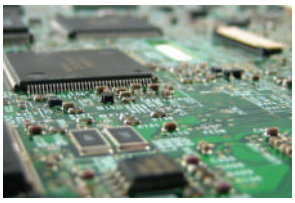

VITREK

ACCREDITED
Calibration Laboratory
Cert # 3678.01

Electrical Safety & Test Equipment

Logicbus® .com.mx

Why Vitrek?

Vitrek - Leading the Electrical Safety Test & Measurement Industry for 25+ Years

Why Vitrek?

For nearly three decades, Vitrek has strived to set the standard for technical innovation, service and value in high-voltage test and measurement. Our products include electrical safety (hipot) testing instruments and systems, power analyzers and high voltage measurement standards. Our global customer base covers the gamut of applications including consumer products, photovoltaic, medical equipment, power conversion, electrical components, appliance manufacturing, and military hardware to aerospace. Our instruments and systems are found in engineering labs, calibration labs and on the production floor.

Leader in Technical Innovation

Precision electrical test and measurement requires the application of a variety of disciplines: expertise in analog measurements — from microvolts to hundreds of kilovolts, from amperes to picoamperes and from microohms to teraohms; special knowledge of high voltage effects on measurements; innovative digital signal processing techniques; effective display and control interfaces and software.

Vitrek's engineering team brings together exceptional knowledge and experience in each of these critical areas with the single-minded aim of producing the world's finest electrical test and measurement equipment.

Leadership In Service

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Calibration Laboratory
Cert # 3678.01

All of Vitrek's products — including hipot, electrical safety testers, high voltage meters, power analyzers and more — come with our pledge to provide world class customer support — before, during and after the sale.

Vitrek operates a fully accredited ISO 17025 Calibration facility. Vitrek's precision instruments are each offered with documentation of accredited calibration. In addition, Vitrek offers calibration services to enable our customers to maintain traceable calibration of your instruments to NIST. *View pages 45 to 46 for details.*

Exceptional Value - Made in the USA

Vitrek's industry-leading quality and performance is the hallmark of Vitrek's value proposition. Our products are cost-effective and typically exceed the performance and quality of competitive units. Vitrek instruments and systems are designed, manufactured and calibrated in our state-of-the-art facility in San Diego, California.

Index

Product specifications contained in this catalog may change without notice.

Our Products

Electrical Safety Test Equipment - Hipot & Ground Bond Testers (V7x & 95x) & Teraohmmeter/IR Tester (98x)

Vitrek manufactures two series of hipot electrical safety testers offering our customers the optimum choice of features, performance and price. The 95x Series features high output power with a wide range of output voltages combined with exceptional leakage current resolution. The V7x series offers outstanding performance in a smaller, lighter weight and lower cost format.

The 98x series Teraohmmeter/IR tester is designed to tackle the toughest High Resistance measurement applications. Demanding applications that most other IR testers won't measure up to. So, when it's time to test higher voltage IR values like today's electric vehicle systems and higher voltage solar arrays — look to Vitrek to deliver the IR tester you need for your production line.

All models come standard with a variety of computer interfaces to simplify test automation right out of the box and can be used with Vitrek's QT Enterprise software. *View pages 9 to 16 for details.*

High Voltage Switching Systems - 964i

Vitrek's 964i high voltage switching system allows you to automate all of your high voltage switching needs. Whether you have to hipot test an 8 pin connector, a 64 conductor cable or an entire tray of SMD capacitors, the 964i automatically routes test points to your tester — so you don't need to. So, when combined with Vitrek's V7x or 95x series hipot testers, this provides a full multi-point testing solution, all controlled through the hipot tester without an additional computer. *View pages 17 to 18 for details.*

Power Analysis - Vitrek PA920, PA910 and PA900 Series and XiTRON XT2640 and 280x Series

Vitrek offers a variety of power analyzers to meet your specific requirements. Our precision harmonic power analyzers are the most accurate, flexible, easy-to-use, high-performance analyzer on the market today — and it won't break your budget. The PA920 delivers multi-channel, high-accuracy, wideband performance to tackle the toughest energy management applications and offers the highest power accuracy (0.024%) available on the market today. Vitrek's power analyzers' modular design can hold up to 4 channels of power measurement in any combination of different channel card types.

In addition Vitrek offers the XiTRON Brand of multi-channel power analyzers including the XT2640 and 280x series 1- and two-channel power analyzers.. The XT2640 offers the same quality, reliability and accuracy you've depended on for all of your XiTRON and Vitrek products. *View pages 21 to 30 for details.*

Precision High Voltage Measurement - 4700 High Voltage Meter

The Vitrek 4700 Precision High Voltage Meter offers the highest level of measurement accuracy, yet with its color touchscreen — it is surprisingly easy to use. Vitrek leverages DSP technology to provide outstanding AC & DC voltage measurement accuracy, stability, repeatability and resolution. The 4700 offers better performance that rivals traditional high voltage reference dividers — yet unlike the tedious divider, the 4700 provides instant and direct high voltage measurement in a safe, highly portable, compact and rugged bench top enclosure.

The 4700 Precision High Voltage Meter measures up to 10kV DC or AC rms directly. With available HV SmartProbes™, the measurement range can be extended to 35 kV, 70 kV, 100 kV or 140 kV.
View pages 19 to 20 for details.

Vitrek Overview

Vitrek's XiTRON Brand

Vitrek's acquisition of the XiTRON brand of high performance instruments expands the company's portfolio to include a variety of additional products. Vitrek will provide ongoing support for all XiTRON products and customers.

DL Series Electronic DC Load

When you need to emulate an electrical load, Vitrek has the solution. Our DL Series electronic load provides the quality and reliability to perform functional tests of batteries, power supplies, solar cells and more. Vitrek's electronic loads are ideal for defense, aerospace, commercial electronics and utility industries when accuracy and reliability are top priority. *View pages 31 to 34 for details.*

Portable Calibrator

The 2000 Series portable DC calibrator brings laboratory accuracy to process control and other field applications. Current loop (4-20 mA) indicators, chart recorders, data acquisition systems, pressure transducers, controllers and recorders can be calibrated with accuracy measured in ppm rather than percentages.

- Generates precise low voltage DC values
- Generates voltages to simulate the most popular TC's
- Calibrates 4-20 ma current loop
- Measure T
- Does closed loop T calibration

View pages 39 to 40 for details.

Phase Angle Volt Meter

The 6250 tests LVDT and RVDT sensors and is a high performance, field-proven instrument that has been trusted for over a decade, and is useful for testing synchro-server systems. It offers an easy-to-use, pre-configured alternative to slower, older and less user-friendly instruments. *View pages 41 to 42 for details.*

XT1600 Microspectrometer

Vitrek offers a variety of products specifically designed for the lighting industry. Vitrek's XiTRON XT1600 Micro-Spectrometer captures any visible light and immediately displays the full spectrum and all test data. The spectrometer features an intuitive touch panel interface and automated report generation. *View page 37 for details.*

257xR Ballast Analyzer

The 257xR Ballast Analyzer provides enhanced technological capabilities while reducing setup and maintenance requirements at a low cost of ownership. With the 257xR, up to four tubes and four ballasts can be tested in a fraction of a second for every key parameter, including peak inrush, striking and light efficiency (when used with a light monitor). With a capacity of 2,000 measurements per second on each of up to 30 signals, the only limitation to testing throughput is the speed of your production line. *View pages 38 for details.*

QT Enterprise Software

While all Vitrek products are designed to be used in completely stand alone manner, there are times when external tools can aid or enhance the operation of an instrument. QTEnterprise & XView software tools and drivers are designed to help easily configure an instrument from a single screen, or are used to view a complete set of measurements on a single screen.

We also offer other software tools that are designed for data collection where results can be recorded in a .csv (Excel compatible) file for post-processing, insertion into reports or simply for archival purposes. *View pages 35 to 36 for details.*

Our Markets

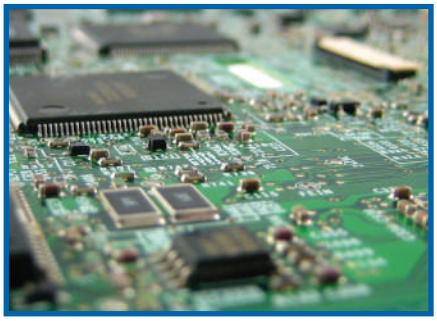
Vitrek supports electrical test and safety requirements in a variety of applications. With Vitrek's ISO 17025 Accreditation, you are ensured of the accuracy and reliability of every Vitrek product. The following provides an overview of some of our primary users.

Manufacturing

Manufacturers have specific electrical and safety test requirements for the products they produce. Manufacturers of electronic devices, home appliances, automotive and medical devices rely on the innovative test and measurement solutions provided by Vitrek. From electrical safety compliance test systems to world class precision power analysis, Vitrek delivers the performance manufacturers need to distinguish their products from the rest of the pack.

Electronic Equipment

Electronic devices must meet specific safety standards that require measurement and testing during the manufacturing process. The global nature of the electronics industry often requires products to meet international safety standards. Vitrek hipot testers are designed to implement pre-programmed tests to confirm product compliance to the relevant electrical safety standards.



Electronic devices, particularly power conversion systems (power supplies, adjustable frequency drives, uninterruptible power supplies, etc.) typically require careful design practices to assure compliance with conducted emissions standards and efficiency objectives. Vitrek Power Analyzers provide an excellent tool to perform these important measurements.

Appliances

Most appliances are a combination of electro-mechanical systems and sophisticated electronic controls. As such, the electronics have the same requirements for compliance testing as most other electronic devices. In addition, the unit itself must also meet electrical safety standards requiring hipot testing.

Automotive

The emergence of electric and hybrid electric vehicles has added a new dimension to automotive electrical safety testing. Battery systems operate at very high (and increasing) voltages requiring accurate measurements possible with Vitrek's High Voltage meters. Cable insulation testing is done using Vitrek's hipot testers and multi-point switching system.

Calibration & Test Labs, R & D Departments

Cal Labs and R & D Departments require high accuracy, product reliability and ease-of-use. They have relied on Vitrek products for over 25 years. Whether testing product upgrades or new products, ensuring the safety of these products is the number one priority. Both hipot and ground bond testers along with high-voltage meters are often found in these facilities. Electrical safety testers (hipot) and high-voltage meters require routine calibration to maintain their NRTL certification. Vitrek's High Voltage Meters are found in calibration facilities, test labs, national standards laboratories and R & D facilities worldwide. In addition, Vitrek operates a ISO17025 accredited calibration facility in our manufacturing facility. Our products are initially shipped with calibration documentation and we offer recalibration services at our San Diego, California facility.

A2LA ACCREDITED
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ISO17025
Certified
Calibration Lab

Medical & Healthcare

Medical and healthcare products frequently require testing to more stringent standards, requiring precise procedures and accurate measurements. Vitrek's hipot testers are designed with the sensitivity to perform leakage current measurements in compliance with these standards.

Vitrek's high-voltage meters are used in tests that require a high accuracy such as in testing radiological devices and other high-voltage medical diagnostic equipment.

Aerospace & Military

Military and aerospace electronics require similar testing for electrical safety as other electronics, but test to different standards. Vitrek's hipot testers are easily programmed to perform these test procedures at the accuracies needed to ensure safety in both of these industries.

Vitrek power analyzers are well-suited to meet the requirements for performing accurate studies of military/aerospace 400 Hz and 800 Hz power distribution systems and power conversion devices. Vitrek products are used world-wide in military calibration and test labs.

Lighting

Vitrek and XiTRON products have several different applications in the lighting industry from hipot & ground bond testing to power analysis, and ballast testers to LED. Vitrek can provide you with the most affordable and cost effective solution for your unique needs.

One product specifically for the lighting industry is the Vitrek XT1600 which provides acccurate lighting level information by measuring any visible light and immediately displaying the full spectrum and all test data. The easy-to-use color touchscreen enables quick and easy measurement and report generation.

Quick and easy measurement enables reporting of:

- Lux - illumination value
- CRI - color rendering index according to CIE
- CRI/DQS - color rendering index/color scale
- Lumen - luminous flux
- CCT correlated color temperature
- and more!

Success Stories

Johnson Controls	**Johnson Controls York, Pennsylvania**
Products Used:	XiTRON XT2640 Power Analyzers
Application:	Manufacturer of Compressors for HVAC equipment. Testing Efficiency of power in versus power out at both ends of production line. Choosing Vitrek products saved over $300,000 over a competing test product.

XP Power	**XP Power Silicon Valley, CA**
Products Used:	Vitrek 4700 High Voltage Meter
Application:	XP Power manufactures High Voltage Power Supplies up to 60kV. Vitrek products utilized for internal testing of DC power supplies as well as R & D department testing utilizing Vitrek's 964i switching system.

axcelis	**Axcelis Beverly, MA**
Products Used	Vitrek 4700 High Voltage Meter HVL70 High Voltage Probe
Application	Manufacturer of Ion implantation systems for semiconductor manufacturing. Vitrek products are embedded in their solution to measure high voltage within their system. Vitrek is an OEM component of their product.

SUB-ZERO	**SubZero Nationwide**
Products Used:	Vitrek Hipot Testers - V7x & 95x
Application:	Manufacturer of a variety of appliances. Vitrek products used for hipot and ground bond testing of appliances on the manufacturing production line. Vitrek was chosen for the accuracy and functionality of the products.

TERADYNE	**Teradyne Nationwide**
Products Used:	Vitrek 95x Hipot Tester with AC30 - 30 kV Output Option
Application:	Manufacturer of testing systems for the semiconductor industry. Vitrek products are embedded in their test systems to measure the high voltage source for their system. Vitrek is an OEM part of their system and was chosen because of our available high voltage output and device accuracy.

Underwriters Laboratories	**UL - Underwriters Laboratories Nationwide**
Products Used:	Utilizes a variety of Vitrek and XiTRON Products including Power Analyzers, Hipot & Ground Bond Testers, High Voltage Meters
Application:	Vitrek & XiTRON products used for a variety of compliance testing including efficiency testing, verification of energy efficiency and standby power specifications for customers.

GE	**GE GE Appliance Products GE Lighting Products Worldwide**
Products Used:	Vitrek 95x & V7x Hipot & Ground Bond Testers for appliance products, V7x Hipot & ground Bond Testers for Lighting division.
Application:	GE appliance products utilize Vitrek Hipot & Ground Bond Testers for manufacturing production line testing of a variety of home appliances including refrigerators, stoves, microwave ovens, dishwashers, etc. GE's lighting division utilizes the V7x hipot testers for their product that enables LED replacement in ballasts from fluorescent tubes. Vitrek testers ensure the safety and reliability of both product lines.

Vitrek Overview

	Boeing Worldwide
Products Used:	Vitrek 95x Hipot & Ground Bond Testers
Application:	Aircraft manufacturers have a special 400 Hz frequency test and validation requirement for their products. The 95x allows for 400 Hz hipot testing of their products and components to ensure reliability and safety of their aircraft.

	Volex - For Tesla Products Worldwide
Products Used:	Vitrek 95x Hipot & Ground Bond Tester with 964i Switching System
Application:	Volex manufactures power charging cables for Tesla electric vehicles. This application requires ultra low contact resistance and high voltage isolation for their products. Vitrek's 95x and 964i systems provide the unique testing capabilities to fit this application.

	TUV-SUD
Products Used:	Vitrek V74 Hipot & Ground Bond Tester
Application:	Third-party compliance testing service. Vitrek products were chosen because of their accuracy, affordability, reliability and the compact size ideal for in-field testing applications.

	Phillips Lighting Division Worldwide
Products Used:	XiTRON Ballast Analyzer and XT2640 Power Analyzer
Application:	Manufacturer of lighting products utilizing the XiTRON Ballast Analyzer for ballast production testing. In addition, Phillips is integrating XT2640 Power Analyzers as their business expands to LED offerings.

	US Government-DFAS Air Force Columbus, OH
Products Used:	Vitrek 4700 High Voltage Meter
Application:	Vitrek products are used worldwide by the government, armed forces and defense departments in a variety of applications. Because Vitrek is a ISO 17025 calibration facility, and our products are shipped with calibration certification certificates, Vitrek products can be easily specified by government entities without having to send devices out for additional certification. DFAS-Columbus replaced their existing resistive dividers with Vitrek products as they are equally accurate yet more affordable then their previous devices.

	Medtronic Nationwide
Products Used:	Vitrek 95x Hipot & Ground Bond Tester and 964i Switching System
Application:	Manufacturer of medical equipment devices including pacemakers, etc. Vitrek products are part of a multi-point test system for medical devices. Vitrek products are the devices of choice because of their flexibility and multi-point switching features.

	Eaton Bus Bar Division Worldwide
Products Used:	Vitrek V7x and 964i Switching System
Application:	Manufacturer of power distribution products. Eaton's bus bar division utilizes Vitrek V7x hipot testers to test power distribution buses. They utilize the 964i switching system for multi-channel switching of multi-phase power systems. Vitrek products allow for quick and easy switching for multi-phase applications while ensuring the accuracy and reliability of Eaton's products.

Electrical Safety Testing Has Never Been Easier.

With color touch LCD and high-speed DSP technology, the compact and rugged V7x sets the standard for price/performance ratio. Made in the USA to meet tough UL, CSA, TUV and IEC Hipot tester requirements — the V7x provides unbeatable speed, accuracy, user safety and reliability.

