GW INSTEK

Simply Reliable

2015 Good Will Instrument Co., Ltd. GENERAL CATALOG

www.gwinstek.com

World-Class Quality and Performance Affordable Price Wide - Range Selection

Originally known and founded in 1975 as Good Will Instrument, GW Instek is the first professional manufacturer in Taiwan specializing in electrical test and measurement instruments. GW Instek began as a manufacturer of power supplies and quickly expanded into developing high precision electronic test and measurement instruments. After 40 years in the test and measurement industry, GW Instek has grown to become one of the most recognized manufacturers of test and measurement instruments in the world. Today, GW Instek has more than 300 items ranging from oscilloscopes, spectrum analyzers, signal sources, dc power supplies, ac power sources, digital meters, LCR meters, other specific application meters to video... to video surveillance systems.

Think of the word "innovation" and it's easy to think of R&D, new inventions, faster processing and groundbreaking technologies. At GW Instek, we focus on another type of innovation that is based on flexibility, manageability and efficient performance in real-world test applications. We call this "customer-focused" innovation and we strongly believe in it. By listening to our customers around the world, we are able to anticipate their needs and respond quickly to emerging trends. So when one of our customers introduces an exciting new technology, GW Instek is ready to test it.

Whether our customers are designing products with the ability to change people's lives, educating and training the engineers of tomorrow, or discovering new technologies that solve complex problems, GW Instek can be trusted to perform reliably and accurately in even the most demanding test environments. How can we be sure? We have the numbers to back it up. Actually, we have just one : 40. That's the number of in-house quality and performance verification tests each GW Instek product must pass before it leaves our facilities. This thorough process starts with environmental, safety and durability testing in the product design phase, through to burn-in and shipping tests ahead of final inspection and packing. Furthermore, our three manufacturing facilities in Taiwan and China all adhere to ISO quality and environmental management standards, as well as European CE safety regulations. That's why GW Instek products can be trusted to test.

At GW Instek, quality is reflected not in higher cost, but in greater value. We pride ourselves on the quality, reliability and affordability of our test and measurement instruments. With each of our products often in use for decades, it's not hard to understand the importance of measuring a product's value not by price, but by lifetime cost. This importance is deep-rooted to us; we have consistently produced products with some of the industry's lowest total cost per ownership. Reducing the total cost per ownership of our products allows us to provide exceptional value, reliability and performance with leading service and support over the lifetime of a product. That's why year after year, GW Instek can be trusted to perform reliably.

The industries we serve are as diverse as they are specialized. Our experience and expertise allow us to deliver high-performance test solutions that address the unique requirements of each client. GW Instek provides customized solutions that are backed by reliable products, comprehensive after-sales support, warranty, calibration services, and one of the industry's lowest Total Cost per Ownership.

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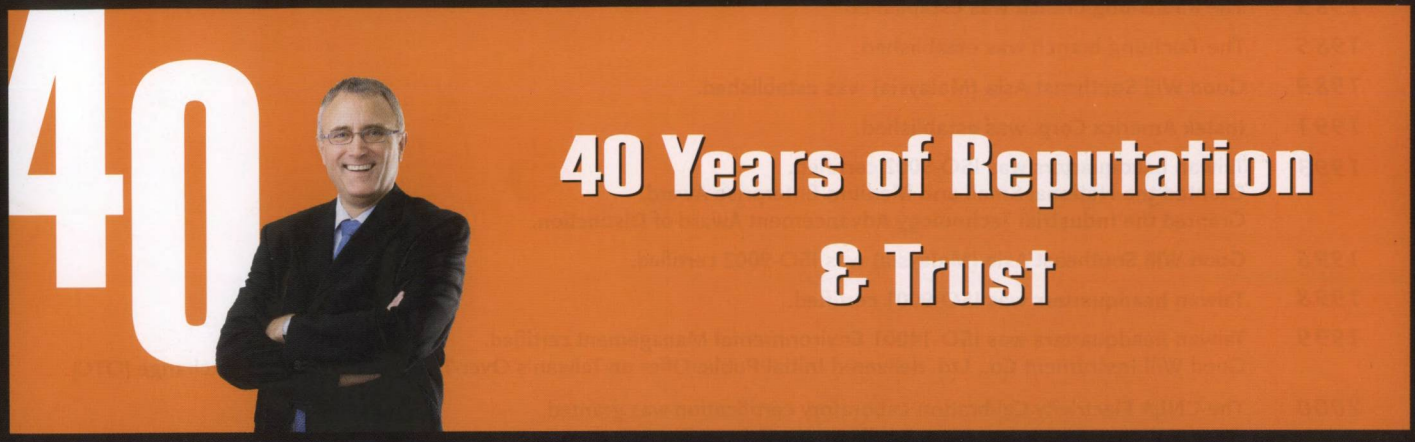
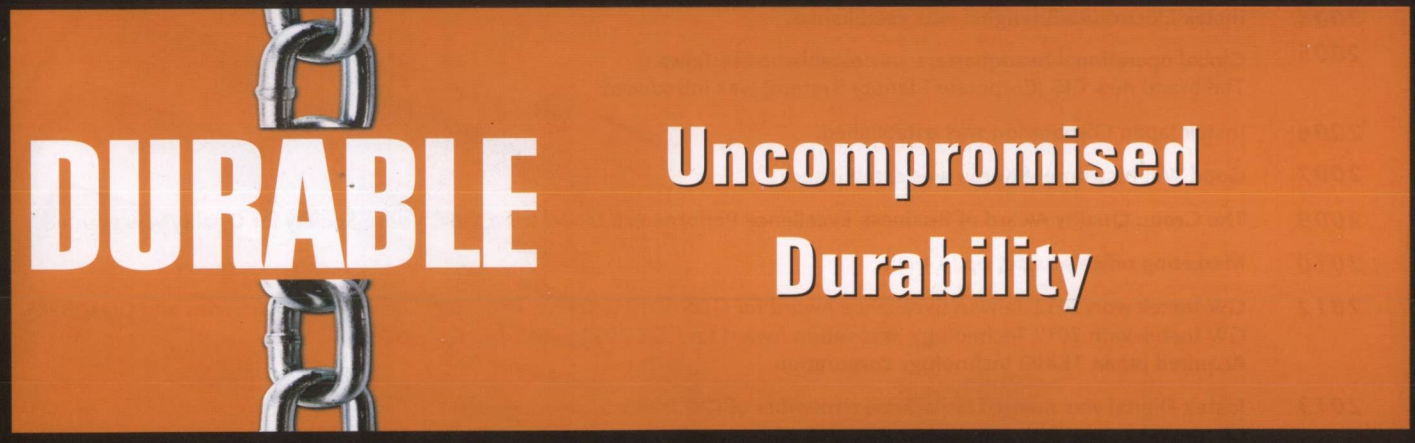


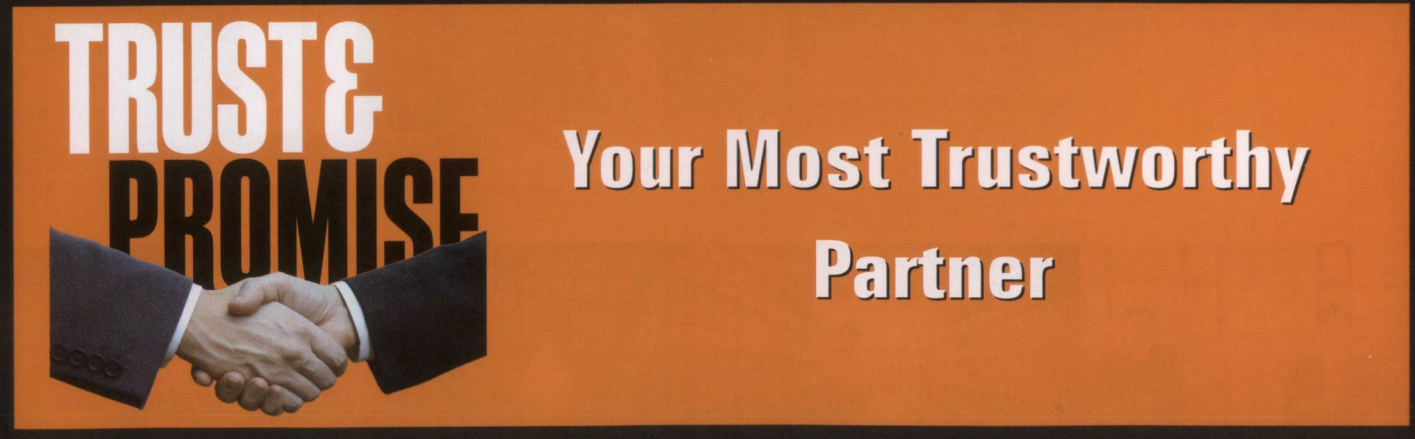
40 Years of Reputation & Trust

We take prides in creating more than 40 years of satisfied customer experiences throughout the world. Today, GW Instek is considered the most **Reliable Brand** for professional measurement instruments with supreme quality and the **lowest TCO - Total Cost per Ownership.** We invite you to be part of GW Instek success story and help perpetuate this value.



Uncompromised Durability

With an overriding commitment to provide highly durable products, GW Instek is your most **Reliable choice** when it comes to selecting the best measurement instructments with the **lowest TCO - Total Cost per Ownership.** Highly durable products mean long product lifetime capable of reducing operation & maintenance costs. This is definitely what you need to consider before investing.



Your Most Trustworthy Partner

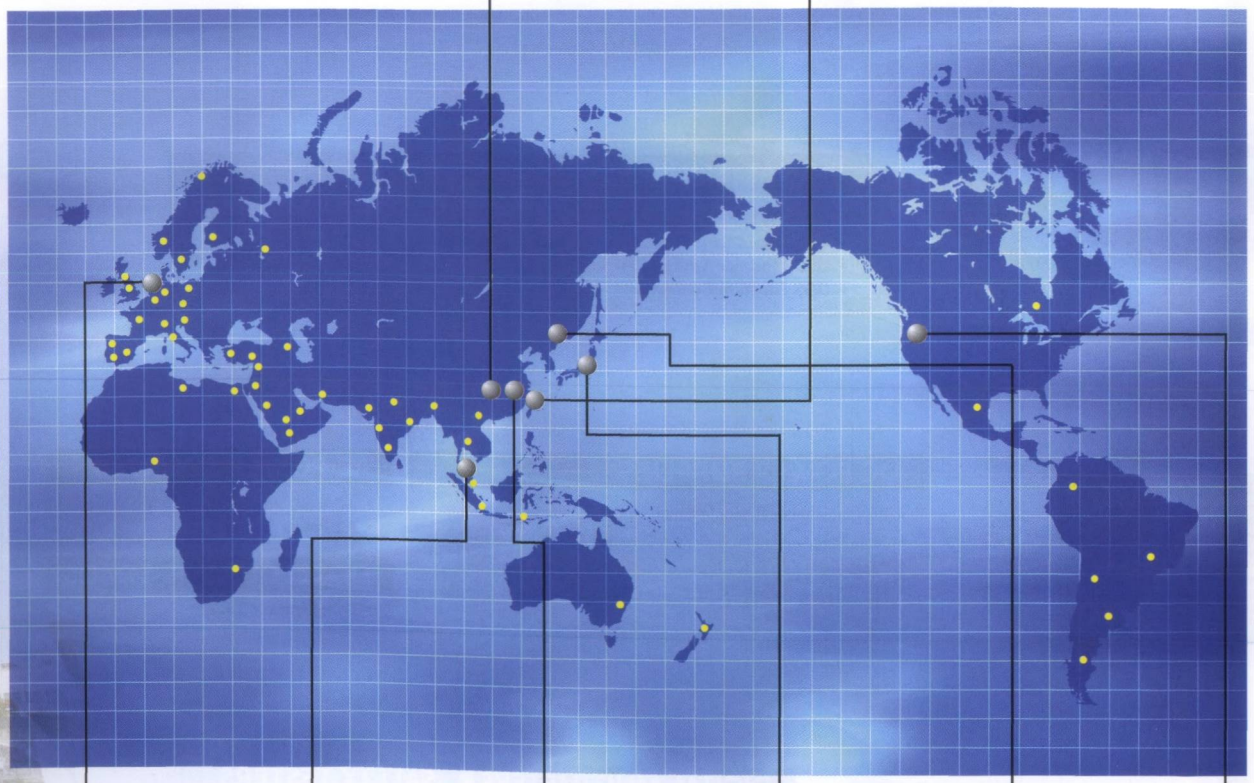
Being your most trustworthy and **Reliable Partner,** GW Instek promises to proactively provide insightful business solutions and products with the **lowest TCO – Total Cost per Ownership**, assisting your business to thrive in the highly competitive world. From feasibility evaluation, product selection, solution adaptation to timely after-sales service, we are dedicated to serving each individual customer and making your professional life easier than ever.

Milestones

1975	Good Will Instrument Co., Ltd was established as a Power Supply manufacturer.
1983	The Kaohsiung branch was established.
1985	The Taichung branch was established.
1989	Good Will Southeast Asia (Malaysia) was established.
1991	Instek America Corp. was established.
1993	Taiwan headquarters was ISO-9002 certified. Granted the National Small and Medium Enterprise Award. Granted the Industrial Technology Advancement Award of Distinction.
1996	Good Will Southeast Asia (Malaysia) was ISO-9002 certified.
1998	Taiwan headquarters was ISO-9001 certified.
1999	Taiwan headquarters was ISO-14001 Environmental Management certified. Good Will Instrument Co., Ltd. delivered Initial Public Offer on Taiwan's Over-The-Counter Security Exchange (OTC).
2000	The CNLA Electricity Calibration Laboratory certification was granted. Good Will Instrument was went public on the Taiwan Stock Exchange.
2001	Good Will Instrument Suzhou was established.
2002	Taiwan headquarters was ISO-9001 : 2000 certified.
2003	Suzhou subsidiary was ISO-9001 : 2000 certified.
2004	Instek Electronics Shanghai was established.
2005	Global operational headquarters was established in Taiwan. The brand new CIS (Corporate Identity System) was introduced.
2006	Instek Japan Corporation was established.
2007	Good Will Instrument Korea was established.
2009	The Group Quality Award of Business Excellence Performance Model from the Chinese Society for Quality was granted.
2010	Marketing office was set up in India.
2012	GW Instek won 2012 Taiwan Excellence Award for GDS-1000-U Series, AFG-3000 Series, PEL-2000 Series and GDM-8261. GW Instek won 2012 Technology Innovation Award for GDS-3000 Series and GSP-930. Acquired Japan TEXIO technology corporation.
2013	Instek Digital was merged to become a member of GW Instek business group. GW Instek cooperated with Hitachi and EMIC to establish GW Alliance in Suzhou, China. GW Instek won 2013 Technology Innovation Award for PPH-1503 and AFG-2225.
2014	GW Instek won 2014 Technology Innovation Award (Gold) for GDS-300 full touch screen oscilloscope. European subsidiary was established in the Netherlands.
2015	GW Instek won 2015 Taiwan Excellence Award for GDS-300/200 Series and PEL-3000 Series.

Suzhou Plant

Headquarters & Plant



Europe Subsidiary

Malaysia Subsidiary

China Subsidiary

Japan Subsidiary

Korea Subsidiary

U.S.A. Subsidiary

Product Mix

OSCILLOSCOPES

- Digital Storage Oscilloscope
- Real-Time/Digital Storage Oscilloscope
- Analog Oscilloscope
- Handheld Digital Storage Oscilloscope & Multimeter
- Oscilloscope Education And Training Kit

SPECTRUM ANALYZERS

- 3GHz Spectrum Analyzer
- 1GHz Spectrum Analyzer
- RF & Spectrum Analyzer Training System

SIGNAL SOURCES

- Arbitrary Function Generator
- True Dual Channel Arbitrary Function Generator
- USB Modular Arbitrary Function Generator
- DDS Function Generator
- Analog Function Generator
- Audio Generator
- RF Signal Generator

DC POWER SUPPLIES

- Programmable & Single Channel DC Power Supply
- Non-Programmable & Single Channel DC Power Supply
- Programmable & Multiple Channel DC Power Supply
- Non-Programmable & Multiple Channel DC Power Supply

AC POWER SOURCES

- AC + DC Power Source
- AC Power Source

DC ELECTRONIC LOADS

- DC Electronic Load

DIGITAL MULTIMETERS

- Benchtop Digital Multimeter
- Handheld Digital Multimeter
- Digital Clamp Meter

SAFETY TESTERS

- Safety Tester
- Leakage Current Tester
- AC Ground Bond Tester
- Multiplex Scanner Box

LCR METERS

- Benchtop LCR Meter
- Handheld LCR Meter

OTHER METERS

- DC Milli-Ohm Meter
- Digital IC Tester
- Precision Current Shunt Meter
- Automatic Distortion Meter
- AC Millvolt Meter
- Frequency Counter
- AC Power Meter
- Logic Probe & Pulser

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* Segmented Memory and Waveform Search Functions
* I^2C/SPI/UART/CAN/LIN Serial Bus Trigger and Decoding Function
* Data Log Function for Waveform Observation in Long Periods of Time
* Network Storage Function

Page A25-30

A 200/100/70 MHz DIGITAL STORAGE OSCILLOSCOPE

CE | USB | PC Software | Labview Driver

台灣精品 TAIWAN EXCELLENCE 2015

NEW

GDS-300/200 Series

* 200/100/70MHz Bandwidth Selections, Two Input Channels
* 1GSa/s Maximum Sample Rate
* Maximum 5M Memory Depth Per Channel
* 7" 800 x 480 Full Touch Panel Capacitive LCD Multi-Point Control, Landscape and Portrait Display
* Built-In 50,000 Counts DMM
* 30,000 Consecutive Waveform Records Logging Function, Replay Measurement Results Any Time
* Temperature Measurement and Logging Function
* Built-In Engineering Calculator, SMD Resistance Coding, Color Coding Info, and Attenuator Calculation Application Software
* Optional Differential Probe to Achieve Isolation Effect

Page A31-36

A 100MHz/70MHz/50 MHz DIGITAL STORAGE OSCILLOSCOPE

CE | USB | PC Software | Labview Driver | Ethernet | PictBridge Compatible

NEW

GDS-1000B Series

* 100MHz/70MHz/50MHz Bandwidth Selections, 2ch or 4ch Input
* 1GSa/s Maximum Sampling Rate
* 10M Maximum Memory Depth For Each Channel
* 7" 800 x 480 WVGA LCD Display
* 256 Color Gradient Display Function to Strengthen Waveform Performance
* 1Mpts FFT Frequency Domain Signal Display
* Zero Key Function For Horizontal Time, Vertical Voltage and Triggering
* Compact And Innovative Exterior Design

Page A37-40

B 3GHz SPECTRUM ANALYZER

CE | USB | LXI | DVI Output | RS-232 | GPIB | PC Software | Micro SD/SDHC

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NEW

GSP-9300

* Frequency Range: 9kHz ~ 3GHz
* High Frequency Stability: 25ppb (0.025ppm)
* RBW: 10Hz ~ 10kHz in 1-3 Steps, 10kHz ~ 1MHz in 10% Adjustable Steps
* Phase Noise: -88dBc/Hz @1GHz, 10kHz Offset
* Built-in Measurement Functions: Channel Power, N-dB Bandwidth, OCBW, ACPR, SEM, TOI, CNR, CTB, CSO
* 1Hz Resolution Marker Counter
* Gate Sweep Function
* AM/FM Demodulation and Analysis
* Built-in Spectrogram and Topographic Display Modes
* 886MHz IF Output for User's Extended Applications
* Various Interface: USB Host/Device,RS-232C,LXI,Micro SD,GPIB (Optional)
* DVI-I Output for External Digital Display
* Built-in Preamplifier, 50dB Attenuator, and Sequence Function
* Optional 6GHz RF Power Sensor, Tracking Generator, Battery Pack

Page B5-14

B GSP-730 3GHz Spectrum Analyzer/GRF-1300A RF and Communications Trainer/USG-LF44 RF Signal Generator

CE | USB | RS-232 | VGA Output | PC Software

GSP-730/GRF-1300A/USG-LF44 NEW

* Frequency Range : 150kHz ~ 3GHz
* Autoset Function
* Noise level : ≤ -100dBm
* RBW Range : 30kHz, 100kHz, 300kHz, 1MHz
* ACPR/CHPW/OCBW Measurement
* 3 Traces in Different Colors
* Split Window Function
* Limit Line Function
* Remote Control Software
* Presentation Material for Training Courses
* Support Interface : USB Device/Host, RS-232C
* 5.6" TFT LCD with VGA Output
* Waveform Support :
  Sine Wave : 0.1 ~ 3MHz
  Square Wave : 0.1 ~ 3MHz
  Triangle Wave : 0.1 ~ 3MHz
* RF Frequency : 870 ~ 920MHz
* AM Modulation & FM Modulation
* 5 On/Off Switches and 5 Test Points to Simulate 8 Failure Conditions for Learning Outcome Test
* USB Interface to Provide Remote Control
* Mixer & 2.4GHz Band Pass Filter
* Frequency Range : 34.5MHz~4400MHz
* Output Power Range : -30dBm~0dBm
* Continuous Wave Signal Without any Modulation
* Support Fixed Frequency, Frequency Sweep, Frequency Hopping & Power Sweep Mode
* -107dBc/Hz Phase Noise@100kHz Offset
* Frequency Resolution : 10kHz
* PC USB Interface Powered and Controlled
* External PC Software Support Different Operating System

Page B21-26

C 25MHz TRUE DUAL CHANNEL ARBITRARY FUNCTION GENERATOR

CE | USB Host | USB Device | PC Software | LabVIEW Driver

AFG-2225 NEW

* Wide Frequency Ranges From 1μ Hz ~ 25MHz (sine wave)
* 1μHz Resolution in Full Range
* Built-in Standard 120MSa/s, 10bit, 4k Points Arbitrary Function for Both Channels
* True Dual-Channel Output, CH2 Provides the Same Characteristics as Ch1
* Dual-Channel Supports Couple, Tracking, Phase Operations
* 1% ~ 99% Adjustable Duty Cycle for Square Waveform
* Friendly User Interface for Easy Parameter Setting and Parameters Display
* Multiple Editing Methods to Edit Arbitrary Waveform Easily
* Built-in Standard AM/FM/PM/FSK/SUM/Sweep/Burst and Frequency Counter
* USB Host/Device Interface for Remote Control and Waveform Editing

Page C11-16

C USB MODULAR ARBITRARY FUNCTION GENERATOR

CE | USB | PC Software

AFG-125/125P/225/225P NEW

* Output Amplitude Range From 1mVpp ~ 2.5Vpp (into 50Ω)
* Wide Frequency Ranges From 1μ Hz ~ 25MHz (sine wave)
* 1μHz Resolution in Full Range
* Built-in Standard 120MSa/s, 10bit, 4k Points Arbitrary Function for Both Channels
* True Dual-Channel Output, CH2 Provides the Same Characteristics as CH1
* Dual-Channel Supports Couple, Tracking, Phase Operations
* 1% ~ 99% Adjustable Duty Cycle for Square Waveform
* User Friendly for Easy Parameter Setting and Parameters Display
* Multiple Editing Methods to Edit Arbitrary Waveform Easily
* Built-in Standard AM/FM/PM/FSK/SUM/Sweep/Burst
* USB Device Interface for Remote Control and Waveform Editing

Page C21-24

C RF SIGNAL GENERATOR

CE | USB | PC Software

USG-Series NEW

* Frequency Range : 34.5MHz ~ 4400MHz
* Output Power Range : -30dBm ~ 0dBm
* Continuous Wave Signal Without any Modulation
* Support Fixed Frequency, Frequency Sweep, Frequency Hopping & Power Sweep Mode
* -107dBc/Hz Phase Noise@100kHz Offset
* Frequency Resolution : 10kHz
* PC USB Interface Powered and Controlled
* External PC Software Support Different Operating System

Page C40-41

D PROGRAMMABLE SWITCHING D.C. POWER SUPPLY

CE | USB | GPIB | Analog Control | LAN | LabVIEW Driver | RS-232 | RS-485

NEW

- * Voltage Rating : 6V/12.5V/20V/40V/60V
- * Output Power Rating : 1200W ~ 1520W
- * C.V/C.C Priority; Particularly Suitable for the Battery and LED Industry
- * Adjustable Slew Rate
- * Series and Parallel Operation (2 Units in Series/4 Units in Parallel Maximum)
- * High Efficiency and High Power Density
- * 19" Rack Mount Size Design
- * Standard Interface : LAN, RS-232 & RS485, USB (Device/Host), Analog Control Interface
- * Optional Interface : GPIB/Analog Control Interface (Isolated Voltage Control)/Analog Control Interface (Isolated Current Control)

PSU-Series

Page D19-24

D PROGRAMMABLE SWITCHING D.C. POWER SUPPLY (MULTI-RANGE D.C. POWER SUPPLY)

USB | RS-232 | GPIB | Analog Control

NEW

- * Output Voltage Rating : 80V/800V, Output Power Rating : 400W ~ 800W
- * Constant Power Output for Multi-Range (V & I) Operation
- * Series and Parallel Operation (2 Units in Series or 4 Units in Parallel Maximum)
- * 90 Degree Angle Rotatable Control Panel
- * Sequence Function Edited by PC will be Controlled Through Power Supply Optional Interfaces
- * Standard Interface : RS-232C/USB/Analog Control Interface
- * Optional Interface : GPIB

PSB-2000 Series

Page D25-32

D PROGRAMMABLE HIGH PRECISION D.C. POWER SUPPLY

CE | USB Host | PC Software | LAN | GPIB | LabVIEW Driver

NEW

- * Dual Range Output (0~15V/0~3A or 0~9V/0~5A) ; Output Power 45W
- * 3.5 Inch TFT LCD Display
- * Digital Panel Control
- * Constant Voltage and Constant Current Operation
- * Key Lock Function
- * Built-in DVM Measurement Function
- * High Measurement Resolution (1mV/0.1mA for 5A Range) ; (1mV/0.1μA for 5mA Range)
- * External Relay Control Output On/Off
- * Sink Current Capability (Maximum : 2A)
- * Selectable Output and Input (DVM) Ports From Front or Rear Panel
- * 5 Sets of Preset Memory Including Power Output ON/OFF States
- * High Speed Transient Recovery Time (<40μS within 100mV;<80μS within 20mV)
- * OVP/OCP/OTP Protection to Prevent DUT Damage Standard Multiple Interfaces : USB/LAN/GPIB LabView Driver and PC Remote Control Software

PPH-Series

Page D36-41

D PROGRAMMABLE D.C. ELECTRONIC LOAD

CE | USB | GPIB | Analog Control | RS-232

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NEW

- * Operating Voltage (DC) : 1.5V~150V
- * Operating Mode : C.C/C.V/C.R/C.P/C.C+C.V/ C.R+C.V/C.P+C.V
- * Parallel Connection of Inputs for Higher Capacity (Max : 9,450W)
- * Support of High Slew Rate : Max 16A/μ s
- * Run Program Function (Go/No Go Test)
- * Sequence Function for High Efficient Load Simulations
- * Commands are Compatible With Kikusui PLZ-4W Model(*)
- * Dynamic (Switching) Function:0.0166Hz~20kHz
- * Setup Memories:100 sets
- * Soft Start Function : Off/On(1~200ms, Res:1ms)
- * 3.5 Inch TFT LCD Display
- * Adjustable OCP/OVP/OPP/UVP Setting
- * Short Circuit Function
- * Timer Function : Elapsed Time of Load on
- * Cut Off Time (Auto Load Off Timer) : 1s to 999h 59min 59s or Off
- * External Channel Control/Monitoring Via Analog Control Connector
- * Multi Interface : USB 2.0 Device/Host, RS-232, GPIB (Optional)

PEL-3000 Series

Page D75-84

E

CE | USB Host | USB Device | PC Software | GPIB

NEW

GDM-8351

* 120,000 Counts, VFD Display
* Dual Measurement/Dual Display
* The Basic Precision of DC Voltage : 0.012%
* Selectable Measurement Speeds, the Mmaximum : 320 Readings/s
* True RMS (AC, AC+DC) Measurements
* Auto/Manual Selection
* 12 Different Measurement Functions : AC/DC Voltage, AC/DC Current, AC+DC Voltage/Current, 2W/4W Resistance, Continuity Beeper, Diode Test, Capacitance, Frequency, Temperature
* Many Auxiliary Functions : Max./Min., REL/REL#, Compare, Hold, dB, dBm, Math(MX+B, %, 1/X)
* Digital I/O Provides Dual Mode(Standard Compare and User Definition Modes) Standard RS-232C and USB Device Interface(Support USBCDC and USBTMC Modes)

Page E13-16

E 50000 COUNTS DUAL MEASUREMENT MULTIMETER

CE | USB Host | USB Device | PC Software | GPIB

NEW

GDM-8300 Series

* 50000 Counts Vacuum Fluorescent Display with Two Colors
* Dual Measurement
* Fast Measurement Rate Up to 40 readings/s for DCV
* 0.02% DCV Basic Accuracy
* Auto/Manual Ranging
* True RMS (AC, AC+DC)
* 11 Measurement Functions
* Max./Min., REL, MX+B, 1/X, Ref %, Compare, Hold, dB, dBm
* Standard USB Device for Communicating to PC
* Temperature Measurement (GDM-8342 only)
* USB Storage for Data Collection (GDM-8342 only)
* Optional GPIB (factory install for GDM-8342 only)

Page E17-20

E AC GROUND BOND TESTER

CE | USB | LINK | GPIB | Remote Terminal | Signal I/O

NEW

GCT-9040

* AC 40A Ground Bone Tester
* Measuring Resistance from 1mΩ~650mΩ
* Connect with the GPT-9800/9900 Series to Become a Multifunctional Test or Simultaneous Test System
* 240x64 Ice Blue Dot Matrix LCD
* Function Key for Quick Selecting
* High Intensity Flash for Caution & Status Indication
* PWM Switching Amplifier to Enhance the Power Efficiency and Reliable Testing
* Max. 100 Memory Block for Test Condition Setting
* Remote Terminal on the Front Panel for "Start" and "Stop" Remote Active
* Interface : USB Device, Signal I/O and GPIB (optional)

Page E51-52

E MULTIPLEX SCANNER BOX

CE | RS-232

NEW

GSB-01/02

* Model : GSB-01 (8CH High Voltage Scanner Box), GSB-02 (6CH High Voltage and 2CH Ground Bond Scanner Box)
* Multi-channel Outputs for Withstanding Voltage, Insulation Resistance, Ground Bond Tests
* High-intensity LED for Channel, Status & Judgment Indications
* Front & Rear Input Connector Design is Suitable for the GPT-9800/9900/9900A Series
* A Maximum of 4 Scanner Boxes (32 CH) can be Connected to One GPT-9800/9900/9900A Series

Page E53-54

E AC/DC WITHSTANDING VOLTAGE/INSULATION RESISTANCE TESTER

CE | Remote Terminal | Signal I/O

NEW

GPT-9600 Series

* 100VA AC Test Capacity
* 240 x 48 Ice Blue Dot Matrix LCD
* True RMS Current Measurement
* ARC Detection
* Zero Crossing Turn-on Operation
* PWM Switching Amplifier to Enhance the Power Efficiency and Reliable Testing
* Automatically Switching Iinput Source for World-wide Input Voltage
* Light Design and Easy to Operation

Page E55-56

E PRECISION CURRENT SHUNT METER

CE | USB | GPIB

NEW

PCS-1000

* 6 1/2 Digit Measurement Resolution
* Dual Measurement for Voltage and Current
* AC & DC Current Measurement Range : 30mA/300mA/3A/30A/300A (Maximum)
  AC Voltage Measurement Range : 200mV/2V/20V/200V/600V (Maximum)
  DC Voltage Measurement Range : 200mV/2V/20V/200V/1000V (Maximum)
* Auto Zero Circuit
* Standard Interfaces : USB, GPIB

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Main Products

A 500/350/250/150 MHz DIGITAL STORAGE OSCILLOSCOPE

CE | RS-232 | GPIB | Ethernet | USB High Speed | PC Software | Labview Driver | PictBridge Compatible | VGA Output

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VPO Visual Persistence Oscilloscope

GDS-3000 Series

* 500/350/250/150MHz Bandwidth, 2/4 Input Channel
* 5GSa/s Real-time Sampling Rate and 100GSa/s Equivalent Time Sampling Rate
* 25k Points Memory for Each Input Channel
* VPO (Visual Persistence Oscilloscope) Technology to Display Less-Frequently-Occurred Signals
* 8"800 x 600 High Resolution TFT LCD Display
* Unique Split Screen System with Independent Setting and Display for Each Input Channel
* Three Built-in Input Impedance Selections : 50Ω/75Ω/1MΩ
* Optional Power Analysis Software for Power Source Measurement and Analysis
* Optional Serial bus Analysis Software for Trigger & Decode of I^2C, SPI and UART Interfaces

Page A9-16

A 300/200/100/70 MHz DIGITAL STORAGE OSCILLOSCOPE

CE | USB Full Speed | PC Software | Labview Driver | RS-232 | GPIB | Ethernet | PictBridge Compatible

VPO Visual Persistence Oscilloscope

GDS-2000A Series

* 300/200/100/70MHz Bandwidth, 2 or 4 Input Channels
* 2GSa/s Maximum Real-Time Sampling Rate and 100GSa/s Equivalent Time Sampling Rate
* 2M points Maximum Record length
* VPO Technology to Display Less-Frequently-Occurred Signals
* Fast Update Rate of 80,000 Waveform Per Second
* Segmented Memory Acquisition and Waveform Search Function
* Standard Model Provides I^2C, UART, SPI Serial Bus Trigger and Analysis Functionality
* Optional 8 or 16 Additional Digital Channels with Logic Analyzer(MSO)
* Upgradable CAN/LIN Bus, DVM, H-Expansion, Data Log and Advanced Logic Functionality
* Optional 5MHz & 25MHz Function Generator
* Flexible Remote Control Connectivity(Standard:USB; Optional:LAN/GPIB)

Page A17-24

C 80MHz/50MHz ARBITRARY FUNCTION GENERATOR

CE | RS-232 | GPIB | USB | PC Software | LabVIEW Driver

台灣精品 TAIWAN EXCELLENCE 2012

AFG-3000 Series

* Wide Frequency Range From 1uHz ~ 80/50MHz
* 1μHz Frequency Resolution Throughout Full Range
* Standard Waveform : Sine, Square, Triangle, Ramp, Pulse, Noise
* Built-In AM, FM, PWM, FSK, Sweep, Burst Functions
* 16bit, 200MSa/s, 1M-Point Deep Arbitrary Waveform
* DWR (Direct Waveform Reconstruction) Capability
* Arbitrary Waveform Editing PC Software
* 4.3" High Resolution LCD Display
* USB, RS-232C, GPIB Standard Interfaces

Page C4-10

D PROGRAMMABLE MULTI-RANGE D.C. POWER SUPPLY

CE | GPIB | USB | LabVIEW Driver | Analog Control | LAN

PSW-Series

* Voltage Rating : 30V/80V/160V/250V/800V, Output Power Rating : 360W~1080W
* Constant Power Output for Multi-Range (V & I) Operation
* C.V / C.C Priority ; Particularly Suitable for the Battery and LED Industry
* Adjustable Slew Rate
* Series Operation(2 units in Series)for(30V/80V/160V), Parallel Operation (3 units in Parallel) for (30V/80V/160V/250V/800V)
* High Efficiency and High Power Density
* 1/2, 1/3, 1/6 Rack Mount Size Design(EIA/JIS Standard) for 360W, 720W, 1080W
* Standard Interface : LAN, USB, Analog Control Interface
* Optional Interface : GPIB-USB Adaptor
* LabVIEW Driver

Page D11-18

Main Products

D MULTIPLE OUTPUT PROGRAMMABLE LINEAR D.C. POWER SUPPLY

CE | USB | PC Software | LabVIEW Driver

GPD-Series

* 2,3,and 4 Independent Isolated Output
* 4 LED Display Sets : 3 Digits After Decimal Point (GPD-2303S/3303S/4303S)
* Minimum Resolution : GPD-2303S/3303S/4303S (1mV/1mA)
  GPD-3303D (100mV/10mA)
* Digital Panel Control (Rotary Encoder Switch, Rubber Key With Indicator)
* User-Friendly Operation, Coarse/Fine Volume Control
* 4 Sets Save/Recall
* Key-Lock
* Output ON/OFF
* Tracking Series and Parallel Mode
* Smart Cooling Fan Achieving Low Noise
* Compact Design
* PC Software & USB Driver
* USB Standard Interface

Page D54-55

D PROGRAMMABLE A.C./D.C. POWER SOURCE

CE | USB | PC Software | Labview Driver | Remote I/O | RS-232

APS-1102A

* 5.7"Large LCD Display
* Output Capacity : 750VA (for AC 100V Input)/1kVA (for AC 200V Input)
* Output Modes : AC and AC+DC Combined With any of the Four Signal Sources
* Signal Sources : Internal (INT), External (EXT), Internal + External(ADD) and Synchronisation (SYNC)
* Arbitrary Waveform Power Output
* Measurement Functions : Voltage, Current, Power, Frequency, Power Factor, CF, and Harmonic Current
* Sequence Function Allows Programming of Output Patterns
* Limiter Function (Upper/Lower Limits Function)
* 30 Sets of SAVE/RECALL Memory
* Output On/Off Switch
* Capacitor Input Load Supported
* Power Amplifier of External Signal
* USB (USBTMC) and RS-232 Standard for Remote Control

Page B63-66

D PROGRAMMABLE D.C. ELECTRONIC LOAD

CE | RS-232 | GPIB | USB | LabVIEW Driver

台灣精品 TAIWAN EXCELLENCE 2012

PEL-2000 Series

* Sequence Function to do High Speed Load Simulations
* Flexible Configuration with Mainframes and Plug-in Modules
* Multiple Independent Load Inputs up to 8 Channels in a Mainframe
* Parallel Connection of Inputs for Higher Load Capacity
* Program Mode to Create Work Routines for Repetitive Tests
* OPP/OCP/OVP/OTP/RVP/UVP Protections
* External Channel Control / Monitoring Via Analog Control Connector
* Multiple-Interface USB Device / Host, RS-232C, and GPIB (Optional)

Page B85-88

E 6 ½ DIGIT DUAL MEASUREMENT MULTIMETER

CE | RS-232 | USB | Digital I/O | GPIB | LAN | PC Software | LabVIEW Driver

GDM-8261A

* 6 ½ Digit Display : 1,200,000 Counts
* DCV Basic Accuracy : 0.0035%
* Dual Measurements to Perform Two Selected Measurements Simultaneously
* Bright Vacuum Fluorescent Display (VFD)
* 11 Measurement Functions & 10 Math Functions
* High Resolution : Up to 100pA Resolution with DCI and 1nA with ACI Measurements
* Temperature Measurement (RTD & Thermocouple) From -200°C ~ +1820°C
* High Data Transmission Speed : Up to 2,400 readings/s Through USB Interface
* Standard Interfaces : USB, RS-232C, Digital I/O
* Optional Interfaces : GPIB or LAN
* Optional Scanner Card : GDM-SC1 (V ch x 16, I ch x 2)
* Free PC Software : DMM-Viewer, LabVIEW Driver

Page E4-8

E 10/5/1MHz PRECISION LCR METER

CE | RS-232 | GPIB | PC Software

* Wide Test Frequency 20Hz ~ 10/5/1MHz
* 0.1% Basic Accuracy & 6 Digits Measurement Resolution
* Large LCD Display with Intuitive User Interface
* Full Measuring Functions with DUT V/I Monitor
* PASS/FAIL Function (abs , % , △) with Judgment Alarm
* Average 1 ~ 256 Times
* DC Resistance Measurement
* Multi Step Mode
* Graph Mode
* Standard RS-232C/GPIB Interface
* Optional DC Bias box (frequency up to 2MHz max.)

LCR-8000G Series

Page E33-36

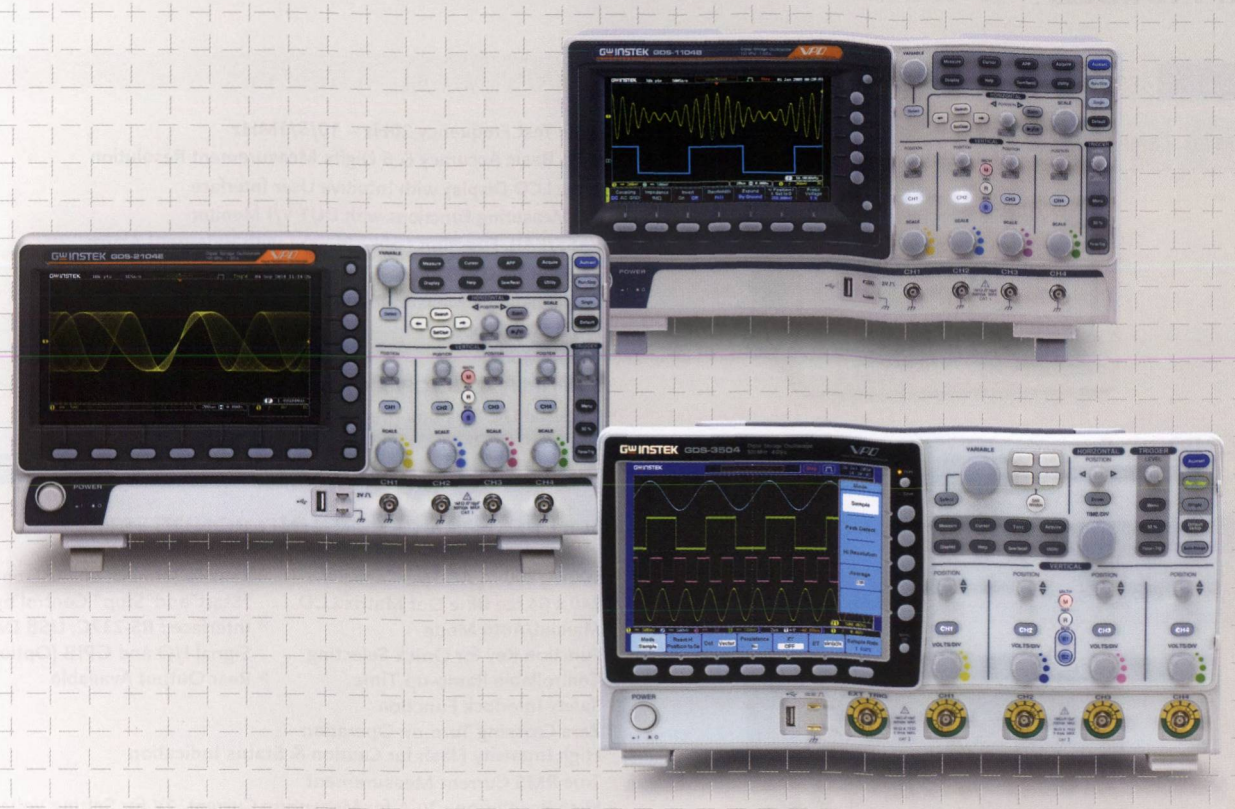
E AC/DC WITHSTANDING VOLTAGE/INSULATION RESISTANCE/GROUND BOND TESTER

CE | USB | RS-232 | GPIB | Remote Terminal | Signal I/O | Rear-Panel Output | LabVIEW Driver

* 500VA/200VA AC Test Capacity
* 240 x 64 Ice Blue Dot Matrix LCD
* Manual/Auto Mode
* Function Key for Quick Selecting
* Controllable Ramp-up Time
* Safety Interlock Function
* Zero Crossing Turn-on Operation
* High Intensity Flash for Caution & Status Indication
* True RMS Current Measurement
* High Resolution : 1μ A for Measuring Current, 2V for Setting Voltage
* PWM Switching Amplifier to Enhance the Power Efficiency and Reliable Testing
* Max. 100 Memory Block for Test Condition(Step) Setting. And Each Step Can be Named Individually
* Remote Terminal on the Front Panel for "Start"and"Stop" Control by External
* Interface : RS-232C, USB Device, Signal I/O and GPIB (Optional)
* Rear Output Available

GPT-9000 Series

Page E45-50



OSCILLOSCOPES

GW Instek provides an entire series of oscilloscope solution, consisting of four groups: Digital Storage Oscilloscope, Analog Oscilloscope, Real Time/Digital Storage Oscilloscope, and Logic Analyzer.

Digital Storage Oscilloscope GDS-Series

The frequency bandwidth ranges from the handy 20MHz to the high-class 500MHz. In addition, up to 5GSa/s realtime sampling rate and 10M points memory depth can pick up and hold the complete signal in order to preserve the accuracy. PC interfaces such as USB, LAN, GPIB, RS-232C, and Printer Port are integrated to the panel to satisfy data transmit/save needs.

Analog Oscilloscope GOS-Series

In this digital competition era, the traditional analog oscilloscope surely and continuously plays the role of "observing the precise waveform" in the test measurement domain. With the frequency ranging from 20MHz to 100MHz, GOS-Series gives the perfect solution when you need to observe an unmodified signal.

Real Time/Digital Storage Oscilloscope GRS-Series

Who said we cannot satisfy them all? GRS-Series provides you with both precision of analog waveform and convenience of digital Data storage. You can stay in between the traditional and the modern age and between analog and digital domain, obtaining the perfect Balance.

PRODUCTS

- Digital Storage Oscilloscope
- Real-Time/Digital Storage Oscilloscope
- Analog Oscilloscope
- Handheld Digital Storage Oscilloscope & Multimeter
- Oscilloscope Education And Training Kit

OSCILLOSCOPE OVERVIEW

Oscilloscopes are considered the most widely used instruments in the Electrical T&M field. With an Oscilloscope, it is possible to understand how an electrical signal changes over a time period graphically. In every electric application, from electronics laboratories, electronics R&D, product development, manufacturing QA, to After-Sales Service, there is a need for waveform representation by an Oscilloscope.

With the rapid advancement of technology, the oscilloscope market has also been shifting from conventional analog oscilloscopes, which displays the electronic waveforms through a CRT, towards Digital Storage Oscilloscopes (DSO). The major function of a DSO not only converts signals from analog to digital, but also stores testing data, allowing remote control and transmitting data through various interfaces. In spite of the strengths of DSOs, analog oscilloscopes still play an important role of providing real-time signal and waveform display.

There has been a growing need for detecting digital signals which are usually presented by 2 discrete voltage levels, a distinction from analog signals presented by continuous voltages. A logic analyzer is better suited for such digital signal measurements compared with an oscilloscope. A logic analyzer also has the benefit of multiple channel input measurements, which is usually limited to 2 or 4 channels in oscilloscopes.

To satisfy various needs of waveform observation in time domain, GW Instek provides an entire series of oscilloscope solutions, consisting of four groups: Digital Storage Oscilloscopes, Analog Oscilloscopes, Real Time/Digital Storage Oscilloscopes, and Logic Analyzers.

Bandwidth / Oscilloscope Lineup	Type	500MHz	350MHz	300MHz	250MHz	200MHz	150MHz	100MHz	70MHz	60MHz	50MHz	35MHz	30MHz	20MHz	Page
GDS-3000 Series	Digital	✓	✓		✓		✓								A9-16
GDS-2000A Series	Digital			✓		✓		✓	✓						A17-24
GDS-2000E Series	Digital					✓		✓	✓						A25-30
GDS-300/200 Series	Digital					✓		✓	✓						A31-36
GDS-1000B Series	Digital							✓	✓		✓				A37-40
GDS-1000A-U Series	Digital						✓	✓	✓						A41-42
GDS-1000-U Series	Digital							✓	✓		✓				A43-44
GDS-122	Digital													✓	A64
GRS-6052A GRS-6032A	Digital & Analog										✓		✓		A50-52
GOS-6100 Series	Analog							✓							A57-58
GOS-6000 Series	Analog										✓		✓		A55-56
GOS-653G/652G	Analog										✓				A61-62
GOS-635G/622G	Analog											✓		✓	A61-62
GOS-630FC	Analog												✓		A57-59
GOS-630	Analog												✓		A61-62
GOS-620	Analog													✓	A61-62
GOS-620FG	Analog													✓	A63

VPO TECHNOLOGY

When using a DSO to measure serial transmission signals, address/data/control buses on digital circuits, noise on signal components, composite video signals or modulated signals, the biggest challenge is that these signals have random, rapidly changing, incidental components or have components with non-periodic characteristics. Therefore it is necessary for a DSO to reduce the acquisition processing time (Dead time) to have the opportunity to capture these signal characteristics.

DSOs equipped with VPO (Visual Persistence Oscilloscope)technology use a high-density IC for hardware acceleration to transfer all the acquired data into the displayed waveform image. Figure A shows the compression and quantification of waveform data. GDS-3000 has a waveform display region of 750 frames in width, while the record length is 25k dots long. The hardware circuit cuts the waveform data into a number of data frames. The data in each data frame is passed through a count array and then written into a three-dimensional memory array. When all the frames have been quantized, a virtual 3D structure is created, shown in Figure B. The value in the memory array designates the appearance frequency of signal points constructing a waveform.

In Figure A, a count array consists of 256 computing units. Each unit is made of several comparators and counters. When 8-bit data passes through Acquire Memory, and then reaches counter array, comparators select corresponding counter that follows an increment in its value then. After some amount of data is processed, part of input waveform is statistically calculated by counter array.

This process holds only for hundreds of micro seconds even if the calculation implemented by hardware architecture repeats for 750 times. The GDS-3000 Series uses such parallel processing structures to shorten the dead time. Take 4-channel GDS-3000 as an example. It has 1024 counter arrays to simultaneously process input waveform data.

In general it takes approximately 16ms for the LCD panel to read data sequentially from the 3D memory array, display the data on the screen, and to update the counter array. Obviously, if the count array doesn't do any processing and only writes(overwrites) the existing information, the 3D memory array will have changed several times during an LCD update and results in users not seeing these changes. Therefore a mechanism called an Aging timer, as shown in the figure, has been added to the VPO circuit to simulate the persisting and aging property of traditional CRTs. The Aging timer will operate with value in 3D memory array when count array is writing and result in only partial value of the value in the 3D memory array been changed. For example, if the count array is not 0 in value, the 3D memory array will gradually increase in value. On the contrary, if the count array is 0 in value, the 3D memory array will gradually decrease in value until it reaches to 0. In this way the latest waveform data can be updated while the previous waveform can be retained for some time, from 100ms up to several seconds. As a result, we can say that the 3D structure of the memory array is dynamic. Users can change this feature by adjusting the Persist time. The time for the circuit to process this data is too short to be detected by the eyes and the overall effect is that the entire screen is aging all together at the same time.

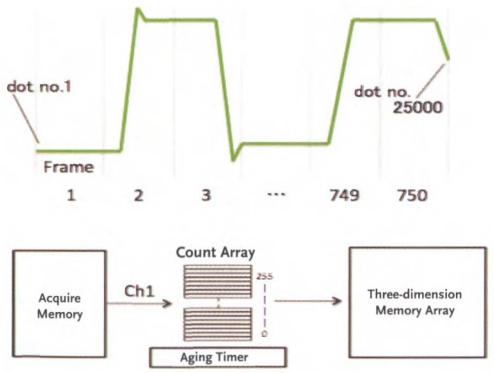


Figure A. The compression and quantization of waveform data

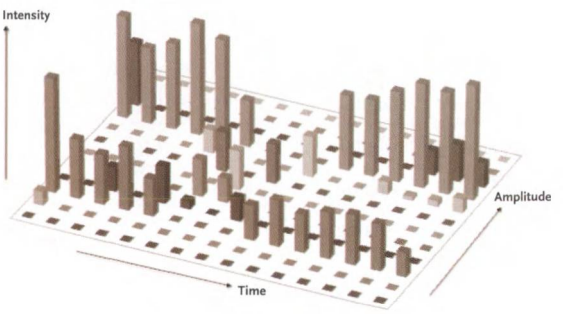
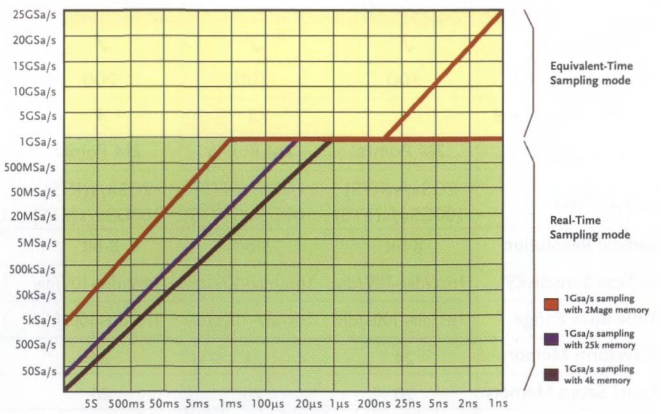


Figure B. Structure of 3D waveform data array

MEMORY DEPTH

The number of samples an oscilloscope can store is defined as Memory Depth. Memory depth can be calculated by dividing these sample rates by the time captured as shown in the formula below. As indicated, memory length has a positive relationship with the sampling rate. In other words, waveforms can be recorded over a long period when stored in large memory.

$$\text{Memory} = \frac{\text{Sample Rate}}{\text{Sample Period}}$$



For relatively slow and repetitive signals, memory depth should be the primary consideration rather than sampling rate; for example, GDS-1000A-U Series has a long memory length of 2M Points, enabling Equivalent-Time Sample (ETS) rates as high as 25GSa/s. The frequency bandwidth has a wide range from 70MHz to 150MHz. The Equivalent Time Sampling rate of 25GSa/s and a memory depth of 2,000,000 (single channel) points enable you to pick up and hold a complete signal with better accuracy. On the other hand, when observing a single shot event, the sample rate would be the most essential element to observe. The GDS-2000A Series has a Real-Time sample rate of 2GSa/s with a bandwidth of 70MHz to 300MHz and a choice of 2 or 4 channels. These features allow you to clearly observe single shot waveforms.

DIGITAL STORAGE OSCILLOSCOPE SELECTION GUIDE

MODEL / MAIN FUNCTION	GDS-3502	GDS-3352	GDS-3252	GDS-3152	GDS-3504	GDS-3354	GDS-3254	GDS-3154
VPO App	✓	✓	✓	✓	✓	✓	✓	✓
Display	8" TFT LCD SVGA	8" TFT LCD SVGA	8" TFT LCD SVGA	8" TFT LCD SVGA	8" TFT LCD SVGA	8" TFT LCD SVGA	8" TFT LCD SVGA	8" TFT LCD SVGA
Bandwidth(MHz)	500	350	250	150	500	350	250	150
Number of Channel	2	2	2	2	4	4	4	4
Memory Depth	25k per channel	25k per channel	25k per channel	25k per channel	25k per channel	25k per channel	25k per channel	25k per channel
Sample Rate	4GSa/s(RTS) 100GSa/s(ETS)	5GSa/s(RTS) 100GSa/s(ETS)	2.5GSa/s(RTS) 100GSa/s(ETS)	2.5GSa/s(RTS) 100GSa/s(ETS)	4GSa/s(RTS) 100GSa/s(ETS)	5GSa/s(RTS) 100GSa/s(ETS)	5GSa/s(RTS) 100GSa/s(ETS)	5GSa/s(RTS) 100GSa/s(ETS)
Vertical Resolution	8-bit	8-bit	8-bit	8-bit	8-bit	8-bit	8-bit	8-bit
Vertical Sensitivity	2mV/div~5V/div (@1MΩ) 2mV/div~1V/div (@50/75Ω)	2mV/div~5V/div (@1MΩ) 2mV/div~1V/div (@50/75Ω)	2mV/div~5V/div (@1MΩ) 2mV/div~1V/div (@50/75Ω)	2mV/div~5V/div (@1MΩ) 2mV/div~1V/div (@50/75Ω)	2mV/div~5V/div (@1MΩ) 2mV/div~1V/div (@50/75Ω)	2mV/div~5V/div (@1MΩ) 2mV/div~1V/div (@50/75Ω)	2mV/div~5V/div (@1MΩ) 2mV/div~1V/div (@50/75Ω)	2mV/div~5V/div (@1MΩ) 2mV/div~1V/div (@50/75Ω)
Time Base Range	1ns/div~100s/div (1-2.5-5 increments)	1ns/div~100s/div (1-2.5 increments)	1ns/div~100s/div (1-2.5 increments)	1ns/div~100s/div (1-2.5 increments)	1ns/div~100s/div (1-2.5-5 increments)	1ns/div~100s/div (1-2.5 increments)	1ns/div~100s/div (1-2.5 increments)	1ns/div~100s/div (1-2.5 increments)
Waveform Memory	24	24	24	24	24	24	24	24
Panel Setup Memory	20	20	20	20	20	20	20	20
Counter Function	✓	✓	✓	✓	✓	✓	✓	✓
USB Host	✓	✓	✓	✓	✓	✓	✓	✓
USB Device	✓	✓	✓	✓	✓	✓	✓	✓
RS-232C	✓	✓	✓	✓	✓	✓	✓	✓
Go/NoGo Output	✓	✓	✓	✓	✓	✓	✓	✓
GPIB	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.
LAN	✓	✓	✓	✓	✓	✓	✓	✓
SVGA Output	✓	✓	✓	✓	✓	✓	✓	✓
Power Source	AC 100V~240V	AC 100V~240V	AC 100V~240V	AC 100V~240V	AC 100V~240V	AC 100V~240V	AC 100V~240V	AC 100V~240V
Page	A9-16	A9-16	A9-16	A9-16	A9-16	A9-16	A9-16	A9-16

DIGITAL STORAGE OSCILLOSCOPE SELECTION GUIDE

MODEL / MAIN FUNCTION	GDS-2304A	GDS-2302A	GDS-2204A	GDS-2202A	GDS-2104A	GDS-2102A	GDS-2074A	GDS-2072A
VPO App	✓	✓	✓	✓	✓	✓	✓	✓
Bandwidth(MHz)	300	300	200	200	100	100	70	70
Number of Channel	4	2	4	2	4	2	4	2
Memory Depth	2M Points	2M Points	2M Points	2M Points	2M Points	2M Points	2M Points	2M Points
Sample Rate	2GSa/s(RTS) 100GSa/s(ETS)	2GSa/s(RTS) 100GSa/s(ETS)	2GSa/s(RTS) 100GSa/s(ETS)	2GSa/s(RTS) 100GSa/s(ETS)	2GSa/s(RTS) 100GSa/s(ETS)	2GSa/s(RTS) 100GSa/s(ETS)	2GSa/s(RTS) 100GSa/s(ETS)	2GSa/s(RTS) 100GSa/s(ETS)
Vertical Resolution	8-bit	8-bit	8-bit	8-bit	8-bit	8-bit	8-bit	8-bit
Vertical Sensitivity	1mV/div~10V/div	1mV/div~10V/div	1mV/div~10V/div	1mV/div~10V/div	1mV/div~10V/div	1mV/div~10V/div	1mV/div~10V/div	1mV/div~10V/div
Time Base Range	1ns/div~100s/div	1ns/div~100s/div	1ns/div~100s/div	1ns/div~100s/div	1ns/div~100s/div	1ns/div~100s/div	1ns/div~100s/div	1ns/div~100s/div
Waveform Memory	24	24	24	24	24	24	24	24
Panel Setup Memory	20	20	20	20	20	20	20	20
Counter Function	✓	✓	✓	✓	✓	✓	✓	✓
Data Logger	✓	✓	✓	✓	✓	✓	✓	✓
Go/NoGo	✓	✓	✓	✓	✓	✓	✓	✓
Zoom FFT	✓	✓	✓	✓	✓	✓	✓	✓
USB Host	✓	✓	✓	✓	✓	✓	✓	✓
USB Device	✓	✓	✓	✓	✓	✓	✓	✓
RS-232C	✓	✓	✓	✓	✓	✓	✓	✓
Go/NoGo Output	✓	✓	✓	✓	✓	✓	✓	✓
GPIB	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.
Power Source	AC 100V~240V	AC 100V~240V	AC 100V~240V	AC 100V~240V	AC 100V~240V	AC 100V~240V	AC 100V~240V	AC 100V~240V
Page	**A17-24**	**A17-24**	**A17-24**	**A17-24**	**A17-24**	**A17-24**	**A17-24**	**A17-24**

Note : * It Support From APP Software.

DIGITAL STORAGE OSCILLOSCOPE SELECTION GUIDE

MODEL / MAIN FUNCTION	GDS-2204E	GDS-2202E	GDS-2104E	GDS-2102E	GDS-2074E	GDS-2072E
VPO App	✓	✓	✓	✓	✓	✓
Bandwidth(MHz)	200	200	100	100	70	70
Number of Channel	4	2	4	2	4	2
Memory Depth	10M Points	10M Points	10M Points	10M Points	10M Points	10M Points
Sample Rate	1GSa/s(RTS)	1GSa/s(RTS)	1GSa/s(RTS)	1GSa/s(RTS)	1GSa/s(RTS)	1GSa/s(RTS)
Vertical Resolution	8-bit	8-bit	8-bit	8-bit	8-bit	8-bit
Vertical Sensitivity	1mV/div~10V/div	1mV/div~10V/div	1mV/div~10V/div	1mV/div~10V/div	1mV/div~10V/div	1mV/div~10V/div
Time Base Range	1ns/div~100s/div	1ns/div~100s/div	1ns/div~100s/div	1ns/div~100s/div	1ns/div~100s/div	1ns/div~100s/div
Waveform Memory	24	24	24	24	24	24
Panel Setup Memory	20	20	20	20	20	20
Counter Function	✓	✓	✓	✓	✓	✓
Data Logger	✓	✓	✓	✓	✓	✓
Go/NoGo	✓	✓	✓	✓	✓	✓
Zoom FFT	✓	✓	✓	✓	✓	✓
USB Host	✓	✓	✓	✓	✓	✓
USB Device	✓	✓	✓	✓	✓	✓
RS-232C	–	–	–	–	–	–
Go/NoGo Output	✓	✓	✓	✓	✓	✓
Power Source	AC 100V~240V	AC 100V~240V	AC 100V~240V	AC 100V~240V	AC 100V~240V	AC 100V~240V
Page	**A25-30**	**A25-30**	**A25-30**	**A25-30**	**A25-30**	**A25-30**

Note : * It Support From APP Software.

DIGITAL STORAGE OSCILLOSCOPE SELECTION GUIDE

MODEL / MAIN FUNCTION	GDS-320	GDS-310	GDS-307	GDS-220	GDS-210	GDS-207
Display	7" TFT LCD Color	7" TFT LCD Color	7" TFT LCD Color	7" TFT LCD Color	7" TFT LCD Color	7" TFT LCD Color
Bandwidth(MHz)	200	100	70	200	100	70
Number of Channel	2	2	2	2	2	2
Memory Depth	5 Mega Points	5 Mega Points	5 Mega Points	1 Mega Points	1 Mega Points	1 Mega Points
Sample Rate	1GSa/s	1GSa/s	1GSa/s	1GSa/s	1GSa/s	1GSa/s
Vertical Resolution	8-bit	8-bit	8-bit	8-bit	8-bit	8-bit
Vertical Sensitivity	2mV/div~10V/div	2mV/div~10V/div	2mV/div~10V/div	2mV/div~10V/div	2mV/div~10V/div	2mV/div~10V/div
Time Base Range	5ns/div~100s/div	5ns/div~100s/div	5ns/div~100s/div	5ns/div~100s/div	5ns/div~100s/div	5ns/div~100s/div
Counter Function	✓	✓	✓	✓	✓	✓
Go/NoGo	✓	✓	✓	✓	✓	✓
USB Device	✓	✓	✓	✓	✓	✓
Battery Power Operation	✓	✓	✓	✓	✓	✓
Power Source	AC 100V~240V	AC 100V~240V	AC 100V~240V	AC 100V~240V	AC 100V~240V	AC 100V~240V
Page	A31-36	A31-36	A31-36	A31-36	A31-36	A31-36

DIGITAL STORAGE OSCILLOSCOPE SELECTION GUIDE

MODEL / MAIN FUNCTION	GDS-1104B	GDS-1102B	GDS-1074B	GDS-1072B	GDS-1054B
Display	7" TFT LCD Color	7" TFT LCD Color	7" TFT LCD Color	7" TFT LCD Color	7" TFT LCD Color
Bandwidth(MHz)	100	100	70	70	50
Number of Channel	4	2	4	2	4
Memory Depth	10 Mega Points	10 Mega Points	10 Mega Points	10Mega Points	10Mega Points
Sample Rate	1 GSa/s(RTS)	1 GSa/s(RTS)	1 GSa/s(RTS)	1 GSa/s(RTS)	1 GSa/s(RTS)
Vertical Resolution	8-bit	8-bit	8-bit	8-bit	8-bit
Vertical Sensitivity	1mV/div~10V/div	1mV/div~10V/div	1mV/div~10V/div	1mV/div~10V/div	1mV/div~10V/div
Time Base Range	5ns/div~100s/div	5ns/div~100s/div	5ns/div~100s/div	5ns/div~100s/div	5ns/div~100s/div
Waveform Memory	15	15	15	15	15
Panel Setup Memory	15	15	15	15	15
Counter Function	✓	✓	✓	✓	✓
Data Logger	✓	✓	✓	✓	✓
Go/NoGo	✓	✓	✓	✓	✓
Zoom FFT	✓	✓	✓	✓	✓
USB Host	✓	✓	✓	✓	✓
USB Device	✓	✓	✓	✓	✓
Battery Power Operation					
Power Source	AC 100V~240V	AC 100V~240V	AC 100V~240V	AC 100V~240V	AC 100V~240V
Page	A37-40	A37-40	A37-40	A37-40	A37-40

Note : 1. RTS : Real-Time Sample Rate

DIGITAL STORAGE OSCILLOSCOPE SELECTION GUIDE

MODEL / MAIN FUNCTION	GDS-1152A-U	GDS-1102A-U	GDS-1072A-U	GDS-1102-U	GDS-1072-U	GDS-1052-U	GDS-122
Display	5.7" TFT LCD Color	5.7" TFT LCD Color	5.7" TFT LCD Color	5.7" TFT LCD Color	5.7" TFT LCD Color	5.7" TFT LCD Color	3.8" STN Color
Bandwidth(MHz)	150	100	70	100	70	50	20
Number of Channel	2	2	2	2	2	2	2
Memory Depth	2 Mega Points	2 Mega Points	2 Mega Points	4k Points	4k Points	4k Points	6k Points/CH
Sample Rate	1 GSa/s(RTS) 25GSa/s(ETS)	1 GSa/s(RTS) 25GSa/s(ETS)	1 GSa/s(RTS) 25GSa/s(ETS)	250 MSa/s(RTS) 25GSa/s(ETS)	250 MSa/s(RTS) 25GSa/s(ETS)	250 MSa/s(RTS) 25GSa/s(ETS)	100MSa/s(RTS)
Vertical Resolution	8-bit	8-bit	8-bit	8-bit	8-bit	8-bit	8-bit
Vertical Sensitivity	2mV/div~10V/div	2mV/div~10V/div	2mV/div~10V/div	2mV/div~10V/div	2mV/div~10V/div	2mV/div~10V/div	5mV~5V
Time Base Range	1ns/div~50s/div	1ns/div~50s/div	1ns/div~50s/div	1ns/div~50s/div	1ns/div~50s/div	1ns/div~50s/div	5ns~5s/div
Waveform Memory	15	15	15	15	15	15	4
Panel Setup Memory	15	15	15	15	15	15	
Counter Function	✓	✓	✓	✓	✓	✓	
Data Logger	✓	✓	✓	✓	✓	✓	
Go/NoGo	✓	✓	✓	✓	✓	✓	
Zoom FFT	✓	✓	✓				
USB Host	✓	✓	✓	✓	✓	✓	
USB Device	✓	✓	✓	✓	✓	✓	✓
Battery Power Operation							✓
Power Source	AC 100V~240V	AC 100V~240V	AC 100V~240V	AC 100V~240V	AC 100V~240V	AC 100V~240V	AC 100V~240V
Page	A41-44	A41-44	A41-44	A45-48	A45-48	A45-48	A64

Note : 1. RTS : Real-Time Sample Rate 2. ETS : Equivalent-Time Sample Rate

500/350/250/150 MHz Digital Storage Oscilloscope

VPO
Visual Persistence Oscilloscope

Patent No.ZL201220307783.4

科技創新獎
2012 TAITRONICS

GDS-3000 Series (500/350/250/150 MHz)

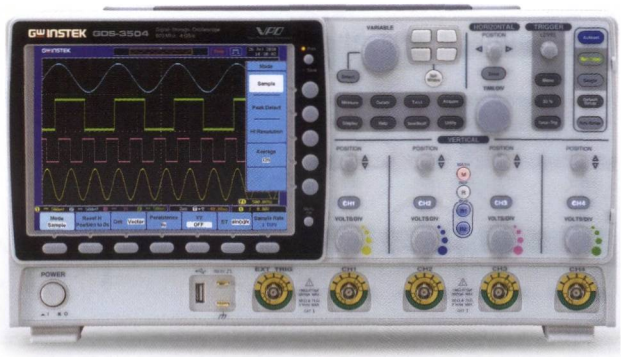
CE | RS-232 | GPIB | Ethernet | USB High Speed | PC Software | Labview Driver | PictBridge Compatible | VGA Output

FEATURES

* 500/350/250/150MHz Bandwidth, 2/4 Input Channel
* 5GSa/s Real-time Sampling Rate and 100GSa/s Equivalent Time Sampling Rate
* 25k Points Memory for Each Input Channel
* VPO (Visual Persistence Oscilloscope) Technology to Display Less-Frequently-Occurred Signals
* 8"800 x 600 High Resolution TFT LCD Display
* Unique Split Screen System with Independent Setting and Display for Each Input Channel
* Three Built-in Input Impedance Selections : 50Ω/75Ω/1MΩ
* Optional Power Analysis Software for Power Source Measurement and Analysis
* Optional Serial bus Analysis Software for Trigger & Decode of I²C, SPI and UART Interfaces

SPECIFICATIONS

	GDS-3152	GDS-3154	GDS-3252	GDS-3254	GDS-3352	GDS-3354	GDS-3502	GDS-3504
VERTICAL								
Channels	2Ch+EXT	4Ch+EXT	2Ch+EXT	4Ch+EXT	2Ch+EXT	4Ch+EXT	2Ch+EXT	4Ch+EXT
Bandwidth	DC~150MHz (-3dB)	DC~150MHz (-3dB)	DC~250MHz (-3dB)	DC~250MHz (-3dB)	DC~350MHz (-3dB)	DC~350MHz (-3dB)	DC~500MHz (-3dB)	DC~500MHz (-3dB)
Rise Time	2.3ns	2.3ns	1.4ns	1.4ns	1ns	1ns	700ps	700ps
Bandwidth Limit	20MHz		20/100MHz		20/100/200MHz		20/100/200/350MHz	
Vertical Resolution	The bandwidth of the 75Ω input impedance is limited to 150MHz only.							
	8 bits							
Vertical Resolution (1MΩ)	2mV~5V/div							
Vertical Resolution (50/75Ω)	2mV~1V/div							
Input Coupling	AC, DC, GND							
Input Impedance	1MΩ // 15pF							
DC Gain Accuracy	±(3% x |Readout| + 0.1div + 1mV)							
Polarity	Normal , Invert							
Maximum Input Voltage(1MΩ)	300V (DC+AC Peak), CAT I							
Maximum Input Voltage(50/75Ω)	5 Vrms , CAT I							
Offset Position Range	2mV/div ~ 100mV/div : ±0.5V ; 200mV/div ~ 5V/div : ±25V							
Waveform Signal Process	Add, Subtract, Multiply, and Divide waveforms, FFT, FFTrms ; FFT : Spectral magnitude. Set FFT vertical scale to Linear RMS or dBV RMS, and FFT window to Rectangular, Hamming, Hanning or Blackman-Harris.							
TRIGGER								
Source	2CH model: CH1, CH2, Line , EXT ; 4CH model: CH1 , CH2 , CH3 , CH4 , Line , EXT							
Trigger Mode	Auto (Supports Roll Mode for 100 ms/div and slower), Normal, Single							
Trigger Type	Edge, Pulse Width, Video, Runt, Rise & Fall, Alternate, Event-Delay(1~65,535 events), Time-Delay(10ns~10s),I²C, SPI, UART(optional)							
Trigger Holdoff Range	10ns ~ 10s							
Coupling	AC, DC, LF rej. , HF rej. , Noise rej.							
Sensitivity	DC~30MHz Approx. 1div or 10mV; 50MHz~150MHz Approx. 1.5div or 15mV; 150MHz~350MHz Approx. 2div or 20mV; 350MHz~500MHz Approx. 2.5div or 25mV							
EXT TRIGGER								
Range	±15V							
Sensitivity	DC~ 150MHz Approx. 100mV; 150MHz ~ 250MHz Approx. 150mV; 250MHz ~ 350MHz Approx. 150mV; 350MHz ~ 500MHz Approx. 200mV							
Input Impedance	1MΩ ±3%, ~16pF							
HORIZONTAL								
Range	1ns/div ~ 100s/div (1-2-5 increments; GDS-3502/3504 1-2.5-5 increments); ROLL : 100ms/div ~ 100s/div							
Pre-trigger	10 div maximum							
Post-trigger	1,000 div max (depend on time base)							
Accuracy	±20 ppm over any ≥ 1 ms time interval							
X-Y MODE								
X-Axis Input/Y-Axis Input	Channel 1; Channel 3/Channel 2; Channel 4							
Phase Shift	±3°at 100kHz							
SIGNAL ACQUISITION								
Real Time Sample Rate	2.5GSa/s	5GSa/s	2.5GSa/s	5GSa/s	5GSa/s	5GSa/s	4GSa/s	4GSa/s
ET Sample Rate	100GSa/s maximum for all models							
Memory Depth	25k points							
Acquisition Mode	Normal, Average, Peak detect, High resolution, Single							
	Average: 2 ~ 256 waveforms ; Peak detect: 2ns							
CURSORS AND MEASUREMENT								
Cursors	Amplitude, Time, Gating available							
Automatic Measurement	28 sets: Vpp, Vamp, Vavg, Vrms, Vhi, Vlo, Vmax, Vmin, Rise Preshoot/ Overshoot, Fall Preshoot/Overshoot							
	Freq, Period, Rise time, Fall time, Positive width, Negative width, Duty cycle,Phase, and eight different delay measurements (FRR, FRF, FFR, FFF, LRR, LRF, LFR, LFF)							
Cursors Measurement	Voltage difference between cursors (△V) Time difference between cursors (△T)							
Auto Counter	6 digits, range from 2Hz minimum to the rated bandwidth							
POWER MEASUREMENTS(OPTION)								
Power Quality Measurements	VRMS, VCrest factor, Frequency, IRMS, ICrest factor, True power, Apparent power, Reactive power, Power factor, Phase angle.							
Harmonics	Freq, Mag, Mag rms, Phase, THD-F, THD-R, RMS							
Ripple Measurements	Vripple ,Iripple							
In-rush Current	First peak, second peak							
CONTROL PANEL FUNCTION								
Autoset	Single-button, automatic setup of all channels for vertical, horizontal and trigger systems, with undo autoset							
Auto-range	Allow automatically adjusts the time base and/or the vertical scale of displayed waveform when the frequency and/or the amplitude of input signal changed.							
Save Setup	20 sets							
Save Waveform	24 sets							



GDS-3000 Series

SPECIFICATIONS

	GDS-3152	GDS-3154	GDS-3252	GDS-3254	GDS-3352	GDS-3354	GDS-3502	GDS-3504
DISPLAY SYSTEM								
TFT LCD Type	8" TFT LCD SVGA color display(LED Back-light)							
Display Resolution	800 horizontal x 600 vertical pixels (SVGA)							
Interpolation	Sin(x)/x & Equivalent time sampling							
Waveform Display	Dots, Vectors, Variable persistence, Infinite persistence							
Display Graticule	8 x 10 divisions							
Display Brightness	Adjustable							
INTERFACE								
RS-232C	DB-9 male connector							
USB Port	2 sets USB 2.0 high-speed host port ;1 set USB high-speed 2.0 device port							
Ethernet Port	RJ-45 connector, 10/100Mbps							
SVGA Video Port	DB-15 female connector, monitor output for display on SVGA monitors							
GPIB	GPIB-to-USB Adapter (Optional)							
Go/NoGo BNC	5V Max/10mA TTL open collector output							
Internal Flash Disk	64MB							
Kensington Style Lock	Rear-panel security slot connects to standard Kensington-style lock							
Line Output	3.5mm stereo jack for Go/NoGo audio alarm							
POWER SOURCE								
Line Voltage Range	AC 100V ~ 240V, 48Hz ~ 63Hz, auto selection; Power Consumption 96VA							
MISCELLANEOUS								
Multi-Language Menu	Available							
On-Line Help	Available							
Time clock	Time and data, provide the date/time for saved date							
DIMENSIONS & WEIGHT								
400(W) X 200(H) X 130(D)mm, Approx. 4 kg								

The specifications apply when the oscilloscope is powered on for at least 30 minutes under +20 C~+30 C .

ORDERING INFORMATION

GDS-3502	500MHz, 2-Channel, Visual Persistence DSO
GDS-3504	500MHz, 4-Channel, Visual Persistence DSO
GDS-3352	350MHz, 2-Channel, Visual Persistence DSO
GDS-3354	350MHz, 4-Channel, Visual Persistence DSO
GDS-3252	250MHz, 2-Channel, Visual Persistence DSO
GDS-3254	250MHz, 4-Channel, Visual Persistence DSO
GDS-3152	150MHz, 2-Channel, Visual Persistence DSO
GDS-3154	150MHz, 4-Channel, Visual Persistence DSO

Accessories
User manual CD x 1 ,Power cord x 1
GTP-151R : 150MHz 10:1 passive probe for GDS-3152/3154(one per channel)
GTP-251R : 250MHz 10:1 passive probe for GDS-3252/3254(one per channel)
GTP-351R : 350MHz 10:1 passive probe for GDS-3352/3354(one per channel)
GTP-501R : 500MHz 10:1 passive probe for GDS-3502/3504 (one per channel)

Option

DS3-PWR	Power analysis software: Power quality/Harmonic/Ripple/In-rush current measurements
DS3-SBD	Serial Bus analysis software: I²C/SPI/UART(only 4 channel models support SPI function)

Optional Accessories

GUG-001	GPIB to USB adapter
GTP-033A	35MHz 1:1 Passive probe
GTP-352R	350MHz 20:1 Passive probe
GDP-025	25MHz High voltage differential probe
GDP-050	50MHz High voltage differential probe
GDP-100	100MHz High voltage differential probe
GCP-005	1kHz/5A Current probe
GCP-020	10kHz/200A Current probe
GCP-100	100kHz/100A Current probe
GCP-530	50MHz/30A Current probe
GCP-1030	100MHz/30A Current probe
GCP-206P	Power supply for current probe (2 input channel)
GCP-425P	Power supply for current probe (4 input channel)
GTL-248	GPIB Cable, Double Shielded, 2000mm
GTL-251	USB-GPIB Adapter, GPIB-USB-HS, USB 2.0, Hi-Speed USB compliance, 2000mm
GSC-008	Soft Carrying Case
GTL-110	Test lead, BNC to BNC connector
GTL-232	RS-232C cable, 9-pin female to 9-pin female, Null modem for computer
GTL-246	USB 2.0 cable, A-B type cable 4P, 1800mm
GRA-411	Rack Adapter Panel
GDB-03	Oscilloscope Education and Training Kit
GKT-100	Deskew fixture

Free Download

PC Software	FreeWave software	**Driver**	USB driver ; LabView driver

Rear Panel

GUG-001 GPIB to USB Adapter

For: GDS-3000 Series, PSW-Series

GRA-411 Rack Adapter Panel

Rack Mounting (19" , 6U)

GDB-03 Oscilloscope Education and Training Kit

For : GDS-3000 Series/GDS-2000A Series

GSC-008 Soft Carrying Case

500/350/250/150 MHz Digital Storage Oscilloscope

Current Probe and Differential Probe Selections

GCP-005/100/020

GCP-530/1030 & GCP-206P/425P

GDP-025

GDP-050/100

In addition to the standard passive probes, the optional current or differential probes can be used to perform additional tests or power analysis. The differential probes come in three bandwidths: 25MHz, 50MHz and 100MHz. The current probes come in a broad variety of bandwidth and current ranges (ranging from 50MHz/30A, 100MHz/30A, 10kHz/200A and 100kHz/100A), to cover any number of power supply testing applications.

** The GCP-530/1030 must be used in conjunction with the GCP-206P/425P current probe power supply.*

** The GCP-100 requires a standard 9V battery; The GCP-005 and GCP-020 do not require batteries or a power supply source.*

CURRENT PROBE

	GCP-005	GCP-100	GCP-020	GCP-530	GCP-1030
Probe Bandwidth	40Hz~1kHz	DC~100kHz	40Hz~40kHz	DC~50MHz	DC~100MHz
Rise Time	–	–	–	7ns or less	3.5ns or less
Maximum Continuous Input Range	5A	0.05~10A(100mV/A) 1~100A(10mV/A)	0.1~24A(100mV/A) 0.5~240A(10mV/A)	30Arms	30Arms
Maximum Peak Current Value	50A	100A	60A(100mV/A) 600A(10mV/A)	50Arms	50Arms
Output Voltage Rate	10mV/A	100mV/A;10mV/A	10mV/A;100mV/A	0.1V/A	0.1V/A
Amplitude Accuracy	±0.5%rdg ±0.1mV (50/60Hz) ±1.0%rdg ±0.2mV (40~1kHz)	≤3%±5mV (50mA~10A peak) ≤4%±500μV (0.5A~40A peak) ≤15%(40~100A peak)	≤2%±50mV (100mA~20A peak) ≤3.5%±5mV (0.5~10A peak) ≤3%±5mV (10~40A peak) ≤1.5%±5mV (100A~240A peak)	±1.0%rdg±1mV (0~30Arms/DC, 45~66Hz);±2.0%rdg (30Arms~50A peak /DC, 45~66Hz)	±1.0%rdg±1mV (0~30Arms/DC, 45~66Hz);±2.0%rdg (30Arms~50A peak /DC, 45~66Hz)
Noise	–	–	–	2.5mArms or less	2.5mArms or less
Rate Supply Voltage	–	–	–	±12V± 0.5V	±12V± 0.5V
Maximum Rated Power	–	–	–	5.6VA	5.3VA
Maximum Rated Voltage	600V, CAT Ⅲ	600V, CAT Ⅲ	600V, CAT Ⅲ	300V, CAT I	300V, CAT I

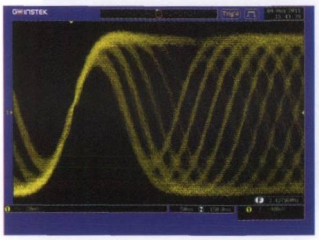
CURRENT PROBE POWER SUPPLY

	GCP -206P	GCP-425P
Compatible Current Probe	GCP-530 GCP-1030	GCP-530 GCP-1030
Number of Power Supply Connectors	2	4
Output Voltage	±12V± 0.5V	±12V± 0.5V
Rated Output Current	±600mA	±2.5A
Rated Supply Voltage (50/60Hz)	110V/120V, 220V/240V AC±10%	100V~240V AC±10%
Maximum Rated Power	20VA	170VA
Dimensions & Weight	73(W)x110(H)x 186(D)mm ; Approx.1.1kg	80(W)x119(H)x 200(D) mm ; Approx.1.1kg
Accessories	Power cord, fuse	Power cord, fuse

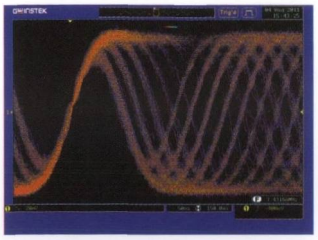
HIGH-VOLTAGE DIFFERENTIAL PROBE

	GDP-025	GDP-050	GDP-100
Probe Bandwidth	DC ~ 25MHz(attenuationx50, x200) ; DC ~ 15MHz(attenuationx20)	DC ~ 50MHz(attenuationx200, x500, x1000) ; DC ~ 25MHz(attenuationx100)	DC ~ 100MHz(attenuationx200, x500 , x1000); DC ~ 50MHz(attenuationx100)
Attenuation	x20 , x50 , x200	x100 , x200 , x500 , x1000	x100 , x200 , x500 , x1000
Accuracy	±2%	±2%	±2%
Voltage Input Range (DC+AC peak to peak)	≤140Vp-p for x 20 , ≤350Vp-p for x 50 , ≤1400Vp-p for x 200	≤ 700Vp-p for x 100 ≤ 1400Vp-p for x 200 ≤ 3500Vp-p for x 500 ≤ 7000Vp-p for x 1000	≤ 700Vp-p for x 100 ≤ 1400Vp-p for x 200 ≤ 3500Vp-p for x 500 ≤ 7000Vp-p for x 1000
Permitted Max Input Voltage	Maximum differential voltage: Max voltage between input terminal and ground: 600Vrms	Maximum differential voltage: Max voltage between input terminal and ground: 6500Vrms	Maximum differential voltage: Max voltage between input terminal and ground: 6500Vrms
Input Impedance	Differential:4MΩ/1.2pF ; Between terminals and ground: 2MΩ/2.3pF	Differential:54MΩ/1.2pF ; Between terminals and ground:27MΩ/2.3pF	Differential: 54MΩ/1.2pF ; Between terminals and ground: 27MΩ/2.3pF
Output	≤7.0V	≤7.0V	≤7.0V
Output impedance	50Ω	50Ω	50Ω
Rise Time	14ns (x50, x200 attenuation) ; 23.4ns (x20 attenuation)	7ns (x200, x500, x1000 attenuation) ; 14ns (x100 attenuation)	3.5ns (x200, x500, x1000 attenuation) ; 7ns (x100 attenuation)
Rejection Rate on Common Mode (CMRR)	60Hz>80dB , 100Hz>60dB, 1MHz>50dB	60Hz>80dB , 100Hz>60dB, 1MHz>50dB	60Hz>80dB , 100Hz>60dB, 1MHz>50dB
Power Supply	External DC adapter	External DC adapter	External DC adapter
Consumption	Maximum 35mA (0.4Watt)	Maximum 35mA (0.4Watt)	Maximum 35mA (0.4Watt)

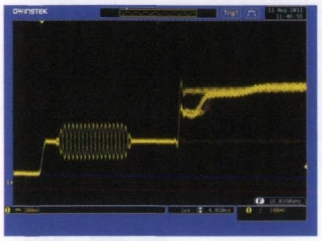
A. VPO VISUAL PERSISTENCE OSCILLOSCOPE SIGNAL PROCESSING TECHNOLOGY

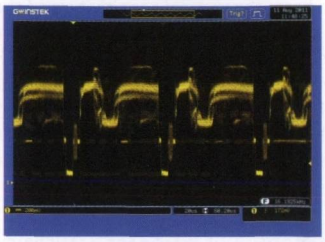


Gray Mode



Color Mode





The GDS-3000 Series equipped with VPO signal processing technology and 5GSa/s high-speed real-time sampling rate, allows you to view the video signal clearly.

The GDS-3000 Series digital storage oscilloscope is a full-featured and powerful tool that allows you to tackle complex measurement issues with ease. The GDS-3000 Series, carrying a maximum bandwidth of 500MHz, is equipped with a real-time sampling rate up to 5GSa/s and an equivalent-time sampling rate of 100GSa/s. The large 8-inch SVGA LCD screen, combined with the advanced digital signal processing technology VPO, provides meticulous detail and clarity for the displayed waveforms. The GDS-3000 Series gives you confidence not to miss any part of the test signal in the product verification and debugging stages and allows you to speed up your task without hesitation.

5GSa/s Sampling & VPO Technology

The GDS-3000 Series adopts VPO (Visual Persistence Oscilloscope) signal processing technology to enhance the performance of multi-gray-scale waveform display. The FPGA parallel processing, instead of conventional microprocessor architecture, is applied in GDS-3000 Series design to significantly increase the data processing speed and therefore increase the waveform update rate. This technology allows the GDS-3000 Series to display waveforms with various gray scales based on the occurrence frequencies, a fashion analogous to the analog oscilloscope display. As the visual persistence oscilloscope contains 3-dimension waveform data, including amplitude, time and intensity, for each waveform spot, it provides more useful signal information than a normal digital storage oscilloscope can do. The high-speed data processing of VPO technology enables the signal analysis of rapid events such as video, jitter, glitch and runt.

The GDS-3000 Series features a maximum real-time sampling rate of 5GSa/s, which is superior to most of the equivalent oscilloscopes available in the market today. (4GSa/s maximum sampling rate for GDS-3502 & GDS-3504 and 2.5GSa/s maximum sampling rate for GDS-3152 & GDS-3252). The series is also equipped with an equivalent- time sampling rate of 100 GSa/s, providing an economical solution for the waveform acquisition and reconstruction of very high-speed repetitive signals. The fast-acquisition capability along with VPO signal processing technology make GDS-3000 a very handy tool for observing occasionally-occurred signals such as transient and inrush events. With powerful technology, GDS-3000 Series gives you full confidence in every acquisition of complex waveform that adheres to high-speed circuit design of modern products.

A Hi-tech DSO Platform

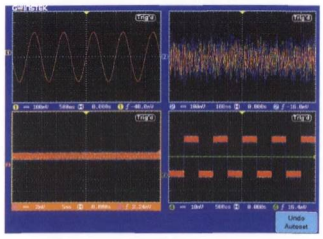
The GDS-3000 Series is a new platform of 4-input channels, 500MHz bandwidth, 5GSa/s sampling rate, and VPO waveform display. The split screen feature has been designed to meet the requirements of multi-window & multi-signal tests in the research and the manufacturing fields. The optional power analysis software and the optional serial bus analysis software are available to facilitate the engineer's tasks in testing and manufacturing of the associated products. Three new differential probes, GDP-025, GDP-050 & GDP-100, and five new current probes, GCP-005, GCP-020, GCP-100, GCP-530 & GCP-1030, are coming along with the GDS-3000 Series to provide total solutions for a wide variety of applications in the industry, service and education market sectors. The GDS-3000 Series, a high-tech platform carrying thoughtful features, brings very high customer value to both general purpose market and professional market.

Serial Bus Analysis Software and Power Quality Analysis Software

With widespread applications of embedded system adopting serial bus communication standards, resolving unexpected issues, such as propagation delay and bus contention, is often a challenge to design and testing engineers. The GDS-3000 Series provides (optional) design and testing engineers with powerful tools for the communication analysis and debugging of most the popular serial interface projects including I^2C ,SPI and UART.

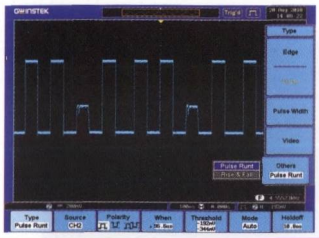
To fulfill the increasing power measurement demands, as a green energy trend, GDS-3000 provides an embedded power analysis software (optional), which includes measurements of Power Quality, Harmonics, Ripple and Inrush Current, meeting requirements of most power measurement standards.

B. UNIQUE SPLIT SCREEN FUNCTION



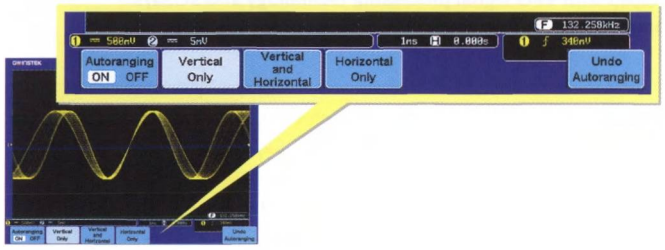
The unique split screen feature of GDS-3000 Series allows each input channel to be operated independently with respective setting and waveform display. The time base, the vertical sensitivity, and the trigger selections can be done by each channel separately, and the waveform of each input signal can be shown on the individual part of the screen. This nearly four-DSO-in-one feature is very useful for the applications that need to simultaneously see the details of multiple waveforms with very different characteristics. The 8-inch high resolution 800 x 600 LCD display makes the split screen a pleasant observation environment to view the details of complex signals.

C. COMPLETE SET of TRIGGER FUNCTIONS



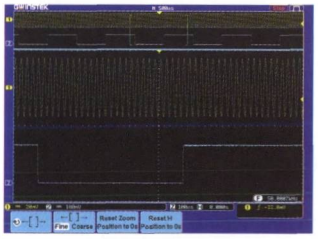
Besides Edge trigger, the GDS-3000 Series also offers various trigger functions, including Video, Pulse Width, Runt, Rise Time & Fall Time (specific time length), Alternate, Delay by Time, Delay by Event, and Hold-Off. The high sampling rate, the VPO signal processing & display, and the flexible trigger function all together make the GDS-3000 Series a powerful tool for waveform capture and display of various types of signals.

D. AUTO RANGE for both TIME BASE and VERTICAL SCALE



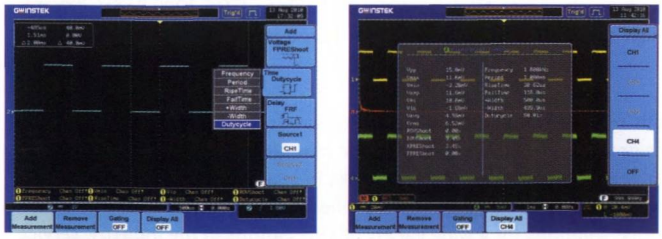
The Auto Range function automatically adjusts the time base and/or the vertical scale of displayed waveform when the frequency and/or the amplitude of input signal changed. This function gives user the convenience to have DSO always display waveform in a proper fashion on the screen tracking the frequency and amplitude changes of the input signal. It is especially useful when the user needs to alternately probe and test multiple circuit points containing signals with different frequencies and amplitudes.

E. DUAL DISPLAY WINDOW ZOOM



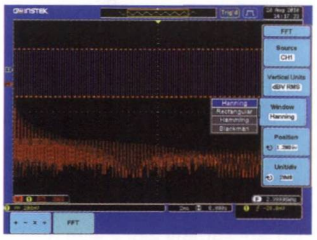
The GDS-3000 Series Window Zoom function provides dual display mode to show the main waveform and the magnified section of zoomed-in waveform at the same time. Under "Zoom" mode, the width and the position of zoom-in window over the main waveform can be selected to get the magnified waveform as needed for detailed observation. To quickly and accurately move the zoom-in window to the expected position, the "Coarse" mode helps move the window to the needed position immediately and the "Fine" mode provides fine adjustment to precisely place the window in the exact position.

F. 28 AUTOMATIC MEASUREMENTS



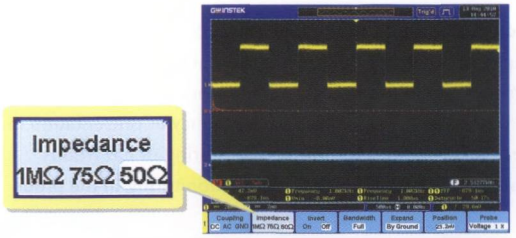
The GDS-3000 Series supports simultaneous measurement of up to 28 waveform measurement items grouped into three main waveform parameters: amplitude, time and delay measurements. The display modes include an individual mode and a Display All mode. The former can display any 8 of the automatic measurements while the later can display all the automatic measurements for a channel.

G. FFT TEST FUNCTION



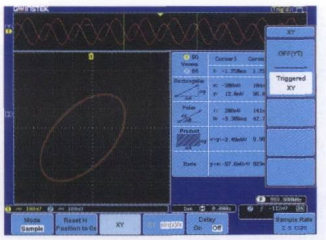
To observe fundamental and harmonic frequency components of a signal, the FFT function on a digital storage oscilloscope is often used. Typically the traditional unit of the FFT is decibel (dB). However, when using dB it is sometimes difficult to identify the fundamental frequency of a signal from a noisy spectrum. With FFTrms function, the GDS-3000 Series can clearly display the fundamental frequency of an acquired waveform. The FFT function of GDS-3000 supports Rectangular, Hamming, Hanning, and Black-harris windows.

H. THREE INPUT IMPEDANCE SELECTIONS



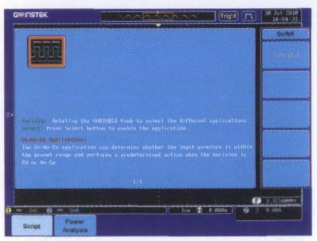
Three input impedance, 1MΩ, 75Ω, and 50Ω are available for user's selection. The flexibility of impedance selections, including 1MΩ to get minimum loading effect, 75Ω to accommodate Video transmission applications and 50Ω to fit RF communication applications, extends the GDS-3000 Series utilization range.

I. X-Y MODE



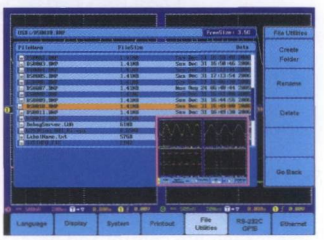
The X-Y mode of GDS-3000 defines CH1 and CH3 as the horizontal axis and CH2 and CH4 as the vertical axis, allowing the display of 2 sets of X-Y pattern simultaneously. The measurement items include Rectangular, Polar, Product and Ratio that fits most of the popular X-Y applications. The X-Y pattern and the time domain waveforms can be shown on the screen simultaneously. Two cursors on the time domain waveforms allow the identification of cursor-associated locations on the X-Y pattern display.

J. EXTENDABLE APPLICATION SOFTWARE



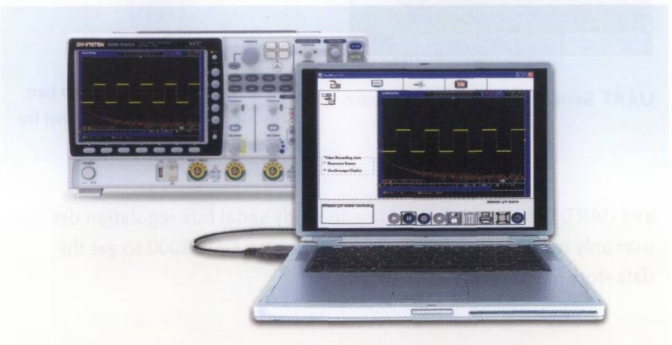
The GDS-3000 Series allows future installation of additional application software at the user site. This provides an open environment for optional software upgrade and additional feature built-in in whenever the GDS-3000 Series user has the need. The flexibility of software installation platform keeps the DSO being in use always up-to-date.

K. WAVEFORM FILE PREVIEW



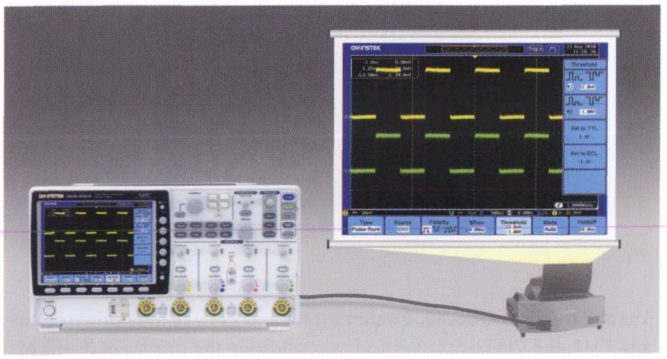
The GDS-3000 provides an optimized operation interface for viewing screen captures. Generally, the oscilloscope may store large amounts of waveform data after a long period of time. To help prevent engineers from selecting the wrong file from a large number of stored waveform files, the screen capture preview function can be used to preview the waveform file without opening files so that operation of the oscilloscope is more efficient and convenient.

L. FREE REMOTE CONTROL SOFTWARE



Using a USB port coupled with FreeWave remote monitoring software is the easiest and most convenient way to capture data from the GDS-3000 Series. With FreeWave, a screenshot can be saved as an image file (.bmp/.jpg/.gif/.png/.tif), waveform data (.csv). Not only can FreeWave monitor and record waveforms over a long period of time, but previously recorded waveforms can also be observed. Instrument settings can even be configured without the need to learn incomprehensible command line syntax. With the simple user interface and robust features, FreeWave allows you to get the most out of the GDS-3000 with little effort.

M. SVGA OUTPUT



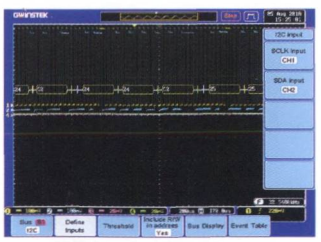
A SVGA video output port in the rear panel of GDS-3000 Series allows the screen-image transfer from DSO to an external projector or a monitor for remote monitoring or big screen observation. This direct image transfer feature greatly increases the efficiency of presentation in the meeting, teaching in the class, remote monitoring of hazardous events from a secured zone, and fast and easy monitoring in the produ ction line.

N. VARIOUS INTERFACES SUPPORT

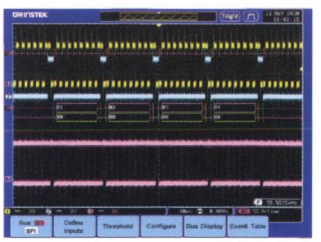
Two high-speed USB 2.0 Host ports located on both front panel and rear panel are used for easy access of stored data. On the rear panel, a USB Device port is available for remote control and hardcopy print-out through a PictBridge compatible printer. RS-232 and LAN interfaces are provided as standard for system communication & ATE applications.

A SVGA video output port allows the transfer of DSO screen image to an external projector or monitor for remote monitoring or big screen observation. A GPIB to USB adaptor is available as an option for interface conversion through the USB Device port on the front panel.

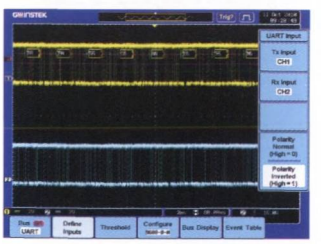
O. SERIAL BUS ANALYSIS SOFTWARE SUPPORTING I²C, SPI and UART (OPTIONAL)



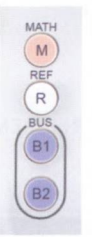
I²C Serial Bus Analysis Software



SPI Serial Bus Analysis Software



UART Serial Bus Analysis Software

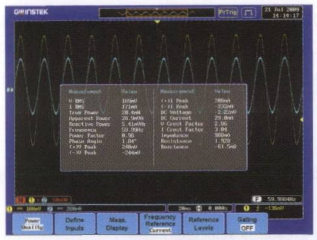


The GDS-3000 Series provides two dedicated keys in the front panel for tow sets of setting recall

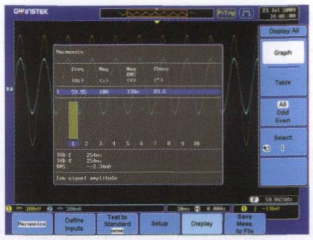
With serial bus technology being widely used in embedded applications, the proper triggering and analysis of flowing data, control signal and associated pulse waveforms in serial bus communication has become a difficult job and challenge to design engineers. The Serial Bus Analysis software of GDS-3000 Series carries complete analysis tools for triggering and decoding of commonly used serial bus interfaces, including I² C, SPI and UART. Without spending time to study serial bus regulation details, user only needs to set the trigger condition on GDS-3000 to get the data slots of interest.

** Only four-channel models support SPI function.*

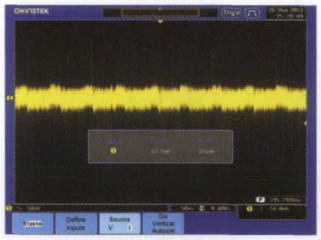
P. POWER ANALYSIS SOFTWARE FOR POWER SUPPLY MEASUREMENTS (OPTIONAL)



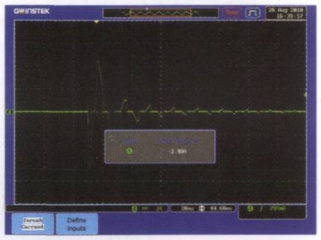
Power Quality



Harmonics



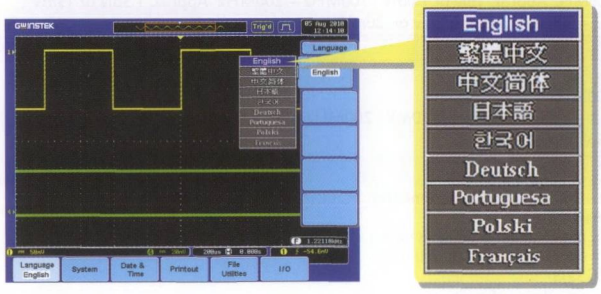
Ripple/Noise



In-rush Current

The Power Analysis software contains four measurement functions, including Power Quality, Harmonics, Ripple and Inrush Current. The Power Quality analysis function allows the measurements of Voltage, Current, Frequency, Power and other quality related parameters for power source efficiency improvement. The Harmonics analysis function performs evaluation of power waveform distortion and gives harmonic test data for power source design and quality check. This function is complied with IEC 61000-3-2 standard. The Ripple measurement function, acquiring the ripple and noise overriding the DC waveform, is used to evaluate the DC power source quality. The Inrush Current measurement function is used to measure the power-on surge current, which may cause the damage of the device circuit.

Q. MULTI-LANGUAGE SUPPORT



The GDS-3000 Series interface supports multiple languages to provide the upmost convenience for cross-country team cooperation and multinational engineering efforts.

SELECTION GUIDE

MODEL	GDS-3504	GDS-3502	GDS-3354	GDS-3352	GDS-3254	GDS-3252	GDS-3154	GDS-3152
Bandwidth	500MHz	500MHz	350MHz	350MHz	250MHz	250MHz	150MHz	150MHz
Channels	4	2	4	2	4	2	4	2
Record Length	25k/Channel	25k/Channel	25k/Channel	25k/Channel	25k/Channel	25k/Channel	25k/Channel	25k/Channel
Real-Time Sampling	4 GSa/s	4 GSa/s	5 GSa/s	5 GSa/s	5 GSa/s	2.5 GSa/s	5 GSa/s	2.5 GSa/s
Equivalent-Time Sampling	100GSa/s	100GSa/s	100GSa/s	100GSa/s	100GSa/s	100GSa/s	100GSa/s	100GSa/s

* 2 Channels on Max Sampling Rate : 2GSa/s (GDS-3504/3502); 2.5GSa/s (GDS-3354/3352/3254/3154); 1.25GSa/s (GDS-3252/3152)
* 3, 4 Channels on Max Sampling Rate : 2GSa/s (GDS-3504); 1.25GSa/s (GDS-3354/3254/3154)

300MHz/200MHz/100MHz/70MHz Digital Storage Oscilloscope

VPO
Visual Persistence Oscilloscope

GDS-2000A Series (300/200/100/70 MHz)

CE | USB Full Speed | PC Software | Labview Driver | RS-232 | GPIB | Ethernet | PictBridge Compatible

FEATURES

* 300/200/100/70MHz Bandwidth, 2 or 4 Input Channels
* 2GSa/s Maximum Real-Time Sampling Rate and 100GSa/s Equivalent Time Sampling Rate
* 2M points Maximum Record length
* VPO Technology to Display Less-Frequently-Occurred Signals
* Fast Update Rate of 80,000 Waveform Per Second
* Segmented Memory Acquisition and Waveform Search Function
* Standard Model Provides I^2C, UART, SPI Serial Bus Trigger and Analysis Functionality
* Optional 8 or 16 Additional Digital Channels with Logic Analyzer(MSO)
* Upgradable CAN/LIN Bus, DVM, H-Expansion, Data Log and Advanced Logic Functionality
* Optional 5MHz & 25MHz Function Generator
* Flexible Remote Control Connectivity (Standard : USB ; Optional : LAN/GPIB)

GDB-03 Oscilloscope Education and Training Kit

For : GDS-3000 Series/GDS-2000A Series

GSC-008 Soft Carrying Case

SPECIFICATIONS

VERTICAL

	GDS-2072A	GDS-2074A	GDS-2102A	GDS-2104A	GDS-2202A	GDS-2204A	GDS-2302A	GDS-2304A
Channels	2Ch+EXT	4Ch+EXT	2Ch+EXT	4Ch+EXT	2Ch+EXT	4Ch+EXT	2Ch+EXT	4Ch+EXT
Bandwidth	DC~70MHz(-3dB)		DC~100MHz(-3dB)		DC~200MHz(-3dB)		DC~300MHz(-3dB)	
Rise Time	5ns		3.5ns		1.75ns		1.17ns	
Bandwidth Limit	20MHz		20MHz		20M/100MHz		20M/100M/200MHz	

Vertical Resolution	8 bits@1M : 1mV*~10V (* : When the vertical scale is set to 1mV/div, the bandwidth limit will be set to 20MHz automatically)
Input Coupling	AC, DC, GND
Input Impedance	1MΩ // 16pF approx.
DC Gain Accuracy(**)	±(3% X |Readout| + 0.1div + 1mV) when 2mV/div or greater is selected ±(5% X |Readout| + 0.1div + 1mV) when 1mV/div is selected (** : The measurement type is average of ≥16 waveforms with vertical position at zero)
Polarity	Normal , Invert
Maximum Input Voltage	300V (DC+AC Peak), CAT I
Offset Position Range	1mV/div ~ 20mV/div : ±0.5V ; 50mV/div ~ 200mV/div : ±5V ; 500mV/div ~ 2V/div : ±25V ; 5V/div~10V/div : ±250V
Waveform Signal Process	+, -, ×, ÷, FFT, FFTrms, d/dt, ∫ dt, √‾ FFT : Spectral magnitude. Set FFT Vertical Scale to Linear RMS or dBV RMS, and FFT Window to Rectangular, Hamming, Hanning , or Blackman-Harris

TRIGGER

Source	Ch1 ,CH2, CH3*, CH4*, Line, EXT, D0-D7 or D0-D15** ; *four channel models only **Logic analyzer option only
Trigger Mode	Auto (Supports Roll Mode for 100 ms/div and slower), Normal, Single
Trigger Type	Edge, Pulse Width, Video, Pulse Runt, Rise & Fall, Alternate, Time out, Event-Delay (1~65,535 events), Time-Delay(10ns~10s), Logic*, Bus* , *with DS2-08LA or DS2-16LA option
Trigger Holdoff Range	10ns ~ 10s
Coupling	AC, DC, LF rej. , Hf rej. , Noise rej.
Sensitivity	DC ~ 100MHz Approx. 1div or 1.0mV ; 100MHz ~ 200MHz Approx. 1.5div or 15mV ; 200MHz ~ 300MHz Approx. 2div or 20mV

EXT TRIGGER

Range	±15V
Sensitivity	DC ~ 100MHz Approx. 100mV 100MHz ~ 200MHz Approx. 150mV ; 200MHz ~ 300MHz Approx. 150mV
Input Impedance	1MΩ±3%, ~16pF

HORIZONTAL

Time Base Range	1ns/div ~ 100s/div (1-2-5 increments); ROLL : 100ms/div ~ 100s/div
Pre-trigger	10 div maximum
Post-trigger	1,000 div max (depend on time base)
Accuracy	±20 ppm over any ≥ 1 ms time interval
Real Time Sample Rate	Max. : 2GSa/s
ET Sample Rate	100GSa/s maximum for all models
Record Length	Max. : 2Mpts
Acquisition Mode	Normal, Average, Peak Detect, Single
Peak Detection	2ns (typical)
Average	Selectable from 2 to 256

X-Y MODE

X-Axis Input	Channel 1 ; Channel 3* (* : four channel models only)
Y-Axis Input	Channel 2 ; Channel 4* (* : four channel models only)
Phase Shift	±3° at 100kHz

CURSORS AND MEASUREMENT

Cursors	Amplitude, Time, Gating Available; Unit : Seconds(S), Hz(1/S), Phase (Degrees), Ratio(%)
Automatic Measurement	36 sets: Pk-Pk, Max, Min, Amplitude, High, Low, Mean, Cycle Mean, RMS, Cycle RMS, Area, Cycle Area, ROVShoot, FOVShoot, RPREShoot, FPREShoot, Frequency, Period, RiseTime, FallTime, +Width, -Width, Duty Cycle, +Pulses, -Pulses, +Edges, -Edges, FRR, FRF, FFR, FFF, LRR, LRF, LFR, LFF, Phase
Control Panel Function	Cursors measurement
Auto Counter	6 digits, range from 2Hz minimum to the rated bandwidth
Autoset	Single-button, automatic setup of all channels for vertical, horizontal and trigger systems, with undo Autoset
Save Setup	20set
Save Waveform	24set

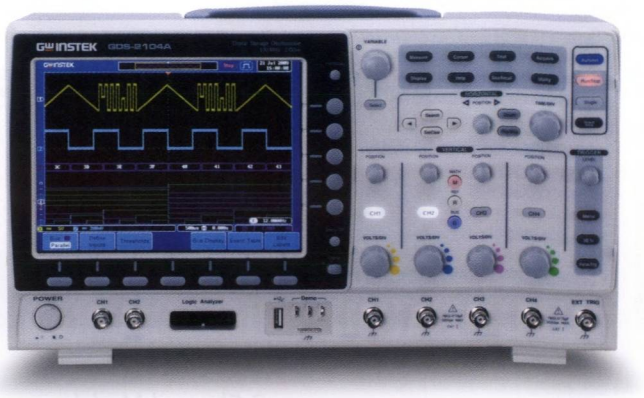
DISPLAY SYSTEM

TFT LCD Type	8" TFT LCD SVGA color display(LED Back-light)
Display Resolution	800 horizontal x 600 vertical pixels (SVGA)
Interpolation	Sin(x)/x & Equivalent time sampling
Waveform Display	Dots, Vectors, Variable persistence(16ms~10s), Infinite persistence
Waveform Update Rate	80,000 waveforms per second, maximum
Display Graticule	8 x 10 divisions

INTERFACE

RS-232C	DB-9 male connector
USB Port	USB 2.0 Full-speed host port, USB 2.0 Full-speed device port
Ethernet Port	RJ-45 connector, 10/100Mbps with HP Auto-MDIX (option)
SVGA Video Port	SVGA output (option)
GPIB	GPIB module (option)
Go/NoGo BNC	5V Max/10mA TTL open collector output
Kensington Style Lock	Rear-panel security slot connects to standard Kensington-style lock

The specifications apply when the oscilloscope is powered on for at least 30 minutes under +20°C~+30°C .
Note : Three-year warranty, excluding probes & LCD display panel.



GDS-2000A Series

SPECIFICATIONS

LOGIC ANALYZER (OPTION)

Sample Rate	500MSa/s
Bandwidth	200MHz
Record Length	2M max
Input Channels	16 Digital (D15 - D0) or 8 Digital (D7~D0)
Trigger Type	Edge, Pattern, Pulse Width, Serial bus (I^2C, SPI, UART), Parallel
Thresholds	Quad-D0 ~ D3, D4 ~ D7..Thresholds D8~D11*, D12~D15* (*: DS2-16LA only)
Threshold Selections	TTL, CMOS, ECL, PECL, User Defined
Threshold Accuracy	±100mV
User-defined Threshold Range	±10V
Maximum Input Voltage	±40V
Minimum Voltage Swing	±500mV
Input Impedance	101KΩ probe loading 8 pF
Vertical Resolution	1 bit

POWER SOURCE MISCELLANEOUS

Line Voltage Range	AC 100V ~ 240V, 48Hz ~ 63Hz, auto selection
Multi-Language Menu	Available
On-Line Help	Available
Time clock	Time and date, provide the date/time for saved data

DIMENSIONS & WEIGHT

380(W) X 220(H) X 145(D)mm, Approx. 4.2 kg

ORDERING INFORMATION

GDS-2304A	300MHz, 4-Channel, Digital Storage Oscilloscope
GDS-2302A	300MHz, 2-Channel, Digital Storage Oscilloscope
GDS-2204A	200MHz, 4-Channel, Digital Storage Oscilloscope
GDS-2202A	200MHz, 2-Channel, Digital Storage Oscilloscope
GDS-2104A	100MHz, 4-Channel, Digital Storage Oscilloscope
GDS-2102A	100MHz, 2-Channel, Digital Storage Oscilloscope
GDS-2074A	70MHz, 4-Channel, Digital Storage Oscilloscope
GDS-2072A	70MHz, 2-Channel, Digital Storage Oscilloscope

Accessories :
Quick start guide x 1 , User manual CD x 1, Power cord x 1
GTP-070A-4 : 70MHz (10:1/1:1) Switchable passive probe for GDS-2072A/2074A(one per channel)
GTP-150A-2 : 150MHz (10:1/1:1) Switchable passive probe for GDS-2102A/2104A(one per channel)
GTP-250A-2 : 250MHz (10:1/1:1) Switchable passive probe for GDS-2202A/2204A(one per channel)
GTP-350A-2 : 350MHz (10:1/1:1) Switchable passive probe for GDS-2302A/2304A(one per channel)

OPTION

DS2-LAN	Ethernet & SVGA output
DS2-GPIB	GPIB Interface
DS2-FGN	DDS Function Generator
AFG-125	25MHz Single channel USB Modular Arbitrary Function Generator
AFG-225	25MHz Dual channel USB Modular Arbitrary Function Generator
DS2-16LA	16-Channel Logic Analyzer includes 16 Channel Logic Analyzer Card(GLA-16) 16-Channel Logic Analyzer Probe(GTL-16LA)
DS2-08LA	8-Channel Logic Analyzer : includes 8-Channel Logic Analyzer Card(GLA-08) 8-Channel Logic Analyzer Probe(GTL-08LA)

OPTIONAL ACCESSORIES

GTL-08LA	8-Channel Logic Analyzer Probe
GTL-16LA	16-Channel Logic Analyzer Probe
GLA-08	8-Channel Logic Analyzer Card
GLA-16	16-Channel Logic Analyzer Card
GRA-420	Rack Adapter Panel
GAK-003	50 Ωmpedance Adapter
DS2-FH1	Module extension bay & USB Type A to Type A/B cable
GSC-008	Soft Carrying Case
GTL-232	RS-232C Cable, 9-pin, F-F Type, null modem, 2000mm
GTL-246	USB Cable, USB 2.0, A-B Type, 1200mm
GTL-248	GPIB Cable, Double Shielded, 2000mm
GTL-251	USB-GPIB Adapter, GPIB-USB-HS, USB 2.0, Hi-Speed USB compliance, 2000mm
GDB-03	Oscilloscope Education & Training Kit
GCP-005	Current Probe, 40Hz ~ 1kHz, 5A, Current Probe
GCP-020	Current Probe, DC ~ 100KHz, 10A, Current Probe
GCP-100	Current Probe, 40Hz ~ 10KHz, 20A, Current Probe
GCP-1030	Current Probe, DC ~ 100MHz, 30Arms, Current probe
GCP-206P	Current Probe - Power Supply, 2 Channel Power Supply for GCP-530/1030
GCP-245P	Current Probe - Power Supply, 4 Channel Power Supply for GCP-530/1030
GCP-530	Current Probe, DC ~ 50MHz, 30Arms, Current Probe
GDP-025	Differential Probe, 25M High Voltage Differntial Probe
GDP-050	Differential Probe, 50M High Voltage Differntial Probe
GDP-100	Differential Probe, 100M High Voltage Differntial Probe
GTP-033A	Oscilloscope Probe, 35MHz 1:1 Passive Probe, BNC(P/M)

FREE DOWNLOAD

PC Software	FreeWave software
Driver	USB driver, LabView Driver

Rear Panel

DS2-16LA 16-Channel Logic Analyzer

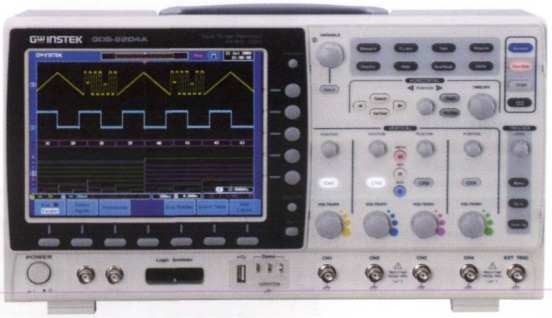
DS2-08LA 8-Channel Logic Analyzer

DS2-LAN Ethernet & SVGA Output

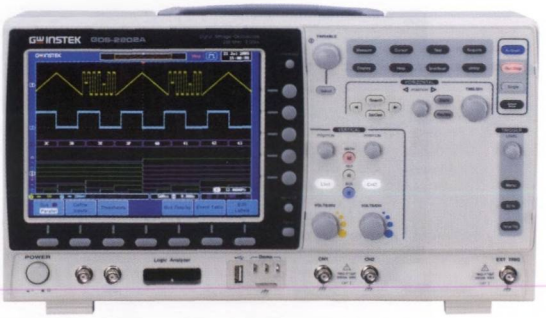
DS2-GPIB GPIB Interface

DS2-FGN DDS Function Generator

300MHz/200MHz/100MHz/70MHz Digital Storage Oscilloscope



4 Channel Model



2 Channel Model

SELECTION GUIDE

MODEL	GDS-2304A	GDS-2302A	GDS-2204A	GDS-2202A	GDS-2104A	GDS-2102A	GDS-2074A	GDS-2072A
Bandwidth	300MHz	300MHz	200MHz	200MHz	100MHz	100MHz	70MHz	70MHz
Channels	4	2	4	2	4	2	4	2
* Record Length	2M	2M	2M	2M	2M	2M	2M	2M
* Real-time Sampling	2 GSa/s	2 GSa/s	2 GSa/s	2 GSa/s	2 GSa/s	2 GSa/s	2 GSa/s	2 GSa/s
Waveform Update Rate	80,000wfms/s	80,000wfms/s	80,000wfms/s	80,000wfms/s	80,000wfms/s	80,000wfms/s	80,000wfms/s	80,000wfms/s

* 1M point record length and 1GSa/s real-time sampling rate per channel for full channel operation.

2GSa/s Real-time Sampling Rate and up to 300MHz Bandwidth

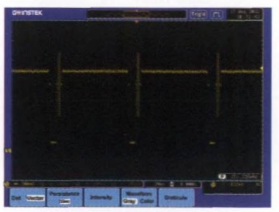
The GDS-2000A Series Digital Storage Oscilloscope offers 2 and 4-channel configurations and wide bandwidth selections, including 300MHz, 200MHz, 100MHz and 70MHz. Each model provides 2GSa/s maximum real-time sampling rate and 100GSa/s high-speed equivalent-time sampling rate. Equipped with an 8-inch 800 x 600 high-resolution TFT LCD display, 1mV/div to 10V/div vertical range and 1ns/div to 100s/div time base, the GDS-2000A Series is able to faithfully demonstrate waveforms of complicated and obscure signals.

2Mega Point Record Length, Waveform Search and Segmented Memory Functions

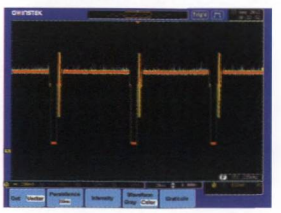
The GDS-2000A Series provides 2Mega point record length, and Waveform Search and Segmented Memory functions as standard features. The events of interest can be captured and saved into the Segmented Memory, which can be divided into 2048 sections, for observation, while the irrelevant waveforms can be ignored. Consequently, the overall efficiency of memory usage can be enhanced. Under Waveform Search mode, after the input signal is triggered, the GDS-2000A Series is able to Search and Mark the waveform sections, which comply with user-defined search condition and threshold level within the whole memory. Meanwhile, with Zoom window and Play/Pause button to browse through whole displayed waveform, users can rapidly navigate all the waveforms in an efficient way.

80,000 wfm/s Waveform Update Rate and VPO Technology

The waveform update rate of 80,000wfm/s enables users to accurately acquire and examine inrush signals and elusive glitches without missing any detail. Attributed to the advanced signal processing technology, VPO (Visual Persistence Oscilloscope), the grayscale display of waveforms shown on GDS-2000A distinguishes the signals from one another according to their occurrence frequencies respectively.



Gray Mode



Color Mode

Upgrade to Mixed Signal Oscilloscope (MSO)

The GDS-2000A Series provides the flexibility of easy conversion from a DSO into a MSO (Mixed Signal Oscilloscope) under a plug-and-play concept. As two plug-in compartments are available on the rear panel to accommodate various plug-in modules, the GDS-2000A Series DSO with an 8 or 16 digital channels module performs MSO functions perfectly with uses' installation of the module. The analysis and decoding functions of parallel bus and serial bus such as I^2C, SPI, and UART are supported after the module is installed. GDS-2000A is regarded as an effective tool in signal analysis, trouble diagnosis and defect debug, Free CAN/LIN bus software provide automotive serial bus analysis.

5MHz Function Generator Option

The plug-in module of DDS (Direct Digital Synthesis) based function generator is provided as an option of the GDS-2000A Series. The function generator, with 5MHz bandwidth, is able to generate Sine, Triangle and Square waveforms, with variable duty cycle of the square waveform. Two 5MHz function generators can be used at the same time to provide dual output signals. With the stimulus source, the verification of electrical characteristics and functionality of the DUT (Device Under Test) can be done in one DSO. GDS-2000A also available to option 25MHz Arbitrary Function Generator of AFG-200 Series The AFG-200 Series, with functions of AM/FM/PM/FSK/SUM modulation, frequency sweep, burst and coupling, are suitable for various communications applications.

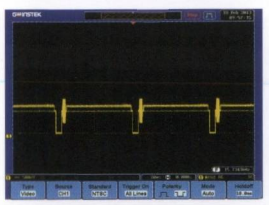
Design for Plugged-in Options

Besides Logic Analyzer and Function Generator modules, the GDS-2000A series also provides optional LAN/SVGA Interfaces module and GPIB interface module for user's selection. The Modularized Structure offers a dramatic elasticity allowing users to upgrade the DSO with field-installable options after the purchase of the main unit. Two modules can be used simultaneously as the maximum capacity of the GDS-2000A options, which include (1) 8-Channel Logic Analyzer (2) 16-Channel Logic Analyzer, (3) 5MHz/25MHz DDS Function Generator (4) LAN/SVGA Interfaces Module, (5) GPIB Interface Module.

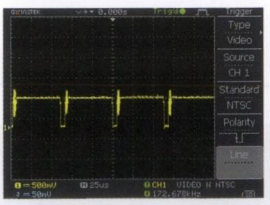
A. GENERAL DESCRIPTION

With modern design concepts and up-to-date component technologies, the GDS-2000A Series DSO possesses a number of outstanding features, such as segmented memory, waveform search function, modularized logic analyzer and Function Generator. The aim of GDS-2000A design is to fit the requirements in embedded system development field and general application industries. As the GDS-2000A Series is a full-fledged DSO carrying a complete set of features, it is also a very useful tool to cover a broad range of educational applications related to signal analysis, trouble diagnosis and defect debugging in the electronic and electric fields.

*** 80,000 wfms/s Update Rate**



80,000 wfms/s



500 wfms/s

The waveform update rate of 80,000 wfms/s enables users to dynamically examine the jittery signal and elusive glitches without missing any detail. The concept is similar to the movie player. The faster movie player, which can bring more film images to the screen in a certain time interval, displays better visual effect than the slower ones. This is especially true when it comes to the replay of fast moving article.

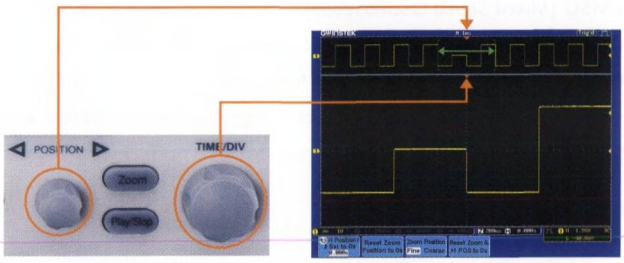
*** VPO**

Attributed to the advanced signal processing technique, VPO, the grayscale display of waveforms shown on GDS-2000A Series distinguishes the signals from one another according to their occurrence frequencies respectively. Based on the same statistics technology used for grayscale display, the color mode can be selected to differentiate the occurrence frequencies among various waveforms on the screen.

*** 2Mega Point Record Length**

With the collaboration of 2Mega point record length, the 2GSa/s sampling rate can bring the waveform acquisition into full play. During a certain period, sufficient record length is necessary for the input signal to be acquired under a high sampling rate. The long memory gives the benefit of mass data acquisition, however, also brings up a challenge on how to quickly find the waveform sections or events of interest within the whole memory length.

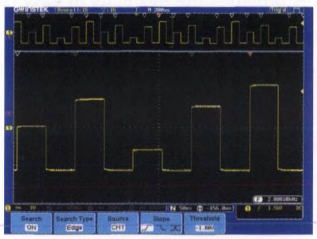
B. ZOOM WINDOW



Zoom Window

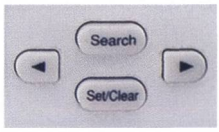
The GDS-2000A Series is equipped with Zoom Window feature which enables users to display the detailed zoomed waveform located by the Zoom Window. Under Zoom mode, the entire inbound waveforms and Zoom range cursors are displayed in the upper window, and the waveform details in the Zoom window are displayed in the bottom window. Users can tune the zoomed range by adjusting Time/Div selection, and pan the window by rotating the scrolling knob position.

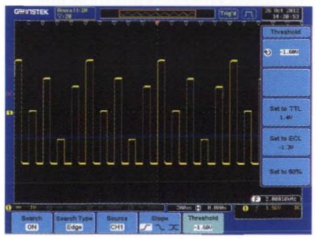
C. PLAY / PAUSE



The Play/Pause button (▶ / II) on the front panel can be controlled to automatically browse the entire inbound waveforms by moving the Zoom window across the display, which enables user to further investigate the events of interest. The browse speed and the rolling direction of the zoomed screen can be adjusted based on users' requirements. The rolling screen can be paused by pressing "pause" button. Collaborating with search markers, the Play/Pause function substantially facilitates the time-consuming task to locate and examine the events of interest at different spots within the whole memory.

D. WAVEFORM SEARCH AND MARKERS

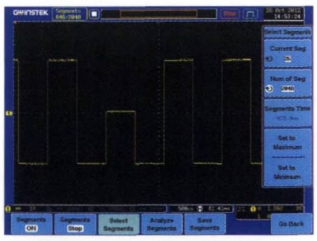


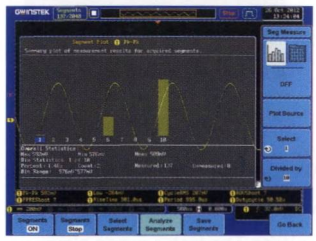


2Mega point record length means that actually there are over thousands of waveform data points being processed and displayed in all times. Impact on engineers is how they can access the events of interest efficiently amongst the huge amount of data. the GDS-2000A Series offers the Search functions to accelerate the navigation over the whole waveform data so that the engineers can locate the events of interests with efficiency. The searching conditions of waveform are set by selecting Search Type and specifying the Threshold settings. All the complying waveforms will be marked and the total amount of events will be counted and displayed. User can use the forward or backward arrow key to navigate the events of interest from one to another. Press Set/Clear button to place (or clear) the marker on the waveform.

There are four search types including Edge, Pulse Width, Runt and Rise/ Fall Times to be selected. Additional type of Bus can be selected in case that the digital channel is equipped.

E. SEGMENTED MEMORY





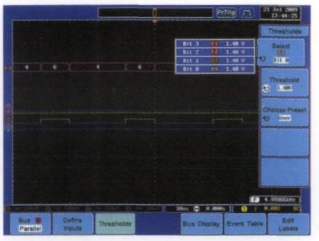
In the system and circuit development, engineers spend most of their time and resource on diagnosis and troubleshooting with DSO. In many cases, only small part of waveform data is of the real concern. Consequently, the efficiency of memory space utilization has been raised- if DSO only processes the concerned waveforms and ignores the irrelevant ones- , which means more data can be processed within the 2Mega memory.

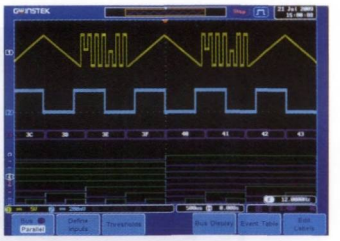
The GDS-2000A Series possesses advantages of Segmented Memory as mentioned above. When being activated, the 2M memory is divided into a number of segments specified by the user. According to the trigger condition, 1k point data will be stored in each segmented memory. The maximum amount of segments is up to 2,048 with 8ns resolution. This is useful for analyzing the serial bus decoding, pulse, jitter glitch, runt, and inrush waveforms.

Repeatedly press the Play/ Pause button (▶ / II) key can play the segment from the first to the last, as well as pause and replay backwards. Controlling the Variable scrolling knob facilitates the playing speed, therefore, the users can make a swift jump to one particular segment among all. Moreover, Segment Analysis can be used for statistics analysis.

F. MIXED SIGNAL OSCILLOSCOPE (MSO)

Logic Analyzer Module

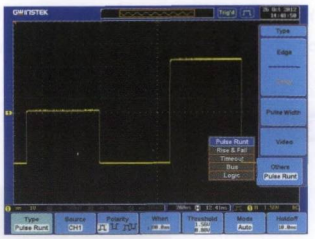


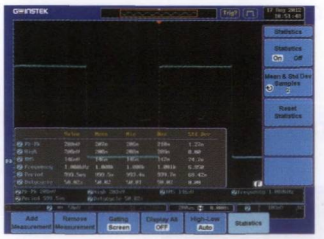


With a plug-in 8 or 16 digital channels module, a 12 or 20-channel MSO can be upgraded from DSO by on-site installation. The analysis and decoding functions of parallel bus and serial bus such as I^2C, SPI, and UART will be processed after the module installation.

Besides, it can measure digital and analog signal of embedded circuit design under an appropriate triggering mode. This further analyzes whether the timing sequence is correct or not.

G. COMPLETE TRIGGER FUNCTIONS AND 36 AUTOMATIC MEASUREMENTS

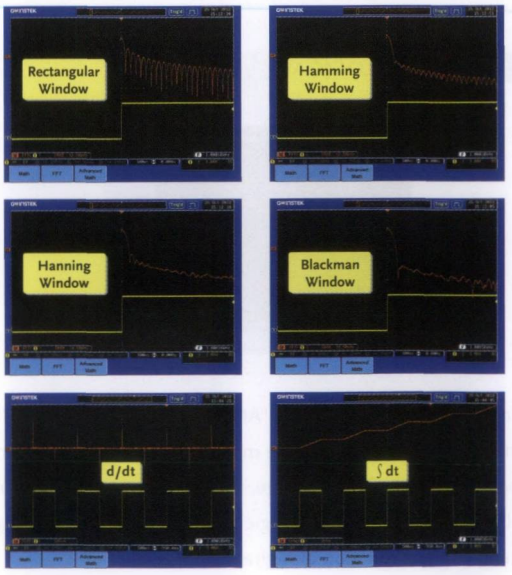




The GDS-2000A Series offers abundant trigger functions. In addition to the Edge, Delay, Pulse Width, Alternate, Single, Rise & Fall Time Trigger, the GDS-2000A Series also provides Video and Runt Trigger. The analysis and decoding functions of parallel bus and serial bus such as I^2C, SPI, and UART are supported after the 8 or 16 digital channels module is installed. Complete Trigger Functions make the GDS-2000A Series a powerful tool in its class for capturing and analyzing any kind of signals.

The GDS-2000A Series offers up to 36 waveform measurements, including voltage/current, time/frequency, and delay measurements. 8 out of 36 measurements can be selected to simultaneously display on one single screen. With statistics mode, users can analyze mean, maximum, minimum, and standard deviation of the captured waveform. With the great amount of the analyzing statistics, users may ensure the integrity of the signal and the abnormal waveforms.

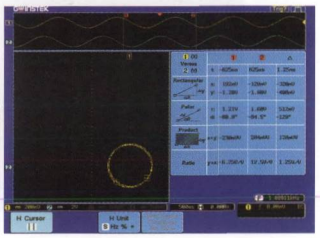
H. FFT AND MATH OPERATION FUNCTIONS



The FFT (Fast Fourier Transform) function of the GDS-2000A Series supports Rectangular, Hamming, Hanning , and Blackman Window Functions. Users can choose one window function based on the input signal type and the specific application. In order to provide the best observation condition, the zoom-in and shift functions for both horizontal and vertical axis are designed to be adjustable. Besides, the vertical unit is selectable among dBuV RMS and Linear RMS as well.

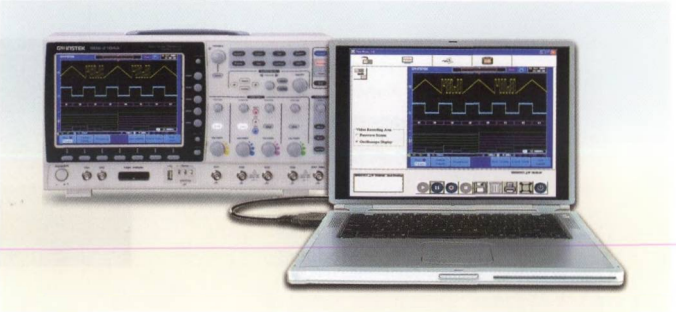
In addition to the general math operations, the advanced math operation like integral, derivative and square root are provided to predict or simulate the behaviors of integrator, differentiator and square root circuit for input signal to fulfill the applications of research and development.

I. X-Y MODE



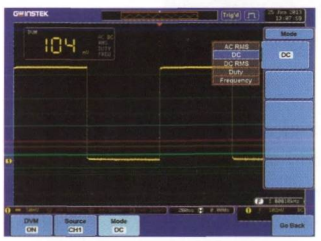
The X-Y mode of GDS-2000A Series defines CH1 and CH3 as the horizontal axis and CH2 and CH4 as the vertical axis, allowing the display of 2 sets of X-Y patterns simultaneously. The measurement items include Rectangular, Polar, Product, and Ratio that fits most of the popular X-Y applications. Dissimilar from traditional oscilloscopes, the GDS-2000A Series can concurrently display input signal and X-Y measurement results on the screen. The applications of X-Y mode include Lissajous figure plot, and IQ constellation diagram.

J. FREE REMOTE CONTROL SOFTWARE



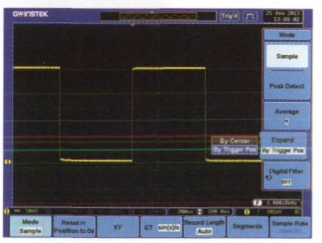
Using a USB port accommodated with FreeWave remote monitoring software is the convenient way to capture data from the GDS-2000A Series. With FreeWave, a screen shot can be saved as an image file (.bmp/.jpg), waveform data (.csv). Not only can FreeWave monitor and record waveforms over a long period of time, but previous recorded waveforms can also be examined. Thus, instrument settings can be configured without the need to learn incomprehensible command line syntax. Free Wave enables the users to reach measurement goals of remote control without tedious procedure.

K. DIGITAL VOLTAGE METER



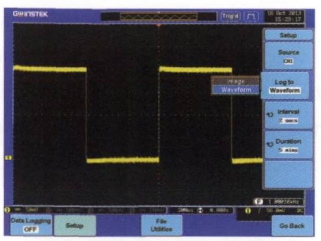
The DVM has functionalities of three digits voltage meter and five digits frequency counter, it allows multi-testing of DC voltage, RMS DC voltage, AC voltage and frequency. Frequently, monitoring voltage and triggering and measuring digital signals concurrently while conducting the diagnosis and debugging of system circuit pose a tremendous challenge to R&D engineers.

L. H-EXPANSION



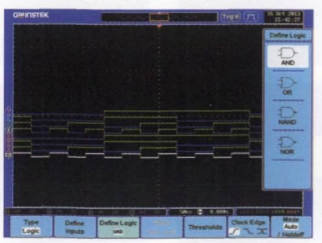
H-Expansion function can help engineers moving trigger point to any position on the screen and expand the fixed point. Users can observe expanded waveforms in great detail without missing the observation of the trigger point.

M. DATA LOG APP



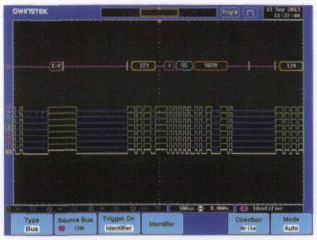
After installing the DataLog software, users can observe waveform variation for a long period of time to ensure products' reliability. DataLog function allows users to set data storage timeframe and interval based upon their test requirements. Data storage can be waveforms or the CSV file for each channel. Data can be stored in USB, GDS-2000A or the remote site computer via LAN.

N. ADVANCED LOGIC APP

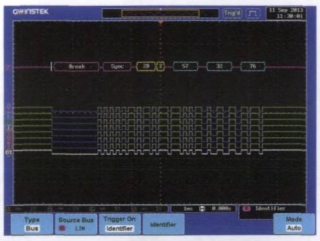


In the logic circuit analysis, "OR", "AND", "NOR", and "NAND" four logic analyses are required and the most fundamental. Users can download and install, free-of-charge, the Advanced Logic software to their GDS-2000A equipped with logic analyzer to enhance the logic trigger and analysis function of digital circuits.

O. CAN/LIN BUS TRIGGER AND ANALYSIS



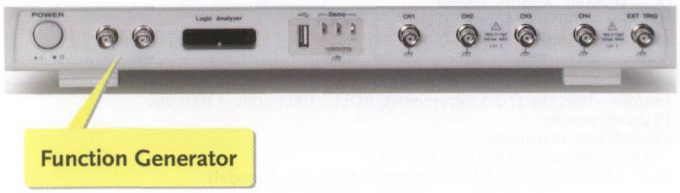
CAN Bus Trigger and Decoding Function

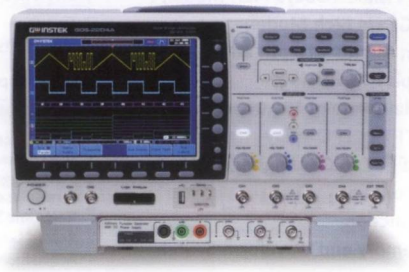


LIN Bus Trigger and Decoding Function

CAN Bus and LIN Bus are the most popular standard bus protocol for automobile electronics. Users can download for free the CAN/LIN Bus trigger and analysis software from the GW Instek website to elevate the software analysis capability of GDS-2000A logic analyzer. CAN bus transmission is often used in the electronic signal transmission for security systems. LIN bus is often seen in the control and operation for peripheral electronics equipment. Users can greatly increase the R&D efficiency of automobile electronics via the software installation.

P. OPTION OF DDS SIGNAL GENERATORS

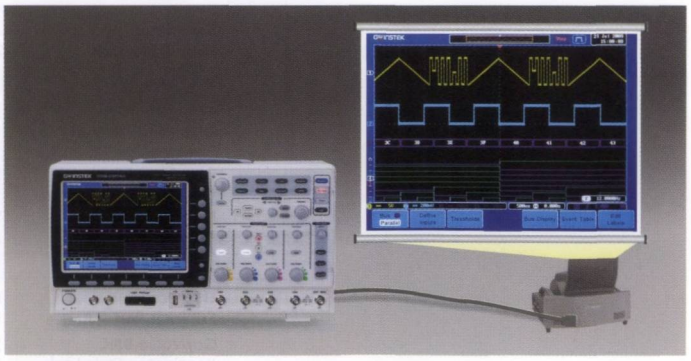




The GDS-2000A Series provides the options of two sets of 5MHz function generators that can generate diverse waveforms such as sine, square, triangle, and pulse waveforms. With this stimulus source, the electrical characteristics and functionality of DUT can be tested in one GDS-2000A Series, which fulfills measurement requirements from omni-dimensions.

Also GDS-2000A available to option AFG-100/200 module to provide single or dual channel arbitrary function generator. The AFG-100/200 Series, with functions of AM/FM/PM/FSK/SUM modulation, frequency sweep, burst and coupling, is suitable for various communications applications.
(The detail specific of AFG-125/225 ,please see page C21)

Q. VARIOUS INTERFACES SUPPORT



Two standard USB interfaces located on both front panel and rear panel are used for easy access of stored data. USB device port on the rear panel is available for remote control or a hard copy print-out through a PictBridge compatible printer. SVGA/LAN interfaces module (option), and GPIB interface module (option) are provided for ATE applications. SVGA video output (on the same card with LAN) allows the screen image to be transferred to external projector or large display screens.

200MHz/100MHz/70MHz Digital Storage Oscilloscope

VPO
Visual Persistence Oscilloscope

GDS-2000E Series (200/100/70 MHz)

NEW

CE | USB high Speed | PC Software | Labview Driver | Ethernet | PictBridge Compatible

FEATURES

* 200/100/70MHz Bandwidth
* Sampling Rate : Max. 1GSa/s (4ch Model) ; Per Channel 1GSa/s (2ch Model)
* 10M Maximum Memory Depth and VPO Waveform Display Technology
* Waveform Update Rate of 120,000 wfm/s
* 8 " 800 x 480 TFT LCD Display
* Max. 1M pts of FFT to Get Higher Resolution in Frequency Domain
* Digital Filter Function
* Segmented Memory and Waveform Search Functions
* I^2C/SPI/UART/CAN/LIN Serial Bus Trigger and Decoding Function
* Data Log Function for Waveform Observation in Long Periods of Time
* Network Storage Function

SPECIFICATIONS

	GDS-2072E	GDS-2074E	GDS-2102E	GDS-2104E	GDS-2202E	GDS-2204E
VERTICAL SENSITIVITY						
Channels	2Ch+EXT	4Ch	2Ch+EXT	4Ch	2Ch+EXT	4Ch
Bandwidth	DC~70MHz(-3dB)		DC~100MHz(-3dB)		DC~200MHz(-3dB)	
Rise Time	5ns		3.5ns		1.75ns	
Bandwidth Limit	20MHz		20MHz		20M/100MHz	
Vertical Resolution	8 bits : 1mV ~ 10V/div					
Input Coupling	AC, DC, GND					
Input Impedance	1MΩ// 16pF approx.					
DC Gain Accuracy	±(3% when 2mV/div or greater is selected ; ±(5%) when 1mV/div is selected					
Polarity	Normal & Invert					
Maximum Input Voltage	300Vpk , CAT I					
Offset Position Range	1mV/div ~ 20mV/div : ±0.5V ; 50mV/div ~ 200mV/div : ±5V ; 500mV/div ~ 2V/div : ±25V ; 5V/div~10V/div : ±250V					
Waveform Signal Process	+, -, x, ÷, FFT, FFTrms, Uesr defined expression. FFT : 1Mpts ; FFT : Spectral magnitude. Set FFT Vertical Scale to Linear RMS or dBV RMS ; FFT Window Displays : Rectangular, Hamming , Hanning, Blackman-Harris					
TRIGGER						
Source	Ch1 ,CH2, CH3, CH4, Line, EXT* ; *dual channel models only.					
Trigger Mode	Auto (Supports Roll Mode for 100 ms/div and slower), Normal, Single Sequence					
Trigger Type	Edge, Pulse Width(Glitch), Video, Pulse Runt, Rise & Fall(Slope), Alternate, Time out, Event-Delay(1~65,535 events), Time-Delay(Duration;4ns~10s), Bus					
Trigger Holdoff Range	4ns ~ 10s					
Coupling	AC, DC, LF rej. , Hf rej. , Noise rej.					
Sensitivity	1div					
EXT TRIGGER						
Range	±15V					
Sensitivity	DC ~ 100MHz Approx. 100mV 100MHz ~ 200MHz Approx. 150mV					
Input Impedance	1MΩ±3%, ~16pF					
HORIZONTAL						
Time Base Range	1ns/div ~ 100s/div (1-2-5 increments); ROLL : 100ms/div ~ 100s/div					
Pre-trigger	10 div maximum					
Post-trigger	2,000,000 div maximum					
Time Base Accuracy	±50 ppm over any ≥ 1 ms time interval					
Real Time Sample Rate	Max. : 1GSa/s (4ch model); Per channel 1GSa/s (2ch model)					
Record Length	Max. : 10Mpts					
Acquisition Mode	Normal, Average, Peak Detect, Single					
Peak Detection	2ns (typical)					
Average	Selectable from 2 to 256					
X-Y MODE						
X-Axis Input	Channel 1 ; Channel 3* (* : four channel models only)					
Y-Axis Input	Channel 2 ; Channel 4* (* : four channel models only)					
Phase Shift	±3° at 100kHz					
CURSORS AND MEASUREMENT						
Cursors	Amplitude, Time, Gating Available; Unit : Seconds(S), Hz(1/S), Phase (Degrees), Ratio(%)					
Automatic Measurement	36 sets: Pk-Pk, Max, Min, Amplitude, High, Low, Mean, Cycle Mean, RMS, Cycle RMS, Area, Cycle Area, ROVShoot, FOVShoot, RPREShoot, FPREShoot, Frequency, Period, RiseTime, FallTime, +Width, -Width, Duty Cycle, +Pulses, -Pulses, +Edges, -Edges, FRR, FRF, FFR, FFF, LRR, LRF, LFR, LFF, Phase					
Control Panel Function	Cursors measurement					
Auto Counter	6 digits, range from 2Hz minimum to the rated bandwidth					
Autoset	Single-button, automatic setup of all channels for vertical, horizontal and trigger systems, with undo Autoset					
Save Setup	20set					
Save Waveform	24set					
DISPLAY SYSTEM						
TFT LCD Type	8" TFT LCD WVGA color display					
Display Resolution	800 horizontal x 480 vertical pixels (WVGA)					
Interpolation	Sin(x)/x					
Waveform Display	Dots, Vectors, Variable persistence(16ms~10s), Infinite persistence					
Waveform Update Rate	120,000 waveforms per second, maximum					
Display mode	YT ; XY					
Display Graticule	8 x 10 divisions					
INTERFACE						
USB Port	USB 2.0 Full-speed host port x 1, USB High-speed 2.0 device port x 1					
Ethernet Port (LAN)	RJ-45 connector, 10/100Mbps with HP Auto-MDIX					
Go/NoGo BNC	5V Max/10mA TTL open collector output					
Kensington Style Lock	Rear-panel security slot connects to standard Kensington-style lock					
POWER SOURCE MISCELLANEOUS						
Line Voltage Range	AC 100V ~ 240V, 48Hz ~ 63Hz, auto selection					
Multi-Language Menu	Available					
On-Line Help	Available					
Time clock	Time and date, provide the date/time for saved data					
Operation Environment	Temperature: 0°C to 50°C. Relative Humidity: ≤80%, 40°C or below; ≤45%, 41°C ~ 50°C					
DIMENSIONS & WEIGHT						
	384(W) X 208(H) X 127.3(D)mm, Approx. 2.8 kg					

Rear Panel

GDS-2000E Series

ORDERING INFORMATION

GDS-2204E	200MHz, 4-Channel, Digital Storage Oscilloscope
GDS-2202E	200MHz, 2-Channel, Digital Storage Oscilloscope
GDS-2104E	100MHz, 4-Channel, Digital Storage Oscilloscope
GDS-2102E	100MHz, 2-Channel, Digital Storage Oscilloscope
GDS-2074E	70MHz, 4-Channel, Digital Storage Oscilloscope
GDS-2072E	70MHz, 2-Channel, Digital Storage Oscilloscope

Accessories :

Quick start guide , User manual CD x 1, Power cord x 1

GTP-070A-4 : 70MHz(10:1/1:1) Switchable passive probe for GDS-2072E/2074E(one per channel)

GTP-150A-4 : 150MHz(10:1/1:1) Switchable passive probe for GDS-2102E/2104E(one per channel)

GTP-300A-4 : 300MHz(10:1/1:1) Switchable passive probe for GDS-2202E/2204E(one per channel)

OPTIONAL ACCESSORIES

GTL-246	USB Cable, USB 2.0, A-B Type, 1200mm
GTL-110	Test Lead, BNC-BNC Heads
GDB-03	Oscilloscope Education & Training Kit
GCP-005	Current Probe, 40Hz ~ 1kHz, 5A, Current Probe
GCP-020	Current Probe, DC ~ 100KHz, 10A, Current Probe
GCP-100	Current Probe, 40Hz ~ 10KHz, 20A, Current Probe
GCP-1030	Current Probe, DC ~ 100MHz, 30Arms, Current probe
GCP-206P	Current Probe - Power Supply, 2 Channel Power Supply for GCP-530/1030
GCP-245P	Current Probe - Power Supply, 4 Channel Power Supply for GCP-530/1030
GCP-530	Current Probe, DC ~ 50MHz, 30Arms, Current Probe
GDP-025	Differential Probe, 25M High Voltage Differntial Probe
GDP-050	Differential Probe, 50M High Voltage Differntial Probe
GDP-100	Differential Probe, 100M High Voltage Differntial Probe
GTP-033A	Oscilloscope Probe, 35MHz 1:1 Passive Probe, BNC(P/M)

FREE DOWNLOAD

PC Software	OpenWave software
Driver	USB driver ; LabView driver

200MHz/100MHz/70MHz Digital Storage Oscilloscope

4 Channel Model

2 Channel Model

SELECTION GUIDE

MODEL	GDS-2204E	GDS-2202E	GDS-2104E	GDS-2102E	GDS-2074E	GDS-2072E
Bandwidth	200MHz	200MHz	100MHz	100MHz	70MHz	70MHz
Channels	4	2	4	2	4	2
Record Length	10M / ch	10M / ch	10M / ch	10M / ch	10M / ch	10M / ch
Real-time Sampling Rate	Max. 1 GSa/s	1 GSa/s / ch	Max. 1 GSa/s	1 GSa/s / ch	Max. 1 GSa/s	1 GSa/s / ch
Waveform Update Rate	120,000wfms/s	120,000wfms/s	120,000wfms/s	120,000wfms/s	120,000wfms/s	120,000wfms/s

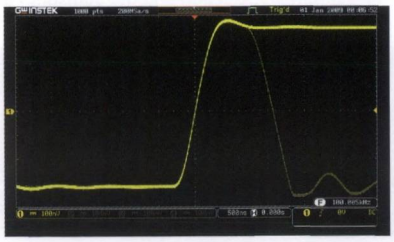
1GSa/s Maximum Real-Time Sampling Rate and 10M Maximum Memory Depth

The GDS-2000E digital oscilloscope features bandwidth selections of 200MHz, 100MH, and 70MHz. Two-channel model provides 1GSa/s real-time sampling rate for each channel; four-channel model provides 1GSa/s maximum real-time sampling rate. The 8-inch 800 x 480 TFT LCD display and the minimum 1mV/div vertical range allow the GDS-2000E Series to measure complex feeble signals and clearly display measurement results.

