GPT-12000 Series

AC/DC/IR/GB Electrical Safety Analyzer

FEATURES

- 200VA AC Test Capacity
- Comply with IEC 61010-2-034
- 7" TFT LCD
- Manual / Auto Mode
- True RMS Current Measurement
- Zero Crossing Turn-on Operation
- Controllable Ramp-up & Ramp-down Time
- Capacitive Load Testing Capability up to 47μF
- Statistics Function
- Sweep Function for DUT Characteristic Analysis
- USB Storage Available
- Rear Panel Output Available
- Interface : RS-232C, USB Host/Device, Signal I/O and GPIB (Opt.)
- Universal Power Input

GW INSTEK
Simply Reliable

GW Instek introduces the flagship model (200VA output capacity) safety analyzer-the GPT-12000 series, which is the first safety analyzer in the world to comply with IEC 61010-2-034 (Safety requirement for electrical requirement for measurement, control and laboratory use – particular requirements for measurement equipment for insulation resistance and test equipment for electric strength), which stipulates that the requirements of the software and hardware interfaces must be followed while designing high voltage and insulation resistance test and measurement instruments so as to ensure that users are provided with necessary protection and warning while using the instruments.

The GPT-12000 series safety analyzer has four models: GPT-12004 features AC/DC withstanding voltage test, insulation resistance test, AC ground bond test and continuity test; GPT-12003 conducts AC/DC withstanding voltage test, insulation resistance test, and continuity test; GPT-12002 carries out AC/DC withstanding voltage test and continuity test; GPT-12001 executes AC withstanding voltage test and continuity test. The entire series provides an output capacity of 200VA and utilizes a high-efficient PWM amplifier to effectively exclude the influence from the fluctuating input voltage or distorted waveforms so as to guarantee a stable high-voltage output while conducting AC withstanding voltage test on the DUT to meet the safety regulations such as IEC、EN、UL、CSA、GB、JIS that demand the test requirements for various electronic/electrical products or parts.

To comply with IEC 61010-2-034 requirements, the series takes into account of safety by adopting the double insulation design for input power supply and output voltage to enhance user safety. Additionally, the retracted on-off switch design (START key) and various (optional) mechanisms for test activation (for instance, press and hold for 1 second to activate, activation by pressing double keys, etc.) are incorporated into the series to avoid accidentally touching that results in high voltage/large current output causing damage and danger to products or users. High illumination LED lights (flashing or permanently lit) and a high volume audial indicator are included in designing the series to provide warnings of the status of the on-going tests or judgement results from the safety analyzer. On top of that, the DUT will be automatically discharged to the safe voltage (approximately 30V) after each test to prevent large residual test voltage from causing harm to users.

The series utilizes 7-inch color TFT LCD and inherits the consistent simplicity key design style of the product family to allow users to experience easy operations and a clear observation of the test results. The major test functions include AC withstanding voltage test (AC 5kV/40mA), DC withstanding voltage test (DC 6kV/10mA), insulation resistance test (DC 50V~1200V/50GΩ max.), ground bond test (AC 32A/650mΩ max.), and grounding continuity test (DC 100mA fixed/70Ω max.). The series also collocates with superb output adjustment resolution, measurement resolution (AC withstanding voltage: 1μA; DC withstanding voltage: 0.1μA; insulation resistance: 0.1MΩ; ground bond: 0.1MΩ; continuity test: 0.01Ω), controllable voltage ramp up and ramp down time settings, and upper/lower limit judgement settings, and large capacitance test capability (up to 47uF) for DUT with large capacitance such as surge absorber and large capacitance on the input terminal of EMC/EMI prevention. For Insulation resistance, provides 10mA pre-charged current (fixed) to first rapidly fully charge the DUT's capacitive load and then to conduct test and measurement so as to avoid misjudgment from fluctuating inrush current. All the above features of the series facilitate a more flexible execution of the required tests so that users can obtain accurate test and measurement results.

