



HIGH VOLTAGE, INC.
AERIAL LIFT TEST SETS
ALT SERIES PRODUCT CATALOG

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AERIAL LIFT TESTING EQUIPMENT

High Voltage Inc, is the leading supplier of high voltage test equipment designed to test all insulating components of aerial lifts and trucks. Whether testing with AC or DC voltage, HVI offers the best in class instruments available for testing booms, liners and insulating fluids.

Applications

Aerial Lift Testing

The high voltage dielectric testing of Aerial Lifts, Platforms, Bucket Trucks, etc., is a very critical testing application that must be performed correctly by trained personnel using the proper equipment and accepted testing methods, like those described in ANSI Standard 92.2. Both AC and DC voltage can be used for field maintenance testing the fiberglass booms and liners, or buckets. Which is used is a matter of preference by the truck operators. Many use AC voltage rather than DC since it is an AC voltage stress the truck and the worker are subject to, however AC hipots are more expensive and larger than and equivalent DC hipot. Factory certification testing, and re-certification after a rebuild, should use AC voltage.



The test voltages used are dependent on the class of the truck: A, B, or C and is detailed in various testing Standards. The most common hipots used are rated 0 - 100 kVdc @ 10 mA for DC testing and 0 - 120 kVac for AC testing. A DC hipot with a 5 or 10 mAdc output current rating is adequate for the test. If AC testing, the capacitance of the load, or actual past test data, must be known. For AC boom testing, usually the power needed is in the range of 2 kVA - 3 kVA. When liner/bucket testing, the capacitance is high, requiring an AC Dielectric Test set rated for 8 – 10 kVA of output power may be needed. A hipot rated 0 - 50 kVac @ 10 kVA is needed to test liners at 50 kVac for factory certification and/or 35 kVac for maintenance testing. Some also test the hydraulic fluid, or oil, in the booms for its dielectric strength.

Aerial Lift Testing Capabilities

Our model ALT-120/60 is the most powerful and full-featured AC aerial lift tester on the market. This model can also be used for other AC testing applications like insulators, iso phase buss duct, bushings, hot sticks, rubber products, etc. Our PFT-1003CM 100k Vac model is also suitable for many of these applications and less expensive, if the power and additional features our ALT-120/60 are not needed. If DC voltage is to be used, our PTS –100U kVdc hipot is available.

Other AC bucket truck testers are either too low in voltage and/or power to perform all the many tests needed. Our unit can do it all. If dielectric testing hydraulic fluid and oil is required, use our DTS-60D fluid tester.

Our Advantages

- Our duty rating of 7 kVA is higher than most others, permitting the testing of most liners (Consult factory for liner testing applications, like the use of our 50kVac@ 10kVA model)
- 7 kVA for 1 hour on / 2 hours off, and 4 kVA continuous which is more than any alternative
- 0 – 60 kVAC and 0 – 120 kVAC outputs
- Internal voltmeter divider, not an external divider stick used by others
- 250 uA current meter scale and 1 mA scale with multipliers up to 100x
- Internal inductive compensation to cancel out some of the capacitive reactance of the load, reducing the input power
- Secondary capacitive current cancellation circuit (optional)
- Guard/Ground Circuit
- Removable interconnect cable
- Ruggedized meters
- Glass front meters eliminate static buildup



Other Testing Applications

The ALT series were designed for testing resistive or light to medium capacitive loads to maintain the ideal size and weight for field portability. These units 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, 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 Hipot/Dielectric Test Set

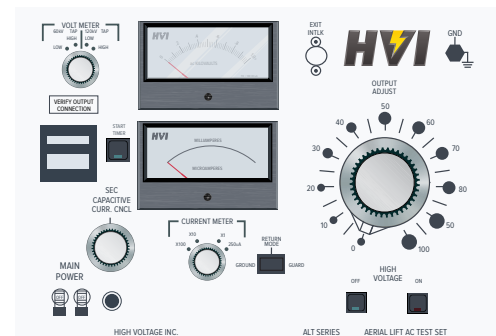
When AC testing, most loads appear capacitive. To apply high voltage AC at power frequency (50/60 Hz) to a capacitive load requires higher power and current ratings from the test set when compared to DC. Unlike DC where the capacitance of the load only needs to be overcome once, as you slowly raise the output voltage, AC must overcome the capacitance 2 times per cycle. Once while reaching the desired test voltage on the positive side and the second while reaching the desired test 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 that is being tested. The capacitance of the load must be known to calculate the required current at the required voltage. Don't undersize the set, select a test set with at least 25% extra power than needed.

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 required at the higher test voltage should be linear. For example: if your load draws 10 mA @ 5kVac it will draw approximately 100 mA @ 50 kVac. For higher current requirements please see our HPA series and PAR series.