Choose from six low cost models offering AC and DC hipot to 5kV, leakage current resolution to 100 nano-amps, Insulation Resistance to 450GΩ, Ground Bond to 30 amps and built-in switching. Combine all that with USB, RS-232 and Digital I/O interfaces.

V7x - Hipot Experience Redefined

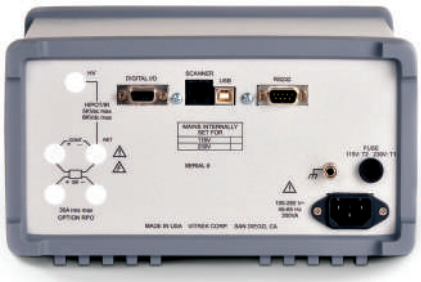
The V7x provides state-of-the-art performance in a powerful yet compact multi-function hipot tester — at an entry level price. From its easy-to-use touch interface, to its ultra-high reliability, high efficiency, fan free design — the V7x provides unrivalled performance for your production line.

Test 8 DUTs at a Time with the V76

For multi-channel hipot testing—choose the V76 with 24 integrated relay high voltage switching. With the versatile V76, you can test hipot or IR for any combination of up to eight test points, and you can measure low resistance (from .001 ohm to 60k ohms) on up to eight conductors. You can test all automatically with a single touch and all from a single compact tester. For requirements exceeding eight points, the V7x can control up to four Vitrek 964i 64 channel HV switching chassis — providing up to 256 channels of hipot test capability. Simple, fast, automatic multi-point hipot — make the switch to the Vitrek V7x. You will be glad you did.

Features & Benefits

- 4.3” Color Touch Display—Easy To Use Intuitive User Interface
- 6 Functions to Choose From—AC/DC Hipot, IR, Ground Bond, Continuity and Built-in Switching
- Made in the USA—Designed and Built in San Diego CA
- QT Enterprise software compatible. Software records test sequences and stores results in a centralized SQL database
- Compact, Lightweight, Rugged, Fan Free, Fast (100ms min test time) and Accurate
- 5kV AC/DC Hipot, 20mA max source current
- Ground Bond 1-30A RMS (42 A peak), 100µΩ Resolution
- 100 nano-Amp Leakage Current Resolution
- Low Cost of Ownership—Two Year Calibration Interval
- USB 2.0, Serial/RS232, Digital I/O Interfaces are standard
- Continuously Variable Insulation Resistance 20-5000V, 450GΩ Max
- Multi-Mode IR with Steady/Rising Pass Mode
- Test Memory Stores up to 999 Steps and 60 Test Sequences
- Internal Self-Test Fully Exercises Output and Verifies Current Accuracy
- Pre-Programmed Daily Verification Test with Optional APVD Series PVD Test Load
- 150µS Safety Shutdown
- APVD Series Ramped Discharge Capability
- Selectable ARC Detection 1-30mA
- Meets UL, CSA, IEC Safety Tester Requirements
- CE Safety Mark Certified to EN61010



Hipot & Ground Bond Testers

AC Hipot

Output Voltage

10 to 5000V RMS, 50/60 Hz (2500V max on V76)

Accuracy :	1% of setting +5V, No load to full load
Resolution :	1V at all levels
Max load current :	20mArms

Leakage Current

Accuracy :	1% of reading +5uA
Resolution :	1uA

DC Hipot

Output Voltage

20 to 5000V (2750V max on V76)

Accuracy :	1% of setting+ 5V, No load to full load
Resolution :	1V at all levels
Max load current :	10mA

Leakage Current

Accuracy :	1% of reading +1uA
Resolution :	0.1uA

IR - Insulation Resistance

Test Voltage

20 to 5000VDC (2750V max on V76)

Accuracy :	2.5% of setting +5V, No load to full load
Resolution :	1V at all levels
Max Charge Current:	5mA automatic
Max Capacitive Load:	2uF

Resistance

Max IR:	450GΩ (90MΩ per volt)
Min IR:	150KΩ
Accuracy :	2% (rdg <5% of max IR), 5% (< 15% of max IR), 10% (< 30% of max IR), 20% (above 30% of max IR)
Max Resolution :	0.1% of value
Min/Max Limits :	Defined for each step, max may be set to none

Test Completion

End on Time:	Determination on final reading
End on Pass:	Test ends with PASS for any reading within limits
End on Fail:	Test ends with FAIL for any reading outside limits
End on Steady:	Test ends with PASS for a steady/rising reading within limits

Low Resistance

Resistance

Range:	0Ω to 60KΩ
Accuracy :	1.5 %+0.015Ω (<13Ω), 3%+1ohm (<1KΩ), 5 %(< 13KΩ)
Resolution :	Down to 0.001Ω

Low Resistance (continued)

Min test time: 60 mS

Test Method:	2 terminal measurement, 10.5mA/ 4.15V max
Resistance Offset:	Test leads/fixture measurement offset may be universally applied

Ground Bond

Test Current:	1 to 30Arms (42A peak), 50/60Hz
Accuracy :	3%+10mA
Resolution :	settable to 0.01A at all levels
Compliance:	> 4.5Vrms (6V pk) for all currents

Method

4 terminal measurement

Resistance

Max Resistance:	Up to compliance V limit at defined test current (4.5ohms max)
Min/Max Limits :	Defined for each step, min may be set to none
Accuracy :	2.5%+3mΩ (<2A), 2mΩ (<6.5A), 1mΩ (otherwise)
Resolution :	0.1mΩ (>6.5A), 1mΩ (otherwise)

Resistance Offset

Test leads/fixture measurement offset may be universally applied.

Test Timing

Ramp Time

For AC/DC Hipot:	0 to 99.9sec (0.1sec resolution, 0.05sec accuracy)

Test/Dwell Time

0.1 to 9999sec or user end (0.1sec resolution, 0.15sec accuracy)

Test Functions

	V70	V71	V73	V74	V76	V77	V79
AC Hipot	•	•	•	•	•	•	
DC Hipot		•	•	•	•	•	
IR			•	•	•	•	
Ground Bond				•		•	•
Low Resistance	•	•	•	•	•	•	•
16 Ch HV Scanner					•	•	

Ordering Information*

V70	AC Hipot Tester
V71	AC/DC Hipot Tester
V73	AC/DC/IR Hipot Tester
V74	AC/DC/IR/GB Hipot Tester
V76	AC/DC/IR Hipot Tester w/ Built-in Scanner
V77	AC/DC/IR Hipot/Ground Bond Tester
V79	Ground Bond Tester
V7x-230V	Factory Set for 230V Line
QT Pro 7	QuickTest Pro Software
QTE-7	QT Enterprise Software
TL-IEC-*	IEC 320 Hipot & Ground Bond Lead Set
TL-115-*	115V Receptacle Hipot Test Adaptor
TL-UP*	Universal Power Receptacle Adapter
TL-209	Additional HV/Continuity Test Lead set
K-2R	Additional Ground Bond Lead Set
HVW-7	High Voltage Warning Light
RSS-7	Remote Start/Stop Switch
RSF-7	Remote Start Footswitch
TL-TP1	High Voltage Test Pistol
RM-7	Rack Mount Kit
HC-7	Hard Carrying Case with Die Cut Foam

Power & Versatility for the Most Demanding Electrical Safety Test Applications.

The 95x Series hipot testers were built 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 range of AC & DC voltage outputs and extremely low leakage current measurement. Then Vitrek added a 4-wire milli-ohmmeter with dynamic range up to 150kOhms and an overlapping tera-ohm class Insulation Resistance function. Add the available 40 Amp Ground Bond capability and you're beginning to get a feel for what the Vitrek 95x Series Hipot Testers can do for you.

For Demanding Hipot Tests — Demand the Vitrek 95x

Speed and power go hand in hand, the 6.5kVDC models offer 50 mA 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 15 kV. Most 95x series testers 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 30 kVAC 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 auto-ranging up to 150kOhms and an available 40 amp Ground Bond function — you've got the most advanced, flexible hipot tester on the market today.

Need to test 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 quick test points and using a PC with Vitrek's QT Enterprise software you can expand that count to 1,020 test points. The HV Switching System of choice is the Vitrek 964i which can hold up to eight 8-channel switching cards — available in 3, 7, 10 and 15kV ratings. The 964i also has switching cards to handle routing of up to 40 amp ground bond currents. View the 964i pages in this catalog for additional details.

Features & 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
- QT Enterprise software compatible — software records test sequences and stores results in a centralized SQL database of test data.
- 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 option AC-30
- 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 sequences with up to 254 steps per sequence. 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 100µ ohms 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

Optional TL-UP2 Test Adapter allows for easy Hipot and Ground Bond connection to virtually any device with a power cord. See accessories section for additional details.

Hipot & Ground Bond Testers

- 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 ensures 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 six Tera-ohm can be obtained with precision in your choice of 4 IR test modes with end on steady or increasing resistance
- 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 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	20V-6.5kV	20V-6.5kV	50V-11kV	50V-11kV	50V-11kV	100-15kV	—
(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 14MΩ	Yes	Yes	Yes	Yes	Yes	Yes	Yes

95x Series Performance Specifications

DC Dielectric Tests (DCW, DCIR, DCez)

DC Output Voltage: 30V to 6500V (951i & 952i)
50V to 11000V (953i, 954i & 955i)
75V to 15000V (957i)
Resolution: 0.1V up to 999.9V, 1V above
Accuracy: <(± 0.25% ± 1.25V ± (0.01% + 0.05V) per mA load) 23C+/-5C

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: measurement period for DC is 7.25ms or 100ms if the dwell is >2s

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 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
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)

AC Dielectric Tests (ACW, ACIR, ACez, ACCAP) (continued)

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 GPIB-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, <85% RH (non-condensing)
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

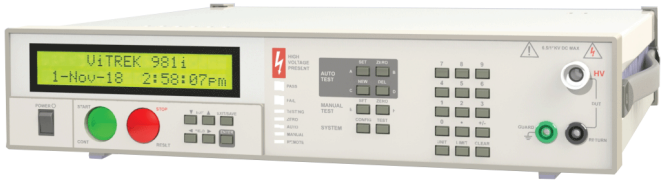
Ordering Information*

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
QTE-9	QT Enterprise 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)

* For complete listing of available accessories visit www.Vitrek.com.

Specifications and prices subject to change without notice.

Expanding the Possibilities of High Voltage High Resistance Measurement.



The Vitrek 981i and 983i Teraohmmeters are designed to tackle the toughest High Resistance measurement applications. Demanding applications that most other IR testers won't measure up to. So when it's time to test higher voltage IR values like today's electric vehicle systems and higher voltage solar arrays — look to Vitrek to deliver the IR tester you need for your production line.

What sets the Vitrek 98x Series IR testers apart from the others?

For starters, these units are based on Vitrek's proven DSP technology — so they have the ability to work into capacitive loads where most others do not. And when it comes to output voltage range, Vitrek delivers — with up to 6.5 kVDC for the 981i and up to 11kV with the 983i.

Need to measure IR on a Multi-Conductor Cable Harness?

The 981i and 983i have 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 QTEnterprise software you can expand the count up to 1020 test points. The HV Switching System of choice is the Vitrek 964i, which can hold eight 8-channel switching cards — available in 3, 7, 10 and 15kV ratings.

In a never ending race for higher efficiency, electric vehicles and solar panel arrays are now operating with voltage rails up to 2.5kV. This is no place for a 1kV tester, it's time to step up to a Vitrek 98x.

Features & Benefits

- Highest Range of IR Test Voltage — Choose from 6.5kVDC or 11kVDC maximum output
- Fast IR Readings – High speed output control with Dual Coldfire® microprocessors and Dual DSPs to provide dwell times as low as 100ms
- QT Enterprise software compatible. Software records test sequences and stores results in a centralized SQL database of test data
- High Resistance Measurement Range – Transfer measurements up to 150 Teraohms
- Expansive Test Sequence Memory holds up to 100 tests with up to 254 steps per test. Tests can be selected via front panel, Ethernet, RS232 or with optional GPIB
- 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
- Ethernet, RS232, Digital I/O, & Scanner Control - All Standard Interfaces - Provides the highest level of test automation. GPIB available
- Pico-Amp Leakage Measurement ensures that even the lowest leakage current levels are accurately detected and 150 Teraohm transfer and 50 Teraohm IR readings are stable and precise
- Test Specific Fixture & Cable Compensation - Automatically calibrate out offset errors caused by test fixture insulation resistance and capacitive and leakage
- Multi-Mode IR - Values up to one Teraohm or more can be obtained with precision in your choice of 4 IR test modes - end on time, end on pass or end on fail or steady or rising
- Continuously Variable IR Test Voltage - Unlike many IR testers which limit you to 3 or 4 discrete test voltages, the 981i allows you to select the test voltage you need from 30V to 6.5kV with 1 volt resolution. The 983i provides outputs from 60V to 11kV
- Capacitive Loads – The 981i & 983i are specified for use with capacitive loads, most IR testers are not. This means the 981i & 983i are exceptional at performing IR tests on cabling, PV panels and CMC devices

Insulation Resistance (IR) Tester

Features & Benefits (continued)

- Light Weight Design – Better reliability, easier on your back. Compare the 4.5 kg 981i/983i to whatever you've been using. Vitrek delivers superior performance in a smaller, lighter footprint
- 3 Year Extended Warranty – 1 year standard, total of 3 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
- Manual Test Mode – Allows for variable voltage output during testing with continuous measurements and pass/fail indication until the user stops the test

General Specifications

Specifications: Valid after 15 minute warm-up, for 1 year from last external calibration, and for ambient temperature within +/-2°C of last performed ZERO operation.

Ethernet: High speed, high noise immunity LAN interface

RS232 Interface: Selectable baud: 9600, 00, 38400, 57600 or 115200, full handshake

VICL Interfaces: Provided for control of HV Scanners

Digital I/O Interface: Provides 4 digital inputs and 5 digital outputs. Functions include, Start/Stop, Testing, Pass/Fail, HV Present, Safety Interlock, Dwell Timer

Optional GPIB: Option GPIB-9 adds GPIB interface capability

Optional HSS2: DUT Isolation Option. Option HSS-2 adds the ability to measure DC breakdown and/or leakage into a grounded DUT with higher resolution than HSS-1. Maximum current capabilities are further reduced.

Operating Temperature: 0°C to 50°C Humidity: <85% RH (non-condensing)

Power: 105-265Vrms, 45-65Hz, 500VA Max

Dimensions: 89mm H x 432mm W x 457mm D
(3.5" H x 17" W x 18" D)

Weight: 5Kg (11 lb.) Net / 7Kg (15 lb.)

Accessories: Alligator test leads, NIST traceable calibration certificate with no data, power cord and operator's manual. Limited ISO 17025 cal cert with data & uncertainties available

Resistance Measurement

NOTE: the use of the OFFSET (or ZERO) capability in either AUTO or MANUAL TEST modes is not required to meet these specifications – the OFFSET capability is intended to allow the user to offset externally produced leakages.

Resistance Measurement (continued)

Minimum resistance:	Higher of 50k ohm or (V/4mA)
981i Resistive Loading:	+/-(0.4%rdg + (R/(1Tohm per kV))%rdg + (10/V)%rdg + 20ohms per kV) for R < 50Tohm
Capacitive Loading (1000pF to 50nF):	+/-(0.5%rdg + (R/(100Gohm per kV))%rdg + (10/V)%rdg + 100ohms per kV) for R < 5Tohm
Capacitive Loading (>50nF):	+/-(0.6%rdg + (R/(10Gohm per kV))%rdg + (10/V)%rdg + 1kohms per kV) for R < 500Gohm
981 + HSS2	(DUT ISOLATED) As 981i plus 1kohm
981 + HSS2 Resistive Loading:	(DUT GROUNDED) +/-(0.5%rdg + (R/(2Gohm per kV))%rdg + (10/V)%rdg + 20ohms per kV) for R < 100Gohm
Capacitive Loading (1000pF to 50nF):	+/-(0.6%rdg + (R/(2Gohm per kV))%rdg + (10/V)%rdg + 100ohms per kV) for R < 100Gohm
Capacitive Loading (>50nF):	+/-(0.75%rdg + (R/(1Gohm per kV))%rdg + (10/V)%rdg + 1kohms per kV) for R < 50Gohm
983i Resistive Loading:	+/-(0.4%rdg + (R/(1Tohm per kV))%rdg + (20/V)%rdg + 40ohms per kV) for R < 50Tohm
Capacitive Loading (1000pF to 50nF):	+/-(0.5%rdg + (R/(100Gohm per kV))%rdg + (20/V)%rdg + 200ohms per kV) for R < 5Tohm
Capacitive Loading (>50nF):	+/-(0.6%rdg + (R/(10Gohm per kV))%rdg + (20/V)%rdg + 2kohms per kV) for R <

Ordering Information*

Item	Description
981i	6.5kV Teraohmmeter/IR Tester
981i+HSS2	6.5kV Teraohmmeter/IR Tester w/ HSS2 Option
983i	11kVDC 6kV Teraohmmeter/IR Tester
QTESW	QT Enterprise Software
GPIB-9	Optional GPIB Interface
RM-1	Rack Mount Kit
RSS-95	Remote Start/Stop Switch
RFS-95	Remote Start Foot Switch

* For complete listing of available accessories visit www.Vitrek.com.

964i High Voltage Switching System

The Perfect Solution for Automated Multi-Conductor, Multi-Point Hipot Testing.