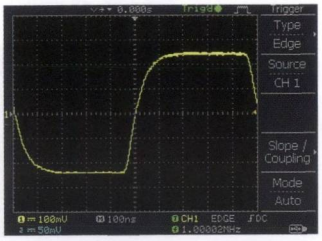
With respect to the memory depth, the GDS-2000E Series digital oscilloscope provides 10M long memory for users to completely retrieve and analyze waveforms. Users, based upon the application requirements, can select 1K, 10K, 100K, 1M or 10M memory depth. Short memory depth collocating with the high sampling rate allows users to observe fast-changing waveforms and, on the other hand, long memory depth aims for continuously changing waveforms. The GDS-2000E Series is equipped with waveform search and segmented memory functions to expand the flexible applications of 10M long memory. The segmented memory can be divided the maximum into 29,000 sections for users to bypass any unimportant waveforms so as to swiftly search all required waveforms. With the function, more meaningful waveforms can be saved and target waveforms can be displayed rapidly. With the waveform search function, users can rapidly search desired waveforms according to the required trigger conditions.

Waveform Update Rate of 120,000 wfm/s and VPO Waveform Display Technology

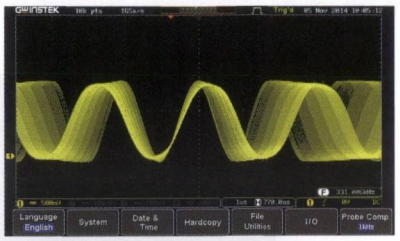
The GDS-2000E digital oscilloscope allows users to easily and completely observe inrush signals and rare transient waveforms to increase waveform debugging efficiency by using features, including advanced VPO (Visual Persistence Oscilloscope) signal processing technology, waveform update rate as high as 120,000 wfm/s, and multi-layered afterglow display to enhance waveform display efficiency. Oscilloscope with VPO technology displays signals with three dimensional waveforms constructing by amplitude, time and signal strength to show each waveform point. 256 color gradients yield clear waveform changes. Comparing with the conventional digital storage oscilloscope, the GDS-2000E Series provides more natural and more genuine signal display effect which is very close to the original analog signal.



120,000wfms/s

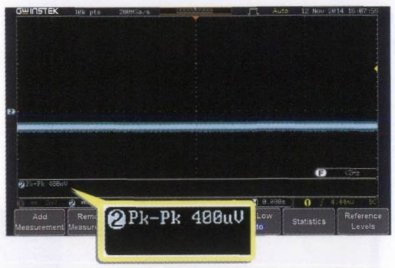


500wfms/s

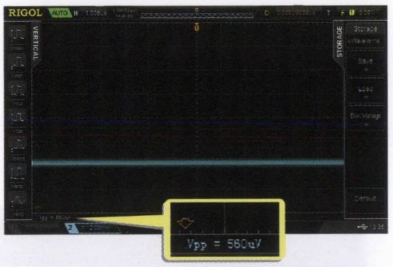


Rich Color Gradient Performance

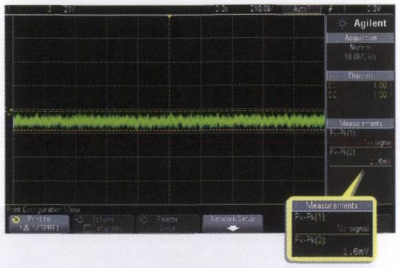
A. Low Background Noise(Beneficial to Small Signal Measurement)



GW Instek



RIGOL



KEYSIGHT

BACKGROUND NOISE COMPARISON

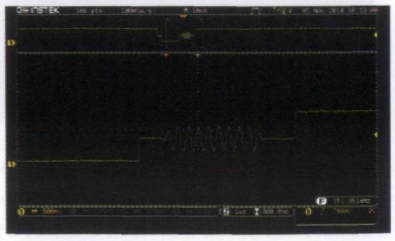
Model	GW Instek GDS-2000E	Rigol DS2000A	Keysight DSOX2000A
Vp-p(*)	400μV	560μV	1.6mV

For small signal measurement, oscilloscope's background noise will affect the measurement results. The brand new GDS-2000E low noise amplifying circuit can tremendously improve overall noise interference to produce the genuine signal demonstration.

As shown in the above diagram, the GDS-2000E series has merely the background noise of 400μV under 2mV/div that is superior to the same category oscilloscopes from competitors.

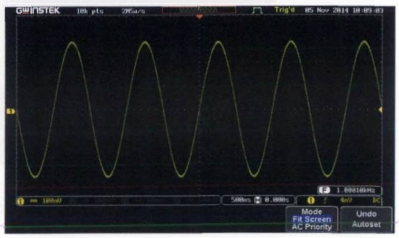
* The measurement data were retrieved from actual tests, under same test conditions.

B. Dual Display Screen Zoom-In and Play/Pause Functions



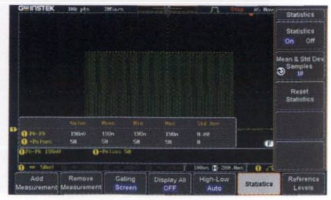
The GDS-2000E series provides the dual display screen zoom-in function to simultaneously display waveforms and major target areas. Users can zoom in display area by adjusting time/div. Under zoom-in mode, waveform can be played or paused so as to automatically view all input waveforms on the moving zoom-in screen. Users can swiftly identify each desired event. Manual control play speed and direction can be adjusted according to users' requirements. Press "Pause" to stop the play function. With "waveform search", all desired events from different stages can be rapidly identified and examined back and forth. The GDS-2000E series is capable of swiftly searching signals and observing signals' details. 10M long memory depth provides the function of complete waveform retrieval and analysis.

C. Small Signal Autoset Retrieving Capability



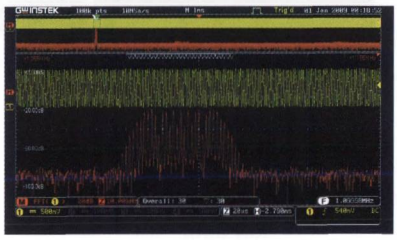
The Autoset function of the GDS-2000E series can retrieve waveform as fast as 0.7 seconds. The GDS-2000E series assists users to rapidly retrieve waveforms of small signals equivalent to 8mV/30Hz.

D. 36 Items of Auto Measurement Selection and the Statistics Function



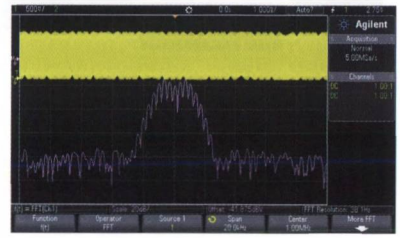
The GDS-2000E series soundly provides 36 measurement items. Based upon the parameters such as voltage, current, time, frequency, and delay measurement, users can decide which measurement items to choose. On the single display screen, the GDS-2000E series provides 8 measurement selections. The statistics mode can also be selected for users to analyze the mean value, the maximum, the minimum, and standard deviation of the retrieved waveforms to ensure signal's integrity and identify abnormal waveforms.

E. 1M FFT Frequency Domain Display Function



GW Instek GDS-2000E - FFT Display

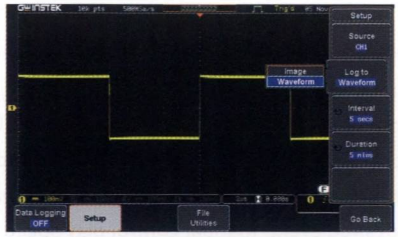
RIGOL DS2000A - FFT Display



KEYSIGHT DSOX2000A - FFT Display

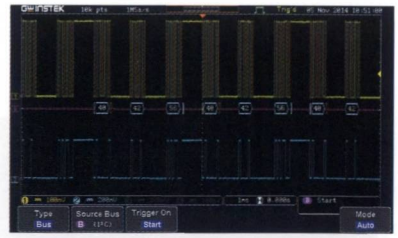
The FFT function of the GDS-2000E Series provides the maximum 1M display for more precision frequency domain display. The function supports four window displays, including Rectangular, Hamming, Hanning, and Black-harris. Users select window display for frequency domain analysis according to test requirements. The GDS-2000E Series not only provides the FFT function but also FFTrms, vertical adjustment, and local zoom-in functions for users to adjust waveforms of frequency domain by their requirements. Via rapid waveform update rate and waveform search functions, users can precisely observe the test results of frequency domain, Users can clearly differentiate the difference between 1M FFT and low-resolution FFT by viewing the above diagrams.

F. Data Log Function



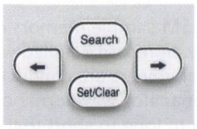
Users, via the data log function, can observe waveform changes in long periods of time to ensure product reliability or measure sporadically appeared signals. The data log function, based on the requirements, can set record time and interval. Record time can be selected from 5 minutes to 100 hours, and record interval is 5 seconds, the minimum. Waveform type for record data and CSV file format for each channel can also be selected. Data can be stored in USB drive, the GDS-2000E series or the remote computer via LAN.

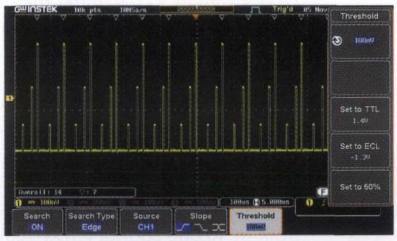
G. Support Serial Bus Trigger and Decoding Function



The serial bus technology has been widely applied in the present embedded application design. How to rapidly and correctly trigger and analyze serial bus data has posed a difficult challenge to engineers. The GDS-2000E series provides serial bus analysis function and 10M long memory depth to trigger, decode, and analyze frequently used I^2C, SPI ,UART serial bus and CAN/LIN bus, which is often used by automotive communications.

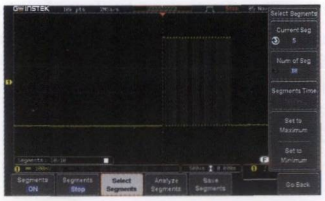
H. Waveform Search Function

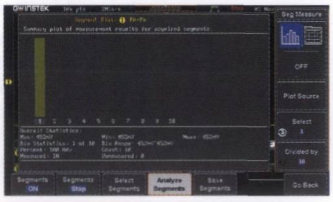




Users can rapidly search desired waveforms according to the trigger condition. After activating the search function, hollow inverted triangles will show the location met the trigger condition. The upper left hand corner Overall will show the total number of waveforms met the trigger condition. Users can set waveform search by the trigger condition such as Edge, pulse width, Runt, Rise/Fall, and Bus. When the trigger condition is met, hollow inverted triangles will appear. Users can save all marks to compare with the next input signal. The front panel of the GDS-2000E series controls waveform zoom-out and play/pause function to swiftly identify each desired event. The function allows users to conveniently complete waveform search and save marks for rapid comparison and analysis.

I. Segmented Memory Function

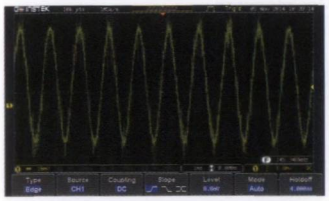




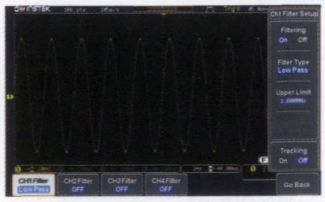
Users Can Also Select "Analyze Segments" To Conveniently Obtain The Analysis Results.

To achieve the most ideal application for memory depth, the GDS-2000E series has the built-in segmented memory function. The segmented memory function allows users to select the desired important signals for observation. Hence, insignificant signals can be neglected and serial bus decoding; pulse or inrush signals can be identified when retrieving signals. The segmented memory function of the GDS-2000E series allows users to select the number of sections. The maximum sections can be selected are 29,000. After activating the function, users can select and observe waveform for each segment by turning the Variable knob. The ultimate application of memory depth, therefore, is completely realized.

J. Digital Filter Function



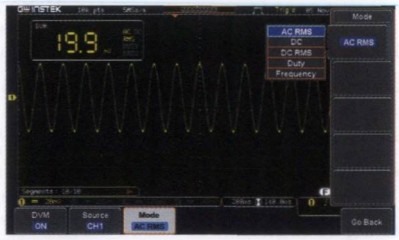
Unfiltered Waveform with Noise Interference



Filtered Waveform, Noise Removed

Engineers are often troubled by noise interference while measuring signals in the electric circuit tests. The GDS-2000E series features the digital filter function which can be set to high pass or low pass digital filter. Digital filter allows users to independently set filter frequency for each channel. The tracking on function rapidly sets same filter frequency for all channels.

K. Digital Voltage Meter



The integrated digital voltage meter provides three-digit voltage meter and five-digit frequency counter. Its function includes tests for AC rms, DC, DC rms, period and frequency. Under the limited resources, engineers can simultaneously monitor voltage and frequency as well as conduct complex measurement for signal trigger to elevate the R&D efficiency. This feature is very convenient for users to grasp the actual issue, diagnose and debug system circuit.

200/100/70 MHz Digital Storage Oscilloscope

Patent No. :
13/671702
ZL201420272063.8
ZL201430150303.2

GDS-200 Series (200/100/70 MHz)

NEW

GDS-300 Series (200/100/70 MHz)

NEW

CE | USB | PC Software | Labview Driver | DMM

UN38.8 | IEC62133 | Built-in Flash Memory | Li-polymer Battery

FEATURES

* 200/100/70MHz Bandwidth Selections, Two Input Channels
* 1GSa/s Maximum Sample Rate
* Maximum 5M/1M Memory Depth Per Channel
* 7" 800 x 480 Full Touch Panel Capacitive LCD Multi-Point Control, Landscape and Portrait Display
* Built-In 50,000/5.000 Counts DMM
* 30,000 Consecutive Waveform Records Logging Function, Replay Measurement Results Any Time
* Temperature Measurement and Logging Function
* Built-In Engineering Calculator, SMD Resistance Coding, Color Coding Info, and Attenuator Calculation Application Software
* Optional Differential Probe to Achieve Isolation Effect

GWS-001 Wrist Strap

The brand new portable 7" full touch panel capacitive LCD, featuring multi-point touch panel method which allows engineers to move waveform position, adjust waveform size, and set trigger conditions easily, subverts the traditional handheld instrument. With this unique feature, engineers can retrieve DUT's signals easily under the complex working environment. Landscape or portrait measurement display not only clearly shows waveforms under full screen status but also combines multi-functional measurement environment to achieve unimaginable measurement results.

Built-in, the second to none, the longest 5M sample memory depth helps engineers diagnose waveforms in great details. The long memory depth can record detailed waveform data and help engineers reproduce the original waveforms while engineers are conducting long observation or retrieving detailed transient signals. Any delicate changes of analog waveforms can be clearly presented in front of engineers when they adjust time scale from long to short that leaves no measurement problems unanswered.

Built-in 50,000 counts (GDS-300) or 5,000 counts (GDS-200) DMM helps engineers accurately measure DUT's electric parameters including not only measurements of D.C. voltage, A.C. voltage, D.C. current, A.C. current, resistance and diode polarity, but also temperature measurement and monitoring. The analysis of trend diagrams further completes test and measurement. DMM can simultaneously work with oscilloscope to conduct multi-measurement tasks.

Normally, engineers wish to effectively record intermittent signals while retrieving a series of signals during a long period of time. GDS-300/GDS-200's built-in 30,000 consecutive waveform records logging function not only records 30,000 waveform records in a long period of time but also replays the recorded data that allows engineers to identify intermittent problems occurred during the recorded time. Leave no problems unidentified.

Engineers need to isolate power and solve corresponding grounding issue while conducting circuit debugging. One of the criteria engineers must overcome is to maintain system grounding and isolation safety in the strict test and measurement environment such as no grounding system or no isolation. GDS-300/200 provide optional differential probe to effectively assist engineers in solving isolation and grounding problems that elevates the efficiency and safety of test and measurement.

Engineers often need some calculation tool software to conduct circuit design and debugging analysis during the R&D process. GDS-300/200 oscilloscopes, with the built-in standard engineering calculator, allow engineers to verify parameters during the test and measurement process. While using unknown resistance, engineers can obtain resistance value via color coding calculation software. If any attenuator was designed in the circuit, GDS-300/200 can also provide corresponding attenuator model and attenuation value calculation.

SPECIFICATIONS

	GDS-307	GDS-310	GDS-320	GDS-207	GDS-210	GDS-220
VERTICAL						
Channels	2 (BNC-Shield)					
Input Impedance	1MΩ±2%, 16.5pf approx.					
Maximum Input	CAT II 300VRMS					
Input Coupling	AC, DC, GND					
Bandwidth	DC~70MHz (-3dB)	DC~100MHz (-3dB)	DC~200MHz (-3dB)	DC~70MHz (-3dB)	DC~100MHz (-3dB)	DC~200MHz (-3dB)
Rise Time	<5ns	<3.5ns	<1.75ns	<5ns	<3.5ns	<1.75ns
Sensitivity	2mV/div~10V/div (1-2-5 increments)					
Accuracy	±(3% x Readout + 0.1 div + 1mV)					
Bandwidth Limit	20MHz(-3dB)					
Polarity	Normal, Invert					
Offset Position Range	2mV/div~50mV/div:±0.4V;100mV/div~500mV/div:±4V;1V/div~5V/div:±40V;10V/div:±300V					
SIGNAL ACQUISITION						
Realtime Sample Rate	1GSa/s					
Memory Depth	5Mpoints per ch			1Mpoints per ch		
Acquisition Mode	Average : 2~256 waveforms; Peak detect : 10ns; sin(x)/x or ET					
Replay Wfms.	30,000 wfms.					
TRIGGER						
Source	Ch1 or Ch2					
Trigger mode	Auto, Normal, Single, Force					
Trigger type	Edge, Pulse Width, Video, Alternate					
Trigger Holdoff	10ns ~ 10s					
Coupling	AC, DC, LFR, HFR, NR					
Sensitivity	DC~25MHz : approx. 0.5div or 5mV; 25MHz~ 70/100/200MHz : approx. 1.5div or 15mV					
HORIZONTAL						
Range	5ns~100s/Div (1-2-5 increments)					
Roll	100ms/div ~ 100s/div					
Pre-trigger	10 div max.					
Post-trigger	1,000 div max(depend on time base)					
Accuracy	±20ppm over any > 1ms time interval					
XY MODE						
Phase Shift	±3° at 100KHz					
CURSOR AND MEASUREMENT						
Cursors	Voltage difference between cursors(△V), Time difference between cursors(△T), frequency measure(1/△T)					
Auto-measurement	36 sets.					
Auto-counter Autoset	6 digits. Range: 2Hz to rated bandwidth					
TEMPERATURE MEASUREMENT						
	Available			Non-Available		

SPECIFICATIONS

	GDS-307	GDS-310	GDS-320	GDS-207	GDS-210	GDS-220
MISCELLANEOUS						
Multi-Language Menu	Available					
On-line Help	Available					
Time and Clock	Available					
BATTERY						
Battery power	Li-polymer 6100mA/hr, 7.4V (Built-in)					
Charge time	2.0 hour (75%)					
Operation time	4.1 hour, depending on operating condition					
PROBE COMPENSATION						
	2V, 1kHz, 50% Duty cycle					
INTERFACE						
USB	USB Device (Isolation)					
Internal Flash Disk	120MB					
DISPLAY						
Type	7 inch					
Display Resolution	480 x 800 pixels					
Display Direction	Landscape & Portrait					
Backlight Control	Manual adjustable, ECO mode					
Touch Panel	Capacitive					
DMM						
Digit Level	50,000 counts			5000 counts		
	CAT II 600VRMS, CAT III 300VRMS					
DC Voltage Range	50mV, 500mV, 5V, 50V, 500V, 1000V 6 ranges					
DC Voltage Accuracy	GDS-320/310/307:50mV,500mV,5V,50V,500V±(0.05%+5digits) GDS-220/210/207:50mV,500mV,5V,500V,1000V±(0.1%+5digits)					
Input Impedance	10MΩ					
DC Current Range	50mA, 500mA, 10A 3 ranges					
DC Current Accuracy	GDS-320/310/307:50mA ~ 500mA, 2 range , ±(0.1% + 5 digits),10A±(0.5% + 1 digit) GDS-220/210/207:50mA~500mA, 10A 3 ranges, ±(0.5% + 1 digit)					
AC Voltage Range	50mV, 500mV, 5V, 50V, 700V 5 ranges					
AC Voltage Accuracy	50mV, 500mV, 5V, 50V, 700V ±(1.5% + 15 digits) at 50Hz~1kH					
AC Current Range	50mA, 500mA, 10A 3 ranges					
AC Current Accuracy	50mA, 500mA, ±(1.5% + 15 digits) at 50Hz~1kHz; 10A ±(3% + 15 digits) at 50Hz~1kHz *Measurement range:>10mA					
RESISTANCE Range	500Ω, 5KΩ, 50KΩ, 500KΩ, 5MΩ 6 range					
RESISTANCE Accuracy	500Ω, 5KΩ, 50KΩ, 500KΩ ±(0.3% + 3 digits); 5MΩ±(0.5% + 5 digits) *Measurement range:50Ω~5MΩ					
Diode Test	Maximum forward voltage 1.5V, Open voltage 2.8V					
Temperature (thermocouple) Range	-50°C ~ +1000°C					
Temperature (thermocouple) Resolution	0.1°C					
Thermocouple	B, E, J, K, N, R, S, T *Specifications do not include probe accuracy. Temperature specifications only apply to the GDS-320/310/307.					
Continuity Beep	< 15 Ω					
Functions	Auto Range, Max, Min, Hold, Trend plot					
POWER ADAPTOR						
Line Voltage	AC 100V~240V, 47~63Hz, Power Consumption 40W; DC Output : 12V/3A, Double Shield					
OPTION						
Differential Probe	Dual-channel, 40MHz, CAT II 600V					
DIMENSIONS & WEIGHT						
	240.2(W) x 136.0(H) x 59.7(D) mm; Approx. 1.5 Kg					

ORDERING INFORMATION

GDS-320 200MHz, 2 Channels, Digital Storage Oscilloscope
GDS-310 100MHz, 2 Channels, Digital Storage Oscilloscope
GDS-307 70MHz, 2 Channels, Digital Storage Oscilloscope
GDS-220 200MHz, 2 Channels, Digital Storage Oscilloscope
GDS-210 100MHz, 2 Channels, Digital Storage Oscilloscope
GDS-207 70MHz, 2 Channels, Digital Storage Oscilloscope

Accessories

Quick start guide x 1, User manual CD x 1 ,Power cord x 1

GTP-150B-2 150MHz Probe, Suitable for GDS-307/207, GDS-310/210
GTP-250B-2 250MHz Probe, Suitable for GDS-320/220
GTL-207 Multimeter Test Lead x 2
GSC-010 Soft Carrying Case
GSC-011 Soft Carrying Bag
GAP-001 AC-DC Adaptor
GWS-001 Wrist Strap

Optional Accessories

GDP-040D 40MHz Dual-Channel Differential Probe, Suitable for GDS-300/200
GTL-253 USB Cable, USB 2.0, A-mini B Type, 1400mm
GTL-131 Test Clip, Suitable for GDP-040D
GCL-001 Vertical Calibration Cable
GPF-700 Protective Films for 7" Touch Screen

Free Download

OpenWave 200 Software

SELECTION GUIDE

MODEL	GDS-307	GDS-310	GDS-320	GDS-207	GDS-210	GDS-220
Bandwidth	70MHz	100MHz	200MHz	70MHz	100MHz	200MHz
Sample Rate	1GSa/s	1GSa/s	1GSa/s	1GSa/s	1GSa/s	1GSa/s
Memory Length	5M pts	5M pts	5M pts	1M pts	1M pts	1M pts
DMM Count	50,000	50,000	50,000	5,000	5,000	5,000
Temperature Measurement	✓	✓	✓	–	–	–

GDS-300 Series Rear Panel

GDS-200 Series Rear Panel

GSC-010 Soft Carrying Case

GSC-011 Soft Carrying Bag

GPF-700 Protective Films

GAP-001 AC-DC Adaptor

300MHz/200MHz/100MHz/70MHz Digital Storage Oscilloscope

GDP-040D 40MHz Dual-channel Differential Probe

DUAL-CHANNEL DIFFERENTIAL PROBE	
	GDP-040D
Channel	2
Bandwidth (-3dB)	DC ~ 40MHz (x200)
Attenuation	200 X
Voltage Input Range	600Vpp Max.
Output	≤ ±3V
Maximun Input Voltage to Earth	600Vpp for x200
Typical CMRR	80dB@60Hz ; 60dB@100Hz ; 50dB@1MHz
Input Impedance	Differential : 2MΩ//1.2pf, Ground 1MΩ//2.4pF
Output Impedance	50Ω
Rise Time	8.75ns for x200
Power Supply	5V DC from GDS-300/200 Series
Accuracy	±2%
Dimension	81.7(H) x 123.0(W) x 28.0(D) mm

*** Full Touch Panel Capacitive LCD allows Landscape and Portrait Display. Measure anywhere!**

In nowadays' high efficient measurement era, do you still wish to continue using complex and clumsy knob controls? The brand new portable 7" full touch panel capacitive LCD, featuring multi-point touch panel method which allows engineers to move waveform position, adjust waveform size, and set trigger conditions easily, subverts the traditional handheld instrument. With this unique feature, engineers can retrieve DUT's signals easily under the complex working environment. Landscape or portrait measurement display not only clearly shows waveforms under full screen status but also combines multi-functional measurement environment to achieve unimaginable measurement results.

*** 5M Memory Depth Allows You to Observe Waveforms in Details. Leave no Details Undiscovered!**

Built-in, the second to none, the longest 5M sample memory depth helps engineers diagnose waveforms in great details. The long memory depth can record detailed waveform data and help engineers reproduce the original waveforms while engineers are conducting long observation or retrieving detailed transient signals. Any delicate changes of analog waveforms can be clearly presented in front of engineers when they adjust time scale from long to short that leaves no measurement problems unanswered.

*** Built-in 50,000/5,000 Counts DMM Realizing Oscilloscope and DMM Two-In-One Multi-Function Measurement**

Built-in 50,000 counts (GDS-300) or 5,000 counts (GDS-200) DMM helps engineers accurately measure DUT's electric parameters including not only measurements of D.C. voltage, A.C. voltage, D.C. current , A.C. current, resistance and diode polarity, but also temperature measurement and monitoring. The analysis of trend plot further completes test and measurement. DMM can simultaneously work with oscilloscope to conduct multi-measurement tasks.

*** 30,000 Consecutive Waveform Records Logging Function, Replay Measurement Results Any Time, Complete Missions Impossible!**

Normally, engineers wish to effectively record intermittent signals while retrieving a series of signals during a long period of time. GDS-300 /GDS-200's built-in 30,000 consecutive waveform records logging function not only records 30,000 waveform records in a long period of time but also replays the recorded data that allows engineers to identify intermittent problems occurred during the recorded time. Leave no problems unidentified.

*** Optional Differential Probe to Solve Grounding and Isolation Issues**

Engineers need to isolate power and solve corresponding grounding issue while conducting circuit debugging. One of the criteria engineers must overcome is to maintain system grounding and isolation safety in the strict test and measurement environment such as no grounding system or no isolation. GDS-200/300 provide optional differential probe to effectively assist engineers in solving isolation and grounding problems that elevates the efficiency and safety of test and measurement,

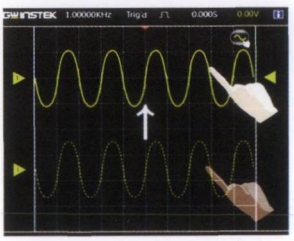
*** Multi-Application Software Solving Engineers' Data Calculation, Resistance and Attenuation Value Calculation Requirements**

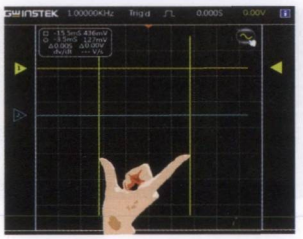
Engineers often need some calculation tool software to conduct circuit design and debugging analysis during the R&D process. GDS-200/ 300 oscilloscopes, with the built-in standard engineering calculator, allow engineers to verify parameters during the test and measurement process. While using unknown resistance, engineers can obtain resistance value via color coding calculation software. If any attenuator was designed in the circuit, GDS-200/300 can also provide corresponding attenuator model and attenuation value calculation.

A. BRIEF ELABORATION

GDS-200/300 Series oscilloscopes, with two analog signal input channels, have standard advanced and economical models which come with 70MHz, 100MHz and 200MHz bandwidth. The maximum sample rate per channel is 1GSa/s and memory depth is 5Mpts. Both series oscilloscopes are equipped with 50,000 counts DMM which can simultaneously measure and monitor A.C. and D.C. voltage and current, and temperature. Trend diagrams in a long period of time can also be drawn that allows engineers to effectively monitor standard electric parameters while measuring basic circuit signals. Engineers are aware of GW Instek oscilloscopes' thoughtful designs through diversified application software. Advanced DMM function and GO/NOGO template editing facilitate users in conducting advanced diversified measurement functions. Engineering calculator, attenuator calculation analysis, and resistance value calculation analysis help users apply auxiliary functions that demonstrate the concept of powerful and comprehensive technological integration.

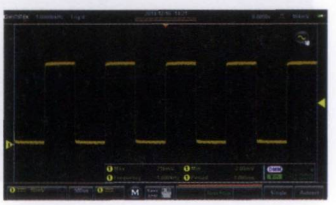
B. FULL TOUCH PANEL CAPACITIVE LCD





GDS-200/300 series oscilloscopes adopt full touch panel capacitive LCD. In the era of smart phone explosion, GW Instek can also usher users into the full touch panel measurement era. With only one finger, users not only can move waveform up and down but also the trigger line position. Two-point touch panel is also applied. Engineers can use two fingers to adjust vertical voltage level and to enlarge or narrow time division scale. The brand new touch panel and swift response renew your measurement concept. Additionally, one finger drag menu selection allows users to follow their intuition to locate required measurement functions, and to save and retrieve diagrams and data anytime anywhere.

C. PORTRAIT/LANDSCAPE DISPLAY



GDS-200/300 series oscilloscopes allow portrait and landscape display. Engineers have different requirements under different environments. When field test and measurement is necessary engineers often need portrait display to conduct measurement due to environment limitation and the emphasis of integrated functions. Waveform measurement and DMM can be simultaneously operated. When indoor test and measurement is required engineers often need stable measurements and large screen which is answered by landscape display. 7" full measurement screen can also be applied as a stable desk-top oscilloscope.

300MHz/200MHz/100MHz/70MHz Digital Storage Oscilloscope

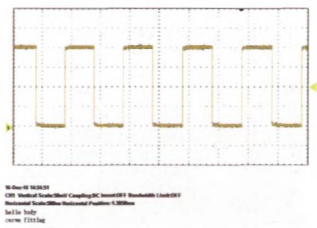
D. SIMULTANEOUS APPLICATION OF OSCILLOSCOPE AND DMM

Traditional oscilloscopes can not meet users' requirements of conducting integrated system circuit measurement. One extra DMM is often required to work with traditional oscilloscopes to handle enormous test requirements. GDS-200/300 series oscilloscopes integrate the functions of oscilloscope and DMM to conduct simultaneous measurement. In the analysis of system circuit waveforms, GDS-200/300 can also use DMM to measure basic voltage and current of the peripheral components that provides users with very powerful test integration.

E. 30,000 WAVEFORM RECORDS REPLAY FUNCTION

GDS-200/300 series oscilloscopes have built-in 30,000 waveform records replay function. With this function, engineers can monitor circuit in a long period of time. When 30,000 waveform records are completed history records can be replayed repeatedly. Any intermittently appeared abnormal waveforms can be identified by this function which provides users with a very powerful search and debugging weapon.

F. BRIEFING MATERIAL COMPILATION

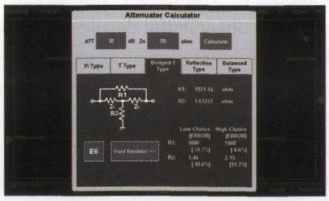


Engineers or students often compile briefing material for work or class requirements. The completeness and convenience of briefing often determine users' performance. GDS-200/300 series oscilloscopes provide very strong briefing material compilation function. Before compiling briefing material, users can select different test and background conditions such as date, time and cursor. In addition, measurement parameters can also be determined based upon different requirements. This customer-made function not only shows the complete waveforms but also provides peripheral parameters to become the key communication bridge for work and class requirements.

G. GO/NOGO TEMPLATE EDITING

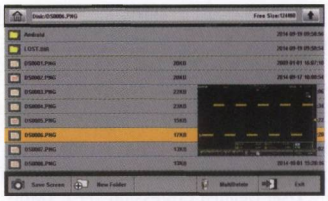
Many component or system manufacturers require GO and NOGO product analysis for quality control or production. GDS-200/300 series oscilloscopes have the same GO/NOGO function as that of GW Instek other oscilloscopes. This function establishes corresponding waveform templates based on waveforms measured to conduct GO or NOGO results calculation. Additionally, GDS-200/300 have template editing function. Users not only can edit template freely according to test or environment conditions but also set templates with different ceiling and floor boundaries, making GO/NOGO function more diversified and user-friendly.

H. TOOLS ELECTRICAL ENGINEERS OFTEN APPLIED



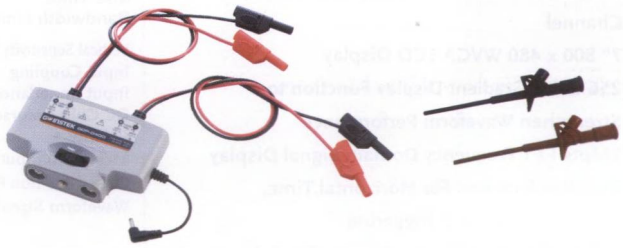
GDS-200/300 series oscilloscopes have built-in diversified application software to provide users with very thoughtful auxiliary tools. In the tedious circuit design process, engineering calculator software provides mathematical calculation functions from basic to advanced allowing engineers to thoroughly understand circuit response and parameter value. Resistance calculation software not only provides accurate resistance value for different surface embedded resistance codes but also color coding resistance value enquiry function. It is a very powerful auxiliary tool for users from students to senior electrical engineers

I. IMAGE STORAGE AND PREVIEW FUNCTION



GDS-200/300 series oscilloscopes can record screen images and preview images. In many complex test and measurement environments, when engineers can not observe images from his or her computer immediately after images were stored the image preview function allows users to make sure file is correct right away. Pre-observation operation is also very convenient to users.

J. OPTIONAL DIFFERENTIAL PROBE



In many strict test and measurement environments, system power isolation and grounding problem have become one of the key issues. Bad isolation and grounding will have serious impact on circuit system safety. Optional differential probe of GDS-200/300 series oscilloscopes can achieve equivalent isolation results for measurement system and there is no grounding problem. Under today's economic constraints, using differential probe to achieve isolation result is one of the best choices.

K. USED AS USB COMPONENT

Once engineers finished waveform measurement and report compilation, GDS-200/300 series oscilloscopes can be used as USB storage component to retrieve and store files. Briefing speaking, users can use USB connecting cable to connect GDS 200/300 with the PC or handheld device to retrieve any required files for follow-up actions. Today, smart phone is ubiquitous, measurement results can be transmitted via smart phone that saves a lot of troubles.

L. TEMPERATURE MEASUREMENT AND LOGGING FUNCTION

GDS-200/300 series oscilloscopes' built-in temperature measurement and logging function allows users to conduct systematic temperature measurement and logging for electric components and electric systems. This function can collocate with different temperature measurement probes. B,E,J,K,N,R,S,T thermal coupling measurement probes are also supported to conduct Celsius and Fahrenheit scaled temperature measurement. Users can also use trend plot editing to conduct temperature monitoring in a long period of time. It is a simple and convenient measurement tool for quality assurance and test departments.

100MHz/70MHz/50MHz Digital Storage Oscilloscope

GDS-1000B Series

CE | USB | PC Software | Labview Driver | Ethernet | PictBridge Compatible

The GDS-1000B Series features two bandwidth selections - 100MHz ,70MHz and 50MHz equips with analog signal input terminals by four or two channels(50MHz, 4 channels input only). The maximum sampling rate for each single channel is 1GSa/s, and the memory depth is 10Mpts per channel independently. The GDS-1000B Series has a waveform update rate of 50,000wfms/s, which helps users to precisely observe the detailed waveform variation. Additionally, 7" WVGA color LCD display and the 256 color gradient display function together allow waveforms to be observed with the senses of transparency and gradation. With respect to the horizontal time scale adjustment knob and trigger level adjustment knob, GW Instek provides a very thoughtful design -the zero key function, which allows engineers to work more effectively. For mathematical analysis mode, 1Mpts FFT signal display makes the dull frequency domain signal analysis more delicate. Options such as the serial bus decoding function, the waveform search function, and the segmented memory function also arm the GDS-1000B Series with more advanced measurement technologies. Moreover, the innovative exterior design and compact design also bring much convenience to users. Other diversified and charming multi-functional operation demonstrates the concept of complete technology integration.

FEATURES

* 100MHz/70MHz/50MHz Bandwidth Selections, 2ch or 4ch Input
* 1GSa/s Maximum Sampling Rate
* 10M Maximum Memory Depth For Each Channel
* 7" 800 x 480 WVGA LCD Display
* 256 Color Gradient Display Function to Strengthen Waveform Performance
* 1Mpts FFT Frequency Domain Signal Display
* Zero Key Function For Horizontal Time, Vertical Voltage and Triggering
* Compact And Innovative Exterior Design

SPECIFICATIONS

	GDS-1054B	GDS-1072B	GDS-1074B	GDS-1102B	GDS-1104B
VERTICAL					
Channels	4 + Ext	2 + Ext	4	2 + Ext	4
Bandwidth	DC~50MHz (-3dB)	DC~70MHz (-3dB)	DC~70MHz (-3dB)	DC~100MHz (-3dB)	DC~100MHz (-3dB)
Rise Time	5ns	5ns	5ns	3.5ns	3.5ns
Bandwidth Limit	20MHz	20MHz	20MHz	20MHz	20MHz
Vertical Sensitivity Resolution	8 bit : 1mV~10V/div				
Input Coupling	AC, DC, GND				
Input Impedance	1MΩ// 16pF approx.				
DC Gain Accuracy*	±3%				
Polarity	Normal & Invert				
Maximum Input Voltage	300Vpk, CAT I (300Vpk CAT II with GTP-070A- 4/100A-4 10:1 probe)				
Offset Position Range	1mV/div : ±1.25V ; 2mV/div ~ 100mV/div : ±2.5V ; 200mV/div ~ 10V/div : ±125V				
Waveform Signal Process	+,-, ×, ÷, FFT, FFTrms, User Defined Expression ; FFT: 1Mpts; FFT: Spectral magnitude. Set FFT Vertical Scale to Linear RMS or dBV RMS ; FFT Window Display : Rectangular, Hamming, Handing, or Blackman-Harris				
TRIGGER					
Source	CH1, CH2, CH3*, CH4*, Line, EXT** ; *four channel models only. ; **two channel models only				
Trigger Mode	Auto (supports Roll Mode for 100 ms/div and slower), Normal, Single Sequence				
Trigger Type	Edge, Pulse Width, Video, Pulse Runt, Rise & Fall, Timeout, Alternate, Event-Delay (1~65535 events), Time-Delay (Duration, 4nS~10S), Bus				
Holdoff range	4ns to 10s				
Coupling	AC, DC, LF rej., Hf rej., Noise rej.				
Sensitivity	1div				
EXTERNAL TRIGGER					
Range	±15V				
Sensitivity	DC ~ 100MHz Approx. 100mV ; 100MHz ~ 200MHz Approx. 150mV				
Input Impedance	1MΩ±3%~16pF				
HORIZONTAL					
Time base Range	5ns/div ~ 100s/div (1-2-5 increments)				
ROLL	100ms/div ~ 100s/div				
Pre-trigger	10 div maximum				
Post-trigger	2,000,000 div maximum				
Timebase Accuracy	±50 ppm over any ≥1 ms time interval				
Real Time Sample Rate	1GSa/s max.				
Record Length	Max. 10Mpts				
Acquisition Mode	Normal, Average, Peak Detect, Single				
Peak Detection	2nS (typical)				
Average	selectable from 2 to 256				
X-Y MODE					
X-Axis Input	Channel 1; Channel 3*(*four channel models only)				
Y-Axis Input	Channel 2; Channel 4*(*four channel models only)				
Phase Shift	±3° at 100kHz				
CURSORS AND MEASUREMENT					
Cursors	Amplitude, Time, Gating available; Unit : Seconds(s), Hz(1/s), Phase(degree), Ration(%)				
Automatic Measurement	36 sets: Pk-Pk, Max, Min, Amplitude, High, Low, Mean, Cycle Mean, RMS, Cycle RMS, Area, Cycle Area, ROVShoot, FOVShoot, RPREShoot, FPREShoot, Frequency, Period, RiseTime, FallTime, +Width, -Width, Duty Cycle, +Pulses, -Pulses, +Edges, -Edges, FRR, FRF, FFR, FFF, LRR, LRF, LFR, LFF, Phase				
Cursors Measurement	Voltage difference between cursors (ΔV) Time ; difference between cursors (ΔT)				
Auto Counter	6 digits, range from 2Hz minimum to the rated bandwidth				
CONTROL PANEL FUNCTION					
Autoset	Single-button, automatic setup of all channels for vertical, horizontal and trigger systems, with undo Autoset				
Save Setup	20set				
Save Waveform	24set				

GDS-1000B Series

Rear Panel

GDB-03 Oscilloscope Education and Training Kit

For : GDS-3000 Series/GDS-2000A Series
GDS-2000E Series/GDS-1000B Series

SPECIFICATIONS

	GDS-1054B	GDS-1072B	GDS-1074B	GDS-1102B	GDS-1104B
DISPLAY					
TFT LCD Type	7" TFT WVGA color display				
Display Resolution	800 horizontal x 480 vertical pixels (WVGA)				
Interpolation	Sin(x)/x				
Waveform Display	Dots, vectors, variable persistence (16ms~4s), infinite persistence				
Waveform Update Rate	50,000 waveforms per second, maximum				
Display Graticule	8 x 10 divisions				
Display Mode	YT, XY				
INTERFACE					
USB Port	USB 2.0 High-speed host port x1, USB High-speed 2.0 device port x1				
Ethernet Port(LAN)	RJ-45 connector, 10/100Mbps with HP Auto-MDIX (only for the GDS-1074B, GDS-1104B.)				
Go-NoGo BNC	5V Max/10mA TTL open collector output				
Kensington Style Lock	Rear-panel security slot connects to standard kensington-style lock				
POWER SOURCE					
	AC 100V ~ 240V , 50Hz ~ 60Hz , Auto selection , Power consumption: 30 Watts				
MISCELLANEOUS					
Multi-Language Menu	Available				
Operation Environment	Temperature : 0°C ~ 50°C. Relative Humidity ≤80% at 40°C or below; ≤ 45% at 41°C ~ 50°C				
Online Help	Available				
DIMENSIONS & WEIGHT					
380(W) x 208 (H) x 127.3(D)mm, Approx. 2.8kg					

The specifications apply when the GDS-1000B is powered on for at least 30 minutes under +20°C~+30°C .

ORDERING INFORMATION

GDS-1104B	100MHz, 4 channels, Digital Storage Oscilloscope
GDS-1102B	100MHz, 2 channels, Digital Storage Oscilloscope
GDS-1074B	70MHz, 4 channels, Digital Storage Oscilloscope
GDS-1072B	70MHz, 2 channels, Digital Storage Oscilloscope
GDS-1054B	50MHz, 4 channels, Digital Storage Oscilloscope

ACCESSORIES :
User manual x1, Power cord x1
GTP-100A-4 100MHz Passive Probe. Suitable for GDS-1104B, GDS-1102B
GTP-070A-4 70MHz Passive Probe.Suitable for GDS-1074B,GDS-1072B,GDS-1054B

OPTIONAL ASSESSORIES

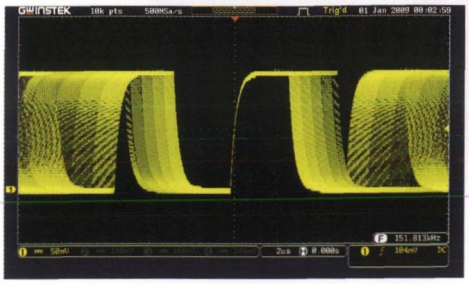
GDB-03	Demo Board
GTL-110	Test lead, BNC to BNC heads
GTL-246	USB cable, USB 2.0 A-B type cable 4P, 1200mm

FREE DOWNLOAD

Software	OpenWave Software
Driver	USB Driver ; LabView Driver

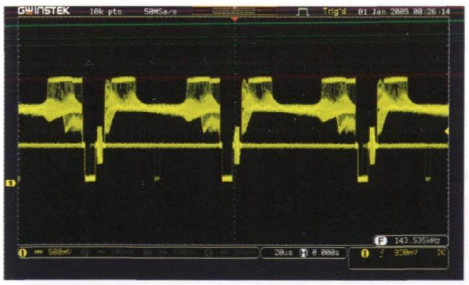
100MHz/70MHz/50MHz Digital Storage Oscilloscope

A. WAVEFORM UPDATE RATE UP TO 50,000wfms



The GDS-1000B Series oscilloscope is under the category of general and fundamental oscilloscope by the market segmentation. Nevertheless, the series arms itself with the waveform update rate up to 50,000wfms/s. Users can input a rapid frequency modulation carrier signal as shown on the diagram. An unsmooth temporarily holding phenomenon will occur while using conventional digital oscilloscopes to measure this signal. As a result, the conventional digital oscilloscopes could not clearly yield the modulation variation process of frequency modulation signals. With the GDS-1000B Series oscilloscope, the measurement result will produce not only a smooth waveform modulation variation, but also detailed changes by distinct layers. Engineers could easily grasp the root cause of electric circuits while measuring the unexpected and fast changing signals. The GDS-1000B Series is indeed an excellent debugging weapon for the test and measurement industry.

B. 256 COLOR GRADIENT DISPLAY

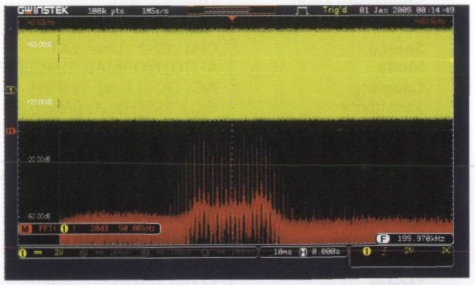


With respect to the waveform display technology, the GDS-1000B Series oscilloscope is capable of displaying 256 color gradients which can delineate the profound gradational fluctuations; as if it can recreate the analog oscilloscope display capability. When a multi-layer video signal is input, the GDS-1000B Series, with 256 color gradient display, has the ability to precisely reveal the colored burst signal and to show details of layers with the brightness. Hence, the dull monochrome waveform is imbued with vitality, which is precisely the unlimited measurement fascination the GDS-1000B Series intents to bring to the general purpose oscilloscope arena.

C. 10M MEMORY DEPTH PER CHANNEL INDEPENDENTLY

The GDS-1000B Series oscilloscope has a powerful and incomparable memory depth for the data retrieving. 10M memory depth per channel independently surpasses the specification of the industry's 1000 Series boundary. 10M memory depth allows users to easily seize the waveform detail while conducting fundamental measurement applications. If a long serial sequent sine waveform is input and the time scale is adjusted to 1mv/div, other 1000 Series oscilloscopes for lack of sufficient memory depth will appear a distorted waveform while enlarging the waveform for its details. The GDS-1000B Series while enlarging the waveform to 20ns/div reveals a very clear sine waveform detail which is precisely the true value of the GDS-1000B Series oscilloscope.

D. 1M FFT MATHEMATICAL SAMPLING ANALYSIS MODE



The GDS-1000B Series oscilloscope, under the Fast Fourier Transform mathematical analysis mode, is equipped with the 1M memory depth retrieving mode. For the conventional digital oscilloscopes, the FFT mode often has only 1000 point retrieving length; therefore, they can not show the strength distribution of each spectrum quantity under the frequency domain mode. The GDS-1000B Series oscilloscope leads the industry to provide the display mode of 1M retrieving points, which can clearly show the detail of each spectrum quantity. On top of that, the 50,000 wfms/s waveform update rate augments the FFT analysis mode to be fast and precise as if a real time spectrum analyzer is used. These features substantially elevate oscilloscope's signal processing capability for the frequency domain analysis. The diagram illustrates a 200 kHz carrier waveform to be modulated as a standard FM signal with 40 kHz carrier waveform and 5 kHz frequency deviation. Since the GDS-1000B Series is equipped with 1M memory depth, a 5 kHz frequency deviation interval can be clearly revealed that allows engineers to fully grasp the measurement details.

150MHz/100MHz/70MHz Digital Storage Oscilloscope

GDS-1000A-U Series

CE | USB | PC Software | Labview Driver

MemoryPrime 2MEGA MEMORY BUILT-IN

The GDS-1000A-U Series is a general purpose 2-channel oscilloscope and originally designed to meet educational and industrial requirements without specializing in DSO features. This series provides three selective bandwidths of 70MHz, 100MHz and 150MHz together with innovative human machine interface design plus an TFT color LCD display, users will enjoy better measurement experience!

The GDS-1000A-U Series offers dual sampling mode, giving users two options for 1GSa/s Real-Time sampling or 25GSa/s high-speed Equivalent sampling rate. What's more, with high-speed waveform ha capability, more advanced triggering functions, and 2.5 kg light-weight design, it is a powerful functiona oscilloscope with the best price than ever. Ultimately, The GDS-1000A-U Series is considered for the replacement of analog oscilloscope and further promoted as a personal DSO affordable to any situatio such as educational labs, service technicians, or industrial fields with high quantity requirements.

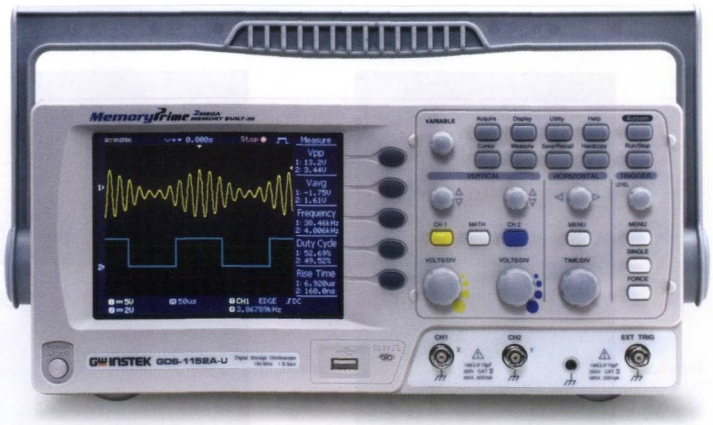
Besides, the requirement of measuring data exchange and analysis is integrated into the GDS-1000A-U Series. The convenient PC standard interface is also available, such as USB device port and host port. This two built-in standard interface capability enable the performance of remote control or data transferring to a desktop/laptop for documenting purpose and enhancing your work efficiency.

FEATURES

* 150/100/70 MHz Bandwidth, 2 Input Channels
* 1GSa/s Real-Time and 25GSa/s Equivalent-Time Sampling Rate
* 2Mega Point Memory Depth
* 2mV~10V Vertical Scale & 1ns~50s Horizontal Range
* Up to 27 Auto Measurements
* Versatile Math Function: +,−, x, FFT, FFTrms, Zoom FFT
* 5.7" Color TFT LCD Display
* USB Host & Device Ports
* Go/NoGo Function
* Data Logger
* Limited Lifetime Warranty

SPECIFICATIONS

	GDS-1072A-U	GDS-1102A-U	GDS-1152A-U
VERTICAL			
Channels	2	2	2
Bandwidth	DC~70MHz(-3dB)	DC~100MHz(-3dB)	DC~150MHz(-3dB)
Rise Time	<5ns Approx.	<3.5ns Approx.	<2.3ns Approx.
Sensitivity	2mV/div ~ 10V/div (1-2-5 increments)		
Accuracy	± (3% x |Readout| + 0.1 div + 1mV)		
Input Coupling	AC, DC & Ground		
Input Impedance	1MΩ± 2%, ~15pF		
Polarity	Normal & Invert		
Maximum Input	300V (DC+AC peak), CATII		
Waveform Signal Process	+ , − , x , FFT, FFTrms , Zoom FFT		
Offset Range	2mV/div ~ 50mV/div : ±0.4V ; 100mV/div ~ 500mV/div : ±4V ; 1V/div ~ 5V/div : ±40V ; 10V/div : ±300V		
Bandwidth Limit	20MHz (- 3dB)		
TRIGGER			
Source	CH1 , CH2 , Line , EXT		
Mode	AUTO, NORMAL, SINGLE, TV, Edge, Pulse width		
Coupling	AC , DC , LF rej. , HF rej. , Noise rej.		
Sensitivity	DC ~ 25MHz: Approx. 0.5div or 5mV; 25MHz ~ 70/100/150MHz: Approx. 1.5div or 15mV		
EXT TRIGGER			
Range	±15V		
Sensitivity	DC ~ 25MHz : ~ 50mV ; 25MHz ~ 70/100/150MHz : ~15mV		
Input Impedance	1MΩ ±2% , ~ 15pF		
Maximum Input	300V (DC+AC peak) , CATII		
HORIZONTAL			
Range	1ns/div ~ 50s/div (1-2.5-5 increments); ROLL : 50ms/div ~ 50s/div		
Modes	MAIN, WINDOW, WINDOW ZOOM, ROLL, X-Y		
Accuracy	±0.01%		
Pre-Trigger	10 div maximum		
Post-Trigger	1000 div		
X-Y MODE			
X-Axis Input	Channel 1		
Y-Axis Input	Channel 2		
Phase Shift	±3° at 100kHz		
SIGNAL ACQUISITION			
Real-Time Sample Rate	1GSa/s maximum		
Equivalent Sample Rate	25GSa/s maximum		
Vertical Resolution	8 Bits		
Memory Depth	2Mega Points maximum		
Acquisition Mode	Normal, Peak Detect, Average		
Peak Detection	10ns(500ns/div ~ 50s/div)		
Average	2 , 4 , 8 , 16 , 32 , 64 , 128 , 256		
CURSORS AND MEASUREMENT			
Voltage Measurement	V_{pp} , V_{amp} , V_{avg} , V_{rms} , V_{hi} , V_{lo} , V_{max} , V_{min} , Rise Preshoot/Overshoot, Fall Preshoot/Overshoot		
Time Measurement	Freq , Period , Rise Time , Fall Time , Positive Width , Negative Width , Duty Cycle		
Delay Measurement	Eight different delay measurement		
Cursors Measurement	Voltage difference between cursors(ΔV)Time difference between cursors(ΔT),frequency measurement(1/ΔT)		
Auto Counter	Resolution : 6 digits Accuracy : ±2% Signal Source: All available trigger source except the Video trigger mode		
ADJUSTABLE PROBE COMPENSATION SIGNAL			
Frequency Range	1kHz ~ 100kHz, 1kHz/STEP		
Duty Cycle Range	5% ~ 95% , 5%/STEP		
CONTROL PANEL FUNCTION			
Autoset	Adjust Vertical VOLT/DIV, Horizontal TIME/DIV, and Trigger level automatically		
Save Setup	Up to15 sets of measurement conditions		
Save Waveform	15 sets of waveform		



GDS-1000A-U Series

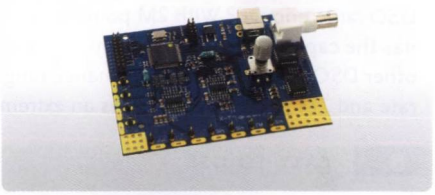
Rear Panel

SPECIFICATIONS	
DISPLAY	
TFT LCD Type	5.7 inch
Display Resolution	234(Vertically)x 320 (Horizontally) Dots
Display Graticule	8 x 10 divisions
Display Brightness	Adjustable
INTERFACE	
Kensington Style Lock	Rear-panel security slot connects to standard Kensington-style lock
USB Device	USB1.1 & 2.0 full speed compatible
USB Host	Image (BMP) waveform data (CSV) and setup (SET)
POWER SOURCE	
Line Voltage Range	AC 100V ~ 240V , 48Hz ~ 63Hz , Auto selection
MISCELLANEOUS	
Go/NoGo Function	Available
Data Logger	Available
Multi-Language Menu	Available
Online Help	Available
DIMENSIONS & WEIGHT	
	310(W) x 142 (H) x 140(D)mm, Approx. 2.5kg

The specifications apply when the oscilloscope is powered on for at least 30 minutes under +20°C~+30°C .

GDB-02 Oscilloscope Education and Training Kit

For : GDS-1000A-U/GDS-1000-U Series



GSC-006 Soft Carrying Case

ORDERING INFORMATION

GDS-1072A-U	70MHz, 2 channel, 1GSa/s & 2Mega Memory DSO
GDS-1102A-U	100MHz, 2 channel, 1GSa/s & 2Mega Memory DSO
GDS-1152A-U	150MHz, 2 channel, 1GSa/s & 2Mega Memory DSO

ACCESSORIES :
Quick Start Guide , Power cord x1 , CD x 1
Probe GTP-070A-4 or equivalent : 70MHz(10:1/1:1)Switchable passive probe for GDS-1072A-U(one per channel)
Probe GTP-100A-4 or equivalent : 100MHz(10:1/1:1)Switchable passive probe for GDS-1102A-U(one per channel)
Probe GTP-150A-2 or equivalent : 150MHz(10:1/1:1)Switchable passive probe for GDS-1152A-U(one per channel)

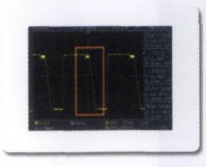
OPTIONAL ASSESSORIES

GTL-246	USB Cable, USB 2.0 Type A - Type B, 4P	**GSC-006**	Soft Carrying Case
GTL-110	Test Lead, BNC-BNC Heads	**GTP-033A**	Oscilloscope Probe, 35MHz 1:1 Passive Probe, BNC(P/M)
GDB-02	Oscilloscope Education and Training Kit		

FREE DOWNLOAD

PC Software	FreeWave software	**Driver**	USB driver, LabView Driver

PRIME FEATURES



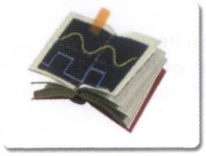
Auto Measurement Gating

A built-in Autoset function on a digital oscilloscope gives engineers remarkable convenience. With the complexities of product features, traditional auto measurement information is inadequate for modern measurement needs. The new Cursor Gating feature allows you to mark an area with cursors for auto measurement.

0.1x to 2000x

Flexible Probe Factor Setting

There is a diverse range of test probes currently on the market such as passive, differential, and electrical probes. The attenuation ratio of each probe type also differs greatly. To ensure compatibility, probe attenuation ratios of 0.1X to 2000X as well as voltage and current probes as supported with the GDS-1000A-U.



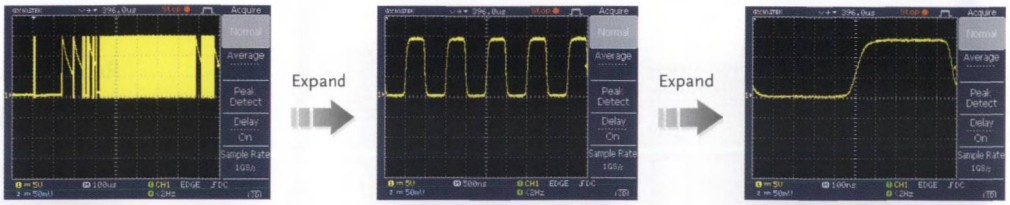
Fast Horizontal Position Mark and Search

MemoryPrime technology allows a maximum of 2M points of waveform data. For engineers, analyzing a considerable amount of data can be an extremely challenging task. To assist engineers in analyzing waveforms quicker, we provide Horizontal Page Skip and Set Time Mark functionalities . This lets engineers take full advantage of the 2M memory depth.

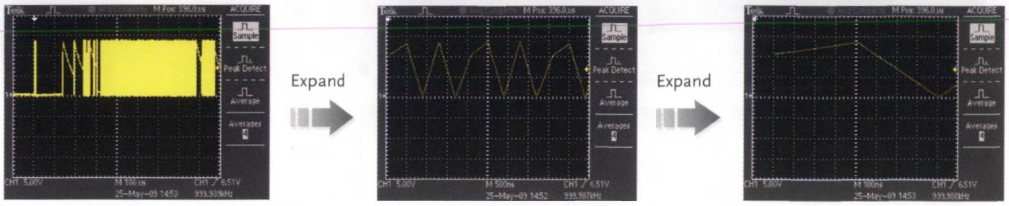
150MHz/100MHz/70MHz Digital Storage Oscilloscope

A. ABOUT MemoryPrime TECHNOLOGY

GDS-1000A-U
2Mega Memory
Waveform Display



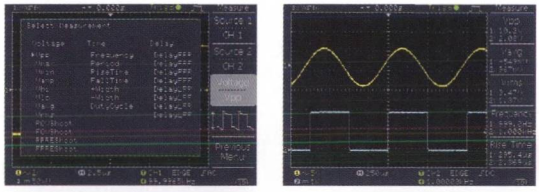
Traditional DSO
2.5k Memory
Waveform Display



Single-Shot Waveform Capture

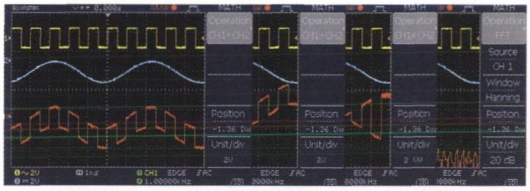
What is the single feature lacking from most digital storage oscilloscopes? Adequate memory depth. Is the memory depth of your DSO large enough? With 2M points of memory, GDS-1000A-U has the capability to acquire far more waveform data compared with other DSOs in the same performance range. The 1GSa/s sampling rate and 2M point memory plays an extremely powerful role for single-shot waveform capture. When the single-shot waveform is triggered and captured, you are able to check and see the single-shot event without losing any detailed information. A DSO, with a high sampling rate but short memory, can't capture a single shot waveform as well as GDS-1000A-U.

B. EASY TO USE



27 Automatic Measurement Functions

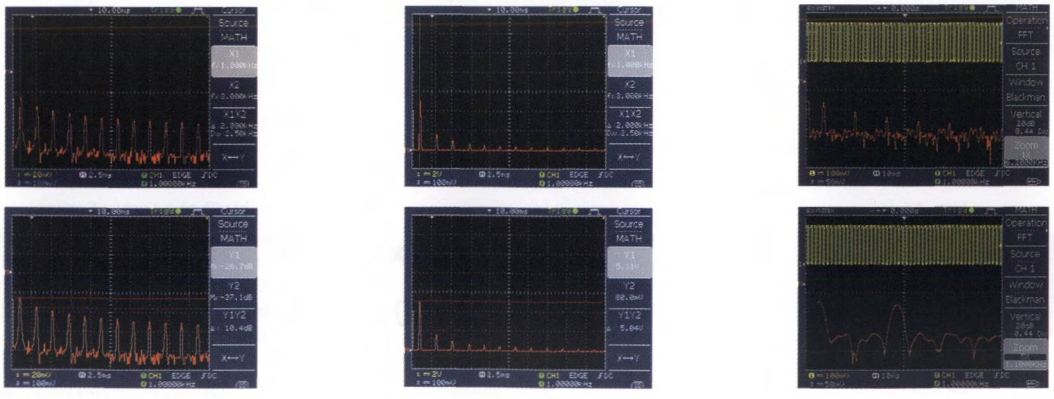
The full-featured Acquisition mode and 27 auto measurement functions help users measure captured waveform parameters accurately. The advanced Auto-Set function enables the GDS-1000A-U Series to capture waveforms automatically and display them quickly.



MATH Functions

With addition, subtraction, multiplication and FFT math functions, the GDS-1000A-U Series keeps users aware of measurement results by constantly updating data. With minimal calculation, the GDS-1000A-U Series can provide sufficient testing information.

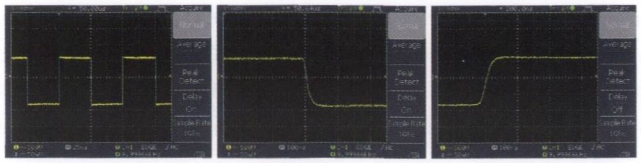
C. FFT / FFTrms / ZOOM FFT MEASUREMENT



FFT Measurement **FFTrms Measurement** **Zoom FFT Measurement**

To observe the fundamental and harmonic components of a signal, the FFT math function on a digital storage oscilloscope is often used. Typically, the traditional unit of the FFT is the decibel (dB). However, when using dB it is sometimes difficult to identify the fundamental frequency of a signal from a noisy spectrum. With the FFTrms function, The GDS-1000A-U Series can clearly display the fundamental frequency of an acquired waveform. Zoom FFT provides users with observation flexibility that they can move FFT waveform horizontally and zoom in it up to 20X to investigate details of FFT signals.

D. OBSERVATION-DELAY ON/ OFF

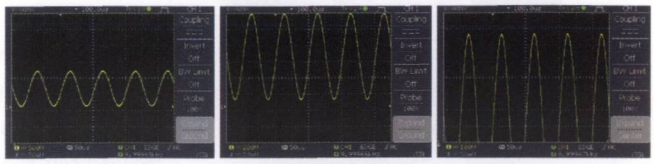


Original Signal | Delay On | Delay Off

For convenient waveform observation and analysis, the GDS-1000A-U Series includes Delay On/Off functions; usually seen only in higher end products. With Delay On, a signal can be observed from an offset of the trigger point. With this feature, the horizontal scale and thus waveform scale can be expanded and centered on the delay point, but not at the trigger point. This allows a signal to be observed in detail where needed.

* With Delay On, the waveform scale is expanded from the center of the screen, With Delay Off, the waveform scale is expanded from the trigger point.

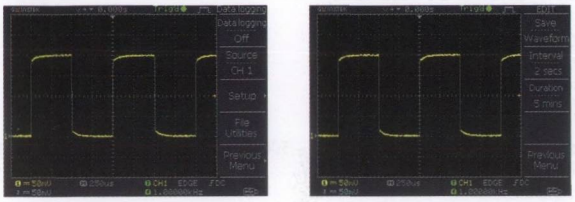
E. OBSERVATION-EXPAND BY GROUND/CENTER



Original Signal | Expand by Ground | Expand by Center

In a DSO, " AC Coupling " is normally used to isolate the AC components of a signal by blocking the DC components. This is useful to see a signal with a small AC component that is offset with a large DC voltage. With AC coupling to block the DC voltage, small AC waveforms can be observed from the center of the screen for measurement or examination. However, capacitive loading under AC coupling mode may cause waveform distortion as low frequency components may become degraded.
The Expand by Ground and Center functions are convenient tools to expand a waveform vertically. With this feature, the vertical scale of a waveform can be expanded either from the ground reference or from the center of the screen without causing capacitive loading.

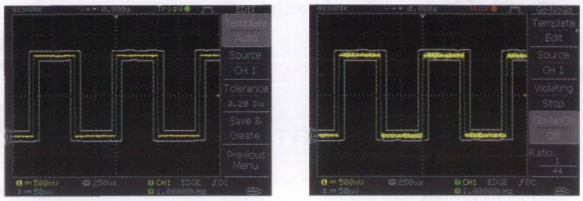
F. USB HOST & DATA LOGGER



Data Logger furn ON | Data Logger Setup

USB host function enables user to easily store waveform setting, data, or image on USB flash disk. Furthermore, data logger can continue monitoring input signals and storing their waveform data in USB flash disk when trigger conditions are met, saving users' efforts to tracking signals manually and allowing them to analyze and observe waveform data afterwards.

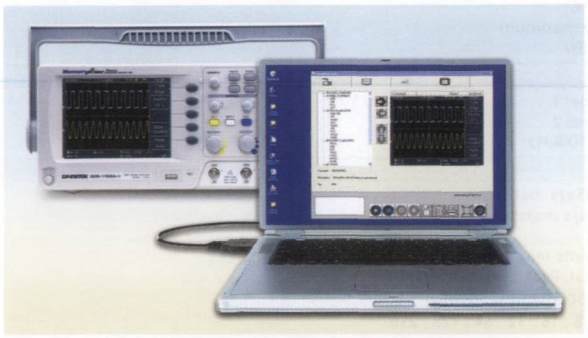
G. GO/NOGO FUNCTION



Template Editing | Go/NoGo Test

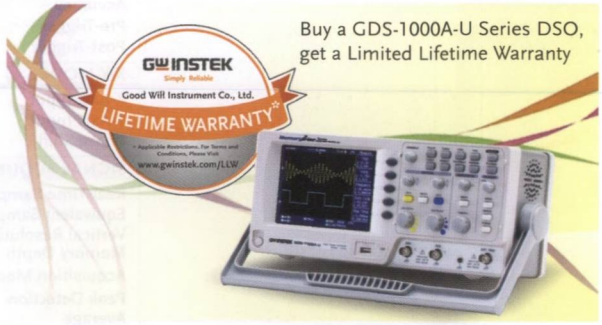
Go/NoGo testing function check whether the incoming signal violates the user-defined template. Users can easily define this template by setting the tolerance ratio to determine violation conditions. Go/NoGo testing can either keep counting violation number or stop testing when violation conditions are met.

H. PC REMOTE CONTROL SOFTWARE



Using a USB port coupled with FreeWave remote monitoring software is the easiest and most convenient way to capture data from GDS-1000A-U. With FreeWave, a screenshot can be saved as an image file (.bmp/.jpg), waveform data(.csv)can be logged and movie files(.wmv) can be recorded in real-time. Not only can FreeWave monitor and record waveforms over a long period of time, but previously recorded waveforms can also be observed. Instrument settings can even be configured without the need to learn incomprehensible command line syntax. With the simple user interface and robust features, FreeWave allows you to get the most out of GDS-1000A-U with little effort.

I. GUARANTEED PROTECTION



By providing the Global Lifetime Warranty Program for GDS-1000A-U digital storage oscilloscope series, we believe you can have high confidence in the quality of each GDS-1000A-U DSO. By purchasing a GDS-1000A-U you can be assured of a highly economical, low maintenance, quality DSO backed with the protection of the Lifetime Warranty program. The Lifetime Warranty Program guarantees customers will be supported regardless of their location. Customers will receive at least 5 years of full support even after production has ceased. For more details and applicable conditions regarding the Lifetime Service program, please visit the GW Instek website **www.gwinstek.com/llw** or consult your nearest distributor.

100MHz/70MHz/50MHz Digital Storage Oscilloscope

The GDS-1000-U Series is 100MHz, 70MHz 50MHz digital storage oscilloscopes with 5.6" color TFT LCD displays. With dual sampling modes, a 4000 point record length, a real-time sampling rate of 250MSa/s and an ET sampling rate of 25GSa/s, the GDS-1000-U Series DSO provides an excellent balance of performance in terms of memory length and sampling speed. Other major features include user-friendly menu tree operations, compact size, ergonomic design, USB host device port, data logger and Go/NoGo test. The GDS-1000-U Series is designed to meet today's most demanding engineering requirements and budgets.

GDS-1000-U Series

台灣精品 TAIWAN EXCELLENCE 2012

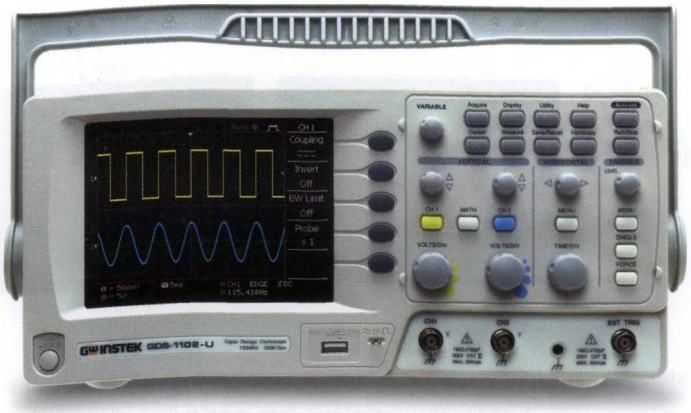
CE | USB | PC Software | LabVIEW Driver | LIFETIME WARRANTY

FEATURES

- 100/70/50 MHz Bandwidth, 2 Input Channels
- 250MSa/s Real-Time & 25GSa/s Equivalent-Time Sampling Rate
- 4k Memory Depth per Channel
- Save/Recall of 15 Front Panel Settings & Waveforms
- 5.7" Color TFT LCD Display
- 19 Auto Measurements
- Math Function: Add, Subtract, FFT
- USB Host & Device Ports
- Go/NoGo Function
- Data Logger
- Limited Lifetime Warranty

SPECIFICATIONS

	GDS-1052-U	GDS-1072-U	GDS-1102-U
VERTICAL			
Channels	2	2	2
Bandwidth	DC~50MHz(−3dB)	DC~70MHz(−3dB)	DC~100MHz(−3dB)
Rise Time	<7ns Approx.	<5ns Approx.	<3.5ns Approx.
Sensitivity	2mV/div ~ 10V/div (1-2-5 increments)		
Accuracy	± (3% x |Readout| + 0.1 div + 1mV)		
Input Coupling	AC, DC & Ground		
Input Impedance	1MΩ± 2%, ~15pF		
Polarity	Normal & Invert		
Maximum Input	300V (DC+AC peak), CATII		
Waveform Signal Process	+ , − , FFT		
Offset Range	2mV/div ~ 50mV/div : ±0.4V ; 10mV/div ~ 500mV/div : ±4V ; 1V/div ~ 5V/div : ±40V ; 10V/div: ±300V		
Bandwidth Limit	20MHz (- 3dB)		
TRIGGER			
Sources	CH1 , CH2 , Line , EXT		
Modes	AUTO, NORMAL, SINGLE, TV, Edge, Pulse width		
Coupling	AC , DC , LF rej. , HF rej. , Noise rej.		
Sensitivity	DC ~ 25MHz: Approx. 0.5div or 5mV; 25MHz ~ 50/70/100MHz: Approx. 1.5div or 15mV		
EXT TRIGGER			
Range	±15V		
Sensitivity	DC ~ 25MHz : ~ 50mV ; 25M ~ 50/70/100MHz : ~15mV		
Input Impedance	1MΩ ±2% , ~ 16pF		
Maximum Input	300V (DC+AC peak) , CATII		
HORIZONTAL			
Range	1ns/div ~ 50s/div (1-2.5-5 increments); ROLL : 50ms/div ~ 50s/div		
Modes	MAIN, WINDOW, WINDOW ZOOM, ROLL, X-Y		
Accuracy	±0.01%		
Pre-Trigger	10 div maximum		
Post-Trigger	1000 div		
X-Y MODE			
X-Axis Input	Channel 1		
Y-Axis Input	Channel 2		
Phase Shift	±3°at 100kHz		
SIGNAL ACQUISITION			
Real-Time Sample Rate	250MSa/s maximum		
Equivalent Sample Rate	25GSa/s maximum		
Vertical Resolution	8 Bits		
Memory Depth	4K Points maximum		
Acquisition Mode	Normal, Peak Detect, Average		
Peak Detection	10ns(500ns/div ~ 50s/div)		
Average	2 , 4 , 8 , 16 , 32 , 64 , 128 , 256		
Voltage Measurement	V_{pp} , V_{amp} , V_{avg} , V_{rms} , V_{hi} , V_{lo} , V_{max} , V_{min} , Rise Preshoot/ Overshoot , Fall Preshoot/ Overshoot		
Time Measurement	Freq , Period , Rise Time , Fall Time , Positive Width , Negative Width , Duty Cycle		
Cursors Measurement	Voltage difference between cursors (ΔV) Time difference between cursors (ΔT)		
Auto Counter	Resolution : 6 digits ; Accuracy : ±2% Signal Source: All available trigger source except the Video trigger mode		
ADJUSTABLE PROBE COMPENSATION SIGNAL			
Frequency Range	1kHz ~ 100kHz, 1kHz/STEP		
Duty Cycle Range	5% ~ 95%, 5%/STEP		
CONTROL PANEL FUNCTION			
Autoset	Adjust Vertical VOLT/DIV, Horizontal TIME/DIV, and Trigger level automatically		
Save Setup	Up to 15 sets of measurement conditions		
Save Waveform	15 sets of waveform		



GDS-1000-U Series

SPECIFICATIONS

DISPLAY	
TFT LCD Type	5.7 inch
Display Resolution	234 (Vertically) x 320 (Horizontally) Dots
Display Graticule	8 x 10 divisions
Display Brightness	Adjustable
INTERFACE	
USB Device	USB1.1 & 2.0 full speed compatible
USB Host	Image (BMP) waveform data (CSV) and setup (SET)
POWER SOURCE	
Line Voltage Range	AC 100V ~ 240V , 48Hz ~ 63Hz , Auto selection
MISCELLANEOUS	
Go/NoGo Function	Available
Data Logger	Available
Multi-Language Menu	Available
Online Help	Available
DIMENSIONS & WEIGHT	
310(W) x 142 (H) x 140(D)mm, Approx. 2.5kg	

The specifications apply when the oscilloscope is powered on for at least 30 minutes under +20 C~+30 C .

ORDERING INFORMATION

GDS-1052-U 50MHz, 2-channel, Color LCD Display DSO
GDS-1072-U 70MHz, 2-channel, Color LCD Display DSO
GDS-1102-U 100MHz, 2-channel, Color LCD Display DSO

ACCESSORIES :
Quick Start Guide x 1, Power Cord x 1 , CD x 1
Probe-GTP-070A-4 : 70MHz(10:1/1:1)Switchable Passive Probe for GDS-1052-U(one per channel)
Probe-GTP-070A-4 : 70MHz(10:1/1:1)Switchable Passive Probe for GDS-1072-U(one per channel)
Probe-GTP-100A-4 : 100MHz(10:1/1:1)Switchable Passive Probe for GDS-1102-U(one per channel)

OPTIONAL ASSESSORIES

GTL-246	USB Cable, USB 2.0 A-B TYPE CABLE, 4P
GTL-110	Test Lead, BNC-BNC Heads
GSC-006	Soft Carrying Case
GDB-02	Oscilloscope Education and Training Kit
GTP-033A	Oscilloscope Probe, 35MHz 1:1 Passive Probe, BNC(P/M)

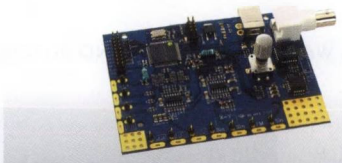
FREE DOWNLOAD

PC Software	FreeWave software
Driver	USB driver
	LabView Driver

Rear Panel

GDB-02 Oscilloscope Education and Training Kit

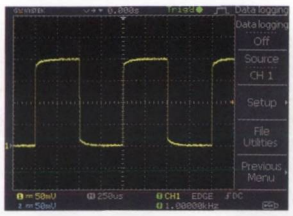
For : GDS-1000A-U/GDS-1000-U Series

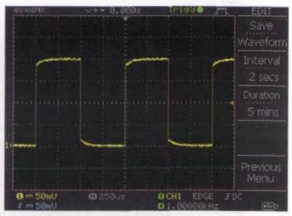


GSC-006 Soft Carrying Case

100MHz/70MHz/50MHz Digital Storage Oscilloscope

A. USB INTERFACE & DATA LOGGER

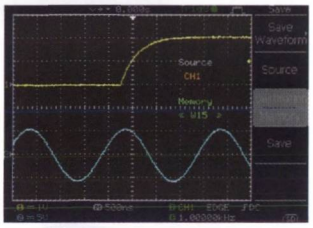


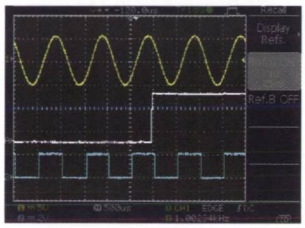


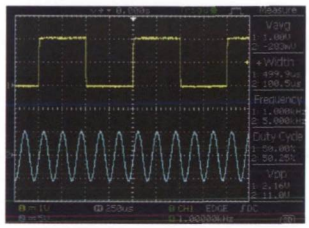
USB Host port on the front significantly enhances the data storage capability of the product. The large amount of data, including screenshot, waveform and panel setup, could be easily stored into a popular flash disk. A USB device port on the rear of the product transfers the screen image and waveform raw data to a PC and also allows a PC to remotely control the GDS-1000-U Series.

Furthermore, data logger can continue monitoring input signals and storing their waveform data in USB flash disk when trigger conditions are met, saving users' efforts to tracking signals manually and allowing them to analyze and observe waveform data afterwards.

B. WAVEFORM SAVING AND AUTOMATIC MEASUREMENT



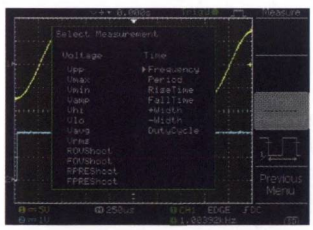


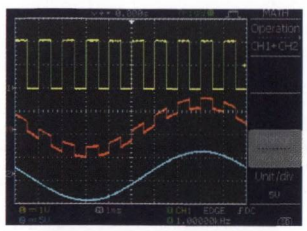


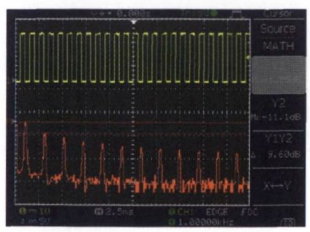
A total of 15 waveforms could be saved into memory for later recall and display, and 2 saved reference waveforms together with 2 live waveforms could be shown on the screen at the same time for comparison. A snapshot of all time & voltage related Auto

Measurement readings of an input signal could be shown on the screen simultaneously.

C. SOPHISTICATED MEASUREMENT FUNCTIONS



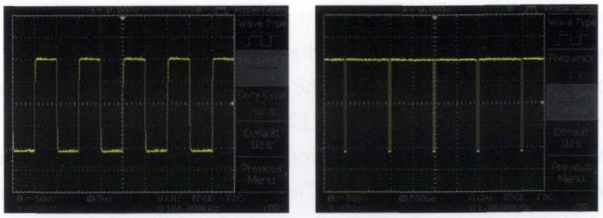




Several acquisition mode and 19 auto measurement functions help user measure the accurate property of waveforms. The advanced auto-set function makes the GDS-1000-U Series catch waveform automatically and display waveform quickly.

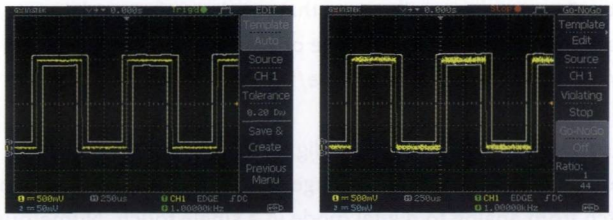
With arithmetic functions, FFT function keeps users abreast of the results by updating value immediately. Without almost extra-calculation the GDS-1000-U Series can provide sufficient information of testing.

D. ENHANCED CAL SIGNAL OUTPUT



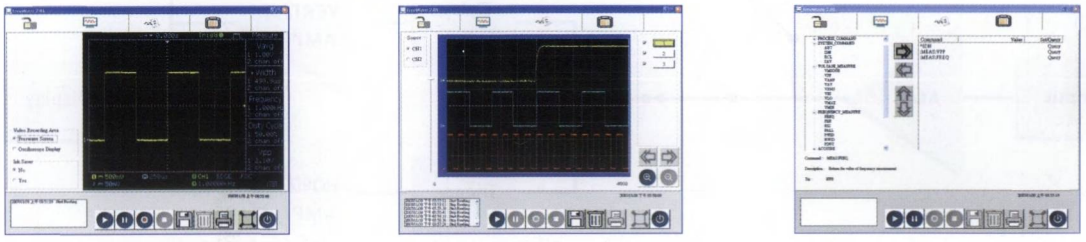
The GDS-1000-U Series has an enhanced 1kHz calibration signal. Its output frequency is adjustable from 1 kHz to 100 kHz as well as the duty cycle adjustable from 5%~95%.

E. GO/NOGO FUNCTION



Go/NoGo testing function checks whether the incoming signal violates the user-defined template. Users can easily define this template by setting the tolerance ratio to determine violation conditions. Go/NoGo testing can either keep counting violation number or stop testing when violation conditions are met.

F. FREEWAVE PC SOFTWARE



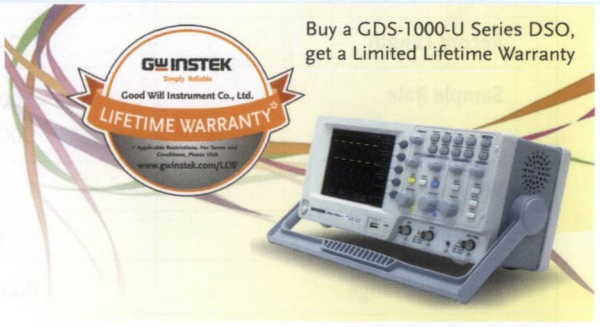
A PC Software, Freewave, supporting the GDS-1000-U Series is available to all customers for free download from GW Instek Website. This software enables the full screen image transfer from the GDS-1000-U Series to a PC via USB port in a fast-updating manner, so users can see a nearly-real-time display on the PC screen.

The screen image (.bmp or .jpg) and waveform raw data (.csv) could be saved into a PC for further applications. The continuous waveform images (.bmp or .jpg) in a time period could be recorded for later playback. This video recording function facilitates the repetitive observation of a saved waveform with continuous variation in a certain period of time.

G. AUTOSET DISABLE FUNCTION

For the educational purpose, instructors might not want to use Autoset function on the DSO when they are teaching how to use oscilloscope for the measurement. The GDS-1000-U Series can disable the Autoset function, enabling students to manually operate oscilloscope functions to further enrich their learning experience.

H. GUARANTEED PROTECTION

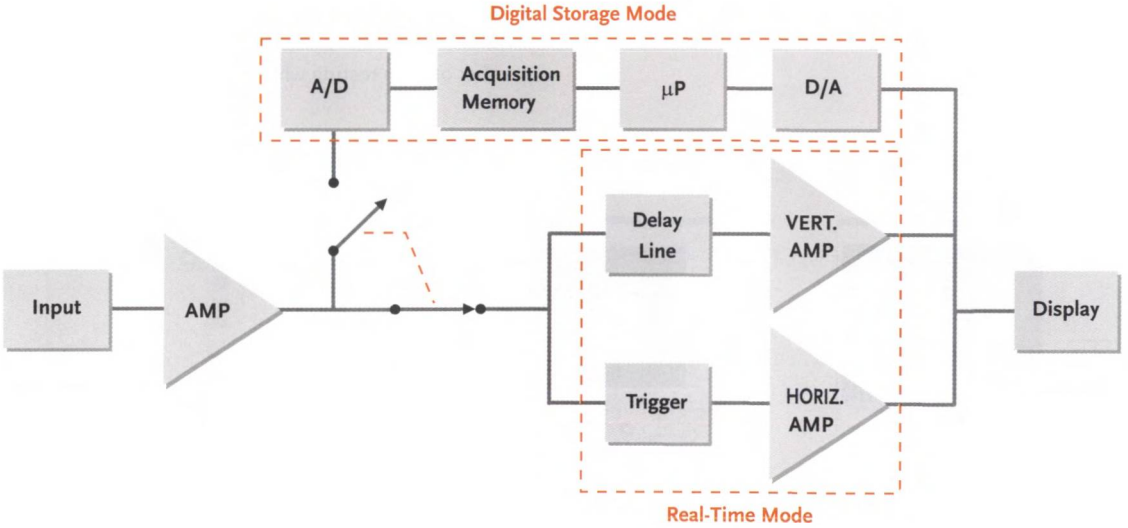


Providing Global Lifetime Warranty Program for GDS-1000-U Series, we believe you can have high confidence in the quality of this series. You are assured of a highly economical, low maintenance, and high quality DSO backed with the Lifetime Warranty program to guarantee the service during the product lifetime. For more details, please visit our website at **www.gwinstek.com/llw** or consult your nearest distributor.

REAL-TIME/DIGITAL STORAGE OSCILLOSCOPE OVERVIEW

When choosing an oscilloscope that requires a fast update rate, an accurate representation of the original signal, and waveform storage and analysis, a Real-Time/Digital Storage Oscilloscope will be the only choice.

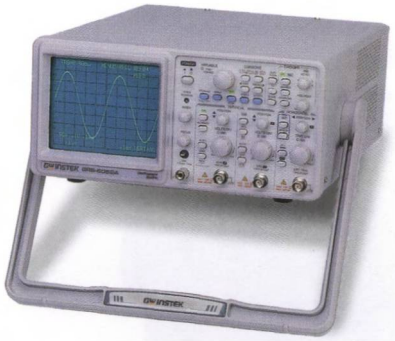
By integrating both analog and digital storage features in one product, Real-Time/Digital Storage Oscilloscopes enable you to switch from analog to digital mode in a single touch. Numerous functions such as Average, Pre-Trigger, Roll mode, Peak Detect, Envelop, Persistence, and X-Y mode allow these oscilloscopes to be used for various measurement applications. Delivering precise analog waveforms with the convenience of digital data storage, GW Instek offers the GRS-Series Real-Time/Digital Storage Oscilloscopes. The RS-232C Interface and the free remote control software enable monitoring, remote control, and waveform storage to a PC. Real-Time storage oscilloscopes allow you to bridge the gap between the analog and digital domain to obtain the perfect balance of traditional and modern technology.



REAL-TIME / DIGITAL STORAGE OSCILLOSCOPE SELECTION GUIDE

MODEL / MAIN FUNCTION	GRS-6052A	GRS-6032A
Display	6" CRT	6" CRT
Bandwidth(MHz)	50	30
Number of Channel	2	2
Record Length	2k Words/CH	2k Words/CH
Sample Rate	100MSa/s (RTS) 500MSa/s (ETS)	100MSa/s (RTS) 500MSa/s (ETS)
Vertical Resolution	8-bit	8-bit
Vertical Sensitivity	1mV ~ 20V	1mV ~ 20V
Time Base range	0.2μs ~ 100s/div	0.2μs ~ 100s/div
Waveform Memory	10	10
Panel Setup Memory	10	10
RS-232C	✓	✓
Power Source	AC 100/120/230 V	AC 100/120/230V
Page	A50-52	A50-52

50MHz/30MHz Real-Time/Digital Storage Oscilloscope



GRS-6052A(50MHz)
GRS-6032A(30MHz)

CE | RS-232 | PC Software

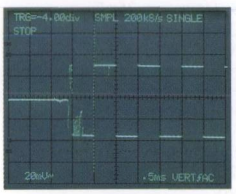
The GRS-6000A Series is Real-Time/Digital Storage Oscilloscope, which provides both analog and digital storage features in one product. The GRS-6000A Series has the advantage of accurately representing analog signals as well as storing them in real-time. With Equivalent Time Sampling at 500MSa/s, the GRS-6000A Series is capable of detailed reconstruction of repetitive waveforms with a bandwidth of up to 50MHz/30MHz. Storing waveforms can be accomplished with just a press of the RUN-STOP button, or through the Single Trigger mode to capture single-shot events. 10 reference waveforms can be saved and recalled for waveform comparison. Numerous functions as Average, Pre-Trigger, Roll mode, Peak Detect, Envelop, Persistence, and X-Y mode are available to suit various measurement applications. An RS-232C interface and the free remote control software allow remote monitoring, remote control, as well as waveform storage on a PC.

A. ANALOG + DIGITAL STORAGE

GRS-6000A Series Real-Time digital storage oscilloscope provides both analog and digital storage features in one product. It is extremely useful for applications requiring real time measurements (analog mode) and waveform storage functions (digital mode) at the same time. With a maximum 500MSa/s equivalent time sample rate, the GRS-6000A Series is able to accurately reconstruct waveforms up to 50MHz (GRS-6052A) and 30MHz (GRS-6032A).

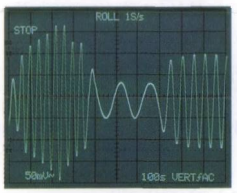
B. DIGITAL STORAGE

Pressing the RUN STOP button or using the Single Trigger mode, waveforms can be conveniently captured. Up to 10 reference waveforms can be saved for waveform comparison. Functions such as Average, Pre-Trigger, Roll mode, and X-Y mode allow the flexibility of digital features with proven analog technology.



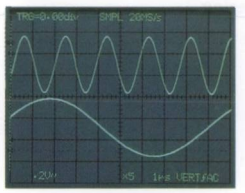
Pre-Trigger

GRS-6000A Series provides a pre-trigger function, which allows you to observe pre-triggered waveforms up to 10 divisions ahead of the trigger point.



ROLL Mode

The low-speed transient events from an input signal can be easily seen under the ROLL Mode. The waveform will roll on from right to the left to show input signal continuously with a roll time of up to 100s/division.

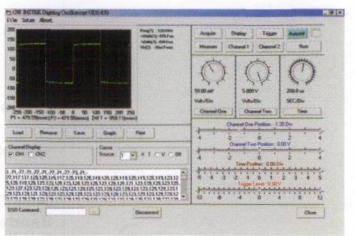


ALT-MAG

With ALT-MAG function, you can expand waveforms by 5, 10 or 20 times for detailed waveform observation. Both the original waveform and expanded waveform can be shown on the screen simultaneously.

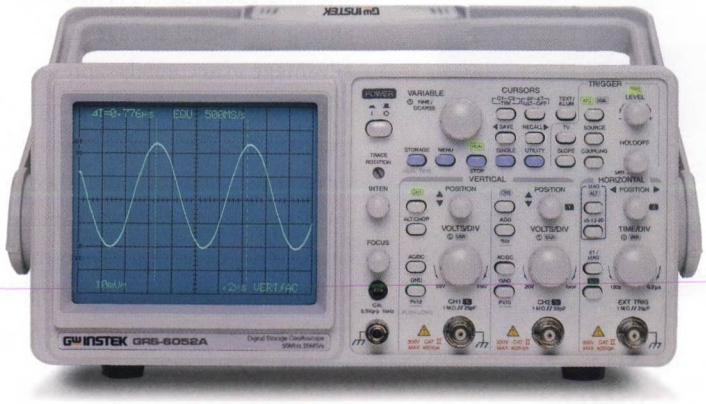
C. RS-232C AND REMOTE CONTROL SOFTWARE

Using the remote control software through the RS-232C interface, waveforms on the oscilloscope screen can be displayed and updated on a PC screen. The graphic user interface provides an easy platform for remote control. All waveform data can be converted into BMP, PCX, TIFF, PNG, or JPEG files for documentation and analysis.



Remote Control Software

50MHz/30MHz Real-Time/digital Storage Oscilloscope



GRS-6052A/6032A

FEATURES

* GRS-6052A : DC~50MHz Bandwidth, 100MSa/s, 2kW/CH x 2
  GRS-6032A : DC~30MHz Bandwidth, 100MSa/s, 2kW/CH x 2
* Equivalent Time Sampling of 500MSa/s max.
* Acquire Mode : Peak Detect, Envelop, Persistence
* Pre-Trigger Function 0 ~ 10 div
* ROLL Mode to 100s/div
* Waveform SAVE/RECALL 10 sets (REF0~REF9)
* Averaging Function (2 ~ 256)
* Smoothing Function ON/OFF
* Max. Sweep Rate 10ns/div
* ALT-MAG Function (x5, x10, x20)
* Cursor Readout Function: △V, △T, 1/△T
* Panel Setting SAVE/RECALL 10 sets (M0~M9)
* VERT Mode Triggering
* RS-232C Interface

SPECIFICATIONS

	GRS-6052A 50MHz, 100MSa/s, 500MSa/s (ETS)	GRS-6032A 30MHz, 100MSa/s, 500MSa/s (ETS)
CRT		
Type and Acceleration	6-inch CRT , 10kV	6-inch CRT , 2kV
ILLUM	Front panel control	Front panel control
Z-axis Input	Sensitivity : at least 5V Polarity : positive going input decrease intensity Max. input voltage:30V(DC+ACpeak) Input Impedance :approx. 33kΩ	Sensitivity : at least 5V Polarity : positive going input decrease intensity Max. input voltage:30V(DC+ACpeak) Input Impedance :approx. 47kΩ
VERTICAL SYSTEM		
Deflection Coefficient and Accuracy	1mV ~ 2mV/div ±5%, 5mV ~ 20V/div ±3%, 14 steps in 1-2-5 sequence	1mV ~ 2mV/div ±5%, 5mV ~ 20V/div ±3%, 14 steps in 1-2-5 sequence
Variable Continuous	2.5 : 1 ~ min. 50V/div	2.5 : 1 ~ min. 50V/div
Bandwidth (-3dB)	1mV ~ 2mV/div: DC~7MHz 5mV ~ 20V/div: DC~50MHz	1mV ~ 20mV/div: DC~7MHz 5mV ~ 20V/div: DC~30MHz
Vertical Mode	CH1, CH2, DUAL (ALT or CHOP)	CH1, CH2, DUAL (ALT or CHOP)
Chopper Frequency	Approx. 250kHz	Approx. 250kHz
Sum or Difference	CH1+CH2, CH1-CH2	CH1+CH2, CH1-CH2
Invert	CH2	CH2
Input Impedance	1MΩ ±2%//approx. 25pF	1MΩ ±2%//approx. 25pF
Input Coupling	AC, DC, GND	AC, DC, GND
Input Voltage	Max. 400V(DC+ACpeak)	Max. 400V(DC+ACpeak)
HORIZONTAL SYSTEM		
Sweep Time	0.2 μs/div ~ 0.5s/div, 20 steps	0.2 μs/div ~ 0.5s/div, 20 steps
Variable Continuously	2.5 : 1 up to 1.25s/div (uncal.)	2.5 : 1 up to 1.25s/DIV (uncal.)
Accuracy	±3%, ±5% at x5/ x10MAG. ±8% at x 20MAG	±3%,±5% at x5/ x10MAG. ±8% at x 20MAG
Sweep Magnification	x5, x10, x20	x5, x10, x20
Max. Sweep Time	20ns/div (10ns/div uncal)	50ns/div (10ns~40ns/div uncal)
ALT-MAG Function	Yes	Yes
HOLD-OFF Time	Variable	Variable
TRIGGER		
Trigger Mode	AUTO, NORM, TV	AUTO, NORM, TV
Trigger Source	VERT, CH1, CH2, LINE, EXT	VERT, CH1, CH2, LINE, EXT
Trigger Coupling	AC, HFR, LFR	AC, HFR, LFR
Trigger Slope	"+" or " - " polarity	"+" or " - " polarity
ALT Trigger	Yes	Yes
Indicator Trigger LED	Yes	Yes
TV Sync. Separator	TV-V(-), TV-H(-)	TV-V(-), TV-H(-)
Trigger Sensitivity	GRS-6052A: 20Hz ~ 5MHz / 5MHz ~ 40MHz / 40MHz ~ 50MHz CH1, CH2: 0.5 div / 1.5 div / 2.0 div VERT-MODE: 2.0 div / 3.0 div / 3.5 div EXT: 200mV / 800mV / 1V	GRS-6032A: 20Hz ~ 2MHz / 2MHz ~ 20MHz / 20MHz ~ 30MHz CH1, CH2: 0.5 div / 1.5 div / 2.0 div VERT-MODE: 2.0 div / 3.0 div / 3.5 div EXT: 200mV / 800mV / 1V
External Trigger Input	TV sync. pulse more than 1 DIV or 200mV (EXT) Input impedance :Approx. 1MΩ//25pF (AC coupling) Max. input voltage :400V (DC + AC peak)	
X-Y OPERATION		
Input	X-axis : CH1 ; Y-axis : CH2	X-axis : CH1 ; Y-axis : CH2
Sensitivity	1mV/div ~ 20V/div	1mV/div ~ 20V/div
Bandwidth	X-axis : DC ~ 500kHz (-3dB)	X-axis : DC ~ 500kHz (-3dB)
X-Y Phase Shift	<3° from DC ~ 50kHz	<3° from DC ~ 50kHz
DIGITAL STORAGE		
Acquisition Digitizer	8 bit ADC x 2	8 bit ADC x 2
Max. Sampling Rate	500MSa/s for equivalent time sampling 100MSa/s for normal sampling	500MSa/s for equivalent time sampling 100MSa/s for normal sampling

Rear Panel

SPECIFICATIONS		
Storage Bandwidth	Single shot: DC ~ 25MHz Repetitive: DC ~50MHz	Single shot: DC ~ 25MHz Repetitive: DC ~30MHz
Dynamic Range	±5div	±5div
Memory Length		
Acquisition Memory	2k words/CH x 2, 1k words/CH(equivalent)	2k words/CH x 2, 1k words/CH(equivalent)
Save REF Memory	1k words/CH x 10 with back-up memory (REF0~REF9)	1k words/CH x 10 with back-up memory (REF0~REF9)
Display Memory	1k words/CH x 4 waveform(max.)	1k words/CH x 4 waveform(max.)
Sweep Time	Equivalent: 0.2 µs/div ~ 0.5 µs/div Normal Sample: 1 µs/div ~ 0.1s/div Roll: 0.2s/div ~ 100s/div	Equivalent: 0.2 µs/div ~ 0.5 µs/div Normal Sample: 1 µs/div ~ 0.1s/div Roll: 0.2s/div ~ 100s/div
Sweep Magnification	x 5, x 10, x 20	x 5, x 10, x 20
Max.Sweep Time	10ns/div	10ns/div
MAG Interpolation	DOTS, LINEAR	DOTS, LINEAR
ALT-MAG Function	Yes	Yes
Acquire Mode	Sample, Peak detect(>25ns), Envelop. Persist, Average(2~256)	Sample, Peak detect(>25ns), Envelop. Persist, Average(2~256)
Operation Mode	Auto, Norm, Single, Single-roll, Roll, X-Y, Run/Stop	Auto, Norm, Single, Single-roll, Roll, X-Y, Run/Stop
Smoothing Function	Dot joint ON/OFF selectable	Dot joint ON/OFF selectable
Pre-Trigger	Pre-trigger 0 ~10div in 0.02div steps	Pre-trigger 0 ~10DIV in 0.02div steps
X-Y Operation	X-axis: CH1 Y-axis: CH2	X-axis: CH1 Y-axis: CH2
Storage Bandwidth	DC~50MHz(-3dB)	DC~30MHz(-3dB)
Display Resolution	H: 100points/div; V: 25points/div; X-Y: 25 x 25 points/div	H: 100points/DIV; V: 25points/div; X-Y: 25 x 25 points/div
Waveform SAVE/RECALL	10 sets(REF0~REF9)	10 sets(REF0~REF9)
Panel Setting SAVE/RECALL	10 sets(M0 ~M9)	10 sets(M0 ~M9)
READOUT & CURSOR		
Cursor Measurement	ΔV, ΔT, 1/ ΔT	ΔV, ΔT, 1/ ΔT
Readout Intensity	Adjustable	Adjustable
OUTPUT SIGNAL		
CH1 Signal Output	Voltage : approx. 20mV/div (with 50Ω terminated) ; Bandwidth : 50Hz ~ 5MHz	
Calibrator Output	Voltage : 0.5V±3% ; Frequency : approx. 1kHz, square wave	
INTERFACE		
RS-232C		
POWER SOURCE		
AC 100V/120V/230V±10%, 50/60Hz		
DIMENSIONS & WEIGHT		
275(W) x 130(H) x 370(D) mm; Approx. 8.5kg		

ORDERING INFORMATION

GRS-6052A 50MHz Digital Storage + Analog Oscilloscope
GRS-6032A 30MHz Digital Storage + Analog Oscilloscope

ACCESSORIES :
User manual x 1, Power cord x 1,
GTP-060A-4 : 60MHz (10 : 1/1 :1) Switchable Passive Probe (one per channel)

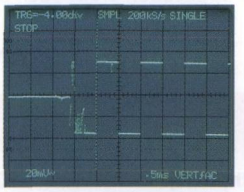
OPTIONAL ACCESSORIES

GTC-001 Instrument Cart, 450(W) x 430(D)mm (120V Input Socket)
GTC-002 Instrument Cart, 330(W) x 430(D)mm (120V Input Socket)
GTL-110 Test Lead, BNC-BNC Heads
GTL-232 RS232C Cable, 9-pin Female to 9-pin, Null Modem for Computer

FREE DOWNLOAD

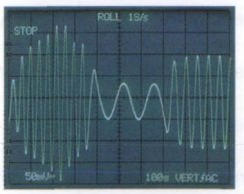
PC Software Remote Control Software

Digital Mode Functions



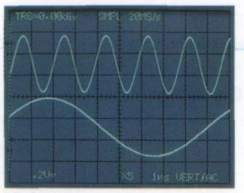
Pre-Trigger

GRS-6000A Series provide Pre-Trigger function, which allows users to observe Pre-Trigger waveform up to 10 divisions ahead of the trigger point.



ROLL Mode

The low-speed transient event of the input signal could be viewed easily under ROLL Mode. The waveform will roll on from right to the left to show the updated input signal all the time.



ALT-MAG

With ALT-MAG function, users could expand the waveforms by 5, 10, or 20 times for a more detailed waveform observation. Both original waveforms and expanded waveforms could be shown on the screen at the same time.

ANALOG OSCILLOSCOPE OVERVIEW

In this digital information era, the traditional analog oscilloscope still plays an important role in "providing Real-Time waveform information" in the test measurement domain. An analog oscilloscope draws waveforms on its display by deflecting an electron beam which sweeps across its screen horizontally. The beam is vertically deflected in proportion to the applied voltage, reproducing the shape of the target trace.

An analog oscilloscope's immediate representation of a waveform on the CRT display results in a faster update rate. Unlike a DSO that needs to digitally sample a signal before it can be displayed, an analog oscilloscope displays the signal in real-time with less risk of modifying any part of the original signal. Moreover, the original intensity of a waveform can be observed with the CRT. The ability to measure intensity is essential in some application areas such as the TV and Video industry.

Analog Oscilloscopes have no trouble with aliasing and interpolating points as well. For these reasons, despite the lack of digital storage and analysis, pre or post-trigger information, and high frequency limitations, analog oscilloscopes are still preferred by some professional users.

GW Instek has a complete series of analog oscilloscopes, the GOS Series, ranging from 20MHz to 100MHz. The GOS Series contains modern features such as Auto Set, Timebase Auto range, Panel Set-up Memory and Cursor Readouts. The GOS-Series is the perfect solution when you need to observe an unmodified signal.

ANALOG OSCILLOSCOPE SELECTION GUIDE

MAIN FUNCTION \ MODEL	GOS-6103C	GOS-6103	GOS-6112	GOS-6051	GOS-653G	GOS-652G
Bandwidth(MHz)	100	100	100	50	50	50
Number of Channels	2	2	2	2	2	2
Cursor Readout	✓	✓	✓	✓		
Vertical Sensitivity	2mV~5V	2mV~5V	2mV~5V	1mV~20V	1mV~5V	1mV~5V
Time Base Range (A)	50ns~0.5s	50ns~0.5s	50ns~0.5s	0.2 μs~0.5s	0.1 μs~0.5s	0.1μ s~0.5s
Time Base Range (B)	50ns~50ms	50ns~50ms	50ns~50ms		10ns~0.5s	
Maximum Sweep S/div	5ns	5ns	5ns	20ns	10ns	10ns
Counter Function	✓			✓		
Timebase Auto Range	✓	✓				
ALT Trigger					✓	✓
Panel Set-up Memory	✓	✓		✓		
Function Generator				✓		
CRT Type	6-inch	6-inch	6-inch	6-inch	6-inch	6-inch
Power Source	AC100/ 120/230V ±10%	AC100/ 120/230V ±10%	AC100/ 120/230V ±10%	AC100/ 120/230V ±10%	AC100/ 120/220 /230V ±10%	AC100/ 120/220 /230V ±10%
Page	A57-58	A57-58	A57-58	A55-56	A61-62	A61-62

ANALOG OSCILLOSCOPES

ANALOG OSCILLOSCOPE SELECTION GUIDE

MAIN FUNCTION / MODEL	GOS-630FC	GOS-635G	GOS-6031	GOS-630	GOS-622G	GOS-620	GOS-620FG
Bandwidth(MHz)	30	35	30	30	20	20	20
Number of Channels	2	2	2	2	2	2	2
Cursor Readout			✓				
Vertical Sensitivity	1mV~5V	1mV~5V	1mV~20V	1mV~5V	1mV~5V	1mV~5V	1mV~5V
Time Base Range (A)	0.2μs~0.5s	0.1μs~0.5s	0.2μs~0.5s	0.2μs~0.5s	0.1μs~0.5s	0.2μs~0.5s	0.2μs~0.5s
Time Base Range (B)							
Maximum Sweep S/div	100ns	10ns	50ns	100ns	10ns	100ns	100ns
Counter Function	✓		✓				
Timebase Auto Range	✓						
ALT Trigger	✓	✓	✓	✓	✓	✓	✓
Panel Set-up Memory			✓				
Function Generator							✓
CRT Type	6-inch	6-inch	6-inch	6-inch	6-inch	6-inch	6-inch
Power Source	AC115/ 230V±15% Selectable	AC100/ 120/220 /230V ±10%	AC100/ 120/230V ±10%	AC115/ /230V ±15%	AC100/ 120/220 /230V ±10%	AC115/ /230V ±15%	AC115/ /230V ±15%
Page	A59-60	A61-62	A55-56	A61-62	A61-62	A61-62	A63

50MHz/30MHz Readout Analog Oscilloscope

GOS-6000 Series analog oscilloscopes have a remarkable combination of performance, compact design and resolution in bandwidths of 30MHz and 50 MHz. Coupled with various trigger modes, waveforms can be acquired and observed in a number of diverse applications. Elusive signal details can be revealed using the ALTMAG function to magnify signals (x5, x10x 30). The on-screen cursor readout function and 6 digit frequency counter allow signals to be tested conveniently, making the GOS-6000 Series oscilloscopes indispensible tools for any professional engineer. The series consists of the GOS-6051 (50MHz) and the GOS-6031(30MHz) models.

GOS-6051 (50MHz)
GOS-6031 (30MHz)

CE CURSOR Readout

FEATURES

* 2 Channels, 4 Traces:
  DC~50MHz Bandwidth (GOS-6051)
  DC ~ 30MHz Bandwidth (GOS-6031)
* Vertical Sensitivity : 1mV/div ~ 20V/div
* CRT Readout
* Cursor Measurement, 6 Digit Frequency Counter, 10 sets Memory for Front Panel Setting Save & Recall (GOS-6051/6031)
* ALT MAG Function (x 5, x 10, x 20)
* Vertical Mode Triggering
* TV Synchronization
* CH1 Signal Output, Z- axis Input
* Buzzer Alarm & LED Indicators
* Compact size(275Wx130Hx370Dmm)and Front Panel Layout Groups for Easy to Use

SPECIFICATIONS

CRT

Type	6-inch rectangular type with internal graticule 0%, 10%, 90%, 100% markers. 8x10 div(1div=1cm)
Accelerating Potential	GOS-6051 : approx.10kV; GOS-6031 : approx. 2kV
Illumination	Provided
Trace Rotation	Provided
Z-axis Input	Sensitivity : at least 5V ; Polarity : positive going input decrease intensity Usable frequency range : DC to 2MHz ; Max. input voltage : 30V (DC + AC peak) at 1kHz or less Input Impedance:GOS-6051 : approx.33kΩ;GOS-6031 : approx.47kΩ

VERTICAL SYSTEM

Sensitivity and Accuracy	1mV~2mV/div±5%,5mV~20V/div±3%,14 calibrated steps in 1-2-5 sequence
Vernier Vertical Sensitivity	Continuously variable to 1/2.5 or less of panel indicate value

		Bandwidth (-3dB)	Rise Time
GOS-6051	5mV ~ 20V/div :	DC ~ 50MHz	Approx. 7nS
	1mV ~ 2mV/div :	DC ~ 7MHz	Approx. 50nS
GOS-6031	5mV ~ 20V/div :	DC ~ 30MHz	Approx. 11.7nS
	1mV ~ 2mV/div :	DC ~ 7MHz	Approx. 50nS

Bandwidth(-3dB) and Rise Time	
Maximum Input Voltage	400V (DC + AC peak) at 1kHz or less
Input Coupling	AC, DC, GND
Input Impedance	1MΩ ±2%//approx. 25pF
Vertical Modes	CH1, CH2, DUAL (CHOP, ALT), ADD, CH2 INV
Chop Frequency	Approx. 250kHz
Dynamic Range	GOS-6051 : 8 div at 40MHz, 6div at 50MHz; GOS-6031 : 8 div at 20MHz, 6div at 30MHz

HORIZONTAL SYSTEM

Sweep Time	0.2 μs/div ~ 0.5s/div, 20 steps selectable in 1-2-5 sequence, continuous variable control between steps at least 1 : 2.5
Accuracy	±3%, ±5% at x5 / x10MAG, ±8% at x 20MAG
Sweep Magnification	x5, x10, x20 MAG
Maximum Sweep Time (at MAG)	GOS-6051 : 20ns/div (10ns/div are uncalibrated) GOS-6031 : 50ns/div (10ns/div ~ 40nS/div are uncalibrated)
ALT-MAG Function	Available

TRIGGER

Trigger Mode	AUTO, NORM, TV
Trigger Source	VERT-MODE, CH1, CH2, LINE, EXT
Trigger Coupling	AC, HFR, LFR, TV-V(-), TV-H(-)
Trigger Slope	"+" or " - " polarity
Trigger Sensitivity	

GOS-6051	20Hz ~ 5MHz	5MHz ~ 40MHz	40MHz ~ 50MHz
GOS-6031	20Hz ~ 2MHz	2MHz ~ 20MHz	20MHz ~ 30MHz
CH1, CH2	0.5 div	1.5 div	2.0 div
VERT-MODE	2.0 div	3.0 div	3.5 div
EXT	200mV	800mV	1V

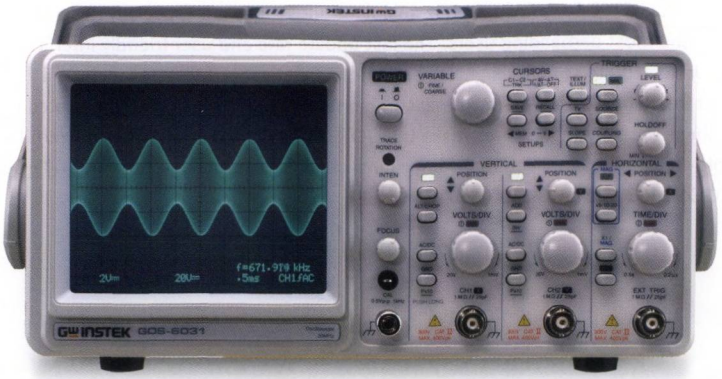
External Trigger Input	TV sync pulse more than 1 div (CH1, CH2, VERT-MODE) or 200mV (EXT) Input impedance:Approx.1MΩ//25pF(AC coupling) Max. input voltage:400V(DC+AC peak)at 1kHz
Hold-off Time	Variable

X-Y OPERATION

Input	X-axis : CH1 ; Y-axis : CH2
Sensitivity	1mV/div ~ 20V/div
Bandwidth	X-axis : DC ~ 500kHz (-3dB)
Phase Difference	3° or less from DC to 50kHz

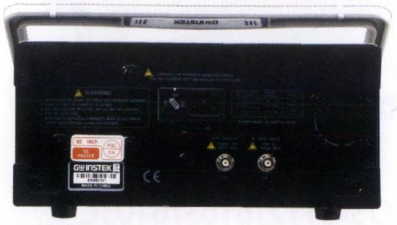
OUTPUT SIGNAL

CH1 Signal Output	Voltage:approx.20mV/div(with 50Ω terminated);Bandwidth:50Hz to at least 5MHz
Calibrator Output	Voltage:0.5V±3% ; Frequency : approx. 1kHz, square wave



GOS-6031 (30MHz)

Rear Panel



SPECIFICATIONS	
CRT READOUT	
Panel Setting Display	CH1/CH2 sensitivity, sweep time, trigger condition
Panel Setting Save & Recall	10 sets
Cursor Measurement	Cursor measurement function : ΔV, ΔT, 1/ΔT Cursor resolution : 1/25 div ; Effective cursor range : vertical : ±3 div Horizontal : ±4 div
Frequency Counter	Display digits : Max. 6-digits decimal Frequency range : GOS-6051 : 50Hz ~ 50MHz; GOS-6031 : 50Hz ~ 30MHz Accuracy : ±0.01% ; Measuring sensitivity : more than 2 div (measuring source selected from CH1 or CH2 as synchronous signal sources)
POWER SOURCE	
AC 100V/120V/230V±10%, 50/60Hz	
DIMENSIONS & WEIGHT	
275(W) x 130(H) x 370(D) mm; Approx. 7.2kg	

ORDERING INFORMATION

GOS-6051 50MHz, Readout Analog Oscilloscope with Cursor Measurement and Frequency Counter
GOS-6031 30MHz, Readout Analog Oscilloscope with Cursor Measurement and Frequency Counter

ACCESSORIES :
User manual x 1, Power cord x 1
Probe-GTP-060A-4 : 60MHz (10 : 1/1 :1) Switchable Passive Probe (one per channel)

OPTIONAL ACCESSORIES

GTC-001 Instrument Cart, 450(W)x430(D)mm (120V Input Socket)
GTC-002 Instrument Cart, 330(W)x430(D)mm (120V Input Socket)
GTL-110 Test Lead, BNC-BNC Heads

100MHz Cursor Readout Analog Oscilloscope

The GW Instek GOS-6100 Series of 100MHz analog oscilloscopes are especially designed to display waveforms for the most demanding users. The fast update rate and user friendly interface provide a simple solution to acquire complex signals in real-time. Its advanced features include a built-in 6 digit frequency, cursor-assisted measurements (GOS-6103C) and sophisticated triggering options. All these outstanding features make the GOS-6100 Series oscilloscopes powerful and indispensable instruments for acquiring video signals and measuring waveform jitter. This series consists of GOS-6112 and GOS-6103/6103C models.

GOS-6112/6103/6103C (100 MHz)

CE CURSOR Readout GOS-6103C Without CE Approval

FEATURES

* 100MHz Bandwidth, Dual Channel, Delayed Sweep
* Built-In 6 digits Universal Counter (GOS-6103C)
* 10 Sets Memory for Front Panel Setting Save & Recall (GOS-6103/GOS-6103C)
* Time Base Auto-range (GOS-6103/GOS-6103C)
* Cursor Readout with 7 Measurements
* Panel Setup Lock of Digital-Control Functions
* Buzzer Alarm
* LED Indicators
* TV Synchronization
* Trigger Signal Output
* Z-Axis Modulation Input
* SMD Technology, High Stability and Reliability

Rear Panel

GOS-6112

SPECIFICATIONS

CRT

Type	6-inch rectangular type with internal graticule; 0%, 10%, 90% and 100% markers 8 x 10 div (1 div = 1 cm)
Accelerating Potential	16 kV approx. (GOS-6103/GOS-6103C), 12kV approx. (GOS-6112)
Illumination	Continuously adjustable (GOS-6103/GOS-6103C)
Z-axis input	Coupling : DC Sensitivity: 5V or more Maximum input voltage : 30V (DC + AC peak) at 1kHz or less Bandwidth : DC ~ 5 MHz

VERTICAL SYSTEM

Sensitivity	2mV~5V/div, 11 step in 1-2-5 sequence
Sensitivity Accuracy	≤3% (5div at the center of display)
Vernier Vertical Sensitivity	Continuously variable to 1/2.5 or less of panel-indicate value
Bandwidth(-3dB)	DC~100MHz(2mV/div:DC~20MHz)
Rise Time	3.5ns (2mV/div:17.5ns)
Signal Delay	Leading edge can be monitored
Max. Input Voltage	400V(DC+AC peak) at 1kHz or less
Input Coupling	AC, DC, GND
Input Impedance	1MΩ ±2% // approx. 25pF
Vertical Mode	CH1,CH2,DUAL(CHOP/ALT), ADD, CH2 INV.
Bandwidth Limited	20MHz
Common-Mode Rejection Ratio	50:1 or better at 50kHz
Dynamic Range	8 div at 60MHz; 5div at 100MHz (GOS-6112) 8 div at 100MHz (GOS-6103/GOS-6103C)

HORIZONTAL SYSTEM

Horizontal Modes	MAIN(A), ALT, DELAY(B)
A(main) Sweep Time	50ns~0.5s/div, continuously variable (UNCAL)
B(delay) Sweep Time	50ns~50ms/div
Accuracy	±3% (±5% at x 10 MAG)
Sweep Magnification	x 10 (maximum sweep time 5nS/div)
Hold Off Time	Variable
Delay Time	1 μs~5s
Delay Jitter	Better than 1:20000
Alternate Separation	Variable

TRIGGER

Trigger Modes	AUTO, NORM,TV
Trigger Source	CH1,CH2,LINE,EXT
Trigger Coupling	AC,DC,HFR,LFR
Trigger Slope	"+" or "-" polarity or TVsync polarity
Trigger Sensitivity	(see table below)
TV sync	TV-V, TV-H
Max. External Input Voltage	400V(DC+AC peak) at 1kHz
External Input Impedance	1MΩ±5% // approx.25pF

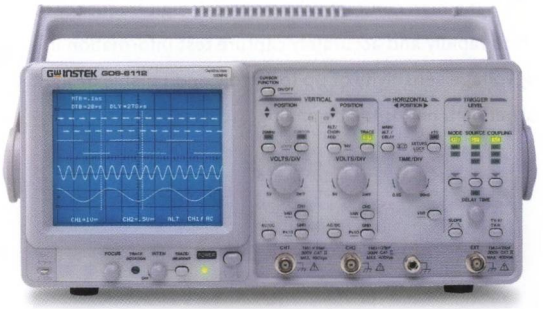
Mode	Frequency	INT	EXT
AUTO	10 Hz ~ 20 MHz 20 MHz ~ 100 MHz	0.35 div 1.5 div	50 mV 150 mV
NORM	DC ~ 20 MHz 20 MHz ~ 100 MHz	0.35 div 1.5 div	50 mV 150 mV
TV	sync signal	1 div	200 mV_{pp}

X-Y OPERATION

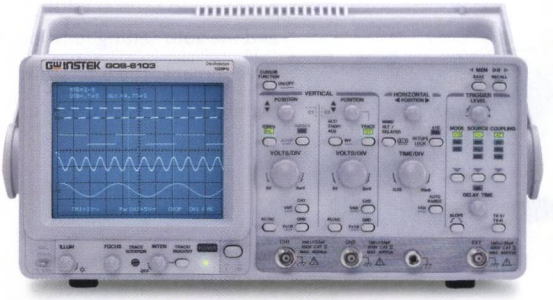
Mode	X-axis: selectable CH1, CH2, EXT ; Y-axis: selectable CH1, CH2, CH1 and CH2
Sensitivity Accuracy	2mV~5V/div±3% ; EXT : 0.1V/div ±5%
X-axis Bandwidth	DC~500kHz(-3dB)
Phase Error	3° or less from DC~50kHz

OUTPUT SIGNAL

Trigger Signal Output	Voltage: approx. 25mV/div into 50Ω ; Frequency response : DC ~ 10MHz
Calibrator Output	1kHz Square wave, 2Vpp ±2%



GOS-6112



GOS-6103/6103C

SPECIFICATIONS

CURSOR READOUT FUNCTION	
Cursor Measurement Function	ΔV, ΔV%, ΔVdB, ΔT, 1/ΔT, ΔT%, Δθ
Cursor Resolution	1/100 div
Effective Cursor Range	Vertical: ±3div ; Horizontal: ±4 div
Panel Setting Display	Vertical: V/div(CH1,CH2),UNCAL,ALT/CHOP/ADD,INV, probe factor,AC/DC/GND Horizontal: s/div(MTB, DTB), UNCAL, x 10MAG, delay time , Hold-off Trigger: source, coupling, slope, level, TV-V, TV-H Others: X-Y, lock, save/recall MEM 0-9 (GOS-6103/GOS-6103C)
AUTO MEASUREMENT FUNCTION (GOS-6103C)	
Parameter Function	FREQ, PERIOD, ±WIDTH, ±DUTY (+ or - polarity selected by trigger slope)
Display Digits	Max. 6-digits, decimal
Frequency Range	50Hz ~ 100MHz
Accuracy	1kHz ~ 100MHz : ±0.01% ; 50Hz ~ 1kHz : ±0.05%
Measuring Sensitivity	> 2 div (Measuring source selected from CH1 and CH2 as synchronous signal sources)
SPECIAL FUNCTION	
TIME/DIV Auto Range	Provided (GOS-6103/GOS-6103C)
Panel Setting Save & Recall	10 sets (GOS-6103/GOS-6103C)
Panel Setups Lock	Provided
POWER SOURCE	
AC 100V/120V/230V±10% , 50/60Hz	
DIMENSIONS & WEIGHT	
310(W) x 150(H) x 455(D) mm ; Approx. 9kg	

ORDERING INFORMATION

GOS-6112 100MHz, 2-channel, Analog Oscilloscope
GOS-6103 100MHz, 2-channel, Analog Oscilloscope
GOS-6103C 100MHz, 2-channel, Analog Oscilloscope with 100MHz Frequency Counter

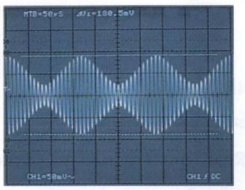
ACCESSORIES :
User manual x 1, Power cord x 1
GTP-100A-4 : 100MHz (10 : 1/1 :1) Switchable Passive Probe (one per channel)

OPTIONAL ACCESSORIES

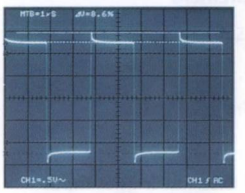
GTC-001 Instrument Cart, 450(W) x 430(D) mm (120V Input Socket)
GTC-002 Instrument Cart, 330(W) x 430(D) mm (120V Input Socket)
GTL-110 Test Lead, BNC-BNC Heads

Cursor Measurement Functions

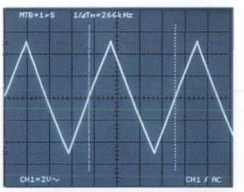
The unique, easy-to-use cursor and numerical readouts make waveform observation and measurement easier, faster and more accurate. The on-screen cursors provide seven measurement functions (ΔV, ΔV%, ΔVdB, ΔT, 1/Δ T,T%, Δθ)



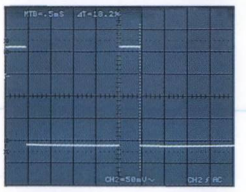
Voltage Measurement



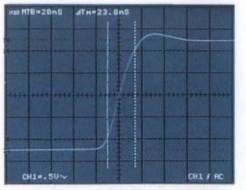
Voltage Percentage Measurement



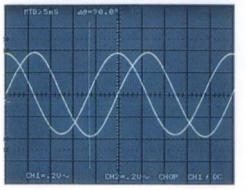
Frequency Measurement



Time Percentage Measurement



Time Measurement



Phase Measurement

30MHz Analog Oscilloscope with Frequency Counter

30MHz GOS-630FC establishes a new benchmark for economical analog oscilloscopes. It includes a number of general purpose features such as the high contrast LCD display, 6-digit frequency counter and the auto setting function for engineers to rapidly and accurately capture test information in any environment. The 0.2 $^{\mu}$s/div sweep speed, voltage sensitivity of up to 1V/div and reliable design highlight GOS-630FC as a unique low cost yet high performance analog oscilloscope.

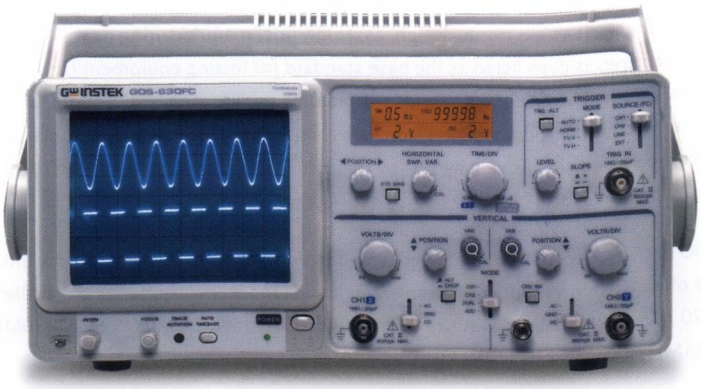
GOS-630FC

CE Counter

FEATURES

* 30MHz Bandwidth
* 1mV/div High Vertical Sensitivity
* Internal 5 Digits Real-Time Frequency Counter
* LCD Readout Display for Vertical/Horizontal/ Frequency Measurement
* Auto Time-Base Setting
* Buzzer Alarm
* TV(TV-V, TV-H) Trigger Modes
* XY Mode
* Z-Axis Input and External Trigger Input

SPECIFICATIONS	
VERTICAL AXIS	
Sensitivity	1mV ~ 5V/div , 12 steps in 1-2-5 sequence
Accuracy	≤ 3%, (1mV/div, 2mV/div: ≤5%)
Vernier Vertical Sensitivity	≤1/2.5 of panel-indicated value
Bandwidth	DC~30MHz (1mV/div, 2mV/div: DC~7MHz)
Rise Time	Approx. 11.7ns (1mV/div, 2mV/div: Approx. 50ns)
Input Impedance	Approx. 1MΩ // Approx. 25pF
Square Wave Characteristics	Overshoot : 5% (At 10mV/div range)
Linearity	<±0.1div of amplitude change
Vertical Modes	CH1, CH2, DUAL (ALT/CHOP), ADD
Chopping Repetition Frequency	Approx. 250kHz
Input Coupling	AC, DC, GND
Maximum Input Voltage	CATⅡ 300V(DC+ACpeak)
Common Mode Rejection Ratio	50:1 or better at 50kHz sinusoidal wave.
Isolation Between Channels	>1000:1at 50kHz, >30:1at 30MHz(at 5mv/div Range)
CH1 Signal Output	At least 20 mV/div at 50Ω terminal, frequency at least 50Hz to 5MHz
TRIGGERING	
Triggering Source	CH1, CH2, ALT, LINE, EXT
Coupling	AC : 20Hz to full bandwidth
Slope	+ / -
Sensitivity	20Hz ~ 2 MHz : 0.5 div, TRIG-ALT : 2 div, EXT : 200mV 2MHz ~ 30MHz : 1.5 div, TRIG-ALT : 3 div, EXT : 800mV TV : Sync pulse more than 1 div (EXT: 1V)
Triggering Modes	AUTO , NORM , TV-V , TV-H
EXT TRIGGERING SIGNAL INPUT	
Input Impedance	Approx. 1MΩ // approx. 25pF
Maximum Input Voltage	CATⅡ 300V(DC+AC peak)
HORIZIONAL AXIS	
Sweep Time	0.2 μS ~ 0.5 S/div , 20 steps in 1-2-5 sequence
Sweep Time Accuracy	±3%
Vernier Sweep Time Control	≤1/2.5 of panel-indicated value
Sweep Magnification	10 times
×10MAG Sweep Time Accuracy	±5% (20nSec~50nSec are uncalibrated)
Linearity	±3%, ×10MAG:±5% (20ns and 50ns are uncalibrated)
X-Y MODE	
Sensitivity	Same as vertical axis
Bandwidth	DC to at least 500kHz
X-Y Phase Difference	≤3° at DC ~50kHz
Z AXIS	
Sensitivity	5 Vp-p (Positive-going signal decreases intensity)
Bandwidth	DC ~ 2MHz
Input Resistance	Approx. 47kΩ
Maximum Input Voltage	CAIⅡ 30V(DC+AC peak)
CALIBRATION VOLTAGE	
Waveform	Positive-going Square wave
Frequency	Approx. 1 kHz
Duty Ratio	Within 48:52
Output Voltage	2 Vp-p ±2%
Output Impedance	Approx. 1 kΩ
FREQUENCY COUNTER	
Display Digits	Max. 5-digits decimal
Frequency Range	50Hz~30MHz
Accuracy	±0.05% : 50Hz~1kHz, ±0.02% : 1kHz~30MHz
Measuring Sensitivity	> 2div
LCD	
Display	VOLT/div, TIME/div, X-Y Mode, Frequency
Backlight	Orange



GOS-630FC

CRT	
Type	6-inch rectangular type, internal graticule
Acceleration Voltage	Approx. 2kV
Effective Screen Size	8 x 10 div (1 div = 10mm (0.39in))
Graticule	Internal
Trace Rotation	Provided
POWER SOURCE	
AC115V, 230V ± 15% selectable, 50Hz or 60Hz	
STORAGE TEMPERATURE & HUMIDITY	
-10℃ ~ 70℃ ; 70%RH (Max.)	
DIMENSIONS & WEIGHT	
310 (W) x 150 (H) x 455 (D) mm ; Approx.8.2kgs (18.0lbs)	

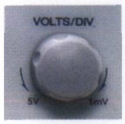
ORDERING INFORMATION

GOS-630FC 30MHz 2-Channel Analog Oscilloscope with Frequency Counter

ACCESSORIES :
User manual x 1, Power cord x 1
Probe-GTP-060A-4 : 60MHz (10 : 1/1 :1) Switchable Passive Probe (one per channel)

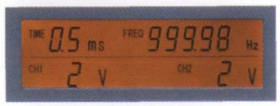
OPTIONAL ACCESSORIES

GTC-001 Instrument Cart, 450(W) x 430(D) mm (120V Input Socket)
GTC-002 Instrument Cart, 330(W) x 430(D) mm (120V Input Socket)
GTL-110 Test Lead, BNC-BNC Heads



High Sensitivity 1mV/div

Auto Time-Base



LCD Readout Display

5 Digits Real-Time Frequency Counter

50/35/30/20MHz Analog Oscilloscope

GOS-653G (50 MHz)

CE

GOS-652G (50 MHz)

CE

FEATURES

* 50MHz Bandwidth, Dual Channel
* Delayed Sweep(GOS-653G)
* Built-In Delay Line (GOS-653G)
* TV Synchronization
* CH1 Output
* Z Axis Modulation Input
* ALT Triggering Function
* Hold Off Function
* Trigger Level Lock Function

The GOS-600G Series is an example of classic analog oscilloscope design. It covers a broad range of industry applications such as electronic design, assembly line, manufacturing as well as service and maintenance. The series is even listed as the base standard for testing equipment for some educational institutions. The GOS-600G Series still features update rates and a simple robust user interface unmatched by today's digital storage oscilloscopes. The ALT trigger mode allows engineers to compare two signals side by side by triggering each channel alternately. The built-in delayed sweep function is ideal for observing signal edges.

The GOS-600G Series is recognized for its high standard level of functions and reliable industrial design that is often used in various measurement fields. All models of the series are available in a full range of 20 / 35 / 50MHz bandwidth, including GOS-653G (50MHz), GOS-652G (50MHz), GOS-635G (35MHz), GOS-622G (20MHz).

SPECIFICATIONS	
CRT	
Type	6-inch rectangular type with internal graticule 0%, 10%, 90% and 100% markers. 8 x 10 div (1div=1cm)
Accelerating Potential	12kV
Illumination	Continuously adjustable
Z-axis Input	Input Impedance: Approx. 5kΩ Sensitivity: Above 3Vp-p Bandwidth: DC ~ 5MHz
VERTICAL SYSTEM	
Sensitivity	5mV/div ~ 5V/div ±3%,1mV ~ 2mV/div ±5%
Bandwidth	DC ~ 50MHz DC ~ 15MHz at 1 ~ 2mV/div
Rise Time	7ns (23.3ns for 1 ~ 2mV/div)
Signal Delay	leading edge can be monitored(GOS-653G only)
Input Impedance	Approx. 1MΩ
Input Coupling	AC, DC, GND
Vertical Mode	CH1, CH2, DUAL, ADD, CH2 INV (Dual automatic switching ALT and CHOP)
HORIZONTAL SYSTEM	
A(main) Sweep Time	0.1 µs ~ 0.5s/div±3% 100ns ~ 50ms/div±5% (x 10 MAG) 10ns ~ 50ns±8% (x 10 MAG)
B(delay) Sweep Time (GOS-653G only)	0.1 µs ~ 0.5ms/div±3% 100ns ~ 50µs/div ±5% (x 10 MAG), 10ns ~ 50ns/div±8% (x 10 MAG)
Delay Time	1 µs ~ 5ms, ±5% (GOS-653G only)
Delay Time Jitter	Better than 1 : 10000 (GOS-653G only)
TRIGGER	
Trigger Mode	AUTO, NORM, SINGLE
Trigger Source	CH1, CH2, ALT, LINE, EXT
Trigger Coupling	AC, DC, HF REJ, TV
Trigger Slope	"+" or "-"
X-Y OPERATION	
Sensitivity	5mV ~ 5V/div±4%
X-axis Bandwidth	DC ~ 2MHz
Phase Error	3° or less from DC ~ 100kHz (GOS-653G) 3° or less from DC ~ 50kHz (GOS-652G)
OUTPUT SIGNAL	
Trigger Signal Output	Voltage: approx. 50mV/div into 50Ω
Calibrator Output	1kHz Square wave, 2Vp-p±2%
POWER SOURCE	
AC 100V/120V/220V/230V±10%, 50Hz/60Hz	
DIMENSIONS & WEIGHT	
310(W) x 150(H) x 455(D) mm; Approx. 8.2kg	

ORDERING INFORMATION

GOS-653G 50MHz, 2-Channel, Oscilloscope with Delayed Sweep
GOS-652G 50MHz, 2-Channel, Oscilloscope

ACCESSORIES :
User manual x 1, Power cord x 1
Probe-GTP-060A-4 : 60MHz (10 : 1/1 :1) Switchable Passive Probe (one per channel)

OPTIONAL ACCESSORIES

GTC-001 Instrument Cart, 450(W) x 430(D) mm (120V Input Socket)
GTC-002 Instrument Cart, 330(W) x 430(D) mm (120V Input Socket)
GTL-110 Test Lead, BNC-BNC Heads

The 20MHz GOS-620 oscilloscope is an economical analog oscilloscope with 5mV/div ~ 5V/div vertical sensitivity and 0.2us/div ~ 0.5s/div horizontal sweep speed. Its outstanding mainstream specifications, reliable industrial design as well as the high quality make it an ideal choice when upgrading equipment for education, training, manufacturing or service and maintenance.

GOS-635G (35MHz)
GOS-622G (20MHz)

CE

GOS-630 (30MHz)
GOS-620 (20MHz)

CE

FEATURES

* 35MHz Bandwidth, Dual Channel (GOS-635G)
* 30MHz Bandwidth, Dual Channel (GOS-630)
* 20MHz Bandwidth, Dual Channel (GOS-622G)
* 20MHz Bandwidth, Dual Channel (GOS-620)
* High Sensitivity 1mV/div
* TV Synchronization
* Z Axis Input
* ALT Triggering Function
* Hold Off Function (GOS-635G,GOS-622G)
* CH1 Output

SPECIFICATIONS

	GOS-635G/GOS-622G	GOS-620/GOS-630
CRT		
Type	6-inch rectangular type with internal graticule 8 x 10 div (1div=1cm)	6-inch rectangular type with internal graticule 8 x 10 div (1div=1cm)
Z-Axis Input	Input Impedance: Approx. 5kΩ Sensitivity: Above 3Vp-p Bandwidth: DC ~ 5MHz	Input Impedance: Approx. 47kΩ Sensitivity: Above 5Vpp Bandwidth: DC ~ 2MHz
VERTICAL SYSTEM		
Sensitivity Bandwidth Rise Time Input Impedance Input Coupling Vertical Mode	5mV/div ~ 5V/div±3%, 1mV ~ 2mV/div± 5% DC ~ 35MHz (GOS-635G) DC ~ 20MHz (GOS-622G) DC ~ 10MHz at 1~ 2mV/div 10ns (35ns at 1mV~2mV/div) (GOS-635G) 17.5ns(35ns at 1mV~2mV/div) (GOS-622G) Approx. 1MΩ AC, DC, GND CH1, CH2, DUAL, ADD, CH2 INV (Dual automatic switching ALT and CHOP)	5mV/div ~ 5V/div±3%, x 5MAG:±5% DC (AC 10Hz) ~ 20MHz(-3dB) (GOS-620) DC ~ 30MHz (GOS-630) DC (AC 10Hz) ~ 7MHz(-3dB) 17.5ns (50ns at x 5MAG) (GOS-620) 11.7ns (50ns at 1mV~2mV/div) (GOS-630) Approx. 1MΩ AC, GND, DC CH1, CH2, DUAL (ALT/CHOP), ADD, CH2 INV
HORIZONTAL SYSTEM		
Sweep Time	0.1μs ~ 0.5s/div±3% 100ns ~ 50ms/div±5% (x 10 MAG) 10ns ~ 50ns/div±8% (x 10 MAG)	0.2μs ~ 0.5s/div±3% 100ns ~ 50ms/div±5% (x 10 MAG) 20ns ~ 50ns/div : uncalibrated
TRIGGER		
Trigger Mode Trigger Source Trigger Coupling Trigger Slope	AUTO, NORM CH1, CH2, ALT, LINE, EXT AC, DC, HF REJ, TV "+"or "-"	AUTO, NORM, TV-V, TV-H CH1, CH2, ALT, LINE, EXT AC "+"or "-"
X - Y OPERATION		
Sensitivity X-axis Bandwidth Phase Error	5mV ~ 5V/div±4% DC ~ 1MHz 3° or less from DC ~ 50kHz	5mV ~ 5V/div±4% DC ~ 500kHz 3° or less from DC ~ 50kHz
OUTPUT SIGNAL		
Trigger Signal Output Calibrator Output	Voltage: approx. 50mV/div into 50Ω 1kHz Square wave, 2Vp-p±2%	Voltage: approx. 20mV/div into 50Ω 1kHz Square wave, 2Vp-p±2%
POWER SOURCE		
	AC 100V/120V/220V/230V±10%, 50Hz/60Hz	AC 115V/230V±15%, 50Hz/60Hz
DIMENSIONS & WEIGHT		
	310(W) x 150(H) x 455(D) mm; Approx. 8.2kg	310(W)x150(H)x455(D) mm; Approx. 8kg

ORDERING INFORMATION

GOS-635G	35MHz, 2-Channel , Oscilloscope with Hold Off Function
GOS-630	30MHz, 2-Channel , Oscilloscope
GOS-622G	20MHz, 2-Channel , Oscilloscope with Hold Off Function
GOS-620	20MHz, 2-Channel , Oscilloscope

ACCESSORIES :
User manual x 1, Power Cord x 1
Probe-GTP-060A-4 : 60MHz (10 : 1/1 :1) Switchable Passive Probe for GOS-630/635G/GOS-622G (one per channel)
Probe-GTP-020A-4 : 20MHz (10 : 1/1 :1) Switchable Passive Probe for GOS-620 (one per channel)

OPTIONAL ACCESSORIES

GTC-001	Instrument Cart, 450(W) x 430(D) mm (120V Input Socket)
GTC-002	Instrument Cart, 330(W) x 430(D) mm (120V Input Socket)
GTL-110	Test Lead, BNC-BNC Heads

20MHz Analog Oscilloscope with Function Generator

GOS-620FG is a general purpose analog oscilloscope with a 20MHz bandwidth. Aside from the basic functions, such as 1mV/div~5V vertical sensitivity, 0.2uS/div~0.5S/div horizontal sweep time, and practical Auto/Norm/TV-V/TV-H trigger modes, GOS-620FG offers extra function generating features required for most class experiments and electrical production lines. The affordable GOS-620FG is capable of generating Sine/Square/Triangle waveforms in the frequency ranges from 0.1Hz~1MHz (7 bands) with sine wave distortion as low as 2%.

GOS-620FG (20 MHz)

CE

FEATURES

* Built-In 1 MHz Function Generator
* 20MHz Bandwidth, Dual Channel
* High Sensitivity 1mV/div
* ALT Triggering Function
* TV Synchronization
* CH1 Output
* Z Axis Input
* Economic Choice for High Quality

SPECIFICATIONS	
CRT	
Type	6-inch rectangular type with internal graticule ; 8 x 10 div (1div=1cm)
Accelerating Potential	2kV
Z-Axis Input	Sensitivity: Above 5Vp-p ; Max. input voltage : 30V (DC + AC peak) Bandwidth: DC ~ 2MHz
Polarity	Positive-going input decrease
Focus Control	Auto focus
FUNCTION GENERATOR	
Frequency Range	0.1Hz ~ 1MHz (7 bands)
Waveform	Sine Wave, Square Wave, Triangle Wave
Frequency Variable Range	10:1 or more
Output Impedance	50Ω ±10%
Voltage	Over 20Vp-p(open circuit)continuous conversion DC offset possible over±10V when open
Sinewave Distortion	1% Max. (10Hz ~ 20kHz)
Squarewave Unsymmetry	±3% or less (in 1 kHz maximum)
Squarewave Rise/Fall Time	50Ω output: 120ns or less
VERTICAL SYSTEM	
Sensitivity	5mV/div~5V/div±3%,1mV/div~1V/div±5%(using x 5MAG.)
Bandwidth	DC to 20MHz (x 5MAG.:DC to 7MHz)
Rise Time	Approx. 17.5ns (x 5MAG.:Approx. 50ns)
Max. Input	300V (DC+ACpeak) at 1kHz
Input Coupling	AC, DC, GND
Input Impedance	Approx. 1MΩ// 25pF
Vertical Mode	CH1,CH2,DUAL(ALT,CHOP),ADD,CH2 INV
HORIZONTAL SYSTEM	
Sweep Time	0.2μs/div ~ 0.5s/div±3%(±5% at x 10MAG)
Max. Sweep Rate	100ns/div (20ns and 50ns/div are uncalibrated)
TRIGGER	
Trigger Mode	AUTO, NORM, TV-V, TV-H
Trigger Source	CH1, CH2, ALT, LINE, EXT
Trigger Slope	" + " or " - "
X-Y OPERATION	
Sensitivity	5mV ~ 5V/div±4%
X-axis Bandwidth	DC ~ 500kHz
Phase Error	3° or less from DC ~ 50kHz
OUTPUT SIGNAL	
Trigger Signal Output	Voltage : approx. 20mV/div into 50Ω Bandwidth : 50Hz to 5MHz (-3dB) Impedance : Approx. 50Ω
Calibrator Output	1kHz Square wave, 2Vp-p±2%
POWER SOURCE	
AC 115/230V± 15%, 50/60Hz	
DIMENSIONS & WEIGHT	
310(W) x 150(H) x 455(D)mm; Approx. 8.5kg	

ORDERING INFORMATION

GOS-620FG 20MHz Oscilloscope with Built-in 1MHz Function Generator

ACCESSORIES :

User manual x 1, Power cord x 1
Probe-GTP-020A-4 : 20MHz (10 : 1/1 :1) Switchable Passive Probe (one per channel)
Test Lead GTL-101 x 1

OPTIONAL ACCESSORIES

GTC-001 Instrument Cart, 450(W) x 430(D) mm
GTC-002 Instrument Cart, 330(W) x 430(D) mm
GTL-110 Test Lead, BNC-BNC Heads

Handheld Digital Storage Oscilloscope & Multimeter

GDS-122 (20MHz)

CE | USB | DMM | PC Software

FEATURES

* 20 MHz Bandwidth
* 100 MS/s Real-Time Sampling Rate
* Digital Storage Oscilloscope & Multimeter
* True RMS Multimeter Volts, Amps, Ohms, Continuity, Diode
* Dual Independent Floating Isolated Channels (for Multimeter and Between Oscilloscope and Multimeter)
* Trigger Mode : Free Run, Single Shot, Edge, Video
* USB Interface
* 4 Hour Capacity Li-ion Rechargeable Battery
* 3.8" Color LCD, Resolution: 320 × 240
* Light Weight at 690g

PACKAGE CONTENTS

Extension module for large current measurement

Oscilloscope probe

Extension module for small capacitance measurement

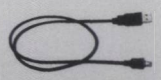
Multimeter test lead

Soft carrying case

AC-DC adaptor

1kHz square wave output cable

USB communication cable



CD-ROM (Software), User manual

GDS-122 is a reliable and handy instrument for all test and electronic engineers. This model is designed to carry out complicated on-site tests. The Dual-channel unit provides 20MHz of bandwidth with a sampling rate of 100MS/s with additional DMM functionality. The color LCD display with a 320 x 240 resolution helps you read waveforms easily, especially when displaying a lot of data or multiple waveforms. The compact design with a total weight of 690g allows engineers to carry it around easily. The unit's protective cover is insulated and specially designed to endure tough environments. A rechargeable Li-ion battery ensures convenience for on-site testing.