Controls and Configuration

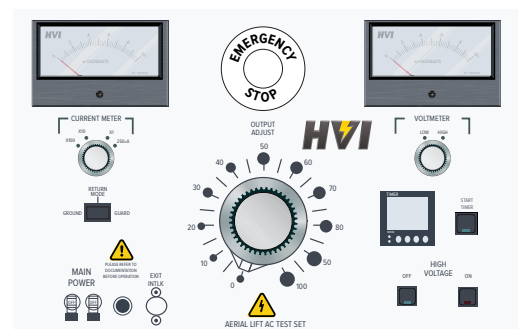
ALT-120/60, ALT-120/60F, ALT-210/50, and ALT-210/50F

- Continuously adjustable output voltage
- Secondary connected 3 range analog voltmeter
- 4 range analog current meter
- Guard/ground circuit for accurate leakage current measurement
- Transit protected, glass faced meters to prevent damage in transit
- Fixed overload set to 120% of variable transformer rated output current
- Built in timer function with buzzer alarm
- Zero start safety interlock
- External interlock provisions



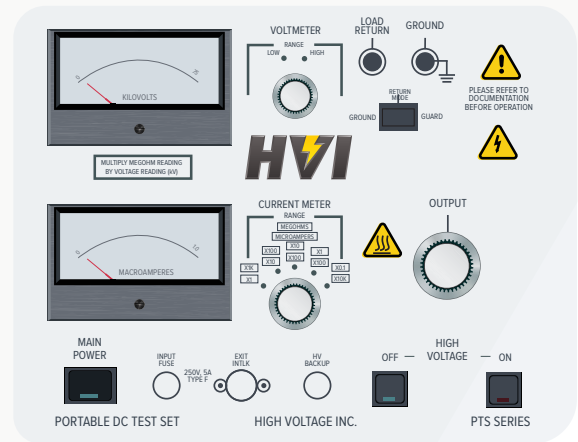
ALT-300F

- Continuously adjustable output voltage
- Secondary connected 2 range analog voltmeter
- 4 range analog current meter
- Guard/ground circuit for accurate leakage current measurement
- Transit protected, glass faced meters to prevent damage in transit
- Fixed overload set to 120% of variable transformer rated output current
- Built in timer function with buzzer alarm
- Zero start safety interlock
- External interlock provisions



PTS-100U

- Continuously adjustable output voltage
- Secondary connected 2 range analog voltmeter
- 5 range analog current/Megohm meter
- Megohm readings at any voltage
- Guard/ground circuit for accurate leakage current measurement
- Transit protected, glass faced meters to prevent damage in transit
- Fixed overload factory set to 11mA_{dc}
- 50 foot test leads and shielded output cable
- Zero start safety interlock
- External interlock provisions



ALT Series Specifications



ALT-120/60



ALT-210/50

| | ALT-120/60 | ALT-210/50 |
|----------------------------|---|---|
| Input: | 120 V, 60 Hz, 30 A (ALT-120/60) 230 V, 50/60 Hz, 15 A (ALT-120/60F) | 120 V, 60 Hz, 30 A (ALT-210/50) 230 V, 50/60 Hz, 15 A (ALT-210/50F) |
| Output: | 0-120kV AC / 0-60 kV AC, 3.6 kVA resistive load up to 7.2KVA capacitive load (1.3 nF @ 120kV or 5.3nF @ 60kV, 60 Hz) Output current is reduced at lower voltages | 0-210kV AC / 0-50 kV AC, 3 kVA resistive load up to 7 KVA capacitive load Output current is reduced at lower voltages |
| Duty: | 7.2 kVA: 1 hour ON, 2 hour OFF 4 kVA: continuous | 7 kVA: 1 hour ON, 2 hour OFF 4 kVA: continuous |
| Voltmeter: | 3.5", scaled 0-30/60kV & 0-60/120kV kV AC, $\pm 2\%$ F.S. | 3.5", scaled 0-30 kV AC, $\pm 2\%$ F.S. |
| Current Meter: | 3.5", scaled 0-250uA and 0-1.0mA $\pm 2\%$ F.S. with range multipliers of x1, x10, x100 | 3.5", scaled 0-20/50kV & 0-80/120kV kV AC, $\pm 2\%$ F.S. |
| Distortion: | Less than 5% | Less than 5% |
| Size & Weight: | Case: 21 x 11.5 x 15.5 in., 46 lb. 533 x 292 x 394 mm, 27 kg HV Tank: 15.5 x 15.5 x 27.5 in., 160 lb. 394 x 394 x 698.5 mm, 72.5 kg | Case: 21 x 11.5 x 15.5 in., 59 lb. 533 x 292 x 394 mm, 27 kg HV Tank: 15.5 x 15.5 x 37.5 in., 240 lb. 394 x 394 x 953 mm, 109 kg |
| Output Termination: | Top Toroid (0-120kV) 1 inch ball side tap (0-60kV) | Top toroid (0-210 kV) 1 inch ball side tap (0-50 kV) |
| Scope of Supply: | 20ft black ground lead, 20ft shielded return cable, external interlock plug, operations manual, calibration certificate | 20ft black ground lead, 20ft shielded return cable, external interlock plug, operations manual, calibration certificate |