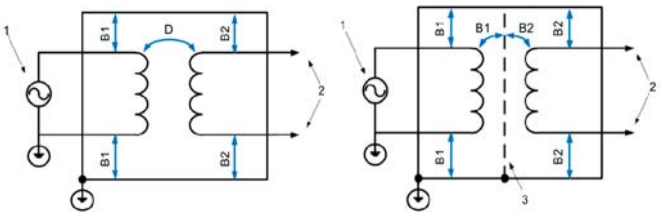
The statistic function is the highlight of the series. Test items, number of tests, judgement results are recoded after testing and the test results can be shown by bar graph on the display. Users can immediately learn the status of product tests and judgement distribution during the manufacturing process without using a PC. The other strong feature is the sweep function, which can be used for the analysis on product's crash point. Users can use the sweep mode to see the curve diagram of the test results after finishing the functional tests. Users can also select any time point during the process to analyze the relation between voltage and current (when ACW or DCW is selected). The test result of the certain period of time can be swept by setting start and stop time points to analyze the relation between voltage and current under that time frame. Furthermore, the tabular continuity test function can combine 10 manual memory sets to carry out automatic tests or 9 manual memory sets with one connection device to connect next automatic test so as to increase the test items of the continuity test. Users can obtain various test values and judgement results without switching to a different display screen.
Other functions and features of the GPT-12000 series include 100 sets of manual test memory for the storage of different test conditions; rear output terminal for system integration; front panel remote control terminal mount/rear panel Signal I/O for users to conveniently control the analyzer's output/stop based upon the requirements. The USB storage function allows test results to be stored in the USB flash drive to save the trouble of using a PC, and the function is conducive to the follow-up data analysis. For users with the requirements of PC control and test results recording, the series also provides RS-232C, USB and GPIB (optional)

PANEL INTRODUCTION

CE | USB Host | RS-232 | GPIB | USB | Signal I/O | Rear Output

1. Start & Stop Button
2. Function Selection Key
3. 7" LCD Display
4. Navigator Key
5. Status Indicator (PASS/FAIL)
6. Wheel & Test Mode key
7. USB Host
8. REMOTE Terminal
9. Hi-Voltage Output Terminal & Indicator
10. Current Output Terminal & Return
11. Rear Output Terminal & Indicator
12. Series Port (RS-232C/USB device)
13. Signal I/O
14. GPIB (optional)

A. Meets IEC 61010-2-034 Design Requirements



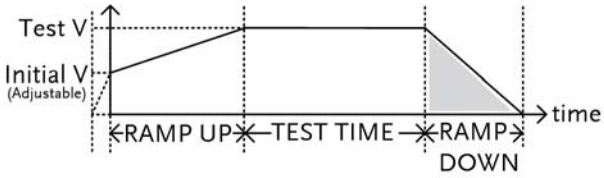
Providing the markets with safe electronic products is the responsibility of every manufacturer! Similarly, safety analyzer that tests whether electronic products meet safety regulations must attach the importance to the safety it provides! GPT-12000 is the world's first safety analyzer to comply with IEC 61010-2-034 (Safety requirement for electrical requirement for measurement, control and laboratory use – particular requirements for measurement equipment for insulation resistance and test equipment for electric strength). Apart from this, the safety considerations also include double insulation for input and output voltages, safe output/warning mechanism, post-test discharge mechanism, etc. to ensure user safety during the operation.

B. High Accuracy and High Resolution Testing Performance

High Adjustment & Measurement Resolution

For production tests and characteristic verification, the GPT-12000 series provides a withstand voltage test voltage (AC 5kV/DC 6kV) that can be adjusted in 1V steps with current measurement resolutions up to 1μA (ACW) or 0.1μA (DCW) to realize the small leakage current measurement for products or components. In addition, the insulation resistance test voltage can be adjusted in 50V steps from a DC output range of 50V to 1200V, and the resistance measurement resolution can reach 0.1MΩ. Since most safety regulations require AC power supply for ground bond test, the GPT-12000 series provides 8Vac (open) and 3A to 32Aac current for ground bond test with a resistance measurement resolution of 0.1mΩ. The entire series provides the continuity grounding test function with a 100mAdc (fixed) test source and a measurement resolution of 0.01Ω to detect if the tested equipment is correctly grounded. With these functions, users can perform various safety tests and verifications with high accuracy and reliability.