SPECIFICATIONS

VERTICAL	
Analog Digital Converter Resolution	8 bits simultaneously sampling on both channels
Sensitivity	5mV/div 5V/div at the input BNC
Displacement Range	±50V (500mV ~ 5V), ±1V(5mV ~ 200mV)
Analog Bandwidth	20MHz
Single Bandwidth	Full bandwidth
Low Frequency Response AD Coupling,-3dB	±5Hz at the BNC input
Rise Time	17.5ns (typical)
DC Gain Accuracy	±5%
DC Measurement Accuracy	±(5% reading + 0.05 div), at the Average sampling mode (> 16)
TRIGGER	
Trigger Sensitivity Edge Triggering	DC coupling : 1div (full bandwidth) AC coupling : Same as the DC coupling ≥ 50Hz
Trigger Level	±6 divs from the screen center
Trigger Level Accuracy	±0.3 divs (typical)
Trigger Displacement	655 divs (pre-trigger), 4 divs (post-trigger)
50% Level Setting	Input signal frequency ≥50Hz
Trigger Sensitivity	2 divs of peak-to-peak value
Video Trigger	Supports NTSC, PAL and SECAM, any or line frequency
HORIZONTAL	
Sampling Rate Range	10S/s~100MS/s
Waveform Interpolation	sin x / x
Record Length	6K points on each channel
Scanning Speed Range S/div	5ns/div 5s/div, stepping in the "1-2.5-5" mode.
Sampling Rate and Relay Time Accuracy	±100ppm(any time interval which is equal to or larger than 1ms)
Time Interval	Single: ±(1 sampling interval time+100ppmxreading+0.6ns)
(T)Measurement Accuracy Full Bandwidth	>average 16 : ±(1 sampling interval time +100ppmxreading+0.4ns)
INPUT	
Input Coupling	DC, AC
Input Impedance	1MΩ±2% connected in parallel with 20pF±3pF
Probe Attenuation Coefficient	1X, 10X, 100X, 1000X
Max. Input Voltage	400V (peak)
Channel Delay Time (Typical)	150ps
SAMPLING	
Sampling Modes	Normal sampling Peak detection Average value
Sampling Rate	100 MSa/s
MEASUREMENT	
Cursor Measurement	Voltage difference (V) and time difference (T) between cursors
Auto Measurement	Peak-to-peak value,average value,root mean square value,frequency and cycle
MULTIMETER SPECIFICATIONS	
Input Impedance	10MΩ
Voltage	VDC: 400mV, 4V, 400V ±(1% +1 digit)
Max Input	DC 400V
VAC	4V, 40V, 400V ±(1% +3 digit)
Frequency	40Hz ~ 400Hz
Max Input	AC 400V (Virtual value)
Current	DCA : 40mA, 400mA ±(1.5% +1 digit); 20A: ±(3% +3 digit) DAA : 40mA ±(1.5% +3 digit), 400mA ±(2% +1 digit); 20A: ±(5% +3 digit)
Impedance	400Ω ±(1%+3 digit), 4KΩ, 40KΩ, 400KΩ, 4MΩ ±(1%+1 digit), 40MΩ ±(1.5%+3 digit)
Capacitance	51.2nF ~ 100uF ±(3%+3 digit)
Diode	0V ~ 1.5V On/Off measurement < 50 (±30) beeping
GENERAL SPECIFICATIONS	
Display	Display type : 3.8" color liquid crystal display Display resolution : 320 (horizontal) x 240 (vertical) pixels Display color : 4096 colors
Power Adapter	Power supply : 100-240 VACRMS, 50Hz, CAT II ; Power consumption : < 6W
Operating Temperature	Used battery : 0~50 °C (32~122 °F);Power adapter : 0~40 °C (32~104 °F)
DIMENSION & WEIGHT	
115(W) x 180(H) x 40(D) mm ; Approx. 0.69kg	

ORDERING INFORMATION

GDS-122 Handheld Digital Storage Oscilloscope & Multimeter

ACCESSORIES :
User manual, AC-DC Adaptor, Probe-T5060:60MHz(10:1/1:1)Switchabel Passive Probe (one per channel)
Multimeter test lead, Serial data communication cable, Extension module for small capacitance measurement, Extension module for large current measurement

FREE DOWNLOAD

PC Software

OSCILLOSCOPE EDUCATION AND TRAINING KIT

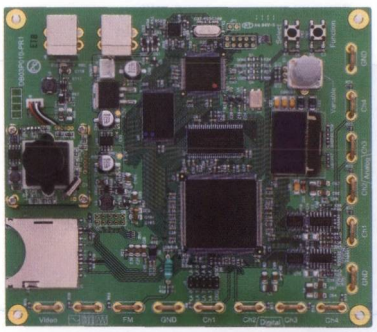
MAIN FUNCTION \ MODEL	GDB-03	GDB-02
Collocation Instrument	GDS-3000 / GDS-2000A / GDS-2000E	GDS-1000A-U / GDS-1000-U
Signal Output	3 Types of Serial Bus Signals 9 Basic and 17 Advanced Oscilloscope Signals	10 Types for Oscilloscopes 5 Types for Logic Analyzer
Applicable Probe	Oscilloscope Probe	Oscilloscope Probe
Interface	USB Device	USB Device
Power Source	5V DC, From USB Type B	5V DC, From USB Type B
Page	**A66**	**A67**

Oscilloscope Education And Training Kit

The GDB-03 training kit allows you to learn both the basic and the advanced functions of the GDS-3000 Series, GDS-2000A Series and GDS-2000E Series Digital Storage Oscilloscope (DSO). Following the training procedures of this training kit, you will quickly understand the basic operations of a DSO, and the unique features of the GDS-3000 Series and GDS-2000A Series, which represents a typical hi-tech DSO today.

The training kit is a signal generator board capable of producing waveforms, which contain various real-life scenarios you might encounter. With the GDB-03 training kit and the included curriculums, you are able to acquire adequate knowledge in using a DSO with advanced features.

GDB-03



SPECIFICATIONS

SIGNAL OUTPUT

The GDB-03 provides
3 types of serial bus signals,
9 basic and 17 advanced oscilloscope training signals

BASIC OSCILLOSCOPE TRAINING

Lab 1 Connect and view a waveform
Lab 2 Compensate the probe (1kHz square wave)
Lab 3 Adjust waveform scale and position (square wave)
Lab 4 Measure the waveform by manual (square wave ; frequency counter, cursor measure)
Lab 5 Automatic measurement (GDB-03 including noise function ; auto measure, cursor getting measure)
Lab 6 VPO (VPO signal, color, gray mode)
Lab 7 Autoset function (Fit screen, AC priority)
Lab 8 Automatic range
Lab 9 Save data using hardcopy function

ADVANCE OSCILLOSCOPE TRAINING

Lab 1 Automatic measurement (gating measurement)
Lab 2 Using peak detect mode
Lab 3 Low speed signal measurement
Lab 4 Noisy signal measurement
Lab 5 Using zoom timebase function
Lab 6 Transient signal measurement
Lab 7 Lissajous waveform & phase measurement
Lab 8 Runt trigger
Lab 9 Video trigger
Lab 10 Rise & Fall trigger
Lab 11 Pulse width trigger
Lab 12 Hold off function
Lab 13 Split window 1
Lab 14 Split window 2
Lab 15 UART signal
Lab 16 I^2C signal
Lab 17 SPI signal

POWER SUPPLY

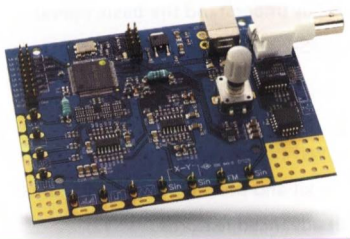
5V DC, USB or auxiliary power input

ORDERING INFORMATION

GDB-03 Oscilloscope Education And Training Kit

ACCESSORIES :
CD x 1
Singnal demo board with instructions
GTL-246 USB 2.0 A-B Type cable

Oscilloscope Education And Training Kit



The GDB-02 Training Kit allows you to learn the basic functions of the GDS-Series Digital Storage Oscilloscopes in a step-by-step manner. Using the training kit will help you quickly understand and access the full power of these instruments.

The Training Kit is a signal generator board capable of producing waveforms which represent various real-life scenarios you might encounter. You can use the board as a training kit to learn how to properly view signals, or use it as a generic signal generator.

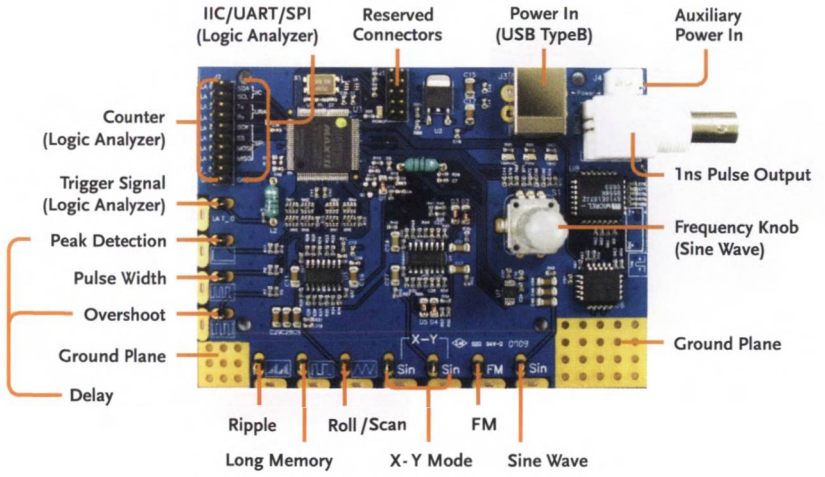
GDB-02

SPECIFICATIONS
SIGNAL OUTPUT
10 types for oscilloscope 5 types for logic analyzer (Signal details are listed in manual)
POWER SUPPLY
5V DC, USB or auxiliary power input
ACCESSORY
USB cable type A type B x 1

ORDERING INFORMATION

GDB-02 Oscilloscope Education And Training Kit

ACCESSORIES :
User manual x 1
Signal source board with instructions
GTL-246 USB 2.0 A-B Type cable



FAQ FOR OSCILLOSCOPES

Q1 **How do I select the correct type of oscilloscope?**

A1 There are a couple of key points you have to know before selecting the right type of oscilloscope for your needs.

Digital or Analog	When waveform analysis, remote control or recording a waveform is required, a digital oscilloscope will be necessary. If the immediate representation of waveform results or the original intensity of the waveform is required, analog oscilloscopes would better satisfy these requirements.
High Bandwidth	The higher the input signal frequency, the higher oscilloscope bandwidth is required. With insufficient bandwidth, there is the strong possibility of inaccurate measurement results. Theoretically, the minimum bandwidth of the oscilloscope can be determined through the following equation: BW = (0.35/ rise time of the signal).
Number of Channels	Generally, oscilloscopes support two input channels, CH 1 & CH 2. For applications requiring the observation of more than 2 signals simultaneously, such as PC power supply outputs with ±12V/±15V outputs, four channel oscilloscopes would be a better choice.
Display	TFT/STN color LCD digital displays offer the ability to represent each waveform in a different color, TFT displays, however, offer a faster display update rate, and a wider viewing angle compared to STN displays. The traditional analog CRTs have a higher resolution and faster waveform update rate compared with the LCD displays in oscilloscopes.
Sampling Rate & Memory Length	The higher the sampling rate, the more precise the captured waveform is. The higher the sample rate, the more samples a captured waveform has for any given period of time. At the same sampling rate, a digital oscilloscope with a longer memory depth can record a signal for longer than an oscilloscope with a short memory depth. Like wise, with a higher sample rate and long memory, an oscilloscope can record more detail.
Real-Time Sampling & Equivalent-Time Sampling	For transient signals, Real-time sampling technology is more capable of accurately capturing waveforms. On the other hand, for repetitive signals, Equivalent Time Sampling (ETS) captures 10 to 100 times more samples per second than real-time sampling. ETS can dramatically improve the sampling rate of DSOs for repetitive signals.
Digital Storage	After capturing and freezing signals, digital storage oscilloscopes are capable of restoring the waveforms to the oscilloscope display, USB flash memory, or to a PC for further analysis.
PC Interface	The standard communication protocol for industrial applications is IEEE 488.2 through a GPIB interface, while RS-232C interface is more common for PC communication. Nowadays, USB has become more popular due to its user friendliness and fast transaction speed. Through USB interfaces, users can easily remotely control their instruments and monitor or store waveforms.
Auto-Set	Depending on the input signal, Auto-Set functions can automatically adjust the vertical and horizontal settings for the best viewing scale.
TV Trigger	The TV trigger function accurately triggers different TV signal standards: NTSC, PAL, and SECAM.
Cursor Readout	The cursor readout function facilitates manually measuring waveforms by using cursors. The cursor readout function will determine the voltage, time or frequency between two manually set cursors.
Frequency Counter	The frequency counter function enables users to measure the input signal frequencies while using an oscilloscope.
XY Mode	The XY mode measures the correlation between two signals, such as in phase and IV curve measurements.
Auto Measurement	The auto measurement function measures various parameters of a waveform and automatically updates them in the oscilloscope display.
Zoom (ALT MAG)	The Zoom or ALT MAG function enlarges a specific portion of a waveform for further analysis.
Printer Port	The Print function prints out the contents of the oscilloscope display to an external printer.
Supported USB Flash Drive	The USB flash drive support enables saving and restoring waveform data, images and oscilloscope settings using a USB flash drive.Technical introduction.

FAQ FOR OSCILLOSCOPES

	GDS-3000 Series	GDS-2000A Series	GDS-2000E Series	GDS-300/ 200 Series	GDS-1000B Series	GDS-1000A-U Series	GDS-1000-U Series
Digital/Analog	Digital	Digital	Digital	Digital	Digital	Digital	Digital
Bandwidth	500~150MHz	300~70MHz	300~70MHz	200~70MHz	100~50MHz	150~70MHz	100~50MHz
Sample Rate	5GSa/s(RTS) 100GSa/s(ETS)	2GSa/s(RTS) 100GSa/s(ETS)	2GSa/s(RTS) 100GSa/s(ETS)	1GSa/s(RTS)	1GSa/s(RTS)	1GSa/s(RTS) 25GSa/s(ETS)	250MSa/s(RTS) 25GSa/s(ETS)
Memory Length	25k Points/CH	2M Points Max.	2M Points Max.	5M/1M/CH	10M/CH	2M Points Max.	4k Points Max.
Number of Channel	2/4	2/4	2/4	2	2	2	2
Display	8" TFT LCD	8" TFT LCD	8" TFT LCD	7" TFT LCD	7" TFT LCD	5.7" TFT LCD	5.7" TFT LCD
Digital Storage	✓	✓	✓	✓	✓	✓	✓
Auto-Set	✓	✓	✓	✓	✓	✓	✓
Auto/Normal Trigger	✓	✓	✓	✓	✓	✓	✓
TV Trigger	✓	✓	✓	✓	✓	✓	✓
Cursor Readout	✓	✓	✓	✓	✓	✓	✓
Frequency Counter	✓	✓	✓	✓	✓	✓	✓
XY Mode	✓	✓	✓	✓	✓	✓	✓
Auto Measurement	✓	✓	✓	✓	✓	✓	✓
Zoom(ALT MAG)	✓	✓	✓		✓	✓	✓
Data Logger	✓	✓	✓		✓	✓	✓
Go/NoGo	✓	✓	✓	✓	✓	✓	✓
Zoom FFT	✓	✓	✓		✓	✓	
PictBridge Supported USB	✓	✓	✓		✓	✓	
SVGA Output	✓	✓ (Option)					
LAN	✓	✓ (Option)	✓				
GPIB	✓ (Option)	✓ (Option)					

Note : 1. RTS : Real-Time Sample Rate
2. ETS : Equivalent-Time Sample Rate
3. GOS-630FC Only Provide Auto Time-Base Function

FAQ FOR OSCILLOSCOPES

	GRS-6052A GRS-6032A	GOS-6100 Series	GOS-6000 Series	GOS-653G GOS-652G	GOS-635G GOS-630 GOS-620 GOS-622G GOS-620FG	GOS-630FC
Digital/Analog	Digital/Analog	Analog	Analog	Analog	Analog	Analog
Bandwidth	50/30MHz	100MHz	50/30MHz	50MHz	35/30/20MHz	30MHz
Sample Rate	100MSa/s(RTS) 500MSa/s(ETS)					
Memory Length	2k Points/CH					
Number of Channel	2	2	2	2	2	2
Display	CRT	CRT	CRT	CRT	CRT	CRT
Digital Storage	✓					
Auto-Set	✓	✓				✓
Auto/Normal Trigger	✓	✓	✓	✓	✓	✓
TV Trigger	✓	✓	✓	✓	✓	✓
Cursor Readout	✓	✓	✓			
Frequency Counter	✓	✓	✓			✓
XY Mode	✓	✓	✓	✓	✓	✓
Auto Measurement	✓	✓				
Zoom(ALT MAG)	✓	✓	✓			
Data Logger						
Go/NoGo						
Zoom FFT						
PictBridge Supported USB						
SVGA Output						
LAN						
GPIB						

Note : 1. RTS : Real-Time Sample Rate
2. ETS : Equivalent-Time Sample Rate
3. GOS-630FC Only Provide Auto Time-Base Function

SPECTRUM ANALYZERS

GW Instek spectrum analyzer lineup fits a broad range of applications in research and design, service and maintenance, manufacturing, educational and other related fields for the frequency requirements ranging from 1GHz to 3GHz. Many features are designed to perform higher stability measurements, further signal analysis and more efficient measurement. The topographic and spectrogram display modes are developed to illustrate the signal in color shade to perform signal persistence and time progress. The SEM, ACPR, OCBW, TOI, Harmonic, CNR, CTB, CSO measurements, frequency counter and many other measurement functions are provided as well. The sequence function can create and perform a series of measurement steps without connecting with the PC. The most common interface such as LXI is included for remote control. GW Instek provides the most cost-effective options in RF measurements.

PRODUCTS

- **3GHz Spectrum Analyzer**
- **1GHz Spectrum Analyzer**
- **Spectrum Analyzer & RF Training System**

SPECTRUM ANALYZER OVERVIEW

Spectrum analyzer is the most widely applied measuring instrument for wireless communications devices, components or systems. It measures and displays the frequency spectrum distribution of an RF signal. Spectrum analyzer can measure and read both frequency and amplitude information. Nowadays, digital communications dominate wireless communications systems. Despite the dominance of digital communications, measuring a frequency spectrum by a spectrum analyzer is still considered an important process.

To choose the right spectrum analyzer, several key specifications should be considered, which are explained below.

FREQUENCY RANGE

Selecting a spectrum analyzer for a measurement requires selecting its frequency range, like 1GHz, 2.4GHz, and so on. Therefore the frequency range is the first consideration for most applications.

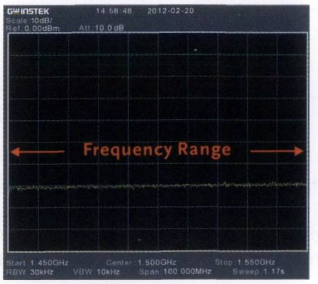


Figure 1, Frequency Range

NOISE FLOOR

Noise floor is the bottom noise level when no signal is fed into spectrum analyzer. It represents the lowest signal level that spectrum analyzer can measure. The noise floor usually depends on Resolution Bandwidth (RBW).

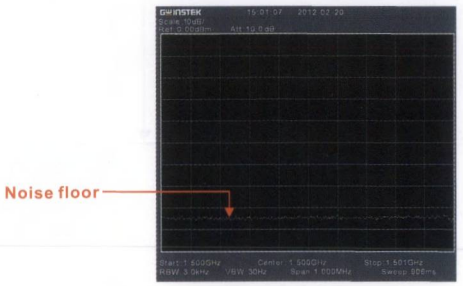


Figure 2, Noise Floor

SPURIOUS NOISE

Circuit noise or interference that looks like a signal occurs even without an input signal due to spurious noise of spectrum analyzer. Unlike noise floor, spurious noise presents itself like a signal with a specific frequency.

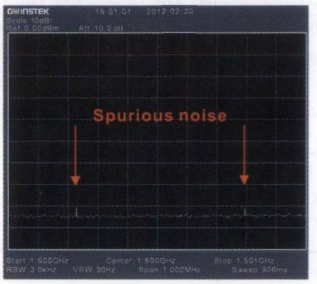


Figure 3, Spurious Noise

HARMONICS

Spectrum analyzer itself also generates harmonics from an input signal. Therefore if the harmonics generated by a spectrum analyzer are greater than the harmonics from an input signal, the harmonic measurement will result in an error as Figure 4 presents.

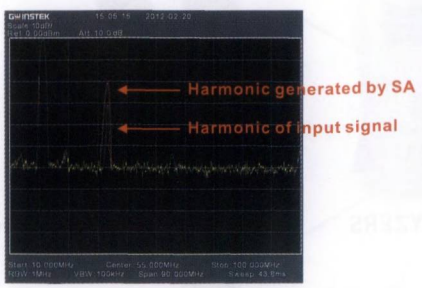


Figure 4, Harmonic Error Because of Greater Harmonic of Spectrum Analyzer

PHASE NOISE

Phase noise shows the purity of a signal. In Figure 5a, there are two signals with different levels of phase noise. The lower one is purer than the upper one, and therefore it has better phase noise performance.

a.Signals with different phase noises b.Definition of phase noise

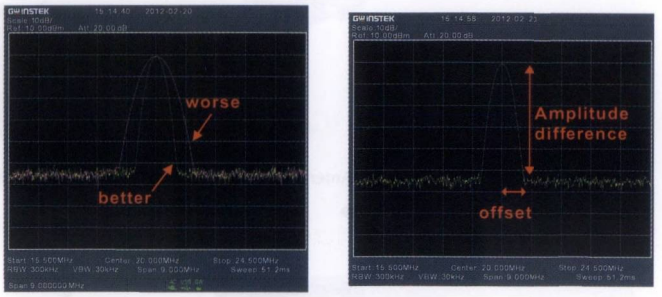


Figure 5 : Phase Noise

Figure 5b shows the definition of phase noise. It is usually defined as dBc with a frequency offset. For example,"-50dBc at 200kHz offset with 30kHz RBW". Refer to the Q&A to see the relationship between phase noise and RBW.

THIRD ORDER INTER-MODULATION

Third order inter-modulation occurs with a two-tone input signal, a signal with two frequencies or two signals with different frequencies that are fed into a spectrum analyzer at the same time. When the input signal frequencies are f1 and f2, the harmonics are as follows.

Input	output	
f1, f2	fundamentals	f1,f2
	2nd order harmonics	2f1, 2f2, f1±f2,
	3rd order harmonics	3f1, 3f2, 2f1±f2, 2f2±f1
	----	----

The third order harmonics are the primary concerns in a system. If the frequencies of f1 and f2 are very close, then 2f1-f2 and f1-2f2 will also be very close to the original signal. It will be difficult for the subsequent filters to filter out the harmonics accordingly. The concepts are illustrated in Figure 6.

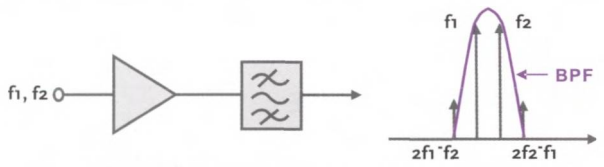


Figure 6: Third Order Harmonics of 2f1-f2 and 2f2-f1

An example is expressed in Table 1.

	Harmonics	1	2	3
Input Frequency	100, 110	**100, 110**	···	300, 330, 310, 320, 90, 120
	100, 101	**100, 101**	···	300, 303, 301, 302, 99, 102
	100, 100.1	100, 100.1	···	300, 300.3, 300.1, 300.2, 99.9, 100.2

Table 1 : Two-Tone Signal Harmonics

In case the input signal frequencies are 100 and 100.1, their 3rd order harmonics will be 99.9 (2f1-f2) and 100.2 (2f2-f1). Using that example it is easy to see that the third order harmonics are close to the original signals, which will pose challenges for designing the subsequent filters. Therefore the inter-modulation distortion of spectrum analyzer itself might limit the ability of two-toned signal measurements.

DYNAMIC RANGE

Different companies use different definitions for dynamic range, but actually they all point to the same thing; the ability to accurately measure amplitude. Considering the specifications introduced above, the dynamic range might actually include more than one term. For example, if a two-tone signal is under measurement, the inter-modulation distortion needs to be considered. If the input signal frequency falls onto the spurious noise, it will limit the dynamic range. But generally speaking, dynamic range is defined as the level between noise floor and the maximum measurable level. Alternatively, sometimes the display range (80 or 100dB) is called dynamic range. It describes the range within the display without shifting the reference level. The entire concept is illustrated in Figure 7.

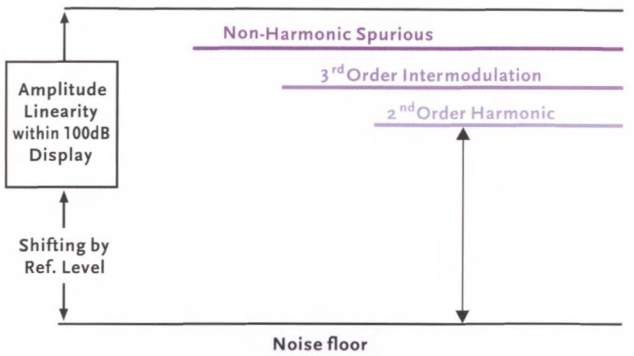
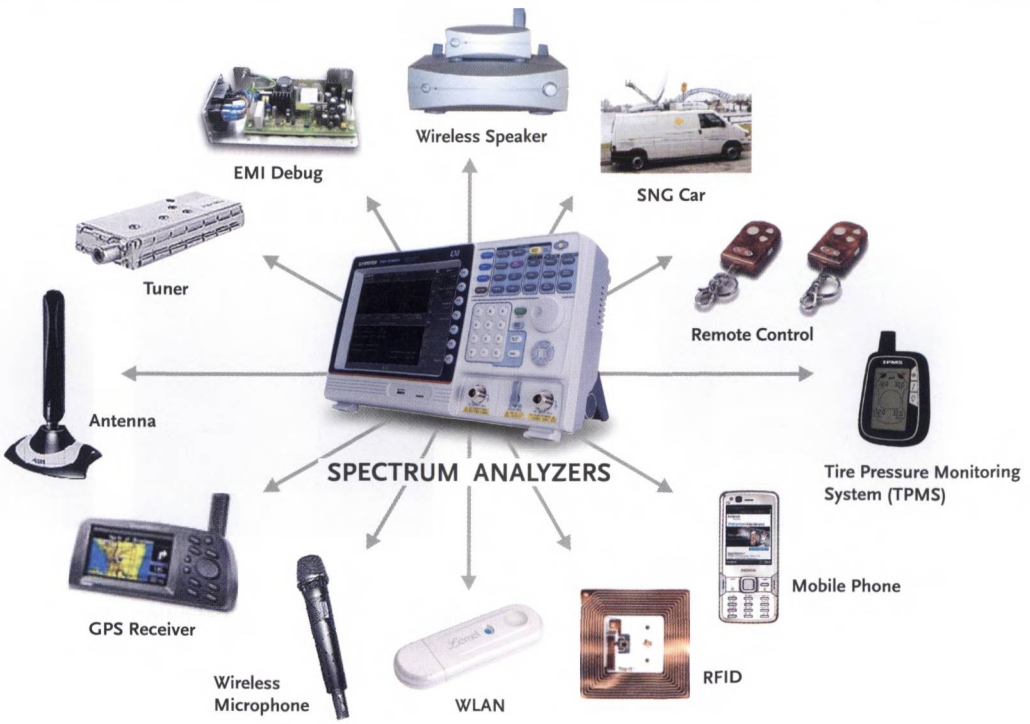


Figure 7 : Dynamic Range

APPLICATION



SPECTRUM ANALYZER

MODEL	GSP-9300	GSP-830	GSP-730	GSP-810
Frequency Range	9kHz ~ 3GHz	9kHz ~ 3GHz	150kHz ~ 3GHz	150kHz ~ 1GHz
Frequency Stability	±2ppm max. (Per Year)	±5 ppm max. (Per Year)	–	±2 ppm max. (Per Year)
Over Temperature Frequency Stability	±0.025 ppm (0 ~ 50 °C)	±10 ppm	–	±10 ppm
RBW Range	1Hz~1MHz in 1-3-10 Sequence 200Hz, 9kHz, 120kHz, 1MHz for EMI Filter	3k, 30k, 300k, 4MHz (10k, 100k, 9k, 120k is Option)	30k, 100k,300kHz, 1MHz (30kHz Range is not Adjustable)	3kHz, 30kHz, 220kHz, 4MHz
Video Bandwidth	1Hz~1MHz in 1-3-10 Steps	10Hz ~ 1MHz in 1-3 Steps	–	1.6kHz/90kHz Coupled with RBW
Phase Noise	-88dBc/Hz @1GHz, 10kHz Offset	-80dBc/Hz @1GHz, 20kHz Offset	-85dBc/Hz @1GHz, 500kHz Offset	-77dBc/Hz @1GHz, 30kHz Offset
Noise Floor	-142dBm @1GHz, 10Hz RBW, Per-amp on	-117dBm @1GHz, 3k RBW	-100dBm @1GHz, 30kHz RBW	-100dBm @500MHz, 3k RBW
Amplitude Measurement Range	-142dBm ~ +30dBm @Pre-amp on	-117dBm ~ +20dBm	-100dBm ~ +20dBm	-100dBm ~ +20dBm
Overload Protection	+30dBm, ±50VDC	+30dBm, ±25VDC	+30dBm, ±25VDC	+30dBm, ±25VDC
Reference Level Range	-110dBm ~ +30dBm	-110dBm ~ +20dBm	-40dBm ~ +20dBm	-30dBm ~ +20dBm
Input Attenuator	0 ~ 50dB, in 1 dB Steps	–	–	–
Pre-amplifier	Built-in 18dB Internal	Option (External)	–	–
Gate Sweep	Yes	–	–	–
Frequency Counter	Support , Min. resolution 1Hz	–	–	–
Power Measurement	SEM, ACPR, OCBW, CHPW, N-dB, Phase Jitter, Phase Noise, Demod. Analyzer, TOI, CNR, CSO, CTB	ACPR, OCBW, CHPW, N-dB, Phase Jitter	ACPR, OCBW, CHPW	–
Trace	4 Traces	3 Traces	3 Traces	1 Traces
Marker	6	10	5	2
Memory Save/Recall	16MB Nominal	10 Traces and Setup	5 Memories	10 Memories
Display Modes	Spectrogram,Topographic, Spectrum, Power Meter (Optional)	Spectrum Mode	Spectrum Mode	Spectrum Mode
Split-Window	Yes	Yes	Yes	–
Sequence	Yes	Yes	–	–
Limit Line	Yes	Yes	Yes	–
Correction Table	Yes	Yes	–	–
Display	8.4 Inchs Color TFT LCD with SVGA (800 x 600)	6.4 Inchs Color TFT LCD with VGA (640 x 480)	5.6 Inchs Color TFT LCD with VGA (640 x 480)	6 - Inch CRT Screen
Tracking Generator	100kHz ~ 3GHz (Optional)	9kHz ~ 3GHz (Optional)	–	150kHz ~ 1GHz (Optional)
Power Meter	10MHz ~ 6.2GHz (Optional)	–	–	10MHz ~ 2GHz (Optional)
Demodulator	Yes, with AM/FM/ASK/FSK Analysis	Optional	–	Yes
IF Output	Yes, 886MHz, -25dBm	–	–	–
DC Power Operation	–	Yes	–	–
Battery Power Operation	Yes	Yes	–	–
USB Interface	Yes	Yes	Yes	–
RS-232C Interface	Yes	Yes	Yes	Yes
GPIB Interface	Optional	Optional	–	–
Micro SD Socket	Yes	–	–	–
LAN Port	Yes, with LXI Standard	–	–	–
VGA Output	Yes, DVI-I, 800 x 600	Yes, 15 pin D-sub, 640 x 480	Yes, 15 pin D-sub, 640 x 480	–
Rack Adapter Panel	Yes, GRA-415	Yes, GRA-404	–	–
Power Source	AC100 ~ 240V, 50 ~ 60Hz	AC100 ~ 240V, 50 ~ 60Hz	AC100 ~ 240V, 50 ~ 60Hz	AC100/120/220/230V±10%,50~60Hz
Page	**B5-14**	**B15-20**	**B21-26**	**B27-28**

RF & SPECTRUM ANALYZER TRAINING SYSTEM

MODEL	GRF-3300S	GRF-1300	GRF-1300A
Collocation Instrument	GSP-830	GSP-730	GSP-730
Necessary Option	Tracking Generator	XX	USG-LF44
RF Cable	SMA Cable	SMA Cable	SMA Cable
RF Connector	SMA Female	SMA Female	SMA Female
Interface	N/A	USB Device	USB Device
Power Source	AC110V/220V, 50/60Hz	AC100 ~ 240V, 50 ~ 60Hz	AC100 ~ 240V, 50 ~ 60Hz
Page	**B29-30**	**B21-26**	**B21-26**

3GHz Spectrum Analyzer

Patent No. ZL201220347963.5

GSP-9300 is a light, compact, and high C/P ratio 3GHz spectrum analyzer. The GSP-9300 frequency range stretches from 9 KHz to 3GHz and features many functions such as radio frequency and power measurement, 2FSK digital communications analysis, EMC pretest mode, and active component P1dB point measurement, etc. It can support the fast sweep speed up to 307usec. GSP-9300 spectrum analyzer, with the built-in preamplifier and the highest sensitivity of -152dBm (1Hz), is capable of measuring very feeble signals. To obtain the accurate results, the low power measurement uncertainty of GSP-9300 is less than 1.5dB.

GSP-9300 (9kHz ~ 3GHz)

CE | USB | LXI | DVI Output | RS-232 | PC Software | GPIB | Micro SD/SDHC

FEATURES

- Frequency Range : 9kHz ~ 3GHz
- High Frequency Stability : 0.025ppm
- 3dB RBW : 1Hz ~ 1MHz
- 6dB EMI Filter : 200Hz, 9kHz, 120kHz, 1MHz
- Sweep Time up to 307us
- Phase Noise: -88dBc/Hz @1GHz,10kHz Offset
- Built-in Measurement Functions : 2FSK Analysis, AM/FM/ASK/FSK Demodulation & Analysis, EMC Pre-test, P1dB point, Harmonic, Channel Power, N-dB bandwidth, OCBW, ACPR, SEM, TOI, CNR, CTB, CSO, Noise Marker, Frequency Counter, Time Domain Power, Gated Sweep
- Built-in Spectrogram and Topographic Display Modes
- 886MHz IF Output for User's Extended Applications
- Remote Control Interface: LAN, USB, RS-232, GPIB (Optional)
- Built-in Preamplifier, 50dB Attenuator, and Sequence Function
- Optional 6.2GHz Power Sensor, Tracking Generator, Battery Pack

PWS-06 RF Power Sensor

For: GSP-9300

GSC-009 Soft Carrying Case

For: GSP-9300

SPECIFICATIONS

FREQUENCY		
FREQUENCY		
Range	9 kHz ~ 3.0 GHz	
Resolution	1 Hz	
FREQUENCY REFERENCE		
Accuracy	±(period since last adjustment x aging rate) +stability over temperature+supply voltage stability	
Aging Rage	± 2 ppm max.	1 year after last adjustment
Frequency Stability Over Temperature	± 0.025 ppm	0 ~ 50 °C
Supply Voltage Stability	± 0.02 ppm	
FREQUENCY READOUT ACCURACY		
Start, Stop, Center, Marker	±(marker frequency indication x frequency reference accuracy+10%xRBW+frequency resolution *1	
Trace Points	Max. 601 points, Min. 6 points	
MARKER FREQUENCY COUNTER		
Resolution	1 Hz, 10 Hz, 100 Hz, 1 kHz	
Accuracy	±(marker frequency indication x frequency reference accuracy + counter resolution)	RBW/Span ≥ 0.02; Mkr level to DNL > 30 dB
FREQUENCY SPAN		
Range	0 Hz (zero span), 100 Hz ~ 3 GHz	
Resolution	1 Hz	
Accuracy	± frequency resolution *1	RBW : Auto
PHASE NOISE		
Offset from Carrier		Fc=1GHz;RBW=1kHz,VBW=10Hz;Average≥40
10 kHz	< -88 dBc/Hz	Typical *2
100 kHz	< -95 dBc/Hz	Typical
1 MHz	< -113 dBc/Hz	Typical
RESOLUTION BANDWIDTH (RBW) FILTER		
Filter Bandwidth	1 Hz ~ 1 MHz in 1-3-10 sequence	-3dB bandwidth
	200 Hz, 9 kHz, 120 kHz, 1MHz	-6dB bandwidth
Accuracy	± 8%, RBW = 1 MHz	Nominal *3
	± 5%, RBW < 1 MHz	Nominal
Shape Factor	< 4.5 : 1	Normal bandwidth ratio: -60dB : -3dB
VIDEO BANDWIDTH (VBW) FILTER		
Filter Bandwidth	1 Hz ~ 1 MHz in 1-3-10 sequence	-3dB bandwidth

*1 Frequency Resolution = Span/(Trace points - 1)
*2 Typical specifications in this datasheet mean that the performance can be exhibited in 80% of the units with a 95% confidence level over the temperature range 20 ~ 30 °C. They are not covered by the product warranty.
*3 Nominal values indicate expected performance. They are not covered by the product warranty.

AMPLITUDE		
AMPLITUDE RANGE		
Measurement Range	100 kHz ~ 1 MHz	Displayed Average Noise Level(DANL)to 18 dBm
	1 MHz ~ 10 MHz	DANL to 21 dBm
	10 MHz ~ 3 GHz	DANL to 30 dBm
ATTENUATOR		
Input Attenuator Range	0 ~ 50 dB, in 1 dB steps	Auto or manual setup
MAXIMUM SAFE INPUT LEVEL		
Average Total Power	≤ +33 dBm	Input attenuator ≥ 10 dB
DC Voltage	± 50 V	
1 dB GAIN COMPRESSION		
Total Power at 1st Mixer	> 0 dBm	Typical ; Fc ≥ 50 MHz; preamp. off
Total Power at the Preamp	> -22 dBm	Typical ; Fc ≥ 50 MHz; preamp. on
		Mixer power level (dBm) = input power (dBm) – attenuation (dB)

GSP-9300

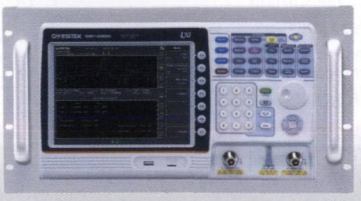
SPECIFICATIONS

DISPLAYED AVERAGE NOISE LEVEL (DANL)*4		*4 DANL spec shall exclude the Spurious Response.
Preamp off	0 dB attenuation; RF Input is terminated with a 50Ω load. RBW 10Hz; VBW 10Hz; span 500Hz; reference level = - 60 dBm; trace average≥ 40	
9 kHz~100 kHz	< -93 dBm	Nominal
100 kHz~1 MHz	< -90 dBm - 3 x (f/100 kHz) dB	Nominal
1 MHz~10 MHz	< -122 dBm	Nominal
10 MHz~3 GHz	< -122 dBm	Nominal
Preamp off	0 dB attenuation; RF Input is terminated with a 50Ω load. RBW 10\Hz; VBW 10\Hz; span 500Hz; reference level = - 60 dBm; trace average≥ 40	
100 kHz~1 MHz	< -108 dBm - 3 x (f/100 kHz) dB	Nominal
1 MHz~10 MHz	< -142 dBm	Nominal
10 MHz~3 GHz	< -142 dBm + 3 x (f/1 GHz) dB	Nominal
LEVEL DISPLAY RANGE		
Scales	Log, Linear	
Units	dBm, dBmV, dBuV, V, W	
Marker Level Readout	0.01 dB 0.01 % of reference level	Log scale Linear scale
Level Display Modes	Trace, Topographic, Spectrogram	Single/Split Windows
Number of Traces	4	
Detector	Positive-peak,negative-peak,sample,normal, RMS(not Video)	Can be setup for each traces separately
Trace Functions	Clear & Write, Max/Min Hold, View, Blank, Average	
ABSOLUTE AMPLITUDE ACCURACY		
Absolute Point	Center=160 MHz; RBW 10 kHz; VBW 1 kHz; span 100 kHz; log scale; 1 dB/div; peak detector; 20 ~ 30°C; signal at Reference level	
Preamp off	± 0.3 dB	Ref level 0 dBm; 10 dB RF attenuation
Preamp on	± 0.4 dB	Ref level -30 dBm; 0 dB RF attenuation
FREQUENCY RESPONSE		
Preamp off	Attenuation:10dB;Reference:160MHz;20~30°C	
100 kHz ~ 2 GHz	± 0.5 dB	
2 GHz ~ 3 GHz	± 0.7 dB	
Preamp on	Attenuation:0dB;Reference:160MHz;20~30°C	
1 MHz ~ 2 GHz	± 0.6 dB	
2 GHz ~ 3 GHz	± 0.8 dB	
ATTENUATION SWITCHING UNCERTAINTY		
Attenuator Setting	0 ~ 50 dB in 1 dB steps	
Uncertainty	± 0.25 dB	Reference : 160 MHz, 10dB attenuation
RBW FILTER SWITCHING UNCERTAINTY		
1 Hz ~ 1 MHz	± 0.25 dB	Reference : 10 kHz RBW
LEVEL MEASUREMENT UNCERTAINTY		
Overall Amplitude	± 1.5 dB	20 ~ 30°C; frequency >1MHz; signal input 0 ~ -50dBm; reference level 0 ~ -50dBm; Input attenuation 10dB; RBW 1kHz; VBW 1 kHz; after cal; Preamp off
Accuracy	± 0.5 dB	Typical
SPURIOUS RESPONSE		
Second Harmonic Intercept	+35 dBm	Preamp off; signal input -30dBm; 0 dB attenuation Typical : 10 MHz < fc < 775 MHz
	+60 dBm	Typical : 775 MHz ≤ fc < 1.5 GHz
Third-order Intercept	> 1dBm	Preamp off; signal input -30dBm; 0 dB attenuation 300 MHz ~ 3 GHz
Input Related Spurious	< -60 dBc	Input signal level -30 dBm, Att. Mode, Att=0dB; 20 ~ 30°C
Residual Response (Inherent)	< -90 dBm	Input terminated; 0 dB attenuation; Preamp off

Rear Panel

GRA-415 Rack Adapter Panel

For : GSP-9300, Rack Mounting (19", 6U)



GKT-001 General Kit Set

Include :
ADP-002
ATN-100
GTL-303
GSC-002
For: GSP-Series

GKT-002 CATV Kit Set

Include :
ADP-001
ADP-101
GTL-304
GSC-003
For: GSP-Series

GKT-003 RLB Kit Set

Include :
GAK-001
GAK-002
GTL-302
GSC-004
For: GSP-Series

GKT-008 EMI Probe Kit Set

Include :
ADP-002
GTL-303
PR-01
PR-02
ANT-04
ANT-05
For: GSP-Series

SPECIFICATIONS		
SWEEP		
SWEEP TIME		
Range	310 µs ~ 1000 s 50 µs ~ 1000 s	Span > 0 Hz Span = 0 Hz; Min resolution=10µs
Sweep Mode	Continuous; Single	
Trigger Source	Free run; Video; External	
Trigger Slope	Positive or negative edge	
RF PREAMPLIFIER		
Frequency Range	1 MHz ~ 3 GHz	
Gain	18 dB	Nominal (installed as standard)
FRONT PANEL INPUT/OUTPUT		
RF INPUT		
Connector Type	N-type female	
Impedance	50Ω	Nominal
VSWR	<1.6 :1	300 kHz to 3 GHz ; Input attenuator ≥10 dB
POWER FOR OPTION		
Connector Type	SMB male	
Voltage/Current	DC +7V/500 mA max	With short-circuit protection
USB HOST		
Connector Type	A plug	
Protocol	Version 2.0	Support Full/High/Low speed
MICRO SD SOCKET		
Protocol	SD 1.1	
Support Cards	Micro SD, Micro SDHC	Up to 32GB capacity
REAR PANEL INPUT/OUTPUT		
REFERENCE OUTPUT		
Connector Type	BNC female	
Output Frequency	10 MHz	Nominal
Output Amplitude	3.3V CMOS	
Output Impedance	50Ω	
REFERENCE INPUT		
Connector Type	BNC female	
Input Reference Frequency	10 MHz	
Input Amplitude	-5 dBm ~ +10 dBm	
Frequency Lock Range	Within ± 5 ppm of the input reference frequency	
ALARM OUTPUT		
Connector Type	BNC female	Open-collector
TRIGGER INPUT/GATED SWEEP INPUT		
Connector Type	BNC female	
Input Amplitude	3.3V CMOS	
Switch	Auto selection by function	
LAN TCP/IP INTERFACE		
Connector Type	RJ-45	
Base	10Base-T; 100Base-Tx; Auto-MDIX	
USB DEVICE		
Connector Type	B plug	For remote control only; supports USB TMC
Protocol	Version 2.0	
IF OUTPUT		
Connector Type	SMA female	
Impedance	50Ω	Nominal
IF Frequency	886 MHz	Nominal
Output Level	-25 dBm	10 dB attenuation; RF input : 0 dBm @ 1 GHz
EARPHONE OUTPUT		
Connector Type	3.5mm stereo jack	Wired for mono operation
VIDEO OUTPUT		
Connector Type	DVI-I (integrated analog and digital), Single Link	Compatible with VGA or HDMI standard through adapter
RS-232C INTERFACE		
Connector Type	D-sub 9-pin female	Tx , Rx , RTS , CTS
GPIB INTERFACE (OPTIONAL)		
Connector Type	IEEE-488 bus connector	
AC POWER INPUT		
Power Source	AC 100 V ~ 240 V, 50/60 Hz	Auto range selection
BATTERY PACK (OPTIONAL)		
Battery Pack	6 cells, Li-Ion rechargeable, 3S2P	With UN38.3 Certification
Voltage	DC 10.8 V	
Capacity	5200 mAh/56Wh	

SPECIFICATIONS

GENERAL

Monitor Display	8.4 inch TFT LCD. SVGA Resolution, 800 x 600 pixel	
Internal Data Storage	16 MB nominal	Nominal
Power Consumption	< 65 W	
Warm-up Time	< 30 minutes	
Temperature Range	+5 °C ~ + 45 °C	Operating
	-20 °C ~ + 70 °C	Storage
Dimensions & Weight	350(W) x 213(H) x 105.7(D) mm, Approx. 4.5kg	Inc. all options (Basic + TG + GPIB + Battery)
	13.8(W) x 8.3(H) x 3.9(D) inch, Approx. 9.9lb	

TRACKING GENERATOR (OPTIONAL)

Frequency Range	100 kHz ~ 3 GHz	
Output Power	-50 dBm ~ 0 dBm in 0.5 dB steps	
Absolute Accuracy	± 0.5 dB	@160 MHz, -10 dBm, Source attenuation 10 dB, 20 ~ 30°C
Output Flatness	Referenced ~ 160 MHz, -10 dBm	
	100 kHz ~ 2 GHz	± 1.5 dB
	2 GHz ~ 3 GHz	± 2 dB
Output Level Switching Uncertainty	± 0.8 dB	Referenced ~ -10 dBm
Harmonics	< -30 dBc	Typical, output level = -10 dBm
Reverse Power	+30 dBm max.	
Connector Type	N-type female	
Impedance	50 Ω	Nominal
Output VSWR	< 1.6 : 1	300 kHz ~ 3 GHz, source attenuation ≥ 12 dB

RF POWER SENSOR (OPTIONAL)

Type	Average power sensor		Model: PWS-06
Interface to Meter	USB cable to GSP-9300 Front-Panel USB Host		
Connector Type	N-type male, 50 ohm nominal		
Input VSWR	1.1 : 1		Typical
	1.3 : 1		Max
Input Frequency	1 ~ 6200 MHz		
Sensing Level	-32 ~ +20 dBm		
Max. Input Damage Power	+ 27 dBm		
Power Measurement Uncertainty @25 °C	-30 dBm ~ +5 dBm:	1 MHz ~ 3GHz: ±0.10 dB typical	± 0.30 dB max.
		3 GHz ~ 6 GHz: ±0.15 dB typical	± 0.30 dB max.
	+5 dBm ~ +12 dBm:	1 MHz ~ 3GHz: ±0.15 dB typical	± 0.30 dB max.
		3 GHz ~ 6 GHz: ±0.15 dB typical	± 0.30 dB max.
	+12 dBm ~ +20 dBm:	1 MHz ~ 3GHz: ±0.20 dB typical	± 0.40 dB max.
		3 GHz ~ 6 GHz: ±0.20 dB typical	± 0.40 dB max.
Power Measurement Uncertainty @0 ~ 25 °C	-30 dBm ~ +5 dBm:	1 MHz ~ 3GHz: ±0.25 dB typical	
		3 GHz ~ 6 GHz: ±0.25 dB typical	
	+5 dBm ~ +12 dBm:	1 MHz ~ 3GHz: ±0.20 dB typical	
		3 GHz ~ 6 GHz: ±0.20 dB typical	
	+12 dBm ~ +20 dBm:	1 MHz ~ 3GHz: ±0.35 dB typical	
		3 GHz ~ 6 GHz: ±0.30 dB typical	
Linearity @25 °C	±3 %		
Measurement Speed	100 ms for Low Noise Mode		Typical
	30 ms for Fast Mode		

Note: The specifications apply when GSP-9300 is powered on for at least 30 minutes to warm-up to a temperature of 20°C to 30°C, unless specified otherwise.
Need to Collocate the Optional Accessories.

ORDERING INFORMATION

GSP-9300 3GHz Spectrum Analyzer

ACCESSORIES :
Power Cord, Quick Start Guide, Certificate of Calibration, CD-ROM (with User Manual, Programming Manual, SpectrumShot Software, SpectrumShot Quick Start Guide & IVI Driver)

OPTION

Opt. 01 Tracking Generator
Opt. 02 Battery Pack
Opt. 03 GPIB Interface

OPTIONAL ACCESSORIES

PWS-06 6.2GHz USB Power Sensor
GSC-009 Soft Carrying Case
GRA-415 Rack Adapter Panel
ADB-002 DC Block BNC 50Ω 10MHz~2.2GHz
ADB-006 DC Block N-TYPE 50Ω 10MHz~6GHz
GTL-246 USB Cable, USB 2.0, A-B Type, 1200mm
GTL-248 GPIB Cable, Double Shielded, 2000mm
GTL-251 USB-GPIB Adapter, GPIB-USB-HS, USB 2.0, Hi-Speed USB compliance, 2000mm
ATA-001 Antenna, General FM Antenna, BNC(M)
GTL-301 RF Cable, RG223 Assembly, 1000mm, N(P/M)
GTL-302 RF Cable, RG223 Assembly, 300mm, N(P/M)
GTL-303 RF Cable, RG316 Assembly, 600mm, SMA(P/M)
GTL-304 RF Cable, RG223 Assembly, 280mm, N(P/M) - N(J/F)

ADB-008 DC Block SMA 50Ω 0.1MHz~8GHz
ADP-001 BNC to N-TYPE Adaptor
ADP-002 SMA to N-TYPE Adaptor
GKT-008 **EMI Probe Kit Set**
ADP-002 : Adaptor SMA(J/F)~N(P/M) x 1
GTL-303 : RF Cable SMA(P/M)~SMA(P/M) x 1
PR-01 : AC Voltage Probe x 1
PR-02 : Touch Passive RF Probe x 1
ANT-04 : H-field Probe x 1
ANT-05 : H-field Probe x 1

GKT-001 **General Kit set**
ADP-002: adaptor, SMA(J/F) ~ N(P/M) x 2
ATN-100: 10dB attenuator, N(J/F) ~ N(P/M) x 1
GTL-303: RF cable assembly(SMA(P/M),RG316,600mm)x 2
GSC-002: Kit box x 1

GKT-002 **CATV Kit set**
ADP-001: adaptor, BNC(J/F) ~ N(P/M) x 2
ADP-101: adaptor,BNC(J/F)75Ω~BNC(P/M)50Ω x 2
GTL-304: RF cable assembly(RG223,N(P/M)-N(J/F),300mm)x 2
GSC-003: Kit box x 1

GKT-003 **RLB Kit set**
GAK-001: termination 50Ω, N(P/M) x 1
GAK-002: Cap with chain, N(P/M) x 1
GTL-302: RF cable assembly(RG223,N(P/M),300mm)x2
GSC-004: Kit box x 1

FREE DOWNLOAD

SpectrumShot PC Software for Windows System (available on GW Instek website)
GSP-9300 Remote Control APP for Android System (available on Google play)
IVI Driver Supports LabVIEW/LabWindows/CVI Programming (available on NI website)

3GHz Spectrum Analyzer

A. KEY FEATURES

GSP-9300 is a light, compact, and high C/P ratio 3GHz spectrum analyzer. The GSP-9300 frequency range stretches from 9 KHz to 3GHz and features many functions such as radio frequency and power measurement, 2FSK digital communications analysis, EMC pretest mode, and active component P1dB point measurement, etc. It can support the fast sweep speed up to 307usec. It is the ideal instrument for various application fields such as the basic operation of R&D, research and school lecture, engineering maintenance, and test for mass production. This light and compact spectrum analyzer is also suitable for automatic test systems and vehicle mounted operation.

GW Instek understands that high quality is a very important consideration for users who are selecting economical spectrum analyzers. GSP-9300 spectrum analyzer, with the built-in preamplifier and the highest sensitivity of -152dBm (1Hz), is capable of measuring very feeble signals. To obtain the accurate results, the low power measurement uncertainty of GSP-9300 is less than 1.5dB.

The built-in measurement functions of GSP-9300 spectrum analyzer include 2FSK digital communications analysis, AM/FM/ASK/FSK signal demodulation & analysis, EMC pretest mode, Harmonic Distortion, TOI, Channel Power, OCBW, ACPR, SEM, Phase Jitter, N-dB Bandwidth, Noise Marker, Frequency Counter, and Time Domain power measurement for burst signal, etc.

Tracking generator, an option for GSP-9300 spectrum analyzer, provides supplementary functions such as measuring the insertion loss of RF cable and identifying the frequency response of antenna, filter or amplifier. The P1dB measurement function supports power sweep and P1dB compression point of active component's. It supports 6.2GHz power sensor PWS-06. Users, via the power meter mode, can conduct related measurement applications without using an independent power meter.

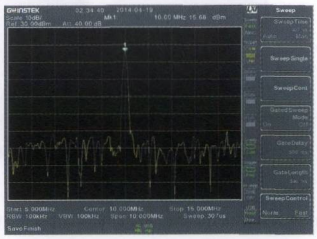
GSP-9300 spectrum analyzer is very user-friendly. All frequently used functions can be applied quickly through function keys and five languages (English, Russian, Traditional Chinese, Simplified Chinese and Japanese) are available for user interface.

Users can use the external software SpectrumShot for EMI test report management and assessment, remote control and waveform data recording for long periods of time. SpectrumShot can be applied to spectrum monitoring for detecting any abnormal radio signals. The software will send out e-mail to inform users if any abnormal situation occurs.

To summarize, GSP-9300 spectrum analyzer is a perfect, light, compact, and economical measurement instrument. With height of 210mm and width of 350mm, GSP-9300 is suitable for automatic test systems. It can be mounted on the 19 inches 6U rack. The light and compact design of GSP-9300 is ideal for vehicle mounted operation to carry out field strength measurement such as monitoring satellite communications signals.

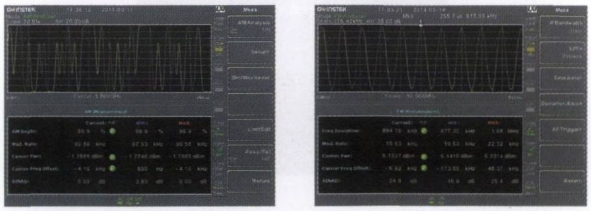
MEASUREMENT FUNCTION KEY FEATURES

A. FAST SWEEP MODE



GSP-9300 supports the fast sweep mode with sweep speed up to 307usec. Users can use the fast sweep mode to capture transient signals such as Tire-pressure monitoring system (TPMS), Bluetooth frequency hopping signals, tuned oscillator, and other interfering signals in ISM frequency band, etc.

B. AM/FM SIGNAL DEMODULATION & ANALYSIS

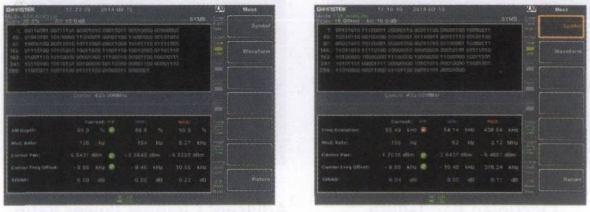


AM/FM Signal Analysis measures parameters including AM depth, frequency deviation, modulation rate, carrier power, carrier frequency offset and SINAD. Users can set the criterion in AM depth, frequency deviation, carrier power and carrier offset for fast test result determination. The GSP-9300 has a convenient AM/FM demodulation function to tune into AM or FM broadcast signals and listen to the demodulated baseband signals using the ear phone out socket.

C. 2FSK SIGNAL ANALYSIS

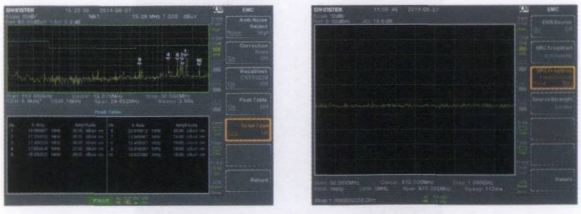
2FSK modulation, for its features of low design cost and low electricity consumption, is widely used by RF communications applications with low power and low data transmission speed characteristics. Nowadays, 2FSK modulation technology has been applied in various products and systems such as consumer electronics, automotive electronics, RFID, auto reading electricity meter, and industrial control devices, etc. 2FSK signal analysis measures parameters including carrier power, FSK frequency deviation, carrier frequency, and carrier frequency offset. Users can set the criterion in frequency deviation and carrier offset for fast test result determination.

D. ASK/FSK SIGNAL DEMODULATION & ANALYSIS



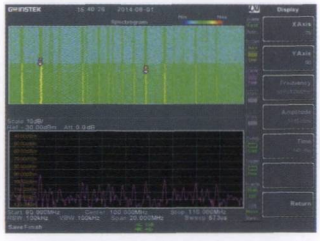
RFID and optical communications systems often use Amplitude Shift Keying (ASK). Applications such as wireless telephone, paging systems, and RFID, etc. utilize Frequency Shift Keying (FSK).
ASK/FSK demodulation and analysis measures parameters including AM depth, frequency deviation, modulation rate, carrier power, carrier frequency offset, SINAD, symbol, and waveform. Users can set AM depth, frequency deviation, carrier power and carrier offset for Pass/Fail testing result.

E. EMC PRETEST MODE



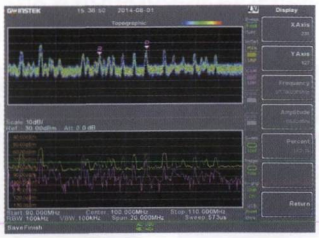
GSP-9300 supports -6dB EMI filter with 200/9k/120k/1M Hz bandwidth and built-in low noise amplifier. Users can apply maximum peak detector and EMI filter to conduct pre-compliance testing for electronics products. Users can activate built-in amplifier to measure feeble electromagnetic interfering signals to -150dBm/Hz in 1GHz frequency band.EMC pretest mode collocates with near field probe or antenna to carry out conduction and radiation electromagnetic interference (EMI) test. Additionally, near field probe and GSP-9300 tracking generator can be used to output 0dBm RF signals to test electromagnetic susceptibility (EMS) for electronics products.

F. SPECTROGRAM



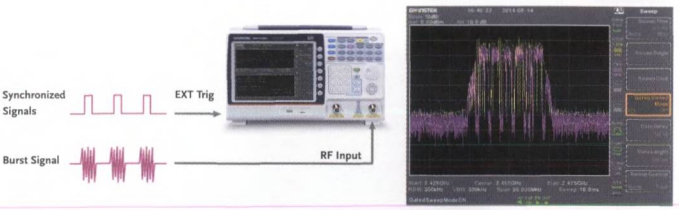
Spectrogram can simultaneously display power, frequency, and time. Frequency and power variation according to time changes can also be tracked. Especially, the intermittently appeared signals can be identified. Users, by using Spectrogram, can analyze the stability of signal versus time or identify the intermittently appeared interference signals in the communications system. Users can use two markers to find out the relation of power to frequency and time.

G. TOPOGRAPHIC



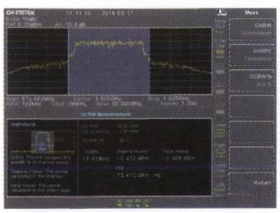
Topographic uses color shade to show the probability distribution of signal appearance. This function allows users to directly understand the process of signal variation according to time changes that is beneficial to observe intermittent feeble signals or electromagnetic interference signals. Users can use two makers to find out the relation of power to frequency and percentage.

H. GATED SWEEP

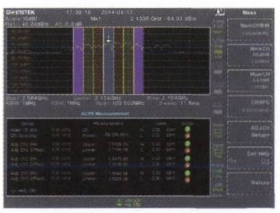


Radar or TDMA communications systems, via intermittently turning on/off output power, control transmission signals. In order to monitor the power spectrum during the transmission process, the Gated Sweep function can initiate measurement only when signals appear. This function is ideal for measuring burst signals such as GSM or WLAN (as shown in the example).

I. OCBW/ACPR



Occupied Bandwidth



Adjacent Channel Power Ratio

The OCBW measurement can simultaneously display OCBW, channel power and PSD. OCBW's unit is shown by percentage. A measurement area containing bandwidth will be shown when OCBW is in use.

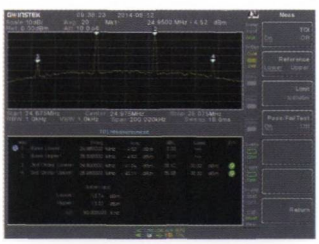
Telecommunications and broadcasting service carriers must reduce interference to the minimum. This interference is caused by power leakage to adjacent transmission channels. The ACPR measurement can examine the leakage status that is conducive to identifying interference source.

J. SEM

Spectrum Emission Mask

SEM measures out-of-channel emission which is defined by corresponding in-channel power. Users can set main channel's parameters, out-of-channel range, and limit line, etc. SEM supports the Pass/Fail test function and lists frequency range for surpassing each out-of-channel limit. An alarm signal will be triggered if any measurement results that are not matched with SEM. GSP-9300 has the built-in SEM settings of 3GPP, WLAN 802.11b/g/n, Wimax 802.16 and self-defined communications system.

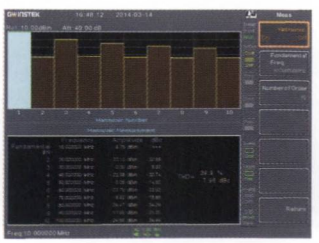
K. TOI



Third Order Intercept

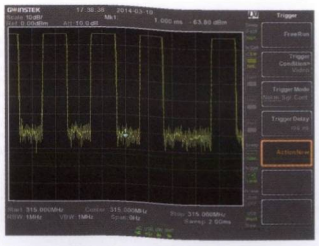
Users can measure the linearity of non-linear systems and components such as receiver, low-noise amplifier and mixer by TOI which automatically tests effective carrier and measures inter-modulation sidebands.

L. HARMONIC



Harmonic can easily measure the amplitude of fundamental frequency and as high as ten order of harmonic frequency. This function can also measure amplitude (dBc) which is the ratio of harmonic and corresponding fundamental carrier. Total harmonic distortion (THD) can also be calculated by this function.

M. TIME DOMAIN POWER

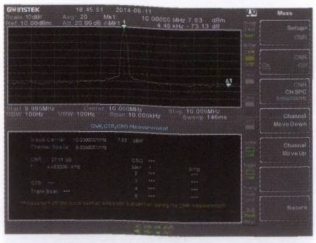


Users can go to zero span setting and open marker to observe burst signals when measuring burst signal in time domain is required.

N. PHASE JITTER

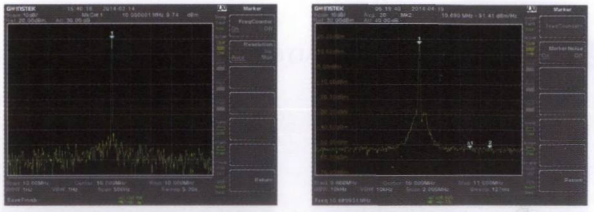
The Phase Jitter function can rapidly measure phase noise produced by RF signal source's and oscillator's carrier deviation. This function can directly convert signal jitter to phase (rad) and time (ns).

O. CNR/CSO/CTB



The built-in CNR/CSO/CTB functions of GSP-9300 are ideal for measuring performance of CATV amplifier and system.

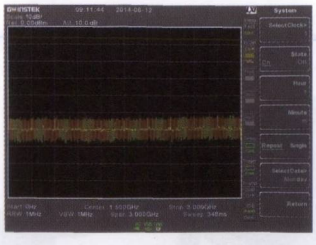
P. FREQUENCY COUNTER & MARKER NOISE



The frequency counter function is used to make accurate frequency measurements up to 1Hz resolution.
The marker noise function calculates the average noise level over a bandwidth of 1Hz, referenced from the marker position.

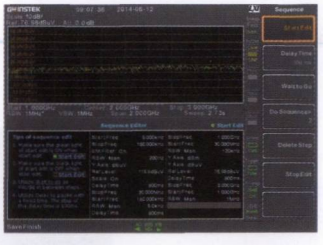
PRODUCTION LINE KEY FEATURES

A. SHORTEN WARM-UP TIME & WAKE-UP CLOCK



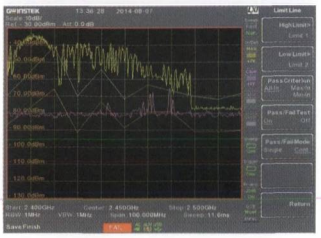
GSP-9300 utilizes the patented design of high efficient heat dissipation and feedback temperature control. After the instrument is turned on, the internal instrument can rapidly maintain a stable temperature so as to provide accurate amplitude measurement and deliver the frequency measurement with 0.025ppm frequency stability.
Users can set up automatic wake-up time for each day of the week. By so doing, the purpose of GSP-9300 pre wake-up can be achieved. Pre wake-up is ideal for the lower temperature environment to conduct tests in the preset time.

B. SEQUENCE FUNCTION



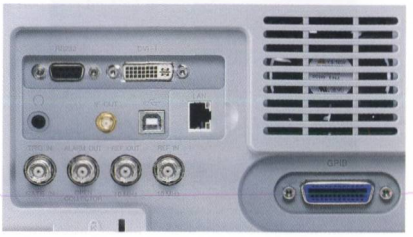
The sequence function allows users to edit a sequence formulated by a series of steps directly from the instrument. Pause and delay can be inserted in the sequence to observe the test results. There are five sets of sequence for selection. Each sequence allows editing of 20 steps. Different sequence can be interactive and support each other. This function provides automatic editing without using the PC that is very convenient for assembly lines in which execute routine test procedures.

C. LIMIT LINE FUNCTION



The limit line function, based upon the preset criteria of passing the test, can be used to directly determine whether the DUT passes the test. Test result not only can be shown on the LCD screen, but also an alarm signal output indication which is done by connecting a speaker or light device with the BNC terminal on the rear panel to facilitate the maximum yield rate of the production line.

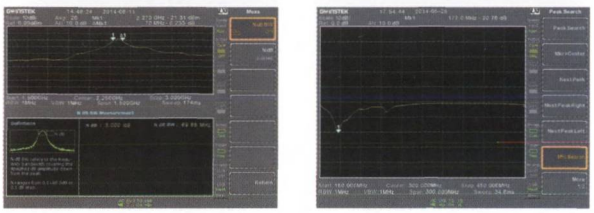
D. VARIOUS INTERFACE



GSP-9300 provides instrument control interface including LAN, RS-232, USB, and GPIB (optional).IVI driver is also provided to support LabVIEW/ CVI/LabWindows to meet the requirements of editing the automatic test software.

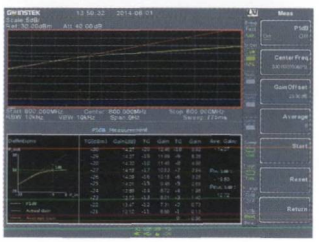
OPTIONS

A. SCALAR NETWORK ANALYSIS



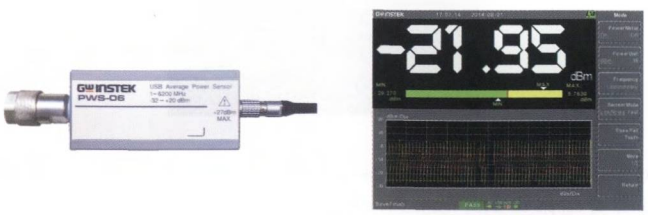
The built-in tracking generator can swiftly and easily measure frequency response of cable loss, filter bandwidth, amplifier gain, mixer conversion loss, etc. The N-dB Bandwidth function measures 3dB bandwidth of Bandpass filter. SWR bridge should be connected with tracking generator to measure the return loss of antenna or filter.

B. P1dB POINT MEASUREMENT



All active components have linear dynamic range for power output. Once output power reaches the maximum level, active component will enter the non-linear saturated area of P1dB point and cease amplifying signal intensity as well as produce harmonic distortion. It is very useful for P1dB point measurement in active components such as low noise amplifier, mixer and active filter. The GSP-9300 tracking generator supports 50dB power sweep range; output power from 0dBm to -50dBm; frequency range from 100kHz to 3GHz.

C. POWER METER



GSP-9300 connecting with PWS-06 USB power sensor can be applied to execute high precision average power measurement for USB PnP. PWS-06 USB power sensor has the built-in zero function; therefore, calibration by an external signal source is unnecessary. GSP-9300 not only collects, displays, and stores the measurement results of power meter, but also provides the Pass/Fail function.

D. BATTERY PACK

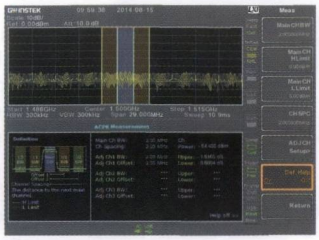
Compact and light-weighted (4kg) GSP-9300 can be powered by battery making it suitable for outdoor operations. Optional GSP-9300 battery pack (opt.02) has a battery life of two hours. Optional soft carrying case (GSC-009) provides convenience and protection to the instrument. GSP-9300 is equipped with 8.4 inches 800x600 pixels LCD display which yields clearer display results for outdoor operations.

USER FRIENDLY DESIGN

A. STATUS ICONS

Status Icons show the interface status, power status, alarm status and etc of GSP-9300. Users can easily understand the setting status and test results of the instrument.

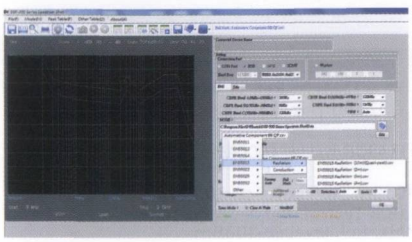
B. DEFINITION HELP

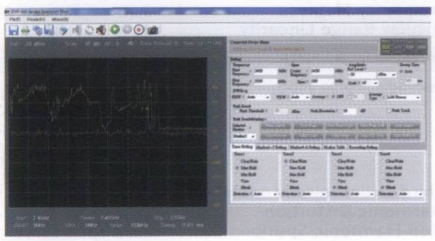


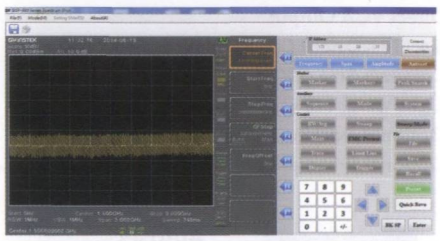
The built-in Definition Help function allows users to immediately understand the parameters of Channel Power, OCBW, ACPR, SEM, Phase Jitter, N-dB Bandwidth & P1dB items so as to save time on reading user manual.

EXTERNAL PC SOFTWARE & DRIVER SUPPORT

A. SPECTRUMSHOT SOFTWARE & IVI DRIVER







Users can use the external software SpectrumShot for EMI test report management and assessment, remote control and waveform data recording for long periods of time.Under the EMI Pre-test Mode, users can select the required CISPR EMI regulation for conduction and radiation measurement. Under Get Trace mode, users can record the waveform data for long periods of time. It can be applied to spectrum monitoring for detecting any abnormal radio signals. The software will send out e-mail to inform users if any abnormal situation occurs. Under the Remote Control mode, users can monitor wireless interference signals or observe signals for long periods of time.

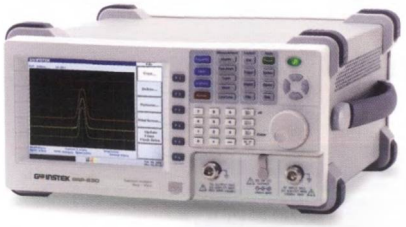
IVI Driver Supports LabView/LabWindows/CVI Programming.
It is available on NI website.

B. GSP-9300 REMOTE CONTROL APP

Users can install the "GSP-9300 Remote Control" APP on an Android Smart Phone or Tablet.To use the GSP-9300 as a server using a 3G modem, the user must first obtain a fixed IP address from a network provider.

For remote locations, using a 3G modem allows the user to remote control the GSP-9300 Spectrum Analyzer.It is available on Google Play Store.

3GHz Spectrum Analyzer



GSP-830 (9kHz ~ 3GHz)

GSP-830 is a swept spectrum analyzer with a 9kHz ~ 3GHz bandwidth. With high performance, a low noise floor, easy-to-use and portability, GSP-830 is equally advantageous in high frequency communications applications, academic research, educational training, electronic component design and manufacturing as well as automated testing. GSP-830 achieves a remarkable noise floor of -152dBm with advanced integrated functional design. To increase sensitivity to resolve weaker signals, the noise floor can be further reduced to -172dBm/Hz with the optional GAP-802 pre-amplifier. Up to ten sequences can be created in the Sequence Mode to automate measurement procedures. Each sequence has a number of running modes (Repeat, Single) to suit different requirements. To meet the application requirements for all users GSP-830 also features a number of outstanding and unique functions such as split window mode, power measurements and limit line testing. A number of interfaces such as USB Host/Device, RS-232C, VGA and GPIB (optional), make GSP-830 a flexible instrument for remote control, monitoring or data transfer.

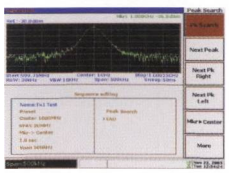
CE | RS-232 | GPIB | USB | VGA Output | PC Software

FEATURES

* Low Noise Floor (-117dBm @1GHz, 3k RBW)
* Sequence Programming Function
* ACPR, OCBW, Channel Power, N-dB, Phase Jitter Measurements
* Pass/Fail Test with Limit Line Editing
* 5 Markers with △ Marker, Peak Functions ; 10Markers with All Peaks Function
* Split Windows Allow Separate Settings
* AC/DC/Battery Multi-Mode Power Operation
* USB/RS-232C/GPIB(Optional) Interface
* Direct VGA Output
* 6.4" TFT Color LCD, Resolution: 640 x 480
* Compact Size, 330(W) x170 (H) x 340 (D)mm
* Light Weight of 6kg Without Options
* Optional Tracking Generator
* Optional Preamplifier

Autoset

Signal is automatically measured and located at the display center with default or specified settings.



Sequence

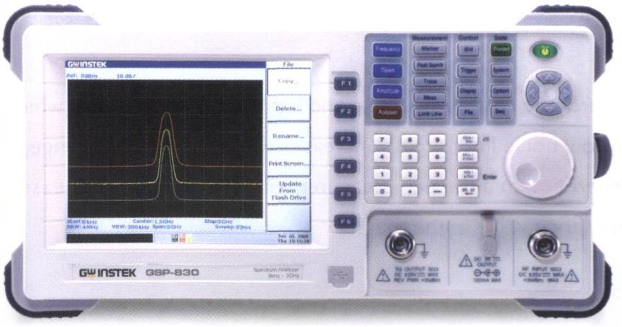
Front panel operations can be automated with built-in Sequence programming functions.

GSC-001 Soft Carrying Case

For: GSP-830

SPECIFICATIONS	
FREQUENCY	
Frequency Range	9kHz ~ 3GHz
Aging Rate	± 10ppm, 0-50°C, 5ppm/yr
Span Range	2kHz ~ 3GHz in 1-2-5 sequence, full span, zero span
Phase Noise	-80dBc/Hz @1GHz 20kHz offset typical
Sweep Time Range	50ms ~ 25.6s
RESOLUTION BANDWIDTH	
RBW Range	3kHz, 30kHz, 300kHz, 4MHz
RBW Accuracy	15%
Video Bandwidth Range	10Hz ~ 1MHz in 1-3-10 steps
AMPLITUDE	
Measurement Range	-103dBm ~ +20dBm, 1MHz ~ 15MHz, Ref.Level@-30dBm -117dBm ~ +20dBm, 15MHz ~ 1000MHz, Ref.Level ≥ -110dBm -114dBm ~ +20dBm, 1000MHz ~ 3000MHz, Ref.Level ≥ -110dBm (Span=50kHz,RBW=3kHz)
Overload Protection	Max. +30dBm, 25VDC
Reference Level Range	-110dBm ~ +20dBm
Accuracy	± 1dB @100MHz
Frequency Flatness	± 1dB
Display Range Linearity	± 1dB over 70dB
DYNAMIC RANGE	
Average Noise Floor	< -135 ± 1dBm/Hz, 1MHz ~ 15MHz, Ref. Level@ -30dBm < -149 dBm/Hz, typical -152dBm/Hz. 15MHz ~ 1000MHz, Ref. Level ≥ -110dBm < -146 dBm/Hz, typical -149dBm/Hz, 1000MHz ~ 3000MHz, Ref. Level ≥ -110dBm
Third Order Inter-Modulation	< -70dBc RF Input @ -40dBm, Ref. Level @-30dBm
Harmonic Distortion	< -60dBc RF Input <-40dBm Typical, Ref. level @-30dBm
Non-Harmonic Spurious	< -93dBm, 1MHz ~15MHz, Ref. level @-30dBm < -107dBm, 15MHz ~ 1000MHz, Ref. level≥ -110dBm < -104dBm, 1000MHz~3000MHz, Ref. level≥ -110dBm (Span=50kHz, RBW=3kHz)
GENERAL	
Display	640 x 480 high resolution TFT color LCD
Split Windows	Active Window : Upper, Lower or Alternate (two simultaneously sweeping windows)
Markers	10 Markers for peaks; 5 normal-delta marker pairs Functions : Delta, To Peak, To Minimum, Peak track, Peak Table, Peak Sort
Trace Detection	3 traces with Peak, Maximum hold, Freeze, Average, Trace math
Power Measurement	ACPR, OCBW, Channel power, N dB BW and Phase Jitter
Autoset Function	Auto tuning the measurement result for observation
Trigger	Conditions : Video, External(Positive-goino + 5V-TTL ext. Signal) Modes : Normal, Single, Continuous
Sequence	Automated test by user-defined macros without any remote controller, 10 Sequential macro sets and 10 macros each set, Variable delays and wait-to-go facilitate automated measurement, Do-Sequence links and nests different sequence sets.
CONNECTORS	
RF-Input	Type: N female, 50Ω nominal RF input VSWR: <2:1@ 0dBm Reference Level
External Reference	Type: BNC female,
Clock Input	1M, 1.544M, 2.048M, 5M, 10M, 10.24M, 13M, 15.36M, 15.4M, 19.2MHz
Reference Clock Output	Type: BNC female, 10MHz
DC Input (DC Power Operation)	Jack: 5.5mm, 12V
DC Output (for GAP-801/802)	Type: SMB male, outputs +9V/100mA Max.
INTERFACE	
RS-232C	D-Sub 9-pins female
USB Connector	USB Host/Device fully speed supported Front panel : Type A receptacle for USB flash drives Real panel : Type mini-B receptacle for PC remote control
VGA Output	D-Sub 15-pins female
GPIB (Option)	Fully programmable with IEEE 488.2 compliance
POWER SOURCE	
AC 100 ~ 240V, 50/60Hz	
DIMENSIONS & WEIGHT	
330(W) x 170(H) x 340(D) mm, Approx. 6kg	

Note: Need to Collocate the Optional Accessories.



GSP-830

ORDERING INFORMATION

GSP-830 3GHz Spectrum Analyzer

ACCESSORIES :
User manual x1 , Power cord x1, USB cable (Type A plug to type mini-B plug) x 1

OPTION

Opt. 01 Tracking Generator

Frequency Range	9kHz ~ 3GHz	Harmonics	<-30dBc typical
Amplitude Range	-50dBm ~ 0dBm	Reverse Power	+30dBm
Amplitude Accuracy	±1dB@100MHz, 0dBm		
Amplitude Flatness	±1dB@0dBm		
Impedance	Type: N female, 50Ω nominal		
RF Output VSWR	< 2 : 1		

Opt. 02 Battery pack
11.1V Li-Ion battery pack x 2

Opt. 03 ±1ppm Stability
±1ppm , 0 ~ 50°C, ±1ppm/yr

Opt. 04 300Hz RBW
RBW 300Hz, 3dB bandwidth ; RBW accuracy : 20%

Opt. 05 EMI Filter 9kHz & 120kHz RBW(*)
RBW selections : 9kHz and 120kHz, 6dB bandwidth ; RBW accuracy : 15%

Opt. 06 10kHz & 100kHz RBW(*)
RBW selections : 10kHz and 100kHz, 3dB bandwidth ; RBW accuracy : 15%

Opt. 07 AM/FM Demodulator & 10kHz & 100kHz RBW(*)
Demodulation : AM , FM ; Output : internal speaker, 3.5mm stereo jack wired for mono operation
RBW selections : 10kHz and 100kHz, 3dB bandwidth ; RBW accuracy : 15%

Opt. 08 GPIB Interface
IEEE 488 bus

NOTE : 1. (*) Only one option can be selected between Opt. 05,06,07 2. All options are factory-installed except opt.02.

OPTIONAL ACCESSORIES

ATA-001 BNC Antenna (An additional ADP-001 is needed for fitting GSP spectrum analyzers)
ADP-001 BNC to N-TYPE Adaptor
ADP-002 SMA to N-TYPE Adaptor
GAP-802 Preamplifier Preamplifier with 20dB(typical)gain, 9kHz ~ 3GHz
RLB-001 Return Loss Bridge RLB Frequency Range 10MHz ~ 1GHz
GKT-001 General Kit set
ADP-002: adaptor, SMA(J/F) ~ N(P/M) x 2
ATN-100: 10dB attenuator, N(J/F) ~ N(P/M) x 1
GTL-303: RF cable assembly(SMA(P/M),RG316,600mm)x 2
GSC-002: Kit box x 1
GKT-002 CATV Kit set
ADP-001: adaptor, BNC(J/F) ~ N(P/M) x 2
ADP-101: adaptor,BNC(J/F)75Ω~BNC(P/M)50Ω x 2
GTL-304: RF cable assembly(RG223,N(P/M)-N(J/F),300mm)x 2
GSC-003: Kit box x 1
GKT-003 RLB Kit set
GAK-001: termination 50Ω, N(P/M) x 1
GAK-002: Cap with chain, N(P/M) x 1
GTL-302: RF cable assembly(RG223,N(P/M),300mm)x2
GSC-004: Kit box x 1
GKT-008 EMI Probe Kit set
ADP-002: Adaptor SMA(J/F) ~ N (P/M) x 1
GTL-303: RF Cable SMA(P/M) ~ SMA(P/M) x 1
PR-01: AC Voltage Probe x 1
PR-02: Touch Passive RF Probe x 1
ANT-04: H-field Probe x 1
ANT-05: H-field Probe x 1
GRA-404 Rack Adapter Panel Rack Mounting (19", 4U)
GSC-001 Soft Carrying Case
GTL-301 RF Cable Rg223 Assembly, 1000mm, N(P/M)
GTL-302 RF Cable Rg223 Assembly, 300mm, N(P/M)
GTL-303 RF Cable Rg316 Assembly, 600mm, SMA(P/M)
GTL-304 RF Cable Rg223 Assembly, 280mm, N(P/M) - N(J/F)
GTL-401 DC Power Cord DC power cord with DC Jack and lighter plug,Current 5A
GTL-253 Mini USB Cable USB Cable 2.0 A-B(mini), 1.3M

FREE DOWNLOAD

PC Software EagleShot, Remote Monitor & EMI Pre-compliance Software
Driver USB Driver

Rear Panel

GRA-404 Rack Adapter Panel

For : GSP-830, Rack Mounting (19", 4U)

GKT-001 General Kit Set

Includes :
ADP-002
ATN-100
GTL-303
GSC-002
For: GSP-Series

GKT-002 CATV Kit Set

Includes :
ADP-001
ADP-101
GTL-304
GSC-003
For: GSP-Series

GKT-003 RLB Kit Set

Includes :
GAK-001
GAK-002
GTL-302
GSC-004
For: GSP-Series

GKT-008 EMI Probe Kit Set

Include :
ADP-002
GTL-303
PR-01
PR-02
ANT-04
ANT-05
For: GSP-Series

GAP-802 Preamplifier

GAP-802 Preamplifier
with 20dB gain
(Typical 9kHz ~ 3GHz)
For: GSP-830

3GHz Spectrum Analyzer

A. KEY FEATURES

GSP-830 inherits the advantages of high performance, affordable cost, easy-to-use and light-weight portability, which are common in GW Instek products. Moreover, its extremely low noise floor greatly increases the measurement range, an advanced user interface brings a significant visual enhancement, and the rich measurement functions make measurements simple and easy. GSP-830 offers the greatest performance/price value in the market.

Wide Measurement Range

With GW Instek's state-of-the-art design, the GSP-830's outstanding low noise floor level of -152dBm/Hz at 1GHz has extreme sensitivity for picking up weak signals. Along with the GAP-802 20dB-gain preamplifier, GSP-830 reaches an equivalent noise floor level as low as -172dBm/Hz, further extending the measurement range.

Automatic Measurement

GSP-830 can be an automatic test instrument eliminating the need for external computer control. Macros can be defined through the front panel keypad and stored into 10 Sequence sets. A sequence can include pause steps that can be used for observing the measurement results when necessary. Repeat or Single run mode can be selected based on application requirements.

Portable Power Operations

Equipped with two packs of Li-ion batteries, GSP-830 can maintain normal operation for more than 3 hours. In DC operation mode GSP-830 can to be powered by a 12-Volt power supply or a standard cigarette lighter socket in an automobile. The large internal memory of GSP-830 means mass storage of measured traces, setup information, limit lines and user-defined macros are possible. With USB flash drive support for mass storage, weighing 6kg and a compact size, GSP-830 is also a convenient tool for service engineers out in the field.

Advanced User Interface

The user-oriented interface design of GSP-830 gives users the pleasure of handling complicated measurements with ease. A high-resolution 6.4" color TFT LCD provides crisp and clear images. Colored, user-defined traces allow small disparities to seen at a glance. The Split-Window mode allows simultaneous monitoring of two different frequency bands on a single display. Under this split-window mode, GSP-830 acts like two spectrum analyzers packed into a single unit.

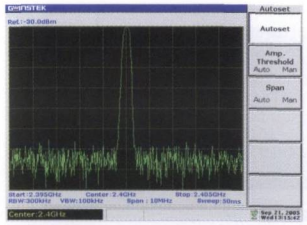
Feature-Rich Interface

The USB host port on the front panel supports flash drives for various functions, including loading/saving setup information, trace data and screen captures. The rear panel USB slave port is used for PC remote control. GSP-830's screen image can be sent directly to external monitors through the VGA port on the rear panel. These features make it easy for remote monitoring in special circumstances such as EMI testing, group presentations or discussions.

Free PC Software for the GSP-830

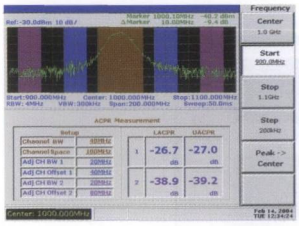
Through RS-232 or USB connection, EagleShot can transfer measurement data from GSP-830 to a PC. Data can be printed as graphs or saved as a text file for further data analysis. With the EagleShot software, the limit lines can be uploaded from GSP-830 or edited directly on a PC. For marking and reading the captured signals on the PC screen, markers can be placed directly on the PC display, as easily as doing it on the GSP-830 front panel. The latest version of EagleShot supports GSP-830 in various application fields whilst maintaining compatibility with GSP-827.

B. AUTOSET FUNCTION

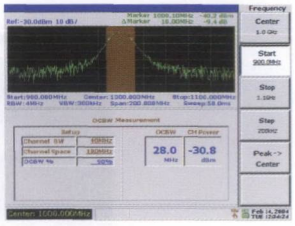


Going through rigorous training sessions and trial-and-error used to be a common process to master how to use a product. That is not the case with GSP-830. The Autoset function automatically captures the signal and configures the optimal display setting in just one step. For complex signals, settings such as amplitude and frequency span can still be manually adjusted to display the desired signal. With the GSP-830's Autoset function, using a spectrum analyzer is no longer a complicated experience.

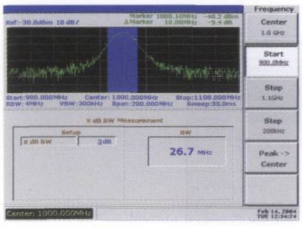
C. POWER MEASUREMENT FUNCTION



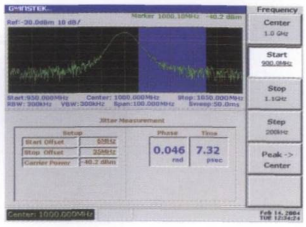
ACPR



OCBW



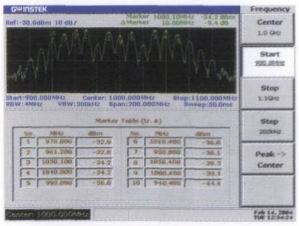
N-dB BW Measurement

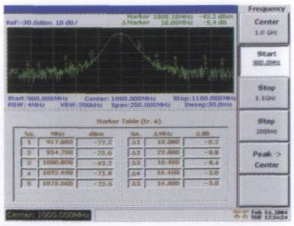


Jitter Measurement

GSP-830 provides various power measurement functions : ACPR, OCBW, Channel Power, Phase Jitter, and N-dB bandwidth. Two adjacent channels as well as channel bands can be shown at the same time with different color codes for easy recognition of test results. Under the power measurement mode, the screen display splits into two parts. The upper part shows the waveform and lower part shows the test results.

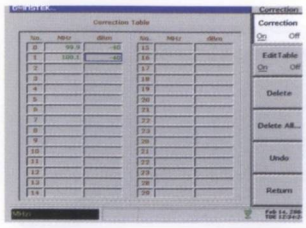
D. MARKER FUNCTION





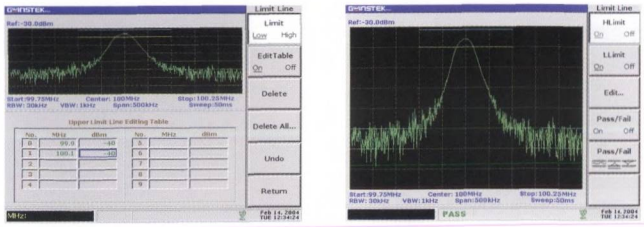
Under Marker mode, 5 pairs of flexible markers can be used to easily find and observe signal peaks, track them or measure delta readings between defined pairs. A tabled list provides a real-time update of the frequency and power information of all markers to observe signal details quickly and easily.

E. CORRECTION TABLE FUNCTION



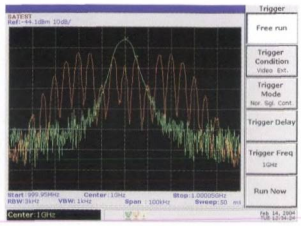
GSP-830 provides up to five sets of amplitude correction functions for compensating antenna effects. Each correction set includes 30 amplitude adjustment points in different frequencies, allowing easy adjustment of antenna effects.

F. PASS/FAIL JUDGMENTS



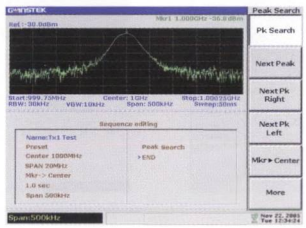
The Pass/Fail Limit function is convenient for quick inspections of repetitive measurements. This function is especially helpful for the efficiency and productivity of production line testing. After setting high/ low limits to create Pass/ Fail templates, GSP-830 can quickly determine whether the waveform of an input signal is within the specified range (Pass) or not (Fail).

G. TRIGGER FUNCTION



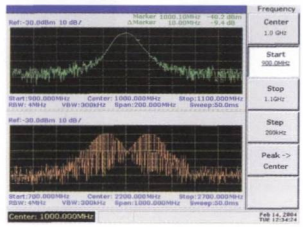
The extensive triggering features add very flexible yet powerful triggering capabilities to GSP-830. Trigger source, mode, delay and frequency can be fully configured to isolate the right trigger conditions.

H. AUTO SEQUENCE MODE



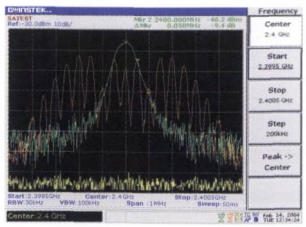
Automatic Sequence feature offers a special functionality that frees you from complex programming; you can configure ATE test programs with GSP-830 without going through software programming processes. After editing the auto sequence sets through the GSP-830 front panel, you can easily run different measurements in series (by a single key press) or carry out all the test sequences step by step.

I. SPLIT-WINDOW DISPLAY IN LIVE MODE



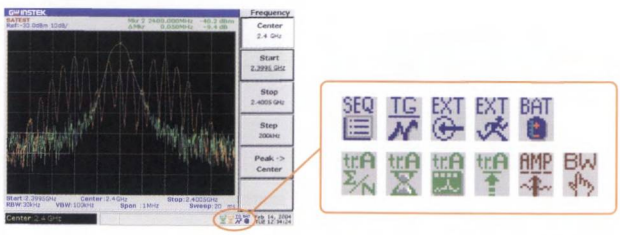
The split-window display allows one signal to be displayed in two different measurement modes or settings. Importantly, both windows continue to be updated in the real-time regardless of the measuring modes. This feature is especially useful when measuring harmonics.

J. THREE-TRACE INDEPENDENT DETECTION



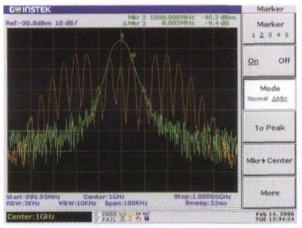
GSP-830 is able to display three traces at once with various signal detection modes such as: peak, average, and sample. The other useful trace functions include trace math operations using the stored traces.

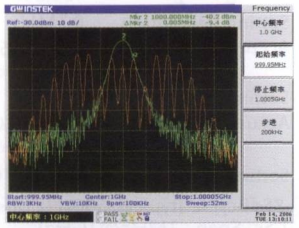
K. STATUS INFORMATION PRESENTED BY ICONS



Breaking away from traditional spectrum analyzer interfaces, GSP-830 has adopted status icons to clearly show the current instrument status. The intuitive icons help you grasp the current conditions immediately. As all the status icons are clearly displayed there is no need to worry about other functions or settings which might cause measurement errors.

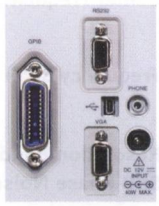
L. MULTI-LANGUAGE OPERATION

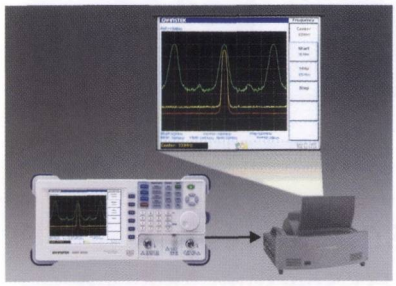




GSP-830 can be operated in English or Simplified Chinese, with English being the default language. The multi-language feature allows you to operate GSP-830 comfortably in your preferred language.

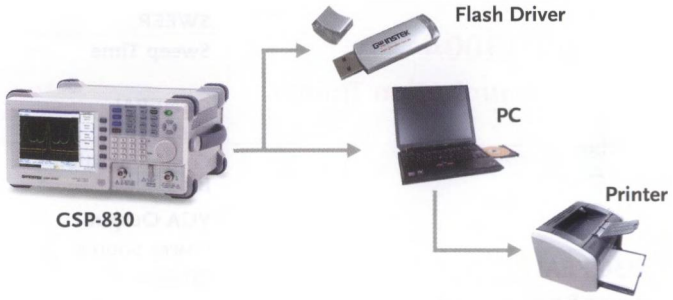
M. VGA OUTPUT





The VGA output terminal can be used for showing GSP-830 display contents on an external device, such as a projector screen or VGA monitor. It offers a huge benefit in a variety of applications such as education and remote monitoring.

N. USB INTERFACE INCLUDED IN THE STANDARD CONFIGURATION



GSP-830 has flexible PC connection. In addition to the standard RS-232 and optional GPIB for ATE control, GSP-830 supports USB Host for data transfer. USB flash drives can be directly connected to the USB Host port to transfer measurement data to improve the work efficiency and make file transfer far more convenient.

O. OPERATION TIME OF 3 HOURS WITH THE BATTERY PACK

Li-Ion Battery Pack

Soft Carrying Case

Three types of power supplies are supported in GSP-830 : AC (100~240V), DC (+11~17V), and battery. Using the battery pack, one can operate GSP-830 for up to 3 hours without an external power source. From a vehicle, the standard 12V supply can not only be used to operate GSP-830, it can also charge the battery. These multiple power options are more than enough to satisfy mobile measurement needs.

3GHz Spectrum Analyzer & RF and Communications Trainer

GSP-730

3GHz Spectrum Analyzer

CE | USB | RS-232 | VGA Output | PC Software

GRF-1300/1300A

RF and Communication Trainer

CE | USB | PC Software

GSP-730 FEATURES

- Frequency Range : 150kHz ~ 3GHz
- Autoset Function
- Noise level : ≤-100dBm
- RBW Range : 30kHz, 100kHz, 300kHz, 1MHz
- ACPR/CHPW/OCBW Measurement
- 3 Traces in Different Colors
- Split Window Function
- Limit Line Function
- Remote Control Software
- Presentation Material for Training Courses
- Support Interface : USB Device/Host, RS-232C
- 5.6" TFT LCD with VGA Output

GRF-1300/1300A FEATURES

- Waveform Support :
  Sine Wave : 0.1 ~ 3MHz
  Square Wave : 0.1 ~ 3MHz
  Triangle Wave : 0.1 ~ 3MHz
- RF Frequency : 870 ~ 920MHz
- AM Modulation & FM Modulation
- 5 On/Off Switches and 5 Test Points to Simulate 8 Failure Conditions for Learning Outcome Test
- USB Interface to Provide Remote Control
- Mixer & 2.4GHz Bandpass Filter (Only GRF-1300A)

GSP-730 SPECIFICATIONS

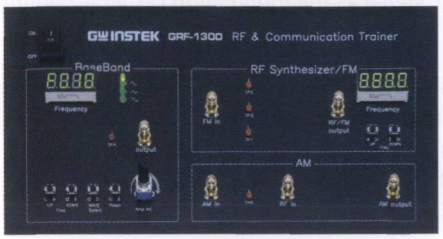
FREQUENCY		
Frequency Range	Setting Range	150kHz ~ 3GHz
Center Frequency	Setting Resolution	0.1MHz
	Accuracy	within ±50kHz (frequency span : 0.3GHz ~ 2.6GHz, 20 ±5°C)
Frequency Span	Setting range	1MHz ~ 3GHz
	Accuracy	within ±3% (frequency span : 0.3GHz ~ 2.6GHz, 20 ±5°C)
Resolution Bandwidth	Setting Range	30kHz, 100kHz, 300kHz,1MHz
SSB Phase Noise	-85dBc/Hz (typical, 500kHz offset, RBW : 30kHz, Sweep time : 1.5s, Span : 1MHz@1GHz)	
Inherent Spurious Response	less than -45dBc@-40dBm Ref. Level (typical less than -50dBc)	
AMPLITUDE		
Reference Level	Input Range	+20 ~ -40dBm
	Accuracy	Within ±2dB (1GHz) ; SPAN : 5MHz
	Unit	dBm, dBV, dBμV
Average Noise Level	≤ -100dBm (typical, center frequency : 1GHz RBW : 30kHz)	
Frequency Characteristic	Within ±3.0dB@300MHz ~ 2.6GHz	
	Within ±6.0dB@80 ~ 300MHz, 2.6 ~ 3GHz	
Input	Input Impedance	50Ω
	Input VSWR	less than 2.0@input att≥10dB
	Input damage level	+30dBm (CW average power), 25VDC
	Input connector	N connector
SWEEP		
Sweep Time	Setting Range	300ms ~ 8.4s, auto (not adjustable)
	Accuracy	within ±2% (frequency span : full span)
GENERAL		
Display	640 x 480 RGB color LCD	
Communication Interface	RS-232C	Sub-D female-D 9 pins
	USB Connector	USB Host/Device full speed supported
VGA Output	Sub-D female 15 pins	
Power Source	AC 100~240V, 50/60Hz	
OTHER		
Operating Temperature	5 ~ 45°C (Guaranteed at 25 ±5°C, without soft carrying case)	
Operating Humidity	Less than 45°C / 90%RH	
Storage Temperature	-20 ~ 60°C, less than 60°C / 70%RH	
DIMENSIONS &WEIGHT		
296(L) x 153(W) x 105(H) mm/11.6(L) x 6(W) x 4.1(H) in, Approx. 2.2kg/4.9lb		

GRF-1300/1300A SPECIFICATIONS

	GRF-1300A	GRF-1300
BASE BAND		
Waveforms	Sine, Square, Triangle	Sine, Square, Triangle
Frequency Range	0.1~3MHz , Step : 10kHz	0.1~3MHz , Step : 10kHz
Amplitude	≧1.5Vpp ≧0.75Vpp into 50 Ohm	≧1.5Vpp
Harmonic Distortion	≦-30dBc	≦-30dBc
RF/FM ANALYSIS		
Frequency Accuracy	±0.15MHz	±0.15MHz
Adjustable Range	≧45MHz (870M ~ 920MHz), Step : 1MHz	≧45MHz (870M ~ 920MHz), Step : 1MHz
Power Range	≧-15dBm	≧-15dBm
FM		
Max Frequency Deviation	>3MHz	>3MHz
AM		
Peak Difference	≧-18dBm	≧-18dBm
MIXER		
LO + IF	≧-35dBm	–
LO - IF	≧-35dBm	–
MIXER + MODULATION		
	≧-60dBm	–
BANDPASS FILTER		
Frequency Centre: 2.4GHz	Bandwidth: ±20MHz	–
INTERFACE		
USB Device	USB Type B	
DIMENSIONS & WEIGHT		
165(W) x 155(H) x 90(D)mm/6.5(W) x 6.1(H) x 3.5(D)in, Approx. 1.2kg/2.6lb		

GSP-730

Rear Panel



GRF-1300 Front Panel

GRF-1300A Front Panel

ORDERING INFORMATION

GSP-730	3GHz Spectrum Analyzer
GRF-1300/1300A	RF and Communication System Trainer

ACCESSORIES :

GSP-730 : Quick start manual x 1, User manual CD x 1, Power cord x1

GRF-1300/1300A : Experiment text book of student version, Power point file and remote control software CD, GRF-1300 : RF cable x 3, Antenna x 1/ GRF-1300A : RF cable x 6, Antenna x 2, N to SMA adaptor connector x 1, Power cord x 1

OPTION	
GBK-001	GRF-1300 Experiment text book of teacher version
GBK-002	GRF-1300A Experiment text book of teacher version

OPTIONAL ACCESSORIES	
ADP-001	BNC to N-TYPE Adaptor
ADP-002	SMA to N-TYPE Adaptor
ATA-001	Antenna, General FM Antenna, BNC(M)
GTL-303	RF Cable, RG316 Assembly, 600mm, SMA(P/M)
GTL-246	USB Cable, USB 2.0, A-B Type, 1200mm

FREE DOWNLOAD	
PC Software	Training syetem remote control software

3GHz Spectrum Analyzer

GW Instek GSP-730 is a 3GHz Spectrum Analyzer developed mainly to fulfill the demands of RF Communication educations. Budget constraint and insufficient teaching tools are normally the two hurdles for schools to provide high-quality courses for RF communication experiments. GSP-730, featuring full functions, a moderate spectrum analyzer should provide, along with GRF-1300/1300A RF communication trainer possesses a unique position in the field as an economical turn-key solution for 3GHz RF Communication Experiment courses.

A TURN-KEY SOLUTION TO CLEAR AWAY TWO OBSTACLES

GSP-730, carrying 3GHz bandwidth and measurement functions including Autoset, Split Window, Limit Line, ACPR and OCBW etc., is regarded as the advanced educations of Mobile Communications (GSM, 3G, 4G/LTE...), Wi-Fi, Zigbee and RFID in the Electronic or the Communication classes. The USB ports, the RS-232 interface and the VGA video output facilitate the teaching efficiency. The combination of GSP-730 and GRF-1300/1300A RF communication training is a turn-key system for both lecture and hands-on training purposes.

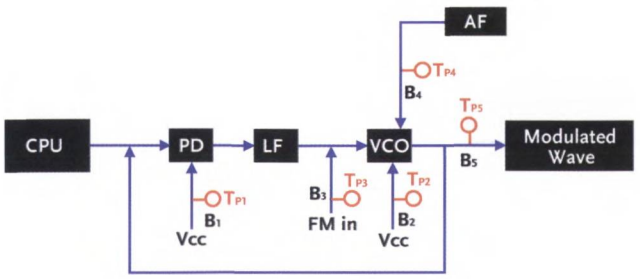
GRF-1300/1300A RF communication trainer, as the counterpart of GSP-730 for the basic RF communication experiment system, is capable of generating a baseband signal and a RF carrier signal for the built-in AM and FM communication operations. The baseband signal output contains the selections of Sine, Triangle, and Square waveforms in the frequency range of 100kHz ~ 3MHz, whereas the RF signal output is a frequency-variable Sine wave in the range of 870 ~ 920 MHz. Connecting the baseband signal output with AM or FM inputs on the panel, GRF-1300/1300A produces AM or FM signal output respectively by using the internal RF signal as the modulation carrier according to users' selected frequency.

The GRF-1300A RF training kit features not only all functions of GRF-1300 RF training kit but also augments itself with Mixer and Bandpass Filter. Users can better understand the characteristics of Mixer and Bandpass Filter by operating scalar network analyzer measurement which is produced by combining GSP-730 spectrum analyzer, GRF-1300A RF Communications Trainer, and USG signal generator. The combination of USG signal generator and GRF-1300A Mixer function can produce 2.4GHz AM and FM modulation signals. GRF-1300A Bandpass Filter can purify the output signals by filtering out harmonic and spurious produced by Mixer output signals.

An Experiment Textbook (student's book) is available as the standard accessory of GRF-1300/1300A to provide experiment courses. The curriculum of the textbook includes the introduction of the frequency domain and the time domain concepts, the operation theories of a spectrum analyzer, and nine experiments to perform hands-on training for the learning of basic RF communication theories and the RF measurement techniques using a spectrum analyzer. A CD, containing power-point slides for course presentation and the remote-control software for experiment, is attainable with GRF-1300/1300A, allowing teachers to give lecture of experiment theories and perform experiment simultaneously.

Another Experiment Textbook (teacher's book) is accessible as an optional accessory of GRF-1300/1300A. In addition to the same contents in the student's book, this book provides the experiment results to the questions and as well as some advanced experiment theories. Thus, a section of test-for-learning outcomes can also be seen in the lecturers' material in order to guide the students from the faulty diagnosis to the correct one in a RF communication circuitry. On the GRF-1300/1300A panel, there are five test points set at different joints of circuit blocks. Through turning on or off the corresponding relays of the five test points enables the teachers to simulate the faults and teach students diagnosis technique.

The economical solution of GSP-730 and GRF-1300 greatly lowers the budget barriers for providing fundamental RF Communication Educations and facilitates the establishment of RF communication experiment labs with more training stations in schools.



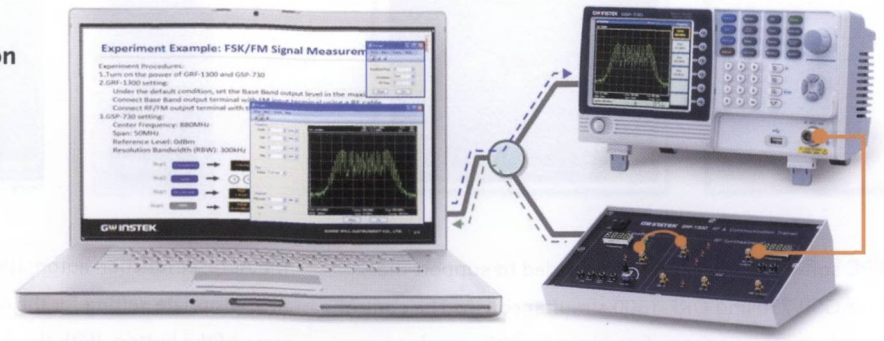
Test Points on GRF-1300 for Fault Diagnosis

- **Introductions of Frequency Domain , Time Domain , and Spectrum Analyzer Basics.**
- **9 Experiments Include**
  - Operations of Spectrum Analyzer
  - Base band and RF signal measurements
  - AM and FM signal measurements
  - Communication system and product measurements
- **Learning Outcome Tests**
- **Auxiliary Tools**
  - PPT files including all experiments contents
  - Remote control software to control GRF-1300, GSP-730 simultaneously
  - Experiment text books including the student version and the teacher(optional)

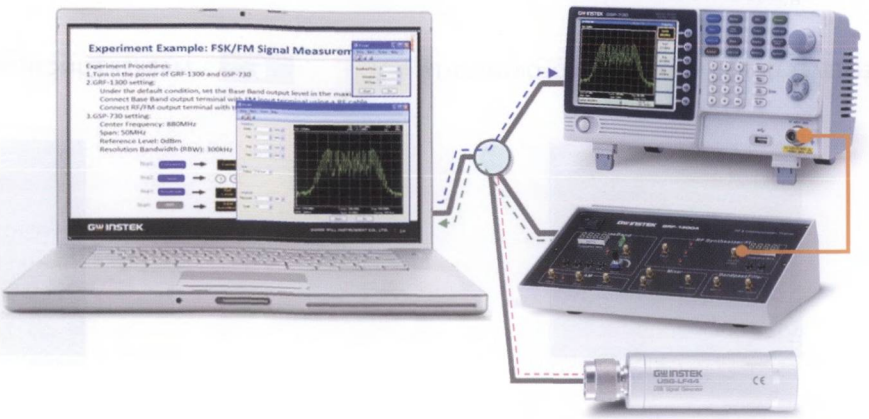
CURRICULUM CONTENTS

A. AN ECONOMIC TURN-KEY SOLUTION

GSP-730+GRF-1300 Solution



GSP-730+GRF-1300A+ USG-Series Solution



Fully-electronic RF Training System

In class, teachers can connect GSP-730 and GRF-1300 with a PC via USB or RS-232 interface. First of all, all the contents of experiment has been converted into power-point slides and provided as the in-class materials. During lecturing the power-point slides, both GSP-730 and GRF-1300 can be remotely set by GRF Training System Control Software. Moreover, the signal shown on GSP-730 can be transferred to PC screen for further research. As a result, GSP-730 and GRF-1300 form an inclusive electronic-teaching-material package which efficiently simplifies lecturers' tasks before classes and shortens the process of the material preparation, and meanwhile, enhances the quality of the lecture. If the PC can only offer one USB interface, an extra purchase of USB hub* may solve the problem of insufficient USB interfaces. With proper installation, PC can manage the conjunction of GSP-730 and GRF-1300.

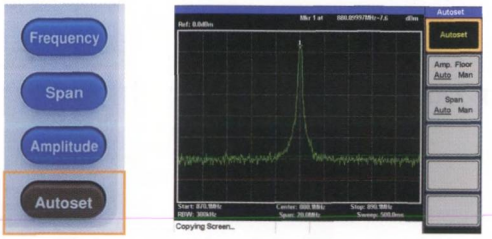
* USB hub is excluded from the product standard accessories.

Properly connect c Spectrum Analyzer, GRF-1300A RF and Communications Trainer, USG-LF44 RF Signal Generator and a PC to perform ongoing experiments while the lecture is being given. Using a PC, teacher can present teaching material with Power Point slides and simultaneously control GSP-730, GRF-1300A and USG-LF44 to perform experiments and get spectrum displays parameter readings on the PC screen. GSP-730, GRF-1300A and USG-LF44 easily transfer the current teaching materials including the PowerPoint slides, textbook and the remote control software into electronic-teaching system.

B. PC SOFTWARE FOR GSP-730 and GRF-1300 REMOTE CONTROL

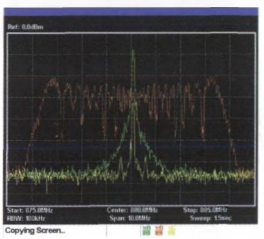
The dedicated PC software, Primary RF, is provided to support the remote control of GSP-730 and GRF-1300 simultaneously. The control includes base band signal waveform, frequency and RF signal frequency for GRF-1300 and Frequency, Span, Amplitude, RBW and spectrum transferring of GSP-730.

C. AUTOSET FUNCTION



The Autoset function automatically captures the signal and configures an appropriate setting for the optimum spectrum display at just one press of the button. With the Autoset function, using a spectrum analyzer like GSP-730 is no longer an annoying and complicated task.

D. THREE-TRACE DISPLAY WITH THREE-COLOR IDENTITY

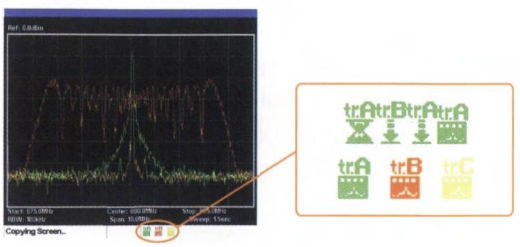


GSP-730 can illustrate a signal with three colors simultaneously under various display modes, including Clear/Write, Max-Peak Hold, Min-Peak Hold, View, Blank and Average. Other useful trace functions such as trace math operations are also accomplishable.

E. MARKER FUNCTION

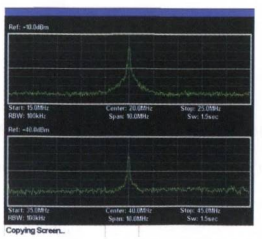
Five Markers can be used to obtain the measurement readings of specified points. Each marker has a counterpart ΔMarker, the amplitude difference can be measured and indicated by setting the frequency of marker and the interval frequency of ΔMarker between two signals. While several pairs of Markers are used for marking more than one pair of signals at the same time, the Marker Table can be turned on and it can process all the tests and demonstrate the reading figures.

F. SETTING STATUS PRESENTED BY ICONS



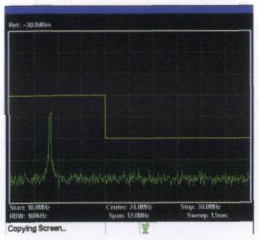
The intuitive icons help users grasp the current setting conditions all the time. As all status icons are clearly shown at the corner of the screen, there is no need to worry about the unknown settings, which may cause confusion and lead to measurement errors.

G. SPLIT-WINDOW DISPLAY IN LIVE MODE



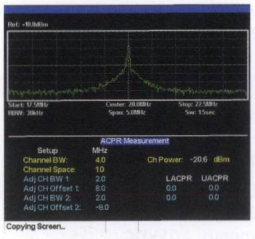
Under Split-Window Display Mode, the monitor will display two independent screens, which can respectively have separated settings. For instance, if processing the test between fundamental and harmonic signals, the separated screens can respectively set at different frequencies at the same time in order to process the measurement.

H. PASS/FAIL JUDGMENTS

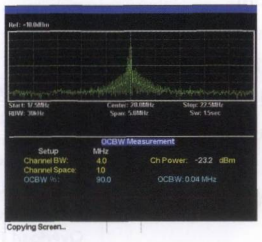


This function may run the "Pass" and "Fail" inspection with efficiency. Firstly, a limit line or upper and lower limit lines should be edited as the judgment criterion, then the LCD will display "Pass" or "Fail" according to whether the input signal meets the condition defined by the limit lines to indicate the examined outcome.

I. POWER MEASUREMENT FUNCTION



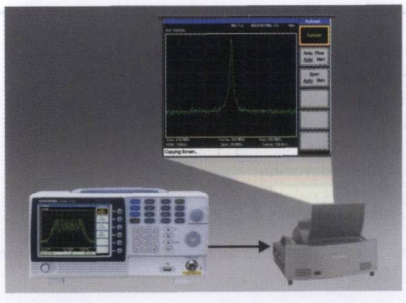
ACPR



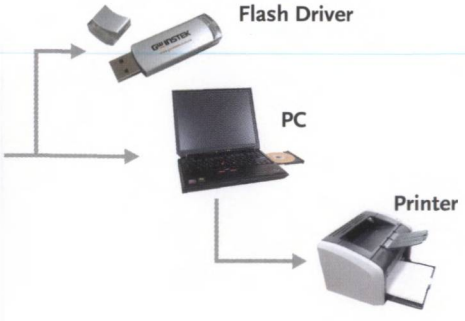
OCBW

GSP-730 provides measurement functions such as ACPR, OCBW, and Channel Power. These items are regulated to be tested in recent communication systems, such as CDMA system. GSP-730 will illustrate channels by various colors so that the operation may become more precise and may minimize errors.

J. FLEXIBLE INTERFACE



GSP-730



The USB host interface on GSP-730 front panel allows the measuring diagrams to be saved in the memory stick. The USB Device and RS-232C interfaces on the rear panel are capable of connecting with a PC for remote control. VGA output can transfer whatever demonstrated on the LCD display to other display device or projector, which will strengthen the impression while giving the lectures.

1GHz Spectrum Analyzer

GSP-810 Spectrum Analyzer is a digitally synthesized, easy-to-use RF measurement instrument with frequency range of 150kHz to 1GHz. It uses a state-of-the-art design with phased-locked RF system that combines measurement quality and performance with an affordable price that has made it become the first choice for RF measurement among schools. GSP-810 is suitable for a variety of measurement environments. The 1 watt input protection dramatically reduces equipment failure caused by improper connections and the light, compact design makes the instrument easy to carry. Using the Remote Display Software (Windows 2000, XP), the spectrum analyzer display can be viewed and results printed or saved via the standard RS-232C interface. All these functions and features make GSP-810 an affordable, expandable and cost-effective measurement instrument.

GSP-810 (150kHz~1GHz)

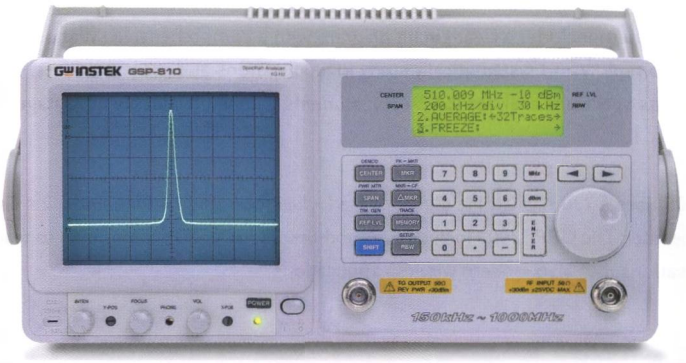
CE RS-232 PC Software

FEATURES

* Frequency Range : 150kHz ~ 1GHz
* Fully Digital Phase Locked Loop Technique Design
* High Frequency Stability : ± 10ppm
* High Resolution of Span to Measure the More Detailed Signal : Zero, 2kHz ~ 100MHz/div
* AM/FM Demodulation Standard
* Two Markers for Absolute and Relative Measurement
* RS-232C Interface and Software to Get Trace from GSP-810 to PC
* Options : Power Meter, Tracking Generator, Romote Control Software

SPECIFICATIONS	
FREQUENCY	
Frequency Range	150kHz~1GHz
Aging Rate	±10ppm, 0~50°C, ±2ppm/yr
Span Range	Zero, 2kHz~100MHz/div in 1-2-5 sequence
Phase Noise	-77dBc/Hz @ 1GHz 30kHz offset
Frequency Resolution	1kHz C.F. entry, 40Hz sweep resolution at 2kHz/div
Frequency Display	6 1/2 digit setting
Frequency Control	Digital phase locked
RESOLUTION BANDWIDTH	
RBW Range	3kHz, 30kHz, 220kHz, 4MHz
RBW Accuracy	15%
Video Bandwidth Range	1.6kHz/90kHz couple with RBW
AMPLITUDE	
Measurement Range	-100dBm~+20dBm
Overload Protection	+30dBm continuous, ± 25VDC
Reference Level Range	-30dBm~+20dBm
Amplitude Display Range	75dB
Amplitude Accuracy	±1.5dB typical @ 0dBm, 80MHz
Frequency Flatness	±1.5dB over 100MHz, ±2.5dB typical over entire band/±3dB:150kHz~10MHz
Amplitude Level Linearity	±1.5dB over 70dB
DYNAMIC RANGE	
Average Noise Floor	-95dBm @30kHz RBW, -100dBm typical /-75dBm: 150kHz~10MHz
Third Order Inter-Modulation	<-70dBc, @-40dBm input, 2tones, 2MHz apart/ <-45dBc:150kHz~10MHz
Harmonic Distortion	<-40dBc, RF input < selected reference
Non-Harmonic Spurious	<-60dBc typical down from reference level, average, 5MHz/div
DISPLAY SYSTEM	
Display Device	CRT Display, 8 x 10 graticule, 6-inch waveform screen LCD Display, 4 line x 20 character data screen
Display Function	Center Frequency Control, Bandwidth, Reference Level, Span Range, Amplitude
FUNCTIONS	
Marker Mode	Absolute, relative, PK->marker, marker->center
Number of Markers	2
Marker Resolution	0.1dB, 1kHz
Marker Accuracy	0.1dB ± amplitude accuracy
Memory	10 memorise of save/recall
Trace	Max. hold, average(2~32 traces), freeze(Hold)
Setup	Access parameters
Demodulator	WB FM, 120kHz deviation MB FM, 75kHz deviation NB FM, 30kHz deviation AM Outputs : Internal speaker, 3.5mm stereo jack, wired for mono operation
Calibrate Signal	80MHz, -30dBm
INTERFACE	
RS-232C standard & remote display software (The software will be downloaded from GW Website.)	
POWER SOURCE	
AC 100V/120V/220V/230V ± 10%, 50/60Hz	
DIMENSIONS & WEIGHT	
310(W) x 150(H) x 455(D) mm, Approx. 8.5kg	

Note: Need to Collocate the Optional Accessories.



GSP-810

ORDERING INFORMATION

GSP-810 1GHz Spectrum Analyzer

ACCESSORIES :
User manual x 1, Power cord x 1

OPTION

Opt. 01 Tracking Generator (factory Installed)

Frequency Range	150kHz ~ 1GHz
Amplitude Range	-50 dBm ~ 0dBm
Amplitude Resolution	1 dB
Amplitude Accuracy	±1 dB @ 0 dBm, 80 MHz
Attenuation Accuracy	±1 dB @ 50 MHz
Amplitude Flatness	±1 dB @ 10 MHz/DIV, ±1.5dB@0dB,entire band
Harmonics	< -30 dBc (<-25dBc, 150kHz ~ 10MHz)
Reverse Power	< +30 dBm
Impedance	50Ω nominal
Return Loss	< 10 dB (VSWR < 2)
Connector	Type N female

Opt. 02 Power Meter (factory Installed)

Frequency Range	10MHz ~ 2 GHz, usable to 2.7GHz
Power Level Range	-20 dBm ~ +23 dBm, usable to +30 dBm
Power Level Overload	+40 dBm < 10% duty cycle, < 10 mS duration
Return Loss	< 1:1.35 VSWR into 50 ohms, < 1:1.25 typical
Readout Resolution	0.2 mW, 100 mW scale, 2 µW, 1 mW scale; 0.1dB, Log scale
Accuracy	±(10% rdg ± 1digit)
Readout	mW or dBm

Opt. 03 Remote Control Software Connecting PC to get the trace and provide the control for setting

OPTIONAL ACCESSORIES

ATA-001 **BNC Antenna** (An additional ADP-001 is needed for fitting GSP spectrum analyzers)
ADP-001 **BNC to N-TYPE Adaptor**
ADP-002 **SMA to N-TYPE Adaptor**
RLB-001 **Return Loss Bridge** RLB Frequency Range 10MHz ~ 1GHz
GKT-001 **General Kit set**
ADP-002: adaptor, SMA(J/F) ~ N(P/M) x 2
ATN-100: 10dB attenuator, N(J/F) ~ N(P/M) x 1
GTL-303: RF cable assembly(RG316),SMA(P/M),600mm) x 2
GSC-002: Kit box x 1
GKT-002 **CATV Kit set**
ADP-001: adaptor, BNC(J/F) ~ N(P/M) x 2
ADP-101: adaptor,BNC(J/F)75Ω~BNC(P/M)50Ω x 2
GTL-304: RF cable assembly(RG223,N(P/M)-N(J/F),300mm)x2
GSC-003: Kit box x 1
GKT-003 **RLB Kit set**
GAK-001: termination 50Ω, N(P/M) x 1
GAK-002: Cap with chain, N(P/M) x 1
GTL-302: RF cable assembly(RG223,N(P/M),300mm)x2
GSC-004: Kit box x 1
GKT-008 **EMI Probe Kit set**
ADP-002: Adaptor SMA(J/F) ~ N (P/M) x 1
GTL-303: RF Cable SMA(P/M) ~ SMA(P/M) x 1
PR-01: AC Voltage Probe x 1
PR-02: Touch Passive RF Probe x 1
ANT-04: H-field Probe x 1
ANT-05: H-field Probe x 1
GTL-301 **RF Cable** RG223, N(P/M), 1000mm
GTL-302 **RF Cable** RG223 Assembly, 300mm, N(P/M)
GTL-303 **RF Cable** RG316 Assembly, 600mm, SMA(P/M)
GTL-304 **RF Cable** RG223 Assembly, 280mm, N(P/M) - N(J/F)

FREE DOWNLOAD

PC Software Remote Display Software
Programming Library DLL file for Programming Use

GKT-001 General Kit Set

Includes :
ADP-002
ATN-100
GTL-303
GSC-002
For: GSP-Series

GKT-002 CATV Kit Set

Includes :
ADP-001
ADP-101
GTL-304
GSC-003
For: GSP-Series

GKT-003 RLB Kit Set

Includes :
GAK-001
GAK-002
GTL-302
GSC-004
For: GSP-Series

GKT-008 EMI Probe Kit Set

Include :
ADP-002 : Adaptor SMA(J/F) ~ N (P/M) x 1
GTL-303 : RF Cable SMA(P/M) ~ SMA(P/M) x 1
PR-01 : AC Voltage Probe x 1
PR-02 : Touch Passive RF Probe x 1
ANT-04 : H-field Probe x 1
ANT-05 : H-field Probe x 1
For: GSP-Series

RLB-001 Return Loss Bridge

10MHz ~ 1GHz
For: GSP-810/830

RF & Spectrum Analyzer Training System

The GRF-3300S RF training system offers the best solution for modern wireless communications education. The system includes a clear circuit diagram with a comprehensive syllabus designed to allow students to rapidly and systematically study RF applications and measurements. By implementing an industrial-class spectrum analyzer (GSP-830), students gain an invaluable advantage upon graduating.

The GRF-3300S uses a 730 ~ 960 MHz digital phase locked loop (digital PLL) and a 2.4 GHz microstrip line filter. The GRF-3300S includes 22 modules and over 50 experiments to teach not only RF communications, but also modern wireless applications.

GRF-3300S

FEATURES

- Designed for Wireless Application Frequency Range
- Understanding the Applications and Measurements for Using Spectrum Analyzer of Communications Instruments
- Designed for Application of RF Transmitter and Receiver System
- Theory and Hand-on Experiments for Each Chapter Regarding Topics in the RF System
- Including 880MHz Digital PLL and 2.4GHz Microstrip Line Filters Circuits
- Training for the Voice Communications System
- Specific RF Circuit Characteristic & PCB Layout on Each Module
- Training System Covering 22 Modules, and Over 50 Experiments

TRAINING CONTENTS

Theory	Experiment	Related Application
The Fundamentals		
Impedance matching network: L-type, π-Type, T-typeSmith chart: theory and practical examples	Theory explaining	RF Component Test
Antenna		
Antenna parameter, antenna structure, antenna type	Frequency response	Antenna Design
Attenuator		
Attenuator parameter, attenuator type, attenuator design	Attenuation characteristics	When the Signal is Too Big
Low Noise Amplifier		
LNA parameter, 1dB compression point, LNA structure	Input and output return loss, amplifier gain, 1dB compression point	Small Signal Enlarged
Preamplifier		
Preamplifier type, preamplifier structure	Input and output return loss, amplifier gain, 1dB compression point	Small Signal Enlarged
Power Amplifier		
Power amplifier frequency characteristics, bias circuit, power amplifier parameter, power amplifier structure	Gain flatness, 1dB compression point, fundamentals to harmonics ratio	Power Enlarge
Filter		
Filter parameter, filter structure : Butterworth, Chebyshev	Input/output return loss, insertion loss	EMI Filter Design
Mixer		
Mixer structure, mixer parameter, mixer type	Conversion gain, 1dB compression point, isolation	TV Tuner
Phase-Locked Loop		
PLL structure, frequency synthesizer, PLL controller, loop filter, design a PLL	Frequency response/modulation	Signal Generator
Audio Processor		
Audio compression/decompression circuit	Pre-emphasis, compression characteristics, expander and de-emphasis, decompression characteristics	Wireless Microphone
Modulation		
Design and implement a modulation circuit	Frequency modulation	Remote Controller
Demodulation		
Design and implement an FM intermediate Frequency demodulation circuit	IF modulation, RSSI output	Broadcasting
Transmitter		
Transmitter parameter, transmitter structure	Transmission spectrum	Radio Set
Receiver		
Receiver parameter, receiver structure	Receiving signal spectrum, demodulation waveform	Radio Set
Voice Demo		
Combine with transmitter & receiver circuits	Voice communication system	VoIP
Microstrip Line Filter		
Transmission line basics, stepped-impedance LPF, coupled line BPF, optimized HPF	Insertion loss	RFID
POWER SOURCE		
AC 110V or 220V, 50/60Hz		
DIMENSIONS & WEIGHT		
428(W) x 90(H) x 303(D) mm for Transmitter & Receiver Box, Approx. 8.4kg		
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GRF-3300S

ORDERING INFORMATION

GRF-3300S Package Including Spectrum Analyzer GSP-830+Tracking Generator(TG), RF Training System GRF-3300S
GRF-3300S(*) RF Training System, Two Systems (Transmitter and Receiver)

* All GRF-3300S experiments are based upon GSP-830, we can't guarantee the result almost has its similarity by using other spectrum analyzers of their kinds.

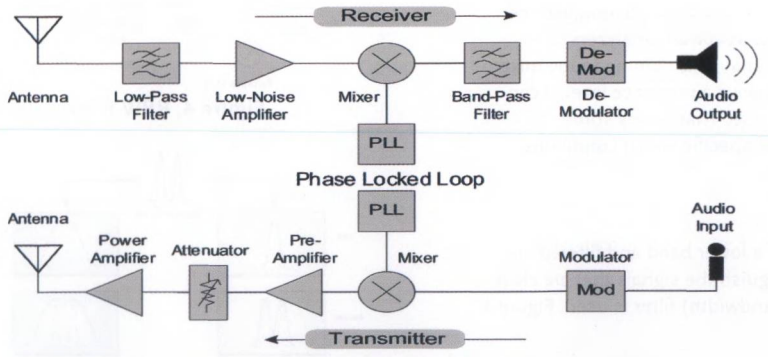
ACCESSORIES :

Teacher book & Student book
50Ω Terminator
AC Power cord (only for GRF-3300S) x 2
Antenna x 2
Microphone
N-SMA Adaptor x 3
Return loss bridge
RF Cable, 10cm x 6
RF Cable, 20cm x 6
RF Cable, 75cm x 3
SMA-SMA Connector

GRF-3300S RF Training System

GRF-3300S includes all the RF circuit modules in two cases: transmitter and receiver. All circuit modules are preassembled, integrated and ready to go. The central power module with a general AC socket provides all internal power required. This model is convenient for portable applications and easy demonstrations, allowing students to concentrate on learning, without the hassle of preparation and configuration.

GRF-3300S Theme Coverage



The basic block diagram of a wireless communications system is illustrated in the above picture. The upper is the receiver portion and the lower is the transmitter portion. On the receiver side, the antenna picks up the signal over air, and the low noise amplifier amplifies the signal followed by a band-pass filter. The LO (local oscillator) in the PLL is used to convert the signal from a high frequency to a number of different frequencies including an IF (Intermediate Frequency). The IF is selected by the band-pass filter and is demodulated for audio output.

Q1 **How does a spectrum analyzer work?**

A1 **Frequency Domain Measurement**

Signal spectrum distribution actually means measurements result in frequency domain. Figure 1 gives the concept of the relationship of frequency domain versus time domain. In the figure, a square-like waveform on the time domain is measured by an oscilloscope. By Fourier analysis, the signal can be decomposed into its fundamental and odd harmonics up to the 11th harmonic. If a signal is observed from frequency domain with a spectrum analyzer, it will distinguish all the frequency components in the spectrum. Taking Figure 1 as an example, the fundamental, 3rd, 5th and 11th harmonics are identified. Here we can see that the time domain and frequency domain are describing the same signal but just from different angles.

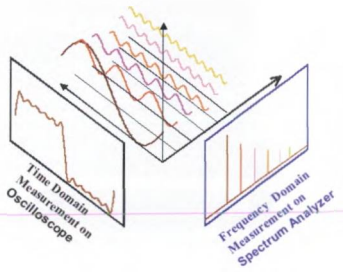


Figure 1
Frequency VS time domain measurement

The following sections introduce the basic concept of how a (sweeping) spectrum analyzer works. We start with the wideband receiver, then add the parts used in the spectrum analyzer step by step. After going through these sections, in addition to the basic concept of spectrum structure, readers should be able to understand the functions of RBW and VBW which are a little difficult to understand for beginners.

Broadband Receiver

A spectrum analyzer basically works as a broadband receiver. Here, broadband means starting from tens of kHz or MHz. The principle function of the receiver is to convert the input signal frequency down to a frequency (band) that detection circuitry can handle, known as heterodyning. Figure 2 illustrates the basic broadband structure. A basic broadband receiver consists of a mixer, a local oscillator (LO) and a band pass filter. Local oscillator produces an oscillating signal of a fixed frequency. The mixer stage will combine input signal with the signal produced from local oscillator. When the signals are mixed, the resultant signal contains the sum and difference of the two signals. The difference of the two signals is known as the Intermediate frequency (IF). The IF is the part of the signal that can be used with the detection circuitry. However, as the signal still contains other unwanted components, a band pass filter is used to filter out the unwanted components, leaving only the IF. The IF is then fed into the detection and display unit. Since a spectrum analyzer is essentially a broadband receiver, more than one frequency conversion is necessary. The number of frequency conversions depends on the frequency range, frequency resolution, and sometimes the RBW filters.

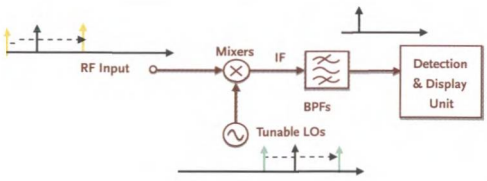


Figure 2
The brief structure of the broadband receiver

Attenuators

The attenuations on the RF input path can increase the dynamic range of the input signal level or give more input protection to spectrum analyzers. Referring to Figure 3, the attenuator limits the signal level coming to the mixer (RF end) to a certain level. If the input signal is above a reference level, it can cause measurement errors, or cause spurious noise. That is why some spectrum analyzers list their specifications under specific signal conditions including specific signal levels at the mixer stage.

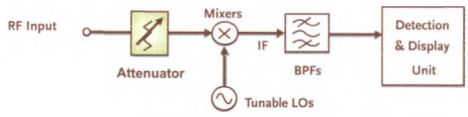


Figure 3, Attenuator

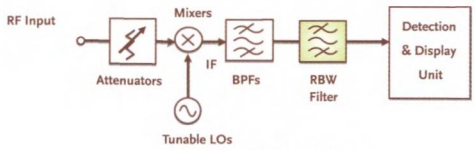


Figure 4, RBW filter

Resolution Filter

When the input signal frequency is converted to a lower band and filtered into the detection and display unit, in order to distinguish the signals that are close to each other in frequency, a RBW (resolution bandwidth) filter is used. Figure 4 shows this concept.

Figure 5 illustrates how a RBW filter distinguishes two tone signals under different resolution bandwidths. In figure 5, a two-tone, equivalent amplitude signal is filtered with two different RBW filters. The resolution of RBW1 is better than the resolution of RBW2. After passing the narrower RBW1 filter, the components of the two tone signal are clearly distinguished from each other as a result. But in the wider RBW2 filter, the result is not as clear as that of RBW1. We can easily predict that if the resolution bandwidth of RBW2 is wider, we could even misunderstand the result as only one signal. This problem will happen if these two signals are even closer in frequency. Another case is when the amplitude of one signal is much higher than the other; the smaller signal can still be detected using RBW1, but is obscured if RBW2 is used. Figure 6 illustrates this difference. This is why these filters are known as resolution filters.

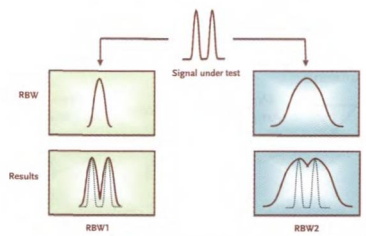


Figure 5, Effect of different RBWs (1)

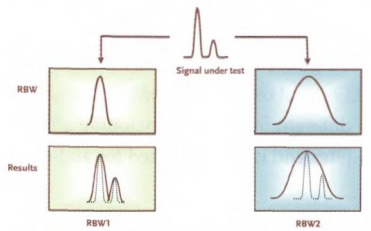


Figure 6, Effect of different RBWs (2)

Detector

Following the RBW filter, the detector detects the power and converts it to DC voltage. The display unit utilizes this DC voltage to "draw" the spectrum distribution as presented in Figure 7.

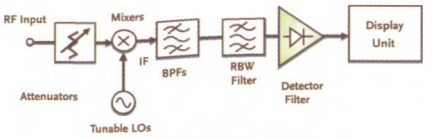


Figure 7, Detector

Video Filter

Just before the detector feeds the DC voltage to the display unit, a filter is necessary to compress the noise generated by the detector. A video filter is employed here, and the bandwidth is therefore called VBW. Figure 8 shows a VBW filter in the system. The term video comes from the TV broadcasting system. It is also known as a post filter. Figure 9 illustrates how VBW effects displayed output. If the signal under test passes through two VBW filters, in which VBW1 is less than VBW2, we can see the noise floor of VBW2 is greater than that in VBW1. In other words, the noise floor is averaged by the video filter. But notice that the level of the noise floor remains the same. The VBW filter only averages the noise level; it doesn't affect the overall amplitude of the signal noise floor.

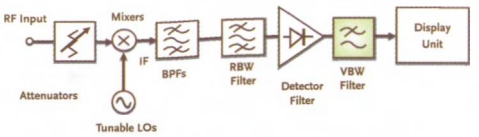


Figure 8, VBW filter in system

Sweep Time

The basic structure of a spectrum analyzer has been introduced above, and moreover, the RBW and VBW have also been explained in detail. Generally speaking, sweep time is inversely proportional to the frequency resolution of a spectrum analyzer. Therefore a faster sweep time will have a lower resolution bandwidth whilst a slower sweep time will have a higher resolution bandwidth. Therefore if a narrow RBW or VBW is selected, it takes a longer time to display the signal. That means the sweep time would be longer in the cases of narrower RBW and VBW. Most spectrum analyzers have automatic and manual selection modes for RBW/VBW/Sweep time. Auto mode usually produces the best combination considering the trade-off between the frequency span, RBW, VBW and sweep time.

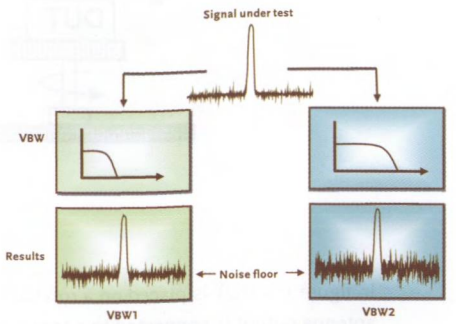
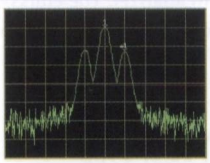


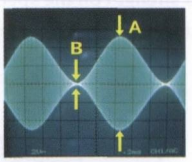
Figure 9, Effects on different VBW

Q2 What Does an AM Signal look like on a Spectrum Analyzer?

A2 Figure 10 shows the measurement results of an AM signal in the both frequency and time domains. On time domain, the AM modulation index is calculated by the scale of A and B. It is not easy to accurately measure the modulation index from an oscilloscope. On an oscilloscope, the carrier frequency is also hard to determine.



AM signal on frequency domain



AM signal on time domain

Figure 10, AM signal on frequency and time domains

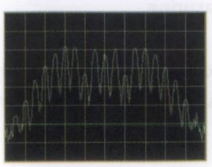
$$m_{AM} = \frac{A - B}{A + B}$$

$$\text{Modulation Index} = \frac{4 \cdot 10^{\frac{x}{dB}}}{1 - 2 \cdot 10^{\frac{x}{dB}}}$$

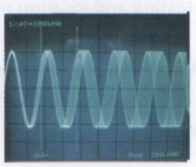
From frequency domain, the carrier and modulating signal frequency can easily be measured. From the different (delta) dB number x in between the carrier and sideband signal, the modulation index can be calculated from the quantitative number of marker read out.

Q3 What Does an FM Signal Look Like on a Spectrum Analyzer ?

A3 FM signals are more complicated than AM signals on time domain which is presented in Figure11. An AM signal is amplitude modulated where as an FM signal is frequency modulated. In an FM signal the frequency is modulated to sweep with specified deviation, and it is very difficult to measure the deviation from time domain. But on frequency domain, the carrier frequency, modulating signal frequency, deviation and bandwidth can be figured out directly with a spectrum analyzer.



FM signal on frequency domain



FM signal on time domain

Figure 11, FM signal on frequency and time domains

Q 4 **Using Near Field Probes For EMI Emission Diagnosis**

A 4 In formal EMI certification testing a receiving antenna is located 8-10 meters from a DUT in either an EMI chamber or an open field site. Testing is designed to measure the emissions radiated from a DUT from any angle. Emissions can come from the top, bottom, right or left hand side of a DUT. This is shown in figure 1.

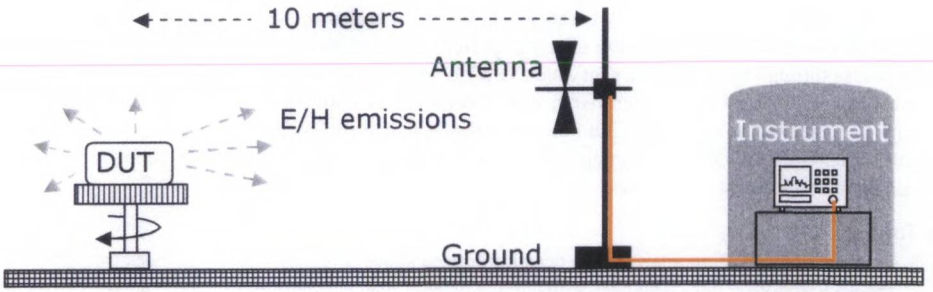


Figure 1, open site EMI test

In figure 1, a DUT is placed on a rotatable table and a height-adjustable receiving antenna is located 10 meters from the DUT. The antenna output is connected to a spectrum analyzer which is located in a shielded room. A perfect ground is needed to ensure an isolated environment. During measurement, the table will rotate 360 degrees so that the antenna receives omni-directional emissions. As the antenna is also vertically adjustable, emissions can be measured from various angles.

However, EMI testing results can not distinguish where on the DUT the emissions were generated. When the emissions are too strong and fail to pass regulations, the source needs to be suppressed and thus has to be identified first. Near field probes are used to find the source of emissions on a DUT.

GKT-008 is a near field probe set which is used with a spectrum analyzer (in most cases) to detect E or H fields. The detection is accomplished by holding the probe and moving it around a DUT as shown in figure 2. When the probe is moved to the vicinity of the source, the E/H field will be inducted through the probe, showing the measured strength on the spectrum analyzer. The emission source can be located accordingly. The probes are insulated with plastic so that short circuits to the DUT are avoided. Different types of probes are chosen to fit different frequencies and DUT shapes.

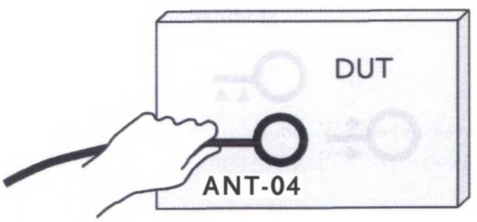


Figure 2, moving the probe around the DUT

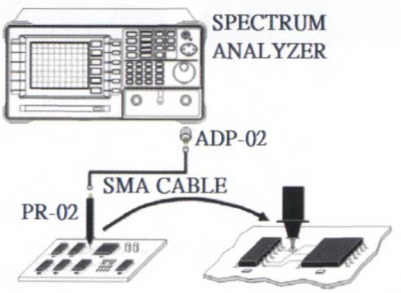


Figure 3, touch the RF probe on the PCB trace

The tip probe is a direct touch probe which allows the probe tip to directly test the circuits as shown in figure 3 . Even though there is no ground connection to the probe the RF signal can still be measured for spot testing and location measuring.

GKT-008 probe set contains four types of probes, one adapter and one cables. With these probes connected to a spectrum analyzer, the EMI emission source of a DUT can be located easily. The probe set is a very efficient tool for diagnostic purposes. Troubleshooting and pretests on a circuit can be performed prior to sending to an EMI Laboratory.

NOTE

SIGNAL SOURCES

GW Instek has been one of the major signal source suppliers for worldwide users by providing the advanced-featured products for decades. The wide product lines including AFG (Arbitrary Function Generators), RF Signal Generator, DDS (Direct Digital Synthesized) Function Generators, and Analog Function Generators are well provided. The AFG-3000 Series is designed for industrial, scientific research and educational applications by the high sample rate and the wide frequency bandwidth. The AFG-2000 and AFG-200 series are designed to accommodate the educational and basic industrial requirements. The USG Series is a pocket-sized, and USB interface compatible RF signal generator. The SFG-series is a DDS based design for entry level engineering and educational applications. To fit versatile applications, each product line features different frequency ranges and/or specifications to meet the demands. Last but not least, Audio Generators are also provided for the specific fields.

PRODUCTS

- **Arbitrary Function Generator**
- **True Dual Channel Arbitrary Function Generator**
- **USB Modular Arbitrary Function Generator**
- **DDS Function Generator**
- **Analog Function Generator**
- **Audio Generator**
- **RF Signal Generator**

ARBITRARY FUNCTION GENERATOR

ARBITRARY FUNCTION GENERATOR OVERVIEW

Arbitrary function generator (ARB) is a digital-synthesized-technique based signal generator which generates both arbitrary and function waveforms. For the arbitrary waveform, the demanded waveform data can be edited by different means, saved into the memory, and sent out thru a digital to analog converter as a stimulus source. For the function waveform generation part in arbitrary function generator, the commonly used function waveforms like sine, square, triangle, ramp, pulse ... etc. are built into the memory for selection, which is referred to DDS (Direct Digital Synthesized) type function generator. The AM, FM, FSK, PWM and Sweep function, etc are usually optional features.

One major difference of the circuit structure between ARB and DDS function generator is that a low pass filter is used at the digital-to-analog converter (DAC) output to smooth out the quantization steps in DDS function generator. Therefore when a function waveform is demanded, in order to obtain low-distortion waveform, the signal generated from function section is suggested instead of ARB section.

The major specifications for arbitrary waveform generation are described as follows.

Sample Rate, Repetition Rate and True-Point-by-Point Arbitrary Waveform

The profile of arbitrary waveform is composed of a series of data. The frequency of arbitrary waveform is derived from sampling rate divided by the number of points constructing a complete waveform, i.e. frequency = sampling rate / number of points in waveform. Based on the equation, the higher the sampling rate, the higher the arbitrary waveform frequency can be available.

The ultimate case of composing an arbitrary waveform is the waveform made of two points. The frequency of the two-points-waveform is supposed to be half of the sample rate according to the above equation. But many ARB waveform generators do not follow this rule. The Repetition Rate is used to describe the limitation of highest frequency can be composed for the arbitrary waveform. It could be one third, one forth... etc of the sample rate. In case of the repetition is half of sample rate, it is true-point-by-point arbitrary waveform generator.

Vertical Resolution

The vertical resolution in arbitrary waveform represents the quantization distortion level, which the bit number of DAC plays the main role to decide it. The higher bit DAC generates the output levels in finer steps, the output signal is less distorted and with less noise.

Memory Length

The waveform data is stored in the memory for sending out. More memory allows more waveform data to be stored, which is convenient for users to create a complex or lasting long waveform.

ARBITRARY FUNCTION GENERATOR SELECTION GUIDE

MODEL / MAIN FUNCTION	AFG-3081	AFG-3051	AFG-2225	AFG-2125	AFG-2112	AFG-2105	AFG-2025	AFG-2012	AFG-2005
Analog Channel	1	1	2	1	1	1	1	1	1
Frequency Range	80MHz	50MHz	25MHz	25MHz	12MHz	5MHz	25MHz	12MHz	5MHz
Frequency Resolution	1 μHz	1 μHz	1 μHz	0.1Hz	0.1Hz	0.1Hz	0.1Hz	0.1Hz	0.1Hz
Sample Rate	200MSa/s	200MSa/s	120MSa/s	20MSa/s	20MSa/s	20MSa/s	20MSa/s	20MSa/s	20MSa/s
Repetition Rate	100MSa/s	100MSa/s	60MSa/s	10MSa/s	10MSa/s	10MSa/s	10MSa/s	10MSa/s	10MSa/s
Vertical Resolution	16-bit	16-bit	10-bit	10-bit	10-bit	10-bit	10-bit	10-bit	10-bit
Memory Length	1M Points	1M Points	4k Points	4k Points	4k Points	4k Points	4k Points	4k Points	4k Points
Impedance Switch	50Ω / Hi-Z	50Ω / Hi-Z	50Ω / Hi-Z	50Ω / Hi-Z	50Ω / Hi-Z	50Ω / Hi-Z	50Ω / Hi-Z	50Ω / Hi-Z	50Ω / Hi-Z
Sine	✓	✓	✓	✓	✓	✓	✓	✓	✓
Square	✓	✓	✓	✓	✓	✓	✓	✓	✓
Triangle	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ramp	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pulse	✓	✓	✓	✓	✓	✓	✓	✓	✓
Noise	✓	✓	✓	✓	✓	✓	✓	✓	✓
Burst	✓	✓	✓	–	–	–	–	–	–
TTL / Sync Output	✓	✓	–	✓	✓	✓	✓	✓	✓
Sweep	✓	✓	✓	✓	✓	✓	–	–	–
AM	✓	✓	✓	✓	✓	✓	–	–	–
FM	✓	✓	✓	✓	✓	✓	–	–	–
PM	–	–	✓	–	–	–	–	–	–
FSK	✓	✓	✓	✓	✓	✓	–	–	–
PWM	✓	✓	–	–	–	–	–	–	–
SUM	–	–	✓	–	–	–	–	–	–
External Counter	–	–	✓	✓	✓	✓	–	–	–
GPIB	✓	✓	–	–	–	–	–	–	–
USB Host	✓	✓	✓	–	–	–	–	–	–
USB Device	✓	✓	✓	✓	✓	✓	✓	✓	✓
RS-232C	✓	✓	–	–	–	–	–	–	–
Display	4.3" TFT LCD	4.3" TFT LCD	3.5" TFT LCD	3.5" 3-Color LCD	3.5" 3-Color LCD	3.5" 3-Color LCD	3.5" 3-Color LCD	3.5" 3-Color LCD	3.5" 3-Color LCD
Page	C4-10	C4-10	C11-16	C17-20	C17-20	C17-20	C17-20	C17-20	C17-20

ARBITRARY FUNCTION GENERATOR SELECTION GUIDE

MODEL / MAIN FUNCTION	AFG-225P	AFG-225	AFG-125P	AFG-125
Analog Channel	2	2	1	1
Frequency Range	25MHz	25MHz	25MHz	25MHz
Frequency Resolution	1 μ Hz	1 μ Hz	1 μ Hz	1 μ Hz
Sample Rate	120MSa/s	120MSa/s	120MSa/s	120MSa/s
Repetition Rate	60MSa/s	60MSa/s	60MSa/s	60MSa/s
Vertical Resolution	10-bit	10-bit	10-bit	10-bit
Memory Length	4k Points	4k Points	4k Points	4k Points
Impedance Switch	50Ω / Hi-Z	50Ω / Hi-Z	50Ω / Hi-Z	50Ω / Hi-Z
Sine	✓	✓	✓	✓
Square	✓	✓	✓	✓
Triangle	✓	✓	✓	✓
Ramp	✓	✓	✓	✓
Pulse	✓	✓	✓	✓
Noise	✓	✓	✓	✓
Burst	✓	✓	✓	✓
TTL / Sync Output	✓	✓	✓	✓
Sweep	✓	✓	✓	✓
AM	✓	✓	✓	✓
FM	✓	✓	✓	✓
PM	✓	✓	✓	✓
FSK	✓	✓	✓	✓
PWM	-	-	-	-
SUM	✓	✓	-	-
External Counter	-	-	-	-
GPIB	-	-	-	-
USB Host	-	-	-	-
USB Device	✓	✓	✓	✓
RS-232C	-	-	-	-
Display	None	None	None	None
Power Supply Output	✓	-	✓	-
Page	C21-24	C21-24	C21-24	C21-24

80MHz/50MHz Arbitrary Function Generator

AFG-3000 Series

台灣精品 TAIWAN EXCELLENCE 2012

CE | RS-232 | GPIB | USB | PC Software | LabVIEW Driver

FEATURES

* Wide Frequency Range From 1μHz~80/50MHz
* 1μHz Frequency Resolution Throughout Full Range
* Standard Waveform : Sine, Square, Triangle, Ramp, Pulse, Noise
* Built-In AM, FM, PWM, FSK, Sweep, Burst Functions
* 16bit, 200MSa/s, 1M-Point Deep Arbitrary Waveform
* DWR (Direct Waveform Reconstruction) Capability
* Arbitrary Waveform Editing PC Software
* 4.3" High Resolution LCD Display
* GPIB, RS-232C, USB Host/Device Standard Interfaces

The AFG-3000 Series is an Arbitrary Waveform and Digital-Synthesized Function Generator designed for industrial, scientific research and educational applications. The series comes with bandwidth of 80MHz for AFG-3081 and 50MHz for AFG-3051. The AFG-3000 Series, featuring 200MSa/s sample rate, 100MHz repetition rate by true point-by-point edit, 16-bit vertical resolution and 1M points waveform length, is a very useful and flexible signal source to meet diversified application needs in the market today.