You have a job to do — you have to hipot test a 16 conductor medical cable at 8500V to ensure that each conductor is properly isolated from every other conductor. You have two choices, you can try to do it manually or you can use the Vitrek 964i to automatically route the HV and return signals to the proper test points.

The manual method is extremely problematic. Slow, error prone, labor intensive and operator hazardous — don't even think about recording the test results! The 964i on the other hand is purpose-built to fully automate all of your HV switching needs. You choose the 964i, partner it with a Vitrek 95x Series Industrial Strength Hipot Tester and QT Enterprise test automation software. The company wins the Malcolm Baldridge National Quality Award, you get a promotion and that corner office you've always wanted. Choose Carefully!

High Voltage Switching Doesn't Get Any Easier

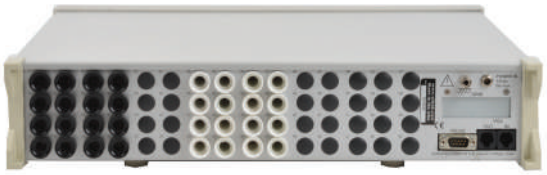
Whether you have to hipot an 8-pin conductor, a 64 conductor cable or an entire tray of SMD capacitors — the 964i has the capacity to automatically route test points to your tester so you don't have to. The 964i is easily configured to handle your test specifications. First, select from 4 different voltage ratings - 3kV, 7kV, 10kV and 15kV. Next, decide on how many cards you need. And finally, choose the input, either + (HV bus) or - (return bus) for each card. It's that simple. Call Vitrek's team of application experts to custom configure the 964i to your specific requirements.

Try the 964i HV Scanner, you will Never Switch Again!

The Vitrek 964i routes high voltage test signals and return signals to any desired test points. This unique capability gives you control over each individual relay, unlike typical cable testers which restrict you to a fixed pattern. Users can also access the matrix with other equipment such as an LCR meter or DMM. The result is a highly repeatable, rapid switching test system with no operator intervention and fully automated switching. With voltage switching capability up to 15,000 volts or current switching as high as 40 amps, the 964i can handle just about any test requirement that comes along.

Features & Benefits

- High Voltage Ratings to 3kV, 7kV, 10kV or 15kV
- High Current Ratings to 70 Amps
- QT Enterprise software compatible. Software records test sequences and stores results in a centralized SQL database of test data.
- Reduces hazardous operator exposure to high voltage
- Improves test quality, consistency and repeatability
- Enhances end product quality and reliability
- Up to 64 channels in a single compact unit
- Vitrek Hipot Tester control ports and RS232 interfaces standard
- GPIB optionally available
- May be controlled directly by Vitrek Hipot Tester
- Pair with a Vitrek V7x or 95x Hipot Tester and QT Enterprise software for a full testing solution
- CE mark certified to EN 61010
- Made in the U.S.A.



The 964i rear panel accommodates up to 60 output terminals. Unit shown above with 16+ terminals (HV) and 16 - terminals (return). The 964i ships with mating cables for all +/- HV terminals 7kV and higher. Custom length HV lead sets are optionally available.

High Voltage Switching System

964i Performance Specifications

HV Series Relay Boards

Max Voltage:	(Between any two connections or ground) HV3: 3kV HV7: 7kVDC 5kVAC, HV10: 10kVDC 7kVAC, HV15: 15kVDC 10kVAC
Frequency:	<500Hz.
Carrying Current:	<1Arms continuous, <2Arms for <1 second.
Switching Power:	HV7 and HhvV10: <50W (resistive). HV15: <10W (resistive).
Switching Time:	<5ms (including bounce).
Expected Life:	<1mA, <100V resistive 500,000 operations. At max switching power: 1,000 operations
Contact Resistance:	At terminals, <50% expected life operations (add 0.1Ω for <100% life) <0.25Ω (uncompensated), <0.1Ω (compensated), <±0.1Ω difference between lowest and highest.
Leakage Resistance:	Any individual connection to ground: >500GΩ at <30C.
Common connection to ground:	>100GΩ at <30C. Between any two connections: >1TΩ at <30C.
Leakage Capacitance:	Any individual connection to ground: 15pF (typical).
Common connection to ground:	50pF (typical). Between any two connections: 5pF (typical).
Thermal EMF:	<1mV.
Coil Power:	Holding closed: 0.3W (typical), Closing: 1.25W for 5ms (typical)

LV Series Relay Boards

Max Voltage:	(Between any two connections) 3kVDC 2kVAC (between any connection and ground) 5kVDC 3kVAC
Frequency:	<500Hz.
Carrying Current:	<1Arms continuous, <8Arms for <1 second.
Switching Power:	<500W (resistive) Switching Time: <10ms (including bounce).
Expected Life:	<1mA, <100V resistive 5.000,000 operations. At max switching power: 100,000
Contact Resistance:	At terminals, <50% expected life operations (add 0.05Ω for <100% life) <0.175Ω (uncompensated), <0.05Ω (compensated), <±0.075Ω difference between lowest and highest.
Leakage Resistance:	Any individual connection to ground: >1GΩ at <30C.
Common connection to ground:	>200MΩ at <30C. Between any two connections: >1GΩ at <30C.
Leakage Capacitance:	Any individual connection to ground: 15pF (typical).
Common connection to ground:	50pF (typical). Between any two connections: 10pF (typical).
Thermal EMF:	<200uV.
Coil Power:	Holding closed: 0.12W (typical), Closing: .5W for 5ms (typical)

HC Series Relay Boards

High Current Relay Specifications -

Max Voltage:	Between any two connections: 1.5kVdc/1kVrms.
Any connection to ground:	1.5kVdc/1kVrms.
Frequency:	<500Hz.
Carrying Current:	<40Arms continuous, <60Arms for <1 second.
Switching Power:	<500W (resistive).
Min Switching Current:	>0.5Arms.
Switching Time:	<20ms (including bounce).
Expected Life:	1 to 10Arms resistive 500,000 operations. At max power: 10,000 operations.
Contact Resistance:	<0.025Ω (at terminals, <100% expected life operations).
Leakage Resistance:	Any individual connection to ground: >20MΩ at <30C.
Common connection to ground:	>5MΩ at <30C. Between any two connections: >20MΩ at <30C.
Coil Power:	Holding closed: 0.6W (typical), Closing: 2.5W for 25ms (typical)

Low Current Relay Specifications -

Voltage:	Between any two connections: 1.5kVdc/1kVrms. Any connection to ground: 1.5kVdc/1kVrms.
Frequency:	<500Hz.
Carrying Current:	<1Arms continuous, <2Arms for <1 second.
Switching Power:	<30W (resistive).
Switching Time:	<5ms (including bounce).
Expected Life:	<1mA, <100Vdc 5,000,000 operations. At max power: 100,000 operations.
Contact Resistance:	At terminals, <50% expected life operations (add 0.05Ω for <100% life), <0.15Ω (uncompensated), <0.05Ω (compensated).

HC Series Relay Boards (continued)

Leakage Resistance;	Any individual connection to ground: >100GΩ at <30C.
Common connection to ground:	>10GΩ at <30C. Between any two connections: >100GΩ at <30C.
Leakage Capacitance:	Any individual connection to ground: 15pF (typical).
Common connection to ground:	50pF (typical). Between any two connections:10pF (typical)
Thermal EMF:	<100uV.
Coil Power:	Holding closed: 0.06W (typical), Closing: 0.25W for 5ms (typical)

General Specifications

Relay Card Capacity:	Eight cards
Front Terminals:	6 input terminals
Rear Panel Terminals:	60 terminals
Interfaces:	RS232 and VICL (Vitrek Hipot Control) standard, GPIB optional
Nominal Dimensions:	89mmH x 432mmW x 457mmD (3.5" x 17" x 18")
Nominal Weight:	Mainframe only 3.5Kg (8lb) net, 7Kg (16lb) shipping. Add 0.75Kg (1.5lb) per relay card
Storage Environment:	-20 to 75C (non-condensing)
Operating Environment:	0 to 50C, <85% RH (non-condensing), Pollution Deg 2
Operating Altitude:	0 to 10000ft ASL
Line Power:	105-265Vrms, 45 to 450Hz, Category II using provided external power module
Accuracy:	Valid one year ± 5C from Cal temperature

Ordering Information*

964i	High Voltage Switching System Mainframe (8 card capacity)
964i-8X2MX	Pre-built 964i w 2 ea 7kV 8 Ch. Cards and a Hipot/Cont Mux Ca
964i-16X2MX	Pre-built 964i w 4 ea 7kV 8 Ch. Cards and a Hipot/Cont Mux Ca
964i-24X2MX	Pre-built 964i w 6 ea 7kV 8 Ch. Cards and a Hipot/Cont Mux Ca
LV3-8R	3kV Single (+) Input Bus 8 Outputs, Red Banana Jacks
LV3-8B	3kV Single - Input Bus 8 Outputs, Black Banana Jacks
LV3-8S	3kV (-) Bus Input 4 Outputs Blk, (+) Bus Input 4 Outputs Red
LV3-MX2	3kV Dual Input (HV/Cont) Single Output (+) Bus
HV7-8W	7kV Single (+) Input Bus 8 Outputs, White HV Terminals
HV7-8B	7kV Single (-) Input Bus 8 Outputs, Black HV Terminals
HV7-8S	7kV (-) Bus Input 4 Outputs Blk, (+) Bus Input 4 Outputs White
HV7-MX2	7kV Dual Input (HV/Cont) Single Output (+) Bus
HV10-8W	10kV Single Input Bus 8 Outputs, White HV Terminals
HV10-8B	10kV Single Input Bus 8 Outputs, Black HV Terminals
HV10-MX2	10kV Dual Input (HV/Cont) Single Output (+) Bus
HV15-8W	15kV Single Input Bus 8 Outputs, White HV Terminals
HV15-8B	15kV Single Input Bus 8 Outputs, Black HV Terminals
HV15-MX2	15kV Dual Input (HV/Cont) Single Output (+) Bus
GP-964	GPIB Interface Option
GP-1	GPIB Cable, 1 meter length
VICL-2	Replacement Vitrek Hipot Communication Cable 7ft
RM-1	Rack Mount Kit
HVC-M*	Additional Male HV Mating Connector,
HVC-FW	Female HV Panel Mount Receptacle/Connector, White
HVC-FB	Female HV Panel Mount Receptacle/Connector, Black
TL-HVW	20kV Rated 18 AWG Test Lead 4ft , HVC-MW to Alligator Clip
TL-HVB	20kV Rated 18 AWG Test Lead 4ft , HVC-MB to Alligator Clip
HVW-20	Bulk 20kV Rated 18 AWG Test Lead Wire, price per ft

4700 High Voltage Meter

Precision & Rugged Reliability You Can Depend On For HV Measuring Requirements.

The 4700 Precision High Voltage Meter offers the highest level of measurement accuracy, yet with its color touchscreen — it's surprisingly easy to use. Vitrek's DSP technology delivers outstanding AC and DC simultaneous voltage measurement accuracy, stability, repeatability and resolution. High speed, direct readings are provided up to 10 kV DC or rms AC. With available HV SmartProbes™, the measurement range can be extended to 35kV, 70kV, 100kV and 150kV.

Superior Performance By Design — HV Reference Divider Performance, Easy-To-Use Touchscreen Operation and Crush-Proof Steel Enclosure

Measurement integrity is our bottom line — whether you are running a production line manufacturing medical imaging equipment, in a national laboratory conducting ground breaking research or in a cal lab certifying test equipment — it is essential to choose your tools carefully. To ensure the best possible measurement accuracy, the 4700 makes over 40,000 readings per second which are then filtered, sub-sampled, scaled and offset corrected — all with "error free" mathematic methodology. The True RMS AC readings are as true as they come, while the DC measurements offer rocket fast settling with solid stability. In addition, the 4700 provides VLF AC readings down to 0.01 Hz, as well as peak to peak, crest factor and fundamental frequency measurement. Available G series probes offer extremely high input impedances for electrostatic voltmeter applications.

High Voltage Test Automation

Automate your HV test requirements with the 4700's built in Ethernet port, high speed serial port or available GPIB. The 4700 is fully programmable so you can select your measurement mode and bandwidth and then take readings as often as desired. The 4700 also comes standard with a USB printer port to capture readings and get printouts of HV plots - so you can document the sag or overshoot in a typical hipot test.

Direct Measurement or HV SmartProbe™

Vitrek's 4700 precisely measures voltages up to 10kV, right out of the box — with no external probes. That's high enough for most of the HV sources out there. However, should you care to expand your high voltage measurement range — just add one or more of the available 35kV, 70kV, 100kV and 150kV SmartProbes™. The Vitrek SmartProbes™ each store their own calibration data which is downloaded when they are plugged in to the 4700 — this results in high accuracy, calibrated readings and allows any Vitrek SmartProbe to be used with any 4700 HV Meter. The SmartProbe's proprietary, ultra-low TC attenuator design minimizes self-heating — while its low capacitance technology enhances AC performance. In addition to the direct input terminal, the 4700 has two probe inputs — use one probe to extend your measurement range or use two probes for making high voltage differential measurements.

Vitrek's Calibration Laboratory is ISO 17025 Accredited

Vitrek's 4700 and probes come with a free ISO 17025 accredited calibration with data and uncertainties.

A2LA ACCREDITED
Calibration Laboratory
Cert # 3678.01

Features & Benefits

- Calibrates hipot testers, HV power supplies and insulation testers
- Measures up to 10 kV directly and 35, 70, 100 or 140kV with HV SmartProbes
- Basic accuracy —0.03% DC and 0.1% true RMS AC
- Color touchscreen — for easy measurement selection & display
- Ethernet, serial, USB printer port all standard, GPIB optional
- Simultaneous AC and DC voltage readings
- Chart Mode provides graphic documentation of HV drift, ramp time, overshoot and sag
- Dual inputs allow Differential or Phase-to-Phase voltage measurement
- High speed DSP provides up to 60 filtered readings per second
- True RMS AC measurement from 0.01 Hz to 600 Hz — covering VLF to aviation frequencies
- AC noise rejection 78dB - for rock solid, six digit DC measurements
- Optional battery pack goes up to 11 hours between charges
- G Series - high input impedance probes for electrostatic applications
- CE mark Certified to EN61010

4700 High Voltage Meter Specifications

General Specifications

AC/DC Voltage Measurement Resolution: Selectable 4, 5 or 6 digits
Measurement Functions: DC Voltage, True RMS AC Voltage, Ripple, Peak to Peak, Crest Factor & Frequency Measurement (4 digits 0.01 Hz to 600Hz)
Measurement Time: Selectable down to 16mS (60 readings per sec.)
Maximum Input to Common Terminal: 3 kV Peak for 1 sec, no damage
Accuracy Specifications: Valid one year ± 5C from Cal temperature

Environmental/Physical

Operating Environment 0 to 50C, <85% RH (non-condensing)
Dimensions 218mm (8.5") wide x 130mm (5") high x 253mm (10") deep, nominally
Weight 2.4kg max (4kg shipping)

Power

AC Source 45 to 450Hz, 100 to 265Vrms at <15W (20VA) using supplied external power supply
DC Source 11 to 16Vdc at <1.2A, using a center positive 2.1mm DC power connector BP-47 Battery Option Up to 11hrs continuous operation

Standard Accessories

The 4700 and probes are shipped with an ISO 17025 cal cert with data and uncertainties, direct input test leads, chassis ground lead, operator's manual, and external power supply. The HVP handheld probes comes with a detachable probe tip and the HVL series probes ship come with a toroid corona shield.

4700 High Voltage Meter Specifications

Maximum Voltage Measurement (Input Impedance)

Direct Input Terminal	10kVDC, 10kVACrms (110 Meg ohms)
HVL/P-35 Probe	35kVDC, 30kVACrms (200 Meg ohms)
HVL-35G Probe	35kVDC (10 Gig ohms)
HVL-70 Probe	70kVDC, 50kVACrms (400 Meg ohms)
HVL-70G Probe	70kVDC (20 Gig ohms)
HVL-100 Probe	100kVDC, 75kVACrms (600 Meg ohms)
HVL-100G Probe	100kVDC (30 Gig ohms)
HVL-150 Probe	140kVDC, 100kVACrms (1 Gig ohm)

DC Voltage Measurement Accuracy (Resolution)

Direct Input Terminal	0.03% of reading + 0.03V (10mV)
HVL/P-35 Probe	0.035% of reading + 0.07V (100mV)
HVL-35G Probe	0.25% of reading + 1.5V (1V)
HVL-70 Probe	0.04% of reading + 0.2V (1V)
HVL-70G Probe	0.35% of reading + 3.5V (1V)
HVL-100 Probe	0.05% of reading + 0.3V (1V)
HVL-100G Probe	0.5% of reading + 15 (10V)
HVL-150 Probe	0.08% of reading + 0.7V (10V)

AC Voltage Measurement Accuracy (Resolution)

Direct Input Terminal	0.12% of reading + 0.1V (10mV)
HVL/P-35 Probe	0.1% of reading + 0.2V (100mV)
HVL-70 Probe	0.1% of reading + 0.4V (1V)
HVL-100 Probe	0.1% of reading + 0.6V (1V)
HVL-150 Probe	0.5% of reading + 1V (10V)

High Voltage Self Heating Effect

Direct Input Terminal	1.5 ppm of reading times kV^2
HVL/P-35 Probe	0.4 ppm of reading times kV^2
HVL-70 Probe	0.14 ppm of reading times kV
HVL-100 Probe	0.14 ppm of reading times kV^2
HVL-150 Probe	0.2 ppm of reading times kV^2

Ordering Information

4700	Precision High Voltage Meter
BP-47	Internal 11 Hour Battery Pack
GP-47	GPIB (IEEE-488) Interface
HC-47	Hard Carrying Case
RM-47	Rack Mount Kit
HVP-35	35kV Handheld Probe
HVL-35	35kV Bench Top Lab Probe
HVL-70	70kV Bench Top Lab Probe
HVL-100	100kV Bench Top Lab Probe
HVL-150	150kV Bench Top Lab Probe
HVL-35G	35kV High Impedance Lab Probe
HVL-70G	70kV High Impedance Lab Probe
HVL-100G	100kV High Impedance Lab Probe
TL-47	Replacement Test Lead kit

* For complete listing of available accessories visit www.Vitrek.com.

