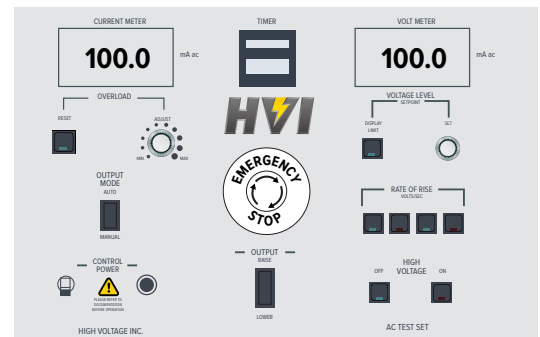
C2 Controls: Simplified Controls with motorized output voltage control

- Voltage meter: two range
- Current meter: three range
- Guard/Ground Circuit
- Control Power breaker/indicating light
- HV On/Off
- Voltage Raise/Lower control
- Fixed voltage rate-of- rise
- Variable Overload w/reset, 10-110% of rated output current
- Emergency Off button
- External interlock provisions



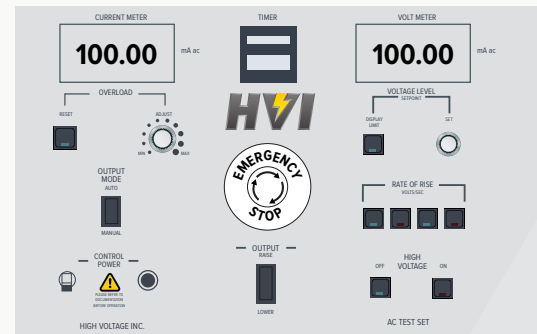
C3 Controls: Automatic Controls with 3.5 Digit Digital Metering

- Voltage meter: digital 3.5 digits
- Current meter: digital 3.5 digits
- Guard/Ground Circuit
- Control Power breaker
- HV On/Off
- Output Mode: Manual/Auto
- Output Voltage: Raise/Lower control Four fixed volts/second rates-of-rise 10 – 100 seconds, consult factory
- Test Dwell timer
- Variable Overload w/reset, 10-110% of rated output current
- Emergency Off button
- External interlock provisions



C4 Controls: Automatic Controls with 4.5 Digit Digital Metering

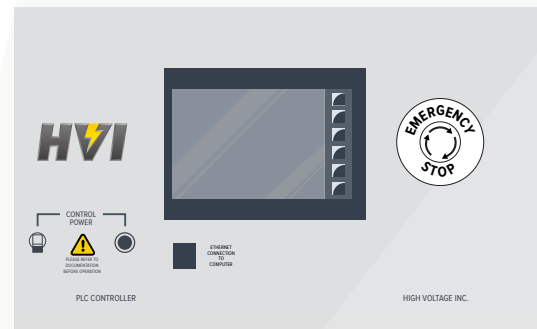
- Voltage meter: digital 4.5 digits
- Current meter: digital 4.5 digits
- Guard/Ground Circuit
- Control Power breaker
- HV On/Off
- Output Mode: Manual/Auto
- Output Voltage: Raise/Lower control Four fixed volts/second rates-of-rise 10 – 100 seconds, consult factory
- Test Dwell timer
- Variable Overload w/reset, 10-110% of rated output current
- Emergency Off button
- External interlock provisions



C5 Controls - PLC programmed and controlled – any kVA

The C5 PLC controller provides an on-board PLC for complete operational and programming control and includes a PC interface to download tests results for report generation. The PLC can fully automate repetitive testing in automatic mode or perform simple hipot tests in manual mode. Test profiles for automatic mode can be preset at the factory or can be entered via the touch screen control. Operation is easily modified using Ladder Logic Programming. The C5 controller allows the user to fully program the operation of the set from the PLC and allows complete downloading of test results for report generation using your reporting software. Guard/Ground Circuit not available with C5 controller.

- 320 x 240 color touch screen display for programming and operation
- Graphical display of output voltage and current during test
- Output voltage and current final test results displayed
- PC Interface for data download via RS-232
- Save and recall test profiles easily
- External interlock provisions User Selectable/Settable Parameters:
- Automatic or Manual Mode
- Voltage set point
- Over Current set point
- Test Dwell Timer
- Voltage Rate of Rise (10-100 Seconds)



Optional Upgrades

PLC Interface

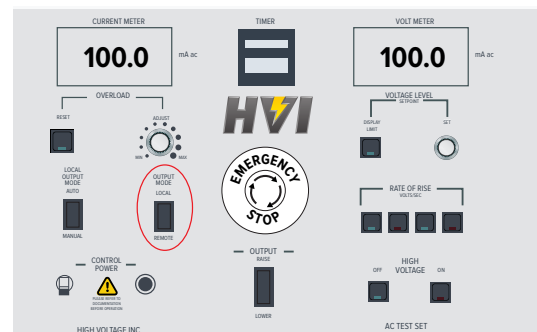
A C3 or C4 controller that also offers input and output control provisions to interface with a remote programmable logic controller (PLC) or some other customer supplied controller. It can be operated in the Local mode using the front panel controls or in the Remote mode via customer supplied external controls. Includes 0-10Vdc Input Control and Output Feedback signals, permitting the remote control over the dielectric test set for most functions with output signals to communicate to an external customer supplied PLC controller. When in the REMOTE mode, all front panel controls are disengaged except for the Emergency Off, Voltmeter and Current meter. Available only on the C3 and C4 control packages.