The user-friendly operation, the On-Screen Help, and the multiple ways of arbitrary waveform editing make AFG-3000 just a plug-and-play equipment. The point by point waveform data entry or standard waveform clip piling through front panel operation, the CSV file waveform data download, the direct waveform reconstruction through DSO waveform data import, and the PC software edited waveform download are the 4 methods available for arbitrary waveform editing.

A 4.3-inch high resolution TFT LCD in the AFG-3000 front panel is used to display waveform and set parameters. The large and high-resolution screen is especially useful when the arbitrary waveform construction is done through front panel operation. The impedance of AFG-3000 can be selected between 50 Ohm and Hi-Z to ensure right impedance compatibility between AFG and DUT.

SPECIFICATIONS

		AFG-3081	AFG-3051
WAVEFORMS			
Standard Waveform		Sine, Square, Ramp, Pulse, Noise, DC, Sin(x)/x, Exponential Rise, Exponential Fall, Negative Ramp	
ARBITRARY WAVEFORMS			
ARB Function		Built in	
Sample Rate		200 MSa/s	
Repetition Rate		100MHz	
Waveform Length		1M points	
Amplitude Resolution		16 bits	
Non-Volatile Memory		Ten 1M waveforms *1	
User define Output Section		Any section from 2 to 1M points	
User define Mark Output		Any section from 2 to 1M points	
FREQUENCY CHARACTERISTICS			
Range	Sine, Square	80MHz	50MHz
	Triangle, Ramp	1MHz	
Resolution		1μHz	
Accuracy	Stability	±1 ppm 0 ~ 50℃	
	Aging	±1 ppm, per 1 year	
	Tolerance	≤1μHz	
OUTPUT CHARACTERISTICS *2			
Amplitude		Range 10 mVpp to 10 Vpp(into 50Ω); 20 mVpp to 20 Vpp(open-circuit) Accuracy ±1% of setting ±1 mVpp (at 1 kHz,>10 mVpp) Resolution 0.1 mV or 4 digits Flatness ±1%(0.1dB)<10MHz; ±2%(0.2dB)10MHz~50MHz; ±10%(0.9 dB)50MHz~70MHz; ±20%(1.9dB)70MHz~80MHz (sinewave relative to 1kHz) Units Vpp, Vrms, dBm	
Offset		Range ±5 Vpk ac +dc (into 50Ω); ±10Vpk ac +dc (Open circuit) Accuracy 1% of setting + 2 mV+ 0.5% of amplitude	
Waveform Output		Impedance 50Ω typical (fixed); >10MΩ (output disabled) Protection Short-circuit protected;overload relay auto-matically disables main output	
SYNC Output		Level TTL-compatible into>1kΩ Impedance 50Ω nominal	
SINEWAVE CHARACTERISTICS			
Harmonic Distortion *5		-60dBc DC~1MHz, Ampl<3Vpp -55dBc DC~1MHz, Ampl>3Vpp -45dBc 1MHz~5MHz, Ampl>3Vpp -30dBc 5MHz~80MHz, Ampl>3Vpp	
Total Harmonic Distortion		<0.2%+0.1mVrms DC ~ 20 kHz	
Spurious (non-harmonic)*5		–60dBc DC~1MHz; –50dBc 1MHz~20MHz; –50dBc + 6dBc/octave 1MHz~80MHz	
Phase Noise		<-65dBc typical 10MHz, 30kHz band; <-47dBc typical 80MHz, 30kHz band	
SQUARE WAVE CHARACTERISTICS			
Rise/Fall Time		<8ns *3	
Duty Cycle		20%~80%	
Overshoot		< 5%	
Asymmetry		1% of period+1ns	
Variable Duty Cycle		20.0%~80.0% ≤ 25MHz; 40.0%~60.0%, 25~50MHz; 50.0%(Fixed), 50~80MHz	
Jitter		0.01% + 525ps < 2MHz; 0.1% + 75ps > 2MHz	
RAMP CHARACTERISTICS			
Linearity		< 0.1% of peak output	
Variable Symmetry		0%~100%	
PULSE CHARACTERISTICS			
Period		20ns ~ 2000s	
Pulse Width		8ns ~ 1999.9s Minimum Pulse Width: 8ns when FREQ≤50MHz; 5% of setting period when FREQ≤6.5MHz Resolution: 1ns when FREQ≤50MHz; 1% of setting period when FREQ≤6.5MHz	
Overshoot		<5%	
Jitter		100 ppm +50 ps	
AM MODULATION			
Carrier Waveforms		Sine, Square, Triangle, Ramp, Pulse, Arb	
Modulating Waveforms		Sine, Square, Triangle, Up/Dn Ramp	
Modulating Frequency		2mHz ~ 20kHz	
Depth		0% ~ 120.0%	
Source		Internal/External	

80MHz/50MHz Arbitrary Function Generator

SPECIFICATIONS

	AFG-3081	AFG-3051
FM MODULATION		
Carrier Waveforms	Sine, Square, Triangle, Ramp	
Modulating Waveforms	Sine, Square, Triangle, Up/Dn Ramp	
Modulating Frequency	2mHz ~ 20kHz	
Peak Deviation	DC ~ 80MHz	DC ~ 50MHz
Source	Internal/External	
PWM		
Carrier Waveforms	Square	
Modulating Waveforms	Sine, Square, Triangle, Up/Dn Ramp	
Modulating Frequency	2mHz ~ 20kHz	
Deviation	0% ~ 100.0% of pulse width	
Source	Internal/External	
FSK		
Carrier Waveforms	Sine, Square, Triangle, Ramp, Pulse	
Modulating Waveforms	50% duty cycle square	
Internal Rate	2 mHz ~ 100 kHz	
Frequency Range	DC ~ 80MHz	DC ~ 50MHz
Source	Internal/External	
SWEEP		
Waveforms	Sine, Square, Triangle	
Type	Linear or Logarithmic	
Source	Internal/External	
Start/Stop FREQ	100μHz ~ 80 MHz	100μHz ~ 50MHz
Sweep Time	1ms ~ 500s	
Trigger	Single, External, Internal	
Marker	Falling edge of Mark signal (Programmable frequency)	
Source	Internal/External	
BURST		
Waveforms	Sine, Square, Triangle, Ramp	
Frequency	1μHz ~ 80MHz*4	1μHz ~ 50 MHz*4
Burst Count	1 ~ 1000000 cycles or Infinite	
Start/Stop Phase	-360.0 ~ +360.0°	
Internal Period	1ms ~ 500s	
Gate Source	External Trigger	
Trigger Source	Single, External or Internal Rate	
Trigger Delay	N-Cycle, Infinite : 0s ~ 85s	
EXTERNAL MODULATION INPUT		
Type	for AM, FM, Sweep, PWM	
Voltage Range	± 5V full scale	
Input Impedance	10kΩ	
Frequency	DC ~ 20 kHz	
EXTERNAL TRIGGER INPUT		
Type	for FSK, Burst, Sweep	
Input Level	TTL Compatible	
Slope	Rising or falling(selectable)	
Pulse Width	> 100 ns	
Input Impedance	10kΩ,DC coupled	
Latency	Sweep: <10us(typical); Burst: <100ns(typical)	
Jitter	Sweep: 2.5us; Burst: 1ns; except pulse, 300ps	
MODULATION OUTPUT		
Type	for AM, FM, Sweep, PWM	
Amplitude	Range: ≥1Vpp; Impedance: >10kΩ typical(fixed)	
TRIGGER OUTPUT		
Type	for Burst, Sweep	
Level	TTL Compatible into 50Ω	
Pulse Width	> 450 ns	
Maximum Rate	1 MHz	
Fan-out	≥4 TTL load	
Impedance	50Ω typical	
MARKER OUTPUT		
Type	for ARB, Sweep	
Level	TTL Compatible into 50Ω	
Fan-out	≥4 TTL load	
Impedance	50Ω typical	
Store/Recall	10 Groups of Setting Memories	
Interface	GPIB, RS-232C, USB Host/Device	
Display	4.3 inch TFT LCD; 480 x 3(RGB) x 272	
SYSTEM CHARACTERISTICS		
Configuration Times (typical)	Function Change: Standard>102ms,Pulse>660ms,Built-In Arb>240ms Frequency Change: 24ms; Amplitude Change: 50ms;Offset Change: 50ms Select User Arb: < 2s for 1M points; Modulation Change: < 200ms	
Arb Download Times (typical)	Binary Code: GPIB/RS-232C (115 Kbps), USB(Device) ASC II Code: USB(Host)*6	
GENERAL SPECIFICATIONS		
Power Consumption	65VA	
Operating Environment	Temperature to satisfy the specification: 18 ~ 28° C; Operating temperature: 0 ~ 40°C Relative Humidity: ≤80%, 0 ~ 40°C, ≤70%, 35 ~ 40°C; Installation category: CAT II	
Operating Altitude	2000 meters	
Pollution Degree	IEC 61010 Degree 2, Indoor Use	
Storage Temperature	-10 ~ 70°C, Humidity: ≤70%	

*1. A total of ten waveforms can be stored (Every waveform can composed of 1M points maximum)

*2. Add 1/10th of output amplitude and offset specification per °C for operation outside of 0°C~28°C range (1year specification)

*3. Edge time decreased at higher frequency

*4. Sine and square waveforms above 25MHz are allowed only with an "Infinite" count

*5. Harmonic distortion and Spurious noise at low amplitudes is limited by a -70 dBm floor

*6. Arb Download Times :

	Binary Code		ASC II Code
Typical	GPIB/RS-232C (115 Kbps)	USB (Device)	USB (Host)
1M points	189 Sec	34 Sec	70 Sec
512K points	95 Sec	18Sec	35 Sec
256K points	49 Sec	9 Sec	18 Sec
64K points	16 Sec	3 Sec	6 Sec
16K points	7 Sec	830mS	1340 mS
8K points	6 Sec	490mS	780mS
4K points	6 Sec	365mS	520 mS
2K points	5 Sec	300mS	390 mS

Rear Panel

AFG-3000 Series

SPECIFICATIONS

	AFG-3081	AFG-3051
POWER SOURCE		
AC100 ~ 240V , 50 ~ 60Hz		
POWER CONSUMPTION		
65VA		
DIMENSIONS & WEIGHT		
265 (W) x 107 (H) x 374 (D)mm, Approx. 4kg		

ORDERING INFORMATION

AFG-3081 80MHz Arbitrary Function Generator
AFG-3051 50MHz Arbitrary Function Generator

ACCESSORIES :
CD (User manual + Software) x 1 , Quick Start Guide x 1 , Power Cord x 1
GTL-110 Test Lead x 1

OPTIONAL ASSESSORIES

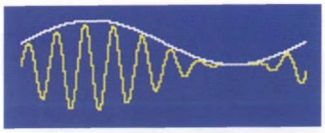
GTL-232 RS-232C Cable
GTL-246 USB Cable, USB 2.0 A-B Type Cable, 4P
GTL-248 GPIB Cable (2.0m)
GTL-250 GPIB Cable, Double Shielded, 600mm
GTL-251 USB-GPIB Adapter, GPIB-USB-HS, USB 2.0, Hi-Speed USB compliance, 2000mm

FREE DOWNLOAD

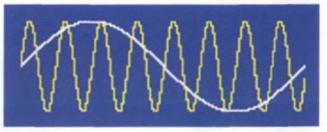
PC Software Arbitrary Waveform Editing Software

80MHz/50MHz Arbitrary Function Generator

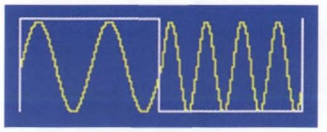
A. MODULATION, SWEEP and BURST FUNCTIONS



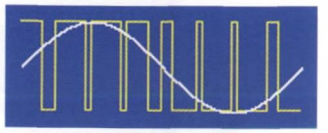
AM



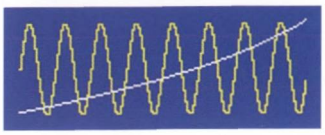
FM



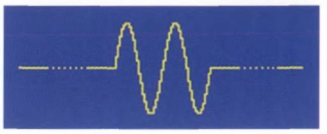
FSK



PWM



Sweep



Burst

PWM to Control & Test the Motor Speed

The Modulation functions, including AM, FM, FSK and PWM, are provided to meet a broad range of market requirements. A dedicated terminal for the modulating signal output is available on the front panel for modulation monitoring or other control purposes. Either an internal signal or an external signal can be selected to perform the modulation.

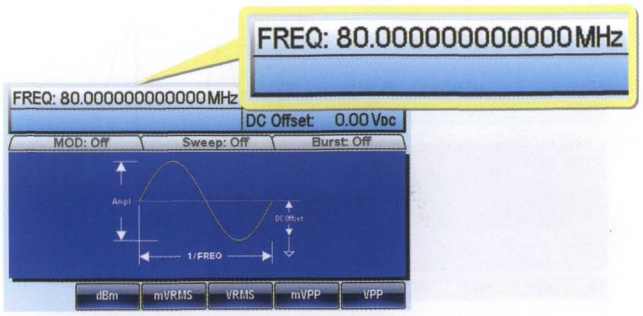
FSK is a frequency modulation scheme in which digital information is transmitted through signal frequency variation. The BFSK (binary FSK) modulation, using two frequencies to represent data 1 and 0 respectively, is commonly applied for Call ID and Remote Metering applications.

PWM is a digital modulation scheme that can be used to adjust the output power level by controlling the pulse width of the driving signal. The examples include the speed control of motor rotation and the luminance control of LED lighting instrument. With the pulse width variation of driving signal, the rotating speed of motor and the luminance of LED will change accordingly.

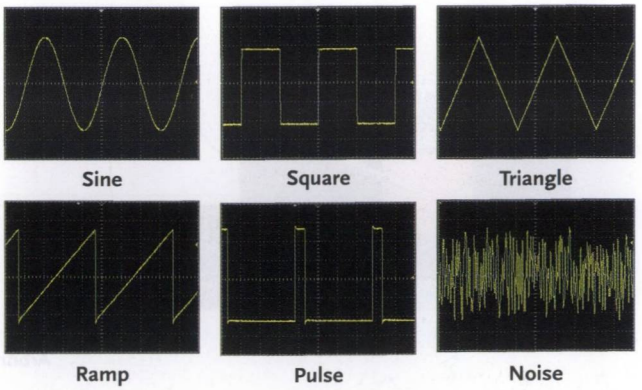
The Sweep function supports three trigger modes of INT, EXT and manual, and two sweep modes of LOG and LIN. Each time a sweep signal is perceived, the function generator will start to sweep through the user-defined frequency range by the frequency variation of either Log curve or Linear curve.

The Burst function supports two modes of Gate and N Cycle. To run burst function, the burst repetitive rate has to be set first, then the time duration of each burst has to be defined under Gate mode, or the number of the waveform cycles in each burst has to be set under N Cycle mode. Under both Gate mode and N Cycle mode, the burst waveform polarity and phase can be controlled.

B. WIDE FREQUENCY RANGE FROM 1μHz to 80/50MHz

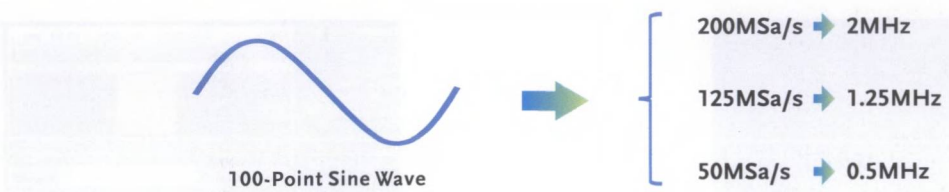


The Minimum 1μHz Resolution



The AFG-3000 series arbitrary waveform/ function generator employs direct digital synthesis (DDS) technology to generate and output a variety of stable and precise waveforms. The frequency operates at up to 80MHz (AFG-3081) or 50MHz (AFG-3051), with a minimum resolution of 1μHz for the entire frequency range.
The built-in standard waveforms include sine, square, triangle, ramp, pulse, noise and other types of waveforms.

C. HIGH 200MSa/s SAMPLING RATE

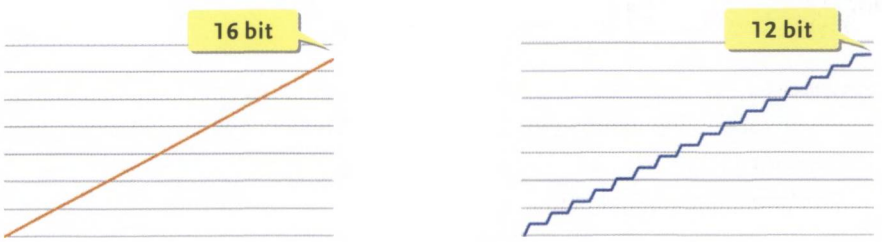


High Sampling Rates Achieve Higher Frequency Ranges

The profile of arbitrary waveform is composed of a series of data. The frequency of arbitrary waveform is derived from sampling rate divided by the number of points constructing a complete waveform, i.e. frequency = sampling rate / the number of points in a waveform. Based on the above, the higher the sampling rate, the higher the arbitrary waveform frequency can be available.

A Sine waveform composed of 100 points waveform data is able to have a 2MHz frequency with 200MSa/s sampling rate, but can only have 1.25MHz frequency with 125Msa/s sampling rate and 0.5MHz frequency with 50MSa/s sampling rate. AFG-3000 , possessing a sampling rate of 200Msa/s, is able to generate a waveform up to 100MHz for a simple waveform composed of 2 points of data.

D. 16 BIT AMPLITUDE RESOLUTION



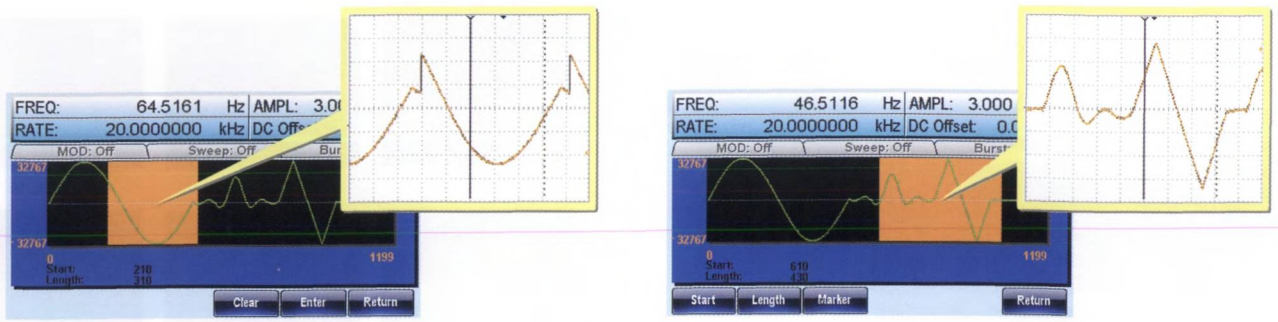
16 bit Allows Greater Details

The 16 bit amplitude resolution can display smooth waveforms, while a lower bit resolution will display jagged or less smooth waveforms.

For example, if 10V is divided into 10,000 equal parts, each part would have a resolution of 1mV. When using a 16 bit resolution, the smallest possible bit resolution is 0.15mV (from 10V).

With 16 bit resolution, the 10,000 parts will appear to be a smooth straight line, while the bit resolution of 12 bit would be 2.4mV, greater than the 1mV needed. In this case the straight line would appear like a ladder.

E. OUTPUT FROM ANY SECTION OF 1M-POINT-LONG WAVEFORMS

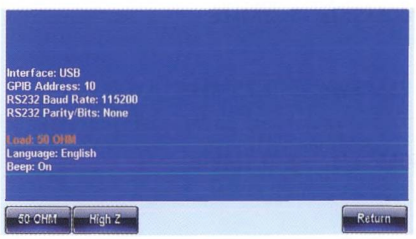


Arbitrary Editing / Output

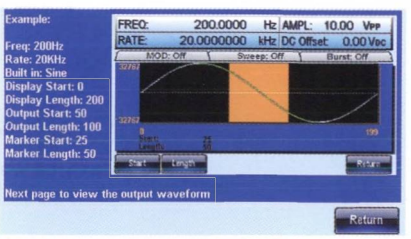
The AFG-3000 Series provides 10 sets of memory for users including save and recall applications. Each set of memory is able to store a set of front panel setting and a set of 1M-point arbitrary waveform data. With 1M long memory, AFG-3000 can store more complex waveforms consisted of more data.

Furthermore, any section of waveform within this 1M memory can be edited or output independently. This is a unique feature allowing more flexibility for users to do waveform storage and extraction.

F. IMPEDANCE SWITCH & ON-SCREEN HELP



Impedance Switch



On-Screen Help

AFG-3000 allows users to select the suitable impedance between 50 ohm and High-Z, ensuring a right impedance compatibility.

The built-in On-Screen Help allows users to understand AFG-3000 operations and the definition of each function key.

G. EASY OPERATION AND FLEXIBLE ARBITRARY WAVEFORM EDITING

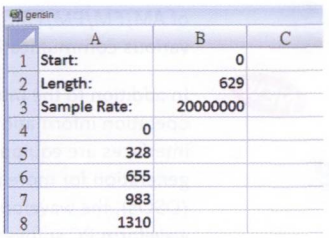
The AFG-3000 presents four ways to generate custom arbitrary waveforms from direct front panel operation, PC software, a CSV file loading, and GDS-2000 series oscilloscope input.

• Front Panel Operation

Panel Operation

Everything from waveform editing, I/O configuring, and panel setting storage and recall can be completed directly through front panel operation. Front panel operation allows users to edit arbitrary waveform, which is correspondingly updated on the screen, a feature of "What You See is What You Get".

• CSV file Download



Supports CSV file

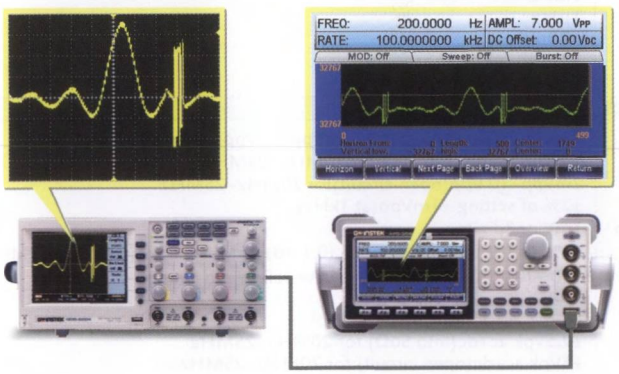
```
% sine wave generation program
result=round(2^15*sin(0:0.01:2*pi));
save gensin.csv result /ascii;
% end
```

```
Start:,0
Length:,629
Sample Rate:,20000000
0
328
655
983
1310
1638
```

From Math Computing Software, Program and Result in CSV File

AFG-3000 supports CSV file editing for arbitrary waveform generation. The CSV file can be created in many ways, including using EXCEL spreadsheet, PC client software, front panel editing or math computing software. The computing result of math software, Octave for example, can be saved into CSV file. Edited CSV file can be downloaded from either USB flash or PC to AFG-3000 for arbitrary waveform output.

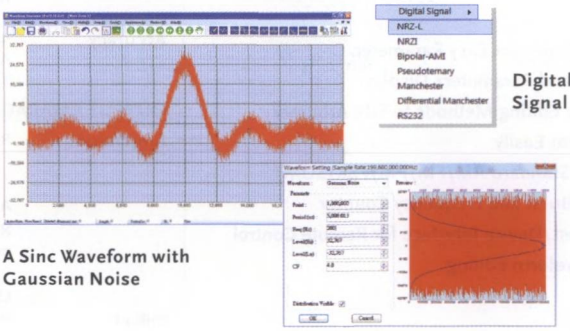
• Direct Waveform Reconstruction (DWR)



Direct Waveform Reconstruction from the GDS-2000 Series

AFG-3000 can be directly connected to GW Instek GDS-1000, GDS-2000 and GDS-3000 Serials DSO with USB cable for waveform data download. Under "DSO Link" mode of AFG-3000, the DSO will transfer the captured waveform data from its memory to AFG-3000 for creating an approximative waveform output.

• Arbitrary Waveform Editing PC Software



Digital Signal

A Sinc Waveform with Gaussian Noise

Gaussian Noise

A PC software for AFG-3000 waveform editing is supported. The software contains not only waveform drawing tools but also a wide variety of waveform editing functions, such as waveform arithmetic operations. The most commonly used waveforms, including Rayleigh, Gaussian, Normal Noise, Pseudo Ternary, Bipolar AMI, Manchester, Differential Manchester, RS-232, and NRZ etc., are available in the library for users to tailor specific waveforms as needed.

25MHz True Dual Channel Arbitrary Function Generator

GW Instek is launching AFG-2225, its first basic level dual-channel arbitrary function generator, which provides superior features in its class. Both channels are equipped with same characteristics to adapt dual-signal applications such as differential signaling or IQ modulation. The outstanding cost-performance value makes the AFG-2225 a practical instrument to accelerate the development process.

The major features for both channels include 10Vpp output amplitude; 25MHz frequency bandwidth with 1μHz resolution; built-in waveforms of Sine, Square, Ramp (Triangle) and Noise. As to the 1%~99% adjustable duty cycle of Square waveform can be used as pulse signal sources. For the arbitrary waveform, user can edit the 66 built-in waveforms or create a whole new one. Moreover, AFG-2225 carries features of AM/FM/PM/FSK/SUM Modulation, Sweep, Burst and Frequency Counter, which can be applied to various communication fields.

AFG-2225

NEW

CE | USB Host | USB Device | PC Software | LabVIEW Driver

In addition to the intuitive and user friendly, the 3.5-inch color LCD displays the comprehensive operation information including the true waveform presented at the output. USB Host and Device interfaces are equipped to link the AFG-2225 with other devices, which provide the flexibility of waveform generation for more practical usages. With link to GW Instek GDS-series Digital Storage Oscilloscopes (DSOs), the waveforms of interest can be captured and reconstructed. User can also use the arbitrary waveform PC software to edit the waveform and then send to AFG-2225 directly, or save the waveform into flash drive and then transfer to AFG-2225.

FEATURES

* Wide Frequency Ranges From 1μHz ~ 25MHz (sine wave)
* 1μHz Resolution in Full Range
* Built-in Standard 120MSa/s, 10bit, 4k Points Arbitrary Function for Both Channels
* True Dual-Channel Output, CH2 Provides the Same Characteristics as Ch1
* Dual-Channel Supports Couple, Tracking, Phase Operations
* 1% ~ 99% Adjustable Duty Cycle for Square Waveform
* User Friendly for Easy Parameter Setting and Parameters Display
* Multiple Editing Methods to Edit Arbitrary Waveform Easily
* Built-in Standard AM/FM/PM/FSK/SUM/ Sweep/Burst and Frequency Counter
* USB Host/Device Interface for Remote Control and Waveform Editing

SPECIFICATIONS

		CH1	CH2
WAVEFORMS			
		Sine, Square, Ramp, Pulse, Noise, ARB	
ARITRARY FUNCTION			
Sample Rate		120MSa/s	
Repetition Rate		60MHz	
Waveform Length		4k points	
Amplitude Resolution		10 bits	
Non-Volatile Memory		4k points	
FREQUENCY CHARACTERISTICS			
Range	Sine/Square	1μHz ~ 25MHz	
	Ramp	1MHz	
Resolution		1μHz	
Accuracy	Stability	±20ppm	
	Aging	±1ppm, per 1 year	
	Tolerance	≤1mHz	
OUTPUT CHARACTERISTICS			
Amplitude	Range	1mVpp~10Vpp(into 50Ω), 2mVpp~20Vpp(open-circuit) 1mVpp~5Vpp(into 50Ω)for 20MHz~25MHz 2mVpp~10 Vpp(open-circuit)for 20MHz~25MHz	
	Accuracy	±2% of setting ±1mVpp(at 1kHz)	
	Resolution	1mV or 3digits	
	Flatness	±1% (0.1dB) ≤100kHz, ±3% (0.3 dB) ≤5MHz, ±5% (0.4 dB) ≤12MHz, ±10%(0.9dB)≤25MHz (sine wave relative to 1kHz)	
	Units	Vpp, Vrms, dBm	
Offset	Range	±5Vpk ac+dc(into 50Ω); ±10Vpk ac+dc(open circuit) ±2.5Vpk ac+dc(into 50Ω) for 20MHz~25MHz ±5Vpk ac+dc(open circuit) for 20MHz~25MHz	
	Accuracy	2% of setting + 5mV+ 0.5% of amplitude	
Waveform Output	Impedance	50Ω typical (fixed); >10MΩ (output disabled)	
	Protection	Short-circuit protected; Overload relay automatically disables main output	
SINE WAVE CHARACTERISTICS			
Harmonic Distortion		–55 dBc DC~200kHz, Ampl > 0.1Vpp; –50 dBc 200kHz~1MHz, Ampl > 0.1Vpp –35 dBc 1MHz~5MHz, Ampl > 0.1Vpp; –30 dBc 5MHz~25MHz, Ampl > 0.1Vpp	
SQUARE WAVE CHARACTERISTICS			
Rise/Fall Time		≤ 25ns at maximum output (into 50Ω load)	
Overshoot		5%	
Asymmetry		1% of period + 5 ns	
Variable Duty Cycle		1.0%~99%≤100kHz ; 10.0%~90.0%≤1MHz ; 50.0%≤ 25MHz	
RAMP CHARACTERISTICS			
Linearity		< 0.1% of peak output	
Variable Symmetry		0%~100%(0.1% Resolution)	
PULSE CHARACTERISTICS			
Period		40ns ~ 2000s	
Pulse Width		20ns ~ 1999.9s	
Overshoot		<5%	
Jitter		20ppm + 5ns	
AM MODULATION			
Carrier Waveforms		Sine, Square, Ramp, Pulse, Arb	Sine, Square, Ramp, Pulse, Arb
Modulating Waveforms		Sine, Square, Triangle, Upramp,	Sine, Square, Triangle, Upramp,
Modulating Frequency		Dnramp 2mHz ~ 20kHz (INT);	Dnramp 2mHz ~ 20kHz (INT);
Depth		DC ~ 20kHz (EXT) 0% ~ 120.0%	DC ~ 20kHz (EXT) 0% ~ 120.0%
Source		Internal / External	Internal / External

AFG-2225

Rear Panel

SPECIFICATIONS

	CH1	CH2
FM MODULATION		
Carrier Waveforms	Sine, Square, Ramp	Sine, Square, Ramp
Modulating Waveforms	Sine, Square, Triangle, Upramp, Dnramp	Sine, Square, Triangle, Upramp, Dnramp
Modulating Frequency	2mHz ~ 20kHz (INT); DC ~ 20kHz (EXT)	2mHz ~ 20kHz (INT); DC ~ 20kHz (EXT)
Peak Deviation	DC ~ Max Frequency	DC ~ Max Frequency
Source	Internal / External	Internal / External
PM		
Carrier Waveforms	Sine, Square, Ramp	Sine, Square, Ramp
Modulating Waveforms	Sine, Square, Triangle, Upramp, Dnramp	Sine, Square, Triangle, Upramp, Dnramp
Modulation Frequency	2mHz ~ 20kHz (INT); DC ~ 20kHz (EXT)	2mHz ~ 20kHz (INT); DC ~ 20kHz (EXT)
Phase Deviation	0° ~ 360°	0° ~ 360°
Source	Internal / External	Internal / External
FSK		
Carrier Waveforms	Sine, Square, Ramp, Pulse	Sine, Square, Ramp, Pulse
Modulating Waveforms	50% duty cycle square	50% duty cycle square
Modulation Frequency	2mHz ~ 100 kHz (INT); DC ~ 100 kHz(EXT)	2mHz ~ 100 kHz (INT); DC ~ 100 kHz(EXT)
Phase Deviation	1μHz ~ Max Frequency	1μHz ~ Max Frequency
Source	Internal / External	Internal / External
SUM		
Carrier Waveforms	Sine, Square, Ramp, Pulse, Noise	Sine, Square, Ramp, Pulse, Noise
Modulating Waveforms	Sine, Square, Triangle, Upramp, Dnramp	Sine, Square, Triangle, Upramp, Dnramp
Modulation Frequency	2mHz ~ 20kHz (INT); DC ~ 20kHz (EXT)	2mHz ~ 20kHz (INT); DC ~ 20kHz (EXT)
Phase Deviation	0% ~ 100.0%	0% ~ 100.0%
Source	Internal / External	Internal / External
SWEEP		
Waveforms	Sine, Square, Ramp	Sine, Square, Ramp
Type	Linear or Logarithmic	Linear or Logarithmic
Start/Stop Freq	1μHz to Max Frequency	1μHz to Max Frequency
Sweep Time	1ms ~ 500s	1ms ~ 500s
Source	Internal / External/Manual	Internal / External/Manual
BURST		
Waveforms	Sine, Square, Ramp	Sine, Square, Ramp
Frequency	1μHz ~ 25MHz	1μHz ~ 25MHz
Burst Count	1 ~ 65535 cycles or Infinite	1 ~ 65535 cycles or Infinite
Start/Stop Phase	-360 ~ +360	-360 ~ +360
Internal Period	1ms ~ 500s	1ms ~ 500s
Gate Source	External Trigger	External Trigger
Trigger Source	Single, External or Internal Rate	Single, External or Internal Rate
N-Cycle, Infinite	0s ~ 655350ns	0s ~ 655350ns
FREQUENCY COUNTER		
Range	5Hz ~ 150MHz	
Accuracy	Time Base accuracy±1count	
Time Base	±20ppm (23°C ± 5°C) after 30 minutes warm up	
Resolution	The maximum resolution is : 100nHz for 1Hz, 0.1Hz for 100MHz	
Input Impedance	1kΩ/1pf	
Sensitivity	35mVrms ~ 30Vms (5Hz ~ 150MHz)	
DUAL CHANNEL FUNCTION		
Phase	-180° ~ 180°, Synchronize phase CH2=CH1	-180° ~ 180°, Synchronize phase CH1=CH2
Tracking	Frequency(Ratio or Difference)Amplitude & DC Offset	Frequency(Ratio or Difference)Amplitude & DC Offset
Coupling		
DSOlink	√	√
EXTERNAL TRIGGER INPUT		
Type	For FSK, Burst, Sweep	
Input Level	TTL Compatibility	
Slope	Rising or Falling(Selectable)	
Pulse Width	>100ns	
Input Impedance	10kΩ, DC coupled	

25MHz True Dual Channel Arbitrary Function Generator

SPECIFICATIONS

	CH1	CH2
EXTERNAL MODULATION INPUT		
Type	For AM, FM, PM, SUM	
Voltage Range	±5V full scale	
Input Impedance	10kΩ	
Frequency	DC ~ 20kHz	
TRIGGER OUTPUT		
Type	For Burst, Sweep, Arb	
Level	TTL Compatible into 50Ω	
Pulse Width	>450ns	
Maximum Rate	1MHz	
Fan-out	≥4 TTL Load	
Impedance	50Ω Typical	
SAVE/RECALL		
10 Groups of Setting Memories		
INTERFACE		
USB(Host & Device)		
DISPLAY		
3.5" TFT LCD		
POWER SOURCE		
AC100 ~ 240V , 50 ~ 60Hz		
POWER CONSUMPTION		
25W (Max.)		
OPERATING ENVIRONMENT		
Temperature to satisfy the specification: 18~28°C; Operating temperature: 0~40°C; Relative Humidity: ≤80%, 0~40°C; ≤70%, 35~40°C;Installation category: CAT II		
OPERATING ALTITUDE		
2000 meters		
STORAGE TEMPERATURE		
-10~70°C, Humidity: ≤70%		
DIMENSIONS & WEIGHT		
266(W)×107(H)×293(D) mm ; Approx. 2.5 kg		

* The specifications apply when the function generator is powered on for at least 30 minutes under +18°C~+28°C.

ORDERING INFORMATION

AFG-2225 25MHz True Dual Channel Arbitrary Function Generator

ACCESSORIES :

User Manual CD x 1, Quick Start Manual x 1, GTL-101 Test Lead x 2, Power Cord x 1

OPTIONAL ASSESSORIES

GTL-110 BNC Cable, BNC(P/M)-BNC(P/M), 1000mm

GTL-246 USB Cable, USB 2.0 Type A – Type B, 4P

FREE DOWNLOAD

PC Software Arbitrary Waveform Editing Software

A. FREQUENCY RANGES AND OFFERS MULTIPLE STANDARD WAVEFORMS

Wide Frequency Range

AFG-2225 offers signal output by DDS technique. The maximum frequency is 25 MHz and offers full-range 1μHz frequency resolution. The built-in functions include Sine, Square, Ramp/Triangle, Pulse, and Noise.

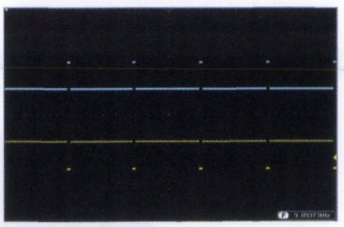
B. FULL-FUNCTIONS EQUIPPED DUAL-CHANNEL SIGNAL OUTPUT CAPABILITY

The Equivalent Function in Dual-Channel

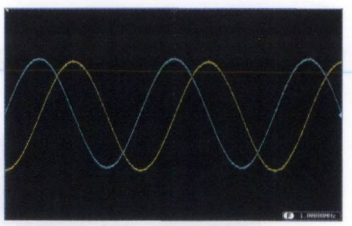
In most two-channel signals applications, such as digital modulation and vehicle electronic simulation signals, the similar or identical waveform capabilities are required for both channel outputs. Unlike other dual-channel AFG in this class, AFG-2225 is fully equipped with equal capabilities on dual outputs. Most of dual-channel arbitrary waveform generators in this basic level cluster offer one major channel and one minor channel, in which the minor channel only provides less functions or inferior performances. This sort of non-full-function dual-channel AFGs cannot meet the requirements of reality.

C. CORRELATED FUNCTIONS OF DUAL-CHANNEL OUTPUTS

Correlated Functions of Dual-Channel



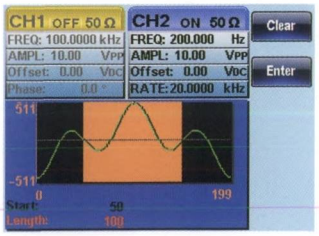
Differential Signals



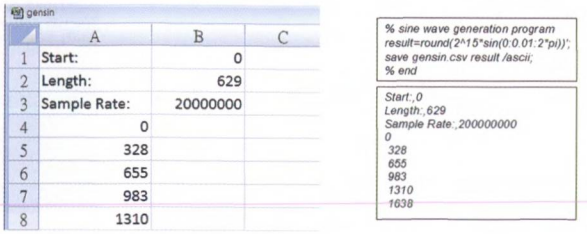
Quadrature (Sine and Cosine) Signals

The two channels can be used in either independent or correlated configuration. AFG-2225 provides three correlated functions which are Couple, Tracking and Phase functions. For Couple function, two signals with a ratio or offset in amplitude or frequency can be generated. One of two signals with adjustable offset frequency is an example which can form the two-tone signals for testing the third order inter-modulation distortion of an amplifier. With Tracking function, two differential signals with equal-frequency, equal-amplitude but inverted phase can be produced. Examples such as PECL, LVPECL and LVDS digital signals or automotive sensors like temperature, speed signals are all able to be simulated by tracking function. The Phase function is designed to create two signals with specified phase offset. When user wants to create two quadrature (sine and cosine) signals, the phase offset is set to be 90 degrees in the Phase function. In conclusion, compared with other arbitrary function generators only equipped with phase function, AFG-2225 provides great convenience to fulfill the various challenges coming from modern electronic industries.

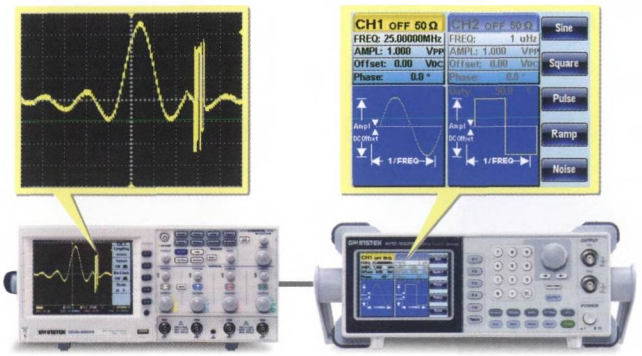
D. HIGH-FLEXIBILITY OF ARBITRARY WAVEFORMS EDITING



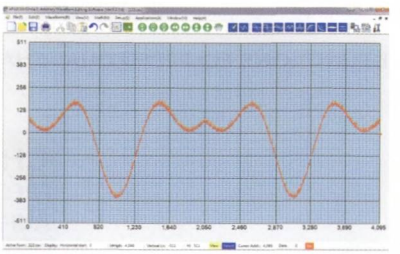
Direct Panel Operation



Supports CSV file upload



Direct Waveform Reconstruction (DWR) Capability

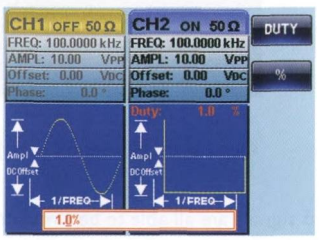


Arbitrary Waveform Editing PC Software

AFG-2225 provides 120MSa/s sampling rate, 10-bit vertical resolution, 4k-point waveform length, and the maximum waveform repeated rate of 60MHz, regarded as an outstanding arbitrary waveform capability. There are four ways for AFG-2225 to generate customized arbitrary waveforms, which are editing waveform via PC software, point-by-point editing on the panel, loading CSV file and loading the captured waveform from GWInstek GDS-Series Oscilloscopes.
The PC software editing and point-by-point editing particularly provide the way to create the user-defined and post-modification waveform.

CSV file loading capability allows AFG-2225 to produce the waveforms with complicated math operation result. Engineer can use PC math software to process the integral and then send the results in CSV format to AFG-2225. With the link to GWInstek GDS-Series Digital Storage Oscilloscopes(DSOs), the waveforms of interest can be captured by DSO and then reconstructed by AFG-2225. User can capture the waveform during the operation and then reconstructed by AFG-2225 for further analysis or diagnosis in the laboratory. Thus, plus the dual-channel feature, numerous derivative applications of capturing signal can be achieved.

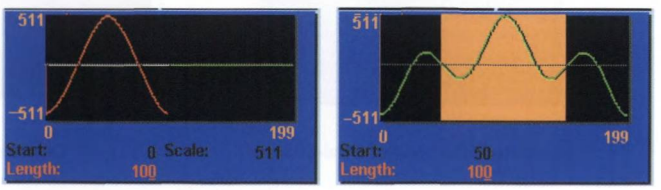
E. 1%~99% ADJUSTABLE DUTY CYCLE OF SQUARE WAVE



1% Duty Cycle of Square Wave

Inheriting the advantage of AFG-2000 Series, AFG-2225 provides a 1%~99% variable duty cycle for its Square waveform within 100kHz bandwidth, which is considered practical for the tests such as simulating pulse and transient signals without purchasing extra advanced function generator and pulse generator.

F. FRIENDLY OPERATING INTERFACES AND INSTANT PARAMETER DISPLAY



High-Flexable Editing/Output Method

AFG-2225 provides friendly panel operation setting as well as What You See Is What You Get operating way. From editing to output, the process can be manipulated via panel. Besides equipped with highly-flexible editing method, the immediate diagram is capable for users to understand the current waveform status and the output waveform contents under the storage/output setup.

G. 66 BUILT-IN ARBITRARY WAVEFORMS

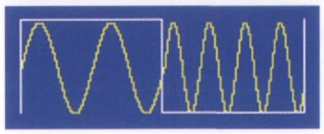
66 frequently used function waveforms in all fields are built in arbitrary waveform memory for user's selection. They are categorized into four groups, Common, Math, Window and Engineer. The trigonometric derivative functions, Blackman, Chebyshev, Bessel, Gamma, Gauss ... can be selected and developed by further editing.

H. IMPEDANCE SWITCH FUNCTION

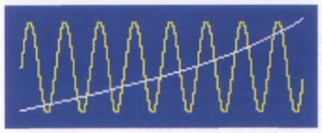
50Ω / High Z Impedance Switch Function

Majority of users are using oscilloscope to observe the waveforms of function generators. However, the differences of input impedance of function generators and oscilloscopes are not the same, and the oscilloscope will not necessarily be equipped with built-in input impedance switch function; the correct amplifier can only be received through computing. AFG-2225 provides 50Ω and high-input impedance switching modes, which can efficiently enhance the accuracy while users reading the results.

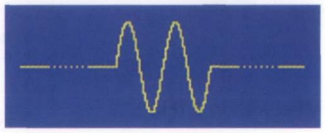
I. SUPPORT MULTI-CHANGE SIGNAL APPLICATION



FSK



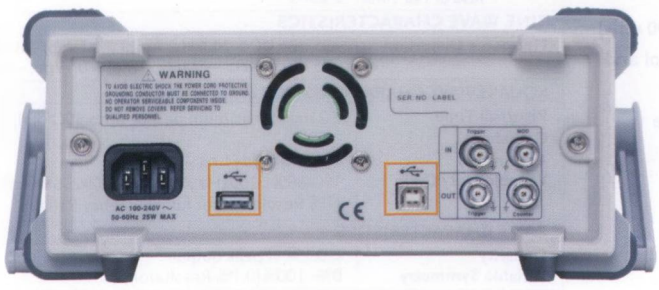
Sweep



Burst

AFG-2225 owns built-in functions, such as Modulation, Sweep, Burst, and RF Counter. The modulation waveforms contain AM, FM, PM, FSK, SUM, and either an internal signal or an external signal can be selected to perform the modulation. Sweep Function includes two sweep ways, linear and log mode, which can also perform sweep function in internal or external. Burst function supports two modes, Gate and N-Cycle, which can be used to control parameters such as phase angles, duration frequency, and duration time. The built-in Frequency Counter is available to provide the maximum 150MHz frequency range without additional purchase.

J. PROVIDE USB HOST/DEVICE INTERFACE



USB Host & USB Device

The USB Host/Device Interfaces are located at the rear panel of AFG-2225. The USB Host is mainly used for directly reconstruction of waveforms of GW Instek GDS-Series Oscilloscope, thus, it can be stored and recalled at portable USB Flash Drive; as to USB Device, which is used to connecting with PC, besides controlling through software on PC, USB Device also supports IEEE488.2 Command List for users to process customized functional control.

Arbitrary Function Generator

AFG-2100 Series

AFG-2000 Series

CE USB PC Software LabVIEW Driver

FEATURES

* 0.1Hz ~ 5/12/25 MHz with in 0.1Hz Resolution
* Sine, Square, Ramp, Noise and Arbitrary Waveform
* 20MSa/s Sampling Rate, 10 bit Vertical Resolution and 4k point Memory for Arbitrary Waveform
* 1% ~ 99% Adjustable Duty Cycle for Square Waveform
* Waveform Parameter Setting Through Numeric Keypad Entry & Knob Selection
* Amplitude, DC Offset and Other Key Setting Information Shown on the 3.5" LCD Screen Simultaneously
* AM/FM/FSK Modulation, Sweep, and Frequency Counter Functions (AFG-2100 only)
* USB Device Interface for Remote Control and Waveform Editing
* PC Arbitrary Waveform Editing Software

The AFG-2100/2000 Series Arbitrary Function Generator is a DDS (Direct Digital Synthesized) based signal generator designed to accommodate the educational and basic industrial requirements for an accurate and affordable signal source covering the output of Sine, Square (Pulse), Ramp (Triangle), Noise and Arbitrary waveforms. The 20MSa/s sampling rate, 10 bit vertical resolution and 4k point memory of the AFG-2100/2000 Series provide users with a flexible environment for creating the specific waveform output as needed. The 0.1Hz resolution of Sine, Square and Triangle waveforms and the 1% ~ 99% adjustable duty cycle of Square (Pulse) waveform are the remarkable features to greatly extend its application range in various fields. The AFG-2100/2000 Series includes 6 models in three frequency bands of 5MHz, 12MHz and 25MHz. Besides the basic features of the whole AFG-2100/2000 Series, AFG-2100 carries additional features of AM/FM/FSK Modulation, Sweep, and Frequency Counter.
The friendly human interface of AFG-2100/2000 Series allows users to set waveform parameters, including waveform type, frequency, amplitude, DC offset, modulation type, and duty cycle, through keypad entry and/or the knob selection, and display the set parameters on the 3.5" LCD screen. The AFG-2100/2000 Series is equipped with a USB Device interface for remote control and waveform editing through a PC. A waveform editing software is provided to facilitate the waveform creation on the PC. After the waveform editing is done, the user is able to download the waveform data from PC to the AFG-2100/2000 Series for signal output.

SPECIFICATIONS

Models	AFG-2100 Series			AFG-2000 Series		
	AFG-2105	AFG-2112	AFG-2125	AFG-2005	AFG-2012	AFG-2025
WAVEFORMS						
	Sine, Square, Ramp, Noise, Arbitrary Waveform					
ARITRARY FUNCTION						
Sample Rate	20MSa/s					
Repetition Rate	10MHz					
Waveform Length	4k point					
Amplitude Resolution	10 bit					
FREQUENCY CHARACTERISTICS						
Range Sine/Square	0.1Hz~5MHz	0.1Hz~12MHz	0.1Hz~25MHz	0.1Hz~5MHz	0.1Hz~12MHz	0.1Hz~25MHz
Ramp	0.1Hz ~ 1MHz					
Resolution Sine,Square,Ramp	0.1Hz					
Accuracy Stability	±20ppm					
Aging	±1ppm, per 1 year					
Tolerance	≤1mHz					
OUTPUT CHARACTERISTICS						
Amplitude						
Range	1mVpp~10Vpp(into 50Ω), 0.1Hz~20MHz; 2mVpp~20Vpp(open-circuit), 0.1Hz~20MHz 1mVpp~5Vpp(into 50Ω), 20MHz~25MHz; 2mVpp~10 pp(open-circuit), 20MHz~25MHz					
Accuracy	±2% of setting ±1mVpp;(at 1kHz,>10mVpp)					
Resolution	1mV or 3digits					
Flatness	±1%(0.1dB)≤ 100kHz; ±3%(0.3dB)≤ 5MHz; ±4%(0.4dB)≤ 12MHz; ±20%(2dB)≤ 20MHz; ±5%(0.4dB)≤ 25MHz; (sine wave relative to 1 kHz)					
Units	Vpp, Vrms, dBm					
Offset						
Range	±5Vpk ac+dc(into 50Ω); ±10Vpk ac+dc(open circuit); ±2.5Vpk ac+dc(into 50Ω) for 20MHz~25MHz; ±5Vpk ac+dc(open circuit) for 20MHz~25MHz					
Accuracy	2% of setting + 5mV+ 0.5% of amplitude					
Waveform Output						
Impedance	50Ω typical (fixed); >300kΩ (output disabled)					
Protection(main output)	Short-circuit protected ; Overload relay auto matically disables main output					
SYNC Output						
Level	TTL-compatible into >1kΩ					
Impedance	50Ω nominal					
Rise or Fall Time	≤ 25ns					
SINE WAVE CHARACTERISTICS						
Harmonic Distortion	–55 dBc DC ~ 200kHz, Ampl > 0.1Vpp; –50 dBc 200kHz ~ 1MHz, Ampl > 0.1Vpp –35 dBc 1MHz ~ 5MHz, Ampl > 0.1Vpp; –30 dBc 5MHz ~ 25MHz, Ampl > 0.1Vpp					
SQUAREWAVE CHARACTERISTICS						
Rise/Fall Time	≤ 25ns at maximum output (into 50Ωload)					
Overshoot	< 5%					
Asymmetry	1% of period+1 ns					
Variable Duty Cycle	1%~99%≤100kHz ; 20.0%~80.0%≤ 5MHz ; 40.0%~60.0%≤10MHz ; 50%≤ 25MHz (1% Resolution for full Frequency Range)					
RAMP CHARACTERISTICS						
Linearity	< 0.1% of peak output					
Variable Symmetry	0%~100%(0.1% Resolution)					
AM MODULATION						
Carrier Waveforms	Sine, Square, Triangle			–		
Modulating Waveforms	Sine, Square, Triangle					
Modulating Frequency	2 mHz~20 kHz (Int); DC~20KHz (Ext)					
Depth	0%~120.0%					
Source	Internal/External					
FM MODULATION						
Carrier Waveforms	Sine, Square, Triangle			–		
Modulating Waveforms	Sine, Square, Triangle					
Modulating Frequency	2 mHz~20 kHz (Int); DC~20KHz (Ext)					
Deviation	DC to Max Frequency					
Source	Internal/External					

SPECIFICATIONS

Models	AFG-2100 Series			AFG-2000 Series		
	AFG-2105	AFG-2112	AFG-2125	AFG-2005	AFG-2012	AFG-2025
SWEEP						
Waveforms Type Start/Stop Frequency Sweep Time Source	Sine, Square, Triangle Linear or Logarithmic 0.1Hz to Max Frequency 1ms~500s Internal/External			–		
FSK						
Carrier Waveforms Modulating Waveforms Internal Rate Modulation Rate Frequency Range Source	Sine, Square, Triangle 50% duty cycle square 2mHz~20kHz 2mHz~100kHz(INT); DC~100kHz(Ext) 0.1Hz~Max Frequency Internal/External			–		
FREQUENCY COUNTER						
Range Accuracy Time base Resolution Input Impedance Sensitivity	5Hz~150MHz Time Base accuracy ± 1count ±20ppm(23°C±5°C)after 30minutes warm up 100nHz for 1Hz, 0.1Hz for 100MHz 1KΩ/1pf 35mVrms~30Vrms (5Hz~150MHz)			–		
STORE/RECALL						
10 Groups of Setting Memories						
INTERFACE						
USB(Device)						
Display						
LCD						
POWER SOURCE						
AC100 ~ 240V , 50 ~ 60Hz						
POWER CONSUMPTION						
25 VA						
OPERATING ENVIRONMENT						
Temperature to satisfy the specification: 18~28°C; Operating temperature: 0~40°C Relative Humidity: ≤80%, 0~40°C; ≤70%, 35~40°C; Installation category: CAT II						
OPERATING ALTITUDE						
2000 meters						
STORAGE TEMPERATURE						
-10~70°C, Humidity: ≤70%						
DIMENSIONS & WEIGHT						
266(W)×107(H)×293(D) mm ; Approx. 2.5 kg						

ORDERING INFORMATION

AFG-2005	5MHz Arbitrary Function Generator
AFG-2105	5MHz Arbitrary Function Generator
AFG-2012	12MHz Arbitrary Function Generator
AFG-2112	12MHz Arbitrary Function Generator
AFG-2025	25MHz Arbitrary Function Generator
AFG-2125	25MHz Arbitrary Function Generator

ACCESSORIES :

CD (user manual + software) x 1, Quick Start Guide x 1, Power cord x 1
AFG-2100 Series - GTL-101 Test Lead x 2, Instruction Manual x 1, Power cord x 1
AFG-2000 Series - GTL-101 Test Lead x 1, Instruction Manual x 1, Power cord x 1

OPTIONAL ASSESSORIES

GTL-246	USB Cable, USB 2.0 Type A - Type B, 4P
GTL-110	BNC Cable, BNC(P/M)-BNC(P/M), 1000mm

FREE DOWNLOAD

PC Software	Arbitrary Waveform Editing Software
Driver	USB driver

AFG-2000 Series Rear Panel

AFG-2100 Series Rear Panel

SELECTION GUIDE

MODEL	AFG-2005	AFG-2105	AFG-2012	AFG-2112	AFG-2025	AFG-2125
FREQUENCY RANGE	5MHz	5MHz	12MHz	12MHz	25MHz	25MHz
ARBITRARY WAVEFORM	✓	✓	✓	✓	✓	✓
DUTY	✓	✓	✓	✓	✓	✓
TTL	✓	✓	✓	✓	✓	✓
DC OFFSET	✓	✓	✓	✓	✓	✓
USB INTERFACE	✓	✓	✓	✓	✓	✓
LIN/LOG SWEEP		✓		✓		✓
AM/FM/FSK MODULATION		✓		✓		✓
EXT COUNTER		✓		✓		✓

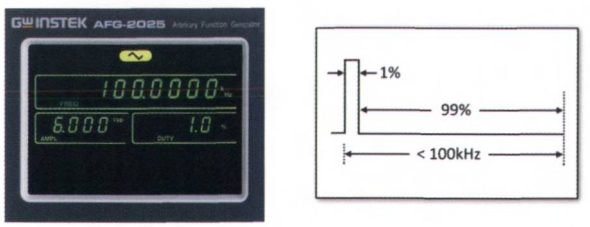
Arbitrary Function Generator

AFG-2100 Series

A. Built-in Arbitrary Waveform Function

In addition to the high accuracy and high stability DDS Function Waveforms-Sine, Square and Ramp, the AFG-2100/2000 Series also provides the feature to generate Arbitrary Waveforms as what users require. The 20MSa/s sampling rate, 10 bit vertical resolution and 4k point waveform memory allow users to create the needed waveform point by point through keypad entry on the front panel, or to do waveform editing on a PC and download the waveform data to the AFG-2100/2000 Series, for arbitrary waveform output.

B. 1% Adjustable Duty Cycle of Square Wave



1% Duty Cycle of Square Wave Setting

For most conventional Function Generators, the adjustable duty cycle falls in a limited 20% ~ 80% range, which may not fit the demands of specific applications. The AFG-2100/2000 series is able to provide a 1%~99% variable duty cycle for its Square waveform and 0%~100% variable symmetry for the Ramp. This allows the AFG-2100/2000 series to be used as a Pulse Generator to create pulse waveform simulating a spike signal or a transient signal.

C. Amplitude & DC Offset Display

Parameter Display

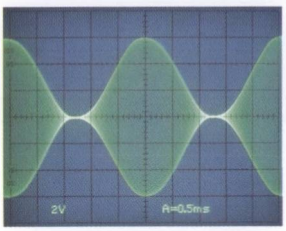
With the 3.5" LCD, the AFG-2100/2000 series is able to show output waveform amplitude, DC offset and other key setting information simultaneously. This provides the convenience for users to know what signal is being sent out at the output terminal without the need to check the waveform through an oscilloscope.

D. Fully Digital Entry Design

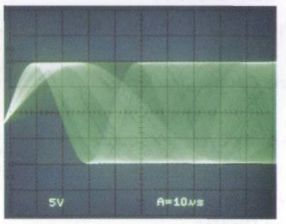
Fully Digital Keypad Operation

The conventional analog knob is not accurate enough for precision setting of waveform parameters, and may generate noise to interfere the system operation. The keypad entry design of AFG-2100/2000 improves the setting uncertainty and therefore significantly increases the accuracy of its waveform output. Besides, there is a Main Output switch which controls the main signal ON/OFF status. When a parameter, like output amplitude, is intended to be changed, users can turn off the output signal to avoid damaging the DUT.

E. AM/FM/FSK MODULATION, SWEEP & FREQUENCY COUNTER



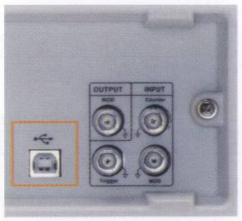
AM Modulated Waveform



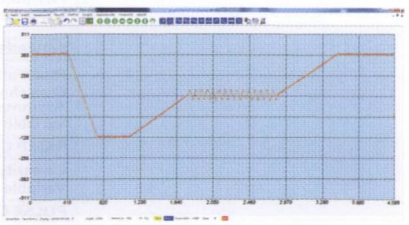
Sweep Waveform

All AFG-2100 models are equipped with additional AM/FM/FSK Modulation, Sweep & Frequency Counter functions. The AM/FM modulated signal provides a means for basic modulation circuit tests and experiments, and the FSK modulated signal offers the signal source of the most common digital modulation signal. The Sweep function adequately fits a lot of basic applications such as sweep-tone test for the speaker in audio frequency range. The built-in frequency counter is able to measure the frequency of an external signal up to 150MHz, which saves the cost of purchasing a frequency counter.

F. USB Interface & Arbitrary Waveform Editing PC Software



USB Device Interface



Arbitrary Waveform Editing PC Software

The AFG-2100/2000 Series provides a USB Device Interface, which allows the programming of remote control or ATE of the product. An arbitrary waveform editing PC software can generate the waveform by hand drawing, recalling and tailoring waveforms including Rayleigh, Gaussian, Normal Noise, Pseudo Ternary, Bipolar AMI, Manchester, Differential Manchester, RS-232C, and NRZ etc. from the library.

Besides, this software can import CSV format file as waveform data which is created by the other tools. After the waveform editing is completed on the PC, the waveform data can be downloaded through USB Interface to the AFG-2100/2000 for arbitrary waveform output. The software fits for both AFG-2100/2000 and 3000 series and can be downloaded from GWInstek's website. (www.gwinstek.com)

USB Modular Arbitrary Function Generator

NEW

AFG-125/125P/225/225P

CE USB PC Software

The brand new AFG-100/200 Series 25MHz USB modular arbitrary function generator has four models for selections. The AFG-100/200 Series arbitrary function generator with many unique features such as light weight, handy, and USB interface compatible is an ideal choice for the applications at the general laboratories in applying stand-alone operation or collocation with the GDS-2000A Series digital oscilloscope.

The main features of the AFG-100/200 Series are output amplitude of 2.5Vpp (connecting with a load of 50 ohms), frequency range reaching 25MHz, frequency resolution of 1uHz, and built-in sine waveform, square waveform, triangle waveform, and noise signal. Square waveform can adjust the duty cycle from 1% to 99% and it can be utilized as pulse signal. Users, via the GDS-2000A FG APP, can select from the 66 built-in function waveforms to conduct arbitrary waveform editing. The AFG-100/200 Series, with functions of AM/FM/PM/FSK/SUM modulation, frequency sweep, burst and coupling, is suitable for various communications applications.

The AFG-100/200 Series collocates with the FG APP of GDS-2000A digital oscilloscope through USB interface. While conducting stand-alone operation, the AFG-100/200 Series utilizes USB interface, which allows users to quickly set up their required tests by the simple connection feature. AWES (arbitrary waveform editing software) PC software is provided to enter settings speedily and easily for measurement. Users can select required waveforms from arbitrary waveform editor.

FEATURES

* Output Amplitude Range From 1mVpp ~ 2.5Vpp (into 50Ω)
* Wide Frequency Ranges From 1μHz ~ 25MHz (sine wave)
* 1μHz Resolution in Full Range
* Built-in Standard 120MSa/s, 10bit, 4k Points Arbitrary Function for Both Channels
* True Dual-Channel Output, CH2 Provides the Same Characteristics as CH1
* Dual-Channel Supports Couple, Tracking, Phase Operations
* 1% ~ 99% Adjustable Duty Cycle for Square Waveform
* User Friendly for Easy Parameter Setting and Parameters Display
* Multiple Editing Methods to Edit Arbitrary Waveform Easily
* Built-in Standard AM/FM/PM/FSK/SUM/ Sweep/Burst
* USB Device Interface for Remote Control and Waveform Editing

SPECIFICATIONS

MODEL		AFG-125/AFG-125P	AFG-225/AFG-225P
OUTPUT CHANNELS WAVEFORMS			
		1	2
		Sine, Square, Ramp, Pulse, Noise, ARB	
ARBITRARY FUNCTIONS			
Sample Rate		120 MSa/s	
Repetition Rate		60MHz	
Waveform Length		4k points	
Amplitude Resolution		10 bits	
Non-Volatile Memory		4k points	
FREQUENCY CHARACTERISTICS			
Range	Sine/Square	1μHz ~ 25MHz	
Ramp		1μHz ~ 1MHz	
Resolution		1μHz	
Accuracy	Stability	±20 ppm	
	Aging	±1 ppm, per 1 year	
	Tolerance	≤1 mHz	
OUTPUT CHARACTERISTICS			
Amplitude	Range	GPA-501 power supply: 1mVpp to 2.5Vpp (into 50Ω), 2mVpp to 5Vpp (open-circuit) USB power supply : 1mVpp to 2Vpp (into 50Ω), 2mVpp to 4Vpp (open-circuit)	
	Accuracy	±2% of setting ±1 mVpp (at 1 kHz)	
	Resolution	1mV or 3 digits	
	Flatness	±1% (0.1dB) ≤100kHz, ±3% (0.3 dB) ≤5MHz, ±5% (0.4 dB) ≤12MHz, ±10%(0.9dB) ≤25MHz (sine wave relative to 1kHz)	
	Units	Vpp, Vrms, dBm	
Offset	Range	GPA-501 power supply: ±1.25 Vpk ac +dc (into 50Ω), ±2.5Vpk ac +dc (Open circuit) USB power supply: ±1 Vpk ac +dc (into 50Ω), ±2 Vpk ac +dc (Open circuit)	
	Accuracy	2% of setting + 10mV+ 0.5% of amplitude	
WAVEFORM OUTPUT			
Impedance		50Ω typical (fixed), > 10MΩ (output disabled)	
Protection		Short-circuit protected, Overload relay automatically disables main output	
SINE WAVE CHARACTERISTICS			
Harmonic Distortion		≤-50 dBc DC ~ 1MHz, Ampl > 1Vpp ≤-35 dBc 1MHz ~ 5MHz, Ampl > 1Vpp ≤-30 dBc 5MHz ~ 25MHz, Ampl > 1Vpp	
SQUARE WAVE CHARACTERISTICS			
Rise/Fall Time		≤10ns at maximum output (into 50 Ω load)	
Overshoot		<2%	
Asymmetry		1% of period +5 ns	
Variable duty Cycle		1.0% ~ 99.0% ≤100kHz; 10% ~ 90% ≤ 1MHz, 50% ≤ 25MHz	
RAMP CHARACTERISTICS			
Linearity		< 0.1% of peak output	
Variable Symmetry		0% ~ 100% (0.1% Resolution)	
PULSE CHARACTERISTICS			
Period		40ns ~ 2000s	
Pulse Width		20ns ~ 1999.9s	
Overshoot		<2%	
Accuracy		0.1%+20ns	
Jitter		20ppm +10ns	
AM MODULATION			
Carrier Waveforms		Sine, Square, Ramp, Pulse, Arb	
Modulating Waveforms		Sine, Square, Triangle, Upramp, Dnramp	
Modulating Frequency		2mHz ~ 20kHz	
Depth		0% ~ 120.0%	
Source		Internal	
FM MODULATION			
Carrier Waveforms		Sine, Square, Ramp,	
Modulating Waveforms		Sine, Square, Triangle, Upramp, Dnramp	
Modulating Frequency		2mHz ~ 20kHz	
Peak Deviation		DC to Max Frequency	
Source		Internal	

SPECIFICATIONS

SWEEP	
Waveforms	Sine, Square, Ramp,
Type	Linear or Logarithmic
Start/Stop Freq	1μHz to Max Frequency
Sweep Time	1ms ~ 500s
Source	Internal / Manual
FSK	
Carrier Waveforms	Sine, Square, Ramp, Pulse
Modulating Waveforms	50% duty cycle square
Modulation Rate	2mHz ~ 100 kHz
Frequency Range	1μHz to Max Frequency
Source	Internal
PM	
Carrier Waveforms	Sine, Square, Ramp
Modulating Waveforms	Sine, Square, Triangle, Upramp, Dnramp
Modulation Frequency	2mHz ~ 20kHz
Phase deviation	0° ~ 360°
Source	Internal
SUM	
Carrier Waveforms	Sine, Square, Ramp, Pulse, Noise
Modulating Waveforms	Sine, Square, Triangle, Upramp, Dnramp
Modulation Frequency	2mHz ~ 20kHz
SUM Depth	0% ~ 100.0%
Source	Internal
SYNC OUTPUT	
Type	Sync, Sweep Marker, Burst Marker or Arbitrary Waveform Marker
Level	TTL Compatible into 50Ω
Assignment	Channel 1 or Channel 2
Polarity	Normal or Inverted
Fan-out	≥4 TTL Load
Impedance	50Ω Typical
DUAL CHANNEL FUNCTION	
Phase	-180° ~180° (Square and Pulse can not be change, Phase is 0°), Synchronize phase
Track	CH2=CH1 OR CH1=CH2
Coupling	Frequency(Ratio or Difference), Amplitude & DC Offset
BURST	
Waveforms	Sine, Square, Ramp, Arb
Frequency	1μHz ~ 15 MHz(sine), 1μHz ~ 15 MHz(Square), 1μHz ~ 1 MHz (Ramp)
Burst Count	1 ~ 65535 cycles or Infinite
Start/Stop Phase	-360 ~ +360
Internal Period	1ms ~ 500s
Gate Source	External Trigger
Trigger Source	Single or Internal Rate
TRIGGER DELAY	
N-Cycle, Infinite	0s ~ 655350ns
SAVE/RECALL	
	10 Groups of Setting Memories
POWER OUTPUT	
Only AFG-125P/AFG-225P	Output Voltage : (2.5V/3.3V/5V)±5%, Output Current : 0.6A
INTERFACE	
	USB (Device)
GENERAL SPECIFICATIONS	
Power Source	DC 5V
Power Consumption	10 W (Max)
Operating Environment	Temperature to satisfy the specification : 18 ~ 28°C , Operating temperature : 0 ~ 40°C Relative Humidity : < 80%, 0 ~ 40°C, Installation category : CAT II
Operating Altitude	2000 Meters
Storage Temperature	-10 ~ 70°C, Humidity : ≤70%
DIMENSIONS & WEIGHT	
	215(W) x 35 (H) x 107(D) mm, Approx. 1kg

ORDERING INFORMATION

AFG-125 25MHz Single Channel USB Modular Arbitrary Function Generator
AFG-225 25MHz Dual Channel USB Modular Arbitrary Function Generator
AFG-125P 25MHz Single Channel USB Modular Arbitrary Function Generator Plus Power Supply
AFG-225P 25MHz Dual Channel USB Modular Arbitrary Function Generator Plus Power Supply

Accessories
Quick Start Guide x 1, CD-ROM with AFG Software and User Manual x 1
GTL-101 BNC-Alligator Test Lead x 1 (only AFG-125/125P)
GTL-101 BNC-Alligator Test Lead x 2 (only AFG-225/225P)
GTL-105A Test Lead x 1 (only AFG-125P/225P)

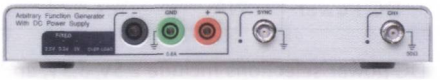
Optional Accessories

DS2-FH1 Module extension bay & USB Type A to Type A/B cable
GPA-501 Power Adapter
GPA-502 Universal Power Adaptor
GTL-246 USB Type A to Type B cable
GTL-201A Ground lead

OPTIONAL ACCESSORIES

GTL-110 BNC Cable, BNC(P/M)-BNC(P/M), 1000mm

AFG-125

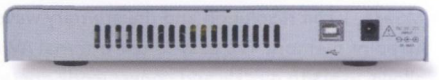


AFG-125P

AFG-225

AFG-225P

Rear Panel



DS2-FH1 Module Extension Bay & USB Type A to Type A/B cable

For : GDS-2000A Series, AFG-100/200 Series

GPA-501 Power Adapter

For : AFG-100/200 Series

GPA-502 Universal Power Adaptor

For : AFG-100/200 Series 5V/3A, 2Ø

USB Modular Arbitrary Function Generator

The model, channel, and power arrangements of the AFG-100/200 Series are as follows :

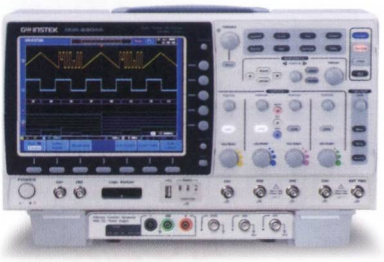
	AFG-125	AFG-125P	AFG-225	AFG-225P
Channels	1	1	2	2
DC Power	NA	Yes	NA	Yes

DC power selections include 2.5V, 3.3V, and 5V.

Power Supply Methods for the AFG-100/200 Series are as Follows :

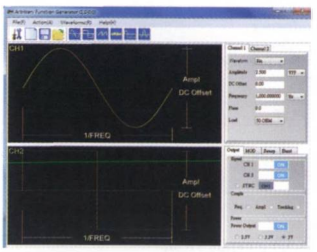
- For stand-alone operation, an external 5V power supply (GPA-501 is optional) is required.
- The USB interface of the GDS-2000A Series DSO provides power when AFG-125/225 collocates with GDS-2000A digital oscilloscope.
- An external 5V power supply (GPA-501 is optional) is required when AFG-125P/225P collocates with GDS-2000A digital oscilloscope.

A. FLEXIBILITY OF ARBITRARY WAVEFORM EDITING



5-in-1 Multi-Functional Test System

Power Adapter Option



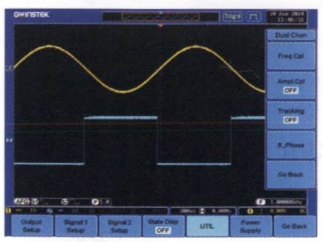
Stand-alone Operation With PC Software

The AFG-100/200 Series provides arbitrary waveform sampling rate of 120 MSa/s, 10 bit resolution and the arbitrary waveform editing function with 4k point memory. The easy-to-use external AWES PC software interface allows users to quickly and conveniently operate the AFG-100/200 Series. Arbitrary waveforms can be produced through four methods as follows :

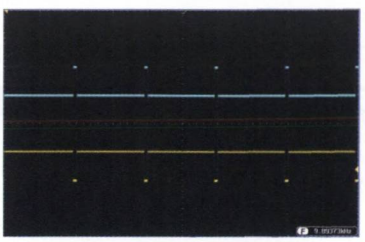
* The AFG-100/200 series collocates with the FG APP of GDS-2000A Series DSO to produce point-by-point output arbitrary waveforms.
* The AFG-100/200 series collocates with GDS-2000A series DSO to directly duplicate and produce retrieved waveform signals.
* Edit complicated waveforms via AWES PC software.
* Support programs such as MATLAB and Excel to upload CSV files into AWES PC software.

A seamless connection between the AFG-100/200 Series and the GDS-2000A Series DSO fulfills the possibility of realizing the five-in-one multi-functional test system, which includes oscilloscope, logic analyzer, digital voltage meter, function generator and power supply. The compact design of the AFG-100/200 Series truly saves a lot of laboratory space.

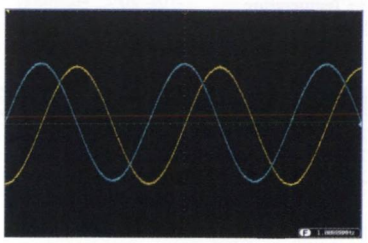
B. CORRELATED FUNCTIONS OF DUAL-CHANNEL OUTPUT



Equivalent Function in Dual-Channel



Differential Signal



Quadrature (Sine and Cosine) Signal

AFG-225/225P dual channel models support independent channel or correlated channel applications. Three correlated functions are coupling, tracking and phase.

* The coupling function allows users to freely set ratio and offset values for frequency and amplitude of both channels to realize that all parameters are simultaneously effective for both channels. The measurement of the Third-Order Intercept Point for an amplifier and the simulations of two different frequency oscillators outputting signals are two application examples for the coupling function.
* The tracking function can produce 180 degree phase offset differential signals with same frequency and amplitude.
* The phase function allows users to freely set phase parameters for both channels such as sine and cosine waveform signals.

The sum modulation function can sum up two signals into one and output this signal via one channel. One of the related applications is to sum up sine waveform and noise to execute speaker distortion tests.

USB MODULAR ARBITRARY FUNCTION GENERATOR SOLUTION FOR ORDERING

MODEL / MAIN FUNCTION	AFG-225P	AFG-225	AFG-125P	AFG-125
Stand-alone Operation	GPA-501/502 option GTL-246 option	GPA-501/502 option GTL-246 option	GPA-501/502 option GTL-246 option	GPA-501/502 option GTL-246 option
Collocation with GDS-2000A Series DSO	DS2-FH1 option GPA-501/502 option	DS2-FH1 option	DS2-FH1 option GPA-501/502 option	DS2-FH1 option

USB MODULAR ARBITRARY FUNCTION GENERATOR SELECTION GUIDE

MODEL / MAIN FUNCTION	AFG-225P	AFG-225	AFG-125P	AFG-125
Analog Channel	2	2	1	1
Frequency Range	25MHz	25MHz	25MHz	25MHz
Frequency Resolution	1 μ Hz	1 μ Hz	1 μ Hz	1 μ Hz
Sample Rate	120MSa/s	120MSa/s	120MSa/s	120MSa/s
Vertical Resolution	10-bit	10-bit	10-bit	10-bit
Memory Length	4k Points	4k Points	4k Points	4k Points
Impedance Switch	50Ω / Hi-Z	50Ω / Hi-Z	50Ω / Hi-Z	50Ω / Hi-Z
Sine/Square/Pulse	✓	✓	✓	✓
Triangle/Ramp	✓	✓	✓	✓
Noise	✓	✓	✓	✓
Burst	✓	✓	✓	✓
TTL/Sync Output	✓	✓	✓	✓
Sweep	✓	✓	✓	✓
AM/FM/PM/FSK	✓	✓	✓	✓
USB Device	✓	✓	✓	✓
SUM	✓	✓	–	–
DC Power Supply	✓	–	✓	–

DIRECT DIGITAL SYNTHESIZED (DDS) FUNCTION GENERATOR OVERVIEW

DDS type Function Generator has become the main stream in signal generation. This technique brings the advantages of simplicity, stable frequency and low distortion. The basic principle of how DDS works is as follows.

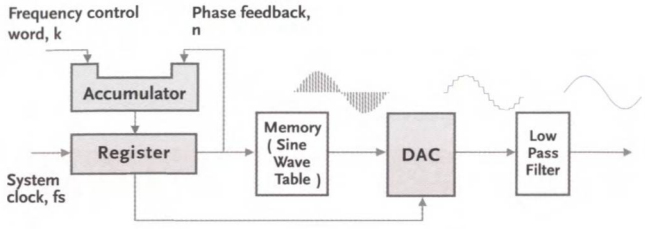


Figure 1 Block Diagram of DDS

The block diagram of DDS is illustrated in Figure 1 above. A digitized sine wave data is stored in a memory. The data is picked and sent out to a DAC, where step-shape sine wave is formed. A pure sine wave is then generated by a low pass filter.

The sine wave data is picked by accumulating the frequency control word, K. The whole sequence is as follows. At the very beginning, K is loaded into the accumulator. In a resister, an address n in the memory selects the K^{Th} data. Meanwhile the address n is fed back as part of the phase feedback to be added with K. Repeat the above steps, the $2K^{Th}$, $3K^{Th}$, and eventually a wave data is sent to construct a complete sine wave. The time base is the system clock f. Compared with the conventional function generator (introduced in the later section), there is no toggle between positive and negative current sources, therefore no spike noise occurs on the peak of the generated sine wave. Besides, the frequency stability follows the time base fs. As a result, the frequency stability is much better than that of a conventional function generator.

The extended product of DDS function generators is the arbitrary waveform generator. In the DDS unit, a sine wave data is stored in the memory. If the waveform data is loaded into the memory as demanded, an arbitrary waveform generator is constructed accordingly.

DDS FUNCTION GENERATOR

MODEL / MAIN FUNCTION	SFG-2010	SFG-2004	SFG-1003	SFG-1013
Analog Channel	1	1	1	1
Frequency Range	10MHz	4MHz	3MHz	3MHz
Frequency Resolution	0.1Hz	0.1Hz	0.1Hz	0.1Hz
Attenuator	-20dB x 2	-20dB x 2	-40dB x 1	-40dB x 1
Sine	✓	✓	✓	✓
Square	✓	✓	✓	✓
Triangle	✓	✓	✓	✓
Ramp	✓	✓	✓	✓
TTL Output	✓	✓	✓	✓
CMOS Output	✓	✓	-	-
Sweep	-	-	-	-
AM Modulation	-	-	-	-
FM Modulation	-	-	-	-
External Counter	-	-	-	-
Ext. Modulation Input	-	-	-	-
Voltage Display	-	-	-	✓
Internal Storage Memory	10 Groups	10 Groups	-	-
Page	C27-29	C27-29	C30-31	C30-31

10MHz/4MHz DDS Function Generator

The SFG-2000 Series function generators are available in 4MHz and 10MHz frequencies. Based on Direct Digital Synthesized (DDS) technology and unique FPGA design, this series supports output frequencies of up to 10MHz with low distortion and a frequency resolution of 0.1Hz. With above functions and features, the SFG-2000 Series are able to provide highly accurate, stable, powerful waveform outputs suitable for a wide variety of applications such as calibration and adjustment sources for electronic devices.

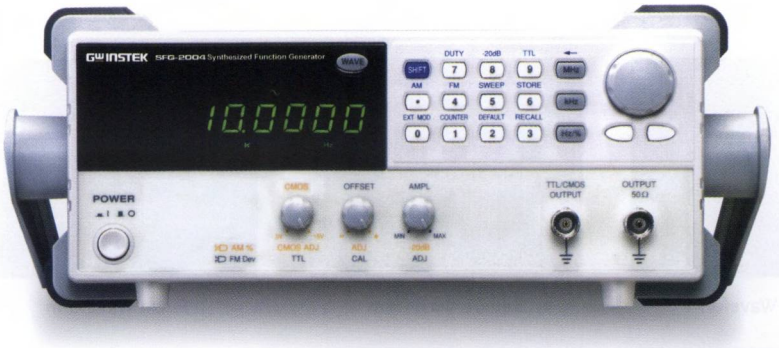
SFG-2010/2004 (10/4 MHz)

CE

FEATURES

* DDS Technology and FPGA Chip Design
* Frequency Range:0.1Hz~4/10 MHz
* High Frequency Accuracy : ±20ppm
* High Frequency Stability : ±20ppm
* Frequency Resolution : 100mHz
* Low Distortion Sine Wave : -55dBc, 0.1Hz ~ 200kHz
* Front Panel Setting Save/Recall with 10 Groups of Setting Memories

SPECIFICATIONS		
	SFG-2010	**SFG-2004**
MAIN		
Frequency		
Range(For Sine, Square)	0.1Hz~10MHz	0.1Hz~4MHz
Range(For Triangle)	0.1Hz~1MHz	
Resolution	0.1Hz	
Stability	± 20 ppm	
Accuracy	± 20 ppm	
Aging	± 5 ppm / year	
Output Function	Sine, Square, Triangle	
Amplitude Range	2mVpp ~ 10Vpp (into 50Ω load)	
Impedance	50Ω ±10%	
Attenuator	-20dB±1dBx2	
DC Offset	<-5V ~ >+5V (into 50Ω load)	
Duty Control	20% to 80% , 2Hz ~ 1MHz (Square wave only)	
Range Resolution	1%	
Display	9 digits LED display	
SINE WAVE		
Harmonics Distortion	-55dBc,0.1Hz~200kHz; -40dBc,0.2MHz~4MHz; -30dBc, 4MHz~10MHz (Specification applied to both TTL/CMOS OFF and from MAX. to 1/10 level)	
Flatness(Relative to 1kHz)	<±0.3dB, 0.1Hz~1MHz; <±0.5dB, 1MHz~4MHz <±2dB, 4MHz~10MHz	
TRIANGLE WAVE		
Linearity	≥98%,0.1Hz~100kHz;≥95%,100kHz~1MHz	
SQUARE WAVE		
Symmetry	±1% of period + 4ns, 0.1Hz~100kHz	
Rise or Fall Time	≤25ns at maximum output. (into 50Ω load)	
CMOS OUTPUT		
Level	4Vpp±1Vpp~15Vpp±1Vpp adjustable Rise or Fall Time≤ 120ns	
TTL OUTPUT		
Level	≥3Vpp	
Fan Out	20 TTL load	
Rise and Fall Time	≤ 25ns	
STORE/RECALL FUNCTION		
	10 groups of panel settings	
POWER SOURCE		
	AC115V±10%, AC230V+10%/-15%, 50/60Hz	
DIMENSION & WEIGHT		
	266(W)x107(H)x293(D) mm; Approx. 3.1kg	



Rear Panel

SFG-2000 Series

ORDERING INFORMATION

SFG-2010 10MHz DDS Function Generator
SFG-2004 4MHz DDS Function Generator

ACCESSORIES :
User manual x 1, Power Cord x 1
GTL-101 test lead x 1 (SFG-2004, SFG-2010)
GTL-101 test lead x 2 (SFG-2110)

OPTIONAL ACCESSORIES

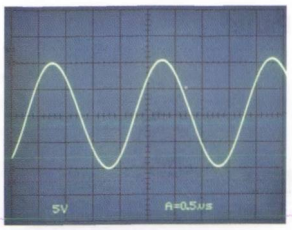
GTL-110 BNC Cable, BNC(P/M)-BNC(P/M), 1000mm

SELECTION GUIDE

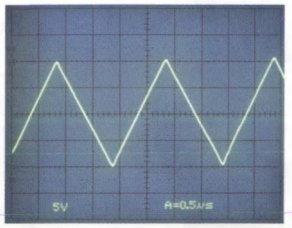
MODEL	SFG-2010	SFG-2004
FREQUENCY RANGE	10MHz	4MHz
DUTY	✓	✓
TTL/CMOS	✓	✓
DC OFFSET	✓	✓

10MHz/4MHz DDS Function Generator

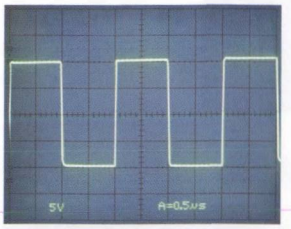
A. OUTPUT WAVEFORM



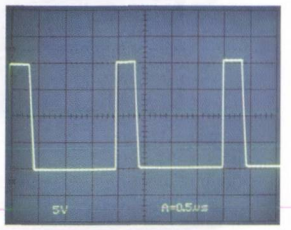
Sine Waveform



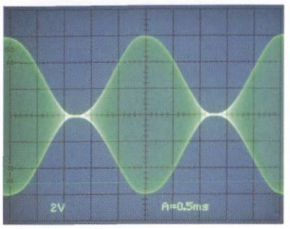
Triangle Waveform



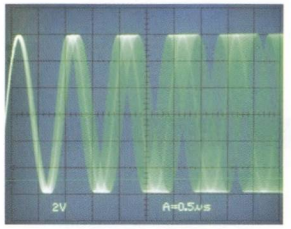
Square Waveform



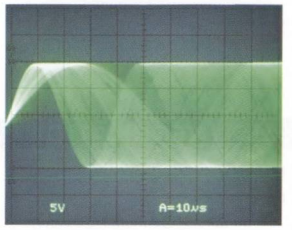
Pulse Waveform



AM Modulated Waveform



FM Modulated Waveform

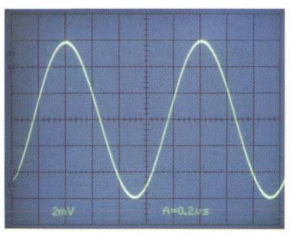


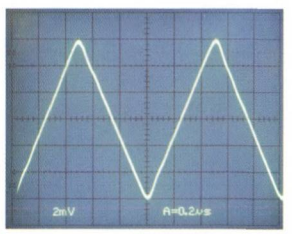
Sweep Waveform

The SFG-2000/2100 Series provides Sine, Triangle and Square waveforms with DC offset and variable duty cycle at± 20ppm frequency stability and accuracy. The low drift rate and -55dBc low sine wave distortion output significantly extend product application range in various market sectors.

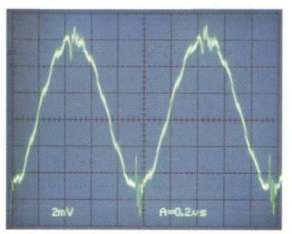
The TTL/CMOS output is also available for fulfilling various requirements. In addition to the basic functions, The SFG-2100 Series provides advanced functions such as AM/FM modulation, sweep mode, and built-in Frequency Counter.

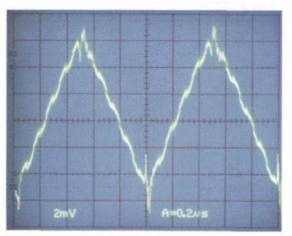
B. DDS FG VS. CONVENTIONAL FG





GW Instek SFG DDS Sine Wave & Triangle Wave





Conventional Function Generator Sine Wave & Triangle Wave

The SFG-2000/2100 Series generates signals by continuously delivering a series of sampling values from a sine waveform table (stored in RAM) to DAC (Digital to Analog Converter) for waveform construction. With a low pass filter circuit to filter out the harmonics of the DAC output and smooth the signal, the SFG-2000/2100 Series is able to provide a stable output with very low waveform distortion. This is very different from the way a conventional FG generates a signal. Since a conventional FG needs to obtain its signal by switching current sources between positive and negative directions all the time, the "Ringing" distortion occurs at the peak of the signal waveform where the switching is activated. This distortion is especially serious when the output amplitude is low. For SFG-2000/2100 DDS FG, however, the waveform distortion remains low even when the output amplitude is at only 2mVpp.

3 MHz DDS Function Generator

For educational institutions, the SFG-1003/1013 series direct digital synthesis (DDS) signal generator is the most affordable option for accurate waveform generation. It supports outputs of up to 3MHz and includes a voltage display. Using DDS technology embedded in an FPGA chip, the SFG-1003/1013 series generates waveforms with high precision and high stability for customers who need accurate signals.

SFG-1003/1013 (3MHz)

CE

FEATURES

* DDS Technology and FPGA Design
* Frequency Range : 0. 1Hz ~ 3MHz
* High Frequency Accuracy : ±20ppm
* High Frequency Stability : ±20ppm
* Max. Frequency Resolution : 100 mHz
* Low Distrortion Sine Wave : -55dBc, 0. 1Hz~200 kHz
* Voltage Display (Only SFG-1013)

SELECTION GUIDE

MODEL / MAIN FUNCTION	SFG-1003	SFG-1013
Frequency	3 MHz	3 MHz
Offset	✓	✓
TTL Output	✓	✓
-40dB Attenuation	✓	✓
Voltage display	—	✓

SPECIFICATIONS

MAIN	
Output Function	Sine, Square, Triangle, TTL
Frequency Range(For Sine, Square)	0.1Hz ~ 3MHz
Frequency Range(For Triangle)	0.1Hz ~ 1MHz
Frequency Resolution	0.1Hz maximum
Frequency Stability	±20ppm
Frequency Accuracy	±20ppm
Aging	±5ppm/year
Amplitude Range	10Vp-p (into 50Ωload)
Amplitude Accuracy	±20% at maximum position (only SFG-1013)
Impedance	50Ω±10%
Attenuator	-40dB±1dBx1
DC Offset	<-5V ~ >5V (into 50Ωload)
Duty Control Range	25% ~ 75% below 1MHz (for square wave only)
Display	6 digits LED display
Output Control	ON/OFF selector
SINE WAVE	
Harmonics Distortion	Maximum Amplitude attenuation to 1/10 of any panel settings, TTL OFF ≥ -55dBc, 0.1Hz ~ 200kHz ≥ -40dBc, 0.2MHz ~ 2MHz ≥ -35dBc, 2MHz ~ 3MHz
Flatness (at maximum amplitude relative to 1kHz)	<±0.3dB, 0.1Hz ~ 1MHz <±0.5dB, 1MHz ~ 2MHz <± 1dB, 2MHz ~ 3MHz
TRIANGLE WAVE	
Linear	≥98%, 0.1Hz ~ 100kHz ; ≥95%, 100kHz ~ 1MHz
SQUARE WAVE	
Symmetry	5% of period+4ns, 0.1Hz ~ 100kHz
Rise or Fall Time	≤ 100ns at maximum output (into 50Ωload)
TTL OUTPUT	
Level	≥ 3Vp-p
Fan Out	20 TTL load
Rise or Fall Time	≤ 25ns
GENERAL	
Operation Environment	Indoor use, altitude <2000m Ambient Temperature : 0℃ ~ 40℃ Relative Humidity: < 80% at 0℃ ~ 40℃ Up to 70% at 35℃ ~ 40℃ Installation category II Pollution Degree 2
POWER SOURCE	
	AC 100V/120V/220V/240V± 10%, 50/60Hz
STORAGE CONDITION	
Temperature	-10℃ ~ 70℃
Humidity	70% (Maximum).
DIMENSION & WEIGHT	
251(W) x 91(H) x 291(D) mm, Approx. 2.1kg	

ORDERING INFORMATION

SFG-1003 3 MHz DDS Function Generator
SFG-1013 3 MHz DDS Function Generator with Voltage Display

ACCESSORIES :
User manualx1, Power cord x 1, Test lead GTL-101 x 1

OPTIONAL ACCESSORIES

GTL-110 BNC Cable, BNC(P/M)-BNC(P/M), 1000mm

ANALOG FUNCTION GENERATOR OVERVIEW

The block diagram of a conventional analog function generator is illustrated in Figure 2. Two current sources are toggled to charge/ discharge the integrator, generating a triangle wave.

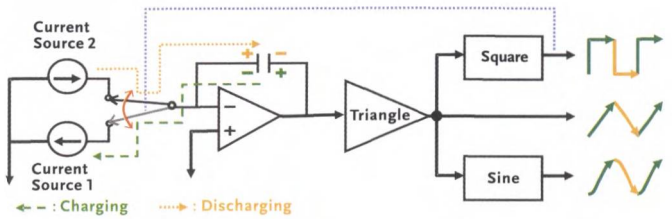


Figure 2

The square and sine wave shaper convert triangle wave to square and sine waves, respectively. But the square shaper has another function. At the moment when the square transition occurs, it switches the current sources to another. As a result, the charge and discharge of integrator produce periodic waveforms.

Since the frequency depends on the current source and components of the integrator, the generated frequency is not as stable as DDS or PLL (Phase Locked Loop).

In GW Instek's analog function generator lineup, GFG-3015 utilizes the conventional current source and integrator technique with additional digital feedback control, so a higher frequency stability can be achieved, while the GFG-8200 family satisfies most of the general application needs.

FUNCTION GENERATOR

MAIN FUNCTION \ MODEL	GFG-3015	GFG-8255A	GFG-8250A	GFG-8219A	GFG-8217A	GFG-8216A	GFG-8215A	GFG-8020H
Analog Channel	1	1	1	1	1	1	1	1
Frequency Range	15MHz	5MHz	5MHz	3MHz	3MHz	3MHz	3MHz	2MHz
Frequency Resolution	0.01Hz	0.1Hz	0.1Hz	0.1Hz	0.1Hz	0.1Hz	0.1Hz	0.1Hz
Attenuator	-	-20dB x 2	-20dB x 2	-20dB x 2	-20dB x 2	-20dB x 2	-20dB x 2	-20dB
Sine	✓	✓	✓	✓	✓	✓	✓	✓
Square	✓	✓	✓	✓	✓	✓	✓	✓
Triangle	✓	✓	✓	✓	✓	✓	✓	✓
Ramp	✓	✓	✓	✓	✓	✓	✓	✓
Burst	✓	-	-	-	-	-	-	-
TTL Output	✓	✓	✓	✓	✓	✓	✓	✓
CMOS Output	-	✓	✓	✓	✓	✓	✓	-
Sync Output	✓	-	-	-	-	-	-	-
Sweep	✓	✓	-	✓	✓	-	-	-
AM	✓	✓	-	✓	-	-	-	-
FM	✓	✓	-	✓	-	-	-	-
GCV Function	✓	✓	-	✓	-	-	-	-
VCF Function	✓	✓	✓	✓	✓	✓	✓	✓
Counter Function	Int./Ext.	Int./Ext.	Int./Ext.	Int./Ext.	Int./Ext.	Int./Ext.	-	Internal
Ext. Trigger Input	✓	-	-	-	-	-	-	-
Ext. Modulation Input	✓	-	-	-	-	-	-	-
Modulation Output	✓	-	-	-	-	-	-	-
Interface	RS-232C	-	-	-	-	-	-	-
Internal Storage Memory	10 Groups	-	-	-	-	-	-	-
Page	C33-34	C35-36	C35-36	C35-36	C35-36	C35-36	C35-36	C37

15MHz Programmable Function Generator

GFG-3015 is a versatile, high precision function generator. Using frequency feedback technology, GFG-3015 provides a stable output from 10mHz to 15MHz with a frequency accuracy of up to 0.02%. It also offers exceptional value for clients in education, service and repair or production, testing and development. 10 sets of front panel setup memories make it easier to output pre-defined signals. GFG-3015 also has a number of standard functions such as AM, FM, Gate, Burst, Trigger, Sweep, five types of waveform outputs, a 150MHz frequency counter, VCF controls as well as dedicated channels for different output types.

GFG-3015 (15MHz)

CE RS-232 PC Software

FEATURES

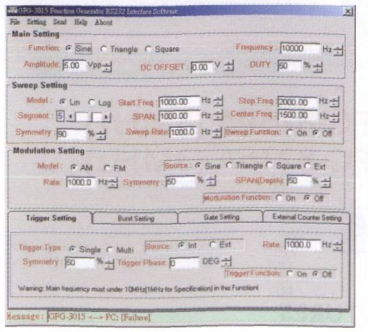
* Frequency Range 0.01Hz~15MHz
* Maximum Frequency Resolution 10mHz
* Frequency Accuracy 0.02%±5 Count
* Dual Displays Indicate Frequency and Amplitude
* Built-in 6 Digits Counter With INT/EXT Function up to 150MHz/High Resolution
* Output Waveforms Sine, Square, Triangle, Pulse, AM, FM, Sweep, TTL, Trigger and Gate or Burst
* INT/EXT AM/FM Modulation
* LIN/LOG Sweep Mode
* Variable DC Offset Control
* VCF for 100 : 1 EXT Frequency Control
* GCV Output for Synchronization
* SYNC Output
* Output Overload Protection
* RS-232C Standard Interface

SPECIFICATIONS	
MAIN	
Output Waveforms	Sine, Square, Triangle, Ramp, Pulse, AM, FM, Sweep, Trigger, Gate or Burst
Frequency Range	10mHz~15MHz in 8 frequency range(auto switch)
Frequency Resolution	15MHz~150kHz(100Hz);1.5MHz~15kHz(10Hz) 150kHz~1.5kHz(1Hz);15kHz~150Hz(0.1Hz);1.5kHz~15Hz(10mHz); 150Hz~1.5Hz(10mHz);15Hz~0.15Hz(10mHz);1.5Hz~0.01Hz(10mHz)
Frequency Accuracy	0.02% ±5 count
Output Impedance	50Ω±10%
Amplitude Range	10.00V ~ 0.01V(into 50Ω) 4 amplitude range |Vac peak| + |Vdc| = 5V ; Resolution : 10mV(10.00V ~ 0.01V)
Amplitude Accuracy	≤3% ± 5count at 10Hz ~ 1MHz ; ≤10% ± 5count at 1MHz ~ 15MHz
Amplitude Unit	Vpp , Vrms , dBm
DC Offset	-5V ~ 5V (into 50Ω); resolution 10mV
DC Offset Accuracy	≤3%±3count at minimum amplitude
Duty Control	20% ~ 80% ~ 1MHz; resolution 1%
Duty Accuracy	≤1% ~ 1MHz at 50% duty
Display	Dual display for frequency 6 digits and amplitude 4 digits
SINE WAVE	
Distortion	≤ 0.5%(-46dBc) for 10Hz ~ 100kHz; ≤-30dBc at 15MHz (for 1Vpp ~ 10Vpp)
TRIANGLE WAVE	
Linearity Error	<1% of full scale output at 100Hz
SQUARE WAVE	
Asymmetry	±1% of period + 3ns
Rise or Fail Time	<18ns
SYNC OUTPUT	
Impedance	50Ω±10%
Level	>1Vp-p open circuit
MODULATION CHARACTERISTICS	
Types	AM, FM, Sweep, Trigger(int/ext), Gate or Burst (implement by trigger type)
Waveform	Sine, Square, Triangle, Ramp or Variable Symmetry Pulse
Rate Frequency Range	10mHz~10kHz in 3 frequencies range (auto switch)
Rate Frequency Accuracy	5% ±1 count
Rate Frequency Resolution	10.0kHz~0.1kHz(100Hz);99Hz~1Hz(1Hz); 0.99Hz ~ 0.01Hz(0.01Hz)
Symmetry	90% : 10% : 90%; resolution : 1%
Symmetry Accuracy	±1 count(≤ ± 1%)
Output Level	≥1Vpp into 10kΩ load
Sine Wave Distortion	≤2% from 10Hz ~ 10kHz
AMPLITUDE MODULATION	
Depth	0 ~ 100%
Modulation Frequency Rate	0.01Hz ~ 10kHz(INT) ; DC ~ 1MHz(EXT)
Carries -3dB Bandwidth	<100Hz to >5MHz
External Sensitivity	≤ 10Vpp for 100% modulation
FREQUENCY MODULATION	
Deviation	0 ~ ±15%
Modulation Frequency Rate	0.01Hz ~ 10kHz(INT) ; DC ~ 50kHz(EXT)
External Sensitivity	≤ 5Vpp for 15% deviation
SWEEP CHARACTERISTICS	
Sweep Range	15MHz ~ 150kHz; 1.5MHz ~ 15kHz; 150kHz ~ 1.5kHz; 15kHz ~ 150Hz; 1.5kHz ~ 15Hz; 150Hz ~ 1.5Hz;15Hz ~ 0.15Hz; 1.5Hz ~ 0.01Hz
Width	>100:1(in the same frequency range)
Rate	0.01Hz ~ 10kHz
Symmetry Control	90% : 10% : 90% ; resolution:1%
Mode	Linear /Log sweep
Sweep Output	0 ≥ -5Vpp into 10kΩ

GFG-3015

Rear Panel

RS-232 Interface PC Software



SPECIFICATIONS	
TRIGGER CHARACTERISTICS	
Start/Stop Phase Range	80°~ 90°
Rate	0.1Hz ~ 10kHz
Frequency Range	0.1Hz ~ 1MHz(Useful ~ 10MHz)
Ext Trig Frequency Range	DC ~ 1MHz, TTL compatible input level
Gate or Burst	Implemented by trigger settings
VCF(Voltage Controlled Frequency)	
Range	100:1(0 ~ 10V ±1V)
Input Linearity	<0.5% ~ 1MHz,<5% ~ 10MHz
Input Impedance	10 kΩ
GCV(Generator Controlled Voltage) OUTPUT	
0.2V ~ 2V as per different frequencies in the same frequency range	
TTL Output	
Level≥3Vpp ; Fan-Out>10 TTL Load	
FREQUENCY COUNTER	
INT/EXT	Switch selector
Range	5Hz ~ 150MHz EXT
Accuracy	Time base accuracy ±1 count
Time Base	±20ppm(23°C ±5°C) after 30 minutes warm up
Resolution	The maximum resolution is 100nHz for 0.1Hz and 1Hz for 100MHz
Input Impedance	1MΩ // 150pF
Sensitivity	≤35mVrms(5 ~ 100MHz); ≤45mVrms(100MHz~150MHz)
MEMORY	
Save/Recall	10 sets of front panel setting memories
INTERFACE	
RS-232C	
POWER SOURCE	
AC115V/230V ±15%, 50/60Hz	
DIMENSIONS & WEIGHT	
290(W) x142(H) x 460(D)mm, Approx. 5kg	

ORDERING INFORMATION

GFG-3015 15MHz Programmable Function Generator

ACCESSORIES :
User manual x 1, Power cord x 1, Test lead GTL-101 x 2

OPTIONAL ACCESSORIES

GTL-110 BNC Cable, BNC(P/M)-BNC(P/M), 1000mm
GTL-232 RS-232C Cable,9-pin Female to 9-pin,Null Modem for Computer

FREE DOWNLOAD

PC Software RS-232 Interface Software

5MHz/3MHz Function Generator

GFG-8255A (5MHz)
GFG-8219A (3MHz)

The GFG-8200A Series Function Generators are embedded with standard functions such as TTL, CMOS and RAMP outputs, VCF (external voltage control frequency) and a 6-digit frequency counter (excluding GFG-8215A). All these integrated functions and the user-friendly operation are made to accommodate applications in audio response testing, vibration testing, servo system evaluations, and ultrasound applications.

In addition, the GFG-8255A and 8219A models include logarithmic and linear sweep, GCV (Generator Controlled Frequency) output and AM/FM modulation. GFG-8217A also includes LIN/LOG output. The GFG-8200A Series' models span two frequency bandwidths; the GFG-8215A/8216A/ 8217A/8219A at 0.3Hz ~ 3MHz and the GFG-8250A/8255A at 0.5Hz ~ 5MHz.

GFG-8250A (5MHz)
GFG-8216A (3MHz)

FEATURES

- Frequency Range: 0.3Hz ~ 3MHz (GFG-8215A/8216A/8217A/8219A)
- Frequency Range: 0.5Hz ~ 5MHz (GFG-8250A/8255A)
- Waveforms: Sine, Triangle, Square,Ramp, TTL and CMOS Output
- External Voltage Controlled Frequency (VCF) Function
- Duty Cycle Control with Signal Inversion Capability
- Variable DC Offset Control
- Two-Steps (-20dBx2) and Variable attenuator
- Built-in 6 Digits Counter with INT/EXT Function up to 150MHz (Except GFG-8215A)
- LIN/LOG Sweep Mode (GFG-8217A/8219A/8255A)
- INT/EXT AM/FM Modulation (GFG-8219A/8255A)
- GCV Output for Synchronization (GFG-8219A/8255A)

SPECIFICATIONS

MODEL	GFG-8215A/8216A/8217A/8219A	GFG-8250A / 8255A
MAIN		
Frequency Range	0.3Hz ~ 3MHz (7 Range)	0.5Hz ~5MHz (7 Range)
Amplitude	> 10Vpp (into 50Ω load)	> 10Vpp (into 50Ω load)
Impedance	50Ω ± 10%	50Ω ± 10%
Attenuator	-20dB ± 1dB x 2	-20dB ± 1dB x 2
DC Offset	<-5V ~ >5V (into 50Ω load)	<-5V ~ >5V (into 50Ω load)
Duty Control	20% ~ 80%,maximum to 1MHz (continuously adjustable)	20% ~ 80%,maximum to 1MHz (continuously adjustable)
Display	6 digits LED display *GFG-8215A does not have a display	6 digits LED display
Range Accuracy	±5%+1Hz (at 3 positions) *only for GFG-8215A	
SINE WAVE		
Distortion THD	≤ 1%, 0.3Hz ~ 200kHz ≤ -35dB below fundamental in all range (MAX. to 1/10 level)	≤1%, 0.5Hz ~ 100kHz ≤-30dB below fundamental in all range (MAX. to 1/10 level)
Flatness	< 0.3dB, 0.3Hz ~ 300kHz < 0.5dB, 300kHz ~ 3MHz	≤0.3dB, below 500kHz ≤1dB, below 5MHz
TRIANGLE WAVE		
Linear	≥ 98%, 0.3Hz ~ 100kHz ≥ 95%, 100kHz ~ 3MHz	≥ 98%, 0.5Hz ~ 100kHz ≥ 95%, 100kHz ~ 5MHz
SQUARE WAVE		
Symmetry	± 2%, 0.3Hz ~ 100kHz	± 2%, 1Hz ~ 100kHz
Rise or Fall Time	≤ 100ns at maximum output (into 50Ω load)	≤ 50ns at maximum output (into 50Ω load)
CMOS OUTPUT		
Level	4Vpp±1Vpp ~ 14.5Vpp±0.5Vpp adjustable	4Vpp±1Vpp ~ 14.5Vpp±0.5Vpp adjustable
Rise or Fall Time	≤ 120ns	≤ 120ns
TTL OUTPUT		
Level	≥ 3Vpp	≥ 3Vpp
Fan Out	20 TTL load	20 TTL load
Rise or Fall Time	≤ 25ns	≤ 25ns
VCF (Voltage Controlled Frequency)		
Input Voltage	0V ~ 10V ±1V (100 : 1)	0V ~ 10V ±1V (100 : 1)
Input Impedance	10kΩ ±10%	10kΩ ±10%
GCV (Generator Controlled Voltage) (GFG-8219A/8255A)		
Output Voltage	sets the voltage between 0V ~ 2V	Sets the voltage between 0V ~ 2V
SWEEP OPERATION (GFG-8217A/8219A/8255A)		
Selection	Switch selector	Switch selector
Sweep/Rate	100 : 1 max, adjustable	100 : 1 max, adjustable
Sweep/Time	0.5sec. ~ 30sec. adjustable	0.5sec. ~ 30sec. adjustable
Sweep/Mode	Lin./Log. switch selector	Lin./Log. switch selector
AMPLITUDE MODULATION (GFG-8219A/8255A)		
Depth	0 ~ 100%	0 ~ 100%
MOD. Frequency	400Hz (INT), DC ~ 1MHz EXT	400Hz (INT), DC ~ 1MHz EXT
Carrier BW	100Hz ~ 3MHz (-3dB)	100Hz ~ 5MHz (-3dB)
EXT Sensitivity	≤ 10Vpp for 100% modulation	≤ 10Vpp for 100% modulation

SELECTION GUIDE

MODEL	GFG-8255A	GFG-8250A	GFG-8219A	GFG-8217A	GFG-8216A	GFG-8215A
DISPLAY	6 Digits LED Display					–
WAVEFORM	Sing , Square , Triangle					
FREQUENCY RANGE	5MHz	5MHz	3MHz	3MHz	3MHz	3MHz
LIN/LOG SWEEP	✓		✓	✓		
AM/FM MODULATION	✓		✓			
FREQUENCY COUNTER	✓	✓	✓	✓	✓	
VOLTAGE CONTROL FREQUENCY	✓	✓	✓	✓	✓	✓
GCV OUTPUT	✓		✓			
TTL/CMOS OUTPUT	✓	✓	✓	✓	✓	✓

GFG-8217A (3MHz)

CE

GFG-8215A (3MHz)

CE

SPECIFICATIONS

MODEL	GFG-8215A/8216A/8217A/8219A	GFG-8250A / 8255A
FREQUENCY MODULATION (GFG-8219A/8255A)		
Deviation	0 ~ ±5%	0 ~ ±5%
MOD. Frequency	400Hz(INT), DC ~ 20kHz(EXT)	400Hz (INT), DC ~ 20kHz(EXT)
EXT. Sensitivity	≤ 10Vpp for 10% modulation	≤ 10Vpp for 10% modulation
FREQUENCY COUNTER (GFG-8216A/8217A/8219A/8250A/8255A)		
INT/EXT	Switch selector	Switch selector
Range	0.3Hz ~ 3MHz (5Hz ~ 150MHz EXT)	0.5Hz ~ 5MHz (5Hz ~ 150MHz EXT)
Accuracy	Time base accuracy ±1 count	Time base accuracy ±1 count
Time Base	± 20ppm (23 °C±5 °C) after 30 minutes warm up	± 20ppm (23 °C±5 °C) after 30 minutes warm up
Resolution	100nHz for 1Hz 1Hz for 100MHz	100nHz for 1Hz 1Hz for 100MHz
Input Impedance	1MΩ // 150pF	1MΩ // 150pF
Sensitivity	≤ 35mVrms (5Hz ~ 100MHz) ≤ 45mVrms (100MHz ~ 150MHz)	≤ 35mVrms (5Hz ~ 100MHz) ≤ 45mVrms (100MHz ~ 150MHz)
POWER SOURCE		
	AC115V, 230V ±15%, 50 / 60Hz	AC115V, 230V ±15%, 50 / 60Hz
DIMENSION & WEIGHT		
	251(W) x 91(H) x 291(D)mm Approx. 2.0 kg (GFG-8215A) Approx. 2.1 kg (GFG-8216A) Approx. 2.15 kg (GFG-8217A) Approx. 2.2 kg (GFG-8219A)	251(W) x 91(H) x 291(D)mm Approx. 2.3 kg (GFG-8250A) Approx. 2.4 kg (GFG-8255A)

ORDERING INFORMATION

GFG-8255A 5MHz Function Generator With Counter, Sweep Mode & AM/FM Modulation
GFG-8250A 5MHz Function Generator With Counter
GFG-8219A 3MHz Function Generator With Counter, Sweep Mode & AM/FM Modulation
GFG-8217A 3MHz Function Generator With Counter & Sweep Mode
GFG-8216A 3MHz Function Generator With Counter
GFG-8215A 3MHz Function Generator

ACCESSORIES :

User manual x 1
Test lead GTL-101 x 2
Test lead GTL-101 x 1 (GFG-8215A)

OPTIONAL ACCESSORIES

GTL-110 BNC Cable, BNC(P/M)-BNC(P/M), 1000mm

2MHz Function Generator

GFG-8020H includes a CMOS output, a built-in 4-digit counter, a coarse/ fine tuning knob and an LED display.

Together with standard functions such as variable DC offset control, output load protection and VCF input, GFG-8020H is the most economical choice for both education and industry.

GFG-8020H (2MHz)

CE

FEATURES

* Frequency Range: 0.2Hz ~ 2MHz
* Coarse and Fine Tuning
* Waveform : Sine, Triangle, Square, TTL Pulse
* CMOS Output
* Built-in 4 Digits Counter(INT only)
* Large 0.5" LED Display
* Variable DC Offset Control
* Output Overload Protection
* VCF Input Function

SPECIFICATIONS

MAIN OUTPUT	
Waveforms	SINE, TRIANGLE, SQUARE, TTL pulse and CMOS output
Amplitude	>20Vp-p (open circuit) ; >10Vp-p (into 50Ω load)
Impedance	50Ω±10%
Attenuator	-20dB ± 1.0dB (at 1kHz)
DC Offset	<-10V to > +10V (<-5V to > +5V into 50Ω load)
Duty Control	1:1 to 10:1 continuously adjustable
Display	4 digits LED display
Frequency Range	0.2Hz to 2MHz 7 ranges
Frequency control	Separate coarse and fine tuning
SINE WAVE	
Distortion	<1% (0.2Hz ~ 20kHz), <2% (20kHz ~ 200kHz)
Frequency Response	<0.2dB (0.2Hz ~ 100kHz), <1dB (100kHz ~ 2MHz)
TRIANGLE WAVE	
Linear	98% 0.2Hz ~ 100kHz, 95% 100kHz ~ 2MHz
SQUARE WAVE	
Symmetry	<2%, 0.2Hz ~ 100kHz
Rise/Fall Time	<120ns
CMOS OUTPUT	
Level	(4Vp-p±1Vp-p) ~ (14.5Vp-p±0.5Vp-p) adjustable
Rise/Fall Time	<120ns
TTL OUTPUT	
Level	>3Vp-p
Rise/Fall Time	<30ns
VCF (Voltage Controlled Frequency)	
Input Voltage	Approx. 0V ~ 10V (±1V) input for 10:1 frequency ratio
Input Impedance	10kΩ ±10%
FREQUENCY COUNTER	
Mode	Internal only
Range	0.2Hz ~ 2MHz
Accuracy	Time base accuracy ±1Count
Time Base	Oscillation frequency 3.58MHz,Temp. stability ±20PPM (23°C±5°C)
Resolution	0.1Hz, 1Hz, 10Hz, 100Hz, 1kHz
POWER SOURCE	
AC100V/120V/220V/230V±10%, 50/60Hz	
DIMENSIONS & WEIGHT	
230(W) x 95(H) x 280(D) mm, Approx. 2.1kg	

ORDERING INFORMATION

GFG-8020H 2MHz Function Generator with 4 Digits LED Display, TTL/CMOS Output

ACCESSORIES :
User manual x 1, Power cord x 1, Test lead GTL-101 x 1

OPTIONAL ACCESSORIES

GTL-110 BNC Cable, BNC(P/M)-BNC(P/M), 1000mm

SPECIFIC APPLICATION SIGNAL SOURCES

SPECIFIC APPLICATION SIGNAL SOURCE OVERVIEW

GAG-809/810 provide a convenient solution for low frequency (< 1MHz) signal generation, specifically for audio bandwidth. Intuitive and simple panel interface provides quick frequency and amplitude adjustment, with dial/key shortcuts to different ranges. Square wave generation covers digital application in addition to the traditional analog using sine wave. Distortion is kept at minimum level, especially at the audible frequency range : 0.02% or less distortion factor for 500Hz~20kHz. The external synchronization signal input helps collaborate with other measurement devices.

The GWInstek USG-Series RF signal generator is a pocket-sized and USB interface compatible RF signal generator. It covers the frequency range from 35MHz ~ 4400MHz. The USG-Series provides continuous wave (CW) signal outputs without any signal modulation function.

The built-in electronic attenuator of the USG-Series allows an adjustable power range between -30dBm to 0dBm. The USG-Series has several operational modes including fixed frequency, frequency sweep, frequency hopping, and power sweep.

AUDIO GENERATOR

MODEL	Description (Main Function)	Page
GAG-809/810	Audio Generator	C39

RF SIGNAL GENERATOR

MODEL	Description (Main Function)	Page
USG-LF44	35MHz ~ 4400MHz RF Signal Generator	C40-41
USG-0103	100MHz ~ 300MHz RF Signal Generator	
USG-0818	800MHz ~ 1800MHz RF Signal Generator	
USG-2030	2000MHz ~ 3000MHz RF Signal Generator	
USG-3044	3000MHz ~ 4400MHz RF Signal Generator	

Audio Generator

GAG-809/810 provide a convenient solution for low frequency (< 1MHz) signal generation, specifically for audio bandwidth. Intuitive and simple panel interface provides quick frequency and amplitude adjustment, with dial/key shortcuts to different ranges. Square wave generation covers digital application in addition to the traditional analog using sine wave. Distortion is kept at minimum level, especially at the audible frequency range: 0.02% or less distortion factor for 500Hz~20kHz. The external synchronization signal input helps collaborate with other measurement devices.

GAG-809/810 (1MHz)

CE

FEATURES

* Frequency from 10Hz ~ 1MHz
* 0.02% Low Sine wave Distortion (GAG-810 Only)
* 6 Steps Output Attenuator
* EXT SYNC Function

SPECIFICATIONS	
SINE WAVE CHARACTERISTIC	
Frequency Range	10Hz ~ 1MHz, 5 Ranges
Frequency Indicator	Dial Scale
Frequency Accuracy	± 5% + 1Hz (at x10, x100)
Output Voltage	5 Vrms (600Ω load)
Frequency Response	10Hz ~ 1MHz±0.5dB(at 600Ω load) Reference Frequency (1kHz)
Distortion Factor	500Hz ~ 20kHz : ≤0.02% (GAG-809 : ≤0.1%) 100Hz ~ 100kHz : ≤0.05% (GAG-809 : ≤0.3%) (x 10 range for 100Hz, x 1k range for 100kHz) 50Hz ~ 200kHz : ≤0.3% 20Hz ~ 500kHz : ≤0.5% 10Hz ~ 1MHz : ≤ 1.5%
SQUARE WAVE	
Output Voltage	≥ 10Vpp (no load)
Overshoot	≤ 2% (at 1kHz, max output)
Rise & Fall Time	< 200ns
Duty Ratio	50%±5%
EXT. SYNCHRONIZATION	
Synchronizing Range	±1%/Vrms
Max. Allowable Input	15V (DC + AC peak)
Input Impedance	150k Ω
OUTPUT	
Output Impedance	600Ω
Output Attenuator	0, -10, -20, -30, -40, -50dB 6 ranges (accuracy ±1dB at 600Ω load)
POWER SOURCE	
AC 100/120/220/230V±10% , 50/60Hz	
DIMENSIONS & WEIGHT	
130(W) x 210(H)x292(D)mm , Approx 3 kg	

ORDERING INFORMATION

GAG-809 1MHz Audio Generator
GAG-810 1MHz Audio Generator with 0.02% Low Sine Wave Distortion

ACCESSORIES :
User Manual x 1, Power cord x 1, Test lead GTL-103 x 1

USG-Series

NEW

CE USB PC Software

FEATURES

* Frequency Range : 34.5MHz ~ 4400MHz
* Output Power Range : -30dBm ~ 0dBm
* Continuous Wave Signal Without any Modulation
* Support Fixed Frequency, Frequency Sweep, Frequency Hopping & Power Sweep Mode
* -107dBc/Hz Phase Noise@100kHz Offset
* Frequency Resolution : 10kHz
* PC USB Interface Powered and Controlled
* External PC Software Support Different Operating System

The GWInstek USG-Series RF signal generator is a pocket-sized and USB interface compatible RF signal generator. It covers the frequency range from 35MHz ~ 4400MHz. The USG-Series provides continuous wave (CW) signal outputs without any signal modulation function.
The built-in electronic attenuator of the USG-Series allows an adjustable power range between -30dBm to 0dBm. The USG-Series has several operational modes including fixed frequency, frequency sweep, frequency hopping, and power sweep.

A USG CD-ROM provides dedicated PC application programs, which were developed under JAVA software structure. This USG PC application program supports operating systems such as Windows 2000 /XP/Vista/7/8, Linux & Mac OS X through the USB interface.

Users can download USG APP to smart phone or tablet with Android 4.0 or above. To operate USG, use USB-OTG connecting cable to connect tablet (or smart phone) and USG. The Android APP application software for the USG signal generator is available on Google Play Store.

The USG signal generator can be designated as the tracking generator for GSP-730 spectrum analyzer to conduct measurement functions of scalar network analyzer. A USG CD-ROM provides PC application programs for the GSP-730 Primary RF software. Users can, using a Windows OS computer, control USG and GSP-730 via the Primary RF software.

SPECIFICATIONS

USG-LF44	USG-0103	USG-0818	USG-2030	USG-3044
FREQUENCY RANGE				
34.5 MHz ~ 4.4 GHz	100 MHz ~ 300 MHz	800 MHz ~ 1.8 GHz	2.0 GHz ~ 3.0 GHz	3.0 GHz ~ 4.4 GHz
OUTPUT POWER				
-30 dBm ~ 0 dBm, in 1 dB steps				
INTERNAL REFERENCE FREQUENCY				
25 MHz, aging ±1 ppm at first year				
FREQUENCY ACCURACY (0 dBm Output Level)				
± 100 Hz at 100MHz	± 100 Hz at 100MHz	± 800 Hz at 800MHz	± 2 kHz at 2GHz	± 3 kHz at 3GHz
FREQUENCY RESOLUTION				
10 kHz				
OUTPUT ISOLATION				
≦ -75 dBc , Output Control On/Off				
MODE CONTROL				
Fixed Frequency / Single Sweep / CW Sweep / Hopping / Power Sweep				
STEP DWELL				
≦1000 ms in 1 ms steps				
FREQUENCY OFFSET				
-50 kHz ~ 50 kHz in 10 kHz steps				
OUTPUT FLATNESS (0 dBm Output Level)				
-1 dBm ~ 3.5 dBm, typical	-1 dBm ~ -2 dBm, typical	-1 dBm ~ -0.5 dBm, typical	-1 dBm ~ -0.5 dBm, typical	-1 dBm ~ 3.5 dBm, typical
PHASE NOISE				
Carrier Frequency				
fc = 1.0 GHz	fc = 200 MHz	fc = 1.3 GHz	fc = 1.5 GHz	fc = 3.7 GHz
at 10kHz Offset Frequency				
< -97 dBc/Hz, typical -100 dBc/Hz	<-100 dBc/Hz, typical	< -97 dBc/Hz, typical	<- 93 dBc/Hz, typical	<- 88 dBc/Hz, typical
at 100kHz Offset Frequency				
< -107 dBc/Hz, typical -110 dBc/Hz	<-110 dBc/Hz, typical	<-102 dBc/Hz, typical	<- 100 dBc/Hz, typical	<- 94 dBc/Hz, typical
2ND HARMONICS (0 dB Attenuation)				
≦ -15 dBc, typical 34.5 MHz ~ 2.0 GHz ≦ -10 dBc, typical 2.0 GHz ~ 3.0 GHz ≦ -25 dBc, typical 3.0 GHz ~ 4.4 GHz	≦ -45 dBc, typical > 100 MHz	≦ -25 dBc, typical > 800 MHz	≦ -30 dBc, typical 2.0 GHz ~ 3.0 GHz	≦ -25 dBc, typical 3.0 GHz ~ 4.4 GHz
3rd HARMONICS (0 dB Attenuation)				
≦ -5 dBc, typical 34.5 MHz ~ 2 GHz ≦ -20 dBc, typical 2.0 GHz ~ 3.0 GHz ≦ -40 dBc, typical 3.0 GHz ~ 4.4 GHz	≦ -7 dBc typical ≦ 150 MHz ≦ -35 dBc, typical > 150 MHz	≦ -25 dBc, typical ≦ 900 MHz ≦ -35 dBc, typical > 900 MHz	≦ -55 dBc, typical 2.0 GHz ~ 3.0 GHz	≦ -40 dBc, typical 3.0 GHz ~ 4.4 GHz
SPURIOUS RELATED TO RESOLUTION SETTINGS				
≦ -30 dBc, typical, Resolution < 1MHz ≦ -65 dBc, typical, Resolution ≧ 1MHz				

ADP-003

50Ω N type (female) to SMA (female) Adapter
For: USG-Series

GTL-303

50Ω SMA RF cable (600mm)
For: USG-Series

SPECIFICATIONS				
USG-LF44	**USG-0103**	**USG-0818**	**USG-2030**	**USG-3044**
SPURIOUS RELATED TO THE FUNDAMENTAL OUTPUT				
≦ -60 dBc, typical	≦ -60 dBc, typical	≦ -65 dBc, typical	≦ -65 dBc, typical	≦ -65 dBc, typical
SUPPORTED OS				
Windows/Linux/Mac/Android				
INTERFACE				
USB 2.0				
USB CONNECTOR TYPE				
Mini B				
SUPPLY VOLTAGE				
5V nominal				
CURRENT CONSUMPTION				
200 mA				
RF CONNECTOR TYPE				
N-type male				
IMPEDANCE				
50 Ω nominal				
OUTPUT VSWR				
< 1.5 : 1 , Output Level @ -30 dBm				
MAXIMUM PERMISSIBLE DC VOLTAGE				
±25V				
MAXIMUM REVERSE POWER				
+30dBm (1W)				
ELECTROMAGNETIC COMPATIBILITY				
EN 55011 class A, EN 61326-1(industrial environment), EN 61326-2-1, EN 61000-4-2, EN 61000-4-3,EN 61000-4-11				
DIMENSIONS & WEIGHT				
30(W) x 103(H) x 30(D)mm; Approx. 100g				

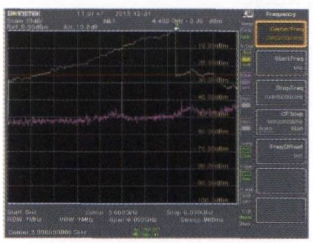
USG-LF44 35MHz ~ 4400MHz RF Signal Generator
USG-0103 100MHz ~ 300MHz RF Signal Generator
USG-0818 800MHz ~ 1800MHz RF Signal Generator
USG-2030 2000MHz ~ 3000MHz RF Signal Generator
USG-3044 3000MHz ~ 4400MHz RF Signal Generator

ACCESSORIES

USB cable, CD-ROM with USG software, GSP-730 PrimaryRF software and User manual
GTL-253 USB Cable, USB 2.0, A-mini B Type, 1400mm

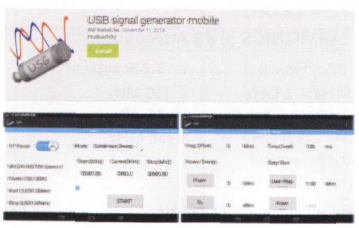
OPTIONAL ACCESSORIES

ADP-003 50Ω N type (female) to SMA (female) Adapter
GTL-303 50Ω SMA RF cable (600mm)

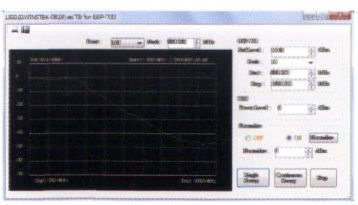


Test Result of Simultaneous Power Sweep and Frequency Sweep

Easy to Use Graphical Interface with Numeric Setting



USG Android APP



Test Result of Low Pass Filter with PrimaryRF Software

FAQ FOR SIGNAL SOURCES

Q1 **Why did you AFG have a twofold voltage value showed on the oscilloscope?**

A1 The output impedance of AFG is 50Ω and the preset (default) display output voltage of AFG connects with 50Ω load. The preset (default) input impedance of oscilloscope is 1MΩ ; therefore, a twofold voltage will occur. Users would be able to obtain the real voltage value by connecting a 50Ω Impedance Adaptor - GAK-003 with oscilloscope's input terminal or using a GDS-3000 Series oscilloscope, which has built-in 50Ω input impedance.
If users wish to obtain the voltage value the same as that of 1MΩ oscilloscopes when using the AFG-3081/3051/2225 and AFG-2100/2000/100/200 series AFG, select the load function display and switch 50Ω to the High Z mode.

Q2 **Why square waveforms produced by your AFG looked like sine waveforms from oscilloscope?**

A2 When outputting square waveforms under high frequency, square waveforms from oscilloscope will look like sine waveforms due to the limitation of rise time specification for square waveforms. For instance, the rise time of AFG-2225 square waveforms is 25ns. If square waveforms are 6MHz or higher, square waveforms will gradually look like sine waveforms. If users require high frequency square waveforms, the AFG-3000 series, with the rise time of 8ns, is the ideal choice. Connecting a 50 Ohm impedance adaptor—GAK-003 with oscilloscope's input terminal will allow oscilloscope to produce complete square waveforms. To achieve the same effect, users can select the GDS-3000 series, which has built-in 50 Ohm input impedance to avoid impedance matching problems.

Q3 **Why is the maximum frequency of a triangle wave less than that of sine and square waves for all DDS type function generators?**

A3 In order to have a straight charge and discharge curve in a triangle wave, the number of required data points is greater than that for sine and square waves. If less data points are used to create a triangle wave, low pass filtering will make the output look like a sine wave.

Q4 **In what kind of applications are DDS function generators better than conventional function generators? Why?**

A4 DDS FGs are better than conventional FGs in most applications. Because of the frequency stability and low distortion, DDS systems are more accurate signal sources. Only in a few cases do conventional function generators have better functionality like the creation of higher frequency triangle waves and external FM functions.

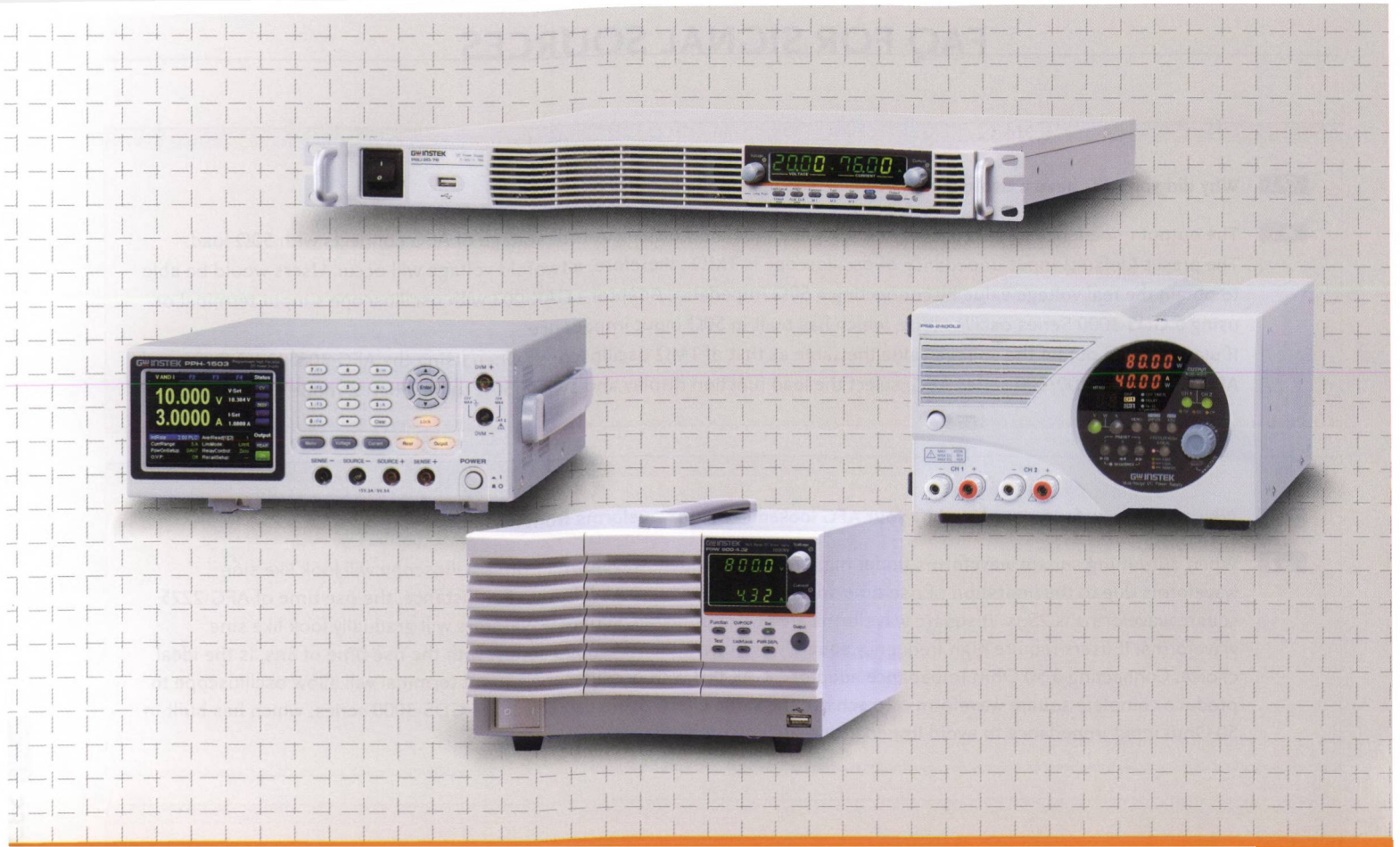
Q5 **What is the relationship between the sampling frequency and output frequency of an arbitrary waveform?**

A5 The relationship is as follows.
Where f_o is the output frequency, f_s is the sampling frequency and n_p is number of data points.

$$f_o = \frac{f_s}{n_p}$$

Q6 **Why is the duty cycle specification specified at the lowest output frequency rather than the maximum output frequency for all function generators?**

A6 If the duty cycle is set to a significant ratio, say 99:1 at 4 MHz, the 1% frequency of 4MHz will be much higher than 4MHz, thus it is beyond the frequency bandwidth. Therefore, the lower frequency limit of the duty cycle is specified.



DC POWER SUPPLIES

Stemming from the design and manufacture demands of electronic industries, GW Instek offers diverse power supply product lines to meet user's demand for a variety of applications. Based on different needs, the product lines can be divided into several categories including DC Power Supply, AC Power Source and DC Electronic Load.

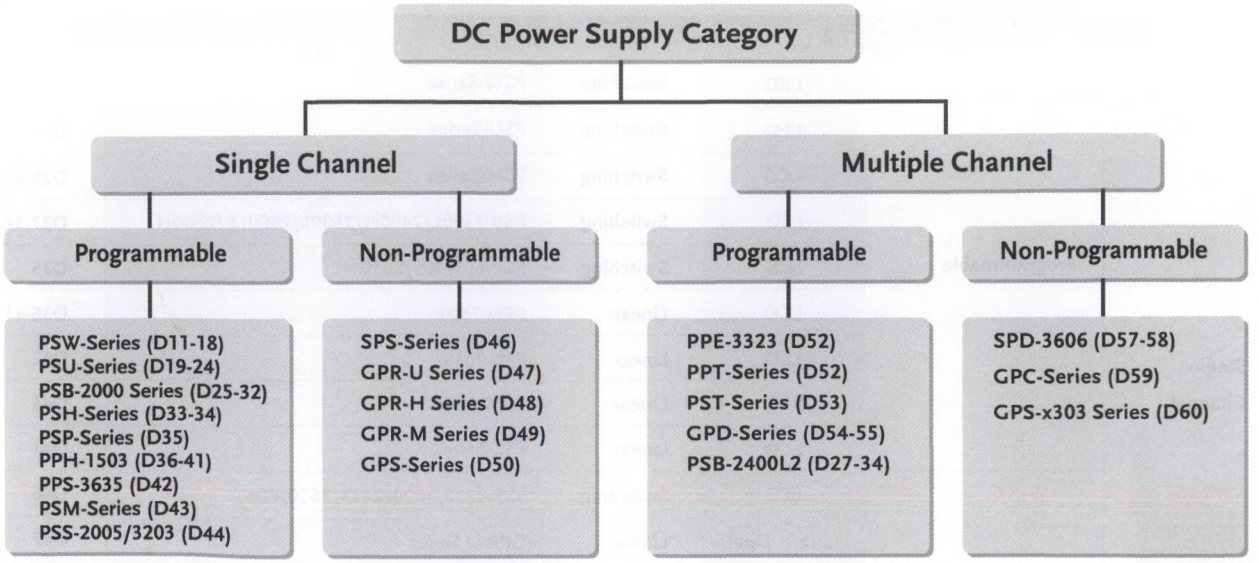
For DC Power Supply, the products can be briefly categorized by the following types, Programmable or Non-programmable, Single or Multiple Outputs, High Precision or Affordable Price, Dual Range and Wide Combinations of Voltage and Current, which can be selected to meet the application requirements.

GW Instek offers more than 100 power supply products are suitable for the requirements of Electronic Assembly Testing, Education, Component Testing, Wireless Product Testing, Burn-in, Battery-Power Product Testing Automotive, Aerospace industries and so on.

PRODUCTS

- **Programmable & Single Channel DC Power Supply**
- **Non-Programmable & Single Channel DC Power Supply**
- **Programmable & Multiple Channel DC Power Supply**
- **Non-Programmable & Multiple Channel DC Power Supply**

GENERAL SELECTION GUIDE OF POWER SUPPLY BY APPLICATION



Series	Education	R&D/ Research Lab	Production Testing	ATE for Production	Burn-IN	Page
PSW-Series		✓	✓	✓	✓	D11-18
PSU-Series		✓	✓	✓	✓	D19-24
PSB-2000 Series		✓	✓	✓	✓	D25-32
PSH-Series		✓	✓	✓	✓	D33-34
PSP-Series	✓	✓		✓		D35
PPH-1503		✓	✓		✓	D36-41
PPS-3635	✓	✓	✓	✓		D42
PSM-Series		✓	✓		✓	D43
PSS-Series		✓	✓	✓		D44
SPS-Series			✓	✓	✓	D46
GPR-U Series					✓	D47
GPR-H Series		✓	✓		✓	D48
GPR-M Series		✓	✓		✓	D49
GPS-Series	✓	✓	✓			D50
PPE-3323	✓	✓	✓	✓		D52
PPT-Series	✓	✓	✓	✓		D52
PST-Series	✓	✓	✓	✓		D53
GPD-Series	✓	✓	✓			D54-55
SPD-3606	✓	✓	✓		✓	D57-58
GPC-Series	✓	✓	✓			D59
GPS-x303 Series	✓	✓	✓			D60

GENERAL SELECTION GUIDE OF DC POWER SUPPLY BY FUNCTION

	Programmability	Display	Technic	Model	Page
Single Channel	Programmable	LED	Switching	PSW-Series	D11-18
		LED	Switching	PSU-Series	D19-24
		LCD	Switching	PSH-Series	D25-26
		LED	Switching	PSB-2400L/2400H/2800L/2800LS/2800H	D27-34
		LCD	Switching	PSP-603/405/2010	D35
		LCD	Linear	PPH-1503	D36-41
		LED	Linear	PPS-3635	D42
		VFD	Linear	PSM-Series	D43
		LCD	Linear	PSS-Series	D44
	Non-Programmable	LED	Switching	SPS-1230/1820/2415/3610/606	D46
		LED Dual	Linear	GPR-U Series	D47
		LED Dual	Linear	GPR-H Series	D48
		LED Dual	Linear	GPR-M Series	D49
		LED	Linear	GPS-1830D/1850D/3030D/3030DD	D50
		Analog	Linear	GPS-1850/3030	D50
Multiple Channel	Programmable	LED	Switching	PSB-2400L2	D27-34
		LED	Linear	PPE-3323	D52
		LED	Linear	PPT-1830/3615	D52
		LCD	Linear	PST-3201/3202	D53
		LED	Linear	GPD-2303S/3303S/4303S/3303D	D54-55
	Non-Programmable	LED	Switching	SPD-3606	D57-58
		LED Dual	Linear	GPC-1850D/3030D/3060D/6030D	D59
		LED Quad	Linear	GPC-3030DQ	D59
		LED Quad	Linear	GPS-2303/3303/4303	D60

GENERAL SELECTION GUIDE OF DC POWER SUPPLY BY TECHNIC

Technic	Channel	Programmability	Display		Model	Page
Switching	Single Channel	Programmable	LED		PSW-Series	D11-18
			LED		PSU-Series	D19-24
			LCD		PSH-Series	D25-26
			LED		PSB-2400L/2400H/2800L/2800LS/2800H	D27-34
			LCD		PSP-603/405/2010	D35
		Non-Programmable	LED		SPS-1230/1820/2415/3610/606	D46
	Multiple Channel	Programmable	LED		PSB-2400L2	D27-34
		Non-Programmable	LED		SPD-3606	D57
Linear	Single Channel	Programmable	LCD		PPH-1503	D36-41
			LED		PPS-3635	D42
			VFD		PSM-Series	D43
			LCD		PSS-Series	D44
		Non-Programmable	LED	Dual	GPR-U Series	D47
			LED	Dual	GPR-H Series	D48
			LED	Dual	GPR-M Series	D49
			LED		GPS-1830D/1850D/3030D/3030DD	D50
			Analog		GPS-1850/3030	D50
	Multiple Channel	Programmable	LED		PPE-3323	D52
			LED		PPT-1830/3615	D52
			LCD		PST-3201/3202	D53
			LED		GPD-2303S/3303S/4303S/3303D	D54-55
		Non-Programmable	LED	Dual	GPC-1850D/3030D/3060D/6030D	D59
			LED	Quad	GPC-3030DQ	D59
			LED	Quad	GPS-2303/3303/4303	D60

PROGRAMMABLE & SINGLE CHENNEL DC POWER SUPPLY

Voltage(V)	Current(A)	Power(W)	Model	Display	Technic	Remark	Page
6	200	1200	PSU 6-200	LED	Switching	USB/LAN/RS-232/RS-485/GPIB(Opt)	D19-24
8	20	200	PSM-2010	VFD	Linear	DUAL RANGE, RS-232/GPIB	D43
12.5	120	1500	PSU 12.5-120	LED	Switching	USB/LAN/RS-232/RS-485/GPIB(Opt)	D19-24
15	3	45	PPH-1503	LCD	Linear	9V/5A or 15V/3A, USB/LAN/GPIB	D36-41
15	7	120	PSM-3004	VFD	Linear	DUAL RANGE, RS-232/GPIB	D43
20	76	1520	PSU 20-76	LED	Switching	USB/LAN/RS-232/RS-485/GPIB(Opt)	D19-24
20	18	360	PSH-2018A	LCD	Switching	RS-232/GPIB(Opt)	D25-26
20	10	200	PSP-2010	LCD	Switching	RS-232	D35
20	10	200	PSM-2010	VFD	Linear	DUAL RANGE, RS-232/GPIB	D43
20	5	100	PSS-2005	LCD	Linear	RS-232/GPIB(Opt)	D44
30	36	360	PSW 30-36	LED	Switching	USB/LAN/USB-GPIB(Opt)	D11-18
30	72	720	PSW 30-72	LED	Switching	USB/LAN/USB-GPIB(Opt)	D11-18
30	108	1080	PSW 30-108	LED	Switching	USB/LAN/USB-GPIB(Opt)	D11-18
30	4	120	PSM-3004	VFD	Linear	DUAL RANGE, RS-232/GPIB	D43
30	6	200	PSM-6003	VFD	Linear	DUAL RANGE, RS-232/GPIB	D43
32	3	96	PSS-3203	LCD	Linear	RS-232/GPIB(Opt)	D44
36	10	360	PSH-3610A	LCD	Switching	RS-232/GPIB(Opt)	D25-26
36	20	720	PSH-3620A	LCD	Switching	RS-232/GPIB(Opt)	D25-26
36	30	1080	PSH-3630A	LCD	Switching	RS-232/GPIB(Opt)	D25-26
36	3.5	126	PPS-3635	LED	Linear	36V/3.5A, GPIB	D42
40	38	1520	PSU 40-38	LED	Switching	USB/LAN/RS-232/RS-485/GPIB(Opt)	D19-24
40	5	200	PSP405	LCD	Switching	RS-232	D35
60	3.5	200	PSP-603	LCD	Switching	RS-232	D35
60	3.3	200	PSM-6003	VFD	Linear	DUAL RANGE, RS-232/GPIB	D43
60	25	1500	PSU 60-25	LED	Switching	USB/LAN/RS-232/RS-485/GPIB(Opt)	D19-24
80	13.5	360	PSW 80-13.5	LED	Switching	USB/LAN/USB-GPIB(Opt)	D11-18
80	27	720	PSW 80-27	LED	Switching	USB/LAN/USB-GPIB(Opt)	D11-18
80	40.5	1080	PSW 80-40.5	LED	Switching	USB/LAN/USB-GPIB(Opt)	D11-18
80	40	400	PSB-2400L	LED	Switching	RS-232/USB/GPIB(Opt)	D27-34
80	80	800	PSB-2800L	LED	Switching	RS-232/USB/GPIB(Opt)	D27-34
80	80	800	PSB-2800LS	LED	Switching	RS-232/USB/GPIB(Opt)	D27-34
160	7.2	360	PSW 160-7.2	LED	Switching	USB/LAN/USB-GPIB(Opt)	D11-18
160	14.4	720	PSW 160-14.4	LED	Switching	USB/LAN/USB-GPIB(Opt)	D11-18
160	21.6	1080	PSW 160-21.6	LED	Switching	USB/LAN/USB-GPIB(Opt)	D11-18
250	4.5	360	PSW 250-4.5	LED	Switching	USB/LAN/USB-GPIB(Opt)	D11-18
250	9	720	PSW 250-9	LED	Switching	USB/LAN/USB-GPIB(Opt)	D11-18
250	13.5	1080	PSW 250-13.5	LED	Switching	USB/LAN/USB-GPIB(Opt)	D11-18
800	1.44	360	PSW 800-1.44	LED	Switching	USB/LAN/USB-GPIB(Opt)	D11-18
800	2.88	720	PSW 800-2.88	LED	Switching	USB/LAN/USB-GPIB(Opt)	D11-18
800	4.32	1080	PSW 800-4.32	LED	Switching	USB/LAN/USB-GPIB(Opt)	D11-18
800	3	400	PSB-2400H	LED	Switching	RS-232/USB/GPIB(Opt)	D27-34
800	6	800	PSB-2800H	LED	Switching	RS-232/USB/GPIB(Opt)	D27-34

NON-PROGRAMMABLE & SINGLE CHENNEL DC POWER SUPPLY

Voltage(V)	Current(A)	Power(W)	Model	Display	Technic	Remark	Page
8	30	240	GPR-0830HD	LED	Linear	Rear-Panel Output	D48
12	30	360	SPS-1230	LED	Switching	Rear-Panel Output	D46
18	3	54	GPS-1830D	LED	Linear	Rear-Panel Output	D50
18	5	90	GPS-1850D	LED	Linear		D50
18	5	90	GPS-1850	Analog	Linear		D50
18	10	180	GPR-1810HD	LED	Linear	Rear-Panel Output	D49
18	20	360	SPS-1820	LED	Switching	Rear-Panel Output	D46
18	20	360	GPR-1820HD	LED	Linear	Rear-Panel Output	D48
18	50	900	GPR-1850HD	LED	Linear	Rear-Panel Output	D47
24	15	360	SPS-2415	LED	Switching		D46
30	3	90	GPS-3030D	LED	Linear	Rear-Panel Output	D50
30	3	90	GPS-3030DD	LED	Linear		D50
30	3	90	GPS-3030	Analog	Linear		D50
30	6	180	GPR-3060D	LED	Linear	Rear-Panel Output	D49
35	10	350	GPR-3510HD	LED	Linear	Rear-Panel Output	D48
35	20	700	GPR-3520HD	LED	Linear		D47
36	10	360	SPS-3610	LED	Switching	Rear-Panel Output	D46
60	3	180	GPR-6030D	LED	Linear	Rear-Panel Output	D49
60	6	360	SPS-606	LED	Switching	Rear-Panel Output	D46
60	6	360	GPR-6060D	LED	Linear	Rear-Panel Output	D48
60	15	900	GPR-6015HD	LED	Linear	Rear-Panel Output	D47
75	5	375	GPR-7550D	LED	Linear	Rear-Panel Output	D48
75	10	750	GPR-7510HD	LED	Linear	Rear-Panel Output	D47
110	3	330	GPR-11H30D	LED	Linear	Rear-Panel Output	D48
160	5	800	GPR-16H50D	LED	Linear	Rear-Panel Output	D47
250	3	750	GPR-25H30D	LED	Linear	Rear-Panel Output	D47
300	1	300	GPR-30H10D	LED	Linear	Rear-Panel Output	D48
350	2	700	GPR-35H20D	LED	Linear	Rear-Panel Output	D47
500	1.5	750	GPR-50H15D	LED	Linear	Rear-Panel Output	D47
600	1.5	900	GPR-60H15D	LED	Linear	Rear-Panel Output	D47
1000	0.5	500	GPR-100H05D	LED	Linear	Rear-Panel Output	D47

PROGRAMMABLE & MULTIPLE CHENNEL DC POWER SUPPLY

Voltage(V)	Current(A)	Power (W)	Model	CH	Display	Technic	Remark	Page
18	3	138	PPT-1830	3	LED	Linear	18V/3A x 2, 6V/5A x 1 GPIB	D52
30	3	180	GPD-2303S	2	LED	Linear	30V/3A x 2 USB	D54-55
30	3	195	GPD-3303S	3	LED	Linear	30V/3A x 2 (2.5/3.3/5V)/3A x 1	D54-55
30	3	195	GPD-4303S	4	LED	Linear	30V/3A x 2 ; (5V/3A) or (5.0V~10V/1A) x 1 ; 5V/1A	D54-55
30	3	195	GPD-3303D	3	LED	Linear	30V/3A x 2 (2.5/3.3/5V)/3A x 1	D54
32	3	207	PPE-3323	3	LED	Linear	±32V/3A; -32V/-3A 3.3V(5V)/3A FIXED ; RS-232	D52
32	1	96	PST-3201	3	LCD	Linear	32V/1A x 3 RS-232/GPIB (Opt.)	D53
32	2	158	PST-3202	3	LCD	Linear	32V/2A x 2, 6V/5A x 1 RS-232/GPIB (Opt.)	D53
36	1.5	126	PPT-3615	3	LED	Linear	36V/1.5A x 2 6V/3A x1; GPIB	D52
80	40	800	PSB-2400L2	2	LED	Switching	RS-232/USB/GPIB (Opt.)	D27-34

NON-PROGRAMMABLE & MULTIPLE CHENNEL DC POWER SUPPLY

Voltage(V)	Current(A)	Power (W)	Model	CH	Display	Technic	Remark	Page
18	5	195	GPC-1850D	3	LED	Linear	18V/5A x 2 ; 5V/3A x 1	D59
30	6	375	SPD-3606	3	LED	Switching	DUAL RANGE	D57-58
30	3	195	GPC-3030D	3	LED	Linear	GE30V/3A x 2 ; 5V/3A x 1	D59
30	6	375	GPC-3060D	3	LED	Linear	30V/6A x 2 ; 5V/3A x 1	D59
30	3	195	GPC-3030DQ	3	LED	Linear	30V/3A x 2 ; 5V/3A x 1	D59
30	3	180	GPS-2303	3	LED	Linear	30V/3A x 2	D60
30	3	195	GPS-3303	3	LED	Linear	30V/3A x 2 ; 5V/3A x 1	D60
30	3	200	GPS-4303	4	LED	Linear	30V/3A x 2 ; 5V/1A x 1 ; 15V/1A x 1	D60
60	3	375	SPD-3606	3	LED	Switching	DUAL RANGE	D57-58
60	3	375	GPC-6030D	3	LED	Linear	60V/3A x 2 ; 5V/3A x 1	D59

PROGRAMMABLE & SINGLE CHANNEL DC POWER SUPPLIES

GW Instek provides 200W~1520W modular type Programmable & Single Channel DC Power Supplies designed to fit into various applications with different power ranges. Some of the products can output up to 9.45kW via series or parallel connections. GW Instek Programmable DC Power Supplies are designed to meet most engineers' requirements with high resolution and safety protection. SCPI command sets and LabVIEW drivers are also provided to facilitate development of ATE software.

