HVEX
Driving Innovation

HDC-120

PORTABLE DC HIPOT TEST SET
UP TO 120 kV WITH TOUCHSCREEN HMI

Withstand · Leakage current · IR / PI · Step voltage · Vacuum interrupters

Reference standards
IEEE 400 / IEEE 400.1, IEEE 95, IEC 60060-1, IEC 60060-3; designed to IEC 61010-1 and IEC 61326-1

7"
TOUCH
HMI



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Portable DC Hipot Test Set — HDC-120

Description

The HVEX HDC-120 is a portable DC high-voltage test set (DC hipot) for withstand, leakage-current and insulation-resistance tests on MV cables, switchgear, vacuum interrupters, surge arresters and rotating machines. It delivers 0 to 120 kV DC at up to 5 mA, with ripple ≤ 0.5 %.
It has two modules: a control unit in a rugged case with a 7" touchscreen HMI, and an HV unit with an epoxy-cast Cockcroft-Walton multiplier. The operator stays away from the HV unit, and every test is recorded, with its report generated on site.

Operating principle

A high-frequency PWM inverter in the control unit drives the HV unit, where a step-up transformer and a Cockcroft-Walton multiplier — diodes and capacitors in cascade, cast in epoxy resin — rectify and multiply the voltage up to 120 kV. The high operating frequency keeps the ripple low and the HV unit compact.
A resistive divider in the column measures the output voltage directly. Leakage current is measured on the low-voltage return, with a guard terminal that bypasses surface currents. The controller regulates the voltage in closed loop, follows the programmed ramp and cuts the output on overcurrent or flashover.

Features

- 0 to 120 kV DC, negative polarity: 5 mA for 10 min and 2.5 mA continuous;
- Ripple ≤ 0.5 % and stability ≤ 1 %, from the high-frequency multiplier;
- Leakage current from 0.1 µA to 5.5 mA, auto-ranging, with guard terminal;
- 7" touchscreen HMI with test plans, kV/µA × time plot and memory for 1,000 tests;
- PDF/CSV reports via USB and HVEX Acquisition software over Ethernet.

Tests performed

- DC withstand (proof) tests with programmable ramp, dwell time and trip limit;
- Leakage current and insulation resistance, with PI and DAR;
- Step-voltage tests on cables and rotating machines (IEEE 400.1, IEEE 95);
- Vacuum interrupter integrity, with pass/fail current threshold;
- DC reference voltage of surge arresters at 1 mA.

Advantages

- Two portable modules — control unit ≈ 9 kg and HV unit ≈ 18 kg — each carried by one person;
- Epoxy-cast multiplier: sealed against dust and humidity, with no oil or gas;
- Guided test plans on the touchscreen: the same procedure every time, fewer operator errors;
- 220–240 V, 50/60 Hz single-phase supply, ≤ 1 kVA: any site outlet or generator;
- Made in Brazil, with local support, calibration and maintenance.

Applications

- Acceptance and maintenance DC tests on MV paper-insulated cables and on cable jackets;
- MV switchgear, busbars, bushings and insulators;
- Vacuum circuit breakers, reclosers and contactors;
- Generators and motors (IEEE 95 step-voltage test);
- Surge arresters and insulating equipment (gloves, sticks, hoses).

