# Guardian

# 6100 Production Safety Analyzer

## For Electronic Medical Products

### USES:

- **Production Testing of Medical Electronic Products and Instruments in Accordance with UL,CSA and IEC Standards such as UL1950, IEC60601-1, UL2601-1, UL1563 and UL544.**
- **Electrical Safety Compliance Testing on a variety of products and devices.**

### FEATURES:

- **Programmable output voltage to 5kV AC and 6kV DC**
- **Ground Bond Testing to 30A AC with Adjustable Limit**
- **Line Leakage Current Measurement (Earth, Patient and Enclosure) with 5 Human Body Models**
- **Monitoring of DUT Current Draw**
- **Programmable Ramp and Test Times**
- **Storage of 99 Tests Setups with 99 Steps per Setup**
- **Continuous Leakage Current Monitoring**
- **Trip Current Programmable to 40mA AC and 20mA DC**
- **Front Panel Lockout via Password**
- **Standard IEEE and Remote Control Interfaces**
- **Optional RS232, Printer Interfaces**
- **Insulation Resistance Measurements from 100kΩ to 50GΩ**

### Introduction

The Guardian 6100 is designed for fast, easy, production testing of single phase electronic medical devices and instruments. Without changing the connection to the device, the tester is able to perform five essential electrical safety tests in one unit, including AC Hipot, DC Hipot, Insulation Resistance, Line Leakage Current and Ground Bond measurements. Performing all these electrical safety tests in one box increases production by reducing test time and eliminating multiple test stations.

### Description

**AC Hipot Test:** Performs AC dielectric testing (hipot) over the voltage range from 50V to 5000V AC RMS. Leakage current detection is programmable from 1µA to 40mA, making the 6100 ideal for testing medical products and instruments having a wide range of leakage currents.

**DC Hipot Test:** DC dielectric testing is possible from 50V to 6000V DC with leakage current detection down to 0.1µA. The maximum total output cutrrent of 20mA allows quick charging of capacitive devices and products.

**Insulation Resistance:** The insulation resistance test (similar to a DC hipot) calculates and displays a product's insulation resistance value in ohms. This resistance can be measured over the range of 100kΩ to 50GΩ with test voltages programmable from 50V to 1000V DC.

**Ground Bond:** The ground bond test, sometimes referred to as a high current continuity test, can be programmed from 1A to 30A AC for verifying the integrity of a product's ground system. Resistance measurements are displayed and a high limit is programmable between 0.1mΩ and 510mΩ.

**Line Leakage Current:** Line leakage tests (Earth, Patient and Enclosure) can be performed directly on the Guardian 6100 in eight possible configurations including: normal operating conditions, reverse line, or a single fault normal and single fault reverse mode with ground set on or off. Five different human body circuit models can be selected in accordance with UL, IEC, and other standards. Leakage current limits are programmable from 0.1µA to 9.999mA.

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For more information about special purchase, rent & lease options, call

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CE

Product Specifications

# Guardian 6100

## AC Output Voltage:

Range: 50V to 5000V AC, 1V resolution
Frequency: 50 or 60 Hz Programmable
Waveform: Sinusoidal
Regulation: <(1% +5V) at Rated Load