PROGRAMMABLE SWITCHING MULTI-RANGE DC POWER SUPPLY (Single Output, Output Power : 360W~1080W)

	Model	Output Voltage (V)	Output Current (A)	Power (W)	Weight(kg)	Page
LED Display	PSW 30-36	0~30	0~36	360	3	D11-18
	PSW 30-72	0~30	0~72	720	5	
	PSW 30-108	0~30	0~108	1080	7	
	PSW 80-13.5	0~80	0~13.5	360	3	
	PSW 80-27	0~80	0~27	720	5	
	PSW 80-40.5	0~80	0~40.5	1080	7	
	PSW 160-7.2	0~160	0~7.2	360	3	
	PSW 160-14.4	0~160	0~14.4	720	5	
	PSW 160-21.6	0~160	0~21.6	1080	7	
	PSW 250-4.5	0~250	0~4.5	360	3	
	PSW 250-9	0~250	0~9	720	5	
	PSW 250-13.5	0~250	0~13.5	1080	7	
	PSW 800-1.44	0~800	0~1.44	360	3	
	PSW 800-2.88	0~800	0~2.88	720	5	
	PSW 800-4.32	0~800	0~4.32	1080	7	

1U-TYPE PROGRAMMABLE SWITCHING DC POWER SUPPLY (Single Output, Output Power : 1200W~1520W)

	Model	Output Voltage (V)	Output Current (A)	Power (W)	Weight(kg)	Page
LED Display	PSU 6-200	0 ~ 6	0 ~ 200	1200	8.7	D19-24
	PSU 12.5-120	0 ~ 12.5	0 ~ 120	1500	8.7	
	PSU 20-76	0 ~ 20	0 ~ 76	1520	8.7	
	PSU 40-38	0 ~ 40	0 ~ 38	1520	8.7	
	PSU 60-25	0 ~ 60	0 ~ 25	1500	8.7	

PROGRAMMABLE SWITCHING DC POWER SUPPLY (Multi-range DC Power Supply)

	Model	Output Voltage (V)	Output Current (A)	Power (W)	Weight(kg)	Page
LED Display	PSB-2400L	0 ~ 80	0 ~ 40	400	5	D25-32
	PSB-2800L	0 ~ 80	0 ~ 80	800	7	
	PSB-2400L2	0 ~ 80 x 2CH	0 ~ 40 x 2CH	400 x 2CH	7	
	PSB-2400H	0 ~ 800	0 ~ 3	400	5	
	PSB-2800H	0 ~ 800	0 ~ 6	800	6	
	PSB-2800LS	0 ~ 80	0 ~ 80	800	7	

PROGRAMMABLE SWITCHING DC POWER SUPPLY (Single Output, Output Power : 360W~1080W)

	Model	Output Voltage (V)	Output Current (A)	Power (W)	Weight(kg)	Page
LCD Display	PSH-2018A	0 ~ 20	0 ~ 18	360	3.3	D33-34
	PSH-3610A	0 ~ 36	0 ~ 10	360	3.3	
	PSH-3620A	0 ~ 36	0 ~ 20	720	6.2	
	PSH-3630A	0 ~ 36	0 ~ 30	1080	9.3	

PROGRAMMABLE SWITCHING DC POWER SUPPLY (Single Output, Output Power : 200W)

	Model	Output Voltage (V)	Output Current (A)	Power(W)	Weight(kg)	Page
LCD Display	PSP-2010	0 ~ 20	0 ~ 10	200	4	D35
	PSP-405	0 ~ 40	0 ~ 5	200	4	
	PSP-603	0 ~ 60	0 ~ 3.5	200	4	

PROGRAMMABLE LINEAR DC POWER SUPPLY

	Model	Output Voltage (V)	Output Current (A)	Power(W)	Display Type	Weight(kg)	Page
LED Display	PPH-1503	Dual range : 9/15	Dual range : 5/3	45	LCD	4.2	D36-41
	PPS-3635	0 ~ 36	0 ~ 3.5	126	LED	9.5	D42
	PSM-2010	Dual Range : 8/20	Dual Range : 20/10	200	VFD	10	D43
	PSM-3004	Dual Range : 15/30	Dual Range : 7/4	120	VFD	10	D43
	PSM-6003	Dual Range : 30/60	Dual Range : 6/3.3	200	VFD	10	D43
	PSS-2005	0 ~ 20	0 ~ 5	100	LCD	4.8	D44
	PSS-3203	0 ~ 32	0 ~ 3	96	LCD	4.8	D44

Programmable Switching D.C. Power Supply (Multi-Range D.C. Power Supply)

PSW-Series

CE | GPIB | USB | LabVIEW Driver | Analog Control | LAN

FEATURES

* Voltage Rating : 30V/80V/160V/250V/800V, Output Power Rating : 360W~1080W
* Constant Power Output for Multi-Range (V & I) Operation
* C.V / C.C Priority ; Particularly Suitable for the Battery and LED Industry
* Adjustable Slew Rate
* Series Operation(2 units in Series)for(30V/80V/160V), Parallel Operation(3 units in Parallel) for (30V/80V/160V/250V/800V)
* High Efficiency and High Power Density
* 1/2, 1/3, 1/6 Rack Mount Size Design (EIA/JIS Standard) for 360W, 720W, 1080W
* Standard Interface : LAN, USB, Analog Control Interface
* Optional Interface : GPIB-USB Adaptor
* LabVIEW Driver

PSW 80-40.5 (0~80V, 0~40.5A, 1080W)

PSW 160-7.2 (0~160V, 0~7.2A, 360W)

PSW 80-13.5 (0~80V, 0~13.5A, 360W)

The PSW-Series is a single-output multi-range programmable switching DC Power Supply covering a power range up to 1080W. This series of products include fifteen models with the combination of 30V, 80V, 160V, 250V and 800V rated voltages and 360W, 720W and 1080W maximum output powers. The multi-range feature allows the flexible and efficient configuration of voltage and current within the rated power range. As the PSW-Series can be connected in series for maximum 2 units or in parallel for maximum 3 units, the capability of connecting multiple PSW-Series units for higher voltage or higher current output provides a broad coverage of applications. With the flexibility of multi-range power utilization and series/parallel connection, the PSW-Series significantly reduces the users' cost for various power supply products to accommodate the projects with different power requirements.

The C.V/C.C priority selection of the PSW-Series is a very useful feature for DUT protection. The conventional power supply normally operates under C.V mode when the power output is turned on. This could bring a high inrush current to the capacitive load or current-intensive load at the power output-on stage. Taking the I-V curve verification of LED as an example, it becomes a very challenging task to perform this measurement using a conventional power supply. With LED connected to a power supply under C.V mode as the initial setting, when the power output is turned on and the voltage rises to the LED forward voltage, the current will suddenly peak up and exceed the preset value of current limit. Upon detecting this high current, the power supply starts the transition from C.V mode to C.C mode. Though the current becomes stable after the C.C mode being activated, the current spike occurred at the C.V and C.C crossover point may possibly damage the DUT. At the power output-on stage, the PSW-Series is able to operate under C.C priority to limit the current spike occurred at the threshold voltage and therefore protects DUT from the inrush current damage.

The adjustable slew rate of the PSW-Series allows users to set for either output voltage or output current, a specific rise time from low to high level transition, and a specific fall time from high to low level transition. This facilitates the characteristic verification of a DUT during voltage or current level changes with controllable slew rates. Most manufacturing tests of lighting device or large capacitor during power output-on are associated with the occurrence of high surge current, which can greatly reduce the life time of the DUT. To prevent inrush current from damaging current-intensive devices, a smooth and slow voltage transition during power On-Off can significantly reduce the spike current and protect the device from high current damage.

The OVP and OCP are provided with the PSW-Series. Both OVP and OCP levels can be selected, with default level set at 110%, of the rated voltage/current of the power supply. When any of the protection levels is tripped, the power output will be switched off to protect the DUT. The PSW-Series provides USB Host/Device and LAN interfaces as standard and GPIB-USB adaptor as optional. The LabView driver and the Data Logging PC software are supported on all the available interfaces. An analog control/monitoring connector is also available on the rear panel for external control of power On/Off and external monitoring of power output Voltage and Current.

PARALLEL OPERATION (3 UNITS)

MODEL	SINGLE UNIT	2 UNITS	3 UNITS
PSW 30-36	30V/36A	30V/72A	30V/108A
PSW 30-72	30V/72A	30V/144A	30V/216A
PSW 30-108	30V/108A	30V/216A	30V/324A
PSW 80-13.5	80V/13.5A	80V/27A	80V/40.5A
PSW 80-27	80V/27A	80V/54A	80V/81A
PSW 80-40.5	80V/40.5A	80V/81A	80V/121.5A
PSW 160-7.2	160V/7.2A	160V/14.4A	160V/21.6A
PSW 160-14.4	160V/14.4A	160V/28.8A	160V/43.2A
PSW 160-21.6	160V/21.6A	160V/43.2A	160V/64.8A
PSW 250-4.5	250V/4.5A	250V/9A	250V/13.5A
PSW 250-9	250V/9A	250V/18A	250V/27A
PSW 250-13.5	250V/13.5A	250V/27A	250V/40.5A
PSW 800-1.44	800V/1.44A	800V/2.88A	800V/4.32A
PSW 800-2.88	800V/2.88A	800V/5.76A	800V/8.64A
PSW 800-4.32	800V/4.32A	800V/8.64A	800V/12.96A

SERIES OPERATION (2 UNITS)

MODEL	SINGLE UNIT	2 UNITS
PSW 30-36	30V/36A	60V/36A
PSW 30-72	30V/72A	60V/72A
PSW 30-108	30V/108A	60V/108A
PSW 80-13.5	80V/13.5A	160V/13.5A
PSW 80-27	80V/27A	160V/27A
PSW 80-40.5	80V/40.5A	160V/40.5A
PSW 160-7.2	160V/7.2A	320V/7.2A
PSW 160-14.4	160V/14.4A	320V/14.4A
PSW 160-21.6	160V/21.6A	320V/21.6A
PSW 250-4.5	N/A	N/A
PSW 250-9	N/A	N/A
PSW 250-13.5	N/A	N/A
PSW 800-1.44	N/A	N/A
PSW 800-2.88	N/A	N/A
PSW 800-4.32	N/A	N/A

SPECIFICATIONS

	PSW 30-36	PSW 30-72	PSW 30-108	PSW 80-13.5	PSW 80-27	PSW 80-40.5	PSW 160-7.2	PSW 160-14.4	PSW 160-21.6
OUTPUT RATING									
Voltage	0 ~ 30V	0 ~ 30V	0 ~ 30V	0 ~ 80V	0 ~ 80V	0 ~ 80V	0 ~ 160V	0 ~ 160V	0 ~ 160V
Current	0 ~ 36A	0 ~ 72A	0 ~ 108A	0 ~ 13.5A	0 ~ 27A	0 ~ 40.5A	0 ~ 7.2A	0 ~ 14.4A	0 ~ 21.6A
Power	360W	720W	1080W	360W	720W	1080W	360W	720W	1080W
REGULATION(CV)									
Load	20mV	20mV	20mV	45mV	45mV	45mV	85mV	85mV	85mV
Line	18mV	18mV	18mV	43mV	43mV	43mV	83mV	83mV	83mV
REGULATION(CC)									
Load	41mA	77mA	113mA	18.5mA	32mA	45.5mA	12.2mA	19.4mA	26.6mA
Line	41mA	77mA	113mA	18.5mA	32mA	45.5mA	12.2mA	19.4mA	26.6mA
RIPPLE & NOISE (Noise Bandwidth 20MHz; Ripple Bandwidth=1MHz)									
CV p-p	60mV	80mV	100mV	60mV	80mV	100mV	60mV	80mV	100mV
CV rms	7mV	11mV	14mV	7mV	11mV	14mV	12mV	15mV	20mV
CC rms	72mA	144mA	216mA	27mA	54mA	81mA	15mA	30mA	45mA
PROGRAMMING ACCURACY									
Voltage	0.1% +10mV	0.1% +10mV	0.1% +10mV	0.1% +10mV	0.1% +10mV	0.1% +10mV	0.1% +100mV	0.1% +100mV	0.1% +100mV
Current	0.1% + 30mA	0.1% + 60mA	0.1% + 100mA	0.1% + 10mA	0.1% + 30mA	0.1% + 40mA	0.1% + 5mA	0.1% +15mA	0.1% +20mA
MEASUREMENT ACCURACY									
Voltage	0.1% +10mV	0.1% +10mV	0.1% +10mV	0.1% +10mV	0.1% +10mV	0.1% +10mV	0.1% +100mV	0.1% +100mV	0.1% +100mV
Current	0.1% +30mA	0.1% +60mA	0.1% +100mA	0.1% +10mA	0.1% +30mA	0.1% +40mA	0.1% +5mA	0.1% +15mA	0.1% +20mA
RESPONSE TIME									
Raise Time	50ms	50ms	50ms	50ms	50ms	50ms	100ms	100ms	100ms
Fall Time(Full Load)	50ms	50ms	50ms	50ms	50ms	50ms	100ms	100ms	100ms
Fall Time(No Load)	500ms	500ms	500ms	500ms	500ms	500ms	1000ms	1000ms	1000ms
Load Transient Recover Time (Load change from 50~100%)	1ms	1ms	1ms	1ms	1ms	1ms	2ms	2ms	2ms
PROGRAMMING RESOLUTION (By PC Remote Control Mode)									
Voltage	1mV	1mV	1mV	2mV	2mV	2mV	3mV	3mV	3mV
Current	1mA	2mA	3mA	1mA	2mA	3mA	1mA	2mA	3mA
MEASUREMENT RESOLUTION (By PC Remote Control Mode)									
Voltage	1mV	1mV	1mV	2mV	2mV	2mV	3mV	3mV	3mV
Current	1mA	2mA	3mA	1mA	2mA	3mA	1mA	2mA	3mA
SERIES AND PARALLEL CAPABILITY									
Parallel Operation	Up to 3 units including the master unit								
Series Operation	Up to 2 units including the master unit								
PROTECTION FUNCTION									
OVP	3 ~ 33V	3 ~ 33V	3 ~ 33V	8 ~ 88V	8 ~ 88V	8 ~ 88V	16~ 176V	16 ~ 176V	16 ~ 176V
OCP	3.6 ~ 39.6A	5 ~ 79.2A	5 ~ 118.8A	1.35 ~ 14.85A	2.7 ~ 29.7A	4.05 ~ 44.55A	0.72 ~ 7.92A	1.44 ~ 15.84A	2.16 ~ 23.76A
OHP	Activated by elecated internal temperatures								
FRONT PANEL DISPLAY ACCURACY, 4 digits									
Voltage	0.1%±20mV	0.1%±20mV	0.1%±20mV	0.1%±20mV	0.1%±20mV	0.1%±20mV	0.1%±100mV	0.1%±100mV	0.1%±100mV
Current	0.1%±40mA	0.1%±70mA	0.1%±100mA	0.1%±20mA	0.1%±40mA	0.1%±50mA	0.1%±5mA	0.1%±30mA	0.1%±30mA
ENVIRONMENT CONDITION									
Operation Temp	0℃ ~ 50 ℃								
Storage Temp	-25℃ ~ 70 ℃								
Operating Humidity	20% ~ 85% RH; No condensation								
Storage Humidity	90% RH or Less; No condensation								
READ BACK TEMP COEFFICIENT									
Voltage	100ppm/℃ of rated output voltage : after a 30 minute warm-up								
Current	200ppm/℃ of rated output current : after a 30 minute warm-up								
OTHER									
Analog Control	Yes								
Interface	USB/LAN/GPIB(Option)								
Fan	With thermal sensing control								
POWER SOURCE	85VAC~265VAC, 47~63Hz, single phase								
DIMENSIONS & WEIGHT	71(W)x124(H) x350(D) mm ; Approx. 3kg	142(W)x124(H) x350(D)mm ; Approx. 5.3kg	214(W)x124(H) x350(D) mm ; Approx. 7.5kg	71(W)x124(H) x350(D) mm ; Approx. 3kg	142(W)x124(H) x350(D) mm ; Approx. 5.3kg	214(W)x124(H) x350(D) mm ; Approx. 7.5kg	71(W)x124(H) x350(D) mm ; Approx. 3kg	142(W)x124(H) x350(D) mm ; Approx. 5.3kg	214(W)x124(H) x350(D) mm ; Approx. 7.5kg

Programmable Switching D.C. Power Supply (Multi-Range D.C. Power Supply)

SPECIFICATIONS	PSW 250-4.5	PSW 250-9	PSW 250-13.5	PSW 800-1.44	PSW 800-2.88	PSW 800-4.32
OUTPUT RATING						
Voltage Current Power	0 ~ 250V 0 ~ 4.5A 360W	0 ~ 250V 0 ~ 9A 720W	0 ~ 250V 0 ~ 13.5A 1080W	0 ~ 800V 0 ~ 1.44A 360W	0 ~ 800V 0 ~ 2.88A 720W	0 ~ 800V 0 ~ 4.32A 1080W
REGULATION(CV)						
Load Line	130mV 128mV	130mV 128mV	130mV 128mV	405mV 403mV	405mV 403mV	405mV 403mV
REGULATION(CC)						
Load Line	9.5mA 9.5mA	14mA 14mA	18.5mA 18.5mA	6.44mA 6.44mA	7.88mA 7.88mA	9.32mA 9.32mA
RIPPLE & NOISE (Noise Bandwidth 20MHz; Ripple Bandwidth=1MHz)						
CV p-p CV rms CC rms	80mV 15mV 10mA	100mV 15mV 20mA	120mV 15mV 30mA	150mV 30mV 5mA	200mV 30mV 10mA	200mV 30mV 15mA
PROGRAMMING ACCURACY						
Voltage Current	0.1%+200mV 0.1%+5mA	0.1%+200mV 0.1%+10mA	0.1%+200mV 0.1%+15mA	0.1%+400mV 0.1%+2mA	0.1%+400mV 0.1%+4mA	0.1%+400mV 0.1%+6mA
MEASUREMENT ACCURACY						
Voltage Current	0.1%+200mV 0.1%+5mA	0.1%+200mV 0.1%+10mA	0.1%+200mV 0.1%+15mA	0.1%+400mV 0.1%+2mA	0.1%+400mV 0.1%+4mA	0.1%+400mV 0.1%+6mA
RESPONSE TIME						
Raise Time Fall Time(Full Load) Fall Time(No Load) Load Transient Recover Time (Load change from 50~100%)	100ms 150ms 1200ms 2ms	100ms 150ms 1200ms 2ms	100ms 150ms 1200ms 2ms	150ms 300ms 2000ms 2ms	150ms 300ms 2000ms 2ms	150ms 300ms 2000ms 2ms
PROGRAMMING RESOLUTION (By PC Remote Control Mode)						
Voltage Current	5mV 1mA	5mV 1mA	5mV 1mA	14mV 1mA	14mV 1mA	14mV 1mA
MEASUREMENT RESOLUTION (By PC Remote Control Mode)						
Voltage Current	5mV 1mA	5mV 1mA	5mV 1mA	14mV 1mA	14mV 1mA	14mV 1mA
SERIES AND PARALLEL CAPABILITY						
Parallel Operation Series Operation	3 N/A	3 N/A	3 N/A	3 N/A	3 N/A	3 N/A
PROTECTION FUNCTION						
OVP OCP	20 ~ 275V 0.45 ~ 4.95A	20 ~ 275V 0.9 ~ 9.9A	20 ~ 275V 1.35 ~ 14.85A	20 ~ 880V 0.144 ~ 1.584A	20 ~ 880V 0.288 ~ 3.168A	20 ~ 880V 0.432 ~ 4.752
OHP	Activated by elecated internal temperatures					
FRONT PANEL DISPLAY ACCURACY (4 digits)						
Voltage Current	0.1%±200mV 0.1%±5mA	0.1%±200mV 0.1%±10mA	0.1%±200mV 0.1%±20mA	0.1%±400mV 0.1%±2mA	0.1%±400mV 0.1%±4mA	0.1%±400mV 0.1%±6mA
ENVIRONMENT CONDITION						
Operation Temp Storage Temp Operating Humidity Storage Humidity	0℃ ~ 50 ℃ -25℃ ~ 70 ℃ 20% ~ 85% RH; No condensation 90% RH or Less; No condensation					
READ BACK TEMP COEFFICIENT						
Voltage Current	100ppm/℃ of rated output voltage : after a 30 minute warm-up 200ppm/℃ of rated output current : after a 30 minute warm-up					
OTHER						
Analog Control Interface Fan POWER SOURCE	Yes USB/LAN/GPIB(Option) With thermal sensing control 85VAC~265VAC, 47~63Hz, single phase					
DIMENSIONS & WEIGHT	71(W)x124(H) x350(D) mm ; Approx. 3kg	142(W)x124(H) x350(D)mm ; Approx. 5.3kg	214(W)x124(H) x350(D) mm ; Approx. 7.5kg	71(W)x124(H) x350(D) mm ; Approx. 3kg	142(W)x124(H) x350(D) mm ; Approx. 5.3kg	214(W)x124(H) x350(D) mm ; Approx. 7.5kg

PSW-Series

PSW-Series (LV) Rear Panel

PSW-Series (HV) Rear Panel

ORDERING INFORMATION

PSW 30-36	(0~30V/0~36A/360W) Multi-Range DC Power Supply
PSW 30-72	(0~30V/0~72A/720W) Multi-Range DC Power Supply
PSW 30-108	(0~30V/0~108A/1080W) Multi-Range DC Power Supply
PSW 80-13.5	(0~80V/0~13.5A/360W) Multi-Range DC Power Supply
PSW 80-27	(0~80V/0~27A/720W) Multi-Range DC Power Supply
PSW 80-40.5	(0~80V/0~40.5A/1080W) Multi-Range DC Power Supply
PSW 160-7.2	(0~160V/0~7.2A/360W) Multi-Range DC Power Supply
PSW 160-14.4	(0~160V/0~14.4A/720W) Multi-Range DC Power Supply
PSW 160-21.6	(0~160V/0~21.6A/1080W) Multi-Range DC Power Supply
PSW 250-4.5	(0~250V/0~4.5A/360W) Multi-Range DC Power Supply
PSW 250-9	(0~250V/0~9A/720W) Multi-Range DC Power Supply
PSW 250-13.5	(0~250V/0~13.5A/1080W) Multi-Range DC Power Supply
PSW 800-1.44	(0~800V/0~1.44A/360W) Multi-Range DC Power Supply
PSW 800-2.88	(0~800V/0~2.88A/720W) Multi-Range DC Power Supply
PSW 800-4.32	(0~800V/0~4.32A/1080W) Multi-Range DC Power Supply

ACCESSORIES

CD-ROM x 1(Programming Manual, User Manual),
GTL-123 Test Lead x 1 (for PSW 30V/80V/160V),
Power Cord x 1(Region dependent), GTL-240 USB Cable " L " Type x 1,
PSW-004 Basic Accessories Kit x 1(for PSW 30V/80V/160V),
Includes : M4 Terminal screws and washers x 2, Air Filter x 1,
Analog control protection dummy x 1, Analog control lock lever x 1,
M8 terminal bolts, nuts and washers x 2,
PSW-008 Basic Accessories kit for PSW 250V/800V models
PSW-009 Output terminal cover for 30V/80V/160V models
PSW-011 Output terminal cover for 250V/800V models
PSW-012 High voltage output terminal for 250V/800V model

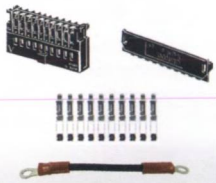
OPTIONAL ACCESSORIES

PSW-001	Accessory Kit
PSW-002	Simple IDC Tool
PSW-003	Contact Removal Tool
PSW-005	Cable for 2 Units of PSW-Series in Series Mode Connection(for PSW 30V/80V/160V)
PSW-006	Cable for 2 Units of PSW-Series in Parallel Mode Connection
PSW-007	Cable for 3 Units of PSW-Series in Parallel Mode Connection
GUG-001	GPIB to USB Adaptor
GRA-410-J	Rack Mount Kit (JIS)
GRA-410-E	Rack Mount Kit (EIA)
GET-001	Extended Terminal(for PSW 30V/80V/160V)
GET-002	Extended Terminal(for PSW 250V/800V)
GTL-130	Test lead : 2 x red, 2 x black(for PSW 250V/800V)
PSW-010	Large filter (Type II/III)
GTL-248	GPIB Cable, Double Shielded, 2000mm
GTL-250	GPIB Cable, Double Shielded, 600mm
GTL-251	USB-GPIB Adapter, GPIB-USB-HS, USB 2.0, Hi-Speed USB compliance, 2000mm

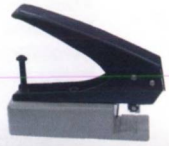
GUG-001 GPIB to USB Adapter

For: GDS-3000Series, PSW-Series

PSW-001 Accessory Kit



PSW-002 Simple IDC Tool



GET-001 Extended Terminal (for PSW 30V/80V/160V)

GET-002 Extended Terminal (for PSW 250V/800V)

PSW-003 Contact Removal Tool

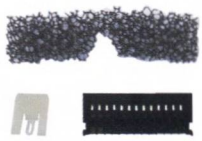
PSW-005 Cable for 2 Units of PSW-Series in Series Mode Connection (for PSW 30V/80V/160V)

PSW-006 Cable for 2 Units of PSW-Series in Parallel Mode Cconnection

PSW-007 Cable for 3 Units of PSW-Series in Parallel Mode Connection

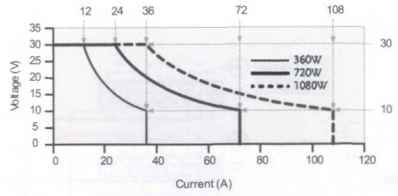
PSW-004 Basic Accessories Kit x 1 (for PSW 30V/80V/160V)

PSW-008 Basic Accessories Kit (for PSW 250V/800V)

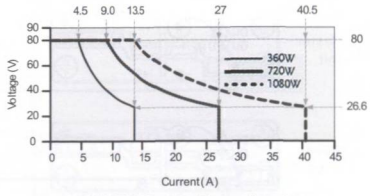


GTL-130 Test lead, 1200mm, 18AWG, UL 3239 (for PSW 250V/800V)

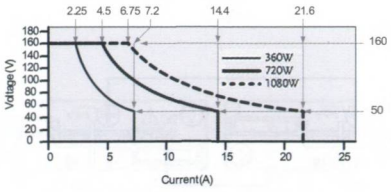
A. MULTI-RANGE OPERATION



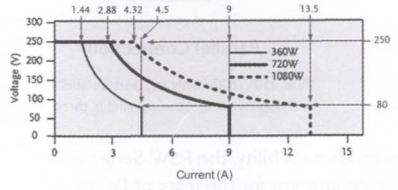
PSW 30V Series Operating Area



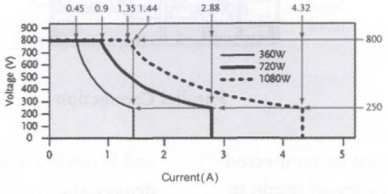
PSW 80V Series Operating Area



PSW 160V Series Operating Area



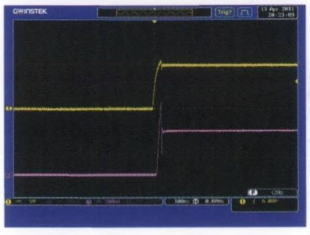
PSW 250V Series Operating Area



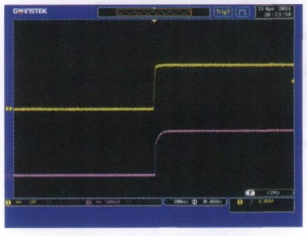
PSW 800V Series Operating Area

When the power supply is configured that the total output (Current x Voltage output) is less than the rated power output, it functions as a typical Constant Current (C.C) and Constant Voltage (C.V) power supply. However, when the power supply is configured such that the total output power (Current x Voltage Output) exceeds the rated power output, the effective output is actually limited to the operation area of the unit.

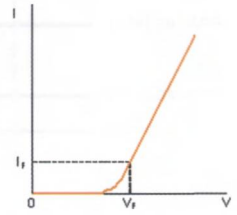
B. C.V / C.C PRIORITY SELECTION



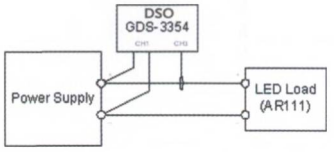
The Inrush Current and Surge Voltage occur at LED Forward Voltage(Vf)Under C.V Priority



The CC Priority Feature Effectively Limits the Occurrence of Inrush Current and Surge Voltage when the Supplied Voltage Rises to the LED Forward Voltage



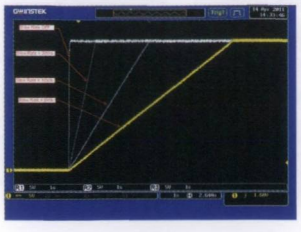
V-I Characteristic of Diode



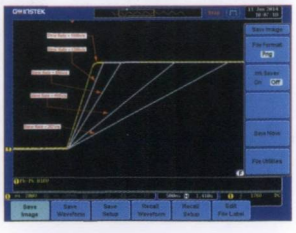
Using GDS-3354 DSO to Test LED Operation Under C.V Priority and C.C Priority Respectively

The PSW-Series provides C.C Mode and C.V Mode to fit various applications in the general purpose market. To get into critical application niches, however, the power supply needs to provide advanced features to meet the specific requirements. The C.C and C.V Priority Selection enable the power supply to run under C.C priority, rather than normal CV priority, at the output-on stage.

C. ADJUSTABLE SLEW RATE



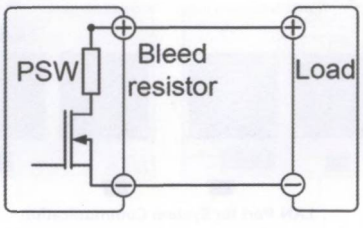
The Adjustable Rise Time of the PSW 30V



The Adjustable Rise Time of the PSW 800V

The PSW-Series has adjustable slew rates for the level transition of both Current and Voltage. This gives the PSW-Series power supply the ability to set specific rise time and fall time of the Voltage and Current drawn from the power supply to verify DUT performance during the Voltage / Current level transition. The feature also provides the benefit to slow down the voltage transition at the power output-on to protect DUT from inrush current damage. This is especially useful for the test of heavy-current-drawn devices like capacitors.

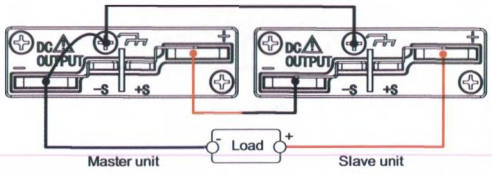
D. BLEEDER CONTROL



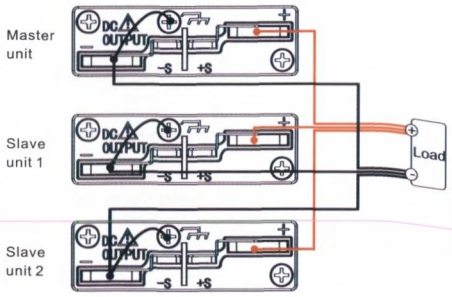
PSW-Series Built-in Bleed Resistor

The PSW-Series employs a bleed resistor in parallel with the output terminal. Bleed resistor is designed to dissipatch the power from the power supply filter capacitors when power is turned off and the load is disconnected. Without a bleed resistor, power terminal may remain charged on the filter capacitors for some time and be potentially hazardous. In addition, bleed resistor also allows for smoother voltage regulation of the power supply as the bleed resistor acts as a minimum voltage load. The bleed resistance can be turned on or off using the configuration setting.

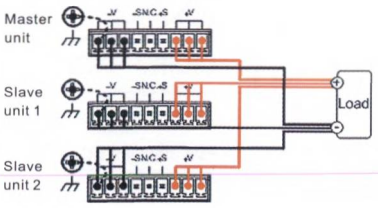
E. SERIES AND PARALLEL CONNECTIONS



Series Connection



Parallel Connection

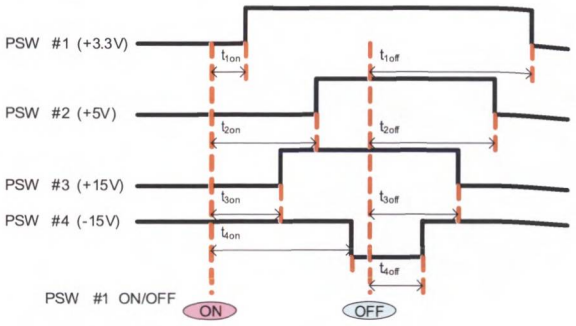


Parallel Connection

PSW 250V/800V only support parallel connections and maximum units in parallel is three.

To increase power output capacity, the PSW-Series could be connected in Series mode to perform double voltage rating or in parallel mode to perform triple current rating for each model. With Multi-Range feature and Series/Parallel connection capability, the PSW-Series is a high power density and cost-effective equipment for the tests of DC power modules, batteries and components in a broad power range.

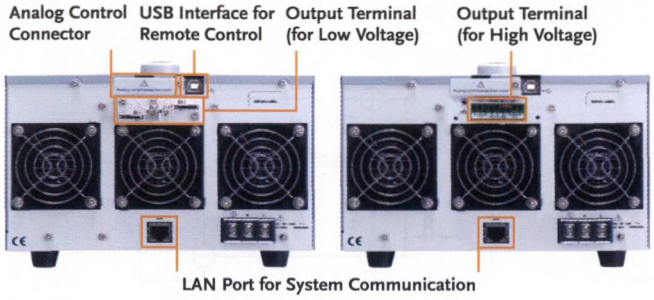
F. OUTPUT ON /OFF DELAY



The Example of Output On/Off Delay Control Among Multiple Outputs of the PSW Units

The output On/Off delay feature enables the setting of a specific time delay for output on after the power supply output is turned on, and a specific time delay for output off after the power supply output is turned off. When multiple PSW units are used, the On/Off delay time of each unit can be set respectively referring to fix time points. This multiple-output control can be done through the Analog Control terminal at the rear panel or through the PC programming with standard commands.

G. VARIOUS INTERFACES SUPPORT & EXTENDED TERMINAL BOX



Rear Panel for PSW-Series

GUG-001
GPIB to USB Adapter

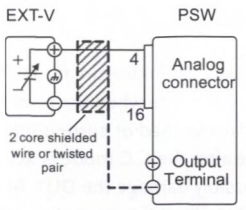
GET-001
Extended Terminal
(for PSW 30V/80V/160V)

GET-002
Extended Terminal
(for PSW 250V/800V)

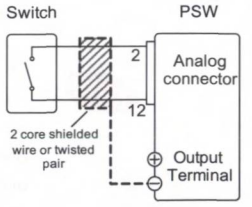
The PSW-Series provides USB Host port in the front panel for easy access of stored data, such as test script program. In the rear panel, a USB Device port is available for remote control or I & V data logging of power output through a PC controller. The LAN interface, which meets DHCP standard, is provided as a standard feature of the PSW-Series for system communications and ATE applications.

An Extender Terminal box (P/N: GET-001/GET-002) is provided as optional accessory to extend the power output form the rear panel to the front side. This extender terminal gives R&D or QC engineers convenience to do the jobs without frequently reaching the output terminal at the rear side of the PSW-Series.

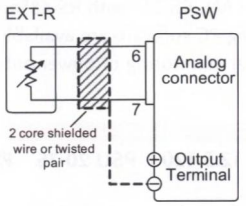
H. EXTERNAL ANALOG REMOTE CONTROL



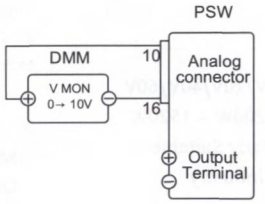
External Voltage Control of the Voltage Output



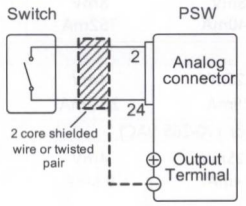
External Switch Control of the Main Power Shut-down



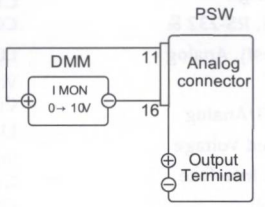
External Resistance control of the Voltage Output



External DMM Monitoring of the Output Voltage



External Switch Control of the Output On/Off



External DMM Monitoring of the Output Current

On the rear panel of the PSW-Series power supply, a 26-pin Analog Control connector is available to perform lots of remote control and monitoring functions. The output voltage and current can be set using external voltage or resistance.

The power supply output on/off and main power shut-down can also be controlled using external switches. This Analog Control Connector is complied with the Mil 26 pin connector (OMRON XG4 IDC plug) standard.

I. USING THE RACK MOUNT KIT

Rack Mount Kit GRA-410-J (JIS)

Rack Mount Kit GRA-410-E (EIA)

The Rack Mount Kit of the PSW-Series supports both EIA and JIS standards. A standard rack can accommodate 6 units of type I (360W Output Power) models, or 3 units of type II (720W Output Power) models, or 2 units of type III (1080W Output Power) models.

The Rack Mount Kits for EIA standard (P/N: GRA-410-E) and for JIS standard (P/N: GRA-410-J) are provided as optional accessaries for the PSW-Series.

Programmable Switching D.C. Power Supply

NEW

PSU-Series

CE | USB | GPIB | Analog Control | LAN | LabVIEW Driver | RS-232 | RS-485

The PSU-Series is a single output programmable switching DC Power Supply covering a power range up to 1520W. This series of products include five models with the combination from 6V to 60V rated voltages. As the PSU-Series can be connected in series for maximum 2 units or in parallel for maximum 4 units, the capability of connecting multiple PSU-Series units for higher voltage or higher current output provides a broad coverage of applications.

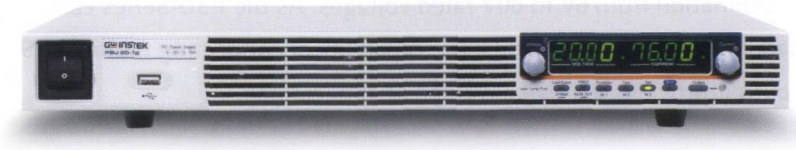
The C.V/C.C priority selection of the PSU-Series is a very useful feature for DUT protection. The conventional power supply normally operates under C.V mode when the power supply output is turned on. This could bring a high inrush current to the capacitive load or current-intensive load at the power output on stage. Though the current becomes stable after the C.C mode is activated, the current spike occurred at the C.V and C.C crossover point may possibly damage the DUT. At the power output on stage, the PSU-Series is able to run under C.C priority to limit the current spike occurred at the threshold voltage and therefore protects DUT from the inrush current damage.

The OVP and OCP protections can prevent the DUT damage. Both OVP and OCP levels can be selected the range of 10% to 110% , with the default level set at 110%, of the rated voltage/current of the power supply. The PSU-Series provides USB Host/Device, LAN, RS-232 with RS-485and Analog Control interfaces as standard. The LabView driver and the data Logging PC software are available at the rear panel for external control of the power On/Off and the external monitoring of power output voltage and current.

FEATURES

* **Voltage Rating : 6V/12.5V/20V/40V/60V**
* **Output Power Rating : 1200W ~ 1520W**
* **C.V/C.C Priority; Particularly Suitable for the Battery and LED Industry**
* **Adjustable Slew Rate**
* **Series and Parallel Operation (2 Units in Series/4 Units in Parallel Maximum)**
* **High Efficiency and High Power Density**
* **19" Rack Mount Size Design**
* **Standard Interface : LAN, RS-232 & RS485, USB (Device/Host), Analog Control Interface**
* **Optional Interface : GPIB/Analog Control Interface (Isolated Voltage Control)/Analog Control Interface (Isolated Current Control)**
* **Preset Memory Function (M1~M3)**

SPECIFICATIONS					
Model	**PSU 6-200**	**PSU 12.5-120**	**PSU 20-76**	**PSU 40-38**	**PSU 60-25**
OUTPUT RATINGS					
Voltage	0 ~ 6V	0 ~ 12.5V	0 ~ 20V	0 ~ 40V	0 ~ 60V
Current	0 ~ 200A	0 ~ 120A	0 ~ 76A	0 ~ 38A	0 ~ 25A
Power	1200W	1500W	1520W	1520W	1500W
OUTPUT RIPPLE AND NOISE					
CV p-p (10~20MHz)	60mV	60mV	60mV	60mV	60mV
CV rms (5Hz~1MHz)	8mV	8mV	8mV	8mV	8mV
CC rms (5Hz~1MHz)	400mA	240mA	152mA	95mA	75mA
LOAD REGULATION					
Voltage	2.6mV	3.25mV	4mV	6mV	8mV
Current	45mA	29mA	20.2mA	12.6mA	10mA
LINE REGULATION (change from 85 to132 VAC input or 170-265 VAC)					
Voltage	2.6mV	3.25mV	4mV	6mV	8mV
Current	22mA	14mA	9.6mA	5.8mA	4.5mA
PROGRAMMING ACCURACY					
Voltage 0.05% + (mV)	3mV	6.25mV	10mV	20mV	30mV
Current 0.2% + (mA)	200mA	120mA	76mA	38mA	25mA
MEASUREMENT ACCURACY					
Voltage 0.1% + (mV)	6mV	12.5mV	20mV	40mV	60mV
Current 0.2% + (mA)	400mA	240mA	152mA	76mA	50mA
LOAD TRANSIENT RECOVERY TIME					
Time	1.5ms	1ms	1ms	1ms	1ms
OUTPUT RESPONSE TIME					
Rise Time (No Load & Full Load)	80ms	80ms	80ms	80ms	80ms
Fall Time (No Load)	500ms	700ms	800ms	1000ms	1100ms
Fall Time (Full Load)	10ms	50ms	50ms	80ms	80ms
PROGRAMMING/MEASUREMENT RESOLUTION					
Voltage	0.2mV	0.4mV	0.7mV	1.3mV	2mV
Current	6mA	4mA	2.5mA	1.2mA	0.8mA
TEMPERATURE COEFFICIENT (after a 30 minute warm-up)					
Voltage	100PPM/°C after 30 minutes warm up				
Current	100PPM/°C after 30 minutes warm up				
SERIES AND PARALLEL OPERATION					
Parallel Operation	Up to 4 units including master unit				
Series Operation	Up to 2 units including master unit				
ENVIRONMENTAL CONDITIONS					
Environment	Indoor use, installation cateorgy II (AC Input), pollution degree 2				
Operating Temperature Range	0℃ ~ 50℃				
Storage Temperature Range	-25℃ ~ 70℃				
Operating Humidity Range	20% to 85% RH				
Storage Humidity Range	Up to 90% or less relative humidity (no condensation)				
AC INPUT					
Norminal Input	100Vac ~ 240Vac, 50Hz ~ 60Hz, single phase				
Input Range	85VAc ~ 265Vac				
Power Factor (100Vac/200Vac)	0.99/0.98				
Maximum Input Current (100Vac/200Vac)	21A/11A				
Inrush Current	≦50A				
Efficiency (100Vac/200Vac)	77%/79%	82%/85%	83%/86%	84%/87%	84%/87%



Rear Panel

PSU-Series

SPECIFICATIONS					
Model	PSU 6-200	PSU 12.5-120	PSU 20-76	PSU 40-38	PSU 60-25
DIMENSIONS & WEIGHT					
Analog Control (Non-Isolated)	YES				
PC Remote Interface (Standard)	USB (Device/Host)/RS-232/RS-485/LAN				
PC Remote Interface (Optional)	GPIB/Analog Control Interface (Isolated Voltage Control)/Analog Control Interface (Isolated Current Control); Note : Selection one of three				
Cooling Fan	Forced air cooling by internal fan				
Dimensions & Weight	423(W) x 43.6(H) x 447.2(D) ; Approach 8.7kg				

ORDERING INFORMATION

PSU 6-200	1200W Programmable Switching DC Power Supply
PSU 12.5-120	1500W Programmable Switching DC Power Supply
PSU 20-76	1520W Programmable Switching DC Power Supply
PSU 40-38	1520W Programmable Switching DC Power Supply
PSU 60-25	1500W Programmable Switching DC Power Supply

ACCESSORIES :
Basic Accessories Kit x 1, CD-ROM x 1 (User Manual, Programming Manual)

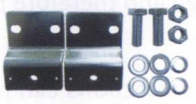
OPTIONAL ACCESSORIES

GTL-248	GPIB Cable (2m)	PSU-232	RS 232 Cable with DB9 connector kit
GTL-246	USB Cable, USB 2.0A-B TYPE CABLE, 4P	PSU-485	RS 485 Cable with DB9 connector kit
GTL-251	GPIB-USB-HS (high speed)	GRM-001	Slide bracket 2pcs/set ,PSU option
PSU-01B	Bus bar for 2 units in parallel connection	PSU-GPIB	GPIB Interface card (factory option)
PSU-01C	Cable for 2 units in parallel connection	PSU-ISO-I	Isolate current remote control card (factory option)
PSU-02B	Bus bar for 3 units in parallel connection	PSU-ISO-V	Isolate voltage remote control card (factory option)
PSU-02C	Cable for 3 units in parallel connection	GPW-001	UL/CSA power cord 3m ,PSU option
PSU-03B	Bus bar for 4 units in parallel connection	GPW-002	VDE power cord 3m ,PSU option
PSU-03C	Cable for 4 units in parallel connection	GPW-003	PSE power cord 3m ,PSU option

FREE DOWNLOAD

Driver LabView Driver

PSU-01B
PSU-01B Bus bar for 2 units in parallel connection

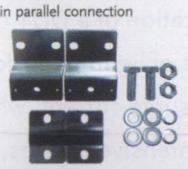


PSU-232
PSU-232 RS232 Cable with DB9 connector kit

PSU-01C
PSU-01C Cable for 2 units in parallel connection

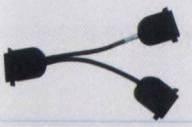
PSU-485
PSU-485 RS485 Cable with DB9 connector kit

PSU-02B
PSU-02B Bus bar for 3 units in parallel connection



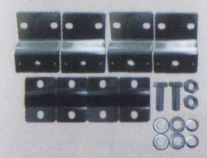
GRM-001
GRM-001 Slide bracket 2pcs/set, PSU option

PSU-02C
PSU-02C Cable for 3 units in parallel connection



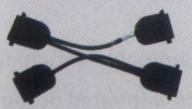
GPW-001
GPW-001 UL/CSA power cord 3m ,PSU option

PSU-03B
PSU-03B Bus bar for 4 units in parallel connection



GPW-002
GPW-002 VDE power cord 3m ,PSU option

PSU-03C
PSU-03C Cable for 4 units in parallel connection



GPW-003
GPW-003 PSE power cord 3m ,PSU option

SERIES OPERATION

Model	Single Unit	Two Units
PSU 6-200	6V/200A	12V/200A
PSU 12.5-120	12.5V/120A	25V/120A
PSU 20-76	20V/76A	40V/76A
PSU 40-38	40V/38A	80V/38A
PSU 60-25	60V/25A	120V/25A

PARALLEL OPERATION

Model	Single Unit	Two Units	Three Units	Four Units
PSU 6-200	6V/200A	6V/400A	6V/600A	6V/800A
PSU 12.5-120	12.5V/120A	12.5V/240A	12.5V/360A	12.5V/480A
PSU 20-76	20V/76A	20V/152A	20V/228A	20V/304A
PSU 40-38	40V/38 A	40V/76A	40V/114A	40V/152A
PSU 60-25	60V/25A	60V/50A	60V/75A	60V/100A

Programmable Switching D.C. Power Supply

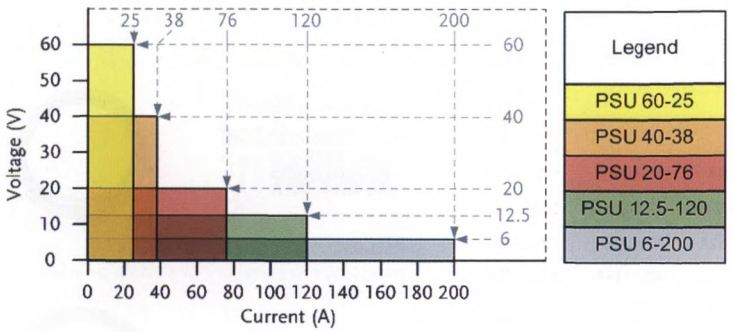
The PSU-Series is a single output programmable switching DC power supply covering a power range up to 1520W. This series of products include five models with the combination from 6V to 60V rated voltages. As the PSU-Series can be connected in series for maximum 2 units or in parallel for maximum 4 units, the capability of connecting multiple PSU-Series units for higher voltage or higher current output provides a broad coverage of applications.

The C.V / C.C priority selection of the PSU-Series is a very useful feature for DUT protection. The conventional power supply normally operates under C.V mode when the power supply output is turned on. This could bring a high inrush current to the capacitive load or current-intensive load at the power output on stage. Though the current becomes stable after the C.C mode is activated, the current spike occurred at the C.V and C.C crossover point may possibly damage the DUT. At the power output on stage, the PSU-Series is able to run under C.C priority to limit the current spike occurred at the threshold voltage and therefore protects DUT from the inrush current damage.

The OVP and OCP protections can prevent the DUT damage, Both OVP and OCP levels can be selected the range of 10% to 110%, with the default level set at 110%, of the rated voltage/current of the power supply. The PSU-Series provides USB Host / Device, LAN, RS-232, RS-485 and Analog Control Interfaces as standard. The LabView is also available at the rear panel for external control of the power On/Off and the external monitoring of power output voltage and current.

The adjustable slew rate of the PSU-Series allows users to set for either output voltage or output current a specific rise time from low to high level transition, and a specific fall time from high to low level transition. The facilitate the characteristic verification of a DUT during voltage or current level changes with controllable slew rates. Most manufacturing tests of lighting device or large capacitance capacitor during power output on are associated with the occurrence of high surge current, which can greatly reduce the life time of the DUT. To prevent inrush current from damaging current intensive devices, a smooth and slow voltage transition during power On-Off can significantly reduce the spike current and protect the device from high current damage.

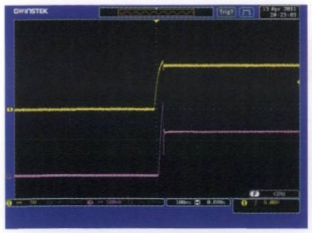
A. OPERATION RANGE



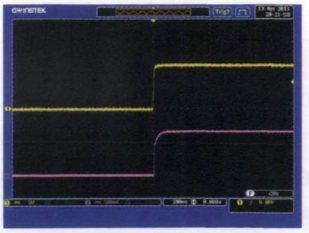
PSU 6-200	Single Channel 1200W / 6V / 200A
PSU 12.5-120	Single Channel 1500W / 12.5V / 120A
PSU 20-76	Single Channel 1520W / 20V / 76 A
PSU 40-38	Single Channel 1520W / 40V / 38A
PSU 60-25	Single Channel 1500W / 60V / 25A

The PSU-Series programmable switching D.C. power supply consists of five models with rated output voltage including 6V, 12.5V, 60V, 20V, 40V and rated output current 200A, 120A, 25A, 76A, 38A, making the output power capacity from 1200W to 1520W.

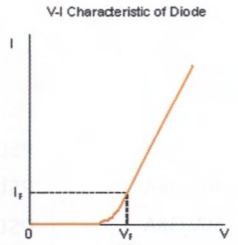
B. C.V/ C.C PRIORITY SELECTION



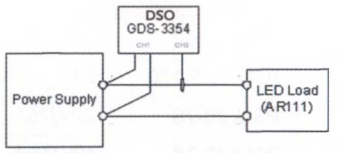
The Inrush Current and Surge Voltage occur at LED Forward Voltage(Vf)Under C.V Priority



The CC Priority Feature Effectively Limits the Occurrence of Inrush Current and Surge Voltage when the Supplied Voltage Rises to the LED Forward Voltage



V-I Characteristic of Diode



Using GDS-3354 DSO to Test LED Operation Under C.V Priority and C.C Priority Respectively

The PSU-Series provides CV mode and CC mode to fit various applications in the general purpose market. To get into critical application niches, however the power supply needs to provide advanced features to meet the specific requirements.

The C.C and C.V priority selection enable the power supply to run under C.C priority, rather than normal CV priority , at the output on stage.

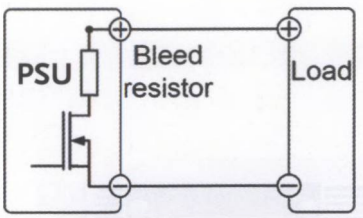
C. ADJUSTABLE SLEW RATE

The Adjustable Rise Time of The PSU-Series

The PSU-Series has adjustable slew rate for the level transition of both current and voltage. This gives the PSU-Series power supply ability to set specific rise and fall time of the voltage and current drawn from the power supply to verify DUT performance during the voltage / current level transition.

The feature also provides the benefit to slow down the voltage transition at the power output onto protect DUT from inrush current damage. This is especially useful for the test of heavy current drawn device like capacitors.

D. BLEEDER CONTROL



PSU-Series Built-in Bleed Resistor

The PSU-Series employs a bleed resistor in parallel with the output terminal. Bleed resistor is designed to dispatch the power from the power supply filter capacitors when power is turned off and the load is disconnected. Without a bleed resistor, power terminal may remain charged on the filter capacitors for some time and be potentially hazardous. In addition, bleed resistor also allows for smoother voltage regulation of the power supply as the bleed resistor acts as a minimum voltage load. The bleed resistance cab be turned on or off using the configuration setting.

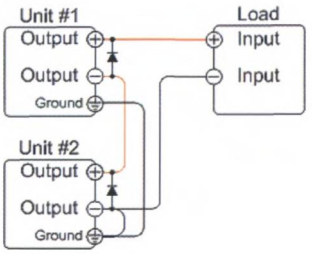
E. SERIES AND PARALLEL CONNECTIONS

SERIES OPERATION

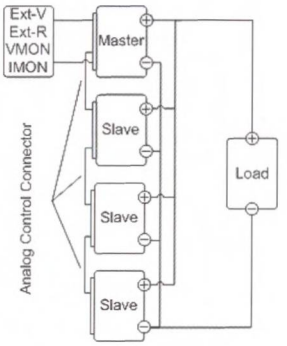
Model	Single Unit	Two Units
PSU 6-200	6V/200A	12V/200A
PSU 12.5-120	12.5V/120A	25V/120A
PSU 20-76	20V/76A	40V/76A
PSU 40-38	40V/38 A	80V/38A
PSU 60-25	60V/25A	120V/25A

PARALLEL OPERATION

Model	Single Unit	Two Units	Three Units	Four Units
PSU 6-200	6V/200A	6V/400A	6V/600A	6V/800A
PSU 12.5-120	12.5V/120A	12.5V/240A	12.5V/360A	12.5V/480A
PSU 20-76	20V/76A	20V/152A	20V/228A	20V/304A
PSU 40-38	40V/38 A	40V/76A	40V/114A	40V/152A
PSU 60-25	60V/25A	60V/50A	60V/75A	60V/100A



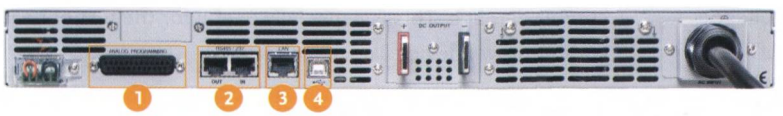
Series Connection



Parallel Connection

To increase power output capacity , the PSU-Series could be connected in Series mode to perform double voltage rating or in parallel mode to perform four times current rating for each model. With Series / Parallel connection capability, the PSU-Series is a high power density and cost effective equipment for the tests of DC power modules, batteries and components in a broad power range.

F. VARIOUS INTERFACES SUPPORT



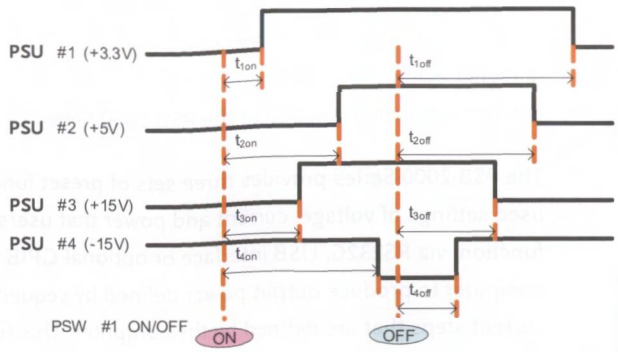
1. Analog Control Interface
2. RS485 / RS232 interface for Remote Control
3. LAN Port for System Communication
4. USB Interface for Remote Control

G. USING THE RACK MOUNT KIT

Rack Mount Kit for PSU-Series EIA & JIS

The rack mount kit of the PSU-Series supports both EIA and JIS standards. A standard rack can accommodate one unit of the PSU-Series.

H. OUTPUT ON / OFF DELAY



The Example of Output On/Off Delay Control Among Multiple Outputs of the PSU Units

The Output On/Off delay feature enables the setting of a specific time delay for output on after the power supply output is turned on, and a specific time delay for output off after the power supply output is turned off. When multiple PSU units are used, the On/Off delay time of each unit can be set respectively referring to fix time points. This multiple-output control can be done through the analog control terminal at rear panel or through the PC programming with standard commands.

Programmable Switching D.C. Power Supply (Multi-range D.C. Power Supply)

PSB-2400L2

PSB-2400L/PSB-2400H/ PSB-2800L/PSB-2800H

PSB-2800LS

USB | RS-232 | GPIB | Analog Control

FEATURES

* Output Voltage Rating : 80V/800V, Output Power Rating : 400W ~ 800W
* Constant Power Output for Multi-Range (V & I) Operation
* Series and Parallel Operation (2 Units in Series or 4 Units in Parallel Maximum)
* 90 Degree Angle Rotatable Control Panel
* Sequence Function Edited by PC will be Controlled Through Power Supply Optional Interfaces
* Standard Interface : RS-232C/USB/Analog Control Interface
* Optional Interface : GPIB
* Preset Function (3 Points)

The PSB-2000 Series is a high power density, programmable and multi-range output DC power supply. There are six models in the series including one power booster unit. The PSB-2000 Series has the output voltage of 0~80V and 0~800V, and the output power ranges of 0~400W and 0~800W. The multi-range output functionality facilitates flexible collocations of higher voltage and larger current under the rated power range. Both series and parallel connections can be applied to the PSB-2000 Series to fulfill the requirements of higher

The PSB-2000 Series provides three sets of preset function keys to memorize regularly used settings of voltage, current and power that users can recall rapidly. The sequence function, via RS232C, USB interface or optional GPIB interface, can connect with the computer to produce output power defined by sequence of a series of set voltage and current steps that are defined by the computer. This function is often used to establish a standard test procedure for the verification of the influence on DUTs done by the swiftly changing operating

The PSB-2000 Series protects over voltage and over current. The power supply output function will be shut down to protect DUTs while the protection mechanism is triggered to function. When conducting battery charging operation, the Hi-Ω mode of the PSB-2000 Series will prevent reverse current from damaging power supply.

The PSB-2000 Series provides analog control interfaces on the rear panel to control PSB-2000 Series output via the external voltage or to externally monitor voltage and current output status of power supply. The PSB-2000 Series panel can be rotated 90 degree angle suitable for vertical or horizontal position to accommodate the ideal space utilization.

SERIES OPERATION

MODEL NUMBER	SINGLE UNIT	TWO UNITS
PSB-2400L	80V/40A	160V/40A
PSB-2800L	80V/80A	160V/80A
PSB-2800LS (Booster Unit for PSB-2800L Only)	N/A	N/A
PSB-2400L2	N/A	N/A
PSB-2400H	N/A	N/A
PSB-2800H	N/A	N/A

PARALLEL OPERATION

MODEL NUMBER	SINGLE UNIT	TWO UNITS	THREE UNITS	FOUR UNITS
PSB-2400L	80V/40A	80V/80A	80V/120A	80V/160A
PSB-2800L	80V/80A	80V/160A	80V/240A	80V/320A
PSB-2800LS	N/A	80V/160A (PSB-2800L x 1+ PSB-2800LS x 1)	80V/240A (PSB-2800L x 1+ PSB-2800LS x 2)	N/A
PSB-2400L2	N/A	N/A	N/A	N/A
PSB-2400H	800V/3A	800V/6A	N/A	N/A
PSB-2800H	800V/6A	800V/12A	N/A	N/A

SPECIFICATIONS

	PSB-2400L	PSB-2800L	PSB-2400L2	PSB-2400H	PSB-2800H	PSB-2800LS
OUTPUT RATING						
Voltage Current Power	0 ~ 80V 0 ~ 40A 400W	0 ~ 80V 0 ~ 80A 800W	0 ~ 80V x 2CH 0 ~ 40A x 2CH 800W	0 ~ 800V 0 ~ 3A 400W	0 ~ 800V 0 ~ 6A 800W	80V 80A 800W
REGULATION (CV)						
Load Line	0.01% ± 3mV of rated voltage 0.01% ± 2mV of rated voltage			0.01% ± 30mV of rated voltage 0.01% ± 20mV of rated voltage		N/A
REGULATION (CC)						
Load Line	0.02% ± 3mA of rated current 0.01% ± 2mA of rated current			0.05% ± 15mA of rated current 0.05% ± 10mA of rated current		N/A
RIPPLE & NOISE (Noise Bandwidth 20MHz ; Ripple Bandwidth=1MHz)						
CV p-p	90mV	150mV	90mV	250mV(only output voltage measures more than 1% of the rated voltage)	300mV(only output voltage measures more than 1% of the rated voltage)	N/A
CV rms	4mV	6mV	4mV	20mV(when current measures<2A) 35mV(when current measures>2A)	25mV(when current measures<2A) 40mV(when current measures>2A)	
CC rms	30mA	60mA	30mA	15mA	20mA	
PROGRAMMING ACCURACY						
Voltage Current Power	0.1% setting±2digits 0.2%setting±2digits ± 10W			0.1% setting±2digits 0.2% setting±2digits ±10W (only output voltage measures more than 1% of rated voltage)		N/A
READ BACK ACCURACY						
Voltage Current Power	0.2% reading±2digits 0.3% reading±2digits 0.5% reading±5digits			0.2% reading±2digits 0.3% reading±2digits 0.5% reading±Vout x 40mA		N/A
RESPONSE TIME						
Raise Time(Full load/No load) Fall Time(Full load) Fall Time(No load) Load Transient Recover Time (Load change from 50~100%)	50ms 100ms 500ms 1ms			200ms 500ms 1000ms 7ms		N/A
PROGRAMMING RESOLUTION						
Voltage Current Power	10mV 10mA 10W			100mV 10mA 10W		N/A
MEASUREMENT RESOLUTION						
Voltage Current Power	10mV 10mA 10W			100mV 10mA 10W		N/A
SERIES AND PARALLEL CAPABILITY						
Channel Number Series Operation Parallel Operation Parallel with booster PSB-2800LS	1 Up to 2 Units Up to 4 Units N/A	1 Up to 2 Units Up to 4 Units Up to 3 Units	2 N/A N/A N/A	1 N/A Up to 2 Units N/A	1 N/A Up to 2 Units N/A	For PSB-2800L Only
PPROTECTION FUNCTION						
OVP (Fixed) OVP (Variable) OCP (Fixed) OCP (Variable) OHP	Output off when 110% of rated voltage Output off when operating; Setting range:1V~84V with front panel Output off when 110% of rated current Output off when operating;Setting range:1A~42A(84A for model number) Output off above heat sink setting temperature			Output off when output voltage exceeds 110% of rated voltage Presettable in range from 10V ~ 840V om front panel Output off when output voltage exceed 110% of rated current Presettable in range from 0.1A ~ 6.30A om front panel Output off at the intemal heat sink temperature over setting value		N/A
ENVIRONMENT CONDITION						
Operation Temp Storage Temp Operating Humidity Storage Humidity	0°C ~ 40°C -20°C ~ 70°C 30% ~ 80% RH (no dew condensation) 30% ~ 80% RH (no dew condensation)					N/A
OTHER						
Inrush Current Power Consumption/Factor	35A Max 560VA/0.99	70A Max 1120VA/0.99	70A Mmax 1120VA/0.99	35A Max 560VA/0.99	70A Max 1120VA/0.99	70A Max 1120VA/0.99
Cooling Method Power Source Interface (Standard) Interface (Optional) Analog Control	Forced air-cooling with fan motor 100VAC ~ 240VAC, 50/60Hz, Single phase RS-232C/USB GPIB Yes					
DIMENSIONS & WEIGHT						
	210(W) x 124(H) x 290(D)mm					
	Approx.5kg	Approx.7kg	Approx.7kg	Approx. 5kg	Approx. 6kg	Approx. 7kg

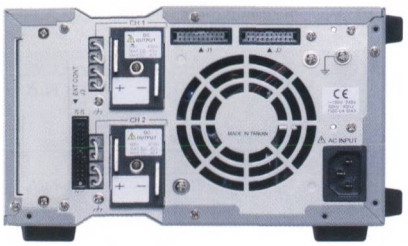
Programmable Switching D.C. Power Supply (Multi-range D.C. Power Supply)

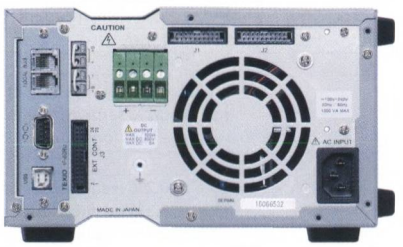
PSB-2400L2

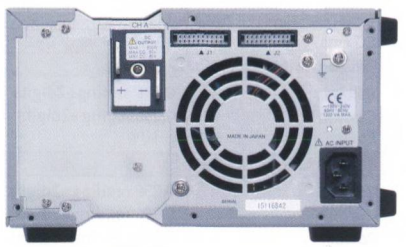
PSB-2400L/PSB-2400H/
PSB-2800L/PSB-2800H

PSB-2800LS

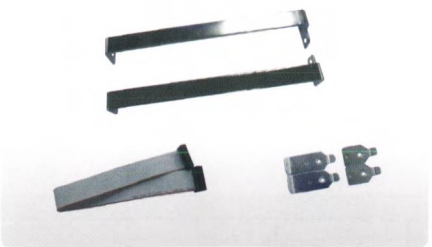
Rear Panel



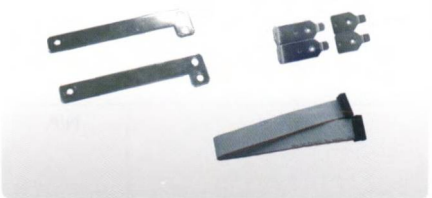




PSB-003 Parallel Connection Kit for Horizontal Installation



PSB-004 Parallel Connection Kit for Vertical Installation



ORDERING INFORMATION

PSB-2400L	0~80V/0~40A/400W Multi-Range DC Power Supply
PSB-2800L	0~80V/0~80A/800W Multi-Range DC Power Supply
PSB-2400L2	0~80V x 2/0~40A x 2/800W Multi-Range DC Power Supply
PSB-2400H	0~800V/0~40A/400W Multi-Range DC Power Supply
PSB-2800H	0~800V/0~80A/800W Multi-Range DC Power Supply
PSB-2800LS	800W Slave (Booster) Unit For Current Extension Only

ACCESSORIES :

User Manual (CD) x 1, AC Power Cord x 1, External Control Connector (26pin), Screws for output terminals on rear panel, Protection covers for output terminals on rear panel, Protection caps for output terminals on the front panel, GND Cable, USB Cable (For Model Number : PSB-2400L; PSB-2800L; PSB-2400L2; PSB-2400H; PSB-2800H) Local Bus (For Model Number : PSB-2400L; PSB-2800L; PSB-2400L2; PSB-2400H; PSB-2800H)

OPTIONAL ACCESSORIES

PSB-001	GPIB Card
PSB-003	Parallel Connection Kit for Horizontal Installation. Kit Includes : (PSB-007 Joint Kit, Horizontal bus bar x 2 , PSB-005 x1)
PSB-004	Parallel Connection Kit for Vertical Installation. Kit Includes : (PSB-007 Joint Kit, Verical bus bar x 2, PSB-005 x 1)
PSB-005	Parallel Connection Signal Cable
PSB-006	Series Connection Signal Cable
PSB-007	Joint Kit : Includes 4 Joining Plates, (M3x6)screws x 4 ; (M3x8)screw x 2
PSB-008	RS232C Cable (PSB-2000 Only)
GTL-232	RS-232C Cable
GTL-246	USB Cable
GTL-248	GPIB Cable
GTL-251	GPIB USB Cable (high speed)
GRJ-1101	Local Bus
GRA-424	Rack Adapter Kit, 19", 2U Size

PSB-001 GPIB Control Board

GRJ-1101 Local Bus

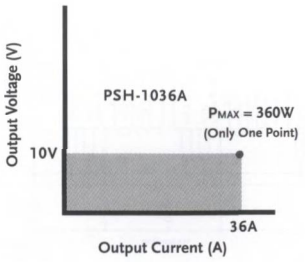
PSB-008 RS-232C Cable (PSB-2000 Only)

PSB-005 Parallel Connection Signal Cable

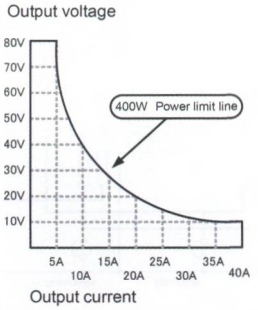
PSB-006 Series Connection Signal Cable

PSB-007 Joint Kit

A. MULTI-RANGE OUTPUT OPERATION



The operation area of a Conventional Power Supply



The operation area of a Multi-Range Power Supply for PSB-2000 Series

Compared with the maximum power output of the conventional power supply that is calculated by the maximum output voltage multiplies by the maximum output current, the PSB-2000 series, defying the formula, has a unique characteristic of multi-range output (voltage and current). This distinguishing feature, under the same maximum power output range, can output a higher voltage with a smaller current and vice versa. For instance, for a conventional power supply with a maximum power output of 360W, the maximum voltage and current outputs are likely to be 10V and 36A respectively. Comparatively, PSB-2400L, with the maximum power output of 400W, provides voltage and current output ranges of 0~80V and 0~40A. The maximum current of 5A will be provided when the voltage reaches 80V and the maximum voltage of 10V for the maximum current of 40A. PSB-2400L, breaking the limitation of Pmax=Vmax x Imax,, broadens voltage and current application ranges. The following diagrams illustrate the voltage and current comparison between the multi-range output power supply and the conventional power supply.

B. PRODUCTS IN THE SERIES

There are six models in the PSB-2000 Series. Model type, output voltage, output current and output power are as follows :

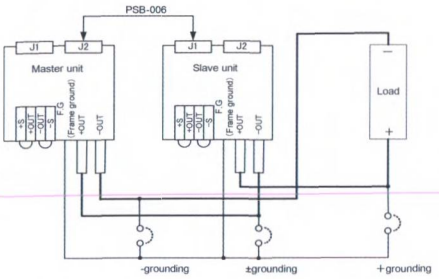
MODEL	PSB-2400L	PSB-2800L	PSB-2400L2	PSB-2400H	PSB-2800H	PSB-2800LS*
Channel Number	1	1	2	1	1	NA
Voltage Rating**	0 ~ 80V	0 ~ 80V	0 ~ 80V x 2CH	0 ~ 800V	0 ~ 800V	80V
Current Rating***	0 ~ 40A	0 ~ 80A	0 ~ 40A x 2CH	0 ~ 3A	0 ~ 6A	80A
Output Power (Max.)	400W	800W	800W	400W	800W	800W

* PSB-2800LS, a booster unit acting as slave to extend current, can not operate alone. It must operate with PSB-2800L master.

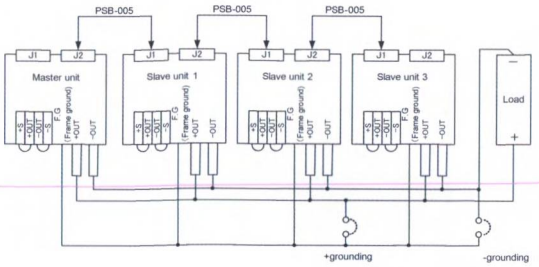
** The maximum current under the highest output voltage is power/voltage. For instance, when PSB-2400L outputs 80V the maximum current is 400W/80V = 5A .

*** Same as above. When PSB2400L outputs 40A the highest voltage is 400W/40A = 10V .

C. SERIES AND PARALLEL CONNECTIONS



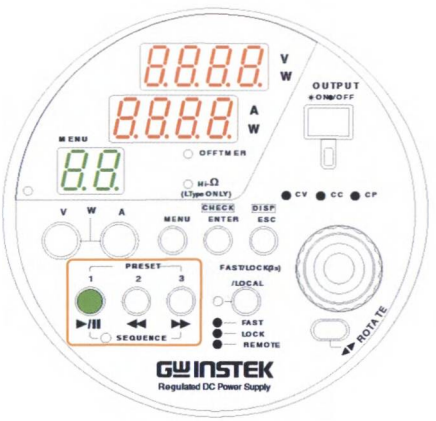
Series Connection



Parallel Connection

Hence, the PSB-2000 Series, with its multi-range output function and the power extension capability of series and parallel connections, is the high power density and high performance to cost ratio DC power supply, which provides a wider range of power applications for any limited equipment space. The PSB-2000 Series is an ideal selection for testing DC power supply module, automobile lithium and lithium iron battery and electronic parts.

D. PRESET FUNCTION



The PSB-2000 Series provides three sets of parameter preset function keys on the front panel and each parameter preset memory includes output voltage, output current and output power.

Users can speedily recall frequently used settings through operating the front panel preset keys to store everyday settings.

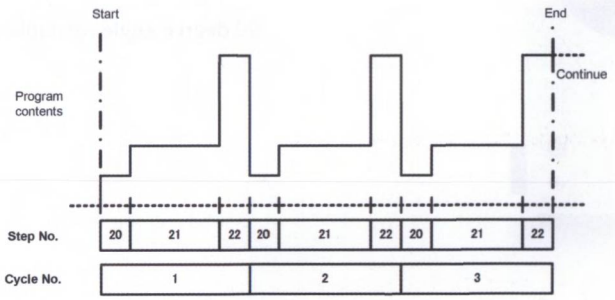
E. OVP AND OCP FUNCTIONS

MODEL NUMBER	OVP SETTING RANGE
PSB-2400L	1.0V to 84.0V
PSB-2800L	
PSB-2400L2	
PSB-2800LS	
PSB-2400H	10.0V to 840.0V
PSB-2800H	

MODEL NUMBER	OVP SETTING RANGE
PSB-2400L	1.0A to 42.0A
PSB-2400L2	
PSB-2800L	1.0A to 84.0A
PSB-2400H	0.1A to 3.15A
PSB-2800H	0.1A to 6.30A

When the voltage and current outputs exceed the preset conditions, the PSB-2000 Series will shut down the output function to prevent DUTs from damaging. The OVP and OCP protection level can be set to 10%～110% of the rated voltage or current and the preset condition is 110% of the rated voltage and current.

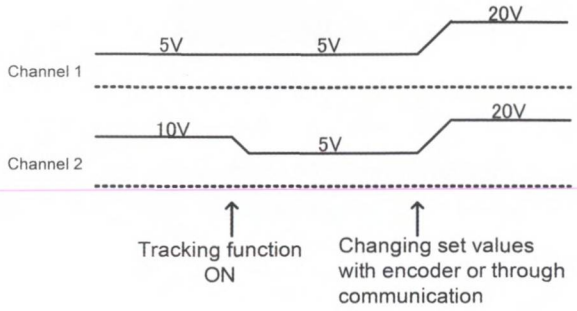
F. SEQUENCE FUNCTION



Example for the sequence operation

When applying sequence function, the computer must first edit a series of steps defined by different voltage, current and duration, which, in CSV format, will be sent to PSB-2000 memory via RS-232C, USB interface or GPIB interface (optional) to periodically produce a series of steps defined by different voltage, current and duration. The minimum time for each sequence is set to one second and the maximum number of step is 100. This function is to test the impact of DUTs done by the rapidly changing power supply. The reliability test of electronics products toward changing power supply is one of the very important verification items.

G. TRACKING FUNCTION

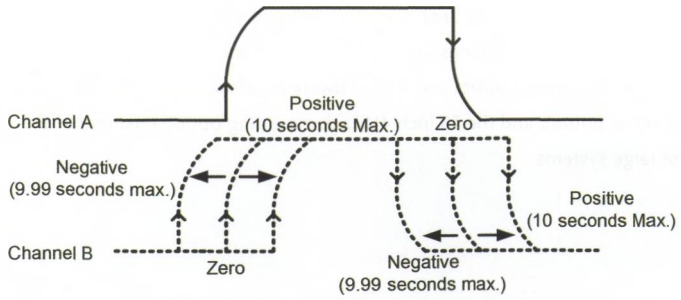


The tracking function is available on the dual output model (PSB-2400L2) only. It allows the setting of both channels to be changed at the same time. When the value of the one channel is changed, and the other channel will automatically change its value accordingly if the tracking function is active (ON).

H. 90 DEGREE ANGLE ROTATABLE CONTROL PANEL

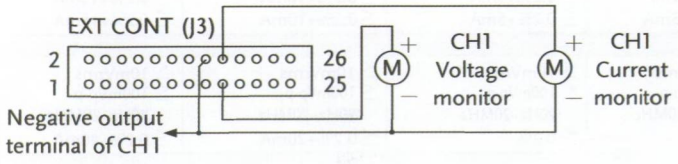
Taking working space utilization into consideration, PSB-2000 can be placed vertically or horizontally by its unique design of 90 degree angle rotatable control panel for users' ease-of-use.

I. DELAY FUNCTION

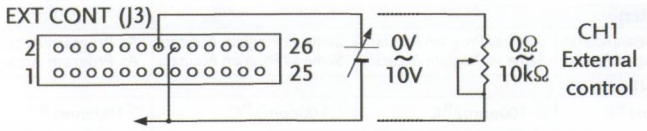


The delay function is available on the dual channel model (PSB-2400L2) only. It adds a rise and fall delay time to the output of channel 2 for a specified amount of time (in seconds) from a reference point (output of channel 1). The rise delay time refers to the delay time for turning the output on. The fall delay time refers to the delay time for turning the output off.

J. EXTERNAL CONTROL AND ANALOG MONITORING FUNCTION



External Voltage Monitor of the Output



External Voltage Control of the output

The rear panel of the PSB-2000 Series provides 26-Pin analog control connector and users can control output voltage and current value via external voltage or resistance. Furthermore, power supply's output on and off or AC input shut down can also be executed through the external control connector. The designated pin of the port can be measured to monitor output voltage and current. The following diagrams illustrate several typical external control application connections. Please refer to product user manual for more or detailed connection methods.

Programmable Switching D.C. Power Supply

PSH-Series

The PSH-Series is single output from 360W to 1080W, programmable switching DC power supplies. OVP, OCP and OTP protect the power supply and loads from unexpected conditions. Remote sensing adds an extra level of precision by compensating cable losses between loads. The bright LCD with simultaneous parameter outputs allows effortless operation. Self-test and software calibration features also reduce maintenance overhead. SCPI commands and LabVIEW driver access through the RS-232C or the optional GPIB interface allow remote control and ATE software development capability. Modular architecture, dedicated rear-panel output, and the 19 inch 4U rack mounting option ensure that the PSH-Series is optimized for large systems.

RS-232 | GPIB | Rear-Panel Output | PC Software | LabVIEW Driver

FEATURES

* Wide Input Voltage Range and High Power Factor (P.F)
* High Efficiency and High Power Density
* Constant Voltage and Constant Current Operation
* Over Voltage , Over Current and Over Temperature Protection
* Self-Test and Software Calibration
* Output ON/OFF Control
* Low Ripple and Noise
* LCD Display
* Built-in Buzzer Alarm
* Standard Interface : RS-232C
* Optional Interface : GPIB (IEEE-488.2)
* LabVIEW Driver

SPECIFICATIONS

	PSH-2018A	PSH-3610A	PSH-3620A	PSH-3630A
OUTPUT				
Voltage Current	20V 18A	36V 10A	36V 20A	36V 30A
REGULATION (C.V.)				
Load Line	≤ 0.1%+5mV ≤ 0.05%+5mV	≤ 0.1%+5mV ≤ 0.05%+5mV	≤0.1%+5mV ≤0.05%+5mV	≤ 0.1%+5mV ≤ 0.05%+5mV
REGULATION (C.C.)				
Load Line	≤ 0.2%+5mA ≤ 0.2%+5mA	≤ 0.2%+5mA ≤ 0.2%+5mA	≤0.2%+10mA ≤0.2%+10mA	≤ 0.2%+15mA ≤ 0.2%+15mA
RIPPLE & NOISE				
Voltage (mVrms) Voltage (mVp-p) Current (mArms)	≤ 10mVrms ≤ 100mVp-p 20Hz~20MHz ≤ 0.2%	≤ 10mVrms ≤ 100mVp-p 20Hz~20MHz ≤ 0.2%	≤ 10mVrms ≤ 100mVp-p 20Hz~20MHz ≤0.2%+20mA	≤ 10mVrms ≤ 100mVp-p 20Hz~20MHz ≤ 0.2%+40mA
RESOLUTION				
Voltage Current	10mV 10mA	10mV 10mA	10mV 10mA	10mV 10mA
PROGRAM ACCURACY				
Voltage Current	≤ 0.05%+25mV ≤ 0.2%+30mA	≤ 0.05%+25mV ≤ 0.2%+30mA	≤ 0.05%+25mV ≤ 0.2%+30mA	≤ 0.05%+25mV ≤ 0.2%+30mA
READBACK RESOLUTION (Meter)				
Voltage Current	Same as Resolution Same as Resolution	Same as Resolution Same as Resolution	Same as Resolution Same as Resolution	As Resolution As Resolution
READBACK ACCURACY (Meter)				
Voltage Current	Same as Program Accuracy Same as Program Accuracy	Same as Program Accuracy Same as Program Accuracy	Same as Program Accuracy Same as Program Accuracy	As Program Accuracy As Program Accuracy
READBACK TEMP. COEFFICIENT				
Voltage (25 ±5℃)	≤ 100ppm/°C	≤ 100ppm/°C	≤100ppm/°C	≤100ppm/°C
RESPONSE (Rise/Fall) TIME				
Voltage Up (10%~90%) Voltage Down (90%~10%)	≤150mS (≤95% rating load) ≤150mS (≥10% rating load)	≤150mS (≤95% rating load) ≤150mS (≥10% rating load)	≤150mS (≤95% rating load) ≤150mS (≥ 10% rating load)	≤150mS (≤95% rating load) ≤150mS (≥10% rating load)
RECOVERY TIME (50% Step Load Change From 25%~75%)				
CV Mode	≤ 2mS	≤ 2mS	≤2mS	≤2mS
PROTECTION				
OVP/OCP/OTP	V	V	V	V
Rush Current	V	V	V	V
OUTPUT ON/OFF CONTROL				
	V	V	V	V
INTERFACE				
Standard : RS-232C; Optional : GPIB				
POWER SOURCE				
AC90V~250V, 50/60Hz				
DIMENSIONS & WEIGHT				
	108(W)x142(H)x393(D) mm; Approx. 3.3kg	108(W)x142(H)x393(D) mm; Approx. 3.3kg	188(W)x142(H)x393(D) mm; Approx. 6.2kg	268(W)x142(H)x393(D) mm; Approx. 9.3kg

Rear Panel

PSH-Series

ORDERING INFORMATION

PSH-2018A	360W Programmable Switching D.C. Power Supply
PSH-3610A	360W Programmable Switching D.C. Power Supply
PSH-3620A	720W Programmable Switching D.C. Power Supply
PSH-3630A	1080W Programmable Switching D.C. Power Supply

ACCESSORIES :
User manual x 1 , Power cord x 1

OPTION

Opt. 01: GPIB Interface (Factory Installed)

OPTIONAL ACCESSORIES

GRA-403	Rack Adapter Panel (19" , 4U)
GTL-232	RS-232C Cable, 9-pin Female to 9-pin, null Modem for Computer
GTL-251	GPIB-USB-HS(High Speed)
GTL-122	Test Lead, U-type to Alligator Test Lead, Max. Current 40A, 1200mm
GTL-248	GPIB Cable, Double Shielded, 2000mm

FREE DOWNLOAD

PC Software	PC Software including Data Log ; Remote Control Software
Driver	Labview Driver

Note : When Opt.01 GPIB interface is ordered, the standard interface RS-232C will be deleted.

Programmable Switching D.C. Power Supply

The PSP-Series is single output, 200W, programmable switching DC power supplies. OVP, OCP, OTP, and OPP protect the PSP-Series and its loads from unexpected conditions. The PSP-Series has a large LCD panel with output and parameter views and a key lock feature to prevent changing the settings. The PSP-Series is suitable for generic bench-top applications in laboratories and educational institutions.

PSP-603/405/2010

CE RS-232 PC Software

FEATURES

* LCD Display
* Output ON/OFF Control
* 3 Step Fan Speed Control
* Voltage/Current/Power Setting
* Key Lock to Avoid Error Operation
* Normal , +% & -% Output Operation Key
* Standard Interface : RS-232C
* Optional European Type Jack Terminal

European Type Jack Terminal

Rear Panel

SPECIFICATIONS

OUTPUT			
Model	PSP-603	PSP-405	PSP-2010
Voltage Current	0 ~ 60V 0 ~ 3.5A	0 ~ 40V 0 ~5A	0 ~ 20V 0 ~ 10A
VOLTAGE REGULATION			
Load Line	≤ 10mV ≤ 0.05%	≤ 10mV ≤ 0.05%	≤ 10mV ≤ 0.05%
CURRENT REGULATION			
Load Line	≤ 5mA ≤ 0.05%	≤ 5mA ≤ 0.05%	≤ 5mA ≤ 0.05%
RIPPLE			
Voltage (mVrms) Current (mArms)	≤ 20mV ≤ 10mA	≤ 20mV ≤ 10mA	≤ 20mV ≤ 10mA
RESOLUTION			
Voltage Current	20mV 2mA	10mV 2mA	10mV 5mA
PROGRAM ACCURACY			
Voltage Current	± 0.05%rdg ± 4digits ± 0.1%rdg + 5digits	± 0.05%rdg ± 3digits ± 0.1%rdg + 5digits	± 0.05%rdg ± 3digits ± 0.3%rdg + 10digits
READBACK (METER) RESOLUTION			
Voltage Current	Same as Resolution Same as Resolution	Same as Resolution Same as Resolution	Same as Resolution Same as Resolution
READBACK (METER) ACCURACY			
Voltage Current	Same as Program Accuracy Same as Program Accuracy	Same as Program Accuracy Same as Program Accuracy	Same as Program Accuracy Same as Program Accuracy
PROTECTION			
OVP/OCP/OPP/OTP	V	V	V
OUTPUT ON/OFF CONTROL			
	V	V	V
DISPLAY			
LCD			
INTERFACE (STANDARD)			
RS-232C			
POWER SOURCE			
AC 115V±10% , AC 230V±15%, 50/60Hz			
DIMENSIONS & WEIGHT			
225(W) x 100(H) x 305(D) mm ; Approx. 4kg			

ORDERING INFORMATION

PSP-603 200W Programmable Switching DC Power Supply
PSP-405 200W Programmable Switching DC Power Supply
PSP-2010 200W Programmable Switching DC Power Supply

ACCESSORIES :
User manual x 1, Power cord x 1, Test lead GTL-104A x 1 , European test lead GTL-204A x 1

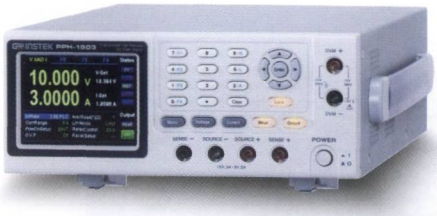
OPTIONAL ACCESSORIES

GTL-232A RS-232C Cable

FREE DOWNLOAD

PC Software RS-232C Remote Control Software

Programmable High Precision D.C. Power Supply



PPH-1503

CE | USB Host | PC Software | LAN | GPIB | LabVIEW Driver

FEATURES

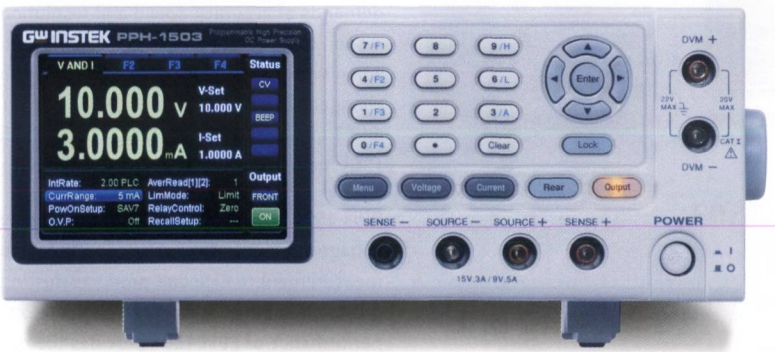
* Dual Range Output (0~15V/0~3A or 0~9V/0~5A) ; Output Power 45W
* 3.5 Inch TFT LCD Display
* Constant Voltage and Constant Current Operation
* Built-in DVM Measurement Function
* High Measurement Resolution (1mV/0.1mA for 5A Range) ; (1mV/0.1μA for 5mA Range)
* External Relay Control Output On/Off
* Sink Current Capability (Maximum : 2A)
* Digital Panel Control
* Selectable Output and Input (DVM) Ports From Front or Rear Panel
* Key Lock Function
* 5 Sets of Preset Memory Including Power Output ON/OFF States
* High Speed Transient Recovery Time (< 40μS within 100mV ; < 80μS within 20mV)
* OVP/OCP/OTP Protection to Prevent DUT Damage Standard Multiple Interfaces : USB/LAN/GPIB LabView Driver and PC Remote Control Software

PPH-1503 is a high-speed and high-precision DC Power Supply with Dual Range of 15V/3A or 9V/5A. PPH-1503 is exclusively designed to meet low power consumption requirements and users' great demands of accuracy, speed and resolution of both voltage and current. Circuits are designed with swift response capability to provide a stable voltage output while experiencing load changes. For example, when switching cellular phone from standby to talk mode, the current consumption will be dramatically changed within milliseconds. When load current exceeded current limit, two operational modes: Limit and Trip can be selected. Under Limit mode, PPH-1503 will automatically switch to constant current (CC) mode. Under Trip mode, voltage output will automatically turn off.

PPH-1503 is designed to provide prompt response to the current change for recovering the output voltage at a minimum variation. The high sampling rate allows fast readback in voltage and current measurement to expedite products' testing speed, which is able to increase the test throughput of production. Sink function can be used to test the battery charger of portable devices. The high precision performance of PPH-1503 provides the measurement capability in low power consumption level. One built-in DVM (Digital Volt-Meter) with input ports is designed to measure any point on DUT while PPH-1503 is outputting voltage and current. Besides, two ports are located on the front and rear panel which users can only select one to perform tests based upon their connection convenience. PPH-1503 is an ideal power source for production lines, R&D laboratories, device inspection, maintenance centers or facilities with the requirements of a swift and precise power supply with DVM.

SPECIFICATIONS	
OUTPUT	
Number of Channel	1
Voltage Rating	0 ~9V/5A ; 0~15V/3A
Current Rating	0 ~ 5A (Low Range : 9V); 0 ~ 3A (High Range:15V)
Power Rating	45W
Output Voltage Rising Time	0.15ms (10% ~ 90%)
Output Voltage Falling Time	0.65ms (90% ~ 10%)
STABILITY	
Voltage	0.01%+0.5mV
Current	0.01%+50 μA
REGULATION (CV)	
Load	0.01%+2mV
Line	0.5mV
REGULATION (CC)	
Load	0.01%+1mA
Line	0.5mA
RIPPLE & NOISE (20Hz ~ 20MHz)	
CV p-p	8mV
CV rms	1mV
PROGRAMMING ACCURACY	
Voltage	±(0.05%+10mV)
Current	±(0.16%+5mA)
READBACK ACCURACY	
Voltage	±(0.05%+3mV)
Current (5A Range)	±(0.2%+400 μA)
Current (5mA Range)	±(0.2%+1 μA)
RESPONSE TIME (RESPONSE to 1000% LOAD CHANGE)	
Transient Recovery Time	< 40 μS within 100mV < 80 μS within 20mV
PROGRAMMING RESOLUTION	
Voltage	2.5mV
Current	1.25mA
READBACK RESOLUTION	
Voltage	1mV
Current (5A Range)	0.1mA
Current (5mA Range)	0.1 μA
PROTECTION FUNCTION	
OVP Accuracy	50mV
DVM	
DC Read Back Accuracy (23℃± 5℃)	±0.05%+3mV
Read Back Resolution	1mV
Maximum DC Differential Voltage	0 ~ 20VDC
Input Resistance and Capacitance	100000MΩ
PULSE CURRENT MEASUREMENT	
Trigger Level	5mA ~ 5A, 5mA/Step
High Time/low Time/average Time	33.3us to 833ms, 33.3us/Step
Trigger Delay	0 ~ 100ms,10us/Steps
Average Readings	1 ~ 100
Long Integration Pulse Timeout	1S ~ 63S
Long Integration Measurement Time	850ms(60Hz)/840ms(50Hz) ~ 60s, or Auto time 16.7ms/Steps(60Hz), 20ms/Steps(50Hz)
Long Integration Trigger Mode	Rising, Falling, Neither

Rear Panel



PPH-1503

SPECIFICATIONS	
OTHER	
Output Terminal	Front/Rear Panel
DVM Input	Front/Rear Panel
Relay Control Connector	150mA/15V 5 Voutput, 100mA
Operation Temperature	0 ~ 40°C
Operation Humidity	≤ 80%
Storage Temperature	-20°C ~ 70°C
Storage Humidity	< 80%
PC REMOTE INTERFACES	
Standard	GPIB/USB/LAN
PC SOFTWARE & LABVIEW DRIVER	
Free	PC Software/Labview Driver
CURRENT SINK CAPACITY	
Sink Current Rating	2A(Vout≦5V); 2A-0.1x(Vout-5)(Vout>5V)
MEMORY	
Save/Recall	5 Sets
POWER SOURCE	
Inpout Power	90 ~ 264VAC ; 50/60Hz
Power Consumption	150VA
DIMENSIONS & WEIGHT	
	222(W) x 86(H) x 363(D) mm; Approx 4.2Kg

ORDERING INFORMATION

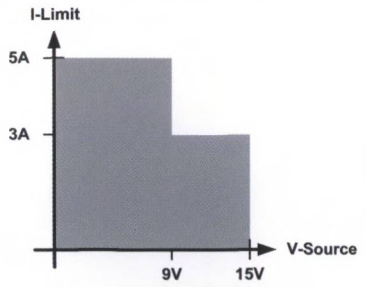
PPH-1503 Programmable High Precision DC Power Supply

ACCESSORIES :
User Manual (CD) x 1, Quick Start Guide x 1, Power Cord x 1 (Region Dependent)
GTL-117 Test Lead (10A Maximum), GTL-204A Test Lead(10A Maximum),
GTL-203A Test Lead (3A Maximum)

OPTIONAL ACCESSORIES

GTL-248 GPIB Cable (2.0M)
GTL-251 GPIB-USB-HS(High Speed)
GTL-246 USB Cable (USB 2.0, A-B Type)

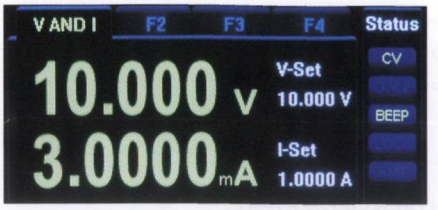
A. DUAL RANGE OPERATION



Dual Range Operation

PPH-1503 operates as a generic power supply with the ability to display different current ranges from 3A range with 0~15.0V output to 5A range with 0~9.0V output totally for 45W output capacity.

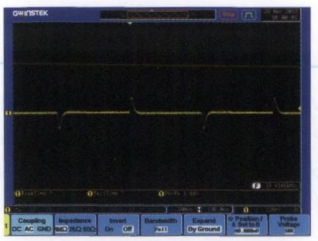
B. ACCURATE LOW CURRENT MEASUREMENT



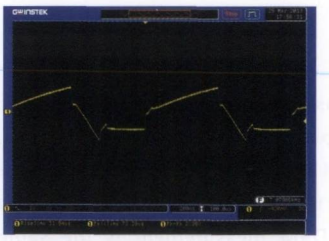
0.1μA Resolution

PPH-1503 provides 0.2%+1μA readback accuracy and 0.1μA resolution for high precision of current measurement. For example, when portable device works in the sleep or standby mode, the current is drawn at a low level. The low current consumption under standby or sleep mode can be measured accurately.

C. FAST RESPONSE TO LOAD AND VOLTAGE CHANGES



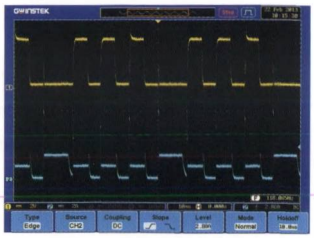
PPH-1503



Conventional Power Supply

When DUT such as cellular phone switches to idling, receiving or transmitting mode, the current drawn from power supply changes over tenfold. The sudden current change will cause the supplied voltage to drop as well. The conventional power supply is considered a dull device since it will take several milliseconds for the dropped voltage to return to the original level. PPH-1503 is designed to simulate battery response when a significant voltage drop occurs. Recovery time of 40μs or less is guaranteed when the maximum voltage drop is within 100mV. Moreover, when users change the voltage level and conventional power supply does not have sufficient speed to reach the set level, PPH-1503 provides rise time of 0.15ms and fall time of 0.65ms, which are hundreds times faster than that of the conventional power supplies.

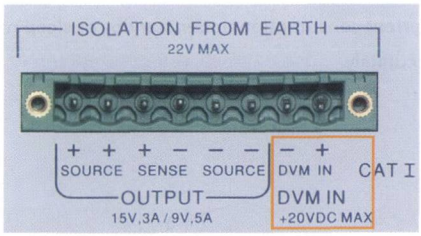
D. MEASUREMENTS FOR POWER CONSUMPTION ANALYSIS



Voltage and Current Waveforms of the Receiving Signals of a Cellular Phone

One particular requirement of power consumption for portable wireless communications devices is Pulse Current. Portable devices such as cellular phones must transmit and receive (detect) signal periodically by drawing pulse current instead of constant current from battery to ensure devices' sound connection in network. To analyze the transient power consumption of a DUT, the peak of short pulse current and average current measurements over a long period of time are crucial. PPH-1503 provides pulse current and long integration functions, the former can measure the peak value of a pulse, the latter can measure the average value of pulses. PPH-1503 provides DUT with pulse current measurement and analyzes the transient power consumption to qualify the device for specified power consumption requirements.

E. BUILT-IN DIGITAL VOLTMETER (DIGITAL VOLT-METER)

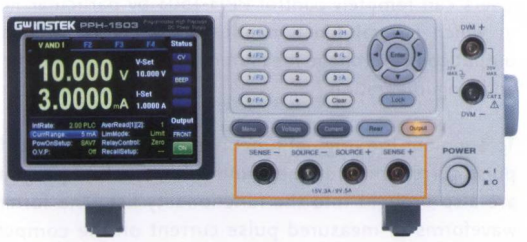


Rear Panel of the PPH-1503

Front Panel of the PPH-1503

PPH-1503 contains a built-in auxiliary DVM (Digital Volt-Meter) with dedicated input ports located on both front and rear panel. Consequently PPH-1503 not only provides power source for DUT but also measures the voltage from any point on the circuit of DUT. The accuracy of DVM measurement is the same as readback accuracy. Both DVM ports can be remotely controlled by SCPI commands via a PC. The built-in DVM function widely supports various voltage applications, therefore, users DO NOT have to purchase extra voltage meters.

F. SELECTABLE FRONT/REAR PORTS FOR POWER OUTPUTS AND DVM INPUTS

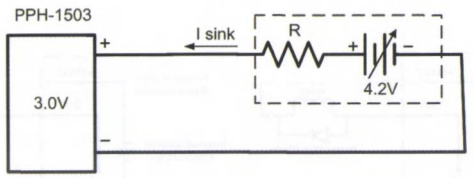


Front Panel of PPH-1503 (Output Terminal)

Rear Panel of PPH-1503 (Output Terminal)

Either front or rear panel provides power supply output and DVM input ports for users' connection consideration. The above-mentioned panels can only be used one at a time. Therefore, this special feature of PPH-1503 not only fits in production lines but also is widely used for R&D laboratories, device inspection or maintenance centers.

G. SINK OPERATION

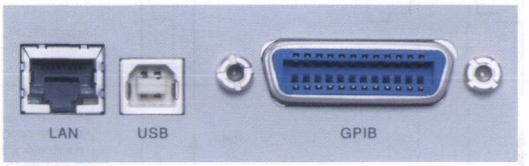


Current Sink Connection

Chargers are often attached to portable battery operated devices. PPH-1503 can sink current, acting as an electronic load, and simulate discharged function of rechargeable batteries. The maximum current is up to 2A. Users can test either battery charged or discharged without changing test equipment.

Note : R is internal resistance of the battery for DUT devices.

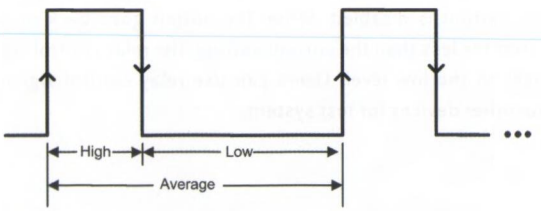
H. MULTIPLE PC REMOTE INTERFACES



Multiple PC Remote Interfaces

PPH-1503 can be connected via USB, GPIB and LAN for remote control by using SCPI commands.

I. PULSE CURRENT MEASUREMENTS



The Time Specified for the Measurement

PPH-1503 DC power supply can perform current measurements for pulsing loads. Its several built-in measurement modes include :

- High Measured Current-measure the peak current of the pulse train.
- Low Measured Current-measure the low current of the pulse train.
- Average Transmit Current-measure the average current of the pulse train.

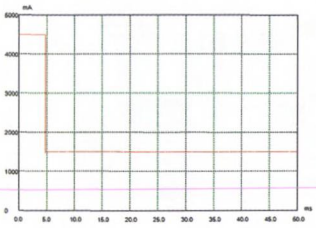
The high, low, and average measurements of a pulse are illustrated as follow :

To avoid false pulse detection, users can use a trigger level of up to 5A. All pulses, noise or other transients that are less than set trigger level will be ignored. The manual integration time range setting is 33 us to 833,333 us.

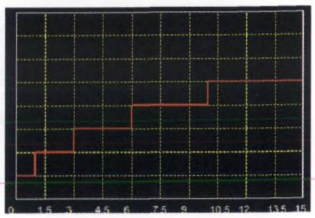
Pulse current measurement can measure transient current consumption to provide the information for the allocation of power supply system for products' preliminary design, i.e. power supply circuits, battery selections for clients' product analyses. Portable communications products, i.e. RF modules and designs based upon blue tooth system can better use pulse current measurement function.

Long integration is an average current measurement of one or more pulses. A pulse edge can be used to trigger the start of a measurement. The long integration time period must be a full period or integer multiples of a complete period of the measured pulse current and can be set to a maximum of 60 seconds. Long integration analyzes products' overall power consumption at a certain period of time, for instance, measuring the power consumed from beginning to the end of a phone call for a cellular phone so as to analyze all parameters of RF module.

J. PC-SOFTWARE



Pulse Current Measurement

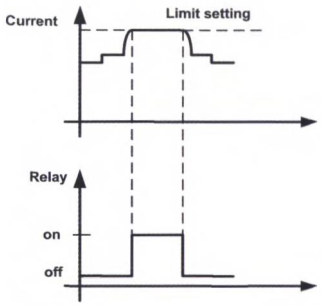


Program Editing

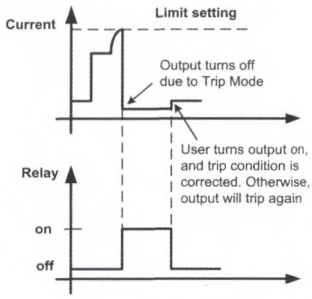
Users can remotely control PPH-1503 by particular PC software, in which several functionalities are included : voltage/current output control, voltage measurement, pulse current measurement and long integration.

To augment the original functions, waveform display function of pulse current measurement and voltage output program function are also brought into the functionality list. The former displays waveforms of measured pulse current on the computer screen. The latter allows users to produce waveforms of predetermined voltage output by programming which can be set to the maximum steps of 20 and each step is 1ms to the fastest. PC software can be downloaded from GW Instek website.

K. EXTERNAL RELAY CONTROL

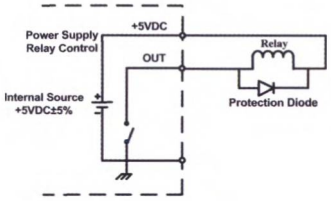


Limit Relay



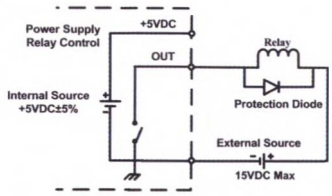
Trip Relay

Relay Can be Driven by Using Internal +5V or External Power Source :



+5VDC Relay Output

Using the +5VDC relay output to drive an external relay. Ensure the current does not exceed 150mA.



External Power Source

Using an external power source to drive the external relay. The voltage of the source can not exceed 15V and the current can not exceed 150mA.

PPH-1503 provides Limit relay and Trip relay modes and is equipped with corresponding output ports, in which output signals control external relay. Under Limit relay mode and the current limit is reached, PPH-1503 will switch from Constant Voltage to Constant Current automatically. Under "Trip relay" mode and the current limit is reached, PPH-1503 will turn output off. Furthermore, External Relay control can be used if users simultaneously use other devices for test system. When "Limit Relay" mode is selected and the current limit is reached, External Relay control signal will go high and will return back to the low level when the current level goes back below the constant current setting. When "Trip Relay" mode is selected and the current limit is reached, the relay control signal will go high and the output is disabled. When the output goes back on and the current is less than the current setting, the relay control signal will back to the low level. Users can use relay control signal to control other devices for test system.

Single Output Programmable Linear D.C. Power Supply

PPS-3635 is a single output, 126W output, programmable linear DC power supply. OVP and OCP hardware protection, compliance to major safety standards such as UL, CSA, and IEC ensure a high level of safety and reliability. The remote sense adds extra level of precision by compensating cable losses between loads. The SCPI command set and LabVIEW driver access through the GPIB interface provide remote control and ATE software development capability. The flexible PPS-3635 GPIB is ideal for high-level applications requiring high precision and an extra level of safety.

PPS-3635

CE GPIB LabVIEW Driver

FEATURES

* Easy Operation with UP/DOWN Key
* High Resolution: 10mV, 1mA
* Over Voltage Protection, Over Current Protection (by Hardware)
* 100 Set Memory
* Self Test and Software Calibration
* Auto Step Running With Time Setting
* FRONT/REAR Output and Sense Switch Selectable
* IEEE-488.2 and SCPI Compatible Command set
* LabVIEW Driver Software
* High Stability, Low Drift
* 4 Digit Display
* IEC Safety Regulation

Rear Panel

SPECIFICATIONS		
OUTPUT		
Voltage Current OVP		0 ~ 36V 0 ~ 3.5A 0 ~ 38.5V
LOAD REGULATION		
Voltage Current		≤ 3mV rear output (≤ 6mV front output) ≤ 3mA (≤ 6mA rating current > 3.5A)
LINE REGULATION		
Voltage Current		≤3mV ≤3mA
RESOLUTION		
Voltage Current OVP		10mV (20mV rating voltage > 36V) 1mA (2mA rating current >3.5A) 10mV(20mV rating voltage > 36V)
PROGRAM ACCURACY (25±5°C)		
Voltage Current OVP		≤0.05% + 25mV (+ 50mV rating voltage > 36 V) ≤0.2% + 10mA ≤2% + 0.6V
RIPPLE & NOISE (20Hz ~ 20MHz)		
Voltage Current		Ripple 1mVrms / 3mVp-p Noise 2mVrms / 30mVp-p ≤3mA rms (≤ 5mA rms rating current > 3.5A)
TEMPERATURE COEFFICIENT (0~40°C)		
Voltage Current		≤100ppm + 3mV ≤150ppm + 3mA
READBACK RESOLUTION ACCURACY (25±5°C)		
Voltage Current Voltage Current		10mV (20mV rating voltage > 36V) 1mA (2mA rating current > 3.5A) ≤0.05% + 25mV (+ 50mV rating voltage > 36V) ≤0.2% + 10mA
RESPONSE TIME		
VOLTAGE UP VOLTAGE DOWN	10% ~ 90% 90% ~ 10%	≤100mS ≤100mS (≥10% rating load)
READBACK TEMPERATURE		
COEFFICIENT DRIFT	Voltage Current Voltage Current	≤100ppm + 10mV (+ 20mV rating voltage > 36V) ≤150ppm + 10mA ≤0.03% + 6mV ≤0.1% + 6mA
MEMORY		
Store/Recall		100 sets
TIMER		
Setting Time Resolution Function		1 second ~ 255 minutes (Max. 255 minutes x 100 Sets) 1 second for output working loop (Auto Step running)
INTERFACE		
GPIB Interface Standard		
POWER SOURCE		
AC 100V/120V/ 220V/240V±10%, 50/60Hz		
DIMENSIONS & WEIGHT		
255(W) x 145(H) x 346(D) mm; Approx. 9.5kg		

ORDERING INFORMATION

PPS-3635 126W Single Output Programmable D.C. Power Supply

ACCESSORIES :

User manualx1, Power cordx1, Test lead GTL-104A x 1

OPTIONAL ACCESSORIES

GRA-401	Rack Adapter Panel, 19" 4U
GTL-248	GPIB Cable, Double Shielded, 2000mm
GTL-251	GPIB-USB-HS(High Speed)

FREE DOWNLOAD

Driver	LabView Driver

Programmable Dual-range Linear D.C. Power Supply

PSM-2010/3004/6003

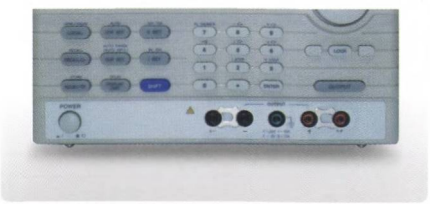
CE | RS-232 | GPIB | Rear-Panel Output | PC Software | LabVIEW Driver

The PSM-Series is single output / dual range, 120W or 200W, programmable linear DC power supplies. OVP, OCP, OTP, and output On/Off control protect the PSM-Series and their load from unexpected conditions. High resolution, high regulation, and low ripple are maintained at 1mV/1mA, 0.01%, and <350μVrms, respectively. Operation and configuration is simplified with a digital interface and a clear LCD display. Standard features include; store/recall output memories, automatic stepping with timers for continuous testing and self-testing and software calibration features to reduce maintenance overhead. SCPI programming, LabVIEW drivers, RS-232C and GPIB interfaces enable easy automated test system integration and remote control. The PSM-Series is an ideal choice for high precision applications such as QA verification and product development.

FEATURES

* Single Output Dual Range Max. 200W
* High Resolution: 1mV/1mA
* Stable & Clear Power: 0.01% Load/Line Regulation, 350μVrms Ripple
* 100 Sets Memory
* Auto Step Running With Timer Setting
* Safety Design: OVP, OCP & OTP ; Output ON/OFF Control(OCP Provides Delay Setting to Prevent Trip of High Start-Up Current)
* Self-Test and Software Calibration
* Highly Visible Vacuum-Fluorescent Display
* Front and Rear Output Terminal
* Standard Interface : RS-232C, GPIB
* Optional European Jack Type Terminal

European Type Jack Terminal



Rear Panel

SPECIFICATIONS

		PSM-2010	PSM-3004	PSM-6003
DC OUTPUT				
Low Range High Range		0 ~ 8V/20A 0 ~ 20V/10A	0 ~ 15V/7A 0 ~ 30V/4A	0 ~ 30V/6A 0 ~ 60V/3.3A
CONSTANT VOLTAGE OPERATION				
Regulation (% of output + offset)		Load regulation ≤ 0.01% + 2mV Line regulation ≤ 0.01% + 2mV		
Ripple & Noise		< 350μVrms/3mVpp	< 350μVrms/2mVpp	≤50V:<500μVrms/3mVpp >50V:<1mVrms/3mVpp
CONSTANT CURRENT OPERATION				
Regulation (% of output + offset) Ripple & Noise		Load regulation ≤ 0.01% + 250μA Line regulation ≤ 0.01% + 250μA < 2mArms		
RESOLUTION				
Programming	Voltage	1mV	1mV	2mV
	Current	1mA	0.5mA	0.5mA
Readback	Voltage	0.5mV	0.5mV	1mV
	Current	1mA	0.1mA	0.5mA
Front Panel	Voltage	1mV		
	Current	1mA(<10A),10mA(≥10A)		
OVP/OCP	Voltage	10mV		
	Current	10mA		
ACCURACY				
Programming	Voltage	0.05% + 10mV		
	Current	0.2% + 10mA		
Readback	Voltage	0.05% + 5mV		
	Current	0.15% + 5mA		
OVP/OCP	Voltage	0.1% + 10mV		
	Current	0.4% + 10mA		
TRANSIENT RESPONSE				
		< 50μsec (for output to recover within 15mV following a change in output current from full load to half load)		
COMMAND PROCESSING TIME				
		100 ms		
VOLTAGE PROGRAMMING RESPONSE TIME (for resistive load)(10% ~ 90%)				
Voltage Up	Full Load	95 ms	50 ms	80 ms
	No Load	45 ms	20 ms	100 ms
Voltage Down	Full Load	30 ms	45 ms	30 ms
	No Load	450 ms	400 ms	450 ms
STABILITY (% of output + offset)				
Voltage Current		0.02% + 1mV 0.1% + 1mA		
MEMORY				
Store/Recall		100 sets		
TEMPERATURE COEFFICIENT PER °C ± (% of Output + Offset)				
Voltage Current		0.01% + 3mV 0.02% + 3mA		
POWER SOURCE				
AC 100V/120V/220V±10% , 230V (- 6% ~ + 10%), 50/60Hz				
INTERFACE				
Standard RS-232C , GPIB				
DIMENSIONS & WEIGHT				
230(W) x 140(H) x 380(D) ; Approx. 10kg				

ORDERING INFORMATION

PSM-2010 200W Single Output, Programmable Power Supply
PSM-6003 200W Single Output, Programmable Power Supply
PSM-3004 120W Single Output, Programmable Power Supply

ACCESSORIES :
User manual x 1, Power cord x 1, Test lead GTL-104A x 1 , European test lead GTL-204A x 1, Ground lead GTL-201A x 1 (European terminal), Sense lead GTL-202 x 1 (European Terminal)

OPTION

Opt. 01 : GRA-407 Rack Mounting (19" , 4U)

OPTIONAL ACCESSORIES

GTL-232 RS-232C Cable, 9-pin Female to 9-pin , Null Modem for PC Computer
GTL-251 GPIB-USB-HS(High Speed)
GTL-248 GPIB Cable, Double Shielded, 2000mm
GRA-407 Rack Adapter Panel (19" 4U)

FREE DOWNLOAD

PC Software PC Software including Data Log ; Remote Control Software
Driver Labview Driver ; PSM VB Example ; PSM VC++ Example

Programmable Linear D.C. Power Supply

PSS-2005/3203

CE | RS-232 | GPIB | PC Software | LabVIEW Driver

The PSS-Series is single output, 96W or 100W, programmable linear DC power supplies. OVP, OCP, and OTP protect the PSS series and their load from unexpected conditions. The LCD panel simultaneously displays output and other parameters and the regulated cooling fan ensures low noise for comfortable operation. RS232C and GPIB interfaces, SCPI command sets and LABVIEW drivers make remote control and ATE software development easier. (Note: only RS-232C or GPIB can be installed at one time) The compact PSS series is suitable for any high resolution bench-top or rack mount application.

FEATURES

* Digitized Programmable Interface
* High Resolution 10mV, 1mA
* High Stability, Low Drift
* Over-Voltage, Over-Current, Over Temperature Protection
* Intelligent Fan Control (Change by Output Power)
* Built-in Buzzer Alarm
* LabVIEW Driver
* Standard Interface : RS-232C
* Optional Interface : GPIB (IEEE-488.2)
* Optional European Jack Type Terminal

European Type Jack Terminal

Rear Panel

SPECIFICATIONS	PSS-2005	PSS-3203
OUTPUT		
Voltage Current OVP	0 ~ 20V 0 ~ 5A 0 ~ 21V	0 ~ 32V 0 ~ 3A 0 ~ 33V
LOAD REGULATION		
Voltage Current	≤ 3mV (≤ 5mV, rating current > 3.0A) ≤ 3mA (≤ 5mA, rating current > 3.0A)	
LINE REGULATION		
Voltage Current	≤ 3mV ≤ 3mA	
RESOLUTION		
Voltage Current OVP	10mV 1mA (2mA, rating current > 3.0A) 10mV	
PROGRAM ACCURACY (25 ± 5°C)		
Voltage Current OVP	≤ 0.05%+20mV ≤ 0.1%+5mA (+10mA, rating current > 3.0A) ≤ 0.05%+20mV	
RIPPLE & NOISE (20Hz ~ 20MHz)		
Voltage Current	Ripple ≤ 1mVrms/3mVp-p ; Noise ≤ 2mVrms/30mVp-p ≤ 3mArms (≤ 5mArms, rating current > 3.0A)	
TEMPERATURE COEFFICIENT (0 ~ 40°C)		
Voltage Current	≤ 100ppm+3mV ≤ 100ppm+3mA	
READBACK RESOLUTION		
Voltage Current	10mV 1mA (2mA, rating current > 3.0A)	
READBACK ACCURACY(25 ± 5°C)		
Voltage Current	≤ 0.05%+10mV ≤ 0.1%+5mA (10mA rating current > 3.0A)	
READBACK TEMPERATURE COEFFICIENT		
Voltage Current	≤ 100ppm+10mV ≤ 100ppm+5mA (10mA rating current > 3.0A)	
RESPONSE TIME		
Voltage Up (10%~90%) Voltage Down (90%~10%)	≤ 100mS ≤ 100mS (≥10% rating load)	
DRIFT		
Voltage Current	≤ 100ppm+10mV ≤ 150ppm+10mA	
INTERFACE		
Standard : RS-232C; Option : GPIB		
POWER SOURCE		
AC 100V/120V/220V±10%, 230V (+10%/-6%), 50/60Hz		
DIMENSIONS & WEIGHT		
108(W) x 142(H) x 318(D) mm, Approx. 4.8kg		

ORDERING INFORMATION

PSS-2005 100W Single Output Programmable D.C. Power Supply
PSS-3203 96W Single Output Programmable D.C. Power Supply

ACCESSORIES :
User manual x 1, Power cord x 1 Test lead GTL-104A x 1(PSS-2005) or GTL-105A x 1(PSS-3203)
European Test Lead GTL-204A x 1 (PSS-2005) or GTL-203A x 1 (PSS-3203)

OPTION

Opt.01 : GPIB Interface (factory installed)

OPTIONAL ACCESSORIES

GTL-232	RS-232C Cable, 9-pin Female to 9-pin, null Modem for Computer
GRA-408	Rack Adapter Panel (19" 4U)
GTL-251	GPIB-USB-HS(High Speed)
GTL-248	GPIB Cable, Double Shielded, 2000mm

FREE DOWNLOAD

PC Software	PC Software including Data Log ; Remote Control Software
Driver	LabView Driver

Note : When Opt.01 GPIB interface is ordered, the standard interface RS-232C will be deleted.

NON-PROGRAMMABLE & SINGLE CHANNEL DC POWER SUPPLY

GW Instek provides non-programmable & single output D.C. Power Supply at 54W ~ 1000W capacities. CC/CV mode with automatic crossover is a standard feature for all linear DC power supplies, while series and parallel tracking modes are standard features for all multi-output power supplies. In order to meet a broad range of applications, GW Instek provides different combinations of voltage and current within the same power ratings.

SPS-Series (Switching Mode, Single Output, Output Power : 360W)

	Model	Output Volts(V)	Output Amps(A)	Power(W)	Display Type	Weight(kg)	Page
LED Display	SPS-1230	0 ~ 12	0 ~ 30	360	3½ digit x 2	3.2	D46
	SPS-1820	0 ~ 18	0 ~ 20	360	3½ digit x 2	3.2	
	SPS-3610	0 ~ 36	0 ~ 10	360	3½ digit x 2	3.2	
	SPS-2415	0 ~ 24	0 ~ 15	360	3½ digit x 2	3.2	
	SPS-606	0 ~ 60	0 ~ 6	360	3½ digit x 2	3.2	

GPR-U Series (Linear Mode, Single Output, Output Power : 500W ~1000W)

	Model	Output Volts (V)	Output Amps (A)	Power(W)	Weight (kg)	Page
LED Display	GPR-1850HD	0 ~ 18	0 ~ 50	900	30	D47
	GPR-3520HD	0 ~ 35	0 ~ 20	700	29.5	
	GPR-6015HD	0 ~ 60	0 ~ 15	900	30	
	GPR-7510HD	0 ~ 75	0 ~ 10	750	29.5	
	GPR-16H50D	0 ~ 160	0 ~ 5	800	30.5	
	GPR-25H30D	0 ~ 250	0 ~ 3	750	29.5	
	GPR-35H20D	0 ~ 350	0 ~ 2	700	29.5	
	GPR-50H15D	0 ~ 500	0 ~ 1.5	750	29.5	
	GPR-60H15D	0 ~ 600	0 ~ 1.5	900	30.5	
	GPR-100H05D	0 ~ 1000	0 ~ 0.5	500	28.5	

GPR-H Series (Linear Mode, Single Output, Output Power : 200W~400W)

	Model	Output Volts (V)	Output Amps (A)	Power(W)	Weight (kg)	Page
LED Display	GPR-0830HD	0 ~ 8	0 ~ 30	240	18.5	D48
	GPR-1820HD	0 ~ 18	0 ~ 20	360	18.5	
	GPR-3510HD	0 ~ 35	0 ~ 10	350	18.5	
	GPR-6060D	0 ~ 60	0 ~ 6	360	18.5	
	GPR-7550D	0 ~ 75	0 ~ 5	375	18.5	
	GPR-11H30D	0 ~ 110	0 ~ 3	330	13.5	
	GPR-30H10D	0 ~ 300	0 ~ 1	300	13.5	

GPR-M Series (Linear Mode, Single Output, Output Power : 180W)

	Model	Output Volts (V)	Output Amps (A)	Power(W)	Weight (kg)	Page
LED Display	GPR-1810HD	0 ~ 18	0 ~ 10	180	11.5	D49
	GPR-3060D	0 ~ 30	0 ~ 6	180	11.5	
	GPR-6030D	0 ~ 60	0 ~ 3	180	11.5	

GPS-Series (Linear Mode, Single Output, Output Power : < 100W)

	Model	Output Volts(V)	Output Amps(A)	Power(W)	Display Type	Weight(kg)	Page
Analog Meter Display	GPS-1850	0 ~ 18	0 ~ 5	90	V-Meter x 1,I-Meter x 1	5.5	D50
	GPS-3030	0 ~ 30	0 ~ 3	90	V-Meter x 1,I-Meter x 1	5	
LED Display	GPS-1830D	0 ~ 18	0 ~ 3	54	3½ digit x 1	4	
	GPS-1850D	0 ~ 18	0 ~ 5	90	3½ digit x 1	5	
	GPS-3030D	0 ~ 30	0 ~ 3	90	3½ digit x 1	5	
	GPS-3030DD	0 ~ 30	0 ~ 3	90	3½ digit x 2	5	

Switching D.C. Power Supply

The SPS-Series is single output, 360W, switching DC power supply. OVP protects the SPS-Series and their load from unexpected conditions. High regulation is maintained at 0.01%. Remote sensing adds an extra level of precision by compensating cable losses between loads. Turning the output On/Off from external device is available through Remote control terminals. The GPS-Series is an ideal solution for power-efficient bench-top or portable applications requiring high regulation.

SPS-1230/1820/2415/3610/606

CE Rear-Panel Output

FEATURES

* Dual Measurement Display
* 0.01 % High Regulation
* Constant Voltage and Constant Current Operation
* High Efficiency
* High Power Density
* Over Voltage Protection
* Remote Output ON/OFF Control

Rear Panel

SPECIFICATIONS

OUTPUT

	SPS-1230	SPS-1820	SPS-2415	SPS-3610	SPS-606
Voltage	0 ~ 12V	0 ~ 18V	0 ~ 24V	0 ~ 36V	0 ~ 60V
Current	0 ~ 30A	0 ~ 20A	0 ~ 15A	0 ~ 10A	0 ~ 6A

CONSTANT VOLTAGE OPERATION	
Regulation	Line regulation ≤5mV Load regulation ≤5mV
Ripple & Noise	≤5mVrms, 100mVp-p 20Hz ~ 20MHz
Recovery Time	≤500μS (50% Load change, Minimum load 0.5A)
Temp. Coefficient	≤ 100ppm /°C
Output Range	0 to rating voltage continuously adjustable

CONSTANT CURRENT OPERATION	
Regulation	Line regulation ≤3mA Load regulation ≤3mA
Ripple Current	≤3mArms (SPS-606) ≤5mArms (SPS-3610) ≤10mArms (SPS-2415) ≤10mArms (SPS-1820) ≤30mArms (SPS-1230)
Output Range	0 to rating current continuously adjustable (HI/LO range switchable)

METER	
Type	3 1/2 digit, 0.39" LED display
Accuracy	± (0.5% of rdg + 2digits)

INSULATION	
Chassis and Terminal	20MΩ or above (DC 500V)
Chassis and AC Cord	30MΩ or above (DC 500V)

POWER SOURCE
AC 115V/ 230V± 15 %, 50/60Hz

DIMENSIONS & WEIGHT
128(W) x 151(H) x 295(D) mm, Approx. 3.2kg

ORDERING INFORMATION

SPS-1230 360W D.C. Switching Power Supply
SPS-1820 360W D.C. Switching Power Supply
SPS-2415 360W D.C. Switching Power Supply
SPS-3610 360W D.C. Switching Power Supply
SPS-606 360W D.C. Switching Power Supply

ACCESSORIES :
User manual x 1 , Power cord x 1 , Test lead GTL-203A x 1

Linear D.C. Power Supply

The GPR-U Series is single output, 500W to 900W, linear DC power supplies. Overload and reverse polarity protection in addition to OVP/OCP/OTP protect the GPR-U Series and their load from unexpected conditions. High regulation and low ripple/noise are maintained at 0.01% and < 2mVrms, respectively for CV mode. The GPR-U series can be ordered with a customized output requirement from voltage rating from 8W to 1000V and current rating from 0.5~75A (under 1kVA available). The GPR-U Series is the ideal lineup for system applications requiring large output capacity and custom-made output settings, such as material testing and product copper plating.

GPR-U Series

Rear-Panel Output

FEATURES

- 0.01% High Regulation
- Constant Voltage and Constant Current Operation
- Low Ripple and Noise
- Overload and Reverse Polarity Protection
- 3 1/2 Digits 0.5" LED Display
- Application for Material and Products Aging
- Built-In Overvoltage and Overcurrent Tripped Crowbar
- Ten-Turn Potentiometer

Rear Panel

GPR-6015HD

GPR-25H30D

SPECIFICATIONS

CONSTANT VOLTAGE OPERATION	
Regulation	Line regulation ≤0.01% + 3mV Load regulation ≤0.01% + 5mV (<10A) ≤ 0.02% + 5mV (≥10A)
Ripple & Noise	≤2mVrms (5Hz ~ 1MHz)
Recovery Time	≤100μS(50% Load change,Minimum load 0.5A)
Output Range	0 to rating voltage continuously adjustable
CONSTANT CURRENT OPERATION	
Regulation	Line regulation≤0.2% + 3mA Load regulation≤0.2% + 3mA
Ripple Current	≤5mArms (≤20A),≤20mArms (≤50A) ≤100mArms (≤100A)
Output Range	0 to rating current continuoulsy adjustable
METER	
Type	3 1/2 Digits 0.5" LED display
Accuracy	±(0.5% of rdg + 2 digits)
INSULATION	
Chassis and Terminal	100MΩor above (DC 1000V)
Chassis and AC Cord	100MΩor above (DC 1000V)
POWER SOURCE	
AC 120V±10%, 50/60Hz (AC220V or 240V order made)	
DIMENSIONS	
430(W) x 178(H) x 572(D) mm	

ORDERING INFORMATION

	Model	Output Volts (V)	Output Amps (A)	Weight (kg)
GPR-1850HD	900W D.C. Power Supply	0 ~ 18	0 ~ 50	30
GPR-3520HD	700W D.C. Power Supply	0 ~ 35	0 ~ 20	29.5
GPR-6015HD	900W D.C. Power Supply	0 ~ 60	0 ~ 15	30
GPR-7510HD	750W D.C. Power Supply	0 ~ 75	0 ~ 10	29.5
GPR-16H50D	800W D.C. Power Supply	0 ~ 160	0 ~ 5	30.5
GPR-25H30D	750W D.C. Power Supply	0 ~ 250	0 ~ 3	29.5
GPR-35H20D	700W D.C. Power Supply	0 ~ 350	0 ~ 2	29.5
GPR-50H15D	750W D.C. Power Supply	0 ~ 500	0 ~ 1.5	29.5
GPR-60H15D	900W D.C. Power Supply	0 ~ 600	0 ~ 1.5	30.5
GPR-100H05D	500W D.C. Power Supply	0 ~ 1000	0 ~ 0.5	28.5

ACCESSORIES :
User manual x 1
Test lead GTL-105A x 1 (≤ 3A) or GTL-104A x 1 (≤ 10A) or Not Available (> 10A or 600V)

OPTIONAL ACCESSORIES

GTL-122	Test Lead, U-type to Alligator Test Lead, Max. Current 40A, 1200mm

Note: Special order 8 volts to 1000 volts and 0.5 Amps to 75 Amps under 1kVA available.
Rear-Panel Output for GPR-1850HD/3520HD/6015HD

Linear D.C. Power Supply

The GPR-H Series consists of single output linear DC power supplies with voltage outputs ranging from 8V to 300V. The series includes overload and reversed polarity protection to protect devices under test from being damaged due to impropriate operation. The internal select for dynamic loads is often used for amplifier testing. It can support high pulse current derived from dynamic processes as well as support low noise and noise, which make it suitable for high-end bench-top applications requiring precision. Its rear panel supports output wiring. These features combined into one assembly allow the GPR-H Series to predominate in applications requiring high voltage or high current.

GPR-H Series

CE Rear-Panel Output

FEATURES

* 0.01% High Regulation
* Constant Voltage and Constant Current Operation
* Internal Select for Continuous or Dynamic Load
* Low Ripple and Noise
* Overload and Reverse Polarity Protection
* 3 1/2 Digit 0.5" LED Display
* Internal Select for Continuous or Dynamic Load (for GPR-3510HD/GPR-6060D/ GPR-7550D)

Rear Panel

SPECIFICATIONS	
CONSTANT VOLTAGE OPERATION	
Regulation	Line regulation ≤ 0.01% + 3mV Load regulation ≤ 0.01% + 5mV (<10A) ≤ 0.02% + 5mV (≥10A)
Ripple & Noise	≤1mVrms 5Hz ~ 1MHz
Recovery Time	≤100μS (50% load change, minimum load 0.5A)
Output Range	0 to rating voltage continuously adjustable
CONSTANT CURRENT OPERATION	
Regulation	Line regulation ≤ 0.2% + 3mA Load regulation ≤ 0.2% + 5mA
Ripple Current	≤5mArms (≤20A), ≤10mArms (≤30A) ≤20mArms (≤50A)
Output Range	0 to rating current continuoulsy adjustable
METER	
Type	3 1/2 Digit 0.5" LED display
Accuracy	±(0.5% of rdg + 2 digits)
INSULATION	
Chassis and Terminal	100MΩ or above (DC 1000V)
Chassis and AC Cord	100MΩ or above (DC 1000V)
POWER SOURCE	
AC 100V/120V/220V/240V ±10%, 50/60Hz	
DIMENSIONS	
254(W) x 152(H) x 456(D) mm	

ORDERING INFORMATION

Model		Output Volts (V)	Output Amps (A)	Weight (kg)
GPR-0830HD	240W D.C. Power Supply	0 ~ 8	0 ~ 30	18.5
GPR-1820HD	360W D.C. Power Supply	0 ~ 18	0 ~ 20	18.5
GPR-3510HD	350W D.C. Power Supply	0 ~ 35	0 ~ 10	18.5
GPR-6060D	360W D.C. Power Supply	0 ~ 60	0 ~ 6	18.5
GPR-7550D	375W D.C. Power Supply	0 ~ 75	0 ~ 5	18.5
GPR-11H30D	330W D.C. Power Supply	0 ~ 110	0 ~ 3	13.5
GPR-30H10D	300W D.C. Power Supply	0 ~ 300	0 ~ 1	13.5

ACCESSORIES :
User manual x 1, Power cord x 1
Test lead GTL-105A x 1 (≤ 3A) or GTL-104A x 1 (≤10A) or Not Available (>10A)

OPTIONAL ACCESSORIES

GTL-122	Test Lead, U-type to Alligator Test Lead, Max. Current 40A, 1200mm

Note: CE Approved Only for GPR-1820HD, GPR-3510HD, GPR-7550D, GPR-11H30D
Rear-Panel Output Only for GPR-0830HD, GPR-1820HD

Linear D.C. Power Supply

The GPR-M Series is single output, 180W, linear DC power supplies which featuring all the same functions as the GPR-H Series but for lower power demands. Like the GPR-H Series, the GPR-M Series is suitable for high-end precision bench top applications. Low load and line regulation for both constant voltage and constant current mode ensure reliable, predictable output. Overload and reverse polarity protection as well as internal selection for dynamic or constant load are standard.

GPR-M Series

CE

FEATURES

* 0.01% High Regulation
* Constant Voltage and Constant Current Operation
* Internal Select for Continuous or Dynamic Load
* Low Ripple and Noise
* Overload and Reverse Polarity protection
* 3 1/2 Digit 0.5" LED Display

SPECIFICATIONS	
CONSTANT VOLTAGE OPERATION	
Regulation	Line regulation ≤0.01% + 3mV Load regulation ≤0.01% + 5mV (<10A) Load regulation ≤ 0.02% + 5mV (≥10A)
Ripple & Noise	≤1mVrms 5Hz ~ 1MHz
Recovery Time	≤100μS(50% load change, minimum load 0.5A)
Output Range	0 to rating voltage continuously adjustable
CONSTANT CURRENT OPERATION	
Regulation	Line regulation≤0.2% + 3mA Load regulation≤0.2% + 3mA
Ripple Current	≤3mArms
Output Range	0 to rating current continuoulsy adjustable
METER	
Digital	3 1/2 Digits 0.5" LED display Accuracy±(0.5% of rdg + 2 digits)
INSULATION	
Chassis and Terminal	20MΩ or above (DC 500V)
Chassis and AC Cord	30MΩ or above (DC 500V)
POWER SOURCE	
AC 100V/120V/220V/240V±10%, 50/60Hz	
DIMENSIONS	
254(W) x 152(H) x 349(D) mm	

ORDERING INFORMATION

Model		Output Volts (V)	Output Amps (A)	Weight (kg)
GPR-1810HD	180W D.C. Power Supply	0 ~ 18	0 ~ 10	11.5
GPR-3060D	180W D.C. Power Supply	0 ~ 30	0 ~ 6	11.5
GPR-6030D	180W D.C. Power Supply	0 ~ 60	0 ~ 3	11.5

ACCESSORIES :
User manual x 1 , Power cord x 1
Test lead GTL-105A x 1 (GPR-6030D)
GTL-104A x 1 (GPR-1810HD/3060D)

OPTIONAL ACCESSORIES

GRA-401 Rack Adapter Panel (19" , 4U)

GPS-1830D/1850D/3030D

CE

GPS-1850/3030

CE

GPS-3030DD

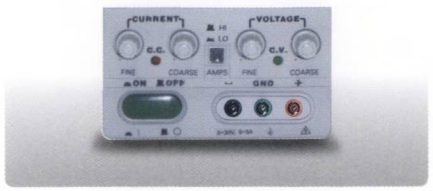
CE

The GPS-Series is single output, 54W to 90W, linear DC power supplies. The GPS-Series includes both analog and digital display meters with varying power outputs. The GPS-Series features overload and reverse polarity protection as well as high regulation and low ripple/noise that are maintained at 0.01% and < 1mVrms, respectively. Continuous or dynamic internal load selection accommodates applications such as pulsed current. Remote control terminals offer programming and operation from an external device.

FEATURES

* Light and Compact Design
* 0.01% High Regulation
* Constant Voltage and Constant Current Operation
* Remote Control for External Programmability
* Internal Select for Continuous or Dynamic Load
* Low Ripple and Noise
* Overload and Reverse Polarity Protection
* Series or Parallel Operation
* Optional European Type Jack Terminal for GPS-3030/GPS-3030D/GPS-3030DD

European Type Jack Terminal



SPECIFICATIONS

CONSTANT VOLTAGE OPERATION	
Regulation	Line regulation≤0.01% + 3mV Load regulation≤0.01% + 3mV (rating current≤3A) ≤0.01% + 5mV (rating current>3A)
Ripple & Noise	≤0.5mVrms 5Hz ~ 1MHz (rating current≤3A) ≤1mVrms 5Hz ~ 1MHz (rating current>3A)
Recovery Time	≤100μS (50% load change, minimum load 0.5A)
Temp. Coefficient	≤300 ppm /°C
Output Range	0 to rating voltage continuously adjustable
CONSTANT CURRENT OPERATION	
Regulation	Line regulation≤0.2% + 3mA Load regulation≤0.2% + 3mA
Ripple Current	≤3mArms
Output Range	0 to rating current continuously adjustable (Hi / Lo range switchable)
METER	
Analog	V-meter and I-meter 2.5 class Dimensions 50 x 50 mm
Digital	3½ digits 0.5" LED display (GPS-1830D/1850D/3030D) 3½ digits 0.39" LED display (GPS-3030DD) Accuracy±(0.5% of rdg + 2 digits)
INSULATION	
Chassis and Terminal	20MΩ or above (DC 500V)
Chassis and AC Cord	30MΩ or above (DC 500V)
POWER SOURCE	
AC 100V/120V/220V/240V±10%, 50/60Hz	
DIMENSIONS	
128(W) x 145(H) x 285(D) mm	

ORDERING INFORMATION

Model		Output Volts(V)	Output Amps(A)	Weight (kg)
GPS-1850	90W D.C. Power Supply	0 ~ 18	0 ~ 5	5.5
GPS-3030	90W D.C. Power Supply	0 ~ 30	0 ~ 3	5
GPS-1830D	54W D.C. Power Supply	0 ~ 18	0 ~ 3	4
GPS-1850D	90W D.C. Power Supply	0 ~ 18	0 ~ 5	5
GPS-3030D	90W D.C. Power Supply	0 ~ 30	0 ~ 3	5
GPS-3030DD	90W D.C. Power Supply	0 ~ 30	0 ~ 3	5

ACCESSORIES :
User manual x 1 , Power cord x 1
Test lead GTL-105A x 1 (≤3A) or GTL-104A x 1 (≤10A)
European test lead GTL-203A x 1 (≤ 3A)or GTL-204A x 1 (≤10A)

PROGRAMMABLE & MULTIPLE CHANNEL DC POWER SUPPLY

GW Instek's Programmable & Multiple Channel DC Power Supply deliver high resolution, high stability, extensive protection measures and user-friendly operation. The sequence function allows users to edit and output test sequences without writing a separate software program. SCPI commands and LabVIEW drivers are provided to facilitate ATE software development.

PROGRAMMABLE & MULTIPLE CHANNEL DC POWER SUPPLIES

	Model	Independent	Power(W)	Series	Parallel	Display Type	Weight	Page
Linear	PPE-3323	(0~+32V, 0~ −32V),(3.3V/5V Fixed) (0~+3A, 0~−3A),(3A Fixed)	207	64V/3A	32V/6A	LED 3 3/4 digit x 2	10	D52
	PPT-1830	(0~18V/0~3A) x 2 (0~6V/0~5A) x 1	138	36V/3A	18V/6A	LED 3 1/2 digit x 1 3 3/4 digit x 1	10	D52
	PPT-3615	(0~36V/0~1.5A) x 2 0~6V/0~3A) x 1	126	72V/1.5A	36V/3A	LED 3 3/4 digit x 1 3 1/2 digit x 1	10	D52
	PST-3201	(0~32V/0~1A) x 3	158	64V/1A	32V/2A	LED 192 x 128	10	D53
	PST-3202	(0 ~ 32V/0 ~ 2A) x 2 (0~6V/0~5A) x 1	96	64V/2A	32V/4A	LED 192 x 128	10	D53
	GPD-2303S	(0 ~ 30V/0 ~ 3A) x 2	180	60V/3A	30V/6A	LED 4 3/4 digit x 2 3 3/4 digit x 2	8	D54-55
	GPD-3303S	(0 ~ 30V/0 ~ 3A) x 2 (2.5V/3.3V/5V)/3A x 1	195	60V/3A	30V/6A	LED 4 3/4 digit x 2 3 3/4 digit x 2	8	D54-55
	GPD-4303S	(0 ~ 30V/0 ~ 3A) x 2 (0 ~ 5V/0 ~ 3A) or (5V ~ 10V)/1A x 1 (0 ~ 5V/0 ~ 1A) x 1	195	60V/3A	30V/6A	LED 4 3/4 digit x 2 3 3/4 digit x 2	8	D54-55
	GPD-3303D	(0 ~ 30V/0 ~ 3A) x 2 (2.5V/3.3V/5V)/3A x 1	195	60V/3A	30V/6A	LED 2 3/4 digit x 4	8	D54-55
Switching	GSB-2400L2	0 ~ 80V x 2CH 0 ~ 40A x 2CH	400 x 2	N/A	N/A	LED	7	D27-34

Multiple Output Programmable Linear D.C. Power Supply

PPE-3323

CE | RS-232 | PC Software

PPT-1830/PPT-3615

CE | GPIB | LabVIEW Driver

The PPE/PPT Series are 3-channel, programmable linear DC power supplies with 207W, 138W or 126W outputs. The PPE/PPT Series feature OVP and OCP and are compliant with all major safety standards (UL, CSA, and IEC) for safe, reliable operation. For extra precision the PPT series includes remote sensing that adds an extra level of precision by compensating cable losses between loads. The digital interface and smart features simplify operation and configuration with output limit store/recall functions, automatic tracking, automatic serial or parallel operation (PPT-Series), and auto stepping for continuous testing. The series have Labview drivers and SCPI commands as standard for remote control and PC interfacing via RS232 (PPE-3323) and GPIB (PPT-Series). The versatile PPE/PPT-Series are ideal for high-level applications requiring high resolution, multiple outputs, and an extra level of safety.

FEATURES

* Easy Operation with UP/DOWN Key
* High Resolution: 10mV, 1mA
* Over Voltage Protection, Over Current Protection (PPT-Series by Hardware, PPE-Series by Software)
* 50 Sets Memory
* Self Test and Software Calibration
* Auto Step Running With Timer Setting
* FRONT/REAR Output and Sense Switch Selectable (PPT-Series)
* Triple Output
* Auto Series and Parallel Operation(PPT-Series)
* Auto Tracking
* IEEE-488.2 and SCPI Compatible Command set (PPT-Series)
* RS-232C Communication (PPE-3323)
* GPIB Standard Interface (PPT-Series)
* LabVIEW Driver Software (PPT-Series)
* High Stability, Low Drift
* 4 Digit Display
* IEC Safety Regulation

Rear Panel

PPE-3323

PPT-1830

SPECIFICATIONS

MODEL	PPE-3323	PPT-1830	PPT-3615
OUTPUT			
Voltage	0~+32V,0~−32V,3.3V/5V FIXED	0~18Vx2,0~6Vx1	0~36Vx2,0~6Vx1
Current	0~+3A,0~−3A,3A FIXED	0~3Ax2,0~5Ax1	0~1.5Ax2,0~3Ax1
OVP	0~+33V,0~−33V	0~20Vx2,0~7Vx1	0~38.5Vx2,0~7Vx1
LOAD REGULATION			
Voltage	≤6mV	≤ 3mV rear output (≤ 6mV front output)	
Current	≤3mA	≤ 3mA (≤ 6mA rating current > 3.5A)	
LINE REGULATION			
Voltage	≤3mV		
Current	≤3mA		
RESOLUTION			
Voltage	10mV (20mV rating voltage > 36V)		
Current	1mA (2mA rating current >3.5A)		
OVP	10mV(20mV rating voltage > 36V)		
PROGRAM ACCURACY (25±5°C)			
Voltage	≤0.05% + 25mV (+ 50mV rating voltage > 36 V)		
Current	≤0.2% + 10mA		
OVP	≤2% + 0.6V		
RIPPLE & NOISE (20Hz ~ 20MHz)			
Voltage	Ripple 1mVrms / 3mVp-p Noise 2mVrms / 30mVp-p		
Current	≤3mA rms (≤ 5mA rms rating current > 3.5A)		
TEMPERATURE COEFFICIENT (0~40°C)			
Voltage	≤100ppm + 3mV		
Current	≤150ppm + 3mA		
READBACK RESOLUTION/ACCURACY (25± 5°C)			
Voltage	10mV (20mV rating voltage > 36V)		
Current	1mA (2mA rating current > 3.5A)		
Voltage	≤0.05% + 25mV (+ 50mV rating voltage > 36V)		
Current	≤0.2% + 10mA		
RESPONSE TIME			
VOLTAGE UP 10% ~ 90%	≤100mS		
VOLTAGE DOWN 90% ~ 10%	≤100mS (≥ rating load)		
READBACK TEMPERATURE COEFFICIENT			
Voltage	≤100ppm + 10mV (+ 20mV rating voltage > 36V)		
Current	≤150ppm + 10mA		
DRIFT			
Voltage	≤100ppm + 10mV	≤0.03% + 6mV	
Current	≤150ppm + 10mA	≤0.1% + 6mA	
TRACK OPERATION			
Tracking Error	≤0.1% + 50mV		
Series Regulation	≤50mV		
PARALLEL OPERATION (PPT-Series only)			
Program Accuracy (25±5°C)	Voltage ≤0.05% + 25mV (+ 50mV rating voltage > 36V) Current ≤0.2% + 20mA OVP ≤2% + 0.6V		
Load Effect	Voltage ≤3mV rear output (≤6mV front output) Current ≤6mA (≤12mA rating current > 3.5A)		
Source Effect	Voltage ≤3mV ; Current ≤6mA		
MEMORY			
Store/Recall	50 sets		
TIMER			
Setting Time	1 second ~ 255 minutes (Max. 255 minutes x 50 sets for PPT-Series) 1 second ~ 99 minutes (Max. 99 minutes x 50 sets for PPE-3323)		
Resolution	1 second		
Function	for output working loop (Auto Step running)		
STANDARD INTERFACE			
RS-232C for PPE-Series; GPIB for PPT-Series			
POWER SOURCE			
AC 100V/120V/ 220V/240V±10%, 50/60Hz			
DIMENSIONS & WEIGHT			
255(W) x 145(H) x 346(D) mm; Approx. 10kg			

ORDERING INFORMATION

PPE-3323 207W Triple Output Programmable D.C. Power Supply
PPT-1830 138W Triple Output Programmable D.C. Power Supply
PPT-3615 126W Triple Output Programmable D.C. Power Supply

Model	Independent	Series	Parallel	Display Type	Weight (kg)
PPT-1830	(0~18V/0~3A)x2,(0~6V/0~5A)x1	36V/3A	18V/6A	LED	10
PPT-3615	(0~36V/0~1.5A)x2,(0~6V/0~3A)x1	72V/1.5A	36V/3A	LED	10

ACCESSORIES :
User manual x 1, Power cord x 1, Test lead GTL-105A x 3(PPE-3323 & PPT-3615), GTL-104A x 3 (PPT-1830)

OPTIONAL ACCESSORIES

GRA-401 Rack Adapter Panel, 19" 4U
GTL-251 GPIB-USB-HS(High Speed)
GTL-204A European test lead x 3 (for PPT-1830/PPT-3615)
GTL-248 GPIB Cable, Double Shielded, 2000mm

FREE DOWNLOAD

PPE-3323 **PC Software** Remote Control Software
PPT-1830, PPT-3615 **Driver** LabView Driver

Multiple Output Programmable Linear D.C. Power Supply

PST-3201/3202

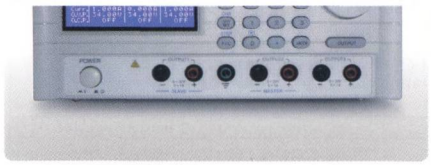
CE | RS-232 | GPIB | PC Software | LabVIEW Driver

PST series is 3-channel, 96W or 158W, programmable linear DC power supplies. High resolution is maintained at 10mV, 1mA (≥3A). OVP, OCP, and OTP protect the PST-Series and its loads from unexpected conditions. PST-Series is capable of independent, series or parallel operation for increased flexibility. The large LCD display conveniently displays all outputs and configurations simultaneously to simplify operation. The programmable interface allows automatic stepping, 100 sets of memory and comprehensive timing operations. GPIB and RS232C interfaces, Labview drivers and SCPI compatibility allow easy ATE software development and remote control. The versatile PST-Series is ideal for high resolution, multiple output, automated operations such as production testing and rack mounting systems.