120 kV
DC output, negative polarity

5 mA
10 min · 2.5 mA continuous

≤ 0.5 %
ripple at rated output

7" HMI
touchscreen · PDF reports

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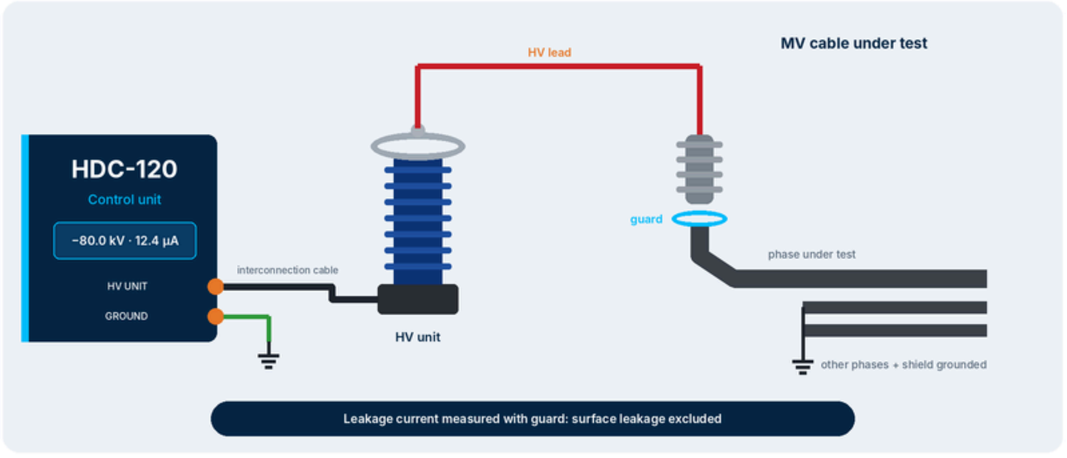
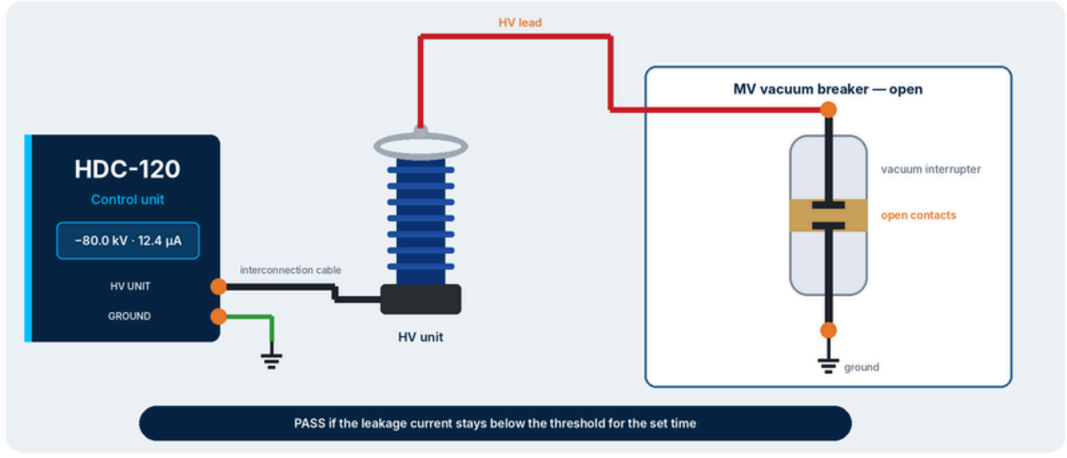
Typical test connections



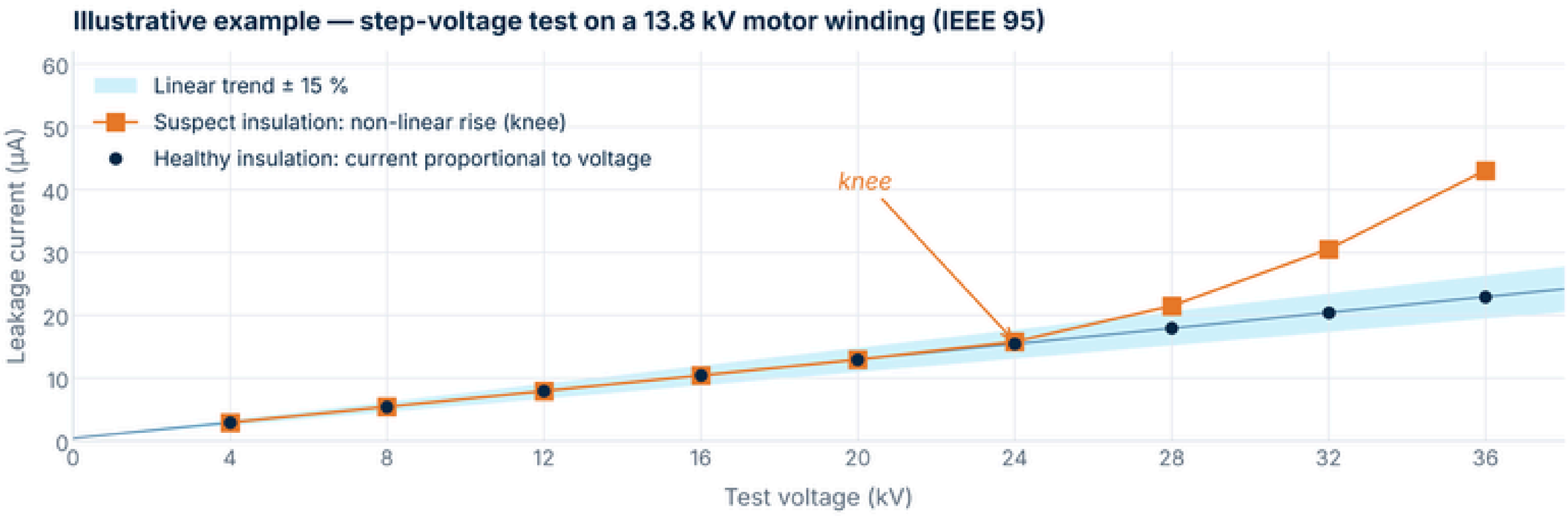
MV cable: HV applied to the phase under test, with the other phases and the shield grounded; the guard at the termination keeps surface leakage out of the measurement.



Vacuum interrupter: DC voltage across the open contacts of each pole; the HDC-120 compares the leakage current with the pass/fail threshold.