PA9xx & XiTRON XT2640
Multi-Channel Power Analyzer

New Product

All The Data You Need at a Price You Can Afford.

The Vitrek PA9xx Series Precision Harmonic Power Analyzers are easy-to-use high performance power analyzer that won't break your budget. The PA9xx Series delivers multi-channel, high-accuracy, wideband performance — to tackle the toughest energy measurement applications. Trust Vitrek to deliver world class power measurement capability at a price that is surprisingly affordable.

The PA9xx series is available in a variety of accuracy levels to meet your unique application. Whether you need ultra-high accuracies as found in the PA920 (0.024%) or the standard accuracies of the PA900 (and XiTRON brand XT2640), the Vitrek series of power analyzers is the right choice for the job.

Precision + Ease of Use = Affordability

The Vitrek PA9xx boasts an impressive array of precision power measurement capabilities, yet its color touchscreen user interface is refreshingly easy to use. The accuracy of the PA9xx series is truly world class — surpassing rival instruments costing triple the price. When it comes to speed and bandwidth — Vitrek power analyzers top the charts with 100 full precision readings per second and measurement bandwidths sufficient to handle 5 MHz waveforms. For tackling tough power factor, low phase angle and high crest factor loads, the PA9xx is unbeatable. Offering full performance for crest factors as high as 30:1, the PA9xx places the advantage of superior power measurement capability squarely in the palm of your hands, or if you prefer, at the tip of your finger.

The Best Solution for the Toughest Power Measurement Applications

Energy is one of our most precious resources. Design engineers are under constant pressure to increase efficiency and reduce excess product power consumption down to the last uW. Challenging programs like LED and HID lighting, solar panel energy output, efficiency testing on inverters and PWM motor drive systems on electric vehicles — all require fast, precise, reliable power measurement. The unequalled performance of a Vitrek Power Analyzer gives you the competitive advantage — the ability to accurately capture the waveforms and power data you need to squeeze the last drop of extra energy out of your project.

Features & Benefits

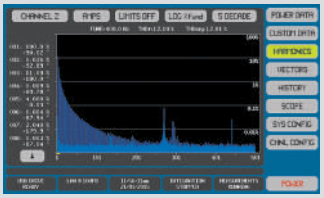
- Most advanced Power Measurement Platform with an unprecedented range of capabilities
- A variety of accuracy options to meet your specific application - PA920 - 0.024%, PA910, PA900 & XT2640 - 0.045%
- Highest Precision with Industry leading noise floor—as low as 1ppm vs 300ppm or more on competitive units
- Up to 500 Harmonics at 400Hz, meets Airbus avionics power measurement criteria. Bar graph also features fingertip selectable numeric amplitude and phase data
- Large, Hi-Resolution Color Display shows all the data you want with an easy-to-use touchscreen user interface to get you up and testing in no time
- Modular design lets you choose up to 4 Power Measurement Channel Cards in any combination of three different Channel Card types
- A variety of channel cards available to meet your specific application and accuracy requirements.
- All Channel Cards types are available with one of 3 current input options: D - Dual Shunt, H - High Current and X - External Current Transducer Input
- Built-in Data Logger—Logs up to 16 selectable data results to USB thumbdrive. Intervals from 10mS to 100 hours with optional time/date stamps
- Power Data Screen - displays V, A, W, VA, VAR and PF data for any selected channel or group of channels
- Custom Power Data Screens - lets you choose the color, font size, location and data you want displayed
- With selectable time base and triggering—Scope View, acts as a 20/24 bit digital scope to capture events such as in-rush current
- Cycle View - Automatically sets the trigger and time base to easily show a single cycle of the voltage and current periodic waveforms sampled over many cycles within a measurement period
- Vector Screen—Displays up to 10 fundamental voltage and current vectors

Features & Benefits

- History Screen—Like a DVR, the PA9xx automatically maintains a continuous historical recording of measurement data. Any data from this record may be viewed or downloaded. Pause, clear and restart functionality is available from the HISTORY screen or via interface
- Effective Sampling Rate - for analysis of periodic signals within a measurement period is 384mS/S
- Measurement Resolution - A variety of options available based on the channel cards required, see model specification pages for details
- Up to 3 Different Virtual Power Analyzers™ (VPAs) may be configured for three phase measurements or input/output efficiency tests—so there is no need to interconnect separate units in order to make synchronous or non-synchronous group power measurements
- VPA Efficiency Grouping—Available data includes: Power totals for IN, MIDDLE and OUT efficiency groups, the power loss between any pair of groups, and the percentage efficiency between any pair of groups
- VPA Multi-Channel Wiring—Each VPA may be configured as 2ø3w (2 ch), 3ø3w (2 ch), 3ø3w (3 ch), 3ø4w (3 ch)
- Connectivity - Ethernet, High Speed Serial and USB (client) control interfaces
- Front Panel USB Drive Interface—Permits data logging to a file, 'screen shot' capture, easy import and export of: display and measurement configurations and custom data screen definitions
- Available MT type Channel Card for motor torque and speed inputs
- CE mark certified to EN61010
- Two year parts and labor warranty, two year accuracy periods
- Made in the USA

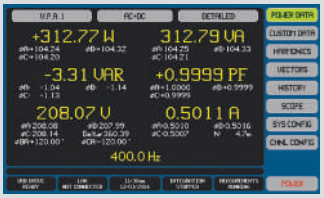
Features	PA900/XT2640	PA910	PA920
# Channels	1-4	1-4	1-4
Multi-Unit Operation	Up to 1,000 units measurement sync and efficiency grouping		
Base Accuracy	0.045% Reading No adder for range	0.045% Reading No adder for range	0.024% Reading No adder for range
A/D Converter	22 bits	24 bits	24 bits
Sample Rate	910kS/s	1.2MS/s	1.2Ms/s
Harmonics Capability	Up to 500th (~435kHz Max)	Up to 500th (~600kHz Max)	Up to 500th (~600kHz Max)
Max Harmonic Fundamental	435kHz	590kHz	590kHz
Max Continuous Voltage	1,000V RMS	1,000V RMS	1,625V RMS 3,300 V Peak
Built-In Compliance Testing	EN50564, EN61000-3-2/-12, User Specified Harmonics Limits and More		
Interface	USB, LAN, RS-232C, GPIB		
Graphical History	Up to ~ parameters always recording (2ms to 584 million years)		
Data Update	Up to 2ms (10ms without increased error)		

Harmonics Screen



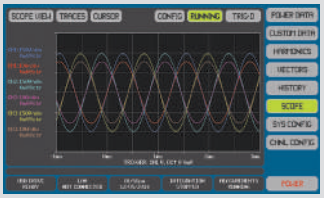
To meet advanced power harmonics requirements, the PA9xx displays up to 500 harmonics even at aviation power frequencies. The chart can be set to show linear, relative linear, logarithmic or relative logarithmic amplitudes.

Power Data Screen



The power data screen, available with one touch, displays V, A, W, VA, VAR and PF data for any selected channel or group of channels known as a Virtual Power Analyzer ™ (VPA). Up to three different VPAs can exist in a single PA9xx. In addition to the primary data, peak readings, phase, CF and other parameters are also available. Integrated data results (WHr) can also be controlled and viewed from the power data screen. For users with unique data requirements, custom data screens can be built with a spreadsheet application and downloaded to the PA9xx via interface or USB drive.

Scope Screen

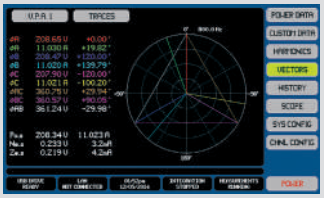


Scope view offers waveform acquisition and analysis similar to a digital scope. Up to six signals can be displayed, each having user selectable scaling, offset and color. Timebase, trigger and trigger position are all user selectable. However, with amplitude accuracies as high as 0.03% — you are unlikely to find any other scope with this high level of precision.

Cycle View

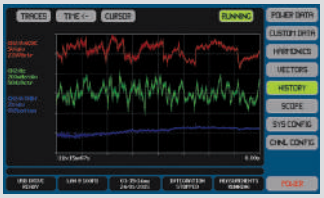
The cycle view represents a single cycle of the voltage and or current periodic waveforms. The adjacent waveforms represent a full 10V square wave in blue and a 50:1 zoomed view in red. Since the user sets amplitude and scaling, the result is an almost unlimited ability to amplitude zoom to expose fine detail. The sampling is forced to be asynchronous to higher order harmonics which leads to an effective sampling rate of 384MSPS.

Vector Screen



A polar chart graphically displays the fundamental voltage and current vectors for the selected channel or VPA. For multi-phase VPAs, the inter-phase voltages and non-measured neutral phase vectors are displayed. The user may enable the display of and select the color of each vector up to a maximum of 10.

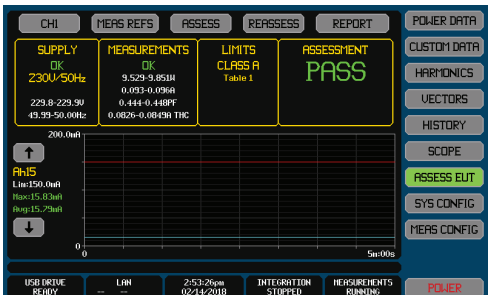
History Screen

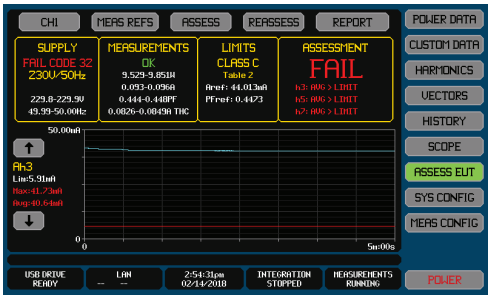


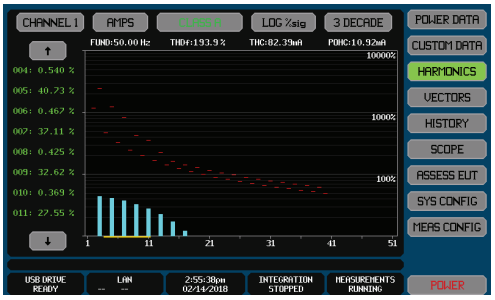
The PA9xx automatically maintains a continuous historical record of all non-harmonic measurement results and selected harmonics. Up to four user selectable parameters can be graphically displayed using the HISTORY screen. The user can display the entire recorded period up for several years or zoom in as far as 1/64th of the total span. This provides an almost unlimited ability to amplitude zoom and include a cursor which may be moved throughout the period with a touch of the screen.

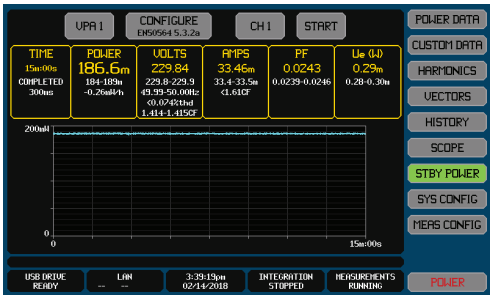
New Product

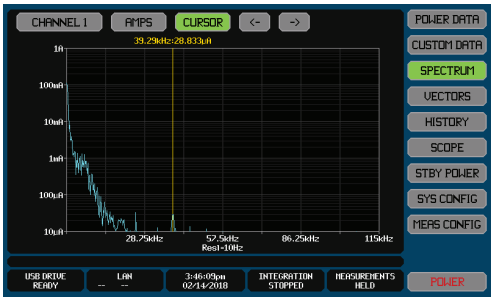
Built-In Standards Compliance Testing.











The Vitrek PA9xx/XiTRON XT2640 Precision Harmonic Power Analyzers feature a built-in compliance test for various industry leading environmental performance standards. These compliance tests are integrated into the PA9xx and are selectable from the touch-screen. The test results can also be displayed on the touch-screen with no requirement for PC-based software.

Our touch screen display feature significantly improves the user interface and efficiency when performing critical tests. Engineers and technicians enjoy the flexibility of using the touch screen at the test station or with external software.

Built-In Compliance Testing Supports Environmental Performance Testing

The Vitrek PA9xx and XT2640's built-in compliance testing supports performance standards including:

- EN60034-2-1:2014 (motor drives)
- EN50564:2011 (standby power)
- EN61000-3-2 and 3-12 and 4-7 (harmonics emissions
- RTCA DO-160E/F/G (avionics)
- Boeing 787B3-0147
- Airbus ABD0100.1.8 (A380) and ABD0100.1.8.1 (A350)

XView Software Compatible

While all Vitrek products are designed to be used in a completely stand alone manner, there are times when external tools can aid or enhance the operation of an instrument.

Xview software tools and drivers are designed to help easily configure an instrument from a single screen, or are used to view a complete set of measurements in a single screen.

Other XView tools are designed for data collection where results can be recorded in an Excel compatible file for post-processing, insertion into reports or simply for archival purposes.

PA900 & XT2640 Technical Specifications

For full technical specifications visit www.vitrek.com

VOLTAGE INPUT CAPABILITY AND CHARACTERISTICS

Specification		S Channel Type	A Channel Type	L Channel Type	W Channel Type
No Damage Voltage Range	<1ms	<3000V_{RMS} and V_{PK}		<500V_{RMS} and 3000V_{PK}	<3000V_{RMS} and V_{PK}
	<100ms	<2000V_{RMS}		<300V_{RMS}	<1500V_{RMS}
	<5s	<1500V_{RMS}		<250V_{RMS}	<1000V_{RMS}
	Continuous	<1000V_{RMS}		<160V_{RMS}	<650V_{RMS}
	PA900 Unpowered	As above			
Measurable Voltage Range		<1803V_{RMS} and V_{PK}		<182.3V_{RMS} and V_{PK}	<1803V_{RMS} and V_{PK}
Specified Voltage Range		<1000V_{RMS} and <1750V_{PK}		<160V_{RMS} and <175V_{PK}	<650V_{RMS} and <1750V_{PK}
Impedance Burden		1.201MΩ ± 0.25%		121kΩ ± 0.25%	399.5kΩ ± 0.25%
3dB Bandwidth (typical)		900kHz			3MHz

CURRENT INPUT CAPABILITY AND CHARACTERISTICS

Specification		Channel Type	Option H	Option D HI Range or Auto-Range when on HI Range	Option D LO Range or Auto-Range when on LO Range	Option X HI Range	Option X LO Range
No Damage Current Range	<8ms	All	<200A_{RMS} and <300A_{PK}	<150A_{RMS} and <250A_{PK}	<60A_{RMS} and <150A_{PK}	<200V_{RMS} and <300V_{PK}	<20V_{RMS} and <30V_{PK}
	<40ms	All	<75A_{RMS}	<50A_{RMS}	<40A_{RMS}	<50V_{RMS}	<10V_{RMS}
	<1s	All	<50A_{RMS}	<30A_{RMS}	<5A_{RMS}	<30V_{RMS}	<5V_{RMS}
	Continuous	All	<30A_{RMS}	<20A_{RMS}	<2A_{RMS}	<25V_{RMS} and V_{PK}	<5V_{RMS} and V_{PK}
	PA900 Unpowered	All	As Above	<2A_{RMS} and <150A_{PK}		<25V_{RMS} and <300V_{PK}	
Measurable Current Range		All	<225A_{RMS} and A_{PK}	<150A_{RMS} and A_{PK}	<1.02A_{RMS} and A_{PK}	<23.1V_{RMS} and V_{PK}	<0.576V_{RMS} and V_{PK}
Specified Current Range		All	<30A_{RMS} and <200A_{PK}	<20A_{RMS} and <140A_{PK}	<1A_{RMS} and A_{PK}	<15V_{RMS} and <20V_{PK}	<0.55V_{RMS} and V_{PK}
Impedance Burden		All	2.5mΩ to 7mΩ	4mΩ to 12mΩ	0.562Ω ± 0.75%	20.5kΩ ± 0.25%	10.25kΩ ± 0.25%
3dB Bandwidth (typical)		S, A or L	1.25MHz				
		W	5MHz			3MHz	

INPUT CAPABILITIES AND CHARACTERISTICS

Input Terminals	SPD (Speed) : BNC (isolated from PA900 chassis), configurable as analog or digital input TRQ (Torque) : BNC (isolated from PA900 chassis), configurable as analog or digital input DIR (Direction) : BNC (isolated from PA900 chassis), digital input
Input Common-Mode	Up to -15Vpk to +15Vpk specified Up to -30Vpk to +30Vpk with no damage
Analog Input Range	Up to -12Vdc to +12Vdc specified Up to -15Vpk to +15Vpk specified Up to -30Vpk to +30Vpk with no damage
Digital Input Range	LO: <0.8V (nominal) HI: >2V (nominal) Up to -30Vpk to +30Vpk with no damage
Input Impedance	Each input nominally 150kΩ to PA900 chassis ground

PA900/XT2640 Power Analyzers

A PA900 or XT2640 comes standard with operator manual CD, power cord and a NIST cal cert with no data including all channels. An ISO 17025 accredited cal cert with data and uncertainties is available. Each channel card includes four color coded, heavy duty 1.5 meter alligator to sheathed banana test leads.