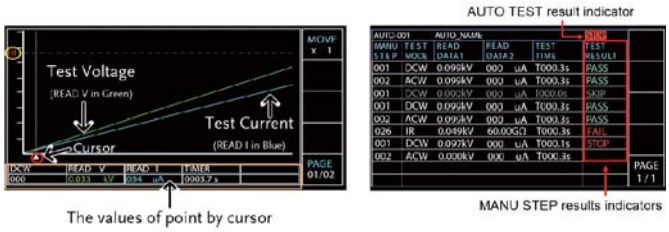
C. Flexible Supplementary Testing Mechanism



Testing Period Timing

To make tests compliant with the test requirements of relevant safety regulations, the GPT-12000 series provides a more flexible output sequence setting starting from the start point of the test. Taking the AC/DC withstand voltage test as an example, the initial voltage can be set. Users determine the initial voltage ratio (i.e., the ratio of the rated test voltage), and then the voltage ramp up can also be set to reduce the risk of insulation breakdown or damage to the DUT caused by transient high voltages. After the rated test voltage is reached, the upper/lower limit judgement window, delay judgment and test timer mechanism can be set to assist users to conduct tests smoothly and correctly. The new voltage ramp down time setting allows users to test with a ramp down voltage to avoid the impact of excessively high rated test voltage to instantaneous discharge on the DUT.
With respect to the insulation resistance test, other than the newly added grounding mode to perform test in accordance with the actual grounding state of the DUT, the setting mechanism of the supplementary upper/lower limit judgement is also added to shorten the test time. The user-definable mode mechanisms include: STOP ON FAIL: The test is terminated as soon as the FAIL setting is met; STOP ON PASS: The test is terminated as long as the PASS setting is met, or TIMER: judgement is conducted when the timer time is reached.

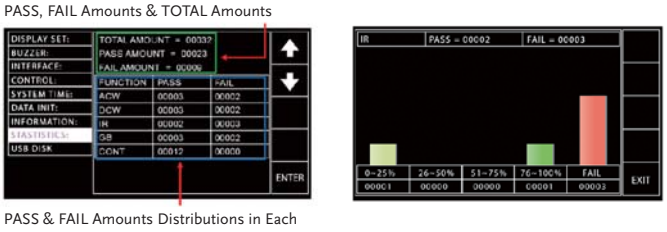
D. Sweep and Tabular Automatic Test



Sweep Function **Tabular Automatic Test**

The GPT-12000 series features a unique sweep function, which displays a curve diagram of the test results of the DUT. Test readings are recorded point by point based on the applied test voltage or current and relevant settings (such as initial voltage, ramp up time, test time, or ramp down time). After the test is completed, users can learn the amount of applied energy (voltage or current) at a specific time point and the results of measurement parameters by moving the cursor position so as to help users understand the changes of the measurement parameters (current or resistance) during the test. The function can also be used to determine the critical break down of the DUT.
With respect to the automatic test function, each automatic test has up to 10 manual test items and all related settings and result judgement are presented in a table, so that users can easily obtain the results of all test items at a time. Other than that, if there are multiple automatic test connection requirements, uses only need to select CON in the last item of the table to automatically connect the automatic measurement of the next position (such as AUTO-012~ AUTO-013)

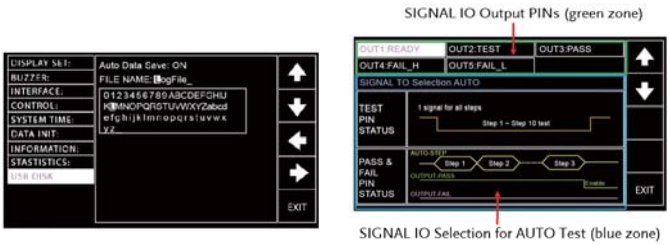
E. Statistic and Analysis



Statistic **Analysis**

The GPT-12000 series provides the statistic function, which can record the test functions and judgment results in the temporary storage area (60,000 lots max.). Users can immediately learn the test of each function during the test without using a PC. The distribution of the good products can be analyzed to understand the quality of the batch based on the data. If most of them fall at the critical point that is close to be categorized as defect product, the results can be found in the test process in time so as to improve the manufacturing process and stop the defect products from entering the markets to ensure the reliability of products after leaving the factory.