**Voltage Display:** Accuracy: ±(1% of reading + 5V)
Resolution: 1Volt

**AC Current Display:** Total current
Range: 1µA to 40mA AC
Resolution: 1 or 10µA steps
Accuracy: ±(1% + 5cnt)

**High/Low Limit Test:** 1µA to 40mA AC
Low limit can be turned OFF

**Arc Detection:** Programmable Level and OFF, >1mA

## DC Output Voltage:

Range: 50V to 6000V DC, 1V resolution
Regulation: <(1% +5V) at Rated Load

**Voltage Display:** Accuracy: ±(1% of reading + 5V)
Resolution: 1Volt

**DC Current Display:** Range: 0.1µA to 20mA DC
Resolution: 0.1, 1 or 10µA steps
Accuracy: ±(1% or reading + 5cnt)

**High/Low Limit Test:** 0.1µA to 20mA DC
Low limit can be turned OFF

**Arc Detection:** Programmable Level and OFF, >1mA

## Insulation Resistance:

Range: 100kΩ - 50GΩ
Accuracy: ±5% to ±15% depending upon voltage and resistance

**Voltage Range:** 50V to 1000V DC

**Voltage Accuracy:** ±(1% of setting + 5V)

**High/Low Limit Test:** 100kΩ - 50GΩ
Low limit can be turned OFF

**IR Test Delay:** 0.3 to 99.9 seconds, Programmable in 0.1 second steps

## Ground Bond:

**Output Current:** Range: 1.0 to 30.0A AC, setting 0.1A/step
Accuracy: ±(1% of setting + 0.3A)

**Display:** Accuracy: ±(1% of reading + 3 counts)

**Frequency:** 50 or 60Hz Selectable

**No Load Voltage:** 6 to 15 V Programmable

**Resistance:** Range: 0.1mΩ - 510.0mΩ, 4 digits
Accuracy: ±(1% of reading + 3 counts)
Resolution: 0.1mΩ

**Hi Limit:** 0.1mΩ to 510mΩ

**Offset Function:** 0 to 100mΩ offset, user selectable

**Test Time:** 0.5 - 999sec (±20ms)

## Line Leakage Current:

**Input Voltage:** Range: 0V to 300V AC, 50 or 60Hz.

**Line Voltage Meter:** 0 - 300V AC, ±(1% of reading + 5cnts)

**Line Current Meter:** 0 - 10A, ±(5% of reading + 5cnts)

**AC Current Display:**

| Range | Res. | Accuracy |
|---|---|---|
| 0.001-0.59mA | 0.0002mA | ±(2% + 5cnts) |
| 0.6 - 9.999mA | 0.003mA | ±(2% + 5cnts) |

**Current Trip Limits:** 0.1µA to 9.999mA, 1µA Resolution
0.1µA to 6.000mA for UL544NP

**Measuring Circuit:** 5 Types of Human Body Models in accordance with UL544 NP, UL544P, UL1563, UL2601-1,IEC60601-1, IEC 950, UL1950, UL3101 Standards

**Measurement Modes:** Normal, Reverse, Single Fault with Ground ON/OFF, Earth Line Leakage, Patient Line Leakage and Patient Auxiliary Leakage.

**Max. DUT Current:** 10A

## Common Features:

**AC/DC Test Time:** Ramp: 0.1 to 999s (±20ms)
Test: 0.1 to 999s (±20ms) and Continuous

**Remote Control:** Inputs: Start,Stop
Outputs: Pass/Fail/Under Test
Connector: Terminal Strip and 9 pin D Series

**Test Setups:** 99 Test Setups with 99 Steps each

**Rear Connectors:** Input: Binding Posts (Line & Neutral)
Isolation Transformer (not included) is required for proper operation
(10A, 300V max.)
Output: High Voltage sockets for connection to 115V corded adapter, G30 (included)

**Front Panel Lockout:** Password

**Safety Features:** Fast Cutoff (<0.4ms) and Fast Discharge

**Miscellanious:** Continuous Voltage on Fail
Scanner Delay: 0.1 to 99.9, 0.1s/step

**Indication:** Pass/fail lights, audible sound

**Buzzer Level:** 1,2,3 and Off

**Standard Interface:** IEEE-488

**Optional Interfaces:** RS232, Printer

**Dimensions:** (w x h x d):17x6.8x17.7in (430x175x450mm)

**Weight:** 53 lbs (24kg) - Net, 60 lbs (27kg) Shipping

**Environmental:** Operating: 0°C to + 40°C,
Humidity: <75%
Storage: - 20°C to + 70° C

**Power:** • 90 - 130V AC • 50 or 60Hz
• 200 - 250V AC • 500W max

# Ordering Information

| | | | | | |
|---|---|---|---|---|---|
| Guardian 6100 Production Safety Analyzer | | G15 | Ground Continuity Lead Set | S05 | Foot Switch |
| Includes: | | G30 | Corded Product Adapter (115V) | G26 | RS232 Interface |
| Guardian 6000 Electrical Safety Analyzer | | G33 | Power Entry Adapter Cable | G27 | Rack Mount Flanges |
| 6000-05 | Hipot/Line Leakage Scanner | 700070 | AC Power Cable | G28 | Printer Interface (replaces IEEE 488) |
| 150687 | Instruction Manual | N/A | Calibration Cert Traceable to NIST | G31 | Isolation Transformer (500VA) |
| S02 | HV Lead Set, 1m | Optional Accessories | | G32 | Isolation Transformer (1000VA) |
| G14 | Power Entry Adapter Cable | N/A | Calibration Data | G41 | RS232 Cable: DB9F to DB25M, 3 feet |

**For more detailed specifications, visit www.quadtech.com • For information about special purchase, rent & lease options, call**

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