PA910/920

New Product

PA910 & PA920 Technical Specifications

Voltage Input Capability and Characteristics

Specification		V Channel Type	K Channel Type	B Channel Type	U Channel Type
Voltage Input Burden		1.201MΩ ± 3kΩ	2MΩ ± 5kΩ	801.5kΩ ± 2kΩ	1.201MΩ ± 3kΩ
Maximum Measurable Voltage (pk, dc or rms)		2kV	3.3kV	1350V	2kV
Max. Specified Continuous Voltage (within maximum measurable peak)	PA910	$1000V_{RMS}$	Not Available	Not Available	Not Available
	PA920	Not Available	$1625V_{RMS}$	$800V_{RMS}$	$1250V_{RMS}$
No Damage Voltage	<1ms	$<3kV_{RMS}$ and V_{PK}	$<4kV_{RMS}$ and V_{PK}	$<3kV_{RMS}$ and V_{PK}	$<3kV_{RMS}$ and V_{PK}
	<100ms	$<2kV_{RMS}$	$<2.5kV_{RMS}$	$<2kV_{RMS}$	$<2kV_{RMS}$
	<5s	$<1.5kV_{RMS}$	$<2kV_{RMS}$	$<1.5kV_{RMS}$	$<1.5kV_{RMS}$
Mains Safety Rating		1000V/CAT II, 600V/CAT III, 300V/CAT IV		600V/CAT II or III 300V/CAT IV	1000V/CAT II, 600V/CAT III, 300V/CAT IV
Transient Isolation Voltage (to ground)		>4.5kVpk			
Voltage Accuracy (DC, 20Hz-1kHz) ± Self-Heating Adder	PA910	±0.03%±0.02% per kV^2	Not Available	Not Available	Not Available
	PA920	Not Available	±0.03%±0.006% per kV^2	±0.03%±0.015% per kV^2	±0.015%±0.0075% per kV^2
DC Voltage Floor		±0.9mV	±1.35mV	±1.8mV	±0.9mV
AC Voltage Floor (10kHz BW)		$450\mu V + \frac{100\mu V}{Vrdg}$	$750\mu V + \frac{200\mu V}{Vrdg}$	$300\mu V + \frac{75\mu V}{Vrdg}$	$450\mu V + \frac{100\mu V}{Vrdg}$
3dB Voltage Bandwidth (typical)		2MHz	850kHz	4.5MHz	2MHz
Maximum Harmonic Frequency		<590kHz and <500 harmonics			
Effective Sampling		24bits @384 MSPS			
Physical Sampling		6bits+18bits @ >1.2MSPS combined			

Current Input Capability and Characteristics

Specification		T Current Option		X Current Option	
		HI Range	LO Range	HI Range	LO Range
Current Input Burden		8mΩ nominal	505mΩ nominal	153kΩ ± 0.5kΩ	100.5kΩ ± 0.3kΩ
Maximum Measurable Current (pk, dc or rms)		150A	1.5A	15V	0.6V
Specified Continuous Current (within measurable peak)	PA910	$30A_{RMS}$	$1.25A_{RMS}$	$12V_{RMS}$	$0.5V_{RMS}$
	PA920	$32A_{RMS}$			
No Damage Current	<8ms	$<200A_{RMS}$ and $<300A_{PK}$	$<150A_{RMS}$ and $<200A_{PK}$	$<1kV_{RMS}$ and V_{PK} (fuse protected above 18V)	
	<40ms	$<75A_{RMS}$	$<40A_{RMS}$		
	<1s	$<50A_{RMS}$	$<5A_{RMS}$		
Mains Safety Rating (Isolation)		1000V/CAT II, 600V/CAT III, 300V/CAT IV			
Transient Isolation Voltage (to ground)		>4.5kVpk			
Current Accuracy (DC, 20Hz-1kHz) ± Self-Heating Adder	UT or UX	±0.018%±0.000025% per A^2	±0.018%		
	Other	±0.03%±0.00005% per A^2	±0.03%		
DC Current Floor	BT or BX	±438µA	±3.25µA	±126µV	±6.15µV
	Other	±188µA	±1.25µA	±46µV	±5.15µV
AC Current Floor (10kHz BW)		$38\mu A + \frac{1.5\mu A}{Ardg}$	$0.25\mu A + \frac{0.1nA}{Ardg}$	$6\mu V + \frac{35nV}{Vrdg}$	$0.15\mu V + \frac{0.02nV}{Vrdg}$
3dB Current Bandwidth (typical)	BT or BX	5MHz		2.5MHz	
	Other	2MHz			
Maximum Harmonic Frequency		<590kHz and <500 harmonics			
Effective Sampling		24bits @384 MSPS			
Physical Sampling		6bits+18bits @ >1.2MSPS combined			

Power (W) Input Capability and Characteristics

Specification		V Channel Type	K Channel Type	B Channel Type	U Channel Type
Power Accuracy (DC, 20Hz-1kHz)	PA910	±0.045%	Not Available	Not Available	Not Available
	PA920	Not Available	±0.045%	±0.045%	±0.024%
Power Floor Adder		±0.000025% * ((maximum measurable V*Ardg) + (maximum measurable A*Vrdg)).			
Self-Heating Adder		± (V and A self-heating)			
DC Power Floor (Apply to DC Only)		(Vrdg*DC current floor) ± (Ardg*DC voltage floor) ± (DC voltage floor*DC current floor)			
Phase Floor		±0.005° per kHz		±0.003° per kHz	±0.005° per kHz

Note: Specifications subject to change.

A PA910/PA920 comes standard with operator manual CD, power cord and a NIST cal cert with no data including all channels. An ISO 17025 accredited cal cert with data and uncertainties is available. Each channel card includes four color coded, heavy duty 1.5 meter alligator to sheathed banana test leads.

Product Configuration Guide

Vitrek allows for two ordering options for our customers convenience. You may choose a pre-configured model or a custom configured model as outlined on the right.

To build a product configuration code for your PA910/PA920 add the 2 digit Channel Card codes (comma separated) in the order desired, for up to a maximum of 4 channel cards. The MT type card is available in slot 4 only.

For example a PA920UT,UT,BT,MBT configures a PA920 with an UT type card in slots 1 & 2 and a BT type card in slots 3 & 4.

To add advanced computational options, add one or both codes after the last channel card.

PA900/XT2640 Ordering Information*

Item	Description
PA900	Power Analyzer Mainframe – 4 Channel Capacity
PA901	Power Analyzer with (1) AD Card included
PA903	Power Analyzer with (3) AD Cards included
XT2640	XiTRON Power Analyzer - See website for models
SD	Standard Dual Current Channel Card
SH	Standard High Current Channel Card
SX	Standard External Current Channel Card
AD	Hi Accuracy Dual Shunt Channel Card
AH	Hi Accuracy High Current Channel Card
AX	Hi Accuracy External Current Channel Card
WD	Wideband Dual Current Channel Card
WH	Wideband High Current Channel Card
WX	Wideband External Current Channel Card
MT	Motor Transducer Channel Card
H500	Increases Capability up to 500 Harmonics
EN	Adds Built-in EN61000 Compliance Computation
LPA-1	Universal Load Power Adaptor
HC-7	Hard Carrying/Shipping Case with Die Cut Foam
RM-7	4U (7"H) 19" W Rack Mount Kit
ISO-CALN-C1	Channel Card ISO 17025 Cal with Data (with purchase)

PA920/PA910 Ordering Information*

Pre-Configured Models

Item	Description
PA921UT	PA920 with a Single Ultra-High Precision UT Card
PA922UT	PA920 with Two Ultra-High Precision UT Cards
PA923UT	PA920 with Three Ultra-High Precision UT Cards
PA924UT	PA920 with Four Ultra-High Precision UT Cards
PA911VT	PA910 w/One Very-High Precision UT Channel Card
PA912VT	PA910 w/Two Very-High Precision UT Channel Cards
PA913VT	PA910 w/Three Very-High Precision VT Channel Cards
PA914VT	PA910 w/Four Very-High Precision UT Channel Cards

PA920 Custom-Configured Models

Item	Description
PA920	Ultra-High Precision Power Analyzer Mainframe – 4 Channel Capacity
UT	Ultra-High Precision Twin Shunt (1, 30A) Channel Card
UX	Ultra-High Precision External Current Transducer Input Channel Card
BT	High Bandwidth Twin Shunt (1, 30A) Channel Card
BX	High Bandwidth External Current Transducer Input Channel Card
KT	Kilovolt (1.6kVrms Continuous) Twin Shunt (1, 30A) Channel Card
KX	Kilovolt (1.6.Vrms Continuous) External Current Transducer Input Channel Card
MT	Motor Transducer Channel Card (Slot 4 only)
LPA-1	Universal Load Power Adaptor
HC-7X	Hard Carrying/Shipping Case with Die Cut Foam
RM-7	4U (7"H) 19" W Rack Mount Kit
GP-900	GPIB Interface in lieu of Std Ethernet, Serial & USB
ISO-CALN-C3	PA920 Channel Card ISO 17025 Cal with Data (with purchase)

* For complete listing of available accessories visit www.Vitrek.com.

PA910 Custom-Configured Models

Item	Description
PA910	Very-High Precision Power Analyzer Mainframe - 4 Channel Capacity
VT	Very-High Precision Twin Shunt (1, 30A) Channel Card
VX	Very-High Precision External Current Transducer Input Channel Card
MT	Very High Precision Motor Transducer Channel Card (Slot 4 only)
LPA-1	Universal Load Power Adapter
HC-7X	Hard Carrying/Shipping Case with Die Cut Foam
RM-7	4U (7"H) 19" W Rack Mount Kit
GP-900	GPIB Interface in lieu of Std Ethernet, Serial & USB
ISO-CALN-C2	PA910 Channel Card ISO 17025 Cal with Data (with purchase)

280x Single & Dual Channel Power Analyzers

XiTRON By VITREK — The Products You've Trusted since 1990.

The XiTRON 2801/2802 Single & Dual Channel Power Analyzers combine an unprecedented feature set with an ideal combination of precision, speed and ease-of-use in an instrument so economical it can be on every bench.

XiTRON Series Quality & Reliability by Vitrek

With an extended measurement range from micro-amps to hundreds of amps, and millivolts to kilovolts, the 280x series power analyzers are ideal for standby power or Energy Star testing. In addition to numerical results, the 280x captures waveforms with true 512-point precision. Results and waveforms can be displayed, read via the communication ports, or sent directly at full resolution to a USB printer. Power and amplitude measurements with an accuracy of <0.1% are automatically synchronized to the fundamental frequency. Peak, RMS, rectified, and DC measurements of voltage, current and power are provided including continuous, inrush, startup and history modes, plus an integration mode for W-Hr, A-Hr, VA-Hr as well as integrated average power. Channels can be operated synchronously or independently on the 2802 the 2801 and 2802 also provide waveform peak and glitch capture modes.

Features & Benefits

- High Performance-to-Cost ratio
- Available in two models — 2801 for single channel applications, and 2802 for dual channel applications
- Up to 2000V peak and 150A peak measurable internally (external CT capable)
- 2802 model includes two channels for independent or synchronous measurements, including input/output efficiency and loss
- Base accuracy <0.08%. Current and voltage accuracies specified to less than 1mArms and 1Vrms respectively (<0.2%)

Features & Benefits

- Measures and displays volts, current ,power, frequency, harmonics (to the 100th), THD, PF, CF, K-Factor, Triplens, inrush, distortion, glitches and much more
- Integrated line switch and inrush waveforms
- Source or load measurements with wiring loss and voltage burden compensation
- DC charge and discharge measurements
- Frequency Range: DC and 20 mHz - 200 kHz
- Graphics display shows numerical results, waveforms, bar graphs, bar graphs, startup & history charts with zoom & scroll features
- 16-bit A/D converters at 235ks/s
- 12 user-configurable digital I/O
- USB Flash drive support for data logging
- Communications interfaces include GPIB (IEEE488), RS-232, USB (host and device)
- Suitable for AC, DC, 1-phase 3-wire, 2-phase 3-wire, 3-phase 3-wire, in out synchronous, or independent measurements (2802 only)

Technical Specifications

Accuracy specifications valid for 1 year for ambient temperatures within 5 degrees C of calibration temperature. Contact Vitrek for complete specifications.

Voltage Range (Measurable)
2000Vpk (850Vrms) max. continuous

Internal Current Range (Measurable)
150Apk (30Arms) max. continuous

External Current Transducers (Measurable)
35Vpk (15Vrms) max continuous

280x Technical Specifications

Crest Factor Accuracy
V: (50mV + 0.01% of pk rdg)/RMS value
A: (50uA + 0.01% of pk rdg)/RMS value

Harmonic Accuracy (Voltage & Current)
0.02%

Waveforms
Actual, Peak Capture, Distortion and Glitch Capture

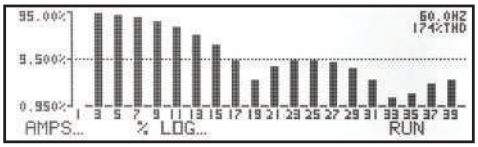
Charts, with Zoom and Scroll
History, Startup and Inrush

Line Switch
Max Open Voltage:	720Vpk (480Vrms)
Max On Current:	10Arms
Turn On Phase:	1° resolution

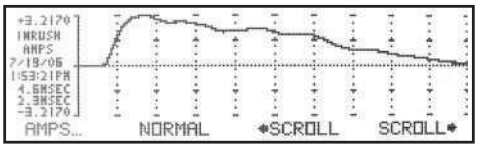
Digital Interfaces
GPIB (IEEE-488), USB (host and device), RS-232, Digital IO

Physical
Power Input:	12 VDC @ 1.5A minimum output
Size: (HxWxD)	4.7" x 13.8" x 9.5" (11.94cm x 35.05 cm x 24.13cm)
Weight:	7.5 lbs/3.4 kg
Operating Range:	0°C to 55°C <95% RH non-condensing
Storage Range:	0°C to 70°C <95% RH non-condensing

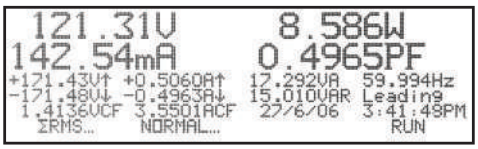
Accessories
Unit is supplied with one T5 universal external power supply, 100-240Vrms, 50-60Hz, with a 2.5mm 12 VDC output plug and a three prong IEC320 AC inlet receptacle, plus a three-prong AC power cord



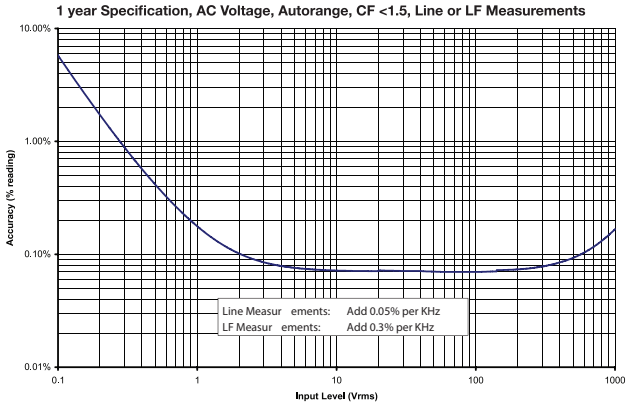
Current, Voltage and Power Harmonics Barcharts (to 100th)

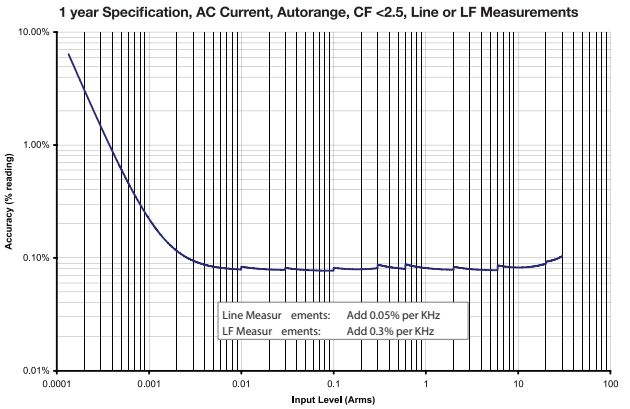


Current and Voltage Inrush Charts



Numerics Results Screens





Ordering Information*

Item	Description
2801	Single Channel Advanced Power Analyzer
2802	Two Channel Advanced Power Analyzer
280X OPT ON	Power ON Option
280X OPT LOG	280X Data Logging
280X CABLE IEC	280X Connection Cable 4 ft, IEC 5-15
280X CABLE NEMA 6-20 P/R	280X Connection Cable 4 ft, NEMA 6-20
280X CABLE NEMA L6-20	280X Connection Cable, 10 ft, NEMA L6-20
280X CABLE WAGO WAGO	280X Connection Cable, 6 ft, WAGO
UG280X	Additional Operating Manual Set
RB-255X-280X	Rack Mount Adapter
RB-255X-BLK -280X	Rack Mount Adapter (Black)
RB-255XFL-280X	Rack Mount Adapter-Flush Mount

2503AH Power Analyzers

XiTRON By VITREK — High Performance Power Analysis System.