Test modes

Mode	How it works	Result
Manual	Operator raises and holds the voltage with the encoder or the touchscreen	Voltage and leakage current in real time
Withstand	Ramps to the test voltage, holds it for the set time and trips above the current limit	Pass/fail and final leakage current
Step voltage	Up to 10 voltage steps with programmable dwell, recording the current at each step	Leakage current × voltage curve
Insulation resistance	Constant voltage with readings at 30 s, 1 min and 10 min	Insulation resistance, PI and DAR
Vacuum interrupter	Applies the set voltage across the open contacts for the set time	Pass/fail against the current threshold
Arrester reference	Raises the voltage until the DC current reaches 1 mA	DC reference voltage (U1mA)



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Control unit and HV unit



- 7" capacitive color touchscreen HMI, sunlight-readable: test mode, voltage, ramp, current limit and time settings; live kV, µA and MΩ display;
- HV ON and HV OFF push-buttons; VOLTAGE ADJUST encoder with fine and coarse steps for manual mode;
- Mushroom-head emergency stop and key switch that blocks the HV output;
- Green READY and red HV pilot lights;
- GROUND, INTERLOCK and HV UNIT connectors; USB and RJ-45 Ethernet;
- Power inlet with MAIN breaker; quick-start guide inside the lid;
- HV unit: Cockcroft-Walton multiplier encapsulated in epoxy — solid insulation, no oil or gas;
- Corona ring and spherical HV terminal; built-in resistive divider measures the voltage at the output;
- Ground stud on the base and guarded HV output lead;
- Interconnection cable keeps the operator and the control unit away from the HV unit during the test.

HVEX Acquisition supervisory software

- Reusable test plans per asset type: cable, motor, generator, switchgear, arrester;
- Download of results via Ethernet or USB, with test history per asset;
- kV, µA and MΩ × time plots; PI/DAR and step-voltage curves;
- PDF reports and CSV export;
- Firmware update and remote diagnostics.

Safety and protections

- HV enabled only with ground connected, key switch on and interlock closed;
- Zero-start: a test cannot begin unless the output is at 0 kV;
- Programmable overvoltage and overcurrent trips; fast shutdown on flashover;
- External interlock input for door, barrier or foot switch; emergency stop;
- Output discharged through the internal divider at the end of each test; 120 kV discharge stick included.

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Technical Specifications

High-voltage output

Output voltage	0 to 120 kV DC, continuously adjustable; setpoint resolution 0.1 kV
Polarity	Negative with respect to ground (positive on request)
Rated current	5 mA for 10 min (600 W)
Continuous current	2.5 mA, continuous duty
Ripple	≤ 0.5 % at rated output
Voltage stability	≤ 1 % for ± 10 % supply variation
Ramp rate	0.1 to 5 kV/s, programmable
Overload capability	110 % of rated voltage for 10 min (no load); current limit 1.25 × rated
Generation	High-frequency PWM inverter and epoxy-cast Cockcroft-Walton multiplier

Measurement

Voltage	Resistive divider in the HV unit; 0 to 132 kV, 0.1 kV resolution
Voltage accuracy	± (1.5 % of reading + 2 digits)
Current ranges	20 µA, 200 µA, 2 mA and 5.5 mA, auto-ranging; 0.1 µA resolution
Current accuracy	± (1.5 % of reading + 2 digits); guard terminal to bypass surface leakage
Insulation resistance	Calculated (V/I), 1 MΩ to 1 TΩ; PI (10 min/1 min) and DAR (60 s/30 s)
Test timer	Dwell from 1 s to 99 min, 1 s resolution

Test modes, data and interfaces

Test modes	Manual; withstand; step voltage (up to 10 steps); IR with PI/DAR; vacuum interrupter pass/fail; arrester U1mA
Data and reports	Memory for 1,000 tests; kV/µA × time plot; PDF and CSV via USB; HVEX Acquisition software
Interfaces	7" color capacitive touchscreen, sunlight readable; USB; RJ-45 Ethernet; external interlock

Supply, construction and environment

Power supply	220–240 V AC ± 10 %, 50/60 Hz, single-phase, ≤ 1 kVA
Control unit	Rugged case, IP54 with lid open; approx. 520 × 420 × 280 mm; ≈ 9 kg
HV unit	Epoxy-cast column with corona ring; approx. Ø 310 × 740 mm; ≈ 18 kg
Environment	Operation −10 to +50 °C; humidity up to 90 % non-condensing

Scope of supply

Included	Control unit; HV unit; 5 m interconnection cable; 5 m HV output cable with guard; ground cables; 120 kV discharge stick; power cord; HVEX Acquisition software; calibration certificate; FAT report; manual
Options	Longer interconnection and HV cables; external warning lamp; foot-switch interlock; on-site training
Warranty	2 years (24 months) against manufacturing defects; support and calibration from HVEX

The standards listed identify the field of application and do not constitute certification of the device under test. Weights and dimensions are approximate. Specifications subject to change without notice. Rev. 11/2026.

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