



# Vitretek 950i Series

## INDUSTRIAL STRENGTH ELECTRICAL SAFETY ANALYZERS



Introducing the 950i family of powerful, versatile, easy-to-use Dielectric Analyzers. With six models to choose from – you can be sure one is just right for your hi-pot test requirements.

Ultra-high performance  
**HIPOT TESTERS**  
have never been this  
capable or affordable.

Forget what you've learned about typical high voltage insulation testers – Vitrek has incorporated advanced DSP technology into the new 950i series to bring you the fastest, most capable, feature rich hipot testers available for a surprisingly low price. Vitrek's new 950i 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 new Vitrek 950i Series Hipot Testers can do for you.

# Vitretek 950i Series

- **HIGHEST LEVEL OF OPERATOR SAFETY** - features include: HSSD™ High Speed Solid-State load Discharge - to remove exposed voltages faster than passive resistor designs, SFI™ Safety Fault Interrupt - shuts down output in as little as 50uS from detection, TLSS™ Test Lead Safety Sense - continuously verifies that test leads are properly connected prior to and during HV and continuity testing, Recessed start switch prevents inadvertent actuation, Dual Channel current measurement detects earth leakage faults
- **HIGH POWER OUTPUT** - means better drive capability and increased test throughput. With up to 50mA of current sourcing for AC & DC hipot the 950i Series gets heavy duty jobs done fast - available 200mA drive tackles even tougher sourcing requirements
- **WIDE RANGE OF BUILT-IN VOLTAGE CAPABILITIES** - starting at 6KV AC/DC extending to 10KVAC and 11KVDC or up to 30KV RMS AC with external option
- **THE FASTEST HIPOT TESTERS AVAILABLE** - Thanks to our Dual Coldfire® microprocessors combined with 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

## FEATURES & BENEFITS

- **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
- **RS232, DIGITAL I/O & SCANNER CONTROL** - All Standard Interfaces - Provides the highest level of test automation. Full serial control and DI/O with remote start/stop, safety fault interrupt, test select & more



- **EXPANSIVE TEST SEQUENCE MEMORY** holds up to 100 tests with up to 100 steps per test. Tests can be selected via front panel, RS232 or Digital I/O or with optional GPIB/Ethernet
- **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

- **HIGH VOLTAGE SCANNER CONTROL** - up to 256 point switching capability can be handled via the standard VICL auxiliary control port. Available scanners can route voltages up to 15KV and currents up to 40A for multi-point hipot and ground bond test requirements
- **IF YOU NEED A UL, CSA, TUV OR CE LABEL** on your product, then make sure the Vitrek label is on your electrical safety tester. The new 950i series - the safest, fastest, most capable & reliable testers available.

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## FEATURES & BENEFITS

- **DUAL DIMENSIONAL / TEST SPECIFIC / BROADBAND ARC DETECTION** - Where lesser testers allow you to set a single, global, amplitude only arc limit - the technologically advanced 950i Series utilizes time & amplitude based arc limits and uniquely applies them to each desired test
- **HARD COPY TEST REPORT, ETHERNET AND GPIB** - All available via optional interface card. Host USB printer control port generates comprehensive test report at the touch of a button, LAN and GPIB ports offer robust industrial interface formats
- **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. Compensation constants are stored with each test and updated with the touch of a button
- **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 test on timer, end test on pass reading or fail reading. Choose either AC IR or DC IR to suit your measurement requirement
- **CONTINUOUSLY VARIABLE IR TEST VOLTAGE** - Unlike most IR testers which limit you to 3 or 4 discrete test voltages, the 950i Series lets you select the test voltage you need. Starting as low as 2V all the way to 6.5KV or 11KV in higher voltage models
- **PRECISION HIGH VOLTAGE MEASUREMENT** - Accurately measures AC and DC voltages up to 11KV DC and 10 KV RMS AC. Excellent for calibrating other hipot testers and HV sources.
- **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** - Reduces component count and internal heat rise while improving overall reliability. Starting at only 18 lbs, 950i Series portability is a snap
- **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 while its High Speed Solid Discharge provides the industry's safest and fastest throughput rates
- **3 YEAR EXTENDED WARRANTY** - Made in the USA. Built-in reliability you can count on for years to come
- **SAFETY TESTED PER EN 61010-1. EMC compliant to EN 61326-1**

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CAPABILITIES	951i	952i	953i	954i	955i	959i
AC Hipot / AC IR (Max Current / Gig ohms)	20V-6KV 50mA 100G	20V-6KV 50mA 100G	20V-6KV 50mA 100G	20V-6KV 50mA 100G	50V-10KV 30mA 200G	-
DC Hipot / DC IR (Max Current / Tera ohms)	2V-6.5KV 50mA 2T	2V-6.5KV 50mA 2T	2V-11KV 30mA 4T	2V-11KV 30mA 4T	2V-11KV 30mA 4T	-
40A Ground Bond	-	Yes	-	Yes	-	Yes
4 Wire Milli-Ohmmeter 100μΩ to 149KΩ	Yes	Yes	Yes	Yes	Yes	Yes
AC-2 200mA/2KV	Option	Option	Option	Option	-	-
400Hz AC Hipot	Yes	Yes	Yes	Yes	Yes	Yes
Pico Amp Leakage Detection	Yes	Yes	Yes	Yes	Yes	-
True Arc 2-30mA, 4-40uS	Yes	Yes	Yes	Yes	Yes	-
SFI Safety Fault Interrupt HSSD Fast Solid State Discharge TLSS Test Lead Safety Sense	Yes	Yes	Yes	Yes	Yes	-
High Speed RS232 Expanded PLC - Digital I/O	Yes	Yes	Yes	Yes	Yes	Yes
Optional Interfaces: USB Print Port, Ethernet, GPIB	Option	Option	Option	Option	Option	Option

