

# 98x Series Teraohmmeter/IR Testers



Expanding the possibilities of High Voltage High  
Resistance Measurement

The new 981i and 983i Teraohmmeters are designed to tackle the toughest High Resistance measurement applications including 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 Q-Test 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 7, 10 and 15KV ratings.

# VITREK

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# The Vitrek 98x Teraohmmeter/IR Tester

## Choose the Industry Leader for Reliability.

### Vitrek 981i and 983i

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
- **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, 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.
- **Measure IR on Grounded Loads** – Some DUTs cannot be isolated from earth ground, add option HSS2 to make precise IR measurements on grounded loads.
- **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, 19200, 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

**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.

**DC Output Voltage****981i: 30V to 6500V**

Accuracy: +/- (0.25% rdg + 0.1V)

**981i with option HSS2: 30V to 5000V**

Accuracy: +/- (0.25% rdg + 0.1V+1V/mA)

**983i: 60V to 11000V**

Accuracy: +/- (0.25% rdg + 0.2V)

**Output Resolution: 1V**

Loading: up to 4mA charging, 2mA continuous

**Current Measurement****981i & 983i RETURN current only, 1pA to 4mA**

Accuracy (Resistive Load up to 1000pF): +/- (0.5%rdg + 10pA + 2pA per kV))

Accuracy (Capacitive Load 1000pF to 50nF): +/- (0.5%rdg + 100pA + 20pA per kV))

Accuracy (Capacitive Load &gt;50nF): +/- (0.5%rdg + 1nA + 200pA per kV))

**Option HSS2 HV Output current, 1nA to 4mA (for grounded loads)**

Accuracy (Resistive Load up to 1000pF, C&lt;1000pF): +/- (0.5%rdg + 5nA + 1nA per kV))

Accuracy (Capacitive Load 1000pF to 50nF): +/- (0.5%rdg + 7.5nA + 2.5nA per kV))

Accuracy (Capacitive Load &gt;50nF): +/- (0.5%rdg + 10nA + 5nA per kV))

**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.

|                     |                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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<br>Capacitive Loading (1000pF to 50nF): +/- (0.5%rdg + (R/(100Gohm per kV))%rdg + (10/V)%rdg + 100ohms per kV) for R < 5Tohm<br>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          | (DUT GROUNDED)<br>Resistive Loading : +/- (0.5%rdg + (R/(2Gohm per kV))%rdg + (10/V)%rdg + 20ohms per kV) for R < 100Gohm<br>Capacitive Loading (1000pF to 50nF): +/- (0.6%rdg + (R/(2Gohm per kV))%rdg + (10/V)%rdg + 100ohms per kV) for R < 100Gohm<br>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<br>Capacitive Loading (1000pF to 50nF): +/- (0.5%rdg + (R/(100Gohm per kV))%rdg + (20/V)%rdg + 200ohms per kV) for R < 5Tohm<br>Capacitive Loading (>50nF): +/- (0.6%rdg + (R/(10Gohm per kV))%rdg + (20/V)%rdg + 2kohms per kV) for R < 500Gohm                   |

Transfer Measurement

Comparative Measurement Capability (measurement of multiple values within 10% at the same test voltage, in the same environmental conditions within +/-1C, within a 1 hour period, with no intervening ZERO operations, and constant power)

Uncertainty (Resistive Load): +/- (0.05%rdg + (R/(5Tohm per kV))%rdg + (1/V)%rdg + 2ohms per kV) for R < 150Tohm

Timing

Charge Time: 1 second minimum charge time, 9999 sec max.  
Dwell Time: 0.1s to 9999 days, 0.1 sec resolution

Ordering Information

| Item   | Description                                    |
|--------|------------------------------------------------|
| 981i   | 6.5KV Teraohmmeter/IR Tester                   |
| 983i   | 11KVDC 6KV Teraohmmeter/IR Tester              |
| HSS-2  | HSS2 High Side Sense Option for 981i (5KV Max) |
| QTESW  | QT Enterprise Software                         |
| TL-980 | 4' Shielded, Alligator Test Lead Set           |
| GPIB-9 | Optional GPIB Interface                        |
| RM-1   | Rack Mount Kit                                 |
| RSS-95 | Remote Start/Stop Switch                       |
| RFS-95 | Remote Start Foot Switch                       |



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*Prices and specifications subject to change*