

95X Series Ultra-High Performance Hipot Testers



Power and Versatility for your Most Demanding
Electrical Safety Test Applications

Vitrek built the 95X series from the ground up with DSP technology—to bring you the safest, fastest, most capable, feature rich hipot testers available. The 95X series combines high output power, with a wide range of AC & DC voltage outputs and extremely low leakage current measurement. Then we added a 4-wire milli-ohmmeter with dynamic range up to 100K ohms and an overlapping Tera-ohm class Insulation Resistance function. Top that off with an available 40 Amp Ground Bond capability and you're just beginning to get a feel for what the Vitrek 95X Series Hipot Testers can do for you.

VITREK

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95X Series Industrial Strength Hipot Testers



More speed, more power, better resolution, more functionality.
What more could you want in an electrical safety tester?

Vitretek 95X Series

For more than 25 years Vitrek has been driven by an obsession to build a better hipot tester. Increased user safety, faster test times, higher output voltages and more functionality have been our driving force. The 95X series is the result of this pursuit—offering power, speed, accuracy and resolution that leave the others far behind.

For Demanding Hipot Tests – Demand the Vitrek 95X

Speed and power go hand in hand, the 6.5KVDC models offer 50mA of source current for DC Hipot—providing the power you need to rapidly charge and discharge challenging DUTs. Models are also available with DC hipot up to 11KV and 15KV. Most of the 95X series also offer 50mA of sourcing

for AC hipot, but for heavier AC loads the 95X can be configured to source up to 100mA or even as much as 200mA. For higher AC hipot voltages the 95X can generate up to 10KV internally and all models are available with an external 30KVAC hipot option.

When it comes to making critical leakage current measurements, the 95X delivers rock-solid resolution down to 100 pico-amps. This high resolution provides built-in insulation resistance measurement (IR) up to a Tera-ohm, add a 4-wire milli-ohmmeter with autoranging up to 100K ohm and an available 40 amp Ground Bond function—and you are beginning to understand the versatility of the Vitrek 95X Series.

Need To Hipot Multiple Test Points?

The 95X has the ability to directly control up to four 64 channel HV scanners, right out of the box. That is up to 256 test points and using a PC with Vitrek's QuickTest Pro software you can expand the count up to 640 test points. The HV Switching System of choice is the Vitrek 964i which can hold eight 8 channel switching cards—available in 7, 10 and 15 KV ratings. The 964i also has switching cards to handle routing up to 40 amp ground bond currents.



The TL-UP2 Test Adaptor allows for easy Hipot and Ground Bound connection to virtually any device with a power cord. The TL-UP2 routes high voltage to both the line and neutral pins of the power socket and connects the earth pin of the socket to the return of the tester. A separate test lead can be connected to the DUT chassis for continuity or Ground Bond testing to the earth pin of the DUT power cord. Available in Hipot/Continuity or Hipot/ Ground Bond versions.

95X Series Output Comparison Chart

Capabilities	951i	952i	953i	954i	955i	957i	959i
AC Hipot	20V-6KV	20V-6KV	20V-6KV	20V-6KV	50V-10KV	20V-6KV	—
(Max Std Current)	50mA	50mA	50mA	50mA	30mA	50mA	—
(500VA Option)	100mA	—	100mA	—	—	100mA	—
(2KV Max Option)	200mA	—	200mA	—	—	200mA	—
(30KVAC Ext. opt)	10mA	10mA	10mA	10mA	10mA	10mA	—
DC Hipot / IR	30V-6.5KV	30V-6.5KV	50V-11KV	50V-11KV	50V-11KV	75-15KV	—
(Max Current)	50mA	50mA	30mA	30mA	30mA	10mA	—
(MAX IR)	2T	2T	4T	4T	4T	6T	—
40A Ground Bond	—	Yes	—	Yes	—	—	Yes
4 Wire Ohmmeter 100μΩ to 149KΩ	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Features and Benefits