The XiTRON 2503AH high performance power analyzer are among the most accurate available. Perfect for motors, lighting, power conversion and appliance test and development applications.

XiTRON Series Quality & Reliability by Vitrek

The 2503AH analyzers measure power, voltage and current up to 500 kHz with premier precision. Available parameters include V, A, W, Power Factor, Crest Factor, K Factor, THD, Harmonics, Phase, VA, VAR, W. Hr, Triplens, Impedance, Inrush, Mean-Peak Values, Efficiency-Loss, etc.

The 2503AH has set the standard for production testing. Independent channel control and unparalleled flexibility and speed have made the 2503AH-3CH the instrument of choice in 3-phase power analysis. The 2503AH-1CH/2CH offers cost effective solutions for single or two-phase applications such as power supply and appliance testing.

Features & Benefits

- 18-bit, 500 kHz sampling speed provides 0.05% basic accuracy
- Ultrafast FFT's per channel produce measurements in 10ms
- 3000V Peak, 50 Amp Peak measurable with internal shunt and optional internal Hall effect CTs*
- Pre-configured for ballast, motor, power supply and appliance tests
- Real-time, ultra-fast harmonic analysis
- Application specific configurations

Features & Benefits

- External CT and PT capability ratio: 0.000001 - 1000000 to 1, for A/V, A/A or V/V
- Frequency Measurement: 500 µHz to 170kHz, 0.01% of reading
- Measurement Period: User defined from 1 ms to 27.8 hours
- Watt, VA & VAR accuracy highest of V x Amp error or Amp x V error yields max. error for either Watts, VA or VAR
- Accumulation accuracy, WHr, VAHr, AHr up to 9999.9 GWHr/GVAHr
- Timing Accuracy: 0.01% + 10mSec. start/stop error

Technical Specifications

Isolation
Inputs are isolated from each other and ground for voltages up to 3000 Vpk

Setting Time
0.0015 mSec (low pass filter disabled)

Low Pass Filters
User definable 5 Hz - 250 kHz, or disabled

Filter Amplitude Accuracy
Add 0.01%kHz for signal frequencies >5kHz, Filter rejection > 40 dB @ 3x selected filter frequency, current and voltage accuracy specifications apply for input signals <0.05x selected filter frequency

The 2503AH analyzers measure power, voltage and current up to 500 kHz with premier precision. Available parameters include V, A, W, Power Factor, Crest Factor, K Factor, THD, Harmonics, Phase, VA, VAR, W. Hr, Triplens, Impedance, Inrush, Mean-Peak Values, Efficiency-Loss, etc.

2503AH Technical Specifications

Harmonic & Spectrum Analysis

Bandwidth: 0.001 Hz to 170 kHz
Max. Harmonic: 2047
Max FFT size: 4096 point complex FFT, Typical THD, harmonic and phase accuracy at line frequencies of 50/60 Hz
THD Accuracy: +/- 0.3%
Harmonic Accuracy: 0.03% of range
Phase Accuracy: 0.1° for freq., <5 kHz, linearly increasing to 5° @ 170 kHz

Power Factor Accuracy

Approximately 0.001 for freq. 10kHz (5 kHz w/filter) increasing linearly to 0.01@200kHz (20kHz w/filter)

Physical Specifications

Power input: 85-265 Vrms autoselect, 40-400 Hz @ 100VA max
Size: 17.71" wide by 7" high by 14" deep
Weight: 28 lbs.
Operating range: 0°C to 50°C, <85% RH @ 40°C non-condensing
Storage range: -30°C to 65°C <95% RH @ 40°C non-condensing
Configuration: Benchtop or optional 19"rack mount

Digital Interfaces (Standard)

IEEE488 (1), RS-232 (2), Parallel Printer

Input Ranges

User may select fixed or autorange.
Voltage: 15-30-60-150-300-600-1200 Vrms
Current: Shunt: 0.05-0.1-0.2-0.5-1-2-5-10-20 Arms
*Int. CT: 7.5-15-30-60 Arms
Bypass: 12.5-25-50-125-250-500 mV rms, 1.25-2.5-5V rms
All ranges allow for up to 2.5X range peak

Resolution

Better than 0.05% of range

Voltage & Current Accuracy

DC Volts: 0.05% +/- 0.15% range +/- 50 mV
DC Amp: 0.05% +/- 0.15% range +/- 200 µA
AC Volts/Amp:

0.001Hz-10 kHz	0.05%	10kHz-20kHz	0.10%
20kHz-50kHz	0.33%	50kHz-100kHz	0.55%
100kHz-200kHz	1.00%	200khz-500kHz	2.35%

For voltage add 0.05% of range + 20 mV
For internal shunt add 0.05% of range + 100 µA
For shunt bypass add 0.05% of range + 10 µV
Min input > 10% of range (1% with filter on)

High Accuracy Option

0.05% of reading for freq. 40-400 Hz, and input >25% of range

Hall Effect CT* Accuracy

DC Amp: 0.15% +/- 0.15%, range +/- 25mA
AC Amp:

0.1Hz-10kHz:	0.25%
10kHz-20kHz:	0.65%
20kHz-50kHz:	2.25%
50kHz-100kHz:	4.25%

For AC add 0.05% of range + 10 mA

Crest Factor

Better than 2.5 at full scale input,linearly increasing to 250:1 at 1% of full scale. For max. inputs of 50 Apk, 3000 Vpk

Voltage Protection

Up to 3000 Vpk. Max slew rate 2500 V/uSec

Current Protection

Max 500 Amp peak via HALL effect CT*
Max 15V peak using shunt bypass input
Max. 50 Amp peak using internal shunt

Options

HA: High accuracy calibration 40-400Hz, 0.05% all parameters
HE 1CH: Internal Hall effect for single channel analyzer*
HE 2CH: Internal Hall effect for two channel analyzer*
HE 3CH: Internal Hall effect for three channel analyzer*
RE: 19" Rack Adapter
*Internal Hall effect CT options not available on CE market units

Ordering Information*

Item	Description
822-2503-AH-1CH	Single Channel Power Analyzer
822-2503-AH-2CH	Two Channel Power Analyzer
822-2503-AH-3CH	Three Channel Power Analyzer
F	IEC61000-3-3 Flicker Analysis Capability
822-AIO	12 Ch. Analog Output, 16 Ch. Digital Outpu
822-HE-1CH-2503	Add 150A peak internal Hall Effect Current Transducer to 2503-AH-1CH
822-HE-2CH-2503	Add 150A peak internal Hall Effect Current Transducer to 2503-AH-2CH
822-HE-3CH-2503	Add 150A peak internal Hall Effect Current Transducer to 2503-AH-3CH
RE	19" Rack Adapter Kit

DL Series Electronic DC Load

— DC Electronic Load With The Features You Need for All Applications.

Industry's Easiest-To-Use DC Load

Vitrek's DL Series Electronic Loads are available in a variety of capacities to meet your unique application requirements. No other electronic DC load on the market today is easier to use. Equipped with a full color LCD touchscreen display, the unit can quickly be set up for your next test. In addition, the DL is equipped with a comprehensive self-test that ensures that all loading and measurement circuitry is functioning properly.

Extremely Flexible in a Variety of Applications - The DL Series is equally at home generating kW, W, mW or µW loading. Whether you are performing tests for LED drivers, batteries, battery chargers or power series, the DL Series is the right choice for these applications.

Maximum Accuracy — Maximum Features - The unit is fully featured with transient and wide band non-linear loading capabilities along with the additional feature of sweep capability. The DL Series Electronic Load provides high accuracy measurements (± 0.05%) of voltage and current with sweep steps as short as 20µs and pulsed loading up to 100 kHz. Units are fully configurable loading riding and falling edge controls and soft-start capabilities. The DL Series provides excellent transient performance in timing and waveshape with the ability for the user to view the current and voltage waveforms using the internal scope. The device provides fully protected short loading with automatic current and power limiting.

Unequaled Visibility of Test Results - The DL Series provides graphical X/Y plotting of V vs I and V vs P characteristics using swept loading. In addition, the unit has a historical data logging capability, both graphical and numerical for additional test analysis and evaluation.

Flexible Integration in a Compact Package - The DL Series is just 5" high, 8.5" wide and 8.5" deep, allowing easy integration into any test bench. The unit provides a variety of interfaces including LAN, USB Device & Host and Digital I/O. In addition, multiple units may be used in parallel for static higher power and current loading. No other manufacturer offers more features than Vitrek — at a price that easily fits in your budget capacities to fit your unique application requirements.

Features & Benefits

- Generates kW, W, mW or µW loading. >20:1 higher and >1000:1 lower loading capability range than most presently available loads.
- High accuracy measurements (0.05%) of voltage and current within pulses or sweep steps as short as 20µs.
- Fully featured with transient and non-linear loading capabilities ranging from 125 to 500 watts with the additional feature of sweep capability.
- Arbitrary loading sequence with up to 100 steps to simulate virtually any "real-world" loading.
- High speed pulsed loading up to 100kHz. Fully configurable loading rising and falling edge controls and soft-start capability.
- Excellent transient performance in timing and waveshape with the ability for the user to view the current and voltage waveforms using the internal scope.
- Fully protected short loading, with automated current and power timing.
- Comprehensive self-test gives assurance that all loading and measurement circuitry is properly functioning.
- Unique graphical X/Y plotting of V vs I and V vs P characteristics using swept loading
- Historical data logging capability - graphical & numerical.
- Displayed results include:
  - 'Real-time' results - numerically represented measured actual applied voltage & actual loading current, and the computed load power & resistance or conductance.
  - Pulse results - numerically represented measured actual applied voltage and actual loading current within a pulse, and the computed load power and resistance or conductance.
  - OCP or OPP result - numerically represented maximum current and power achieved prior to the voltage dropping below a set voltage.
  - Battery test - numerically represented accumulated A.Hr and W.Hr, as accumulated since the operation was started with automatic stop at ending voltage.
  - Historical data logging - graphically represented measured actual applied voltage and the actual loading current and the computed load power with down to 1ms resolution and a long-term maximum.
  - Oscilloscope - graphically represented up to 400ks/s sampled applied voltage and loading current.
  - XY Plot - graphically represented V vs A/W plot of swept measurement results.

DL Series Technical Specifications

Setting, Measurement & Loading Accuracy & Resolution

Voltage Setting & Readout Accuracy: ±0.03% ± 1mV
Current Settings & Readout: 0.035%
Power, Resistance and Conductance Settings & Readout:
Accuracy is the relevant combination of the voltage and current accuracies.

Loading Modes

CV, CR, CC and CW Modes (Usable as any combination of CV+CR+C-C+CW Mode: known as Basic Mode)
All these modes are always simultaneously available and operated in the same manner with the actual operating mode automatically selected as appropriate for the applied voltage and user set maximum current, maximum power and minimum resistance settings.

Table Mode
The user may define a table of current vs. applied voltage describing an arbitrary voltage/current relationship for the loading. The user can optionally select to linearly interpolate between table entries or have no interpolation. Up to 100 V/A data pairs can be provided by the user.

Short Mode
The maximum current, maximum power and minimum resistance are all set to their respective limits.

Open Mode
The load will provide an unloaded condition in this mode.

Arbitrary Mode
In this mode the user can configure up to 100 arbitrary steps of "Basic" loadings, each having independent settings for loading and each having an independently configured time at that step.

Sweep Mode
The user can configure the start and ending current or power levels, and can configure for the sweep to be either linear or logarithmically provided in up to 500 steps between them, and to be either single direction or dual direction.

OCP/OPP (Over Current Protection/Over Power Protection) Mode
This is a variant of the Swept mode which ends the test should the applied voltage drop below a configured level. This is to detect the level at which a power sources' OCP or OPP is activated.

Battery Test Mode
This performs a basic loading until the applied voltage drops below a user configured voltage. Until the loading is dropped, the integrated A.Hr and W.Hr figures are accumulated.

Interfaces

The following interfaces are provided:
- LAN (LXI compatible)
- USB Device (CDC - communication class) Full speed
- USB Host (front panel) Full speed supports external USB drive only
- Digital I/O

Loading Levels

The DL Series have two independent configurable loading levels (labelled A and B), each of which can have any of the available loading modes listed previously.
The unit can automatically perform the following selections of these levels:
- Continuous A or B. This continuously applies one of the levels. The user can manually switch between levels if desired.
- Pulsed. This pulses between the levels alternately.
- Interleaved. This pulses each level alternately, but unlike the pulsed loading above does so for each step in an arbitrary or swept level.

Loading Timing Limits

Rate of change of load current:
- Applies to all modes, separate limits apply to each direction of change.
- User Set Slew Limit: 1mA/s to 5A/µs, or none.
- User Set 10%-90% Time: 5.5µs to 10ms.
  Actual limit is the most stringent of the above.

CR, CW and Table CC Bandwidth: >25kHz typical.
Minimum Transient: 5µs.
Transient Overshoot: <(2% + 1mA) typical.

Physical

Size: (HxWxD) 5" x 8.5" x 13"
Weight: 8 lbs
Display: 5" diagonal, 800x400 pixel color LCD with touchscreen

Ordering Information*

Item	Description
DL115	150V/21A/125W DC Load with 3.6kW/32A transient capacity
DL215	150V/42A/250W DC Load with 7.25kW/65A transient capacity
DL515	150V/84A/500W DC Load with 14.5kW/130A transient capacity
DL150	500V/21A/500W DC Load with 2.4kW/32A transient capacity
DL250	500V/42A/250W DC Load with 4.8kW/65A transient capacity
DL550	500V/84A/500W DC Load with 9.6kW/130A transient capacity
RM-DL	Rack Mount Option

XT9812 DC Load

- Designed for LED Driver or DC Power Supply Applications.

This is a special device that has been designed primarily for testing LED drivers. The design utilizes high performance semiconductors with high speed and high accuracy, and resolutions of 0.1 mV and 0.01 mA (the basic accuracy is 0.03%, the basic current rise speed is 2.5 A/us). The XT9812 has wide applications from production line settings to the engineering bench. Target markets include the following type of manufacturers and markets: LED driver, cell phone chargers, cell phone battery, electronic vehicle battery, switching power supply and linear power supply manufacturers, research institutes, automotive electronics, solar cells and fuel cell markets.

XiTRON Series Quality & Reliability by Vitrek

While all Vitrek precision test equipment is designed to be used in a completely stand-alone manner, there are times when external tools can aid or enhance the operation of an instrument. XView software tools and drivers are designed to help easily configure an instrument from a single screen, or are used to view a complete set of measurements in a single screen. Other XView tools are designed for data collection where results can be recorded in an Excel-compatible file for post-processing, insertion into reports, or simply for archival purposes.

Often, Vitrek can provide the source code for a particular application, and it can be used as a convenient “starting point” for a custom software application.