F. Complete test Data retrieval Interface



Usb Storage Function **Signal I/O Self-defined Signal I/O**

In order to facilitate users to analyze the results of the safety test, GPT-12000 provides the USB storage function in addition to its own statistic and analysis functions. When a USB is inserted and the storage function is activated, each time the test button (START) is pressed, the test results of all tests (every manual or automatic test item) are automatically saved to the USB in the form of a text file (txt) for follow-up analysis. For interface connections, the GPT-12000 series offers external control or a variety of remotely connected ports such as a signal I/O port that can be used to connect an external controller or PLC. The signal I/O's output signal pins can be self-defined so as to collocate with various PLC control requirements. Besides, the entire series is equipped with RS-232C and USB device (GPIB is optional) for easy retrieval of test data and results by connecting a PC.

SPECIFICATIONS

AC WITHSTANDING			
Output-Voltage Range			0.050kV~5.000kV
Output-Voltage Resolution			1V
Output-Voltage Accuracy			±(1% of setting + 5V) [no load]
Maximum Rated Load			200 VA (5kV/40mA)
Maximum Rated Current			40mA (0.5kV< V≦5kV); 10mA (0.05kV≦ V ≦0.5kV)
Output-Voltage Waveform			Sine wave
Output-Voltage Frequency			50 Hz / 60 Hz selectable
Voltage Regulation			±(1% + 5V) [maximum rated load -- no load]
Voltmeter Accuracy			±(1% of reading + 5V)
Current Measurement Range			1μA~40.00mA
Current Best Resolution			1μA / 10μA
Current Measurement Accuracy			±(1.5% of reading + 30μA)
Window Comparator Method			Yes
ARC Detect			Yes
RAMP UP (Rise Time)			0.1s~999.9s
RAMP DOWN (Fall Time)			0.0s~999.9s
TIMER (Test Time)			OFF, 0.3s~999.9s
WAIT TIME			0.0s~999.9s
GND			ON/OFF
DC WITHSTANDING			
Output-Voltage Range			0.050kV~6.000kV
Output-Voltage Resolution			1V
Output-Voltage Accuracy			±(1% of setting + 5V) [no load]
Maximum Rated Load			50W (5kV/10mA)
Maximum Rated Current			10mA (0.5kV< V ≦6kV); 2mA (0.05kV≦ V ≦0.5kV)
Voltage Regulation			±(1% + 5V) [maximum rated load -- no load]
Voltmeter Accuracy			±(1% of reading + 5V)
Current Measurement Range			1μA~10.00mA
Current Best Resolution			0.1μA /1μA /10μA
Current Measurement Accuracy			±(1.5% of reading + 3μA) when I Reading < 1mA ; ±(1.5% of reading + 30μA) when I Reading≧1mA
Window Comparator Method			Yes
ARC Detect			Yes
RAMP UP (Rise Time)			0.1s~999.9s
RAMP DOWN (Fall Time)			0.0s~999.9s
TIMER (Test Time)			OFF, 0.3s~999.9s
WAIT TIME			0.0s~999.9s
GND			ON/OFF
INSULATION RESISTANCE			
Output Voltage			50V~1200V dc
Output-Voltage Resolution			50V
Output-Voltage Accuracy			±(1% of setting + 5V) [no load]
Resistance Measurement	Test Voltage	Display Range	Measurement Range / Accuracy