- **Highest Level of Operator Safety** — features include: GFI High speed shut down for earth ground leakage faults, SFI™ Safety Fault Interlock — High speed shut down for interruption of safety interlock, TLSS™ Test Lead Safety Sense — Clamps DUT chassis near ground by continuously verifying proper connection of test leads prior to and during HV testing
- **High Power Output** — means better drive capability and increased test throughout. With up to 50mA of sourcing current for DC hipot the 95X Series gets heavy duty jobs done fast — available 100mA & 200mA AC drive tackles even the toughest sourcing requirements
- **Wide Range of built-in Voltage Capabilities** — Choose from 6.5KVDC, 11KVDC or 15KVDC and 6KVAC, 10KVAC or up to 30KV RMS AC with external option
- **The Fastest Hipot Testers available** — High output power combined with Dual Coldfire® microprocessors and Dual DSPs to provide Ramp rates up to 50KV/second, dwell times as low as 20mS and overall test times as fast as 3mS in optional Flash mode
- **Expansive Test Sequence Memory** holds up to 100 tests with up to 100 steps per test. Tests can be selected via front panel, Ethernet, RS232, Digital I/O or with optional GPIB
- **Ground Bond Test Capability** available in three models with output currents from 100mA to 40Amps RMS and test times from 20mS to 1000 seconds or longer
- **4-Wire Milli-Ohmmeter Function** provides fast, accurate 5 digit resistance measurements with resolution down to 100μΩ and range up to 100K ohms
- **Built-in Phase Angle Measurement** — allows the measurement and display of both resistive (in-phase) leakage current and reactive (out-of-phase) leakage current caused by capacitive coupling
- **Multi-Dwell Functionality** — permits dwells at different voltage levels without having to return to zero between test steps — dramatically simplifying advanced analysis of dielectric properties
- **Ramp High/Dwell Low Current Limits** — permits the user to set separate limits for the ramp and dwell providing faster ramp times and lower leakage test limits
- **Ethernet, RS232, Digital I/O, USB Printer & Scanner Control** — All Standard Interfaces — Provides the highest level of test automation. GPIB optional
- **High Voltage Scanner Control** — up to 256 point switching capability with available 964i HV Scanners. Route voltages up to 15KV and currents up to 40A for multi-point hipot and ground bond tests
- **Dual Dimensional / Test Specific / Broadband Arc Detection.** Where lesser testers allow you to set a single, global, amplitude only arc limit — the technologically advanced 95X Series utilizes time & amplitude based arc limits and uniquely applies them to each desired test
- **Pico-Amp Leakage Measurement** insures that even the lowest leakage current levels are accurately detected and tera-ohm range IR readings are stable and precise
- **Test Specific Fixture & Cable Compensation** — Automatically calibrate out offset errors caused by lead resistance, fixture capacitance and leakage
- **Multi-Mode IR** — Insulation Resistance values up to one Tera-ohm can be obtained with precision in your choice of 3 IR test modes — end on time, end on pass or end on fail

continued

- **Continuously Variable IR Test Voltage** — Unlike most IR testers which limit you to three or four discrete test voltages, the 950i Series allows you to select the test voltage you need. Starting as low as 20V all the way to 6.5KV, 11KV or 15KVDC
- **Capacitance Test Modes** — For AC & DC hipot and IR provide tightly controlled charge and discharge profiles for superior results on critical solar panel tests and

- other highly capacitive loads
- **Light Weight Switching Power Supply Design** — Better reliability, easier on your back. Compare the 8.2 kg 95X to whatever you've been using
- **400Hz AC Voltage Withstand Testing** provides aviation frequency specific test results for a more effective analysis of dielectric properties on avionic components

- **Solar Panel Testing Simplified** — Designed with PV testing in mind, the 950i Series uses pico-amp resolution to detect minute defects in solar cells
- **Three Year Extended Warranty** — One year standard, total of three years extended warranty with registration and annual factory calibration. Built-in reliability you can count on for years to come
- **Safety Tested** per EN 61010-1. EMC compliant to EN 61326-1