Features & Benefits

- Six high speed operating modes:
  1. Constant Current (CC)
  2. Constant Resistance (CR)
  3. Constant Voltage (CV)
  4. Constant Wattage (CW)
  5. Constant Current (CC) + Constant Voltage (CV)
  6. Constant Resistance (CR) + Constant Wattage (CW)
- LED mode supports LED power driver test, provides steady reading and capacitance sensitive driver compatibility
- Over-current, over-voltage, over-power, over-heating and reverse polarity protection
- Easy-to-read display
- Intelligent fan system that is automatically activated based on temperature changes
- Soft-start time setting runs the power supply according to the pre-set voltage value
- Battery and short-circuit testing functions
- Capable of dynamic testing with rising edge and falling edge settings
- Supports external trigger of input and output
- External current waveform monitor terminal
- Supports remote voltage compensation and data storage
- Power-on self test, software calibration ready and standard rack mountable
- Arbitrary waveform editing
- USB Interface

Ordering Information

Item	Description
XT9812	Programmable DC Electronic Load 300W, 150V, 30A
XT9812B	Programmable DC Electronic Load 300W, 500V, 15A

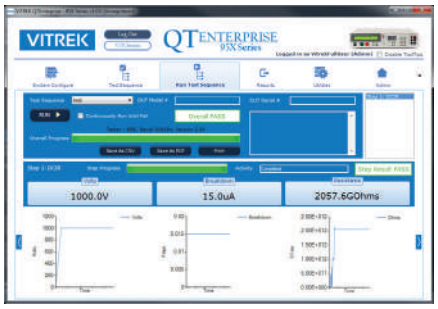
XT9812 DC Load Specifications

MODEL		XT9812 / XT9812 B	
INPUT RA TING	Powe r	300W	
	Curr ent	0-30A or 0-15A(B)	
	Voltage	0-150V or 0-500V(B)	
CC MODE	Range	0-3A	0-30A or 0-15A(B)
	Resolution	0.1mA	1mA
	Accuracy	0.03% + 0.05%FS	0.03% + 0.05%FS
CV MODE	Range	0.1 - 19.999V	0.1-150V
	Resolution	1mV	10mV
	Accuracy	0.03%+0.02%FS	0.03%+0.02%FS or 0.05% (B)
CR MODE (Input Curr ent ≥ 10%FS) (Input V oltage ≥ 10%FS)	Range	0.03Ω-10kΩ	0.03Ω-5kΩ
	Resolution	16 digit	16 digit
	Accuracy	0.1%+0.1%FS	0.1%+0.1%FS
CW MODE (Input Curr ent ≥ 10%FS) (Input V oltage ≥ 10%FS)	Range	0-300W	0-300W
	Resolution	1mW	10mW
	Accuracy	0.1%+0.1%FS	0.1%+0.1%FS
V MEASUREMENT	Voltage	0-19.999 V	0-150V or 0-500V (B)
	Resolution	1mV	10mV
	Accuracy	0.015%+0.03%FS	0.015%+0.03%FS
I MEASUREMENT	Curr ent	0-3A	0-30A or 0-15A (B)
	Resolution	0.01mA	0.1mA
	Accuracy	0.03%+0.05%FS	0.03%+0.08%FS
W MEASUREMENT (Input Curr ent ≥ 10%FS) (Input V oltage ≥ 10%FS)	Powe r	100W	300W
	Resolution	1mW	10mW
	Accuracy	0.1%+0.1%FS	0.1%+0.1%FS
BA TTER Y MEASUREMEN T	Battery Input: 0.1-150V ;Max. Measur ement: Capacity=999AH Resolution=0.1mA; Time Range=1S-16H		
DYNAMIC MEASUREMENT	Transition List: 0-25kHZ;z .5A/μS; T1&T2:60μS-999S; Accuracy:+15% of fset+10%FS		
Curr ent Soft- start-up time	1mS; 2mS; 5mS;10mS; 20mS; 50mS;100mS; 200mS; 500mS and 1000mS Accuracy:+15% of fset+10%FS		
LED TEST	Press shift+ ▲ button to enter LED test. Repeat to escape the LED test. A D character shows on lower right of the display in the LED test.		
SHOR T CIRCUIT	Constant Curr ent (CC)	3.3A	33A or 18A (B)
	Constant V oltage (CV)	0V	
	Constant Resistance (CR)	28mΩ or 200mΩ (B)	
TEMPERA TURE	Operating	0~40°C	
	Storage	–10°C ~ 70°C	
WEIGHT	Lbs/Kgs	7.7 lbs/3.5kgs	
OPERA TING POWER SUPP LY	100V/200V , 60Hz/50Hz Manual Switch		

QT Enterprise

Software

— Powerful & Flexible Electrical Safety Test Automation Software



QT Enterprise — Vitrek's most powerful & flexible electrical safety test automation software available, yet surprisingly easy-to-use and affordable.

Maximum Flexibility

QT Enterprise software is available for use with Vitrek V7X and 95X Series Hipot testers in addition to the 98X Series of IR Tester/Teraohmmeters to streamline your test sequences and provide the features you want — and need — for your electrical safety tests.

Procedures stored via QT Enterprise can be recalled via a barcoded scan to enable fast and accurate setup. In situations where multiple test points are involved, the software can interface with Vitrek's 964i High Voltage Switching Systems, operating in conjunction with V7X & 95X Hipot Testers to further automate the process. For complex setups, QT Enterprise can display detailed instructions and images to the operator to ensure proper connections prior to testing.

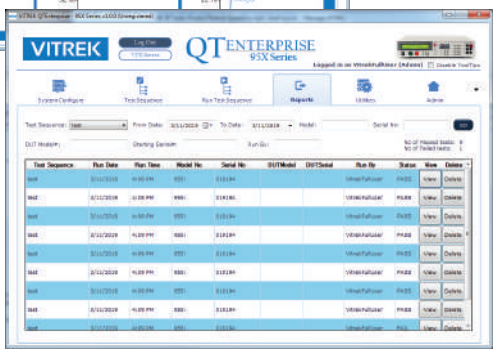
Maximum Productivity

Increase productivity and eliminate human error by using a barcode scanner to read the DUT model number and instantly bring up the correct, ready-to-run test sequence. Multiple DUT model numbers can be linked to a given test sequence. When configured to require a serial number entry, the barcode scanner can load the data and launch the test all from the tug of a trigger. Vitrek's QT Enterprise software is the most powerful and easy-to-use test automation software in the industry. Download a copy today and watch your productivity shift into hyper speed.

Maximum Results

QT Enterprise records the results of every test. Each test can be named (such as Model # and Serial #). By using filtering functions provided, individual tests can be recalled for auditing purposes or detailed analysis on testing or product performance. Results of recalled tests can be saved as PDF or CSV files and recalled as if the test was just performed.

QT Enterprise provides a clean and intuitive means for creating and modifying a virtually unlimited number of electrical safety testing procedures. Each test sequence can have as many as 999 steps to perform a comprehensive range of electrical safety tests including AC and/or DC voltage withstand, insulation resistance, ground bond testing and others. Barcode reading of device-under-test (DUT) model and serial number assures proper application of required tests.



Features & Benefits

- Configurations, test sequences, test results, users and other system settings are stored on a local PC or in a central SQL database accessible through a network
- Test data is easily accessible and user may sort and filter a list of results based on your specific criteria
- Integrates with barcode scanner to read DUT model and bring up the correct, ready-to-run test sequence
- Multimedia Setup Instructions can be incorporated into test sequences providing operator with visual prompts for easy and accurate DUT hookup
- Easy-to-use graphical setup screens allow for quick and easy test setup
- Quick and easy setup or modification of test sequences via intuitive function buttons within the software
- Auto Save Test Results to a predetermined file location for easy access
- Automated Multi-Point Switching - software capable of integrating the Vitrek 964i High Voltage Scanning Matrix into any desired test to automate test point selection on multipoint devices or “batch test” multiple DUTs for even high throughput
- Advanced Admin Tab allows for quick and easy user setup and administration including editing, deleting and assigning access levels for test procedures

QT Enterprise Technical Specifications

Operating Systems
- Windows XP SP3
- Windows Vista SP1 or later
- Windows 7
- Windows 8 (Desktop Application)
- Windows 10

Supported Architectures
- x86 (32 bit)
- x64 (64 bit)

Hardware Requirements
Recommended Minimum: 2 GHz Processor speed or higher with 2 GB Ram (Hardware requirements may be higher due to OS requirements.)

Tester
A Vitrek 951, 952, 953, 954, 955, 956, 957 or 959 instrument running main firmware v2.02 or later.

A Vitrek V7X instrument running main firmware version 1.10 or later recommended.

A Vitrek 98X IR Tester/Teraohmmeter

Switch Units (Optional)
Any of Vitrek models 948, 964, V75 or V76 instruments. Different models cannot be intermixed in the same system.

Ordering Information*

Item	Description
QTE-7	QT Enterprise Software for use with Vitrek V7X Hipot Testers
QTE-9	QT Enterprise Software for use with Vitrek 95X & 98X Series Hipot Testers

XT1600 Micro-Spectrometer — Portable Lighting Measurement Made Easy.

The XiTRON XT1600 micro-spectrometer provides unparalleled performance and flexibility in a portable, battery-powered instrument.

Quality & Reliability You Can Depend On

The XT1600 micro-spectrometer captures any visible light and immediately displays the full spectrum and all test data. The spectrometer features an intuitive touch panel interface and automated report generation.

Features & Benefits

- Easy-to-use 4.3” color touchscreen
- Compact size for easy portability
- Ideal for measurement of:
  - Lux - Illumination Value
  - Lumen - Luminous Flux
  - CRI - Color Rendering Index According to CIE
  - CCT Corrected Color Temperature
  - CRI/CQS - Color Rendering Index/Color Quality Scale
  - PPF - Photosynthetic Photon Flux Density, E_µ MOL
  - Color - Color Coordinates According to CIE 1931 and CIE 1976
- High Resolution - 4.2-5nm FWHM
- Measurement Range 1 - 200.000 lx
- 1GB built-in Flash Memory Storage, Optional Micro SD Card 4 GB

Technical Specifications

Overview

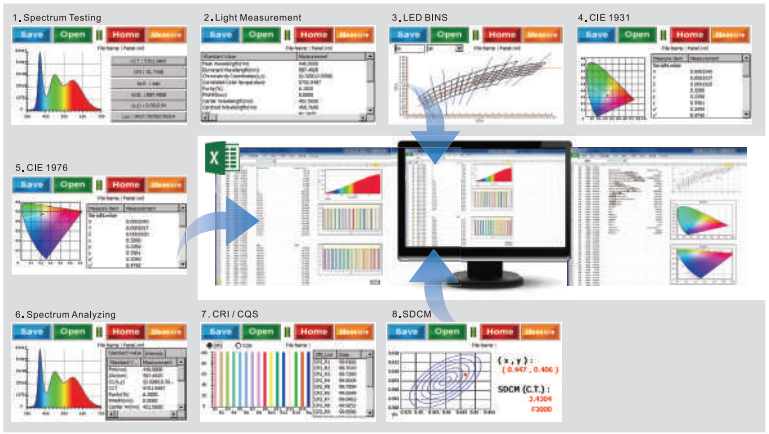
Resolution: 4.2 - 5 nm FWHM
Measurement Range: 1 - 200.000 lx
Integration Time: 1 ms to 1 s
Signal-to-noise range: 150:1
Spectral Range: 380-780 nm
Spectral Deviation: 0.12%
Spectroradiometric Accuracy: 0.4%

Detector
Detector: Sony ILX563A CCD

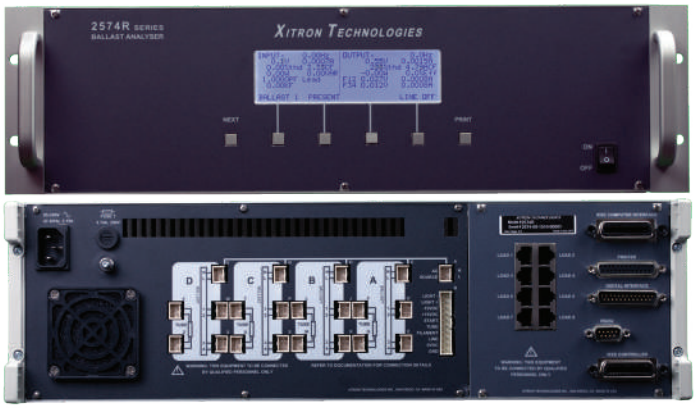
Physical
Display: Number of Pixels: 2048
Power: Power Lithium-Ion Battery 2600m Ah
Power Consumption: ~ 15W
Ambient Temperature: -10° ~ 50° C
Dimensions: 148.5mm W x 96mm D x 24mm H
Weight: 550g/630g

Ordering Information*

Item	Description
XT1600	Portable Micro-Spectrometer



257xR Ballast Analyzer — Speed and Versatility for all your Ballast Analysis Needs.



The 257xR ballast analyzers have been adopted by ballast/ lighting manufacturers worldwide because of their greatly enhanced technological capabilities, greatly reduced setup and maintenance requirements and low cost of ownership.

Quality & Reliability You Can Depend On

With the 257xR, up to four tubes and four ballasts can be tested in a fraction of a second for every key parameter, including peak inrush, striking and light efficiency (when used with a light monitor). With a capacity of 2,000 measurements per second on each of up to 30 signals, the only limitation to testing throughput is the speed of your production line.

The 257xR can be used in stand alone or computer controlled environments. It allows the user to simultaneously measure all pins on all tubes, independent output measurements, 12 voltages and 12 currents, (i.e. independent tube V and I measurement, independent filament V and I, for each tube that is configured). Continuous sampling at up to 2 Ms/s ensures that even the shortest transient events are measured.

Features & Benefits

- Displays all relevant ballast input/output measurements on a single screen
- Completely tests a ballast in less than 100 ms
- Fully automatic ballast start-up and tube striking detection
- Results displayed graphically or numerically with down to 1 ms time resolution
- IEEE488 control of AC sources for single user interface
- Wide bandwidth, ballast output frequencies to 2 MHz
- Every signal is monitored continuously with 12-bit, 2 MHz sampling
- Automatic test sequencing and complete comparison of measurements vs. limits, including selection of different 1500 series load modules and engagement of 1500 series line switch modules
- No computer or user software required
- Graphical startup profiling with time sequencing
- Graphical historical measurements
- Supports magnetic, instant/rapid start, HID < 5kV pk, compact, high frequency and hybrid ballasts, plus LED drivers
- Test summary screen designated for the production floor environment, can display either a large PASS/FAIL or, upon query, can show up to 3 pass/fail faults

Ordering Information*

Item	Description
XT1822-2571R	Single Tube Ballast Analyzer (Rackmount w/ System Interfaces)
822-2572R	Two Tube Ballast Analyzer (Rackmount w/System Interfaces)
822-2573R	Three Tube Ballast Analyzer (Rackmount w/ System Interfaces)
822-2574R	Four Tube Ballast Analyzer (Rackmount w/ System Interfaces)

822-2574R Options

822-2574/R OPT. M	Increased Voltage Accuracy up to.5kVpk limit
822-2574/R OPT. HI	Removes Spark Gaps (increases input to 4.5kVpk)
822-257XR-HID	HID Ballast Option, 4.5kVpk Input, includes XC Current Option (6Apk per pin, 12Apk total) X= 1, 2, 3 OR 4 Ballast Output Connection
822-2574/R OPT. HL	Increases Line Current Capability to 40Apk
822-2574/R OPT. LC	Low Current Load Capability (0.75Apk per pin)
822-2574/R OPT. XC	Very High Current Load Capability (6Apk per pin)
892-2574/R OPT. F	Decrease to 2MHz -3dB bandwidth, reduced accuracy above 100kHz
892-2574/R OPT. 2X	Extra High Current Load Capability (12Apk per pin)
892-2574/R OPT. 1MEG INPUT IMP	892-257xR Option 1MEG input impedance upgrade, per channel cost (requires a calibration cost as well if not performed as part of a repair)
UG2574R	Additional Operating Manual Set

* For complete listing of available accessories visit www.Vitrek.com.

Versatile Calibrators Bring Lab Accuracy to Process Control Applications

The 2000 Series of portable DC calibrator brings laboratory accuracy to process control applications. Calibrate current loop (4-20 mA)/ pressure and flow indicators, controllers and temperature/voltage/ current recorders with accuracy measured in ppm rather than percentages.

Performance & Flexibility in a Portable, Battery-Operated Design

Thermocouple simulation allows the fine tuning of any measurement or control loop. Temperature measurement is automatically cold-junction compensated.

The 2000 Series instruments will compute current or voltage output using a linear equation derived from two data points. This allows the user to enter a temperature, pressure or flow level and the 2000 will output the precise current or voltage signal equivalent to that temperature/pressure or flow value.

The highly versatile 2000MN adds temperature measurement and TC simulation to the impressive list of features. It allows the user to read and source in °C or °F for B, E, J, K, N, R, S or T thermocouples.

Compact and economical, the 2000 Series provides the right combination of accuracy and flexibility for most temperature/simulation applications. These portable, precision instruments address a wide cross-section of calibration requirements.

Features & Benefits

- Excellent performance and flexibility in a portable, battery operated design.
- DC voltage and current capability, +/- 22 volt, 10ppm accuracy, +/- 22mA, 40ppm accuracy
- Temperature simulation with 0.01⁰ resolution, 0.015⁰ C -0.12⁰ C accuracy (90 day)
- DC resolution down to 10nV or 10pA
- Temperature measurement with 0.1˚C-0.2⁰ C accuracy (90 day)
- Auto cold junction compensation.
- NiMH battery operation (8 hours typ.) Suitable for commercial air travel.
- Standard RS232 interface allows laptop PC control in the field, while the optional IEEE-488 interface supports ATE applications.
- Additional memory can be added to either interface for 10 user-defined test steps
- Thermocouple measurement and simulation
- Battery status indication

2000x Technical Specifications

Physical

Size: (W x H x D) 4.1" x 6.3" x 9.7" (104mm x 160mm x 246mm)

Weight: 4.5 lbs

Environmental

Operating: 0^0 C to 50^0 C, less than 90% R.H (typ) at 40°C (non-condensing)

Storage: -30^0 C to 65^0 C, less than 95% R.H. at 40° C (non-condensing)

Isolation

Output to Chassis, Ground or Interface: 1500V pk max.
Unit is supplied with a T5 universal external power supply, 100-240 Vrms, 50-60Hz, with a 2.5mm 12 VDC output plug and a three prong IEC320 AC Inlet receptacle, plus a three prong AC cord

Calibration

An automatically sequenced Internal Calibration may be performed at any time. This procedure does not require any external equipment or connections. The accuracy specification assumes the use of this procedure at least every five days, or following an ambient temperature change of greater than 5^0 C.

An automatically sequenced External Calibration may be performed at any time. In order to prevent unauthorized access, an optional password protection scheme is utilized. A one year external calibration cycle is recommended for normal use, however, this may be reduced (e.g. to three months) if increased accuracies are required, or increased (e.g. to two years) if reduced accuracies can be tolerated.

External Calibration may be performed at any ambient temperature between 10^0C and 35^0C without degradation of the accuracy specifications, the accuracy figures then being valid for ambient temperatures of up to 5^0C from this calibration temperature.