## PERFORMANCE SPECIFICATIONS

### DC DIELECTRIC TESTS (DCW, DCIR, DCEZ, DCCAP)

- **DC OUTPUT VOLTAGE:**  
 2V to 6500V (951i & 952i)  
 2V to 11000V (953i, 954i & 955i)  
 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)
- **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
- **DISCHARGE:**  
 25mA max in solid-state constant current discharge mode,  
 selectable same as ramp rate or ramp to next level if next step is  
 DCW, DCEZ or DCIR
- **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)

# Vitretek 950i Series

	Test Voltage	5% Accuracy* Max resistance	10% Accuracy* Max resistance	20% Accuracy* Max resistance
<b>DC Insulation Resistance (IR):</b>  Test modes include: End on pass reading, end on fail or end on dwell timer	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.

## PERFORMANCE SPECIFICATIONS

### AC DIELECTRIC TESTS (ACW, ACIR, ACez, ACCAP)

- **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
- **AC CURRENT SOURCING:**  
50mA RMS max (951i, 952i, 953i, 954i)  
30mA RMS max, (955i)  
200mA RMS with option AC-2 (2KVAC RMS max output)
- **OUTPUT FREQUENCY:**  
Digitally synthesized, low distortion sinewave  
20Hz to 500Hz, standard 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
- **RAMP DOWN:**  
Selectable same as ramp time or ramp to next level if next test step is an ACV test type
- **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

	Test Voltage	10% Accuracy* Max resistance	20% Accuracy* Max resistance
<b>AC Insulation Resistance:</b>  Test modes include: End on pass reading, end on fail or end on dwell timer	500V	5GΩ	10GΩ
	1000V	10GΩ	20GΩ
	2500V	25GΩ	50GΩ
	5000V	50GΩ	100GΩ
	10000V (955i only)	100GΩ	200GΩ

\*Approximate uncertainties, ACIR accuracy is determined by adding output voltage accuracy to in-phase current accuracy in percentages.

# Vitretek 950i Series

## 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
- **RAMP DOWN:**  
Fast (35mS), same rate as ramp up or may be skipped if next test step is a ground bond test
- **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

## LOW RESISTANCE MEASUREMENT

- **MEASUREMENT RANGE:**  
0 to 150Kohm (999.9m $\Omega$  to 99.99K $\Omega$ , 149.9K $\Omega$  in 7 ranges).
- **RESOLUTION:**  
4 digits, 100 $\mu\Omega$  on 1ohm range
- **TEST CURRENT:**  
55mAdc constant current up to  $\approx$  91 $\Omega$ , 5VDC constant V above
- **ACCURACY (4-WIRE):**  
0.5% + 0.002ohm + 1/2 digit up to 30K ohm  
1.5% + 1/2 digit above 30K ohm  
5% + 1 digit from 100K to 150K ohm  
Add 20m $\Omega$  for 2-wire

## LEAKAGE CURRENT & PRECISION HIGH VOLTAGE MEASUREMENT

(Models 951i - 955i only)

- **VOLTAGE MEASUREMENT:**  
0 to  $\pm$  8KVDC 6KV RMS AC (951i & 952i)  
0 to  $\pm$  11KVDC 8KV RMS AC (953i & 954i)  
0 to  $\pm$  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  $\pm$  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

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## PULSE MODE (FLASH) TEST

- **TEST WAVEFORM:**  
Square/Trapezoidal pulse waveform. Selectable positive polarity pulse, Negative polarity pulse or Bi-polar pulse
- **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 30mA RMS and pulse width limit from 4 to 30 microseconds for each test
- **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
- **OPTIONAL INTERFACE \*UL-2\*:**  
USB Host Printer Port for hard copy test reports and LAN/Ethernet Interface
- **OPTIONAL INTERFACE \*GUL-3\*:**  
Adds GPIB capability to above USB Host Printer Port and 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, 500 VA 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 data, power cord and operator's manual
- **WARRANTY:**  
One year parts and labor standard, 3 year extended warranty with registration and annual calibration

# Vitretek 950i Series

## 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
959i	Ground Bond/LR Safety Compliance Analyzer
PMT-1	Pulse Mode / High Speed Flash Test Option
AC-2	200mA 2 KVAC Output Option
UL-2	USB Printer Port and LAN/Ethernet Interface Option
GUL-3	GPIB, USB Printer Port and LAN/Ethernet Interface Option
K-1	4-wire Kelvin Low Resistance Measurement Lead Set
K-2	4-Wire 40 A Ground Bond Lead Set
TL-IEC95	IEC Power Socket HV Test lead Set
TL-IEC95GB	IEC Power Socket HV & GB Test lead Set
TL-115-95	IEC NEMA 5-15 Power Socket HV Test lead Set
TL-115-95GB	NEMA 5-15 Power Socket HV & GB Test lead Set
RM-1	Rack Mount Kit

\*North American prices in US\$. International prices slightly higher. Specifications and prices subject to change without notice. ILUNR4610



### VITREK CORPORATION

9880A Via Pasar  
San Diego, CA 92126

Phone: (858) 689-2755  
Fax: (858) 689-2760

Email: [info@vitrek.com](mailto:info@vitrek.com)  
[www.Vitrek.com](http://www.Vitrek.com)