95X Series Performance Specifications

Maximum Voltage Measurement (Input Impedance)

DC Output Voltage:	20V to 6500V (951i & 952i) 50V to 11000V (953i, 954i & 955i) 100V to 15000V (957i) Resolution: 0.1V up to 999.9V, 1V above Accuracy: 0.25% + 0.5V (1 year 23°C ± 3°)
DC Current Sourcing:	50mA max, 25mA above 6000V (951i & 952i) 30mA max, 20mA above 6000V, 10mA above 7500V, 5mA above 9000V (953i, 954i, 955i) 10mA (957i)
Ramp Time:	0.01 to 9999sec, 0.01sec resolution or 0.1 to 50000V/sec, 0.1V/sec resolution
Dwell Time:	0.02 to 9999 seconds or user terminated, 0.01sec resolution
DC Leakage Current:	Measurement Range: 0 to +/-200mA, Resolution: 4 digits (9999 counts) down to 100pico-amps Accuracy: 0.25% + 0.5nA + ½ digit (1 year 23°C ± 3°) Selectable Min & Max limits for Ramp & Dwell, from 100 pico-amps up Measurement Period: 1 power line cycle (50/60Hz)

Insulation Resistance (IR): Test modes include: End on pass reading, end on fail or end on timer

Test Voltage	5% Accuracy* Max resistance	10% Accuracy* Max resistance	20% Accuracy* Max resistance
500V	50GΩ	100GΩ	200GΩ
1000V	100GΩ	200GΩ	400GΩ
2500V	250GΩ	500GΩ	1TΩ
5000V	500GΩ	1TΩ	2TΩ
10000V	1TΩ	2TΩ	4TΩ

**Above uncertainties are approximate, IR accuracy is determined by adding output voltage accuracy to current measurement accuracy in percentages.*

Low Resistance Measurement

Measurement Range:	0 to 150Kohm (999.9mΩ to 99.99KΩ, 149.9KΩ in 7 ranges).
Resolution:	4 digits, 100μΩ on 1ohm range
Test Current:	55mAdc constant current up to ≈ 91Ω, 5VDC constant V above
Accuracy (4-wire):	0.5% + 0.002ohm + ½ digit up to 30K ohm 1.5% + ½ digit above 30K ohm 5% + 1 digit from 100K to 150K ohm Add 20mΩ for 2 -wire

AC Output Voltage:	20V to 6000V RMS (951i, 952i, 953i, 954i) 50V to 10,000V RMS (955i) Resolution: 0.1V up to 999.9V, 1V above Accuracy: 0.25% + 1.5V (+ 0.01% per Hz above 100Hz) Decrease max output voltage by 0.1% per Hz above 100Hz Decrease max voltage by 12.5V/ma loading (25V/ma 955i)
AC Current Sourcing:	50mA RMS max (951i, 952i, 953i, 954i) 30mA RMS max (955i) 100mA RMS max with 500VA option (951i, 953i) 200mA RMS with option AC-2 (2KVAC RMS max output)
Output Frequency:	Digitally synthesized, low distortion sinewave 20Hz to 500Hz, standard, 500VA or AC-2) 40Hz to 500Hz, (955i) 0.1% accuracy, 0.1Hz resolution (1Hz above 99.9Hz)
Ramp Time:	0 to 9999sec, 0.01sec resolution or 0.1 to 100000V/sec, 0.1V/sec resolution
Dwell Time:	0.02 to 9999 seconds or user terminated, 0.01sec resolution
AC Leakage Current:	Measurement Range: 0 to +/-200mA RMS Resolution: 4 digits (9999 counts) down to 100pico-amps Accuracy: 0.5% + 10nA (add 0.005% per Hz above 100Hz) Selectable min & max limits for Ramp & Dwell, from 100 pico-amps up Measurement Period: 1 power line cycle (50/60Hz)
Phase Measurement:	Total RMS current, In-phase current, Quadrature current (reactive/out-of-phase) Accuracy: 0.01° per Hz, relative to output voltage