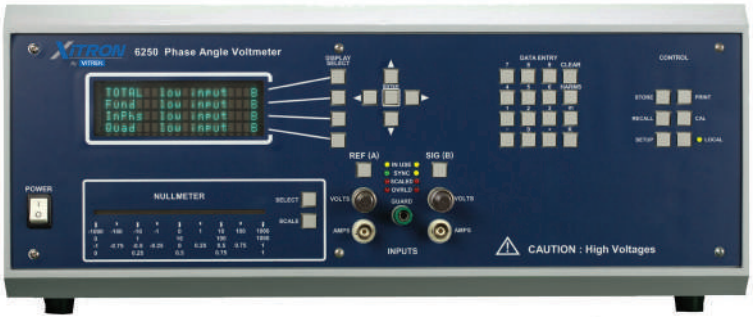
Ordering Information*

Item	Description
2000IN	DC Voltage and Current Calibrator, includes T5 and RS-BAT (RS232)
2000MN	DC Voltage and Current Calibrator, Thermocouple Simulator with Voltage and Temperature Measurement and Automatic Cold Junction Compensation. Includes T5 and RS-BAT (RS232 Interface)
2000-IE-BAT	IEEE-488 Interface
UG2000	Additional Operating Manual Set
CC-2000	Canvas Carrying Case with Charger and Lead Pocket
SP48-2000	48" Long Low Thermal EMF Shielded Lead Set (Spade Terminals)
PL36-2000	36" Long Low Thermal EMF Red & Black Lead Set (Plugs)
RA-2000	Single Instrument Rack Adapter Kit
RB-2000	Three Instrument Rack Adapter Kit
RC-2000	Two Instrument Rack Adapter Kit
2000I OPT NB	No Internal Battery Option, at time of order. (Typically used in ATE applications.)
2000M OPT NB	No Internal Battery Option, at time of order. (Typically used in ATE applications.)

* For complete listing of available accessories visit www.Vitrek.com.

6250 Digital Phase Angle Volt Meter

Pre-Configured for Most LVDT/RVDT Test.



The 6250 is a high performance, field-proven instrument that has been trusted for over a decade. It offers an easy-to-use, pre-configured alternative to slower, older and less user-friendly technology.

Ready to Go — Right Out Of The Box

The 6250 requires less set-up and maintenance than competing products, saving manufacturer customers down-time and loss of product throughput. Because of its simplicity, it can be used by virtually anyone who wants to access results more quickly and more reliably in critical manufacturing and testing environments.

The 6250 continually self-tests its internal circuitry ensuring the most accurate results possible and eliminating lengthy recalibrations. These minimal calibration requirements, coupled with field-proven superior reliability and a two-year warranty, provide a low cost of ownership.

The Perfect Choice for Applications that include:

- Transformer ratio and phase tests
- Amplifier gain and phase
- Network transfer function analysis
- Input/output impedance testing
- Wide band, high sensitivity null detection
- Phase sensitive null detection
- Attenuator linearity testing
- Harmonic analysis
- Accelerometer testing
- Phase angle measurements
- Synchro/Resolver transducer testing
- LVDT/RVDT testing
- Filter testing: Insertion loss
- Phase shift measurement of power factors
- Complex impedance phasing of servo motors & servos
- Automatic test equipment (ATE)

Features & Benefits

- Wide bandwidth (0.1Hz - 100kHz)
- 0.05% basic amplitude accuracy
- 0.05° phase accuracy
- Total and individual harmonic analysis
- 100ppm accuracy, 1ppm resolution, frequency measurements
- 4-line scrollable (50 lines total) display and 101 element nullmeter
- Separate amplitude and frequency scaling and phase offset on all outputs
- Phase sensitive or frequency selective voltage, current power and impedance measurements
- Frequency response and distortion analysis
- Front panel configuration lockout for dedicated production and QC test applications
- All 6250 instruments have IEEE488, RS232 and Parallel Printer Interfaces as standard

6250 Technical Specifications

Physical

Power:	80-265 Vrms autoselect, 40 - 400 Hz @25VA max
Size:	7” H x 17” W x 14” D
Weight:	20 lbs

Environmental

Operating:	0^0 C to 50^0 C, less than 85% R.H (typ) at 40°C (non-condensing)
Storage:	-30^0 C to 65^0 C, less than 95% R.H. at 40° C (non-condensing)

Warranty

Two Years

Voltage Inputs

Amplitude:	0.05% + 0.005%/kHz for any single input and for matching between any inputs multiply by 2 for voltages in excess of 300Vpk
Phase:	0.05° + 0.005%/kHz between A and B on same range, + 0.0025°/kHz per range when differing ranges, +0.05°/kHz between unpaired inputs, multiply by 2 for voltages in excess of 300Vpk
Noise:	0n V + 0.00001% of full-scale range/√Hz of measurement bandwidth
DC Offset:	100µV + 0.03% of full-scale range
Distortion:	-80dB at any harmonic
Voltage Range:	10mV to 1000Vpk full scale (10V RMS max for 50Ω input) in 3:1 steps. Fixed or auto range
Trigger Level:	Zero, TTL, ECL, CMOS, or Variable. 1% of input range accuracy
Bandwidth:	>2.5MHz or user-defined upper limit in the range of 5Hz to 100kHz (-3db)
Configuration:	Balanced differential BNC input pairs with separate Guard binding posts. DC + AC or AC only coupling (0.1Hz cut off). Guard may be externally driven or internally connected to either input Lo
Impedance:	600kΩ to Guard from each input node, selectable 50Ω input impedance, in parallel with less than 35pF

6250 Technical Specifications

Common Mode:	Guard isolated from ground (100MΩ |1000pF) for voltages <1000Vpk Inputs may have voltages to Guard of up to the larger of the range full-scale value or 10V. CMRR referred to Guard is >80db for frequencies up to 10kHz, decreasing linearly to >60dB at 100kHz. CMRR referred to ground is >140dB at DC to 10kHz, decreasing linearly to >100dB at 100kHz

Current Inputs

Current inputs use voltage inputs with an internal current shunt, yielding full-scale current ranges of up to 300mA peak in 3:1 steps. Maximum burden is 250mV. External shunts may optionally be used on the voltage inputs to extend the current ranges up to 20A RMS

Ordering Information*

Item	Description
6250	Two-Input Phase Angle Voltmeter
AIO-6250	12-Channel Analog Output, 16-Channel Digital Output
RE-6250	Rack Adapter Kit
MO6250	Additional Operating Manual

* For complete listing of available accessories visit www.Vitrek.com.

XT560 Digital Milliohmmeter

Ideal for Low-Resistance Measurement using the 4-Wire Kelvin technique.

The XT560 Digital Milliohmmeter is ideal for reliable, accurate, low resistance measurements using the standard 4-wire Kelvin technique.

Quality and Reliability

The XT560 Digital Milliohmmeter is a dedicated, fully automatic instrument that selects the optimal test current, from 100nA to 100mA DC to accurately measure resistance from 10μΩ to 33MΩ. The XT560 will auto range between 9 ranges, or can be manually set to a fixed range. The XT560 includes a set of Kelvin test clip leads for making four-terminal measurements. The XT560 is ideal for measuring wiring or cable resistances, windings of motors or generators, lamp filaments, cable splices, wire-to-terminal resistances, heating elements, contact resistance of breakers or switches, connector quality/resistance, fuse resistances, transformers and grounding connectors.

Four-Wire Measurement

The XT560 makes 4-wire resistance measurements as shown in Figure 1. The source HI and LO leads apply a known, internal current source to the unknown resistance. The sense HI and LO leads measure the voltage across the unknown resistance.

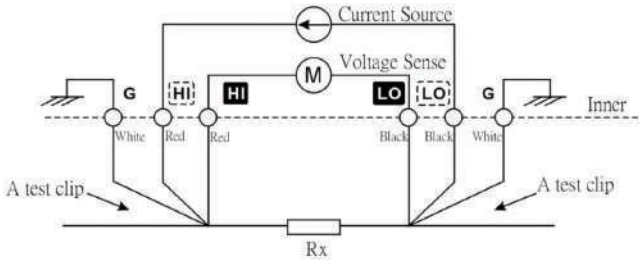


Figure 1. Four-Wire Measurement Diagram.

Features & Benefits

- Maximum display of 33000
- Wide Measurement Range from 10μΩ resolution to 30MΩ full scale
- High Accuracy +/-0.02% (most ranges)
- Auto/Manual Function
- RS-232 Interface standard
- Measurement speed 10 samples/second
- HOLD, REL function
- Physical power input: 90VAC to 260VAC, 50/60 Hz
- Size: 8.9 cm H x 24.7 cm W x 28 cm D
- Weight: 5 lbs
- Operating range: 0° C to 50° C, < 80% RH non-condensing
- Storage Range: -20° C to 70° C non condensing
- Unit is supplied with one set of Kelvin test leads for 4-terminal measurements
- One year warranty

Ordering Information*

Item	Description
XT560	Digital Milliohmmeter includes Kelvin test lead set (1 pair)
CA560	Kelvin test lead set (one pair), 18 in long
CA560-48	Kelvin test lead set (one pair), 48 in long

* For complete listing of available accessories visit www.Vitrek.com.

Academic

Universities, Vocational Schools, Graduate Schools, Technical Colleges and Training Facilities Receive a % Academic Discount on Vitrek & XiTRON products and accessories.

Vitrek precision instruments are used in university and research laboratories around the world. We understand the unique needs and requirements of the education/research arena, including ever-tighter budget constraints in the face of increasing workloads.

Graduate to Vitrek Testing

That is why we have introduced our special Academic Discount Program. It is designed to ease the burden of upgrading your equipment by increasing your purchasing power. The bottom line is reduced prices on Vitrek equipment to all qualified university, college and research laboratories.

Our premier instruments are not only among the highest performance testing products on the market today, but also the most economical when you purchase through our Academic Discount Program. Their ease of use and robustness make them ideal for inexperienced users. Make Vitrek your academic resource for innovative research and development and power test equipment.

Calibration Services

External Calibration

When an instrument's time in service reaches the specified calibration interval, we recommend that you return it to the manufacturer for calibration. We compare the instrument's measurements to external traceable standards, and make adjustments to the instrument. We not only verify that the measurements are within specified tolerances, but we also optimize the measurements to the center of their limits. In general, we include:

- Evaluation of the instrument's capabilities to determine operation within specifications with consideration given to the effect of the uncertainty of measurement.
- Adjustment of measurement to increase accuracy.
- Optional updates to the latest firmware and/or hardware version.
- Issuance of a calibration certificate, stating the instrument's compliance to specifications when compared to a standard.

Routine performance of external calibration ensures your measurement accuracy.

System Calibration

The goal of full system calibration is to quantify and compensate for the total measurement error in your system.

Cable losses and sensor offsets may induce measurement error. By applying known inputs to your system, and reviewing the resultant measurement, we can adjust or apply compensation factors to cover the measurement range of your system calibration needs.

This can be done with customer-supplied sensors, or those provided by Vitrek. Contact our calibration support staff for information on how we can support your system calibration needs.

By using our facility for calibration, you will keep your Vitrek instrument at optimum performance. We go above and beyond a standard calibration. Instruments are updated with any firmware or hardware changes by our technical staff to ensure your equipment is at the latest production level, maximize the life span of your instrument, and guarantee optimal performance for many years to come.

Calibration Certificates

Calibration certificates are documented proof that your specific measurement hardware meets its published specifications. At a minimum, a calibration certificate should identify the measurement device calibrated, and provide proof of traceability, environmental conditions (temperature and humidity), date of calibration, and show that the calibration conforms to a quality standard.

Vitrek's calibration certificates conform to ISO 17025:2017 providing these details and more to ensure the accuracy and reliability of your product.

Standard Calibration Service

Vitrek provides a Standard Calibration Certificate with all new measurement products. This certificate states the product is calibrated, meets quality requirements, and is traceable to internationally accepted standards. A copy of your certificate is provided at the time of shipment, and a copy is held on file should you ever require a duplicate replacement.

ISO 17025 Accredited Calibration with Data & Uncertainties

If your quality requirements state that you need more than a standard calibration certificate, we can provide a certificate that includes an accredited ISO17025 calibration with Data and Uncertainties.

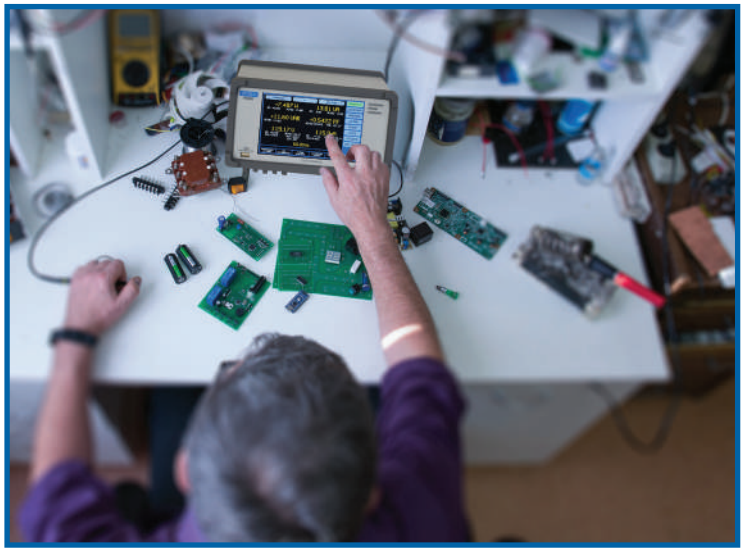
NIST Calibration without Data

If you do not require the ISO 17025 certification, we also offer a basic NIST calibration (without Data). Whichever calibration option you require, Vitrek can meet your individual needs.

Schedule your Recalibration Today!

Vitrek's internal staff as well as worldwide authorized representatives are here to support your calibration and repair needs. Vitrek prides itself on providing top level support prior, during and after the sale, to ensure that you have the right product, at the right price, for your application.

For additional information on Vitrek calibration or repair services contact our office at (858) 689-2755 or email info@vitrek.com.



Vitrek — Accuracy & Quality You Can Count On.

ACCREDITED
Calibration Laboratory
Cert # 3678.01

Vitrek performs calibration services every single day, why would you trust someone who works on your model one once a year?

Vitrek runs a full performance test on every product that comes through our doors to ensure that the device is working as if it were leaving us for the first time.

Vitrek's standard calibration procedures includes adjusting the instrument's measurement capability to ensure measurement accuracy. Vitrek is an accredited calibration laboratory to defined quality standards such as ISO 17025:2017.

Vitrek provides world class customer support — before, during and after the sale. Our highly skilled factory service technicians take pride in getting the job done right and providing standard calibration turnaround times that are among the fastest in the test equipment industry.

We provide service world-wide for all Vitrek products and offer a variety of calibration options to meet your needs.

Vitrek is an ISO 17025 Accredited Calibration Lab. Our quality management system is accredited to ISO 17025 by A2LA, so you can be certain you are receiving the highest quality instrument calibration available.

Calibration and repair services are available for NIST Calibration with No Data as well as ISO 17025 Accredited Calibration with Data & Uncertainties.

Recommended Calibration Intervals

Vitrek recommends regular calibration of all your hardware to ensure the best measurement accuracy possible.

Why Calibrated Instruments?

The benefit of purchasing calibrated instruments, and maintaining them by performing periodic maintenance include:

- Assurance of accurate measurements
- Ability to trace measurements back to a known and accepted standard
- Consistent measurements between countries
- Meeting requirements of quality standards such as ISO 9001:2000

Improving Measurement Accuracy

The accuracy of electronic components used in all instruments drifts with time, temperature and humidity changes. At some point, this drift could cause the instrument's uncertainty to exceed its specifications; meaning the manufacturer can no longer guarantee measurement results. Be sure to have your device recalibrated before this happens!

Vitrek supplies full product specifications, providing you with a better uncertainty profile and the period your device's accuracy is specified over defined environmental conditions..

Internal vs. External Calibration

Internal, or self-calibration is a method whereby an instrument uses onboard reference standards instead of external standards to adjust measurement accuracy. During internal calibration, the instrument measures and compares itself against these references, and adjusts its measurement capabilities to account for changes in accuracy due to drift or environment effects such as temperature. We recommend that this is done as part of an ongoing maintenance program, or whenever the instrument environment has changed by more than 5° C from the temperature at which it was last calibrated.

Internal, or self-calibration, does not replace external calibration. You must still perform external calibration to quantify the internal references, so that they can be used during self-calibration. Internal calibration and external calibration work together to ensure the measurement accuracy of instruments.

VITREK

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Since 1990, Vitrek has provided innovative global solutions for High Voltage Test and Measurement. All Vitrek poducts are designed and manufactured in the USA. Our advanced automated Electrical Safety Compliance Testers verify insulation integrity and ground bonding on a single device or a complex system. Our multi-point HV scanners automatically route voltages up to 15kV and currents up to 40A to hundreds of test points.

Vitrek supplies Precision High Voltage Measurement Standards to national laboratories and calibration labs around the world and our Graphical Power Analyzers set the standard for world class performance at a very economical price. In addition to manufacturing superior quality test and measurement equipment, Vitrek is also an ISO 17025 accredited calibration laboratory.

This unique combination of capabilities positions Vitrek as a world leader in providing test solutions to the photovoltaic, lighting, appliance, machinery, medical equipment, power conversion, electrical component, automotive, mil-aero, energy and metrology industries. Our team of application specialists can assist you in configuring the right solution for your test requirement. And you can count on team Vitrek to supply not only the very best equipment, but also the ultimate in customer support.

Vitrek sales and technical support is available locally via our domestic and international network of independent manufacturer representatives or directly from the Vitrek team of experts. For your local representative visit www.Vitrek.com or email us directly at info@vitrek.com.