FEATURES

* Digitized Programmable Interface
* High Resolution 10mV, 1mA
* 192 x 128 LCD Display, Simultaneously Shows Settings and Measuring Result
* Over-Voltage, Over-Current, Over Temperature Protection
* Intelligent Fan Control (Changes by Output Power)
* 100 Sets Memory
* Auto Step Running With Timer Setting
* Auto Series and Parallel Function
* LabVIEW Driver
* Standard Interface : RS-232C
* Optional Interface : GPIB (IEEE-488.2)
* Optional European Jack Type Terminal

European Type Jack Terminal



Rear Panel

SPECIFICATIONS

	PST-3202	PST-3201
OUTPUT		
Voltage Current OVP	0~32Vx2, 0~6Vx1 0~2Ax2, 0~5Ax1 0~33Vx2, 0~7Vx1	0~32Vx3 0~1Ax3 0~33Vx3
LOAD REGULATION		
Voltage Current	≤ 3mV (≤ 5mV rating current >3.0A) ≤ 3mA (≤ 5mA rating current >3.0A)	
LINE REGULATION		
Voltage Current	≤ 3mV ≤ 3mA	
RESOLUTION		
Voltage Current OVP	10mV 1mA (2mA, rating current >3.0A) 10mV	
PROGRAM ACCURACY(25 ± 5°C)		
Voltage Current OVP	≤ 0.05%+20mV ≤ 0.1%+5mA (+10mA, rating current>3.0A) ≤ 0.05%+20mV	
RIPPLE & NOISE(20Hz~20MHz)		
Voltage Current	Ripple: ≤ 1mVrms/3mVp-p ; Noise: ≤ 2mVrms/30mVp-p ≤ 3mArms (≤ 5mArms, rating current >3.0A)	
TEMPERATURE COEFFICIENT (0 ~ 40 °C)		
Voltage Current	≤ 100ppm+3mV ≤ 100ppm+3mA	
READBACK RESOLUTION		
Voltage Current	10mV(20mV, rating voltage >36V) 1mA(2mA, rating current >3.0A)	
READBACK ACCURACY(25 ± 5 °C)		
Voltage Current	≤ 0.05%+10mV(+20mV, rating voltage >36V) ≤ 0.1%+5mA(+10mA, rating current>3.0A)	
READBACK TEMPERATURE COEFFICIENT		
Voltage Current	≤ 100ppm+10mV(+20mV, rating voltage >36V) ≤ 150ppm+10mA(+20mA, rating current >3.0A)	
RESPONSE TIME		
Voltage Up (10%~90%) Voltage Down (90%~10%)	≤ 100mS ≤ 100mS (≥ 10% rating load)	
DRIFT		
Voltage Current	≤ 100ppm+10mV(+20mV, rating voltage >36V) ≤ 150ppm+10mA	
TRACK OPERATION		
Tracking Error Series(Load Effect)	≤ 0.1%+20mV ≤ 20mV	
PARALLEL OPERATION		
Program Accuracy(25 ± 5°C) Load Effect Source Effect	Voltage ≤ 0.05%+20mV,Current ≤ 0.1%+10mA,OVP ≤ 0.05%+20mV Voltage ≤ 3mV(≤ 5mV, rating current>3.0A);Current≤ 6mA Voltage ≤ 3mV;Current ≤ 6mA	
MEMORY		
Store/Recall	100 Sets	
TIMER		
Setting time Resolution Function	0.1 second~99 Minutes 59 second(Max. 99 Minutes 59 second x 100) 0.1 second Auto step running (for output working loop)	
INTERFACE		
Standard : RS-232C ; Option: GPIB (IEEE488.2)		
POWER SOURCE		
AC 100V/120V/220V ± 10%, 230V(+10%/-6%), 50/60Hz		
DIMENSIONS & WEIGHT		
230(W) x 140(H) x 380(D) mm , Approx.10kg		

ORDERING INFORMATION

PST-3202 158W Triple Output Programmable D.C. Power Supply
PST-3201 96W Triple Output Programmable D.C. Power Supply

Model	Independent	Series	Parallel	Display Type	Weight (kg)
PST-3201	(0~32V/0~1A)x3	64V/1A	32V/2A	LCD	10
PST-3202	(0~32V/0~2A)x2,(0~6V/0~5A)x1	64V/2A	32V/4A	LCD	10

ACCESSORIES :
User manual x 1, Power cord x 1, Test lead: GTL-104A x 3 (PST-3202) or GTL-105A x 3 (PST-3201)
European test lead: GTL-204A x 3 (PST-3202) or GTL-203A x 3 (PST-3201)

OPTION

Opt.01: GPIB Interface (factory installed)

OPTIONAL ACCESSORIES

GRA-407 Rack Mounting(19",4U) **GTL-232** RS-232C Cable, 9-pin Female to 9-pin, null Modem for Computer
GTL-251 GPIB-USB-HS(High Speed) **GTL-248** GPIB Cable, Double Shielded, 2000mm

FREE DOWNLOAD

PC Software PC Software including Data Log ; Remote Control Software **Driver** LabView Driver

Multiple Output Programmable Linear D.C. Power Supply

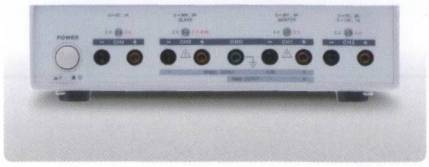
GPD-2303S/3303S/ 4303S/3303D

CE | USB | PC Software | LabVIEW Driver

FEATURES

* 2, 3 and 4 Independent Isolated Output
* 4 LED Display Sets : 3 Digits After Decimal Point (GPD-2303S/3303S/4303S)
* Minimum Resolution : GPD-2303S/3303S/4303S (1mV/1mA) GPD-3303D (100mV/10mA)
* Digital Panel Control (Rotary Encoder Switch, Rubber Key With Indicator)
* User-Friendly Operation, Coarse / Fine Volume Control
* 4 Sets Save / Recall
* Key-Lock
* Output ON/OFF
* Tracking Series and Parallel Mode
* Smart Cooling Fan Achieving Low Noise
* Compact Design
* PC Software & USB Driver
* USB Standard Interface
* Optional European Jack Type Terminal

European Type Jack Terminal



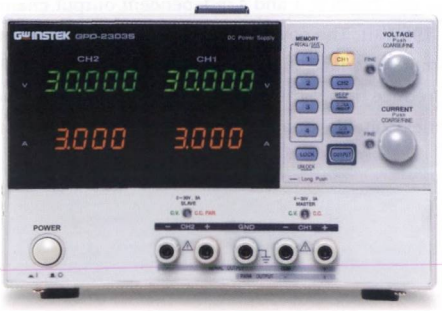
The GPD-Series is cutting edge, economical, high resolution programmable power supplies. They are equipped with 2, 3 and 4 independent output channels and support a maximum output from 180Watt to 195Watt. The power supplies include four sets of memory for voltage and current setting, a USB remote interface, high resolution (GPD-2303S / GPD-3303S / GPD-4303S) and intelligent fan control to reduce noise. The durable features along with the free output monitoring software make the GPD-Series suitable for any lab as well as the LED industry.

SPECIFICATIONS

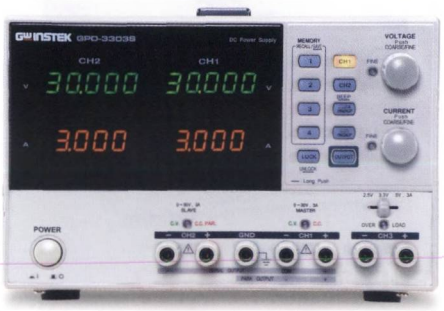
	GPD-2303S		GPD-3303S			GPD-4303S				GPD-3303D		
OUTPUT												
Channel	CH1	CH2	CH1	CH2	CH3	CH1	CH2	CH3	CH4	CH1	CH2	CH3
Voltage	0~30V	0~30V	0~30V	0~30V	2.5/3.3/5.0V	0~30V	0~30V	0~5V or 5.001V~10V	0~5V	0~30V	0~30V	2.5/3.3/5.0V
Current	0~3A	0~3A	0~3A	0~3A	0~3A	0~3A	0~3A	0~3A or 0~1A	0~1A	0~3A	0~3A	0~3A
CONSTANT VOLTAGE OPERATION												
Regulation	Line regulation ≤ 0.01%+3mV Load regulation ≤ 0.01%+3mV(rating current≤ 3A) ≤ 0.02%+5mV(rating current >3A)											
Ripple & Noise	≤ 1mVrms (5Hz~1MHz)											
Recovery Time	≤100 μS (50%Load change, Minimum load 0.5A)											
Temp.Coefficient	≤300ppm / ℃											
Output Range	0 to rating voltage continuously adjustable											
CONSTANT CURRENT OPERATION												
Regulation	Line regulation ≤ 0.2%+3mA Load regulation ≤ 0.2%+3mA											
Ripple Current	≤3mArms											
Output Range	0 to rating current continuously adjustable											
TRACKING OPERATION												
Regulation of PAR.	Line regulation ≤ 0.01%+3mV Load regulation ≤ 0.01%+3mV (rating current≤3A) ≤ 0.02%+5mV (rating current >3A)											
Regulation of SER.	Line regulation ≤ 0.01%+5mV Load regulation ≤ 300mV											
Tracking Error	≤ 0.5%±10mV (10 ~ 30V no load) with load added ≤ 300mV) ≤ 0.5%±30mV (0 ~ 9.99V no load) with load added ≤ 300mV)											
METER												
Tracking error	≤0.5% + 10mV									≤0.5% + 50mV		
Display	Voltage: 4 3/4 digits 0.4" LED Display Current: 3 3/4 digits 0.4" LED Display									Voltage:2 3/4 digits 0.4"LED Display Current:2 3/4 digits 0.4"LED Display		
Resolution	Voltage: 1mV Current: 1mA									Voltage:100mV Current:10mA		
Program Accuracy(25±5℃)	Voltage: ±(0.03% of RDG +10 digits) Current: ±(0.3% of RDG +10 digits)									Voltage:±(0.5% of RDG+2 digits) Current:±(0.5% of RDG+2 digits)		
Readback Aaccuracy(25±5℃)	Voltage: ±(0.03% of RDG +10 digits) Current: ±(0.3% of RDG +10 digits)									Voltage:±(0.5% of RDG+2 digits) Current:±(0.5% of RDG+2 digits)		
CH3 SPECIFICATIONS												
Output Voltage	–		(2.5V/3.3V/5V)±8%			0~5V / 5~10V				(2.5V/3.3V/5V)±8%		
Output Current			3A			0~3A / 0~1A				3A		
Regulation (25±5℃)			Line regulation ≤ 0.01%+3mV Load regulation ≤ 0.01%+3mV			Line regulation ≤ 0.01%+3mV Load regulation ≤ 0.01%+3mV				Line regulation ≤ 0.01%+3mV Load regulation ≤ 0.01%+3mV		
Repple & Noise			≤1mVrms(5Hz~1MHz)			≤2mVrms(5Hz~1MHz)				≤1mVrms(5Hz~1MHz)		
KEY LOCK												
Yes												
MEMERY SAVE/RECALL												
4 sets												
POWER SOURCE												
AC100V/120V/220V/230V±10%, 50/60Hz												
DIMENSION & WEIGHT												
210(W) x 130 (H) x 265 (D) mm ; Approx. 7kg												

Multiple Output Programmable Linear D.C. Power Supply

Rear Panel

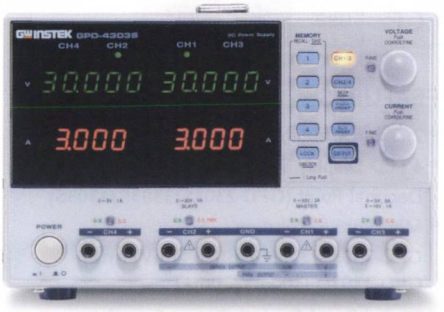


GPD-2303S



GPD-3303S

GPD-3303D



GPD-4303S

ORDERING INFORMATION

GPD-2303S	GPD-2303S 2 Channels, 180W Programmable Linear DC Power Supply
GPD-3303S	GPD-3303S 3 Channels, 195W Programmable Linear DC Power Supply
GPD-4303S	GPD-4303S 4 Channels, 195W Programmable Linear DC Power Supply
GPD-3303D	GPD-3303D 3 Channels, 195W Programmable Linear DC Power Supply

ACCESSORIES :

User Manual x 1
Power cord x 1

GPD-2303S	Test Lead GTL-104A x 2, European Test Lead GTL-204Ax2, GTL-201A x 1
GPD-3303S	Test Lead GTL-104A x 2,GTL-105A x 1; European Test Lead GTL-203A x 1, GTL-204A x 2, GTL-201A x 1
GPD-4303S	Test Lead GTL-104A x 2,GTL-105A x 2; European Test Lead GTL-203A x 2, GTL-204A x 2, GTL-201A x 1
GPD-3303D	Test Lead GTL-104A x 2,GTL-105A x 1; European Test Lead GTL-203A x 1, GTL-204A x 2, GTL-201A x 1

OPTIONAL ACCESSORIES

GTL-246	USB Cable

FREE DOWNLOAD

PC Software	PC Software including Data Log
Driver	Labview Driver

NON-PROGRAMMABLE & MULTIPLE CHANNEL DC POWER SUPPLY

GW Instek provides Non-Programmable & Multiple Channel DC Power Supply at 180W ~ 360W capacities. CC/CV mode with automatic crossover is a standard feature for all linear DC power supplies, while series and parallel tracking modes are standard features for all multi-output power supplies.

In order to meet a broad range of applications, GW Instek provides different combinations of voltage and current within the same power ratings.

SPD-3606 (Switching Mode, Multiple Output, Output Power : 375W)

	Model	Independent	Power(W)	Series	Parallel	Display Type	Weight(kg)	Page
LED Display	SPD-3606	[0~30V/0~6A / 0~60V/0~3A] x 2 0.1~5V/3A	375	[0~60V/0~6A / 0~120V/0~3A]	[0~30V/0~12A / 0~60V/0~6A]	3digit x 4 (3CH)	6	D57-58

GPC-Series (Linear Mode, Triple Output With Fixed 5V/3A Output, Output Power : 200W~400W)

	Model	Independent	Power(W)	Series	Parallel	Display Type	Weight(kg)	Page
LED Display	GPC-1850D	(0 ~ 18V/0 ~ 5A) x 2 (5V/3A MAX) x 1	195	36V/5A	18V/10A	$3\frac{1}{2}$digit x 2	11.5	D59
	GPC-3030D	(0 ~ 30V/0 ~ 3A) x 2 (5V/3A MAX) x 1	195	60V/3A	30V/6A	$3\frac{1}{2}$digit x 2	11.5	
	GPC-3030DQ	(0 ~ 30V/0 ~ 3A) x 2 (5V/3A MAX) x 1	195	60V/3A	30V/6A	$3\frac{1}{2}$digit x 4	11.5	
	GPC-6030D	(0 ~ 60V/0 ~ 3A) x 2 (5V/3A MAX) x 1	375	120V/3A	60V/6A	$3\frac{1}{2}$digit x 2	18.5	
	GPC-3060D	(0 ~ 30V/0 ~ 6A) x 2 (5V/3A MAX) x 1	375	60V/6A	30V/12A	$3\frac{1}{2}$digit x 2	18.5	

GPS-Series (Linear Mode, Multiple Output, Output Power : < 200W)

	Model	Independent	Power(W)	Series	Parallel	Display Type	Weight(kg)	Page
LED Display	GPS-4303	(0 ~ 30V / 0 ~ 3A) x 2 (2.2~5.2V/0~1A MAX) x 1 (8~15V/0~1A MAX) x 1	375	60V/3A	30V/6A	3 digit x 4 (2 CH)	7	D60
	GPS-3303	(0 ~ 30V / 0 ~ 3A) x 2 (5V / 0 ~ 3A MAX) x 1		60V/3A	30V/6A	3 digit x 4 (2 CH)	7	
	GPS-2303	(0 ~ 30V / 0 ~ 3A) x 2		60V/3A	30V/6A	3 digit x 4 (2 CH)	7	

Multiple Output Dual Range D.C. Power Supply

SPD-3606

CE Remote I/O

The SPD-3606 DC power supply provides 375W output capacity, three isolated outputs with dual-range for CH1 & CH2, highly efficient power conversion, low noise, high reliability, thorough protection, excellent value and a compact size. SPD-3606 creates a new bench mark for satisfying mainstream power supply demands. CH1 & CH2 offer dual-range output either at 30V/6A or 60V/3A per channel to accommodate a wide range of applications. SPD-3606 supports series and parallel tracking, allowing the CH1 and CH2 to be internally connected in series or parallel providing flexible output (30V/12A, 60V/6A, or 120V/3A). High power density and high power conversion efficiency lets SPD-3606 consume less energy making for a greener power supply. In addition, the high power density makes SPD-3606 weigh less than half and occupy much less space compared to linear power supplies. To avoid damage caused by improper operation, it also has OVP and OTP. The dual range AC input accepts both 115V and 230V inputs. When the instrument is on, devices can be connected and voltage/current levels can be adjusted safely from the front panel by turning off the output using the Output on/off key. The optional voltage/current protection knobs can be used to prevent accidentally changing the output levels. These knobs are useful for automated testing at fixed output levels, such as in assembly lines or product inspections.

FEATURES

* Three Independent, Isolated Output
* CH1/CH2 : Dual Output Range of 30V/6A or 60V/3A
* CH3 Adjustable Output : 0.1~5V/3A
* High Efficiency Power Conversion (Up to 25% Than Traditional Power Supply)
* Remote Output On/Off Control
* OVP to Protect the DUT
* OTP to Protect SPD-3606 for Reducing the Repair Rate
* Automatically Switches AC 115V/230V Source
* Full Safety Design: Reverse Polarity, CH3 Overload Protection, Safe Output Setting , C.C./C.V. Mode
* Compact Size, Light Weight
* Low Fan Acoustic Noise with Fan Speed Control Circuit
* Voltage/Current Protection Knob(Option)
* Optional European Jack Type Terminal

European Type Jack Terminal

SPECIFICATIONS	
OUTPUT RATINGS	
CH1/CH2 Independent	0 ~ 30V / 0 ~ 6A ; 0 ~ 60V / 0 ~ 3A
CH1/CH2 Series	0 ~ 60V / 0 ~ 6A ; 0 ~ 120V / 0 ~ 3A
CH1/CH2 Parallel	0 ~ 30V / 0 ~ 12A ; 0 ~ 60V / 0 ~ 6A
CH3	0.1 ~ 5V / 3A
VOLTAGE REGULATION	
Line	≤ 0.01% + 3mV
Load	≤ 0.01% + 5mV (rating current ≤ 6A)
	≤ 0.01% + 8mV (rating current ≤ 12A)
Ripple & Noise	≤ 5mVrms (5Hz ~ 1MHz); ≤ 50mVpp (20Hz ~ 20MHz)
Recovery Time	≤ 100 μs(50% load change, minimum load 0.5A)
CURRENT REGULATION	
Line	≤ 0.2% + 3mA
Load	≤ 0.2% + 3mA
Ripple & Noise	≤ 3mArms
TRACKING OPERATION	
Tracking Error	≤ 0.5% + 10mV of master
Series Regulation	≤ 300mV
Ripple & Noise	≤ 10mVrms (5Hz ~ 1MHz) ;≤ 100mVpp (20Hz ~ 20MHz)
OUTPUT ON/OFF RESPONSE TIME	
Voltage Up (10% ~ 90%)	≤ 100ms (≤ 95% rating load)
Voltage Down (90% ~ 10%)	≤ 100ms (≥ 10% rating load)
OVP	
Accuracy	± (0.5% of reading + 0.5V)
METER	
Type	3 1/2digit 0.5" LED display
Accuracy	± (0.5% of reading + 2 digits)
Resolution	100mV/10mA
INSULATION	
Chassis & Terminal	100MΩor above (DC 1000V)
Chassis & AC code	100MΩor above (DC 1000V)
TEMPERATURE COEFFICIENT	
Voltage	≤ 100ppm/°C + 3mV
Current	≤ 150ppm/°C + 3mA
REMOTE CONTROL	
Output On/Off	
FAN NOISE	
≤ 50dB	
OPERATION ENVIRONMENT	
Ambient temperature 0 ~ 40°C ; Relative humidity ≤ 80%	
STORAGE ENVIRONMENT	
Ambient temperature -10 ~ 70°C ; Relative humidity ≤ 70%	
POWER SOURCE	
AC 115V/230V±15%, 50/60Hz	
DIMENSIONS & WEIGHT	
255 (W) x 145 (H) x 265 (D) mm ; Approx. 6kg	

SPD-3606

Rear Panel

ORDERING INFORMATION	
SPD-3606	Multiple Output Dual Range D.C. Power Supply
ACCESSORIES :	
User manual x 1, Power code x 1, Test lead GTL-104A x 2, GTL-105A x 1	
European Test Lead GTL-201A x 1, GTL-203A x 1, GTL-204A x 2	
OPTIONAL ACCESSORIES	
GPS-001	Voltage/Current protection Knob

GPS-001
Voltage/Current protection Knob

Triple Output Linear D.C. Power Supply

The GPC-Series is triple output, 195W to 375W, linear DC power supplies. Channel 1 and 2 are fully adjustable (model dependant) and channel 3 is fixed at 5V/3A with ripple and noise at less than 2mVrms. Overload and reverse polarity protection keep GPC-Series and its loads safe from unexpected conditions. GPC-3030DQ contains a temperature controlled cooling fan for thermal protection. GPC features continuous or dynamic internal load selection and series or parallel tracking for application flexibility. The GPC-Series is an ideal solution for inexpensive bench-top applications requiring low noise and multiple outputs.

GPC-1850D/3030D/3060D/6030D

CE (Note: GPC-3060D/6030D are not CE appoved.)

GPC-3030DQ

CE

FEATURES

* Four Digital Panel Meters (GPC-3030DQ)
* Triple Output
* Auto Tracking
* Auto Series and Parallel Operation
* Constant Voltage and Constant Current Operation
* Low Ripple and Noise
* Internal Select for Continuous or Dynamic Load
* Overload and Reverse Polarity Protection
* 3 1/2 Digits 0.39" LED Display(GPC-3030DQ)
* 3 1/2 Digits 0.5" LED Display(GPC-1850D/3030D/3060D/6030D)
* 5V, 3A Fixed Output

SPECIFICATIONS

OPERATION MODE	
Independent	Two independent outputs and 5V fixed output
Series	Output from 0 to rating volts and 0 to rating amperes Output from 0 to ± rating volts at rating amperes each
Parallel	Output from 0 to double rating volts at rating amperes Output from 0 to double rating amperes at rating volts
CONSTANT VOLTAGE OPERATION	
Regulation	Line regulation ≤ 0.01% + 3mV Load regulation ≤ 0.01% + 3mV (rating current ≤ 3A) ≤ 0.01% + 5mV(rating current ≤ 10A) ≤ 0.02% + 5mV (rating current ≥ 10A)
Ripple & Noise	≤ 1mVrms 5Hz ~ 1MHz
Recovery Time	≤ 100μS (50% Load change, Minimum load 0.5A)
CONSTANT CURRENT OPERATION	
Regulation	Line regulation ≤ 0.2% + 3mA Load regulation ≤ 0.2% + 3mA (for GPC-1850D/GPC-3030D/GPC-3030DQ) Load regulation ≤ 0.2% + 5mA (for GPC-3060D/GPC-6030D)
Ripple Current	≤ 3mArms
5V FIXED OUTPUT	
Regulation	Line regulation ≤ 5mV Load regulation ≤ 10mV
Ripple & Noise	≤ 2mVrms
Voltage Accuracy	5V ± 0.25V
Output Current	3A
TRACKING OPERATION	
Tracking Error	≤ 0.5% + 10mV of the master
Series Regulation	≤ 300mV
METER	
Digital	3½ digits 0.5" LED display 3½ digits 0.39" LED display (for GPC-3030DQ) Accuracy ± (0.5% of rdg + 2 digits)
INSULATION	
Chassis and Terminal	20MΩ or above (DC 500V) 100MΩ or above (DC 1000V) (for GPC-3060D/6030D)
Chassis and AC Cord	30MΩ or above (DC 500V) 100MΩ or above (DC 1000V) (for GPC-3060D/6030D)
POWER SOURCE	
AC 100V/120V/220V/240V ± 10%, 50/60Hz	
DIMENSIONS	
255(W) x 145(H) x 420(D) mm	

ORDERING INFORMATION

Model		Independent	Series	Parallel	Weight (kg)
GPC-1850D	195W D.C. Power Supply	(0 ~ 18V/0 ~ 5A) x 2 , (5V/3A MAX) x 1	36V 5A	18V 10A	11.5
GPC-3030D	195W D.C. Power Supply	(0 ~ 30V/0 ~ 3A) x 2 , (5V/3A MAX) x 1	60V 3A	30V 6A	11.5
GPC-6030D	375W D.C. Power Supply	(0 ~ 60V/0 ~ 3A) x 2 , (5V/3A MAX) x 1	120V 3A	60V 6A	18.5
GPC-3060D	375W D.C. Power Supply	(0 ~ 30V/0 ~ 6A) x 2 , (5V/3A MAX) x 1	60V 6A	30V 12A	18.5
GPC-3030DQ	195W D.C. Power Supply	(0 ~ 30V/0 ~ 3A) x 2 , (5V/3A MAX) x 1	60V 3A	30V 6A	11.5

ACCESSORIES :
User manual x 1 , Power cord x 1
Test lead GTL-105A x 1 (≤ 3A) or GTL-104A x 2 (≤ 10A)

OPTIONAL ACCESSORIES

GRA-401 Rack Adapter Panel (19" , 4U)

Multiple Output Linear D.C. Power Supply

The GPS Series linear power supplies have 2-4 independent output channels, 180W to 200W output, overload and reverse polarity protection as well as an output ON/OFF switch for safety. The tracking mode switches allow voltage/current to be output in parallel or series and the intelligent fan reduces noise. The GPS-Series is entry level general purpose power supplies recognized for their affordability in education, laboratories and industry.

GPS-2303/3303/4303

CE

FEATURES

* 2, 3 and 4 Independent Isolated Output
* Four "3 Digits" LED Displays
* 0.01% Load and Line Regulation
* Low Ripple and Noise
* Tracking Operation and Auto Series/Parallel Operation
* Output ON/OFF Switch
* Output Voltage and Current Setting When Output Disable (Except for GPS-2303)
* Fan Speed Control Circuit to Minimize Fan Noise
* Over Load and Reverse Polarity Protection
* Optional European Jack Type Terminal

European Type Jack Terminal

GPS-001
Voltage/Current protection Knob

Rear Panel

GPS-3303

SPECIFICATIONS

	GPS-4303				GPS-3303			GPS-2303	
OUTPUT MODE									
	CH1	CH2	CH3	CH4	CH1	CH2	CH3	CH1	CH2
Voltage	0 ~ 30V		2.2 ~ 5.2V	8 ~ 15V	0 ~ 30V		5V Fixed	0 ~ 30V	
Current	0 ~ 3A		1A Max.	1A Max.	0 ~ 3A		3A Max.	0 ~ 3A	
Tracking Series Voltage	0 ~ 60V		----		0 ~ 60V		----	0 ~ 60V	
Tracking Parallel Current	0 ~ 6A				0 ~ 6A			0 ~ 6A	
CONSTANT VOLTAGE OPERATION (CH1, CH2)									
Line Regulation	≤ 0.01% + 3mV								
Load Regulation	≤ 0.01% + 3mV (rating current ≤ 3A) ≤ 0.02% + 5mV (rating current > 3A)								
Ripple & Noise	≤ 1mVrms , 5Hz ~ 1MHz								
Recovery Time	≤ 100 μS (50% Load change, Minimum load 0.5A)								
CONSTANT CURRENT OPERATION (CH1, CH2)									
Line Regulation	≤ 0.2% + 3mA								
Load Regulation	≤ 0.2% + 3mA								
Ripple & Noise	≤ 3mArms								
TRACKING OPERATION (CH1, CH2)									
Tracking Error	≤ 0.5% + 10mV of CH1								
Series Regulation	≤ 0.01% + 5mV								
Load Regulation	≤ 300mV								
Ripple & Noise	≤ 2mVrms , 5Hz ~ 1MHz								
CH3 OPERATION (for GPS-3303/4303)									
CH3 Voltage	GPS-4303 : 2.2V ~ 5.2V , GPS-3303 : 5V Fix								
Line Regulation	≤ 5mV								
Load Regulation	≤ 15mV								
Ripple & Noise	≤ 2mVrms, 5Hz ~ 1MHz								
Current Output	GPS-4303 : 1A, GPS-3303 : 3A								
CH4 OPERATION (for GPS-4303)									
CH4 VOLTAGE	8V ~ 15V								
Line Regulation	≤ 5mV								
Load Regulation	≤ 10mV								
Ripple & Noise	≤ 2mVrms, 5Hz ~ 1MHz								
Current Output	1A								
METER									
Digital	3 digits 0.5" LED display GPS-4303/3303 Out ON Accuracy ± (0.5% of rdg + 2 digits) GPS-4303/3303 Out OFF Accuracy ± (0.5% of rdg + 8 digits) GPS-2303 Accuracy ± (0.5% of rdg + 2 digits)								
INSULATION									
Chassis and Terminal	≥ DC 500V / 20MΩ								
Chassis and AC Cord	≥ DC 500V / 30MΩ								
POWER SOURCE									
AC 100V/120V/220V±10%, 230V(+10%~-6%), 50/60Hz									
DIMENSIONS & WEIGHT									
255(W) x 145(H) x 265(D) mm, Approx. 7 kg									

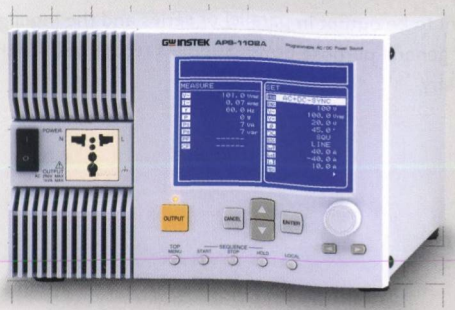
ORDERING INFORMATION

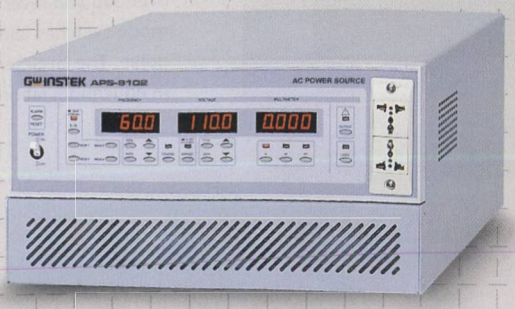
GPS-4303 4-channels, 200W D.C. Power Supply
GPS-3303 3-channels, 195W D.C. Power Supply
GPS-2303 2-channels, 180W D.C. Power Supply

ACCESSORIES :
User manual x 1, Power cord x 1,
GPS-4303 : Test lead GTL-104A x 2,GTL-105A x 2 ; European test lead GTL-203A x 2,GTL-204A x 2, GTL-201 x 1
GPS-3303 : Test lead GTL-104A x 2,GTL-105A x 1 ; European test lead GTL-203A x 1,GTL-204A x 2, GTL-201 x 1
GPS-2303 : Test lead GTL-104A x 2 ; European test lead GTL-204A x 2, GTL-201A x 1

OPTIONAL ACCESSORIES

GPS-001 Voltage/Current Protection Knob (It's available OCT/07' production batch)





AC POWER SOURCES

GW Instek AC Power Sources currently can be divided into three categories.

AC Power Source APS-1102A not only plays the role as a precision AC/DC power source but also a powerful analyzer. It contains abundant features for the testing and characteristic analysis of power supplies, electronic devices, components and modules.

The APS-7000 series is programmable linear AC Power Source, with the height of 2U and output frequency range is 45~500Hz. The maximum rated output for APS-7050 is 500VA, 310Vrms, 4.2Arms and APS-7100 is 1000VA, 310Vrms, 8.4Arms. The APS-7000 series comprises nine measurement and test functions and provides user interface similar to that of AC Power Meter.

The APS-9000 Series are dual output, 300 to 1000VA, linear AC Power Source. To protect the APS-Series and loads from unexpected conditions, over current, over temperature, and short-circuit protection are standard.

PRODUCTS

- **AC + DC Power Source**
- **AC Power Source**

AC POWER SOURCES

Programmable Switching AC/DC Power Source

GW Instek not only provides compact and lightweight switching AC/DC power sources but also features AC and AC+DC power outputs and the real time measurements of voltage, current, power, frequency, PF, and harmonic current. Four signal sources are collocated as Internal (INT), External (EXT), Internal+ External (ADD), and External Synchronization (SYNC) to flexibly output power so as to meet customers' demands. The powerful sequence function is very suitable for producing arbitrary waveforms. 16 sets of arbitrary waveform storage space and 30 sets of panel setting memory space are provided for data storage and setting input.

Linear AC Power Source

GW Instek recommends linear AC power source for AC power with the requirements of high accuracy, high stability and low ripple/noise. Programmable AC Power Source APS-7000 is suitable for simulating AC power outputs and it has 9 measurement functions (Vrms, Irms, F, Ipk, W, VA, PF, Ipk hold, CF), 7 waveform modes, Sequence mode, Simulate mode, and Surge/Dip Control Mode etc. For general purpose AC power source applications, non-programmable AC source APS-9000, with high precision and THD of less than 0.5%, is the ideal selection.

PROGRAMMABLE SWITCHING AC/DC POWER SOURCE

Model	Output Capacity	Output Freq.	Output Voltage	Max. Current	Display Type	Weight(kg)	Page
APS-1102A	1k VA	1~550Hz	AC 100V Range 0.0V~155.0V AC 200V Range 0.0V~310.0V DC 100V Range -220.0V~+220.0V DC 200V Range -440.0V~+440.0V	AC 100V Range 10A AC 200V Range 5A DC 100V Range 10A DC 200V Range 5A	LCD	9.7	D63-66

PROGRAMMABLE LINEAR AC POWER SOURCE

Model	Output Capacity	Output Freq.	Output Voltage	Max. Current	Display Type	Weight(kg)	Page
APS-7050	500 VA	45~500Hz	0~310V 0~155V	2.1A 4.2A	LCD	24	D67-71
APS-7100	1K VA	45~500Hz	0~310V 0~155V	4.2A 8.4A	LCD	38	

NON-PROGRAMMABLE AC POWER SOURCE

Model	Output Capacity	Output Freq.	Output Voltage	Max. Current	Display Type	Weight(kg)	Page
APS-9102	1k VA	45~500Hz	0~300V 0~150V	4.2A 8.4A	LED 3 1/2 digit x 3	35	D72
APS-9501	500 VA	45~500Hz	0~300V 0~150V	2.1A 4.2A	LED 3 1/2 digit x 3	25	
APS-9301	300 VA	45~500Hz	0~300V 0~150V	1.3A 2.6A	LED 3 1/2 digit x 3	20	

Programmable AC/DC Power Supply

APS-1102A

CE | USB | PC Software | Labview Driver | Remote I/O | RS-232

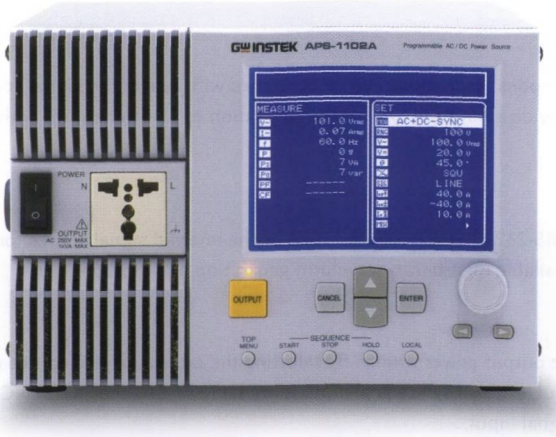
APS-1102A is not only a precision AC/DC power supply, but also a powerful analyzer, containing abundant features for the testing and characteristic analysis of power supplies, electronic devices, components and modules. In addition to AC/DC power, APS-1102A is fully programmable to simulate different power outputs. Sequences can be created using arbitrary waveforms as well as voltage or frequency sweeps. Output is divided into two main operation modes: AC and AC+DC. Each mode can be combined with four signal source modes: internal (INT), external (EXT), internal + external (ADD) and external synchronization (SYNC) to provide flexible power settings. Voltage, current, power, frequency, load power factor, load crest factor and harmonic current output can be monitored in real-time. Even Inrush Current can easily be measured during the power-up of capacitive loads. All parameters and values as well as measurement results are displayed simultaneously on the 5.7 inch LCD screen. APS-1102A includes multi functional easy-to-use software that can be used with a USB or RS-232 interface. The software is used to remotely control panel settings, and to create and edit sequences and arbitrary waveforms. APS-1102A also has a universal power outlet on the front that is suitable for most countries as well as output terminal on the rear panel.

FEATURES

* 5.7"Large LCD Display
* Output Capacity : 750VA (for AC 100V Input)/1kVA (for AC 200V Input)
* Output Modes : AC and AC+DC Combined With any of the Four Signal Sources
* Signal Sources : Internal (INT), External (EXT), Internal + External(ADD) and Synchronisation (SYNC)
* Arbitrary Waveform Power Output
* Power Amplifier of External Signal
* Measurement Functions : Voltage, Current, Power, Frequency, Power Factor, CF, and Harmonic Current
* Capacitor Input Load Supported
* Sequence Function Allows Programming of Output Patterns
* Limiter Function (Upper/Lower Limits Function)
* 30 Sets of SAVE/RECALL Memory
* Output On/Off Switch
* USB (USBTMC) and RS-232 Standard for Remote Control

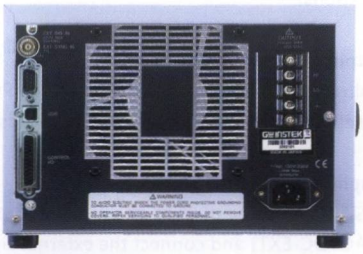
SPECIFICATIONS

MAXIMUM OUTPUT CAPACITY			
AC Input (100 ~ 180V)	750VA		
Input (180 ~ 250V)	1000VA		
DC Input (100 ~ 180V)	750W		
Input (180 ~ 250V)	1000W		
OUTPUT VOLTAGE			
AC 100V	0.0V ~ 155.0Vrms		
200V	0.0V ~ 310.0Vrms		
DC 100V	-220.0V~+220.0V		
200V	-440.0V~+440.0V		
OUTPUT MAX. CURRENT			
AC 100V	10A		
200V	5A		
DC 100V	10A		
200V	5A		
OUTPUT MAXIMUM PEAK CURRENTS			
100V	40Apk		
200V	20Apk		
FREQUENCY			
Setting Range	1.0Hz ~ 550.0Hz		
Setting Accuracy	±0.01% of set (1.0Hz~550.0Hz, 23±5℃)		
WAVEFORM			
SINE WAVE, SQUARE WAVE, ARBITRARY WAVE (Up To 16 Types Can Be Saved)	When signal source mode is INT and ADD mode only		
Output Voltage Distortion Rate	0.5% MAX(50Hz/60Hz), ±50% or higher of the rated output voltage, the maximum current or lower ; THD+N		
LINE VOLTAGE REGULATION			
0.2% MAXIMUM	Power input voltage 100V/120V/230V, no load ,rated output		
LOAD VOLTAGE REGULATION			
0.5% MAXIMUM	At output terminal under no load and rated resistance load		
MEASUREMENT			
	RANGE	**RESOLUTION**	**ACCURACY**
Frequency Counter	1.0 ~ 550.0 Hz	0.1Hz	0.01 % of set (1.0Hz~550.0Hz,23±5℃)
RMS Volt-Meter(AC+DC)	At 45Hz~65Hz		
	Full Scale 100V:250.0Vrms	0.1Vrms	±(0.5 % of rdg+0.3Vrms); at 23±5℃
	Full Scale 200V:500.0Vrms	0.1Vrms	±(0.5 % of rdg+0.6Vrms); at 23±5℃
	At DC 40Hz~550Hz		
	Full Scale 100V:250.0Vrms	0.1Vrms	±(0.7 % of rdg+0.9Vrms); at 23±5℃
	Full Scale 200V:500.0Vrms	0.1Vrms	±(0.7 % of rdg+1.8Vrms); at 23±5℃
RMS Amp-Meter(AC+DC)	At 45Hz~65Hz		
	Full Scale 15.00Arms	0.01Arms	±0.5% of rdg+0.04Arms ; at 23±5℃
	At DC 40Hz~550Hz		
	Full Scale 15.00Arms	0.01Arms	±0.7% of rdg+0.08Arms ; at 23±5℃
Wattage Meter	At 45Hz~65Hz		Output Current is 5%~100% of the Maximum Current
	Full Scale 1200W	1W	±2% of rdg+1W ; at 23±5℃
	At DC		
	Full Scale 1200W	1W	±3% of rdg+12W ; at 23±5℃ 50V or higher output voltage, output current is 10% to 100% of the maximum current



APS-1102A

Rear Panel



GTL-234 RS-232C Cable

For: APS-1102A, LCR-8000G

SPECIFICATIONS

	RANGE	RESOLUTION	ACCURACY
Load Power Factor Measurement	0.00 ~ 1.00	0.01	
Load Crest Factor Measurement	0.00 ~ 50.00	0.01	
External Synchronization			
Frequency Measurement	38.0Hz ~ 525.0Hz	0.1Hz	±0.2Hz; at 23±5℃
Phase When Output Is On	0.0°~ 359.9°	0.1	When signal source mode is INT and ADD mode only
PROGRAM (SEQUENCE PROGRAMMING)			
Memory	1~30 Sets		
Step Range (Each Memory Set)	1~255 Step		
Step Time Setting	0.0001 S ~ 999.9999 S	0.0001S (=0.1mS)	
EXTERNAL SIGNAL INPUT (EXT Mode , ADD Mode)			
Gain Setting Range	100V range 0~220.0 times (Initial Value : 100.0)	0.1	± 5% (DC or 45Hz to 65Hz , gain is at initial value, with the rated voltage output, no load)
	200V range 0~440.0 times (Initial Value : 200.0)	0.1	± 5% (DC or 45Hz to 65Hz , gain is at initial value, with the rated voltage output, no load)

OUTPUT MODE

AC - INT Mode　AC + DC - INT Mode　AC - ADD Mode　AC + DC - ADD Mode
AC - EXT Mode　AC + DC - EXT Mode　AC - SYNC Mode　AC + DC - SYNC Mode

MEMORY

Save/Recall 30 sets

POWER SOURCE

AC100V ~ 230V ±10% ; 50Hz / 60Hz ±2Hz (Signal Phase)

POWER CONSUMPTION/FACTOR

1.4kVA max / 0.95min (AC100V) ; 0.9min (AC200V)

INTERFACE

USB(USBTMC) & RS-232 Standard

DIMENSIONS & WEIGHT

258(W) X 176(H) X 440(D) ; Approx. 9.7 kg

ORDERING INFORMATION

APS-1102A 1kVA Programmable AC/DC Power Source

ACCESSORIES :

User Manual x 1, Power Cord x 2, (15A/125V ; 2m ; for Japan) (10A/250V ; 1.5m without plug, for Japan, North America, and Europe only), CD-ROM (Remote Control Software) x 1

OPTIONAL ACCESSORIES

GRA-409 Rack Adapter Panel (19" , 4U)
GTL-234 RS232 Cable
GTL-246 USB Cable, USB 2.0, A-B Type, 1200mm

FREE DOWNLOAD

Remote Control Software
LabView Driver

A. OUTPUT MODES

The power output function of APS-1102A includes AC and AC+DC main modes. Each mode can be combined with one of the signal sources, including internal, external, internal + external, and external synchronization, to provide a powerful tool for the generation of a power source with abnormal variations.

Output of Arbitrary Waveforms

Arbitrary waveforms can be edited on the PC and transferred via USB or RS-232 interface to APS-1102A as the internal signal source for power output. 16 sets of waveform memory with 4k words waveform length each are available for arbitrary waveform generation and storage.

Amplifier of External Signal

APS-1102A can be used as an amplifier for the external signal to generate output power source. By selecting the external signal source mode (AC-EXT or AC+DC-EXT) and connect the external signal to the external signal input/external sync signal input terminal (EXT SIG IN/EXT SYNC IN), APS-1102A generates the power output according to the waveform of the external signal input.

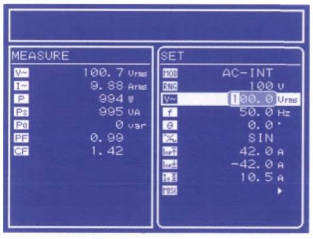
Power output synchronization with External Signal

The externally synchronized oscillation of APS-1102A allows the output power source to be frequency-synchronized with the external signal at TTL level in the frequency range from 40Hz to 500Hz.

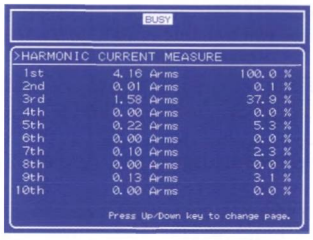
B. MEASUREMENT FUNCTIONS

APS-1102A is equipped with the following measurement functions

- Voltage (RMS, Average DC, Peak)
- Current (RMS, Average DC, Peak, Peak hold)
- Power (Effective, Reactive, Apparent)
- Synchronization frequency (external synchronization)
- Load power factor
- Load crest factor
- Harmonic current (50/60Hz fundamental, up to 40th harmonics)



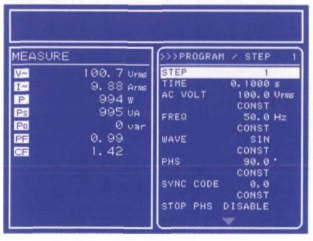
Measurement Results and Setting Values



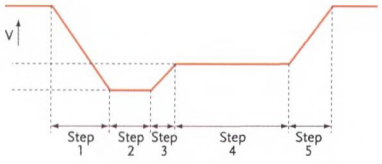
Measurement of Output Harmonic Current

C. SEQUENCE OPERATION

In the Sequence Operation programming, DC, sine waves, square waves, and 16 arbitrary waveforms captured via USB interface can be used as components for sequence editing. Among the total 255 sequence steps, as maximum capacity, the waveform, level, and time duration can be set , and constant / keep / sweep can be chosen in each individual step. APS-1102A is also equipped with other functions, such as the branching to a specified step during a sequence operation. All the data of start, stop, or hold of a sequence operation are saved into the sequence memory to perform the Sequence Operation automatically.



Setting Screen for the Sequence Function (Set for Each Step)



Voltage Fluctuation Test Pattern

D. APPLICATION FIELDS

- R & D and Testing of wide variety but small quantity power supply manufacturers
- R & D and Testing of wide variety and compact consumer device manufacturers
- Testing of battery-powered modules
- Used as the power source for relay and switch characteristic testing
- Used as the power source for product inspection lines of devices in wide variety
- Used as the power source for LCD or battery formation

E. UNIQUE FEATURES

Inrush Current Measurement and Inrush Current Limiter

For an electronic device containing a capacitor type rectifier, an inrush current, which is larger than the rated current of the device, may flow through the power line immediately after the device is turned on. APS-1102A , with peak current hold capability, is able to measure this short time inrush current. On the other hand, the large inrush current flows through the power line may cause the voltage drop, so the electronic device should be able to limit this effect to a certain extent. APS-1102A can supply four times as large peak current as the rated current to support this test.
The output current can be limited by setting the maximum output current(peak/average current) in advance, so the prototypes can be protected from abnormal current damage during development evaluation. However, to measure the inrush current of a completed product, the peak current limiter should be set at the maximum value to get a correct measurement result.

Harmonic Current Measurement Function

Switching power sources are widely used in both consumer and industrial electrical products in today's market. With the capacitor type rectifier, the switching power source has its disadvantages using an input AC source carrying significant amount of harmonic current. When a large amount of harmonic current flows through the power source line, the switching power supply in the device may experience operation faults caused by the voltage distortion, which can lead to transformer overheat and possibly result in a hazardous accident. APS-1102A includes a harmonic current measuring function, which can be performed under AC-INT mode at the fundamental wave setting (panel frequency setting) of either 50 Hz or 60 Hz. Absolute values of harmonic current in RMS and the harmonic to fundamental ratios up to the 40th harmonics(2 kHz at 50 Hz fundamental)can be measured and displayed.

F. APPLICATION EXAMPLES

- DC to DC converter verification: As in the general environment the input source of DC to DC converter couldn't be a perfect DC. It may contain some AC ripples riding on a DC source due the simple rectifier and filtering circuit used in the consumer products. As of this, AC+DC source is used as the simulation of input power to do the characteristic verification of DC to DC converter.

- Transformer verification : Ideally the voltage flows through transformer should be a pure AC, however, in the general environment it may also contain a DC component, which may cause magnetic saturation of the transformer and therefore reduce its efficiency. AC +DC source is the simulation of such power environment.

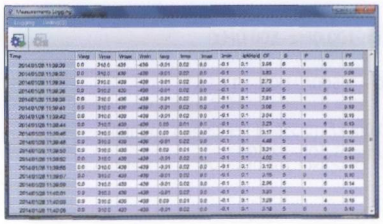
- Capacitor verification : The main function of a capacitor is to block the DC voltage and connect the AC voltage in most of the circuits. The DC voltage imposed on the Capacitor, however, will generate extra heat and gradually degrade the function of the capacitor. AC +DC source could be used to test the durability and reliability of a capacitor.

- LCD formation : APS-1102A provides various types of power source that suits the application of the formation of LCD panel in the manufacturing process. The power source could be AC or AC + DC at various levels of output. Formation is an important process to format the liquid crystal cells inside the panel, so the polarity of the crystal cells could be well-arranged to become functional.

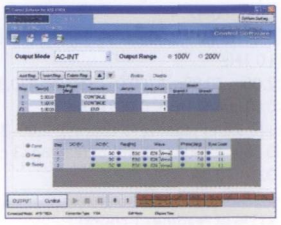
G. REMOTE CONTROL SOFTWARE

APS-1102A includes a multi-functional and user-friendly software, which supports the remote control of panel operations, Sequence editing and execution, Arbitrary waveform editing and transfer, and Data logging. The remote control software is included to perform the following functions via USB & RS-232 interface :

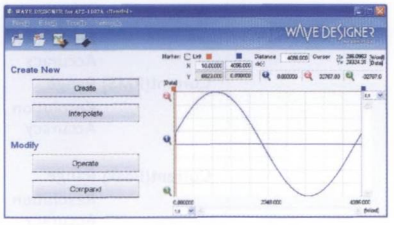
A. Data logging , B. Sequence editing and execution, C. Arbitrary waveform editing and transfer, D. Remote control of panel operations



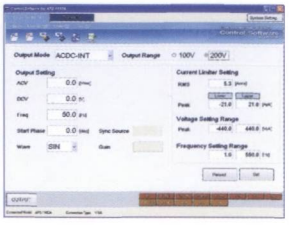
A. Logging of Measurement Values



B. Sequence Editing



C. Creation of Arbitrary Waveform



D. Remote Control Screen

500/1000 VA Programmable AC Power Source

NEW

APS-7000 Series

CE | USB | GPIB | LAN | RS-232

FEATURES

* 4.3" large LCD Display
* Measurement Function : Voltage, Current, Power, Frequency, Power Factor, Crest Factor, Apparent Power, Ipeak, Ipk hold
* Surge/Dip Control Mode
* OVP/OCP/OTP Protection
* Simulate Mode, Sequence Mode, Program Mode
* Ramp Control Function
* ARB (Function Waveform) Mode
* Frequency : 45.0 ~ 500.0Hz (Std); 45.0 ~ 999.9Hz (Opt)
* Voltage Range (RMS) : 155V (Std)/310V (Std)/ 600V (Opt)
* Standard Interface : USB/LAN
* Optional Interface : RS-232 & USB CDC/GPIB

The APS-7000 Series is an AC power source, containing abundant features for the testing and characteristic analysis of power supplies, electronic devices, components and modules. The APS-7000 Series is fully programmable to simulate different power outputs. All parameters and values as well as measurement results are displayed simultaneously on the 4.3 inch TFT-LCD screen.
The APS-7000 Series comprises nine measurement functions (Vrms, Irms, F, Ipk, W, VA, PF, Ipk hold, CF), and provides user interface similar to that of AC Power Meter. The APS-7000 Series, internal circuit design 4 sets of current range to improve measurement resolution, is ideal for the LED industry and standby mode power consumption test. Under the ARB (function waveform) mode, the APS-7000 Series provides waveforms, including SINE waveform, Triangle waveform, Staircase waveform, Clipped Sinewave, Crest factor waveform, Surge waveform, and Fourier series to meet the requirement of simulating abnormal input power waveform test of different industry.
Ten sets of Preset allow users to store ten settings; Power ON Output setting allows Sequence, Simulate, and Program to automatically execute output after the equipment power is on.
The APS-7000 Series features five methods to cope with special purpose or abnormal voltage, frequency, and phase; ten sets of the Simulate mode simulate power outage, voltage rise, and voltage fall; ten sets of the Sequence mode allow users to define parameters and produce sine wave by editing steps; Ramp Control allows users to set the variation speed for output voltage rise and fall; Surge/Dip Control simulates DUT's input power producing a Surge or Dip voltage overlapping with output voltage waveform at a specific time. Ethernet Port, on the rear panel of the series, can be used for remote program control; Sync Output Socket provides external 10V sync output; Signal Output Connector provides monitor of Program execution results. The APS-7000 Series also provides Trigger In/Out and Output on/off remote control functions from J1 connector on the rear panel.

SPECIFICATIONS

Model		APS-7050	APS-7100
Power Rating		500VA	1000VA
Output Voltage		0 ~ 310.0 Vrms	0 ~ 310.0 Vrms
Output Frequency		45.00 ~ 500.0 Hz	45.00 ~ 500.0 Hz
Maximum Current (r.m.s)			
	0~155Vrms	4.2A @ 120V	8.4A @ 120V
	0~310Vrms	2.1A @ 240V	4.2A @ 240V
Maximum Current (peak)			
	0~155Vrms	16.8A	33.6A
	0~310Vrms	8.4A	16.8A
OPT. APS-003 (r.m.s)			
	0~600Vrms	1.05A@480V	2.1A@480V
OPT. APS-003 (peak)			
	0~600Vrms	4.2A	8.4A
Total Harmonic Distoration (THD)		≤0.5% at 45 ~ 500Hz (Resistive Load)	
Crest Factor		≥4	
Line regulation		0.1% (% of full scale)	
Load regulation		0.5% (% of full scale)	
Response time		<100us	
SETTING			
Voltage	Range	155Vrms/310Vrms/Auto	
	Resolution	0.01V at 0.00 ~ 99.99Vrms; 0.1V at 100.0 ~ 310.0Vrms	
	Accuracy	±(0.5% of setting+2 counts)	
Frequency	Range	45 ~ 500Hz	
	Resolution	0.01Hz at 45.00 ~ 99.99Hz/0.1Hz at 100.0 ~ 500.0Hz	
	Accuracy	±0.02% of setting	
Power On/Off Phase Angle	Range	0 ~ 359°	
	Resolution	1°	
	Accuracy	±1°(45 ~ 65Hz)	
MEASUREMENT			
Voltage(RMS)	Range	0.20 ~ 38.75Vrms/38.76 ~ 77.50 Vrms/77.51 ~ 155.0Vrms/155.1 ~ 310.0Vrms	
	Resolution	0.01V at 0.00 ~ 99.99Vrms; 0.1V at 100.0 ~ 310.0Vrms	
	Accuracy	±(0.5% of reading + 2 counts)	
Frequency	Range	45 ~ 500Hz	
	Resolution	0.01Hz (at 45.00Hz~99.99Hz)/0.1Hz (at 100.0Hz~500.0Hz)	
	Accuracy	±0.1Hz	
Current(RMS)	Range	2.00 ~ 70.00mA/60.0 ~ 350.0mA/0.300 ~ 3.500A/3.00 ~ 17.5A	
	Resolution	0.01mA, 0.1mA, 0.001A, 0.01A	
	Accuracy	±(0.6% of reading+5 counts); 2.00~350.0mA/±(0.5% of reading+5 counts); 0.350~3.500A/±(0.5% of reading+3 counts);3.500~17.50A	
Current(Peak)	Range	0.0 ~ 70.0A	
	Resolution	0.1A	
	Accuracy	±(1% of reading+1 count)	
Power(W)	Resolution	0.01W, 0.1W, 1W	
	Accuracy	±(0.6% of reading + 5 counts); 0.20~99.99W/±(0.6% of reading + 5 counts); 100.0 ~ 999.9W/±(0.6% of reading + 2 counts); 1000~9999W	
Apparent(VA)	Resolution	0.01VA, 0.1VA, 1VA,	
	Accuracy	±(1% of reading + 5 counts);0.20~99.99VA/±(1% of reading + 5 counts); 100.0~999.9VA/±(1% of reading + 2 counts);1000~9999VA	
Power Factor	Resolution	0.001	
	Accuracy	±(2% of reading + 2 counts)	

APS-7050 Front

APS-7100 Front

SPECIFICATIONS

Model	APS-7050	APS-7100
GENERAL		
Remote Output Signal	Pass , Fail, Test-in Process, Trigger in, Trigger out , OUT ON / OFF	
Sync Output Signal	Output Signal 10V, BNC type	
Number of Preset	10(0~9 Numeric keys)	
Protection	OCP, OPP, OHP and Alarm	
SEQUENCE / SIMULATION / FUNCTION		
Number of Memories	10 (0 ~ 9 Numeric keys)	
Number of Steps	255 max. (For each sequence)	
Step Time Setting	0.01 ~ 99.99S	
Operation Within Step	Constant / Keep / Linear Sweep	
Parameters	Output Range, Frequency, Waveform (Sine Wave Only); On Phase, Off Phase, Term Jump Count (0 ~ 255) jump-to, Branch 1, Branch 2, Trigger Output	
Sequence Control	Start, Stop, Hold, Continue, Branch 1, Branch 2	
ENVIRONMENT CONDITIONS		
Operation Temperature	0 ~ +40°C	
Storage Temperature	-10 ~ +70°C	
Operating Temperature	20 ~ 80% RH (No Condensation)	
Storage Humidity	80% RH or less(No Condensation)	
PC REMOTE CONTROL INTERFACE		
Standard Interface	USB Host/LAN	
Optional Interface	GPIB/RS232 & USB CDC	
Input Power Source	1φ AC 115/230Vac ±15%, 47 ~ 63Hz	
DIMENSIONS		
	430(W) x 88(H) x 400(D) mm; Approx. 24Kg	430(W) x 88(H) x 560(D) mm; Approx. 38Kg

ORDERING INFORMATION

APS-7050 500VA Programmable AC Power Source
APS-7100 1000VA Programmable AC Power Source

ACCESSORIES :
CD ROM (User Manual, Programming Manual) x 1, Power Cord (Region Dependent)x1,
Mains Terminal Cover Set x 1, GTL-123 Test Lead x 1

OPTIONAL ACCESSORIES

APS-001 GPIB Interface Card
APS-002 RS-232/USB Interface Card
APS-003 Output Voltage Capacity : 0~600Vrms
APS-004 Output Frequency Capacity : 45~999.9Hz
GRA-423 APS-7000 Rack Mount Kit

GTL-232 RS-232C Cable, 9-pin, F-F Type, null modem, 2000mm
GTL-246 USB Cable, USB 2.0, A-B Type, 1200mm
GTL-248 GPIB Cable, Double Shielded, 2000mm
GTL-251 USB-GPIB Adapter, GPIB-USB-HS, USB 2.0, Hi-Speed USB compliance, 2000mm

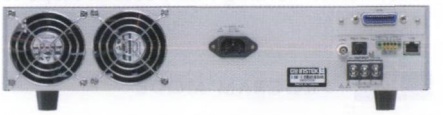
SELECTION GUIDE

Model Name	Max. Output Current	Power Rating	Output Voltage
APS-7050	4.2A/2.1A	500VA	0~310.0 Vrms
APS-7100	8.4A/4.2A	1000VA	0~310.0 Vrms

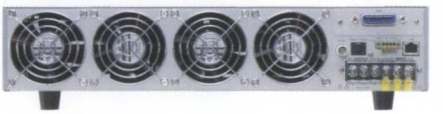
APS-7050 (Europe Type Output Outlet)

APS-7100 (Europe Type Output Outlet)

APS-7050 Rear Panel



APS-7100 Rear Panel

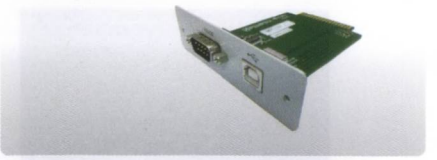


APS-001 GPIB Interface Card

For: APS-7000 Series

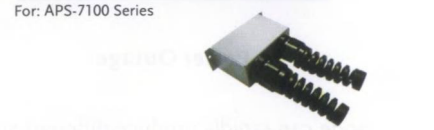
APS-002 RS-232/USB Interface Card

For: APS-7000 Series

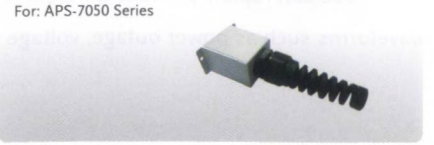


Mains Terminal Cover Set

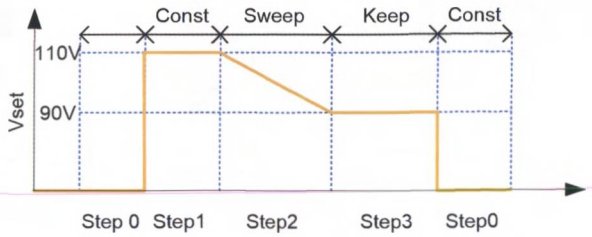
For: APS-7100 Series



For: APS-7050 Series



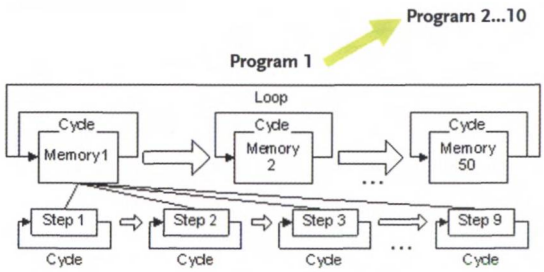
A. SEQUENCE MODE



Sequence Waveform

There are ten sets of Sequence mode and each set has 0 ~ 255 steps. The time setting range for each step is 0.01 ~ 99.99 seconds. Combining many sets of steps to edit required waveforms satisfies users' requirement of highly complicated waveforms.

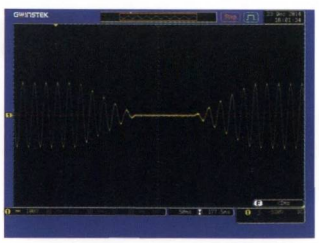
B. PROGRAM MODE



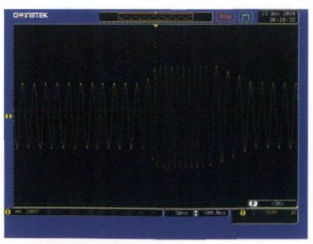
Program Mode

This mode allows users to set ceiling and floor specifications to produce PASS/FAIL result after the measurement is done. It can also show test results for each test procedure or only show the last result. There are ten sets of Program mode and each set has 50 sets of memories. Each memory comprises 9 steps. Each Program will perform according to memories sequence, self-defined loops or designated steps to stop.

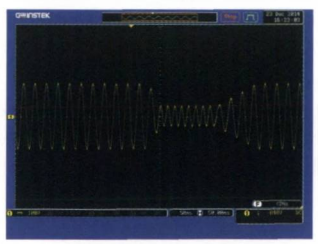
C. SIMULATE MODE



Power Outage



Voltage Rise

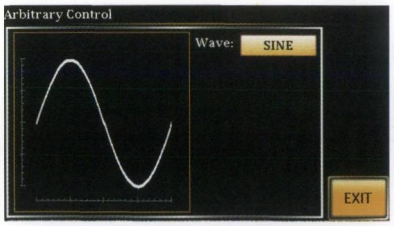


Voltage Fall

This mode can rapidly produce different simulated input transient waveforms such as power outage; voltage rise and voltage fall etc. for engineers to evaluate the impact on DUT posed by the transient phenomena. For instance, capacitor endurance test.

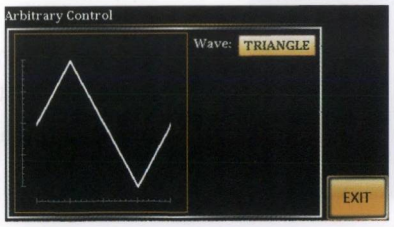
D. ARB MODE

This mode provides more than 50 different waveforms in 7 major categories to rapidly simulate distorted AC voltage waveforms.



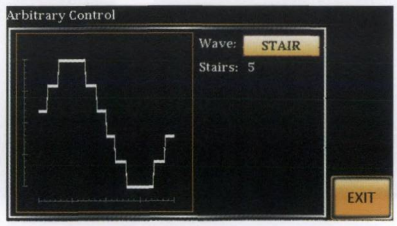
Sine Waveform

Standard AC Waveform



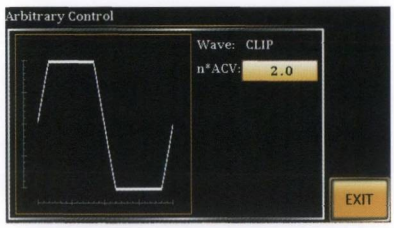
Triangle Waveform

Power harmonic output simulation is triangle waveform



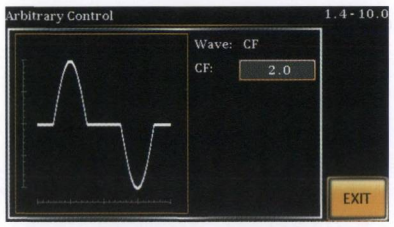
Staircase Waveform

Simulate square waveform and staircase waveform for commercial UPS



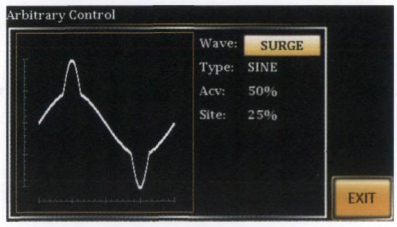
Clipped Sinewave

Simulate grid power supply heavy load waveform



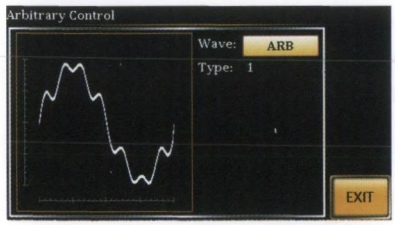
Crest Factor Waveform

Simulate rectified filter current waveform by capacitor input



Surge Waveform

Simulate grid power supply's peak over-voltage

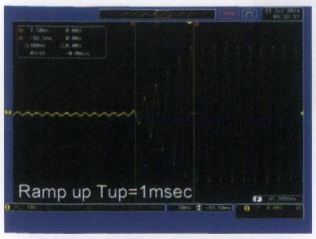


Fourier Series Synthesized Waveform

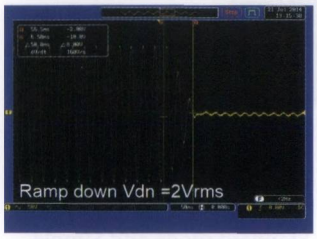
Simulate real output power waveform. Distorted power waveform is produced due to output impedance and non-linear effect such as inductance, capacitance, and parasitic capacitance effect.
For example : motor.

E. RAMP CONTROL

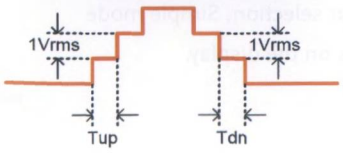
Ramp control allows users to set output voltage rise or fall speed which is based on time (1ms) or voltage (1Vrms) unit.



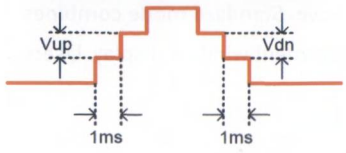
Mode=Time, Tup=1 msec,
VAC=100V, Freq=50Hz,
Ramp output=on.



Mode=Voltage, Vdn=2Vrms,
VAC=100V, Freq=50Hz,
Ramp output=off.

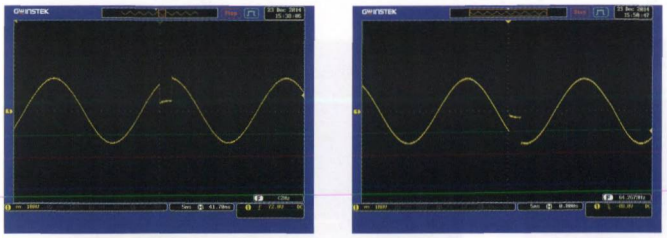


Tup-> 0.1 ~ 999.9ms
Tdn-> 0.1 ~ 999.9ms



Vup-> 0.01 ~ 99.99 Vrms
Vdn-> 0.01 ~ 99.99 Vrms

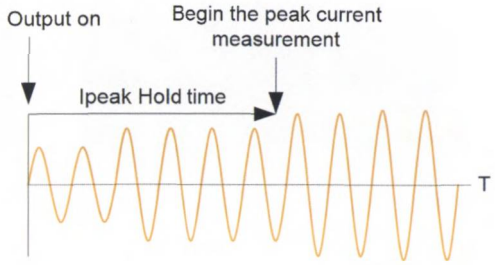
F. SURGE/DIP CONTROL



Dip Surge

Overlapping a Surge/Dip voltage on a normal voltage as the input power for DUT allows users to simulate Surge/Dip situation and evaluate DUT characteristics.

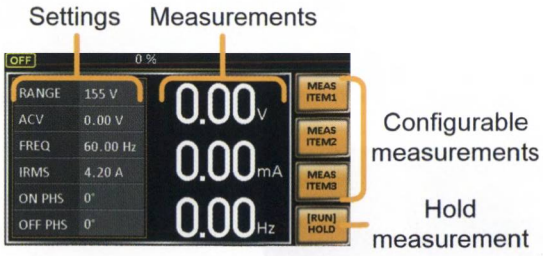
G. T IPEAK, HOLD FUNCTION



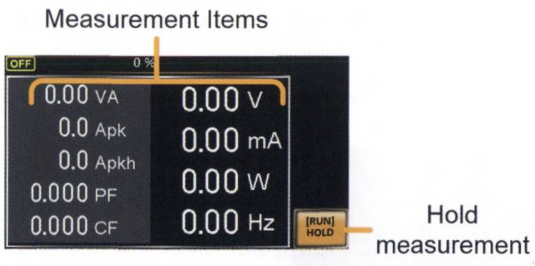
Ipeak Measurement

T, Ipk Hold sets delay time (1ms~60 seconds) for measurement after the output of Ipeak value and the maximum value will be retrieved. Update will be preceded only if measured value is greater than the original value. Ipk Hold is for measuring transient inrush current as soon as the equipment power is on that is usually done by oscilloscope and current probe. T, Ipk Hold delay time setting can be applied to measure inrush current of sequentially activated DUT.

H. CONTROL PANEL CHARACTERISTICS



Standard Mode

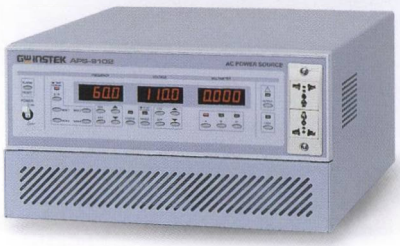


Simple Mode

There are two control panel modes : Standard mode and Simple mode. Both modes are shown as above. Standard mode combines settings and AC Power Meter measurement window display. Users apply Function key (F1~F3) to select required measurement items. There are nine items for selection. Simple mode shows all measurement items on the display.

A.C. Power Supply

APS-9301/9501



APS-9102

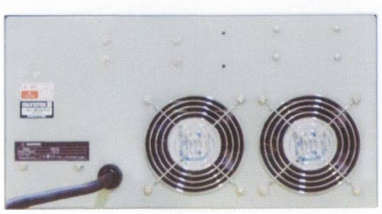
The APS-Series is dual output, 300 to 1000VA linear AC power sources. To protect the APS-Series and loads from unexpected conditions, over current, over temperature and short-circuit protection are standard. High accuracy and low distortion are maintained at true RMS and < 0.5% THD, respectively. The key lock feature prevents tampering and the three separate LED displays simultaneously show frequency, voltage and current to enable easy operation. Configuration is simplified with the store/recall functions for output settings. Software calibration reduces maintenance overhead. The APS-Series is suitable for medium-sized laboratories and production test applications requiring high accuracy and security.

FEATURES

* True RMS Meter
* Wide Output Voltage/Frequency Variable Range
* Saves/Recalls 4 Sets of Voltage/Frequency Memory
* Stable and Low-Distortion Output Waveforms
* Software Calibration to Ensure Accuracy
* Panel-Lock Function to Prevent Operation Error
* Over Current Protection and Over Temperature Protection
* Frequency, Volt, Amp, Watt and Power Factor Display

Rear Panel

APS-9501



APS-9102

SPECIFICATIONS

TYPE

	APS-9301	APS-9501	APS-9102
OUTPUT CAPACITY			
	300 VA	500 VA	1k VA
OUTPUT VOLTAGE			
	0.0~300.0 VAC, 0.1V step (110,220V selectable)		
OUTPUT MAX. CURRENT			
0~150V 0~300V	2.6 Arms 1.3 Arms	4.2 Arms 2.1 Arms	8.4 Arms 4.2 Arms
FREQUENCY			
	45.0~500.0Hz (50Hz, 60Hz selectable) 0.1Hz/step(45.0~100.0Hz), 1Hz/step(100.0~500.0Hz)		
WAVEFORM			
	≤0.5% THD (resistance load)		
LINE VOLTAGE REGULATION			
	<0.1%		
LOAD REGULATION			
	± 0.5% + 0.1V		
SAVE/RECALL			
	4 settings, Save/Recall operated by hand		
PROTECTION			
	Short-circuit protection, panel- lock, over temperature protection, current overflow		
MEASUREMENT			
	Range	Resolution	Accuracy
Frequency Counter	0.0~999.9Hz	0.1Hz	±0.1Hz
RMS Volt-Meter	0.0~380.0V	0.1V	± (1% of rdg + 1digit)
RMS Amp-Meter	0.000~2.000A 1.80~35.00A	1.0mA 0.01A	± (1% of rdg + 5digits) ± (1% of rdg + 20digits)
Wattage Meter	0.0~360.0W 320.0~3500.0W	0.1W 1.0W	± (1.5% of rdg + 5digits) ± (1.5% of rdg + 1digit)
POWER SOURCE			
AC 115V/230V±15%, 47~63Hz, single phase			
OPERATION TEMPERATURE/HUMIDITY			
0℃~+40℃; <80% (non-condensing)			
DIMENSION			
	430(W) x 137(H) x 500(D)mm		430(W)x225(H)x500(D)mm
WEIGHT			
	Approx. 20kg	Approx. 25kg	Approx. 35kg

ORDERING INFORMATION

APS-9102 1000VA A.C. Power Supply
APS-9501 500VA A.C. Power Supply
APS-9301 300VA A.C. Power Supply

ACCESSORIES :
User manual x 1 , Power cord x 1

DC ELECTRONIC LOADS

Electronic loads provided by GW Instek are DC electronic loads which can be divided into three product series.

The PEL-3000 Series, a single channel programmable DC electronic load with 0.01mA current resolution and the current slew rate reaching 16A/ μ s, is ideal for server power tests, SPS for commercial and industrial computers such as 24 hour non-stop cloud ecosystem. A single unit of the PEL-3000 Series provides up to 1520W. Via series or parallel connections, the PEL-3000 series provides the maximum output of 9450W.

PEL-2000 programmable DC electronic load can be operated under C.C., C.V., and C.R. modes. It can also simulate various kinds of dynamic loads. The PEL-2000 Series was a modulation design which intends to assist users to reserve the augmentation capability of future higher power requirements. Via parallel connections, the maximum of five units can be connected to output the maximum power of 7kVA.

Additionally, PEL-300 is a single channel, 300W DC electronic load. OVP, OCP, and OPP protect PEL-300 from unexpected load conditions.

PRODUCTS

- **DC Electronic Loads**

DC ELECTRONIC LOAD

Electronic load controls current, voltage and resistance. Electronic load is utilized to absorb power and its specifications are usually indicated by ampere, voltage and the maximum power.

Electronic loads are often categorized as resistant, inductive or capacitive. In the real tests, electronic load involves complex factors, including dynamic variation, C.V., C.C., C.R. or the control of power.

PROGRAMMABLE DC ELECTRONIC LOAD

Model	Operation Voltage	Operation Current	Power	Channel	Weight(kg)	Page
PEL-3021	1.5~150V	35A	175W	1	6	D75-84
PEL-3041	1.5~150V	70A	350W	1	7	
PEL-3111	1.5~150V	210A	1050W	1	17	
PEL-3211	1.5~150V	420A	2100W	1	23	
PEL-3212	1.5~150V	420A	2100W	1	67.5	
PEL-3323	1.5~150V	630A	3150W	1	85.5	
PEL-3424	1.5~150V	840A	4200W	1	110	
PEL-3535	1.5~150V	1050A	5250W	1	127.5	
PEL-3322	1.5~150V	630A	3150W	1	73	
PEL-3533	1.5~150V	1050A	5250W	1	96.5	
PEL-3744	1.5~150V	1470A	7350W	1	125	
PEL-3955	1.5~150V	1890A	9450W	1	149	
PEL-2020	1~80V	20A	100/100W	2	3.8	D85-88
PEL-2030	1~80V	5/40A	30/250W	2	3.8	
PEL-2040	1~80V	70A	350W	1	3.8	
PEL-2041	2.5~500V	10A	350W	1	3.8	

NON-PROGRAMMABLE DC ELECTRONIC LOADS

Model	Operation Voltage	Operation Current	Power	Channel	Weight(kg)	Page
PEL-300	3 ~ 60V	60A	300W	1	9	D89

Programmable D.C. Electronic Load

PEL-3111

NEW

PEL-3041/3021

NEW

CE | USB | GPIB | Analog Control | RS-232

FEATURES

* Operating Voltage (DC) : 1.5V~150V
* Operating Mode : C.C/C.V/C.R/C.P/C.C+C.V/ C.R+C.V/C.P+C.V
* Parallel Connection of Inputs for Higher Capacity (Max : 9,450W)
* Support of High Slew Rate : Max 16A/μs
* Run Program Function (Go/No Go Test)
* Sequence Function for High Efficient Load Simulations
* Commands are Compatible With Kikusui PLZ-4W Model (*)
* Dynamic (Switching) Function : 0.0166Hz~20kHz
* Soft Start Function : Off/On (1~200ms, Res : 1ms)
* Adjustable OCP/OVP/OPP/UVP Setting
* Short Circuit Function
* Timer Function : Elapsed Time of Load on
* Cut Off Time (Auto Load Off Timer) : 1s to 999h 59min 59s or Off
* External Channel Control/Monitoring Via Analog Control Connector
* Setup Memories : 100 sets
* 3.5 Inch TFT LCD Display
* Multi Interface : USB 2.0 Device/Host, RS-232C, GPIB (Optional)

The PEL-3000 Series, a single-channel, programmable D.C. electronic load with 0.01mA current resolution and 16A/μs current Slew Rate, is very ideal for testing server power supply and SPS (Switching Power Supply) for commercial and industrial computers. For a heavy-duty device like cloud ecosystem running 24-hour nonstop operations, a stable and high-power power supply, ranging from 350W to 1500W, is required to maintain the normal operation of server, Hub, and the equipment of data storage and internet communications. Owing to the increasing demand of data transmission and large scale data storage of telecommunications systems, the infrastructure of internet communications is in the pace of rapid expansion. This has greatly boosted the market demand of telecommunications equipment powered by power supply of 2000W and above. The flexible power combination of PEL-3000 meets the test requirements of present high-power power supply. With respect to battery testing applications such as rechargeable battery for electrical tools, battery module and automobile battery, PEL-3000 has three stand-alone models to offer including 175W, 350W, 1050W and 1050W. By connecting Booster 2100W units with master units, the maximum load capacity of the whole system can reach 9,450W. Hence, the PEL-3000 Series fulfills various power testing requirements including medium to low power or high-power power supply.

The PEL-3000 Series has seven operating modes and three operating functions. Among the seven operating modes, four of them are basic operating modes, including constant current, constant voltage, constant resistance, and constant power, and the other three are advanced operating modes including constant current + constant voltage, constant resistance + constant voltage, and constant power + constant voltage. Users must first select operating mode and then operating function based upon the test requirements. Static, Dynamic and Sequence operating functions can be applied to different testing conditions including a fixed load level, switching between two levels or switching among more than two levels. Sequence function is divided into Fast Sequence and Normal Sequence according to the test time of each step. Both Dynamic and Sequence are to assist users to simulate the genuine load change. For instance, PEL-3000 can simulate HEV current consumption to make sure that automobile battery can supply HEV with sufficient power need on the road. By so doing, manufacturers can elevate product quality and reliability.

The adjustable high speed Slew Rate of 16A/μs simulates rise and fall speed of different load current so as to test the adequacy of the Response time of power supply. The Soft Start function of the PEL-3000 Series can set current rise time for the moment PEL-3000 is turned on to reduce the abnormal situation of the voltage drop of power supply under test. The adjustable Under Voltage Protection(UVP), Go/NoGo voltage input monitoring function, current monitoring function and Timer Function to control load activation time can be jointly applied to the characteristic tests of battery bleeding to avoid battery damage during bleeding operation. Based upon the functionalities described above, the PEL-3000 Series can test a vast variety of power supply ranging from the fundamental static sink current to complex dynamic load simulations so as to enhance product quality and reliability.

The PEL-3000 Series D.C Electronic Load

The PEL-3000 Series is a high speed, single channel and programmable D.C. electronic load and its power, functionality, parallel
combination and size are listed on the following chart :

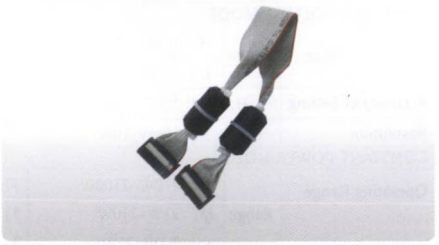
MODEL	PEL-3021	PEL-3041	PEL-3111	PEL-3211
Power	175W	350W	1,050W	2,100W Booster
Function	Full-function Single Unit	Full-function Single Unit	Full-function Single Unit	No control panel, can not be operated alone
Parallel Combination	Parallel with same model, 5 units the maximum	Parallel with same model, 5 units the maximum	Parallel with same model, 5 units the maximum Parallel with the maximum of four PEL-3211s	Parallel with PEL-3111
Size	Half Rack	Half Rack	Full Rack	Full Rack

SPECIFICATIONS

Model			PEL-3021			PEL-3041			PEL-3111			PEL-3211
Voltage Current Power			1.5V~150V 0~35A 175W			1.5V~150V 0~70A 350W			1.5V~150V 0~210A 1050W			1.5V~150V 0~420A 2100W
CONSTANT CURRENT MODE												
Operating Range			0~35A	0~3.5A	0~0.35A	A~70A	A~7A	A~0.7A	A~210A	A~21A	A~2.1A	420A
Accuracy of Setting	H,M,L		±(0.2 % of set + 0.1 % of f.s[*1]) + Vin[*2]/500 kΩ									±(1.2% of set+ 1.1% of f.s)
Accuracy of Setting(Parallel)	H,M,L		±(1.2% of set +1.1% of f.s.[*3])									
Resolution			1mA	0.1mA	0.01mA	2mA	0.2mA	0.02mA	10mA	1mA	0.1mA	N/A
CR MODE												
Operating Range	Range	H	23.3336S~400μS (42.857mΩ~2.5kΩ)			46.6672S~800μS (21.428mΩ~1.25kΩ)			140.0016S~2.4mS (7.1427mΩ~ 416.6667Ω)			28.0002s~ 484.8us (35.7135mΩ~ 2.08334Ω)
		M	2.33336S~40μS (428.566mΩ~25kΩ)			4.6667S~80μS (214.28mΩ~12.5kΩ)			14.0001S~242.4μS (71.427mΩ~ 4.16667kΩ)			
		L	0.233336S~4μS (4.28566Ω~250kΩ)			0.46667S~8μS (2.1428Ω~125kΩ)			1.40001S~24.24μS (714.27mΩ~ 41.6667kΩ)			
Accuracy of Setting	H,M,L		±(0.5 % of set[*4] + 0.5 % of f.s[*1]) + Vin[*3]/500kΩ									±(1.2% of set +1.1% of f.s)
Resolution			400μS	40μS	4μS	800μS	80μS	8μS	2.4mS	240μS	24μS	N/A
CONSTANT VOLTAGE MODE												
Operating Range	Range	H	1.5V~150V									1.5V~150V
		L	1.5V~15V									1.5V~15V
Accuracy of Setting	H,L		±(0.1 % of set + 0.1 % of f.s)									N/A
Resolution	H,L		10mV/1mV									
CONSTANT POWER MODE												
Operating Range	Range	H	17.5W~175W			35W~350W			105W~1050W			210W~2100W
		M	1.75W~17.5W			3.5W~35W			10.5W~105W			21W~210W
		L	0.175W~1.75W			0.35W~3.5W			1.05W~10.5W			2.1W~21W
Accuracy of Setting	H,M,L		±(0.6 % of set[*5] + 1.4 % of f.s[*6])									
Resolution			10mW	1mW	0.1mW	10mW	1mW	0.1mW	100mW	10mW	1mW	
PARALLEL Mode												
Capacity			875W			1750W			5250W			PEL-3111 with 4 booster units : Max 9.45kW
SLEW RATE												
Setting Range (CC mode)	Range	H	2.5mA/μs~2.5A/μs			5mA/μs~5A/μs			16mA/μs~16A/μs			16mA/μs~16A/μs
		M	250μA/μs~250mA/μs			500μA/μs~500mA/μs			1.6mA/μs~1.6A/μs			1.6mA/μs~1.6A/μs
		L	25μA/μs~25mA/μs			50μA/μs~50mA/μs			160μA/μs~160mA/μs			N/A
Setting Range (CR Mode)	Range	H	250μA/μs~250mA/μs			500μA/μs~500mA/μs			1.6mA/μs~1.6A/μs			1.6mA/μs~1.6A/μs
		M	25μA/μs~25mA/μs			50μA/μs~50mA/μs			160μA/μs~160mA/μs			160μA/μs~160mA/μs
		L	2.5μA/μs~2.5mA/μs			5μA/μs~5mA/μs			16μA/μs~16mA/μs			N/A
Accuracy of Setting	H,M,L		±(10 % of set*7 + 5μs)									N/A
Resolution			0.1μA ~ 1mA			0.2μA ~ 2mA			0.6μA ~ 6mA			N/A
METER												
Voltmeter Ammeter Ammeter(Parallel Operation)	Accuracy Accuracy Accuracy		±(0.1 % of rdg + 0.1 % of f.s) ±(0.2 % of rdg + 0.3 % of f.s) ±(1.2% of rdg +1.1% of f.s.)									N/A
DYNAMIC MODE												
Operation Mode T1 & T2 Accuracy			CC and CR 0.025mS~10mS/Res : 1μs ; 1ms~30s/Res : 1ms 1μS/1ms ± 100ppm									
Slew Rate	Range	H	2.5mA/μs~2.5A/μs			5mA/μs~5A/μs			16mA/μs~16A/μs			16mA/μs~16A/μs
		M	250μA/μs~250mA/μs			500uA/μs~500mA/μs			1.6mA/μs~1.6A/μs			1.6mA/μs~1.6A/μs
		L	25μA/μs~25mA/μs			50uA/μs~50mA/μs			160μA/μs~160mA/μs			N/A
Current Accuracy			±0.4%F.S.			±0.4%F.S.			±0.4%F.S.			±(1.2%of set+1.1% of F.S.)
PROTECTION FUNCTION												
Overvoltage protection(OVP)			Adjustable ; Turns off the load at 110% of the rated voltage									N/A
Overcurrent protection(OCP) Overpower protection(OPP)			0.03A~38.5A(Adjustable) 0.1W~192.5W(Adjustable)			0.06A~77A(Adjustable) 0.3W~385W(Adjustable)			0.2A~231A(Adjustable) 1W~1155W(Adjustable)			
Overheat protection(OHP)			Turns off the load when the heat sink temperature reaches 95 °C									
Undervoltage protection(UVP)			Adjustable : Turns off the load when detected Can be set in the range of 0 V to 150 V or Off									
Reverse connection protection(REV)			By diode. Turns off the load when an alarm occurs.									
POWER SOURCE												
AC100V ~ 230V±10% ; 50Hz / 60Hz ± 2Hz												
INTERFACE												
USB/RS232/Analog Control (Standard) ; GPIB(Option)												
DIMENSIONS & WEIGHT												
			214.5(W)x124(H)x 400(D)mm; Approx. 6kg			214.5(W)x124(H)x 400(D)mm; Approx. 7kg			429.5(W)x128(H)x 400(D)mm; Approx. 17kg			427.7(W)x128(H) x592.5(D)mm; Approx. 23kg

Rear Panel

GTL-255 Frame Link Cable (300mm)



GTL-120 Test Lead

GRA-413 Rack Mount Kit (EIA+JIS)

For : PEL-3211

GRA-414-J Rack Mount Kit (JIS)

For : PEL-3021/3041/3111

GRA-414-E Rack Mount Kit (EIA)

For : PEL-3021/3041/3111

Programmable D.C. Electronic Load

SPECIFICATIONS

Model			PEL-3212	PEL-3323	PEL-3424	PEL-3535	PEL-3322	PEL-3533	PEL-3744	PEL-3955
Voltage Current Power			1.5V~150V 0~420A 2100W	1.5V~150V 0~630A 3150W	1.5V~150V 0~840A 4200W	1.5V~150V 0~1050A 5250W	1.5V~150V 0~630A 3150W	1.5V~150V 0~1050A 5250W	1.5V~150V 0~1470A 7350W	1.5V~150V 0~1890A 9450W
CONSTANT CURRENT MODE										
Operating Range			0~420A / 0~42A / 0~4.2A	0~630A / 0~63A / 0~6.3A	0~840A / 0~84A / 0~8.4A	0~1050A / 0~105A / 0~10.5A	0~630A / 0~63A / N/A	0~1050A / 0~105A / N/A	0~1470A / 0~147A / N/A	0~1890A / 0~189A / N/A
Accuracy of Setting	H,M,L		±(0.2 % of set + 0.1 % of f.s[*1]) + Vin[*2]/500 kΩ							
Resolution			20mA / 2mA / 0.2mA	30mA / 3mA / 0.3mA	40mA / 4mA / 0.4mA	50mA / 5mA / 0.5mA	30mA / 3mA / N/A	50mA / 5mA / N/A	70mA / 7mA / N/A	90mA / 9mA / N/A
CR MODE										
Operating Range	Range	H	280.0032S~4.8mS (3.57138mΩ~ 208.333Ω)	420.0048S~7.2mS (2.38092mΩ~ 138.888Ω)	560.0064S~9.6mS (1.78569mΩ~ 104.166Ω)	700.008S~12mS (1.42855mΩ~ 83.3333Ω)	420.0048S~7.2mS (2.38092mΩ~ 138.888Ω)	700.008S~12mS (1.42855mΩ~ 83.3333Ω)	980.0112S~16.8mS (1.02039mΩ~ 59.5238Ω)	1260.0144S~21.6mS (793.641uΩ~ 46.2963Ω)
		M	28.00032S~480µS (35.7138mΩ~ 2083.33Ω)	42.00048S~720µS (23.8092mΩ~ 1388.88Ω)	56.00064S~960µS (17.8569mΩ~ 1041.66Ω)	70.0008S~1.2mS (14.2855mΩ~ 833.333Ω)	42.00048S~720µS (23.8092mΩ~ 1388.88Ω)	70.0008S~1.2mS (14.2855mΩ~ 833.333Ω)	98.00112S~1.68mS (10.2039mΩ~ 595.238Ω)	126.00144S~2.16mS (7.93641mΩ~ 462.963Ω)
		L	2.800032S~48µS (357.138mΩ~ 20.8333kΩ)	4.200048S~72µS (238.092mΩ~ 13.8888kΩ)	5.600064S~96µS (178.569mΩ~ 10.4166kΩ)	7.00008S~120µS (142.855mΩ~ 8.33333kΩ)	N/A	N/A	N/A	N/A
Accuracy of Setting	H,M,L		±(0.5 % of set[*4] + 0.5 % of f.s[*3]) + Vin[*2]/500kΩ							
Resolution			4.8mS / 480µS / 48µS	7.2mS / 720µS / 72µS	9.6mS / 960µS / 96µS	12mS / 1.2mS / 120µS	7.2mS / 720µS / –	12mS / 1.2mS / –	16.8mS / 1.68mS / –	21.6mS / 2.16mS / –
CONSTANT VOLTAGE MODE										
Operating Range	Range	H	1.5V~150V							
		L	1.5V~15V							
Accuracy of Setting	H,L		±(0.1 % of set + 0.1 % of f.s)							
Resolution	H,L		10mV/1mV							
CONSTANT POWER MODE										
Operating Range	Range	H	210W~2100W	315W~3150W	420W~4200W	525W~5250W	315W~3150W	525W~5250W	735W~7350W	945W~9450W
		M	21W~210W	31.5W~315W	42W~420W	52.5W~525W	31.5W~315W	52.5W~525W	93.5W~735W	94.5W~945W
		L	2.1W~21W	3.15W~31.5W	4.2W~42W	5.25W~52.5W	N/A	N/A	N/A	N/A
Accuracy of Setting	H,M,L		±(0.6 % of set + 1.4 % of f.s[*3])							
Resolution			200mW / 20mW / 2mW	300mW / 30mW / 3mW	400mW / 40mW / 4mW	500mW / 50mW / 5mW	300mW / 30mW / –	500mW / 50mW / –	700mW / 70mW / –	900mW / 90mW / –
PARALLEL Mode										
Capacity			–	–	–	–	–	–	–	–
SLEW RATE										
Setting Range (CC mode)	Range	H	32mA/µs~16A/µs	48mA/µs~16A/µs	64mA/µs~16A/µs	80mA/µs~16A/µs	48mA/µs~16A/µs	80mA/µs~16A/µs	112mA/µs~16A/µs	144mA/µs~16A/µs
		M	3.2mA/µs~1.6A/µs	4.8mA/µs~1.6A/µs	6.4mA/µs~1.6A/µs	8mA/µs~1.6A/µs	4.8mA/µs~1.6A/µs	8mA/µs~1.6A/µs	11.2mA/µs~1.6A/µs	14.4mA/µs~1.6A/µs
		L	320µA/µs~160mA/µs	480µA/µs~160mA/µs	640µA/µs~160mA/µs	800µA/µs~160mA/µs	N/A	N/A	N/A	N/A
Resolution			1.2µA~12mA	1.8µA~18mA	2.4µA~24mA	3µA~30mA	1.8µA~18mA	3µA~30mA	4.2µA~42mA	5.4µA~54mA
Setting Range (CR Mode)	Range	H	3.2mA/µs~1.6A/µs	4.8mA/µs~1.6A/µs	6.4mA/µs~1.6A/µs	8mA/µs~1.6A/µs	4.8mA/µs~1.6A/µs	8mA/µs~1.6A/µs	11.2mA/µs~1.6A/µs	14.4mA/µs~1.6A/µs
		M	320µA/µs~160mA/µs	480µA/µs~160mA/µs	640µA/µs~160mA/µs	800µA/µs~160mA/µs	480µA/µs~160mA/µs	800µA/µs~160mA/µs	1.12mA/µs~160mA/µs	1.44mA/µs~160mA/µs
		L	32µA/µs~16mA/µs	48µA/µs~16mA/µs	64µA/µs~16mA/µs	80µA/µs~16mA/µs	N/A	N/A	N/A	N/A
Resolution			120nA~1.2mA	180nA~1.8mA	240nA~2.4mA	300nA~3.0mA	0.18nA~1.8mA	0.3nA~3.0mA	0.42nA~4.2mA	0.54nA~5.4mA
Accuracy of Setting	H,M,L		±(10 % of set[*7] + 5µs)							
METER										
Voltmeter Ammeter	Accuracy Accuracy		±(0.1 % of rdg + 0.1 % of f.s) ±(0.2 % of rdg + 0.3 % of f.s)							
DYNAMIC MODE										
Operation Mode T1 & T2 Accuracy			CC and CR 0.025mS~10mS/Res : 1µs ; 1mS~30S/Res : 1mS 1µS/1ms ± 100ppm							
Slew Rate (CC Mode)	Range	H	32mA/µs~16A/µs	48mA/µs~16A/µs	64mA/µs~16A/µs	80mA/µs~16A/µs	48mA/µs~16A/µs	80mA/µs~16A/µs	112mA/µs~16A/µs	144mA/µs~16A/µs
		M	3.2mA/µs~1.6mA/µs	4.8mA/µs~1.6A/µs	6.4mA/µs~1.6A/µs	8mA/µs~1.6A/µs	4.8mA/µs~1.6A/µs	8mA/µs~1.6A/µs	11.2mA/µs~1.6A/µs	14.4mA/µs~1.6A/µs
		L	320µA/µs~160mA/µs	480µA/µs~160mA/µs	640µA/µs~160mA/µs	800µA/µs~160mA/µs	N/A	N/A	N/A	N/A
Slew Rate (CR Mode)	Range	H	3.2mA/µs~1.6A/µs	4.8mA/µs~1.6A/µs	6.4mA/µs~1.6A/µs	8mA/µs~1.6A/µs	4.8mA/µs~1.6A/µs	8mA/µs~1.6A/µs	11.2mA/µs~1.6A/µs	14.4mA/µs~1.6A/µs
		M	320µA/µs~160mA/µs	480µA/µs~160mA/µs	640µA/µs~160mA/µs	800µA/µs~160mA/µs	480µA/µs~160mA/µs	800µA/µs~160mA/µs	1.12mA/µs~160mA/µs	1.44mA/µs~160mA/µs
		L	32µA/µs~16mA/µs	48µA/µs~16mA/µs	64µA/µs~16mA/µs	80µA/µs~16mA/µs	N/A	N/A	N/A	N/A
Current Accuracy			±0.4%F.S.	±0.4%F.S.	±0.4%F.S.	±0.4%F.S.	±0.4%F.S.	±0.4%F.S.	±0.4%F.S.	±0.4%F.S.
PROTECTION FUNCTION										
Overvoltage protection(OVP)			Adjustable ; Turns off the load at 110% of the rated voltage							
Overcurrent protection(OCP) Overpower protection(OPP)			0.4A~462A(Adjustable) 2W~2310W(Adjustable)	0.6A~693A(Adjustable) 3W~3465W(Adjustable)	0.8A~924A(Adjustable) 4W~4620W(Adjustable)	1.0A~1155A(Adjustable) 5W~5775W(Adjustable)	0.6A~693A(Adjustable) 3W~3465W(Adjustable)	1.0A~1155A(Adjustable) 5W~5775W(Adjustable)	1.4A~1617A(Adjustable) 7W~8085W(Adjustable)	1.8A~2079A(Adjustable) 9W~10395W(Adjustable)
Overheat protection(OHP) Undervoltage protection(UVP) Reverse connection protection(REV)			Turns off the load when the heat sink temperature reaches 95 °C Adjustable : Turns off the load when detected Can be set in the range of 0 V to 150 V or Off By diode. Turns off the load when an alarm occurs							

SPECIFICATIONS								
Model	PEL-3212	PEL-3323	PEL-3424	PEL-3535	PEL-3322	PEL-3533	PEL-3744	PEL-3955
POWER SOURCE								
AC100V ~ 230V±10% ; 47Hz ~ 63Hz								
INTERFACE								
USB/RS232/Analog Control (Standard) ; GPIB(Option)								
DIMENSIONS & WEIGHT								
	598(W)x611(H)x 706(D)mm; Approx. 67.5kg	598(W)x611(H)x 706(D)mm; Approx. 85.5kg	598(W)x877(H)x 706(D)mm; Approx. 110kg	598(W)x877(H)x 706(D)mm; Approx. 127.5kg	598(W)x611(H)x 706(D)mm; Approx. 73kg	598(W)x611(H)x 706(D)mm; Approx. 96.5kg	598(W)x877(H)x 706(D)mm; Approx. 125kg	598(W)x877(H)x 706(D)mm; Approx. 149kg

ORDERING INFORMATION

PEL-3021 175W Programmable DC Electronic Load
PEL-3041 350W Programmable DC Electronic Load
PEL-3111 1050W Programmable DC Electronic Load
PEL-3211 2100W Booster unit for PEL-3111 only
PEL-3212 2100W Programmable DC Electronic Load
PEL-3323 3150W Programmable DC Electronic Load
PEL-3424 4200W Programmable DC Electronic Load
PEL-3535 5250W Programmable DC Electronic Load
PEL-3322 3150W Programmable DC Electronic Load
PEL-3533 5250W Programmable DC Electronic Load
PEL-3744 7350W Programmable DC Electronic Load
PEL-3955 9450W Programmable DC Electronic Load

ACCESSORIES :

User Manual x 1, Power Cord (depend on model number), Protection cover, Insulation sheet, GTL-255 Frame Link Cable (for PEL-3211/3212/3323/3424/3535/3322/3533/3744/3955)

OPTIONAL ASSESSORIES

GTL-120 Test Lead (Max 40A)
GTL-248 GPIB Cable (2m)
GTL-246 USB Cable, USB 2.0A-B TYPE CABLE, 4P
GTL-251 GPIB-USB-HS (High Speed)
GTL-255 Frame Link Cable (300mm)
GRA-413 Rack Mount Kit (EIA+JIS) for PEL-3211
GRA-414-J Rack Mount Kit (JIS) for PEL-3021/3041/3111
GRA-414-E Rack Mount Kit (EIA) for PEL-3021/3041/3111
PEL-004 GPIB Card
PEL-010 Dust filter

FREE DOWNLOAD

Driver LabView Driver

*1. Full scale of H range.
*2. Vin: input terminal voltage of electronic load.
*3. M range applies to the full scale of H range.
*4. Set = Vin/Rset.
*5. It is not applied for the condition of the parallel operation.
*6. M range applies to the full scale of H range.
*7. Time to reach from 10 %~90 % when the current is varied from 2 %~100 %(20 %~100 % in M range) of the rated current.

PEL-3322

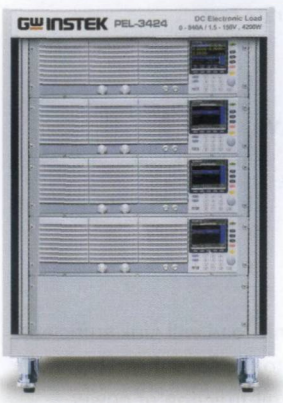
PEL-3533

PEL-3744

PEL-3955

PEL-3212

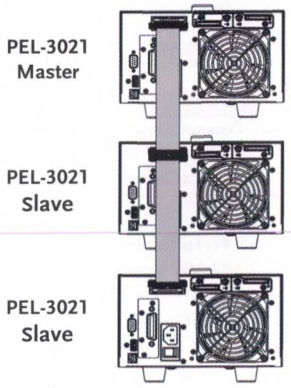
PEL-3323



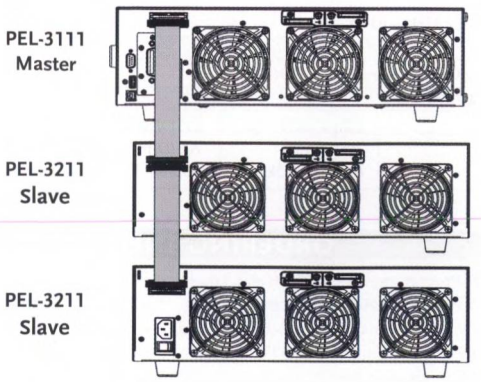
PEL-3424

PEL-3535

A. OPERATING FUNCTION FOR MASTER AND SLAVE IN PARALLEL



Three PEL-3021 in Parallel

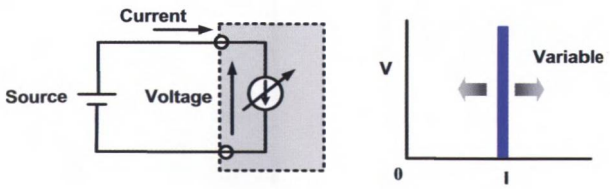


One PEL-3111 connects with two PEL-3211 in Parallel

PEL-3000 Series connects with loads via MIL 20-pin interface and connecting cables to designate a master to control other slave units in parallel. One PEL-3111 and four PEL-3211s in parallel provide the maximum power of 9,450W. Parallel arrangement allows users to flexibly select and apply different power arrangement which enhances equipment utilization efficiency to save R&D cost.

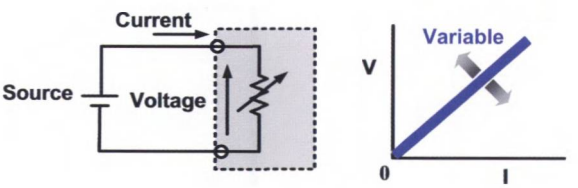
B. OPERATING MODE

The PEL-3000 series provides four fundamental operating modes and three add-on modes of CC, CR and CP separately combining with CV. Users can set different load condition under different operating modes such as setting operating range for load level, Current Slew Rate, input voltage and load current. The input voltage range has two levels - high and low. The load current operating range has three levels - high, medium and low current levels which possess different resolution to meet test requirements of different power product specifications.



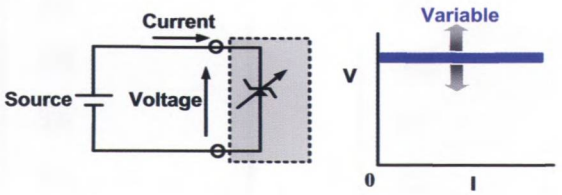
CC Mode

Under constant current mode, electronic load will sink the amount of current users has set. Different current settings via CC mode allow users to test the voltage changes of DC power supply which is called load regulation rate test.



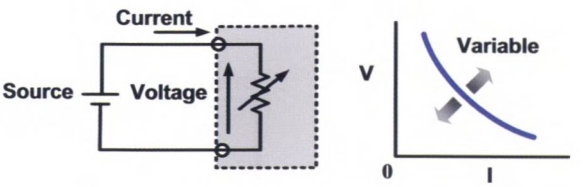
C.R Mode

Under constant resistance mode, electronic load will sink load current, which is linearly direct proportion to input voltage. This mode can be utilized in testing voltage or the activation and current limit of power supply.



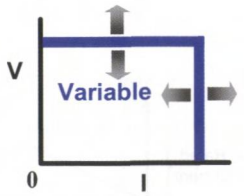
C.V Mode

Under constant voltage mode, electronic load will sink sufficient current to regulate the voltage source to the set value. This mode allows users not only to test current limit function of power supply, but also to simulate battery operation in testing battery chargers.

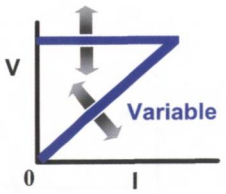


C.P Mode

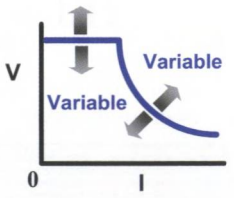
Under constant power mode, electronic load will sink load current, which is indirect proportion to input voltage to reach preset constant power requirement. Hence, the changes of input voltage will have indirect proportion effect on current sinking so as to reach constant power control.



CC+CV Mode



CR+CV Mode



CP+CV Mode

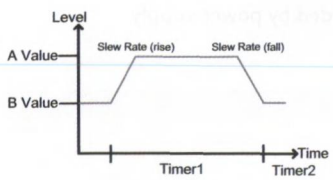
+CV mode can be selected under CC, CR or CP mode. When +CV mode function is turned on and electronic load sinks more current than the maximum current of power supply under test, electronic load will automatically switch to CV mode. It is because that the current sunk is the maximum current of power device. Therefore, power supply will switch to CC mode and PEL-3000 will switch to CV mode to limit electronic load from sinking the total current of power supply so as to prevent power supply under test from damaging. Electronic load will cease operation once the voltage of DUT is lower than the set voltage under +CV mode.

C. THREE OPERATING FUNCTIONS

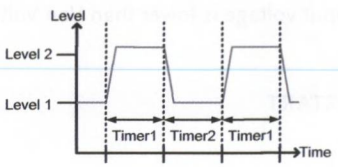
The PEL-3000 series, according to different test conditions, step or continuous changes, test speeds, and selectable modes, has three operating functions: Static, Dynamic and Sequence, which can be separately applied on a fixed load test; between two loads; or among more than two loads. Detailed descriptions of these functions are as follows:

Static function provides a fixed load to test output stability of power supply. Switching load value A to B will be manually operated. Under Dynamic function, two test conditions can be switched automatically and every set of parameter includes Level, Timer and Slew Rate. Timer can be set to the fastest of 25μs to accommodate response time of different power supply and assist testing power supply output status when load is unstable in order to enhance products' reliability and quality.

Function \ Operation	Static	Dynamic	Sequence	
			Fast	Normal
Operating Condition Selection	Single fixed condition	Selection between two conditions	Selection among more than two conditions	Selection from more than two conditions
Operating Modes	All modes	• Two conditions using same mode • CR, CC,CP modes	• Each condition must use same mode • Support CC or CR mode	• Each condition using different mode • All modes
Adjustable Condition Setting	• A/B Value • Slew Rate	• Level 1/Level 2 • Timer 1/Timer 2 • Slew Rate 1/Slew Rate 2	• Level • Others... • Timer • Slew Rate	• Level • Others... • Timer • Slew Rate
Sequence Step Combination	N/A	N/A	• 1 Sequence • 25μs/step • 1,000 steps	• 10 Sequence • 1ms/step • 1,000 steps
Other Functions	N/A	N/A	• Trigger Out function	• Trigger Out function • Ramp function

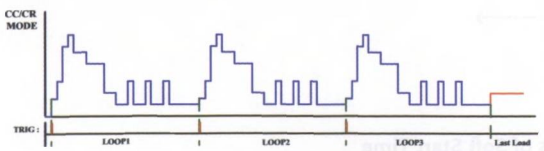


Static Mode

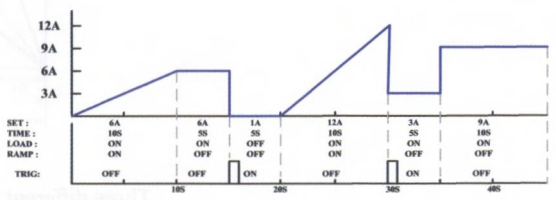


Dynamic Mode

In Sequence function, waveforms of load current edited by Fast Sequence are steps and every step can reach the fastest of 25μs to provide the high slew rate for electronic loads.



Fast Sequence Diagram

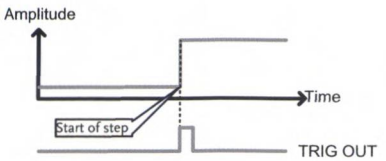


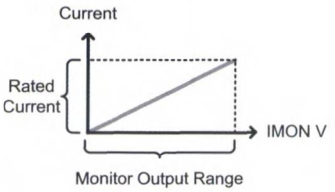
Normal Sequence Diagram

Normal Sequence provides RAMP function to users, according to their requirements, to select between slope and step method under set time to sink current.

By applying a complete sequence editing function, users can control electronic load without using a computer or writing a program so as to save cost and time of R&D.

D. TRIGGER SIGNAL AND CURRENT MONITORING (IMON)





BNC connectors on the front panel

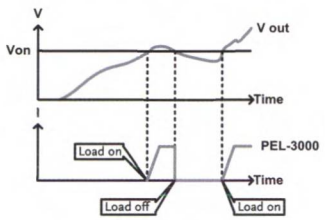
The front panel of PEL-3000, via BNC connectors provides two output signals, which are Trigger Signal and IMON. Under Dynamic or Sequence function, the moment the load current setting is changed BNC on the front panel will output a 4.5V and 2us pulse voltage. This trigger signal can be set to open or close for every step. Users can use trigger signal to synchronize other devices inside the system.

TRIG OUT = ON

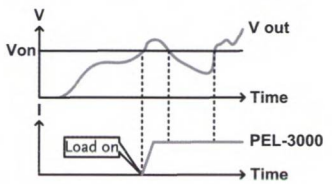
IMON OUTPUT

Current monitoring signals, using a BNC connector to compare with the full scale of real load current, output 0 ~ 1V at high and low current levels and 0 ~ 0.1V at medium current level. Therefore, users can monitor load current change without using current probe to save cost.

E. VON VOLTAGE AND VON LATCH FUNCTION



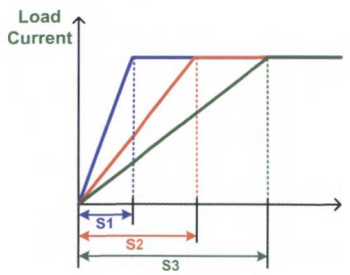
Von Latch = OFF



Von Latch = ON

Von Voltage is the threshold voltage for electronic load to activate or terminate sinking current. When Von Latch is set to off, electronic load operation will be activated if input voltage is higher than Von Voltage and electronic load operation will be terminated if input voltage is lower than Von Voltage. When Von Latch is set to on, electronic load operation will be activated if input voltage is higher than Von Voltage and will continue operation even input voltage is lower than Von Voltage. Von Voltage function can test the transient maximum current capability provided by power supply.

F. SOFT START



Three different load waveforms of Soft Start Time

Soft Start regulates the time of current rising from 0 to preset value during the moment load is activated. This function is to prevent voltage from dropping due to the fast transient rising speed of load current. Sudden voltage drop will result in an unsuccessful activation of electronic load or DUT and a damaged DUT.

G. PROTECTION MODES

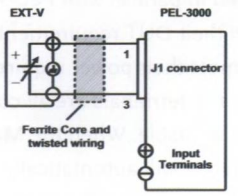
Functions \ Protection	OCP	OVP	OPP	OTP	UVP
Adjustable Thresholds	✓	✓	✓	Fixed	✓
Load Off	✓	✓	✓	N/A	✓
Limit Function	✓	N/A	✓	N/A	N/A

The PEL-3000 Series provides many protective functions including over current protection (OCP), over voltage protection (OVP), over power protection (OPP), over temperature protection (OTP) and under voltage protection (UVP). Except for OTP, all thresholds of protective functions are adjustable. When protective function is activated, electronic load will send out warning signal and terminate operation. Other than protective functions, Limit function can also be utilized to maintain electronic load in operation at a preset value. The related settings and selections are as follows: Take UVP as an example. In battery bleeding tests, electronic load will cease operation if battery voltage is lower than the set protective threshold value in order to prevent battery from over bleeding.

H. ANALOG CHANNEL CONTROL

Rear Panel of PEL-3111

Rear Panel of PEL-3021/PEL-3041

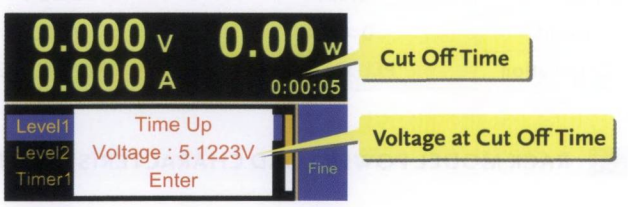


External Voltage Connection

The PEL-3000 Series provides the external analog channel control function, which allows users to connect J1 and J2 MIL 20 pin standard connectors on the rear panel to input voltage or to connect resistance to control electronic load operation. Input voltage is limited to the range of 0 ~ 10V; connecting resistance is limited to the range of 0Ω ~ 10kΩ; and related to load level are 0~100%. For instance, when operating PEL-3021under CC mode and 35A, external input voltage is 1V and sink current is 3.5A. Users can integrate this function into test system and utilize signals generated from the test system to control PEL-3000 Series.

I. TIMER FUNCTIONS

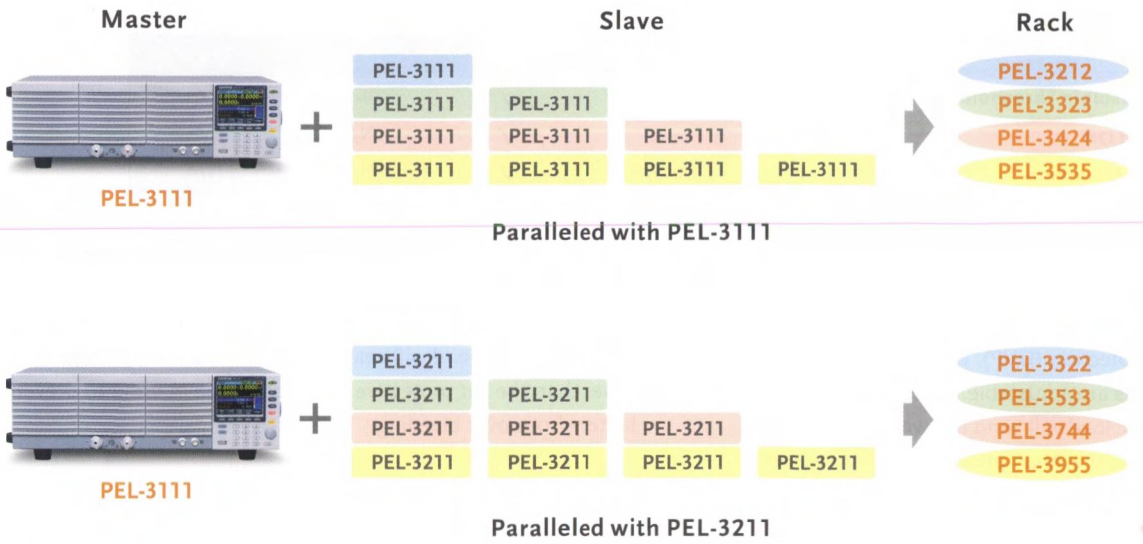
Elapsed Time



Voltage at Cut Off Time

The PEL-3000 series provides count time and cut off time functions. The display screen will show present activation time when electronic load is activated. When electronic load operation is terminated count time will stop and the total operation time will be shown on the display screen.
The activation time of cut off time can be set to the maximum length of 999h 59min 59s. When electronic load is activated this function will start counting time. Electronic load will cease operation (load off) and show the final input voltage on the screen when preset time is reached. Timer function can provides information and application related to time. Users can obtain the total time of limiting electronic load operation to increase the agility of electronic load tests.

J. MATER/SLAVE PARALLEL CONTROL:



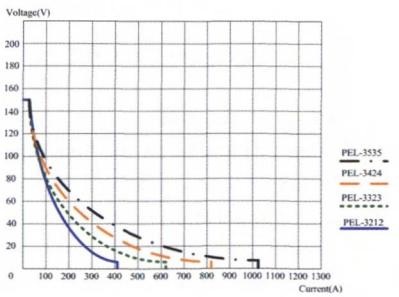
PEL-3111 can be used as either master or Slave. PEL-3111 can also be connected in parallel with PEL-3211 (Booster unit). Customers, based upon their DUT requirements, can collocate different models to meet their power requirements. The system collocation connection and terminals are all copper bar structure. System Rack is also available. When the Master/Slave control mode is selected, Master will automatically calculate current sunk as soon as load has been activated. The system will automatically distribute current to each Master/Slave unit. For Master/Slave parallel collocation, users only enter settings and edit programs on Master. Logically speaking, Master/Slave parallel collocation can be regarded as one single load unit. Therefore, this collocation can safely provide load capacity with actual current and power in the respective level. Parallel collocation can also meet different current and power requirements.

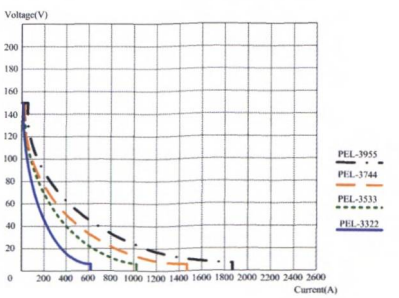
K. RACK MODEL COLLOCATION AND RATED POWER

Model	PEL-3322	PEL-3533	PEL-3744	PEL-3955
Watt	3150W	5250W	7350W	9450W
Current	0~630A	0~1050A	0~1470A	0~1890A
Collocation	PEL-3111+PEL-3211	PEL-3111+PEL-3211 x 2	PEL-3111+PEL-3211 x 3	PEL-3111+PEL-3211 x 4

Model	PEL-3212	PEL-3323	PEL-3424	PEL-3535
Watt	2100W	3150W	4200W	5250W
Current	0~420A	0~630A	0~840A	0~1050A
Collocation	PEL-3111 x 2	PEL-3111 x 3	PEL-3111 x 4	PEL-3111 x 5

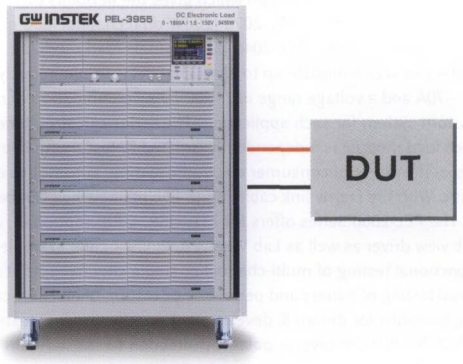
L. RACK MODEL POWER LOAD CHARACTERISTICS (TYPICAL)



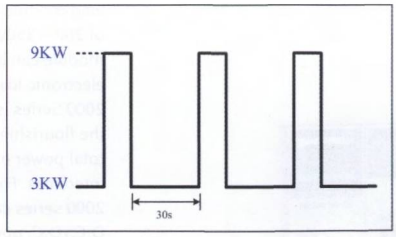


M. SUCCESSFUL CASE OF HIGH POWER MODEL IN PARALLEL:

Load's Waveform Shown on Right Diagram :



Connection Diagram of Application



Example the Waveform of Load

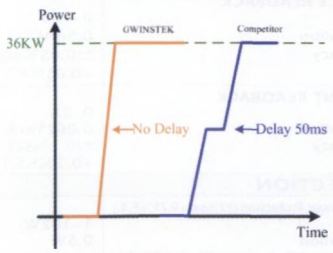
Some large power supply system has a stable load of 3kW under the normal duty operation and its dynamic load of transient peak will reach 9kW. This system uses PEL-3955 to simulate load patterns so as to assist engineers in analyzing and testing DUT. The procedures:

* Select load mode as CC or CP
* Select appropriate operational level: I Range/V Range ≥ High
* Select operational mode as Dynamic mode or Sequence
* Set related load arguments sequentially Level1, Level2, Slew Rate and Duration Time
* If Sequence is selected, each segment's load condition must be set according to users' requirements
* Execute load operation

N. HIGH POWER MODEL AUGMENTATION AND PARALLEL

To meet customers' larger sink current, larger power and flexible application of electronic load requirements, the design concept of the PEL-3000 series not only meets the requirement of low power products with high resolution, but also supports the measurement of high power and large current. Single unit of the series can satisfy various load conditions. For higher power requirements, users can consider purchasing additional Slave control system to collocate the system in parallel through system connection. For operating PEL-3955(1.5~150V/1890A/9.45kW), six units of PEL-3955 are arranged in parallel to reach load capacity of 56.7kW. Bus bar connection can guarantee the safety of large power and large current operations.

O. LARGER POWER MODEL DYNAMIC SYNCHRONIZATION CONTROL



Waveform of power load

To ensure each Rack can execute synchronized parallel load operation and to simulate the real dynamic load operation. The orange curve of the above diagram shows PEL-3955 executing dynamic synchronized control under external parallel. Comparing with other electronic loads in parallel, the PEL-3000 series does not delay. PEL-3955, with its superior performance and distinct characteristics, has been widely used as test and verification equipment in the power test field. In addition to single unit electronic load of 1kW, larger power models have power outputs including 3kW/5kW/7kW/9kW/18kW/27kW/36kW/54kW, which provide the most important test and verification platform for R&D and QA in the fields of server power system, communications power system, hybrid power pack, solar power module.

Programmable D.C. Electronic Load

PEL-2004

PEL-2002

台灣精品 TAIWAN EXCELLENCE 2012

CE | RS-232 | GPIB | USB | LabVIEW Driver

FEATURES

* Sequence Function to do High Speed Load Simulations
* Flexible Configuration with Mainframes and Plug-in Modules
* Multiple Independent Load Inputs up to 8 Channels in a Mainframe
* Parallel Connection of Inputs for Higher Load Capacity
* Program Mode to Create Work Routines for Repetitive Tests
* OPP/OCP/OVP/OTP/RVP/UVP Protections
* External Channel Control / Monitoring via Analog Control Connector
* Multiple-Interface USB Device / Host, RS-232C, and GPIB (Optional)

The PEL-2000 programmable DC electronic load series can be operated under constant current, constant voltage and constant resistance mode. The series can also emulate a variety of dynamic load conditions. Its sequence function allows waveforms to be edited using load current, rising and falling slew rate, current level, duration and other parameters. The PEL-Series also supports external channel control with voltage and current monitoring. The system allows up to 120 sets of test parameters to be saved into the built-in memory to be recalled at any time according to test requirements. The series consists of two mainframes; PEL-2002 (accommodates 2 load modules) and PEL-2004 (up to 4 modules). Both have a modularized design which gives the flexibility to scale up to future power demands. At present, four load modules are available : PEL-2020 (200W dual channel load module 100W * 2; PEL-2030 (280W dual channel load module 30W + 250W); PEL-2040 (350W single load module); PEL-2041 (350W single load module). For example, PEL-2004 can accommodate up to eight channels simultaneously with a power range of 200 ~ 350W, a current range of 0~70A and a voltage range of 1~500V. Any combination of mainframe and load module can be used to create a custom system for each application. The series can simultaneously operate multiple electronic loads in parallel, and each load module is independently isolated to test multiple-output devices. The PEL-2000 Series is flexible enough to meet the needs of consumer electronic testing, automotive energy testing as well as the flourishing green energy industry. With the Frame link cable, up to five mainframes can be used in parallel for a total power output reaching 7kVA. The PEL-2000 Series offers RS-232, USB, GPIB (optional), as well as GO/NG interfaces. For programming, a Lab view driver as well as Lab View, VB, C, C ++ code examples are available. The PEL-2000 series can used to perform functional testing of multi-channel or single channel output A.C./D.C. power supplies, D.C./D.C. power modules, functional testing of battery and performance testing of electronically powered devices. It provides rapid and effective testing solutions for design & development, production line testing and product testing operations. It has OPP, OCP, OVP, OTP, UVP and reverse polarity protection to substantially increase reliability for automated test environments.

SPECIFICATIONS

	PEL-2020		PEL-2030		
CHANNEL	L/R	L/R	Left	Right	Right
RANGE	Low	High	N/A	Low	High
POWER	100W	100W	30W	250W	250W
CURRENT	0~2A	0~20A	0~5A	0~4A	0~40A
VOLTAGE	1~80V	1~80V	1~80V	1~80V	1~80V
MIN.OPERATING VOLTAGE(DC)	1.0V at 2A	1.0V at 20A	1.0V at 5A	1.0V at 4A	1.0V at 40A
STATIC MODE					
CONSTANT CURRENT MODE					
Range	0~2A	0~20A	0~5A	0~4A	0~40A
Resolution	0.5mA	5mA	1mA	1mA	10mA
Accuracy	±(0.1%set + 0.1%F.S.)	±(0.1%set + 0.1%F.S.)	±(0.1%set + 0.1%F.S.)	±(0.1%set + 0.1%F.S.)	±(0.1%set + 0.2%F.S.)
CONSTANT RESISTANCE MODE					
Range	0.075Ω~300Ω (100W/16V) 3.75Ω~15K (100W/80V)		0.3Ω~1.2KΩ (30W/16V) 15Ω~60K (30W/80V)	0.0375Ω~150Ω (250W/16V) 1.875Ω~7.5K (250W/80V)	
Resolution	12bits		12bits	12bits	
Accuracy	300Ω: ±(0.2%set+0.1℧) 15KΩ: ±(0.1%set+0.02℧) With≥ 2.5V at input		12KΩ±(0.2%set+0.1℧) 60KΩ: ±(0.1%set+0.01℧) With≥ 2.5V at input	150Ω ±(0.2%set+0.1℧) 7.5KΩ:±(0.1%set+0.02℧) With≥ 2.5V at input	
CONSTANT VOLTAGE MODE					
Range	1~80V		1~80V		
Resolution	20mV		20mV		
Accuracy	±(0.05%set+0.1%F.S.)		±(0.05%set+0.1%F.S.)		
DYNAMIC MODE					
CONSTANT CURRENT MODE					
T1&T2	0.025mS~10mS/Res:1μS 1mS ~ 30S / Res : 1mS		0.025mS~10mS/Res:1μS 1mS ~ 30S / Res : 1mS		
Accuracy	1μS / 1mS ± 100ppm		1μS / 1mS ± 100ppm		
Slew Rate (±10%set+15μS)	0.32~80mA/μS	3.2~800mA/μS	0.8~200mA/μS	0.64~160mA/μS	6.4~1600mA/μS
Slew Rate Resolution	0.32mA/μS	3.2mA/μS	0.8mA/μS	0.64mA/μS	6.4mA/μS
Current	0~2A	0~20A	0~5A	0~4A	0~40A
Current Resolution	0.5mA	5mA	1.25mA	1mA	10mA
Current Accuracy	±0.4% F.S.	±0.4% F.S.	±0.4%F.S.	±0.4%F.S.	±0.4%F.S.
MEASUREMENT					
VOLTAGE READBACK					
Range	0~16V	0~80V	0~16V,0~80V	0~16V	0~80V
Resolution	0.5mV	2.5mV	0.5mV,2.5mV	0.5mV	2.5mV
Accuracy	±(0.05%set +0.05%F.S.)	±(0.05%set +0.05%F.S.)	±(0.05%set +0.05%F.S.)	±(0.05%set +0.05%F.S.)	±(0.05%set +0.05%F.S.)
CURRENT READBACK					
Range	0~2A	0~20A	0~5A	0~4A	0~40A
Resolution	0.0625mA	0.625mA	0.15625mA	0.125mA	1.25mA
Accuracy	±(0.1%set +0.1%F.S.)	±(0.1%set +0.1%F.S.)	±(0.1%set +0.1% F.S.)	±(0.1%set +0.1% F.S.)	±(0.1%set +0.1% F.S.)
PROTECTION					
Over Power Protection (±2%set+0.25%F.S.)					
Range	1~102W		0.9~30.6W	1.25~255W	
Resolution	0.5W		0.15W	1.25W	
Over Current Protection (±2%set+0.25%F.S.)					
Range	0.25~20.4A		0.0625~5.1A	0.5~40.8A	
Resolution	0.05A		0.0125A	0.1A	
Over Voltage Protection (±2%set+0.25%F.S.)					
Range	1~81.6V		1~81.6V	1~81.6V	
Resolution	0.2V		0.2V	0.2V	
Over Temperature Protection	≒85℃		≒85℃	≒85℃	
Rated Power Protection(±2%set) Value	110W		33W	275W	
GENERAL					
SHORT CIRCUIT					
Current(CC)	≒2.2/2A	≒22/20A	≒5.5/5A	≒4.4/4A	≒44/40A
Voltage(CV)	0V	0V	0V	0V	0V
Resistance(CR)	≒3.75Ω	≒0.075Ω	≒15Ω, ≒0.3Ω	≒1.875Ω	≒0.0375Ω
INPUT RESISTANCE(LOAD OFF)					
	800KΩ (Typical)		800KΩ (Typical)		
POWER SOURCE	AC100V ~ 230V ± 10% ; 50Hz / 60Hz ± 2Hz				
WEIGHT	Approx. 3.8 kg				
DIMENSIONS & WEIGHT(PEL-2002)	272(W) x 200(H) x 581(D) mm ; Approx. 16.1kg(full modules)				
DIMENSIONS & WEIGHT(PEL-2004)	435(W) x 200(H) x 581(D) mm ; Approx. 24.8kg(full modules)				

SPECIFICATIONS

	PEL-2040		PEL-2041	
CHANNEL	–	–	–	–
RANGE	Low	High	Low	High
POWER	350W	350W	350W	350W
CURRENT	0~7A	0~70A	0~1A	0~10A
VOLTAGE	1~80V	1~80V	2.5~500V	2.5~500V
MIN.OPERATING VOLTAGE(DC)	1.0V at 7A	1V at 70A	2.5V at 1A	2.5V at 10A
STATIC MODE				
CONSTANT CURRENT MODE				
Range	0~7A	0~70A	0~1A	0~10A
Resolution	1mA	10mA	0.2mA	2mA
Accuracy	±(0.1%set + 0.1%F.S.)	±(0.1%set + 0.2%F.S.)	±(0.1%set + 0.1%F.S.)	±(0.1%set + 0.2%F.S.)
CONSTANT RESISTANCE MODE				
Range	0.025Ω~100Ω (350W/16V) 1.25Ω~5K (350W/80V)		1.25Ω~5KΩ (350W/125V) 50Ω~200K (350W/500V)	
Resolution	12bits		12bits	
Accuracy	100Ω:±(0.2%set+0.1℧) 5KΩ:±(0.1%set+0.02℧) With≥2.5V at input		5KΩ:±(0.2%set+0.02℧) 200KΩ:±(0.1%set+0.01℧) With≥5V at input	
CONSTANT VOLTAGE MODE				
Range	1~80V		2.5~500V	
Resolution	20mV		100mV	
Accuracy	±(0.05%set+0.1%F.S.)		±(0.05%set+0.1%F.S.)	
DYNAMIC MODE				
CONSTANT CURRENT MODE				
T1&T2	0.025mS~10mS/Res:1μS 1mS ~ 30S / Res : 1mS		0.025mS~10mS/Res:1μS 1mS ~ 30S / Res : 1mS	
Accuracy	1μS / 1mS ± 100ppm		1μS / 1mS ± 100ppm	
Slew Rate (±10%set+15μS)	0.001~0.28A/μS	0.01 ~ 2.8A/μS	0.16~40mA/μS	1.6~400mA/μS
Slew Rate Resolution	0.001A/μS	0.01A/μS	0.16mA/μS	1.6mA/μS
Current	0~7A	0~70A	0~1A	0~10A
Current Resolution	1mA	10mA	0.2mA	2mA
Current Accuracy	±0.4%F.S.	±0.4%F.S.	±0.4%F.S.	±0.4%F.S.
MEASUREMENT				
VOLTAGE READBACK				
Range	0~16V	0~80V	0~125V	0~500V
Resolution	0.5mV	2.5mV	4mV	16mV
Accuracy	±(0.05%set +0.05%F.S.)	±(0.05%set +0.05%F.S.)	±(0.05%set +0.05%F.S.)	±(0.05%set +0.05%F.S.)
CURRENT READBACK				
Range	0~7A	0~70A	0~1A	0~10A
Resolution	0.175mA	1.75mA	0.032mA	0.32mA
Accuracy	±(0.1%set +0.1%F.S.)	±(0.1%set +0.1%F.S.)	±(0.1%set +0.1%F.S.)	±(0.1%set +0.1%F.S.)
PROTECTION				
Over Power Protection (±2%set+0.25%F.S.)				
Range	1.75~357W		1.75~357W	
Resolution	1.75W		1.75W	
Over Current Protection (±2%set+0.25%F.S.)				
Range	0.875~71.4A		0.125~10.2A	
Resolution	0.175A		0.025A	
Over Voltage Protection (±2%set+0.25%F.S.)				
Range	1~81.6V		2.5~510V	
Resolution	0.2V		1.25V	
Over Temperature Protection	≒85℃		≒85℃	
Rated Power Protection(±2%set)	385W		385W	
Value				
GENERAL				
SHORT CIRCUIT				
Current(CC)	≒7.7/7A	≒77/70A	≒1.1/1A	≒11/10A
Voltage(CV)	0V	0V	0V	0V
Resistance(CR)	≒1.25Ω	≒0.025Ω	≒50Ω	≒1.25Ω
INPUT RESISTANCE (LOAD OFF)				
	800KΩ (Typical)		800KΩ (Typical)	
POWER SOURCE	AC100V ~ 230V ± 10% ; 50Hz / 60Hz ± 2Hz			
WEIGHT	Approx. 3.8 kg			
DIMENSIONS & WEIGHT(PEL-2002)	272(W) x 200(H) x 581(D) mm ; Approx. 16.0kg(full modules)			
DIMENSIONS & WEIGHT(PEL-2004)	435(W) x 200(H) x 581(D) mm ; Approx. 28.4kg(full modules)			

ORDERING INFORMATION

PEL-2020 Dual Channel Module, (1~80V, 20A, 100W) x 2
PEL-2030 Dual Channel Module, (1~80V, 5A, 30W)+(1~80V, 40A, 250W)
PEL-2040 Single Channel Module, 1~80V, 70A, 350W
PEL-2041 Single Channel Module, 2.5~500V, 10A, 350W
PEL-2004 4-Slot Programmable DC Electronic Load Mainframe
PEL-2002 2-Slot Programmable DC Electronic Load Mainframe

Note : Load module cannot be used without a mainframe

ACCESSORIES :

PEL-2002/2004 User Manual x 1, Power Cord x 1
PEL-2020/2030/2040/2041 GTL-120 Test Lead x 1 , GTL-121 Sense Lead x 1

* PEL-003 x 3 (PEL-2004) ; PEL-003 x 1 (PEL-2002)

OPTIONAL ACCESSORIES

PEL-001 GPIB Card
PEL-002 PEL-2000 Series Rack Mount Kit
PEL-003 Panel Cover
GTL-251 GPIB-USB-HS(High Speed)
GTL-248 GPIB Cable (2m)
GTL-249 Frame Link Cable
GTL-246 USB Cable, USB 2.0 A-B TYPE CABLE, 4P
GTL-232 RS-232C Cable, 9-pin, F-F Type, null modem, 2000mm

PEL-002 Rack Mount Kit

PEL-003 Panel Cover

GTL-249 Frame Link Cable

GTL-120 Test Lead

GTL-121 Sense Lead

Rear Panel

PEL-2000 Series

A. SATISFY ALL YOUR HIGH SPEED LOAD SIMULATION NEEDS

The PEL-2004 and PEL-2002 are multiple channel, programmable DC electronic loads with a modularized structure. The PEL-2000 Series is designed to meet the continuing shift toward high speed operation in today's semiconductor market. As the power supply units, DC-DC converters, and batteries that drive semiconductor circuits need to follow this shift, power supply design, quality inspection and characteristic certification using high-speed performance loads have become necessary. The PEL-2000 Series includes two types of mainframes and 4 types of load modules to accommodate users' requirements in a flexible manner. Any load module combination can be used with a mainframe to tailor a test system based on the number of channels, and the maximum load power, voltage and current of each channel. Multiple loads can be connected in parallel to provide a higher-power load to test higher power supply outputs. This flexibility significantly reduces the investment needed for future projects that have differed power requirements.

PEL-2004 is a 4-slot mainframe with a master control unit to hold 4 load modules, while PEL-2002 is a 2-slot mainframe with master control unit to hold 2 load modules. When PEL-2004 is configured with 4 load modules rated at 350W each, the PEL-2000 series is able to sink up to 1.4kVA of power.

For higher load capacities, mainframes can be linked together in parallel with standard MIL 20-pin connectors. A maximum of 5 mainframes, including one master and 4 slaves can be chained together to create a total load capacity of 7kW for high current and high power applications. Using 4 dual channel load modules, PEL-2004 is able to test 8 power supply outputs simultaneously.

The Sequence function allows each channel to change its load sink according to a predefined sequence at a rate of up to 100μs per step. Each sequence is able to run concurrently, under the control of one clock. This is one of the most powerful features of the PEL-2000 Series as it is able to realistically simulate a multi-output power supply load. Under Dynamic mode, the load current or load resistance pulses between two preset levels at a pre-defined speed up to 25μs per step. This is often used as the standard test procedure to verify the response of a power supply to quick load changes. Most remarkably, multiple load channels can be connected in parallel to run Dynamic tests synchronously under a single clock. This Parallel Dynamic functionality gives the flexibility to perform dynamic tests for a high-power power supply without the need of another high-power load.

The PEL-2000 Series includes a number of protection modes: Over Current Protection (OCP), Over Voltage Protection (OVP), Over Power Protection (OPP), Reverse Voltage Protection (RVP), and Under Voltage Protection(UVP). The protection modes are useful to protect both the load modules and the DUT(s). A buzzer can be set for when a protection setting has been tripped. When a protection mode has been tripped, the load unit will display an alarm and stop sinking current/voltage. When a load unit is operating in CR or CV mode, the unit may need Over Current Protection to prevent excessive current being sunk. Over Current Protection stops the load from sinking more current than its recommended limit and prevents the load from burn-out damage. Over Voltage Protection is used to limit the amount of voltage sunk. If the OVP trips, the PEL-Series load will stop sinking voltage. Over Power Protection is used when the input power exceeds the specifications of the load. When OPP is tripped, the power will cease to be sunk. Reverse Voltage Protection prevents reverse voltage damage to the PEL-2000 Series up to the specified rating. When Reverse Voltage Protection has been tripped, an alarm tone will sound until the reverse voltage is removed. Under Voltage Protection will turn off the load when the voltage drops below a set limit.

The Go/NoGo function is available to monitor test results all the time. When a test result goes beyond a preset limit range, a "No Go" indication will be shown on the display and a "No Go" signal can be sent out through the D-SUB interface for external device control. This Go/NoGo function is available for CC mode, CV mode and CR mode. Under "Program" mode, 12 programs each containing 10 panel-setup memories, can be edited to create work routines for repetitive tests. After a program has been executed, the results of all test steps, along with the Go/NoGo judgments, will be shown on the screen. For external control and system configuration, the PEL series has USB and RS232 interfaces as standard and GPIB as an option. The LabView driver and Data Logging PC software are both supported for all the available interfaces. Each channel has an analog control/monitoring connector on the rear panel to externally turn a load on/off and to externally monitor load input current and voltage.

B. MODULARIZED STRUCTURE/PROGRAM & INTERFACE

Modularized Structure

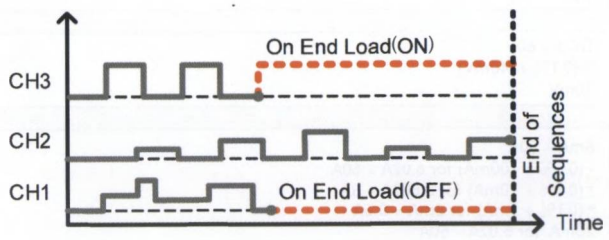
PEL-2004 is a 4-slot mainframe with a master control unit made to hold 4 load modules, and PEL-2002 is a 2-slot mainframe with a master control unit made to hold 2 load modules. The modularized structure of the PEL-2000 Series allows any combination of mainframe and load module (PEL-2020, PEL-2030, PEL-2040, PEL-2041) to be integrated into a custom-tailored system.

Multiple loads within the same mainframe can be connected in parallel to perform both static and dynamic tests. This flexibility makes the PEL-2000 Series a very cost-effective instrument for testing a broad range of power supply outputs.

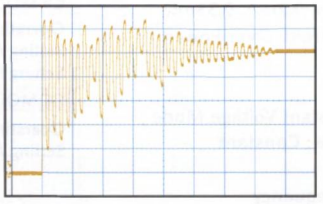
Program & Interface

The PEL-2000 Series supports a total of 12 different programs and 10 sequences to each program. With a total of up to 120 different configurations. For external control and system configuration, the PEL-Series has USB and RS-232 interfaces as standard and GPIB as an option. The LabView driver and Data Logging PC software are supported for all the interfaces available. Each channel has an analog control/ monitoring connector to externally turn a load on/off and to externally monitor load input current and voltage.

C. AUTOMATICALLY SEQUENCE FUNCTION



Sequence - On End Load

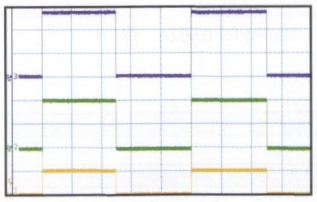


The figure above shows the current waveform of a simulation using the sequence function.

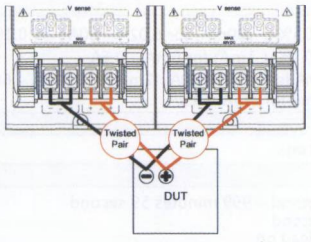
The Sequence function allows each channel to change its load sink according to a predefined sequence at a rate of up to 100μ s per step. Each sequence is able to run concurrently, under the control of one clock. This is one of the most powerful features of the PEL-2000 Series as it is able to realistically simulate a multi-output power supply load. Under Dynamic mode, the load current or load resistance pulses between two preset levels at a pre-defined speed up to 25μ s per step. This is often used as the standard test procedure to verify the response of a power supply to quick load changes.

The picture above is an example of a sequence used as a load profile for a single output switching power supply. A load profile is programmed to simulate the current drawn of a power supply load.
By using a current probe to acquire a current waveform, PEL-2000 is able to evaluate the performance of a power supply based on the load sequence that is programmed. An oscilloscope is then used to display the result.

D. PARALLEL DYNAMIC LOADING



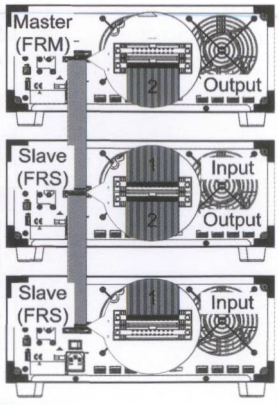
Dynamic Test



Wire Connection

All the load channels in a PEL-2000 mainframe can be connected in parallel to perform any combination of static or dynamic loading. Under Dynamic mode, the load current or load resistance pulses between two preset levels at a predefined speed of up to 25μ s per step. When the channels are connected in parallel, dynamic tests are synchronously clocked. The ability to perform parallel dynamic loading gives you the flexibility to perform dynamic tests to high-power power supplies without the need for a dedicated high power electronic load.

E. FRAME LINK



The PEL-2000 Series allows multiple mainframes to be linked together with standard MIL 20-pin connectors to provide higher power load capacity. A maximum of 5 mainframes, including one master and 4 slaves, can be chained together to give a 7kW load capacity for high current and high power applications

D.C. Electronic Load

PEL-300

PEL-300 is a single channel, 300W, programmable DC electronic load. OVP, OCP, and OPP protect PEL-300 from unexpected load conditions. The PEL-300 DC electronic load complies with major safety standards such as UL, CSA, and IEC to ensure safety. A high resolution of 20mV, 0.2mA and 0.33mΩ(CV, CC, CR mode) ensures accurate load measurements. Sequence programming is simplified with save and recall options as well as extensive timer settings. It has self-test and software calibration features to reduce maintenance overhead. PEL-300 is suitable for laboratory and production line applications, where safety and reliability are the top priorities.

CE

FEATURES

* Operating Voltage DC 3 ~ 60V
* Operating Current 6mA ~ 60A
* Operating Power 1 ~ 300W
* Easy Operation with UP/DOWN Key
* High Resolution : 20mV, 0.2mA, 0.33mΩ
* Over Voltage, Over Current, Over Power Protection
* 100 Sets Memory
* Operation Mode : Constant Voltage Mode ; Constant Current Mode ; Constant Resistance Mode
* Transient Generator Frequency Range : 1Hz ~ 1kHz ; Duty Range : 10% ~ 90%
* Self-Test and Software Calibration

SPECIFICATIONS

RATING	
Operating Voltage	DC 3 ~ 60V
Current	6mA ~ 60A
Power	1 ~ 300W
Minimum Operation	3V
CV MODE	
Operating Range	DC 3 ~ 60V
Setting Accuracy	± (0.1% + 40mV)
Setting Resolution	20mV
CC MODE	
Operating Range	6mA ~ 60A
Setting Accuracy	±(0.5% + 100mA) for 6.02A ~ 60A ±(0.1% + 10mA) for 0.602A ~ 6A ±(0.1% + 1mA) for 6mA ~ 0.6A
Setting Resolution	20mA for 6.02A ~ 60A 2mA for 0.602A ~ 6A 0.2mA for 6mA ~ 0.6A
CR MODE	
Operating Range	50mΩ ~ 1kΩ
Setting Accuracy	± (5% + 1Ω) for 100.33Ω~1kΩ ± (5% + 100mΩ) for 10.033Ω~100Ω ± (5% + 10mΩ) for 1.0033Ω~10Ω ± (5% + 1mΩ) for 50mΩ~1Ω
Setting Resolution	330mΩ for 100.33Ω ~1kΩ 33mΩ for 10.033Ω ~100Ω 3.3mΩ for 1.0033Ω ~10Ω 0.33mΩ For 50mΩ~ 1Ω
DYNAMIC OPERATION CC MODE ONLY	
Frequency Range	1Hz ~ 1kHz
Resolution	5Hz for 100Hz ~ 1kHz ; 0.5Hz for 10Hz ~100Hz 0.05Hz for 1Hz ~ 10Hz
Duty Range	10% ~ 90%
Resolution	1%
VOLTAGE READBACK	
Accuracy	± (0.1% + 60mV)
Resolution	20mV
CURRENT READBACK	
Accuracy	±(0.5% + 100mA) for 6.02A ~ 60A ; ±(0.1% + 10mA) for 0.602A ~ 6A ±(0.1% + 1mA) for 6mA ~ 0.6A
Resolution	20mA for 6.02A ~ 60A ; 2mA for 0.602A ~ 6A 0.2mA for 6mA ~ 0.6A
MEMORY	
Store/Recall	100 sets
TIMER	
Range	1 second ~ 999 minutes 59 second
Resolution	1 second
Function	for load on
POWER SOURCE	
AC100V/120V/220V/240V±10%, 50/60Hz	
DIMENSIONS & WEIGHT	
255(W) x 145(H) x 346(D) mm, Approx. 9kg	

ORDERING INFORMATION

PEL-300 300W DC Electronic Load

ACCESSORIES :
User manual x 1, Power cord x 1

OPTIONAL ACCESSORIES

GRA-401 Rack Adapter Panel

NOTE

DIGITAL MULTIMETER

GW Instek provides bench-top, hand-held digital multimeter and digital clamp meter to meet customers' needs under different circumstances.

For bench-top multimeter, GDM-8000 series, selections are available with 6 1/2 digit to 5 1/2, 4 3/4 digit, 4 1/2, and 3 1/2 digit models. With the design focused on superior performance, the GDM-8000 series has become some of the best assets for engineers and technicians in service & repair, production testing and in educational institutions.

As regards the GDM-300/400 series hand-held multimeter, 4 1/2 and lower digit options with fundamental functions and easy operation are for your pick. Digital clamp meters designed for cable measurement are also available.

PRODUCTS

- **Benchtop Digital Multimeter**
- **Handheld Digital Multimeter**
- **Digital Clamp Meter**

DIGITAL MULTIMETER OVERVIEW

From 6 1/2 to 3 1/2 digits, the GDM-8000 Series can deliver a measurement accuracy of up to 0.0035% and with high current fuse protection can withstand up to 20A. With the design focused on superior performance and ease of use, the GDM-8000 Series has become some of the best assets for engineers and technicians in service & repair, production testing and in educational institutions. USB, RS-232C, GPIB, LAN and Scanner card interfaces all make the series ideal for PC controlled applications.