ALT-300F



PTS-100U

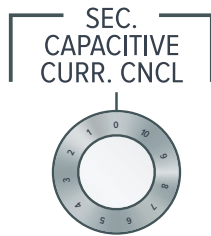
| | ALT-300F | PTS-100U |
|---|--|---|
| Input: | 230 V, 50/60 Hz, 30 A | 120 V, 60Hz, 10 A (PTS-100U) 230 V, 50/60 Hz, 5 A (PTS-100UF) |
| Output: | 300kV AC, 7kVA resistive load 7kVA capacitive load Output current is reduced at lower voltages | 0 – 100 kV DC @ 10 mA, negative polarity, positive ground Full Wave Bridge Rectification |
| Duty: | 7kVA: 1 hour ON, 2 hour OFF 5 kVA: continuous | Continuous, capacitive charging |
| Voltmeter: | 3.5", scaled 120/300kV kV AC, $\pm 2\%$ F.S. | 3.5", Scaled 0 - 50/100 kV DC, $\pm 2\%$ F.S |
| Current Meter: | 3.5", scaled 0-250uA and 0-1.0mA $\pm 2\%$ F.S. with range multipliers of x1, x10, x100 up to 100 mA | 3.5", scaled 0 – 1.0 uA DC, $\pm 2\%$ F.S. with multipliers of x 1, x 10, x 100, x 1 k, x 10k Guard/ground load return |
| Distortion (ALT): Megohmmeter (PTS): | Less than 5% | Scaled 100 -1 M Ω with multipliers of x 0.1, x 1, x 10, x 100, x 1 k |
| Size & Weight: | Case: 21 x 15.5 x 15.25 in., 80 lb. 534 x 394 x 387 mm, 36 kg HV Tank: 28 x 28 x 69 in., 1050 lb. 712 x 712 x 1753 mm, 476 kg | Case: 14 x 11 x 14 in., 30 lb. 356 x 279 x 356 mm, 14 kg HV Tank: 9.5 x 11.75 x 14.5 in., 68 lb. 241 x 298 x 368 mm, 31 kg |
| Output Termination: | Top Toroid (0-300kV) | 50ft. (15m) shielded EPR output cable with alligator clamp EPR cable stays flexible in cold weather |
| Scope of Supply: | 20ft black ground lead, 20ft shielded return cable, external interlock plug, operations manual, calibration certificate | 50ft EPR shielded output cable, 50ft red test lead, x2 50ft black test leads, 14in safety ground stick, external interlock plug, operations manual, calibration certificate |

Optional Upgrades



Digital Metering

Add 3.5-digit digital meters to models with analog meters as standard equipment. Deletes any volt or current meter range switches.



Secondary Capacitive Current Cancellation Circuit

The SECONDARY CURRENT compensation potentiometer is used to cancel capacitive load currents leaving the resistive component of the signal. To do this, the line signal is sampled and a phase shifted signal is inverted and summed with the load current signal into an OP AMP input. The resulting output, when adjusted to minimum, represents the resistive current in the load. When in the OFF position the capacitive cancel has no effect on the load signal.



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 HPA AC Dielectric 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.



Grounding Sticks

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



Handcart

Included handcart for increased portability of ALT-120/60. Not available for ALT-210/50F, and ALT-300F.

AC Output Configuration Toroidal Output and DC Output Configuration Cable Output



Cable Output

50 foot shielded output cable. Standard on PTS-100U. No PD Spec.



Toroidal Output

Toroidal dish and/or ball termination on top of a fiberglass cylinder, standard on the ALT-120/60, ALT-120/60F, ALT-210/50, ALT-210/50F, and ALT-300F. No PD Spec.

HVI does not supply an output cable on AC test sets 65kVac and above. This includes models that use a metal sphere, spinning, toroid, or bushing as the high voltage output termination. A shielded cable rated for the test voltage is not practical due to the size, weight, and/or high capacitance value. Use of a bare wire, test lead, or tubing is recommended instead. This output connection must be isolated from ground for the test voltage applied. The height of the high voltage section or output bushing are a good reference for the clearance needed. Refer to the manual for your exact equipment for more information. It is up to the user to ensure a safe and effective test setup.



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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.