	50V≦V≦100V	0.1MΩ~10.00GΩ	0.1MΩ~1MΩ : ±(5% of reading + 3 count); 1 MΩ~50MΩ : ±(5% of reading + 1 count);
	150V≦V≦450V	0.1MΩ~20.00GΩ	51MΩ~2GΩ : ±(10% of reading + 1 count)
	500V≦V≦1200V	0.1MΩ~50.00GΩ	0.1MΩ~1MΩ : ±(5% of reading + 3 count);1 MΩ~500MΩ : ±(5% of reading + 1 count); 501MΩ~9.999GΩ : ±(10% of reading + 1 count); 10GΩ~50GΩ : ±(20% of reading + 1 count)
Voltage Regulation			±(1% + 5V) [maximum rated load -- no load]
Voltmeter Accuracy			±(1% of reading + 5V)
Short-Circuit Current			10mA max.
Output Impedance			2kΩ
Window Comparator Method			Yes
RAMP UP (Rise Time)			0.1s~999.9s
RAMP DOWN (Fall Time)			0.0s~999.9s
TIMER (Test Time)			0.3s~999.9s
WAIT TIME			0.0s~999.9s
GND			ON/OFF
GROUND BOND			
Output-Current			03.00A~32.00A ac
Output-Current Resolution			0.01A
Output-Current Accuracy			3A≦I≦8A : ±(1% of reading + 0.2A); 8A<I≦32A : ±(1% of reading + 0.05A)
Test-Voltage			8Vac max (open circuit)
Test-Voltage Frequency			50Hz/60Hz selectable
Ohmmeter Measurement Range			1mΩ~ 650mΩ
Ohmmeter Measurement Resolution			0.1mΩ
Ohmmeter Measurement Accuracy			±(1% of reading + 2 mΩ)
Window Comparator Method			Yes
TIMER (Test Time)			0.3s~999.9s
Test Method			Four Terminal
GND			ON/OFF
CONTINUITY TEST			
Output-Current			100mA dc (fixed)
Ohmmeter Measurement Range			0.10Ω~ 70.00Ω
Ohmmeter Measurement Resolution			0.01Ω
Ohmmeter Measurement Accuracy			±(10% of reading + 2 Ω)
Window Comparator Method			Yes
TIMER (Test Time)			0.3s~999.9s
MEMORY			
Single Step Memory			MANU : 100 blocks
Automatic Testing Memory			AUTO : 100 blocks, Manu per auto : 10
INTERFACE			
Standard (Front)			REMOTE, USB host
Standard (Rear)			Rear Output, RS-232C, USB device, Signal I/O,
Option			GPIB
DISPLAY			
			7" color LCD
POWER SOURCE			
			AC 100V~240V ± 10%, 50Hz/60Hz; Power consumption : Max. 400VA
DIMENSIONS & WEIGHT			
			380(W) x 148(H) x 454(D) mm; Approx. 15kg

Specifications subject to change without notice. GPT-12000CD1BH

ORDERING INFORMATION

GPT-12004 AC/DC/IR/GB Electrical Safety Analyzer
GPT-12003 AC/DC/IR Electrical Safety Analyzer
GPT-12002 AC/DC Electrical Safety Analyzer
GPT-12001 AC Electrical Safety Analyzer

ACCESSORIES

Quick Start Guide x 1, Power cord x 1, CDx1(complete user manual), Interlock Key x 1, Remote terminal Cable GHT-119 x 1, Test lead GHT-115 x 1 for GPT-12001/12002/12003, Test lead GHT-115 x 1, GTL-215 x 1 for GPT-12004

OPTION

Opt.1 GPIB card

OPTIONAL ASSESSORIES

GHT-113 High Voltage Test Pistol
GHT-117 High Voltage Adapter Box
GHT-118 High Voltage / Ground Bond Adapter Box
GHT-205 High Voltage Test Probe
GTL-232 RS232C Cable, 9-pin Female to 9-pin, null Modem for Computer
GTL-246 USB Cable, A-B type, approx. 1.2m
GTL-248 GPIB Cable, approx. 2m
GRA-440 Rack Adapter Panel (19', 4U)