Ground Bond Tests (GB, GBez - 952i, 954i, 959i)

Test Current:	0.1 to 40A RMS, 0.001A resolution Accuracy: 0.5% + 5mA accuracy (add 0.005% per Hz above 100Hz)
Test Frequency:	40Hz to 500Hz Resolution: 0.1Hz (1Hz above 99.9Hz) Accuracy: 0.1% accuracy Waveform: Digitally synthesized, low distortion sinewave
Measurement Configuration:	4-Terminal Kelvin
Compliance Voltage:	6.5V RMS, may be user limited to a lower level with 0.01V resolution
Resistance Range:	6.5 ohms at 1A decreasing to 162.5 milli-ohms max at 40A Max load impedance: 10 ohms
Ramp Time:	0 to 9999sec, 0.01sec resolution
Dwell Time:	0.02 to 9999sec or user terminated, 0.01sec resolution
Voltage Sense:	Range: 0 to 8 v rms Resolution: 4 digits down to 10uV Accuracy: 0.5% + 30uV
Phase Measurement:	RMS, In-phase and Quadrature measurements 0.01° per Hz phase relative to test current

Line Leakage Current & Voltage Measurement (Models 951i - 955i only)

Voltage Measurement:	0 to ± 8KVDC 6KV RMS AC (951i & 952i) 0 to ± 11KVDC 8KV RMS AC (953i & 954i) 0 to ± 11KVDC 10KV RMS AC (955i) Resolution: 0.1V, 1 V above 999.9V DC Accuracy: 0.25% + 0.5V AC Accuracy: 0.5% + 1.5V
Leakage Current:	0 to ± 200mA DC or RMS AC Resolution: 4 digits (9999 counts) down to 100pico-amps DC Accuracy: 0.25% + 0.5nA AC Accuracy: 0.5% + 20nA
Test Results	Test Time: 0.02 to 9999 sec Last, Minimum, Average & Max V& A reading plus arc current

Pulse Mode (Flash) Test (Option PMT-1 available on models 951i, 952i, 953i, 954i)

Test Waveform:	Trapezoidal (Selectable positive polarity, negative polarity or bi-polar)
Ramp Up/Down Time:	1ms (0.5ms for option AC2) to 30mS with 0.1ms resolution
Dwell Time:	1ms (0.5ms for option AC2) to 30mS with 0.1ms resolution
Test Voltage:	50V to 8000V (20V to 2750V with option AC-2) Resolution: 0.1V up to 999.9V, 1V above Accuracy: 0.25% + 1.5V

General Specifications

Arc Detection:	Test Specific, Dual Parameter. Allows a specific broadband current amplitude limit from 2 to 20mA peak and pulse width limit from 4 to 30 microseconds for each test
Ethernet	High speed, high noise immunity LAN interface
RS232 Interface:	Selectable baud: 9600, 19200, 38400, 57600 or 115200, full handshake
VICL Interfaces:	Two each provided for control of HV Scanners and other 950i series units
Digital I/O Interface:	Provides 8 digital inputs and 5 digital outputs. Functions include Test Selection, Start/Stop, Testing, Pass/Fail, Print, HV Present, Safety Interrupt, Dwell Timer
USB Host Printer Port	For hard copy test reports and LAN/Ethernet Interface
Optional GPIB	Option GP-9 adds GPIB capability to LAN/Ethernet card
Test Lead Safety Sense:	TLSS™ Technology continuously verifies that test leads are properly connected prior to and during HV, 4-wire Low Ohms and Ground Bond testing
Real Time Clock:	Accuracy: 10 seconds per day, Battery Backup: 30 days minimum
Non-Volatile Memory:	100 user test sequences up to 100 steps each not to exceed 1000 total test steps. All test sequences, user settings and calibration data are stored in internal non-volatile Memory data retention is specified for 20 years and 1000000 write cycles
Dwell Time Accuracy:	0.05% + 20mS, Digital output provides dwell timer verification
Operating Temperature:	0 °C to 50 °C
Humidity:	90% RH max, 0 to 40 C
Power:	110 to 260 VAC, 50-60 Hz, 500VA Max
Dimensions:	89mm H x 432mm W x 457mm D (3.5" H x 17" W x 18" D)
Weight:	9Kg (18 lb.) Net / 18Kg (25 lb.) shipping (951i, 953i, 959i) 14Kg (28 lb.) Net / 18Kg (35 lb.) shipping (952, 954i, 955i)
Accessories:	Alligator test leads, NIST traceable calibration certificate with no data, power cord and operator's manual. ISO 17025 cal cert with data and uncertainties available
Warranty:	One year parts and labor standard, 3 year extended warranty with registration and annual factory calibration