BENCH-TOP DIGITAL MULTIMETER

MODEL / MAIN FUNCTION	GDM-8261A	GDM-8351	GDM-8255A
Display	6 1/2 (1200000 Counts) VFD Dual Measurement	5 1/2 (120000 Counts) VFD Dual Measurement	5 1/2 (120000 Counts) VFD Dual Measurement
Autoranging	✓	✓	✓
DCV Basic Accuracy	0.0035%	0.012%	0.012%
Major Measurement Functions	AC & DC Voltage AC & DC Current 2- & 4-wires resistance Continuity & Diode Frequency & Period Temperature (RTD/Thermocouple)	AC & DC Voltage AC & DC Current 2- & 4-wires resistance Continuity & Diode Frequency & Period Temperature (Thermocouple) Capacitance	AC & DC Voltage AC & DC Current 2- & 4-wires resistance Continuity & Diode Frequency & Period Temperature (Thermocouple)
Advanced Functions	REL, dB, dBm, Hold, Math, Max./Min., Compare, Store, Recall, AC+DC True RMS	REL, dB, dBm, Hold, Math, Max./Min., Compare, AC+DC True RMS	REL, dB, dBm, Hold, Math, Max./Min., Compare, Store, Recall, AC+DC True RMS
Interface (Std.)	USB device (USBCDC) RS-232C, Digital I/O	USB device (support USBTMC/USB CDC) RS-232C, Digital I/O	USB device (USBCDC) RS-232C, Digital I/O
Optional	Scanner Card/GPIB/LAN	–	Scanner Card
Page	E4-8	E13-16	E9-12

BENCH-TOP DIGITAL MULTIMETER

MODEL / MAIN FUNCTION	GDM-8342	GDM-8341	GDM-8245	GDM-8135	GDM-8034
Display	50000 Counts VFD Dual Measurement	50000 Counts VFD Dual Measurement	50000 Counts LED Dual Display	3 1/2(1999 Counts)LED Single Display	3 1/2(1999 Counts)LCD Single Display
Autoranging	✓	✓	✓	–	–
DCV Basic Accuracy	0.02%	0.02%	0.03%	0.1%	0.5%
Major Measurement Functions	AC & DC Voltage AC & DC Current 2- wires resistance Continuity & Diode Frequency & Period Temperature (Thermocouple) Capacitance	AC & DC Voltage AC & DC Current 2-wires resistance Continuity & Diode Frequency & Period Temperature (Thermocouple) Capacitance	AC & DC Voltage AC & DC Current 2-wires resistance Continuity & Diode Frequency Capacitance	AC & DC Voltage AC & DC Current 2-wires resistance Continuity & Diode	AC & DC Voltage AC & DC Current 2-wires resistance Continuity & Diode Capacitance
Advanced Measurement Functions	REL, dB, dBm, Hold, Math, Max./Min., Compare, AC+DC True RMS	REL, dB, dBm, Hold, Math, Max./Min., Compare, AC+DC True RMS	REL, dBm, Hold, Max./Min., AC+Hz, AC+DC True RMS	–	–
Interface (Std.)	USB device(USBCDC) USB host	USB device (USBCDC)	–	–	–
Optional	GPIB	–	–	–	–
Page	E17-20	E17-20	E21-22	E23	E24

DIGITAL MULTIMETERS

HAND-HELD DIGITAL MULTIMETER

MODEL	GDM-461	GDM-452	GDM-397	GDM-360	GDM-398	GDM-357	GDM-350B
Max. Display	22000	19999	4000	6000	4000	1999	1999
Auto Ranging	✓		✓	✓	✓		
Analogue Bar	✓		✓	✓	✓		
True RMS	✓			✓			
Display Backlight			✓	✓	✓		
Fused 10A Range	✓	✓	✓	✓	✓		✓
Auto Power off		✓	✓	✓	✓	✓	
DC Voltage	1000V	600V	1000V	1000V	1000V	600V	250V
AC Voltage	750V	600V	750V	750V	750V	600V	250V
DC Current	10A	10A	10A	10A	10A	10A	10A
AC Current	10A	10A	10A	10A	10A	10A	
Resistance	220MΩ	20MΩ	40MΩ	60MΩ	40MΩ	20MΩ	20MΩ
Capacitance	220mF	20 μ F	4000 μ F	4000 μ F	4000 μ F	200 μ F	
Frequency	220MHz	20kHz	10MHz	10MHz	10MHz		
Diode	✓	✓	✓	✓	✓	✓	✓
Continuity	✓	✓	✓	✓	✓	✓	✓
Temperature			✓			✓	✓
Duty Cycle (%)	✓		✓	✓	✓		
Transistor (hFE)					✓		✓
EF					✓		
REL	✓		✓	✓	✓		
Data Hold	✓	✓	✓	✓	✓	✓	✓
Peak Hold	✓						
MAX MIN			✓	✓	✓		
RS-232C	✓		✓	✓			
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DIGITAL CLAMP METER

MODEL	Description (Main Function)	Page
GCM-403	Digital Clamp Meter ACA, ACV, DCA, DCV, Ohm, Diode, Buzzer	E27
GCM-407	Digital Clamp Meter ACA, ACV, DCV, Ohm, Diode, Buzzer and True RMS	E28

6 ½ Digit Dual Measurement Multimeter

GDM-8261A

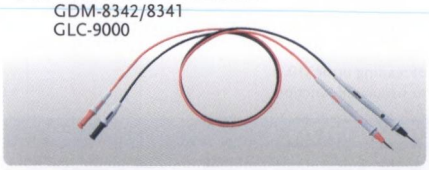
CE | RS-232 | USB | Digital I/O | GPIB | LAN | PC Software | LabVIEW Driver

FEATURES

* 6 ½ Digit Display : 1,200,000 Counts
* DCV Basic Accuracy : 0.0035%
* Dual Measurements to Perform Two Selected Measurements Simultaneously
* Bright Vacuum Fluorescent Display (VFD)
* 11 Measurement Functions & 10 Math Functions
* High Resolution : Up to 100pA Resolution with DCI and 1nA with ACI Measurements
* Temperature Measurement (RTD & Thermocouple) From -200°C ~ +1820°C
* High Data Transmission Speed : Up to 2,400 readings/s Through USB Interface
* Standard Interfaces : USB, RS-232C, Digital I/O
* Optional Interfaces : GPIB or LAN
* Optional Scanner Card : GDM-SC1 (V ch x 16, I ch x 2)
* Free PC Software : DMM-Viewer, LabVIEW Driver

GTL-207 Test Lead

Approx. 0.8m
For: GDM-8261A, GDM-8255A
GDM-8342/8341
GLC-9000



GTL-247 USB Cable

A-A type cable,
Approx. 1.8m
For: GDM-8261A
GDM-8255A
GPT-9900 Series
GPT-9800 Series

GDM-01 Calibration key

For: GDM-8261A
GDM-8255A

GDM-8261A is a high precision 6 ½ digit Digital Multimeter with dual measurement displays, 11 measurement functions and 10 math functions at high accuracy (35ppm DC voltage accuracy) to accommodate the most frequently performed parameter measurements in various application fields today. GDM-8261A adopts a scanner card, which carries 16 V-Channels and 2 I-Channels, to facilitate the measurements of multiple-test points on either a device or multiple devices all at a press of a button. With this multi-point measurement capability, GDM-8261A can be used as a semi-auto ATE System to increase the throughput of manufacturing test or as a data logger to perform long term monitoring or characterization of a DUT. A PC Software, DMM-Viewer, is available with GDM-8261A to support multi-channel panel setting and data logging of the scanner card. Besides, a LabVIEW driver is also supported to help user create his/her own virtual instrument on the PC screen for easy programming. For ATE system measurements or remote control applications, both USB and RS-232C Interfaces are provided as standard, and either GPIB or LAN can be selected as optional interface for GDM-8261A.

SPECIFICATIONS Accuracy : ± (% of reading + % of range) for 1-hour warm-up at 6 ½ digits, slow mode

FUNCTION

Range (*1)	Resolution	Test Current or etc.	24 Hours 23°C ± 1°C	90 Days 23°C ± 5°C	1 Year 23°C ± 5°C	Temperature Coefficient 0°~18°C /28°~55°C
DC VOLTAGE						
100.0000 m V	0.1 μV	10MΩ or >10GΩ	0.0030 + 0.0030	0.0040 + 0.0035	0.0050 + 0.0035	0.0005 + 0.0005
1.000000 V	1 μV	10MΩ or >10GΩ	0.0015 + 0.0004	0.0020 + 0.0005	0.0035 + 0.0005	0.0005 + 0.0001
10.00000 V	10 μV	11.11MΩ±1%	0.0020 + 0.0006	0.0030 + 0.0007	0.0048 + 0.0007	0.0005 + 0.0001
100.0000 V	0.1mV	10.1MΩ±1%	0.0020 + 0.0006	0.0035 + 0.0006	0.0081 + 0.0006	0.0005 + 0.0001
1000.000 V	1mV	10.1MΩ±1%	0.0025 + 0.0006	0.0044 + 0.0010	0.0090 + 0.0010	0.0005 + 0.0001
RESISTANCE (*2)						
100.0000 Ω	100 μΩ	1 mA	0.030 + 0.0030	0.008 + 0.004	0.010 + 0.004	0.0008 + 0.0005
1.000000 kΩ	1mΩ	1 mA	0.020 + 0.0005	0.008 + 0.001	0.010 + 0.001	0.0008 + 0.0001
10.00000 kΩ	10mΩ	100 μA	0.020 + 0.0005	0.008 + 0.001	0.010 + 0.001	0.0008 + 0.0001
100.0000 kΩ	100mΩ	10 μA	0.020 + 0.0005	0.008 + 0.001	0.010 + 0.001	0.0008 + 0.0001
1.000000 MΩ	1Ω	3.5 μA	0.020 + 0.0010	0.008 + 0.001	0.010 + 0.001	0.0010 + 0.0002
10.00000 MΩ	10Ω	350 nA	0.0150 + 0.0010	0.020 + 0.001	0.040 + 0.001	0.0030 + 0.0004
100.0000 MΩ	100Ω	350 nA//10 MΩ	0.3000 + 0.0100	0.800 + 0.010	0.800 + 0.010	0.1500 + 0.0002
DC CURRENT						
100.0000 μA	100pA	< 0.015 V	0.010 + 0.020	0.04 + 0.025	0.05 + 0.025	0.002 + 0.0030
1.000000 mA	1nA	< 0.15 V	0.007 + 0.005	0.03 + 0.005	0.05 + 0.005	0.002 + 0.0005
10.00000 mA	10nA	< 0.07 V	0.005 + 0.010	0.03 + 0.020	0.05 + 0.020	0.002 + 0.0020
100.0000 mA	0.1 μA	< 0.7 V	0.010 + 0.004	0.03 + 0.005	0.05 + 0.005	0.002 + 0.0005
1.000000 A	1 μA	< 0.8 V	0.050 + 0.006	0.08 + 0.010	0.10 + 0.010	0.005 + 0.0010
10.00000 A	10 μA	< 0.5 V	0.100 + 0.008	0.12 + 0.008	0.15 + 0.008	0.005 + 0.0008
CONTINUITY						
1000.000Ω	0.001Ω	1 mA	0.002 + 0.030	0.008 + 0.030	0.010 + 0.030	0.001 + 0.002
DIODE TEST (*3)						
1.000000 V	1 μV	1 mA (*4)	0.002 + 0.010	0.008 + 0.020	0.010 + 0.020	0.001 + 0.002

SPECIFICATIONS Accuracy : ± (% of reading + % of range) for 1-hour warm-up at 6 ½ digits, slow mode

FUNCTION

Range (*1)	Resolution	Frequency or etc.	24 Hours 23°C ± 1°C	90 Days 23°C ± 5°C	1 Year 23°C ± 5°C	Temperature Coefficient 0°~18°C / 28°~55°C
TRUE RMS AC VOLTAGE (*5)						
100.0000mV	0.1 μV	3Hz~5Hz	1.00 + 0.03	1.00 + 0.04	1.00 + 0.04	0.100 + 0.004
		5Hz~10Hz	0.35 + 0.03	0.35 + 0.04	0.35 + 0.04	0.035 + 0.004
		10Hz~20kHz	0.04 + 0.03	0.05 + 0.04	0.06 + 0.04	0.005 + 0.004
		20kHz~50kHz	0.10 + 0.05	0.11 + 0.05	0.12 + 0.05	0.011 + 0.005
		50kHz~100kHz	0.55 + 0.08	0.60 + 0.08	0.60 + 0.08	0.060 + 0.008
		100 kHz~300kHz(*7)	4.00 + 0.50	4.00 + 0.50	4.00 + 0.50	0.200 + 0.020
1.000000V~ 750.000 V (*6)	1 μV~ 1mV	3Hz~5Hz	1.00 + 0.02	1.00 + 0.03	1.00 + 0.03	0.100 + 0.003
		5Hz~10Hz	0.35 + 0.02	0.35 + 0.03	0.35 + 0.03	0.035 + 0.003
		10Hz~20kHz	0.04 + 0.02	0.05 + 0.03	0.06 + 0.03	0.005 + 0.003
		20kHz~50kHz	0.10 + 0.04	0.11 + 0.05	0.12 + 0.05	0.011 + 0.005
		50kHz~100kHz	0.55 + 0.08	0.60 + 0.08	0.60 + 0.08	0.060 + 0.008
		100kHz~300kHz(*7)	4.00 + 0.50	4.00 + 0.50	4.00 + 0.50	0.200 + 0.020
TRUE RMS AC CURRENT (*5)						
1.000000 mA	1nA	3Hz~5Hz	1.00 + 0.04	1.00 + 0.04	1.0 +0.04	0.100 + 0.006
		5Hz~10Hz	0.30 + 0.04	0.30 + 0.04	0.3 + 0.04	0.035 + 0.006
		10Hz~5kHz	0.10 + 0.04	0.10 + 0.04	0.1 + 0.04	0.015 + 0.006
		5kHz~10kHz	0.20 + 0.25	0.20 + 0.25	0.2 + 0.25	0.030 + 0.006
10.00000 mA	10nA	3Hz~5Hz	1.10 + 0.06	1.10 + 0.06	1.10 + 0.06	0.200 + 0.006
		5Hz~10Hz	0.35 + 0.06	0.35 + 0.06	0.35 + 0.06	0.100 + 0.006
		10Hz~5kHz	0.15 + 0.06	0.15 + 0.06	0.15 + 0.06	0.015 + 0.006
		5kHz~10kHz	0.35 + 0.70	0.35 + 0.70	0.35 + 0.70	0.030 + 0.006
100.0000 mA	100nA	3Hz~5Hz	1.00 + 0.04	1.00 + 0.04	1.00 + 0.04	0.100 + 0.006
		5Hz~10Hz	0.30 + 0.04	0.30 + 0.04	0.30 + 0.04	0.035 + 0.006
		10Hz~5kHz	0.10 + 0.04	0.10 + 0.04	0.10 + 0.04	0.015 + 0.006
		5kHz~10kHz	0.20 + 0.25	0.20 + 0.25	0.20 + 0.25	0.030 + 0.006

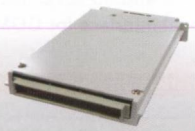
6 ½ Digit Dual Measurement Multimeter

Rear Panel

GDM-8261A

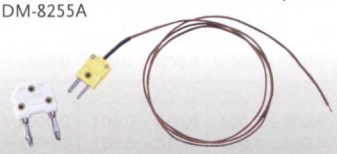
GDM-SC1 Scanner card

Multipoint Testing can be facilitated by simple insertion of scanner card.
For: GDM-8261A
GDM-8255A



GTL-205 Temperature probe adaptor with thermocouple (K type)

Approx. 1m
For: GDM-8261A, GDM-8351, GDM-8342/8341, GDM-8255A



GTL-207 Test Lead

Approx. 0.8m
For: GDM-8261A, GDM-8351, GDM-8255A
GDM-8342/8341, GLC-9000

GTL-108A 4W Type Test Lead

Approx. 1.1m
For: GOM-801H/802 , GDM-8261A ,
GDM-8255A

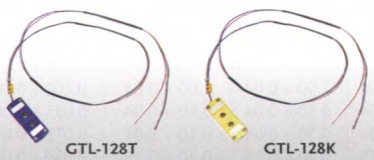
GTL-232 RS-232C Cable

Approx. 2m
For: GDM-8261A
GDM-8255A
GPT-9900/9800 Series

GTL-128J Extension Cables (J type)
GTL-128T Extension Cables (T type)
GTL-128K Extension Cables (K type)

Approx. 0.6m
For: GDM-SC1

GTL-128J



GTL-128T GTL-128K

SPECIFICATIONS

Accuracy : ± (% of reading + % of range)for 1-hour warm-up at 6 ½ digits, slow mode

TRUE RMS AC CURRENT (*5)

Range (*1)	Resolution	Frequency or etc.	24 Hours 23°C ± 1°C	90 Days 23°C ± 5°C	1 Year 23°C ± 5°C	Temperature Coefficient 0°~18°C/28°~55°C
1.000000 A	1μA	3Hz~5Hz 5Hz~10Hz 10Hz~5kHz 5kHz~10kHz	1.00 + 0.04 0.30 + 0.04 0.10 + 0.04 0.35 + 0.70	1.00 + 0.04 0.30 + 0.04 0.10 + 0.04 0.35 + 0.70	1.00 + 0.04 0.30 + 0.04 0.10 + 0.04 0.35 + 0.70	0.100 + 0.006 0.035 + 0.006 0.015 + 0.006 0.030 + 0.006
10.00000 A	10μA	3Hz~5Hz 5Hz~10Hz 10Hz~5kHz 5kHz~10kHz	1.10 + 0.06 0.35 + 0.06 0.15 + 0.06 0.35 + 0.70	1.10 + 0.06 0.35 + 0.06 0.15 + 0.06 0.35 + 0.70	1.10 + 0.06 0.35 + 0.06 0.15 + 0.06 0.35 + 0.70	0.100 + 0.006 0.035 + 0.006 0.015 + 0.006 0.030 + 0.006
FREQUENCY PERIOD (*8)						
100.0000 mV~ 750.0000 V(*6)	–	3 Hz~5 Hz 5 Hz~10 Hz 10 Hz~40 Hz 40 Hz~300 kHz	0.1 0.05 0.03 0.006	0.1 0.05 0.03 0.01	0.1 0.05 0.03 0.01	0.005 0.005 0.001 0.001
TEMPERATURE (RTD) (*9)						
-200 °C~600 °C	0.002°C	–	–	–	0.06°C(typical)	–
TEMPERATURE (THERMOCOUPLES)(*9)						
-200 ~ +1372 °C -50 ~ +1870 °C	0.003°C 0.01°C	(J/K/N/T/E Type) (R/S/B Type)	–	–	0.2°C(typical) 1.0°C	0.004 °C/°C(typical) 0.14 °C/°C

DISPLAY	
VFD, Two Colors Display	
INTERFACE	
RS-232C, USB, Digital I/O	
POWER SOURCE	
AC 100V/120V/220V/240V±10%, 45 Hz ~ 66 Hz and 360 Hz ~ 440 Hz; Power Comsumption : Max. 25VA	
DIMENSIONS & WEIGHT	
265(W) x 107(H) x 350(D) mm, Approx. 3.1 kg	

Note : (*1) 20% overrange on all ranges, except 1000 Vdc/750Vac, 10A range and Continuity.
(*2) Specifications are for 4-wire ohms function, or 2-wire ohms using REL function.
(*3) Accuracy specifications are for the voltage measured at the input terminals only.
(*4) Variation in the current source will create some variation in the voltage drop across a diode junction.
(*5) Specifications are for sinewave input >5% of range.
(*6) 750 Vac range limited to 100 kHz
(*7) Typically 30% of reading error at 1 MHz.
(*8) Input > 100 mV. For 10 mV to 100 mV inputs, multiply % of reading error x10.
(*9) Specifications do not include probe accuracy and relative to simulated junction

ORDERING INFORMATION

GDM-8261A 6 ½ Digit Dual Measurement Multimeter

ACCESSORIES :
Quick star guide x 1, Power cord x 1, Test lead GTL-207 x 1, USB cable GTL-247 x 1, CD x 1(including complete user manual, upgrade program and PC software DMM-Viewer), Calibration key GDM-01 x 1(for firmware upgrade)

OPTION

Opt. 01 GDM-SC1 Scanner Card (V ch x 16, I ch x 2)
Opt. 02 GPIB Card
Opt. 03 LAN Card
* Either GPIB or LAN can be installed on each GDM-8261A.

OPTIONAL ACCESSORIES

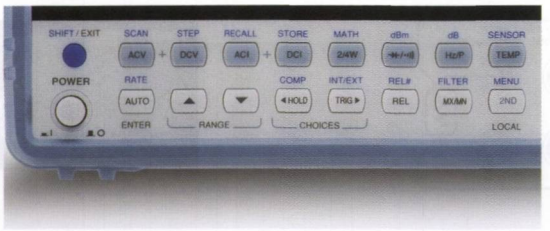
GTL-108A 4W Type test lead
GTL-232 RS-232C Cable, 9-pin female to 9-pin, null modem for computer, Approx. 2m
GTL-248 GPIB Cable, Approx. 2m
GTL-251 GPIB-USB-HS(High Speed)
GRA-422 Rack Adapter Panel (19", 2U)
GTL-128J Extension Cables (J type)
GTL-128T Extension Cables (T type)
GTL-128K Extension Cables (K type)
GTL-205 Temperature probe adaptor with thermocouple (K type)

FREE DOWNLOAD

PC Software DMM-VIEWER, RS-232C/USB Interface Supported
LabVIEW Driver, RS-232C/USB/GPIB Interface Supported
Driver USB Driver

* Three-year warranty, excluding accessories.

A. IDEAL FOR BENCH ASSIGNMENT



GDM-8261A includes all the basic measurement functions that are required for engineers to handle design, development and testing jobs for electronic circuits or products. The basic measurement functions include voltage, current, resistance, diode, continuity, frequency and temperature. Remarkably, the current measurement function covers a very wide range from 100 μA to 10A for DC current (in 6 ranges) and from 1mA to 10A for AC current (in 5 ranges). In addition, GDM-8261A features 10 Math functions (dBm, dB, compare, REL and other mathematical operations) to accommodate specific measurement requirements and complex measurement applications.

B. DUAL MEASUREMENTS WITH DUAL DISPLAYS

1st Display	2nd Display					
	ACV	DCV	ACI	DCI	Hz/P	2W/4W*
ACV	✓	✓	✓	✓	✓	-
DCV	✓	✓	✓	✓	✓	-
ACI	✓	✓	✓	✓	✓	-
DCI	✓	✓	✓	✓	✓	-
Hz/P	✓	✓	✓	✓	✓	-
2W/4W*	-	-	-	-	-	✓

Unlike most of the "dual display" digital multimeters, which show test result on the primary display and range information on the secondary display, GDM-8261A is able to perform two measurement functions simultaneously and shows the test results on primary display and secondary display respectively.

GDM-8261A supports an almost unlimited number of measurement combinations of dual measurement functions, besides the normal test result and range information displays, greatly increases the test speed of multi-function measurement tasks.

C. HIGH MEASUREMENT RESOLUTION & HIGH SAMPLING RATE

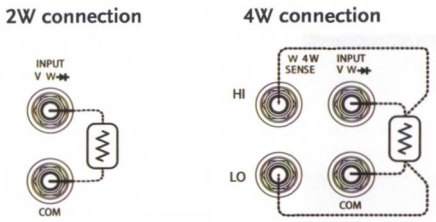
Mode	Resolution	DCV/DCI/Resistance Measurement Speed
Fast	4½ digits	2,400 readings/second
Medium	5½ digits	600 readings/second
Slow	6½ digits	30 readings/second

GDM-8261A offers an exceptionally high resolution of 0.1 μV for voltage measurement, 100pA for DC current measurement, 1nA for AC current measurement, and 100 μΩ for Resistance measurement. This level of resolution and accuracy becomes a must for the precision measurements in specific applications. In addition,

GDM-8261A is capable of acquiring 30 measurement readings/s at the display resolution of 6 ½ digits and 2,400 readings/s at the display resolution of 4 ½ digits. The fast acquisition rate of GDM-8261A adequately meets today's measurement demands.

6 ½ Digit Dual Measurement Multimeter

D. 2/4 WIRE RESISTANCE MEASUREMENT

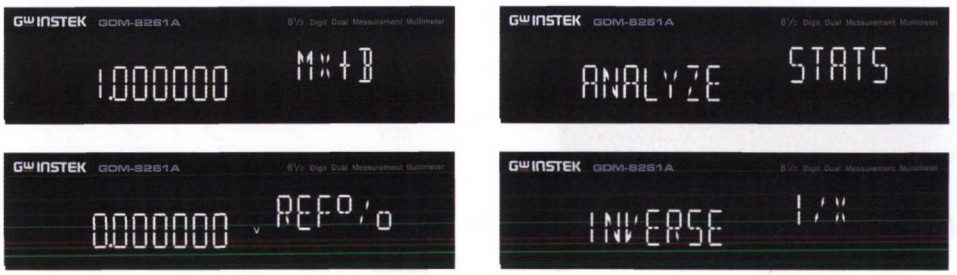


GDM-8261A offers two methods, both 2-wire and 4-wire, for resistance measurements. The 2-wire measurement is most commonly used for resistance measurement in the range from 100Ω to 10kΩ. Whereas the 4-wire connection is normally applied for resistance measurement at a value lower than 100Ω. When applied, 4-wire measurement automatically compensates the test lead resistance and connector contact resistance to get an accurate measurement result.

E. STORE / RECALL FUNCTION

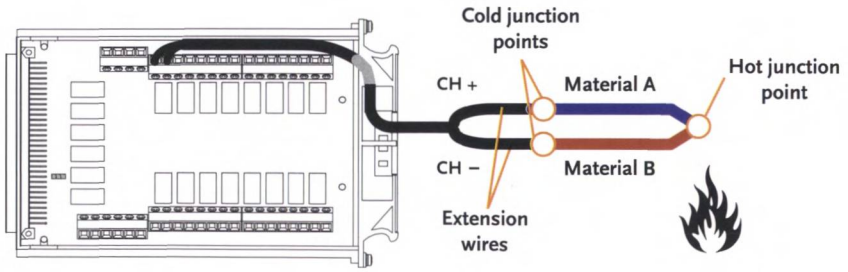
GDM-8261A is able to acquire and record 2 ~ 9999 measurement readings for the "store" and "recall" functions. This allows an immediate observation of the maximum, minimum, average or standard deviation values of all the recorded data whenever the data acquisition stops.

F. MATH MEASUREMENT



The "Math" function of GDM-8261A includes four mathematical operations for measurements: MX+B, 1/X, Percentage and Stats. "MX+B" is to multiply the measurement reading (X) by a factor (M) and adds/subtracts an offset value (B) to calculate linear offsets or scales. The "1/X" function is to divide 1 by the measurement reading (X), calculating the inverse of the reading. The "Percentage" function calculates the ratio of the measured value to a target value using the following equation: (Reading X – Reference)/Reference x 100%. The "Stats" function makes statistical calculations continuously or by a user-defined measurement counts. The statistical calculations include Maximum, Minimum, Average and Standard deviation. With these mathematical operations,GDM-8261A makes complex measurements quick and easy without the complexity of manual calculations.

G. TEMPERATURE MEASUREMENT

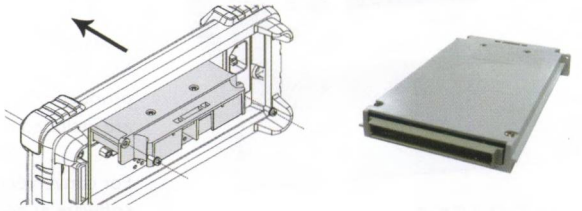


GDM-8261A performs temperature measurement accommodating a wide range of temperature sensors of either thermocouples or RTD (Resistive Temperature Detectors). For thermocouples, GDM-8261A uses voltage measurement terminals as the thermocouple input and calculates the temperature from the voltage fluctuation. Most of the popular thermocouple types are supported for temperature measurement on GDM-8261A. For RTD sensors, GDM-8261A calculates the voltage fluctuation arisen from the resistance variation due to temperature change. Either front panel terminals or scanner card terminals can be used as the input for temperature sensor.

H. VERSATILE INTERFACES WITH FAST TRANSMISSION SPEED

For system applications, GDM-8261A provides USB interface and RS-232C interface as standard. Up to 2,400 readings/s of data can be transferred over USB in ASCII format. Either GPIB or LAN interface is available as an option to support the ATE systems currently in use.

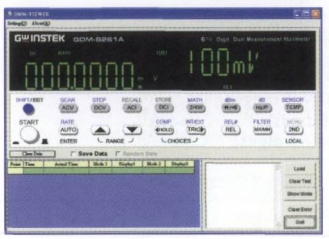
I. MULTIPOINT SCANNER CARD MEASUREMENT



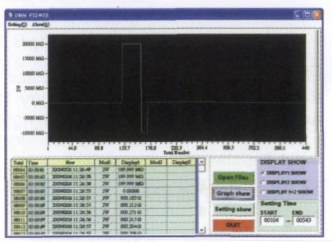
The optional scanner card, with a field-installable design, is a self-contained multipoint measurement solution. This approach eliminates the complexities of software development for multi-point measurement and data processing. The scanner card allows users to effectively measure multiple channels connected to a single GDM-8261A.

I. CONVENIENT PC SOFTWARE

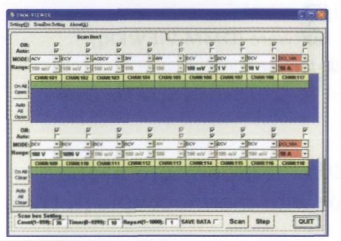
DMM-Viewer



Control & Data Acquisition

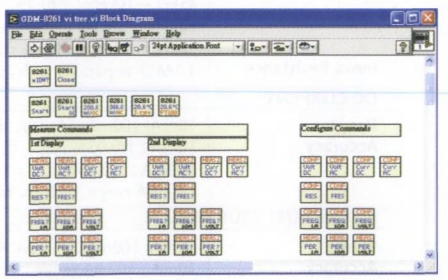


Data Reload & Graph



Panel Setting & Data Acquisition for All Scanner Channels

LabVIEW Driver



For the convenience of remote control and long time data acquisition, a free software, DMM-Viewer, is supported with GDM-8261A. This software allows users to remotely control GDM-8261A without the need to give commands or to develop programming software. DMM-Viewer's human interface resembles GDM-8261A front panel, which significantly shortens the users' learning time. For the data capture through a PC, the software allows users to continuously observe the measurement results before saving them into a file. Further more, the saved files can be loaded and viewed as a graph for data analysis.

When GDM-8261A works with scanner card for multi-point measurements, the DMM-Viewer allows users to easily select the measurement function and range for each channel and start acquiring measurement data promptly. The GDM-8261A LabVIEW driver is also available for free download. With this driver, users can create a virtue instrument on the PC for the instrument control. With DMM-Viewer & LabVIEW driver, GDM-8261A becomes a high value semi-auto ATE system without further software/hardware investments.

5 ½ Digit Dual Display Digital Multimeter

GDM-8255A

CE | RS-232 | USB | Digital I/O | PC Software | LabVIEW Driver

GDM-8255A portable precision multimeters feature 199,999 counts, a dual display, a 0.012% DCV accuracy and 2w/4w measurement. The VFD display technology provides the excellent observation of contrast and brightness.

GDM-8255A carry an extensive list of standard measurement items with a dual-display allowing two measurement items to be displayed simultaneously. Advanced measurement functions, such as Max/Min, Hold, Relative value and Compare, are suitable for a multiplicity of applications such as production testing, research and field verification. The USB, RS-232C and 9-pin digital I/O interface are included as standard features for remote control and data capturing for ATE applications.

For convenient PC-based remote control and extensive data capture, GDM-8255A include DMM-Viewer software at no additional cost. DMM-Viewer mimics the operation of the multimeters on the PC, allowing you to quickly use the software with little effort.

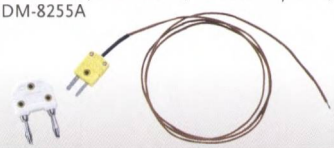
The optional scanner card (GDM-SC1) creates a self-contained multipoint measurement solution with plug-in design. This approach eliminates the complexities of multipoint measurements and data processing. The scanner lets users effectively measure multiple channels connected to a single GDM-8255A. Each scanner card has 16 general purpose channels and 2 extra channels for current (ACI, DCI) measurements. All channels are fully isolated (Hi and Lo). Up to two scanner cards can be inserted into each multimeter for a maximum of 36 channels. These optional modules not only provide customers with a complete hands-free multiple measurement solution, but also provide a cost effective upgrade path compared with purchasing dedicated instruments.

FEATURES

* 5 ½ Digits(199,999 Counts Max.)
* VFD Two Colors Display
* 0.012% DCV Accuracy
* True RMS (AC, AC+DC)
* 9 Major Measuring Functions and 10 Advanced Measurement Functions
* 2W/4W Resistance Measurement
* High Voltage 1000V and 10A Current Range
* Standard Interface : RS-232C, USB Device, Digital I/O
* Free PC Software (DMM-VIEWER), LabVIEW Driver
* Optional 16+2 Channels Scanner Card

GTL-205 Temperature probe adaptor with thermocouple (K type)

Approx. 1m
For: GDM-8261A, GDM-8351, GDM-8342/8341, GDM-8255A



GTL-207 Test Lead

Approx. 0.8m
For: GDM-8261A, GDM-8351, GDM-8255A, GDM-8342/8341, GLC-9000

GTL-247 USB Cable

A-A type cable,
Approx. 1.8m
For: GDM-8261A
GDM-8255A
GPT-9900 Series
GPT-9800 Series

GDM-01 Calibration key

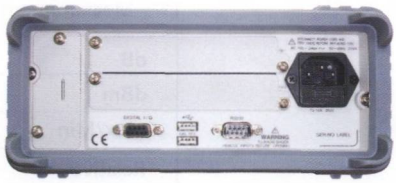
For: GDM-8261A
GDM-8255A

SPECIFICATIONS

FULL SCALE	
	5 ½ Digits (199,999 Counts Max.)
SAMPLE RATE	
	Slow : 5 1/2 digits, 10 readings/second Medium : 4 1/2 digits, 30 readings/second Fast : 3 1/2 digits, 60 readings/second
DC VOLTAGE	
Range Accuracy Input Resistance	100mV, 1V, 10V, 100V, 1000V 5 ranges 100mV : ±(0.012% rdg + 8 digits) 1V ~ 1000V : ±(0.012% rdg + 5 digits) 10MΩ
AC VOLTAGE True RMS	
Range Accuracy Input Resistance	100mV, 1V, 10V, 100V, 750V 5 ranges 100mV ranges : 20Hz ~ 45Hz : ±(1% rdg + 100 digits) 45Hz ~ 10kHz : ± (0.2% rdg + 100 digits) 10kHz ~ 30kHz : ± (1.5% rdg + 300 digits) 30kHz~100kHz : ±(15% rdg + 300 digits) 1V, 10V, 100V, 750V ranges : 20Hz ~ 45Hz : ±(1% rdg + 100 digits) 45Hz ~ 10kHz : ± (0.2% rdg + 100 digits) 10kHz ~ 30kHz : ± (1% rdg + 100 digits) 30kHz~100kHz : ±(3% rdg + 200 digits) 1.1MΩ in parallel with approx. 100pF
DC CURRENT	
Range Accuracy	10mA, 100mA, 1A, 10A 4 ranges 10mA : ±(0.05% rdg + 15 digits) 100mA : ±(0.05% rdg + 5 digits) 1A, 10A range : ±(0.2% rdg + 5 digits)
AC CURRENT TRUE RMS	
Range Accuracy	10mA, 100mA, 1A, 10A 4 ranges 10mA , 100mA range : 20Hz ~ 50Hz : ±(1.5% rdg + 100 digits) 50Hz ~ 10kHz : ±(0.5% rdg + 100 digits) 10kHz~20kHz : ±(2% rdg + 200 digits) 1A , 10A range : 50Hz ~ 10kHz : ±(1% rdg + 100 digits)
RESISTANCE	
Range 2W Accuracy 4W Accuracy	100Ω, 1kΩ, 10kΩ, 100kΩ, 1MΩ, 10MΩ, 100MΩ 7 ranges 100Ω range : ±(0.1% rdg + 8digits) (*) 1kΩ range : ±(0.08% rdg + 5 digits) (*) 10kΩ ranges : ±(0.06% rdg + 5digits) (*) 100kΩ ~ 1MΩ ranges : ±(0.06% rdg + 5digits) 10MΩ range : ±(0.3% rdg + 5 digits) 100MΩ range : ±(3% rdg + 8 digits) 100Ω range : ±(0.05% rdg + 8 digits) 1kΩ ~ 1MΩ 4 ranges : ±(0.05% rdg + 5 digits) 10MΩ range : ±(0.3% rdg + 5 digits) 100MΩ range : ±(3% rdg + 8 digits)

GDM-8255A

Rear Panel



SPECIFICATIONS
DIODE TEST
Open Circuit Voltage 2.0V, Test Current 0.5mA : Accuracy±(0.025%rdg + 5 digits)
FREQUENCY
10Hz~100kHz : Sensitivity 0.1V, Accuracy±(0.05%rdg + 15 digits) 100Hz~600kHz : Sensitivity 1V, Accuracy±(0.05%rdg + 3 digits) 600Hz~800kHz : Sensitivity 2.5V, Accuracy±(0.05%rdg + 3 digits)
CONTINUITY BEEPER
1 ~ 1000Ω Define by user : Accuracy±(0.08%rdg + 5 digits)
TEMPERATURE
0 C°~ 300 C°: J , K , T Type
OTHER FUNCTIONS
Auto range / Manual, Math : MX + B/ % / 1/X Max, Min, dBm, dB, REL, Hold, Compare, Store, Recall
DISPLAY
VFD, Two Colors Display
INTERFACE
Digital I/O, USB, RS-232C
POWER SOURCE
AC 100V~240V ± 10%, 50/60Hz; Power Comsumption : Max. 20VA
DIMENSIONS & WEIGHT
265(W) x 107(H) x 350(D) mm, Approx. 2.6 kg

Note : (*)USE "REL" Mode

ORDERING INFORMATION

GDM-8255A 5 ½ Digit Dual Display Digital Multimeter

ACCESSORIES :
Quick start user manual x 1, Power cord x 1, Test lead GTL-207 x 1, USB Cable GTL-247
CD x 1 (including complete user manual, upgrade program and PC software DMM Viewer),
Calibration key GDM-01 x 1

OPTION

Opt.01	GDM-SC1 Scanner Card (V ch x 16, I ch x 2)

OPTIONAL ACCESSORIES

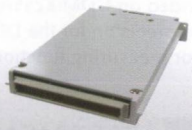
GTL-108A	4W Type test lead
GTL-232	RS-232C Cable, 9-pin female to 9-pin, null modem for computer, Approx 2m
GTL-128J	Extension Cables (J type)
GTL-128T	Extension Cables (T type)
GTL-128K	Extension Cables (K type)
GTL-205	Temperature probe adaptor with thermocouple (K type)
GRA-422	Rack Adapter Panel (19", 2U)

FREE DOWNLOAD

PC Software	DMM-VIEWER
Driver	USB Driver
	LabVIEW Driver (for LabVIEW 7.1)

GDM-SC1 Scanner card

Multipoint Testing can be facilitated by simple insertion of scanner card.
For: GDM-8261A
GDM-8255A



GTL-108A 4W Type Test Lead

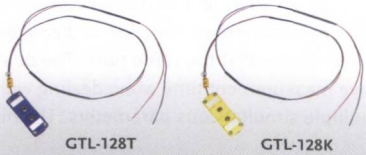
Approx. 1.1m
For: GOM-801H/802 , GDM-8261A , GDM-8255A

GTL-232 RS-232C Cable

Approx. 2m
For: GDM-8261A
GDM-8255A
GPT-9900 Series
GPT-9800 Series

GTL-128J Extension Cables (J type)
GTL-128T Extension Cables (T type)
GTL-128K Extension Cables (K type)

Approx. 0.6m
For: GDM-SC1



5 ½ Digit Dual Display Digital Multimeter

A. RICH MEASURING FUNCTIONS WITH ENHANCED FEATURES

Advanced Measurement	Basic Measurement					
	AC/DCV	AC/DCI	2/4W	Hz/P	°C/°F	→|←/•))
dB	✓	–	–	–	–	–
dBm	✓	–	–	–	–	–
Max/Min	✓	✓	✓	✓	✓	–
Relative	✓	✓	✓	✓	✓	–
Hold	✓	✓	✓	✓	✓	–
Compare	✓	✓	✓	✓	✓	–
Math	✓	✓	✓	✓	✓	–
Dual Measurement	✓	✓	✓	✓	–	–

Nine major measuring functions such as DCV/ACV, DCI/ACI, 2w/4w Resistance, Diode, Frequency, Continuity test and Temperature are provided on GDM-8255A. The 0.012% DC voltage accuracy provides great precision for the DC voltage applications. In addition to the major measuring functions, there are several advanced measuring functions such as Max, Min, dB, dBm, REL/REL#, Hold, Compare and Math functions (MX+B, %, 1/X) to enhance the effectiveness of measuring results.

B. FAST MEASUREMENT SPEED & TRANSFER RATE

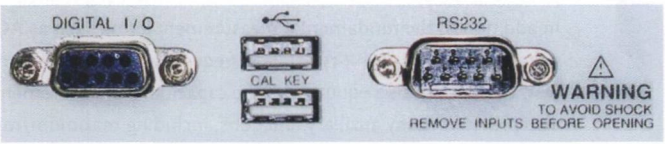
Mode	Resolution	Measurement Speed	Transfer Speed
Fast	3½ digits	60 readings/second	Typical 17ms
Medium	4½ digits	30 readings/second	Typical 34ms
Slow	5½ digits	10 readings/second	Typical 100ms

GDM-8255A offer selectable measurement speed rates under different modes. The speed rates allow you to maximize measurement efficiency while maintaining sufficient accuracy. In fast mode, the instrument delivers 60 readings/sec (see table below), adequately meeting today's speed demands. The display can be turned off by pressing the OUTPUT ON/OFF button at anytime. When using remote control, the display can be turned off to increase the measurement speed by reducing the operating load.

C. DIVERSE MEASURING COMBINATIONS WITH VFD DUAL COLOR DISPLAY

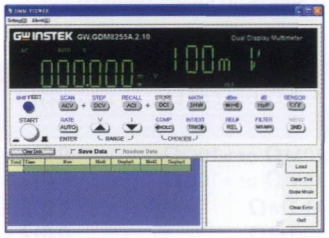
Offering a variety of dual display combinations, GDM-8255A allow a main measurement function and an auxiliary measurement function to be displayed at the same time. The dual measuring function will save measurement time when dealing with applications requiring multiple simultaneous parameters. The high quality dual color VFD (Vacuum Fluorescent Display) is strongly illuminated with a clear contrast for both red and green.

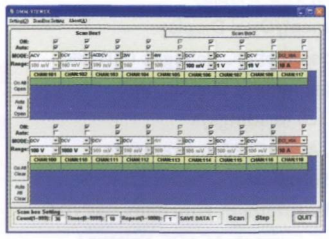
D. MULTIPLE STANDARD INTERFACES



GDM-8255A provide multiple interfaces for PC connection as standard: RS-232C and USB. With RS-232 and USB as standard, remote control and data transfer is faster and smoother. Without the need for expensive propriety communication interfaces, cost is significantly reduced for PC control and monitoring. In addition, the digital I/O terminal outputs comparison measurement results to control external devices for ATE applications and the VCC output can be used as a power source for TTL or CMOS circuits.

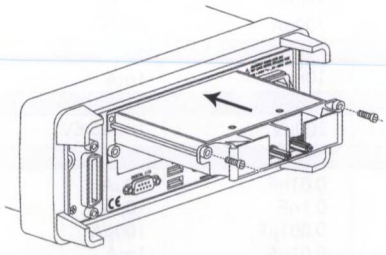
E. CONVENIENT PC SOFTWARE

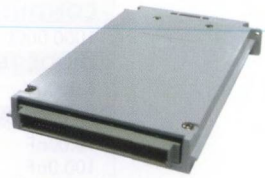




For convenient remote control and long data captures, GDM-8255A/ are accompanied with free software, DMM-Viewer. This software allows users to remotely control GDM-8255A without the need to issue commands or develop new program interfaces. DMM-Viewer's software interface resembles the GDM-8255A front panel, shortening training. For data capturing through a PC, the software allows you to observe measurement results before saving to a file for further study. Additionally saved files can be loaded and viewed as a graph. With DMM-Viewer, operating GDM-8255A multimeters can be much more effective.

F. EFFECTIVE MULTIPLE MEASUREMENT SCANNER CARD





The optional scanner card (GDM-SC1) creates a self-contained multipoint measurement solution with plug-in design. This approach eliminates the complexities of multipoint measurements and data processing. The scanner lets users effectively measure multiple channels connected to a single GDM-8255A. Each scanner card has 16 general purpose channels and 2 extra channels for current (ACI, DCI) measurements. All channels are fully isolated (Hi and Lo). Up to two scanner cards can be inserted into each multimeter for a maximum of 36 channels. These optional modules not only provide customers with a complete hands-free multiple measurement solution, but also provide a cost effective upgrade path compared with purchasing dedicated instruments.

5 ½ Digit Dual Measurement Multimeter

NEW

GDM-8351

CE | USB Device | PC Software | RS-232 | LabVIEW Driver | Digital I/O

FEATURES

* 120,000 Counts, VFD Display
* Dual Measurement/Dual Display
* The Basic Precision of DC Voltage : 0.012%
* Selectable Measurement Speeds, the Mmaximum : 320 Readings/s
* True RMS (AC, AC+DC) Measurements
* Auto/Manual Selection
* 12 Different Measurement Functions : AC/DC Voltage, AC/DC Current, AC+DC Voltage/ Current, 2W/4W Resistance, Continuity Beeper, Diode Test, Capacitance, Frequency, Temperature
* Many Auxiliary Functions : Max./Min., REL/ REL#, Compare, Hold, dB, dBm, Math(MX+B, %, 1/X)
* Digital I/O Provides Dual Mode(Standard Compare and User Definition Modes) Standard RS-232C and USB Device Interface (Support USBCDC and USBTMC Modes)

GW Instek presents the brand new 5 1/2 Digit Dual Measurement Multimeter-GDM-8351 to replace GDM-8251A of the same category. GDM-8351 eatures VFD dual-display, maximum 120,000 counts, 0.012% basic DC voltage accuracy and USB/RS232C connectors to provide users with measurement precision, lucid data observation, and the convenient connection with the personal computer.
In addition to the fundamental measurement items such as AC/DC voltage, AC/DC current, AC+DC voltage/current, 2W/4W resistance, frequency, temperature measurement, continuity beeper and diode test, GDM-8351 also equips with the capacitance measurement function. Furthermore, the GDM-8351 also provides many auxiliary functions, including maximum/minimum values, dB, dBm, compare, reading hold, algorithms (MX+B, 1/X, %) etc. to meet the measurement requirements for manufacturing process tests, educational experiments and testing facilities. For the external control, the pin of digital I/O interface not only provides the signal output frequently used by the compare function, but also allows users to define signal output for each pin. Under the self-definition mode, users can apply the I/O as a simple digital hardware. The external control requirement can be achieved by signals from each pin so as to help users reduce trouble of making hardware. With respect to remote control and retrieving data, GDM-8351, taking consideration of users' habitual practice and universal system interface, provides standard RS-232C and USB interface to edit control programs and read measurement results. It is worth noting that for utilizing the USB interface, users have options of selecting either USBCDC or USBTMC mode. While USBTMC is selected, users are able to control instrument with the USB interface exactly the same as controlling instrument with the GPIB interface; therefore, the relatively expensive GPIB connection cable is no longer required.

SPECIFICATIONS (*1)

Range(*2)	Resolution	Test Current or Etc.	Accuracy(*3)1 Year(23°C±5°C)
DC VOLTAGE			
100.000mV	1μV	10MΩ or >10GΩ	0.012 + 8
1.00000V	10μV	10MΩ or >10GΩ	0.012 + 5
10.0000V	100μV	11.1MΩ	0.012 + 5
100.000V	1mV	10.1MΩ	0.012 + 5
1000.00V	10mV	10MΩ	0.012 + 5
RESISTANCE			
100.000Ω	1mΩ	1mA	0.05 + 8
1.00000KΩ	10mΩ	1mA	0.05 + 5
10.0000kΩ	100mΩ	100μA	0.05 + 5
100.000kΩ	1Ω	10μA	0.05 + 5
1.00000MΩ	10Ω	1μA	0.05 + 5
10.0000MΩ	100Ω	0.5μA	0.30 + 5
100.000MΩ	1kΩ	0.5μA//10MΩ	3.00 + 8
DC CURRENT			
10.0000mA	100nA	1.1Ω	0.05 + 15
100.000mA	1μA	1.1Ω	0.05 + 5
1.00000A	10μA	0.1Ω	0.20 + 5
10.0000A	100μA	0.01Ω	0.20 + 5
CONTINUITY			
1000.00Ω	10mΩ	1mA	0.05 + 5
DIODE TEST			
6.0000V	100μV	1mA@6V	0.05 + 15
CAPACITANCE			
10.00nF	0.01nF	10μA	2.0 + 10
100.0nF	0.1nF	10μA	2.0 + 4
1.000μF	0.001μF	100μA	2.0 + 4
10.00μF	0.01μF	1mA	2.0 + 4
100.0μF	0.1μF	1mA	2.0 + 4

General	
Display	VFD, Two Colors Display
Interface	RS-232C, USB device (USBCDC & USBTMC)
Power Source	AC 100 V / 120 V / 220 V / 240 V ±10%, 50-60Hz ; Power Consumption Max. 15VA
Dimensions & Weight	265(W) x 107(H) x 302(D) mm, approx. 2.9kg

Note:

1. All specifications are applicable to the main (1st) display only and warmed up for at least 30 minutes and operated in the slow rate.
2. 20% overrange on all ranges, except 750V/10A range
3. Accuracy: ± (% of Reading + Digits)

GDM-8351

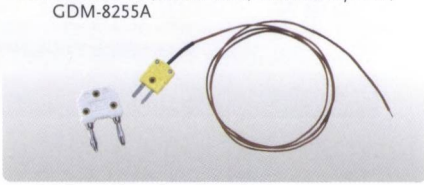
Rear Panel

SPECIFICATIONS (*1)

Range(*3)	Resolution	Frequency or Etc.	Accuracy 1 Year (23°C±5°C)
True RMS AC (or AC+DC – AC Coupled) Voltage			
100.000mV	1μV	20Hz ~ 45Hz 45Hz ~ 10kHz 10kHz ~ 30kHz 30kHz ~ 100kHz	1.0 + 100 0.3 + 100 1.5 + 300 5.0 + 300
1.00000V	10μV	20Hz ~ 45Hz 45Hz ~ 10kHz 10kHz ~ 30kHz 30kHz ~ 100kHz	1.0 + 100 0.2 + 100 1.0 + 100 3.0 + 200
10.0000V	100μV	20Hz ~ 45Hz 45Hz ~ 10kHz 10kHz ~ 30kHz 30kHz ~ 100kHz	1.0 + 100 0.2 + 100 1.0 + 100 3.0 + 200
100.000V	1mV	20Hz ~ 45Hz 45Hz ~ 10kHz 10kHz ~ 30kHz 30kHz ~ 100kHz	1.0 + 100 0.2 + 100 1.0 + 100 3.0 + 200
750.00V	10mV	20Hz ~ 45Hz 45Hz ~ 10kHz 10kHz ~ 30kHz 30kHz ~ 100kHz	1.0 + 100 0.2 + 100 1.0 + 100 3.0 + 200
True RMS AC (or AC+DC – AC Coupled) Current			
10.0000mA	100nA	20Hz ~ 45Hz 45Hz ~ 2kHz 2kHz ~ 10kHz	1.5 + 100 0.5 + 100 2.0 + 200
100.000mA	1μA	20Hz ~ 45Hz 45Hz ~ 2kHz 2kHz ~ 10kHz	1.5 + 100 0.5 + 100 2.0 + 200
1.00000A	10μA	20Hz ~ 45Hz 45Hz ~ 2kHz 2kHz ~ 10kHz	1.5 + 100 0.5 + 100 2.0 + 200
10.0000A	100μA	20Hz ~ 45Hz 45Hz ~ 2kHz 2kHz ~ 10kHz	1.5 + 100 1.0 + 100 -------
FREQUENCY			
(Voltage)10Hz – 1MHz (Current)20Hz – 10kHz	------- -------	------- -------	0.01 + 3 0.01 + 3
TEMPERATURE (Thermocouple)			
-200 °C ~ 0 °C 0 °C ~ +300 °C	0.01 °C 0.01 °C	J / T / K J / T / K	0.4 °C(typical) 0.2 °C(typical)

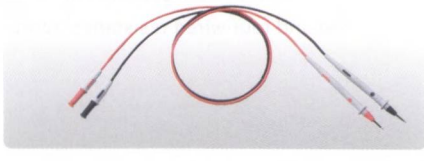
GTL-205 Temperature probe adaptor with thermocouple (K type)

Approx. 1m
For: GDM-8261A, GDM-8351, GDM-8342/8341, GDM-8255A



GTL-207 Test Lead

Approx. 0.8m
For: GDM-8261A, GDM-8351, GDM-8255A, GDM-8342/8341, GLC-9000



ORDERING INFORMATION

GDM-8351 5 ½ Digit Dual Measurement Multimeter

ACCESSORIES :
Safety Instruction Sheet x 1, Power cord x 1, Test lead GTL-207 x 1, CD x 1 (including complete user manual, driver and software)

OPTIONAL ACCESSORIES

GTL-108A	4Wire Test Lead (Kelvin Clip), Approx. 1100mm
GTL-128J	Extension Cables (J type)
GTL-128T	Extension Cables (T type)
GTL-128K	Extension Cables (K type)
GTL-205	Temperature probe adaptor with thermocouple (K-type), Approx. 1000mm
GTL-232	RS-232C Cable, 9-pin female to 9-pin, null modem for computer, Approx. 2000mm
GTL-246	USB Cable, A-B type, Approx. 1200mm
GRA-422	Rack Adapter Panel (19" 2U)

5 ½ Digit Dual Measurement Multimeter

A. SELECTABLE MEASUREMENT SPEEDS

Displayed digits will not be decreased because of selecting different speeds

Function vs. Speed(Reading/s)	Slow(S)	Medium(M)	Fast(F)
DCV/DCI/R	10	40	320
ACV/ACI	10	40	320
Continuity Beeper/Ddiode	10	40	320
Frequency/Period	1	9.8	83
Temperature	10	40	320
Capacitance	2	2	2

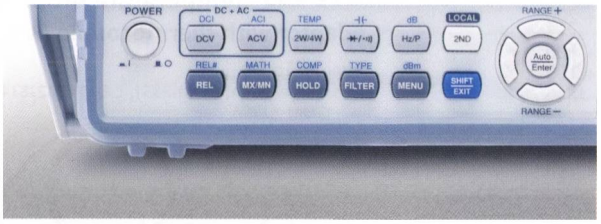
GDM-8351 has fastest measurement speed among the same category products and three selectable measurement speeds are available - slow/medium/fast. For instance, the DC voltage measurement can reach 320 readings per second on the fast mode, which can maximize the effectiveness of each measurement

B. DUAL MEASUREMENT/DUAL DISPALY

	ACV	DCV	ACI	DCI	Freq.	R
ACV	✓	✓	✓	✓	✓	–
DCV	✓	✓	✓	✓	–	–
ACI	✓	✓	✓	✓	✓	–
DCI	✓	✓	✓	✓	–	–
Freq.	✓	–	✓	–	✓	–
R	–	–	–	–	–	✓

GDM-8351, similar to GW Instek 6 1/2 and 5 1/2 digit multimeters, equips with VFD dual display to support the possible combinations of measurement items. For example, the DC voltage and current or DC voltage with AC element will appear when monitoring components of test wiring. The results of each measurement will simultaneously appear on different displays that not only save users' precious time but also exempt users from the trouble of selecting displays while reading measurement results.

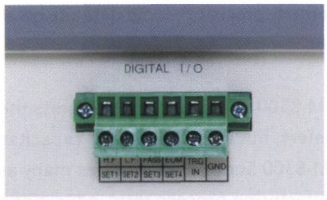
C. VARIOUS MEASUREMENT ITEMS AND FUNCTIONALITIES



Auxiliary Functions	MAJOR MEASUREMENT ITEMS						
	V	I	R	Hz/P	Temp*	Diode	Capa.
dB	✓	–	–	–	–	–	–
dBm	✓	–	–	–	–	–	–
Max/Min	✓	✓	✓	✓	✓	–	✓
Relative	✓	✓	✓	✓	✓	–	✓
Hold	✓	✓	✓	✓	✓	–	–
Compare	✓	✓	✓	✓	✓	–	✓
Math	✓	✓	✓	✓	✓	–	–

GDM-8351 provides various measurement items and functionalities compared with that of the products of same category. There are twelve major measurement items of GDM-8351, including AC voltage/current, DC voltage/current, AC+DC voltage/current, two-wired and four-wired resistance, temperature, frequency, diode and continuity beeper test, and even the capability of measuring capacitance. Many auxiliary functions, such as maximum/minimum values, reading hold, relative values, dB, dBm, algorithms (MX+B, 1/X, %) and compare, are designed to reinforce the major measurement items to satisfy users' daily working requirements.

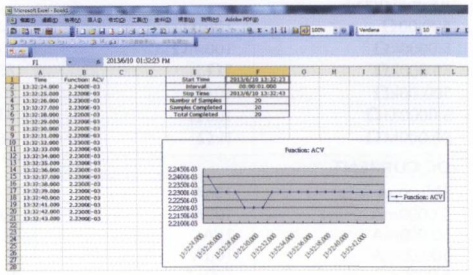
D. CONVNEIENT DIGITAL I/O FUNCTION



H.F	L.F	PASS	EOM	TRIG	GND
SET1	SET2	SET3	SET4	IN	

Another difference, while comparing with GDM-8251A, is that the Digital I/O of GDM-8351 provides two different modes which are general and self-definition. With the general mode, Digital I/O will output Hi Fail, Lo Fail, Pass and EOM (measurement results) based upon the results of the compare function and, furthermore, external trigger input is also provided. Under the self-definition mode, users can define output conditions for four pins (SET1~SET4) to execute the external control.

E. FREE SOFTWARE-REMOTE CONTROL AND DATA RETRIEVING



GDM-8351 provides free software-Excel ADDins for users' easy access. After installing the software, Microsoft Excel will establish Marco for users to directly control the setting of GDM-8351 to record the results of the measurements. The recorded data will be synchronously transformed into graphic displays via Excel drawing function that not only eliminates the cost and time of developing programs but also overcomes the compatibility issue of different programming languages.

F. COMMAND COMPATIBILITY

For GDM-8251A users, GDM-8351 also provides compatible commands. Users can replace machines through the simple setting of GDM-8351 without worrying the extra cost to modify the existing program and the delay of production time.

50000 Counts Dual Measurement Multimeter

Patent No. ZL201320125978.1

GW Instek rolls out the new generation Dual Measurement Multimeter -- the GDM-8300 Series, which has two models - GDM-8341 and GDM-8342. Its exceptional features include 50,000 counts, VFD dual-display, 0.02% basic DC voltage accuracy and a USB protocol connector to provide users with measurement precision, lucid data observation, and the convenience to connect with the personal computer.

The GDM-8300 Series not only supports the fundamental measurement items provided by general multimeters, but also equips with capacitance and temperature measurement functions. Furthermore, the GDM-8300 Series also provides many auxiliary functions to meet the measurement requirements for manufacturing process tests, educational experiments and testing facilities.

GDM-8341
GDM-8342

NEW

CE | USB Host | USB Device | PC Software | GPIB | LabVIEW Driver

With respect to storing and retrieving data, the GDM-8300 Series has two methods to offer: first, the USB flash drive storage function--- operating alone without connecting with a computer; second, USB interface (virtual COM port) and optional GPIB interface (must be installed in factory) for automatic measurement system users to conveniently save and retrieve data.

FEATURES

* 50000 Counts Vacuum Fluorescent Display with Two Colors
* Dual Measurement
* Fast Measurement Rate Up to 40 readings/s for DCV
* 0.02% DCV Basic Accuracy
* Auto/Manual Ranging
* True RMS (AC, AC+DC)
* 11 Measurement Functions
* Max./Min., REL, MX+B, 1/X, Ref %, Compare, Hold, dB, dBm
* Standard USB Device for Communicating to PC
* Temperature Measurement (GDM-8342 only)
* USB Storage for Data Collection (GDM-8342 only)
* Optional GPIB (factory install for GDM-8342 only)

SPECIFICATIONS (*1*2)

FUNCTION

Range(*3)	Resolution	Test Current or etc.	Accuracy 1 Year (23°C±5°C)
DC VOLTAGE			
500.00mV	10μV	10MΩ or >10GΩ	0.02 + 4
5.0000V	100μV	10MΩ or >10GΩ	0.02 + 4
50.000V	1mV	11.1MΩ	0.02 + 4
500.00V	10mV	10.1MΩ	0.02 + 4
1000.0V	100mV	10MΩ	0.02 + 4
RESISTANCE			
500.00Ω	10mΩ	0.83mA	0.10 + 5 (*4)
5.0000kΩ	100mΩ	0.83mA	0.10 + 3 (*4)
50.000kΩ	1Ω	83μA	0.10 + 3
500.00kΩ	10Ω	8.3μA	0.10 + 3
5.0000MΩ	100Ω	830nA	0.10 + 3
50.000MΩ	1kΩ	560nA//10 MΩ	0.30 + 3
DC CURRENT			
500.00μA	10nA	0.06Vmax.	0.05 + 5
5.0000mA	100nA	0.6Vmax.	0.05 + 4
50.000mA	1μA	0.14Vmax.	0.05 + 4
500.00mA	10μA	1.4Vmax.	0.10 + 4
5.0000A	100μA	0.5Vmax.	0.25 + 5
10.000A	1mA	0.8Vmax.	0.25 + 5
CONTINUITY			
5000.0Ω	100mΩ	0.83mA	0.10 + 5
DIODE TEST			
5.0000V	100μV	0.83mA	0.05 + 5
CAPACITANCE			
5.000nF : 0.5~1nF	0.001nF	8.3μA	2.00 + 20
5.000nF : 1~5nF	0.001nF	8.3μA	2.00 + 10
50.00nF : 5~10nF	0.01nF	8.3μA	2.00 + 30
50.00nF : 10~50nF	0.01nF	8.3μA	2.00 + 10
500.0nF	0.1nF	83μA	2.00 + 4
5.000μF	1nF	0.56mA	2.00 + 4
50.00μF	10nF	0.83mA	2.00 + 4

SPECIFICATIONS (*1*2)

FUNCTION

Range(*3)	Resolution	Test Current or etc.	Accuracy 1 Year (23°C±5°C)
True RMS AC (or AC+DC – AC Couple) Voltage (*5*6)			
500.00mV	10μV	30Hz ~ 50Hz 50Hz ~ 10kHz 10kHz ~ 30kHz 30kHz ~ 100kHz	1.00 + 40 0.50 + 40 2.00 + 60 3.00 + 120
5.0000V	100μV	30Hz ~ 50Hz 50Hz ~ 10kHz 10kHz ~ 30kHz 30kHz ~ 100kHz	1.00 + 20 0.35 + 15 1.00 + 20 3.00 + 50
50.000V	1mV	30Hz ~ 50Hz 50Hz ~ 10kHz 10kHz ~ 30kHz 30kHz ~ 100kHz	1.00 + 20 0.35 + 15 1.00 + 20 3.00 + 50
500.00V	10mV	30Hz ~ 50Hz 50Hz ~ 10kHz 10kHz ~ 30kHz 30kHz ~ 100kHz	---- 0.50 + 15 1.00 + 20 3.00 + 50
750.0V	100mV	30Hz ~ 50Hz 50Hz ~ 10kHz 10kHz ~ 30kHz 30kHz ~ 100kHz	---- 0.50 + 15 ---- ----

GDM-8300 Series

Rear Panel

SPECIFICATIONS (*1*2)

True RMS AC (or AC+DC – AC Couple) Current (*5*6)			
500.00μA	10nA	30Hz ~ 50Hz 50Hz ~ 2kHz 2kHz ~ 5kHz 5kHz ~ 20kHz	1.50 + 50 0.50 + 40 1.50 + 50 3.00 + 75
5.0000mA	100nA	30Hz ~ 50Hz 50Hz ~ 2kHz 2kHz ~ 5kHz 5kHz ~ 20kHz	1.50 + 40 0.50 + 20 1.50 + 40 3.00 + 60
50.000mA	1μA	30Hz ~ 50Hz 50Hz ~ 2kHz 2kHz ~ 5kHz 5kHz ~ 20kHz	1.50 + 40 0.50 + 20 1.50 + 40 3.00 + 60
500.00mA	10μA	30Hz ~ 50Hz 50Hz ~ 2kHz 2kHz ~ 5kHz 5kHz ~ 20kHz	1.50 + 40 0.50 + 20 1.50 + 40 3.00 + 60
5.0000 A	100μA	30Hz ~ 50Hz 50Hz ~ 2kHz	2.00 + 40 0.50 + 30
10.000A	1mA	30Hz ~ 50Hz 50Hz ~ 2kHz	2.00 + 40 0.50 + 30
FREQUENCY / PERIOD			
10Hz ~ 500Hz 500Hz ~ 500kHz 500kHz ~ 1MHz	–	–	0.01 + 5 0.01 + 3 0.01 + 5
TEMPERATURE (THERMOCOUPLE)			
-200 °C ~ +300 °C	0.1 °C	J / T / K type	2 °C (*7)
DISPLAY			
VFD, Two Colors Display			
INTERFACE			
USB device, USB Host (GDM-8342 only)			
POWER SOURCE			
AC 100V/120V/220V/240V ±10%, 50 ~ 60Hz ; Power Comsumption : Max. 15VA			
DIMENSIONS & WEIGHT			
265(W) x 107(H) x 302(D) mm, Approx. 2.9kg			

Note: The specifications apply when the DMM is warmed up for at least 30 minutes and operates in slow rate.

1. All specifications are ensured only under main (1st) display.
2. Accuracy : ± (% of reading + digits)
3. 2% overrange on all ranges, except 10A.is 20% overrange.
4. REL function is on.
5. The accuracy of AC+DC is equal to AC with 10 more digits added.
6. AC Characteristics are for sinewave input > 5% of range.
7. Specifications do not include probe accuracy.

ORDERING INFORMATION

GDM-8342 with GPIB	50000 counts Dual Measurement Multimeter with USB Host/Device and opt.01 GPIB
GDM-8342	50000 counts Dual Measurement Multimeter with USB Host/Device
GDM-8341	50000 counts Dual Measurement Multimeter with USB Device

ACCESSORIES :

Safety Instruction Sheet x 1, Power cord x 1, Test lead GTL-207 x 1, CD x 1 (including complete user manual, USB driver and PC software)

OPTION *

Opt.01	GPIB Interface * Factory installed for GDM-8342 only.

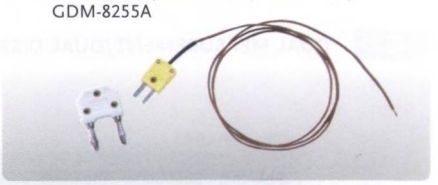
OPTIONAL ACCESSORIES

GTL-205	Temperature probe adaptor with thermocouple (K-type), Approx. 1m
GTL-246	USB Cable, USB 2.0, A-B Type, 1200mm
GTL-248	GPIB Cable, Double Shielded, 2000mm
GTL-251	GPIB-USB-HS (high Speed), Approx. 2m
GRA-422	Rack Adapter Panel (19", 2U)

GTL-251 GPIB-USB-HS (High Speed) Approx. 2m

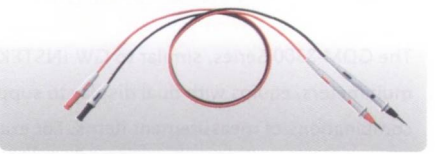
GTL-205 Temperature probe adaptor with thermocouple (K type)

Approx. 1m
For: GDM-8261A, GDM-8351, GDM-8342, GDM-8255A



GTL-207 Test Lead

Approx. 0.8m
For: GDM-8261A, GDM-8351, GDM-8255A, GDM-8342/8341, GLC-9000



50000 Counts Dual Measurement Multimeter

A. CONVENIENT USB FLASH DRIVE STORAGE FUNCTION

The major distinction between GDM-8342 and products in the same category is that GDM-8342 provides USB flash drive storage function, which allows users to conveniently save data into a USB flash drive through a simple and proper setting. This unique function, different from other digital multimeters which must first save data into its own internal memory then transfer out the file, or connect multimeters with a computer to retrieve data, not only saves operational time but also cuts down the cost and time of developing programs.
The USB flash drive storage function incorporates two modes -- basic and advanced, which can be selected from the front panel. When the basic mode is on, data will be saved into an automatically established new folder (time of established file will be determined by system default) and the starting time of data logging will use a fixed time marker (00hr: 00min: 00sec). For advanced mode, users can designate a file path to save data or establish a new folder and the starting time of data logging is determined by users' inputs (for instance: 23hr: 45min: 32sec). The number of data files can be saved in one second is determined by the speed of selected function.

The USB storage function allows each flash drive to establish 100 folders (GW000 ~ GW099). Each folder has a capacity of saving 5,000,000 data files (which are divided into 100 sub-file names, therefore, each sub-file name can save 50,000 data files. Take folder GW000 as an example, internal file names are GW000_00 ~ GW00_99). The storage format is CSV, which can open files and conduct file analysis by existing tools. (such as Microsoft Excel)

B. SELECTABLE MEASUREMENT SPEEDS

Will not Decrease Displayed Digits Because of Selecting Different Speeds

Function vs. Speed	Slow	Medium	Fast
DCV/DCI/R	5	10	40
ACV/ACI	5	10	40
Continuity/Diode	10	20	40
Frequency/Period	1	10	76
Capacitance	2	2	2

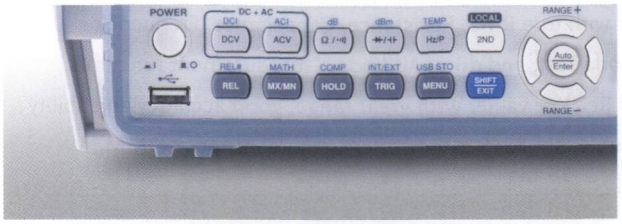
The GDM-8300 Series has three selectable measurement speeds- fast/medium/slow. For instance, the DC voltage measurement can reach 40 readings per second on the fast mode, which can maximize the effectiveness of each measurement.

C. DUAL MEASUREMENT/DUAL DISPLAY

	ACV	DCV	ACI	DCI	Hz/P
ACV	✓	✓	✓	✓	✓
DCV	✓	✓	✓	✓	✓
ACI	✓	✓	✓	✓	✓
DCI	✓	✓	✓	✓	✓
Hz/P	✓	✓	✓	✓	✓

The GDM-8300 Series, similar to GW INSTEK's 6 1/2 and 5 1/2 digits multimeters, equips with dual display to support the possible combinations of measurement items. For example, the DC voltage and current or DC voltage with AC element will appear when monitoring components of test wiring. The results of each measurement will simultaneously appear on different displays that not only save users' precious time but also exempt users from the trouble of selecting displays while reading measurement results.

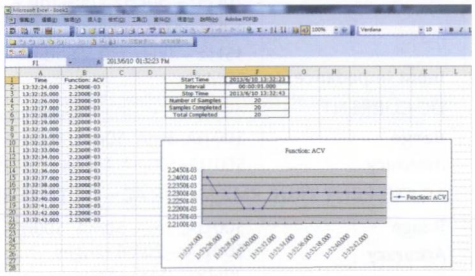
D. VARIOUS MEASUREMENT ITEMS AND FUNCTIONALITIES



Auxiliary Functions	MAJOR MEASUREMENT ITEMS						
	V	I	R	Hz/P	Temp*	Diode	Capa.
dB	✓	–	–	–	–	–	–
dBm	✓	–	–	–	–	–	–
Max/Min	✓	✓	✓	✓	✓	–	✓
Relative	✓	✓	✓	✓	✓	–	✓
Hold	✓	✓	✓	✓	✓	–	–
Compare	✓	✓	✓	✓	✓	–	✓
Math	✓	✓	✓	✓	✓	–	–

The GDM-8300 Series provides various measurement items and functionalities compared with that of the products of same category. There are twelve major measurement items of this series including AC voltage/current, DC voltage/current, AC+DC voltage/current, two-wired resistance, capacitance, Frequency/ period, diode and continuity beeper test. Temperature measurement is an optional function for GDM-8342. Many auxiliary functions, such as maximum/minimum values, reading hold, relative values, dB, dBm, algorithms (MX+B, 1/X, %) and comparison, are designed to reinforce the major measurement items to satisfy users' daily working requirements.

E. COMMAND COMPATIBILITY & FREE SOFTWARE-REMOTE CONTROL AND DATA RETRIEVING



For GDM-8246 users, the GDM-8300 Series also provides a complete command compatibility (SYSTEM\LANG\COMP). Users can replace machines through the simple setting of the GDM-8300 Series without worrying the extra cost to modify the existing program and the delay of production time.

The GDM-8300 Series provides free USB protocol connection software-Excel ADDins for users' easy access. After installing the software, Microsoft Excel will establish Marco for users to directly control the setting of the GDM-8300 Series to record the results of the measurements. The recorded data will be synchronously transformed into graphic displays via Excel drawing function that not only eliminates the cost and time of developing programs but also overcomes the compatibility issue of different programming languages.

50000 Counts Dual Display Digital Multimeter

GDM-8245 is an economical bench-top DMM equipped with a rich set of features. GDM-8245 has large 7 segment LED dual display features up to 50,000 counts and the ability to show two measurements at extensive list of measurement items - DC Voltage/ Current, AC Voltage/Current with true RMS, Resistance, Capacitance, Frequency, Continuity (with beeper), Diode Test, and dBm. Additional measurement functions, such as Max/Min, Hold and Relative value. With great range, good accuracy and ability to accept up to 20A of current, GDM-8245 is the perfect general purpose DMM.

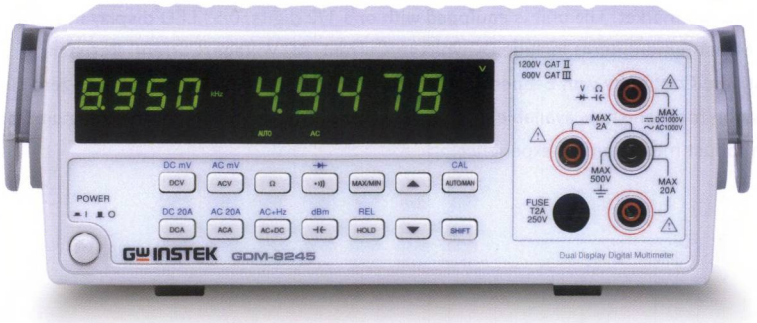
GDM-8245 (50000 Counts)

CE

FEATURES

* 50000 Counts Display
* Multi-Function ACV, DCV, ACA, DCA, R, C, Hz, Continuity Beeper, Diode Test, Max/Min, REL, Hold, dBm
* Dual Display Indicate ACV and Hz, DCV(ACV) and dBm
* Manual or Auto Ranging
* 0.03% DCV Accuracy
* ACV Measuring Frequency Up to 50kHz
* AC True RMS or AC + DC True RMS

SPECIFICATIONS	
DC VOLTAGE	
Range	500mV, 5V, 50V, 500V, 1000V 5 ranges
Accuracy	± (0.03% rdg + 4 digits)
Input Impedance	10MΩ
AC VOLTAGE TRUE RMS (AC OR AC + DC TRUE RMS)	
Range	500mV, 5V, 50V, 500V, 1000V 5 ranges
Accuracy	500mV ~ 50V 3 ranges : 20Hz ~ 45Hz : ±(1% rdg + 15 digits) 45Hz ~ 2kHz ±(0.5% rdg + 15 digits) 2k~10kHz ±(1% rdg + 15 digits) 10kHz ~ 20kHz ±(2% rdg + 30 digits) 20kHz ~ 50kHz ±(5% rdg + 30digits) 500V,1000V range : 45Hz ~ 1kHz ±(0.5% rdg + 15 digits)
Input Impedance	10MΩ
DC CURRENT	
Range	500μA, 5mA, 50mA, 500mA, 2A, 20A 6 ranges
Accuracy	500μA~500mA 4ranges:±(0.2% rdg+2 digits);2A~20A 2ranges:±(0.3% rdg+2digits)
AC CURRENT TRUE RMS (AC OR AC + DC TRUE RMS)	
Range	500μA, 5mA, 50mA, 500mA, 2A, 20A 6 ranges
Accuracy	500μA ~ 20A 6 ranges 20Hz ~ 45Hz :±(1% rdg + 15 digits) ; 45Hz ~ 2kHz :±(0.5%rdg + 15 digits) 500μA ~ 50mA 3 ranges 2kHz ~ 10kHz : ±(1% rdg + 15 digits) ; 10kHz ~ 20kHz :±(2% rdg + 15 digits)
RESISTANCE	
Range	500Ω,5kΩ,50kΩ,500kΩ,5MΩ,20MΩ 6 ranges
Accuracy	500Ω : ±(0.1% rdg + 4 digits); 5kΩ ~ 500kΩ 3 ranges : ±(0.1% rdg + 2 digits) 5MΩ : ±(0.2% rdg + 2 digits); 20MΩ : ±(0.3% rdg + 2 digits)
DIODE TEST	
	The one range can check the forward voltage of diode. Maximum forward voltage 1.5V open voltage 2.8V
CAPACITANCE	
Range	5nF, 50nF, 500nF, 5μF, 50μF 5 ranges
Accuracy	± (2% rdg + 4 digits)
FREQUENCY	
Input Level (Sine Wave)	mV range : 10Hz ~ 50kHz : >120mV ; 50k ~ 150kHz : >200mV 5V ~ 50V range : 10Hz ~ 200kHz >1.2V ; 500V range : 20Hz ~ 1kHz >12V
FUNCTIONS	
	Auto Manual/Range, Max, Min, dBm, REL, Hold
CONTINUITY BEEPER	
	Built in buzzer sounds when conductance is less than 5Ω
DISPLAY	
Dual Display 0.4" and 0.5", 7 segment LED display	
POWER SOURCE	
AC 100V/120V/230V±10%, 50/60Hz ; Power Comsumption : Max. 8VA	
DIMENSIONS & WEIGHT	
251(W) x 91(H) x 291(D) mm, Approx. 2.6kg	



GDM-8245

Rear Panel

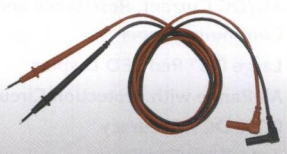
ORDERING INFORMATION

GDM-8245 50,000 Counts Dual Display Digital Multimeter

ACCESSORIES :
User manual x 1, Power cord x 1, Test lead GTL-117 x 1

GTL-117 Test Lead

Approx. 1.1m
For: GDM-8245



4 1/2 & 3 1/2 Digital Multimeter

In terms of cost/performance ratio, the GDM-8135 Series yields one of the best choices among the DMMs in today's market. The unit is equipped with or 3 1/2 digits, 0.5" LED display in a distinctive red color. Measurement items include DC Voltage/Current, AC Voltage/Current, Resistance, Diode Test, and Continuity with Beeper. Small voltage offsets are canceled by the auto-zero circuit, and protection mechanism is available for the entire measurement range. All these features provide users with robust measurement experience.

GDM-8135 (3 1/2 Digits)

CE

FEATURES

- Vast Measuring Functions : AC/DC Voltage, AC/DC Current, Resistance and Diode Test Continuity Beeper
- Large 0.5" Red LED Display
- All Range with Protection Circuit
- 0.1% DCV Accuracy
- Auto Zero Circuit
- 20A High Current Range
- 1000V High Voltage Range

SPECIFICATIONS	
DC VOLTAGE	
Range	200mV, 2V, 20V, 200V, 1000V 5 ranges
Accuracy	±(0.1% rdg + 1 digit)
Input Impedance	10MΩ
AC VOLTAGE	
Range	200mV, 2V, 20V, 200V, 1000V 5 ranges
Accuracy	200mV ~ 20V 3 ranges : 40Hz ~ 1kHz±(0.5% rdg + 1 digit) 1kHz ~ 10kHz±(1% rdg + 1 digit) 10kHz ~ 20kHz±(2% rdg + 1 digit) 20kHz ~ 40kHz±(5% rdg + 1 digit) 200V range : 40Hz ~ 1kHz±(0.5% rdg + 1 digit); 1kHz ~ 10kHz±(1% rdg + 1 digit) 1000V range : 40Hz ~ 1kHz±(0.5% rdg + 1 digit)
Input Impedance	10MΩ
DC CURRENT	
Range	200μA, 2mA, 20mA, 200mA, 2A, 20A 6 ranges
Accuracy	200μA ~ 200mA 4 ranges : ±(0.2% rdg + 1 digit) 2A ~ 20A 2 ranges : ±(0.5% rdg + 1 digit)
AC CURRENT	
Range	200 μA, 2mA, 20mA, 200mA, 2A, 20A 6 ranges
Accuracy	200μA ~ 200mA 4 ranges 40Hz ~ 1kHz±(0.5% rdg + 1 digit) 1kHz ~ 10kHz±(1% rdg + 1 digit) 10kHz ~ 20kHz±(2% rdg + 1 digit) 2A ~ 20A 2 ranges, 40Hz ~ 2kHz±(1% rdg + 2 digits)
RESISTANCE	
Range	200Ω, 2kΩ, 20kΩ, 200kΩ, 2MΩ, 20MΩ 6 ranges.
Accuracy	200Ω ~ 2MΩ 5ranges : ±(0.2% rdg + 1 digit) 20MΩ range : ±(0.5% rdg + 1 digit)
DIODE TEST	
Test Current	Max. 1 mA
Open Voltage	Max. 13V
CONTINUITY BEEPER	
Description	Buzzer sounds if conductance < 10Ω
Test Current	Max. 1 mA
Open Voltage	Max. 13V
DISPLAY	
0.5" LED display	
POWER SOURCE	
AC 100V/120V/220V/230V±10%, 50/60Hz ; Power Comsumption : Max. 12VA	
DIMENSIONS & WEIGHT	
245(W) x 95(H) x 280(D) mm, Approx. 2kg	

GTL-107A Test Lead

Approx. 1.1m
For: GDM-8034,GDM-8135

ORDERING INFORMATION

GDM-8135 3 1/2 Digits Digital Multimeter

ACCESSORIES :
User manual x 1, Power cord x 1, Test lead GTL-107A x 1

3 1/2 Digital Multimeter

GDM-8034 is the most affordable and cost-effective bench-top digital multimeter available today.. A large 0.5" LCD display with 3 1/2 digits always provides a clear view of the measurement results. A series of powerful built-in functions, such as AC/DC Voltage, AC/DC Current, Resistance, Capacitance, Diode Test, and Audible Continuity Beeper, make the users' applications measurements simpler and easier. Compact profile, sufficient functionality, and excellent cost-performance make GDM-8034 best suited for educational institutions such as schools and training centers.

GDM-8034 (3 1/2 Digits)

FEATURES

* 8 Functions AC/DC Voltage, AC/DC Current, Resistance, Capacitance, Diode Test and Audible Continuity Beeper
* High Voltage 1000V and 20A Current Range
* 0.5% Basic DCV Accuracy
* LCD Display

SPECIFICATIONS

DC VOLTAGE	
Range	200mV, 2V, 20V, 200V, 1000V 5 ranges
Accuracy	± (0.5% rdg + 1 digit)
Input Impedance	10MΩ
AC VOLTAGE	
Range	200mV, 2V, 20V, 200V, 750V 5 ranges
Accuracy	40Hz ~ 500Hz±(1% rdg + 4 digits)
Input Impedance	10MΩ
DC CURRENT	
Range	200µA, 2mA, 20mA, 200mA, 2A, 20A 6 ranges
Accuracy	200µA ~ 200mA±(0.5% rdg + 1 digit) 2A ~ 20A±(1% rdg + 3 digits)
AC CURRENT	
Range	200µA, 2mA,20mA,200mA, 2A,20A 6 ranges
Accuracy	40Hz ~ 500Hz on all ranges 200µA ~ 200mA±(1% rdg + 4 digits) 2A ~ 20A±(1.5% rdg + 2 digits)
RESISTANCE	
Range	200Ω, 2k, 20k, 200kΩ, 2MΩ, 20MΩ 6 ranges
Accuracy	200Ω ~ 2MΩ±(0.75% rdg + 1 digit) 20MΩ±(1.5% rdg + 5 digits)
CAPACITANCE	
Range	2nF, 20nF, 200nF, 2µF, 20µF 5 ranges
Accuracy	±(2% rdg + 4 digits)
Test Freq.	300Hz±5%
DIODE TEST	
Test Current	Max. 2.5mA
Open Voltage	Max. 3.2V
CONTINUITY BEEPER	
Description	Buzzer sounds if conductance less than 30Ω
Test Current	Max. 2.5 mA
Open Voltage	Max. 3.2V
DISPLAY	
0.5" LCD display	
POWER SOURCE	
AC 110V/220V±15%, 50/60Hz	
DIMENSIONS & WEIGHT	
245(W) x 95(H) x 280(D) mm, Approx. 2kg	

GTL-107A Test Lead

Approx. 1.1m
For: GDM-8034,GDM-8135

ORDERING INFORMATION

GDM-8034 3 1/2 Digits LCD Digital Multimeter

ACCESSORIES :

User manual x 1, Power cord x 1, Test lead GTL-107A x 1

Hand-Held Digital Multimeter

GDM-452

GDM-357

GDM-350B

GDM-452 FEATURES

* 4 ½ Digits Manual Ranging
* AC Current True RMS
* Capacitance, Frequency Measurement
* Data Hold
* Auto Power Off

GDM-357 FEATURES

* 3 ½ Digits Manual Ranging
* Temperature Measurement
* Capacitance, Frequency Measurement
* Data Hold
* Auto Power Off

GDM-350B FEATURES

* 3 ½ Digits Manual Ranging
* Temperature Measurement
* Continuity Beeper/Diode Test
* hFE Test
* Data Hold

The GDM-300/400 Series Hand Held DMM are a compact, high precision, battery operated multimeter series designed to meet of service engineers. The GDM-300/400 Series design is driven by mobile-oriented features: automatic power off to preserve battery life, a large backlight display for crisp viewing, a rotary selector and push buttons to ease operation, and temperature measurement for outdoor use. The basic functions match the depth of bench-top multimeters: fuse-protected current input, true RMS for accurate AC measurements, Auto ranging, Duty cycle, and Relative mode. These compact, reliable, and economical devices are ideal for any engineer.

SPECIFICATIONS	
DC VOLTAGE	
Range	220mV, 2.2V, 22V, 220V, 1000V(GDM-461); 200mV, 2V, 20V, 200V, 600V(GDM-452); 40mV, 400mV, 4V, 40V, 400V, 1000V(GDM-397); 60mV, 600mV, 6V, 60V, 600V, 1000V(GDM-360); 400mV, 4V, 40V, 400V, 1000V(GDM-398); 200mV, 2V, 20V, 200V, 600V(GDM-357); 200mV, 2000mV, 20V, 200V, 250V(GDM-350B)
Best Accuracy	±(0.1%rdg + 2 digits) for GDM-461; ±(0.05%rdg + 3 digits) for GDM-452;±(0.5%rdg + 1 digit) for GDM-397/360/398/357; ±(0.5%rdg + 2 digits) for GDM-350B
Input Impedance	10MΩ (3000MΩ for mV range of GDM-461/397/360/398)
AC VOLTAGE	
Range	220mV, 2.2V, 22V, 220V, 750V(GDM-461); 200mV, 2V, 20V, 200V, 600V(GDM-452) 40mV, 400mV, 4V, 40V, 400V, 750V(GDM-397); 400mV, 4V, 40V, 400V, 750V(GDM-398) 60mV, 600mV, 6V, 60V, 600V, 750V(GDM-360); 2V, 20V, 200V, 600V(GDM-357) 200V, 250V(GDM-350B)
Best Accuracy	±(0.8%rdg + 10 digits) for GDM-461; ±(0.5%rdg + 10 digits) for GDM-452 ±(1.0%rdg + 3 digits) for GDM-397/360/398; ±(0.8%rdg + 3 digits) for GDM-357 ±(1.2%rdg + 3 digits) for GDM-350B
Input Impedance	10MΩ(3000MΩ for mV range of GDM-461/397/360/398; 4.5MΩ for GDM-350B)
DC CURRENT	
Range	220μA, 2200μA, 22mA, 220mA, 10A(GDM-461); 2mA, 20mA, 200mA, 10A(GDM-452) 400μA, 4000μA, 40mA, 400mA, 4A, 10A(GDM-397/398) 600μA, 6000μA, 60mA, 600mA, 6A, 10A(GDM-360) 2mA, 20mA, 200mA, 10A(GDM-357); 2000μA, 20mA, 200mA, 10A(GDM-350B)
Best Accuracy	±(0.5%rdg + 10 digits) for GDM-461; ±(0.5%rdg + 5 digits) for GDM-452 ±(1.0%rdg + 2 digits) for GDM-397/398/350B; ±(1.0%rdg + 3 digits) for GDM-360 ±(0.8%rdg + 1 digit) for GDM-357
AC CURRENT	
Range	220μA, 2200μA, 22mA, 220mA, 10A(GDM-461); 2mA, 20mA, 200mA, 10A(GDM-452) 400μA, 4000μA, 40mA, 400mA, 4A, 10A(GDM-397/398) 600μA, 6000μA, 60mA, 600mA, 6A, 10A(GDM-360); 20mA, 200mA, 10A(GDM-357)
Best Accuracy	±(0.8%rdg + 10 digits) for GDM-461/452; ±(1.0%+3) for GDM-357; ±(1.2%rdg + 5 digits) for GDM-397/360/398
RESISTANCE	
Range	220Ω ~ 220MΩ 7 ranges(GDM-461); 200Ω ~ 20MΩ 6 ranges(GDM-452/357/350B) 400Ω ~ 40MΩ 6 ranges(GDM-397/398); 600Ω ~ 60MΩ 6 ranges(GDM-360)
Best Accuracy	±(0.5%rdg + 10 digits) for GDM-461; ±(0.3%rdg + 1 digit) for GDM-452; ±(1.0%rdg + 2 digits) for GDM-397/360/398/357; ±(0.8%rdg + 5 digits) for GDM-350B
CAPACITANCE	
Range	22nF, 220nF, 2.2μF, 22μF, 220μF, 2.2mF, 22mF, 220mF(GDM-461) 20nF, 200nF, 2μF, 20μF(GDM-452); 2nF, 20nF, 200nF, 2μF, 200μF(GDM-357) 40nF, 400nF, 4μF, 40μF, 400μF, 4000μF (GDM-397/360/398)
Best Accuracy	±(3.0%rdg + 5 digits) for GDM-461; ±(4.0%rdg + 20 digits) for GDM-452 ±(3.0%rdg + 5 digits) for GDM-397/360/398; ±(4.0%+3) for GDM-357
FREQUENCY	
Range	10Hz ~ 220MHz(GDM-461); 1Hz ~ 20kHz(GDM-452) 10Hz ~ 10MHz(GDM-397/360/398)
Best Accuracy	±(0.01%rdg + 5 digits) for GDM-461; ±(1.5%rdg + 5 digits) for GDM-452 ±(0.1%rdg + 4 digits) for GDM-397/360/398
DIODE TEST	
Open Circuit Voltage	GDM-461/452/397/360/398/357 : 2.8V (Approx.) GDM-350B : 2.3V (Approx.)
CONTINUITY BEEPER	
Buzzer sounds if conductance less than 10Ω for GDM-461/397/357/360/398/350B Buzzer sounds if conductance less than 30Ω for GDM-452	
TEMPERATURE	
Range	-40℃~1000℃
Best Accuracy	±(1.2%rdg + 4 digits) for GDM-397; ±(1.0%rdg + 7 digits) for GDM-357 ±(1.0%rdg + 3 digits) for GDM-350B
SPECIAL FUNCTION	
Auto Ranging (GDM-461/397/360); True RMS (GDM-461/360); RS-232C (GDM-461/397/360) hFE Test (GDM-398/350B); Display Backlight (GDM-397/360/398); EF Function (GDM-398) Analog Bar (GDM-461/397/360/398); Auto Power Off (GDM-452/397/357/360/398)	
LCD DISPLAY	
22000 counts (GDM-461), 4 1/2 digits (GDM-452), 6000 counts (GDM-360) 3 3/4 digits (GDM-397/398), 3 1/2 digits (GDM-357/350B)	
POWER SOURCE	
Single 9V Battery (6F22)	

GDM-461

CE RS-232 PC Software

GDM-397

CE RS-232 PC Software

GDM-360

CE RS-232 PC Software

GDM-398

CE

SPECIFICATIONS

DIMENSIONS & WEIGHT

87(W) x 180(H) x 47(D) mm, Approx. 370g (GDM-461/397/360/398)
91(W) x 186(H) x 39(D) mm, Approx. 300g (GDM-452/357)
72(W) x 137(H) x 35(D) mm, Approx. 200g (GDM-350B)

ORDERING INFORMATION

GDM-461	22000 Counts Hand-Held DMM with True RMS Measurement and RS-232C Interface
GDM-452	4 ½ Digits hand-Held DMM
GDM-397	3 3/4 Counts Hand-Held DMM with RS-232C Interface
GDM-360	6000 counts Hand-Held DMM with True RMS Measurement and RS-232C Interface
GDM-398	3 3/4 counts Hand-Held DMM
GDM-357	3 1/2 Digits Hand-Held DMM
GDM-350B	3 1/2 Digits Hand-Held DMM

ACCESSORIES :
User manual x 1 , Test leads , Battery

FREE DOWNLOAD

GDM-461 PC Software	PC Software; Remote software (RS-232C/USB Interface Cable(Optional))
GDM-397 PC Software	PC Software; Remote software (RS-232C/USB Interface Cable(Optional))
GDM-360 PC Software	PC Software; Remote software (RS-232C)

SELECTION GUIDE

MODEL	GDM-461	GDM-452	GDM-397	GDM-360	GDM-398	GDM-357	GDM-350B
Max. Display	22000	19999	4000	6000	4000	1999	1999
Auto Ranging	✓		✓	✓	✓		
Analogue Bar	✓		✓	✓	✓		
True RMS	✓			✓			
Display Backlight			✓	✓	✓		
Fused 10A Range	✓	✓	✓	✓	✓		✓
Auto Power off		✓	✓	✓	✓	✓	
DC Voltage	1000V	600V	1000V	1000V	1000V	600V	250V
AC Voltage	750V	600V	750V	750V	750V	600V	250V
DC Current	10A	10A	10A	10A	10A	10A	10A
AC Current	10A	10A	10A	10A	10A	10A	
Resistance	220MΩ	20MΩ	40MΩ	60MΩ	40MΩ	20MΩ	20MΩ
Capacitance	220mF	20 μ F	4000 μ F	4000 μ F	4000 μ F	200 μ F	
Frequency	220MHz	20kHz	10MHz	10MHz	10MHz		
Diode	✓	✓	✓	✓	✓	✓	✓
Continuity	✓	✓	✓	✓	✓	✓	✓
Temperature			✓			✓	✓
Duty Cycle (%)	✓		✓	✓	✓		
Transistor (hFE)					✓		✓
EF					✓		
REL	✓		✓	✓	✓		
Data Hold	✓	✓	✓	✓	✓	✓	✓
Peak Hold	✓						
MAX MIN			✓	✓	✓		
RS-232C	✓		✓	✓			

GDM-461 FEATURES

* 22000 Counts Auto/Manual Ranging
* 46 segments Analogue Bar
* Data/Peak Hold and Relative Mode
* True RMS/RS232C

GDM-397 FEATURES

* 4000 Counts Auto/Manual Ranging
* 41 segments Analogue Bar
* MAX/MIN, Data Hold and Relative Mode
* RS232C
* Auto Power Off

GDM-360 FEATURES

* 6000 Counts Auto/Manual Ranging
* Continuity Beeper/Diode Test
* Capacitance, Frequency Measurement
* Data Hold and Relative Mode
* True RMS/RS232C

GDM-398 FEATURES

* 4000 Counts Auto/Manual Ranging
* Capacitance, Frequency Measurement
* hFE Test / EF Function
* Data Hold and Relative Mode
* Auto Power Off

Digital Clamp Meter

The GCM-403 is digital clamp meter can measure AC/DC voltage, AC/DC current, resistance, diodes, continuity, capacitance, frequency and temperature. Tapered jaws, auto range, data hold, REL function and auto power off which makes it a superb tool for electricians.

GCM-403

CE

FEATURES

* AC/DC 600A/600V Max Input
* Auto Range Except Current Measurement
* Auto Power Off
* Capacitance Measurement
* Frequency Measurement
* Temperature Measurement
* Max. Clamp Size : ∅ 28mm

SPECIFICATIONS	
ACV	
Range	4V, 40V, 400V, 600V
Resolution	0.001V, 0.01V, 0.1V, 1V
Accuracy	±(1.0 + 5) ~ ±(1.2 + 5)
Input Impedance	≧10MΩ // 100pF at least
Frequency Response	40~400Hz
ACA	
Range	40A, 600A
Resolution	0.01A, 0.1A
Accuracy	±(2.5 + 5) ~ ±(2.5 + 8)
Frequency Response	50~60Hz
DCV	
Range	400mV, 4V, 40V, 400V, 600V
Resolution	0.1mV, 0.001V, 0.01V, 0.1V, 1V
Accuracy	±(0.8 + 1) ~ ±(1.0 + 3)
Input Impedance	≧10MΩ
DCA	
Range	40A, 600A
Resolution	0.01A, 0.1A
Accuracy	±(2.0 + 5)
OHM	
Range	400Ω, 4kΩ, 40kΩ, 400kΩ, 4MΩ, 40MΩ
Resolution	0.1Ω, 0.001kΩ, 0.01kΩ, 0.1kΩ, 0.001MΩ, 0.01MΩ
Accuracy	±(1.0 + 2) ~ ±(1.5 + 2)
DIODE	
Range	4V
Resolution	0.001V
Open-circuit Voltage	Approx. 1.48V
CONTINUITY	
Range	400Ω
Resolution	0.1Ω
Accuracy	The buzzer turns on for resistance lower than 10Ω
Open-circuit Voltage	Approx. 0.45V
CAPACITANCE	
Range	40nF, 400nF, 4μF, 40μF, 100μF
Resolution	0.01nF, 0.1nF, 0.001μF, 0.01μF, 0.1μF
Accuracy	±(4.0 + 3) ~ ±(5.0 + 10)
FREQUENCY	
Range	10Hz, 100Hz, 1kHz, 10kHz, 100kHz, 1MHz, 10MHz
Resolution	0.001Hz, 0.01Hz, 0.1Hz, 1Hz, 10Hz, 100Hz, 1kHz
Accuracy	±(4.0 + 3) ~ ±(5.0 + 10)
TEMPERATURE (°C only)	
Range	-40°C ~ 1000°C
Accuracy	±(2.5 + 3) ~ ±(8.0 + 5)
OTHER FUNCTION	
Data Hold, REL	
LCD DISPLAY	
Liquid crystal display : Displays 4000 counts maximum.	
CLAMP OPENING DIAMETER	
∅ 28mm Maximum	
POWER SOURCE	
9V battery (16F22)	
DIMENSIONS & WEIGHT	
210 (L) x 76 (W) x 30 (H) mm; Approx. 260g	

ORDERING INFORMATION

GCM-403 Digital Clamp Meter

ACCESSORIES :
User manual x 1, Test leads, Temperature probe, Carrying case

Digital Clamp Meter

GCM-407

The GCM-407 is digital clamp meter with true RMS measurement. Featuring tapered jaws, a wide range (AC 600A/750V, DC 1000V max input), capacitance measurement as well as non-contact voltage sensing function and the ability to keep MAX/MIN or hold data and automatically power down make the GCM-407 suitable for almost any cable measurement task.

FEATURES

* True RMS Measurement
* AC 600A/750V, DC 1000V Max Input
* Auto Range Except Current Measurement
* Auto Power Off
* Capacitance Measurement
* Non-Contact Voltage sensing function
* Max. Clamp Size : ∅30mm

SPECIFICATIONS	
ACV	
Range	6V, 60V, 600V, 750V
Resolution	0.001V, 0.01V, 0.1V, 1V
Accuracy	±(1.2 + 5) ~ ±(1.5 + 5)
Input Impedance	≧10MΩ
Frequency Response	40~400Hz
ACA	
Range	6A, 60A, 600A
Resolution	0.001A, 0.01A, 0.1A
Accuracy	±(2.5 + 5) ~ ±(2.5 + 30)
Frequency Response	50~60Hz
DCV	
Range	600mV, 6V, 60V, 600V, 1000V
Resolution	0.1mV, 0.001V, 0.01V, 0.1V, 1V
Accuracy	±(0.8 + 1) ~ ±(1.0 + 8)
Input Impedance	≧10MΩ
OHM	
Range	600Ω, 6kΩ, 60kΩ, 600kΩ, 6MΩ, 60MΩ
Resolution	0.1Ω, 0.001kΩ, 0.01kΩ, 0.1kΩ, 0.001MΩ, 0.01MΩ
Accuracy	±(1.0 + 2) ~ ±(1.5 + 5)
DIODE	
Range	6V
Resolution	0.001V
Open-circuit Voltage	Approx. 3.3V
CONTINUITY	
Range	600Ω
Resolution	0.1Ω
Accuracy	The buzzer turns on for resistance lower than 30Ω
Open-circuit Voltage	Approx. 1.2V
CAPACITANCE	
Range	99nF, 999nF, 9μF, 99μF, 999μF, 9mF, 59mF
Resolution	0.01nF, 0.1nF, 0.001μF, 0.01μF, 0.1μF, 0.001mF, 0.01mF
Accuracy	±(4.0 + 5) ~ ±10
NCV (Non-Contact Voltage)	
Range	< 10mm
Accuracy	AC Voltage only
OTHER FUNCTION	
Data Hold, MAX/MIN, REL, Backlight, Flashlight	
LCD DISPLAY	
Liquid crystal display : Displays 6000 counts maximum.	
CLAMP OPENING DIAMETER	
∅30mm Maximum	
POWER SOURCE	
3 AAA 1.5V zinc manganese batteries	
DIMENSIONS & WEIGHT	
228 (L) x 77 (W) x 41 (H) mm; Approx. 265g (inclusive of the battery)	

ORDERING INFORMATION

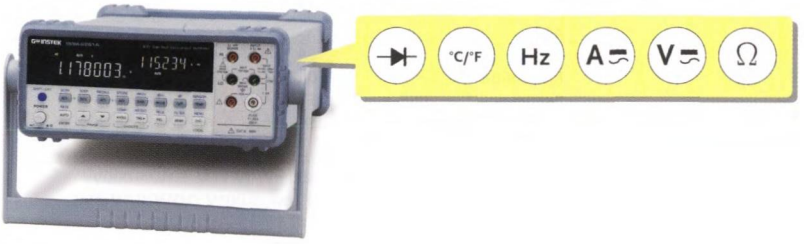
GCM-407 Digital Clamp Meter with True RMS Measurement

ACCESSORIES :
User manual x 1, Test leads, Carrying case

Q 1 **What is Digital Multimeter?**

A 1 **Digital Multi-meter Basic Concept**

1. A digital multimeter (DMM) is an epitomized device that combines the function alities of voltmeter, currentmeter and ohmmeter. It can perform parameters measurement such as voltage, current, resistance, frequency, temperature as well as capacitance. On the other hand, engineers can handle design, development and testing job for electronic circuits or products by just single equipment. Some DMM also provides more functionality to support a test demand for instead an internal buffer with readings storage, a scanner card switch from point to point in a circuit or to several devices under test.



2. There are two methods commonly used in digital multi-meter (DMM) AC measurements, one is AC average rectified measurement and the other is True RMS measurement. True RMS is a consistent and standard way to measure and compare dynamic signals of all shapes and sizes. In other words, RMS measurement is equivalent to the heating potential of a dynamic waveform. The formulas below compare the calculations of an RMS meter compared to an average rectified measuring meter when measuring pure sinusoidal AC voltage.

$$V_{RMS} = \sqrt{\frac{1}{T}\int_0^T v^2(t)dt} = V_{pk}/\sqrt{2} = 0.707\ \text{Vpk}$$

$$V_{AVE} = \frac{1}{T}\int_0^T |v(t)|dt = 0.637\ \text{Vpk}$$

Therefore in non-true RMS meter reading, the value is calibrated by a form factor of 1.11, which is coming from 0.707/0.637, but this is only accurate for a pure sinusoidal waveform.

"RMS" stands for root-mean-square. It comes from a mathematical formula that calculates the "effective" value (or heating value) of any ac wave shape. In electrical terms, the ac rms value is equivalent to the dc heating value of a particular waveform—voltage or current. For example, if a resistive heating element in an electric furnace is rated at 15 kW of heat at 240 V ac rms, then we would get the same amount of heat if we applied 240 V of dc instead of ac.

Waveform	Crest Factor (CF)	Effective Value (Vrms)	Average Value (Vavg)	Conversion (Vrms/Vavg)
	$\sqrt{2}$ ↓ ≈1.414	$\frac{1}{\sqrt{2}}$ A↓ ≈0.707	$\frac{2}{\pi}$ A↓ ≈0.637	≈1.11
	1.000	A	A	1
	$\sqrt{3}$ ↓ ≈1.732	$\frac{1}{\sqrt{3}}$ A↓ ≈0.577	0.5A	≈1.154

FAQ DIGITAL METERS

LCR METERS

GW Instek offers high-precision LCR meters: the LCR-8000G/LCR-800 series which are designed for a variety of applications such as production testing, QC inspection, and design verification, etc. Reliable operability, accurate results, user-friendly interfaces, and automatic testing functions make the LCR-8000G/LCR-800 series one of the best choices for passive component tests.

Other than the LCR-8000/LCR-800 series bench-top LCR meters, GW Instek also provides the LCR-900 series hand-held LCR meters to make quick and basic LCR measurements at an affordable price.

PRODUCTS

- **Benchtop LCR Meter**
- **Handheld LCR Meter**

LCR METERS OVERVIEW

Test Frequency

Electrical components need to be tested at the frequency in which the final product/application is used. The test frequency should be set as the working frequency of DUTs.

Test Voltage

Most LCR meters can select the signal level applied to DUTs. Generally, the signal level is measured under an open circuit condition.

Accuracy/Speed

The testing speed of an LCR meter is actually a trade-off between testing accuracy. The more time it takes, the more accurate the measurement becomes. Conversely, the faster the measurement speed, the less accurate it becomes.

Measurement Parameters

Primary parameters L, C and R ; Secondary parameters D, Q, and θ

Range

In order to measure a wide range of impedance values, a measurement instrument must have several ranges. Selecting a range is usually done automatically according to the impedance of DUTs.

Averaging

Averaging is related to an LCR meter's integration time. If the integration time is longer than cycles of the test signal, the measurement time will be longer, but the accuracy will be enhanced.

Bias Voltage and Bias Current

An LCR meter might include bias voltage or bias current function applicable to devices under test. GW Instek offers high performance LCR meters; the LCR-8000G/LCR-800 Series which are designed for a variety of applications such as production testing, QC inspection, and design evaluation. Reliable operation, accurate results, and a user-friendly interface with automatic testing features make the LCR-8000G/LCR-800 Series one of the best choices for passive component tests.

High Resolution and Accuracy

A resolution of 5 digits with an accuracy of 0.05% for the LCR-817/819/821 Series and an accuracy of 0.1% for the LCR-8110G/8105G/8101G and the LCR-829/827/826/816 Series.

Wide Frequency

Hundreds of user programmable test frequencies can be chosen for different applications.

Absolute value, Delta Value, Delta % Display (LCR-800 Series)

Three measurement display modes are available depending on the test conditions.

Setup Save/Recall (LCR-800 Series)

Up to 100 sets of measurement conditions can be stored and recalled.

Easy to Use

A large LCD graphic display and a user friendly menu and interface enable easy-to-use measurement operations.

BENCHTOP LCR METER

MODEL	Description (Main Function)	Page
LCR-8110G	10MHz High Precision LCR Meter	E33-36
LCR-8105G	5MHz High Precision LCR Meter	E33-36
LCR-8101G	1MHz High Precision LCR Meter	E33-36
LCR-821	High Precision LCR Meter 12Hz~200kHz (504 steps)	E37-38
LCR-819	High Precision LCR Meter 12Hz~100kHz (503 steps)	E37-38
LCR-817	High Precision LCR Meter 12Hz~10kHz (489 steps)	E37-38
LCR-829	Handler Interface High Precision LCR Meter 12Hz~100kHz (503 steps)	E37-38
LCR-827	Handler Interface High Precision LCR Meter 12Hz~10kHz (489 steps)	E37-38
LCR-826	Handler Interface High Precision LCR Meter 100Hz~2kHz (245 steps)	E37-38
LCR-816	High Precision LCR Meter 100Hz~2kHz (245 steps)	E37-38

HAND-HELD LCR METER

MODEL	Description (Main Function)	Page
LCR-916	100Hz/120Hz/1k/10k/100kHz Hand Held LCR Meter	E39-40
LCR-915	100Hz/120Hz/1k/10kHz Hand Held LCR Meter	E39-40
LCR-914	100Hz/120Hz/1kHz Hand Held LCR Meter	E39-40

10/5/1MHz Precision LCR Meter

LCR-8000G Series

CE | RS-232 | GPIB | PC Software

The LCR-8000G Series LCR meter, with test frequency up to 10MHz, provides accuracy, versatility and high resolution for a wide range of component measurements, even including DC resistance measurement and Voltage/Current monitoring. The Multi-Step function allows on-screen programming of customized measurement sequence with Pass/Fail indication. Each program includes 30 test steps and each test step can be set with selected parameters and test limits. Under Multi-Step operation, a tedious work routine can be done step by step automatically just at a press of a button. With Graph Mode, LCR-8110G, LCR-8105G and LCR-8101G display the component impedance response either over a wide range of test frequency sweep or over a wide range of test voltage sweep in a graph chart. This gives an analysis result of either impedance vs. frequency or impedance vs. applied voltage all at a glance. GPIB and RS-232C interfaces are available as standard for instrument control and test result display on the PC. The rich features of LCR-8000G Series easily make your measurement tasks done at a very competitive price.

FEATURES

* Wide Test Frequency 20Hz ~ 10/5/1MHz
* 0.1% Basic Accuracy & 6 Digits Measurement Resolution
* Large LCD Display with Intuitive User Interface
* Full Measuring Functions with DUT V/I Monitor
* PASS/FAIL Function (abs , % , △) with Judgment Alarm
* Average 1 ~ 256 Times
* DC Resistance Measurement
* Multi Step Mode
* Graph Mode
* Standard RS-232C/GPIB Interface
* Optional DC Bias box (frequency up to 2MHz max.)

LCR-12

Description :
Kelvin clip test lead
Frequency : DC to 10MHz
Max. Voltage : +/- 35V
Approx. 0.6m

DC BIAS BOX (Optional)

Description :
External DC Bias box
Frequency : DC to 2MHz
Max. Voltage : +/- 200V

SPECIFICATIONS

MODEL	LCR-8110G	LCR-8105G	LCR-8101G
TEST FREQUENCY			
	20Hz ~ 10MHz, 5 Digits, ±0.005%	20Hz ~ 5MHz, 5 Digits, ±0.005%	20Hz ~ 1MHz, 5 Digits, ±0.005%
OUTPUT IMPEDANCE			
	100Ω		
BASIC ACCURACY			
	±0.1% (R, Z, X, G, Y, B, L, C)		
TEST SPEED			
	AC (>2kHz) - MAX: 75mS, FAST: 150mS, MEDIUM: 450mS, SLOW: 600mS DC - MAX: 30mS, FAST: 60mS, MEDIUM: 120mS, SLOW: 900mS		

TEST SIGNAL LEVELS

Test Frequency	Test Signal Level (rms)	Step	Accuracy
≤ 3MHz	10mV ~ 2V	1mV/10mV	2%± 5mV
> 3MHz	10mV ~ 1V	1mV/10mV	2%± 5mV

SHORT CIRCUIT CURRENT

Max. 20mA

MEASUREMENT RANGES

Mode	Measure Range
R, Z, X	0.1mΩ ~ 100MΩ
Rdc	0.01mΩ ~ 100MΩ
G, Y, B	10nS ~ 1000S
L	0.1nH ~ 100kH
C	0.01pF ~ 1F
D	0.00001 ~ 9.9999
Q	0.1 ~ 9999.9
θ	-180°~ +180°

MEASUREMENT PARAMETERS

Impedance (Z), Phase Angle (θ), Inductance (L), Capacitance (C), AC Resistance (Rac), Quality Factor (Q), Dissipation Factor (D), Admittance (Y), Conductance (G), Reactance (X), Susceptance (B), DC Resistance (Rdc)

SERIES OR PARALLEL EQUIVALENT CIRCUIT

C + R, C + D, C + Q, L + R, L + Q, L + D

SERIES EQUIVALENT CIRCUIT ONLY

X + R, X + D, X + Q

PARALLEL EQUIVALENT CIRCUIT ONLY

C + G, B + G, B + D, B + Q, B + R, L + G

POLAR FORM

Z + Phase Angle, Y + Phase Angle

AVERAGE

1 ~ 256 times

* Basic accuracy varies with the temperture, frequency, AC signal level and impedance of the device under test.

LCR-8110G

SPECIFICATIONS
LCD DISPLAY
320 x 240 DOT-MATRIX
INTERFACE
RS-232C, GPIB
POWER SOURCE
AC 115V (+10%/-25%), AC 230V (+15% / -14%) (Selectable), 50/60Hz
DIMENSIONS & WEIGHT
330(W) x 170(H) x 340(D)mm, Approx. 5kg

ORDERING INFORMATION

LCR-8110G 10 MHz Precision LCR Meter
LCR-8105G 5 MHz Precision LCR Meter
LCR-8101G 1 MHz Precision LCR Meter

ACCESSORIES :
User manual x 1 , Power cord x 1 , Test lead LCR-12 x 1

OPTION

Opt. 01 GTL-251 GPIB-USB-HS(High Speed)
Opt. 02 DC Bias Box (up to 200V)

FREE DOWNLOAD

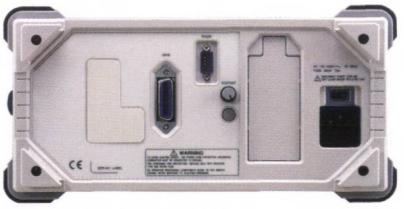
PC Software LCR. Exe.

OPTIONAL ACCESSORIES SELECTION GUIDE

ACCESSORY MODEL	BRIEF DESCRIPTION	LCR-8110G	LCR-8105G	LCR-8101G
LCR-05	Test Fixture for axial & radial lead components	△	△	✓
LCR-06A	Test Lead with Kelvin clip (4 wire type)	△	△	✓
LCR-07	Test Lead with Alligator clip (2 wire type)	△	△	✓
LCR-08	Test Fixture (Tweezers) for SMD/Chip components	△	△	✓
LCR-09	Test Fixture for SMD/Chip components	✓	✓	✓
LCR-12	Test Lead with Kelvin clip (4 wire type)	✓	✓	✓
LCR-13	Test Fixture for SMD/Chip components	✓	✓	✓
GTL-234	RS-232C Cable	✓	✓	✓
GTL-248	GPIB Cable	✓	✓	✓
GRA-404	Rack Adapter Panel (19", 4U)	✓	✓	✓

Note : "△" means the accessories work with a frequency limitation (under 1MHz)

Rear Panel

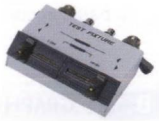


LCR-06A

Description:
Kelvin clip test lead
Frequency: DC to 1MHz
Max. Voltage: +/- 35V

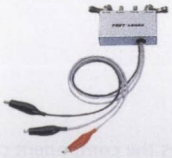
LCR-05

Patent:185538



Description:
Test fixture for measuring axial and radial lead components
Frequency: DC to 1MHz
Max. Voltage: +/- 35V

LCR-07



Description:
Test leads for conventional component measurement.
Useful for high impedance measurement.
Two-wire measurement applicable to low C or high R.
Frequency: DC to 1MHz
Max. Voltage: +/- 35V

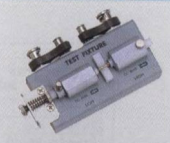
LCR-08

Patent:188540

Description:
SMD / chip tweezers
Frequency: DC to 1MHz
Max. Voltage: +/- 35V

LCR-09

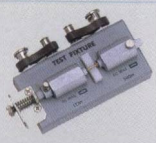
Patent:186171



Description:
SMD / chip test fixture
Frequency: DC to 10MHz
Max. Voltage: +/- 35V
Applicable size:
0603 to 1812

LCR-13

Patent:186171



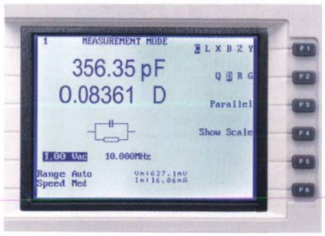
Description:
SMD / chip test fixture
Frequency: DC to 10MHz
Max. Voltage: +/- 35V
Applicable size:
0201 to 0805

GTL-234 RS-232C Cable

For: APS-1102A, LCR-8000G

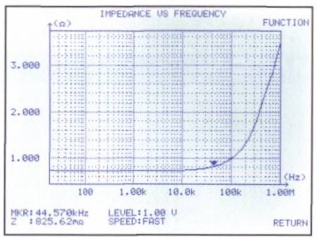
10/5/1MHz Precision LCR Meter

A. FRIENDLY INTUITIVE USER INTERFACE



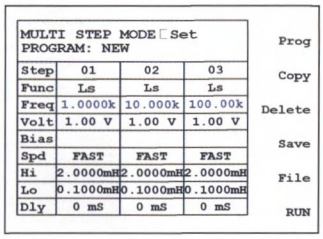
The LCR-8000G Series is designed to perform precision impedance measurements over a wide frequency range of 20Hz~10MHz for LCR-8110G, 20Hz~5MHz for LCR-8105G and 20Hz~1MHz for LCR-8101G. The instrument is capable of measuring 11 different parameters with 0.1% basic accuracy, which meets the precision measurement requirements of components and modules used in the RF circuits. The large LCD display with single-layer operation menu of LCR-8000G Series provides users with ultimate convenience to plug and play without much learning time.

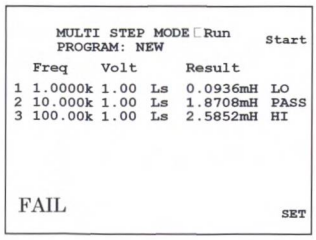
B. GRAPH MODE



The graph function shows the component characteristics in visual manner. Either voltage sweep or frequency sweep can be selected for horizontal scale. Just select the parameter, and set the start/stop voltage or the start/stop frequency of the sweep, LCR-8000G will run through the sequence of measurements and show the results on a graph. This graphical parameter measurement performs the characteristic verification of components and materials over the response to the changes in AC test frequency or AC test voltage without the need of complex programming of an external controller. When the graph gets out of the vertical range, the LCR-8000G Series can automatically adjust the scale to get full test information. On the graph the marker operation is available for detailed observation.

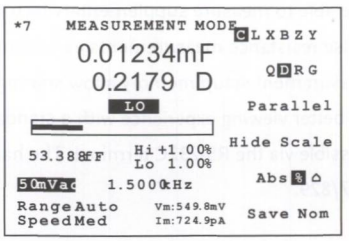
C. MULTI STEP MODE

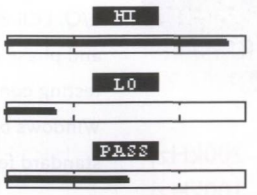




The Multi-Step mode is capable of running a series of measurements of a component at a number of user-defined steps in sequence automatically. Total 64 programs can be saved into the non-volatile memory, and each program contains up to 30 test steps. The parameter and Hi/Lo limits can be set respectively for each test step. After a program being properly edited, the instrument can run through all the measurement steps either at a press of the button under the Manual Trigger selection, or automatically run the program by detecting the connection of a DUT under the Auto Trigger selection. When all the test steps are completed, the screen shows the measurement reading of the parameter being selected for each step with Pass, HI, or LO measurement result.

D. PASS/FAIL FUNCTION WITH JUDGMENT ALARM





In the Pass/Fail test, primary parameter measurement result is compared with user-defined limits and the pass or fail result is then displayed. Three methods, including absolute limit, percentage and delta limit, are available for Hi(high) and Lo(low) limit setting based on the nominal test value. The Pass/Fail test checks whether the parameter measurement result sits within the limits, then display "PASS" for within the limits, or "LO" for lower than the low limit, or "HI" for higher than the high limit. A scale and bar for displaying measurement result is shown at the center of the screen to give a graphical identification, which greatly reduces operator's load in a long time inspection work. This scale and bar also facilitate the adjustment of the variable components. Either Pass or Fail result can be set with a buzzer alarm, which makes component or material sorting easy with sound identification.

E. APPLICATIONS

Education Lab and Training Institution

The large LCD display and user friendly interface allows operators with little to no training to get practical measurements right from the start.

Research & Design

Graphical sweep measurements can be plotted on screen to visually verify component and material response to changes in test frequency or voltage, without the need for complex programming.

Quality Assurance Verification

A wide range of components can be accurately tested to a high resolution using versatile functions over a wide frequency range.

High Precision LCR Meter

The LCR-800 Series is high-end digital LCR meters for component/material measurements, applicable to various R&D activities and assembly lines. The large 240 x 128 dot matrix LCD display provides ample room for two measurement items and setup parameters allowing you to grasp measurement results quickly. All test modes are able to measure supplementary factors such as, R/Q, C/D, C/R, and L/Q. LCR-821 also contains precise resistance measurements as a combination of absolute value and phase angle. 100 sets of measurement setup memory allow sharing a single unit among multiple testing conditions or sites. For a better viewing experience with a standard PC monitor, proprietary Windows based software is accessible via the RS-232C terminal. The handler interface is also a standard feature for LCR-826/827/829.

LCR-821 (12Hz~200kHz)
LCR-819/829 (12Hz~100kHz)
LCR-817/827 (12Hz~10kHz)
LCR-816/826 (100Hz~2kHz)

CE | RS-232 | Handler | PC Software

FEATURES

* Test Frequency :
  12Hz ~ 200kHz (LCR-821)
  12Hz ~ 100kHz (LCR-819/829)
  12Hz ~ 10kHz (LCR-817/827)
  100Hz ~ 2kHz (LCR-816/826)
* 0.05 ~ 0.1% Measurement Accuracy
* 100 Sets Memory for Save/Recall of Settings
* R/Q, C/D, C/R, L/Q Test Modes for all Models; Z/θ , L/R for LCR-821 Only
* Absolute Value, △ Value, and △ % Measurement Display
* 240 x 128 dot Matrix LCD Display
* Displays Condition and Test Result Simultaneously
* Interface : RS-232C (Standard : LCR-821;
  Option : LCR-819/817/816)
  Handler (LCR-829/827/826)

SPECIFICATIONS	
TEST FREQUENCY	
	12Hz ~ 200kHz (504 steps) for LCR-821 12Hz ~ 100kHz(503 steps) for LCR-819/829 12Hz ~ 10kHz(489 steps) for LCR-817/827 100Hz ~2kHz (245 steps) for LCR-816/826
BASIC ACCURACY *	
	0.05% for basic accuracy for LCR-821/819/817 0.1% for basic accuracy for LCR-829/827/826/816
TEST SPEED	
	68ms for LCR-821/819/817/816, 34ms for LCR-829/827/826
TEST SIGNAL LEVELS	
	5mV ~ 1.275Vrms (5mV/step) for LCR-821/819/829/817/827 0.1V ~ 1.275Vrms (5mV/step)for LCR-816/826
DC BIAS	
Internal External	2V 0 ~ 35V for LCR-821; 0 ~ 30V for LCR-819/829/817/827/816/826
DISPLAY RANGE **	
Resistance	R 0.00001Ω ~ 99999kΩ
Capacitance	C 0.00001pF ~ 99999μF
Inductance	L 0.00001mH ~ 99999H
Quality Factor	Q 0.0001 ~ 9999
Dissipation Factor	D 0.0001 ~ 9999
Impedance	|Z| 0.00001Ω ~ 99999k for LCR-821
Phase Angle (Degree)	θ -180.00° ~ 180.00° for LCR-821
TEST MODE	
	R/Q , C/D, C/R, L/Q Z/θ, L/R for LCR-821 only
EQUIVALENT CIRCUIT	
	Parallel or series selectable
MEMORY	
	100 memory blocks total
AVERAGE	
	1 to 255 times
TEST SPEED MODE	
	SLOW, MEDIUM and FAST
DISPLAY MODE	
	Value, △ , △ %
DISPLAY	
	240x128 dot matrix C.C.F.L back light LCD
INTERFACE	
	Standard Interface : RS-232C for LCR-821 Standard Interface : Handler Interface for LCR-829/827/826 Optional : RS-232C Interface for LCR-819/817/816 (factory installed) (Including LCR-Viewer Software)
POWER SOURCE	
AC 100V ~ 240V , 47 ~ 63/400Hz ; Power Comsumption : Max. 45 Watts	
DIMENSIONS & WEIGHT	
322 (W) x 149 (H) x 433 (D)mm, Approx. 5.5kg	

* Basic accuracy varies with the Speed, frequency, AC signal level and impedance of the device under test.
** Display range refers to the range of measurement values that can be displayed on the screen.
Please see the LCR-800 Series user manual for the effective measurement ranges.

LCR-821

ORDERING INFORMATION

LCR-821 200kHz High Precision LCR Meter with RS-232C Interface
LCR-819 100kHz High Precision LCR Meter
LCR-829 100kHz High Precision LCR Meter with Handler Interface
LCR-817 10kHz High Precision LCR Meter
LCR-827 10kHz High Precision LCR Meter with Handler Interface
LCR-816 2kHz High Precision LCR Meter
LCR-826 2kHz High Precision LCR Meter with Handler Interface

ACCESSORIES :
User manual x 1, Power cord x1, LCR-06A x 1

OPTION

Opt.01 RS-232C Interface (Factory Installed) for LCR-819/817/816

OPTIONAL ACCESSORIES

LCR-05 Test Fixture for Axial & Radial Lead Components
LCR-06A Kelvin Clip Test Lead
LCR-07 Test Fixture, Two-Wire with Alligator Clips
LCR-08 Test Fixture(Tweezers) for SMD/Chip Components
LCR-09 Test Fixture for SMD/Chip Components
LCR-13 Test Fixture for SMD/Chip Components
GRA-402 Rack Adapter Panel, Rack Mounting (19", 4U)
GTL-232 RS-232C Cable, 9-pin Female to 9-pin, null Modem for Computer
GTC-001 Instrument Cart
GTC-002 Instrument Cart

FREE DOWNLOAD

PC Software LCR-Viewer

SELECTION GUIDE

MODEL		LCR-821	LCR-819	LCR-829	LCR-817	LCR-827	LCR-816	LCR-826
Display		240 x 128 dot matrix CCFL back light LCD						
Test Frequency		12Hz~200kHz (504 steps)	12Hz~100kHz (503 steps)		12Hz~10kHz (489 steps)		100Hz~2kHz (245 steps)	
Basic Accuracy		0.05%	0.05%	0.1%	0.05%	0.1%	0.1%	
Test Mode		R/Q, C/D, C/R L/Q, Z/θ, L/R	R/Q, C/D, C/R,L/Q		R/Q, C/D, C/R,L/Q		R/Q, C/D, C/R,L/Q	
Memory		100 memory blocks totally						
DC BIAS	Internal	2V	2V		2V		2V	
	External	0 ~35V	0 ~30V		0 ~30V		0 ~30V	
Interface	RS-232C	Std.	Opt.		Opt.		Opt.	
	Handler			Std.		Std.		Std.

LCR-821 Rear Panel

LCR-829 Rear Panel

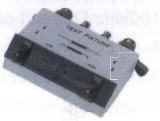
LCR-819 Rear Panel

LCR-06A

Description:
Kelvin clip test lead
Frequency: DC to 1MHz
Max. Voltage: +/- 35V

LCR-05

Patent:185538



Description:
Test fixture for measuring axial and radial lead components
Frequency: DC to 1MHz
Max. Voltage: +/- 35V

LCR-07

Description:
Test leads for conventional component measurement.
Useful for high impedance measurement.
Two-wire measurement applicable to low C or high R.
Frequency: DC to 1MHz
Max. Voltage: +/- 35V

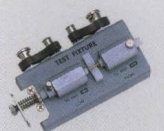
LCR-08

Patent:188540

Description:
SMD / chip tweezers
Frequency: DC to 1MHz
Max. Voltage: +/- 35V

LCR-09

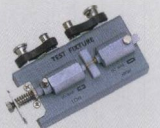
Patent:186171



Description:
SMD / chip test fixture
Frequency: DC to 10MHz
Max. Voltage: +/- 35V
Applicable size:
0603 to 1812

LCR-13

Patent:186171



Description:
SMD / chip test fixture
Frequency: DC to 10MHz
Max. Voltage: +/- 35V
Applicable size:
0201 to 0805

Hand Held LCR Meter

LCR-916/915/914 (100kHz/10kHz/1kHz)

CE USB

The LCR-916/915/914 is a smart, convenient and fully-functional dual display handheld LCR meter. The test frequency extends as high as 100 kHz/10/1kHz, providing greater flexibility to test a wider range of components. The LCR-916/915/914 uses a dual 20,000/2000 count display. The 20000 count display is used for displaying primary parameters such as capacitance, inductance, reactance and resistance and a 2000 count display is for secondary parameters such as Q, D, ESR and RP measurements. Secondary measurements can also be combined with the primary measurement while the primary measurement is still being taken. The LCR-916/915/914 provides two measurement methods, 2 wire and 5 wire measurement, The LCR-916/915/914 also come with a host of various standard or optional accessories to assist in testing a number of different component types. The meters also include handy functions such as data hold, tolerance sorting, zero mode and Min/Max (LCR-916 only).

The meters' USB interface can be used to log data to a PC using the LCR-900 software and provide the DC 5V needed to power the meter.

With the LCR-916/915/914, you can perform quick and basic LCR measurements with precision at an affordable price.

FEATURES

* 20,000/2,000 Counts Dual Display
* Test Frequency : 100Hz/120Hz/1kHz/10kHz/ 100kHz Depend on Model
* Auto LCR Mode for DUT Measuring
* 0.2% Basic Accuracy
* Measurement Parameters : L, C, R(AC/DC), D, Q, ESR, θ
* Parallel/Series Testing Mode
* Sorting Mode for Quality Control
* 2Wire or 5Wire Measurement Available
* Data Hold and Zero Mode Supported
* Max and Min (LCR-916 Only)
* Auto Range, Auto Backlit
* Low Battery Indication
* Auto Power Off
* Data Collection or DC Power Operation (Optional for LCR-915)

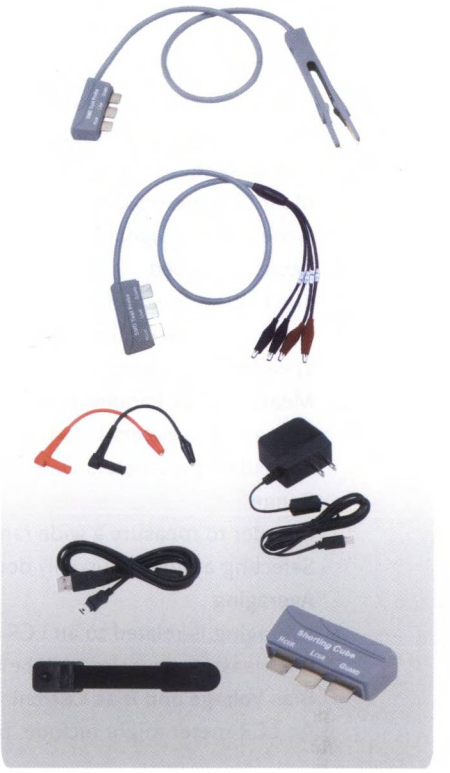
SPECIFICATIONS			
	LCR-916	LCR-915	LCR-914
TEST FREQUENCY			
	100Hz/120Hz/1kHz/10kHz/ 100kHz Selectable	100Hz/120Hz/1kHz/10kHz Selectable	100Hz/120Hz/1kHz Selectable
FULL SCALE			
	Main Display : 20,000/2,000 count Selectable; Sub Display : 2,000 count		
INDUCTANCE			
Range	20uH ~ 20kH depends on the selected test frequency		
Best Accuracy	± (0.2% rdg + 2 digits)		
Resolution	0.001uH ~ 0.001kH depends on the selected range		
CAPACITANCE			
Range	20pF ~ 20mF depends on the selected test frequency		
Best Accuracy	± (0.2% rdg + 2 digits)		
Resolution	0.001pF ~ 0.001mF depends on the selected range		
RESISTANCE			
Range	20Ω ~ 200MΩ depends on the selected test frequency		
Best Accuracy	± (0.2% rdg + 2 digits)		
Resolution	0.001Ω ~ 0.01MΩ depends on the selected range		
DC RESISTANCE			
Range	200Ω ~ 200MΩ		
Best Accuracy	± (0.2% rdg + 2 digits)		
Resolution	0.01Ω ~ 0.01MΩ depends on the selected range		
QUALITY FACTOR (Q)			
Range	0.000 ~ 999		
Accuracy	2 x (main parameter accuracy)		
Best Resolution	0.001		
DISSIPATION FACTOR (D)			
Range	0.000 ~ 999		
Accuracy	2 x (main parameter accuracy)		
Best Resolution	0.001		
PHASE ANGLE (θ)			
Range	-90.0° ~ 90.0°		
Accuracy	± (0.2% rdg + 5 digits)		
Resolution	0.1°		
MEASUREMENT CIRCUIT			
Parallel or Series Selectable			
AUTO LCR MODE			
Automatically identifies and measures the DUT when the meter is switched on			
SORTING MODE			
±0.1%, ±0.2%, ±0.25%, ±0.5%, ±1.0%, ±2.0%, ±5.0%, ±10.0%, ±20.0% and +80%/-20% Selectable			
OTHER FUNCTIONS			
Auto range, Auto back-light, Max, Min, Data Hold, Zero, 46 segments Analogue bar, Auto power off			
DISPLAY			
LCD mono display			
INTERFACE			
USB			
POWER SOURCE			
AA Battery 1.5V x 4, DC 5V (through AC adapter or USB cable - optional for LCR-915/914)			
DIMENSIONS & WEIGHT			
95(W) x 207(H) x 52(D) mm, Approx. 630 g			

Note : Specifications are performed by test cable length = 0m

AUTO LCR MODE

5Wire & 2Wire Measurement Terminal

Full Accessories



ORDERING INFORMATION

LCR-916	100kHz Hand-held LCR Meter
LCR-915	10kHz Hand-held LCR Meter
LCR-914	1kHz Hand-held LCR Meter

ACCESSORIES :
User manual x 1, Battery

OPTIONAL ACCESSORIES

Opt.01	4Wire DIP test lead
Opt.02	Accessory Pack for LCR-915
Opt.03	Accessory Pack for LCR-914
Opt.04	Magnetic Hang kit for LCR-914

Note : 1. The accessory pack for LCR-915 includes SMD test probe, AC adapter, USB cable and CD.

ACCESSORIES GUIDE

MODEL	LCR-916	LCR-915	LCR-914
Shorting Cube	Standard	Standard	Standard
Alligator Clip	Standard	Standard	Standard
Magnetic Hang Kit	Standard	Standard	Opt. 04
4 Wire SMD Probe	Standard	Opt. 02	Opt. 03
AC Power Adapter	Standard	Opt. 02	Opt. 03
USB Cable	Standard	Opt. 02	Opt. 03
PC Software (CD)	Standard	Opt. 02	N/A
4 Wire DIP Clip	Opt. 01	Opt. 01	Opt. 01

FAQ LCR METERS

Q1 **How should I choose the right LCR meter?**

A1 Before choosing an LCR meter, you should understand of the key specifications :

Test Frequency
Electrical components need to be tested at the frequency in which the final product/application is used.
The test frequency should be set as the working frequency of DUTs.

Test Voltage
Most LCR meters can select the signal level applied to DUTs.
Generally, the signal level is measured under an open circuit condition.

Accuracy/Speed
The testing speed of an LCR meter is actually a trade-off between testing accuracy.
The more time it takes, the more accurate the measurement becomes. Conversely, the faster the measurement speed, the less accurate it becomes.

Measurement Parameters
Primary parameters L, C and R
Secondary parameters D, Q, and θ

Range
In order to measure a wide range of impedance values, a measurement instrument must have several ranges.
Selecting a range is usually done automatically according to the impedance of DUTs.

Averaging
Averaging is related to an LCR meter's integration time. If the integration time is longer than cycles of the test signal, the measurement time will be longer, but the accuracy will be enhanced.

Bias Voltage and Bias Current
An LCR meter might include bias voltage or bias current function applicable to devices under test.

Q2 **What is the best test condition when using an LCR meter?**

A2 Our suggested test conditions are specified below :

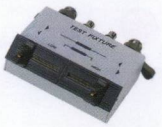
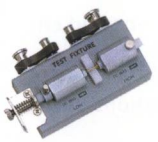
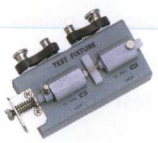
Component	Value of Compnent	Test Circuit	Frequency
Inductor	< 10μH	Series	100kHz
	10μH ~ 1mH	Series	10kHz
	1mH ~ 1H	Series	1kHz
	>1H	Series	0.1kHz
Capacitor	<10pF	Series	100kHz
	10pF ~ 400pF	Series or Parallel	10kHz
	400pH ~ 1μF	Series	1kHz
	>1μF	Series	0.1 or 0.12kHz
Resistor	<1kΩ	Series	1kHz
	1kΩ ~ 10MΩ	Parallel	0.25kHz
	>10MΩ	Parallel	0.03kHz

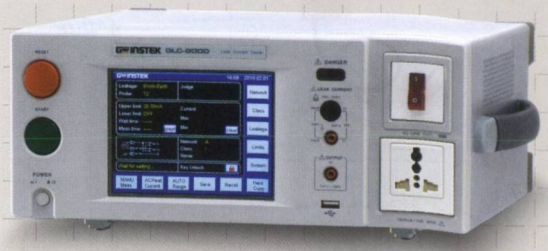
Q3 **What is the difference between basic accuracy and actual accuracy of LCR meters?**

A3 The basic accuracy of LCR meters is the best accuracy you can get when testing it in best condition. Basic accuracy does not add errors from external factors like fixturing or cables and is calculated under the optimum test signal, frequencies, highest accuracy setting or slowest measurement speed and impedance of DUTs. Therefore, it is really important to know the actual accuracy of the measurement you want to perform in real world. Measurement range, speed, test frequency and voltage level are the factors you need to consider. Moreover, there are additional errors including dissipation factor Df of DUTs, internal source impedance and ranges of the instrument, which all affect the accuracy. The accuracy formulas take into account each factor affecting accuracy.

Q 4 **How should I choose the right test fixture for my LCR meters?**

A 4 See the selection guide below

Fixture Model	Connection	DUT package	Application
LCR-05 	4 Wire	Axial & radial lead components	Suitable for axial & radial lead type L, C, R
LCR-06 A	4 Wire (Kelvin clip)	Odd-shaped components	Suitable for low R or high C
LCR-07	2 Wire (Alligator clip)	Conventional component for in-circuit, board-mounted components	Suitable for low C or high R
LCR-08	4 Wire (SMD/chip tweezers)	SMD components	Suitable for SMD type L, C, R
LCR-09 	4 Wire (SMD/chip test fixture)	SMD/chip components	Suitable for SMD Range:0603 to 1812
LCR-13 	4 Wire (SMD/chip test fixture)	SMD/chip components	Suitable for SMD Range:0201 to 0805



SAFETY TESTERS

Safety testers are designed to ensure safe operation of DUTs under various operating conditions and environment. GW Instek's GPT-9000 Series safety testers provide safe and quick measurement tools for AC/DC withstanding voltage tests, insulation resistance tests, and AC ground bond tests. Those tests are required by many international safety regulations such as CE, UL, VDE, and etc.

A dedicated option, multiplex scanner box, for specific safety tester series. This multiplex scanner box, GSB-01/02, has a function that distributes the test voltage or current provided by the GPT-9800/9900/9900A Series to multiple test points.

We also have leakage current tester, GLC-9000, which supports all the major leakage current test standards for medical and general electronic equipment.

PRODUCTS

- **AC/DC Withstanding Voltage/Insulation Resistance/Ground Bond Tester**
- **AC Ground Bond Tester**
- **Multiplex Scanner Box**
- **AC/DC Withstanding Voltage/Insulation Resistance Tester**
- **Leakage Current Tester**

SAFETY TESTERS

SAFETY TESTERS OVERVIEW

Number of Safety Tests Designed to Ensure Safe operation of DUTs under a number of operating conditions and environments. Many of the international safety regulations, such as UL in USA, VDE in Germany, CE in EU, BS in the Great Britain and CSA in Canada, are constituted to standardize safety testing. GW Instek offers a series of Safety Testers, designed for manufacturers to meet the mentioned regulations with variable tests such as AC Hi-Pot, DC Hi-Pot, Insulation Resistance, and Ground Bond tests. The Safety Testers offered by GW Instek cover a variety of different uses: The GPT-9900/9800/9600 Series are general multifunction safety testers. The GPT-9900/9800/9600 Series can also generate sine waves using DDS technology and PWM for digitizing the output voltage. The GPT-9900/9800/9600 Series also have a number of other advantages :

- **Ramp up Time Control**
- **Isolated From AC Line Distortion**
- **High Voltage Regulation**
- **Low Voltage Regulation**

TEST ITEMS EXPLANATION

Hi-Pot Test
Purpose : Make sure users do not receive electrical shocks that might be caused by a breakdown of the electrical insulation when they use the product.
Method : While operating the product under high voltage mode, measure the current leakage between AC primary circuits and low voltage secondary circuits, between AC primary circuits and their ground, and between low voltage secondary circuits and its ground.

Insulation Test
Purpose : Check the quality of insulation.
Method : Measure the resistance between AC primary circuits and low voltage secondary circuits, between AC primary circuits and their ground, and between low voltage secondary circuits and their ground.

Ground Bond
Purpose : Verify if exposed conductive parts of a product and their power system ground are well connected.
Method : Check if an electric path exists between exposed conductive metal surfaces and power system ground. Measure the resistance of a ground circuit and verify the adequacy of the connection. The Ground Bond Test is in measuring the ground path with low voltage and high current.

Arc Detection
Purpose : Check potential problems such as loose screws, bad material insulation, etc.
Method : Measure the duration (>10us) of a current spike caused by a dramatic change in voltage or current. Normally, an Arc Detection is performed during a Hi-Pot test.

GPT-9000 FAMILY (GPT-9900 Series, GPT-9800 Series and GPT-9600 Series)

The GPT-9000 family are fully automatic electrical testers with 500VA, 200VA and 100VA test capacity which combine AC/DC Hi-pot, Insulation Resistance and high current ground bond (up to 32Aac) tests. The GPT-9000 family comply with electrical equipment and appliance testing standards such as UL, CSA and. The safety compliance, reliable test results, user-friendly and fully automatic interface make the GPT-9000 Series family an advanced safety tester series that can perform up to four essential electrical safety tests and deliver fast and reliable test results from a single test connection.

No Load Set Up of Trip Current and Output Voltage
With the GPT-9900/9800 Series, the trip current and output voltage can be set without high voltage, or using a load resistor.

Safety Fault Interrupt
With the built-in Safety Fault Intercept technology, the GPT-9900/9800/9600 Series are able to set the high limit current as a watchdog to detect whether the current is abnormal to shut-off the output power when tripped.

Flashing High voltage indicator
A flashing red LED indicator outputs a warning when a high voltage is present at the output

Highly Efficiency Voltage Output
The high-efficiency PWM power amplifier of the GPT-9900/9800/9600 Series provides a very stable HV output and avoids load affecting the DUT.

Zero Crossing Turn-On
The Zero Crossing Turn-On feature ensures that the output voltage will start from the zero crossing point of a sine wave. This function prevents unexpected occurrences of spikes or arcs, and ensures accurate cut-off current.

True RMS Current Read-Back
The GPT-9900/9800/9600 Series are equipped with a true RMS circuit to make sure that the read-back of the test is a real value instead of average value, especially under capacitance and inductance loads. This function will prevent wrong cut-off current measurements.

Selectable Arc Detection
An Arc is a short duration (>10uS) current spike occurring due to a dramatic change in voltage or current. The GPT-9900/9800/9600 Series offer selectable Arc detection setting value depending on the cutoff range to identify the potential problems in product quality such as loose screws, bad insulation material etc.

Controllable Ramp Up Time
During a AC/DC Hi-pot and IR test, an unfavorable condition such as spike in current might occur. The GPT-9900/9800 Series can control the ramp up time to prevent spikes, which might cause erroneous measurement results.

Memories of 100 AUTO, Each AUTO 16 Manu Steps of Test Set-Up
The GPT-9900/9800 Series provide 16 steps for test set-ups, each Manu step containing one electrical safety test. All 16 steps can be executed just by pressing a button. The GPT-9900/9800 Series offer 100 AUTO of memories to facilitate testing of up to 100 different products in a production line.

SAFETY TESTING INSTRUMENTS

MODEL	Description (Main Function)	Page
GPT-9904	AC 500VA AC/DC Withstanding Voltage/Insulation Resistance/Ground Bond Tester	E45-50
GPT-9903A	AC 500VA AC/DC Withstanding Voltage/Insulation Resistance Tester	E45-50
GPT-9902A	AC 500VA AC/DC Withstanding Voltage Tester	E45-50
GPT-9901A	AC 500VA AC Withstanding Voltage Tester	E45-50
GPT-9804	AC 200VA AC/DC Withstanding Voltage/Insulation Resistance/Ground Bond Tester	E45-50
GPT-9803	AC 200VA AC/DC Withstanding Voltage/Insulation Resistance Tester	E45-50
GPT-9802	AC 200VA AC/DC Withstanding Voltage Tester	E45-50
GPT-9801	AC 200VA AC Withstanding Voltage Tester	E45-50
GCT-9040	AC Ground Bond Tester	E51-52
GSB-01	Multiplex Scanner Box – 8CH H.V.	E53-54
GSB-02	Multiplex Scanner Box – 6CH H.V./ 2CH G.B	E53-54
GPT-9603	AC 100VA AC/DC Withstanding Voltage/Insulation Resistance Tester	E55-56
GPT-9612	AC 100VA AC Withstanding Voltage/Insulation Resistance Tester	E55-56
GPT-9602	AC 100VA AC/DC Withstanding Voltage Tester	E55-56
GPT-9601	AC 100VA AC Withstanding Voltage Tester	E55-56
GLC-9000	Leakage Current Tester	E57-58

AC/DC Withstanding Voltage/Insulation Resistance/Ground Bond Tester

GPT-9904

GPT-9903A/9902A/9901A

GPT-9804

GPT-9803/9802/9801

CE | USB | RS-232 | GPIB

Remote Terminal | Signal I/O | Rear-Panel Output | LabVIEW Driver

FEATURES

- 500VA and 200VA AC Test Capacity
- 240 x 64 Ice Blue Dot Matrix LCD
- Manual/Auto Mode
- Function Key for Quick Selecting
- High Intensity Flash for Caution & Status Indication
- Safety Interlock Function
- Zero Crossing Turn-on Operation
- Controllable Ramp-up Time
- True RMS Current Measurement
- High Resolution : 1μA for Measuring Current, 2V for Setting Voltage
- PWM Switching Amplifier to Enhance the Power Efficiency and Reliable Testing
- Max. 100 Memory Block for Test Condition (Step) Setting. And Each Step can be Named Individually
- Remote Terminal on the Front Panel for "Start"and"Stop" Control by External
- Interface : RS-232C, USB Device, Signal I/O and GPIB (Optional)

The whole new electrical safety testers, the GPT-9900 and GPT-9800 series, carry with high stability output capacity, high durability and multiple user-protection design to serve the market with higher power demands for the safety tests of electronic products and components. Each series supports the major test items among all the needed for the compliance of the safety standards such as IEC, EN, UL, CSA, GB, JIS and other safety regulations.

The GPT-9900 series is built upon a platform of AC 500VA, and the GPT-9800 series is built upon a platform of AC 200VA maximum power output. Each series with 4 models, The GPT-9904 and GPT-9804 are a 4-in-1 model capable of performing AC withstanding, DC withstanding, insulation resistance and ground bond tests. The GPT-9903 and GPT-9803 are a 3-in-1 model capable of performing AC withstanding, DC withstanding and insulation resistance tests. The GPT-9902A and GPT-9802 are capable of performing both AC and DC withstanding tests, whereas the GPT-9901A and GPT-9801 are able to perform AC withstanding test. The high-efficiency PWM amplifier is the core of both series platform design to impede the influence from the voltage fluctuation of input AC source.

Following a tidy and easy-to-use design concept, the both series are equipped with a simple & clear panel layout, a high resolution dot matrix LCD display, and color LED indicators, allowing operators to interpret measurement results easily and quickly. All major test functions, including AC withstanding (AC 5kV), DC withstanding (DC 6kV), insulation resistance (DC 50V ~ 1000V) and ground bond (AC 32A max.) tests, are performed under a high-stability voltage or current output with high-resolution measurement results. Further more, the test duration, ramp up time and upper/lower limits of the tripping current/resistance are fully-adjustable to accommodate a wide variety of safety tests with accurate measurement results.

The unique "Sweep" function of the GPT-9900 series is able to display the test results point by point all through the testing period to form a trace graph. This graphic display performs the characteristic verification of a DUT through observing the parameter response to the changes of the applied voltage or current or testing time.

Other significant functions and features are also incorporated with both series such as the output voltage is automatically cut off (within 150μs) upon the detection of an abnormal output voltage or a trip of current limits during test to protect the operator from hazardous injury and automatically discharges a DUT after test to eliminate excessive voltage on a DUT, the open-circuit detection to ensure proper connections of apparatus for ground bond test, 100 sets of memory to save and recall the panel settings for individual or sequential tests, a remote output on-off terminal on the front panel and a signal I/O port in the rear panel provided as the means for remote start/stop control of the safety tester, and RS-232C, USB and GPIB (optional) interfaces available for PC remote control and test result logging.