Input Remote Control Signals

- Contact N/O: Close HV ON - Open HV OFF
- Rate of Rise: 0-10V = 10s – 100s to full output
- Contact N/O: RAISE – Close to operate
- Contact N/O: LOWER – Close to operate
- Contact N/C: Overload Reset – Open to operate
- Overload Set Point: 0-10Vdc = 10 - 110% current

Output Feedback Signals

- Remote Enabled: N/O
- Main Power ON: N/O
- High Voltage ON: N/O
- Overload FAULT: N/O
- Voltage: 0-10Vdc = 0 - 100% output voltage
- Current: 0-10Vdc = 0 - 100% output current
- Voltage return to 0 (automatic after overload): N/O



BURN Circuit

An optional BURN reactor provides the ability to enable current limiting of the output for burning a fault within the device under test in order to locate it. The OVERLOAD function is disabled when BURN is ON. Available on all control packages.



Flashing Warning Light

Flashing Red Warning Lamp that illuminates when the high voltage circuit has been energized. Available on all control packages.



Safety Light Stack

Status light option, illuminates green when the high voltage circuit is not energized and illuminates red when the high voltage circuit is energized. Available on all control packages.



Safety Key Interlock Switch

Front panel mounted key operated interlock switch. Available on all control packages.



Casters

2 inch or 6 inch casters mounted under the Control and/or High Voltage Section. Available on all control packages.



Digital Meters

3.5 digit digital meter upgrade. Available as an upgrade to C1 (standard controller package) and C2 style control packages. Adds "D" suffix to model number.

High Voltage Section Configurations



Cable Output

Terminated with a shielded output cable.

Matrix of Models/Specs



Shown with digital meter upgrade



Shown with C3 Controller

ABT-103CM

ABT-303CM

Input:	120 V, 60Hz, 15 A (ABT-103CM) 230 V, 50/60Hz, 8 A (ABT-103CMF)	120 V, 60 Hz, 15 A (ABT-303CM) 230 V, 50/60 Hz, 8 A (PABT-303CMF)
Output:	0-10 kV AC, 1.5 kVA Up to 150 mA current Output current is reduced at lower voltages	0-30 kV AC, 1.5 kVA Up to 50 mA current Output current is reduced at lower voltages
Duty:	1.5 kVA: continuous	1.5 kVA: continuous
Voltmeter:	3.5", scaled 0-5/10 kV AC, $\pm 2\%$ F.S.	3.5", scaled 0-12/00 kV AC, $\pm 2\%$ F.S.
Current Meter:	3.5", scaled 0-5/10 kV AC, $\pm 2\%$ F.S. with range multipliers of x1, x10, x100, guard/grounded load return	3.5", scaled 0-5/10 kV AC, $\pm 2\%$ F.S. with range multipliers of x1, x10, x100, guard/grounded load return
Distortion:	Less than 5%	Less than 5%
Size & Weight:	21 x 15.5 x 14.5 in., 70 lb 533 x 394 x 368mm, 32kg	21 x 15.5 x 14.5 in., 104 lb 533 x 394 x 368mm, 47kg
Output Termination:	20 ft. (6m) shielded EPR output cable with alligator clamp	20 ft. (6 m) shielded output cable with alligator clamp
Scope of Supply:	20ft black ground lead, operation manual, calibration certificate	20ft black ground lead, operation manual, calibration certificate



Shown with C5 Controller

ABT-503CM

Input: 120 V, 60 Hz, 15 A (ABT-503CM)
230 V, 50/60 Hz, 8 A (ABT-503CM)

Output: 0-10 kV AC, 1.5 kVA
Up to 30 mA current
Output current is reduced at lower voltages

Duty: 1.5 kVA: continuous

Voltmeter: 3.5", scaled 0-25/50 kV AC, $\pm 2\%$ F.S

Current Meter: 3.5", scaled 0-1.0 mA, $\pm 2\%$ F.S.
with range multipliers of x1, x10, x100,
guard/grounded load return

Distortion: Less than 5%

Size & Weight: 21 x 15.5 x 14.5 in., 104 lb.
533 x 394 x 368mm, 47kg

Output Termination: Top Toroid

Scope of Supply: 20ft black ground lead, operation
manual, calibration certificate

Optional Accessories



DVR Series

The DVR-150 and DVR-300 are precision voltage dividers used to verify the voltage calibration of your ABT AC Hipot Test Set.



Grounding Sticks

Safely confirm the device under test has been discharge and is at ground potential before handling after testing.



Hand and Foot Safety Interlock Switches

Dead man style safety switches that connect to the external interlock provisions on the rear terminal block of the ABT AC Hipot Test Set.

The switch must be depressed before "HV On" and remain depressed during the duration of the testing. Releasing the switch has the same effect as hitting "HV Off", turning off the high voltage circuit. Supplied with 12 foot lead.



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© **COPYRIGHT 2018 - HIGH VOLTAGE, INC.** – Manufacturers of high voltage test equipment. Products include portable VLF AC .1Hz to .01Hz. Very Low Frequency, sinewave output hipots up to 200 kV; Tan delta and PD diagnostic measurement bridges for cable diagnostics, portable switchgear and bottle testers up to 100 kV AC ; Portable DC Hipots/Megohmmeters to 300 kV DC ; Oil Test sets at 60 kV or 100 kV; Aerial lift and bucket truck testers to 300 kV AC; High Power AC Dielectric test sets up to 300 kV AC @ 40 KVA; OHM Check concentric neutral tester; Controlled energy cable fault locators, Radar and Tracing devices; 150 kV and 300 kV HV voltage dividers.