Ordering Information

Item	Description
951i	6KV AC/DC/IR/LR Electrical Safety Compliance Analyzer
952i	6KV AC/DC/IR/GB/LR Electrical Safety Compliance Analyzer
953i	11KVDC 6KVAC/IR/LR Electrical Safety Compliance Analyzer
954i	11KVDC 6KVAC/IR/GB/LR Electrical Safety Compliance Analyzer
955i	11KVDC 10KVAC/IR/LR Electrical Safety Compliance Analyzer
957i	15KVDC 6KVAC/IR/LR Electrical Safety Compliance Analyzer
959i	40A Ground Bond/LR Safety Compliance Analyzer
QTPro II-950	QuickTest Pro II Test Automation Software
GPIB-9	Optional GPIB Interface
500VA	500VA Output Option (951i, 953i & 957i only)
AC-2	200mA 2 KVAC Max Output Option
AC-30	30KVAC External Option
RPOO-95	Rear Panel Only Output Terminals
HSS-1	High Side Current Measurement (for grounded loads)
PMT-1	Pulse Mode / High Speed Flash Test Option
ISO-CALN-95X	ISO 17025 Accredited Cal Cert (with purchase)
TL-UP1	Universal Power Receptacle Hipot Test Adaptor
TL-UP2	Universal Power Receptacle Hipot & GB Test Adaptor
TL-UP3	Universal Power Receptacle GB only Test Adaptor
TL-IEC1	IEC 320 C13 Power Socket Hipot Test Lead Set
TL-IEC2	IEC 320 C13 Power Socket Hipot & GB Test Lead Set
TL-IEC3	IEC 320 C13 Power Socket GB only Test Lead Set
TL-115-1	NEMA 5-15 Power Socket Hipot Test Lead Set
TL-115-2	NEMA 5-15 Power Socket Hipot & GB Test Lead Set
TL-TP1	HV Retractable Tip Test Pistol Test Lead 6ft
TL-109	5KV HV Pencil Probe Test Lead Set 4ft
TL-209	Standard HV Alligator Clip Test Lead 4ft
TL-30	Heavy Duty HV Alligator Test Lead Set 4ft
K-1	4-wire Kelvin Low Resistance Measurement Lead Set (10A Max)
K-2R	4-Wire 2 Clip 40A Ground Bond Test Lead Set 4ft
RM-1	Rack Mount Kit
RSS-95	Remote Start Switch
RFS-95	Remote Start Foot Switch
USB-1	USB A to B Cable 6ft (95X/4700 to printer or V7X/PA900 to PC)
USB-2	USB A to RS232 (Serial) Adapter Cable (Requires RS-2)
RS-2	Female to Female Null Modem RS323 (Serial) Cable 6ft
GP-1	1 Meter Shielded GPIB (IEEE-488)

Specifications and prices subject to change without notice.



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