SPECIFICATIONS

	GPT-9800 Series	GPT-9900 Series
AC WITHSTANDING		
Output-Voltage Range	0.100kV~ 5.000kV ac	0.100kV~ 5.000kV ac
Output-Voltage Resolution	2V/step	2V/step
Output-Voltage Accuracy	±(1% of setting + 5V) [no load]	±(1% of setting + 5V) [no load]
Maximum Rated Load	200 VA (5kV/40mA)	500 VA (5kV/100mA)
Maximum Rated Current	40mA (0.5kV<V≤5kV) 10mA (0.1kV≤V≤0.5kV)	100mA (0.5kV< V≤5kV) 10mA (0.1kV≤V≤0.5kV)
Output-Voltage Waveform	Sine wave	Sine wave
Output-Voltage Frequency	50Hz/60Hz selectable	50Hz/60Hz selectable
Voltage Regulation	±(1% of rdg + 5V) [full load → no load]	±(1% of rdg + 5V) [full load → no load]
Voltmeter Accuracy	±(1% of rdg + 5V)	±(1% of rdg + 5V)
Current Measurement Range	0.001mA~40.0mA	0.001mA~100.0mA
Current Best Resolution	0.001mA/0.01mA/0.1mA	0.001mA/0.01mA/0.1mA
AC Current Measurement Accuracy	±(1.5% of rdg+30counts)when HI SET <1.00mA ±(1.5% of rdg+3counts)when HI SET ≥1.00mA	±(1.5% of rdg+30counts)when HI SET <1.11mA ±(1.5% of rdg+3counts)when HI SET ≥1.11mA
Window Comparator Method	Yes	Yes
ARC Detect	Yes	Yes
RAMP (Ramp-Up Time)	0.1s~999.9s	0.1s~999.9s
TIMER (Test Time)*	OFF, 0.5s~999.9s	OFF, 0.5s~999.9s
Sweep Function*	NOT Support	Yes
GND	ON/OFF	ON/OFF
DC WITHSTANDING		
Output-Voltage Range	0.100kV~6.000kV dc	0.100kV~6.000kV dc
Output-Voltage Resolution	2V/step	2V/step
Output-Voltage Accuracy	±(1% of setting + 5V) [no load]	±(1% of setting + 5V) [no load]
Maximum Rated Load	50W(5kV/10mA)	100W (5kV/20mA)
Maximum Rated Current	10mA(0.5kV< V≤6kV) 2mA (0.1kV≤V≤0.5kV)	20mA (0.5kV< V≤6kV) 2mA (0.1kV≤V≤0.5kV)
Voltage Regulation	±(1% of rdg + 5V)[full load→no load]	±(1% of rdg + 5V)[full load→no load]
Voltmeter Accuracy	±(1% of rdg + 5V)	±(1% of rdg + 5V)
Current Measurement Range	0.001mA~10.0mA	0.001mA~20.0mA
Current Best Resolution	0.001mA/0.01mA/0.1mA	0.001mA/0.01mA/0.1mA
DC Current Measurement Accuracy	±(1.5% of rdg+30counts)when HI SET <1.00mA ±(1.5% of rdg+3counts)when HI SET ≥1.00mA	±(1.5% of rdg+30counts)when HI SET<1.11mA ±(1.5% of rdg+3counts)when HI SET≥1.11mA

SPECIFICATIONS

	GPT-9800 Series		GPT-9900 Series	
Window Comparator Method	Yes		Yes	
ARC Detect	Yes		Yes	
RAMP (Ramp-Up Time)	0.1s~999.9s		0.1s~999.9s	
TIMER (Test Time)*	OFF, 0.5s~999.9s		OFF, 0.5s~999.9s	
Sweep Function*	NOT Support		Yes	
GND	ON/OFF		ON/OFF	
INSULATION RESISTANCE				
Output Voltage	50V~1000V dc		50V~1000V dc	
Output-Voltage Resolution	50V/step		50V/step	
Output-Voltage Accuracy	±(1% of setting +5V)[no load]		±(1% of setting +5V)[no load]	
Resistance Measurement Range	1MΩ~ 9500MΩ		0.001GΩ~ 50.00GΩ	
Test Voltage	Measurable Range	Accuracy	Measurable Range	Accuracy
50V≤V≤450V	1 ~ 50MΩ 51 ~ 2000MΩ	±(5% of rdg+1count) ±(10% of rdg+1count)	0.001~0.050GΩ 0.051~2.000GΩ	±(5% of rdg+1count) ±(10% of rdg+1count)
500V≤V≤1000V	1 ~ 500MΩ 501 ~ 9500MΩ	±(5% of rdg+1count) ±(10% of rdg+1count)	0.001~0.500GΩ 0.501~9.999GΩ 10.00~50.00GΩ	±(5% of rdg+1count) ±(10% of rdg+1count) ±(15% of rdg+1count)
Window Comparator Method	Yes		Yes	
Output Impedance	600kΩ		600kΩ	
RAMP (Ramp-Up Time)	0.1s~999.9s		0.1s~999.9s	
TIMER (Test Time)	1s~999.9s		1s~999.9s	
GND	OFF (fix)		OFF (fix)	
Sweep Function*	NOT Support		Yes	
GROUND BOND				
Output-Current	03.00A~30.00A ac		03.00A~32.00A ac	
Output-Current Resolution	0.01A		0.01A	
Output-Current Accuracy	3A≤I≤8A : ±(1% of setting+0.2A), 8A< I≤30A : ±(1% of setting+0.05A)		3A≤I≤8A : ±(1% of setting+0.2A), 8A< I≤32A : ±(1% of setting+0.05A)	
Test-Voltage	6Vac max (open circuit)		6Vac max (open circuit)	
Test-Voltage Frequency	50Hz/60Hz selectable		50Hz/60Hz selectable	
Resistance Measurement Range	10mΩ~ 650.0mΩ		10mΩ~650.0mΩ	
Resistance Measurement Resolution	0.1mΩ		0.1mΩ	
Resistance Measurement Accuracy	±(1% of rdg + 2mΩ)		±(1% of rdg + 2mΩ)	
Window Comparator Method	Yes		Yes	
TIMER (Test Time)	0.5s~999.9s		0.5s~999.9s	
Sweep Function*	NOT Support		Yes	
Test Method	Four Terminal		Four Terminal	
MEMORY				
Single Step Memory	MANU : 100 blocks		MANU : 100 blocks	
Automatic Testing Memory	AUTO : 100 blocks, menu per auto:16		AUTO : 100 blocks, menu per auto:16	
INTERFACE				
Rear Output	NOT Support		Standard	
RS-232C	Standard		Standard	
USB	Standard		Standard	
GPIB	Option		Option	
Remote Terminal (Front)	Standard		Standard	
Signal I/O	Standard		Standard	
DISPLAY	240 x 64 Ice Blue Dot matrix LCD		240 x 64 Ice Blue Dot matrix LCD	
POWER SOURCE				
	AC100V/120V/220V/230V±10%,50/60Hz; Power Comsumption : Max. 500VA		AC100V/120V/220V/230V±10%,50/60Hz; Power Comsumption : Max. 1000VA	
DIMENSIONS & WEIGHT				
	330(W) x 148(H) x 452(D) mm Approx. 19kg max.		330(W)x148(H)x587(D)mm(GPT-9904) 330(W)x148(H)x482(D)mm(GPT-9902A/9901A/9903A); Approx. 27kg max.	

* The sweep function and timer off can only be performed when the tester is in the special MANU mode.

ORDERING INFORMATION

GPT-9904	AC 500VA AC/DC Withstanding Voltage/Insulation Resistance/Ground Bond Tester
GPT-9903A	AC 500VA AC/DC Withstanding Voltage/Insulation Resistance Tester
GPT-9902A	AC 500VA AC/DC Withstanding Voltage Tester
GPT-9901A	AC 500VA AC Withstanding Voltage Tester
GPT-9804	AC 200VA AC/DC Withstanding Voltage/Insulation Resistance/Ground Bond Tester
GPT-9803	AC 200VA AC/DC Withstanding Voltage/Insulation Resistance Tester
GPT-9802	AC 200VA AC/DC Withstanding Voltage Tester
GPT-9801	AC 200VA AC Withstanding Voltage Tester

ACCESSORIES :
Quick Start Guide x 1, Power cord x 1, CDx1(complete user manual), Interlock Key x 1, Remote terminal male plug x 1, Test lead GHT-114 x 1 for GPT-9903A/9902A/9901A/9803/9802/9801, Test lead GHT-114 x 1, GTL-115 x 1 for GPT-9904/9804

OPTION

Opt.1 GPIB card
Opt.2 GSB-01(8CH H.V.)Multiplex Scanner Box
Opt.2 GSB-02(6CH H.V./2CH G.B.)Multiplex Scanner Box

OPTIONAL ASSESSORIES

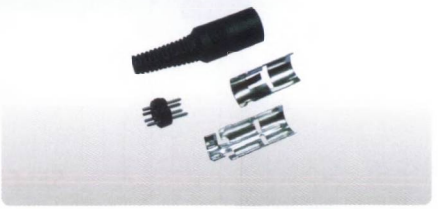
GHT-113	High Voltage Test Pistol	**GTL-248**	GPIB Cable, approx. 2m
GHT-205	High Voltage Test Probe	**GTL-251**	GPIB-USB-HS (High Speed)
GTL-232	RS-232C Cable, 9-pin Female to 9-pin, null Modem for Computer	**GRA-417**	RACK Adapter Panel (19", 4U)
GTL-247	USB Cable, A-A type, approx. 1.8m	* GRA-417 can not be used with GPT-9904	

Interlock Key

For : GPT-9900/9800/9600 Series

Remote Terminal Male Plug

For : GPT-9900/9800/9600 Series

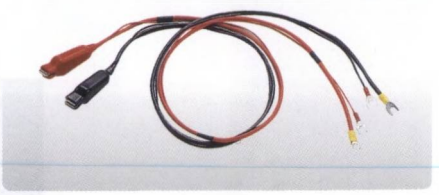


GHT-114 Clip High Voltage Probe

Approx. 1m
For : GPT-9900/9800/9600 Series

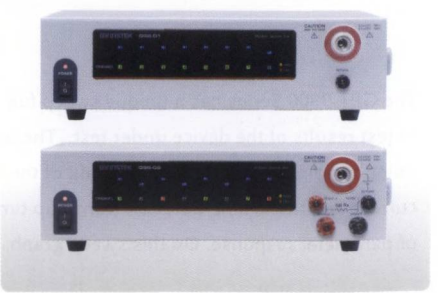
GTL-115 Test Lead

Approx. 1m ; For: GPT-9904/9804



GSB-01/02 Multiplex Scanner Box

For: GPT-9900/9800 Series



AC/DC Withstanding Voltage/Insulation Resistance/Ground Bond Tester

GPT-9904

GPT-9900 Series Rear Panel

GPT-9800 Series Rear Panel

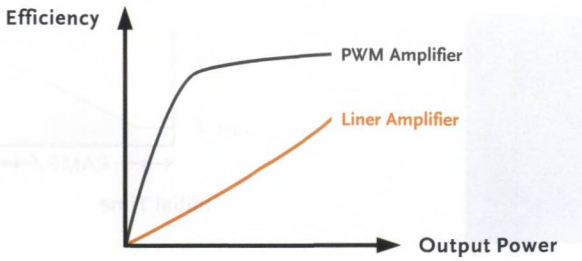
SELECTION GUIDE

MODEL \ FUNCTION	AC	DC	IR	GB	SWEEP
GPT-9904	✓	✓	✓	✓	✓
GPT-9903A	✓	✓	✓		✓
GPT-9902A	✓	✓			✓
GPT-9901A	✓				✓
GPT-9804	✓	✓	✓	✓	
GPT-9803	✓	✓	✓		
GPT-9802	✓	✓			
GPT-9801	✓				

A. UNIQUE SWEEP FUNCTION FOR DUT CHARACTERISTICS ANALYSIS

The GPT-9900 Series has a unique sweep function to show the trace graph of test results of the device under test. The test readings are recorded point by point according to the setting of the applied test voltage or current and the testing duration (ramp-up time + timer) to form a trace of parameter response. On this sweep graph, users can use a moveable cursor to locate the point of specific time or specific amount of applied source (voltage or current) within test period to know the measurement result of this point. It helps users to verify the changes of measured parameter (current or resistance) all thorough the test process, instead of just obtaining one final value at the end.

B. HIGH EFFICIENCY AND HIGH STABILITY OUTPUT



PWM Amplifier Efficiency

Unlike the conventional safety tester design that uses variable voltage transformer and class AB amplifier to provide testing voltage, the GPT-9900 Series, carrying a high-efficiency PWM amplifier design, generates output source up to 98% efficiency. This greatly reduces the amount of power loss to heat and therefore lowers the temperature within the cabinet of the GPT-9900 Series. The suppression of temperature rise during heavy-duty operations of the tester significantly increases its reliability and service lifetime. In addition, as PWM amplifier is comparatively more resistant to the fluctuations of input power voltage, a stable high-voltage output with less than 1% regulation is provided by the GPT-9900 Series to perform precision tests of DUTs.

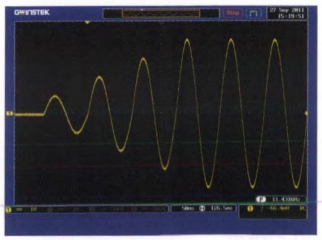
C. HIGH ACCURACY AND HIGH RESOLUTION TESTING PERFORMANCE

High Adjustment & Measurement Resolution

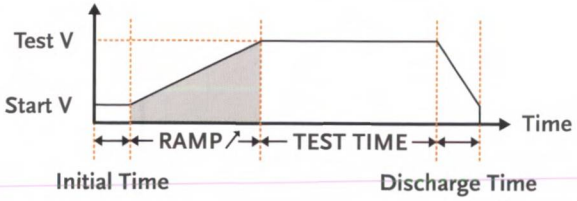
In order to provide high accuracy testing for production test, regulation compliance, and characteristic verification, the withstanding test voltage (AC 5kV/DC 6kV) of the GPT-9900 Series can be adjusted in 2V steps, while the current measurement can be done with 1 μA resolution and ±(1.5% + 30 μA) accuracy to enable small leakage current measurements of the products or the components. In addition, the test voltage of insulation resistance of the GPT-9900 Series can be adjusted in 50V steps within the DC output range from 50V to 1kV, carrying a measurement accuracy of ±(10% of reading +1 count) at full scale (2000MΩ/9.999GΩ) and ±(15% of reading +1 count) at full scale (50.00GΩ). This provides the flexibility for performing Insulation Resistance (IR) measurements under variable levels of applied voltage. As the majority of safety regulations need an AC source for ground bond testing, the GPT-9900 Series provides 6Vac voltage (open circuit) and 3A~32Aac current for ground bond test. Furthermore, open circuit detection (via SOURCE H, SENSE H and SOURCE L terminals) for ground bond test is also provided to check whether the test apparatus is properly connected before the start of a test. This is to ensure the ground bond test is done accurately without any unnoticeable misconnection of the test leads and the test terminals.

With these capabilities, users are able to perform various safety tests and verifications with high flexibility, accuracy and confidence.

D. SAFETY GUARDING THROUGHOUT THE TESTING PERIOD



Zero-Crossing Operation



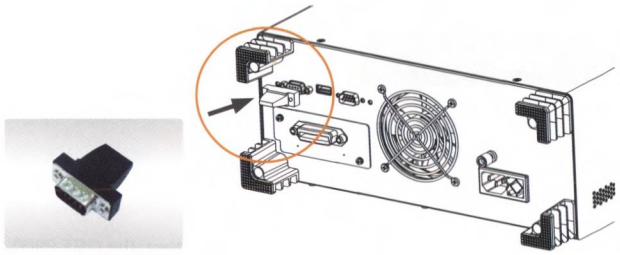
Output Voltage Variation in One Test Cycle

Once the GPT-9900 Series is turned on, the protection functions to protect operator and DUTs are always in operation throughout the testing period. When the power is turned on, the GPT-9900 Series immediately goes through the self-check procedures to ensure that all test functions are performed under normal conditions, as the first protection function being applied.

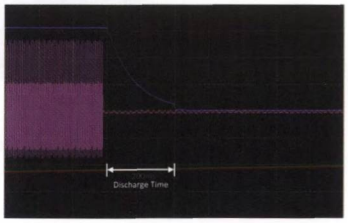
The second protection function is activated once the "Start" (output) button is pressed. At the first moment of start up, the GPT-9900 will send a detection voltage (~100V) during the initialization period (100ms) to check whether a DUT has any short circuit due to poor insulation before the high voltage is applied. This is to prevent high voltage or current from returning to a DUT during the test time. To protect DUTs from insulation breakdown caused by the rapid increase of test voltage at power-on and avoid flashover or arcing phenomena that could affect the test results, the GPT-9900 Series has a Zero Crossing Turn-On feature, which ensures the output always starts from the zero crossing of a sine wave. Moreover, the adjustable voltage ramp-up time (0.1s ~ 999.9s) allows the test voltage to slowly rise to the set test voltage to reduce the risk of damaging DUTs during mandatory production testing.

Furthermore, after the voltage has ramped to the set test voltage, the GPT-9900 will continue monitoring the voltage and cut off power output once any irregularity is detected. This provides both the safety tester and the operator with a high level protection, which allows the test to be done in a safe and accurate manner.

E. MULTIPLE PROTECTION MECHANISMS



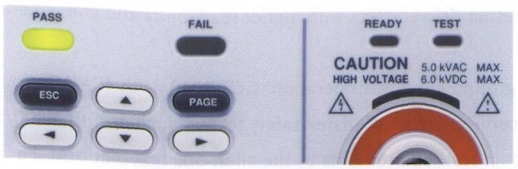
Safety Interlock



Discharge

The GPT-9900 Series also offers multiple protection designs to ensure operator safety in operating the safety tester. The interlock function provides the hardware key protection for voltage output. When the interlock function is activated, the testing voltage will present at the output ONLY when the dedicated interlock key is attached to the Signal I/O port on the rear side. When the test is not intended to executed, removing the interlock key can inhibit the voltage output to prevent the hazard of high voltage output. Except connecting with the key, two inputs of the Signal I/O port can be connected alone to a senor switch installed in safety test system. If any unexpected object is detected to intrude into the system, the output is disabled and thus prevents the operator from exposure to hazardous voltages/currents. In addition, the GPT-9900 Series can quickly cut off the high voltage output within 150μs when the test has completed, the high/low limits have been reached or the emergent stop caused by an abnormal situation. Lastly, when a test has stopped, the unit also automatically discharges the voltage across DUTs to reduce the risk of injury to operator.

F. FRIENDLY USER INTERFACE



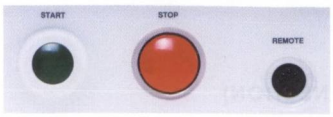
High Intensity Indicators

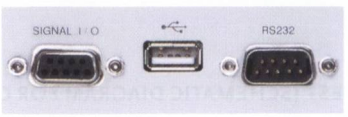
The 240 x 64 LCD displays not only the setting parameters but also the test conditions, measurement values and DUT inspection results (PASS or FAIL) in a legible pattern. The LED indicators in different colors alert the operator to the status of the safety tester to avoid any possible risk.

Large LCD and Function Keys

For example, the status indicator sitting above the high voltage output terminal will automatically blink when a high voltage presents at output. In addition, the function keys arranged below the LCD display provide convenient operation that test setup can be easily done by fewer key punches.

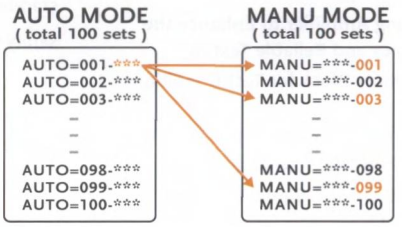
G. CONVENIENT MANUAL AND AUTOMATED TEST





Variety of Control Methods

In order to comply with all safety regulations, the GPT-9900 series also offers a large number of memory locations (100 sets in total) to store a variety of test conditions. When a test condition is saved to one of the 100 fixed memory locations, a unique test file name (up to 12 characters) can also be assigned to its memory location. For example, the test file name "IEC61010AH" (IEC61010 AC Withstanding test) can saved and recalled for future use. Any test conditions that have been previously stored can be used for a single test or combined together for automatic testing- eliminating the need to perform a series of tests manually.



AUTO Testing include Multiple MANU Processing

In addition to using the START/STOP buttons on the front panel to control the safety tester, the GPT-9900 Series also provides a remote terminal for connection to an external remote controller and a signal I/O port on the rear panel for connection to a PLC interface for actuator control. Furthermore with RS-232C and USB as standard (GPIB optional) for all the models in the GPT-9900 Series, retrieving test data and results is convenient via a PC connection.

AC Ground Bond Tester

GCT-9040

NEW

CE | USB | LINK | GPIB | Remote Terminal | Signal I/O

GW Instek rolls out 40A AC ground bond tester - GCT-9040 to augment the existing safety tester product line and to replace the legacy model GCT-630. GCT-9040 provides the maximum AC test current of 40A and adopts the PWM design the same as other models to ensure test efficiency and reliability. Furthermore, large LCD display, 100 memory blocks from setting criteria, and programmable communications interface together deliver users with higher readability and convenience.

In addition to the standalone ground bond test operation, GCT-9040, with 40A AC ground bond test capability, can also externally connect with GW Instek safety testers such as GPT-9800/9900/9900A Series to augment users' product test requirements by the all-in-one test platform. For instance, GPT-9802 (AC/DC withstanding tester), via external connection, can be expanded to a safety tester system with three testing functionalities.

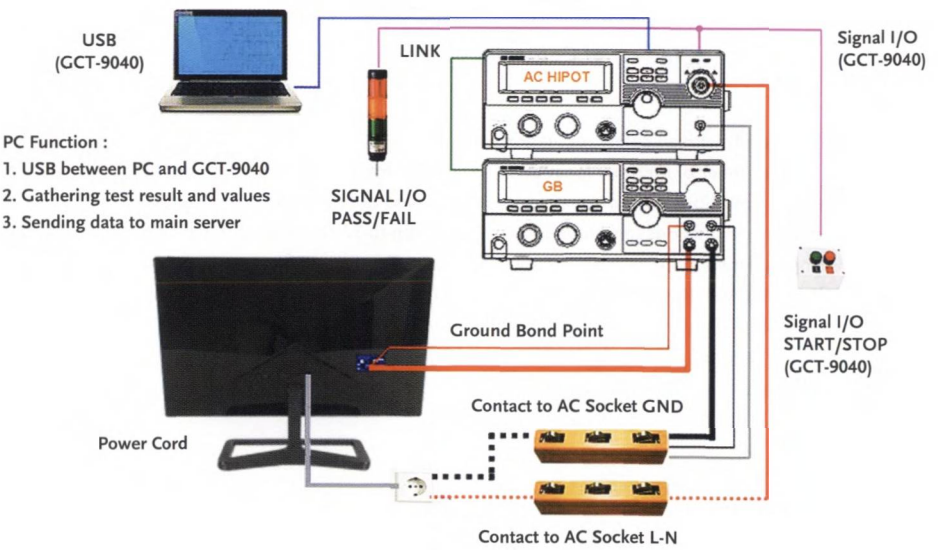
Additionally, after the safety tester system has been assembled, not only the sequential test function for the original all-in-one models can be executed, but also the simultaneous output test can be conducted. The simultaneous output test allows two testers to simultaneously test DUT so as to shorten the overall test time. Whether the safety tester system executes sequential test or simultaneous output test, GCT-9040 will automatically obtain control over two testers, including activation control, final status indication light, and pin signal output from Digital I/O etc. to avoid confusion caused by each tester's indication light.

Last but not least, GCT-9040, with respect to remote control and data retrieval, not only provides standard USB (optional GPIB) interface to control all functionalities but also controls connected safety testers (GPT-9800/9900/9900A Series) via commands to read measurement results.

FEATURES

* AC 40A Ground Bone Tester
* Measuring Resistance from 1mΩ~650mΩ
* Connect with the GPT-9800/9900 Series to Become a Multifunctional Test or Simultaneous Test System
* 240x64 Ice Blue Dot Matrix LCD
* Function Key for Quick Selecting
* High Intensity Flash for Caution & Status Indication
* PWM Switching Amplifier to Enhance the Power Efficiency and Reliable Testing
* Max. 100 Memory Block for Test Condition Setting
* Remote Terminal on the Front Panel for "Start" and "Stop" Remote Active
* Interface : USB Device, Signal I/O and GPIB (optional)

SIMULTANEOUS TEST (SCHEMATIC DIAGRAM FOR CONNECTION)



GTL-215 Test Lead

Rear Panel

GCT-9040

SPECIFICATIONS

GROUND BOND	
Output-Current	03.00A~ 40.00A ac
Output-Current Resolution	0.01A
Output-Current Accuracy	3A≦I≦8A: ±(1% of setting + 0.2A) 8A< I≦40A: ±1% of setting + 0.05A)
Test-Voltage	8Vac max (open circuit)
Test-Voltage Frequency	50Hz/60Hz selectable
Resistance Measurement Range	1.0mΩ ~ 650.0mΩ
Resistance Measurement Resolution	0.1mΩ
Resistance Measurement Accuracy	±(1% of reading + 2mΩ)
Window Comparator Method	Yes
TIMER (Test Time)	0.5s~999.9s
GND	OFF (fix)
Test Method	Four Terminal
MEMORY	
Single Step Memory	MANU : 100 blocks
INTERFACE	
LINK	For system connection
USB	Standard
GPIB	Option
Remote Terminal (Front)	Standard
Signal I/O	Standard
Display	240 x 64 Ice Blue Dot matrix LCD
POWER SOURCE & COMSUMPTION	
Source	AC 100 V / 120 V / 220 V / 230 V ±10%, 50/60Hz
Comsumption	Max. 700VA
DIMENSIONS & WEIGHT	
330(W) x 148(H) x 460(D) mm; Approx. 17kg max.	

ORDERING INFORMATION

GCT-9040 40A AC Ground Bond Tester

ACCESSORIES:

Quick Start Guide x 1, Power cord x 1, Test lead GTL-215 x 1, LINK cable GTL-132 x 1, USB cable GTL-247 x 1, Remote terminal male plug x 1, Interlock key x 1, CD x1 (complete user manual)

OPTION

Opt.1 GPIB card

OPTIONAL ASSESSORIES

GTL-248	GPIB Cable, approx. 2m
GTL-251	GPIB-USB-HS (High Speed)
GRA-417	RACK Adapter Panel (19", 4U)

Multiplex Scanner Box

ZL201420282101.8

GSB-01/02

NEW

CE RS-232

The GSB-01/GSB-02, multiplex scanner box, is a dedicated option for GPT-9800/9900/9900A Series. The GSB-01 has connections for ACW, DCW and IR testing, while the GSB-02 also includes support for GB testing. It will provide reliable withstanding voltage, insulation resistance and ground bond testing for the electronic products and components.

This scanner box handles withstanding voltage 5kVac / 6kVdc and insulation resistance voltage 1kVdc as well as the ground bond current 40Aac supplied from safety tester proper. Each scanner box extends the output to 8 channels, a potential HI, LO or X can be set for each channel and AC/DC withstanding voltage, insulation resistance or ground bond test can be conducted depending on the model of scanner box.

A maximum 4 scanner boxes can be connected to one GPT-9800/9900/9900A series, it allows the output channel can be extended up to 32 channels. It is particularly well suited for multi-point safety testing as well for volume testing on factory floors.

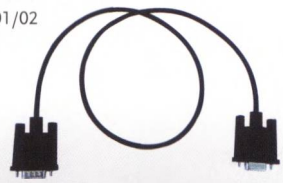
FEATURES

* Model : GSB-01 (8CH High Voltage Scanner Box), GSB-02 (6CH High Voltage and 2CH Ground Bond Scanner Box)
* Multi-channel Outputs for Withstanding Voltage, Insulation Resistance, Ground Bond Tests
* High-intensity LED for Channel, Status & Judgment Indications
* Front & Rear Input Connector Design is Suitable for the GPT-9800/9900/9900A Series
* A Maximum of 4 Scanner Boxes (32 CH) can be Connected to One GPT-9800/9900/9900A Series

SPECIFICATIONS		
	GSB-01	GSB-02
HIGH VOLTAGE RATING		
	5kVac/ 6kVdc	5kVac/ 6kVdc
HIGH CURRENT RATING		
	----	40Aac
NUMBER OF H.V. CHANNELS		
	8CH	6CH
NUMBER OF G.B CHANNELS		
	----	2CH
MAXIMUM NUMBER OF SCANNERS		
	4 Scanners (up to 32 channels)	
INTERFACE		
	RS-232C for connection between tester or scanner box	
POWER SOURCE		
	AC 100-240V ±10%, 50/60Hz	
DIMENSIONS & WEIGHT		
	GSB-01 : 330(W) x 101(H) x 399(D) mm GSB-02 : 330(W) x 101(H) x 413(D) mm Approx. 5.5kg	

GTL-235 Communication Cable

Approx. 700mm
For : GSB-01/02



GHT-116R Test Lead

Approx. 1.5M
For : GSB-01/02

GHT-116B Test Lead

Approx. 1.5M
For : GSB-01/02

ORDERING INFORMATION

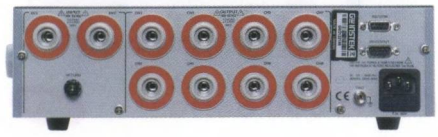
GSB-01 Multiplex Scanner Box – 8CH H.V.
GSB-02 Multiplex Scanner Box – 6CH H.V./ 2CH G.B

ACCESSORIES:
Quick Start Guide x 1, Power Cord x 1, CD x 1 (Complete user manual),
H.V. Wiring Lead GHT-108 x 1, G.B Wiring Lead GHT-109 x 1 (GSB-02 only),
Communication Cable GTL-235 x 1
Test Lead for GSB-01 : GHT-116R x 8, GHT-116B x 1
Test Lead for GSB-02 : GHT-116R x 6, GHT-116B x 1, GTL-116R x 2, GTL-116B x 1

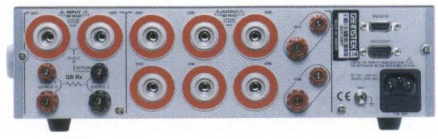
GSB-01

GSB-02

GSB-01 Rear Panel

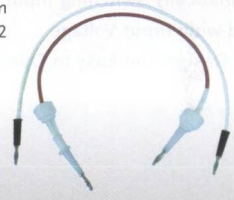


GSB-02 Rear Panel



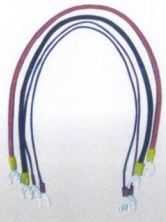
GHT-108 H.V. Wiring Lead

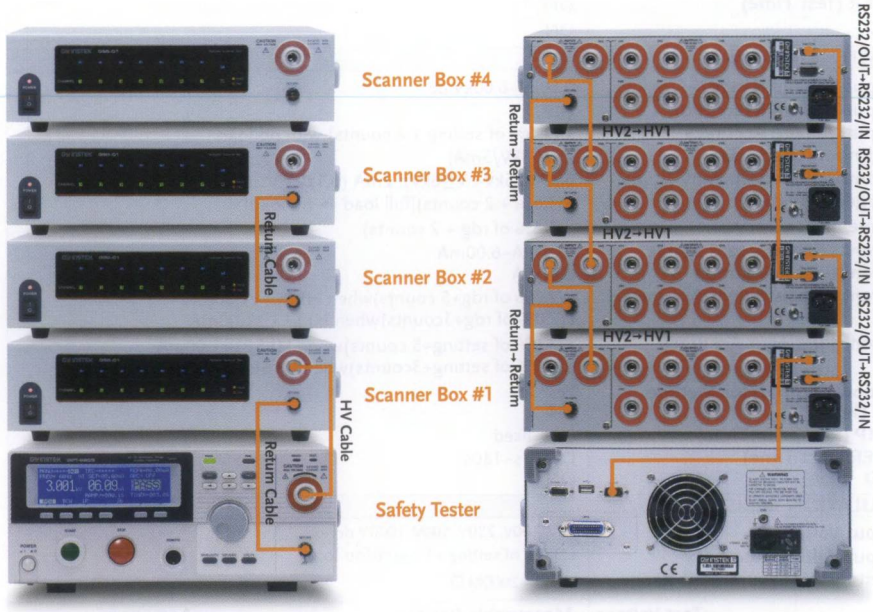
Approx. 500mm
For : GSB-01/02



GHT-109 G.B Wiring Lead

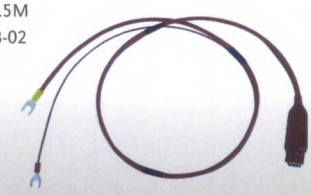
Approx. 450mm
For : GSB-02





GTL-116R Test Lead

Approx. 1.5M
For : GSB-02



GTL-116B Test Lead

Approx. 1.5M
For : GSB-02

AC/DC Withstanding Voltage/Insulation Resistance Tester

GPT-9600 Series

NEW

CE | Remote Terminal | Signal I/O

GW Instek launches new economical safety testers, the GPT-9600 Series, which offers an affordable solution for supporting routine tests of major items of the safety standards such as IEC, EN, UL, CSA, GB, JIS and other safety regulations.

The GPT-9600 Series is built upon a platform of 100VA AC maximum power output. The GPT-9603 is a 3-in-1 model capable of performing AC withstanding, DC withstanding and insulation resistance tests. The GPT-9612 is capable of performing AC withstanding and insulation resistance tests. The GPT-9602 is capable of performing AC and DC withstanding tests, and GPT-9601 is able to perform AC withstanding test. The GPT-9600 Series is equipped with the high-efficiency PWM amplifier, which is the core of the platform design to impede the influence from the input AC voltage fluctuation and ensure a stable voltage output.

Following a tidy and easy-to–use design concept, the GPT-9600 Series renders users an intuitive operation environment by a simple and clear panel layout, a large LCD display and color LED indicators. The switching power supply, used as a universal input source, accommodates the power systems in most countries in the world. The GPT-9600 series, equipped with the same output voltage function as that of all GW Instek Safety Testers, indicates the expected output voltage before high voltage tests are applied. Furthermore, an AUTO mode, including test sequence selections of withstanding-then-insulation or insulation-then-withstanding, is designed for models carrying insulation Resistance test function to reduce the testing time of dual test items.

Other functions and features of GPT-9600 include: the zero crossing turn-on operation protects DUT from the impact of surge voltage output, the interlock function safeguards users from the hazardous shock of unintentional touch of the voltage output, a remote output on-off terminal in the front panel and a signal I/O port in the rear panel are provided as the means for remote start/stop control of the safety tester.

FEATURES

* 100VA AC Test Capacity
* 240 x 48 Ice Blue Dot Matrix LCD
* True RMS Current Measurement
* ARC Detection
* Zero Crossing Turn-on Operation
* PWM Switching Amplifier to Enhance the Power Efficiency and Reliable Testing
* Automatically Switching Input Source for World-wide Input Voltage
* Light Design and Easy to Operation

SPECIFICATIONS

AC WITHSTANDING

Output-Voltage Range	0.10kV~ 5.00kV ac
Output-Voltage Resolution	10V
Output-Voltage Accuracy	± (1.5% of setting + 2 counts) with no load
Maximum Rated Load	100VA(5kV/20mA)
Maximum Rated Current	20mA (0.5kV< V≤ 5kV); 5mA (0.1kV≤V≤0.5kV)
Output-Voltage Waveform	Sine wave
Output-Voltage Frequency	50Hz/60Hz selectable
Voltage Regulation	±(1.5% + 2 counts) [full load → no load]
Voltmeter Accuracy	±(1.5% of rdg + 2 counts)
Current Measurement Range	0.01mA~20.0mA
Current Best Resolution	0.01mA/0.1mA
Current Measurement Accuracy	±(2.0% of rdg+5 counts)when HI SET<1.00mA ; ±(2.0% of rdg+3counts)when HI SET≥1.00mA
Current Judgment Accuracy	±(3.0% of setting+5 counts)when HI SET<1.00mA ; ±(3.0% of setting+3counts)when HI SET≥ 1.00mA
Window Comparator Method	Yes
ARC Detect	Yes
RAMP (Ramp-Up Time)	0.1s fixed
TIMER (Test Time)	OFF, 1s~180s
GND	ON

DC WITHSTANDING

Output-Voltage Range	0.10kV~6.00kV dc
Output-Voltage Resolution	10V
Output-Voltage Accuracy	± (1.5% of setting + 2 counts) with no load
Maximum Rated Load	25W(5kV/5mA)
Maximum Rated Current	6mA(0.5kV< V≤6kV); 2mA (0.1kV≤V≤0.5kV)
Voltage Regulation	±(1.5% + 2 counts)[full load → no load]
Voltmeter Accuracy	±(1.5% of rdg + 2 counts)
Current Measurement Range	0.01mA~6.00mA
Current Best Resolution	0.01mA
Current Measurement Accuracy	±(2.0% of rdg+5 counts)when HI SET<1.00mA ±(2.0% of rdg+3counts)when HI SET≥1.00mA
Current Judgment Accuracy	±(3.0% of setting+5 counts)when HI SET<1.00mA ±(3.0% of setting+3counts)when HI SET≥1.00mA
Window Comparator Method	Yes
ARC Detect	Yes
RAMP (Ramp-Up Time)	0.1s fixed
TIMER (Test Time)	OFF, 1s~180s
GND	ON

INSULATION RESISTANCE

Output Voltage	50V, 100V, 250V, 500V, 1000V dc	
Output-Voltage Accuracy	±(3.0% of setting +1 count)[no load]	
Resistance Measurement Range	1MΩ~ 2000MΩ	
Test Voltage	Measurable Range	Accuracy
50V/100V/250V	1 ~ 50MΩ 51 ~ 2000MΩ	±(5% of rdg + 2MΩ) ±(10% of rdg + 2MΩ)
500V/1000V	1 ~ 500MΩ 501 ~ 2000MΩ	±(5% of rdg + 2MΩ) ±(10% of rdg + 2MΩ)

GPT-9600 Series

Rear Panel

SPECIFICATIONS	
Window Comparator Method	Yes
Output Impedance	600kΩ
RAMP (Ramp-Up Time)	0.1s fixed
TIMER (Test Time)	OFF, 1s~180s
GND	OFF (fix)
TEST MODE *	
Single **Auto**	ACW, DCW, IR AC-IR, IR-AC, DC-IR, IR-DC
INTERFACE	
Remote Terminal (Front)	Standard
Signal I/O	Standard
DISPLAY	
	240 x 48 Ice Blue Dot matrix LCD
POWER SOURCE	
	AC100V~120V/220V~240V±10% , 50/60Hz
POWER COMSUMPTION	
	400VA Max.
DIMENSIONS & WEIGHT	
	330(W)x148(H)x385(D)mm; Approx. 9kg max.

* The available "Test Mode" depends on selected model

ORDERING INFORMATION

GPT-9603 AC 100VA AC/DC Withstanding Voltage/Insulation Resistance Tester
GPT-9612 AC 100VA AC Withstanding Voltage/Insulation Resistance Tester
GPT-9602 AC 100VA AC/DC Withstanding Voltage Tester
GPT-9601 AC 100VA AC Withstanding Voltage Tester

ACCESSORIES :
Quick Start Guide x 1, Power cord x 1, CD x 1 (complete user manual), Interlock Key x 1, Remote terminal male plug x 1, Test lead GHT-114 x 1

OPTIONAL ASSESSORIES

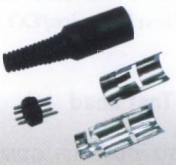
GHT-113 High Voltage Test Pistol
GRA-417 RACK Adapter Panel (19', 4U)
GHT-205 High Voltage Test Probe

Interlock Key

For : GPT-9900/9800/9600 Series

Remote Terminal Male Plug

For : GPT-9900/9800/9600 Series



GHT-114 Clip High Voltage Probe

Approx. 1m
For : GPT-9900/9800/9600 Series

Leakage Current Tester

GLC-9000

CE | RS-232 | GPIB | USB Device | USB Host | EXT I/O

The GLC-9000, leakage current tester, is used to perform leakage current (or called touch current) tests on medical electrical (IEC 60601-1) and general purpose electric & electronic (IEC 60990)equipment. This tester engages with nine measurement networks (or called Measuring Device) to provide the simulation of human body whilst the EUT (equipment under test) is taking a leakage current testing , in compliance with the specific standards or regulations such as IEC, UL, JIS...etc..

In order to provide a simple operation environment, the GLC-9000 equips a large TFT LCD touch panel to configure system as well as to present the measurement settings information and result simultaneously. Besides, there are 50 preset testing conditions, which conform to IEC60990 and other standards, for general electric equipment can be recalled to reduce the setting time. In addition, 30 sets of empty memory are available for user defined.

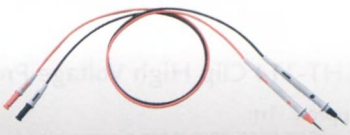
A Meter mode is also available for the GLC-9000. It uses the measurement terminal (T1/T2) to measure voltage as the same way of ordinary voltmeter. During the voltage measurement, the SELV function (safety extra low voltage) is applicable to detect the voltage value between measuring points whether exceeding the SELV setting.

FEATURES

* Suitable for Medical Electrical & General Electrical of Leakage Current Measurement
* Touch Panel with Color LCD Display
* 9 Different Measurement Network to Simulate the Resistance of Human Body
* 50 Sets Preset Test Conditions Conform to the IEC 60990 ; 30 Sets Memories for Customer Defined
* 8 Different Types of Leakage Current for General Electrical & Medical Equipment
* Meter Function with SELV/CONV Function
* Upper & Lower Limitation for PASS/FAIL Judgment
* Various Leakage Current Measuring Mode : DC/AC/AC+DC/AC Peak
* Various Standard Interfaces : RS-232C/ GPIB/USB Host & Device/EXT I/O

GTL-207 Test Lead

Approx. 0.8m
For: GDM-8261A, GDM-8351, GDM-8255A, GDM-8342/8341, GLC-9000



GLC-01 Alligator Clips

For: GLC-9000

GLC-02 Foil Probe

For: GLC-9000

SPECIFICATIONS

	Ranges	Range	Resolution	Accuracy
DC				
	25.00mA	5.00mA ~ 25.00mA	10μA	±(0.2%rdg+3dgt)
	5.000mA	0.500mA ~ 5.000mA	1μA	±(0.2%rdg+3dgt)
	500.0μA	50.0μA ~ 500.0μA	0.1μA	±1.0%fs
	50.00μA	4.00μA ~ 50.00μA	0.01μA	±1.0%fs
AC or AC+DC				10Hz<f ≤100kHz / 100kHz<f ≤1MHz
	25.00mA	5.00mA ~ 25.00mA	10μA	±(2.0%rdg+6dgt) / ±(2.0%rdg+10dgt)
	5.000mA	0.500mA ~ 5.000mA	1μA	±(2.0%rdg+6dgt) / ±(2.0%rdg+10dgt)
	500.0μA	50.0μA ~ 500.0μA	0.1μA	±(2.0%rdg+6dgt) / ±(2.0%rdg+10dgt)
	50.00μA	4.00μA ~ 50.00μA	0.01μA	±2.0%fs / ±2.0%fs
AC PEAK				20Hz<f ≤1kHz / 1kHz<f ≤ 10kHz
	75.0mA	10.0mA ~ 25.0mA	100μA	±(2.0%rdg+2dgt) / ±(5.0%rdg+10dgt)
	10.00mA	1.00mA ~ 10.00mA	10μA	±(2.0%rdg+2dgt) / ±(5.0%rdg+10dgt)
	1.000mA	500μA ~ 1.000mA	1μA	±2.5%fs / ±5.0%fs
	500.0μA	40.0μA ~ 500.0μA	0.1μA	±4.0%fs / ±5.0%fs
EUT (V/I CHECK)				
Voltage	300V	85V ~ 300V	0.1V	±(2%rdg+10dgt)
Current	10A	0.5A ~ 10A	0.1A	±(2%rdg+5dgt)
METER MODE				
	AC/DC	10.0 ~ 300.0V	0.1V	±(3%rdg+2V)
	AC+DC	10.0 ~ 300.0V	0.1V	±(3%rdg+2V)
	AC Peak	15.0 ~ 430.0V	0.1V	±(3%rdg+2V)
INTERFACE				
RS-232C, GPIB, USB Host & Device, EXT I/O				
POWER SOURCE				
For GLC-9000 : AC 100V/120V/220V/230V±10%, 50/60Hz For EUT : AC 85V ~ 250V, 50/60Hz				
DIMENSIONS & WEIGHT				
330 (W) x 150 (H) x 350 (D) mm; Approx. 5kg				

ORDERING INFORMATION

GLC-9000 Leakage Current Tester

ACCESSORIES :
User manual x 1, Power cord x 2, Test lead(GTL-207) x 2, CD x1(Complete user manual), Alligator clips(GLC-01) x 4(Red x 2/Black x 2), Foil probe(GLC-02) x 1,

OPTIONAL ACCESSORIES

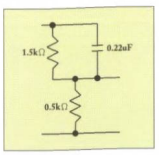
GTL-232	RS-232C Cable
GTL-240	USB Cable, USB 2.0, A-B Type (L Type), 1200mm
GTL-246	USB Cable, USB 2.0 A-B TYPE CABLE, 4P
GTL-248	GPIB Cable (2.0m)
GTL-251	GPIB-USB-HS(High Speed)

GLC-9000

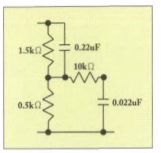
Rear Panel

MEASUREMENT NETWORK (MD)

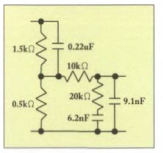
MD-A



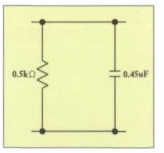
MD-B



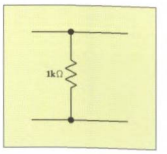
MD-C



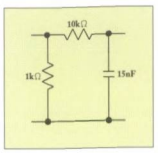
MD-D



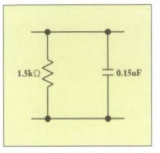
MD-E



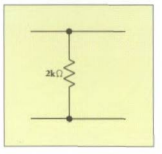
MD-F



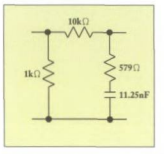
MD-G



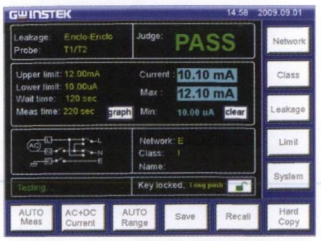
MD-H



MD-I

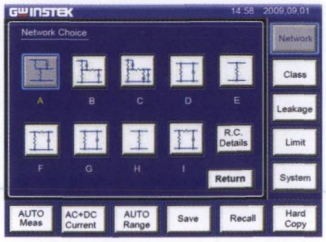


A. SIMPLE AND INTUITIVE SYSTEM



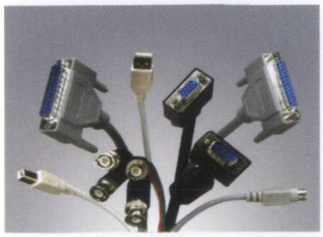
The color TFT touch screen makes operation intuitive and simple, whilst making it easier to observe test result.

B. VARIOUS MEASUREMENT NETWORK



Nine Measurement Network are available for measuring the leakage current of electrical and medical equipment.

C. VARIOUS STANDARD INTERFACES

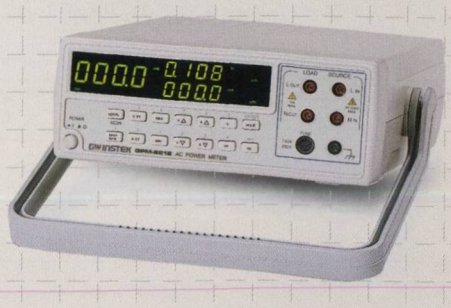


The various practical interfaces are equipped as standard making control convenient and flexible.

Q 5 **How should I choose the right safety tester?**

A 5 When choosing a safety tester, you will need to consider a couple of important elements. First of all, you will need to well understand the safety test items, such as AC Withstanding, DC Withstanding, IR, Ground Bond, or ARC detection. Secondly, you will also need to understand test condition, such as test voltage, leakage current limit and test time, Thirdly, you will have to find out the test wiring between the tester and DUTs. Also, you should consider the capability of connecting an external device to a safety tester. Finally, you will need to review additional features such as programmable test setup, maximum current detection, arc detection, sequence testing, and voltage ramp up time.

NOTE



OTHER METERS

In order to provide customers with a complete "one stop shopping" solution, GW Instek also offers many other special test and measurement instruments for different applications. For current measurement, PCS-1000 is a high-precision D.C. and A.C. Current Shunt Meter which carries built-in current shunts and high-accuracy current measurement circuits. For power related measurement, bench-top GPM-8212 Digital A.C. power meter is suitable for middle to high-end applications. If you need to measure the impedance of material components, the GOM-800 Series D.C. milli-ohm meter is your ideal tool. As for audio signals related measurements, GW Instek provides GAD-201G automatic distortion meter and GVT-417B/GVT-427B A.C. millivolt meters. We also supply several models of the GFC-8000 Series frequency counters with ranges of 2.7GHz, 1.3GHz and 120MHz. Other special application instruments such as digital IC tester and logic probe (pulser included) are also available.

PRODUCTS

- **DC Milli-Ohm Meter**
- **Digital IC Tester**
- **Precision Current Shunt Meter**
- **AC Power Meter**
- **Automatic Distortion Meter**
- **AC Millvolt Meter**
- **Frequency Counter**
- **Logic Probe & Pulser**

OTHER APPLICATION METERS

COMPONENTS TESTING INSTRUMENT

MODEL	Description (Main Function)	Page
GOM-802	DC Milli-Ohm Meter 30mΩ ~ 3MΩ	E63
GOM-801H	DC Milli-Ohm Meter 20mΩ ~ 20kΩ	E64
GUT-6000B	Digital IC Tester	E65
GUT-6600A	Handy Digital IC Tester	E66

PRECISION CURRENT SHUNT METER

MODEL	Description (Main Function)	Page
PCS-1000	Max. Voltage, AC 600V/DC 1000V, Max. Current, AC 300A/DC 300A	E67-68

AUDIO RELATED INSTRUMENT

MODEL	Description (Main Function)	Page
GAD-201G	20Hz ~ 20kHz Automatic Distortion Meter	E69
GVT-427B/417B	AC Millivolt Meter (2CH/1CH)	E70

FREQUENCY COUNTER

MODEL	Description (Main Function)	Page
GFC-8270H	0.01Hz ~ 2.7GHz Intelligent Counter	E71
GFC-8131H	0.01Hz ~ 1.3GHz Intelligent Counter	E71
GFC-8010H	10Hz ~ 120MHz Digital Frequency Counter	E72

POWER RELATED INSTRUMENT

MODEL	Description (Main Function)	Page
GPM-8212	Digital A.C. Power Meter Simultaneous Display of W, A, V (PF or Hz) True RMS V, A, W; Max./Min./Hold Function	E73

OTHER

MODEL	Description (Main Function)	Page
GLP-1A	Logic Probe & Pulser	E74

D.C. Milli-Ohm Meter

GOM-802 milliohm meter is designed for component and material resistance measurements in laboratories and other test environments. A large display with 30,000 counts and a superb accuracy of up to 0.05% gives the reliability and flexibility required in demanding measurement applications. Features such as Auto ranging, a built-in comparator offering Hi-Lo testing, a Limit Percent setting, and Go/NoGo testing reduce the effort for complex testing setups. Displayed selections of Relative, Actual, and % Value show results viewed from multiple perspectives. GOM-802 supports 4 Wire Kelvin resistance measurements for faster accurate results. For an accurate, sophisticated, affordable milliohm meter, GOM-802 is the right choice.

GOM-802

CE | RS-232 | GPIB | SCAN | Handler | LabVIEW Driver

FEATURES

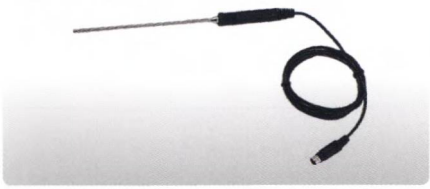
* 30000 Counts Display
* High Accuracy 0.05%
* Hi/Lo Comparator and Limit Percent Setting
* Measurement of REL, Actual and % Value
* Continuous or Triggered Measurement Mode
* Temperature Compensation and Measurement
* Four-Terminal Measurement Technique
* Auto-Recall Last Setting Before Power OFF
* Alarm Setting for PASS/FAIL
* Scan, Handler Interface (Standard)
* Manual or Autoranging
* RS-232C+GPIB (Option)

GTL-108A 4W Test Lead

Approx. 1.1m
For: GOM-801H/802, GDM-8261A, GDM-8255A/8251A

PT-100 Temperature Probe

Approx. 1.5m ; For: GOM-802



Rear Panel

SPECIFICATIONS

DISPLAY	
	30,000 counts
RESISTANCE	
Ranges/Test Current (Fixed)	30mΩ /1A | 300mΩ/100mA | 3Ω/100mA 30Ω /10mA | 300Ω/1mA | 3kΩ/100μA 30kΩ /100μA | 300kΩ/10μA | 3MΩ/1μA
Accuracy	30mΩ : ±0.1% reading + 6 digits 300mΩ : ±0.05% reading + 6 digits 3Ω: ± 0.05% reading + 3 digits 30Ω~ 3MΩ : ±0.05% reading + 2 digits
Resolution	1 μΩ , 10 μΩ , 100 μΩ , 1mΩ, 10mΩ, 100mΩ, 1Ω, 10Ω , 100Ω
TEMPERATURE	
Ranges Accuracy Resolution	-50 °C ~ 100 °C -10 °C ~ 40° C : 0.3% + 0.5 ° C other : 0.3% + 1.0 ° C 0.1 ° C
FUNCTION	
	Hi/Lo, Go/No-Go, Manual Trigger, Actual, %, Temp, TC for Transformer
MEASURING RATE	
	7 measuring / sec at 30,000 counts , 30 measuring / sec at 3,000 counts
MEMORY	
	20 sets
INTERFACE	
	Standard : Handler / Scan (same connector) Option : RS-232C+GPIB
POWER SOURCE	
AC 100/120/220/230V ±10% , 50/60Hz ; Power Comsumption : Max. 27VA	
DIMENSIONS & WEIGHT	
251(W) x 91(H) x 291(D)mm, Approx. 3kg	

ORDERING INFORMATION

GOM-802 High Precision Programmable DC Milli-Ohm Meter

ACCESSORIES :
User manual x 1 , Power cord x 1 , Test lead GTL-108A x 1

OPTION

Opt.01 RS-232C + GPIB Interface (Factory Installed)

OPTIONAL ACCESSORIES

PT-100 Platinum Temperature Probe
GTL-232 RS-232C Cable, 9-pin Female to 9-pin, null Modem for Computer
GTL-248 GPIB Cable (2m)
GTL-251 GPIB-USB-HS(High Speed)

FREE DOWNLOAD

Driver LabView Driver

D.C. Milli-Ohm Meter

GOM-801H milliohm meter is the ideal device for quick and precise component and material resistance measurements. The main display is equipped with a 3 1/2 digit 0.5" red LED with comparator indicators. Measurable objects can cover cable joints, earth bonds, switches, motors, transformers and generators. The front panel features seven selectable test ranges, 20mΩ to 20kΩ The internal comparator is fully adjustable for the user settable Hi/Lo comparison indicator. GOM-801H is the best choice for an inexpensive, easy to use, yet reliable milliohm meter.

GOM-801H

CE

FEATURES

* 3 1/2 Digits 0.5" LED Display
* Measures from 20mΩ ~ 20kΩ in 7 Ranges
* 1A High Test Current
* High Resolution 10 μΩ
* Hi/Lo Comparator Indicator and Buzz Alarm

GTL-108A 4W Test Lead

Approx. 1.1m
For: GOM-801H/802, GDM-8261A, GDM-8255A/8251A

SPECIFICATIONS	
TEST RANGE	
	20, 200mΩ, 2, 20, 200Ω, 2k, 20kΩ, 7 Ranges
TEST CURRENT (Test Voltage 0.2V)	
	20mΩ/200mΩ : 1A 2Ω : 0.1A 20Ω : 10mA 200Ω : 1mA 2kΩ : 100μA 20kΩ : 10μA
ACCURACY	
	20mΩ ± (0.2% rdg + 6 digits) 200mΩ ~ 20kΩ ± (0.2% rdg + 4 digits)
RESOLUTION	
	0.01mΩ, 0.1mΩ, 1mΩ, 10mΩ, 100mΩ, 1Ω, 10Ω
COMPARATOR	
	HI, LO settable
DISPLAY	
	3 1/2 digits 0.5" LED display HI, GO, LO indicator
POWER SOURCE	
AC 100V/120V/220V/230V±10% , 50/60Hz ; Power Comsumption : Max. 25VA	
DIMENSIONS & WEIGHT	
230(W) x 95(H)x280(D)mm, Approx. 2 kg	

ORDERING INFORMATION

GOM-801H High Precision DC Milli-Ohm Meter

ACCESSORIES :
User manual x 1 , Power cord x 1
Test Lead GTL-108A x 1

Digital IC Tester

GUT-6000B is a desktop digital IC tester. Oriented toward automating testing tasks, GUT-6000B contains high-end features such as auto-search and loop testing. Automated processes provide an intelligent and continuous process for detecting defective ICs. Self-diagnosis functions and over-load protection mechanisms make GUT-6000B close to maintenance-free, releasing users from unnecessary hassles. The wide device coverage includes the 1800 series as well as the ubiquitous TTL and CMOS, providing a one-size fits-all solution for an IC testing bench area.

GUT-6000B

CE

FEATURES

* Loop Test
* Auto-Search
* Self-Diagnosis
* Over-Load Protection
* Measures 1800 Types of Device
* 54/74 Series TTL
* 4000 and 4500 Series CMOS
* Test Socket : 28-Pin

SPECIFICATIONS	
TEST RANGE	
	TTL 74/54 CMOS 40/45 DRIVE
TEST VOLTAGE	
	2.5/3.0/3.3/5V
TEST TIME	
	Average Search Time : 0.6Sec
DISPLAY	
	16Characters in 1 line LCD
POWER SOURCE	
	AC100V~240V±10%,50/60Hz
DIMENSIONS & WEIGHT	
	335(W) x105(H) x300(D)mm, Approx. 1.5kg

(*) Batteries not included

ORDERING INFORMATION

GUT-6000B Digital IC Tester

ACCESSORIES :
User manual x 1 , Power cord x 1 (GUT-6000B)
User manual x 1, DC 9V/500mA adaptor (GUT-6600A)

Digital IC Tester

GUT-6600A is a portable Digital IC tester with features matching those of its desktop cousin, GUT-6000B. Standard DC adaptor operation or battery provides a secure power supply anytime, anywhere. Geared towards ease of use, no programming or fixtures are required when operating GUT-6600A; users simply have to plug in the device and a search is completed within a mere 0.6 seconds on average. All these features and compact profile make GUT-6600A the ideal choice as an additional companion in a users' tool kit.

GUT-6600A

CE

FEATURES

- Easy-Operation Tester, Particularly Designed for the Digital IC
- Supported Device : 74/54/40/45, Drive 2xxx
- Small, Portable, Light and Power-Saving
- Can be Operated using either DC adaptor or Batteries
- Average Search Time : 0.6 Second
- Display : 16 Characters in 1 Line LCD
- Test Pins : 14 ~ 24 Pins

SPECIFICATIONS	
TEST RANGE	
	TTL 74/54 CMOS 40/45 DRIVE 2xxx
TEST VOLTAGE	
	2.5/3.0/3.3/5V
TEST TIME	
	Average Search Time : 0.6Sec
DISPLAY	
	16 Characters in 1 line LCD
POWER SOURCE	
	DC 9V/500mA adaptor or 9V battery x 2(*)
DIMENSIONS & WEIGHT	
	110(W) x 45(H) x 160(D)mm, Approx. 0.4kg

(*) Batteries not included

ORDERING INFORMATION

GUT-6600A Handy Digital IC Tester

ACCESSORIES :
User manual x 1 , Power cord x 1 (GUT-6000B)
User manual x 1, DC 9V/500mA adaptor (GUT-6600A)

Precision Current Shunt Meter

NEW

PCS-1000

CE USB GPIB

PCS-1000 is a High-Precision D.C. and A.C. Current Shunt Meter which carries built-in current shunts and high-accuracy current measurement circuits. PCS-1000 not only measures current in five current levels - 300A, 30A, 3A, 300mA and 30mA, but also measures voltage at 6 ½ digit resolution simultaneously. This unique feature puts PCS-1000 in an unprecedented position among all the shunt meters available in the market today. After a long time operation, PCS-1000 is able to maintain high measurement accuracy in spite of the temperature variation. This is due to its core design based on the high stability and low temperature coefficient shunts. PCS-1000, a verification-lab level current and voltage measurement equipment, is suitable for the R&D, quality verification and testing jobs of all power products such as power supply, communications system power, server power and electronic load. The maximum voltage/current measurement ranges of PCS-1000, including DC 1000V/AC 600V/ AC 300A/DC 300A, meet all current and voltage measurement challenges of every power industry. *

* PCS-1000 can measure A.C. voltage and current simultaneously but it can't measure phase. Therefore, it does not provide power measurement function.

FEATURES

* 6 1/2 Digit Measurement Resolution
* Dual Measurement for Voltage and Current
* AC & DC Current Measurement Range : 30mA/300mA/3A/30A/300A (Maximum)

  AC Voltage Measurement Range : 200mV/2V/20V/200V/600V (Maximum)

  DC Voltage Measurement Range : 200mV/2V/20V/200V/1000V (Maximum)
* Auto Zero Circuit
* Standard Interfaces: USB, GPIB

SPECIFICATIONS

DC VOLTAGE CHARACTERISTICS

	Range	23℃±5℃ (1 Year)	Temperature Cofficient/℃
	200.0000mV	0.0050+0.0035	0.0005+0.0005
	2.000000V	0.0050+0.0010	0.0005+0.0001
	20.00000V	0.0050+0.0010	0.0005+0.0001
	200.0000V	0.0050+0.0010	0.0005+0.0001
	1000.000V	0.0050+0.0020	0.0005+0.0001
Accuracy	±(% of reading +% of Range); Voltage input Resistance:10MΩ for all DC Voltage ranges		

DC CURRENT CHARACTERISTICS

	Range	Burden Voltage	23℃±5℃ (1 Year)	Temperature Cofficient/℃
	30.00000mA	<0.4V	0.01+0.005	0.001+0.002
	300.0000mA	<0.5V	0.01+0.005	0.001+0.002
	3.000000A	<0.8V	0.01+0.005	0.001+0.002
	30.00000A	<0.8V	0.01+0.005	0.001+0.002
	300.0000A	<0.8V	0.02+0.005	0.001+0.002
Accuracy	±(% of reading +% of Range)			

TRUE RMS AC VOLTAGE CHARACTERISTICS

	Range	Frequency	23℃±5℃ (1 Year)	Temperature Cofficient/℃
	200.0000mV			0.005+0.005
	2.000000V	45Hz-2KHz	0.5+0.05	0.005+0.005
	20.00000V	2KHz-10kHz	1.0+0.05	0.005+0.005
	200.0000V	10kHz-20kHz	2.0+0.10	0.005+0.005
	600.000V			0.005+0.005
Accuracy	±(% of reading +% of Range)			

TRUE RMS AC CURRENT(AC+DC) CHARACTERISTICS

	Range	Frequency	23℃±5℃ (1 Year)	Temperature Cofficient/℃
	30.00000mA	45Hz-2KHz	0.5+0.05	0.03+0.006
	300.0000mA	2KHz-10kHz	1.0+0.05	0.03+0.006
	3.000000A			0.03+0.006
	30.00000A	45Hz-400Hz	0.5+0.05	0.03+0.006
	300.0000A			0.03+0.006
Accuracy	±(% of reading +% of Range)			

CURRENT MONITOR ACCURACY

Range	Shunt Value	DC Accuracy	AC Accuracy≦400Hz	Max Input DC/AC RMS
	10Ω	0.01%	0.1%	30mA
	1Ω	0.01%	0.1%	300mA
	0.1Ω	0.01%	0.1%	3A
	0.01Ω	0.01%	0.1%	30A
	0.001Ω	0.02%	0.1%	300A

POWER SOURCE

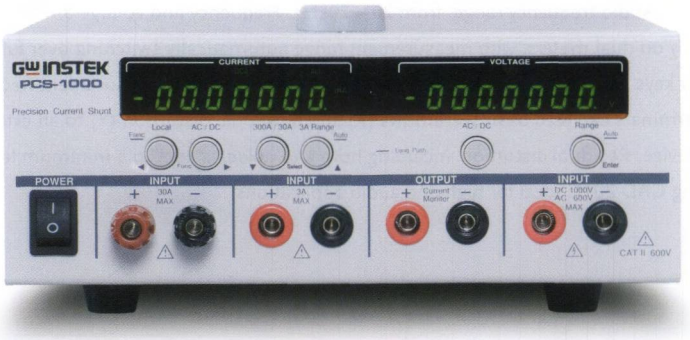
100V/120V/220V/240V±10%

POWER LINE FREQUENCY

50/60Hz

OPERATING ENVIRONMENT

Full Accuracy for 0℃ ~ 50℃, Full accuracy to 80% R.H. at 40℃



PCS-1000

Rear Panel

SPECIFICATIONS

STORAGE ENVIRONMENT
-40℃ ~ 70℃
POWER CONSUMPRION
Max 35VA
DIMENSIONS & WEIGHT
210(W) x 80(H) x 390(D)mm ; Approx. 6kg

ORDERING INFORMATION

PCS-1000 Precision Current Shunt Meter

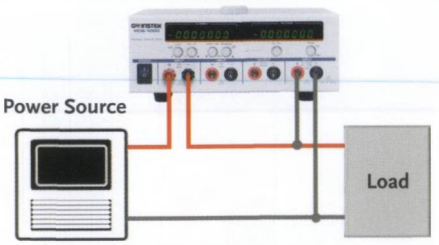
ACCESSORIES :
User Manual x 1, AC Power Cord x 1

GTL-105A Alligator Clip Test Lead (3A Max)
GTL-207 Banana Plug Test Lead
GTL-240 USB Cable
PCS-001 Basic Accessory Kit

OPTIONAL ACCESSORIES

GRA-419-J Rack Mount Adapter (JIS)
GRA-419-E Rack Mount Adapter (EIA)
GTL-246 USB Cable, USB 2.0, A-B Type, 1200mm
GTL-248 GPIB Cable, Double Shielded, 2000mm
GTL-251 USB-GPIB Adapter, GPIB-USB-HS, USB 2.0, Hi-Speed USB compliance, 2000mm

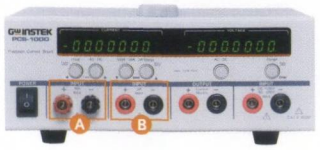
SIMULTANEOUSLY CONDUCT PRECISION AND STABLE CURRENT AND VOLTAGE MEASUREMENT



PCS-1000 Current Shunt Meter Simultaneously Measures Current and Voltage

PCS-1000 High-Precision Current Shunt Meter can simultaneously measure current and voltage. Compared with the test of traditional models or meters in other brands, PCS-1000 is easy-to-use in connection and there is no requirement of any additional instrument. The following diagram shows the connection method of measuring voltage on the load and measuring current simultaneously.

A.C./D.C. VOLTAGE AND CURRENT LEVEL SELECTION



PSC-1000 has five selectable voltage and current measurement levels to meet users' terminal measurement requirements by manual or automatic selection. In selecting current levels, users must, at the same time, select corresponding current input terminal. Please refer to respective current input terminals :
(A) 30A Max (B) 3A Max (C) 300A Max

Automatic Distortion Meter

The GAD-201G distortion meter is aimed at total harmonic distortion (THD) and AC voltage measurement at audio frequency range, from 20 ~ 20kHz. Frequency and voltage are displayed simultaneously on dual meters, with measurement range automatically switching over full scale. The frequency keys cover 400Hz, 1kHz, and 10kHz for commonly used measurement frequencies. The output terminals can feed basic waveforms (X) and harmonic distortion (Y) to an external monitoring device. Residual distortion, including hum and noise, is kept to a minimum level of 0.03%, making GAD-201G ideal for high-end audio applications.

GAD-201G

FEATURES

* Automatic Level & Distortion Measurements
* Auto or Hold Function Can be Selectable
* 0.1% ~ 100% in 7 Distortion Measuring Ranges
* 20Hz ~ 20kHz in 3 Continuous Ranges
* 400Hz, 1kHz, 10kHz 3 Spot Frequency
* 1mVrms ~ 300Vrms in 12 ACV Measuring Ranges

SPECIFICATIONS

DISTORTION MEASUREMENT	
Range	0.1% ~ 100% full scale in 7 ranges by auto ranging
Fundamental Frequency Range	20Hz ~ 20kHz in 3 continuous ranges with fine adjustment tuning and 3 spots for 400Hz, 1kHz and 10kHz only
Input Level	100mVrms ~ 300Vrms
Automatic Level Control Range	±10dB
Fundamental Rejection	80dB or above
Second Harmonic Accuracy	Within±1dB at a basic frequency of 20Hz ~ 20kHz
Residual Distortion	(Including hum and noise) Less than 0.03%
AC VOLTAGE MEASUREMENT	
Range	1mVrms to 300Vrms full scale in 12 ranges by auto ranging
Frequency Response	20Hz ~ 200kHz ±1dB
Input Impedance	100kΩ±10%, 70pF or less(Unbalanced)
Accuracy	Within±3% of full scale (at 1kHz)
Residual Noise	Less than 10μV (input short circuited)
Output Level	X : 1Vrms, Y : 500mVrms at meter full scale
Output Impedance	Approx. 600Ω
POWER SOURCE	
AC 100V/120V/220V/240V±10%, 50/60Hz; Power Comsumption : Max. 25VA	
DIMENSIONS & WEIGHT	
310(W) x 165(H) x 300(D)mm, Approx. 4.6 kg	

GTL-103 Test Lead

Banana-Alligator Heads
Approx. 1.2m

ORDERING INFORMATION

GAD-201G Automatic Distortion Meter

ACCESSORIES :
User manual x 1 , Power cord x 1
Test lead GTL-103 x 1

A.C. Millivolt Meter

GVT-427B (2CH)

GVT-417B (1CH)

CE

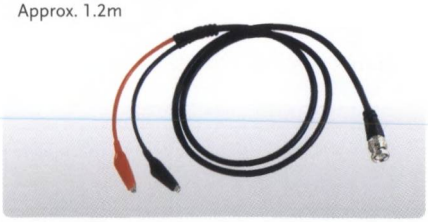
The GVT-427B/417B Series is a compact analog AC millivoltmeter ideal for low level voltage measurements with a remarkable 300μV full scale sensitivity. GVT-427 has dual independent channels that can be used simultaneously or separately for measurement. Voltage scale is separated into 12 ranges, easily accessible by the large rotary selector. The wide measurement range, frequency (10Hz ~ 1MHz) and voltage (-70dB ~ +40dB), provides ample headroom for most applications.

FEATURES

* 300 μV Full Scale Sensitivity
* Measures Frequency From 10Hz ~ 1MHz
* Measures From -70dB ~ +40dB in 12 Ranges
* Dual Channel (GVT-427B)

GTL-101 Test Lead

BNC-Alligator Heads
Approx. 1.2m



SPECIFICATIONS	
INPUT	
Voltage Range	300 μV ~ 100V of Full Scale in 12 ranges
Decibel Range	-70dB ~ +40dB in 12 ranges
Accuracy	±3% of full scale
Operating Mode	GVT-427B : Ch1 and Ch2 separately or simultaneously at Ch1 GVT-417B : one Ch1 only
Frequency Response	20Hz ~ 200kHz±3%,10Hz ~ 1MHz±10% (reference 1 kHz)
Impedance	1MΩ, approx, 40pF
OUTPUT	
Level	Approx. 0.1Vrms at full scale
Distortion	Less than 2%
POWER SOURCE	
AC 115V/230V ±10% , 50/60Hz; Power Comsumption : Max. 10VA	
DIMENSIONS & WEIGHT	
130(W) x 210(H) x 295(D)mm; Approx. 2.8 kg	

ORDERING INFORMATION

GVT-427B	2 Channels AC Millivolt Meter
GVT-417B	1 Channel AC Millivolt Meter

ACCESSORIES :
User manual x 1 , Power cord x 1
Test Lead GTL-101 x 2 for GVT-427B
Test Lead GTL-101 x 1 for GVT-417B

Note : GVT-427B Without CE Approved

Intelligent Counter

The GFC-8000 Series performs virtually all of the counting measurements required in laboratories, in terms of both period and frequency. A bright red 8 digit LED display with an included overflow indicator provides a clear view. Both models feature a stable time base with a maximum resolution of 100nHz and 10nS at 1Hz for frequency and period measurement, respectively. Gate time can be configured for fast response (5 digits/10ms) or accuracy (7 digits/s) for more control. For high frequency needs, GFC-8270H can operate at up to 2.7GHz. The GFC-8000 Series features easy operation with a simple front panel interface, suitable for both portable and bench-top use.

GFC-8270H (2.7GHz)
GFC-8131H (1.3GHz)

FEATURES

* Frequency and Period Measurement
* High Resolution at Both High and Low Frequency
* 0.01Hz~2.7GHz Frequency Range(GFC-8270H)
* 0.01Hz~1.3GHz Frequency Range(GFC-8131H)
* 10mV rms High Sensitivity
* 100nHz Resolution for 1Hz
* Variable Trigger Level Control
* Microprocessor Controlled Intelligent Counter(Only GFC-8270H)

GTL-101 Test Lead

BNC-Alligator Heads
Approx. 1.1m

GTL-110 Test Lead

BNC-BNC Heads
Approx. 1m

SPECIFICATIONS	
DISPLAY	
	8 digits with Hz, kHz, MHz, GHz, S, mS, μS, nS and overflow
GATE TIME	
	Variable from 10ms to 10s, or 1 period of input depending on whichever is greater
ACCURACY	
	±(Resolution± timebase error)
CHANNEL A	
Range	DC coupled 0.01Hz ~ 120MHz AC coupled 30Hz ~ 120MHz
Sensitivity	10mV rms typical, 50mV rms max
Coupling	AC or DC, switchable
Filter	Low pass, switchable in or out for channel A -3dB point of nominally 100kHz
Impedance	1MΩ//40pF
Attenuator	1/1 or 1/20dB
Trigger Level Adjustment	-2.5 VDC ~ + 2.5 VDC
Resolution	For frequency measurement, the maximum resolution is 100nHz for 1Hz and 0.1Hz for 100MHz inputs respectively. For period measurement, the maximum resolution is 10nS for 1Hz and $0.1x10^{-3}$ S for 100MHz inputs respectively. At least, the display is 7 digits for 1sec, 6 digits for 100ms, 5 digits for 10ms gate time respectively.
Period Range	8nS to 100S at least 7 digits displayed for per second of gate time
CHANNEL B	
Range	50MHz ~ 2.7GHz for GFC-8270H 50MHz ~ 1.3GHz for GFC-8131H
Sensitivity	≤50mVrms (10mVrms typical) for GFC-8270H ≤40mVrms (10mVrms typical) for GFC-8131H
Coupling	AC only
TIME BASE	
Aging rate	1ppm per Month
Temperature	5ppm 23°C±5°C
Line variation	0.005ppm for ±10% variation
POWER SOURCE	
AC 100V/120V/220V/230V±10%, 50/60Hz ; Power Comsumption : Max. 15VA	
DIMENSIONS & WEIGHT	
230(W) x 95(H) x 280(D)mm, Approx. 2.2kg	

ORDERING INFORMATION

GFC-8131H	1.3GHz Intelligent Counter
GFC-8270H	2.7GHz Intelligent Counter

ACCESSORIES :
User manual x 1 , Power cord x 1 , GTL-110 x 1 , GTL-101 x 1

Digital Frequency Counter

GFC-8010H is a Digital Frequency Counter, particularly suitable for educational and laboratory use. It features a stable 5ppm time base, a low pass filter and an overflow indicator with a maximum operating rate of 120MHz. The clear 8 digit LED display coupled with a quick easy-to-use interface makes it a handy instrument on any bench-top.

GFC-8010H (120MHz)

FEATURES

* 10Hz ~ 120MHz Range
* 8 Digit Display (0.3" LED)
* 15mVrms High Sensitivity
* 5ppm High Stability Time Base
* Frequency and Period Measurement
* Low Pass Filter Function
* Over-Flow Indicator

SPECIFICATIONS	
MAIN	
Display	8 Digit with Hz, kHz, MHz, S, mS, μ S, nS and overflow
Gate Time	0.1S , 1S , 10 S switch selectable
Accuracy	±(1 Digit + Time base accuracy)
INPUT	
Sensitivity	10Hz ~ 10MHz < 15mVrms 10MHz ~ 40MHz < 20mVrms 40MHz ~ 80MHz < 35mVrms 80MHz ~ 120MHz < 50mVrms
Impedance	1MΩ//35pF
Coupling System	AC Coupling
Max Input Voltage	150Vrms
TIME BASE	
Oscillation Frequency	10MHz
Aging Rate	±1 ppm per month
Temp. Stability	25°C ±5°C : ± 5ppm
RESOLUTION	
The maximum resolution is 1μ Hz for 10Hz and 0.1Hz for 100MHz Input respectively for frequency measurement and 1nS for 10Hz and 0.1 x 10^{-15} for 100MHz	
POWER SOURCE	
AC 100V/120V/220V/230V±10% , 50/60Hz ; Power Comsumption : Max. 5Watts	
DIMENSIONS & WEIGHT	
230(W) x 95(H) x 280(D) mm, Approx. 1.7kg	

GTL-101 Test Lead

BNC-Alligator Heads
Approx. 1.1m

ORDERING INFORMATION

GFC-8010H 120MHz Digital Frequency Counter

ACCESSORIES :
User Manual x 1 , Power cord x 1
Test Lead GTL-101 x 1

OPTIONAL ACCESSORIES

GTL-110 BNC Cable, BNC(P/M)-BNC(P/M), 1000mm

A.C. Power Meter

GPM-8212 is a bench-top power meter suitable for middle to high-end applications. Performance and functionality are maintained at the highest level with a maximum 9999 CT/PT ratio, high immunity to external noise, and true RMS voltage/current/power. The user interface has been designed to simplify setup and operation. The large 0.56" display simultaneously shows all three measurement units, Power/Voltage/Current, either as frequency (Hz) or power factor (PF). The RS-232C or RS-485 PC interfaces allow data capture control and for automated test systems.

GPM-8212

RS-232 | RS-485 | PC Software

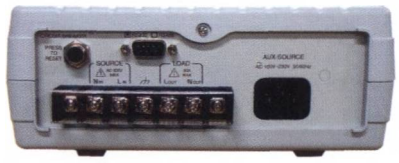
FEATURES

* Simultaneous Display of W, A, V (PF or Hz)
* True RMS V, A, W
* Max. / Min. / Hold Function
* High Immunity to External Noise
* CT Ratio (1 ~ 9999)
* PT Ratio (1 ~ 9999)

SPECIFICATIONS

VOLTAGE	
Range	5V, 10V, 20V, 40V, 80V, 160V, 320V, 640V total 8 ranges by auto-range or manual.
Measurement Type	True RMS
Input Resistance	≥1MΩ
Maximum Input Voltage	1000V(peak), 700V(rms)
PT Ratio Setting	1 ~ 9999
Accuracy (at 23°C±5°C) (Sinewave)	±0.1% of reading±0.1% of range
CURRENT	
Range	160mA, 320mA, 640mA, 1.280A, 2.560A, 5.120A,10.24A, 20.48A total 8 ranges by auto-range or manual
Measurement Type	True RMS
Input Resistance	0.01Ω
Maximum Input Current	30A(peak), 20A(rms)
CT Ratio Setting	1 ~ 9999
Accuracy (at 23°C±5°C) (Sinewave)	±0.1% of reading±0.1% of range
WATT	
Measurement Range	0.32mW ~ 13.10kW
Measurement Type	True rms
Accuracy (at 23°C±5°C) (Sinewave)	±0.2% of reading ±0.2% of range
POWER FACTOR	
Range	0.001 ~ 1.000
Computation	W/(V x A) = Power factor (PF)
Accuracy (at 23°C±5°C) (Sinewave)	±0.2% of reading ±0.2% of range
FREQUENCY	
Measurement Range	40Hz ~ 400Hz
Accuracy(23°C ±5°C)	±0.2% of reading ±2 digits
GENERAL	
Display	4 digits 0.56" LED and 2 sets of 4 digits 0.4" LED
Minimum Input	2% of range
Response Time	2 cycles/sec
Overload Indicating	" O.L"
INTERFACE	
RS-232C or RS-485 Interface (decided before purchase)	
POWER SOURCE	
AC 100 ~ 230V, 50/60Hz ; Power Comsumption : Max. 28VA	
DIMENSIONS & WEIGHT	
251(W) x 91(H) x 291(D) mm, Approx. 1.6kg	

Rear Panel



ORDERING INFORMATION

GPM-8212	A.C. Power Meter
GPM-8212 (RS-232C)	A.C. Power Meter with RS-232C Interface
GPM-8212 (RS-485)	A.C. Power Meter with RS-485 Interface

ACCESSORIES :
User manual x 1 , Power cord x 1

OPTIONAL ACCESSORIES

GTL-232 RS-232C Cable, 9-pin Female to 9-pin, null Modem for Computer

FREE DOWNLOAD

PC Software Remote Control Software (RS-232C)

Logic Probe & Pulser

The GLP-1A logic pulsers can be used to perform in-circuit testing of TTL, CMOS, and many other logic devices at a maximum of 50MHz. GLP-1A is enhanced with a logic probe function with a minimum detectable pulse width of 10 ns, providing enough sensitivity for most applications. A Short 10 sec pulse width assures that no damage will occur to circuits whilst testing. With a weight less than 50g, a non-slip grip and an external sync input all provide comfort and reliability for various troubleshooting tasks.

GLP-1A (Logic Probe & Pulser)

CE

FEATURES

* Combining a Logic Probe and Pulser Combined into One
* Probe for Troubleshooting Digital Circuits
* Operating Voltage : 4VDC~18VDC
* Maximum Input Signal Frequency: 50MHz
* TTL : Logic "1" >3.0V±0.25V, Logic"0" <0.75V±0.25V
* CMOS : Logic "1" >60%VCC±5%, Logic"0" <15% VCC±5%
* Minimum Detectable Pulse Width 10nsec
* Pulser : Sync Input Impedance 120kΩ
* Pulse Rate : Switchable 0.5/400Hz
* Pulse width : 10μsec
* Dimensions & Weight : 18(W) x 210(H) x 18(D)mm, Approx. 50g

ORDERING INFORMATION

GLP-1A	Logic Probe & Pulser

Accessories Index

PAGE	MODEL	DESCRIPTION	APPLICABLE DEVICE
F8	ADB-002	DC Block BNC 50 Ohm 10MHz to 2.2GHz	GSP-9300
F8	ADB-006	DC Block N-TYPE 50 Ohm 10MHz to 6GHz	GSP-9300
F8	ADB-008	DC Block SMA 50 Ohm 0.1MHz to 8GHz	GSP-9300
F8	ADP-001	Adaptor, 50Ω, BNC(J/F) - N(P/M)	GSP-Series
F8	ADP-002	Adaptor, 50Ω, SMA(J/F) - N(P/M)	GSP-Series, GRF-3300S
C41	ADP-003	Adaptor, 50Ω, N(J/F) - SMA(J/F)	USG-Series
F8	ADP-101	Adaptor, 75Ω BNC(J/F) - 50Ω BNC(P/M)	GSP-Series
C21	AFG-125	USB Arbitrary Function Generator, 1CH/25MHz	GDS-2000A Series
C21	AFG-225	USB Arbitrary Function Generator, 2CH/25MHz	GDS-2000A Series
D68	APS-001	GPIB interface card	APS-7000 Series
D68	APS-002	RS-232 / USB interface card	APS-7000 Series
D68	APS-003	Output Voltage Capacity (0 ~ 600Vrms)	APS-7000 Series
D68	APS-004	Output Frequency Capacity (45~999.9Hz)	APS-7000 Series
F8	ATA-001	Antenna, General FM Antenna, BNC(M)	GSP-Series
F8	ATN-100	Adaptor, 10dB Attenuator, 50Ω, N(J/F)-N(P/M)	GSP-Series
A18	DS2-08LA	8-Channel Logic Analyzer, Includes 8-channel Logic analyzer card(GLA-08) and 8 channel Logic analyser probe(GTL-08LA)	GDS-2000A Series
A18	DS2-16LA	16-Channel Logic Analyzer, Includes 16-channel Logic analyzer card(GLA-16) and 16 channel Logic analyser probe(GTL-16LA)	GDS-2000A Series
A18	DS2-FGN	DDS Function Generator, 5MHz, sine/square/triangle/pulse function	GDS-2000A Series
A18	DS2-FH1	Module extension bay & USB Type A to Type A/B cable	GDS-2000A Series, AFG-200/100 Series
A18	DS2-GPIB	GPIB Interface	GDS-2000A Series
A18	DS2-LAN	Ethernet & SVGA Output	GDS-2000A Series
A10	DS3-PWR	Power Analysis Software: Power quality/Harmonic/Ripple/In-rush current	GDS-3000 Series
A10	DS3-SBD	Serial Bus Analysis software I2C / SPI/ UART (for 4 channel model only)	GDS-3000 Series
F8	GAK-001	Adaptor, 50Ω Termination, N(P/M)	GSP-Series
F8	GAK-002	Adaptor, Cap with Chain, N(P/M)	GSP-Series
F8	GAK-003	Adaptor, 50Ω Termination, BNC(P/M)	GDS-3000 Series, GDS-2000A Series, GDS-2000E Series, GDS-1000A-U Series, GDS-1000-U
A32	GAP-001	AC-DC Adaptor	GDS-300/200 Series
F8	GAP-802	Preamplifier, 20dB Preamplifer, 9kHz ~ 3GHz, N(P/M)	GSP-830
B22	GBK-001	GRF-1300 Experiment Text Book of Teacher Version	GRF-1300
B22	GBK-002	GRF-1300A Experiment Text Book of Teacher Version	GRF-1300A
A32	GCL-001	Vertical Calibration Cable	GDS-300/200 Series
F7	GCP-005	Current Probe, 40Hz ~ 1kHz, 5A, Current Probe	GDS-3000 Series, GDS-2000A Series, GDS-2000E Series, GDS-1000A-U Series, GDS-1000-U
F7	GCP-020	Current Probe, DC ~ 100KHz, 10A, Current Probe	GDS-3000 Series, GDS-2000A Series, GDS-2000E Series, GDS-1000A-U Series, GDS-1000-U
F7	GCP-100	Current Probe, 40Hz ~ 10KHz, 20A, Current Probe	GDS-3000 Series, GDS-2000A Series, GDS-2000E Series, GDS-1000A-U Series, GDS-1000-U
F7	GCP-1030	Current Probe, DC ~ 100MHz, 30Arms, Current probe	GDS-3000 Series, GDS-2000A Series, GDS-2000E Series, GDS-1000A-U Series, GDS-1000-U
F7	GCP-206P	Current Probe - Power Supply, 2 Channel Power Supply for GCP-530/1030	GDS-3000 Series, GDS-2000A Series, GDS-2000E Series, GDS-1000A-U Series, GDS-1000-U
F7	GCP-425P	Current Probe - Power Supply, 4 Channel Power Supply for GCP-530/1030	GDS-3000 Series, GDS-2000A Series, GDS-2000E Series, GDS-1000A-U Series, GDS-1000-U
F7	GCP-530	Current Probe, DC ~ 50MHz, 30Arms, Current Probe	GDS-3000 Series, GDS-2000A Series, GDS-2000E Series, GDS-1000A-U Series, GDS-1000-U
A66	GDB-03	Digital Storage Oscilloscope Demo Kit	GDS-3000 Series, GDS-2000A Series, GDS-2000E Series
A67	GDB-02	Digital Storage Oscilloscope Demo Kit	GDS-1000A-U Series, GDS-1000-U Series
E5	GDM-01	Calibration Key	GDM-8261A/8255A/8251A
E5	GDM-SC1	Scanner Card, 16+2 Channel Testing	GDM-8261A/8255A/8251A
F7	GDP-025	Differential Probe, 25M High Voltage Differntial Probe	GDS-3000 Series, GDS-2000A Series, GDS-2000E Series, GDS-1000A-U Series
A32	GDP-040D	Differential Probe, 40M High Voltage Differntial Probe, Suitable for GDS-300/200	GDS-300/200 Series
F7	GDP-050	Differential Probe, 50M High Voltage Differntial Probe	GDS-3000 Series, GDS-2000A Series, GDS-2000E Series, GDS-1000A-U Series, GDS-1000-U
F7	GDP-100	Differential Probe, 100M High Voltage Differntial Probe	GDS-3000 Series, GDS-2000A Series, GDS-2000E Series, GDS-1000A-U Series, GDS-1000-U
D15	GET-001	Extended terminal for 30V/80V/160V models	PSW-Series
D15	GET-002	Extended terminal for 250V/800V models	PSW-Series
E53	GHT-108	H.V. Wiring Lead, 500mm	GSB-01/02
E53	GHT-109	G.B. Wiring Lead, 450mm	GSB-01/02
F11	GHT-113	High Voltage Test Pistol, Approx. 1000m	GPT-Series
E46	GHT-114	High Voltage Test Lead, Clip High Voltage Probe, Approx. 1000mm	GPT-Series
E54	GHT-116B	High Voltage Test Lead, Color Black, 1500mm	GSB-01/02
E54	GHT-116R	High Voltage Test Lead, Color Red, 1500mm	GSB-01/02
F11	GHT-205	High Voltage Test Lead, High Voltage Test Probe	GPT-Series
F8	GKT-001	General Kit Set, Including ADP-002, ATN-100, GTL-303, GSC-002	GSP-Series
F8	GKT-002	CATV Kit Set, Including ADP-001, ADP-101, GTL-304, GSC-003	GSP-Series
F8	GKT-003	RLB Kit Set, Including GAK-001, GAK-002, GTL-302, GSC-004	GSP-Series
F8	GKT-008	EMI Probe Kit Set, Including ANT-04. ANT-05, PR-01, PR-02, ADP-002, GTL-303	GSP-Series
F5	GKT-100	Deskew fixture	GDS-3000 Series
A18	GLA-08	Logic Analyzer Card, 8-Channel Logic Analyzer Card for DS2-8LA	GDS-2000A Series
A18	GLA-16	Logic Analyzer Card, 16-Channel Logic Analyzer Card for DS2-16LA	GDS-2000A Series
E57	GLC-01	Alligator Clips	GLC-9000 Series
E57	GLC-02	Foil Probe	GLC-9000 Series
C22	GPA-501	Power Adapter, DC Output: 5V/2A	AFG-200/100 Series
C22	GPA-502	Universal Power Adapter, DC Output: 5V/2A	AFG-200/100 Series
A32	GPF-700	Protection Films for 7" Touch Screen	GDS-300/200 Series
D58	GPS-001	Knob, Voltage/Current Protection Knob	GPS-x303 Series, SPD-3606
D20	GPW-001	UL/CSA Power Cord, 3000mm	PSU-Series
D20	GPW-002	VDE Power Cord, 3000mm	PSU-Series
D20	GPW-003	PSE Power Cord, 3000mm	PSU-Series
F12	GRA-401	Rack Adapter Kit, 19", 4U Size	GPC-Series, GPR-M Series, PPE-3323, PPS-3635, PPT-Series, PEL-300
F12	GRA-402	Rack Adapter Kit, 19", 4U Size	LCR-800 Series
F12	GRA-403	Rack Adapter Kit, 19", 4U Size	PSH-Series
F12	GRA-404	Rack Adapter Kit, 19", 4U Size	GSP-830, LCR-8000G Series
F12	GRA-407	Rack Adapter Kit, 19", 4U Size	PSM-Series, PST-Series
F13	GRA-408	Rack Adapter Kit, 19", 4U Size	PSS-Series
F13	GRA-409	Rack Adapter Kit, 19", 4U Size	APS-1102A
F13	GRA-410-E	Rack Adapter Kit (EIA), 19", 3U Size	PSW-Series
F13	GRA-410-J	Rack Adapter Kit (JIS), 19", 3U Size	PSW-Series
F13	GRA-411	Rack Adapter Kit, 19", 6U Size	GDS-3000 Series
F14	GRA-413	Rack Adapter Kit (EIA+JIS), 19", 3U Size for PEL-3211	PEL-3000 Series
F14	GRA-414-E	Rack Adapter Kit (EIA), 19", 3U Size for PEL-3021/3041/3111	PEL-3000 Series
F14	GRA-414-J	Rack Adapter Kit (JIS), 19", 3U Size for PEL-3021/3041/3111	PEL-3000 Series
F14	GRA-415	Rack Adapter Kit, 19", 6U Size	GSP-9300
F15	GRA-417	Rack Adapter Kit, 19", 4U Size	GPT-9000 Series
F15	GRA-419-E	Rack Adapter Kit (EIA), 19", 2U Size	PCS-1000
F15	GRA-419-J	Rack Adapter Kit (JIS), 19", 2U Size	PCS-1000
F15	GRA-420	Rack Adapter Kit, 19", 6U Size	GDS-2000A Series

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PAGE	MODEL	DESCRIPTION	APPLICABLE DEVICE
F15	GRA-422	Rack Adapter Kit, 19", 2U Size	GDM-8261A/8255A/8351/834x Series
F16	GRA-423	Rack Adapter Kit, 19", 2U Size	APS-7000 Series
F16	GRA-424	Rack Adapter Kit, 19", 2U Size	PSB-2000 Series
D27	GRJ-1101	Local Bus	PSB-2000 Series
D20	GRM-001	Slide bracket 2pcs / set	PSU-Series
E53	GSB-01	8-CH High Voltage Scanner Box, for GPT-9800/9900/9900A	GPT-9900/9800 Series
E53	GSB-02	6-CH High Voltage and 2-CH Ground Bond Scanner Box, for GPT-9800/9900/9900A	GPT-9900/9800 Series
B15	GSC-001	Soft Carrying Case	GSP-830
A42	GSC-006	Soft carrying case	GDS-1000A-U Series, GDS-1000-U Series
A10	GSC-008	Soft carrying case	GDS-3000 Series, GDS-2000A Series
B5	GSC-009	Soft Carrying Case	GSP-9300
A32	GSC-010	Soft Carrying Case	GDS-300/200 Series
A32	GSC-011	Soft Carrying Bag	GDS-300/200 Series
F16	GTC-001	Instrument Cart, 120V Input Socket, Self Loading 30kg	All Products
F16	GTC-002	Instrument Cart, 120V Input Socket, Self Loading 30kg	All Products
A18	GTL-08LA	Logic Analyzer Probe, 8-Channel Logic Analyzer Probe for DS2-8LA	GDS-2000A Series
F9	GTL-101	Test Lead, BNC(P/M) to Alligator Test Lead, 1100mm	AFG-Series, SFG-Series, GFG-Series, GFC-Series, GVT-Series
F9	GTL-103	Test Lead, Banana to Alligator Test Lead, 1200mm	GAG-800 Series, GAD-201G
F9	GTL-104A	Test Lead, U-type to Alligator Test Lead, Max. Current 10A, 1000mm	PSM/PSP/PSS/PST/GPC/GPD/GPR/GPS/PPT-Series, PPS-3635, SPD-3606
F9	GTL-105A	Test Lead, Alligator to Banana Test Lead, Max. Current 3A, 1000mm	AFG-200/100 Series, PSS/PST/GPC/GPD/GPR/GPS/PPT-Series, PPE-3323, SPD-3606, PCS-
E23	GTL-107A	Test Lead, Banana to Probe Test Lead, 1100mm	GDM-8135/8034
E5	GTL-108A	Test Lead, Banana to Kelvin Test Lead, 4W Type, 1100mm	GDM-8261A/8255A/8351, GOM-802/801H
F9	GTL-110	BNC Cable, BNC(P/M)-BNC(P/M), 1000mm	GDS-3000 Series, GDS-2000A Series, GDS-2000E Series, GDS-1000A-U Series, GDS-1000-U Series, GRS-6000A Series, GOS-Series, GSP-Series, AFG-Series, SFG-Series, GFG-Series,
F9	GTL-115	Test Lead, U-type to Alligator Test Lead, Approx. 1000mm	GPT-9900/9800 Series
E53	GTL-116B	G.B. Test Lead, Color Black, 1500mm	GSB-01/02
E53	GTL-116R	G.B. Test Lead, Color Red, 1500mm	GSB-01/02
F9	GTL-117	Test Lead, Banana to Probe Test Lead, 1200mm	PPH-1503, GDM-8245, GDM-400/300 Series
F9	GTL-120	Test Lead, O-type to O-type Test Lead, Max. 40A, 1200mm	PEL-3000 Series, PEL-2000 Series
F9	GTL-121	Sense Lead, O-type to free Lead, 1200mm	PEL-2000 Series
F9	GTL-122	Test Lead, U-type to Alligator Test Lead, Max. Current 40A, 1200mm	PSH-Series, GPR-U Series, GPR-H Series
F10	GTL-123	Test Lead, O-type to O-type Test Lead, 1200mm	PSW-Series, APS-7000 Series
E5	GTL-128J	Extension cable, with J-type connector, Approx. 600mm	GDM-8261A/8255A/8351/834x Series
E5	GTL-128K	Extension cable, with K-type connector, Approx. 600mm	GDM-8261A/8255A/8351/834x Series
E5	GTL-128T	Extension cable, with T-type connector, Approx. 600mm	GDM-8261A/8255A/8351/834x Series
D15	GTL-130	Test leads: 2 x red, 2 x black, for 250V/800V models, 1200mm	PSW-Series
A32	GTL-131	Test Clip, Suitable for GDP-040D	GDS-300/200 Series
A18	GTL-16LA	Logic Analyzer Probe, 16-Channel Logic Analyzer Probe for DS2-16LA	GDS-2000A Series
F10	GTL-201A	Ground Lead, Banana to Banana, European Terminal, 200mm	AFG-200/100 Series, PSM Series, GPD-Series, GPS-x303 Series, SPD-3606
F10	GTL-202	Sense Lead, Banana to Banana Lead, European Terminal, 200mm	PSM-Series
F10	GTL-203A	Test Lead, Banana to Alligator, European Terminal, Max. Current 3A, 1000mm	PSS/PST/GPD/GPS/SPS-Series, SPD-3606, PPH-1503
F10	GTL-204A	Test Lead, Banana to Alligator, European Terminal, Max. Current 10A, 1000mm	PSM/PSP/PSS/GPS/PPT/PST/GPD-Series, SPD-3606
E5	GTL-205	Test Lead, Temperature probe adaptor with thermocouple (K-type), Approx. 1000mm	GDM-8261A/8255A/8351/834x Series
E4	GTL-207	Test Lead, Banana to Probe Test Lead, 800mm	GDS-300/200 Series, GDM-8261A/8255A/8351/834x Series, GDM-400/300 Series, GLC-9000 Series, PCS-1000
E52	GTL-215	Test Lead, U-type to Alligator Test Lead, Approx. 1000mm	GCT-9040
F10	GTL-232	RS-232C Cable, 9-pin, F-F Type, null modem, 2000mm	GDS-3000 Series, GDS-2000A Series, GRS-6000A Series, AFG-3000 Series, GFG-8200 Series, PSH/PSM/PSS/PST-Series, APS-7000 Series, PEL-2000 Series, GDM-8261A/8255A/8351/834x Series, LCR-800 Series, GPT-9900/9800 Series, GLC-9000, GOM-
F10	GTL-232A	RS-232C Cable, 9-pin, F-F Type, null modem, 2000mm	PSP-Series
D64	GTL-234	RS-232C Cable, 9-pin, F-F Type, 2000mm	APS-1102A, LCR-8000G Series
E53	GTL-235	Communication Cable, 700mm	GSB-01/02
F10	GTL-240	USB Cable, USB 2.0, A-B Type (L Type), 1200mm	GSP-9300, GSP-730, GRF-1300/1300A, PSW-Series, PSU-Series, APS-1102A, APS-7000 Series, GLC-9000, PCS-1000
F10	GTL-246	USB Cable, USB 2.0, A-B Type, 1200mm	GDS-3000 Series, GDS-2000A Series, GDS-2000E Series, GDS-1000A-U Series, GDS-1000-U Series, GDB-03/02, GSP-9300, GSP-730, GRF-1300/1300A, AFG-Series, PSU-Series, PSB-2000 Series, PPH-1503, GPD-Series, APS-1102A, APS-7000 Series, PEL-3000 Series, PEL-2000 Series, GDM-8351, GDM-834x Series, GLC-9000, PCS-1000
F10	GTL-247	USB Cable, USB 1.1, A-A Type, 1800mm	GDM-8261A/8255A, GPT-9900/9800 Series
F11	GTL-248	GPIB Cable, Double Shielded, 2000mm	GDS-3000 Series, GDS-2000A Series, GSP-9300, GSP-830, AFG-3000 Series, PSB-2000 Series, PPH-1503, PSW/PSU/PSH/PSM/PSS/PST/PPT-Series, PPS-3635, APS-7000 Series, PEL-3000 Series, PEL-2000 Series, GDM-8261A/834x Series, LCR-8000G Series, GPT-9900/9800 Series, GLC-9000, GOM-802, PCS-1000
D86	GTL-249	Frame Link Cable, 300mm	PEL-2000 Series
F11	GTL-250	GPIB Cable, Double Shielded, 600mm	GDS-3000 Series, GDS-2000A Series, GSP-9300, GSP-830, AFG-3000 Series, PSW/PSU/PSH-Series, PSB-2000 Series, APS-7000 Series, GDM-8261A/834x Series, LCR-8000G Series, GPT-9900/9800 Series, GLC-9000, GOM-802, PCS-1000
F11	GTL-251	USB-GPIB Adapter, GPIB-USB-HS, USB 2.0, Hi-Speed USB compliance, 2000mm	GDS-3000 Series, GDS-2000A Series, GSP-9300, GSP-830, AFG-3000 Series, PSB-2000 Series, PPH-1503, PPS-3635, PSW/PSU/PSH/PSM/PSS/PST/PPT-Series, APS-7000 Series, PEL-3000/2000 Series, GDM-8261A/834x Series, LCR-8000G Series, GPT-9900/9800 Series, GLC-9000, GOM-802, PCS-1000
F11	GTL-253	USB Cable, USB 2.0, A-mini B Type, 1400mm	GDS-300/200 Series, GSP-830, USG-Series
D76	GTL-255	Frame Link Cable, 300mm	PEL-3000 Series
F8	GTL-301	RF Cable, RG223 Assembly, 1000mm, N(P/M)	GSP-Series
F8	GTL-302	RF Cable, RG223 Assembly, 300mm, N(P/M)	GSP-Series
F8	GTL-303	RF Cable, RG316 Assembly, 600mm, SMA(P/M)	GSP-Series, GRF-1300/1300A, USG-Series
F8	GTL-304	RF Cable, RG223 Assembly, 280mm, N(P/M) - N(J/F)	GSP-Series
F8	GTL-401	DC Power Cord, DC Power Cord with Lighter Plug, Max. Current 5A	GSP-830
F4	GTP-020A-4	Oscilloscope Probe, 20MHz (10:1/1:1) Switching Passive Probe, BNC(P/M)	GOS-630 & GOS-620, GOS-620FG
F6	GTP-033A	Oscilloscope Probe, 35MHz 1:1 Passive Probe, BNC(P/M)	GDS-3000 Series, GDS-2000A Series, GDS-2000E Series, GDS-1000A-U Series, GDS-1000-U
F4	GTP-060A-4	Oscilloscope Probe, 60MHz (10:1/1:1) Switching Passive Probe, BNC(P/M)	GRS-6000A Series, GOS-Series
F4	GTP-070A-4	Oscilloscope Probe, 70MHz (10:1/1:1) Switching Passive Probe, BNC(P/M)	GDS-2000A Series, GDS-2000E Series, GDS-1000A-U Series, 1000-U Series
F4	GTP-100A-4	Oscilloscope Probe, 100MHz (10:1/1:1) Switching Passive Probe, BNC(P/M)	GDS-2000A Series, GDS-2000E Series, GDS-1000A-U Series, 1000-U Series, GOS-6112/6103/6103C
F4	GTP-150A-2	Oscilloscope Probe, 150MHz (10:1/1:1) Switching Passive Probe, BNC(P/M)	GDS-2000A Series, GDS-2000E Series, GDS-1000A-U Series, 1000-U Series
F5	GTP-150A-4	Oscilloscope Probe, 150MHz (10:1/1:1) Switching Passive Probe, BNC(P/M)	GDS-2000E Series
F5	GTP-150B-2	Oscilloscope Probe, 150MHz (10:1/1:1) Switching Passive Probe, BNC(P/M)	GDS-300/200 Series
F5	GTP-151R	Oscilloscope Probe, 150MHz 10:1 Passive Probe, BNC(P/M)	GDS-3000 Series
F4	GTP-200A-4	Oscilloscope Probe, 200MHz (10:1/1:1) Switching Passive Probe, BNC(P/M)	GDS-3000 Series, GDS-2000A/E Series, GDS-1000A-U Series, 1000-U Series
F5	GTP-250A-2	Oscilloscope Probe, 250MHz (10:1/1:1) Switching Passive Probe, BNC(P/M)	GDS-2000A Series, GDS-2000E Series
F5	GTP-250B-2	Oscilloscope Probe, 250MHz (10:1/1:1) Switching Passive Probe, BNC(P/M)	GDS-300/200 Series
F6	GTP-251R	Oscilloscope Probe, 250MHz 10:1 Passive Probe, BNC(P/M)	GDS-3000 Series
F5	GTP-300A-4	Oscilloscope Probe, 300MHz (10:1/1:1) Switching Passive Probe, BNC(P/M)	GDS-2000E Series

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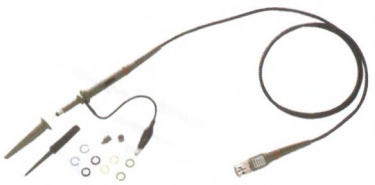
PAGE	MODEL	DESCRIPTION	APPLICABLE DEVICE
F6	**GTP-350A-2**	Oscilloscope Probe, 350MHz (10:1/1:1) Switching Passive Probe, BNC(P/M)	**GDS-2000A Series, GDS-2000E Series**
F6	**GTP-351R**	Oscilloscope Probe, 350MHz 10:1 Passive Probe, BNC(P/M)	**GDS-3000 Series**
F6	**GTP-352R**	Oscilloscope Probe, 350MHz 20:1 Passive Probe, BNC(P/M)	**GDS-3000 Series**
F6	**GTP-501R**	Oscilloscope Probe, 500MHz 10:1 Passive Probe, BNC(P/M)	**GDS-3000 Series**
A10	**GUG-001**	GPIB-USB Adaptor, GPIB to USB adaptor	**GDS-3000 Series, PSW-Series**
A31	**GWS-001**	Wrist Strap	**GDS-300/200 Series**
E34	**LCR-05**	Test Fixture, 4 Wire	**LCR-8000G Series, LCR-800 Series**
E34	**LCR-06A**	Test Fixture, 4 Wire, Kelvin Clip	**LCR-8000G Series, LCR-800 Series**
E34	**LCR-07**	Test Fixture, 2 Wire, Alligator Clip	**LCR-8000G Series, LCR-800 Series**
E34	**LCR-08**	Test Fixture, 4 Wire, SMD/Clip tweezers	**LCR-8000G Series, LCR-800 Series**
E34	**LCR-09**	Test Fixture, 4 Wire, SMD/Chip test fixture	**LCR-8000G Series, LCR-800 Series**
E34	**LCR-12**	Test Fixture, 4Wire, Kelvin Clip	**LCR-8000G Series**
E34	**LCR-13**	Test Fixture, 4 Wire, SMD/Chip test fixture	**LCR-8000G Series, LCR-800 Series**
E66	**PCS-001**	Basic Accessory Kit	**PCS-1000**
D86	**PEL-001**	GPIB Card	**PEL-2000 Series**
F16	**PEL-002**	Rack Mount Kit, PEL-2000 Series Rack Mount Kit	**PEL-2000 Series**
D86	**PEL-003**	Panel Cover	**PEL-2000 Series**
D78	**PEL-004**	GPIB Card	**PEL-3000 Series**
D78	**PEL-010**	Dust filter	**PEL-3000 Series**
D27	**PSB-001**	GPIB Card	**PSB-2000 Series**
D27	**PSB-003**	Parallel connection kit (for horizontal installation), Kit includes: (PSB-007 Joint Kit,Horizontal bus bar x 2 , PSB-005 x1)	**PSB-2000 Series**
D27	**PSB-004**	Parallel connection kit (for vertical installation) Kit includes: (PSB-007 Joint Kit, Verical bus bar x 2, PSB-005 x 1)	**PSB-2000 Series**
D27	**PSB-005**	Parallel Connection Signal Cable	**PSB-2000 Series**
D27	**PSB-006**	Serial Connection Signal Cable	**PSB-2000 Series**
D27	**PSB-007**	Joint Kit: Includes 4 joining plates, [M3x6]screws x 4 ; [M3x8]screw x 2	**PSB-2000 Series**
D27	**PSB-008**	RS232C Cable (PSB-2000 Only)	**PSB-2000 Series**
D20	**PSU-01B**	Bus Bar for 2 units in parallel operation	**PSU-Series**
D20	**PSU-01C**	Cable for 2 units in parallel operation	**PSU-Series**
D20	**PSU-02B**	Bus Bar for 3 units in parallel operation	**PSU-Series**
D20	**PSU-02C**	Cable for 3 units in parallel operation	**PSU-Series**
D20	**PSU-03B**	Bus Bar for 4 units in parallel operation	**PSU-Series**
D20	**PSU-03C**	Cable for 4 units in parallel operation	**PSU-Series**
D20	**PSU-232**	RS232 Cable with DB9 connector kit	**PSU-Series**
D20	**PSU-485**	RS485 Cable with DB9 connector kit	**PSU-Series**
D20	**PSU-GPIB**	PSU GPIB Interface Card (Factory Installed)	**PSU-Series**
D20	**PSU-ISO-I**	Isolated Current Remote Control Card (Factory Installed)	**PSU-Series**
D20	**PSU-ISO-V**	Isolated Voltage Remote Control Card (Factory Installed)	**PSU-Series**
D15	**PSW-001**	Accessory Kits	**PSW-Series**
D15	**PSW-002**	Simple IDC Tool	**PSW-Series**
D15	**PSW-003**	Contact Removal Tool	**PSW-Series**
D15	**PSW-004**	Basic Accessory Kit for 30V/80V/160V models	**PSW-Series**
D15	**PSW-005**	Series Operation Cable for 2 units. (30V/80V/160V models moly)	**PSW-Series**
D15	**PSW-006**	Parallel Operation Cable for 2 units.	**PSW-Series**
D15	**PSW-007**	Parallel Operation Cable for 3 units.	**PSW-Series**
D15	**PSW-008**	Basic Accessory Kit for 250V/800V models	**PSW-Series**
D14	**PSW-009**	Output terminal cover for 30V/80V/160V models	**PSW-Series**
D14	**PSW-010**	Large filter (Type II/III)	**PSW-Series**
D14	**PSW-011**	Output terminal cover for 250V/800V models	**PSW-Series**
D14	**PSW-012**	High voltage output terminal for 250V/800V model	**PSW-Series**
E63	**PT-100**	Temperature Probe, Temperature Sensor	**GOM-802**
B8	**PWS-06**	RF Power Meter, 6.2GHz RF Power Meter, USB DC input, N(J/F)	**GSP-9300**
F8	**RLB-001**	Return Loss Bride, 10MHz - 1GHz, Source/Load: N(J/F), Coupling: N(P/M)	**GSP-9300/830/810**

Accessories

GTP-020A-4

For : GOS-620/620FG,
GOS-630

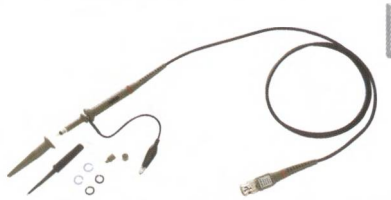


The GTP-020A-4 is a passive high impendence oscilloscope probe designed and calibrated for use on instrument having an input impedance of 1MΩ shunted by 30pF. However, it may be compensated for use with instruments having an input capacitance of 25~45pF. The probe incorporates a two position slide switch in the head which selects attenuation of x1, x10 position.

Item	10:1	1:1
Bandwidth	DC~20MHz(±3dB)	DC~6MHz(±3dB)
Input R	~10MΩ	1MΩ (Oscilloscope)
Input C	~30pF	~170pF
Att. Ratio	1/10	1/1
Max. Input Voltage	< 600 Vpk	< 200 Vpk
Accessories	1.Pincher tip 2.Ground lead 3.Cable Marker 4.Screw driver 5. IC top	

GTP-060A-4

For: GOS-Series,
GRS-6000A Series

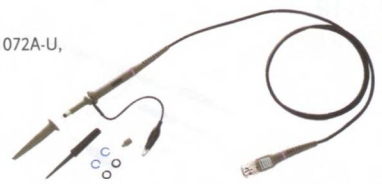


GTP-060A-4 is a x1, x10 attenuator modular probe. Designed for use with DC to 60MHz oscilloscope with input impedance of 1MΩ The probe consists of following separate units;
1. BNC male connector and compensation box.
2. Probe body probe tip and R.C. assemblies.
3. Approx. 1.2M cable

Item	10:1	1:1
Bandwidth	DC~60MHz(±3dB)	DC~6MHz(±3dB)
Input R	~10MΩ	1MΩ (Oscilloscope)
Input C	~30pF	~200pF
Att. Ratio	1/10	1/1
Max. Input Voltage	<300Vpk	<150Vpk
Accessories	1.Pincher tip 2.Ground lead 3.Cable Marker 4.Screw driver 5. IC	

GTP-070A-4

For: GDS-1052-U/1072-U/1072A-U,
GDS-2072A/2074A,
GDS-2072E/2074E



GTP-070A-4 is a x1, x10 attenuator modular probe. Designed for use with DC to 70MHz oscilloscope with input impedance of 1MΩ The probe consists of following separate units;
1. BNC male connector and compensation box.
2. Probe body probe tip and R.C. assemblies.
3. Approx. 1.2M cable

Item	10:1	1:1
Bandwidth	DC~70MHz(±3dB)	DC~6MHz(±3dB)
Input R	~10MΩ	1MΩ (Oscilloscope)
Input C	~32pF	~200pF
Att. Ratio	1/10	1/1
Max. Input Voltage	≤600Vpk	≤200Vpk
Accessories	1.Pincher tip 2.Ground lead 3.Cable Marker 4.Screw driver 5. IC	

GTP-100A-4

For: GDS-2102A/2104A,
GDS-2102E/2104E,
GOS-6103/6103C/6112

The GTP-100A-4 is a passive high impendence oscilloscope probe designed and calibrated for use on instrument having an input impedance of 1MΩ shunted by 20pF. However, it may be compensated for use with instruments having an input capacitance of 10~35pF.The probe incorporates a two position slide switch in the head which selects attenuation of x1, x10 position.

Item	10:1	1:1
Bandwidth	DC~100MHz(±3dB)	DC~6MHz(±3dB)
Input R	~10MΩ	1MΩ (Oscilloscope)
Input C	~17pF	~47pF
Att. Ratio	1/10	1/1
Max. Input Voltage	DC 500V CAT I, 300V CAT II	DC 300V CAT I, 150V CAT II
Accessories	1.Channel identifier clip 2.hook 3.Ground lead 4.Insulating tip 5.IC tip 6.Adjusting tool 7.earth tip	

GTP-150A-2

For: GDS-1152A-U,
GDS-2102A/2104A

The GTP-150A-2 is a passive high impendence oscilloscope probe designed and calibrated for use on instrument having an input impedance of 1MΩ shunted by 20pF. However, it may be compensated for use with instruments having an input capacitance of 10~35pF. The probe incorporates a two position slide switch in the head which selects attenuation of x1, x10 position.

Item	10:1	1:1
Bandwidth	DC~150MHz(±3dB)	DC~6MHz(±3dB)
Input R	~10MΩ	1MΩ (Oscilloscope)
Input C	~17pF	~47pF
Att. Ratio	1/10	1/1
Max. Input Voltage	500V CAT I, 300CAT II	300V CAT I, 150CAT II
Accessories	1.Channel identifier clip 2.hook 3.Ground lead 4.Insulating tip 5.IC tip 6.Adjusting tool 7.earth tip	

GTP-150B-2

For: GDS-300/200 Series

The GTP-150B-2 is a passive high impendence oscilloscope probe designed and calibrated for use on instrument having an input impedance of 1MΩ shunted by 20pF. However, it may be compensated for use with instruments having an input capacitance of 10~35pF. The probe incorporates a two position slide switch in the head which selects attenuation of x1, x10 position.

Item	10:1	1:1
Bandwidth	DC~150MHz(±3dB)	DC~6MHz(±3dB)
Input R	~10MΩ	1MΩ (Oscilloscope)
Input C	~17pF	~47pF
Att. Ratio	1/10	1/1
Max. Input Voltage	500V CAT I, 300CAT II	300V CAT I, 150CAT II
Accessories	1.Channel identifier clip 2.hook 3.Ground lead 4.Insulating tip 5.IC tip 6.Adjusting tool 7.earth tip	

Ordering Guide

If an accessory is ordered separately from the main product, please indicate the nomenclature of the accessory when placing order.

Example : GSC-006 Soft Carrying Case for GDS-1000A-U Series

If an accessory is ordered along with the main product, please indicate the option number of the accessory when placing order.

Example : GDS-3352 350MHz, 2-Channel, Visual Persistance DSO , GSC-008 Soft Carrying Case

Accessories

GTP-150A-4

For: GDS-2102E/2104E Series

The GTP-150A-4 is a passive high impendence oscilloscope probe designed and calibrated for use on instrument having an input impedance of 1MW shunted by 20pF.
However, it may be compensated for use with instruments having an input capacitance of 10~35pF. Connect this sentence to the end of the previous sentence.

Item	10:1	1:1
Bandwidth	DC~150MHz(±3dB)	DC~10MHz(±3dB)
Input R	~10MΩ	1MΩ (Oscilloscope)
Input C	8.5~18.5pF	45~65pF
Att. Ratio	1/10	1/1
Max. Input Voltage	600V CAT Ⅱ	200V CAT Ⅱ
Accessories	1.Channel identifier clip 2.hook 3.Ground lead 4.Insulating tip 5.IC tip 6.Adjusting tool 7.earth tip	

GTP-200A-4

For: GDS-Series

The GTP-200A-4 is a passive high impendence oscilloscope probe designed and calibrated for use on instrument having an input impedance of 1MΩ shunted by 20pF. However, it may be compensated for use with instruments having an input capacitance of 10~35pF.The probe incorporates a two position slide switch in the head which selects attenuation of x1, x10 position.

Item	10:1	1:1
Bandwidth	DC~100MHz(±3dB)	DC~6MHz(±3dB)
Input R	~10MΩ	1MΩ (Oscilloscope)
Input C	~17pF	~47pF
Att. Ratio	1/10	1/1
Max. Input Voltage	DC 500V CAT Ⅰ, 300V CAT Ⅱ	DC 300V CAT Ⅰ, 150V CAT Ⅱ
Accessories	1.Channel identifier clip 2.hook 3.Ground lead 4.Insulating tip 5.IC tip 6.Adjusting tool 7.earth tip	

GTP-250A-2

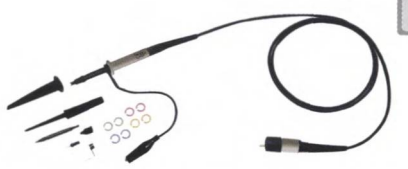
For: GDS-2202A/2204A

The GTP-250A-2 is a passive high impendence oscilloscope probe designed and calibrated for use on instrument having an input impedance of 1MW shunted by 20pF.
However, it may be compensated for use with instruments having an input capacitance of 10~35pF. Connect this sentence to the end of the previous sentence.

Item	10:1	1:1
Bandwidth	DC~250MHz(±3dB)	DC~6MHz(±3dB)
Input R	~10MΩ	1MΩ (Oscilloscope)
Input C	~17pF	~47pF
Att. Ratio	1/10	1/1
Max. Input Voltage	500V CAT Ⅰ, 300CAT Ⅱ	300V CAT Ⅰ, 150CAT Ⅱ
Accessories	1.Channel identifier clip 2.hook 3.Ground lead 4.Insulating tip 5.IC tip 6.Adjusting tool 7.earth tip	

GTP-151R

For : GDS-3000 Series



The GTP-151R is compatible with readout function oscilloscopes that automatically detect and display the attenuation factor of the probe.

Item	10:1
Bandwidth	DC~150MHz(±3dB)
Input R	~10MΩ
Input C	~12pF
Att. Ratio	1/10
Max. Input Voltage	< 500 Vpk
Accessories	1.Channel identifier clip 2.Sprung hook 3.Ground lead 4.Insulating tip 5.IC tip 6.Adjusting tool 7.Measuring tip 8. Sprung earth tip

GTP-250B-2

For: GDS-300/200 Serie

The GTP-250B-2 is a passive high impendence oscilloscope probe designed and calibrated for use on instrument having an input impedance of 1MW shunted by 20pF.
However, it may be compensated for use with instruments having an input capacitance of 10~35pF. Connect this sentence to the end of the previous sentence.

Item	10:1	1:1
Bandwidth	DC~250MHz(±3dB)	DC~6MHz(±3dB)
Input R	~10MΩ	1MΩ (Oscilloscope)
Input C	~17pF	~47pF
Att. Ratio	1/10	1/1
Max. Input Voltage	500V CAT Ⅰ, 300CAT Ⅱ	300V CAT Ⅰ, 150CAT Ⅱ
Accessories	1.Channel identifier clip 2.hook 3.Ground lead 4.Insulating tip 5.IC tip 6.Adjusting tool 7.earth tip	

GTP-300A-4

For: GDS-2202E/2204E Series

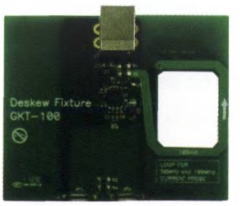
The GTP-300A-4 is a passive high impendence oscilloscope probe designed and calibrated for use on instrument having an input impedance of 1MΩ shunted by 20pF. However, it may be compensated for use with instruments having an input capacitance of 10~35pF. The probe incorporates a two position slide switch in the head which selects attenuation of x1, x10 position.

Item	10:1	1:1
Bandwidth	DC~300MHz(±3dB)	DC~10MHz(±3dB)
Input R	~10MΩ	1MΩ (Oscilloscope)
Input C	8.5~18.5pF	45~65pF
Att. Ratio	1/10	1/1
Max. Input Voltage	600V CAT Ⅱ	200V CAT Ⅱ
Accessories	1.Channel identifier clip 2.hook 3.Ground lead 4.Insulating tip 5.IC tip 6.Adjusting tool 7.earth tip	

GKT-100 Deskew Fixture

The GKT-100 deskew fixture is used to compensate for the propagation delay between a passive voltage probe and current probe. It is used with the GDS-3000 Series, Required tools.

1.GDS-3000 x 1
2.GKT-100 x 1
3.USB type A-B cable x1 -used for deskew fixture
4.Standard passive probe x1
5.Current probe x1 (GCP-530 or GCP-1030)

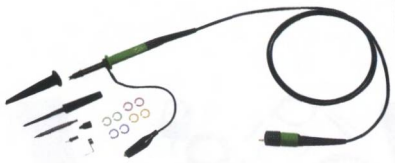


ACCESSORIES

Accessories

GTP-251R

For: GDS-3000 Series



The GTP-251R is compatible with readout function oscilloscopes that automatically detect and display the attenuation factor of the probe.

Item	10:1
Bandwidth	DC~250MHz(±3dB)
Input R	~10MΩ
Input C	~12pF
Att. Ratio	1/10
Max. Input Voltage	DC 500V CAT I, 300V CAT II
Accessories	1.Channel identifier clip 2.Sprung hook 3.Ground lead 4.Insulating tip 5.IC tip 6.Adjusting tool 7.Measuring tip 8. Sprung earth tip

GTP-351R/352R

For: GDS-3000 Series

Both GTP-351R and GTP-352R are passive high impendence oscilloscope probes designed and calibrated for use on instrument. GTP-351R has an input impendence of 1 MΩ shunted by 20pF while GTP-352R has an input impendence of 1 MΩ shunted by 15pF. However, GTP-351R may be compensated for use with instruments having an input capacitance of 10~35pF while GPT-352R has an input impendence of 10~30pF.

	GTP-351R	GTP-352R
Item	10:1	20:1
Bandwidth	DC~350MHz	DC~350MHz
Input R	~10MΩ	~10MΩ
Input C	~12pF	~7pF
Att. Ratio	1/10	1/20
Max. Input Voltage	500V CAT I , 300CAT II	1kV CAT II
Accessories	1.Channel identifier clip 2.Sprung hook 3.Ground lead 4.Insulating tip 5.IC tip 6.Adjusting tool 7.Measuring tip 8. Sprung earth tip	

GTP-501R

For: GDS-3000 Series
GDS-2000A Series

The GTP-501R is a passive high impendence oscilloscope probe designed and calibrated for use on instrument having an input impedance of 1MW shunted by 13pF.
However, it may be compensated for use with instruments having an input capacitance of 8~20pF. Connect this sentence to the end of the previous sentence.

Item	10:1
Bandwidth	DC~500MHz
Input R	~10MΩ
Input C	~11.5pF
Att. Ratio	1/10
Max. Input Voltage	500V CAT I, 300V CAT II
Accessories	1.Channel identifier clip 2.Sprung hook 3.Ground lead 4.Insulating tip 5.IC tip 6.Adjusting tool 7.Measuring tip 8. Sprung earth tip

GTP-033A

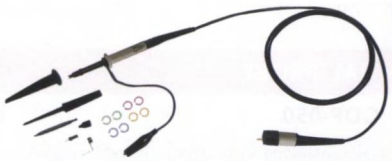
For: GDS-3000 Series

GTP-033A is a x 1, attenuator modular probe. Designed for use with DC to 35MHz oscilloscope with input impedance of 1MΩ The probe consists of following separate units;
1. BNC male connector and compensation box.
2. Approx. 1.2M cable

Item	1:1
Bandwidth	DC~35MHz(±3dB)
Input R	1MΩ (Oscilloscope)
Input C	~83pF
Att. Ratio	1/1
Max. Input Voltage	<300 CATI
Accessories	1.Channel Identifier Clip 2.Sprung Hook 3.Ground Lead 4.Insulating Tip 5. IC Tip

GTP-350A-2

For: GDS-3000 Series
GDS-2302A/2304A



The GTP-352A-2 is a passive high impendence oscilloscope probe designed and calibrated for use on instrument having an input impedance of 1MΩ shunted by 15pF.
However, it may be compensated for use with instruments having an input capacitance of 10~30pF.
Connect this sentence to the end of the previous sentence.

Item	10:1	1:1
Bandwidth	DC~350MHz	DC~6MHz
Input R	~10MΩ	~1MΩ
Input C	~13pF	~46pF
Att. Ratio	1/10	1/1
Max. Input Voltage	500V CAT I, 300VAC II	300V CAT I, 150VAC II
Accessories	1.Channel identifier clip 2.Sprung hook 3.Ground lead 4.Insulating tip 5.IC tip 6.Adjusting tool 7.Measuring tip 8. Sprung earth tip	

Accessories

Current Probe and Differential Probe Selections

GCP-005/100/020

GCP-530/1030 & GCP-206P/425P

GDP-025

GDP-050/100

In addition to the standard passive probes, the optional current or differential probes can be used to perform additional tests or power analysis. The differential probes come in three bandwidths: 25MHz, 50MHz and 100MHz. The current probes come in a broad variety of bandwidth and current ranges (ranging from 50MHz/30A, 100MHz/30A, 10kHz/200A and 100kHz/100A), to cover any number of power supply testing applications.

** The GCP-530/1030 must be used in conjunction with the GCP-206P/425P current probe power supply.*

** The GCP-100 requires a standard 9V battery; The GCP-005 and GCP-020 do not require batteries or a power supply source.*

CURRENT PROBE

	GCP-005	GCP-100	GCP-020	GCP-530	GCP-1030
Probe Bandwidth	40Hz~1kHz	DC~100kHz	40Hz~40kHz	DC~50MHz	DC~100MHz
Rise Time	–	–	–	7ns or less	3.5ns or less
Maximum Continuous Input Range	5A	0.05~10A(100mV/A) 1~100A(10mV/A)	0.1~24A(100mV/A) 0.5~240A(10mV/A)	30Arms	30Arms
Maximum Peak Current Value	50A	100A	60A(100mV/A) 600A(10mV/A)	50Arms	50Arms
Output Voltage Rate	10mV/A	100mV/A;10mV/A	10mV/A;100mV/A	0.1V/A	0.1V/A
Amplitude Accuracy	±0.5%rdg ±0.1mV (50/60Hz) ±1.0%rdg ±0.2mV (40~1kHz)	≤3%±5mV (50mA~10A peak) ≤4%±500μV (0.5A~40A peak) ≤15%(40~100A peak)	≤2%±50mV (100mA~20A peak) ≤3.5%±5mV (0.5~10A peak) ≤3%±5mV (10~40A peak) ≤1.5%±5mV (100A~240A peak)	±1.0%rdg±1mV (0~30Arms/DC, 45~66Hz);±2.0%rdg (30Arms~50A peak /DC, 45~66Hz)	±1.0%rdg±1mV (0~30Arms/DC, 45~66Hz);±2.0%rdg (30Arms~50A peak /DC, 45~66Hz)
Noise	–	–	–	2.5mArms or less	2.5mArms or less
Rate Supply Voltage	–	–	–	±12V± 0.5V	±12V± 0.5V
Maximum Rated Power	–	–	–	5.6VA	5.3VA
Maximum Rated Voltage	600V, CAT III	600V, CAT III	600V, CAT III	300V, CAT I	300V, CAT I

CURRENT PROBE POWER SUPPLY

	GCP-206P	GCP-425P
Compatible Current Probe	GCP-530 GCP-1030	GCP-530 GCP-1030
Number of Power Supply Connectors	2	4
Output Voltage	±12V± 0.5V	±12V± 0.5V
Rated Output Current	±600mA	±2.5A
Rated Supply Voltage (50/60Hz)	110V/120V, 220V/240V AC±10%	100V~240V AC±10%
Maximum Rated Power	20VA	170VA
Dimensions & Weight	73(W)x110(H)x 186(D)mm ; Approx.1.1kg	80(W)x119(H)x 200(D) mm ; Approx.1.1kg
Accessories	Power cord, fuse	Power cord, fuse

HIGH-VOLTAGE DIFFERENTIAL PROBE

	GDP-025	GDP-050	GDP-100
Probe Bandwidth	DC ~ 25MHz(attenuationx50, x200) ; DC ~ 15MHz(attenuationx20)	DC ~ 50MHz(attenuationx200, x500, x1000) ; DC ~ 25MHz(attenuationx100)	DC ~ 100MHz(attenuationx200, x500 , x1000); DC ~ 50MHz(attenuationx100)
Attenuation	x20 , x50 , x200	x100 , x200 , x500 , x1000	x100 , x200 , x500 , x1000
Accuracy	±2%	±2%	±2%
Voltage Input Range (DC+AC peak to peak)	≤140Vp-p for x 20 , ≤350Vp-p for x 50 , ≤1400Vp-p for x 200	≤ 700Vp-p for x 100 ≤ 1400Vp-p for x 200 ≤ 3500Vp-p for x 500 ≤ 7000Vp-p for x 1000	≤ 700Vp-p for x 100 ≤ 1400Vp-p for x 200 ≤ 3500Vp-p for x 500 ≤ 7000Vp-p for x 1000
Permitted Max Input Voltage	Maximum differential voltage: Max voltage between input terminal and ground: 600Vrms	Maximum differential voltage: Max voltage between input terminal and ground: 6500Vrms	Maximum differential voltage: Max voltage between input terminal and ground: 6500Vrms
Input Impedance	Differential:4MΩ/1.2pF ; Between terminals and ground: 2MΩ/2.3pF	Differential:54MΩ/1.2pF ; Between terminals and ground:27MΩ/2.3pF	Differential: 54MΩ/1.2pF ; Between terminals and ground: 27MΩ/2.3pF
Output	≤7.0V	≤7.0V	≤7.0V
Output impedance	50Ω	50Ω	50Ω
Rise Time	14ns (x50, x200 attenuation) ; 23.4ns (x20 attenuation)	7ns (x200, x500, x1000 attenuation) ; 14ns (x100 attenuation)	3.5ns (x200, x500, x1000 attenuation) ; 7ns (x100 attenuation)
Rejection Rate on Common Mode (CMRR)	60Hz>80dB , 100Hz>60dB, 1MHz>50dB	60Hz>80dB , 100Hz>60dB, 1MHz>50dB	60Hz>80dB , 100Hz>60dB, 1MHz>50dB
Power Supply	External DC adapter	External DC adapter	External DC adapter
Consumption	Maximum 35mA (0.4Watt)	Maximum 35mA (0.4Watt)	Maximum 35mA (0.4Watt)

Accessories

GAP-802 Preamplifier

Preamplifier with 20dB(Typical 9kHz ~ 3GHz)
For: GSP-830

Parameter	Term	Minimum	Typical	Maximum	Unit
Frequency Range	f_o	0.009	---	3	GHz
Gain	G_P	15	20	---	dB
Output 1dB-Compression Point	P_{1dB}	+13.4	+16.4	---	dBm
Standing Wave Ratio	SWR	< 2:1	---	<1.2:1	---
3rd Order Intercept Point	IP_3	+24	+30	---	dBm
Noise Figure	NF	---	3.5	3.7	dB
Device Current	I_C	76	80	85	mA

RLB-001

Return Loss Bridge
10MHz ~ 1GHz
For: GSP-Series

Frequency Range	10MHz ~ 1GHz
Directivity	10MHz ~ 100MHz : >48dB ; 100MHz ~ 1000MHz : >38dB
Insertion Loss	Source to Load : <10dB ; Load to Coupler : <6dB
Return Loss	Source Return Loss : >7dB ; Load Return Loss : >11dB Coupler Return Loss : >17dB
Characteristic Impedance	50 Ohm
Connector	N Type ; Source and Load : Female ; Coupler : Male
Dimension & Weight	88 x 54 x 32 (mm) , 230 g

GKT-008 EMI Probe Kit Set

ADP-002 : Adaptor SMA(J/F) ~ N (P/M) x 1
GTL-303 : RF Cable SMA(P/M) ~ SMA(P/M) x 1
PR-01 : AC Voltage Probe x 1
PR-02 : Touch Passive RF Probe x 1
ANT-04 : H-field Probe x 1
ANT-05 : H-field Probe x 1
For: GSP-Series

GKT-001 General Kit Set

ADP-002
ATN-100
GTL-303
GSC-002
For:GSP-Series

GKT-002 CATV Kit Set

ADP-001
ADP-101
GTL-304
GSC-003
For:GSP-Series

GKT-003 RLB Kit Set

GAK-001
GAK-002
GTL-302
GSC-004
For:GSP-Series

ADP-001

Adaptor
BNC(J/F)~N(P/M)
For:GSP-Series

ADP-002

Adaptor
SMA(J/F)~N(P/M)
For:GSP-Series

GAK-001

Termination 50Ω
N (P/M)
For:GSP-Series

GAK-002

Cap with Chain
N (P/M)
For:GSP-Series

ADB-002

DC Block BNC 50Ω 10MHz~2.2GHz
For: GSP-9300

ADB-006

DC Block N-TYPE 50Ω 10MHz~6GHz
For: GSP-9300

ADB-008

DC Block SMA 50Ω 0.1MHz~8GHz
For: GSP-9300

GAK-003

50Ω Impedance Adaptor
For:GDS-Series,
GSP-Series

ADP-101

BNC(J/F) 75Ω ~
BNC(P/M) 50Ω
For:GSP-Series
(An additional ADP-001 is needed for fitting GSP spectrum analyzers)

ATN-100

10dB Attenuator
N(J/F) ~ N(P/M)
For:GSP-Series

GTL-401

DC Power Cord with DC Jack and Lighter Plug, Current 5A
For: GSP-830

ATA-001

BNC Antenna
For:GSP-Series
(An additional ADP-001is needed for fitting GSP spectrum analyzers)

GTL-301

RF Cable (RG 223 N(P/M) , 1000mm)
For:GSP-Series

GTL-302

RF Cable Assembly (RG223, N(P/M), 300mm)
For:GSP-Series

GTL-303

RF Cable Assembly (SMA(P/M),RG316, 600mm)
For: GSP-Series, USG-Series
(An additional ADP-002 is needed for fitting GSP spectrum analyzers)

GTL-304

RF Cable Assembly (Rg223, N(P/M) ~N(J/F),280mm)
For: GSP-Series

Accessories

GTL-101

Approx. 1100mm
For: GOS-620FG, GVT-427B/417B, SFG-2000 Series, SFG-1000 Series, GFG-8000 Series, GFC-8000 Series, AFG-Series

GTL-103

Approx. 1200mm
For: GAG-809/810, GAD-201G

GTL-104A

Approx. 1000mm ; Max. Current 10A
For: PSP-Series, PST-Series, PSS-Series, PSM-Series, GPR-U/H/M Series, GPS-Series, GPC-Series

GTL-105A

Approx. 1000mm ; MAX Current 3A
For: GPR-U/H/M Series, GPC-Series, GPS-Series, PPE-Series, PPS-Series, PPT-Series, PSS-Series, PST-Series

GTL-110

Approx. 1000mm
For: GDS-2000 Series, GOS-Series, GDS-1000-U/1000A-U Series, GRS-Series, GFC-8131H/8270H, GSP-Series, SFG-Series, AFG-Series

GTL-115

Approx. 1000mm
For: GPT-9904/9804

GTL-117

Approx. 1200mm
For: GDM-8245

GTL-120

Approx. 1200mm, MAX. Current 40A
For: PEL-3000 Series, PEL-2000 Series

GTL-121

Approx. 1200mm, Voltage sense lead
For: PEL-2000 Series

GTL-122

Approx. 1200mm, MAX. Current 40A
For: PSH-Series, GPR-U Series, GPR-H Series

Accessories

GTL-123 Test Lead

Approx. 1200mm , MAX. Current 40A
For: PSW-Series

GTL-202 Sense Lead (European Terminal)

Approx. 200mm
For: PSM-Series

GTL-201A Ground Lead (European Terminal)

Approx. 200mm
For: GPS-2303/3303/4303, PSM-Series,
GPS-3030/3030D/3030DD, AFG-225P/125P

GTL-203A (European Terminal)

Approx. 1000mm , MAX. Current 3A
For: PSS-Series, PST-Series,
SPS-Series

GTL-232 RS-232C Cable

Approx. 2000mm
For: GDS-2000 Series, GRS-6032A/6052A,
LCR-800 Series,
PSM-2010/3004/6003,GOM-802,
GDM-8261A, GDM-8255A,
GDM-8351, GPT-9900/9800 Series

GTL-204A (European Terminal)

Approx. 1000mm , MAX. Current 10A
For: GPC-Series, GPS-Series,
PPE-Series, PPS-Series,
PPT-Series, PSM-Series,
PSP-Series,PST-Series,

GTL-232A RS-232C Cable

Approx. 2000mm
For: PSP-603/405/2010

GTL-240 USB Cable

Approx. 1200mm
USB 2.0 Type A-Type B Cable , 4P,
Type B as " L " Format
For: PSW-Series

GTL-246 USB Cable

Approx. 1200mm
USB 2.0 Type A-Type B Cable, 4P
For: GDS-3000/2000 Series,
GDS-1000A-U/1000-U Series,
GLA-1000 Series, AFG-3000/2000 Series,
GPD-2303S/3303S/4303S/3303D,
GLC-9000, PPH-Series, GDM-8342/8341,
GDM-8351, GSP-930, GSP-730,
GRF-1300/1300A

GTL-247 USB Cable

Approx. 1800mm , A-A type cable
For: GDM-8261A, GDM-8255A,
GPT-9900/9800 Series

Accessories

GTL-248 GPIB Cable (2.0m)

Approx. 2000mm
For: GDS-2000 Series, GSP-830,
AFG-3000 Series, PPH-Series,
PS-3635, PPT-1830, PST-3201/3202,
PPS-2005/3203, PSM-Series,
PSH-A Series, PEL-2000 Series,
GDM-8261A, GOM-802,
LCR-8000G Series,
GPT-9900/9800 Series
GDM-8342

GTL-250 GPIB Cable

Approx. 600mm
For: GDS-2000 Series, GSP-830,
AFG-3000 Series, PPS-3635,
PPT-1830, PST-3201/3202,
PPS-2005/3203, PSM-Series,
PSH-A Series, PEL-2000 Series,
GDM-8261A, GOM-802,
LCR-8000G Series,
GPT-9900/9800 Series
GDM-8342

GTL-251 GPIB-USB-HS (High Speed)

For: GDS-Series, GSP-830, AFG-3000 Series, PPH-Series, PPS-3635, PPT-1830,
PST-3201/3202, PPS-2005/3203, PSM-Series, PSH-A Series, PEL-2000 Series, GDM-8261A,
GOM-802, LCR-8000G Series,
GPT-9900/9800 Series, GDM-8342

GTL-253 Mini USB Cable

Approx. 1300mm
USB Cable 2.0 A-B(mini)
For : GDS-300/200 Series, USG-Series,
GSP-830, LCR-916/915

GHT-205 High Voltage Test Probe

Approx. 1000mm
For: GPT-9900/9800/9600 Series

GHT-113 High Voltage Test Pistol

Approx. 2000mm
For : GPT-9900/9800/9600 Series

GTL-108A 4W Type Test Lead

Approx. 1.1m
For: GOM-801H/802, GDM-8261A ,
GDM-8255A, GDM-8351

GTL-107A Test Lead

Approx. 1.1m
For: GDM-8034, GDM-8135

GHT-114 Clip High Voltage Probe

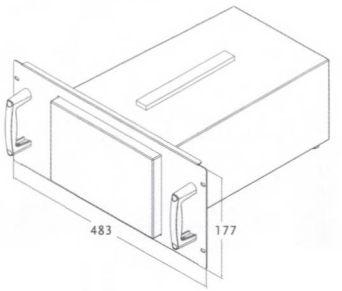
Approx. 1m
For: GPT-9900/9800/9600 Series

Accessories

GRA-401 Rack Adapter Kit

Rack Mounting (19", 4U) , For: PPE/PPS/PPT/PEL/GPC/GPR-M Series

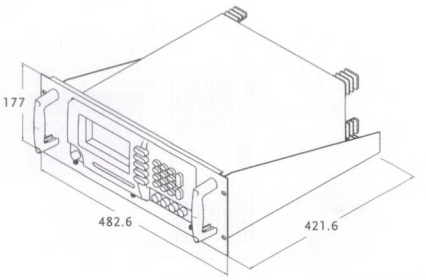
GRA-401 Rack Dimension (mm)



GRA-402 Rack Adapter Kit

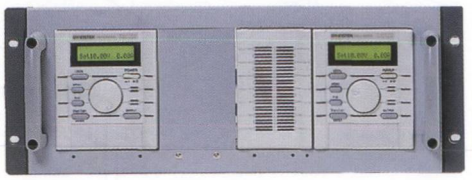
Rack Mounting (19", 4U) , For : LCR-800 Series

GRA-402 Rack Dimension (mm)

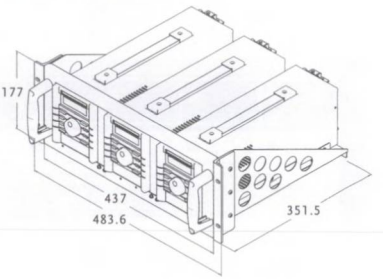


GRA-403 Rack Adapter Kit

Rack Mounting (19", 4U) , For : PSH-Series

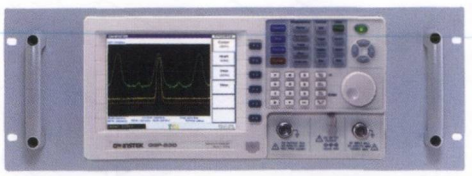


GRA-403 Rack Dimension (mm)

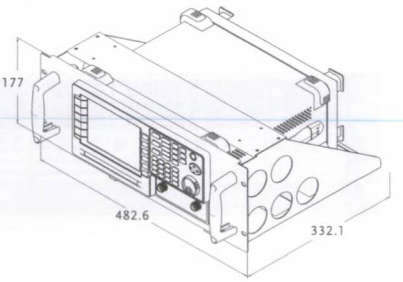


GRA-404 Rack Adapter Kit

Rack Mounting (19", 4U) , For : GSP-830, LCR-8000G



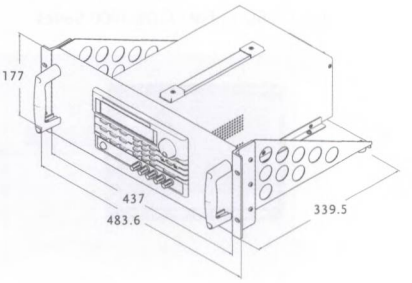
GRA-404 Rack Dimension (mm)



GRA-407 Rack Adapter Kit

Rack Mounting (19", 4U) , For : PSM-Series, PST-Series

GRA-407 Rack Dimension (mm)

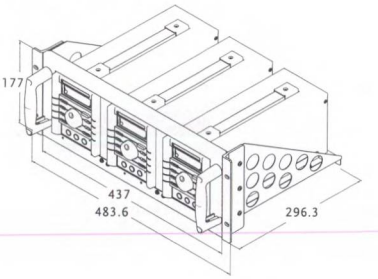


Accessories

GRA-408 Rack Adapter Kit

Rack Mounting (19", 4U) , For : PSS-Series

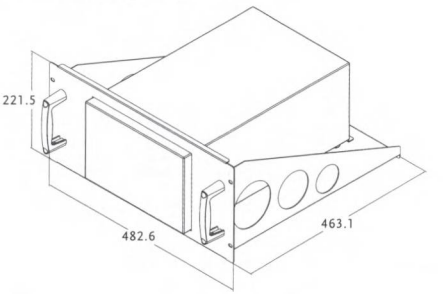
GRA-408 Rack Dimension (mm)



GRA-409 Rack Adapter Kit

For : APS-1102A

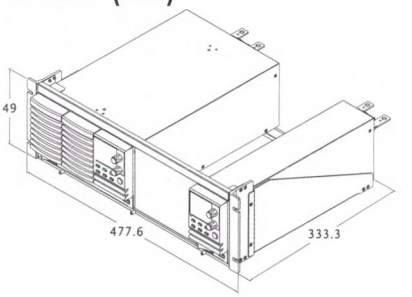
GRA-409 Rack Dimension (mm)



GRA-410-J Rack Mount Kit (JIS)

For : PSW-Series

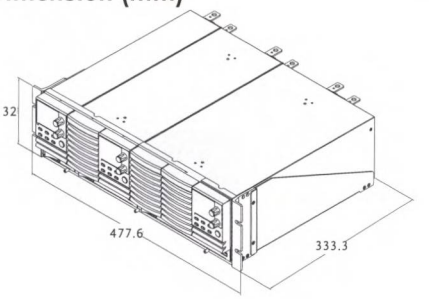
GRA-410-J Rack Dimension (mm)



GRA-410-E Rack Mount Kit (EIA)

For : PSW-Series

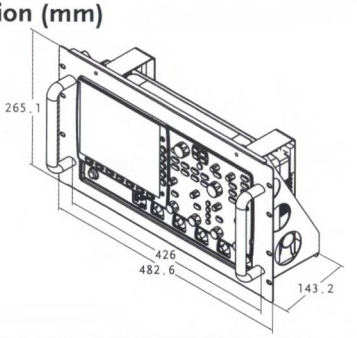
GRA-410-E Rack Dimension (mm)



GRA-411 Rack Adapter Kit

Rack Mounting (19" , 6U) , For : GDS-3000 Series

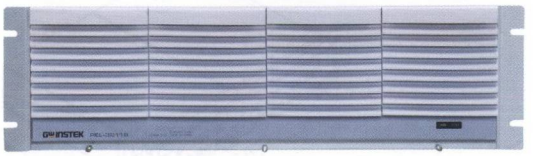
GRA-411 Rack Dimension (mm)



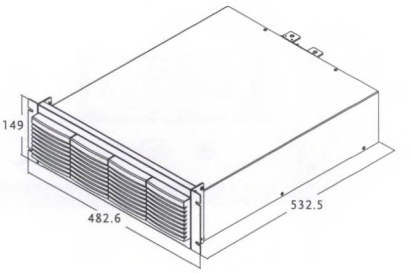
Accessories

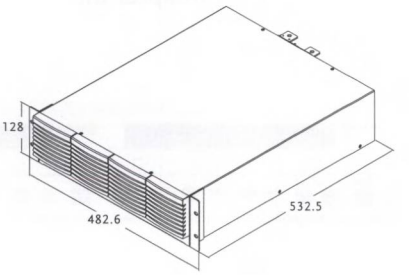
GRA-413 JIS+EIA Rack Mount Kit

For : PEL-3211



GRA-413 JIS+EIA Rack Dimension (mm)

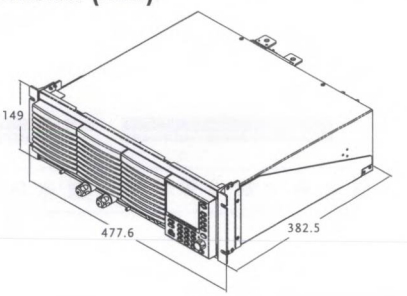




GRA-414-J Rack Mount Kit (JIS)

For : PEL-3021/3041/3111

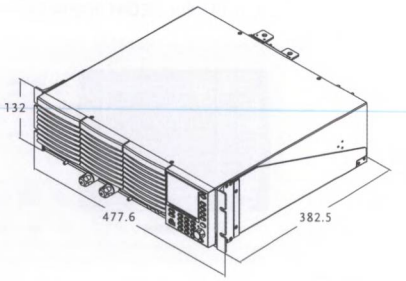
GRA-414-J Rack Dimension (mm)



GRA-414-E Rack Mount Kit (EIA)

For : PEL-3021/3041/3111

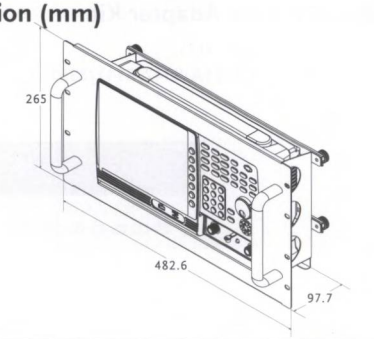
GRA-414-E Rack Dimension (mm)



GRA-415 Rack Adapter Kit

Rack Mounting (19" , 6U) , For : GSP-9300

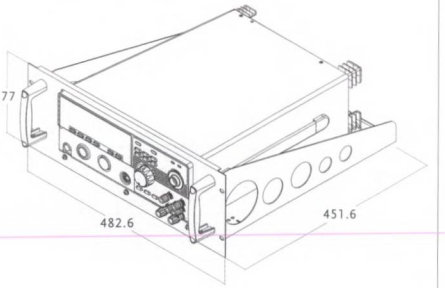
GRA-415 Rack Dimension (mm)



GRA-417 Rack Adapter Kit

Rack Mounting (19", 4U)
For : GPT-9900/9800/9600 Series

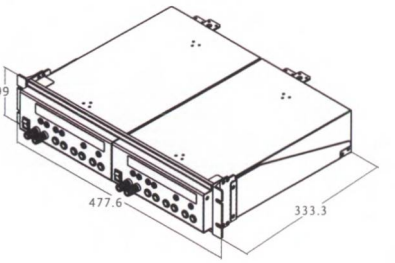
GRA-417 Rack Dimension (mm)



GRA-419 JIS Rack Adapter Kit

For : PCS-1000

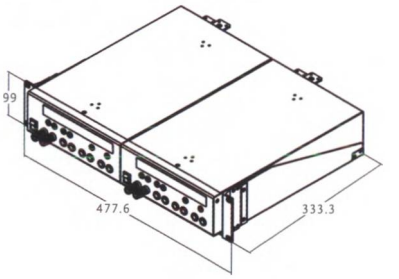
GRA-419 JIS Rack Dimension (mm)



GRA-419 EIA Rack Adapter Kit

For : PCS-1000

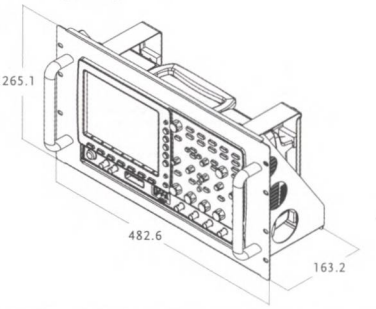
GRA-419 EIA Rack Dimension (mm)



GRA-420 Rack Adapter Kit

Rack Mounting (19" , 6U) , For : GDM-2000A Series

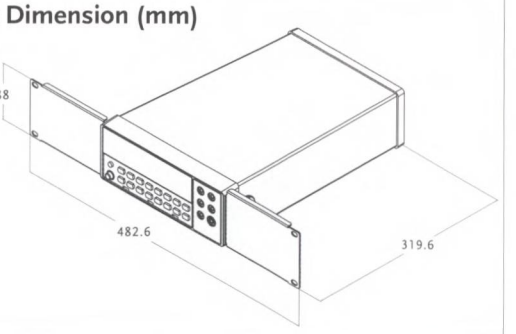
GRA-420 Rack Dimension (mm)



GRA-422 Rack Adapter Kit

Rack Mounting (19" , 2U),
For : GDM-8261A/8255A/8342/8341/8351

GRA-422 Rack Dimension (mm)

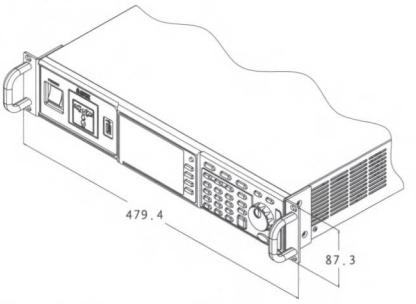


Accessories

GRA-423 Rack Adapter Kit

Rack Mounting (19" , 2U),
For : APS-7000 Series

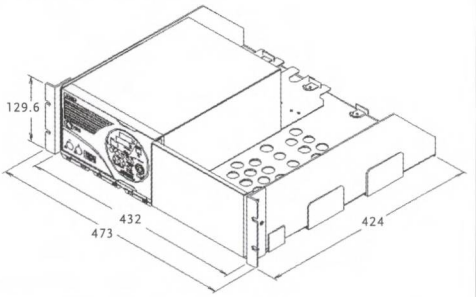
GRA-423 Rack Dimension (mm)



GRA-424 Rack Adapter Kit

Rack Mounting (19" , 2U),
For : PSB-2000 Series

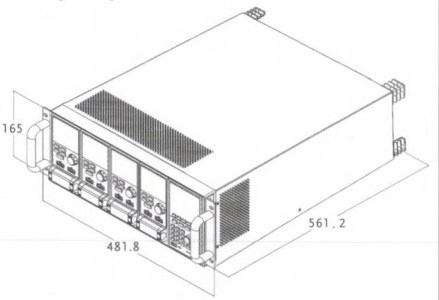
GRA-424 Rack Dimension (mm)



PEL-002 Rack Mount Kit

For: PEL-2000 Series

PEL-002 Rack Dimension (mm)



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